



ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet User Guide



Machine Type: 7D6E

Sixth Edition (March 2025)

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 Safety Information（安全信息）。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

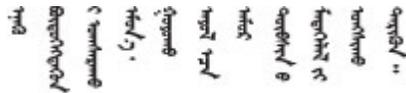
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.



Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་ཇུས་འདི་བདེ་སྤྱོད་མ་བྱས་གོང་། སྐྱོར་གྱི་ཡིད་གཟབ་
བྱ་འདྲ་མིན་ཡོད་པའི་འོད་ཟེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen
canjbinj soengq cungj vahgangj ancien siusik.

Safety inspection checklist

Use the information in this section to identify potentially unsafe conditions with your server. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

Note: The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.

Note: The set-up of the server is made in the server room only.

CAUTION:

This equipment must be installed or serviced by trained personnel, as defined by the IEC 62368-1, the standard for Safety of Electronic Equipment within the Field of Audio/Video, Information Technology and Communication Technology. Lenovo assumes you are qualified in the servicing of equipment and trained in recognizing hazards energy levels in products. Access to the equipment is by the use of a tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

Important: Electrical grounding of the server is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Use the following checklist to verify that there are no potentially unsafe conditions:

1. Make sure that the power is off and the power cord is disconnected.
2. Check the power cord.
 - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
 - Make sure that the power cord is the correct type.

To view the power cords that are available for the server:

- a. Go to:

<http://dcsc.lenovo.com/#/>

- b. Click **Preconfigured Model** or **Configure to order**.
- c. Enter the machine type and model for your server to display the configurator page.
- d. Click **Power → Power Cables** to see all line cords.
 - Make sure that the insulation is not frayed or worn.
3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Chapter 1. Introduction

See this topic for information about ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet.

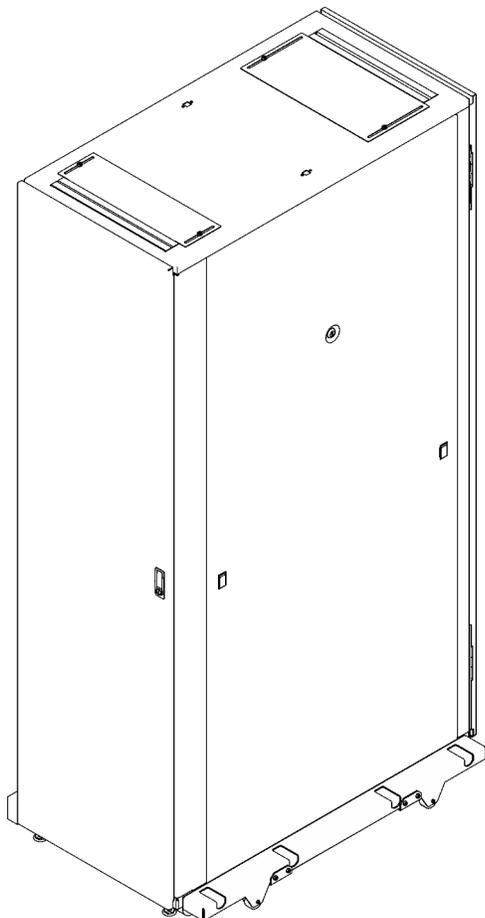


Figure 1. ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet

Features and specifications

See this topic for features and specifications of ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet.

Features

Table 1. Features

Optional device capacity	<ul style="list-style-type: none">• 0U PDU:<ul style="list-style-type: none">– Without rack extension kit: Four units– With rack extension kit: Six units• 1U optional devices rack side/side pocket: eight units
Extension capacity	Up to two units of rack extension kit are supported.
Cooling enhancement	ThinkSystem Rear Door Heat eXchanger for 48U Rack

Dimension and weight

Table 2. Dimension

	mm	inches
Without package		
Height	2277	90
Width (with outriggers)	770	31
Width (without outriggers)	600	24
Depth	1200	47
With package		
Height	2472	97
Width	1100	43
Depth	1760	69

Table 3. Weight

	KG	lbs
Empty rack cabinet with front door	191	421
Rear door	12	26
Outriggers	8	18
Stabilizer	7	15
Empty rack with one unit of extension	210	463
side panels	27	60
Empty rack with two units of extension	264	582
Maximal load	1814	3999
Packaging	251	553
Anchor shipping brackets	6	13
Maximal loaded shipping weight	2335	5148
Rear Door Heat eXchanger for 48U (empty)	49	108
One unit of extension	18	40
Maximal empty rack cabinet weight	319	703
Rear Door Heat eXchanger for 48U (filled)	58	128
Maximal deployed weight	2071	4566

Chapter 2. Rack cabinet components

See this topic for components of ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet.

Parts listing

See this topic to learn about parts of ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet.

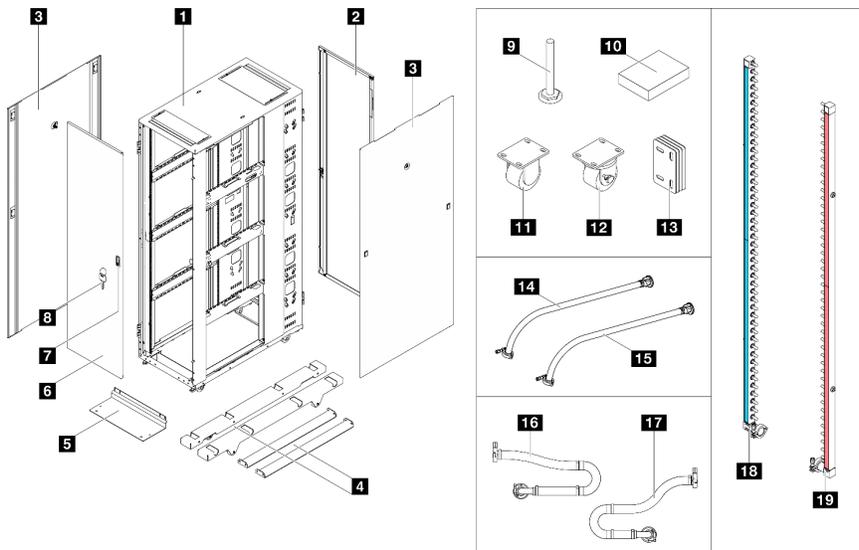
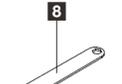
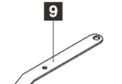


Figure 2. Parts listing

Table 4. Heavy Duty Full Depth 48U Rack Cabinet components

1 Rack cabinet frame	11 Fixed caster
2 Rear door	12 Swivel caster
3 Side covers	13 Baying kit
4 Outriggers (side stabilizers)	14 In-row hose supply side
5 Front stabilizer	15 In-row hose return side
6 Front door	16 In-rack connection set supply side
7 Door latch	17 In-rack connection set return side
8 Keys (doors and side covers)	18 Manifold supply side
9 Leveling pad	19 Manifold return side
10 Tools	

Figure 3. Tool box

					1 20 M6 C type caged nuts
(20)	(30)	(20)	(10)	(20)	2 30 M6 G type caged nuts
					3 20 M5 C type caged nuts
(20)	(1)	(1)	(1)		4 10 M6 flanges
					5 20 M5 screws
(1)	(15)				6 20 M6 screws
					7 Wrench for 10, 14, 5, 18, 26
					8 Wrench for 8, 9, 2
					9 Wrench for 10, 13
					10 Nut insertion tool
					11 15 Velcro cable ties
					12 Grounding kit

Note: Make sure to use the nuts and screws that come in the tool box.

Neptune DWC RM100 in-rack Coolant Distribution Unit (CDU) configuration

See this topic for the rack configuration when Neptune® DWC RM100 in-rack CDU is installed.

Attention: There is some residual water remaining in the CDU secondary circuit after Lenovo manufacturing integration, test, and draining. Before filling the CDU secondary circuit and rack for the first time, be sure to flush/rinse the entire secondary loop with clean, bacteria free water (distilled or deionized preferred). After draining the rinsing fluid, proceed with filling the CDU secondary circuit and rack with water which complies with the Lenovo Water Quality Specification and comes with the appropriate concentrations of corrosion inhibitor and biocide.

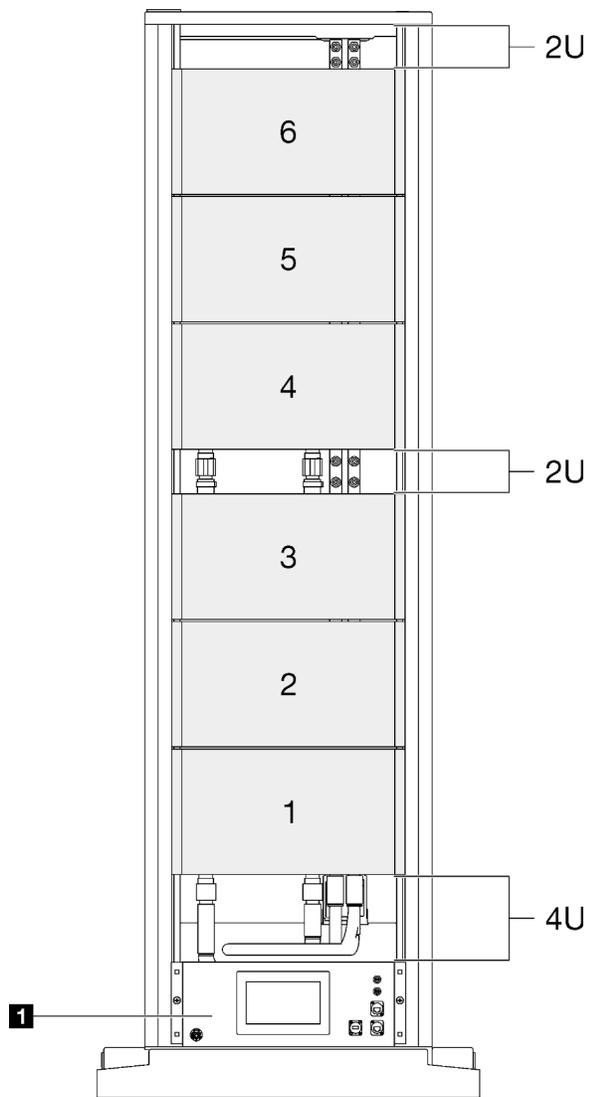


Figure 4. In-rack coolant distribution layout - front view

Table 5. In-rack coolant distribution layout - front view

1 Neptune DWC RM100 in-rack CDU

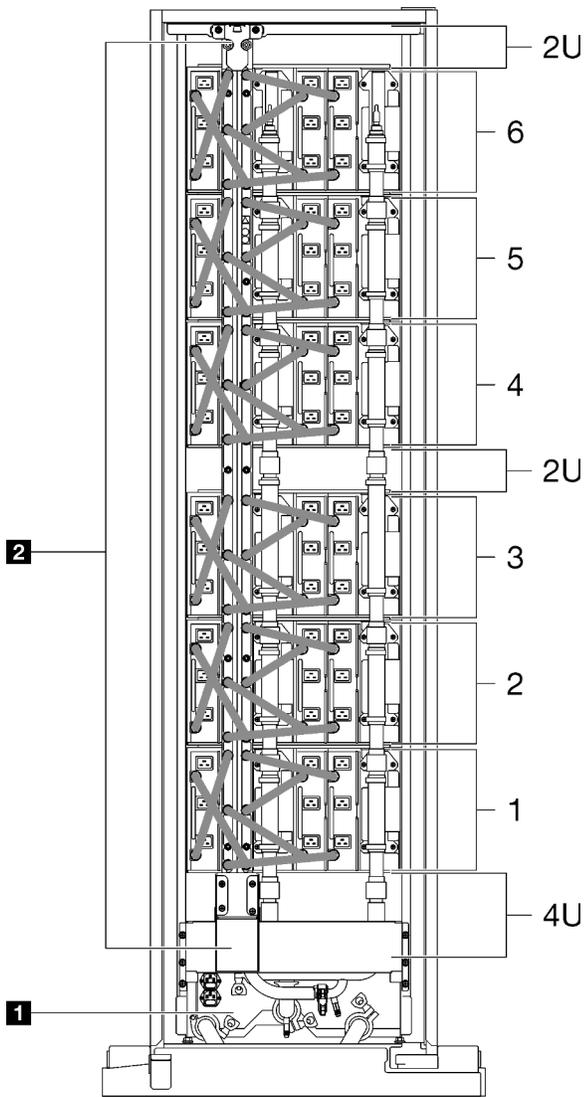


Figure 5. In-rack coolant distribution layout - rear view

Table 6. In-rack coolant distribution layout - rear view

1 Neptune DWC PSU manifold	2 Neptune DWC RM100 in-rack CDU
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Rack cabinet options

See this topic to learn about optional components that are supported by ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet.

48U Advanced Rack Extension Kit

See this topic to learn about parts of ThinkSystem 48U Advanced Rack Extension Kit.

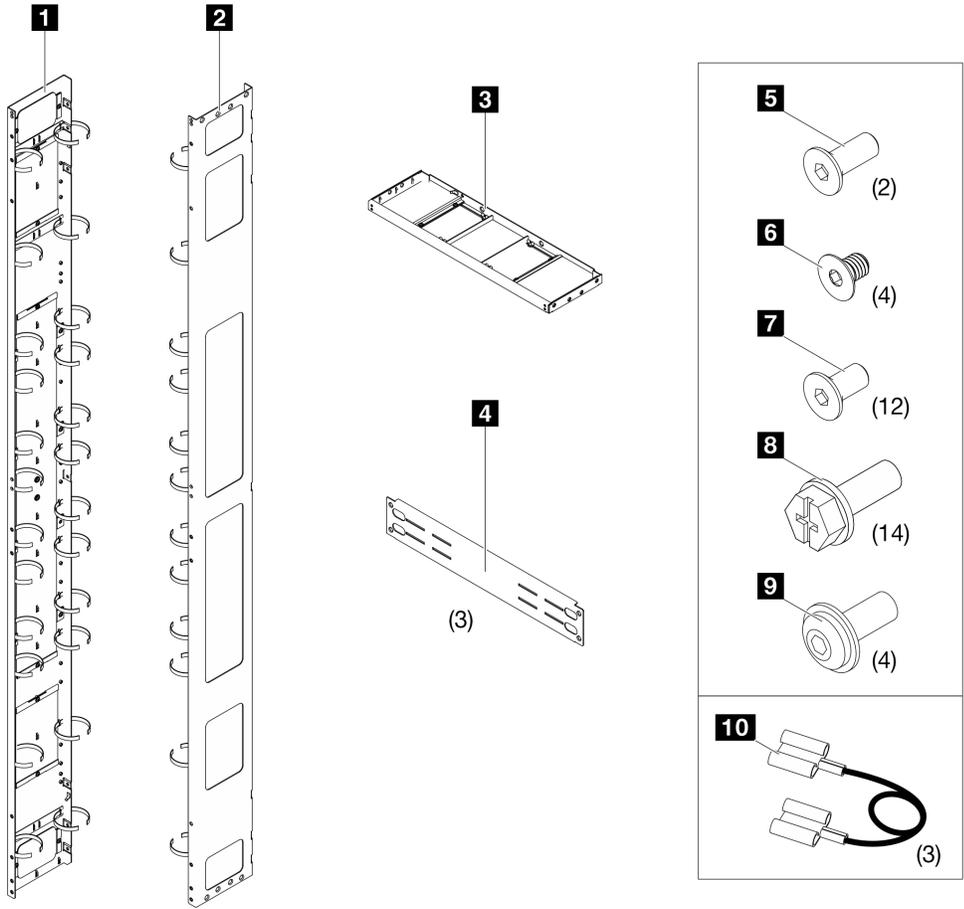


Figure 6. 48U Advanced Rack Extension Kit

Table 7. Rack extension kit components

<p>1 One left extension panel</p>	<p>6 Four M4 x 6 mm flat head socket cap screws (for extension top cover)</p>
<p>2 One right extension panel</p>	<p>7 Twelve M6 x 12 mm flat head socket cap screws (for support brackets)</p>
<p>3 One extension top cover</p>	<p>8 Fourteen M6 x 16 mm hex head flange screws (for extension panels)</p>
<p>4 Three support brackets</p>	<p>9 Four M6 x 16 mm round head flange screws *</p>
<p>5 Two M6 x 16 mm flat head socket cap screws (for extension top cover)</p>	<p>10 Three grounding wires</p>

Note: * This screw type is only needed to replace the ones on the extension panels when installing the 0U PDU mounting bracket(s) in certain locations. For more information, see [“Install 48U Advanced Rack Extension Kit” on page 33](#) or [“Install 48U Advanced Rack Extension Kit with RDHX” on page 57](#).

Specifications

Table 8. Rack extension kit specifications

Extension depth	180 mm / 7 inches
Weight	25.1 kg / 55.3 lbs
Cable management	<p>There are six openings on each extension panel:</p> <ul style="list-style-type: none"> • U0.5 to U2.5 • U7 to U11 • U13.5 to U23.5 • U25 to U35 • U41 to U45 • U46 to U48

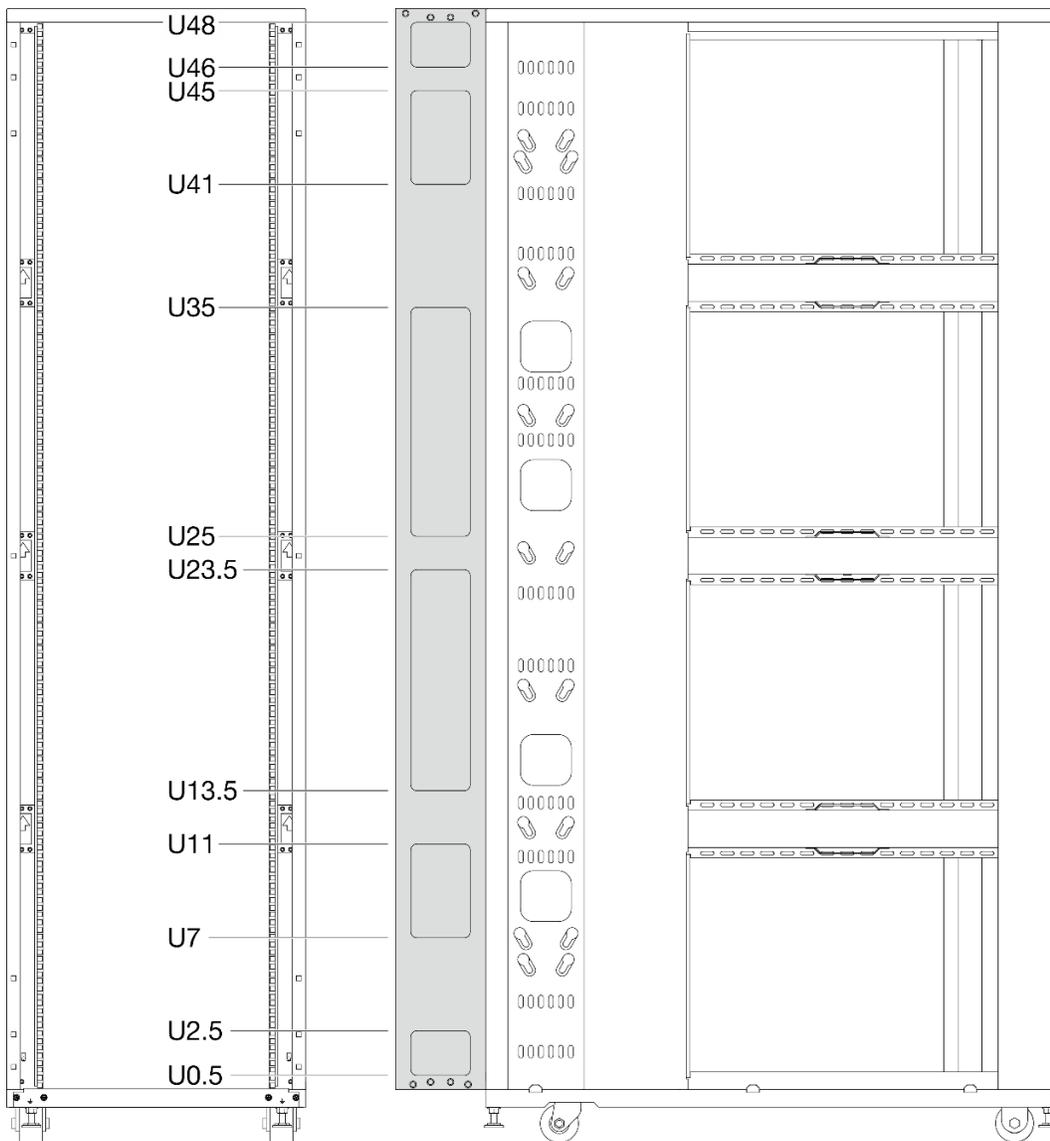


Figure 7. Openings on a extension panel

For installation procedure, see [“Install 48U Advanced Rack Extension Kit”](#) on page 253 or [“Install 48U Advanced Rack Extension Kit with RDHX”](#) on page 57.

48U Advanced Rack Extension Bracket Kit

See this topic to learn about parts of ThinkSystem 48U Advanced Rack Extension Bracket Kit.

- The bracket kit supports up to two PDUs and one manifold
- Required tool: One 3mm Allen wrench
- The bracket kit contains the following components:

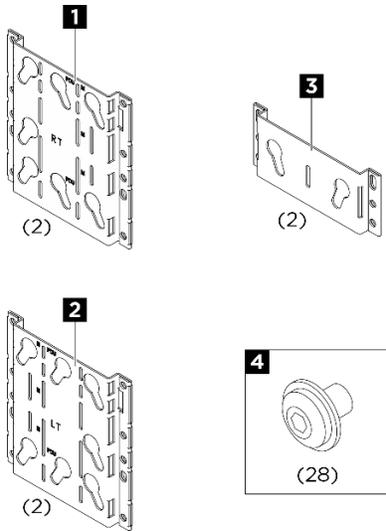


Figure 8. 48U bracket components

No.	Description	Quantity
1	Right bracket	2
2	Left bracket	2
3	Manifold bracket	2
4	M5 round head flange screw	28

For installation procedure, see [“Install 48U Advanced Rack Extension Bracket Kit”](#) on page 390.

48U Standard Rack Extension Kit

See this topic to learn about parts of ThinkSystem 48U Standard Rack Extension Kit.

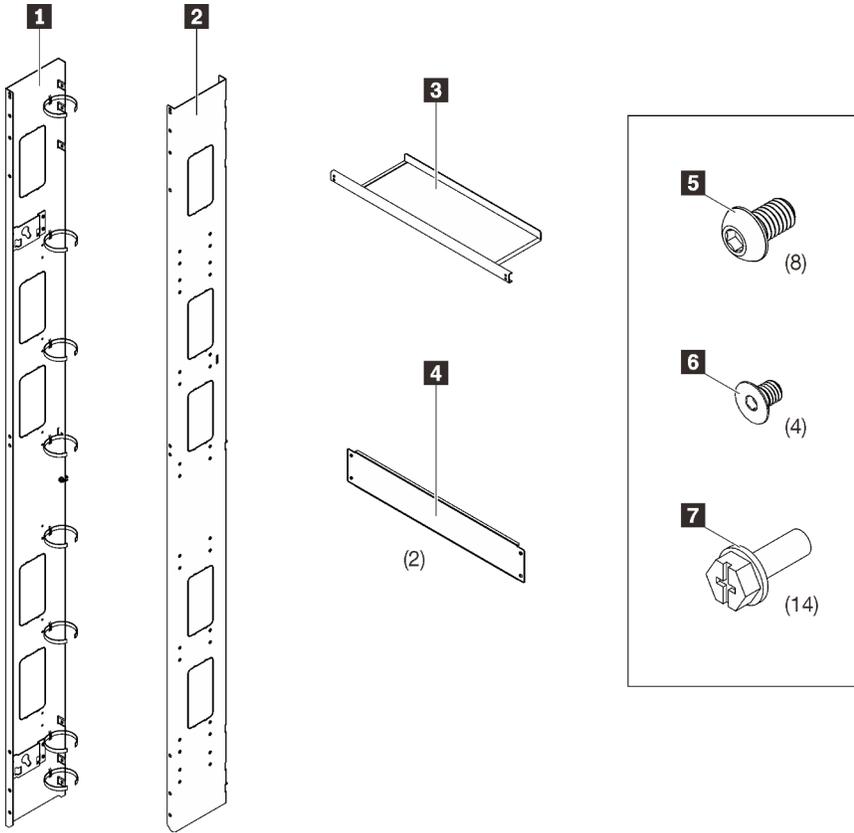


Figure 9. 48U Standard Rack Extension Kit

Table 9. Rack extension kit components

1 One left extension panel	5 Eight support bracket screws
2 One right extension panel	6 Four extension top cover screws
3 One extension top cover	7 Fourteen extension panel screws
4 Two support brackets	

Specifications

Table 10. Rack extension kit specifications

Extension depth	180 mm / 7 inches
Weight	18 kg / 39.7 lbs
Openings	<p>There are five 89 (width) x 178 (height) mm openings on each side panel:</p> <ul style="list-style-type: none"> • U7 to U11 • U13 to U17 • U25 to U29 • U32 to U36 • U42 to U45

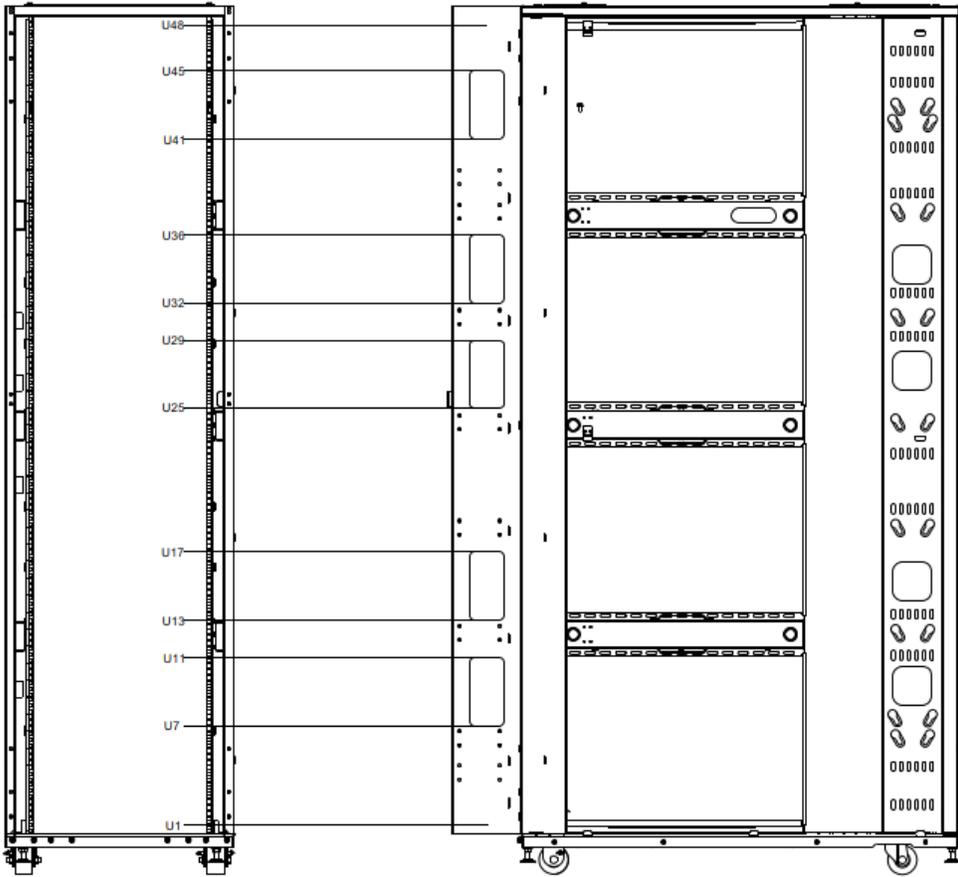


Figure 10. Openings on a extension panel

For installation procedure, see [“Install 48U Standard Rack Extension Kit”](#) on page 86.

Cable management brackets

See this topic to learn about the front cable management brackets.

21U front cable management bracket

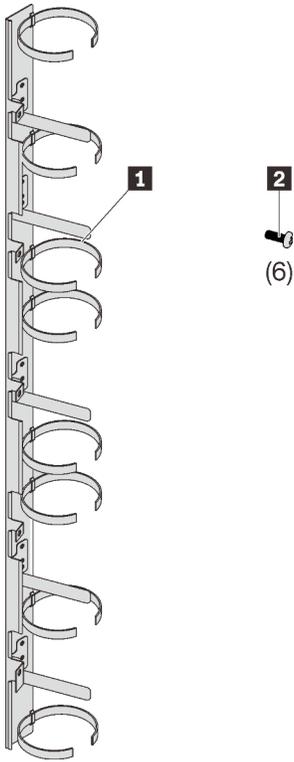


Figure 11. 21U front cable management bracket components

1 21U front cable management bracket	2 Six screws
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6U front cable management bracket

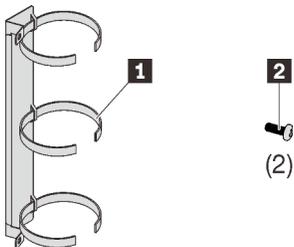


Figure 12. 6U front cable management bracket components

1 6U front cable management bracket	2 Two screws
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Rear cable management bracket

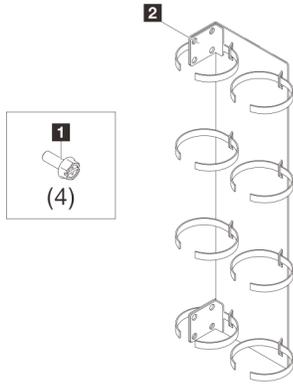


Figure 13. Rear cable management bracket components

1 Four screws	2 Rear cable management bracket
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For installation procedure, see [“Install a cable management bracket” on page 333](#).

DWC 38 Port Rack Manifold

See this topic to learn about parts of ThinkSystem Neptune® DWC 38 Port Rack Manifold.

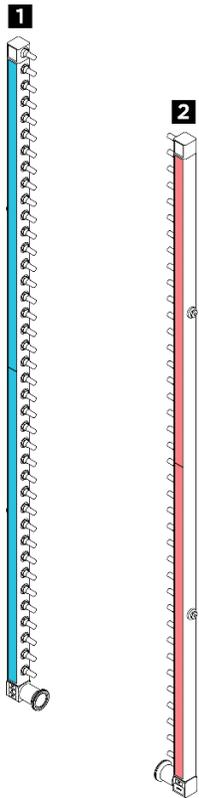


Figure 14. DWC 38 Port Rack Manifold

Table 11. DWC 38 Port Rack Manifold components

1 Manifold supply side	2 Manifold return side
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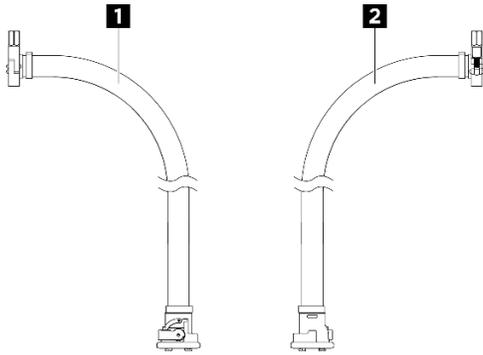


Figure 15. In-row hose kit components (1.3m)

Table 12. In-row hose kit components (1.3m)

1 In-row hose supply side	2 In-row hose return side
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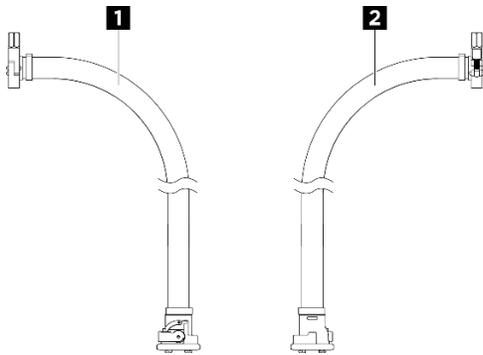


Figure 16. In-row hose kit components (2.3m)

Table 13. In-row hose kit components (2.3m)

1 In-row hose supply side	2 In-row hose return side
----------------------------------	----------------------------------

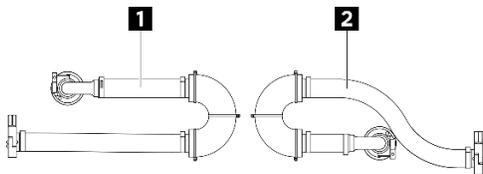


Figure 17. 42U in-rack connection set

Table 14. 42U in-rack hose kit components

1 In-rack connection set supply side	2 In-rack connection set return side
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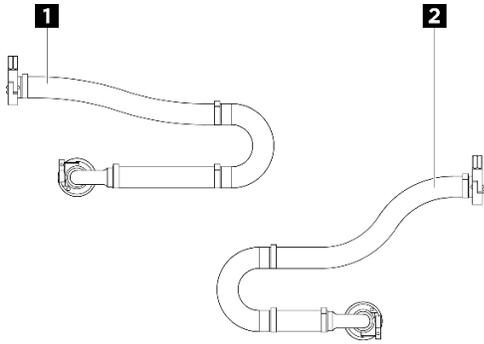


Figure 18. 48U in-rack hose kit

Table 15. 48U in-rack connection set components

1 In-rack connection set supply side	2 In-rack connection set return side
--------------------------------------	--------------------------------------

DWC 45 Port Rack Manifold

See this topic to learn about parts of ThinkSystem Neptune® DWC 45 Port Rack Manifold.

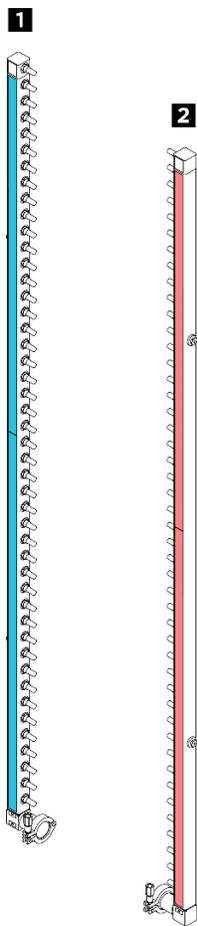


Figure 19. DWC 45 Port Rack Manifold

Table 16. DWC 45 Port Rack Manifold components

1 Manifold supply side	2 Manifold return side
-------------------------------	-------------------------------

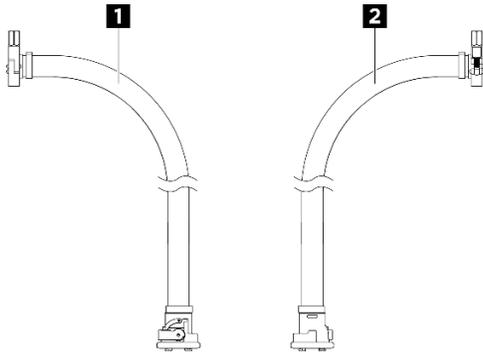


Figure 20. In-row hose kit components (1.3m)

Table 17. In-row hose kit components (1.3m)

1 In-row hose supply side	2 In-row hose return side
----------------------------------	----------------------------------

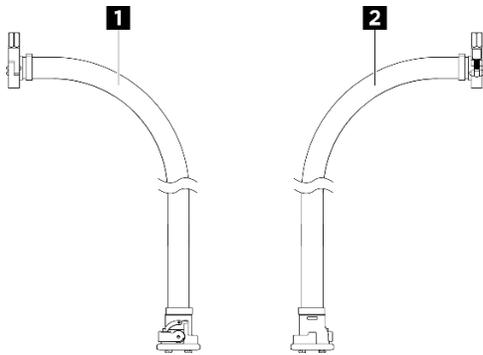


Figure 21. In-row hose kit components (2.3m)

Table 18. In-row hose kit components (2.3m)

1 In-row hose supply side	2 In-row hose return side
----------------------------------	----------------------------------

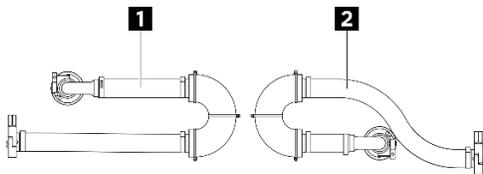


Figure 22. 48U in-rack connection set

Table 19. 48U in-rack hose kit components

1 In-rack connection set supply side	2 In-rack connection set return side
---	---

Power distribution units and console switches

See this topic to learn about the power distribution units and console switches that are supported by the rack cabinet.

This cabinet supports the following PDUs/switches:

- 0U PDU:
 - Without rack extension kit: Four units
 - With rack extension kit: Six units
- 1U optional devices rack side/side pocket: eight units

For a complete list of supported power distribution units, go to

- Power distribution units: <https://lenovopress.com/servers/options/pdu>
- Console switches: <https://lenovopress.com/servers/options/kvm>

Rear Door Heat eXchanger for 48U Rack

See this topic to learn about parts of ThinkSystem Rear Door Heat eXchanger for 48U Rack.

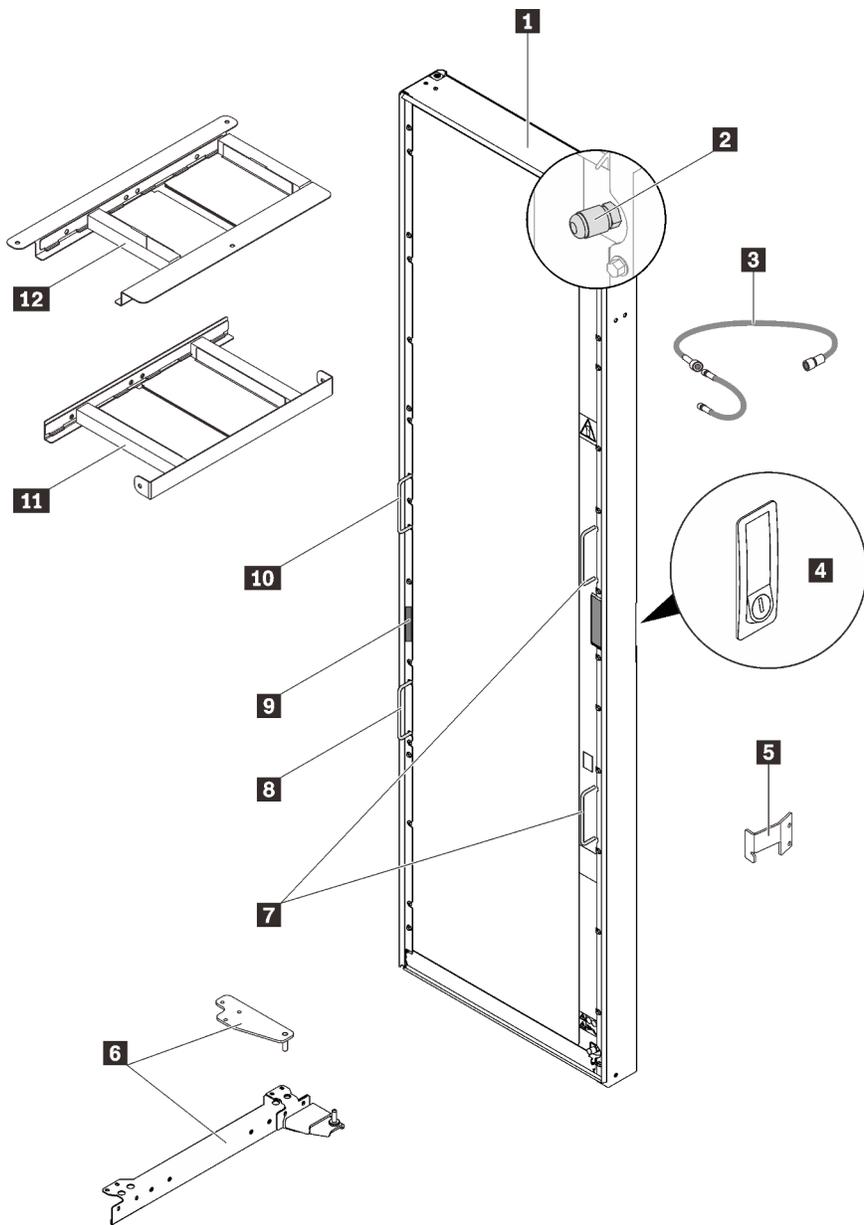


Figure 23. ThinkSystem Rear Door Heat eXchanger for 48U Rack components

Table 20. Rear Door Heat eXchanger components

1 Rear Door Heat eXchanger assembly	7 Lift handles
2 Air-purging valve	8 Lift handle
3 Air-purging tool	9 Serial number
4 Door latch	10 Lift handle
5 Latch plate	11 Lower air baffle
6 Hinge kit	12 Upper air baffle

For setup and installation, see [“Set up Rear Door Heat eXchanger for 48U Rack”](#) on page 171.

Specifications

Dimension	<ul style="list-style-type: none"> • Depth: 121.5 mm / 4.8 inches • Height: 2179 mm / 85.8 inches • Width: 592 mm / 23.3 inches
Weight	Empty: 49 kg / 103.6 lbs
Air movement	Provided by servers and other devices in the rack
Air temperature drop	With high-heat-load devices, up to 25°C (45°F) between the air exiting the rack devices and the air exiting the heat exchanger.
Water	<ul style="list-style-type: none"> • Source User-supplied, compliant with specifications in this document • Pressure <ul style="list-style-type: none"> – Normal operation: <137.93 kPa (20 psi) – Maximum: 689.66 kPa (100 psi) • Volume Approximately 9 liters (2.4 gallons) • Temperature <ul style="list-style-type: none"> – Above dew point – 18°C ±1°C (64.4°F ±1.8°F) for ASHRAE Class 1 Environment – 22°C ±1°C (71.6°F ±1.8°F) for ASHRAE Class 2 Environment <p>Note: See “Heat exchanger performance” for more information.</p> <ul style="list-style-type: none"> • Required water flow rate (as measured at the supply entrance to the heat exchanger) <ul style="list-style-type: none"> – Minimum: 22.7 liters (6 gallons) per minute – Maximum: 56.8 liters (15 gallons) per minute

Heat exchanger performance

The following figure illustrates the diagram of rack air flow and heat exchanger water flow.

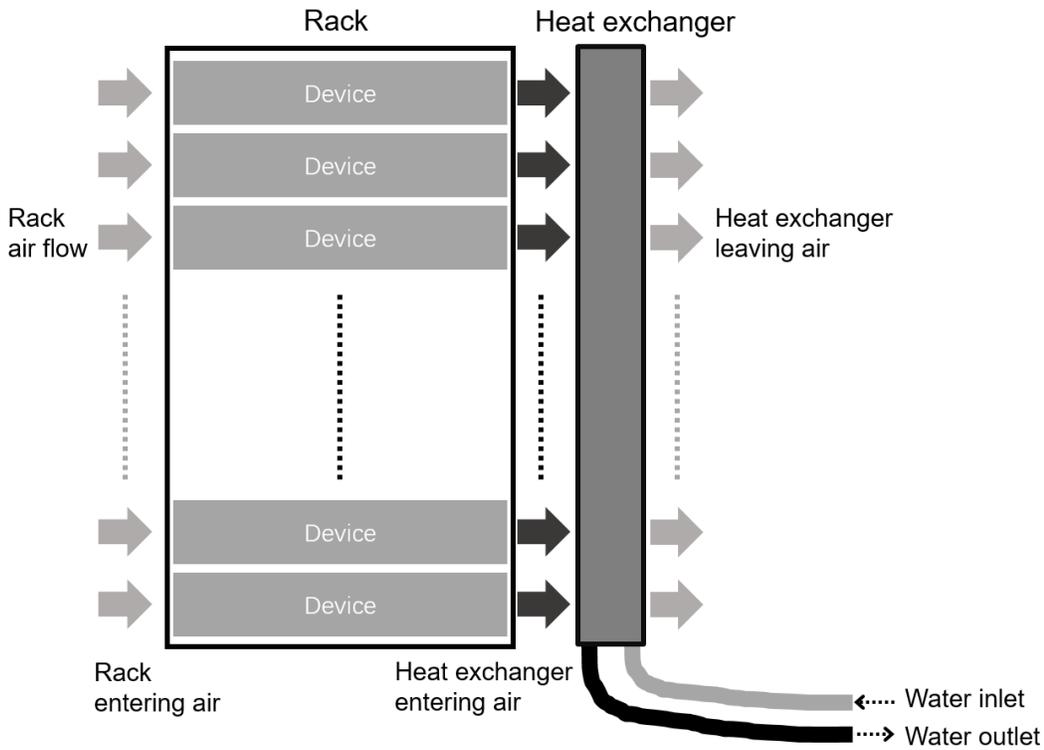


Figure 24. Diagram of rack air flow and heat exchanger water flow

Expected performance of the heat exchanger is illustrated in the following figures for 25°C (77°F) rack entering air temperature and typical rack air flow of 3840SCFM and 4800SCFM. By selecting the correct rack power, water inlet temperature, you can achieve the water flow rate (lpm) for 100% heat removal. Water flow rate (lpm) for 100% heat removal indicates that an amount of heat equivalent to that generated by the devices has been removed by the heat exchanger and the average air temperature leaving the heat exchanger is identical to that entering the rack (25°C /77°F in this example).

Heat removal as function of water inlet temperature and water flow rate for the given rack entering air temperature and air flow rate.

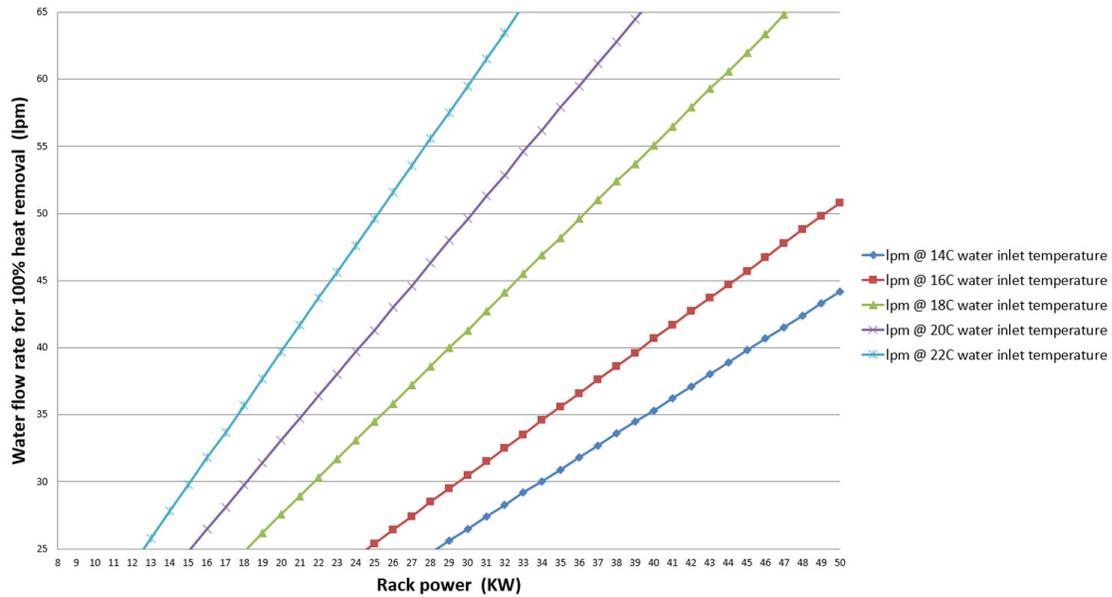


Figure 25. Typical performance of the heat exchanger, 3840SCFM Rack air flow, 25°C Rack entering temperature

Heat removal as function of water inlet temperature and water flow rate for the given rack entering air temperature and air flow rate.

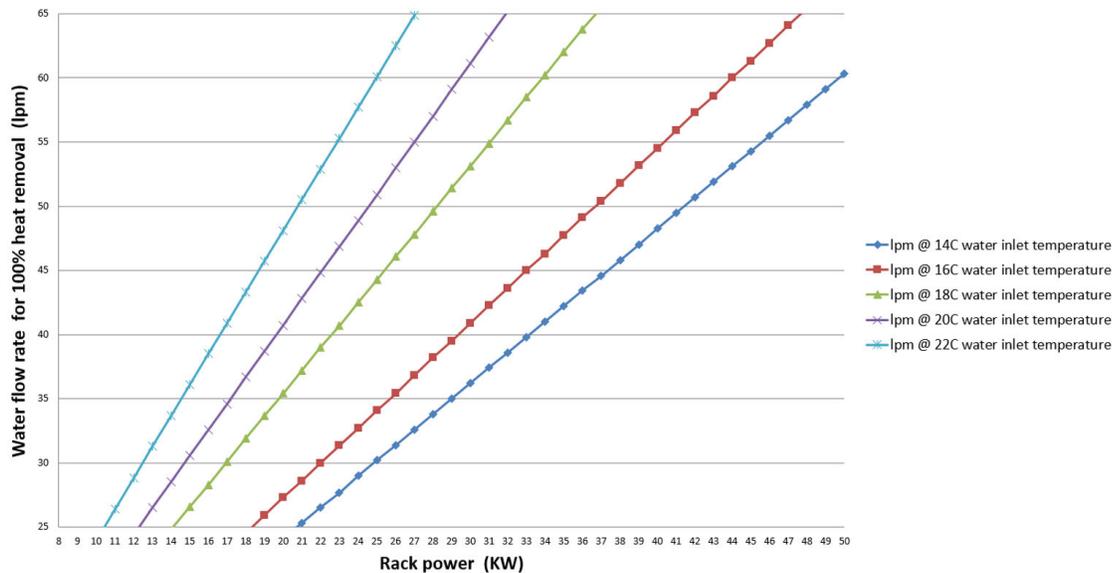


Figure 26. Typical performance of the heat exchanger, 4800SCFM Rack air flow, 25°C Rack entering temperature

Rear Door Heat Exchanger Support Kit

See this topic to learn about parts of Rear Door Heat Exchanger Support Kit.

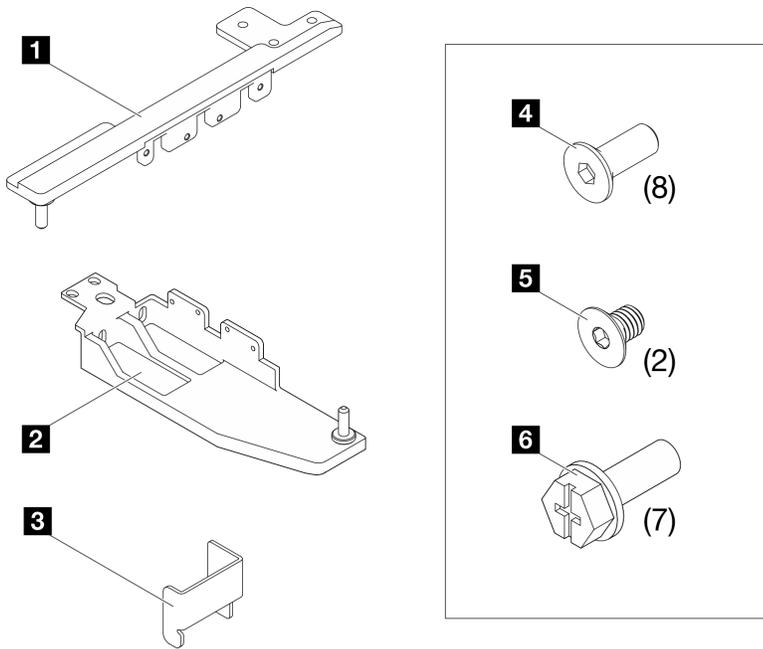


Figure 27. Rear Door Heat Exchanger Support Kit

Table 21. Support kit components

<p>1 One top hinge</p>	<p>4</p> <ul style="list-style-type: none"> • Four top hinge screws • Four bottom hinge screws
<p>2 One bottom hinge</p>	<p>5 Two latch plate screws</p>
<p>3 One latch plate</p>	<p>6</p> <ul style="list-style-type: none"> • Three top hinge screws • Four bottom hinge screws

For installation procedure, see [“Install 48U Advanced Rack Extension Kit with RDHX”](#) on page 57.

Chapter 3. Rack cabinet setup

Follow instructions in this topic to setup the rack cabinet.

CAUTION:

The raised floor or slab on which the system will be installed must be capable of supporting the system's weight. Contact the raised floor tile manufacturer, a structural engineer, or both to verify that the complete raised floor structure and sub-floor are safe to support the concentrated and distributed load of the racks and its contents. The evaluation of the slab and any raised floor structure should consider both the static weight of the rack and its contents, as well as the installed weight with any additional infrastructure such as racks attached cable trays, additional cables, Rear Door Heat Exchangers, containment structures that rest on the racks, personnel in the space, etc... Depending on the type of raised floor tile, additional supports, such as pedestals or custom support frames, might be necessary to maintain the structural integrity of an uncut tile or to restore the integrity of a tile that is cut for cable or hose entry/exit. Contact the raised floor tile manufacturer, a structural engineer, or both to ensure that the raised floor tiles and pedestals can support the concentrated loads.

Special consideration should be given to the dynamic/rolling weight of the rack and its contents to ensure the integrity of the raised floor or slab is not compromised when rolling loaded racks across the floor. In some cases, load distribution plates may be required to better distribute the dynamic load of a rolling rack at various points from the loading dock to the data center and on to the data center floor. Other things to consider are ramps, lifts/elevator ratings, hallways, transitions between different types of flooring or sub-floors, elevation differences between floors, gaps between elevator entry points and the main floors.

Space planning

Follow the guidelines in this topic to make plans for the space that will contain the rack cabinet.

Dimensions of the 48U rack cabinet:

- Height: 2277 mm (89.6 in)
- Width (without outriggers): 600 mm (23.6 in)
- Depth (without extensions): 1200 mm (47.2 in)

See the following illustration for distances between various components on the bottom of the rack cabinet, and make plans accordingly.

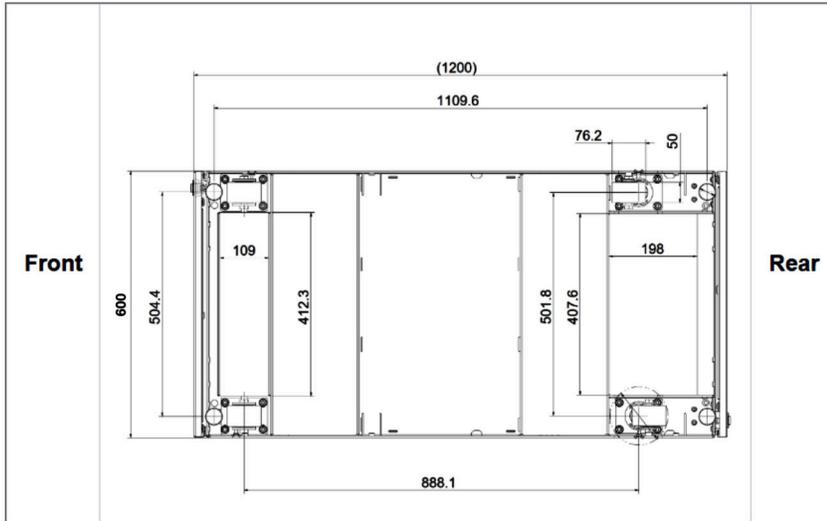


Figure 28. Space planning (mm)

Unpack the rack cabinet

See this topic to learn how to unpack the rack cabinet.

S037



CAUTION:

The weight of this part or unit is more than 200 kg (441 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit.

Make sure to follow fork-lift truck operating regulations to prevent overturning of the rack cabinet.

Notes:

- **Space requirement:** You will need minimum of 2885 mm (113.6 inch) on the rear side of the pallet to unpack the rack cabinet.
- **Tool requirement:** You will need one sharp tool.
- **Forklift requirements:**

Note: Only the front side of the pallet is available for the forklift.

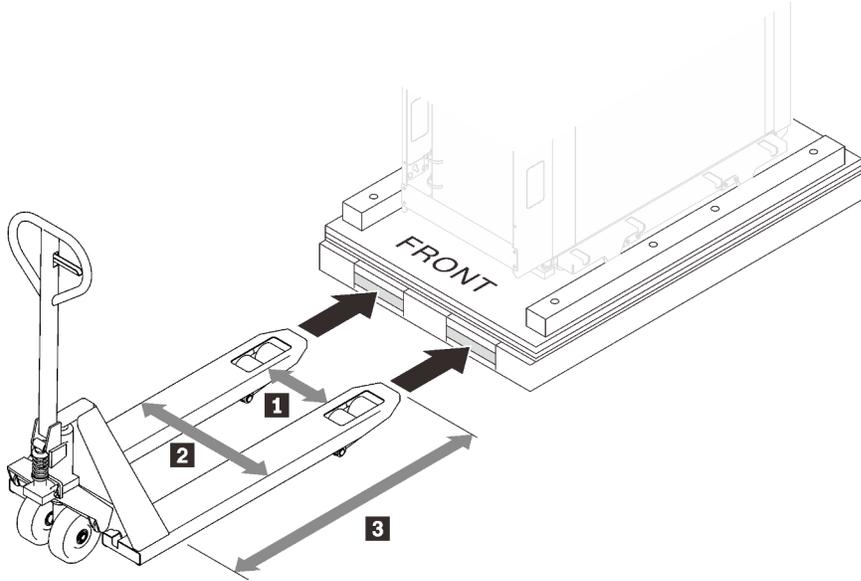


Figure 29. Forklift

- **1** must be longer than 350 mm.
- **2** must be shorter than 700 mm.
- **3** must be between 1450 to 1650 mm.
- Loading capacity must be larger than 3000 kg.

Step 1. Cut the four straps with a sharp tool.

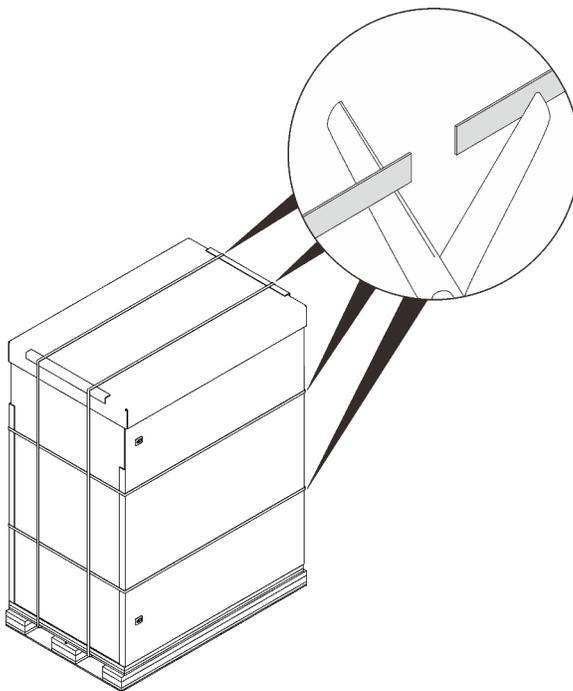


Figure 30. Cutting the straps

Step 2. Remove the top cover and side cardboards.

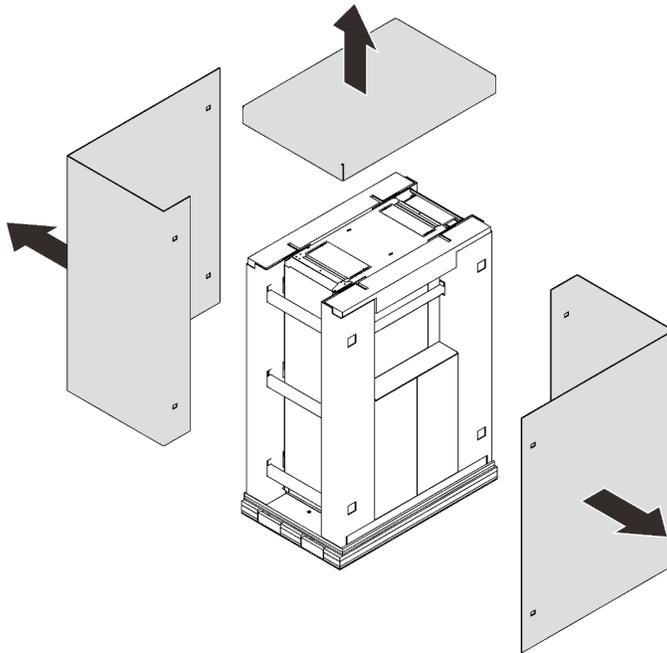


Figure 31. Removing the cardboards

Step 3. Remove the top bars and side boxes.

Note: One of the side cartons contains the ramps and is quite heavy. Lifting it requires two people.

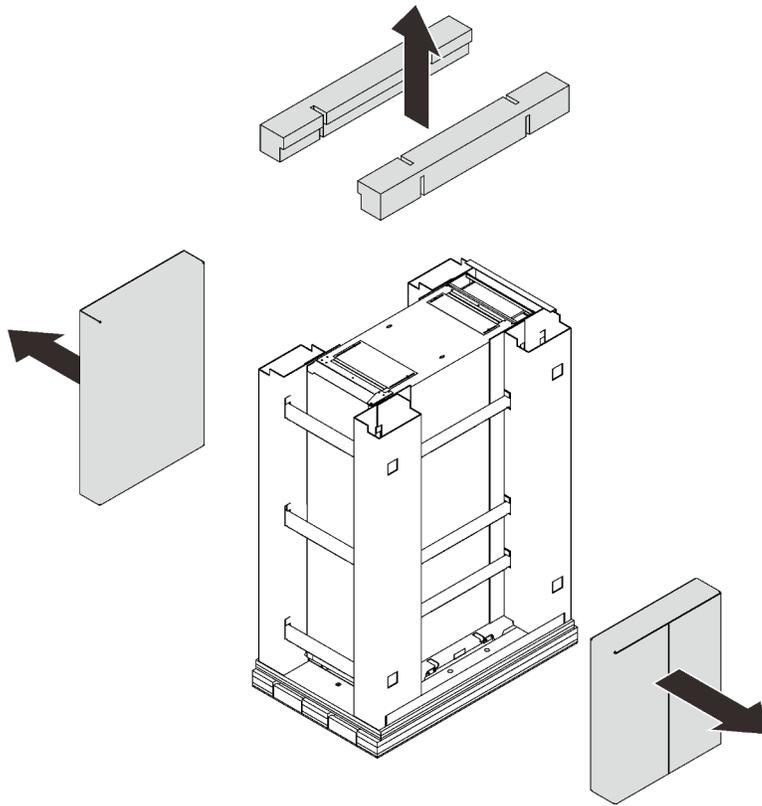


Figure 32. Removing the top bars and side cardboards

Step 4. Release and remove the side frames.

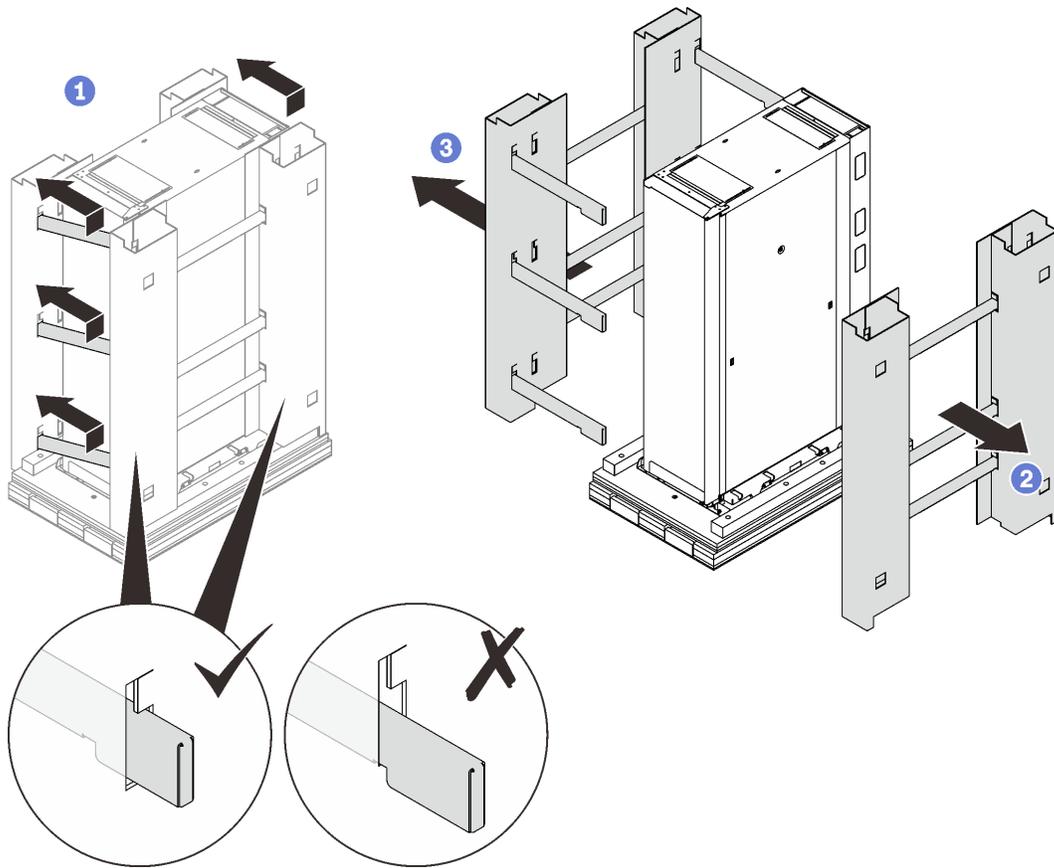


Figure 33. Removing the side frames

- 1 Slightly lift and slide the six horizontal bars left to disengage their right ends from the slots on the right frame.
- 2 Remove the right frame along with the three horizontal bars.
- 3 Remove the left frame along with the nine horizontal bars.

- Step 5. Open the front door, and remove the following:
- Remove the two bolts with wrench for 10, 14, 5, 18, 26.
 - Remove the four M6 screws with wrench for 8, 9, 2
 - Remove the eight M10 screws with wrench for 8, 9, 2.

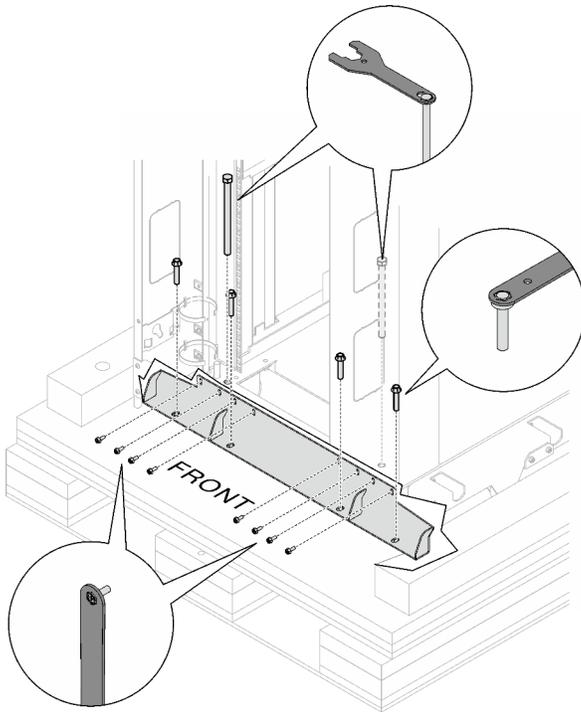
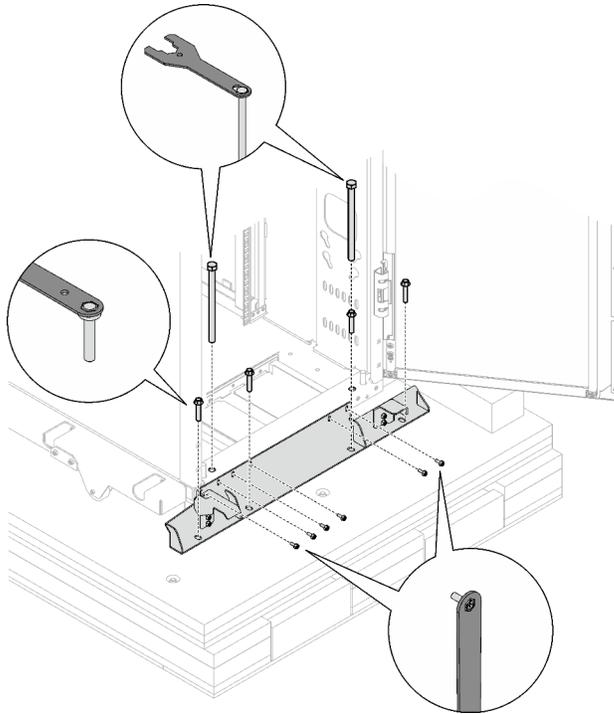


Figure 34. Removing the front shipping bracket

- Step 6. Open the rear door, and remove the following:
- Remove the two bolts with wrench for 10, 14, 5, 18, 26.
 - Remove the four M6 screws with wrench for 8, 9, 2
 - Remove the six M10 screws with wrench for 8, 9, 2.



Note: Keep at least one bolt for later use.

Figure 35. Removing the rear shipping bracket

- Step 7. Rise each of the four leveling pads with wrench for 10, 14, 5, 18, 26 in turns until they no longer bear the weight of the rack cabinet.

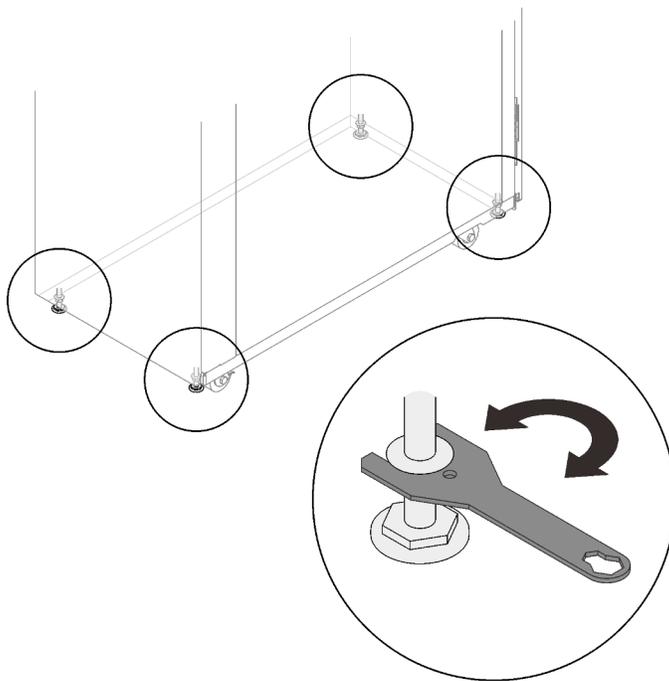


Figure 36. Raising the leveling pads

Step 8. Secure the two metal plates to the ramp with the eight screws that come in a small bag attached to the plates.

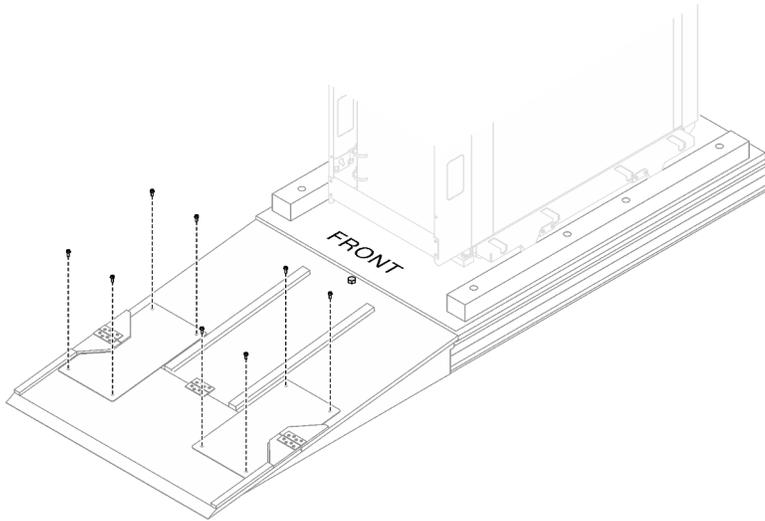


Figure 37. Securing the two plates to the ramp

Step 9. Secure the ramp to the pallet with one of the bolts that have been removed previously with wrench for 10, 14, 5, 18, 26.

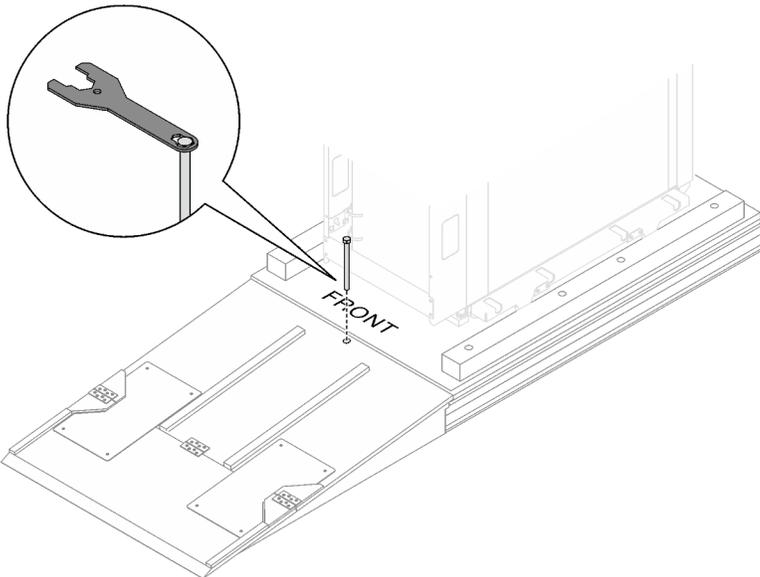


Figure 38. Securing the ramp to the pallet

Step 10. Place the ramp next to the cabinet front door, and slowly slide the rack cabinet down from the pallet to the designated location.

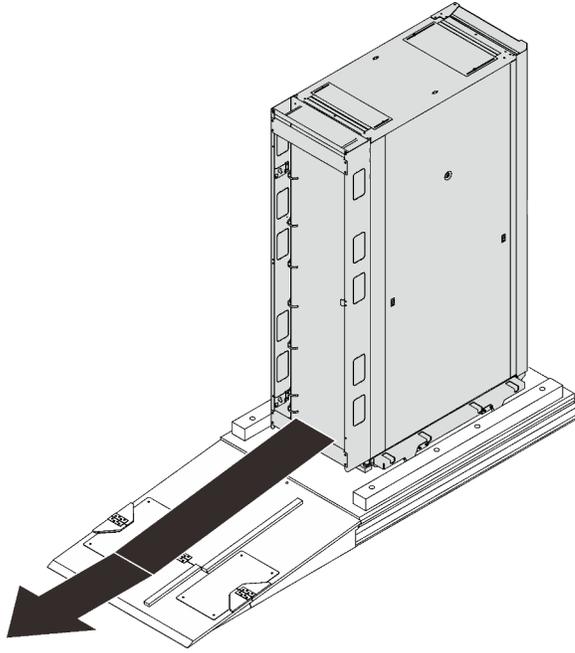


Figure 39. Removing the cardboards

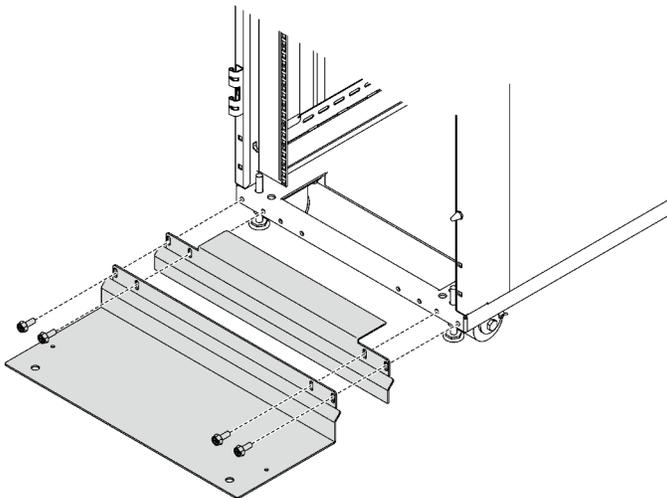
Install the front stabilizer and recirculation prevention plate

See this topic to learn how to enhance rack cabinet balance with the front stabilizer.

Procedure

- Step 1. Unlock and open the front door.
- Step 2. Secure the stabilizer and recirculation prevention plate to the front of the rack cabinet with four screws.

Figure 40. Installing the front stabilizer and recirculation prevention plate



- Step 3. Secure the stabilizer to the floor with two screws.

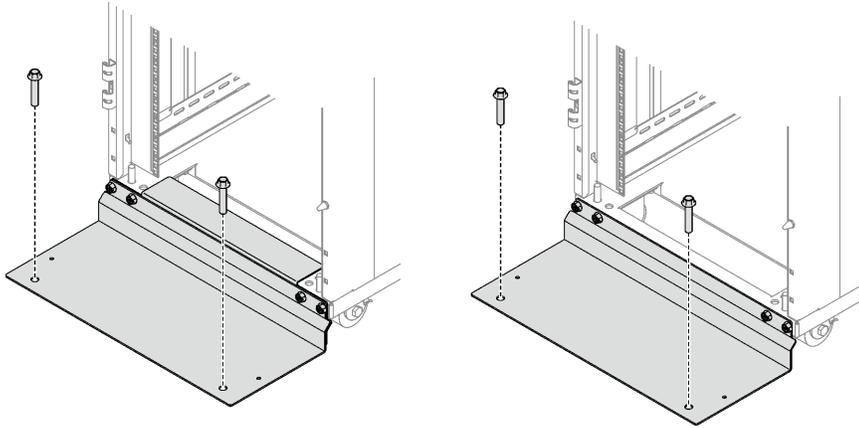


Figure 41. Securing the stabilizer to the floor

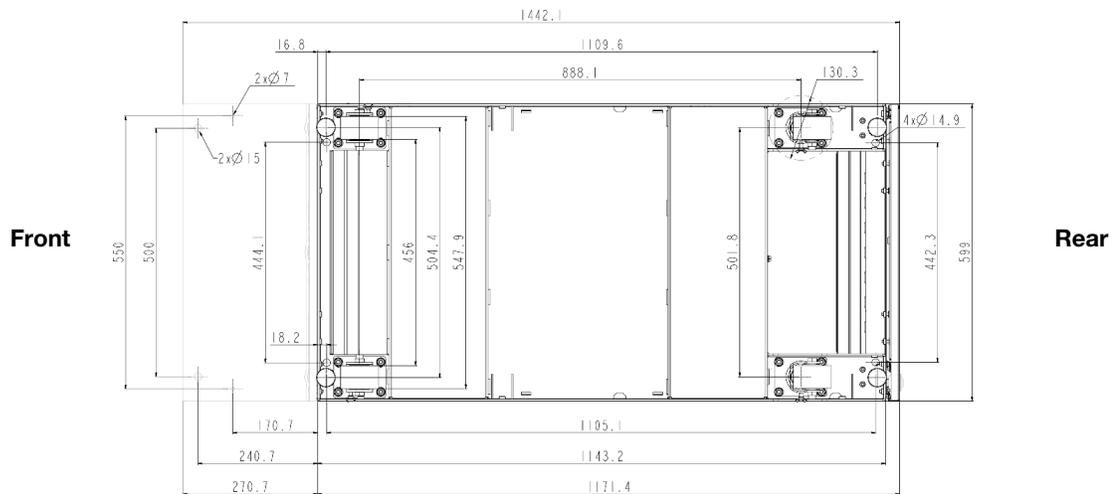


Figure 42. Rack cabinet with stabilizer installed

Install rack extension kit

See this topic to learn how to install extension kit.

Install 48U Advanced Rack Extension Kit

See this topic to learn how to install 48U Advanced Rack Extension Kit.

Notes:

- Each unit of rack extension kit comes with additional capacity for up to two 0U PDUs, or one 0U PDU and one manifold, on each side of the rack.
- Each rack cabinet supports up to two units of rack extension kit (one to the front and one to the rear side).
- If there is a plan to install baying kit while only one of the adjacent cabinets will be installed with extension, make sure to install the baying kit first (see [“Install the baying kit” on page 95](#)). Then, as preparation for this procedure, remove the two screws from the upper and lower part of the cabinet that will be installed with the extension kit, and jump to [Step 5 on page 39](#).

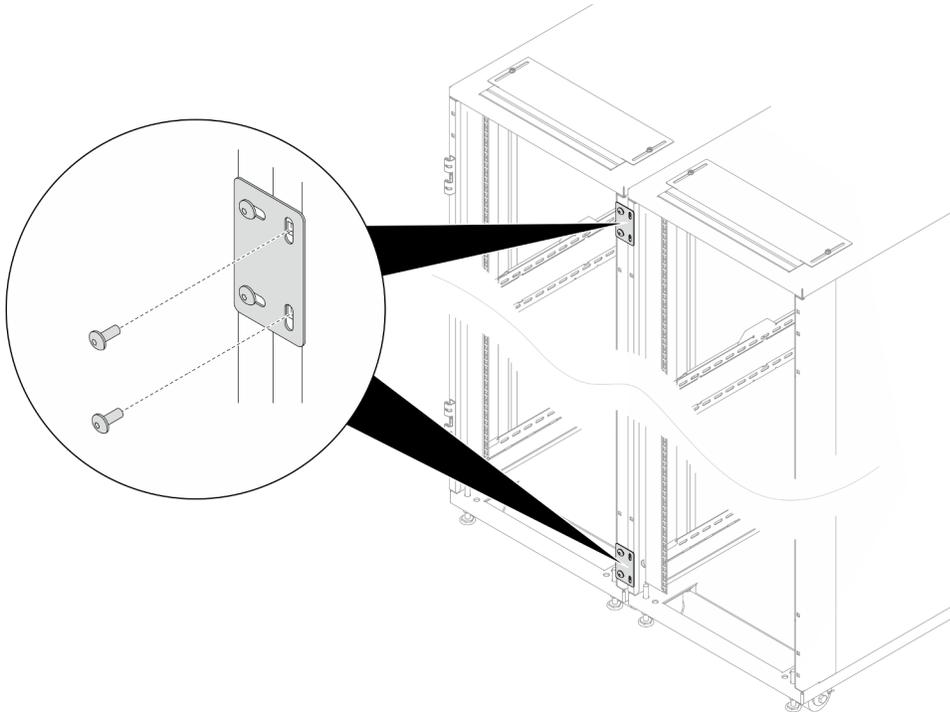


Figure 43. Removing screws to prepare for extension installation

- **Required tools**

- One tool with plastic blade/scissors to open the packaging
- One rubber hammer to align the extension panels with the side of the rack
- One Screwdriver with No. 3 Phillips bit to tighten the M6 screws (9 in the next bullet point)
- One Nut-driver with holding hex bit 10 mm to tighten the M6 screws (9 in the next bullet point)
- One 2.5 mm Hex bit socket to tighten the M4 screws (13 in the next bullet point)
- One 3 mm Hex bit socket to tighten the M5 screws (PDU/manifold brackets, opening covers on the extension panels)
- One 4 mm Hex bit socket to tighten the M6 screws (3 and 12 in the next bullet point)
- The extension kit comes with a miscellaneous bag, which contains the following components:

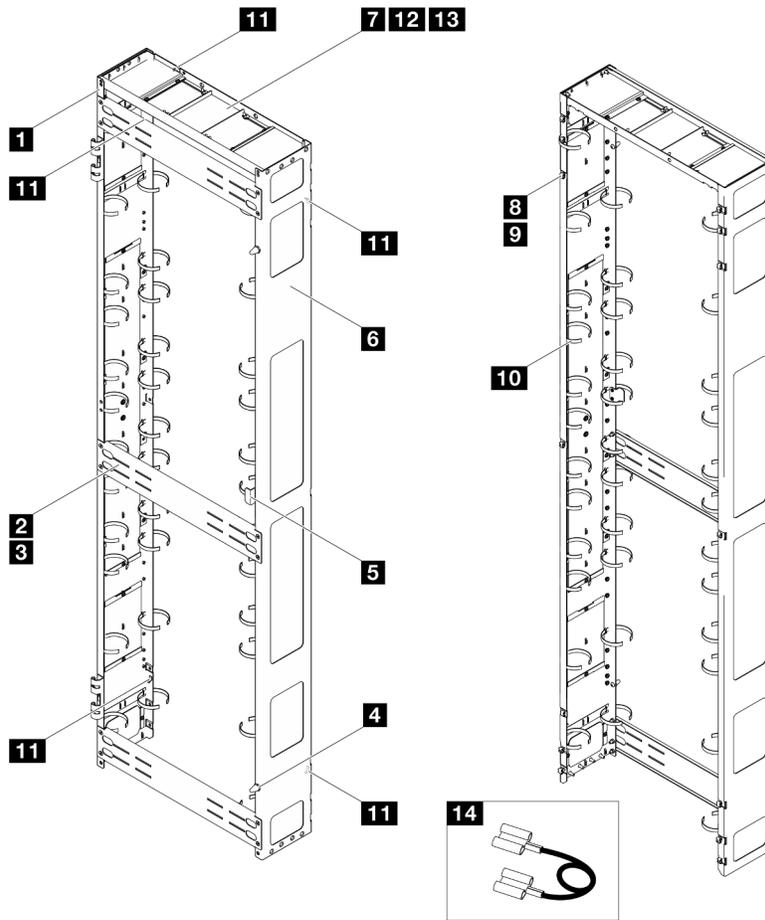


Figure 44. Parts

No.	Description	Quantity	No.	Description	Quantity
1	Left extension panel	1	8	M6 cage nut	14
2	Support bracket	3	9	M6 x 16 mm hex head flange screw	14
3	M6 x 12 mm flat head socket cap screw	12	10	Cable strap module ¹²³	2
4	Doorstop	2	11	Grounding plate	5
5	Door latch	1	12	M6 x 16 mm flat head socket cap screw	2
6	Right extension panel	1	13	M4 x 6 mm flat head socket cap screws	4
7	Extension top cover	1	14	Grounding wire ⁴	3

- ¹ Cable straps are removable, remove the straps from the extension panels if needed.
- ² Cable straps can be lengthened by connecting two or more straps together.
- ³ Use cable straps to secure PDUs and manifolds prior to shipping.
- ⁴ Connect one end of the grounding wire to the grounding plate on the extension panel and the other end to the nearest grounding plate on the rack.

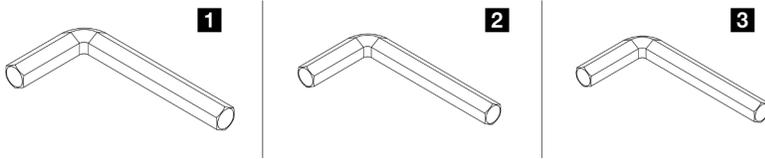


Figure 45. Hex Allen wrenches

No.	Description
1	Hex Allen wrench, 4 mm
2	Hex Allen wrench, 3 mm
3	Hex Allen wrench, 2.5 mm

Procedure

Step 1. Remove the door.

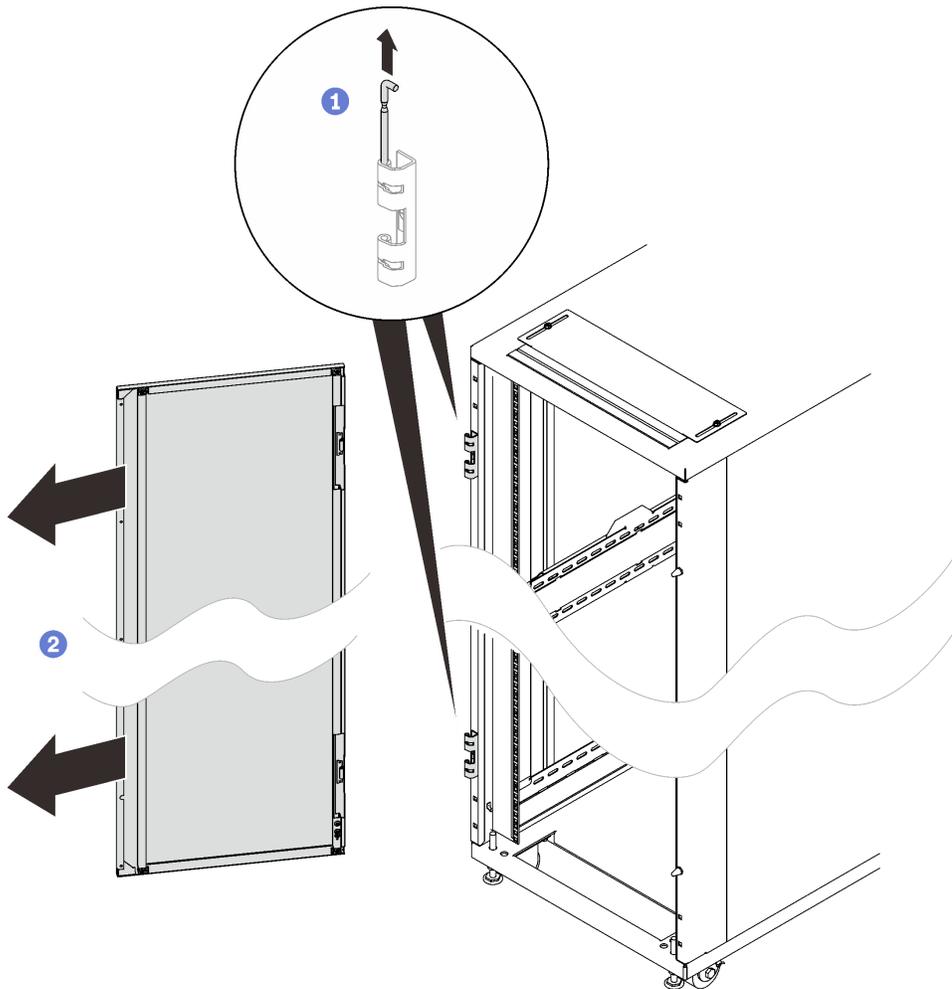


Figure 46. Removing a door

- 1 Hold the door in place, and lift both hinge pins until they lock in the open position so that the door is disengaged.
- 2 Remove the door from the rack cabinet frame.

Step 2. Remove the two hinges and the two doorstops.

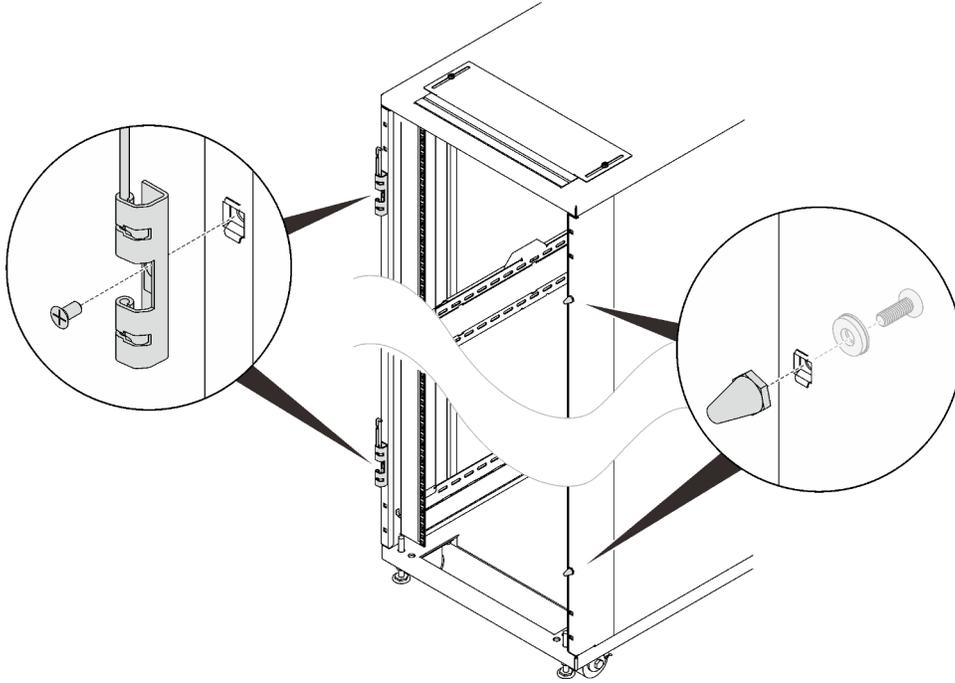


Figure 47. Removing the door hinges and doorstops

Step 3. Remove the door latch.

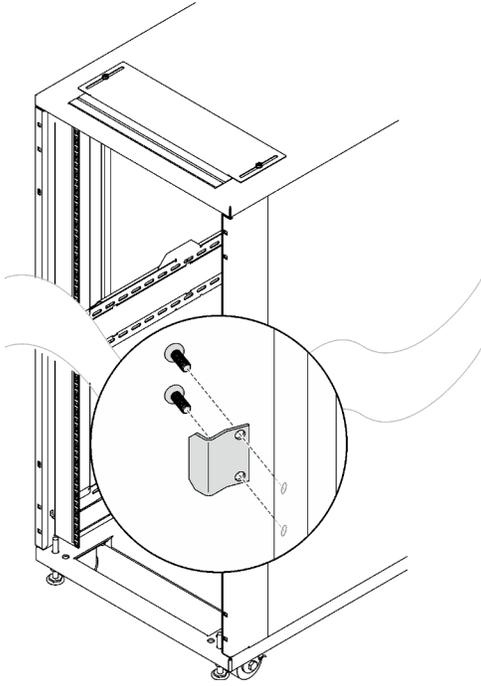


Figure 48. Removing the door latch

- Step 4. Install fourteen M6 cage nuts to the rack frame with [cage nut insertion tool](#) or a [flat-blade screwdriver](#).

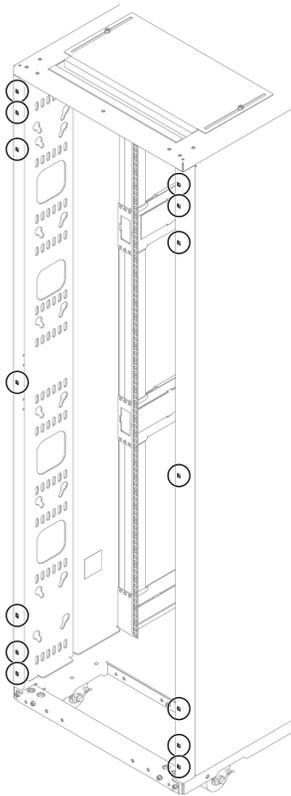
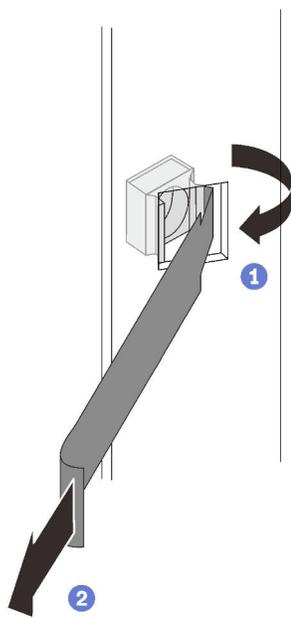


Figure 49. Cage nut installation location

With cage nut insertion tool



- 1 Insert one edge of the cage nut into the target mounting flange hole, and hook the other edge with the insertion tool through the flange hole.
- 2 Rotate and pull the tool to force the other nut edge into the flange hole, and thus secure the nut.

Figure 50. Installing cage nuts with cage nut insertion tool

With flat blade screwdriver

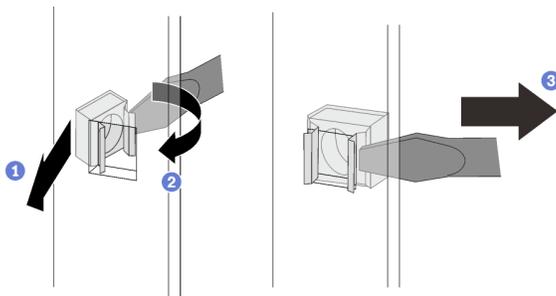


Figure 51. Installing cage nuts with flat blade screwdriver

- 1 Insert one edge of the cage nut into the target mounting flange hole.
- 2 Press and compress the other nut edge with a flat-blade screwdriver, and rotate the screwdriver towards the flange hole until the nut edge goes in the hole.
- 3 Release the screwdriver to secure the nut in the mounting flange hole.

Step 5. Tighten the fourteen screws to secure the two extension panels to the rack.

Note: If baying kit has been installed previously, make sure to remove the two screws from top and bottom of the cabinet first. Then, secure the screws through the panel and the baying kit.

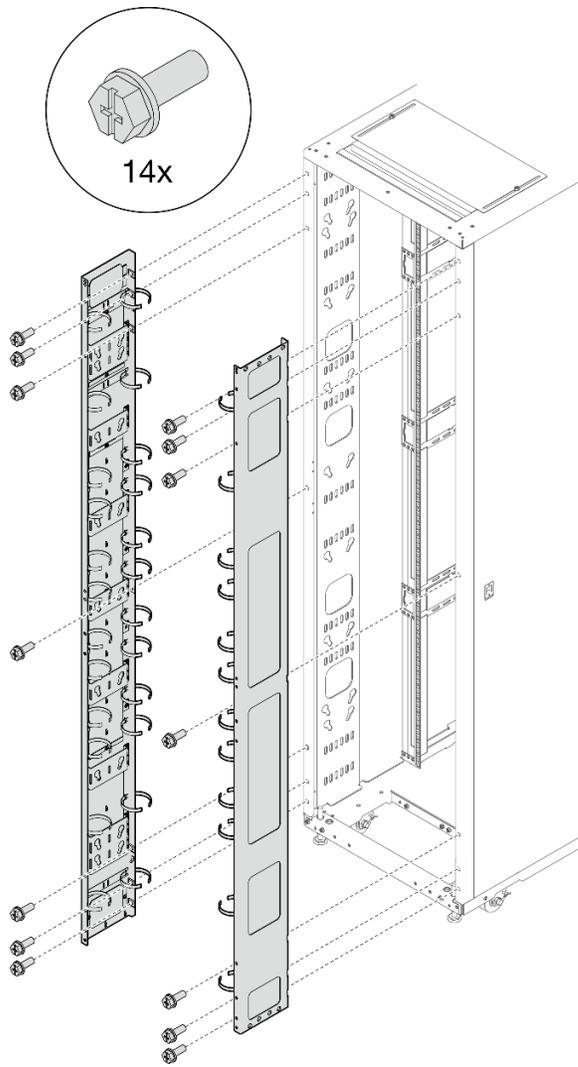


Figure 52. Installing the extension panels

- Step 6. Align the extension top cover with the screw holes on the extension panels, and secure it with six screws.

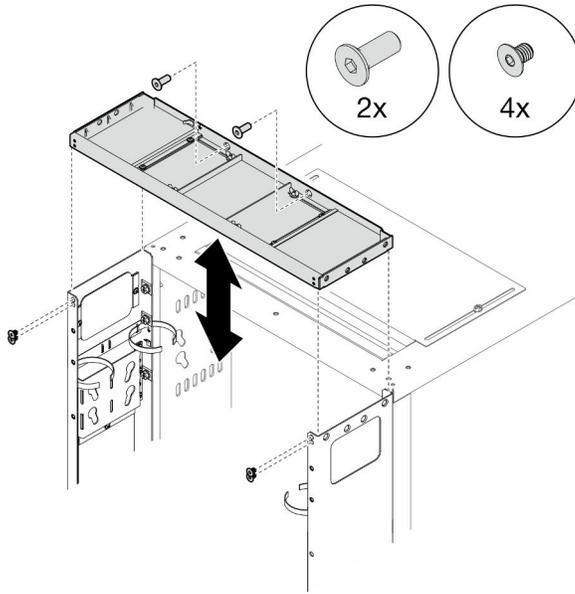


Figure 53. Installing the extension top cover

Step 7. Depending on the requirements, remove the filler(s) from the extension panels to route cables.

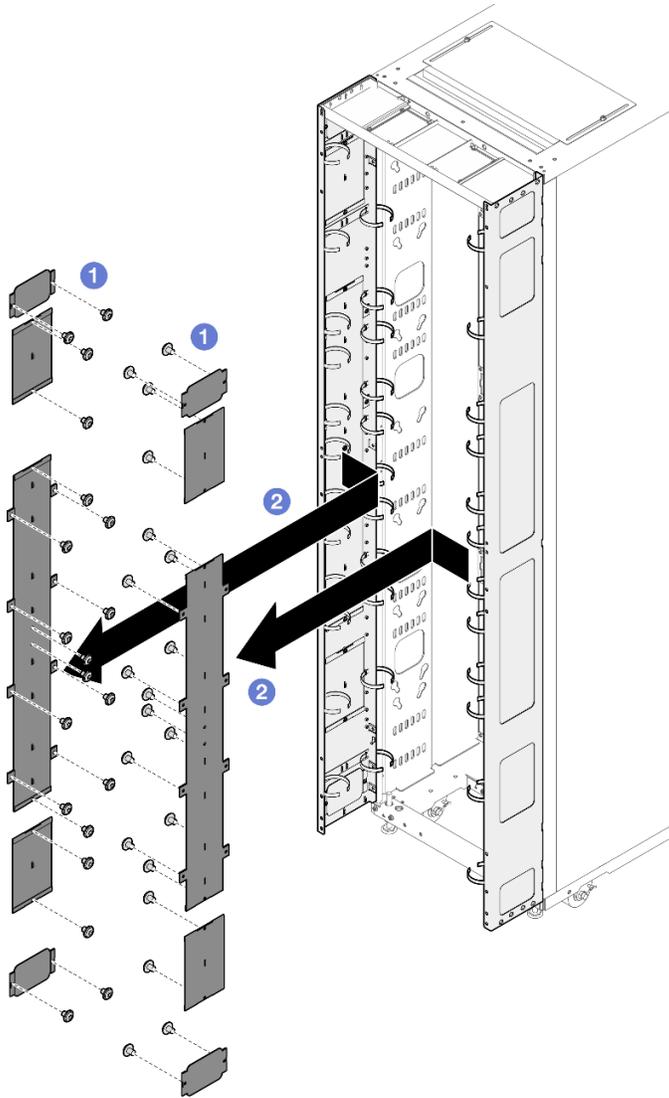


Figure 54. Removing the filler(s)

1. **1** Loosen the screws that secure the filler to the extension panel.
2. **2** Remove the filler.

Step 8. If there is a plan to install 0U PDU to the extension panel, complete the following steps.

Depending on the requirements, select the corresponding installation procedures.

- **Bracket with two keyhole slots (up to two PDUs, or one PDU and one manifold)**

Notes:

- Below illustration shows the locations for installing the brackets.

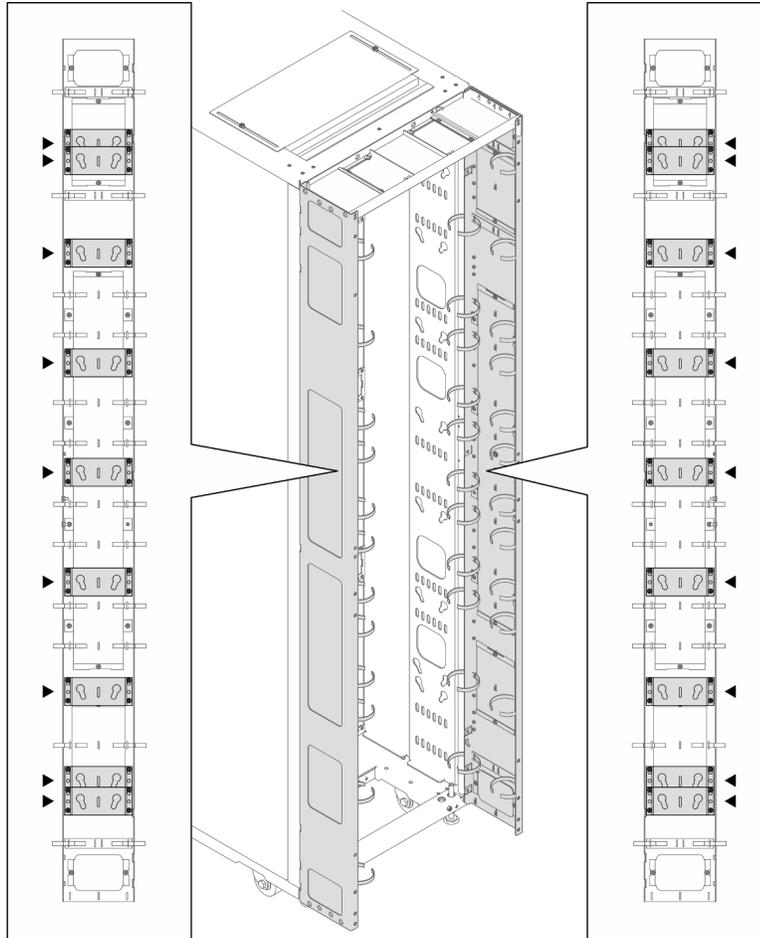


Figure 55. Locations for installing the brackets with two keyhole slots

- If one or two brackets are installed in the locations indicated in the illustration below, the M6 hex head flange screw must be replaced with an M6 round head flange screw.

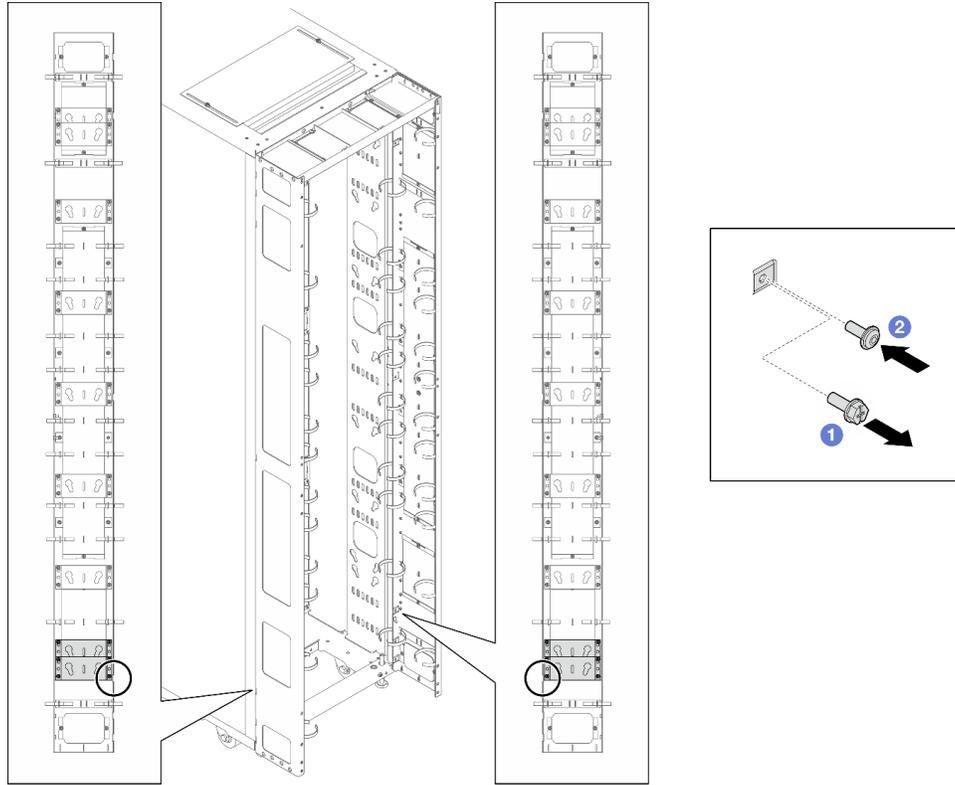


Figure 56. Replacing the screw

1. **1** Remove the M6 hex head flange screw.
 2. **2** Install the M6 round head flange screw.
1. Align the bracket with the extension panel, and secure it with four screws.

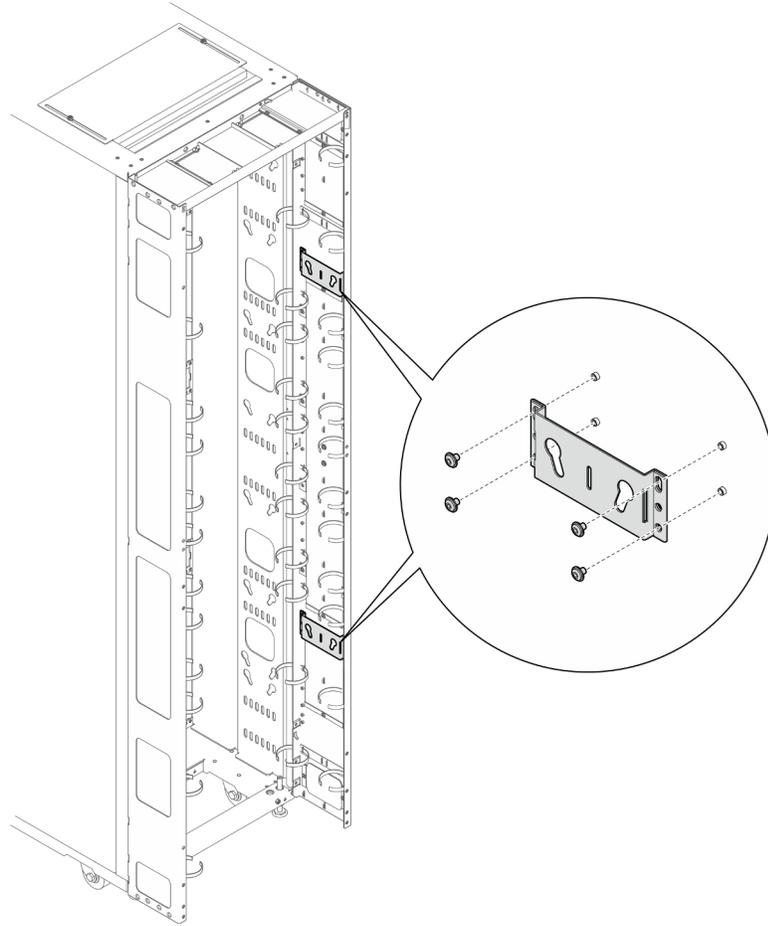


Figure 57. Installing the bracket with two keyhole slots

2. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets. Choose the left or right slot for PDU installation based on the requirements.

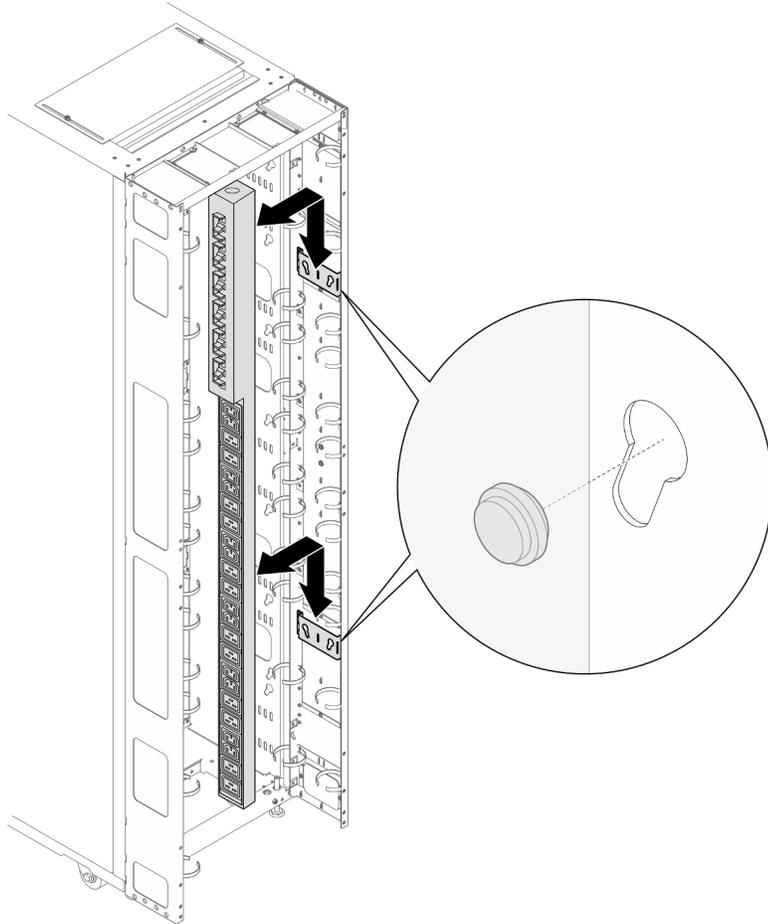


Figure 58. Installing the PDU

Note: PDU can be rotated 180 degrees for installation with the input cable at the bottom.

- **L-shaped bracket (up to two PDUs, or one PDU and one manifold)**

Notes:

- Below illustration shows the locations for installing the brackets.

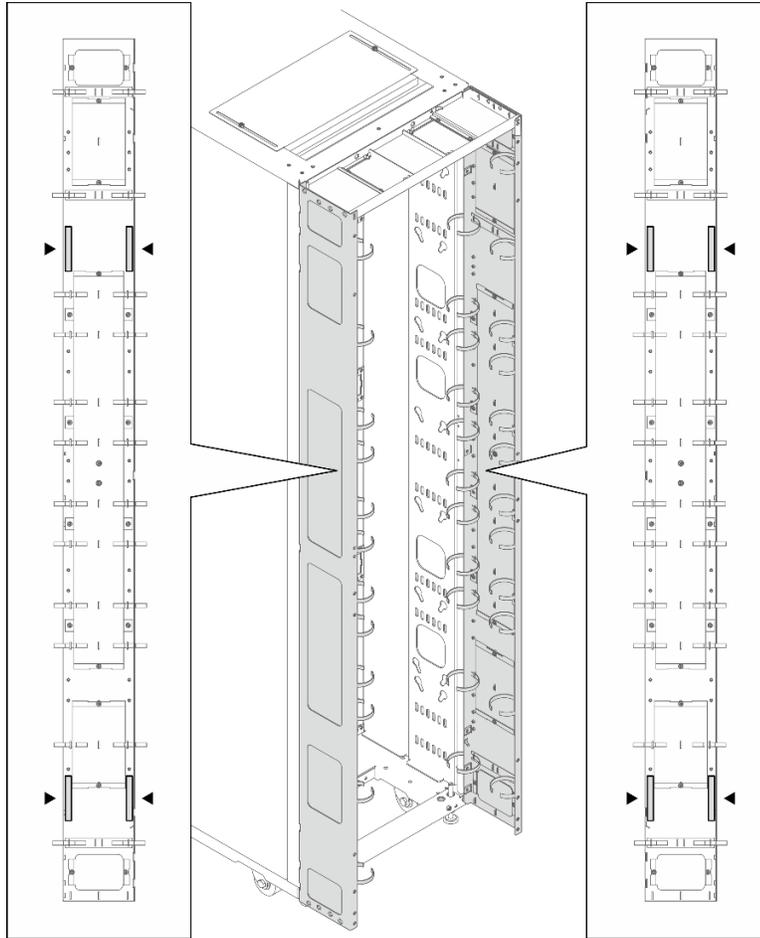


Figure 59. Locations for installing the L-shaped brackets

- If one or two brackets are installed in the locations indicated in the illustration below, the M6 hex head flange screw must be replaced with an M6 round head flange screw.

