

F-Drive Series R12

Installation Manual

Part Number: 7148M2100 Rev: G

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Introduction

Congratulations on your purchase of the ETC F-Drive Series R12. The F-Drive Series R12 LED power control solution provides a modular, centralized approach for controlling LED luminaires. The R12 is a card cage enclosure that can hold up to 12 low-voltage output cards, providing power and data to multiple circuits per card. By maintaining remote, easy access to the output cards and power supplies, LED-based systems can be easily installed and serviced, while ensuring critical components are readily accessible to support staff.

Document Conventions

This document uses the following conventions to draw your attention to important information.



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



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



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



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

All ETC documents are available for free download from our website: etcconnect.com.

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

Help from ETC Technical Services

If you are having difficulties and your problem is not addressed by this document, try the ETC support website at support.etconnect.com or the main ETC website at etconnect.com. If none of these resources are sufficient, contact ETC Technical Services directly at one of the offices identified below. Emergency service is available from all ETC offices outside of normal business hours.

When calling for help, take these steps first:

- Prepare a detailed description of the problem
- Go near the equipment for troubleshooting
- Find your notification number if you have called in previously

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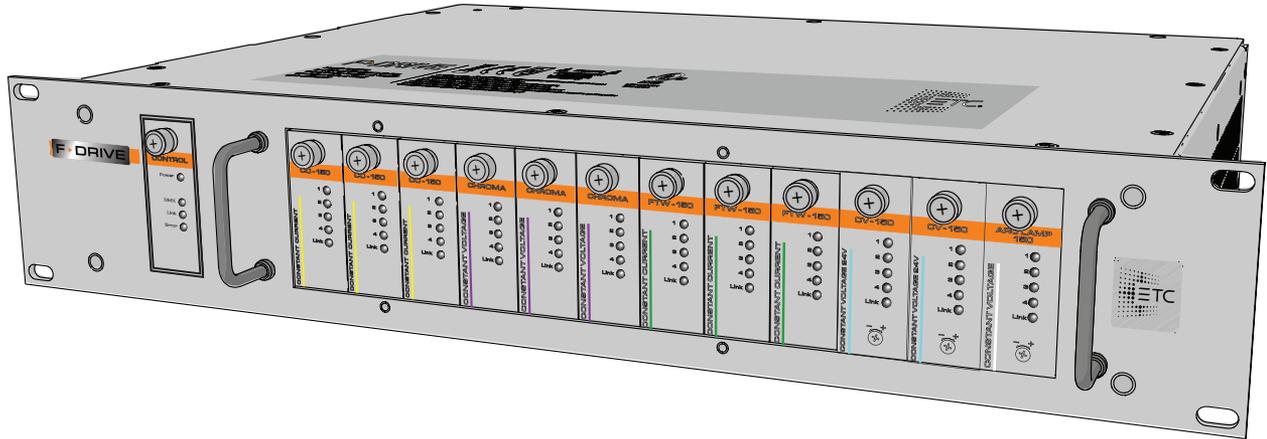
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Chapter 1

Overview



F-Drive R12 Driver

System Components

An F-Drive R12 system consists of the following:

- One or more F-Drive R12 drivers.
- One or more F-Drive Power Supplies or other 48 VDC external power supplies. See [Power Supplies on page 7](#).
- Up to 12 output cards for each R12. See [Output Cards below](#).
- Compatible luminaires or third-party fixtures. See [Luminaires on page 7](#).

Accessories

- F-Drive B-Box breakout boxes (optional). See [Optional Accessories on page 7](#).
- F-Drive bussing kit: required for use with optional MEAN WELL RKP-1U three-bay frames. See [Bussing Kits on page 46](#). The F-Drive Power Supply does not require a bussing kit.

F-Drive System Design Tool

Visit the [F-Drive System Design Tool \(etconnect.com/FDriveSysDesignTool\)](http://etconnect.com/FDriveSysDesignTool) to design an F-Drive R12 system with different luminaires, breakout boxes, cable lengths, and other system components.

Output Cards

R12 output cards are available for a variety of low-voltage load types. Output cards are sold separately.



CAUTION: *Do not coil excess Category-type cable.*



Note: F-Drive R12 supports output cards and luminaires up to 1500 W total. To prevent configurations that may exceed system limits, visit the [F-Drive System Design Tool \(etcconnect.com/FDriveSysDesignTool\)](http://etcconnect.com/FDriveSysDesignTool) for more information about system limits.

CC-150 Card

The CC-150 Card is designed for use with F-Drive-compatible Fixed White luminaires and 200–700 mA constant current fixtures by other manufacturers. See [Compatible Products on page 7](#).

F-Drive Series R12 CC-150 Card supports a wide variety of third-party loads. Determining compatibility between these loads and the CC-150 Card is an important step toward ensuring the success of a project. Search the [LED Dimming Compatibility Database](http://etcconnect.com/compatibility) at etcconnect.com/compatibility to see if your load is compatible. If your load is not in the compatibility database, follow the instructions at the link above to contact the ETC Applications Engineering department to arrange for compatibility testing.

	Output	Adjustable 200–700 mA constant current per channel, 2.8 A total per card (see Configure the CC-150 Card on page 28) 48 VDC
	Output Channels	Four channels on a single RJ45 or eight-pin terminal block
	Loads	<ul style="list-style-type: none"> Up to four F-Drive-compatible Fixed White luminaires per card. See Compatible Products on page 7. 200–700 mA constant current fixtures manufactured by others.
	Maximum Load	33 W per two-pin channel, 134 W total per card
	Model Number	FDROCCC150
	Part Number	7148K1011
	Label Stripe Color	Yellow to match Navis 100 Fixed White luminaire face and cap labeling



Note: The CC-150 Card does not support ArcSystem Pro One-Cell High Output luminaires.



CAUTION: Setting the F-Drive CC-150 Card to output more current than the manufacturer recommends for the loads may reduce the lifetime or cause damage to the loads. See [Configure the CC-150 Card on page 28](#).



CAUTION: Do not exceed any Class 2 limits stated by the manufacturer of the third-party load.



Note: Use ONE type of output connector for each card. For example, use the RJ45 receptacle OR the eight-pin terminal block on the slot where a FTW-150 Card or a CC-150 Card is installed.

FTW-150 Card

The FTW-150 Card is designed for use with Navis 100 Fade to Warm luminaires.

	Output	Constant current, maximum 450 mA per channel, 1.8 A total per card 48 VDC
	Output Channels	Four channels on a single RJ45 or eight-pin terminal block
	Loads	Up to four Navis 100 Fade to Warm luminaires per card
	Maximum Load	21.6 W per channel, 86 W per card
	Model Number	FDROCFTW150
	Part Number	7148K1010
	Label Stripe Color	Green to match Navis 100 Fade to Warm luminaire face and cap labeling



Note: Use *ONE* type of output connector for each card. For example, use the RJ45 receptacle *OR* the eight-pin terminal block on the slot where a FTW-150 Card or a CC-150 Card is installed.

Chroma Card

The Chroma Card is designed for use with Navis 100 RGBW luminaires.

	Output	48 VDC power and data
	Output Channels	Four channels on a single RJ45*
	Loads	Up to four Navis 100 RGBW luminaires per card
	Maximum Load	2.1 A, 100 W per card
	Model Number	FDROCCHC100
	Part Number	7148K1014
	Label Stripe Color	Purple to match Navis 100 RGBW luminaire face and cap labeling
	*An eight-pin terminal block is present, but disabled.	

CV-150 Card

The CV-150 Card supports a wide variety of third-party loads. Determining compatibility between these loads and the CV-150 Card is an important step toward ensuring the success of a project. Search the [LED Dimming Compatibility Database](https://etcconnect.com/compatibility) at etcconnect.com/compatibility to see if your load is compatible. If your load is not in the compatibility database, follow the instructions at the link above to contact the ETC Applications Engineering department to arrange for compatibility testing.

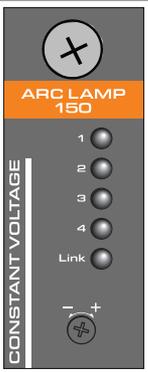
	Output	Adjustable 24–28 VDC constant voltage 2.1 A per channel, 6.25 A total per card
	Output Channels	Four channels on an eight-pin terminal block*
	Loads	24 VDC fixtures manufactured by others
	Maximum Load	50 W per channel, 150 W per card
	Model Number	FDROCCV150
	Part Number	7148K1013
	Label Stripe Color	Blue
	*An RJ45 receptacle is present, but disabled.	



CAUTION: Do not exceed any Class 2 limits stated by the manufacturer of the third-party load.

ArcLamp 150 Card

The ArcLamp 150 Card is designed for use with ETC ArcLamp retrofit screw-in LED lamps. Voltage drop is an important consideration for ArcLamp installations. See [Voltage Drop on page 10](#). For information on the installation of ArcLamps, see the *ArcLamp System Installation Manual* at etcconnect.com/ArcLamp.

	Output	Adjustable 24–28 VDC power and data
	Output Connectors	Four channels on an eight-pin terminal block [†]
	Loads	Up to eight ArcLamps per channel and a maximum of thirty-two ArcLamps per card
	Maximum Load	50 W per channel, 150 W per card
	Model Number	FDROCAC150
	Part Number	7148K1012
	Label Stripe Color	White
	[†] An RJ45 receptacle is present, but disabled.	



Note: Do not bridge outputs on R12 ArcLamp output cards. If your installation requires more than eight ArcLamps per circuit, consider a standalone ArcLamp wall-mount or rack-mount driver. See etcconnect.com/ArcLamp.

Compatible Products

Luminaires

R12 output cards are compatible with the following ETC luminaires:

- Navis 100 Fixed White, Fade to Warm, and RGBW luminaires
- Source Four Mini LED for F-Drive Fixed White luminaires
- Irideon FPZ and Irideon WLZ for F-Drive Fixed White luminaires
- ArcSystem Pro One-Cell Standard*, Pro One-Cell Small*, and Pro One-Cell Micro* Fixed White or Fade to Warm luminaires
- ArcSystem ArcLamp lamps

R12 output cards are also compatible with third-party constant current and constant voltage luminaires. For more information on compatible products, see [LED Dimming Compatibility Database below](#) and [Documentation for Compatible Products on the next page](#).



Note: *The most convenient way to connect ArcSystem Pro One-Cell Fixed White luminaires to a CC-150 Card is with an FD-BBOX-4M. See [ArcSystem Pro One-Cell Luminaires on page 20](#).

Power Supplies

- F-Drive Power Supply: The F-Drive Power Supply houses a single power supply to power a single F-Drive R12 driver.
- MEAN WELL RKP-1U three-bay frame and RCP-2000 modules: Each three-bay frame houses up to three power supply modules to power up to three F-Drive R12 drivers.

Optional Accessories

- B-Boxes (optional):
 - FD-BBOX-4R can connect F-Drive-compatible luminaires with RJ45 input in star topology.
 - FD-BBOX-4M provides a convenient way to connect ArcSystem Pro One-Cell luminaires.
 - FD-BBOX-4T can be used with third-party loads.
- F-Drive bussing kit (optional): required for use with optional MEAN WELL RKP-1U three-bay frames. See [Bussing Kits on page 46](#). The F-Drive Power Supply does not require a bussing kit.

ETC Concert

F-Drive Series drivers can be configured using ETC Concert software.

LED Dimming Compatibility Database

The [LED Dimming Compatibility Database \(etconnect.com/compatibility\)](#) is a searchable list of devices that ETC has tested for compatibility with ETC dimming and control systems.

Documentation for Compatible Products

The following documents are available at etcconnect.com/Products/Power-Controls/LED-Drivers/F-Drive/Documentation.aspx:

- *F-Drive B-Box4 Installation Guide*
- *F-Drive Series W1 Installation Manual*
- *F-Drive R12 and W1 Wiring Reference Guide*
- *F-Drive Power Supply Installation Guide*

The following documents are available at etcconnect.com/Products/Architectural-Fixtures/:

- *ArcSystem Navis 100 Installation Guide*
- *Source Four Mini LED F-Drive Installation Guide*
- *Irideon WLZ (F-Drive) Installation Guide*
- *Irideon FPZ (F-Drive) Installation Guide*
- *ArcSystem Pro D1 and D2 Series Drivers Installation Guide* for information about ArcSystem Pro One-Cell luminaires
- *ArcLamp System Installation Manual*

ETC Concert software and documentation is available at etcconnect.com/concert.

