Lenovo

ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet
User Guide

Machine Type: 7D6E

Second Edition (April 2024)

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Chapter 1. Introduction

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

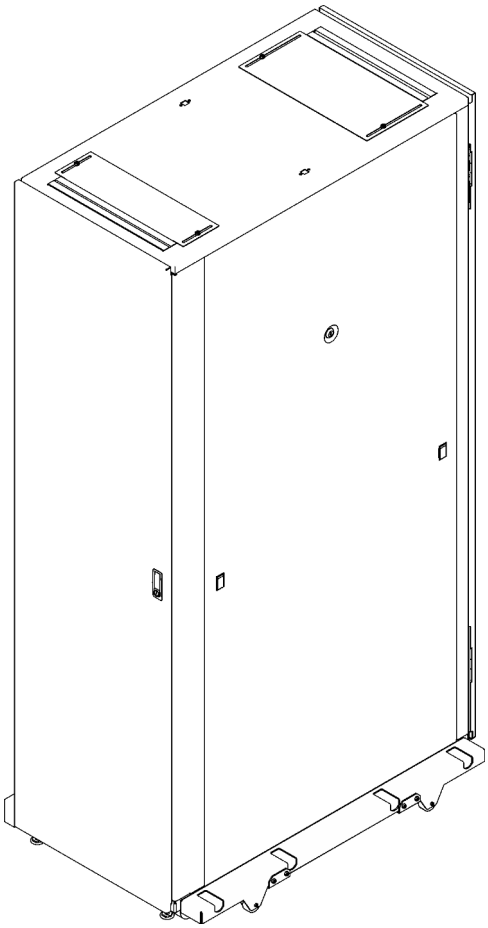

Figure 1. ThinkSystem Heavy Duty Full Depth 48U Rack Cabinet

Features and specifications

See this topic for features and specifications of ThinkSystem Heavy Duty Full Depth 42U Rack Cabinet.

Features

Table 1. Features

Optional device capacity	• 0U PDU: – Without rack extension: Four units – With rear rack extension: Six units • 1U optional devices rack side/side pocket: eight units
Extension capacity	Up to two units of rack extension are supported.
Cooling enhancement	ThinkSystem Rear Door Heat eXchanger for 48U Rack

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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	183	403
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	2087	4601

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.

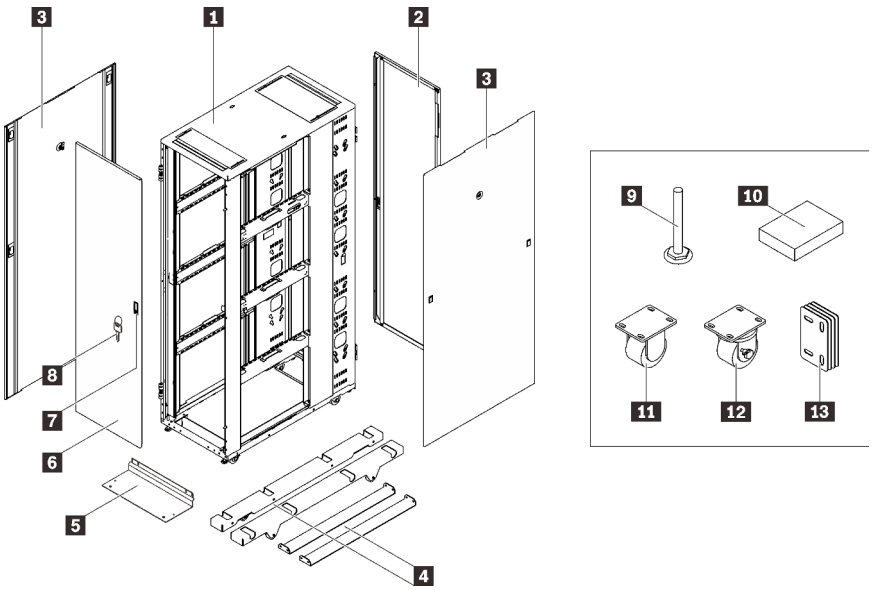

Figure 2. Parts listing

Table 4. Heavy Duty Full Depth 42U Rack Cabinet components

1 Rack cabinet frame	8 Keys (doors and side covers)
2 Rear door	9 Leveling pad
3 Side covers	10 Tools
4 Outriggers (side stabilizers)	11 Fixed caster
5 Front stabilizer	12 Swivel caster
6 Front door	13 Baying kit
7 Door latch	

Figure 3. Tool box

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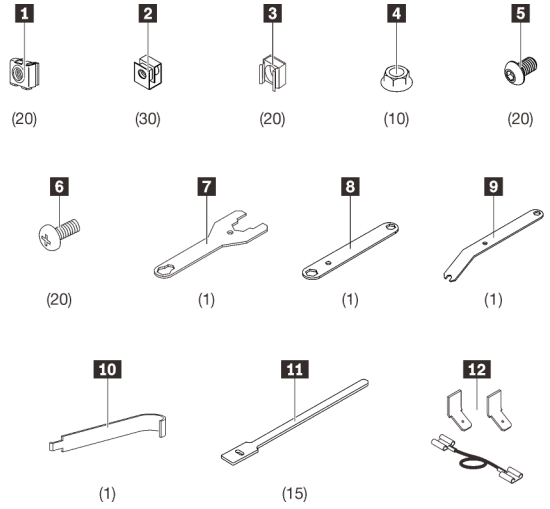	1 20 M6 C type caged nuts
	2 30 M6 G type caged nuts
	3 20 M5 C type caged nuts
	4 10 M6 flanges
	5 20 M5 screws
	6 20 M6 screws
	7 Wrench for 10, 14, 5, 18, 26
	8 Wrench for 8, 9, 2
	9 Wrench for 10, 13
	10 Nut insertion tool
	11 15 Velcro cable ties
	12 Grounding kit

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.

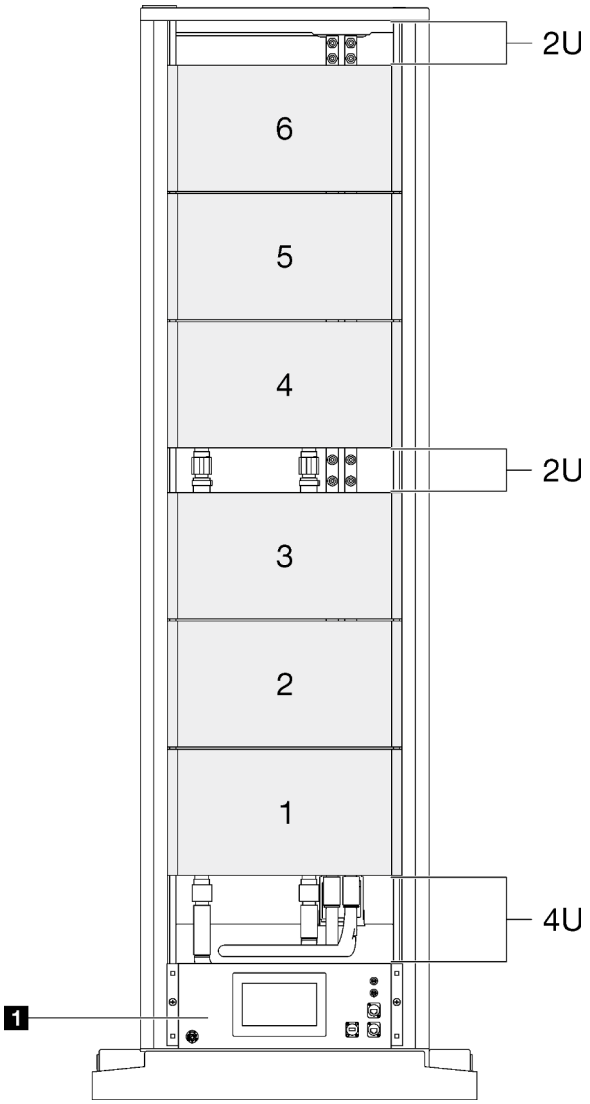

Figure 4. In-rack coolant distribution layout - front view

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

1 Neptune DWC RM100 in-rack CDU

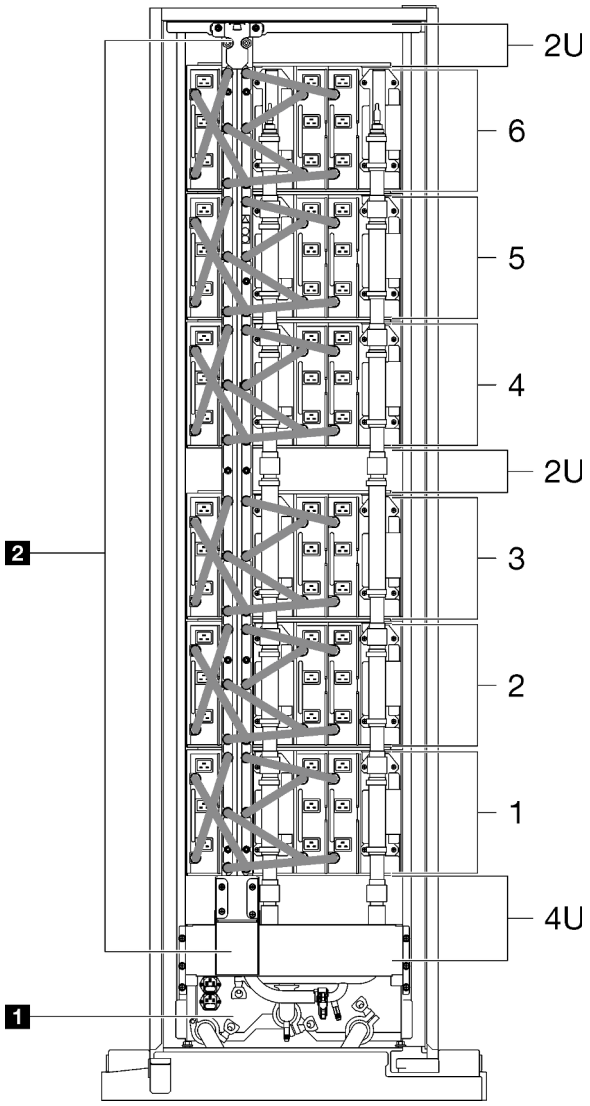

Figure 5. In-rack coolant distribution layout - rear view

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

1 Neptune DWC PSU manifold	2 Neptune DWC RM100 in-rack CDU

Rack cabinet options

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

Rear Door Heat eXchanger for 48U Rack

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

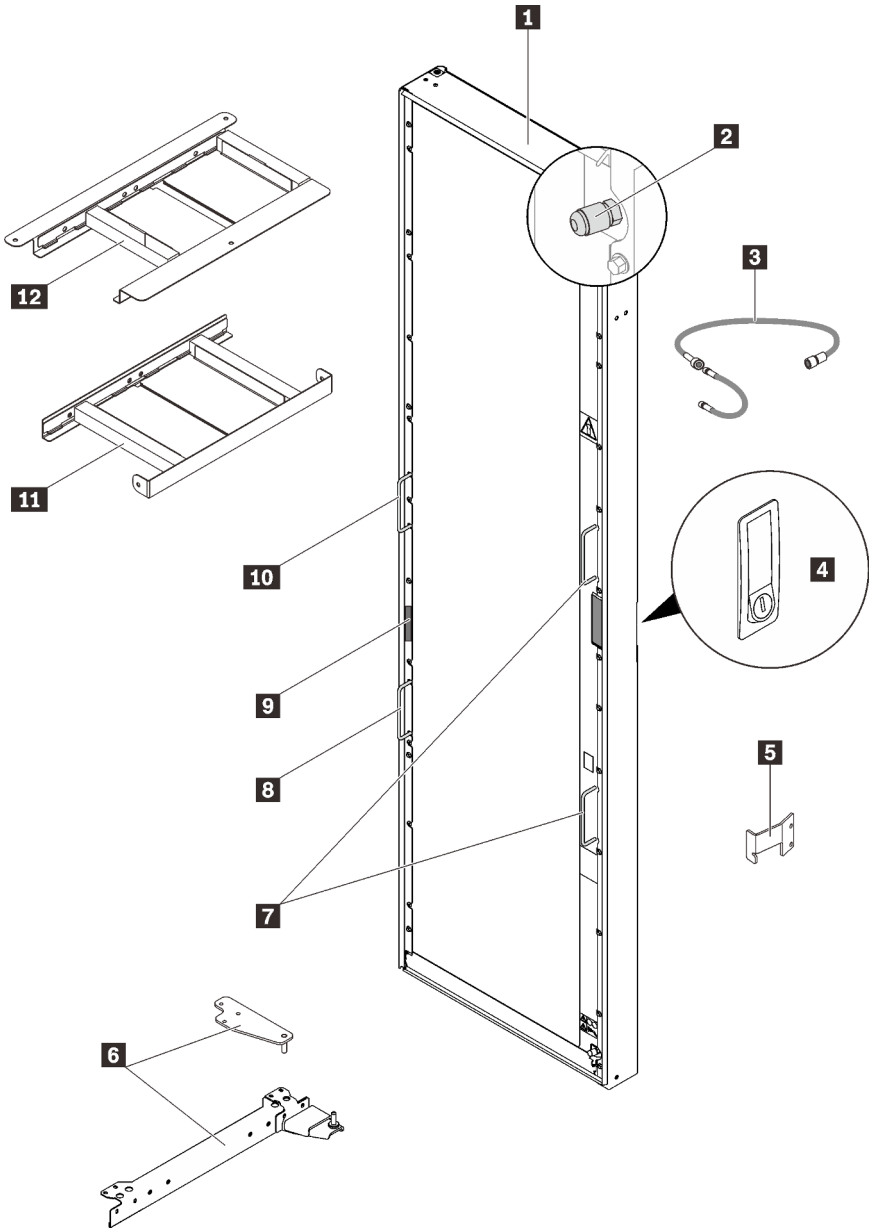

Figure 6. ThinkSystem Rear Door Heat eXchanger for 48U Rack components

Table 7. 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 46.

Specifications

Dimension	• Depth: 496 mm / 19.5 inches • Height: : 2275 mm / 89.6 inches • Width: 725 mm / 28.5 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	• **Source** User-supplied, compliant with specifications in this document • **Pressure** – Normal operation: <137.93 kPa (20 psi) – Maximum: 689.66 kPa (100 psi) • **Volume** Approximately 9 liters (2.4 gallons) • **Temperature** – 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 **Note:** See “Heat exchanger performance” for more information. • **Required water flow rate** (as measured at the supply entrance to the heat exchanger) – 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.

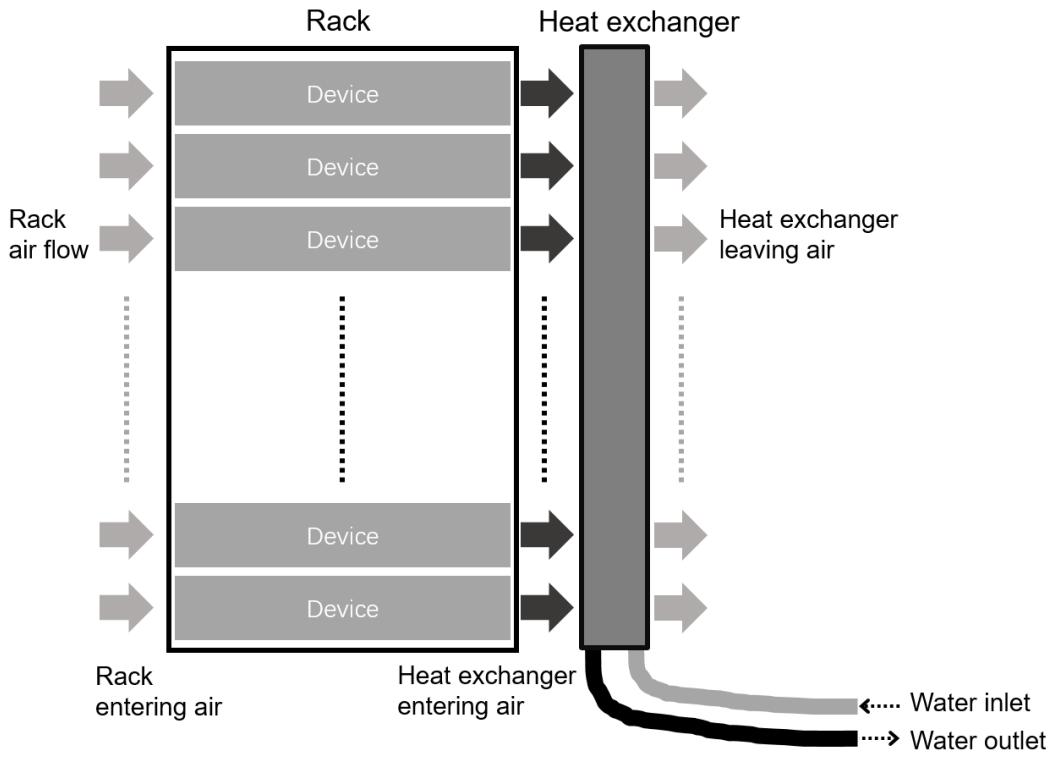

Figure 7. Diagram of rack air flow and heat exchanger water flow

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.

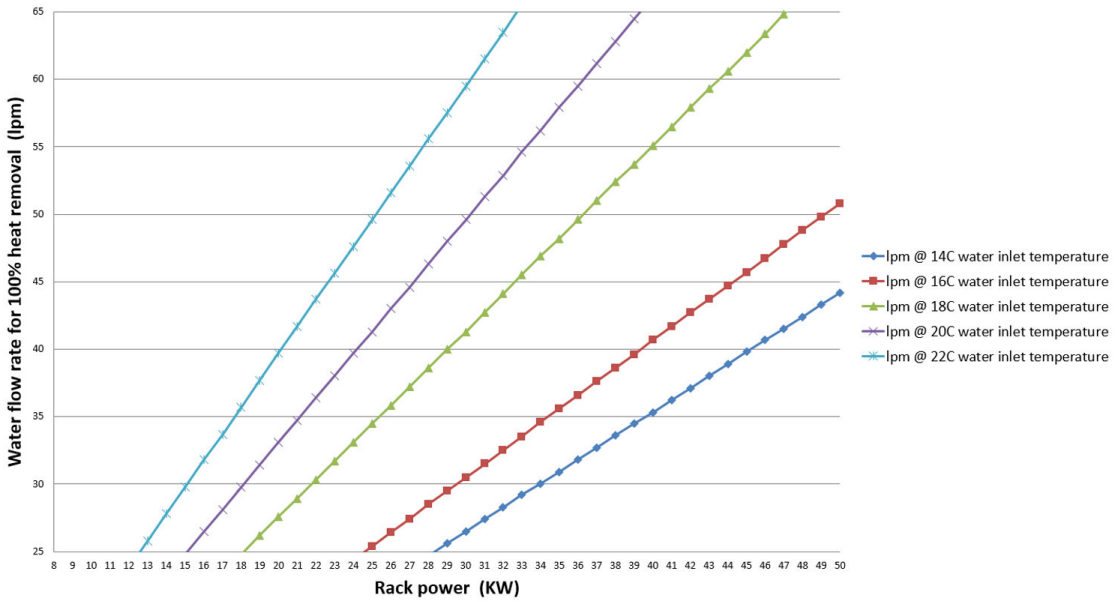

Figure 8. Typical performance of the heat exchanger, 3840SCFM Rack air flow, 25°C Rack entering temperature

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

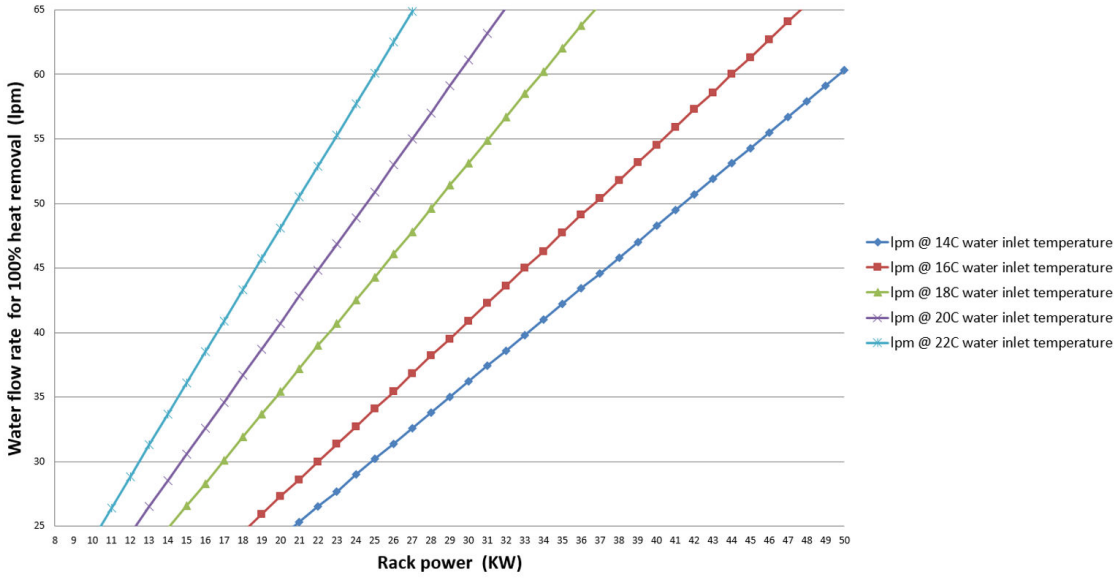

Figure 9. Typical performance of the heat exchanger, 4800SCFM Rack air flow, 25°C Rack entering temperature

48U Heavy Duty Rack Extension

See this topic to learn about parts of ThinkSystem 48U Heavy Duty Rack Extension.

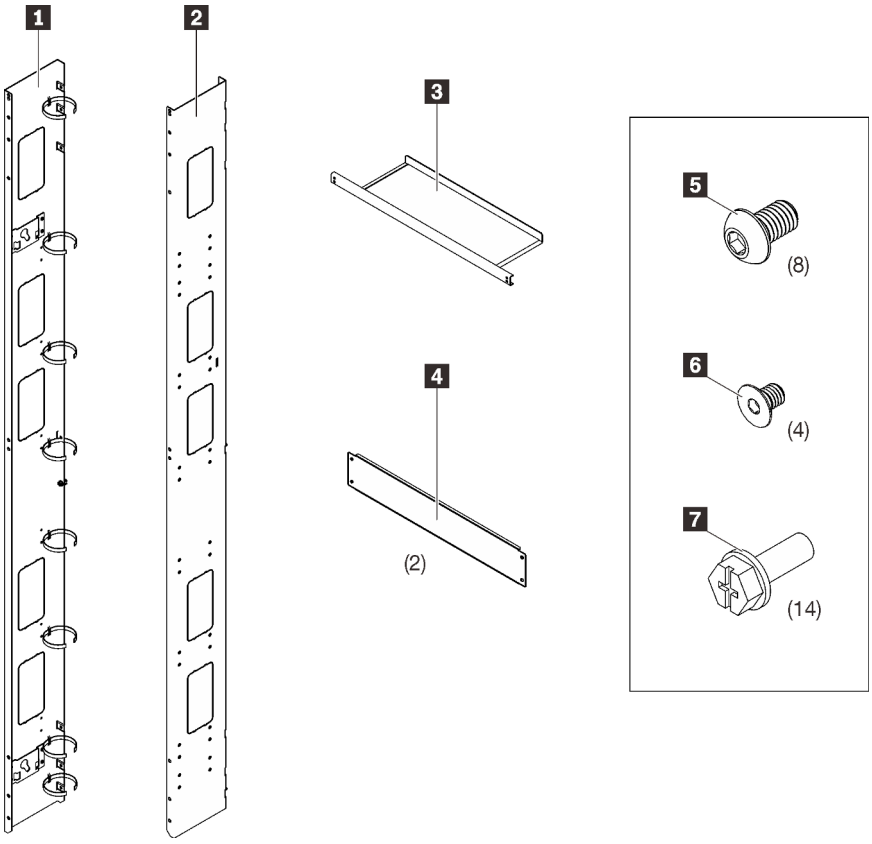

Figure 10. ThinkSystem 48U Heavy Duty Rack Extension

Table 8. ThinkSystem 48U Heavy Duty Rack Extension components

1 One left panel	5 Eight front cover screws
2 One right panel	6 Four top cover screws
3 One top cover	7 Fourteen side panel screws
4 Two front covers	

Specifications

Table 9. 48U Heavy Duty Rack Extension specifications

Extension depth	180 mm / 7 inches
Weight	18 kg / 39.7 lbs
Openings	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

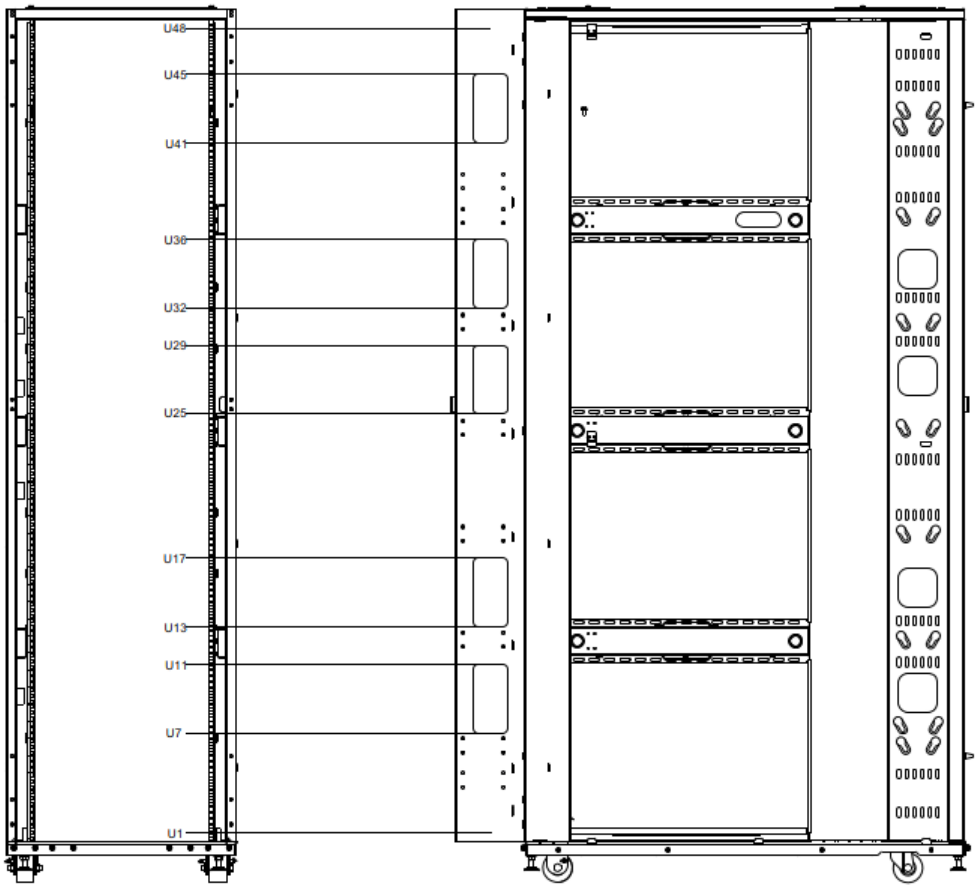

Figure 11. Openings on a extension panel

For installation procedure, see “Install 48U Heavy Duty Rack Extension” on page 25.

Cable management brackets

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

21U front cable management bracket

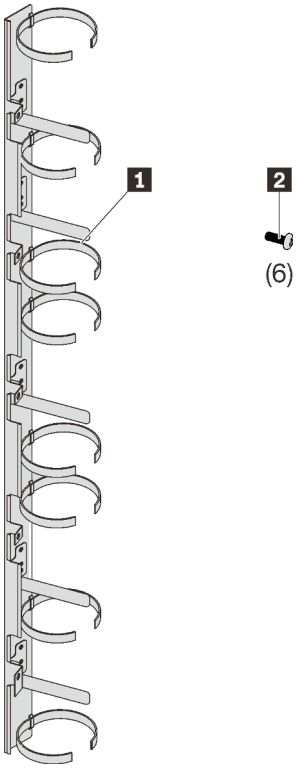

Figure 12. 21U front cable management bracket components

1 21U front cable management bracket	2 Six screws

6U front cable management bracket

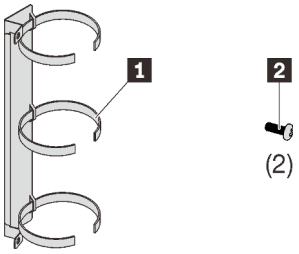

Figure 13. 6U front cable management bracket components

1 6U front cable management bracket	2 Two screws

Rear cable management bracket

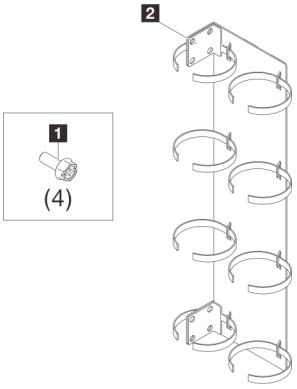

Figure 14. Rear cable management bracket components

1 Four screws	2 Rear cable management bracket

For installation procedure, see “Install a cable management bracket” on page 151.

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: Four units
  - With rear rack extension: 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

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, but also 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.

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

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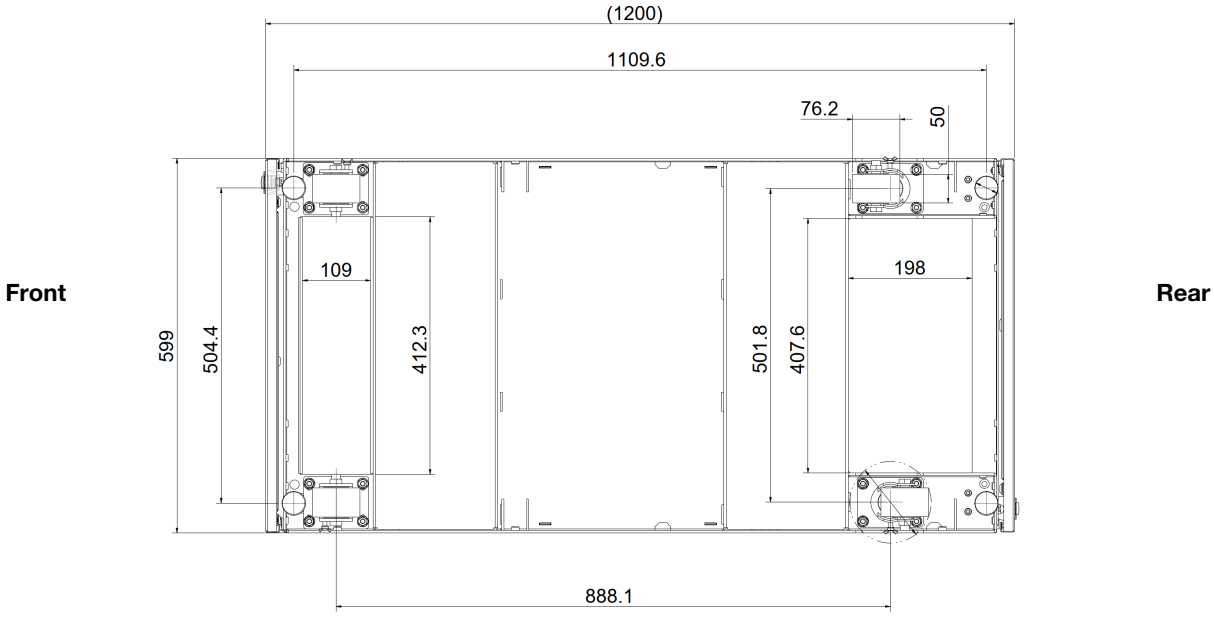


Figure 15. Space planning (mm)

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.

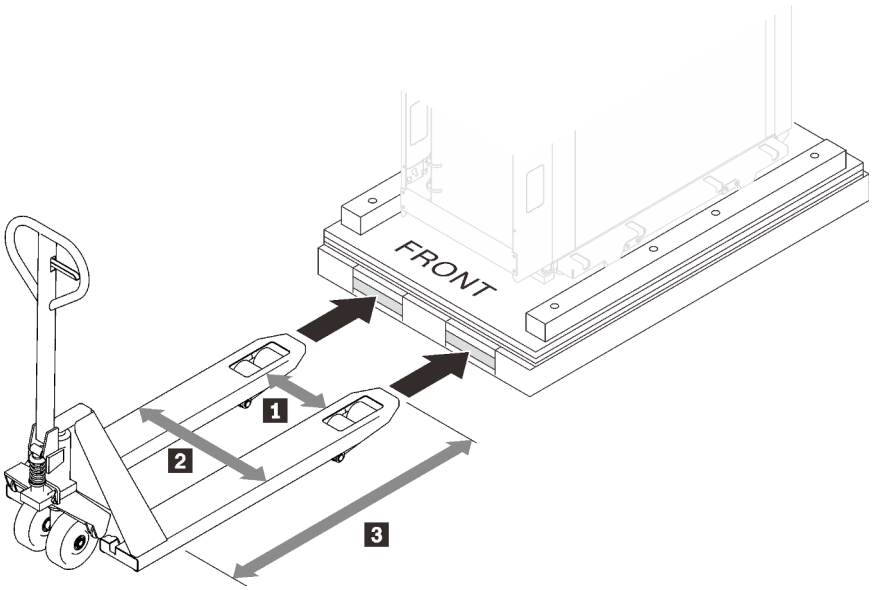


Figure 16. Forklift

- **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.

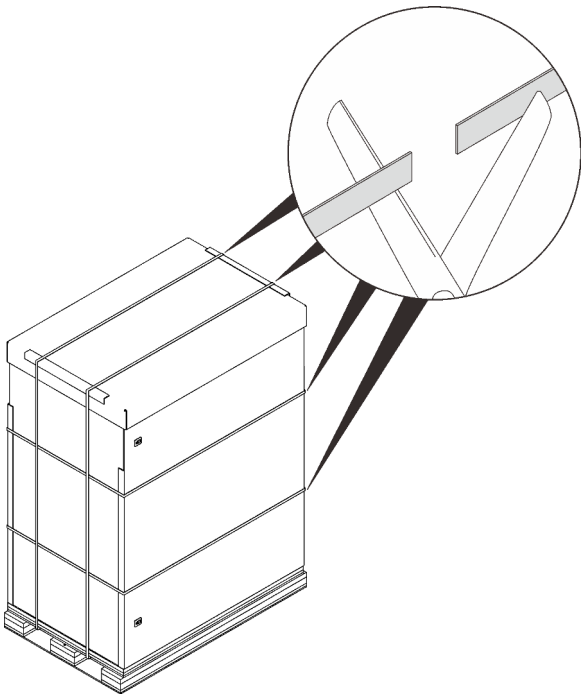


Figure 17. Cutting the straps

Step 2. Remove the top cover and side cardboards.

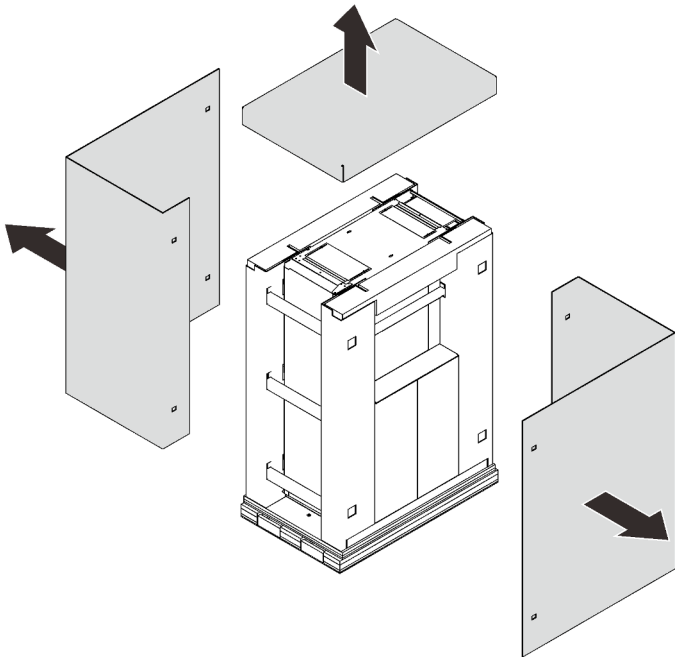


Figure 18. Removing the cardboards

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.

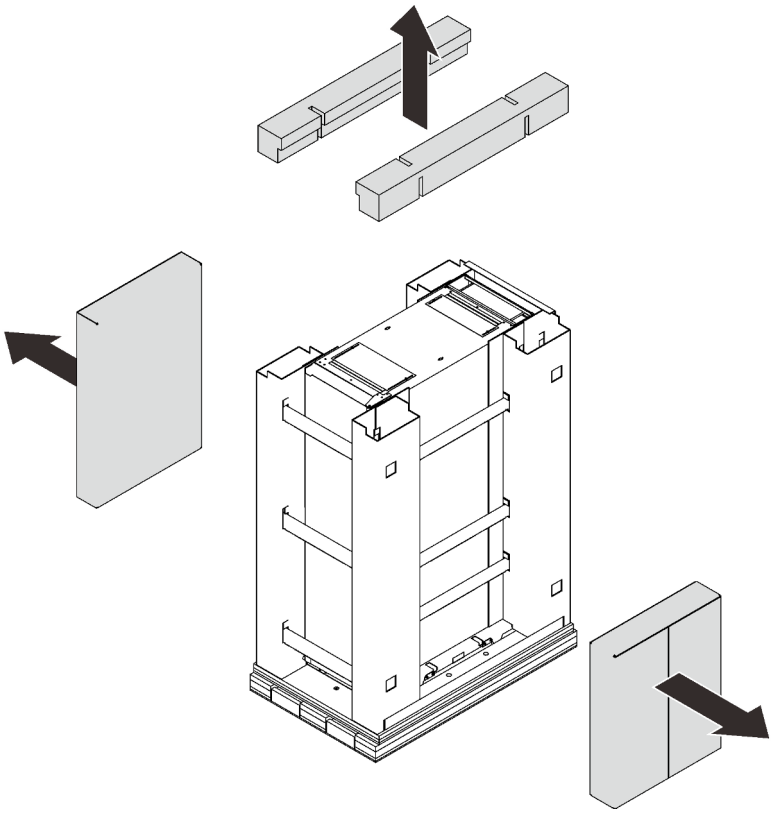


Figure 19. Removing the top bars and side cardboards

Step 4. Release and remove the side frames.

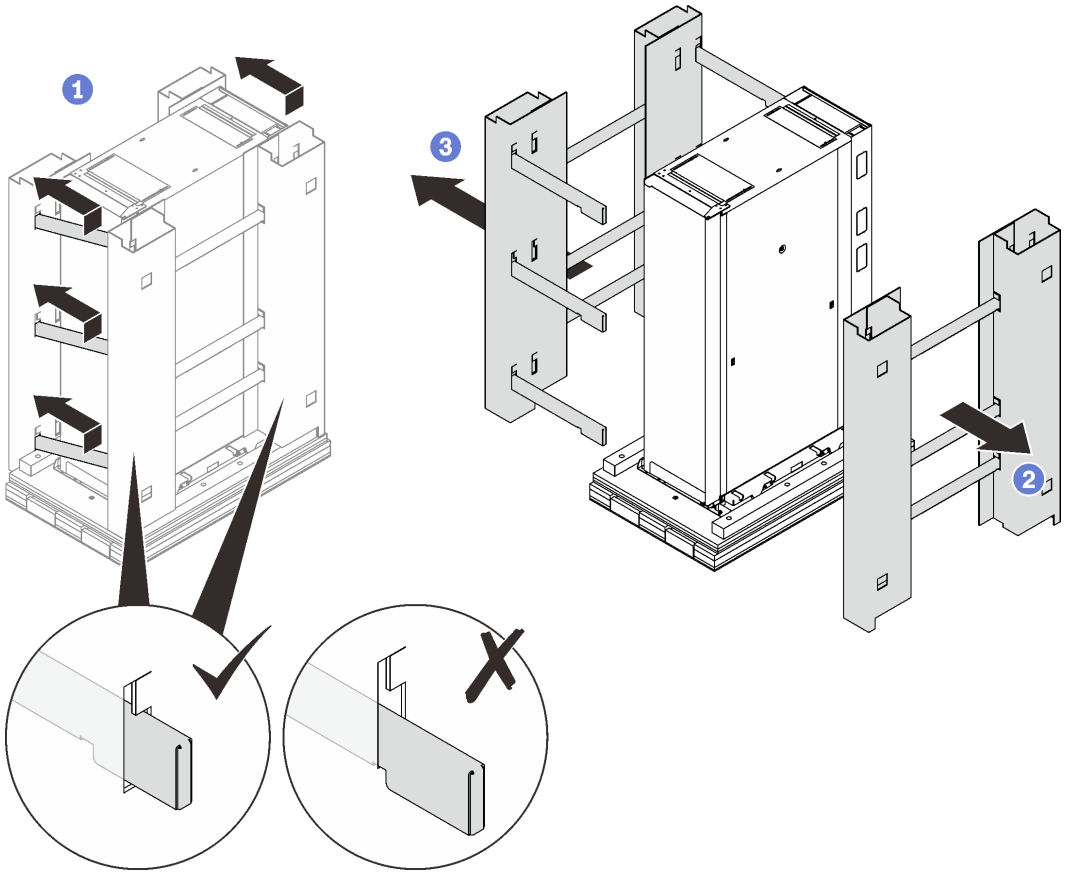


Figure 20. Removing the side frames

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.

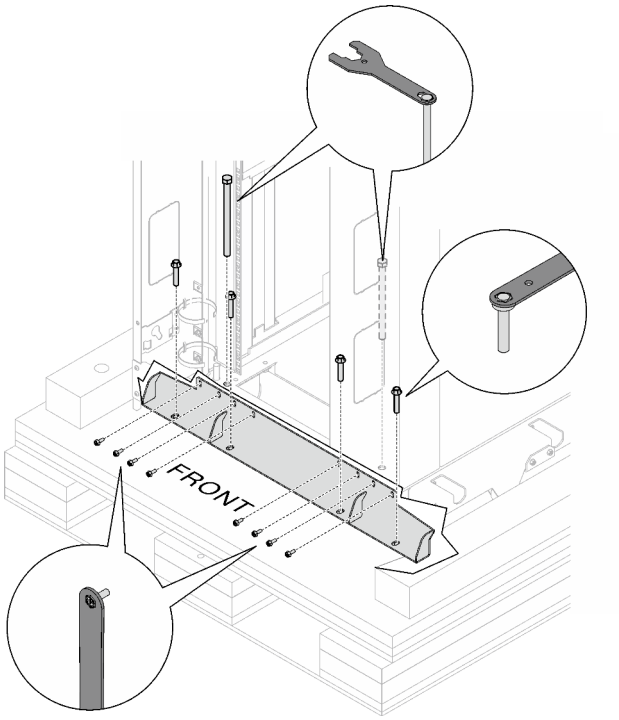
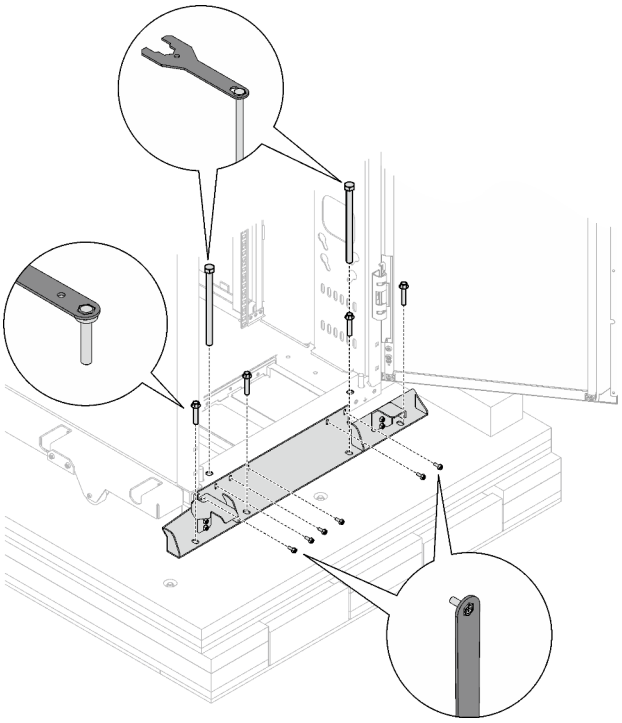


Figure 21. Removing the front shipping bracket

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 22. 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 long bear the weight of the rack cabinet.

