Quantum DXi4700 DC Power Installation Guide

This document contains the following topics:

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Overview

Follow the steps in this guide to install a DC power supply in the DXi4700 Node and Array Module:

- Installing Node DC Power Supplies on the next page
- Installing Array Module DC Power Supplies on page 10

Notational Conventions

This guide uses the following conventions:

Note: Note emphasizes important information related to the main topic.

Caution: Caution indicates potential hazards to equipment or data.

WARNING: Warning indicates potential hazards to personal safety.

Warnings and Cautions

WARNING: For equipment using -48 to -60V DC power supplies, a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices.

WARNING: An energy hazard will exist if the safety ground cable is omitted or disconnected.

WARNING: The system chassis must be positively grounded to the rack cabinet frame. Do not attempt to connect power to the system until grounding cables are connected.

Caution: This equipment is designed to permit the connection of the earthed conductor of the DC supply circuit to the earthing conductor on the equipment. See the installation instructions. If this connection is made, all of the following conditions must be met.

- This equipment must be connected directly to the DC supply system earthing electrode conductor to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode conductor is connected.
- This equipment must be located in the same immediate area (such as, adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system must not be earthed elsewhere.
- The DC supply source must be located within the same premises as this equipment.

- This equipment is intended for installation in a restricted access location.
- The earthed circuit conductor between the DC power source and the earthing electrode conductor must not be connected to switching or disconnecting devices.

Precaution Statements

Connect the equipment to a -48V DC supply source that is electrically isolated from the AC source (reliably grounded 48V DC SELV source). Ensure that the -48V DC source is secured to earth (ground).

A readily accessible disconnect device that is suitably approved and rated must be incorporated in the field wiring.

⚠ **Caution:** Wire the unit with copper wire only, unless otherwise specified, use only 10 American Wire Gauge (AWG) wire rated minimum 90 ºC (194 ºF) for source and return. Protect the 48 - 60V DC (1 wire) with a branch circuit over-current protection rated 50 A for DC with a high interrupt current rating.

⚠ **Caution:** When stranded wiring is required, use approved wiring termination, such as closed-loop or spade-type with upturned lugs. These terminations are the appropriate size for the wires and must be double crimped, one on the conductor and one on the insulation.

⚠ **Caution:** When installing the unit, the ground connection must always be made first and disconnected last to prevent an energy hazard.

⚠ **Caution:** Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Installing Node DC Power Supplies

This section describes how to install DC power supplies in the DXi4700 Node.

Tasks:

To install a DC power supplies in the DXi4700 Node, perform the following tasks:

1. Obtain a Node DC power supply kit from Quantum (Obtaining a Node DC Power Supply Kit on the next page).
2. Remove the Node AC power supply (Removing a Node AC Power Supply on the next page).
3. Install DC power supply labels on DXi4700 Node (Installing DC Power Supply Labels on page 5).
4. Wire the DC power supply (Wiring a Node DC Power Supply on page 6).
5. Install the DC power supply (Installing a Node DC Power Supply on page 8).

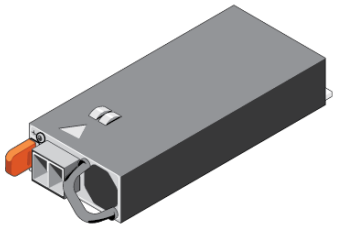
Obtaining a Node DC Power Supply Kit

Before beginning the replacement procedure, make sure that you have the required replacement kit. The appropriate replacement power supply will be provided by Quantum.

Required Equipment

You will need the following items to perform this procedure:

- DXi4700 Node DC power supply kit (DDY47-APSD-ND1A).
- Wire-stripper pliers capable of removing insulation from size 10 AWG stranded insulated copper wire.
- (Not included) DC power cable wiring. For wire AWG requirements, see Wiring a Node DC Power Supply on page 6.

