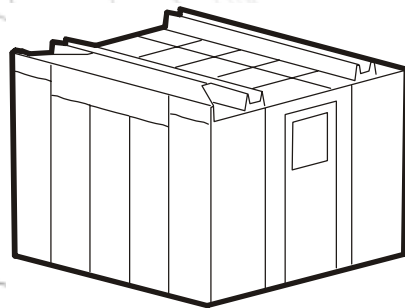


Installation Manual

Hot Aisle Containment System



Contents

General Information.....	1
Overview	1
Safety	2
Safety symbols used in this manual	2
Cross-reference symbols used in this manual	2
Component Identification	3
Main Components	3
Hardware	4
Joining hardware and trim	4
Tools Required	5
Planning the Layout and Installation.....	6
General guidelines for installation	6
Installation procedure overview	7
Sample floor layouts	8
Critical Dimensions	10
Installation.....	11
Layout and Positioning of the Main Components	11
Main Component	12
SX enclosures	12
SX to VX or VS enclosures	12
InRow RC to SX enclosure	12
NetworkAIR IR 40 CW to VX enclosure	12
900-mm VX enclosures	12
Joining the enclosures	13
900-mm VX and 1070-mm VX or SX enclosures	13
1070-mm VX enclosures.	15

Door and Door Frames	16
Assemble the door frame—VX enclosures	16
Assemble the door frame—SX enclosures	17
Door frame installation	19
Doors and Locksets	21

Ceiling Panels	24
Types of ceiling panels	24
Order of installation	24
Installing IR40 CW-to-IR40 CW ceiling panels	26
Installing IR40 CW-to-Rack ceiling panels	26
Installing Rack-to-Rack Ceiling panels	28
Installing InRow RC-to-InRow RC ceiling panels	30
Ceiling Panel Inserts	31

Power Troughs and Data Partitions	34
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End Panels	34
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Warranty and Service	35
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Limited warranty	35
Warranty limitations	35
Obtaining service	35

General Information

Overview

The Hot Aisle Containment System encloses a hot aisle to collect and cool equipment exhaust, making it available for cool air intakes. This creates a self-contained system capable of supporting high density power loads.

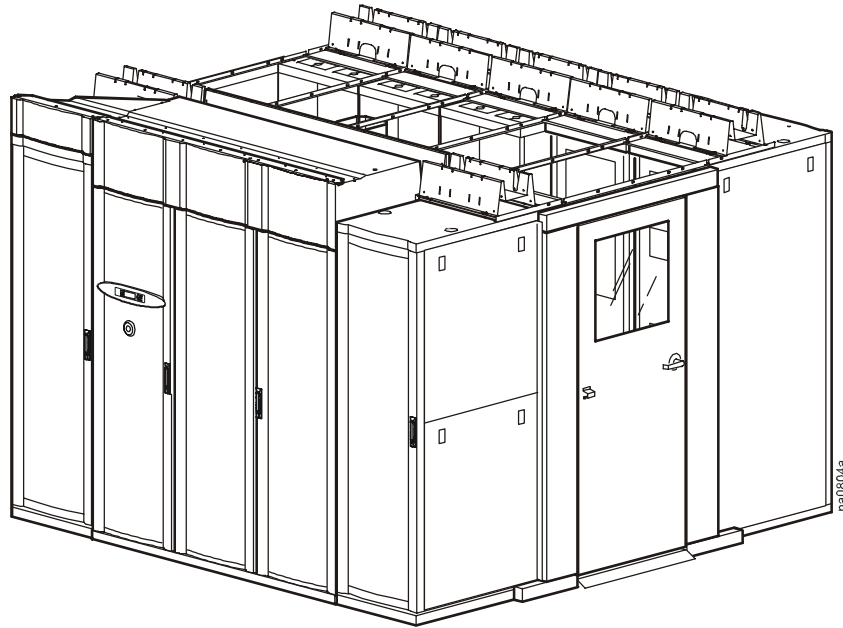
The Hot Aisle Containment System can be built using new APC equipment or with existing APC equipment.

This manual is a guide for basic installation procedures for creating a Hot Aisle Containment System.



See also

Refer to the documentation provided with each piece of equipment for specific installation and joining instructions. All documentation is available on the APC Web site, at www.apc.com.



na0804a

Safety

Safety symbols used in this manual



Indicates an electrical hazard, which, if not avoided, could result in injury or death.



Indicates a hazard, which, if not avoided, could result in severe personal injury or substantial damage to product or other property.



Indicates a potential hazard, which, if not avoided, could result in personal injury or damage to product or other property.



Indicates a heavy load that should not be lifted without assistance.



Indicates important information.



Indicates a hazard, which, if not avoided, could result in personal injury or damage to product or other property.

Cross-reference symbols used in this manual



Indicates that more information is available on the same subject in a different section of this manual.

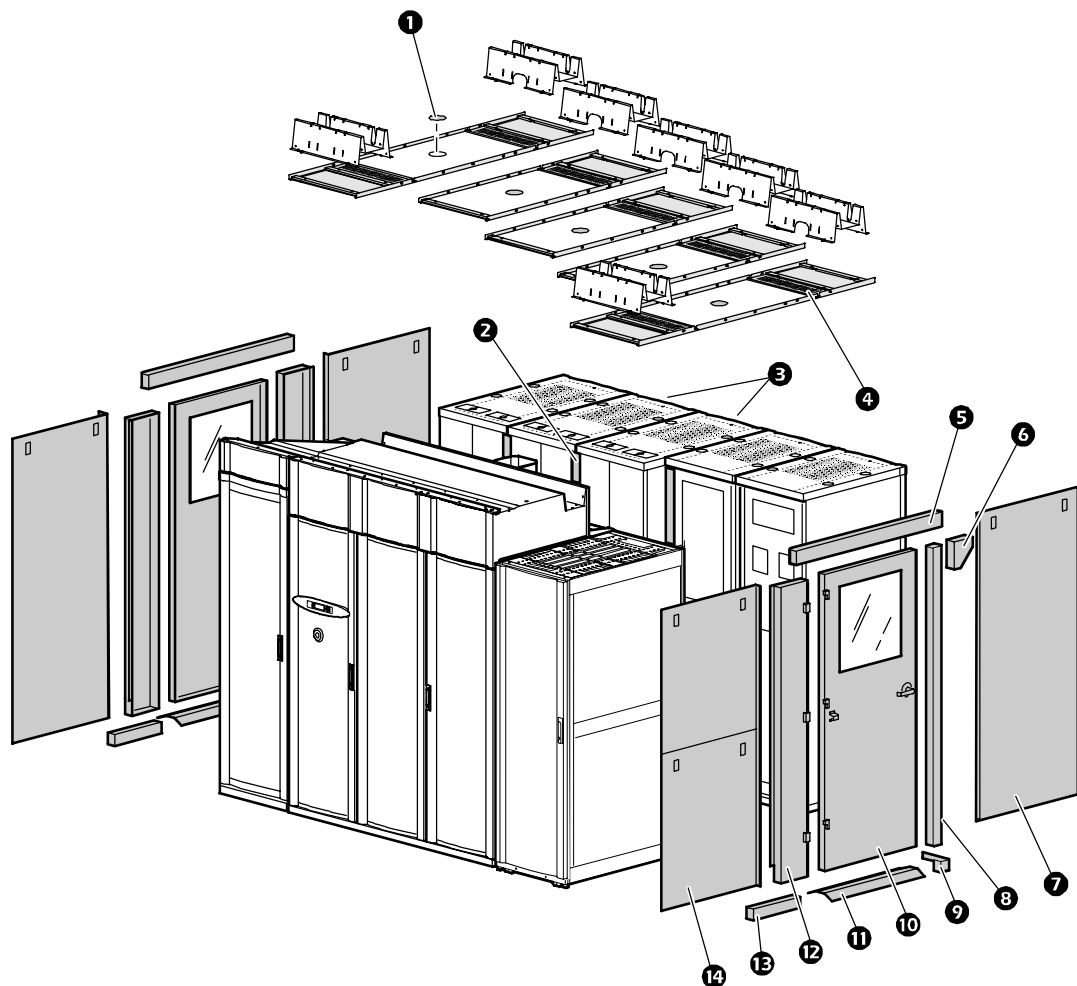


See also

Indicates that more information is available on the same subject in a different manual.

Component Identification

Main Components



* Your kits may vary from what is show above.

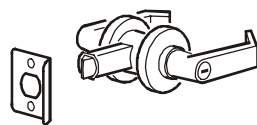
- | | |
|-------------------------------|----------------------------------|
| ❶ Cap plug | ❸ Door frame upright |
| ❷ Joining brackets | ❹ Plinth block |
| ❸ 21U side panels (not shown) | ❺ Door |
| ❹ Ceiling panels | ❻ Threshold |
| ❺ Door header | ❼ Door frame upright |
| ❻ Corner brace assembly | ❽ Plinth block |
| ❼ Side panel | ❾ 21U side panels (SX enclosure) |



Note

Ceiling panel assemblies come with Lexan® inserts that are not yet attached to the frames. Remove these and store them in safe location. Install the ceiling panel inserts last.

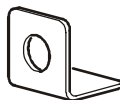
Hardware



Lockset



Ceiling panel bracket
(threaded)



Ceiling panel
bracket



Screw
M6 x 30-mm



Door stop



Plasti-Grommet



Screw
M6 x 12-mm



Retaining
fastener



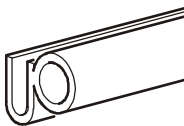
Screw
M3 x 12-mm



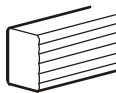
12-24 x 1/2-in FHPHSS
undercut screw



M6 flange nut



Door-frame
gasket

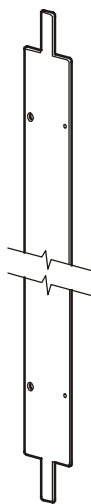


Ceiling-panel
gasket



Screw
8-32 x 3/8-in

Joining hardware and trim



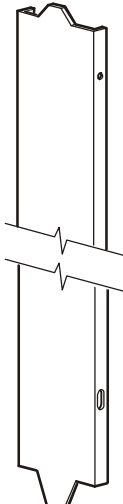
Joining trim
InRow to
InRow



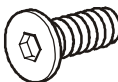
Joining trim
900-mm to
900-mm



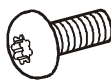
Joining trim
900-mm
to
1070-mm



Joining
bracket
1070-mm
to
1070-mm



pan-head
socket
screw



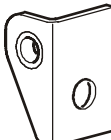
M6 x 16-mm
Torx®
screw



M8 flat
washer



1070-mm
trim
bracket

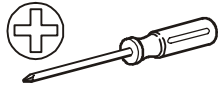


900-mm trim
bracket

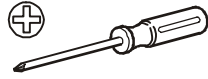


Button-head
socket cap
screw

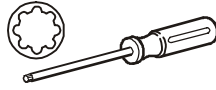
Tools Required



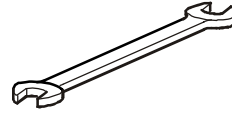
P2 Phillips
screwdriver



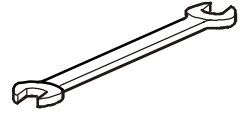
P1 Phillips
screwdriver



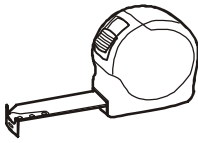
T-30 Torx
screwdriver



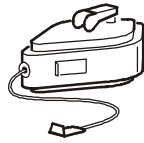
Open end wrench
13-mm/14-mm



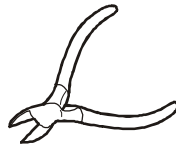
Open end wrench
7-mm/8-mm



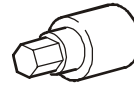
Tape measure



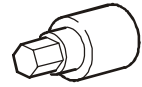
Chalk line



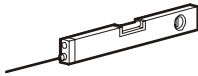
Cutting tool for
door-frame gasket



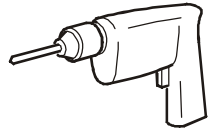
M5 socket



M6 socket



Laser Level



Drill

Planning the Layout and Installation

The Hot Aisle Containment System can be installed around units that are already installed in a building, or can be assembled from new units.

