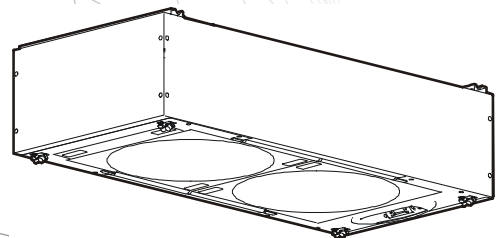


Installation

InRow OA and Accessories

ACOA500, ACOA501





This manual is available in English on the enclosed CD.

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

Deze handleiding staat in het Nederlands op de bijgevoegde cd.

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

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

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

本マニュアルの日本語版は同梱の CD-ROM からご覧になれます。

Instrukcja Obsługi w języku polskim jest dostępna na CD.

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

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

您可以从包含的 CD 上获得本手册的中文版本。

您可以从附属的 CD 上获得本手册的中文版本。

동봉된 CD 안에 한국어 매뉴얼이 있습니다 .

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General Information

Overview

Save these instructions

This manual contains important instructions that must be followed during the installation of this equipment.

Operating ambient

The operating ambient for the OA is 21° C - 41° C (70° F - 105° F).

Safety symbols that may be 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.

General symbols that may be used in this manual

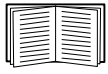


Discard indicated part or assembly.



Do not discard indicated part or assembly.

Cross-reference symbol used in this manual



See another section of this document or another document for more information on this subject.

Safety



Note: All work should be performed by American Power Conversion (APC®) authorized personnel only. Follow all local and national codes and regulations when installing this equipment.



Caution: Keep your hands, clothing, and jewelry away from moving parts. Check the equipment for foreign objects before closing the doors and starting the equipment.



Heavy: The equipment is heavy. For safety purposes, at least two people must be present when moving or installing this equipment.



Electrical Hazard: Do not wear jewelry when working near energized components.



Note: A class 1 LED product (LED lighting) is present in this equipment per IEC 60825-1 (A2:2001).

Maximum measured power based on IEC 60825-1 Ed. 1.2:

0.290mW with the cover in place.

0.469mW with the cover removed.



Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Inspecting the Equipment

Your American Power Conversion (APC®) InRow OA air conditioner and accessories have been tested and inspected for quality assurance before shipment from APC. Carefully inspect both the exterior and interior of the equipment immediately upon receipt to ensure that the equipment has not been damaged during transit.

Verify that all parts ordered were received as specified and that the equipment is the correct type, size, and voltage.

Filing a claim. If damage is identified on receipt of the equipment, note the damage on the bill of lading and file a damage claim with the shipping company. Contact APC Worldwide Customer Support at one of the numbers listed on the back cover of this manual for information about filing a claim with the shipping company. The shipping claim must be filed at the receiving end of the delivery.



Note: In case of shipping damage, do not operate the equipment. Keep all packaging for inspection by the shipping company.

Storing the Equipment Before Installation

If the equipment will not be installed immediately, store it in a safe place with packaging intact, protected from the weather.



Caution: Leaving the equipment uncovered and exposed to possible damage from the environment will void the factory warranty.

Moving the Equipment

Moving the equipment to its final location



Caution: Do not use piping to lift or move the InRow OA.

The recommended tools for moving the equipment **while it is still on the pallet** include the following:

Pallet jack

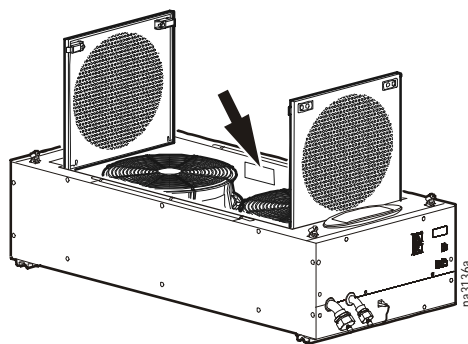
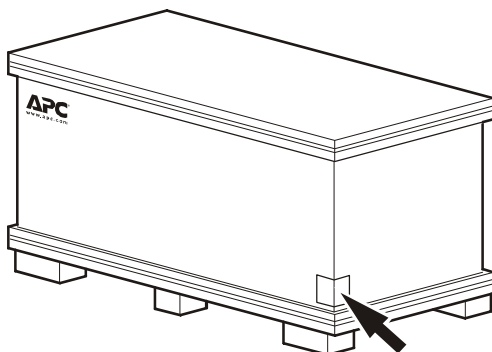
Forklift



Model Identification

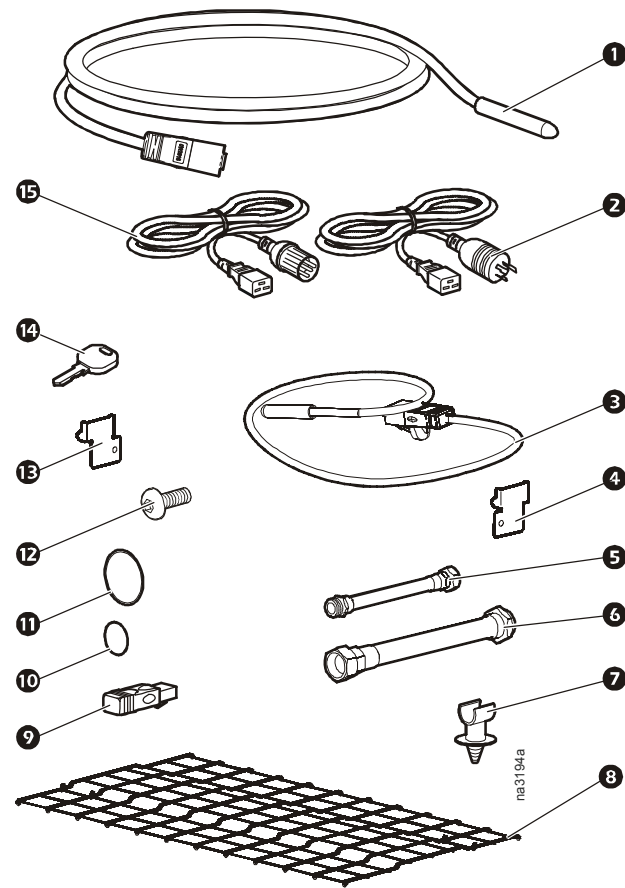
The model number can be found on the outside of the shipping crate and on the unit nameplate located as shown. Use the table below to verify that the equipment is the correct type and voltage.

Model	Configuration	Voltage
ACOA500	Pumped refrigerant	100-120/1~/50-60 Hz
ACOA501	Pumped refrigerant	200-240/1~/50-60 Hz



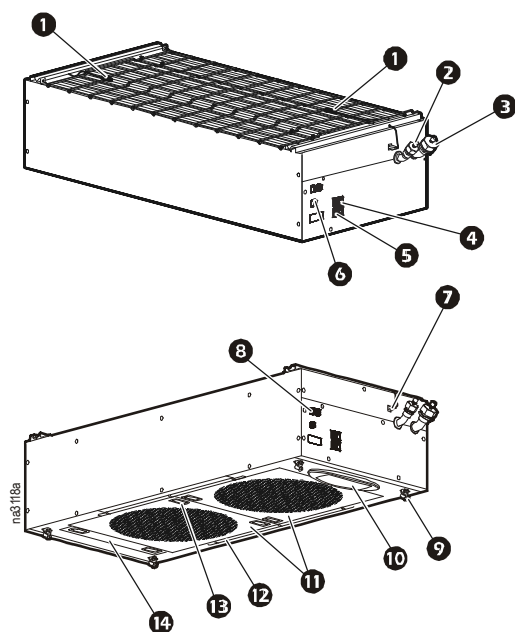
Component Identification

InRow OA loose parts



Item	Description	Qty	Item	Description	Qty
①	Remote temperature sensor	1	⑨	A-Link terminator	1
②	Power cord, L5-20P (ACOA500 only)	2	⑩	Teflon ring, 1-1/4 in	4
③	Supply air temperature sensor	2	⑪	Teflon ring, 1-3/4 in	4
④	ACOA mounting clip, right hand	2	⑫	Pan head Torx screw	5
⑤	Supply header connection	1	⑬	ACOA mounting clip, left hand	2
⑥	Return header connection	1	⑭	Key	2
⑦	Cable clip	3	⑮	Power cord, IEC 309 (ACOA501 only)	2
⑧	Grille	1			

InRow OA exterior components



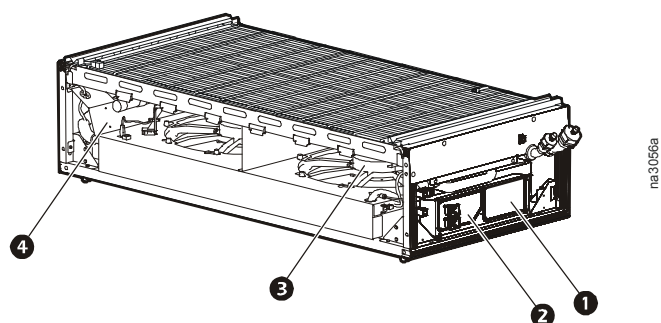
Item Description

- ❶ Supply air temperature sensors
- ❷ Refrigerant supply connection
- ❸ Refrigerant return connection
- ❹ Primary electrical power inlet
- ❺ Secondary electrical power inlet
- ❻ Rack temperature probe connection
- ❼ Rear air supply temp connection (front not shown)

Item Description

- ❸ A-link connections
- ❹ Roller
- ❺ Display interface
- ❻ Fan access panels
- ❼ Lights, LED aperture class 1
- ❽ Latch
- ❾ Electrical board access

InRow OA interior components



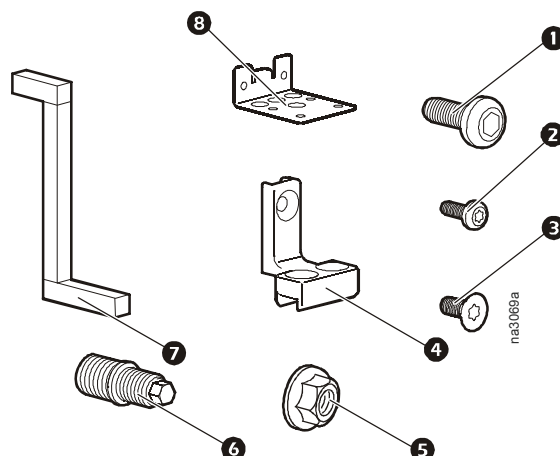
Item Description

- ❶ Relay board
- ❷ Line filter board

Item Description

- ❸ Fan and shroud assembly
- ❹ Main control board

Rack mount kit - ACAC11000



Item Description

- ❶ Screw, M10 × 16, M6 pan head
- ❷ Screw, Torx M4 × 8 pan head
- ❸ Screw, Torx M4 × 8 flat head
- ❹ Connector, frame, 25 mm drop-in, 90 degree cross

Qty

8
17
25
8

Item Description

- ❺ Flanged hex nut, M10
- ❻ Adapter stud M12 x M10
- ❼ Support leg assembly
- ❽ Rack mount plate bracket

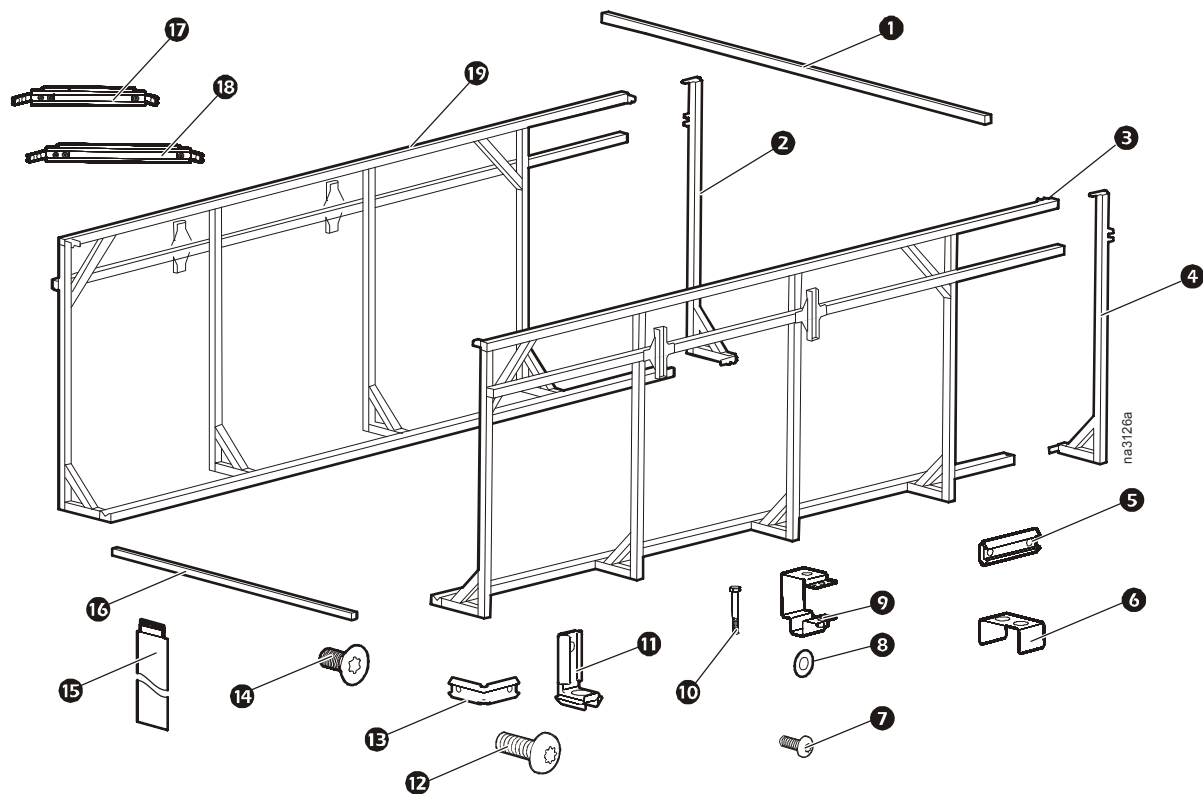
Qty

8
8
8
8



Note: Depending on system configuration, you may have extra parts remaining after assembly.

InRow OA mount frame, 2200 mm (3-unit) - ACAC11002

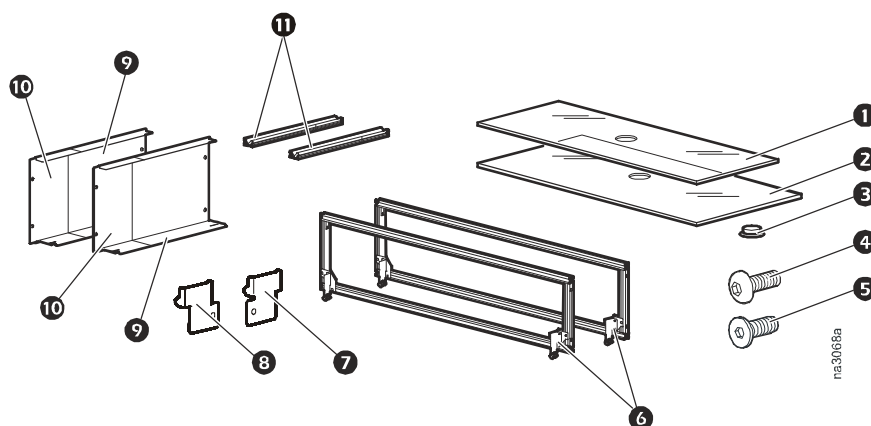


Item	Description	Qty	Item	Description	Qty
❶	Upper cross rail, 1510 mm	2	❶❶	Frame end connector, 25 mm	4
❷	Right hand vertical support assembly	1	❶❷	Torx screw, M4 × 8 mm pan head	4
❸	Right side OA mount frame assembly	1	❶❸	Frame corner connector, 25 mm	20
❹	Left hand vertical support assembly	1	❶❹	Torx screw, M4 × 8 flat head	88
❺	Frame slide-in splice connector, 25 mm	8	❶❺	Side air block strip assembly (190 mm × 300 mm)	32
❻	Frame joining clip	2	❶❻	Cross-aisle beam, 1150 mm	5
❼	Torx screw, M4 × 12 mm	4	❶❼	Gusset, 190 mm	4
❸	Flat washer	4	❶❸	Gusset, 250 mm	4
❹	Extrusion hanger bracket	4	❶❹	Left side OA mount frame assembly	1
❶❶	Hex bolt, M10 × 80 mm	4			



Note: Depending on system configuration, you may have extra parts remaining after assembly.

Ceiling containment kit (300-450 mm) - ACAC11003

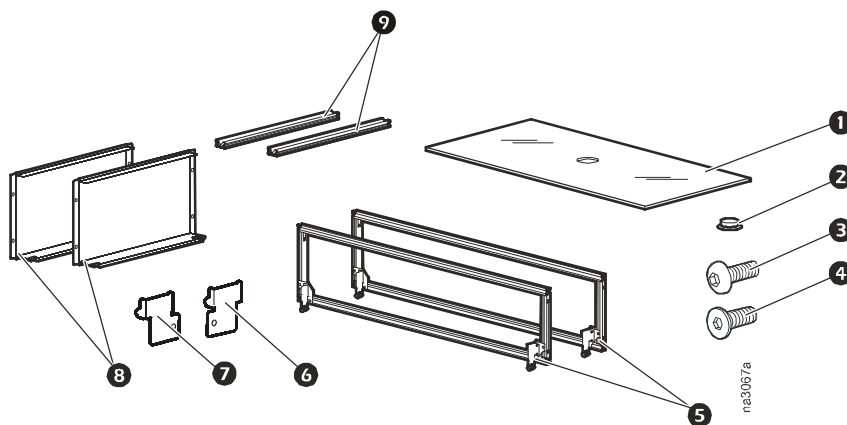


Item	Description	Qty	Item	Description	Qty
1	Ceiling tile, 300 mm	1	7	ACOA mounting clip, right hand	2
2	Ceiling tile, 450 mm	1	8	ACOA mounting clip, left hand	2
3	Hole plug	1	9	End panel, LH	2
4	Torx screw, M4 × 8 pan head	5	10	End panel, RH	2
5	Torx screw, M4 × 8 flat head	13	11	Extrusion - V-track, scored	2
6	Side frame assembly	2			



Note: Depending on system configuration, you may have extra parts remaining after assembly.

Ceiling containment kit (600 mm) - ACAC11004

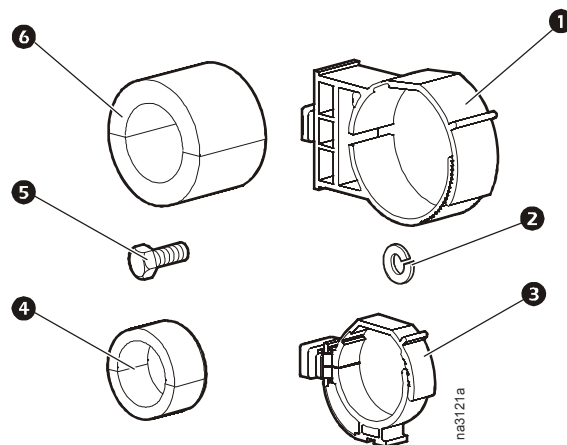


Item	Description	Qty	Item	Description	Qty
1	Ceiling tile, 600 mm	1	6	ACOA mounting clip, right hand	2
2	Hole plug	1	7	ACOA mounting clip, left hand	2
3	Torx screw, M4 × 8 pan head	5	8	End panel	2
4	Torx screw, M4 × 8 flat head	13	9	Extrusion - V-track, 597 mm	2
5	Side frame assembly	2			



Note: Depending on system configuration, you may have extra parts remaining after assembly.

Pipe clamp kit - ACAC11005

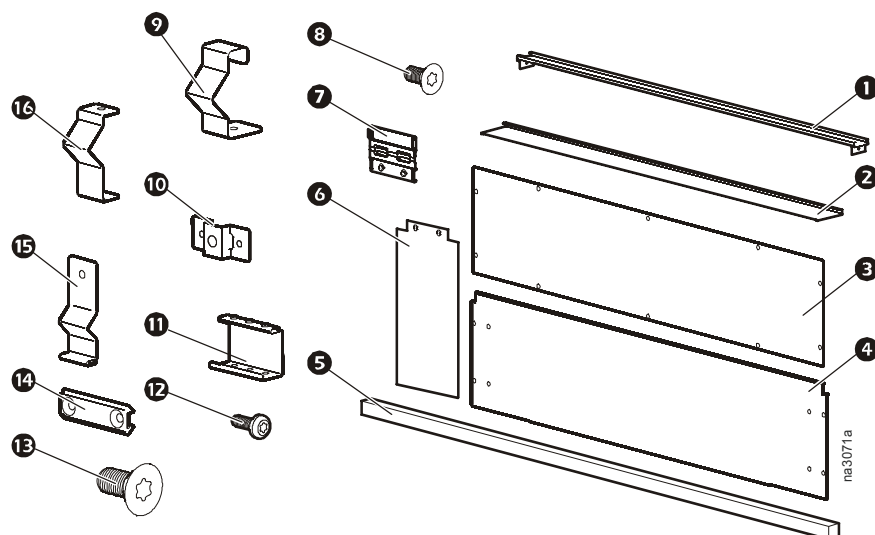


Item	Description	Qty	Item	Description	Qty
❶	Pipe clamp, 3.98 in - 4.53 in (return)	2	❷	Pipe support insulation 1 5/8 in × 2 in	2
❸	3/8 in split lockwasher	4	❸	Hex head bolt, 3/8 × 16 × 3/4	4
❹	Pipe clamp, 2.60 in - 2.99 in (supply)	2	❹	Pipe support insulation 3 1/8 in × 3 in	2



Note: Depending on system configuration, you may have extra parts remaining after assembly.

End cap kit - ACAC11006

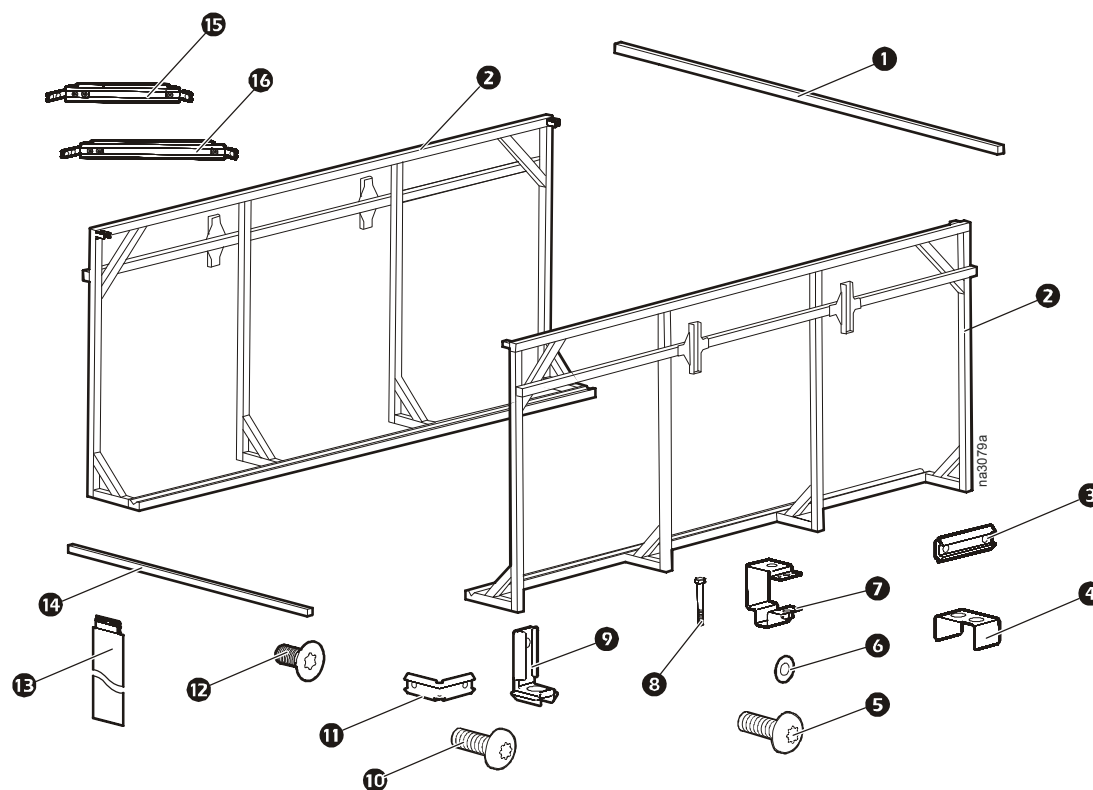


Item	Description	Qty	Item	Description	Qty
1	End of aisle ceiling containment, outside	1	9	Ceiling containment kit end stop clip	2
2	End of aisle ceiling containment, inside	2	10	Netbotz camera mounting clip	1
3	Ceiling containment assembly end panel	1	11	PDU rack mount bracket	4
4	Rack mount support end panel	1	12	Torx screw, M4 × 8 pan head	10
5	End of aisle curtain beam	1	13	Torx screw, M6-1 × 20 flat head	4
6	Vinyl air curtain - 190 mm × 300 mm	14	14	Connector, slide-in, 180 degrees	4
7	Air curtain clip	14	15	ACOA track end stop clip	2
8	Torx screw, M4 × 8 flat head	32	16	ACOA unit track end stop	2



Note: Depending on system configuration, you may have extra parts remaining after assembly.

InRow OA mount frame, 1800 mm (3-unit) - ACAC11007

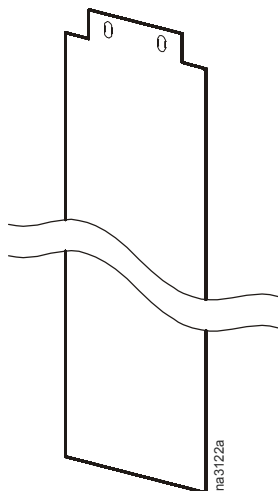


Item	Description	Qty	Item	Description	Qty
1	Upper cross rail, 1510 mm	2	9	Frame end connector, 25 mm	4
2	Side frame assembly, 1800 mm	2	10	Torx screw, M4 × 8 mm pan head	4
3	Frame slide-in splice connector, 25 mm	8	11	Frame corner connector, 25 mm	16
4	Frame joining clip	2	12	Torx screw, M4 × 8 flat head	88
5	Torx screw, M4 × 12 mm	4	13	Side air block strip assembly (190 mm × 300 mm)	28
6	Flat washer, M4	4	14	Cross-aisle beam, 1150 mm	4
7	Extrusion hanger bracket	4	15	Gusset, 190 mm	4
8	Hex bolt, M10 × 80 mm	4	16	Gusset, 250 mm	4



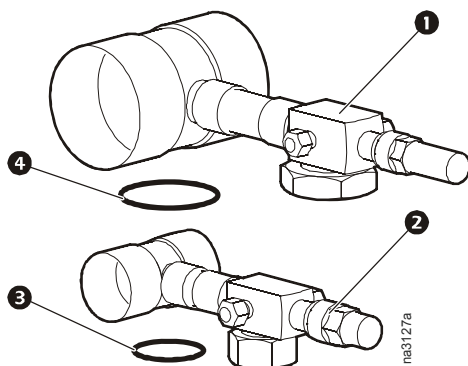
Note: Depending on system configuration, you may have extra parts remaining after assembly.

