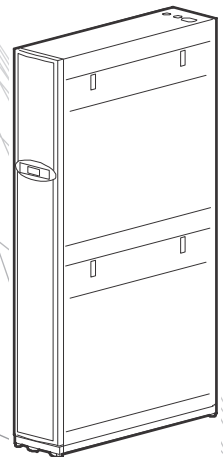


Installation

InRow[™] RC

**ACRC100
ACRC103**





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。

동봉된 CD 안에 한국어 매뉴얼이 있습니다 .

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General Information

Overview

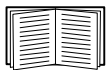
Save these instructions

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

Manual updates

Check for updates to this manual on the APC Web site, www.apc.com/support. Click on the **User Manuals** link and enter the manual part number or SKU for your equipment in the search field. See the back cover of this manual for the part number.

Cross-reference symbol used in this manual



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

Safety

Read and adhere to the following important safety considerations when working with this cooling unit.

⚠ DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
Turn off all power supplying this equipment before working on the equipment. All electrical work must be performed by licensed electricians. Practice lockout/tagout procedures. Do not wear jewelry when working with electrical equipment.
Failure to follow these instructions will result in death or serious injury.

⚠ WARNING
HAZARD FROM MOVING PARTS
Keep hands, clothing, and jewelry away from moving parts. Check the equipment for foreign objects before closing the doors and starting the equipment.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

DAMAGE TO EQUIPMENT OR PERSONNEL

The equipment is heavy and can easily be tipped. For safety purposes, adequate personnel must be present when moving this equipment.

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

⚠ CAUTION

HAZARD TO EQUIPMENT OR PERSONNEL

All work must be performed by American Power Conversion (APC™) by Schneider Electric authorized personnel.

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

Inspecting the Equipment

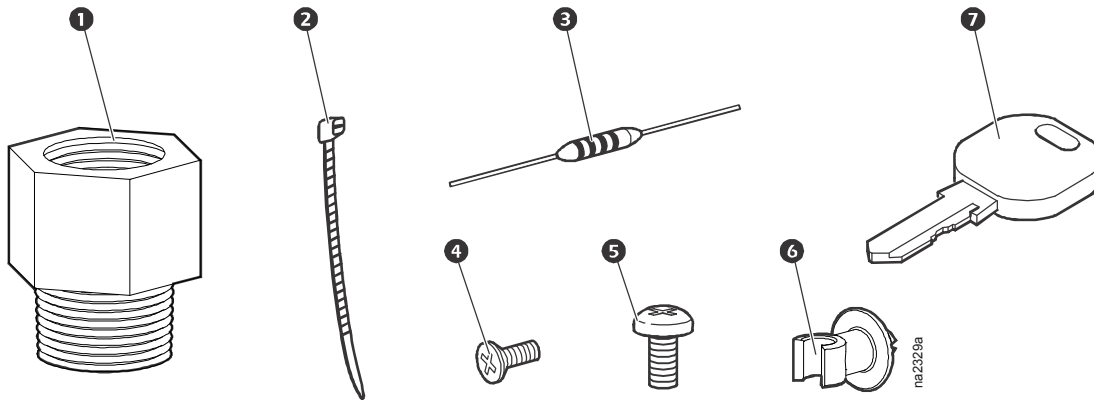
Inspect for missing components. All shipped loose components are identified by part number and description on the bill of lading. Ensure each item is present before accepting delivery of the unit.

Filing a claim. If damage has occurred, or if shipped loose parts are missing, report it immediately to the delivering carrier and note the problem on the receiving copy of the bill of lading. Failure to do so will result in replacement parts and repairs being billed to the customer.

In case of shipping damage, do not operate the equipment. Keep all packaging for inspection by the shipping company and contact APC by Schneider Electric.

Inventory

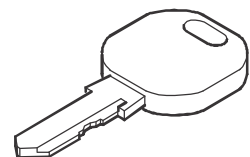
Installation kit



Item	Description	Quantity
1	1-in NPT to 1-in BSPT adapters	2
2	Tie wraps	3
3	Termination resistor	1
4	M5 x 12 mm Phillips screws	4
5	M4 x 8 mm Phillips screws	4
6	Wire clip	3
7	Key	2