For current technical information about the MEAN WELL RKP-1UI three-bay frame and RCP-2000 48 VDC power supplies, visit meanwell.com. The *RCP-2000/RKP-1UI Instruction Manual* is available at etclink.it/mayQfb7p.

Chapter 2

Before You Begin Installation

Review the following information before installing the F-Drive R12.

Safety

The F-Drive Series R12 is intended for professional use only. **Read the entire manual before using this equipment.**

IMPORTANT SAFEGUARDS

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

READ AND FOLLOW ALL SAFETY INSTRUCTIONS.

- Do not use outdoors.
- Do not let power supply cords touch hot surfaces.
- Do not mount near gas or electric heaters.
- Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.
- The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
- Do not use this equipment for other than intended use.
- To reduce the risk of fire and overheating, make sure all connections are tight.
- Turn off electrical power before modifying the lighting system in any way.

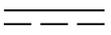
SAVE THESE INSTRUCTIONS



Note: *Cable bundling limitations apply to F-Drive R12 Class 2 output cables. For more information about maximum number of four-pair cables in a bundle, see NFPA 70 2020 National Electrical Code, table 725.144.*

Label Symbols

R12 Drivers are conveniently labeled with relevant symbols for your safety. Refer to the product label to see which symbols apply to your product.

	General warning	Avertissement général
	This product should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.	Ce produit ne doit pas être jeté avec les déchets ménagers mais doit être déposé dans une collecte de déchets électroniques ou dans un point de collecte.
	The product input or output is suitable for direct current only.	L'entrée et la sortie de ce produit convient uniquement au courant continu.
	Safety extra low voltage device	Dispositif de sécurité à très basse tension
	Protective earth (ground)	Protection Classe I Mise à la terre

Installation Requirements

- Ambient operating temperature 0°C–40°C (32°F–104°F), 20%–90% non-condensing humidity.
- Dry locations only.
- The R12 requires a 19-inch equipment rack that must support the weight of the R12 plus up to twelve output cards and any power supplies and accessories.
- The R12 is a 48 VDC input product that requires an external power supply for operation.

Voltage Drop

Voltage drop along load wiring is a consideration for constant voltage loads. Voltage drop calculations vary by project and are based on the type, length, and gauge of wire. The CV-150 Card and the ArcLamp 150 Card have an adjustable dial on the front of the output card to set the 24–28 VDC (+/-5%) output. Measure the voltage at the load and adjust the dial to achieve 24 VDC at the load. Contact a qualified electrician and refer to the following resources for more information:

- The [F-Drive System Design Tool](https://etcconnect.com/FDriveSysDesignTool) at etcconnect.com/FDriveSysDesignTool
- [Configure the CV-150 Card and ArcLamp 150 Card on page 28](#)
- [F-Drive R12 Wire and Terminal Specifications on page 13](#) for recommended wire gauges

Power Disconnect Device

Before installation, make sure you have an accessible input power disconnect device installed ahead of your F-Drive R12.



WARNING: RISK OF DEATH BY ELECTRIC SHOCK! Failure to disconnect all power to the system before installation, maintenance, cleaning, or any other system modification could result in serious injury or death.

AVERTISSEMENT : RISQUE DE MORT PAR DÉCHARGE ÉLECTRIQUE! Négliger de débrancher toutes les sources d'alimentation du système avant l'installation, l'entretien, le nettoyage ou toute autre modification du système peut causer des blessures graves ou la mort.

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



WARNING: RISK OF ELECTRIC SHOCK! Circuits that are installed without an accessible power disconnect device cannot be serviced or operated safely.

AVERTISSEMENT : RISQUE DE DÉCHARGE ÉLECTRIQUE! Il est imprudent d'utiliser ou de réparer les circuits installés sans qu'un dispositif de déconnexion de l'alimentation ne soit accessible.

Clearance Requirements



CAUTION: *To reduce risk of fire, do not install closer than 3 inches to cabinet wall.*

ATTENTION : *Pour réduire les risques d'incendie, n'installez pas plus de 3 pouces au mur de l'armoire.*

Refer to the *F-Drive Power Supply Installation Guide* or [Install MEAN WELL 48 VDC Power Supplies on page 40](#) for power supply clearance considerations.

Chapter 3

Prepare to Install the R12

Inspect the Shipment

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

1. Check the shipping container for physical damage.
 - If you find damage, document it to help with a claim against the shipper.
2. Inspect the order for completeness.
 - Check the box contents received against the packing list to ensure that your order is complete.
 - If you discover a problem with the contents of the shipment, contact ETC. See [Help from ETC Technical Services on page 2](#).

ETC Part Number or Model	Description	Notes
FDR12FD	R12	R12 ships with the control card (ETC part number 7148K1000) installed and with blanks covering the slots for the output cards.
7148B7002	2.4 m (8 ft) red-and-black DC wiring harness	See Connect the DC Power Input on page 15 .
7148B7003	61 cm (2 ft) green ground/earth harness	See Connect Ground/Earth on page 15 .
HWM1656	M5 k-lock nut	See Connect Ground/Earth on page 15 .
7148K1015	three-pin panic termination kit	See Wire the Panic Connector on page 24 .
7148K1016	12-piece eight-pin output channel termination kit	
4100A1023	DMX 3-position termination kit	Follow the DMX termination kit instructions provided with the product to terminate the control wiring.



Note: All output cards and accessories are packaged separately.

Parts and Tools

The following supplies are required, but not provided:

- #2 Phillips screwdriver
- Precision flatblade screwdriver
- Precision wire stripper with self-adjusting blades or wire stripper that includes a fixed opening for 23–24 AWG
- Wire cutter
- Wire ties

F-Drive R12 Wire and Terminal Specifications

Terminal/Connector		Wire Range/Specifications	Strip Length	Torque
Power Input		Use provided DC power harness: 2.4 m (8 ft) of 8 AWG.	11 mm (7/16 in)	None
Ground/Earth		Use provided ground/earth harness: 61 cm (2 ft) of 8 AWG.	None	None
DMX In/Thru three-pin connectors		Belden 9729 or equivalent or Cat5e (or better) 0.2 mm ² (24 AWG) or larger conductors terminated to T568B standard.	See wiring instructions included with the termination kit.	
Panic three-pin connector		0.05–2.5 mm ² (30–12 AWG) Follow class 2 wiring methods.	6 mm (1/4 in)	None
RJ45 connectors (A–L)	Chroma Card power/data FTW-150 Card power CC-150 Card power	You must use 0.25 mm ² (23 AWG) or larger conductors in Category-type cable. Terminate to T568B standard.		
Eight-pin connectors (A1–A4 through L1–L4)	FTW-150 Card power CC-150 Card power two pins per output channel	0.2–1.5 mm ² (26–14 AWG) Follow Class 2 wiring methods.	6 mm (1/4 in)	0.4–0.5 Nm (3.5–4.4 in-lb)
	CV-150 Card power ArcLamp 150 Card power two pins per output channel	1.5 mm ² (14 AWG) Follow Class 2 wiring methods.	6 mm (1/4 in)	0.4–0.5 Nm (3.5–4.4 in-lb)



CAUTION: *Do not coil excess Category-type cable.*



Note: *Use ONE type of output connector for each card. For example, use the RJ45 receptacle OR the eight-pin terminal block on the slot where a FTW-150 Card or a CC-150 Card is installed.*

Rack-Mount Safety

The F-Drive R12 and F-Drive Power Supply or MEAN WELL three-bay frame install into a standard 19-inch rack enclosure.

- **Elevated Operating Ambient Temperature:** If the R12 is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may elevate above the room ambient temperature. Do not operate the device in an enclosed environment above 40°C (104°F).
- **Reduced Air Flow:** When installing the R12 in an equipment rack, the rack must be vented and have adequate airflow to maintain an operating temperature below 40°C (104°F).
- **Mechanical Loading:** The R12 must be installed in a rack in a horizontal flat orientation to ensure even mechanical loading in the rack, avoiding hazardous or dangerous loading conditions.
- **Circuit Overloading:** When installing the R12 in an equipment rack, consider the connection of the equipment to the rack or power source to avoid overloading the rack circuit or supply wiring. Consider the rack or power distribution in the equipment rack during installation.
- **Reliable Grounding:** Maintain reliable grounding of the rack-mounted equipment. Give particular attention to any supply connections other than direct connections to the branch circuit (for example, the use of power strips).

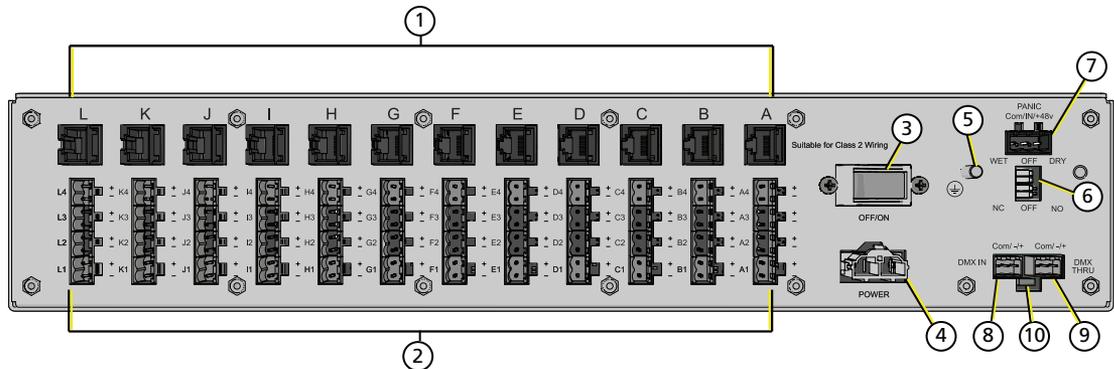
Install a Power Supply

Each F-Drive Series R12 requires a 48 VDC power supply. ETC offers two options:

- The F-Drive Power Supply: Houses a single power supply to power a single F-Drive R12 driver. See the *F-Drive Power Supply Installation Guide* at etconnect.com/Products/Power-Controls/LED-Drivers/F-Drive/Documentation.aspx.
- The MEAN WELL RKP-1UI three-bay frame and RCP-2000 power supply modules: Each three-bay frame houses up to three power supply modules to power up to three F-Drive R12 drivers. Three-bay frames can be bussed together. See *Install MEAN WELL 48 VDC Power Supplies on page 40*.

Chapter 4

Install the R12



1	RJ45 power and data outputs, one per output card (A–L)
2	Eight-pin terminal power outputs, one per output card (A1–A4 through L1–L4)
3	Breaker
4	Power input from external 48 VDC supply
5	Ground/earth stud
6	Panic switches (see Panic Connector on page 23)
7	Three-pin Panic connector (see Panic Connector on page 23)
8	DMX In
9	DMX THRU
10	DMX termination switch

Rack-Mount the R12

Secure the R12 into the 19-inch rack. See [Rack-Mount Safety on page 14](#).

Connect Ground/Earth

The R12 has a ground/earth stud (item 5 in the illustration above). ETC provides a 0.6 m (2 ft) harness of 8 AWG insulated wire with a ring terminal on one end and a bare end on the other and an M5 k-lock nut with the R12 for connection to ground/earth. Follow all local and national codes.

Connect the DC Power Input

Connect the R12 power input plug from the DC power harness to the R12 power input receptacle (item 4 in the illustration above) and terminate the bare ends of the harness to the plug that you received with your F-Drive Power Supply. See the *F-Drive Power Supply Installation Manual*.

If you are using a MEAN WELL RKP-1U three-bay frame, see [Wire the DC Power Output on page 43](#) to install bussing kits with DC power harnesses on the MEAN WELL three-bay frame.