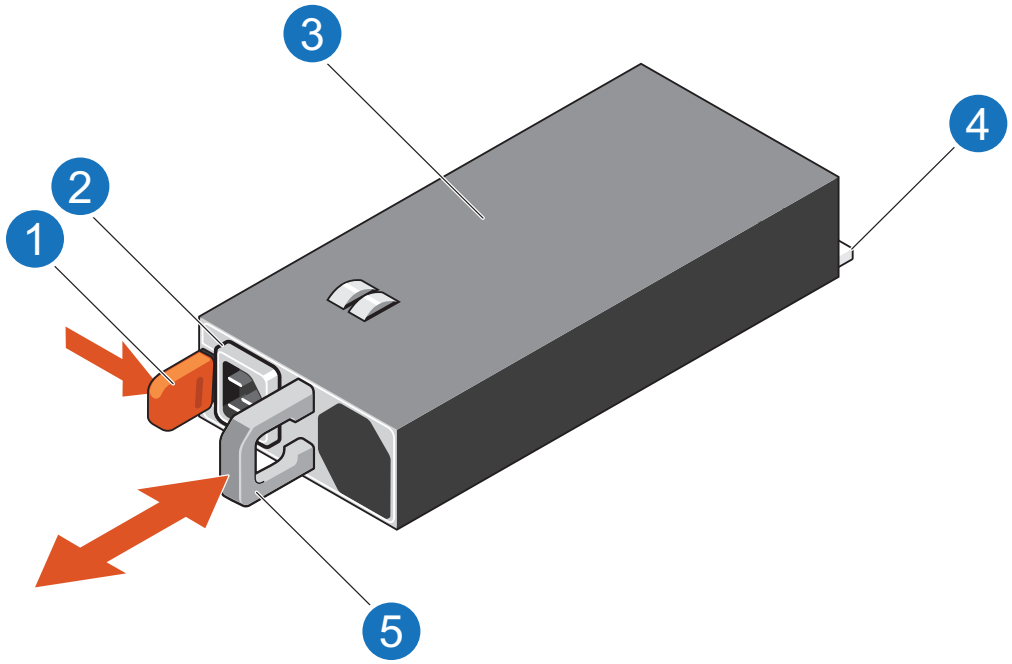
Illustration	Description
	DC Power Supply for DXi4700 Node DDY47-APSD-ND1A

Removing a Node AC Power Supply

Caution: Do not mix AC and DC power supplies on the same Node. Ensure the source power is off to both of the Node power supplies before starting the conversion process.

1. Disconnect the power cable from the power source and from the power supply unit you intend to remove and remove the cables from the strap.
2. Press the release latch and slide the power supply unit out of the chassis.

Figure 1: Removing a Node AC power supply unit



1. release hatch **2. power supply unit cable connector** **3. power supply**

4. connector **5. power supply handle**

Installing DC Power Supply Labels

The Node DC power supply kit contains the following labels (see Figure 2 below and Figure 3 on the next page). Install the DC power labels on the side of the DXi4700 Node chassis in the following locations (see Figure 4 on the next page).

Note: Install the DC power labels before installing the DXi4700 system in the rack. For more information, see the *Quantum DXi4700 Installation and Configuration Guide* (6-67961).

Figure 2: DC Power Supply Label A

Figure 3: DC Power Supply Label B

Figure 4: DC Power Supply Label Location on DXi4700 Node chasis

1. Label A (Place on top of existing label) **2. Label B (Place on top of existing label)**

Wiring a Node DC Power Supply

Steps:

Wiring a DC power supply includes the following steps:

1. Assembling and Connecting the Safety Ground Wire on the next page
2. Assembling the DC Input Power Wires on the next page

WARNING: Before wiring a Node DC power supply, verify that the power cable is not connected to the DC power source.

Additional Information

- Before wiring a power supply, review all Warnings and Cautions on page 2 and Precaution Statements on page 3.
- Wire the unit with copper wire only, unless otherwise specified, use only 10 American Wire Gauge (AWG) wire rated minimum 90 ºC for source and return. Protect the 48 - 60V DC (1 wire) with a branch circuit over-current protection rated 50 A for DC with a high interrupt current rating.
- It is recommended that you use stranded copper wire type.

- Connect the equipment to a 48 - 60V DC supply source that is electrically isolated from the AC source (reliably grounded (48–60) V DC SELV source). Ensure that the 48 - 60V DC source is efficiently secured to earth (ground).

Assembling and Connecting the Safety Ground Wire

1. Strip the insulation from the end of the green or yellow wire, exposing approximately 0.175 inch (4.5 mm) of copper wire.
2. Using a hand-crimping tool (Tyco Electronics, 58433-3 or equivalent), crimp the ring-tongue terminal (Jeeson Terminals Inc., R5-4SA or equivalent) to the green/yellow wire (safety ground wire).

