



PowerDirect 3000 50 VDC Power System

Installation and User Manual

Specification Number: 1PSS503319N3

Model Number: PSS503319N3

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/support/> for additional assistance.

TABLE OF CONTENTS

Admonishments Used in this Document.....	v
Important Safety Instructions.....	vi
Safety Admonishments Definitions.....	vi
General Safety.....	vi
Personal Protective Equipment (PPE).....	vi
Hazardous Voltage.....	vi
Maintenance and Replacement Procedures.....	vii
Ventilation Openings.....	vii
Handling Equipment Containing Static Sensitive Components.....	vii
Input Voltages.....	vii
Lockout/Tagout (LOTO).....	vii
AC Input Voltages.....	vii
Output Voltages.....	vii
Lockout/Tagout (LOTO).....	vii
DC Output Voltages (≤ 50 VDC).....	vii
Static Warning.....	viii
1 Customer Documentation Package.....	1
2 Field Replaceable Unit List.....	1
3 System Description.....	1
4 Installation Acceptance Checklist.....	2
5 Installing the System.....	3
5.1 General Requirements.....	3
5.2 Inspecting the Equipment.....	3
5.3 Installation.....	4
6 Making Electrical Connections.....	9
6.1 Important Safety Instructions.....	9
6.2 Wiring Considerations.....	9
6.3 50 VDC Output Connection.....	10
6.4 Parallel Shelves Connection.....	11
6.5 AC Input.....	12
6.5.1 Component and Connector Definition.....	12
6.6 Controller Front Panel RJ45 Connectors.....	14
6.7 Reset Button.....	15
6.8 Controller Indicator Light.....	15
6.9 Controller Power Input/Output.....	16
7 Installing the PSUs and PMC.....	17
7.1 Installing PSUs.....	17
7.2 Installing the PMC.....	18
8 Initially Starting, Configuring, and Checking System Operation.....	19
8.1 Important Safety Instructions.....	19
8.2 Initial Startup Preparation.....	19
8.3 Initially Starting the System.....	19

9 Operating Procedures.....21

9.1 PMC and PSUs.....21

10 Maintenance.....21

10.1 System Maintenance Procedures.....21

10.2 Adding a PSU (R505500V3) to a DC Shelf.....21

11 Troubleshooting and Repair21

11.1 Contact Information.....21

11.2 Controller and PSUs.....21

11.3 System Troubleshooting Information21

11.4 Replacement Information.....22

11.4.1 Replacement Assemblies.....22

11.5 Replacement Procedures.....22

11.5.1 Important Safety Instructions22

11.5.2 Replacing PMC22

11.5.3 Replacing a PSU22

Admonishments Used in this Document



DANGER! Warns of a hazard the reader ***will*** be exposed to that will ***likely*** result in death or serious injury if not avoided. (ANSI, OSHA)



WARNING! Warns of a potential hazard the reader ***may*** be exposed to that ***could*** result in death or serious injury if not avoided. This admonition is not used for situations that pose a risk only to equipment, software, data, or service. (ANSI)



CAUTION! Warns of a potential hazard the reader ***may*** be exposed to that ***could*** result in minor or moderate injury if not avoided. (ANSI, OSHA) This admonition is not used for situations that pose a risk only to equipment, data, or service, even if such use appears to be permitted in some of the applicable standards. (OSHA)



ALERT! Alerts the reader to an action that ***must be avoided*** in order to protect equipment, software, data, or service. (ISO)



ALERT! Alerts the reader to an action that ***must be performed*** in order to prevent equipment damage, software corruption, data loss, or service interruption. (ISO)



FIRE SAFETY! Informs the reader of fire safety information, reminders, precautions, or policies, or of the locations of fire-fighting and fire-safety equipment. (ISO)



SAFETY! Informs the reader of general safety information, reminders, precautions, or policies not related to a particular source of hazard or to fire safety. (ISO, ANSI, OSHA)

Important Safety Instructions

Safety Admonishments Definitions

Definitions of the safety admonishments used in this document are listed under “Admonishments Used in this Document” on page v.

General Safety



WARNING! YOU MUST FOLLOW APPROVED SAFETY PROCEDURES.

Performing the following procedures may expose you to hazards. These procedures should be performed by qualified technicians familiar with the hazards associated with this type of equipment. These hazards may include shock, energy, and/or burns. To avoid these hazards:

- a) The tasks should be performed in the order indicated.
- b) Remove watches, rings, and other metal objects.
- c) Prior to contacting any uninsulated surface or termination, use a voltmeter to verify that no voltage or the expected voltage is present. Check for voltage with both AC and DC voltmeters prior to making contact.
- d) Wear eye protection. When handling batteries, use gloves.
- e) Use certified and well-maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed.
- f) Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact an input or output terminal or exposed wire connected to an input or output terminal. NEVER allow a metal object, such as a tool, to contact more than one terminal at a time, or to simultaneously contact a terminal and a grounded object. Even a momentary short circuit can cause sparking, explosion, and injury.
- g) After handling of the enclosure or any such component, such as batteries, cables, busbars, etc., always wash hands immediately after.
- h) For systems operating with 400 VDC power, do not work on an energized system without full arc flash and PPE protection.

Personal Protective Equipment (PPE)



DANGER! ARC FLASH AND SHOCK HAZARD.

Appropriate PPE and tools required when working on this equipment. An appropriate flash protection boundary analysis should be done to determine the “hazard/risk” category, and to select proper PPE.



Only authorized and properly trained personnel should be allowed to install, inspect, operate, or maintain the equipment.

Do not work on LIVE parts. If required to work or operate live parts, obtain appropriate Energized Work Permits as required by the local authority, per NFPA 70E “Standard for Electrical Safety in the Workplace”.

Hazardous Voltage



DANGER! HAZARD OF ELECTRICAL SHOCK.

Be sure to disconnect the AC input power connection before removing the power shelf from the rack.

Maintenance and Replacement Procedures



ALERT! When performing any step in the procedures that requires removal or installation of hardware, use caution to ensure no hardware is dropped and left inside the unit; otherwise, service interruption or equipment damage may occur.



ALERT! Performing maintenance and/or troubleshooting procedures may interrupt power to the loads.



NOTE! When performing any step in the procedures that requires removal of existing hardware, retain all hardware for use in subsequent steps, unless otherwise directed.

Ventilation Openings



ALERT! PREVENT EQUIPMENT DAMAGE, MAINTAIN VENTILATION

To optimize the service life of this equipment, make sure there are no obstructions in front of the ventilation openings.

Handling Equipment Containing Static Sensitive Components



ALERT! Installation or removal of equipment containing static sensitive components requires careful handling. Before handling any equipment containing static sensitive components, read and follow the instructions provided under “Static Warning” on page viii.

Input Voltages

Refer to the input rating on the nameplate attached to the system.

Lockout/Tagout (LOTO)



DANGER! Follow local lockout/tagout procedures to ensure upstream branch circuit breakers remain de-energized during installation. DO NOT apply input power to the system until all electrical connections have been completed and checked.

AC Input Voltages

For Systems Operating with AC Input Voltage



DANGER! This system operates from AC input voltage capable of producing fatal electrical shock. AC input power must be completely disconnected from all branch-circuit's wiring used to provide power to the system before any AC electrical connections are made.