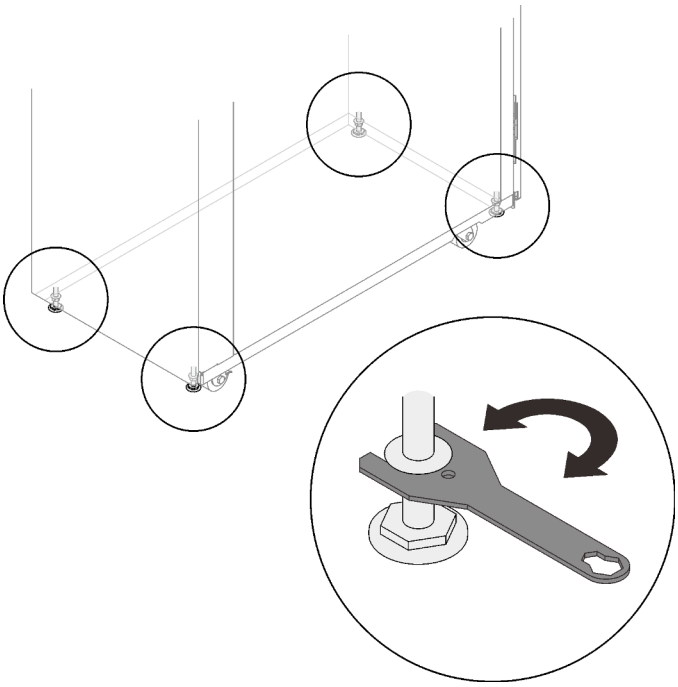


Figure 23. Rising the leveling pads

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

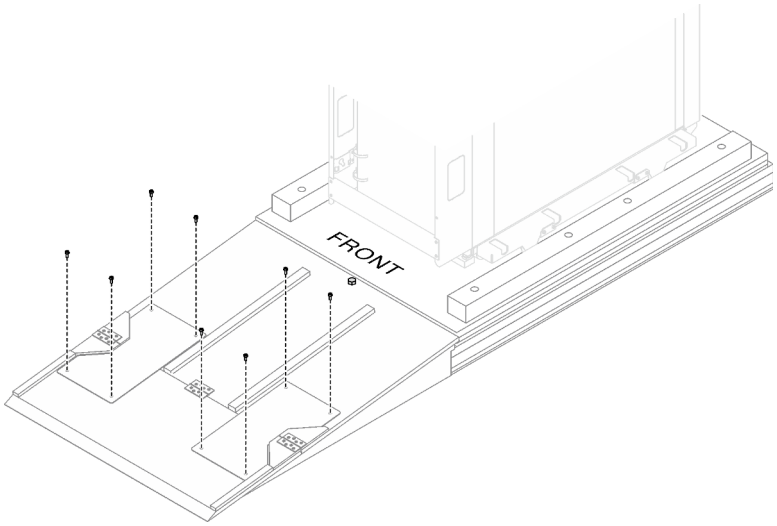


Figure 24. Securing the two plates to the ramp

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.

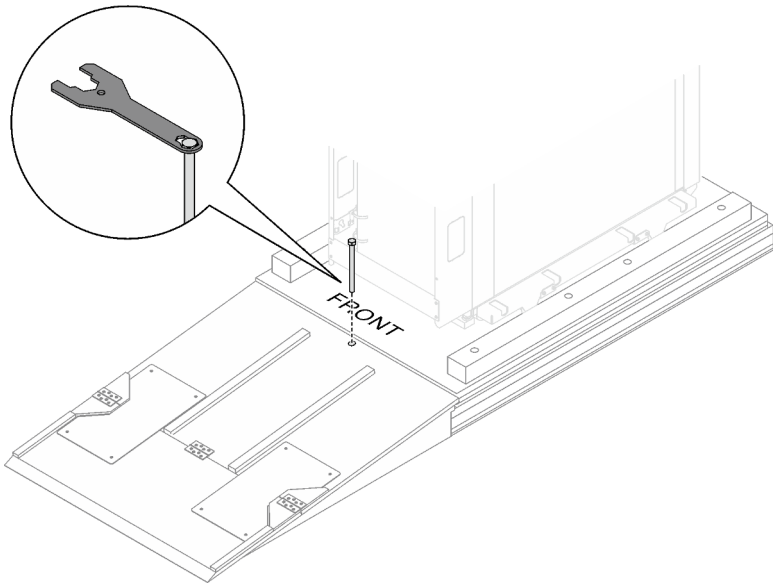


Figure 25. Securing the ramp to the pallet

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.

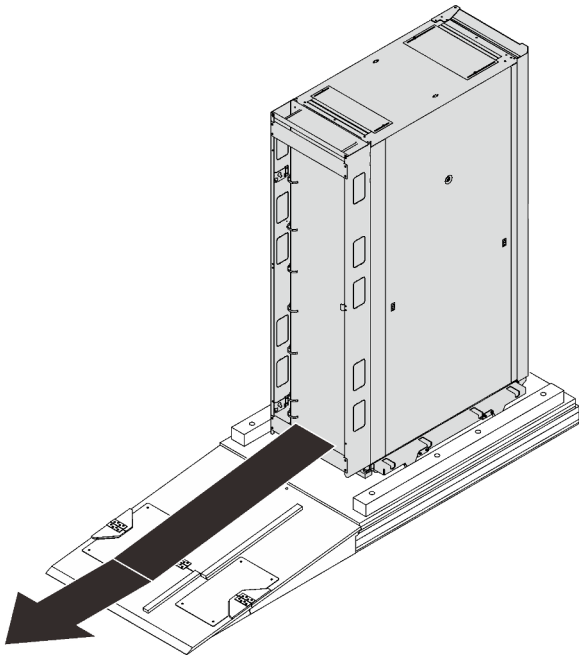


Figure 26. Removing the cardboards

Install the front stabilizer and recirculation prevention plate

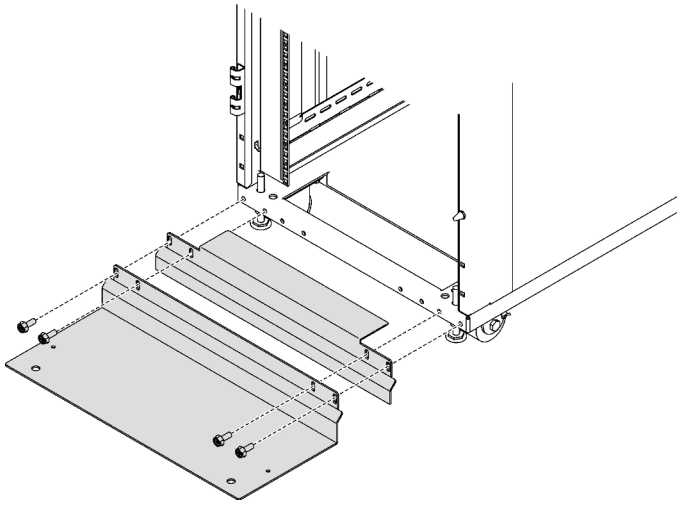
See this topic to learn how to enhance rack cabinet balance with the front stabilizer.

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 27. Installing the front stabilizer and recirculation prevention plate



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

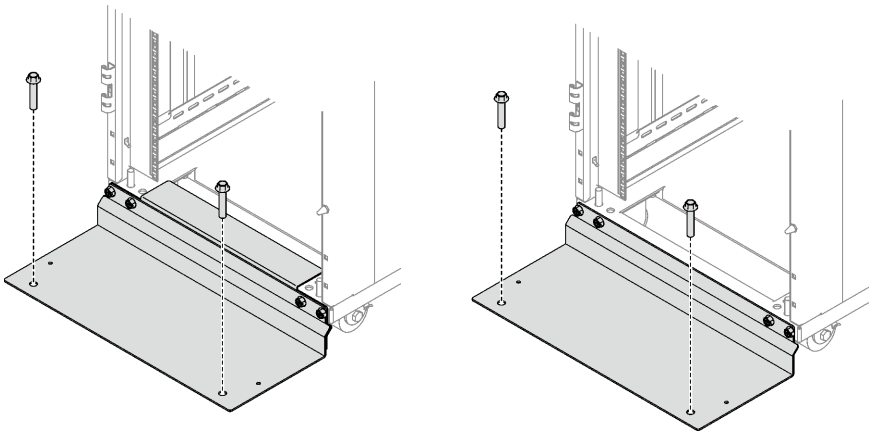


Figure 28. Securing the stabilizer to the floor

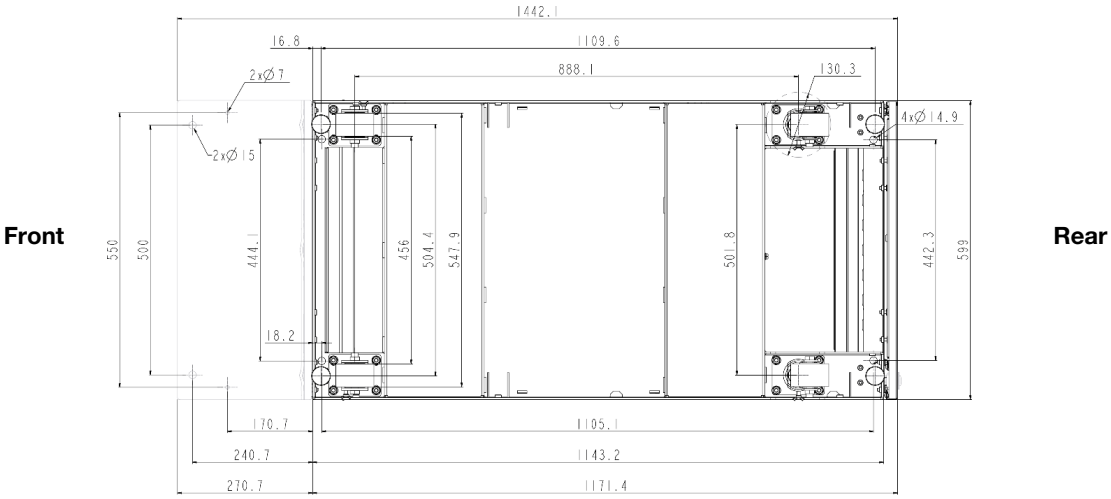


Figure 29. Rack cabinet with stabilizer installed

Install 48U Heavy Duty Rack Extension

See this topic to learn how to install 48U Heavy Duty Rack Extension.

Notes:

- Each unit of extension module 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 (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 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 34). 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 Step 4 on page 28.

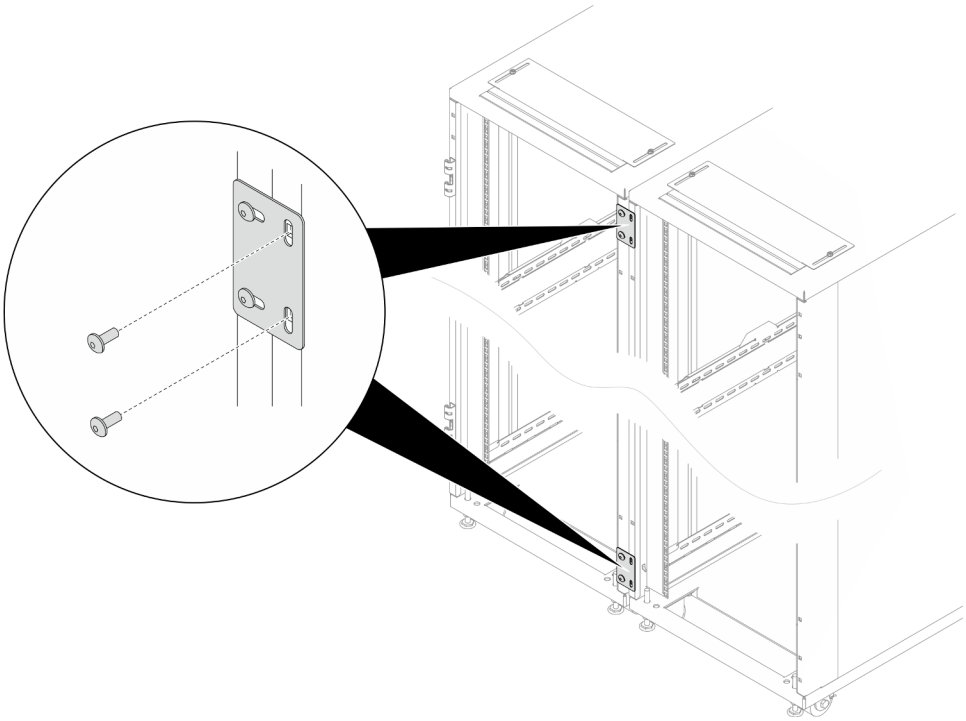


Figure 30. Removing screws to prepare for extension installation

Procedure

Step 1. Remove the door.

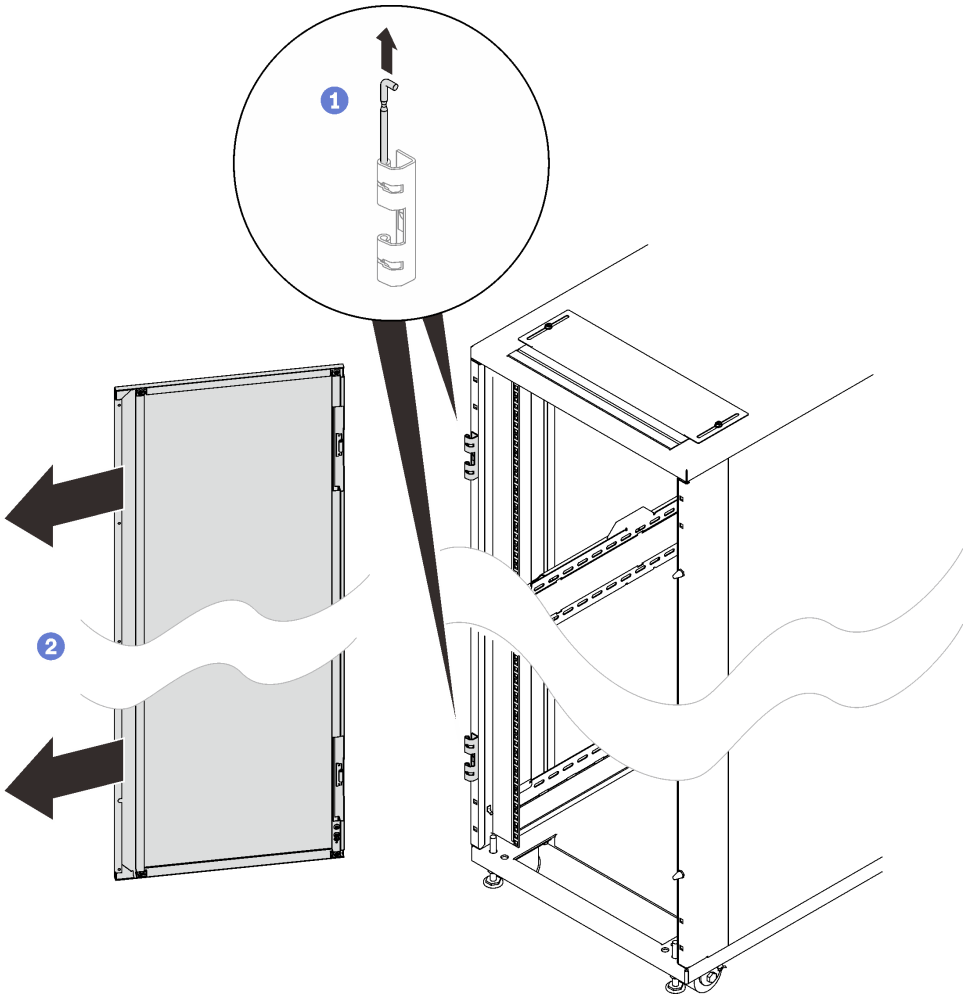


Figure 31. Removing a door

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.

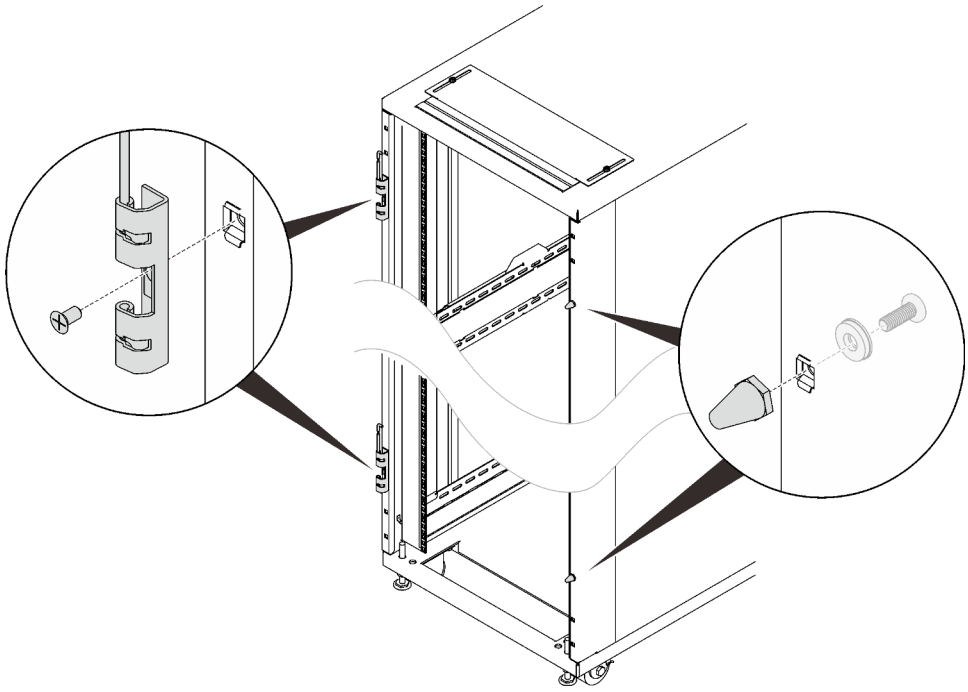


Figure 32. Removing the door hinges and doorstops

Step 3. Remove the door latch.

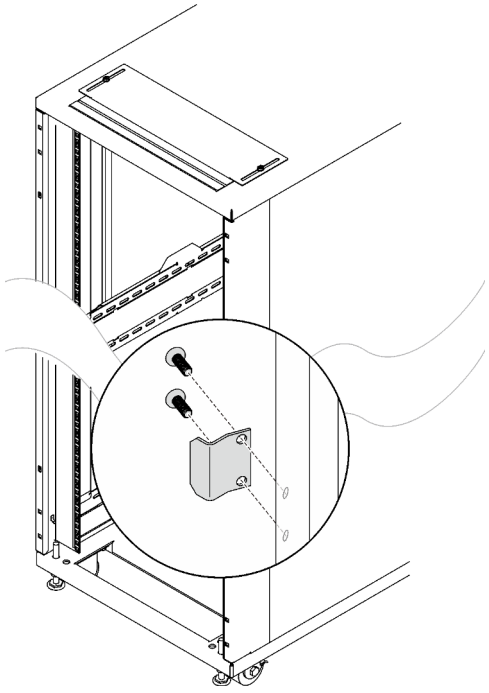


Figure 33. Removing the door latch

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

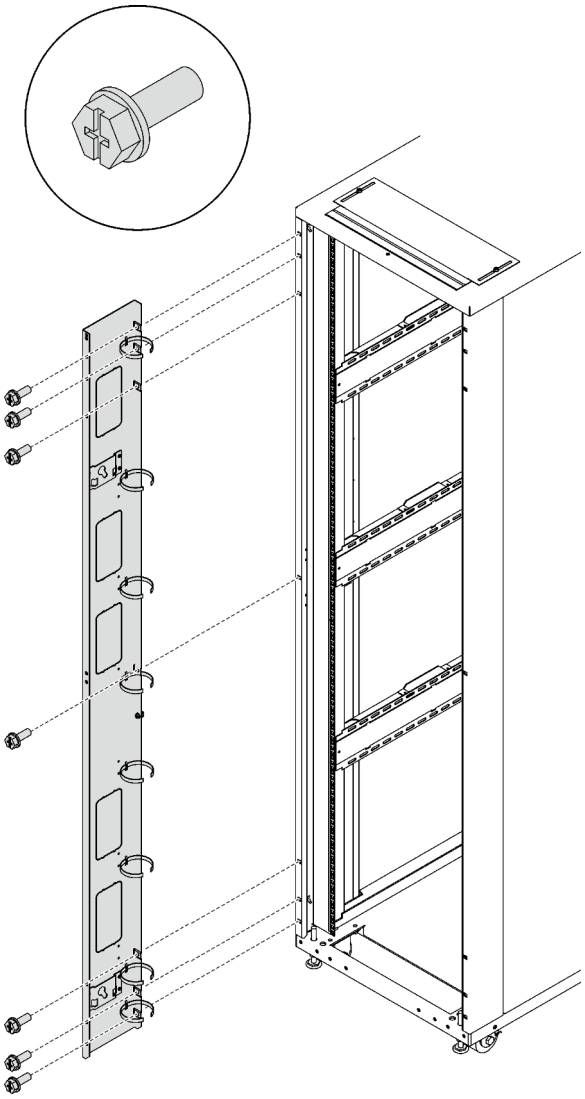


Figure 34. Installing an extension side panel

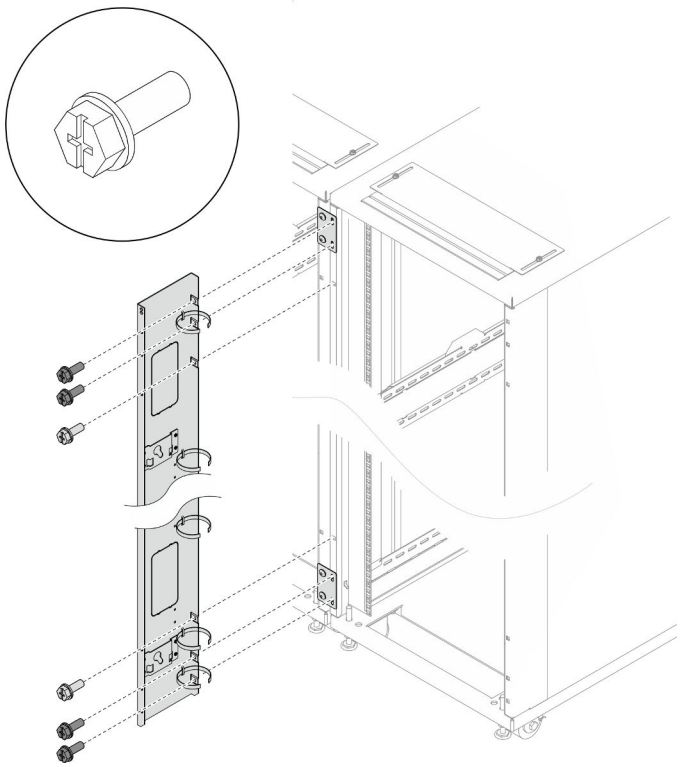


Figure 35. Installing an extension panel (with baying kit)

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.

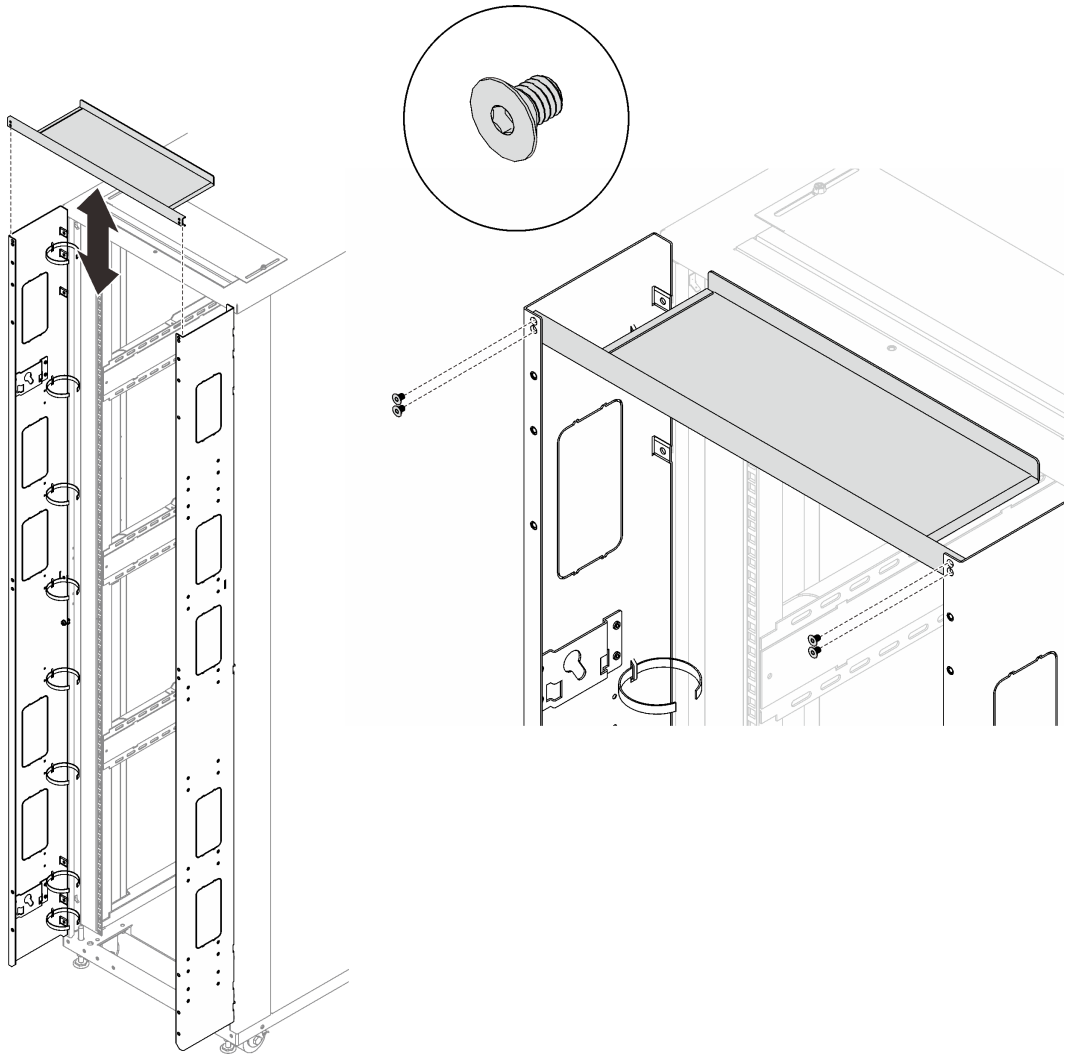


Figure 36. Installing the extension top cover

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

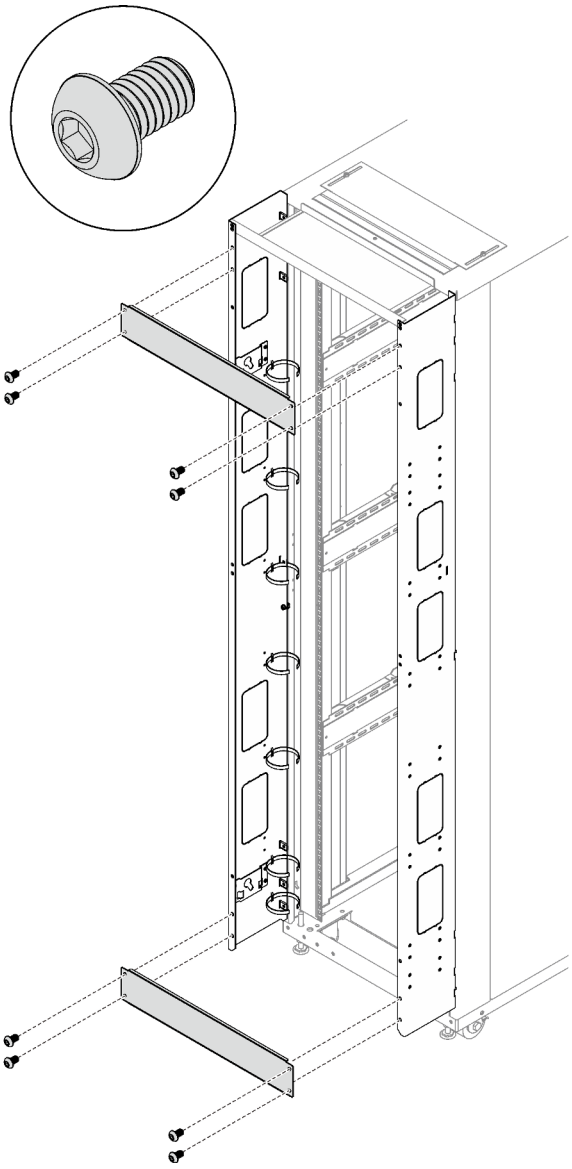


Figure 37. Installing the extension front panels

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

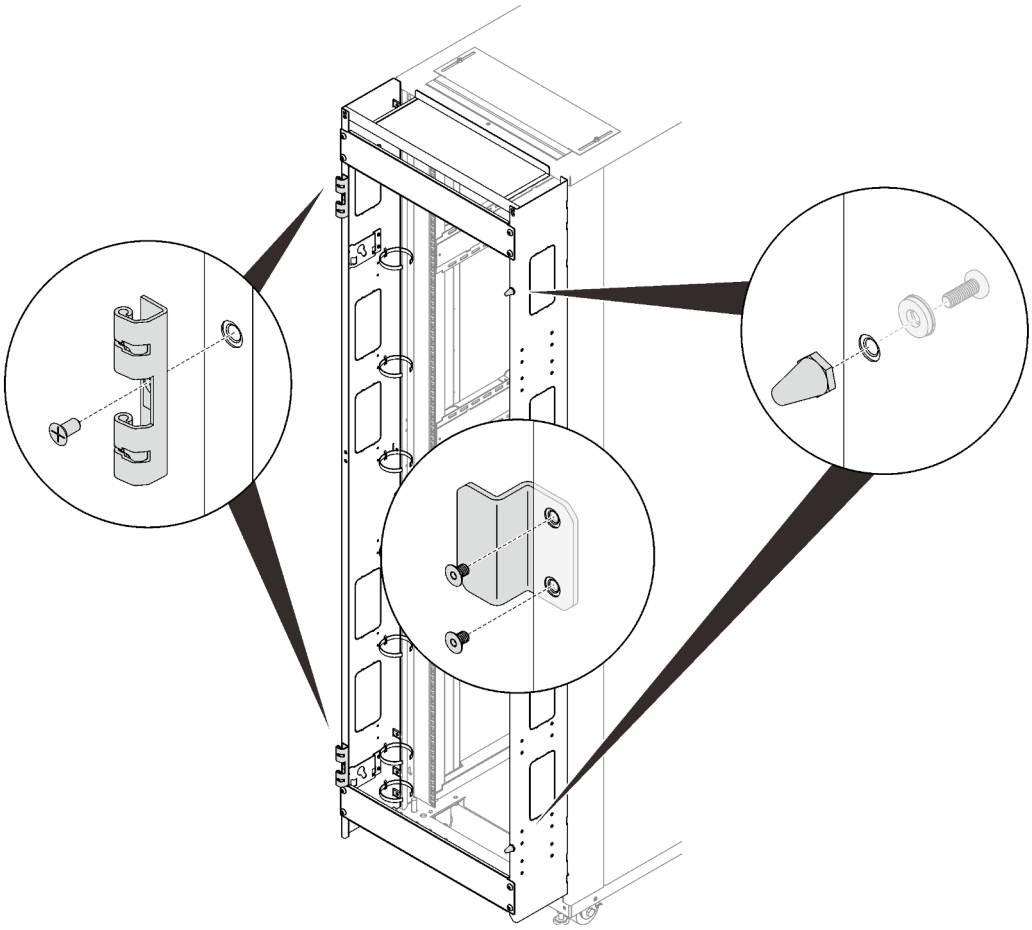


Figure 38. Install the hinges, doorstops, the door latch

Step 8. Install the door back to the rack.

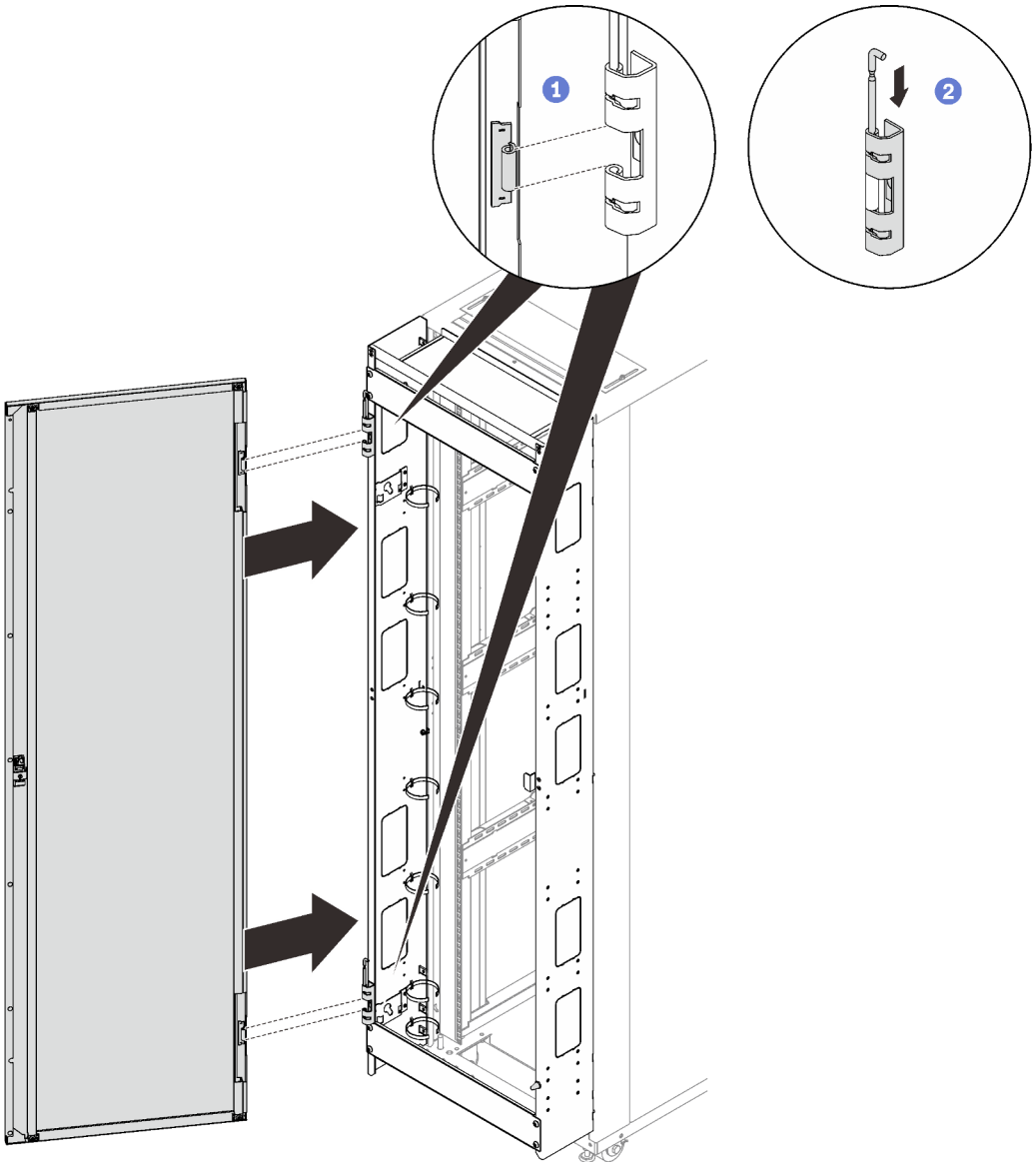


Figure 39. Installing the door

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.

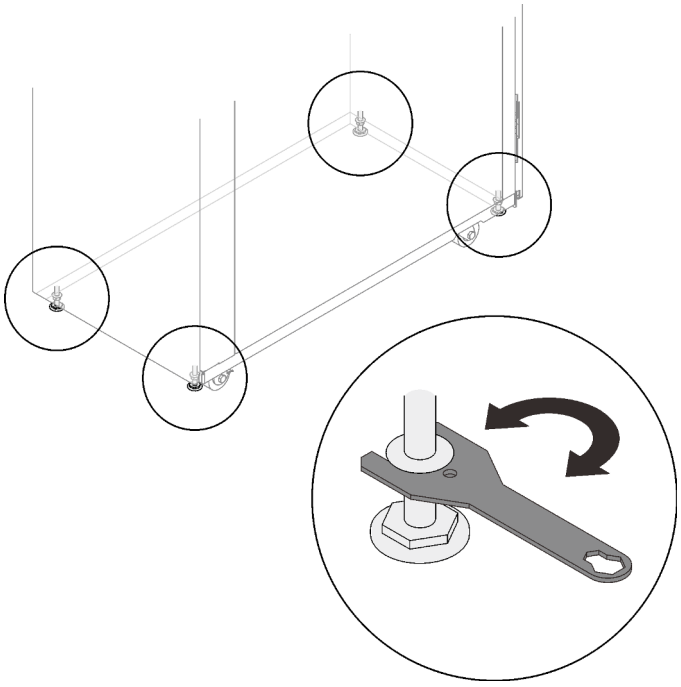


Figure 40. Lowering the leveling pads

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

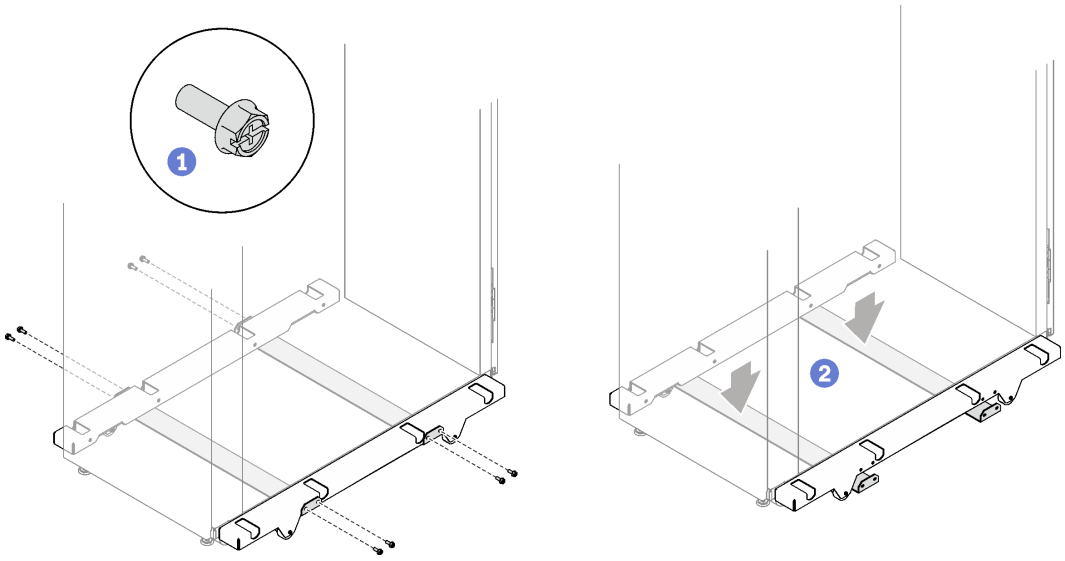


Figure 41. Removing the outrigger stabilizing bars

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.

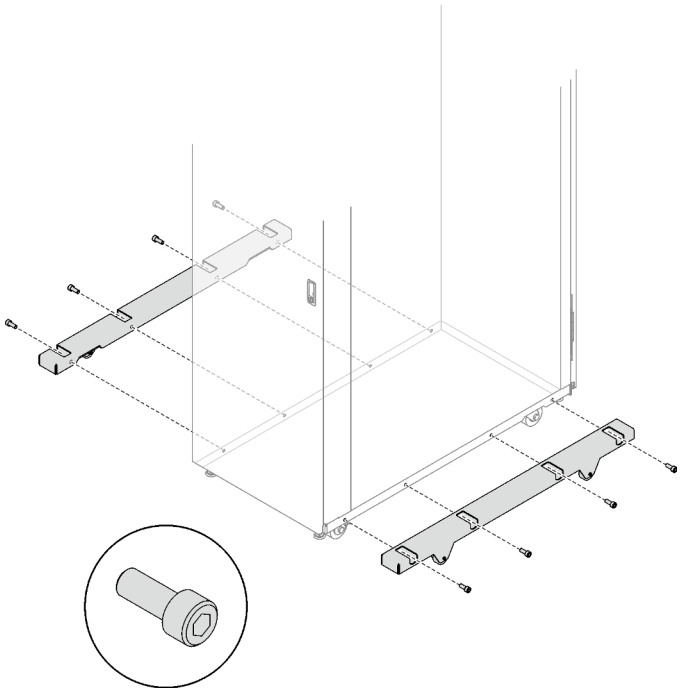


Figure 42. Removing the outriggers

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

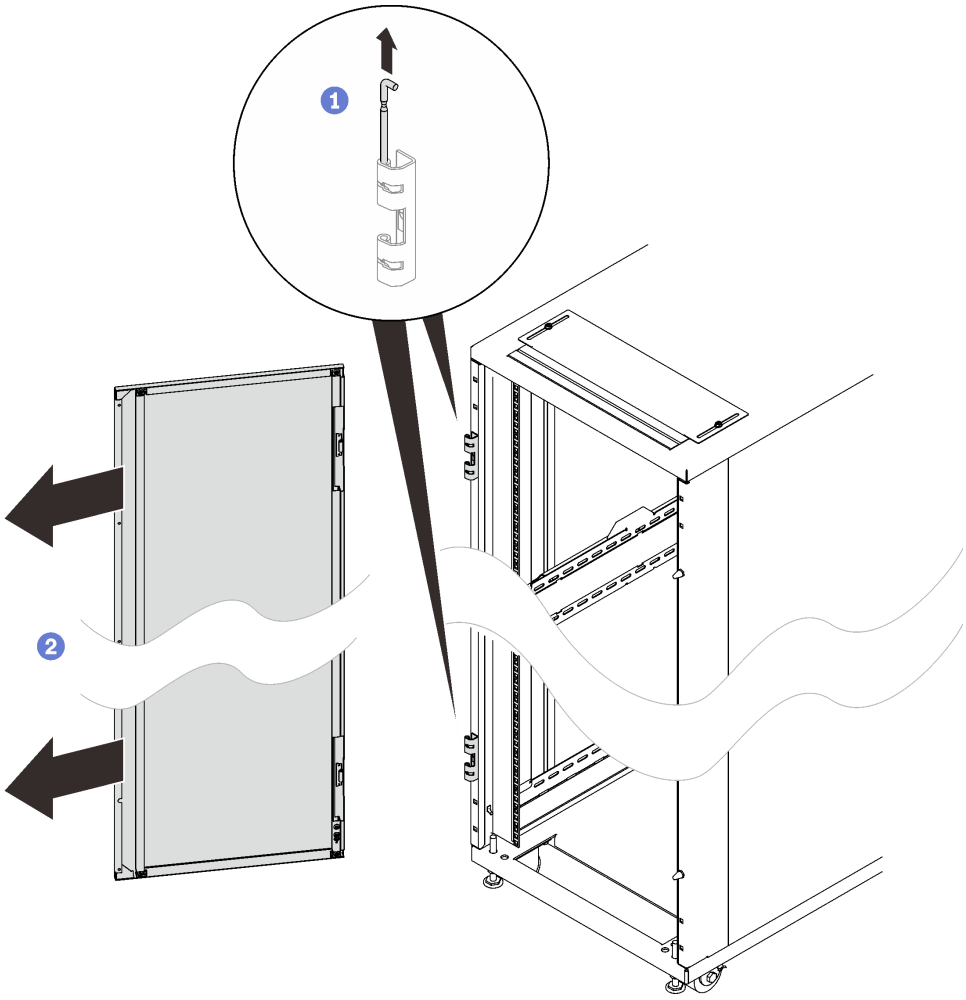


Figure 43. Removing a door

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.

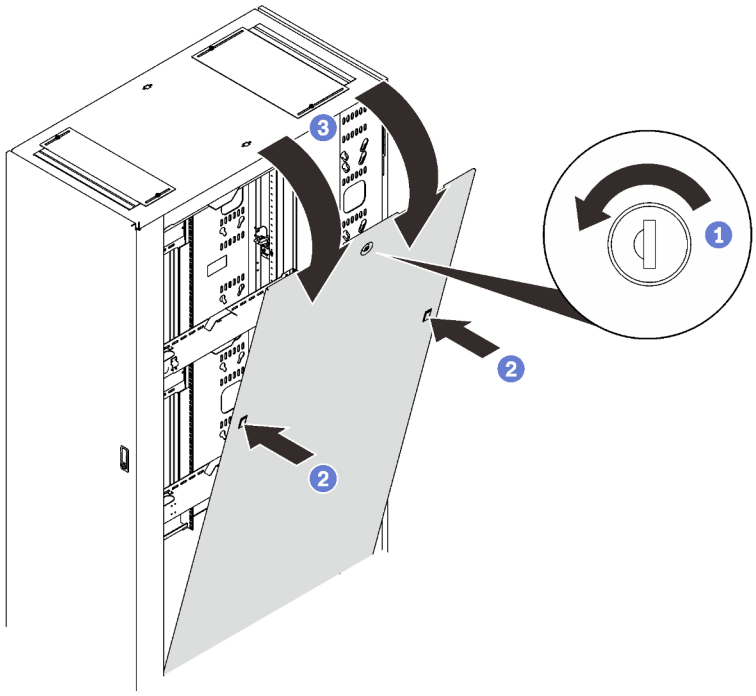


Figure 44. Removing a side cover

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 “Instal a 1U device into the side pocket” on page 80).

