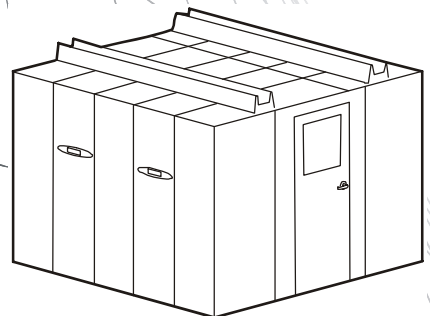


Installation

Hot Aisle Containment System (HACS)





This manual is available in English on the enclosed CD.

Deze handleiding staat in het Nederlands op de bijgevoegde cd.

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

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

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

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

Ilpqqriuh~ nm hpnmj {gmb`lh} l` orppimk ~gzie nohj`c`eqp~ l` dhpie (CD).

Instrukcja Obsługi w języku polskim jest dostępna na CD.

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。

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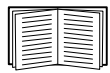
General Information

Overview

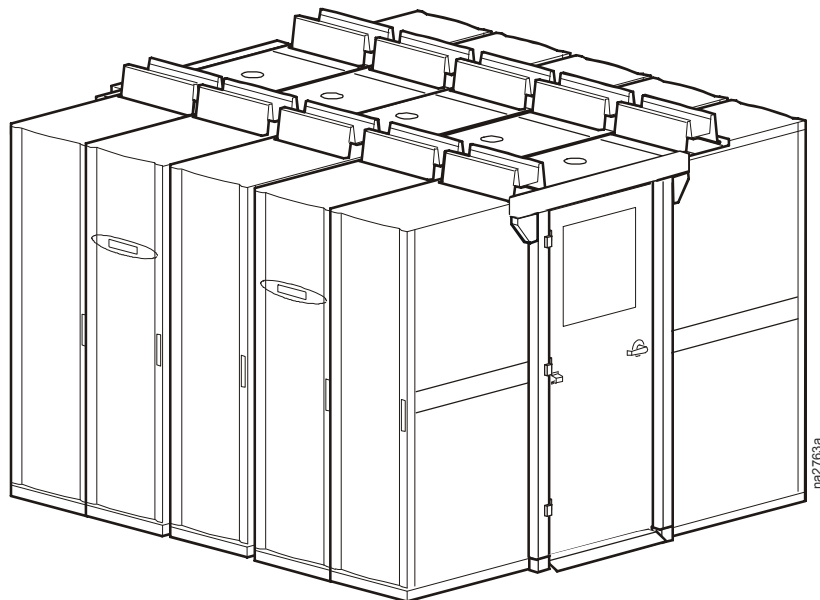
The Hot Aisle Containment System encloses a hot aisle to collect and cool equipment exhaust, making it available for cool air intakes. This creates a self-contained system capable of supporting high density power loads.

The Hot Aisle Containment System can be built using new American Power Conversion (APC®) equipment or with existing APC equipment.

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



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.



Safety

Symbols used in this manual



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



Danger: Indicates a hazard which, if not avoided, could result in severe personal injury or death.



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



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



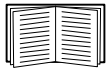
Caution: Indicates a potential hazard which, if not avoided, could result in damage to the equipment or other property.



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

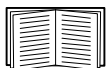


Note: Indicates important information.



Indicates that more information is available on the same subject.

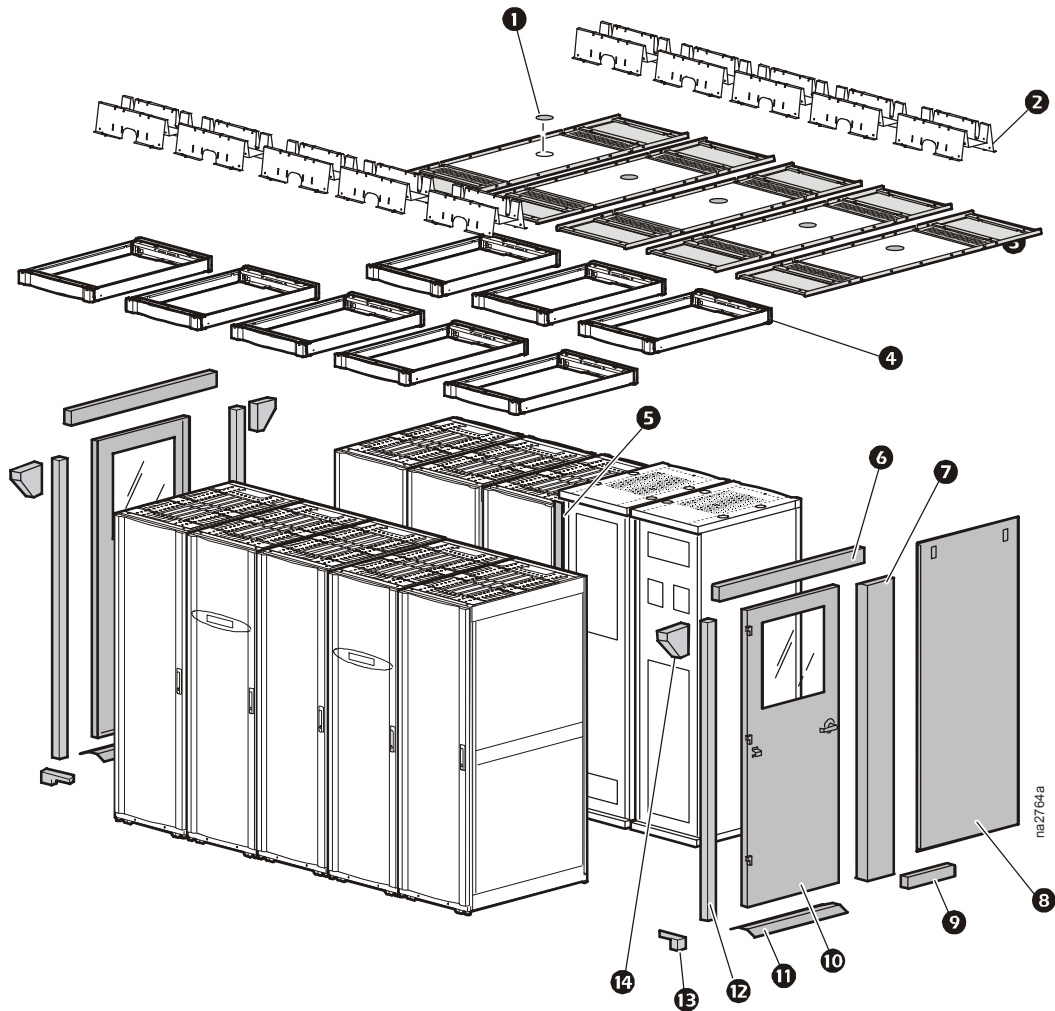
Cross-reference symbols used in this manual



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

Component Identification

Main components



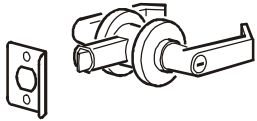
* Your kits may vary from what is shown above.

- | | |
|--------------------------------|--|
| ❶ Cap plug | ❸ Privacy side panel for VX rack |
| ❷ Wiring trough | ❹ Plinth block for attaching to VX rack |
| ❸ Ceiling panel | ❺ Door |
| ❹ SX to VX height adapter | ❻ Threshold |
| ❺ Joining bracket | ❼ Door frame upright (SX rack) |
| ❻ Door header | ❽ Plinth block for attaching to SX rack |
| ❼ Door frame upright (VX rack) | ❿ Corner brace assembly for attaching to SX rack |

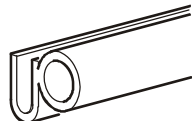


Ceiling panel assemblies come with Lexan[®] panels attached to the frames. Before installing the ceiling panel frames, remove the Lexan panels and store them in a safe location. The Lexan ceiling panels are installed last.

Door hardware



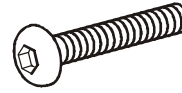
Lockset



Door-frame gasket



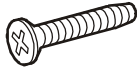
M6 flange nut



Screw
M6 × 30-mm



Door stop



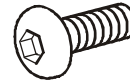
12-24 × 1/2-in FHPHSS
undercut screw
(door frame for VX rack)



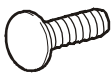
Screw
M8 × 25-mm



Screw
M3 × 12-mm
pre-installed in door for
attaching doorstop



Screw
M6 × 12-mm



Retaining fastener



12-24 nut

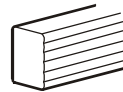
Ceiling panel hardware



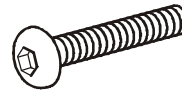
Plasti-Grommet



Screw
M6 × 12-mm



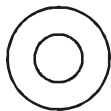
Ceiling panel
gasket



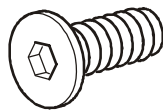
Screw
M6 × 30-mm



Cap plug
2.125-in



Washer M10



Screw
M10 × 16

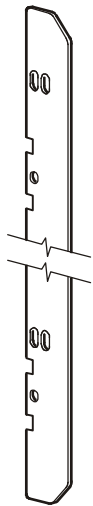


M10 flange nut

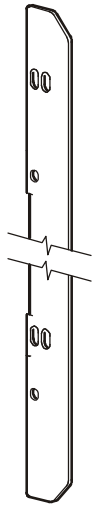
Joining hardware and trim



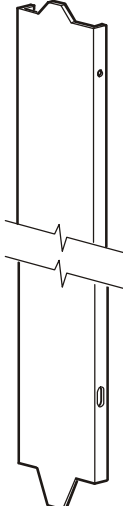
Joining trim
InRow to
InRow



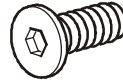
Joining trim
900-mm to
900-mm



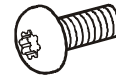
Joining trim
900-mm
to
1070-mm



Joining
bracket
1070-mm
to
1070-mm



pan-head
socket
screw



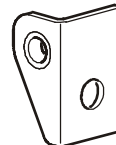
M6 × 16-mm
Torx®
screw



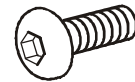
M8 flat
washer



1070-mm
trim
bracket

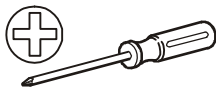


900-mm trim
bracket



Button-head
socket cap
screw

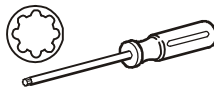
Tools Required



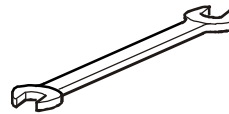
P2 Phillips
screwdriver



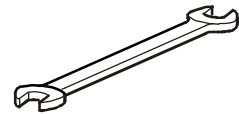
P1 Phillips
screwdriver



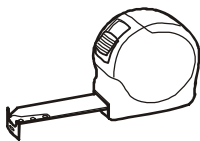
T-30 Torx
screwdriver



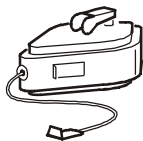
Open end wrench
13-mm/14-mm



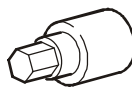
Open end wrench
7-mm/8-mm



Tape measure



Chalk line



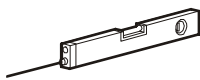
4-mm Hex socket



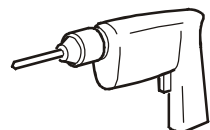
5-mm Hex socket



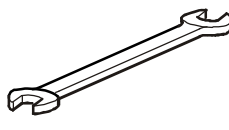
6-mm Hex socket



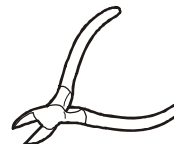
Laser Level



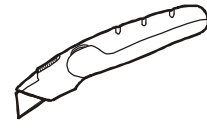
Drill



7/16-in wrench



Cutting tool for
door-frame gasket



Utility knife

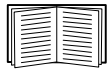
Planning the Layout and Installation

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.**



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

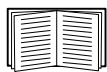


See the *InfraStruXure System Installation Manual* available on the *Utility* CD that came with the PDU or from the APC Web site for proper system shut down.

General guidelines for installation

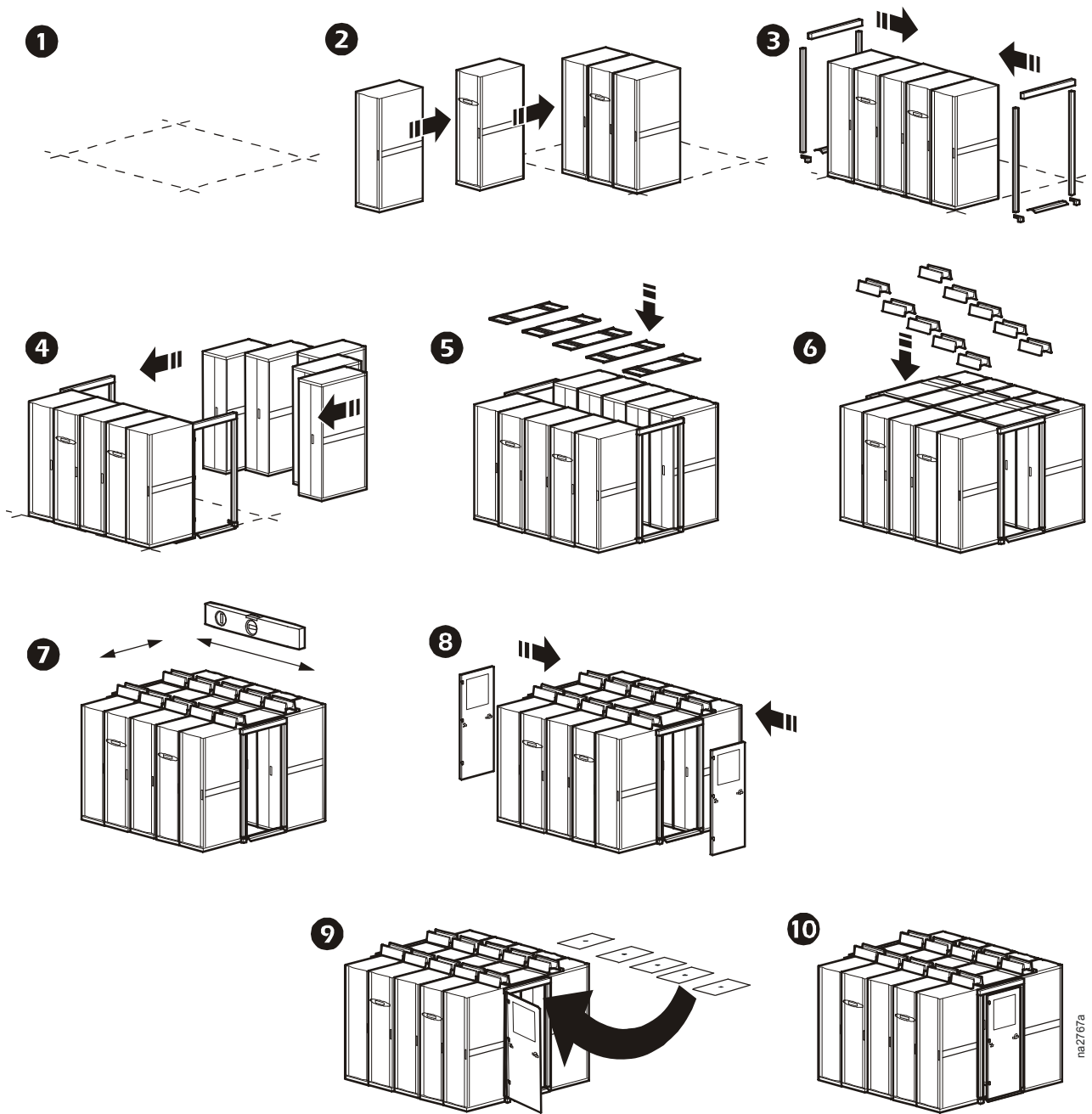
A Hot Aisle Containment System can be assembled from many different types of equipment, but these guidelines must be followed to ensure that it is assembled correctly:

- Join enclosures on 600 mm centers. See “Joining the enclosures” on page 13 for more information.
- If installing on a raised floor, plan the installation of the cooling 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.
- A single InRow RC or RD (300 mm) cooling unit must be installed directly across from another InRow RC or RD (300 mm) cooling unit.
- When laying out and aligning the equipment rows, use a ceiling panel to help to distance the rows. See “Layout and Positioning of the Main Components” on page 11 for more information.
- Racks of the same width must be placed directly across the hot aisle from each other.
- APC recommends removing the rear doors and hinges from all SX racks before installing them in a HACS to avoid interference with ceiling panels. Air and electrical racks should retain their doors for the protection of the user.



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



ns2767a

Installation procedure overview:

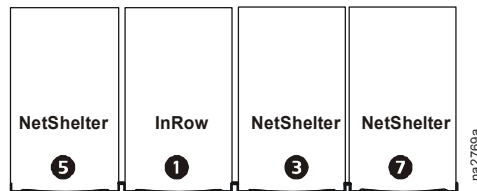
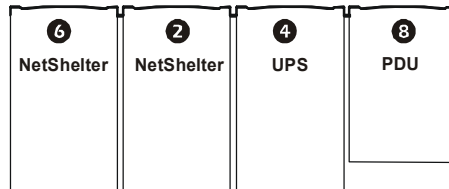
- ❶ Layout the position of the main components using the ISX Designer printout as a dimensional reference. Each enclosure must line up exactly with the enclosure directly across the aisle.
See “Critical dimensions” on page 10.
See “Layout and Positioning of the Main Components” on page 11.
- ❷ Assemble the first row. Position and join the main components working either from one end to the other, or starting from an InRow cooling unit, PDU or UPS and work your way out to both ends.
See “Installation” on page 11 for more information.
- ❸ Assemble and install the door frames on both ends. These will aid in the positioning of the second row.
See “Door Frames and Doors” on page 18. Do not the lower leveling feet at this time.
- ❹ Position and join the main components of the second row. Use the door frames as a distancing guide.
See “Installation” on page 11.
- ❺ Install the ceiling panel frames. The Lexan panels are not installed at this time.
See “Ceiling Panels” on page 28.
- ❻ Install the power troughs and data partitions.
See “Power Troughs and Data Partitions” on page 49.
- ❼ Finalize alignment of the racks and rack equipment. Make sure all of the panels line up on the top. Level the racks and equipment by deploying the leveling feet.
- ❽ Install the end panels and hang the doors on the hinges.
See “End Panels” on page 49. See “Door Frames and Doors” on page 18.
- ❾ Install the Lexan panels from inside the Hot Aisle. See “Installing Lexan ceiling panels” on page 50.
- ❿ Completed installation shown.

Sample floor layouts

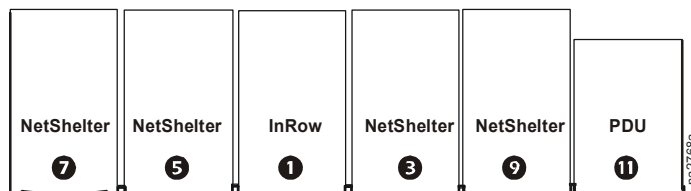
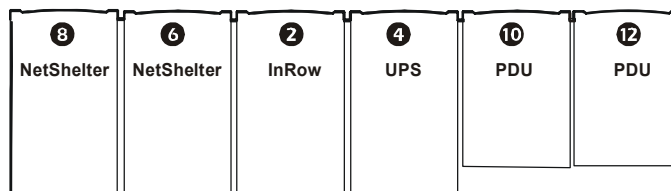
Each Hot Aisle Containment System will have different requirements for installation, based on the equipment being used. Use the layout samples below as guides to determine a layout that will work best for your Hot Aisle Containment System.