Output Voltages

Refer to the output rating on the nameplate attached to the system.

Lockout/Tagout (LOTO)



DANGER! Follow local lockout/tagout procedures to ensure branch circuit protection devices remain de-energized during installation at loads, as required.

DC Output Voltages (≤ 50 VDC)

For Systems Producing DC Output Voltage ≤ 50 VDC



DANGER! This system produces DC power. Although the DC voltage is not hazardously high, the system can deliver large amounts of current.

Static Warning



This equipment contains static sensitive components. The warnings listed below must be observed to prevent damage to these components. Disregarding any of these warnings may result in personal injury or damage to the equipment.

1. Strictly adhere to the procedures provided in this document.
2. Before touching any equipment containing static sensitive components, discharge all static electricity from yourself by wearing a wrist strap grounded through a one megohm resistor. Some wrist straps have a built-in one megohm resistor; no external resistor is necessary. Read and follow wrist strap manufacturer's instructions outlining use of a specific wrist strap.
3. Do not touch traces or components on equipment containing static sensitive components. Handle equipment containing static sensitive components only by the edges that do not have connector pads.
4. After removing equipment containing static sensitive components, place the equipment only on static dissipative surfaces such as conductive foam or ESD bag. Do not use ordinary Styrofoam or ordinary plastic.
5. Store and ship equipment containing static sensitive components only in static shielding containers.
6. If necessary to repair equipment containing static sensitive components, wear an appropriately grounded wrist strap, work on a conductive surface, use a grounded soldering iron, and use grounded test equipment.

1 Customer Documentation Package

This document (UM1PSS503319N3, *Installation and User Instructions*) for the Vertiv™ PowerDirect Rack 50 VDC Power System: Model PSS503319N3, Spec. No. 1PSS503319N3.

The complete Customer Documentation Package consists of...

Document Number	Document Description	How Provided
UM1PSS503319N3	Power System Installation and User Instructions	PDF File
SAG1PSS503319N3	System Application Guide	PDF File
UM1PMC1S3	System Controller User Instructions	PDF File
UM1R505500V3	Power Supply Unit Instructions	PDF File

2 Field Replaceable Unit List

The Field Replaceable Unit list is as follows:

Vertiv Part Number	Vertiv Model Number	Description
1PSS503319N3L	PSS5033-19N3-L	50 VDC, 33kW, 19" 1RU, GB300 Power Shelf (left AC input)
1PMC1S3	PMC1S3	Power Management Controller for GB300
10250067	/	L type bracket (Left & Right side) 744*43*40.5 mm
1R505500V3	R50-5500V3	50 VDC, 5.5kW, 19" 1RU PSU for GB300
1PSS503319N3R	PSS5033-19N3-R	50 VDC, 33kW, 19" 1RU, GB300 Power Shelf (right AC input)
10283898	/	GB300 PSU dummy (panel without painting)

3 System Description

The Vertiv™ PowerDirect Rack Model PSS503319N3, 50 VDC Power System is an integrated power system containing power supply units (PSU), a DC shelf and system controller PMC.

49 VDC @ up to 264 kW (Up to eight (8) shelves can be configured in a single system)

The capacity of a single shelf is 33 kW / 49 VDC.

Refer to SAG1PSS503319N3 (System Application Guide) for additional information.

Safety Requirements

IEC60950, IEC62368, UL and CE

System Rated input Voltage and Current

- Three-phase input:

Three-phase WYE: 60 A Maximum. The power supply is three-phase, with each phase supplying power to two modules.

DC Shelf

The DC shelf houses up to six (6) PSUs. Up to eight (8) shelves (4+4 Redundancy Configuration) can be configured in a single system. Each shelf in the system also houses the controller.

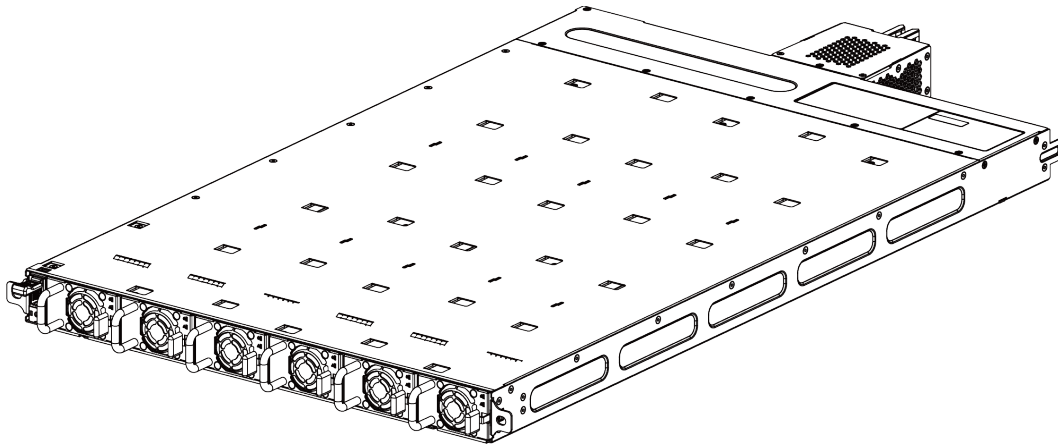
System Controller

The PMC is a power monitoring control unit, which collects PSU signals and reports the collected data to an external management unit via Redfish over Ethernet. It is connected to the PSUs in the shelf via the system backboard.

PSUs

The system contains PSUs that provide load power during normal operating conditions. Refer to the Power Supply Unit Instructions (UM1R505500V3) for more information.

Figure 3.1 Vertiv™ PowerDirect Rack 50 VDC Power System Overview Illustration



4 Installation Acceptance Checklist

Provided in this section is an Installation Acceptance Checklist. This checklist helps ensure proper installation and initial operation of the system. As the procedures presented in this document are completed, check the appropriate box on this list. If the procedure is not required to be performed for your installation site, also check the box in this list to indicate that the procedure was read. When installation is done, ensure that each block in this list has been checked. Some of these procedures may have been factory performed for you.



NOTE! The system should not be powered up until the end of this checklist.



NOTE! Some of these procedures may have been performed at the factory for you.

Installing the System

- ☐ Equipment Inspection Completed
- ☐ Shelf Busbar clip fully mated with rack busbar
- ☐ DC Shelf(s) Mounted in a Rack

Making Electrical Connections

- ☐ Power System Frame Grounding Connection Made
- ☐ 50 VDC Output Connection Made
- ☐ PMC RJ45 connector
- ☐ Parallel Shelves Connection Made via RJ45 connectors on the rear of the shelves

- ☐ AC Input Connections Made

Installing the PSUs

- ☐ PSUs Installed, as required

Initially Starting, Configuring, and Checking System Operation

- ☐ System Started, Configured, and Checked

5 Installing the System

5.1 General Requirements

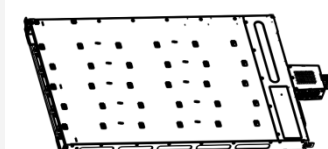
- This product is intended only for installation in a restricted access location on or above a non-combustible surface.
- This product must be located in a controlled environment with access to craft persons only.
- This product is intended for installation in data centers or network telecommunication facilities (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).
- This product is intended to be installed in a data center facility and be connected to a rack management unit, and the rack management unit directly monitors the status of the PSUs through the PMC.
- PSU and DC shelf ventilation openings must not be blocked, and the temperature of air entering these must not exceed the rated operating ambient temperature range.
- DC shelves are installed on the rails in the rack.

