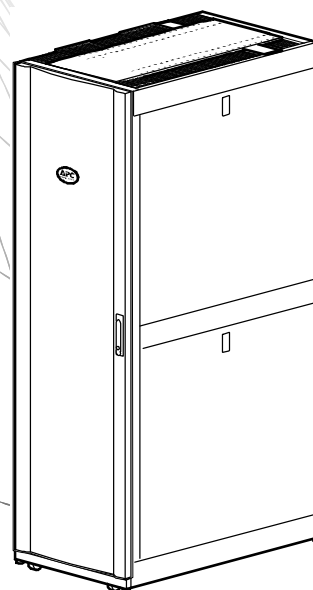




Unpacking, Installation, and Customization Manual

NetShelter[®] SX Networking Enclosure



U.S. Patent No. 7,293,666 B2
Date of Patent: November 13, 2007



This manual is available in English on the enclosed CD.

Dieses Handbuch ist in Deutsch auf der beiliegenden CD-ROM verfügbar.

Este manual está disponible en español en el CD-ROM adjunto.

Ce manuel est disponible en français sur le CD-ROM ci-inclus.

Questo manuale è disponibile in italiano nel CD-ROM allegato.

本マニュアルの日本語版は同梱の CD-ROM からご覧になれます。

Instrukcja obsługi w języku polskim jest dostępna na CD.

O manual em Português está disponível no CD-ROM em anexo.

Данное руководство на русском языке имеется на прилагаемом компакт-диске.

Bu kullanım kilavuzunun Türkçe'si, aşağıdaki gönderilen CD içerisinde mevcuttur.

您可以从包含的 CD 上获得本手册的中文版本。

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Introduction

The American Power Conversion (APC®) NetShelter® SX Networking 750-mm wide enclosures are high-quality enclosures for storage of industry-standard (EIA-310), 19-inch rack-mount hardware, which includes servers and voice, data, networking, internetworking, and APC power protection equipment. This manual covers the three APC NetShelter SX Networking 750-mm wide enclosures:

- NetShelter SX Networking 42-U, 750-mm wide, 1070-mm deep enclosure (AR3140)
- NetShelter SX Networking 42-U, 750-mm wide, 1200-mm deep enclosure (AR3340)
- NetShelter SX Networking 48-U, 750-mm wide, 1200-mm deep enclosure (AR3347)

Safety Warnings and Cautions

Observe all Warnings and Cautions in this manual, plus the following.



Tip Hazard: This equipment is easily tipped. Use extreme caution when unpacking or moving.



Heavy: Use at least two people to unpack the enclosure.



Warning: To avoid damage or injury, do not use the roof as a walkway.

Unpacking the Enclosure

Disclaimer

American Power Conversion is not responsible for damage sustained during reshipment of this product.

Receiving inspection

Inspect the package and contents for shipping damage, and make sure that all parts were sent. Report any damage immediately to the shipping agent. Report missing contents, damage, or other problems immediately to APC or your APC reseller.

Please Recycle



The shipping materials are recyclable. Save them for later use, or dispose of them appropriately.

Procedure

1. Move the shipping pallet to a firm, level surface in an open area. Inspect for visible signs of shipping damage. If you detect shipping damage, contact APC Customer Support using the contact information on the back cover of this manual.
2. See the label on the packaging to determine where to cut the wrapping. Using sturdy shears or a utility knife, carefully remove the plastic stretch wrap surrounding the enclosure.
3. Remove the four cardboard corner protectors.
4. Remove and retain the two pallet-mounting brackets with mounting hardware that anchor the enclosure to the shipping pallet. Use a 13-mm wrench (not provided).



Note: Save the pallet-mounting brackets if you plan to bolt the enclosure to the floor.

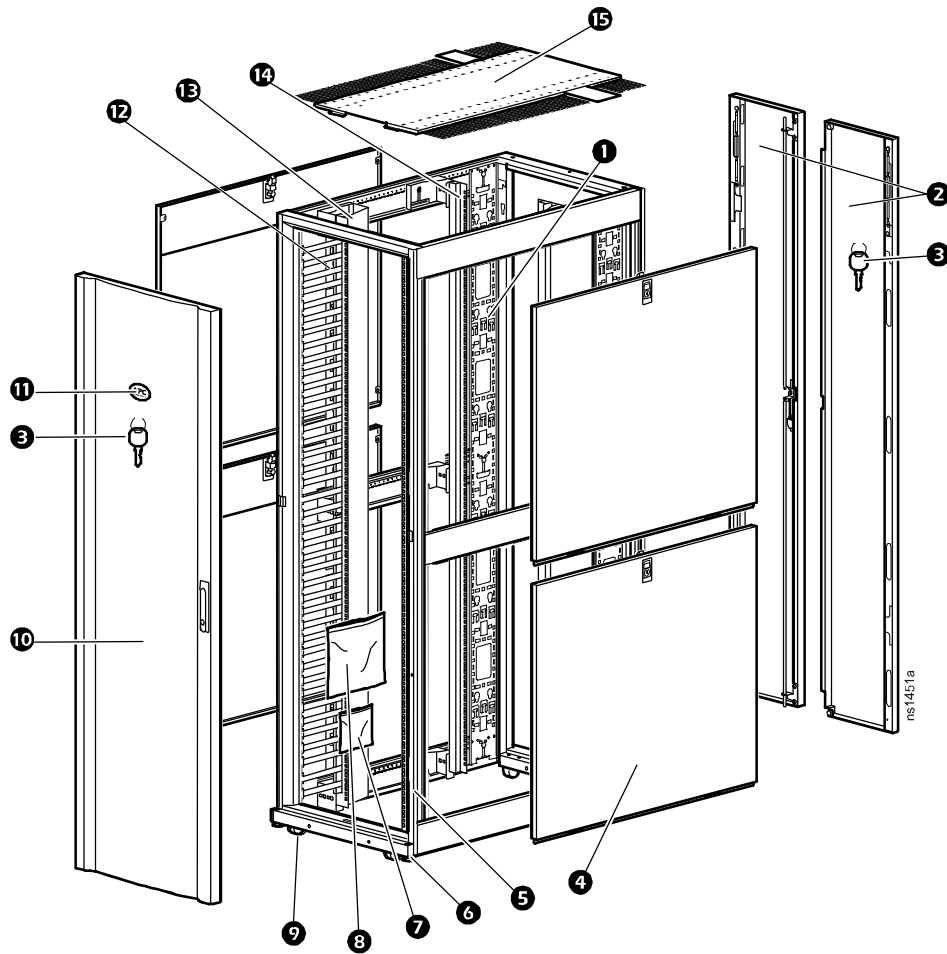
5. With one person on each side of the enclosure, carefully roll it toward the rear of the pallet until the rear casters clear the back edge of the pallet. Continue to slide the enclosure until the rear casters touch the floor.
6. While one person carefully tips the enclosure slightly away from the pallet, have the other person pull the pallet away from the enclosure. Set the enclosure gently on its casters.



Warning: Use caution when moving an empty enclosure on its casters; the enclosure may be unstable when pushed or pulled from the side. Push the enclosure from the front or back when moving it on its casters. For extra stability, load 158 kg (350 lbs) of equipment into the bottom of the enclosure before moving it on its casters.

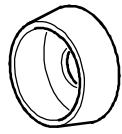
Component Identification

Enclosure

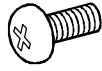


- | | | | |
|---|-------------------------------------------|----|-------------------------------------|
| 1 | Adjustable vertical 0 U accessory channel | 9 | Casters |
| 2 | Removable rear split doors | 10 | Removable and reversible front door |
| 3 | Key for doors and side panels | 11 | APC nameplate |
| 4 | Removable side panels with locks | 12 | Vertical cable managers |
| 5 | Enclosure frame | 13 | Mounting flange cable manager |
| 6 | Adjustable leveling feet | 14 | Vertical mounting flanges |
| 7 | Hardware bag (see page 4) | 15 | Roof |
| 8 | Airflow management kit (see page 4) | | |

Hardware bag contents



Plastic cup washers (60)



M6 x 16 Phillips slot screws (60)



M5 x 12 screws (4)



Cage nuts (60)



7-mm hole plugs (4)