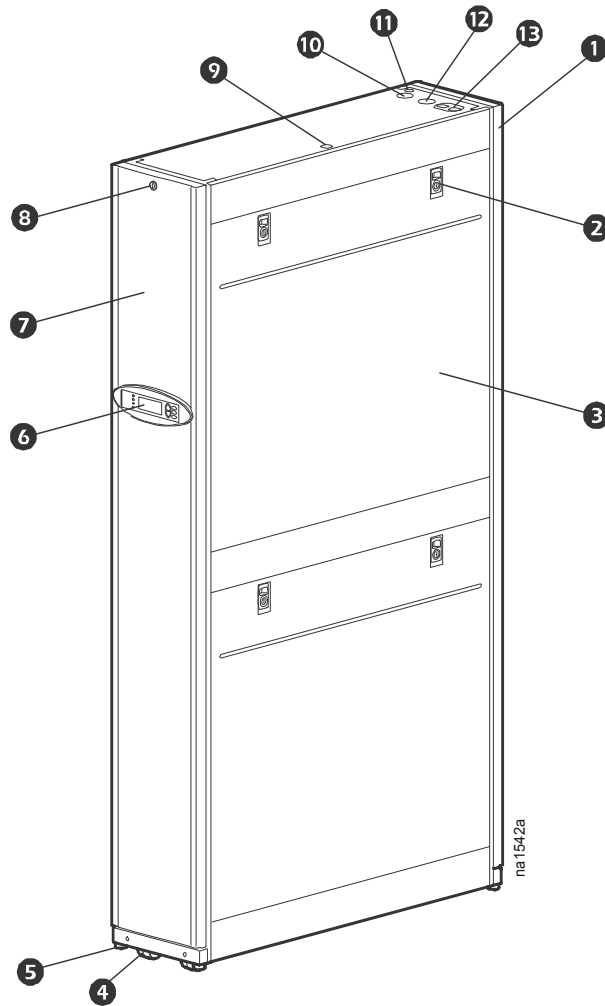
Door and side panel locks

The four side panels are locked at the factory, and the front and rear doors are not locked. Two keys are in the plastic documentation envelope located inside the equipment.