Terminate DMX In and Thru

DMX is installed in a daisy-chain topology and includes one pair of wires (Data + and Data -) plus an ISO ground (common).

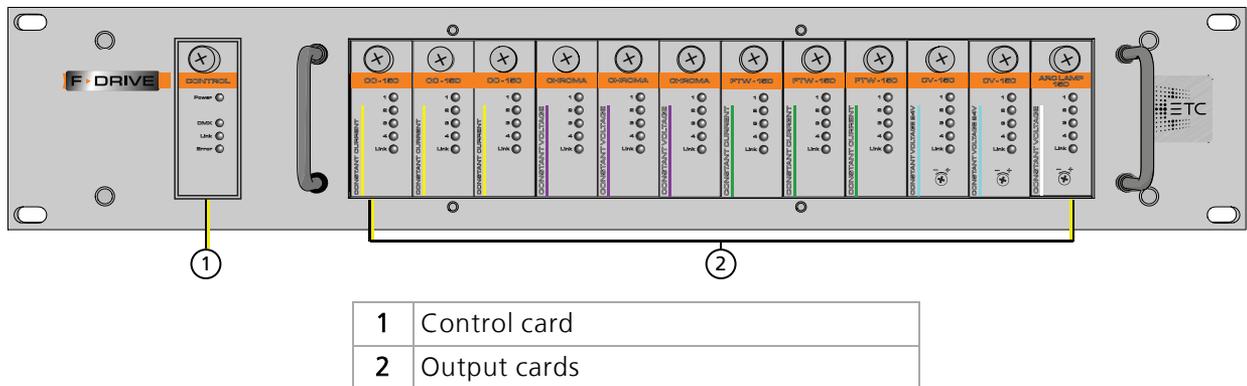
1. Follow the DMX termination kit instructions provided with the product to terminate the control wiring.
2. Insert the prepared connector into the "DMX IN" receptacle on the back of the R12.
3. Optionally, terminate DMX thru to the next device in the DMX data run. Up to 32 DMX/RDM devices can be daisy-chained together per data run.
 - a. Prepare a cable according to the instructions provided with the included termination kit (see Step 1).
 - b. Insert the connector with wires terminated into the "DMX THRU" receptacle on the back of the R12.
4. Terminate DMX/RDM data signal for the last DMX/RDM device in the data run by setting the termination switch near the DMX receptacle to "ON". All other devices in the data run maintain the factory default termination switch setting: "OFF".

Panic

For information on wiring the Panic input and configuring the Panic switches, see [Panic Connector on page 23](#).

Chapter 5

Install R12 Output Cards



WARNING: RISK OF ELECTRIC SHOCK! Working inside the F-Drive with power applied exposes you to the possibility of dangerous currents and voltages.

AVERTISSEMENT : RISQUE DE CHOC ÉLECTRIQUE! Travailler à l'intérieur du F-Drive lorsqu'il est alimenté vous expose à la possibilité de courants et de tensions dangereux.



CAUTION: Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

ATTENTION : Des tensions dangereuses sont présentes. Pour réduire le risque de choc électrique et de danger pour la santé personnelle, suivez les instructions.



CAUTION: Static electricity can damage F-Drive components like control cards and output cards. To avoid damage, keep all static-sensitive devices in their static-protective bags until you are ready to install them. Use anti-static safety precautions during installation.



CAUTION: When installing cards, make sure to insert the card in the card guides in the slot. Do not force a card into a slot. Misalignment of cards may cause damage to the card or the backplane board inside the F-Drive.

F-Drive R12 output cards and the control card can be installed and replaced while the R12 is powered on.

1. Using a Phillips screwdriver, remove the screw securing the plate that covers the output card slot.
 - Leave plates in place over empty output card slots until you are ready to install an output card.
 - Save any plates and screws that you remove and install them over empty card slots as needed.
2. Align the output card with the card guides inside the R12.
3. Gently slide the card into the slot until its card edge connector is seated on the backplane.
4. Tighten the thumbscrew on the front of the output card to secure it in place.

Mismatched Cards



CAUTION: *When replacing cards with the power on, make sure to install the same type of card as the card that you removed.*

If you change an output card in an R12 slot to a different type (mismatch), it may result in poor performance until you reboot the R12. At reboot, the control card will recognize the new card and restore the default settings for the new card type. Use Concert to update the configuration with your preferred settings.



Note: *Do not install a control card in an output card slot. Do not install an output card in the control card slot.*

Connect Luminaires to the Output Cards

F-Drive R12 output cards have two output wiring options: an RJ45 receptacle or an eight-pin terminal block.

- Chroma Cards provide RJ45 output. The eight-pin terminal block is disabled.
- FTW-150 Cards and CC-150 Cards provide either RJ45 output or output from the eight-pin terminal block.
- CV-150 Cards and ArcLamp 150 Cards provide output from the eight-pin terminal block. The RJ45 connector is disabled.

Visit the [F-Drive System Design Tool](https://etconnect.com/FDriveSysDesignTool) at etconnect.com/FDriveSysDesignTool and see the *F-Drive R12 and W1 Wiring Reference Guide* at etconnect.com/Products/Power-Controls/LED-Drivers/F-Drive/Documentation.aspx for wiring examples, considerations, and recommendations.



CAUTION: *Do not coil excess Category-type cable.*



Note: *Cable bundling limitations apply to F-Drive R12 Class 2 output cables. For more information about maximum number of four-pair cables in a bundle, see NFPA 70 2020 National Electrical Code, table 725.144.*



Note: Use ONE output connector on each card. For example, use the RJ45 receptacle OR the eight-pin terminal block for a FTW-150 Card or a CC-150 Card.



Note: If you are installing Navis luminaires, you must use 0.25 mm² (23 AWG) or larger conductors in Category-type cable.

F-Drive-Compatible Luminaires with RJ45 Input

F-Drive-compatible luminaires with RJ45 input include:

- Navis 100
- Irideon FPZ for F-Drive
- Irideon WLZ for F-Drive
- Source Four Mini LED for F-Drive

To connect ArcSystem Pro One-Cell luminaires (which have Molex connectors), see [ArcSystem Pro One-Cell Luminaires on the next page](#).

See the luminaire installation guides for luminaire installation instructions and compatibility with F-Drive R12 output cards. Refer to [Compatible Products on page 7](#). ETC documents are available for download in PDF format free of charge at etcconnect.com.

Connection options include:

- [Connect F-Drive-Compatible Luminaires in a Daisy Chain on the next page](#).
- [Connect F-Drive-Compatible Fixed White or Fade to Warm Luminaires in Star Topology with B-Box4R on the next page](#).

Alternatively, F-Drive-compatible Fixed White and Fade to Warm luminaires can be connected to the eight-pin terminal block outputs of the CC-150 Card. See [Connect F-Drive-Compatible Luminaires with RJ45 Input to the Terminal Block Output on page 37](#)



CAUTION: Possible damage to equipment. Connect only Fixed White luminaires to a CC-150 Card. Connect only Fade to Warm luminaires to a FTW-150 Card. Connect only Navis 100 RGBW luminaires to a Chroma Card.



CAUTION: Possible damage to equipment. Connect only the same types of luminaires in a wiring run. DO NOT mix Fixed White, Fade to Warm, and RGBW luminaires in the same wiring run.



CAUTION: Possible damage to equipment. You must configure the output channel of the CC-150 card to the appropriate output for your luminaire before applying power to the luminaire. See [Configure the CC-150 Card on page 28](#).



Note: Each Chroma Card ships with an RJ45 DMX terminator. Navis RGBW luminaires are not self-terminating. You must terminate the last Navis RGBW luminaire in line with a 120Ω resistor.

To purchase extra RJ45 terminators, please contact your ETC customer service representative and request part number N4086.



Note: *Navis 100, Irideon FPZ for F-Drive, Irideon WLZ for F-Drive, and Source Four Mini LED for F-Drive luminaires can be live-plugged into R12 output cards while the R12 and output cards are powered.*

Connect F-Drive-Compatible Luminaires in a Daisy Chain

Up to four F-Drive-compatible luminaires with RJ45 input can be daisy-chained along one run of cable from the RJ45 output of an output card. The cable distance of the wiring run must not exceed 100 m (328 ft). Refer to the luminaire installation guides for full details.

Connect F-Drive-Compatible Fixed White or Fade to Warm Luminaires in Star Topology with B-Box4R



Note: *Navis RGBW luminaires are not compatible with B-Box4.*

You can install F-Drive-compatible Fixed White or Fade to Warm luminaires in star topology using a B-Box4 breakout box with RJ45 outputs (FD-BBOX-4R). The FD-BBOX-4R takes a single four-channel RJ45 output from an FTW-150 Card or CC-150 Card and provides four separated RJ45 output channels. The cable distance of each wiring run must not exceed 100 m (328 ft). Visit the [F-Drive System Design Tool](http://etconnect.com/FDriveSysDesignTool) at etconnect.com/FDriveSysDesignTool and see the *F-Drive B-Box4 Installation Manual* and the *F-Drive R12 and W1 Wiring Reference Guide* for more information.

ArcSystem Pro One-Cell Luminaires

F-Drive-compatible ArcSystem Pro One-Cell luminaires include:

- ArcSystem Pro One-Cell Standard
- ArcSystem Pro One-Cell Small
- ArcSystem Pro One-Cell Micro

The CC-150 Card can drive up to four ArcSystem Pro One-Cell Standard, Small, or Micro luminaires. See [Configure the CC-150 Card on page 28](#) to configure the CC-150 Card output current correctly for ArcSystem Pro One-Cell luminaires.

Connection options:

- [Use B-Box4M to Connect ArcSystem Pro One-Cell Luminaires below.](#)
 - [Connect F-Drive-Compatible Luminaires to the Terminal Block Output on page 37.](#)
-



CAUTION: *Possible damage to equipment. You must configure the output channel of the CC-150 Card to the appropriate output for your luminaire before applying power to the luminaire. See [Configure the CC-150 Card on page 28](#).*



Note: *Maximum supported wire length between ArcSystem Pro One-Cell Standard, Small, and Micro luminaires and F-Drive R12 is 100 m (328 ft).*

Use B-Box4M to Connect ArcSystem Pro One-Cell Luminaires

The FD-BBOX-4M takes a single four-channel RJ45 output from the CC-150 Card and provides four separated Molex output channels. Visit the [F-Drive System Design Tool](http://etconnect.com/FDriveSysDesignTool) at etconnect.com/FDriveSysDesignTool and see the *F-Drive B-Box4 Installation Manual* and the *F-Drive R12 and W1 Wiring Reference Guide* for more information.

Third-Party Fixtures

The CC-150 Card and the CV-150 Card support a wide variety of third-party loads. Determining compatibility between these loads and the driver is an important step toward ensuring the success of a project. Search the [LED Dimming Compatibility Database](https://etcconnect.com/compatibility) at etcconnect.com/compatibility to see if your load is compatible. If your load is not in the compatibility database, follow the instructions at the link above to contact the ETC Applications Engineering department to arrange for compatibility testing.

Connection Options:

- [Use B-Box4T to Connect Lighting by Other Manufacturers below.](#)
- [Connect Lighting by Other Manufacturers to the Terminal Block Output below.](#)

See [Configure the CC-150 Card](#) and [Configure the CV-150 Card and ArcLamp 150 Card](#) for important details about configuring output cards for third-party loads.



CAUTION: Do not exceed any Class 2 limits stated by the manufacturer of the third-party load.

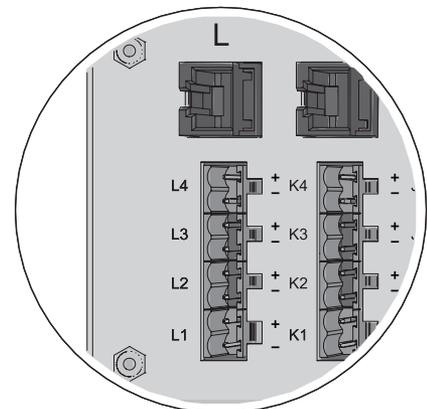
Use B-Box4T to Connect Lighting by Other Manufacturers

The FD-BBOX-4T takes a single four-channel RJ45 output from an FTW-150 Card or CC-150 Card and provides four separated two-pin output channels. Visit the [F-Drive System Design Tool](https://etcconnect.com/FDriveSysDesignTool) at etcconnect.com/FDriveSysDesignTool and see the *F-Drive B-Box4 Installation Manual* and the *F-Drive R12 and W1 Wiring Reference Guide* for more information.