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.

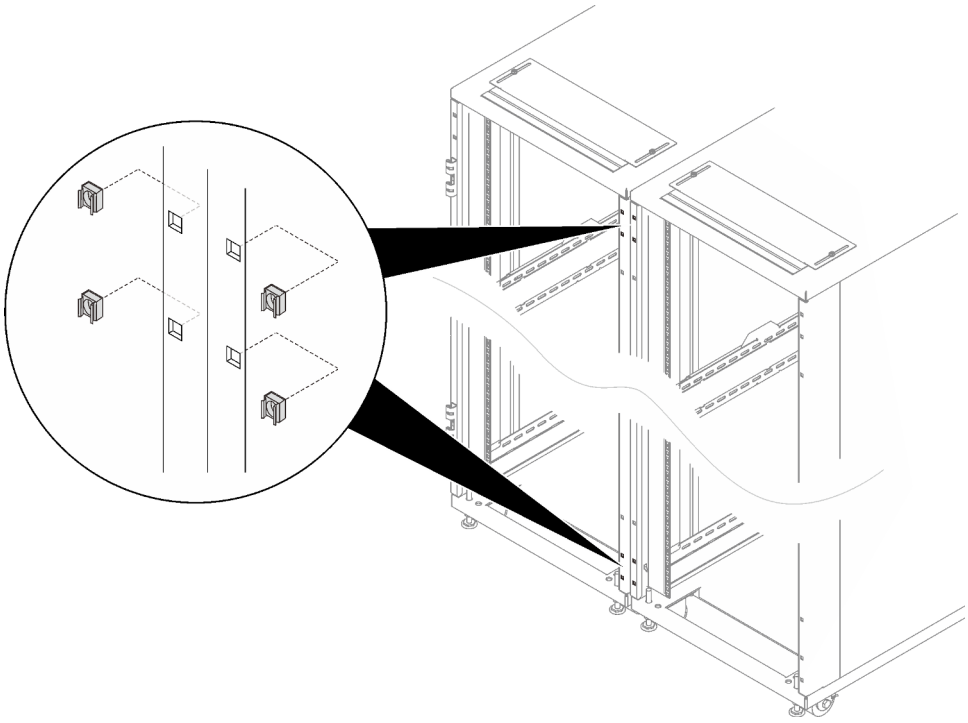


Figure 45. Installing the cage nuts

See “Install nuts on the mounting flanges” on page 41 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.

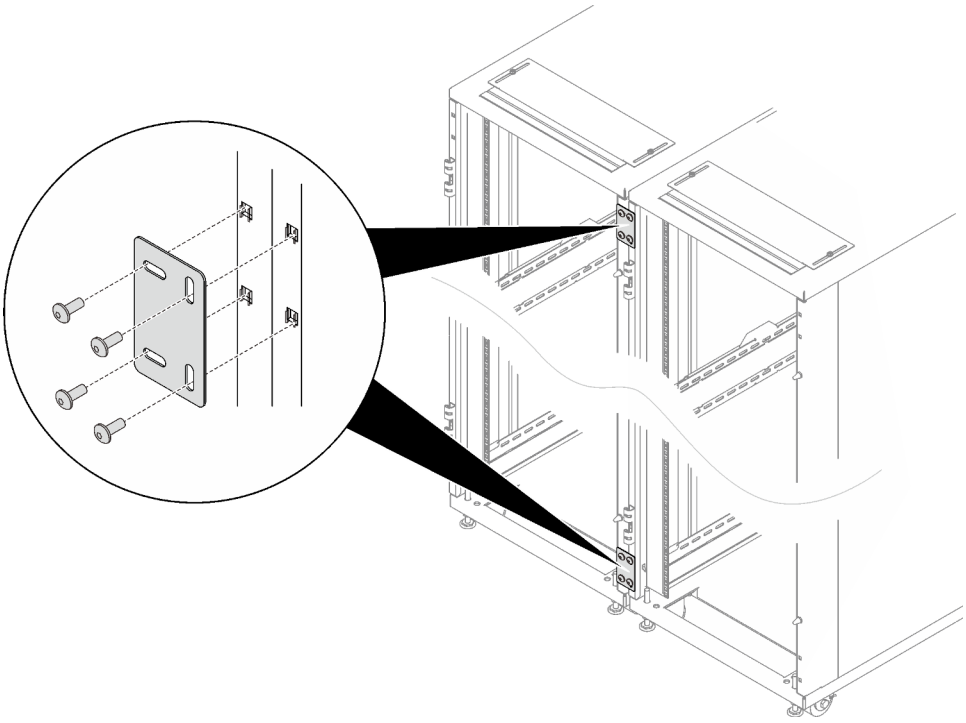


Figure 46. Installing attachment brackets

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 Heavy Duty Rack Extension” on page 25.

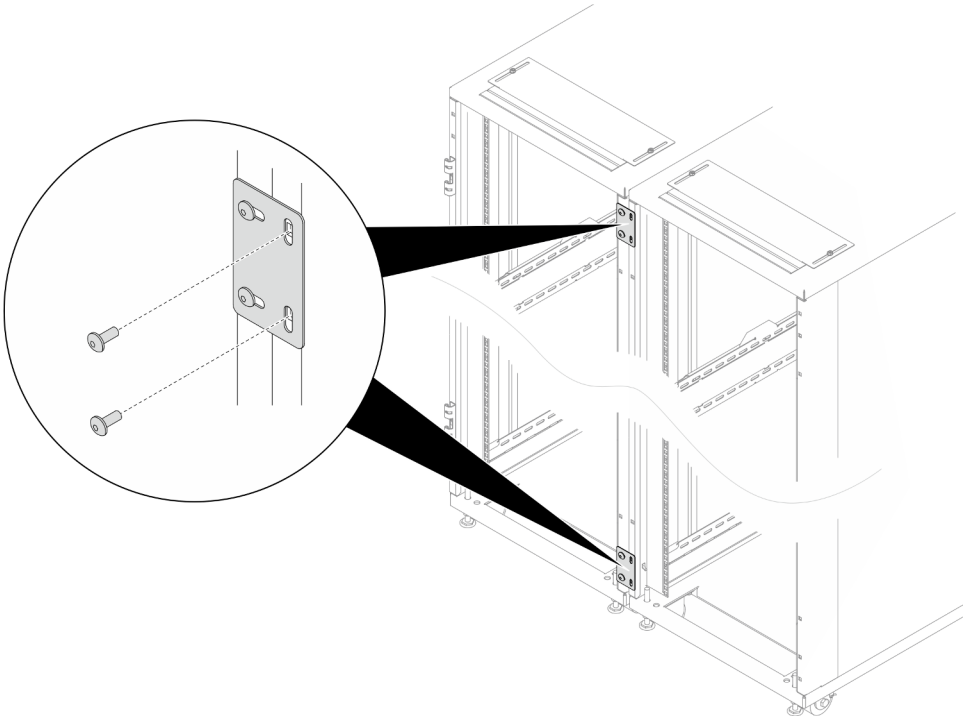


Figure 47. Removing screws to prepare for extension installation

Otherwise, reinstall all the doors that have been removed.

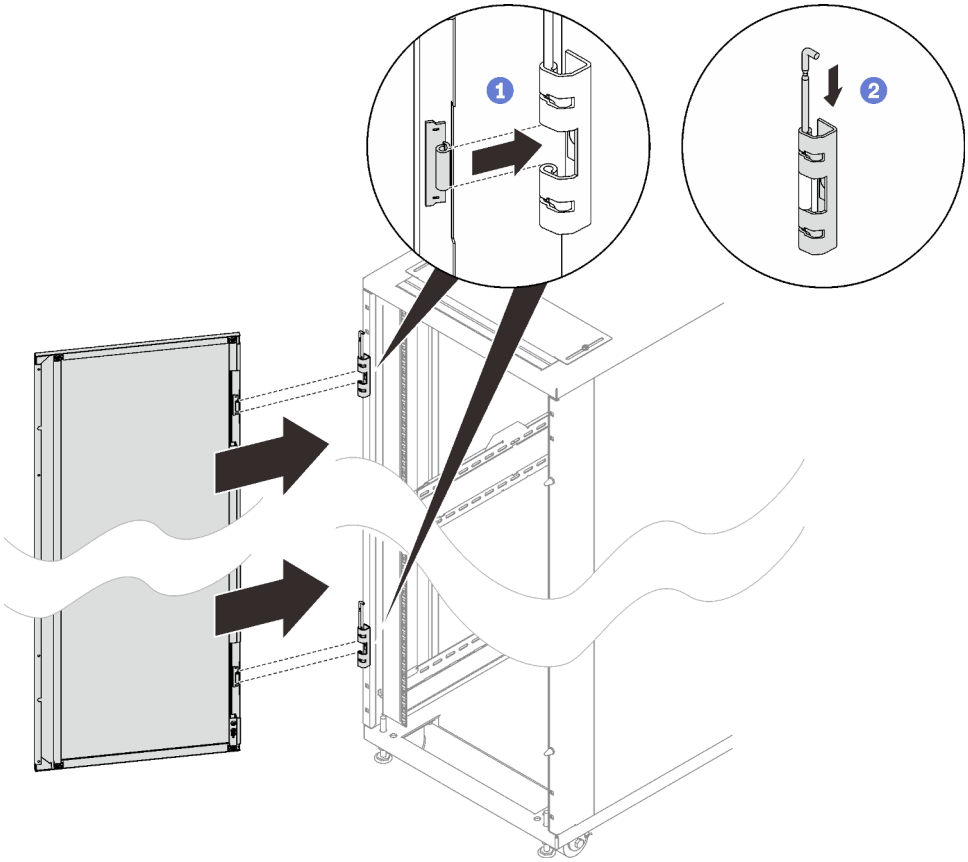


Figure 48. Installing a door

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.

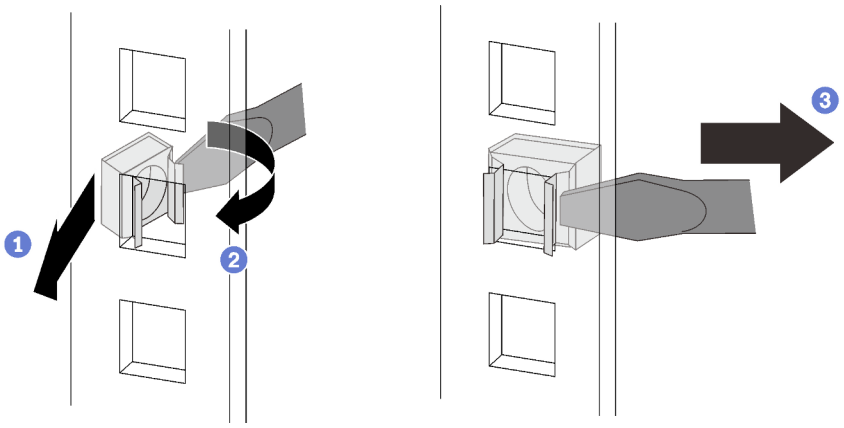


Figure 49. Installing a cage nut

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.

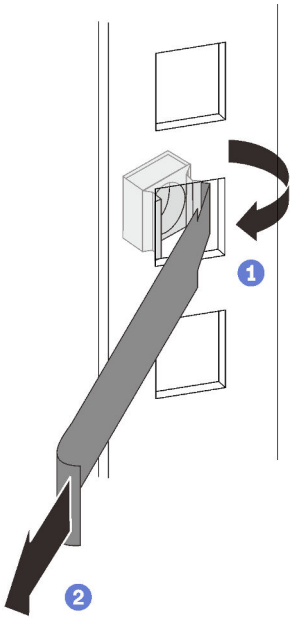


Figure 50. Installing a cage nut

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 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.

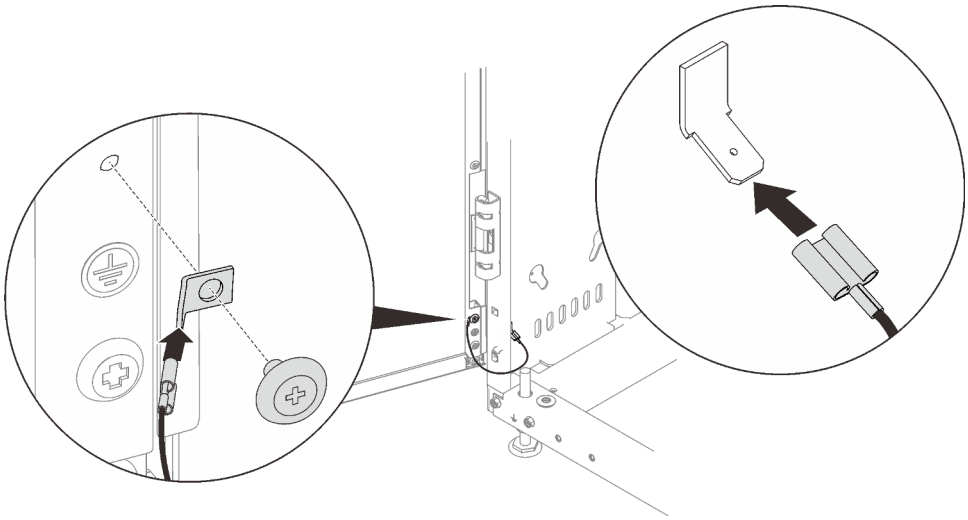


Figure 51. Installing the rack grounding kit

Step 2. Remove the side cover.

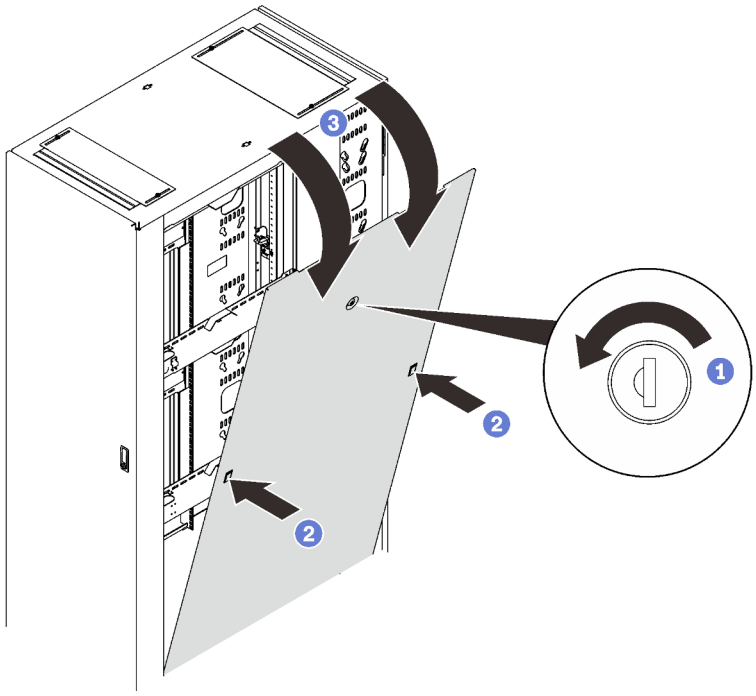


Figure 52. Removing a side cover

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.

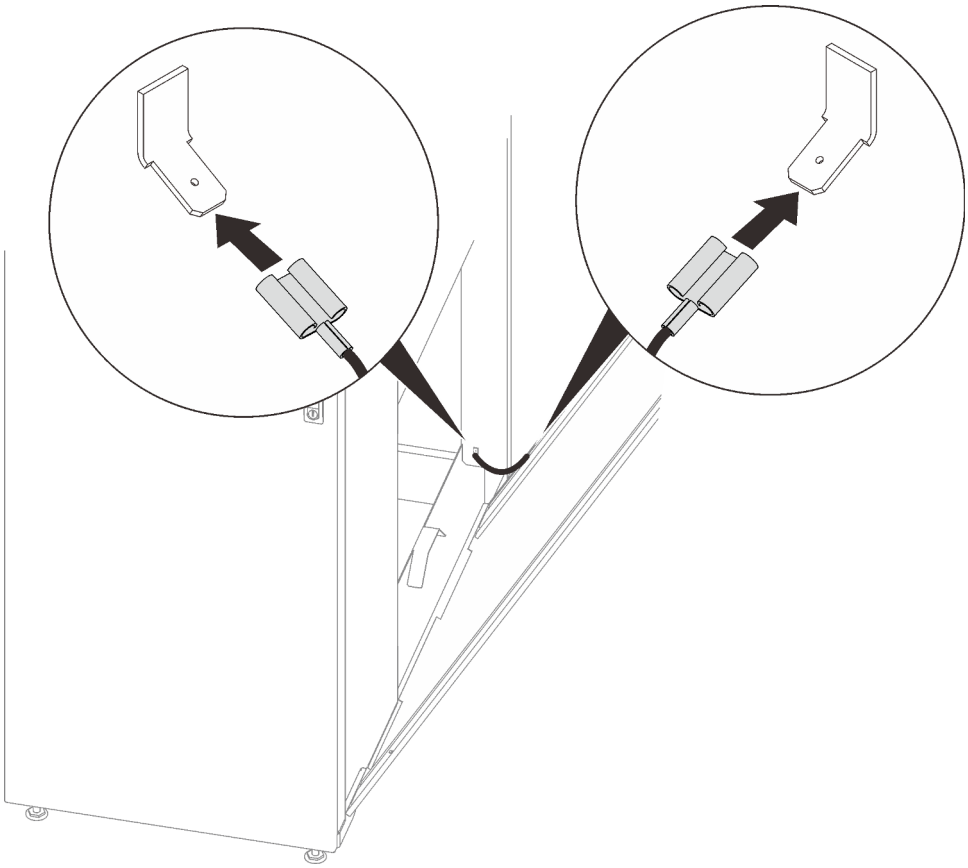


Figure 53. Installing the grounding jumper wire

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

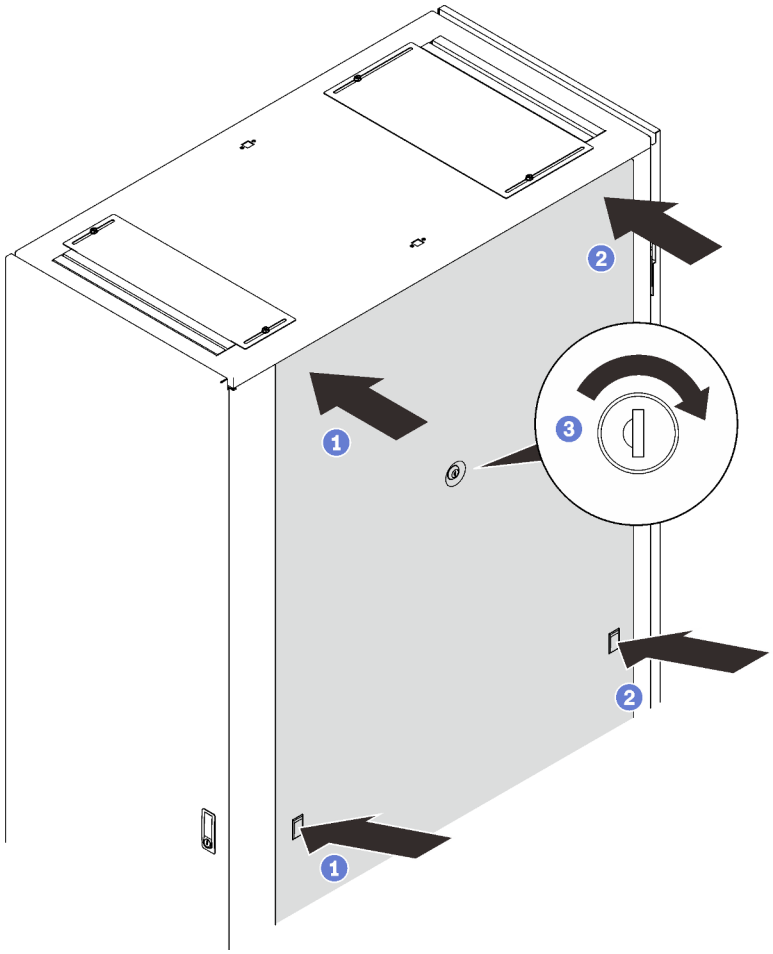


Figure 54. Securing the side cover

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.

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:

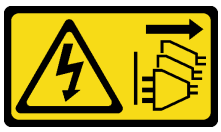
- If Rear Door Heat eXchanger for 48U Rack comes when installed to the rack, see “Complete setup of Rear Door Heat eXchanger 48U that comes with the rack” on page 48 to complete the setup procedure.
- To replace a regular rear door with Rear Door Heat eXchanger for 48U Rack, see “Replace a regular door with Rear Door Heat eXchanger for 48U” on page 51.

Important: Make sure to plan the cooling system with consideration of "Water specifications for the secondary cooling loop" on page 63.

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.

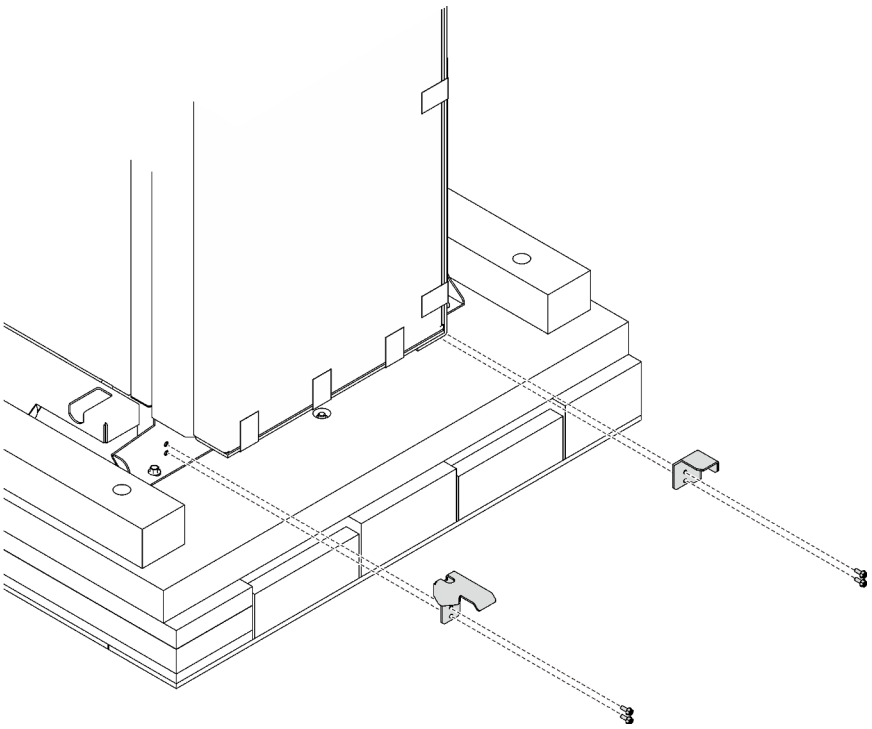


Figure 55. Removing the supporting brackets

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.

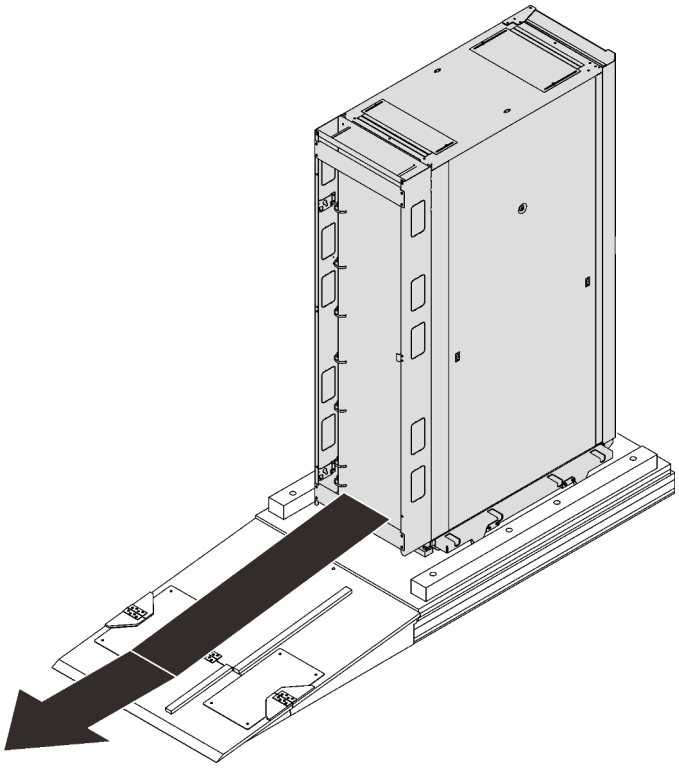
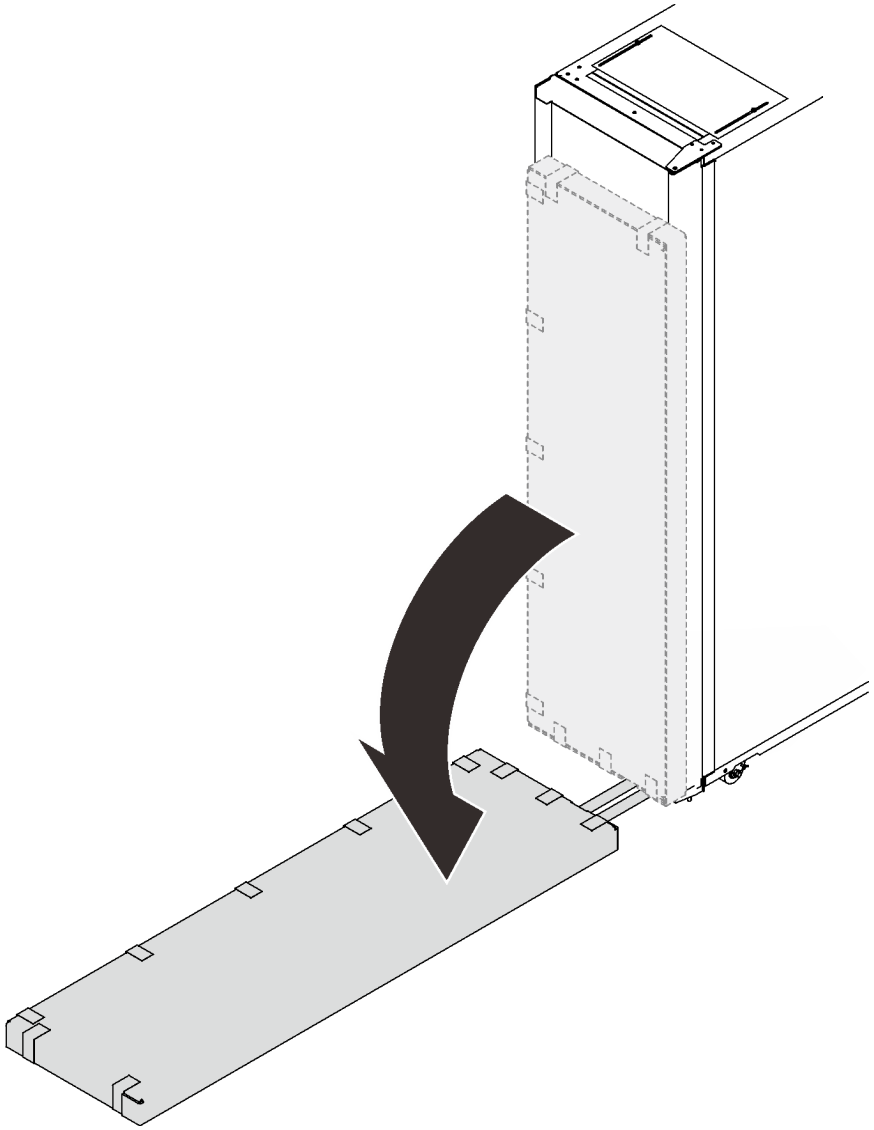


Figure 56. Moving the rack cabinet from the pallet

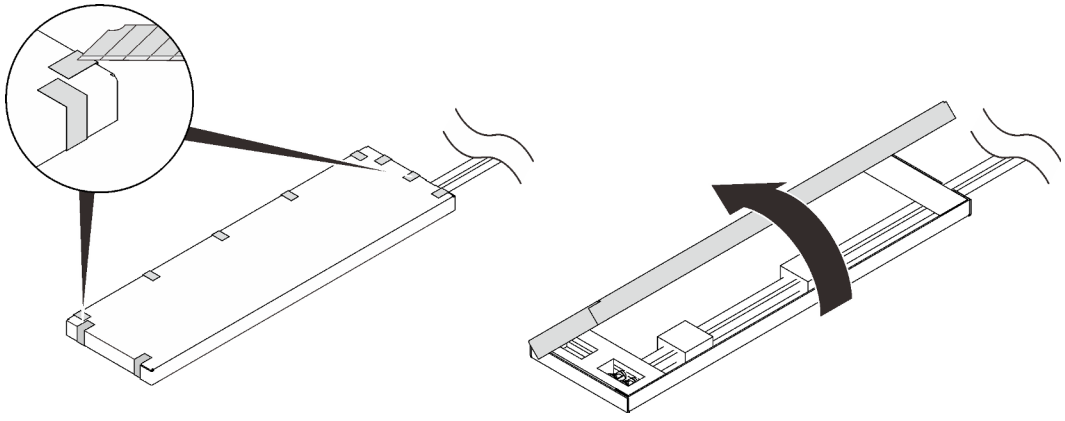
Step 3. Lower the carton that contains the manifolds.

Figure 57. Lowering the manifold carton



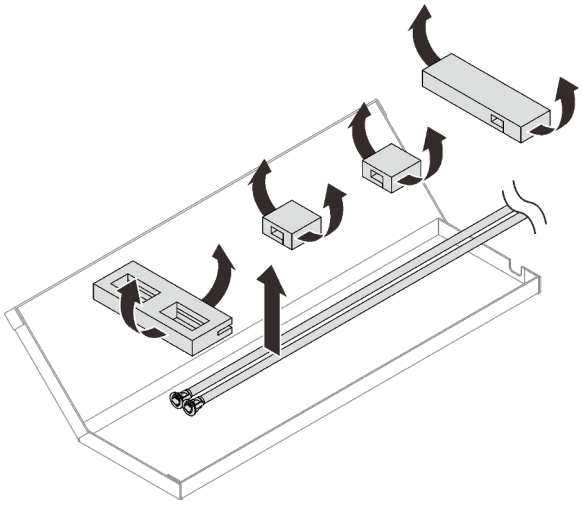
Step 4. Cut the edge of the carton with a sharp tool, and open the carton.

Figure 58. Unpacking the manifolds



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

Figure 59. Unpacking the manifolds



After this task is completed

Proceed to "Fill the heat exchanger with water" on page 73.

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.

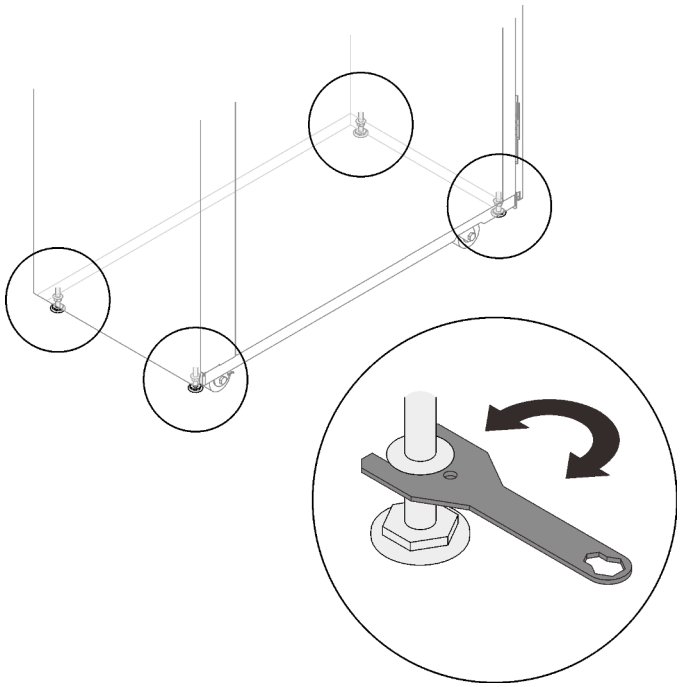


Figure 60. Lowering the leveling pads

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

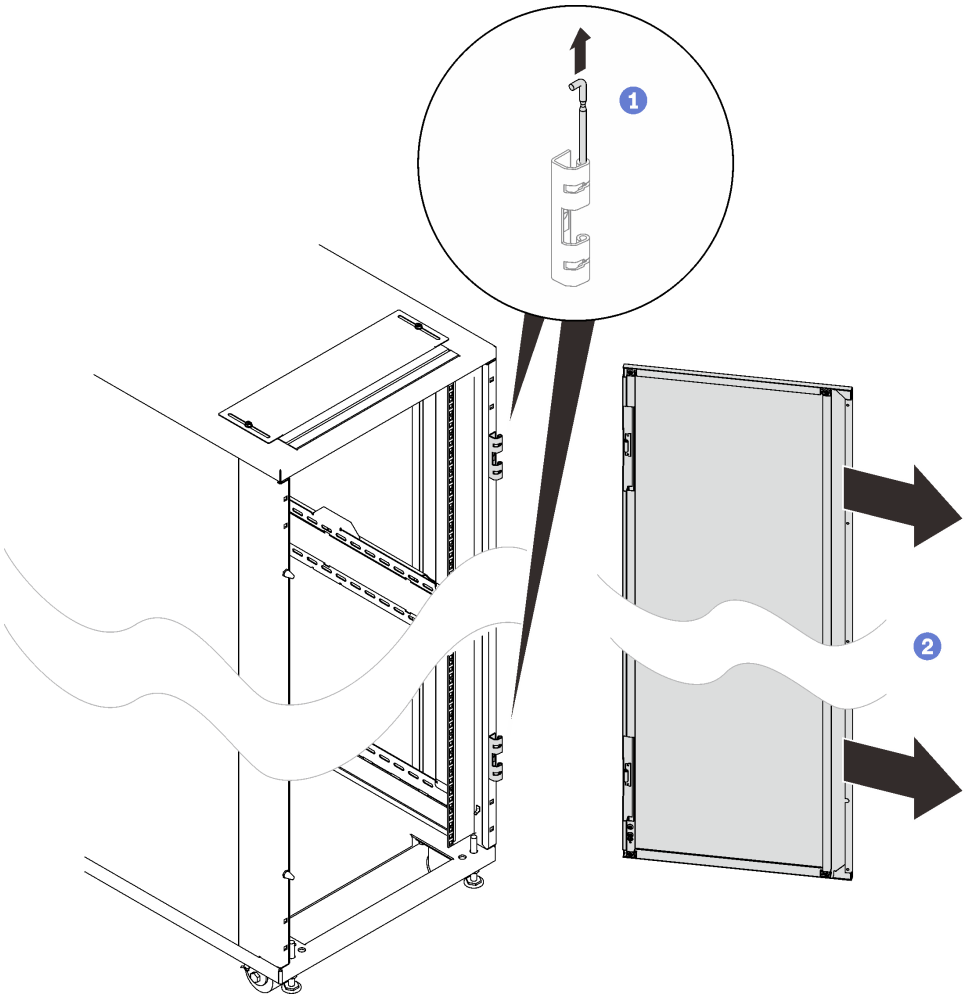


Figure 61. Removing a door

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

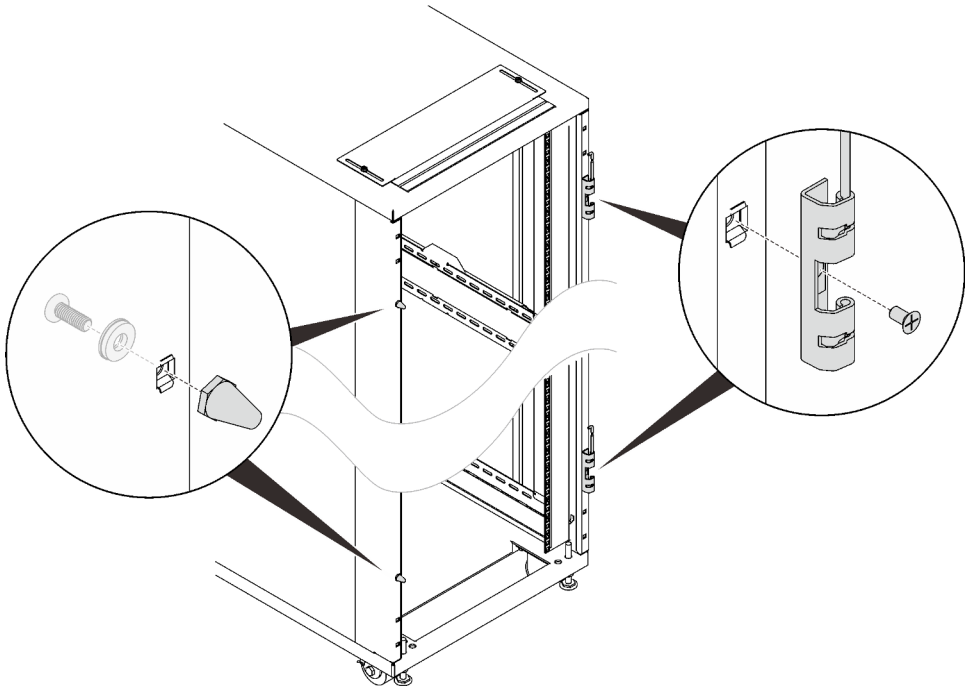


Figure 62. Removing the door hinges and doorstops

Step 4. Remove the door latch.

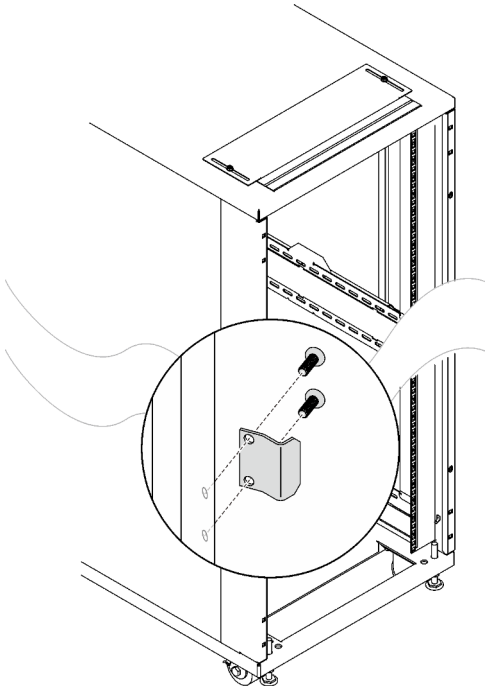


Figure 63. Removing the door latch

Step 5. Install the upper air baffle.

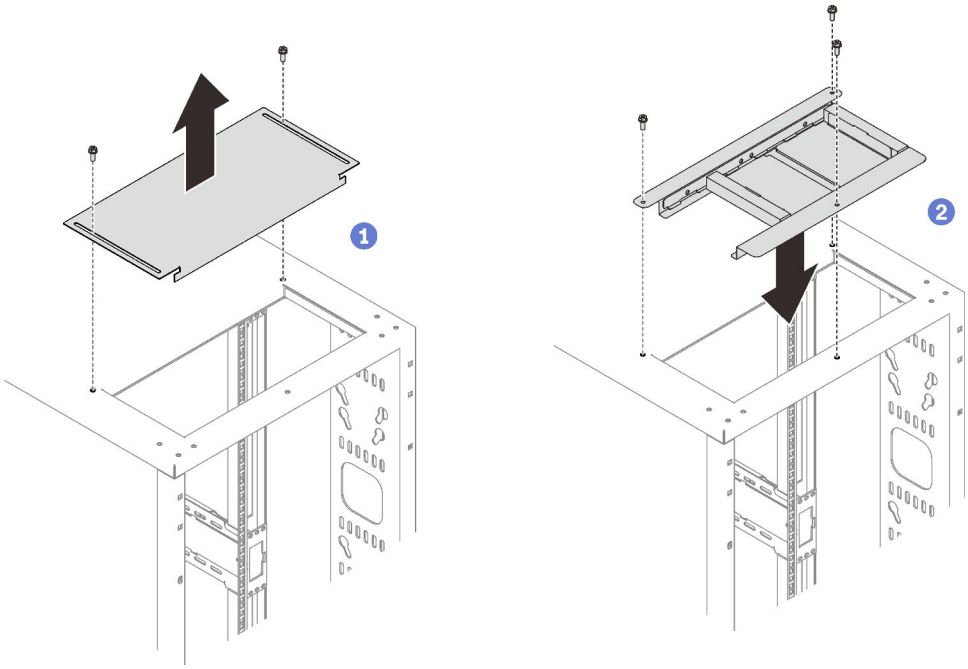


Figure 64. Installing the upper air baffle

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.