End aisle containment kit - ACAC11008 (42U) or ACAC11009 (48U)



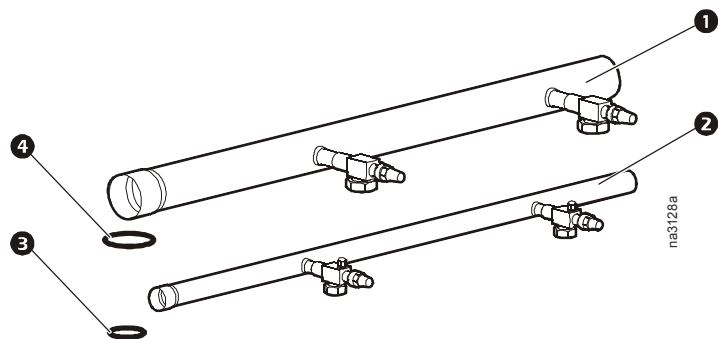
Description	Qty
Vinyl air curtain - 190 mm × 2228 mm (ACAC11008)	14
Vinyl air curtain - 190 mm × 2495 mm (ACAC11009)	14

RDU piping kit, one port - ACAC21000



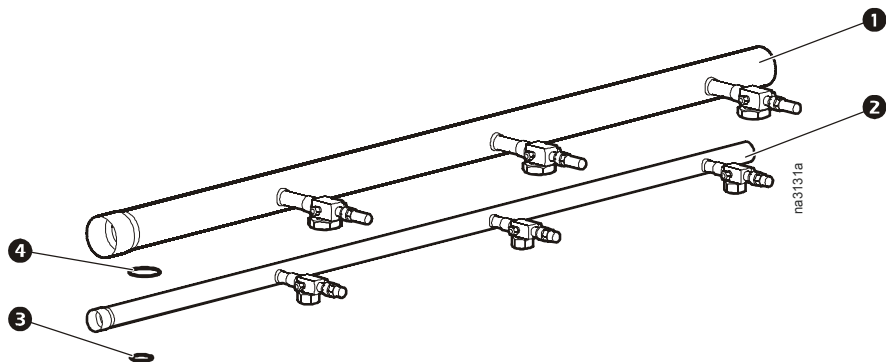
Item	Description	Qty	Item	Description	Qty
❶	RDU 1 port assembly, return	1	❸	Teflon ring for rotolock 1 1/4 in	2
❷	RDU 1 port assembly, supply	1	❹	Teflon ring for rotolock 1 3/4 in	2

RDU piping kit, two port - ACAC21002



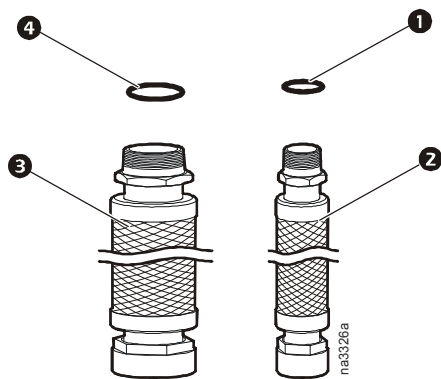
Item	Description	Qty	Item	Description	Qty
1	RDU 2 port assembly, return	1	3	Teflon ring for rotolock 1 1/4 in	4
2	RDU 2 port assembly, supply	1	4	Teflon ring for rotolock 1 3/4 in	4

RDU piping kit, three port - ACAC21004



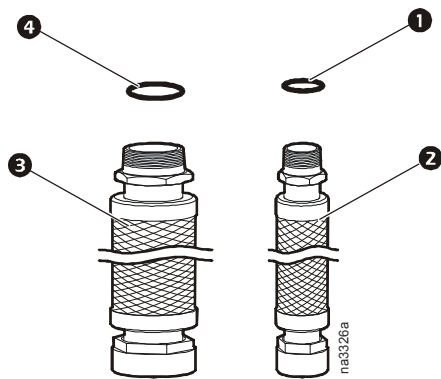
Item	Description	Qty	Item	Description	Qty
1	RDU 3 port assembly, return	1	3	Teflon ring for rotolock 1 1/4 in	6
2	RDU 3 port assembly, supply	1	4	Teflon ring for rotolock 1 3/4 in	6

914 mm (3 ft) stainless steel flex pipe kit - ACAC21007



Item	Description	Qty	Item	Description	Qty
1	Teflon ring, 1.25 in	1	3	Hose, 1.25 in OD, 914 mm (3 ft)	1
2	Hose, 1 in OD, 914 mm (3 ft)	1	4	Teflon ring, 1.75 in	1

1828 mm (6 ft) stainless steel flex pipe kit - ACAC21008



Item	Description	Qty	Item	Description	Qty
1	Teflon ring, 1.25 in	1	3	Hose, 1.25 in OD, 1828 mm (6 ft)	1
2	Hose, 1 in OD, 1828 mm (6 ft)	1	4	Teflon ring, 1.75 in	1

Connections Overview



Warning: Make all connections in accordance with all local and national codes.

Power connections

Model	Voltage	Frequency (Hz)	MCA	MOP	FLA
ACOA500	100-120	50/60	N/A	20A	8A @ 120 V
ACOA501	200-240	50/60	N/A	20A	5A @ 240 V

Above data is based on maximum operating conditions.

Consult local and national codes for wire size, conduit requirements and overload protection.

Piping connections

Connection	Type	Torque
Refrigerant supply	1 1/4-in Rotalock*	90 N-m (66.4 lb-ft)
Refrigerant return	1 3/4-in Rotalock*	110 N-m (81.1 lb-ft)

* Use the provided Teflon[®] gasket to prevent leakage.

Room Preparation

The design of the data center should have considered ease of entry for the equipment, floor loading factors, and accessibility to piping and wiring.

The room should be sealed with a vapor barrier to minimize moisture infiltration. (Polyethylene film is recommended for ceiling and wall applications.) Rubber- or plastic-based paints should have been applied to concrete walls and floors.

Ensure the room is insulated to minimize the influence of exterior heat loads. The minimum required amount of fresh air should be used for make up to comply with local and national codes and regulations. Fresh air imposes extreme load variation on the cooling equipment from summer to winter and causes increased operating costs.

Ensure the data center has sufficient interior volume to allow personnel to respond to any potential exposure to refrigerant (approximately 16 pounds per 1,000 ft³ in accordance with ASHRAE Standard 15-2001).

The equipment is designed as a sensible cooling unit for in-row use in data centers. The equipment does not have humidification or dehumidification control. **Room humidity must be within acceptable operating conditions before starting equipment.**

Air distribution

The equipment removes air from the hot aisle, cools it and distributes it into the cold aisle.



Note: This unit is not intended to be connected to ductwork.

Incoming power supply requirements

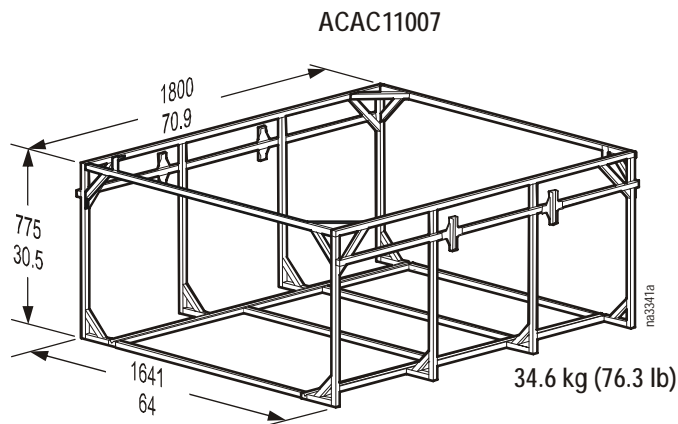
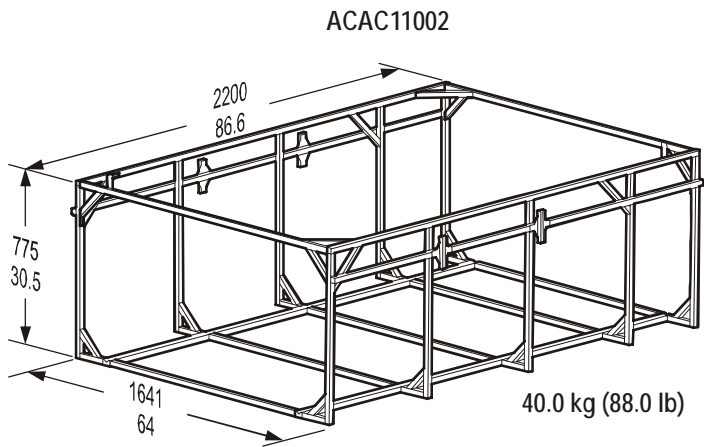


Electrical Hazard: Electrical service must conform to local and national electrical codes and regulations. The equipment must be grounded.

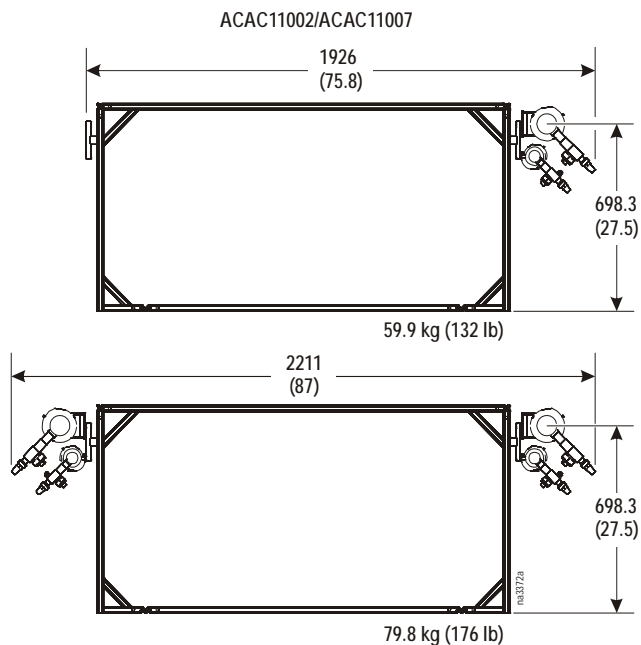


Warning: Ensure that a readily-accessible disconnect device is installed (in accordance with local and national codes) near the installation site.

Weights and Dimensions

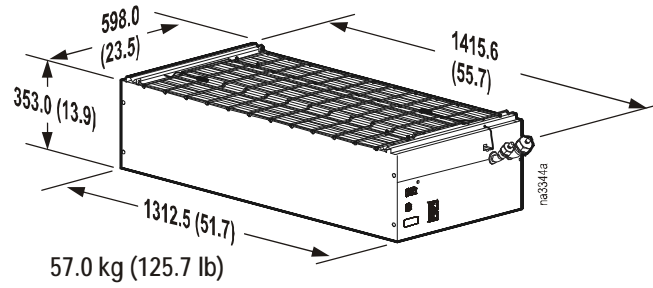


Dimensions are shown in mm (in), and include pipe mounting brackets.

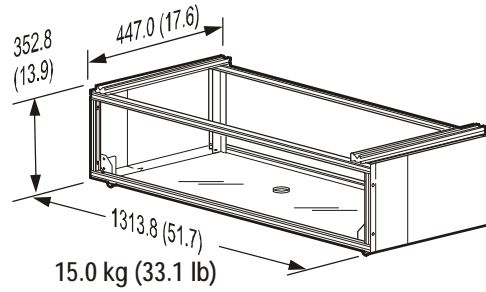
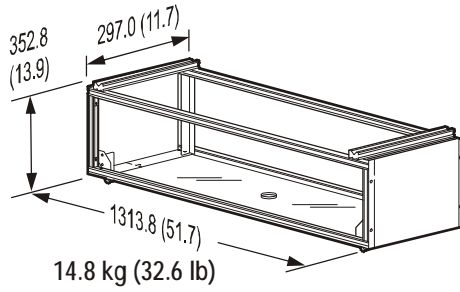


Dimensions are shown in mm (in).

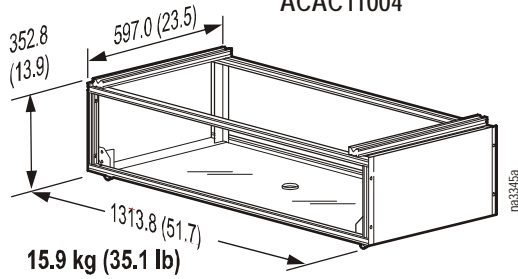
ACOA500/ACOA501



ACAC11003



ACAC11004



Dimensions are shown in mm (in).

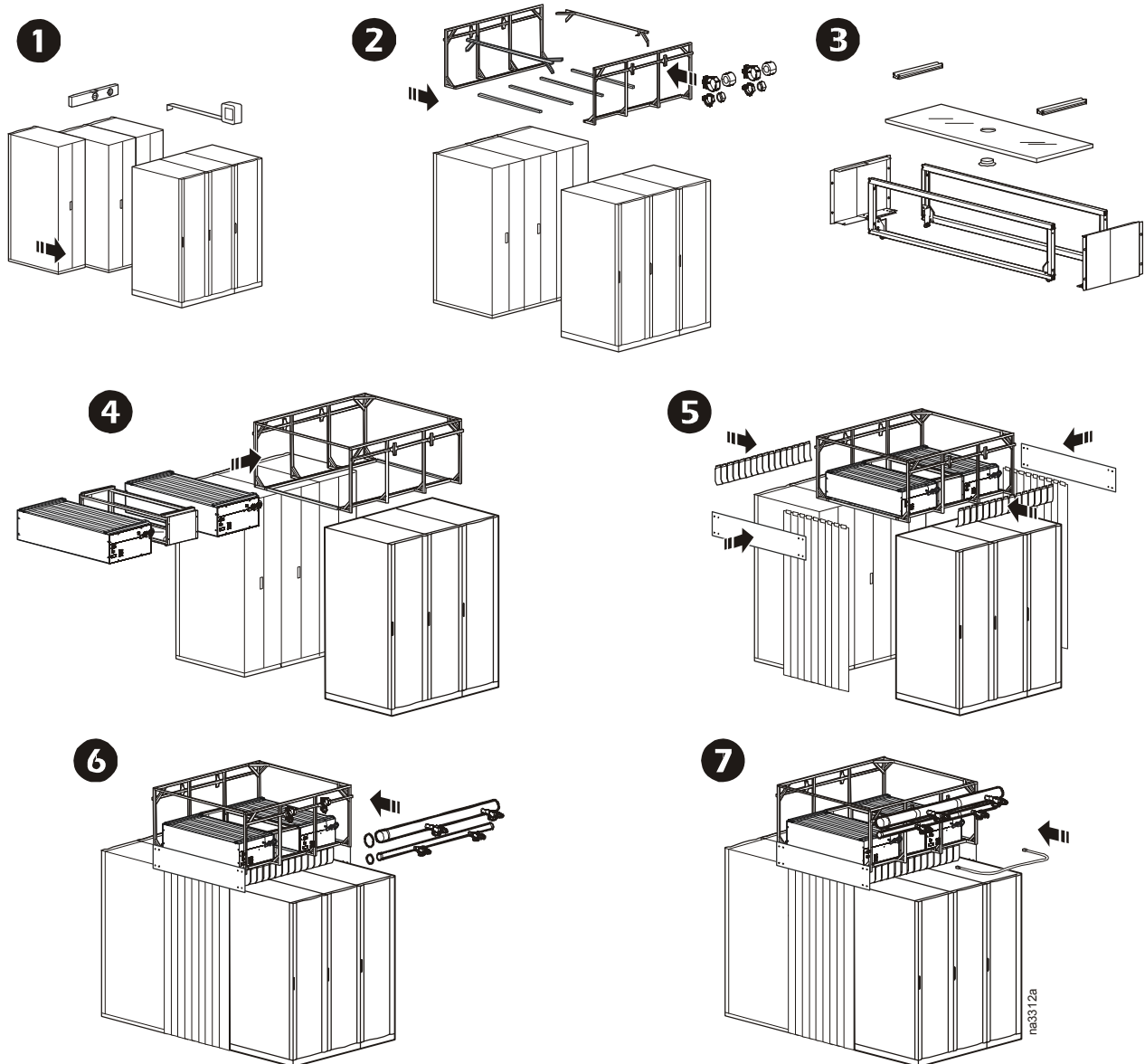
Packed Weight and Dimensions

SKU	Description	Weight - kg (lb)	Dimensions - mm (in)		
			H	W	L
ACOA500, ACOA501	InRow OA	78.0 (172.0)	566.8 (22.3)	753.0 (29.6)	1561.2 (61.5)
ACAC11000	InRow OA rack mount kit	5.0 (11.0)	207.0 (8.1)	236.0 (9.3)	306.0 (12.0)
ACAC11002	InRow OA mount kit, 2200 mm (3 unit)	49.0 (108.0)	301.0 (11.9)	903.5 (35.6)	2303.5 (90.7)
ACAC11003	Ceiling containment kit, 300-450 mm	17.2 (37.9)	111.5 (4.4)	731.0 (28.8)	1506.0 (59.3)
ACAC11004	Ceiling containment kit, 600 mm	18.1 (39.9)	111.5 (4.4)	731.0 (28.8)	1506.0 (59.3)
ACAC11005	InRow OA pipe clamp kit	1.8 (4.0)	165.4 (6.5)	183.8 (7.2)	234.6 (9.2)
ACAC11006	InRow OA end cap kit	19.5 (43.0)	86.0 (3.4)	428.5 (16.9)	1436.0 (56.5)
ACAC11007	InRow OA mount kit, 1800 mm (3 unit)	42.6 (93.9)	301.0 (11.9)	903.5 (35.6)	1907.5 (75.1)
ACAC11008	InRow OA end aisle containment kit (42U)	12.2 (26.9)	229.0 (9.0)	364.0 (14.3)	364.0 (14.3)
ACAC11009	InRow OA end aisle containment kit (48U)	13.0 (28.7)	229.0 (9.0)	364.0 (14.3)	364.0 (14.3)

Overhead Unit Installation

Overview

Major installation steps are shown in order, below. For details, see the pages as referenced.



- | | |
|--|---|
| ① Secure racks and ensure proper aisle width (page 22) | ⑤ Install air block curtains and end cap kits (page 59) |
| ② Assemble InRow OA mount frames (page 22) | ⑥ Install headers (page 83) |
| ③ Assemble ceiling containment kits (page 33) | ⑦ Make power and communications connections (page 88) |
| ④ Install overhead units (page 51) | |

General Considerations

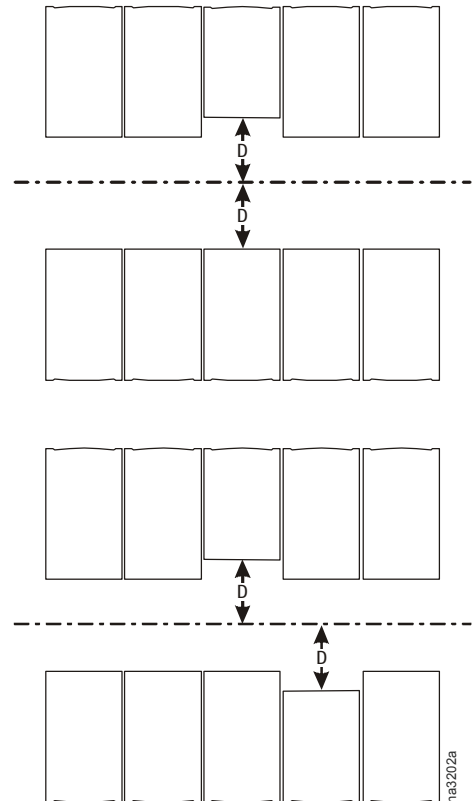
Aisle width

Because of the possible differences in equipment rack sizes, the width of the aisle between the rows of racks can vary from one installation to another. The most important consideration is that the maximum distance (D) between the centerline of the InRow OA mount kit and the equipment is 610 mm (24 in) as shown.

The drawing shows two possible examples of how equipment racks may be configured. Example 1 shows a shallow rack, which forces the rest of that half of the aisle to be narrower than the other half. Example 2 shows shallow racks on opposite sides of the aisle, resulting in equal widths of both halves of the aisle.

In an on-rack installation configuration, all equipment racks must be leveled and secured in position (and to each other) before installing the InRow OA mount kits.

If door frames and doors will be used, install them now so they can aid in setting the proper aisle width. See “Door Frames and Doors” on page 63.



Height clearance

Proper installation of the InRow OA mount kits requires at least 1100 mm (43.3 in) vertical space above the highest point of the equipment racks (including any height adapters).

Assemble InRow OA Mount Frames

A typical data center installation includes multiple InRow OA mount frames. Some of them will be 1800 mm InRow OA mount frames (shown); others will be 2200 mm InRow OA mount frames. The number and SKUs of your InRow OA mount frame system has been determined by the configuration of the equipment racks and how many InRow OA units will be installed.

Both sizes are assembled the same way. In some installations, a 2200 mm InRow OA mount frame will need to be cut to size. See “Reducing the length of an InRow OA mount frame” on page 31.

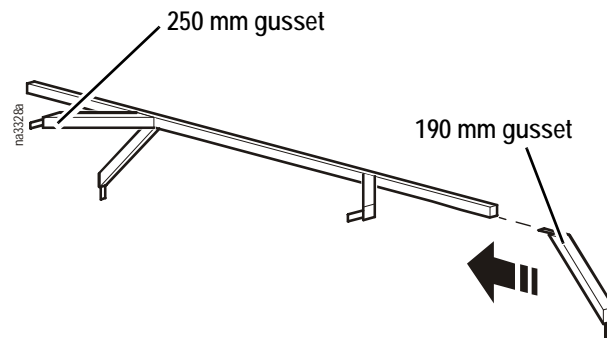
Your installation will normally consist of a first, last, and one or more center InRow OA mount frames. These InRow OA mount frames will be assembled in slightly different ways.



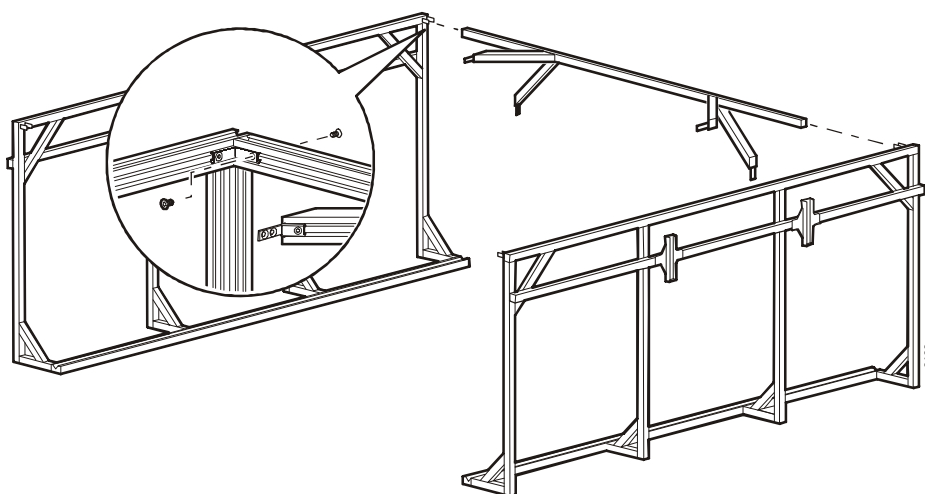
Note: Cover the assembly area with the packaging material or other padding to avoid damaging the finish.

All InRow OA mount frames

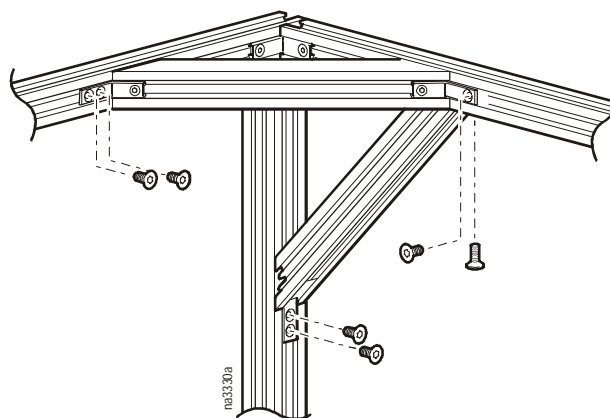
1. Slide two 250 mm gussets and two 190 mm gussets onto each cross-aisle beam as shown. Ensure the two 250 mm gussets are on the tops of the cross-aisle beams.
2. Insert both cross-aisle beams onto the side frames and secure with T-20 flat head screws as shown.



Note: Be sure the 250 mm gussets are on the top of the InRow OA mount frame.



3. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).
4. Slide all gussets out towards the side frames until the connectors are inserted in the side frame extrusions.
5. Secure all gussets with T-20 flat head screws as shown.
6. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).
7. Continue to assemble the InRow OA mount frame according to its position in the system (first, last, or center).



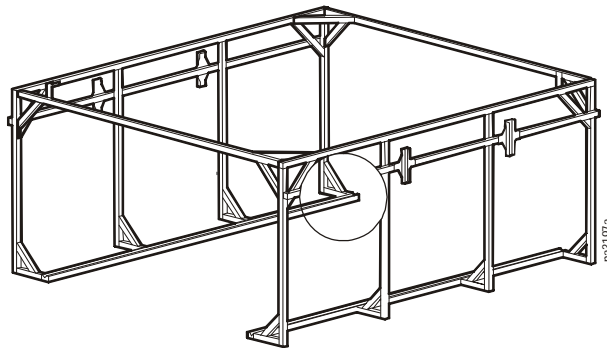
First InRow OA mount frame

End cross-aisle beam.

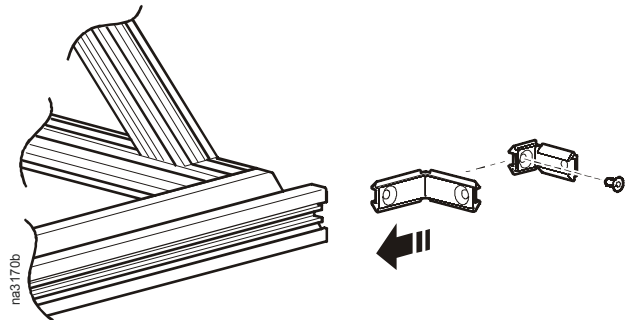
1. Install the end cross-aisle beam connectors.



Note: Cross-aisle beam installation is easier if the InRow OA mount frame is turned upside-down.



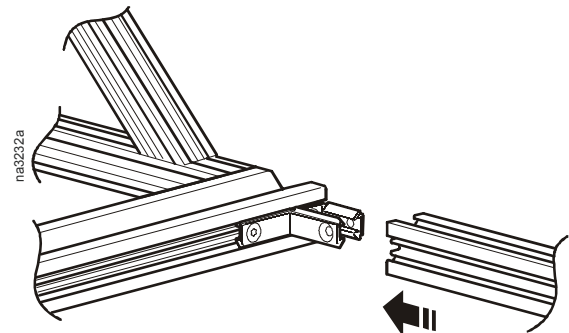
- a. On one end of the InRow OA mount frame, insert connectors into both tracks as shown.
- b. Ensure the end connector is flush with the end of the track, then secure it to the track with one screw as shown.
- c. Torque the screw to 1.7-2.3 N-m (15-20 lb-in).



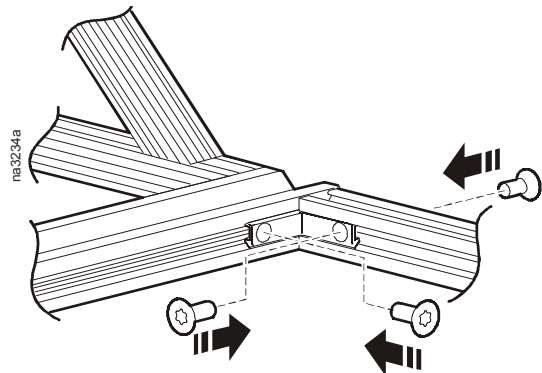
2. Spread the two tracks apart far enough to insert the connectors into the end cross-aisle beam. You may need to slide the loose connectors to one side or the other.



Note: If the end cross-aisle beam is not flush with the end of the InRow OA mount frame, remove it and readjust the position of the end connector.

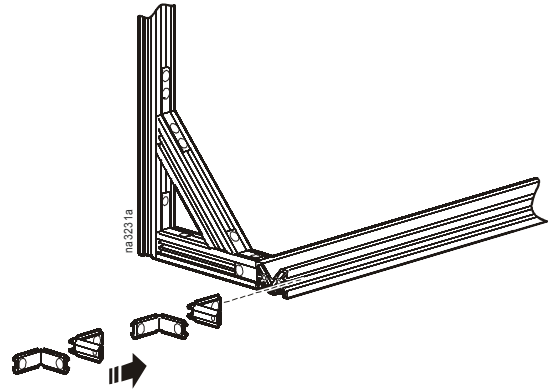


3. Secure the end cross-aisle beam.
 - a. Install screws as shown.
 - b. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).



Intermediate cross-aisle beams. The final position of each intermediate cross-aisle beam is between two overhead units (InRow OA units or ceiling containment frames). The first InRow OA mount frame uses one fewer intermediate cross-aisle beams than there are overhead units.

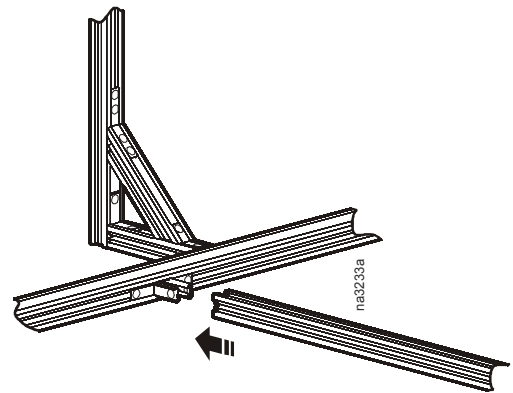
1. Install intermediate cross-aisle beam connectors.
 - a. Slide two connectors for each of the intermediate cross-aisle beams into both tracks as shown.
 - b. Do not insert screws into these connectors yet.