5.2 Inspecting the Equipment

General

1. Check the packing slip to make sure all components ordered were received. Report any missing items to the carrier and your local sales representative immediately.
2. Inspect the equipment and shipping container(s) for any signs of damage or mishandling.
3. As the equipment is unpacked, visually examine the system for transit damage.
4. Do not attempt to install the system if damage is apparent.
5. If any damage is noted, follow local practices for reporting and handling damaged goods.

Table 5.1 Product List

Power Shelf Product List			
Number	Part Description	Quantity / pcs	Picture
1	33kW Power Shelf	1	

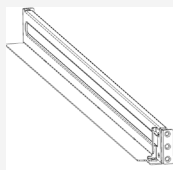
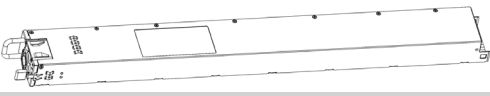
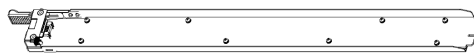
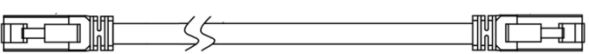
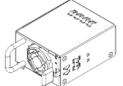
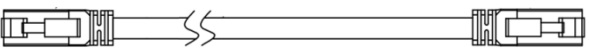
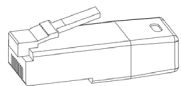
2	19-inch right bracket	1	
3	19-inch left bracket	1	
4	M6 torx screws (M6X1X8.2L, Torx T-25 driver)	10	
5	M6 Phillips screws(M6X14 Spring Washer Combo Screw, PH2 driver)	2	
6	5.5kW PSU	6	
7	PMC	1	

Table 5.2 Option accessory list

Power Shelf Product List			
Number	Part Description	Quantity / pcs	Picture
1	Cat 6* 30.5 cm MCU-Daisy Chain Cable	1	
2	GB300 blank PSU module	1	
3	Cat 6* 243 cm MCU-Daisy Chain Cable	1	
4	RJ45-120Ω terminal resistor	1	

5.3 Installation

Install rack mounting rail kit into a 19-inch IT rack as follows. Refer to Figure 5.1 to Figure 5.6 as this procedure is performed.

Procedure

1. Attach the two 19-inch bracket crossbars to the rack using 10 M6X1X8.2L screws (Torx T-25). Tighten to a recommended torque of 30 kgf-cm (2.94N-m). As shown in Figure 5.1.
2. Push the Power Shelf into the rack along the bracket crossbars until its mounting ears align with the rack. Fasten it with two M6 screws (including spring and flat washers, PH2 Screwdriver). applying a recommended torque of 30 kgf-cm (2.94N-m). As shown in Figure 5.2.



NOTE! Pay attention to the installation direction of the power shelf: the label faces up; the end tab of the inserted shelf must be aligned with the slots of the left and right bracket rear stops. The power shelf clip needs to align with the rack busbar.

3. PSU modules install into the Power Shelf (6 slots for option). Push the PSU modules into the Power Shelf along the slot until the latch clicks into position. As shown in Figure 5.3.
4. PMC module installed into the Power Shelf. Push the PMC module into the Power Shelf along the slot until the latch clicks into position. As shown in Figure 5.4.
5. Insert the AC input whip, connect to the power, and when the current is applied, the power shelf starts working. As shown in Figure 5.5. The AC connector is located on the rear of the shelf at either the left side or right side.
6. Insert the Daisy Chain cable for each MCU, up and down interconnection, and the shelf can be connected to each other in a daisy chain. The 120 Ω terminal resistors must be plugged into the top and bottom shelves. As shown in Figure 5.6.