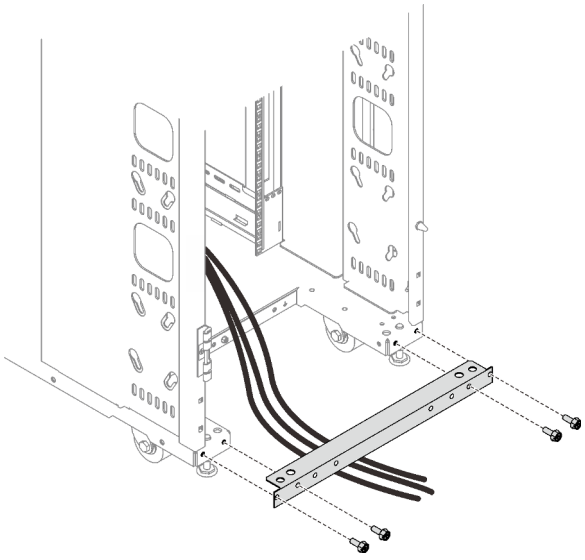


Figure 65. Removing the cable access bar

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

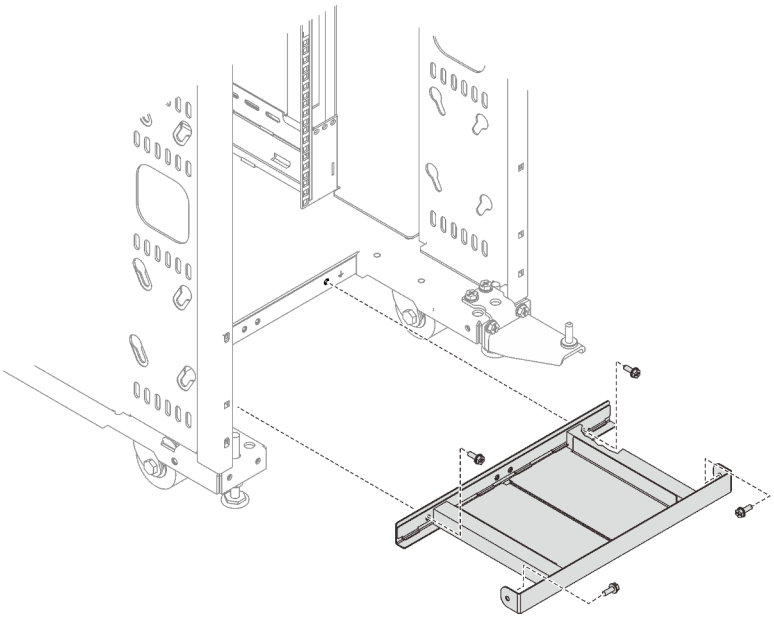


Figure 66. Installing the lower air baffle

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

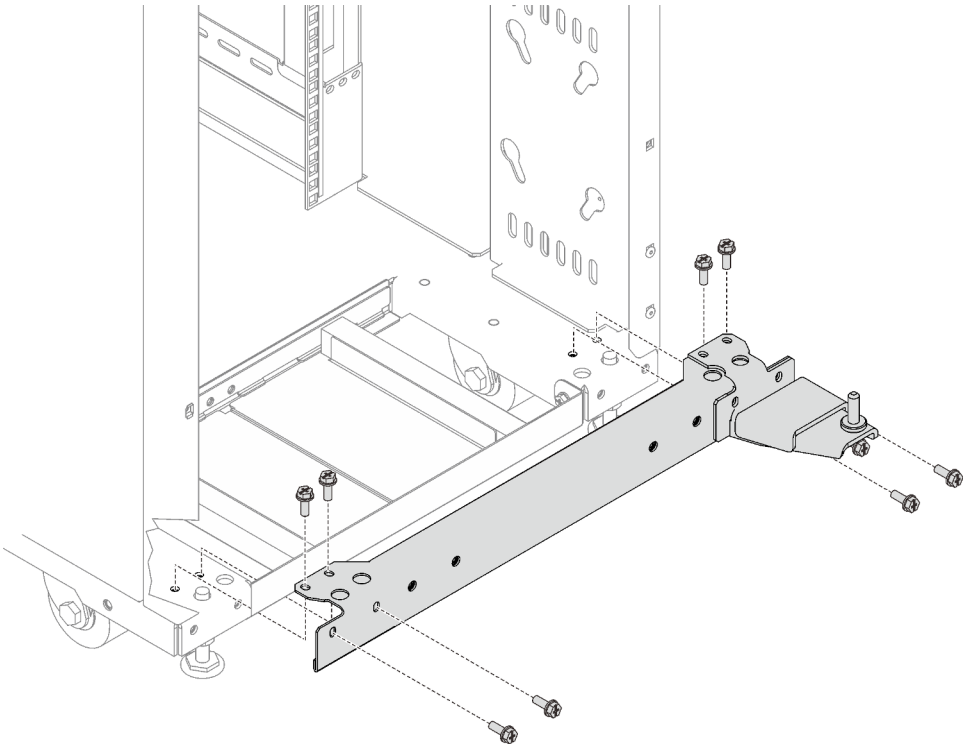


Figure 67. Installing the bottom hinge assembly

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

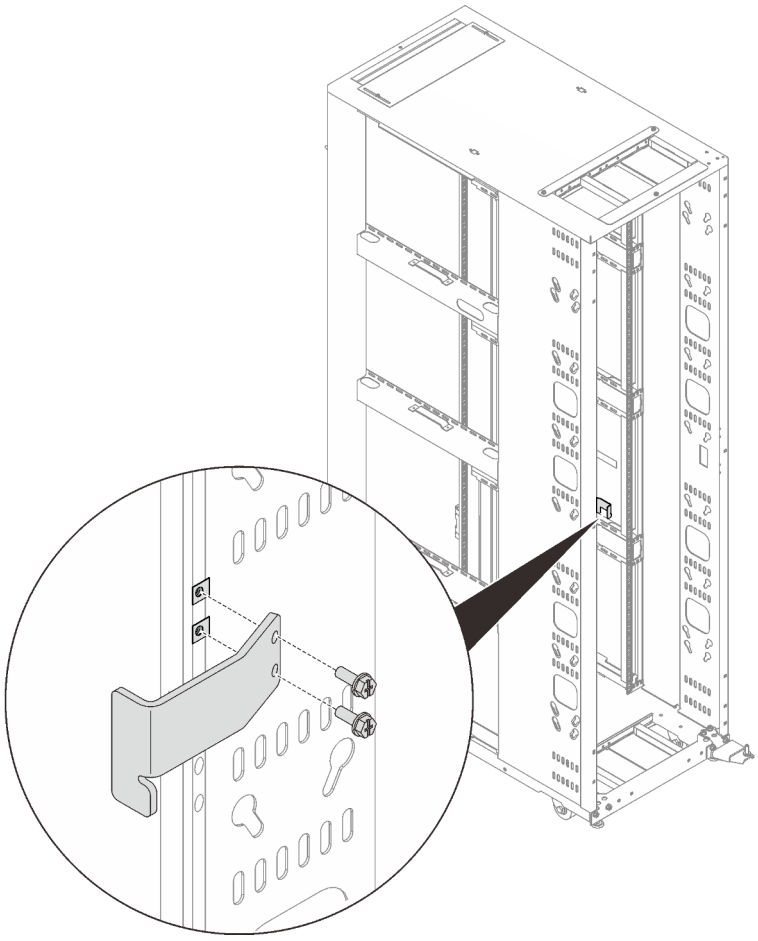


Figure 68. Installing the latch plate

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

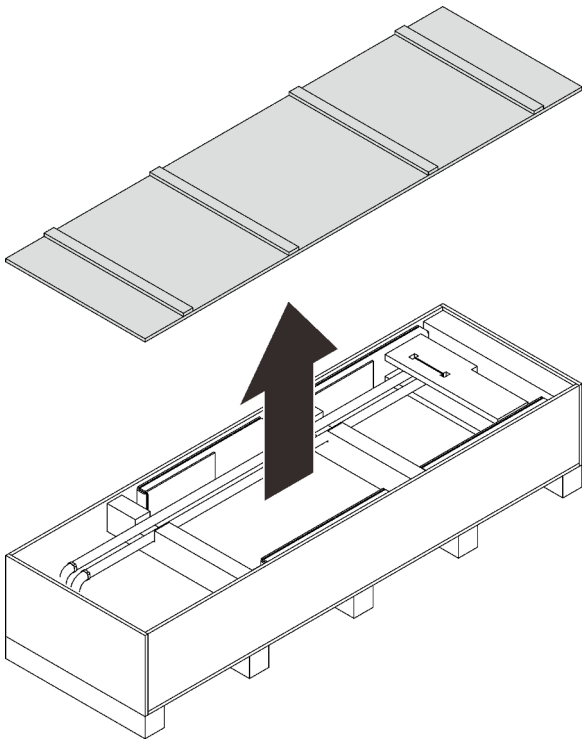


Figure 69. Removing the cover of the box

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

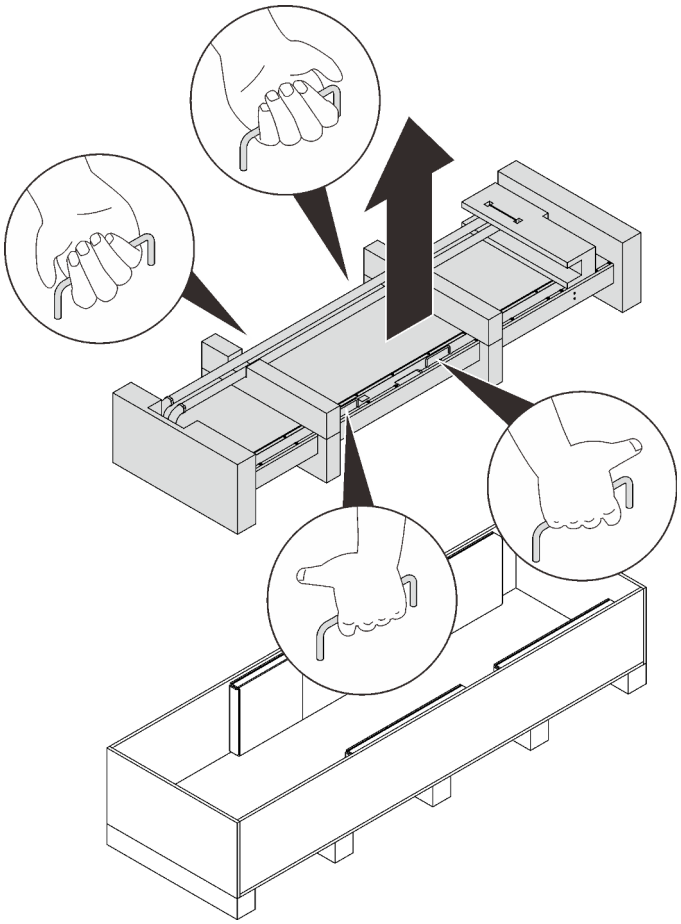


Figure 70. Removing the heat exchanger

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

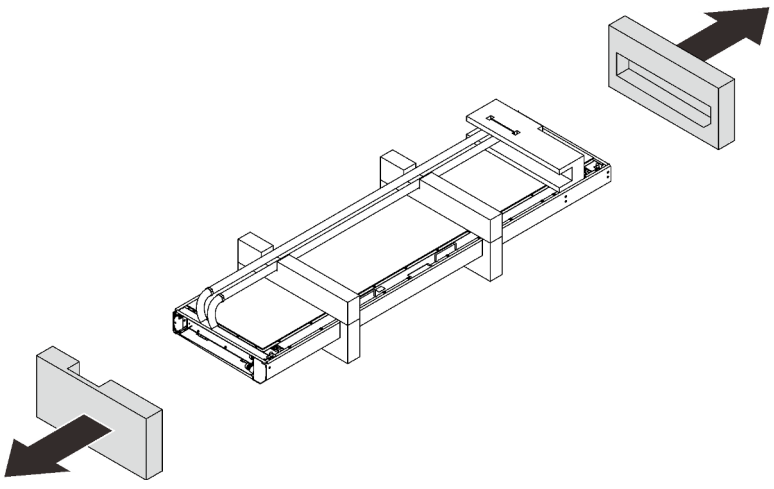


Figure 71. Removing the packing materials

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

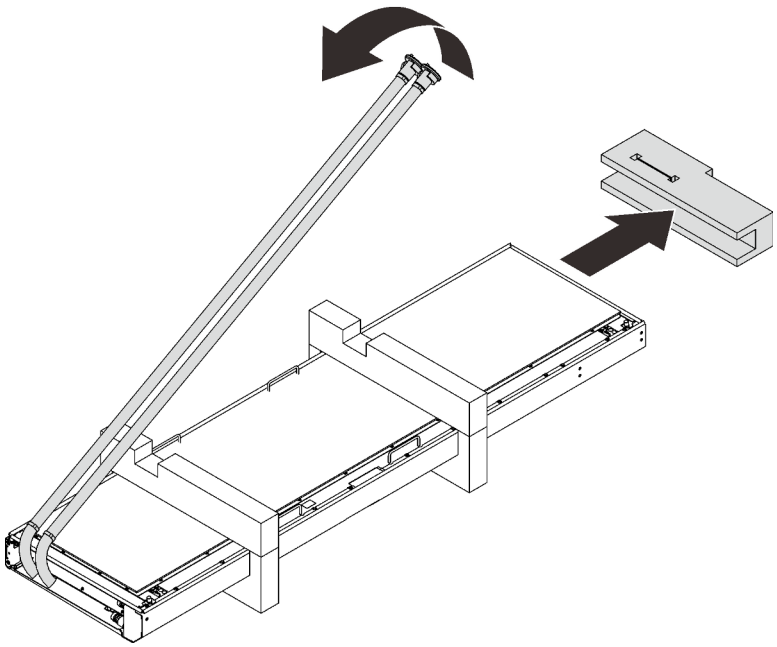


Figure 72. Removing the retaining material

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

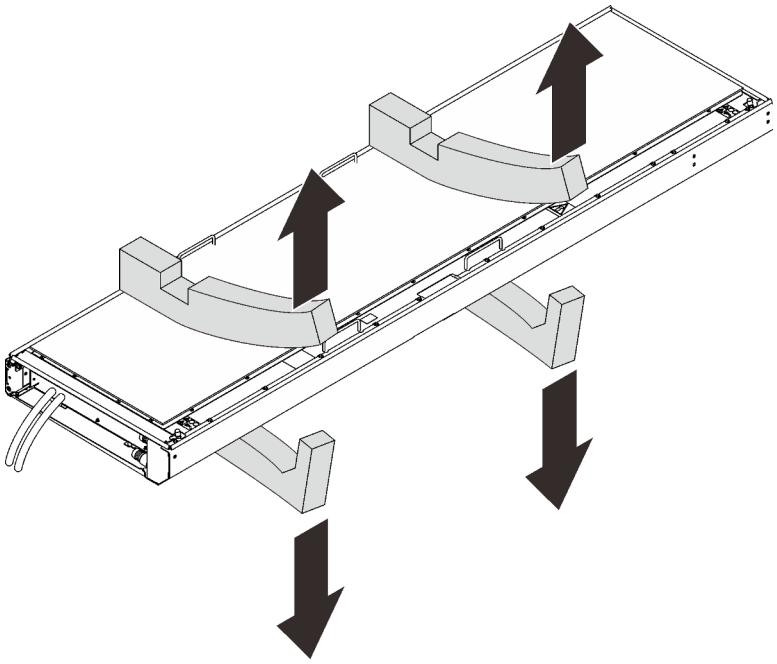


Figure 73. Removing the packing materials

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.

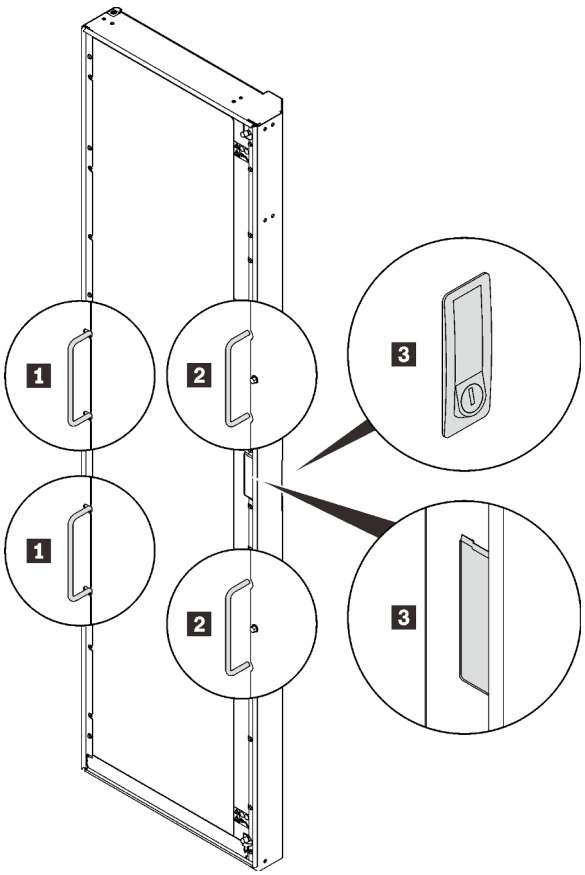


Figure 74. Lifting the heat exchanger with three people

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.

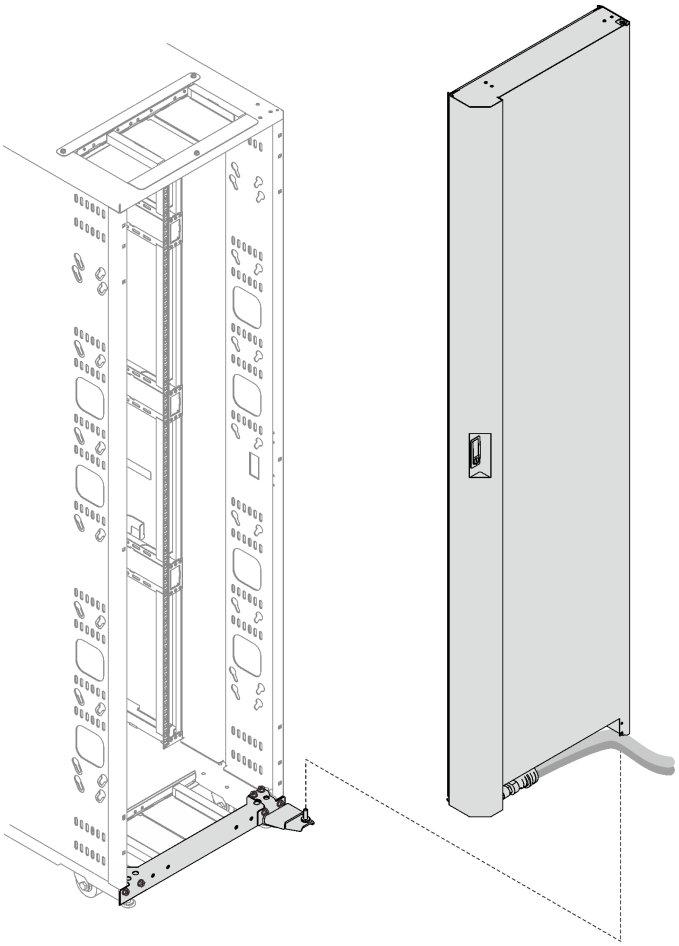


Figure 75. Installing the heat exchanger to the rack cabinet

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

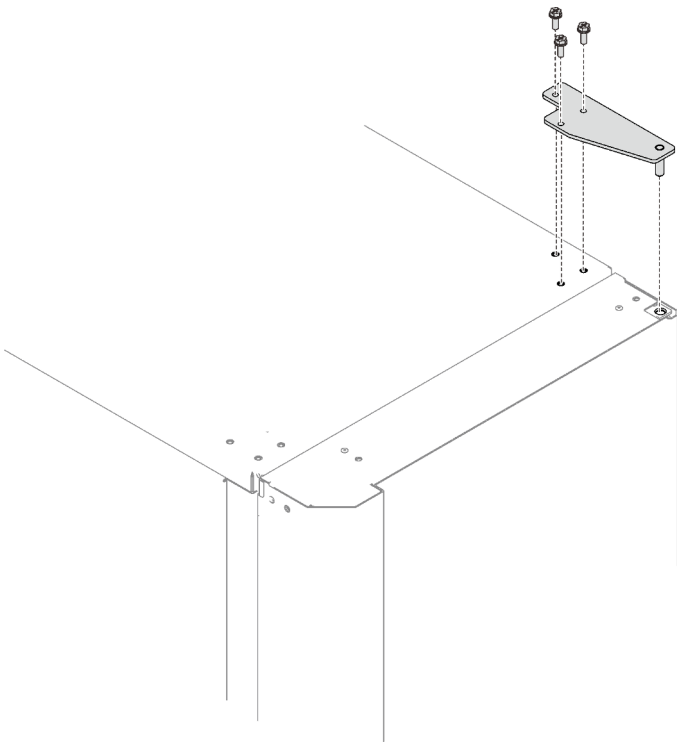


Figure 76. Installing the top hinge bracket

After this task is completed

Proceed to "Fill the heat exchanger with water" on page 73.

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
- Peroxidecured 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**

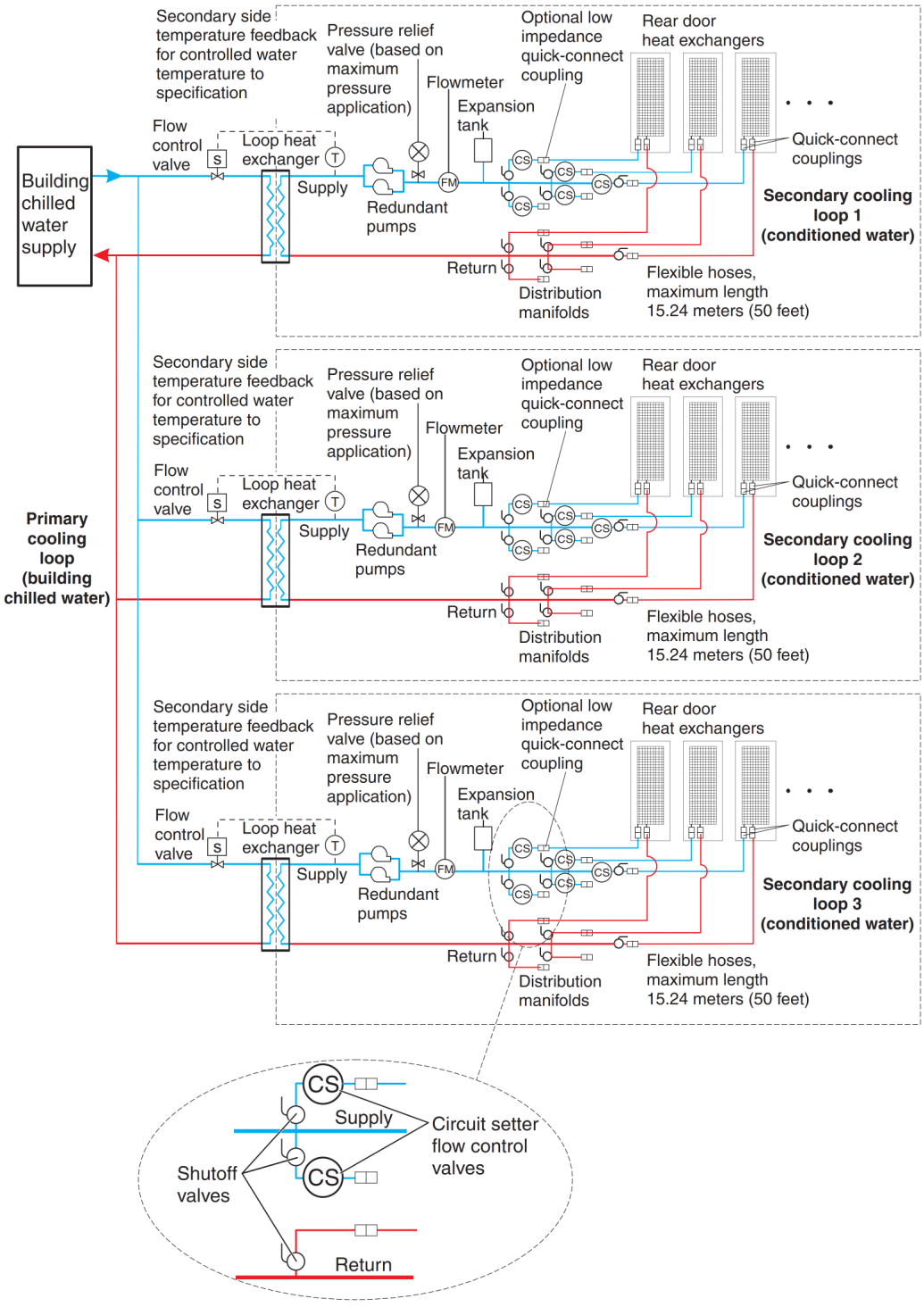


Figure 77. Primary and secondary cooling loops

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**

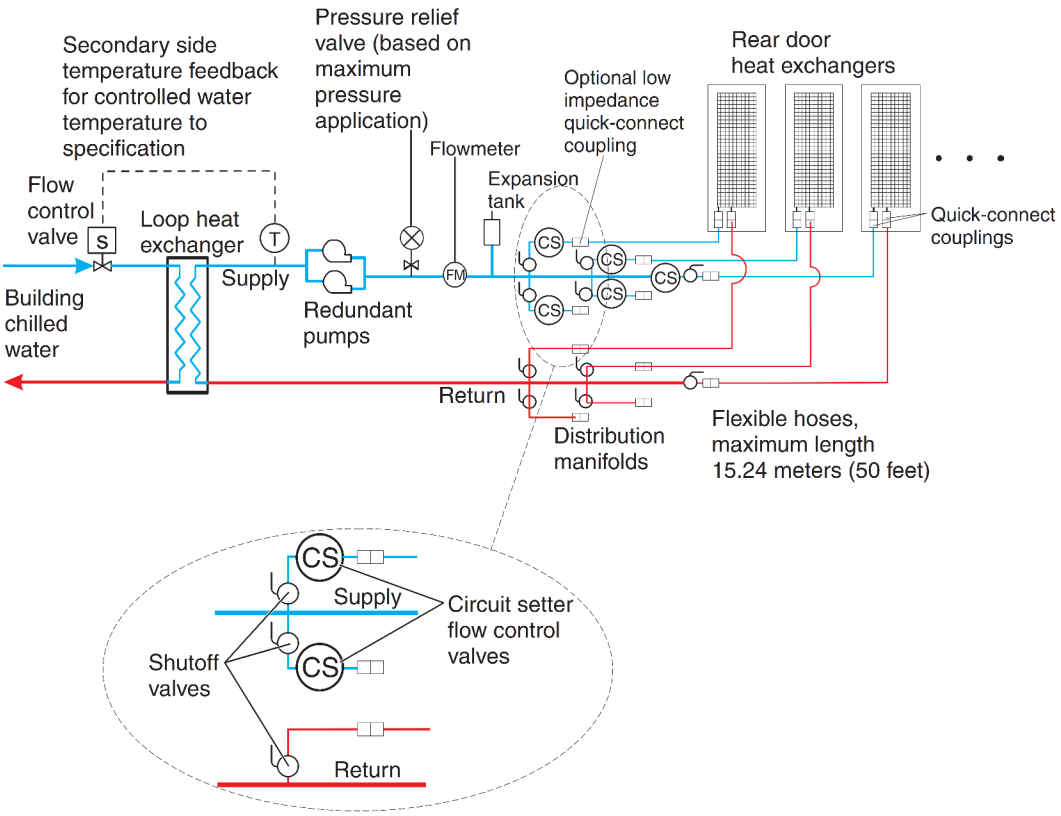


Figure 78. Coolant distribution unit with a fabricated facilities solution

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**

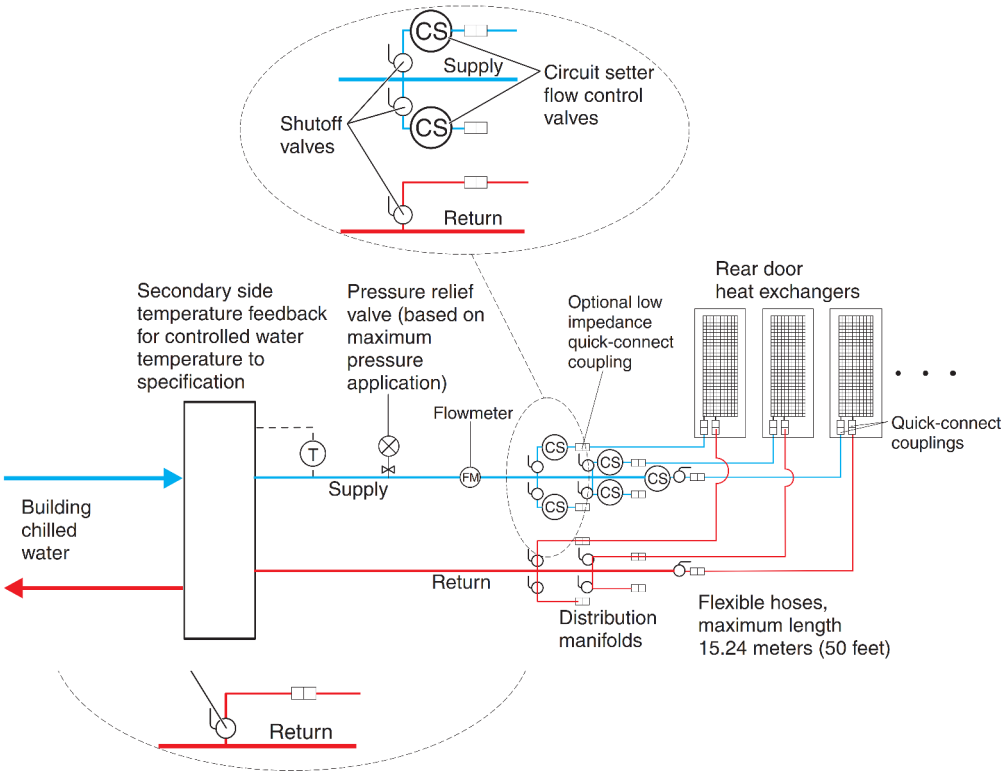


Figure 79. Coolant distribution unit that uses off-the-shelf supplier solutions

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**

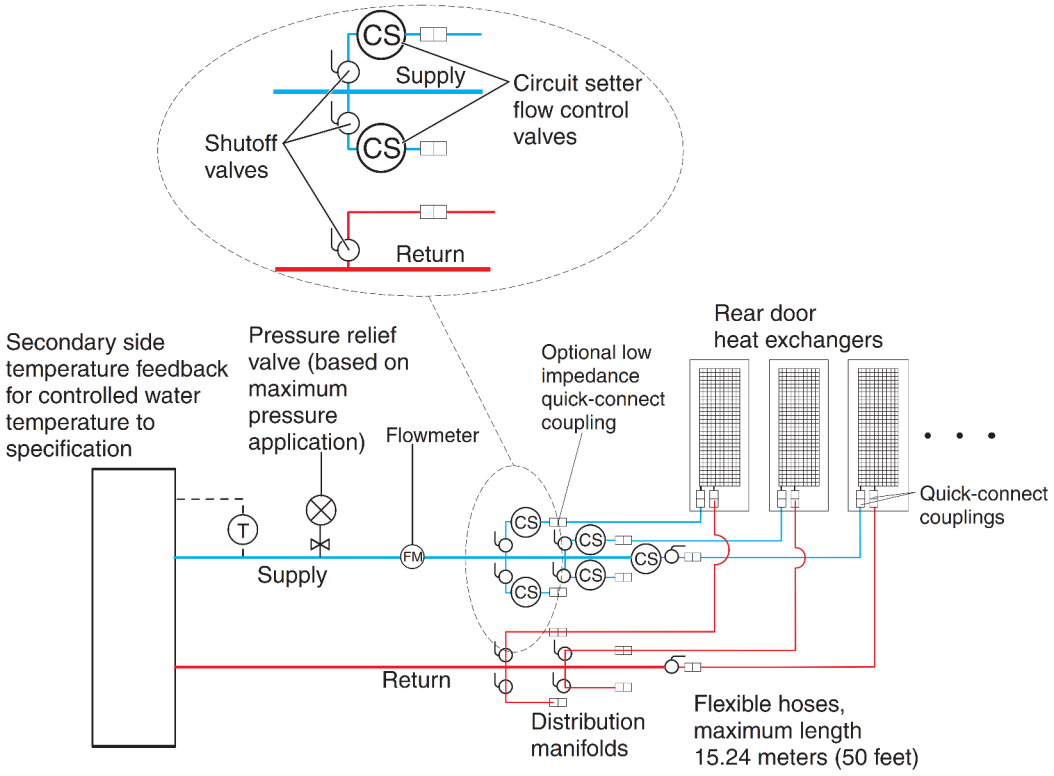


Figure 80. Coolant distribution unit that uses off-the-shelf supplier solutions

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 81 “The following figure” on page 71 shows another layout for multiple water circuits.

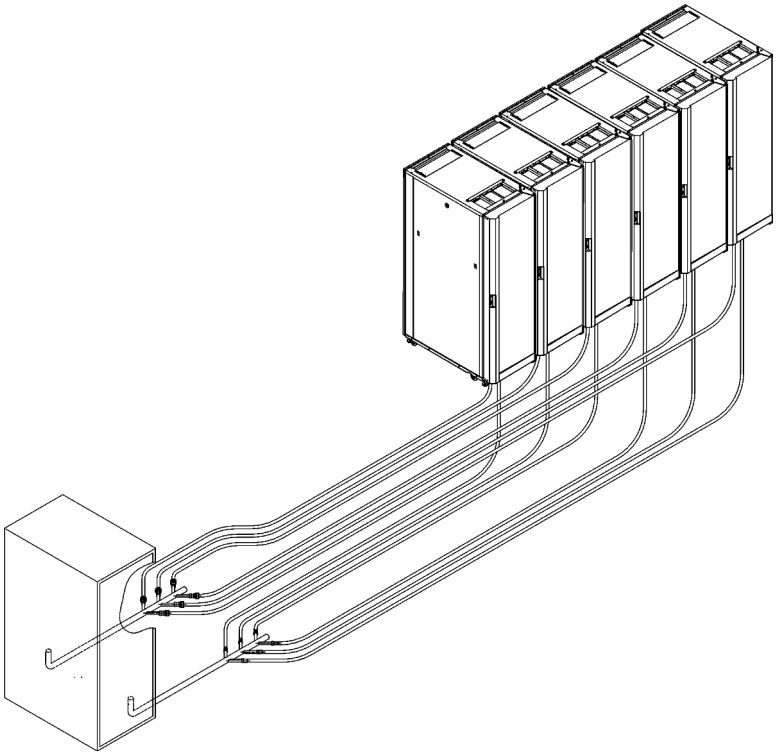


Figure 81. Typical central manifold (at a central location for multiple water circuits)

Figure 82 “The following figure” on page 72 shows an extended manifold layout.

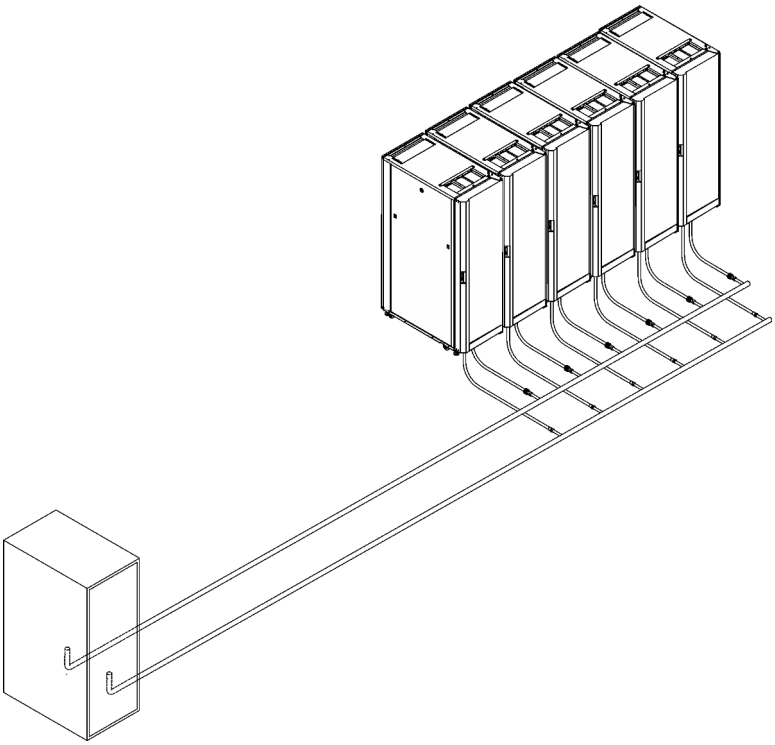


Figure 82. Typical extended manifold (along aisles between racks)

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 passivated 300-L series stainless steel or brass with less than 30% zinc content. The coupling size is 19 mm (0.75 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.

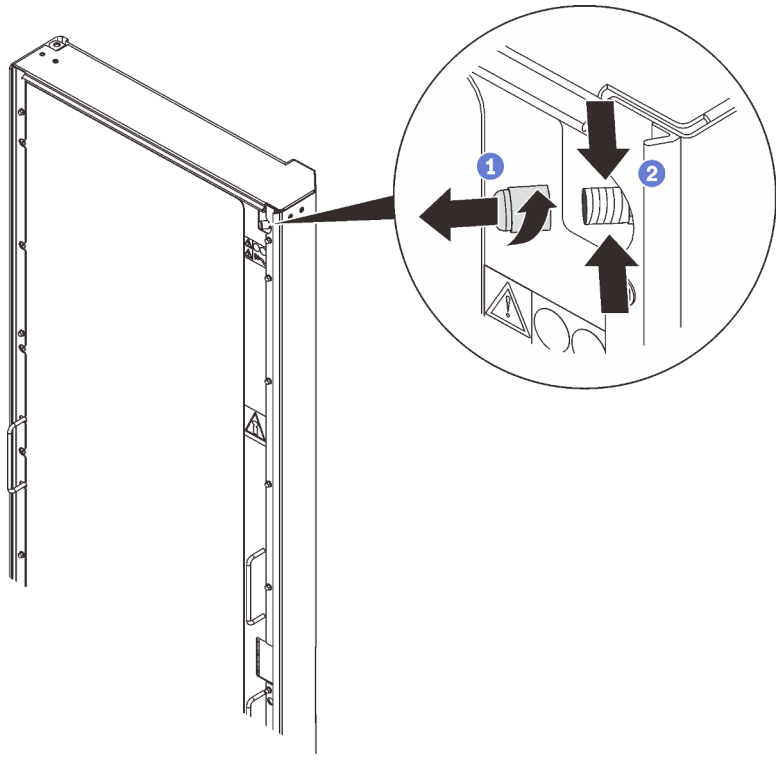


Figure 83. Purging nitrogen

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.

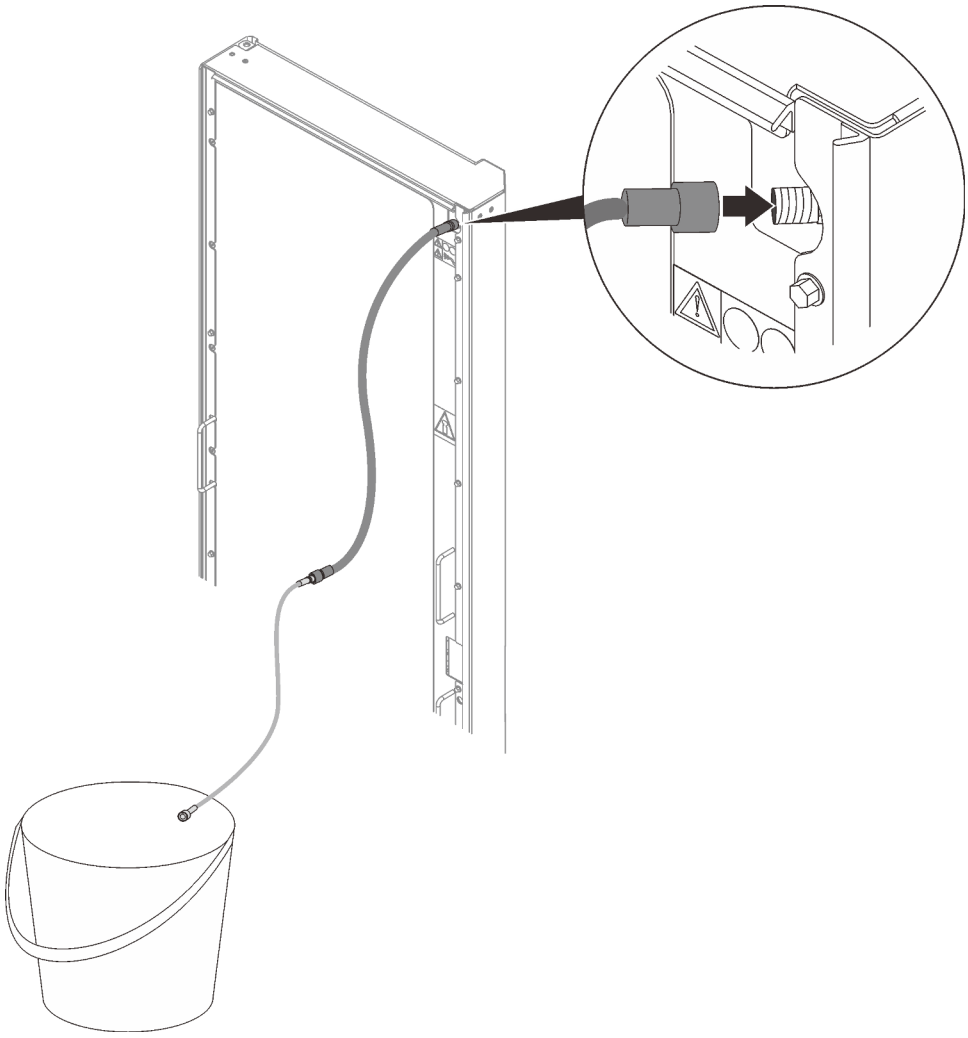


Figure 84. Installing the air-purging tool

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

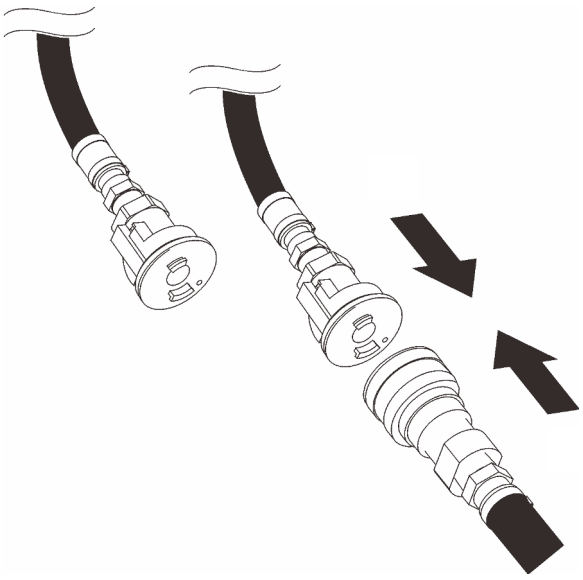


Figure 85. Connecting manifolds

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.

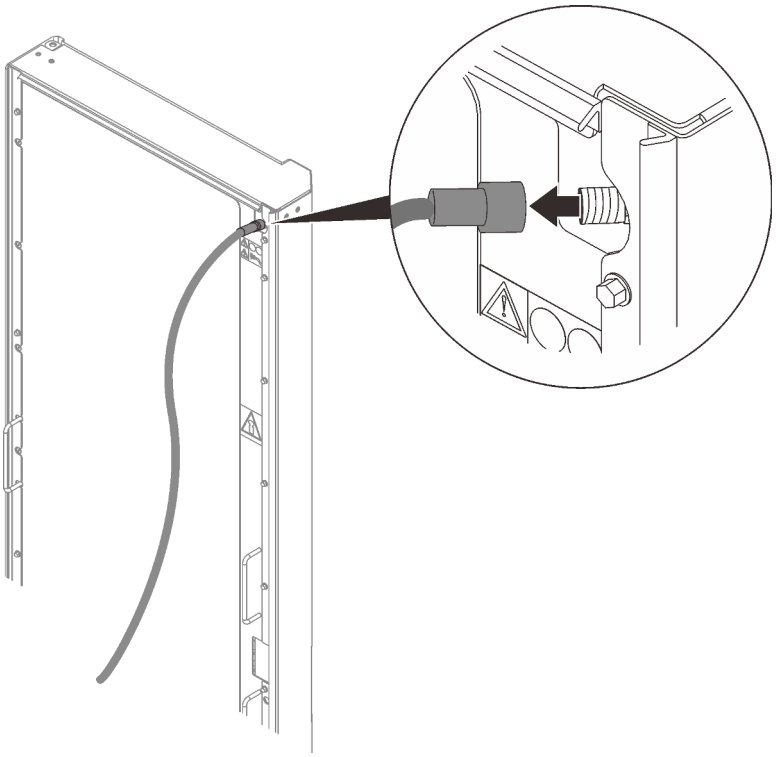


Figure 86. Removing the air-purging tool

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

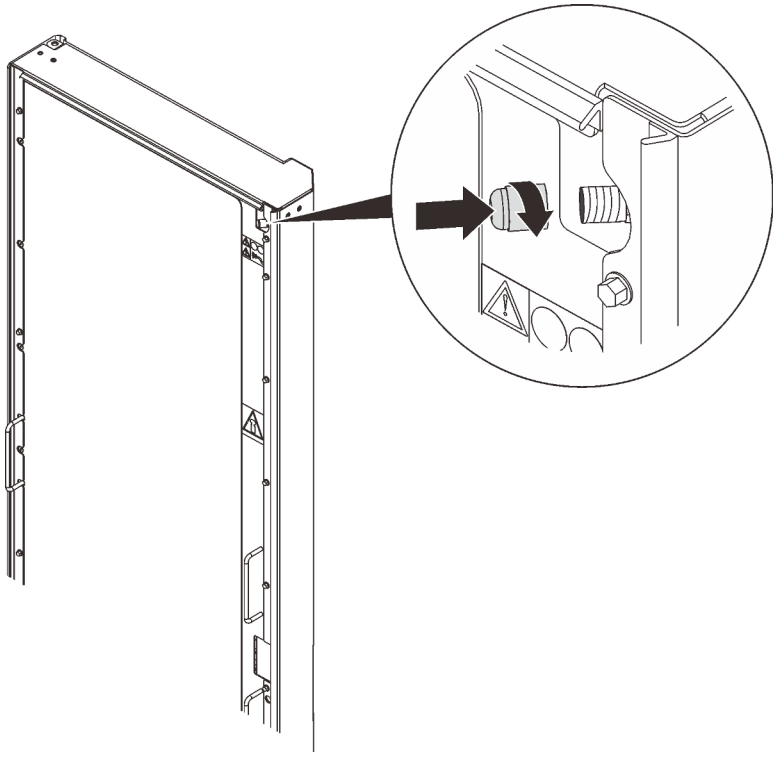


Figure 87. Installing the valve cap

Instal 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:

- "Instal a 0U device" on page 78
- "Install a 1U PDU or console switch to the rack side" on page 79
- "Instal a 1U device into the side pocket" on page 80

Instal 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.