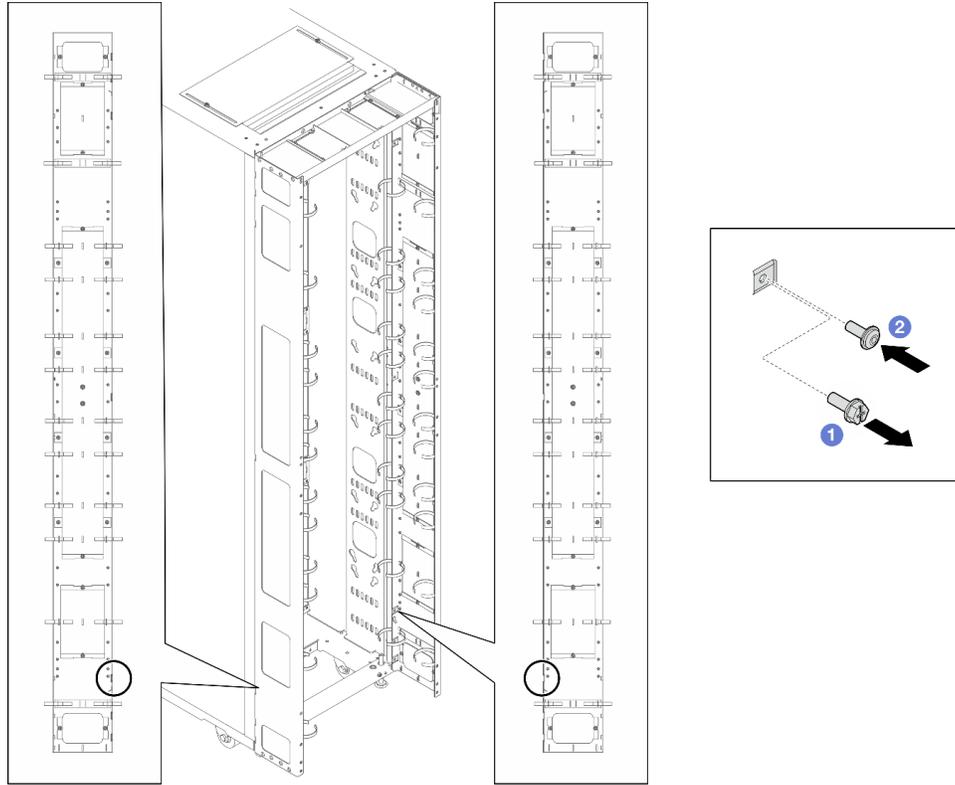


Figure 60. Replacing the screw

1. **1** Remove the M6 hex head flange screw.
 2. **2** Install the M6 round head flange screw.
1. Align the bracket with the extension panel, and secure it with three screws. Choose the installation location for the bracket based on the orientation of the PDU.

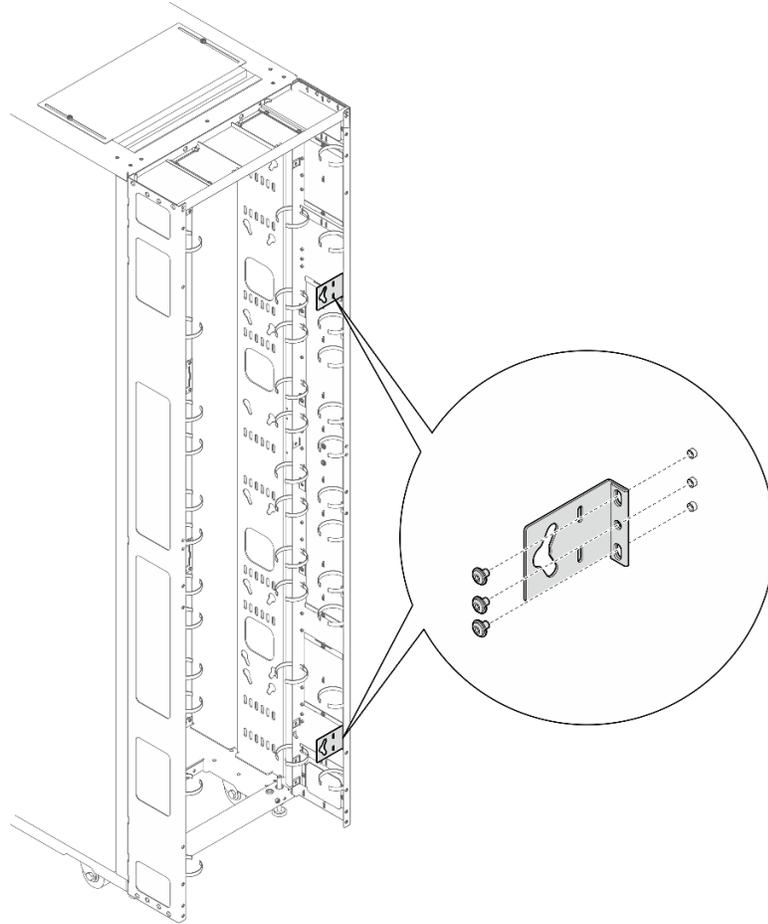


Figure 61. Installing the L-shaped bracket with the PDU facing the front of the rack cabinet

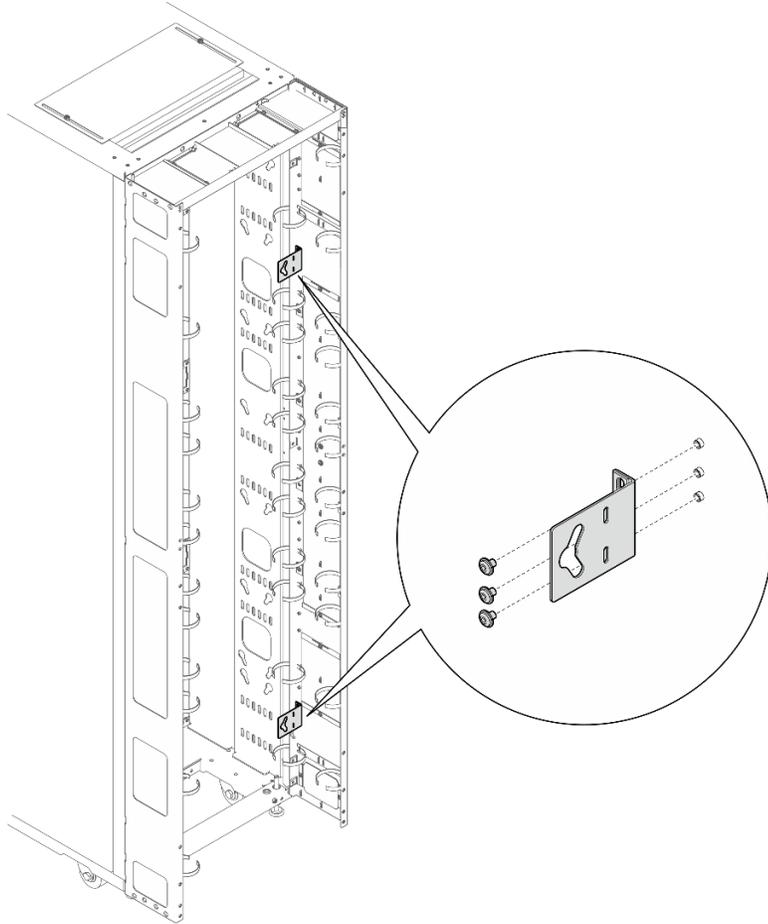


Figure 62. Installing the L-shaped bracket with the PDU facing the front of the rack cabinet

2. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets.

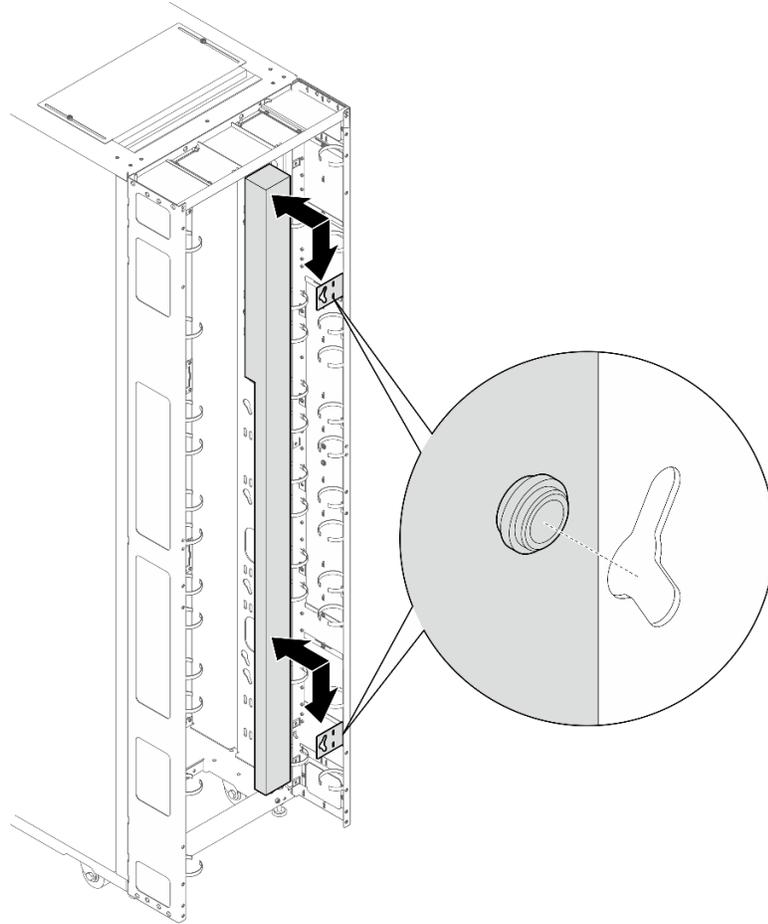


Figure 63. Installing the PDU with the PDU facing the front of the rack cabinet

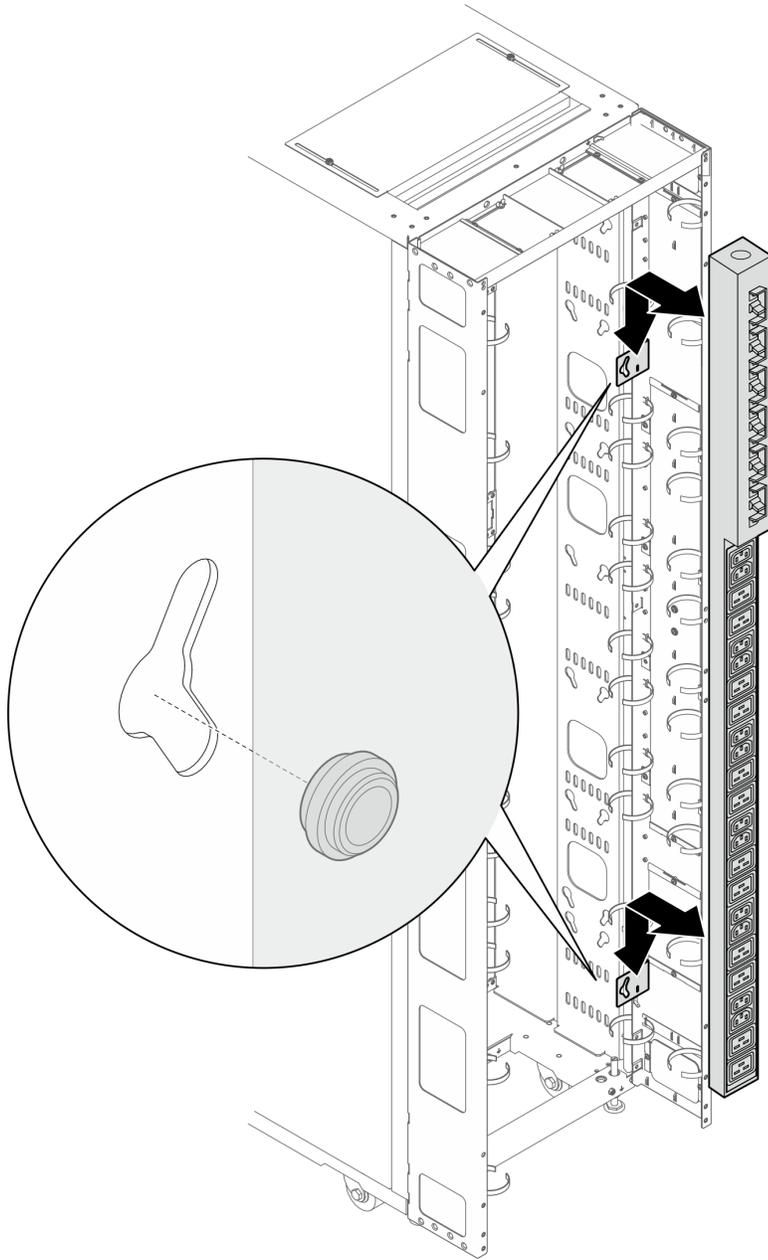


Figure 64. Installing the PDU with PDU facing the rear of the rack cabinet

Step 9. Depending on the requirements, select one of the following methods to ensure there is sufficient space for routing cables.

- **Slide the brush panel**

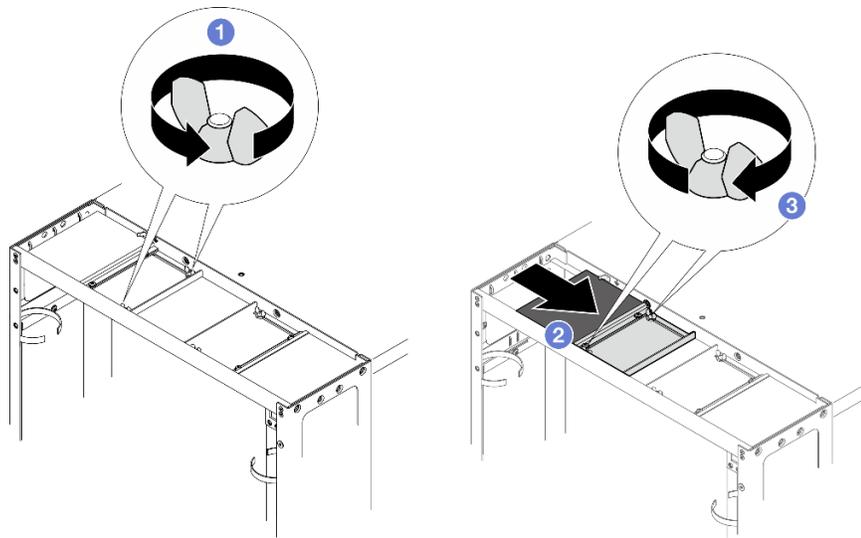


Figure 65. Sliding the brush panel

1. **1** Loosen the two screws that secure the baffle to the top cover.
2. **2** Slide the baffle and brush panel toward the center of the top cover.
3. **3** Tighten the two screws to secure the baffle.

- **Remove the brush panel**

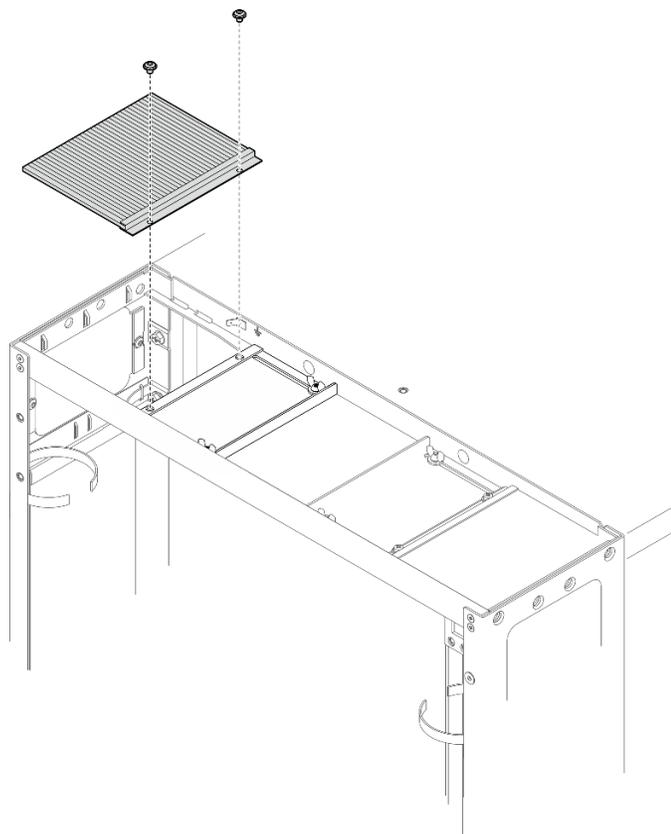


Figure 66. Removing the brush panel

Loosen the two screws to remove the brush panel from the top cover.

- **Remove the brush panel and baffle**

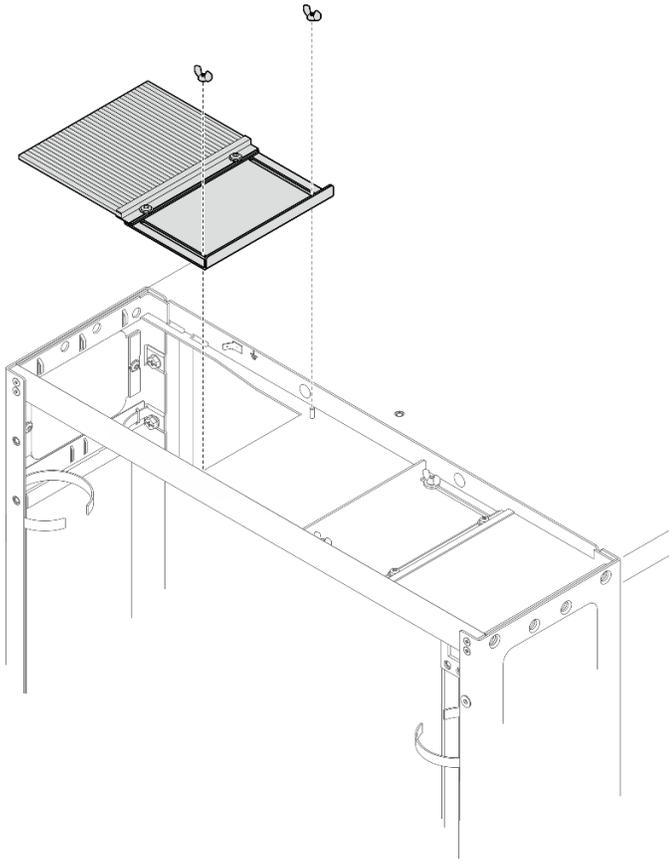


Figure 67. Removing the brush panel and baffle

Loosen the two screws to remove the brush panel and baffle from the top cover.

Step 10. Install the two door hinges and the door latch to the extension panels.

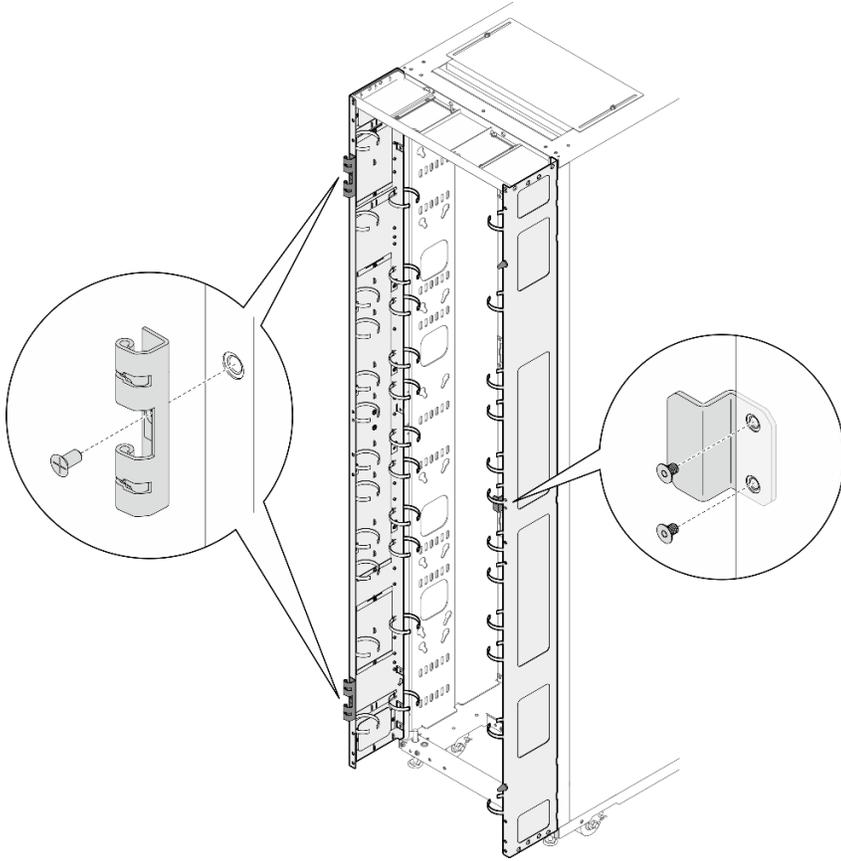


Figure 68. Installing the door hinges and door latch

Step 11. If the rack needs to be shipped, install the three support brackets.

Note: Depending on the requirement, remove the support brackets upon arrival at the site.

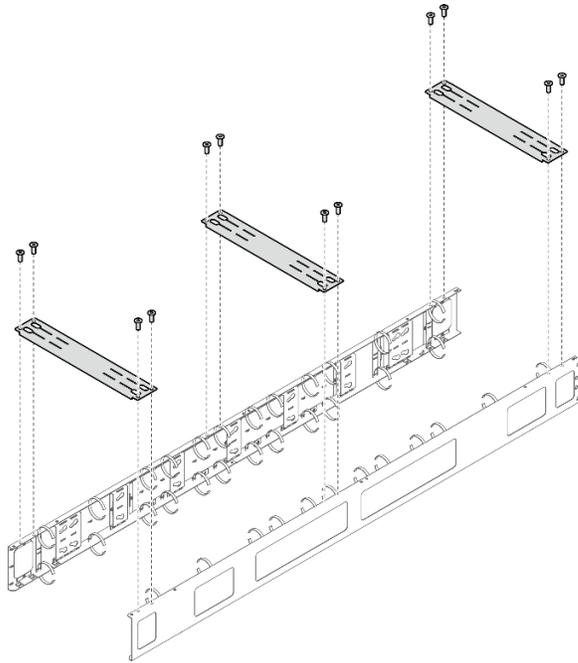


Figure 69. Installing the support brackets

Step 12. Install the door back to the rack.

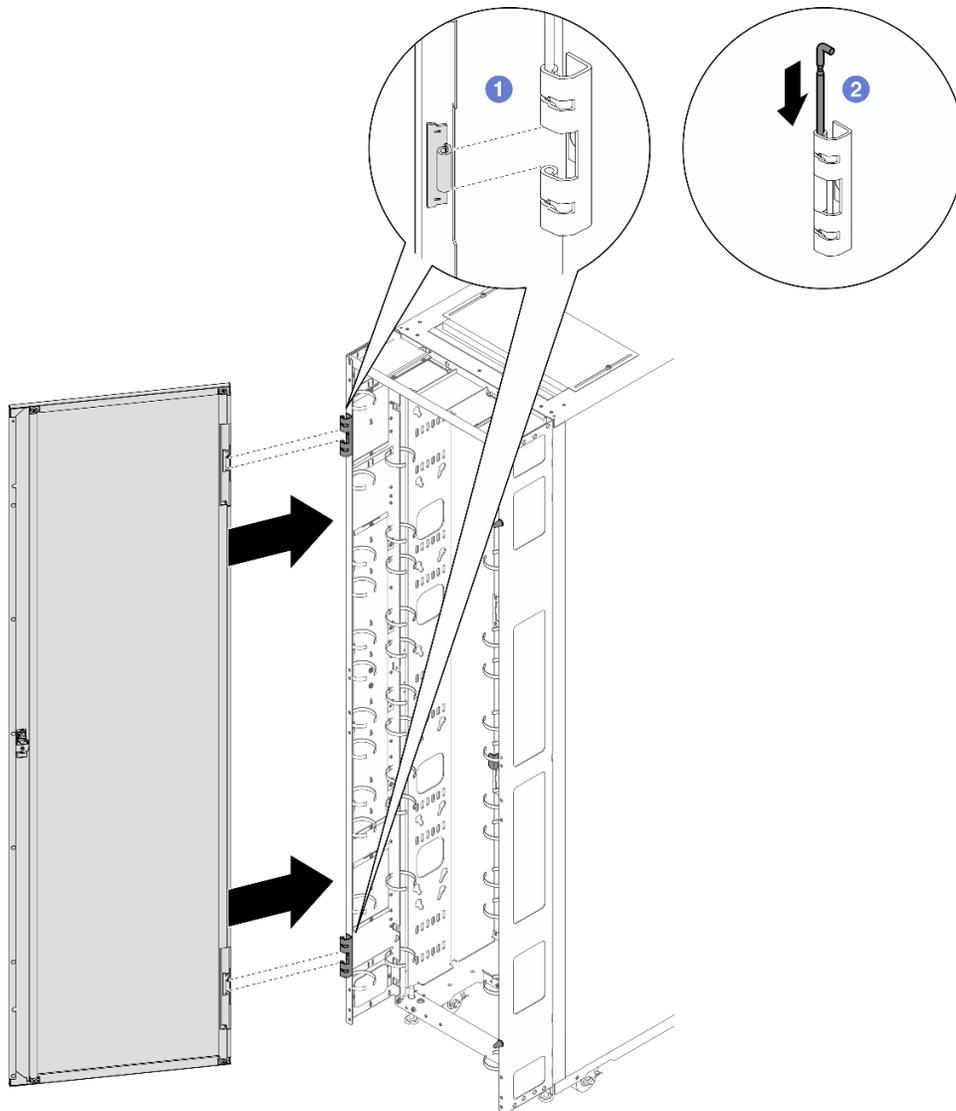


Figure 70. Installing the door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Install 48U Advanced Rack Extension Kit with RDHX

See this topic to learn how to install 48U Advanced Rack Extension Kit and RDHX.

Notes:

- Each unit of rack extension kit comes with additional capacity for up to two 0U PDUs, or one 0U PDU and one manifold, on each side of the rack.
- Each rack cabinet supports up to two units of rack extension kit (one to the front and one to the rear side).
- If there is a plan to install baying kit while only one of the adjacent cabinets will be installed with extension, make sure to install the baying kit first (see [“Install the baying kit” on page 95](#)). Then, as preparation for this procedure, remove the two screws from the upper and lower part of the cabinet that will be installed with the extension kit, and skip to [Step 5 on page 63](#).

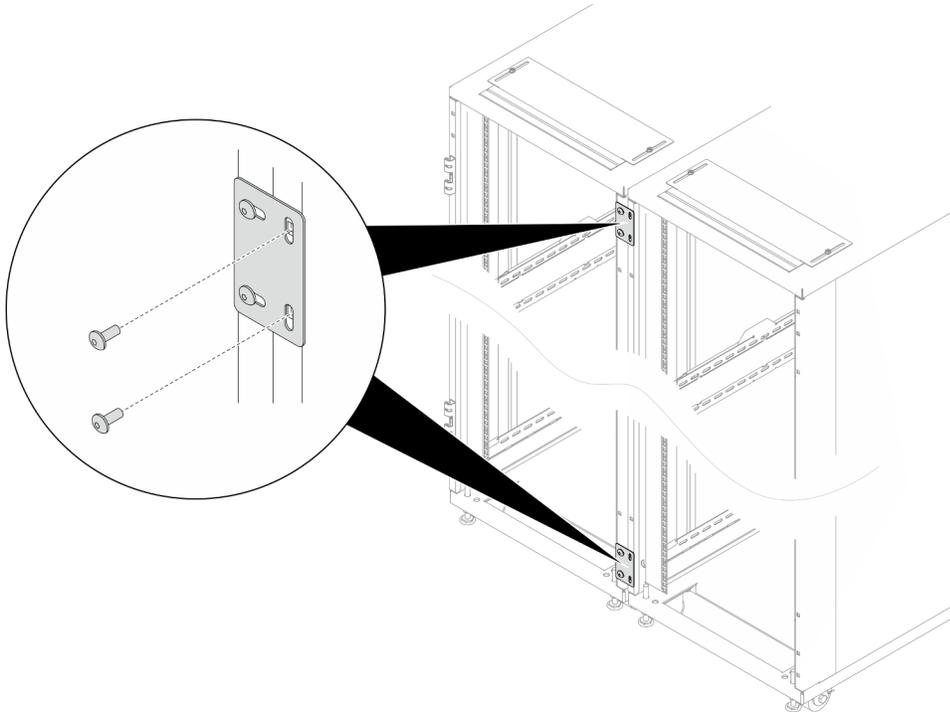


Figure 71. Removing screws to prepare for extension installation

- **Required tools**

- One tool with plastic blade/scissors to open the packaging
- One rubber hammer to align the extension panels with the side of the rack
- One Screwdriver with No. 3 Phillips bit to tighten the M6 screws (9 in the next bullet point)
- One Nut-driver with holding hex bit 10 mm to tighten the M6 screws (9 in the next bullet point)
- One 2.5 mm Hex bit socket to tighten the M4 screws (13 in the next bullet point)
- One 3 mm Hex bit socket to tighten the M5 screws (PDU/manifold brackets, opening covers on the extension panels)
- One 4 mm Hex bit socket to tighten the M6 screws (4 and 14 in the next bullet point)
- The extension kit comes with a miscellaneous bag, which contains the following components:

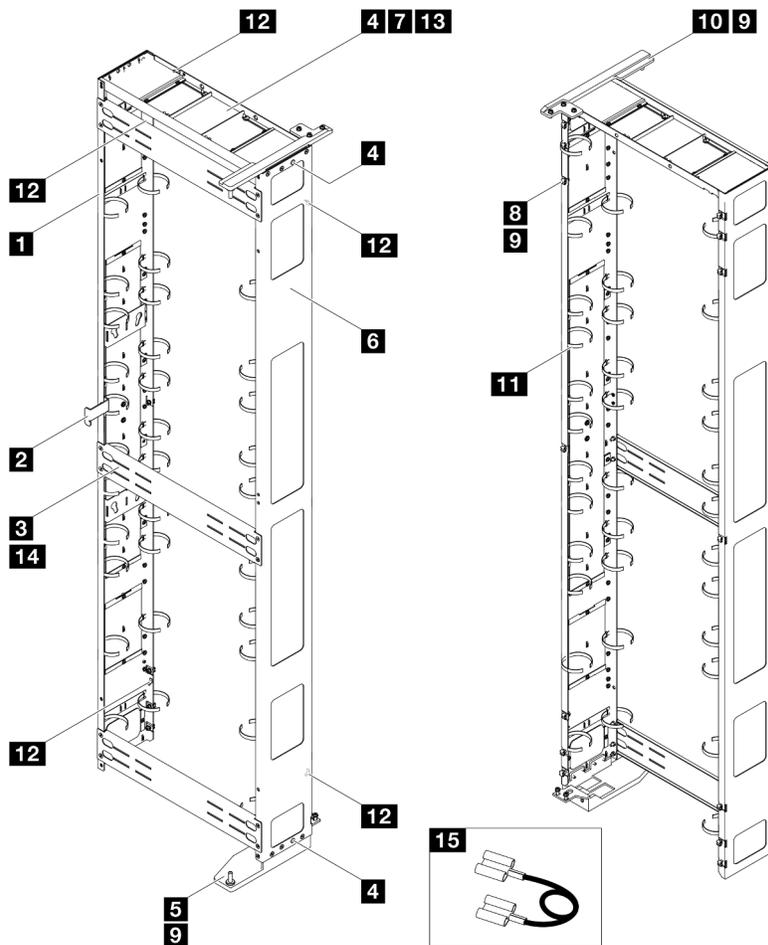


Figure 72. Parts

No.	Description	Quantity	No.	Description	Quantity
1	Left extension panel	1	9	M6 x 16 mm hex head flange screw	21
2	Latch plate	1	10	Top hinge for RDHX	1
3	Support bracket	3	11	Cable strap module ¹²³	2
4	M6 x 16 mm flat head socket cap screw	10	12	Grounding plate	5
5	Bottom hinge for RDHX	1	13	M4 x 6 mm flat head socket cap screws	4
6	Right extension panel	1	14	M6 x 12 mm flat head socket cap screw	12
7	Extension top cover	1	15	Grounding wire ⁴	3
8	M6 cage nut	14			

- ¹ Cable straps are removable, remove the straps from the extension panels if needed.
- ² Cable straps can be lengthened by connecting two or more straps together.
- ³ Use cable straps to secure PDUs and manifolds prior to shipping.

- 4 Connect one end of the grounding wire to the grounding plate on the extension panel and the other end to the nearest grounding plate on the rack.

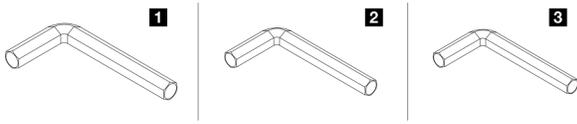


Figure 73. Hex Allen wrenches

No.	Description
1	Hex Allen wrench, 4 mm
2	Hex Allen wrench, 3 mm
3	Hex Allen wrench, 2.5 mm

Procedure

Step 1. Remove the door.

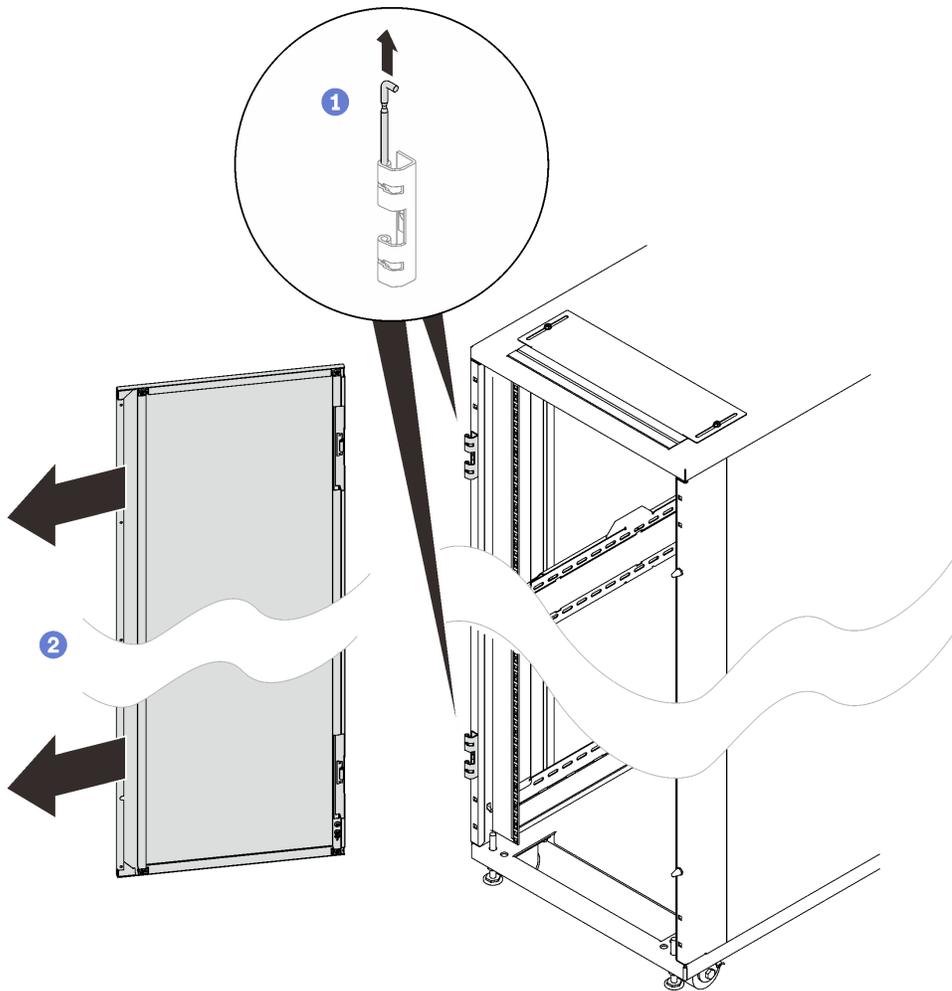


Figure 74. Removing a door

- 1 Hold the door in place, and lift both hinge pins until they lock in the open position so that the door is disengaged.
- 2 Remove the door from the rack cabinet frame.

Step 2. Remove the two hinges and the two doorstops.

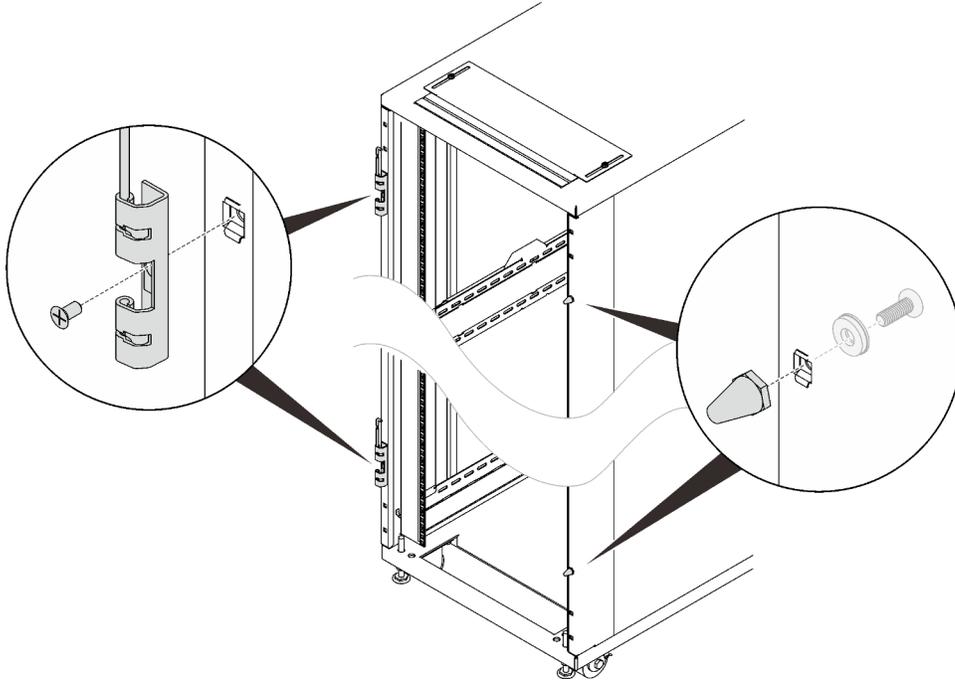


Figure 75. Removing the door hinges and extension bottom covers

Step 3. Remove the door latch.

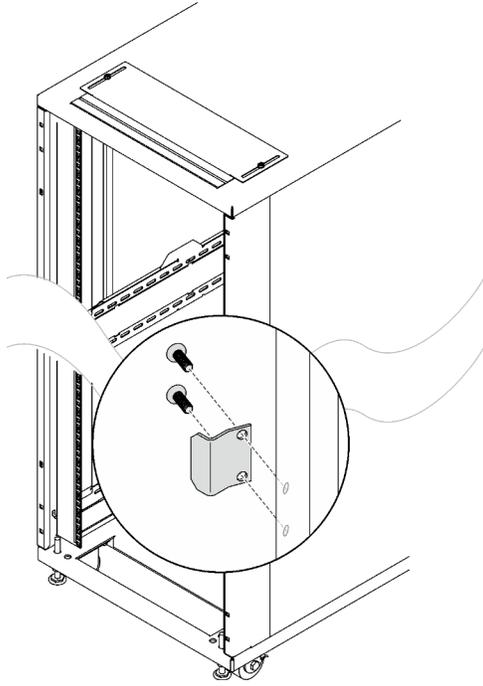


Figure 76. Removing the door latch

- Step 4. Install fourteen M6 cage nuts to the rack frame with [cage nut insertion tool](#) or a [flat-blade screwdriver](#).

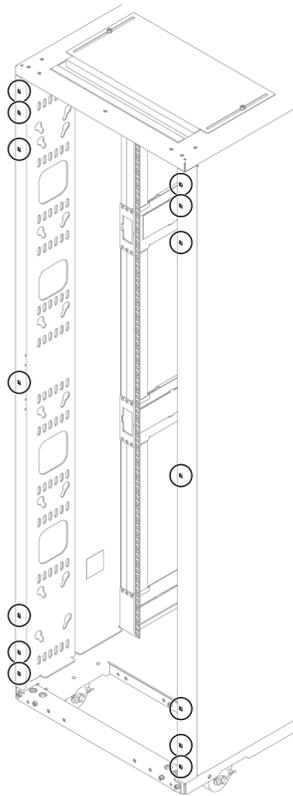
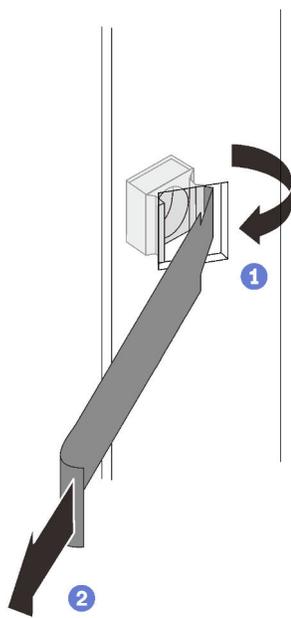


Figure 77. Cage nut installation location

With cage nut insertion tool



- 1 Insert one edge of the cage nut into the target mounting flange hole, and hook the other edge with the insertion tool through the flange hole.
- 2 Rotate and pull the tool to force the other nut edge into the flange hole, and thus secure the nut.

Figure 78. Installing cage nuts with cage nut insertion tool

With flat blade screwdriver

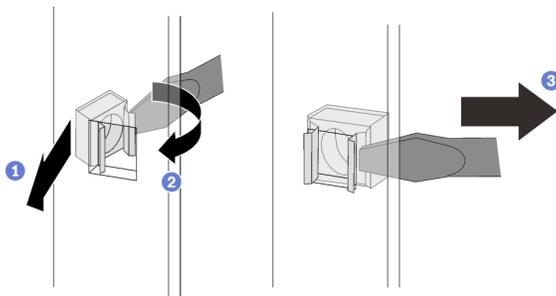


Figure 79. Installing cage nuts with flat blade screwdriver

- 1 Insert one edge of the cage nut into the target mounting flange hole.
- 2 Press and compress the other nut edge with a flat-blade screwdriver, and rotate the screwdriver towards the flange hole until the nut edge goes in the hole.
- 3 Release the screwdriver to secure the nut in the mounting flange hole.

Step 5. Install the bottom hinge.

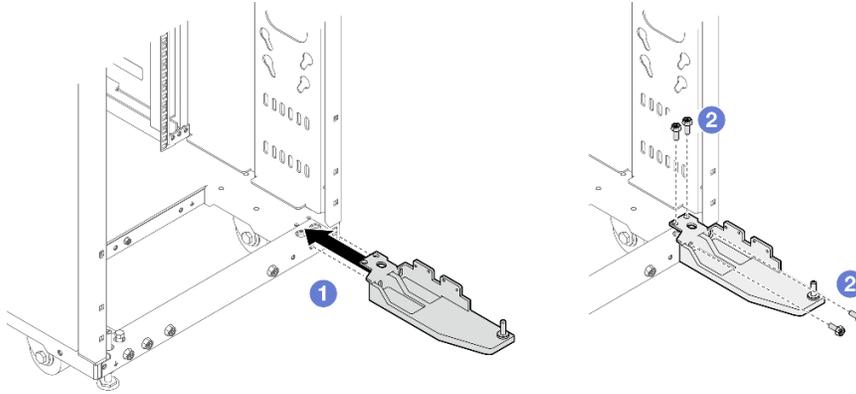


Figure 80. Securing the bottom hinge

Note: Do not fully tighten the four screws in this step.

- 1 Align the hinge with the rack.
- 2 Secure the hinge to the rack with four screws.

Step 6. Secure the two extension panels to the rack with fourteen screws.

Notes:

- Do not fully tighten the fourteen screws in this step.
- If baying kit has been installed previously, make sure to remove the two screws from top and bottom of the cabinet first. Then, secure the screws through the panel and the baying kit.

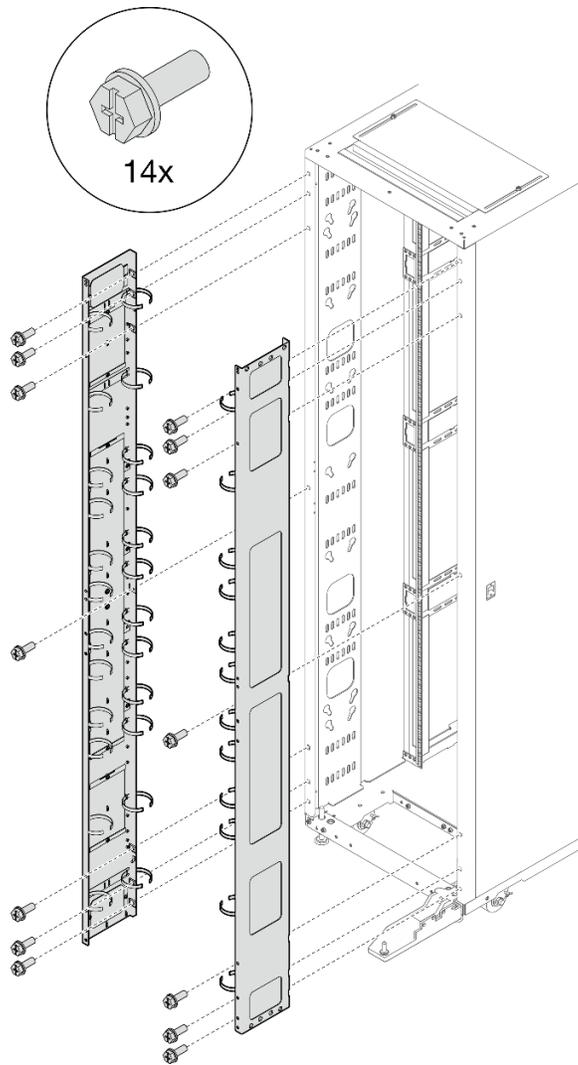


Figure 81. Installing the extension panels

- Step 7. Align the extension top cover with the screw holes on the extension panels, and secure it with six screws.

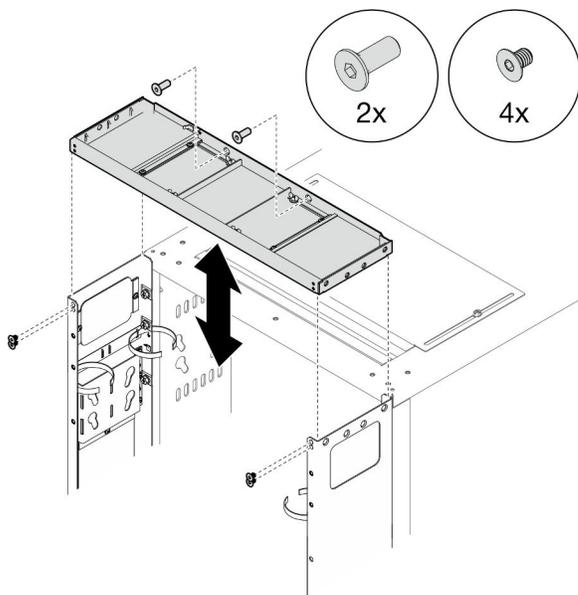


Figure 82. Installing the extension top cover

Step 8. Depending on the requirements, remove the filler(s) from the extension panels to route cables.

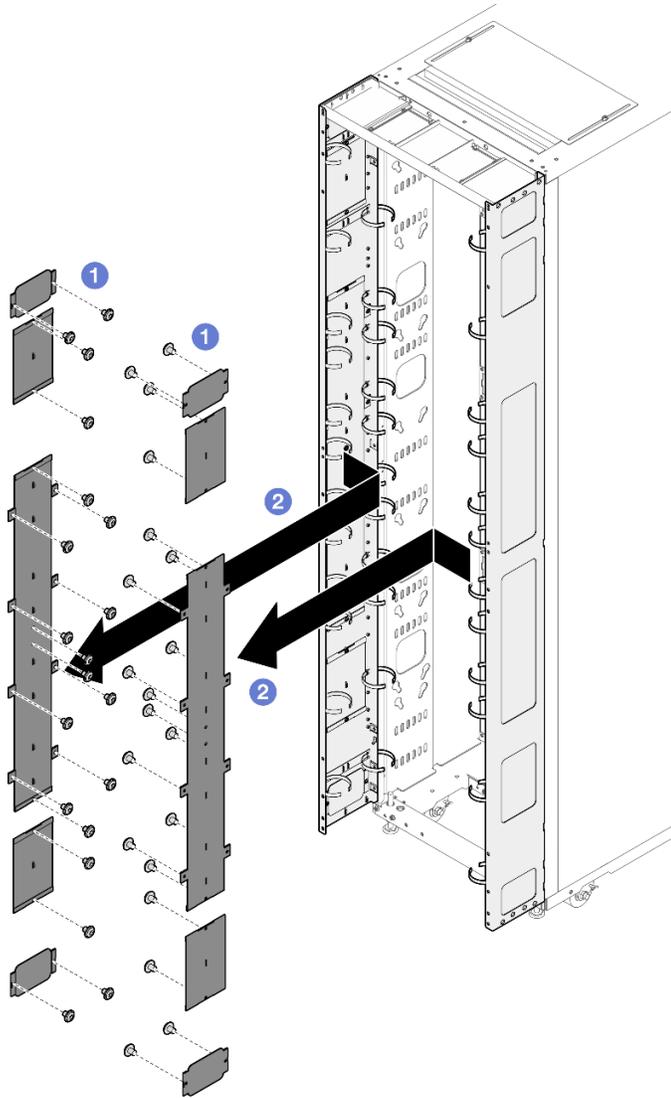


Figure 83. Removing the filler(s)

1. **1** Loosen the screws that secure the filler to the extension panel.
2. **2** Remove the filler.

Step 9. If there is a plan to install 0U PDU to the extension panel, complete the following steps.

Depending on the requirements, select the corresponding installation procedures.

- **Bracket with two keyhole slots (up to two PDUs, or one PDU and one manifold)**

Notes:

- Below illustration shows the locations for installing the brackets.

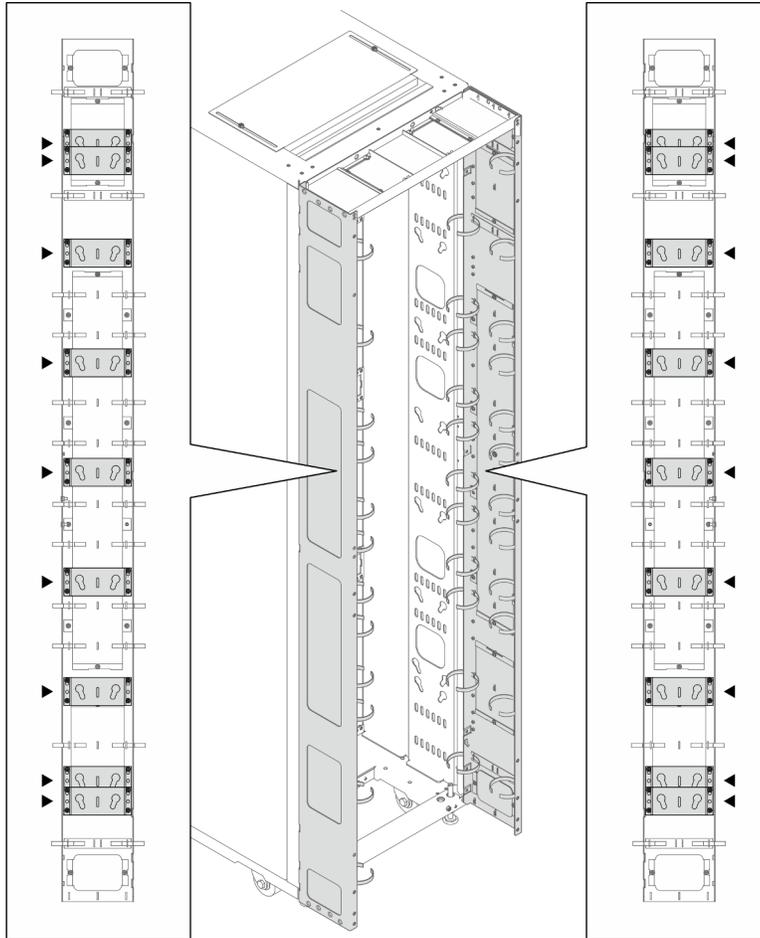


Figure 84. Locations for installing the brackets with two keyhole slots

- If one or two brackets are installed in the locations indicated in the illustration below, the M6 hex head flange screw must be replaced with an M6 round head flange screw.

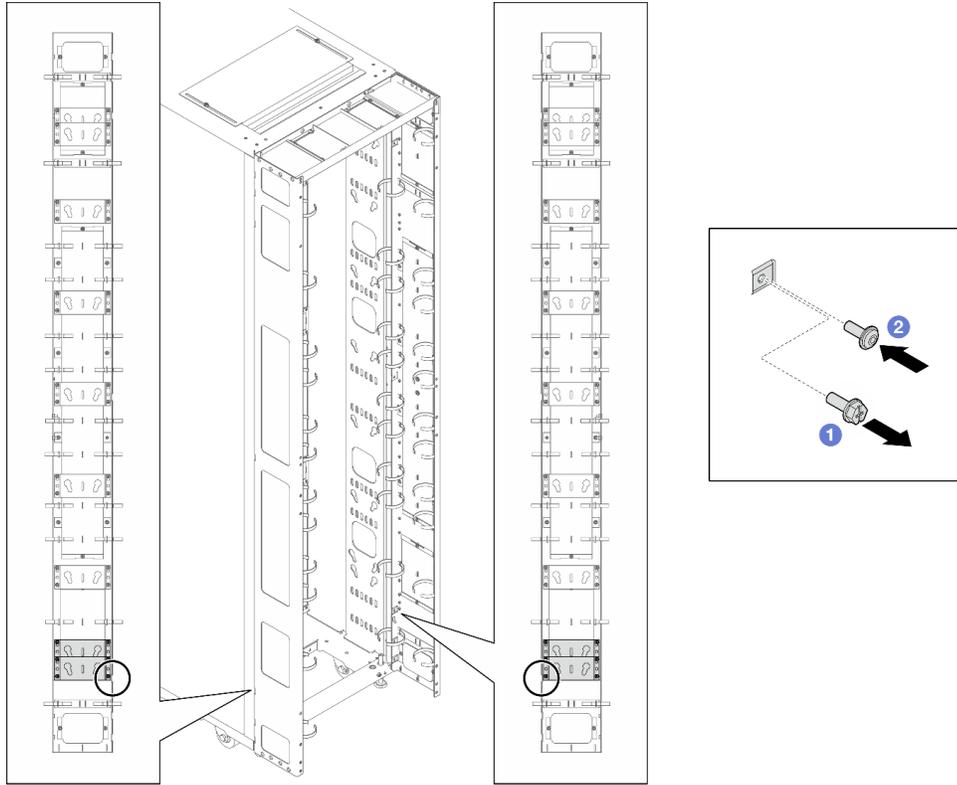


Figure 85. Replacing the screw

1. **1** Remove the M6 hex head flange screw.
 2. **2** Install the M6 round head flange screw.
1. Align the bracket with the extension panel, and secure it with four screws.

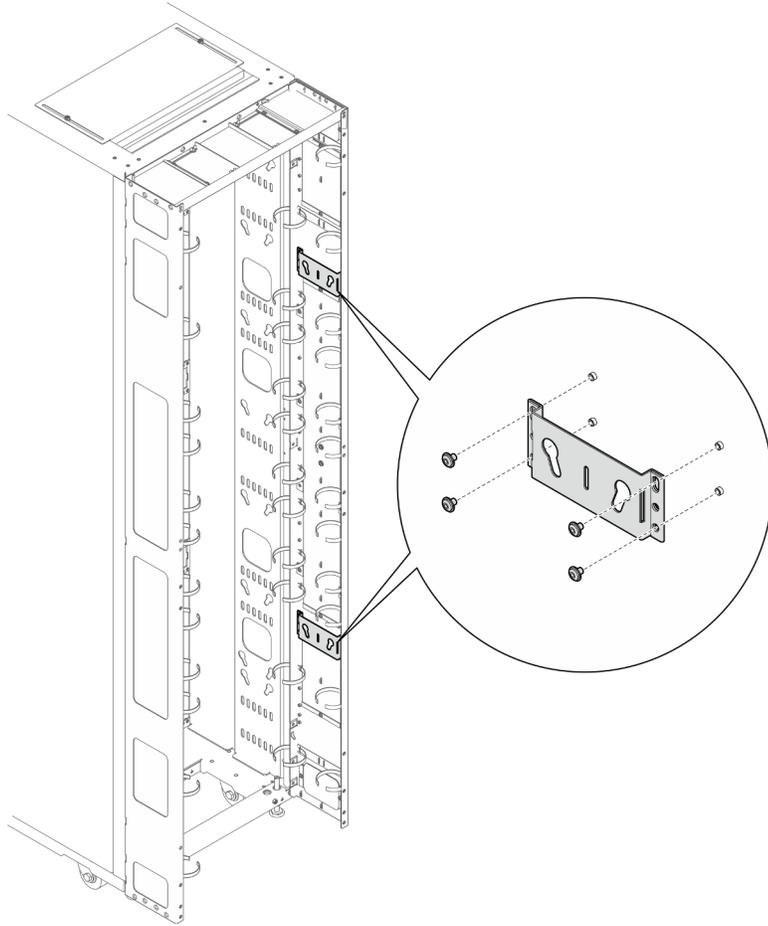


Figure 86. Installing the bracket with two keyhole slots

2. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets. Choose the left or right slot for PDU installation based on the requirements.

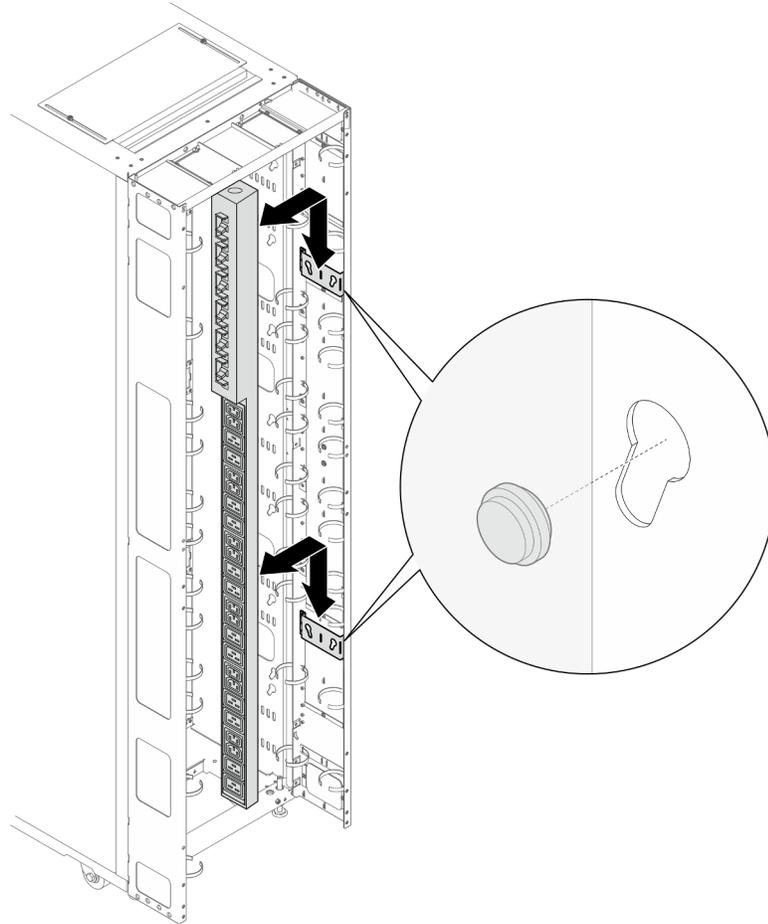


Figure 87. Installing the PDU

Note: PDU can be rotated 180 degrees for installation with the input cable at the bottom.

- **L-shaped bracket (up to two PDUs, or one PDU and one manifold)**

Notes:

- Below illustration shows the locations for installing the brackets.

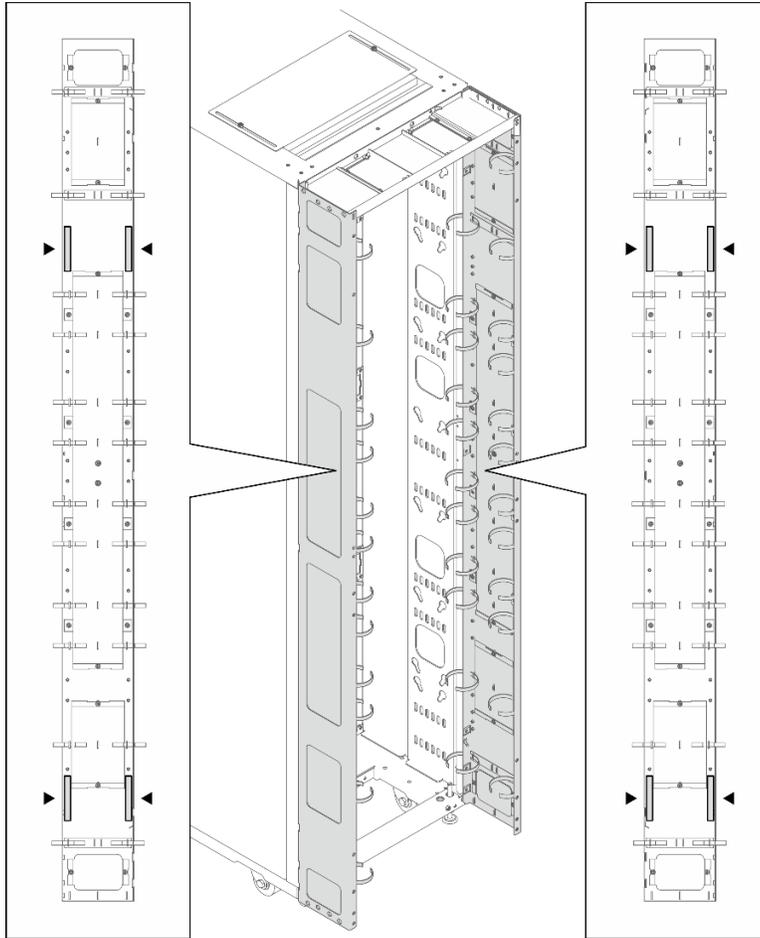


Figure 88. Locations for installing the L-shaped brackets

- If one or two brackets are installed in the locations indicated in the illustration below, the M6 hex head flange screw must be replaced with an M6 round head flange screw.

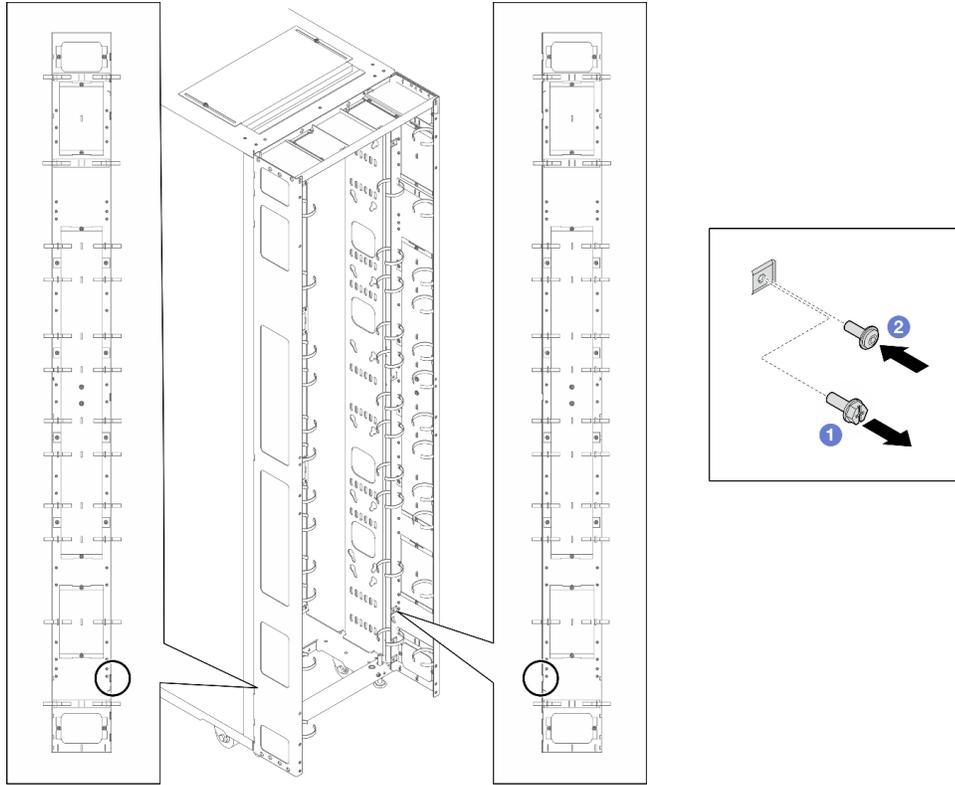


Figure 89. Replacing the screw

1. **1** Remove the M6 hex head flange screw.
 2. **2** Install the M6 round head flange screw.
1. Align the bracket with the extension panel, and secure it with three screws. Choose the installation location for the bracket based on the orientation of the PDU.

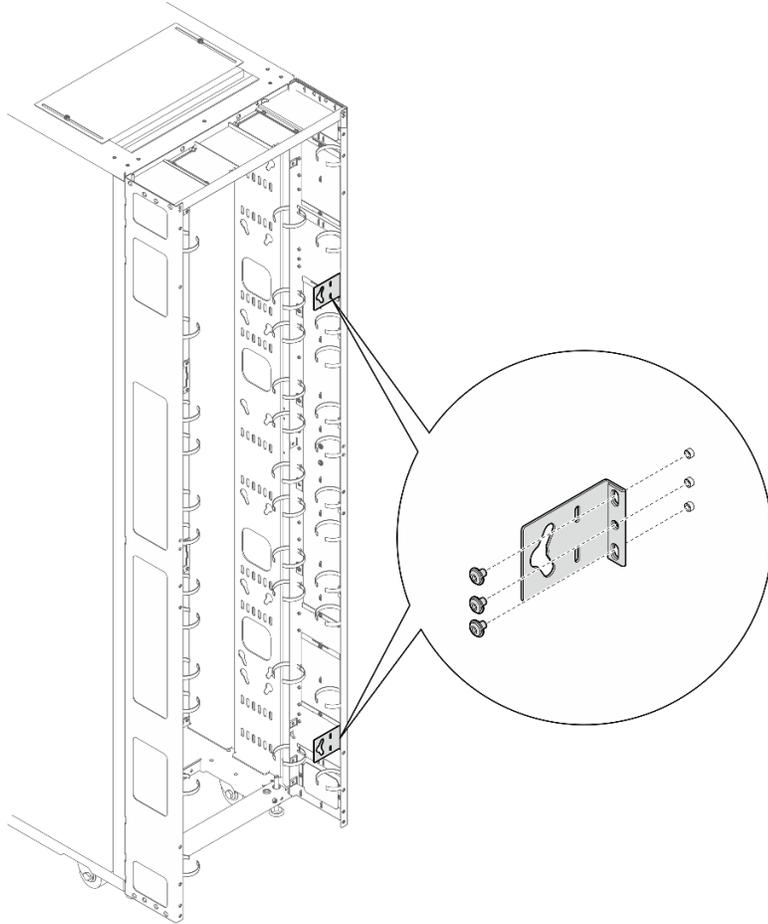


Figure 90. Installing the L-shaped bracket with the PDU facing the front of the rack cabinet

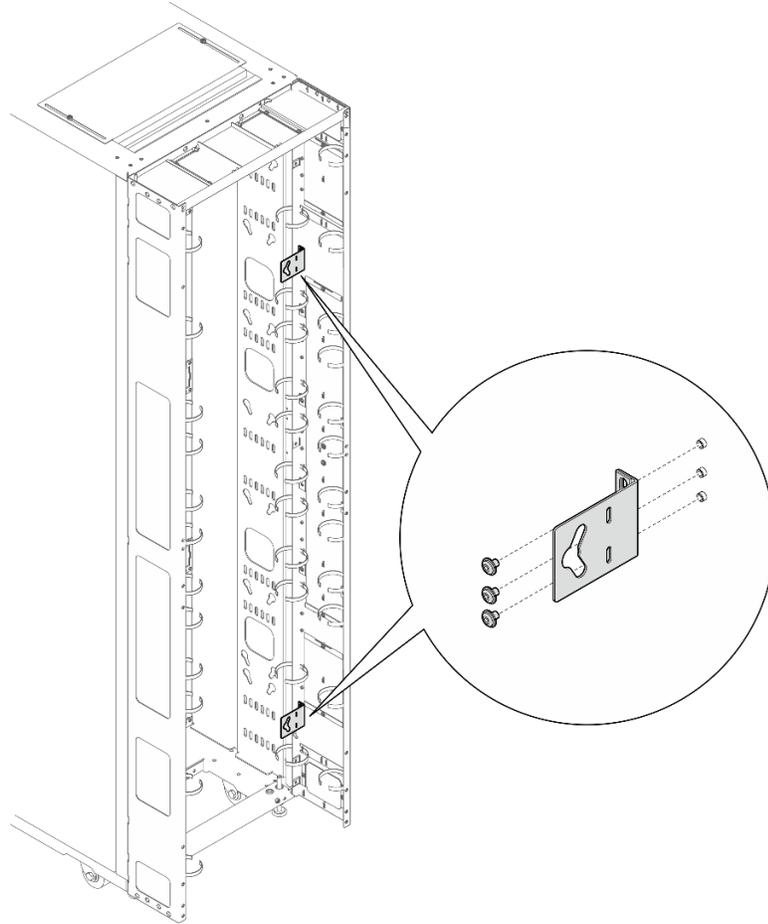


Figure 91. Installing the L-shaped bracket with the PDU facing the front of the rack cabinet

2. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets.

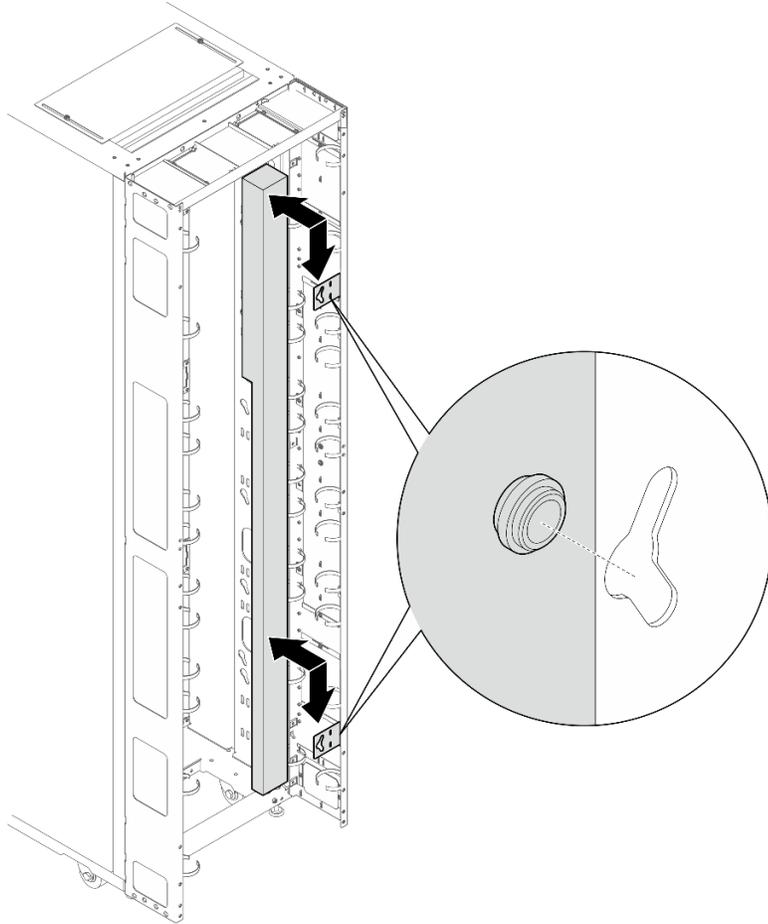


Figure 92. Installing the PDU with the PDU facing the front of the rack cabinet

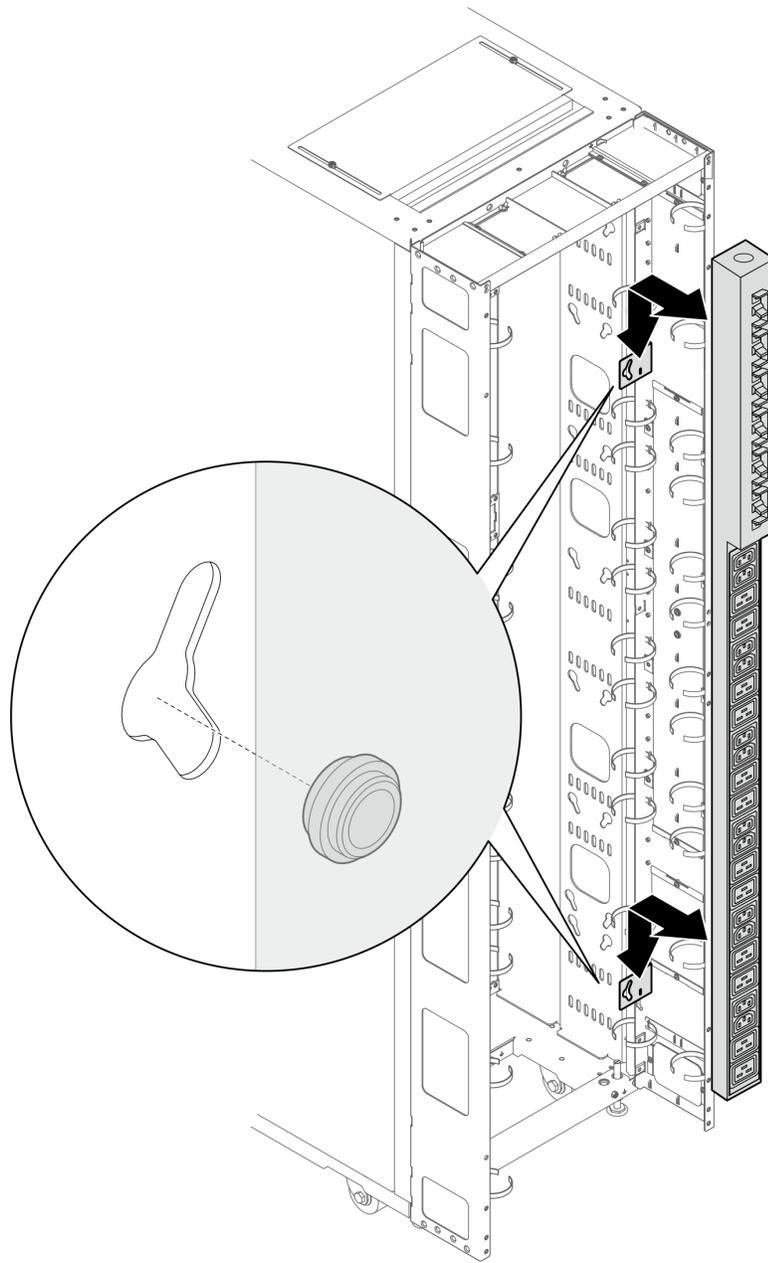


Figure 93. Installing the PDU with PDU facing the rear of the rack cabinet

Step 10. Depending on the requirements, select one of the following methods to ensure there is sufficient space for routing cables.

- **Slide the brush panel**

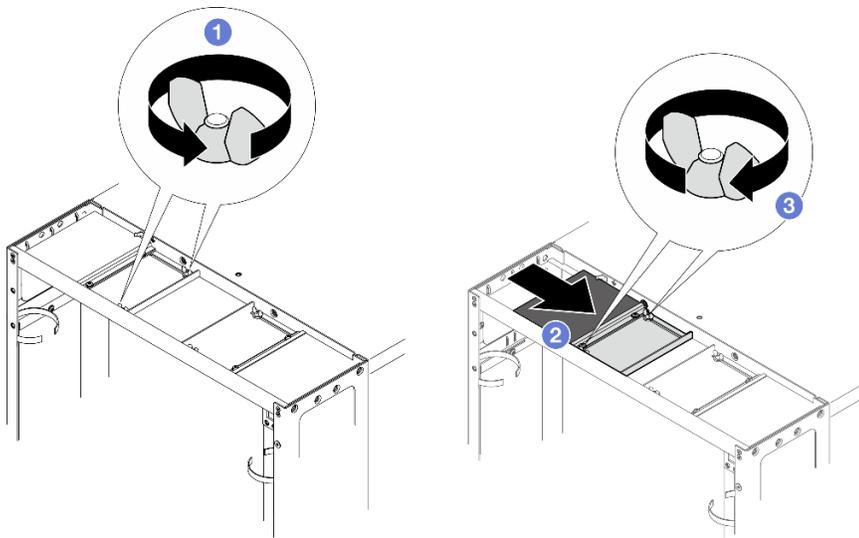


Figure 94. Sliding the brush panel

1. **1** Loosen the two screws that secure the baffle to the top cover.
2. **2** Slide the baffle and brush panel toward the center of the top cover.
3. **3** Tighten the two screws to secure the baffle.

- **Remove the brush panel**

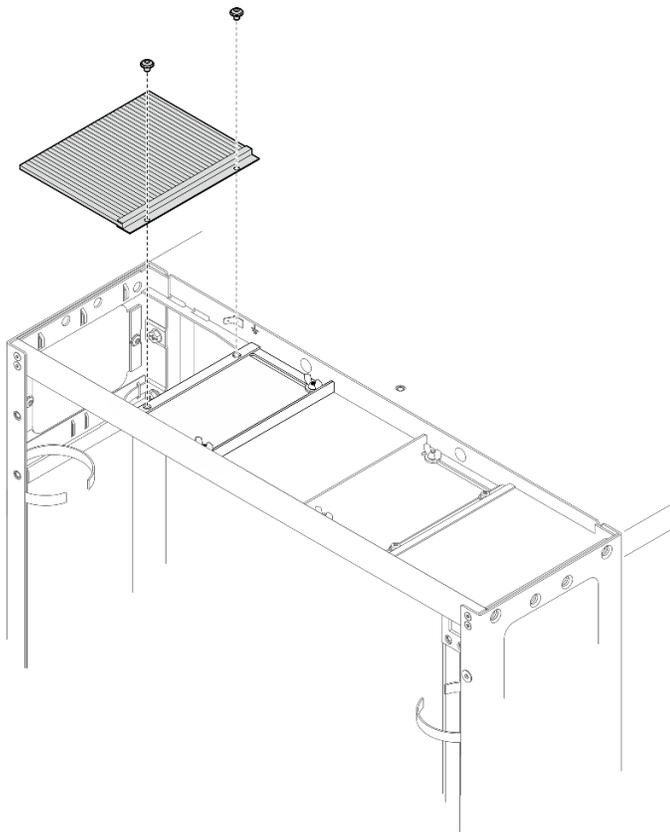


Figure 95. Removing the brush panel

Loosen the two screws to remove the brush panel from the top cover.

- **Remove the brush panel and baffle**

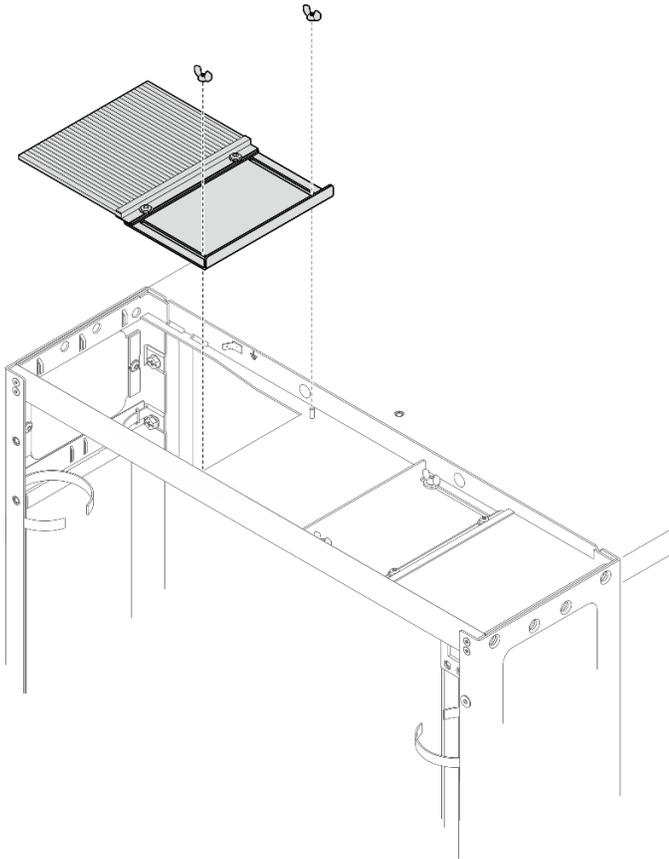


Figure 96. Removing the brush panel and baffle

Loosen the two screws to remove the brush panel and baffle from the top cover.

Step 11. Tighten the two screws to secure the latch plate to the left extension panel.

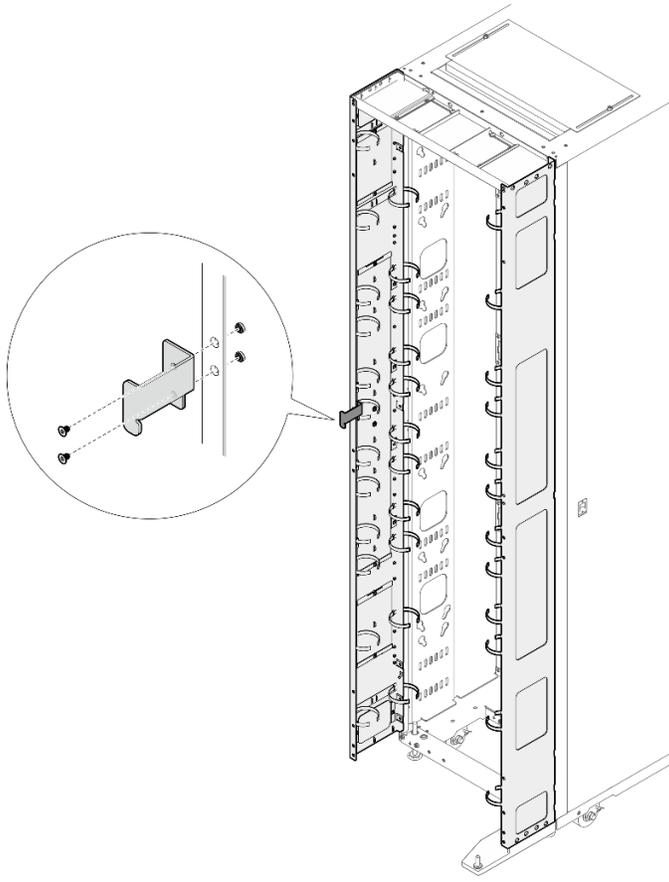


Figure 97. Installing the latch plate

Step 12. Remove the two doorstops from the right extension panel.

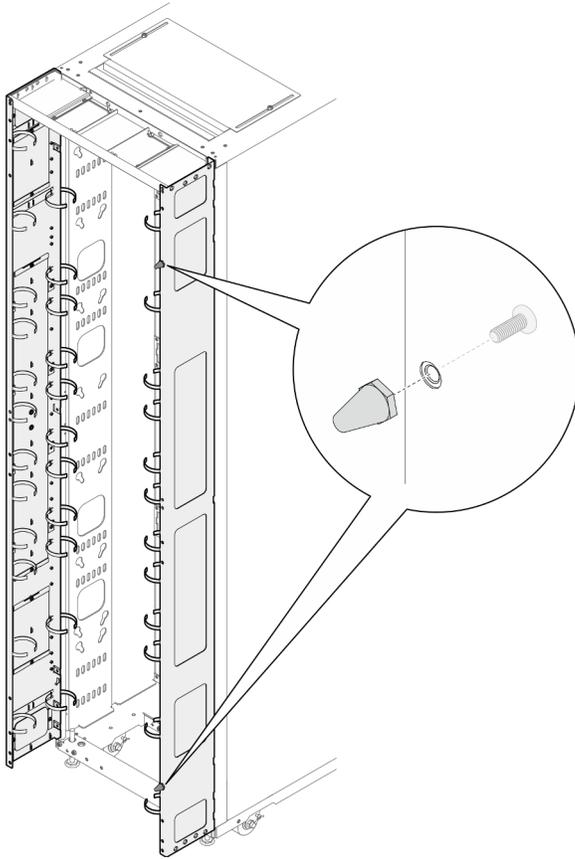


Figure 98. Removing the doorstops

Step 13. Secure the bottom hinge to the right extension panel with four screws.

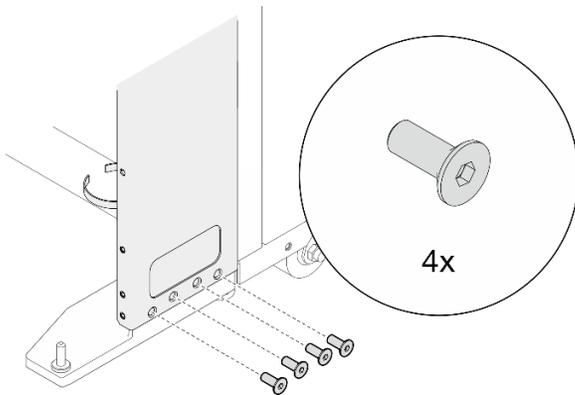


Figure 99. Securing the bottom hinge

Step 14. If the rack needs to be shipped, install the three support brackets and skip steps 15 to 20.

Note: The support brackets must be removed upon arrival at the site to install the RDHX.

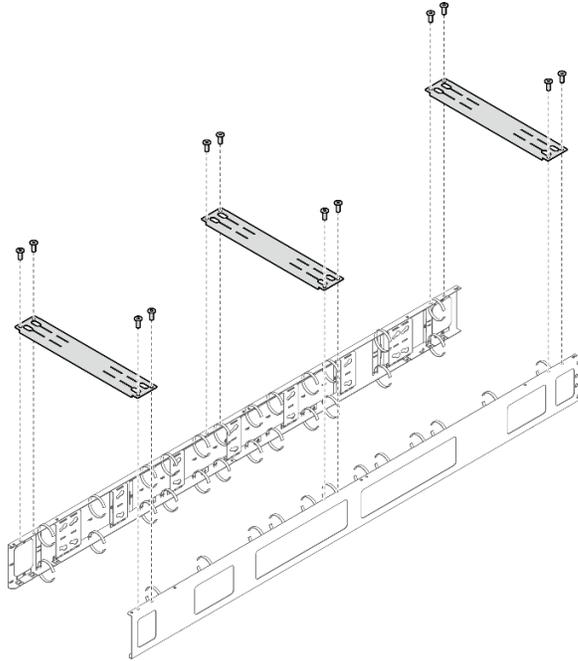


Figure 100. Installing the support brackets

Step 15. Face the bottom side of the carton, remove the carton top, and slit the two carton corners on your right-hand side with a knife. Then, fold the right carton panel down to the ground, and rotate the three carton inserts down.

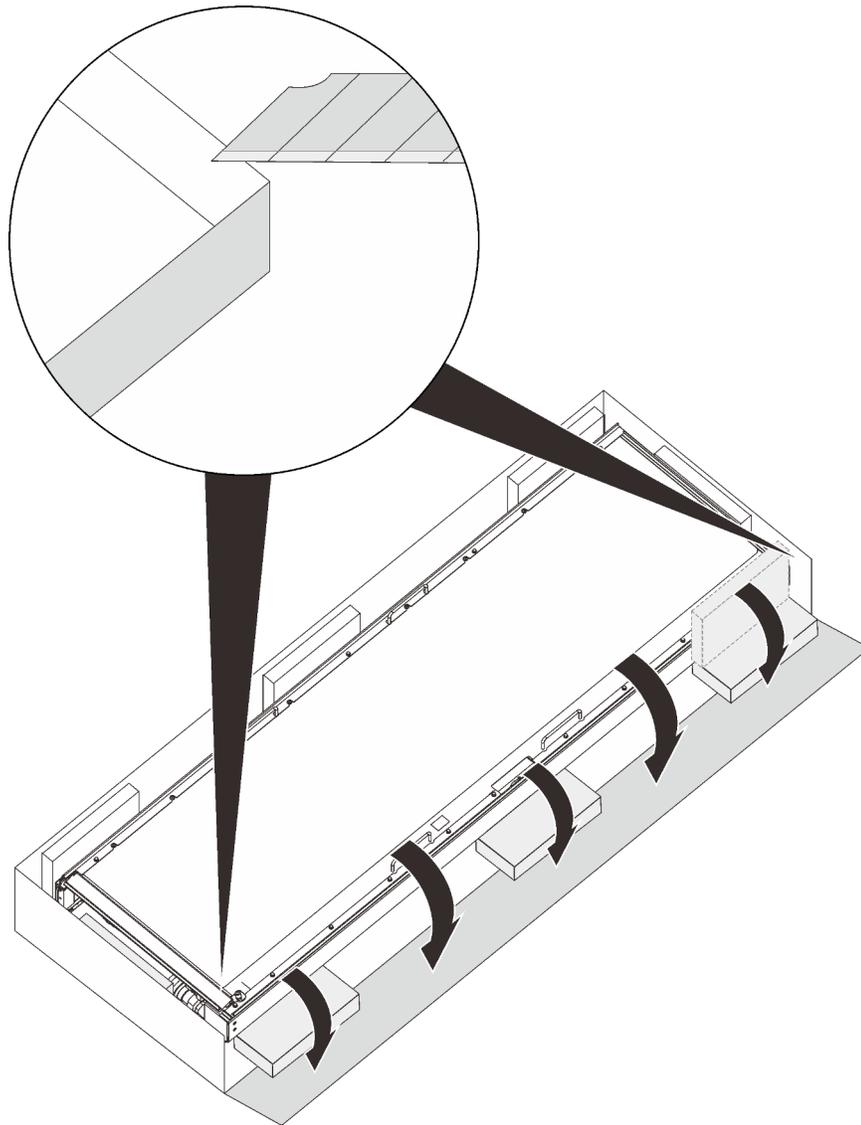
**Bottom**

Figure 101. Unpacking the heat exchanger

Step 16. With three people, rotate the heat exchanger to vertical on the three carton inserts. Then, remove the inner and outer hose access panels while one person hold the heat exchanger.

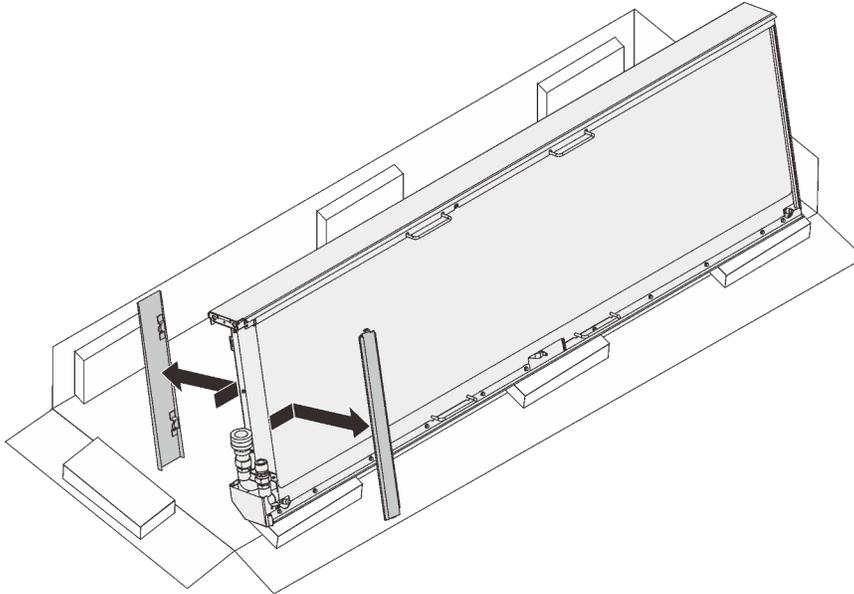


Figure 102. Removing the hose access panels

Step 17. Hold the heat exchanger with three people on the handles/spots as illustrated. Then, carefully lift the heat exchanger and turn it upright.

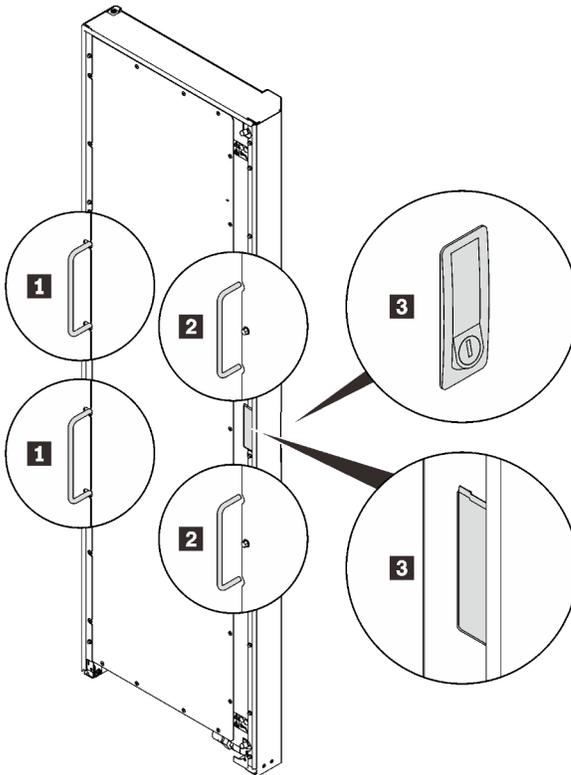


Figure 103. Lifting the heat exchanger with three people

1 Handles that the first person hold on to	3 Spots that the third person hold on to
2 Handles that the second person hold on to	

Step 18. Carry the heat exchanger with three people to the cabinet frame. Align the bottom corner with the bottom hinge pin; then, lower the heat exchanger to fit the pin in.

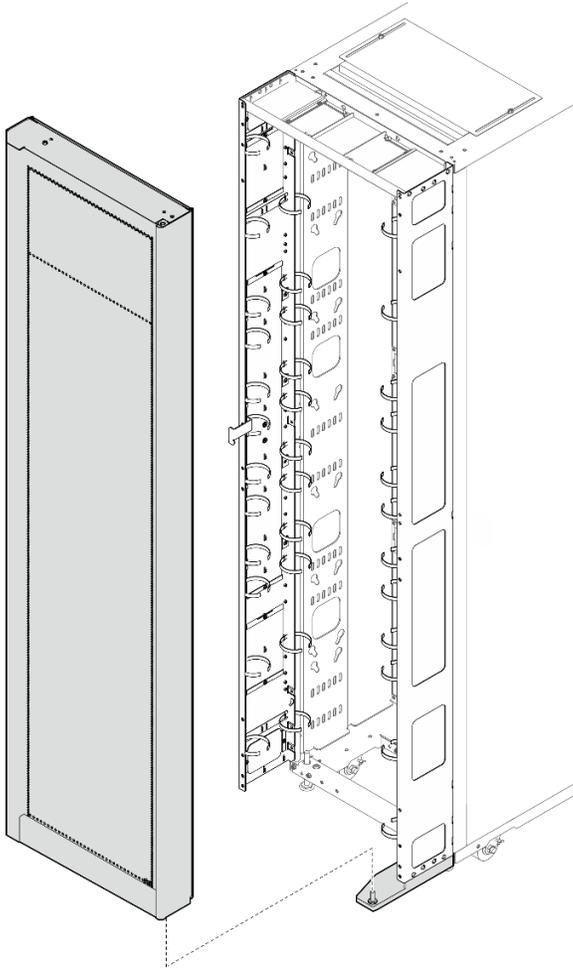


Figure 104. Installing the heat exchanger to the rack cabinet

Step 19. Hold the heat exchanger in place with two people. Insert the top hinge pin to the heat exchanger; then, secure the hinge with seven screws.

Note: Do not fully tighten the seven screws in this step.

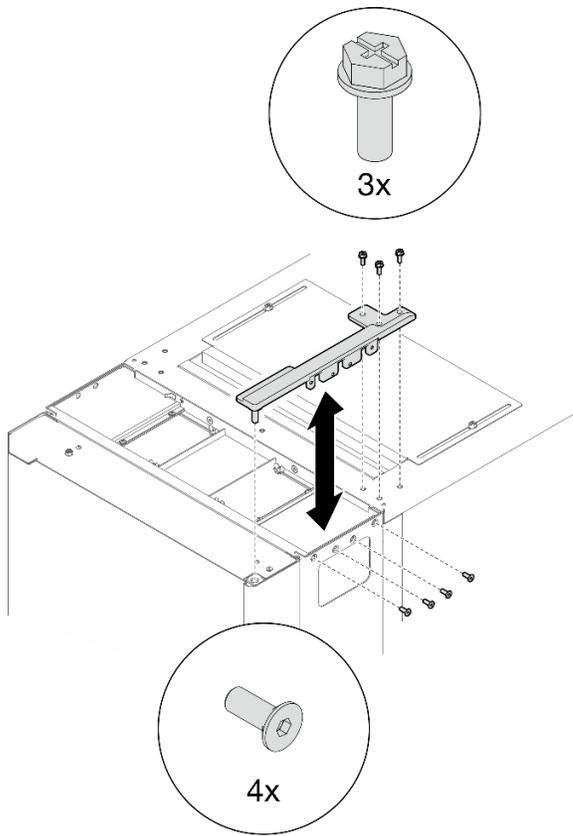


Figure 105. Installing the top hinge

Step 20. Follow the sequence below to fully tighten the screws.

Note: Hold the handles on the heat exchanger and slightly lift it in steps 20-a to 20-c.

1. Four top hinge screws on the right side in [Step 19 Step 19 on page 85](#)
2. Three top hinge screws at the top in [Step 19 Step 19 on page 85](#)
3. Four bottom hinge screws in [Step 5 Step 5 on page 63](#)
4. Fourteen extension panel screws in [Step 6 Step 6 on page 64](#)

Install 48U Standard Rack Extension Kit

See this topic to learn how to install 48U Standard Rack Extension Kit.

Notes:

- Each unit of rack extension kit comes with additional capacity of one unit 0U PDU to each side of the rack.
- Each rack cabinet supports up to two units of rack extension kit (one to the front and one to the rear side). However, if the rear side has been installed with the Rear Door Heat Exchanger, the rack extension kit cannot be installed.
- If there is a plan to install baying kit while only one of the adjacent cabinets will be installed with extension, make sure to install the baying kit first (see [“Install the baying kit” on page 95](#)). Then, as preparation for this procedure, remove the two screws from the upper and lower part of the cabinet that will be installed with the extension kit, and jump to [Step 4 on page 89](#).

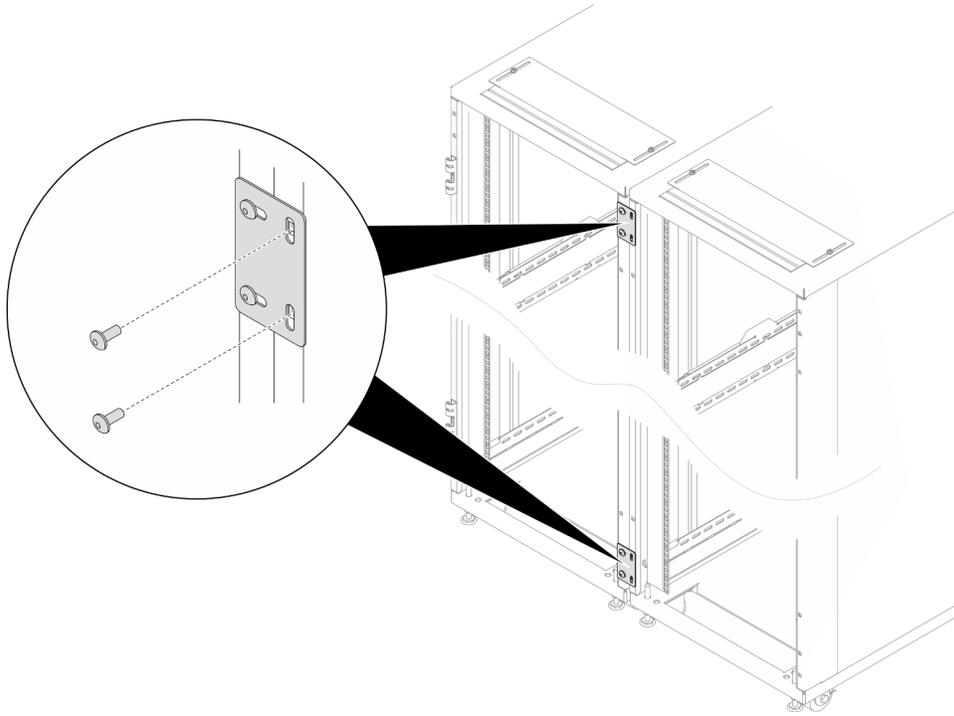


Figure 106. Removing screws to prepare for extension installation

Procedure

Step 1. Remove the door.

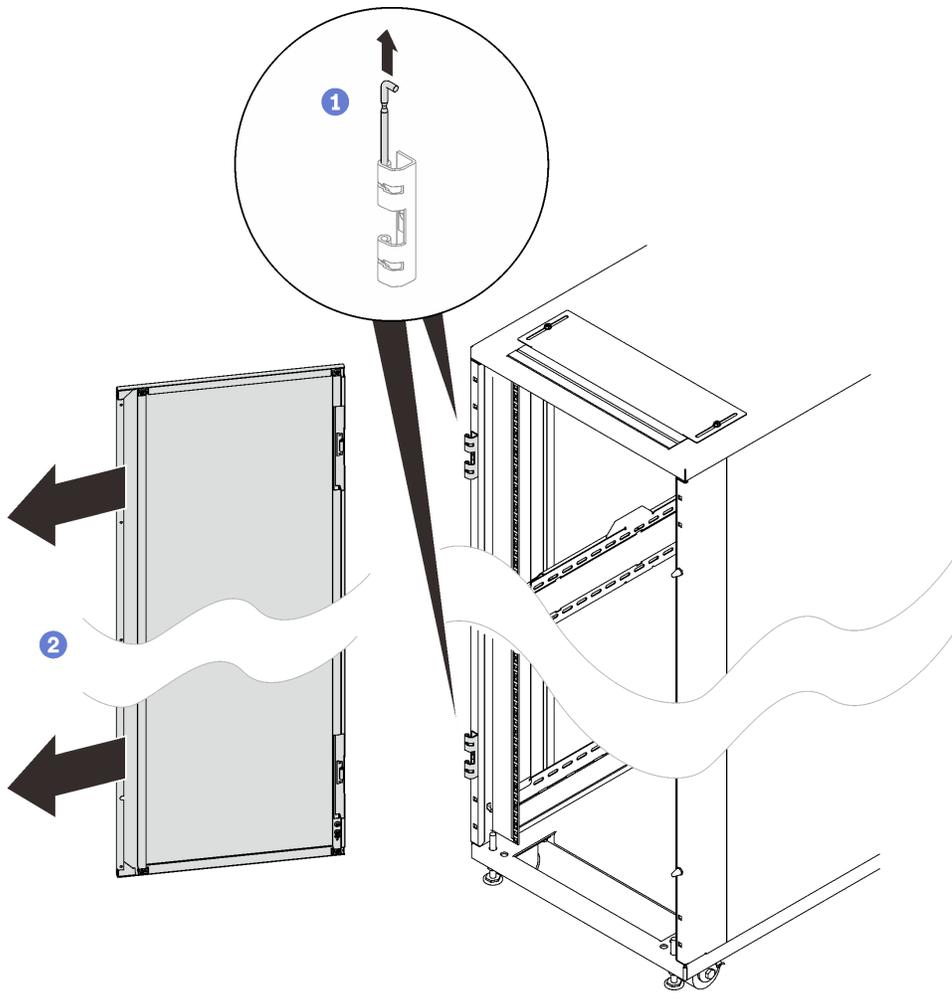


Figure 107. Removing a door

- 1 Hold the door in place, and lift both hinge pins until they lock in the open position so that the door is disengaged.
- 2 Remove the door from the rack cabinet frame.

Step 2. Remove the two hinges and the two doorstops.

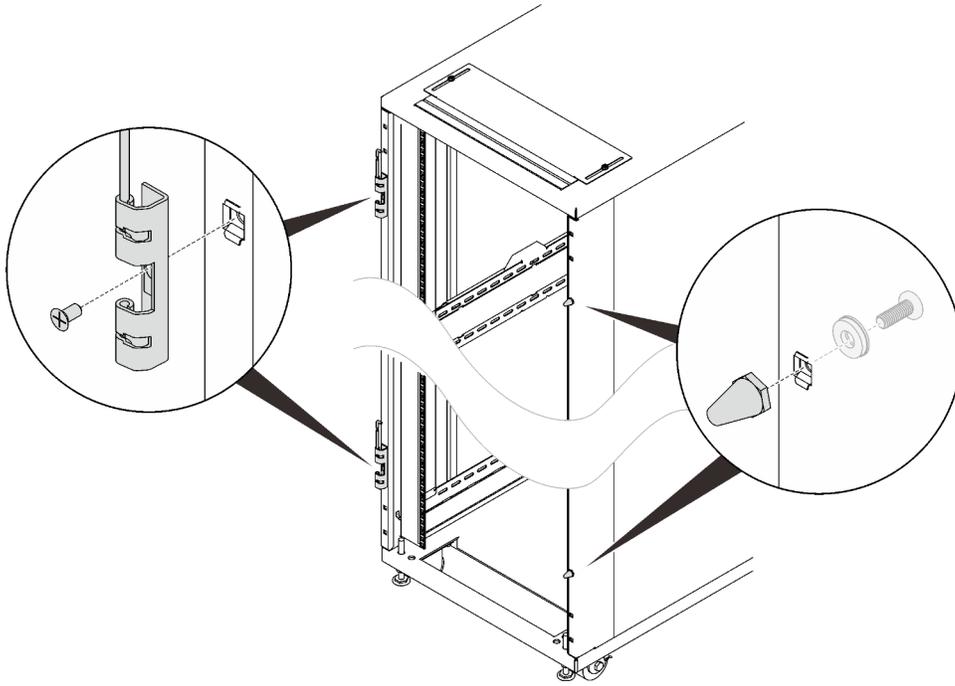


Figure 108. Removing the door hinges and doorstops

Step 3. Remove the door latch.

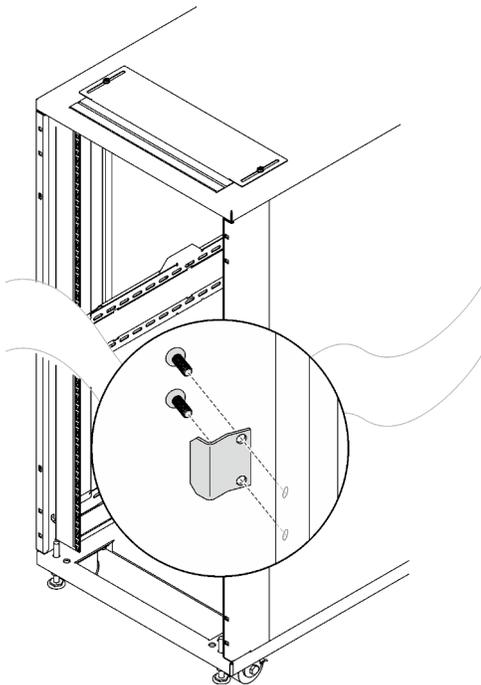


Figure 109. Removing the door latch

Step 4. Secure an extension panel to the side of the rack with seven screws, and repeat the step on the other extension panel.

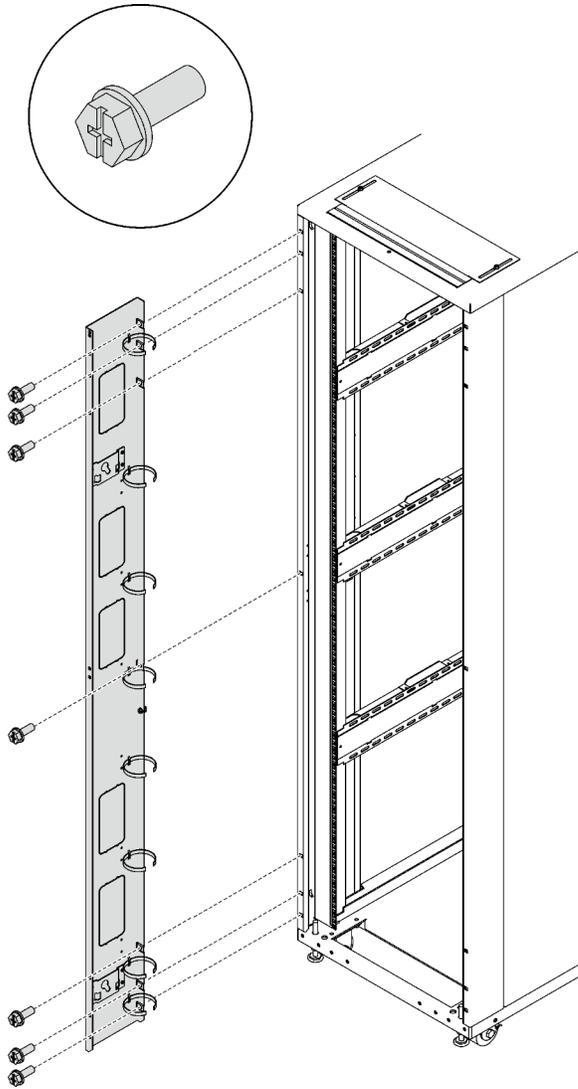


Figure 110. Installing an extension panel

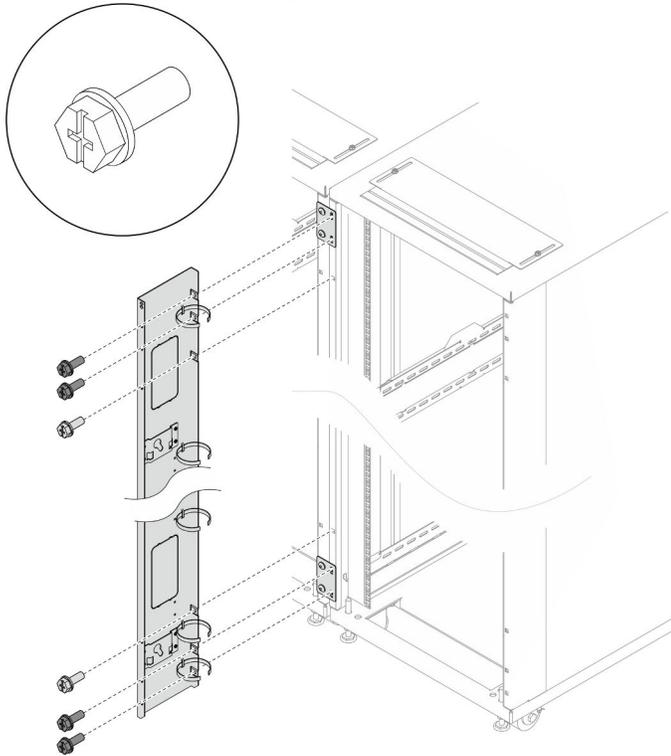


Figure 111. Installing an extension panel (with baying kit)

Step 5. Align the extension top cover with the screw holes on the front of the rack, and secure each side with two screws.

Note: It is advised not to fully tighten the screws in this step.

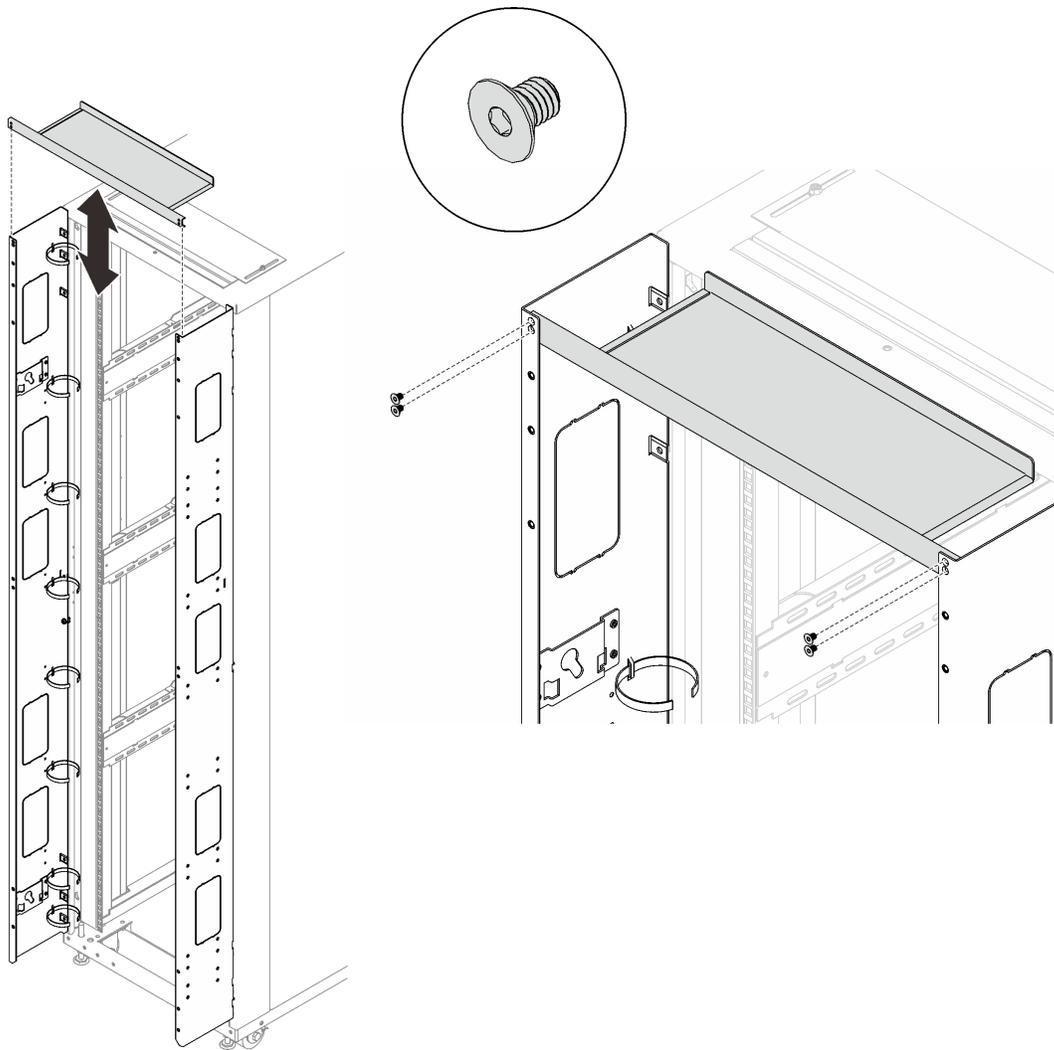


Figure 112. Installing the extension top cover

- Step 6. Secure each of the two support brackets to the extension panels with four screws. If the extension panel screws have not been fully tightened, tighten them now.

