DataDirect™
N E T W O R K S

42U/45U
28" Wide Rack

Installation & Service Guide

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Preface

What is in this Guide

This guide provides installation and maintenance information that is specific to the DataDirect Networks 42U/45U 28" wide racks.

Who should use this Guide

This guide should be used by service representative to install or repair the 42U/45U racks.

Rack System Precautions

Elevated Operating Ambient Temperature

The rack design should take into consideration the maximum operating ambient temperature for the unit.

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the system in an environment compatible with the system's maximum rated ambient temperature.

Reduced Air Flow

Installation of the system in a rack should be such that the amount of air flow required for safe operation of the system is not compromised.

Mechanical Loading

Mounting of the system in the rack should be such that a hazardous condition does not occur due to uneven mechanical loading. The rack design should incorporate stabilizing features suitable to prevent the rack from tipping during installation.

When loading a rack with the enclosures, fill the rack from the bottom up and empty from the top down.

The rack design should incorporate stabilizing features suitable to prevent the rack from tipping or being pushed over in normal use.

Circuit Overloading

Consideration should be given to the connection of the system to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring.

The rack should have a safe electrical distribution system. It must provide overcurrent protection for the unit and must not be overloaded by the total number of units installed in the rack. Consideration of the units nameplate rating should be used when addressing these concerns.

Reliable Earthing

Reliable earthing of rack-mounted systems should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power distribution units).

The electrical distribution system must provide a reliable earth for each unit and the rack.

The design of the electrical distribution system must take into consideration the total earth leakage current from all the power supplies in all the units. The rack will require labeling with "HIGH LEAKAGE CURRENT. Earth connection essential before connecting supply".

Rack Relocation

Observe the following precautions when you need to relocate your rack:

- Before you add or remove drawers, always lower the leveling feet and install the anti-tip plates, or have the rack bolted to the floor.

- Always install drawers at the bottom of the rack first.

- Always remove drawers from the top of the rack first.

- Always install the heaviest drawers on the bottom of the rack.

- Never push on the sides of the rack.

Table of Contents

1   Installing the Rack

This chapter contains the procedures for installing the rack and preparing it for operation.

1.1   Site Pre-Installation Inspection

Warning

Given the weight and size of the rack, it is possible that the rack may tip over while moving.

The rack must be removed from the shipping crate using a minimum of 2 people. The rack may not be tipped more than 10 degrees, either from a level surface or rolling down an incline (ramp).

Before a rack can be installed, a site inspection needs to be done and questions need to be answered to assure a successful installation.

Questions to answer:

1. Where will the crate be dropped off ?

2. Are there obstacles in the way at drop off point, such as steps and slope, complicating rack removal from crate ?

3. Can the rack be wheeled to destination without obstacles such as low door hangs and low building components ?

4. Is a sufficient power source installed and appropriate for customers desired configuration ?

5. Are temperature, BTU cooling, and humidity of the room appropriate ?

6. Are the floor tiles rated properly to hold the rack weight ?

If any of these questions are not fully addressed, precautionary measures might be needed at time of product deployment to create a successful installation.

1.2   Shipment and Handling Verification

1.   Verify that the information on the shipping label is correct (Figure 1). This should be the same as your sales order.

Figure 1. Shipping Label

2.   Visually inspect the crate for signs of external damage. If you detect any problems, please report it to Customer Service.

3.   There are two tilt monitors attached to the left and front of the crate to indicate if the crate has been tipped over in transit (Figure 2). Verify that the arrow window on **both** monitors are clear. If not, report the problem to Customer Service.

Figure 2. Tilt Monitors

1.3   Unpacking

CAUTION !   When transporting the crate, insert forklift from the two sides of crate only (Figure 3). To prevent the pallet jack from breaking the crate base, only insert forklift 3/4 way in (Figure 4).

Figure 3. Using Forklift on Crate

Insert Forklift from Side of Crate Only

Figure 4. Inserting Forklift

Insert Forklift 3/4 Way In Only

> **NOTE :** Make sure you have enough space in front of the crate. The crate door will be used as a ramp for rolling out the rack.

Tools Required:

- Cutter/scissors
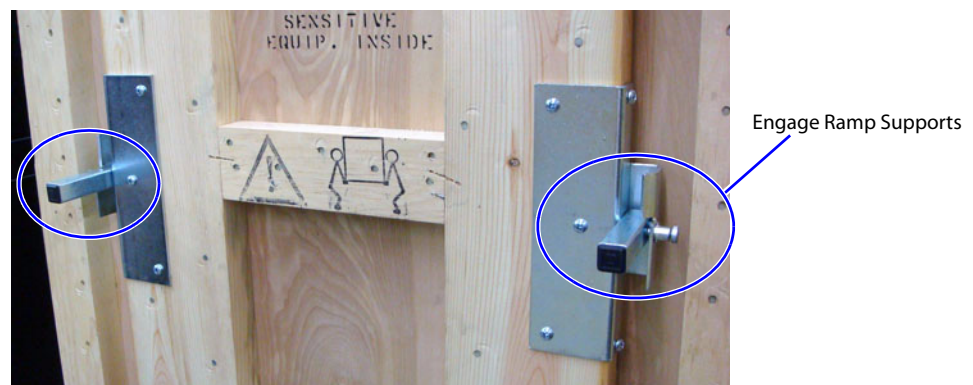
- 3/4" Wrench

- 3/16" Allen wrench

1. Cut the center fastening strip as shown in Figure 5. Do NOT cut the other two strips.
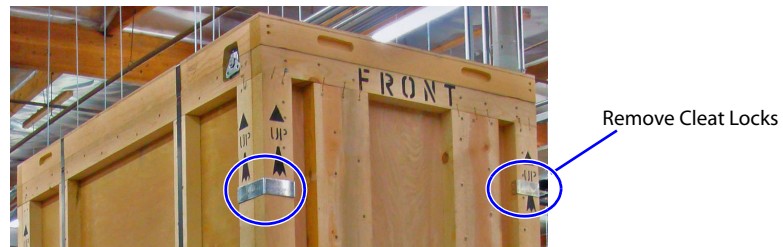
Figure 5. Opening the Shipping Crate

DO NOT CUT

Cut Center Strip Only

2. Engage the two ramp supports on front panel—pull the pin out, turn the swivel leg up and release pin to lock (Figure 6).

Figure 6. Engage Ramp Supports

Engage Ramp Supports

3. Remove the 2 metal cleat locks near top of panel (Figure 7).

Figure 7. Remove Metal Cleat Locks

Remove Cleat Locks

4. Disengage the two link locks at top on both sides—lift up the flap and turn counter-clockwise. Then flip open the top panel (Figure 8).

