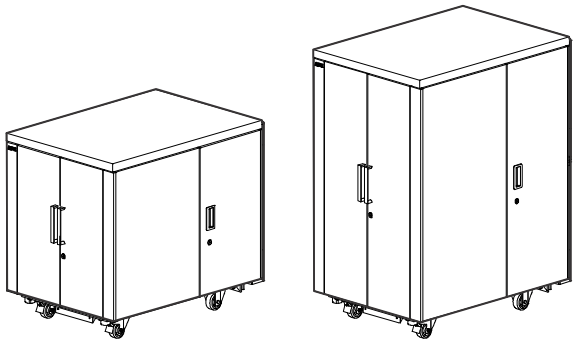
Installation and Customization

NetShelter™ CX SP

18 U and 24 U Enclosures with Shock Packaging

990-91180-001

Publication Date: July 2018



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General Information

NetShelter CX SP cabinets are specialized cabinets with integrated cooling, noise dampening, and power distribution for server and network applications in office environments. The cabinets provide storage for industry-standard (EIA-310), 19 in. rack-mount hardware, which includes servers, voice, data, networking, internetworking, and Schneider Electric power protection equipment.

NetShelter CX SP cabinets

Model	Voltage and Connector Type	Rack Mounting Height	Rack Mounting Width mm (in.)	Rack Mounting Depth mm (in.)	External cabinet Height mm (in.)	External cabinet Width mm (in.)	External cabinet Depth mm (in.)
AR4018SP AR4018SPX429 AR4018SPX431 AR4018SPX432	100-240V IEC-320 C14	18 U†	482 (19)	862 (33.93)	1015 (40)	750 (29.53)	1130 (44.5)
AR4024SP AR4024SPX429 AR4024SPX431 AR4024SPX432	100-240V IEC-320 C14	24U	482 (19)	862 (33.93)	1275 (50.2)	750 (29.53)	1130 (44.5)

†One U= 44.45 mm (1.75 in.). See “One U-space on the vertical mounting flange” on page 14.

Receipt and Inspection

It is your responsibility to inspect the cabinet upon receipt and report any damage to the shipper immediately. Contact Customer Support at **www.apc.com** or your local APC by Schneider Electric supplier after reporting damage to the shipper.

Safety Information

Read the instructions carefully and become familiar with the cabinet before trying to install or maintain it. The following special messages may appear throughout this manual or on the cabinet to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

CAUTION

CAUTION (without alert symbol) indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage.

NOTICE

NOTICE addresses practices not related to physical injury including certain environmental hazards, potential damage or loss of data.

About This Manual

This manual is intended for users of the specified APC by Schneider Electric equipment. It contains important safety warnings and instructions and provides detailed information for proper use of the equipment.

Related Documents

Download technical publications and other technical information or look for updates to your manual at our website at **www.apc.com**.

User Comments

Contact **www.apc.com/support**. We welcome your comments about this document.

Safety

Important Safety Instructions

SAVE THESE INSTRUCTIONS

This manual contains important instructions that must be followed during installation, operation, and maintenance of the equipment.

Use caution when moving an empty cabinet on its casters. The cabinet may be unstable when pushed or pulled from the side. Push the cabinet 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 cabinet before moving it on its casters.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow all local and national codes when installing a Rack PDU.
- Connect the Rack PDU to the UPS, if installed, or to a single-outlet dedicated circuit protected by a circuit breaker or fuse with the same current rating as the Rack PDU.
- Power off the UPS or Mains Supply before connecting the Rack PDU.
- The plug or inlet serves as the disconnect for the Rack PDU. Make sure the utility power outlet for the Rack PDU will be close to the Rack PDU and readily accessible.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

TIP HAZARD

- Stabilize the cabinet before installing the components.
- Do not extend components on sliding rails out from the cabinet until you have installed similar equipment in the cabinet to balance the distribution of weight.
- Do not extend more than one component from the cabinet at a time.
- Load the heaviest components first, and place them toward the bottom of the cabinet to prevent the cabinet from becoming top-heavy.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION

WEIGHT AND LEVERAGE HAZARD

- Doors and side panels are heavy. Removal or installation requires two people.
- Fan modules are heavy. Two people are recommended when removing the fan modules from the cabinets.

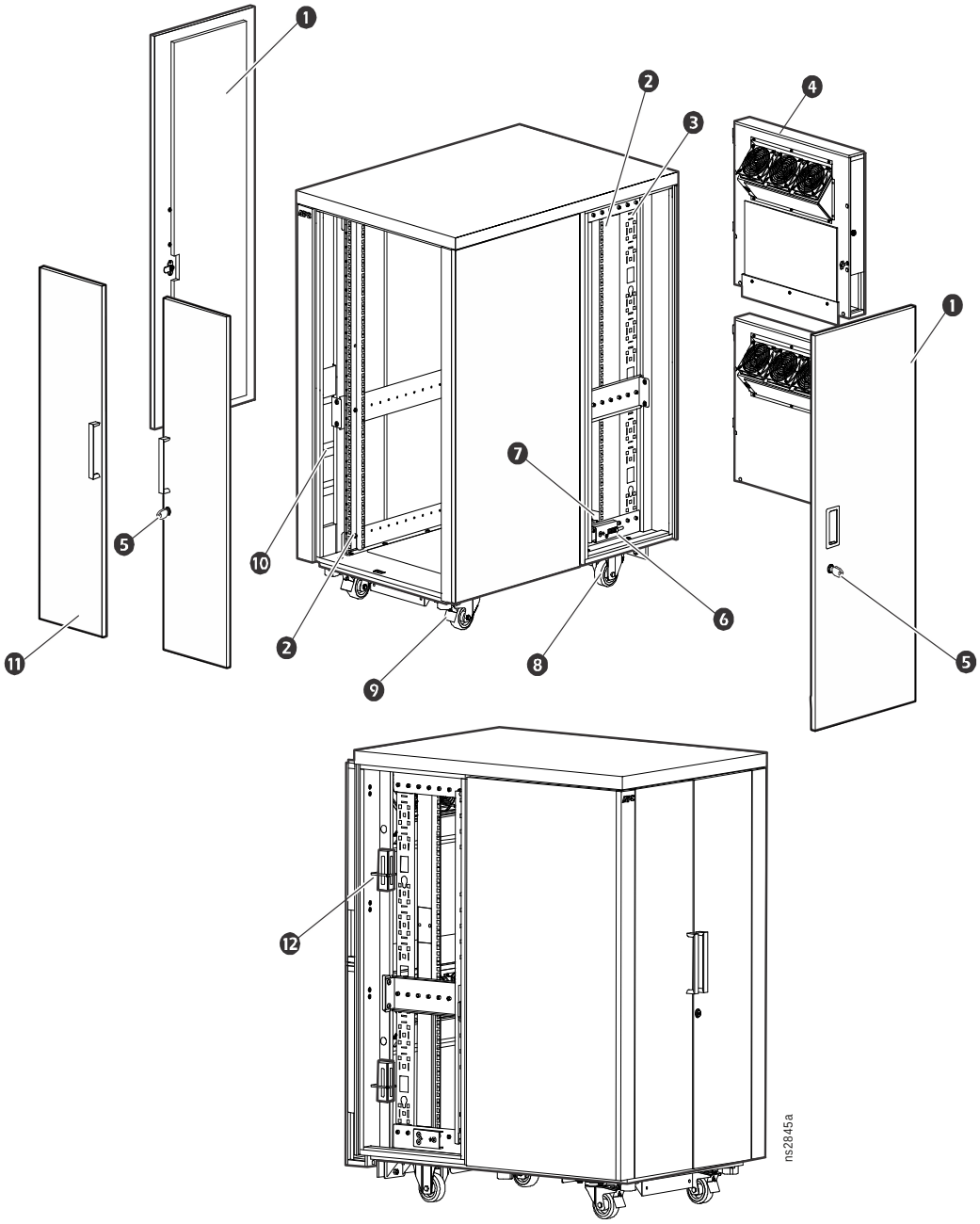
Failure to follow these instructions can result in injury.