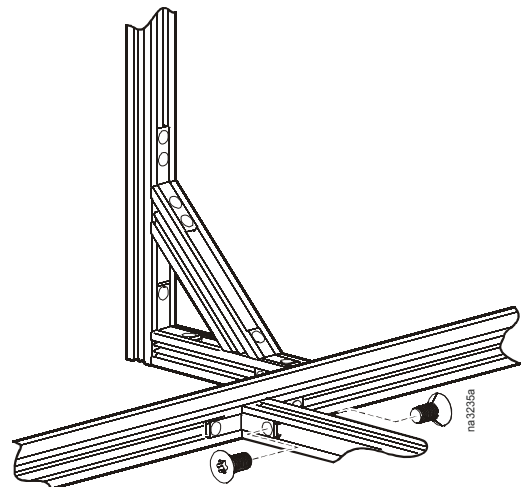
2. Install cross-aisle beams by spreading the two tracks apart far enough to insert connectors into both ends of the intermediate cross-aisle beams.



Note: The intermediate cross-aisle beams will not be secured in their final positions until after all InRow OA units and ceiling containment kits are installed.



- a. Secure the connectors to the intermediate cross-aisle beams with screws as shown. Do not secure the connectors to the tracks at this time.
- b. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).

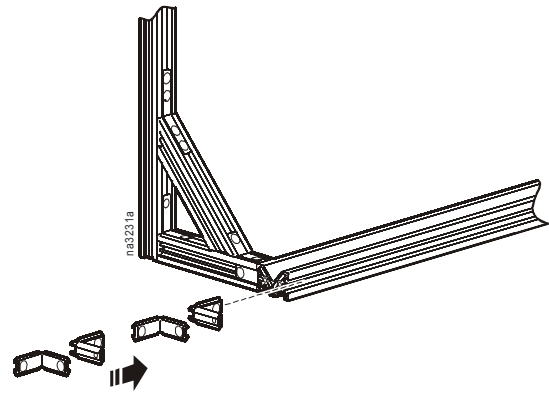


Center InRow OA mount frame

End cross-aisle beam. Do not install an end cross-aisle beam.

Intermediate cross-aisle beams. The final position of each intermediate cross-aisle beam is between two overhead units (InRow OA units or ceiling containment frames). Center InRow OA mount frames use the same number of intermediate cross-aisle beams as there are overhead units, because the first intermediate cross-aisle beam will be positioned near the end of the frame.

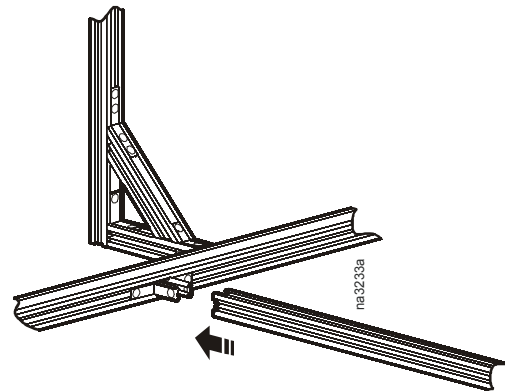
1. Install intermediate cross-aisle beam connectors.
 - a. Slide two connectors for each of the intermediate cross-aisle beams into both tracks as shown.
 - b. Do not insert screws into these connectors yet.



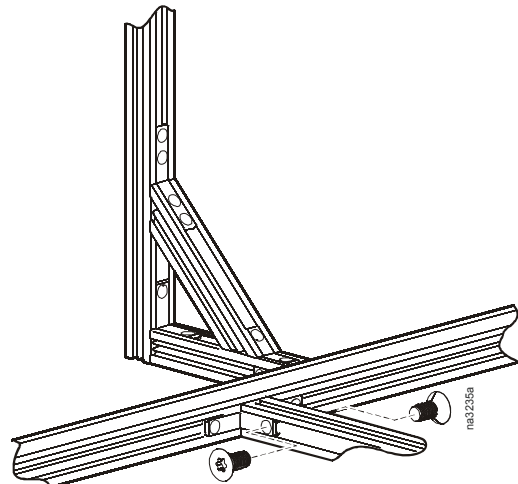
2. Install cross-aisle beams by spreading the two tracks apart far enough to insert connectors into both ends of the intermediate cross-aisle beams.



Note: The intermediate cross-aisle beams will not be secured in their final positions until after all InRow OA units and ceiling containment kits are installed.



- a. Secure the connectors to the intermediate cross-aisle beams with screws as shown. Do not secure the connectors to the tracks at this time.
- b. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).

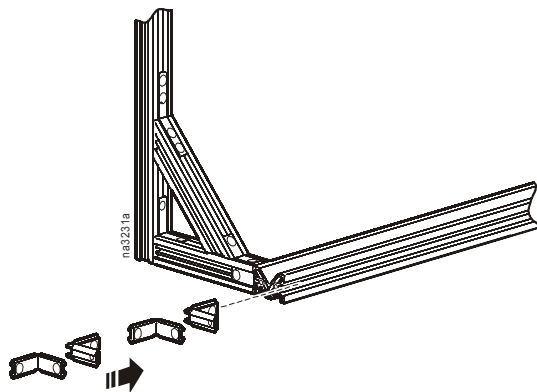


Last InRow OA mount frame

Some installations require that cutting down the last InRow OA mount frame to conform to the remaining space to be filled. See “Reducing the length of an InRow OA mount frame” on page 31.

Intermediate cross-aisle beams. The final position of each intermediate cross-aisle beam is between two overhead units (InRow OA units or ceiling containment frames). The last InRow OA mount frame uses the same number of intermediate cross-aisle beams as there are overhead units.

1. Install intermediate cross-aisle beam connectors.
 - a. Slide two connectors for each of the intermediate cross-aisle beams into both tracks as shown.
 - b. Do not insert screws into these connectors yet.

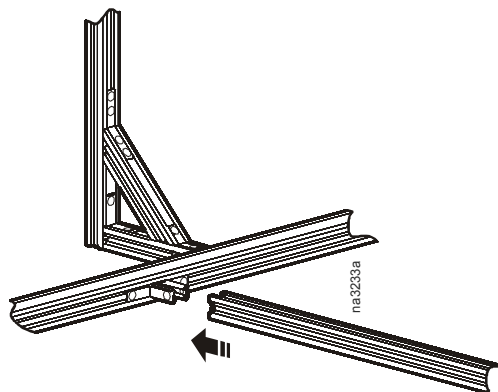


2. Install cross-aisle beams by spreading the two tracks apart far enough to insert connectors into both ends of the intermediate cross-aisle beams.



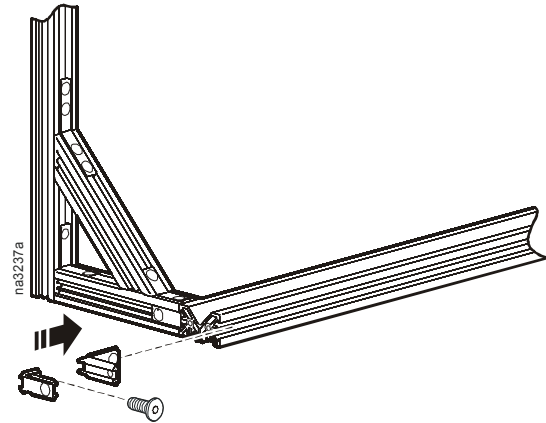
Note: The intermediate cross-aisle beams will not be secured in their final positions until after all InRow OA units and ceiling containment kits are installed.

3. Position cross-aisle beams in the approximate locations they will occupy after the overhead units are installed.

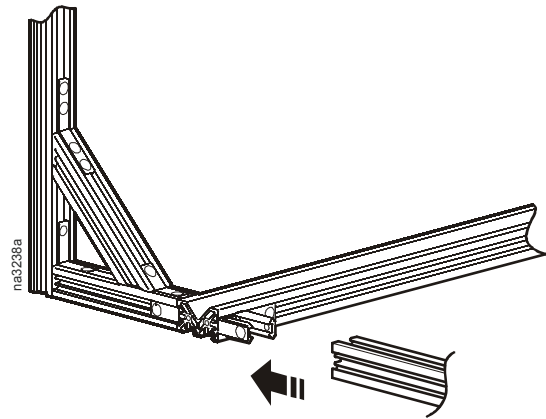


End cross-aisle beam.

1. On the far end of the InRow OA mount frame, insert connectors into both tracks.
2. Ensure the end connector is flush with the end of the track, then secure it to the track with one screw as shown.
3. Torque the screw to 1.7-2.3 N-m (15-20 lb-in).

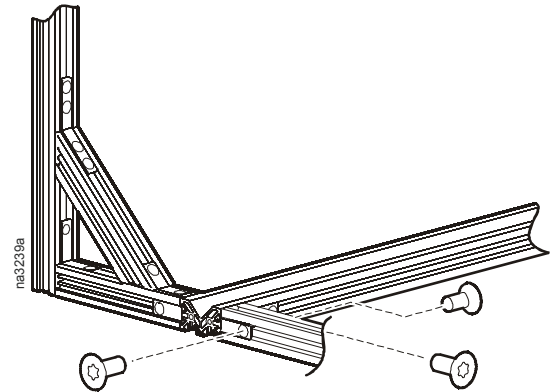
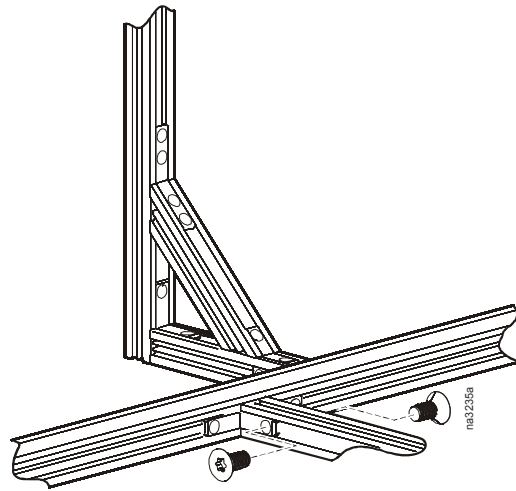


4. Spread the two tracks apart far enough to insert the connectors into the end cross-aisle beam. You may need to slide the the loose connectors to one side or the other.



Secure all cross-aisle beams.

1. Secure the connectors to the intermediate cross-aisle beams with screws as shown. Do not secure the connectors to the tracks at this time, as their final positions will be determined after the overhead units are installed.
2. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).
3. Secure the end cross-aisle beam with screws at both ends as shown.
4. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).

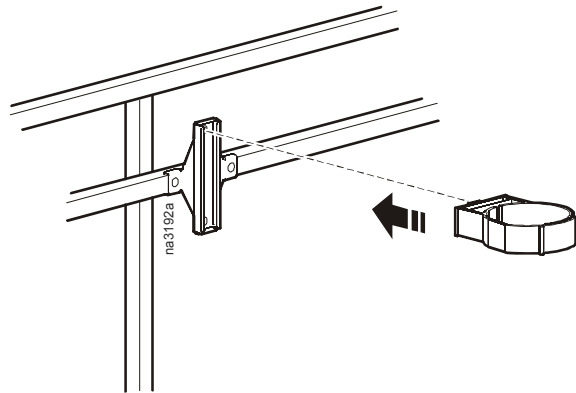


Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

Install pipe clamps

If refrigerant header pipes are to be mounted on the InRow OA mounting frames, install the pipe supports to the brackets on the sides of the InRow OA mount frame where the pipes will be mounted. For more mounting options, see “Pipe clamp mounting options” on page 82.

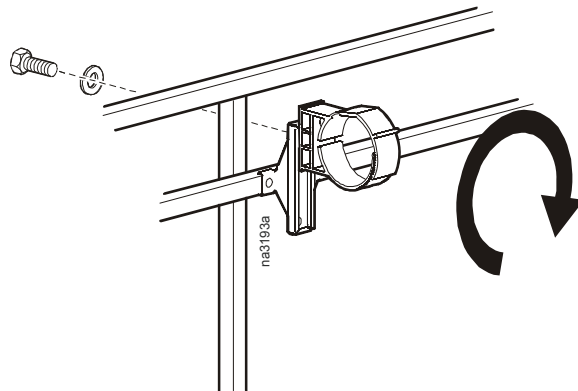
1. Insert the 101-115 mm pipe support into the bracket as shown.
2. Ensure the hole in the pipe support lines up with the top hole in the bracket.



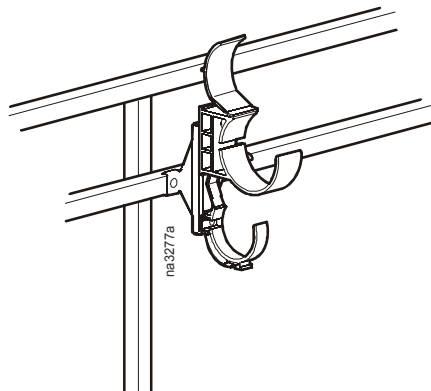
3. Rotate the pipe support 90° to lock it into the bracket.



Warning: To properly support the headers, ensure the rigid part of the pipe support is on the bottom.



4. Secure the pipe support with one bolt and lock washer as shown.
5. Install the 66-76 mm pipe support the same way you installed the 101-115 mm pipe support.
6. Open the pipe supports.



Reducing the length of an InRow OA mount frame

The 2200 mm InRow OA mount frame assembly is used when the remaining open space above the racks (after the other InRow OA mount frames are installed) is greater than 1800 mm. If required, the sides of the mount frame can be cut down to exactly fill the open space above your racks.



Note: All other mount frames must be in place before measuring the available space and reducing the length of the final InRow OA mount frame.

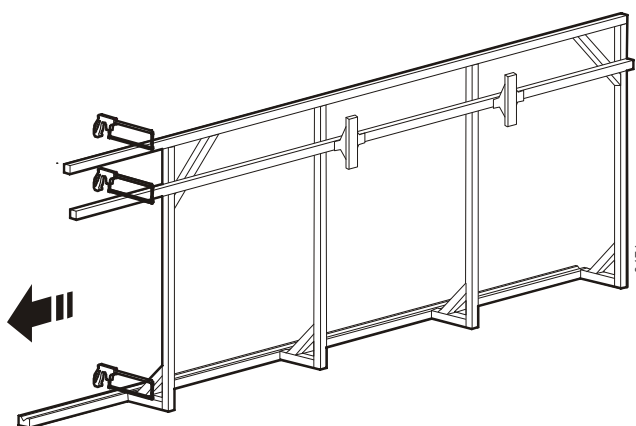


Note: During this process, use the packaging material or other padding to avoid damaging the finish.



Note: The 2200 mm InRow OA mount frame is shown. In some cases, you may alter the size of an 1800 mm InRow OA mount frame. The process is similar (the 1800 mm mount frame does not ship with a loose vertical end member).

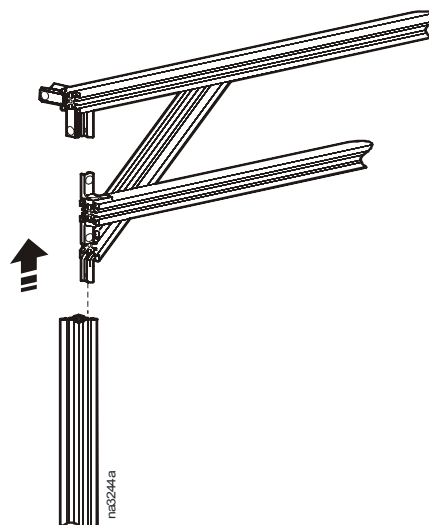
1. Locate and remove the loose vertical end member.
2. As necessary, remove any connectors remaining on the end to be cut. Set them aside for later use.
3. Measure the space remaining at the end of the installed InRow OA mount frames.
4. Cut each horizontal frame member to size:
 - a. Cut the top rail first.
 - b. Flip the frame assembly upside-down and cut the bottom rail.
 - c. Cut the center (pipe mounting) rail.
5. Deburr the cut edges of the frame and apply touch-up paint as necessary.



Note: When the cut InRow OA mounting frame is installed, be sure the cut end is on the extreme end of the system.

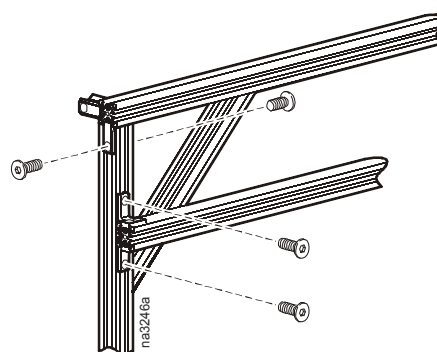
6. If necessary, remove any gussets that are part of the area that was removed. Reinstall those gussets on the cut end of the frame.
7. Install any connectors that were removed from the cut end.

8. Reassemble the vertical end member to the frame.



9. Secure the frame assembly end with screws as shown.

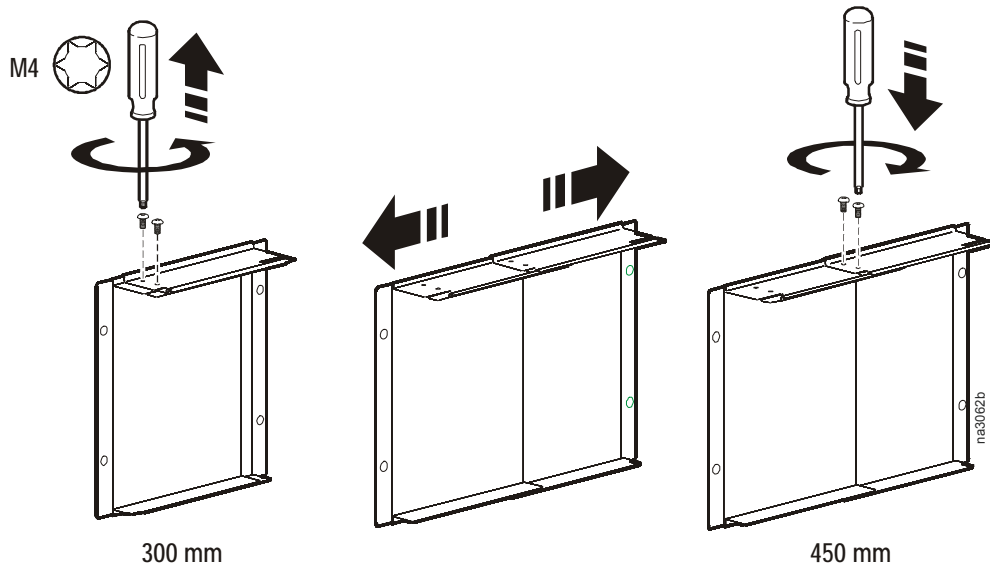
10. Continue assembling the InRow OA mount frame.



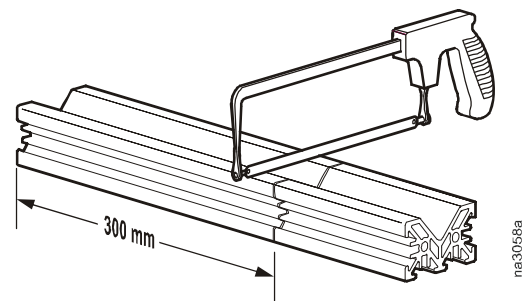
Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

Assemble Ceiling Containment Kits

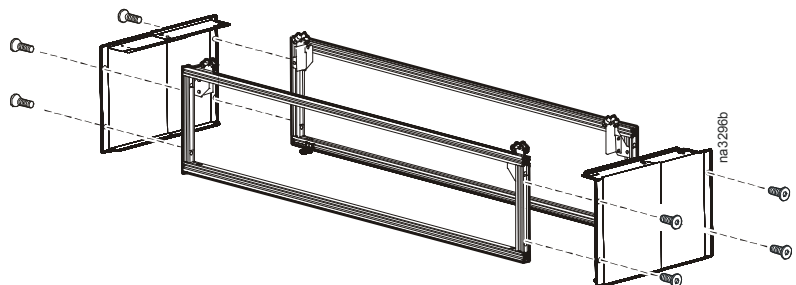
1. For the 600 mm width ceiling containment kit, skip to step 5.
2. The 300-450 mm ceiling containment kit is already adjusted to 300 mm. For the 450 mm width ceiling containment kit, adjust the ACAC11003 end panels to 450 mm as shown.



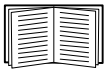
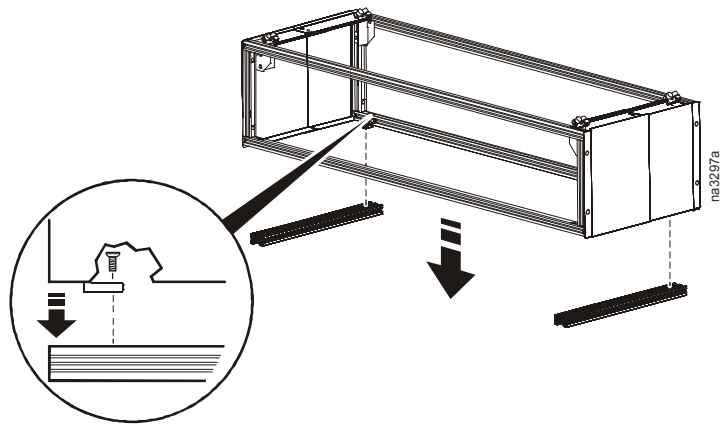
3. For the 300 mm width ceiling containment kit cut the ACAC11003 V-track extrusions at the 300 mm scribe line.
4. Deburr the cut end of the V-track and apply touch-up paint as required.



5. Assemble the side frames and end panels using eight M4 flat head Torx screws.



6. With the V-track extrusions sitting on a flat surface, lower the assembled ceiling containment kit onto them.
7. Line up the V-track extrusions with the connectors installed on the containment kit frame.
8. Secure using four M4 flat head Torx screws.
9. Set the assembled ceiling containment kits aside.



See “Installing InRow OA units” on page 51 for instruction on how to complete the installation of the ceiling containment kit and ceiling tile.



Note: It is recommended that the ceiling tile and hole plug be installed after the assembled ceiling containment kit is installed in the overhead rack.



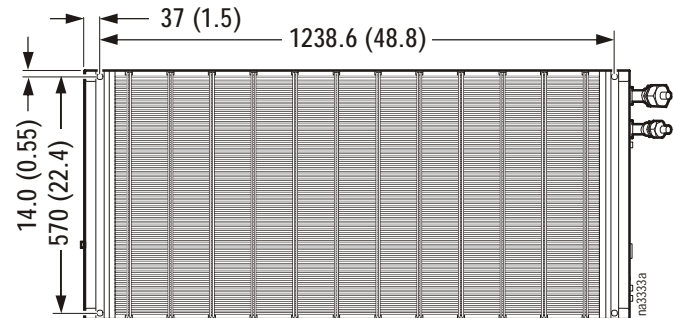
Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

Mounting Options

Single unit mounting

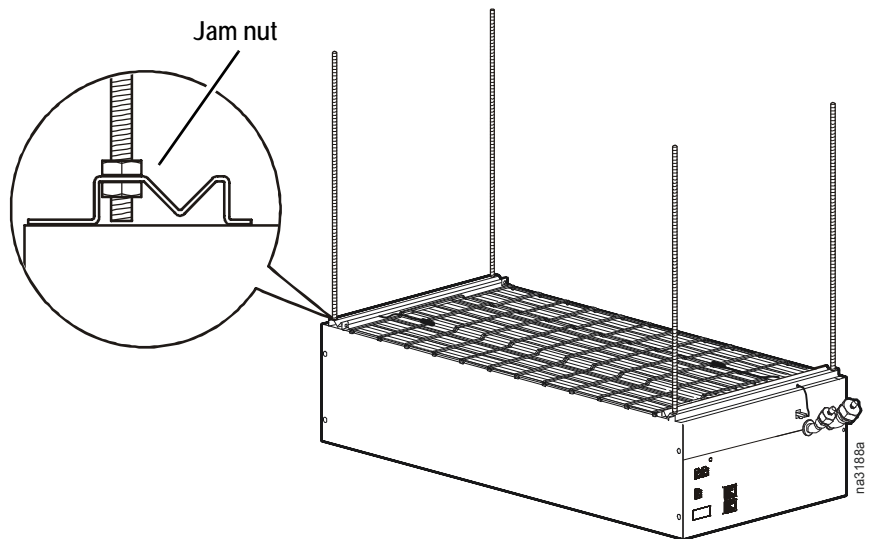
Individual InRow OA units can be mounted from the ceiling without using the InRow OA mount kit.

1. Suspend four M10-1.5 threaded rods (not supplied) from the ceiling using the dimensions supplied.
2. Insert jam nuts (not supplied) onto each threaded rod.



Dimensions are shown in mm (in).

3. Screw one threaded rod into the receptacle on each corner of the InRow OA unit.



Ceiling mount

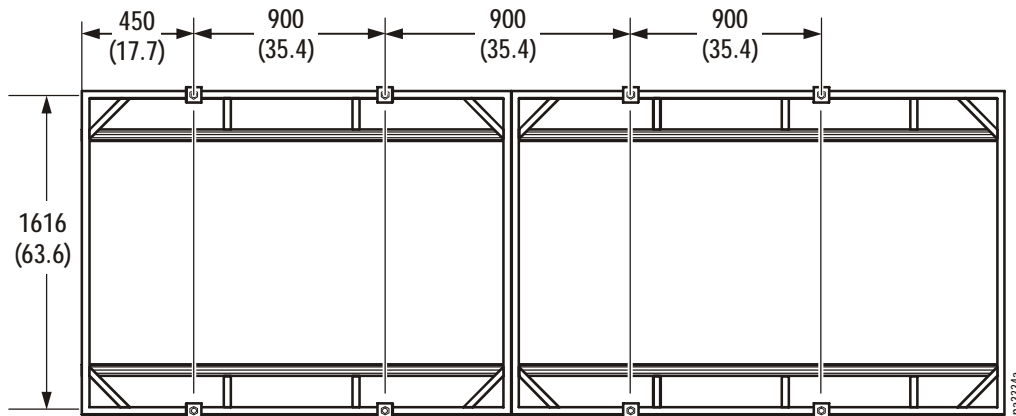
Each mounting kit allows you to suspend up to three InRow OA units from the ceiling for use with APC or third party racks. This option provides a more flexible option to move IT racks into and out of a row without affecting the cooling equipment.

Ensure the aisle between the equipment racks is between 914 mm (36 in) and 1219 mm (48 in) wide, and that all racks are secured in place and to each other. Be sure the aisle has the correct centerline. See “Aisle width” on page 22.



Warning: The InRow OA mount frames must be properly supported.

1. For each InRow OA mount frame to be installed, secure four 16 mm (5/8 in) customer-supplied threaded rods to the overhead in accordance with all national and local codes. Position the centerlines of all brackets as shown in the dimensioned drawings (allowing for possible overhead obstructions).

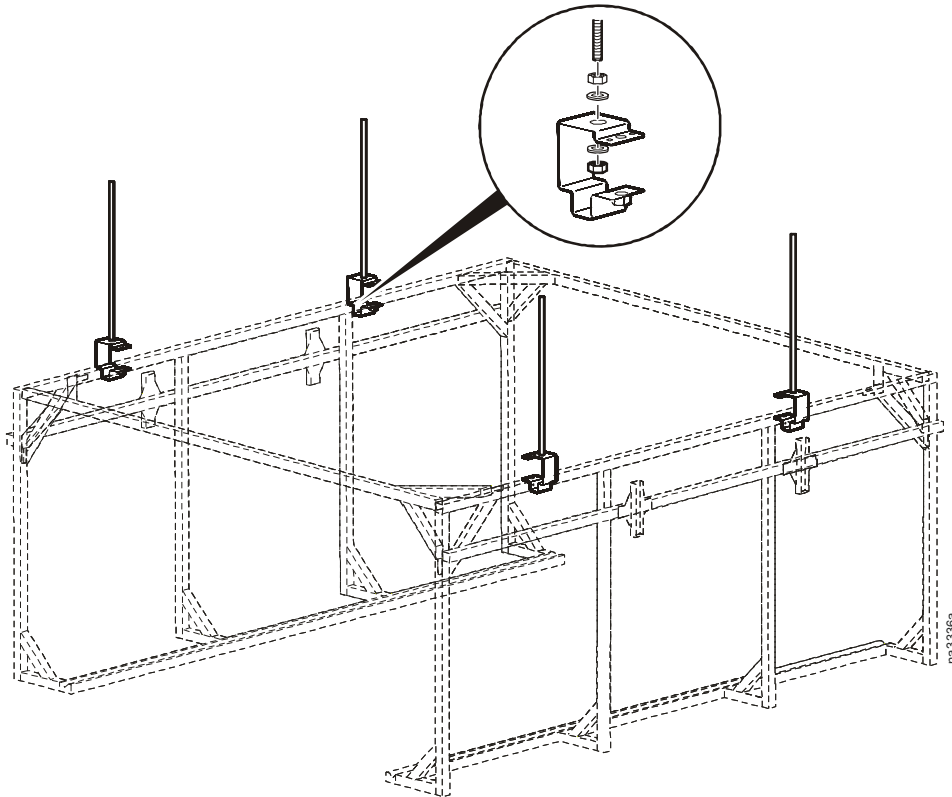


Dimensions are shown in mm (in).