Figure 8. Disengage Link Locks and Open Top Panel

Flip Open Top Panel

Disengage Lock
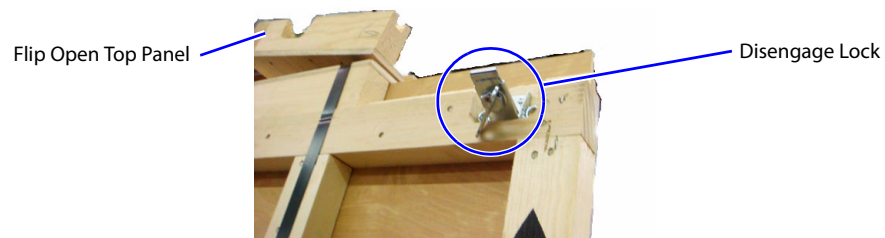
5. Lift and pull out the front panel (Figure 9). Lay the panel on the floor and align the holes in ramp top with bolts on base.

Figure 9. Set Front Panel as Ramp

Pull Out Front Panel

Align Holes with Bolts

6. Remove the ramp extension panel from left side of crate (Figure 10). Place the extension at end of ramp, making sure the two velcro fasteners are secured.

Figure 10. Set Up Ramp Extension

FORKLIFT FROM SIDES ONLY

Ramp Extension Panel

Fasten Velcro
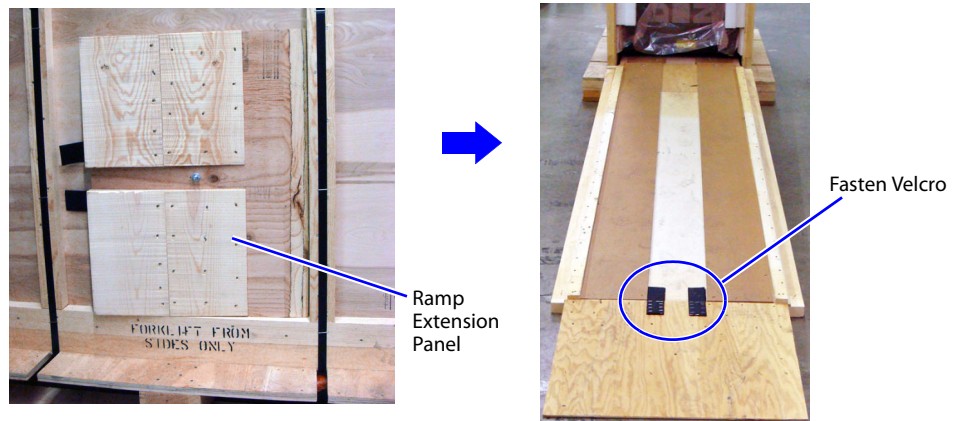
7. Remove the 2 metal cleat locks from rear panel (Figure 11). Remove and set panel aside.

Figure 11. Remove Metal Cleat Locks

Remove Metal Cleat Locks

8. Verify that the 4 leveling feet at the bottom corners of rack are raised to the maximum height so they will not scratch the floor when the rack is moved (Figure 12). Use the wrench to adjust if necessary.

Figure 12. Leveling Foot Position

Leveling Foot
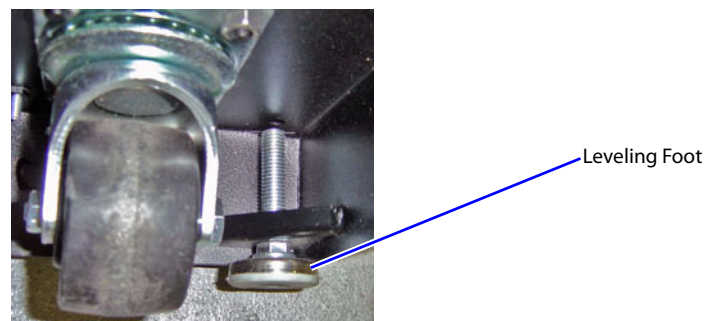
9. Remove the 2 foam pads at front (Figure 13).

Figure 13. Remove Foam Pads

Foam Pad

10. With the help of your partner, push the rack out from the rear side while the other person steer the rack down the ramp from front (Figure 14).

11. Once the rack is rolled onto the floor, remove the plastic cover. Then reassemble the crate.

Figure 14. Pushing Out the Rack

Push Out from Rear

Steer Down from Front

12. Remove the stiffener panels that are attached to the rack for shipment (Figure 15).

Figure 15. Remove Stiffener Panels
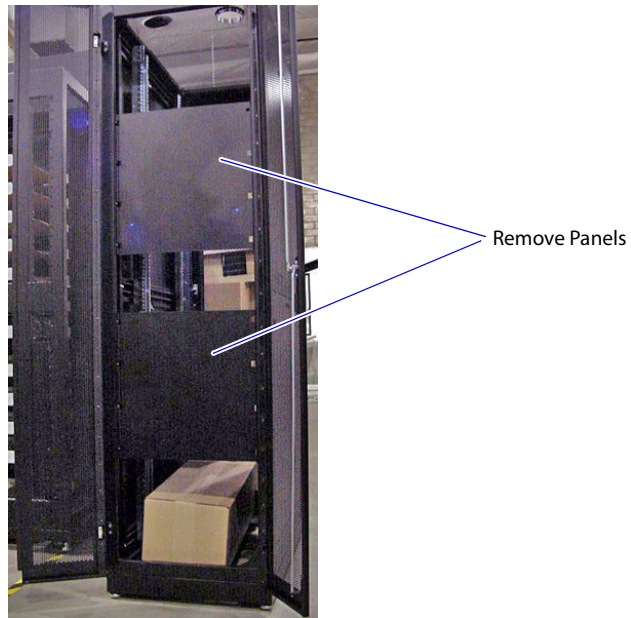
13. Verify that the locks on the side panels are engaged (Figure 16).

CAUTION !	The side panels can potentially be a hazard when they become unlatched. It is highly recommended that you lock the side panels if they are installed.

Figure 16. Locks on Side Panels
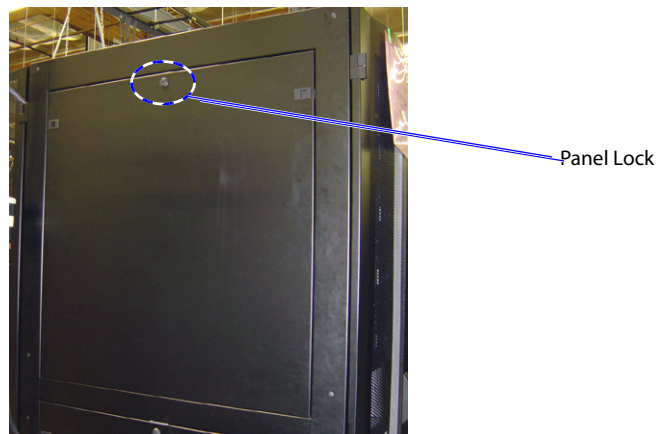
1.4   Positioning the Rack