NOTICE

To ensure adequate air movement, place the sides of the cabinet no closer than six to eight inches from the wall.

Product Overview

Inventory (24 U cabinet shown)

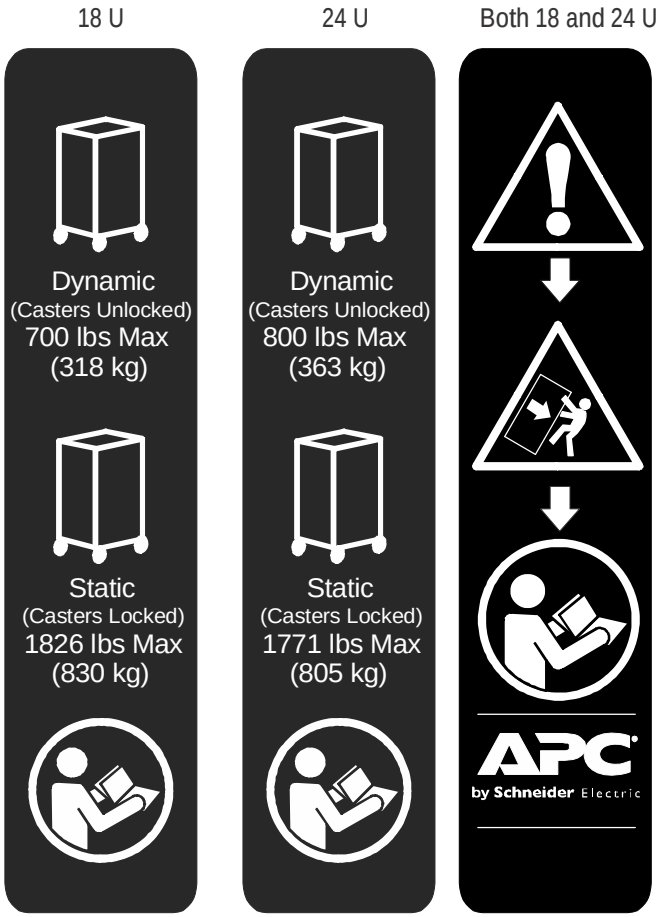


- ❶ Side access panel (2)
- ❷ Vertical mounting flange (4)
- ❸ Vertical OU accessory channel (4)
- ❹ Fan module (2) 24 U, (1) 18 U cabinet
- ❺ Key (2)†
- ❻ Sliding rail with grounding points
- ❼ Cable access port
- ❽ Caster (2)
- ❾ Locking caster (2)
- ❿ Airflow opening
- ⓫ Front door (2)
- ⓬ Fan module power supply (2)

† The door/side panel keys are not installed and can be found packed inside the cabinet.

Preparation

Labels: The labels in the illustration below can be found on the NetShelter CX SP 18 U and 24 U cabinets. These labels serve to communicate important safety information such as tipping hazards for cabinets in general, and weight restrictions of the casters which are different for the 18 U and 24 U cabinets.



Weight limits: The cabinet can be moved on its casters with up to 318 kg (700 lb) of equipment installed in the 18 U cabinet and up to 363 kg (800 lb) of equipment installed in the 24 U cabinet. Lock the swivel casters once you have the cabinet in place. The static cabinet can be loaded to 830 kg (1,826 lb) in the 18 U cabinet and 805 kg (1,771lb) in the 24 U cabinet.

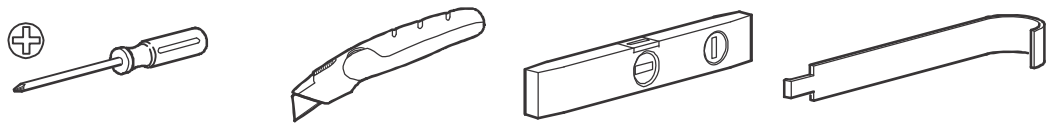
⚠ WARNING

TIP HAZARD

- To prevent tipping, push the cabinet from the front or back, not the sides.
- For greater stability, load 159 kg (350 lbs) or more in the bottom of the cabinet before moving.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Tools required (not provided)



Phillips screwdriver | Utility knife | Level | Cage nut tool

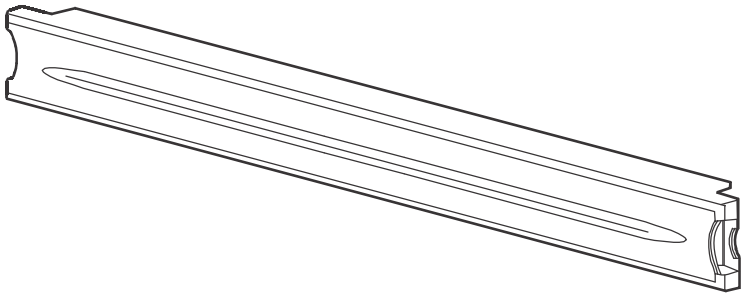
Configuration

Before installing the enclosure, plan the location and space needed to install equipment, and plan the ergonomics of keyboards and video monitors. Improper airflow could damage installed components.

Blanking panels

Use blanking panels to close up large open spaces in the cabinet but not to completely seal the cabinet. The NetShelter CX SP works best when air can travel not just through the equipment vents, but also above and below any equipment that generates thermal energy.

APC by Schneider Electric offers modular, plastic Airflow Management Blanking Panels that snap into place without tools (AR8136BLK).



Front doors and Side Panels

The front doors and side panels may be opened or removed to access the interior. Locking side panels offer additional security and assist with proper airflow within the cabinet.

To avoid personal injury or damage to the cabinet, one person should support the door or side panel while another person removes the door or side panel from its frame.