Connect Lighting by Other Manufacturers to the Terminal Block Output

The F-Drive R12 ships with twelve eight-pin connectors (ETC part number 7148K1016). Each output channel requires two pins. To connect a third-party luminaire to a CC-150 Card or CV-150 Card, see the pinout to the right and the [F-Drive R12 Wire and Terminal Specifications on page 13](#).

Terminal Block Pinout



ArcLamps

ArcLamp is an LED source from ETC that is available in several models including the choice of screw base, color temperature, and clear or frosted glass finish. ArcLamp systems require a ArcLamp 150 Card in order to be powered and controlled by the F-Drive R12. The ArcLamp 150 Card supports a total of thirty-two 4.4 W ArcLamps with up to eight ArcLamps per channel. Each channel requires two pins of the eight-pin terminal block on the ArcLamp 150 Card.

The F-Drive R12 ships with twelve eight-pin connectors (ETC part number 7148K1016). Each output channel requires two pins. Refer to [Wire the Eight-Pin Connector to Category-Type Cable on page 38](#).

See [Voltage Drop on page 10](#) before wiring an ArcLamp 150 Card.



Note: Do not bridge outputs on R12 ArcLamp output cards. If your installation requires more than eight ArcLamps per circuit, consider a standalone ArcLamp wall-mount or rack-mount driver.

For more information on the installation of ArcLamps, see the *ArcLamp System Installation Manual*.

Record Installed Output Cards

Use this page to record the location of output cards in your F-Drive R12. Make additional copies as necessary for each R12. The card slot labels run A–L from left to right when facing the front of the R12, and A–L from right to left when facing the back. See the illustration at [Install the R12 on page 15](#).

R12 Location/Description:						
Slot	Output Card Type (check one)					Description, Quantity, and Location of Loads
	FTW-150 green	CC-150 yellow	CV-150 blue	Chroma purple	ArcLamp white	
Ex.	✓					front left down FTW x4 on A1–A4
A						
B						
C						
D						
E						
F						
G						
H						
I						
J						
K						
L						

Chapter 6

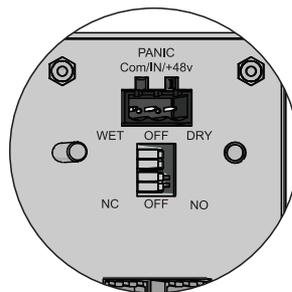
Panic Connector

The R12 supports emergency lighting control bypass in the following ways:

- It accepts input from non-isolated (dry) contact closure powered by the F-Drive R12.
- It accepts input from isolated (wet) contact closure providing +48 VDC.
- It can be configured for normally open or normally closed operation.
- It can be used to trigger the emergency functionality of an F-Drive W1 Emergency Driver in the event of power loss to the R12. This function can be used with or without input from an additional non-isolated (dry) contact closure.

To use the Panic input with a W1 Emergency Driver, see [How to Use R12 with a W1 Emergency Driver on page 25](#).

Panic Switches



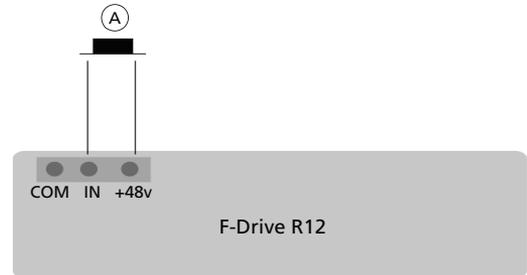
Switch	Position	Contact Action	Function
WET/OFF/DRY	WET	-	"COM" on the three-pin panic connector is isolated to allow the use of an externally powered contact closure. Use "COM" and "IN" to connect the contact closure.
	OFF	-	Wet or Dry is not set.
	DRY	-	<ul style="list-style-type: none"> • "+48V" on the three-pin panic connector can be used to power an external contact closure. Use "+48V" and "IN" to connect the contact closure. "COM" is connected to the F-Drive R12 common. • "+48 V" and "COM" on the three-pin "PANIC" connector can also be used as the sense input for an F-Drive W1 Emergency Driver.
NC/OFF/NO	NC (normally closed)	close	R12 is in normal state and outputs return to normal DMX control.
		open	R12 is in panic/emergency state and outputs are driven to full.
	OFF	-	Panic behavior is disabled for the R12.
	NO (normally open)	open	R12 is in normal state and outputs return to normal DMX control.
		close	R12 is in panic/emergency state and outputs are driven to full.

Wire the Panic Connector

A three-pin header with a pluggable connector is provided for panic connections (ETC part number 7148K1015). Follow the directions below according to the type of contact you are using.

Non-Isolated (Dry) Contact

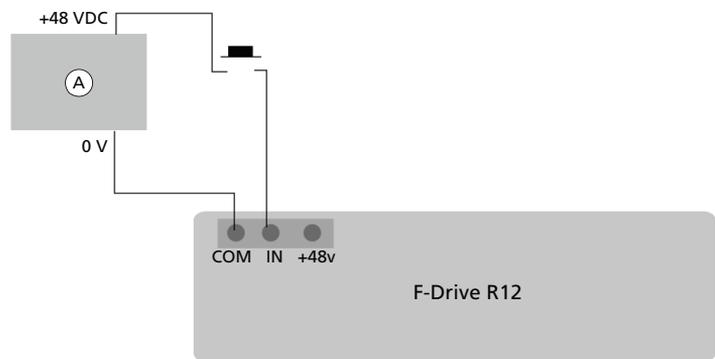
1. Strip 6 mm (1/4 in) of insulation from the two panic wires.
2. Locate and remove the panic connector from the back of the R12.
3. Loosen the "IN" terminal and the "+48V" terminal.
4. Insert one wire into the "IN" terminal.
Using a jeweler's screwdriver, tighten the screw firmly onto the wire.
5. Insert one wire into the "+48V" terminal.
Using a jeweler's screwdriver, tighten the screw firmly onto the wire.
6. Plug the connector into the "PANIC" header on the back of the R12.



A Dry contact

Isolated (Wet) Contact (+48 VDC Signal)

1. Strip 6 mm (1/4 in) of insulation from the two panic wires.
2. Locate and remove the panic connector from the back of the R12.
3. Loosen the "COM" terminal and the "IN" terminal.
4. Insert the common wire into the "COM" terminal.
Using a jeweler's screwdriver, tighten the screw firmly onto the wire.
5. Insert the +48 VDC wire into the "IN" terminal.
Using a jeweler's screwdriver, tighten the screw firmly onto the wire.
6. Plug the connector into the "PANIC" header on the back of the R12.



A External Power Supply Unit (PSU)

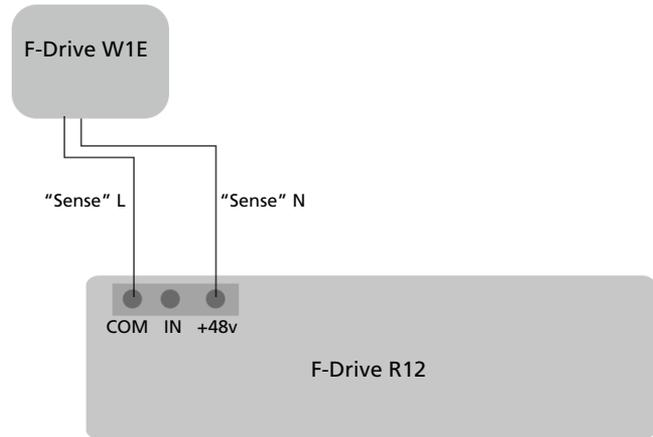
How to Use R12 with a W1 Emergency Driver

The R12 panic connector can be connected to the input of a W1 Emergency Driver to trigger the emergency functionality of the W1 Emergency Driver in the event of power loss to the R12. The R12 "COM" and "+48V" terminals are wired to the W1 Emergency Driver Sense Input terminals. During normal operation, the W1 Emergency Driver senses that power is present at its Sense Input terminals and operates normally. If the R12 loses power, the W1 Emergency Driver goes into emergency state and drives its outputs to full.

The *F-Drive W1 Installation Manual* is available free of charge at etconnect.com for information about W1 Series driver installation and configuration.

Follow the wiring instructions below:

1. Pull two 0.2–2.5 mm² (24–14 AWG) wires through conduit to the W1 Emergency Driver.
2. Strip 6.5 mm (1/4 in) of insulation from each wire.
3. Insert one wire into the W1 Emergency Driver line "L" terminal and torque the terminal to 0.5–0.6 Nm (4.4–5.3 in-lb).
4. Insert the other wire into the W1 Emergency Driver neutral "N" terminal and torque the terminal to 0.5–0.6 Nm (4.4–5.3 in-lb).
5. Pull the wires to the rear of the R12.
6. Locate and remove the panic connector from the back of the R12.
7. Terminate the wire from the W1 Emergency Driver line "L" terminal to the R12 "COM" terminal. Using a jeweler's screwdriver, tighten the screw firmly onto the wire.
8. Terminate the wire from the W1 Emergency Driver neutral "N" terminal to the R12 "+48V" terminal. Using a jeweler's screwdriver, tighten the screw firmly onto the wire.
9. Set the top panic switch on the F-Drive R12 to "DRY".



Additional Non-Isolated (Dry) Contact

The "PANIC" output of the F-Drive R12 can be used simultaneously with the 48 VDC output for a non-isolated (dry) normally closed or normally open external contact closure. Set the bottom panic switch on the F-Drive R12 to NC, OFF, or NO as needed and follow the wiring instructions for [Non-Isolated \(Dry\) Contact on the previous page](#).

Chapter 7

Power Up and Control

Power Up Procedure

1. Check that the power switch on the back of all F-Drive R12 drivers is on.
2. If applicable, check that all third-party load power switches are on.
3. Check the DMX control source to ensure proper installation and termination per the manufacturer's instructions.
4. Check that all wires are terminated properly and secure in the terminals, if applicable.
5. Apply power at the equipment rack providing power to the external power supplies.
6. Verify that the external power supplies are powered on.
7. Remove the label over the control card on the front of the R12.
8. Verify LED status on the front of the R12. See [Troubleshooting on page 34](#).



Note: *On initial power up the F-Drive will perform a routine driver setup. During setup status panel LEDs may flash. Do not disconnect power to the F-Drive while LEDs are flashing. Driver setup typically takes several minutes, but may vary depending on connected loads.*

9. Allocate DMX addresses in ETC Concert software. See [DMX System Control below](#).
10. **For each CC-150 Card:** Use Concert to verify that each channel is set to output the correct current for the luminaire. See [Configure the CC-150 Card on page 28](#).
11. If desired, test the output by using the Panic switches to drive all outputs to full. See [Panic Connector on page 23](#).

Identify

You can send an identify command to individual channels of an output card using ETC Concert or a third-party RDM controller. When you send an identify command to a channel, the corresponding LED (1, 2, 3, or 4) on the output card will blink and fixtures connected to the channel will blink on and off: 500 ms on, 500 ms off until you stop the identify command.

You can also send an identify command to the control card, causing all LEDs on the control card to blink on and off: 500 ms on, 500 ms off until you stop the identify command.

See the F-Drive Device Package Help in Concert or [Identify Device on page 31](#) for information about this RDM command.

DMX System Control

You can control the R12 over wired DMX from a lighting console or ETC Concert software. Concert is available for free download at etcconnect.com/Concert.

- F-Drive Series products are compliant with DMX 512-A (ANSI E1.11-2008 (R2013)).
- DMX loss behavior is configurable via RDM with three options: Go to off, Hold last look, and Go to full.