If you are installing the Hot Aisle Containment System around pieces of equipment that are already installed, consider using the PDU, UPS, or InRow unit as a starting point. **If you have to move a PDU, a UPS, or an InRow unit, you must first disconnect the power to the unit.**



Caution

The floor in the room where the Hot Aisle Containment System will be installed must be within 0.075° from level for an eight-unit system, or within 0.035° from level for a 16-rack configuration.



See also

See the *InfraStruXure System Installation Manual* available on the *Utility* CD that came with the PDU or from the APC Web site, for proper system shut down.

General guidelines for installation

A Hot Aisle Containment System can be assembled from many different types of equipment, but these guidelines must be followed to ensure that the it is assembled correctly.

- Join enclosures on either 24-in centers or 600-mm centers. **Do not use both as the equipment in the aisle will not properly align.**
 - If there are VX enclosures in a row, join the enclosures on 24-in centers. If there are SX enclosures in a row, join the enclosures on 600-mm centers.
- If installing on a raised floor, plan the installation of the NetworkAIR IR 40 CW. unit to allow one of the floor tiles to be completely unobstructed, to allow under floor access to pipes and valves.
- Do not fully tighten screws and bolts until all components, ceiling panels, doors, and door frames are assembled and installed.
- The ISX InRow RC air conditioner must be installed directly across from another ISX InRow RC air conditioner.
- When laying out and aligning the equipment rows, use a ceiling panel to help to distance the rows. See the ceiling panel on installing the ceiling panels for more information.



Note

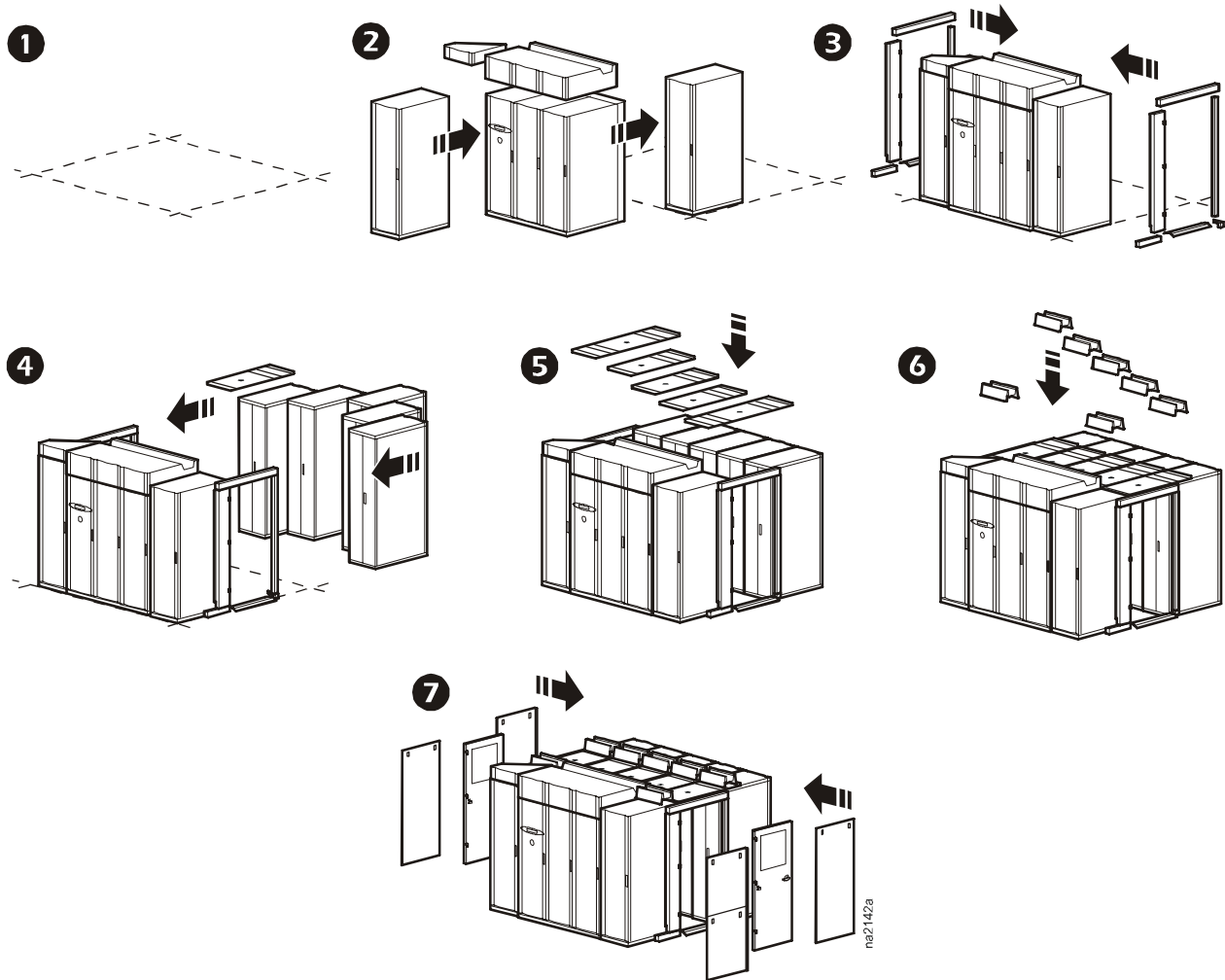
If there is more than one NetworkAIR IR 40 CW unit in your Hot Aisle Containment System, be prepared to move at least one unit so that the aisle will line up properly.



See also

See the documentation provided with each APC unit for additional instructions on installation. All documentation is also available on the APC Web site, www.apc.com.

Installation procedure overview



- 1** Layout the position of the main components using the BOT printout as a dimensional reference. Each enclosure must line up exactly with the enclosure directly across the aisle.
See “Layout and Positioning of the Main Components” on page 11
- 2** Assemble the first row. Position the main components working either from one end to the other, or starting from an NetworkAIR IR 40 CW, PDU or UPS and work your way out to both ends.
See “Main Component” on page 12
- 3** Assemble and install the door frames on both ends. These will aid in the positioning of the second row.
See “Door and Door Frames” on page 16
- 4** Position the main components of the second row. Use ceiling panels as a distancing guide.
See “Main Component” on page 12
- 5** Install the ceiling panels.
See “Ceiling Panels” on page 24
- 6** Install the power troughs and data partitions.
See “Power Troughs and Data Partitions” on page 34
- 7** Install the end panels and doors.
See “End Panels” on page 34

Sample floor layouts

Each Hot Aisle Containment System will have different requirements for installation, based on the equipment being used. Use these as guides to determine what layout will work best for your Hot Aisle Containment System.

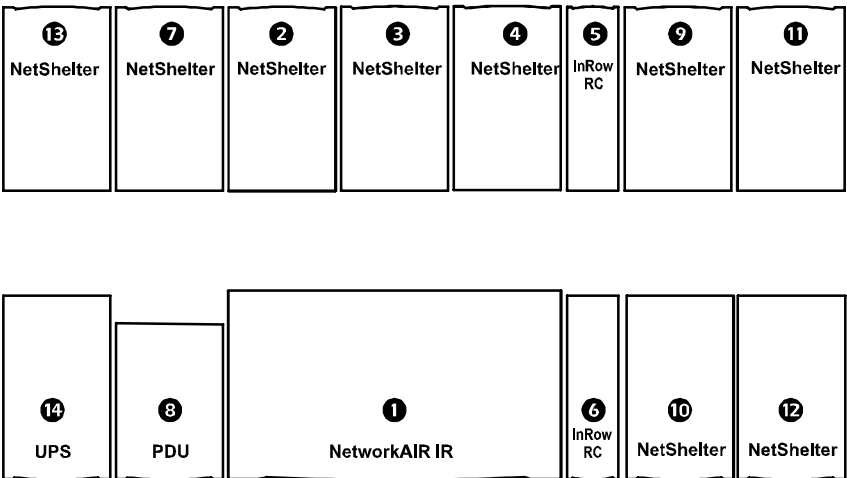
APC recommends starting the construction of the Hot Aisle Containment System with an NetworkAIR IR 40 CW unit, which is large and difficult to move.



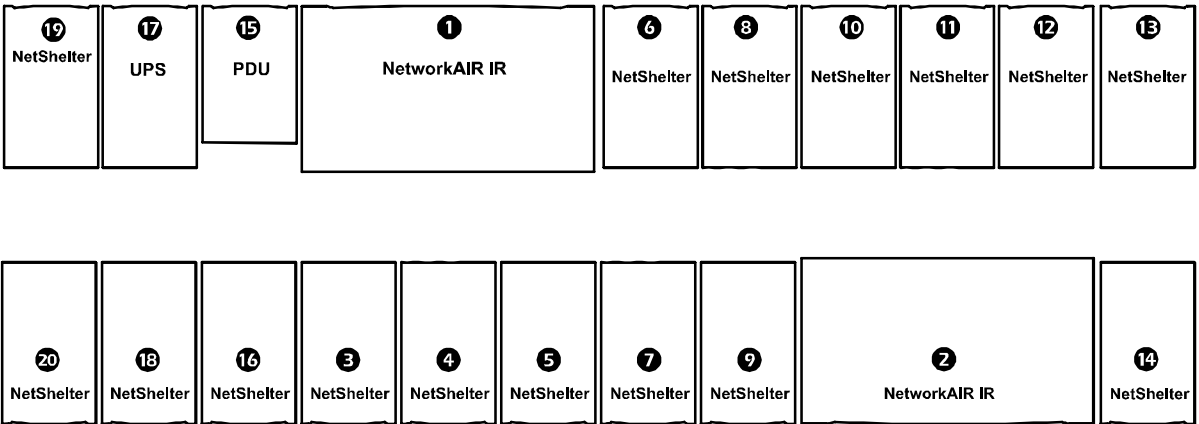
If there is more than one NetworkAIR IR 40 CW unit in your Hot Aisle Containment System, be prepared to move at least one unit so that the aisle will line up properly.

The following layouts are examples showing the order in which to install the main components.