1.4.1   42U Rack Service Clearance

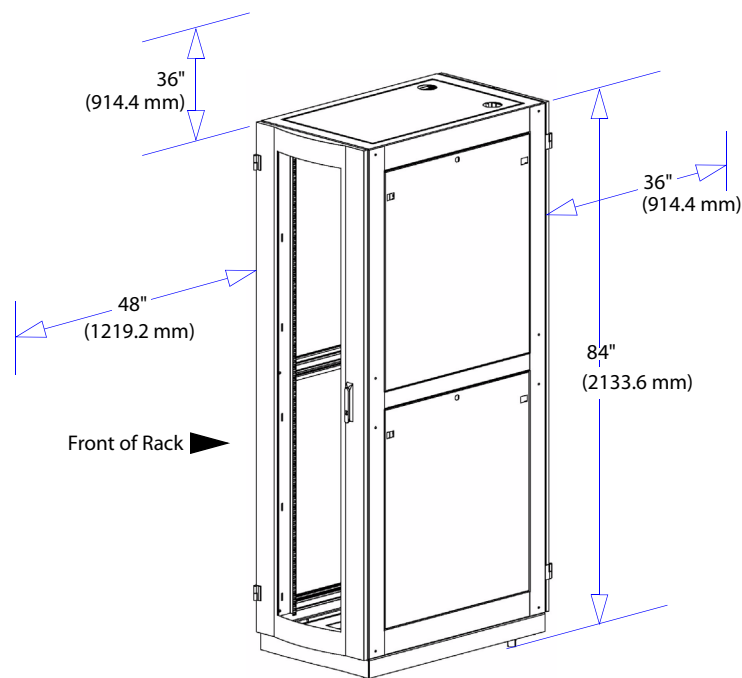For 42U racks populated with 16-bay enclosures, the recommended service clearances are given in Table 1 (Figure 17).

Table 1. 42U Rack Service Clearance

Location	Clearance
Front	48" (1219.2 mm) when using 16-bay enclosures[a]
Rear	36" (914.4 mm)
Side	None
Height	84" (2133.6 mm)
Above top of rack	36" (914.4 mm)[b]

a.   Extra clearance is needed to faciliate the movement of mechanical lift when replacing the top enclosures. Please refer to your mechanical lift specifications for ground clearance information.

b.   Use of hard hat is recommended when servicing the top enclosures in low-ceiling environments.

NOTE :   The service clearance is only one of the factors used to determine floor layout. Cooling is another major factor that must be considered for your specific site/facility.

Figure 17. 42U Rack Service Clearance

1.4.2   45U Rack Service Clearance

For 45U racks populated with 48-bay or 60-bay enclosures, the recommended service clearances are given in Table 2 (Figure 18) .

Table 2. 45U Rack Service Clearance

Location	Clearance
Front	54" (1371.6 mm) when using 48-bay or 60-bay enclosures[a]
Rear	36" (914.4 mm)
Side	None
Height	89" (2260.6 mm)
Above top of rack	36" (914.4 mm)[b]

a. Extra clearance is needed to faciliate the movement of mechanical lift when replacing the top enclosures. Please refer to your mechanical lift specifications for ground clearance information.

b. Use of hard hat is recommended when servicing the top enclosures in low-ceiling environments.

NOTE :   The service clearance is only one of the factors used to determine floor layout. Cooling is another major factor that must be considered for your specific site/facility.
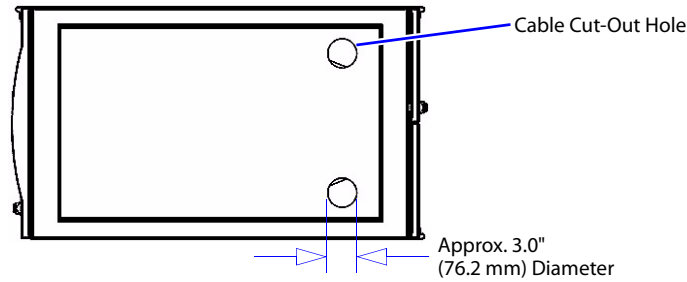

Figure 18. 45U Rack Service Clearance
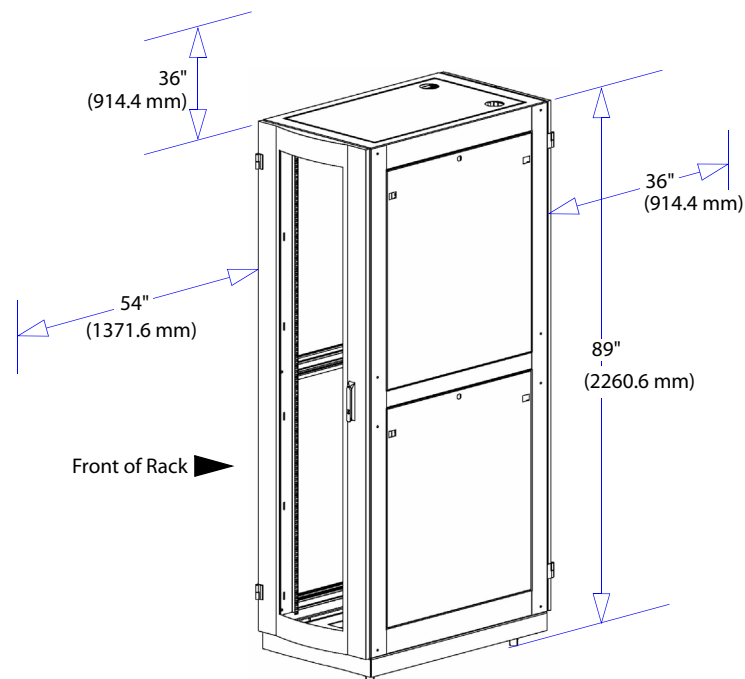
1.4.3 Cable Management

There are cut-out holes, approximately 3.0" (76.2 mm) in diameter, on the top panel for passing cables into the rack from above (Figure 19).

Figure 19. Top View of Rack

Cable Cut-Out Hole

Approx. 3.0"
(76.2 mm) Diameter

If you plan to pass the cables into the rack from underneath the floor, the recommended cut-out is 6" × 6" in the rear of the tile on which the rack is positioned. Figure 20 illustrates the location for the cut-out. Figure 21 shows the location of the castors at the bottom of rack.
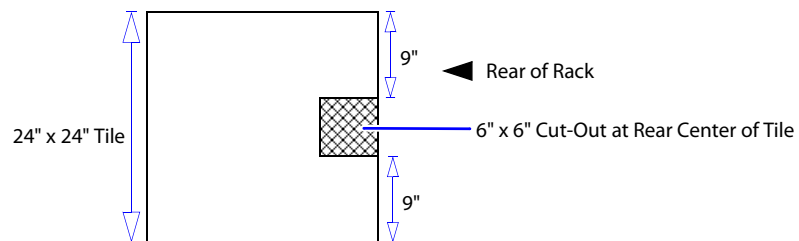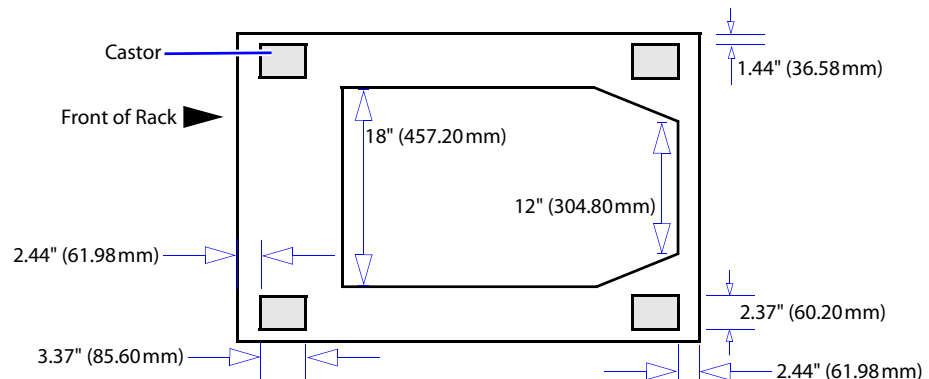
Figure 20. Location of Cable Cut-Out in Floor