Figure 5.1 Mounting the two 19inch bracket crossbars

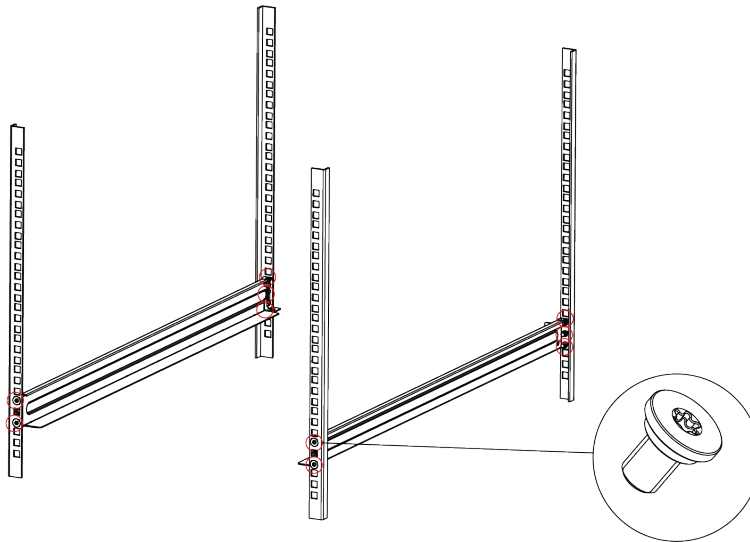


Figure 5.2 Pushing the Power Shelf into the rack

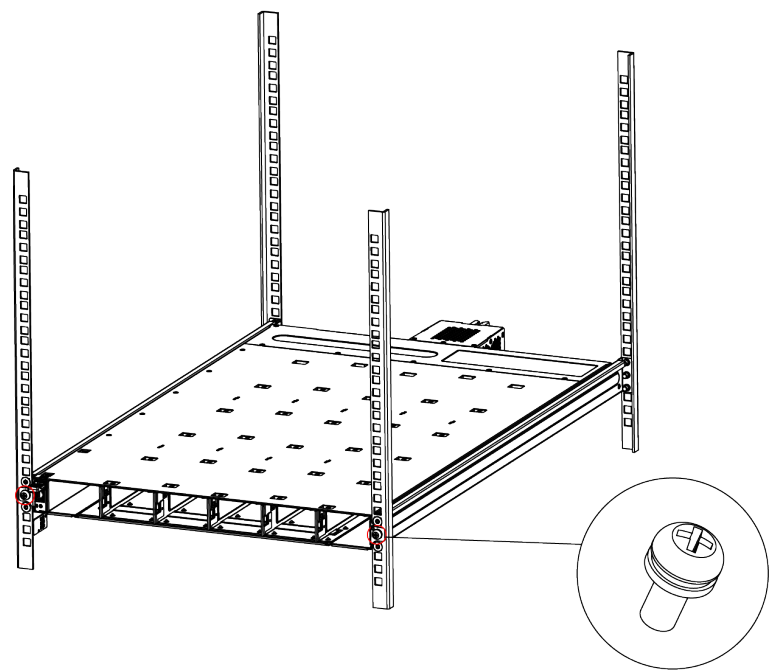


Figure 5.3 Pushing Power Shelf into the rack

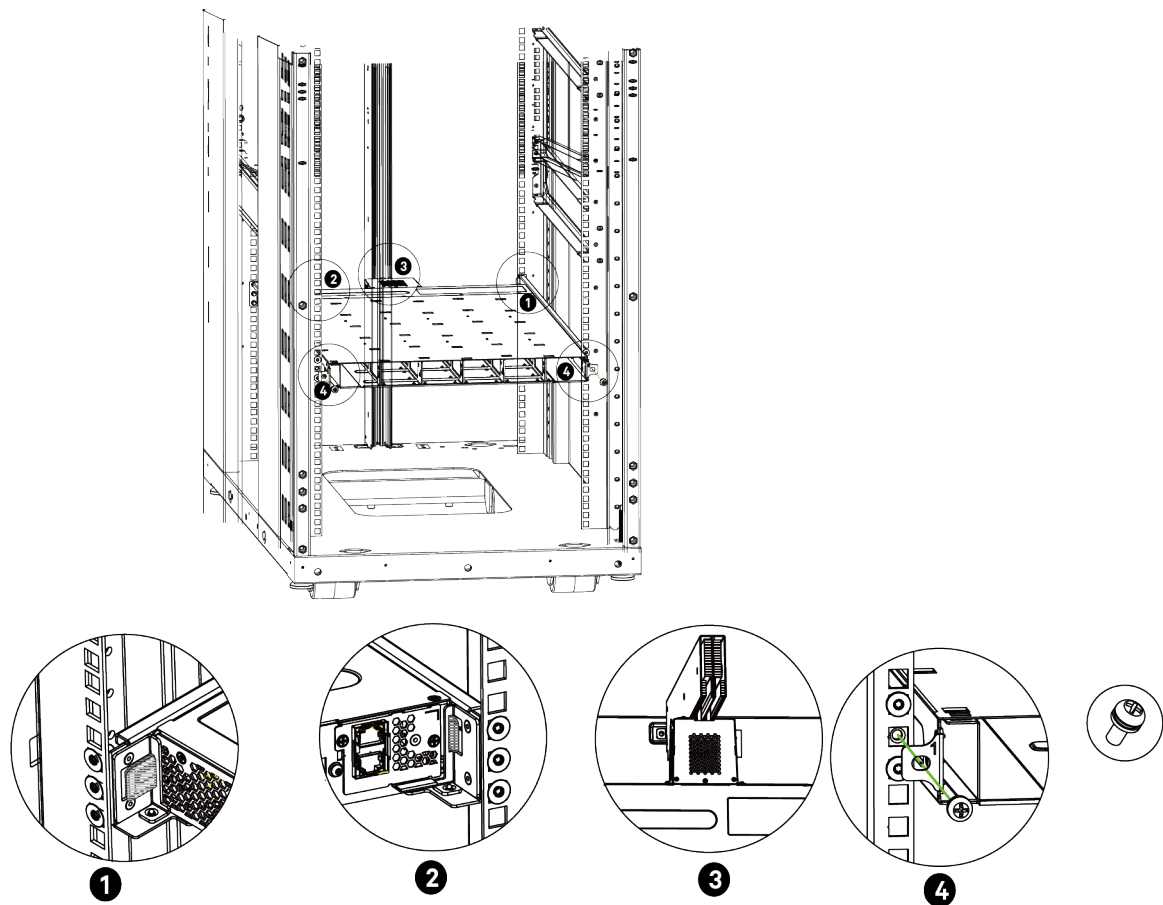
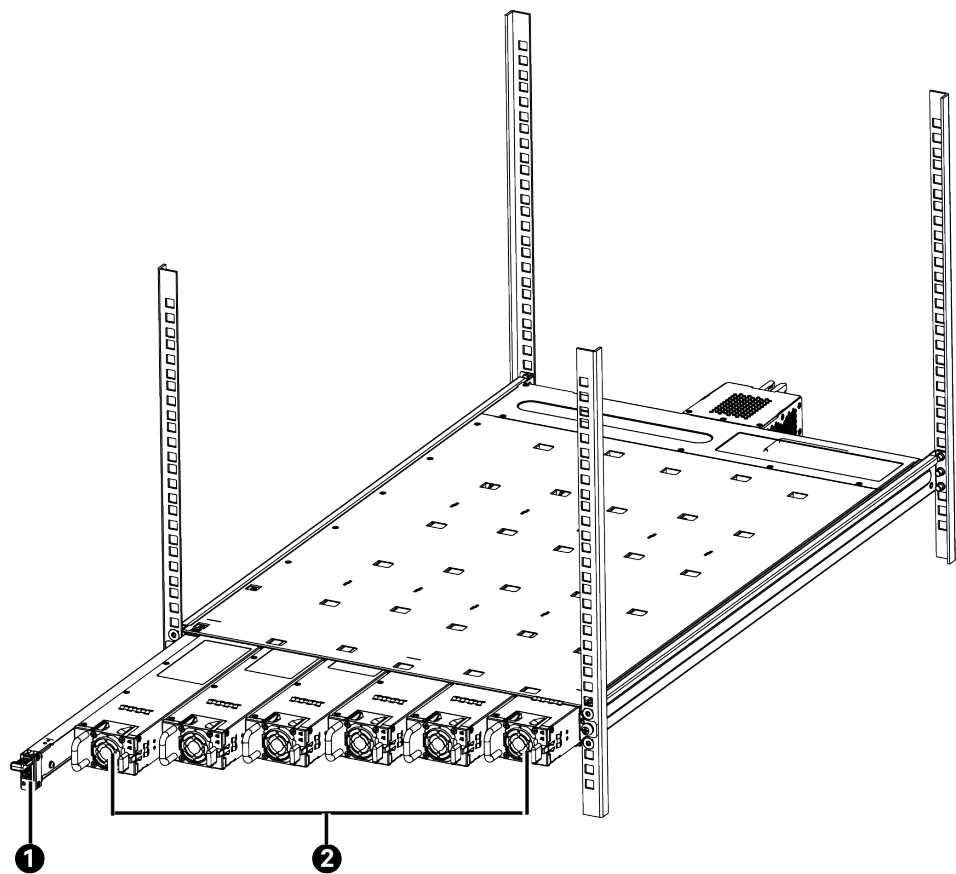
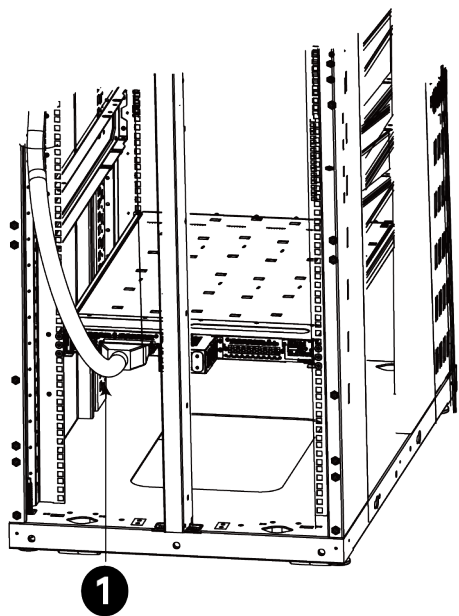