Navis Luminaire DMX Personalities

Navis RGBW luminaires have two personality options: direct (IRGBW) and IRGB. Navis Fade to Warm luminaires have two personality options: Intensity and Warm Trim. Navis Fixed White luminaires have a single personality: Intensity. The personality is set per output card.

The IRGB DMX personality provides a means for matching the output from Navis RGBW luminaires to 3000 K Fixed White and Fade to Warm luminaires. When all four IRGB channels are set to 100%, the output from the RGBW luminaire is 3000 K white light.

The Warm Trim DMX personality for Navis Fade to Warm luminaires enables the user to scale the intensity level at which the Red Shift color temperature changes begin to occur.

DMX Channel	Navis RGBW Luminaires		Navis Fade to Warm Luminaires		Navis Fixed White Luminaires
	Direct (IRGBW)	IRGB (default)	Intensity	Warm Trim	Intensity
1	Intensity	Intensity	Intensity	Intensity	Intensity
2	Red	Red		Fade to Warm scaling	
3	Green	Green			
4	Blue	Blue			
5	White				

Live Edit Configuration Files

You can live edit configuration files using ETC Concert software v4.1.2 or later with the F-Drive device package. Concert is available for free download at etcconnect.com/Concert. For more information on Concert, see the help files within the Concert application.

Edit Offline and Save Configuration Files to microSD

You can edit configuration files offline in Concert with the F-Drive device package, save them to a microSD card, and install the microSD card in the driver.

1. Remove the control card from the R12 enclosure to access the microSD card.

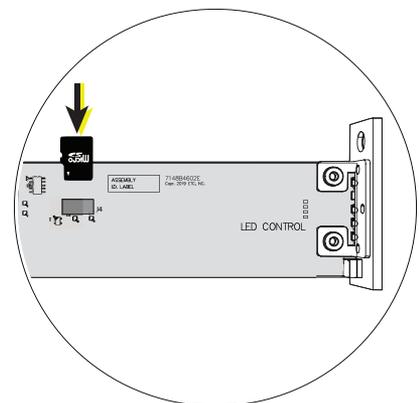


Note: *The control card can be removed and replaced while the R12 is powered on.*

2. Remove the microSD card.
3. Edit a configuration file you have saved or edit the default F-Drive configuration file in Concert.
4. Save the configuration file with filename `rackConfig.cfg` to the root of the microSD card.
 - Overwrite the old configuration file on the microSD card.



Note: *F-Drive R12 and F-Drive W1 configuration files must be named `rackConfig.cfg`.*



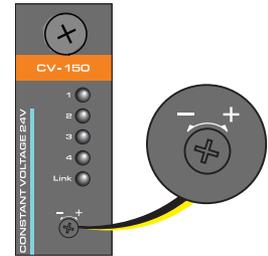
Detail of Control Card and microSD Card

5. Insert the microSD card into the receptacle on the control card as shown in the illustration above.
6. Replace the control card in the R12 enclosure.

Configure the CV-150 Card and ArcLamp 150 Card

The CV-150 Card and ArcLamp 150 Card are capable of 24–28 VDC output to compensate for voltage drop along the cable to the load. Follow these steps to adjust the output voltage:

1. Adjust the dial on the front of the output card to its minimum value, 24 V.
2. Measure the voltage at the load.
3. Turn the dial on the front of the output card to increase output voltage until 24 V is measured at the load.



Configure the CC-150 Card



CAUTION: *Setting the driver card to output more current than the manufacturer's recommended fixture driver current may reduce the lifetime of the fixtures or cause damage to the fixtures.*

The CC-150 Card can output 200–700 mA. The output current can be configured for each output channel via ETC Concert.

For F-Drive firmware versions v1.1.3 and newer, default output current is 200 mA. For F-Drive firmware versions v1.1.2 and older, default output current was 600 mA.

ETC Luminaire	Current Requirement
ArcSystem Navis 100 Fixed White	600 mA
ArcSystem Pro One-Cell Micro White or Fade to Warm	200 mA
ArcSystem Pro One-Cell Small White or Fade to Warm	600 mA
ArcSystem Pro One-Cell White or Fade to Warm	600 mA
Irideon FPZ for F-Drive or Irideon WLZ for F-Drive	450 mA
Source Four Mini LED for F-Drive	350 mA

Configure the Chroma Card and FTW-150 Card

The Chroma Card and FTW-150 Card do not have adjustable current or voltage and are designed for compatibility with Navis 100 luminaires.

Chroma Card DMX Footprint

The Chroma Card has a different DMX footprint than other output cards. When you first install a Chroma Card, or if you relocate a Chroma Card in a new slot in a F-Drive R12, you will have to reallocate DMX addresses.

Firmware Upgrade Instructions

When commissioning a system installation, check all F-Drive Series drivers to ensure that the latest firmware is present. If the firmware is not up to date, upgrade it using ETC Concert and ETC UpdaterAator software before commissioning is completed. For more information on UpdaterAator, download the UpdaterAator Software Quick Guide for free from etcconnect.com.

Alternatively, a qualified ETC technician can upgrade drivers in the field using ETC UpdaterAator Software and a microSD card.

1. Remove the control card from the R12 enclosure to access the microSD card.
2. Remove the microSD card.
3. Save the new R12 firmware files to the root of the microSD card.
 - Overwrite the old firmware files on the microSD card. The firmware files must be named as shown in the table below.
4. Insert the microSD card into the receptacle on the control card.
5. Replace the control card in the R12 enclosure.
6. Cycle power to the R12 driver.



Note: *The control card can be removed and replaced while the R12 is powered on. However, you must cycle power to the R12 in order to start the firmware upgrade process.*



Note: *Status panel LEDs may flash while the driver updates its firmware. Do not disconnect power to the R12 while LEDs are flashing. Firmware upgrade typically takes several minutes, but may vary depending on connected loads.*

Firmware packages include these six files with ".s" extensions:

Function	File Name
Control Card firmware	ReliantControl.s
ArcLamp 150 Card firmware	ArcLampDriver.s
FTW-150 Card/CC-150 Card firmware	FTWDriver.s FTWDriverK30.s
Chroma Card firmware	ColorComm.s
CV-150 Card firmware	CVDriver.s
Navis RGBW luminaire firmware	RGBWFixture.s

RDM Parameters



Note: F-Drive Chroma Card RDM communication may not function properly if Navis RGBW luminaires are not set to unique channels using the channel rotary switch on the side of the Navis RGBW luminaire. See the ArcSystem Navis 100 Installation Guide for details on Navis RGBW luminaire installation.

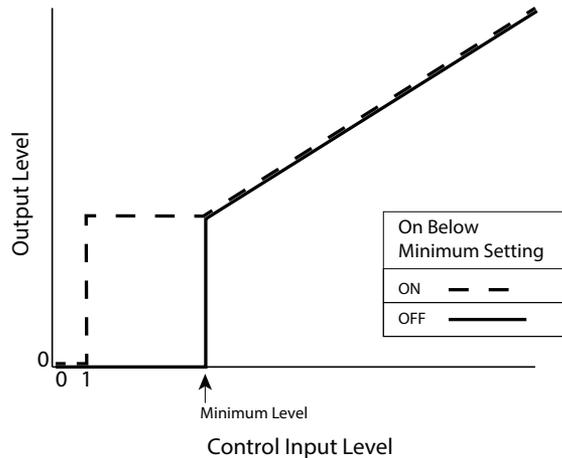
Parameter	RDM PID	Value	Notes
Status Messages	0x0030	See RDM E1.20-2006	<p>Errors will be in the format: "Error type: [data value 1] [data value 2]"</p> <p>Control Card:</p> <ul style="list-style-type: none"> Board overtemp E120_STS_OVERTEMP[0000] [Temp degrees C] Fan 1/2 Error E120_STS_FEEDBACK_ERROR[fan number][not used] Emergency Error E120_STS_DIM_PANIC[0000] [0000] <p>Chroma Card:</p> <ul style="list-style-type: none"> Board overtemp E120_STS_OVERTEMP[Sensor Number][Temp degrees C] Fixture overtemp E120_STS_OVERTEMP[Sensor Number][Temp degrees C] Fixture calibration error E120_STS_CAL_FAIL [E120_SD_UNDEFINED][not used] Fixture no serial number E120_STS_NOT_READY [E120_SD_UNDEFINED][not used] Fixture overcurrent/short circuit E120_STS_OVERCURRENT[0][0] <p>Other Output Cards:</p> <ul style="list-style-type: none"> Board overtemp E120_STS_OVERTEMP[Sensor Number][Temp degrees C] Board overcurrent/short circuit E120_STS_OVERCURRENT[0][0]
Device Info	0x0060	See RDM E1.20-2006	<ul style="list-style-type: none"> Root (control card): reports a footprint of 0 and a start address of 0xFFFF. Subdevices (output card channels): in patched or straight mode, all output card channels report their current addresses and a footprint of 1. There are 48 output card channels. Chroma Card will report a footprint of 4 in IRGB mode or 5 in Direct mode. See DMX Personality on the facing page.
Device Model Description	0x0080	ASCII string for model description	<ul style="list-style-type: none"> Root Device: "F-Drive R12" Subdevices (output card channels): the installed card type that contains the channel. <ul style="list-style-type: none"> Chroma Card: "Chroma" FTW-150 Card: "FTW-150" or "FTW_K30-150" CV-150 Card: "CV-150" ArcLamp 150 Card: "ArcLamp-150" CC-150 Card: "CC-150" or "CC_K30-150"
Manufacturer Label	0x0081	ASCII string for manufacturer label	Get returns "ETC" from the root (control card) only.
Device Label	0x0082	ASCII string for device label	<p>Get or Set</p> <ul style="list-style-type: none"> root device (control card): "F-Drive R12" subdevices (output cards) : "[channel] %d" where %d is the channel number 1–48.

Parameter	RDM PID	Value	Notes																												
DMX Personality	0x00E0	1 = Intensity 2 = Direct (IRGBW) 3 = IRGB 4 = Warm Trim	<table border="1"> <thead> <tr> <th rowspan="2">Output Cards</th> <th colspan="4">Personalities Supported</th> <th rowspan="2">Default Personality</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Chroma Card</td> <td></td> <td>✓</td> <td>✓</td> <td></td> <td>2</td> </tr> <tr> <td>FTW-150 Card</td> <td>✓</td> <td></td> <td></td> <td>✓</td> <td>1</td> </tr> <tr> <td>ArcLamp 150 Card, CC-150 Card, and CV-150 Card</td> <td>✓</td> <td></td> <td></td> <td></td> <td>1</td> </tr> </tbody> </table>	Output Cards	Personalities Supported				Default Personality	1	2	3	4	Chroma Card		✓	✓		2	FTW-150 Card	✓			✓	1	ArcLamp 150 Card, CC-150 Card, and CV-150 Card	✓				1
Output Cards	Personalities Supported				Default Personality																										
	1	2	3	4																											
Chroma Card		✓	✓		2																										
FTW-150 Card	✓			✓	1																										
ArcLamp 150 Card, CC-150 Card, and CV-150 Card	✓				1																										
DMX Personality Description	0x00E1																														
DMX Start Address	0x00F0	Range = 001 to 512																													
Block Address	0x0140	Range = 001 to 512	Sending "set" to root (control card) will set the start address of all outputs sequentially.																												
Identify Device	0x1000	0 = stop identify 1 = start identify	Sending "set" with value 1 to a subdevice (output card channel) causes connected loads to flash in a one second on, one second off pattern. Set to 1 sent to the root (control card) will cause all LEDs on the control card to blink in a 500 ms on, 500 ms off pattern.																												
Minimum Level	0x0341	0 to 254	Bottom trim. Minimum Level must be lower than the Maximum Level. Default is 0. Chroma Card ignores this setting. <i>See On Below Minimum on page 33.</i>																												
Maximum Level	0x0342	1 to 255	Top trim. Maximum Level must be higher than the Minimum Level. Default is 255. Chroma Card ignores this setting.																												
Curve	0x0343	1 or 2	<ul style="list-style-type: none"> Set to 1 is the Default Set to 2 is the ArcSystem , to match the dimming curve of ArcSystem Pro Fade to Warm luminaires and ArcSystem Fade to Warm ArcLamps 																												
Curve Description	0x0344																														
Output Response Time	0x0345	<ul style="list-style-type: none"> 1 is 0 ms 2 is 50 ms 3 is 100 ms 4 is 200 ms 5 is 250 ms 6 is 300 ms 7 is 400 ms 8 is 500 ms 9 is 600 ms 10 is 700 ms 11 is 800 ms 12 is 900 ms 13 is 1000 ms 	Set the speed of response/slewing for output cards. Default is 300 ms.																												
Output Response Time Description	0x0346	See Output Response Time above.	"Get" returns an ASCII text string.																												
DMX Loss Behavior	0x810A	0 = Hold Last Look 1 = Go to Full 2 = Go to Off	Sending "set" to the root (control card) determines the behavior if DMX is lost. Scenes and Hold Time are not supported.																												
DMX Loss Behavior Description	0x810B		Sending "get" to the root (control card) returns an ASCII text string.																												