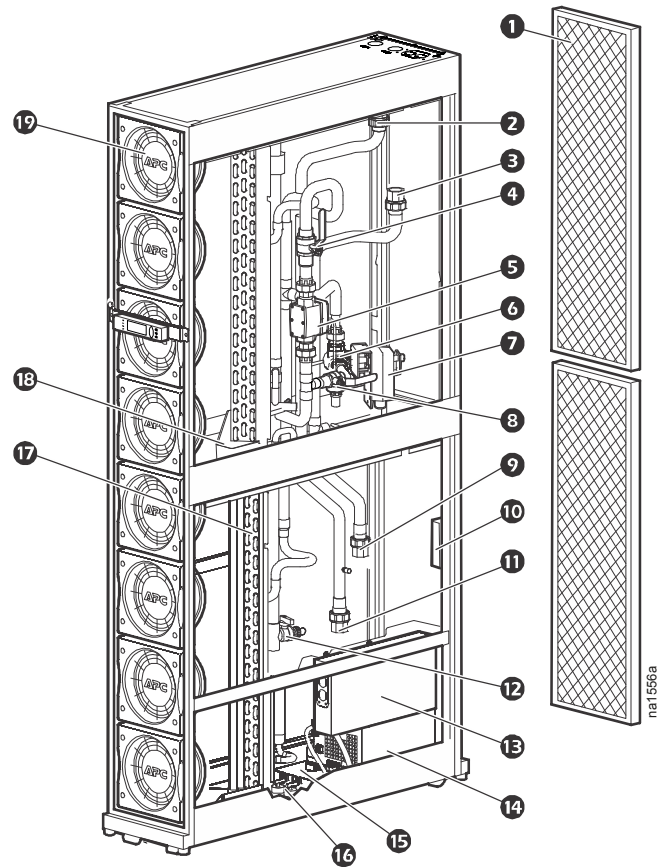
Component Identification

Exterior



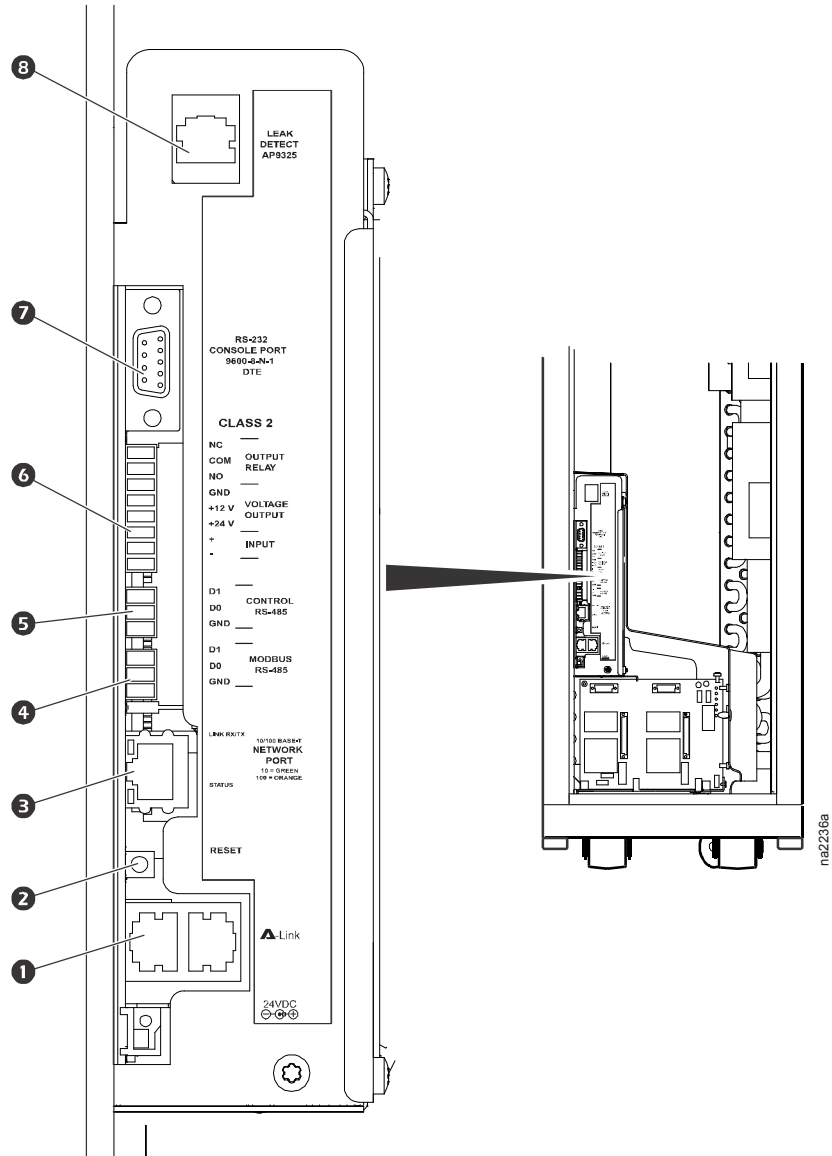
- | | |
|----------------------------|------------------------------------|
| ① Removable rear door | ⑧ Door lock (front and rear doors) |
| ② Side panel latch | ⑨ Top network wiring access |
| ③ Removable side panel | ⑩ Top supply (inlet) |
| ④ Caster | ⑪ Top condensate drain |
| ⑤ Adjustable leveling foot | ⑫ Top return (outlet) |
| ⑥ Display interface | ⑬ Top power cord access |
| ⑦ Removable front door | |

Interior



- | | |
|---|--|
| ❶ Air filter | ❶❶ Bottom supply connection (optional) |
| ❷ Top supply connection (optional) | ❶❷ Drain valve (cap is installed at factory) |
| ❸ Top return connection (optional) | ❶❸ User interface connection box |
| ❹ 2-way supply valve (1-inch) | ❶❹ Power supply unit (PSU) |
| ❺ Flow meter | ❶❺ Bottom condensate drain pan |
| ❻ 3-way valve | ❶❻ Condensate floats |
| ❼ 2-way or 3-way valve with flow control actuator | ❶❼ Coil |
| ❽ 2-way valve (3/4-inch) bypass shut-off | ❶❽ Top condensate drain pan |
| ❾ Bottom return connection (optional) | ❶❾ Fan |
| ❿ Condensate pump | |

User interface connection panel



- ❶ A-Link ports
- ❷ Reset button
- ❸ Ethernet port
- ❹ Building management system (BMS) RS-485 port
- ❺ Control RS-485 port
- ❻ Form C alarm contacts and shutdown input
- ❼ Configuration port
- ❽ Leak detector port

Room Preparation

During the design of the data center, consider ease of entry for the equipment, floor loading factors, and accessibility to piping and wiring.

Seal the room with a vapor barrier to minimize moisture infiltration. (Polyethylene film is recommended for ceiling and wall applications.) Apply rubber- or plastic-based paints to concrete walls and floors.