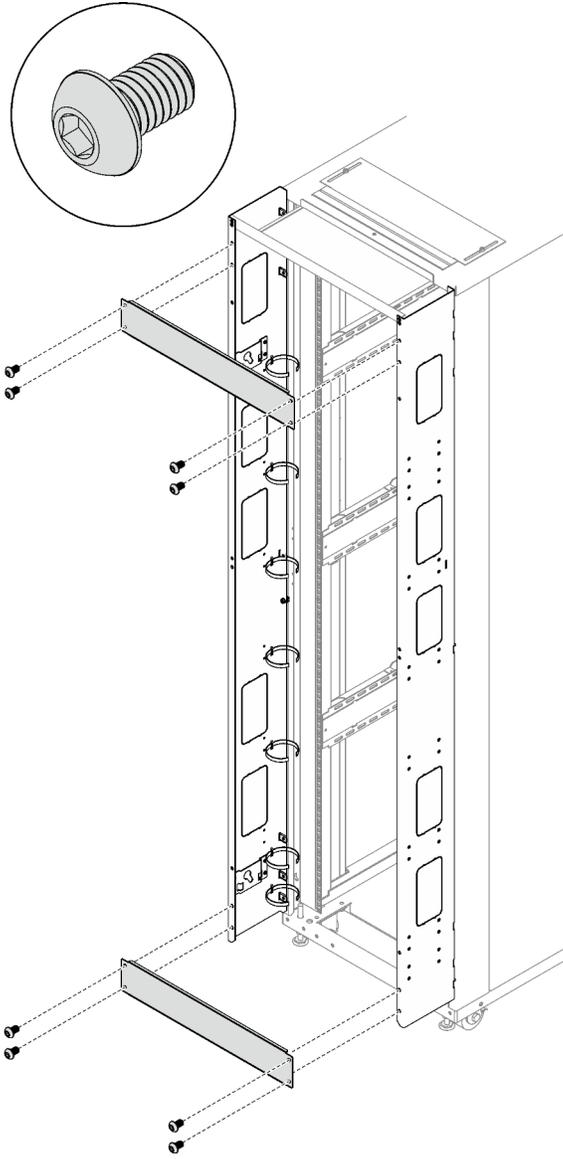


Figure 113. Installing the support brackets

Step 7. Install the two hinges, two doorstops, and the door latch to the rack.

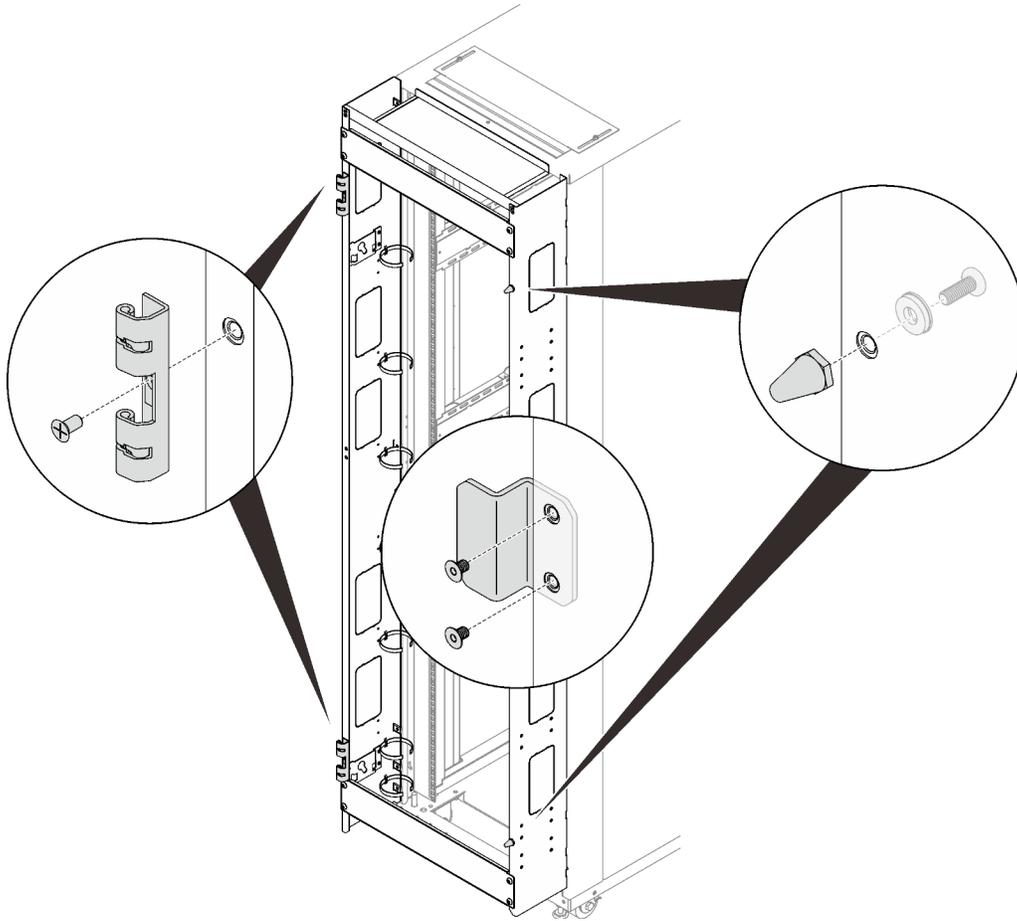


Figure 114. Install the hinges, doorstops, the door latch

Step 8. Install the door back to the rack.

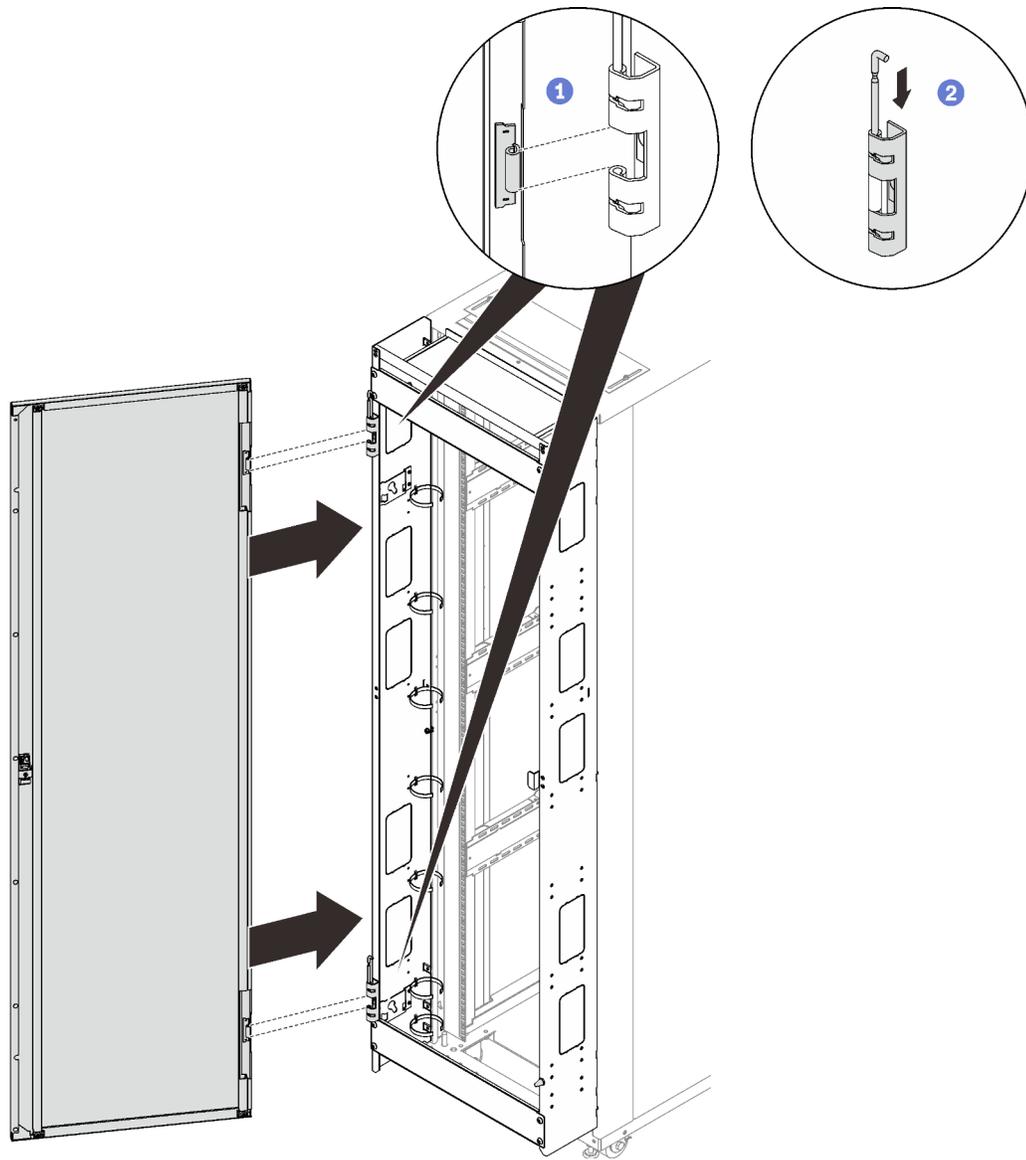


Figure 115. Installing the door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Install the baying kit

More than one rack cabinets could be connected into a suite. See this topic to learn how to attach rack cabinets into a suite with the baying kit.

About this task

Notes: To maintain balance of the rack cabinet, **do not** remove the outriggers except the following situations:

- when two or more rack cabinets are connected with the baying kit.
- when the rack cabinet is secured to the floor with stabilizer.

R002



 **DANGER**

- **Always lower the leveling pads on the rack cabinet.**
- **Always install stabilizer brackets on the rack cabinet.**
- **Always install the heaviest devices in the bottom of the rack cabinet.**
- **Always install servers and optional devices starting from the bottom of the rack cabinet.**

Procedure

Step 1. Extend each of the four leveling pads in turns until they firmly contact the floor and support the rack cabinet. Make sure the cabinet is balanced by gently pushing the cabinet. If it tilts, adjust the length of the leveling pads until the cabinet is well balanced.

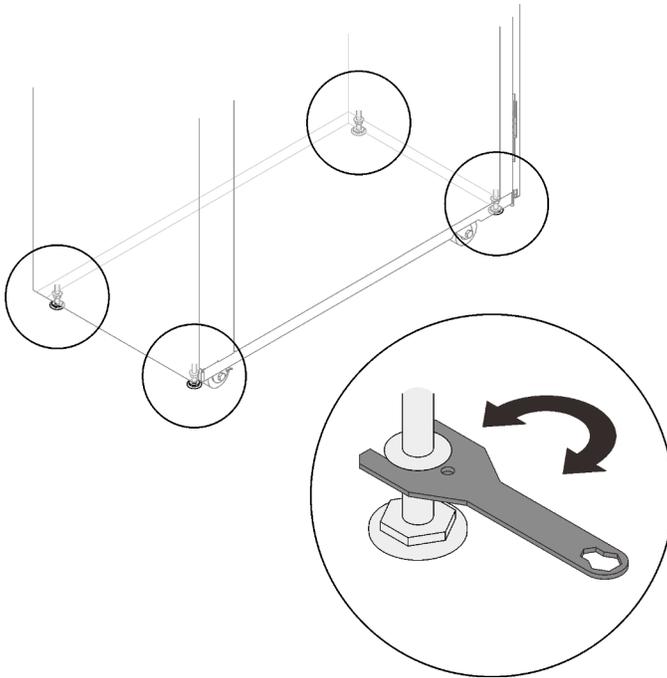


Figure 116. Lowering the leveling pads

Step 2. Remove the outrigger stabilizing bars, and remove them.

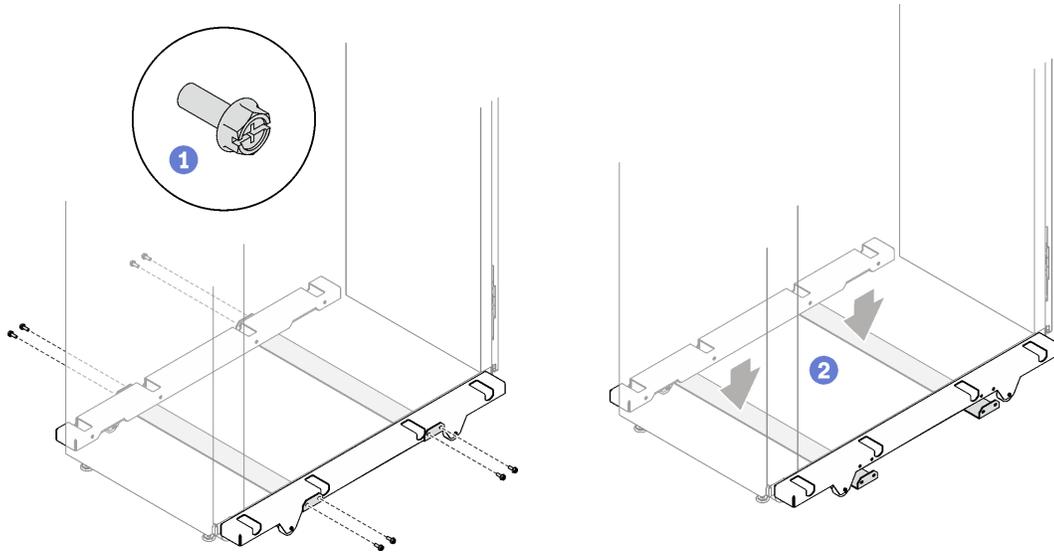


Figure 117. Removing the outrigger stabilizing bars

- 1 Remove the eight screws that secure the two bars to the rack cabinet.
- 2 Place the two stabilizing bars on the ground, and remove the bars.

Step 3. Remove the four screws that secure each of the outriggers, and remove the outriggers.

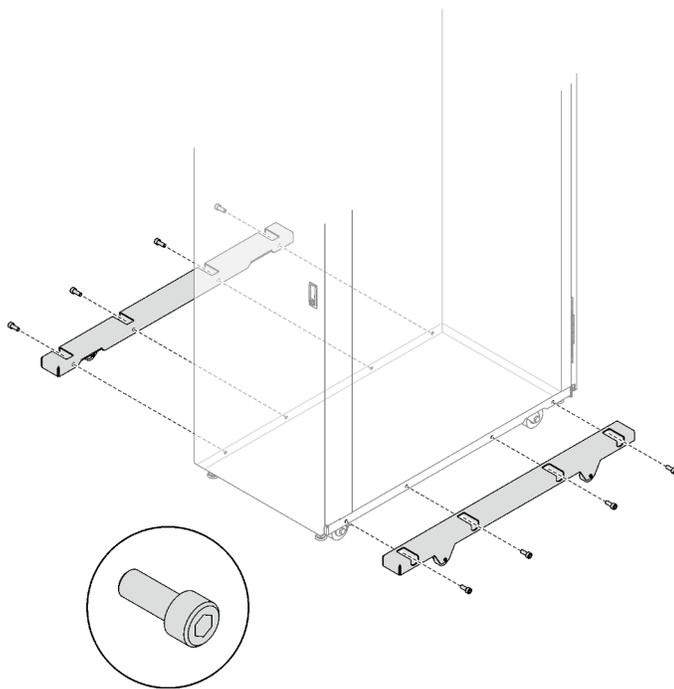


Figure 118. Removing the outriggers

Step 4. Remove the front and rear doors of every rack cabinet that is to be part of the suite.

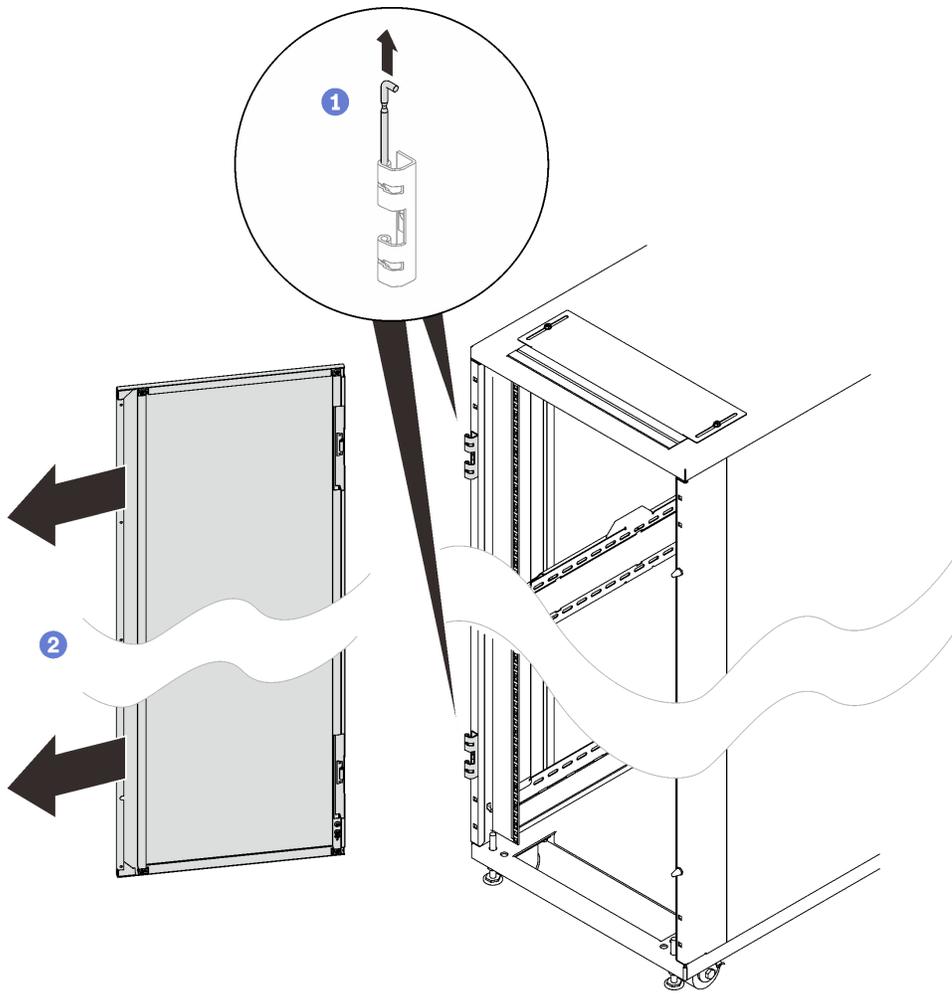


Figure 119. Removing a door

- 1 Hold the door in place, and lift both hinge pins until they lock in the open position so that the door is disengaged.
- 2 Remove the door from the rack cabinet frame.

Step 5. (Optional) Remove all the sides covers that will contact each other in the suite.

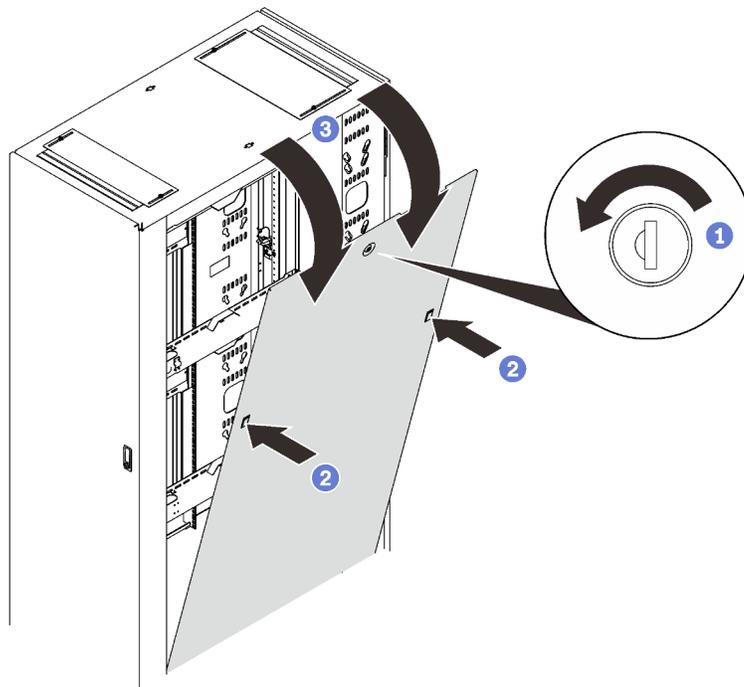


Figure 120. Removing a side cover

- 1 Unlock the side cover with the key.
- 2 Press on the two latches on both sides of the cover to disengage it from the rack.
- 3 Rotate the top of the side cover away from the rack, and remove it.

Step 6. If there are plans of installing devices in any side pocket of the cabinets, do it now and complete all the required cable connection and setup (see [“Install a 1U device into the side pocket”](#) on page 205).

Make sure to complete all the required cable connection and device setup before installing baying kits to the cabinets, as these tasks will be hard to operate afterwards.

Step 7. Install four cage nuts on upper and lower locations on the side of adjacent cabinets as preparation for baying kit installation. Use the cage nuts that come with the baying kit.

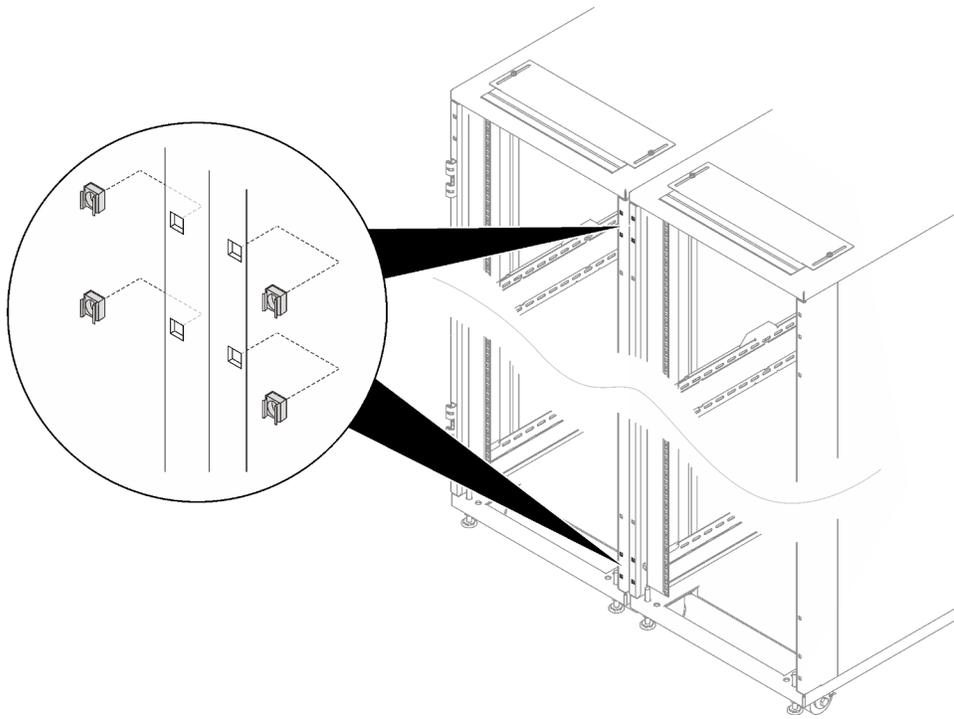


Figure 121. Installing the cage nuts

See [“Install nuts on the mounting flanges” on page 111](#) for details.

Step 8. Align the four screw holes of two attachment brackets with the holes in the adjacent cabinets, and secure each bracket to the racks with four screws.

Note: Do not fully tighten the screws on the first bracket until securing the second bracket.

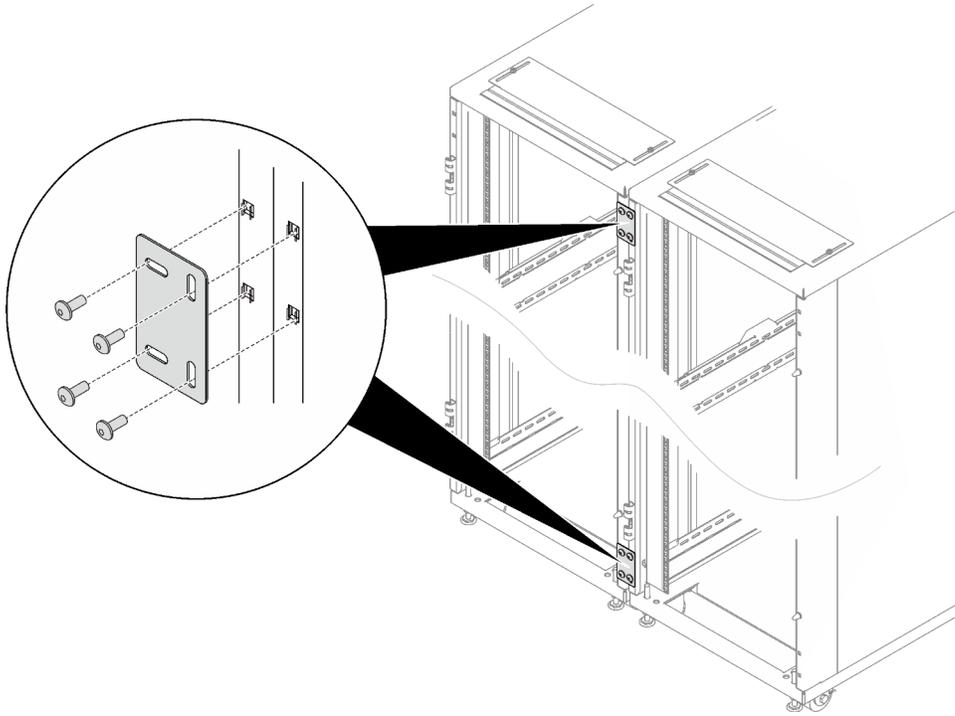


Figure 122. Installing attachment brackets

- Step 9. If there is a plan to install extension kit on only one of the cabinets, remove the two screws from the upper and lower side of the cabinet that will be installed with the extension kit. Then, proceed with the actual extension kit installation procedure. See [“Install 48U Standard Rack Extension Kit” on page 86](#).

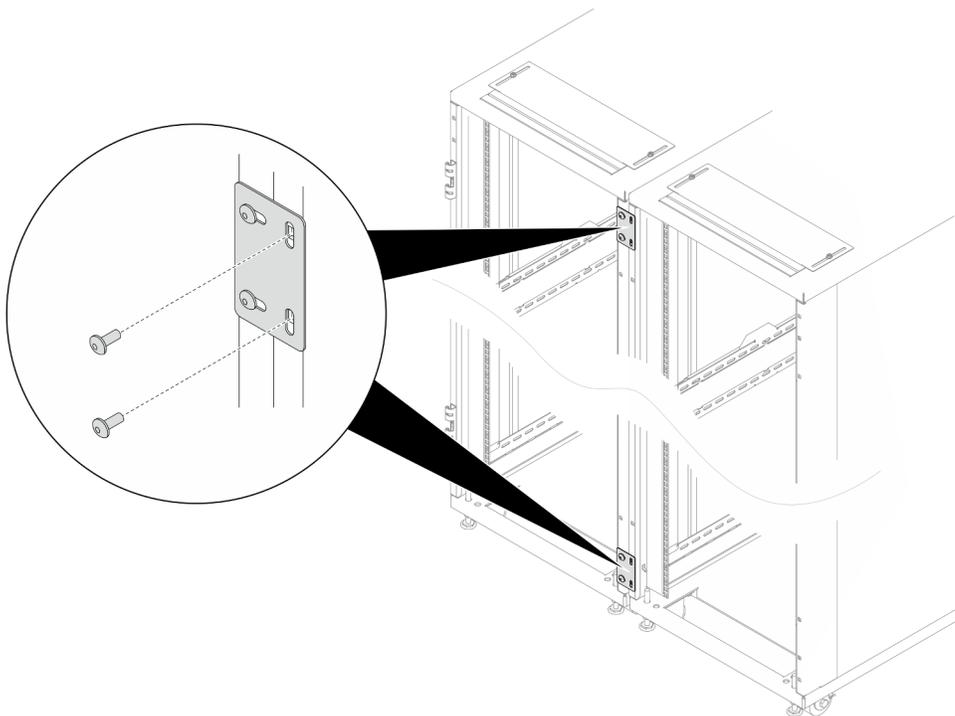


Figure 123. Removing screws to prepare for extension installation

Otherwise, reinstall all the doors that have been removed.

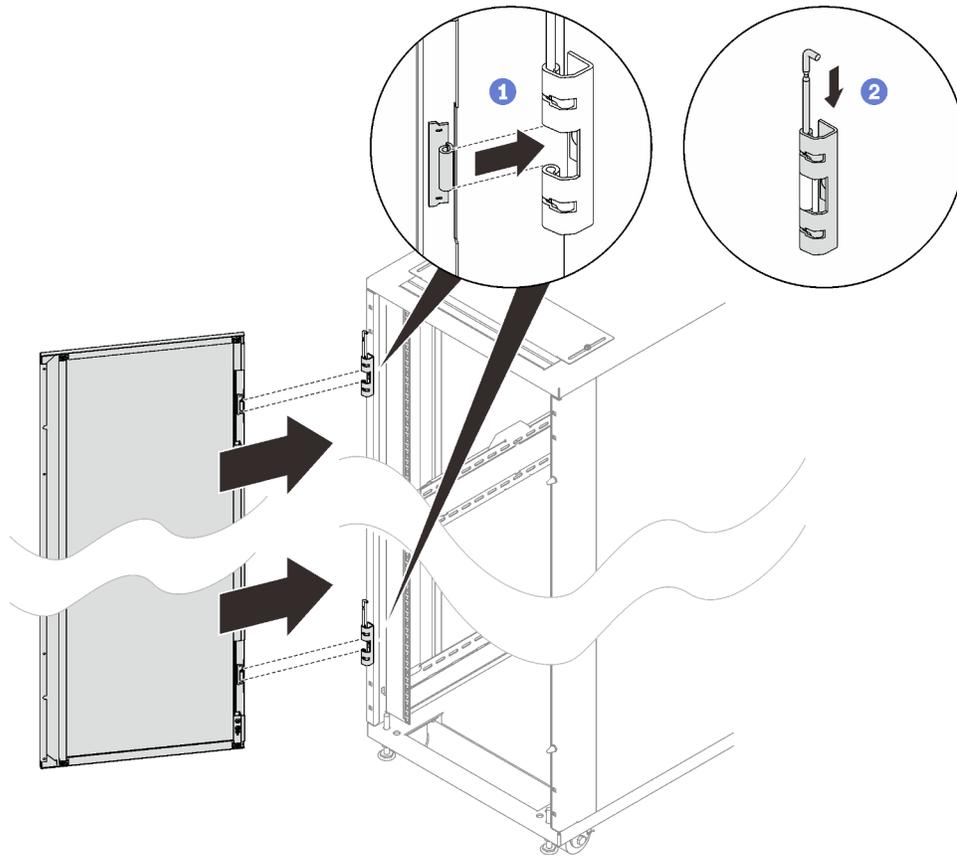
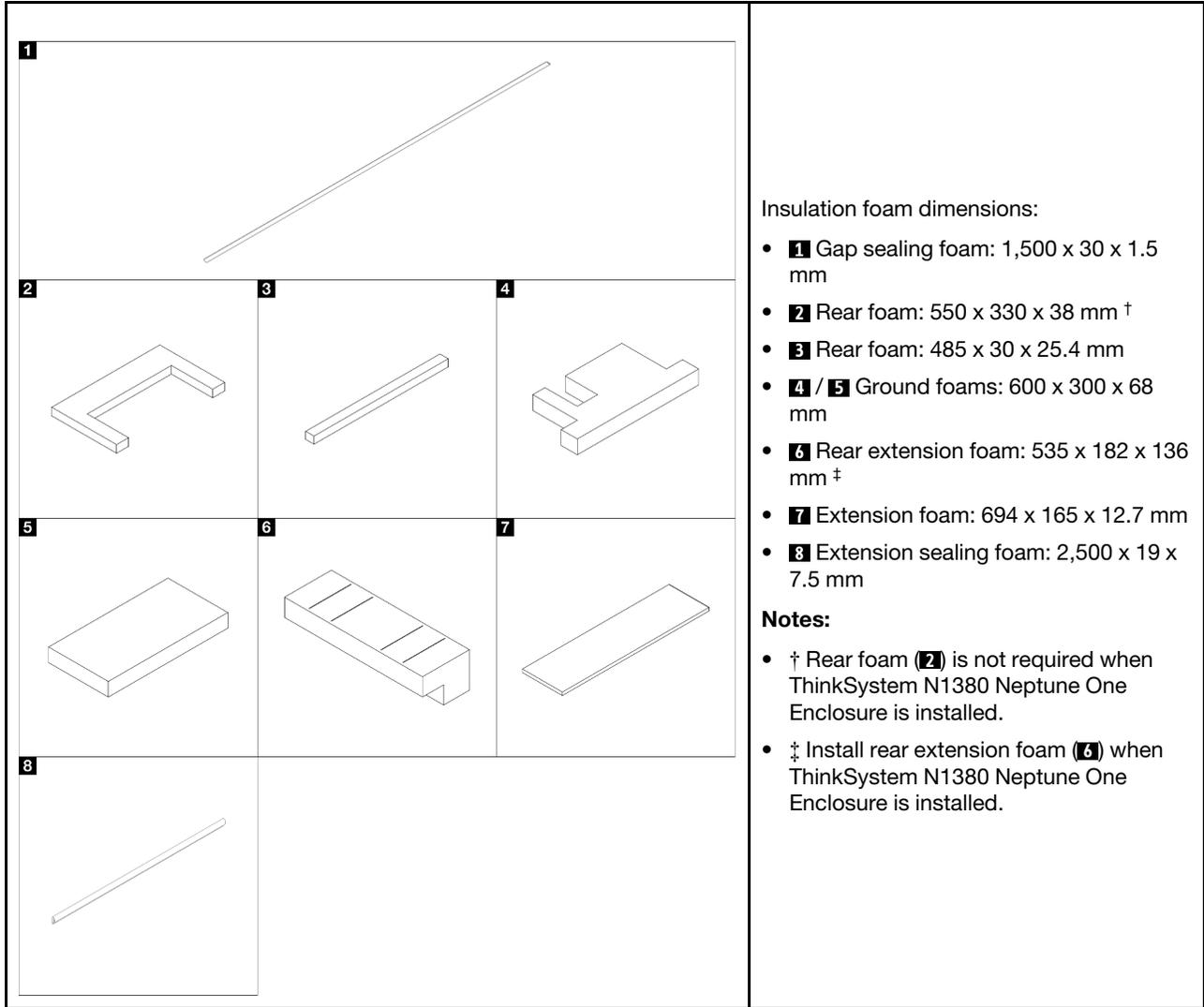


Figure 124. Installing a door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Install insulation foams on-site

See this topic to learn how to install insulation foams on-site.



Insulation foam dimensions:

- **1** Gap sealing foam: 1,500 x 30 x 1.5 mm
- **2** Rear foam: 550 x 330 x 38 mm †
- **3** Rear foam: 485 x 30 x 25.4 mm
- **4** / **5** Ground foams: 600 x 300 x 68 mm
- **6** Rear extension foam: 535 x 182 x 136 mm ‡
- **7** Extension foam: 694 x 165 x 12.7 mm
- **8** Extension sealing foam: 2,500 x 19 x 7.5 mm

Notes:

- † Rear foam (**2**) is not required when ThinkSystem N1380 Neptune One Enclosure is installed.
- ‡ Install rear extension foam (**6**) when ThinkSystem N1380 Neptune One Enclosure is installed.

1 Gap sealing foam

- Step 1. Peel off the liner from the foam.
- Step 2. Place the foam onto the gap between the rack cabinet frame and the extension, and attach it to seal the gap. Cut off the excess foam with a sharp tool.

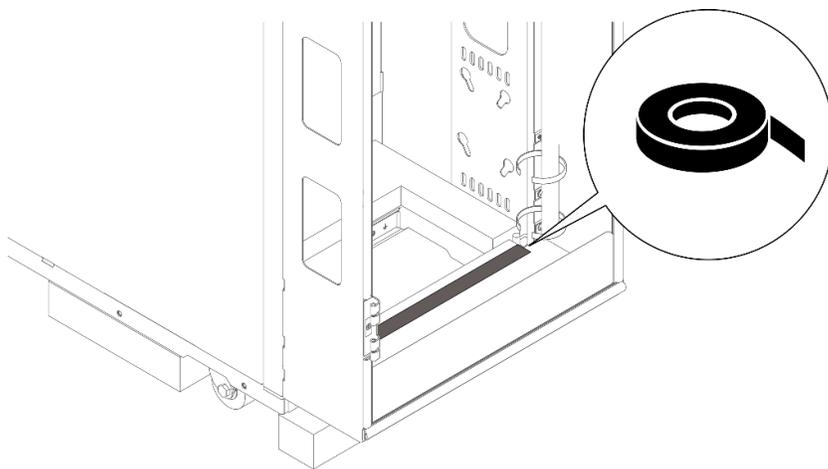


Figure 125. Installing the sealing foam

2 3 Rear foams

Step 1.

Note: Skip this step when ThinkSystem N1380 Neptune One Enclosure is installed.

Peel off the liner, and attach the foam (2) to the rear side of the rack cabinet as illustrated.

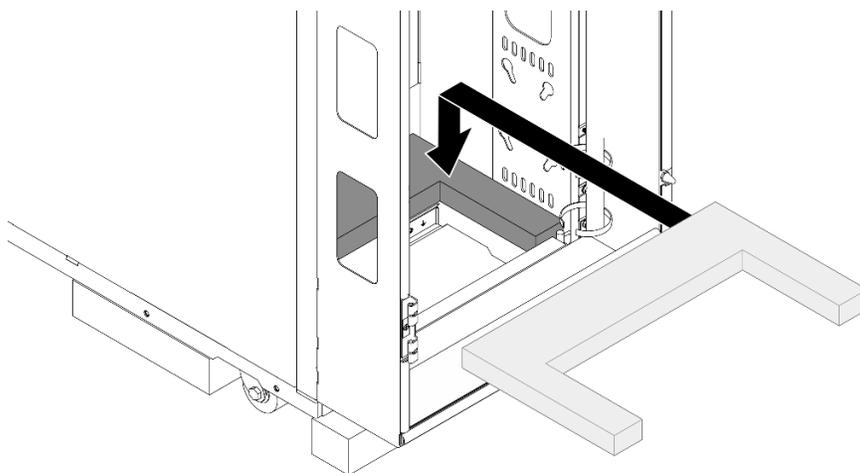


Figure 126. Installing the rear foam

Step 2. Peel off the liner, and attach the foam (3) to the rear side of the rack cabinet as illustrated.

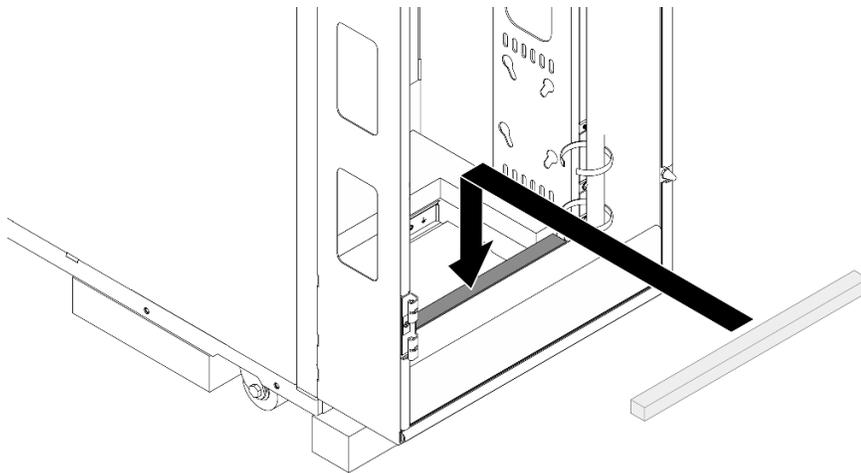


Figure 127. Installing the rear foam

4 5 Ground foams

- Step 1. Insert the foam (4) into the rear bottom of the rack cabinet.
- Step 2. Insert the foam (5) into the rear bottom of the rack cabinet until it connects to the other one.

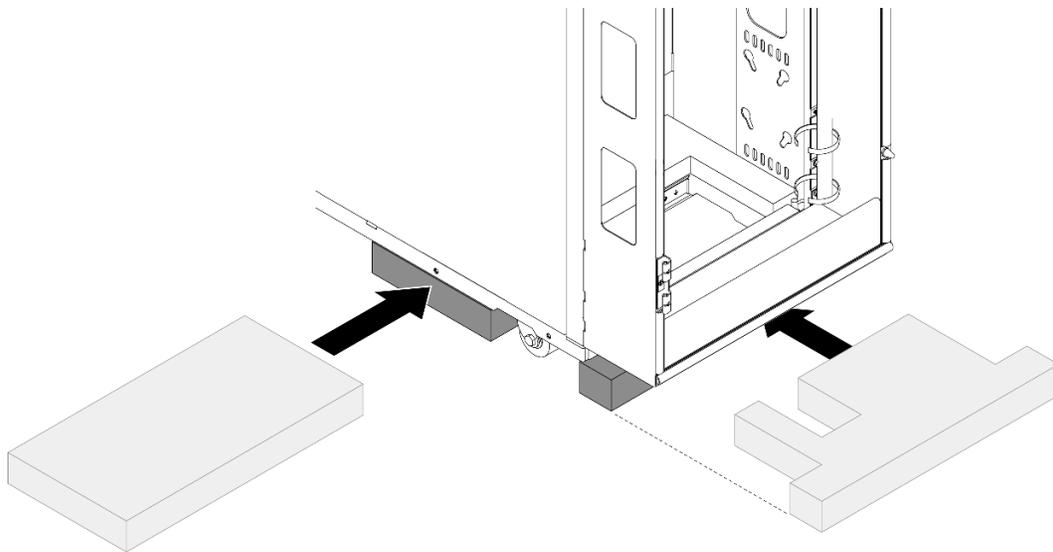


Figure 128. Installing the ground foams

6 Rear extension foam

Note: Install the foam only when ThinkSystem N1380 Neptune One Enclosure is installed.

- Step 1. Peel off the liner from the rear extension foam, and attach it to the ground foam as illustrated.
- Step 2. If necessary, cut the rear extension foam along the cutting lines; then, route cables and hoses through the foam.

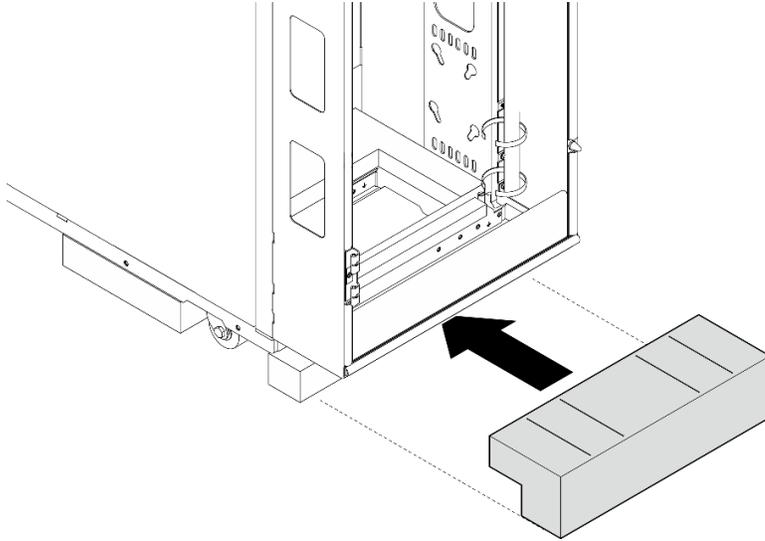


Figure 129. Installing rear extension foam

■ Extension foam

Install the extension foam after multiple racks are connected.

- Step 1. Peel off the liner from the foam.
- Step 2. Center align the three foams with the extension, and attach them.
- Step 3. Repeat to attach the foams to the other three extensions.

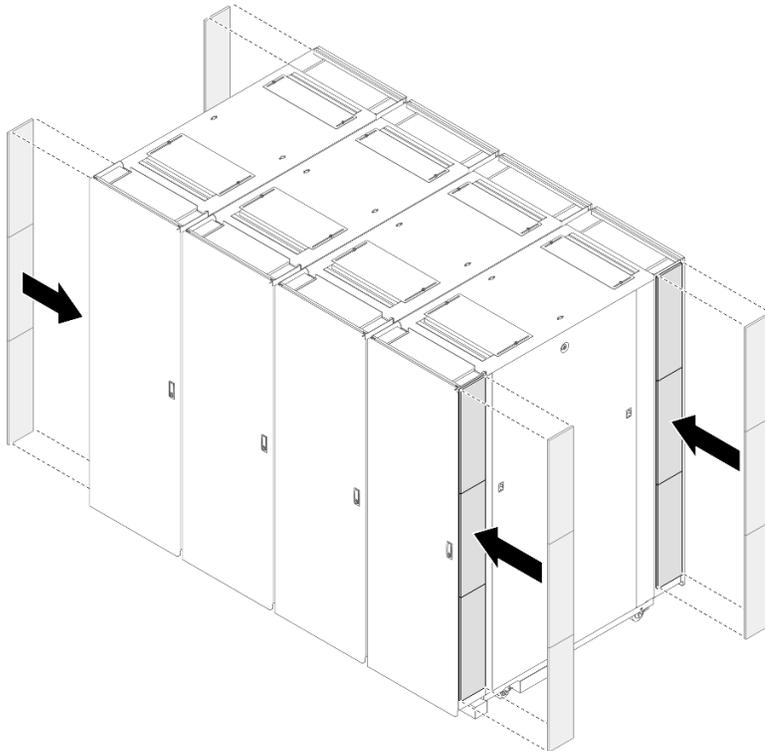


Figure 130. Installing extension foam

8 Extension sealing foam

Step 1. Unlock and open the door.

Step 2. Remove the door.

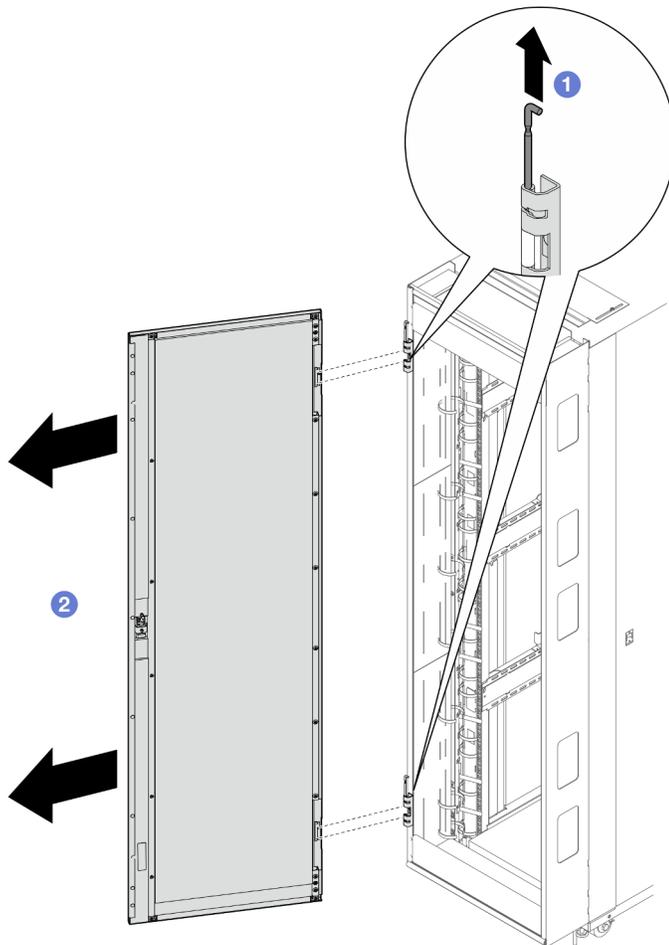


Figure 131. Removing a door

1 Hold the door in place, and lift both hinge pins until they lock in the open position so that the door is disengaged.

2 Remove the door from the rack cabinet frame.

Step 3. Center align the foam with the folded edge of the left side of the rack, and attach it. Cut off the foam with a sharp tool where the hinges are installed.

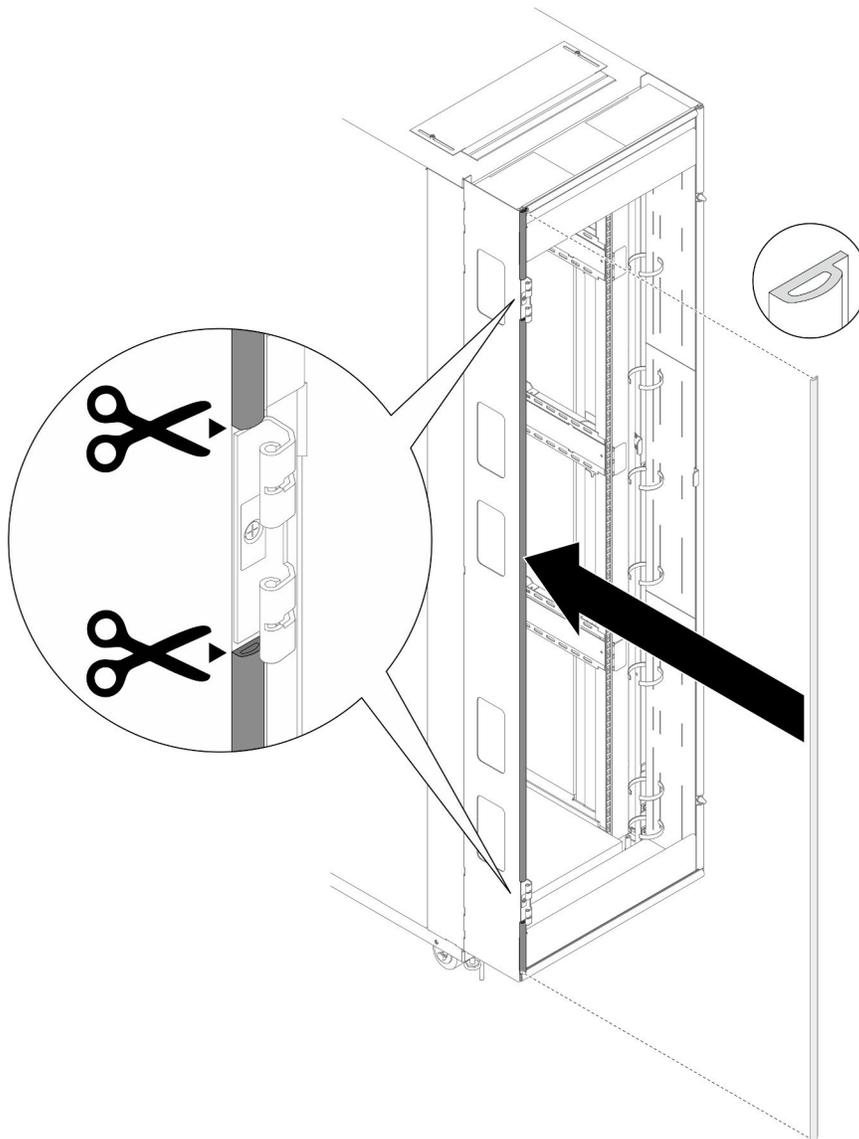


Figure 132. Installing the extension sealing foam to the left side of the rack

- Step 4. Center align the foam with the folded edge of the right side of the rack, and attach it. Cut off the foam with a sharp tool where the guide pins are installed.

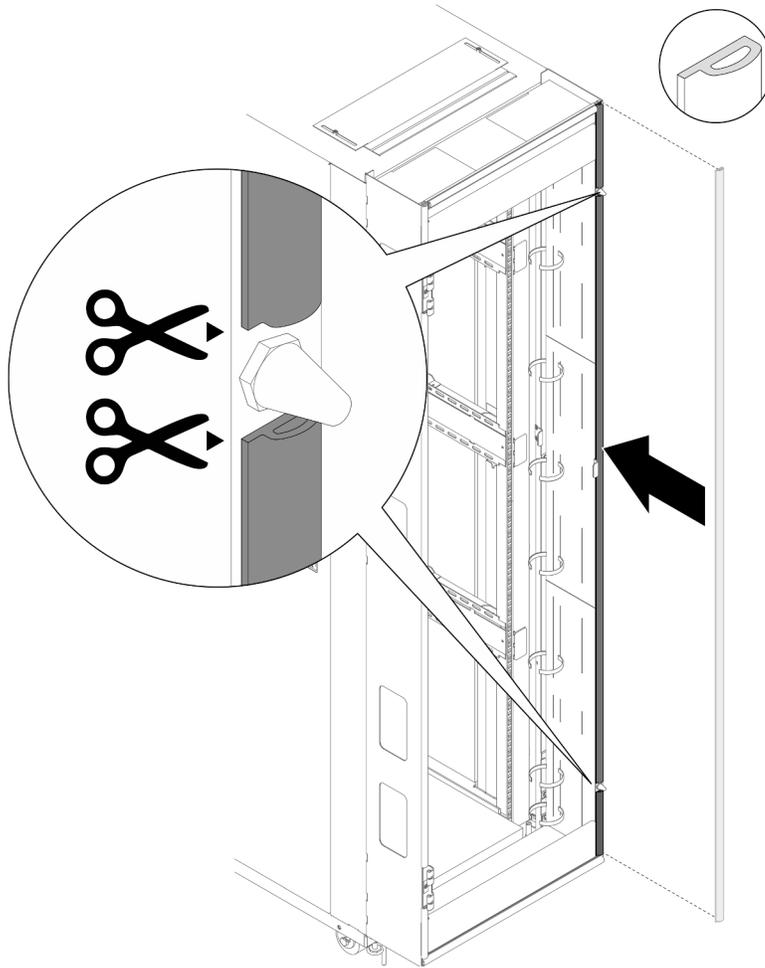


Figure 133. Installing the extension sealing foam to the right side of the rack

Step 5. Install the foam to the extension top cover and bottom cover.

- a. Align the foam with the folded edge of the extension top cover, and attach it. Cut off the excess foam with a sharp tool.

Note: A minimum distance of 1 to 2 mm between foam and extension panels needs to be left.

- b.

Note: Skip this step for rear extension bottom cover when ThinkSystem N1380 Neptune One Enclosure is installed.

Align the foam with the folded edge of the extension bottom cover, and attach it. Cut off the excess foam with a sharp tool.

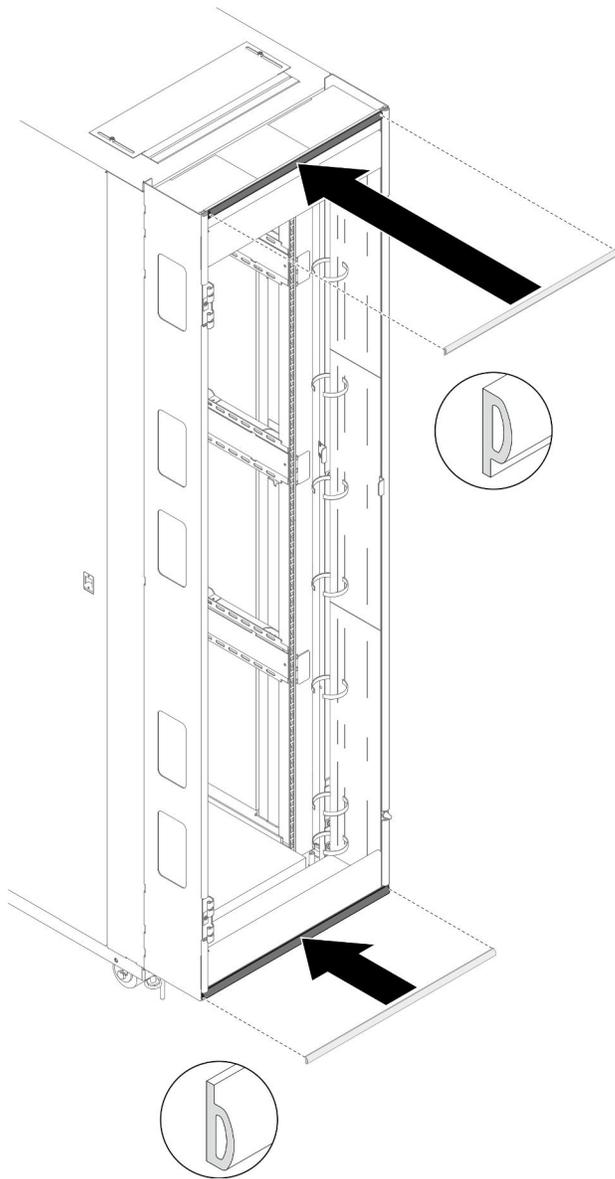


Figure 134. Installing the extension sealing foam to the extension top cover and bottom cover

Step 6. Install the door.

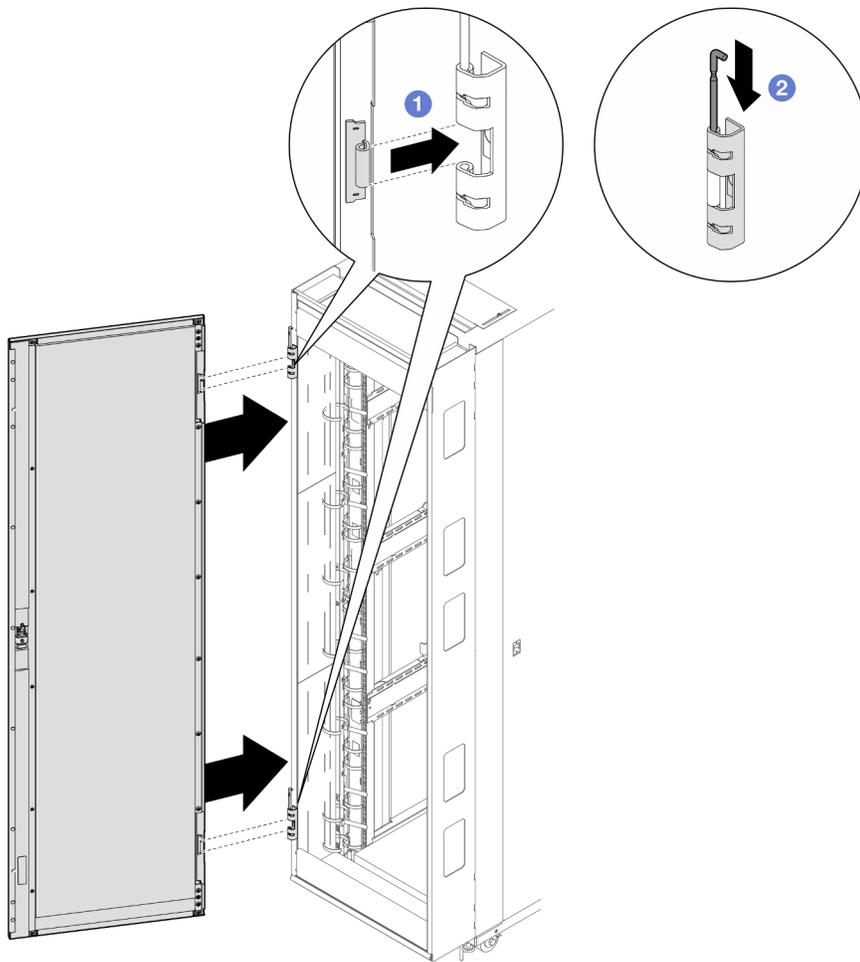


Figure 135. Installing a door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Install nuts on the mounting flanges

See this topic to learn how to adjust mounting flange holes with various types of nuts.

Install cage nuts with a flat-blade screwdriver

Procedure

- Step 1. Locate the flange hole to install the nut in.
- Step 2. Install the cage nut.

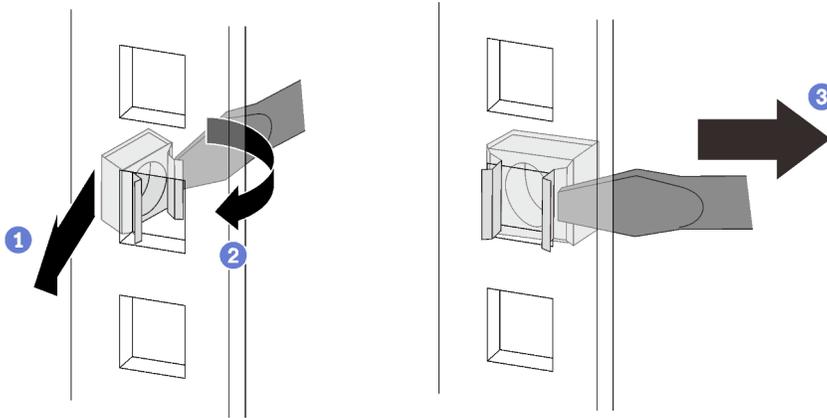


Figure 136. Installing a cage nut

- 1 Insert one edge of the cage nut into the target mounting flange hole.
- 2 Press and compress the other nut edge with a flat-blade screwdriver, and rotate the screwdriver towards the flange hole until the nut edge goes in the hole.
- 3 Release the screwdriver to secure the nut in the mounting flange hole.

Install cage nuts with insertion tool

Procedure

Step 1. Locate the flange hole to install the nut in.

Step 2. Install the cage nut.

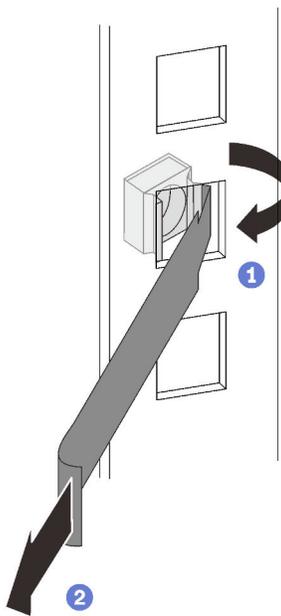


Figure 137. Installing a cage nut

- 1 Insert one edge of the cage nut into the target mounting flange hole, and hook the other edge with the insertion tool through the flange hole.

- 2 Rotate and pull the tool to force the other nut edge into the flange hole, and thus secure the nut.

Install the rack grounding kit

See this topic to learn how to install the rack grounding kit.

Procedure

- Step 1. Secure each of the two grounding plates to the bottom of the cabinet door and the flange with a screw, and connect the ends of the grounding jumper wire to the two plates.

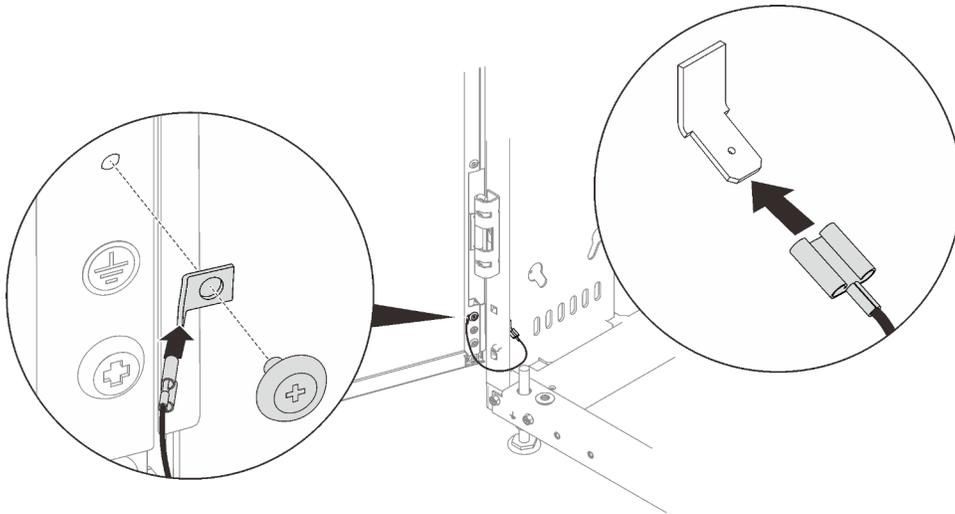


Figure 138. Installing the rack grounding kit

- Step 2. Remove the side cover.

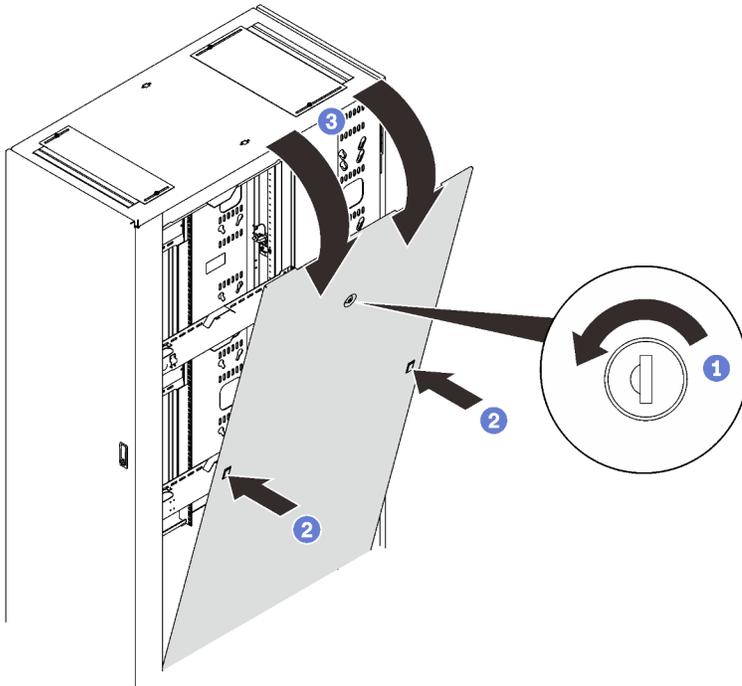


Figure 139. Removing a side cover

- 1 Unlock the side cover with the key.
- 2 Press on the two latches on both sides of the cover to disengage it from the rack.
- 3 Rotate the top of the side cover away from the rack, and remove it.

Step 3. Align the bottom of the side cover with the slot on the rack cabinet; then, connect the grounding jumper wire to the posts on the rack frame and the side cover.

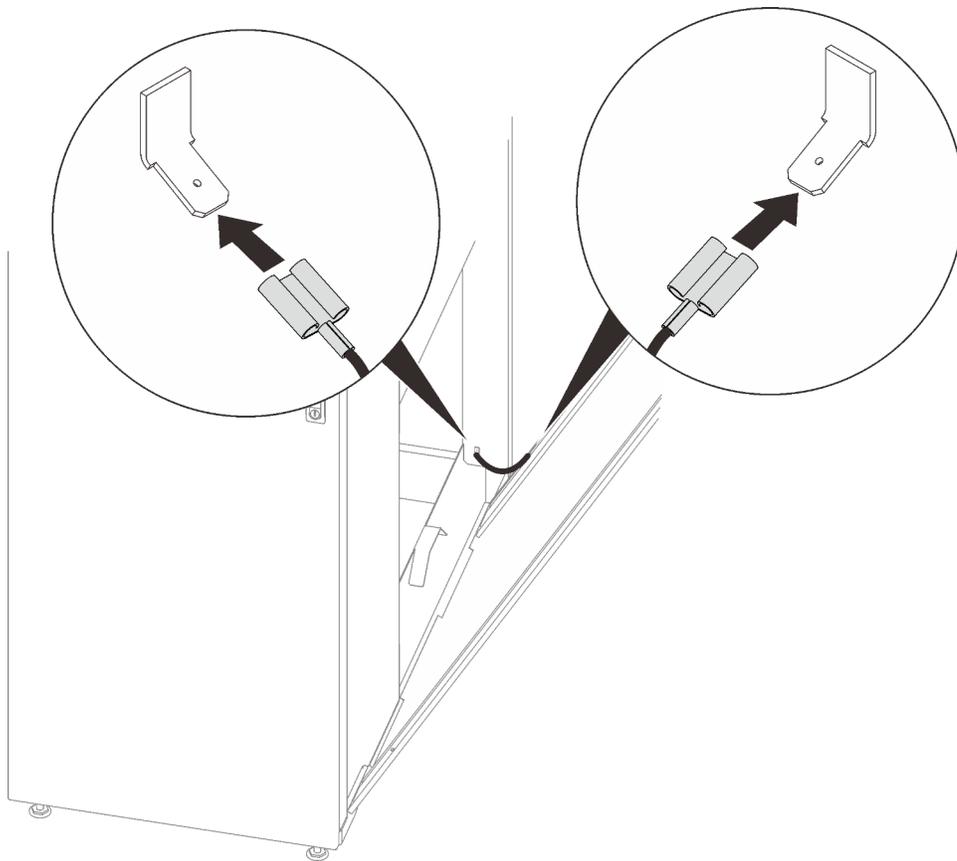


Figure 140. Installing the grounding jumper wire

Step 4. Secure the side cover to the rack cabinet.

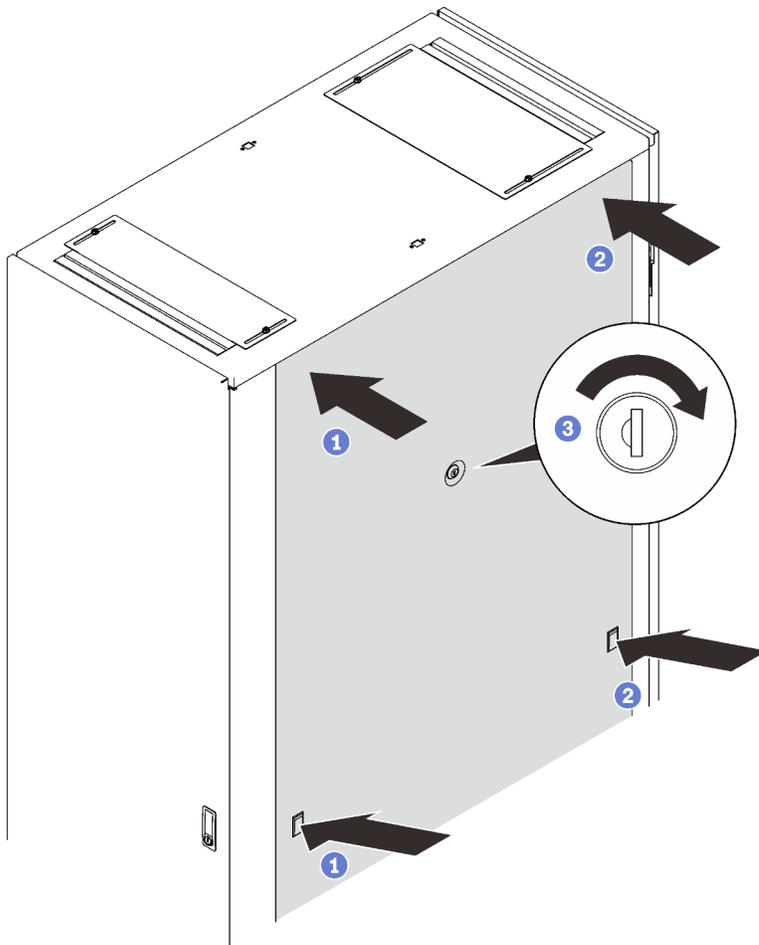


Figure 141. Securing the side cover

Note: This procedure is best executed by two people.

- 1 Press and hold the latch of one side, and firmly press the upper corner in.
- 2 Repeat the previous step on the other side.
- 3 Lock the side cover with the key.

Step 5. Repeat the previous three steps on the other side cover.

Install DWC 38 Port Rack Manifold (in-rack system)

Use this information to install the manifold in an in-rack direct water cooling system.

CAUTION:

The coolant might cause irritation to the skin and eyes. Avoid direct contact with the coolant.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S011



CAUTION:

Sharp edges, corners, or joints nearby.

S038



CAUTION:

Eye protection should be worn for this procedure.

S040



CAUTION:

Protective gloves should be worn for this procedure.

L016



خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
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Избягвайте работа по или около оборудване под напрежение,
докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER: Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危險: 由于本产品中存在水或者水溶液，因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。(L016)

危險: 本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polití produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risco op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

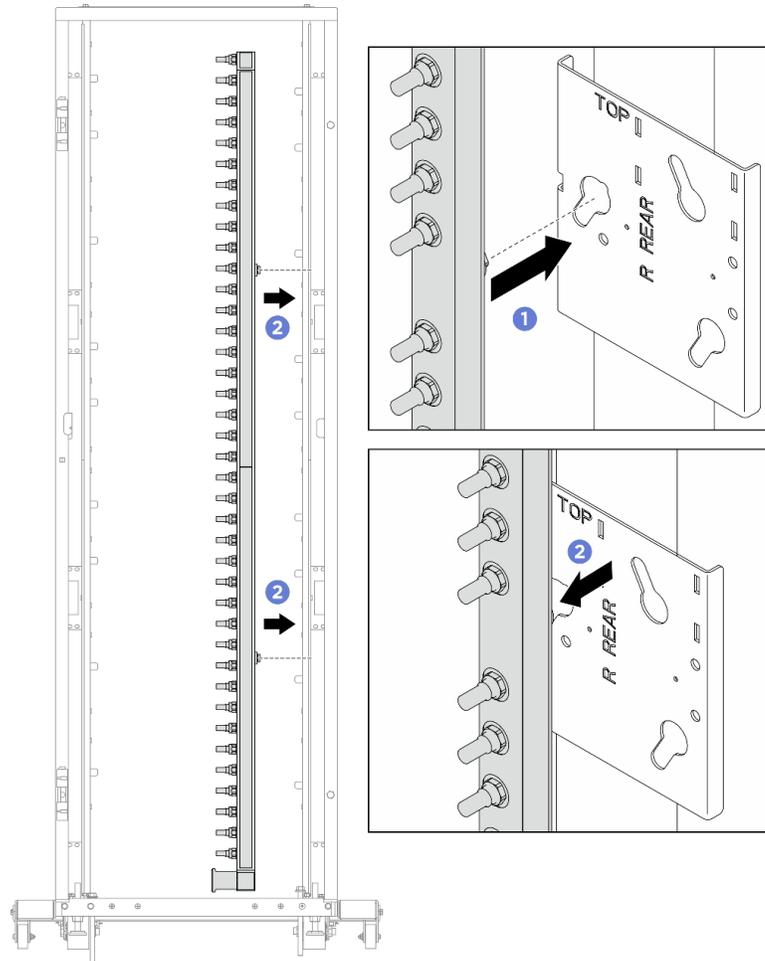


Figure 142. Installing the manifold

- a. ① Hold the manifold with both hands, and mount it onto the rack cabinet.
- b. ② Align the spools with holes, and clutch the cabinet.

Step 4. Repeat the last step to install the other manifold.

Step 5. Install ball valves to CDU.

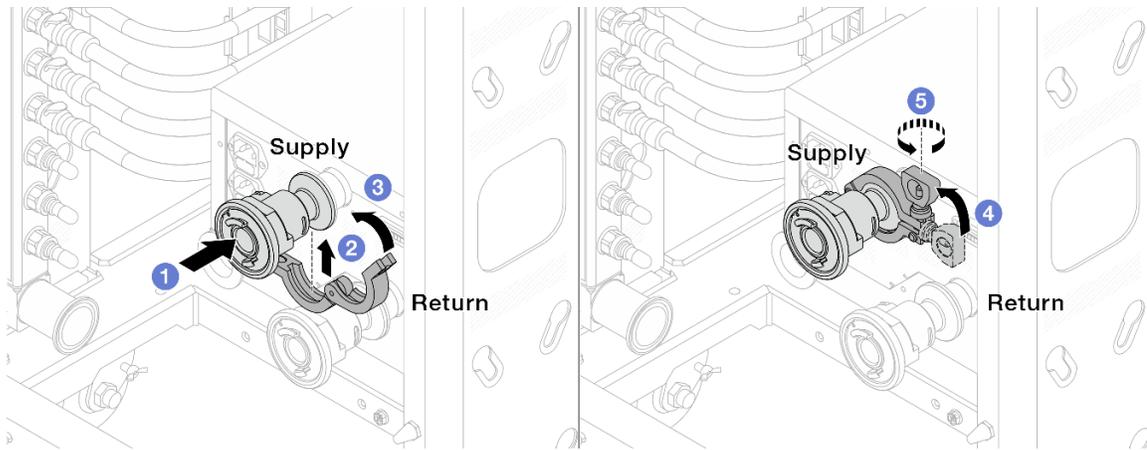


Figure 143. Installing ball valves

- a. 1 Connect the ball valves to **Supply** and **Return** ports.
- b. 2 Wrap the interface around with the clamp.
- c. 3 Close the clamp.
- d. 4 Lift the screw upright.
- e. 5 Tighten the screw and make sure that it is secured.

Step 6. Install the connection set to manifolds.

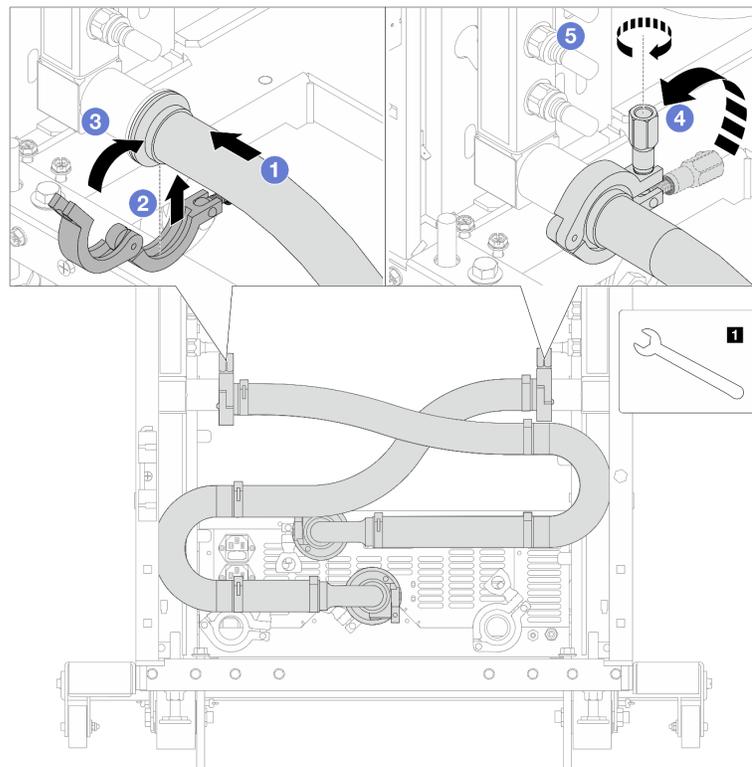


Figure 144. Installing the connection set

1 17 mm wrench

- a. **1** Connect the connection set to both manifolds.
- b. **2** Wrap the interface around with the clamp.
- c. **3** Close the clamp.
- d. **4** Lift the screw upright.
- e. **5** Tighten the screw and make sure that it is secured.

Step 7. Install the connection set to ball valves.

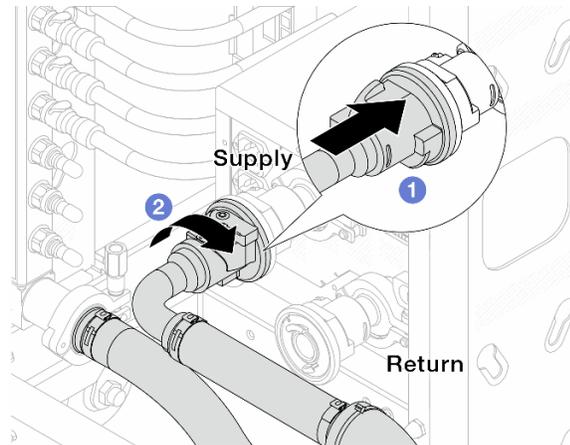


Figure 145. Connecting ball valves

- a. **1** Connect ball valves.
- b. **2** Rotate to the right to lock the two valves.

Step 8. Prepare the in-rack CDU.

- a. Connect the feed hose to inlet port on the front.

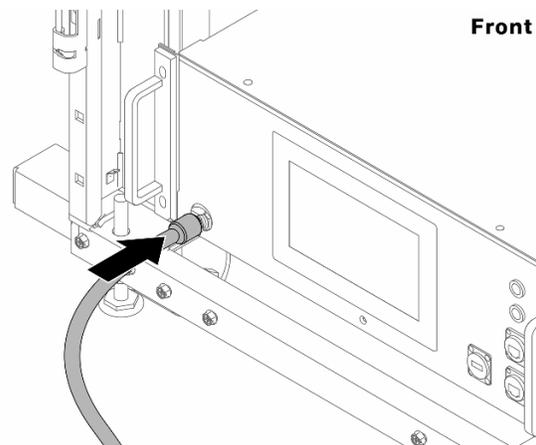


Figure 146. The front of CDU

- b. Connect hoses to the drain port and bleeder port on the rear.

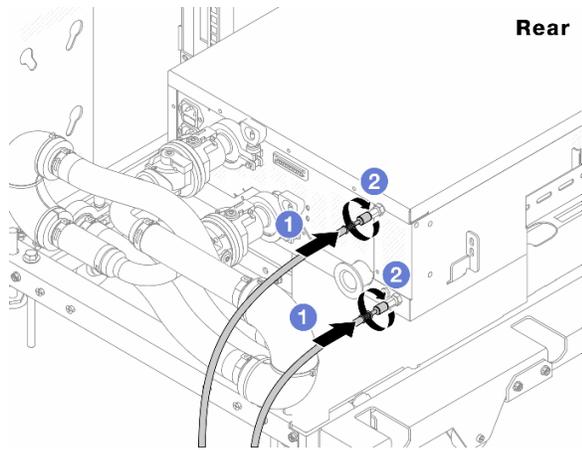


Figure 147. The rear of CDU

- 1 Connect both drain and bleeder hoses to CDU.
- 2 Rotate the connectors to the right to secure the connection.

Important:

- For more operation and maintenance guidelines, see [Lenovo Neptune DWC RM100 in-rack Coolant Distribution Unit \(CDU\) Operation & Maintenance Guide](#).
- For service support, associated warranty and maintenance sizing, contact Lenovo Professional Services team at cdusupport@lenovo.com.

Step 9. Install the quick connect plug to the manifolds.

Note: Depending on the model, your server might look different from the illustrations in this topic.

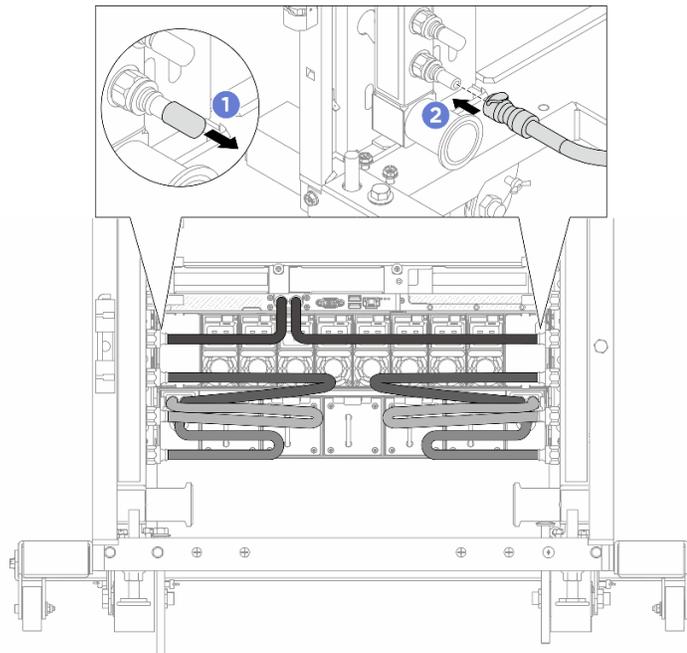


Figure 148. Installing the quick connect plug

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Connect the plug to the manifold port.

Step 10. Install the bleeder kit to the manifold supply side.

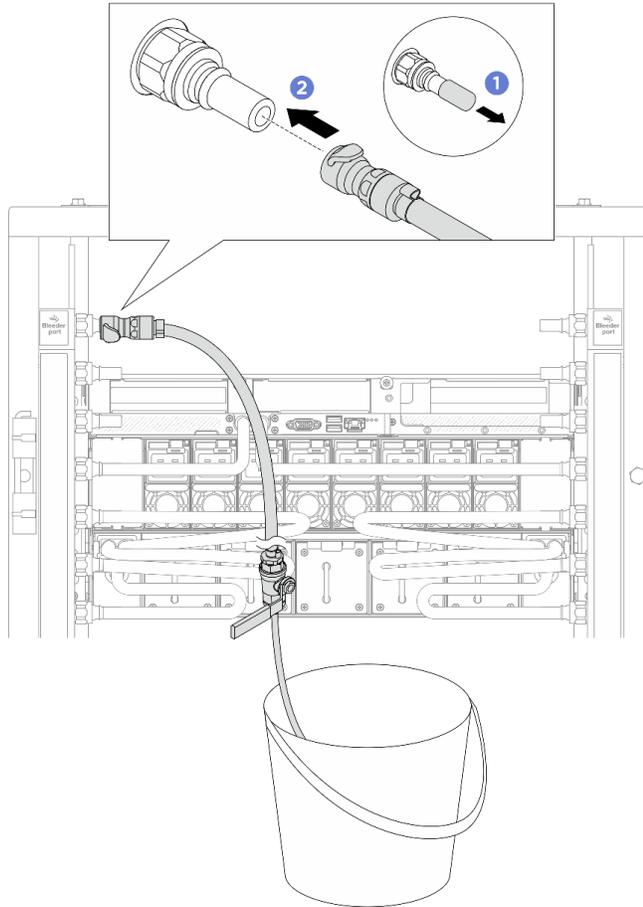


Figure 149. Installing the bleeder kit to the supply side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 11. To push the air out of the manifolds, open ball valve switches to let coolant fill the system.

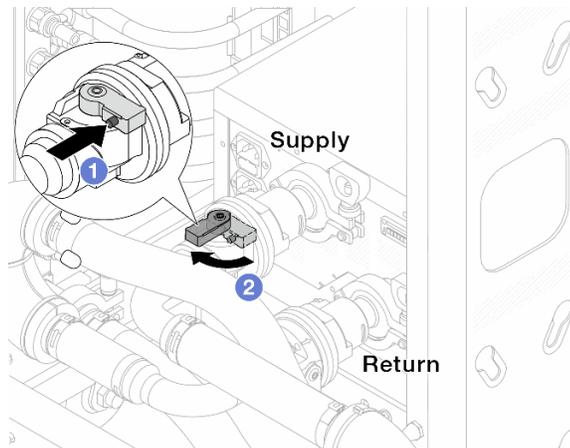


Figure 150. Opening ball valves

- a. 1 Press the button on the ball valve switch.
- b. 2 Rotate the switch to fully open the valves as illustrated above.

Attention:

- Pay close attention to the front display of CDU and maintain the system pressure at **one bar**.
- For more information about coolant temperature and system pressure requirements, see the water requirements section of your server.

Step 12. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

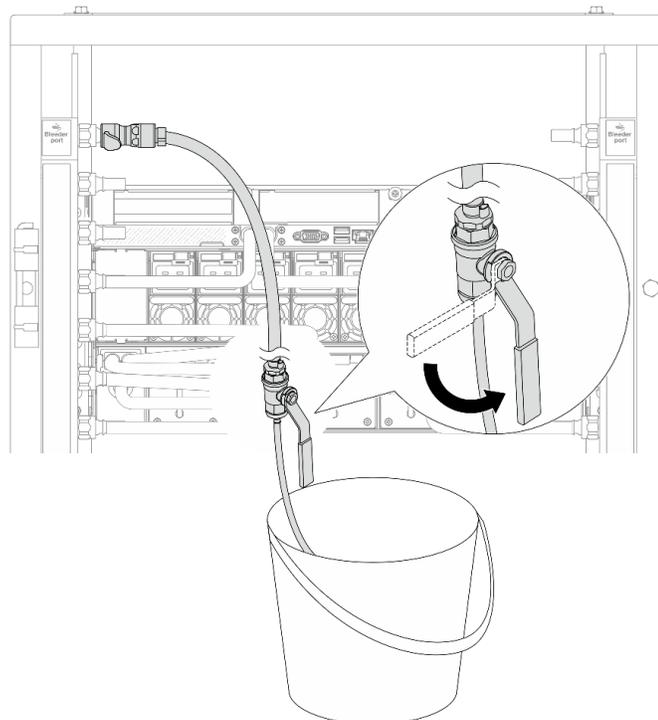


Figure 151. Opening the bleeder valve on the supply side

Step 13. Install the bleeder kit to the manifold return side.

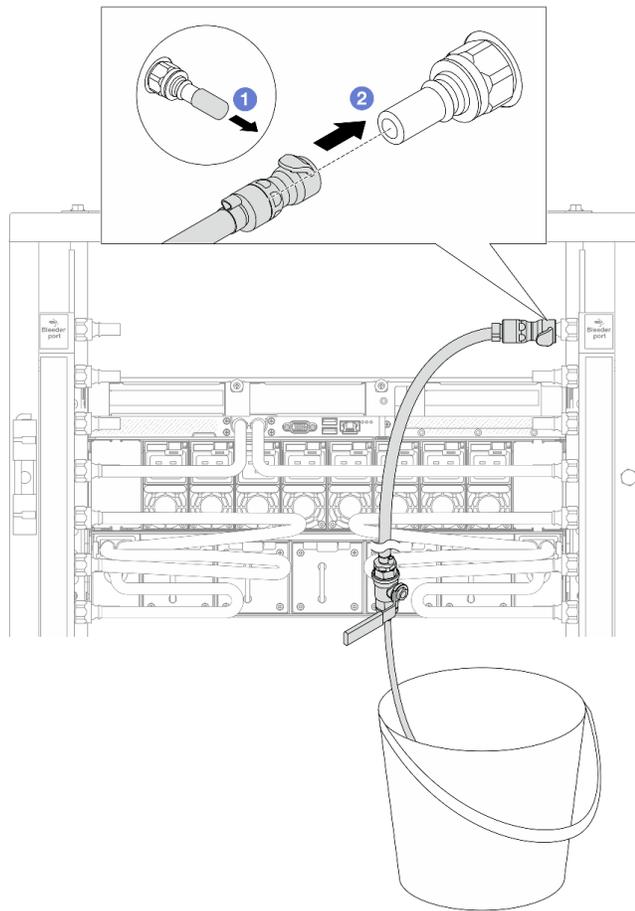


Figure 152. Installing the bleeder kit on the return side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 14. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

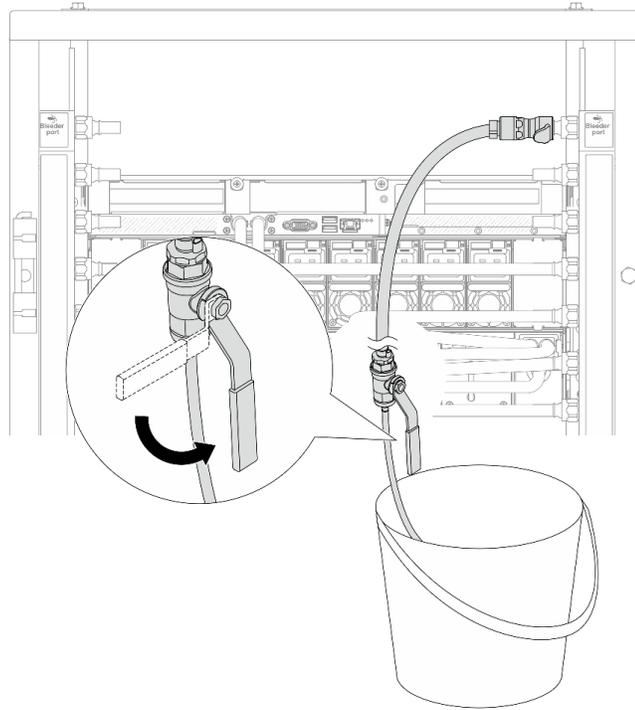


Figure 153. Opening the bleeder valve on the return side

Step 15. (For precaution) To make sure that the air inside is as little as possible, re-install the bleeder kit back to manifold supply side and do it one more time. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

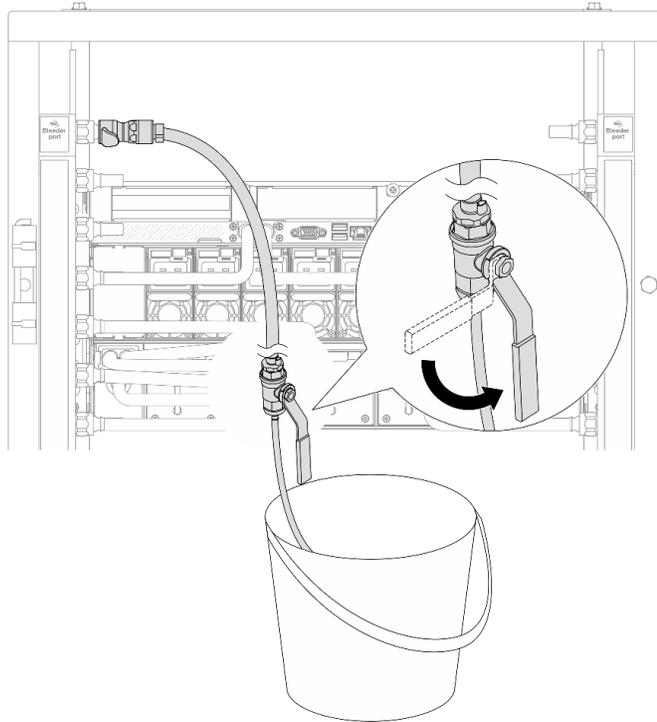


Figure 154. Opening the bleeder valve on the supply side

Step 16. Once completed, pay close attention to the front display of CDU and maintain the system pressure at **one bar**. For more information about coolant temperature and system pressure requirements, see the water requirement section for your server.

Install DWC 38 Port Rack Manifold (in-row system)

Use this information to install the manifold in an in-row direct water cooling system.

CAUTION:

The coolant might cause irritation to the skin and eyes. Avoid direct contact with the coolant.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S011



CAUTION:
Sharp edges, corners, or joints nearby.

S038



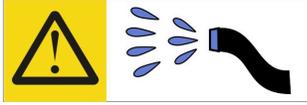
CAUTION:
Eye protection should be worn for this procedure.

S040



CAUTION:
Protective gloves should be worn for this procedure.

L016



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(L016)

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危險: 本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

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(L016)

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GEVAAR: Risico op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda. (L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda. (L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

ཉེན་བརྒྱུ: རྩོམ་རྩིས་འདིའི་ནང་དུ་རྒྱ་ལྷན་ཁྲུང་གི་གཤེར་གཟུགས་འདུས་ཡོད་པ་སུ། དེ་ལས་སློབ་ལྗགས་པའི་ཉེན་ཁ་ཡོད། ལག་པའི་ཐོག་ལྗགས་པའི་ལྷན་ཁྲུང་གི་མར་བཞུར་བའི་གནས་ཚུལ་འགྲོགས་ཡོད་པའི་སློབ་ཆས་ལ་བཞོལ་སྤྱོད་བྱེད་མི་ཉེན་པོ། (L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول ھۆل ھالەتتە ۋە ياكى سۇ سىرغىپ چىققان ھالەتتە، توكلۇق ئۇسكۇنىگە قارىتا ۋە ياكى توكلۇق ئۇسكۇنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiemyj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiemyj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong. (L016)

Attention:

- Ensure proper handling procedures are followed when working with any chemically treated coolant used in the rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the coolant chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the coolant chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.
- This task requires two or more people.

Procedure

Step 1. Install the server into the rack.

Step 2. Install the manifold.

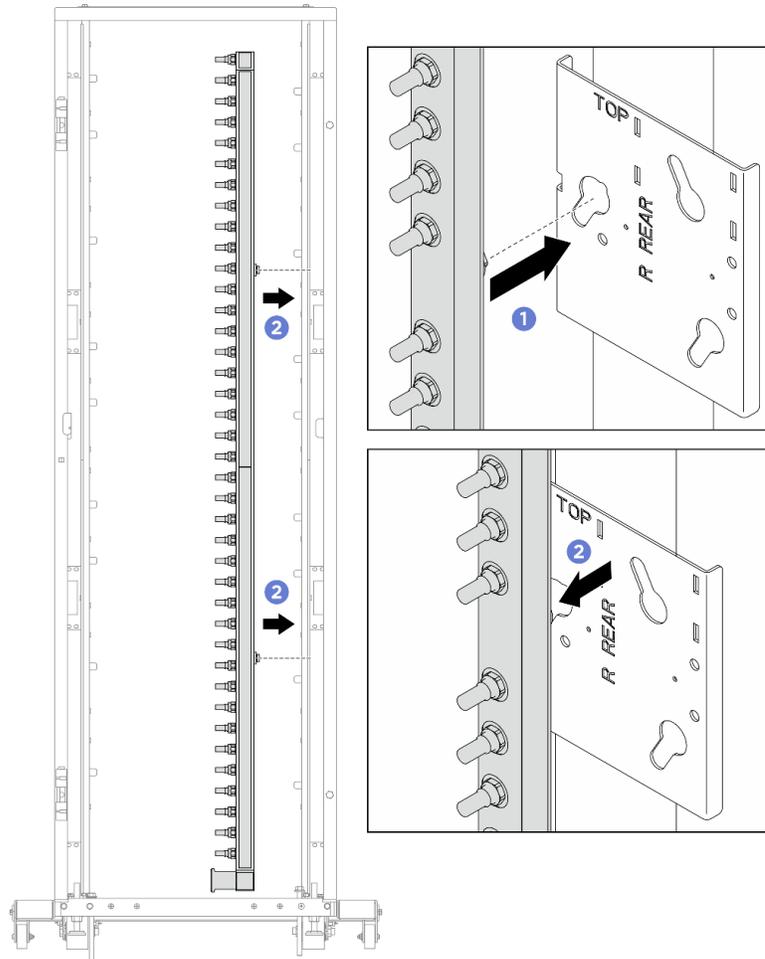


Figure 155. Installing the manifold

- a. ① Hold the manifold with both hands, and mount it onto the rack cabinet.
- b. ② Align the spools with holes, and clutch the cabinet.

Step 3. Repeat the last step to install the other manifold.

Step 4. Install the quick connect plug to the manifolds.

Note: Depending on the model, your server might look different from the illustrations in this topic.

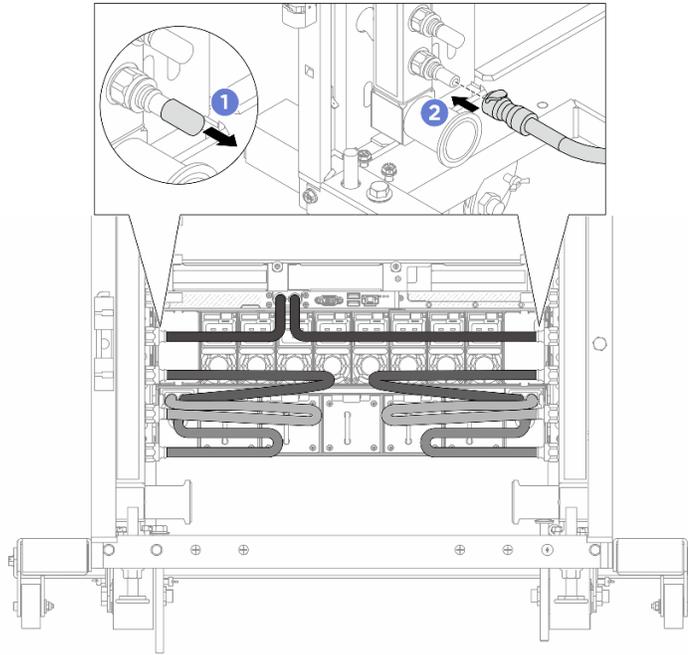


Figure 156. Installing the quick connect plug

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Connect the plug to the manifold port.

Step 5. Install the hose kit to the manifold.

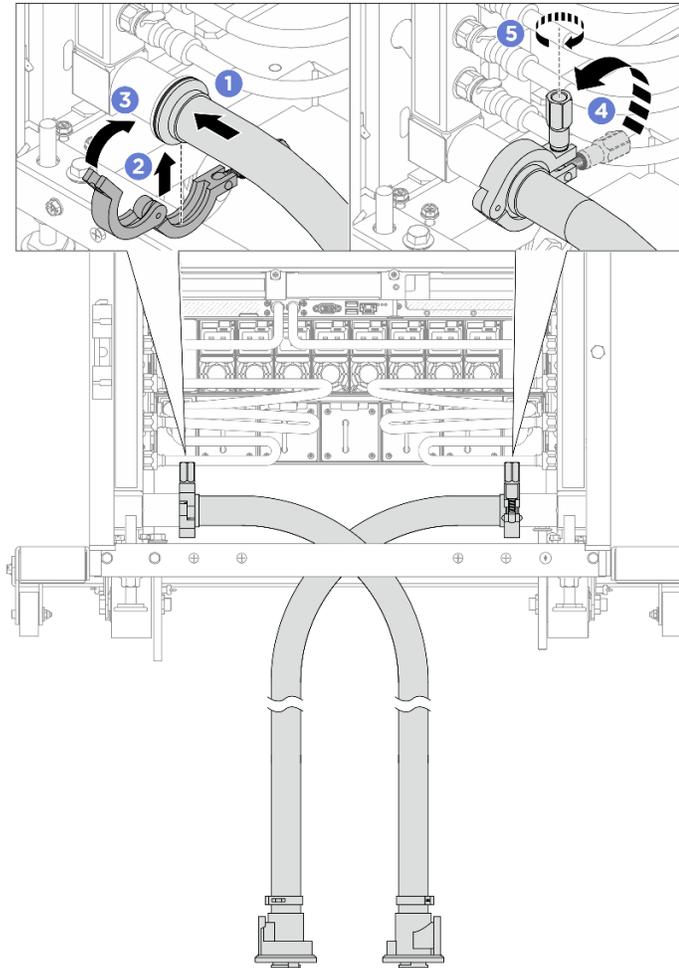


Figure 157. Installing the hose kit

1 17 mm wrench

- a. **1** Connect the hose kits to both manifolds.
- b. **2** Wrap the interface around with the clamp.
- c. **3** Close the clamp.
- d. **4** Lift the screw upright.
- e. **5** Tighten the screw and make sure that it is secured.

Step 6. Install the bleeder kit to the manifold supply side.

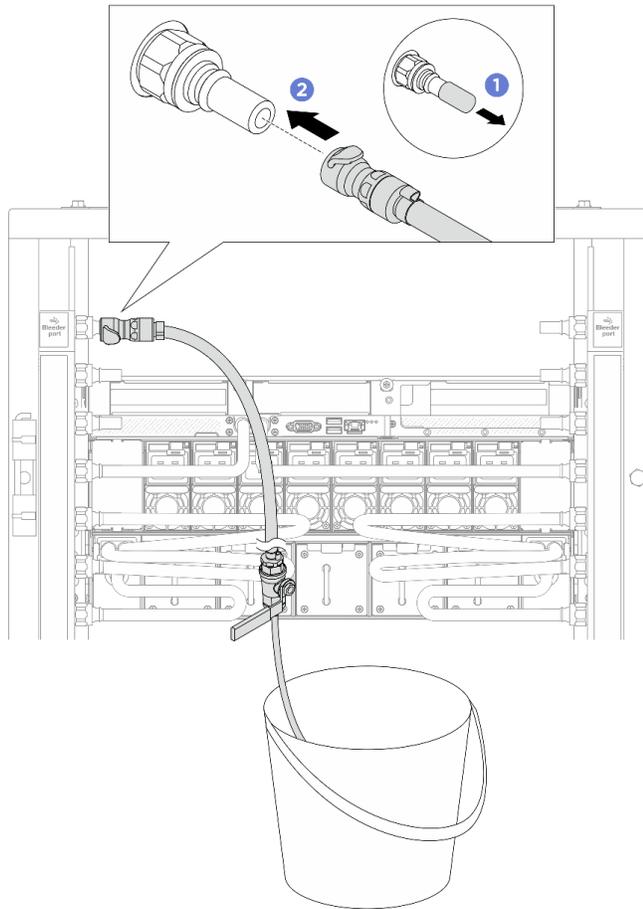


Figure 158. Installing the bleeder kit to the supply side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 7. To push the air out of the manifold supply side, connect **facility supply** to **manifold return**.

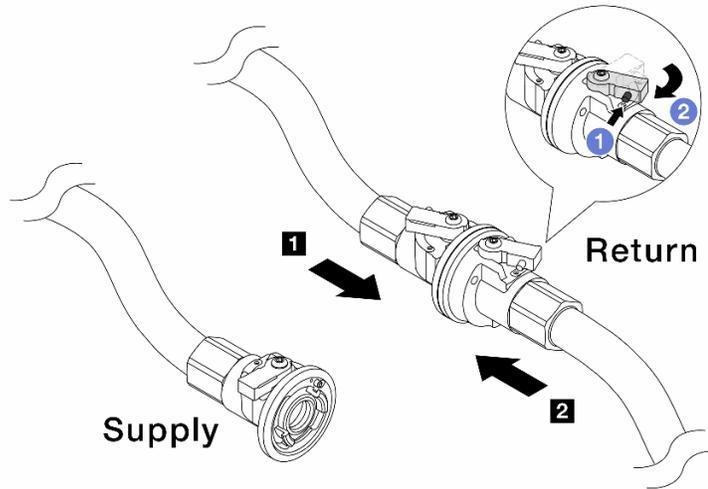


Figure 159. Facility supply to manifold return

- a. ① Press the button on the ball valve switch.
- b. ② Rotate both switches open and stop at around 1/4 of 90 degrees.

Attention:

- Open the ball valves on ① manifold return side and ② facility supply side, while keep manifold supply side closed.
- Do not fully open the ball valves, or the water flow gets too rapid to contain.

Step 8. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

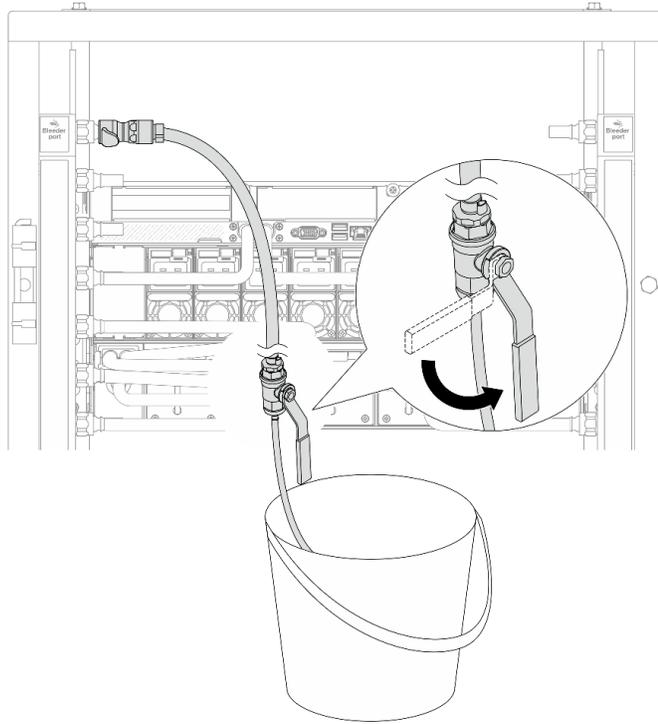


Figure 160. Opening the bleeder valve on the supply side

Step 9. Install the bleeder kit to the manifold return side.

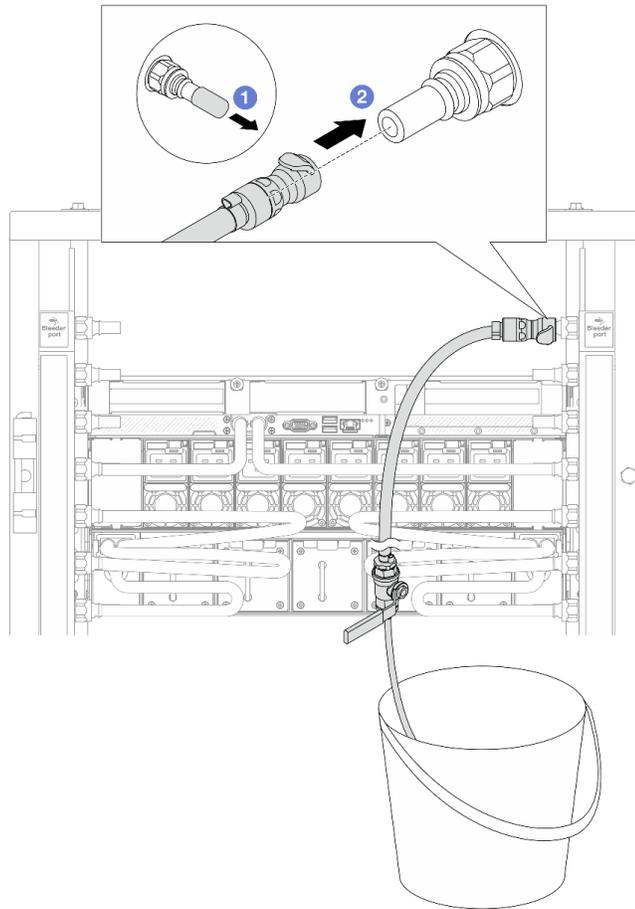


Figure 161. Installing the bleeder kit on the return side

- a. 1 Remove the rubber quick connect plug covers from the ports on the manifold.
- b. 2 Plug the bleeder kit to the manifold.

Step 10. To push the air out of the manifold return side, connect **facility supply** to **manifold supply**.

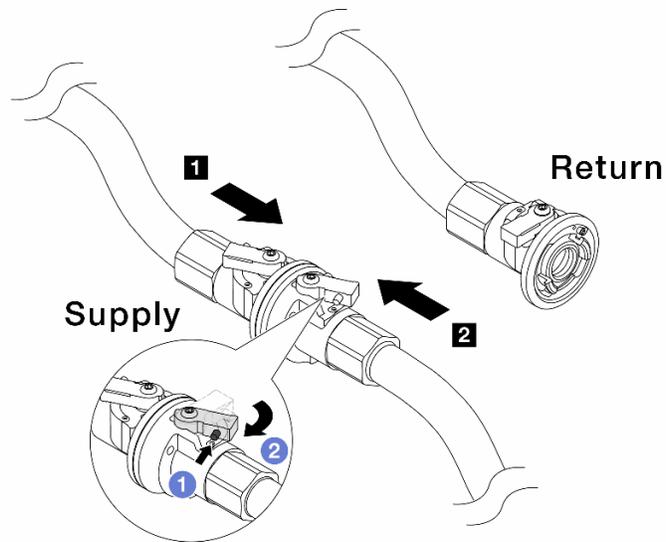


Figure 162. Facility supply to manifold supply

- a. ① Press the button on the ball valve switch.
- b. ② Rotate both switches open and stop at around 1/4 of 90 degrees.

Attention:

- Open the ball valves on ① manifold supply side and ② facility supply side, while keep manifold return side closed.
- Do not fully open the ball valves, or the water flow gets too rapid to contain.

Step 11. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

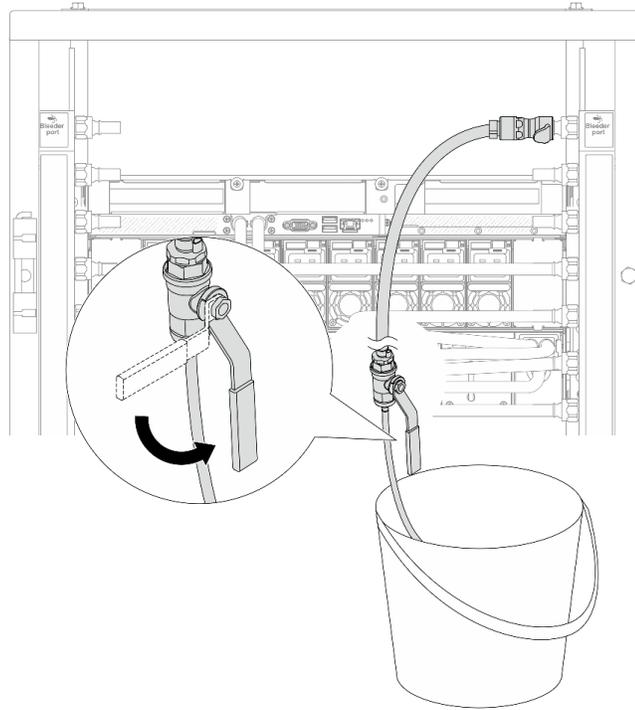


Figure 163. Opening the bleeder valve on the return side

Step 12. (For precaution) To make sure that the air inside is as little as possible, re-install the bleeder kit back to manifold supply side and do it one more time. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

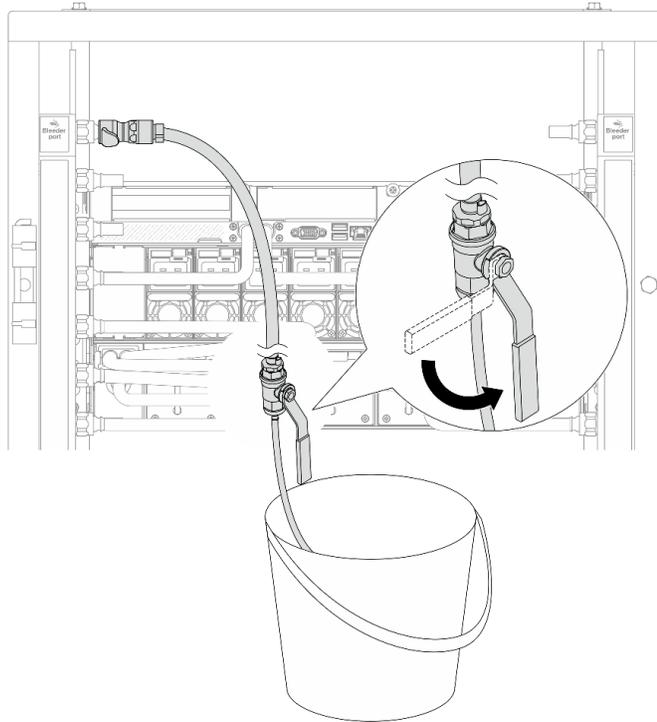


Figure 164. Opening the bleeder valve on the supply side

Step 13. Once completed, connect the supply and return of manifold and facility correspondingly. Fully open all connections on both supply and return sides.

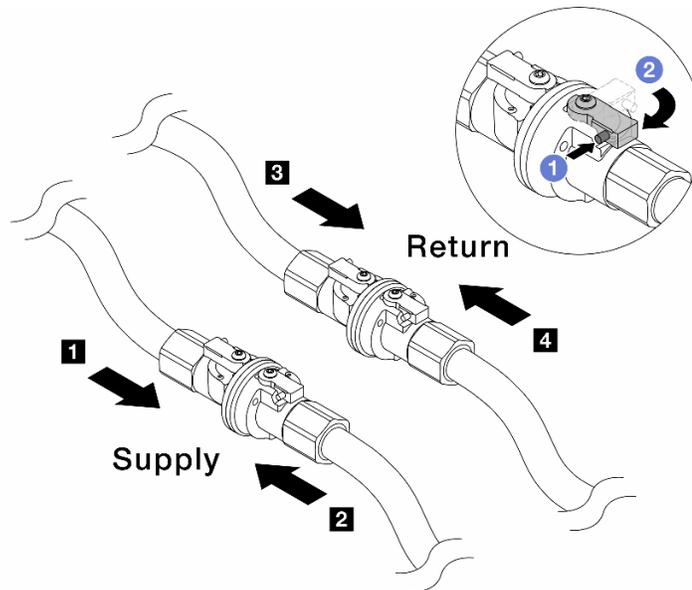


Figure 165. Opening ball valves

Note:

<p>1 Manifold supply connects to 2 facility supply</p>	<p>3 Manifold return connects to 4 facility return</p>
--	--

- a. 1 Press the button on the ball valve switch.
- b. 2 Rotate the switch to fully open the valves as illustrated above.

Install DWC 45 Port Rack Manifold (in-rack system)

Use this information to install the 45 port manifold in an in-rack direct water cooling system.

CAUTION:

The coolant might cause irritation to the skin and eyes. Avoid direct contact with the coolant.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S011



CAUTION:

Sharp edges, corners, or joints nearby.

S038



CAUTION:

Eye protection should be worn for this procedure.

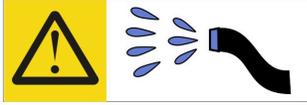
S040



CAUTION:

Protective gloves should be worn for this procedure.