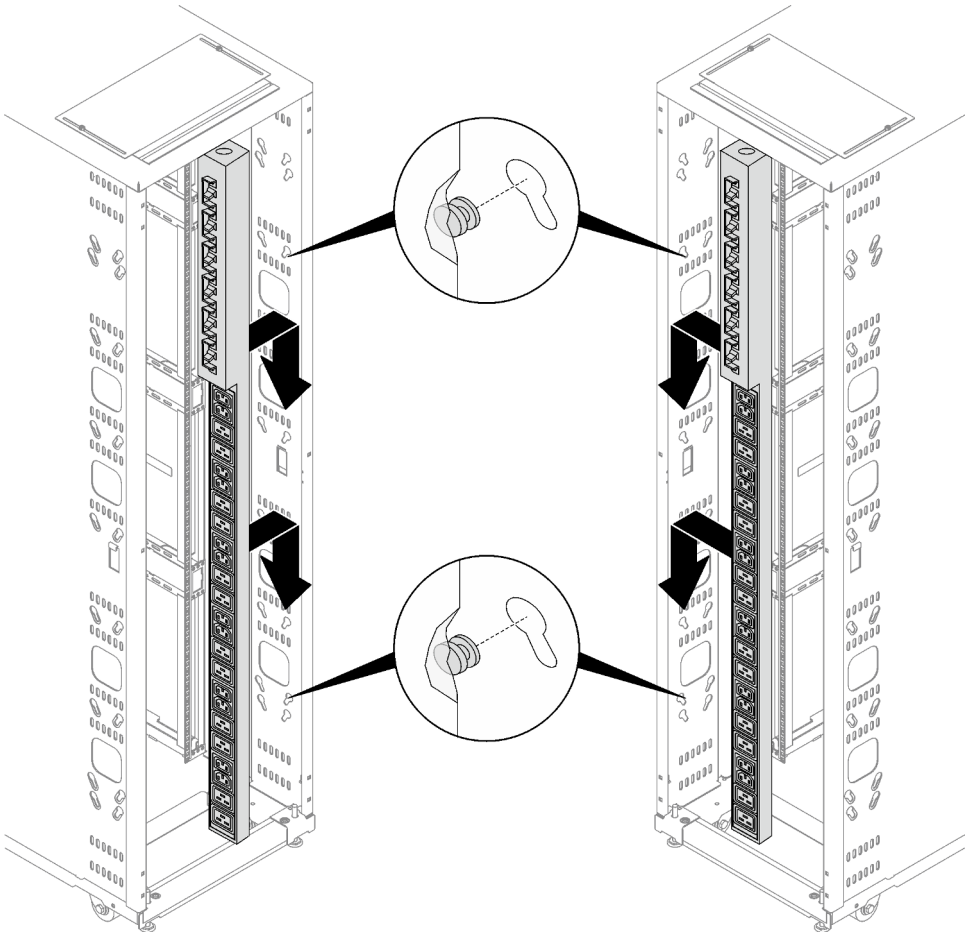


Figure 88. Installing a 0U PDU

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.

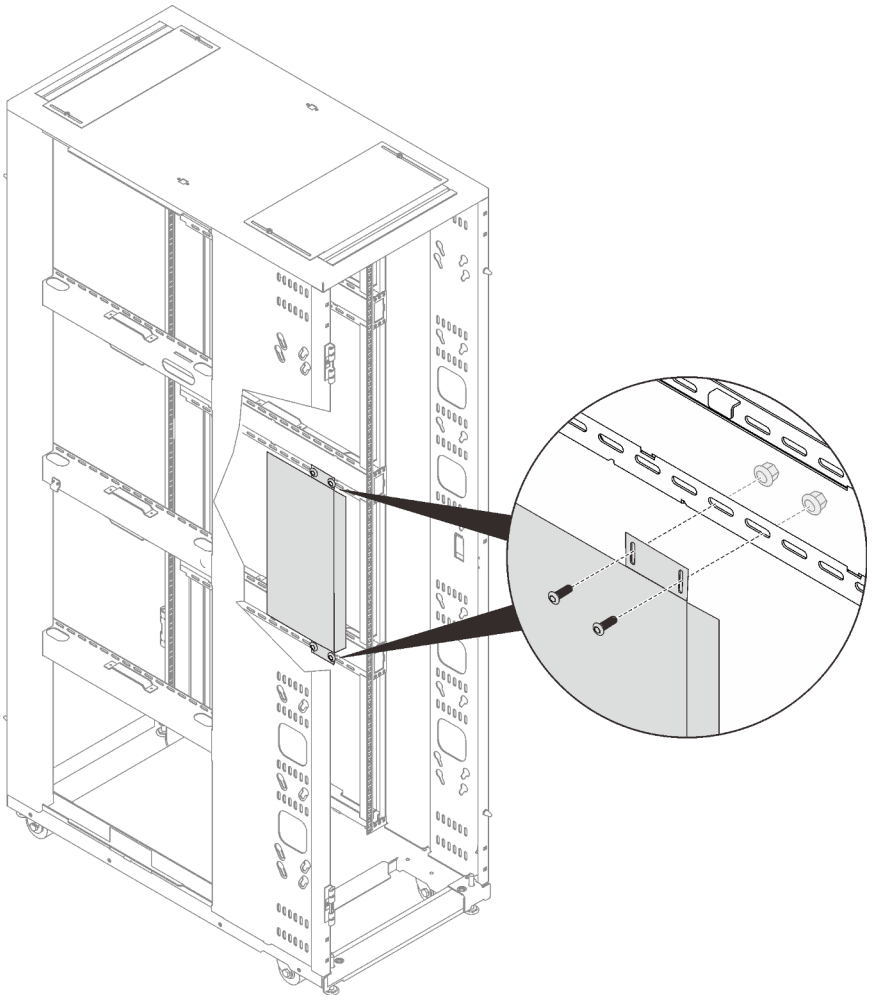


Figure 89. Installing a 1U device into the rack side

Instal 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 91).

Step 2. Refer to the document that comes with the device, and install the mounting brackets if necessary.

Step 3. Install the device.

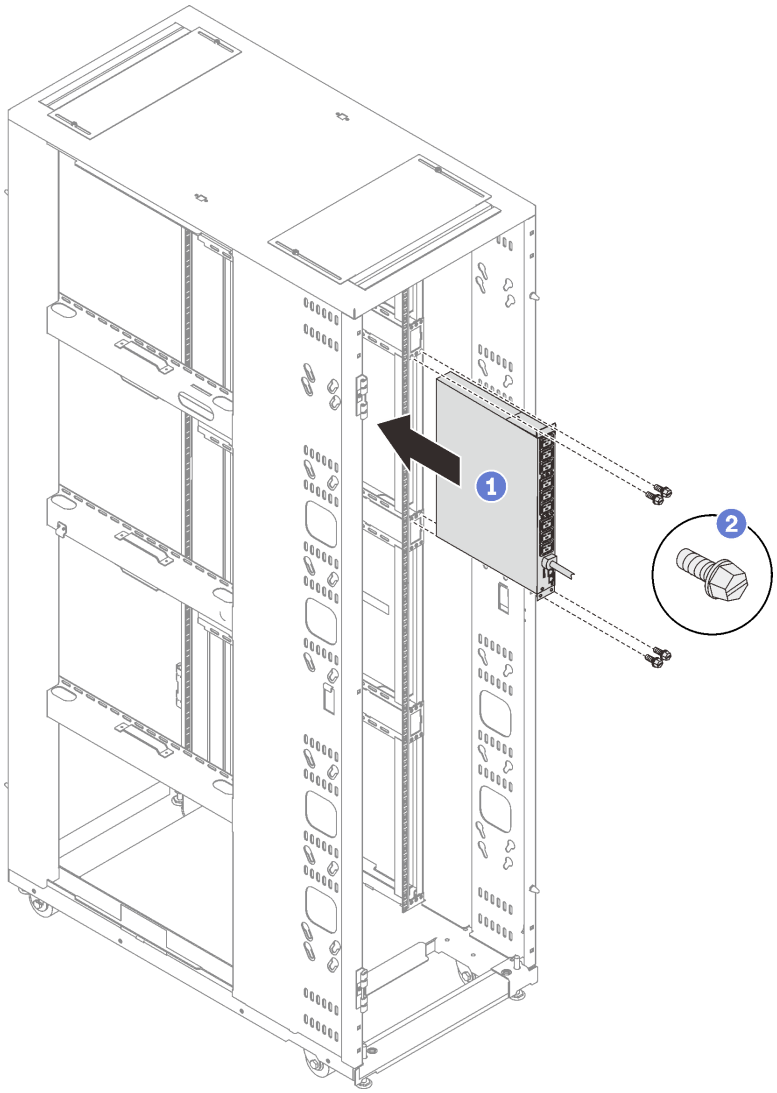


Figure 90. Installing a 1U PDU or console switch

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 91).

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 83
- “Cable access bar on the bottom of the rack cabinet” on page 83
- “Cable access openings on the top of the rack cabinet” on page 84
- “Cable access openings on extension panel” on page 87
- “Cable strap module” on page 86
- “Cable access openings on extension panel” on page 87

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.

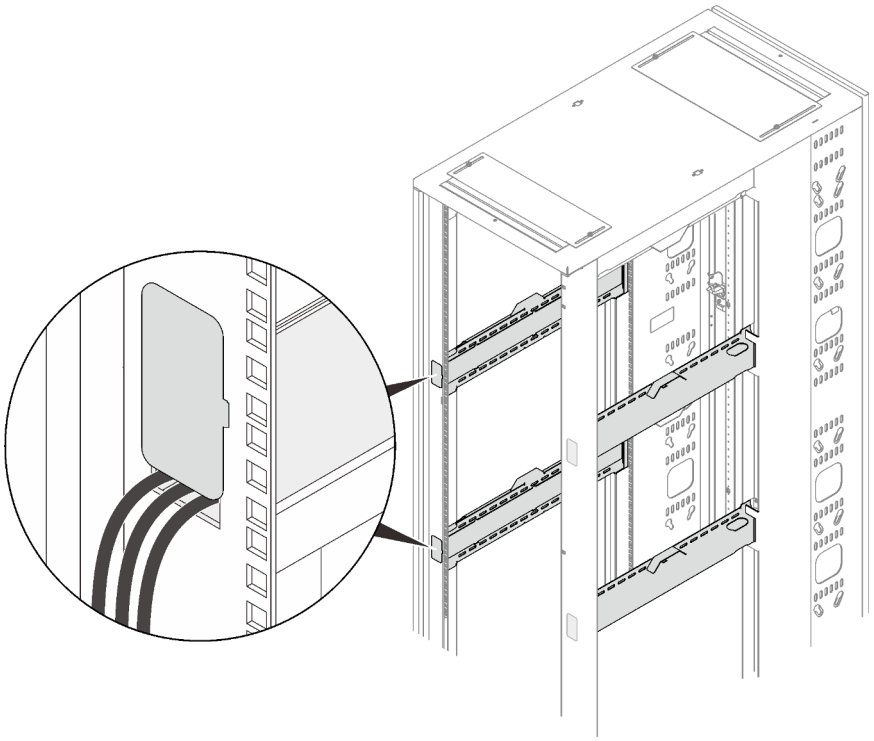


Figure 91. Front-to-rear cable channels

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.

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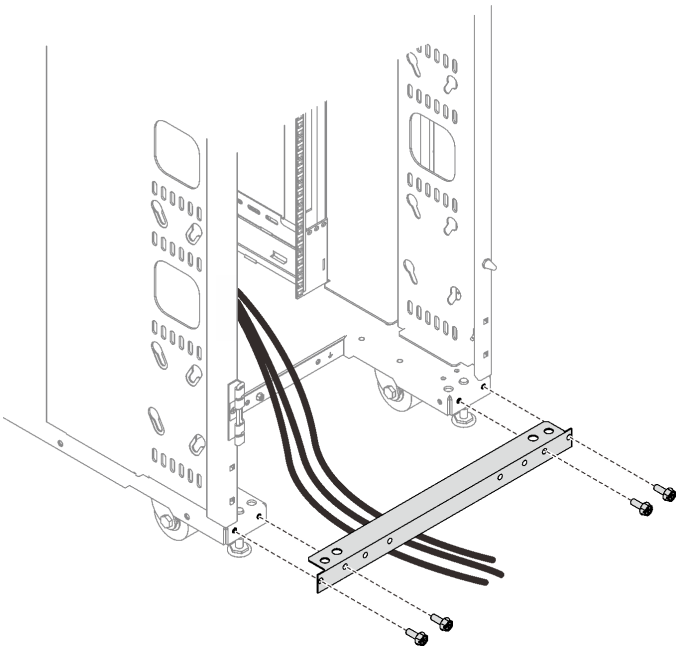
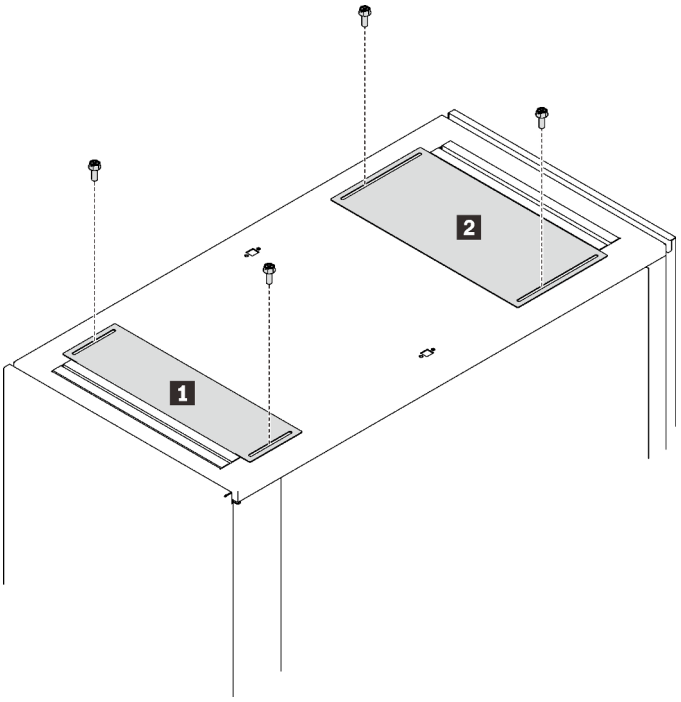


Figure 92. Cable access bar on the bottom of the rack cabinet

Cable access openings on the top of the rack cabinet



1 Front cable access cover	2 Rear cable access cover

Figure 93. 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

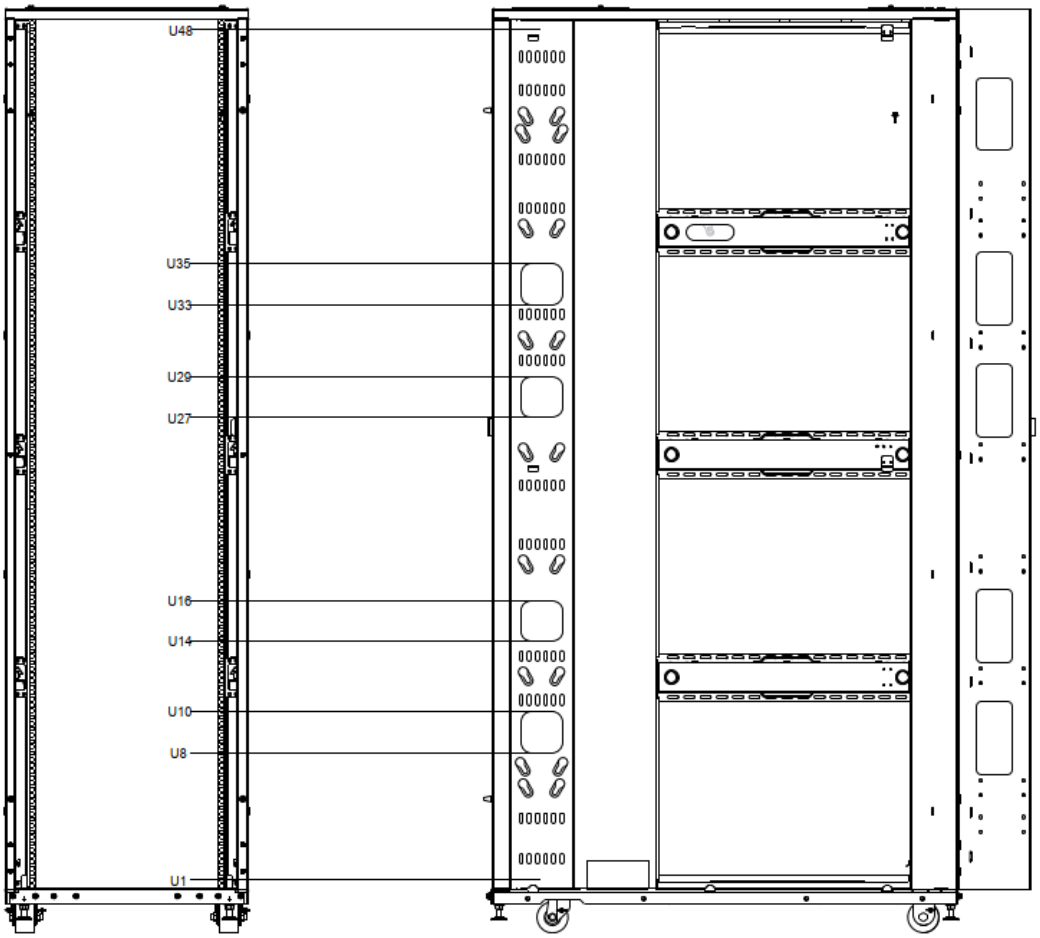


Figure 94. Cable access openings on rear side of the rack cabinet

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

Cable strap module

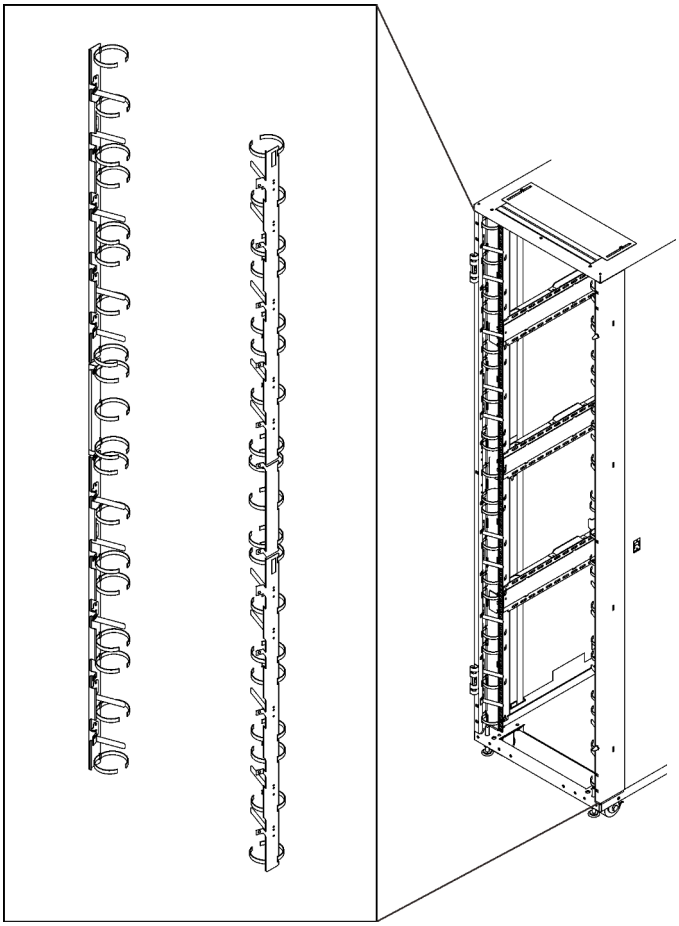


Figure 95. Cable strap module

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

Cable access openings on extension panel

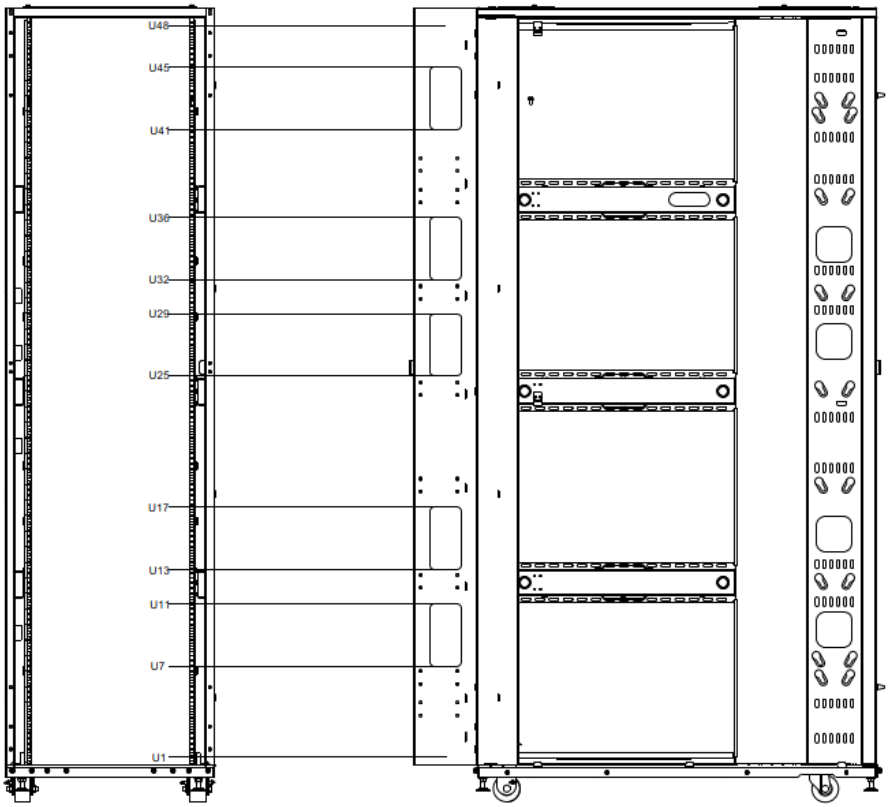


Figure 96. Cable access openings on extension panel

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

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.

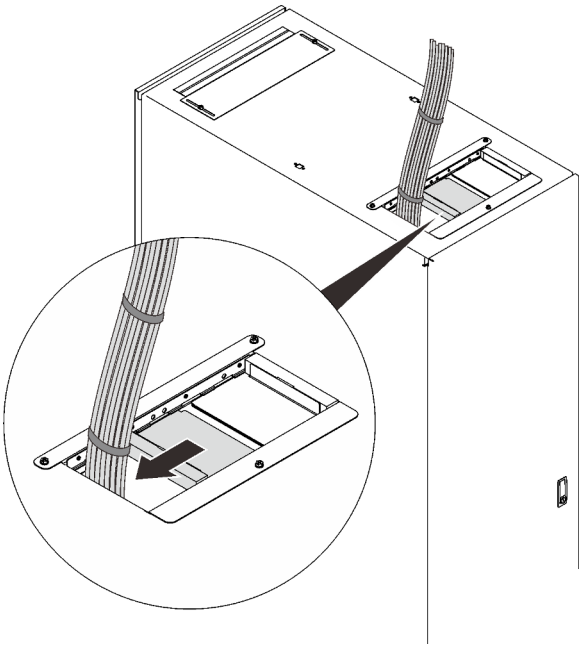


Figure 97. Managing cables with the upper air baffle

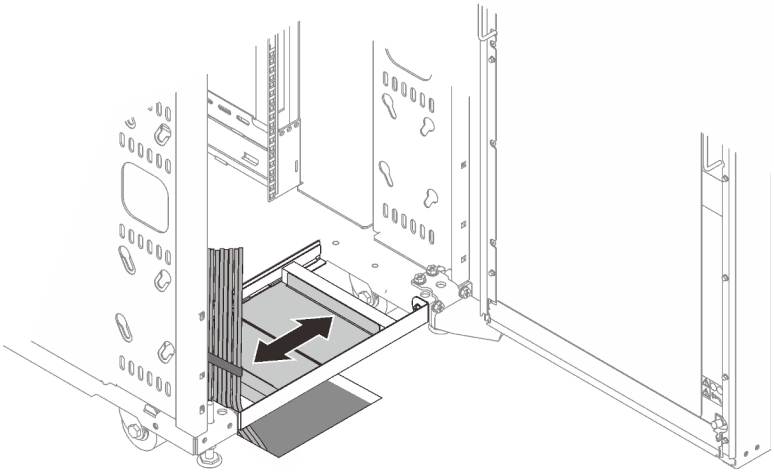


Figure 98. Managing cables with the lower air baffle

- 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.

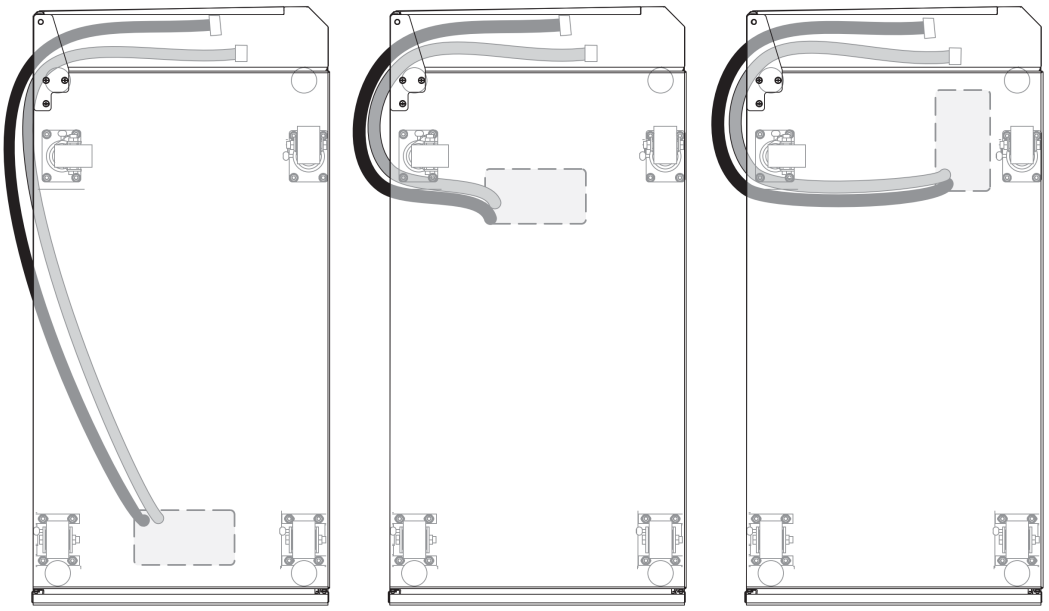
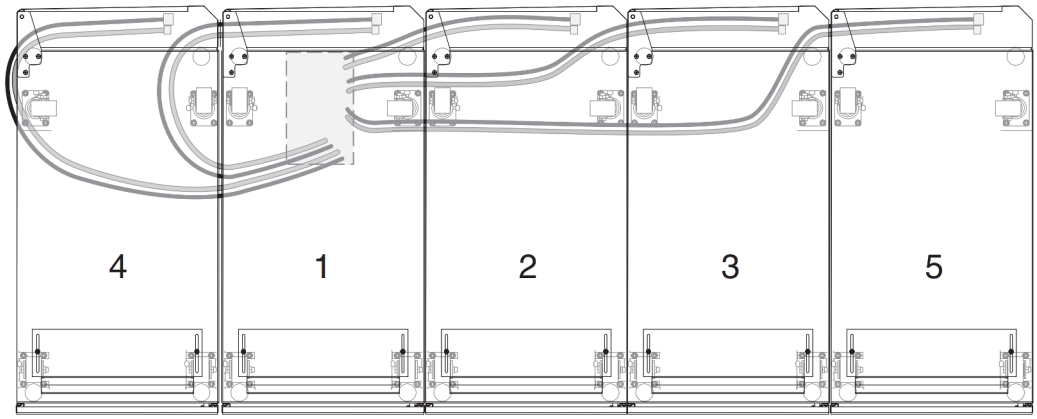


Figure 99. Routing and securing the hoses in a raised-floor environment for individual racks (from the top, looking down)

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 100. 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 9363 rack has sufficient clearance underneath the rack to enable the quick connects 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.

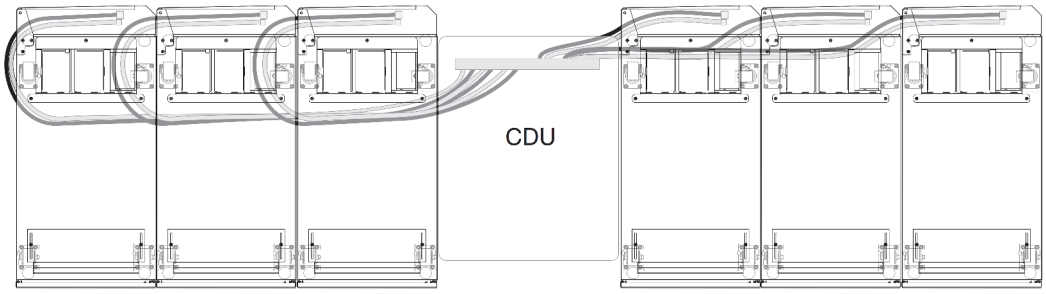


Figure 101. Routing and securing the hoses in raised-floor and non-raised-floor environments (from the top, looking down)

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.

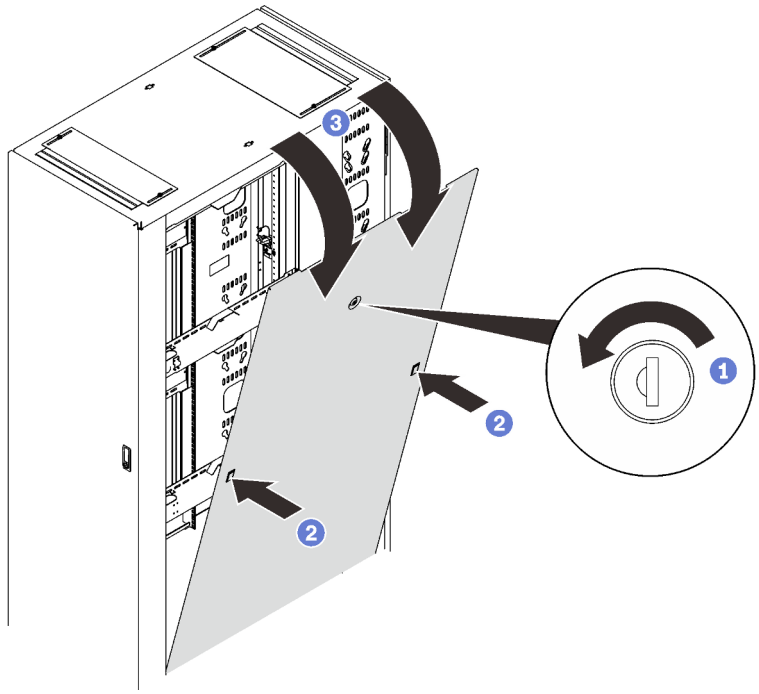


Figure 102. Removing a side cover

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

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Step 1. Install the side cover.

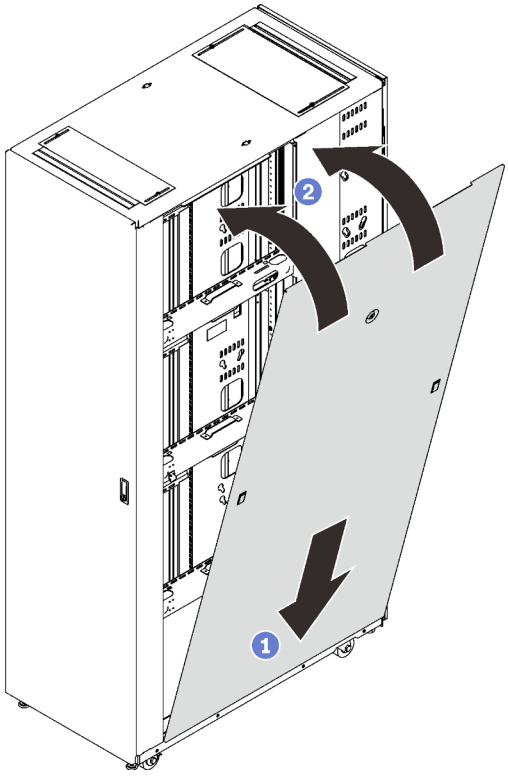

Figure 103. Installing the side cover

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.

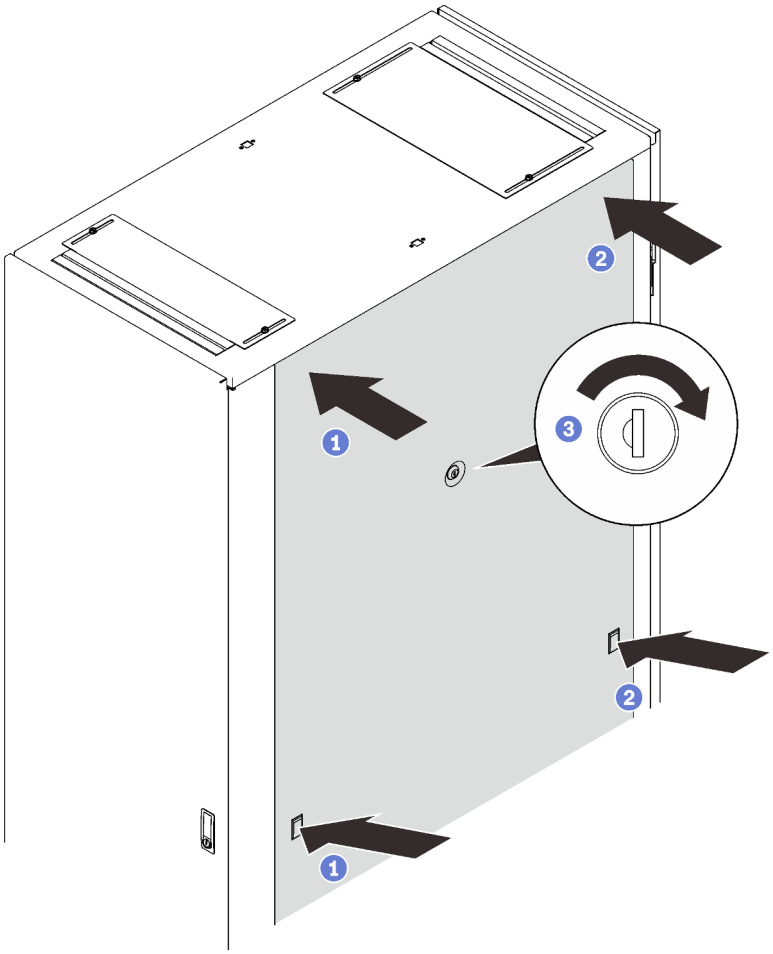

Figure 104. Securing the side cover

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.

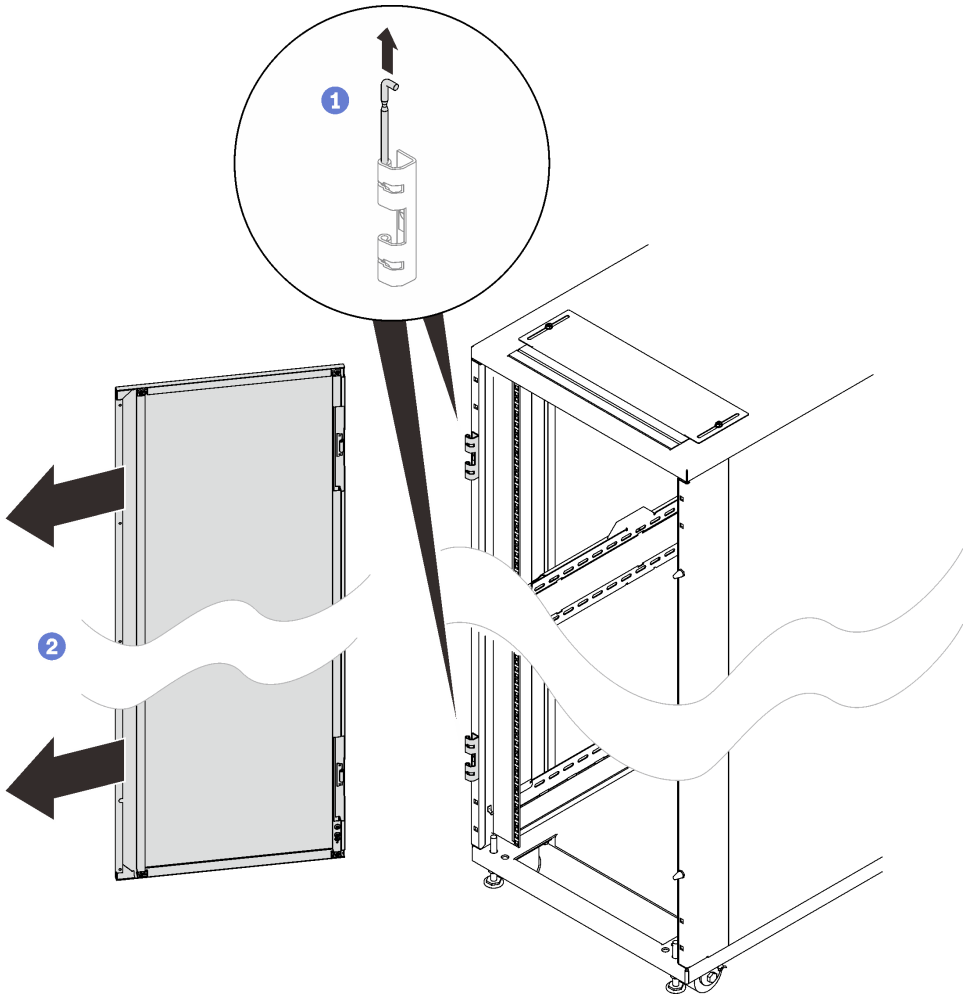

Figure 105. Removing a door

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.

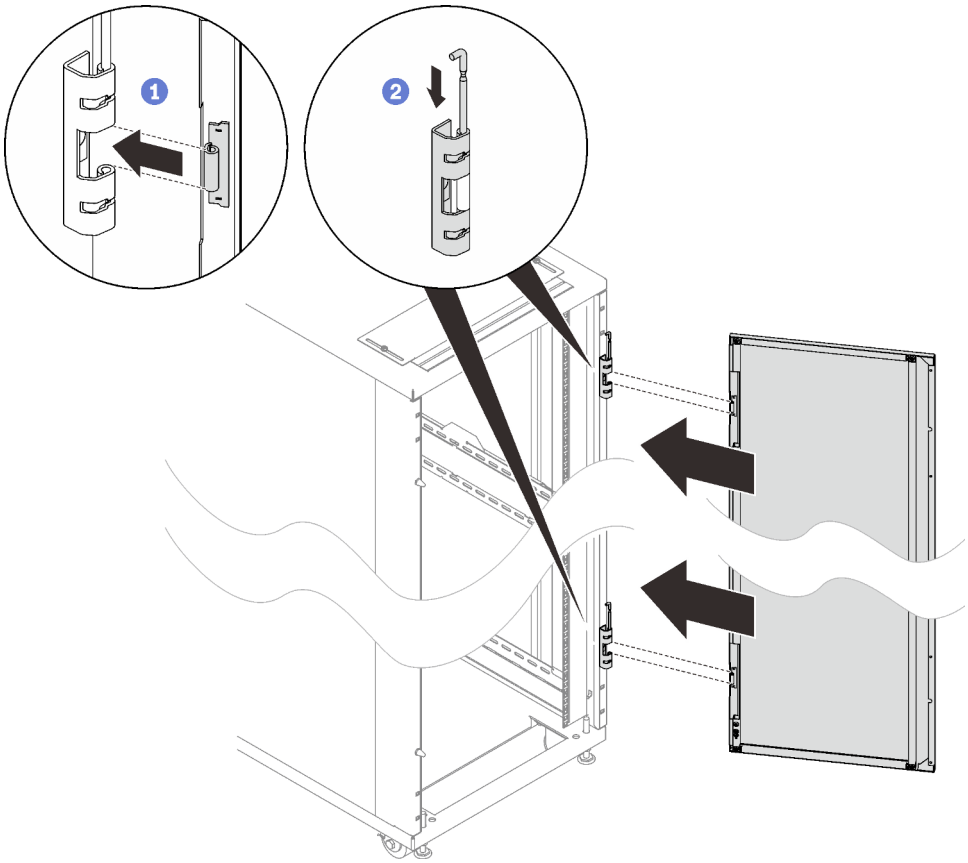

Figure 106. Installing a door

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.

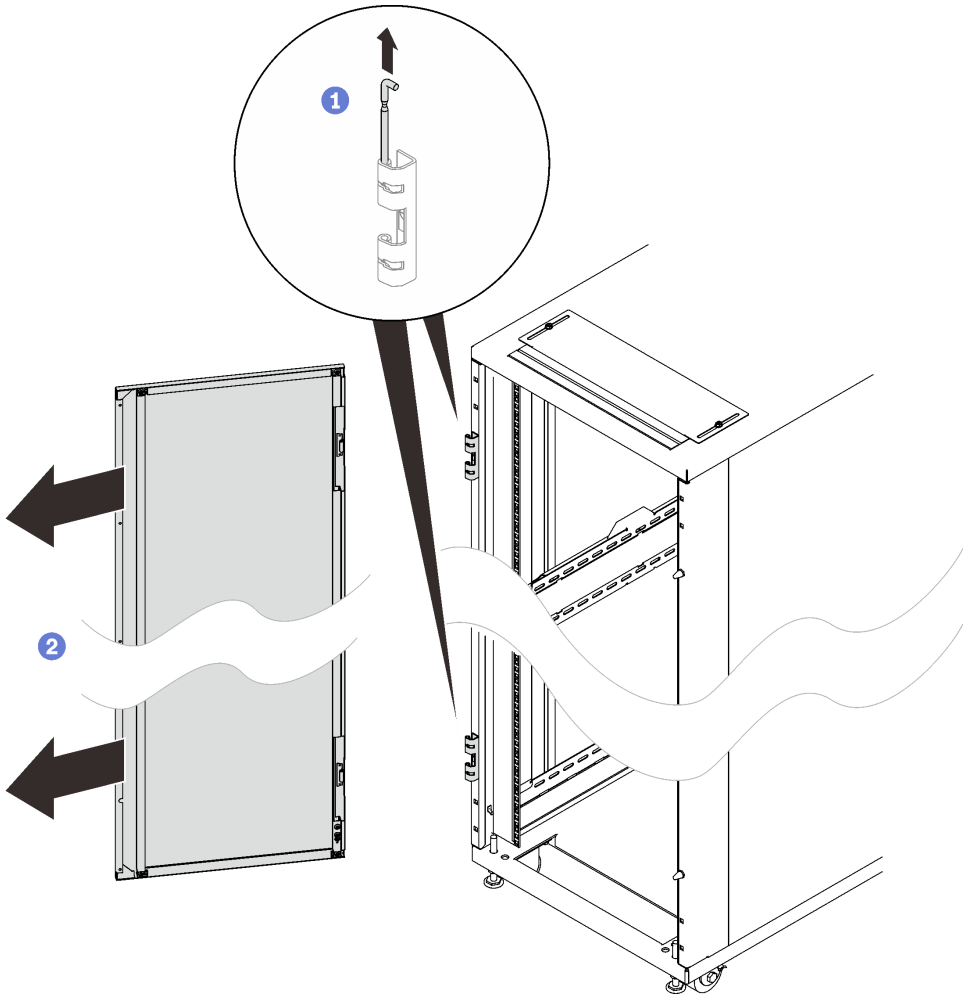

Figure 107. Removing a door

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.

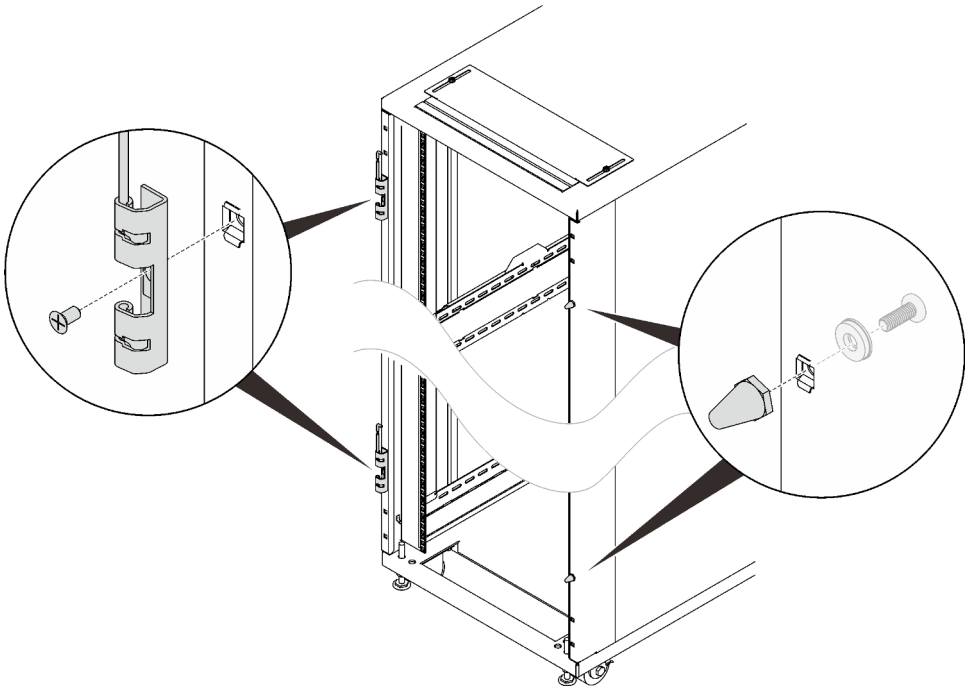

Figure 108. Removing the hinges and the doorstops

Step 3. Reverse the door latch.