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

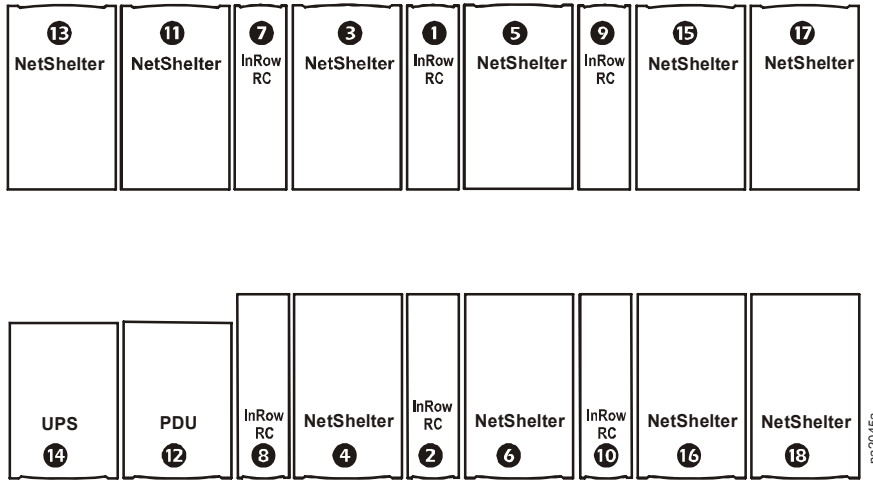
Installation with one InRow RP, RC, or RD 600 mm cooling unit



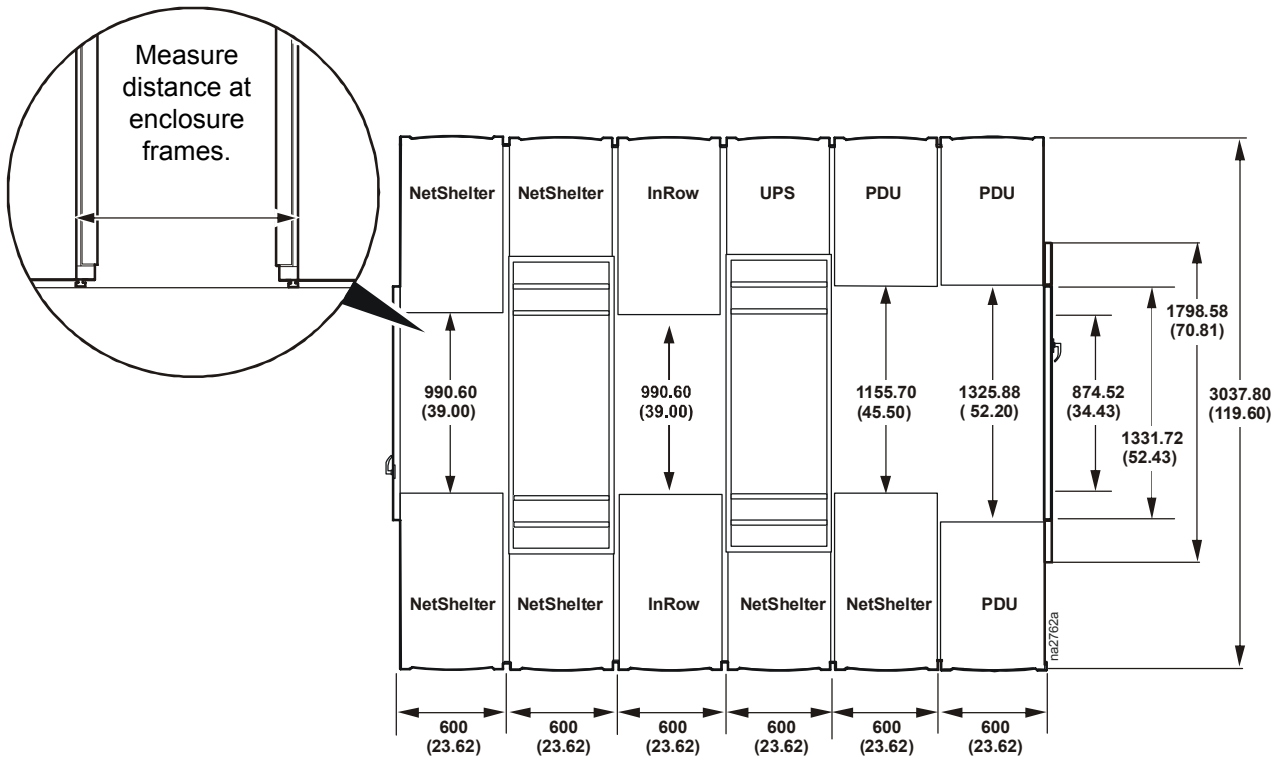
Installation with two InRow RP, RC, or RD 600 mm cooling units directly across from each other



Installation with InRow RC or RD 300 mm units



Critical dimensions



* Dimensions are in mm (in)

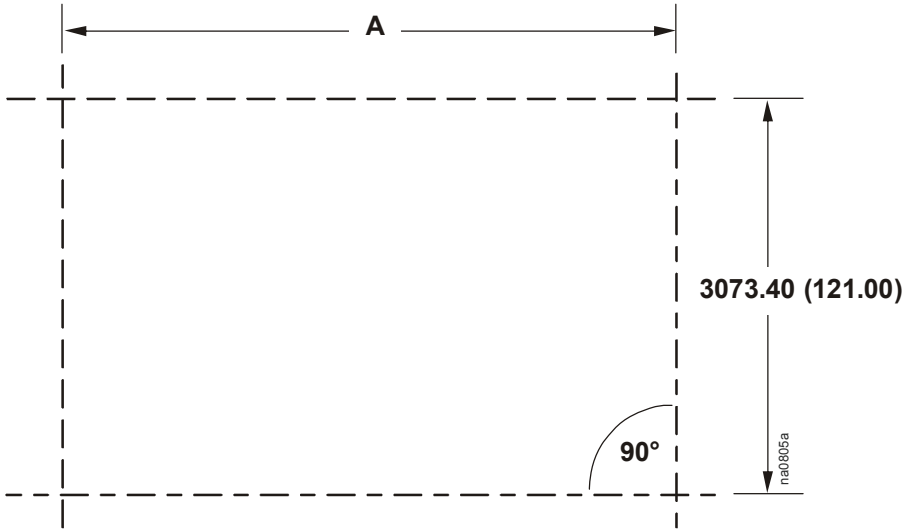


Note: Dimensions may vary slightly depending upon the door and rack combinations in your assembly.

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 mm (in).

** Dimensions may vary depending on the racks installed. Make sure the hot aisle is 990.6-mm (39.00-in) wide.

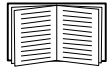


Note: Dimension A is based on the Hot Aisle Containment System component configuration. Check the ISX Designer printout for specifics.

Main Components

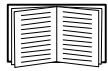
There are multiple types of enclosures and units that can be joined to form a Hot Aisle Containment System. Refer to the instructions that come with the equipment for specific information on how to install each main component. Some of these instructions are listed below.

SX enclosures



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

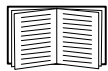
SX to VX or VS (UPS, PDU, or Battery) enclosures



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

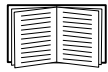
InRow RC, RD, and RP to SX enclosure

The InRow RC, RD, and RP cooling units join to other enclosures in the same way as a NetShelter SX enclosure.



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

900-mm VS enclosures



See the instructions included with the *NetShelter VS Enclosure Unpacking, Installation, and Customization Manual* (990-7144) for information on joining of 900-mm enclosures.

Joining the enclosures

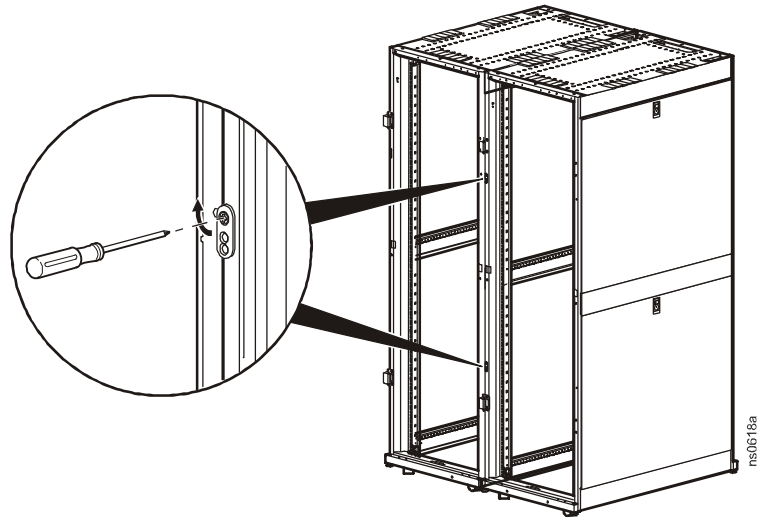
1070-mm SX enclosures



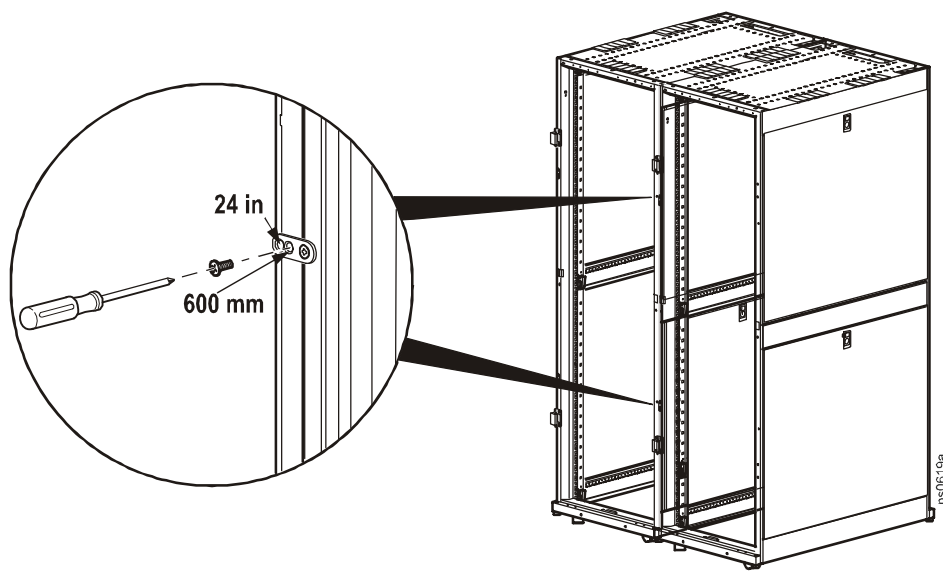
See *Netshelter SX Enclosure: Unpacking, Installation, and Customization Manual*, 990-2183D for more information about joining an SX enclosure to another SX enclosure.

Remove the front doors from the enclosures if necessary

1. Locate the four joining brackets on the enclosure—two brackets on the front and two brackets on the rear. Rotate each bracket ninety degrees toward the adjoining enclosure, so that the brackets are parallel to the floor.



2. The 600-mm enclosures can be joined so that their centers are 24-in or 600-mm apart. 600-mm spacing is recommended for joining enclosures in a HACS. (750-mm racks use the same bracket hole.) Align the enclosures to use the appropriate holes on the front and rear of the enclosures for the spacing you need and secure the enclosures using one M5 x 12 flat-head screw per bracket. (Hardware is included in the rack hardware bag.)



3. Joining 600-mm enclosures on 24-in centers is not recommended. There is a gap between them. APC offers optional baying trim (AR7600) to cover the gap between the enclosures. The trim snaps into place without tools and can be installed after the units are joined together and have equipment installed in them.

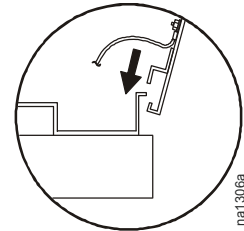


Note: To connect a NetShelter SX enclosure to a NetShelter VX or NetShelter VS enclosure, APC offers a separate joining kit (AR7601 for enclosures with 600-mm centers or AR7602 for enclosures with 24-in centers). When using the AR7601, the NetShelter SX enclosure will be inset by 33.2 mm (1.3 in) from the VX or VS enclosure.

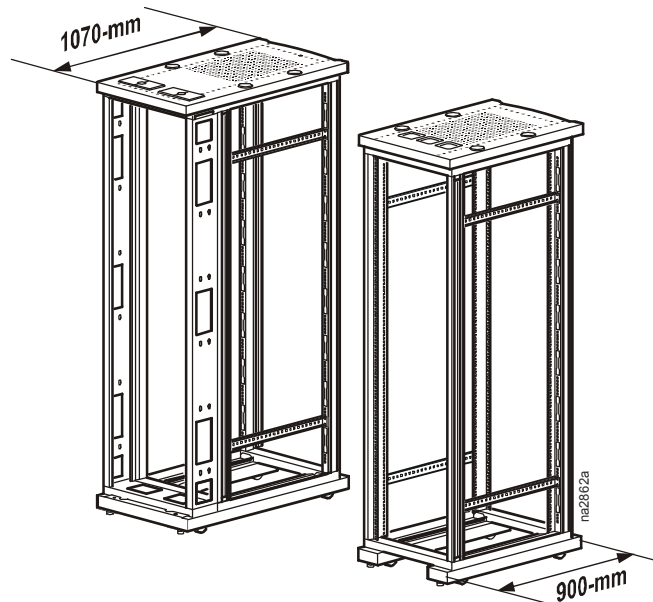
Joining 900-mm deep VS enclosures and 1070-mm deep VX enclosures



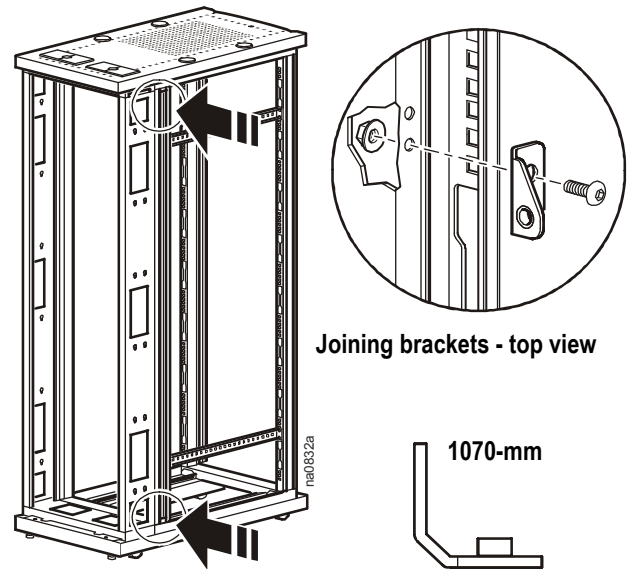
Note: The order of the racks in the hot aisle row may require the installation of two 21-U side panels to the VX rack before joining the VS and VX racks. Existing equipment rows may need to be pulled apart to install the 21-U panels. These panels are optional for enclosures.



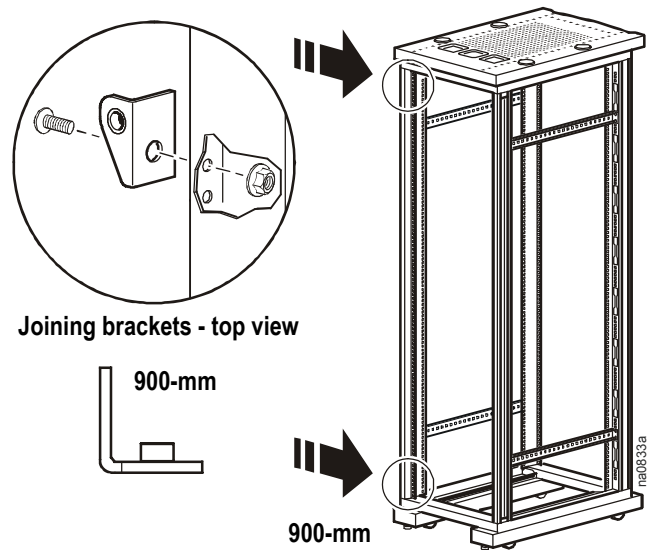
nat3008a



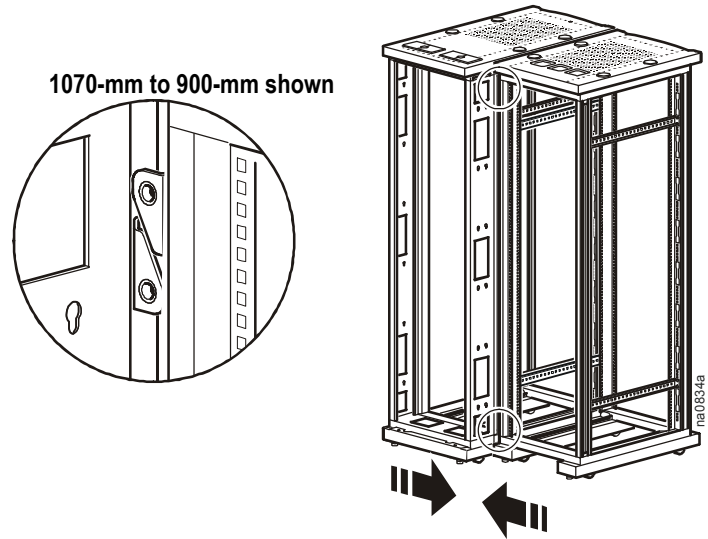
1. Use an M6 × 12-mm screw and flange nut to attach two 1070-mm trim brackets (included in the baying kit) to the side of the 1070-mm deep enclosure. Use the bottom hole of the two holes on the side of the enclosure.



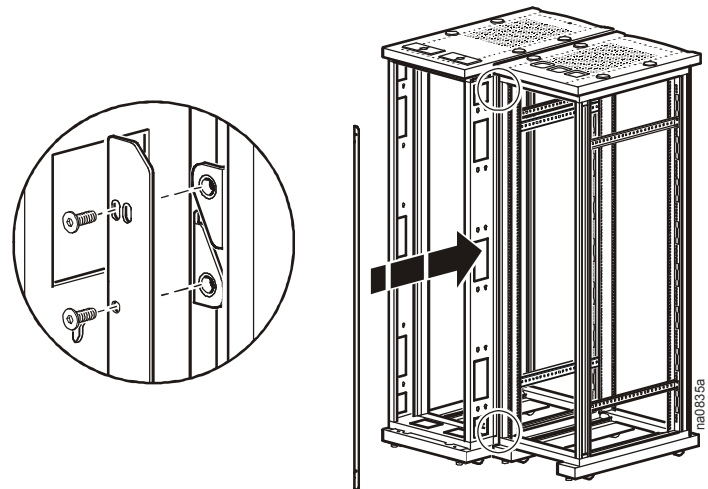
2. Use an M6 × 12-mm screw and flange nut to attach two 900-mm trim brackets (included in the baying kit) to the side of the 1070-mm deep enclosure. Use the top hole of the two holes on the side of the enclosure.



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.