Assembling the DC Input Power Wires

1. Strip the insulation from the ends of the DC power wires, exposing approximately 13 mm (0.5 inch) of copper wire.

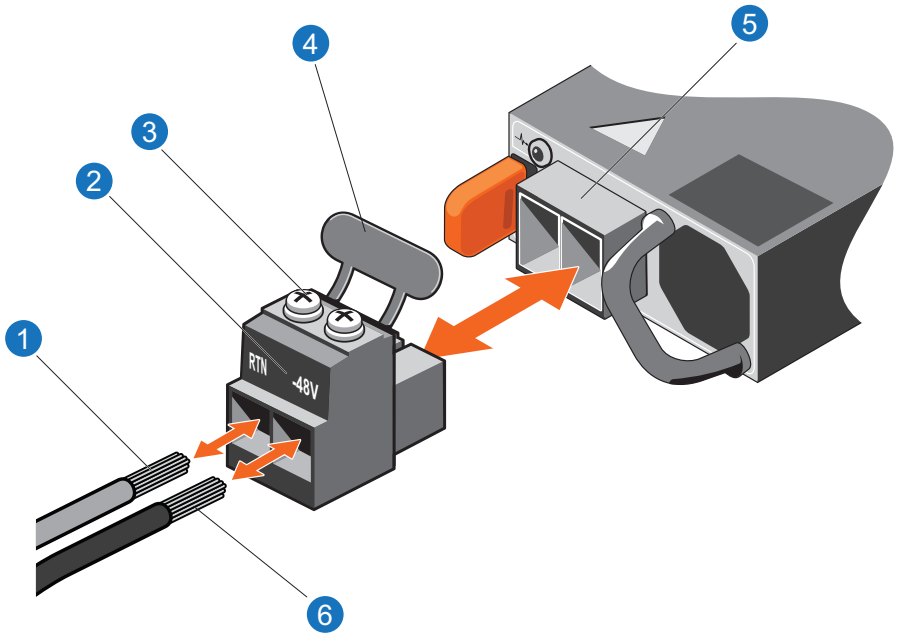
   Caution: Reversing polarity when connecting DC power wires can permanently damage the power supply or the system.

2. Insert the copper ends into the mating connectors and tighten the captive screws at the top of the mating connector using a #2 Phillips screwdriver.

   Caution: To protect the power supply from electrostatic discharge, the captive screws must be covered with the rubber cap before inserting the mating connector into the power supply.

3. Rotate the rubber cap clockwise to fix it over the cap
4. Insert the mating connector into the power supply (see Figure 5 on the next page).

Figure 5: Assembling the DC Input Power Wires



1. wire RTN **2. DC power connector** **3. captive screws (2)**
4. rubber cap **5. DC power socket** **6. wire -48 V**