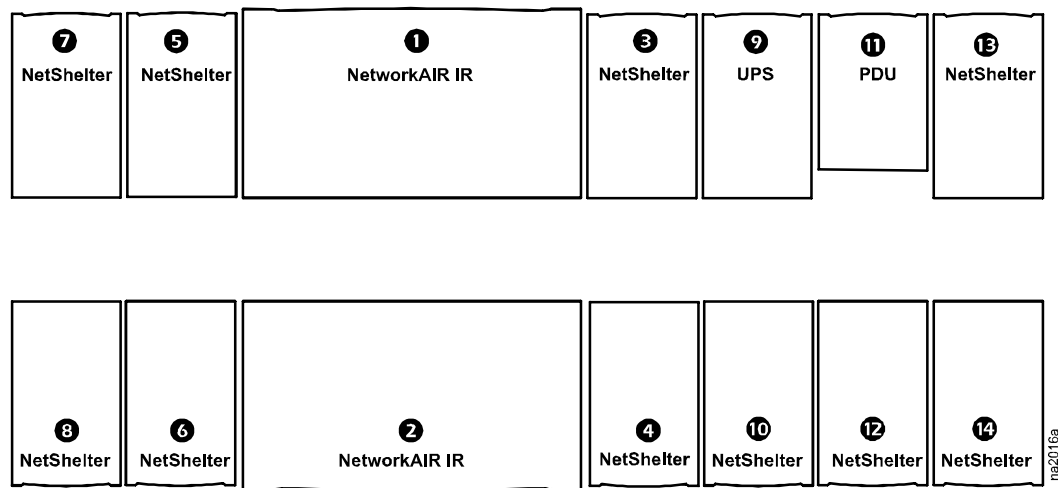
Installation with one NetworkAIR IR 40 CW unit



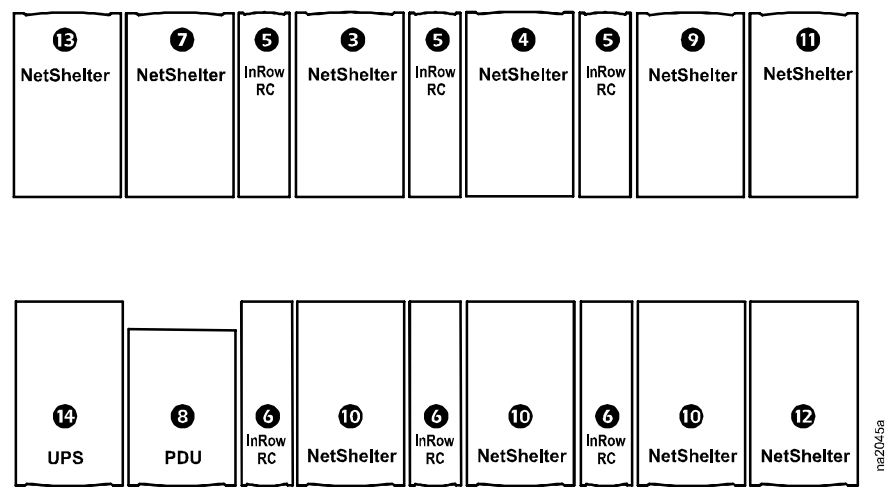
Installation with two NetworkAIR IR 40 CW units



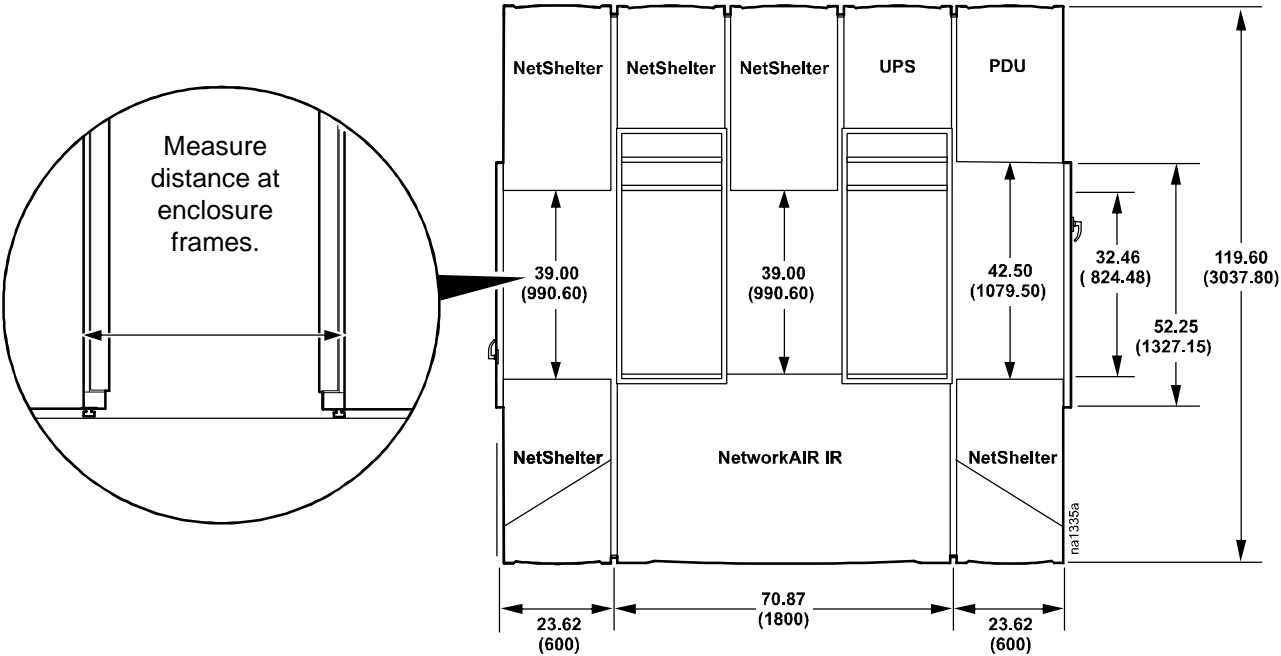
Installation with two NetworkAIR IR 40 CW units directly across from each other



Installation with InRow RC units



Critical Dimensions

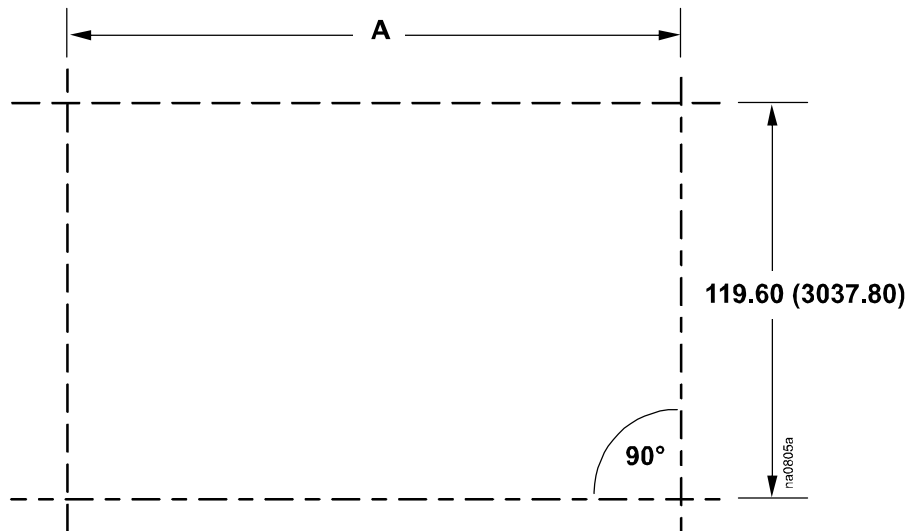


* Dimensions are in inches (millimeters).

Installation

Layout and Positioning of the Main Components

Determine the position of the main components and the total length of the Hot Aisle Containment System. Using a chalk line or a similar tool, lay out the perimeter, making sure all corners are square.



* Dimensions are in inches (millimeters).



Dimension “A” is based on the Hot Aisle Containment System component configuration. Check the Build-out tool printout for specifics.

Main Component

There are multiple types of enclosures and units that can be joined to form a Hot Aisle Containment System. Refer to the instructions the comes with the equipment for specific information on how to install each main component. Some of these instructions are listed below

SX enclosures



See the instructions included with the *NetShelter SX Enclosure Installation Manual* (990-2183) for information on joining SX enclosures.

SX to VX or VS enclosures



See the *NetShelter SX to VX or VS External Joining Kit* (990-2339) installation sheet.

InRow RC to SX enclosure

The InRow RC joins to other enclosures in the same way as a NetShelter SX enclosure.



See the instructions included with the *NetShelter SX Enclosure Installation Manual* (990-2183) for information on joining the InRow RC to an SX enclosure.

NetworkAIR IR 40 CW to VX enclosure



See the *Baying Kit: NetworkAIR IR 40 CW to VX* (990-1494) installation sheet.

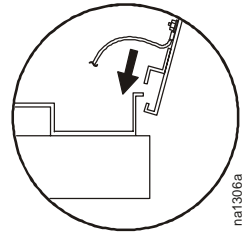
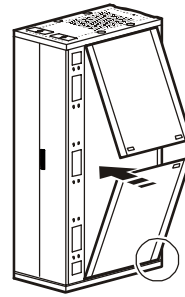
900-mm VX enclosures



See the instructions included with the *NetShelter VX Enclosure Installation Manual* (990-0393) for information on joining of 900-mm enclosures.

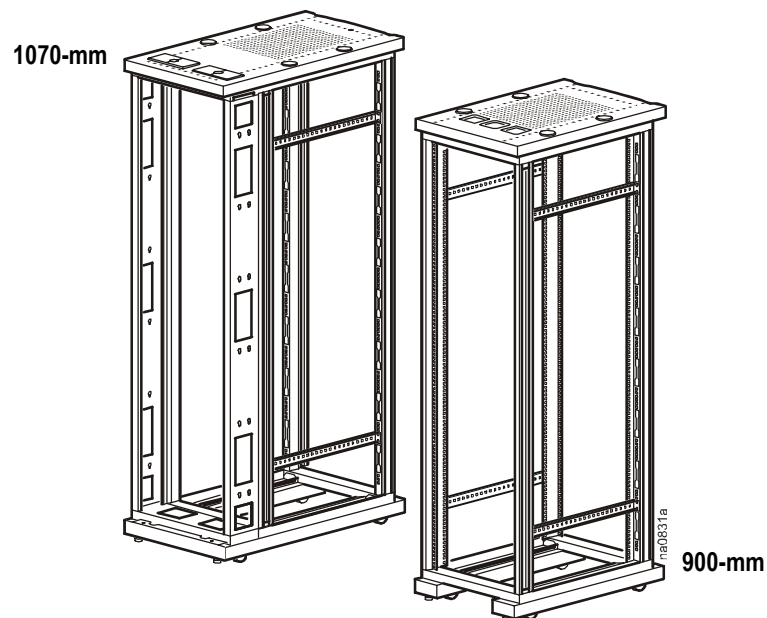
Joining the enclosures

VX enclosures only: Before installing the VX enclosures, install two 21U side panels. Existing equipment rows may need to be pulled apart to install the 21U panels. These panels are options for enclosures.