Parameter	RDM PID	Value	Notes
FTW Temperature Scaling	0x8052	The structure of data includes: <ul style="list-style-type: none"> enabled (uint8_t): 0 = disabled, 1 = enabled Max CT (uint16_t): 2700K–3000K Int for max CT (uint8_t): 128–255 	This parameter is used to set or get the fade to warm temperature scaling on a FTW-150 Card. This feature allows you to set a maximum color temperature (2700 K–3000 K) that an ArcSystem Navis Fade to Warm luminaire will achieve at an associated "set point" intensity (128–255). Default Max CT is 3000 K. Default set point is 255.
Output Current	0x8053	<ul style="list-style-type: none"> 0 is 200 mA 1 is 250 mA 2 is 300 mA 3 is 350 mA 4 is 400 mA 5 is 450 mA 6 is 500 mA 7 is 550 mA 8 is 600 mA 9 is 650 mA 10 is 700 mA 	Gets or sets the output current for a CC-150 Card. For F-Drive firmware versions v1.1.3 and newer, default output current is 200 mA. For F-Drive firmware versions v1.1.2 and older, default output current was 600 mA. See Configure the CC-150 Card on page 28 for the current requirements for F-Drive compatible luminaires.
Output Current Description	0x8054	See Output Current values above.	Get returns enumerated string describing the output current of a CC-150 Card.
Red Shift	0x8106	0, 1	Sets if red shift is enabled on a Chroma Card 0 = disabled 1 = enabled
Red Shift Description	0x8114	"disabled" or "enabled"	"Get" returns an ASCII text string.
Color Fixture White Point	0x8107	<ul style="list-style-type: none"> 0 is 2700K 1 is 3000K 2 is 3500K 3 is 4000K 4 is 5000K 	"Set" shifts the white point of the Chroma Card. The default is 3000 K. This feature is only available in IRGB mode (see DMX Personality on the previous page).
Color Fixture White Point Description	0x8108	See Color Fixture White Point above.	"Get" returns an ASCII text string.
ArcLamp Dimming Steps	0x8031	0–254	Controls how many steps the ArcLamp 150 Card makes while dimming. The default is 17.
ArcLamp Enable Fade to Warm Support	0x8032	0 = disabled 1 = enabled	Set disables or enables fade to warm for an ArcLamp 150 Card. Default is enabled.
Get Slot Info	0x0120	Chroma Card in Direct personality: Intensity, Red, Green, Blue, White	
Get Slot Description	0x0122	Chroma Card in RGBW personality: Intensity, Red, Green, Blue	
Default Slot Value	0x0122	All other output cards: Intensity See DMX System Control on page 26 .	
Factory Defaults	0x0090		Set resets the configurations of the control card and all output cards to defaults.
Software Version Label	0x00C0		Get returns current software version as an ASCII text string.

On Below Minimum

"On Below Minimum" is a sub-feature of the RDM "Minimum Level" parameter (see [Minimum Level on page 31](#)). When "On Below Minimum" is set to "true," the channel's minimum level will hold until the DMX level is 0. Any non-zero input level below the set minimum level will cause fixtures connected to the channel to output at the set minimum level. When "On Below Minimum" is set to "false," the fixtures connected to the channel turn off when the DMX level is below the minimum level.



See RDM E1.37-1 2012 for full details.

Maintenance



WARNING: RISK OF DEATH BY ELECTRIC SHOCK! Failure to disconnect all power to the system before installation, maintenance, cleaning, or any other system modification could result in serious injury or death.

AVERTISSEMENT : RISQUE DE MORT PAR DÉCHARGE ÉLECTRIQUE! Négliger de débrancher toutes les sources d'alimentation du système avant l'installation, l'entretien, le nettoyage ou toute autre modification du système peut causer des blessures graves ou la mort.

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



CAUTION: RISK OF ELECTRIC SHOCK! Disconnect power before servicing.

ATTENTION : RISQUE DE CHOC ÉLECTRIQUE! Couper l'alimentation avant l'entretien.

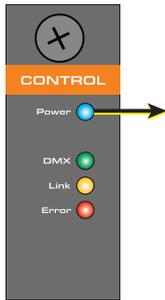
You can remove the F-Drive R12 from the equipment rack using the two aluminum 'U' handles. The F-Drive R12 contains no user-serviceable parts. Contact ETC Technical Services with any service questions.

Troubleshooting

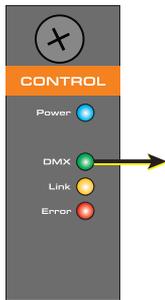
F-Drive R12 Control Card LED Indicators



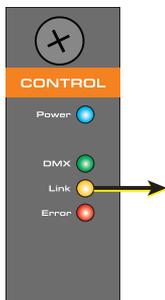
Note: If you send an Identify command to the control card to 1 for "start identify," it will cause all LEDs on the control card to blink in a 500 ms on, 500 ms off pattern until you stop the Identify command.



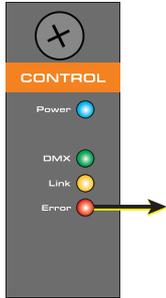
Blue "Power" LED	
Behavior	Status or Error
Solid On	Power is present at the control card.
Off	Power is not present at the control card.
Triple Blink	Firmware download is in progress. The "DMX" (green), "Link" (yellow), and "Error" (red) LEDs and LEDs on the output cards will also triple blink.
Slow Blink	Bootloader mode: waiting for firmware. The "Link" (yellow) LED will also slow blink.
	Invalid RDM ID. The "Link" (yellow) LED will also slow blink and the "Error" (red) LED will fast blink.



Green "DMX" LED	
Behavior	Status or Error
Solid On	DMX data is present.
Slow Blink	DMX data is not present.
Triple Blink	Firmware download is in progress. The Power (blue), Link (yellow), and Error (red) LEDs and LEDs on the output cards will also triple blink.



Yellow "Link" LED	
Behavior	Status or Error
Random Blink	Communication is active.
Triple Blink	Firmware download is in progress. The "Power" (blue), "DMX" (green), and "Error" (red) LEDs and LEDs on the output cards will also triple blink.
Off	Communication is inactive.
Slow Blink	Bootloader mode: waiting for firmware. The "Power" (blue) LED will also slow blink.
	Invalid RDM ID. The "Power" (blue) LED will also slow blink and the "Error" (red) LED will fast blink.



Red "Error" LED	
Behavior	Status or Error
Off	Normal operation.
Solid On	There is an active error. See Errors on the next page .
Fast Blink	Invalid RDM ID. The "Power" (blue) and "Link" (yellow) LEDs will also slow blink.
Double Blink	SD card error.
Triple Blink	Firmware download is in progress. The "Power" (blue), "DMX" (green), and "Link" (yellow) LEDs and LEDs on the output cards will also triple blink.

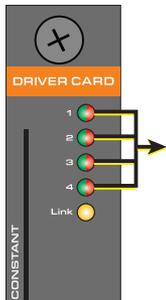
F-Drive R12 Output Card LED Indicators



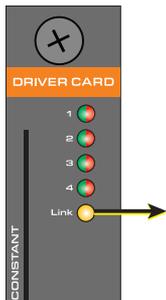
Note: F-Drive Chroma Card LED indicators may not function properly if Navis RGBW luminaires are not set to unique channels using the channel rotary switch on the side of the Navis RGBW luminaire. See the ArcSystem Navis 100 Installation Guide for details on Navis RGBW luminaire installation.



Note: When you send an identify command to a channel, the corresponding LED (1, 2, 3, or 4) on the output card will blink and fixtures connected to the channel will blink on and off: 500 ms on, 500 ms off until you stop the identify command.



Color	Channel # LED Behavior	Status or Error
Green	Solid On	Output > 0%.
	Off	Output is off.
	Triple Blink	Firmware download is in progress. The "Link" (yellow) LED on the output card and the LEDs on the control card will also triple blink.
Red	Solid On	There is an active error. See Errors on the next page .
	Fast Blink	Fixture firmware upgrade in progress (Chroma Card only).
	Slow Blink	Fixture needs firmware (Chroma Card only).
	Alternating blink in pairs	Bootloader mode: waiting for firmware. Red LEDs blink in pairs "1" and "3" then "2" and "4".



Yellow "Link" LED	
Behavior	Status or Error
Random Blink	Communication is active.
Off	Communication is inactive.

Errors

An illuminated red "Error" LED on a control card or an illuminated red LED on a channel of an output card can be the result of several problems, depending on the type of card.

The errors below are also reported through RDM Status Messages. See [RDM Parameters on page 30](#).

Output Card	Errors
Control Card	Panic/emergency state is active (see Panic Connector on page 23), Card over temperature, fan failure, overcurrent/short circuit
FTW-150 Card	Card over temperature, channel over temperature, over current/short circuit
CC-150 Card (Constant Current)	Card over temperature, channel over temperature, short circuit
CV-150 Card (Constant Voltage)	Card over temperature, channel over temperature, over current/short circuit
Chroma Card	Card over temperature, fixture over temperature, fixture calibration error, invalid fixture ID, over current/short circuit
ArcLamp 150 Card	Card over temperature, channel over temperature, over current/short circuit

Reset an Output Card After an Error

To reset a CC-150 Card, CV-150 Card, or FTW-150 Card after an over current/short circuit error, turn channel level to off. To reset an ArcLamp 150 Card or Chroma Card after an over current/short circuit error, remove the card and reinsert it.

Appendix A

Connect F-Drive-Compatible Luminaires to the Terminal Block Output

The easiest ways to connect F-Drive-compatible Fixed White or Fade to Warm luminaires with RJ45 input to a compatible output card are:

- [Connect F-Drive-Compatible Luminaires in a Daisy Chain on page 20](#)
- [Connect F-Drive-Compatible Fixed White or Fade to Warm Luminaires in Star Topology with B-Box4R on page 20.](#)

Alternatively, you can connect them to the eight-pin terminal block output as described below.

The easiest way to connect ArcSystem Pro One-Cell luminaires to a CC-150 Card is through a B-Box4M. See [Use B-Box4M to Connect ArcSystem Pro One-Cell Luminaires on page 20.](#)

Alternatively, you can connect them to the eight-pin terminal block output as described on [page 39.](#)

Connect F-Drive-Compatible Luminaires with RJ45 Input to the Terminal Block Output

F-Drive-compatible Fixed White and Fade to Warm luminaires with RJ45 input can be connected via terminal block output from their respective output cards. When using the terminal block on an output card, luminaires cannot be daisy-chained together; each luminaire requires two pins of the eight-pin terminal block and must have its own Category-type cable with 0.25 mm² (23 AWG) or larger conductors. Connect up to four luminaires per output card.