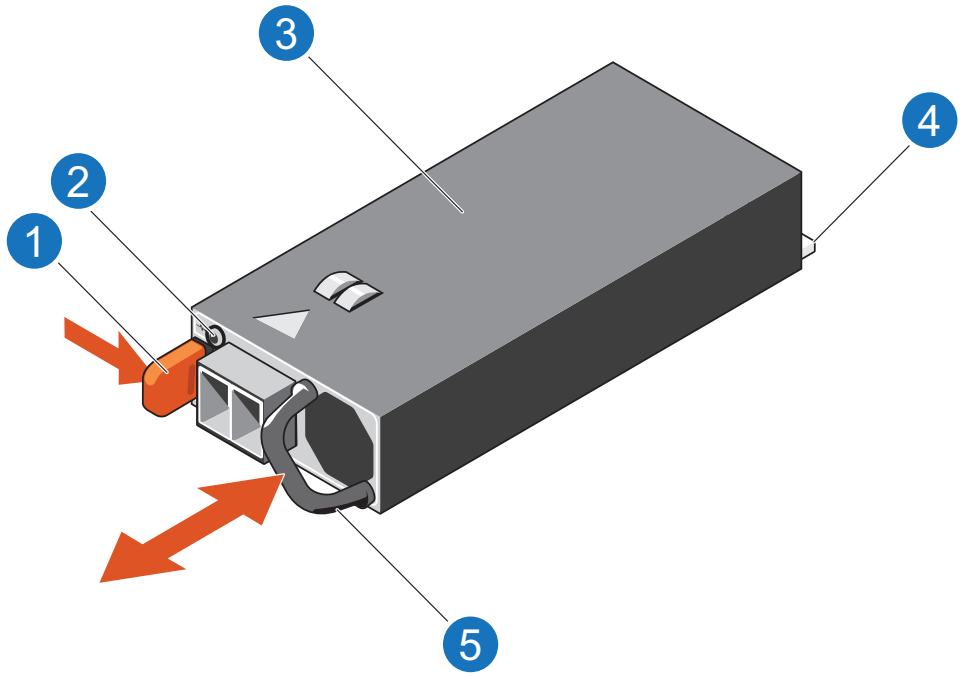
Installing a Node DC Power Supply

1. Verify that both the power supplies are of the same type and have the same maximum output power.

   Note: The maximum output power (shown in watts) is listed on the power supply label.

2. Slide the new power supply unit into the chassis until the power supply unit is fully seated and the release latch snaps into place (see Figure 6 on the next page).

Figure 6: Installing a Node DC Power Supply

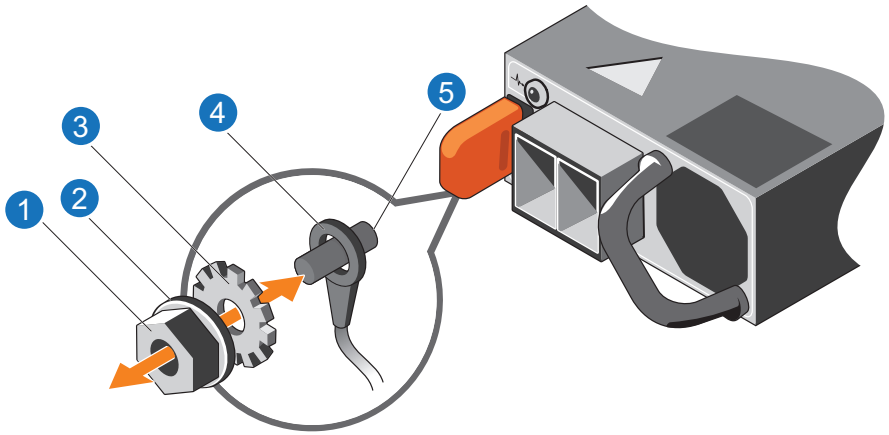


1. release hatch **2. power supply status indicator** **3. power supply**

4. connector **5. power supply handle**

3. Connect the safety ground wire to the grounding post on the back of the system using a #6-32 nut equipped with a locking washer (see Figure 7 below).

Figure 7: Assembling and Connecting the Safety Ground Wire.



1. #6-32 nut **2. spring washer** **3. locking washer**

4. safety ground wire **5. grounding post**

4. Install the DC power connector in the power supply unit.

   Caution: When connecting the power wires, secure the wires with the strap to the power supply handle.

5. Connect the wires to a DC power source.

   Note: When installing, hot-swapping, or hot-adding a new power supply, wait for 15 seconds for the system to recognize the power supply and determine its status. The power-supply status indicator turns green to signify that the power supply is functioning properly

Installing Array Module DC Power Supplies

This section describes how to install DC power supplies in the DXi4700 Array (JBOD).

Tasks:

To install DC power supplies in the DXi4700 Array, perform the following tasks:

1. Obtain an Array DC power supply kit from Quantum (Obtaining an Array DC Power Supply Kit below).
2. Remove the Array AC power supply (Removing an Array AC Power Supply on the next page).
3. Wire the DC power supply (Wiring an Array DC Power Supply on page 12)
4. Install the DC power supply (Installing an Array DC Power Supply on page 15)

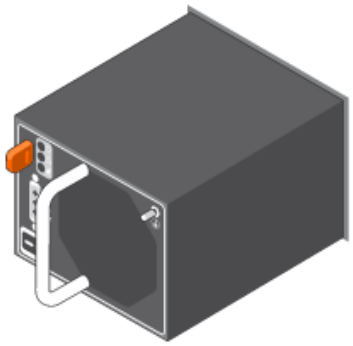
Obtaining an Array DC Power Supply Kit

Before beginning the replacement procedure, make sure that you have the required replacement kit. The appropriate replacement power supply will be provided by Quantum.