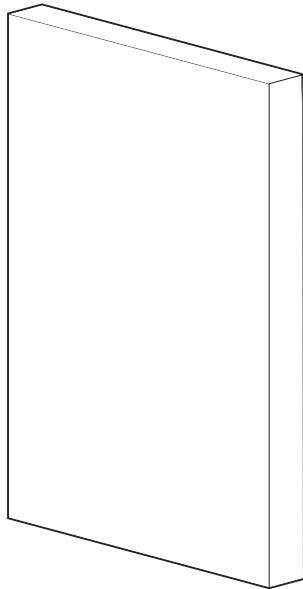


Torx[®] T30/#2 Phillips wrench

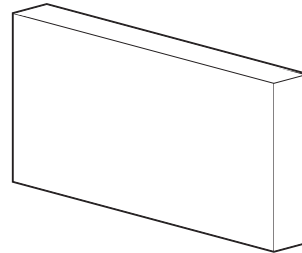


Cage nut tool

Airflow management kit



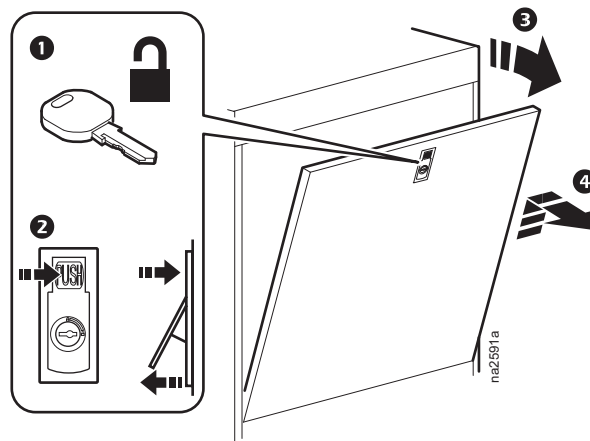
3-U foam airflow management panel (12 included with 42 U enclosures [AR3140 and AR3340]; 14 included with the 48 U enclosure [AR3347])



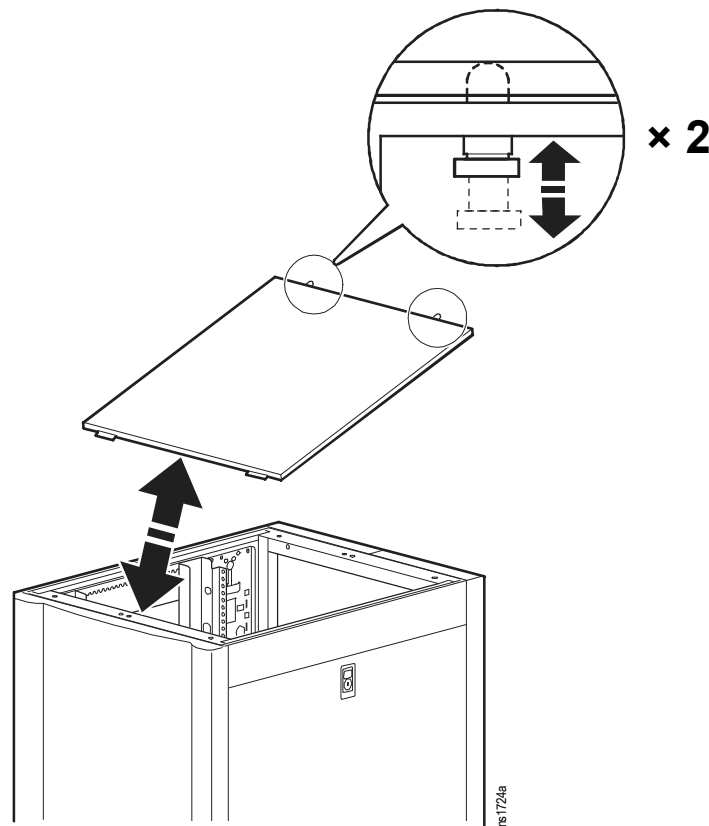
1-U foam airflow management panel (4)

Removing and Reinstalling Side Panels, Roof, and Doors

Side Panels



Roof

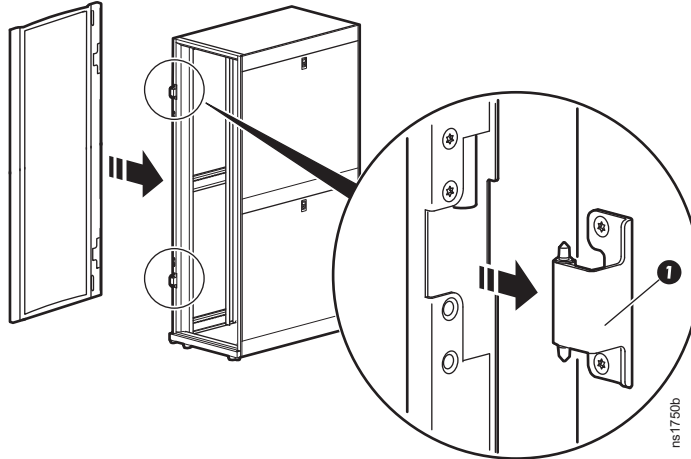


Doors

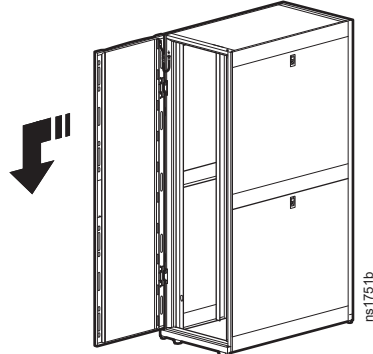


Note: Doors self-align on hinge pins when properly reinstalled.

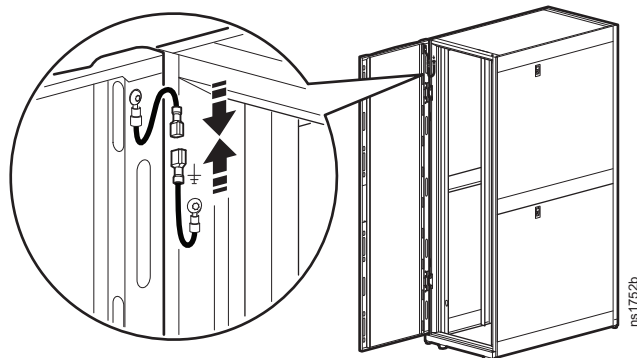
1. With the door at a 90-degree angle to the front of the enclosure, position the door over the hinge pins (1).



2. Use slight pressure to pull the door away from enclosure; then lower the door.



3. Connect the ground wire.



Enclosure Installation

Moving the Enclosure



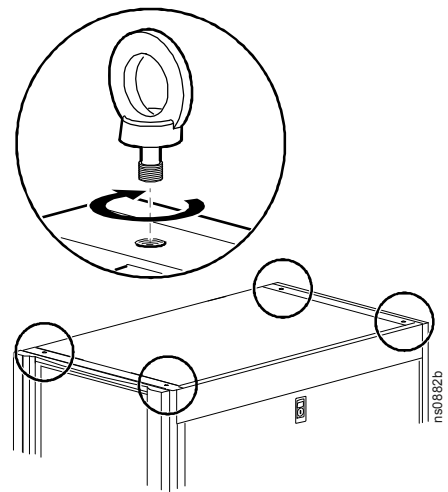
Caution: To avoid damaging the enclosure and causing a tip hazard, make sure the leveling feet are up before moving the enclosure.

Casters. The enclosure can be moved on its casters with up to 1021 kg (2,250 lbs) of equipment installed.



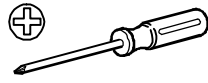
Tip Hazard: Use caution when moving an empty enclosure on its casters. Push the enclosure from the front or back only; the enclosure may be unstable if pushed or pulled from the side. For extra stability, load 158 kg (350 lbs) of equipment into the bottom of the enclosure before moving it on its casters.

Eye bolts. The enclosure can be lifted using eye bolts with up to 567 kg (1,250 lbs) of equipment installed. Use M10 eye bolts with a shoulder rated for 181 kg (400 lbs).

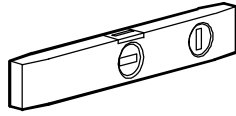


Leveling the Enclosure

Required tools:



Phillips screwdriver



Level

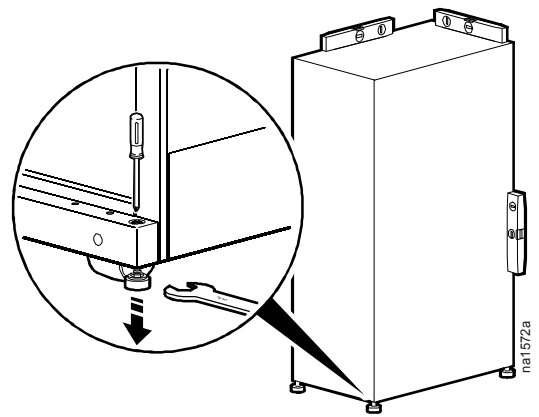


13-mm open-ended wrench
(803-513C)



Warning: The leveling feet at the corners provide a stable base if the floor is uneven, but they cannot compensate for a badly sloped surface.

To adjust the leveling feet after equipment has been installed, use the 13-mm open-ended wrench (not provided).