⚠ CAUTION
WEIGHT AND LEVERAGE HAZARD
Doors and side panels are heavy. Removal and installation requires two people.
Failure to follow these instructions can result in injury.

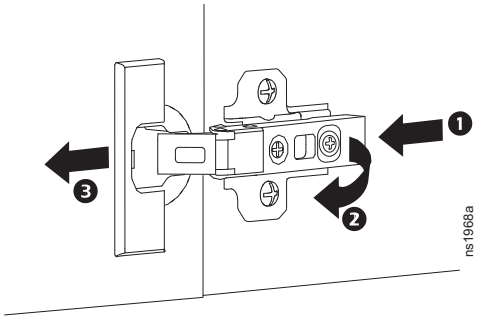
Hinges

Removal:

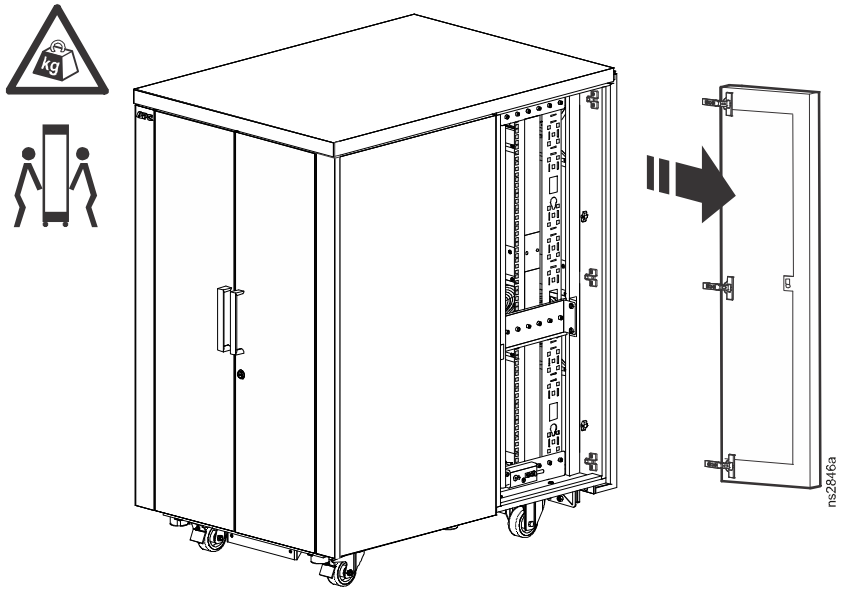
❶ Press on the hidden latch under the side arm.

❷ Lift the hinge arm off the mounting plate

❸ Slide the latch and door away from the mounting plate.

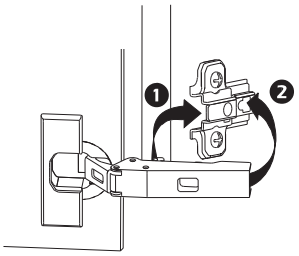


When all hinges are detached from their mountings, the door can be removed.



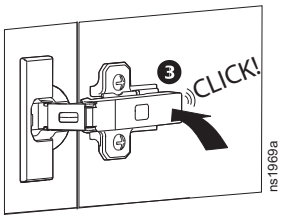
Installation:

Slide the latch end of the hinge on the door or side panel ❶ into the front of the mounting plate ❷ attached to the inside of the cabinet.



Using finger pressure, press the latch onto the mounting plate. The latch will secure with an audible click ❸.

The hinges are attached to their mountings in the cabinet to complete door installation. 24U cabinets have three (3) hinges per door. The 18U cabinets have two (2) hinges per door.



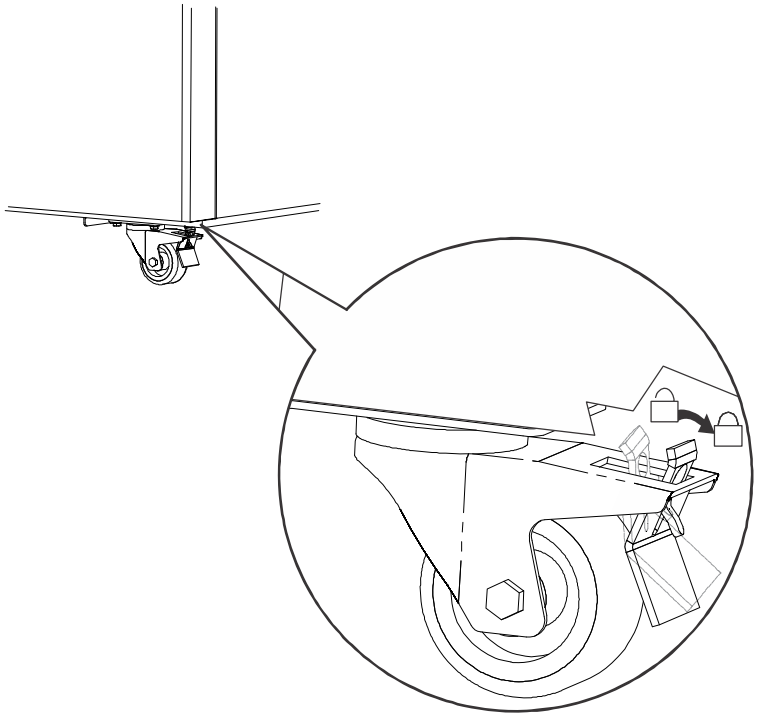
Installation

⚠ CAUTION
HEAVY EQUIPMENT HAZARD It is recommended that two people move and position the cabinet. **Failure to follow these instructions can result in injury, or equipment damage.**

Stabilize the Cabinet

⚠ CAUTION
PINCH POINT HAZARD Do not use your hands to release the locking casters. **Failure to follow these instructions can result in injury.**

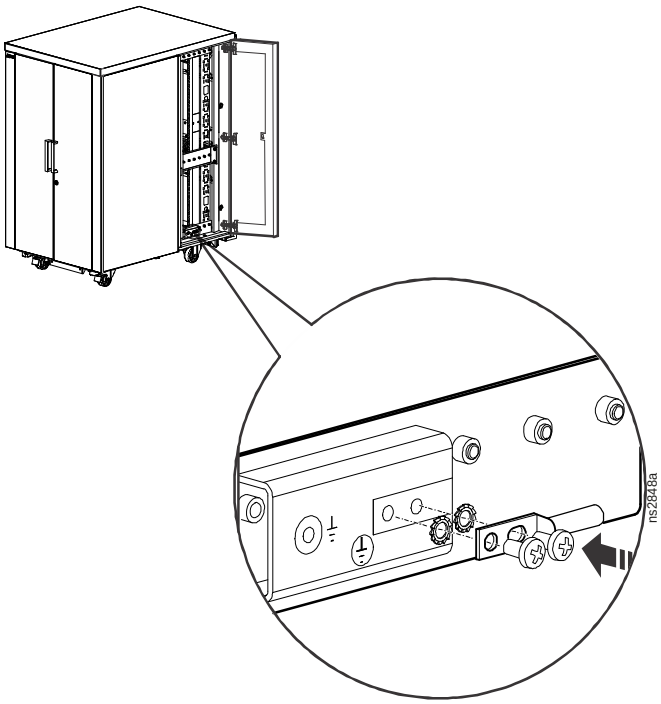
The casters on the front of the cabinet can be locked to hold the cabinet in place. Step down on the locking plate to lock and pull up on the locking plate with your foot or a tool to release the lock. Do not attempt to release the locking plate with your hands.