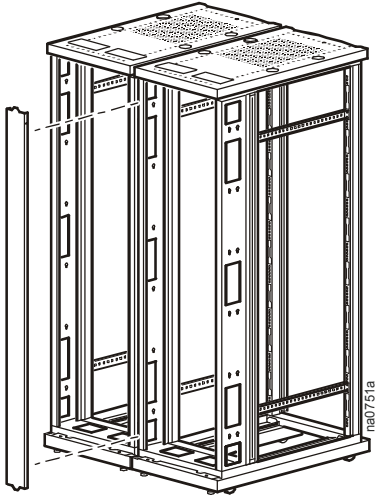
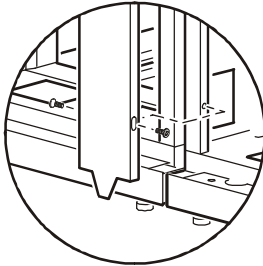
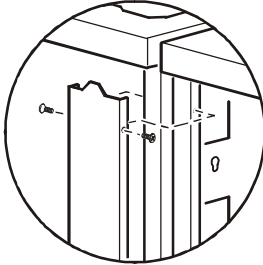


1070-mm VX enclosures

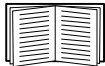


Note: The rear doors of the enclosures must be removed before the joining brackets can be installed.

When joining two 1070-mm deep enclosures, you must use the appropriate rear joining brackets (provided in the baying kit). 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 in the baying kit) to join two 1070-mm deep enclosures.



Electrical Hazard: 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 Frames and Doors

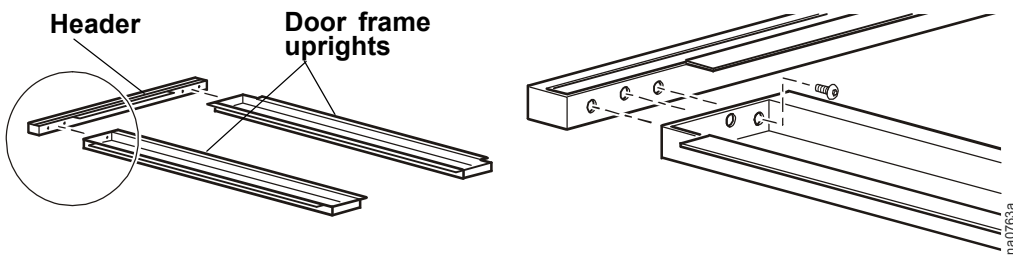
Install a door frame and door on both ends of the Hot Aisle Containment System. They are used for aligning and joining the two rows of equipment.

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

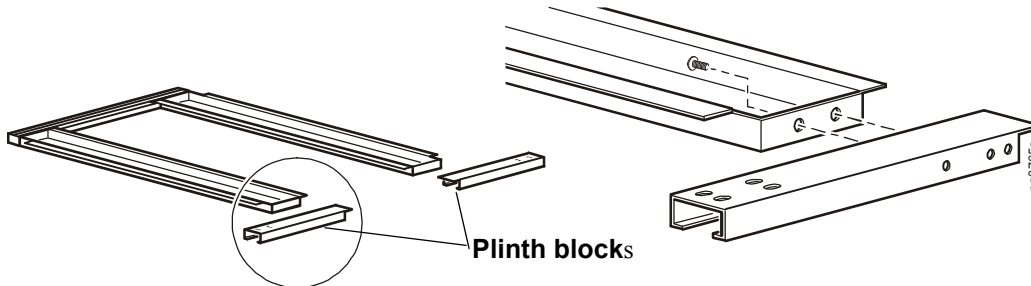
SKU number	End aisle enclosures
ACDC1016	An SX enclosure on both the left and right.
ACDC1021	A VX/VS enclosure on both the left and right.
ACDC1017	An SX enclosure on the left and a VX/VS enclosure on the right.
ACDC1020	A VX/VS enclosure on the left and an SX enclosure on the right.

Assemble the door frame—VX/VS enclosures to VX/VS enclosures (ACDC1021)

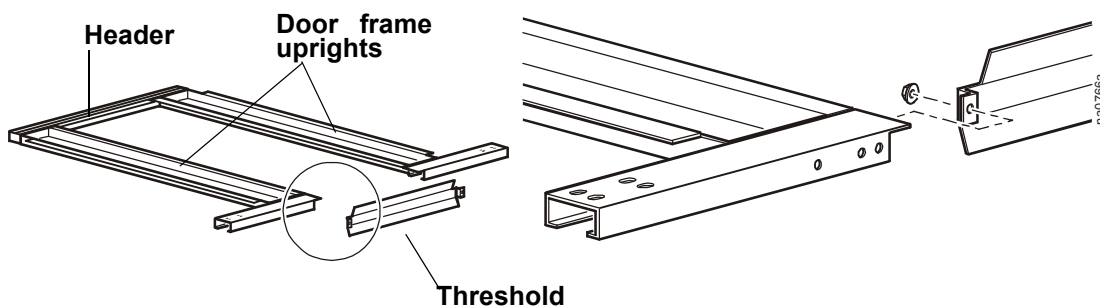
1. Lay all components face down on a clean surface for ease of installation.
2. Attach the header to the left- and right-side door frame uprights using six M6 × 12-mm screws (3 screws for each door frame upright).



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.

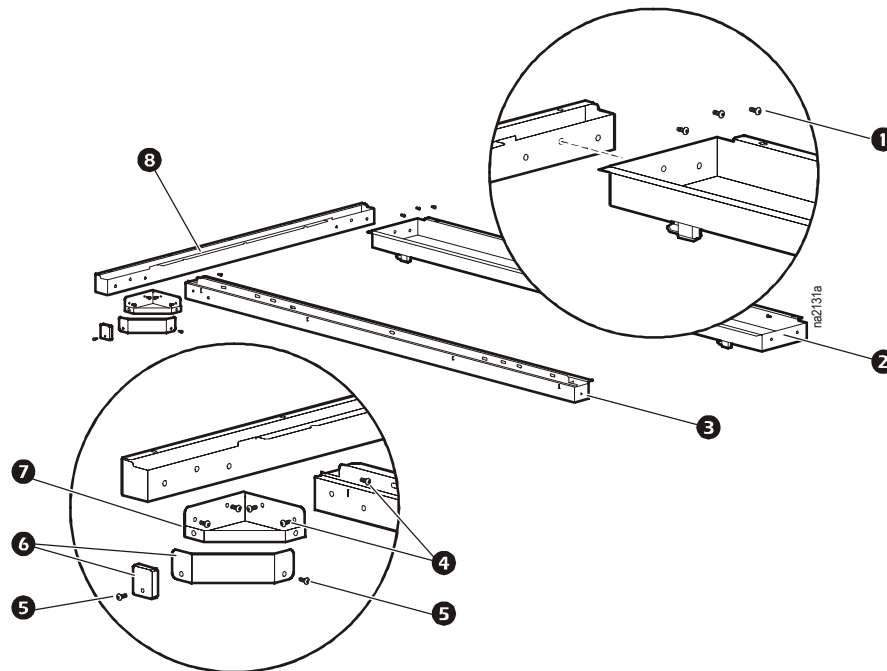


Assemble the door frame—SX enclosures to VX/VS enclosures (ACDC1017 or ACDC1020)



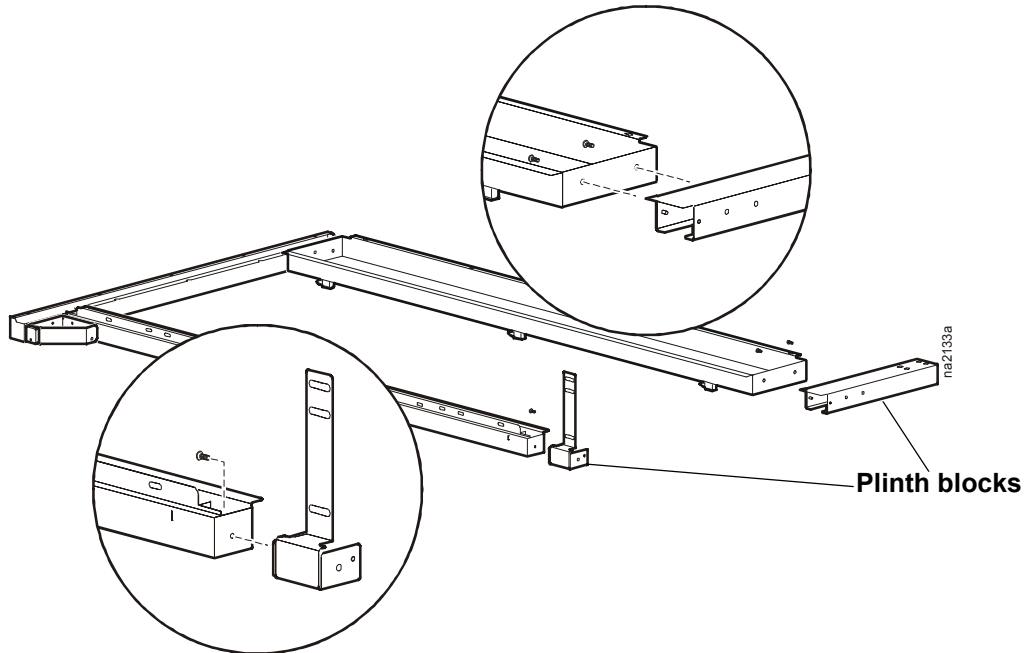
Note: ACDC1020 is shown in the illustration. The ACDC1017 vertical frame is a mirror image of the ACDC1020.

1. Lay all components face down on a clean surface for ease of installation.
2. Attach the header to the VX door frame upright **2** with three M6 x 12-mm screws **1**.
3. Attach the SX door frame upright **3** to the header **8** with one M6 x 12-mm screw **4**.
4. Attach the SX corner gusset **7** to the SX door frame upright **3** and header **8** using four M6 x 12-mm screws **4**.
5. Attach the corner brace cover assembly **6** to the corner gusset assembly **7** using two M6 x 30-mm screws **5**.

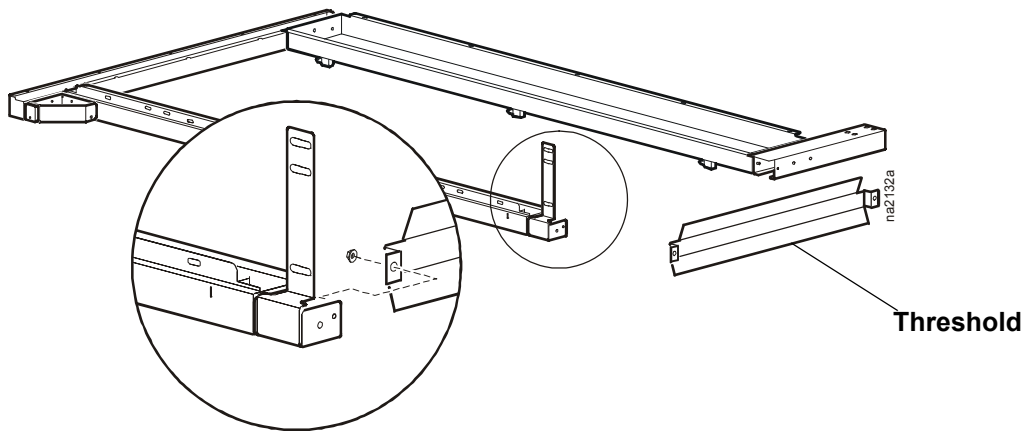


Item Number	Description	Quantity
1	M6 X 12 Screw	3
2	VX door frame upright	1
3	SX door frame upright	1
4	M6 X 12 Screw	5
5	M6 X 30 Screw	2
6	SX corner brace cover assembly (2 pieces)	1
7	SX corner gusset assembly	1
8	Header	1

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

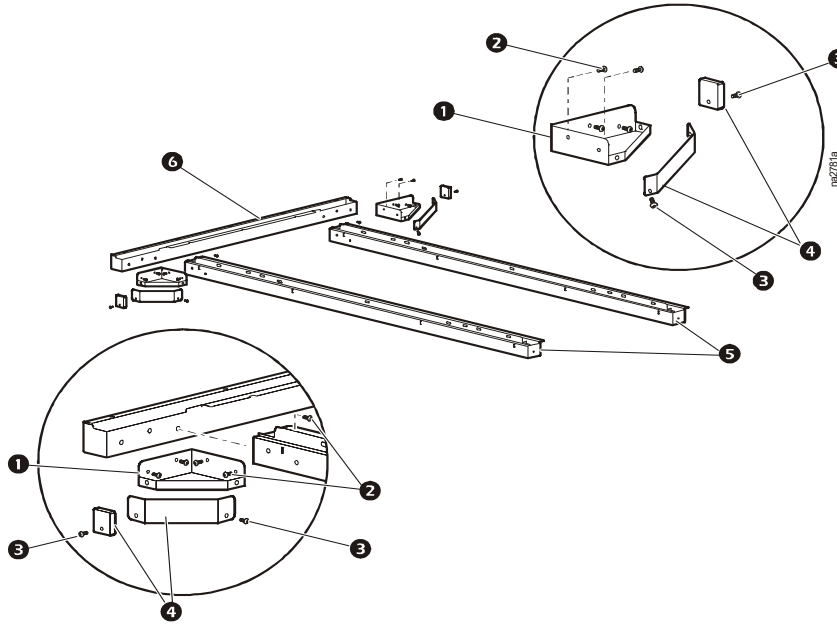


7. Attach the threshold to the bottom of the plinth blocks using two M6 flange nuts.



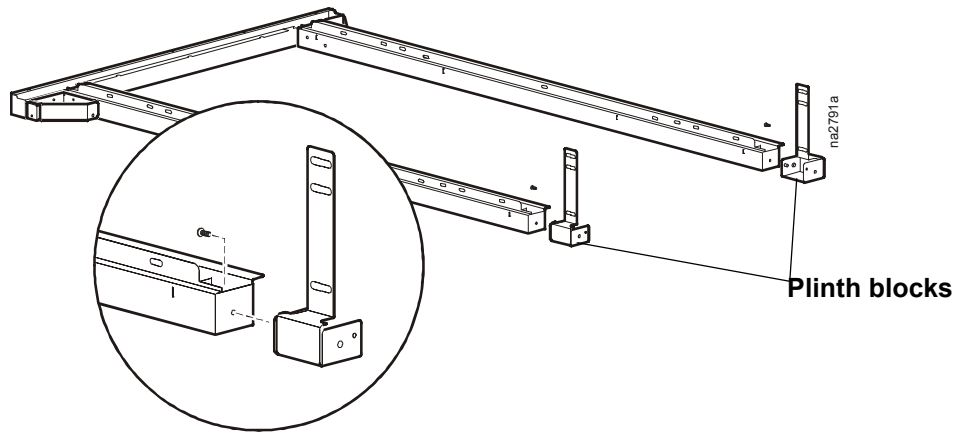
Assemble the door frame—SX enclosures to SX enclosures (ACDC1016)

1. Lay all components face down on a clean surface for ease of installation.
2. Attach the header **6** to the left- and right-side door frame uprights **5** using two M6 × 12-mm screws **2** (one for each door frame upright).
3. Attach the corner gusset **1** to the door frame upright **5** and header **6** using eight M6 x 12-mm screws **2** (four for each side).
4. Attach the corner brace cover assembly **4** to the corner gusset assembly **1** using four M6 × 30-mm screws **3**.

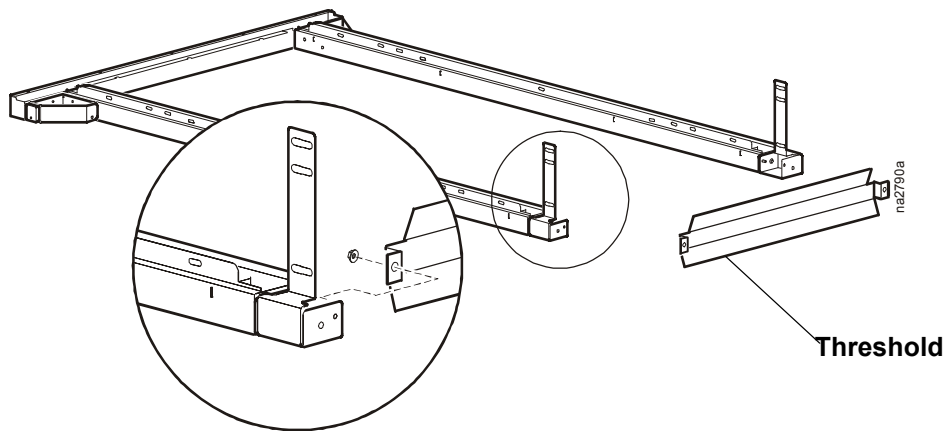


Item Number	Description	Quantity
1	Corner gusset	2
2	M6 X 12 Screw	10
3	M6 X 30 Screw	4
4	Corner brace cover assembly	2
5	Door frame upright	2
6	Header	1

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

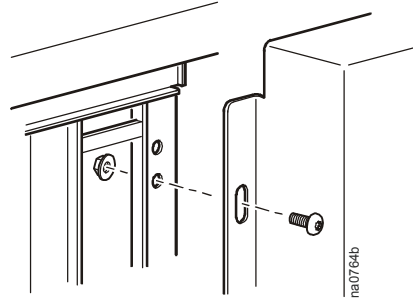
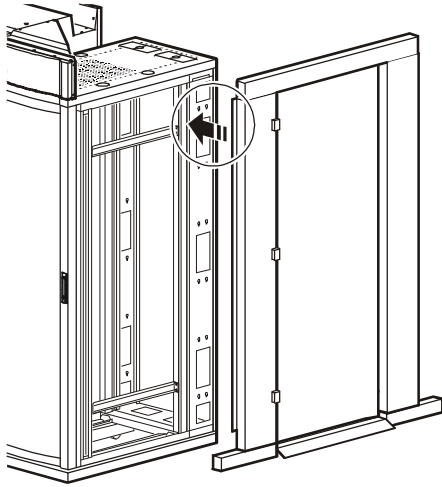


6. Attach the threshold to the bottom of the plinth blocks using two M6 flange nuts.

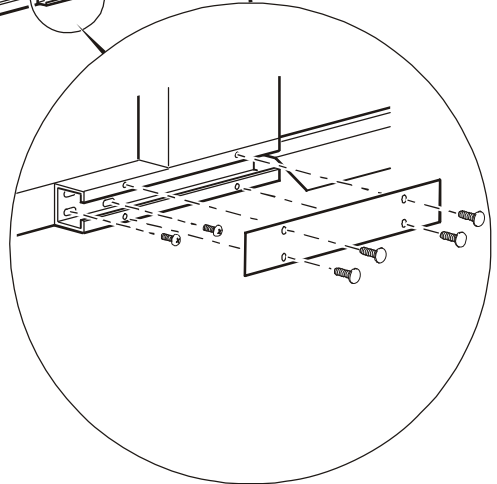
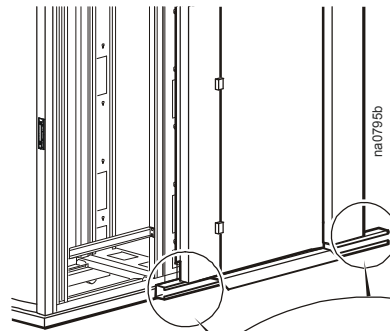


Door frame installation VX/VS to VX/VS (ACDC1021)

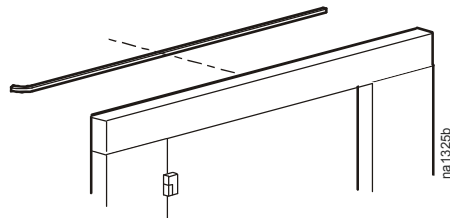
1. Use five M6 × 12-mm screws and M6 flange nuts on each side (for a total of ten screws and nuts) to attach the door frame to the units at the end of the aisle



2. Attach the plinth blocks to the unit using two M8 × 25-mm screws on each side (for a total of four screws)
3. Attach the plinth block covers to the plinth blocks using four plastic retaining fasteners for each plinth block cover.