9"

Rear of Rack

24" x 24" Tile

6" x 6" Cut-Out at Rear Center of Tile

9"

Figure 21. Location of Castors (Viewed from Top of Rack)

Castor

1.44" (36.58 mm)

Front of Rack

18" (457.20 mm)

12" (304.80 mm)

2.44" (61.98 mm)

2.37" (60.20 mm)

3.37" (85.60 mm)

2.44" (61.98 mm)

1.5 Leveling the Rack

> **NOTE :** If you are joining multiple racks, skip this section and proceed to Section 1.6.

Tools Required:

- 3/4" Wrench
- Level

Once the rack is placed at the desired location, it must be properly leveled. There are four leveling feet at the corners of the rack, next to the wheels.

1. Rotate each leveling foot by hand with a quick "spinning wheel" motion to lower the foot (Figure 22). *Note: A slow rotation or pulling down of the foot does not engage the thread*.

Figure 22. Leveling Foot on Rack
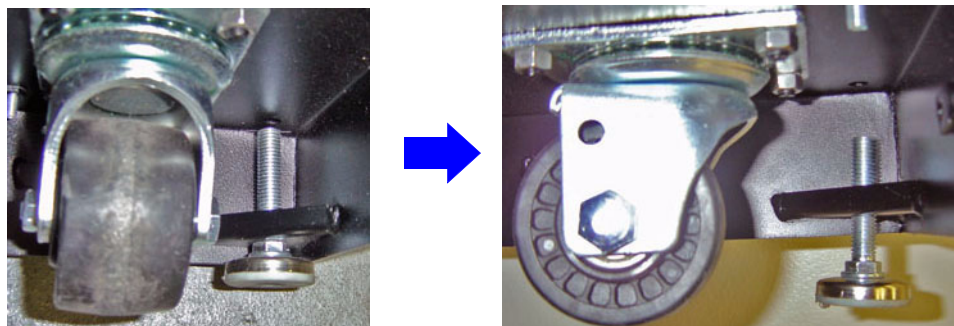
2. Keep turning the leveling foot down by hand until it touches the floor (Figure 23). Then use the wrench to adjust and tighten the leveling nut until the wheel next to the leveling foot is completely off the floor.

Figure 23. Leveling the Rack
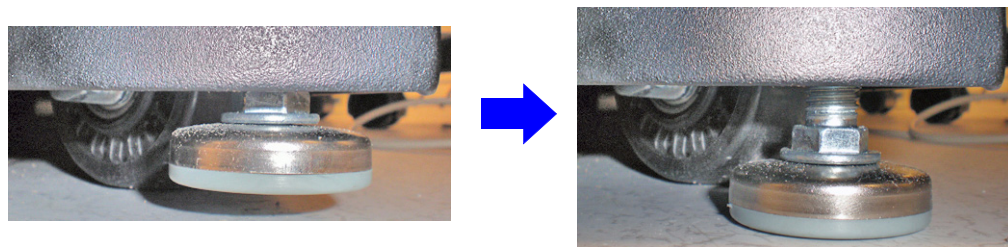
3. Repeat Steps 1 and 2 above for the other 3 leveling feet.

4. Checking with a level, adjust the leveling nuts as needed until the rack is level.

> **NOTE :** All caster wheels must be completely off the floor so only the leveling feet are supporting the rack.

1.6 Joining Multiple Racks

Follow these steps to join two or more racks together side-by-side.

Parts List:

- 11-00154-016   Bolt, 1/4-20×1.0", HEX, PSZ, RoHS   [Qty 4]
- 13-R0039-001   Washer, ID.315, OD.74, THK.06, PSZ, RoHS   [Qty 8]
- 12-R0019-001   Nut, Wing, 1/4-20, HEX, PSZ, RoHS   [Qty 4]

Tools Required:

- 7/16" socket wrench or 7/16" open-end wrench
- #2 Phillips screwdriver
- Step-ladder

Procedure:

1. Remove the two "inside" (sides to be joined) side panels from racks—disengage the locks, then release the latches and pull the panel out and up (Figure 24). Store the side panels for future use if desired.

2. On both racks, push out the 8 hole covers in each corner of the exterior frame (Figure 24).

Figure 24. Removing the Side Panels and Hole Covers
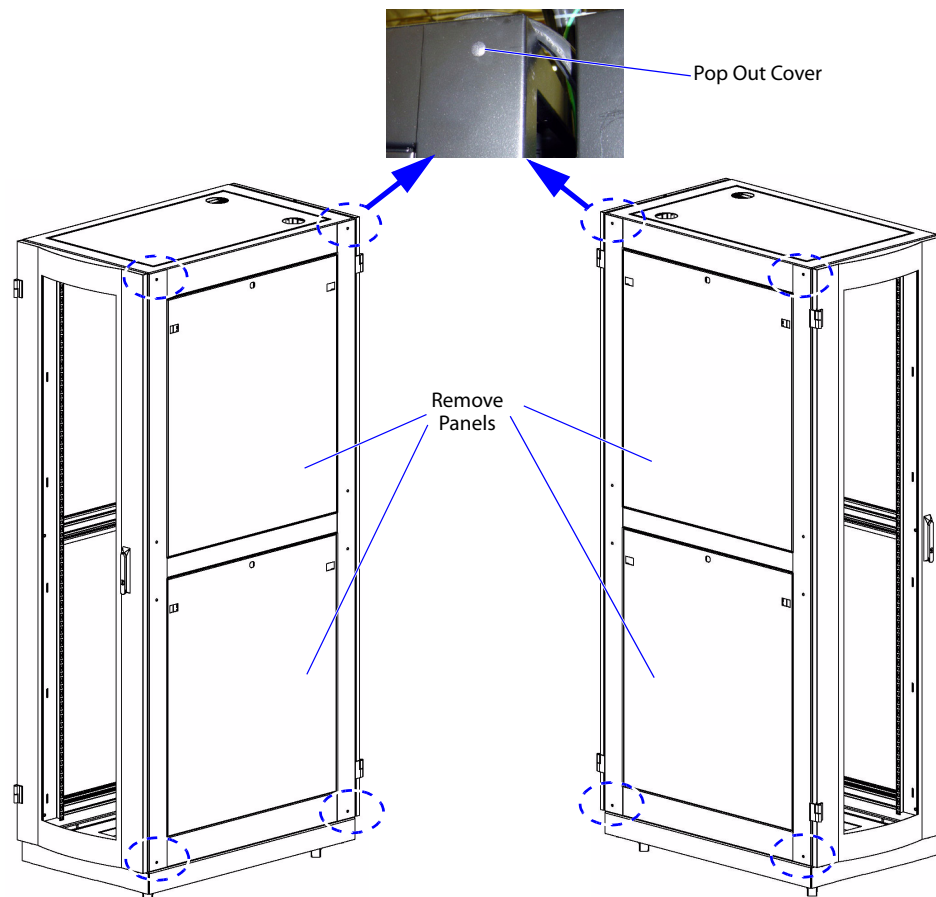
3. Using the screwdriver, remove the filler panel on bottom of rack (Figure 25).