The F-Drive R12 ships with twelve eight-pin connectors (ETC part number 7148K1016). Each output channel requires two pins. Refer to the pinout below and the instructions at [Wire the Eight-Pin Connector to Category-Type Cable on the next page.](#)

RJ45 Pinout for F-Drive-Compatible Fixed White and Fade to Warm Luminaires

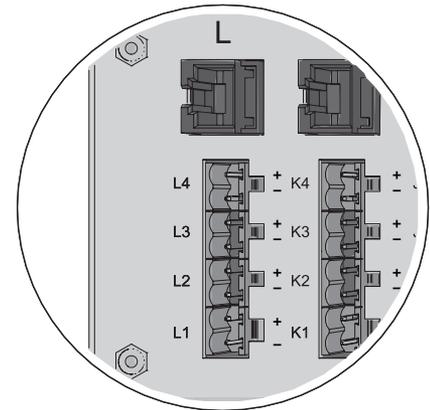
RJ45 Pin	Description	Typical Wire Color (T568B standard)
1	Ground	white-and-orange
5	Power	white-and-blue

See [Documentation for Compatible Products on page 8](#) and refer to the installation guide for the luminaire for full pinout information.

Wire the Eight-Pin Connector to Category-Type Cable

1. Terminate the luminaire end of the cable according to T568B standard.
2. On the end of the cable going to the equipment rack, follow installation procedures for the Category-type cable that you are using and strip the ends of the wires.
3. Separate the pin 1 and pin 5 wires from the cable.
4. Cut the remaining unused conductors from the cable flush to the cable jacket.
5. Label the cable with the data type and run designation.
6. Insert the conductors through two terminals on the provided screw-terminal connector as follows and tighten the screws to secure the wires in the terminals:
 - a. Pin 1 to a positive (" + ") terminal (for example, on "L4").
 - b. Pin 5 to the negative (" - ") terminal on the same labeled location (for example, "L4").
7. Insert the screw-terminal connector into the output card terminal block receptacles (for example, L1–L4).
8. Plug the RJ45 connector into the "In" receptacle on the luminaire.
9. Repeat steps 2–8 for up to four total luminaires.

Terminal Block Pinout

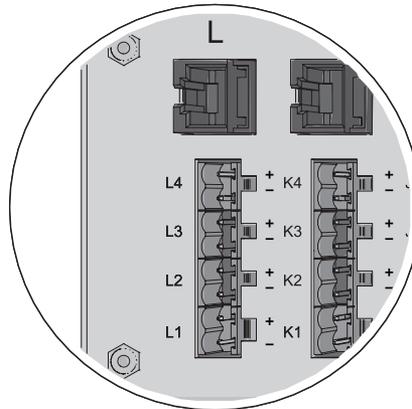


Connect ArcSystem Pro One-Cell Luminaires to the Terminal Block Output

The CC-150 Card can support four ArcSystem Pro One-Cell Standard, Pro One-Cell Small, or Pro One-Cell Micro luminaires using its terminal block output, with two pins per luminaire.

The F-Drive R12 ships with twelve eight-pin connectors (ETC part number 7148K1016). Each output channel requires two pins. See the pinout and polarity information below and the [F-Drive R12 Wire and Terminal Specifications on page 13](#).

Terminal Block Pinout



Note: ArcSystem Pro One-Cell luminaires have different wire color conventions on their input cables. See the table below for wire colors.

Luminaire	Wire Color and Polarity	
	Red	Black
ArcSystem Pro One-Cell Standard	negative (-)	positive (+)
ArcSystem Pro One-Cell Small	negative (-)	positive (+)
ArcSystem Pro One-Cell Micro	positive (+)	negative (-)

Appendix B

Install MEAN WELL 48 VDC Power Supplies

The MEAN WELL RKP-1UI rack-mount units are 1U, low-profile power distribution option for providing 48 VDC power to the ETC F-Drive R12.

The MEAN WELL rack-mount unit should only be installed by a qualified electrician or service technician.



WARNING: Connect this equipment to a non-dimmable power source in order to avoid damage to the equipment's internal power supply and other electrical components. Using a dimmable power source may damage the equipment and will void the warranty.



CAUTION: Each MEAN WELL RKP-1UI three-bay frame may require between one and three dedicated power circuits, one per RCP-2000 power supply.

- One RCP-2000 can supply up to 2000 W.
- Three RCP-2000 fit in a single RKP-1UI three-bay frame and can supply up to 6000 W.
- Three RKP-1UI three-bay frames can be loaded with nine RCP-2000; when bussed together they can supply up to 18000 W.

For estimated power consumption and BTUs, see the F-Drive System Design Tool at etconnect.com/FDriveSysDesignTool.

ETC Part Number	MEAN WELL Model	Description
PS505	MEAN WELL RKP-1UI	Custom RKP-1UI rack-mount unit for ETC
PS504	MEAN WELL RCP-2000-48	48 VDC, 2000 W power supply module

Important Accessories

Save these important parts that ship with your MEAN WELL three-bay frame. Each MEAN WELL three-bay frame ships with:

- **One DB-25 terminator** that must be installed in the CN500 port in order for the three-bay frame to power on. See [Final Installation Steps on page 46](#). The DB-25 terminator resembles a serial port or parallel port connector.
- **One RJ45 terminator** that must be installed in one of the JK1 ports if you are bussing multiple three-bay frames together. See [Final Installation Steps on page 46](#).
- **Three power supply blanks** to cover unused power supply module bays. Save these blanks if you are not installing three power supply modules in each three-bay frame.

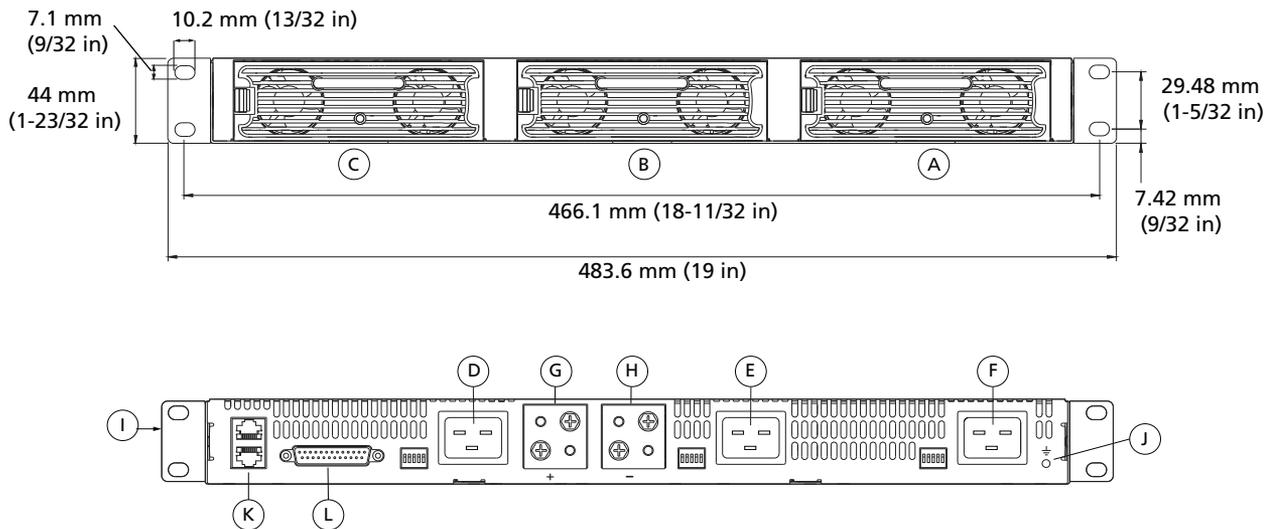
Technical Information from MEAN WELL

For current technical information, view the RKP-1UI specifications on the MEAN WELL website at meanwell.com. The RCP-2000/RKP-1UI Instruction Manual is available at etclink.it/mayQfb7p.

MEAN WELL RKP-1UI Features

- RKP-1UI three-bay frames fit in an EU or US 19-inch equipment rack
- Each RKP-1UI rack-mount unit (three-bay frame) supports up to three RCP-2000 power supply modules from MEAN WELL.
- Three RCP-2000 power supply modules provide up to 6000 W to a single RKP-1UI rack-mount unit.
- Bussing kits are available from ETC to bus together up to three rack systems. See [Bussing Kits on page 46](#).
- Three bussed RKP-1UI rack-mount units bussed together and containing nine RCP-2000 power supplies can provide a maximum of 18000 W.
- ETC offers multiple power supply cord options for the RKP-1UI rack-mount unit:
 - 15 A Edison plug to locking IEC connector (Model FD-RPS-IC-E15)
 - 20 A Edison plug to locking IEC connector (Model FD-RPS-IC-E20)
 - 16 A Schuko plug to locking IEC connector (Model FD-RPS-IC-S16)
 - 16 A Ceeform plug to locking IEC connector (Model FD-RPS-IC-C16)
 - 16 A bare end to locking IEC connector (Model FD-RPS-IC-EUBE16)

MEAN WELL RKP-1UI with three RCP-2000 Modules



A	Module A	G	DC output terminal "+ "
B	Module B	H	DC output terminal "- "
C	Module C	I	Mounting bracket
D	AC input for module A	J	Ground/Earth stud
E	AC input for module B	K	JK1 ports
F	AC input for module C	L	CN500 port

Clearance

The MEAN WELL RKP-1UI three-bay external power supply frame requires the following clearances:

- The built-in DC fans require 10 cm (3/8 in) clearance around the ventilation holes after mounting the three-bay frame in the 19-inch equipment rack.
- The power bussing connections on the back of the MEAN WELL three-bay frame require 20 mm (3/4 in) clearance. Equipment mounted directly above or below a MEAN WELL three-bay frame must be less than 35 cm (14 in) in depth. See the warning below.



WARNING: RISK OF ELECTRIC SHOCK! Maintain 20 mm (3/4 in) clearance behind the installed MEAN WELL three-bay frame. Equipment mounted above or below a MEAN WELL three-bay frame must be 35 cm (14 in) or less in depth. Equipment with a depth of more than 35 cm (14 in) mounted immediately above or below a MEAN WELL three-bay frame may cause an unsafe electrical connection due to mechanical interference with the power bussing connections.

AVERTISSEMENT : RISQUE DE CHOC ÉLECTRIQUE! Conservez un espace de 20 mm (3/4 po) derrière le châssis du rack MEAN WELL installé. Tout équipement monté au-dessus ou au-dessous d'un rack MEAN WELL doit avoir une profondeur de 35 cm (14 po) ou moins. Tout équipement d'une profondeur de plus de 35 cm (14 po) monté immédiatement au-dessus ou au-dessous d'un rack MEAN WELL peut provoquer une connexion électrique dangereuse en raison d'interférences mécaniques avec les connexions de bus d'alimentation.



Note: *If you are bussing two or more RKP-1UI rack systems together, they must be installed vertically adjacent in the equipment rack.*

Install the Power Supply in the Rack



WARNING: Connect this equipment to a non-dimmable power source in order to avoid damage to the equipment's internal power supply and other electrical components. Using a dimmable power source may damage the equipment and will void the warranty.

Before installing equipment in the rack, review [Rack-Mount Safety on page 14](#).



WARNING: RISK OF ELECTRIC SHOCK! Maintain 20 mm (3/4 in) clearance behind the installed MEAN WELL three-bay frame. Equipment mounted above or below a MEAN WELL three-bay frame must be 35 cm (14 in) or less in depth. Equipment with a depth of more than 35 cm (14 in) mounted immediately above or below a MEAN WELL three-bay frame may cause an unsafe electrical connection due to mechanical interference with the power bussing connections.

AVERTISSEMENT : RISQUE DE CHOC ÉLECTRIQUE! Conservez un espace de 20 mm (3/4 po) derrière le châssis du rack MEAN WELL installé. Tout équipement monté au-dessus ou au-dessous d'un rack MEAN WELL doit avoir une profondeur de 35 cm (14 po) ou moins. Tout équipement d'une profondeur de plus de 35 cm (14 po) monté immédiatement au-dessus ou au-dessous d'un rack MEAN WELL peut provoquer une connexion électrique dangereuse en raison d'interférences mécaniques avec les connexions de bus d'alimentation.

1. Ensure power to the rack is off.
2. Mount all rack-mount units in a 19-inch equipment rack using the supplied rack-mounting rails.
3. Insert MEAN WELL RCP-2000 power supplies with the same output voltage and current into the three-bay frames.