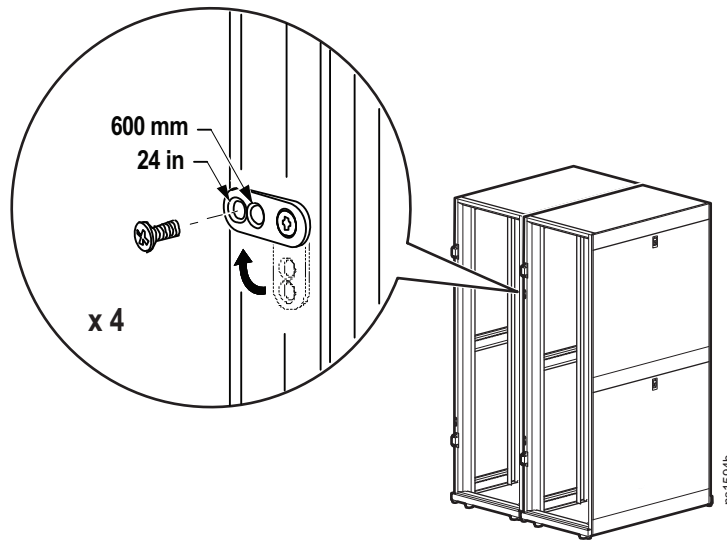
Joining Enclosures

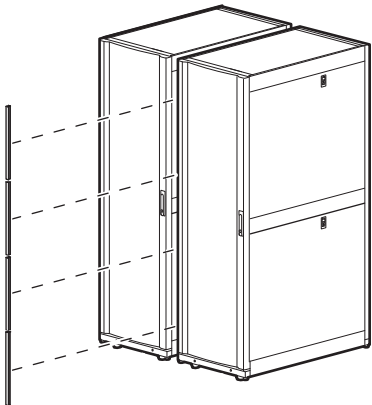
Enclosures can be joined with or without side panels installed to provide for alignment and some stability.



Caution: Joining enclosures provides limited stability to the enclosures.

1. Remove the front and rear doors.
2. Choose between 24-in centers or 600-mm centers (see the detail view below).
3. Align the enclosures and join them using one M5 x 12 flat-head screw (provided in the hardware bag) per bracket—two brackets for the front and two brackets for the rear.
4. Reinstall the doors.

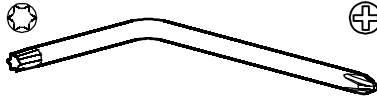


Accessory	Part Number	Description
42 U/48 U Baying Trim	AR7600	Fills the gap between the enclosures spaced on 24-in centers, providing finished look. 

Reversing the Front Door

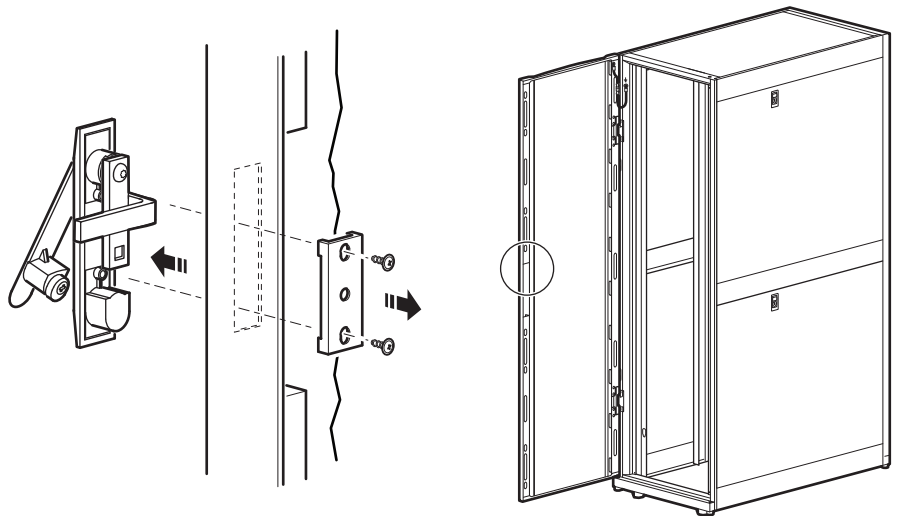
You can reverse the front door so the door is hinged on the opposite side.

Required tools:

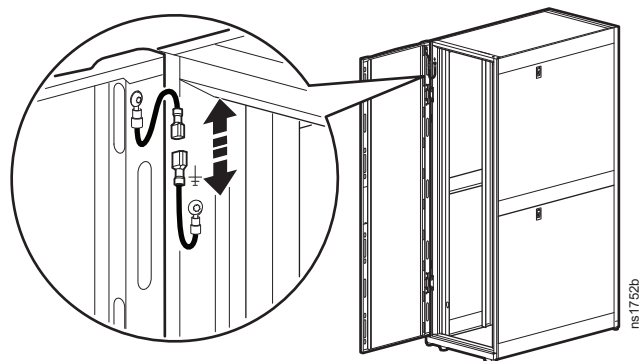


Torx[®] T30/#2 Phillips wrench (provided in hardware bag)

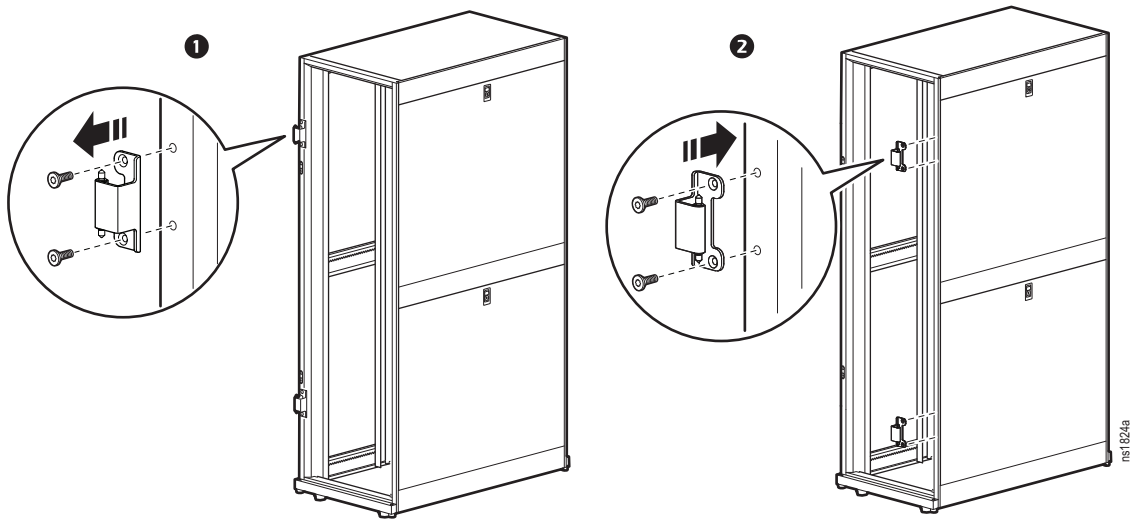
1. Remove the handle.



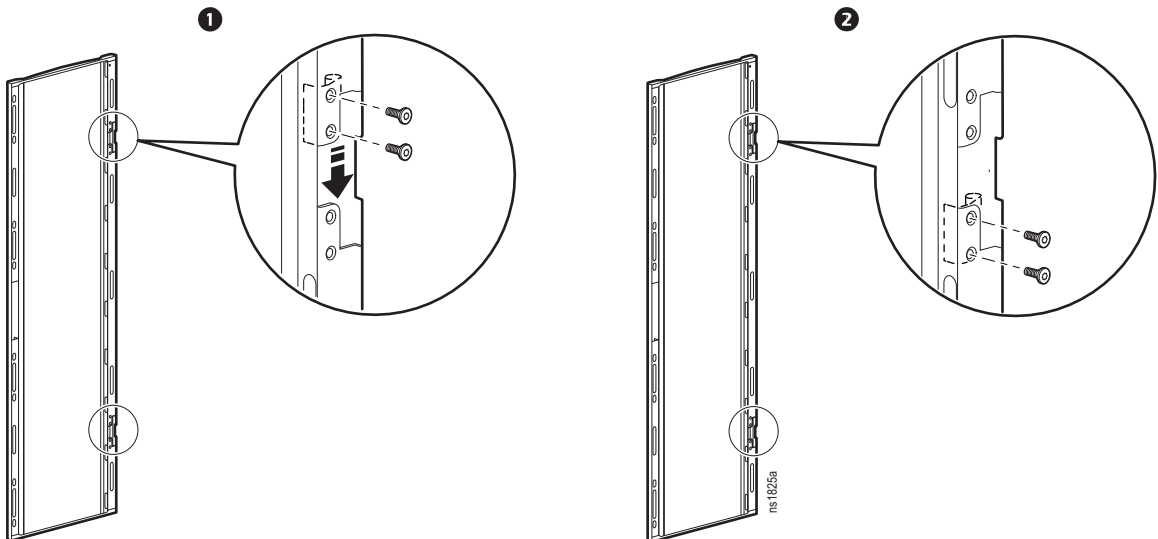
2. Disconnect the ground wire and then remove the door.