Figure 5.4 Installing PMC and PSU into the rack



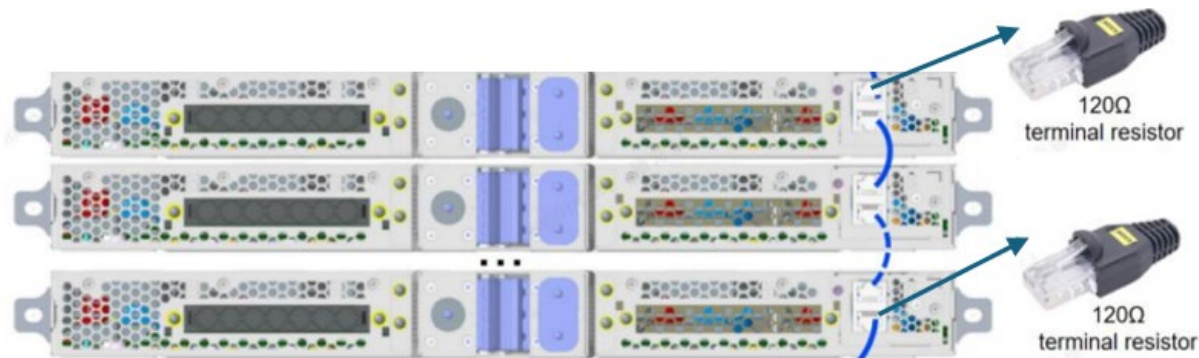
Item		Description
1	PMC	
2	PSU	

Figure 5.5 Inserting AC input whip



Item	Description
1	Insert AC Input Whip

Figure 5.6 Inserting the Daisy Chain cable



6 Making Electrical Connections

6.1 Important Safety Instructions



DANGER! Adhere to the “Important Safety Instructions” starting on page vi.

- The maximum input branch circuit rating is: 60A (3W+N+PE) at 346/200VAC.
- The DC shelf is built in.

6.2 Wiring Considerations

All wiring and branch circuit protection should follow the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), and applicable local codes. For operation in countries where the NEC is not recognized, follow the IEC 60364 applicable codes.

For wire size, branch circuit protection, and general wiring recommendations, refer to System Application Guide SAG1PSS503319N3.

6.3 50 VDC Output Connection

Important Safety Instructions



DANGER! Adhere to the “Important Safety Instructions” starting on page vi.

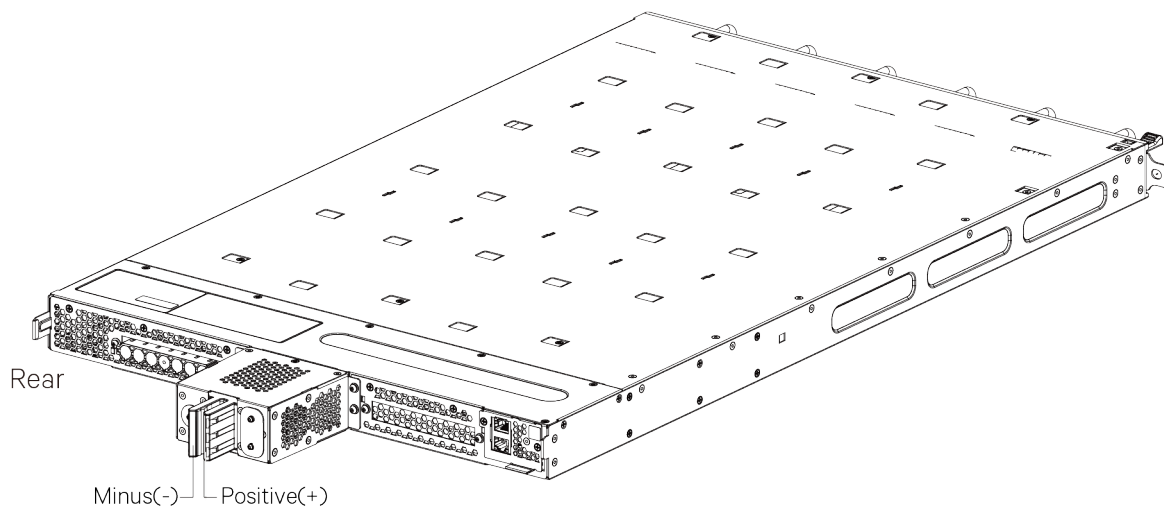


WARNING! Observe proper polarity when making output connections.

General

DC output is provided via a DC output connector located on the back of the DC shelf as shown in Figure 6.1. This connector is compatible to mate with the vertical DC busbar which is mounted in the rack and must have a minimum current rating of 1400 amps.

Figure 6.1 50 VDC Output Connections

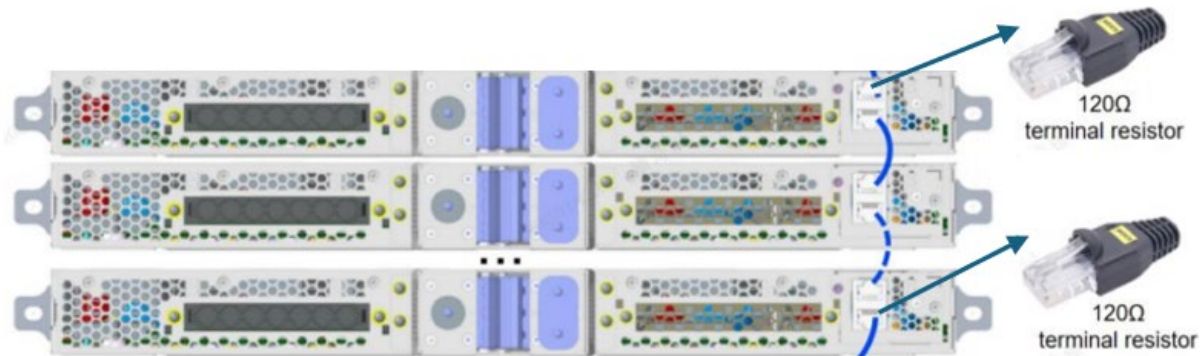


6.4 Parallel Shelves Connection

Insert the Daisy Chain cable for each MCU, with up-and-down interconnection, and connect the shelves in a daisy chain. The 120 Ω terminal resistors must be plugged into the top and bottom shelves.

49 VDC @ up to 264 kW (up to eight shelves can be configured in a single system), the capacity of single shelf is 33 kW / 49 VDC. The following diagram shows three power shelves (the maximum shelf number is 8) connected in parallel.

Figure 6.2 Parallel Shelves Connection



NOTE! Cable loosen alarms will be triggered if any rear RJ45 cable is loose (including the 2 terminal resistors) or if any MCU is not working.

6.5 AC Input

Important Safety Instructions

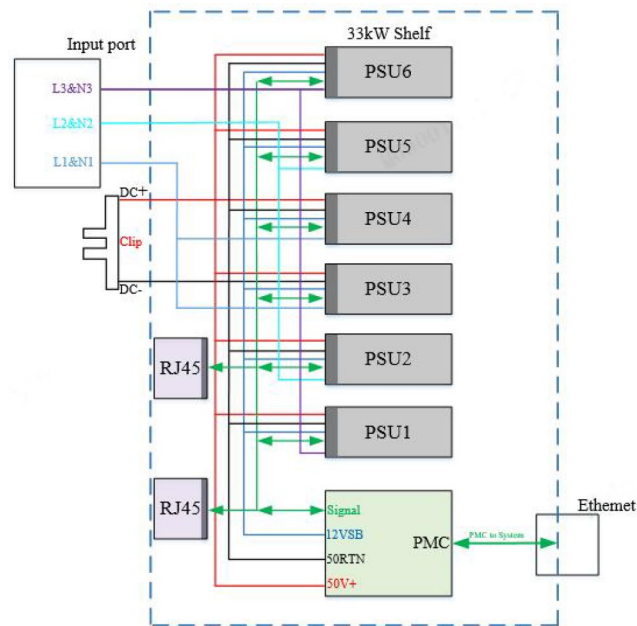


DANGER! Adhere to the “Important Safety Instructions” starting on page vi.