Grounding the Cabinet

Each cabinet shall be grounded directly to the building ground using the designated grounding location.

Unlock the side panel on the right side of the cabinet and open the panel. The sliding rail with grounding points is located on the bottom rail as shown in the illustration to the right.



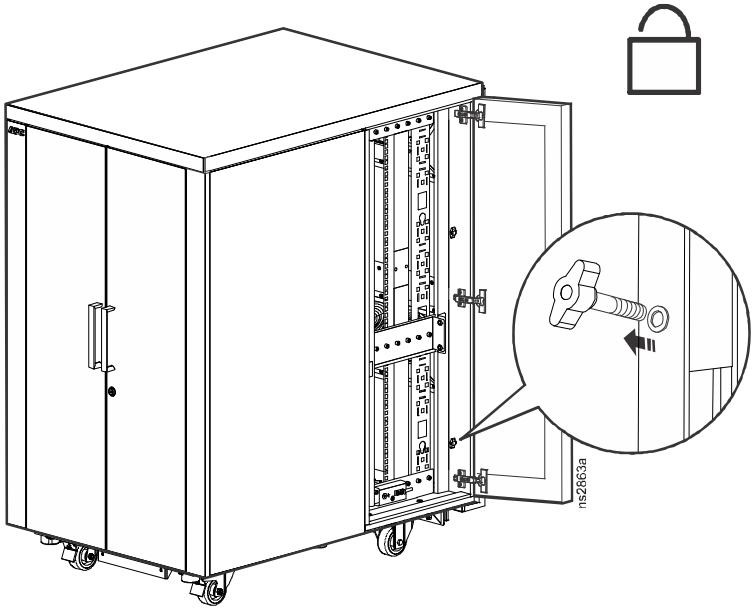
Attach your ground wire using the two M6 threaded inserts (provided) and paint-piercing washers (not provided) installed in the sliding rail at the bottom rear of the cabinet.

- Use a Common Bonding Network Jumper kit (for example, Listed [KDER] Panduit RGCBNJ660PY or equivalent).
- Use paint-piercing washers between the ground terminal and the cabinet frame or remove the paint on the frame under the ground terminals per NEC NFPA 70 Article 250.12.
- Torque the screws to 6.9 N-m (60 in-lb).

Fan Module Removal and Installation

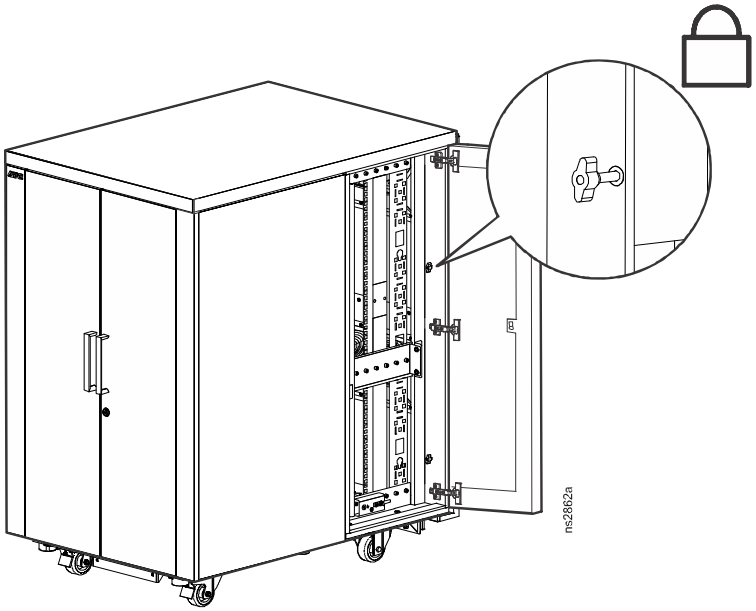
Unlock the fan module

Open the right hand side access panel. Unscrew the thumbscrew on the right side of the fan module to unlock the fan module so it can be opened.



Lock the fan module

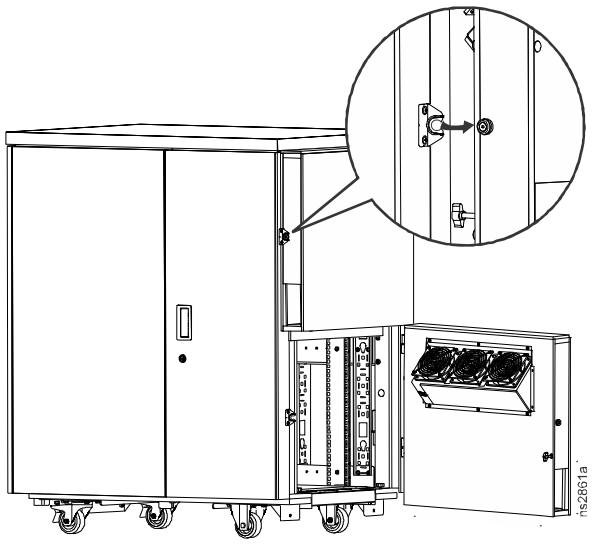
Open the right hand side access panel. Install the thumbscrew on the right side of the fan module to lock the fan module in place.



Open the fan module

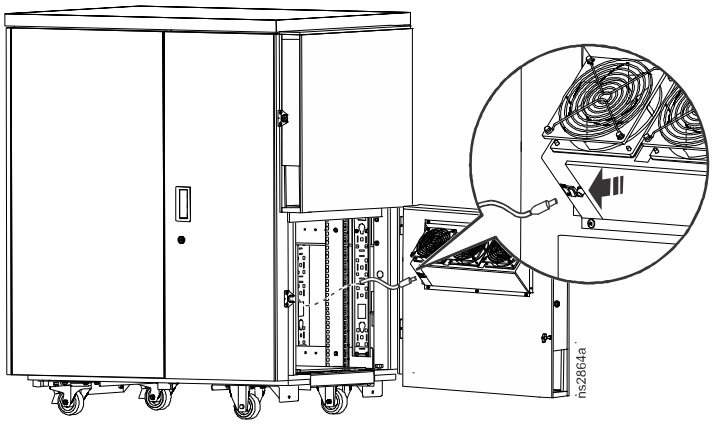
Button latch operation: The button part of the module's door latch assembly pulls apart from the clasp side to release the fan module door.