Required Equipment

You will need the following items to perform this procedure:

- DXi4700 Array DC power supply kit (DDY47-APSD-EX1A) and DC power cable provided by Quantum.
- Hand-crimping tool (Tyco Electronics, 58433-3 or equivalent).
- Wire-stripper pliers capable of removing insulation from size 10 AWG stranded insulated copper wire.

Illustration	Description
	DC Power Supply for DXi4700 Array DC Power Cable for DXi4700 Array DDY47-APSD-EX1A

Removing an Array AC Power Supply

Caution: Do not mix AC and DC power supplies on the same Array. Ensure the source power is off to both of the Node power supplies before starting the conversion process.

Caution: A single power supply unit or cooling fan module can be removed from a turned on enclosure for a maximum period of five minutes. Beyond that time, the enclosure may automatically shut down to prevent damage.

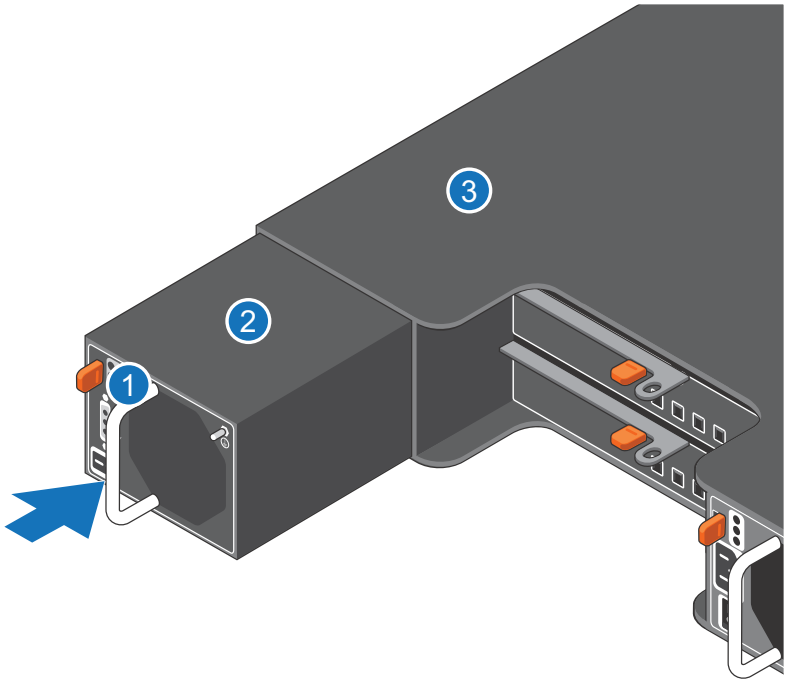
Note: If you remove a fully functioning power supply or cooling fan module, the fan speed in the remaining module increases significantly to provide adequate cooling. The fan speed decreases gradually when a new power supply or cooling fan module is installed.

1. Turn off the power supply unit or cooling fan module.
2. Disconnect the power cable from the power source.
3. Remove the Velcro straps that secure the power cable and then disconnect the power cable from the power supply or cooling fan module.

   WARNING: The power supply unit or cooling fan modules are heavy. Use both hands while removing the module.

4. Press the release tab and pull the power supply out of the chassis (see Figure 8 on the next page).

Figure 8: Removing and installing a power supply unit or cooling fan module



1. release tab **2. power supply unit**

3. EMM or Power Supply Cage

Wiring an Array DC Power Supply

Steps:

Wiring a DC power supply includes the following steps:

1. Assembling and Connecting the Safety Ground Wire on the next page
2. Wiring the Power Cables on page 14
3. Connecting the Cable to the Power Supply Module on page 15

WARNING: Before wiring a node DC power supply, verify that the power cable is not connected to the DC power source.