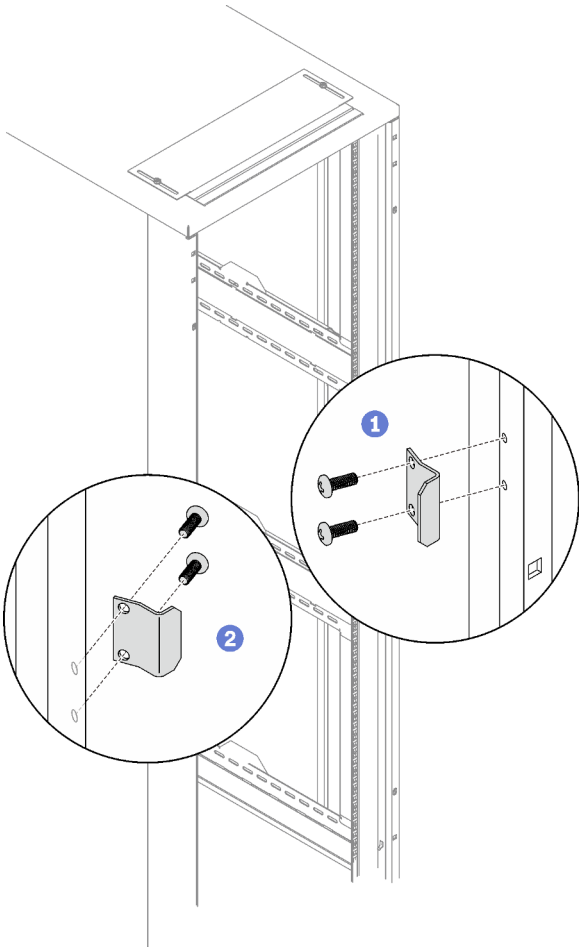

Figure 109. Reversing the door latch

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

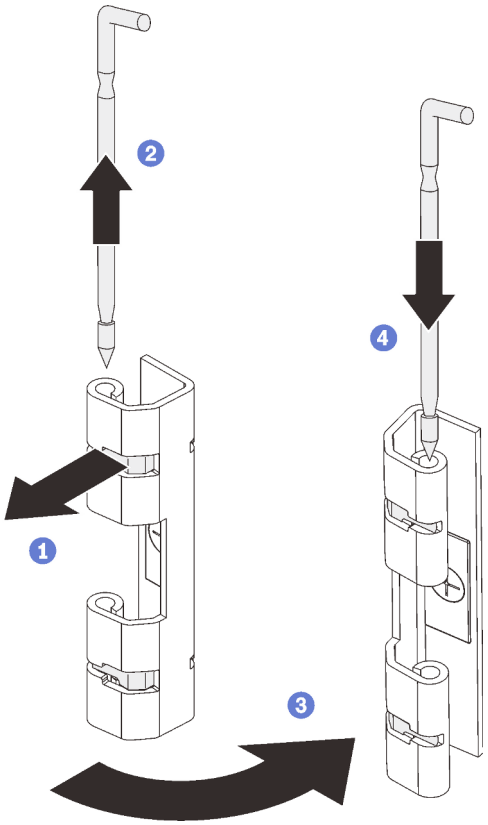

Figure 110. Reversing the hinge orientation

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.

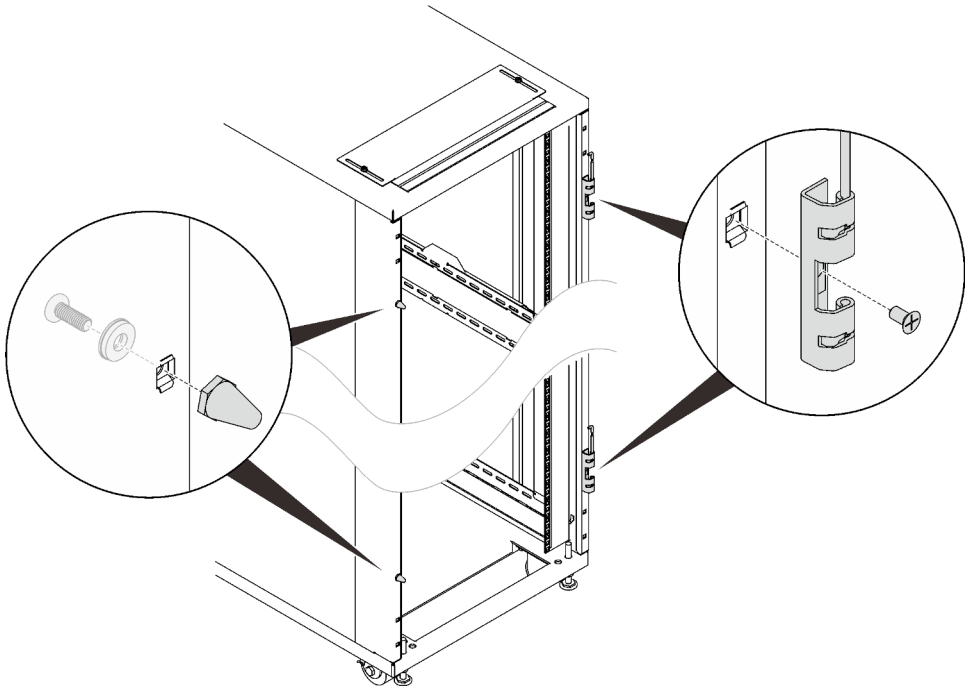

Figure 111. Installing hinges and doorstops

Step 7. Reverse the door handle.

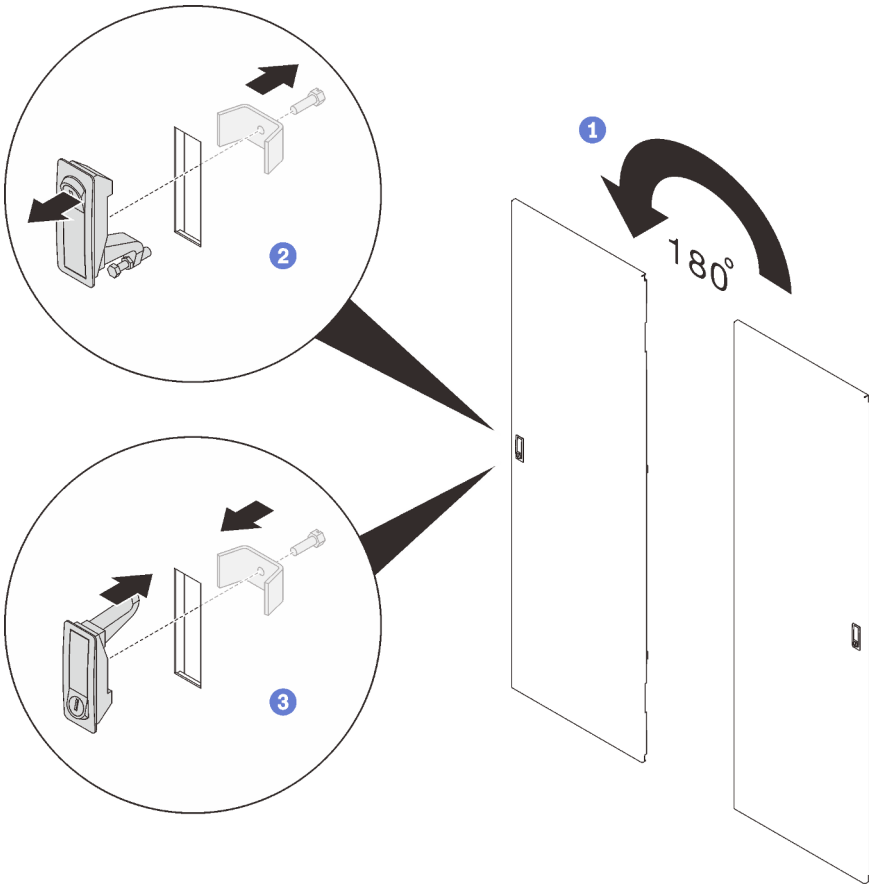

Figure 112. Reversing the door handle

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.

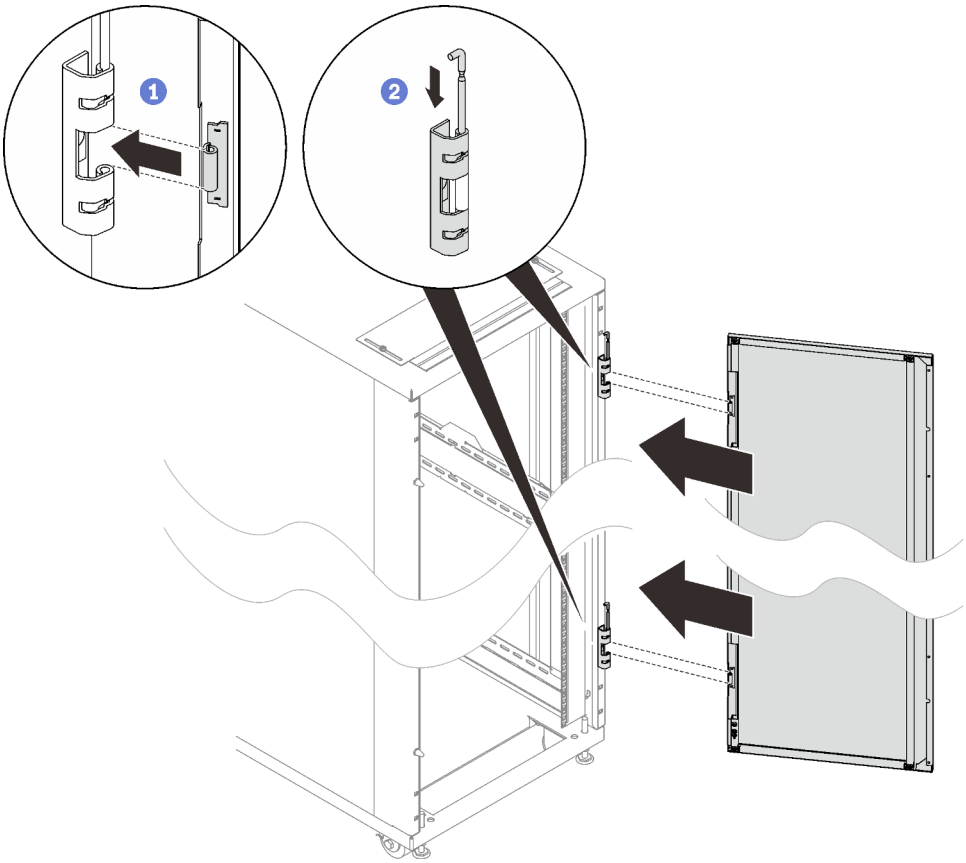

Figure 113. Installing the door

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 eXcahnger for 48U Rack replacement

See this topic to learn how to remove and install Rear Door Heat eXcahnger 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.

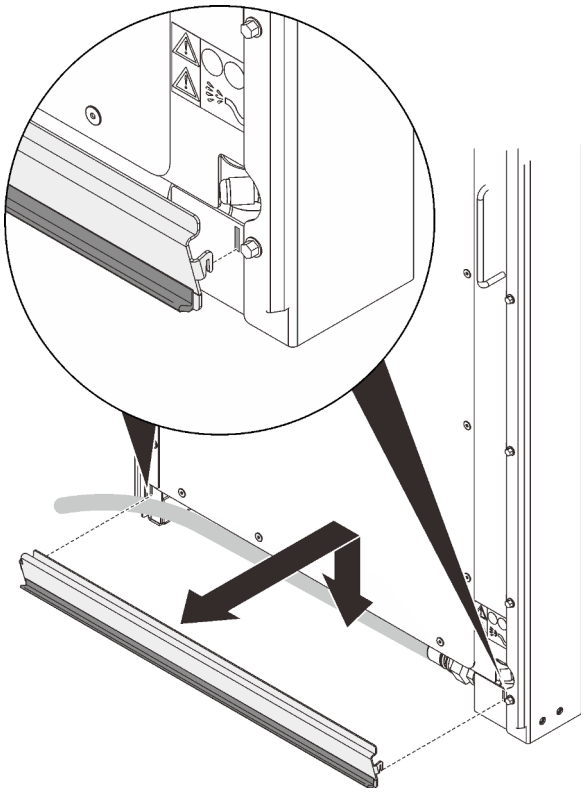

Figure 114. Removing the inner hose access pane

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

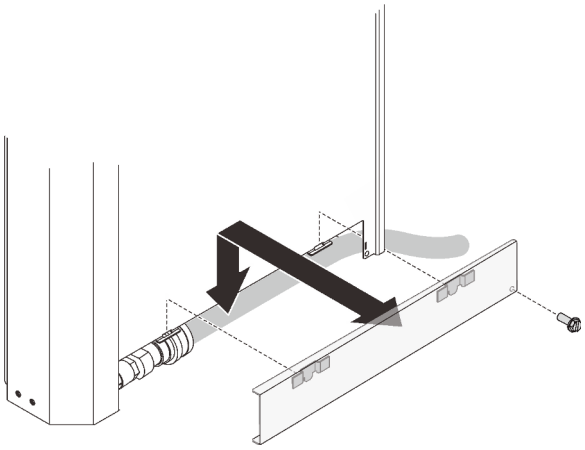

Figure 115. Removing the outer hose access pane

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

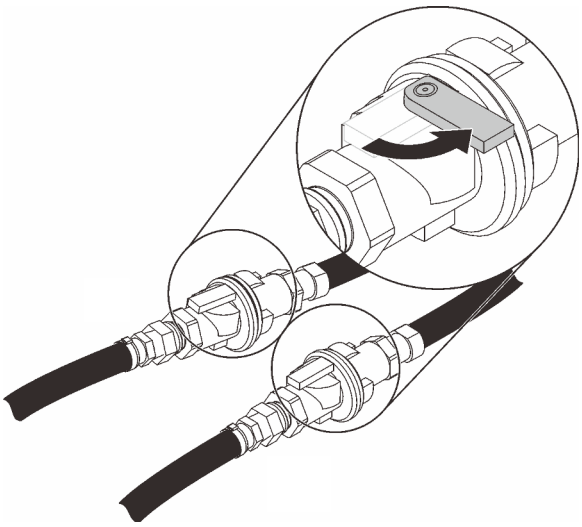

Figure 116. Opening Eaton ball valves

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

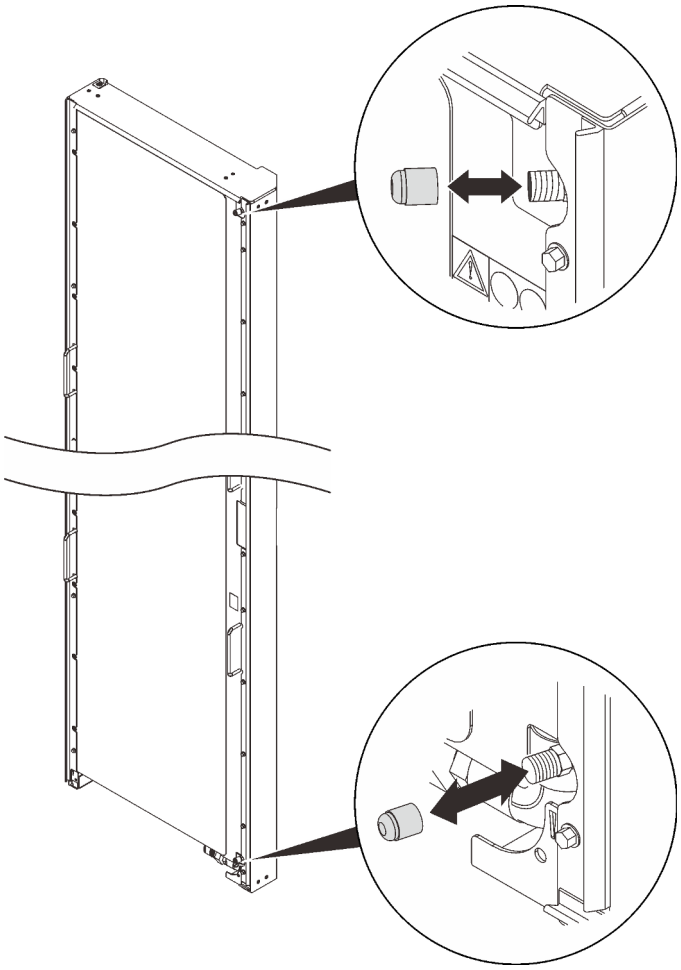

Figure 117. Removing valve caps

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

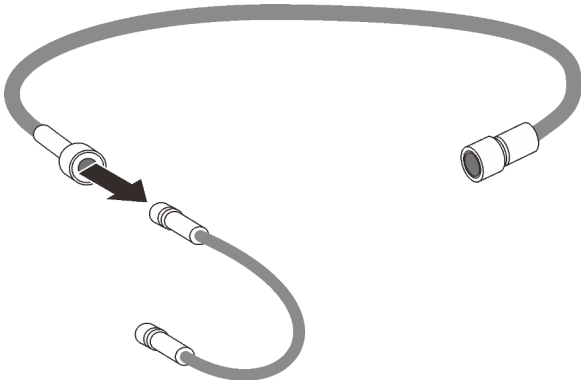

Figure 118. Removing the extension hose

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.

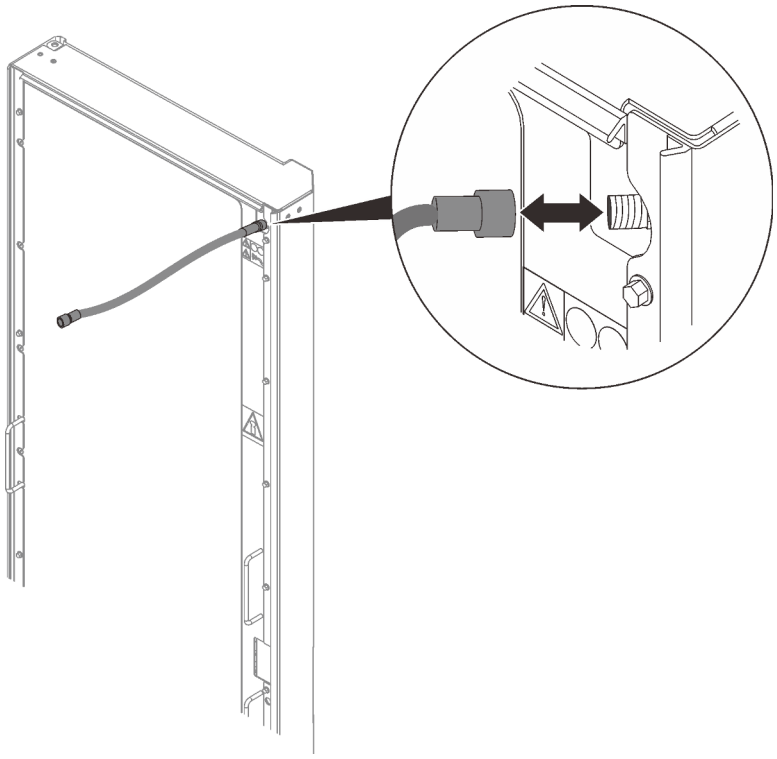

Figure 119. Inserting the air-purging tool extension hose

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.

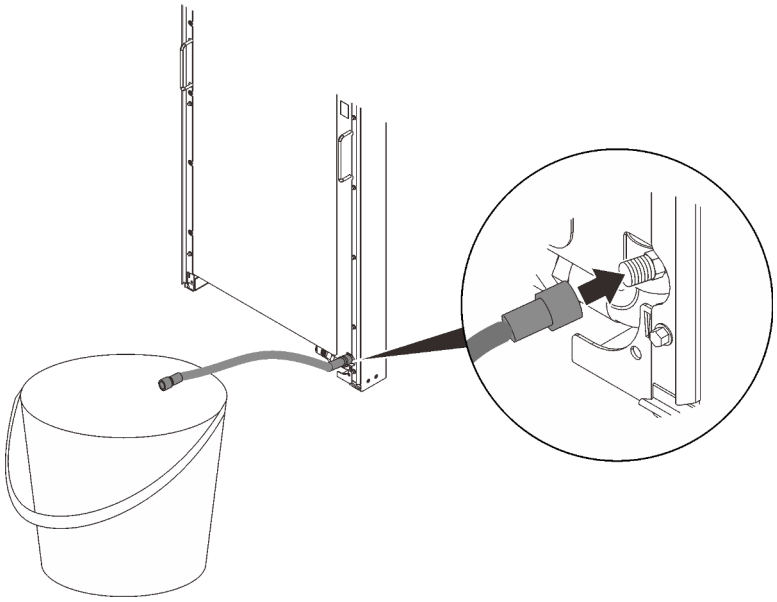

Figure 120. Draining water

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

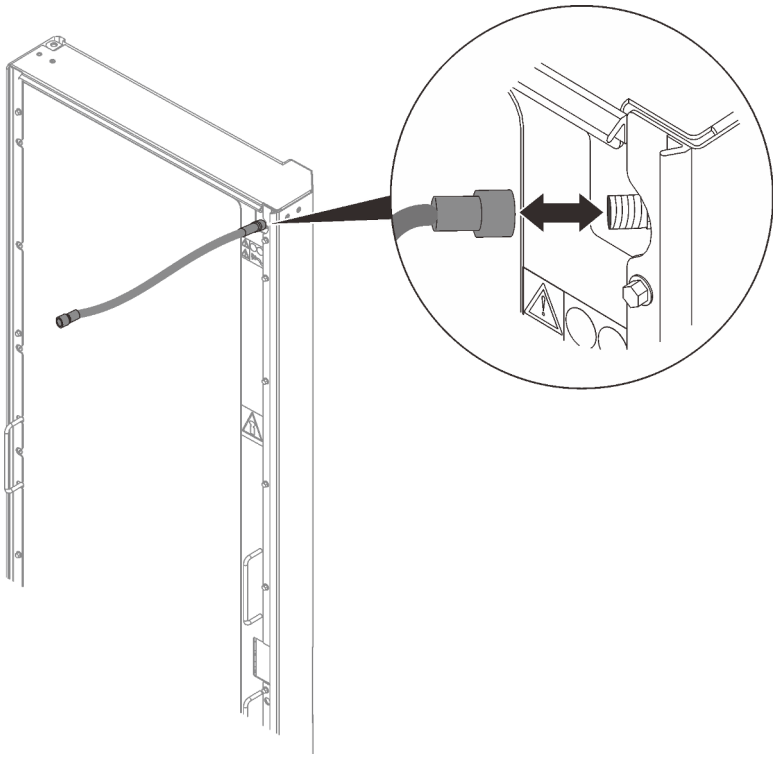

Figure 121. Removing the air-purging tool extension hose

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

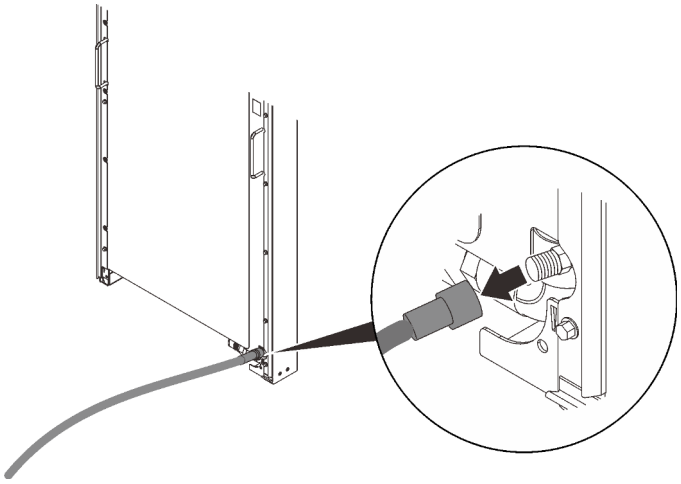

Figure 122. Removing the air-purging tool

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

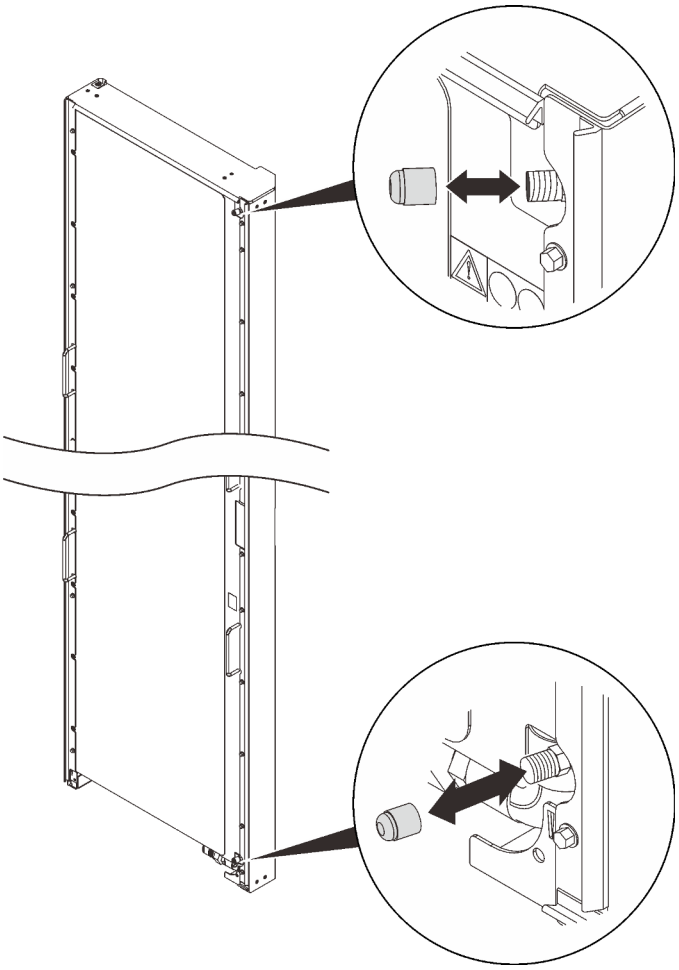

Figure 123. Installing the valve caps

Step 11.

Remove Rear Door Heat eXcahnger 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 102.

Step 2. Hold the heat exchanger in place with two people, and remove the three screws that secure the top hinge bracket to the heat exchanger.

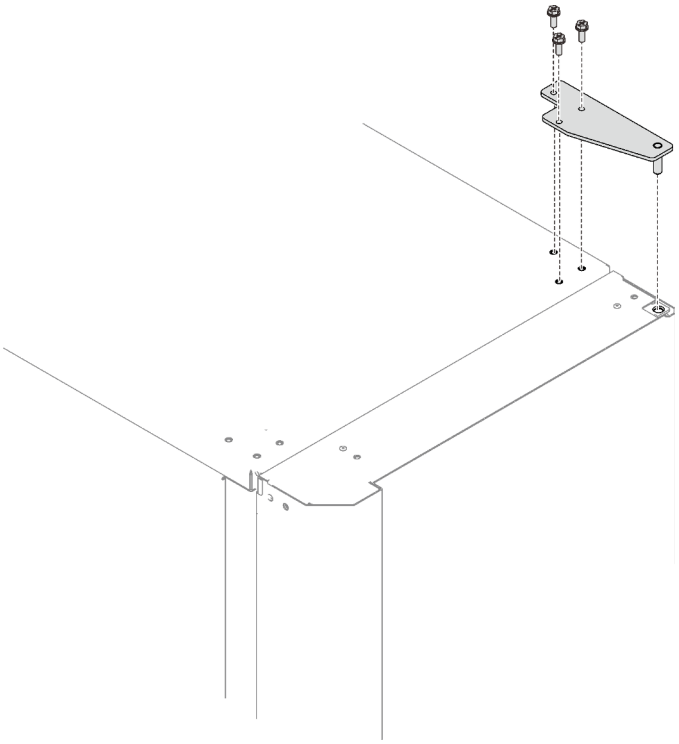

Figure 124. Removing the top hinge bracket

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

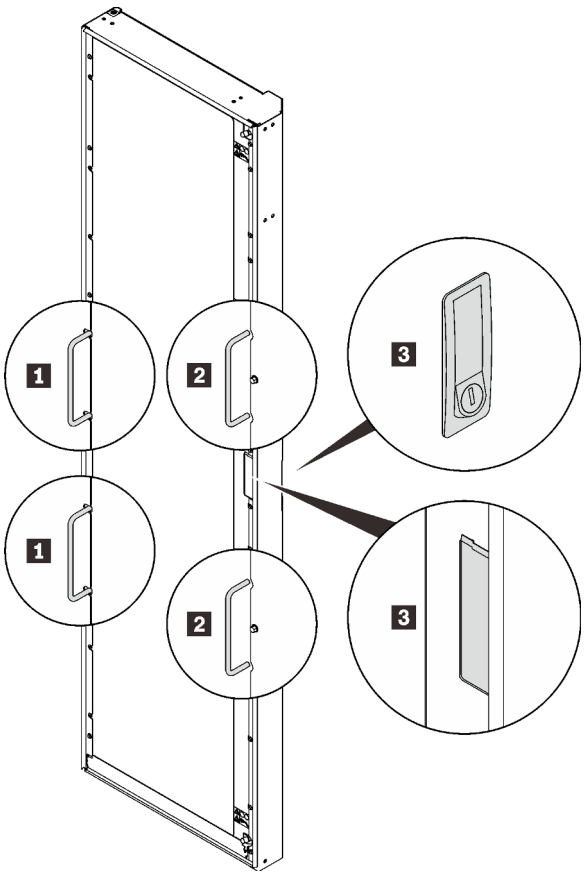

Figure 125. Lifting the heat exchanger with three people

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.

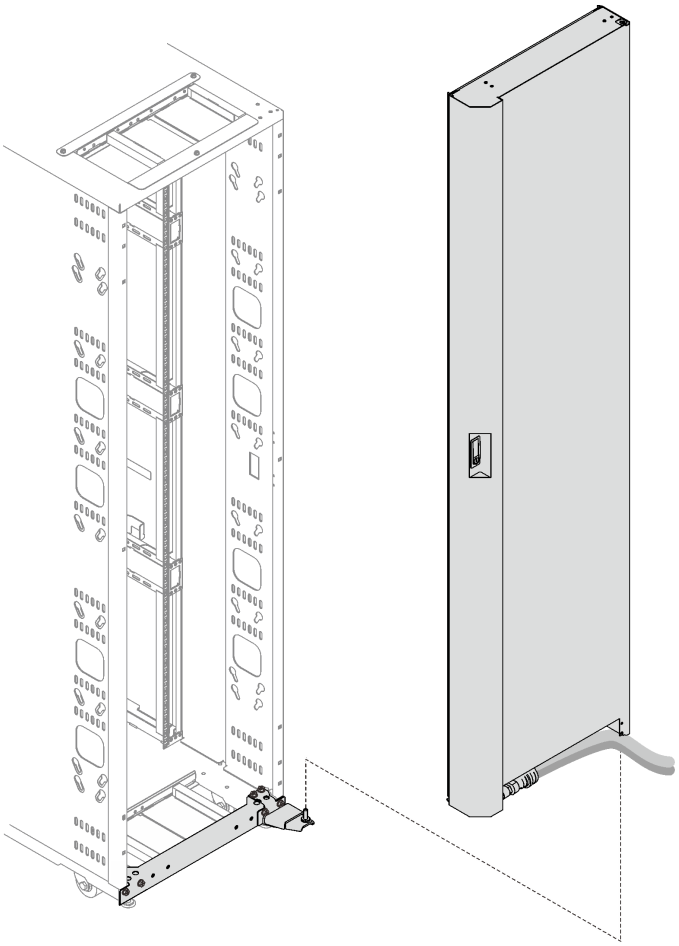

Figure 126. removing the heat exchanger from the rack cabinet

Install Rear Door Heat eXcahnger 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. Remove the cover of the box that contains the heat exchanger.

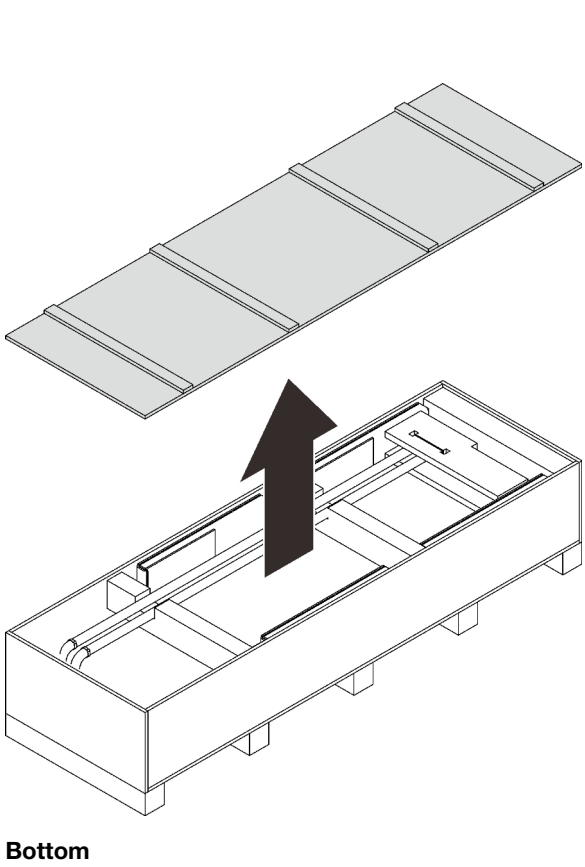

Figure 127. Removing the cover of the box

Step 2. Lift both sides of the heat exchanger with two trained technicians by handles, and remove the heat exchanger from the box.

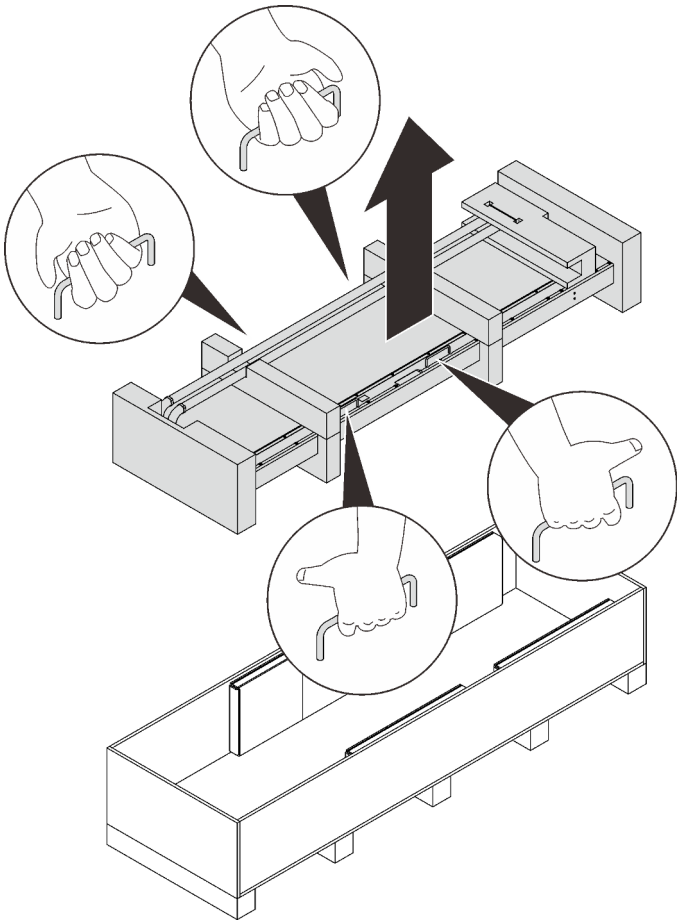

Figure 128. Removing the heat exchanger

Step 3. While the two technicians keep lifting the heat exchanger, have another person remove the top and bottom packing materials

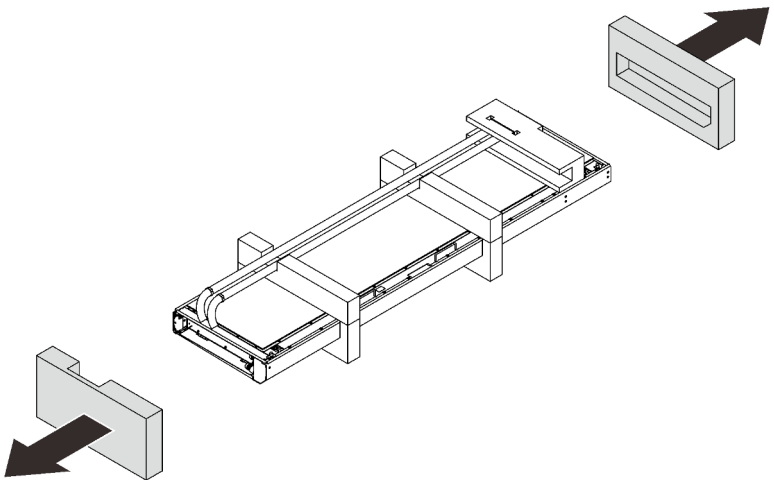

Figure 129. Removing the packing materials

Step 4. Remove the hose retaining material and peel the hoses away.

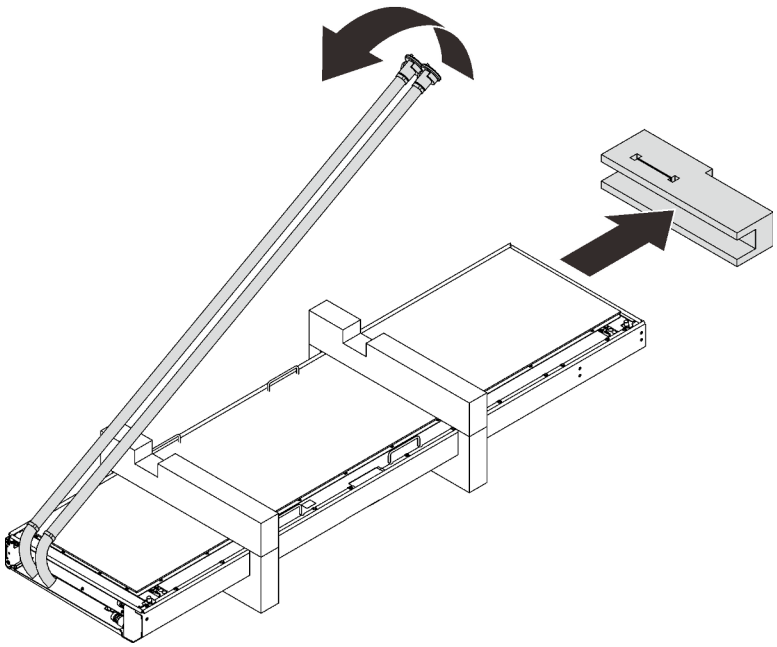

Figure 130. Removing the retaining material

Step 5. Split and remove the rest of the packing materials.

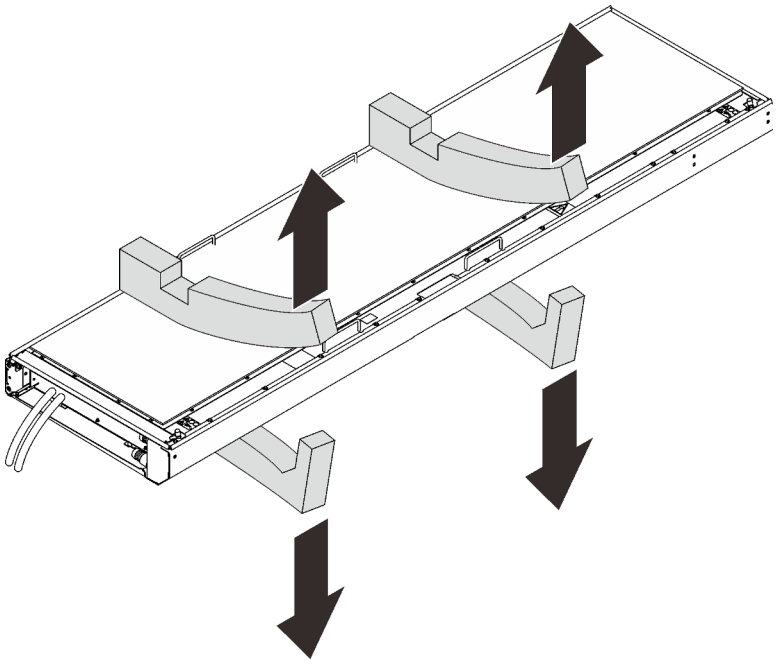

Figure 131. Removing the packing materials

Step 6. 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.

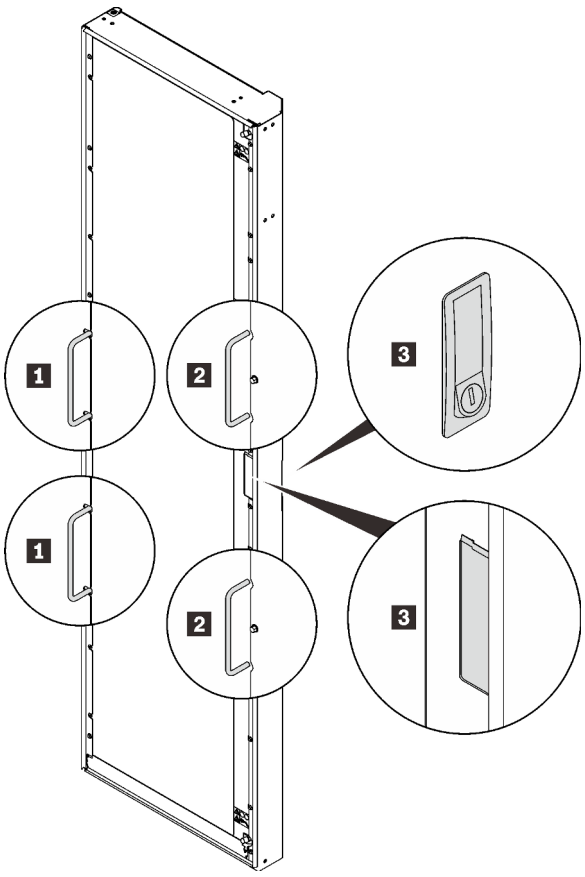

Figure 132. Lifting the heat exchanger with three people

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 7. 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.

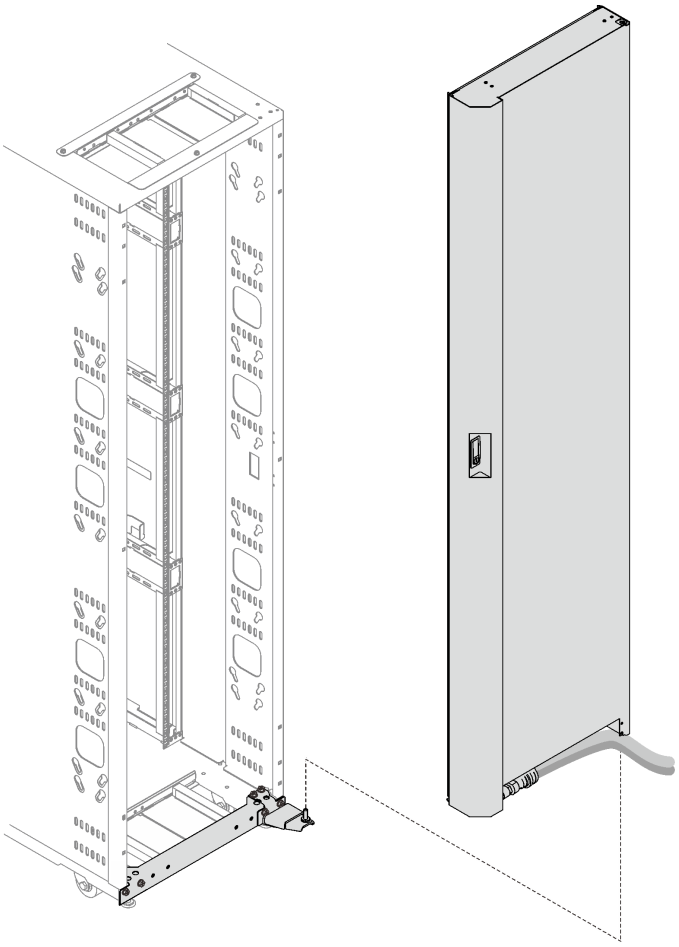

Figure 133. Installing the heat exchanger to the rack cabinet

Step 8. Hold the heat exchanger in place with two people. Insert the top hinge bracket pin to the heat exchanger; then, secure the bracket with three screws.

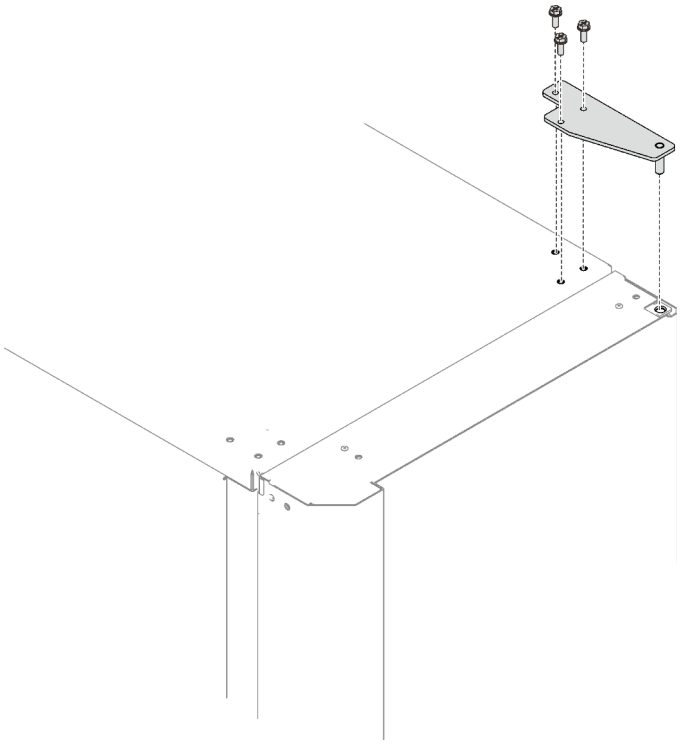

Figure 134. Installing the top hinge bracket

After this task is completed

Proceed to "Fill the heat exchanger with water" on page 119.