3. Remove and reinstall the hinges on the enclosure frame.

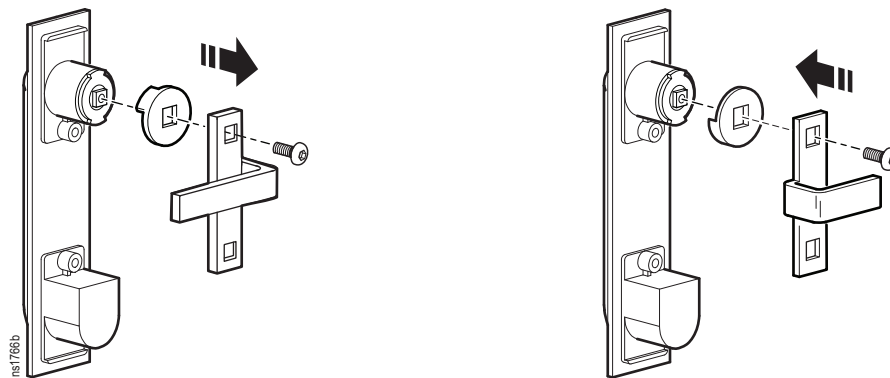


4. Remove and reinstall the hinges in the door frame.

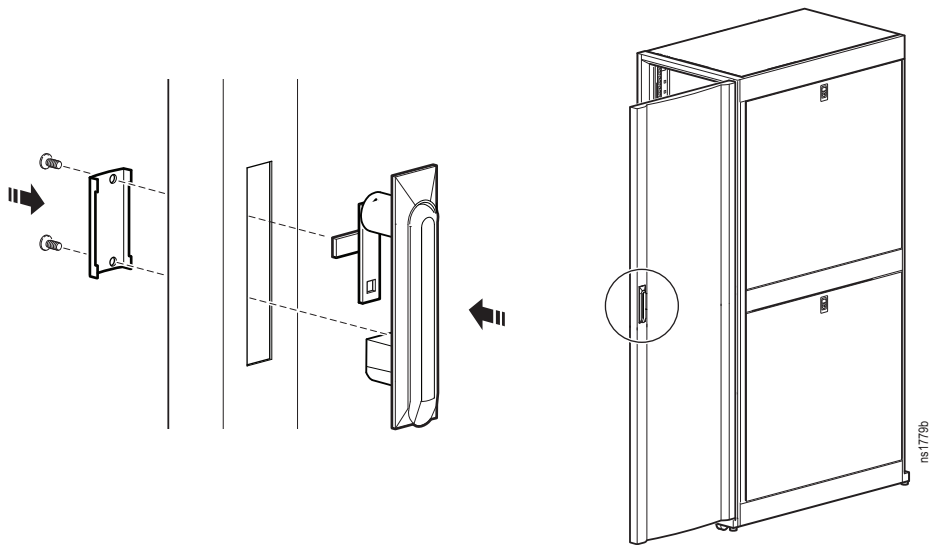


5. Reinstall door and reconnect the ground wire.

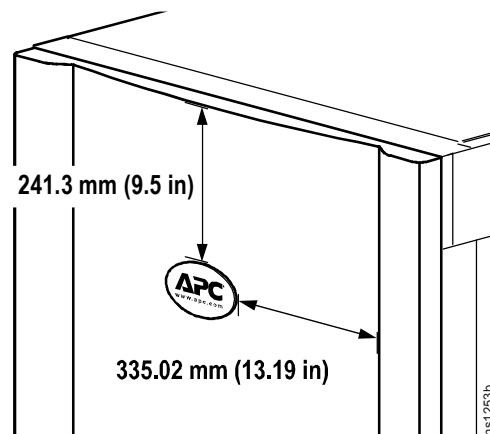
6. Remove and reinstall the latch and washer oriented as shown. The washer is rotated 90 degrees from its original orientation, and the latch is rotated 180 degrees.



7. Reinstall the handle on the door.



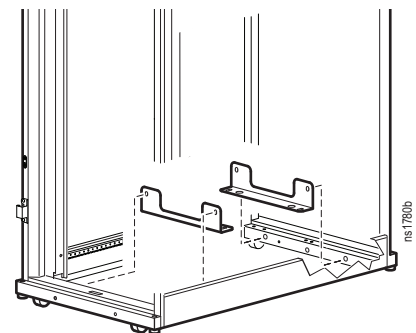
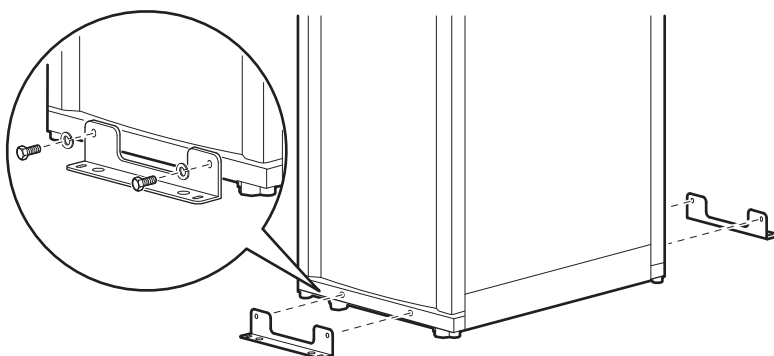
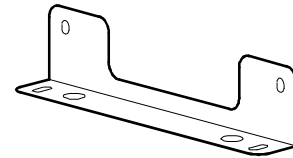
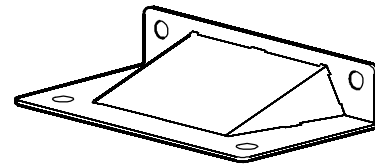
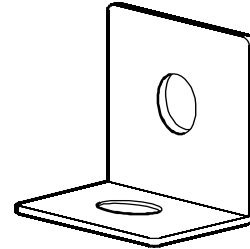
8. Remove and reinstall the APC nameplate at the location shown.



Securing the Enclosure

For additional stabilization, secure the enclosure to the floor. Use fastener locations on the outside or inside of the enclosure, and choose from the accessories shown below.

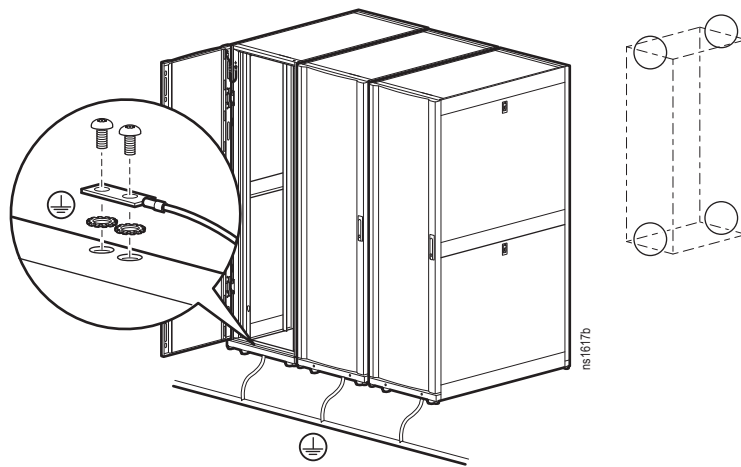
Accessory	Part Number	Description
Bolt-down kit	AR7701	Attaches to rack and floor internally or externally to provide additional stability without blocking cable access.
NetShelter SX stabilizer plate	AR7700	Attaches externally to the rack and floor to provide additional stability.
Pallet/bolt-down brackets	(provided with the enclosure)	Attaches to rack and floor internally or externally to provide additional stability without blocking cable access. With the appropriate mounting hardware, meets IBC/CBC seismic requirements.



Grounding the Enclosure

Each enclosure should be grounded directly to the building ground using one of the designated grounding locations (two M6 threaded inserts) at the top or bottom of the enclosure.

- Use a Common Bonding Network Jumper kit (for example, Listed [KDER] Panduit® RGCBNJ660PY or equivalent).
- Use paint-piercing washers between ground terminal and enclosure frame or remove paint on frame under ground terminals per NEC NFPA 70 Article 250.12.
- Torque screws to 6.9 N-m (60 in-lb).
- Do not ground one enclosure to another enclosure in a cascading style.



Equipment Installation

Adjusting Vertical Mounting Flanges

Vertical mounting flanges come factory-installed on the enclosure in the proper position for use with rack-mountable equipment that has a depth of:

- 558.8 mm (22 in) for a 1070-mm deep enclosure
- 749.3 mm (29.5 in) for a 1200-mm deep enclosure

The mounting flanges are adjustable towards the front or the rear of the enclosure to accommodate different rails or equipment with other depths. The flanges can be adjusted to be as close as 279.4 mm (11 in) or as far apart as:

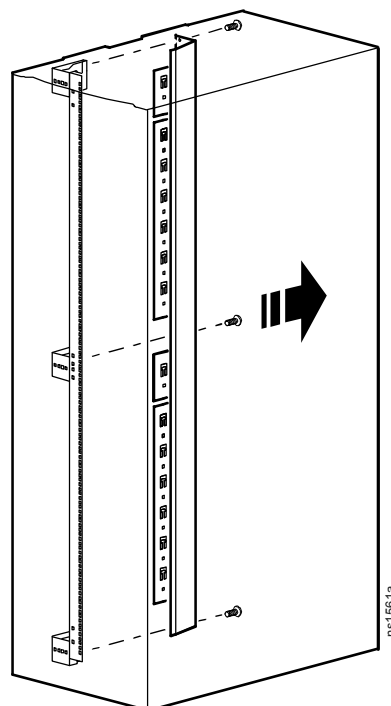
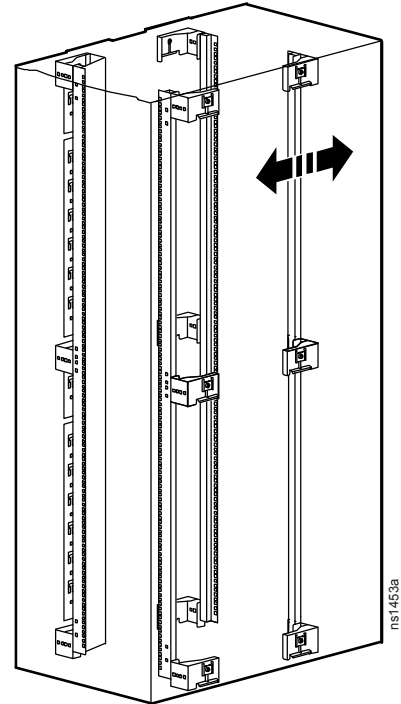
- 819 mm (32.25 in) for a 1070-mm deep enclosure
- 959 mm (37.75 in) for a 1200-mm deep enclosure