Figure 25. Remove Filler Panel

Filler Panel Removed
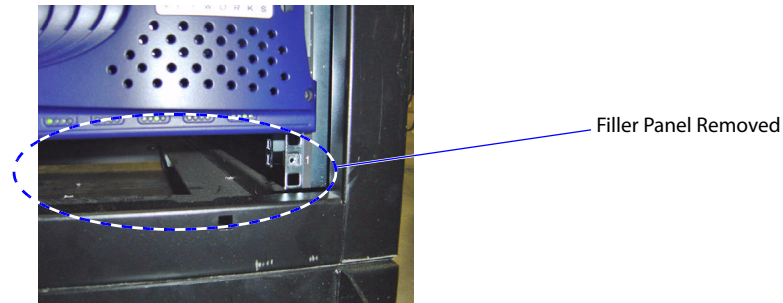
4. Align the racks side by side with frames touching.

5. Stand on the step-ladder. Remove all four screws from each top screen (Figure 26). Then slide the screens back for easier access to holes at top front.

Figure 26. Slide Back Top Screen

Slide Screen Back

Remove Screws at 4 Corners of Screen
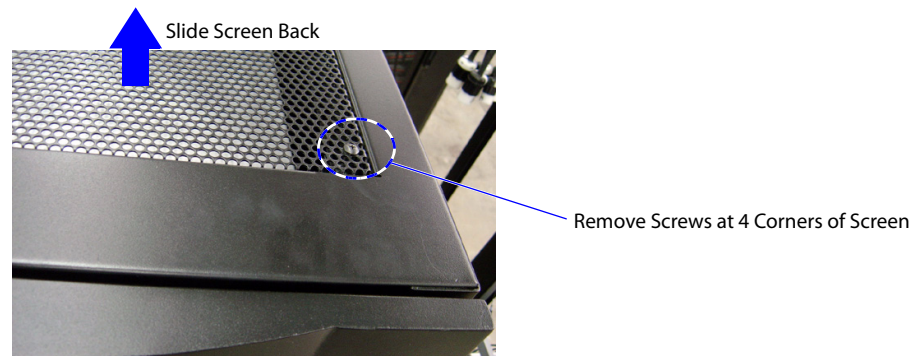
6. Insert one washer on each bolt.

7. Insert each bolt with washer through both racks, from the inside of one rack out and into the adjacent rack.

8. Then secure each bolt with one washer and wing nut. Tighten until snug using the 7/16" wrench.

9. Replace the top screens and screws.

10. Replace the filler panels at bottom of racks.

1.7   Attaching Anti-Tip Plates

|	
CAUTION !	Anti-tip plates must be firmly attached to the bottom of the rack to prevent the rack from tipping over when the drawers are pulled out of the rack.

Tools Required:

- 7/16" wrench

Each kit includes 3 anti-tip plates and 6 bolts. The three plates are to be attached to the bottom sides and front of the rack. For joined-rack configuration, plates will be attached to the sides of the two end units and front of each rack.

1. Place the short anti-tip plate at bottom front of rack, aligning the holes (Figure 27). Using the 7/16" wrench, attach 2 bolts to fasten plate to rack.

Figure 27. Attaching Anti-Tip Plates to Bottom of Rack

Attach
Bolt Here
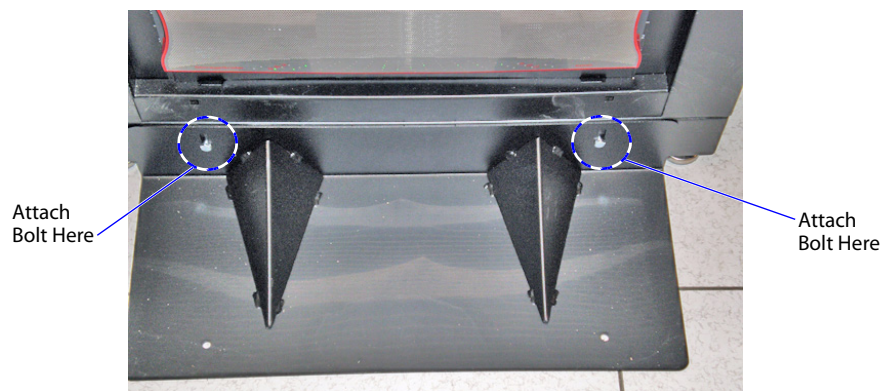
Attach
Bolt Here

2. Similarly, attach the two long plates to the bottom sides of rack. For joined-rack configuration, attach the long plates to the sides of the two end units.

1.8   Powering On the Rack

1. Make sure you have performed all the grounding checks.

2. Verify that your ac power source is ready.

3. Plug in all the enclosure power cords to the PDUs.

4. Connect the power cord of each PDU to your ac power outlets.

5. Turn on all switches on each PDU and verify that the 2 power LEDs on each PDU are on.

6. Follow the power on procedures for your enclosures.

2 Power Distribution Units

This chapter provides information on the power distribution unit (PDU) used with the racks.

2.1 Types of PDU

Power is distributed to the disk enclosures and controllers in the rack by the PDUs. The PDUs must be installed in pairs. There are 8 PDUs installed in the 45U rack and 4 PDUs installed in the 42U rack.
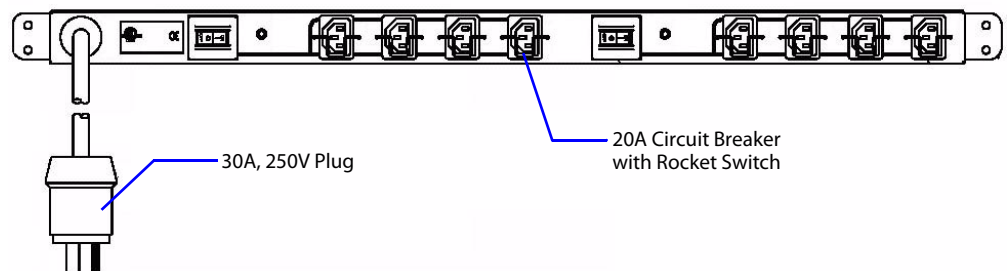
Two types of PDU are supported:

- IEC 309 plug type has $8 \times$ IEC 320-C13, 200-240V receptacles and 2 power switches (Figure 28)