General

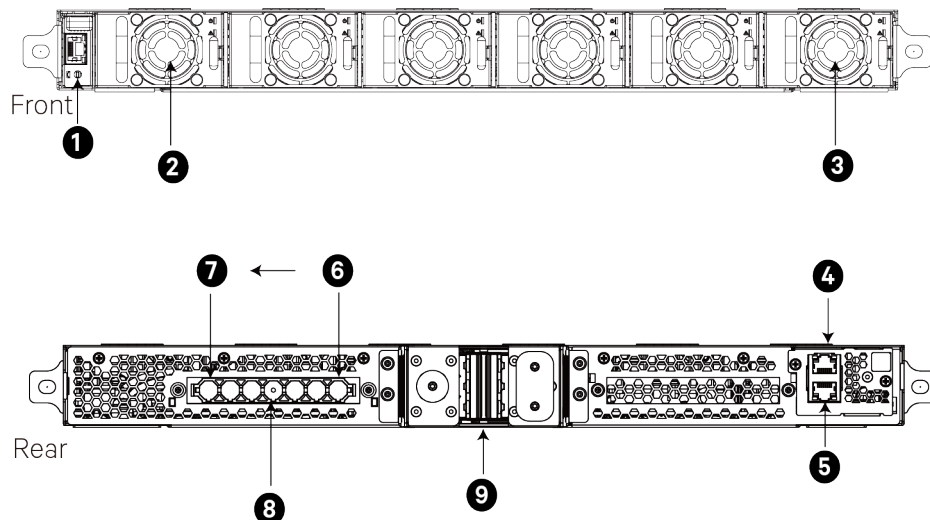
The DC shelf is designed to accommodate one AC power supply circuit, which powers six modules. The power supply is three-phase, with each phase supplying power to two modules. See Figure 6.3.

Figure 6.3 AC Input in the Shelf



6.5.1 Component and Connector Definition

Figure 6.4 Front shelf and Rear shelf



Item	Description	Item	Description
1	PMC	6	PIN1
2	PSU1	7	PIN7
3	PSU6	8	AC Input Connector (may be located on either the left or right side of the shelf)
4	RJ45-1	9	DC Busbar Clip Connector
5	RJ45-2		

Refer to Table 6.1 for AC Input Connector Definition.

Table 6.1 Input Connector Definition

Pin Number	WYE	PSU Connection 1 Whip SKU
1	L1	PSU3, PSU4
2	N1	PSU3, PSU4
3	L2	PSU2, PSU5
4	PE	Shelf Chassis
5	N2	PSU2, PSU5
6	L3	PSU1, PSU6
7	N3	PSU1, PSU6

Refer to Table 6.2 for recommended AC input branch circuit protection.

Table 6.2 Recommended AC Input Branch Circuit Protection (Nominal 415 VAC / 240 VAC, Three Phase, 50 Hz / 60 Hz)

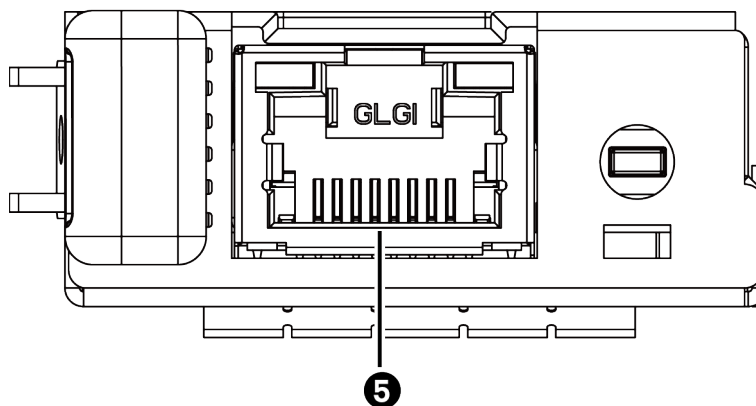
Input Voltage	Nominal Input Current	Overcurrent Protection ⁽¹⁾
415 VAC / 240 VAC	48.6 A	Size per AC Line Cord Plug Rating
480VAC/277VAC	42.0A	Size per AC Line Cord Plug Rating

¹The AC input branch circuit protective device should be of the time delay or high inrush type.

6.6 Controller Front Panel RJ45 Connectors

At the front of the PMC, there is one 1Gb Ethernet RJ45 connector designated for Redfish monitoring. Please also refer to **Figure 6.7**

Figure 6.5 RJ45 Connectors



Item	Description
5	RJ45 Connector

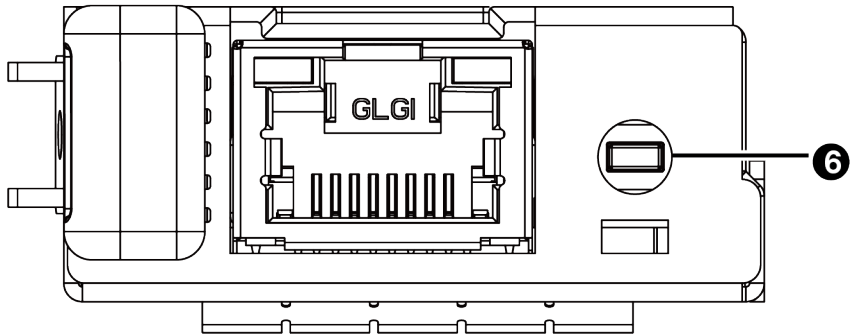
Table 6.3 RJ45 Pin Definition

RJ45			
Pin#	Wire Color	Signal	Function
1	White/Orange	ETH0_TRXP0_C	100/1000M Ethernet data differential pair 1
2	Orange	ETH0_TRXN0_C	100/1000M Ethernet data differential pair 1
3	White/Green	ETH0_TRXP1_C	100/1000M Ethernet data differential pair 2
4	Blue	ETH0_TRXP2_C	100/1000M Ethernet data differential pair 2
5	White/Blue	ETH0_TRXN2_C	100/1000M Ethernet data differential pair 3
6	Green	ETH0_TRXN1_C	100/1000M Ethernet data differential pair 3
7	White/Brown	ETH0_TRXP3_C	100/1000M Ethernet data differential pair 4
8	Brown	ETH0_TRXN3_C	100/1000M Ethernet data differential pair 4
9	/	GND	100/1000M Ethernet connection and data indicator (Amber)
10	/	ETH0_PHY_LED2_C	100/1000M Ethernet connection and data indicator (Amber)
11	/	GND	100/1000M Ethernet speed indicator (Green)
12	/	ETH0_PHY_LED1_C	100/1000M Ethernet speed indicator (Green)

6.7 Reset Button

At the front of the PMC, there is a Reset Button. The reset button can be pressed to restore default network parameter settings of the PMC. Please also refer to **Figure 6.8**.