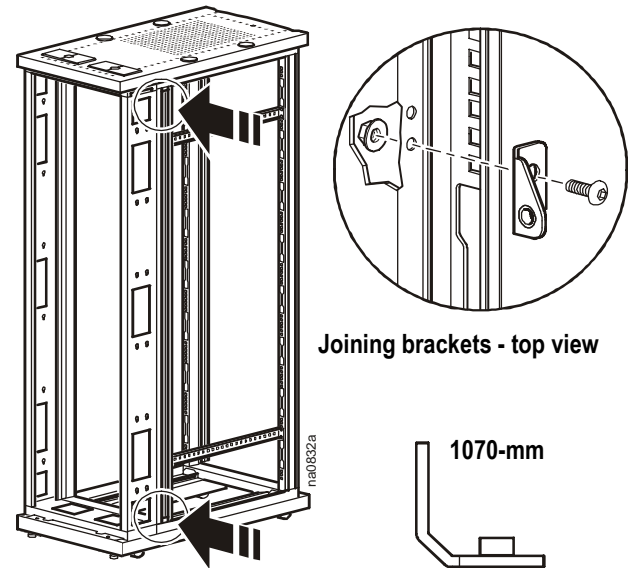


na1306a

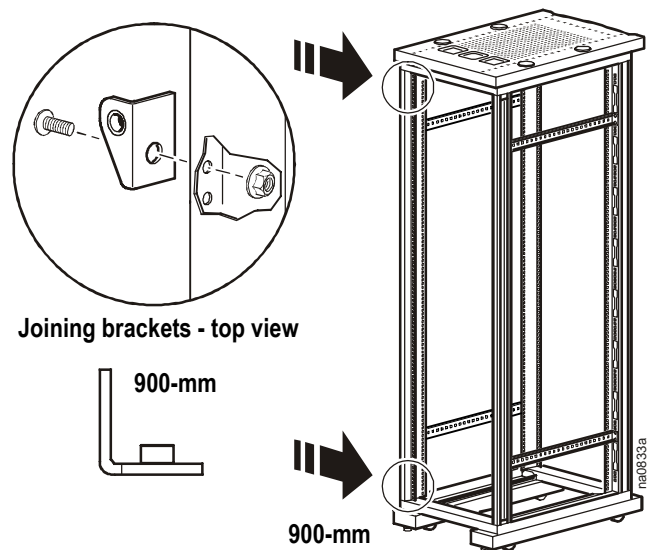
900-mm VX and 1070-mm VX or SX enclosures



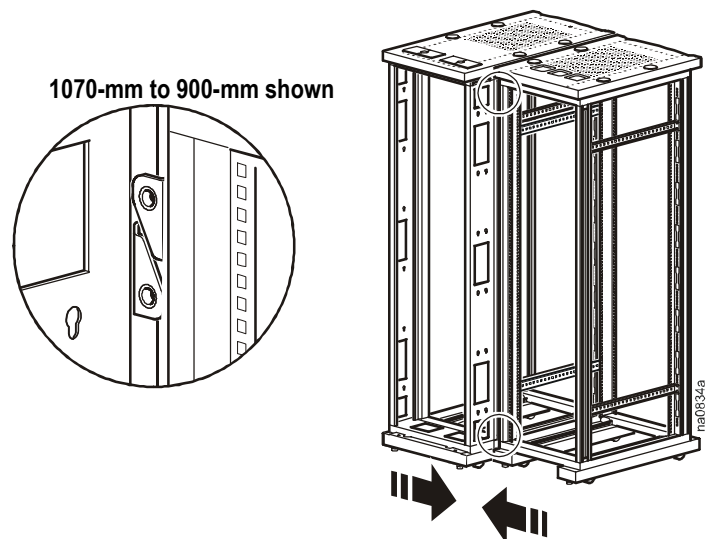
1. Use an M6 × 12-mm screw and flange nut to attach two 1070-mm trim brackets (included) to the side of the 1070-mm enclosure. Use the bottom hole of the two holes on the side of the enclosure.



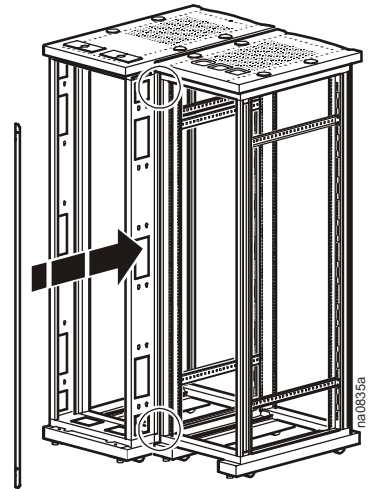
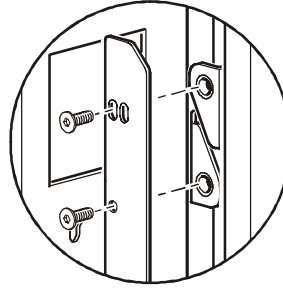
2. Use an M6 × 12-mm screw and flange nut to attach two 900-mm trim brackets (included) to the side of the 1070-mm enclosure. Use the top hole of the two holes on the side of the enclosure.



3. Move the enclosures into the row, slide them together, and align the joining trim brackets as shown.



4. Install the joining trim to the joining trim brackets, using four pan-head screws.



1070-mm VX enclosures.

When joining two 1070-mm enclosures, you must use the appropriate rear joining brackets (provided). Orient the brackets so that the two round holes are at the top position and the slots are in the middle and lower positions. Use six M6 × 12-mm screws (provided) to join two 1070-mm enclosures.

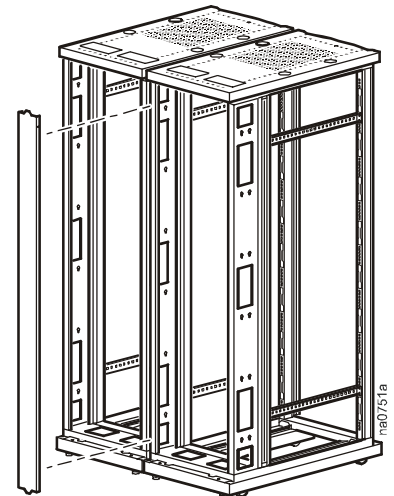
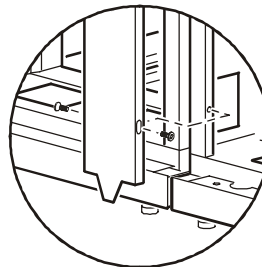
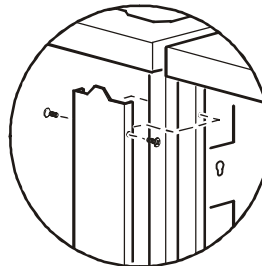
The rear doors of the enclosures must be removed before the joining brackets can be installed.



Do not remove the rear doors of the UPS, PDU, or XR Battery.



See the instructions included with your equipment for information on how to remove the rear doors.



Door and Door Frames

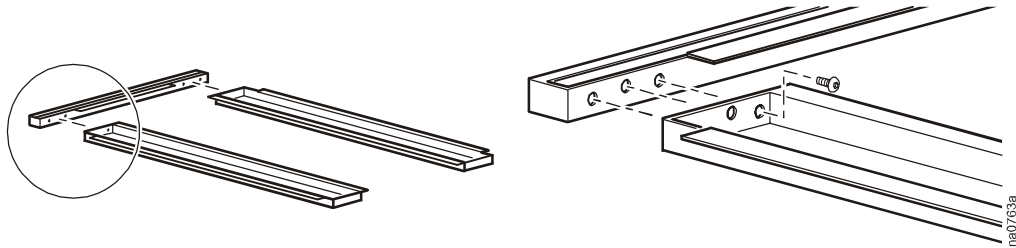
You will install a door and door frame on both ends of the Hot Aisle Containment System. They are used for aligning and joining the two rows of equipment.

Different door assemblies are required, depending on what type of enclosures are at the ends of the hot aisle.

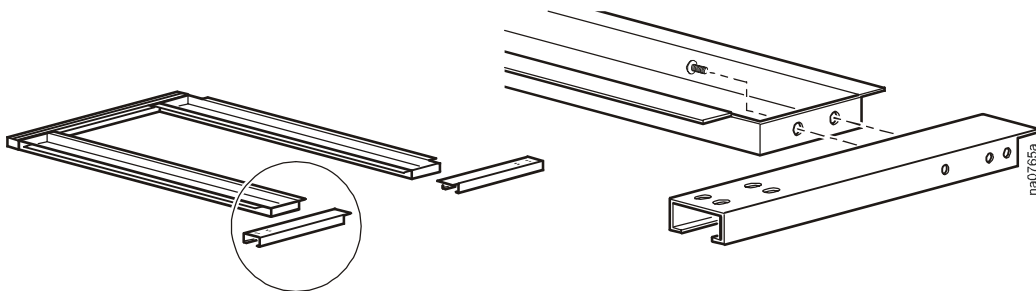
SKU number	End aisle enclosures
ACDC1016	An SX enclosure on both the left and right
ACDC1004	A VX enclosure on both the left and right
ACDC1017	An SX enclosure on the left and a VX enclosure on the right.
ACDC1020	A VX enclosure on the left and an SX enclosure on the right.

Assemble the door frame—VX enclosures

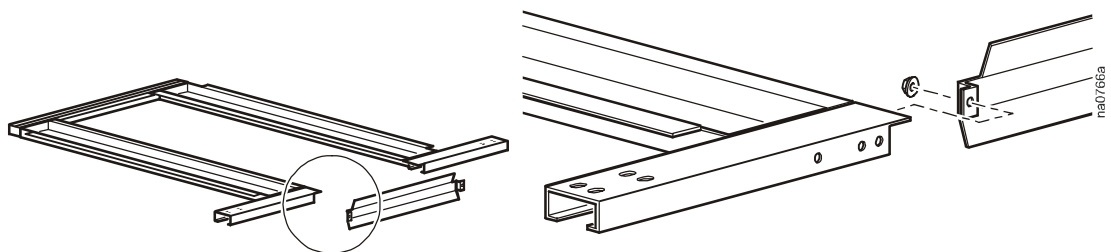
1. Attach the header to the left- and right-side door frame uprights using six M6 × 12-mm screws.



2. Attach the plinth blocks to the bottom of the door frame uprights using four M6 × 12-mm screws.



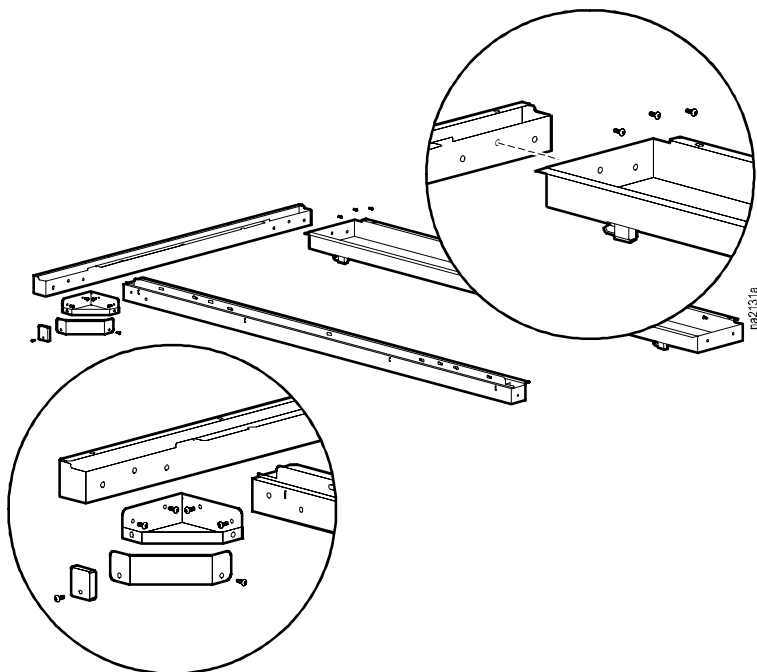
3. Attach the threshold to the bottom of the plinth blocks using two M6 flange nuts.