To adjust a vertical mounting flange:

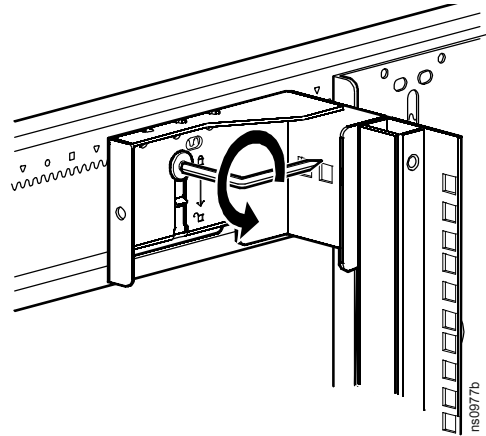


Warning: To avoid personal injury or damage to the enclosure, perform this procedure without any equipment installed on the mounting flanges.

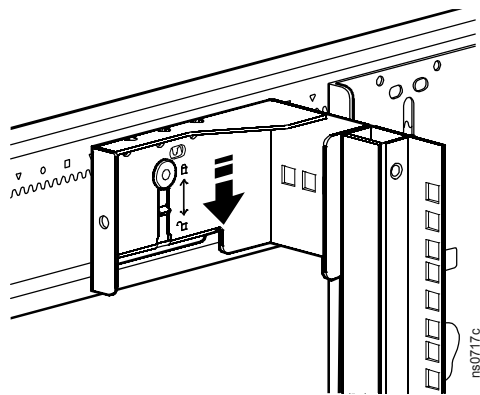
1. Remove the cable manager from the front left vertical mounting flange.



2. Use the Torx T30/#2 Phillips wrench (provided) to loosen—but not remove—the three Torx screws.



3. Lower the three flat brackets and move the mounting flange to the desired location.

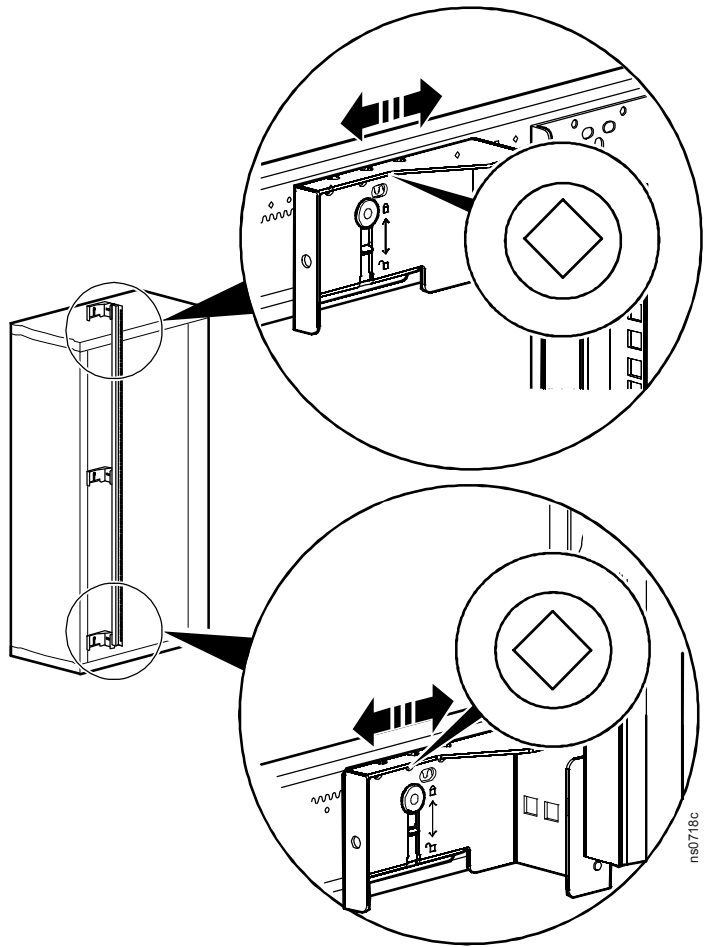


- To align the vertical mounting flanges properly, note the symbol (for example, a diamond) visible through one of the three holes on the top of the flange, and ensure that the same symbol is visible through the corresponding hole at the bottom of the flange. Only one symbol is visible at a time through any of the holes. In the factory-standard position, diamonds are visible

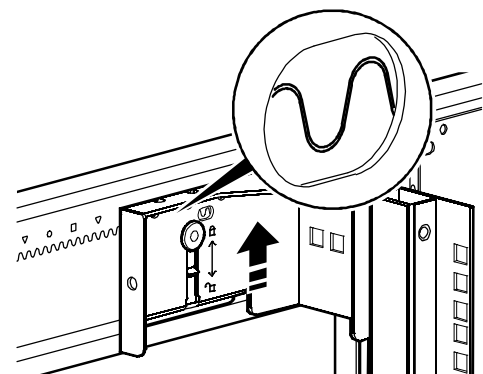


Note: Vertical mounting flanges adjust in 6-mm (1/4-in) increments.

Vertical mounting flanges placed across from each other must have the same visible symbol.



- When the vertical mounting flange is in the proper location, at the top, middle, and bottom, raise the flat bracket until the teeth in the bracket engage fully with the teeth in the side brace and then tighten the Torx screws.



Installing Equipment

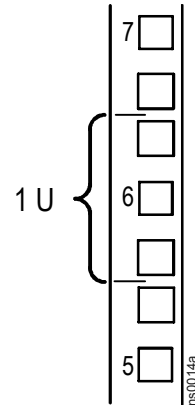


Warning: To prevent the enclosure from tipping over after equipment installation:

- Make sure you have secured the enclosure to the floor before installing equipment.
- Install the heaviest equipment first toward the bottom of the enclosure to prevent the enclosure from becoming top-heavy.
- Do not extend equipment on sliding rails until you have installed three or more pieces of similar-sized equipment or until you have installed the stabilizer plate or bolt-down brackets. Do not extend more than one piece of equipment on sliding rails at a time.

To install rack-mount equipment in the enclosure:

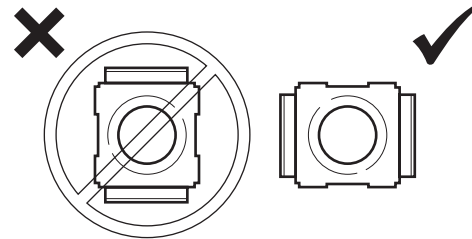
1. Review the equipment manufacturer's installation instructions.
2. Locate the top and bottom U-space on the vertical mounting rails. Every third hole on the mounting rails is numbered to indicate the middle of a U-space.
3. Install the cage nuts on the interior of the vertical mounting rail; then install the equipment.