Figure 6.6 Reset Button

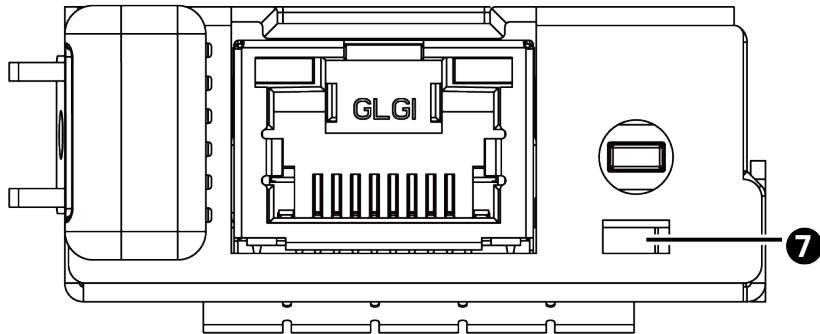


Item	Description
6	Reset Button

6.8 Controller Indicator Light

There is an LED light in front of the PMC. Refer to **Figure 6.9** for details.

Figure 6.7 Indicator Light



Item	Description
7	LED

Table 6.4 Indicator Light Definition

Type	Status	Meaning
Indicator LED	Red	PMC Over Temperature (Temperature > 70°C or Temperature < -25 <°C)
	Yellow	PMC Over Temperature (45°C < Temperature < 70°C or -25°C < Temperature < -5°C)
	Green	Power supply OK/BMC startup

NOTE! When two or more failures occur simultaneously, use the LED to indicate the highest-priority failure. Priority 0 represents the highest priority.

6.9 Controller Power Input/Output

Power Input:

Voltage: 47.5 VDC to 52.5 VDC

Current: <0.5A

Power Output:

Voltage: 3.15 VDC to 3.45 VDC

Current: <0.25A

7 Installing the PSUs and PMC

7.1 Installing PSUs

 **CAUTION!** The PSU contains double-pole fusing; parts of the equipment that remain energized may pose a hazard during servicing after the fuse operates.

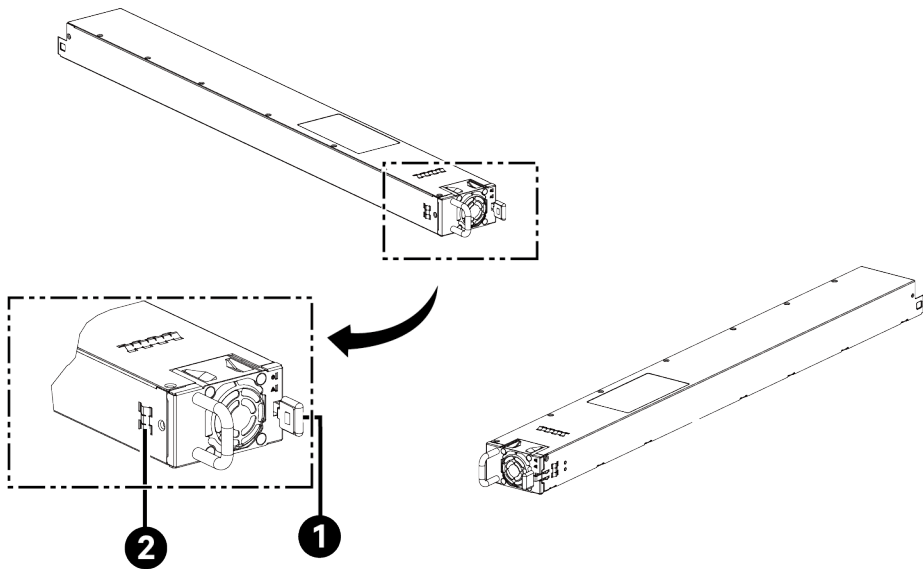
The PSU is hot swappable. It can be removed and reinstalled while the system is operating, without affecting the bus output.

Procedure

 **NOTE!** Refer to Figure 7.1 as this procedure is performed.

1. Unpack the PSU.
2. Partially slide the PSU into the shelf.
3. Push the spring latch handle located on the front of the PSU to the right (this will retract the securing latch located on the side of the PSU).
4. Slide the PSU completely into the shelf and release the spring latch handle (the securing latch located on the side of the PSU will pop into a notch in the shelf to secure the PSU to the shelf).
5. After the PSUs are physically installed in the mounting shelf(s), they are ready for operation immediately after power is supplied to them.
6. If the system is operating, ensure that there are no local or remote alarms active on the system.

Figure 7.1 Installing PSU



Item	Description
1	Spring Latch Handle
2	EMI gasket

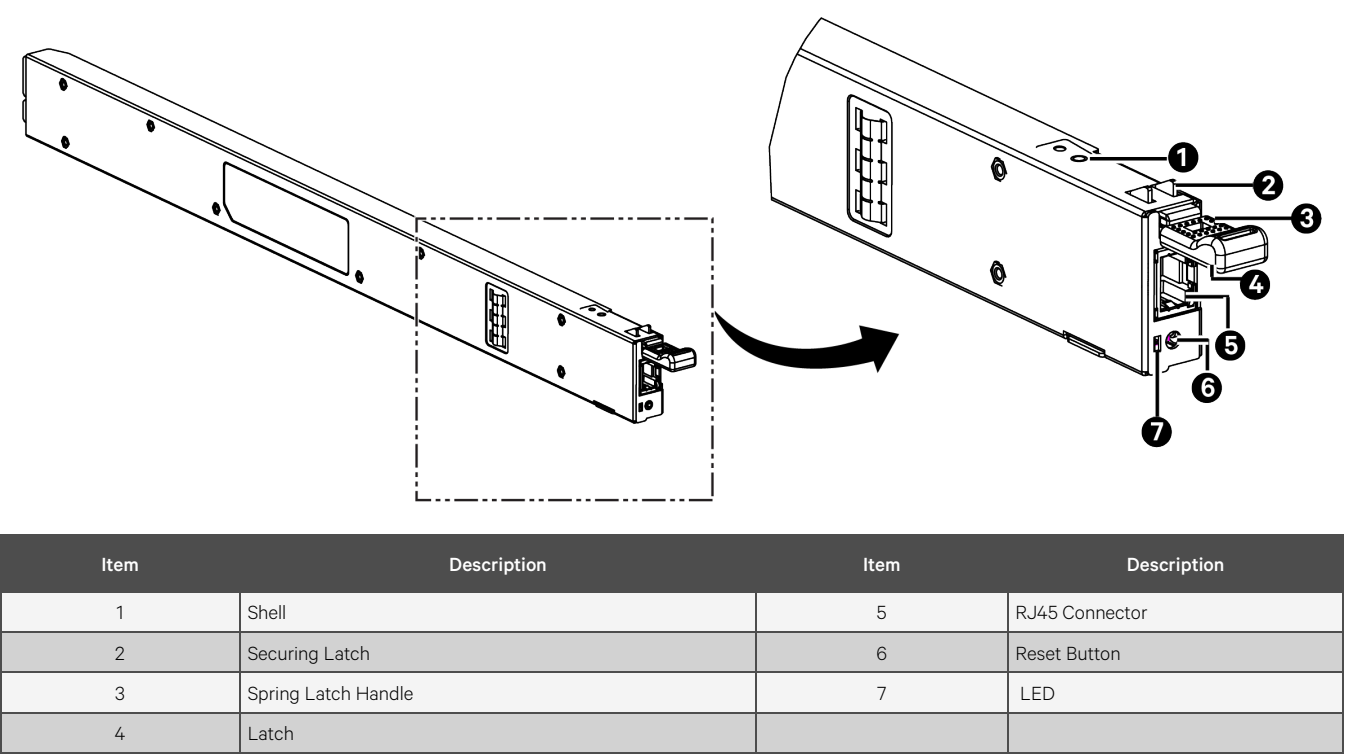
7.2 Installing the PMC

The PMC is hot swappable. It can be removed and reinstalled while the system is operating, without affecting the output bus.