Figure 28. IEC 309 PDU

30A, 250V Plug

20A Circuit Breaker with Rocket Switch
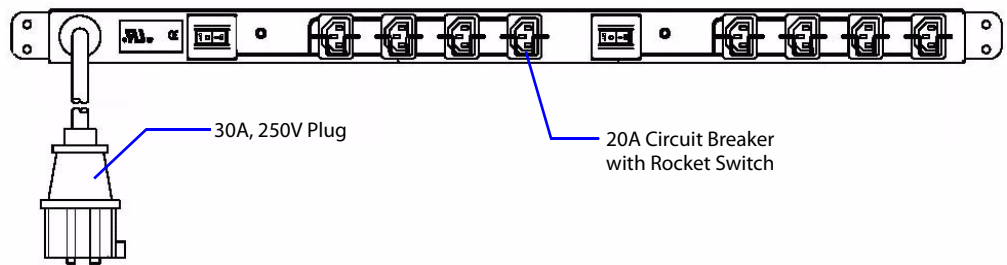
- NEMA L6-30P plug type has $8 \times$ IEC 320-C13, 200-240V receptacles and 2 power switches (Figure 29)

Figure 29. NEMA L6-30P PDU

30A, 250V Plug

20A Circuit Breaker with Rocket Switch

2.1.1 Field Replaceable Units

These PDU are field replaceable. The part numbers are:

- PDU-30A-USA-R
- PDU-30A-EUR-R

3   Servicing the Racks

This chapter provides information on product specifications and how to replace the PDUs and doors on the racks.

3.1   Product Specifications

42U Wide Rack Specifications		
Height:		84" (2133.6 mm)
Depth:	With front and rear doors installed Less front and rear doors	44" (1117.6 mm) 42" (1066.8 mm)
Width:	With side panels installed	28" (711.2 mm)
Weight:	Empty rack	380 lbs (172.73 kg)
	Max. weight with ten 16-bay enclosures and controller couplet	1216 lbs (552.73kg)
	Max. weight with ten 16-bay enclosures only	1108 lbs (503.64 kg)
	Max. weight with five 48-bay enclosures and controller couplet	1305 lbs (593.18 kg)
	Max. weight with five 48-bay enclosures only	1197 lbs (544.09 kg)

45U Wide Rack Specifications		
Height:		89" (2260.6 mm)
Depth:	With front and rear doors installed Less front and rear doors	44" (1117.6 mm) 42" (1066.8 mm)
Width:	With side panels installed	28" (711.2 mm)
Weight:	Empty rack	610 lbs (277.27 kg)
	Max. weight with ten 48-bay enclosures and controller couplet	2418 lbs (1099.09 kg)
	Max. weight with ten 48-bay enclosures only	2310 lbs (1050.0 kg)
	Max. weight with ten 60-bay enclosures and controller couplet	3090 lbs (1403.67 kg)
	Max. weight with ten 60-bay enclosures only	3010 lbs (1367.27 kg)

## 3.2 Replacing the PDU

Tools Required:

- 7/16" wrench

- 3/8" wrench

- #2 Phillips screwdriver

There are 4 PDUs installed in the 42U rack, two on each side attached to a mounting rail. There are 8 PDUs installed in the 45U rack, four on each side attached to two mounting rails. A PDU can be replaced in the field if it is found to be defective.

Follow these steps to replace a PDU:

1. For 45U rack, pull all the enclosures out about 8" at the front.

2. Turn off all power switches on the defective PDU and unplug it from the ac power source.

3. Determine which power supply modules must be turned off to service the defective PDU. Then turn off those modules and unplug their power cords from the defective PDU.

4. Using the 7/16" wrench, remove the top, middle, and bottom bolts from the PDU mounting rail (Figure 30). Be careful to support the mounting rail after you have removed the bolts.

Figure 30. Remove Bolts from PDU Mounting Rail
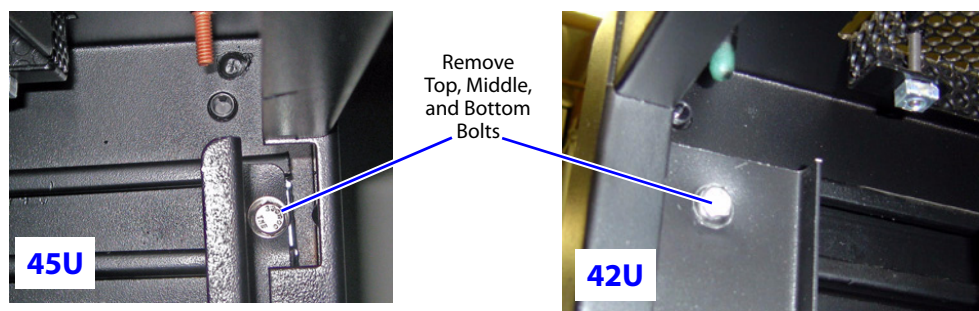
5. Flip over the mounting rail. Using the 3/8" wrench and #2 Phillips screwdriver, remove the 2 screws and nuts to detach the defective PDU from mounting rail (Figure 31).

Figure 31. Remove Screws and Nuts from PDU
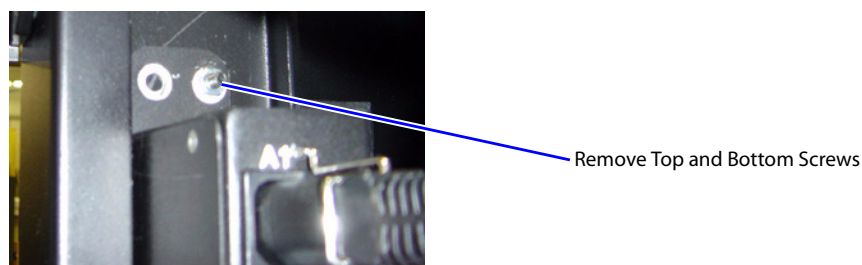
6. Attach the replacement PDU to the mounting rail using the 2 screws and nuts.

7. Attach the mounting rail to rack using the 3 bolts.

8. Connect the power supply modules' power cords to the replacement PDU.

9. Connect the replacement PDU to your ac power outlet.

10. Turn on all switches on the PDU and verify that the 2 power LEDs are on.

11. Turn on the power supply modules.

12. For 45U rack, push in all the enclosures.
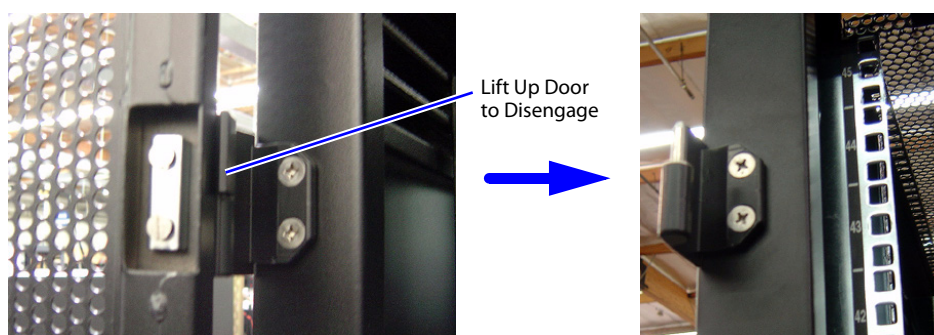
3.3   Replacing the Doors

To remove a door:

1.   Make sure the lock is disengaged. Press the lock button to release the door handle (Figure 32). Turn handle to open door.