Additional Information

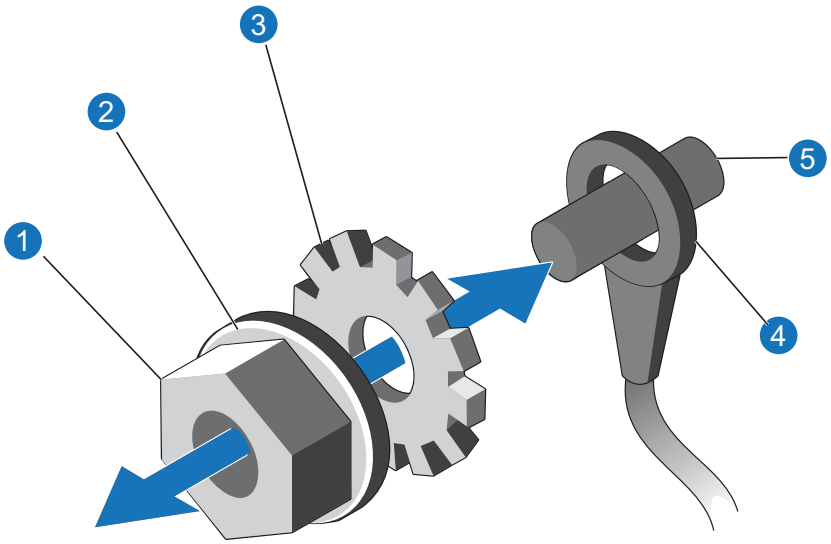
- Before wiring a power supply, review all Warnings and Cautions on page 2 and Precaution Statements on page 3.
- It is recommended that you use stranded copper wire type.

Assembling and Connecting the Safety Ground Wire

Note: The safety wire ground is not required if the Array is grounded via the cable connector. The ground may be required to comply with applicable local or national codes and practices.

1. Strip the insulation from the end of the green or yellow wire, exposing approximately .175 inch (4.5 mm) of copper wire.
2. Using a hand-crimping tool (Tyco Electronics, 58433-3 or equivalent), crimp the ring-tongue terminal (Jeeson Terminals Inc., R5-4SA or equivalent) to the green/yellow wire (safety ground wire).
3. Connect the safety ground wire to the grounding post on the back of the system using a #6-32 nut equipped with a locking washer (see Figure 9 below).

Figure 9: Assembling and Connecting the Safety Ground Wire.



1. #6/32 nut **2. spring washer** **3. locking washer**

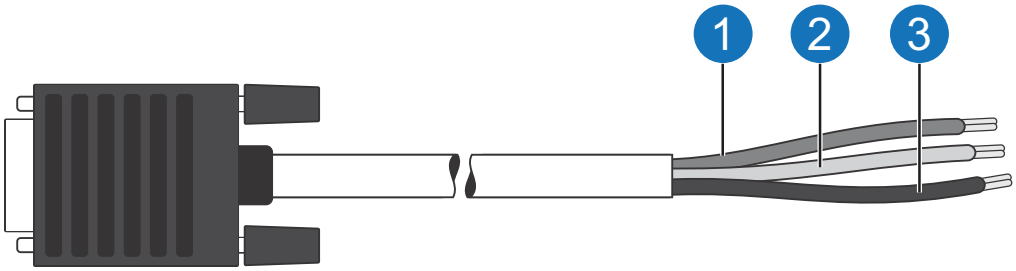
4. safety ground wire terminal **5. grounding post**

Wiring the Power Cables

The DC power supply module must be hard-wired to a DC power source in your environment by a qualified electrician. To wire your DC power supply module to a DC power source:

1. Make sure that the power switch is in the OFF position, and the power supply module is turned off.
2. Connect each wire on power cable to the matching wire or terminal on DC power source (see Figure 10 below).