Procedure

1. Unpack the PMC.
2. Partially slide the PMC into the shelf.
3. Push the spring latch handle located on the front of the PMC to the right (this will retract the securing latch located on the side of the PMC).
4. Slide the PMC completely into the shelf and release the spring latch handle (the securing latch located on the side of the PMC will pop into a notch in the shelf to secure the PMC to the shelf).
5. If the system is operating, wait for the PMC to finish booting and verify that the system operates normally.
6. If the system is operating, ensure that there are no local or remote alarms active on the system.

Figure 7.2 Installing the Controller (PMC)



8 Initially Starting, Configuring, and Checking System Operation

8.1 Important Safety Instructions



CAUTION! Performing various steps in the following procedures may cause a service interruption and/or extend alarms. Notify any appropriate personnel before starting these procedures. Also, notify personnel when these procedures are completed.

8.2 Initial Startup Preparation

- Ensure that all blocks, except the last one, in the “Installation Acceptance Checklist” starting on page 2 have been checked.
- Ensure that PSU mounting positions are filled by a PSU or a blank panel as required.
- Ensure that PMC mounting positions are filled by a PMC or a blank panel as required.
- Each shelf is equipped with at least one PSU and one PMC.
- Verify all PSUs and PMC are fully seated and secured to the DC shelf.
- Refer to the separate PMC User Manual for complete controller operating information.

8.3 Initially Starting the System

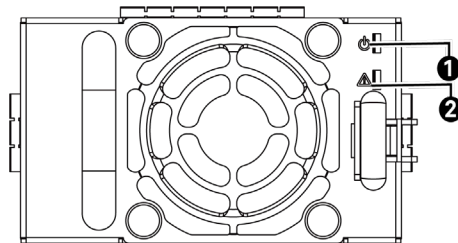


NOTE! After power is initially applied to the system, it takes several seconds for the PSUs to begin producing power, and the PMC initialization routine takes several minutes.

Procedure

1. Apply AC input power to the DC shelf by closing ALL external AC disconnects or protective devices that supply input power to the DC shelf.
2. PSUs start.
3. Refer to the separate PMC User Manual (UM1PMC1S3) and set the PMC as required for your application.
4. Observe the status of the indicators located on the PSUs (see Figure 8.1). If the system is operating normally, the status of these is as shown in Table 7.1.
5. Verify there are no external alarms.

Figure 8.1 PSUs Indicators



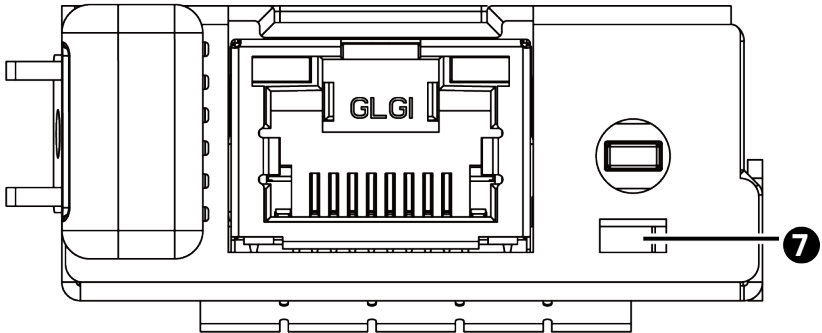
Item	Description
1	Power Indicator (Green)

2	Protection Indicator (Amber)
---	------------------------------

Table 8.1 PSU Status and Alarm Indicators

Component	Indicator		Normal State
PSU	Power Indicator	Green	On
	Protection Indicator	Amber	Off

Figure 8.2 PMC Indicator



Type	Status	Meaning
Indicator LED	Red	PMC Over Temperature (Temperature > 70°C or Temperature < -25 <°C)
	Yellow	PMC Over Temperature (45°C < Temperature < 70°C or -25°C < Temperature < -5°C)
	Green	Power supply OK/BMC startup

For the LED indicator definition, refer to **Table 6.5**.

NOTE! When two or more failures occur simultaneously, use the LED to indicate the highest-priority failure. Priority 0 represents the highest priority.

Final Steps

Procedure

If any controller configuration settings were changed, refer to the separate Controller User Manual (UM1PMC1S3) and save a copy of the configuration file. This file can be used to restore the controller settings, if required, at a later date.

9 Operating Procedures

9.1 PMC and PSUs

General

For operation instructions on these units, refer to the following documents.

- PMC Instructions (UM1PMC1S3)
- Power Supply Unit Instructions (UM1R505500V3)

Local Indicators

Refer to the separate instruction manuals listed above.

10 Maintenance

10.1 System Maintenance Procedures

It is recommended to perform the maintenance procedures listed in Table 10.1 every 6 months to ensure continuous system operation.

Table 10.1 Maintenance Procedures to be Performed at 6-Month Intervals

Procedure	Referenced In
Check ventilation openings for obstructions such as dust, papers, etc.	--
Inspect and tighten all installer's connections.	See "Making Electrical Connections" starting on page 9.

10.2 Adding a PSU (R505500V3) to a DC Shelf

To increase system current capacity, a PSU can be easily added to an existing DC shelf with an empty PSU mounting position. Refer to "Installing PSUs" on page 17.

11 Troubleshooting and Repair

11.1 Contact Information

Go to <https://www.vertiv.com/support/> for local support information.

11.2 Controller and PSUs

For troubleshooting and repair instructions on these units, refer to the following documents.

- PMC Instructions (UM1PMC1S3)
- Power Supply Unit Instructions (UM1R505500V3)

11.3 System Troubleshooting Information

This system is designed to make troubleshooting and repairing easier. The various indicators, as described in the controller and PSU instructions, are designed to isolate failure to a specific element. After the faulty element has been identified, refer to "Replacement Information" on page 22 and "Replacement Procedures" on page 22.

11.4 Replacement Information

11.4.1 Replacement Assemblies

When a trouble symptom is localized to a faulty Power Supply Unit module or PMC, that particular device should be replaced in its entirety. No attempt should be made to troubleshoot or repair any individual components of the Power Supply Unit module or PMC.

11.5 Replacement Procedures

11.5.1 Important Safety Instructions



DANGER! Adhere to the “Important Safety Instructions” starting on page vi.

11.5.2 Replacing PMC

Refer to the separate PMC User Manual (UM1PMC1S3) for a replacement procedure.

11.5.3 Replacing a PSU

Refer to the Power Supply Unit Instructions (UM1R505500V3) for a replacement procedure. Refer also to “System Troubleshooting Information” on page 21.

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