Figure 32. Door Handle

Door Handle
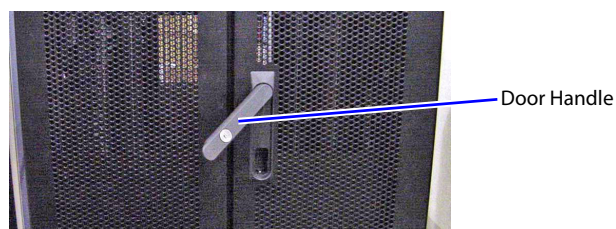
2.   Lift up to take the door off from the hinges (Figure 33).
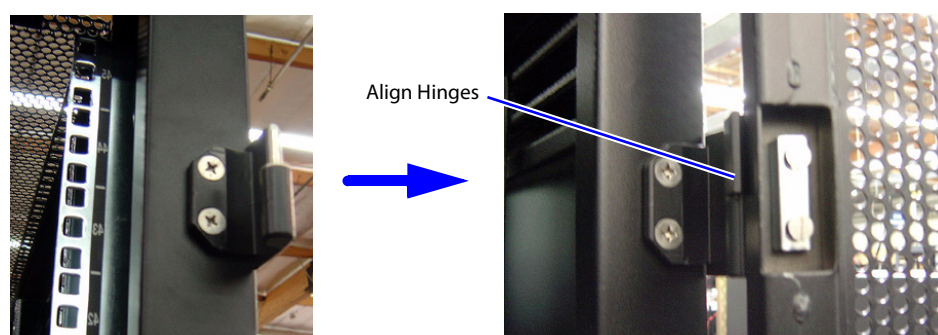
Figure 33. Door Hinge

Lift Up Door
to Disengage

To install a door:

Hold the door close to rack, aligning the top and bottom hinges (Figure 34). Then place the hinges on door over hinge pins. Make sure both hinges are completely engaged.
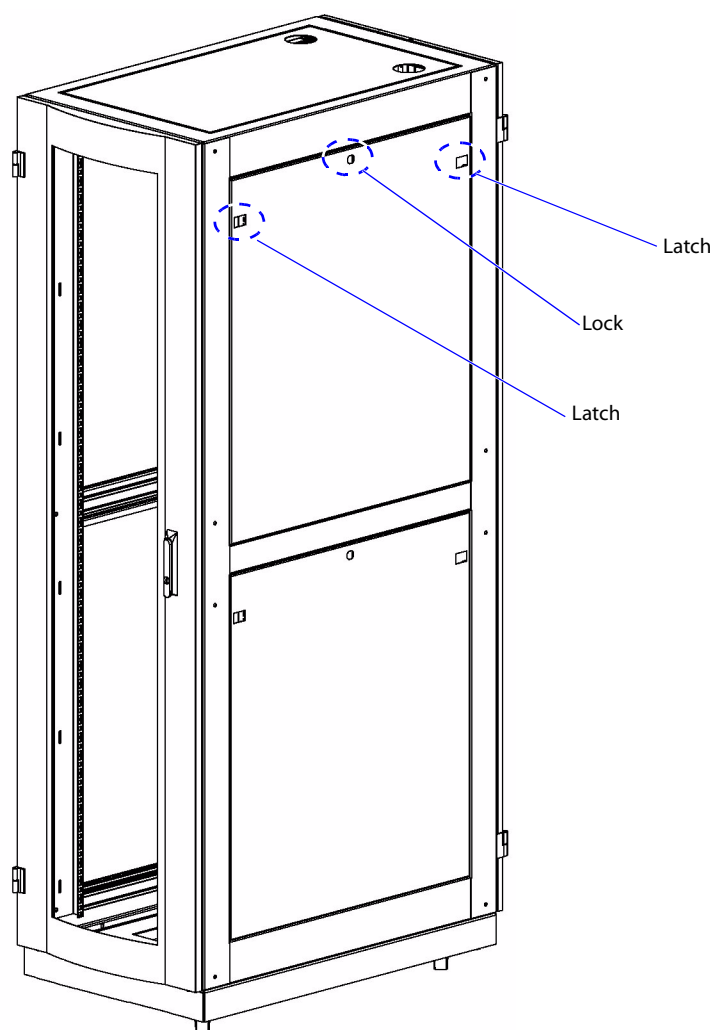
Figure 34. Front Door Top Hinge

Align Hinges

3.4 Replacing the Side Panels

To remove a side panel:

1. Make sure the lock is disengaged.

2. Press to release the two latches simultaneously (Figure 35).

3. Then pull the panel out and up.

Figure 35. Removing a Side Panel

To install a side panel:

1. Hold the panel at an angle and slide it onto the bottom edge of opening (Figure 36). Make sure the lip of the panel is fully inserted.

2. Push the panel towards the rack until the two latches are engaged.

CAUTION! The side panels can potentially be a hazard when they become unlatched. It is highly recommended that you lock the side panels if they are installed.