Door opening sequence: On 24 U cabinets, open the bottom module first, then open the top module.



Swing the fan module out on its hinges.

Disconnect the fan module power supply lead from the fan module.



Remove the fan modules

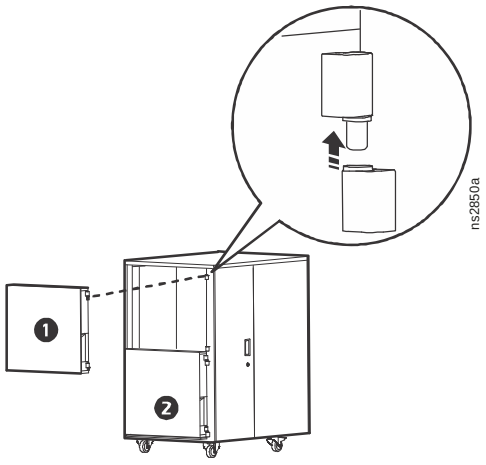
⚠ CAUTION
HEAVY EQUIPMENT HAZARD Fan modules are heavy. Two people are recommended to remove the fan modules from the cabinets. **Failure to follow these instructions can result in injury, or equipment damage.**

NOTE: Remove the top fan module first on 24 U cabinets.

Lift the fan module from the hinges attached to the cabinet.

Module removal sequence:

Remove the top fan module ❶
Remove the bottom fan module ❷



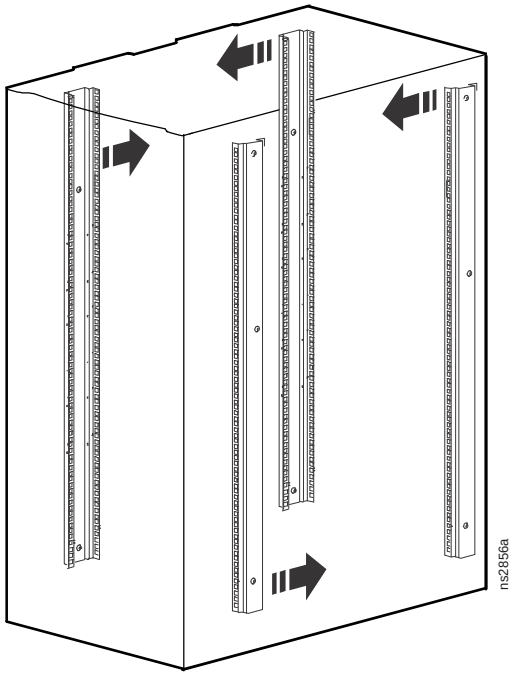
Install the fan module

Reverse the removal procedure to install the fan module.

Vertical Mounting Flanges

Vertical mounting flanges come factory-installed on the cabinet in the proper position for use with rack-mountable equipment having a depth of 782 mm (38.8 in.). The front mounting flanges are adjustable towards the rear of the cabinet to accommodate different rails or equipment with other depths. The rear mounting flanges are adjustable towards the front. The flanges can be adjusted to be as close as 120 mm (4.7 in.) or as far as 862 mm (33.94 in.) apart in 40 mm (1.5 in.) increments.

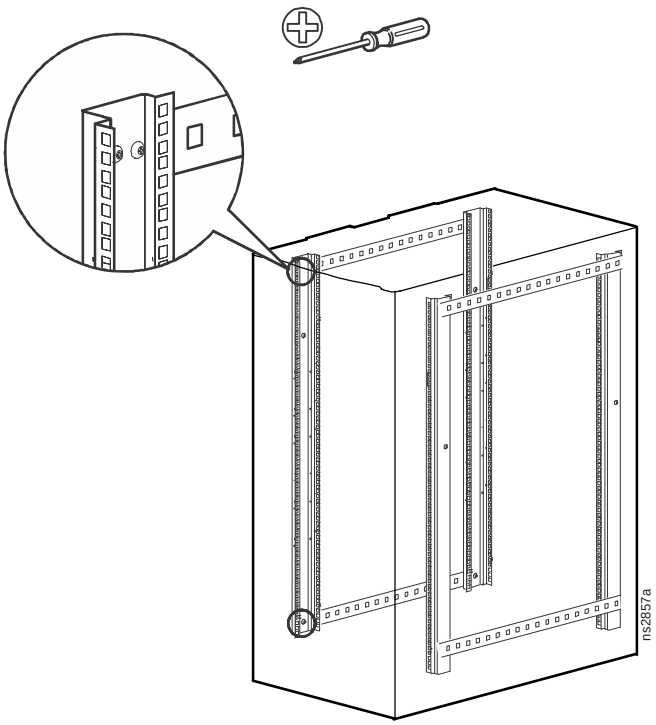
A common application for the cabinet is to move the flanges to a depth of 476 mm (18.75 in.) to accommodate networking and telecommunications equipment.



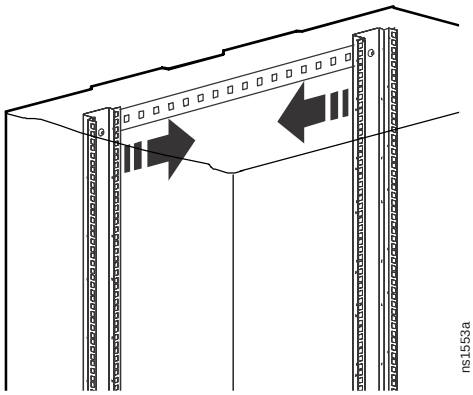
Adjusting the vertical mounting flanges on the side braces

Perform this procedure without any equipment installed on the mounting flanges.

1. Use a Phillips screwdriver (not provided) to remove the screws in the vertical mounting flange.



2. Move the vertical mounting flange to th desired position and install the screws.

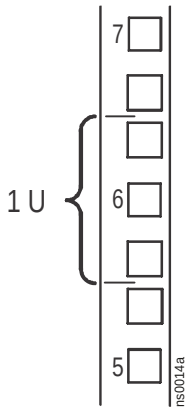


Rack Mount Equipment Installation

This section provides information on how to install rack-mount equipment in the cabinet. The manufacturer's instructions included with the equipment provide more detailed information.

One U-space on the vertical mounting flange

To install rack-mount equipment, locate the top and bottom of a U-space on the mounting flanges. Every third hole on the mounting flanges of a NetShelter CX SP cabinet is numbered to indicate the middle of a U-space. A U-space consists of one of these numbered holes and one hole directly above and below it, as shown.



Cage nut installation

Schneider Electric offers a cage nut hardware kit (AR8100) for use with square holes.