L016



خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
تجنب العمل في أو بالقرب من أي جهاز فعال بأيدي مبللة أو عند وجود تسرب للماء. (L016)

AVISO: Risco de choque elétrico devido à presença de água ou solução aquosa no produto. Evite trabalhar no equipamento ligado ou próximo a ele com as mãos molhadas ou quando houver a presença de água derramada. (L016)

ОПАСНО: Риск от токов удар поради вода или воден разтвор, присъстващи в продукта.
Избягвайте работа по или около оборудване под напрежение,
докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER: Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危險: 由于本产品中存在水或者水溶液，因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。(L016)

危險: 本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polití produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risico op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda. (L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda. (L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

ཉེན་བརྒྱ: རྩོམ་རྩིས་འདིའི་ནང་དུ་རྒྱུ་ལམ་རྩིས་གཤེར་གཟུགས་འདུས་ཡོད་པ་སྟེ། དེ་ལས་སློབ་རྒྱུ་པའི་ཉེན་ཁ་ཡོད། ལག་པའི་སློབ་རྩིས་པའི་ལམ་རྩིས་ལྷོ་མའི་བཟུང་བའི་གནས་ཚུལ་འགྲོགས་ཡོད་པའི་སློབ་ཚན་ལ་བཞག་སྟེ་བྱེད་མི་ཉེན་པོ། (L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول ھۆل ھالەتتە ۋە ياكى سۇ سىرغىپ چىققان ھالەتتە، توكلۇق ئۇسكۇنىگە قارىتا ۋە ياكى توكلۇق ئۇسكۇنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiernj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiernj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong. (L016)

Attention:

- Ensure proper handling procedures are followed when working with any chemically treated coolant used in the rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the coolant chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the coolant chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.
- This task requires two or more people.

Procedure

- Step 1. Make sure that the in-rack CDU and other devices are not powered on, and that all external cables are disconnected.
- Step 2. Install the server into the rack.
- Step 3. Install the manifold.

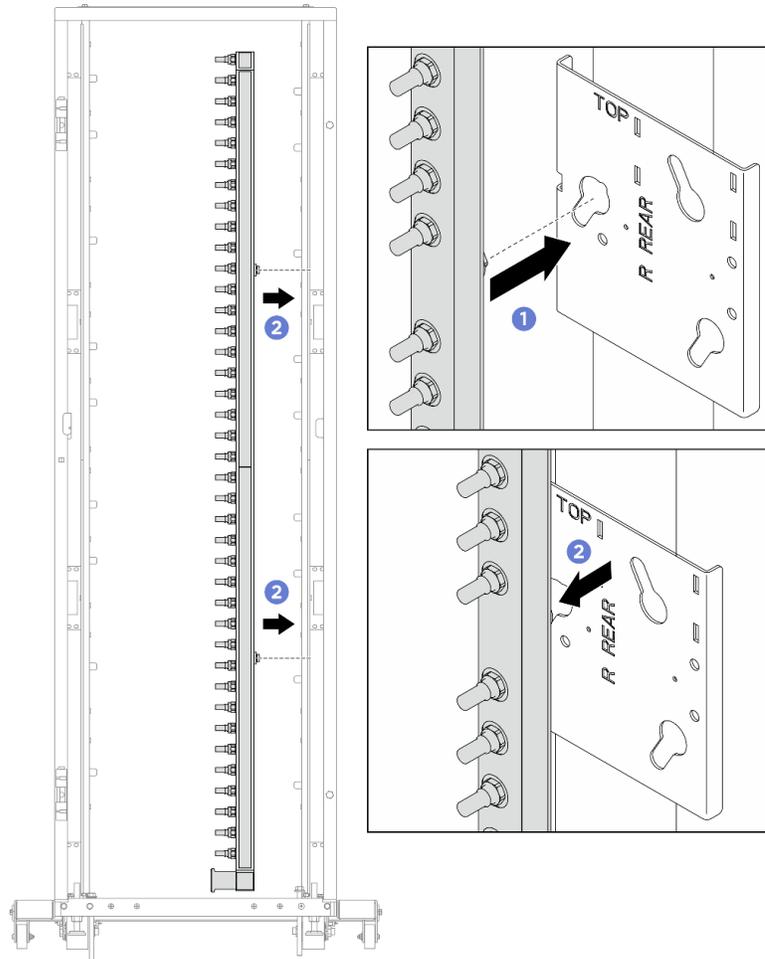


Figure 166. Installing the manifold

- a. ① Hold the manifold with both hands, and mount it onto the rack cabinet.
- b. ② Align the spools with holes, and clutch the cabinet.

Step 4. Repeat the last step to install the other manifold.

Step 5. Install ball valves to CDU.

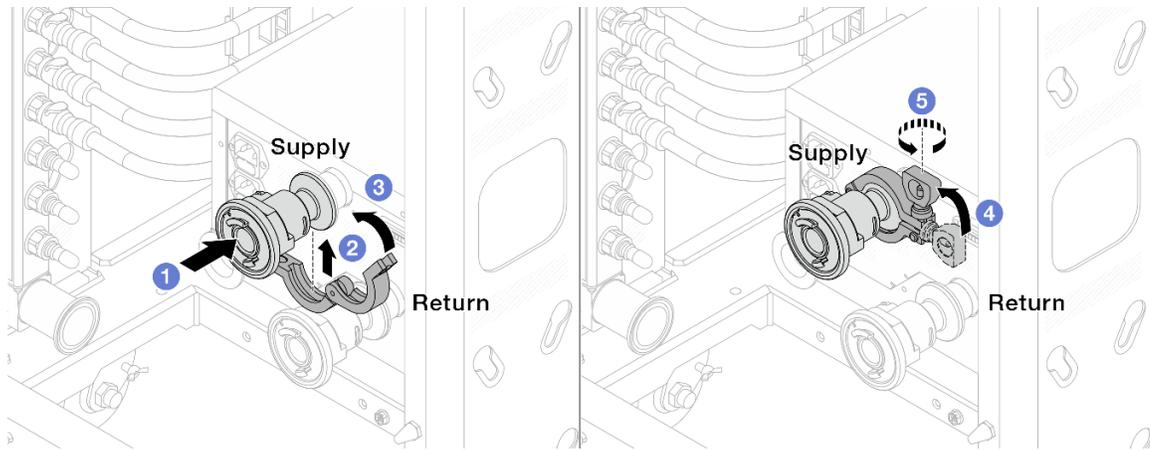


Figure 167. Installing ball valves

- a. 1 Connect the ball valves to **Supply** and **Return** ports.
- b. 2 Wrap the interface around with the clamp.
- c. 3 Close the clamp.
- d. 4 Lift the screw upright.
- e. 5 Tighten the screw and make sure that it is secured.

Step 6. Install the connection set to manifolds.

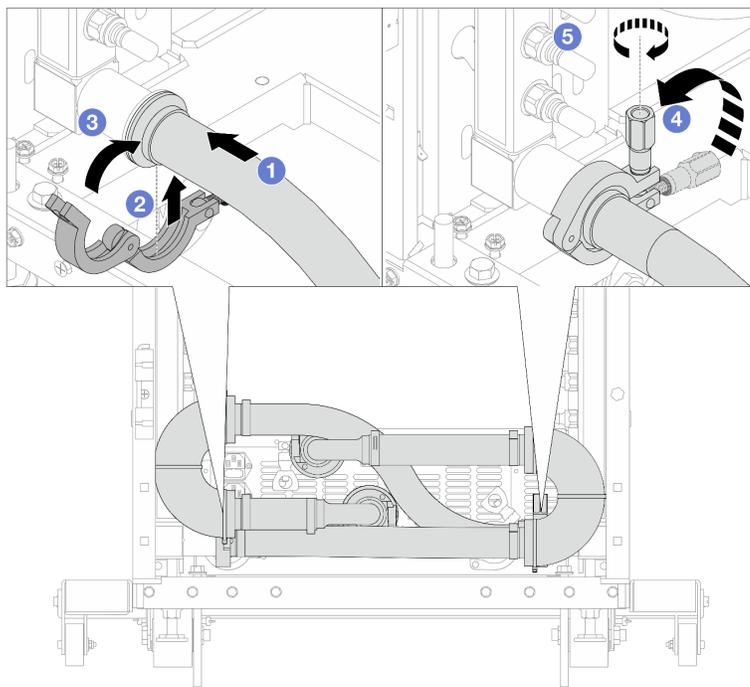


Figure 168. Installing the connection set

1 17 mm wrench

- a. **1** Connect the connection set to both manifolds.
- b. **2** Wrap the interface around with the clamp.
- c. **3** Close the clamp.
- d. **4** Lift the screw upright.
- e. **5** Tighten the screw and make sure that it is secured.

Step 7. Install the connection set to ball valves.

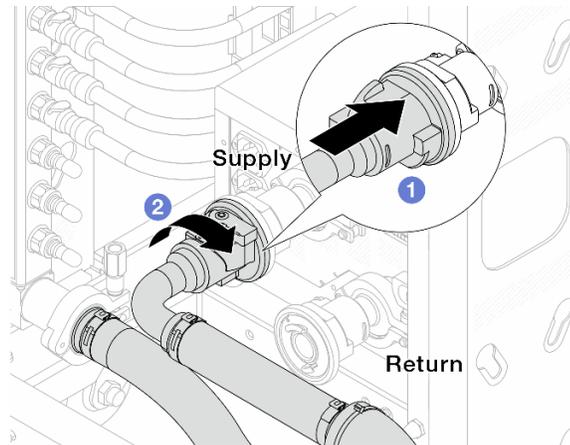


Figure 169. Connecting ball valves

- a. **1** Connect ball valves.
- b. **2** Rotate to the right to lock the two valves.

Step 8. Prepare the in-rack CDU.

- a. Connect the feed hose to inlet port on the front.

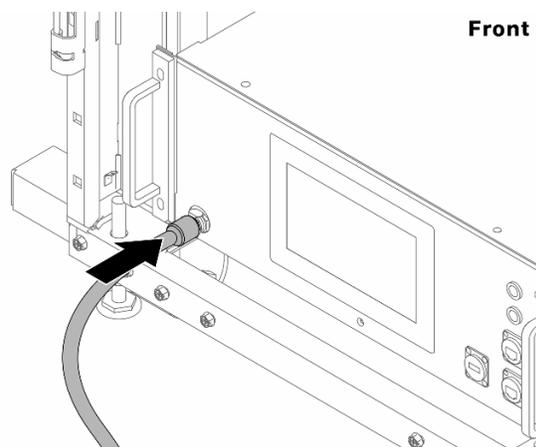


Figure 170. The front of CDU

- b. Connect hoses to the drain port and bleeder port on the rear.

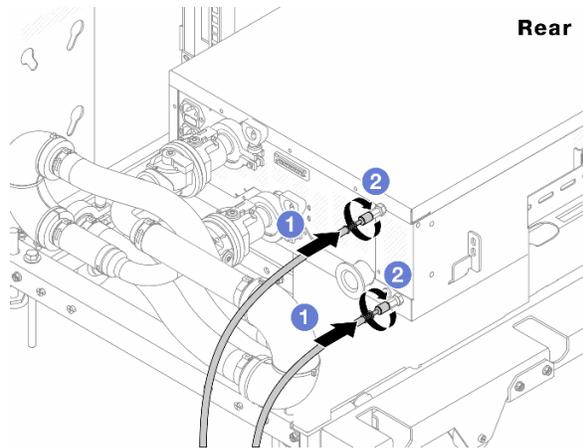


Figure 171. The rear of CDU

- 1 Connect both drain and bleeder hoses to CDU.
- 2 Rotate the connectors to the right to secure the connection.

Important:

- For more operation and maintenance guidelines, see [Lenovo Neptune DWC RM100 in-rack Coolant Distribution Unit \(CDU\) Operation & Maintenance Guide](#).
- For service support, associated warranty and maintenance sizing, contact Lenovo Professional Services team at cdusupport@lenovo.com.

Step 9. Install the quick connect plug to the manifolds.

Note: Depending on the model, your server might look different from the illustrations in this topic.

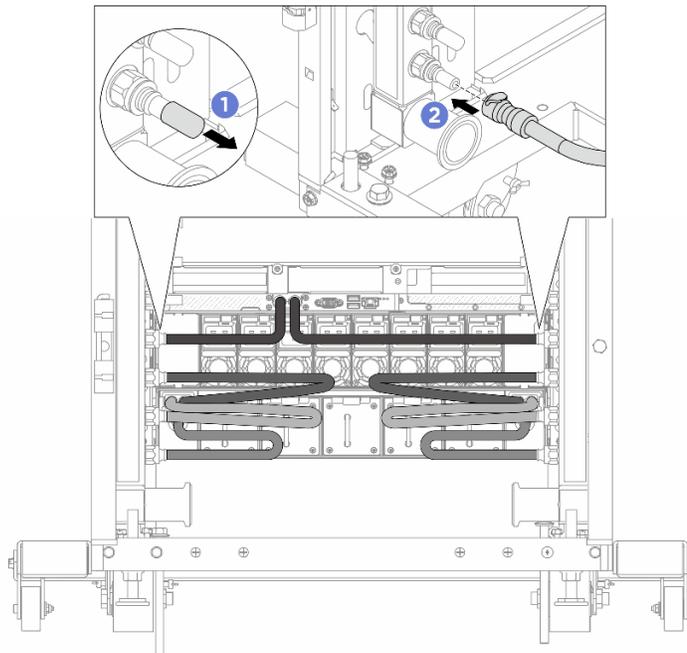


Figure 172. Installing the quick connect plug

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Connect the plug to the manifold port.

Step 10. Install the bleeder kit to the manifold supply side.

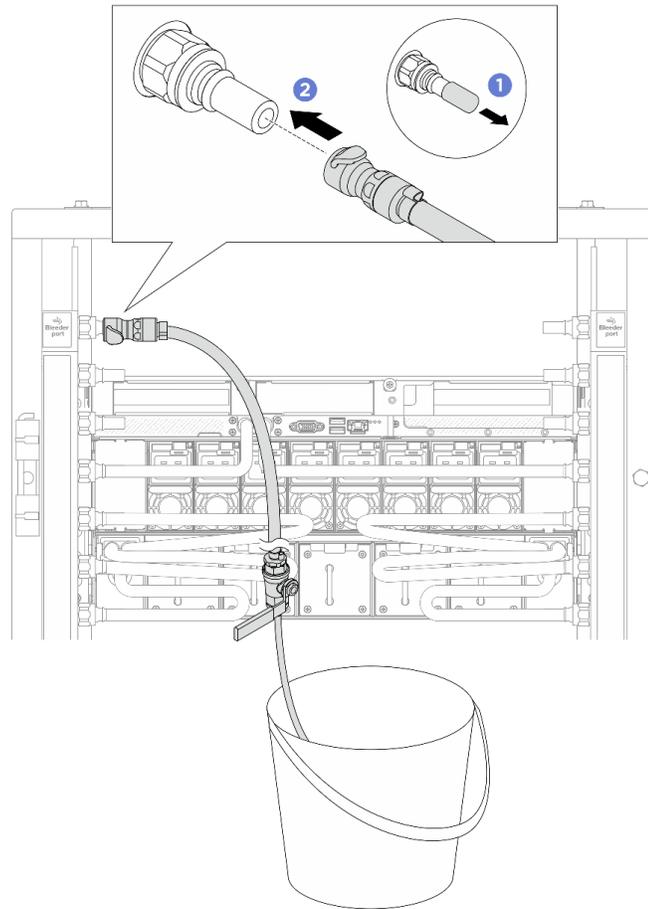


Figure 173. Installing the bleeder kit to the supply side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 11. To push the air out of the manifolds, open ball valve switches to let coolant fill the system.

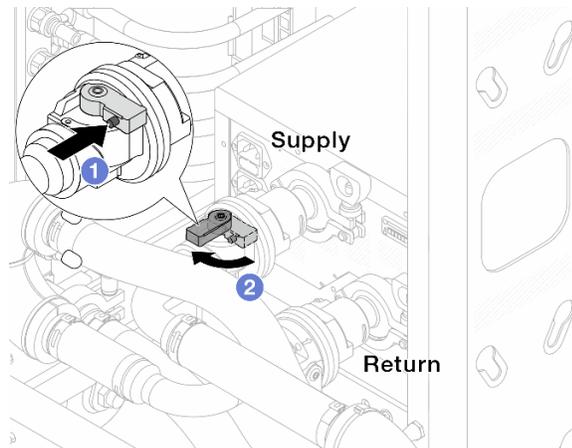


Figure 174. Opening ball valves

- a. 1 Press the button on the ball valve switch.
- b. 2 Rotate the switch to fully open the valves as illustrated above.

Attention:

- Pay close attention to the front display of CDU and maintain the system pressure at **one bar**.
- For more information about coolant temperature and system pressure requirements, see the water requirements section of your server.

Step 12. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

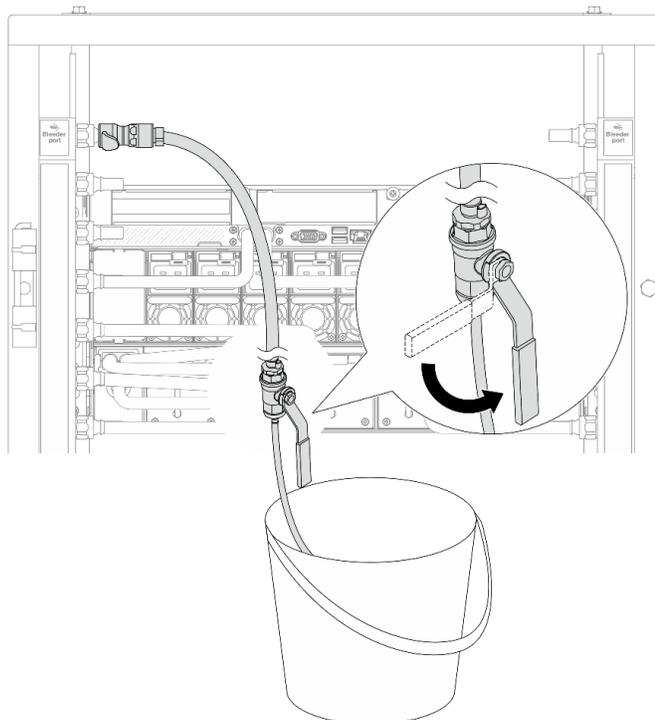


Figure 175. Opening the bleeder valve on the supply side

Step 13. Install the bleeder kit to the manifold return side.

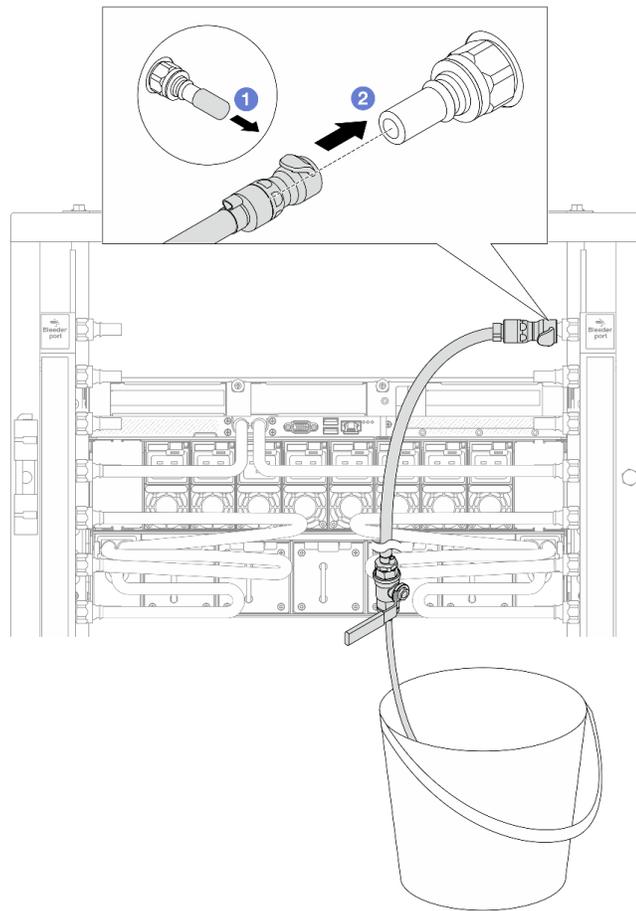


Figure 176. Installing the bleeder kit on the return side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 14. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

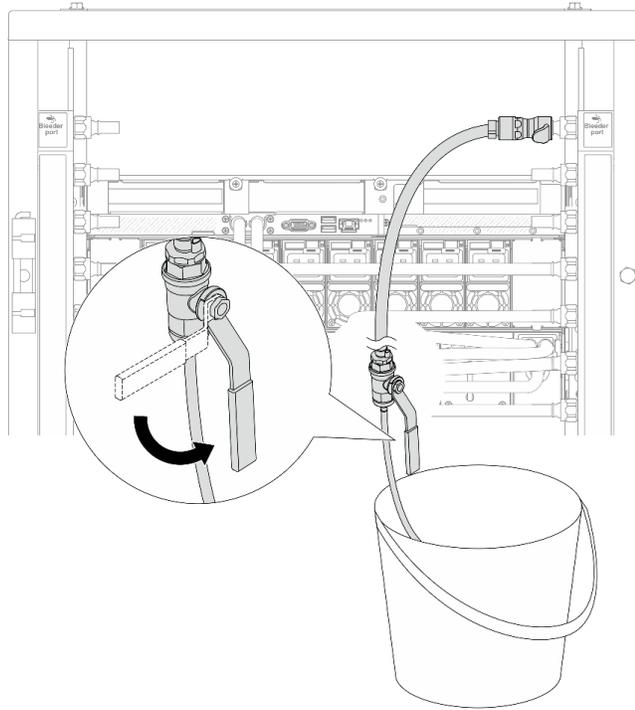


Figure 177. Opening the bleeder valve on the return side

- Step 15. (For precaution) To make sure that the air inside is as little as possible, re-install the bleeder kit back to manifold supply side and do it one more time. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

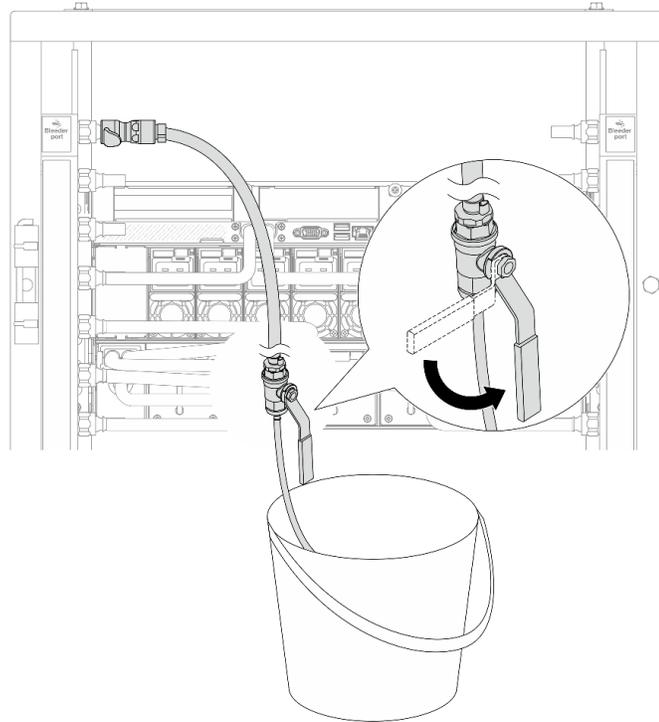


Figure 178. Opening the bleeder valve on the supply side

Step 16. Once completed, pay close attention to the front display of CDU and maintain the system pressure at **one bar**. For more information about coolant temperature and system pressure requirements, see the water requirement section for your server.

Install DWC 45 Port Rack Manifold (in-row system)

Use this information to install the 45 port manifold in an in-row direct water cooling system.

CAUTION:

The coolant might cause irritation to the skin and eyes. Avoid direct contact with the coolant.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S011



CAUTION:
Sharp edges, corners, or joints nearby.

S038



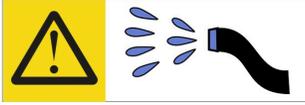
CAUTION:
Eye protection should be worn for this procedure.

S040



CAUTION:
Protective gloves should be worn for this procedure.

L016



خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
تجنب العمل في أو بالقرب من أي جهاز فعال بأيدي مبللة أو عند وجود تسرب للماء. (L016)

AVISO: Risco de choque elétrico devido à presença de água ou solução aquosa no produto. Evite trabalhar no equipamento ligado ou próximo a ele com as mãos molhadas ou quando houver a presença de água derramada. (L016)

ОПАСНО: Риск от токов удар поради вода или воден разтвор, присъстващи в продукта.
Избягвайте работа по или около оборудване под напрежение,
докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER: Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危險: 由于本產品中存在水或者水溶液，因此存在電擊風險。請避免使用潮濕的手在帶電設備或者有水濺出的環境附近工作。(L016)

危險: 本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polití produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risco op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda. (L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda. (L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

ཉེན་བརྒྱ: རྩོམ་རྒྱུ་འདི་ནི་ནང་དུ་རྒྱུ་ལྷན་ལྷན་གྱི་ཤིང་གཞུག་ལ་འདུལ་ཡོད་པ་ལ། དེ་ལས་སློབ་ཆུག་པའི་ཉེན་ཁ་ཡོད། ལག་པའི་ཐོག་ལྷན་ཡོད་པའི་རྩོམ་རྒྱུ་ལྷན་ལྷན་གྱི་ཤིང་གཞུག་ལ་འདུལ་ཡོད་པའི་སློབ་ཆས་ལ་བརྟེན་སྦྱོར་བྱེད་མི་ཉེན་ཁ། (L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول ھۆل ھالەتتە ۋە ياكى سۇ سىرغىپ چىققان ھالەتتە، توكلۇق ئۇسكۇنىگە قارىتا ۋە ياكى توكلۇق ئۇسكۇنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiemi: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiemi bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong. (L016)

Attention:

- Ensure proper handling procedures are followed when working with any chemically treated coolant used in the rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the coolant chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the coolant chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.
- This task requires two or more people.

Procedure

- Step 1. Install the server into the rack.
- Step 2. Install the manifold.

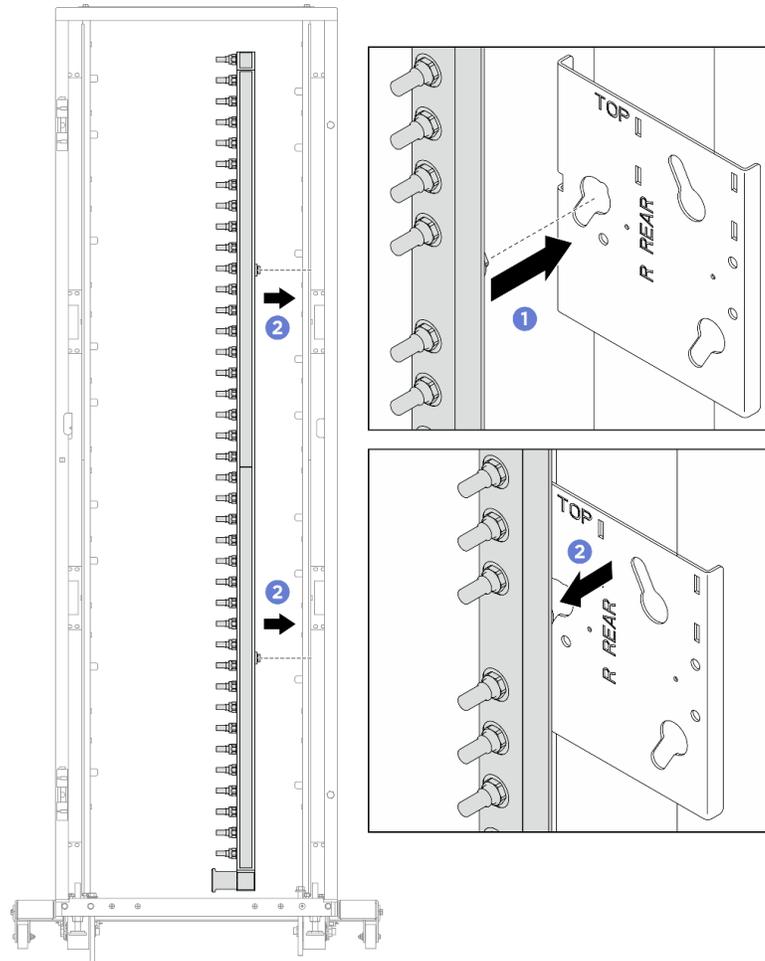


Figure 179. Installing the manifold

- a. ① Hold the manifold with both hands, and mount it onto the rack cabinet.
- b. ② Align the spools with holes, and clutch the cabinet.

Step 3. Repeat the last step to install the other manifold.

Step 4. Install the quick connect plug to the manifolds.

Note: Depending on the model, your server might look different from the illustrations in this topic.

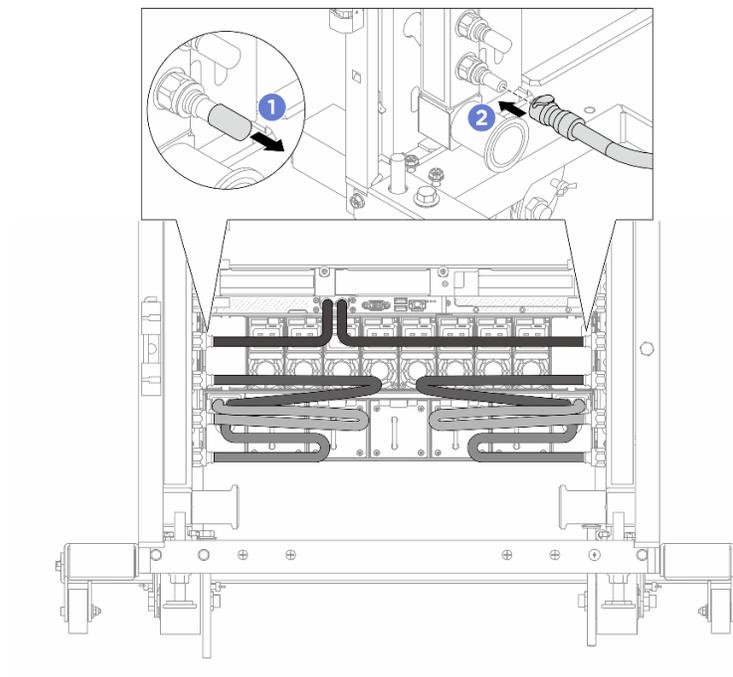


Figure 180. Installing the quick connect plug

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Connect the plug to the manifold port.

Step 5. Install the hose kit to the manifold.

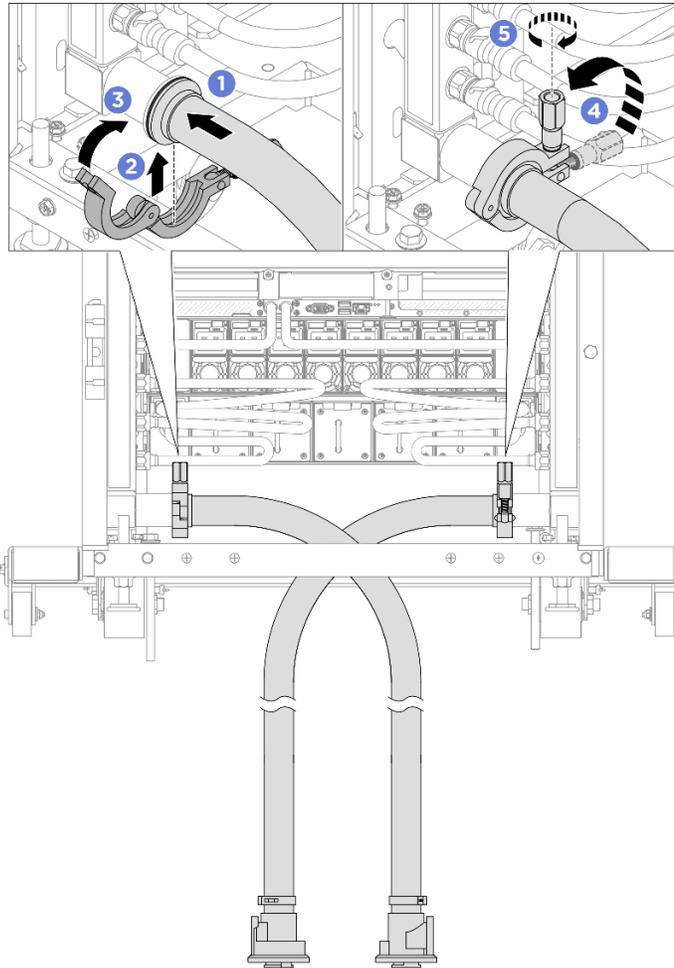


Figure 181. Installing the hose kit

1 17 mm wrench

- a. **1** Connect the hose kits to both manifolds.
- b. **2** Wrap the interface around with the clamp.
- c. **3** Close the clamp.
- d. **4** Lift the screw upright.
- e. **5** Tighten the screw and make sure that it is secured.

Step 6. Install the bleeder kit to the manifold supply side.

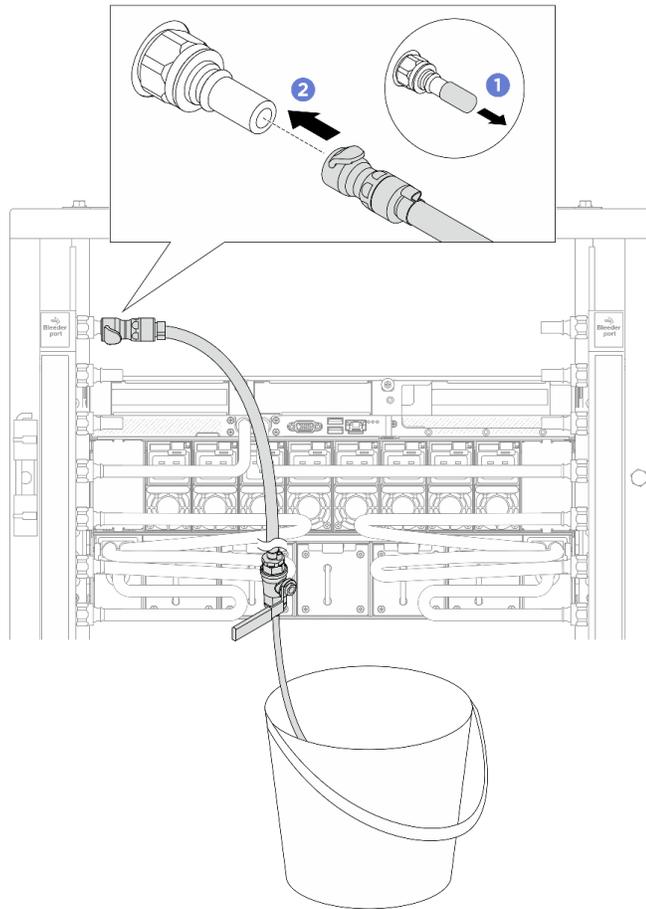


Figure 182. Installing the bleeder kit to the supply side

- a. 1 Remove the rubber quick connect plug covers from the ports on the manifold.
- b. 2 Plug the bleeder kit to the manifold.

Step 7. To push the air out of the manifold supply side, connect **facility supply** to **manifold return**.

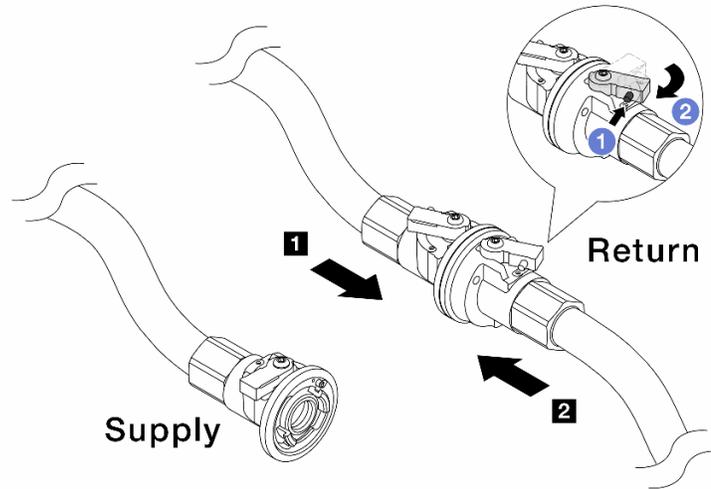


Figure 183. Facility supply to manifold return

- a. ① Press the button on the ball valve switch.
- b. ② Rotate both switches open and stop at around 1/4 of 90 degrees.

Attention:

- Open the ball valves on ① manifold return side and ② facility supply side, while keep manifold supply side closed.
- Do not fully open the ball valves, or the water flow gets too rapid to contain.

Step 8. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

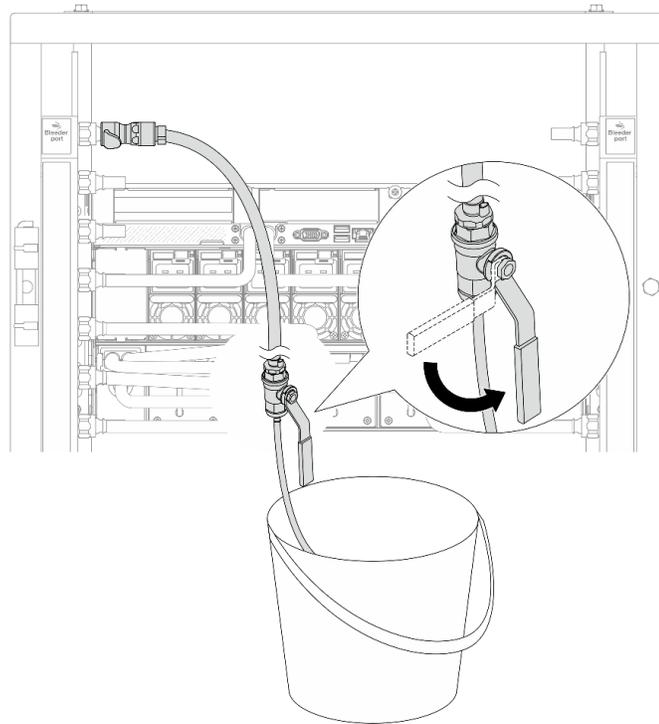


Figure 184. Opening the bleeder valve on the supply side

Step 9. Install the bleeder kit to the manifold return side.

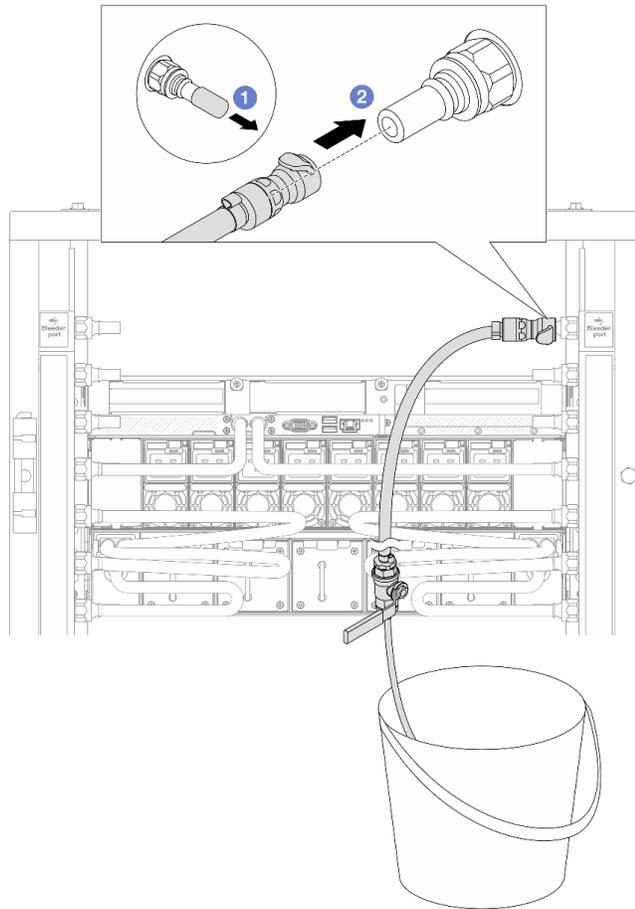


Figure 185. Installing the bleeder kit on the return side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 10. To push the air out of the manifold return side, connect **facility supply** to **manifold supply**.

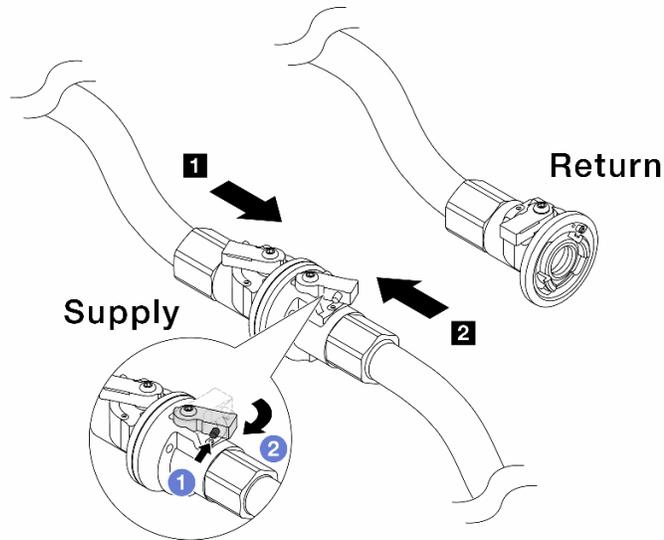


Figure 186. Facility supply to manifold supply

- a. ① Press the button on the ball valve switch.
- b. ② Rotate both switches open and stop at around 1/4 of 90 degrees.

Attention:

- Open the ball valves on ① manifold supply side and ② facility supply side, while keep manifold return side closed.
- Do not fully open the ball valves, or the water flow gets too rapid to contain.

Step 11. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

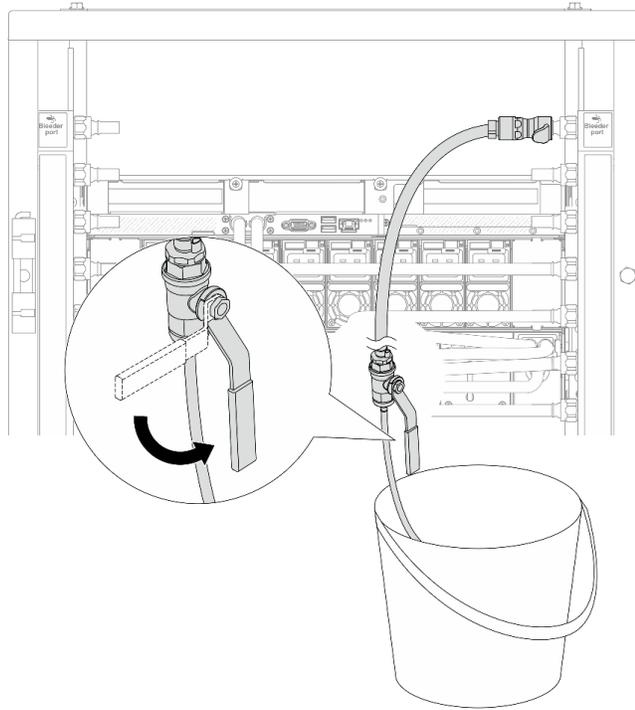


Figure 187. Opening the bleeder valve on the return side

- Step 12. (For precaution) To make sure that the air inside is as little as possible, re-install the bleeder kit back to manifold supply side and do it one more time. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

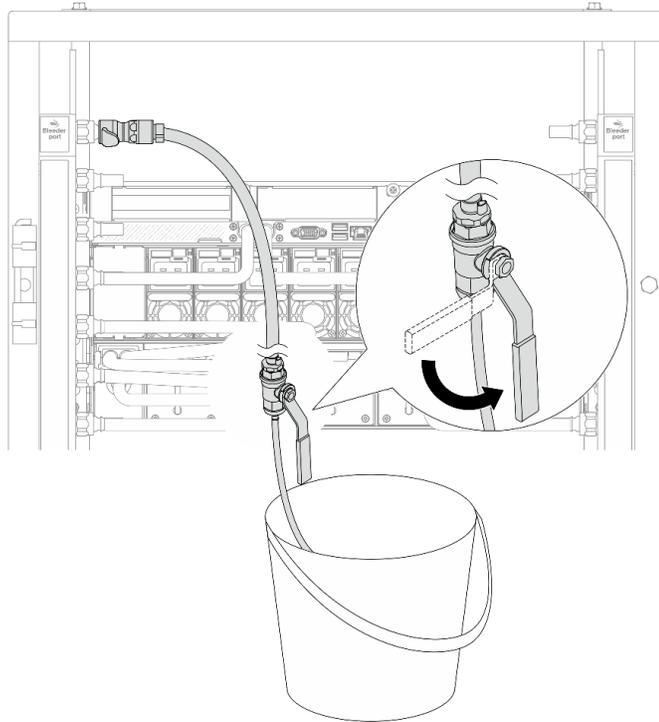


Figure 188. Opening the bleeder valve on the supply side

Step 13. Once completed, connect the supply and return of manifold and facility correspondingly. Fully open all connections on both supply and return sides.

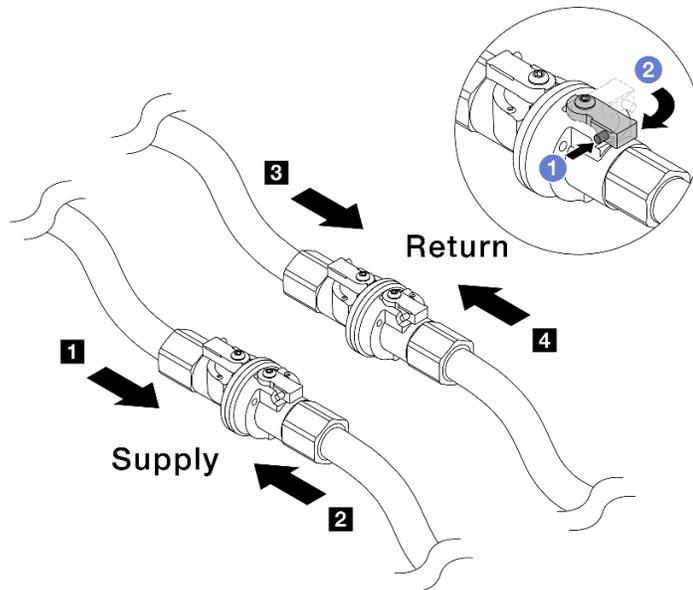


Figure 189. Opening ball valves

Note:

<p>1 Manifold supply connects to 2 facility supply</p>	<p>3 Manifold return connects to 4 facility return</p>
--	--

- a. 1 Press the button on the ball valve switch.
- b. 2 Rotate the switch to fully open the valves as illustrated above.

Set up Rear Door Heat eXchanger for 48U Rack

See this topic to learn how to install and set up ThinkSystem Rear Door Heat eXchanger for 48U Rack.

About this task

Follow the instructions in the section corresponding to the installation scenario:

- If Rear Door Heat eXchanger for 48U Rack comes when installed to the rack, see [“Complete setup of Rear Door Heat eXchanger 48U that comes with the rack” on page 172](#) to complete the setup procedure.
- To replace a regular rear door with Rear Door Heat eXchanger for 48U Rack, see [“Replace a regular door with Rear Door Heat eXchanger for 48U” on page 176](#).

Important: Make sure to plan the cooling system with consideration of [“Water specifications for the secondary cooling loop” on page 188](#).

S010



CAUTION:

Do not place any object weighing more than 82 kg (180 lb) on top of rack-mounted devices.

S019



CAUTION:

The power-control button on the device does not turn off the electrical current supplied to the device. The device also might have more than one connection to dc power. To remove all electrical current from the device, ensure that all connections to dc power are disconnected at the dc power input terminals.

R007



 **DANGER**

- Connect power cords from devices in the rack cabinet to electrical outlets that are near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before you service any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices that are installed in a rack cabinet to power devices that are installed in the same rack cabinet. Do not connect a power cord from a device that is installed in one rack cabinet to a power device that is installed in a different rack cabinet.

R004



CAUTION:

See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

S038



CAUTION:

Eye protection should be worn for this procedure.

Complete setup of Rear Door Heat eXchanger 48U that comes with the rack

See this topic to learn how to complete setup of ThinkSystem Rear Door Heat eXchanger for 48U Rack when it comes already installed to the rack.

Procedure

Step 1. Remove the brackets that support the rear door heat exchanger.

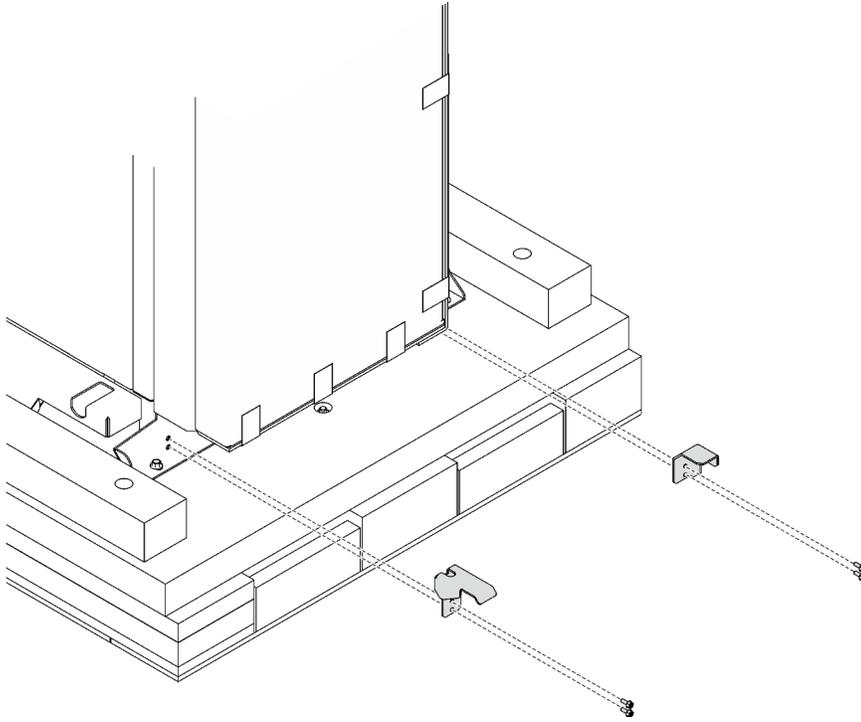


Figure 190. Removing the supporting brackets

- Step 2. Make sure that one specially trained person holds onto the rear door heat exchanger and guides the rack down the ramp. The other specially trained persons must guide the rack down the ramp by holding onto the rack frame. Slowly roll the rack down the ramp until the casters are on the floor. Move the rack to the final location.

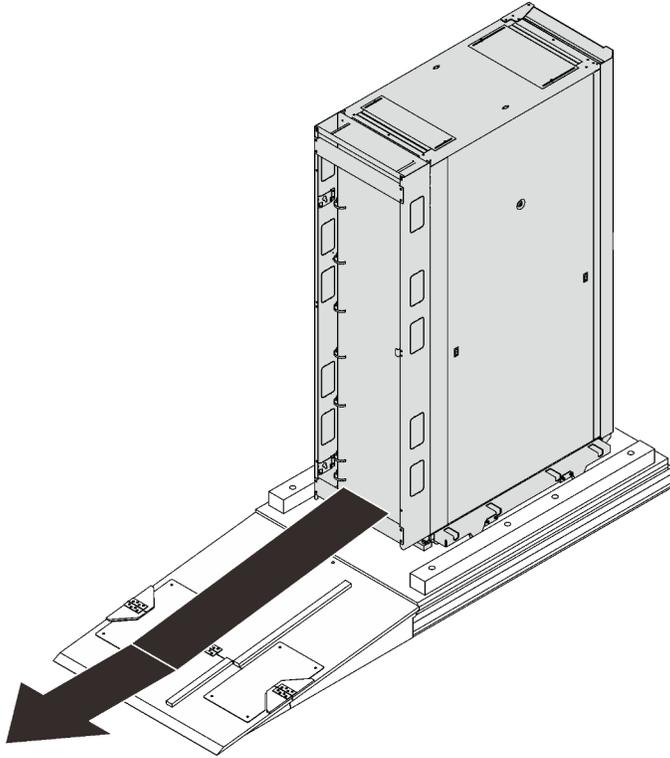
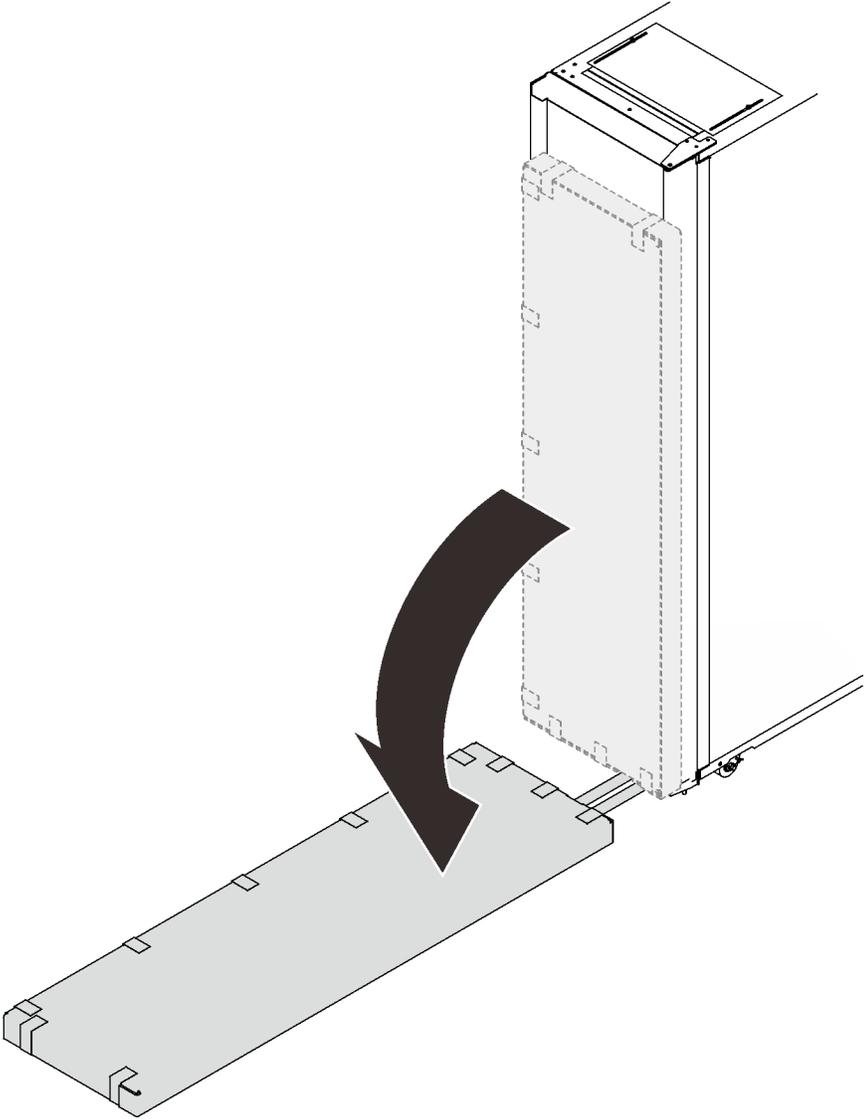


Figure 191. Moving the rack cabinet from the pallet

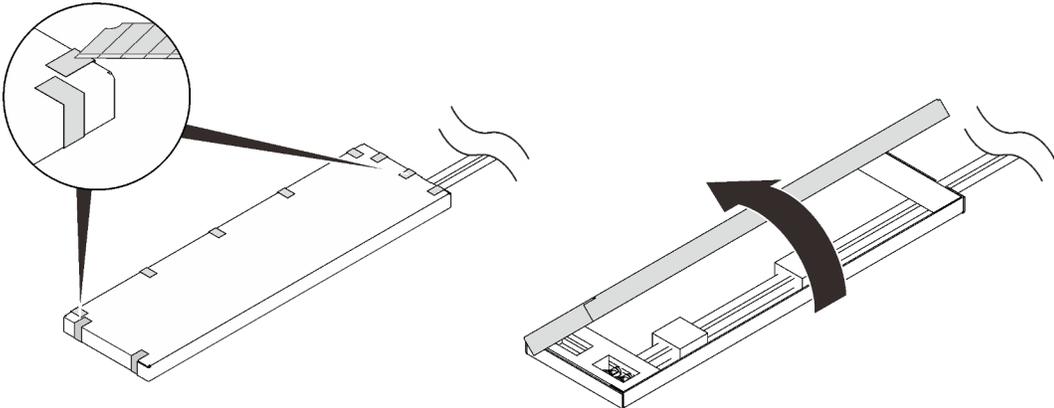
Step 3. Lower the carton that contains the manifolds.

Figure 192. Lowering the manifold carton



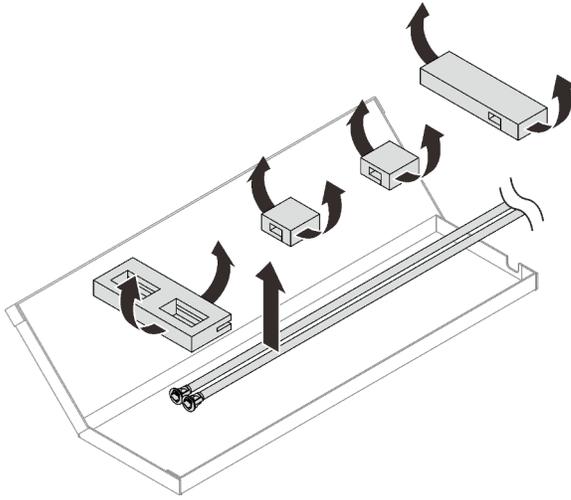
Step 4. Cut the edge of the carton with a sharp tool, and open the carton.

Figure 193. Unpacking the manifolds



- Step 5. Remove the materials that secure the manifolds to the carton, and remove the carton from the manifolds.

Figure 194. Unpacking the manifolds



After this task is completed

Proceed to [“Fill the heat exchanger with water”](#) on page 198.

Replace a regular door with Rear Door Heat eXchanger for 48U

See this topic to learn how to replace a regular rear door with ThinkSystem Rear Door Heat eXchanger for 48U Rack.

Procedure

- Step 1. Extend each of the four leveling pads in turns until they firmly contact the floor and support the rack cabinet. Make sure the cabinet is balanced by gently pushing the cabinet. If it tilts, adjust the length of the leveling pads until the cabinet is well balanced.

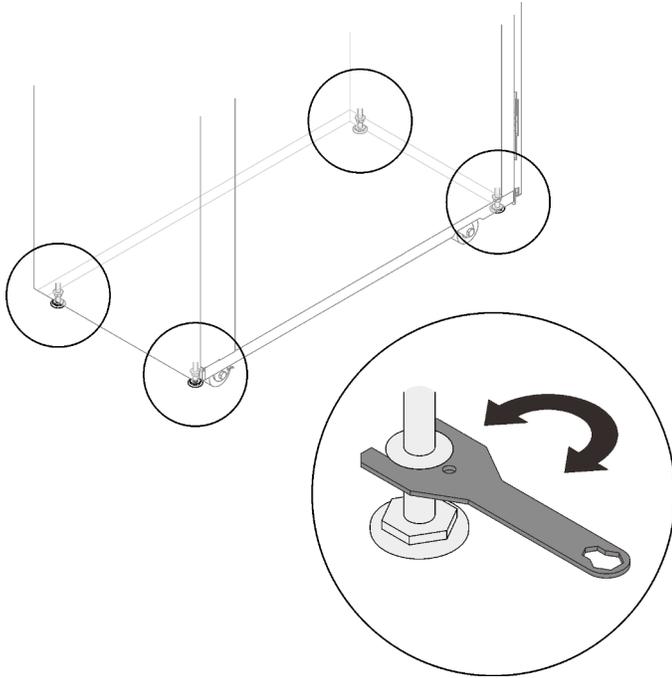


Figure 195. Lowering the leveling pads

Step 2. Remove the rear door from the rack cabinet.

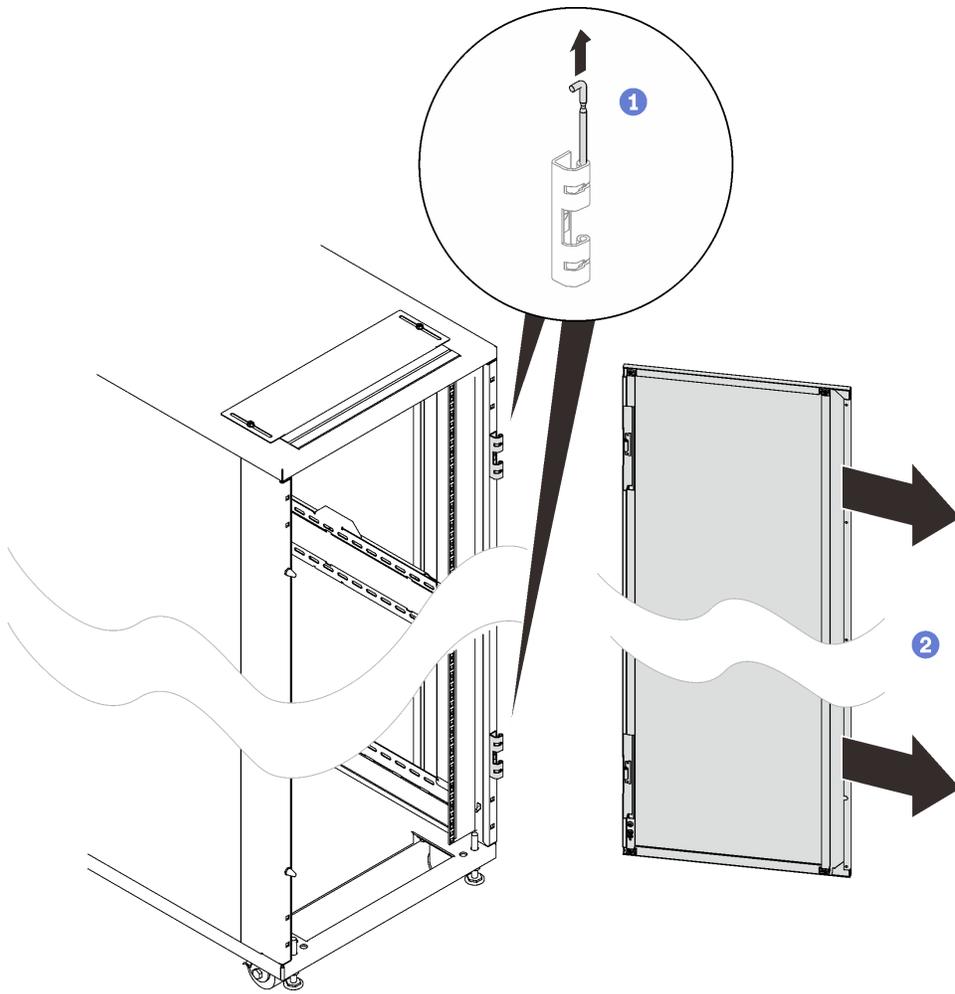


Figure 196. Removing a door

Step 3. Remove the two door hinges and the two doorstops.

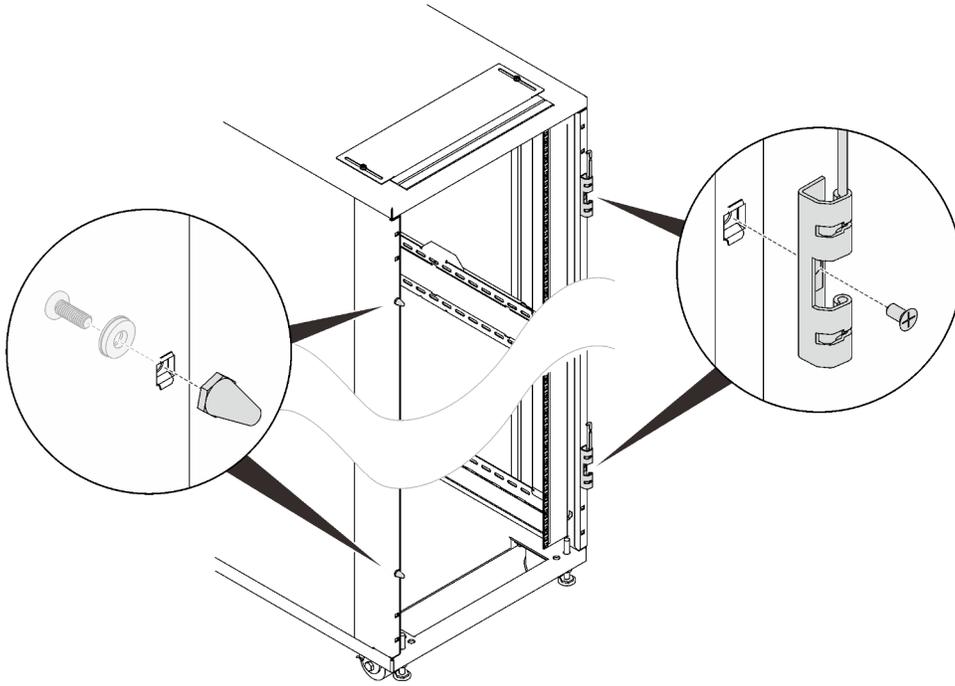


Figure 197. Removing the door hinges and doorstops

Step 4. Remove the door latch.

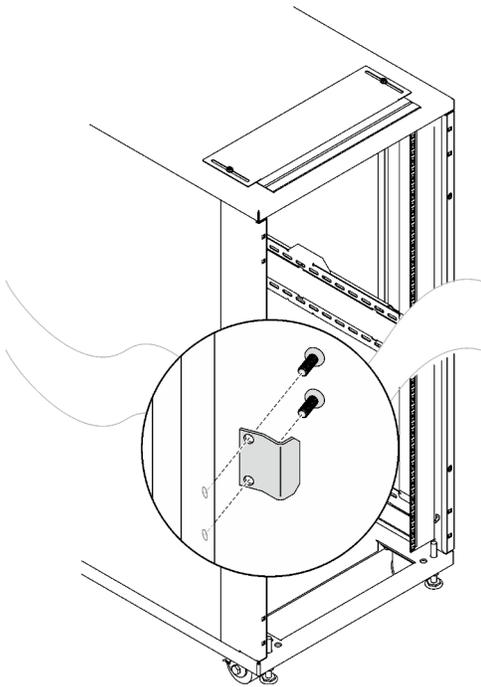


Figure 198. Removing the door latch

Step 5. Install the upper air baffle.

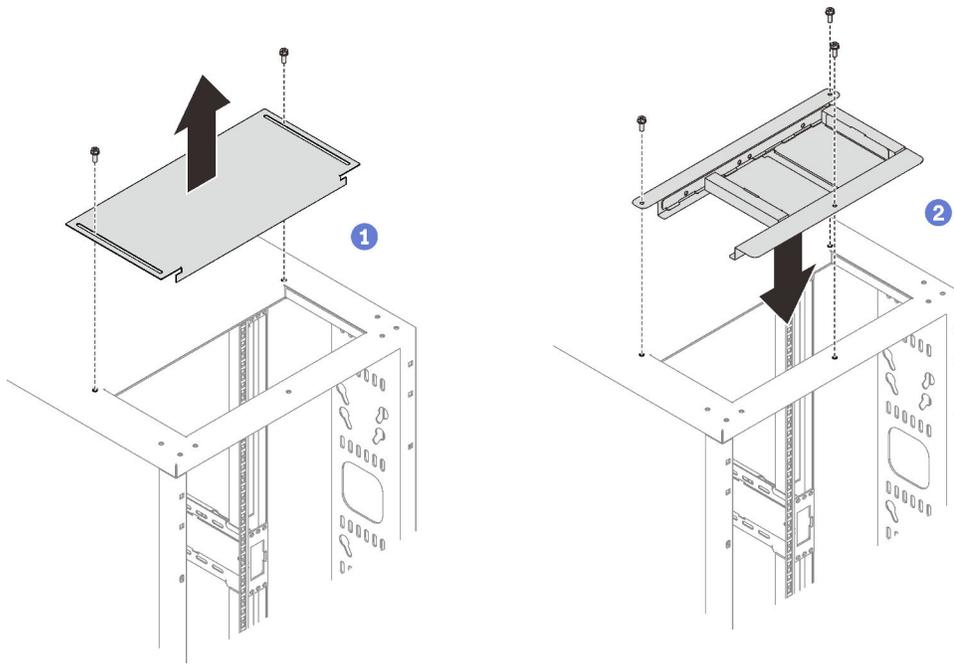


Figure 199. Installing the upper air baffle

- 1 Remove the two screws that secure the rear cable access cover, and remove the cover.
- 2 Align the upper air baffle with the slot, and secure it with three screws.

Step 6. Remove the four screws that secure the cable access bar, and remove the bar.

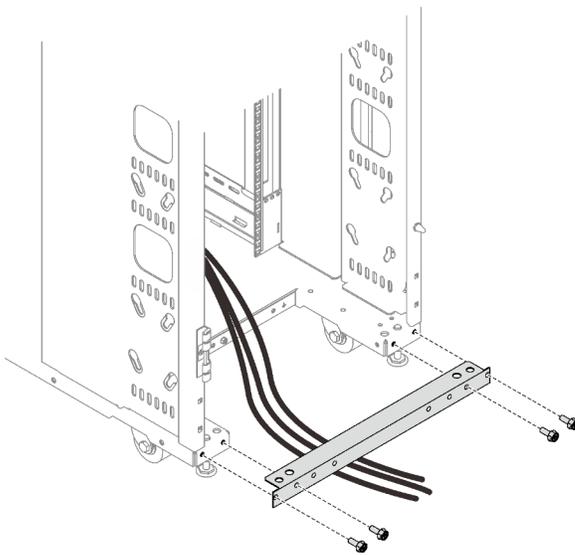


Figure 200. Removing the cable access bar

Step 7. Align the lower air baffle to the bottom cable slot, and secure it with four screws as illustrated.

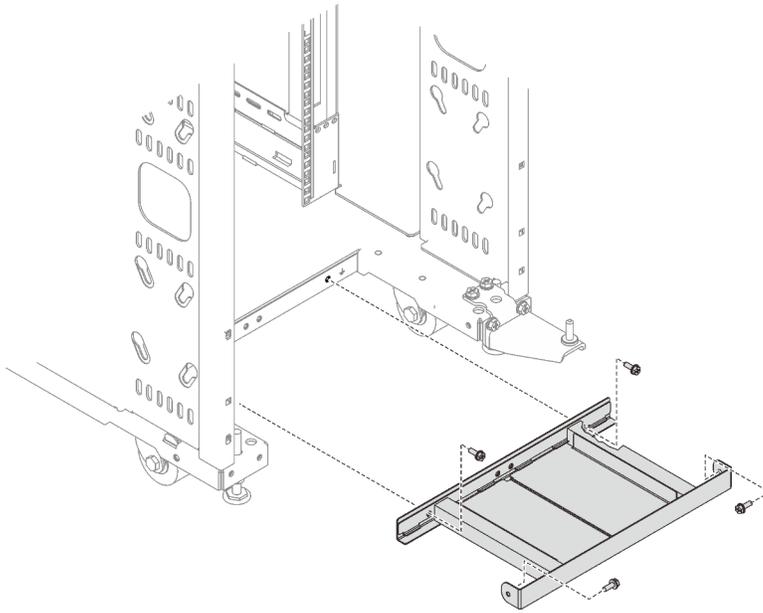


Figure 201. Installing the lower air baffle

Step 8. Secure the bottom hinge assembly to the rack cabinet with eight screws.

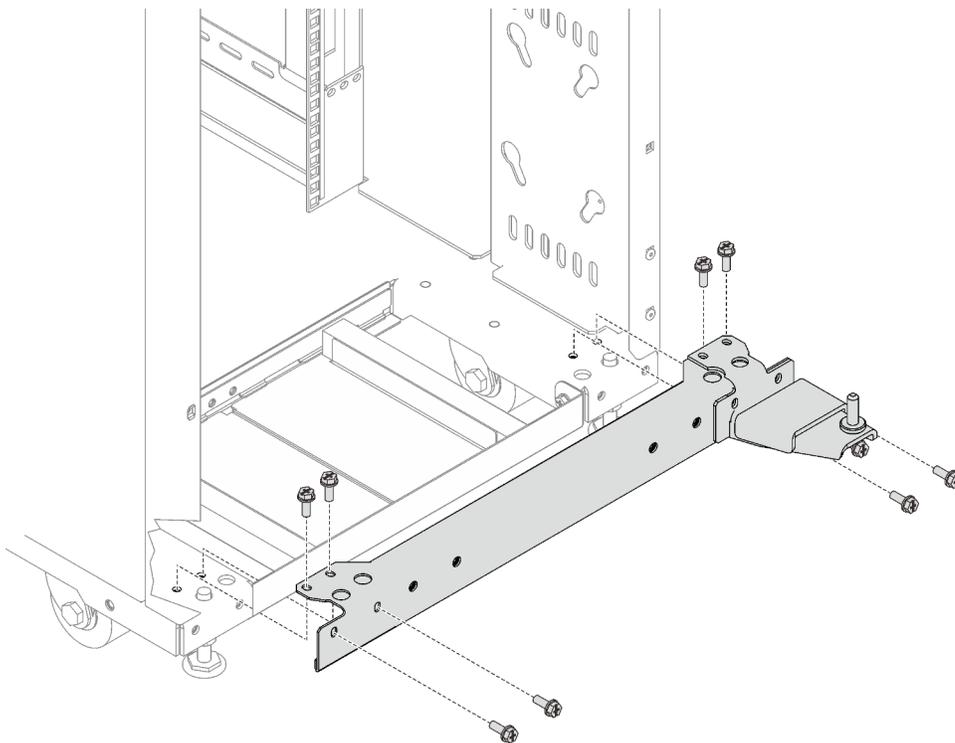


Figure 202. Installing the bottom hinge assembly

Step 9. Secure the latch plate to the heat exchanger with two screws.

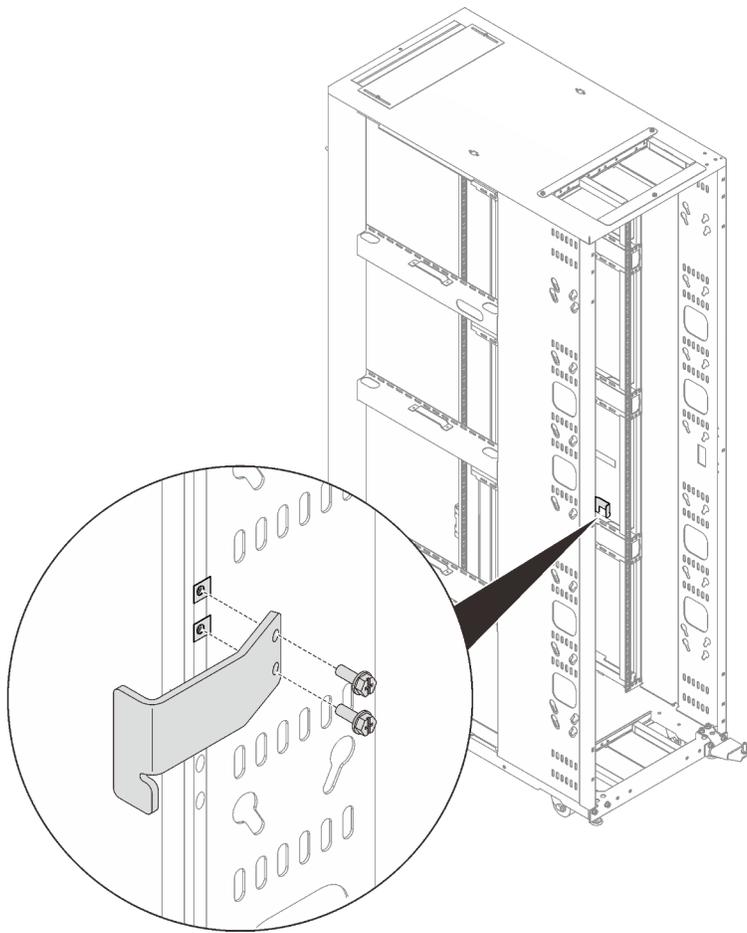
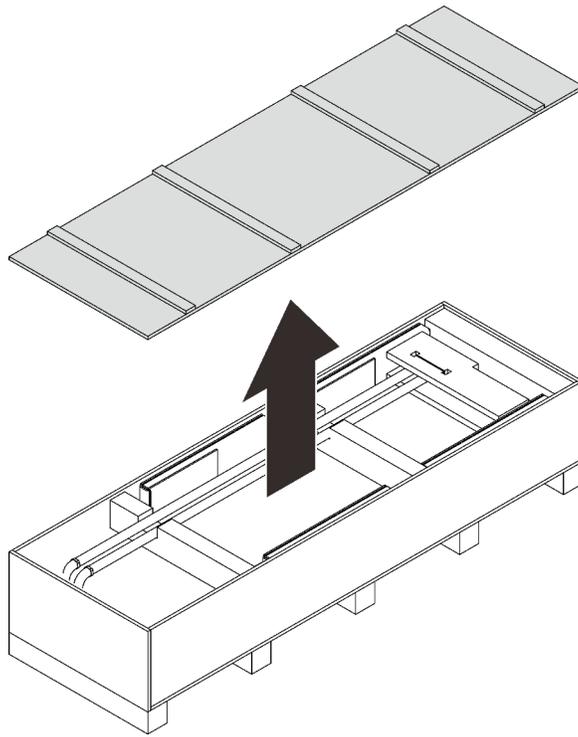


Figure 203. Installing the latch plate

Step 10. Remove the cover of the box that contains the heat exchanger.



Bottom

Figure 204. Removing the cover of the box

Step 11. Lift both sides of the heat exchanger with two trained technicians by handles, and remove the heat exchanger from the box.

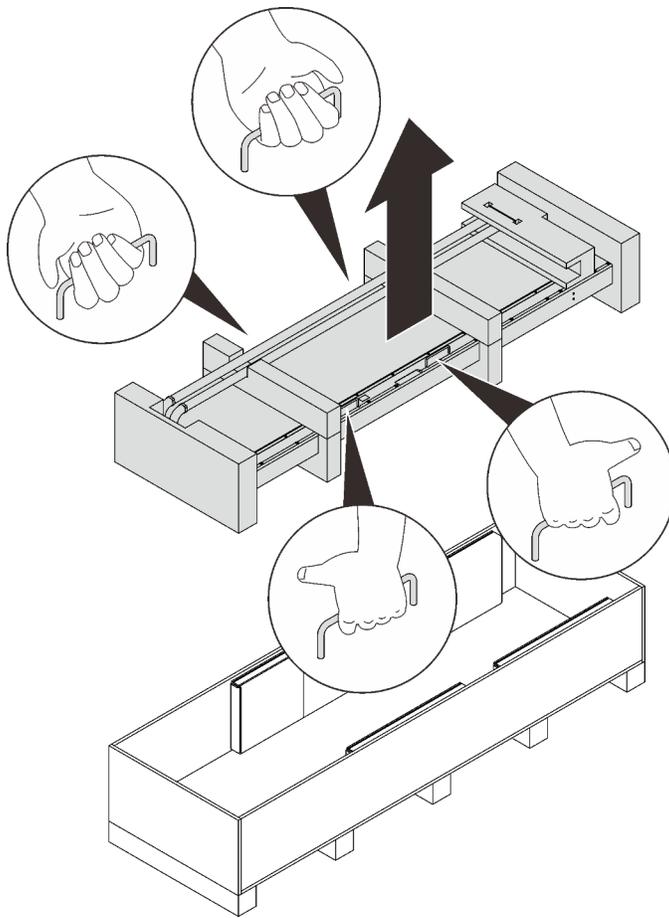


Figure 205. Removing the heat exchanger

Step 12. While the two technicians keep lifting the heat exchanger, have another person remove the top and bottom packing materials.

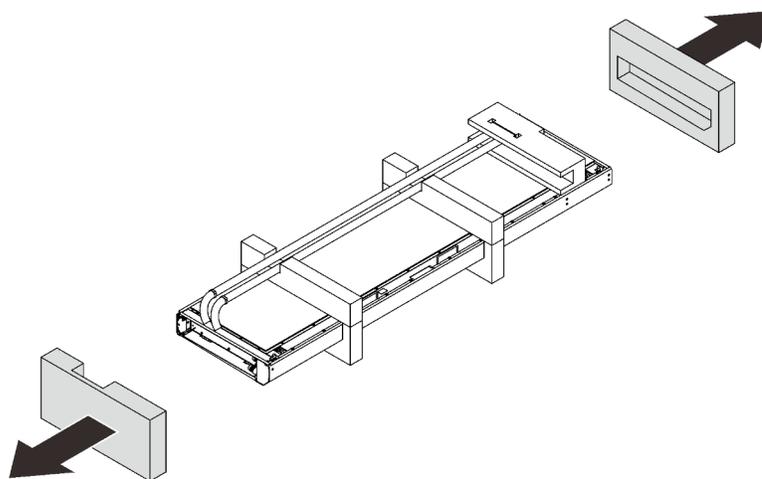


Figure 206. Removing the packing materials

Step 13. Remove the hose retaining material and peel the hoses away.

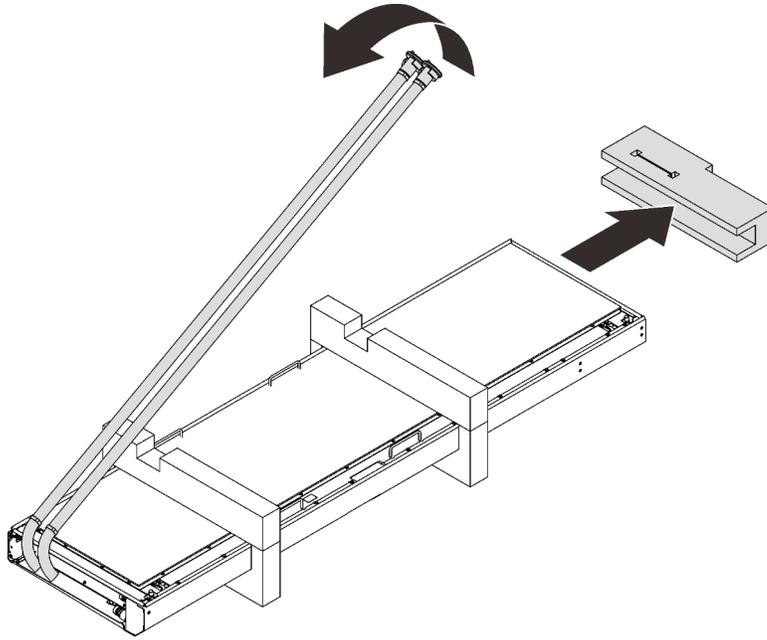


Figure 207. Removing the retaining material

Step 14. Split and remove the rest of the packing materials.

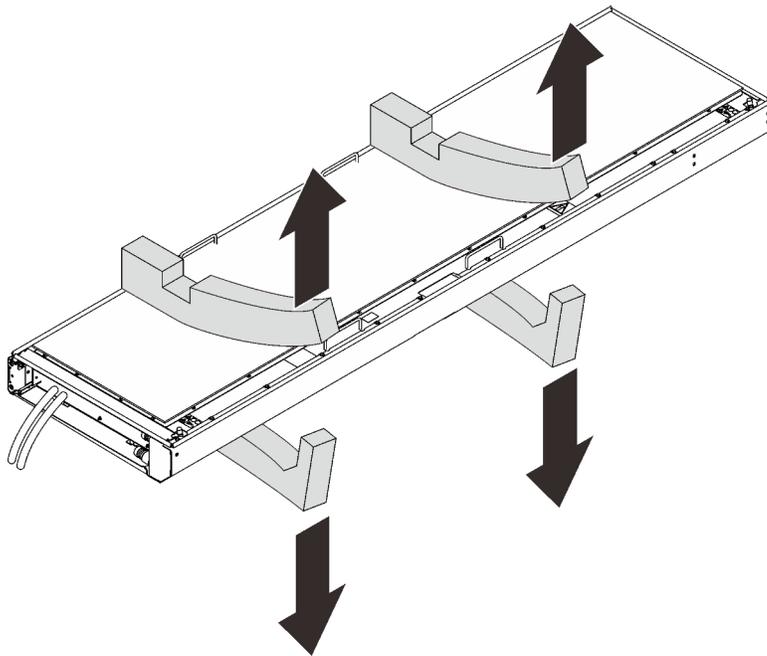


Figure 208. Removing the packing materials

Step 15. While the two technicians who are lifting the heat exchanger rotate it to vertical orientation, the other person hold on to the other handle and the door latch.

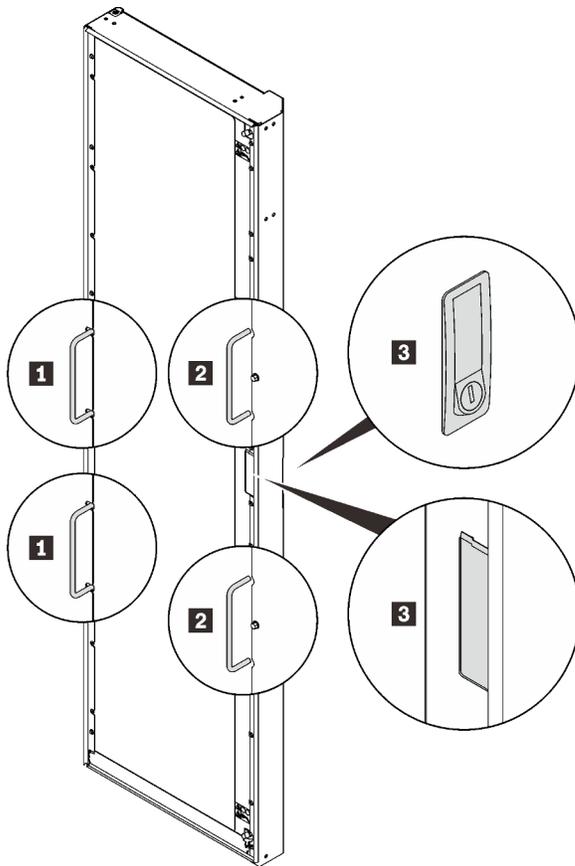


Figure 209. Lifting the heat exchanger with three people

1 Handles that the first person hold on to	3 Spots that the third person hold on to
2 Handles that the second person hold on to	

Step 16. Carry the heat exchanger with three people to the cabinet frame. Align the bottom corner with the bottom hinge pin on the rack cabinet; then, lower the heat exchanger to fit the pin in.

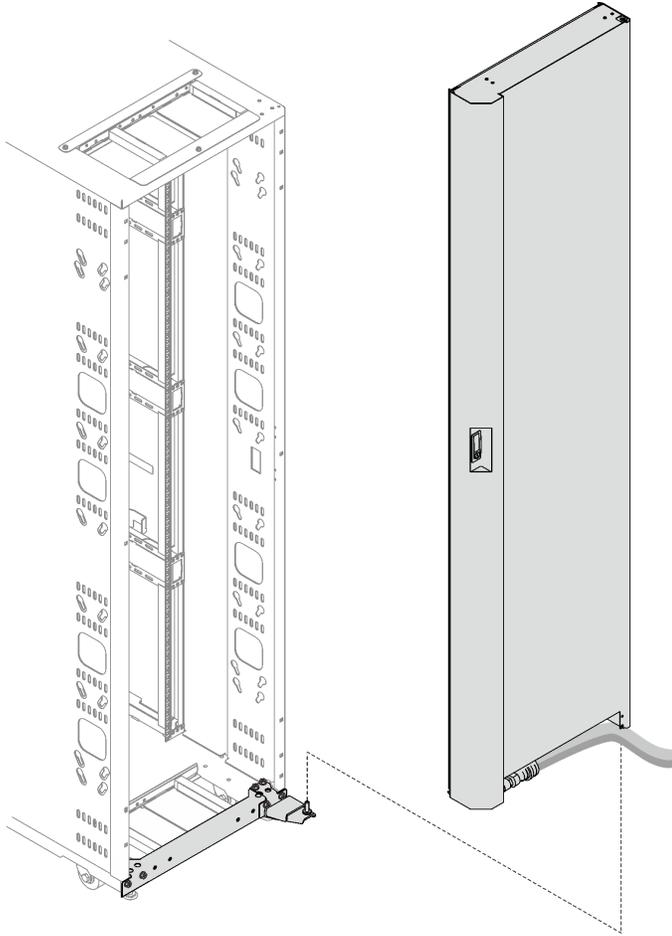


Figure 210. Installing the heat exchanger to the rack cabinet

Step 17. Hold the heat exchanger in place with two people. Insert the top hinge pin to the heat exchanger; then, secure the hinge with three screws.

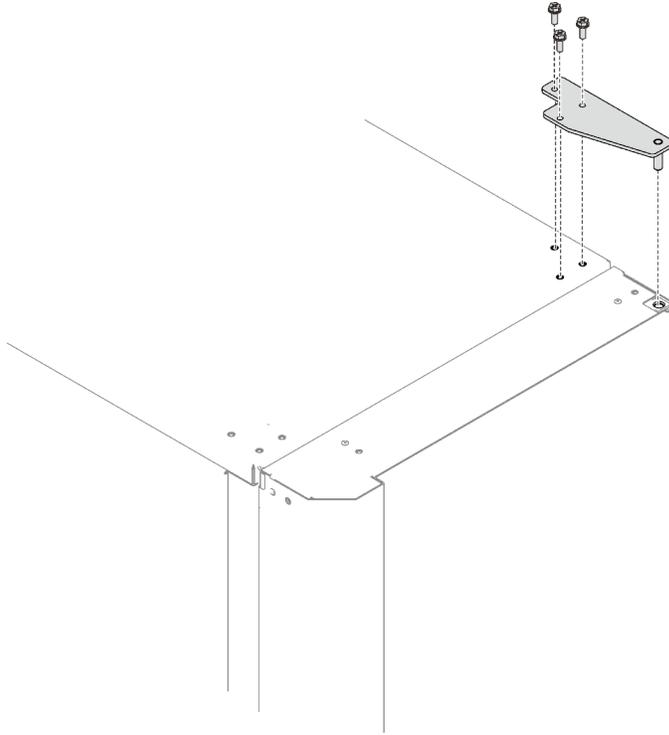


Figure 211. Installing the top hinge

After this task is completed

Proceed to [“Fill the heat exchanger with water” on page 198.](#)

Water specifications for the secondary cooling loop

It is of crucial importance that water supplied to the heat exchanger meet the requirements listed in this topic. Make sure to meet the requirements before setting up liquid cooling system.

Important: Without the water that is being supplied to the heat exchanger meeting the requirements that are described in this topic, system failures might occur as a result of any of the following problems:

- Leaks due to corrosion and pitting of the metal components of the heat exchanger or the water-supply system.
- Buildup of scale deposits inside the heat exchanger, which can cause the following problems:
 - A reduction of the ability of the heat exchanger to cool the air that is exhausted from the rack
 - Failure of mechanical hardware, such as a hose quick-connect coupling
- Organic contamination, such as bacteria, fungi, or algae. This contamination can cause the same problems as described for scale deposits.

Control and conditioning of the secondary cooling loop

The water that is used to fill, refill, and supply the heat exchanger must be particle-free deionized water or particle-free distilled water with appropriate controls for avoiding the following issues:

- Metal corrosion
- Bacterial fouling
- Scaling

The water cannot originate from the primary chilled-water system for the building, but must be supplied as part of a secondary closed-loop system.

Important: Do not use glycol solutions, because they can adversely affect the cooling performance of the heat exchanger.

Materials to use in secondary loops

Use any of the following materials in supply lines, connectors, manifolds, pumps and any other hardware that makes up the closed-loop water-supply system:

- Copper
- Brass with less than 30% zinc content
- Stainless steel 303 or 316
- Peroxide-cured ethylene propylene diene monomer (EPDM) rubber, non-metal-oxide material

Materials to avoid in secondary loops

Do not use any of the following materials in any part of the water-supply system:

- Oxidizing biocides, such as chlorine, bromine, and chlorine dioxide
- Aluminum
- Brass with greater than 30% zinc
- Irons (non-stainless steel)

Water-supply requirements for secondary loops

This section includes specific characteristics of the system that supplies the chilled conditioned water to the heat exchanger.

- **Temperature:**

The heat exchanger and its supply hose and return hoses are not insulated. Avoid any condition that might cause condensation. The temperature of the water inside the supply hose, return hose, and heat exchanger must be kept above the dew point of the location where the heat exchanger is being used.

Attention: Typical primary chilled water is too cold for use in this application because building chilled water can be as cold as 4°C - 6°C (39°F - 43°F).

Important: The system that supplies the cooling water must be able to measure the room dew point and automatically adjust the water temperature accordingly. Otherwise, the water temperature must be above the maximum dew point for that data center installation. For example, the following minimum water temperature must be maintained:

- 18°C ±1°C (64.4°F ±1.8°F). This is applicable within an ASHRAE Class 1 Environmental Specification that requires a maximum dew point of 17°C (62.6°F).
- 22°C ±1°C (71.6°F ±1.8°F). This is applicable within an ASHRAE Class 2 Environmental Specification that requires a maximum dew point of 21°C (69.8°F).

See the ASHRAE document *Thermal Guidelines for Data Processing Environments*. Information about obtaining this document is at <https://www.techstreet.com/ashrae/products/1909403>.

- **Pressure**

The water pressure in the secondary loop must be less than 690 kPa (100 psi). Normal operating pressure at the heat exchanger must be 414 kPa (60 psi) or less.

- **Flow rate**

The flow rate of the water in the system must be in the range of 23 - 57 liters (6 - 15 gallons) per minute. Pressure drop versus flow rate for heat exchangers (including quick-connect couplings) is defined as approximately 103 kPa (15 psi) at 57 liters (15 gallons) per minute.

- **Water volume limits**

The heat exchanger holds approximately 9 liters (2.4 gallons). Fifteen meters (50 ft) of 19 mm (0.75 in.) supply and return hoses hold approximately 9.4 liters (2.5 gallons). To minimize exposure to flooding in the event of leaks, the entire product cooling system (heat exchanger, supply hose, and return hose), excluding any reservoir tank, must have a maximum 18.4 liters (4.8 gallons) of water. This is a cautionary statement, not a functional requirement. Also consider using leak detection methods on the secondary loop that supplies water to the heat exchanger.

- **Air exposure**

The secondary cooling loop is a closed loop, with no continuous exposure to room air. After you fill the loop, remove all air from the loop. An air bleed valve is provided at the top of a heat exchanger manifold for purging all air from the system.

Water delivery specifications for secondary loops

This section includes the various hardware components that make up the delivery system secondary loop that provides the chilled, conditioned water to the heat exchanger. The delivery system includes pipes, hoses, and the required connection hardware to connect the hoses to the heat exchanger. Hose management in raised-floor and non-raised-floor environments is also described.

The heat exchanger can remove 100% or more of the heat load from an individual rack when it is running under optimum conditions.

The primary cooling loop is considered to be the building chilled-water supply or a modular chiller unit. The primary loop must not be used as a direct source of coolant for the heat exchanger.

The main purpose of this topic is to provide examples of typical methods of secondary loop setup and operating characteristics that are needed to provide an adequate, safe supply of water to the heat exchanger.

Attention: The overpressure safety device must meet the following requirements:

- Comply with ISO 4126-1 (Information about obtaining this document is at <https://webstore.ansi.org/Standards/ISO/ISO41262013>. Search on document number iso 4126-1.)
- Be installed so that it is easily accessed for inspection, maintenance, and repair.
- Be connected as close as possible to the device that it is intended to protect.
- Be adjustable only with the use of a tool.
- Have a discharge opening that is directed so that discharged water or fluid will not create a hazard or be directed toward any person.
- Be of adequate discharge capacity to ensure that the maximum working pressure is not exceeded.
- Be installed without a shutoff valve between the overpressure safety device and the protected device.

The following figures show typical cooling solutions with the most flexibility possible. Consider the following guidelines before planning your solution.

- A method for monitoring and setting the total flow rate delivered to all of the heat exchangers is required. This can be a discrete flowmeter that is built into the flow loop or a flowmeter within the secondary loop of the coolant distribution unit (CDU).
- After you set the total flow rate for all of the heat exchangers by using a flowmeter as previously described, it is important to design the plumbing so that it provides the flow rate that you want for each heat exchanger and provides a way to verify the flow rate. Figure 5 on page 16 through Figure 8 on page

19 illustrate the use of circuit setters to adjust the flow rate to each heat exchanger. Other methods, such as inline or external flowmeters, can provide a more accurate method for setting the flow rate through the individual shutoff valves.

- Design the flow loop to minimize the total pressure drop within the flow loop. The Optional Low Impedance Quick Connect feature (shown in Figure 5 on page 16 through Figure 8 on page 19) cannot be the Eaton quick-connect couplings that are used on the heat exchanger because of the excessive pressure drop associated with flowing through four quick-connect pairs in series. These must be very low, near 0, flow impedance quick connects. Alternatively, these quick connects can be eliminated and replaced with a hose barb connection.

Following are some examples of the most common solutions.

- **Primary and secondary cooling loops**

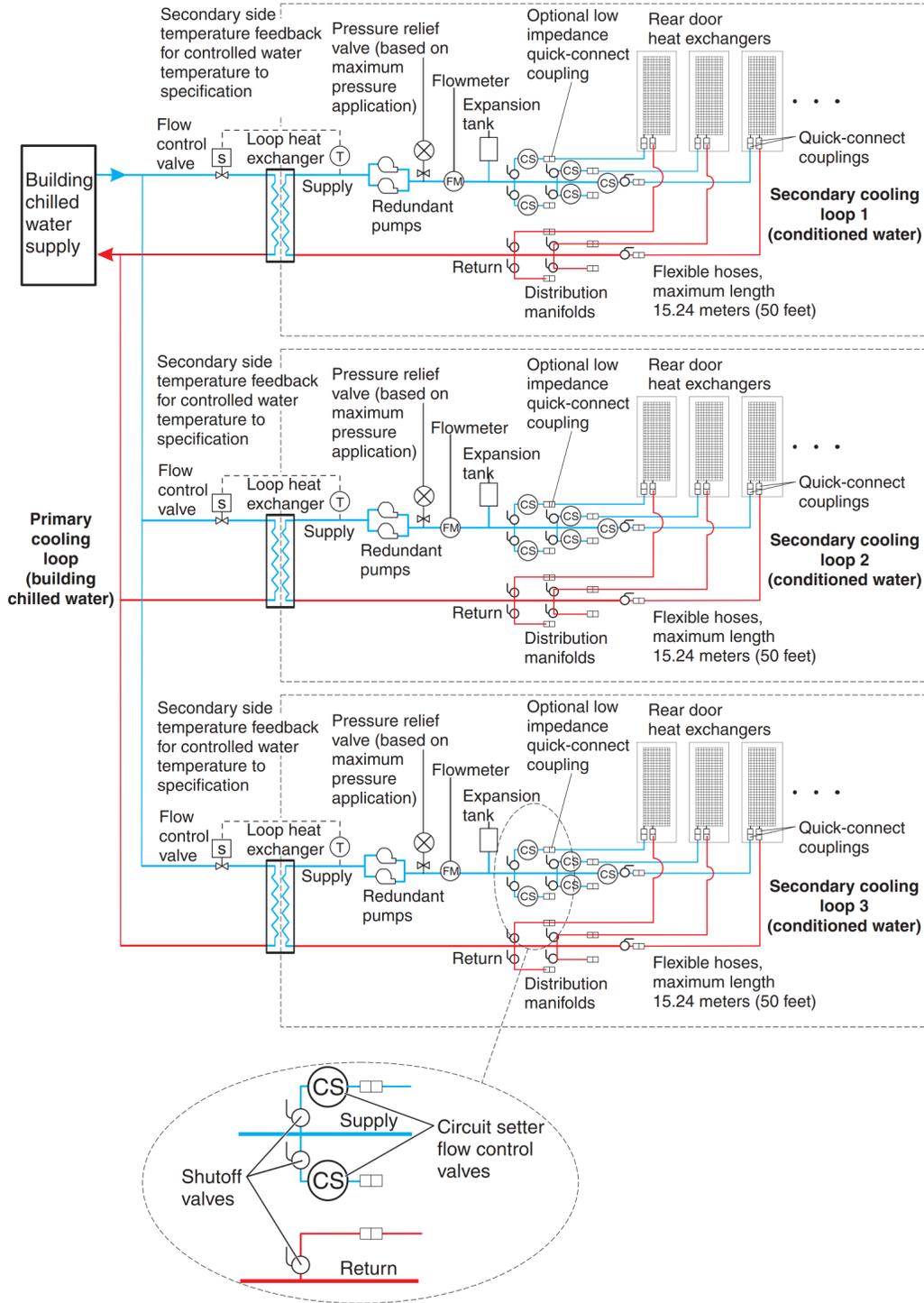


Figure 212. Primary and secondary cooling loops

This figure shows a typical cooling solution and identifies the components of the primary cooling loop and the secondary cooling loop.

- **Coolant distribution unit with a fabricated facilities solution**

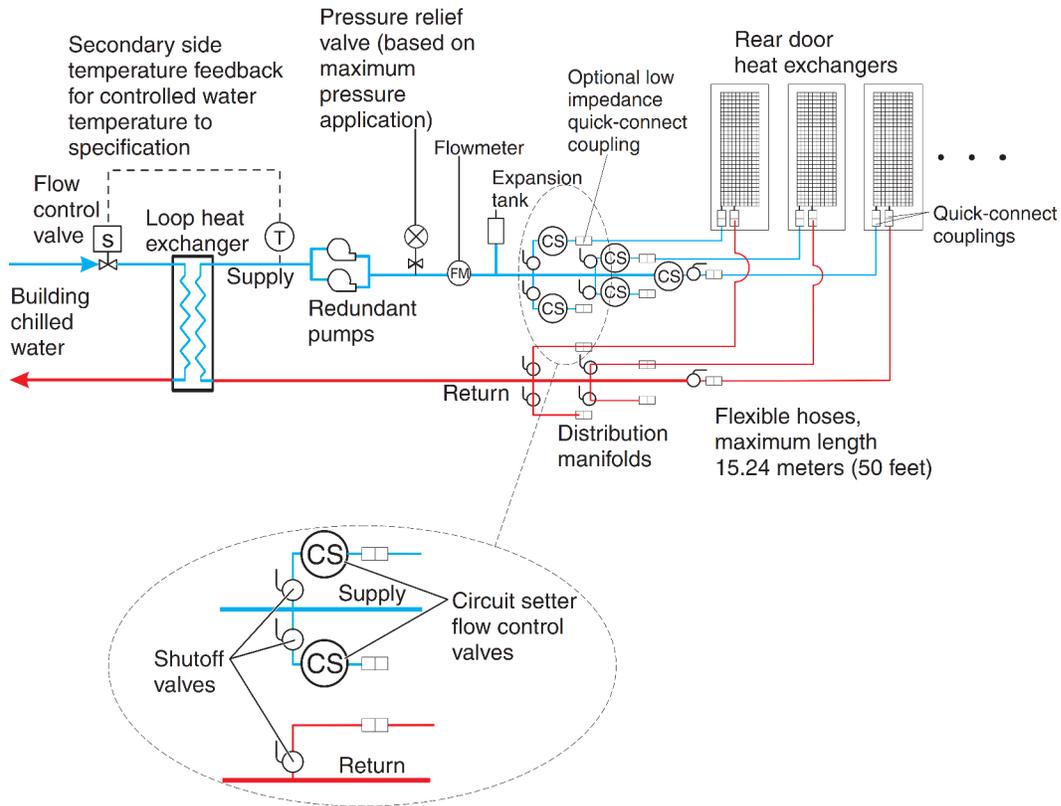


Figure 213. Coolant distribution unit with a fabricated facilities solution

This figure shows an example of a facilities fabricated solution. The actual number of heat exchangers that are connected to a secondary loop depends on the capacity of the coolant distribution unit that is running the secondary loop.

- **Coolant distribution unit with off-the-shelf supplier solutions**

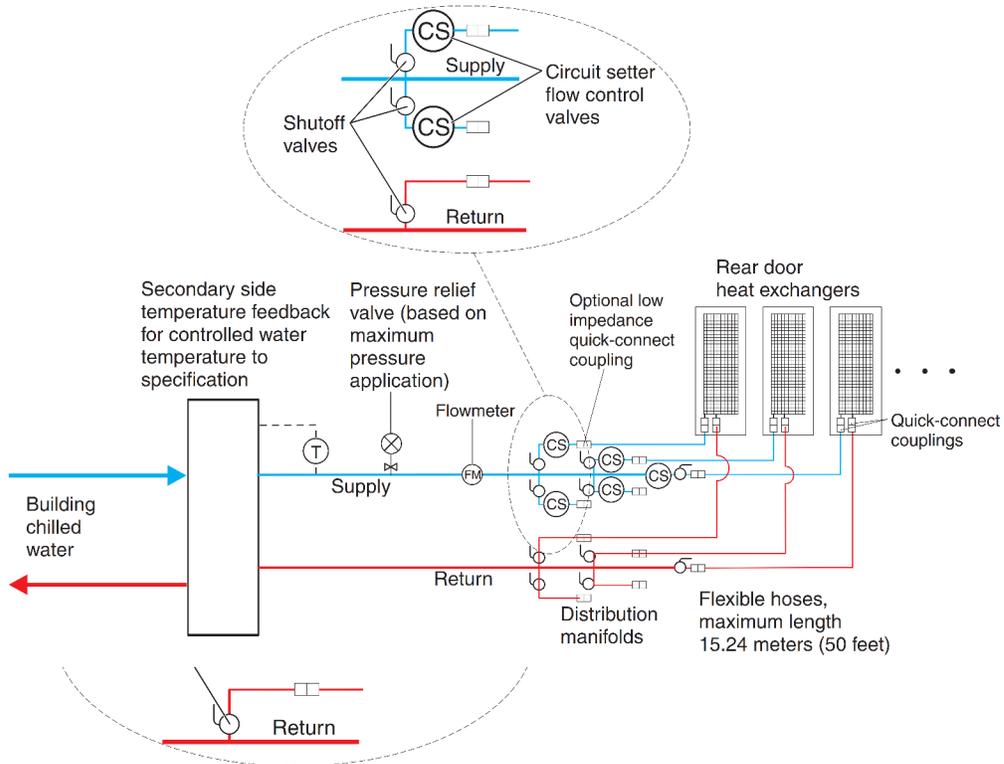


Figure 214. Coolant distribution unit that uses off-the-shelf supplier solutions

Notes: Supplier-built coolant distribution unit (CDU) suggested features:

- Temperature and flow metering (monitoring)
- Leak detection or water level sensing and shutdown
- Local and remote monitoring and control
- Access port for filling and water treatment

This figure shows an example of an off-the-shelf modular coolant distribution unit. The actual number of heat exchangers that are connected to a secondary loop depends on the capacity of the coolant distribution unit that is running the secondary loop

- **Coolant distribution unit with a water chiller unit to provide conditioned water**

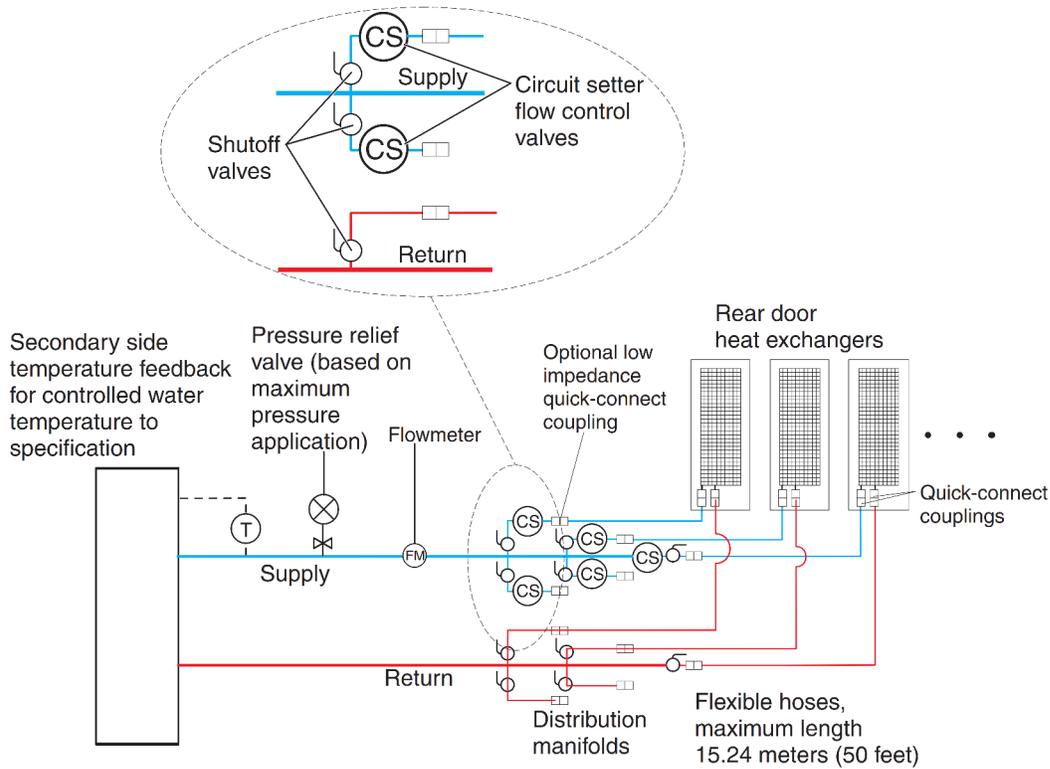


Figure 215. Coolant distribution unit that uses off-the-shelf supplier solutions

Notes: Supplier-built water chiller unit required features:

- Temperature and flow metering (monitoring)
- Leak detection or water level sensing and shutdown
- Local and remote monitoring and control
- Access port for filling and water treatment

This figure shows an example of a water chiller unit that supplies conditioned water to one or more heat exchangers. This must be a closed system (no exposure of the water to air) and meet all materials, water quality, water treatment, and temperature and flow specifications that are defined in this document. A water chiller unit is considered an acceptable alternative to use as a building chilled water source for removing heat from an Rear Door Heat eXchanger.

Manifolds and piping

Manifolds that accept large-diameter feed pipes from a pump unit are the preferred method for splitting the flow of water to smaller-diameter pipes or hoses that are routed to individual heat exchangers. Manifolds must be constructed of materials that are compatible with the pump unit and related piping. The manifolds must provide enough connection points to allow a matching number of supply and return lines to be attached, and the manifolds must match the capacity rating of the pumps and the loop heat exchanger (between the secondary cooling loop and the building chilled-water source). Anchor or restrain all manifolds to provide the required support to avoid movement when quick-connect couplings are connected to the manifolds.

Example manifold supply pipe sizes

- Use a 50.8 mm (2 in.) or larger supply pipe to provide the correct flow to three 19 mm (0.75 in.) supply hoses, with a 100 kW coolant distribution unit (CDU).

- Use a 63.5 mm (2.50 in.) or larger supply pipe to provide the correct flow to four 19 mm (0.75 in.) supply hoses, with a 120 kW CDU.
- Use an 88.9 mm (3.50 in.) or larger supply pipe to provide the correct flow to nine 19 mm (0.75 in.) supply hoses, with a 300 kW CDU.

To stop the flow of water in individual legs of multiple circuit loops, install shutoff valves for each supply and return line. This provides a way to service or replace an individual heat exchanger without affecting the operation of other heat exchangers in the loop.

To ensure that water specifications are being met and that the optimum heat removal is taking place, use temperature and flow metering (monitoring) in secondary loops.

Anchor or restrain all manifolds and pipes to provide the required support and to avoid movement when quick-connect couplings are being attached to the manifolds.

Figure 216 “The following figure” on page 196 shows another layout for multiple water circuits.

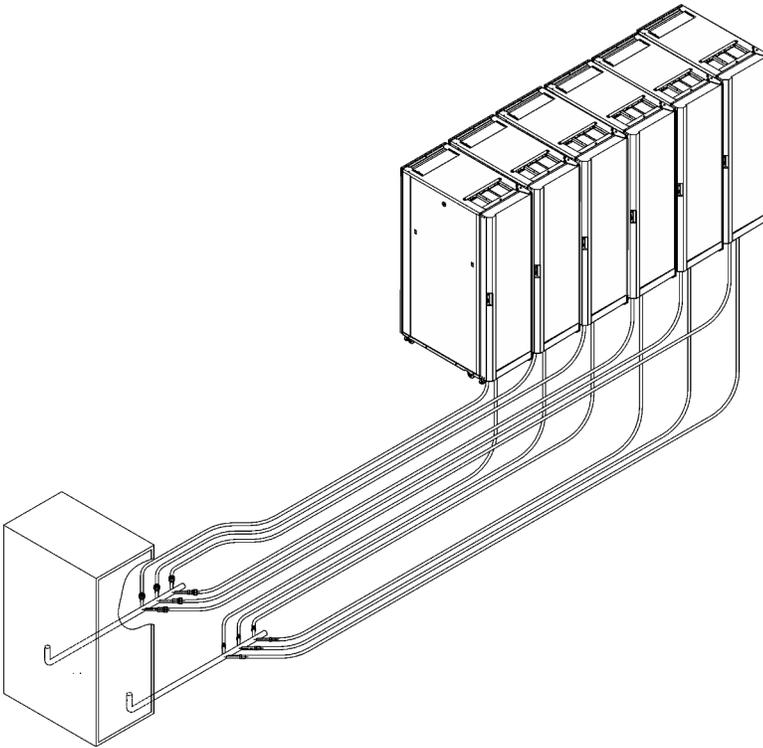


Figure 216. Typical central manifold (at a central location for multiple water circuits)

Figure 217 “The following figure” on page 197 shows an extended manifold layout.

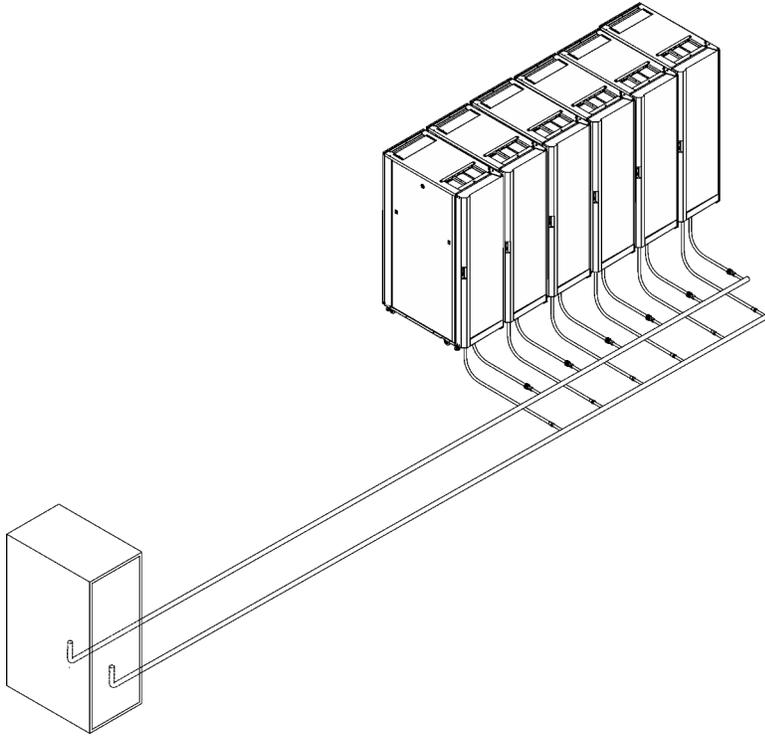


Figure 217. Typical extended manifold (along aisles between racks)

Flexible hoses and connections to manifolds and heat exchangers

Pipe and hose configurations can vary. You can determine the best configuration for your installation by analyzing the needs of your facilities, or a site preparation representative can provide this analysis.