Insulate the room to minimize the influence of exterior heat loads. Use the minimum required amount of fresh air 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.

The equipment is designed as a sensible cooling air conditioning 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.** If operated in spaces where the humidity is in the unacceptable operating conditions section of the Operating Guidelines chart (see the InRow RC *Operation and Maintenance* manual) the equipment condenses excess water vapor from the air. This will exceed the pumping capacity of the condensate pump, causing the equipment to send an alarm and shut down to avoid overflowing the condensate pan. The condensate pump runs until the fluid level in the pan is reduced, and the alarm is automatically reset. The equipment self-regulates in this manner until normal operating conditions are present.



Note: The InRow RC is not intended to be used in an occupied office environment, due to potentially high noise levels during peak loads. Install the InRow RC in a computer room where people are normally present only for maintenance.

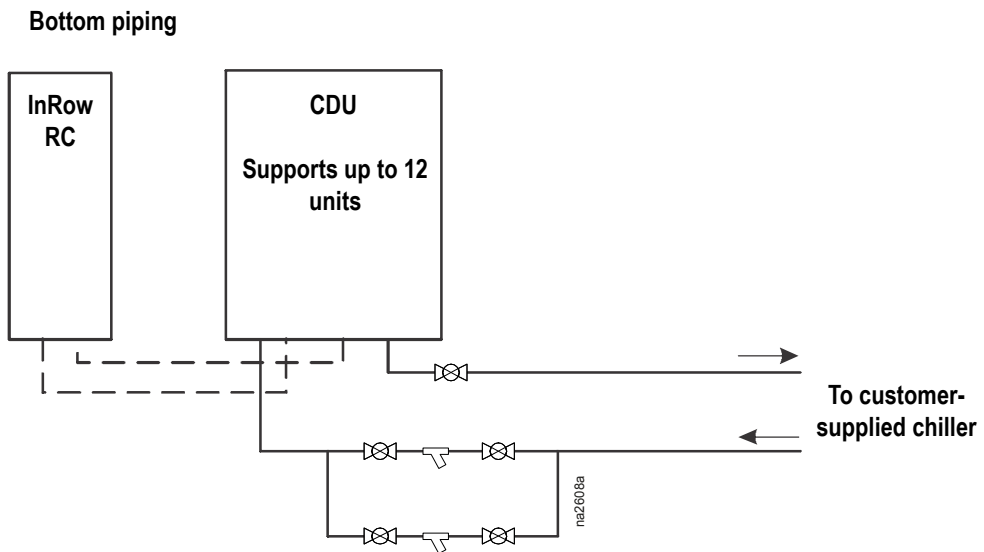
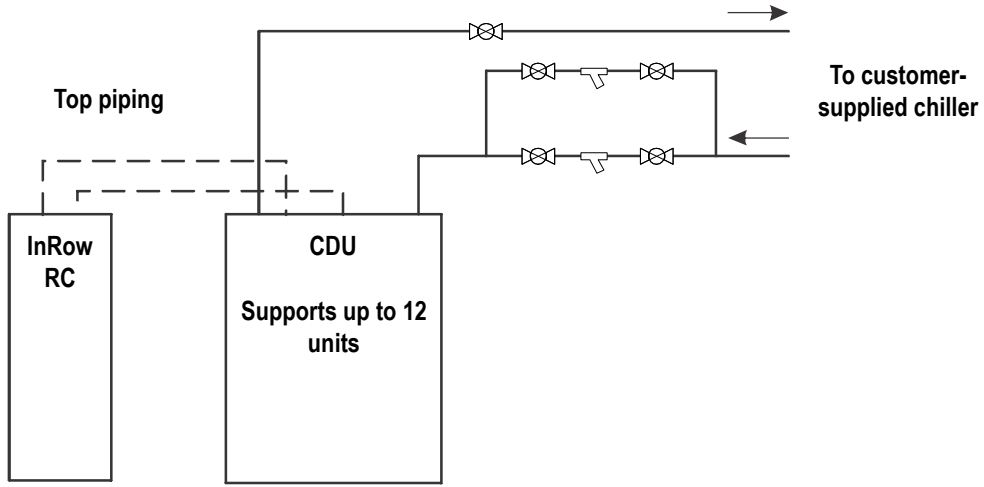
Incoming power supply requirements

See the electrical rating label on the equipment to determine the maximum possible current draw of the equipment. Provide either a single outlet circuit or a Power Distribution Unit (PDU) with sufficient capacity to handle all loads. Do not plug two InRow RC units into the same branch circuit or PDU.