- [illegible]

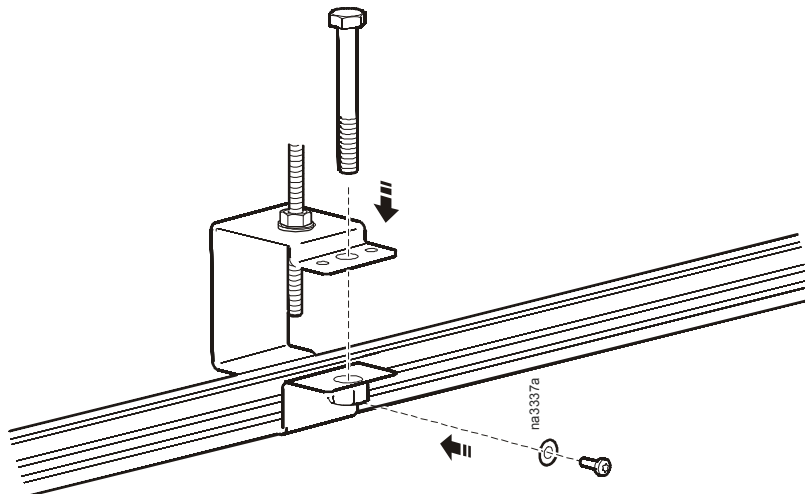
OA and Accessories Installation Manual

3. Attach the brackets to the threaded rod with customer-supplied washers and nuts as shown.



Warning: This assembly is heavy and awkward to handle. Use at least two persons to install.

4. Hang the InRow OA mount frame on the brackets, and adjust the position of the frame as required.
5. Secure the brackets to the InRow OA mount frame with flat washers and M4 pan head screws.

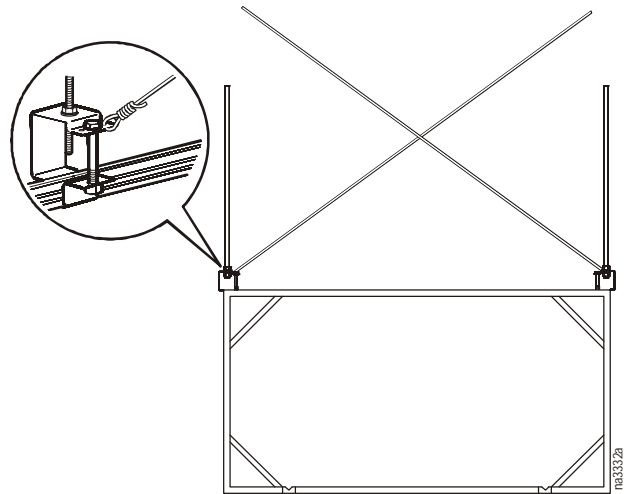


6. Insert one M10 hex-head bolt in the bracket as shown. Tighten the bolt snugly, but do not deform the bracket.
7. Adjust the nuts supporting the brackets as necessary to level the frame assembly. Tighten all nuts.



Caution: Ensure the InRow OA mounting frame is level.

8. Secure the InRow OA mount frame in position with guy-wires as shown. Be sure to comply with all local and national codes.

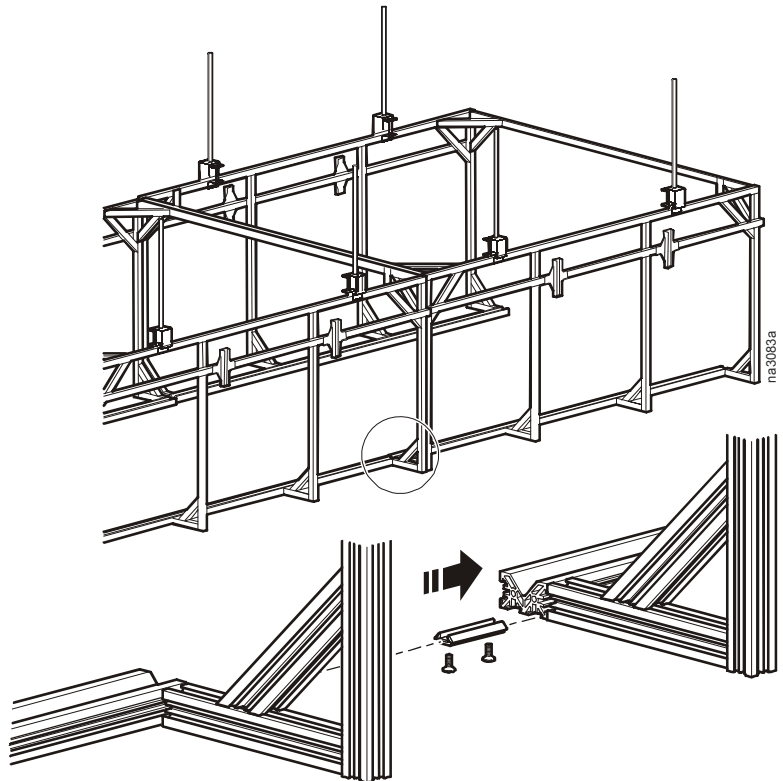


Adding more mount kits. As previously noted, each InRow OA mount kit allows the installation of up to three OA units. If more OA units are to be installed, add additional mounting kits as follows:

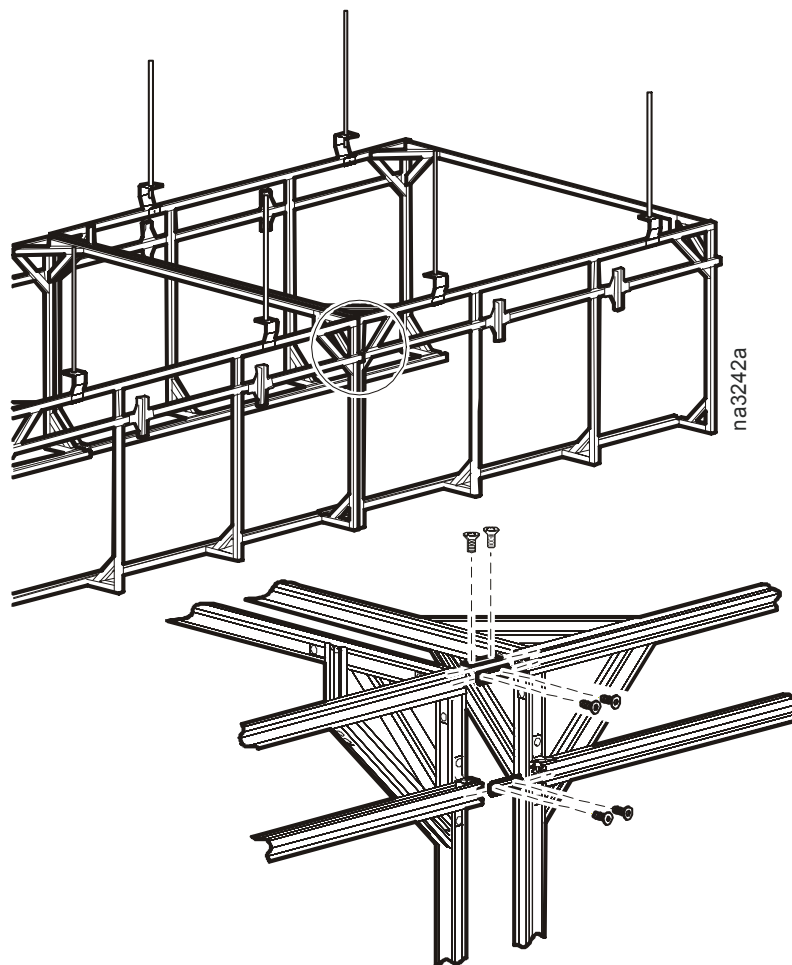


Note: Use C-clamps (or equivalent) to hold InRow OA mount kits tightly together while securing frame connectors.

1. In the InRow OA mount kit that is already installed, insert frame connectors in the outside channels of both tracks as shown, and secure with one screw. This will help locate the next InRow OA mount kit.

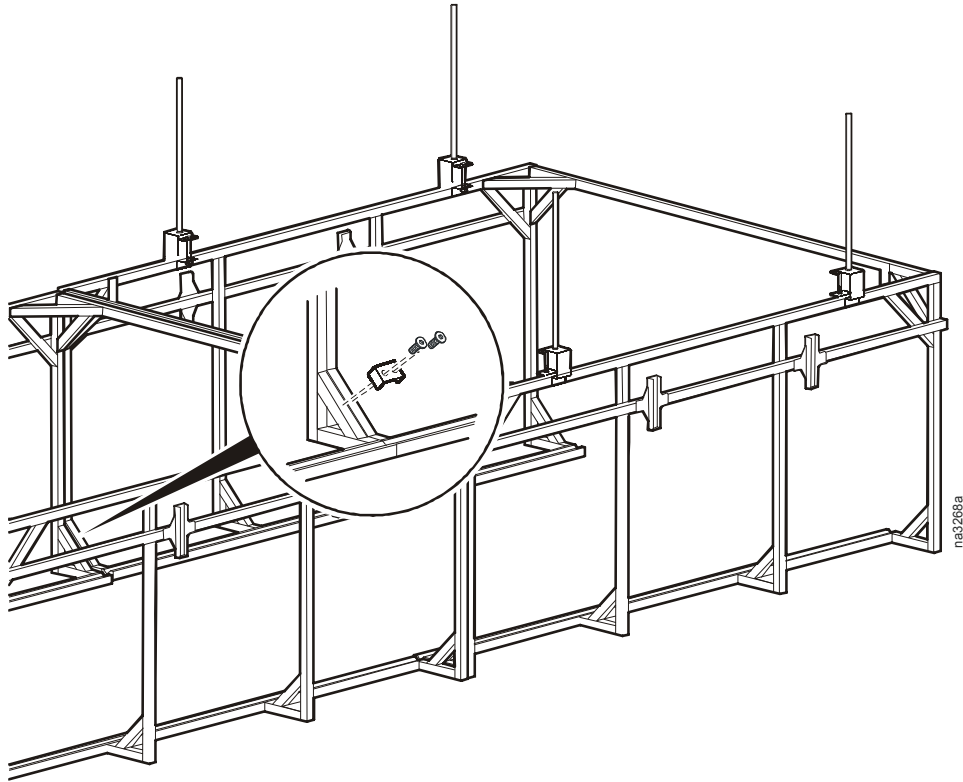


2. In the InRow OA mount kit that is already installed, insert frame connectors in one of three locations in the upper part of the frame:
 - a. Slide one frame connector in the outside edge of the pipe rail, or
 - b. Slide one frame connector in either the top or the outside edge of the top frame rail.



3. After the two InRow OA mount kits are together, slide the frame connector into the adjacent InRow OA mount kit.
4. Secure all frame connectors with screws.
5. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).

6. Install frame joining clips to capture the lower gussets as shown, and secure with two screws each.

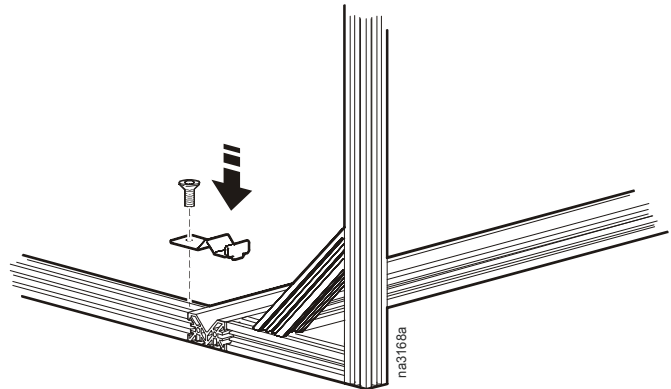


7. Repeat for each additional InRow OA mount kit.

Track end stop clips.

The track end stop clips prevent InRow OA units and ceiling containment kits from rolling off the tracks. Installing the end stop clips at both ends of the tracks is recommended as a safety measure.

1. Install one track end stop clip to each end of both tracks as shown.
2. Secure each track end stop clip with a screw.



Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

Rack mount

Each InRow OA mount frame kit allows you to mount up to three InRow OA units on top of APC equipment racks.

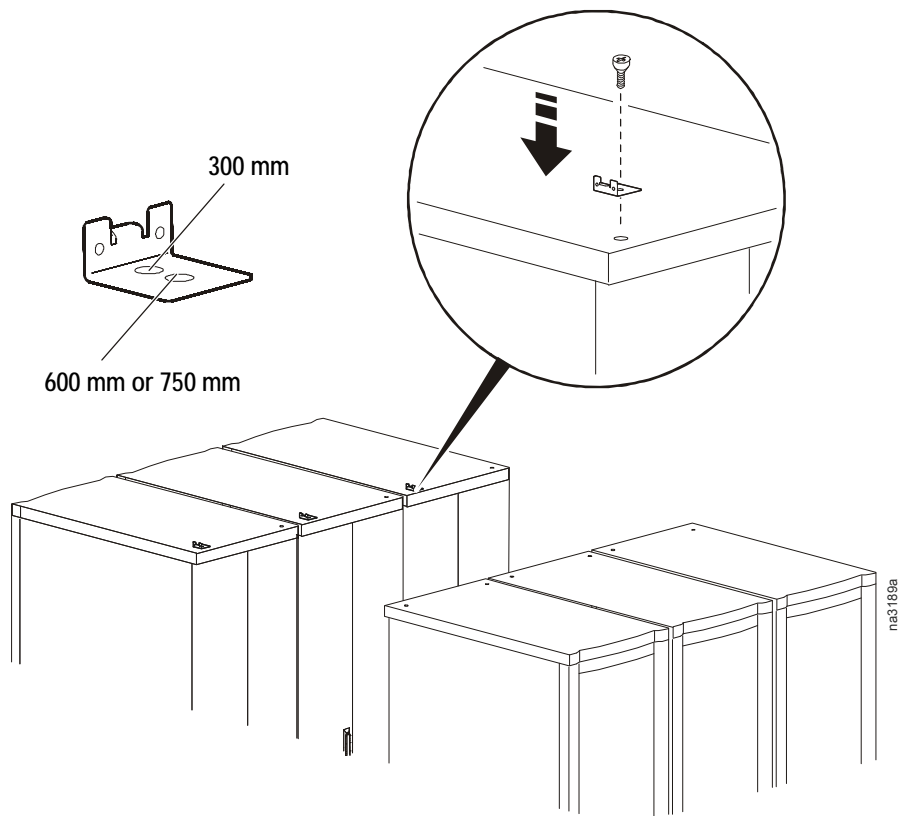
Ensure the aisle between the equipment racks is between 914 mm (36 in) and 1219 mm (48 in) wide, and that all racks are secured in place and to each other. Be sure the aisle has the correct centerline. See “Aisle width” on page 22.

Standard rack mount.

1. Place brackets on top of all equipment racks.
2. Secure the brackets into the lifting eye holes in the tops of the racks using supplied M10 screws. Use the appropriate holes in the brackets for the rack size as shown.

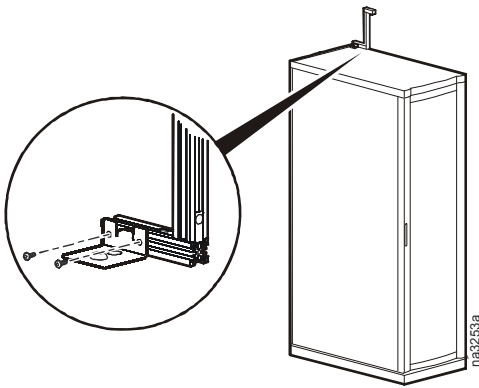


Warning: Spacing between support legs along the length of the row must not be greater than 800 mm (31.5 in).

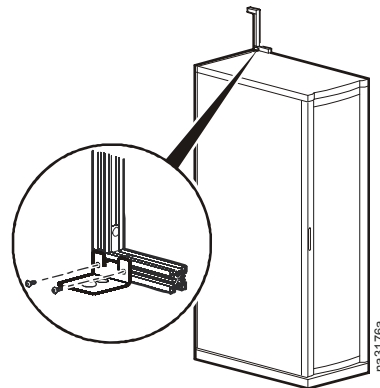


3. Install support leg assemblies on top of the racks. Two positions are available as shown, depending upon the width of the aisle between the equipment racks.

914 mm (36 in) aisle

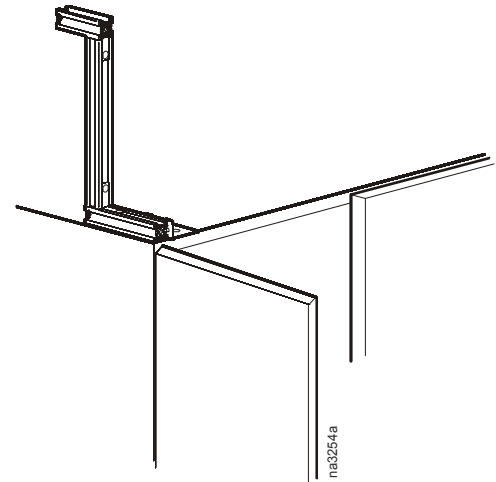


1219 mm (48 in) aisle



Warning: For maximum stability, all support leg assemblies must be plumb and securely mounted to all racks.

4. Ensure the support leg assemblies are mounted flush with the cabinet frame, NOT the door, as shown.
5. Secure with M4 pan head screws.
- a. Torque screws to 1.7-2.3 N-m (15-20 in-lb).



Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

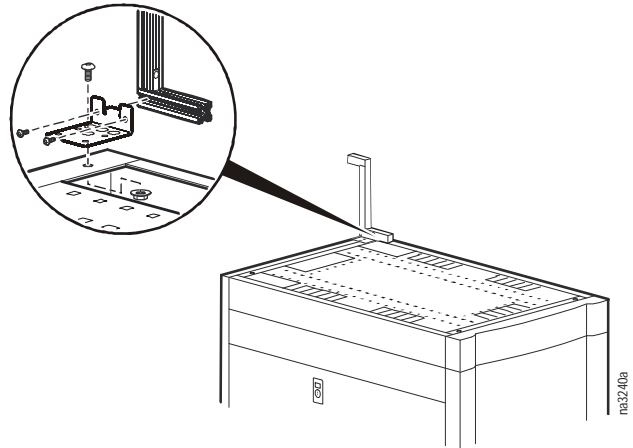
Rack mounting with roof height adapters. If the racks are equipped with roof height adapters, attach the support leg assemblies as follows:

1. Secure brackets with supplied M10 screws and nuts as shown.
2. Install support leg assemblies on top of the roof height adapters. Two positions are available as shown, depending upon the width of the aisle between the equipment racks.



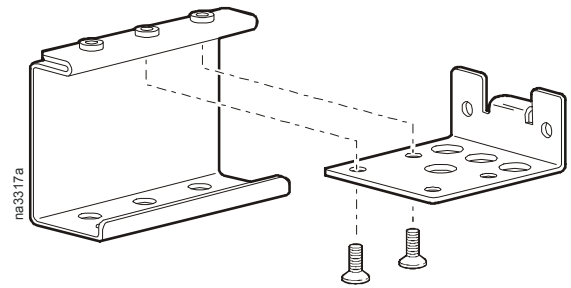
Warning: Do not install support leg assemblies over openings in the roof.

3. Ensure the support leg assemblies are mounted flush with the cabinet frame, NOT the door, as shown above.
4. Secure with pan head screws.
 - a. Torque screws to 1.7-2.3 N-m (15-20 in-lb).

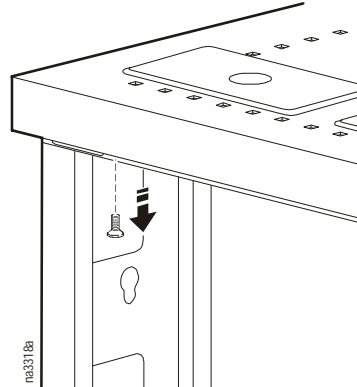


Rack mounting with PDU adapters. A support leg assembly can be attached to the top of a PDU as follows:

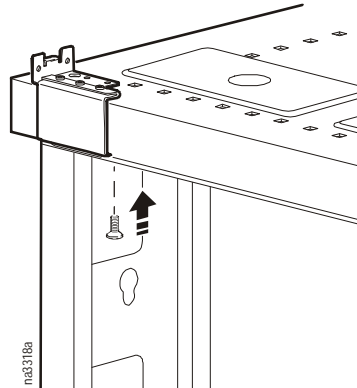
1. Assemble one PDU rack adapter bracket to a rack mount plate bracket with flat head M-4 screws as shown.



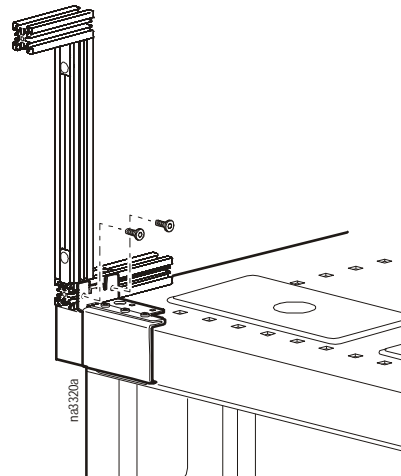
2. Remove one M-6 screw from below the roof of the unit as shown.



3. Assemble the PDU rack adapter bracket assembly to the unit using the M-6 x 20 flat head screw.

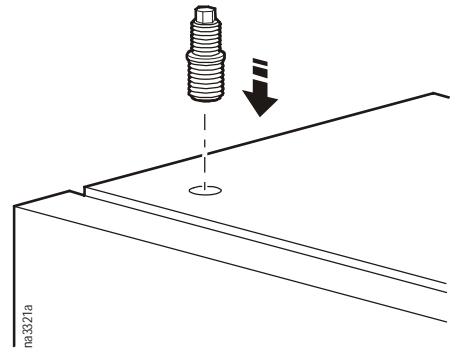


4. Attach the support leg assembly to the brackets with two M-4 pan head screws.
5. Torque screws to 1.7-2.3 N-m (15-20 in-lb).

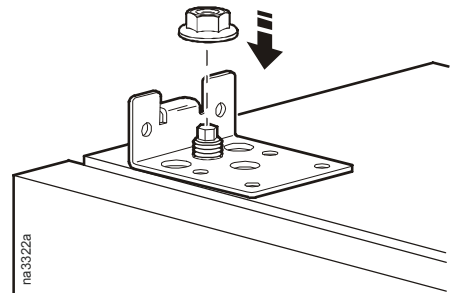


Mounting on heavy duty racks and enclosures. Some units are designed to accept M-12 lifting eyes rather than the smaller M-10 lifting eyes. An M-12 to M-10 adapter is provided with the rack mount kit.

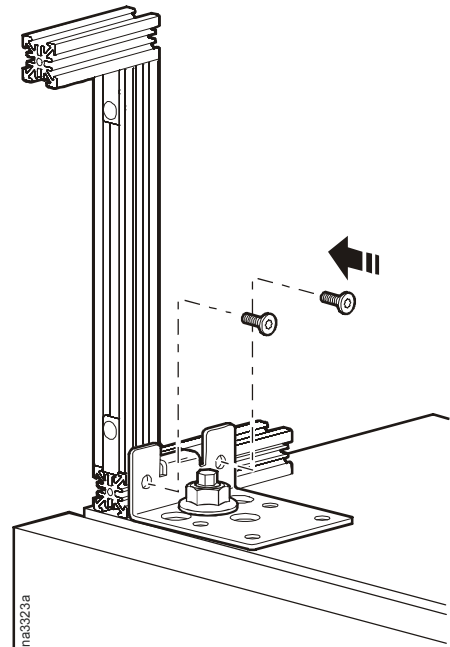
1. Insert the adapter into the M-12 hole in the top of the unit. Tighten with a 6 mm wrench.



2. Install a rack mount plate bracket over the adapter and secure with an M-10 nut.

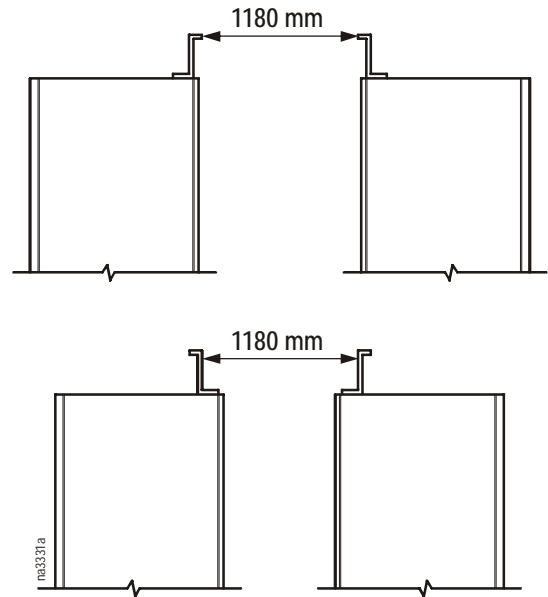


3. Attach the support leg assembly to the brackets with two M-4 pan head screws.
4. Torque screws to 1.7-2.3 N-m (15-20 in-lb).



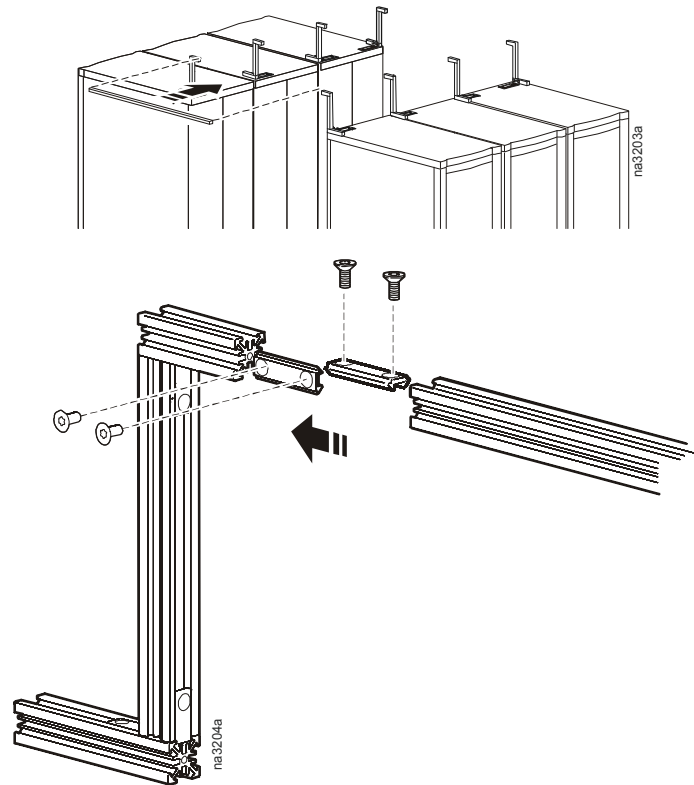
Distance between support leg assemblies.

Ensure the distance between the support leg assemblies on opposite sides of any width aisle is exactly as shown. If necessary, make adjustments to the support leg assemblies or the enclosures to achieve this distance.



End of aisle curtain beam.

1. Install the end of aisle curtain beam on each end of the row of InRow OA mount frames.
2. Insert two connectors (front and top) completely into the support leg assemblies as shown.
3. Locate the end of aisle curtain beam in place and secure with the connectors.
4. Install four screws on each end as shown.
5. Torque screws to 1.7-2.3 N-m (15-20 lb-in).



Installing the InRow OA mount frame to racks.

1. Place the InRow OA mount frame on top of the support leg assemblies as shown.

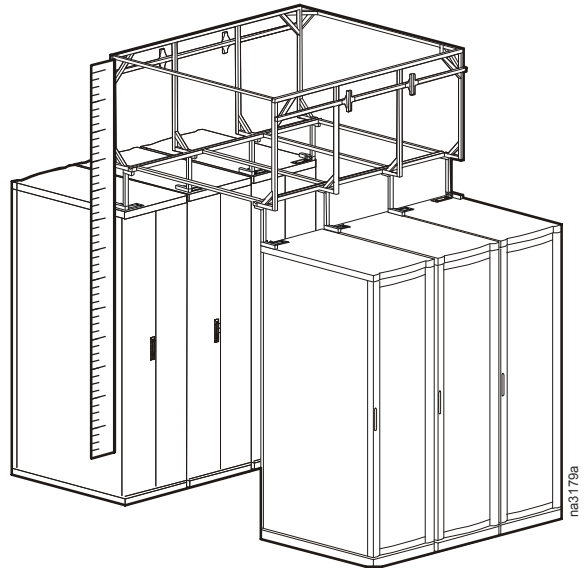


Warning: This assembly is heavy and awkward to handle. Use at least two persons to install.

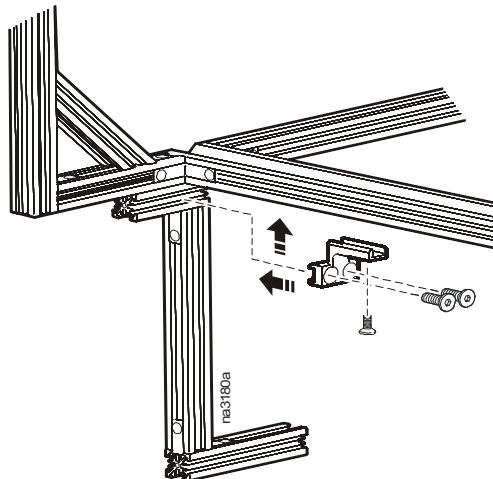
2. Align the InRow OA mount frame with the fronts of the racks using a straight edge.