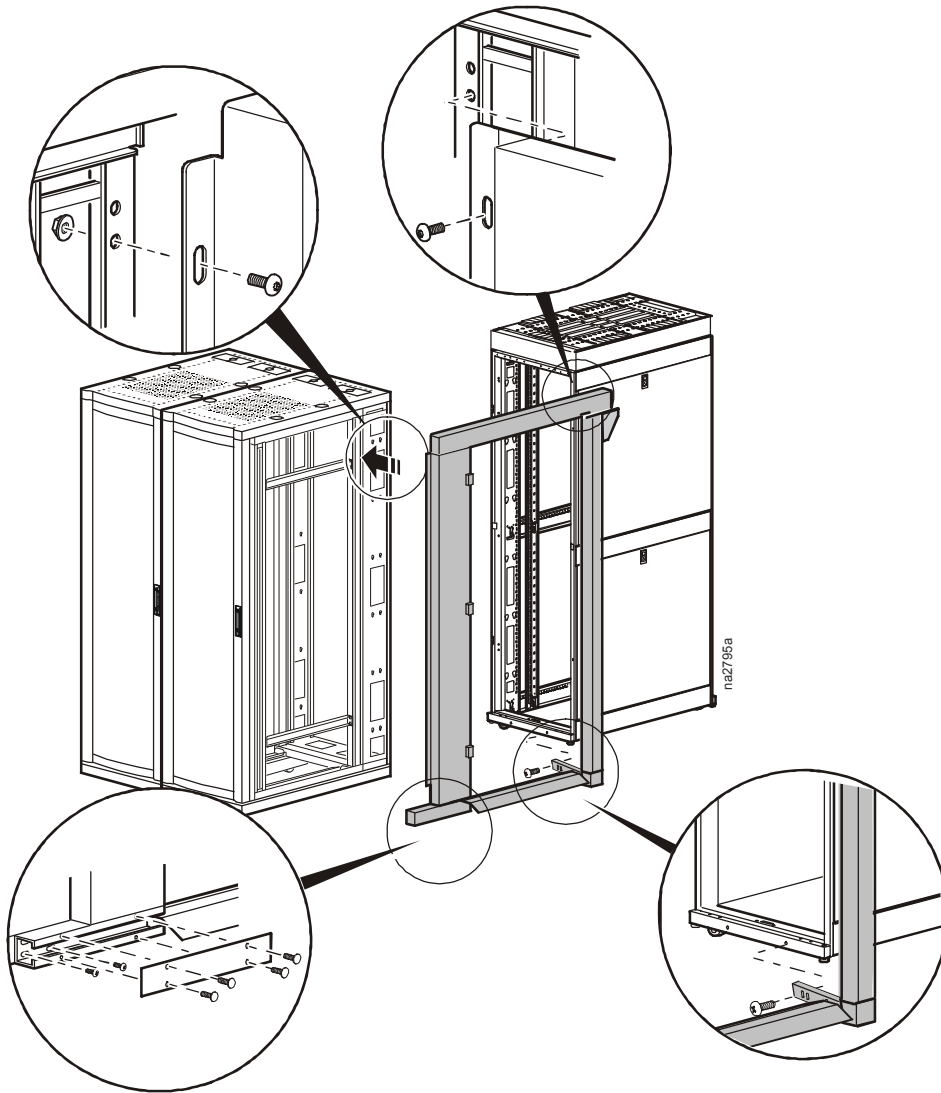


4. Apply a foam gasket to the door frame header.



Door frame installation VX/VS to SX (ACDC1017 and ACDC1020)

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



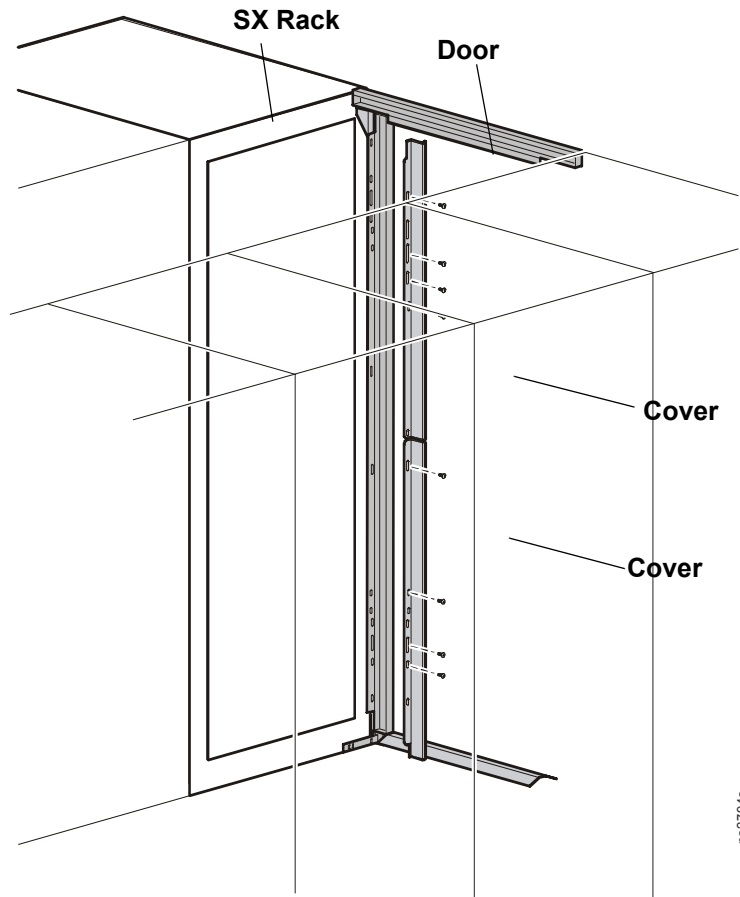
Note: ACDC1020 is shown in the above illustration. The ACDC1017 vertical frame is a mirror image of the ACDC1020.

2. Attach the plinth block to the VX or VS rack using two M8 × 25-mm screws.
3. Attach the plinth block cover to the plinth block using four plastic retaining fasteners.
4. Attach the plinth block to the SX rack using one M8 × 25-mm screw.

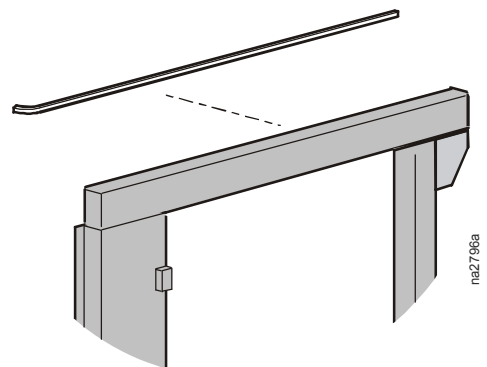


Note: Make sure all rear door hinges and any plastic plugs covering screw holes have been removed from the rack frame.

5. Install the door frame and covers to the *inside* of the door frame that connects to the SX rack using seven M6 x 12-mm screws into the threaded holes of the SX rack.

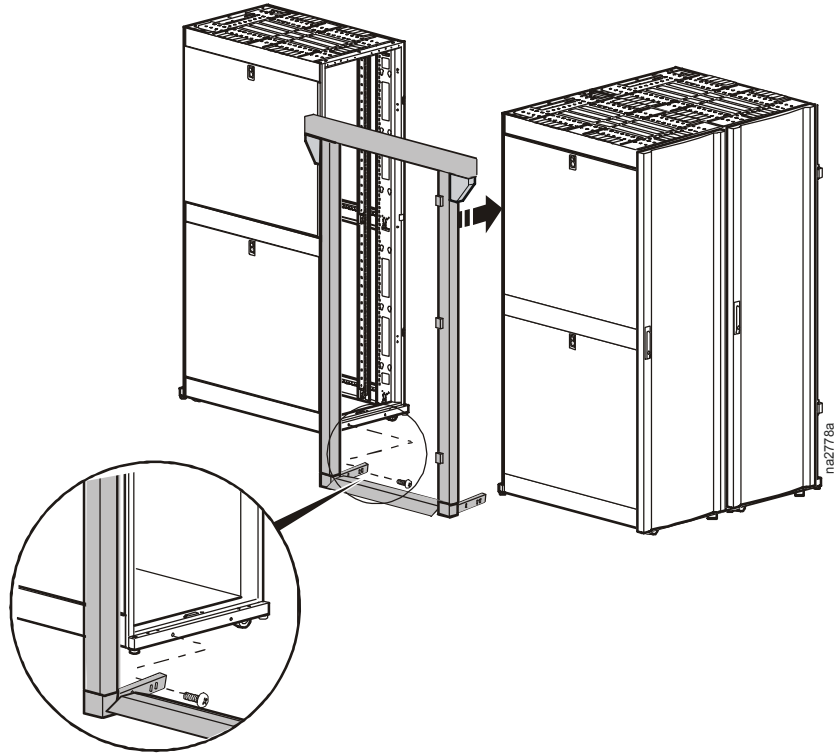


6. Apply the foam gasket to the door frame header.

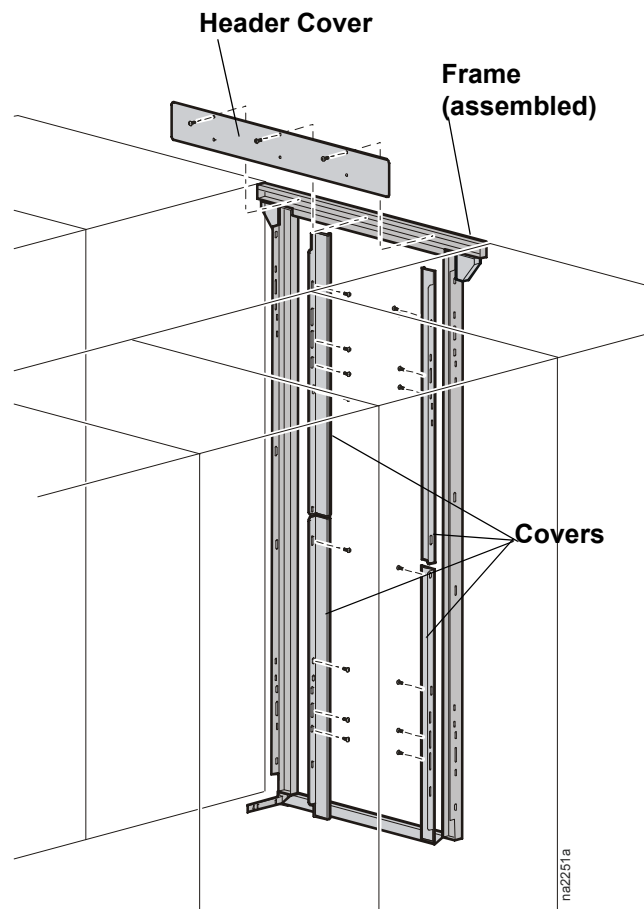


Door frame installation SX to SX (ACDC1016)

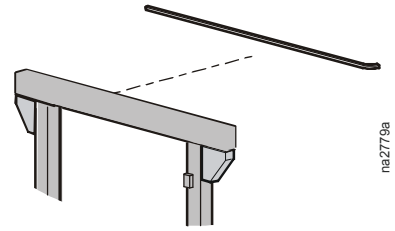
1. Attach the plinth blocks to the SX racks using one M8 × 25-mm screw on each side.



2. Install the door frame and upright covers using seven M6 × 12-mm screws on each side (for a total of fourteen) into the threaded holes in the SX racks.
3. Install the header cover to the door frame using three M6 x 12-mm screws.



4. Apply a foam gasket to the door frame header cover.



Roof Height Adapters



Note: Prior to installing ceiling panels on HACS where VX and SX racks are combined, roof height adapters must be installed on the SX racks and InRow cooling units.

Roof height adapter chart

Rack Type	Roof Adapter	Manual
600-mm, SX, 42 U	AR7203	990-2346-001
750-mm, SX, 42U	AR7202	990-2346-001
300-mm, InRow RC, InRow RD	ACAC10003	990-2797A
600-mm, InRow RP, InRow RC, and InRow RD	ACAC10004	990-2888B



See the instructions included in the roof match kits for information on installing adapters to various rack and cooling units.

Ceiling Panels

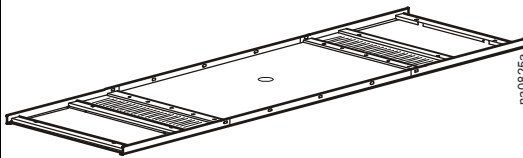
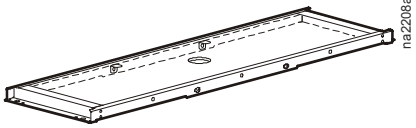
Types of ceiling panels

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

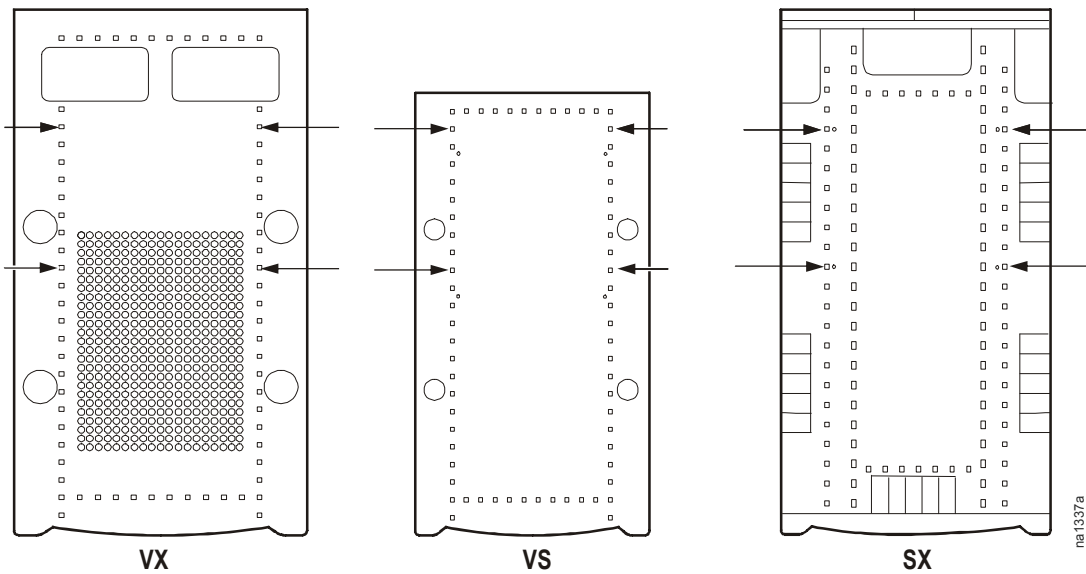
Ceiling panels are shipped as a complete assembly but can be disassembled for existing applications to avoid having to disconnect cables. Each ceiling panel configuration has a unique set of installation hardware.



Note: Some installations will require ceiling panels to be disassembled and some parts may not be used depending on the installation.

Configuration	Ceiling Panel
Rack-to-Rack (ACDC1015 - 750 mm) InRow RP, RC, RD or Rack-to-Rack, InRow RP, RC or RD (ACDC1019 - 600 mm)	
InRow RC or RD-to- InRowRC or RD (ACDC1018 - 300 mm)	

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



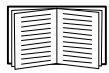
Ceiling panels are not designed to support weight. Do not use the ceiling panels to route power or data cables.

Order of installation

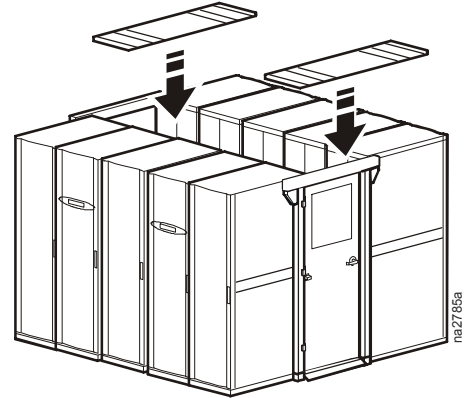


Note: Both rows must be aligned and straight, with the corners square, before proceeding.

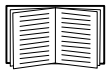
- 1 Remove the Lexan panels from the ceiling panel frames and store in a safe place until time to install.
- 2 Install the end ceiling panel frames first.



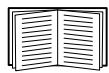
See “Installing rack-to-rack ceiling panel frames (ACDC1015 and ACDC1019)” on page 30.



- 3 Starting from the ends, work toward the center of the aisle installing the remaining ceiling panel frames.



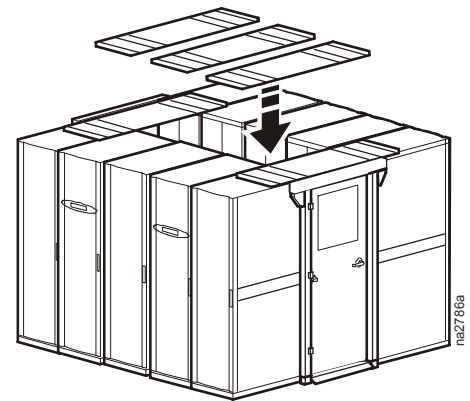
See “InRow RC or RD 300 mm-to-InRow RC or RD 300 mm ceiling panel installation (ACDC1018)” on page 43.



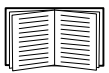
See “InRow RP, RC or RD 600 mm to rack, InRow RP, RC or RD 600 mm ceiling panel installation (ACDC1019)” on page 38.



See “Installing rack-to-rack ceiling panel frames (ACDC1015 and ACDC1019)” on page 30.



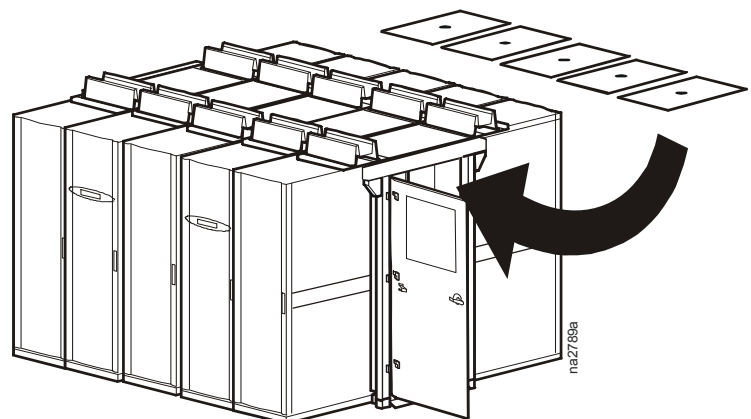
- 4 Install the Lexan ceiling panels from inside the hot aisle after the HACS is aligned and level and all troughs and partitions are installed.



See step 7 on page 7 and page 8 for alignment and leveling instructions.



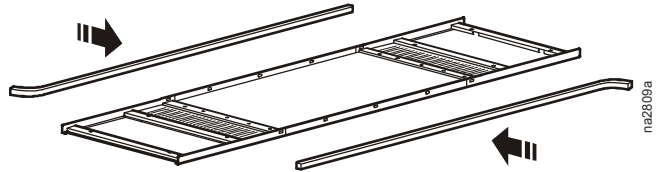
See page 50 for Lexan panel installation instructions.