Note: MEAN WELL power supplies are factory-calibrated. If you find it necessary to calibrate the output of each MEAN WELL power supply for optimal current-sharing, see the Output Voltage Adjustment section of the RCP-2000/RKP-1U Instruction Manual from MEAN WELL. See [Technical Information from MEAN WELL on page 40](#).



Note: If you are bussing two or more RKP-1UI rack systems together, they must be installed vertically adjacent in the equipment rack.

Connect Ground/Earth

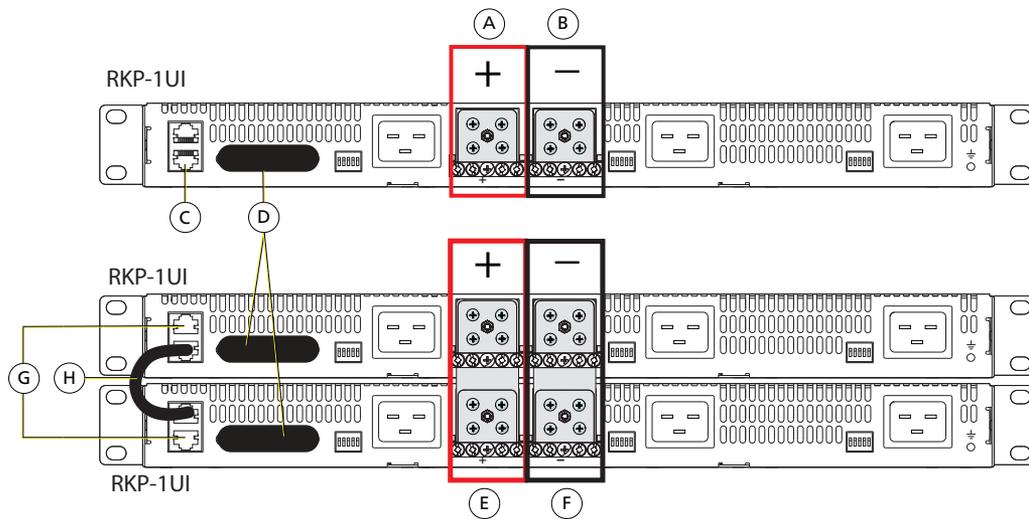
Each RKP-1UI three-bay frame has a ground/earth stud (J in the illustration on [page 41](#)) for connection to the equipment rack ground/earth. ETC provides a 0.6 m (2 ft) harness of 8 AWG insulated wire with a ring terminal on one end and a bare end on the other with the R12 bussing kits for this purpose. Use the nut installed on the stud to install the ring terminal. Follow all local and national codes. See [Bussing Kits on page 46](#) for more information about bussing kits.

Wire the DC Power Output

You need one bussing kit with tin-plated bus bars for every MEAN WELL three-bay frame and one red-and-black DC power wiring harness for each F-Drive R12 in order to connect the DC Power Output of a MEAN WELL three-bay frame to the power input of each F-Drive R12. See [Bussing Kits on page 46](#) for available bussing kits. Each bussing kit and each F-Drive R12 includes a red-and-black DC power wiring harness with an F-Drive R12 power input plug on one end and bare ends on the other.

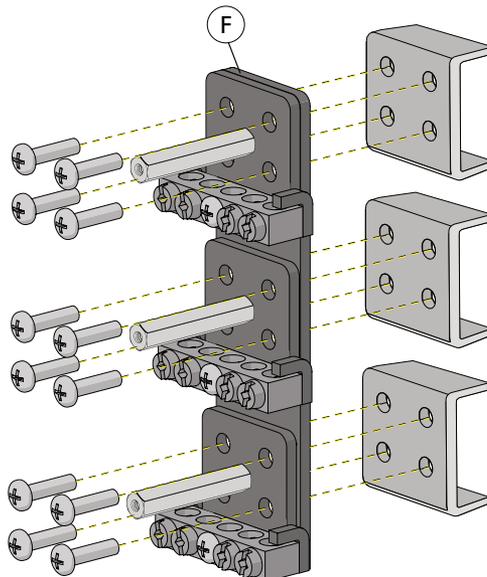
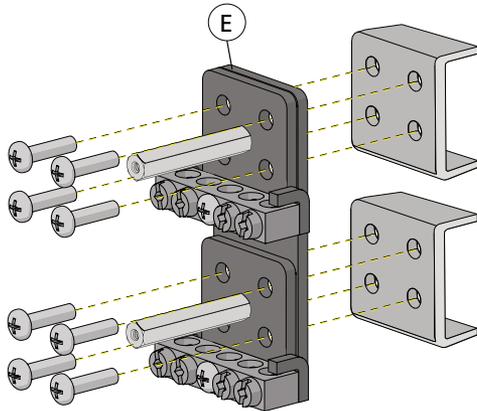
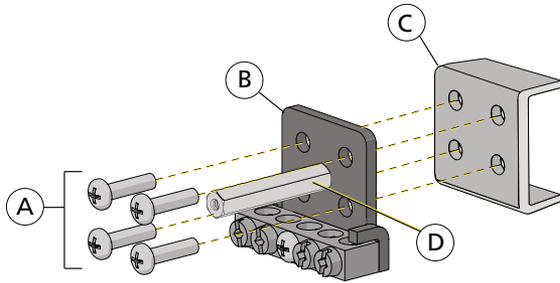
1. Ensure power to the rack is off.
2. Use a Phillips screwdriver to remove all screws from the "+" and "-" terminals on each three-bay frame.

3. Install a bus plate to the "+" terminal of one three-bay frame using the screws provided with the MEAN WELL three-bay frame. See [Bussing Kit Parts Illustration on the facing page](#).
 - a. Install a 1U bus bar if you are installing a single three-bay frame.
 - b. Install a 2U bus bar to the "+" terminals of two three-bay frames, located in adjacent positions in the same equipment rack.
 - c. Install a 3U bus bar to the "+" terminals of three three-bay frames, located in adjacent positions in the same equipment rack.
4. Repeat step 3 for the "-" terminals of the three-bay frames.
5. Strip the free end of each wire on all DC power harnesses to 11 mm (7/16 in).
6. Insert the red wire from each DC power harness into a terminal on the positive bus bar.
7. Insert the black wire from each DC power harness into a terminal on the negative bus bar.
8. Tighten the screws securing each bus bar to the terminals and tighten the screws securing each wire into a terminal.
9. Complete the [Final Installation Steps on page 46](#).

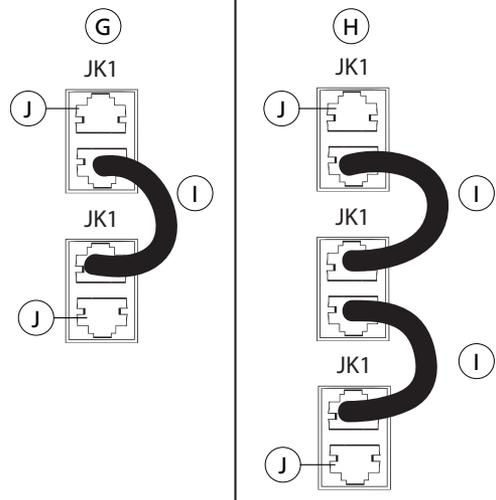


A	1U positive (+) bus bar: connect red wires from R12 power harnesses to any terminal.
B	1U negative (-) bus bar: connect black wires from R12 power harnesses to any terminal.
C	JK1 ports, left open in the top example because there is only one RKP-1UI. See Final Installation Steps on page 46 .
D	CN500 port with DB-25 terminator. See Final Installation Steps on page 46 .
E	2U positive (+) bus bar: connect red wires from R12 power harnesses to any terminal.
F	2U negative (-) bus bar: connect black wires from R12 power harnesses to any terminal.
G	Install one RJ45 terminator in each RKP-1UI when bussing two or more RKP-1UI together. See Final Installation Steps on page 46 .
H	Install an RJ45 bussing cable when bussing two RKP-1UI. See Final Installation Steps on page 46 . Bussing three RKP-1UI requires a second RJ45 bussing cable. RJ45 bussing cables are included in the 2U and 3U bussing kits.
Note: See Bussing Kits on page 46 and Bussing Kit Parts Illustration on the facing page for information about assembling bussing kits. This illustration does not show the RKP-1UI ground connections.	

Bussing Kit Parts Illustration



A	Screws provided with the MEAN WELL three-bay frame
B	1U bus bar
C	DC output terminal on MEAN WELL three-bay frame
D	Threaded standoff
E	2U bus bar
F	3U bus bar
G	2U bus bar kit RJ45 termination
H	3U bus bar kit RJ45 termination
I	RJ45 bussing cable (only included in 2U or 3U bussing kits)
J	Install RJ45 terminators provided by MEAN WELL in these locations.



For clarity, only one terminal of each MEAN WELL three-bay frame is shown above. The rest of the three-bay frame is omitted from the illustration.

Bussing Kits

ETC offers bussing kits for installations with one, two, or three RKP-1UI rack-mount units. The following bussing kits are available:

Bussing Kit Model	Bussing Kit Part Number	Quantity		Quantity of Bussing Kit Components			
		RKP-1U	R12	Ground Harnesses	DC Power Harnesses	Bus Bars and Bus Bar Covers	RJ45 Bussing Cables
FDRPS1BK1-1	7148K1001	1 (1U)	1	1	1	<ul style="list-style-type: none"> Two 1U bus bars One 1U bus bar cover 	None
FDRPS1BK1-2	7148K1002		2		2		
FDRPS1BK1-3	7148K1003		3		3		
FDRPS1BK2-4	7148K1004	2 (2U)	4	2	4	<ul style="list-style-type: none"> Two 2U bus bars One 2U bus bar cover 	1
FDRPS1BK2-5	7148K1005		5		5		
FDRPS1BK2-6	7148K1006		6		6		
FDRPS1BK3-7	7148K1007	3 (3U)	7	3	7	<ul style="list-style-type: none"> Two 3U bus bars One 3U bus bar cover 	2
FDRPS1BK3-8	7148K1008		8		8		
FDRPS1BK3-9	7148K1009		9		9		

Bussing Kit Details

- Each DC power harness is 2.4 m (8 ft) long with with one red wire and one black 8 AWG wire, pre-terminated to R12 input plugs on one end with bare ends on the other.
- Each ground harness is 61 cm (2 ft) long with 8 AWG insulated wire with a ring terminal on one end and a bare end on the other.
- Each bus bar cover comes with M4 x 12 mm nylon screws for installation to the standoffs on the bus bars.
- Each RJ45 bussing cable is 30 cm (1 ft).

See [Bussing Kit Parts Illustration on the previous page](#).

Final Installation Steps



Note: Each MEAN WELL three-bay frame ships with a DB-25 terminator that must be installed in the CN500 port in order for the three-bay frame to power on.



Note: The current-sharing features of the MEAN WELL power supplies in multiple three-bay frames will not work unless the JK1 ports are connected in parallel. See the Parallel Operation section in the RCP-2000/RKP-1U Instruction Manual from MEAN WELL (see [Technical Information from MEAN WELL on page 40](#)) and the [Bussing Kit Parts Illustration on the previous page](#).

1. Ensure power to the rack is off.
2. Install the bus-bar cover to the standoffs on the bus bars using the provided nylon screws.
3. If you are installing multiple three-bay frames with a 2U or 3U bussing kit, connect the JK1 ports on the three-bay frames in parallel using the RJ45 cables provided in the bussing kit.
 - Install two of the RJ45 terminators included with the MEAN WELL three-bay frames.
4. Install a DB-25 terminator (included with your MEAN WELL three-bay frame) to the connector CN500 on each three-bay frame. The DB-25 terminator resembles a serial port or parallel port connector.
5. Connect the AC inputs of each power supply module to the AC power source using the provided power input cords.

MEAN WELL LED Indicators

For information on the LED indicators on the MEAN WELL power supply modules, view the RKP-1UI and RCP-2000 specifications on the MEAN WELL website. See [Technical Information from MEAN WELL on page 40](#).

Appendix C

Compliance

For complete product documentation, including compliance documentation, visit etconnect.com.



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