Figure 10: DC Power Cable Connector and Terminals



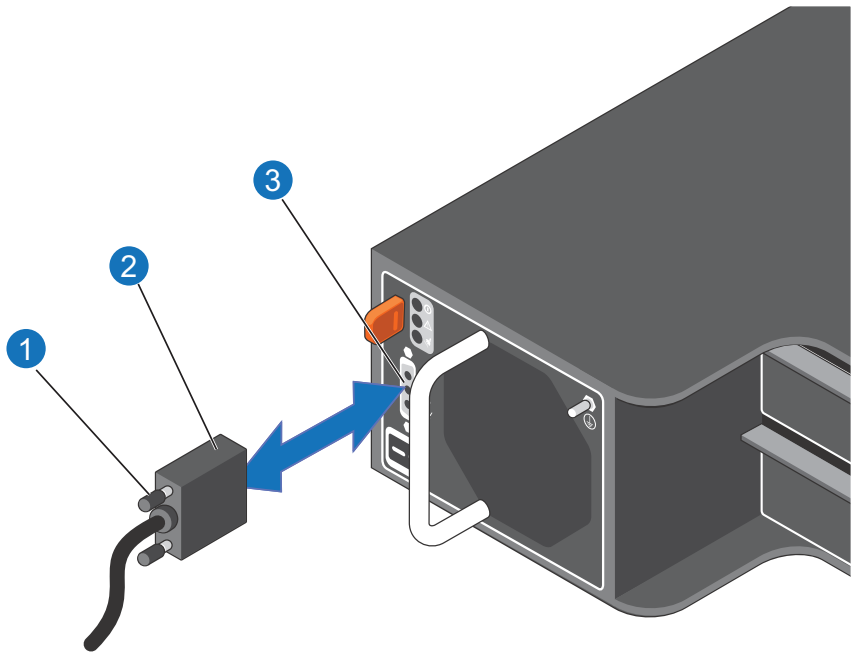
Pin	Description	Wire Color	Wire Size
1	-48V DC Safety Ground (F or G)	Green or Yellow	10 AWG
2	-48V DC Return (+)	Blue	10 AWG
3	-48V DC (–)	Black	10 AWG

Connecting the Power Cable to the Power Supply Module

Caution: Make sure that the power switch is in the OFF mode before connecting the DC power cable.

1. Connect the DC power supply cable to the power supply module by plugging the power cables into the matching power supply module plug connector.
2. Secure the power cables to the power supply module by fastening the power cables firmly to the system using the attached (trapped) finger screws (see Figure 11 on the next page).
3. Install the screws to the corresponding screw holes on the system and tighten until the power connector is firmly held in place.

Figure 11: Connecting the Cable to the Power Supply Module



1. attached (trapped) finger screws

2. connector on the power supply cable

3. connector on the power supply module

Installing an Array DC Power Supply

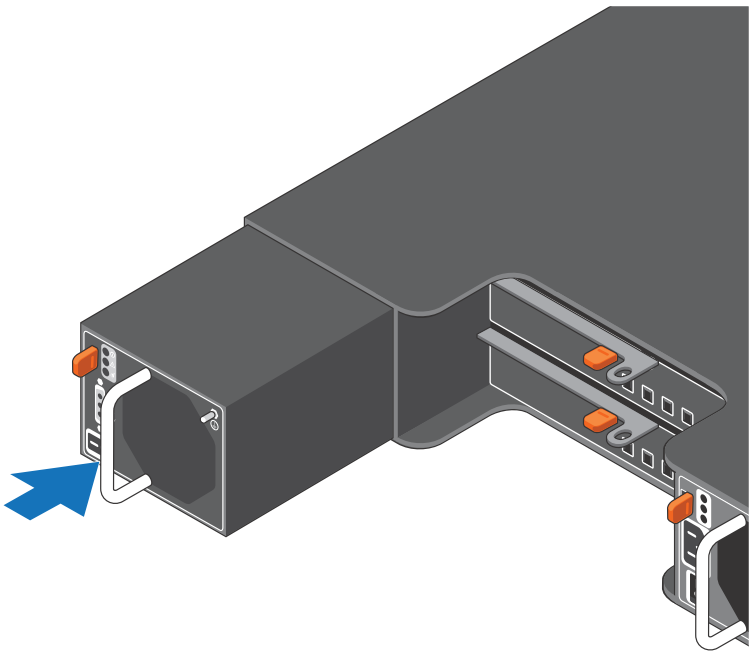
WARNING: For equipment using -48 to -60V DC power supplies, a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices.

1. Verify that both the power supplies are of the same type and have the same maximum output power.

   Note: The maximum output power (shown in watts) is listed on the power supply label.

2. Slide the new power supply unit into the chassis until the power supply unit is fully seated and the release latch snaps into place (see on page 10).

Figure 12: Installing an Array DC Power Supply



3. Connect the safety ground wire.

Note: The safety wire ground is not required if the Array is grounded via the cable connector. The ground may be required to comply with applicable local or national codes and practices.