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.

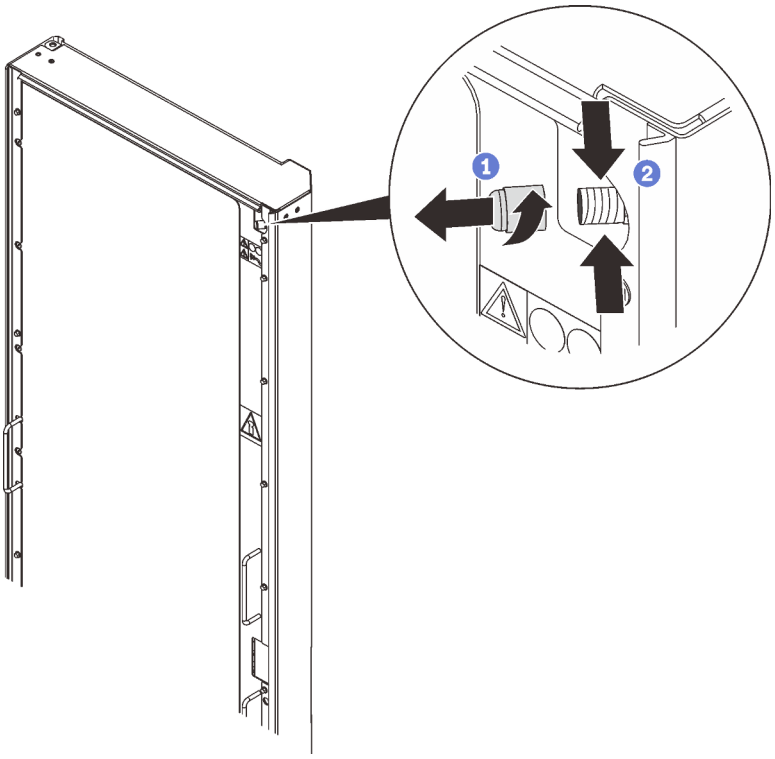

Figure 135. Purging nitrogen

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.

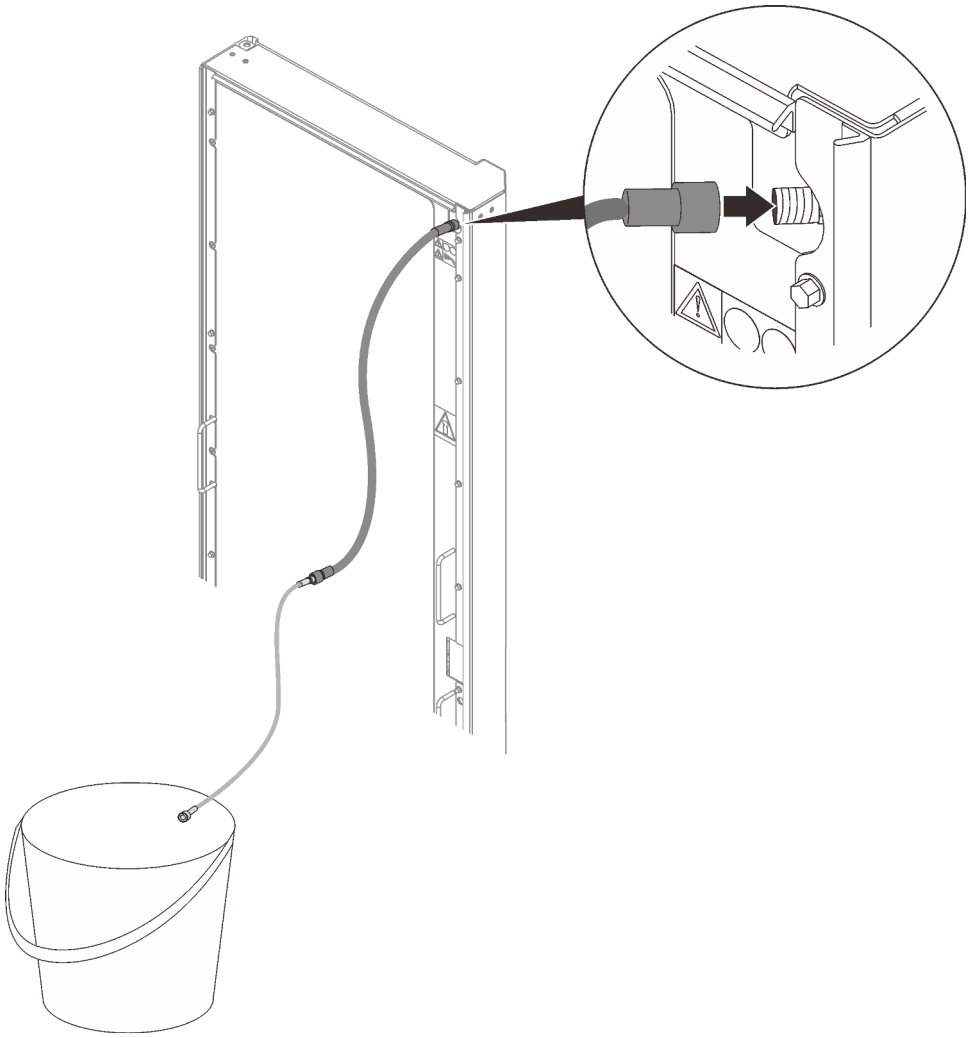

Figure 136. Installing the air-purging tool

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

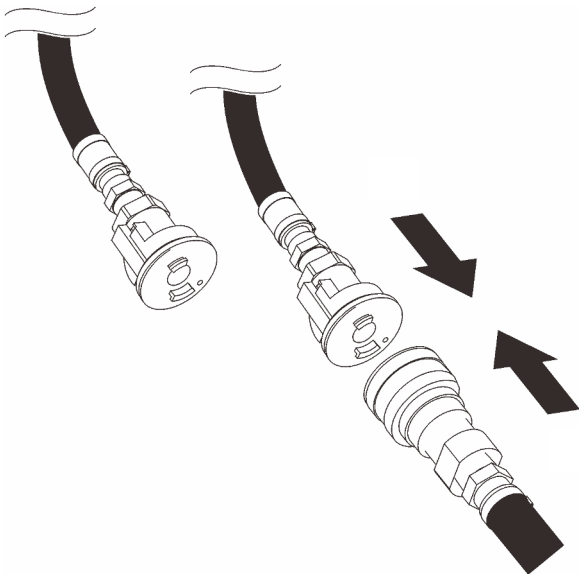

Figure 137. Connecting manifolds

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.

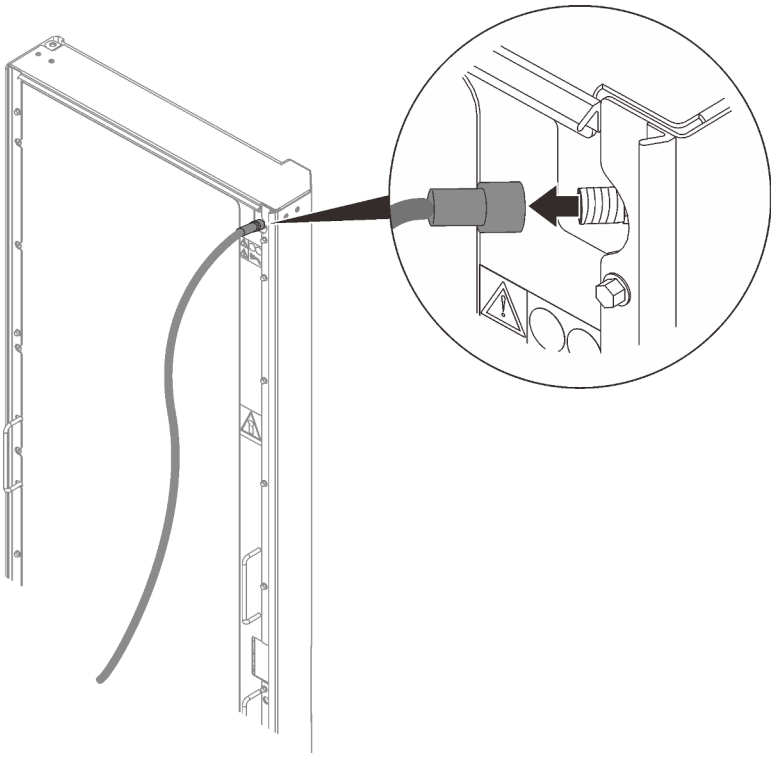

Figure 138. Removing the air-purging tool

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

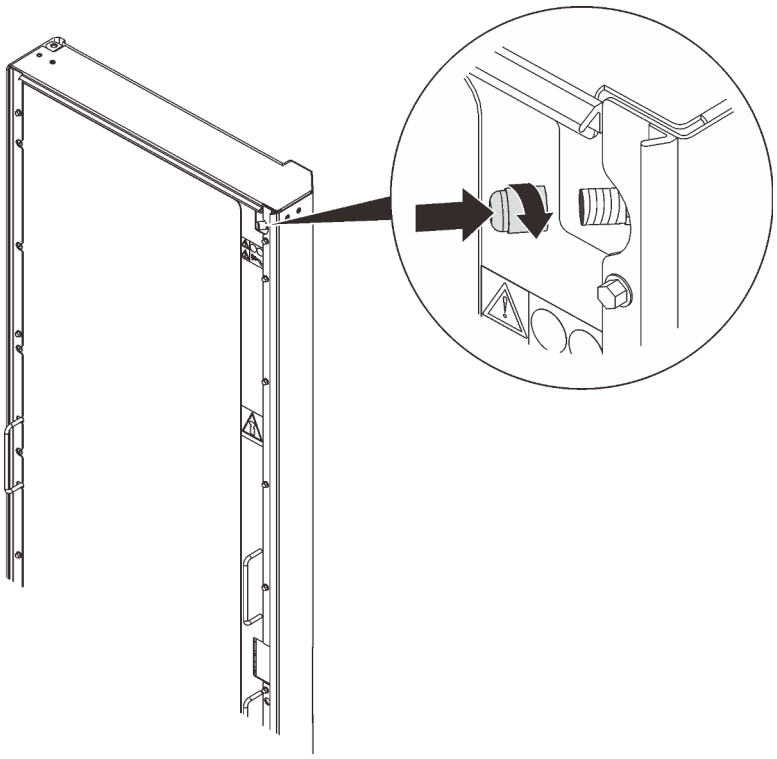

Figure 139. Installing the valve cap

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.

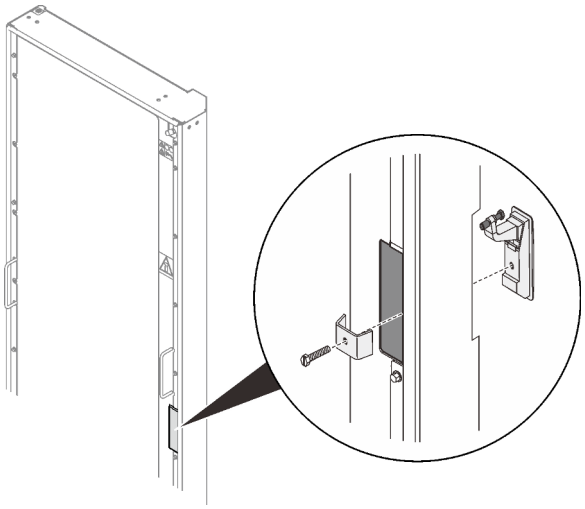

Figure 140. Replacing the door latch

Installing and removing 48U Heavy Duty Rack Extension

The rack cabinet supports up to two unit of 48U Heavy Duty Rack Extension, while each unit adds capacity of two 0U PDU to the rack. See this topic to learn how to remove and install the rack extension.

Install 48U Heavy Duty Rack Extension

See this topic to learn how to install 48U Heavy Duty Rack Extension.

Notes:

- Each unit of extension module 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 (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 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 34). 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 Step 4 on page 28.

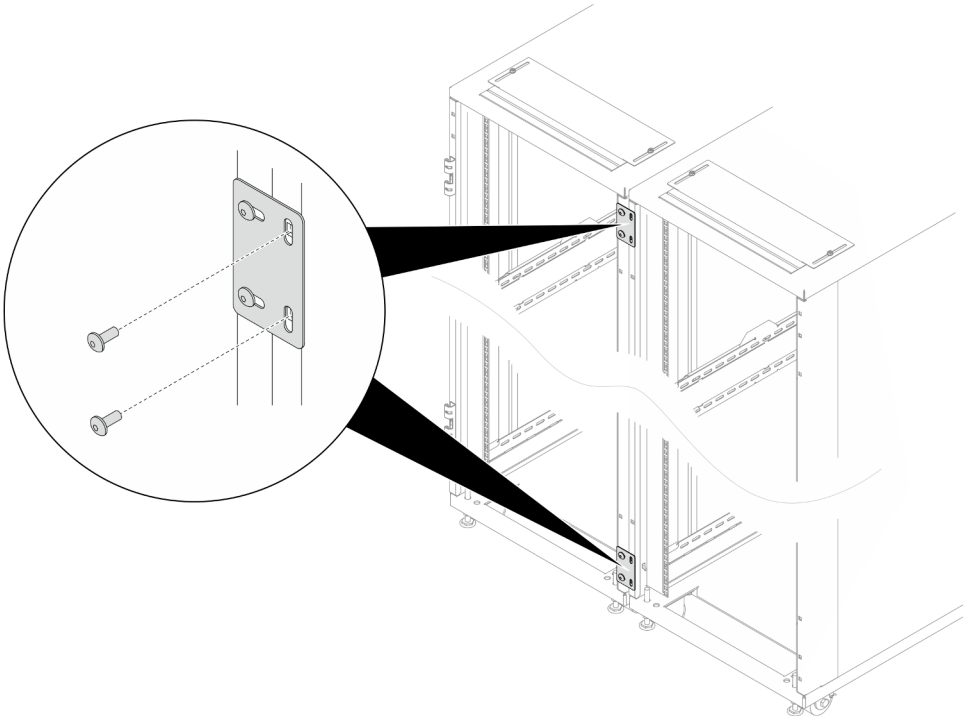

Figure 141. Removing screws to prepare for extension installation

Procedure

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

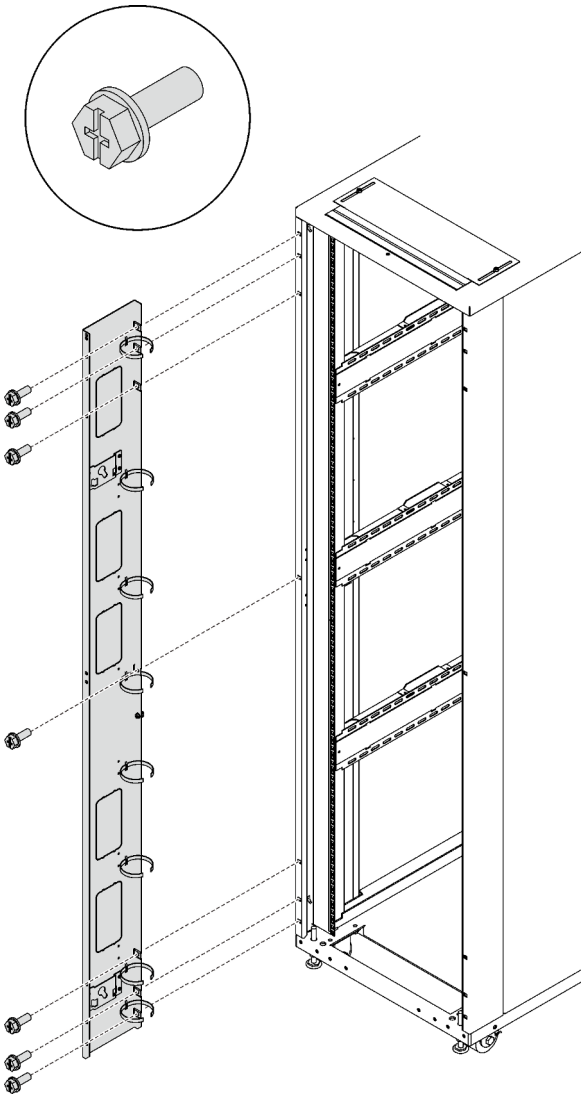

Figure 142. Installing an extension side panel

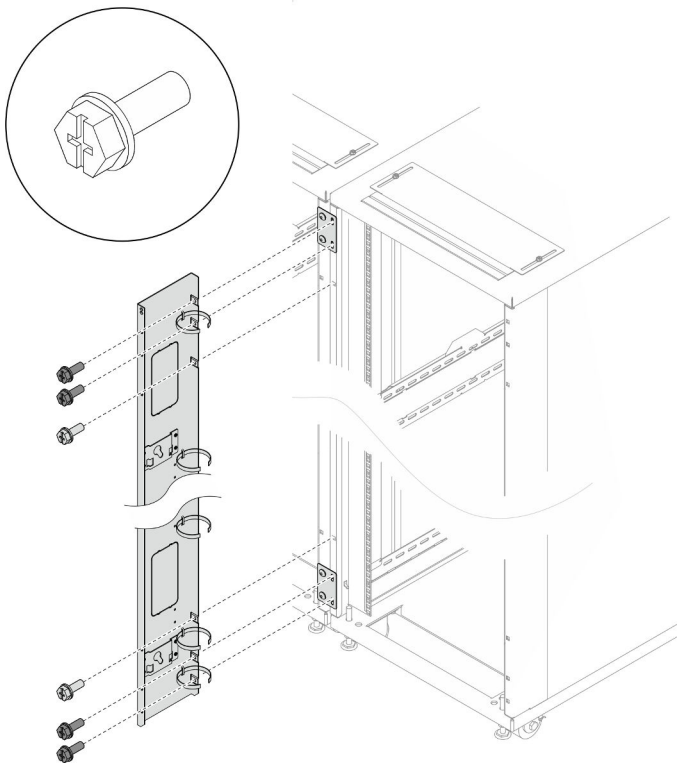

Figure 143. Installing an extension panel (with baying kit)

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.

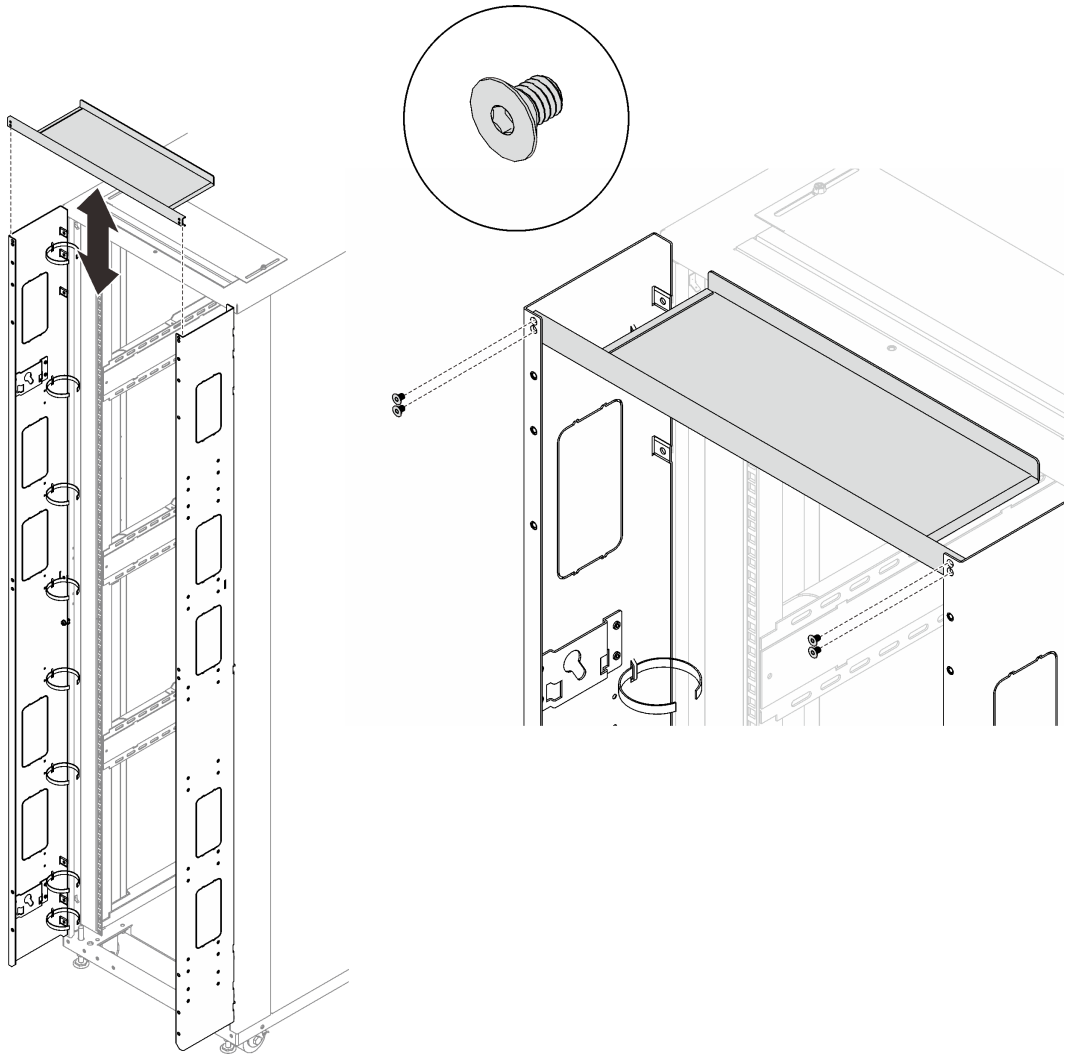

Figure 144. Installing the extension top cover

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

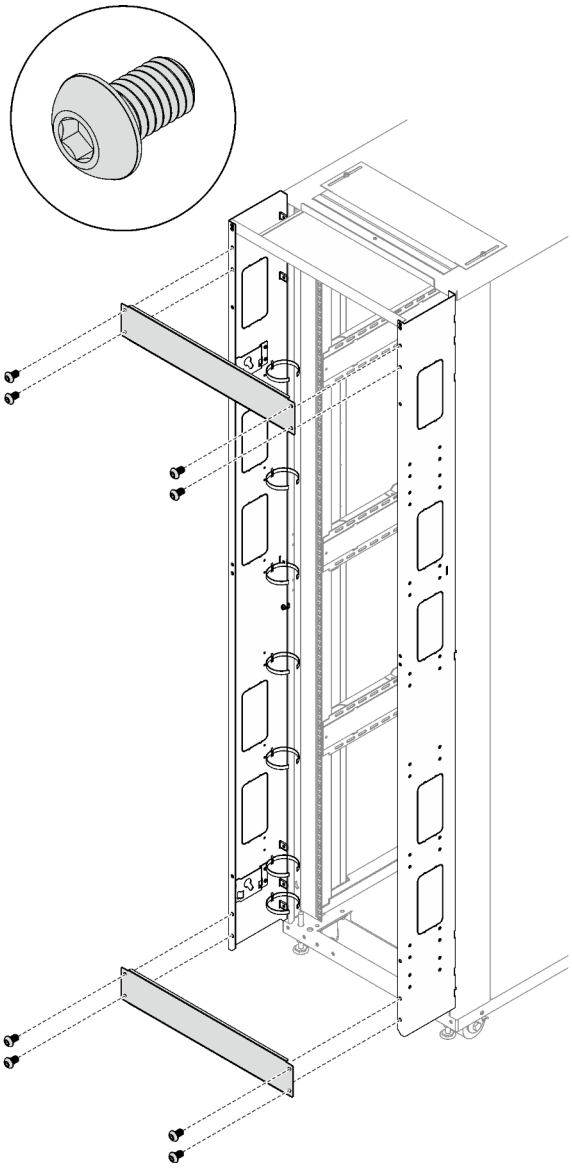

Figure 145. Installing the extension front panels

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

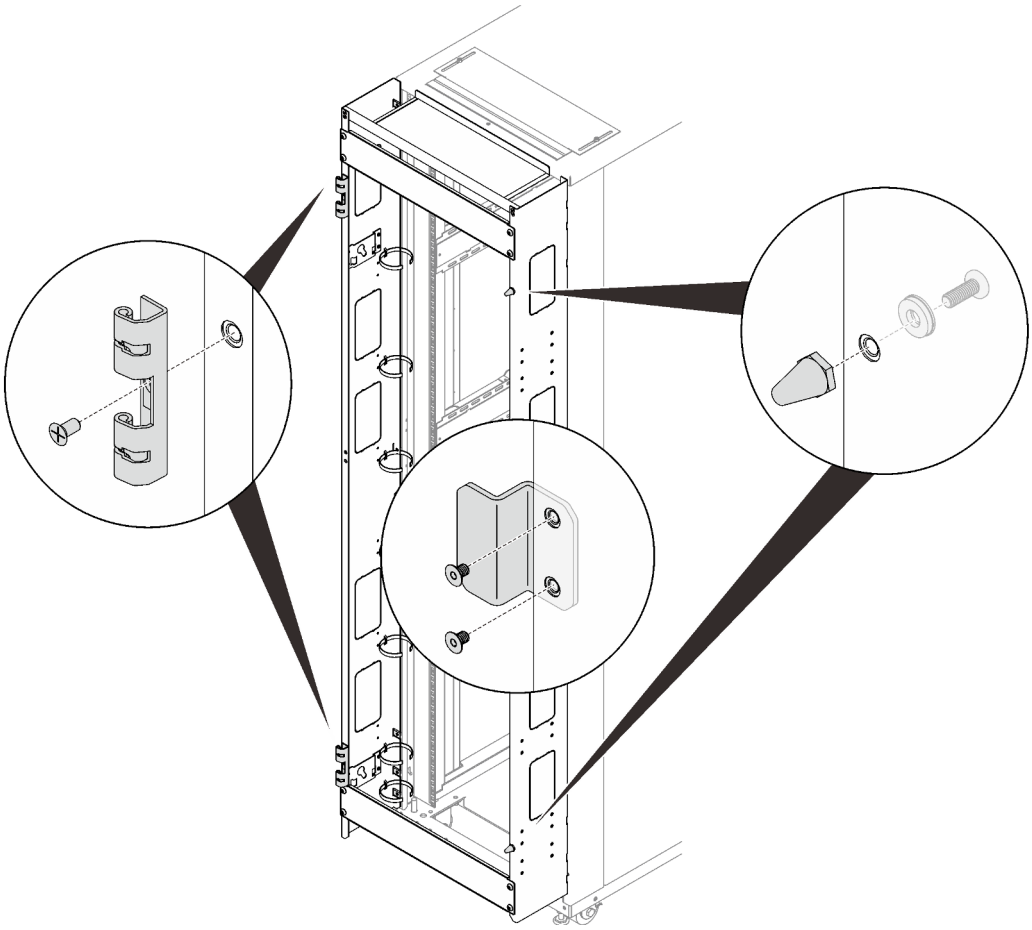

Figure 146. Install the hinges, doorstops, the door latch

Step 5. Install the door back to the rack.

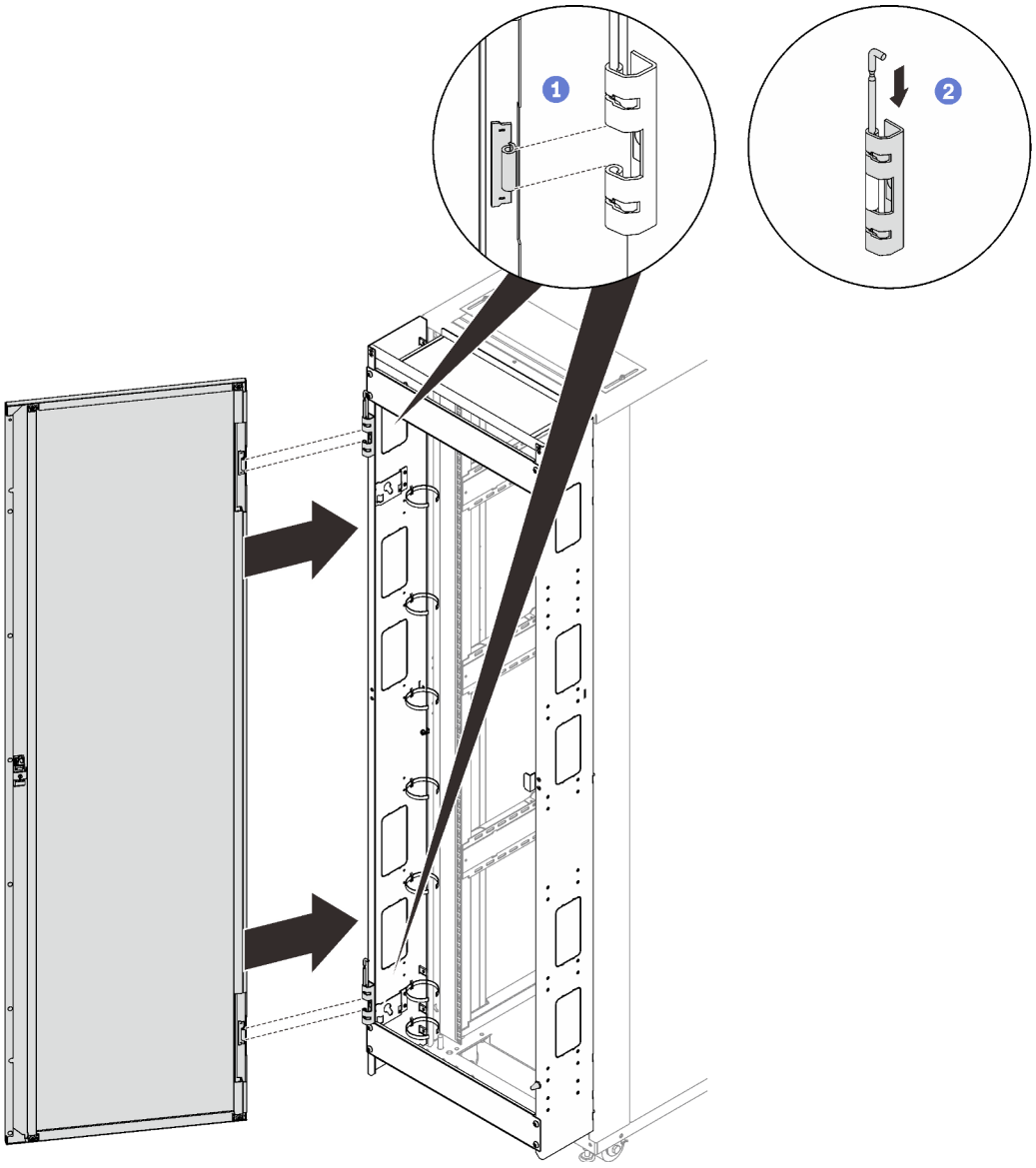

Figure 147. Installing the door

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 Heavy Duty Rack Extension

See this topic to learn how to remove 48U Heavy Duty Rack Extension.

Procedure

Step 1. If any devices are installed to the extension side panels, remove them (see “Remove a 0U PDU” on page 137 or “Remove a 1U PDU or console switch from the rack side” on page 141).

Step 2. Remove the door from the rack cabinet (see “Remove a door” on page 93).

Step 3. Remove the two hinges, two door stops, and the door latch if necessary.

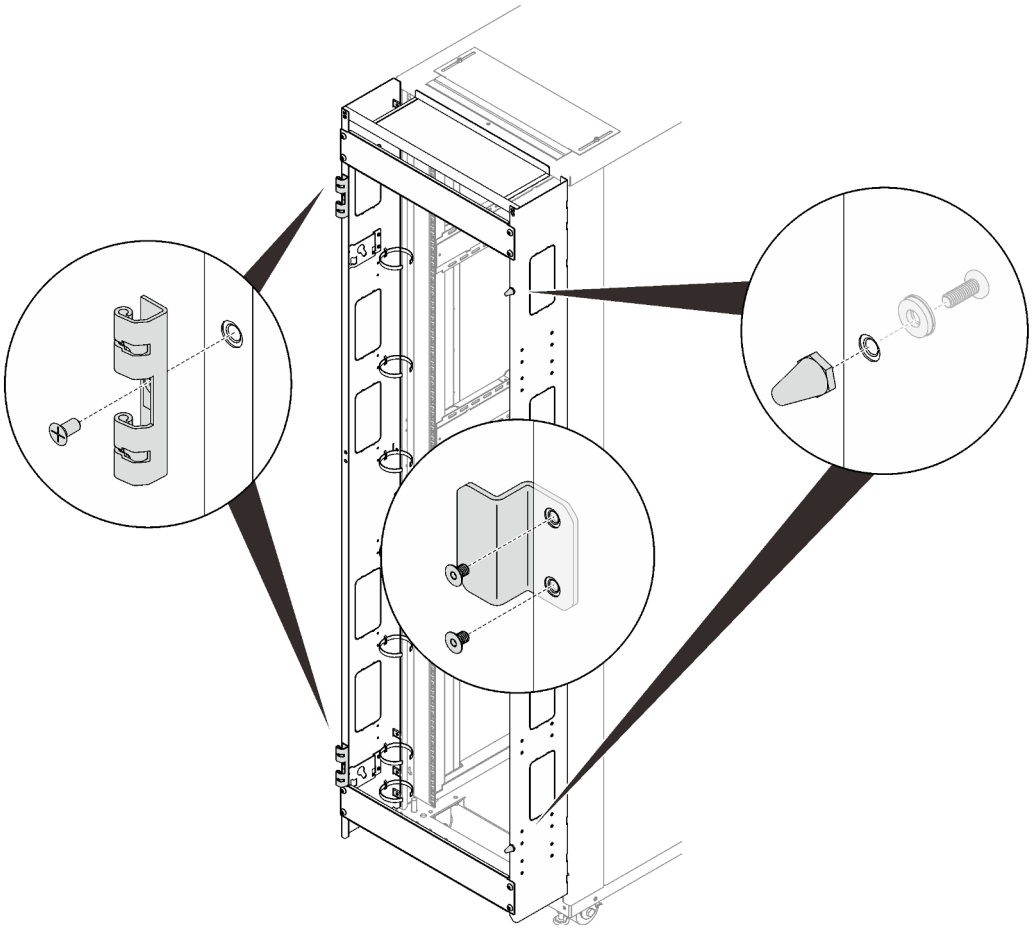

Figure 148. Removing the door hinges and doorstops

Step 4. Remove the four screws that secure each of the two front covers, and remove the covers.

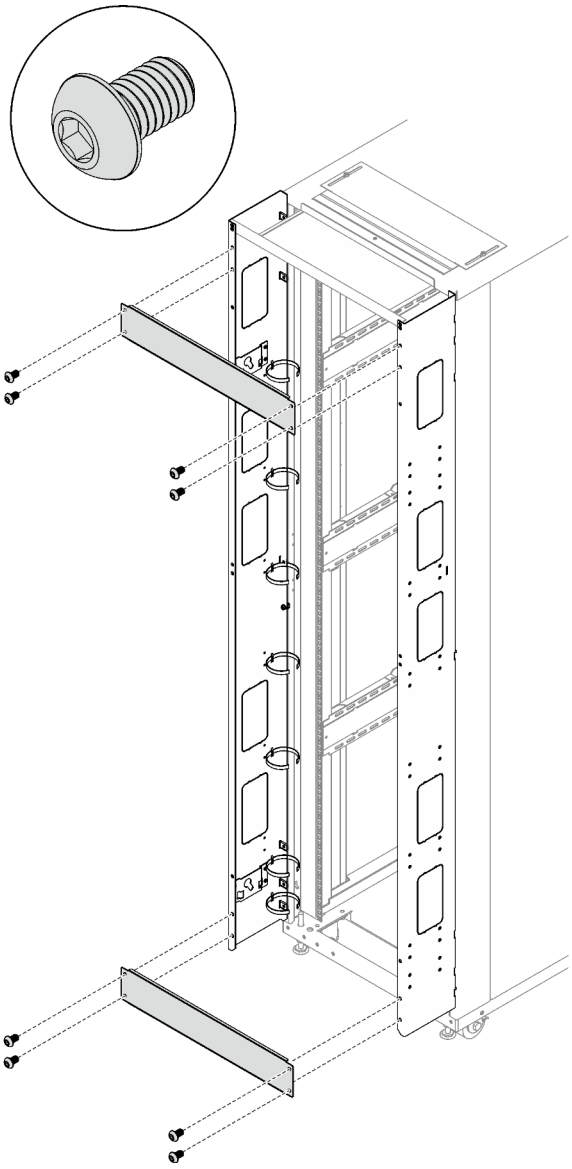

Figure 149. Removing the extension front covers

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

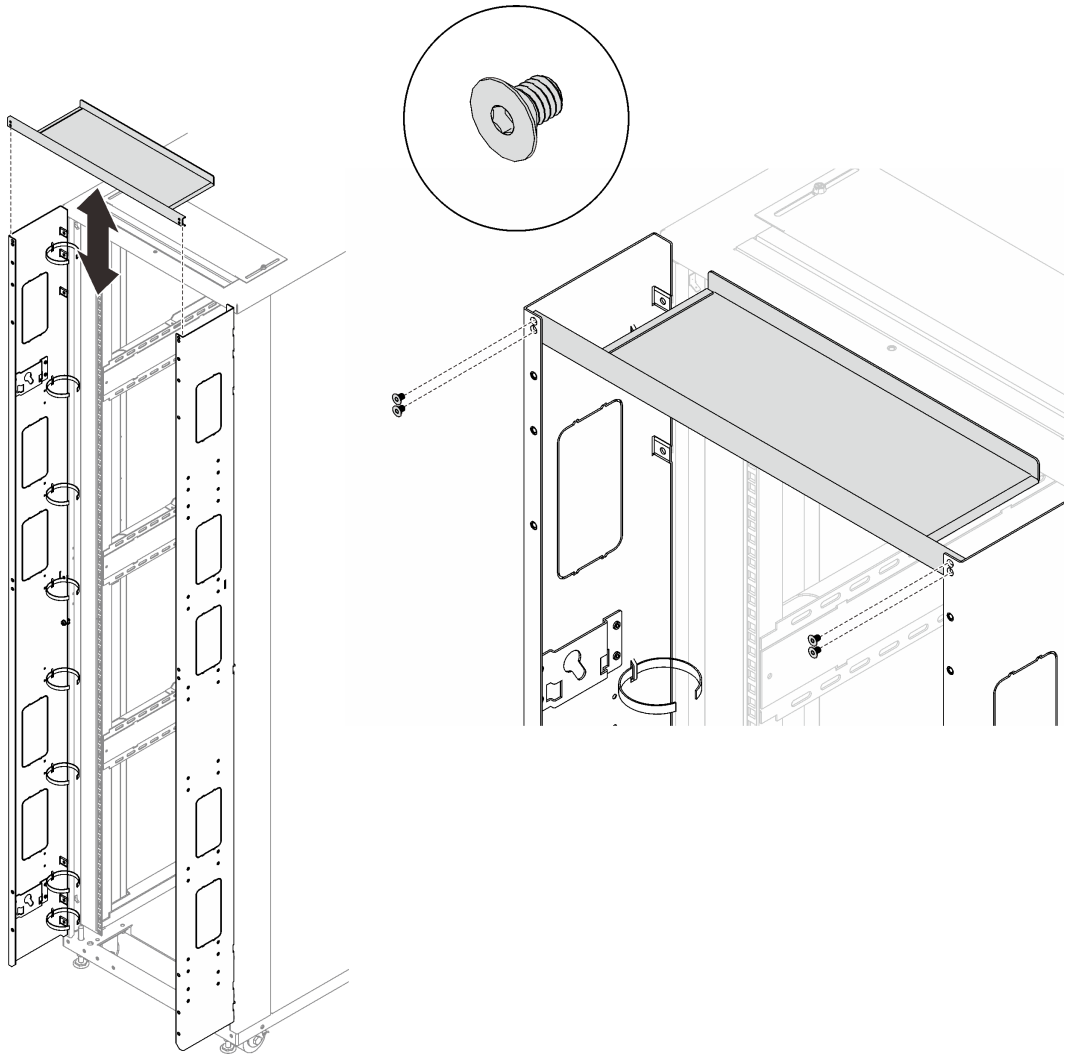

Figure 150. Removing the top cover

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

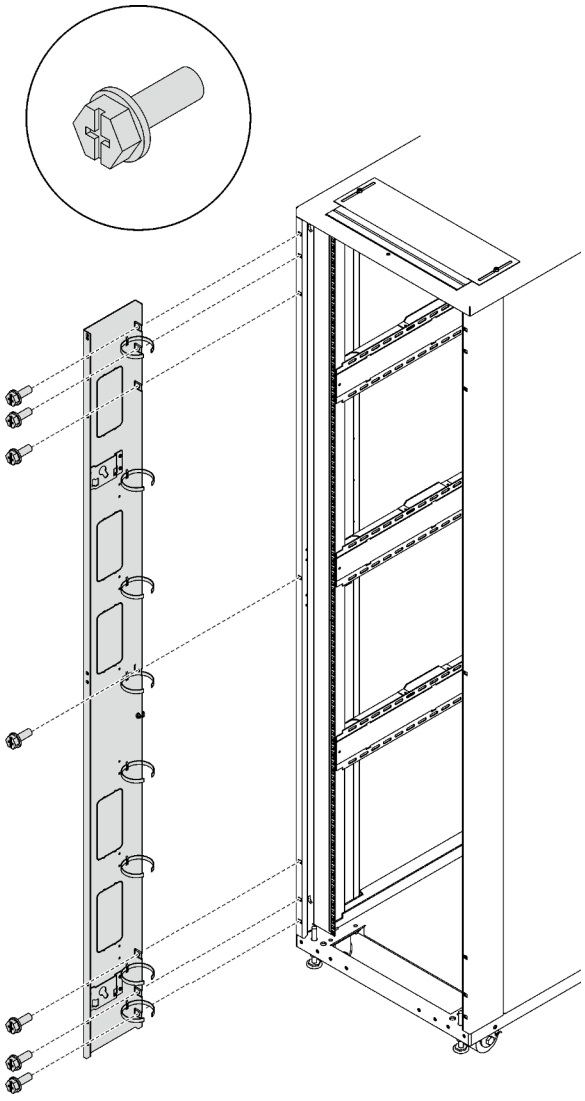

Figure 151. Removing an extension side panel

After this task is completed

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

1. Install the door latch.

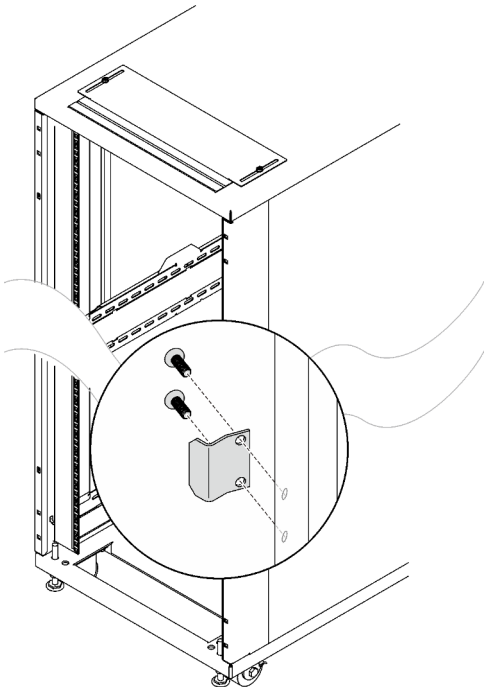

Figure 152. Installing the door latch

2. Install the two hinges and the two doorstops.

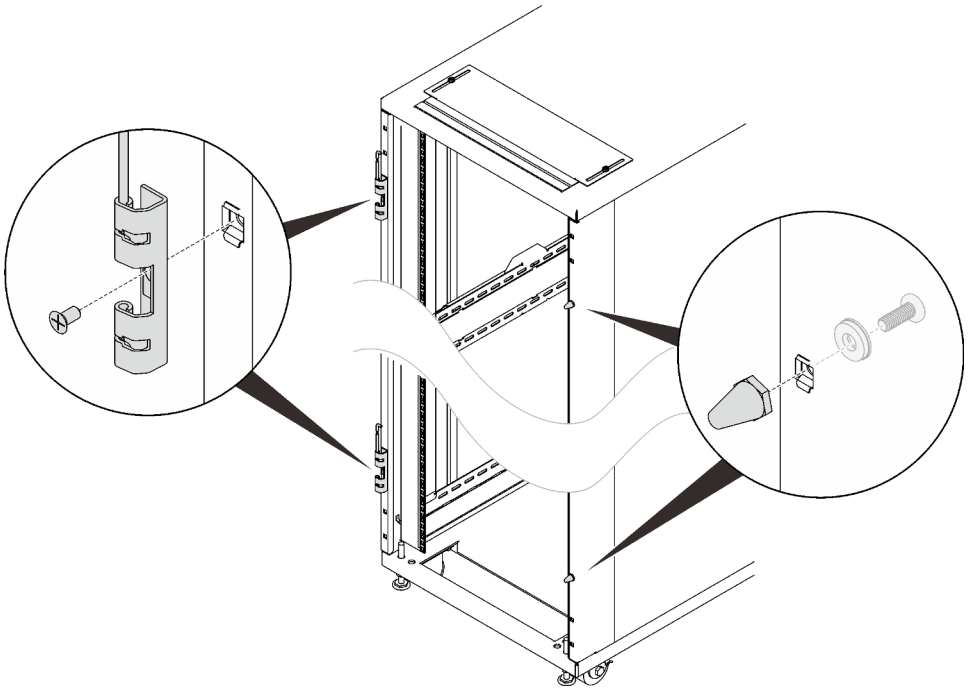

Figure 153. Installing the hinges and doorstops

3. Install the door.

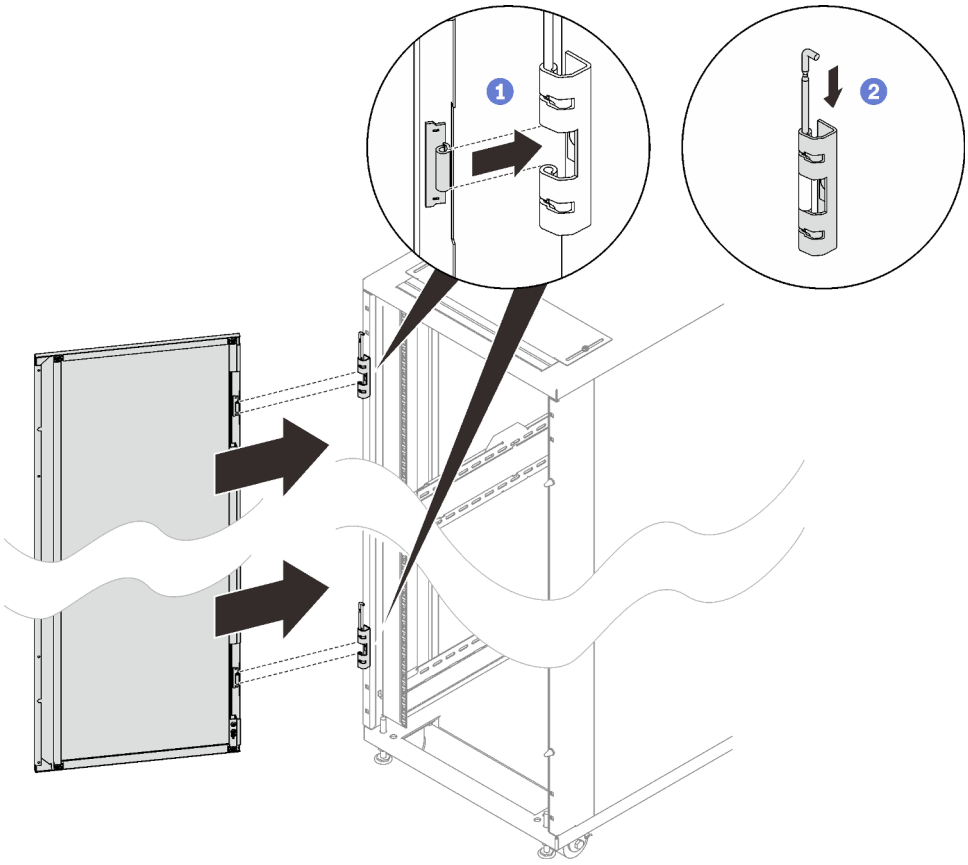

Figure 154. Installing the door

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.