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

Piping Diagrams

With cooling distribution unit (CDU)



----- Flex hose or copper tubing

————— Copper tubing



Y-strainer with 20 mesh screen (field installed)



Shutoff valve (field-installed)

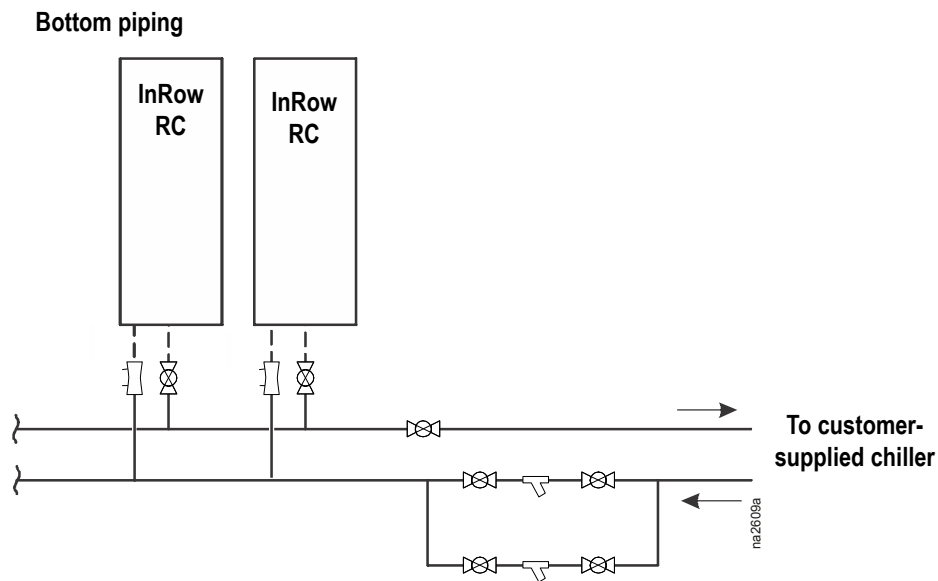
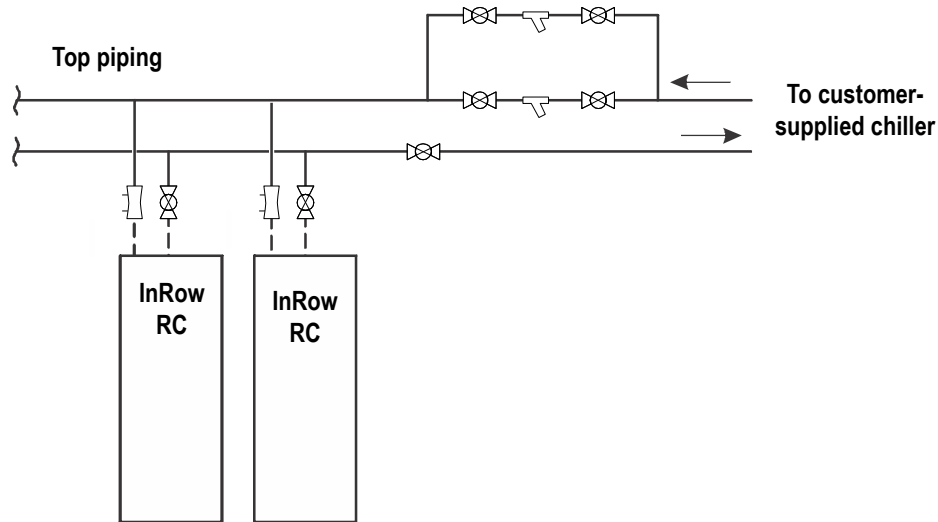


Note: Install isolation valves and particulate strainers with 20 mesh stainless steel screen (opening size = 865 micron) in the supply line between the chiller and the CDU. If the system is to be set up as an isolated loop - a chiller and pipe layout, dedicated only to supplying RC units and no other equipment - the strainer may be placed in the piping circuit before the pump. Thoroughly flush the system to remove all debris and process chemicals.




Note: Top or bottom entry can be chosen individually for each type of connection, i.e. power, condensate drain, humidifier water supply, chilled water supply and chilled water return. Top piping configurations will have the same valves and strainers as bottom piping configurations.