Figure 36. Installing a Side Panel

Bottom of Panel Must
Latch on Edge of Opening

Lip
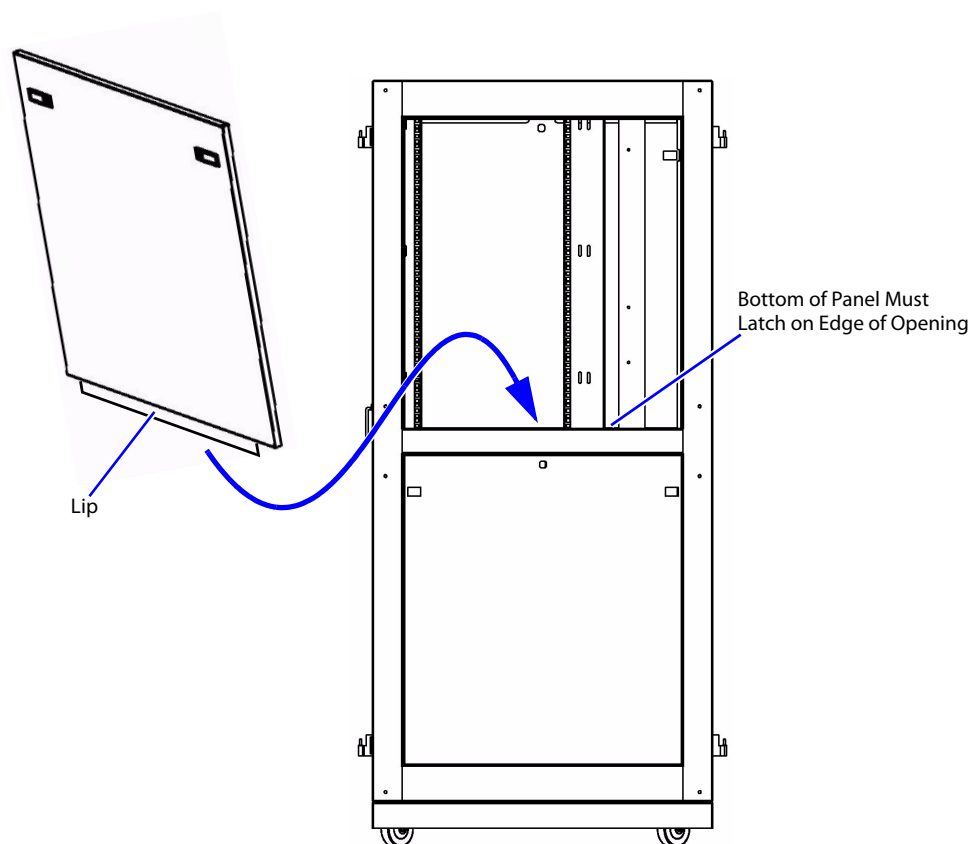
3.5   Relocating a Rack

CAUTION !	Removing components from the upper positions in the rack cabinet improves rack stability during relocation.

If needed, reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. After the rack has been relocated, restore the rack cabinet to its original configuration.

Follow these steps whenever you relocate a populated rack cabinet within a room or building.

1. Turn off all power to the rack and the system that is installed.

2. Disconnect all PDU power cords from the wall outlets and secure the power cords inside the rack.

3. Make sure that all anti-tip plates are installed.

4. Ensure that the heaviest devices are installed in the bottom of the rack cabinet.

5. Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 25U level.

6. Remove all anti-tip plates.

7. If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.

8. Ensure that all devices, shelves, drawers, doors, and cables are secure.

9. Ensure that the four leveling feet are raised to their highest position.

10. Inspect the route that you plan to take when moving the rack to eliminate potential hazards:

    - **Note:** Do not use a ramp inclined at more than 10 degrees.

    - Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to Section 3.1 on page 22 for the weight of a loaded rack cabinet.

    - Verify that all door openings are bigger than the rack. Refer to Section 3.1 on page 22 for the dimensions of rack cabinet.

11. With the help of your partner, carefully roll the rack to the new location.
    If a long distance relocation is required, restore the rack cabinet to the configuration as you received it. Pack the rack cabinet in the original packaging material, or equivalent.

Once the rack cabinet is in the new location, do the following:

1. Lower the four leveling feet.

2. Level the rack.

3. Attach the anti-tip plates to the rack cabinet.

4. If previously removed, replace all the drawers and devices to their original rack location.

4   Breaking Down the Crate

This chapter provides information on how to break down the crate for disposal.

1.   Disengage the two link locks at the top of crate (Figure 37).

Figure 37. Disengage the Two Link Locks

Disengage Locks
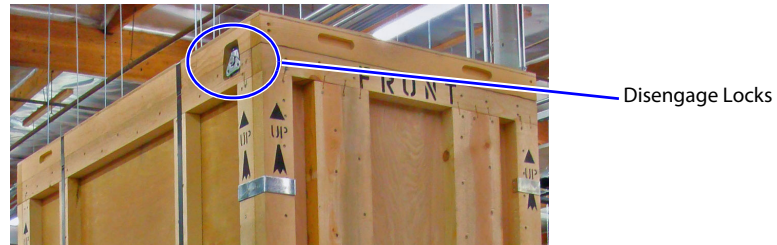
2.   Remove the front and rear panels.

3.   Carefully cut the fastening strips at 4 places on both sides as shown in Figure 38 (total 8 cuts).
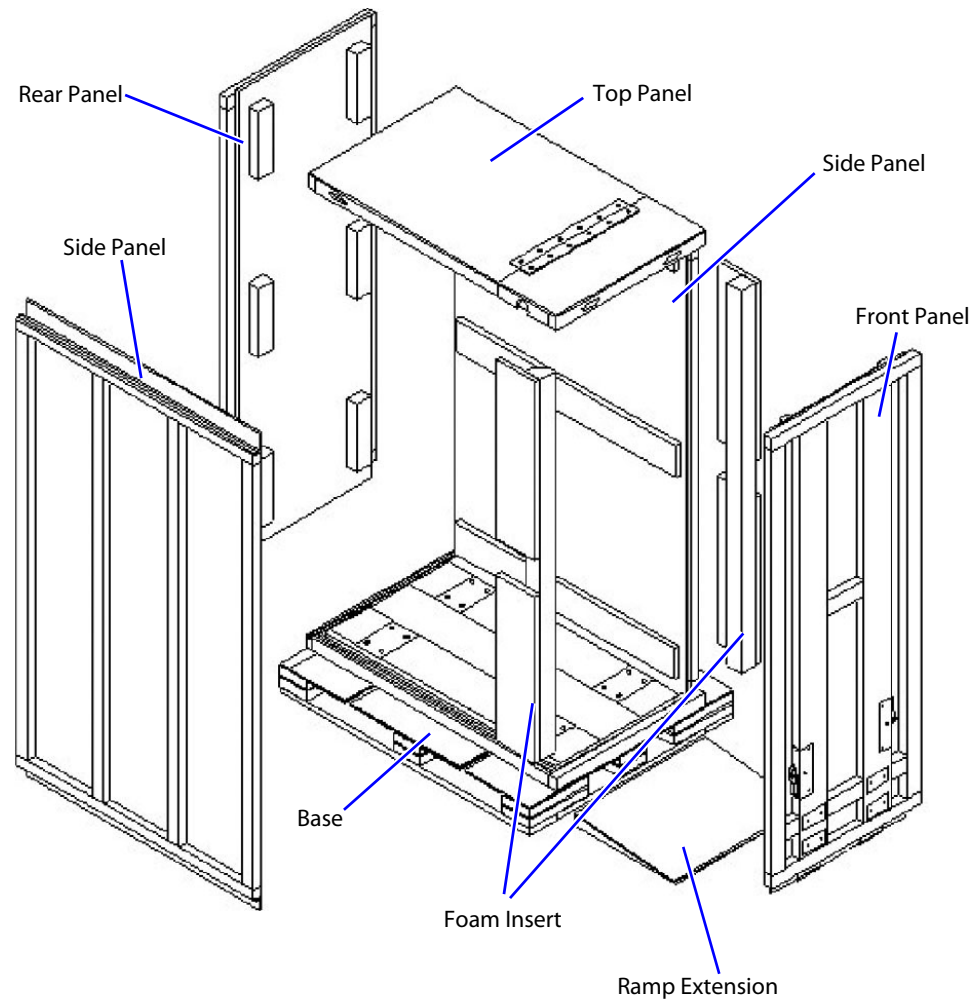
Figure 38. Cut the Fastening Strips

4.   Lift and remove the top panel.

CAUTION !   Side panels will fall freely.

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5.   Lift and pull the remaining panels off the pallet base.

6. Dispose of loose pieces—top panel, front panel, rear panel, two side panels, base, ramp extension, and two foam inserts (Figure 39).

Figure 39. Crate Panels

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