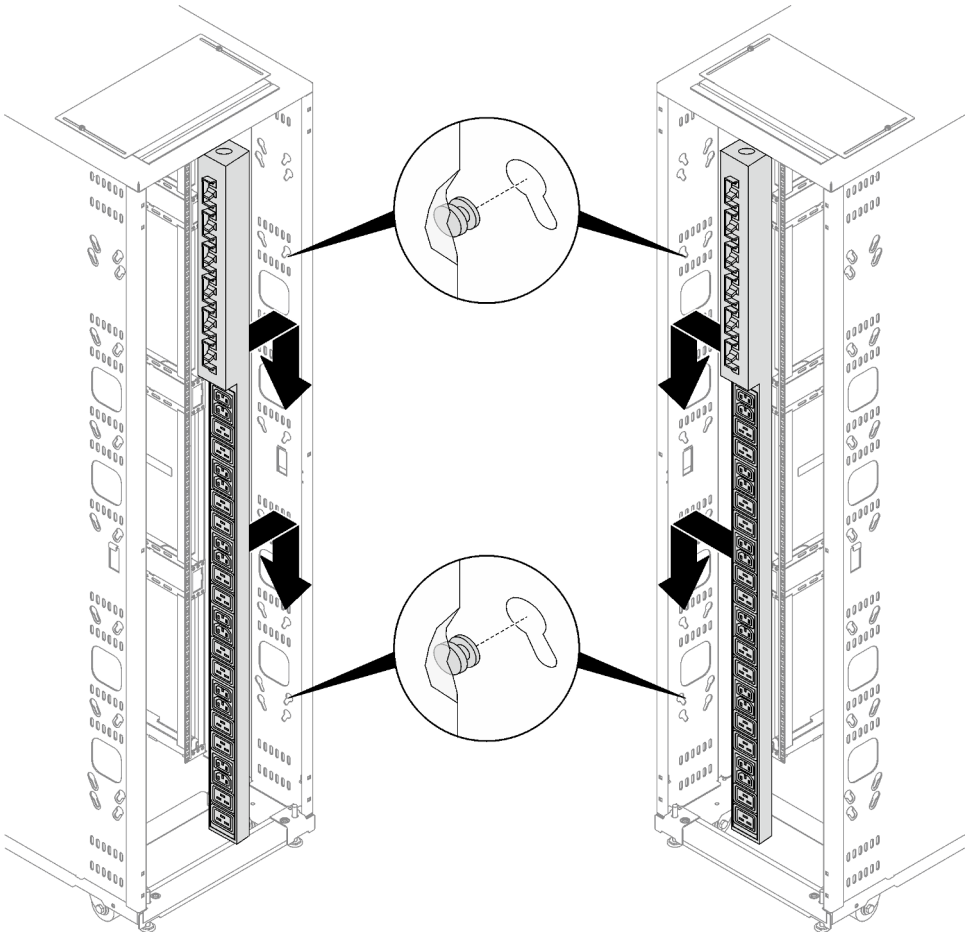

Figure 155. Installing a 0U PDU

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.

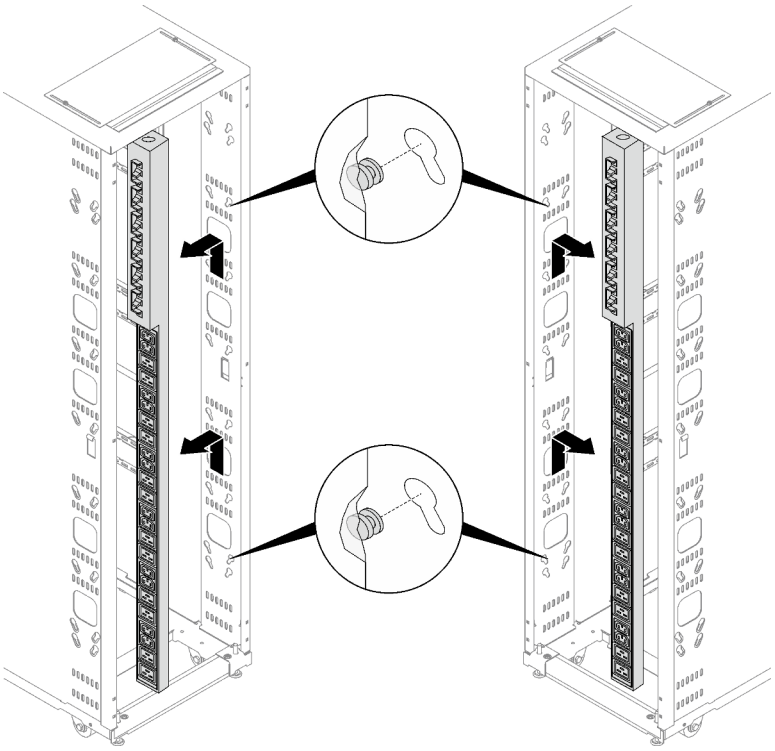

Figure 156. Removing a 0U PDU

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.

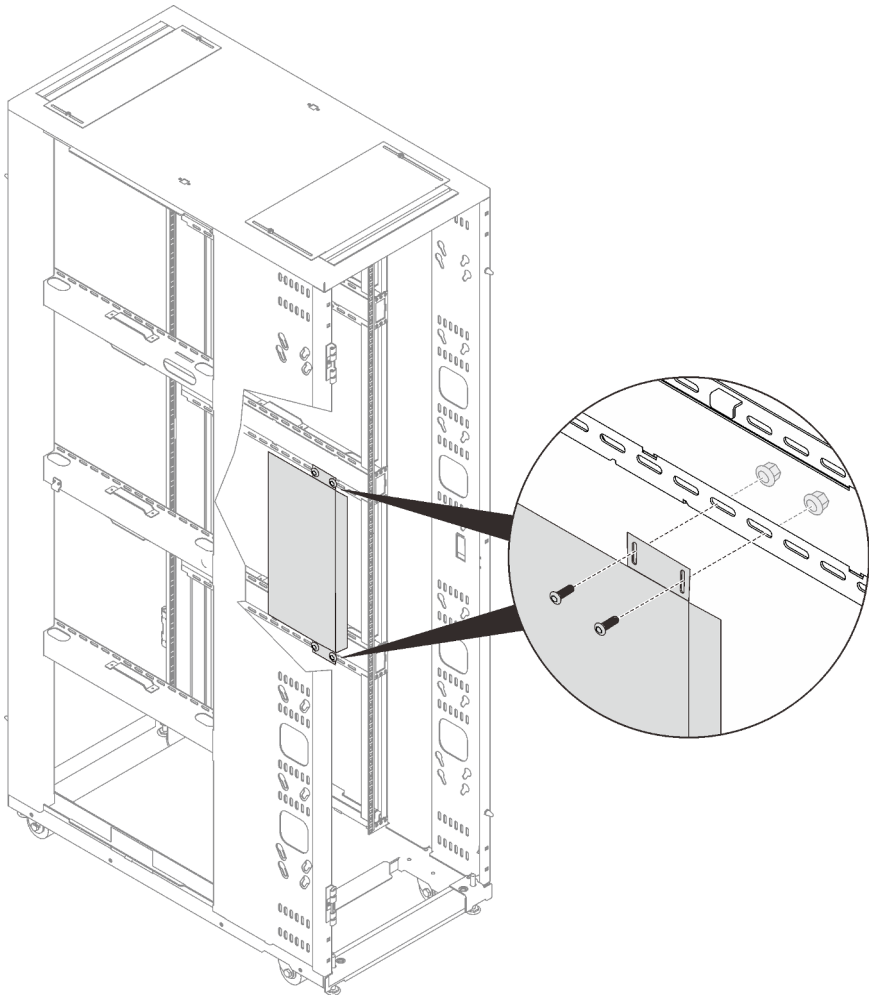

Figure 157. Installing a 1U device into the rack side

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.

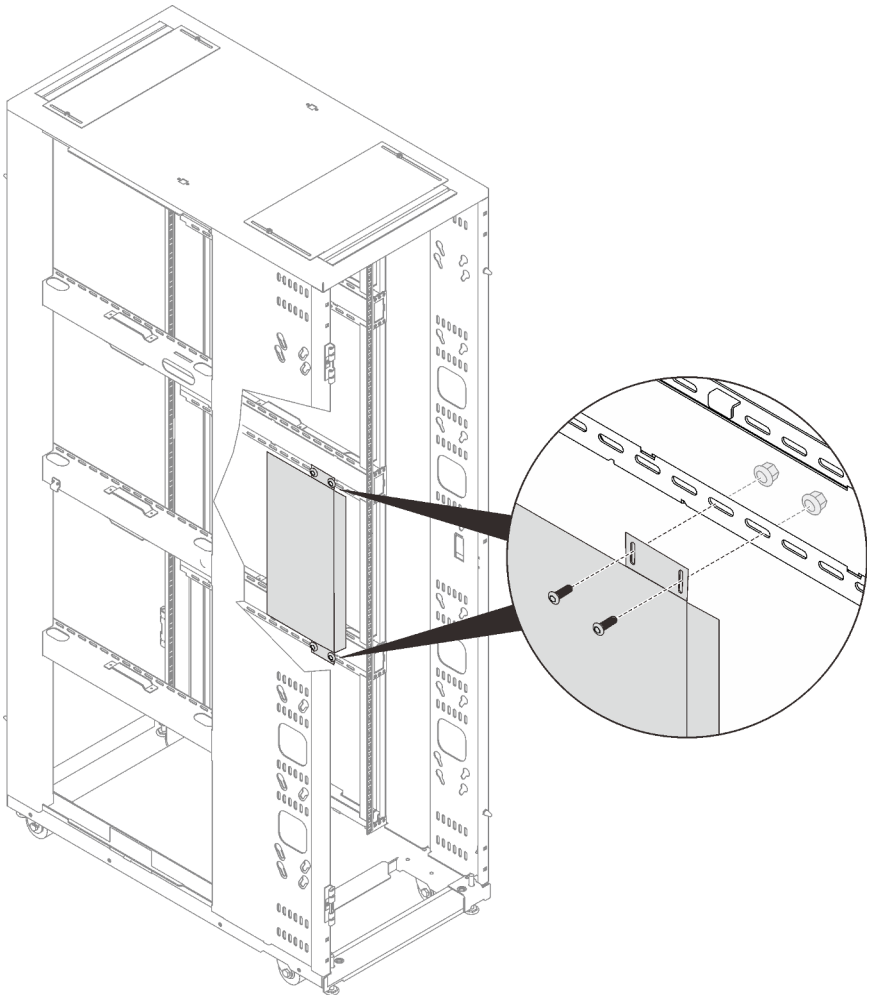

Figure 158. Removing a 1U device from the rack side

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 baying 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 91).

Step 2. Refer to the document that comes with the device, and install the mounting brackets if necessary.

Step 3. Install the device.

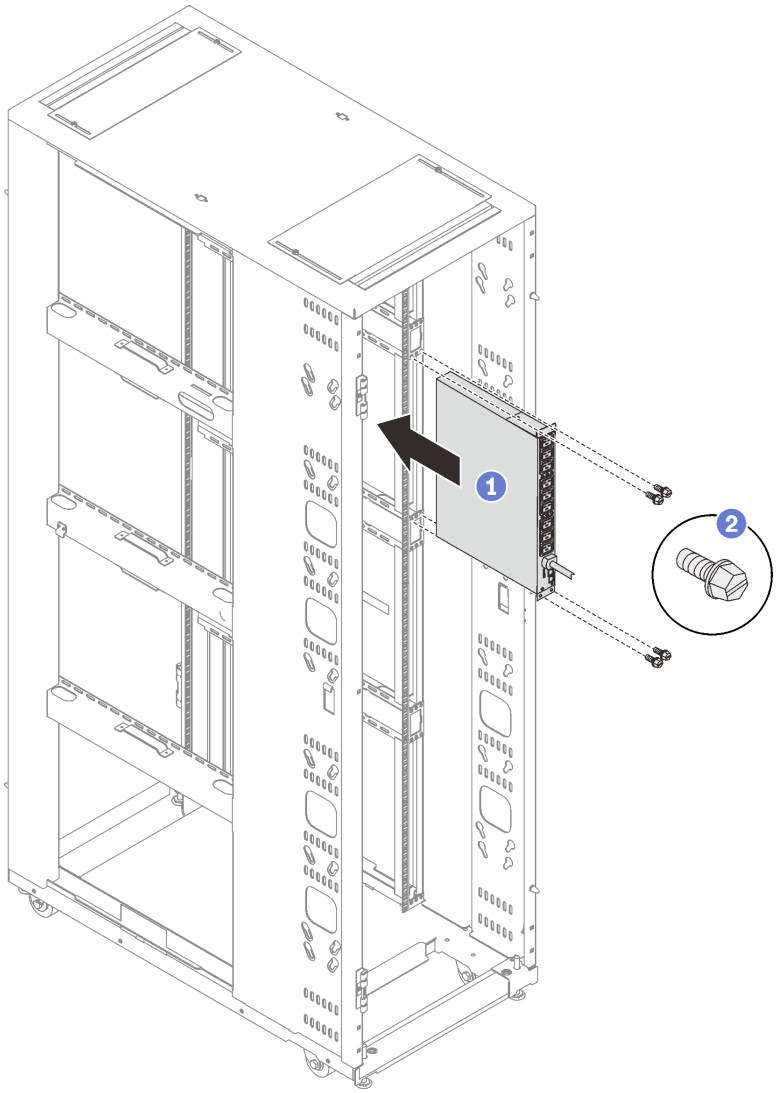

Figure 159. Installing a 1U PDU or console switch

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 91).

Remove a 1U device from the side pocket

Step 1. Remove the device.

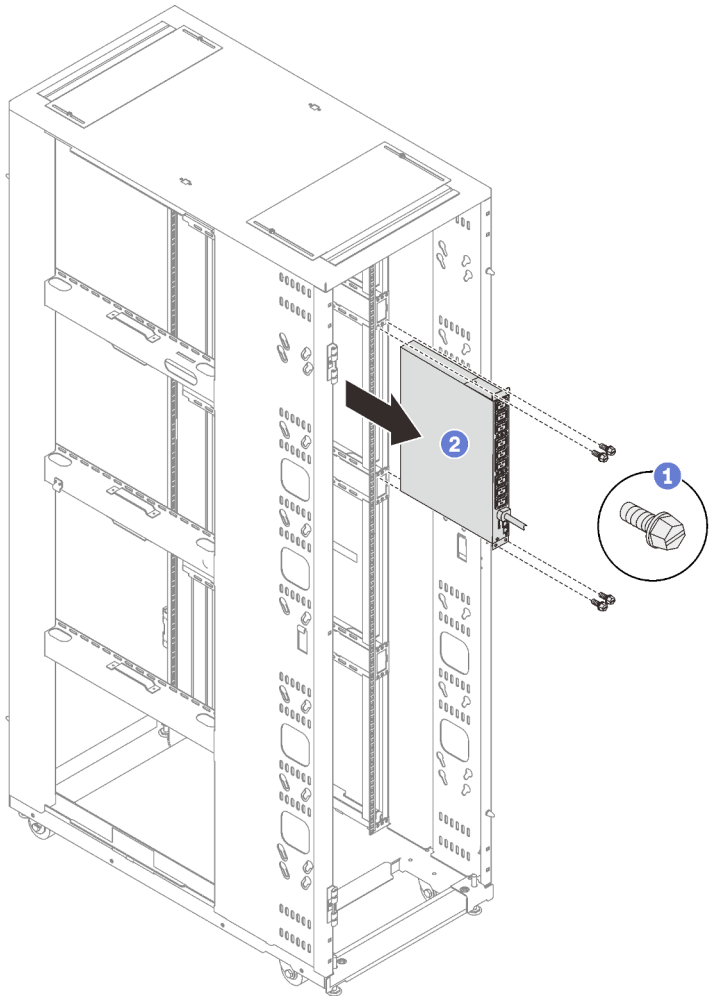

Figure 160. Removing a 1U PDU or console switch

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.

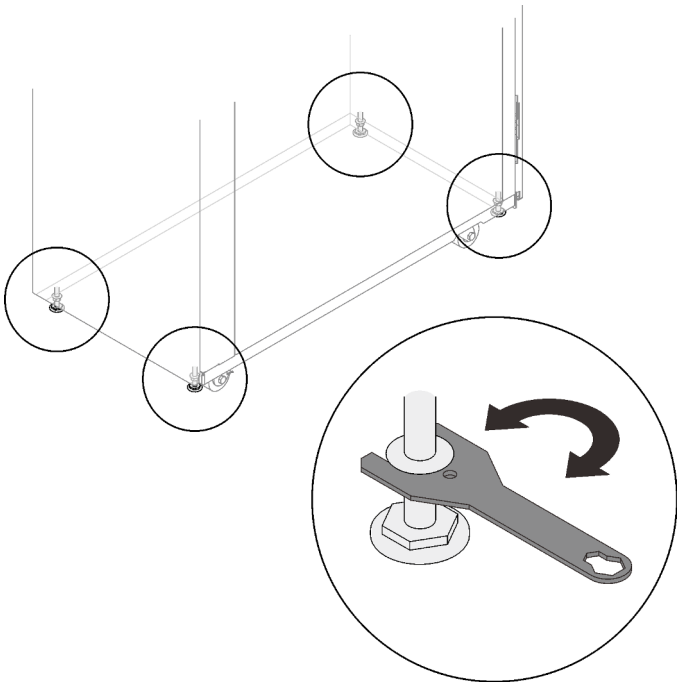

Figure 161. Lowering the leveling pads

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

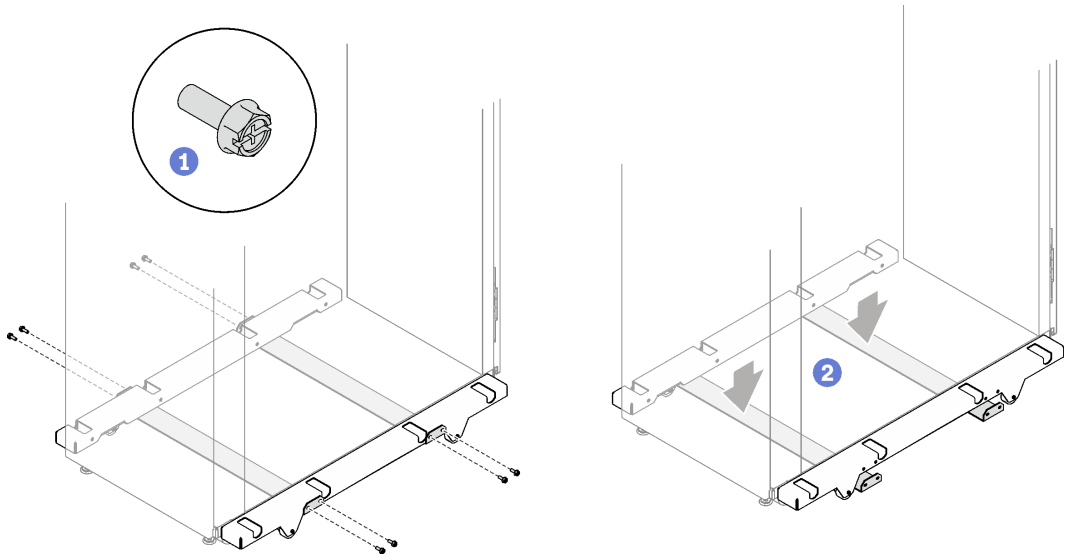

Figure 162. Removing the outrigger stabilizing bars

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.

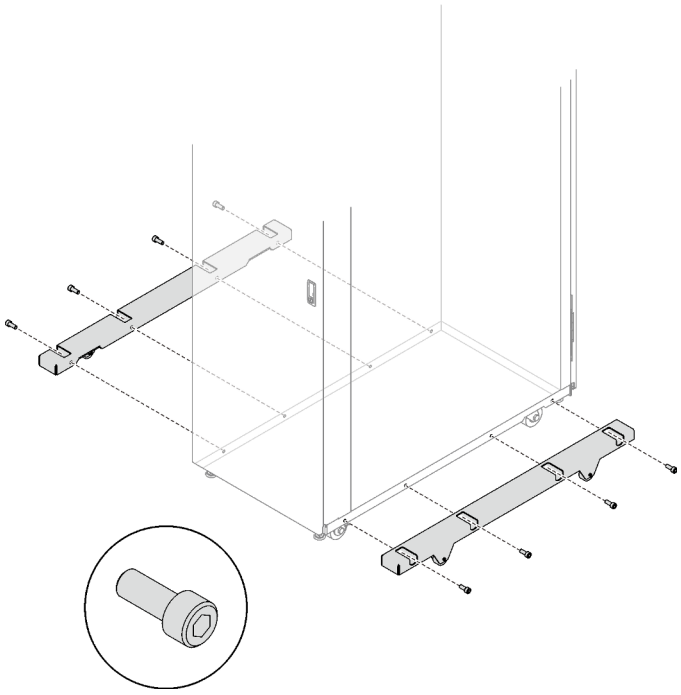

Figure 163. Removing the outriggers

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.

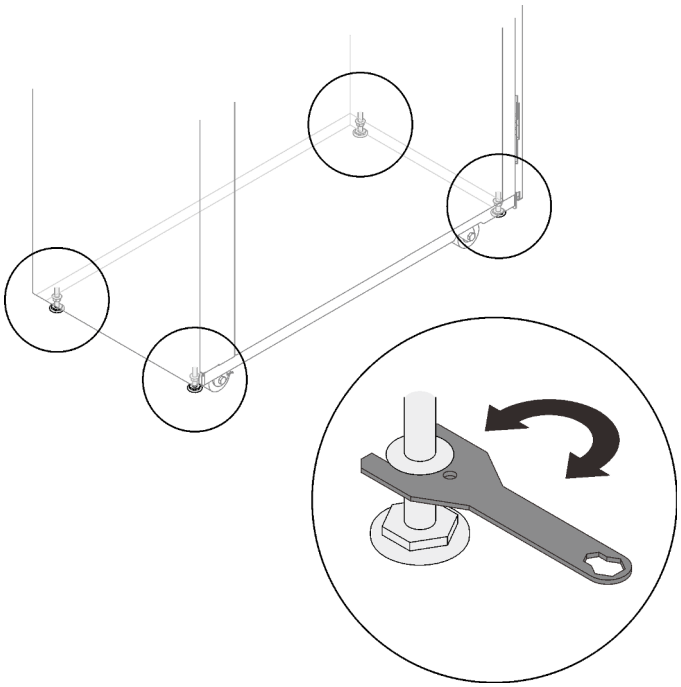

Figure 164. Lowering the leveling pads

Step 2. Secure each of the outriggers with four screws.

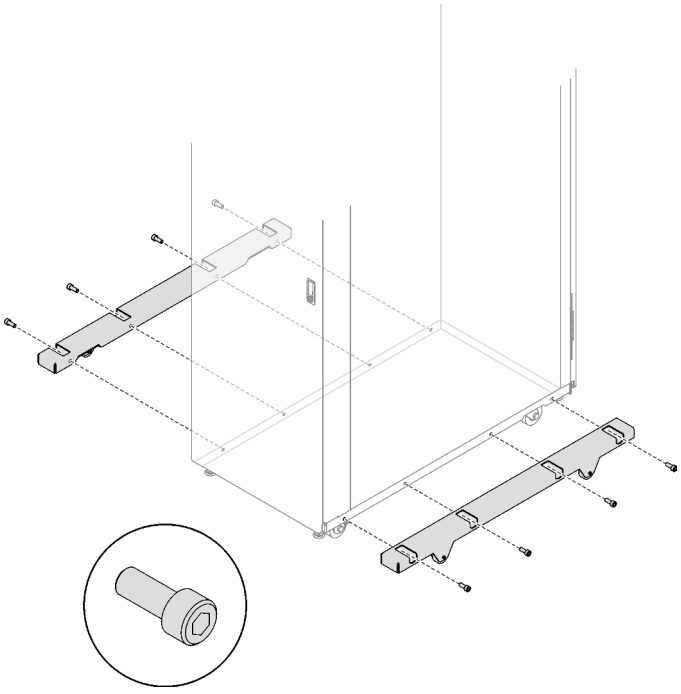

Figure 165. Installing the outriggers

Step 3. Install the outrigger stabilizing bars.

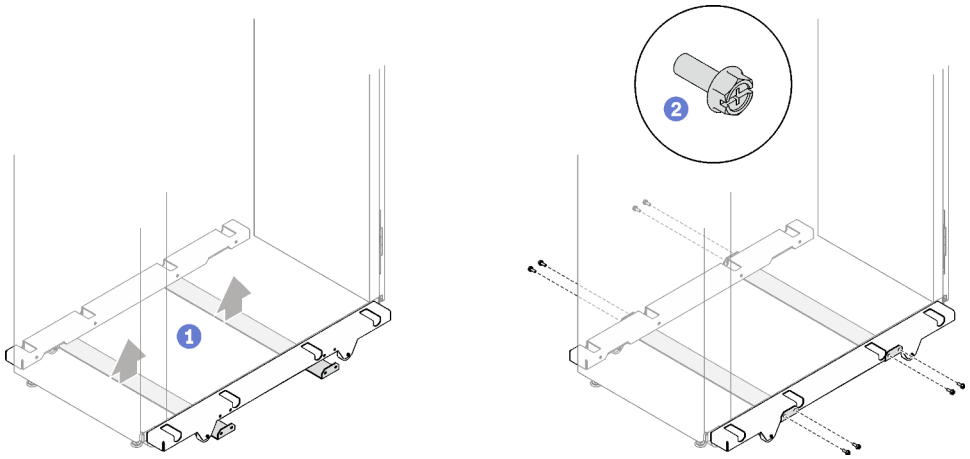

Figure 166. Installing the outrigger stabilizing bars

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.

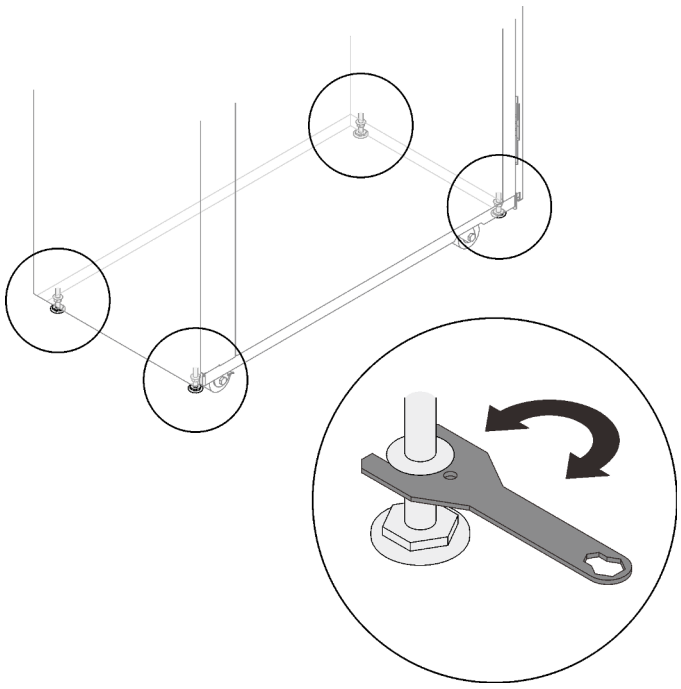

Figure 167. Shortening the leveling pads

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.

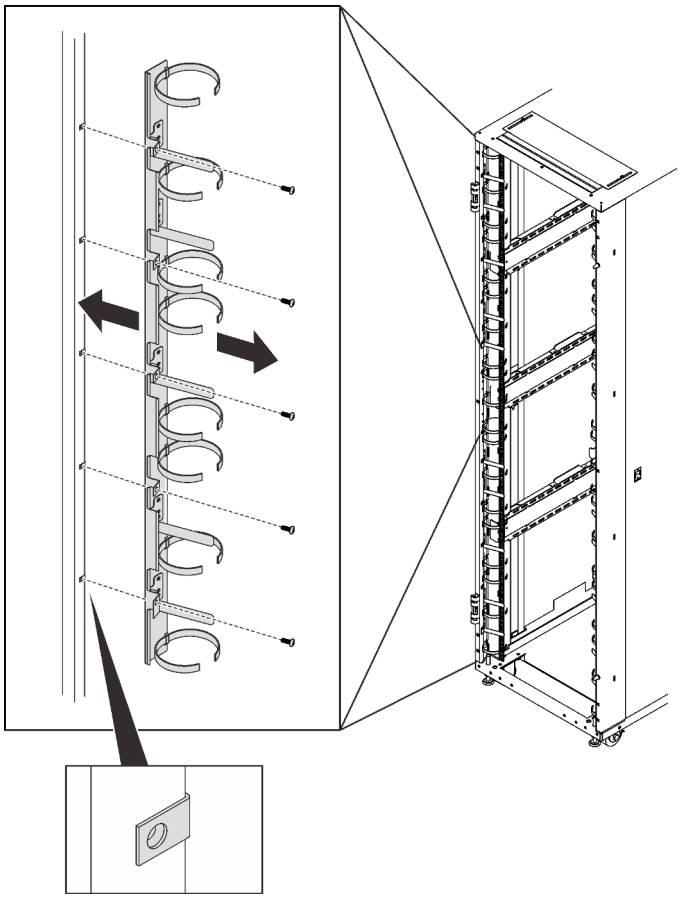

Figure 168. Removing a 21U front cable management bracket

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.

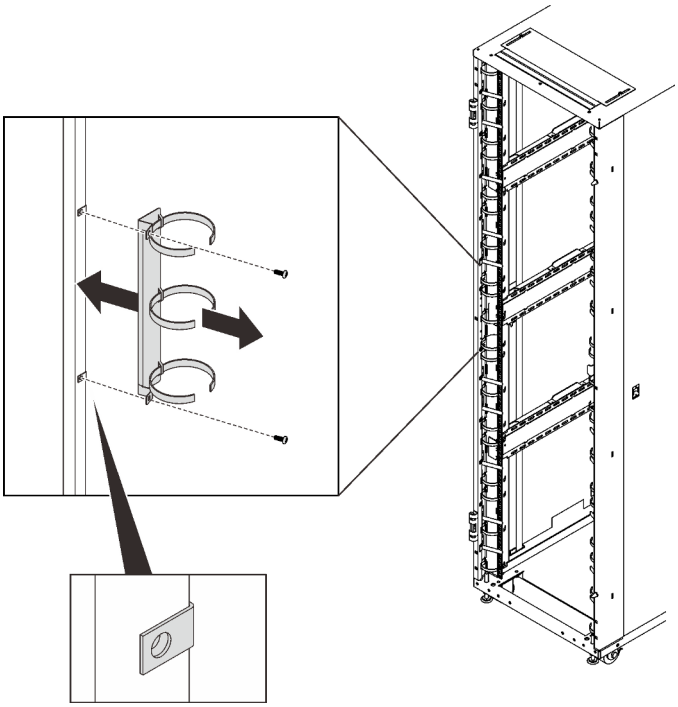

Figure 169. Removing a 6U front cable management bracket

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.

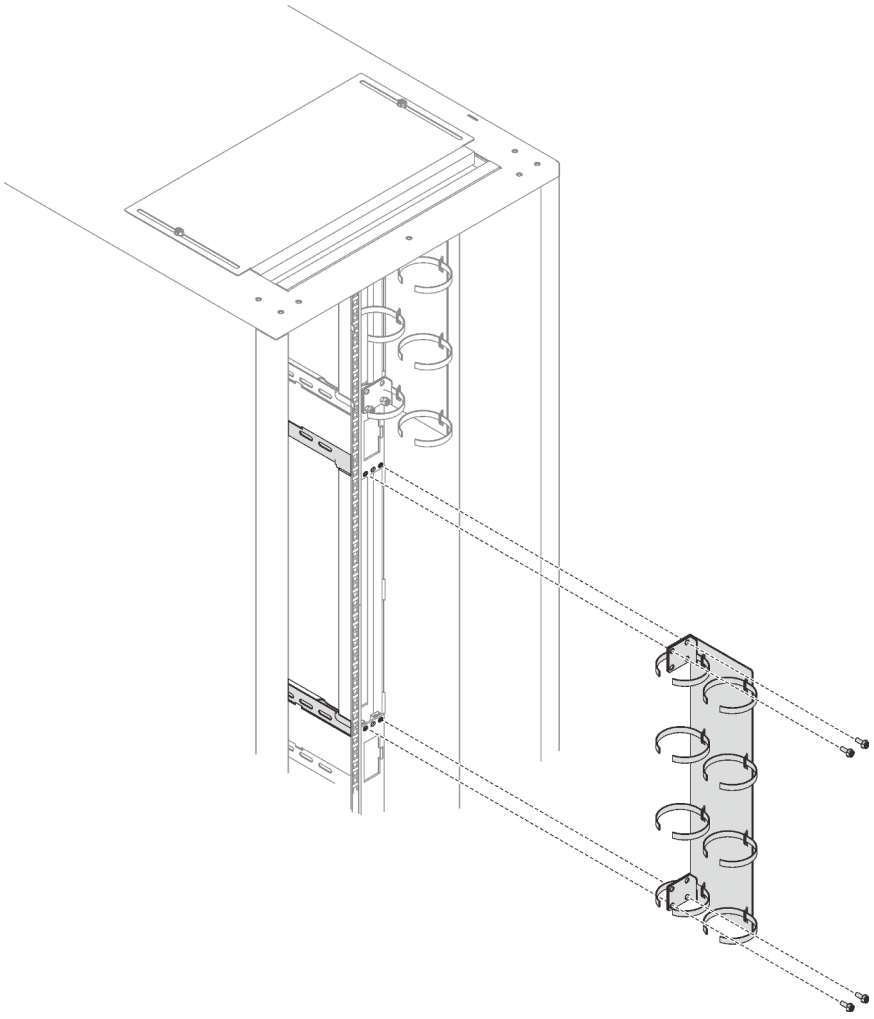

Figure 170. Removing a rear cable management bracket

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.

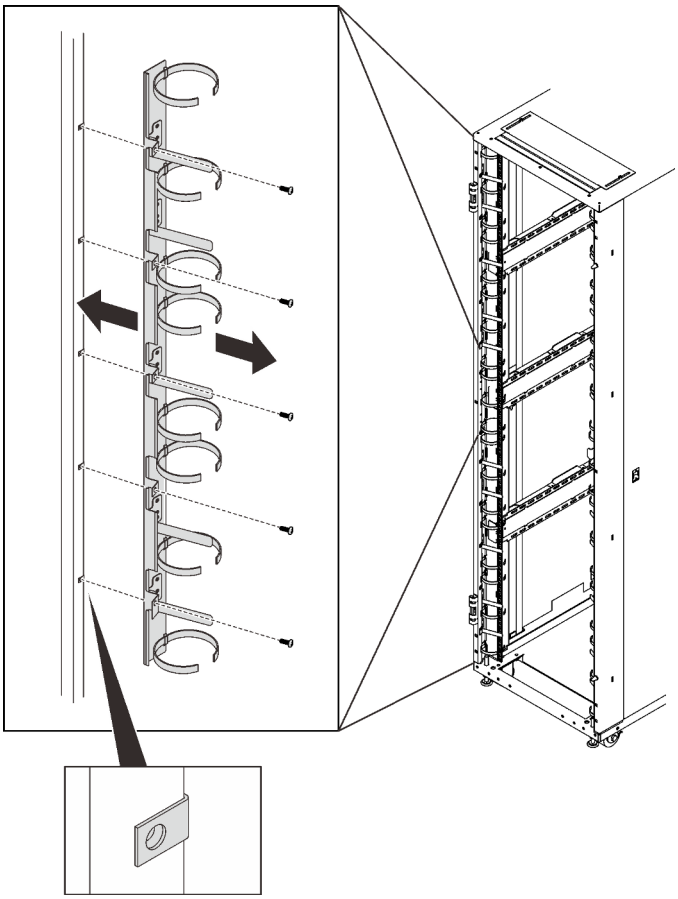

Figure 171. Installing a 21U cable strap module

Install a 6U front cable management bracket

Procedure

Step 1. Install two clip nuts, and secure the front cable management bracket with two screws.

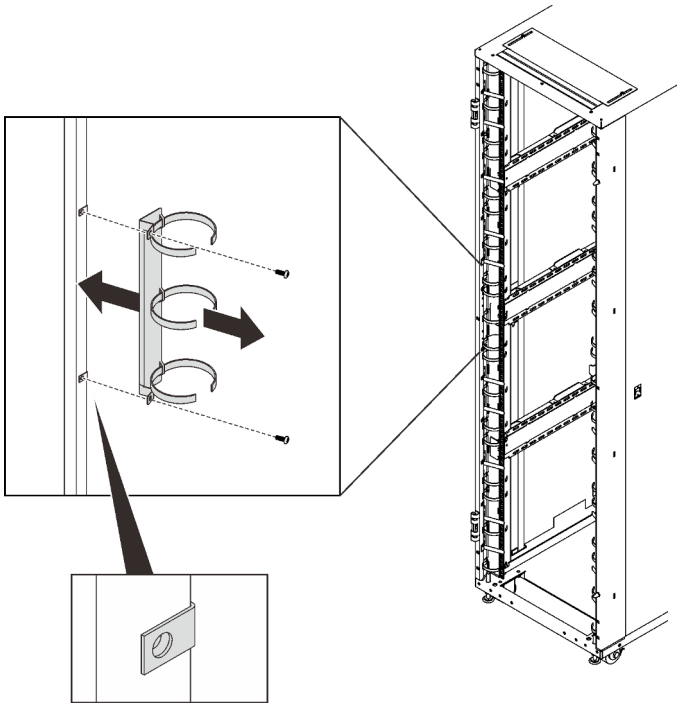

Figure 172. Installing a 6U front cable management bracket

Install a rear cable management bracket

Procedure

Step 1. Secure the rear cable management bracket to the side pocket with four screws.

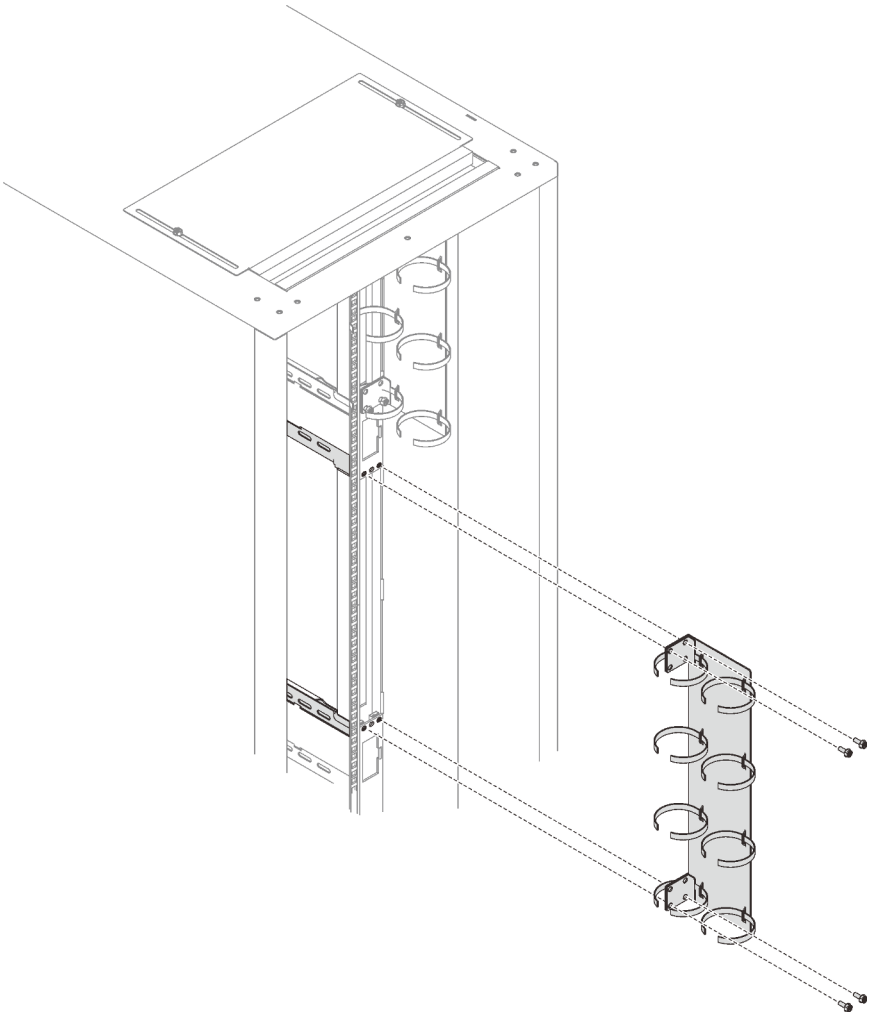

Figure 173. Installing a rear cable management bracket

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.

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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/supportphonelist for your region support details.

Appendix B. Notices

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