Flexible hoses are needed to supply and return water between your hard plumbing (manifolds and coolant distribution units) and the heat exchanger (allowing needed movement for opening and closing the rack rear door).

Hoses are available that provide water with acceptable pressure-drop characteristics and that help prevent depletion of some corrosion inhibitors. These hoses must be made of peroxide-cured ethylene propylene diene monomer (EPDM) rubber, non-metal oxide material and must have Eaton self-coupling type quick connector ball valve at one end which are attached to the heat exchanger, and must either have a low impedance quick connect coupling or nothing so as to attach to a barb at the other end. The Eaton ball valves that are described in this topic are compatible with the heat exchanger couplings. Hose lengths from 3 to 15 meters (10 to 50 ft), in increments of 3 meters (10 ft), are available. Hoses that are longer than 15 meters (50 ft) might create unacceptable pressure loss in the secondary circuit and reduce the water flow, reducing the heat removal capabilities of the heat exchanger.

Use quick-connect couplings to attach the hoses to the heat exchangers. Hose couplings that connect to the heat exchanger must have the following characteristics:

- The couplings must be constructed of 303 stainless steel, and the size is 25 mm (1 in.).
- The hoses must have Eaton part number FD83-2046-16-16, or equivalent.
- If a low impedance quick-connect coupling is used at the opposite (manifold) end of the hose, use positive locking mechanisms to prevent loss of water when the hoses are disconnected. The connections must minimize water spill and air inclusion into the system when they are disconnected.

Fill the heat exchanger with water

See this topic to learn how to fill ThinkSystem Rear Door Heat eXchanger for 48U Rack with water.

About this task

S038



CAUTION:
Eye protection should be worn for this procedure.

Attention: Wear safety goggles or other eye protection whenever you fill, drain, or purge air or nitrogen from the heat exchanger.

Procedure

Step 1. Purge the nitrogen that has been filled in the hose from the hose.

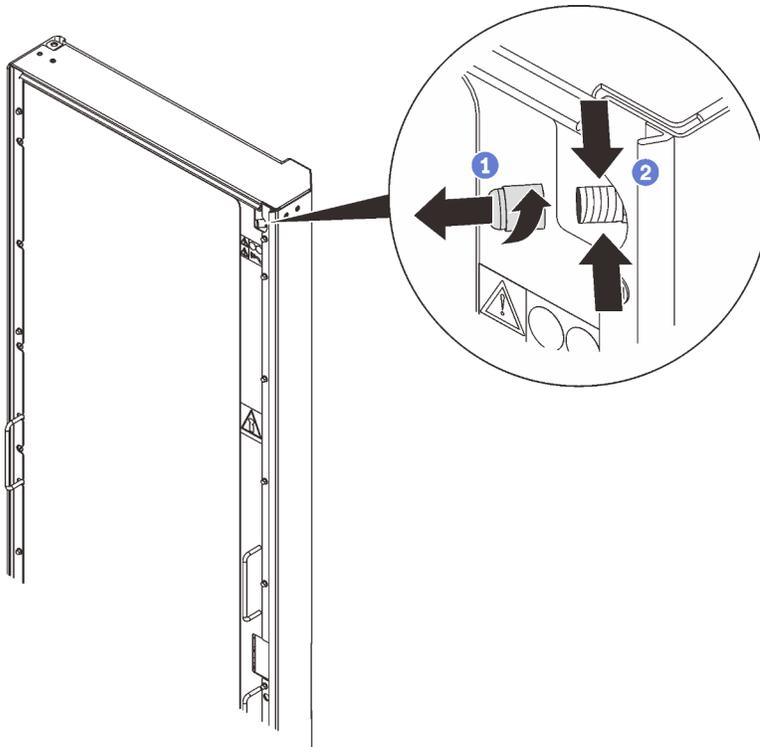


Figure 218. Purging nitrogen

- 1 Loosen and remove the cap from the air-purging valve.
- 2 Press in on the valve stem of the air-purging valve to purge the nitrogen from the heat exchanger. Continue holding in the valve stem until the pressure is released.

Step 2. Attach the air-purging tool to the air-purging valve at the top of the heat exchanger, and place the drain end into a 2-liter (or larger) container to catch the water and air bubbles that escape during the filling procedure.

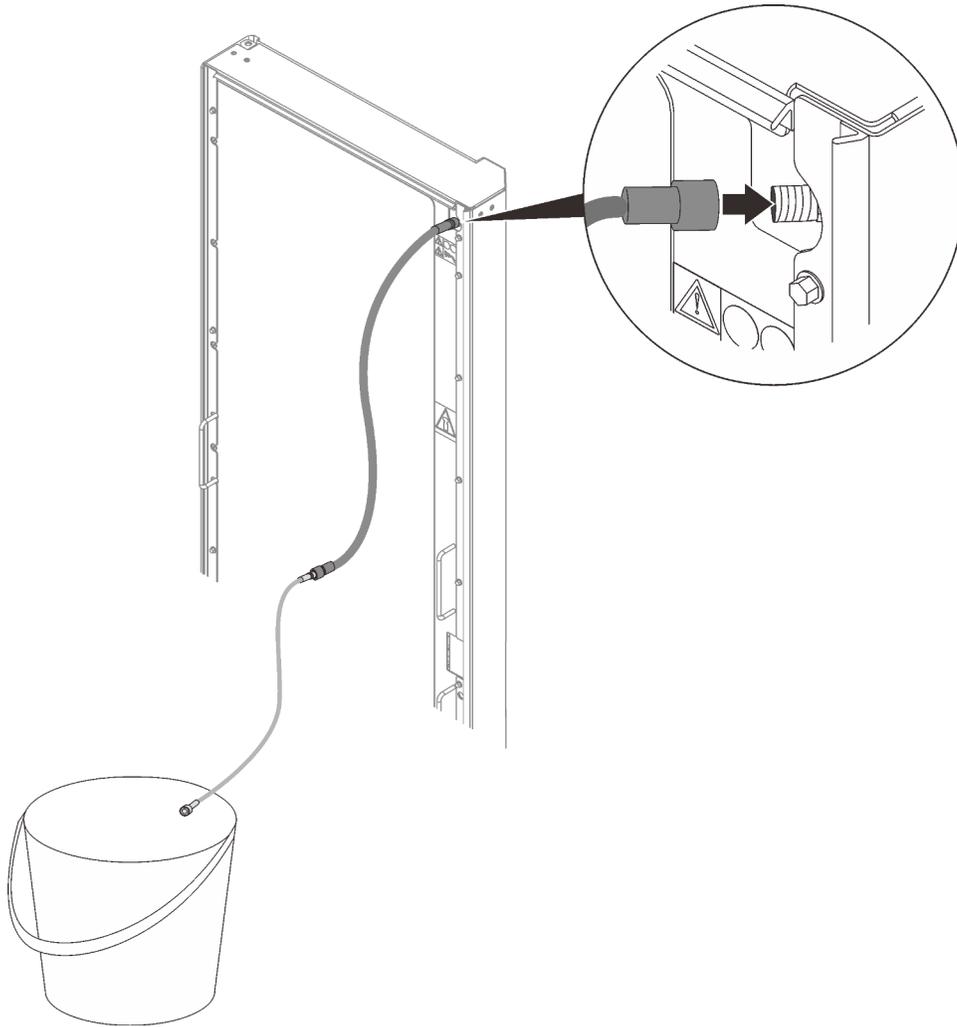


Figure 219. Installing the air-purging tool

Step 3. Connect the supply and return hose couplings with the manifolds.

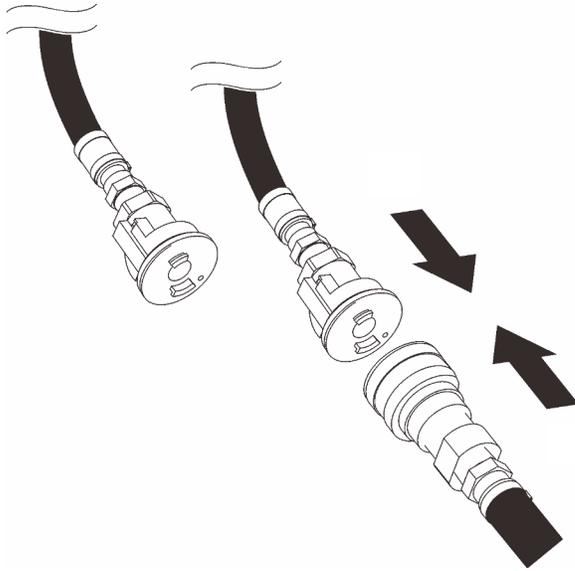


Figure 220. Connecting manifolds

- Step 4. Turn on the flow of water to the heat exchanger, and let it run for several minutes.
- Step 5. When there is a steady stream of liquid into the container from the air-purging tool, disconnect the tool from the heat exchanger.

Attention: If water drips from the air-purging valve after you remove the air-purging tool, reattach the tool and disconnect it again to seal the valve.

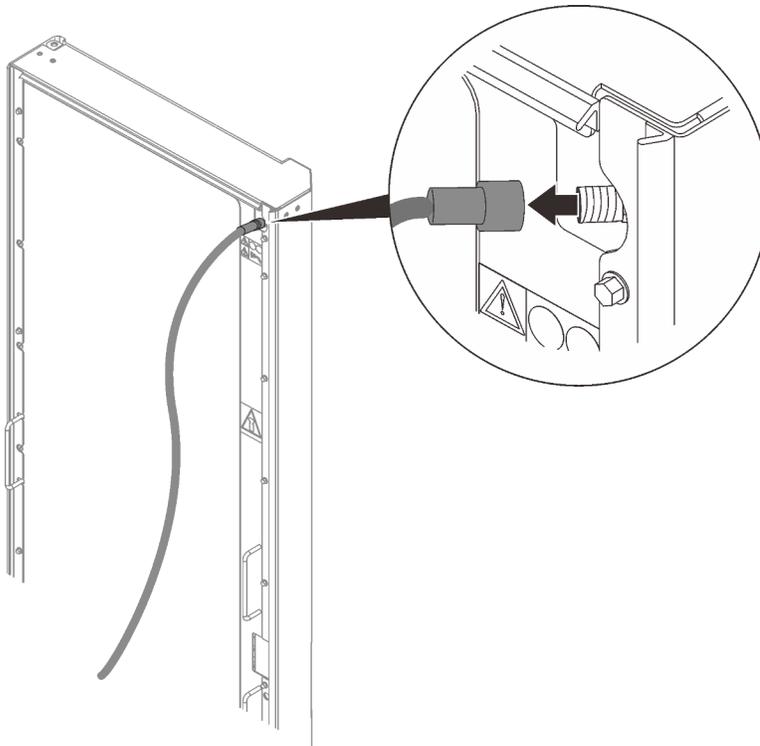


Figure 221. Removing the air-purging tool

Step 6. Install the valve cap back to the air-purging valve.

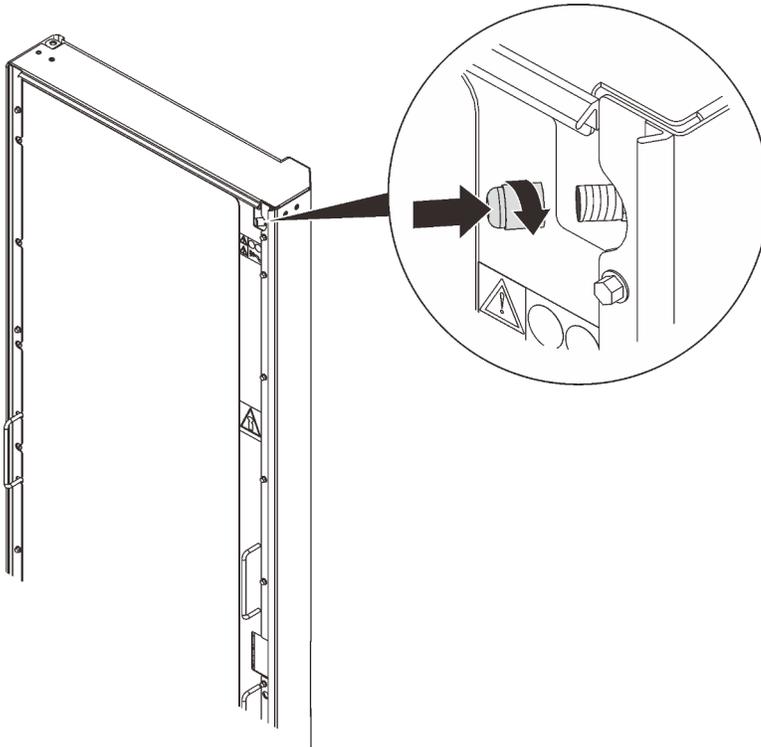


Figure 222. Installing the valve cap

Install a 0/1U device into the rack

See this topic to learn how to install a 0/1U device into the rack side.

About this task

S001



 **DANGER**

**Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:**

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

S013



 **DANGER**

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

S014



CAUTION:

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the label is attached.

R009



CAUTION:

Removing components from the upper positions in the Enterprise Rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must do the following:
 - Remove all devices in the 32 U position and above.
 - Make sure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Make sure that there are no empty U positions between devices installed in the rack cabinet below the 32 U position.
- If the rack cabinet that you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- Inspect the route that you plan to take, to eliminate potential hazards.
- Make sure that the route that you choose can support the weight of the loaded rack cabinet. See the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Make sure that all door openings are at least 760 x 2030 mm (30 x 80 in.)
- Make sure that all devices, shelves, drawers, doors, and cables are secure.
- Make sure that the four leveling pads are raised to their highest positions.

- **Make sure that no stabilizer bracket is installed on the rack cabinet.**
- **Do not use a ramp that is inclined more than 10 degrees.**
- **When the rack cabinet is in the new location, do the following:**
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.

If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off the pallet and bolt the rack cabinet to the pallet.

This cabinet supports up to four units of 1U devices that are installed to the rack side.

Note: Each rack side space only allows two units of 1U or two units of 0U devices to be installed at the same time. Mixing 1U and 0U devices on the same rack side is not feasible.

Refer to corresponding instructions based on the installation scenario:

- [“Install a 0U device” on page 203](#)
- [“Install a 1U PDU or console switch to the rack side” on page 204](#)
- [“Install a 1U device into the side pocket” on page 205](#)

Install a 0U device

Procedure

- Step 1. Insert the two PDU pegs into the keyhole slots in the side of the rack cabinet, and push down the PDU to secure it to the rack.

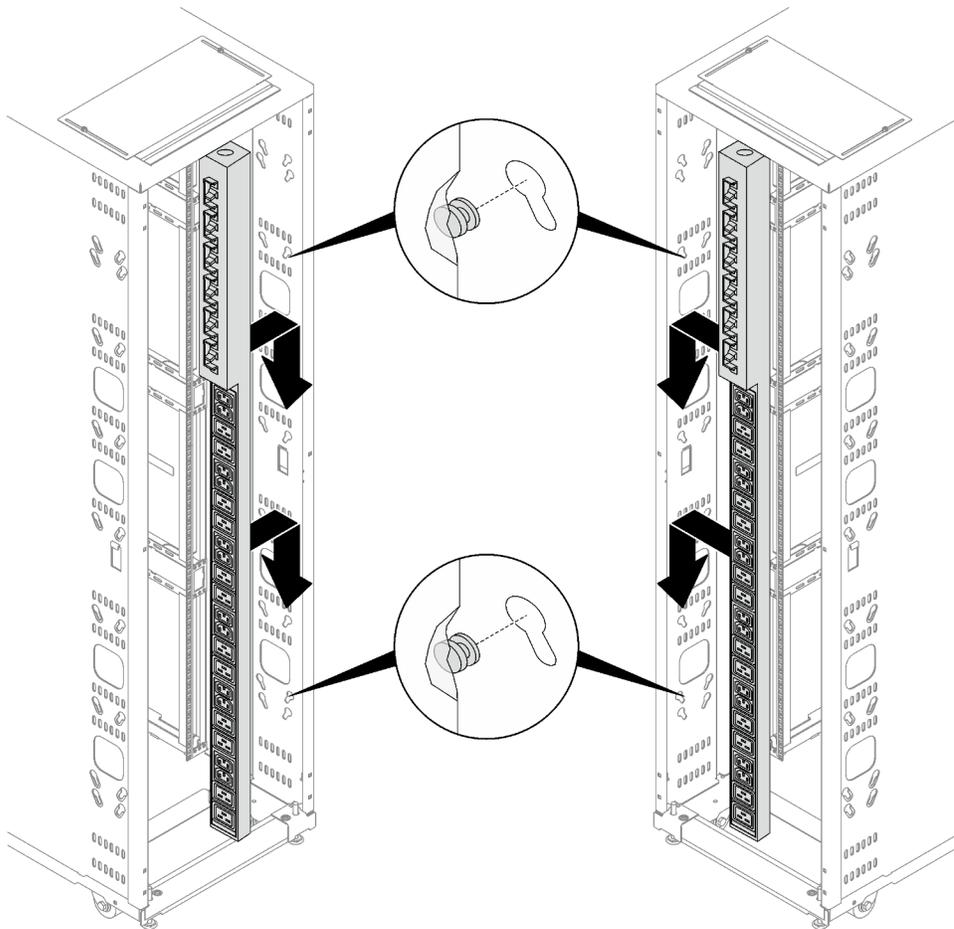


Figure 223. Installing a 0U PDU

Note: 0U PDU can be installed with sockets facing either rear or center of the rack cabinet.

Install a 1U PDU or console switch to the rack side

Procedure

- Step 1. Refer to the document that comes with the device, and install the mounting brackets if necessary.
- Step 2. Align the mounting brackets with the holes in the rack flange, and secure it with four sets of screw and nut.

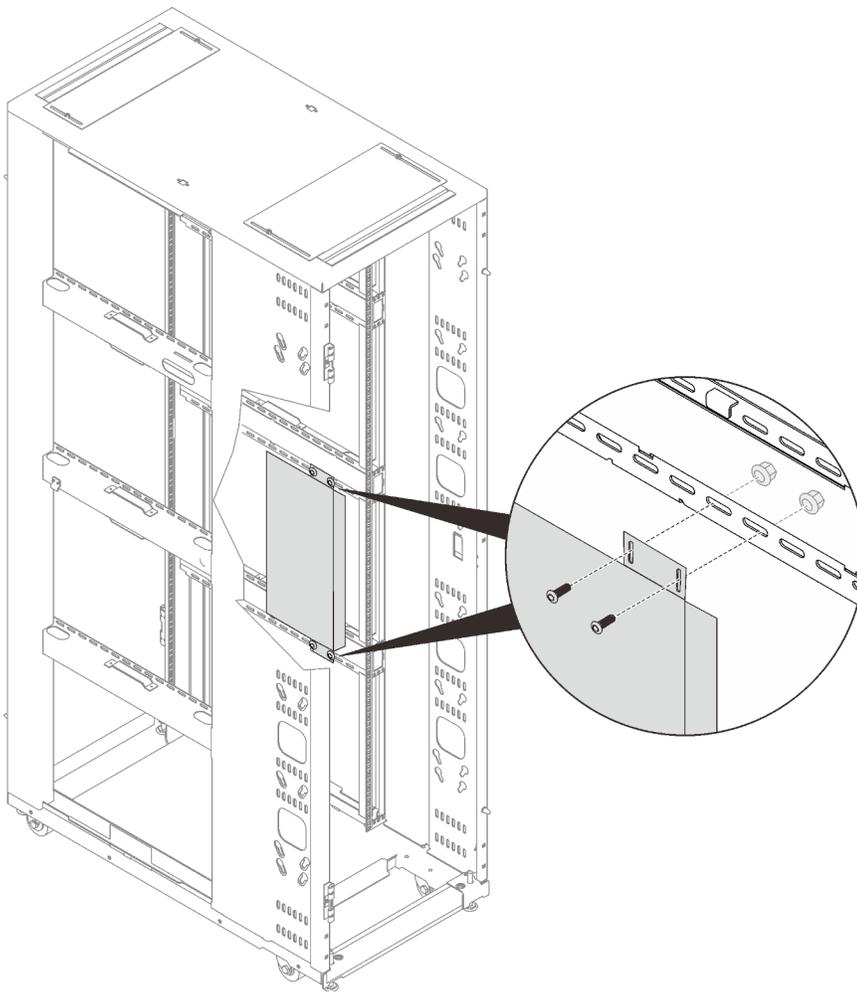


Figure 224. Installing a 1U device into the rack side

Install a 1U device into the side pocket

Procedure

- Step 1. Remove the side cover next to the side pocket (see [“Remove a side cover” on page 217](#)).
- Step 2. Refer to the document that comes with the device, and install the mounting brackets if necessary.
- Step 3. Install the device.

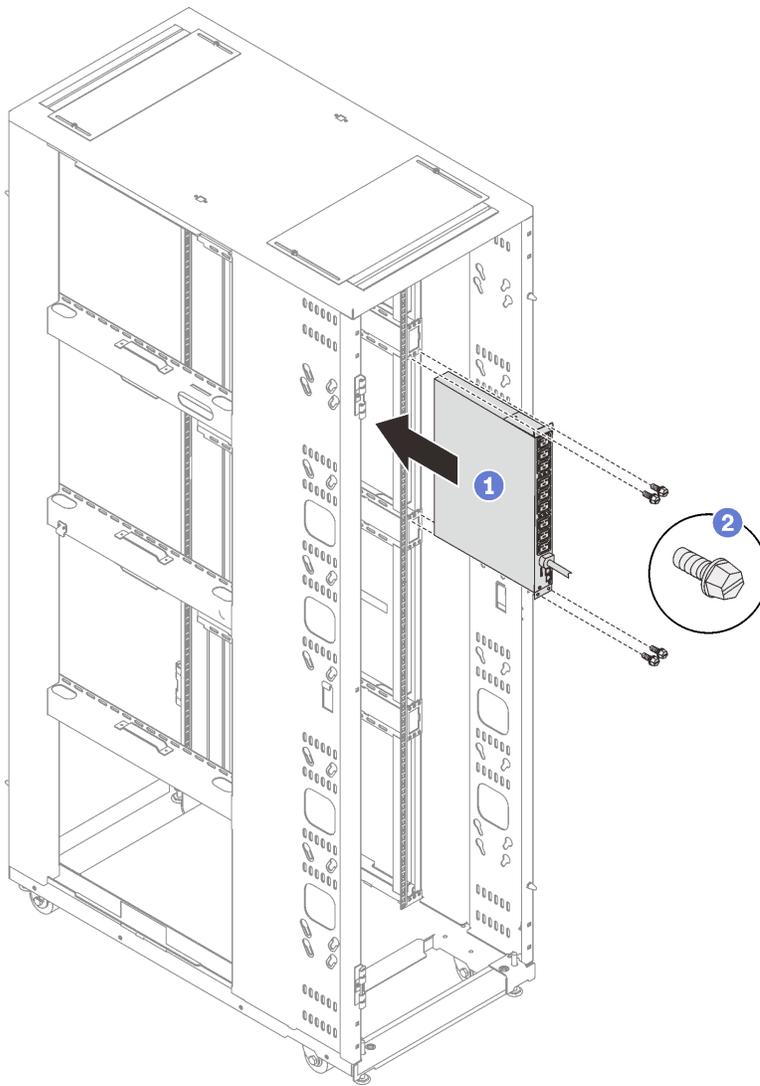


Figure 225. Installing a 1U PDU or console switch

- 1 Slide the device all the way into the side pocket.
- 2 Secure the device with four M6 screws.

Step 4. Complete all the required cable connection and setup of the device. Refer to the document that comes with the device for details.

- Make sure to complete all the required cable connection and device setup before installing baying kits to the cabinets, as these tasks will be hard to operate afterwards.
- It is advised to complete all the cable connection and setup task for the device before installing the side cover back.

Step 5. Install the side cover back (see [“Install a side cover”](#) on page 217).

Chapter 4. Managing cables and hoses

See this topic to learn how to manage the cables going through the rack cabinet.

The following channels and openings are available for cable management:

- “Front-to-rear cable channels” on page 207
- “Cable access bar on the bottom of the rack cabinet” on page 207
- “Cable access openings on the top of the rack cabinet” on page 208
- “Cable access openings on extension panel” on page 211
- “Cable strap module” on page 210
- “Cable access openings on extension panel” on page 211

Front-to-rear cable channels

When managing cables that go through the cabinet side, route the cables in the channels, and manage them with channel covers.

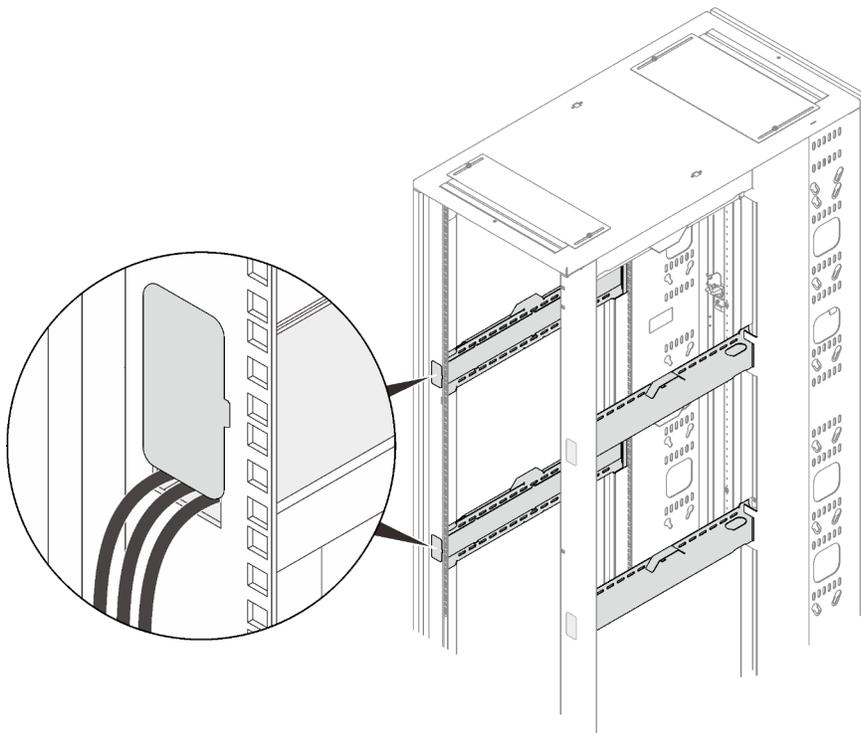


Figure 226. Front-to-rear cable channels

Cable access bar on the bottom of the rack cabinet

When managing cables near the bottom of the rack cabinet, route the cables in the open space after removing the cable access bar, and install the bar to contain the cables.

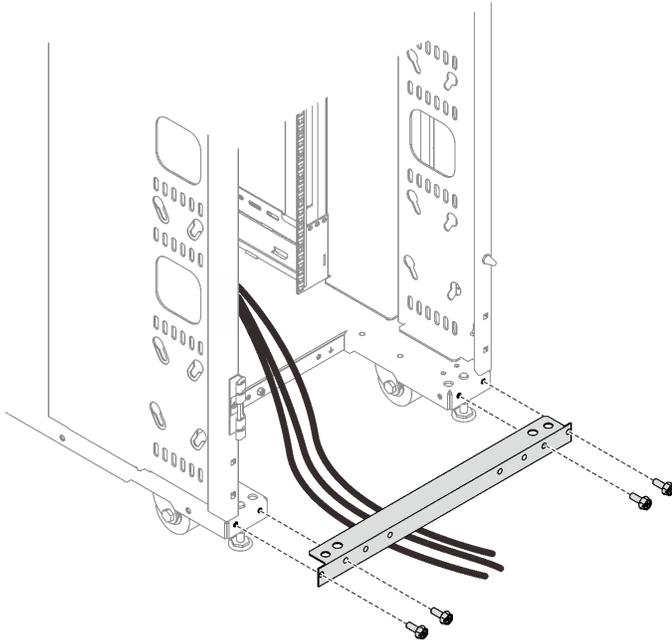
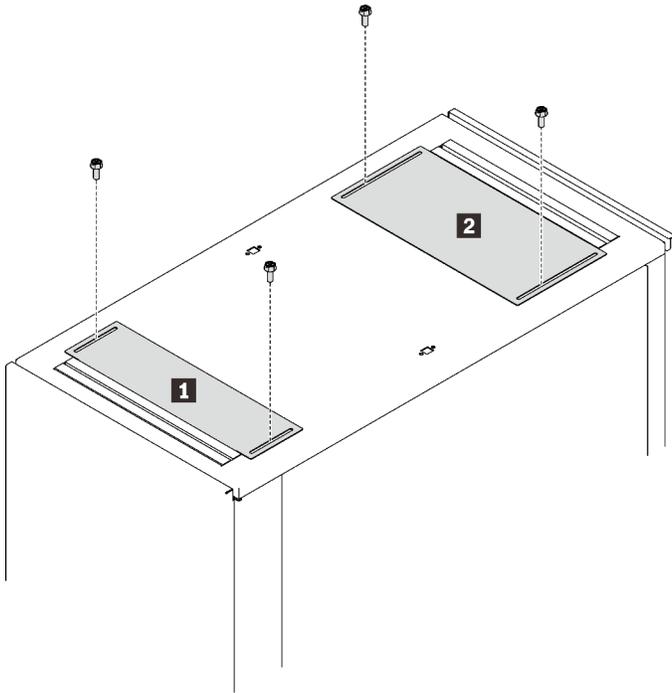


Figure 227. Cable access bar on the bottom of the rack cabinet

Cable access openings on the top of the rack cabinet



1 Front cable access cover	2 Rear cable access cover
-----------------------------------	----------------------------------

Figure 228. Cable access openings on the top of the cabinet

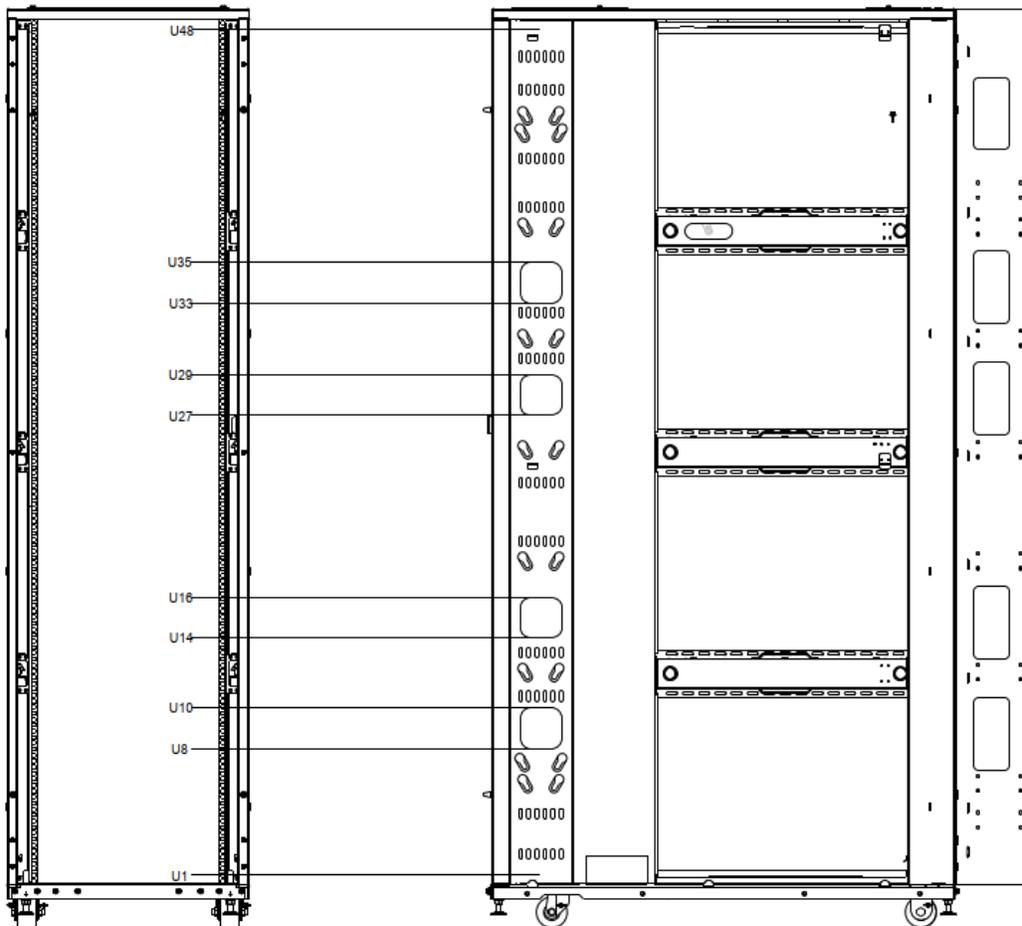
1 Front cable access cover

Slide the cover as far forward as possible to close off the open area, thus prevent hot exhaust air from recirculating back through the rack.

2 Rear cable access cover

Slide the cover all the way open or closed, or in any intermediate position. Leaving the cover open provides extra exhaust area for components near the top and bottom of the rack; however, in some configurations, this shortens the hot air recirculation path from the rear to the front.

Cable access openings on the rear of the rack cabinet



There are four 101.6 x 101.6 mm openings on each side of the rear side of the cabinet:

- U8 to U10
- U14 to U16
- U27 to U29
- U33 to U35

Figure 229. Cable access openings on rear side of the rack cabinet

Cable strap module

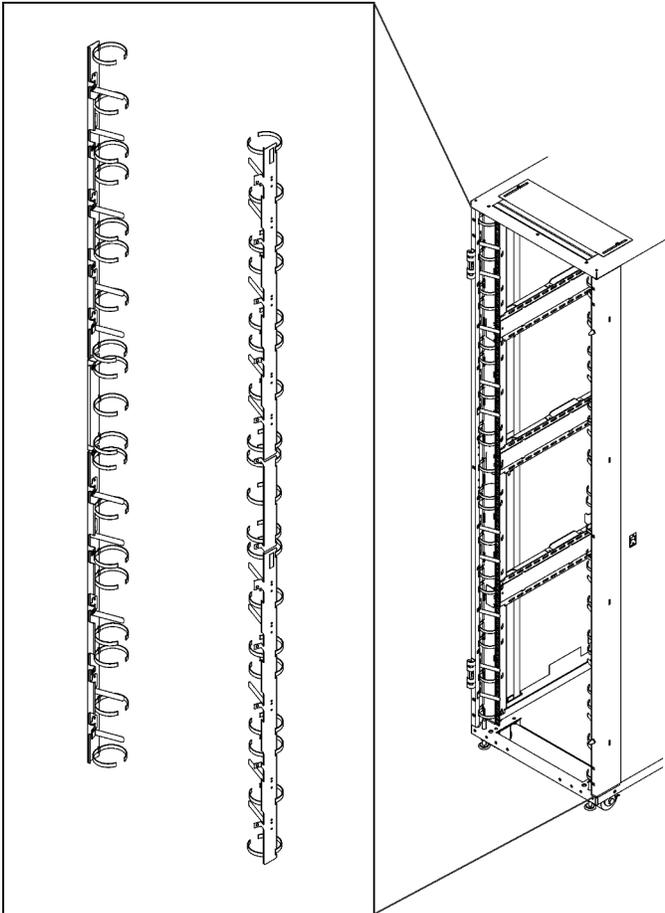
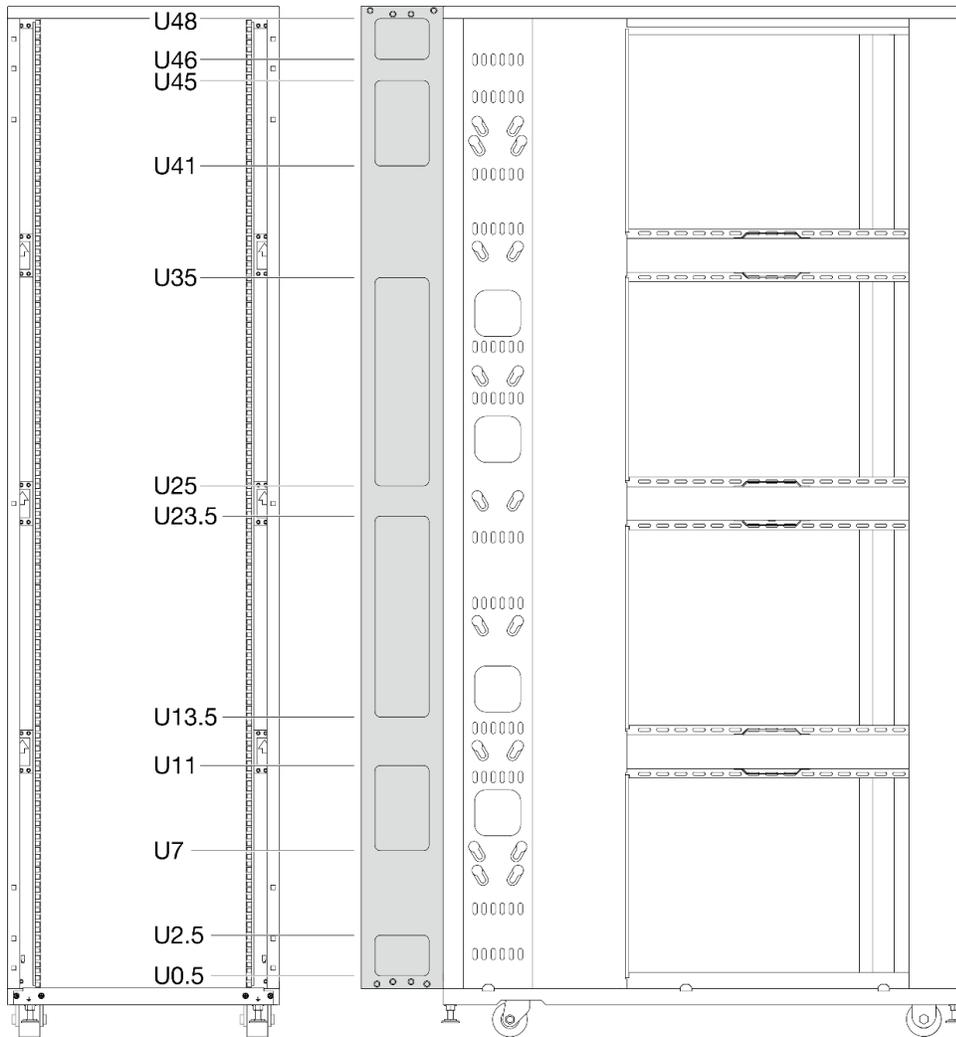


Figure 230. Cable strap module

Two lines of built-in cable straps along the front door frame are available for cable management.

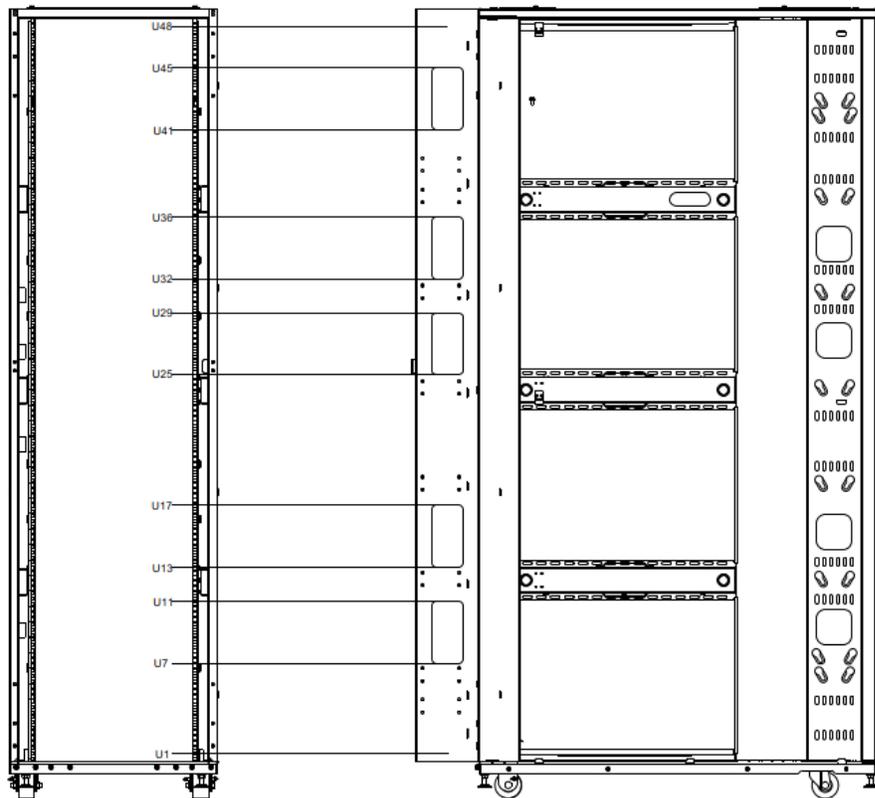
Cable access openings on extension panel



There are six openings on each extension panel:

- U0.5 to U2.5
- U7 to U11
- U13.5 to U23.5
- U25 to U35
- U41 to U45
- U46 to U48

Figure 231. Cable access openings on extension panel — 48U Advanced Rack Extension Kit



There are five 89 (width) x 178 (height) mm openings on each side panel:

- U7 to U11
- U13 to U17
- U25 to U29
- U32 to U36
- U42 to U45

Figure 232. Cable access openings on extension panel — 48U Standard Rack Extension Kit

Routing cables/hoses for water-cooled system

Adopt one of the following procedures, depending on whether the rack is in a raised-floor environment.

Important: To help maintain optimal performance and provide proper cooling for all rack components, always take the following precautions:

- Install filler panels over all unoccupied bays.
- Route signal cables at the rear of the rack so that they enter or exit the cabinet through the top and bottom air baffles.

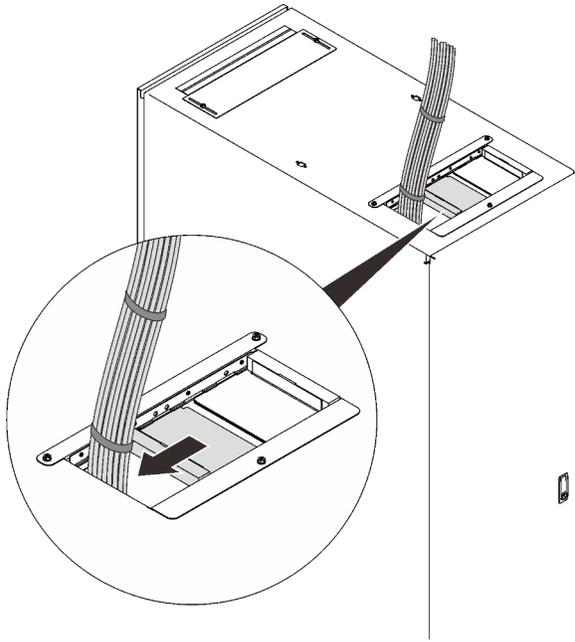


Figure 233. Managing cables with the upper air baffle

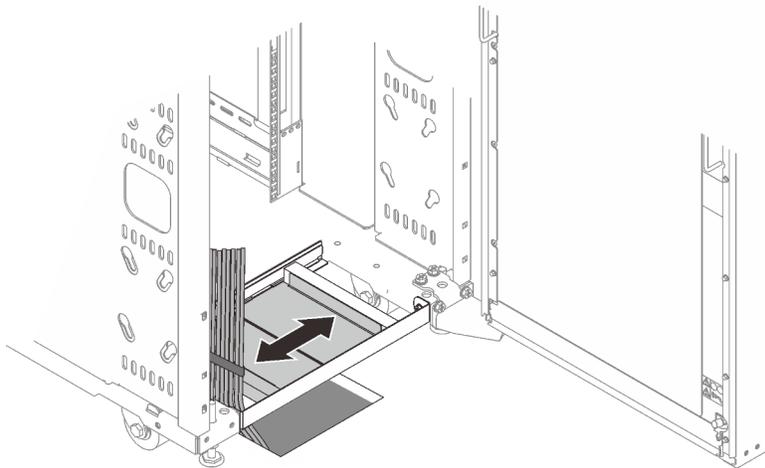


Figure 234. Managing cables with the lower air baffle

- Bundle signal cables together in a rectangle so that the air-baffle sliders are closed as far as possible. Do not bundle signal cables together in a circular formation.

Raised-floor environment

The following illustrations show routing and securing the hoses in a raised-floor environment for individual racks and adjacent racks.

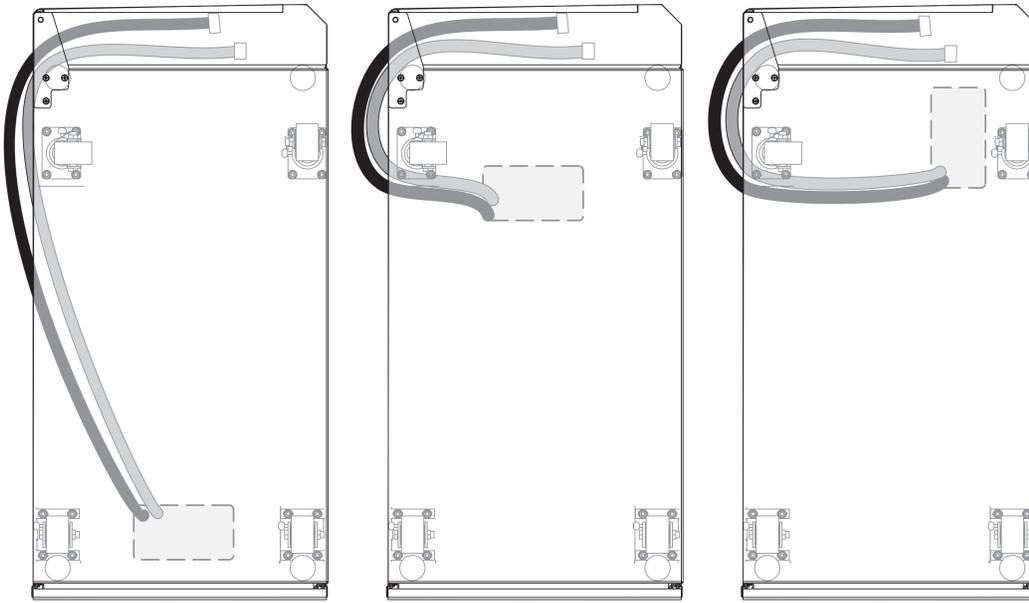
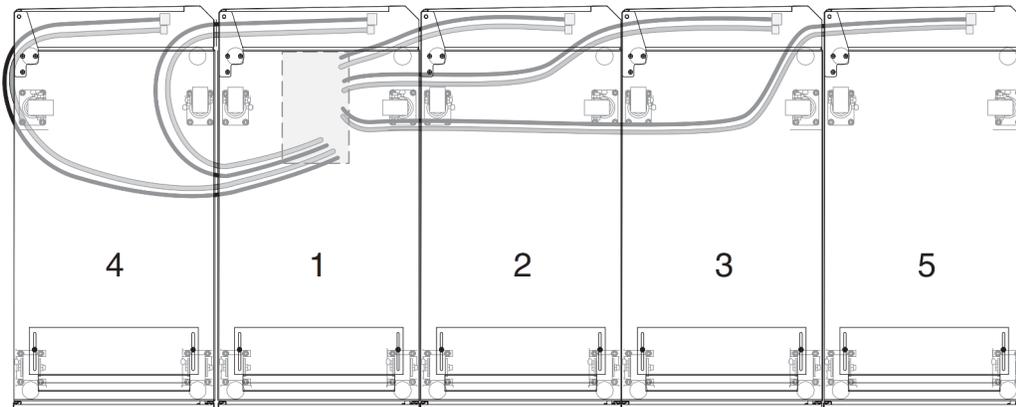


Figure 235. Routing and securing the hoses in a raised-floor environment for individual racks (from the top, looking down)

In the following illustration, the numbers represent the suggested placement of racks that share one hole in the floor. For example, if three racks will share one hole in the floor, place the racks as shown by the numbers 1, 2, and 3. If you want to add a fourth rack that will share the same hole in the floor, place it next to rack number 1.



To route and secure the hoses in a raised-floor environment, complete the following steps:

Figure 236. Option for hoses in adjacent racks to share a single hole in the floor (from the top, looking down)

- Step 1. Remove the floor tile under the rack that will have an access hole cut into it.
- Step 2. Cut an access hole in the floor tile; then, reinstall the floor tile. The access hole for the supply and return hoses must be a minimum of 200 mm (8 in.) long x 100 mm (4 in.) wide.

Notes:

- Each hose must be routed through the access hole lengthwise so that the hose has the entire 200 mm (8 in.) to pass through the floor. If adjacent racks share a hole in the floor, increase the size of the hole according to the number of hoses, 50 mm (2 in.) in length for every rack. For

example, the hole for one rack is 100 x 200 mm (4 x 8 in.), the hole for two racks is 150 x 200 mm (6 x 8 in.), and so on. Smaller hole sizes might also work, depending on the hose routing underneath the raised floor.

- Each hose must be routed with a minimum bend radius of 200 mm (8 in.). A bend radius less than 200 mm (8 in.) will cause the hose to kink, will restrict the flow of water to and from the heat exchanger, and will void the heat exchanger warranty.

- Step 3. Route the hoses through the access hole lengthwise, under the rack and around the rear caster on the pivot side of the heat exchanger. See “Filling the heat exchanger with water” on page 48 for information about how to connect the hoses.
- Step 4. Check the heat exchanger for air in the manifolds again after one month of operation, to ensure that the heat exchanger is filled correctly.

Raised-floor and non-raised-floor environments

If the coolant distribution unit (CDU) that is providing water to the heat exchanger is in a row of racks with heat exchangers, all hoses can be routed on the floor, irrespective of if it is a raised floor or slab installation. The Type 7D6E rack has sufficient clearance underneath the rack to enable the ball valves to be run underneath the rack. This provides a very clean hose-routing solution with hoses of minimum length.

Note: Each hose must be routed with a minimum bend radius of 200 mm (8 in.). A bend radius less than 200 mm (8 in.) will cause the hose to kink, will restrict the flow of water to and from the heat exchanger, and will void the heat exchanger warranty.

- Step 1. If the hoses must be run overhead, either route the hoses through the rack vertically, or route them vertically down the hinge (pivot) side of the heat exchanger, leaving enough slack in the hoses to reach the couplings.

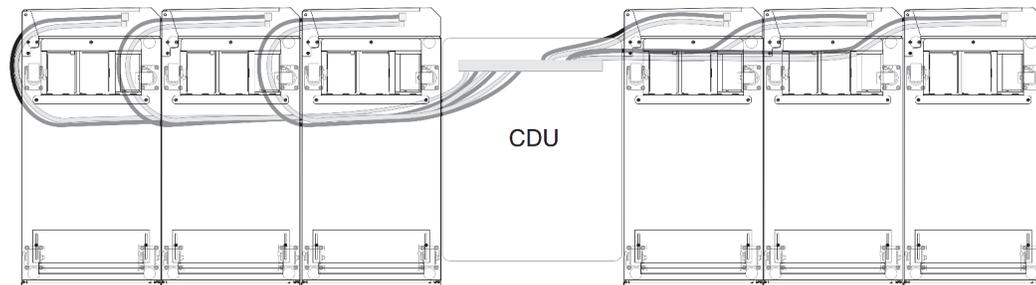


Figure 237. Routing and securing the hoses in raised-floor and non-raised-floor environments (from the top, looking down)

- Step 2. After several hours of operation, repeat the air-purging procedure on the valve (trapped air from the hoses might have migrated to the heat exchanger). To perform the air-purging procedure, complete step 7 on page 52 through step 10 on page 52 in Filling the heat exchanger with water.
- Step 3. Check the heat exchanger for air in the manifolds again after one month of operation, to ensure that the heat exchanger is filled correctly.

Chapter 5. Hardware removal, installation and conversion

See this topic to learn how to remove, install and convert components of ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet.

Removing and installing the side covers

See this topic to learn how to remove and install the side covers.

About this task

Note: Due to the weight of the side cover, this task required two people.

Remove a side cover

Procedure

Step 1. Remove the side cover.

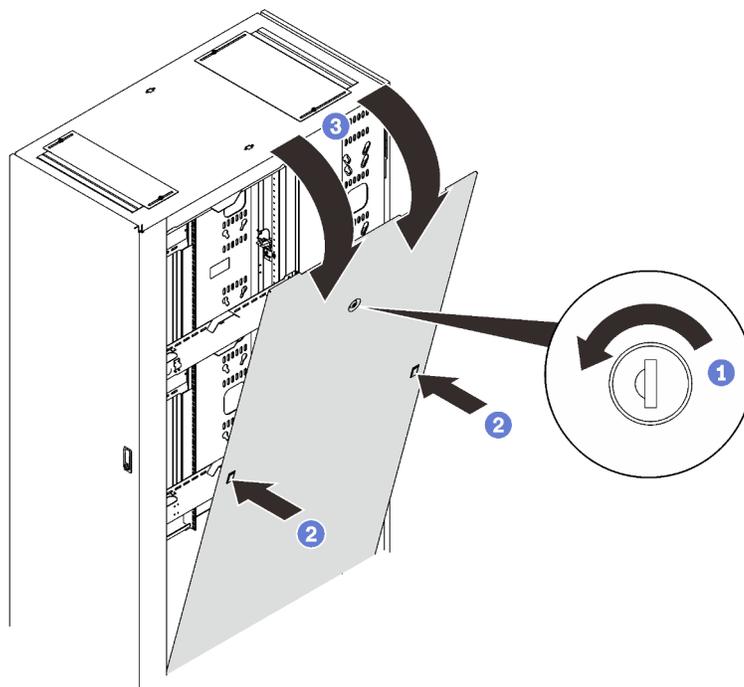


Figure 238. Removing a side cover

- 1 Unlock the side cover with the key.
- 2 Press on the two latches on both sides of the cover to disengage it from the rack.
- 3 Rotate the top of the side cover away from the rack, and remove it.

Install a side cover

Procedure

Step 1. Install the side cover.

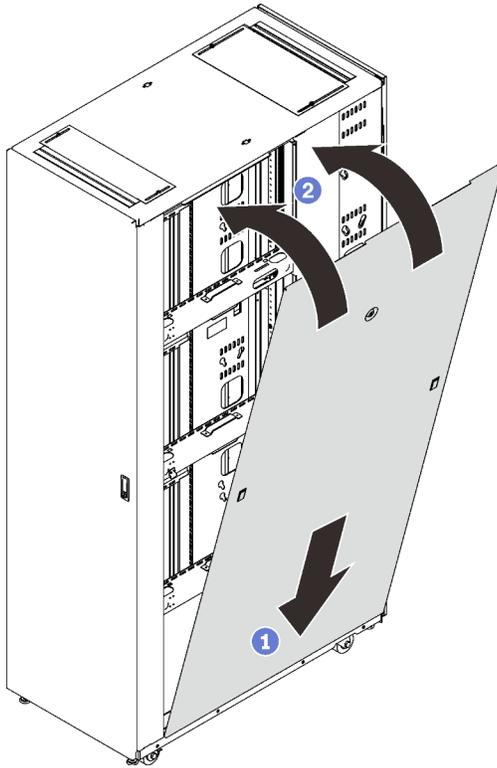


Figure 239. Installing the side cover

- 1 Align the bottom of the side cover with the slot on the rack cabinet.
- 2 Rotate the top of the cover towards the rack.

Step 2. Secure the side cover to the rack cabinet.

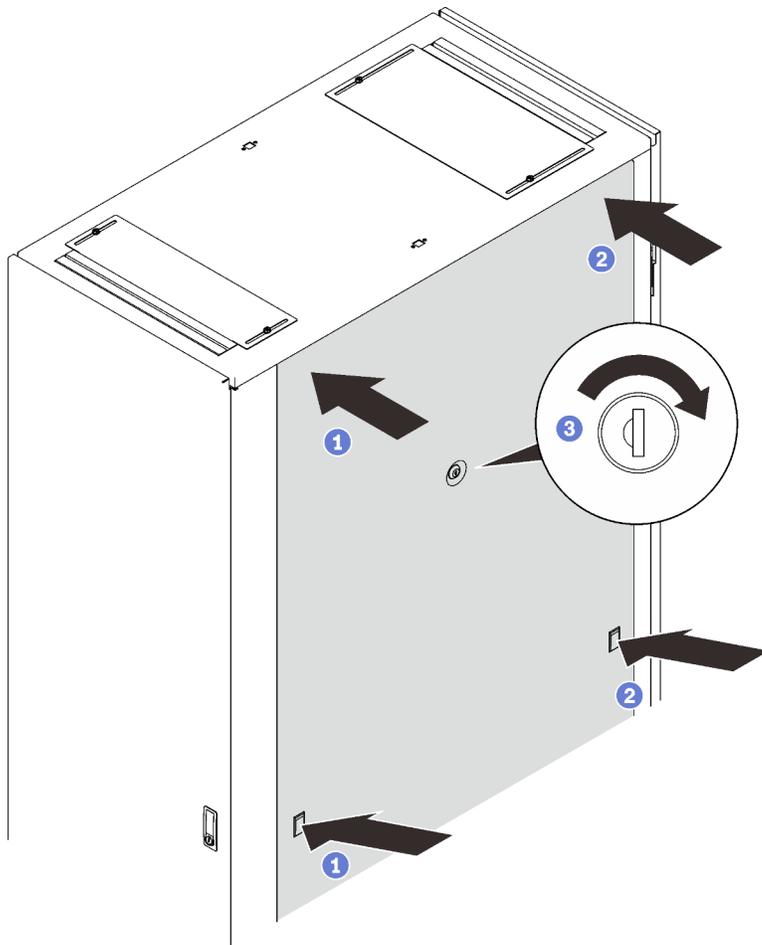


Figure 240. Securing the side cover

Note: This procedure is best executed by two people.

- 1 Press and hold the latch of one side, and firmly press the upper corner in.
- 2 Repeat the previous step on the other side.
- 3 Lock the side cover with the key.

Installing, removing, and converting the door

See this topic to learn how to remove, install and convert the door

Remove and install a door

See this topic to learn how to remove and install a door.

Remove a door

Procedure

- Step 1. Unlock and open the door.
- Step 2. Remove the door.

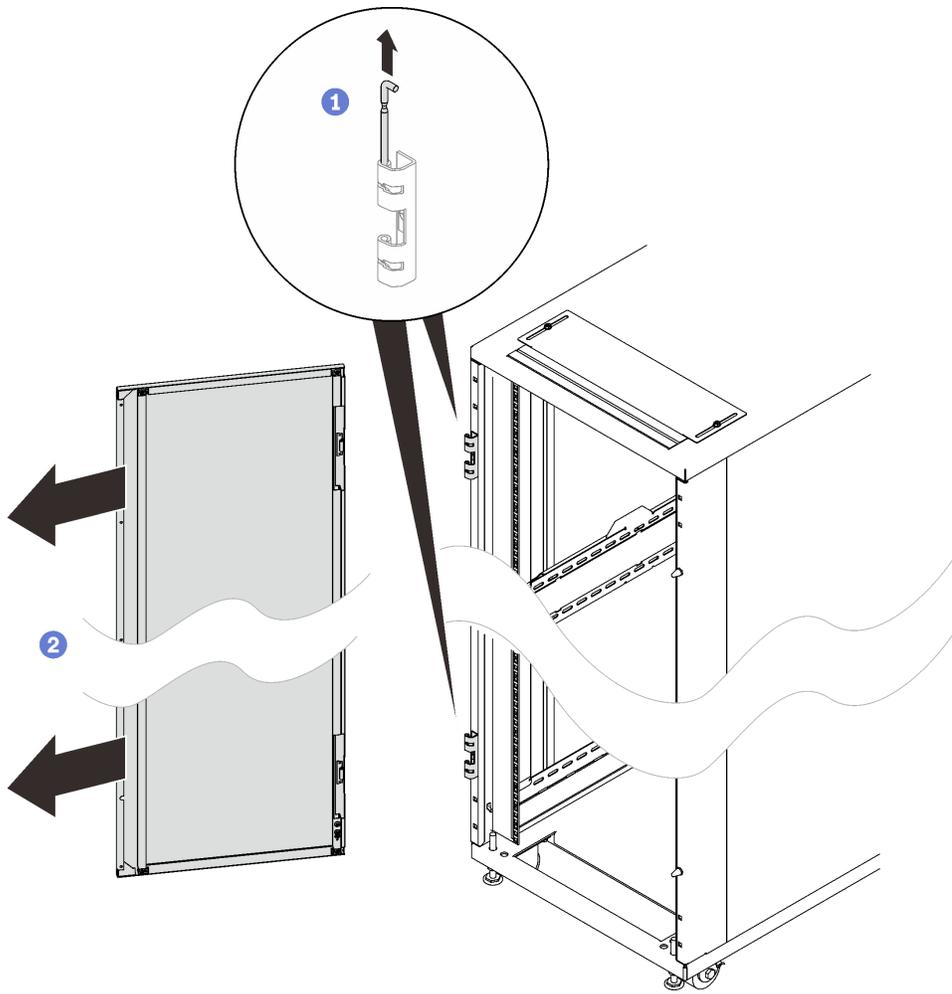


Figure 241. Removing a door

- 1 Hold the door in place, and lift both hinge pins until they lock in the open position so that the door is disengaged.
- 2 Remove the door from the rack cabinet frame.

Install a door

Procedure

Step 1. Install the door.

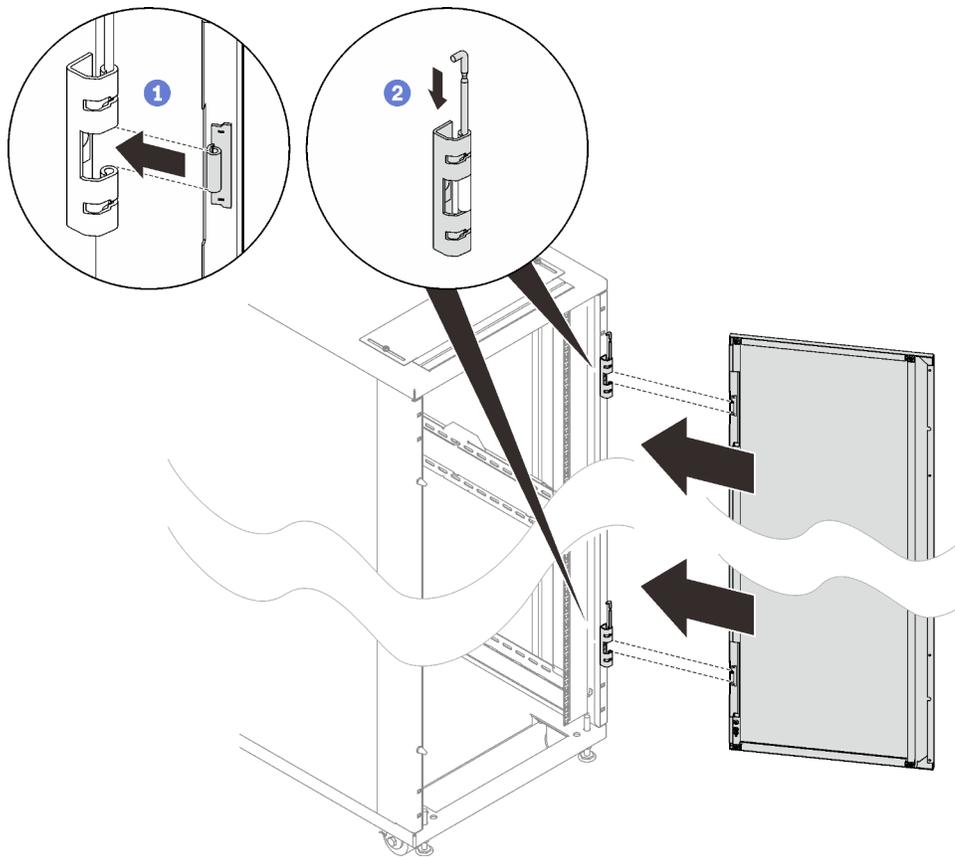


Figure 242. Installing a door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Reverse a door

See this topic to learn how to reverse a door.

Procedure

Step 1. Remove the door.

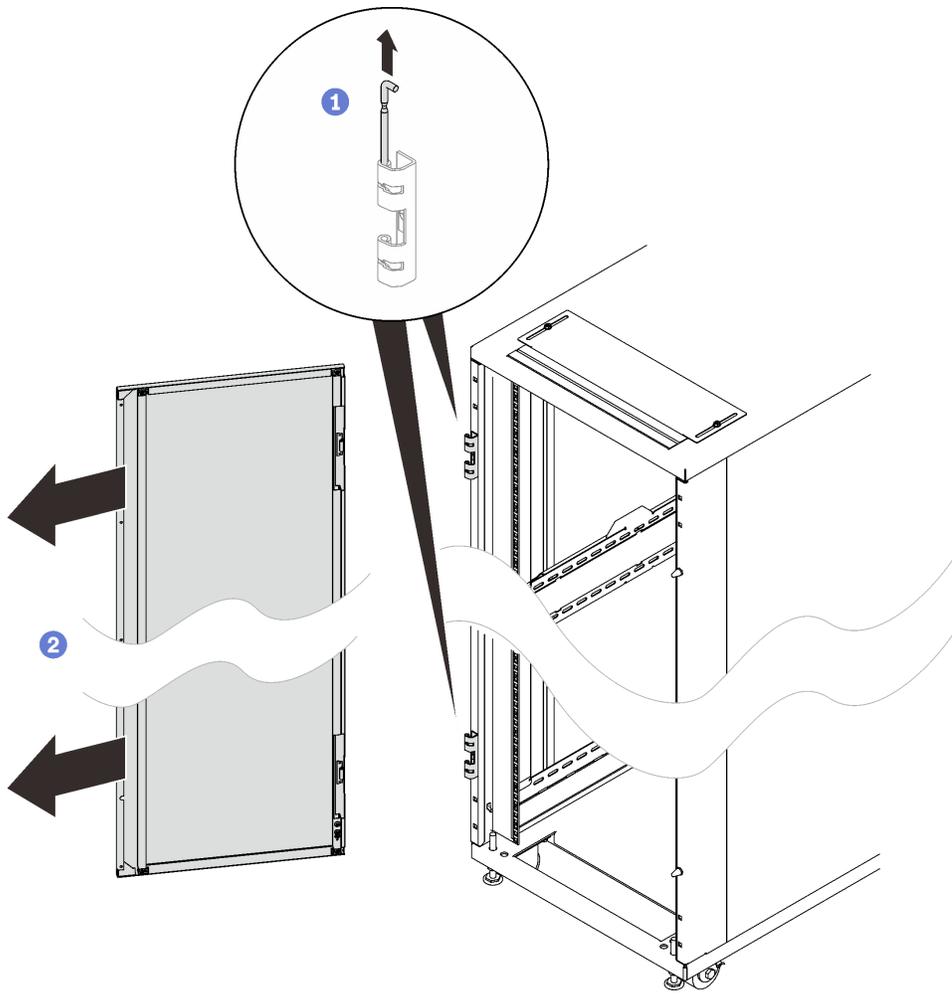


Figure 243. Removing a door

- 1 Hold the door in place, and lift both hinge pins until they lock in the open position so that the door is disengaged.
- 2 Remove the door from the rack cabinet frame.

Step 2. Remove the two hinges and the two doorstops.

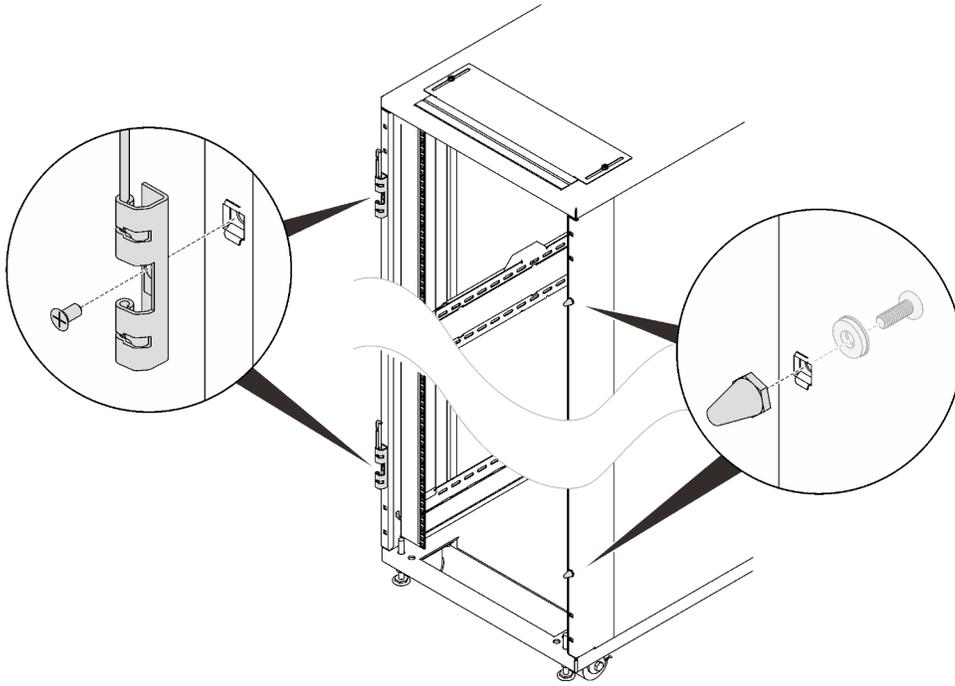


Figure 244. Removing the hinges and the doorstops

Step 3. Reverse the door latch.

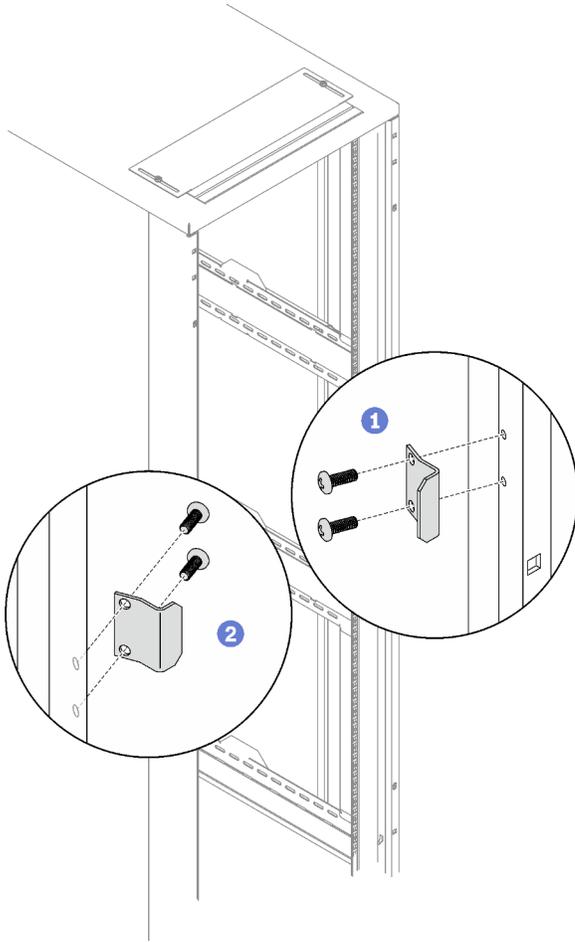


Figure 245. Reversing the door latch

- 1 Remove the two screws that secure the latch to the rack.
- 2 Rotate the latch 180 degree, and secure it to the opposite side on the rack cabinet with two screws.

Step 4. Reverse the hinge orientation

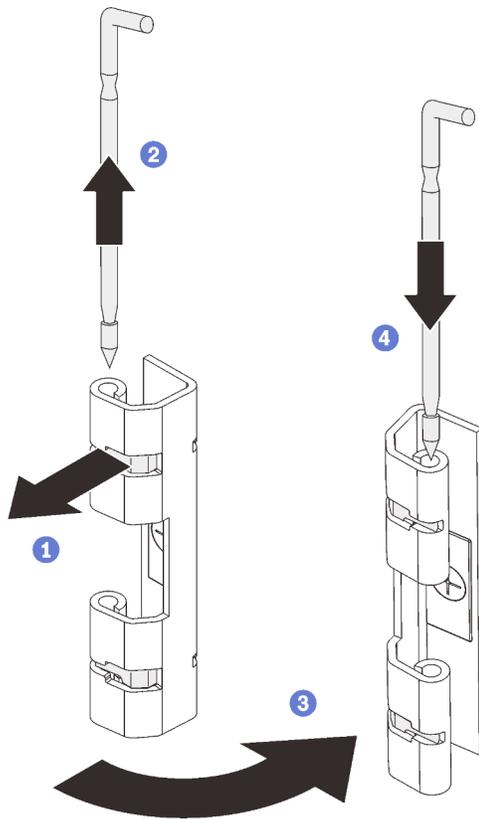


Figure 246. Reversing the hinge orientation

- 1 Pull the retainer spring out to release the hinge pin from the hinge.
 - 2 Pull and remove the pin from the hinge.
 - 3 Rotate the hinge 180 degree.
 - 4 Insert the pin from the top of the hinge.
- Step 5. Repeat the previous step on the other hinge.
- Step 6. Install the two reversed hinges and the two doorstops to the opposite sides of the rack cabinet frame.

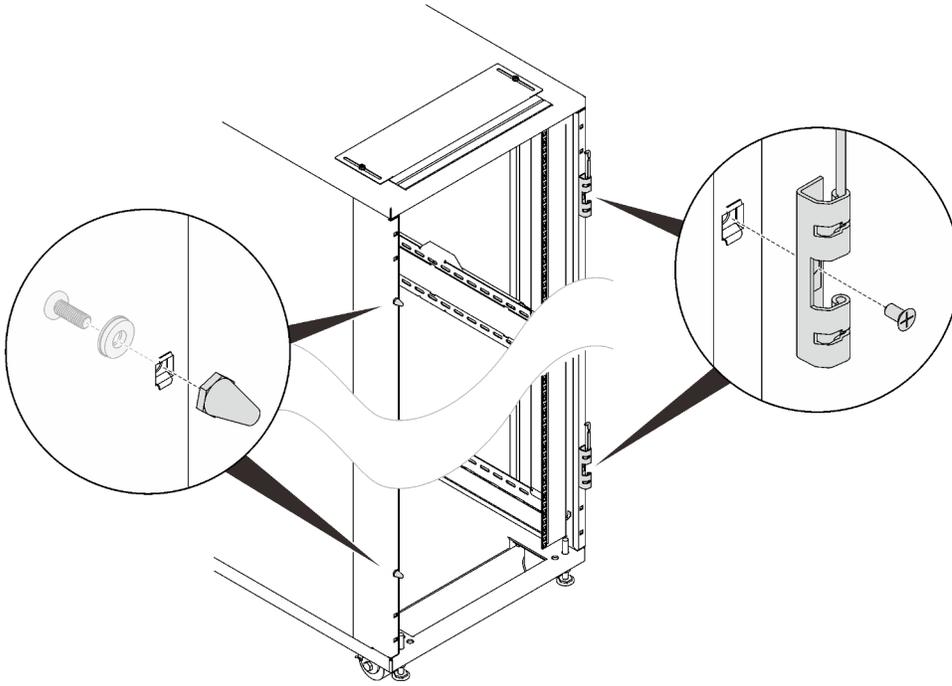


Figure 247. Installing hinges and doorstops

Step 7. Reverse the door handle.

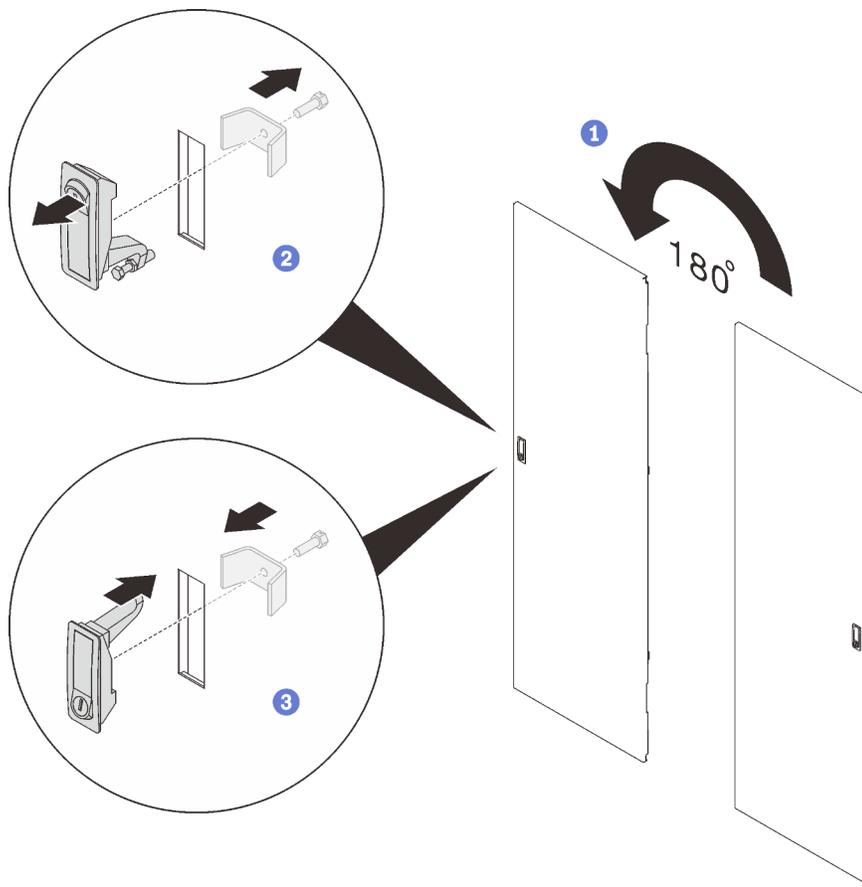


Figure 248. Reversing the door handle

- 1 Rotate the door 180 degree.
- 2 Remove the screw that secures the handle to the door.
- 3 Rotate the door handle 180 degree, and secure it to the door with a screw.

Step 8. Install the door.

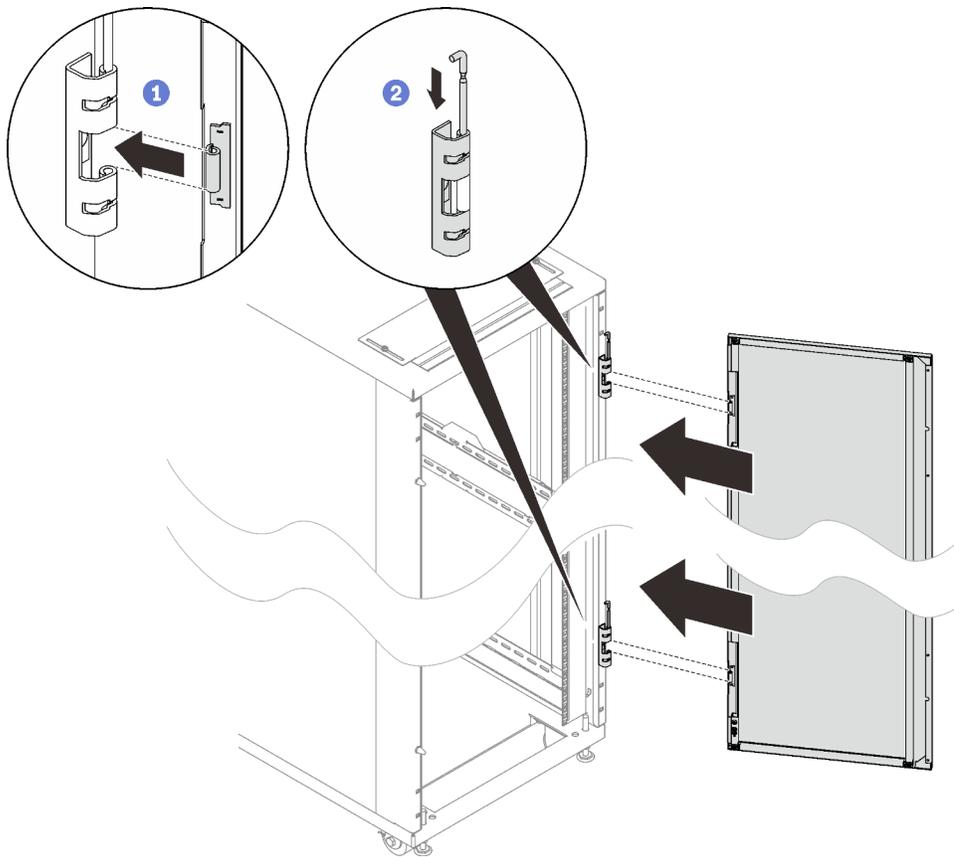


Figure 249. Installing the door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Rear Door Heat eXchanger for 48U Rack replacement

See this topic to learn how to remove and install Rear Door Heat eXchanger for 48U Rack and subsidiary components.

Drain the heat exchanger of water

See this topic to learn how to drain the heat exchanger of water.

About this task

S038



CAUTION:
Eye protection should be worn for this procedure.

Attention: Wear safety goggles or other eye protection whenever you fill, drain, or purge air or nitrogen from the heat exchanger.

Procedure

Step 1. Lift and remove the inner hose access panel from the heat exchanger.

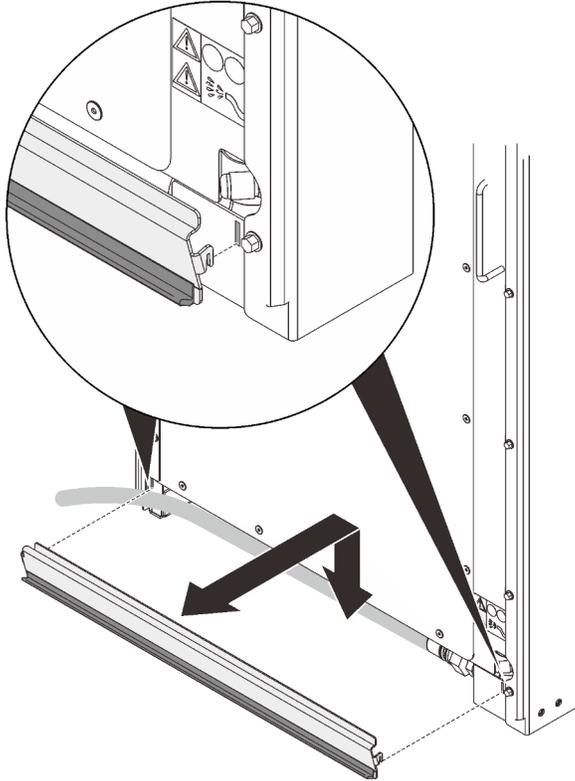


Figure 250. Removing the inner hose access panel

Step 2. Remove the screw that secures the panel if applicable, then lift and remove the panel from the heat exchanger.

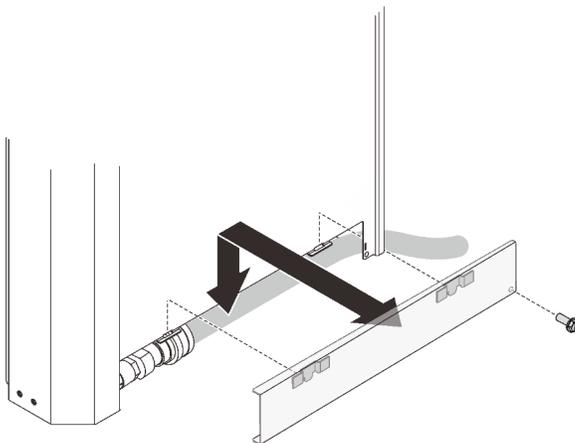


Figure 251. Removing the outer hose access pane

Step 3. Open the four Eaton ball valves, and disconnect the supply and return couplings from the manifolds.

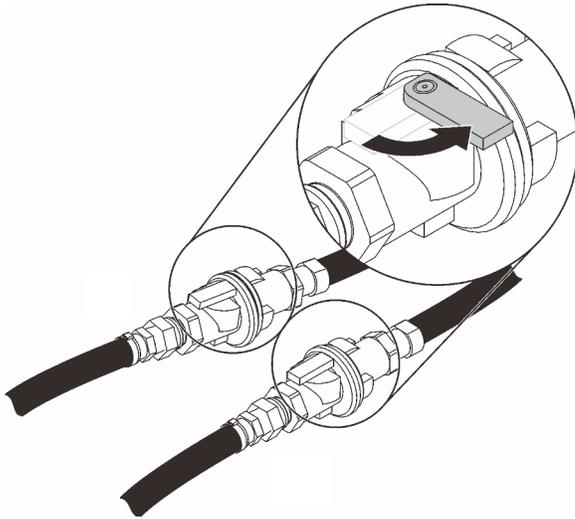


Figure 252. Opening Eaton ball valves

Step 4. Remove the caps from the air-purging and drain valve.

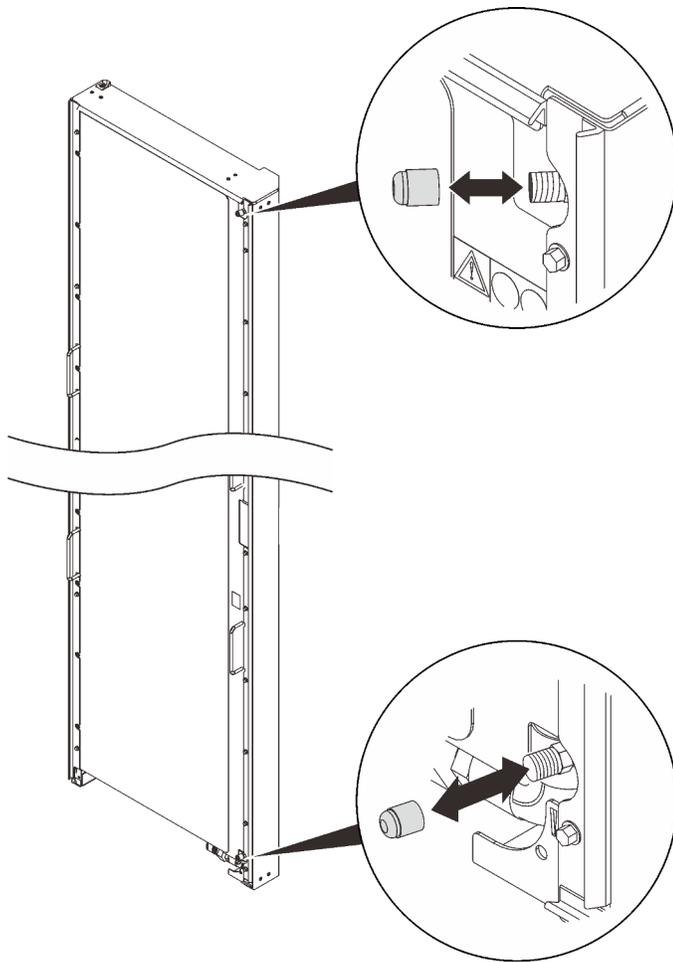


Figure 253. Removing valve caps

Step 5. Remove the extension hose from the air-purging tool.

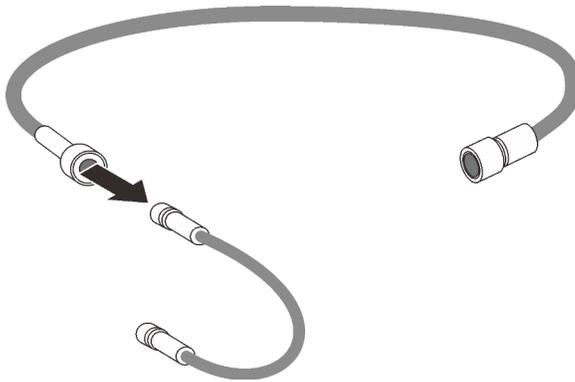


Figure 254. Removing the extension hose

Step 6. Insert one end of the air-purging tool extension hose into the center of air-purging valve stem at the top of the heat exchanger to allow air to enter the manifolds.

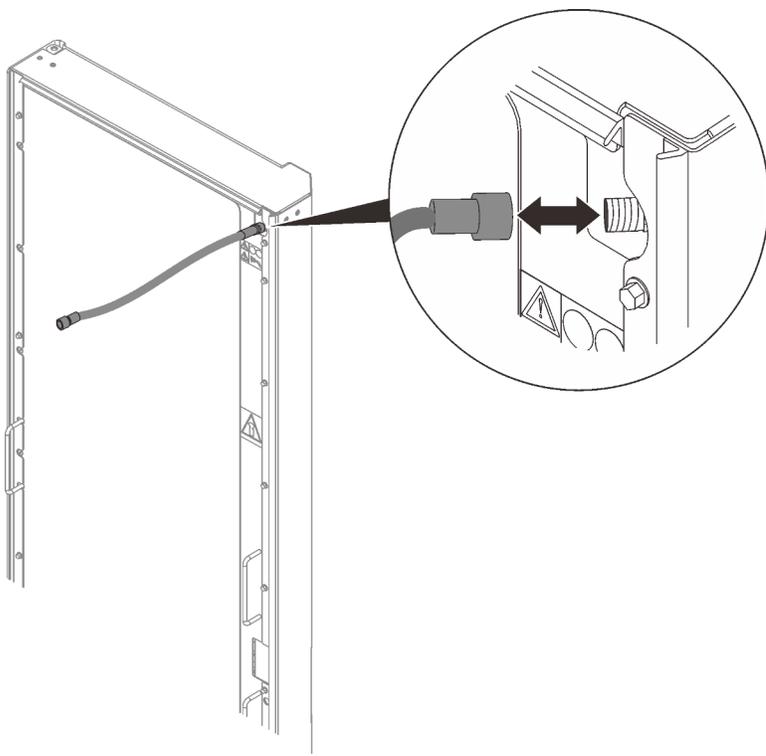


Figure 255. Inserting the air-purging tool extension hose

Step 7. Attach the air-purging tool to the drain valve at the bottom of the heat exchanger, and place the drain end into a 2-liter (or larger) container to catch the water.

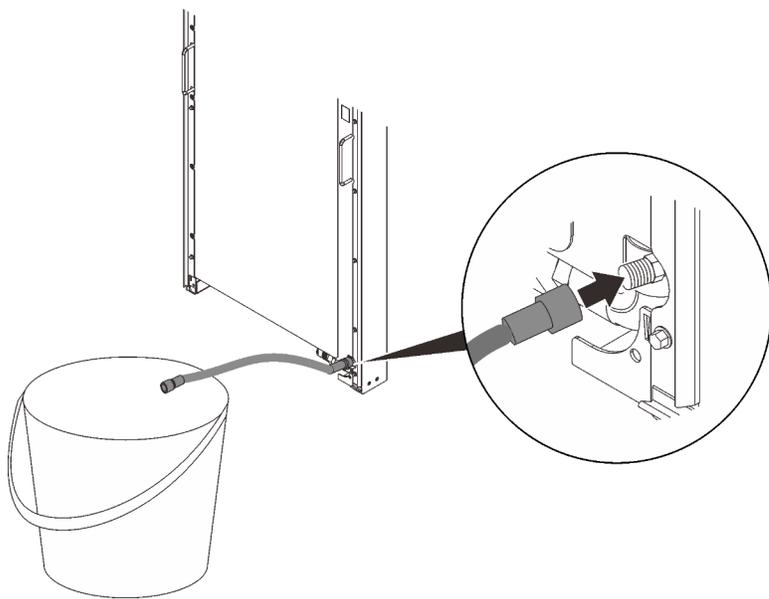


Figure 256. Draining water

Step 8. When the water is drained completely, remove the air-purging-tool extension hose from the valve.

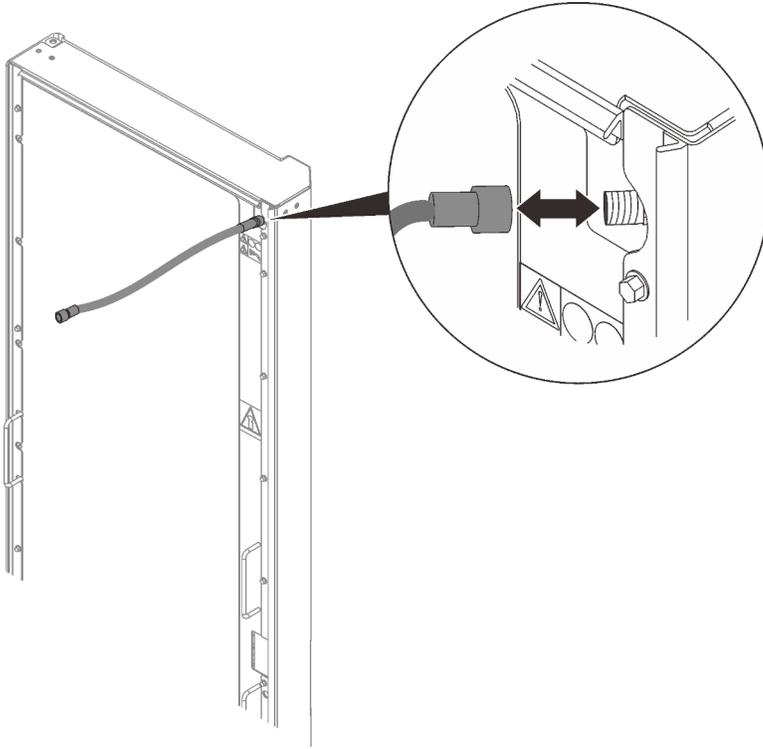


Figure 257. Removing the air-purging tool extension hose

Step 9. Remove the air-purging tool from the drain valve.

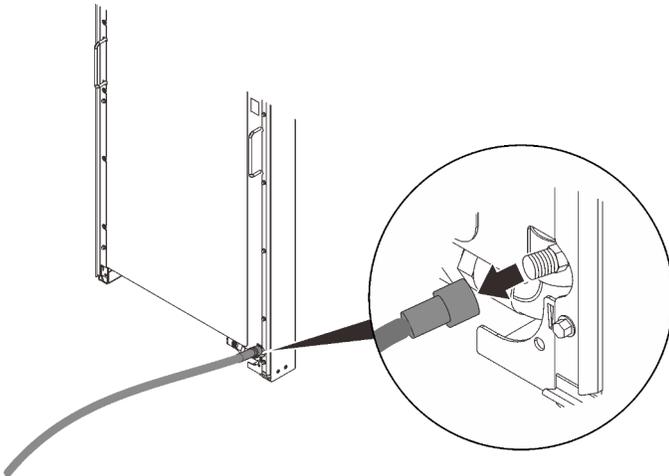


Figure 258. Removing the air-purging tool

Step 10. Install the two caps back to the air-purging and drain valve.

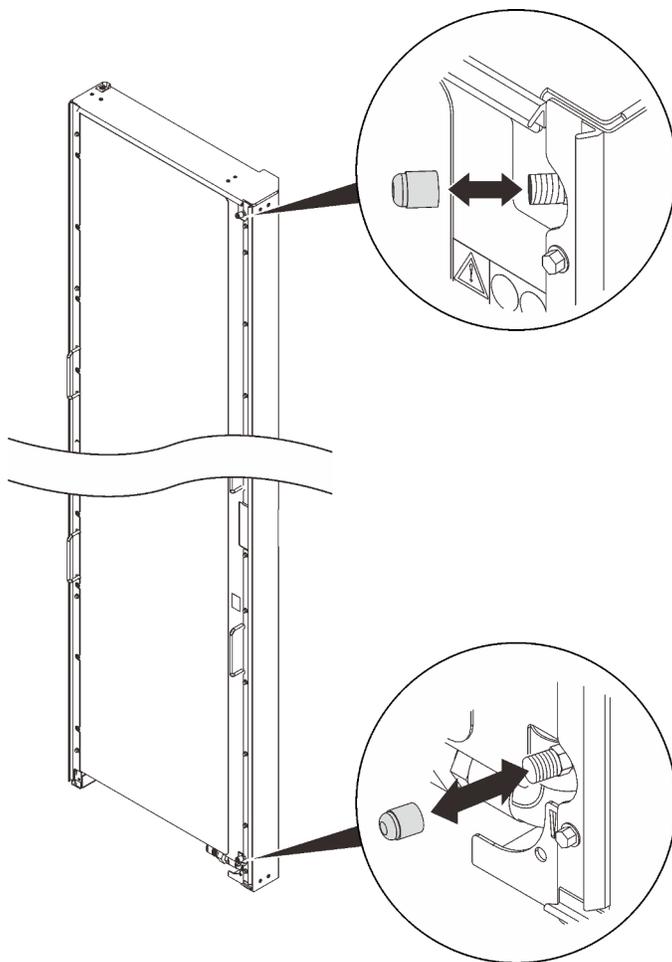


Figure 259. Installing the valve caps

Step 11.

Remove Rear Door Heat eXchanger for 48U Rack

See the section to learn how to remove Rear Door Heat eXchanger for 48U Rack.

About this task

S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

CAUTION:
Use safe practices when lifting.

S010



CAUTION:

Do not place any object weighing more than 82 kg (180 lb) on top of rack-mounted devices.

S019



CAUTION:

The power-control button on the device does not turn off the electrical current supplied to the device. The device also might have more than one connection to dc power. To remove all electrical current from the device, ensure that all connections to dc power are disconnected at the dc power input terminals.

R007



 **DANGER**

- Connect power cords from devices in the rack cabinet to electrical outlets that are near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before you service any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices that are installed in a rack cabinet to power devices that are installed in the same rack cabinet. Do not connect a power cord from a device that is installed in one rack cabinet to a power device that is installed in a different rack cabinet.

R004



CAUTION:

See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

S038



CAUTION:
Eye protection should be worn for this procedure.

Procedure

Step 1. Drain the water from the heat exchanger completely (see [“Drain the heat exchanger of water”](#) on page 228).

Step 2. Hold the heat exchanger in place with two people, and remove the top hinge. Depending on the configuration, select the corresponding removal procedures:

- **Without rack extension kit installed**

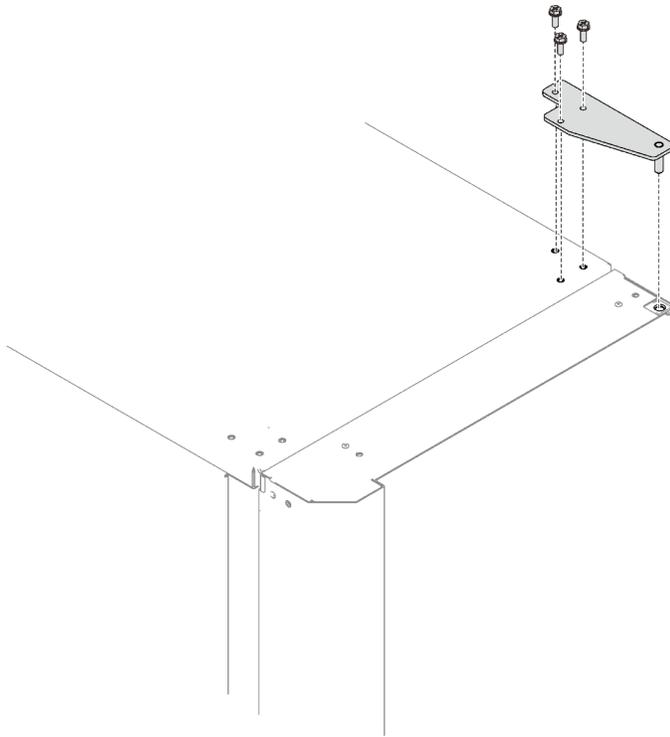


Figure 260. Removing the top hinge

Unfasten the three screws to remove the top hinge.

- **With 48U Advanced Rack Extension Kit installed**

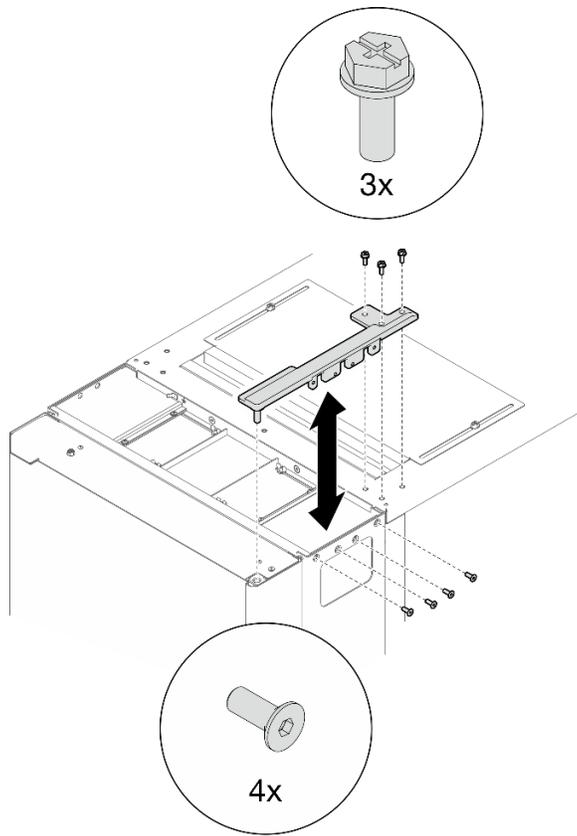


Figure 261. Removing the top hinge

Unfasten the seven screws to remove the top hinge.

Step 3. Hold the heat exchanger with three people on the handles/spots as illustrated.

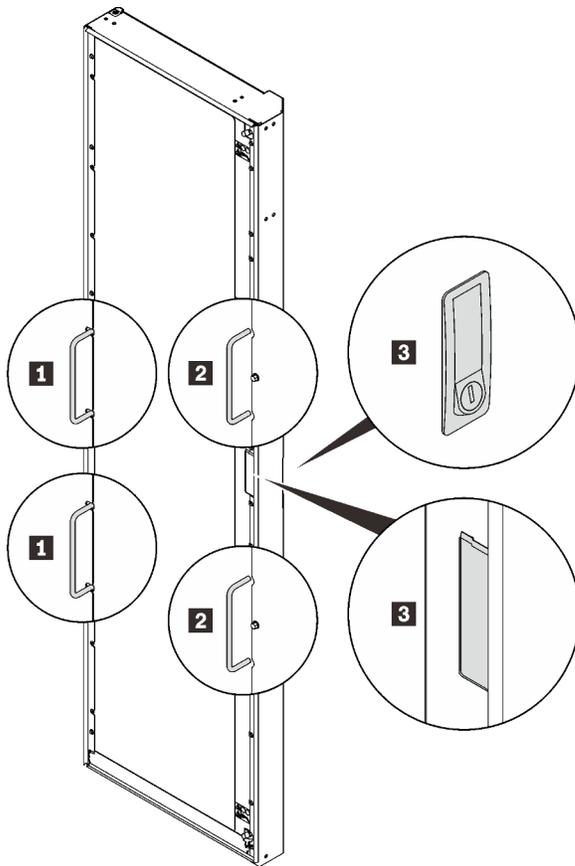


Figure 262. Lifting the heat exchanger with three people

1 Handles that the first person hold on to	3 Spots that the third person hold on to
2 Handles that the second person hold on to	

Step 4. Lift the heat exchanger with three people as described in the previous step, and remove it from the rack cabinet.

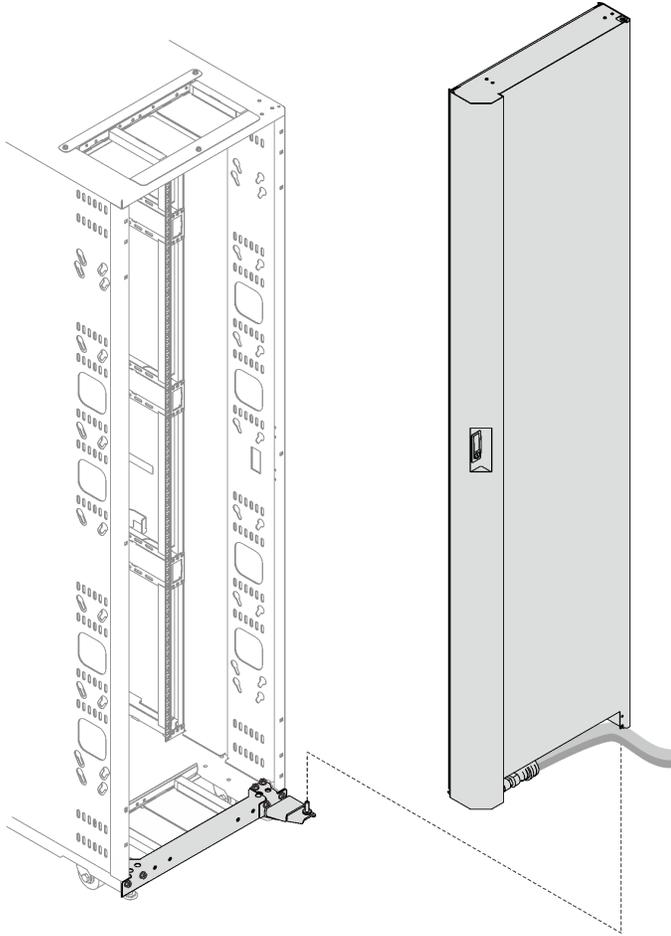


Figure 263. Removing the heat exchanger from the rack cabinet

Install Rear Door Heat eXchanger for 48U Rack

See this topic to learn how to install ThinkSystem Rear Door Heat eXchanger for 48U Rack.

About this task

S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

CAUTION:
Use safe practices when lifting.

S010



CAUTION:

Do not place any object weighing more than 82 kg (180 lb) on top of rack-mounted devices.

S019



CAUTION:

The power-control button on the device does not turn off the electrical current supplied to the device. The device also might have more than one connection to dc power. To remove all electrical current from the device, ensure that all connections to dc power are disconnected at the dc power input terminals.

R007



 **DANGER**

- Connect power cords from devices in the rack cabinet to electrical outlets that are near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before you service any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices that are installed in a rack cabinet to power devices that are installed in the same rack cabinet. Do not connect a power cord from a device that is installed in one rack cabinet to a power device that is installed in a different rack cabinet.

R004



CAUTION:

See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

S038



CAUTION:
Eye protection should be worn for this procedure.

Procedure

Step 1. **(With 48U Advanced Rack Extension Kit installed only)** Make sure the three support brackets are removed from the extension panels.

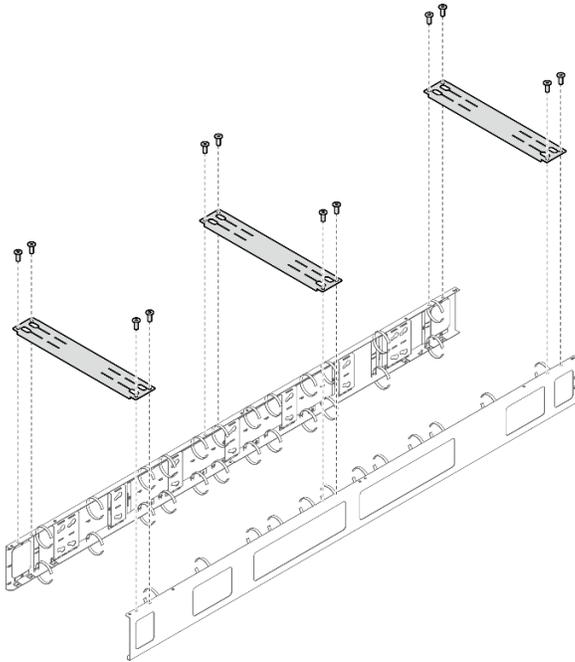
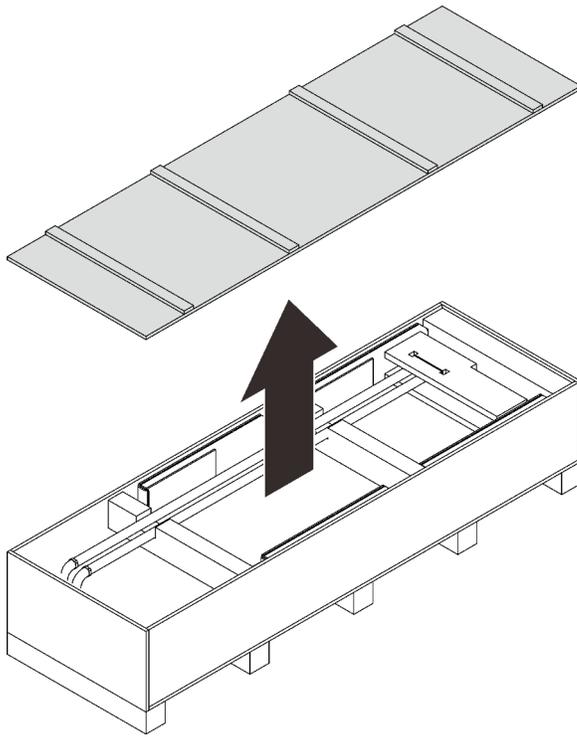


Figure 264. Removing the support brackets

Step 2. Remove the cover of the box that contains the heat exchanger.



Bottom

Figure 265. Removing the cover of the box

- Step 3. Lift both sides of the heat exchanger with two trained technicians by handles, and remove the heat exchanger from the box.

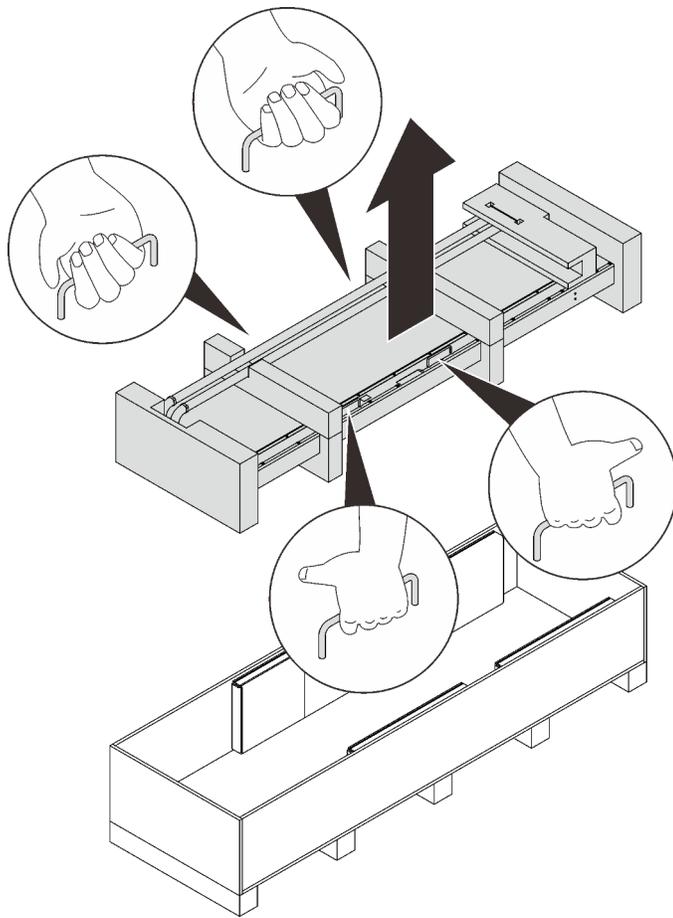


Figure 266. Removing the heat exchanger

- Step 4. While the two technicians keep lifting the heat exchanger, have another person remove the top and bottom packing materials.

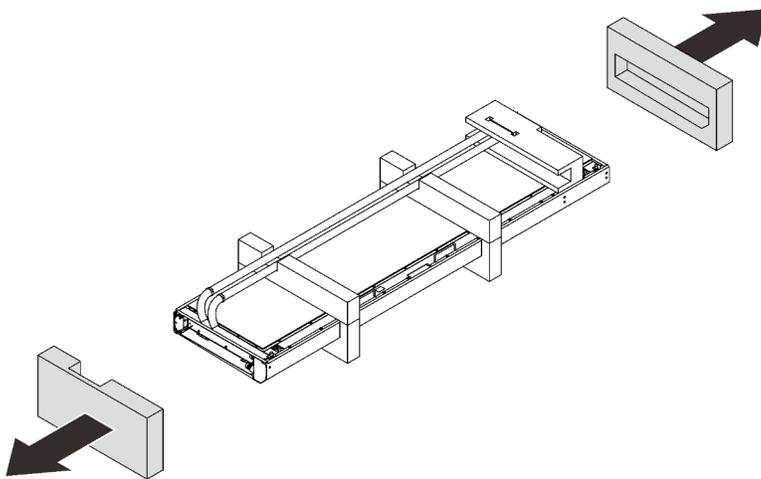


Figure 267. Removing the packing materials

- Step 5. Remove the hose retaining material and peel the hoses away.

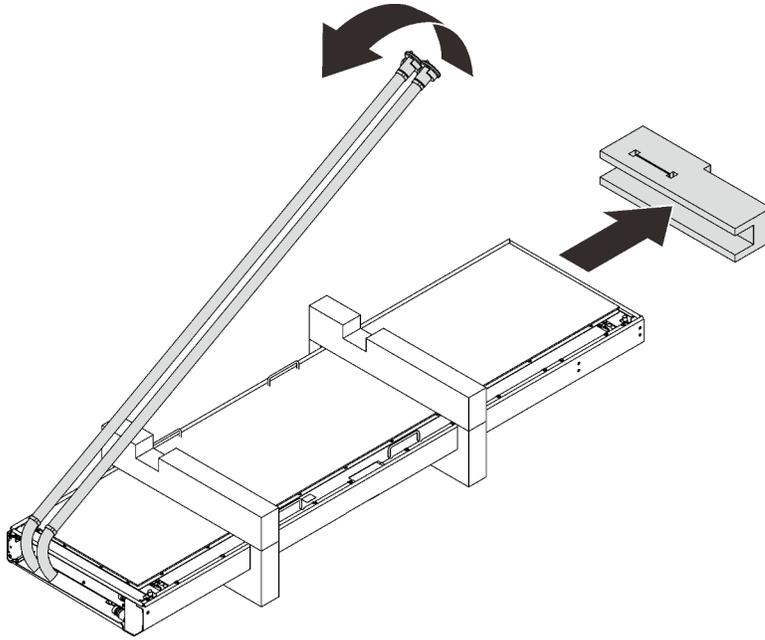


Figure 268. Removing the retaining material

Step 6. Split and remove the rest of the packing materials.

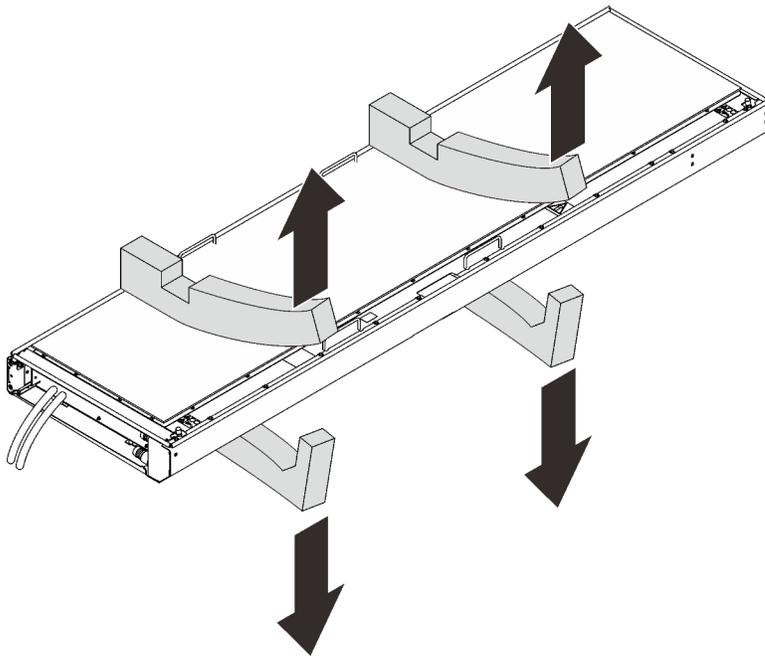


Figure 269. Removing the packing materials

Step 7. While the two technicians who are lifting the heat exchanger rotate it to vertical orientation, the other person hold on to the other handle and the door latch.