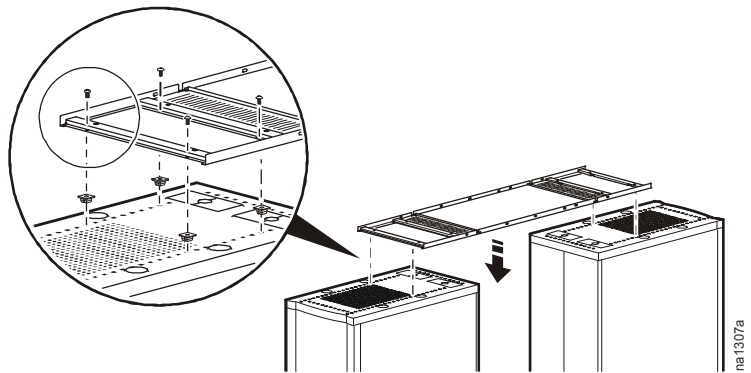
Installing rack-to-rack ceiling panel frames (ACDC1015 and ACDC1019)

New installation:

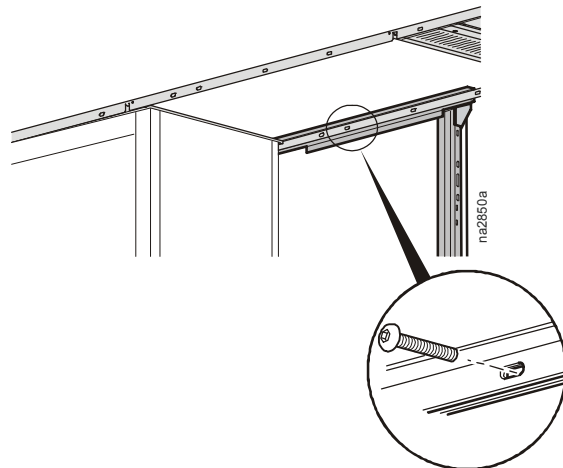
1. Remove the Lexan panels from the ceiling panel frames and store in a safe place until time to install.
2. Apply foam gasket to the sides of the ceiling panel frame.



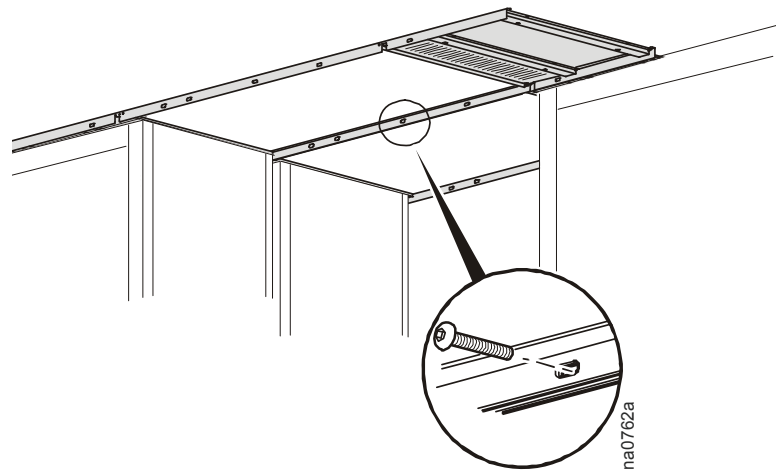
3. Install four Plasti-Grommets to the top of the rack. See page 28 for Plasti-Grommet locations.
4. Attach the ceiling panels to the racks using four M6 × 12-mm screws secured to the Plasti-Grommets.



5. Attach ceiling panel frames on the ends of the hot aisle to the door headers using three M6 x 30 screws at each door header.



6. Moving down the row, secure the frames together with three M6 x 30 screws per side for a total of six screws per ceiling frame.
7. Install the Lexan panels. See “Installing Lexan ceiling panels” on page 50.

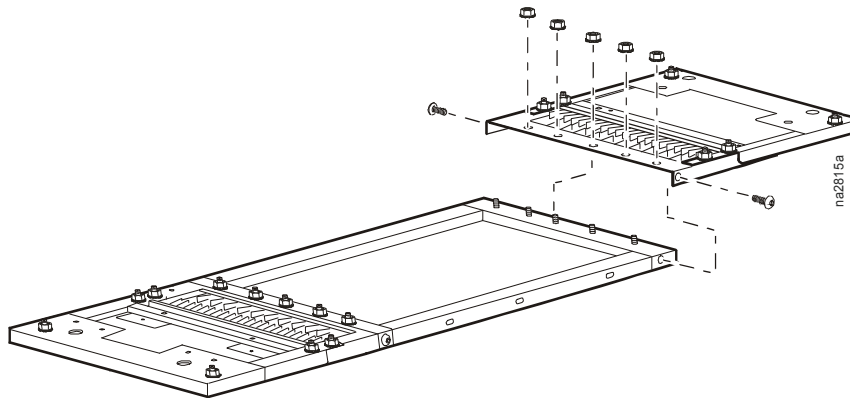


Existing installation example 1 (ACDC1015):

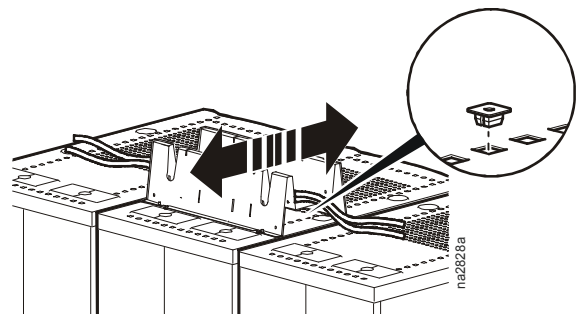


Note: Use the following instructions if there are no cables coming from the rear of the rack and entering the trough.

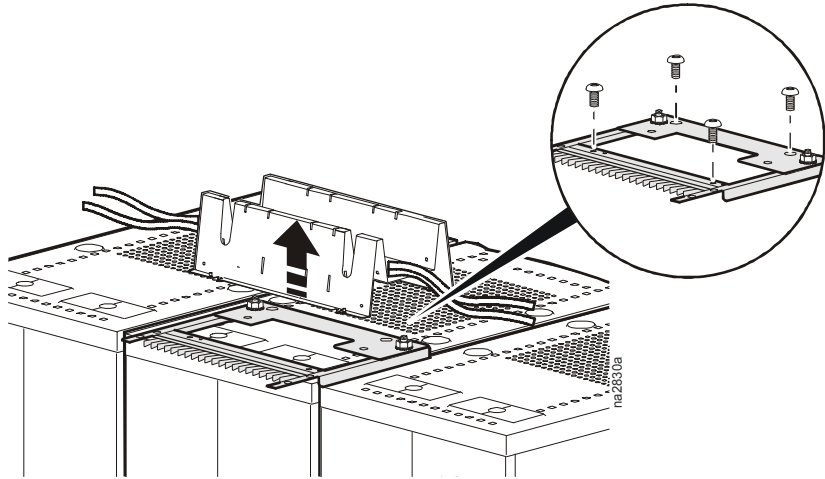
1. Remove the Lexan panels from the ceiling panel frames and store in a safe place until time to install.
2. Disassemble the center panel assembly from the enclosure end sections using a 7-mm wrench and a 4-mm hex driver.



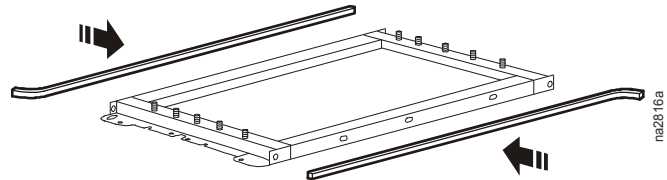
3. Detach and slide the cable trough forward to install 2 Plasti-Grommets to the top of the rack. Slide the cable trough back to install the remaining 2 Plasti-Grommets. See page 28 for the Plasti-Grommet locations.



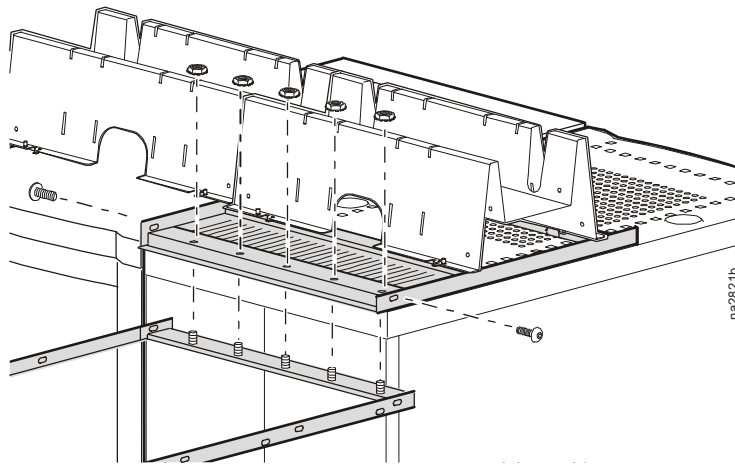
4. Attach the enclosure section to the top of the rack with four M6 x 12-mm screws secured to the Plasti-Grommets.



5. Apply foam gasket to the sides of the ceiling panel center frame.

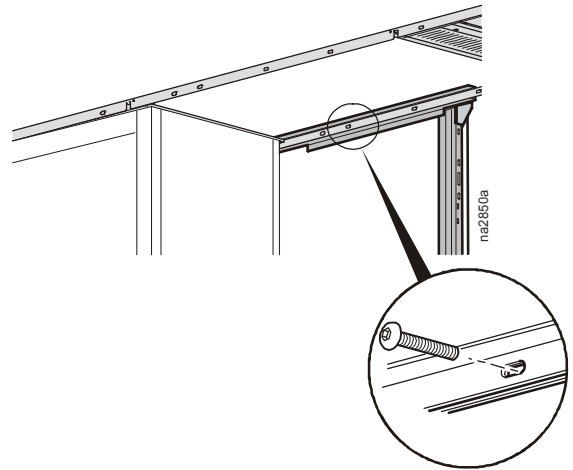


6. Bring the center frame up under the end of the enclosure section. Align the threaded studs on the end of the center frame to the holes in the enclosure section. Attach with five M4 nuts and two M6 x 8-mm screws (removed in step 2).



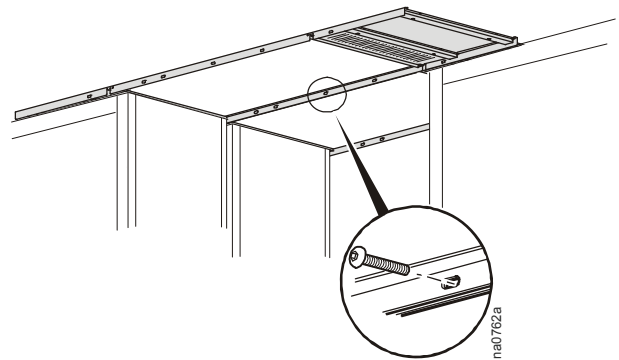
7. Attach the cable trough to the ceiling panel frame. See the instructions supplied with the troughs for proper installation.

8. Attach ceiling panel frames on the ends of the hot aisle to the door headers using three M6 x 30 screws at each door header.



9. Moving down the row, secure the frames together with three M6 x 30 screws per side for a total of six screws per ceiling frame.

10. Install the Lexan panels. See “Installing Lexan ceiling panels” on page 50.



Existing installation example 2 (ACDC1015):

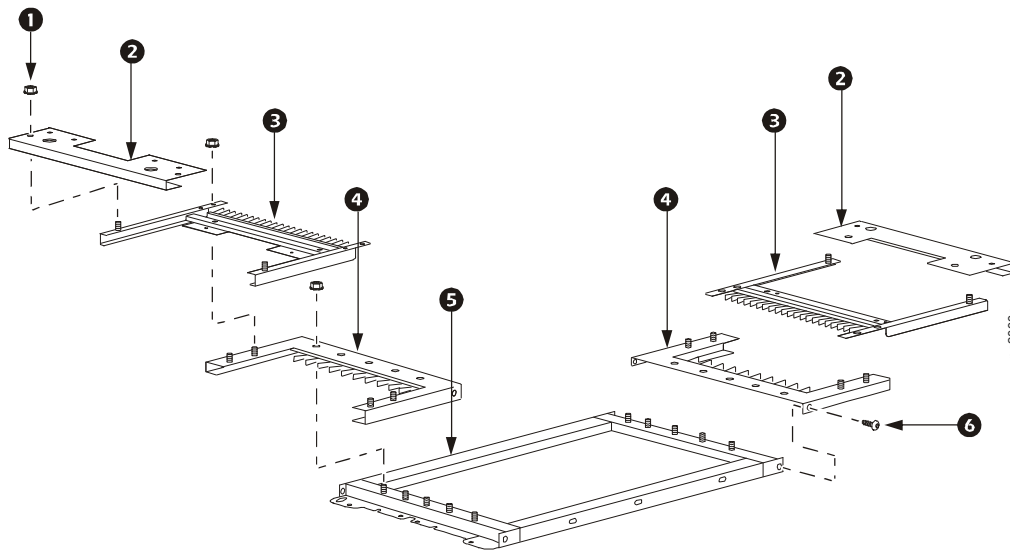


Note: If top piped cooling units are in the HACS, the enclosure section may be disassembled into three pieces for installation.

Note: If there are cables going from the rear of the rack to the trough, the ceiling panel frame must be split at the brush strips.

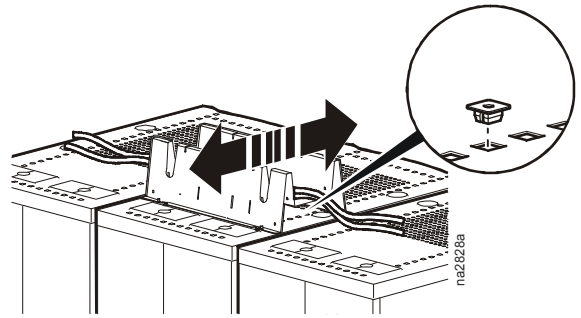
Note: Your HACS arrangement may require only partial disassembly of the ceiling panel frame. Review your installation and assemble accordingly.

1. Remove the Lexan panels from the ceiling panel frames and store in a safe place until time to install.
2. Disassemble the ceiling panel frame using a 7-mm wrench and a 4-mm hex driver.

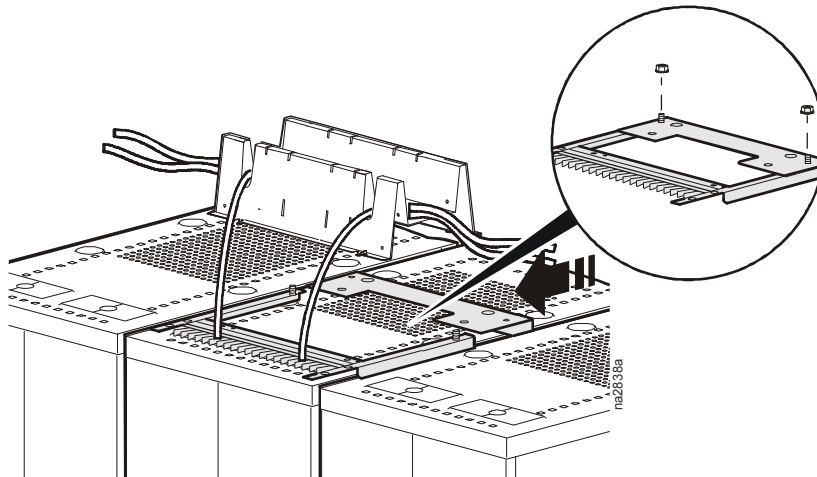


Item Number	Description
❶	M4 nut
❷	Rack cross member (enclosure section)
❸	Brush strip 1 (enclosure section)
❹	Brush strip 2 (enclosure section)
❺	Center panel assembly
❻	M6 x 8-mm screw

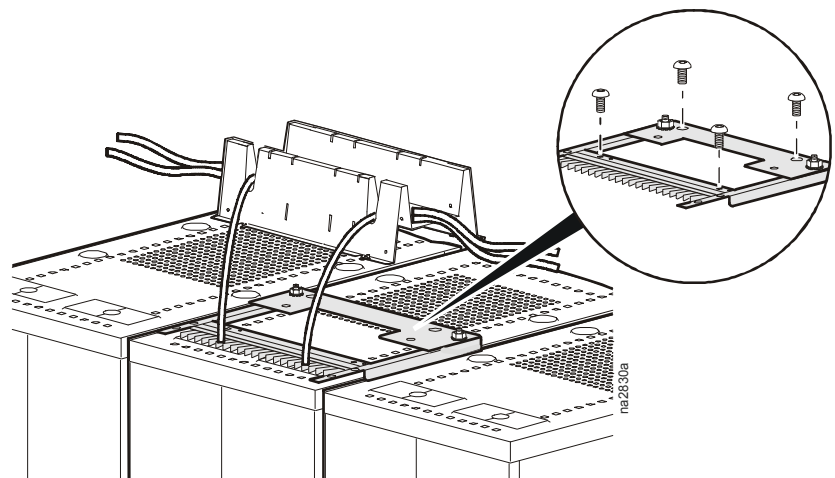
3. Detach and slide the cable trough forward to install 2 Plasti-Grommets to the top of the rack. Slide the cable trough back to install the remaining 2 Plasti-Grommets. See locations in “Before installing the ceiling panels:” on page 28



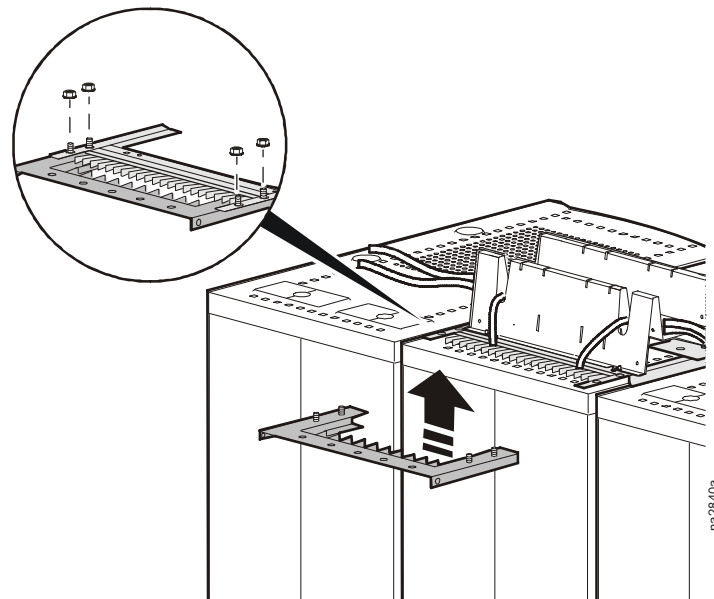
4. Insert brush strip 1 (see page 34, item 3) under the front of the trough and the rack cross member (see page 34, item 2) under the trough from the back. Attach the two pieces with two M4 nuts.



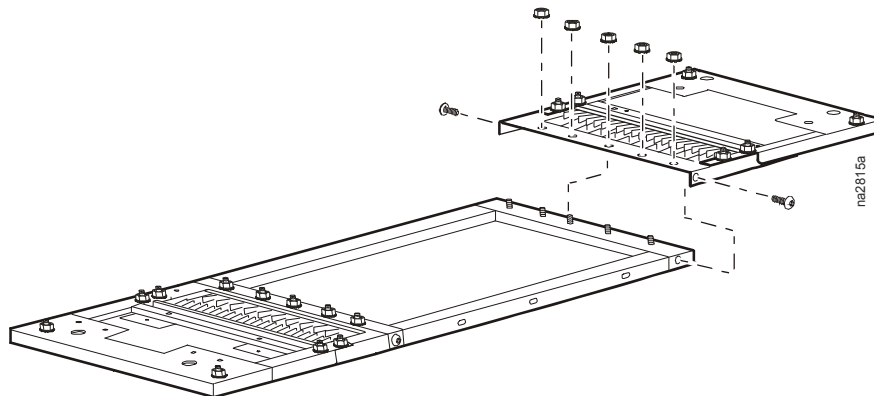
5. Attach the assembled two pieces to the top of the rack with four M6 x 12-mm screws secured to the Plasti-Grommets (installed in step 3).