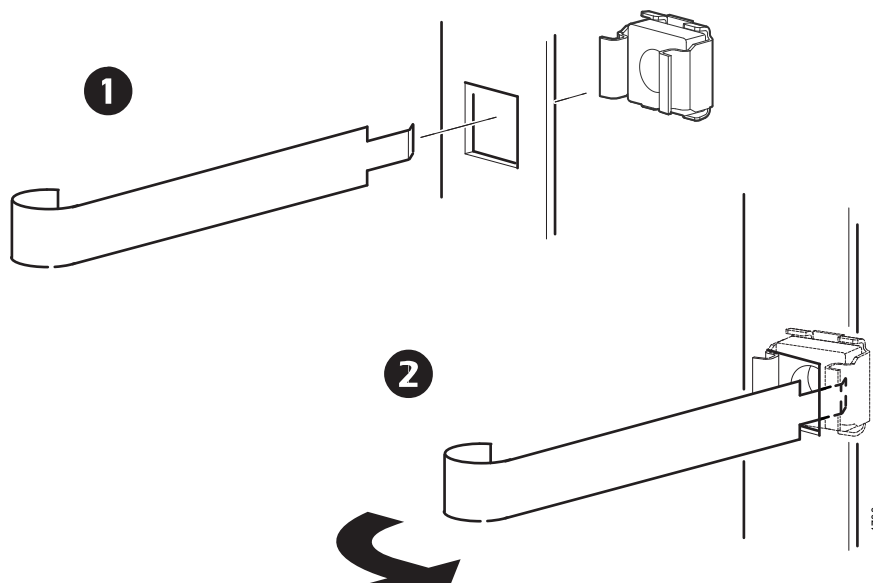
How to install a cage nut



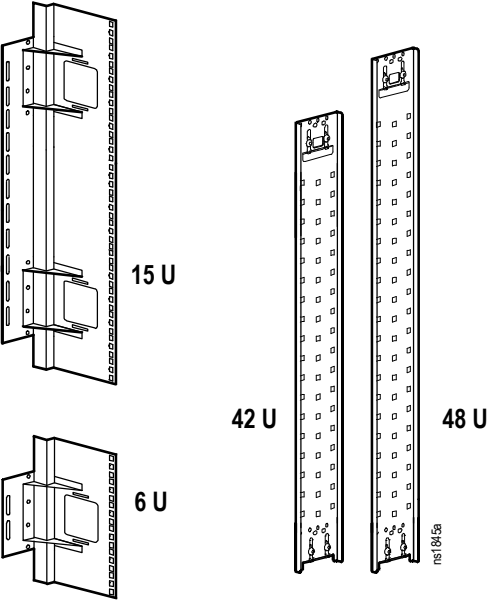
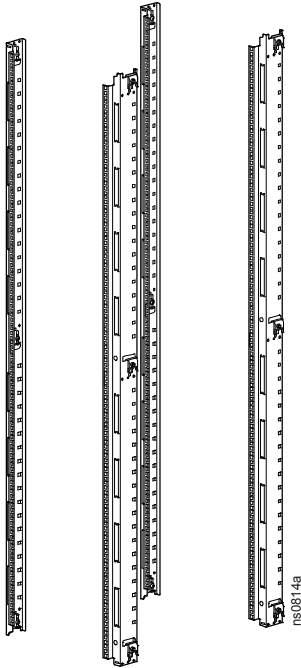
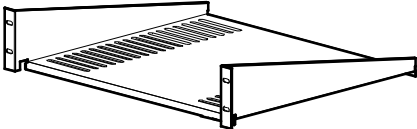
Warning: To ensure equipment installs securely, install cage nuts with tabs engaging the left and right sides of the square hole. Do NOT install cage nuts with tabs engaging the top and bottom of the square hole.



Note: To remove a cage nut, squeeze the sides to release it from the square hole.



Equipment Installation Accessories

Accessory	Part Number	Description	
Recessed rail kit	AR7508 (for a 42 U enclosure) AR7578 (for a 48 U enclosure)	Use the recessed rail kit to install equipment that has a different mounting depth from the other equipment in the enclosure.	 <p>The image shows four technical drawings of recessed rail kits. On the left, two side-view drawings show the rail kit installed in a rack, labeled '6 U' and '15 U'. On the right, two front-view drawings show the rail kit for '42 U' and '48 U' enclosures. A small 'ns 1958' label is located at the bottom right of the drawings.</p>
NetShelter SX 42 U, 23-inch, EIA Mounting Rails	AR7510	For NetShelter SX Networking 42 U, 750-mm wide enclosures (AR3140 and AR3340) only, the mounting rails accommodate 23-in rack mountable equipment.	 <p>The image shows three technical drawings of mounting rails. Two are side-view drawings showing the rail's profile and mounting points, and one is a front-view drawing showing the rail's length and spacing. A small 'ns08148' label is located at the bottom right of the drawings.</p>
Fixed shelf 50-lb	AR8105BLK	Cantilever fixed shelf to enable the mounting of a monitor or other equipment into the rack environment or to allow cable pass-through from the front to rear of the enclosure.	 <p>The image shows a technical drawing of a cantilever fixed shelf. It is a rectangular tray with a slanted front edge and a flat top surface, designed to be mounted into a rack.</p>

Airflow Management



Caution: Improper airflow could damage installed components.

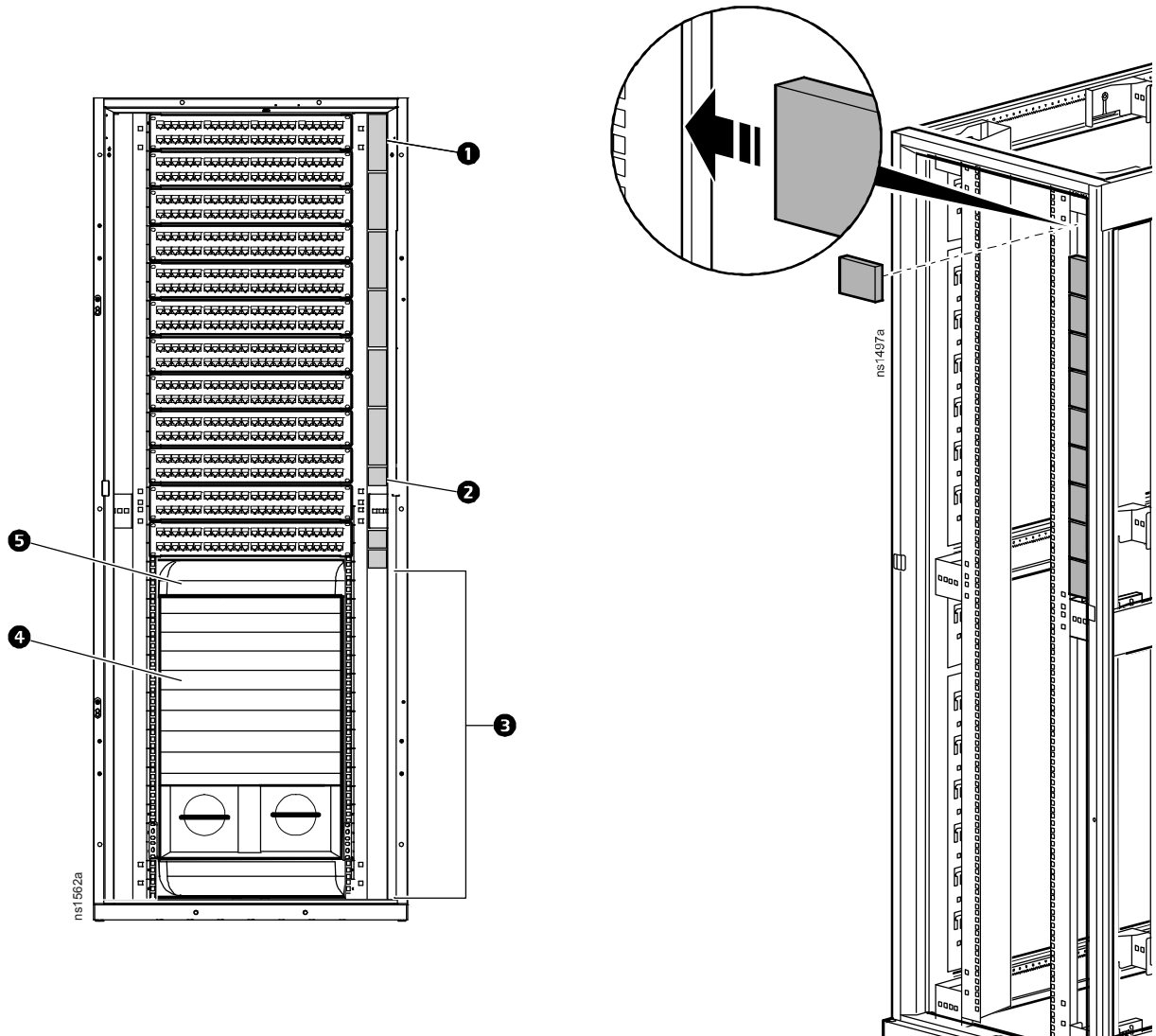
Installing Airflow Management Panels

1 U **2** and 3 U **1** foam airflow management panels help isolate hot air and prevent it from entering the cold aisle. Install airflow management panels in the channel along the right vertical mounting flange next to inactive equipment such as patch panels. The left side of the enclosure does not require panels.

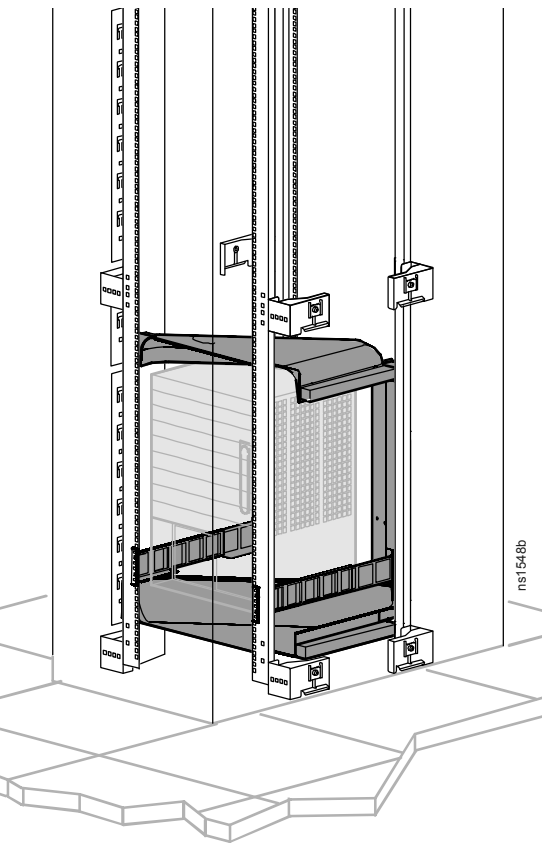
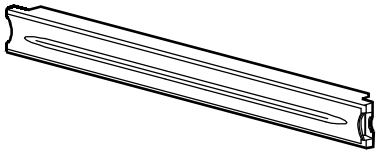
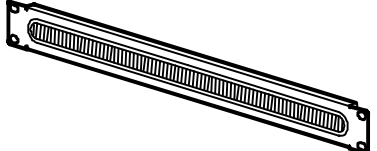