Note: Ensure OA mount frame, support leg assemblies, and the ends of racks are flush.



3. Loosley secure the InRow OA mount frame to the support leg assemblies using connectors and screws.
4. Install more InRow OA mount frame kits as required. See “Adding more mount kits” on page 49.



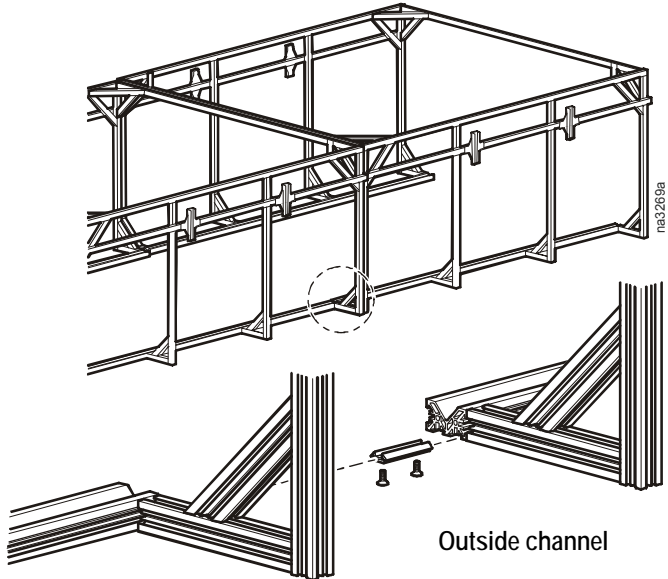
Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

Adding more mount kits. As previously noted, each InRow OA mount kit allows the installation of up to three OA units. If more OA units are to be installed, add additional mounting kits as follows:

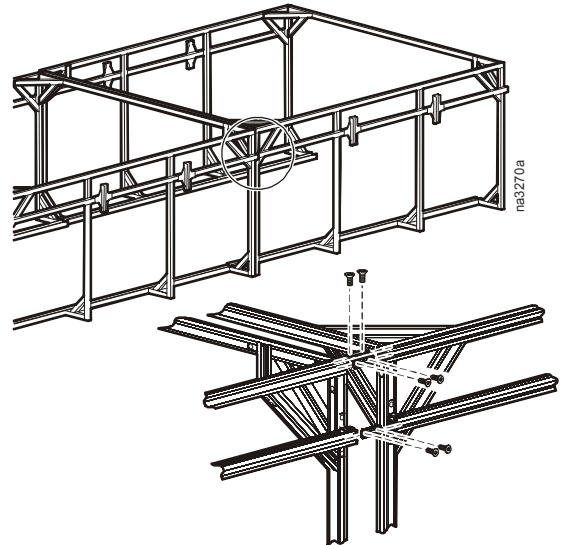


Note: Use C-clamps (or equivalent) to hold InRow OA mount kits tightly together while securing frame connectors.

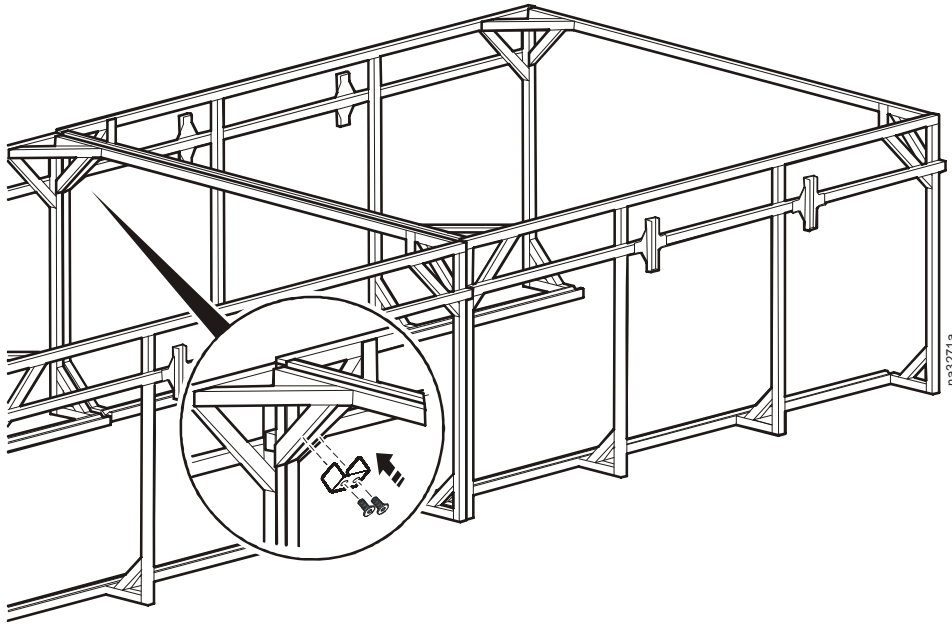
1. In the InRow OA mount kit that is already installed, insert frame connectors in the outside channels of both tracks as shown, and secure with one screw. This will help locate the next InRow OA mount kit.



2. In the InRow OA mount kit that is already installed, insert frame connectors in one of three locations in the upper part of the frame:
 - a. Slide one frame connector in the outside edge of the pipe rail, or
 - b. Slide one frame connector in either the top or the outside edge of the top frame rail.
3. After the two InRow OA mount kits are together, slide the frame connector into the adjacent InRow OA mount kit.
4. Secure all frame connectors with screws.
5. Torque the screws to 1.7-2.3 N-m (15-20 lb-in).



6. Install frame joining clips to capture the upper gussets as shown, and secure with two screws each.

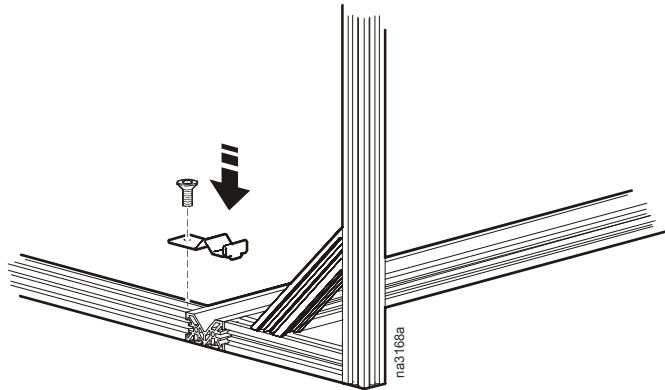


7. Repeat steps 1 through 4 for each additional InRow OA mount kit.

Track end stop clips.

The track end stop clips prevent InRow OA units and ceiling containment kits from rolling off the tracks. Installing the end stop clips at both ends of the tracks is recommended as a safety measure.

1. Install one track end stop clip to each end of both tracks as shown.
2. Secure each track end stop clip with a screw.

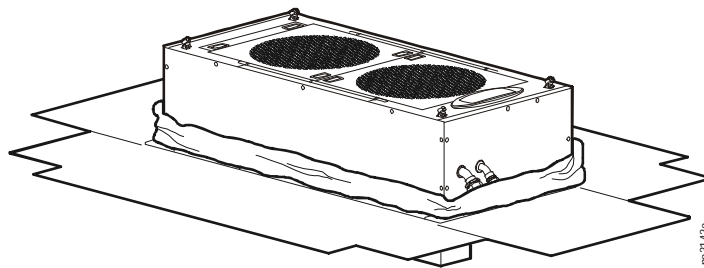


Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

Installing InRow OA units

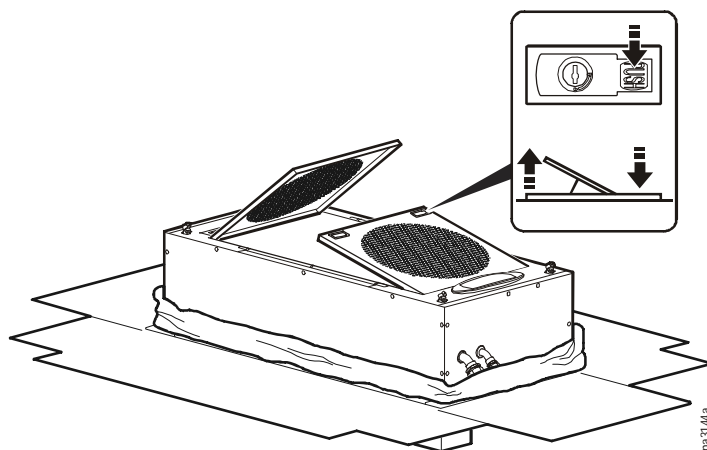
Unpack and remove parts

1. Place the packaged InRow OA unit at the end of the row where it will be installed. Be sure the InRow OA unit is oriented upside-down as shown.
2. Unpack the InRow OA unit per instructions printed on the lid of the shipping container.

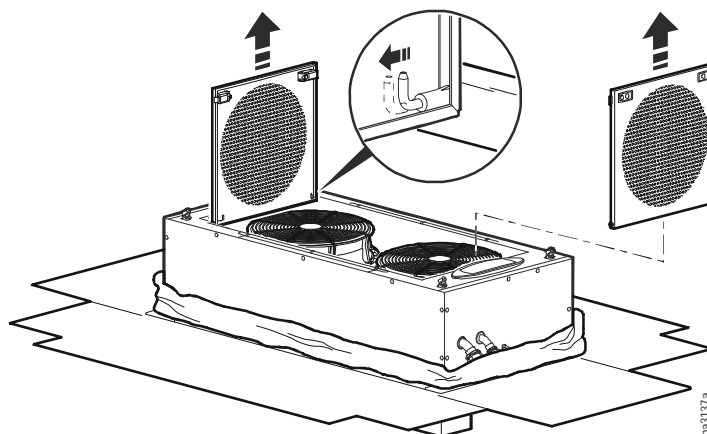


Caution: Do not use piping to lift or move the unit.

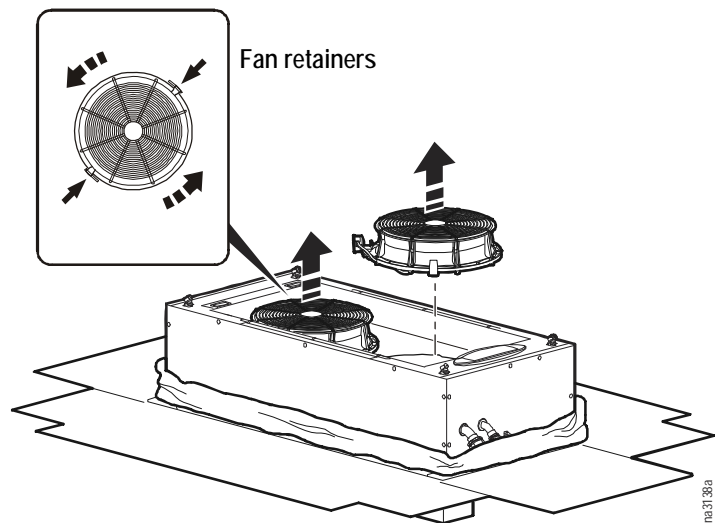
3. To lighten the InRow OA units and make them easier to lift into position, remove the fans and fan covers.
 - a. Unlock and open the fan covers.



- b. Pull hinge pins toward each other and remove the covers.



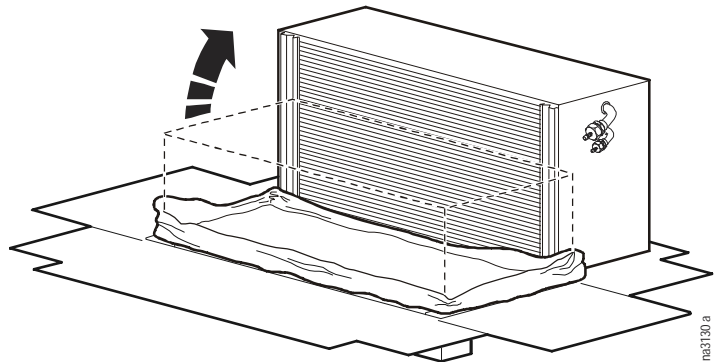
- c. Press both fan retainers toward the center of the fan.
- d. Rotate the fan to the left as shown.
- e. Pull the fan straight out of the InRow OA housing.
- f. Repeat these steps for all remaining fans.



- g. Carefully position the unit as shown.



Caution: Do not use piping to lift or move the unit.



Install OA units

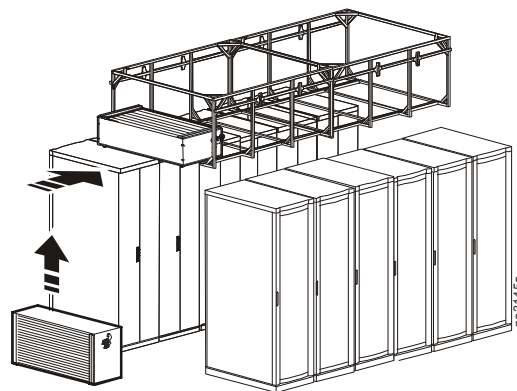


Warning: Do not step on the OA units or ceiling containment kits.

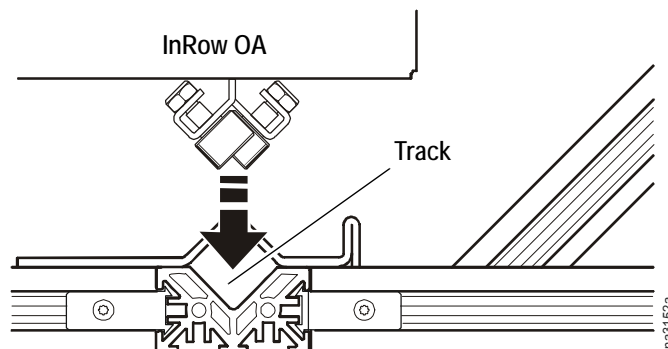
1. Insert the first InRow OA unit from the end of the aisle as shown.



Heavy: OA units weigh approximately 41 kg (90 lb) without fans. At least two people should lift them into place.

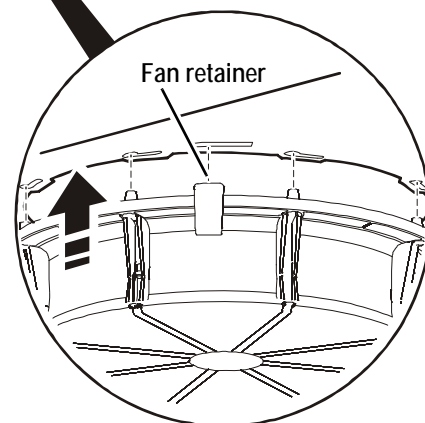
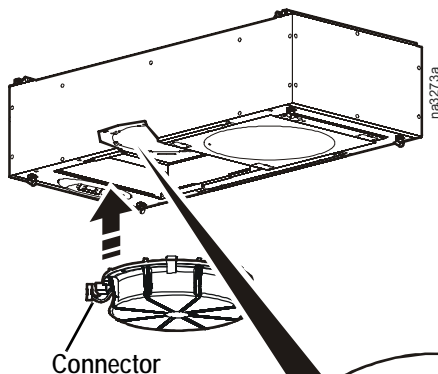


2. Lift the InRow OA unit over the track stops, and be sure the rollers are properly inserted into the tracks as shown.

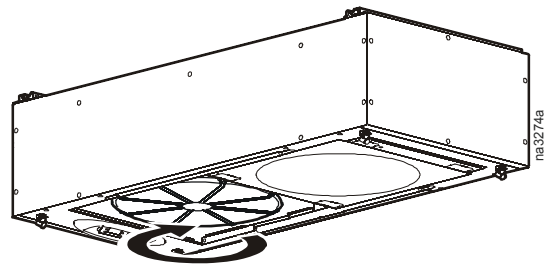


Reinstall parts

1. Install the InRow OA fans and fan cover doors.
 - a. From below, align the connector on the fan with the connector inside the InRow OA unit.
 - b. Ensure both fan retainers and all the locating pins on the fan are aligned with their mounting slots as shown.
 - c. Place the fan inside the InRow OA unit. Ensure the fan housing touches the fan housing deck all around its circumference.

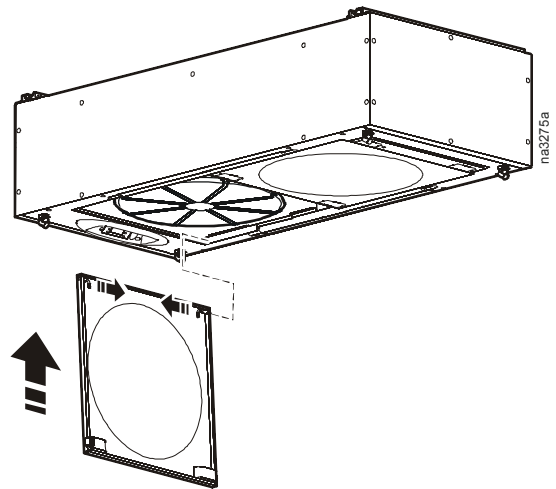


- d. Turn the fan to the right until the fan retainers lock it into place.

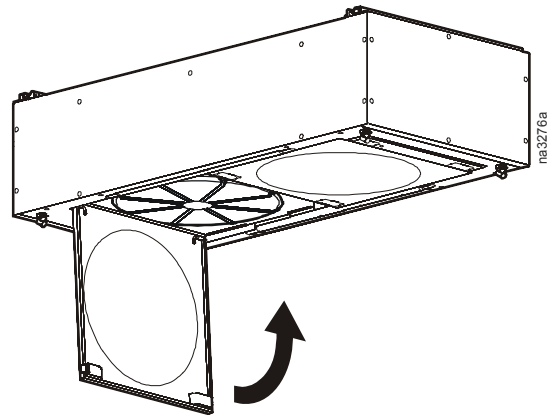


Caution: Before applying power, check the fan for security and ensure the connector is mated properly.

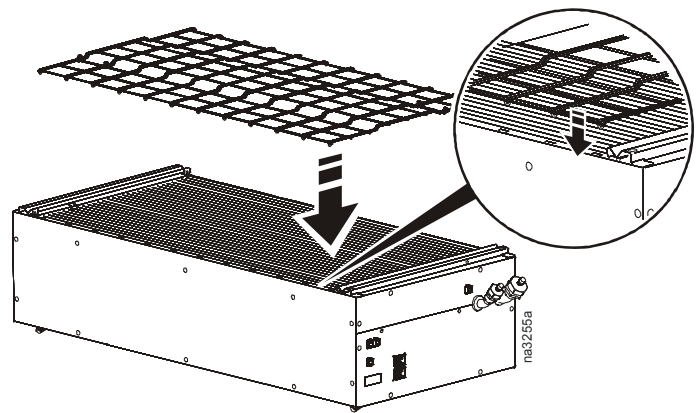
- e. Pull the hinge pins toward each other and place the door into position.



- f. Release the hinge pins and close the door. The latches will snap into place.

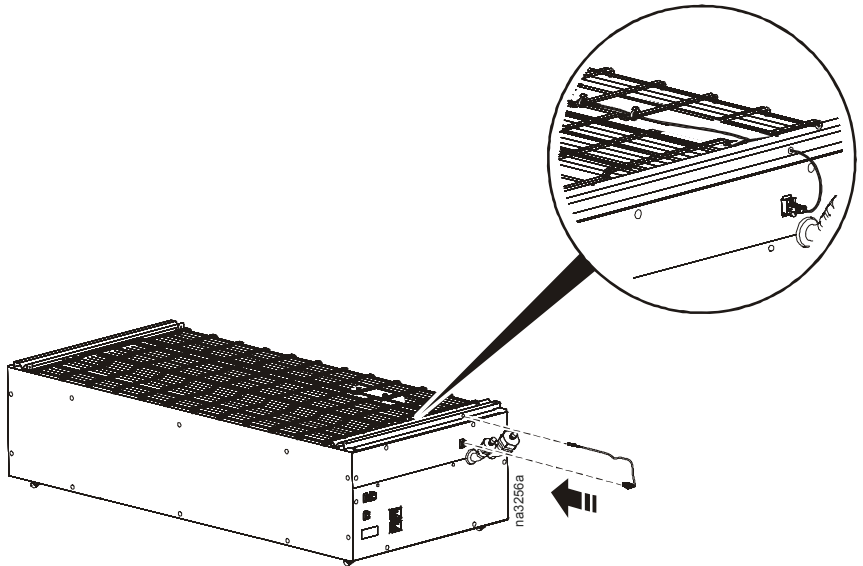


2. Install the grille by setting it into place and fitting the grill tabs into slots on the InRow OA unit as shown.

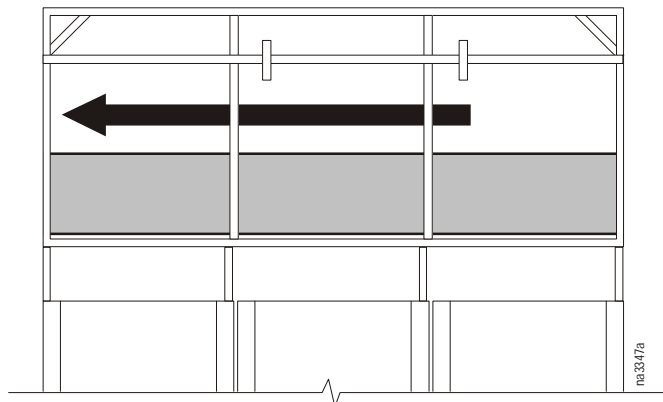


3. Install the temperature sensors:

- Pass the bulb ends of each of the two temperature sensors through the holes in the tracks as shown.
- Pass the temperature sensors through the tie wraps.
- Plug the temperature sensors connector into the receptacle at both ends of the InRow OA unit.
- Tighten the tie wraps to secure the temperature sensors to the grill.



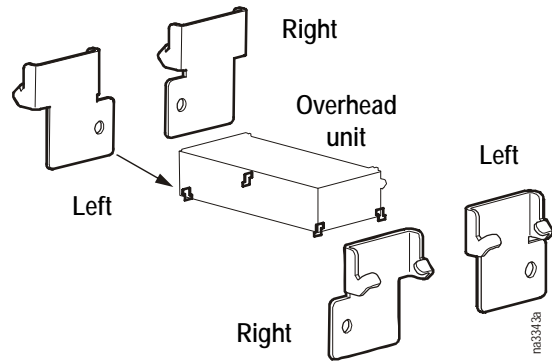
4. Roll the InRow OA unit down the tracks to make room for the next unit.



5. Install the remaining OA units and ceiling containment kits.

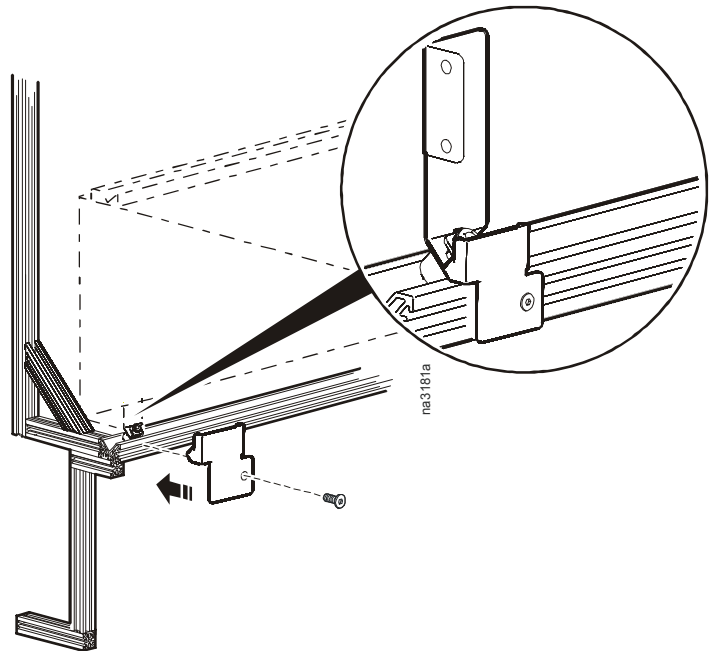
Secure overhead units

The InRow OA and ceiling containment kits (overhead units) are secured to the InRow OA mounting frame tracks with the provided left- and right-hand mounting clips. The proper orientation of the mounting clips is shown.



Note: Rack mounted units shown.

1. Secure the overhead unit (InRow OA or ceiling containment kit) nearest to the end of the first InRow OA mounting frame installed, flush with the mounting frame.
 - a. From underneath the unit, position left hand or right hand mounting clips as appropriate (left hand mounting clip shown) to capture and cover the roller brackets on all four corners of the InRow OA units and ceiling containment kits.
 - b. The mounting clip fits against the track portion of the InRow OA mount frame.
 - c. Secure each mounting clip with one screw as shown.

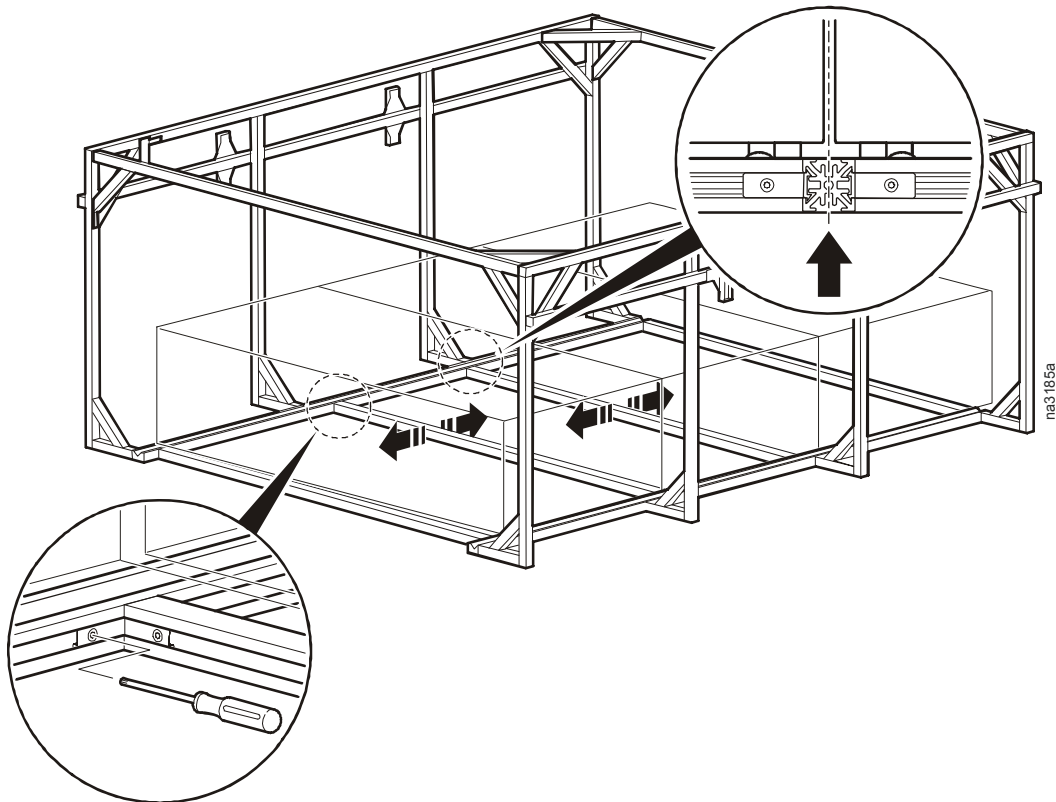


2. From the far end of the aisle, push all the units together so the gaps between them are as small as possible.
3. Secure the unit on the far end of the aisle with mounting clips on all four corners.

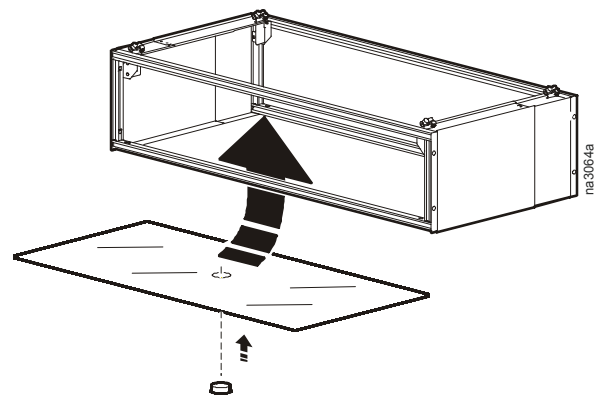


Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

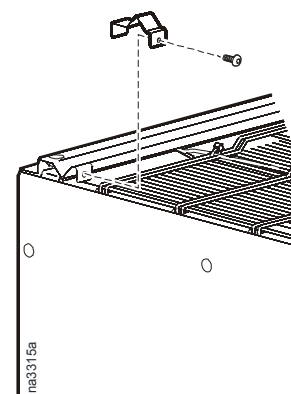
4. Position cross-aisle beams between InRow OA units or InRow OA units and ceiling containment kits as required.
5. Secure with flat head M4 screws and torque to 1.7-2.3 N-m (15-20 lb-in).