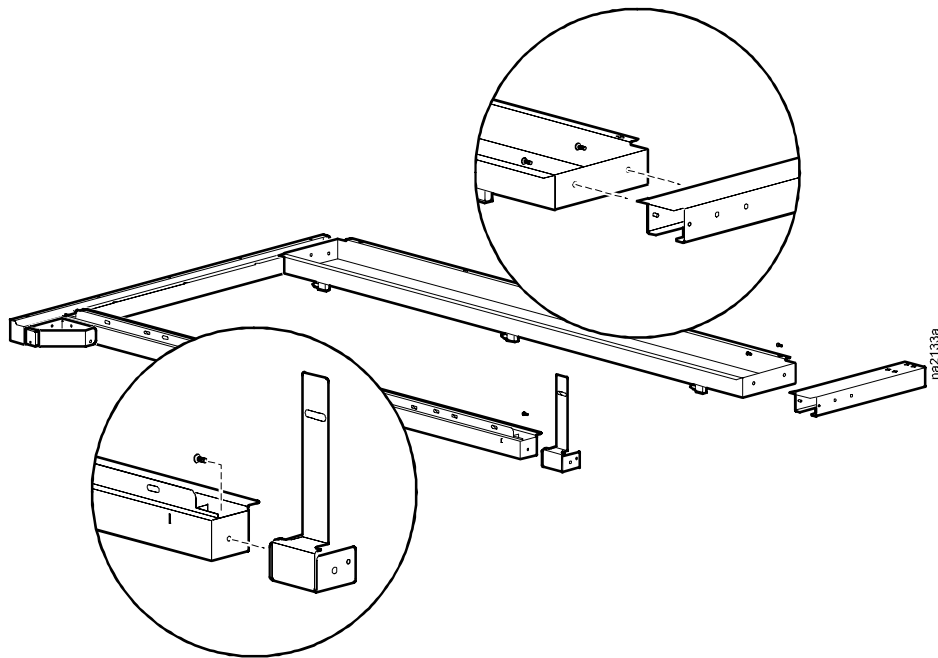
Assemble the door frame—SX enclosures

(left hand frame shown)

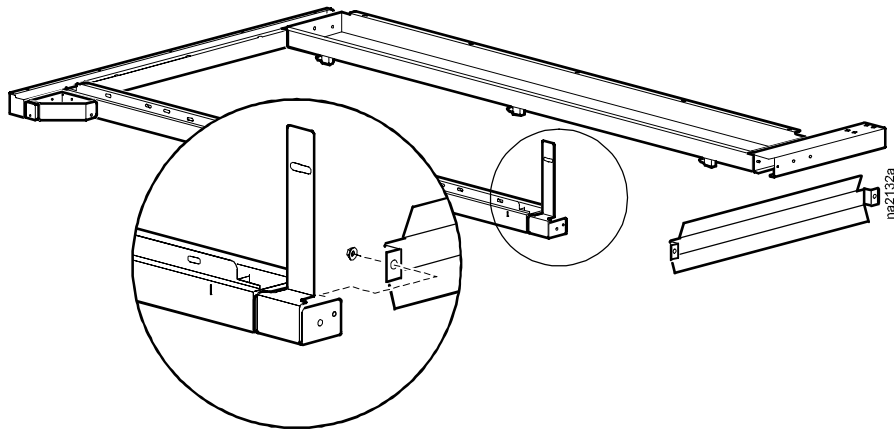
1. Attach the header to the left- and right-side door frame uprights using seven M6 × 12-mm screws.
2. Attach the corner brace assembly to the door frame assembly using two M6 × 30-mm screws.



3. Attach the plinth blocks to the bottom of the door frame uprights using four M6 × 12-mm screws.

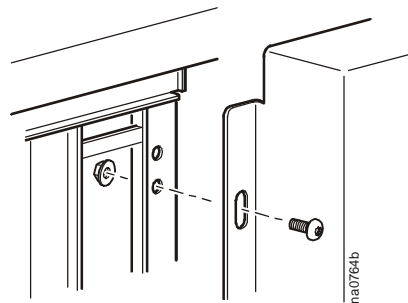
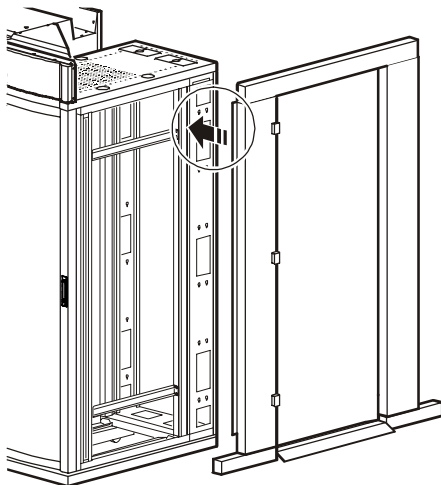


4. Attach the threshold to the bottom of the plinth blocks using two M6 flange nuts.

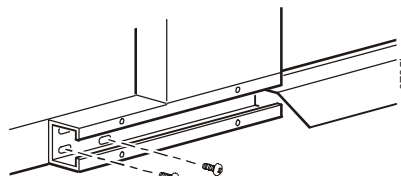
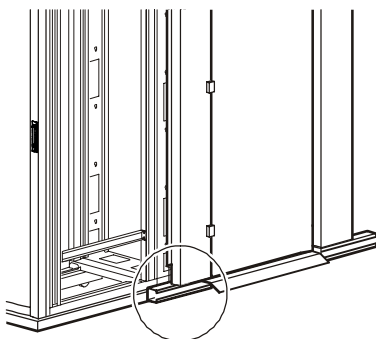


Door frame installation

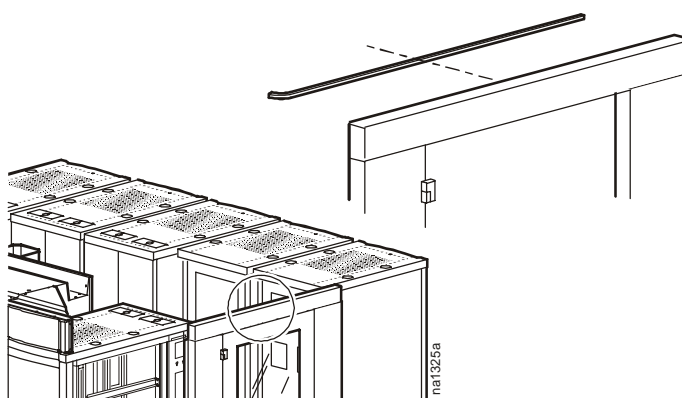
1. Use five M6 × 12-mm screws and M6 flange nuts to attach the door frame to the units at the end of the aisle.



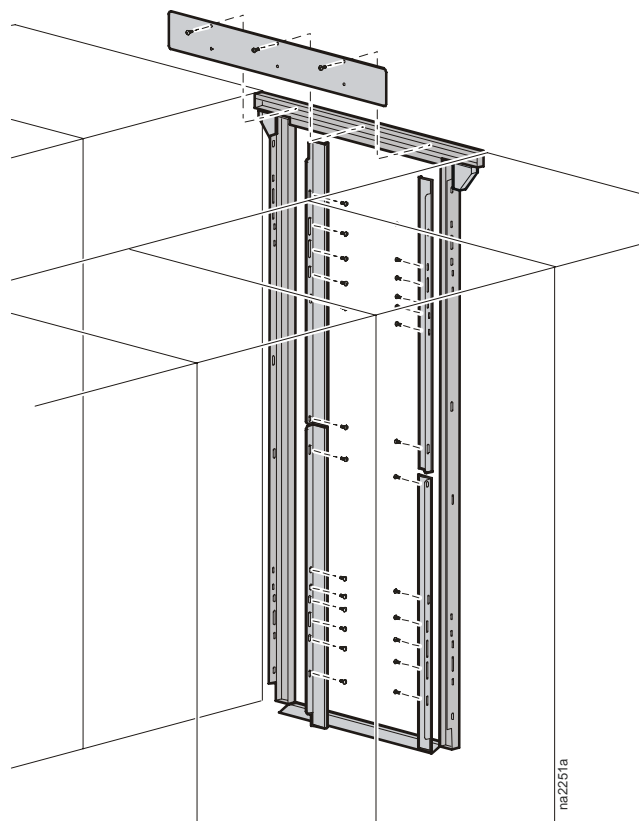
2. Attach the plinth block covers to the unit using two M8 × 25-mm screws.



3. Apply a foam gasket to the door frame.



4. **For SX enclosures only:** Install the header and door frame upright covers (for SX enclosures only) to the *inside* of the door frame and headers using M6 × 12-mm screws.



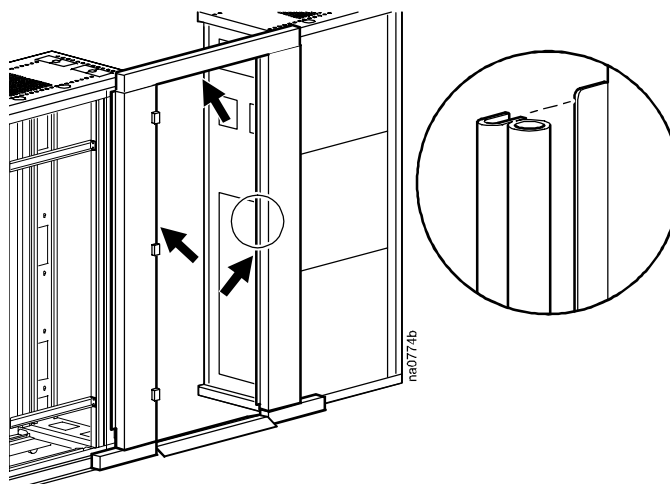
Doors and Locksets



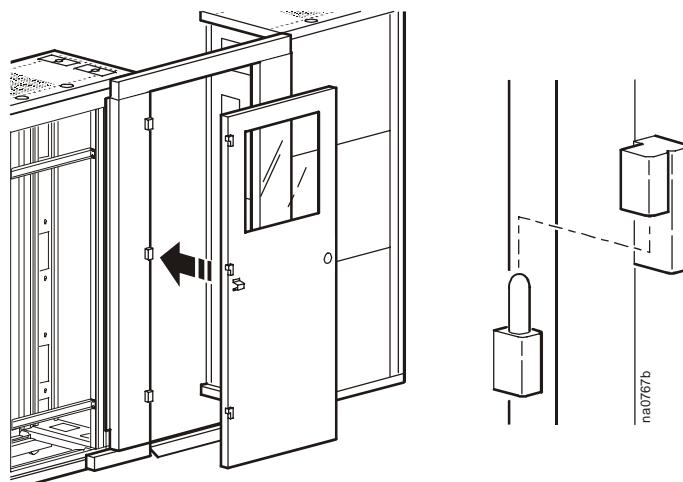
Heavy

To avoid injury, at least two people should install the door frame and door.