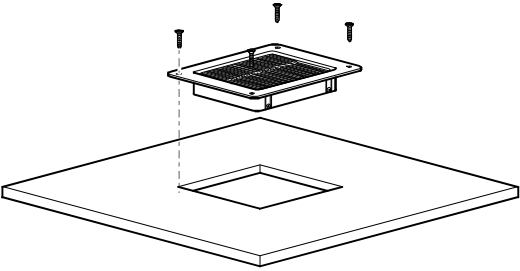
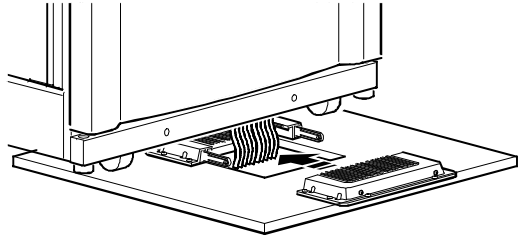
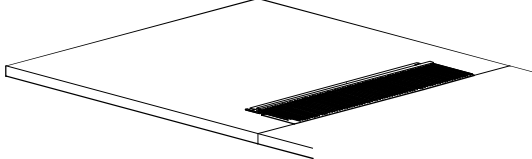
Note: To ensure proper airflow into networking switches **4**, keep open the networking switch air intake **3** areas as well as the inlets **5** of the side airflow duct kit.

Note: Install the airflow management panels before installing any cabling.



Airflow Management Accessories

Accessory	Part Number	Description	
Side Airflow Duct Kit	AR7715	<p>The NetShelter Side Airflow Duct Kit is intended for use with Cisco® Catalyst 6509, 6509-E, and 6513 Switches and Cisco MDS 9509 and 9513 Multilayer Switches. For networking switch applications, the Side Airflow Duct Kit allows for improved cable management solutions while maintaining adequate airflow and separation of hot and cold aisles to cool switches. The Side Airflow Duct Kit maintains separation of hot and cold aisles via ducts and baffle panels.</p>	
Airflow Management Blanking Panel	AR8136BLK (Qty. 10) AR8136BLK200 (Qty. 200)	Covers an empty vertical enclosure space to maintain proper airflow.	
19-inch 1 U cable pass-through with brush strip	AR8429	Assists with containing air in the enclosure and providing an aesthetic solution for cable routing.	

Accessory	Part Number	Description	
KoldLok [®] raised floor grommet	AR7720 (Qty. 10)	Designed to seal openings in new raised floor cutouts prior to the installation of communications or power cabling.	
	AR7730 (Qty. 10)		
	AR7740 (Qty. 10)		

Cable Routing and Cable Management

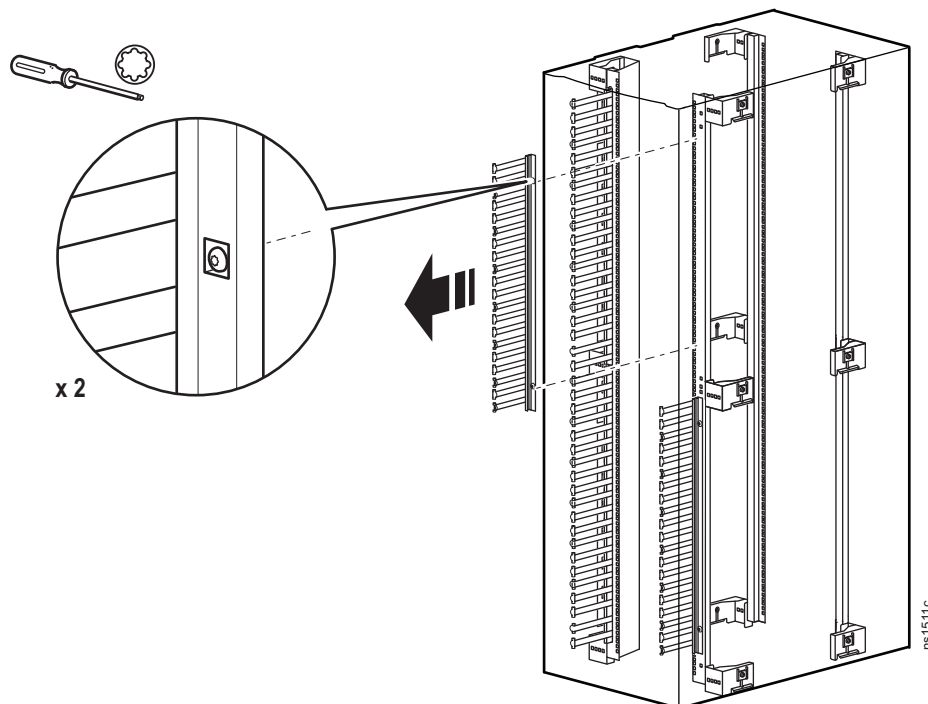
The NetShelter SX Networking Enclosure has cable access openings on its roof, sides, and bottom. Four vertical cable managers and two Vertical 0 U Accessory Channels are included with the enclosure and APC offers a variety of other cable management accessories.

Adjusting the Vertical 0 U Accessory Channels

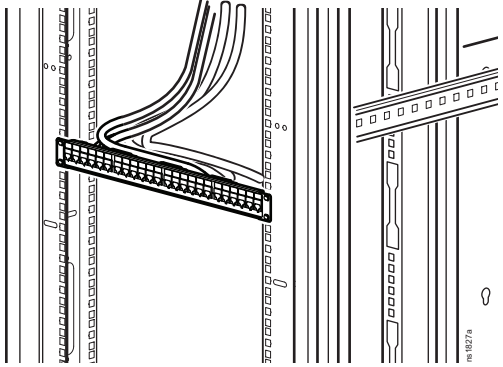
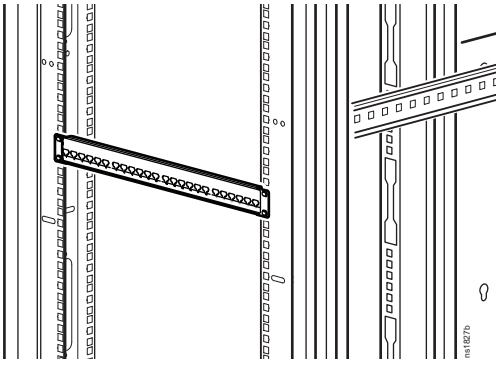
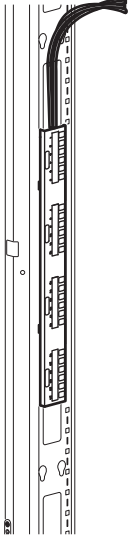
The vertical 0 U accessory channels provide toolless mounting capabilities for APC Rack Power Distribution Units (PDUs) and APC cable containment brackets. They also provide tie-off locations for cables. The factory-default position for the vertical 0 U accessory channels is in the rear of the enclosure, but you can move them anywhere along the side braces in a similar manner to the mounting flanges. (See “Adjusting Vertical Mounting Flanges” on page 15.) If needed, the channels can be removed completely. Additional vertical 0 U accessory channels can be ordered from APC (see “Cable Management Accessories” on page 24 for details).

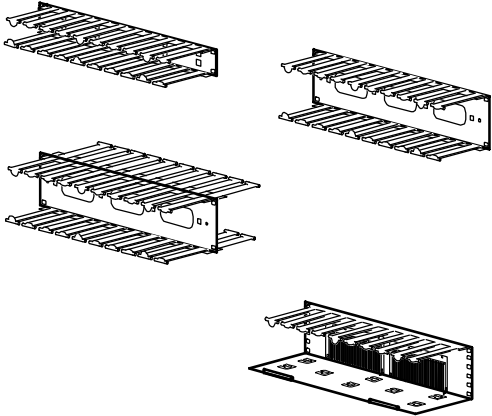
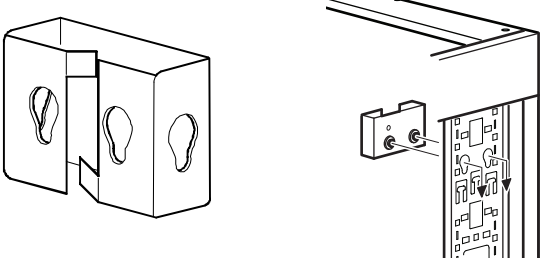
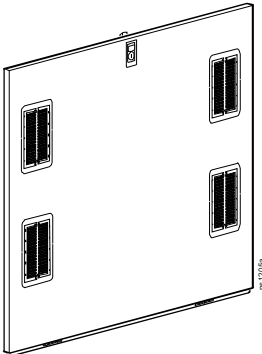
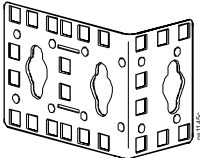
Removing Vertical Cable Managers

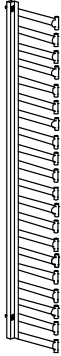
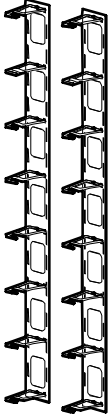
You can remove vertical cable managers if needed to meet your cable-routing needs. If removed, vertical cable managers can be reinstalled in the vertical 0 U accessory channels.