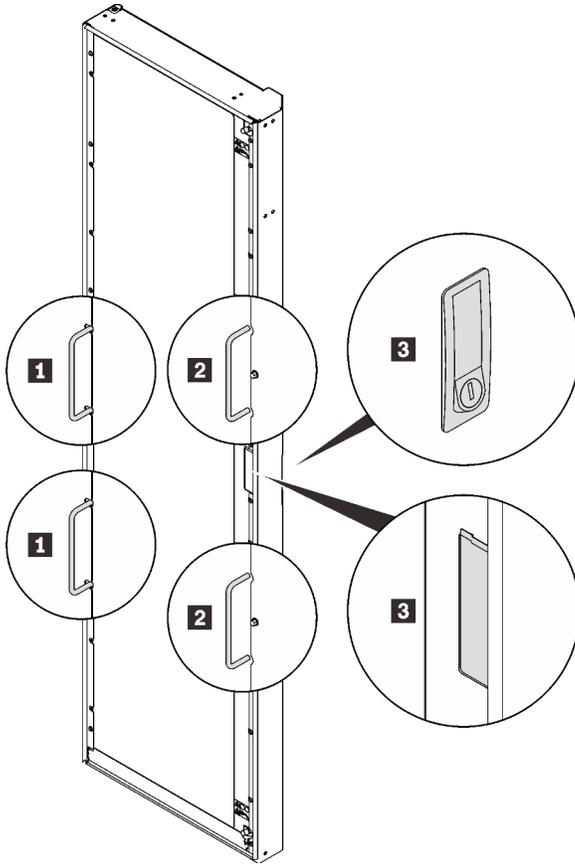


Figure 270. Lifting the heat exchanger with three people

1 Handles that the first person hold on to	3 Spots that the third person hold on to
2 Handles that the second person hold on to	

Step 8. Carry the heat exchanger with three people to the cabinet frame. Align the bottom corner with the bottom hinge pin on the rack cabinet; then, lower the heat exchanger to fit the pin in.

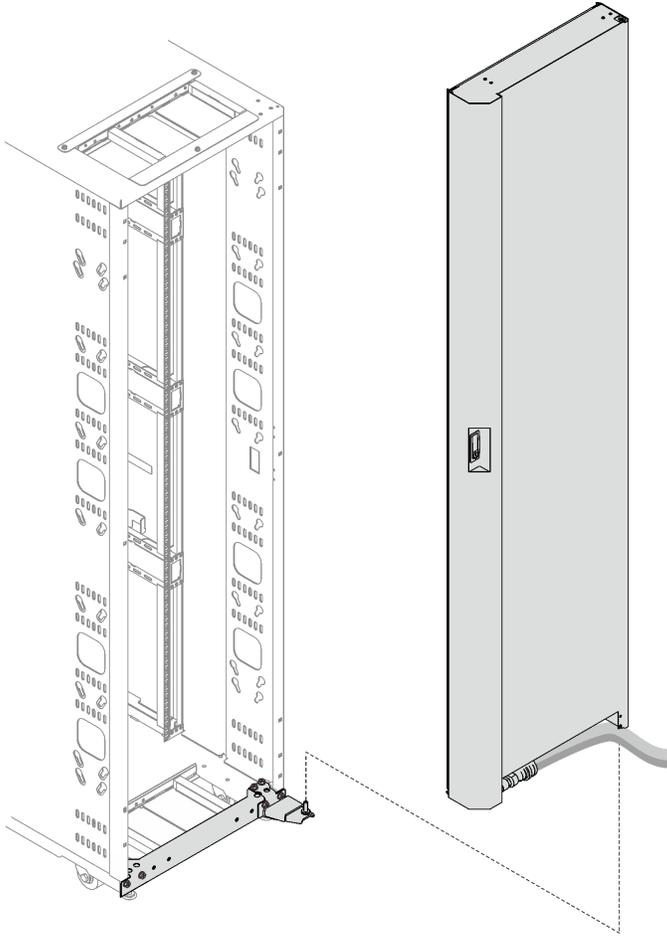


Figure 271. Installing the heat exchanger to the rack cabinet

Step 9. Hold the heat exchanger in place with two people, and install the top hinge. Depending on the configuration, select the corresponding installation procedures:

- **Without rack extension kit installed**

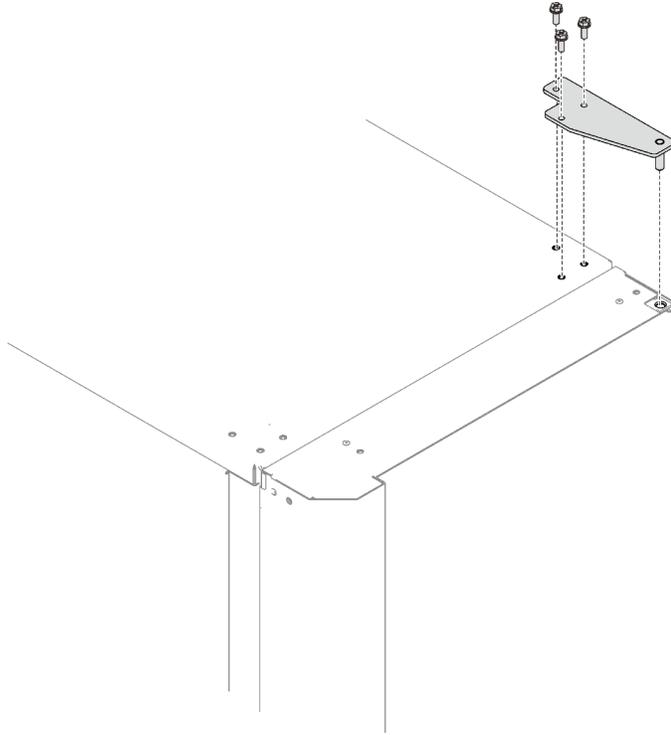


Figure 272. Installing the top hinge

Insert the top hinge pin to the heat exchanger; then, secure the hinge with three screws.

- **With 48U Advanced Rack Extension Kit installed**

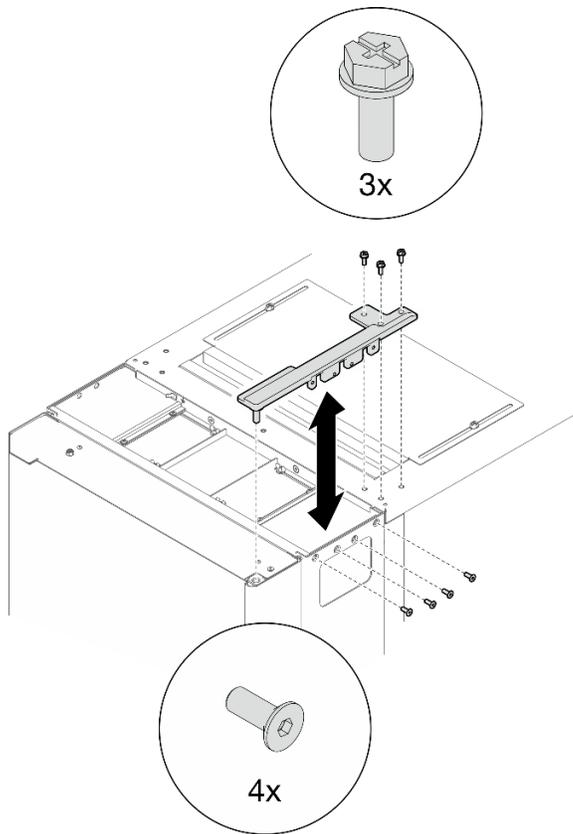


Figure 273. Installing the top hinge

Insert the top hinge pin to the heat exchanger; then, secure the hinge with seven screws.

After this task is completed

Proceed to [“Fill the heat exchanger with water” on page 248.](#)

Fill the heat exchanger with water

See this topic to learn how to fill ThinkSystem Rear Door Heat eXchanger for 48U Rack with water.

About this task

S038



CAUTION:
Eye protection should be worn for this procedure.

Attention: Wear safety goggles or other eye protection whenever you fill, drain, or purge air or nitrogen from the heat exchanger.

Procedure

Step 1. Purge the nitrogen that has been filled in the hose from the hose.

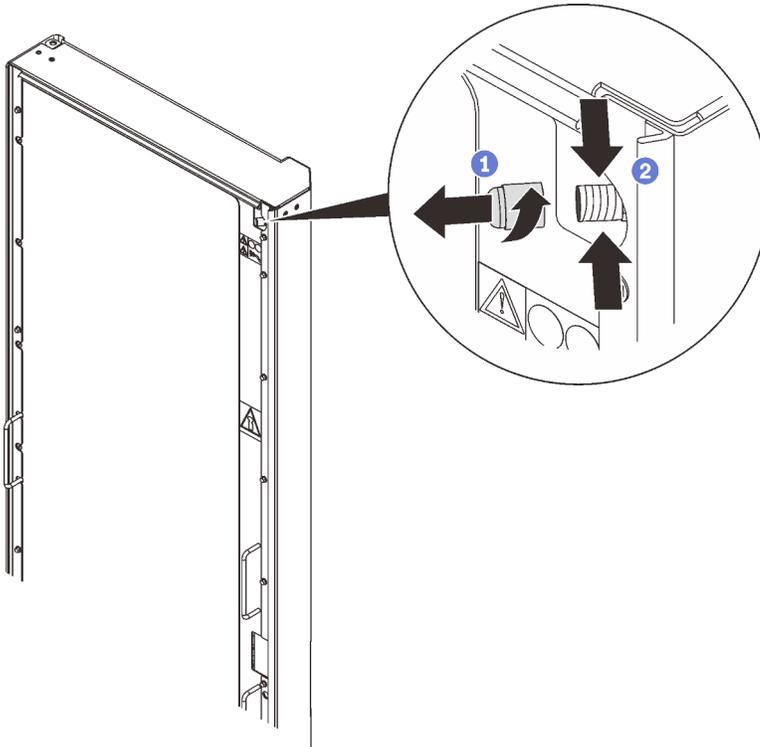


Figure 274. Purging nitrogen

- 1 Loosen and remove the cap from the air-purging valve.
- 2 Press in on the valve stem of the air-purging valve to purge the nitrogen from the heat exchanger. Continue holding in the valve stem until the pressure is released.

Step 2. Attach the air-purging tool to the air-purging valve at the top of the heat exchanger, and place the drain end into a 2-liter (or larger) container to catch the water and air bubbles that escape during the filling procedure.

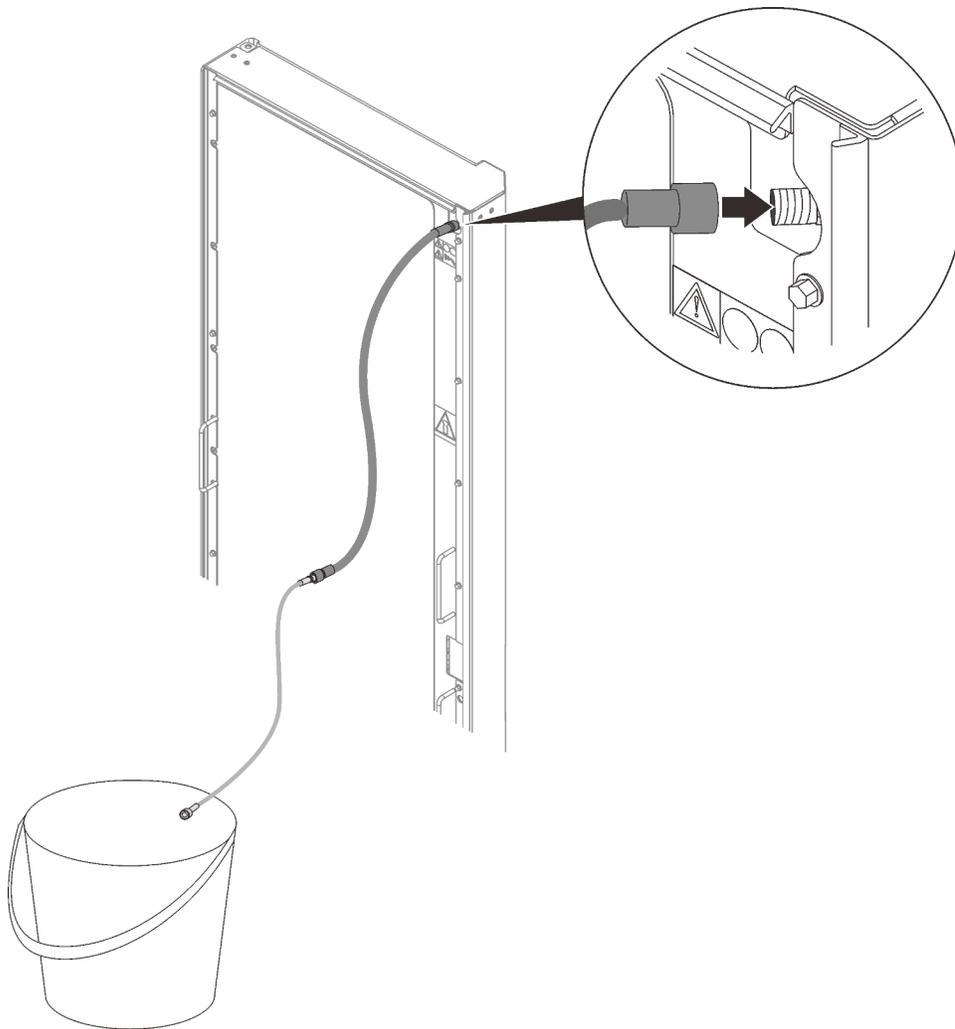


Figure 275. Installing the air-purging tool

Step 3. Connect the supply and return hose couplings with the manifolds.

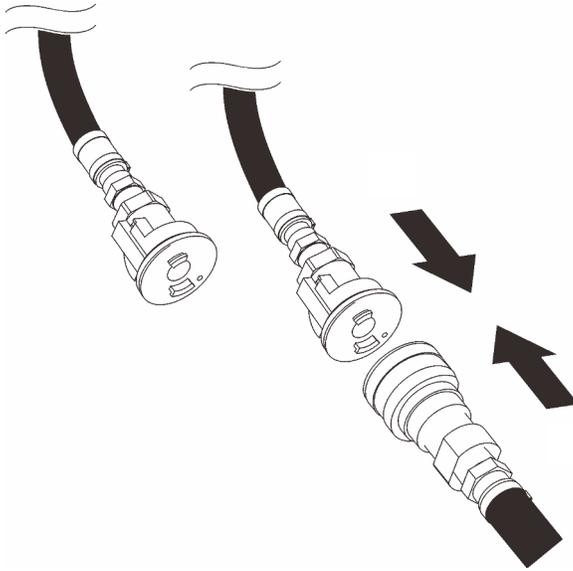


Figure 276. Connecting manifolds

- Step 4. Turn on the flow of water to the heat exchanger, and let it run for several minutes.
- Step 5. When there is a steady stream of liquid into the container from the air-purging tool, disconnect the tool from the heat exchanger.

Attention: If water drips from the air-purging valve after you remove the air-purging tool, reattach the tool and disconnect it again to seal the valve.

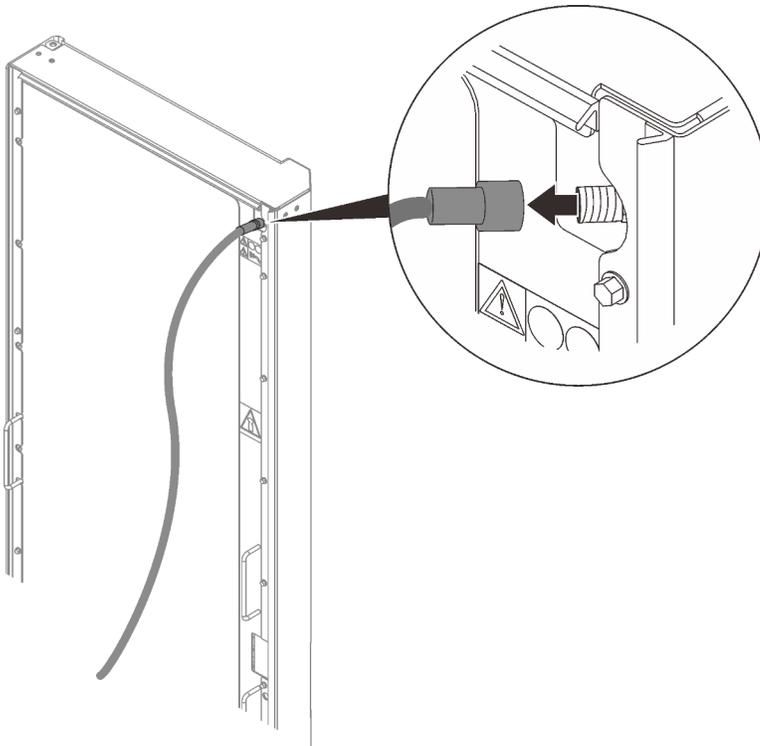


Figure 277. Removing the air-purging tool

Step 6. Install the valve cap back to the air-purging valve.

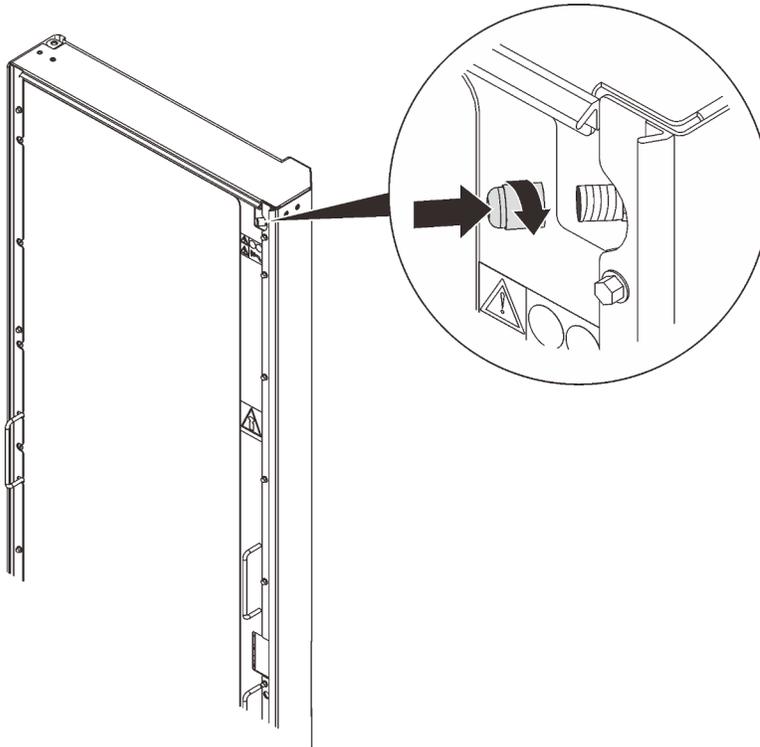


Figure 278. Installing the valve cap

Replace the door latch

See this topic to learn how to replace the door latch of Rear Door Heat eXchanger.

Procedure

Step 1. Remove the screw that secure the latch to the heat exchanger; then, secure the replacement unit with the same screw.

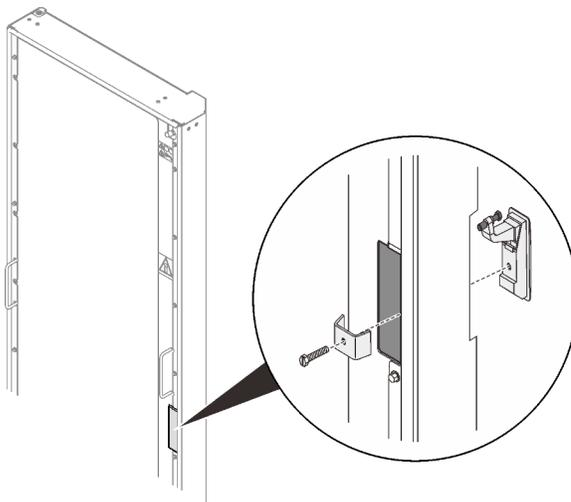


Figure 279. Replacing the door latch

Installing and removing rack extension kit

The rack cabinet supports up to two units of rack extension kit. See this topic to learn how to remove and install the rack extension kit.

Install 48U Advanced Rack Extension Kit

See this topic to learn how to install 48U Advanced Rack Extension Kit.

Notes:

- Each unit of rack extension kit comes with additional capacity for up to two 0U PDUs, or one 0U PDU and one manifold, on each side of the rack.
- Each rack cabinet supports up to two units of rack extension kit (one to the front and one to the rear side).
- If there is a plan to install baying kit while only one of the adjacent cabinets will be installed with extension, make sure to install the baying kit first (see [“Install the baying kit” on page 95](#)). Then, as preparation for this procedure, remove the two screws from the upper and lower part of the cabinet that will be installed with the extension kit, and jump to [Step 2 on page 256](#).

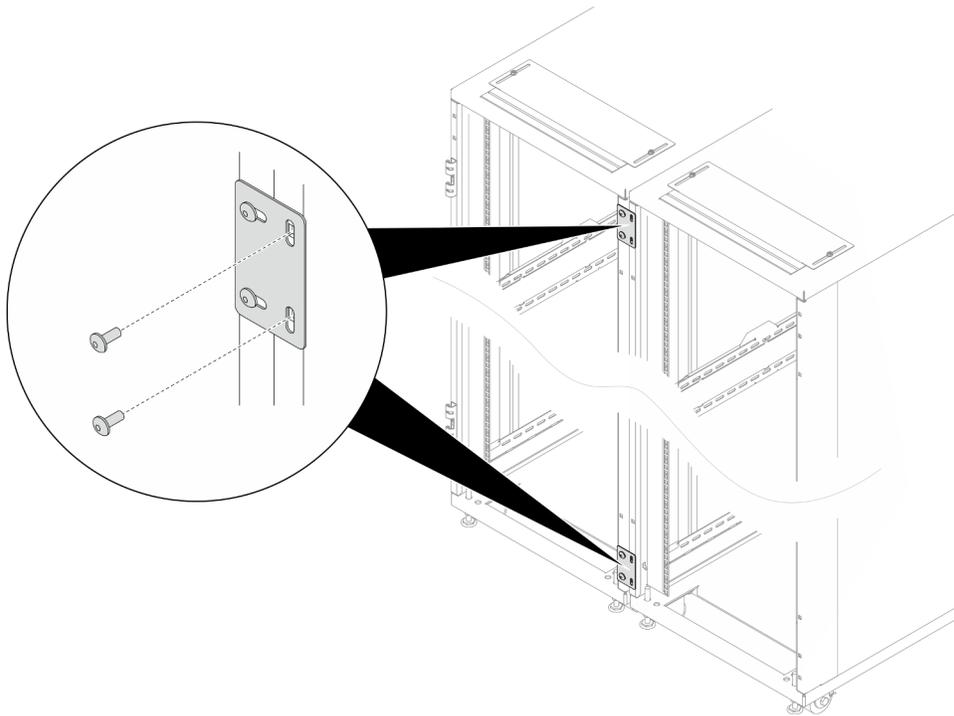


Figure 280. Removing screws to prepare for extension installation

• Required tools

- One tool with plastic blade/scissors to open the packaging
- One rubber hammer to align the extension panels with the side of the rack
- One Screwdriver with No. 3 Phillips bit to tighten the M6 screws (9 in the next bullet point)
- One Nut-driver with holding hex bit 10 mm to tighten the M6 screws (9 in the next bullet point)
- One 2.5 mm Hex bit socket to tighten the M4 screws (13 in the next bullet point)

- One 3 mm Hex bit socket to tighten the M5 screws (PDU/manifold brackets, opening covers on the extension panels)
- One 4 mm Hex bit socket to tighten the M6 screws (**3** and **12** in the next bullet point)
- The extension kit comes with a miscellaneous bag, which contains the following components:

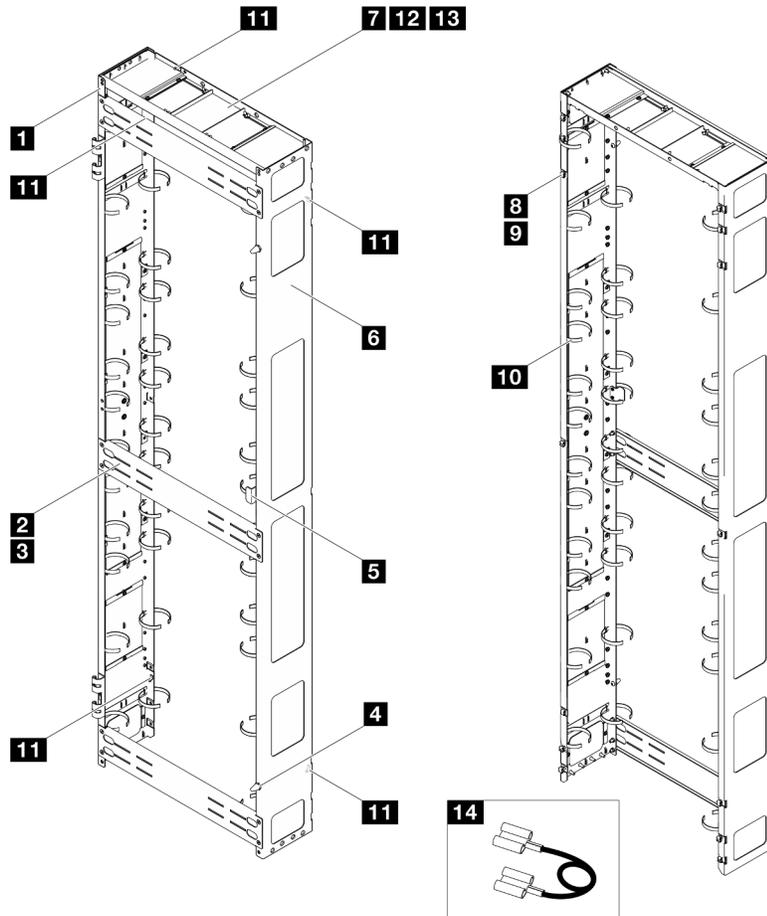


Figure 281. Parts

No.	Description	Quantity	No.	Description	Quantity
1	Left extension panel	1	8	M6 cage nut	14
2	Support bracket	3	9	M6 x 16 mm hex head flange screw	14
3	M6 x 12 mm flat head socket cap screw	12	10	Cable strap module ¹²³	2
4	Doorstop	2	11	Grounding plate	5
5	Door latch	1	12	M6 x 16 mm flat head socket cap screw	2
6	Right extension panel	1	13	M4 x 6 mm flat head socket cap screws	4
7	Extension top cover	1	14	Grounding wire ⁴	3

- ¹ Cable straps are removable, remove the straps from the extension panels if needed.
- ² Cable straps can be lengthened by connecting two or more straps together.
- ³ Use cable straps to secure PDUs and manifolds prior to shipping.
- ⁴ Connect one end of the grounding wire to the grounding plate on the extension panel and the other end to the nearest grounding plate on the rack.

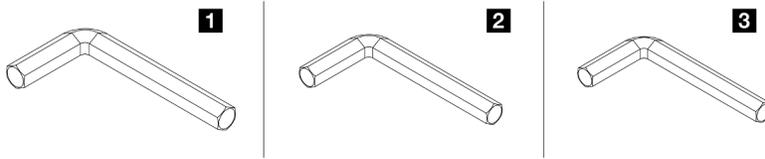


Figure 282. Hex Allen wrenches

No.	Description
1	Hex Allen wrench, 4 mm
2	Hex Allen wrench, 3 mm
3	Hex Allen wrench, 2.5 mm

Procedure

- Step 1. Install fourteen M6 cage nuts to the rack frame with [cage nut insertion tool](#) or a [flat-blade screwdriver](#).

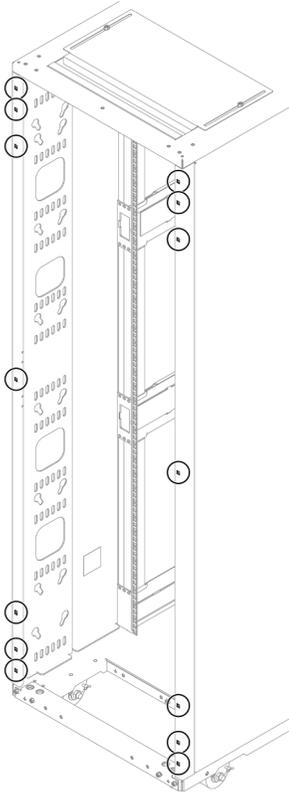
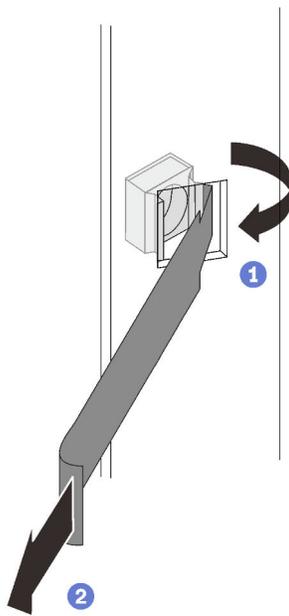


Figure 283. Cage nut installation location

With cage nut insertion tool



- 1 Insert one edge of the cage nut into the target mounting flange hole, and hook the other edge with the insertion tool through the flange hole.
- 2 Rotate and pull the tool to force the other nut edge into the flange hole, and thus secure the nut.

Figure 284. Installing cage nuts with cage nut insertion tool

With flat blade screwdriver

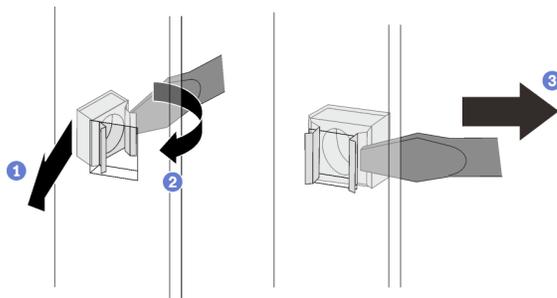


Figure 285. Installing cage nuts with flat blade screwdriver

- 1 Insert one edge of the cage nut into the target mounting flange hole.
- 2 Press and compress the other nut edge with a flat-blade screwdriver, and rotate the screwdriver towards the flange hole until the nut edge goes in the hole.
- 3 Release the screwdriver to secure the nut in the mounting flange hole.

Step 2. Tighten the fourteen screws to secure the two extension panels to the rack.

Note: If baying kit has been installed previously, make sure to remove the two screws from top and bottom of the cabinet first. Then, secure the screws through the panel and the baying kit.

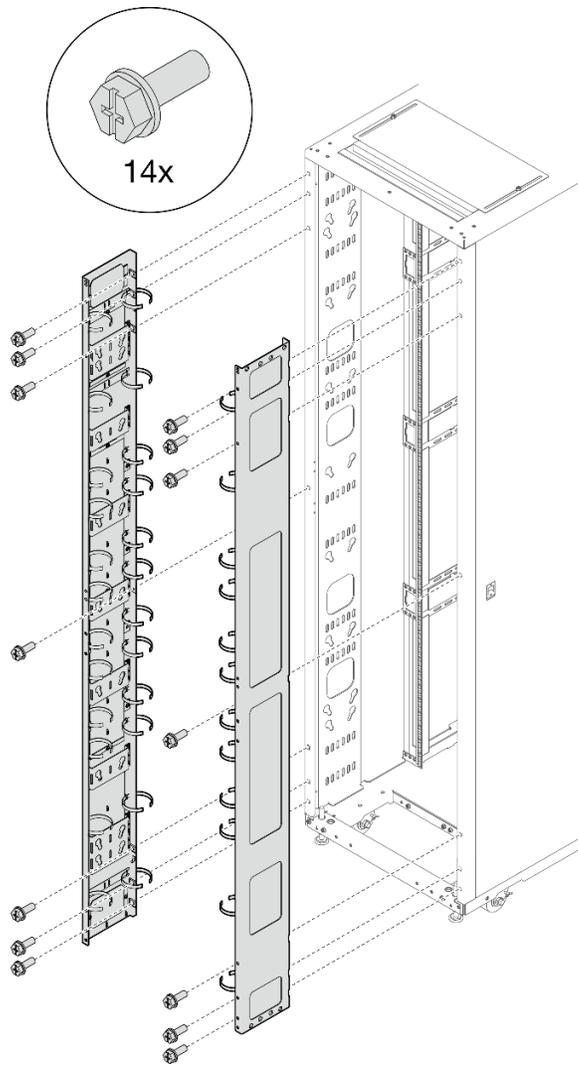


Figure 286. Installing the extension panels

- Step 3. Align the extension top cover with the screw holes on the extension panels, and secure it with six screws.

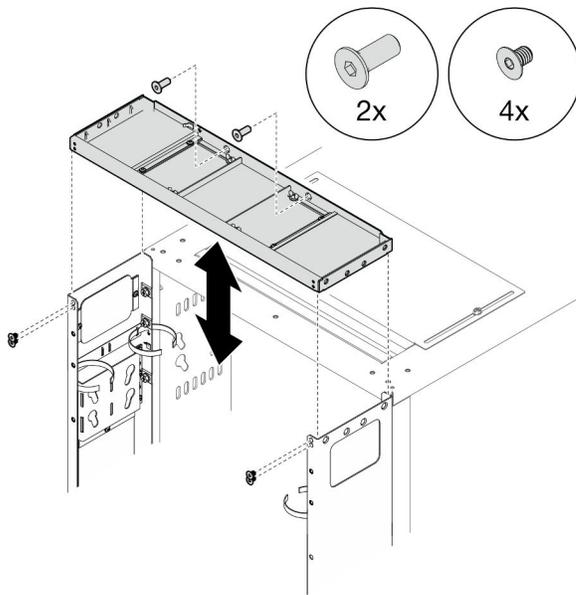


Figure 287. Installing the extension top cover

Step 4. Depending on the requirements, remove the filler(s) from the extension panels to route cables.

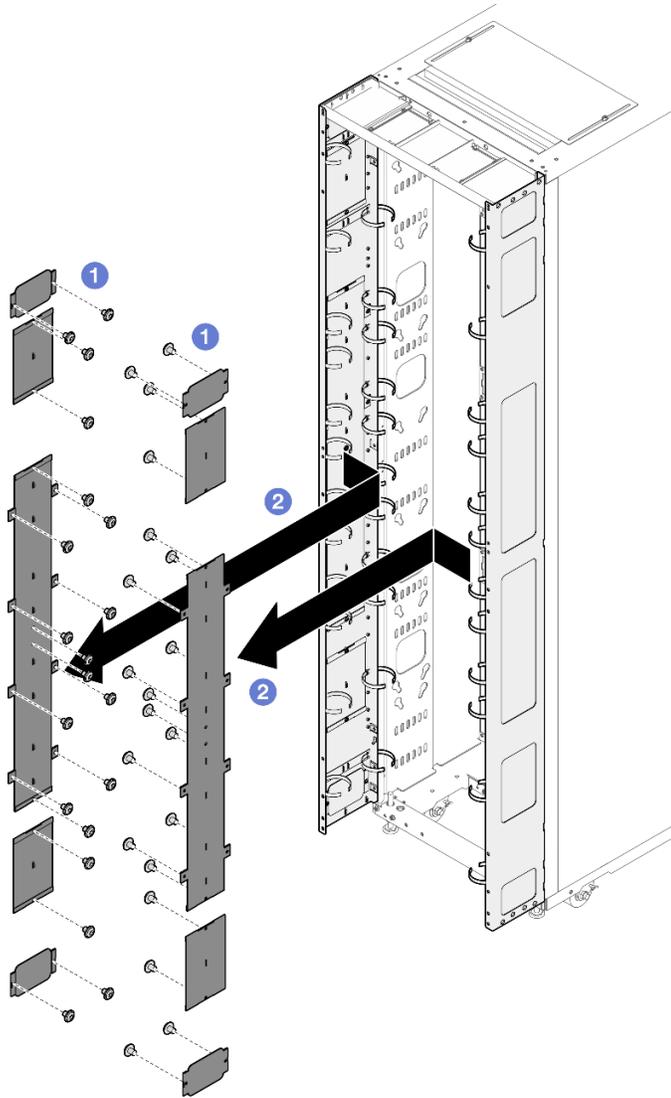


Figure 288. Removing the filler(s)

1. ① Loosen the screws that secure the filler to the extension panel.
2. ② Remove the filler.

Step 5. If there is a plan to install 0U PDU to the extension panel, complete the following steps.

Depending on the requirements, select the corresponding installation procedures.

- **Bracket with two keyhole slots (up to two PDUs, or one PDU and one manifold)**

Notes:

- Below illustration shows the locations for installing the brackets.

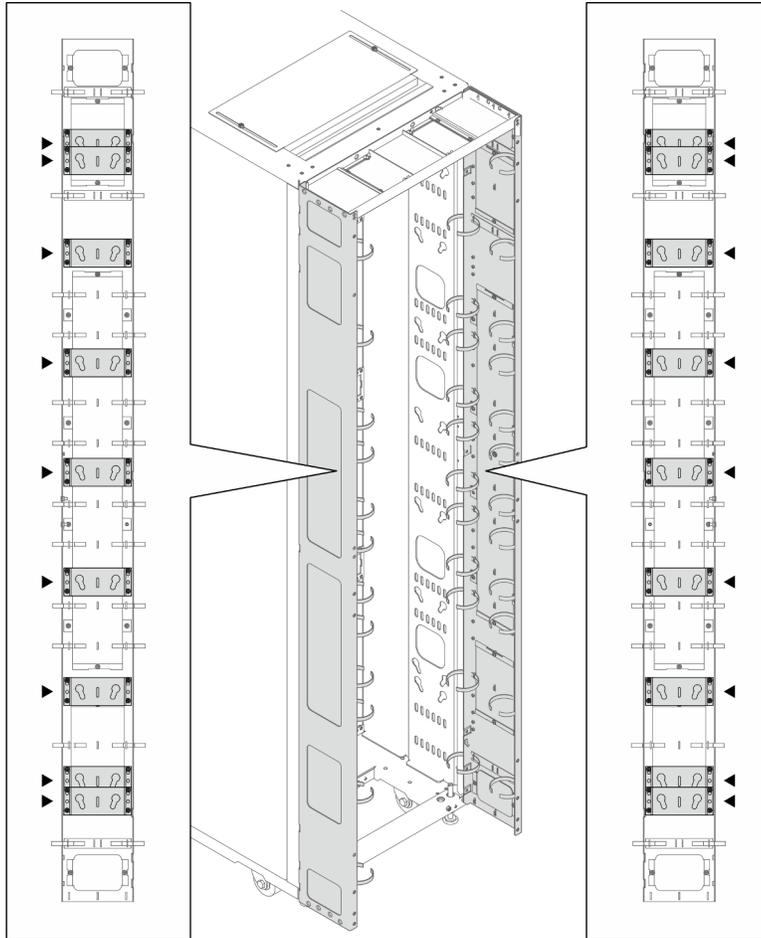


Figure 289. Locations for installing the brackets with two keyhole slots

- If one or two brackets are installed in the locations indicated in the illustration below, the M6 hex head flange screw must be replaced with an M6 round head flange screw.

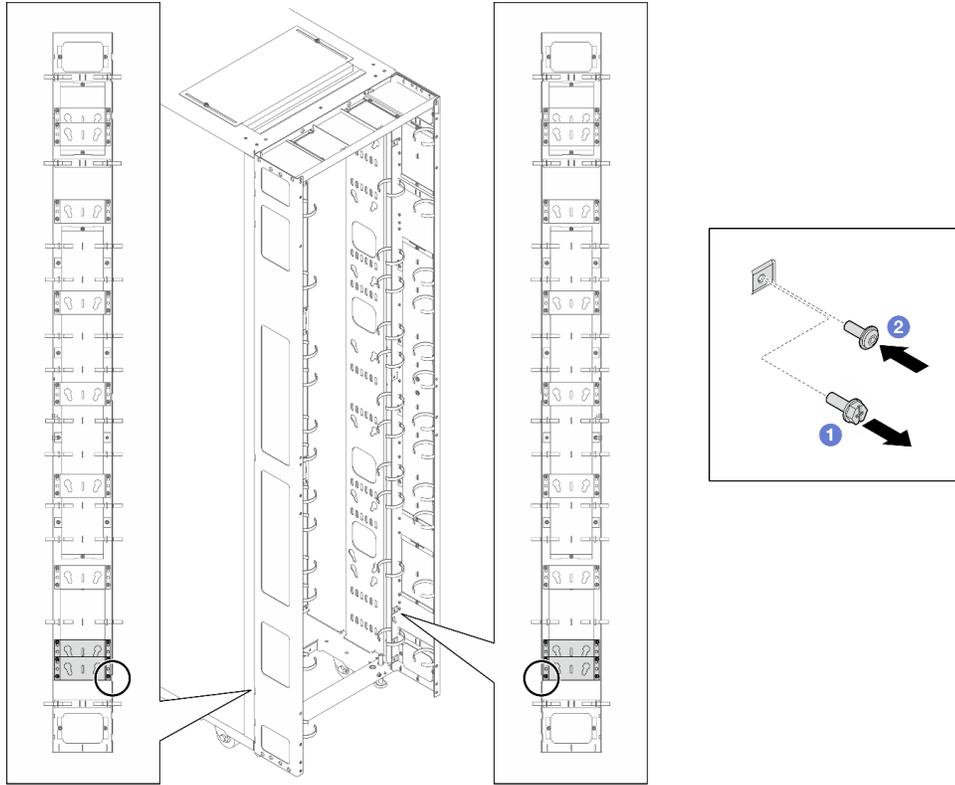


Figure 290. Replacing the screw

1. **1** Remove the M6 hex head flange screw.
 2. **2** Install the M6 round head flange screw.
1. Align the bracket with the extension panel, and secure it with four screws.

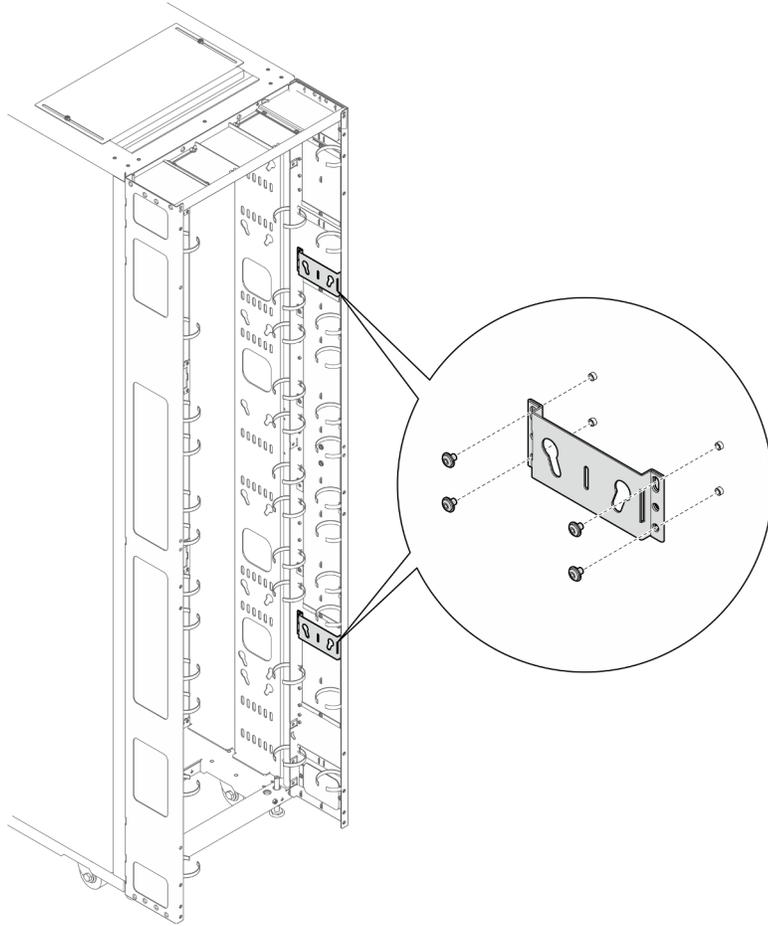


Figure 291. Installing the bracket with two keyhole slots

2. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets. Choose the left or right slot for PDU installation based on the requirements.

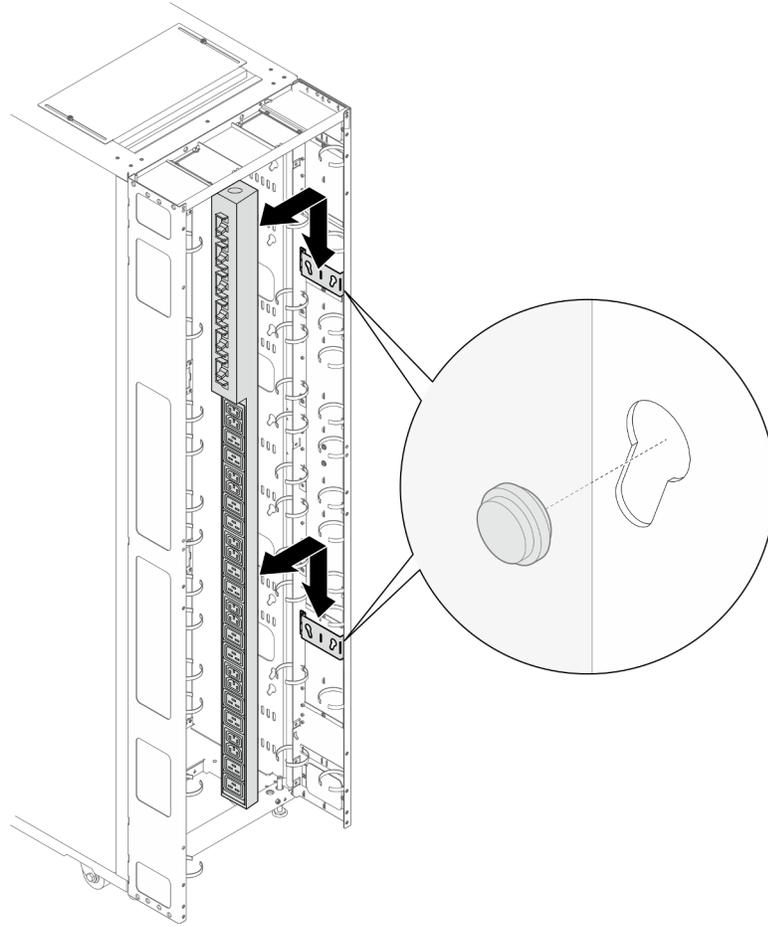


Figure 292. Installing the PDU

Note: PDU can be rotated 180 degrees for installation with the input cable at the bottom.

- **L-shaped bracket (up to two PDUs, or one PDU and one manifold)**

Notes:

- Below illustration shows the locations for installing the brackets.

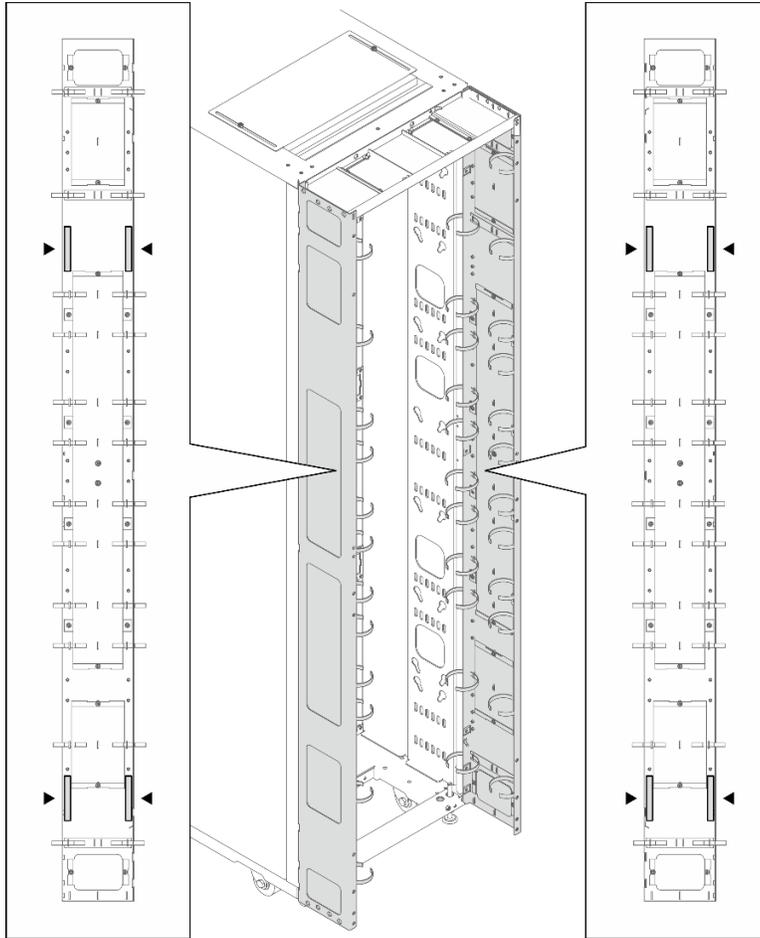


Figure 293. Locations for installing the L-shaped brackets

- If one or two brackets are installed in the locations indicated in the illustration below, the M6 hex head flange screw must be replaced with an M6 round head flange screw.

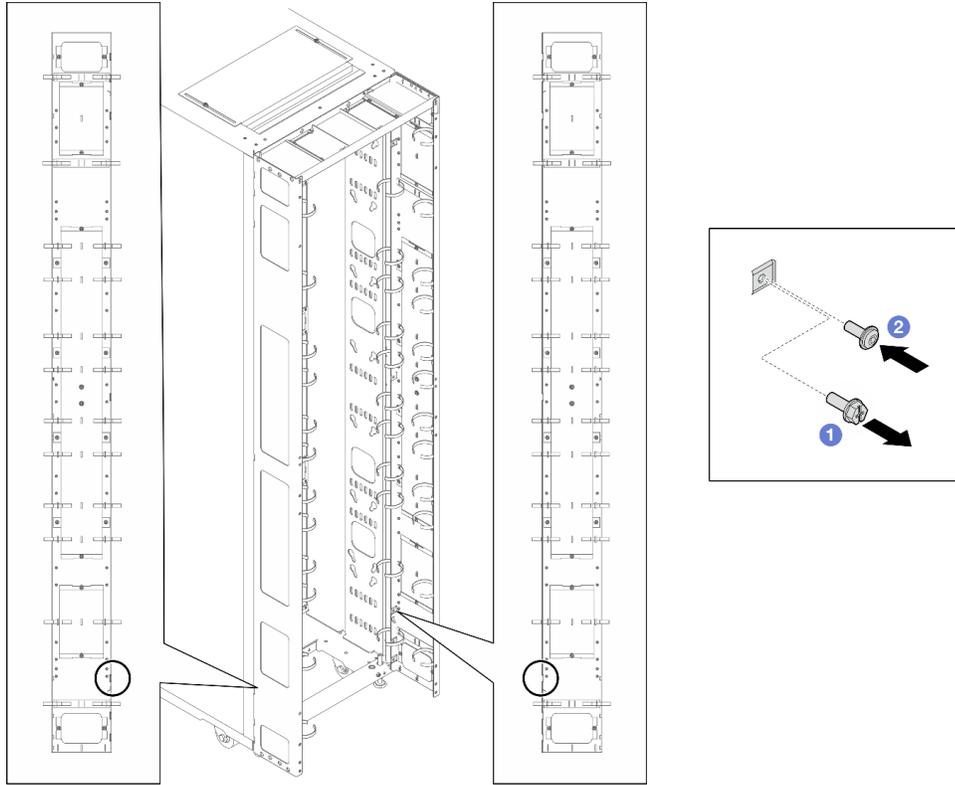


Figure 294. Replacing the screw

1. **1** Remove the M6 hex head flange screw.
 2. **2** Install the M6 round head flange screw.
1. Align the bracket with the extension panel, and secure it with three screws. Choose the installation location for the bracket based on the orientation of the PDU.

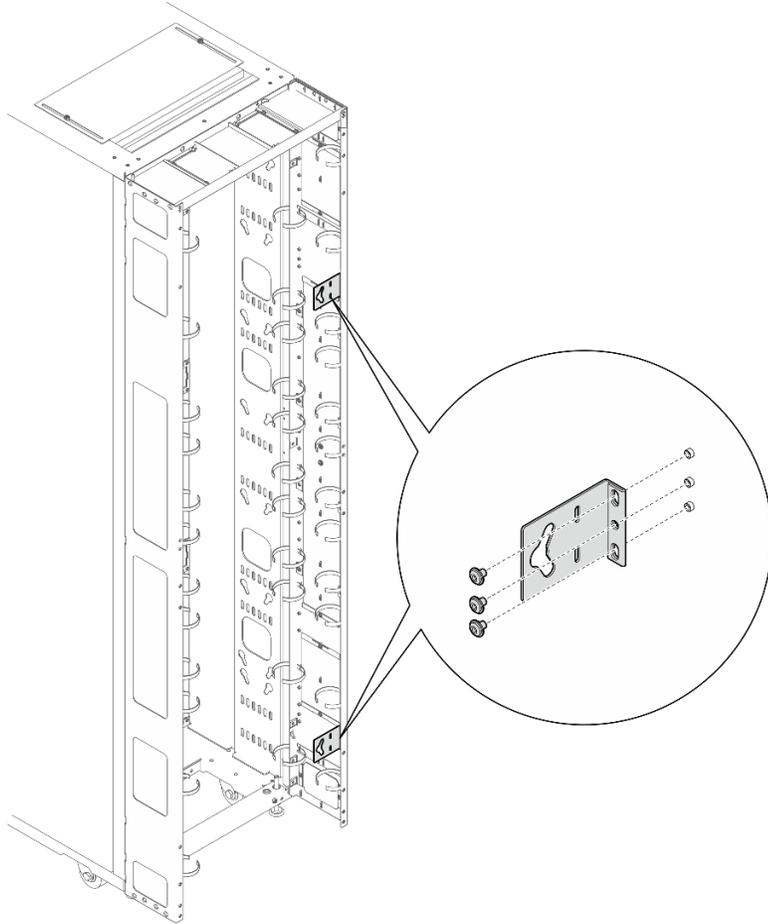


Figure 295. Installing the L-shaped bracket with the PDU facing the front of the rack cabinet

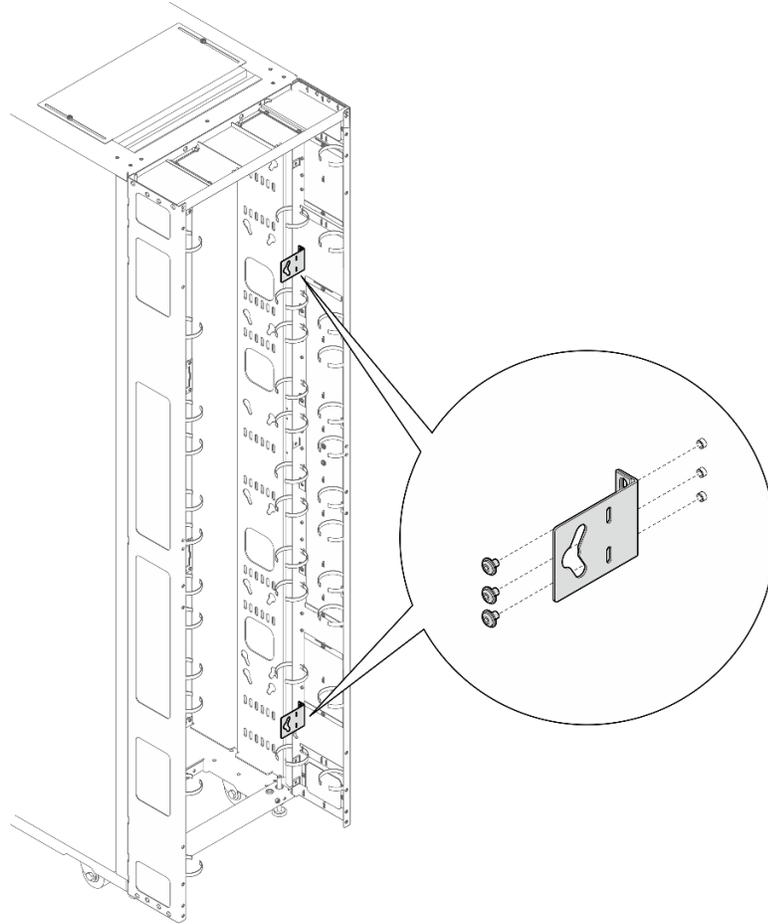


Figure 296. Installing the L-shaped bracket with the PDU facing the front of the rack cabinet

2. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets.

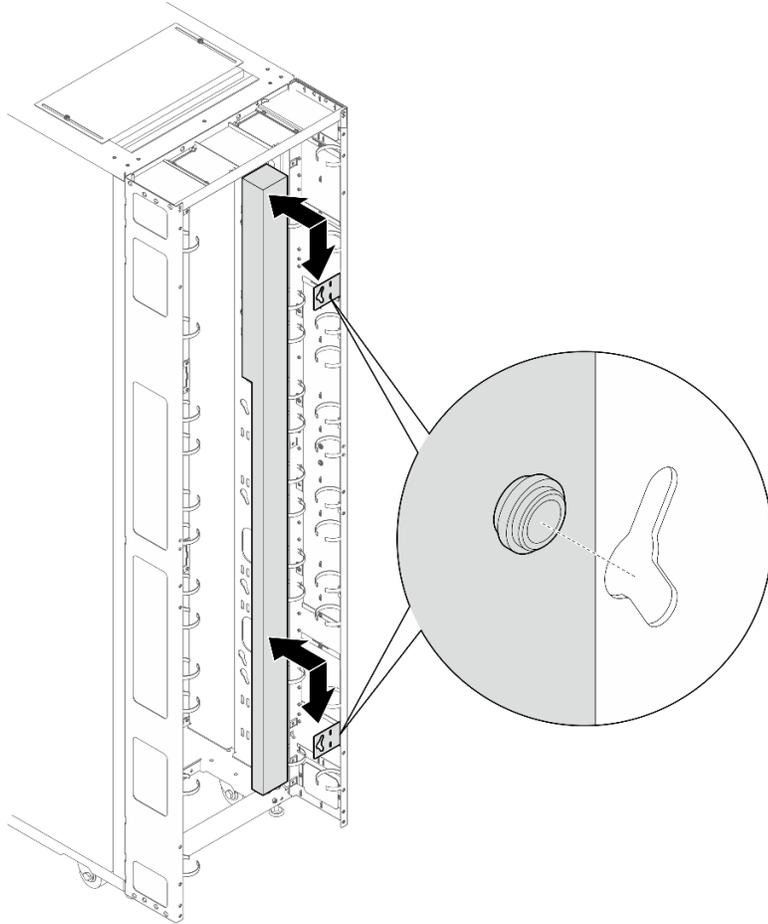


Figure 297. Installing the PDU with the PDU facing the front of the rack cabinet

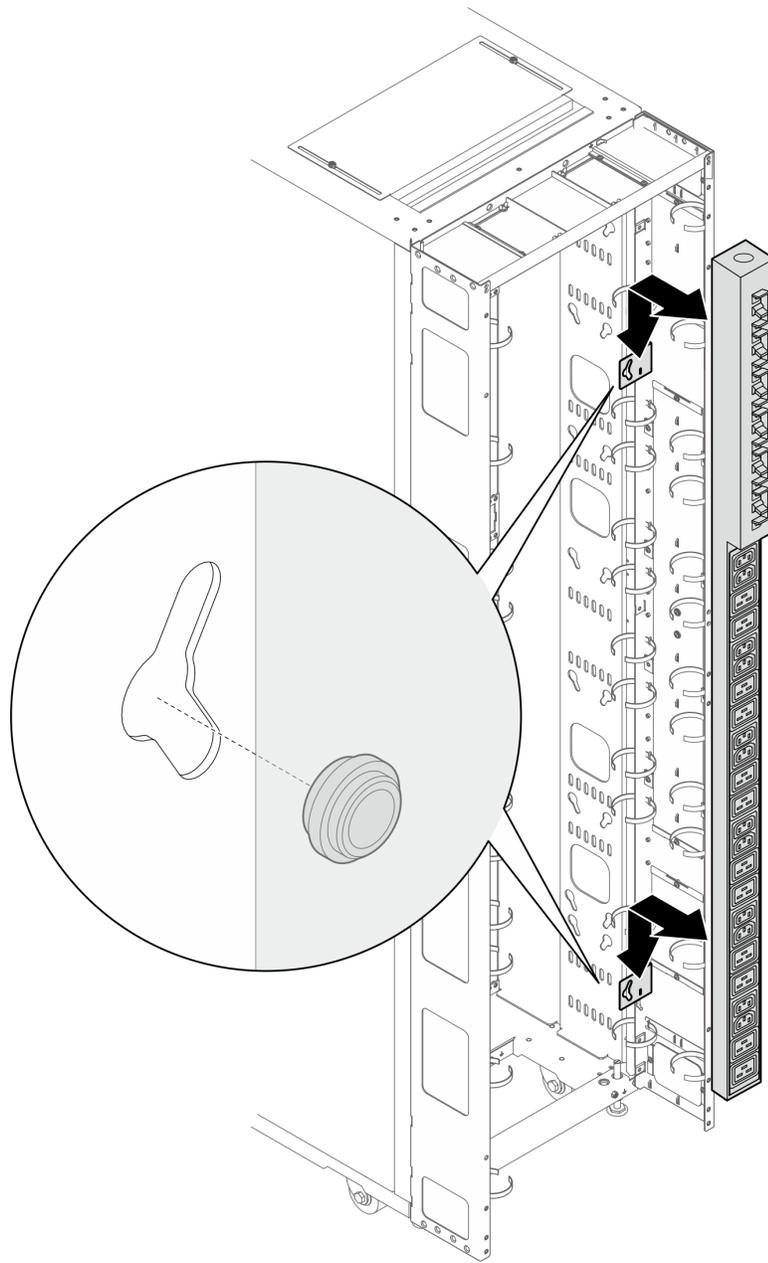


Figure 298. Installing the PDU with PDU facing the rear of the rack cabinet

Step 6. Depending on the requirements, select one of the following methods to ensure there is sufficient space for routing cables.

- **Slide the brush panel**

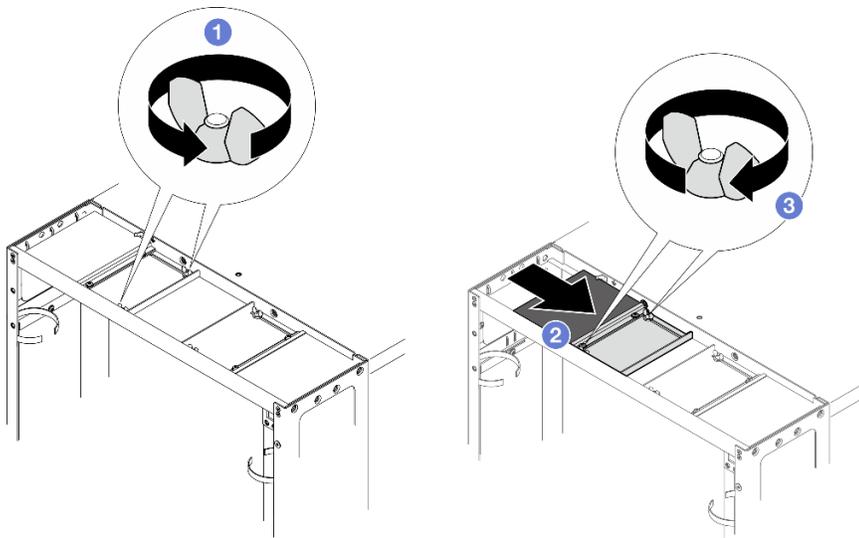


Figure 299. Sliding the brush panel

1. **1** Loosen the two screws that secure the baffle to the top cover.
2. **2** Slide the baffle and brush panel toward the center of the top cover.
3. **3** Tighten the two screws to secure the baffle.

- **Remove the brush panel**

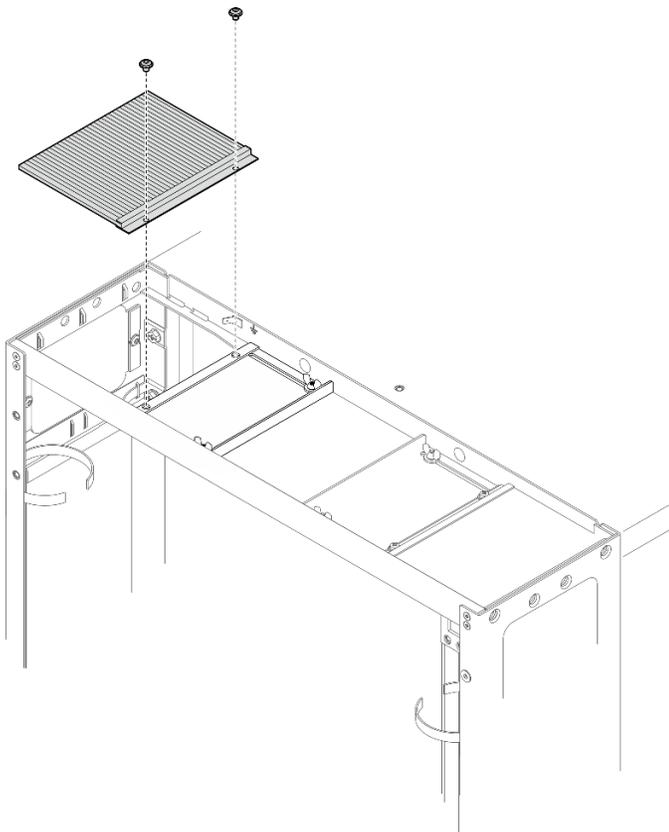


Figure 300. Removing the brush panel

Loosen the two screws to remove the brush panel from the top cover.

- **Remove the brush panel and baffle**

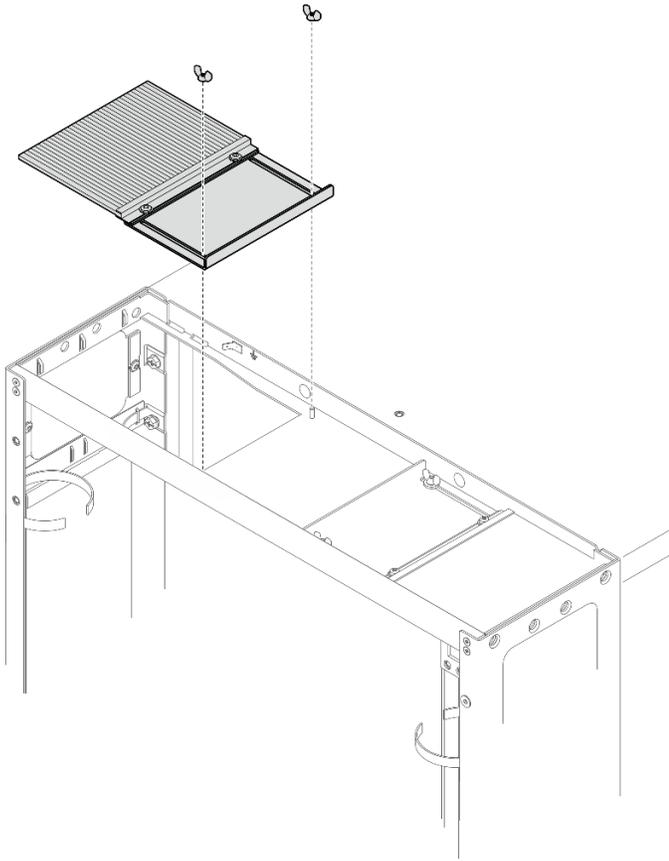


Figure 301. Removing the brush panel and baffle

Loosen the two screws to remove the brush panel and baffle from the top cover.

Step 7. Install the two door hinges and the door latch to the extension panels.

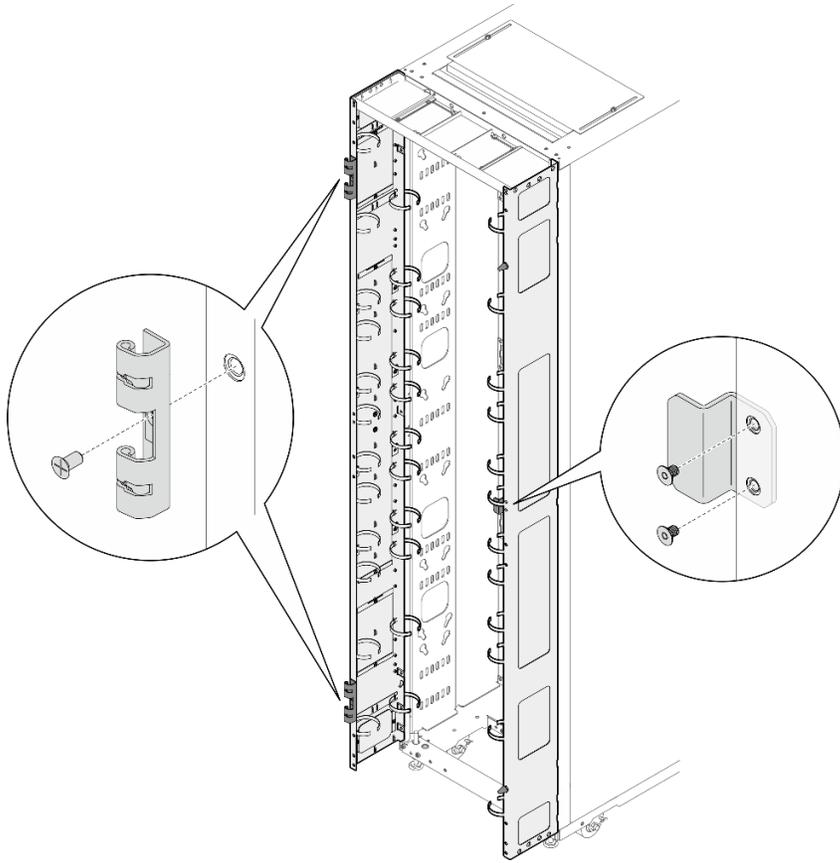


Figure 302. Installing the door hinges and door latch

Step 8. If the rack needs to be shipped, install the three support brackets.

Note: Depending on the requirement, remove the support brackets upon arrival at the site.

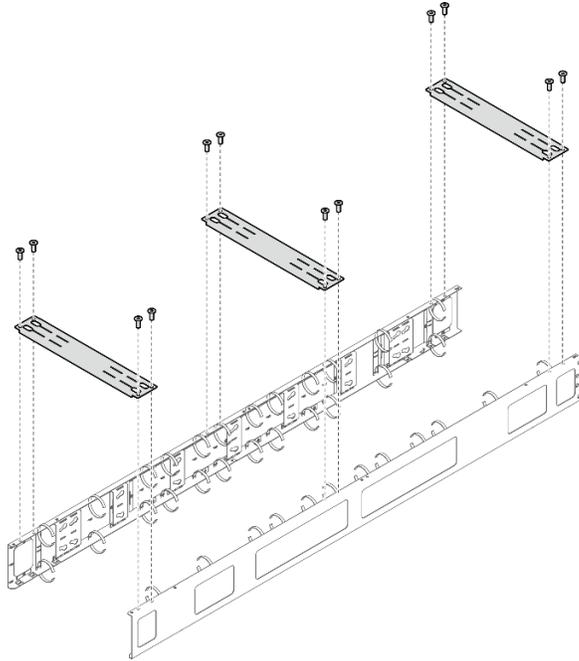


Figure 303. Installing the support brackets

Step 9. Install the door back to the rack.

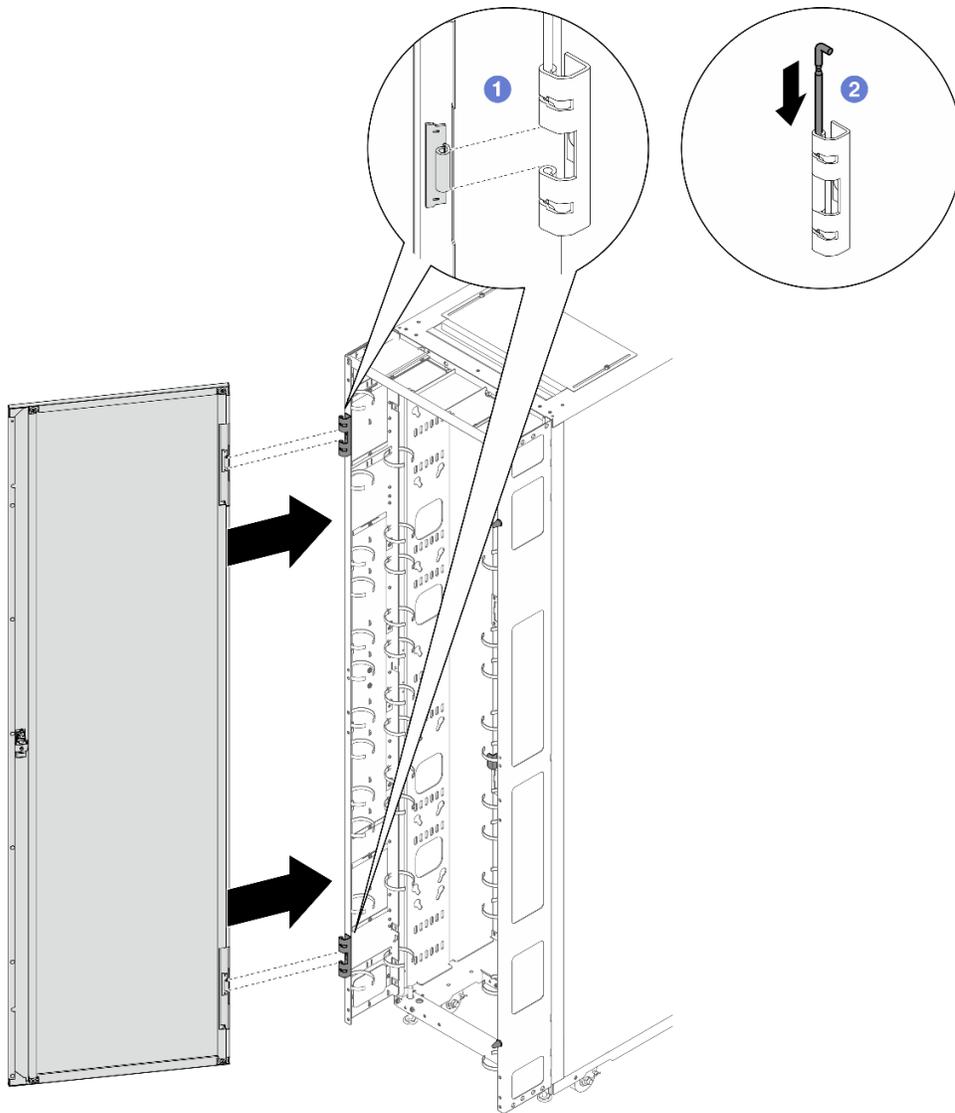


Figure 304. Installing the door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Remove 48U Advanced Rack Extension Kit

See this topic to learn how to remove 48U Advanced Rack Extension Kit.

Procedure

- Step 1. Remove the door from the rack cabinet (see [“Remove a door”](#) on page 219).
- Step 2. If any devices are installed to the extension panels, remove them (see [“Remove a 0U PDU”](#) on page 319).
- Step 3. Unfasten the six screws, and remove the extension top cover.

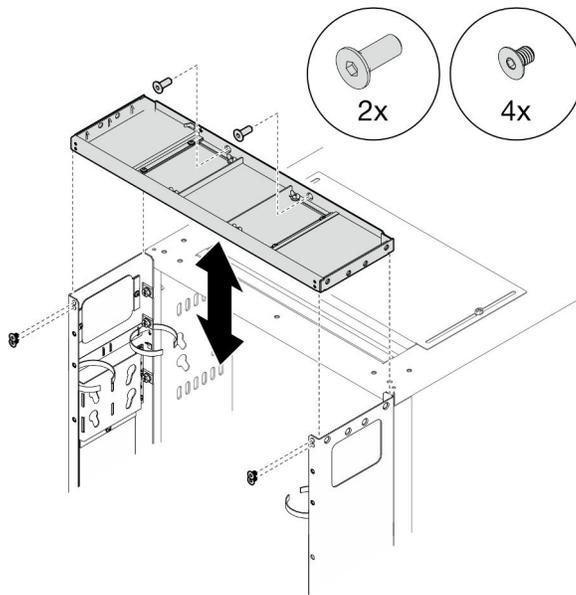


Figure 305. Removing the extension top cover

Step 4. Unfasten the fourteen screws, and remove the two extension panels.

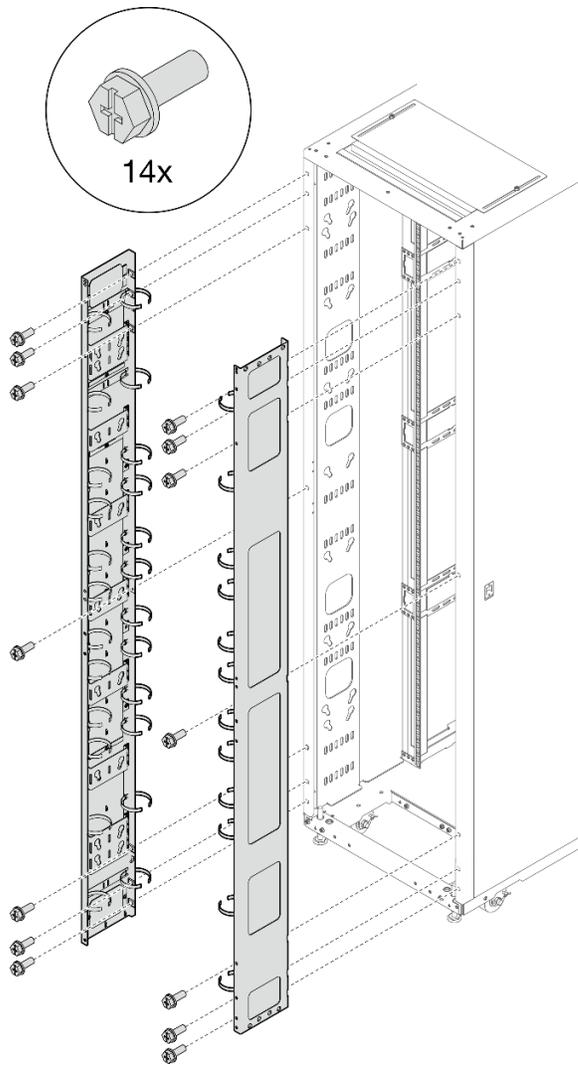


Figure 306. Removing the extension panels

After this task is completed

Reinstall the door (see [“Install a door” on page 220](#)).

Install 48U Advanced Rack Extension Kit with RDHX

See this topic to learn how to install 48U Advanced Rack Extension Kit and RDHX.

- Each unit of rack extension kit comes with additional capacity for up to two 0U PDUs, or one 0U PDU and one manifold, on each side of the rack.
- Each rack cabinet supports up to two units of rack extension kit (one to the front and one to the rear side).
- If there is a plan to install baying kit while only one of the adjacent cabinets will be installed with extension, make sure to install the baying kit first (see [“Install the baying kit” on page 95](#)). Then, as preparation for this procedure, remove the two screws from the upper and lower part of the cabinet that will be installed with the extension kit, and skip to [Step 2 on page 280](#).

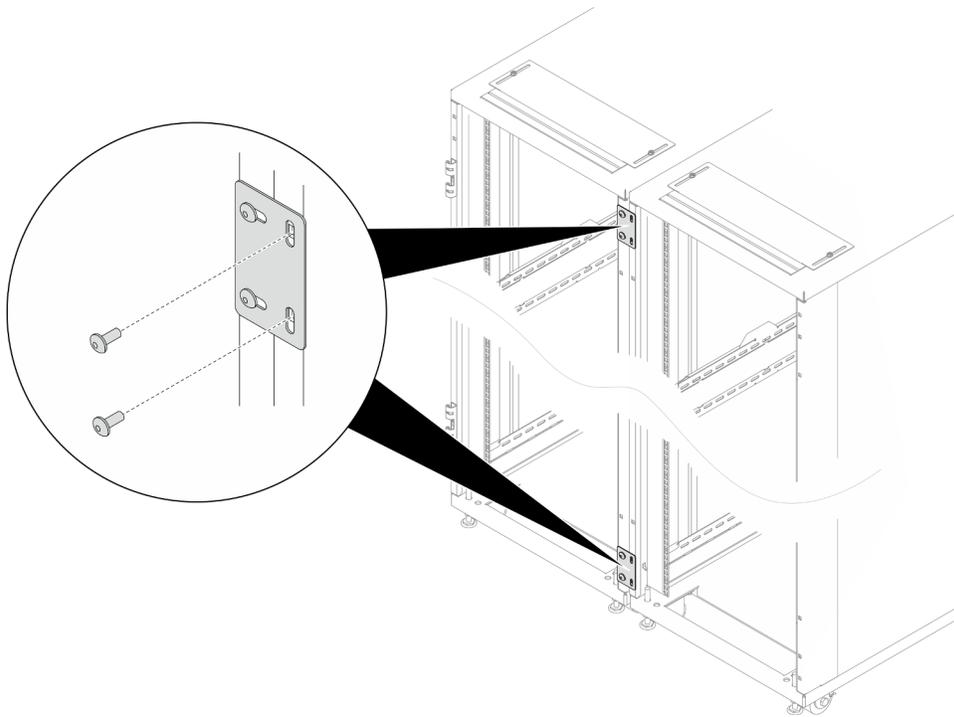


Figure 307. Removing screws to prepare for extension installation

- **Required tools**

- One tool with plastic blade/scissors to open the packaging
- One rubber hammer to align the extension panels with the side of the rack
- One Screwdriver with No. 3 Phillips bit to tighten the M6 screws (9 in the next bullet point)
- One Nut-driver with holding hex bit 10 mm to tighten the M6 screws (9 in the next bullet point)
- One 2.5 mm Hex bit socket to tighten the M4 screws (13 in the next bullet point)
- One 3 mm Hex bit socket to tighten the M5 screws (PDU/manifold brackets, opening covers on the extension panels)
- One 4 mm Hex bit socket to tighten the M6 screws (4 and 14 in the next bullet point)
- The extension kit comes with a miscellaneous bag, which contains the following components:

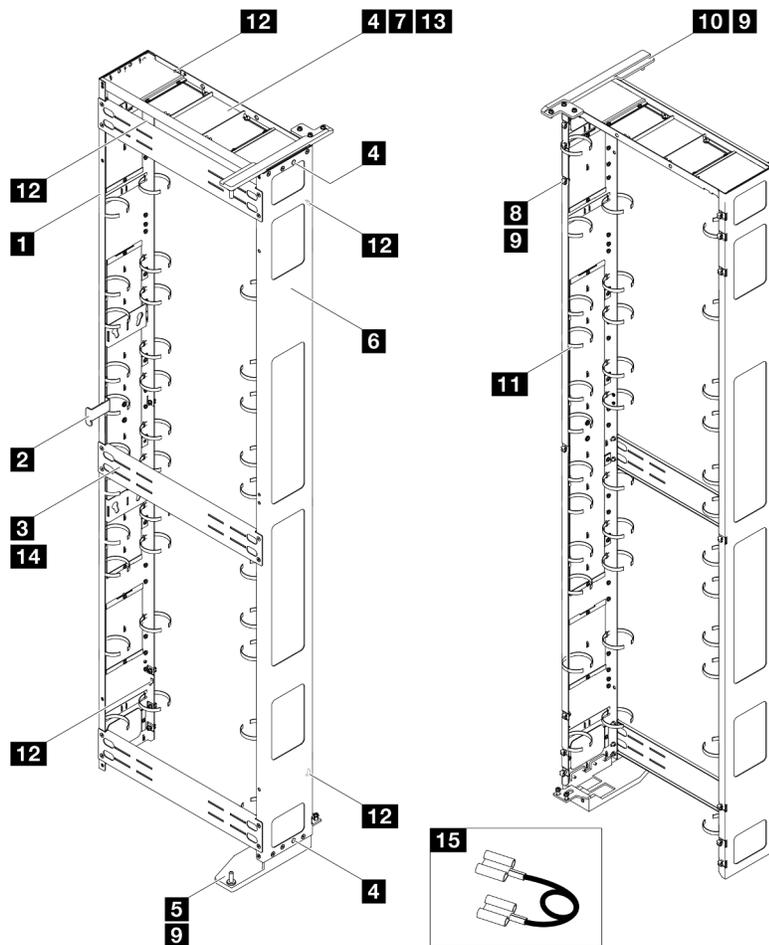


Figure 308. Parts

No.	Description	Quantity	No.	Description	Quantity
1	Left extension panel	1	9	M6 x 16 mm hex head flange screw	21
2	Latch plate	1	10	Top hinge for RDHX	1
3	Support bracket	3	11	Cable strap module ¹²³	2
4	M6 x 16 mm flat head socket cap screw	10	12	Grounding plate	5
5	Bottom hinge for RDHX	1	13	M4 x 6 mm flat head socket cap screws	4
6	Right extension panel	1	14	M6 x 12 mm flat head socket cap screw	12
7	Extension top cover	1	15	Grounding wire ⁴	3
8	M6 cage nut	14			

- ¹ Cable straps are removable, remove the straps from the extension panels if needed.
- ² Cable straps can be lengthened by connecting two or more straps together.
- ³ Use cable straps to secure PDUs and manifolds prior to shipping.

- 4 Connect one end of the grounding wire to the grounding plate on the extension panel and the other end to the nearest grounding plate on the rack.

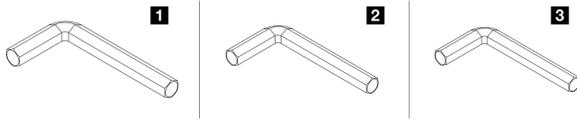


Figure 309. Hex Allen wrenches

No.	Description
1	Hex Allen wrench, 4 mm
2	Hex Allen wrench, 3 mm
3	Hex Allen wrench, 2.5 mm

Procedure

- Step 1. Install fourteen M6 cage nuts to the rack frame with [cage nut insertion tool](#) or a [flat-blade screwdriver](#).

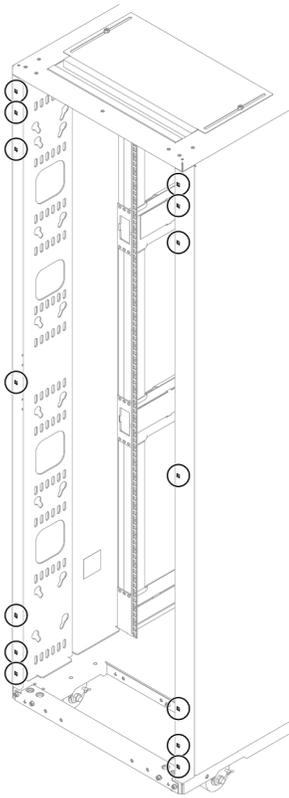
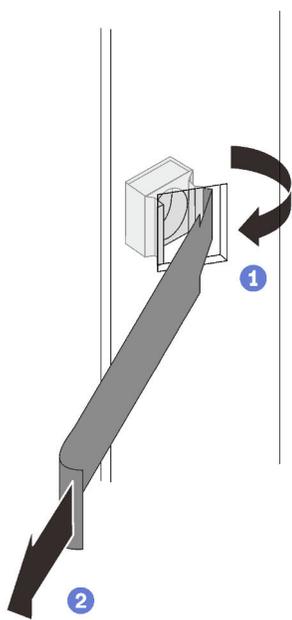


Figure 310. Cage nut installation location

With cage nut insertion tool



- 1 Insert one edge of the cage nut into the target mounting flange hole, and hook the other edge with the insertion tool through the flange hole.
- 2 Rotate and pull the tool to force the other nut edge into the flange hole, and thus secure the nut.

Figure 311. Installing cage nuts with cage nut insertion tool

With flat blade screwdriver

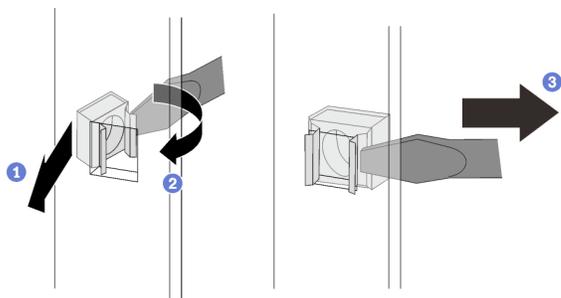


Figure 312. Installing cage nuts with flat blade screwdriver

- 1 Insert one edge of the cage nut into the target mounting flange hole.
- 2 Press and compress the other nut edge with a flat-blade screwdriver, and rotate the screwdriver towards the flange hole until the nut edge goes in the hole.
- 3 Release the screwdriver to secure the nut in the mounting flange hole.

Step 2. Install the bottom hinge.

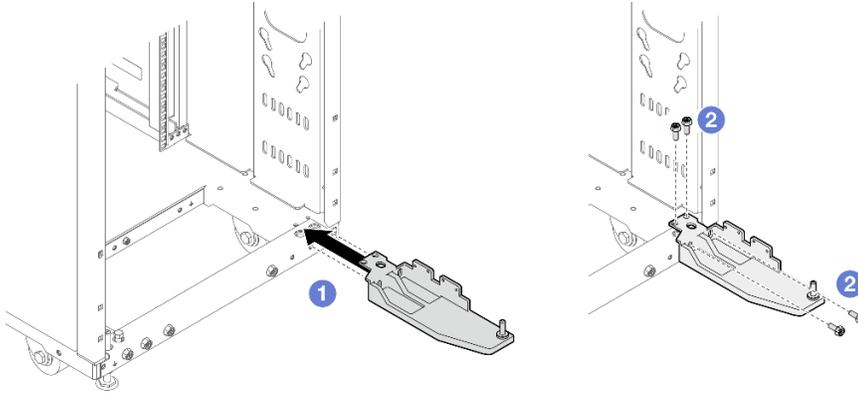


Figure 313. Securing the bottom hinge

Note: Do not fully tighten the four screws in this step.

- 1 Align the hinge with the rack.
- 2 Secure the hinge to the rack with four screws.

Step 3. Secure the two extension panels to the rack with fourteen screws.

Notes:

- Do not fully tighten the fourteen screws in this step.
- If baying kit has been installed previously, make sure to remove the two screws from top and bottom of the cabinet first. Then, secure the screws through the panel and the baying kit.

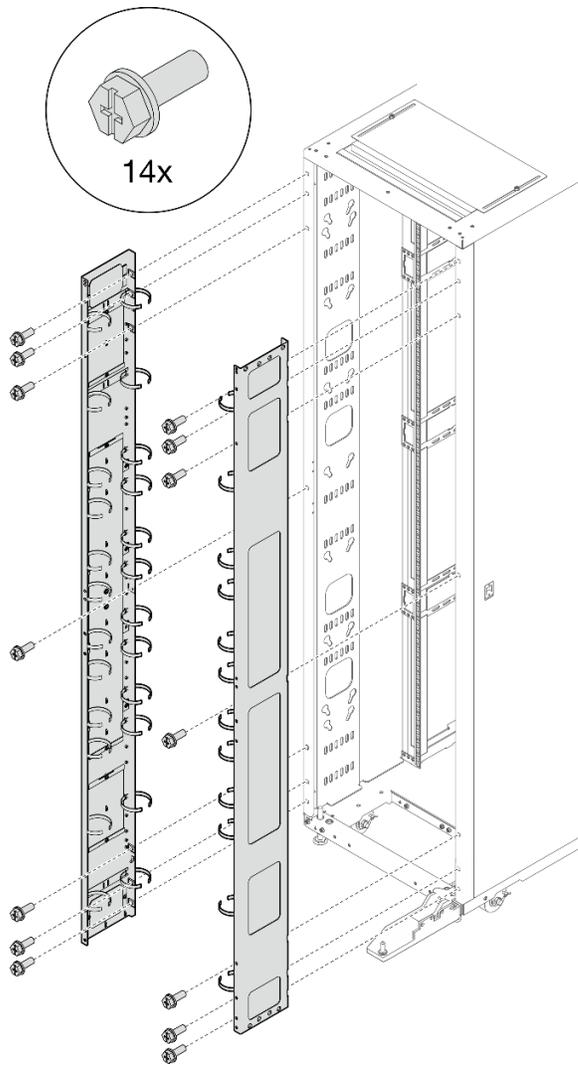


Figure 314. Installing the extension panels

- Step 4. Align the extension top cover with the screw holes on the extension panels, and secure it with six screws.

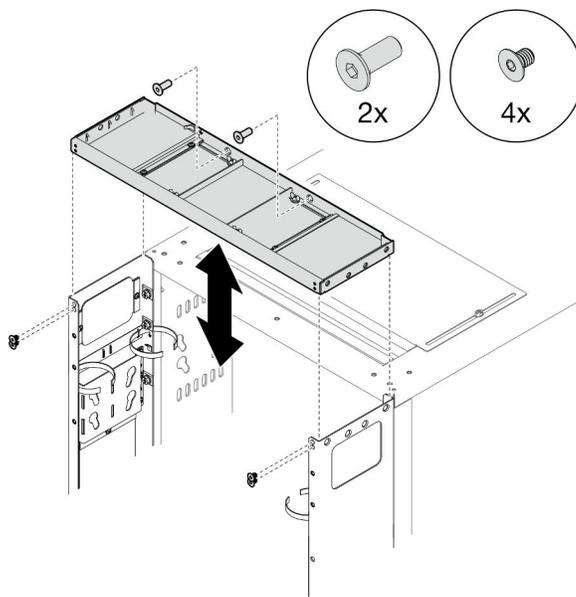


Figure 315. Installing the extension top cover

Step 5. Depending on the requirements, remove the filler(s) from the extension panels to route cables.

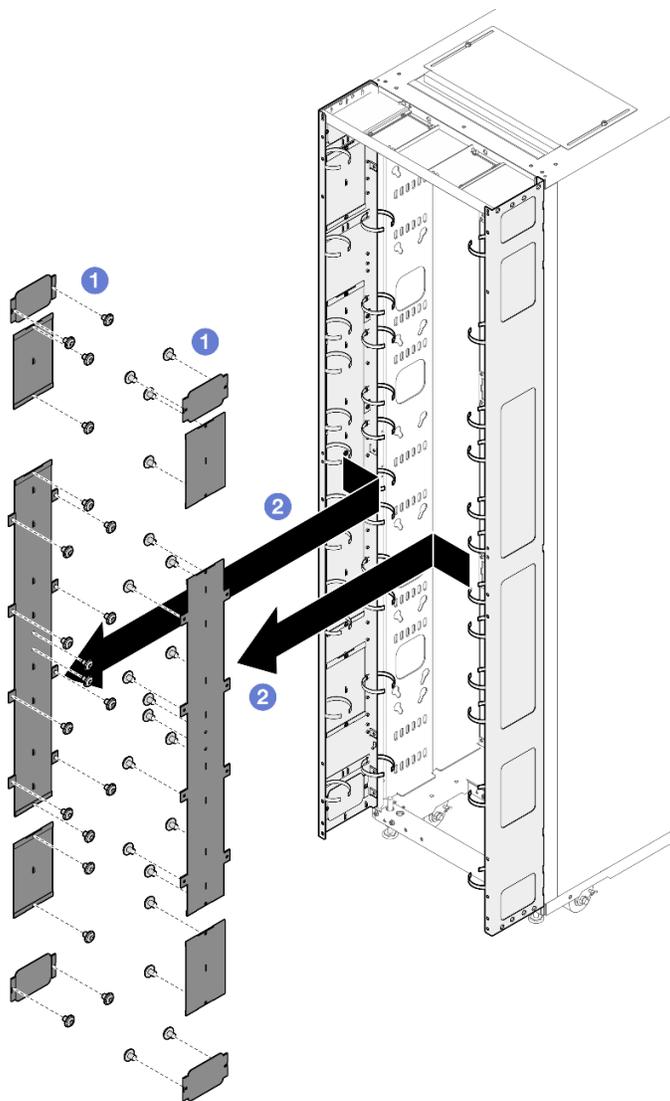


Figure 316. Removing the filler(s)

1. **1** Loosen the screws that secure the filler to the extension panel.
2. **2** Remove the filler.

Step 6. If there is a plan to install 0U PDU to the extension panel, complete the following steps.

Depending on the requirements, select the corresponding installation procedures.

- **Bracket with two keyhole slots (up to two PDUs, or one PDU and one manifold)**

Notes:

- Below illustration shows the locations for installing the brackets.

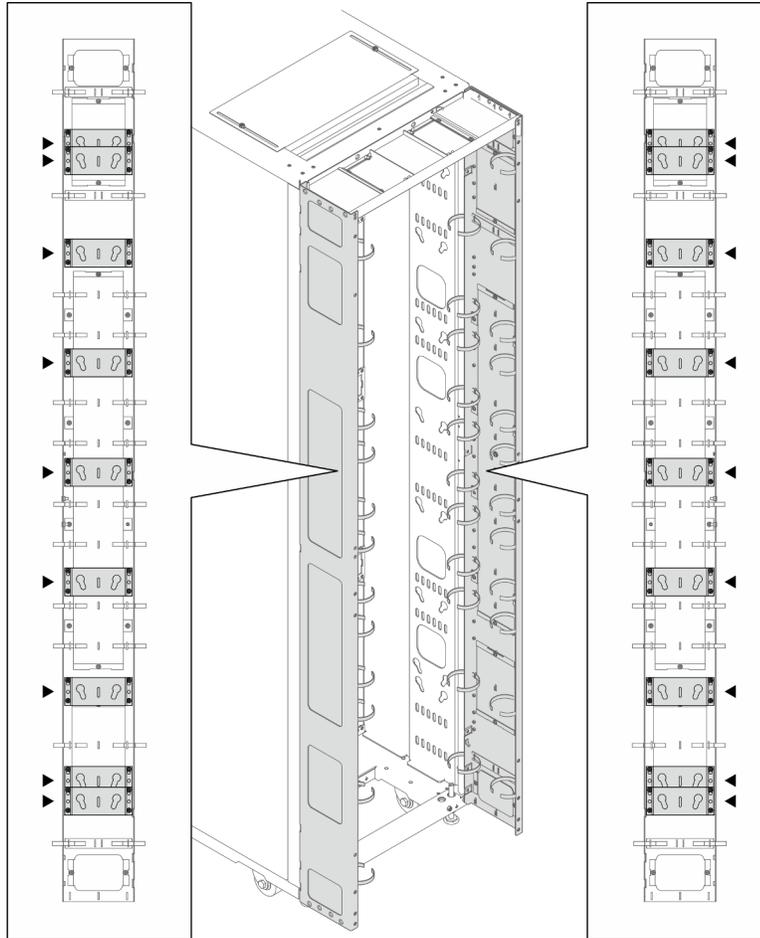


Figure 317. Locations for installing the brackets with two keyhole slots

- If one or two brackets are installed in the locations indicated in the illustration below, the M6 hex head flange screw must be replaced with an M6 round head flange screw.

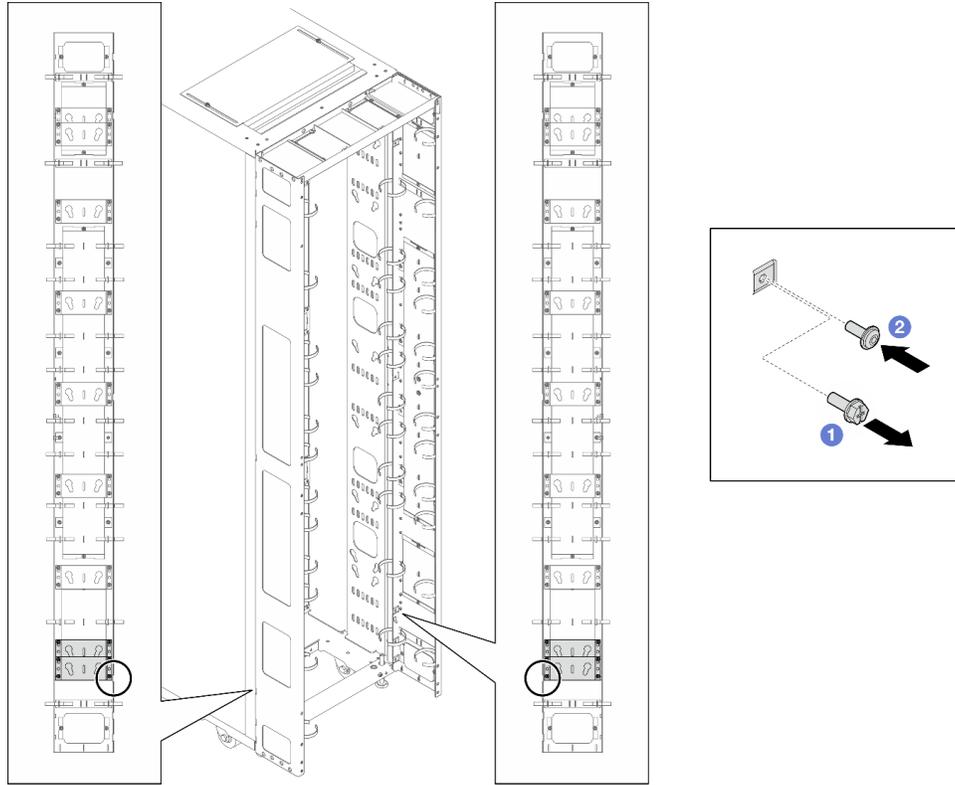


Figure 318. Replacing the screw

1. **1** Remove the M6 hex head flange screw.
 2. **2** Install the M6 round head flange screw.
1. Align the bracket with the extension panel, and secure it with four screws.

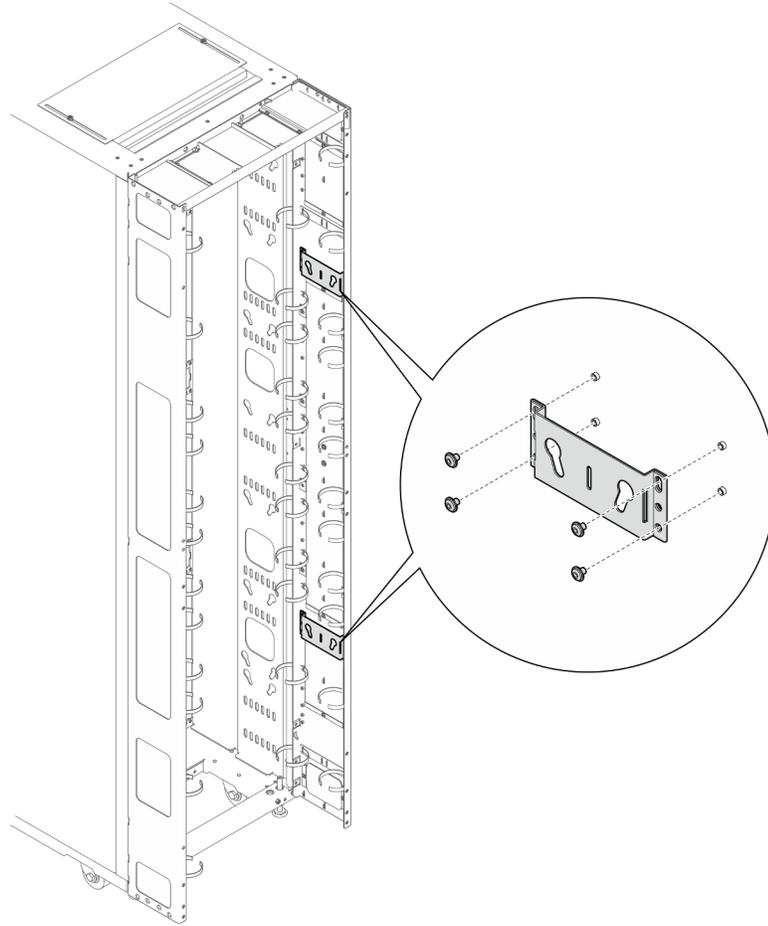


Figure 319. Installing the bracket with two keyhole slots

2. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets. Choose the left or right slot for PDU installation based on the requirements.

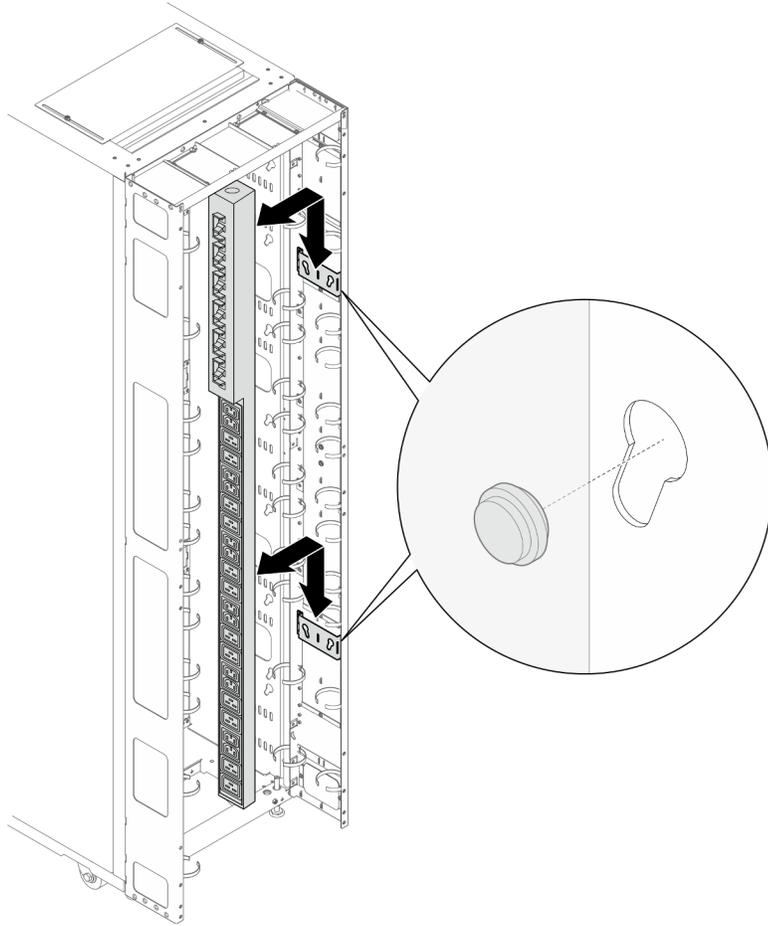


Figure 320. Installing the PDU

Note: PDU can be rotated 180 degrees for installation with the input cable at the bottom.

- **L-shaped bracket (up to two PDUs, or one PDU and one manifold)**

Notes:

- Below illustration shows the locations for installing the brackets.

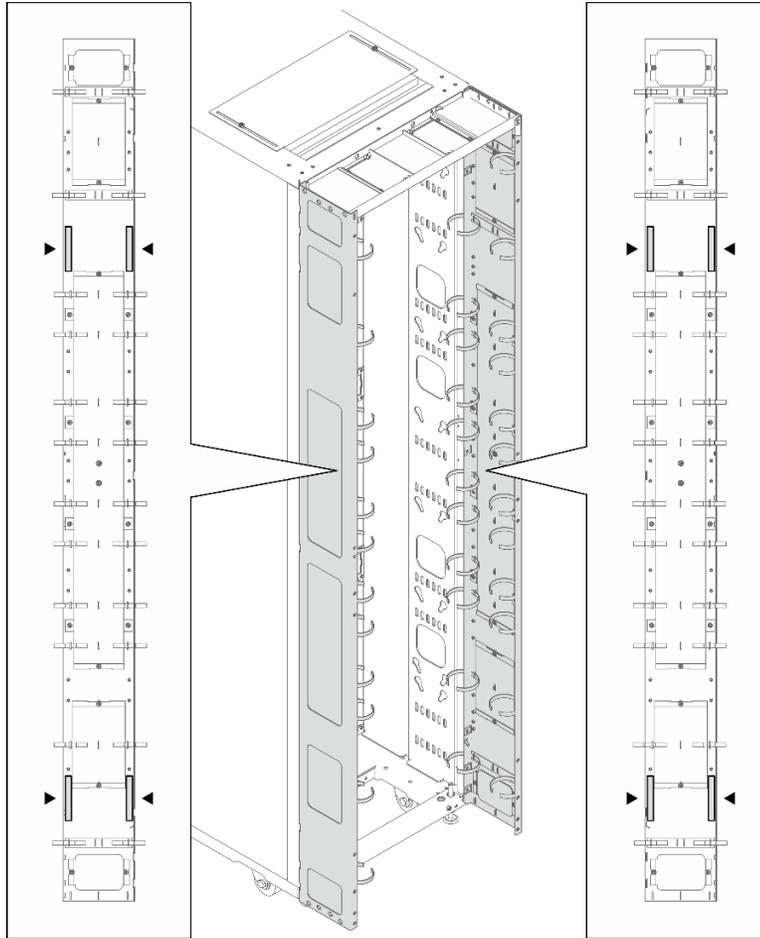


Figure 321. Locations for installing the L-shaped brackets

- If one or two brackets are installed in the locations indicated in the illustration below, the M6 hex head flange screw must be replaced with an M6 round head flange screw.

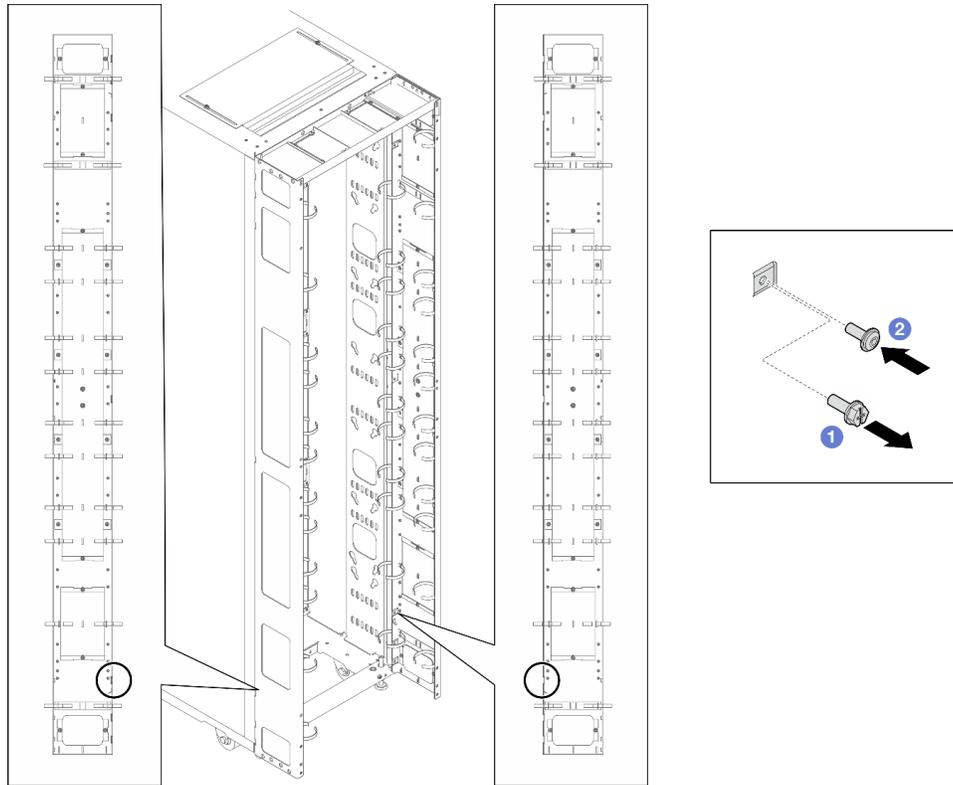


Figure 322. Replacing the screw

1. **1** Remove the M6 hex head flange screw.
 2. **2** Install the M6 round head flange screw.
1. Align the bracket with the extension panel, and secure it with three screws. Choose the installation location for the bracket based on the orientation of the PDU.

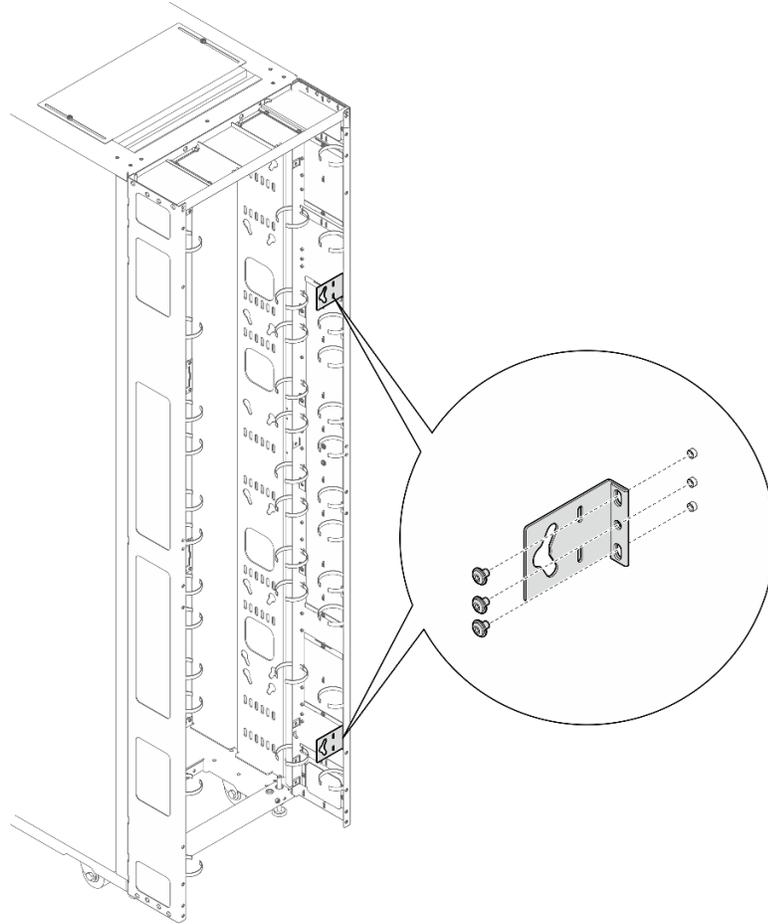


Figure 323. Installing the L-shaped bracket with the PDU facing the front of the rack cabinet

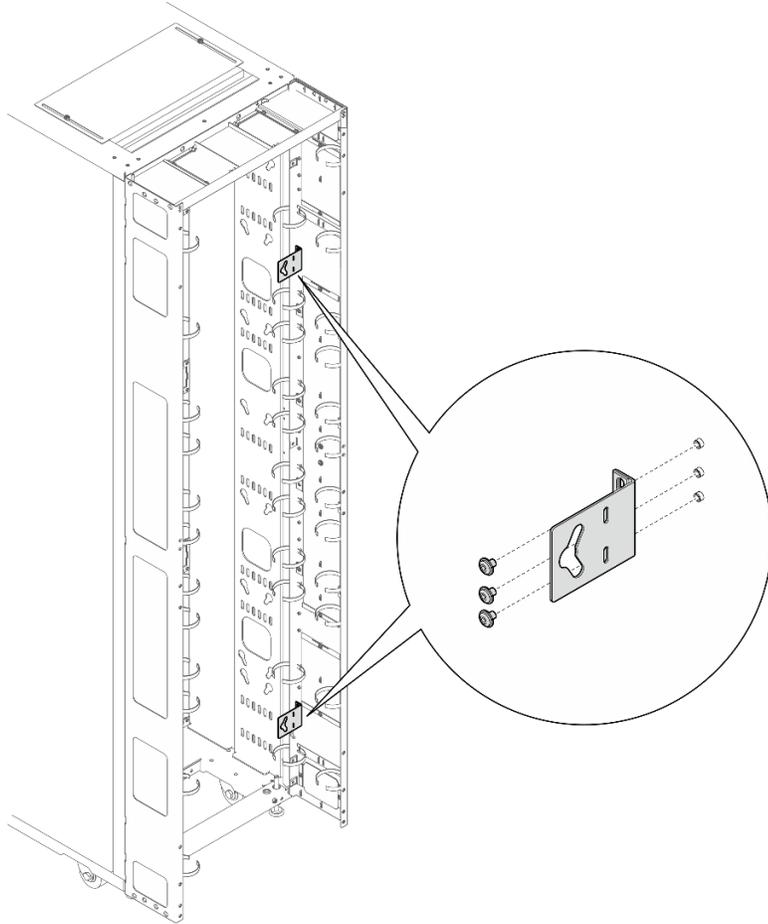


Figure 324. Installing the L-shaped bracket with the PDU facing the front of the rack cabinet

2. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets.