1. Apply the door frame gasket material to the door frame sides, and cut off any excess. Position the door gasket bulb on the outside of the door frame where it will make contact when the door is closed.



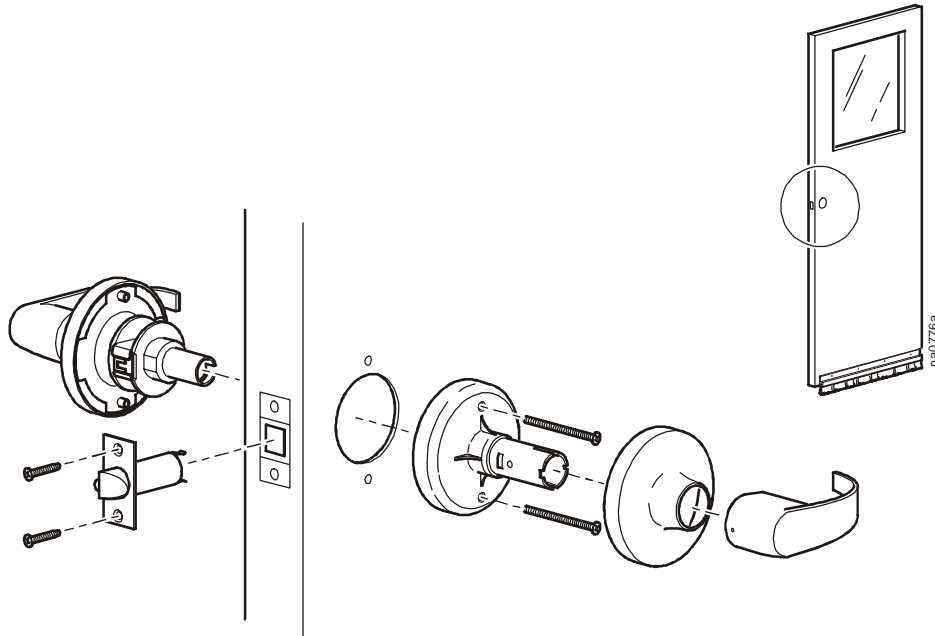
2. Hang the door on the frame.



3. Attach a lockset to each door.



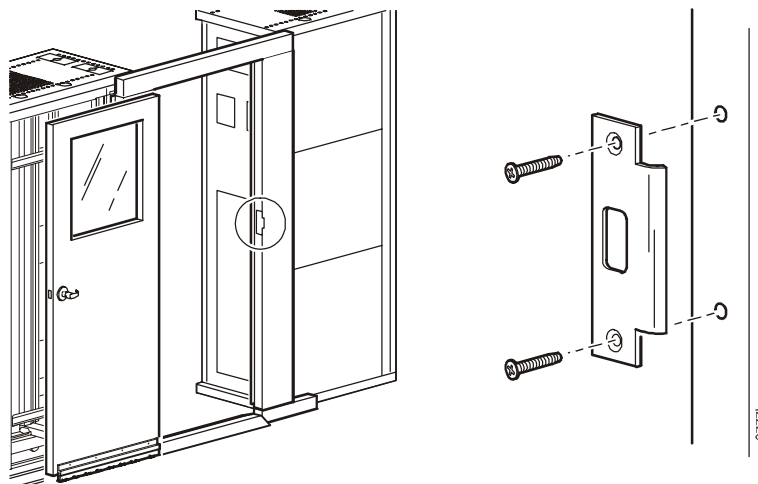
Use the wire hook (provided with lockset) to release the assembled parts of the lockset to release the assembled parts prior to installed the lockset onto the door frame.
Position the lock cylinder on the outside of the door.



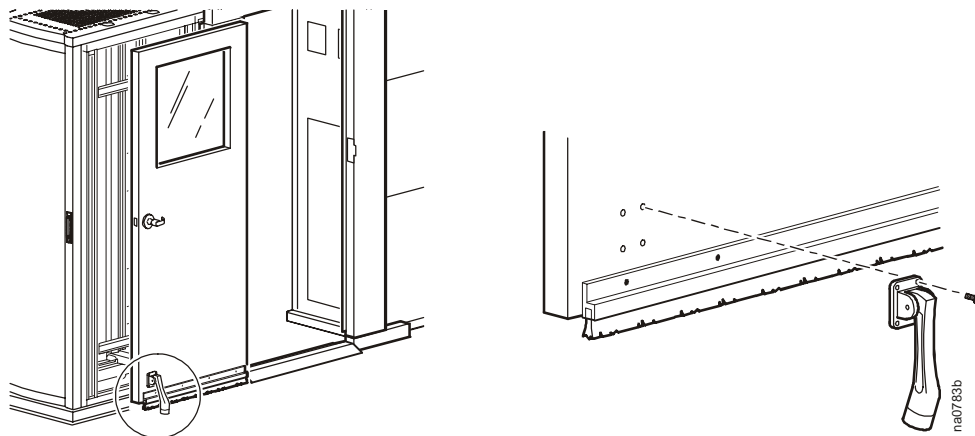
4. If the lock is installed next to a VX enclosure, install the strike plate onto the door frame, using two 12-24 × 1/2-inch FHPHSS undercut screws (provided).



Do not use the screws supplied with the lockset.



5. Install door stops using four M3 × 12-mm Phillips screws (provided).

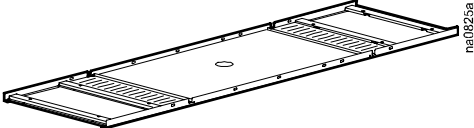
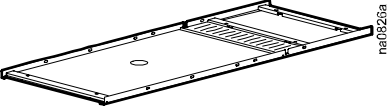
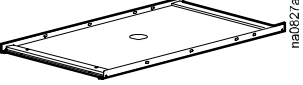
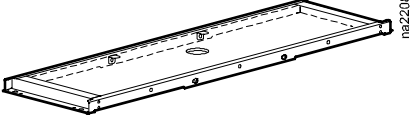


Ceiling Panels

Types of ceiling panels

Ceiling panels are available in different lengths and widths based on the size of the enclosures they span.

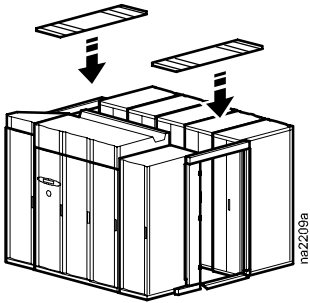
Ceiling panels are available as a complete assembly or as a multi-part unit that you can disassemble for existing applications to avoid having to disconnect cables. Each ceiling panel configuration has a unique set of installation hardware.

Configuration	Ceiling Panel
Rack-to-Rack	
IR40 CW-to-Rack	
IR40 CW-to-IR40 CW	
InRow RC-to-InRow RC	

Order of installation

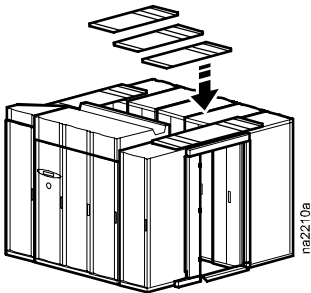
- 1 Install the end ceiling panels.

See “Installing Rack-to-Rack Ceiling panels” on page 28.



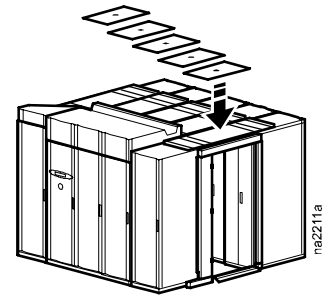
- 2 Starting from the ends and working toward the center of the aisle, install the remaining ceiling panels.

See “Installing IR40 CW-to-Rack ceiling panels” on page 26.
 See “Installing IR40 CW-to-IR40 CW ceiling panels” on page 26.
 See “Installing InRow RC-to-InRow RC ceiling panels” on page 30.



- 3 Install the ceiling panel inserts.

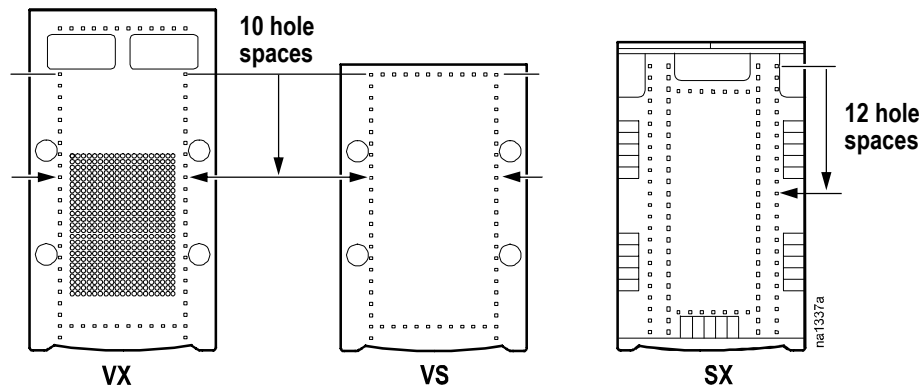
See “Ceiling Panel Inserts” on page 31.



Note

Both rows must be aligned and straight, with the corners square, before proceeding.

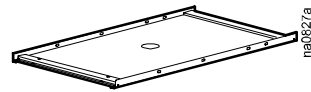
Before installing the ceiling panels: Install Plasti-Grommets into the tops of the equipment (two grommets per enclosure top) in the locations shown below.



Caution

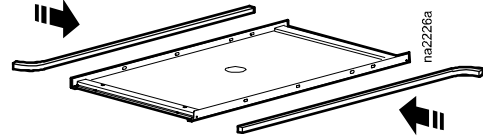
Ceiling panels are not designed to support weight. Do not use the ceiling panels to route power or data cables.

Installing IR40 CW-to-IR40 CW ceiling panels

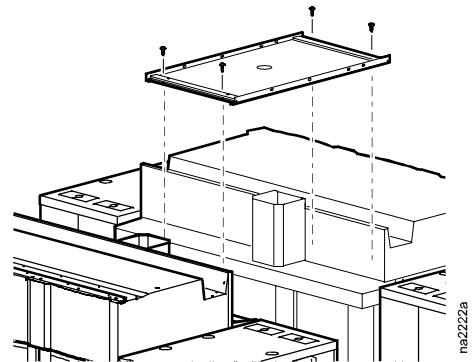


New and existing installations:

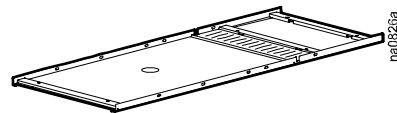
1. Apply foam gasket to the sides of the ceiling panel frame.