⚠ CAUTION

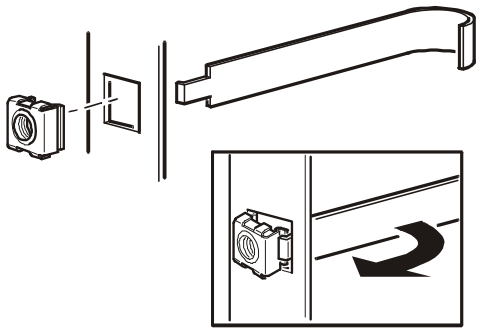
HAZARD OF FALLING EQUIPMENT

Never install cage nuts vertically with the ears (or tabs) engaging the top and bottom of the square hole. This will result in insecure mounting for rack-mounted equipment.

Failure to follow these instructions can result in injury or equipment damage.

1. Install cage nuts on the interior of the vertical mounting flange. Install cage nuts horizontally, with the ears (tabs) engaging the sides of the square hole. Insert the cage nut into the square hole by hooking one ear (tab) of the cage nut assembly through the far side of the hole.

2. Place the cage nut tool (not provided) on the other side of the cage nut and pull to snap it into position.



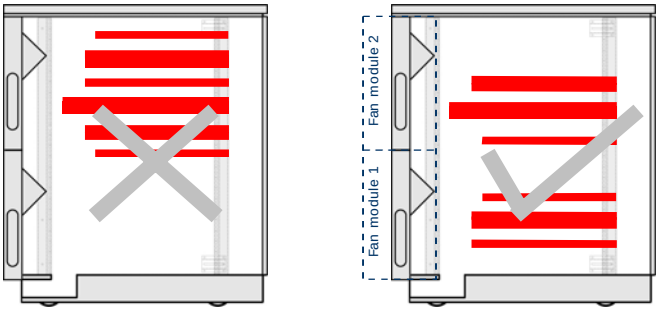
Cage nut removal

1. Remove any attached screw.
2. Grasp the cage nut and squeeze the sides to release it from the square hole.

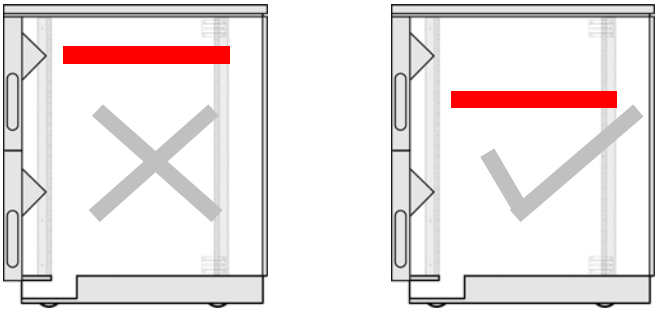
Equipment Planning Guidelines

Please note the following guidelines for proper installation and operation of hardware in a NetShelter CX cabinet.

Avoid clustering hot-running equipment such as servers, dense redundant arrays of independent disks (RAID), and large voice-over-internet-protocol (VOIP) switches in one part of the cabinet. Distribute the thermal load evenly up and down the cabinet such that each fan module supports an equal amount of the thermal load.



Each fan module has a triangular metal section which protrudes slightly into the cabinet. This does not create an issue for installation of most equipment, but to allow for ample cabling space to the rear of the cabinet, deep servers should be installed in the cabinet space above and below these triangular metal protrusions.

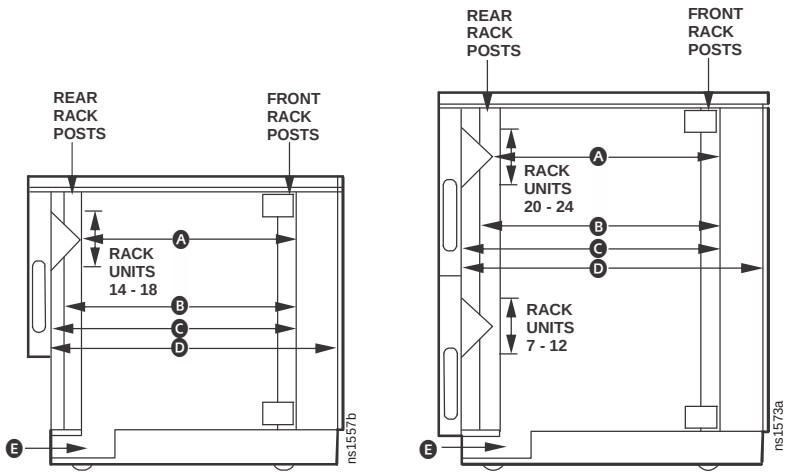


Internal Cabinet Dimensions

The fan module creates a triangular protrusion which reduces the internal depth of the cabinet at that point.

The depth of your equipment should be considered to ensure room for cables and for adequate air circulation. Deep servers should be moved above or below the protrusions.

18U **24U**



Dimension key:

a. 840 mm (33.10 in.)
b. 782mm (30.8 in.)
c. 934 mm (36.77 in.)
d. 1001 mm (39.41 in.)
e. Indicates soundproofed cable entry/exit pathway.

Cable Management

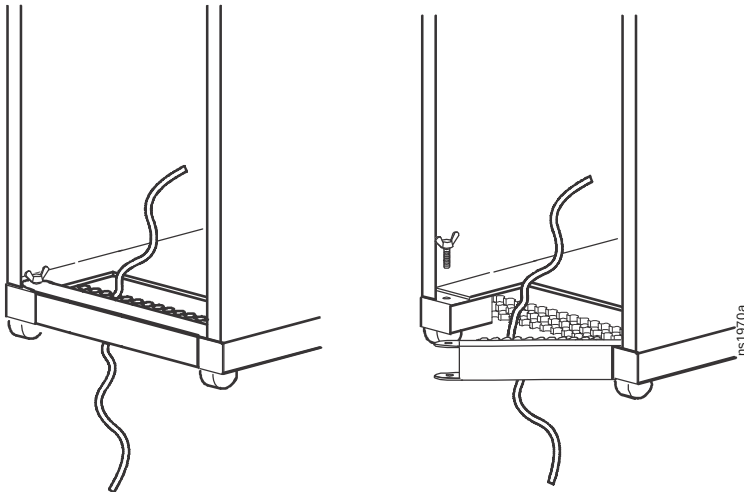
The NetShelter CX SP cabinet has a cable access opening (cable port) at the rear of the cabinet. The 38U cabinet has an additional cable port at the top for cabling from above. Four vertical 0U accessory channels are factory installed in the cabinets.

A variety of other cable management accessories are available. Visit the website at **www.apc.com** and go to the NetShelter CX SP product page for a full list of compatible cable management accessories.

Rear cable access port

The cable port is large enough to accommodate approximately 300-400 Cat 5e - Cat 6A Ethernet cables and has a removable top cover. The design is such that pre-terminated data distribution panels can be installed effortlessly, with no need for de-termination and re-termination.