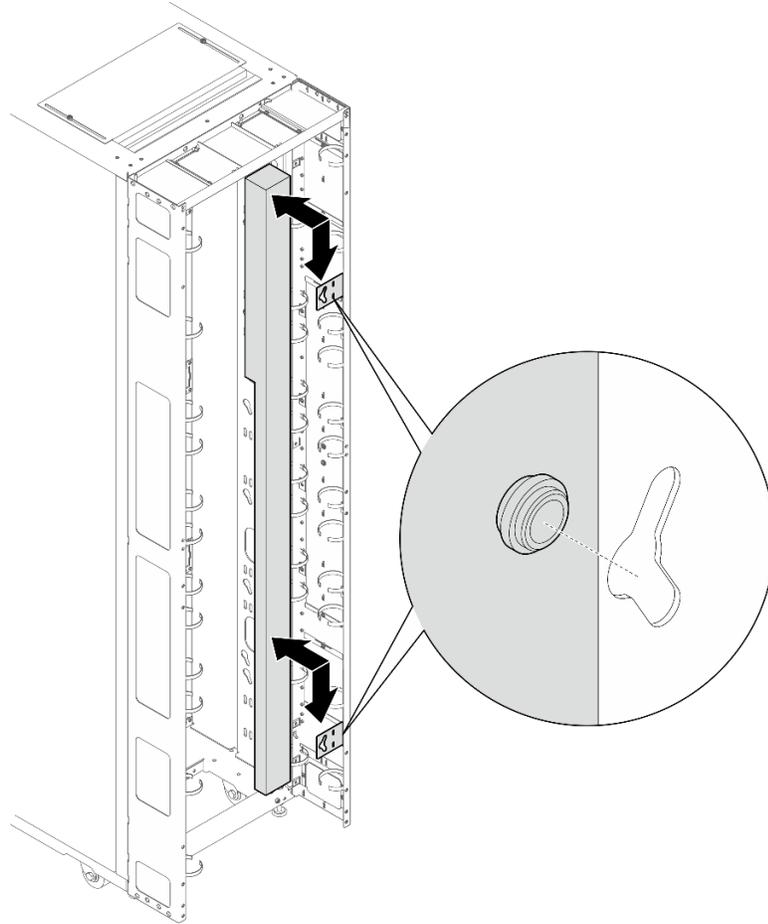


Figure 325. Installing the PDU with the PDU facing the front of the rack cabinet

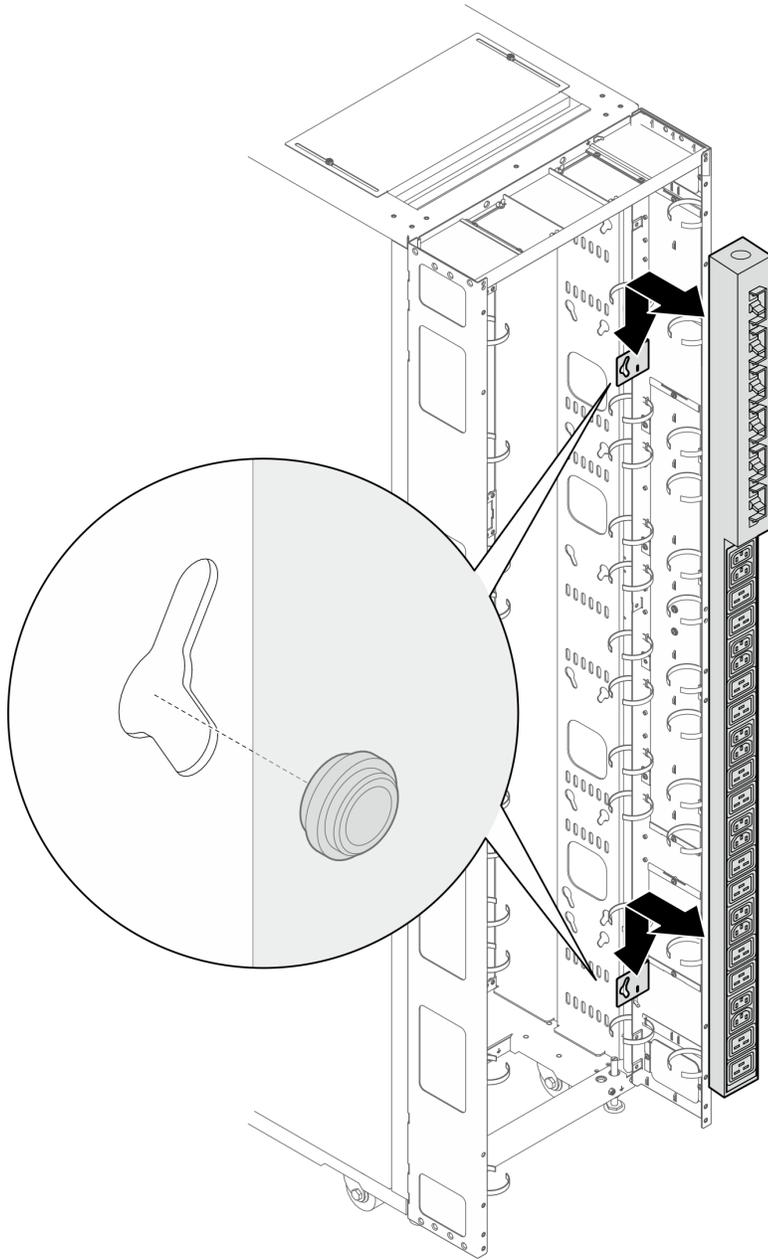


Figure 326. Installing the PDU with PDU facing the rear of the rack cabinet

Step 7. Depending on the requirements, select one of the following methods to ensure there is sufficient space for routing cables.

- **Slide the brush panel**

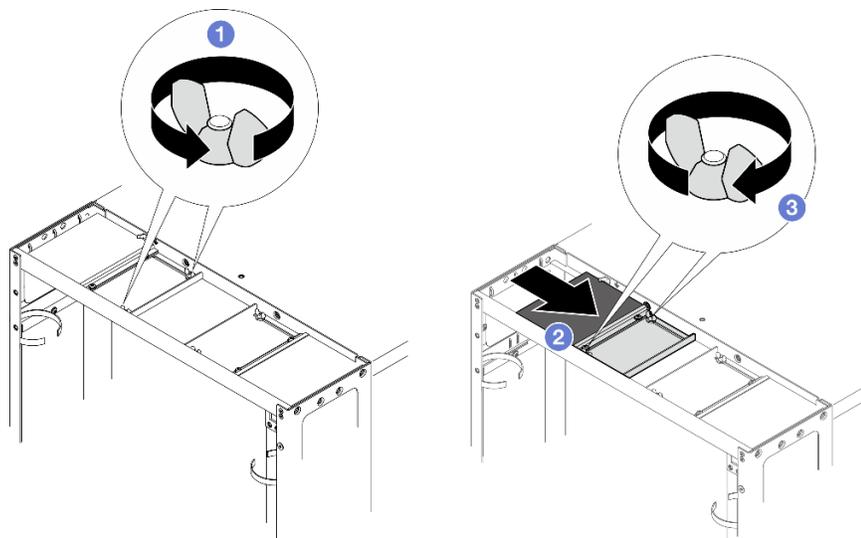


Figure 327. Sliding the brush panel

1. **1** Loosen the two screws that secure the baffle to the top cover.
2. **2** Slide the baffle and brush panel toward the center of the top cover.
3. **3** Tighten the two screws to secure the baffle.

- **Remove the brush panel**

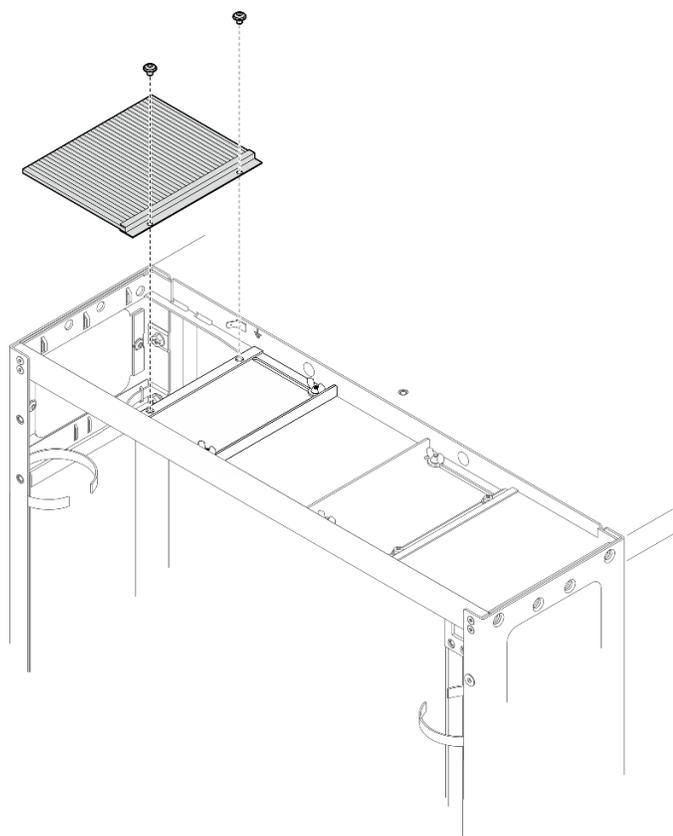


Figure 328. Removing the brush panel

Loosen the two screws to remove the brush panel from the top cover.

- **Remove the brush panel and baffle**

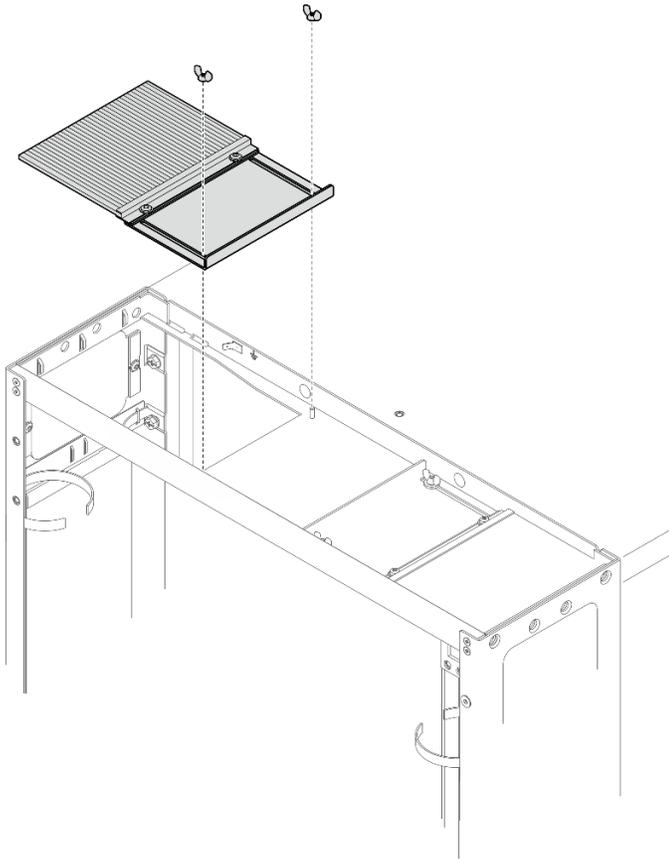


Figure 329. Removing the brush panel and baffle

Loosen the two screws to remove the brush panel and baffle from the top cover.

Step 8. Tighten the two screws to secure the latch plate to the left extension panel.

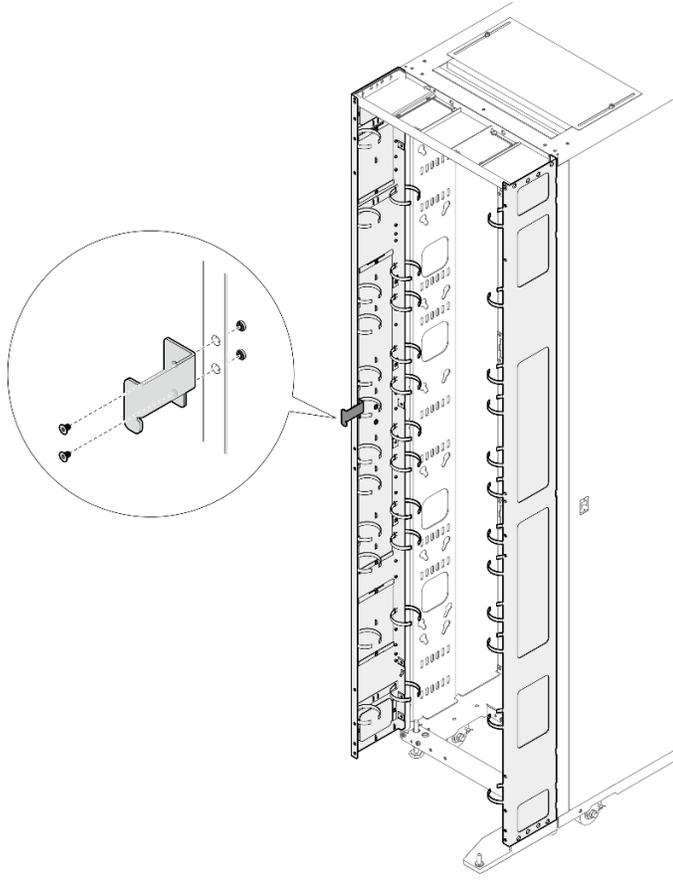


Figure 330. Installing the latch plate

Step 9. Remove the two doorstops from the right extension panel.

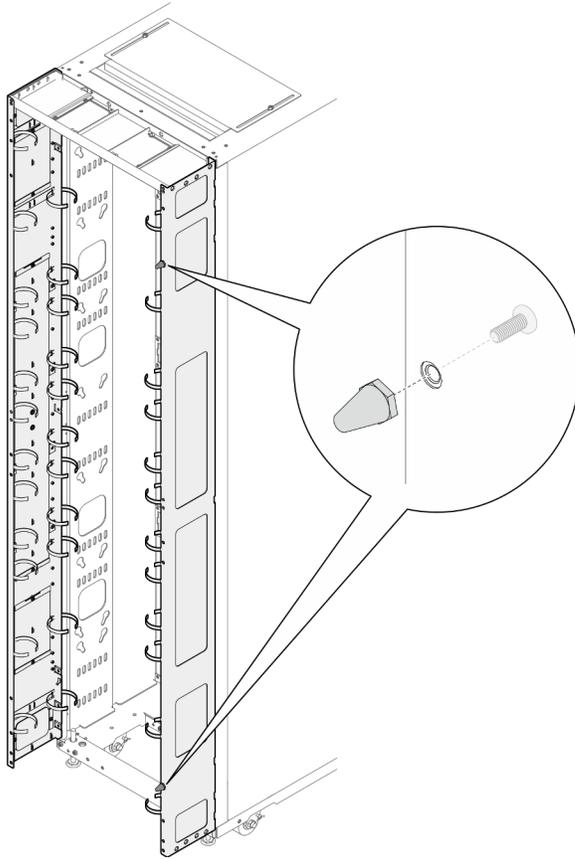


Figure 331. Removing the doorstops

Step 10. Secure the bottom hinge to the right extension panel with four screws.

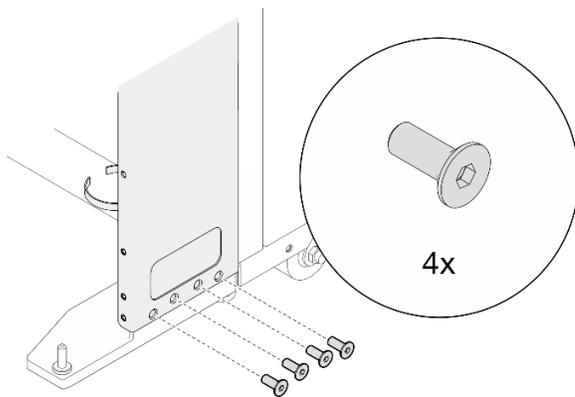


Figure 332. Securing the bottom hinge

Step 11. If the rack needs to be shipped, install the three support brackets and skip steps 12 to 17.

Note: The support brackets must be removed upon arrival at the site to install the RDHX.

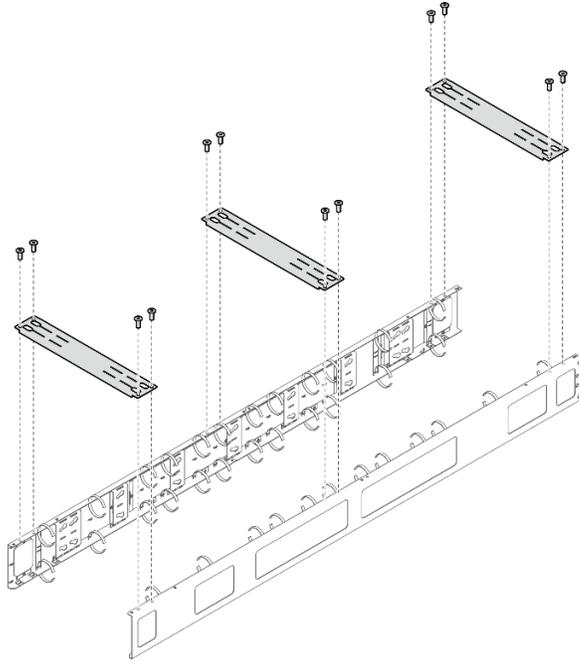
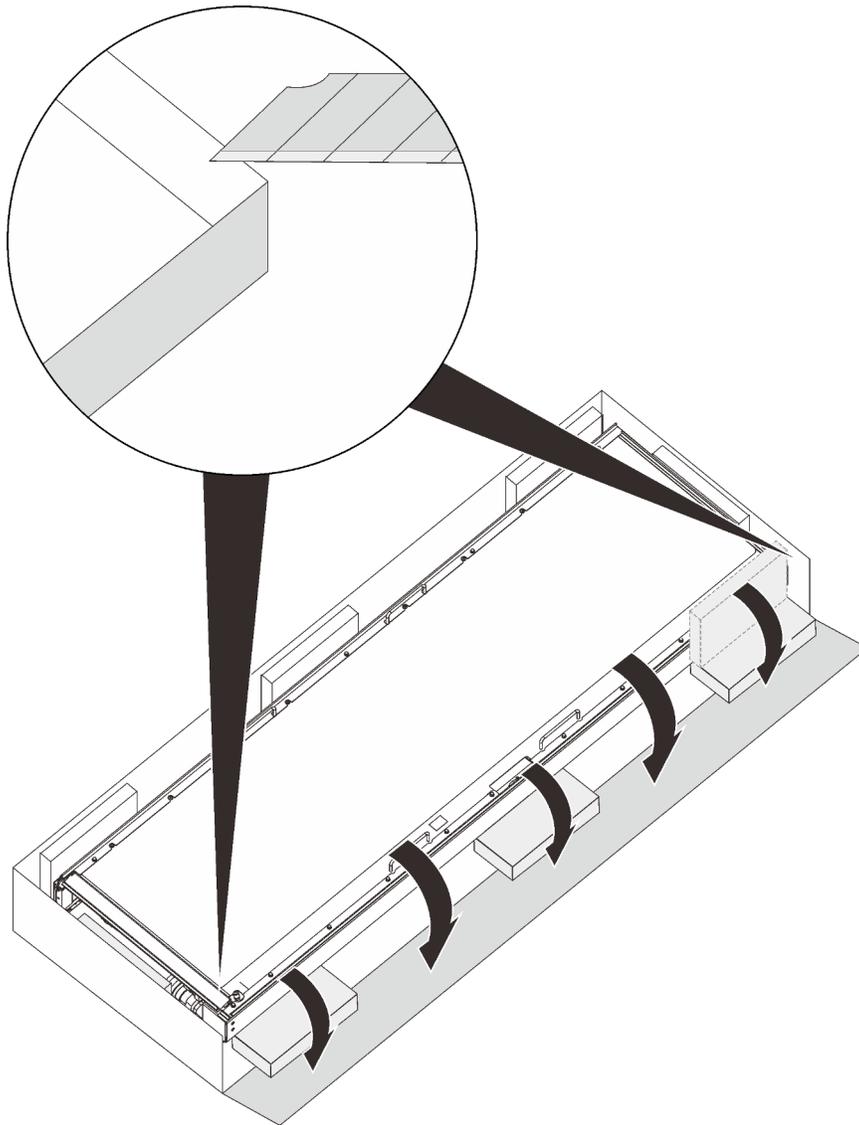


Figure 333. Installing the support brackets

- Step 12. Face the bottom side of the carton, remove the carton top, and slit the two carton corners on your right-hand side with a knife. Then, fold the right carton panel down to the ground, and rotate the three carton inserts down.



Bottom

Figure 334. Unpacking the heat exchanger

Step 13. With three people, rotate the heat exchanger to vertical on the three carton inserts. Then, remove the inner and outer hose access panels while one person hold the heat exchanger.

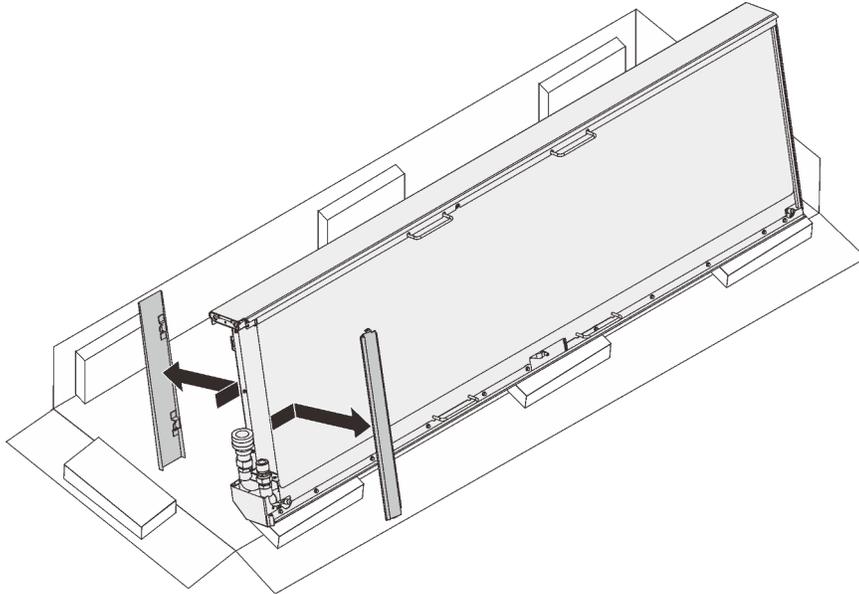


Figure 335. Removing the hose access panels

Step 14. Hold the heat exchanger with three people on the handles/spots as illustrated. Then, carefully lift the heat exchanger and turn it upright.

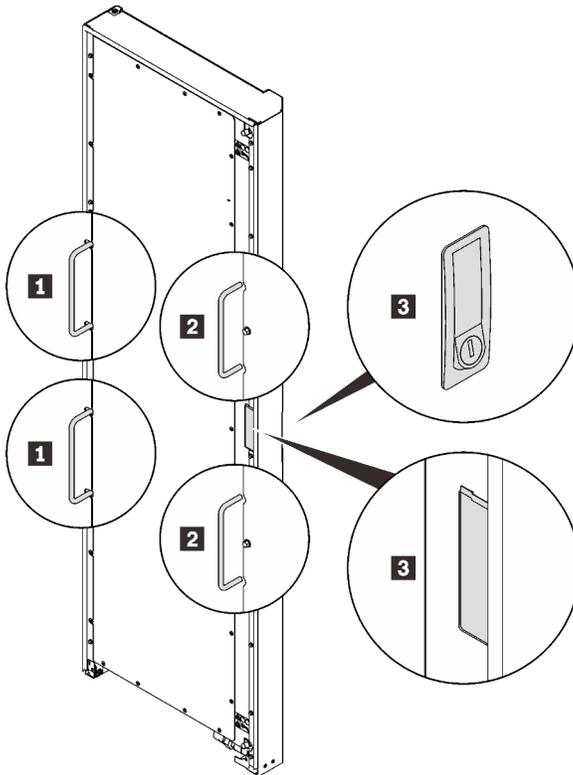


Figure 336. Lifting the heat exchanger with three people

1 Handles that the first person hold on to	3 Spots that the third person hold on to
2 Handles that the second person hold on to	

Step 15. Carry the heat exchanger with three people to the cabinet frame. Align the bottom corner with the bottom hinge pin; then, lower the heat exchanger to fit the pin in.

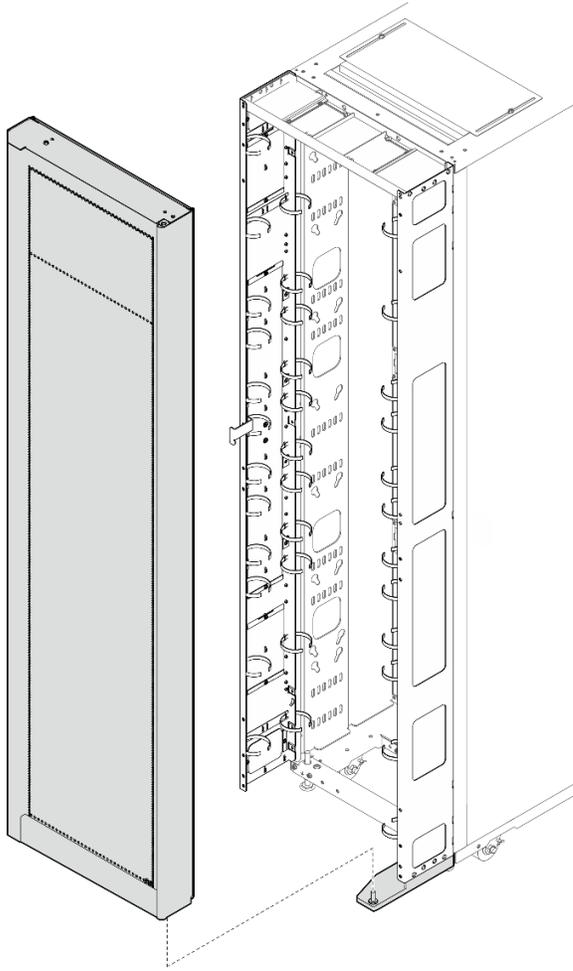


Figure 337. Installing the heat exchanger to the rack cabinet

Step 16. Hold the heat exchanger in place with two people. Insert the top hinge pin to the heat exchanger; then, secure the hinge with seven screws.

Note: Do not fully tighten the seven screws in this step.

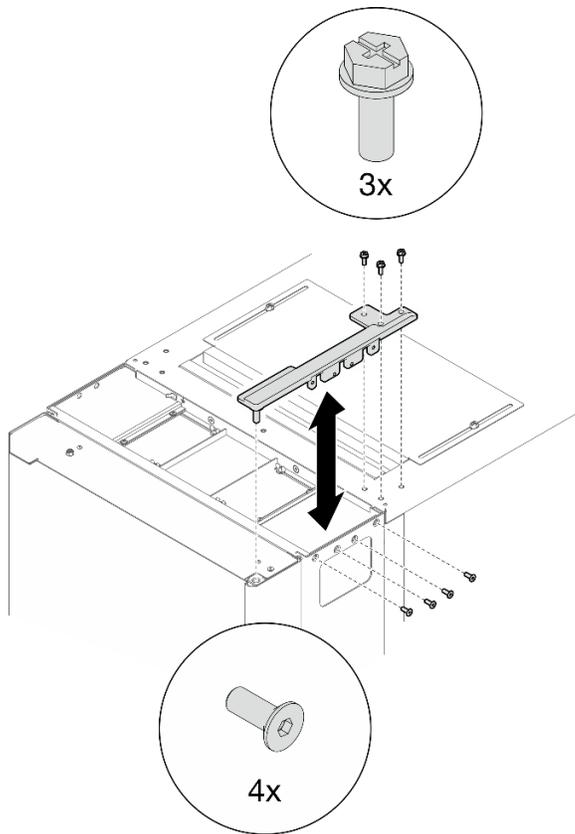


Figure 338. Installing the top hinge

Step 17. Follow the sequence below to fully tighten the screws.

Note: Hold the handles on the heat exchanger and slightly lift it in steps 17-a to 17-c.

1. Four top hinge screws on the right side in [Step 16 Step 16 on page 302](#)
2. Three top hinge screws at the top in [Step 16 Step 16 on page 302](#)
3. Four bottom hinge screws in [Step 2 Step 2 on page 280](#)
4. Fourteen extension panel screws in [Step 3 Step 3 on page 281](#)

Remove 48U Advanced Rack Extension Kit with RDHX

See this topic to learn how to remove 48U Advanced Rack Extension Kit with RDHX.

Procedure

- Step 1. Remove the RDHX (see [“Remove Rear Door Heat eXchanger for 48U Rack” on page 234](#)).
- Step 2. If any devices are installed to the extension panels, remove them (see [“Remove a 0U PDU” on page 319](#)).
- Step 3. Remove the four screws that secure the bottom hinge to the right extension panel.

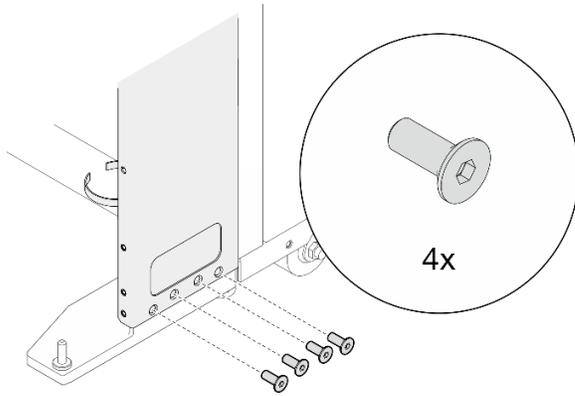


Figure 339. Removing the screws

Step 4. Unfasten the six screws, and remove the extension top cover.

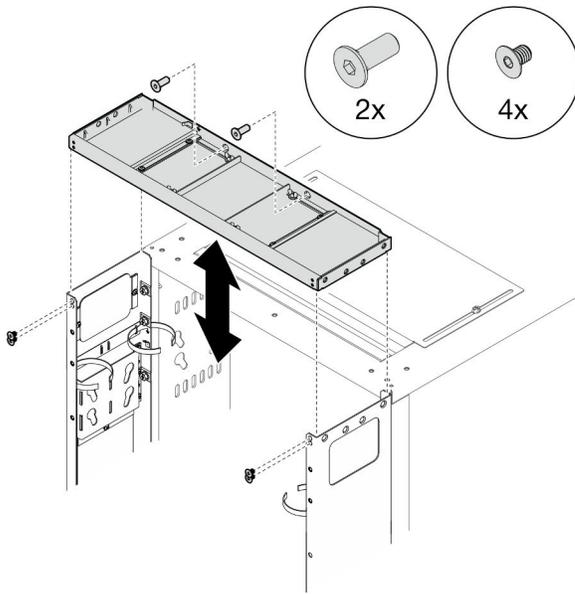


Figure 340. Removing the extension top cover

Step 5. Unfasten the fourteen screws, and remove the two extension panels.

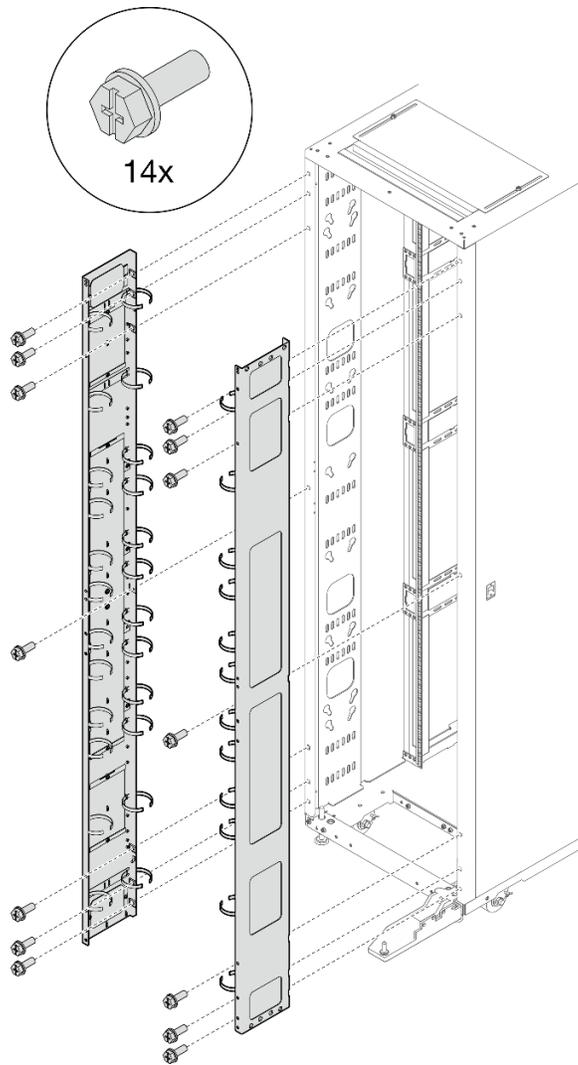


Figure 341. Removing the extension panels

Step 6. Remove the bottom hinge.

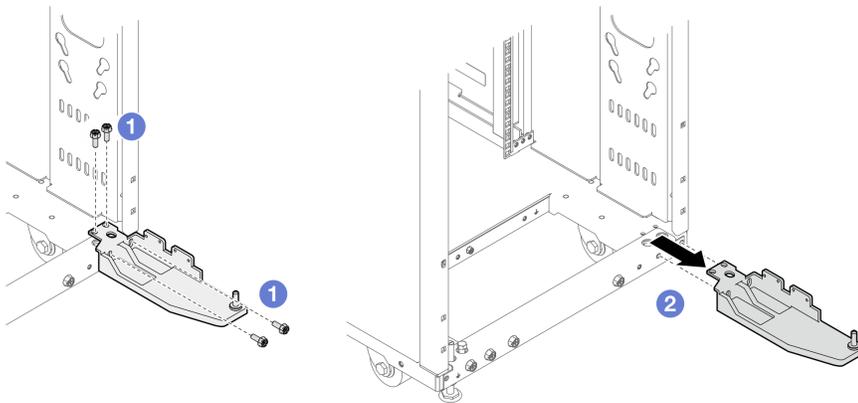


Figure 342. Removing the bottom hinge

- 1 Loosen the four screws from the hinge.
- 2 Remove the hinge from the rack.

After this task is completed

Depending on the requirement, reinstall the door or the RDHX (see [“Remove a door” on page 219](#) or [“Install Rear Door Heat eXchanger for 48U Rack” on page 239](#)).

Install 48U Standard Rack Extension Kit

See this topic to learn how to install 48U Standard Rack Extension Kit.

Notes:

- Each unit of rack extension kit comes with additional capacity of one unit 0U PDU to each side of the rack.
- Each rack cabinet supports up to two units of rack extension kit (one to the front and one to the rear side). However, if the rear side has been installed with the Rear Door Heat Exchanger, the rack extension kit cannot be installed.
- If there is a plan to install baying kit while only one of the adjacent cabinets will be installed with extension, make sure to install the baying kit first (see [“Install the baying kit” on page 95](#)). Then, as preparation for this procedure, remove the two screws from the upper and lower part of the cabinet that will be installed with the extension kit, and jump to [Step 4 on page 89](#).

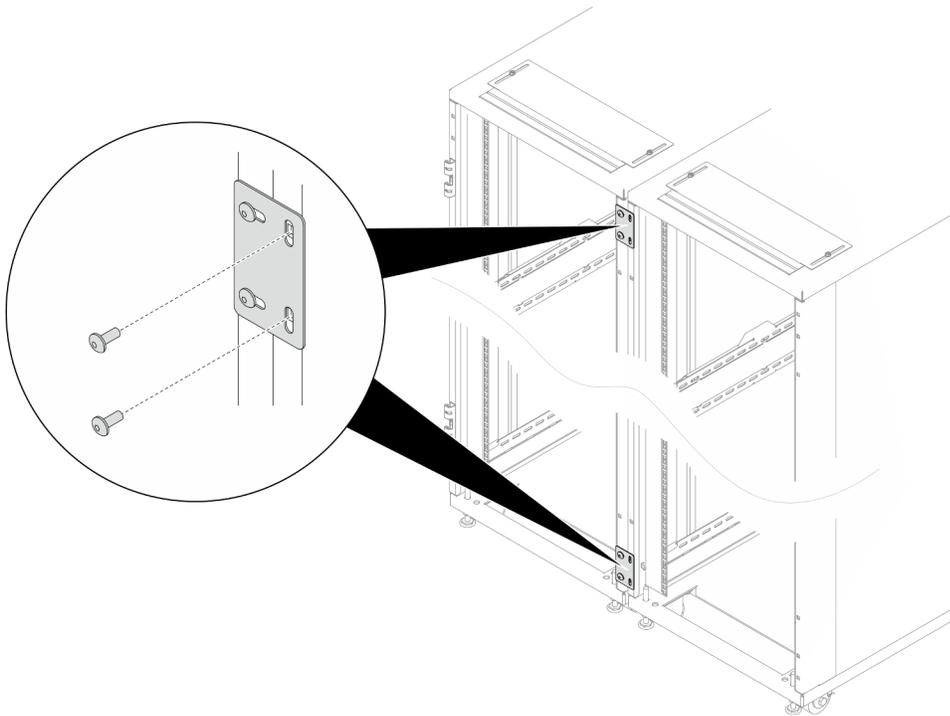


Figure 343. Removing screws to prepare for extension installation

Procedure

- Step 1. Secure an extension panel to the side of the rack with seven screws, and repeat the step on the other extension panel.

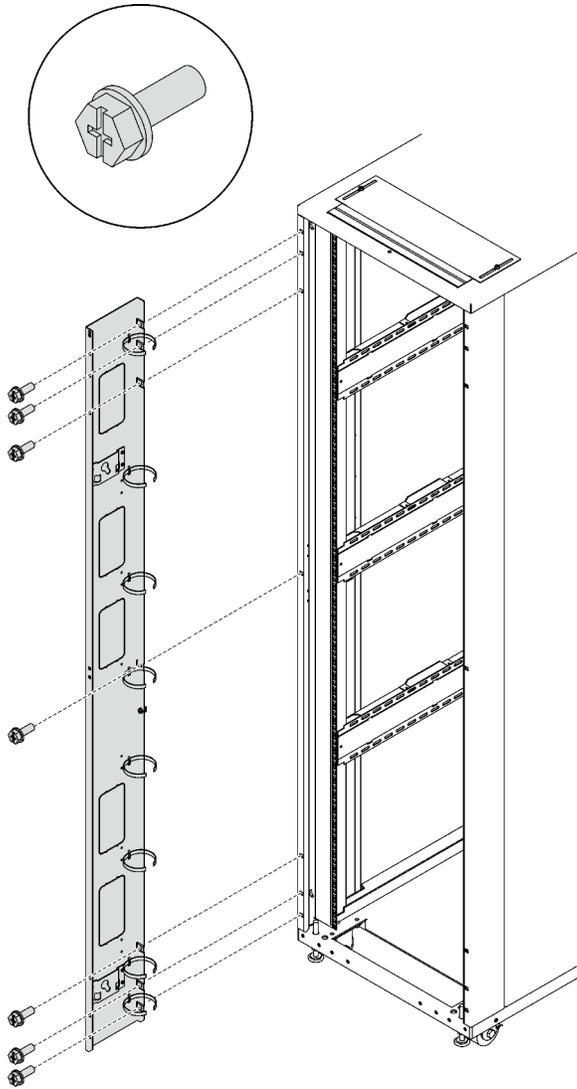


Figure 344. Installing an extension panel

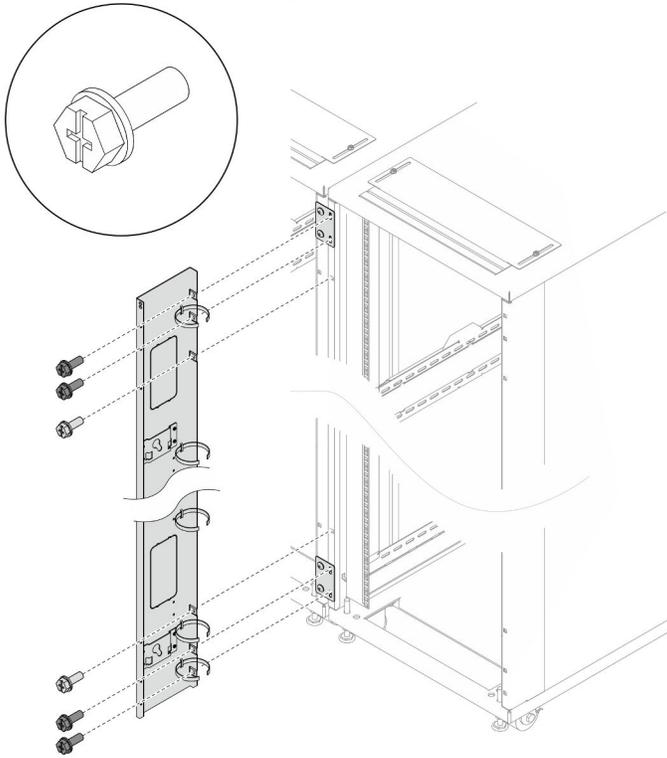


Figure 345. Installing an extension panel (with baying kit)

Step 2. Align the extension top cover with the screw holes on the front of the rack, and secure each side with two screws.

Note: It is advised not to fully tighten the screws in this step.

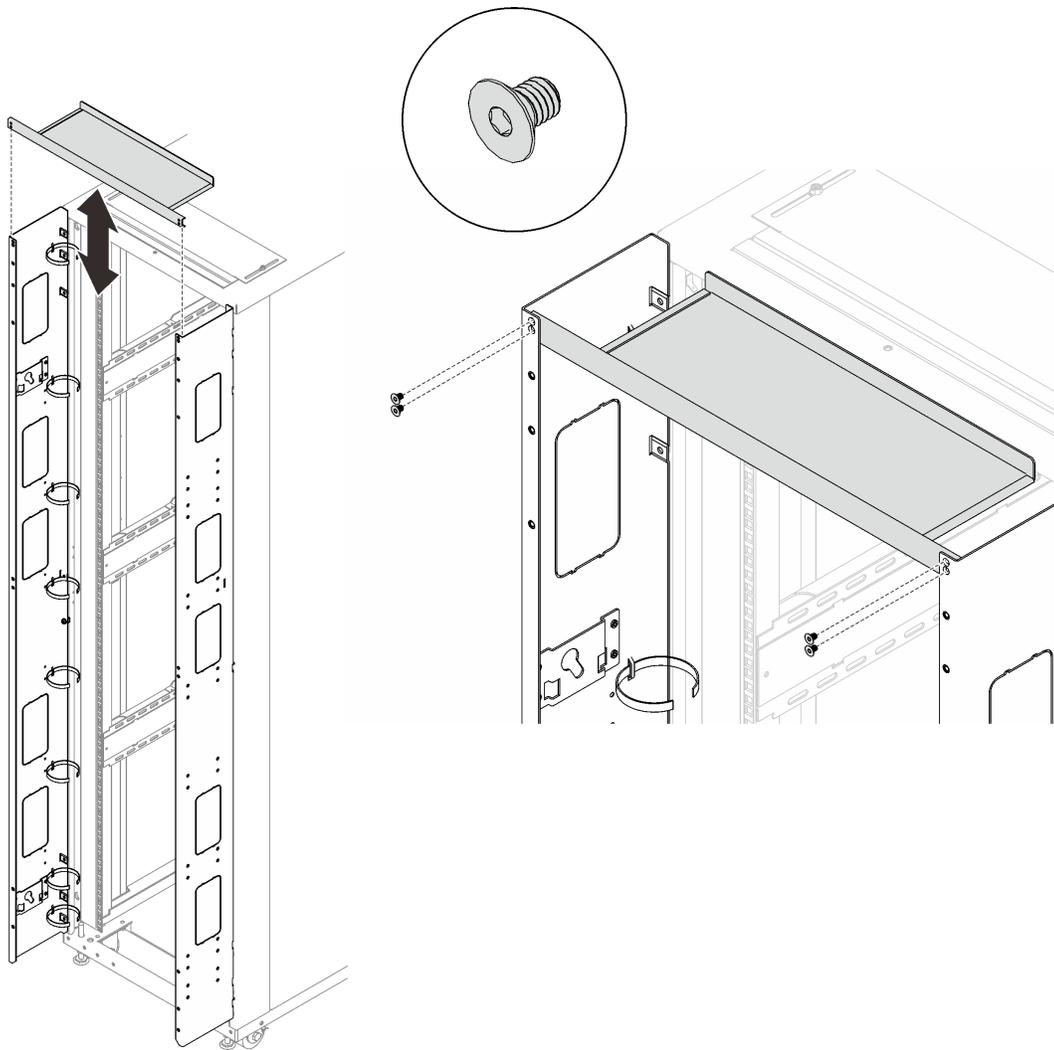


Figure 346. Installing the extension top cover

- Step 3. Secure each of the two support brackets to the extension panels with four screws. If the extension panel screws have not been fully tightened, tighten them now.

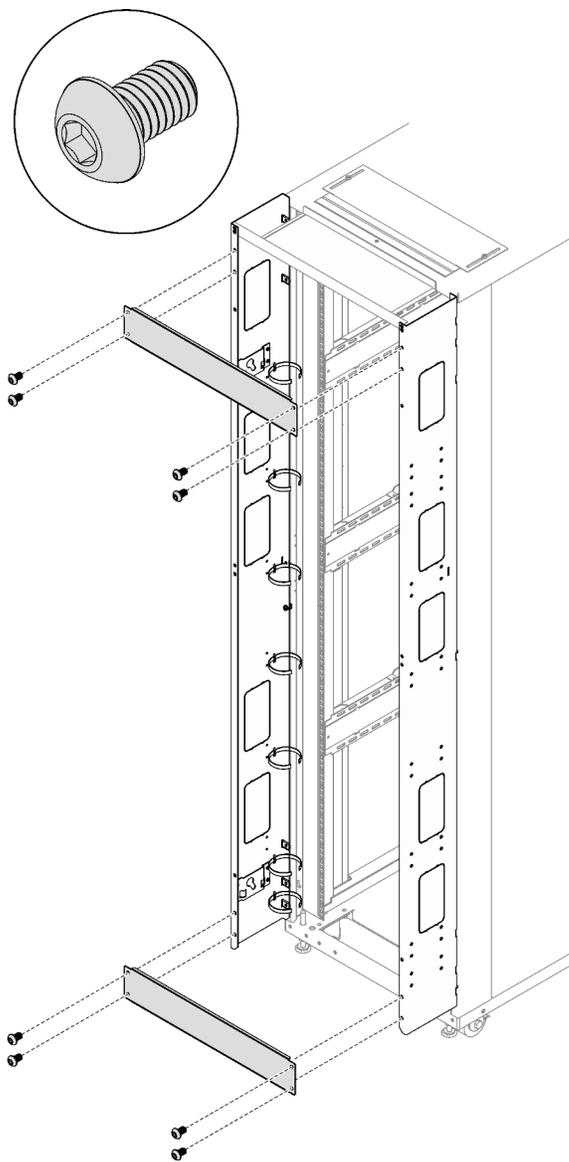


Figure 347. Installing the support brackets

Step 4. Install the two hinges, two doorstops, and the door latch to the rack.

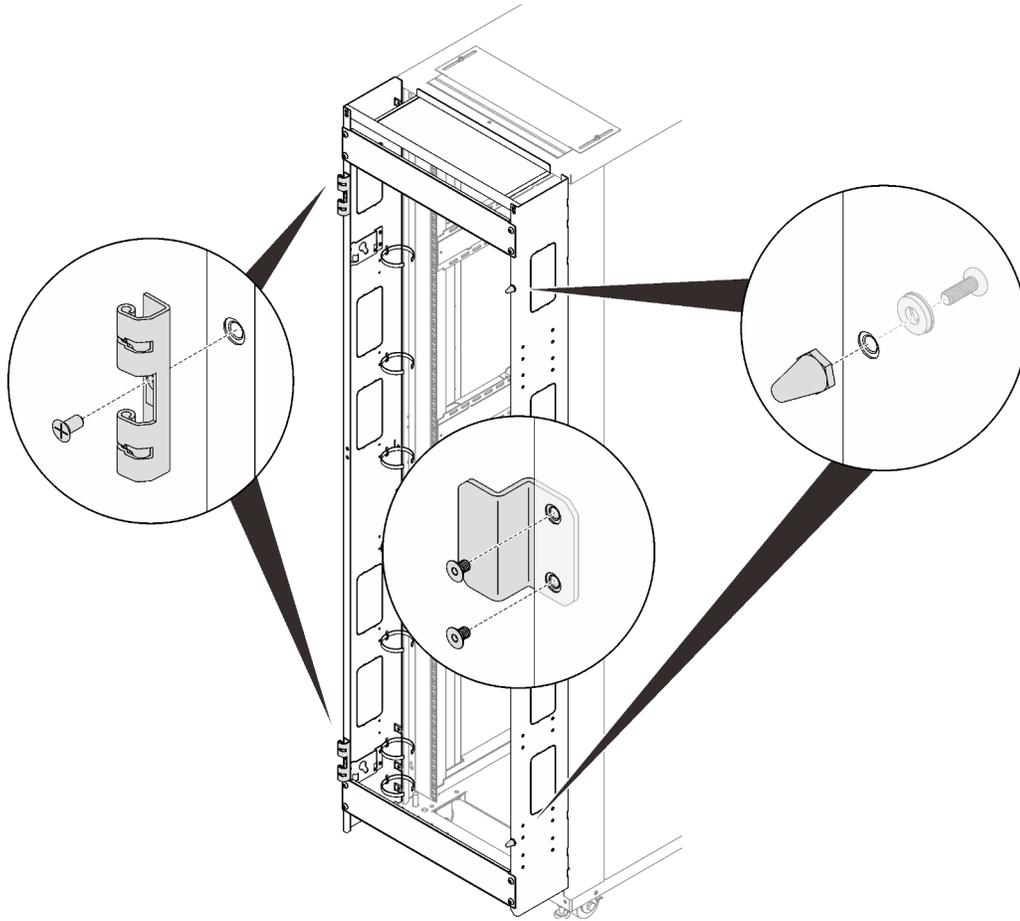


Figure 348. Install the hinges, doorstops, the door latch

Step 5. Install the door back to the rack.

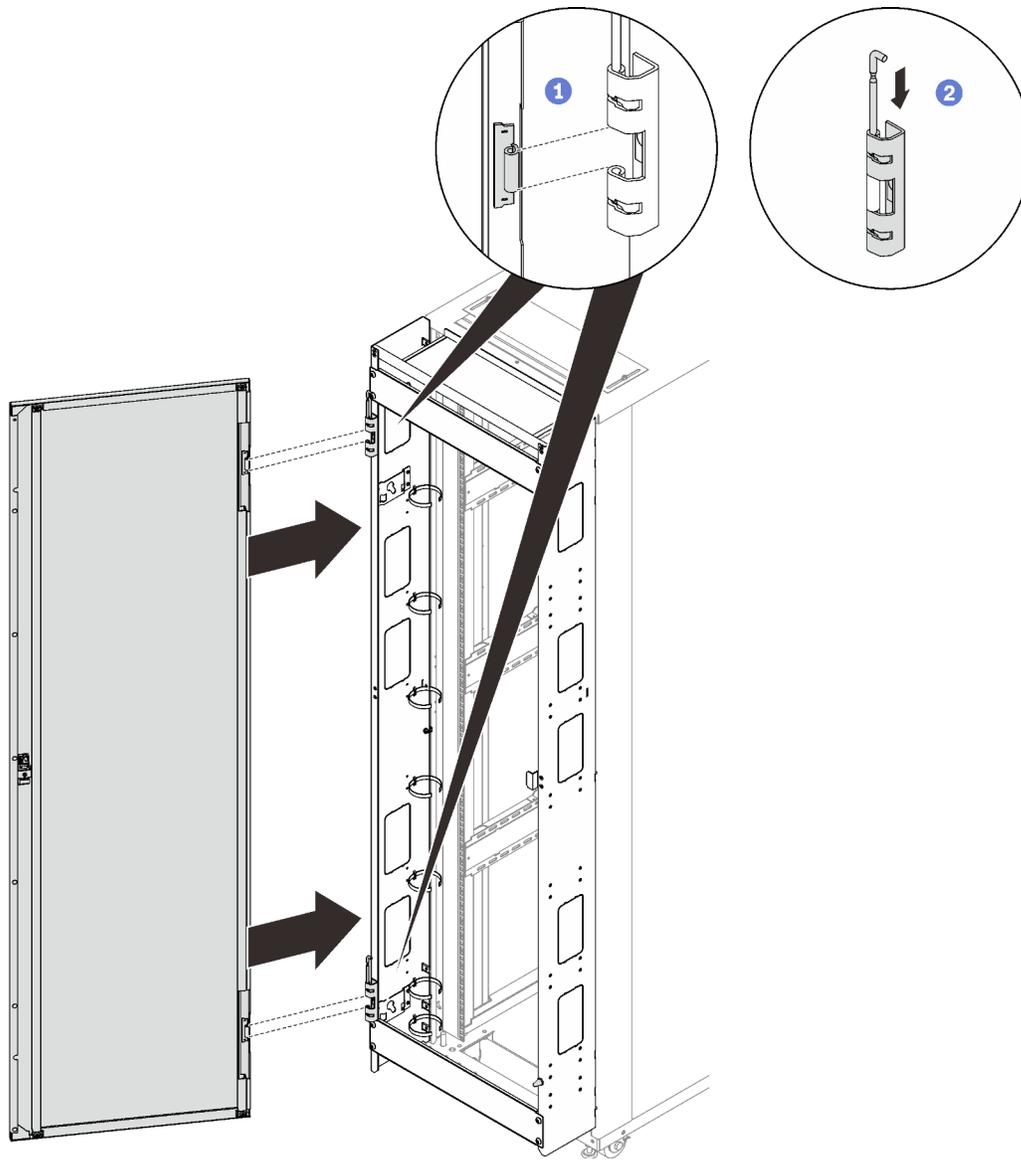


Figure 349. Installing the door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Remove 48U Standard Rack Extension Kit

See this topic to learn how to remove 48U Standard Rack Extension Kit.

Procedure

- Step 1. Remove the door from the rack cabinet (see [“Remove a door” on page 219](#)).
- Step 2. If any devices are installed to the extension panels, remove them (see [“Remove a 0U PDU” on page 319](#) or [“Remove a 1U PDU or console switch from the rack side” on page 323](#)).
- Step 3. Remove the two hinges, two door stops, and the door latch if necessary.

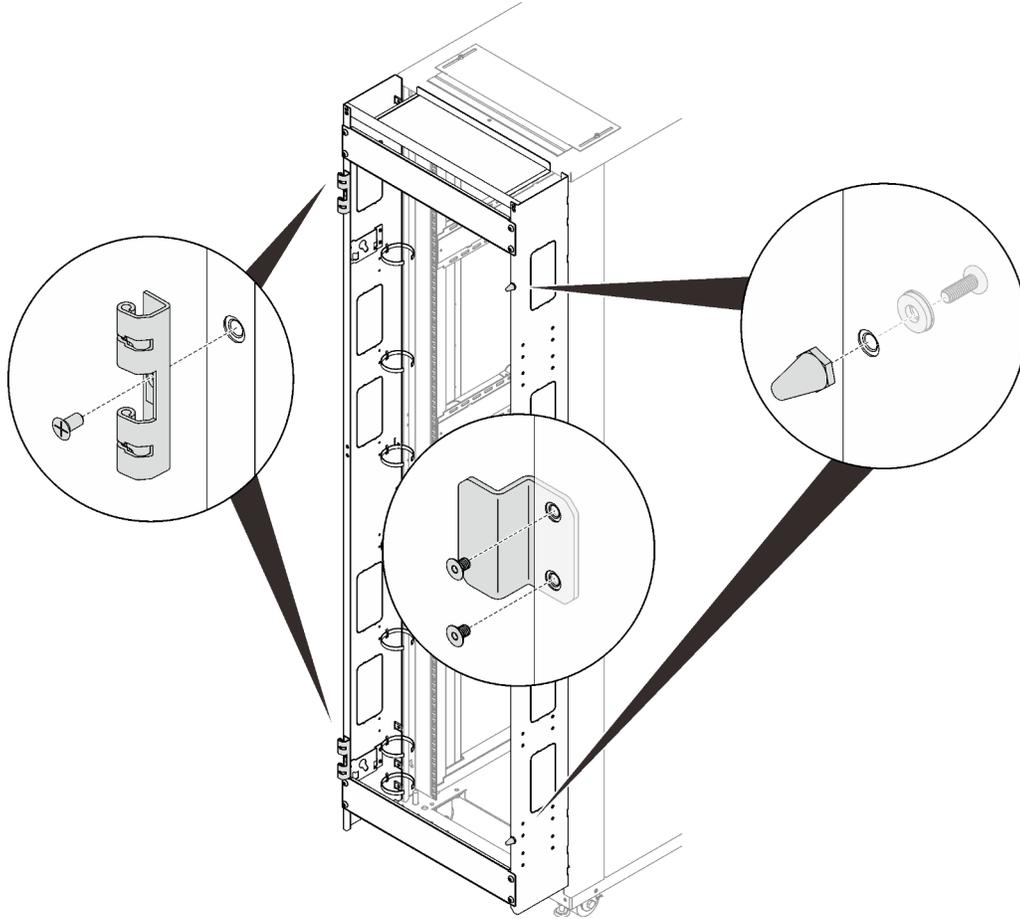


Figure 350. Removing the door hinges and doorstops

- Step 4. Remove the four screws that secure each of the two support brackets, and remove the support brackets.

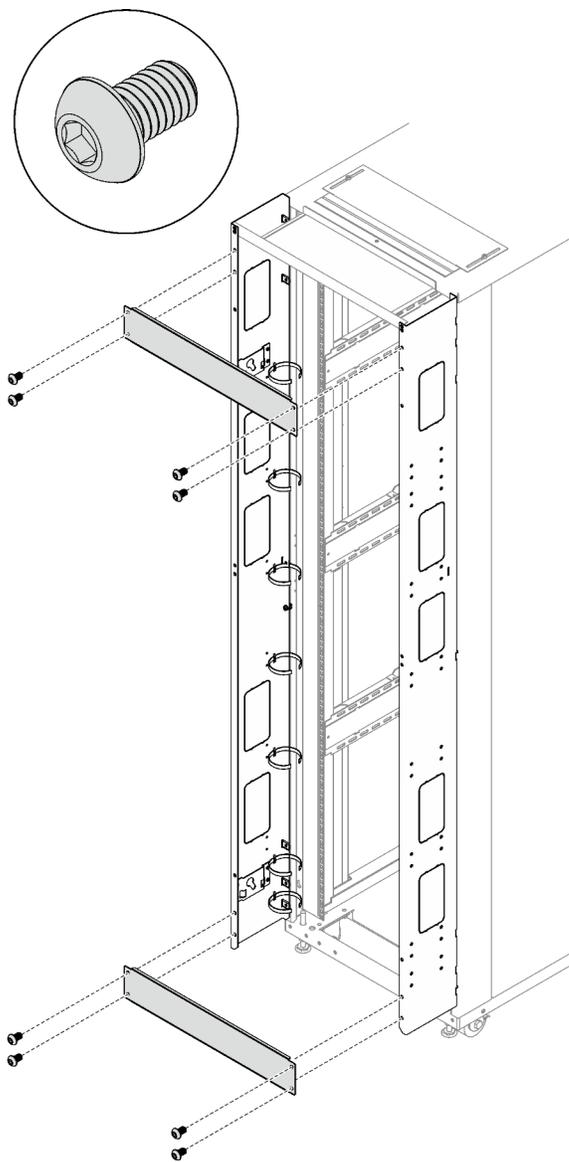


Figure 351. Removing the support brackets

Step 5. Remove the four screws that secure the top cover, and remove the cover.

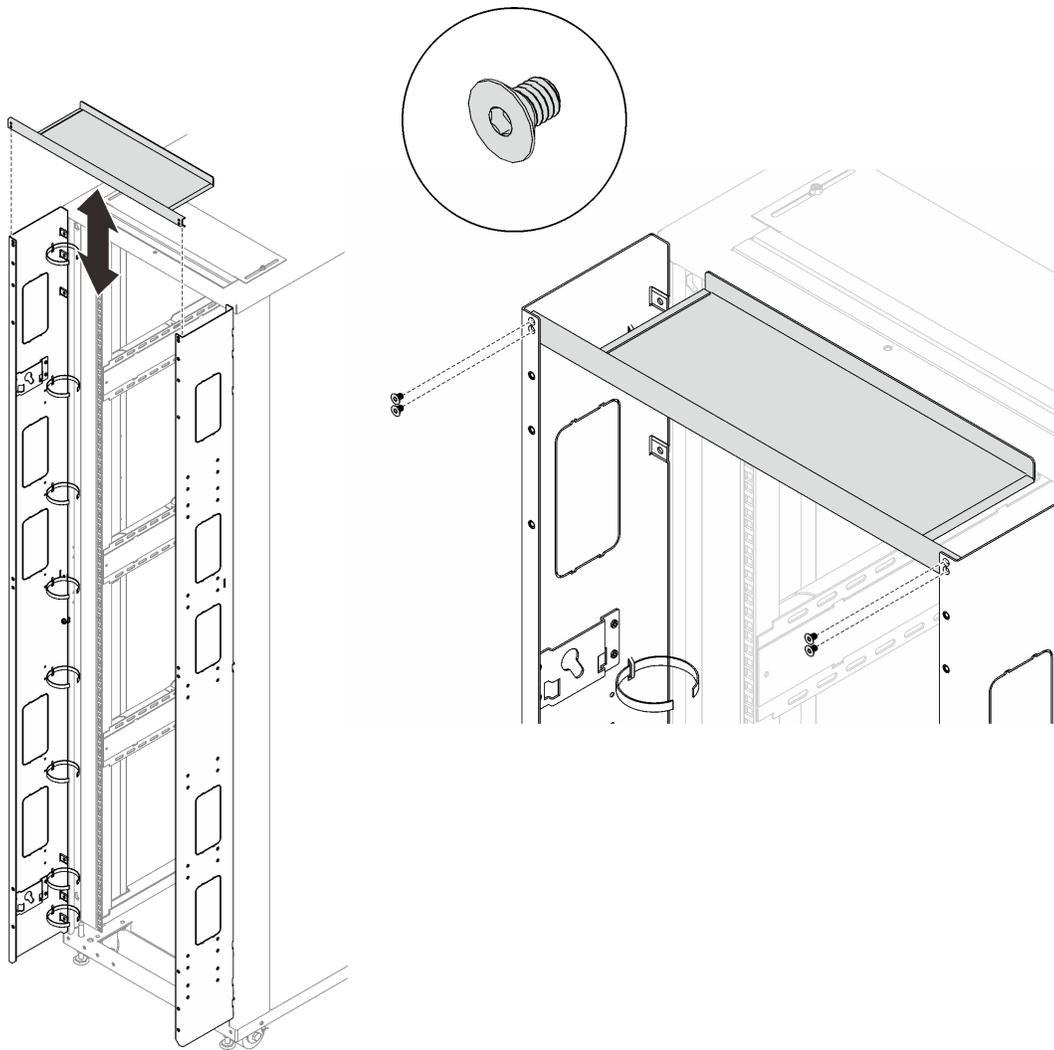


Figure 352. Removing the top cover

- Step 6. Remove the seven screws that secure the extension panel, and repeat the step on the other extension panel.

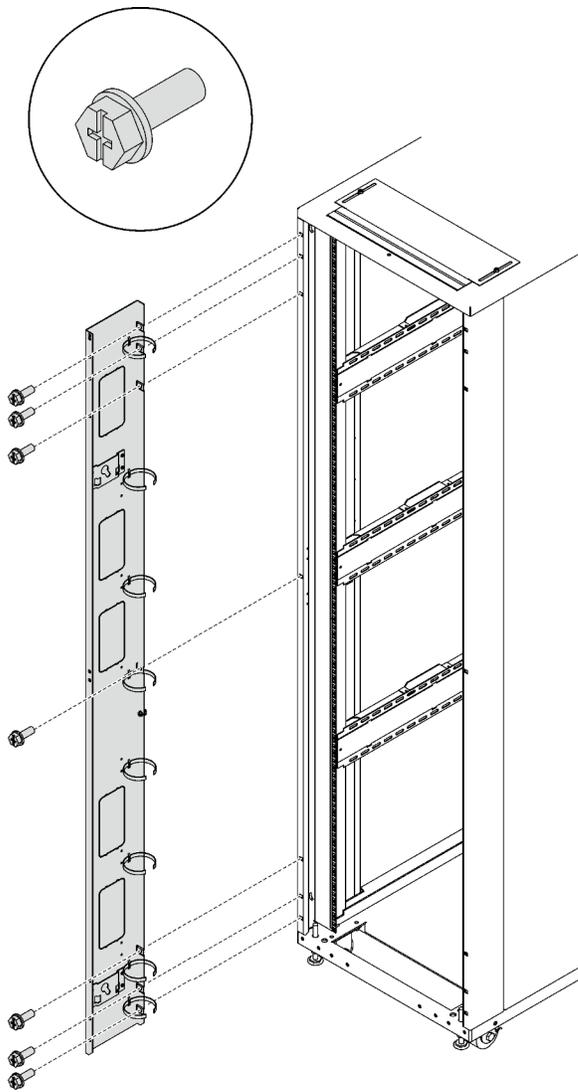


Figure 353. Removing an extension panel

After this task is completed

Complete the following steps to install the door back to the rack if necessary.

1. Install the door latch.

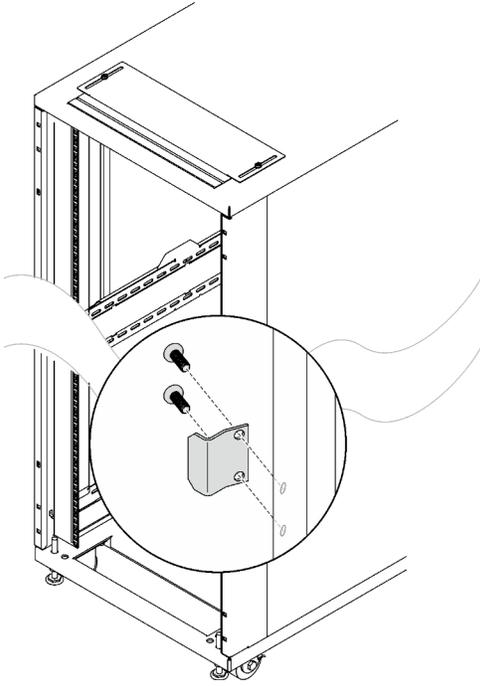


Figure 354. Installing the door latch

2. Install the two hinges and the two doorstops.

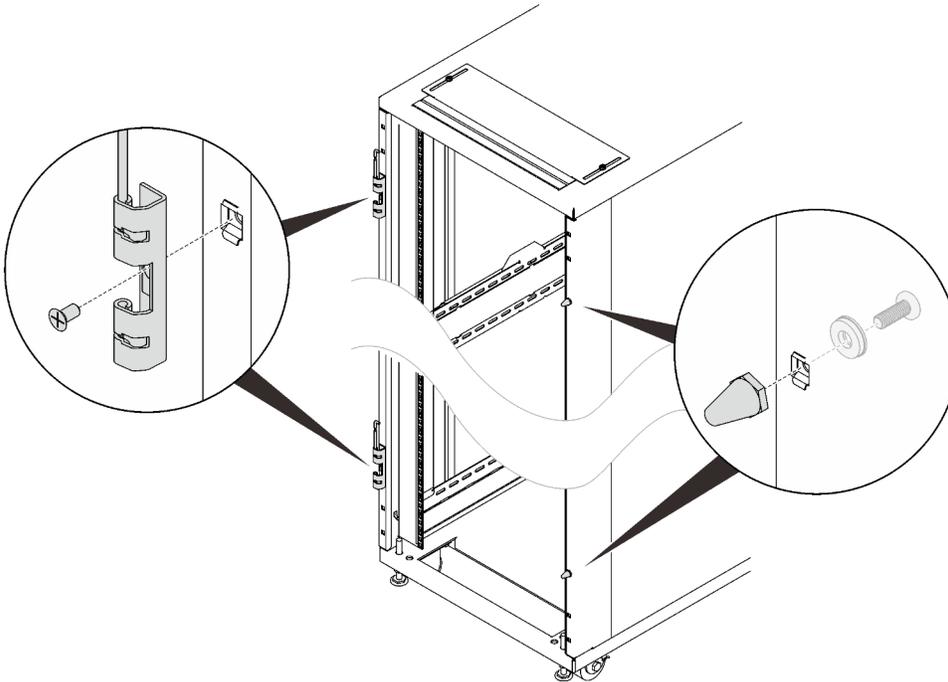


Figure 355. Installing the hinges and doorstops

3. Install the door.

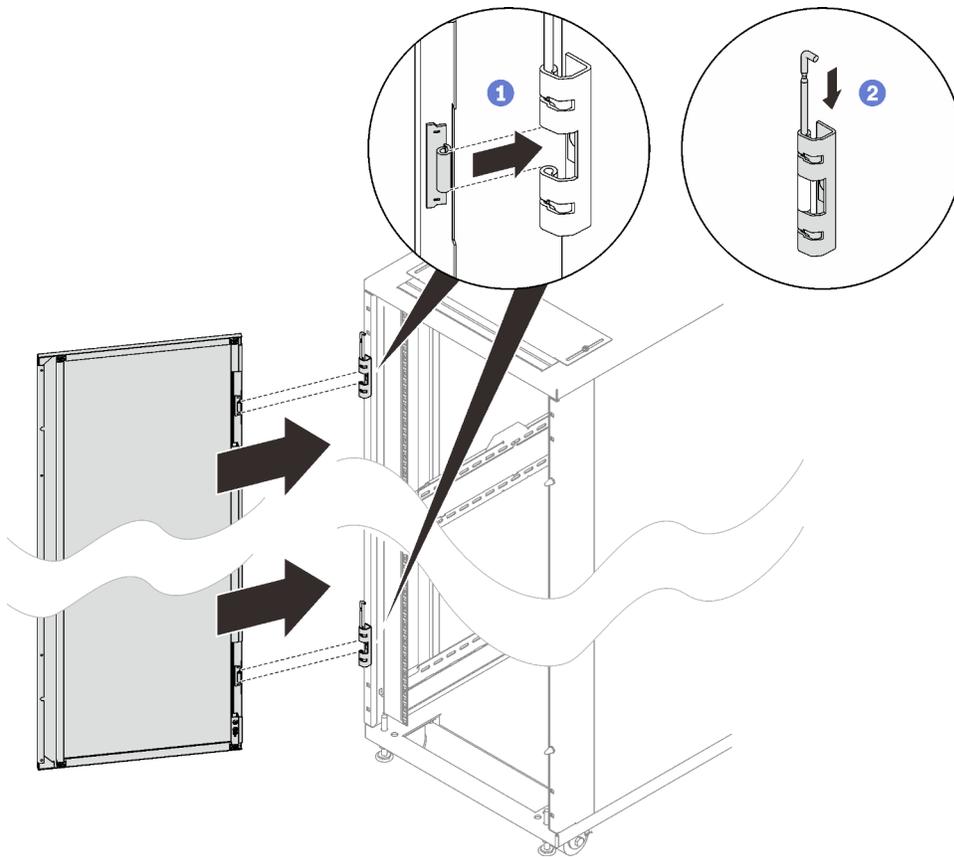


Figure 356. Installing the door

- 1 Align the door with the hinges, and hold the door in place.
- 2 Push the hinge pins down to the closed position so that the door is secured.

Installing and removing power distribution units or switches

See this topic to learn how to remove and install power distribution units or switches.

Install and remove a 0U PDU

See this topic to learn how to install and remove a 0U PDU.

Install a 0U PDU

Procedure

- Step 1. Insert the two PDU pegs into the keyhole slots in the side of the rack cabinet, and push down the PDU to secure it to the rack.

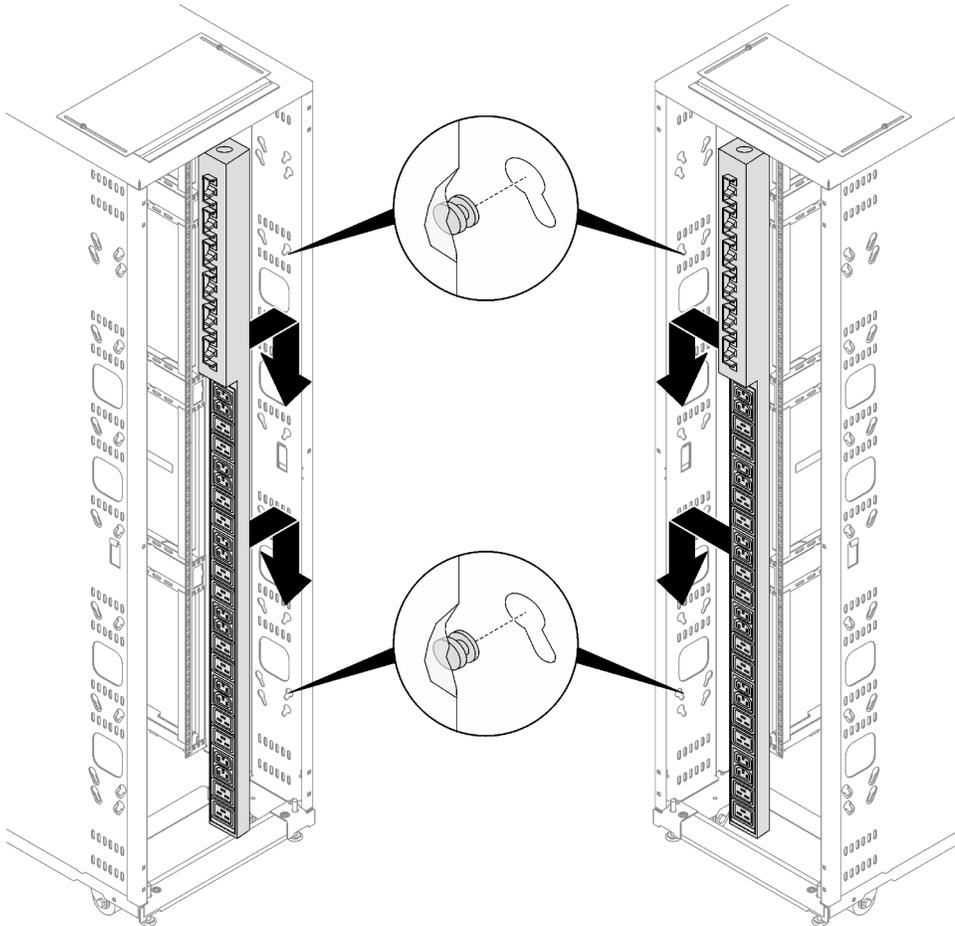


Figure 357. Installing a 0U PDU

Note: 0U PDU can be installed with sockets facing either rear or center of the rack cabinet.

Remove a 0U PDU Procedure

Step 1. Lift the PDU to detach it from the rack, and remove it.

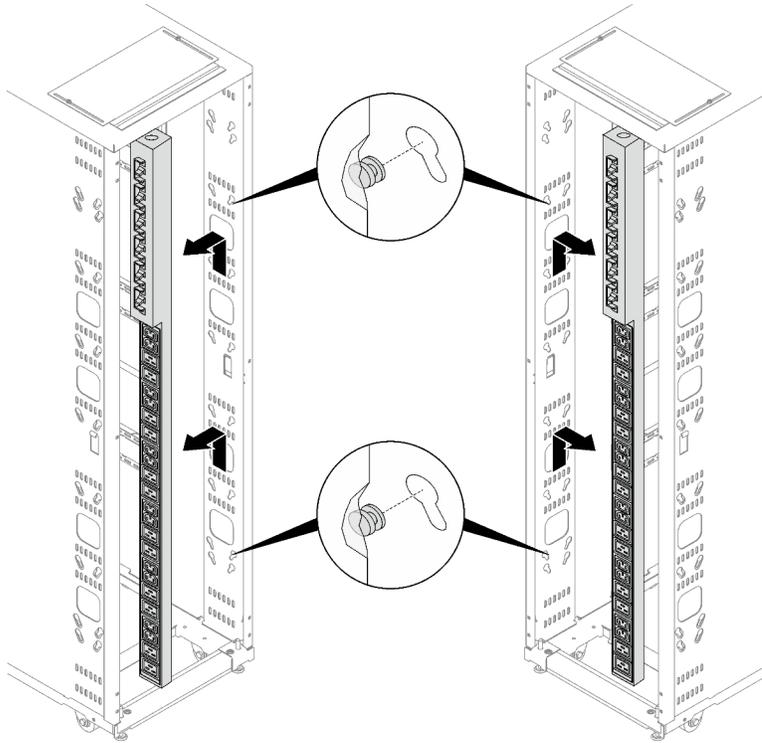


Figure 358. Removing a 0U PDU

Install or remove a 1U device into or from the rack side

See this topic to learn how to install or remove a 1U device into or from the rack side.

About this task

S001



 **DANGER**

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- Connect all power cords to a properly wired and grounded electrical outlet/source.
- Connect any equipment that will be attached to this product to properly wired outlets/sources.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S013



 **DANGER**

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

S014



CAUTION:

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the label is attached.

R009



CAUTION:

Removing components from the upper positions in the Enterprise Rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must do the following:
 - Remove all devices in the 32 U position and above.
 - Make sure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Make sure that there are no empty U positions between devices installed in the rack cabinet below the 32 U position.
- If the rack cabinet that you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- Inspect the route that you plan to take, to eliminate potential hazards.
- Make sure that the route that you choose can support the weight of the loaded rack cabinet. See the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Make sure that all door openings are at least 760 x 2030 mm (30 x 80 in.)
- Make sure that all devices, shelves, drawers, doors, and cables are secure.
- Make sure that the four leveling pads are raised to their highest positions.
- Make sure that no stabilizer bracket is installed on the rack cabinet.

- Do not use a ramp that is inclined more than 10 degrees.
- When the rack cabinet is in the new location, do the following:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.

If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off the pallet and bolt the rack cabinet to the pallet.

This cabinet supports up to four units of 1U devices that are installed to the rack side.

Note: Each rack side space only allows two units of 1U or two units of 0U devices to be installed at the same time. Mixing 1U and 0U devices on the same rack side is not feasible.

Install a 1U PDU or console switch to the rack side

Procedure

- Step 1. Refer to the document that comes with the device, and install the mounting brackets if necessary.
- Step 2. Align the mounting brackets with the holes in the rack flange, and secure it with four sets of screw and nut.

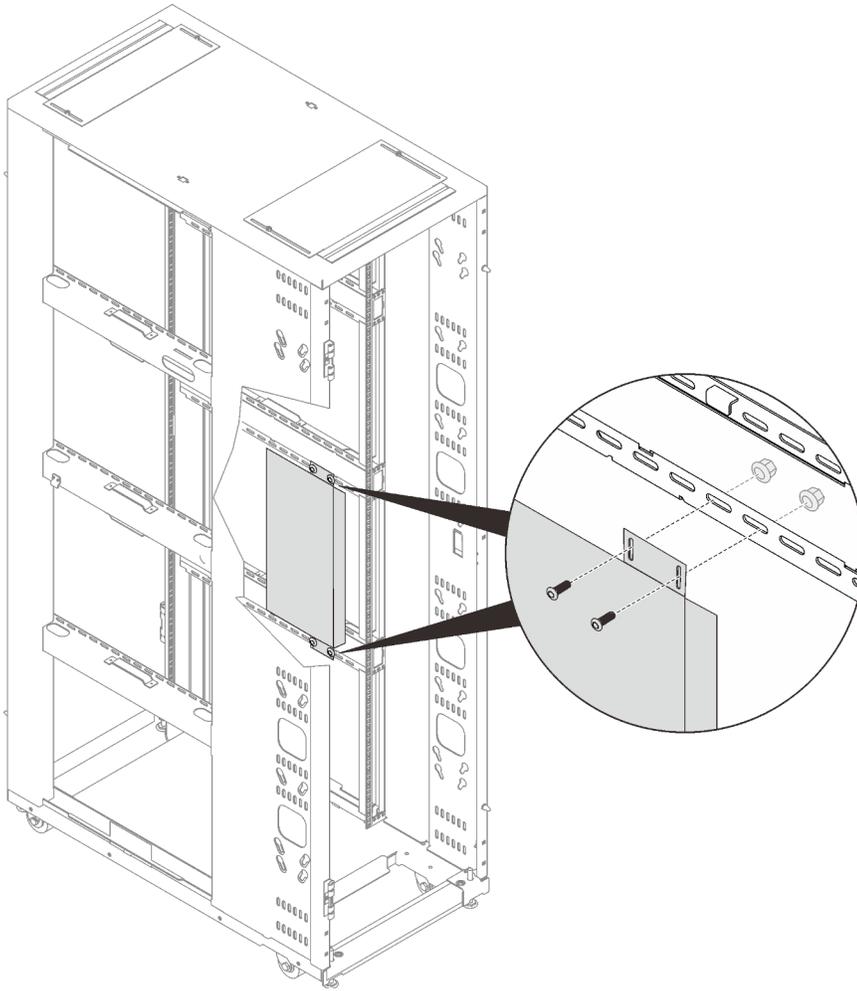


Figure 359. Installing a 1U device into the rack side

Remove a 1U PDU or console switch from the rack side

Procedure

Step 1. Remove the four screws and nuts that secure the device, and remove the device.

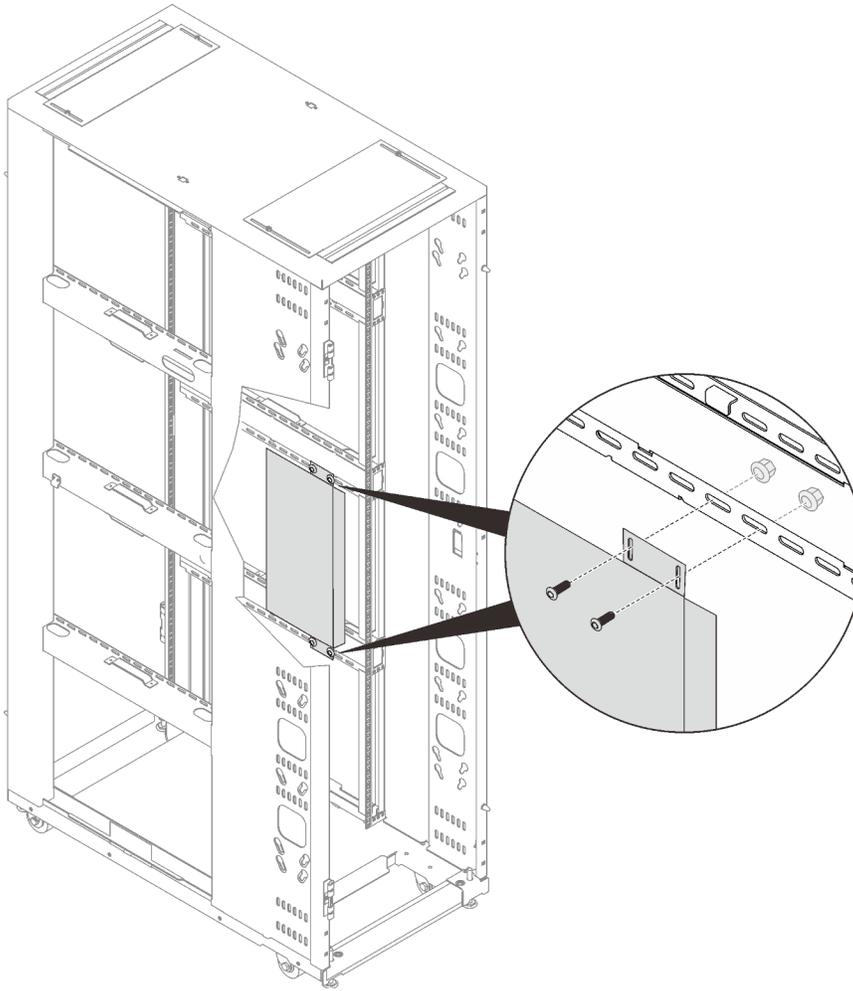


Figure 360. Removing a 1U device from the rack side

Installing and removing a 1U device in/from the side pocket

See this topic to learn how to install or remove a 1U PDU or console switch in the side pocket.

Install a 1U device into the side pocket

About this task

Make sure to complete all the required cable connection and device setup before installing buying kits to the cabinets, as these tasks will be hard to operate afterwards.

Procedure

- Step 1. Remove the side cover next to the side pocket (see [“Remove a side cover”](#) on page 217).
- Step 2. Refer to the document that comes with the device, and install the mounting brackets if necessary.
- Step 3. Install the device.

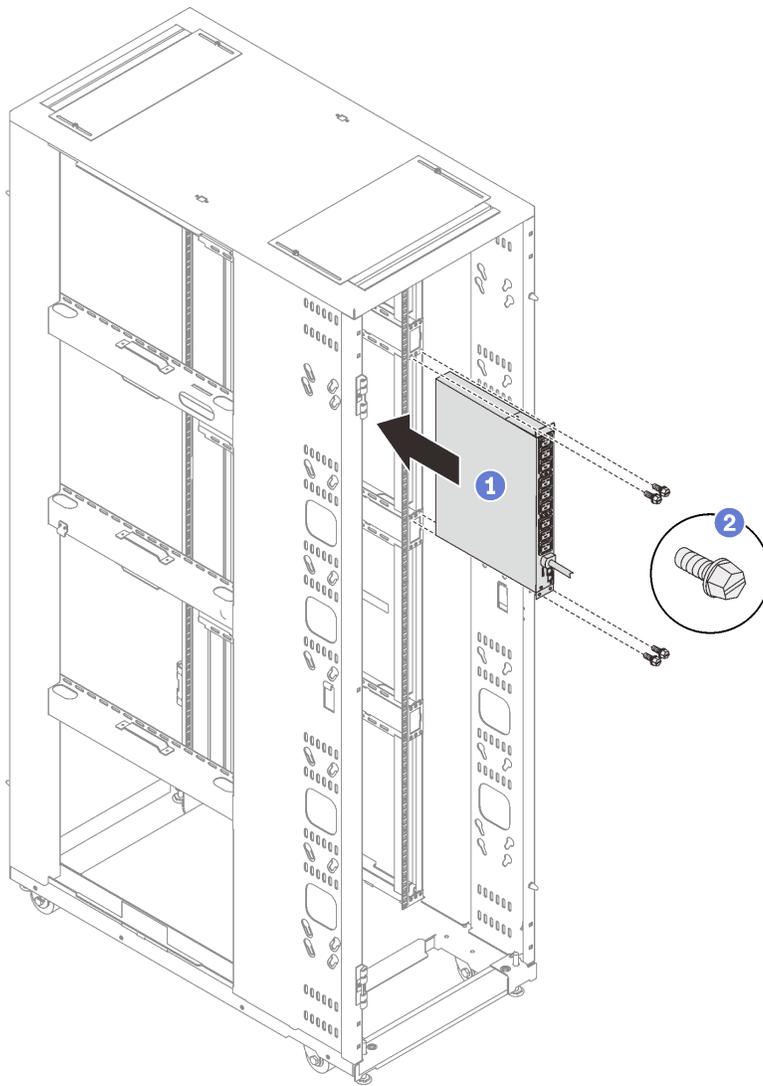


Figure 361. Installing a 1U PDU or console switch

- 1 Slide the device all the way into the side pocket.
- 2 Secure the device with four M6 screws.

Step 4. Complete all the required cable connection and setup of the device. Refer to the document that comes with the device for details.

- Make sure to complete all the required cable connection and device setup before installing baying kits to the cabinets, as these tasks will be hard to operate afterwards.
- It is advised to complete all the cable connection and setup task for the device before installing the side cover back.

Step 5. Install the side cover back (see [“Install a side cover” on page 217](#)).

Remove a 1U device from the side pocket

Step 1. Remove the device.

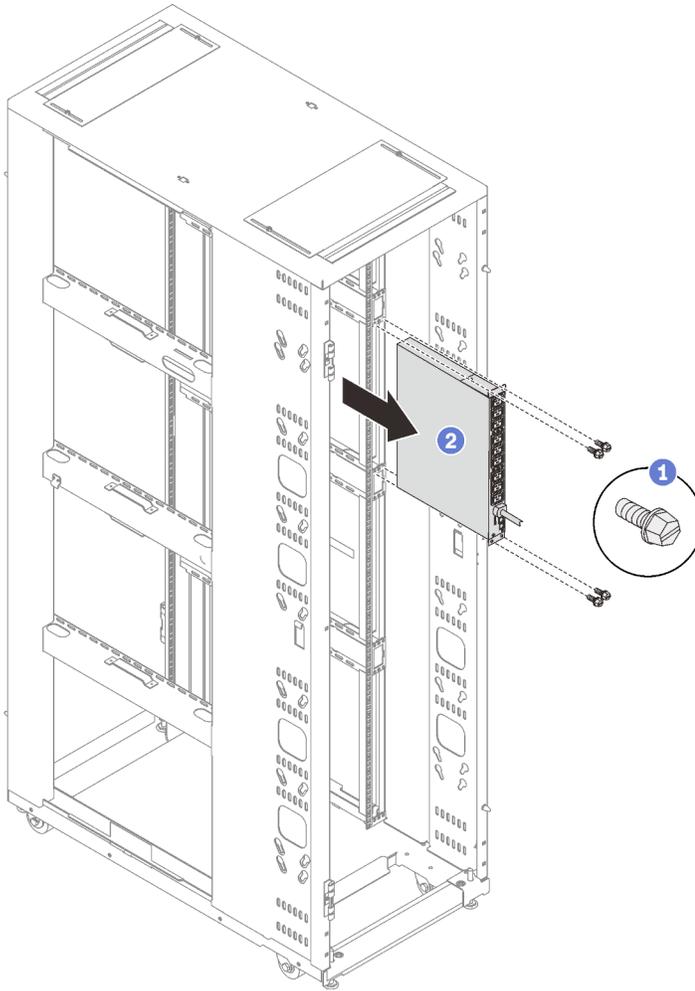


Figure 362. Removing a 1U PDU or console switch

- 1 Remove the four M6 screws.
- 2 Slide the device all the way out from the side pocket.

Install and remove the outriggers

Outriggers enhance stability of a single unit of rack cabinet. See this topic to learn how to install and remove the outriggers.

Remove the outriggers

About this task

Notes: To maintain balance of the rack cabinet, **do not** remove the outriggers except the following situations:

- when two or more rack cabinets are connected with the baying kit.
- when the rack cabinet is secured to the floor with stabilizer.

Procedure

- Step 1. Extend each of the four leveling pads in turns until they firmly contact the floor and support the rack cabinet. Make sure the cabinet is balanced by gently pushing the cabinet. If it tilts, adjust the length of the leveling pads until the cabinet is well balanced.

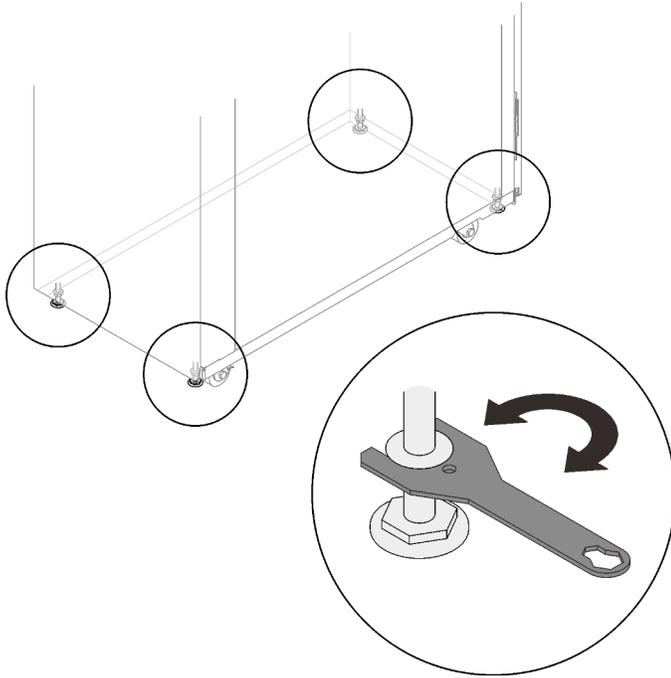


Figure 363. Lowering the leveling pads

- Step 2. Remove the outrigger stabilizing bars, and remove them.

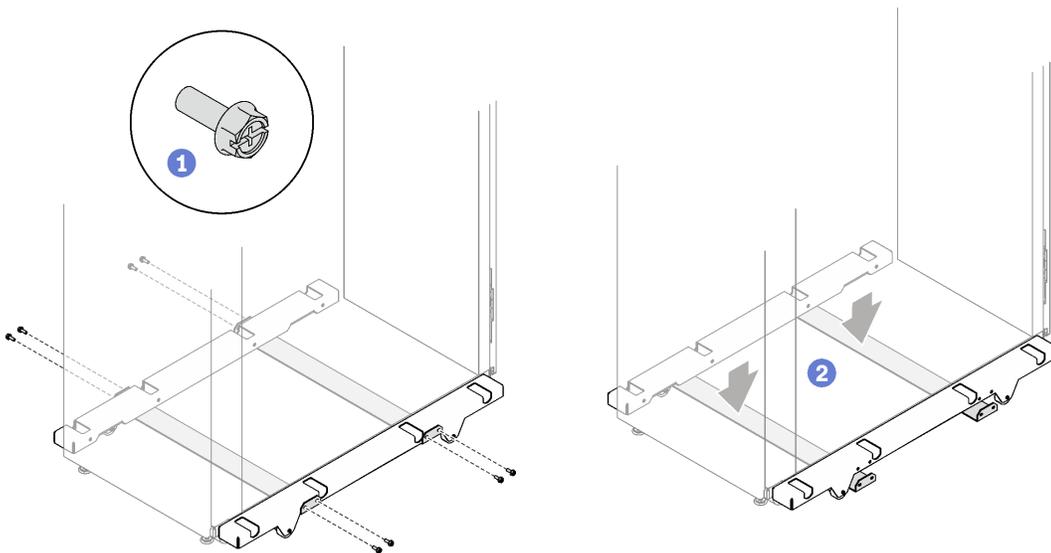


Figure 364. Removing the outrigger stabilizing bars

- 1 Remove the eight screws that secure the two bars to the rack cabinet.
 - 2 Place the two stabilizing bars on the ground, and remove the bars.
- Step 3. Remove the four screws that secure each of the outriggers, and remove the outriggers.

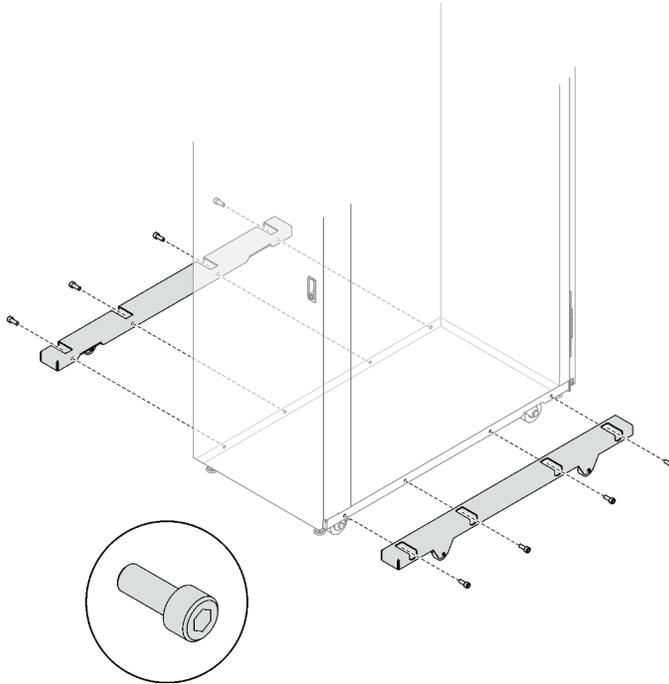


Figure 365. Removing the outriggers

Install the outriggers

Procedure

- Step 1. Extend each of the four leveling pads in turns until they firmly contact the floor and support the rack cabinet. Make sure the cabinet is balanced by gently pushing the cabinet. If it tilts, adjust the length of the leveling pads until the cabinet is well balanced.

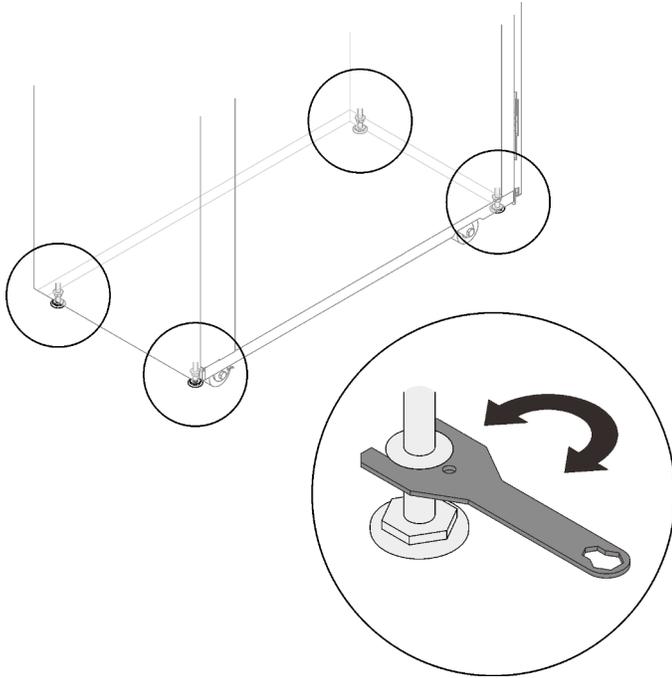


Figure 366. Lowering the leveling pads

Step 2. Secure each of the outriggers with four screws.

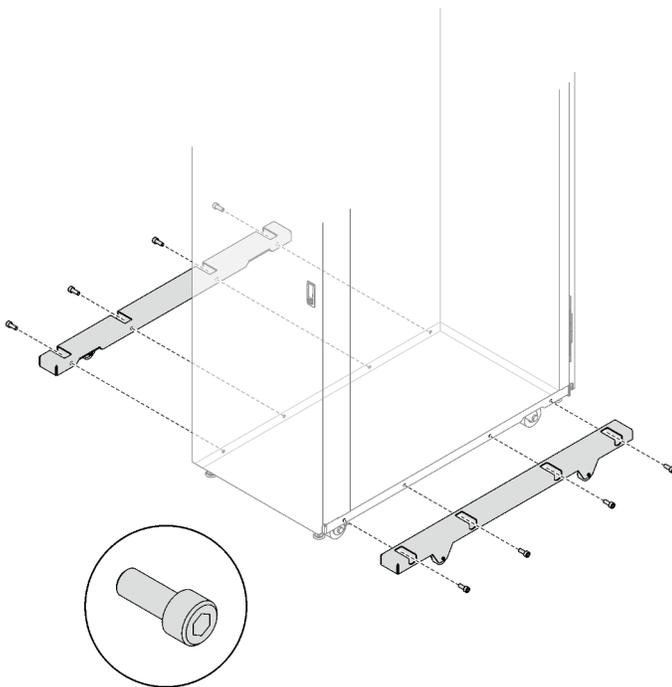


Figure 367. Installing the outriggers

Step 3. Install the outrigger stabilizing bars.

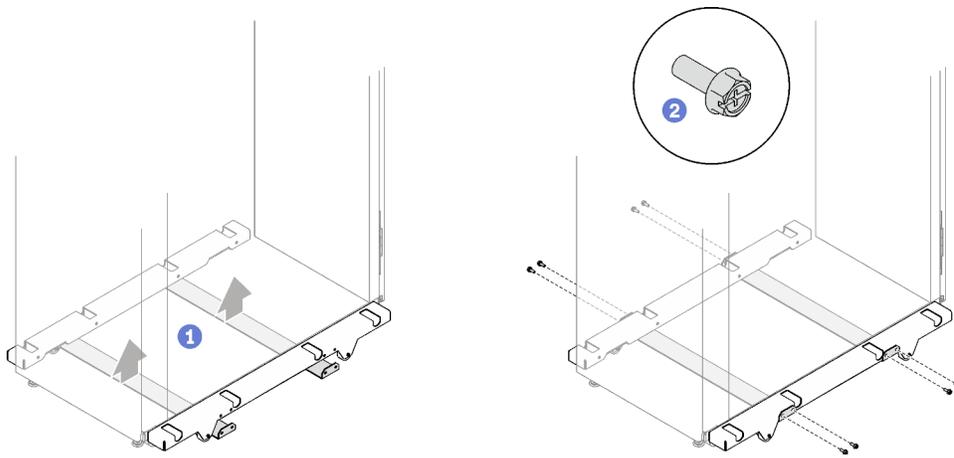


Figure 368. Installing the outrigger stabilizing bars

- 1 Align the two stabilizing bars with the bottom of the rack cabinet.
- 2 Secure the two stabilizing bars with eight screws.

Step 4. If you intend to move the rack cabinet, shorten the leveling pads until the cabinet weight is solely on the outriggers.

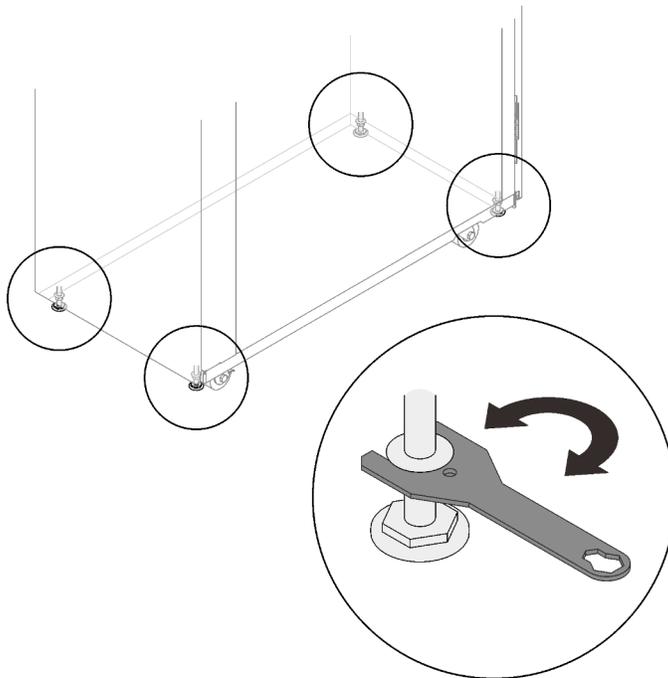


Figure 369. Shortening the leveling pads

Installing and removing cable management brackets

See this topic to learn how to remove and install the cable management brackets.

Remove a cable management bracket

See this topic to learn how to remove a cable management bracket.

Remove a 21U front cable management bracket

Procedure

- Step 1. Open the front door, and release all the cables that are secured by the cable straps on the bracket.
- Step 2. Remove the six screws that secure the front cable management bracket, and remove the clip nuts.

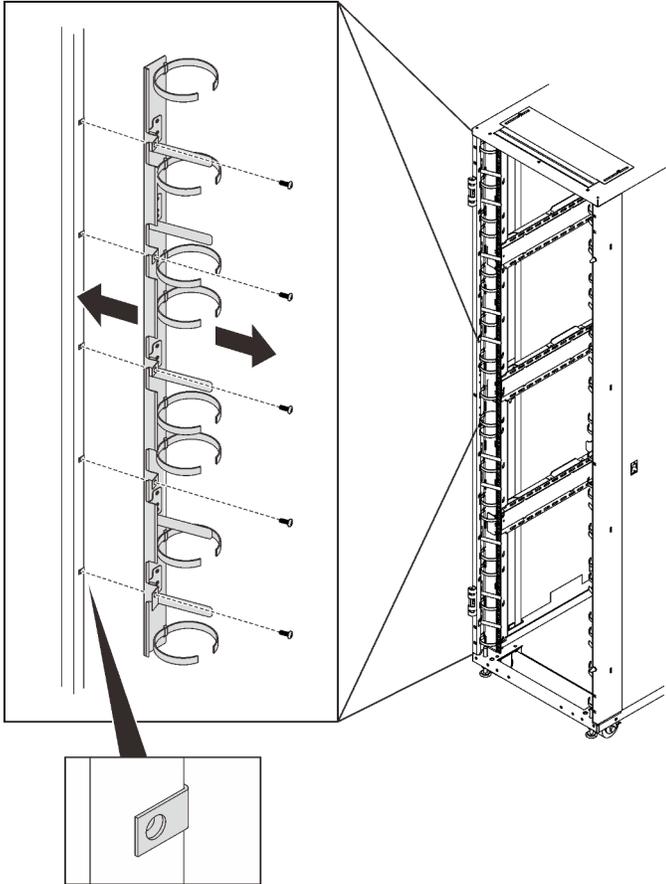


Figure 370. Removing a 21U front cable management bracket

Remove a 6U front cable management bracket

Procedure

- Step 1. Open the front door, and release all the cables that are secured by the cable straps on the bracket.
- Step 2. Remove the two screws that secure the front cable management bracket, and remove the clip nuts.

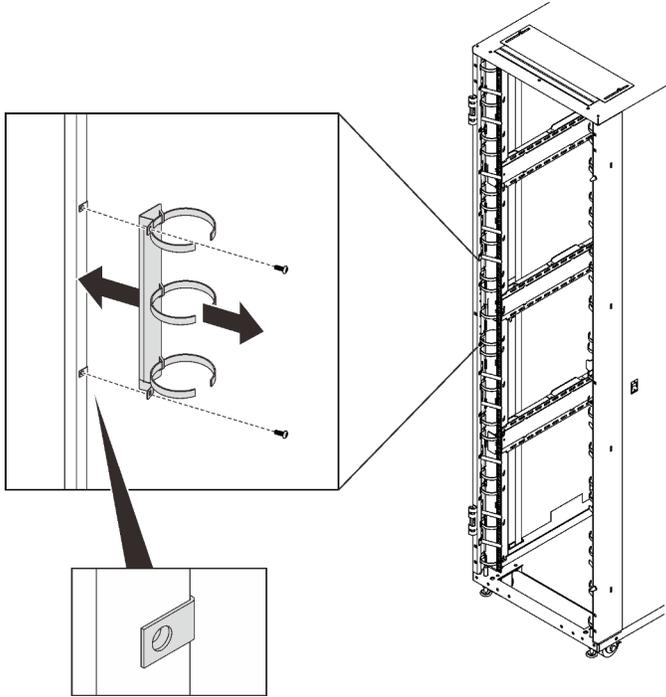


Figure 371. Removing a 6U front cable management bracket

Remove a rear cable management bracket

- Step 1. Open the rear door, and release all the cables that are secured by the cable straps on the bracket.
- Step 2. Remove the four screws that secure the rear cable management bracket to the side pocket, and remove the bracket.

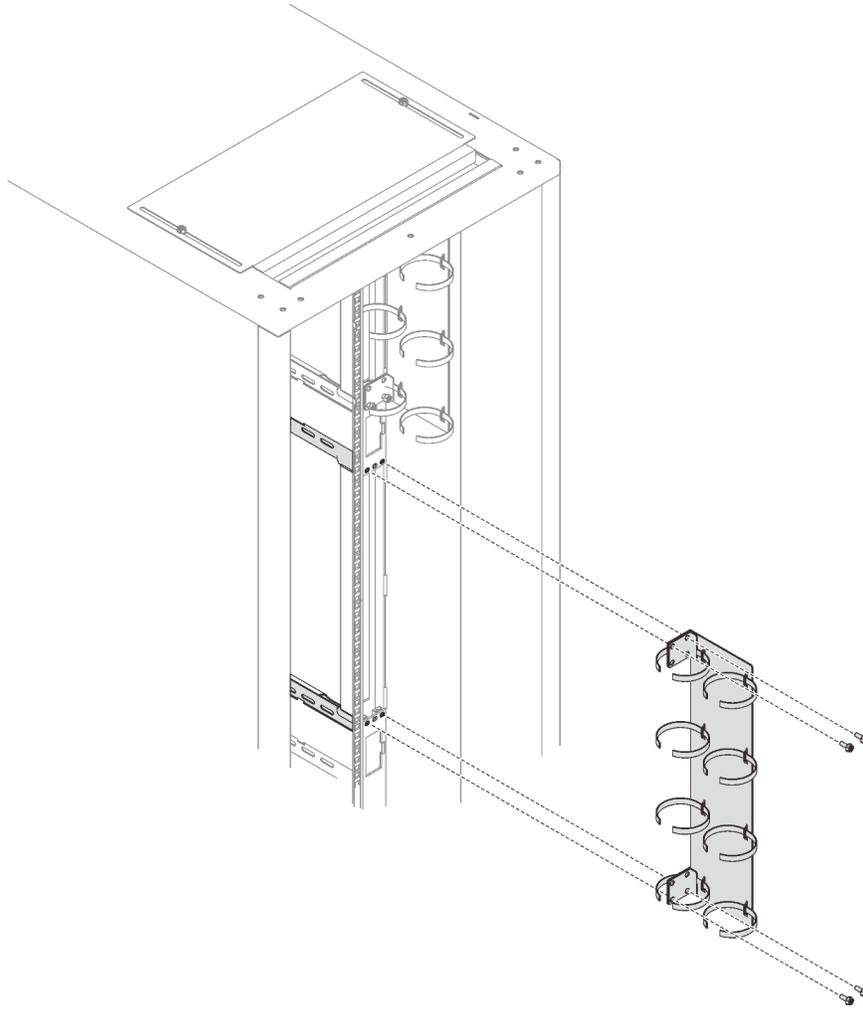


Figure 372. Removing a rear cable management bracket

Install a cable management bracket

See this topic to learn how to install a cable management brackets.

Install a 21U front cable management bracket

Procedure

Step 1. Install six clip nuts, and secure the front cable management bracket with six screws.

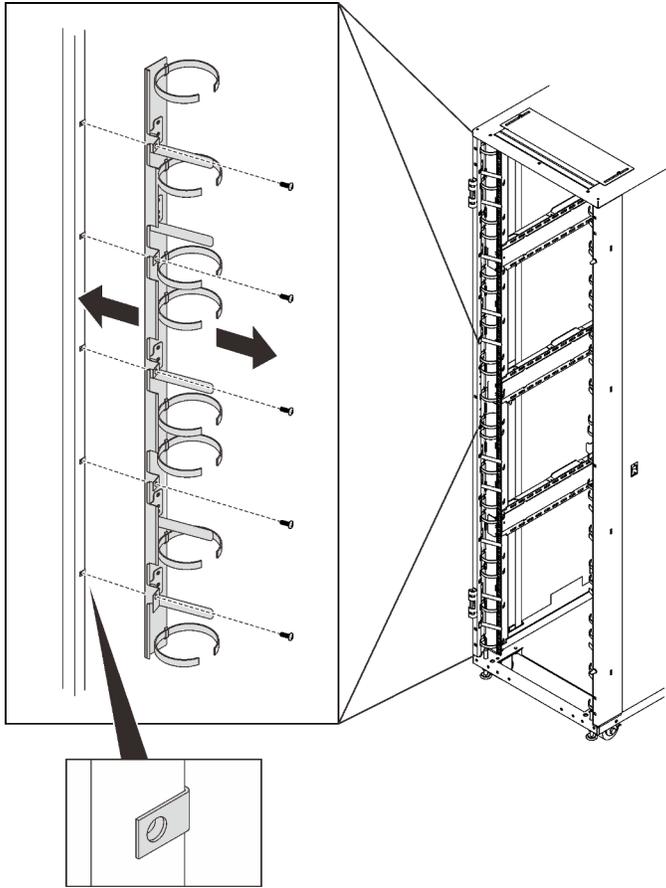


Figure 373. Installing a 21U cable strap module

Install a 6U front cable management bracket

Procedure

Step 1. Install two clip nuts, and secure the front cable management bracket with two screws.

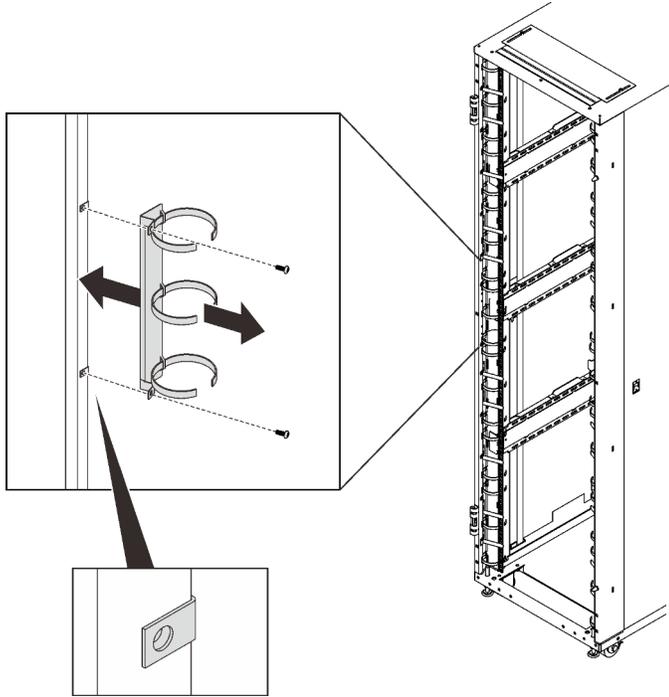


Figure 374. Installing a 6U front cable management bracket

Install a rear cable management bracket

Procedure

Step 1. Secure the rear cable management bracket to the side pocket with four screws.