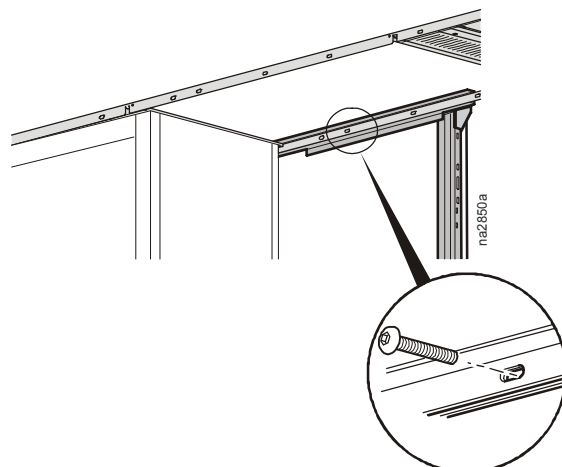
6. Attach brush strip 2 (see page 34, item ④) to brush strip 1 with four M4 nuts. Cables extending from the racks are routed through the brush strips.



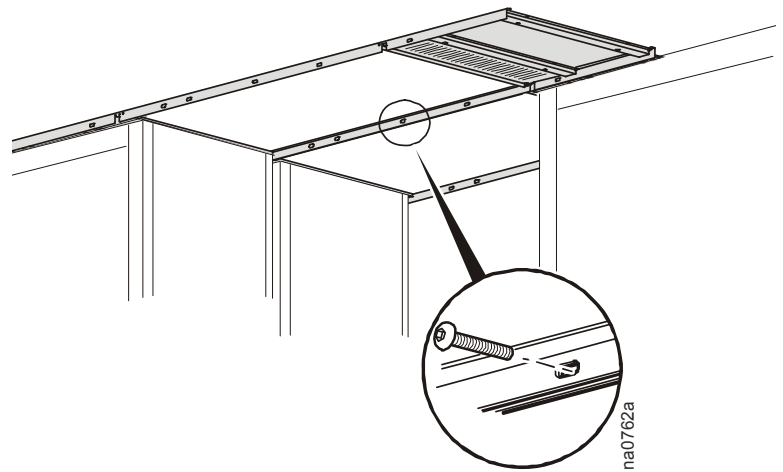
7. Attach the cable trough to the enclosure section. See the instructions supplied with the troughs for proper installation.
8. Bring the center frame up under the end of the enclosure section. Align the threaded studs on the end of the center frame to the holes in the enclosure section. Attach with five M4 nuts and two M6 x 8-mm screws (removed in step 2).



9. Attach ceiling panel frames on the ends of the hot aisle to the door headers using three M6 x 30 screws at each door header.



10. Moving down the row, secure the frames together with three M6 x 30 screws per side for a total of six screws per ceiling frame.
11. Install the Lexan panels. See “Installing Lexan ceiling panels” on page 50.



InRow RP, RC or RD 600 mm to rack, InRow RP, RC or RD 600 mm ceiling panel installation (ACDC1019)



Note: ACDC1019 ceiling panels can be used with 600 mm InRow cooling units, 600 mm rack enclosures or two 300 mm InRow cooling units.



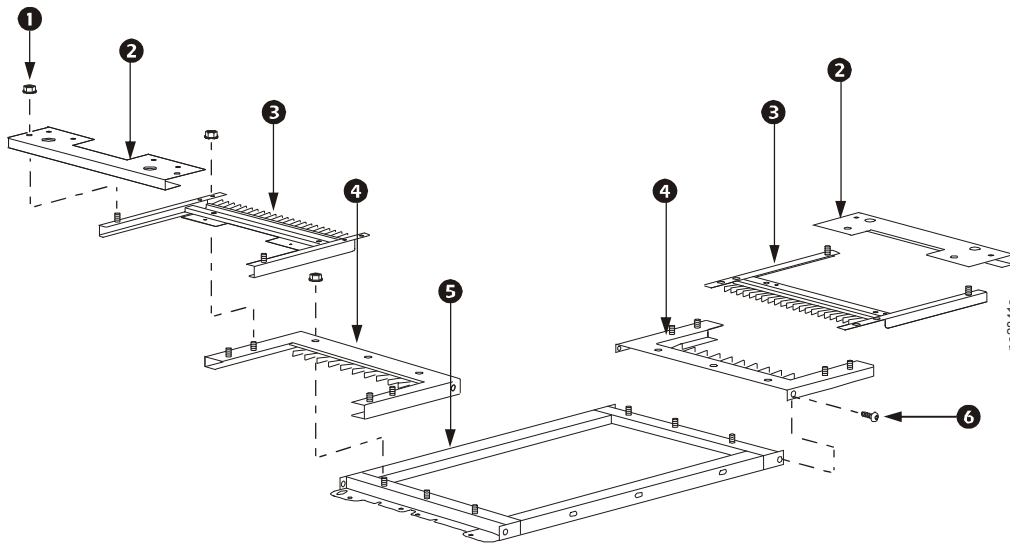
Note: If top piped cooling units are in the HACS, the enclosure section may be disassembled into three pieces for installation.

Note: If there are cables going from the rear of the rack to the trough, the ceiling panel frame must be split at the brush strips.

Note: Your HACS arrangement may require only partial disassembly of the ceiling panel frame. Review your installation and assemble accordingly.

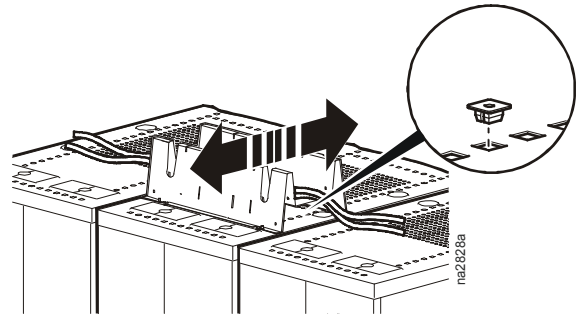
New installations:

1. Remove the Lexan panels from the ceiling panel frames and store them in a safe place until time to install them.
2. Disassemble the ceiling panel using a 7-mm wrench and a 4-mm hex driver.

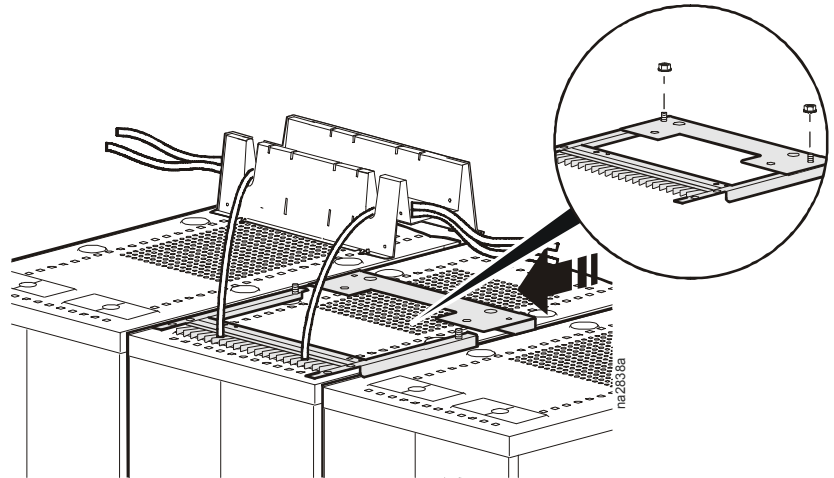


Item Number	Description
①	M4 nut
②	Rack cross member (enclosure section)
③	Brush strip 1 (enclosure section)
④	Brush strip 2 (enclosure section)
⑤	Center panel assembly
⑥	M6 x 8-mm screw

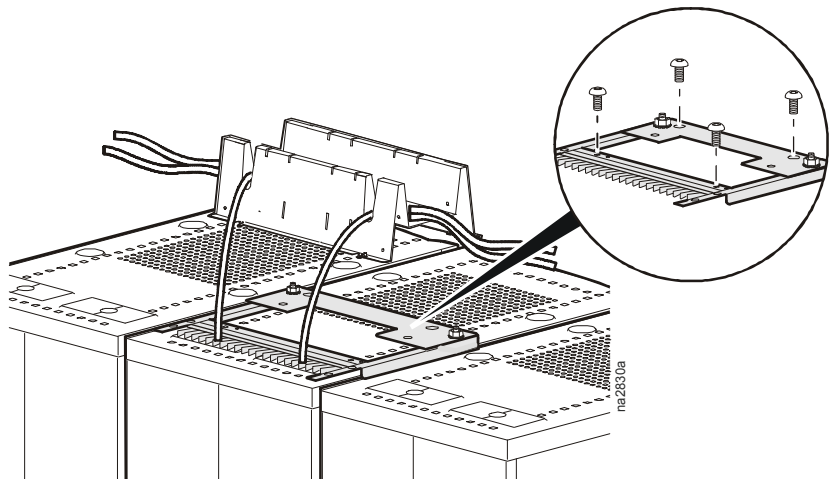
3. Detach and slide the cable trough forward to install 2 Plasti-Grommets to the top of the rack. Slide the cable trough back to install the remaining 2 Plasti-Grommets. See page 28 for the Plasti-Grommet locations.



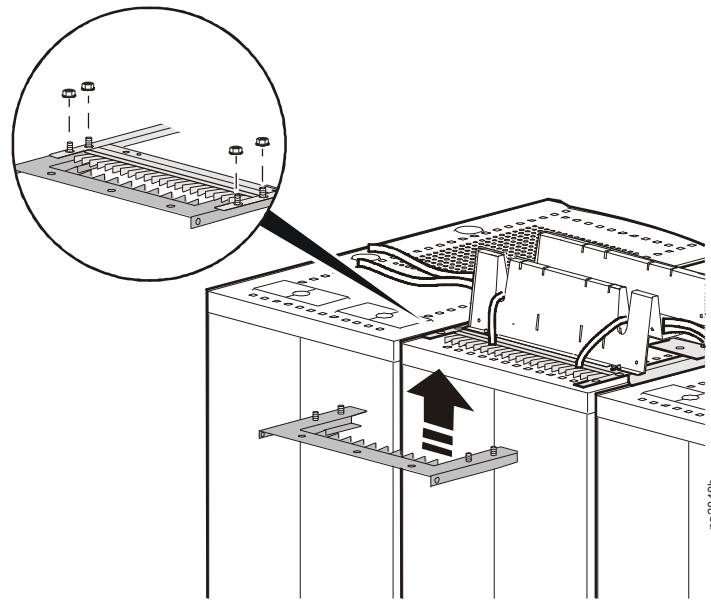
4. Insert brush strip 1 (see page 38, item 3) under the front of the trough and the rack cross member (see page 38, item 2) under the trough from the back. Attach the two pieces with two M4 nuts.



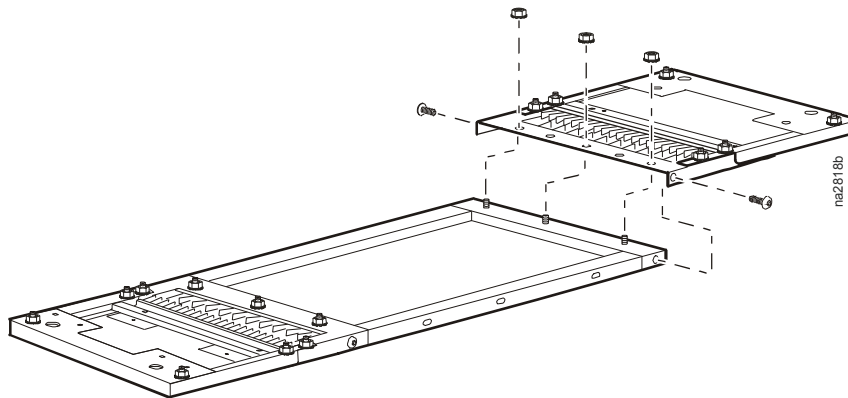
5. Attach the assembled two pieces to the top of the rack with four M6 x 12-mm screws secured to the Plasti-Grommets installed in step 3.



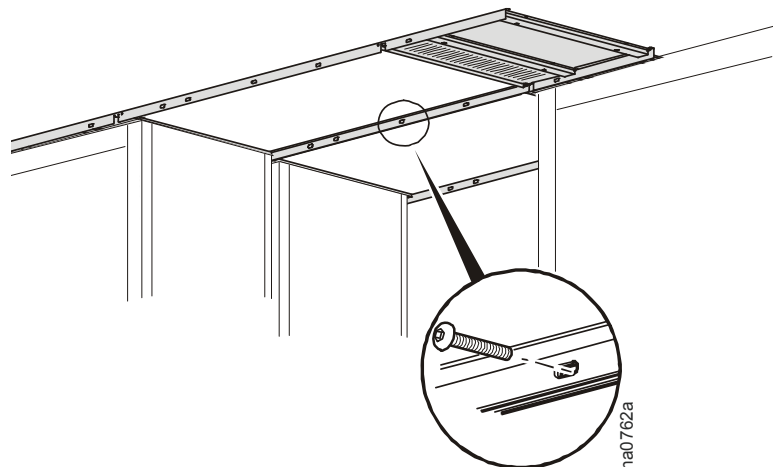
- Attach brush strip 2 (see page 38, item 4) to brush strip 1 with four M4 nuts. Cables extending from the racks are routed through the brush strips.



- Bring the center frame up under the end of the enclosure section. Align the threaded studs on the end of the center frame to the holes in the enclosure section. Attach with five M4 nuts and two M6 x 8-mm screws (removed in step 2).



- Attach the cable trough to the ceiling panel frame end. See the instructions supplied with the troughs for proper installation.
- When all of the ceiling panels are installed, move down the row securing the frames together with three M6 x 30 screws per side for a total of six screws per ceiling frame.
- Install the Lexan panels. See "Installing Lexan ceiling panels" on page 50.

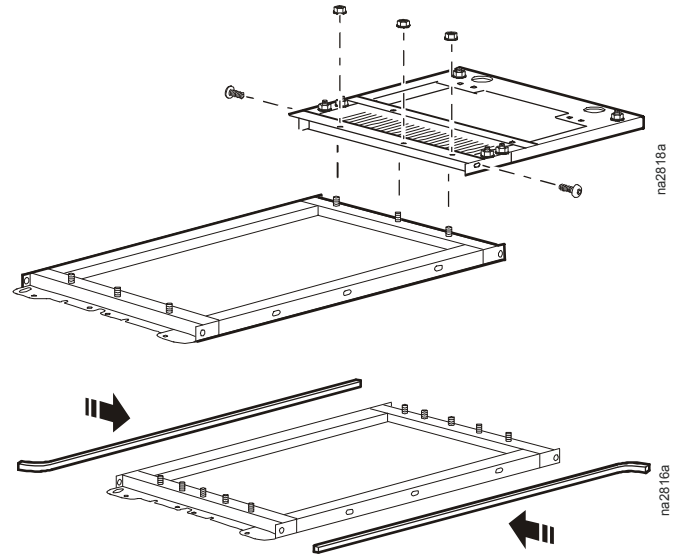


Alternate installations:

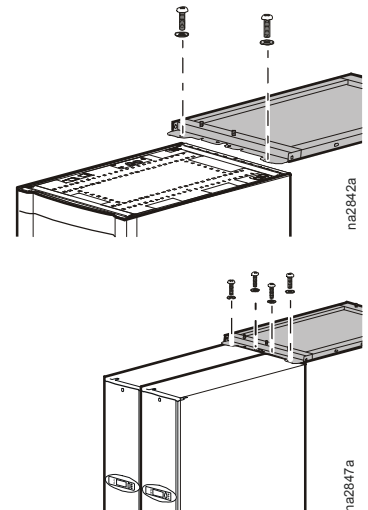


Note: This method can be used if there are no cables or troughs on top of the HACS or if the AR Bridge trough is used on top of the cooling unit.

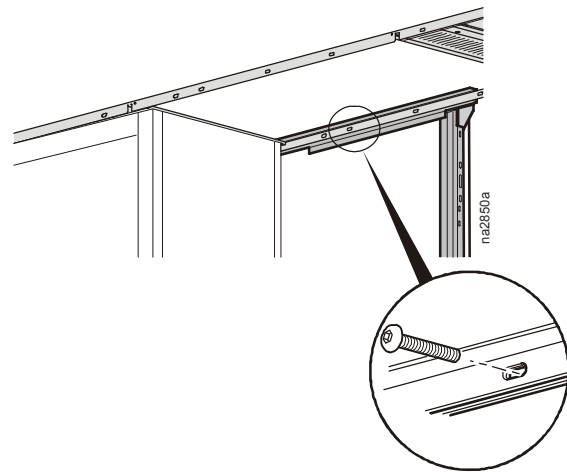
1. Remove the Lexan panels from the ceiling panel frames and store them in a safe place until time to install them.
2. Remove both enclosure ends including brush strips from the ceiling panel frame by removing three M4 nuts and two M6 x 8 screws. Set them aside. They will not be used for this application.
3. Apply foam gasket to the sides of the center ceiling panel frame.



4. Install only the center of the ceiling panel frame to the InRow RP, RC or RD 600 mm cooling unit using two M10 × 16-mm screws and two 10-mm washers at each end.
5. Two InRow RC or RD 300 mm cooling units installed side by side can use one ACDC1019 (600-mm) ceiling panel frame center. Secure the panel to both InRow RC or RD 300 mm cooling units with four M10 x 16 screws and four 10-mm washers.



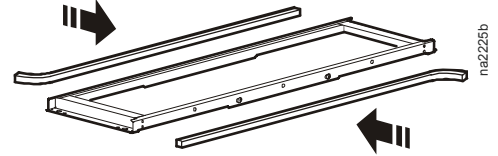
6. When all of the ceiling panels are installed, move down the row securing the frames together with three M6 x 30 screws per side for a total of six screws per ceiling panel frame.
7. Install the Lexan panels. See “Installing Lexan ceiling panels” on page 50.