4. Install the DC power connector in the power supply unit.

Caution: When connecting the power wires, secure the wires with the strap to the power supply handle.

5. Connect the wires to a DC power source.

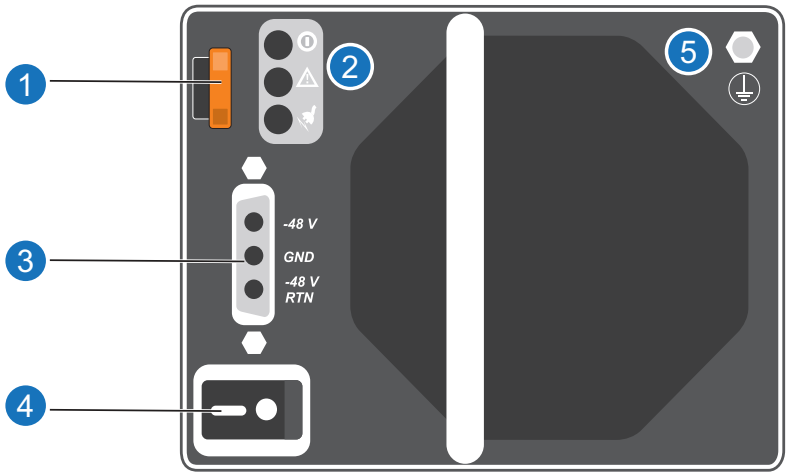
Note: When installing, hot-swapping, or hot-adding a new power supply, wait for 15 seconds for the system to recognize the power supply and determine its status. The power-supply status indicator turns green to signify that the power supply is functioning properly

DXi4700 Array DC Power Supply Features

A DXi4700 Array receives its power from two power modules. The power supply kit contains two 48 V DC power supply modules. Each power supply module has two cooling fans.

Figure 13 on the next page shows the Array power supply module features.

Figure 13: Array DC Power Supply Module Back Panel Features



Item	Feature	Description
1	Power supply release lever	Unlocks the power supply module for removal from the storage array.
2	Power indicator codes	Provides power status of module (see Power Indicator Codes below).
3	Connector on the power supply module	Connects the power supply module to the DC power supply module.
4	Power supply On or Off switch	Controls the power supply module power output to the storage array.
5	Protective safety earth ground	Provides grounding for the power supply module. It must be connected to the building's protective safety earth ground.

Power Indicator Codes

The DC power supply module has LEDs that indicate power supply status (see Figure 14 on the next page). Under normal conditions, the power output and line input LEDs are lit at the same time.

Figure 14: Power Indicator Codes

Item	LED	Color	State
1	Power output	Green	• ON - Normal operation. Power supply is connected to DC power and the power switch is on. The power supply module is supplying DC power to the array. • OFF - Indicates any one of the following: ◦ The power switch is off. ◦ The power supply module is not connected to power. ◦ There is a fault condition.
2	Power supply module fault	Yellow	• ON - Fault detected. • OFF - OK • Blinks briefly when power is first turned on to the power supply module.
3	Line input	Green	• ON - Power supply module is connected to a source of DC power whether or not the power switch is on. • OFF- Power supply module is completely disconnected from any source of DC power.

DXi4700 DC Power Supply Specifications

DXi4700 Node and Array Module (JBOD)

Specification	DXi4700 Node	DXi4700 Array Module (JBOD)
Input Voltage	-48 to -60V DC	-48 to -60V DC
Inrush Current	10.4A @ -48 V DC 8.3A @ -60 V DC	5.7A @ -48V DC 4.6A @ -60V DC
Operating Current	9.6A @ -48 V DC 7.8A @ -48 V DC	4.6A @ -48V DC 3.7A @ -60V DC
Operating Power	466W 1591 BTU/hr	220W 751 BTU/hr

Maximum DXi4700 Configuration (1 Node and 3 JBODs)

Specification	Maximum DXi4700 Configuration
Input Voltage	-48 to -60V DC
Inrush Current	26.9A @ -48 V DC 21.9A @ -60 V DC
Operating Current	24.1A @ -48 V DC 19.3A @ -48 V DC
Operating Power	1160W 3960 BTU/hr