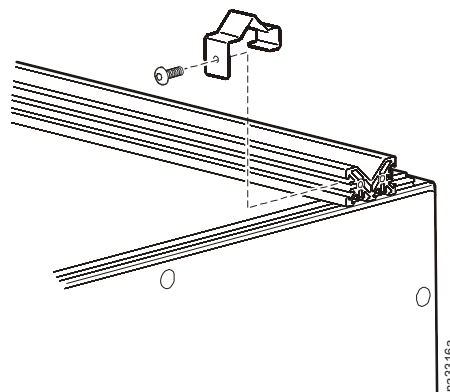
6. Secure each of the remaining overhead units with an mounting clip on all four corners.
7. Remove protective covering from the ceiling tiles and install ceiling tiles and hole plugs in the ceiling containment units.



8. If an InRow OA unit is at the end of the row, install the appropriate track end stops to both tracks. Secure with one pan head screw each.



9. If a ceiling containment kits is at the end of a row, install the appropriate track end stops to both tracks. Secure with one pan head screw each.



Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

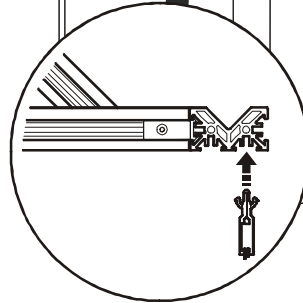
Install air blocks and curtains

1. Install side air blocks by pushing them into the inside track channel (InRow OA units and ceiling containment kits removed for clarity).

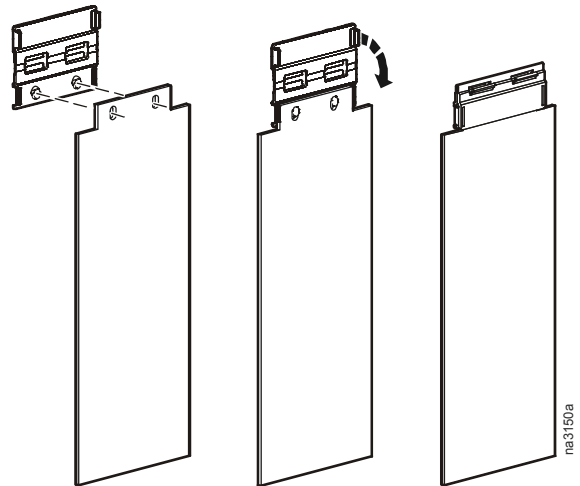


Note: Ensure the top clips of all curtain strips are spaced to provide complete coverage over the entire length of the track while allowing the curtains to overlap.

2. Trim curtain strips as required to fit around obstacles.



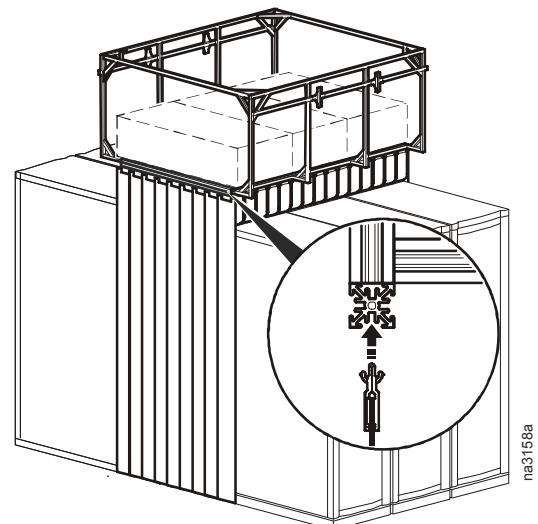
3. Assemble clips to the end of aisle air curtains.



4. Install end of aisle air curtains as shown (InRow OA units and ceiling containment kits removed for clarity).

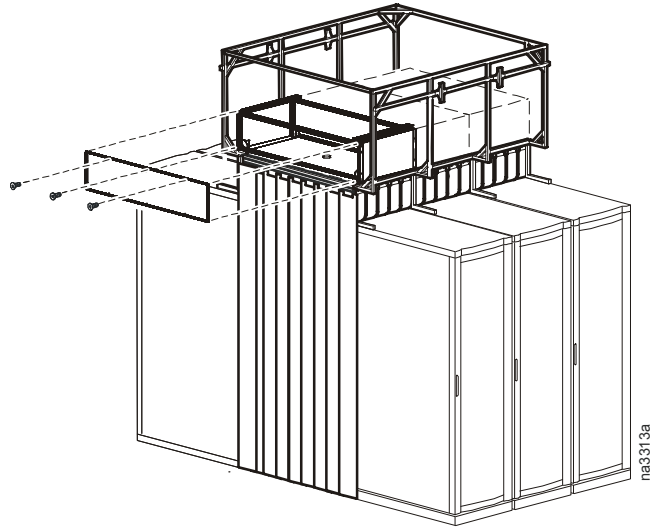


Note: Ensure the top clips of all curtain strips are installed end-to-end to provide maximum overlap.

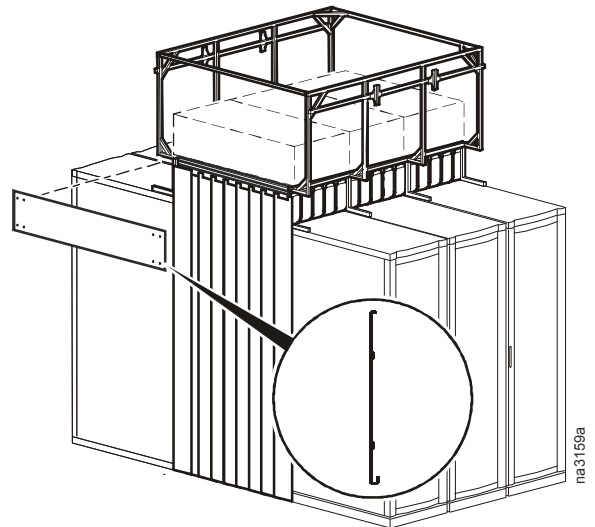


End panels

1. If a ceiling containment kit is on the end of the overhead system, install one ceiling containment kit end panel and secure with 10 flat head screws. Torque to 1.7-2.3 N-m (15-20 lb-in).

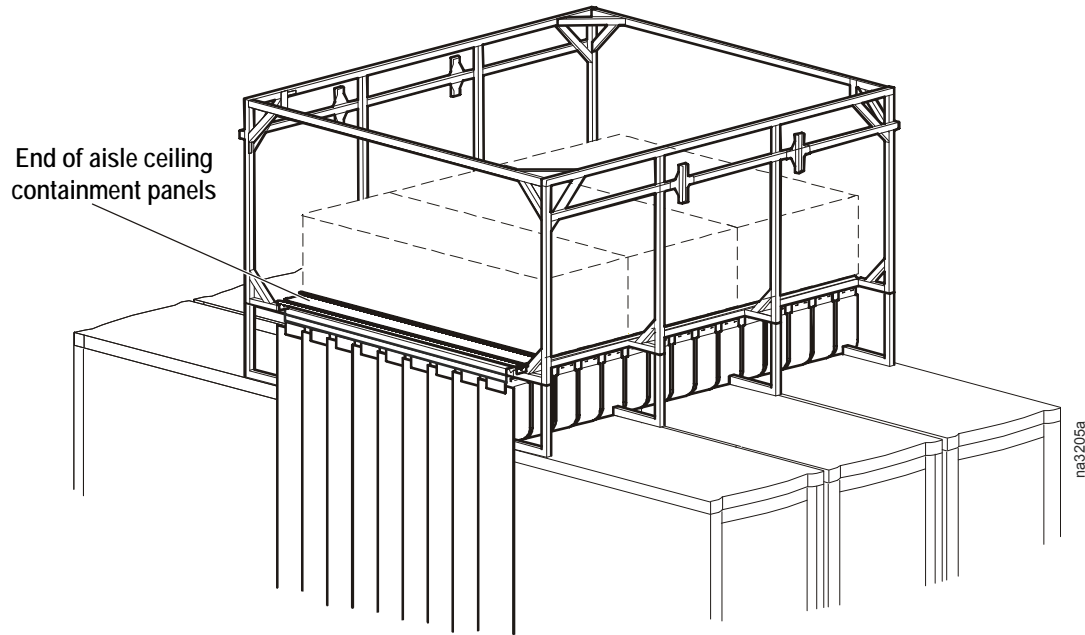


2. On rack mounted units only, install an end cap panel on both ends. Ensure the “J” channel is on the bottom as shown (InRow OA units and ceiling containment kits removed for clarity).
3. Secure the end cap panel with four flat head screws. Torque to 1.7-2.3 N-m (15-20 lb-in).

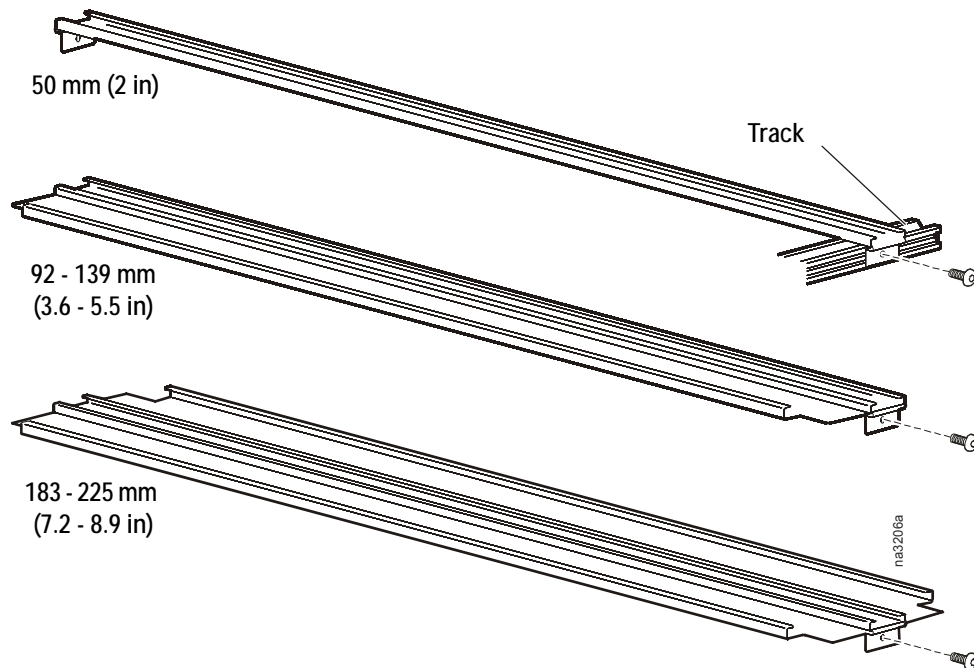


End of aisle ceiling containment panels

The end of aisle ceiling containment panels are designed to fill any remaining space between an InRow OA unit (or a ceiling containment kit) and the end of the InRow OA mount frame, as shown.



The end of aisle ceiling containment panels can be arranged to cover various sized horizontal openings, as shown.



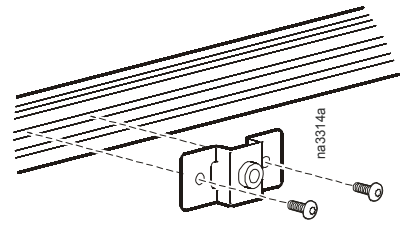
1. Use one, two, or three ceiling containment panels as required.
2. Secure to the tracks with two panhead screws, as shown.



Warning: Ensure all screws installed up to this point are torqued to the proper value: 1.7-2.3 N-m (15-20 lb-in).

Camera mount

1. As required, install the Netbotz camera mount to any available frame member.
2. Secure with two pan head screws and tighten to 1.7-2.3 N-m (15-20 in-lb).



Secure all connectors.

1. Once all components are in place, tighten all screws to 1.7-2.3 N-m (15-20 in-lb).

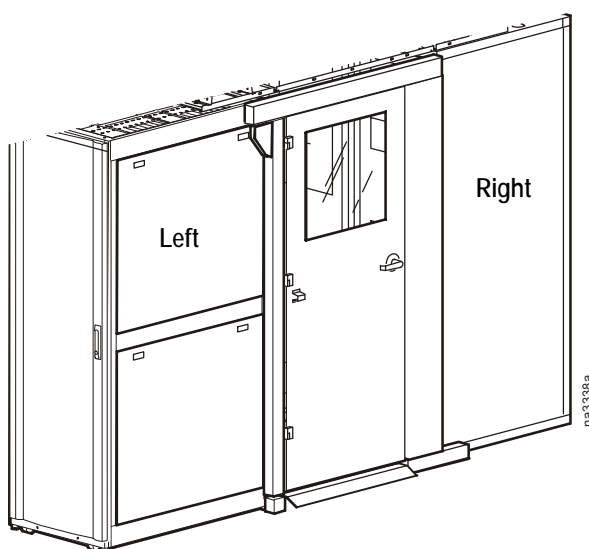
Door Frames and Doors

Optional door frames and doors may be installed on one or both ends of the aisle. They may be used for aligning and joining the two rows of equipment. See “Aisle width” on page 21.

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

SKU	Rack or unit	
	Left	Right
ACDC1016	RDU/SX 42U	RDU/SX 42U
ACDC1021	VX/VS	VX/VS
ACDC1017	RDU/SX 42U	VX/VS
ACDC1020	VX/VS	RDU/SX 42U

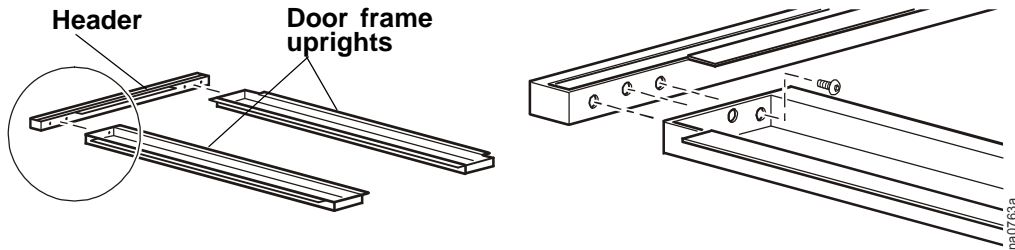
Left and right are defined as looking at the end of the hot aisle from outside.



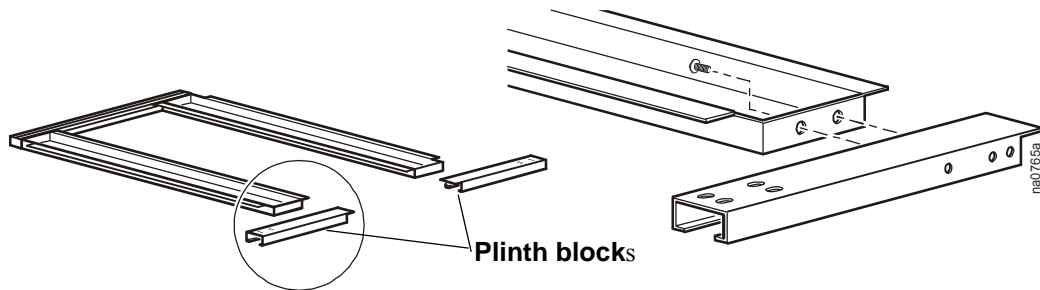
Assemble Door Frames

VX/VS enclosures to VX/VS enclosures (ACDC1021)

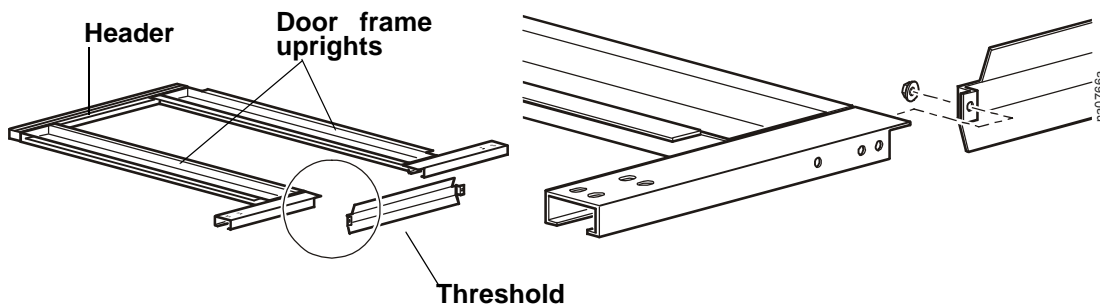
1. Lay all components face down on a clean surface for ease of installation.
2. Attach the header to the left- and right-side door frame uprights using six M6 × 12-mm screws (3 screws for each door frame upright).



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.

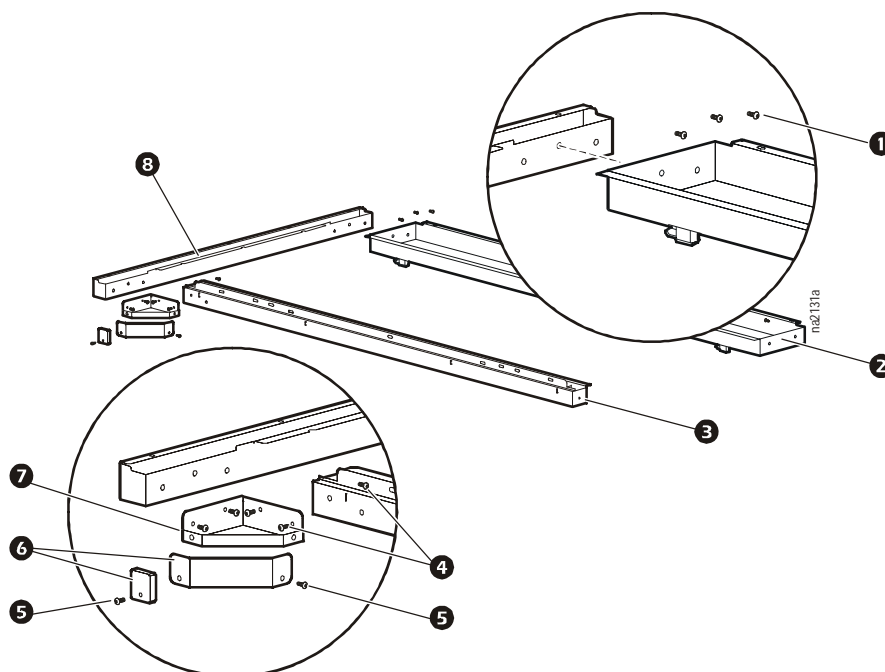


RDU or SX enclosures to VX/VS enclosures (ACDC1017 or ACDC1020)



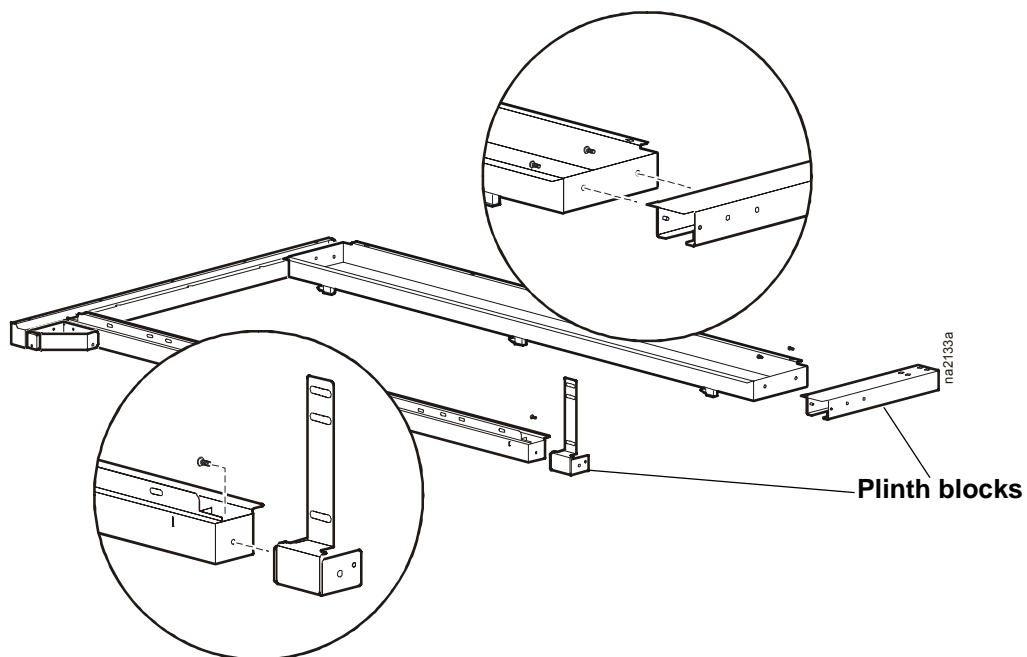
Note: ACDC1020 is shown in the illustration. The ACDC1017 vertical frame is a mirror image of the ACDC1020.

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 × 12-mm screws **1**.
3. Attach the SX door frame upright **3** to the header **8** with one M6 × 12-mm screw **4**.
4. Attach the SX corner gusset **7** to the SX door frame upright **3** and header **8** using four M6 × 12-mm screws **4**.
5. Attach the corner brace cover assembly **6** to the corner gusset assembly **7** using two M6 × 30 mm screws **5**.

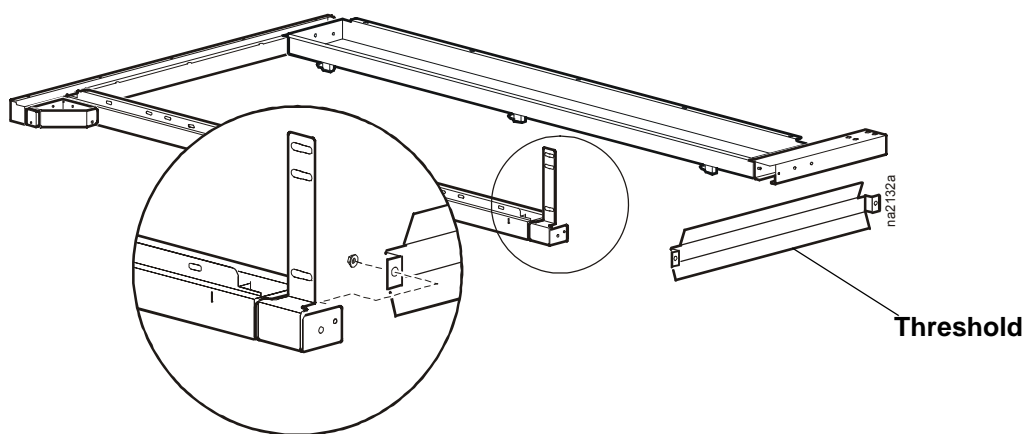


Item	Description	Qty	Item	Description	Qty
1	M6 × 12 screw	3	5	M6 × 30 screw	2
2	VX door frame upright	1	6	SX corner brace cover assembly (2 pieces)	1
3	SX door frame upright	1	7	SX corner gusset assembly	1
4	M6 × 12 screw	5	8	Header	1

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

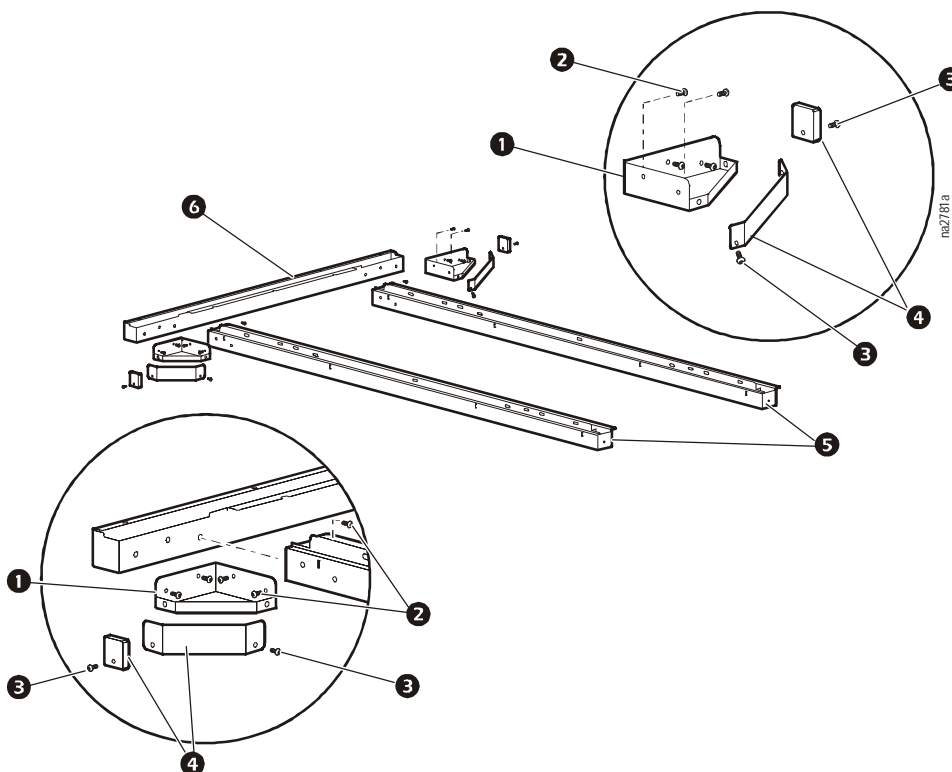


2. Attach the threshold to the bottom of the plinth blocks using two M6 flange nuts.



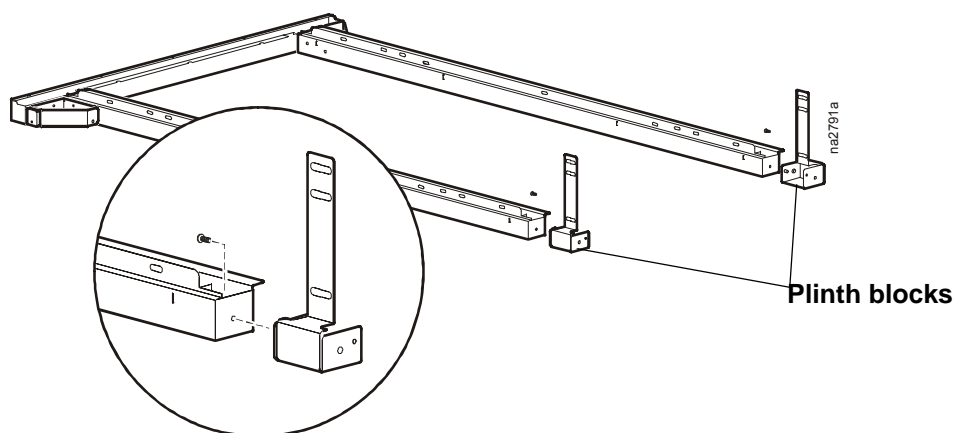
RDU or SX enclosures to RDU or SX enclosures (ACDC1016)

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 × 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**.

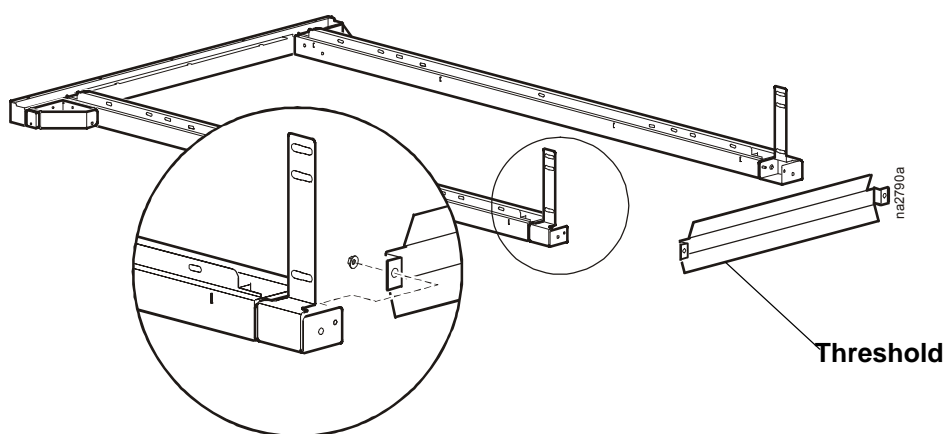


Item	Description	Qty	Item	Description	Qty
1	Corner gusset	2	4	Corner brace cover assembly	2
2	M6 × 12 screw	10	5	Door frame upright	2
3	M6 × 30 screw	4	6	Header	1

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



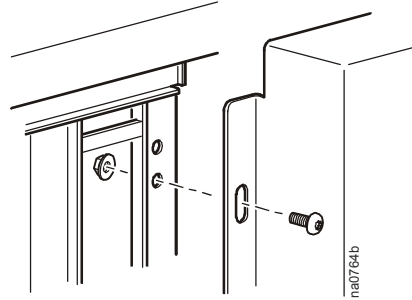
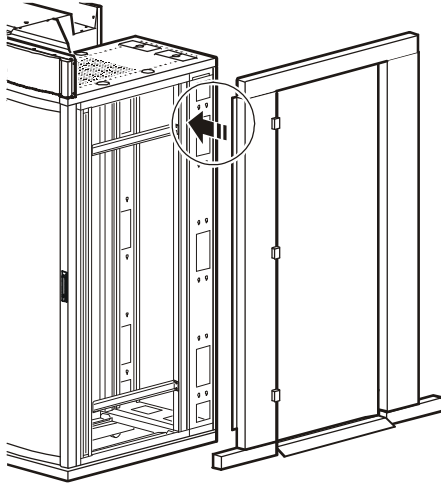
2. Attach the threshold to the bottom of the plinth blocks using two M6 flange nuts.