2. Install the ceiling panel using four M6 × 12 mm screws.

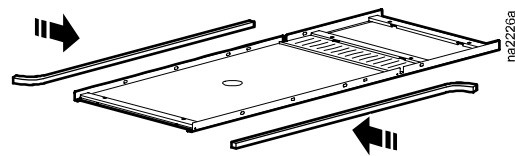


Installing IR40 CW-to-Rack ceiling panels

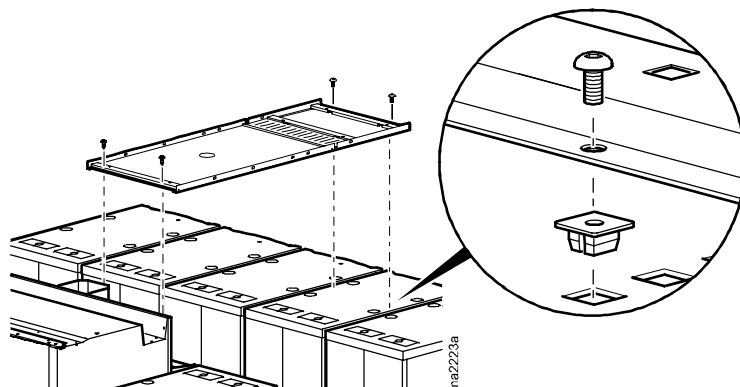


New installation:

1. Apply foam gasket to the side of the ceiling panel frame.

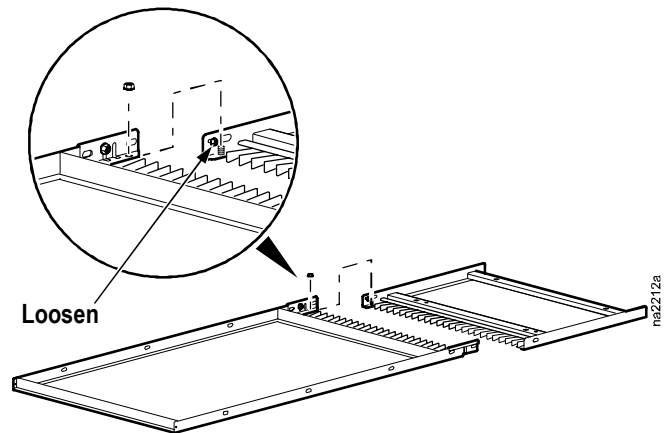


2. Install the ceiling panel using two M6 × 12 mm screws to attach one side to the InRow40 CW and two 8-32 × 3/8-in screws to the Rack.

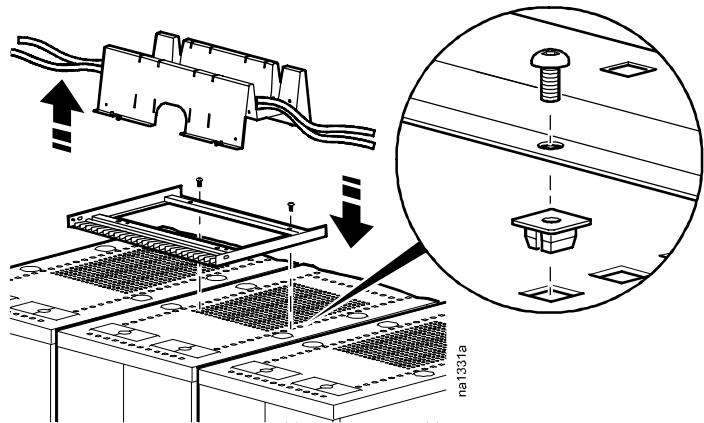


Existing installation:

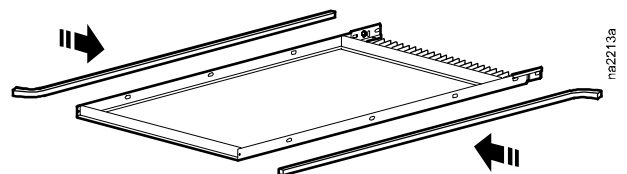
1. Disassemble the outer IR 40 CW-to-rack ceiling panels using a 7-mm wrench.



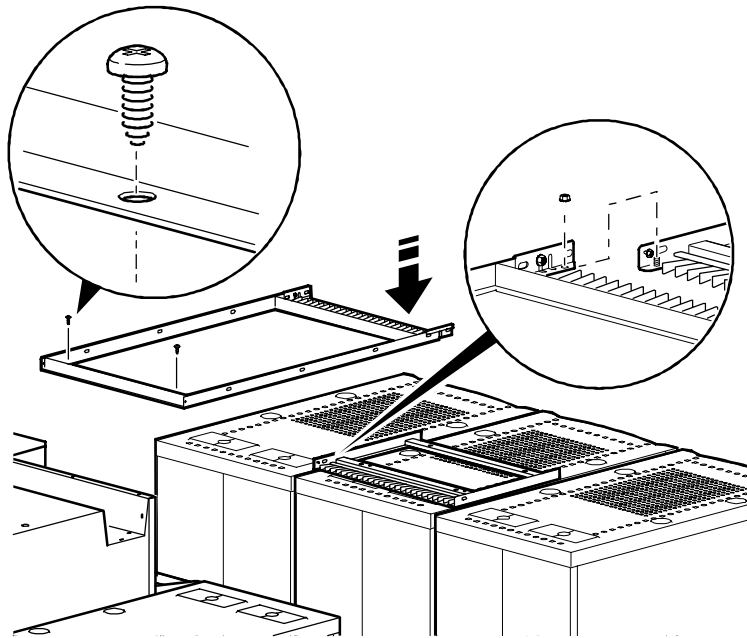
2. Lift up the cable trough and attach the rack end of the IR 40 CW-to-rack ceiling panel to the enclosure using two Plasti-Grommets and two M6 × 12-mm screws.
3. Re-attach the cable trough to the ceiling panel end; see the instructions supplied with the troughs for proper installation.



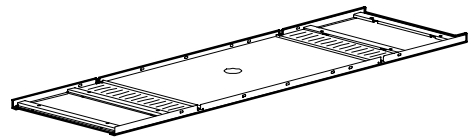
4. Apply foam gasket to the sides of the ceiling panel frame.



5. Re-attach the ceiling panel frame to the ceiling panel end using a 7-mm wrench,
6. Attach the IR 40 CW end to the IR 40 CW unit using two 8-32 \times 3/8-inch screws.

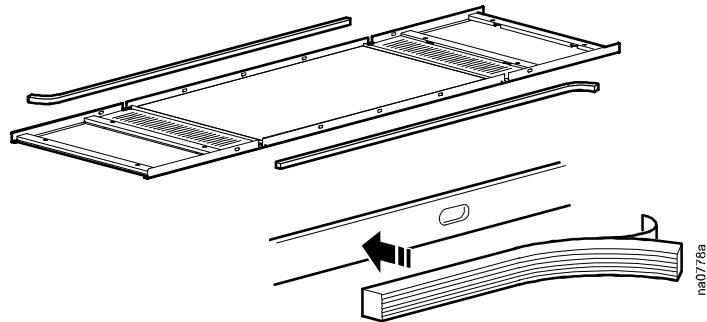


Installing Rack-to-Rack Ceiling panels

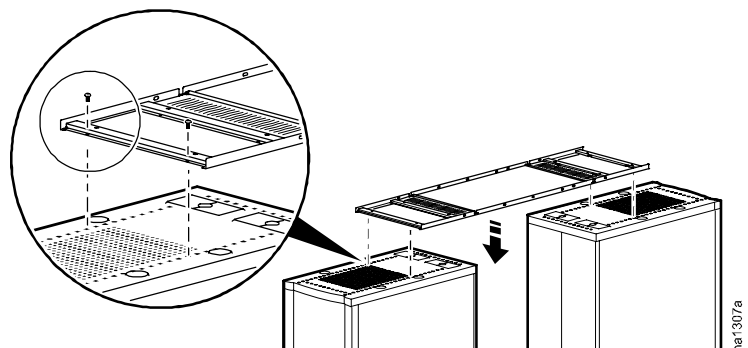


New installation:

1. Apply foam gasket to the sides of the ceiling panel frame.

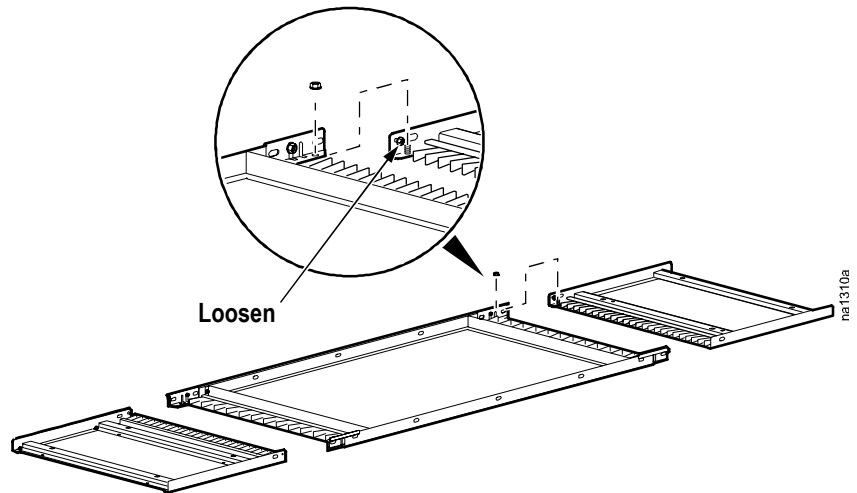


2. Attach the ceiling panels to the racks using four Plasti-Grommets and four M6 \times 12-mm screws.

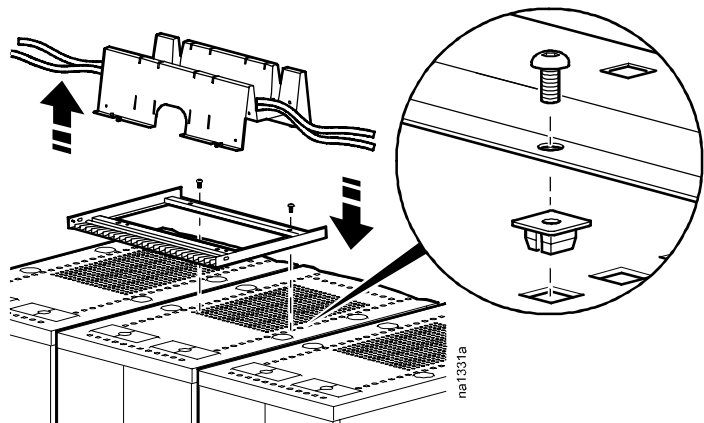


Existing installation:

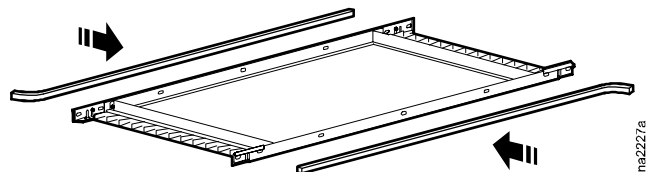
1. Disassemble the ceiling panels using a 7-mm wrench.



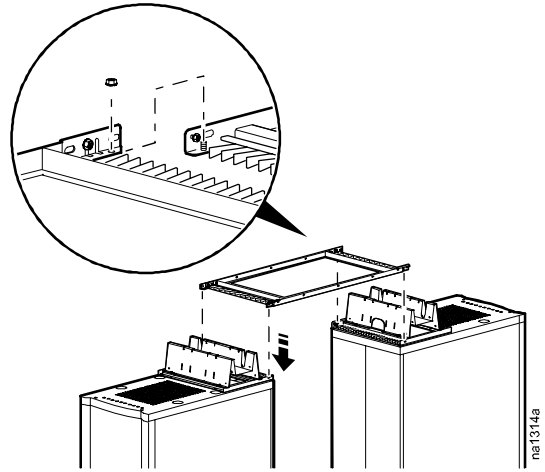
2. Lift up the cable troughs and attach the enclosure ends of the rack-to-rack ceiling panel to each enclosure using two Plasti-Grommets and two M6 × 12-mm screws.
3. Re-attach the cable trough to the ceiling panel end; see the instructions supplied with the troughs for proper installation.