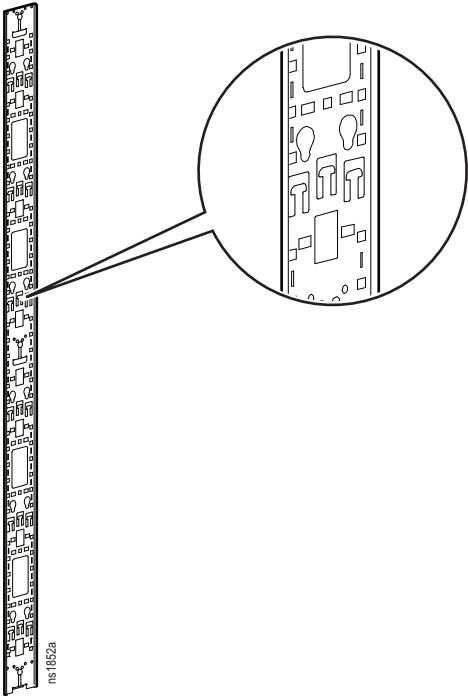
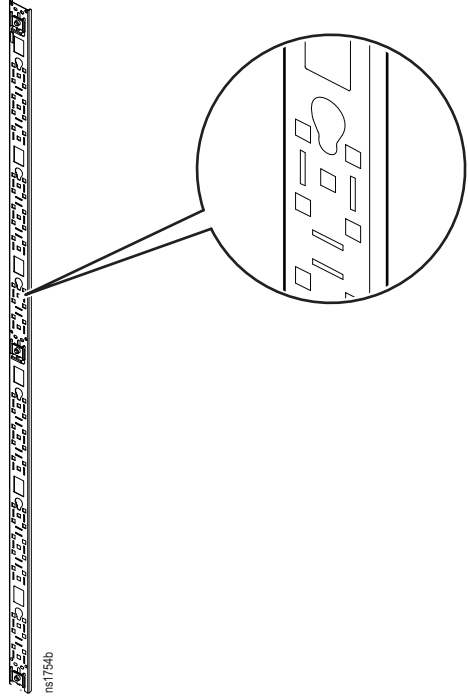


Cable Management Accessories

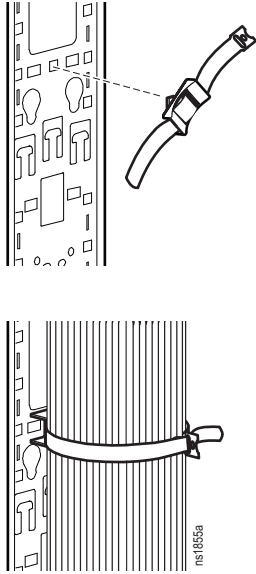
Accessory	Part Number	Description	
<p>1 U data distribution panel</p> <p>2 U data distribution panel</p>	<p>AR8451 (shown)</p> <p>AR8452</p>	<p>Holds four data distribution cables, for a total of 24 ports.</p> <p>Holds eight data distribution cables, for a total of 48 ports.</p>	
<p>CAT 6 Patch Panel</p>	<p>CAT6PNL-24 (shown)</p> <p>CAT6PNL-48</p>	<p>24-port RJ45 to 110 568 A/B color-coded patch panel.</p> <p>48-port RJ45 to 110 568 A/B color-coded patch panel.</p>	
<p>0 U data distribution panel</p>	<p>AR8457</p>	<p>Installs in a vertical 0 U accessory channel. Holds four data distribution cables, for a total of 24 ports.</p>	

Accessory	Part Number	Description	
19-inch horizontal cable organizers	AR8602 (1U) AR8600 (2 U) AR8601 (2 U double sided) AR8603 (2 U high density)	Routes cables horizontally on the front or back of the 19-inch EIA enclosure.	
Cable containment brackets	AR7710 (Qty. 6)	Contains cables along the vertical 0 U accessory channel. Installs without tools.	
Side panel with access holes	AR7305 (Qty. 2)	For a NetShelter SX Networking 42 U, 1070-mm deep enclosure (AR3140) only. Allows cable pass-through to adjacent enclosures. Openings contain brushes to restrict airflow.	
Zero-U accessory mounting bracket	AR7711	Zero-U multi-purpose accessory mounting bracket for 1 U and 2 U equipment, including Rack PDUs.	

Accessory	Part Number	Description	
Vertical cable manager	AR7717 (Qty. 4)	Installs in the vertical mounting flanges and in the vertical 0 U accessory channels. The vertical cable manager has smooth plastic cable guides at 1 U increments to allow patch cords to enter and exit in an organized manner.	
Vertical cable organizer for NetShelter 0 U accessory channel	AR8442 (Qty. 2)	Eliminates cable stress by organizing cable layout within the rear channels of the enclosure. Uses 0 U space within the enclosure. Consists of two pieces of equal size. When stacked, both pieces span the entire height of the enclosure. Two pieces can be installed side by side in the vertical 0 U accessory channel. Can be used in any APC enclosure.	

Accessory	Part Number	Description	
<p>NetShelter SX 42 U vertical cable organizer</p> <p>NetShelter SX 48 U vertical cable organizer</p>	<p>AR7502 (Qty. 2)</p> <p>AR7572 (Qty. 2)</p>	<p>Installs in the enclosure along the side braces. Provides toolless mounting capabilities for APC Rack Power Distribution Units (PDU) and APC cable containment brackets. Provides tie-off locations for cables.</p>	
<p>NetShelter SX 42 U narrow vertical 0 U cable organizer</p>	<p>AR7511 (Qty. 2)</p>	<p>For NetShelter SX Networking 42 U enclosures (AR3140 and AR3340) only. The narrow vertical 0 U accessory channel complements the standard vertical 0 U accessory channel by offering additional cable management options. The narrow channel can be used in the front of the enclosure to mount fiber cable spools and vertical cable managers or can be used in the middle of the enclosure for cable tie off. In addition, keyholes are provided to mount one vertical Rack PDU per organizer.</p>	

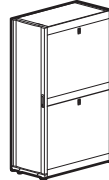
Accessory	Part Number	Description	
Vertical fiber organizer	AR8443A	The vertical fiber organizer provides a method to manage fiber cabling within an enclosure and mounts toollessly into the vertical 0 U accessory channel.	
Fiber organizer spools	AR8444 (Qty. 4)	Can be mounted toollessly to the vertical fiber organizer or a vertical 0 U accessory channel.	

Accessory	Part Number	Description	
Toolless hook-and-Loop cable manager	AR8621 (Qty. 10)	Includes ten 457-mm (18-in) hook and loop black cable straps that install in the square mounting holes of vertical 0 U accessory channels or vertical mounting flanges.	

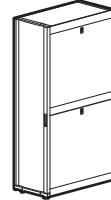
Specifications



AR3140



AR3340



AR3347

Height	1991 mm (78.40 in); 42 U	1991 mm (78.40 in); 42 U	2258 mm (88.90 in); 48 U
Width	750 mm (29.53 in)	750 mm (29.53 in)	750 mm (29.53 in)
Depth	1070 mm (42.13 in)	1200 mm (47.24 in)	1200 mm (47.24 in)
Net weight	155.95 kg (343.10 lb)	161.36 kg (355.00 lb)	185.45 kg (408.00 lb)
Total open area (front door)	788 972 mm ² (1,222.91 in ²)	788 972 mm ² (1,222.91 in ²)	900 417 mm ² (1,395.65 in ²)
Total open area (rear door)	866 920 mm ² (1,343.73 in ²)	866 920 mm ² (1,343.73 in ²)	989 243 mm ² (1,533.33 in ²)
Open area per U (front door)	18 787 mm ² (29.12 in ²)	18 787 mm ² (29.12 in ²)	18 787 mm ² (29.12 in ²)
Open area per U (rear door)	20 645 mm ² (32 in ²)	20 645 mm ² (32 in ²)	20 645 mm ² (32 in ²)
Perforation pattern percentage	69%	69%	69%
Percent of perforated area (front)	88%	88%	87%
Percent of perforated area (rear)	96%	96%	96%
Clearance (for wiring between front door and vertical mounting flange)	238.76 mm (9.40 in)	216.9 mm (8.5 in)	216.9 mm (8.5 in)
Weight rating: static load [†]	1361 kg (3,000 lb)	1361 kg (3,000 lb)	1361 kg (3,000 lb)
Weight rating: rolling	1021 kg (2,250 lb)	1021 kg (2,250 lb)	1021 kg (2,250 lb)

[†] Lower the leveling feet if the static weight is over 1020.58 kg (2,250 lb).

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