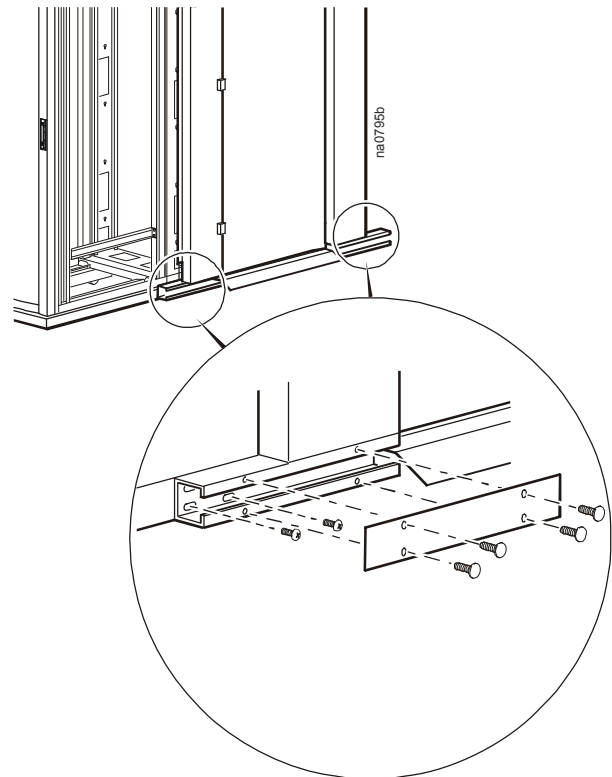
Install Door Frames

VX/VS to VX/VS (ACDC1021)

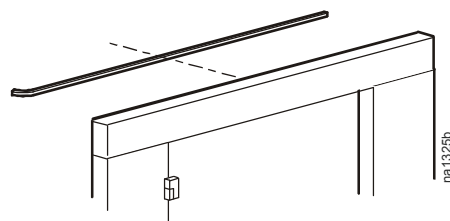
1. Use five M6 × 12-mm screws and M6 flange nuts on each side (for a total of ten screws and nuts) to attach the door frame to the units at the end of the aisle



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.

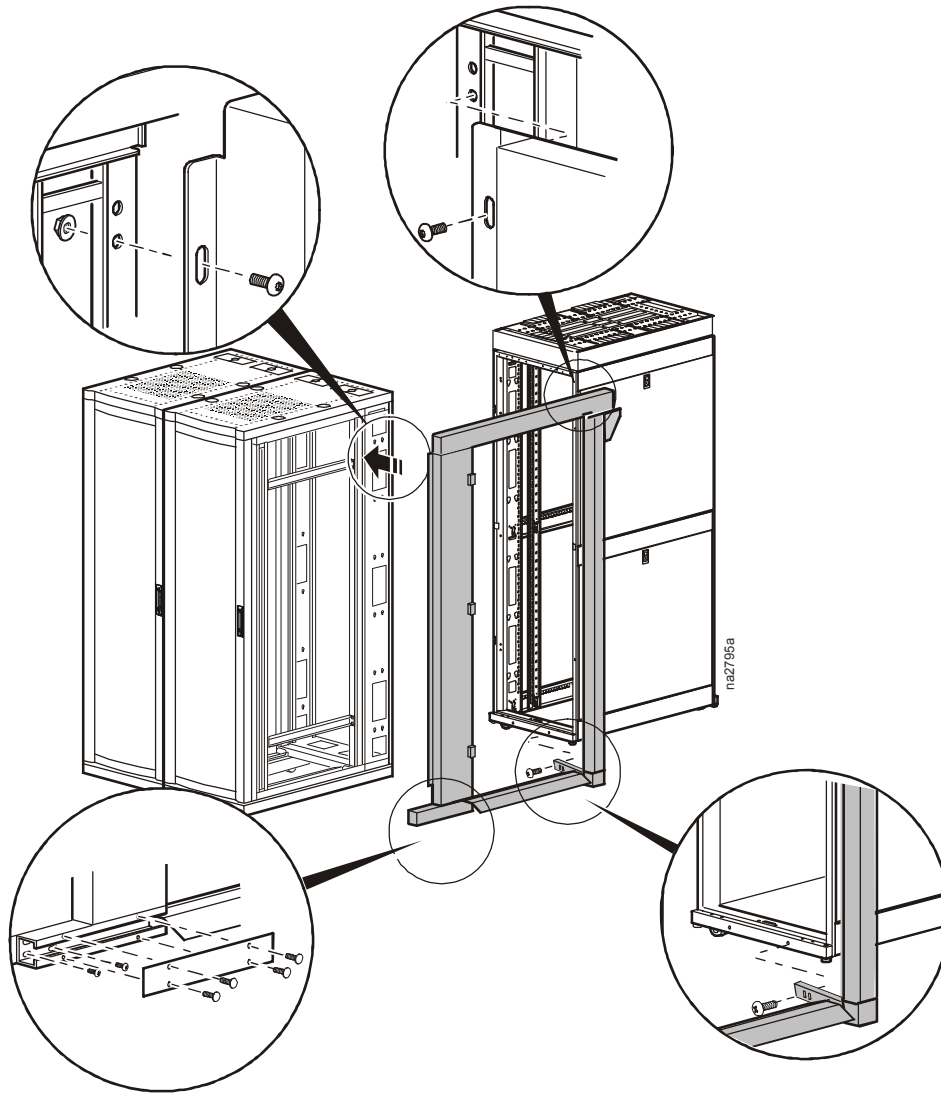


4. Apply a foam gasket to the door frame header.



VX/VS to RDU or 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.



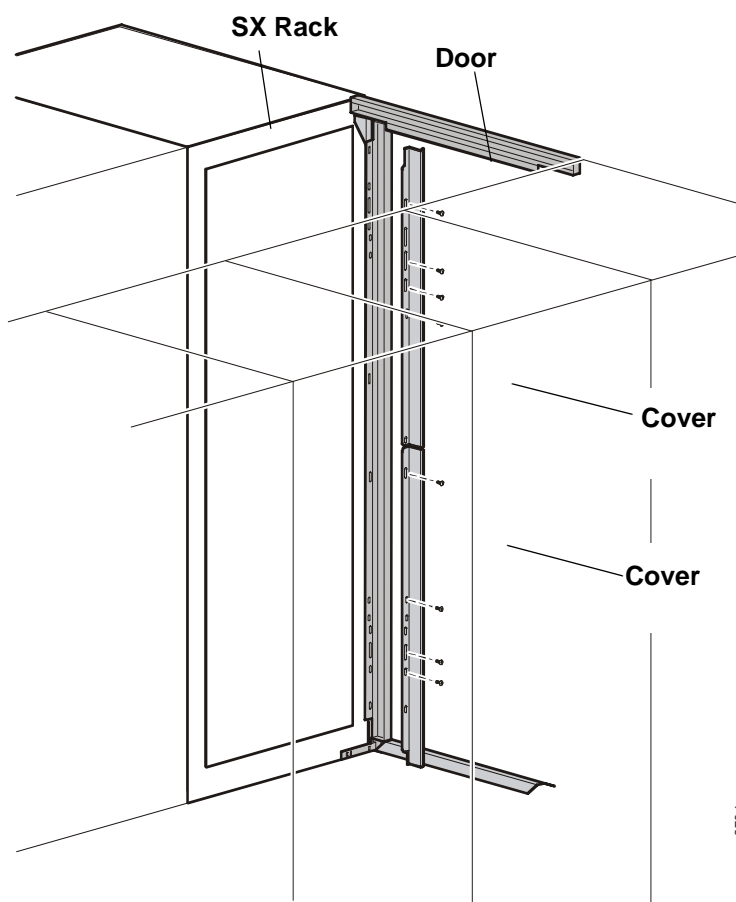
Note: ACDC1020 is shown in the above illustration. The ACDC1017 vertical frame is a mirror image of the ACDC1020.

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

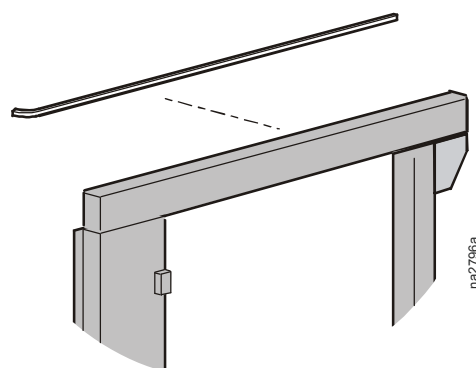


Note: Make sure all rear door hinges and any plastic plugs covering screw holes have been removed from the rack frame.

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

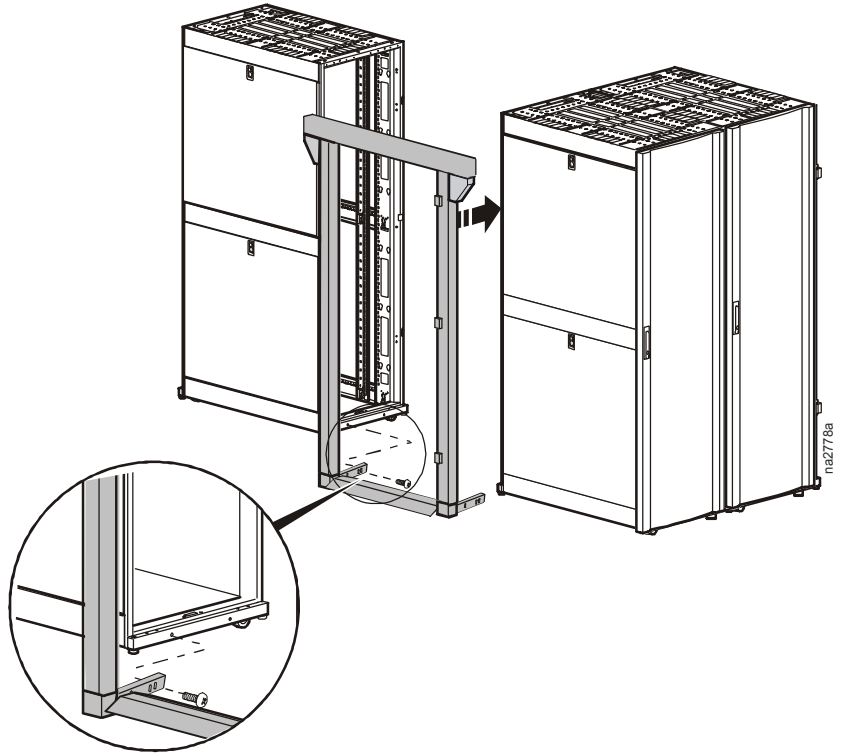


2. Apply the foam gasket to the door frame header.

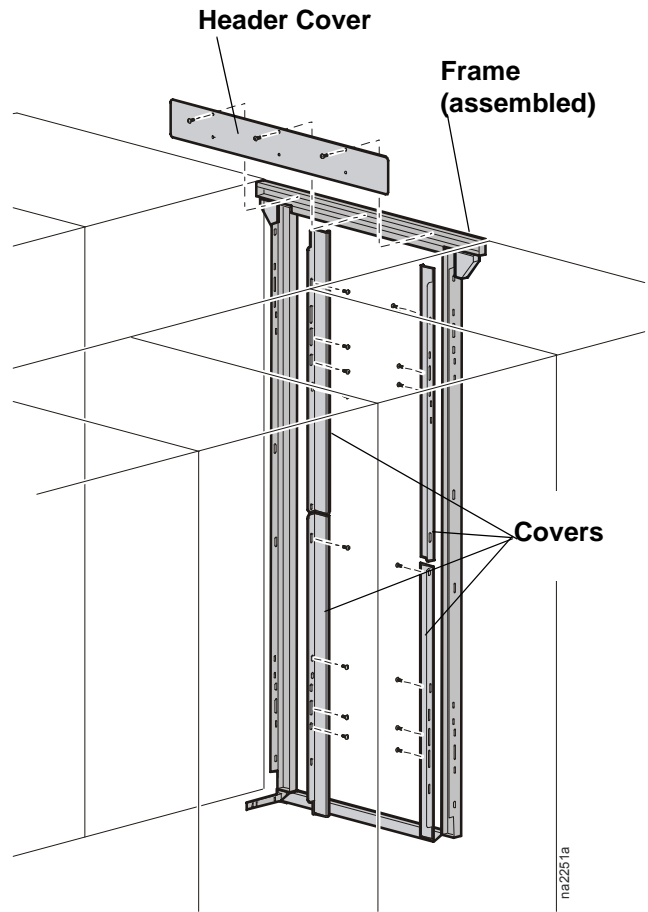


RDU or SX to RDU or SX (ACDC1016)

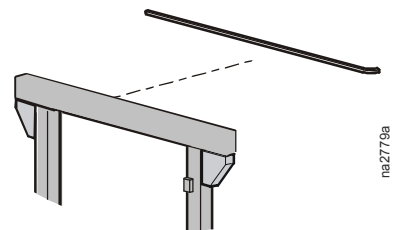
1. Attach the plinth blocks to the RDU or SX racks using one M8 \times 25-mm screw on each side.



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 RDU or SX racks.
3. Install the header cover to the door frame using three M6 × 12-mm screws.



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



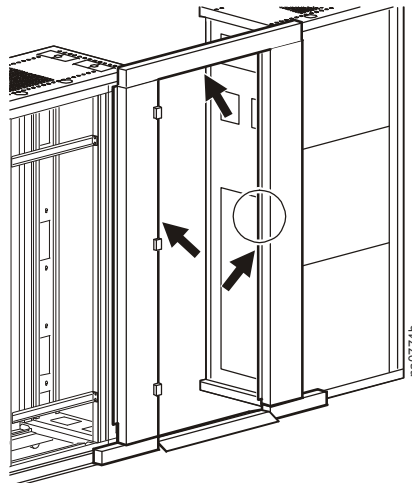
Install Doors and Locksets

Doors

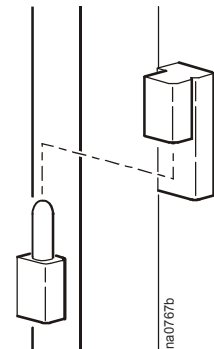
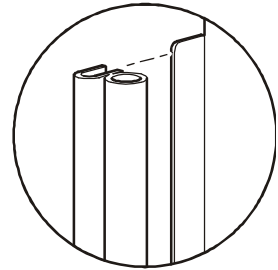
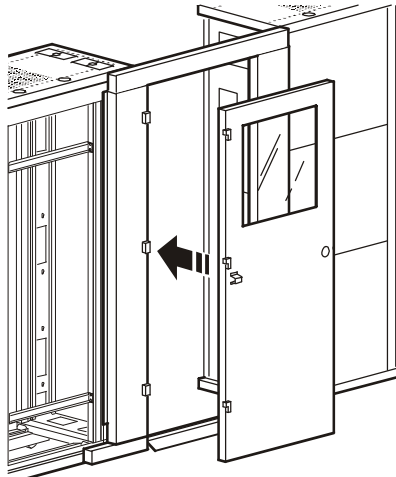


Heavy: The door is very heavy. To avoid injury, at least two people should install the door frame and door.

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.

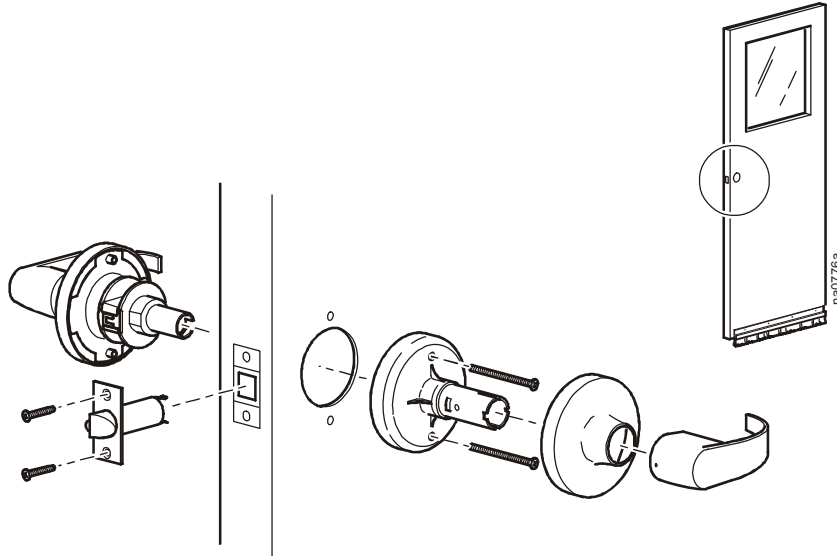


Locksets



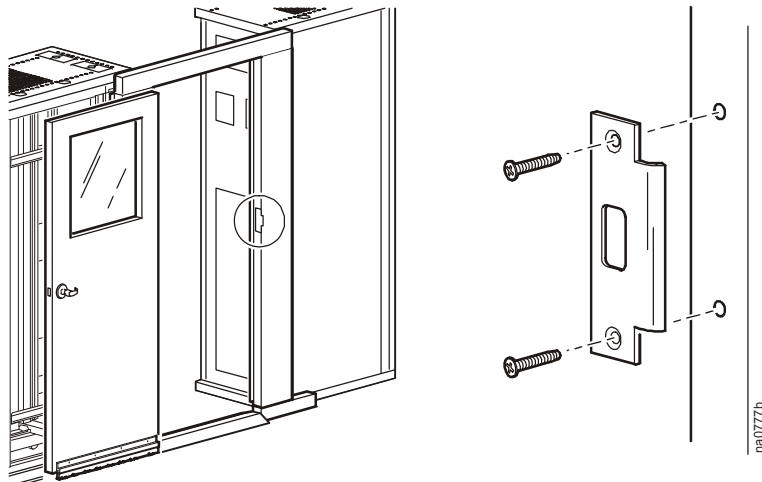
Note: Use the wire hook (provided with lockset) to release the assembled parts of the lockset prior to installing the lockset into the door frame.

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

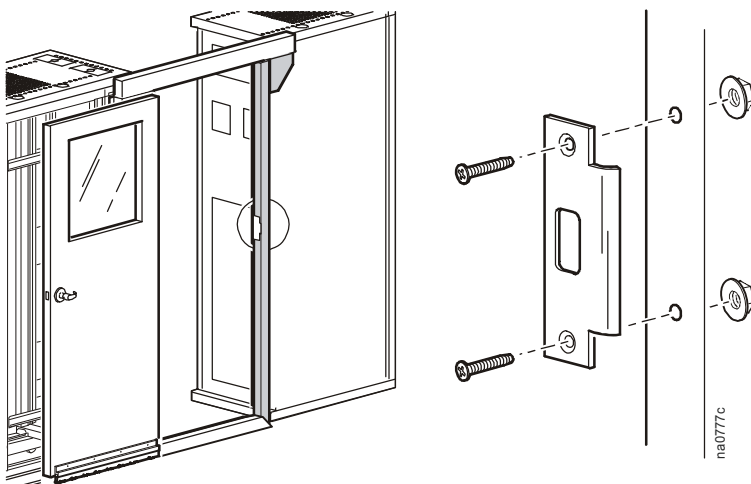


Note: Do not use the screws supplied with the lockset.

2. 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).

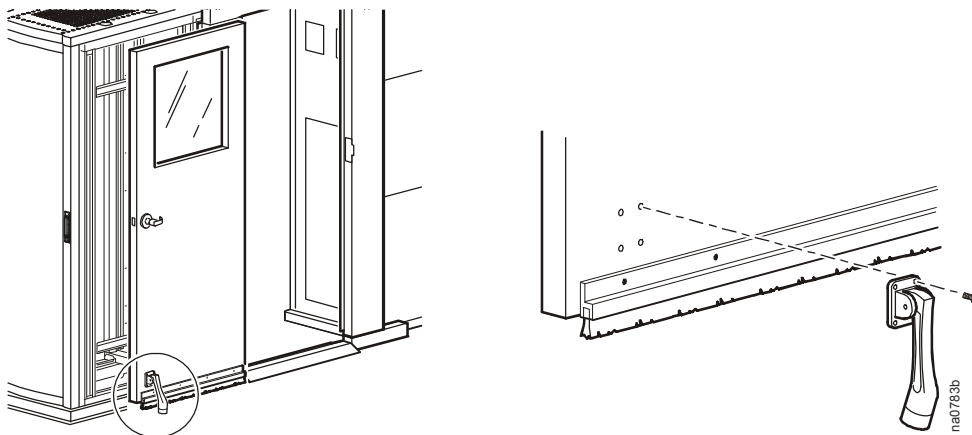


3. If the lock is installed next to an SX enclosure, install the strike plate onto the door frame using two 12-24 flange nuts and two 12-24 × 1/2 FHPHSS screws. Tighten with a 7/16-in wrench.



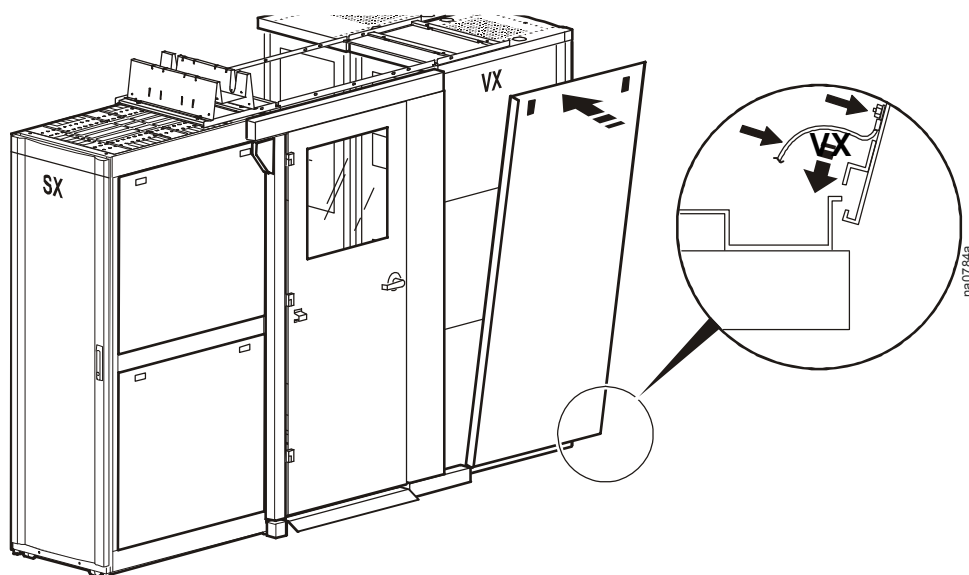
Door Stop

1. 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

1. Install the end panels at the ends of each row.



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.

Install End of Aisle Panels or Air Blocks

Rack mount units

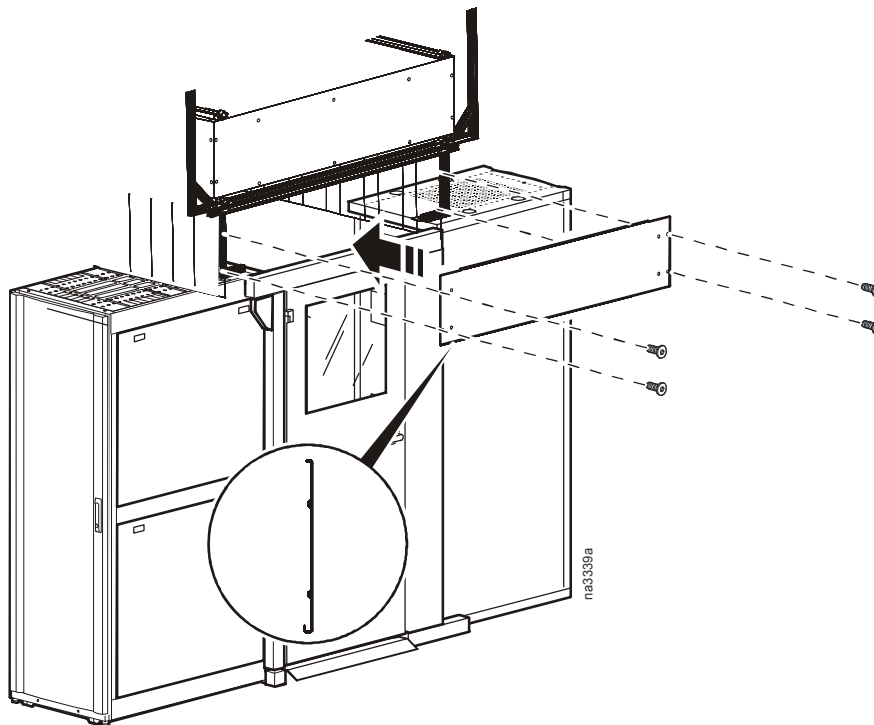
When the InRow OA mount frame is mounted directly to racks and enclosures, either solid panels or vinyl air block curtains may be used.

End cap panel.

1. Install an end cap panel on both ends. Ensure the “J” channel is on the bottom as shown.



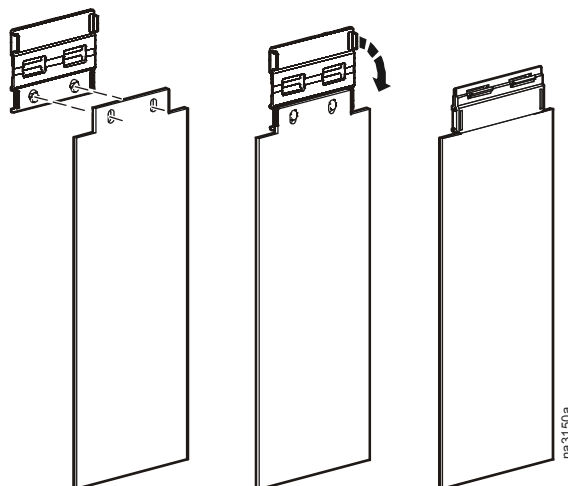
Note: Some modifications may need to be done to the end cap panels to avoid interference with the door frames.



2. Secure each of the end cap panels with four flat head screws. Torque to 1.7-2.3 N-m (15-20 lb-in).

Vinyl air blocks.

1. Assemble clips to the end of aisle air blocks.



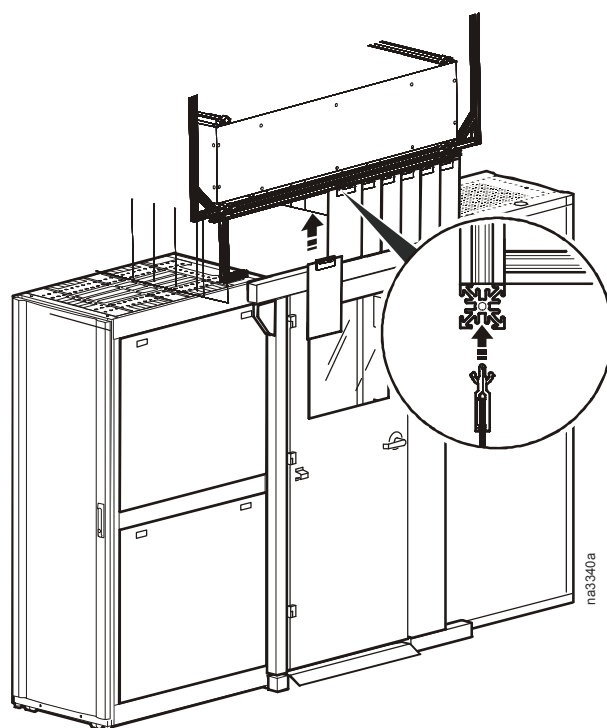
2. Install end of aisle air blocks as shown.



Note: Ensure the top clips of all curtain strips are installed end-to-end to provide maximum overlap.



Note: Ensure the end of aisle air blocks meet the top of the door frame.

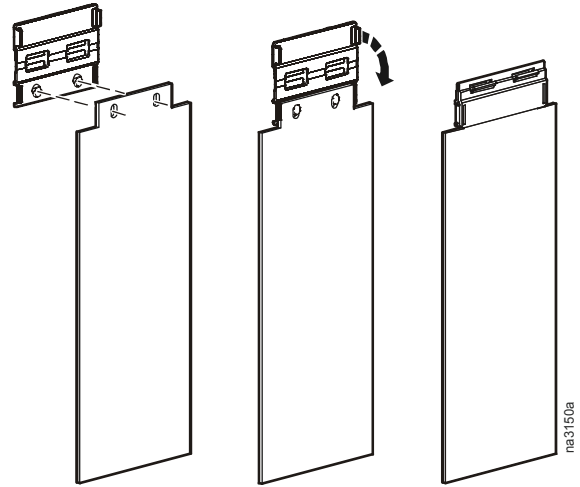


Ceiling mount units

When the InRow OA mount frame is ceiling mounted vinyl air block curtains must be used.