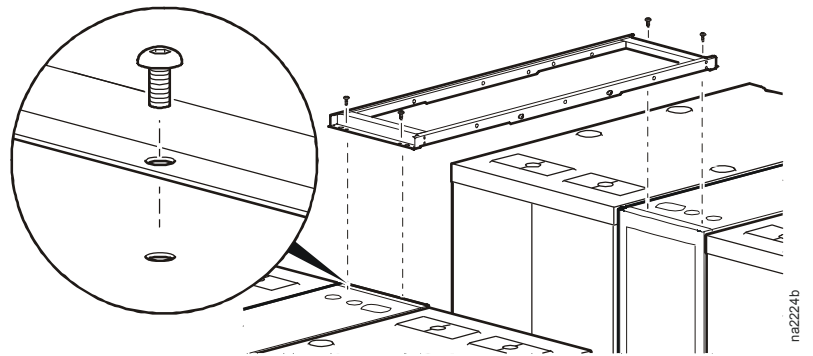
InRow RC or RD 300 mm-to-InRow RC or RD 300 mm ceiling panel installation (ACDC1018)

New and existing installations:

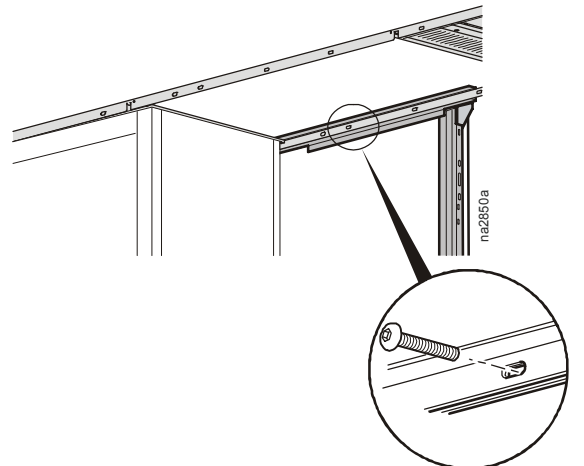
1. Remove the Lexan panels from the ceiling panel frames and store in a safe place until time to install.
2. Apply foam gasket to the sides of the ceiling panel frame.



3. Attach the ceiling panel to the top of each InRow RC or RD 300 mm cooling unit using four M6 × 12 mm screws.

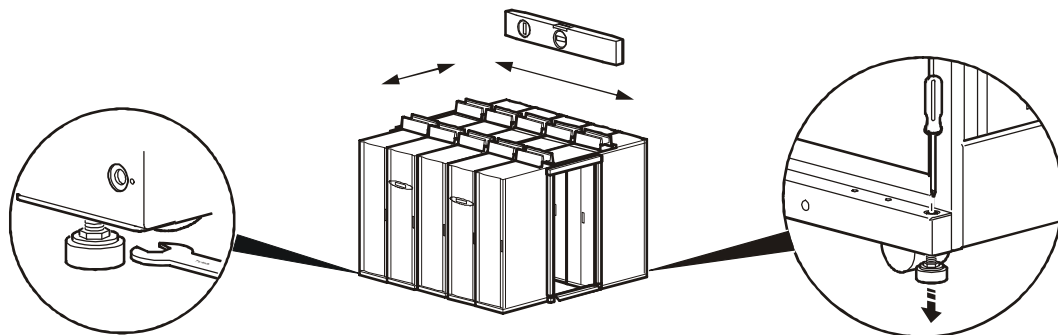


4. When all of the ceiling panels are installed, move down the row securing the ceiling panel frames together with three M6 x 30mm screws per side for a total of six screws per ceiling panel frame.
5. Install the Lexan panels. See “Installing Lexan ceiling panels” on page 50.



Leveling

Before installing doors, end panels, and ceiling panels, the racks and cooling units in the HACS must be aligned and level. See the Installation manual for your rack or cooling unit for complete leveling instructions.

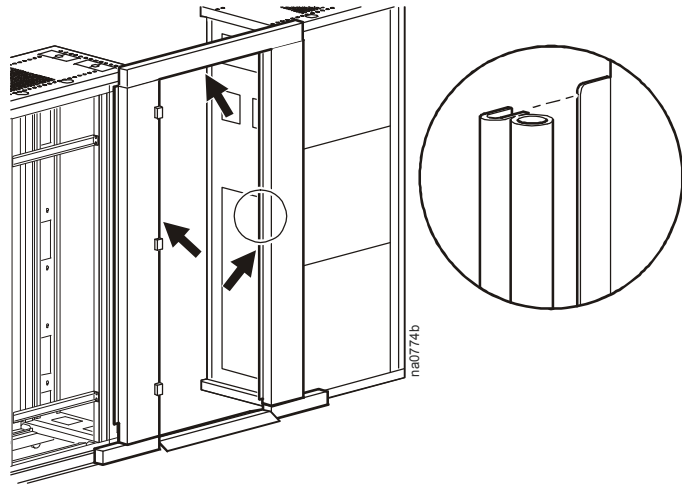


Doors and Locksets

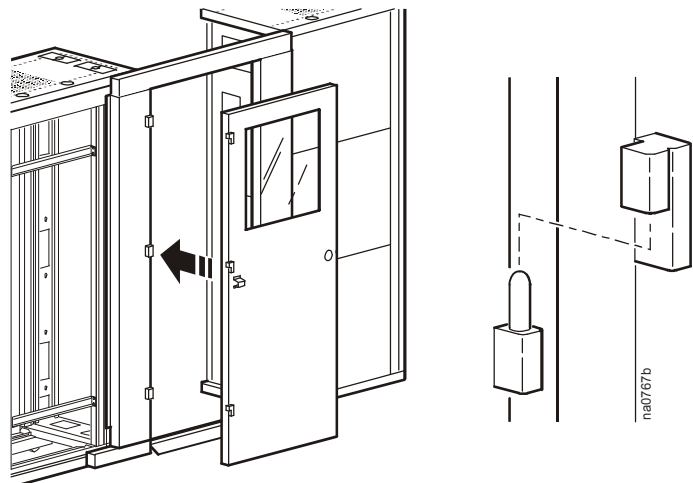


Heavy: The door is very heavy. To avoid injury, at least two people should install the door frame and door.

1. Apply the door frame gasket material to the door frame sides. Position the door gasket bulb on the outside of the door frame where it will make contact when the door is closed. Start at the bottom of one side of the door frame and work up to the top, then across the top and down the other side pressing the gasket material firmly in place. Cut off any excess.



2. Hang the door on the frame hinges.

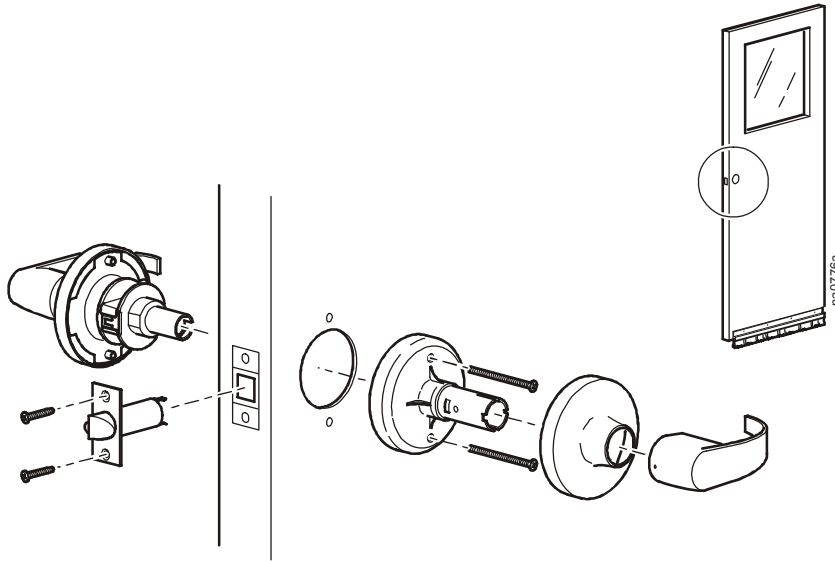


3. Attach a lockset to each door.



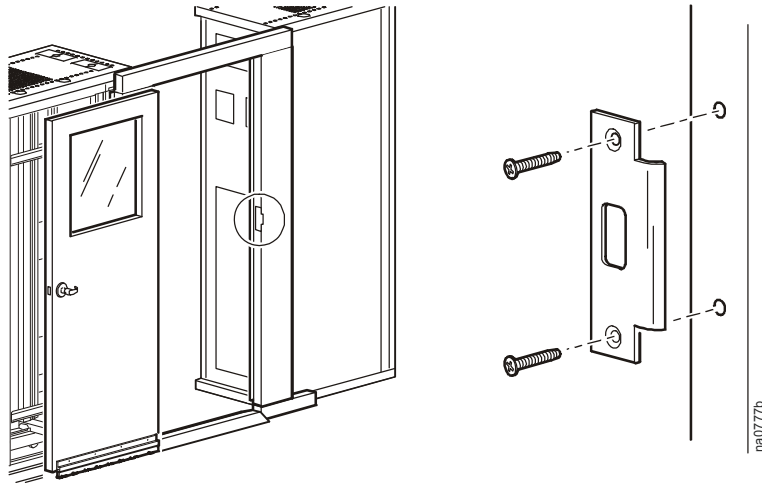
Note: Use the wire hook (provided with lockset) to release the assembled parts of the lockset prior to installing the lockset into the door frame.

4. Position the lock cylinder on the outside of the door.

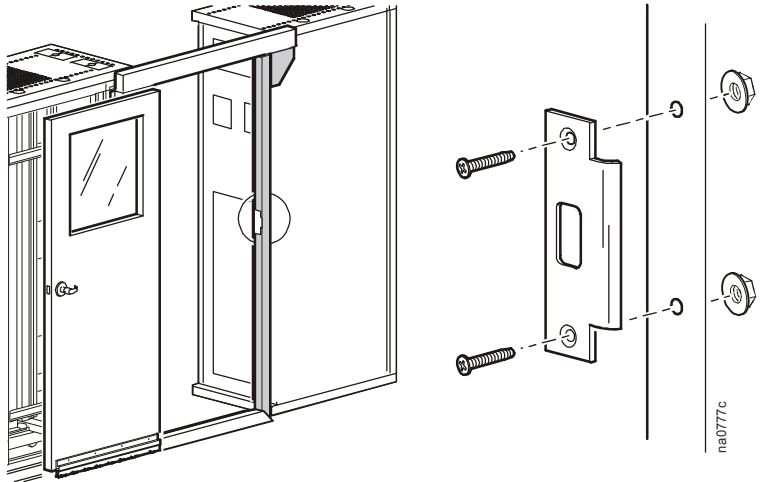


Note: Do not use the screws supplied with the lockset.

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

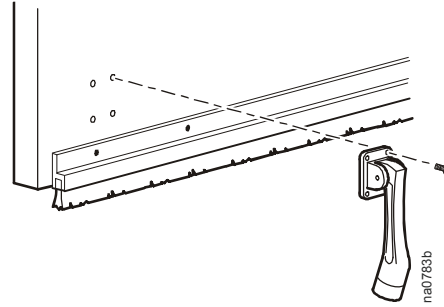
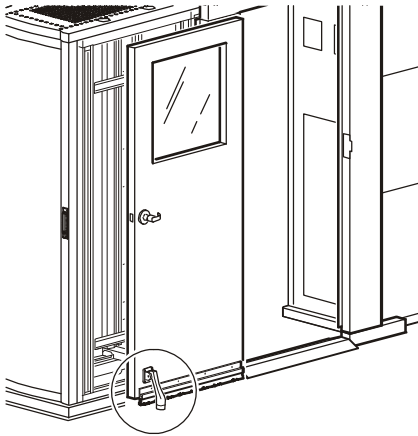


6. If the lock is installed next to an SX enclosure, install the strike plate onto the door frame using two 12-24 flange nuts and two 12-24 x 1/2 FHPHSS screws. Tighten with a 7/16-in wrench.



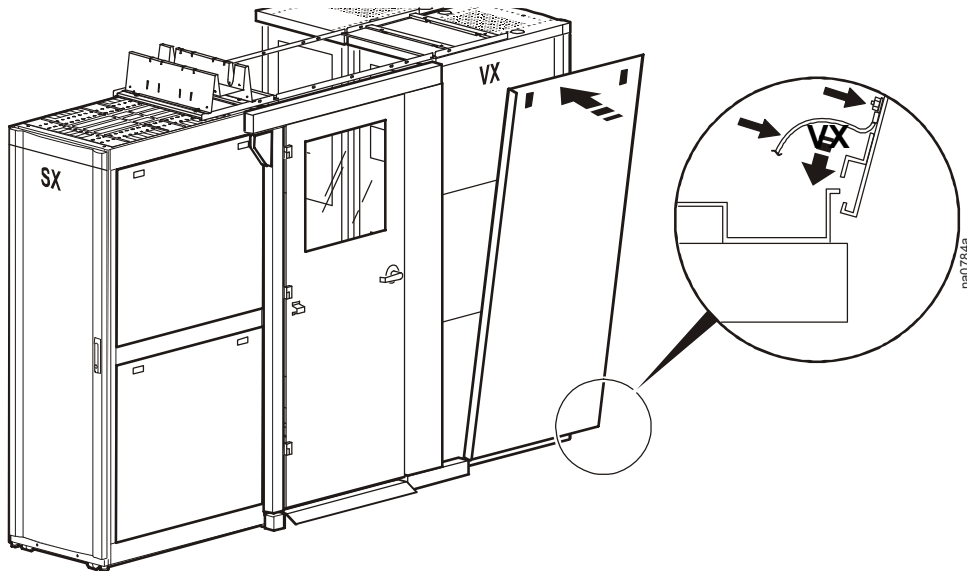
Door Stop

Four M3 × 12-mm Phillips head screws are installed in the door at the location for the door stop. Remove the four screws and install the door stop to the door at that location using the four screws.



End Panels

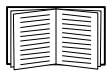
Install the end panels at the ends of each row of the Hot Aisle Containment System.



Note: A VX panel will be included in the door kit when the VX door frame is ordered. Your existing VX panel will no longer fit once the door frame is installed.

Power Troughs and Data Partitions

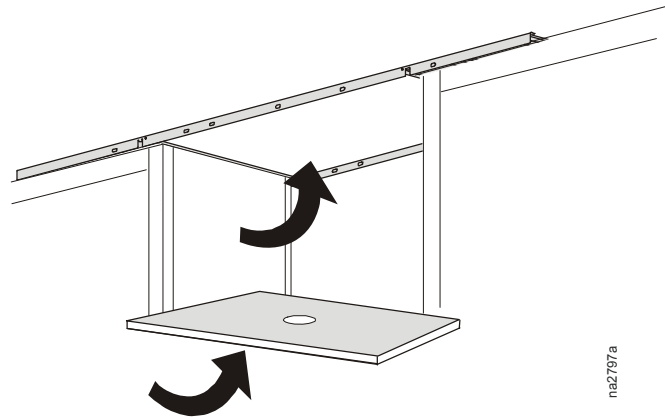
Install the troughs into the slots located in the ceiling panel frames.



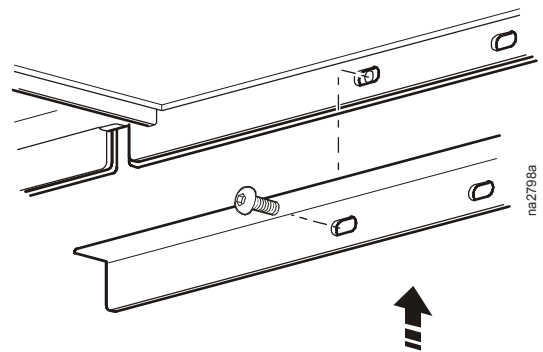
See the instructions supplied with the troughs for proper installation.

Installing Lexan ceiling panels

1. Remove the protective plastic from both sides of the Lexan panel.
2. Start at a ceiling panel frame located next to a hot aisle door. Install the Lexan panel from the under side of the ceiling frame. Remove the plastic strip from the double-sided tape and carefully position the Lexan panel in the ceiling frame.



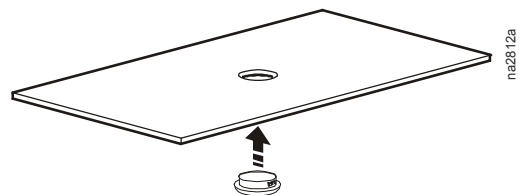
3. Hold the Lexan panel in place and position the retaining bracket under the Lexan panel along the edge of the ceiling panel frame. Secure with two M6 × 8-mm screws.
4. Attach a retaining bracket to the opposite side of the panel.



5. Secure the next Lexan panel to the adjacent ceiling frame with a retaining bracket and two M6 × 8-mm screws on each side of the panel.
6. Work down the row to install the remaining Lexan panels.

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. The cap is inserted from the underside of the panel.



Installation for NetworkAIR IR 40 CW

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

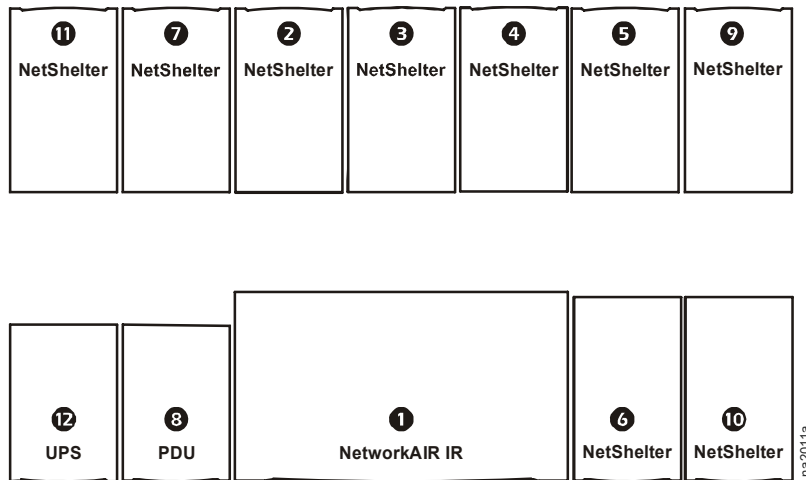
APC recommends starting the construction of the Hot Aisle Containment System with the cooling unit.



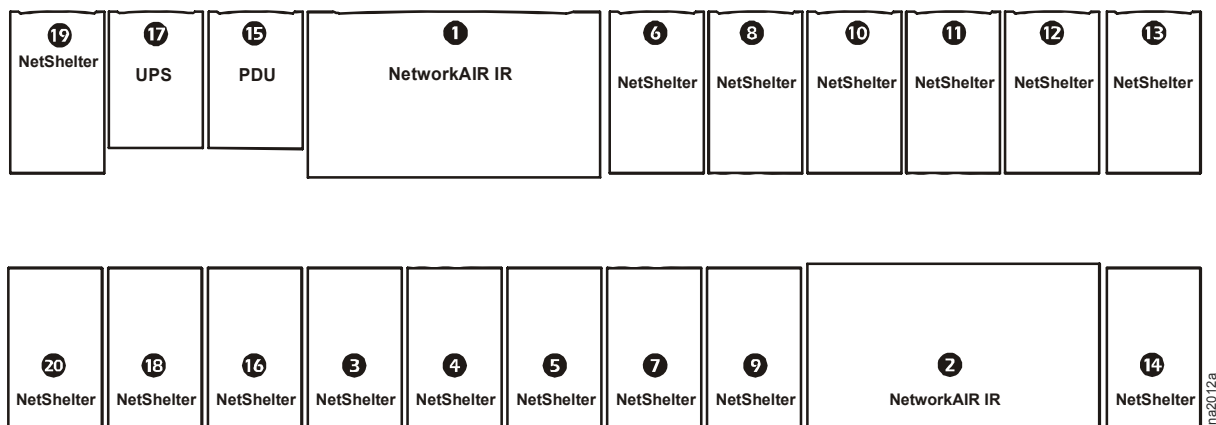
Note: If there is more than one cooling unit in your Hot Aisle Containment System, be prepared to move at least one cooling unit so that the aisle will line up properly.