Unscrew and remove one of the two thumbscrews to swing open the port door. Unscrew and remove the second thumbscrew to fully remove the cable port door.

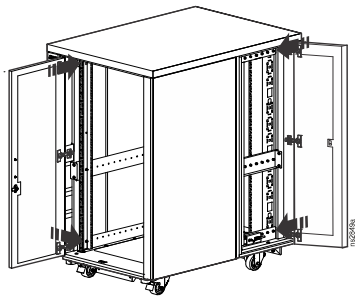


Vertical 0U accessory channels

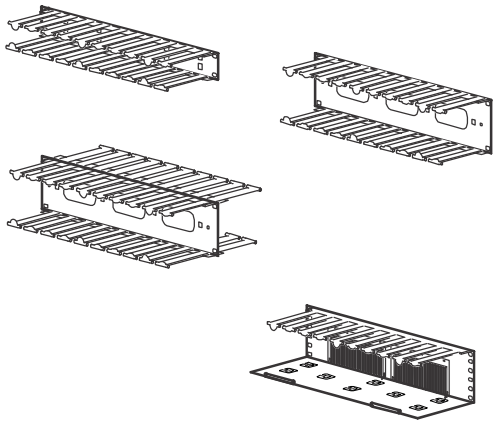
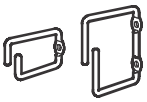
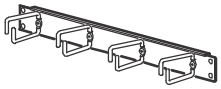
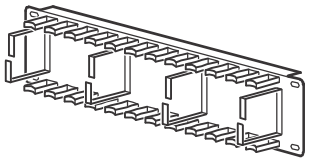
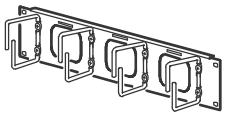
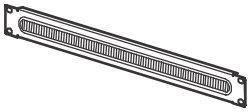
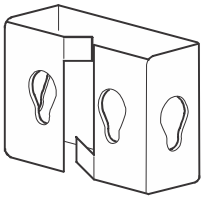
The vertical 0U accessory channels provide toolless mounting capabilities for APC by Schneider Electric Rack Power Distribution Units, APC by Schneider Electric cable containment brackets, and tie-off locations for cables. The standard position for the accessory channels is two located in the front of the cabinet and two in the rear of the cabinet.

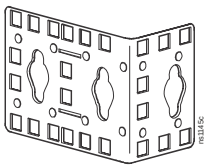
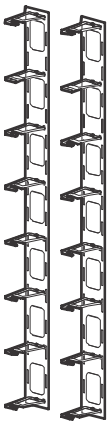
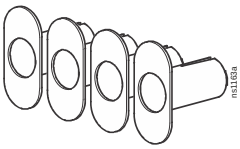
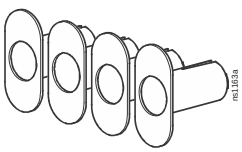
Vertical 0U accessory channels can be removed completely from the cabinet. Loosen the fasteners that attach the vertical 0U accessory to the cabinet.

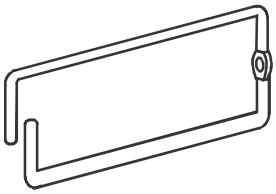
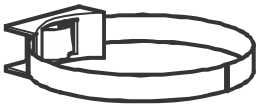
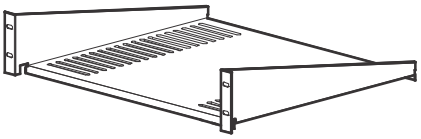
Reverse the procedure to install the accessory channels.



Cable management options for the cabinets

Product	SKU	Description	Figure
19 in. horizontal cable organizers	AR8602 (1U) AR8600 (2U) AR8601 (2U double sided) AR8603A (2U high density)	Route patch cables horizontally at the front or rear of a 19 in. EIA cabinet.	
Cable management rings	AR8113A	Fastens cables to posts, mounting rails, or braces.	
19 in. horizontal cable organizer	AR8425A (1U) AR8426A (2U)	Routes cables horizontally on the front or back of the 19 in. EIA rack.	
19 in. 2U patch cord organizer	AR8427A	Routes cables horizontally on the front or back of the 19 in. EIA rack.	
19 in. 2U horizontal cable organizer pass-through	AR8428	Routes cables horizontally or front-to-rear.	
19 in. 1U cable pass-through with brush strip	AR8429	Assists with containing air in the cabinet.	
Cable containment brackets	AR7710	Contains cables along the vertical 0U accessory channel and is installed without tools. Quantity of six.	

Product	SKU	Description	Figure
0U accessory mounting bracket	AR7711	The bracket can be mounted in various locations throughout the cabinet for supporting small accessories and equipment.	
Vertical Cable Organizer for NetShelter 0U Channel	AR8442	Eliminates cable stress by organizing cable layout within the rear channels of the cabinet. Takes up 0U of space within the cabinet. Consists of two pieces of equal size that, when connected, span the height of a 42U cabinet. Can be used in any Schneider Electric cabinet.	
Vertical fiber organizer and spools	AR8443A	The vertical fiber organizer and fiber organizer spools provide a method to manage fiber cabling within an cabinet and mount toollessly into the vertical 0U accessory channel of the cabinet. Quantity of two.	
Fiber organizer (spools only)	AR8444	Can be mounted toollessly to the vertical fiber organizer or attached with screws to the mounting rails of 750 mm wide cabinets.	