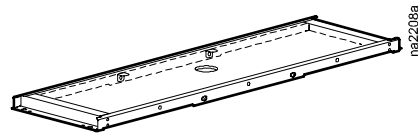
4. Apply foam gasket to the sides of the ceiling panel center frames.



5. Re-attach the ceiling panel centers to the ceiling panel ends using a 7-mm wrench.

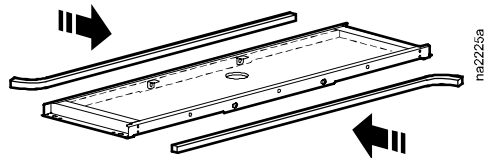


Installing InRow RC-to-InRow RC ceiling panels

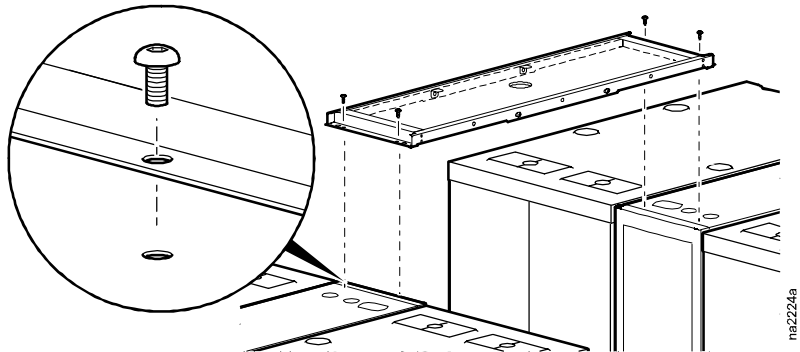


New and existing installations:

1. Apply foam gasket to the sides of the ceiling panel frame.

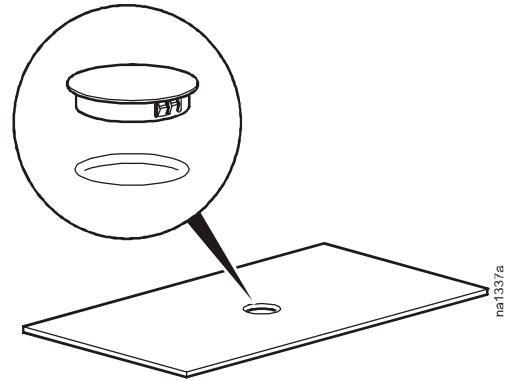


2. Install the ceiling panel using four M6 × 12 mm screws.

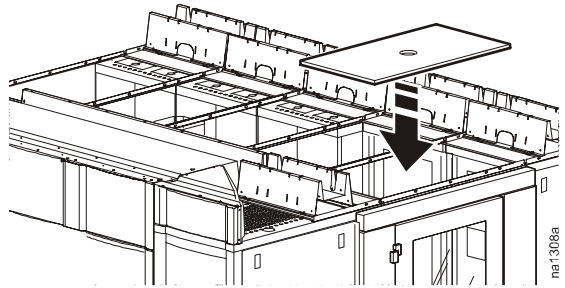


Ceiling Panel Inserts

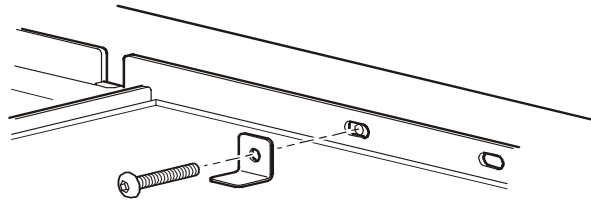
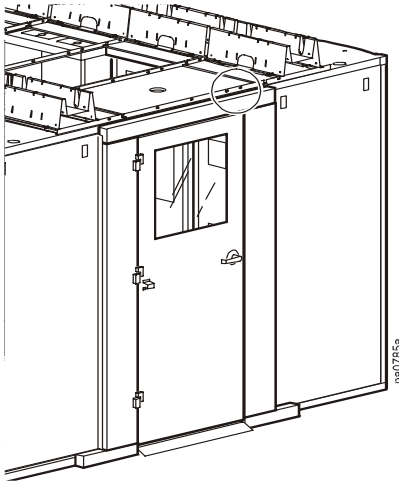
Fire suppression device. A hole is located in the center of each ceiling panel for a fire suppression device. If no fire suppression device is used, close off the hole in each panel with the supplied caps.



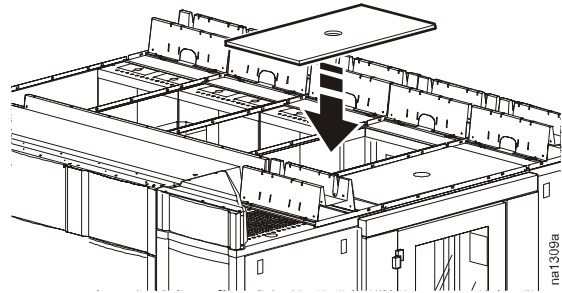
1. Remove the adhesive backing film from the panel frame at one end of the row; remove the protective plastic from both sides of the Lexan and carefully set the Lexan panel in place, pressing the edges firmly.



2. Attach each end ceiling panel to the door header using three angle brackets and five M6 × 30-mm screws.

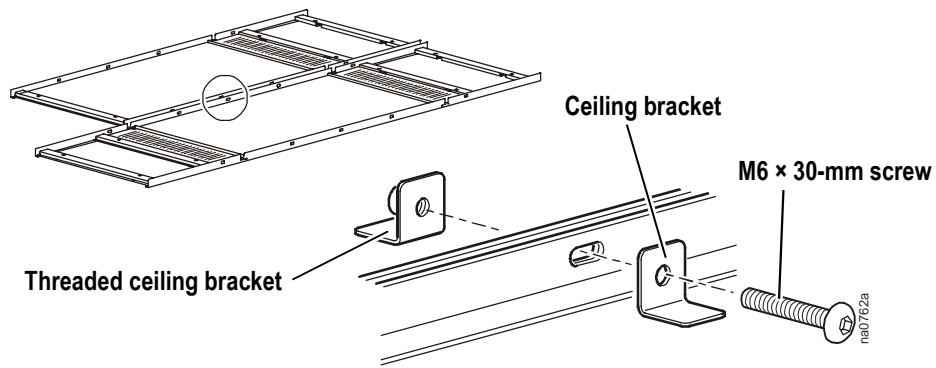


3. Remove the adhesive backing film from the next panel frame; remove the protective plastic from both sides of the Lexan. Carefully set the Lexan panels in place, pressing the edges firmly.
4. Secure the ceiling panel to the previously installed ceiling panel. Use a set of fasteners consisting of a M6 × 30-mm screw, a ceiling panel bracket, and a threaded ceiling panel bracket at each connection point.



Number of Fasteners per Ceiling Panel

	Rack-to-rack	InRow-to-rack	InRow 40 CW-to-IR 40 CW	InRow RC-to-InRow RC
Rack-to-rack	5	4	3	3
InRow-to-rack	4	4	3	3
IR 40 CW-to-IR 40 CW	3	3	3	3
InRow RC-to-InRow RC	3	3	3	3



5. Repeat steps 3 through 4 for each of the remaining ceiling panels.
6. Complete the installation by repeating steps 1 and 2 for the last ceiling panel.

Power Troughs and Data Partitions

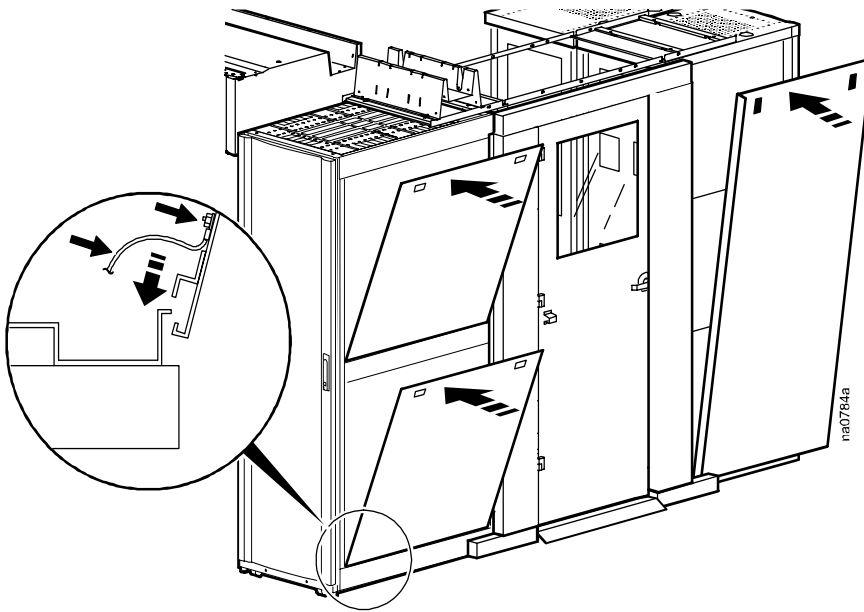
Install the troughs into the slots located in the ceiling panel frames.



See the instructions supplied with the troughs for proper installation.

End Panels

Install the side panels at the ends of each row of the Hot Aisle Containment System.



Warranty and Service

Limited warranty

APC warrants the Hot Aisle Containment System to be free from defects in materials and workmanship for a period of two years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. 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. This warranty applies only to the original purchaser.

Warranty limitations

Except as provided herein, APC makes no warranties, expressed or implied, including warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

Except as provided above, in no event will APC be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of this product, even if advised of the possibility of such damage.

Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights, which vary according to jurisdiction.

Obtaining service

To obtain support for problems with your Hot Aisle Containment System:

1. Note the serial number.
2. Contact Customer Support at a phone number on the back cover of this manual. A technician will try to help you solve the problem by phone.
3. If you must return the product, the technician will give you a return material authorization (RMA) number. If the warranty expired, you will be charged for repair or replacement.
4. Pack the unit carefully. The warranty does not cover damage sustained in transit. Enclose a letter with your name, address, RMA number and daytime phone number; a copy of the sales receipt; and a check as payment, if applicable.
5. Mark the RMA number clearly on the outside of the shipping carton.
6. Ship by insured, prepaid carrier to the address provided by the Customer Support technician.

APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to access documents in the APC Knowledge Base and to submit customer support requests.
 - **www.apc.com** (Corporate Headquarters)
Connect to localized APC Web sites for specific countries, each of which provides customer support information.
 - **www.apc.com/support/**
Global support searching APC Knowledge Base and using e-support.
- Contact an APC Customer Support center by telephone or e-mail.
 - Regional centers:

Direct InfraStruXure Customer Support Line	(1)(877)537-0607 (toll free)
APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702000 (Ireland)
Japan	(0) 3 5434-2021
Australia, New Zealand, South Pacific area	(61) (2) 9955 9366 (Australia)

- Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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