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

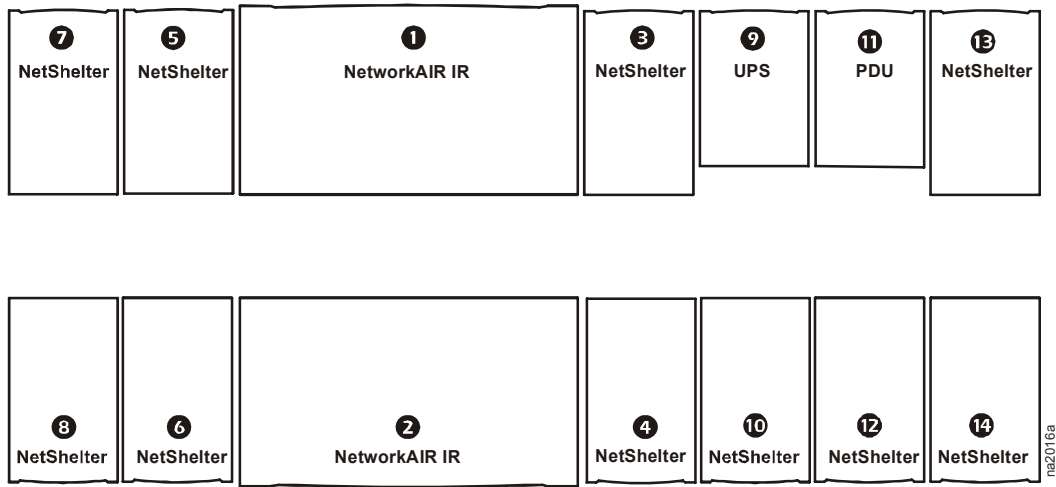
Installation with one NetworkAIR IR 40 CW unit



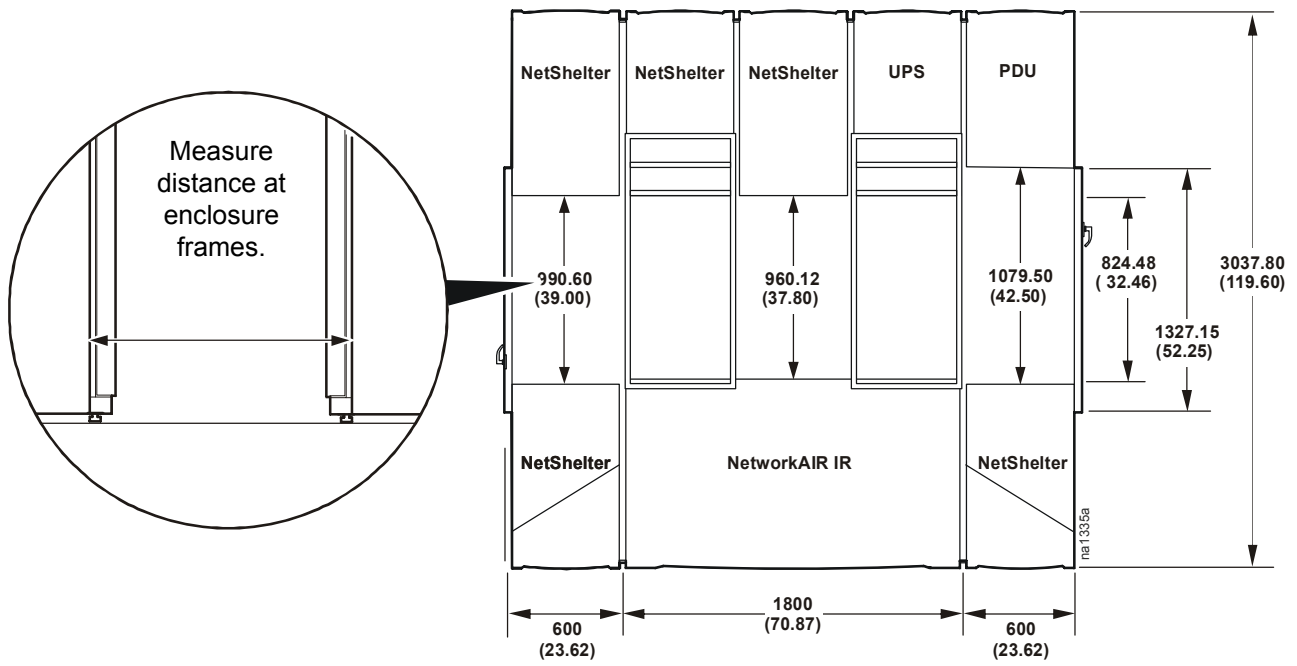
Installation with two NetworkAIR IR 40 CW units



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



Critical Dimensions



* Dimensions are in mm (in).

NetworkAIR IR 40 CW Ceiling Panels

Types of ceiling panels

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

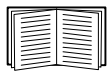
Ceiling panels are available as a complete assembly or as a multi-part unit that you can disassemble for existing applications to avoid having to disconnect cables. Each ceiling panel configuration has a unique set of installation hardware.

Configuration	Ceiling Panel
IR40 CW-to-Rack (ACDC1014)	A perspective view of a rectangular ceiling panel with a central section that is slightly recessed or has a different texture. The part number 'na0626a' is printed vertically on the right side.
IR40 CW-to-IR40 CW (ACDC1003)	A perspective view of a rectangular ceiling panel with a central section that is slightly recessed or has a different texture. The part number 'na0627a' is printed vertically on the right side.

Order of installation



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. See page 28 for the locations.

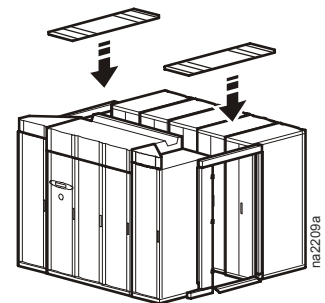


Caution: Ceiling panels are not designed to support weight. Do not use the ceiling panels to route power or data cables.

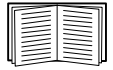
- 1 Remove the Lexan panels from the ceiling panel frames and store in a safe place until time to install.
- 2 Install the end ceiling panel frames first.



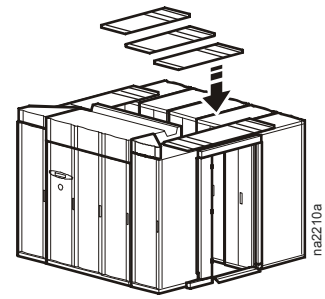
See “Installing rack-to-rack ceiling panel frames (ACDC1015 and ACDC1019)” on page 30.



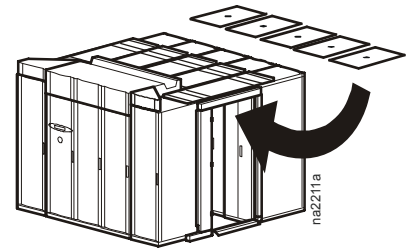
- 3 Starting from the ends and working toward the center of the aisle, install the remaining ceiling panels.



See “Installing IR 40 CW-to-rack ceiling panels (ACDC1014)” on page 55.
See “Installing IR 40 CW-to-IR 40 CW ceiling panels (ACDC1003)” on this page.



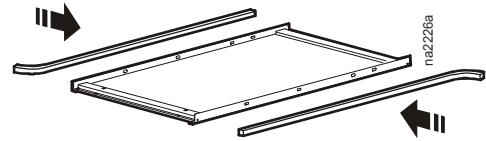
- 4 Install the Lexan panels. See page 50 for Lexan panel installation instructions.



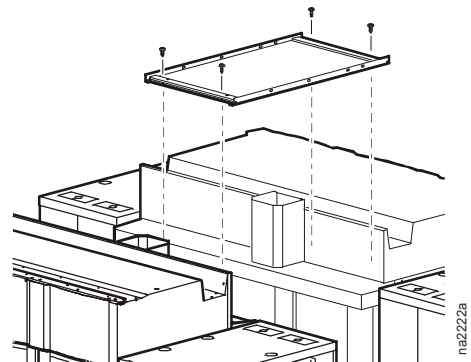
Installing IR 40 CW-to-IR 40 CW ceiling panels (ACDC1003)

New and existing installations:

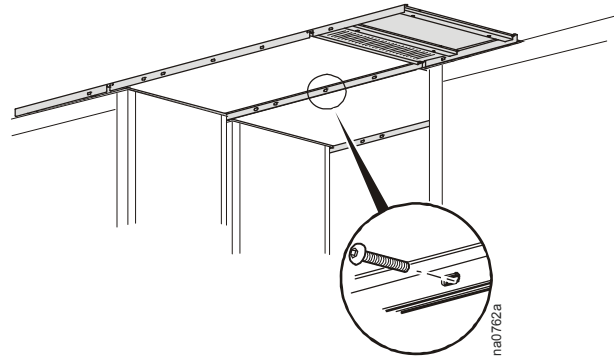
1. Remove the Lexan panels from the ceiling panel frames and store in a safe place until time to install.
2. Apply foam gasket to the sides of the ceiling panel frame.



3. Install the ceiling panel frame using four $8/32 \times 3/8$ -in screws.



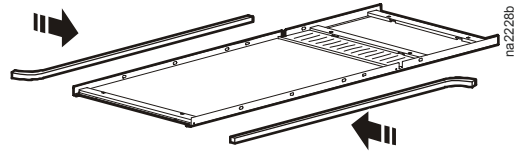
4. When all of the ceiling panel frames are installed, move down the row securing the frames together with three M6 x 30 screws per side for a total of six screws per ceiling frame.
5. Install the Lexan panels. See “Installing Lexan ceiling panels” on page 50.



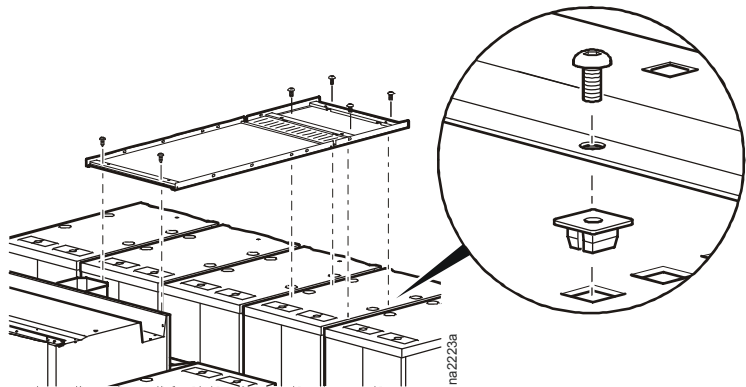
Installing IR 40 CW-to-rack ceiling panels (ACDC1014)

New installation:

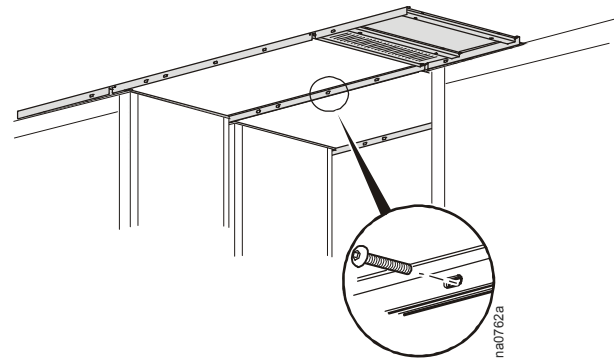
1. Apply foam gasket to the sides of the ceiling panel frame.



2. Install four Plasti-Grommets to the top of the rack. See “Before installing the ceiling panels:” on page 28 for Plasti-Grommet locations.
3. Attach the ceiling panel using two 8-32 x 3/8-in screws to attach to the IR 40 CW and four M6 x 12-mm screws secured to the Plasti-Grommets installed in step 2.



4. When all of the ceiling panels are installed, move down the row securing the frames together with three M6 x 30 screws per side for a total of six screws per ceiling frame.
5. Install the Lexan panels. See “Installing Lexan ceiling panels” on page 50.



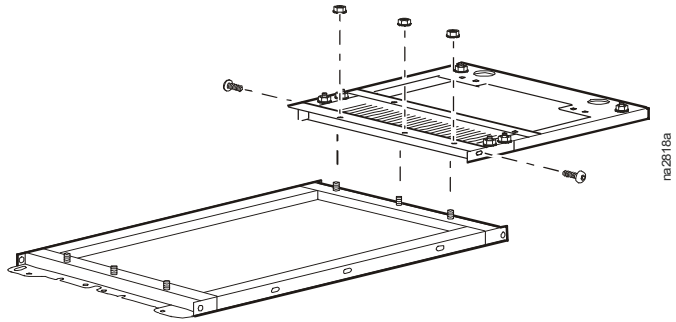
Existing installation:



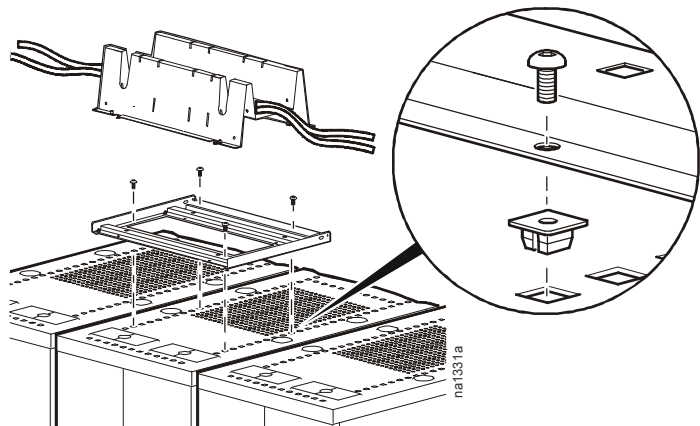
Note: If there are cables going from the rear of the rack to the trough, the enclosure section must be split at the brush strips. See “Existing installation example 2 (ACDC1015):” on page 34 for instructions.

Note: Your HACS arrangement may require only partial disassembly of the ceiling panel frame. Review your installation and assemble accordingly.

1. Disassemble the ceiling panel frame using a 7-mm wrench and a 4-mm hex driver.

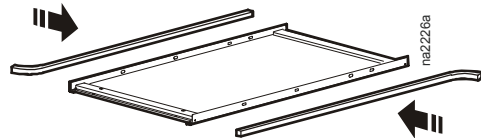


2. Detach and slide the cable trough forward to install 2 Plasti-Grommets to the top of the rack. Slide the cable trough back to install the remaining 2 Plasti-Grommets. See page 28 for the Plasti-Grommet locations.

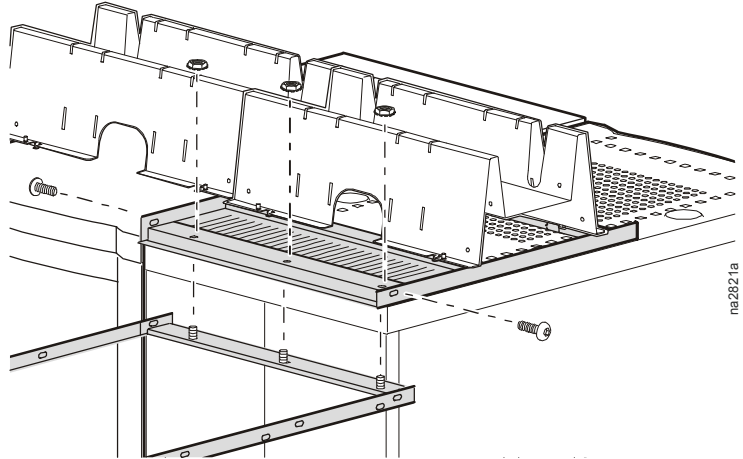


3. Attach the enclosure section of the ceiling panel frame to the top of the rack with four M6 x 12-mm screws secured to the Plasti-Grommets installed in step 2.

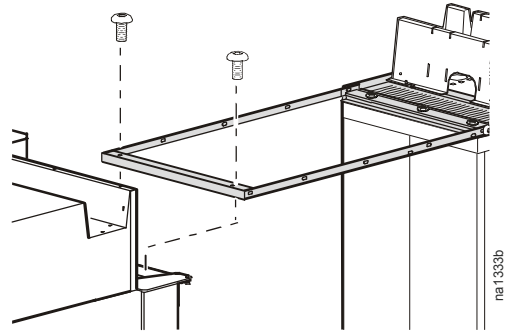
4. Attach the cable trough to the enclosure section. See the instructions supplied with the troughs for proper installation.
5. Apply foam gasket to the sides of the center ceiling panel frame.



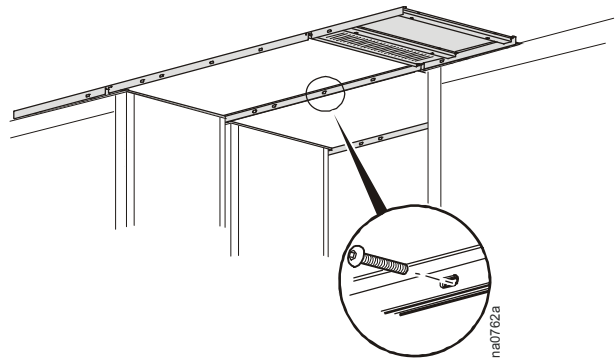
- Bring the center frame up under the end of the enclosure section. Align the threaded studs on the end of the center frame to the holes in the enclosure section. Attach with three M4 nuts and two M6 x 8-mm screws removed in step 1.



- Attach the IR 40 CW end of the ceiling panel frame to the IR 40 CW cooling unit using two 8-32 x 3/8-in screws.



- When all of the ceiling panel frames are installed, move down the row securing the frames together with three M6 x 30 screws per side for a total of six screws per ceiling panel frame.
- Install the Lexan panels. See “Installing Lexan ceiling panels” on page 50.



Warranty and Service

One-Year Factory Warranty

The limited warranty provided by American Power Conversion (APC®) in this Statement of Limited Factory Warranty applies only to products you purchase for your commercial or industrial use in the ordinary course of your business.

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Non-transferable warranty

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Customers with warranty claims issues may access the APC customer support network through the Support page of the APC Web site, www.apc.com/support. Select your country from the country selection pull-down menu at the top of the Web page. Select the Support tab to obtain contact information for customer support in your region.

Warranty Procedures

Claims

To obtain service under the warranty, contact APC Customer Support (see the back cover of this manual for contact information). You will need the model number of the Product, the serial number, and the date purchased. A technician will also ask you to describe the problem. If it is determined that the Product will need to be returned to APC, you must obtain a returned material authorization (RMA) number from APC Customer Support. Products that must be returned must have the RMA number marked on the outside of the package and must be returned with transportation charges prepaid. If it is determined by APC Customer Support that on-site repair of the Product is allowed, APC will arrange to have APC authorized service personnel dispatched to the Product location for repair or replacement, at the discretion of APC.

Parts

- APC warrants the parts of their systems for 1 year from the date of commissioning or 18 months from the ship date. This warranty only covers the cost of the part and not the labor for installation.
- Calls for warranty parts requests need to have specific unit information (serial number, model number, job number) to allow proper identification and processing of the warranty part transaction.
- A purchase order may be required to issue any warranty parts. An invoice will be sent once the parts are shipped to the field. You have 30 days to return the defective parts to APC. After 30 days, the warranty invoice will be outstanding, and payment of the invoice will be expected in full.
- Return authorization documentation will be sent with the replacement part. This documentation must be sent back with the defective part to APC for proper identification of the warranty return. Mark the warranty return number on the outside of the package.
- After the part has been received at APC, we will determine the status of the credit based on the findings of the returned part. Parts that are damaged from lack of maintenance, misapplication, improper installation, shipping damage, or acts of man/nature will not be covered under the parts warranty.
- Any warranty parts request received before 1:00 PM EST will be shipped same-day standard ground delivery. Any costs associated with Next Day or Airfreight will be the responsibility of the party requesting the part.
- Return freight of warranty parts to APC is the responsibility of the party returning the part.

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 the APC Customer Support Center by telephone or e-mail.
 - Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

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