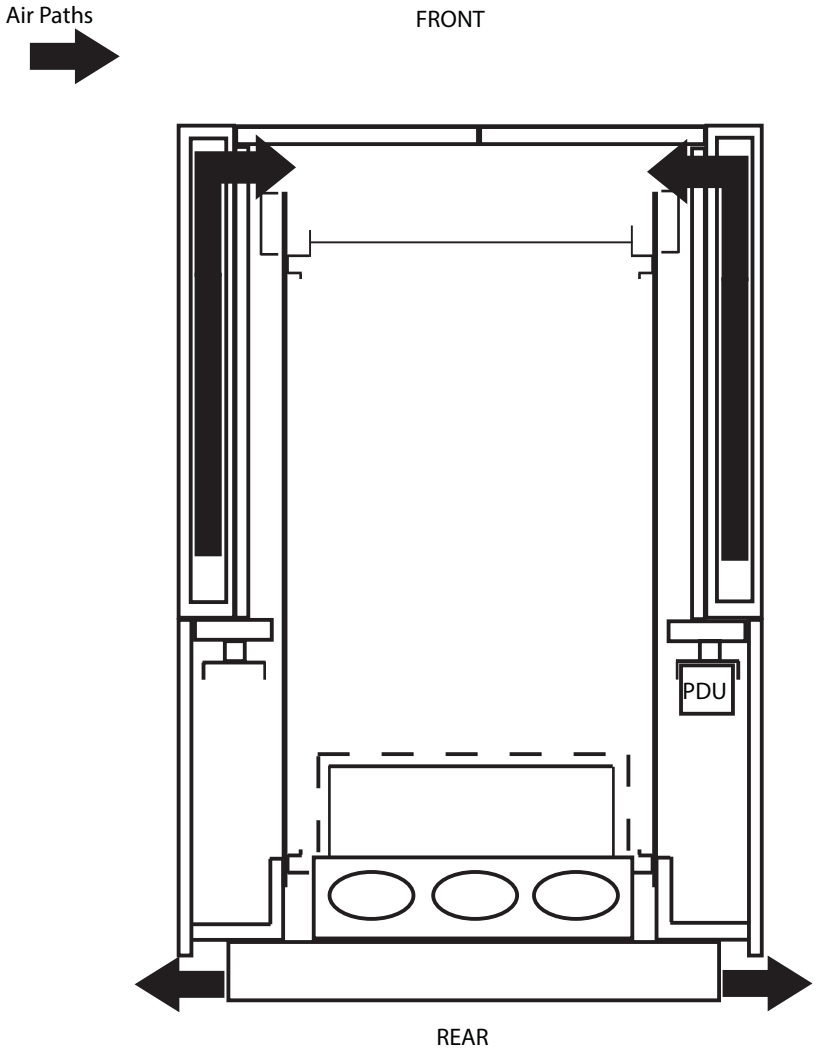
Product	SKU	Description	Figure
1U cable ring	AR7707	Fastens cables to posts, for use with 750 mm cabinet networking applications.	
Toolless Hook-and-Loop Cable Managers	AR8621	A toolless mount hook-and-loop cable fastener for organizing data cable bundles. Various mounting positions are available on the back panel of a vertical cable organizer. Quantity of ten.	
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 cabinet.	

Air Circulation

Cabinet placement

When placing the NetShelter CX SP in an open office environment:

- The rear of the unit can be pushed fully against a wall. Six to eight inches of clearance should be left on either side of the unit.
- Do not place the cabinet unit in direct sunlight or in a small non-air conditioned space.
- Place the cabinet close to ventilation or cool air ingress points in the room.



Rack PDU Options for your NetShelter CX SP Cabinet

The following table lists the APC by Schneider Electric Rack Power Distribution Units that can be used inside your NetShelter CX SP cabinet. Choose a Rack PDU compatible with your requirements and compliant with the electrical standards for your location.

SKU	Input	Output	Type	Mounting
AP7800B	NEMA 5-15P	(8) 5-15R	Metered	Horizontal
AP7801B	NEMA L5-20P	(8) 5-20R	Metered	Horizontal
AP7802B	NEMA L5-30P	(16) 5-20R	Metered	Horizontal
AP7811B	NEMA L6-20P	(12) C13, (4) C19	Metered	Horizontal
AP7820B	C14	(8) C13	Metered	Horizontal
AP7821B	C20	(8) C13	Metered	Horizontal
AP7822B	IEC309-32A	(12) C13, (4) C19	Metered	Horizontal
AP8831	NEMA 5-15P	(16) 5-15R	Metered	Vertical
AP7850B	C14	(16) C13	Metered	Vertical
AP7900B	NEMA 5-15P	(8) 5-15R	Switched	Horizontal
AP7901B	NEMA L5-20P	(8) 5-20R	Switched	Horizontal
AP7902B	NEMA L5-30P	(16) 5-20R	Switched	Horizontal
AP7911B	NEMA L5-30P	(16) 5-20R	Switched	Horizontal
AP7920B	C14	(8) C13	Switched	Horizontal
AP7921B	C20	(8) C13	Switched	Horizontal
AP7922B	IEC309-32A	(16) C13	Switched	Horizontal

Connect the Rack PDU

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow all local and national codes when installing the Rack PDU.
- Never use extension cords with the Rack PDU.
- Connect the Rack PDU to the UPS, if installed, or to a single-outlet dedicated circuit protected by a circuit breaker or fuse with the same current rating as the Rack PDU.
- Power off the UPS or Mains Supply before connecting the Rack PDU.
- The plug or inlet serves as the disconnect for the Rack PDU. Make sure the utility power outlet for the Rack PDU will be close to the Rack PDU and readily accessible.

Failure to follow these instructions will result in death or serious injury.

Connect the Rack PDU to the UPS when a UPS is installed in the cabinet or connect it to the nearest local Mains supply point.

Specifications

18 U and 24 U Cabinets

	Measurements	
	18 U	**24 U**
Height	1015 mm (41 in.)	1275 mm (50.2 in.)
Width	750 mm (29.53 in.)	750 mm (29.53 in.)
Depth	1130 mm (44.5 in.)	1130 mm (44.5 in.)
Net weight cabinet	144 kg (317 lb)	172 kg (379.2 lb)
Net weight packaged	220 kg (485 lb)	248 kg (546.8 lb)
Clearance (for wiring between front door and vertical rail)	60.96 mm (2.40 in.)	60.96 mm (2.40 in.)
Maximum equipment Weight: Static load (4 casters. Swivel castors to be locked)	830 kg (1826 lb)	805 kg (1771 lb)
Maximum equipment Weight: Dynamic load (4 casters.)	318 kg (700 lb)	363 kg (800 lb)
Maximum recommended thermal load	1.2 kW (4,100 BTU/hr)	2.4 kW (8,200 BTU/hr)
Power consumption	39 watts	68 watts
Noise reduction †	Up to 18.5 dB	Up to 18.5 dB

† 18.5 dB equates to perceived drop in noise of 98.5%. The NetShelter CX SP generates 48.5 dB of noise during normal operation. This is below standard office ambient noise levels of approximately 50 dB.

Two-Year Factory Warranty

This warranty applies only to the products you purchase for your use in accordance with this manual.

Terms of warranty

APC by Schneider Electric warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. APC by Schneider Electric will repair or replace defective products covered by this warranty. This warranty does not apply to equipment that has been damaged by accident, negligence or misapplication or has been altered or modified in any way. Repair or replacement of a defective product or part thereof does not extend the original warranty period. Any parts furnished under this warranty may be new or factory-remanufactured.

Non-transferable warranty

This warranty extends only to the original purchaser who must have properly registered the product. The product may be registered at the APC by Schneider Electric website, **www.apc.com**.

Exclusions

APC by Schneider Electric shall not be liable under the warranty if its testing and examination disclose that the alleged defect in the product does not exist or was caused by end user's or any third person's misuse, negligence, improper installation or testing. Further, APC by Schneider Electric shall not be liable under the warranty for unauthorized attempts to repair or modify wrong or inadequate electrical voltage or connection, inappropriate on-site operation conditions, corrosive atmosphere, repair, installation, exposure to the elements, Acts of God, fire, theft, or installation contrary to APC by Schneider Electric recommendations or specifications or in any event if the APC by Schneider Electric serial number has been altered, defaced, or removed, or any other cause beyond the range of the intended use.

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