Vinyl air blocks.

1. Assemble clips to the end of aisle air blocks.



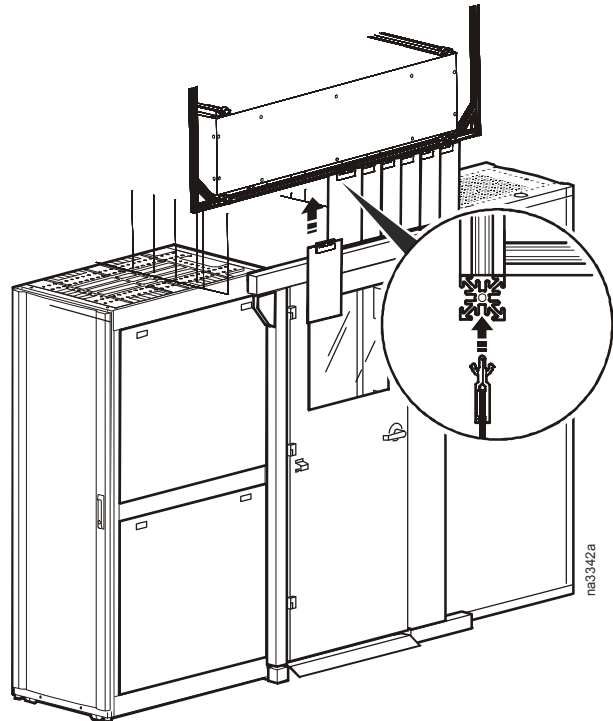
2. Install end of aisle air blocks as shown.



Note: Ensure the top clips of all curtain strips are installed end-to-end to provide maximum overlap.



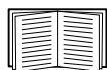
Note: Ensure the end of aisle air blocks meet the top of the door frame.



Mechanical Connections

Refrigerant piping options

Customer-supplied piping. If ceiling-suspended refrigerant piping is present, make connections to the InRow OA units using refrigerant distribution unit (RDU), piping kits, and flexible hoses.



See the RDU Installation manual for more information.

InRow OA mount frame piping. Refrigerant piping manifolds may be directly installed to the InRow OA mounting frames. See the piping installation procedure beginning on page 83.

Piping requirements

The equipment must be connected to an RDU. Install all refrigerant lines in accordance with applicable industry guidelines as well as local and national codes and regulations.

The maximum equivalent length for refrigerant piping between the RDU and the most distant CM is 24.4 m (80 ft). Use the table below to calculate the equivalent length of fittings to ensure that maximum equivalent length is not exceeded.

Connection lines between the distribution piping and CM are 3/4 in nominal (7/8 in ACR tubing size) for the refrigerant supply and 1-1/4 in nominal (1-3/8 in ACR tubing size) for the refrigerant return. Field fabricated connections between the CM and distribution piping may be a maximum of 3.05 m (10 ft) equivalent length. This equivalent length must be included in total equivalent length between the CM and RDU.



Note: If flex hoses are used, the total equivalent length is reduced to 19.8 m (65 ft), NOT including the flex hose lengths. Ensure your installation conforms to these requirements by calculating equivalent length based on the actual linear length of the run, plus the equivalent length of valves and fittings.



Note: All fittings should be long-radius to minimize pressure drop.



Note: Install all piping in accordance with applicable industry guidelines as well as local and national codes and regulations.

ASHRAE standards for equivalent piping length

Nominal pipe size	ACR tubing size	Type of fitting - equivalent length of pipe in m (ft)						Usage
		90° STD	90° long radius	90° street	45° STD	45°street	180° STD	
3/4 in	7/8 in	0.6 (2)	0.5 (1.4)	1.0 (3.2)	0.3 (0.9)	0.5 (1.6)	1.0 (3.2)	OA supply
1-1/4 in	1-3/8 in	1.0 (3.2)	0.7 (2.3)	1.7 (5.6)	0.5 (1.7)	0.9 (3)	1.7 (5.6)	OA return
1-1/2 in	1-5/8 in	1.4 (4.0)	0.8 (2.6)	1.9 (6.3)	0.6 (2.1)	1.0 (3.4)	1.9 (6.3)	Header supply
3 in	3-1/8 in	2.3 (7.5)	1.5 (5.0)	3.7 (12.0)	1.2 (4.0)	2.0 (6.4)	3.7 (12.0)	Header return

Note: R/D is approximately equal to 1 except for 90° long radius which is approximately equal to 1.5.

Note: Source: 2006 ASHRAE Handbook-Refrigeration, 2.16 Table 16

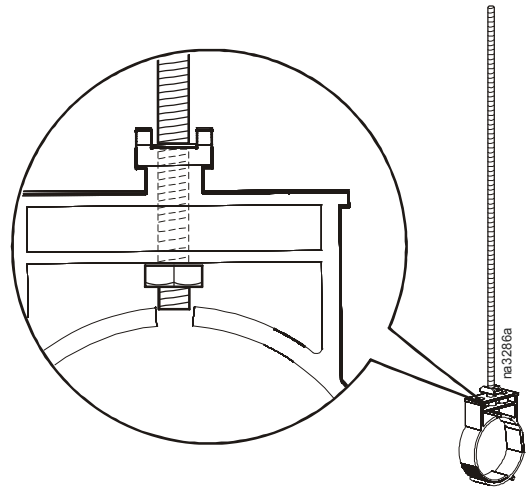
Pipe clamp mounting options

As alternatives to mounting the refrigerant pipes on the InRow OA mount frames, pipe clamps may be suspended from threaded rod or attached to u-channel.

Install pipe clamps to threaded rod

Refrigerant pipe clamps may be suspended from the ceiling on threaded rods as an alternative to using the InRow OA mounting frame to support them.

1. Install M10-1.5 (3/8-16) threaded rods (customer supplied) as required in accordance with all national and local codes.
2. Screw a jam nut and the pipe clamp onto the threaded rod as shown.



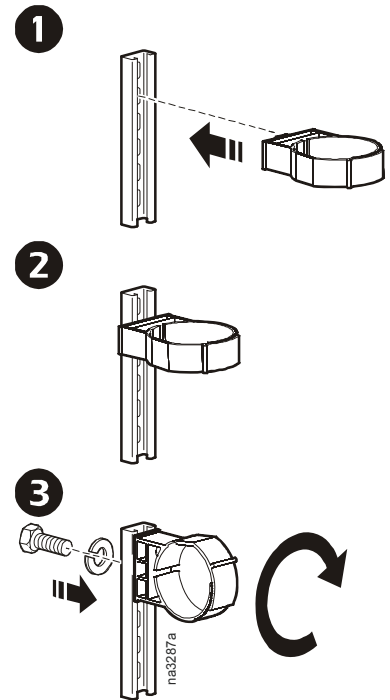
Install pipe clamps to u-channel

Refrigerant pipe clamps may be installed on properly sized (13/16 in \times 1-5/8 in, 14 gauge) u-channel (such as Unistrut® or equivalent).

1. Cut u-channel to desired lengths.
2. Install pipe clamps into the u-channel as shown.
3. Secure the pipe clamps to the u-channel with bolts and lockwashers.
4. Secure the u-channel to the building structure or other supports in accordance with national and local codes.



Warning: To properly support the headers, ensure the rigid part of the pipe support is on the bottom.

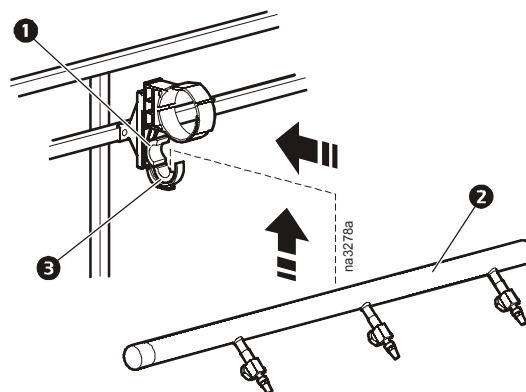


Install piping



Note: It is recommended that the smaller pipe manifold be installed first.

1. Place the pipe support insulation ③ into the pipe support ① and open the insulation.
2. Insert the pipe manifold ② into the pipe support insulation ③.
3. Loosely close the pipe support ①. You will tighten it up later after the pipes are connected to the InRow OA units.
4. Repeat steps 1 through 3 for the large pipe manifold.
5. Add more manifolds as required, and connect them to facility piping.



Be sure to use only clean, refrigerant-grade (ACR Type L) pipe and follow standard procedures for pipe size selection for refrigerant-based equipment.

Connect refrigerant lines

Using header pipes



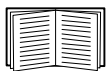
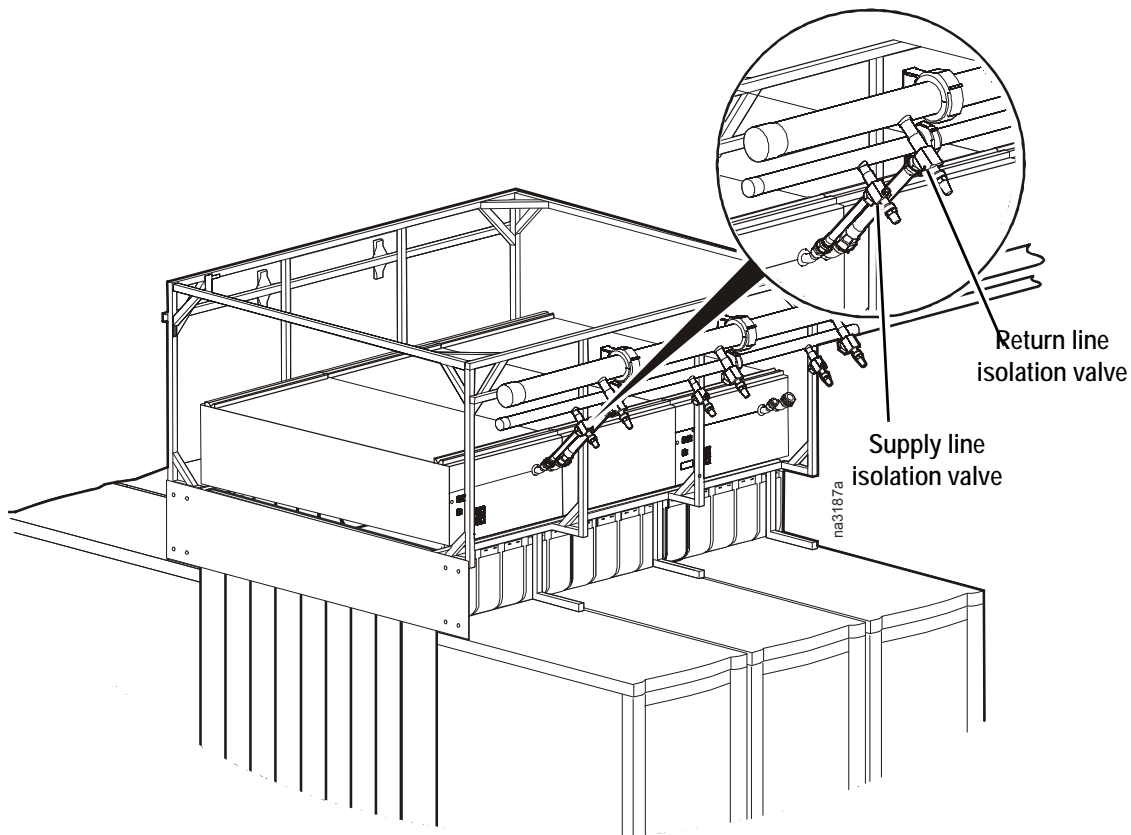
Warning: Each InRow OA unit has been shipped pressurized with nitrogen. Remove this charge before proceeding. Be sure to wear safety glasses.

1. Remove caps from the InRow OA unit refrigerant connections.
2. Insert new o-rings on the InRow OA unit and the valve ends of the header connection pipes.
3. Connect each InRow OA unit to the manifold with the header connection pipes as shown. (The example shows a ceiling containment unit between two InRow OA units.)



Caution: Use a backup wrench to avoid damaging the piping.

4. Torque supply lines to 90 N-m (66.4 lb-ft) and return lines to 110 N-m (81.1 lb-ft).

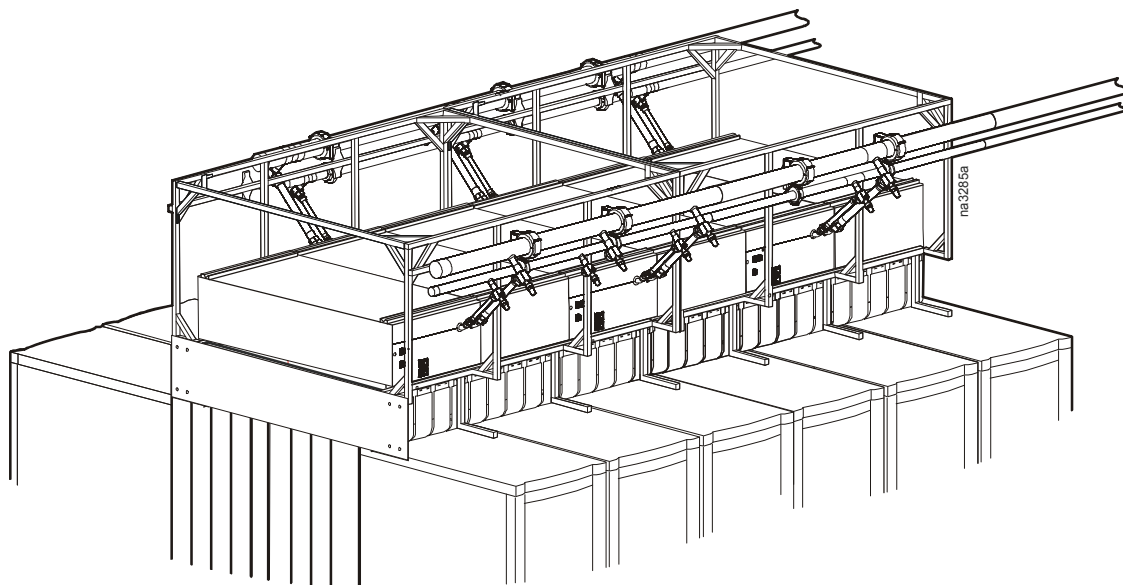


See the *RDU Installation* manual for more piping connection information.



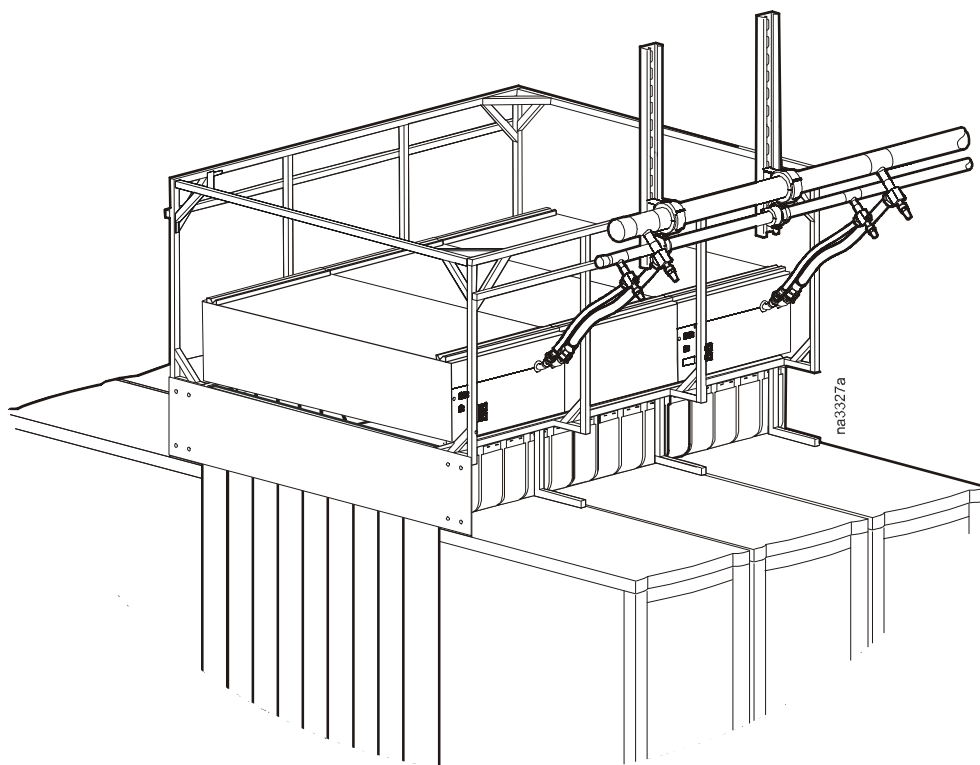
Note: When brazing field-installed copper refrigeration lines, use a nitrogen purge to minimize contamination of the system during the brazing process.

Alternating InRow OA units. If your installation includes two or more RDUs, you can alternate InRow OA units and piping (typical installation shown).



Using flex pipes

For installations using alternate methods of supporting the piping, use the optional flex pipes in place of the solid headers. The example shows the piping supported by u-channel.



Proper hose installation guidelines.

- Ensure all hoses are connected as shown in the **Correct** column.
- Install hoses so all bends are in the same plane.
- Install hoses so flexing takes place in the same plane as the bends.
- Observe the static centerline bend radius of 127 mm (5 in).
- Provide dielectric coupling where applicable to protect dissimilar metals.
- Additional field-supplied components may be required for proper hose installation.
- After installation, insulate hoses (materials not provided by APC). Follow insulation manufacturer recommendation for specific application.
- Use hangers as required to support the weight of hoses.
- Installation must comply with all national and local codes.
- Torque supply lines to 90 N-m (66.4 lb-ft) and return lines to 110 N-m (81.1 lb-ft).
- Do not torque, overbend, stretch, or compress hoses.
- Apply wrenches to fittings only, not hose or weld ferrule.
- Avoid sharp edges or rubbing. Braid is for hose strength, not protection.

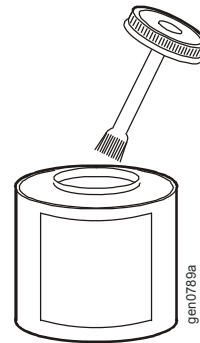
Correct	Incorrect

re2398a

Insulation. Use only approved insulation (closed cell elastomeric insulation with sealing seams). Insulation should be 12.7 mm (1/2 in) thick. All horizontal insulation sections must be installed with seams facing up. Each section of insulation must be glued to the adjacent section. Any insulation sections that must be fitted around piping support clamps (other than supplied clamps) must be glued together to prevent condensation.

Insulation adhesive. Use a low-VOC (Volatile Organic Compounds), black contact adhesive specifically designed for joining seams in pipe insulation. Use a black colored adhesive to achieve a neater finished insulation. Apply a thin coat of adhesive to both surfaces. Allow the adhesive to dry but still be tacky to the touch. Position the pieces accurately when contact is made. Apply moderate pressure over the entire area to ensure the seam is sealed.

.



Electrical Connections

The electrical connections required in the field are:

- Communication (A-Link)
- Remote rack temperature sensor
- Supply air temperature sensors (2)
- Two power feeds to the InRow OA (single phase plus ground)

All electrical connections must be in accordance with applicable industry guidelines as well as national and local codes and regulations.

See the equipment nameplate for voltage and current requirements.

Make all low-voltage connections, including data and control connections, with properly insulated wires. Insulation of low-voltage wiring must be rated for at least the voltage of any adjacent wiring.



Electrical Hazard: Potentially lethal voltages exist within this equipment. More than one disconnect switch may be required to energize or de-energize this equipment. Observe all cautions and warnings. Failure to do so could result in serious injury or death. Only qualified service and maintenance personnel may work on this equipment.

Electrical Hazard: The equipment must be grounded. Check the equipment nameplate for correct ratings.



Warning: Use a voltmeter to ensure that no power is present before servicing electrical connections.

Control Connections



Note: Wire all low voltage input and output connections as Class 2 circuits.

A-Link Connections

The A-Link bus connection allows a group of up to twenty-two InRow OA units to communicate with one another and the RDU.

To enable the InRow OAs to work as a group, link them using the supplied cables, or CAT-5 cables with RJ-45 connectors. The A-Link bus must be terminated at the first and last unit installed in the group. For example, the RDU is the first unit and the InRow OA (or another RDU) farthest from the RDU is the last unit. An A-Link terminator is supplied with each unit.

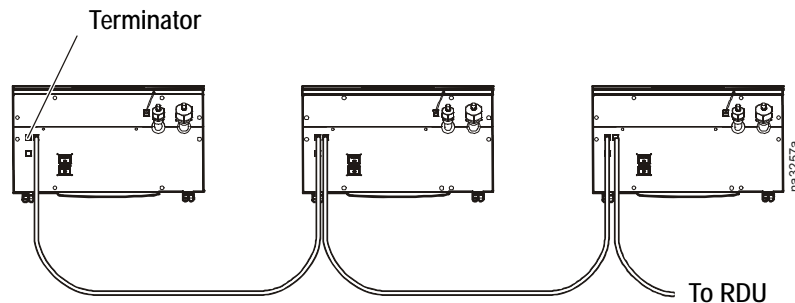


Note: Even if InRow OA units are piped to different RDU units, they may still be connected together.



Warning: Devices connected on the A-Link ports are to use a standard pinout (1-1, 2-2, 3-3, 4-4, 5-5, 6-6, 7-7, 8-8) CAT5 cable only, otherwise damage to electronics will occur.

The maximum wire length for the entire group may not exceed 300 m (1,000 ft).



Rack temperature sensors

Rack temperature sensors control the equipment airflow and ensure adequate supply of cooling air to the server racks in the data center.

Each InRow OA is supplied with one external rack temperature sensor. See “InRow OA loose parts” on page 5.

How to install the rack temperature sensor

1. Insert the rack temperature sensor connector in the temperature sensor port as shown.

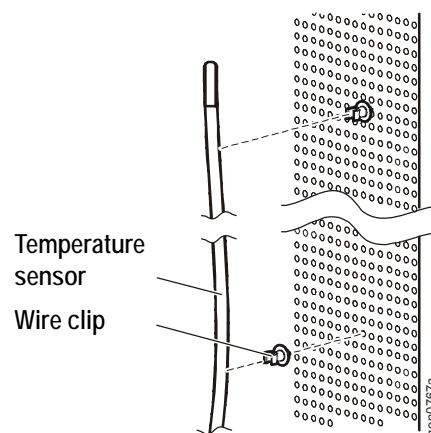
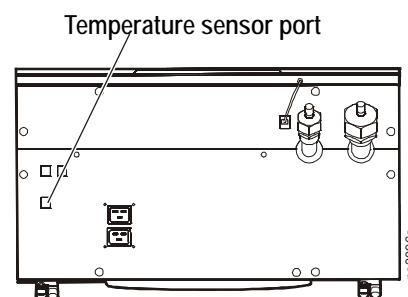
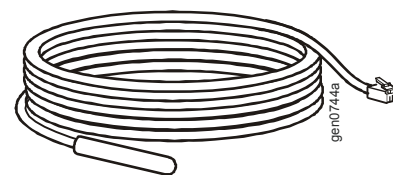


Note: Remote rack temperature sensors must be installed for proper operation.

2. Route the temperature sensor cable to the rack whose temperature you want to monitor.
3. Secure the temperature sensor cable to the front door of the server rack at multiple locations using the provided wire clips as shown.

Install sensors where lack of sufficient cooling air is most likely. The optimum position of the rack temperature sensors will vary from installation to installation, but should be located in the airflow to allow accurate readings. Servers most likely to have insufficient or inadequately cooled cooling air due to the recirculation of hot air from the hot aisle include:

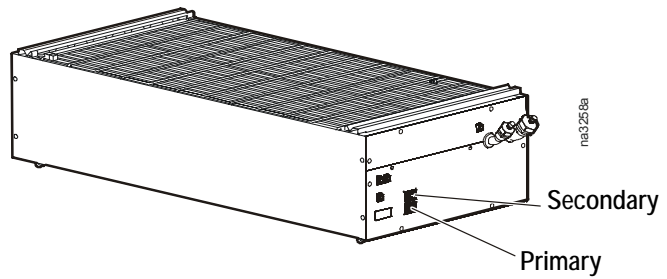
- a. Servers positioned at the top of a rack.
- b. Servers positioned at any height in the last rack at an open end of a row.
- c. Servers positioned behind flow-impairing obstacles such as building elements.
- d. Servers positioned in a bank of high-density racks.
- e. Servers positioned next to racks with Air Removal Units (ARU).
- f. Servers positioned very close to or very far from the equipment.



Power Connections

The unit is capable of using two power feeds (primary and secondary).

Using the supplied power cords, connect the primary power feed to the primary receptacle and the secondary power feed to the secondary receptacle as shown.



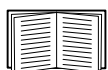
Note: If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.



Note: In Japan, use only PSE approved power supply cord, APC P/N 960-0098C.

Adding and Removing InRow OA Units

This section details the procedure for adding or removing an InRow OA unit in an existing system.



See the *Pumped Refrigerant System Refrigerant Distribution Unit (RDU) Operation and Maintenance (O&M)* manual for detailed information as instructed.

Remove an InRow OA



Note: To prevent unnecessary errors, remove the InRow OA from the RDU and reconfigure your group settings accordingly. (See O&M Manual).

1. Close the liquid line isolation valve See “Connect refrigerant lines” on page 84.

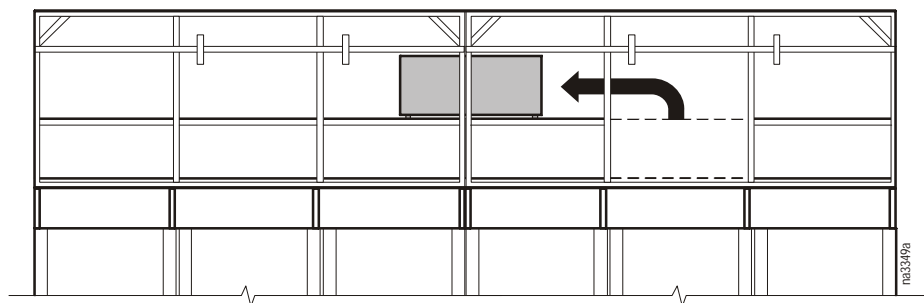


Note: This allows for the liquid refrigerant that is left in the unit to be converted to a gas.

2. Configure the InRow OA to the evacuation mode (see the O&M manual).
3. Close the gas line isolation valve See “Connect refrigerant lines” on page 84.
4. From both supply and return isolation valve ports, reclaim the refrigerant remaining in the InRow OA unit per local codes.
5. Disconnect power and data cabling. See “A-Link Connections” on page 90 and “Power Connections” on page 92.
6. Disconnect piping. See “Connect refrigerant lines” on page 84.
7. If present, remove the mounting clips securing the InRow OA to the tracks. See “Secure overhead units” on page 56.
8. Remove the fan covers and fans to lighten the InRow OA. See “Installing InRow OA units” on page 51.
9. Lift the InRow OA unit to the tracks on top of the adjacent overhead unit, roll it to the end of the aisle, and remove it.



Note: Piping and wiring not shown for clarity.



10. Connect data cabling around the InRow OA unit that is being removed so that communication is restored within the group.
11. Install another InRow OA or ceiling containment kit in place of the removed InRow OA.

Add an InRow OA

1. Remove the fan covers and fans to lighten the InRow OA. See “Installing InRow OA units” on page 51.
2. Lift the InRow OA unit to the tracks on top of the end overhead unit, roll it on top of the adjacent overhead unit, and carefully lower it to its final position.
3. Install the mounting clips to secure the InRow OA to the tracks. See “Secure overhead units” on page 56.
4. Reinstall the fan covers and fans. See “Reinstall parts” on page 53.
5. Ensure the isolation valves on both header pipes are closed.



Caution: Do not open the isolation valves until instructed to do so.

6. Connect piping. See “Connect refrigerant lines” on page 84.
7. Connect power and data cabling. See “A-Link Connections” on page 90 and “Power Connections” on page 92.
8. Assign the InRow OA to the RDU (see the O&M manual).
9. Configure the InRow OA to the evacuation mode (see the O&M manual).
10. Evacuate the InRow OA and header connection piping per local codes.
11. Configure the InRow OA to the standby mode (see the O&M manual).
12. Open the liquid line and gas line isolation valves See “Connect refrigerant lines” on page 84.
13. Configure the InRow OA to the on mode (see the O&M manual).

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- Visit the APC Web site to access documents in the APC Knowledge Base and to submit customer support requests.
 - **www.apc.com** (Corporate Headquarters)
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 - **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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