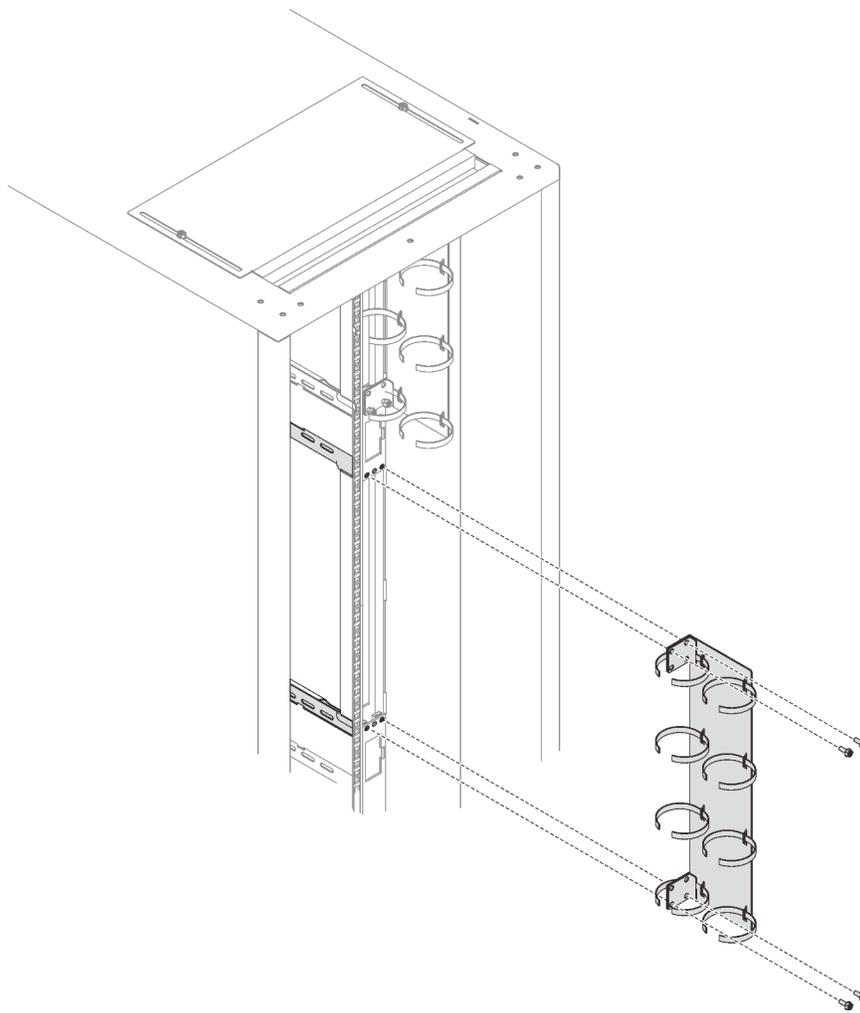


Figure 375. Installing a rear cable management bracket

Installing and removing DWC 38 Port Rack Manifold

Use the following procedures to remove and install the ThinkSystem Neptune® DWC 38 Port Rack Manifold.

Important: The coolant runs through the cooling system is de-ionized water. For more information about the coolant, see water requirements section in the user manual of the server.

For more operation and maintenance guidelines on Coolant Distribution Unit (CDU), see [Lenovo Neptune DWC RM100 in-rack Coolant Distribution Unit \(CDU\) Operation & Maintenance Guide](#).

The illustrations below present the rear views of a rack cabinet; three sets of manifolds and three sets of connection hoses. There are two labels attached to the front of the manifolds, and one label on one end of each hose.

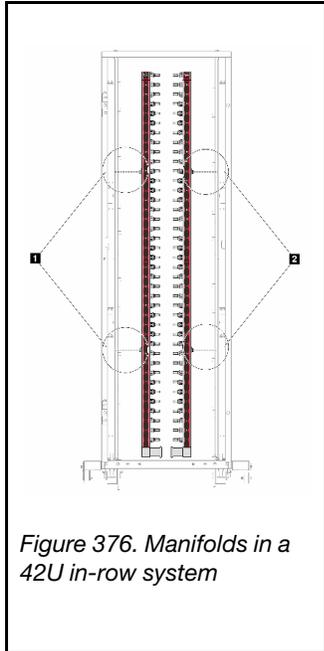


Figure 376. Manifolds in a 42U in-row system

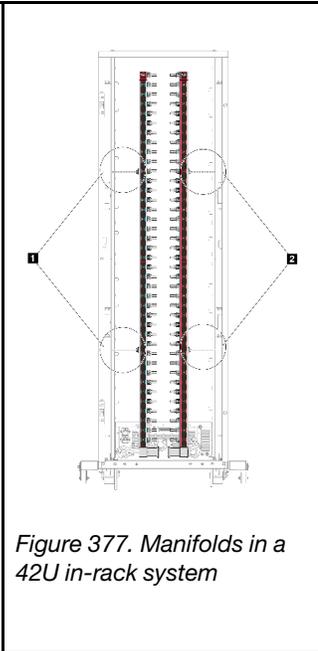


Figure 377. Manifolds in a 42U in-rack system

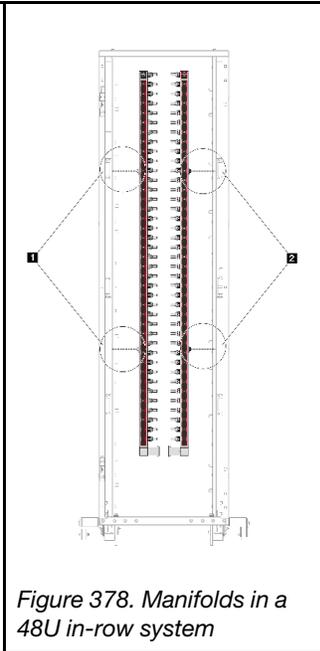


Figure 378. Manifolds in a 48U in-row system

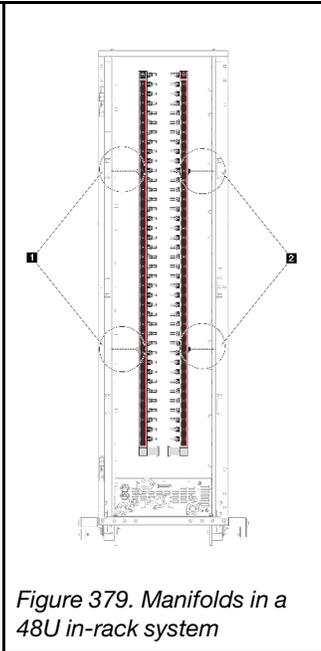


Figure 379. Manifolds in a 48U in-rack system

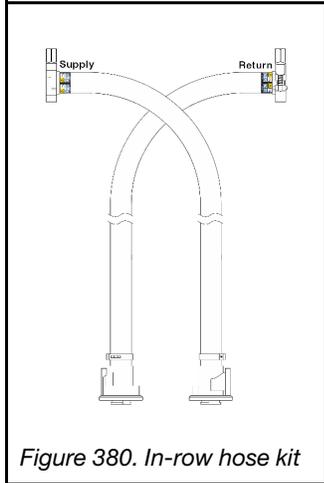


Figure 380. In-row hose kit

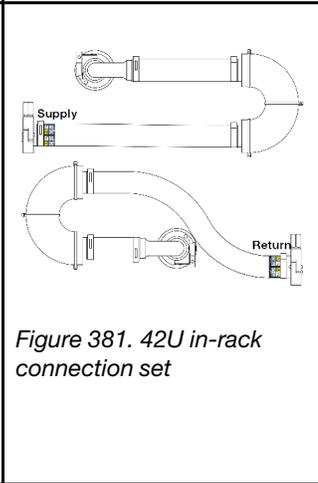


Figure 381. 42U in-rack connection set

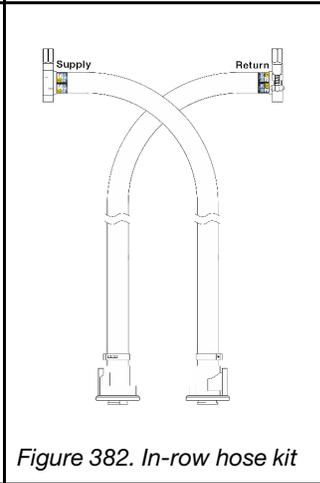


Figure 382. In-row hose kit

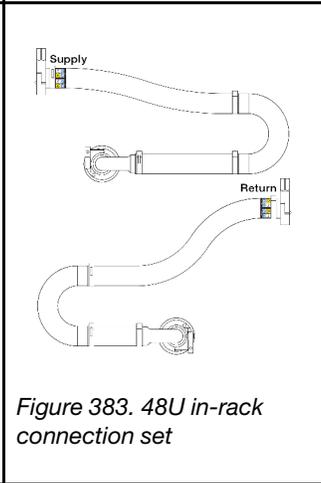


Figure 383. 48U in-rack connection set

- **1** Two left spools on supply manifold
- **2** Two right spools on return manifold
- [“Remove DWC 38 Port Rack Manifold \(in-rack system\)” on page 337](#)
- [“Install DWC 38 Port Rack Manifold \(in-rack system\)” on page 347](#)
- [“Remove DWC 38 Port Rack Manifold \(in-row system\)” on page 360](#)
- [“Install DWC 38 Port Rack Manifold \(in-row system\)” on page 372](#)

Remove DWC 38 Port Rack Manifold (in-rack system)

Use this information to remove the manifold in an in-rack direct water cooling system.

CAUTION:

The coolant might cause irritation to the skin and eyes. Avoid direct contact with the coolant.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S011



CAUTION:

Sharp edges, corners, or joints nearby.

S038



CAUTION:

Eye protection should be worn for this procedure.

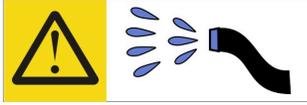
S040



CAUTION:

Protective gloves should be worn for this procedure.

L016



خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
تجنب العمل في أو بالقرب من أي جهاز فعال بأيدي مبللة أو عند وجود تسرب للماء. (L016)

AVISO: Risco de choque elétrico devido à presença de água ou solução aquosa no produto. Evite trabalhar no equipamento ligado ou próximo a ele com as mãos molhadas ou quando houver a presença de água derramada. (L016)

ОПАСНО: Риск от токов удар поради вода или воден разтвор, присъстващи в продукта.
Избягвайте работа по или около оборудване под напрежение,
докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER: Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危險: 由于本产品中存在水或者水溶液，因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。(L016)

危險: 本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polížení produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risico op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda. (L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda. (L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

ཉེན་བརྒྱུ: རྩོམ་རྒྱུ་འདི་ནི་རྩ་རྒྱ་ཆུ་འཕྲུ་ཆུ་འཕྲུ་གཤེར་གཟུགས་འདུས་ཡོད་པ་སྟེ་དེ་ལས་སློབ་ཆུག་པའི་ཉེན་ཁ་ཡོད། ལག་པའི་ཐོག་ཆུ་ཡོད་པའམ་ཆུ་ཐིག་མར་བཞུར་བའི་གནས་ཚུལ་འགྲོག་ཡོད་པའི་སློབ་ཆས་ལ་བཞོལ་སྤྱོད་བྱེད་མི་ཉེན་པོ། (L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول ھۆل ھالەتتە ۋە ياكى سۇ سىرغىپ چىققان ھالەتتە، توكلۇق ئۇسكۇنىگە قارىتا ۋە ياكى توكلۇق ئۇسكۇنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiemyj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiemyj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong. (L016)

Attention:

- Ensure proper handling procedures are followed when working with any chemically treated coolant used in the rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the coolant chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the coolant chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.
- This task requires two or more people.

Procedure

- Step 1. Power off the in-rack CDU and disconnect all power cords.
- Step 2. Close both ball valves.

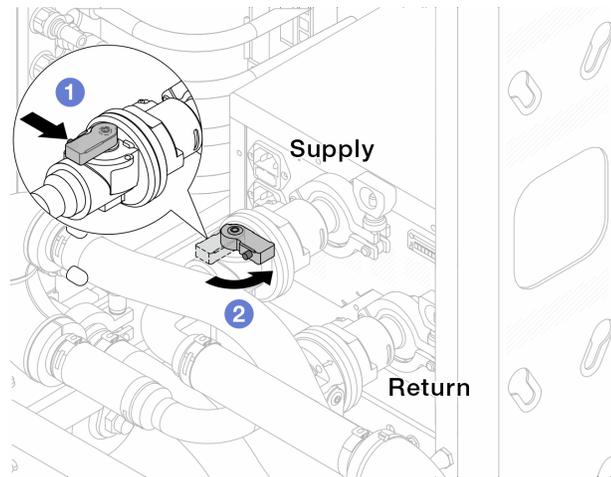


Figure 384. Closing ball valves

- a. ① Press the button on the ball valve switch.
- b. ② Rotate the switch to close the valves as illustrated above.

Step 3. Remove the quick connect plugs to separate the hoses from the manifold.

Note: Depending on the model, your server might look different from the illustrations in this topic.

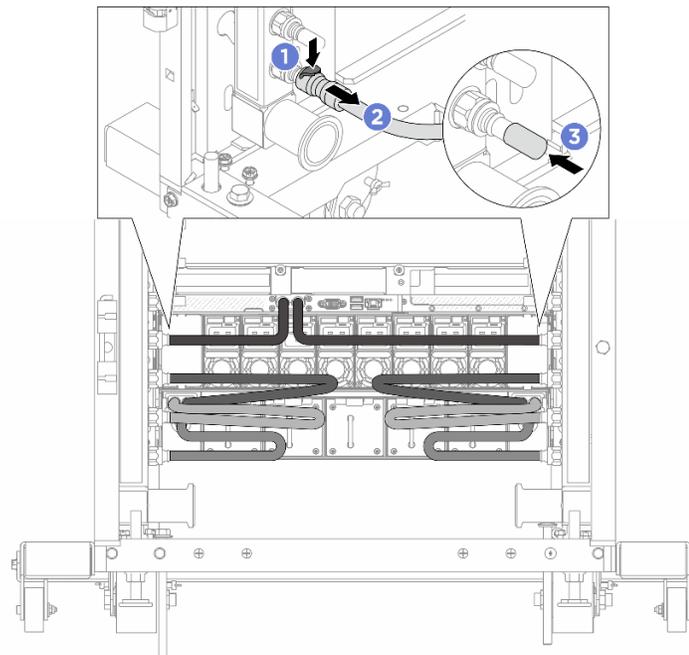


Figure 385. Quick connect plug removal

- a. ① Press the latch down to unlock the hose.
- b. ② Pull the hose off.
- c. ③ Re-install the rubber quick connect plug covers to the ports on the manifold.

Step 4. Repeat [Step 3 step 3 on page 342](#) to the other manifold.

Step 5. Disengage the connection set from ball valves.

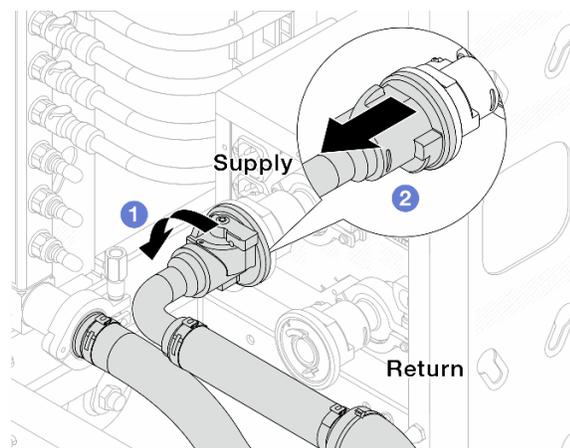


Figure 386. Removing the connection set

- a. ① Rotate the ball valve to the left.
- b. ② Pull the connection set off from ball valve.

Step 6. Remove the manifold with the connection set attached.

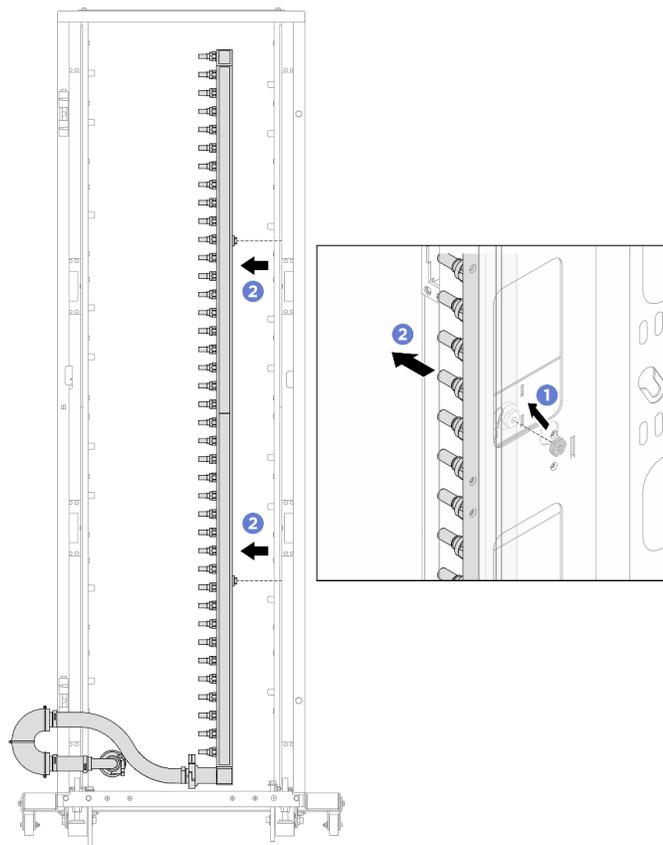


Figure 387. Removing the manifold

- a. ① Hold the manifold with both hands, and lift it upward to relocate the spools from the small openings to large ones on the rack cabinet.
- b. ② Remove the manifold with the connection set attached.

Step 7. Repeat [Step 6 step 6 on page 343](#) to the other manifold.

Notes:

- There is remaining coolant inside the manifold and the connection set. Remove both together and leave the further draining to the next step.

Step 8. Install the bleeder kit to the manifold supply side.

Note: This step drains the coolant with the help of a pressure difference inside and outside the supply manifold.

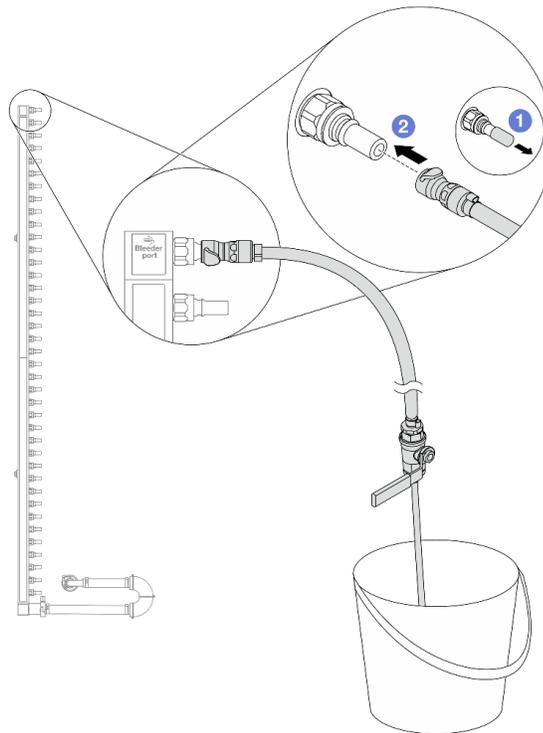


Figure 388. Installing the bleeder kit to the supply side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 9. Slowly open the bleeder valve to allow a steady stream of coolant to drain. Close the bleeder valve once coolant stops flowing.

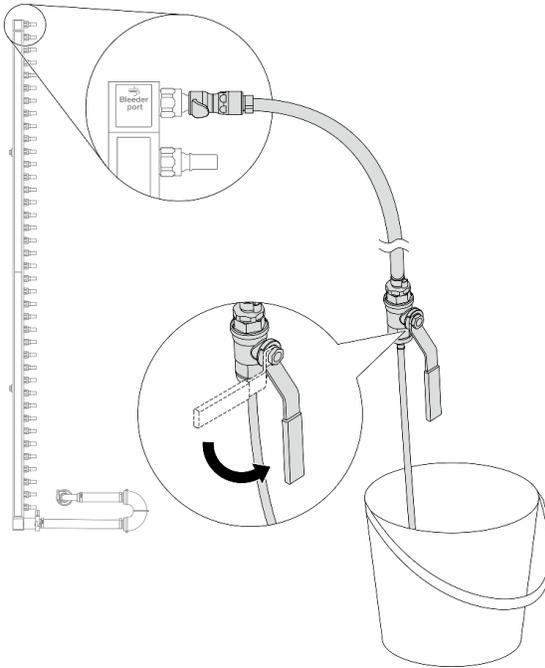


Figure 389. Opening the bleeder valve

Step 10. Install the bleeder kit to the manifold return side.

Note: This step drains the coolant with the help of a pressure difference inside and outside the return manifold.

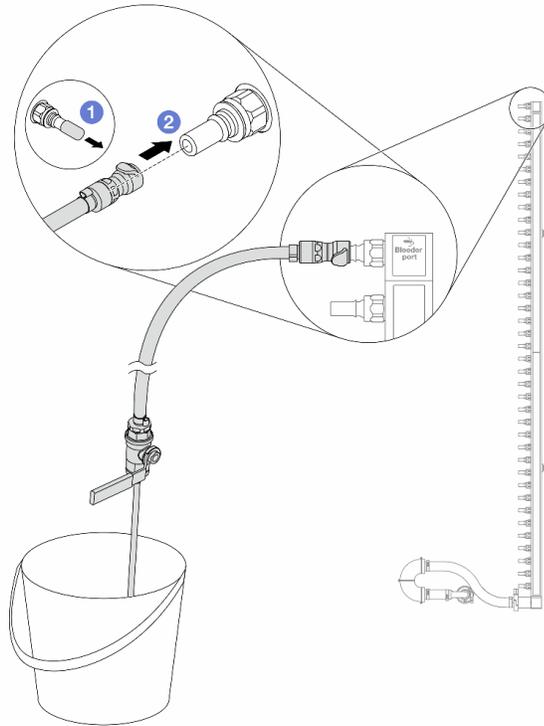


Figure 390. Installing the bleeder kit to the return side

- a. 1 Remove the rubber quick connect plug covers from the ports on the manifold.
- b. 2 Plug the bleeder kit to the manifold.

Step 11. Slowly open the bleeder valve to allow a steady stream of coolant to drain. Close the bleeder valve once coolant stops flowing.

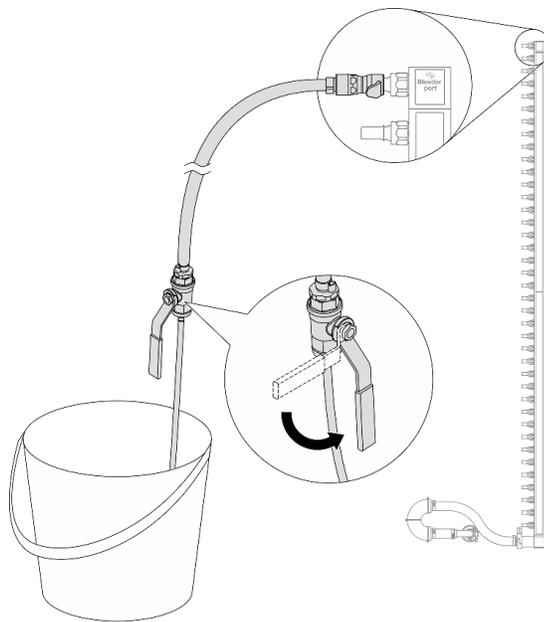


Figure 391. Opening the bleeder valve

Step 12. Separate the manifold from the connection set in a dry and clean work area, and keep a bucket and absorbent cloths around to collect any coolant that may drain out.

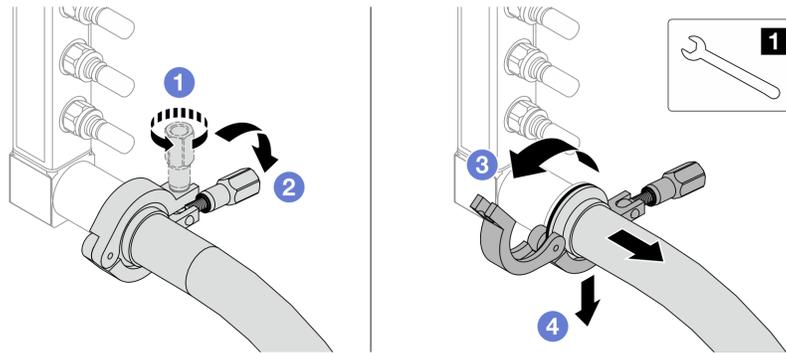


Figure 392. Separating the manifold from the connection set

1 17 mm wrench

- 1 Loosen the screw that locks the ferrule.
- 2 Put the screw down.
- 3 Open the clamp.
- 4 Remove the ferrule and connection set from the manifold.

Step 13. Repeat the last step to the other manifold.

Step 14. For better sanitation, keep the manifold ports and connection sets dry and clean. Re-install quick connect plug covers or any covers that protect connection sets and manifold ports.

Install DWC 38 Port Rack Manifold (in-rack system)

Use this information to install the manifold in an in-rack direct water cooling system.

CAUTION:

The coolant might cause irritation to the skin and eyes. Avoid direct contact with the coolant.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S011



CAUTION:
Sharp edges, corners, or joints nearby.

S038



CAUTION:
Eye protection should be worn for this procedure.

S040



CAUTION:
Protective gloves should be worn for this procedure.

L016



خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
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(L016)

DANGER: Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危险: 由于本产品中存在水或者水溶液, 因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。(L016)

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tekućina.
(L016)

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GEVAAR: Risico op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

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خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول ھۆل ھالەتتە ۋە ياكى سۇ سىرغىپ چىققان ھالەتتە، توكلۇق ئۇسكۇنىگە قارىتا ۋە ياكى توكلۇق ئۇسكۇنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiernj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiernj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong. (L016)

Attention:

- Ensure proper handling procedures are followed when working with any chemically treated coolant used in the rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the coolant chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the coolant chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.
- This task requires two or more people.

Procedure

- Step 1. Make sure that the in-rack CDU and other devices are not powered on, and that all external cables are disconnected.
- Step 2. Install the server into the rack.
- Step 3. Install the manifold.

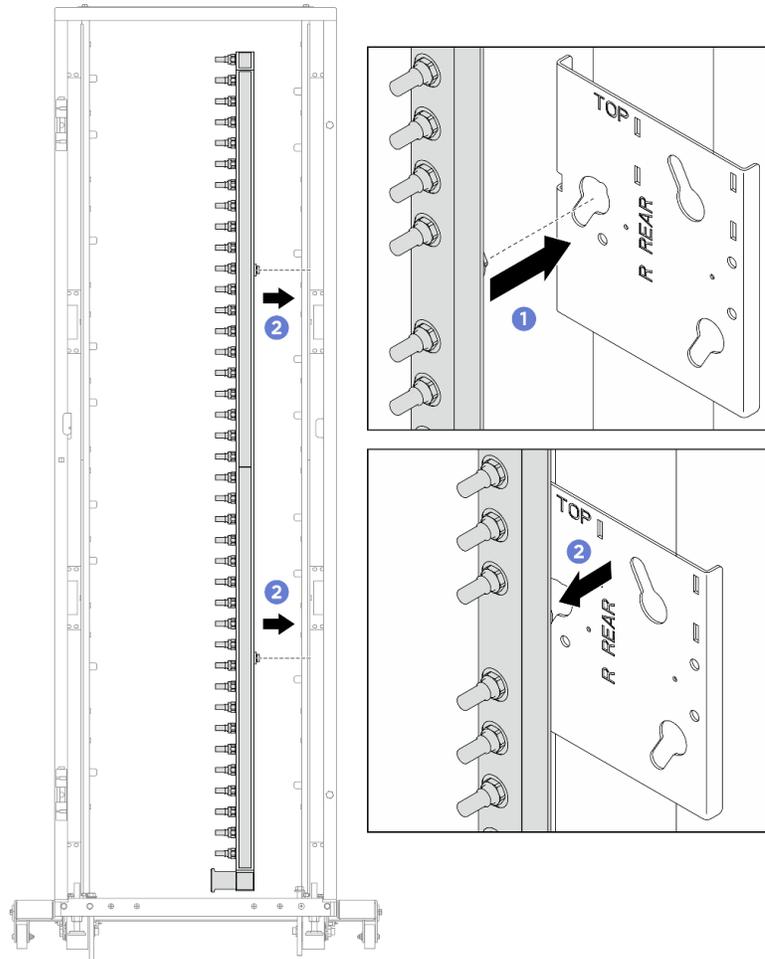


Figure 393. Installing the manifold

- a. ① Hold the manifold with both hands, and mount it onto the rack cabinet.
- b. ② Align the spools with holes, and clutch the cabinet.

Step 4. Repeat the last step to install the other manifold.

Step 5. Install ball valves to CDU.

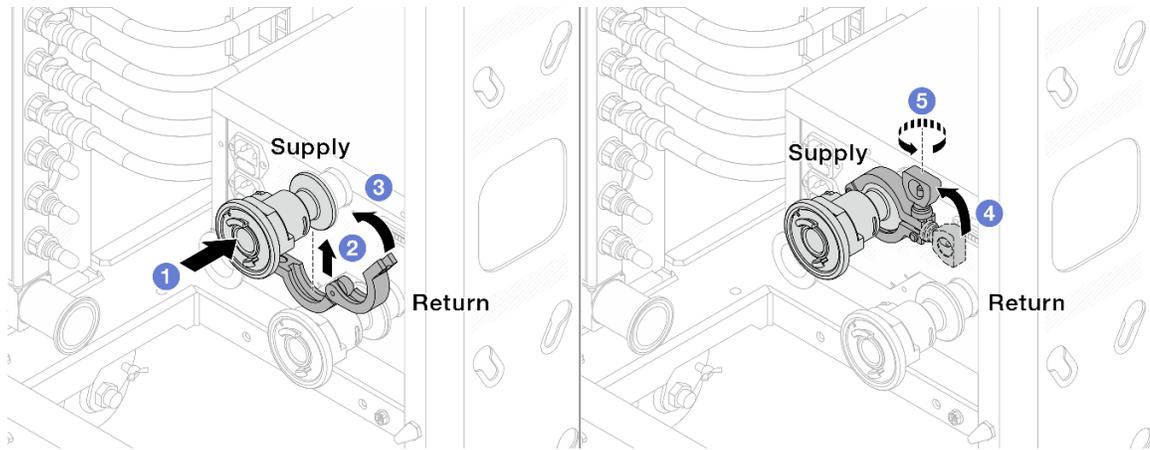


Figure 394. Installing ball valves

- a. 1 Connect the ball valves to **Supply** and **Return** ports.
- b. 2 Wrap the interface around with the clamp.
- c. 3 Close the clamp.
- d. 4 Lift the screw upright.
- e. 5 Tighten the screw and make sure that it is secured.

Step 6. Install the connection set to manifolds.

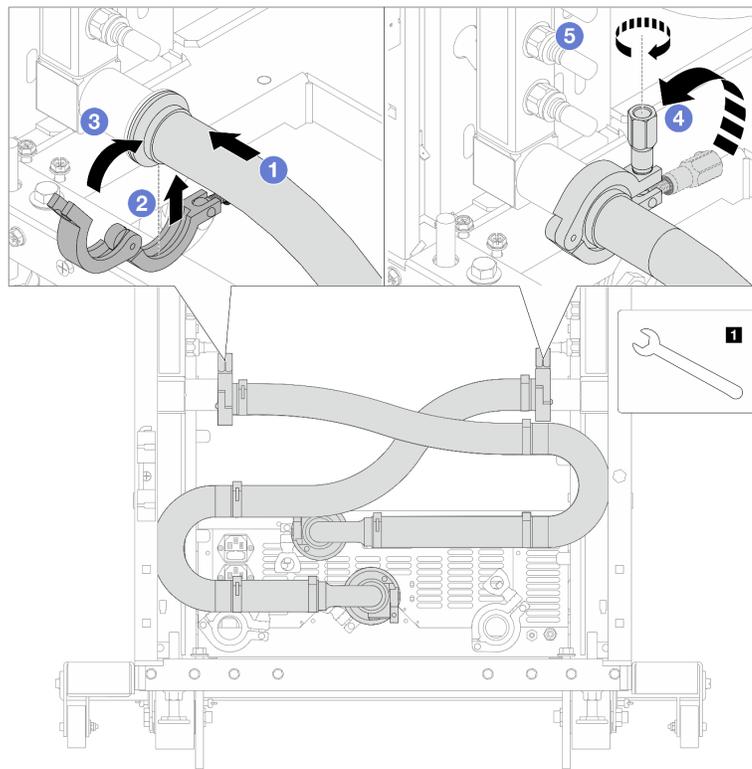


Figure 395. Installing the connection set

1 17 mm wrench

- a. **1** Connect the connection set to both manifolds.
- b. **2** Wrap the interface around with the clamp.
- c. **3** Close the clamp.
- d. **4** Lift the screw upright.
- e. **5** Tighten the screw and make sure that it is secured.

Step 7. Install the connection set to ball valves.

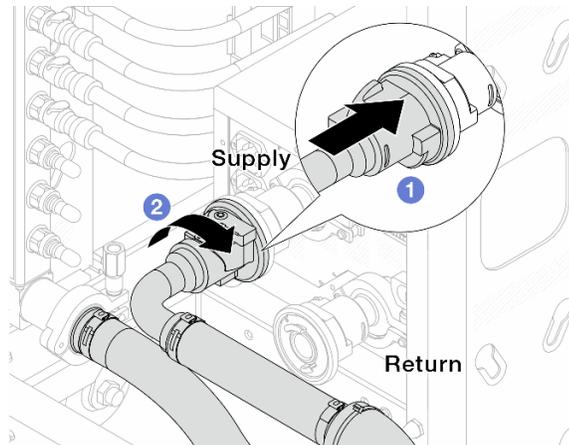


Figure 396. Connecting ball valves

- a. **1** Connect ball valves.
- b. **2** Rotate to the right to lock the two valves.

Step 8. Prepare the in-rack CDU.

- a. Connect the feed hose to inlet port on the front.

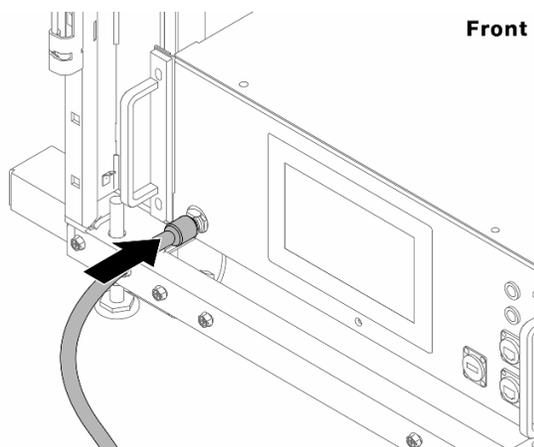


Figure 397. The front of CDU

- b. Connect hoses to the drain port and bleeder port on the rear.

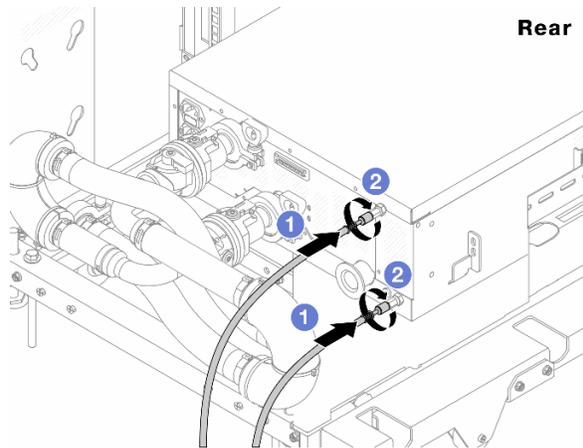


Figure 398. The rear of CDU

- 1 Connect both drain and bleeder hoses to CDU.
- 2 Rotate the connectors to the right to secure the connection.

Important:

- For more operation and maintenance guidelines, see [Lenovo Neptune DWC RM100 in-rack Coolant Distribution Unit \(CDU\) Operation & Maintenance Guide](#).
- For service support, associated warranty and maintenance sizing, contact Lenovo Professional Services team at cdusupport@lenovo.com.

Step 9. Install the quick connect plug to the manifolds.

Note: Depending on the model, your server might look different from the illustrations in this topic.

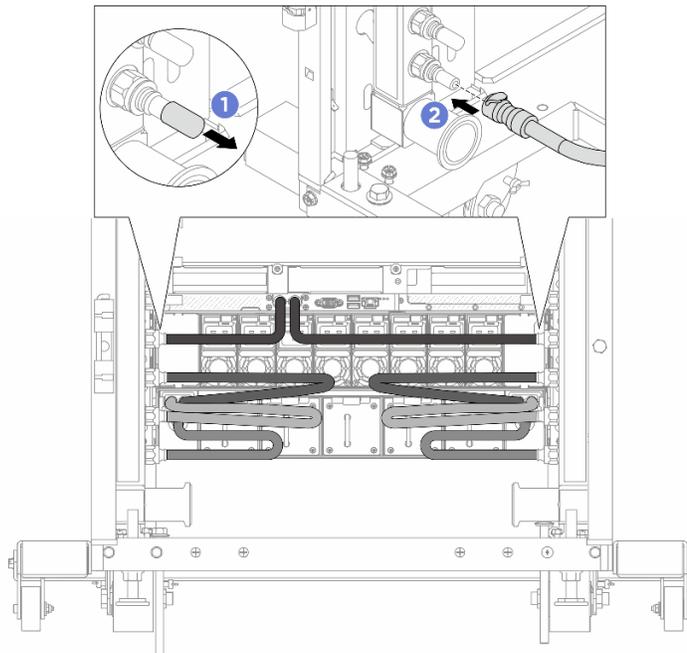


Figure 399. Installing the quick connect plug

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Connect the plug to the manifold port.

Step 10. Install the bleeder kit to the manifold supply side.

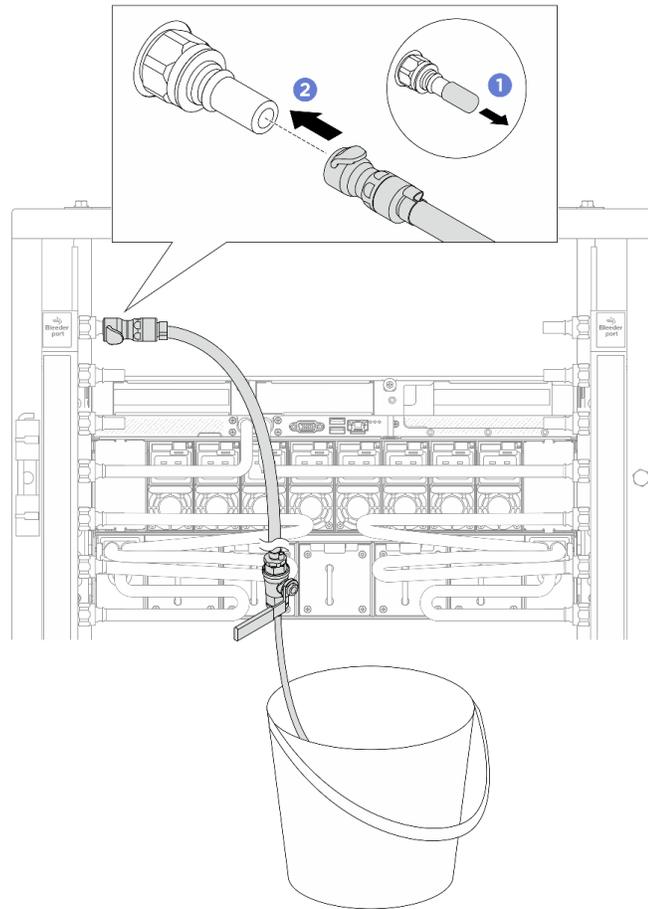


Figure 400. Installing the bleeder kit to the supply side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 11. To push the air out of the manifolds, open ball valve switches to let coolant fill the system.

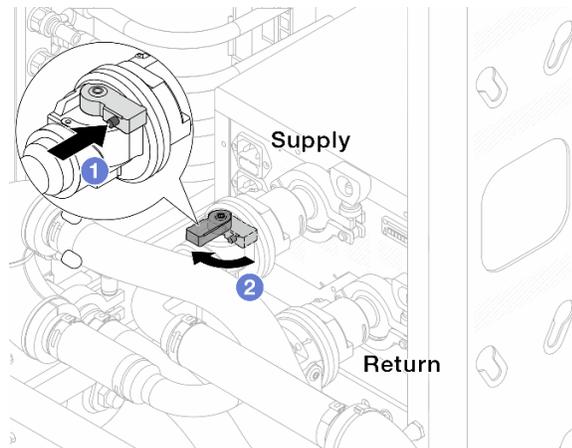


Figure 401. Opening ball valves

- a. ① Press the button on the ball valve switch.
- b. ② Rotate the switch to fully open the valves as illustrated above.

Attention:

- Pay close attention to the front display of CDU and maintain the system pressure at **one bar**.
- For more information about coolant temperature and system pressure requirements, see the water requirements section of your server.

Step 12. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

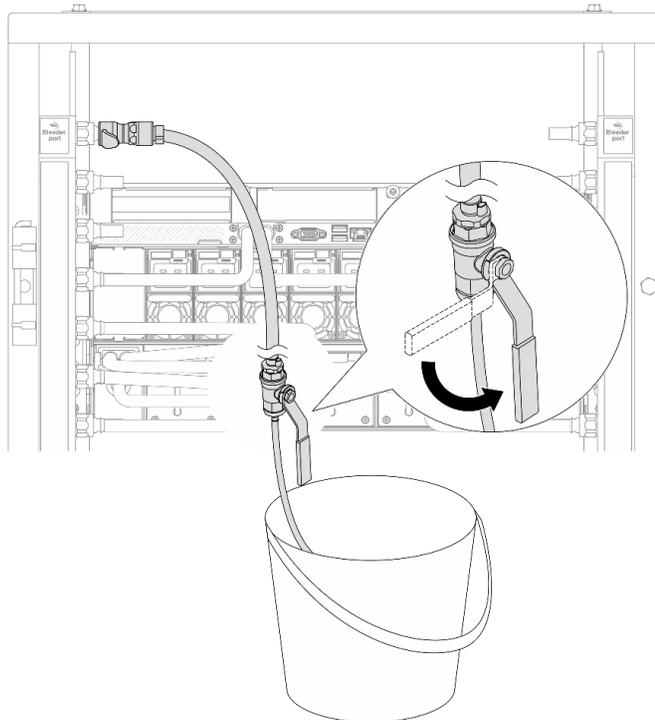


Figure 402. Opening the bleeder valve on the supply side

Step 13. Install the bleeder kit to the manifold return side.

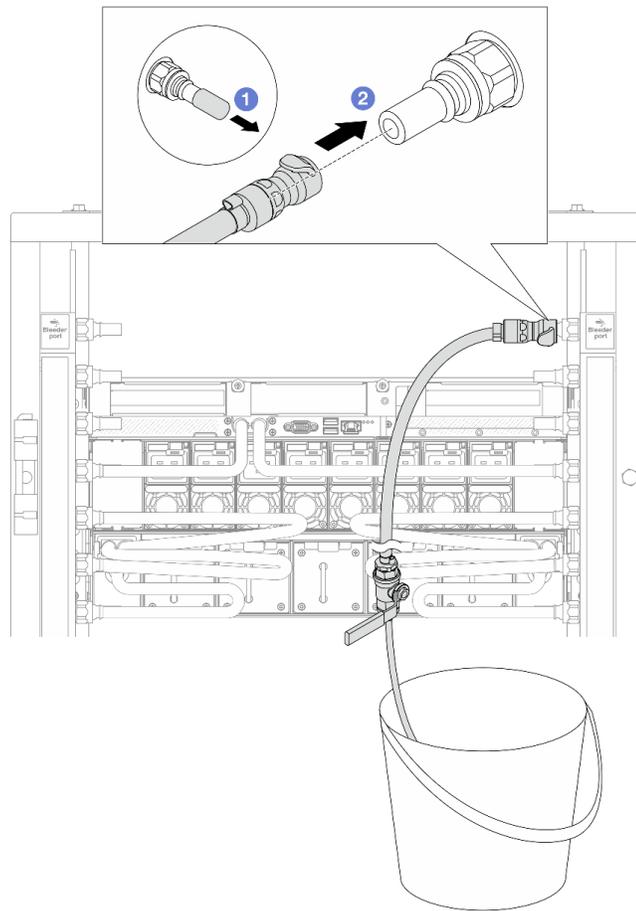


Figure 403. Installing the bleeder kit on the return side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 14. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

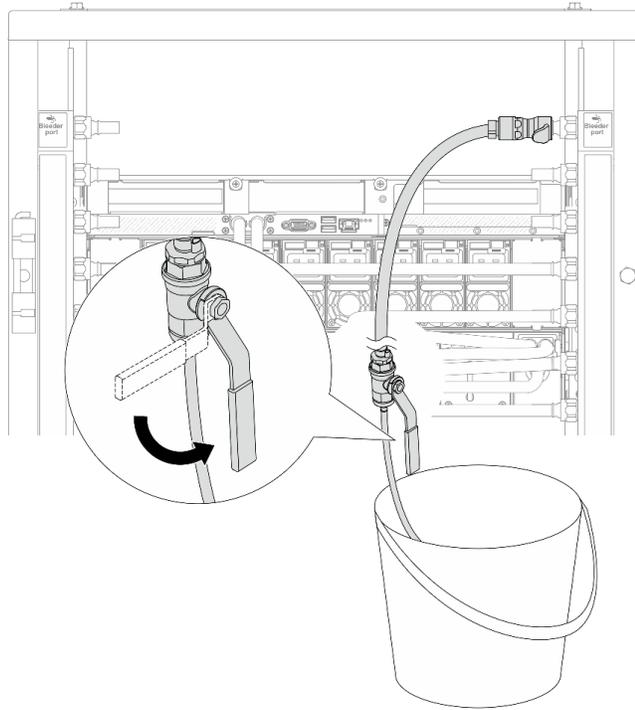


Figure 404. Opening the bleeder valve on the return side

- Step 15. (For precaution) To make sure that the air inside is as little as possible, re-install the bleeder kit back to manifold supply side and do it one more time. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

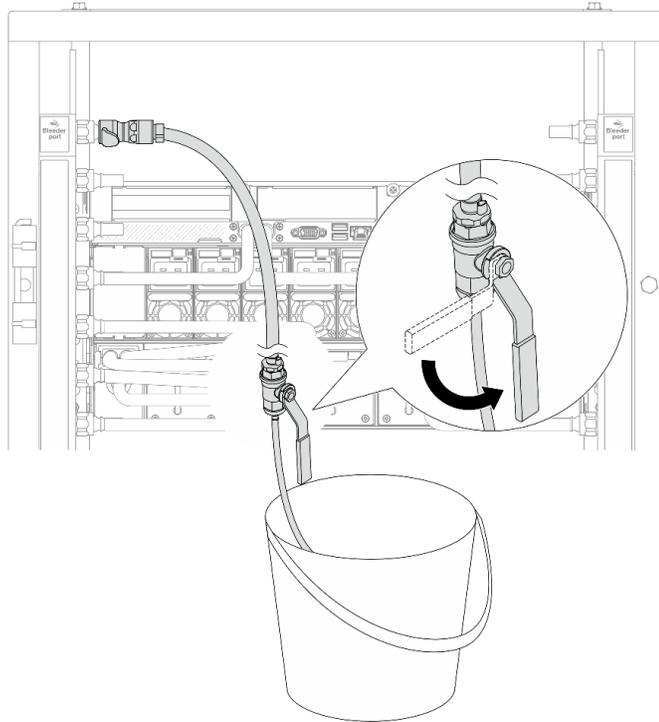


Figure 405. Opening the bleeder valve on the supply side

Step 16. Once completed, pay close attention to the front display of CDU and maintain the system pressure at **one bar**. For more information about coolant temperature and system pressure requirements, see the water requirement section for your server.

Remove DWC 38 Port Rack Manifold (in-row system)

Use this information to remove the manifold in an in-row direct water cooling system.

CAUTION:

The coolant might cause irritation to the skin and eyes. Avoid direct contact with the coolant.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S011



CAUTION:
Sharp edges, corners, or joints nearby.

S038



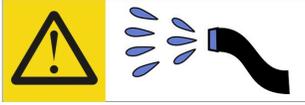
CAUTION:
Eye protection should be worn for this procedure.

S040



CAUTION:
Protective gloves should be worn for this procedure.

L016



خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
تجنب العمل في أو بالقرب من أي جهاز فعال بأيدي مبللة أو عند وجود تسرب للماء. (L016)

AVISO: Risco de choque elétrico devido à presença de água ou solução aquosa no produto. Evite trabalhar no equipamento ligado ou próximo a ele com as mãos molhadas ou quando houver a presença de água derramada. (L016)

ОПАСНО: Риск от токов удар поради вода или воден разтвор, присъстващи в продукта.
Избягвайте работа по или около оборудване под напрежение,
докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER: Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危險: 由于本产品中存在水或者水溶液，因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。(L016)

危險: 本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polití produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risco op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda. (L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda. (L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

ཉེན་བརྒྱ: རྩོམ་ཆས་འདིའི་ནང་དུ་རྒྱ་འཕྲུལ་རྒྱུ་ལྡན་གྱི་ཤེར་གཟུགས་འདུལ་ཡོད་པ་སྟེ་དེ་ལས་སློབ་ཆུག་པའི་ཉེན་ཁ་ཡོད། ལག་པའི་ཐོག་ལྡོག་པའི་འཕྲུལ་རྩོམ་ཆས་ལ་བརྟུར་བའི་གནས་སྟངས་ལ་འགྲོགས་ཡོད་པའི་སློབ་ཆས་ལ་བཞག་སྟེ་བྱེད་མི་ཉེན་ཁ། (L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول ھۆل ھالەتتە ۋە ياكى سۇ سىرغىپ چىققان ھالەتتە، توكلۇق ئۇسكۇنىگە قارىتا ۋە ياكى توكلۇق ئۇسكۇنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiernj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiernj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong. (L016)

Attention:

- Ensure proper handling procedures are followed when working with any chemically treated coolant used in the rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the coolant chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the coolant chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.
- This task requires two or more people.

Procedure

Step 1. Close both ball valves.

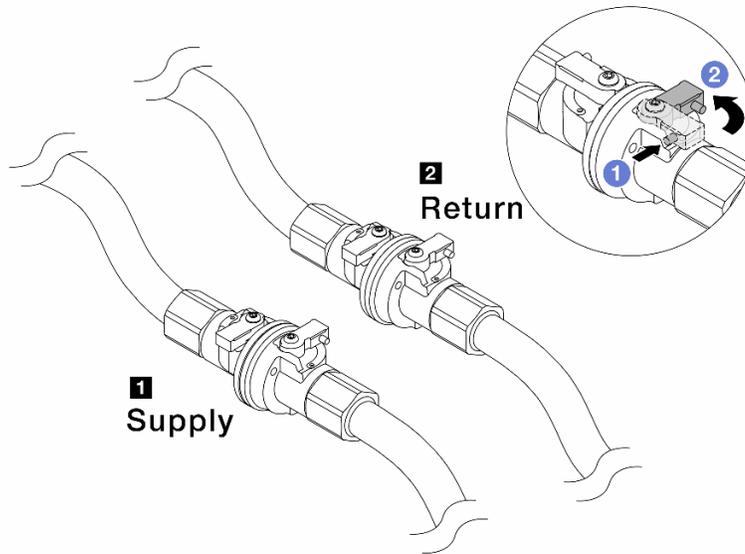


Figure 406. Closing ball valves

Note:

<p>1 Manifold supply connects to facility supply</p>	<p>2 Manifold return connects to facility return</p>
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- a. **1** Press the button on the ball valve switch.
- b. **2** Rotate the switches to close the valves as illustrated above.

Step 2. Remove the quick connect plugs to separate the hoses from the manifold.

Note: Depending on the model, your server might look different from the illustrations in this topic.

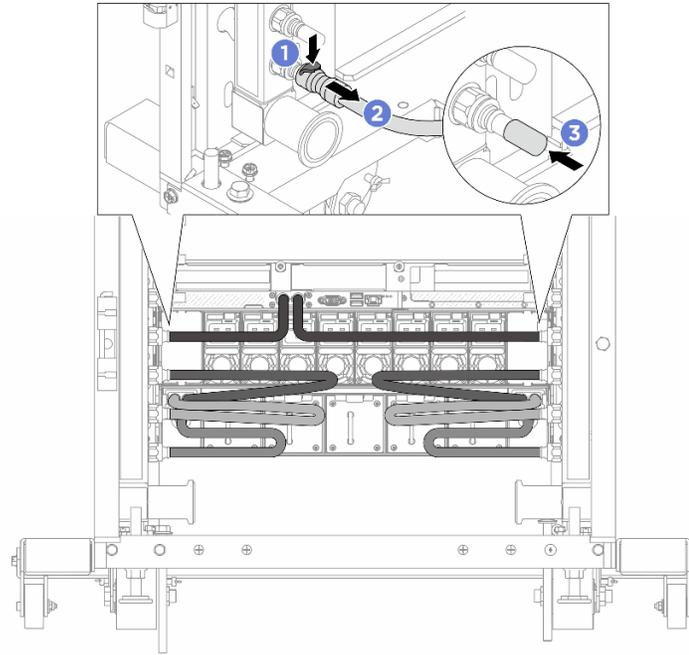


Figure 407. Quick connect plug removal

- a. ① Press the latch down to unlock the hose.
- b. ② Pull the hose off.
- c. ③ Re-install the rubber quick connect plug covers to the ports on the manifold.

Step 3. Repeat [Step 2 step 2 on page 365](#) to the other manifold.

Step 4. Remove the manifold with the hose kit attached.

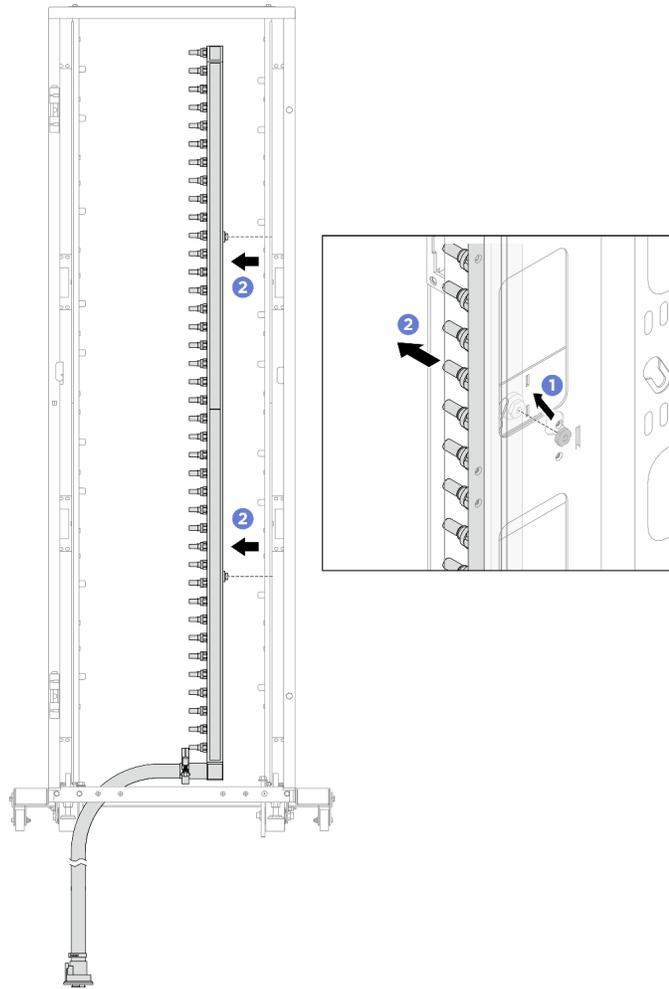


Figure 408. Removing the manifold

- a. ① Hold the manifold with both hands, and lift it upward to relocate the spools from the small openings to large ones on the rack cabinet.
- b. ② Remove the manifold with the hose kit attached.

Step 5. Repeat [Step 4 step 4 on page 366](#) to the other manifold.

Notes:

- There is remaining coolant inside the manifold and the hose kit. Remove both together and leave the further draining to the next step.

Step 6. Install the bleeder kit to the manifold supply side.

Note: This step drains the coolant with the help of a pressure difference inside and outside the supply manifold.

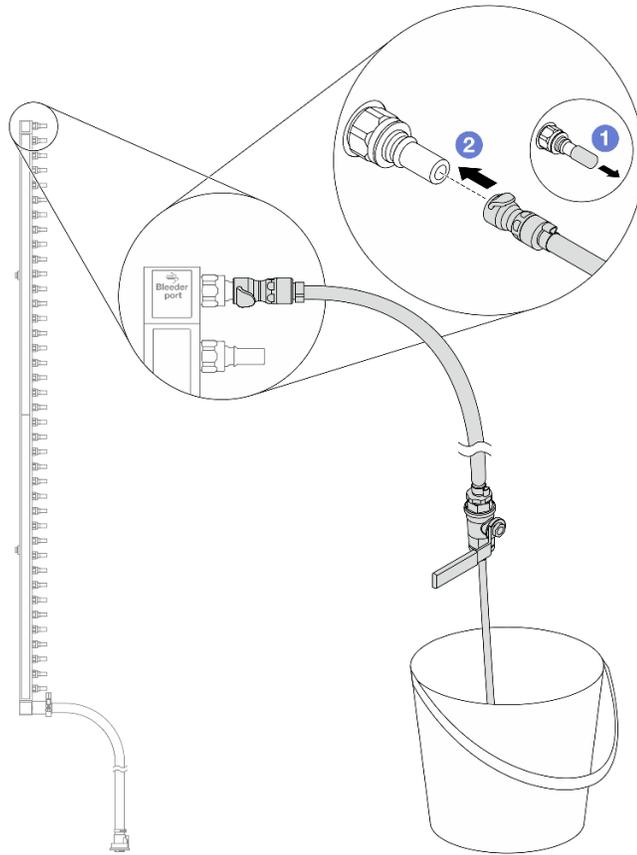


Figure 409. Installing the bleeder kit to the supply side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 7. Slowly open the bleeder valve to allow a steady stream of coolant to drain. Close the bleeder valve once coolant stops flowing.

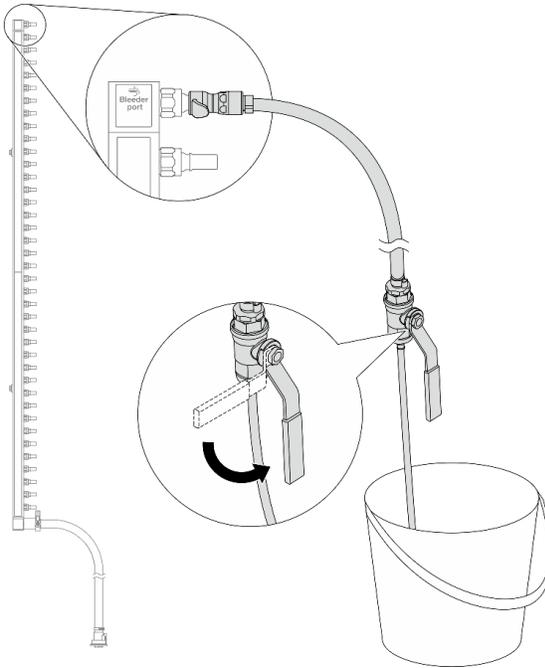


Figure 410. Opening the bleeder valve

Step 8. Install the bleeder kit to the manifold return side.

Note: This step drains the coolant with the help of a pressure difference inside and outside the return manifold.

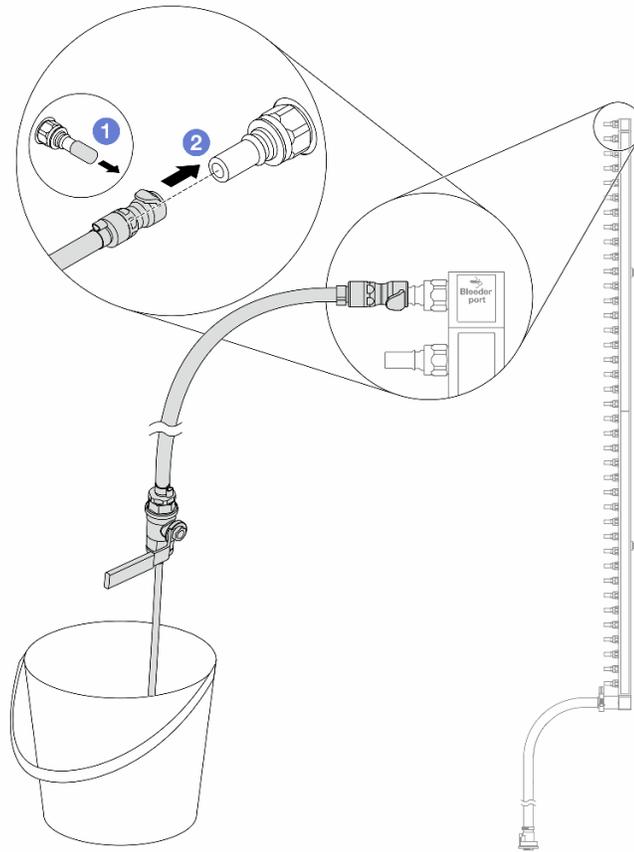


Figure 411. Installing the bleeder kit to the return side

- a. 1 Remove the rubber quick connect plug covers from the ports on the manifold.
- b. 2 Plug the bleeder kit to the manifold.

Step 9. Slowly open the bleeder valve to allow a steady stream of coolant to drain. Close the bleeder valve once coolant stops flowing.

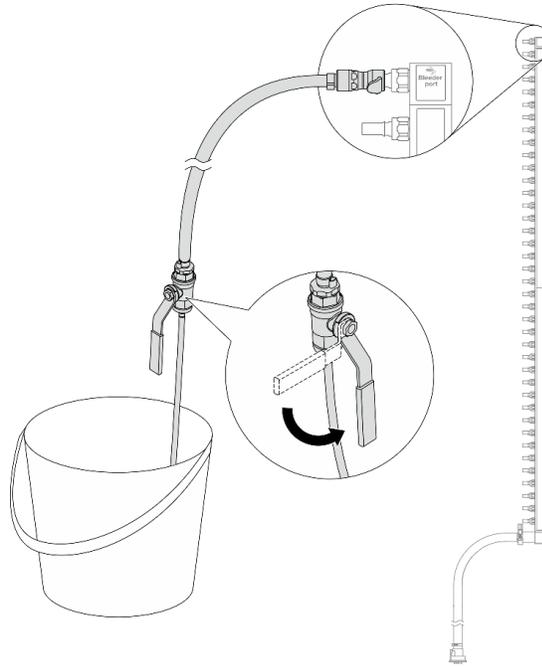


Figure 412. Opening the bleeder valve

Step 10. Separate the manifold from the hose kit in a dry and clean work area, and keep a bucket and absorbent cloths around to collect any coolant that may drain out.

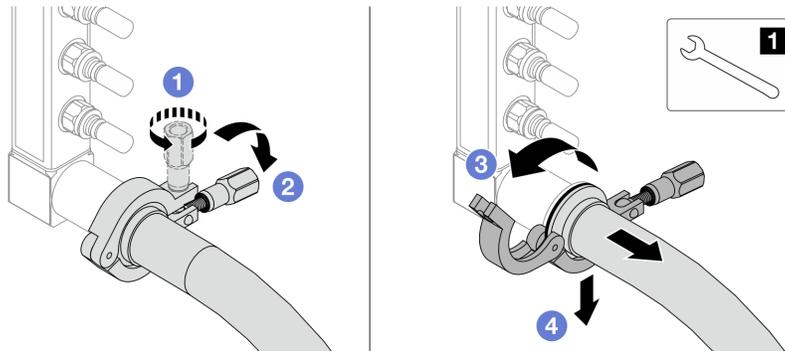


Figure 413. Separating the manifold from the hose kit

1 17 mm wrench

- a. **1** Loosen the screw that locks the ferrule.
- b. **2** Put the screw down.
- c. **3** Open the clamp.
- d. **4** Remove the ferrule and hose kit from the manifold.

Step 11. Repeat the last step to the other manifold.

Step 12. For better sanitation, keep the manifold ports and hose kits dry and clean. Re-install quick connect plug covers or any covers that protect hose kits and manifold ports.

Install DWC 38 Port Rack Manifold (in-row system)

Use this information to install the manifold in an in-row direct water cooling system.

CAUTION:

The coolant might cause irritation to the skin and eyes. Avoid direct contact with the coolant.

S002



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S011



CAUTION:

Sharp edges, corners, or joints nearby.

S038



CAUTION:

Eye protection should be worn for this procedure.

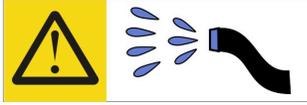
S040



CAUTION:

Protective gloves should be worn for this procedure.

L016



خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
تجنب العمل في أو بالقرب من أي جهاز فعال بأيدي مبللة أو عند وجود تسرب للماء. (L016)

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докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER: Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危險: 由于本产品中存在水或者水溶液，因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。(L016)

危險: 本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polití produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risico op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda. (L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda. (L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

ཉེན་བརྒྱུ: རྩོམ་རྒྱུ་འདི་ནི་རྩ་རྒྱ་ལྷན་པའི་གཞུགས་འདུས་ཡོད་པའི་དེ་ལས་སྐྱོག་རྒྱུ་པའི་ཉེན་ཁ་ཡོད། ལག་པའི་རྩོག་རྒྱ་ཡོད་པའམ་རྩིག་མའ་བཞུར་བའི་གནས་ཚུལ་འགྲོག་ཡོད་པའི་སྐྱོག་ཆས་ལ་བཞོལ་སྦྱོར་བྱེད་མི་ཉེན་པོ། (L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول ھۆل ھالەتتە ۋە ياكى سۇ سىرغىپ چىققان ھالەتتە، توكلۇق ئۇسكۇنىگە قارىتا ۋە ياكى توكلۇق ئۇسكۇنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiemyj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiemyj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong. (L016)

Attention:

- Ensure proper handling procedures are followed when working with any chemically treated coolant used in the rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the coolant chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the coolant chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.
- This task requires two or more people.

Procedure

- Step 1. Install the server into the rack.
- Step 2. Install the manifold.

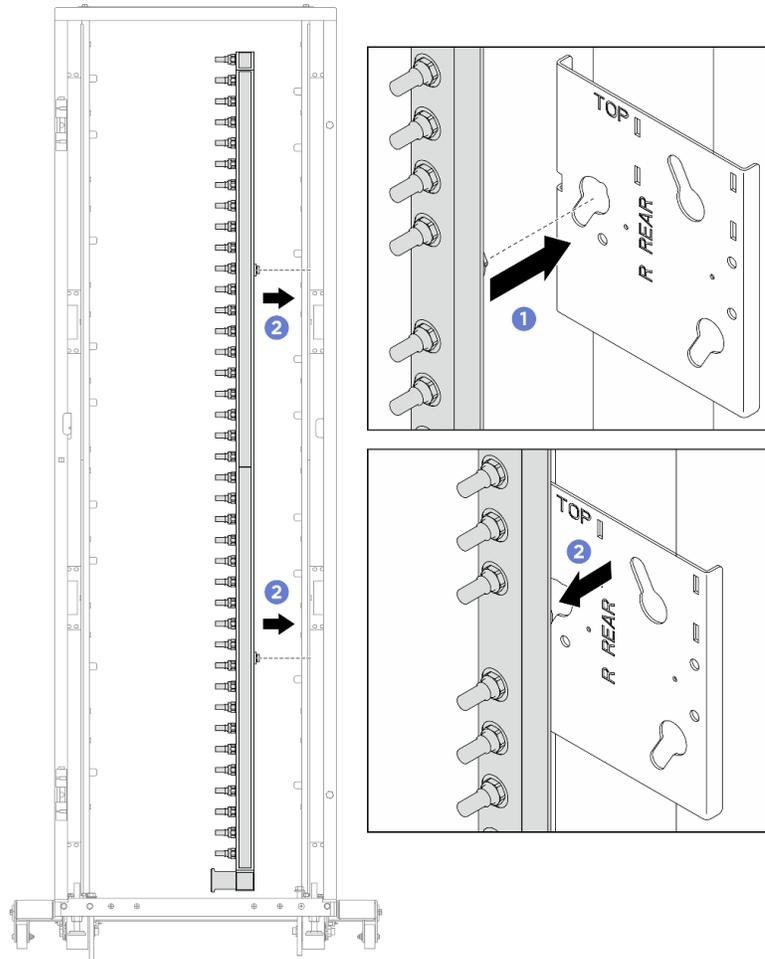


Figure 414. Installing the manifold

- a. ① Hold the manifold with both hands, and mount it onto the rack cabinet.
- b. ② Align the spools with holes, and clutch the cabinet.

Step 3. Repeat the last step to install the other manifold.

Step 4. Install the quick connect plug to the manifolds.

Note: Depending on the model, your server might look different from the illustrations in this topic.

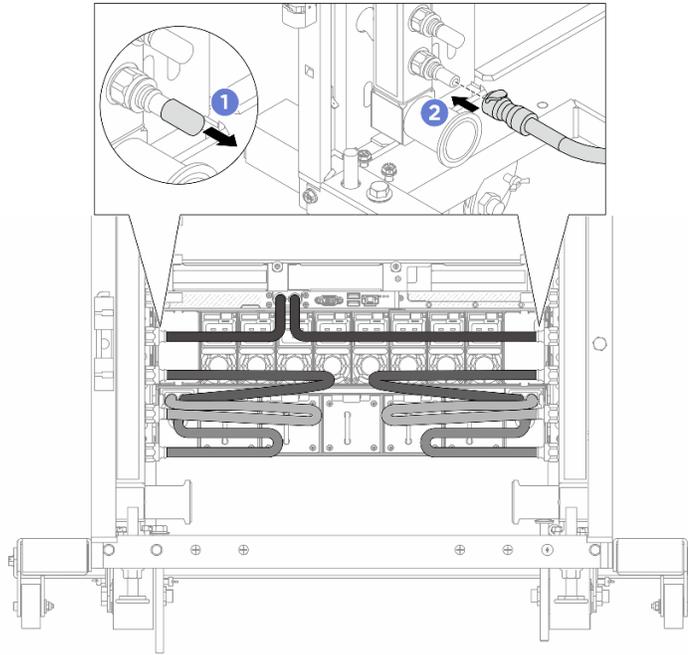


Figure 415. Installing the quick connect plug

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Connect the plug to the manifold port.

Step 5. Install the hose kit to the manifold.

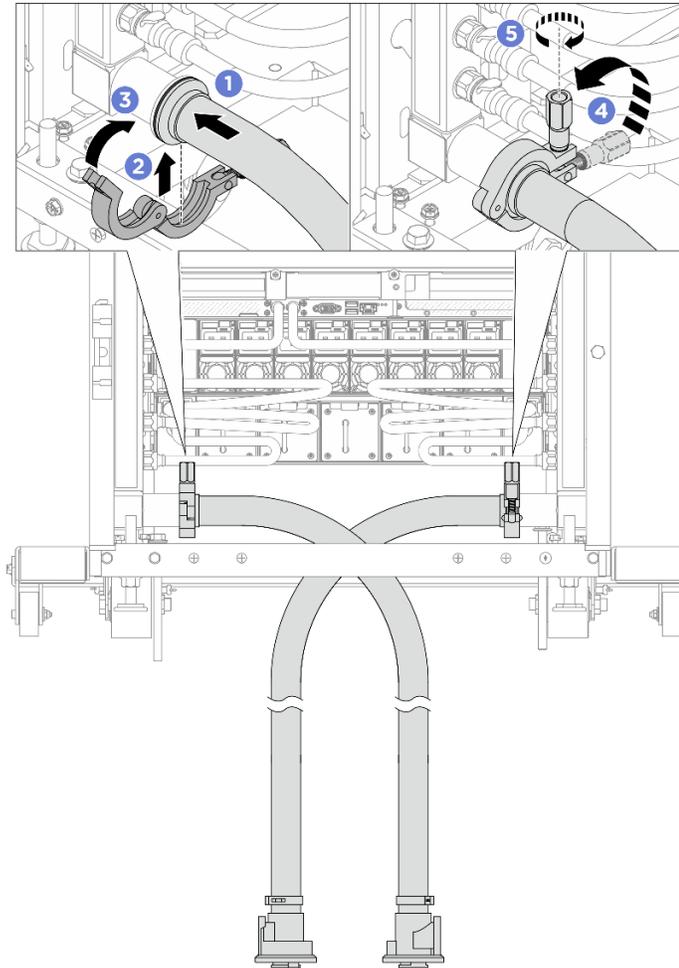


Figure 416. Installing the hose kit

1 17 mm wrench

- a. **1** Connect the hose kits to both manifolds.
- b. **2** Wrap the interface around with the clamp.
- c. **3** Close the clamp.
- d. **4** Lift the screw upright.
- e. **5** Tighten the screw and make sure that it is secured.

Step 6. Install the bleeder kit to the manifold supply side.

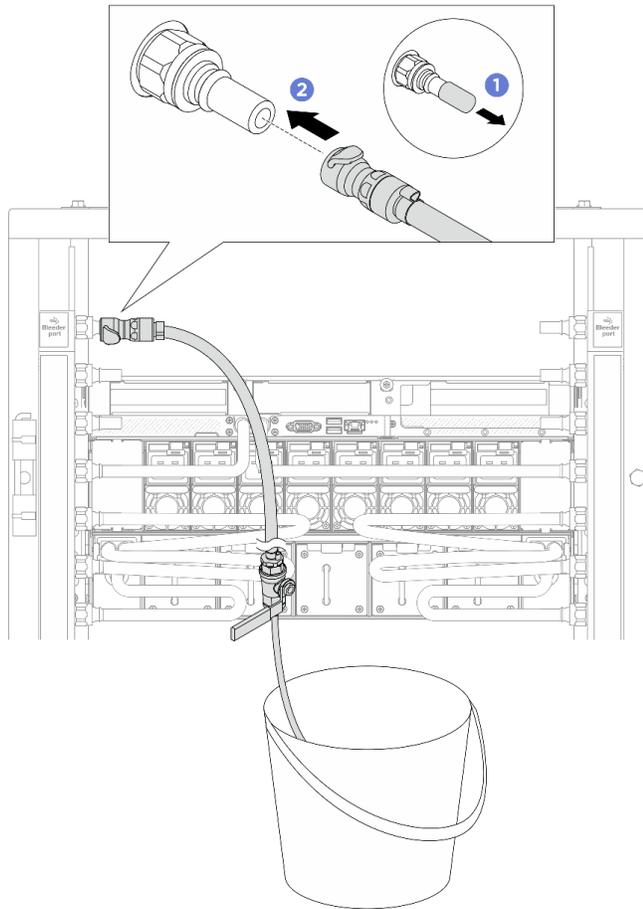


Figure 417. Installing the bleeder kit to the supply side

- a. ① Remove the rubber quick connect plug covers from the ports on the manifold.
- b. ② Plug the bleeder kit to the manifold.

Step 7. To push the air out of the manifold supply side, connect **facility supply** to **manifold return**.

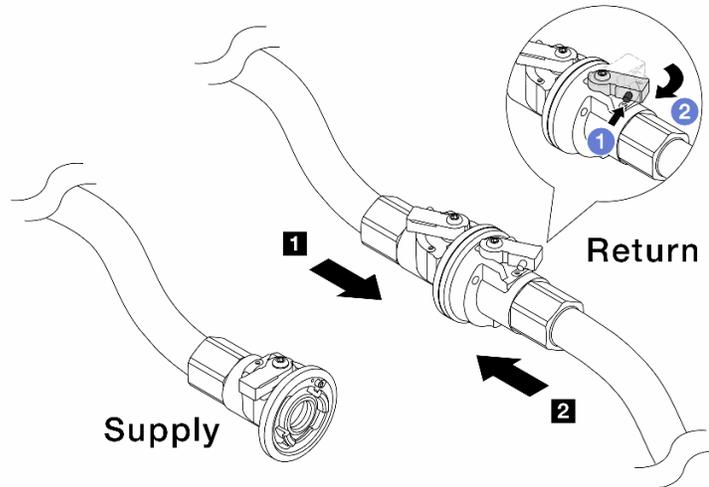


Figure 418. Facility supply to manifold return

- a. ① Press the button on the ball valve switch.
- b. ② Rotate both switches open and stop at around 1/4 of 90 degrees.

Attention:

- Open the ball valves on ① manifold return side and ② facility supply side, while keep manifold supply side closed.
- Do not fully open the ball valves, or the water flow gets too rapid to contain.

Step 8. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

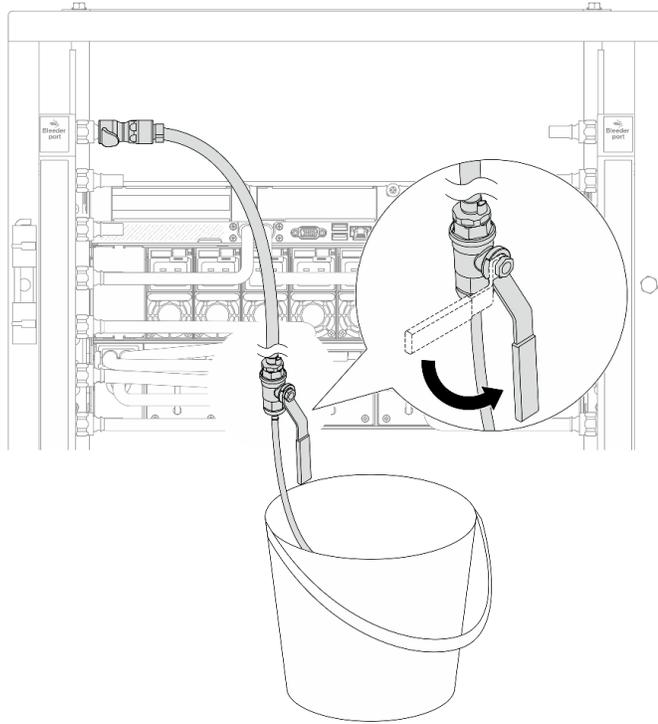


Figure 419. Opening the bleeder valve on the supply side

Step 9. Install the bleeder kit to the manifold return side.

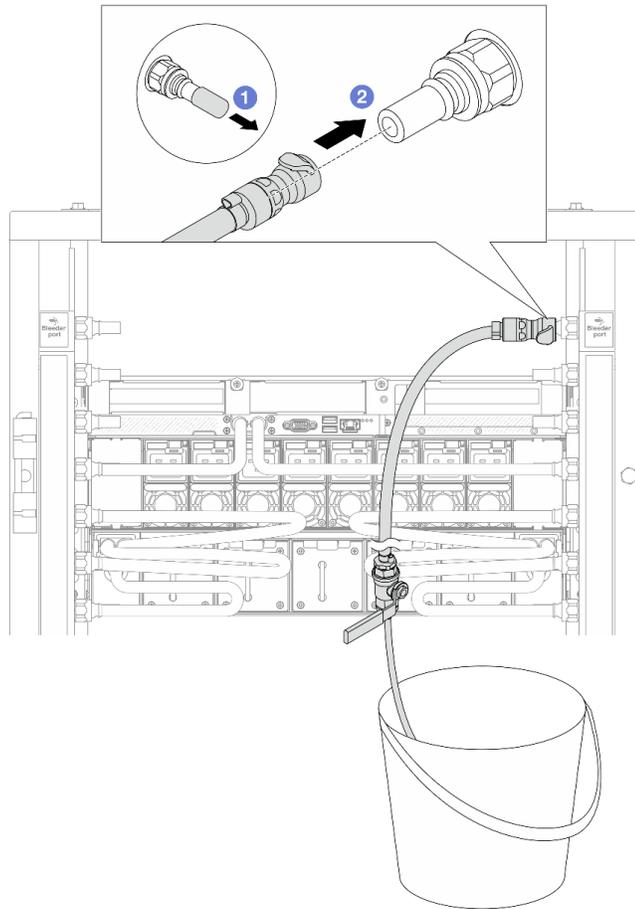


Figure 420. Installing the bleeder kit on the return side

- a. 1 Remove the rubber quick connect plug covers from the ports on the manifold.
- b. 2 Plug the bleeder kit to the manifold.

Step 10. To push the air out of the manifold return side, connect **facility supply** to **manifold supply**.

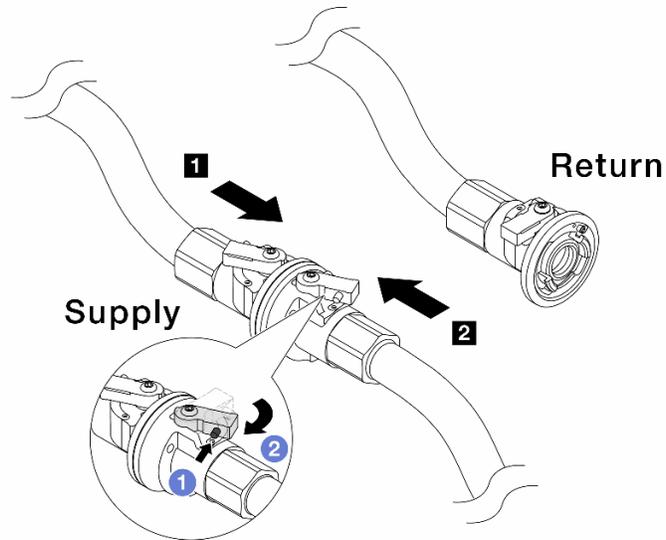


Figure 421. Facility supply to manifold supply

- a. ① Press the button on the ball valve switch.
- b. ② Rotate both switches open and stop at around 1/4 of 90 degrees.

Attention:

- Open the ball valves on ① manifold supply side and ② facility supply side, while keep manifold return side closed.
- Do not fully open the ball valves, or the water flow gets too rapid to contain.

Step 11. Slowly open the bleeder valve to conduct the air out of the hose. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

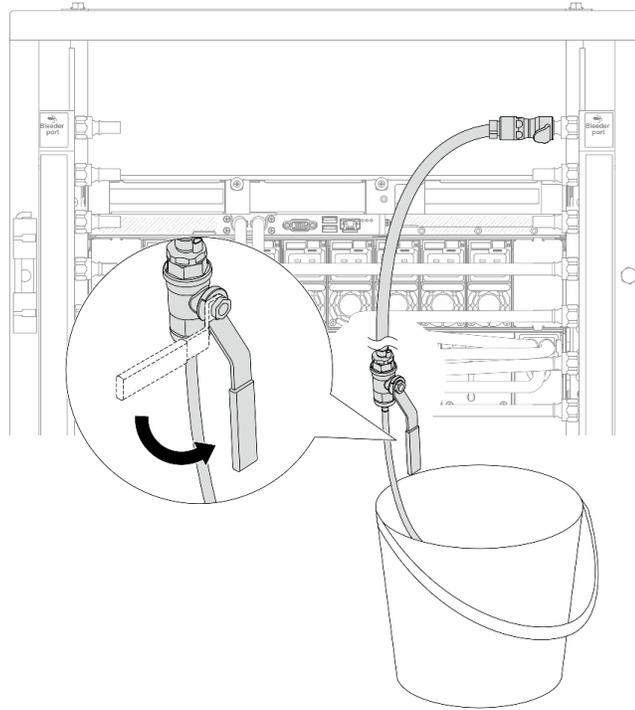


Figure 422. Opening the bleeder valve on the return side

Step 12. (For precaution) To make sure that the air inside is as little as possible, re-install the bleeder kit back to manifold supply side and do it one more time. Close the bleeder valve once a steady stream of water flows into the bucket or there are only minimal bubbles in the bleeder hose.

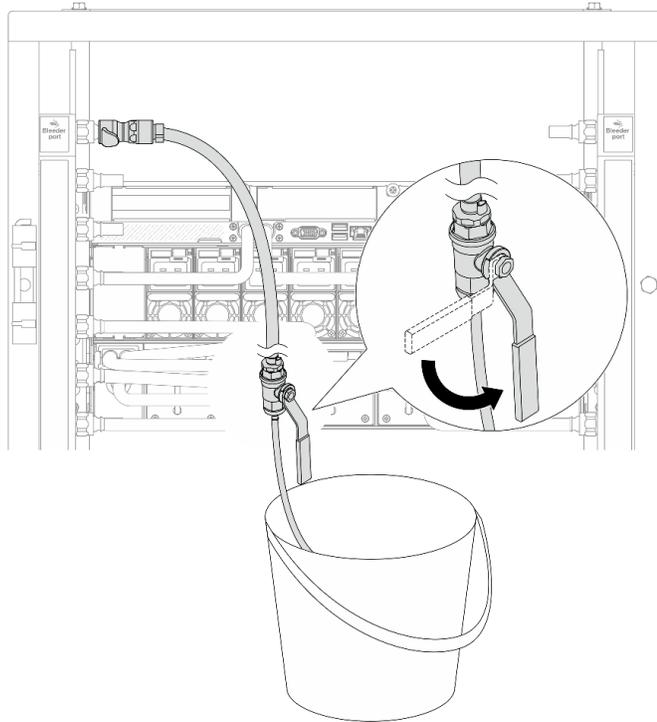


Figure 423. Opening the bleeder valve on the supply side

Step 13. Once completed, connect the supply and return of manifold and facility correspondingly. Fully open all connections on both supply and return sides.

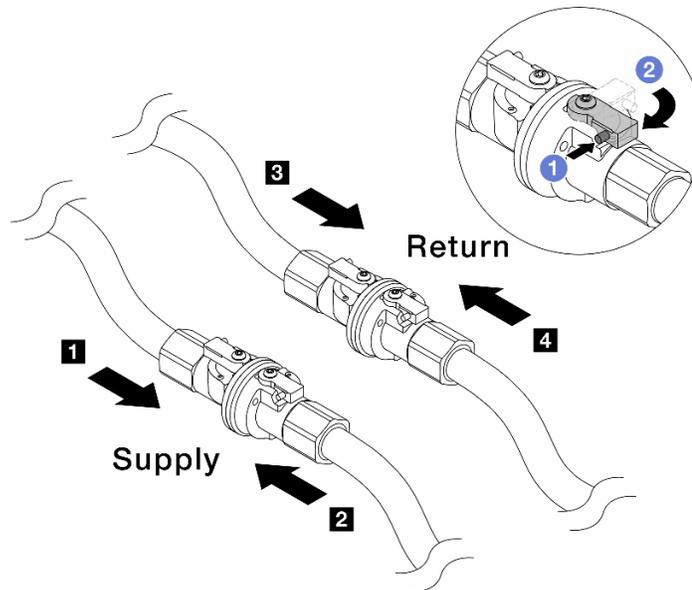


Figure 424. Opening ball valves

Note:

<p>1 Manifold supply connects to 2 facility supply</p>	<p>3 Manifold return connects to 4 facility return</p>
--	--

- a. 1 Press the button on the ball valve switch.
- b. 2 Rotate the switch to fully open the valves as illustrated above.

Installing and removing 48U Advanced Rack Extension Bracket Kit

See this topic to learn how to remove and install 48U Advanced Rack Extension Bracket Kit

Remove 48U Advanced Rack Extension Bracket Kit

See this topic to learn how to remove 48U Advanced Rack Extension Bracket Kit.

Procedure

Step 1. Remove the PDUs and manifold follow the sequence shown below:

- a. Lift the manifold to detach it from the rack, and remove it.

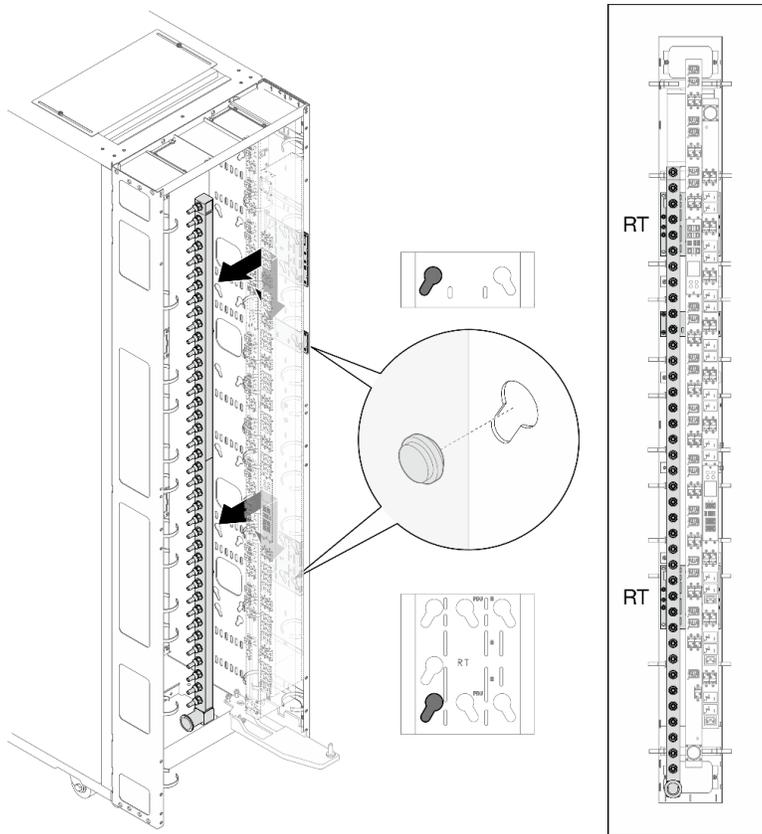


Figure 425. Removing the manifold

- b. Lift the PDU to detach it from the rack, and remove it.

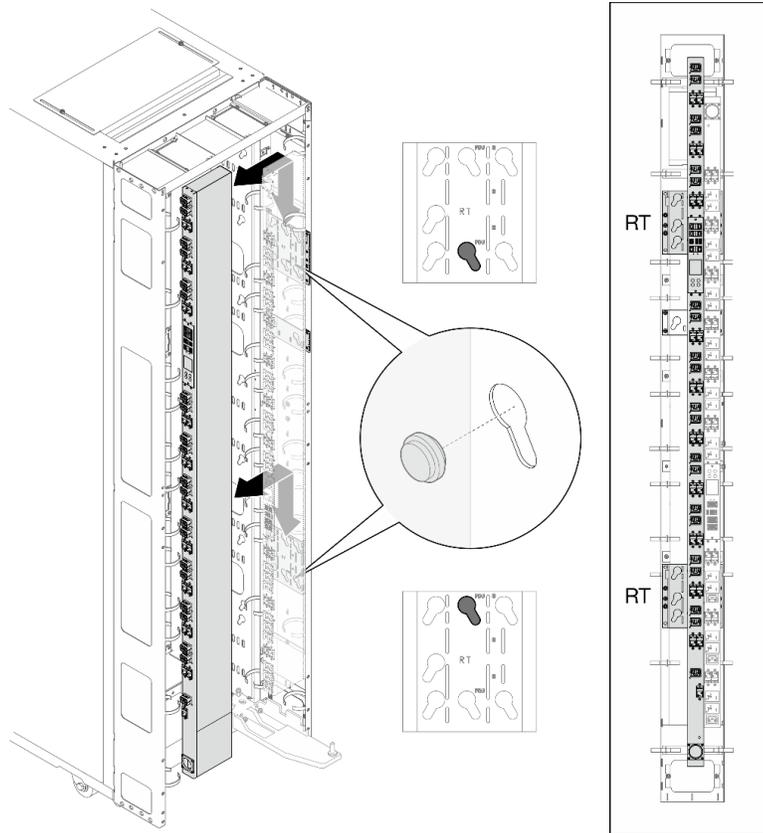


Figure 426. Removing the first PDU

- c. Lift the PDU to detach it from the rack, and remove it.

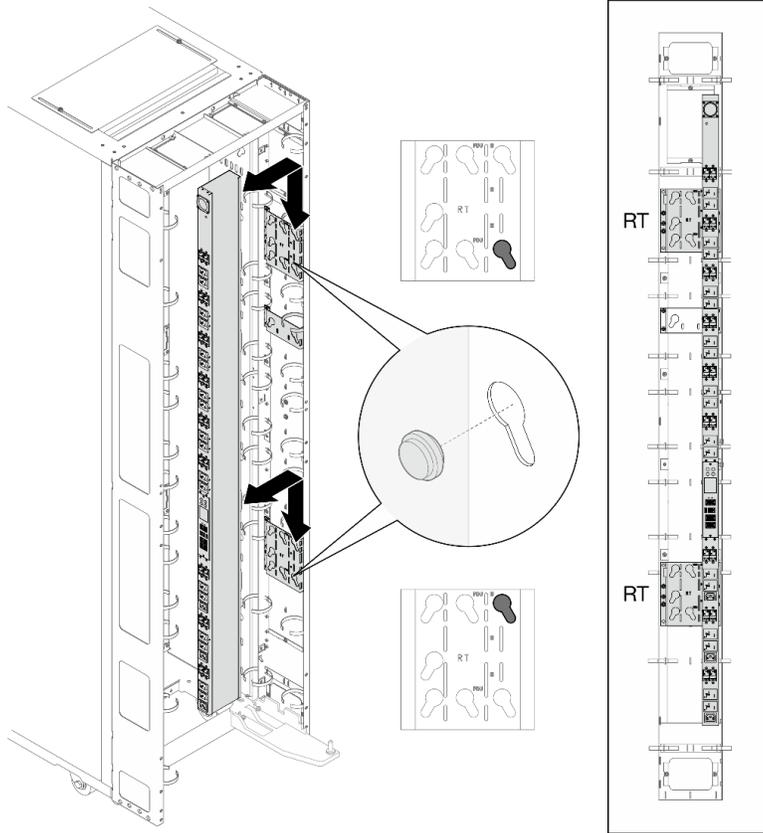


Figure 427. Removing the second PDU

Step 2. Below illustration shows the locations of the brackets.

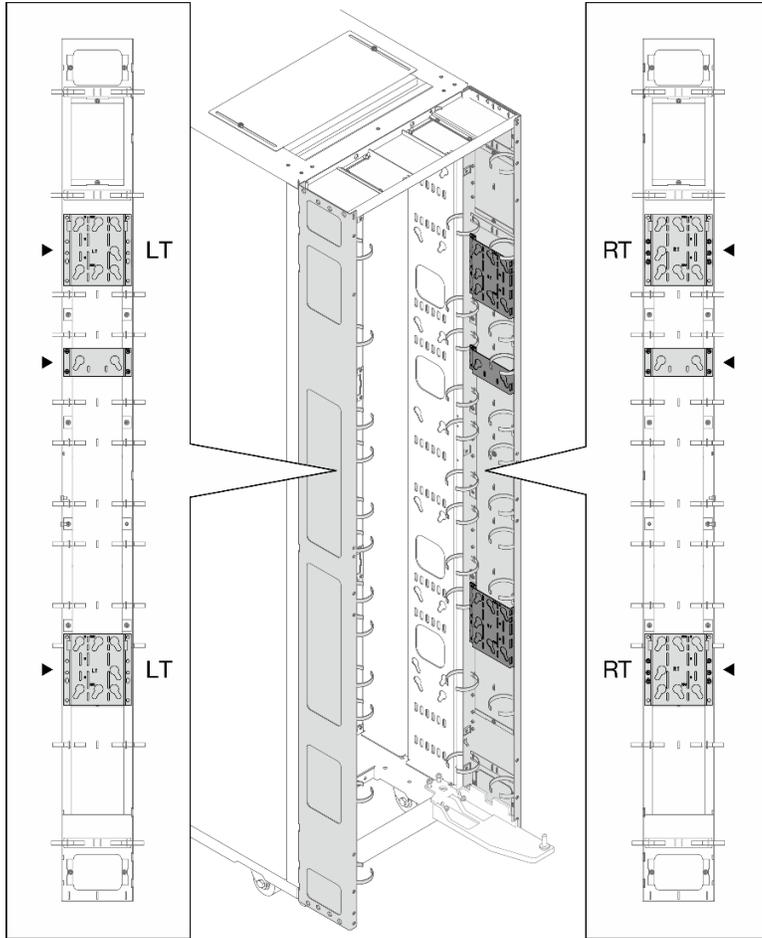


Figure 428. bracket locations

- Step 3. Use a 3mm Allen wrench to unfasten the fourteen M5 round head flange screws to remove the brackets.

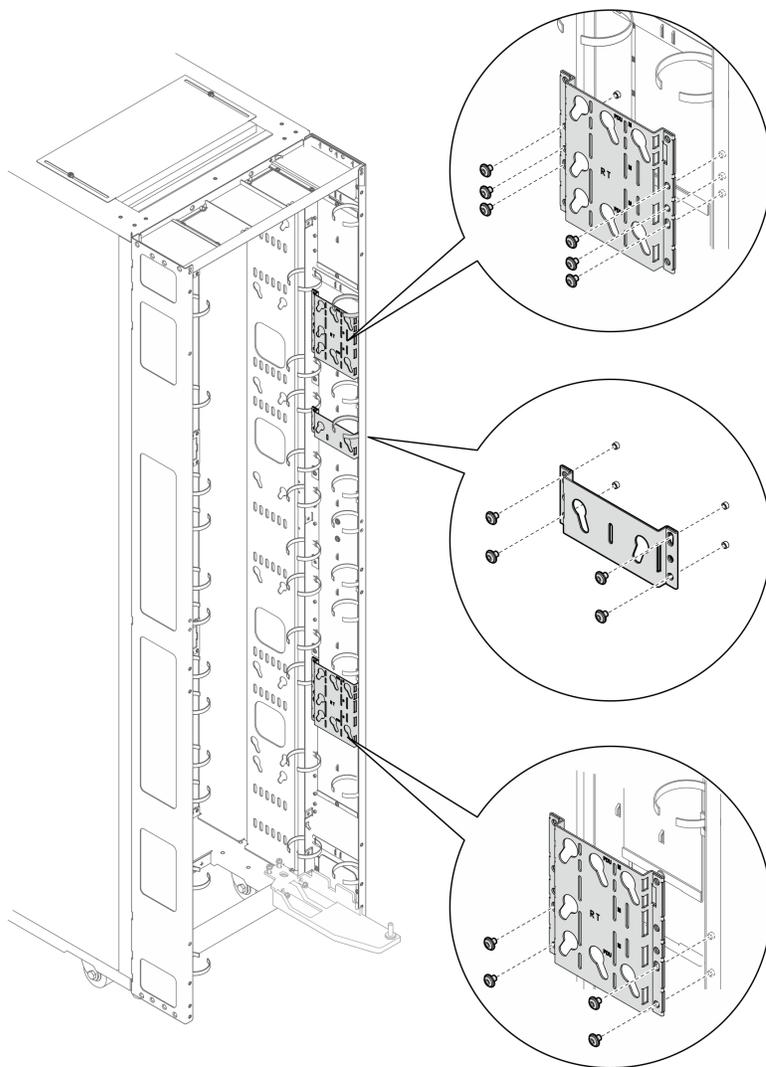


Figure 429. Removing the brackets

Install 48U Advanced Rack Extension Bracket Kit

See this topic to learn how to install 48U Advanced Rack Extension Bracket Kit.

- The bracket kit supports up to two PDUs and one manifold
- Required tool: One 3mm Allen wrench
- The bracket kit contains the following components:

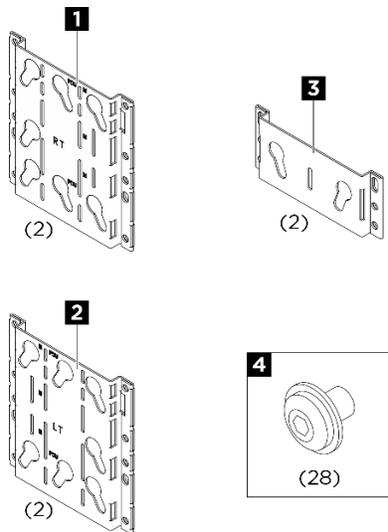


Figure 430. 48U bracket components

No.	Description	Quantity
1	Right bracket	2
2	Left bracket	2
3	Manifold bracket	2
4	M5 round head flange screw	28

- ¹ Cable straps are removable, remove the straps from the extension panels if needed.
- ² Cable straps can be lengthened by connecting two or more straps together.
- ³ Use cable straps to secure PDUs and manifolds prior to shipping.
- ⁴ Connect one end of the grounding wire to the grounding plate on the extension panel and the other end to the nearest grounding plate on the rack.

Procedure

Step 1. Below illustration shows the locations of the brackets.

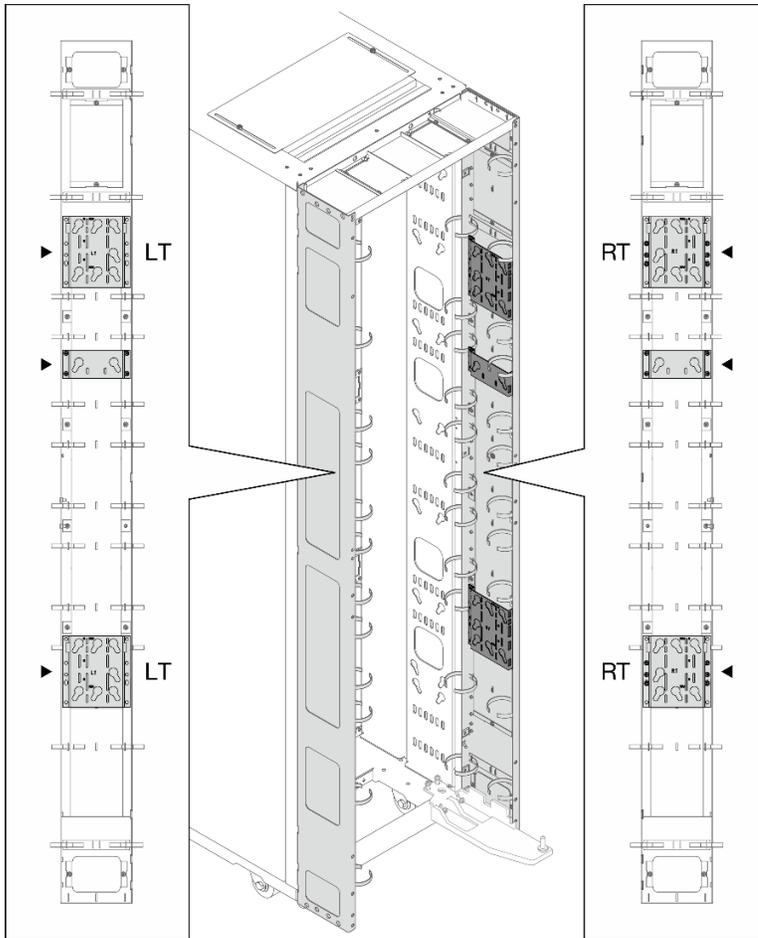


Figure 431. bracket locations

Step 2. Align the bracket with the extension panel, and use a 3mm Allen wrench to secure it with fourteen M5 round head flange screws.

Notes:

- The manifold brackets are optional if no manifold is going to be installed.
- Install the brackets on left or right side. Left side brackets are marked with L and right side brackets are marked with R.

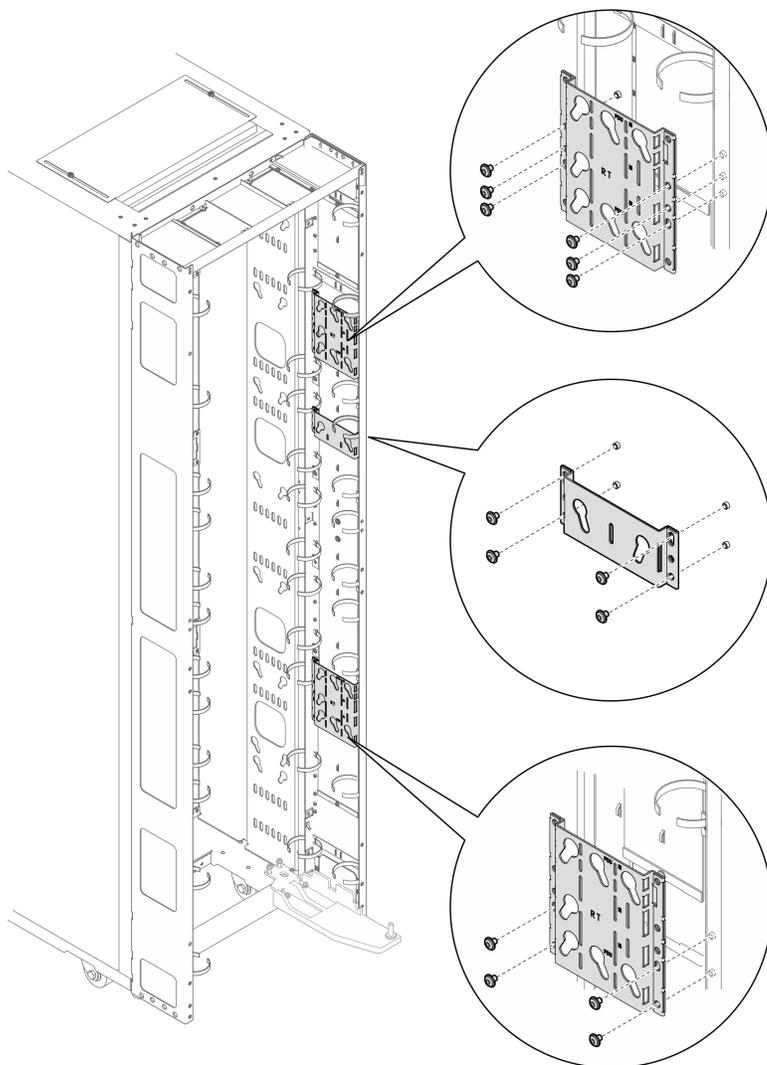


Figure 432. Installing the brackets

Step 3. Install the PDUs and manifold follow the installation sequence and location:

Note: The 48U bracket kit supports tool-less mounting of up to two vertical rack mount PDUs with maximum widths of 45mm each. Refer to the following illustration and table for the dimensions that are supported by this bracket kit:

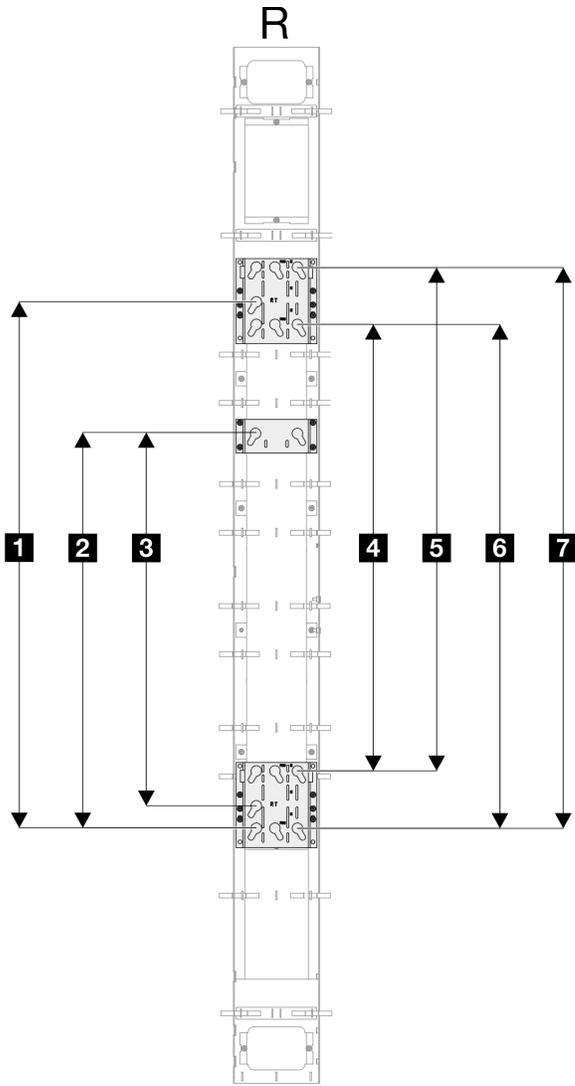


Figure 433. Mounting peg distance

No.	Distance (mm)
1	1100
2	825 (DWC 38 Port Rack Manifold)
3	778
4	933
5	1053
6	1053
7	1173

Notes: Depending on the requirements, the following combinations can be installed:

- Two PDUs
- One PDU and one manifold
- Two PDUs and one manifold

- a. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets.

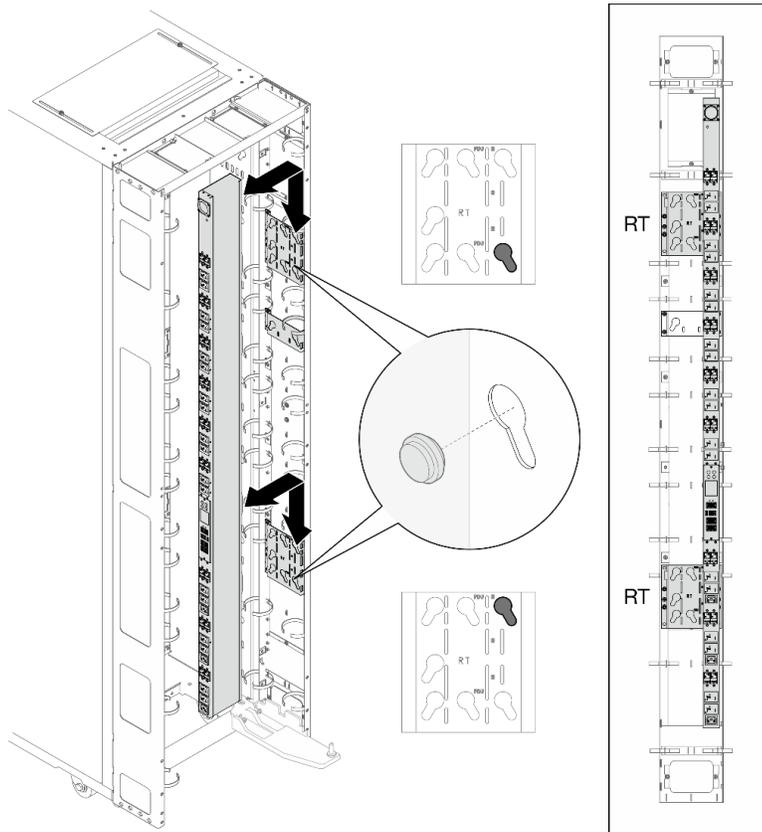


Figure 434. Installing the first PDU

- b. Insert the two PDU pegs into the keyhole slots on the brackets, and push down the PDU to secure it to the brackets.

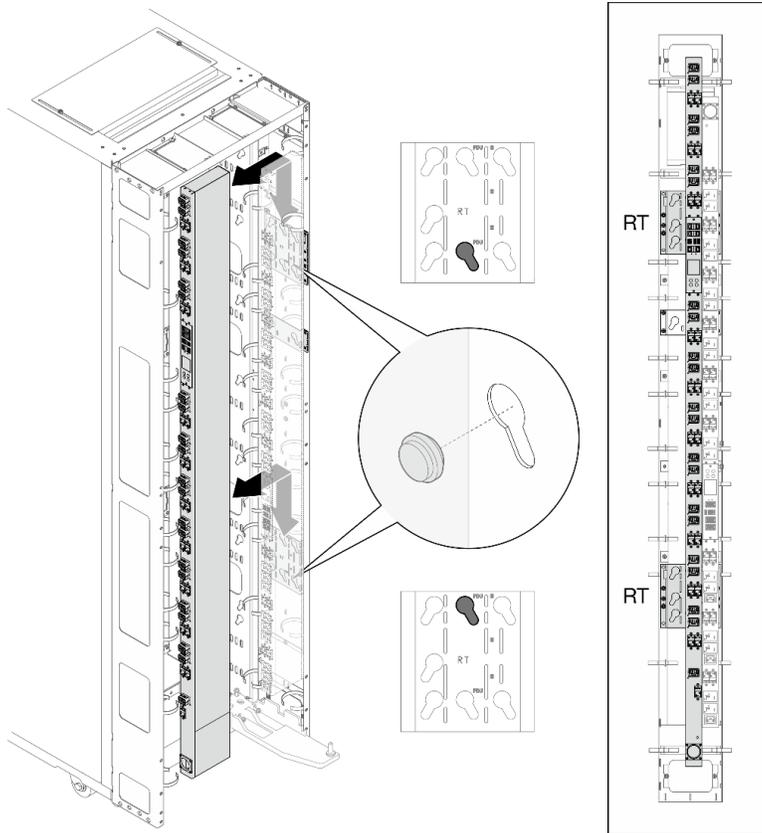


Figure 435. Installing the second PDU

- c. Insert the three manifold pegs into the keyhole slots on the brackets, and push down the manifold to secure it to the brackets.

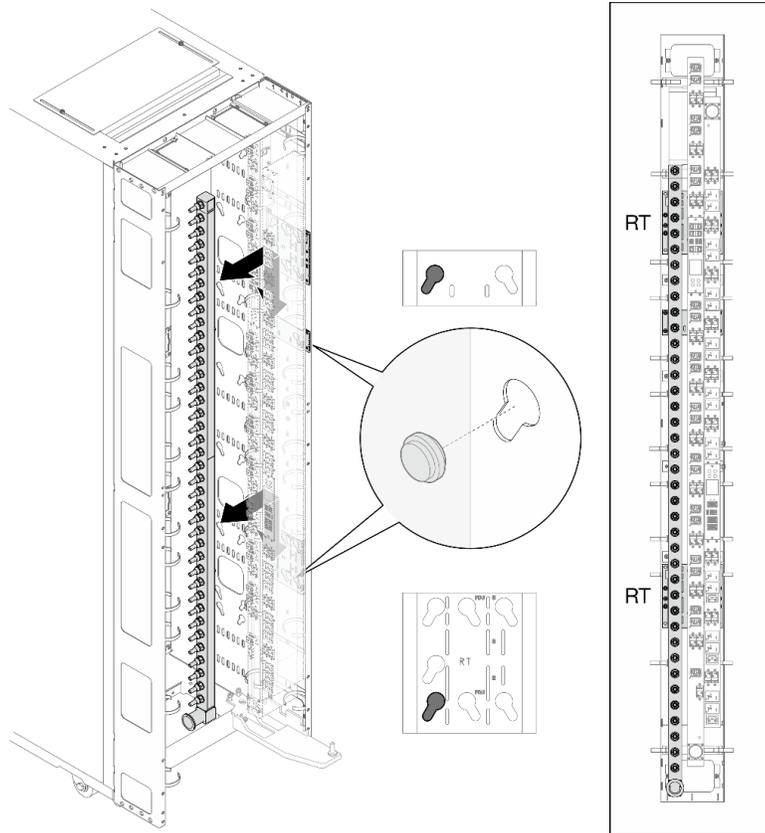


Figure 436. Installing the manifold

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support are available at:

<http://datacentersupport.lenovo.com>

Note: This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for ThinkSystem.

Before you call

Before you call, there are several steps that you can take to try and solve the problem yourself. If you decide that you do need to call for assistance, gather the information that will be needed by the service technician to more quickly resolve your problem.

Attempt to resolve the problem yourself

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

You can find the product documentation for your ThinkSystem products at the following location:

<http://thinksystem.lenovofiles.com/help/index.jsp>

You can take these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- If you have installed new hardware or software in your environment, check <https://static.lenovo.com/us/en/serverproven/index.shtml> to make sure that the hardware and software is supported by your product.
- Go to <http://datacentersupport.lenovo.com> and check for information to help you solve the problem.
 - Check the Lenovo forums at https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg to see if someone else has encountered a similar problem.

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Gathering information needed to call Support

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call. You can also see <http://datacentersupport.lenovo.com/warrantylookup> for more information about your product warranty.

Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier)
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

As an alternative to calling Lenovo Support, you can go to <https://support.lenovo.com/servicerequest> to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The Lenovo service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to <https://datacentersupport.lenovo.com/serviceprovider> and use filter searching for different countries. For Lenovo support telephone numbers, see <https://datacentersupport.lenovo.com/supportphonenumberlist> for your region support details.

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