Without CDU




--- Flex hose or copper

— Copper tubing

 Circuit setter

 Y-strainer with 20 mesh screen (field installed)

 Shutoff valve (field-installed)

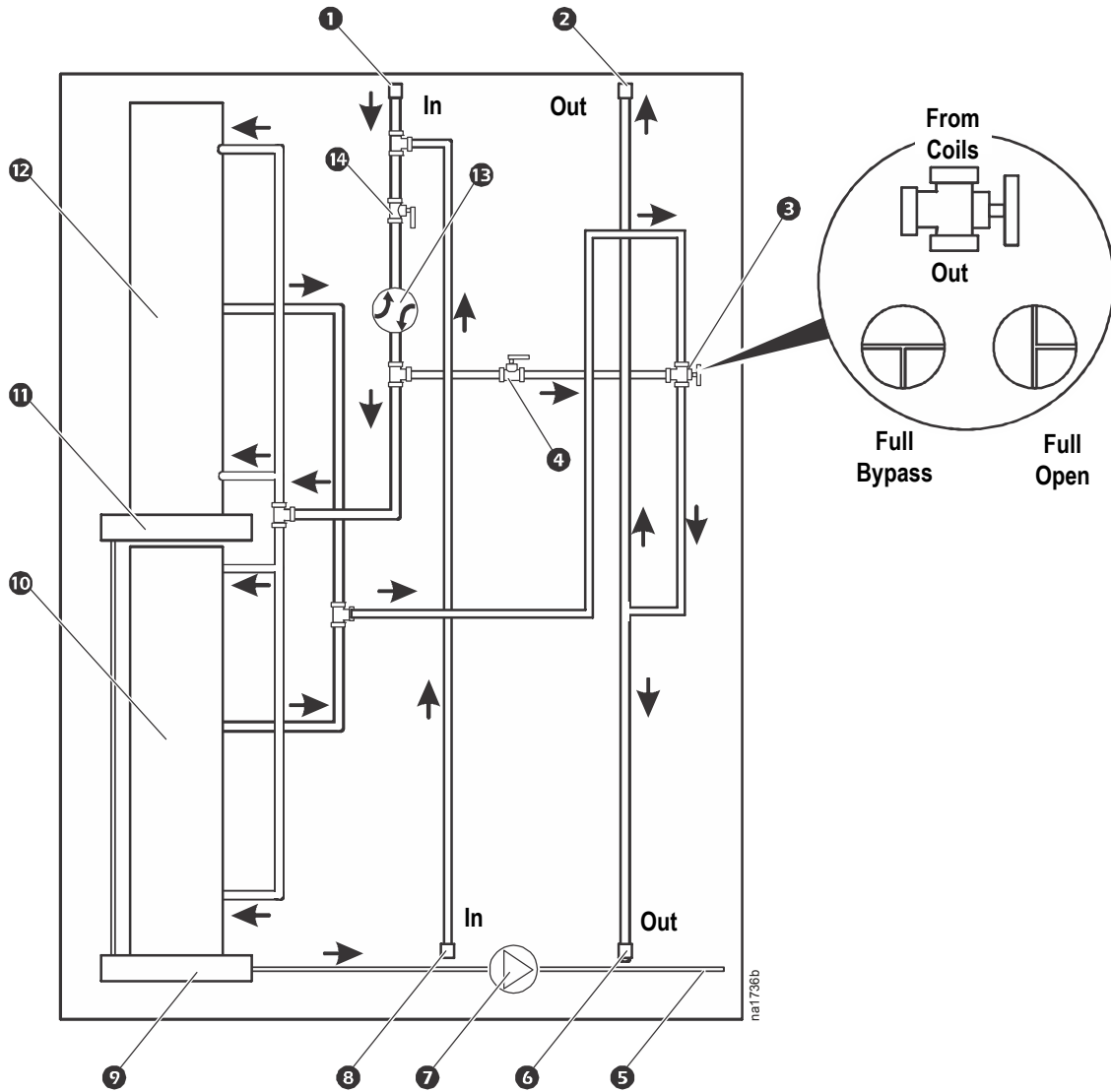


Note: Install isolation valves and particulate strainers with 20 mesh stainless steel screen (opening size = 865 micron) in the supply line between the chiller and the CDU. If the system is to be set up as an isolated loop - a chiller and pipe layout, dedicated only to supplying RC units and no other equipment - the strainer may be placed in the piping circuit before the pump. Thoroughly flush the system to remove all debris and process chemicals.



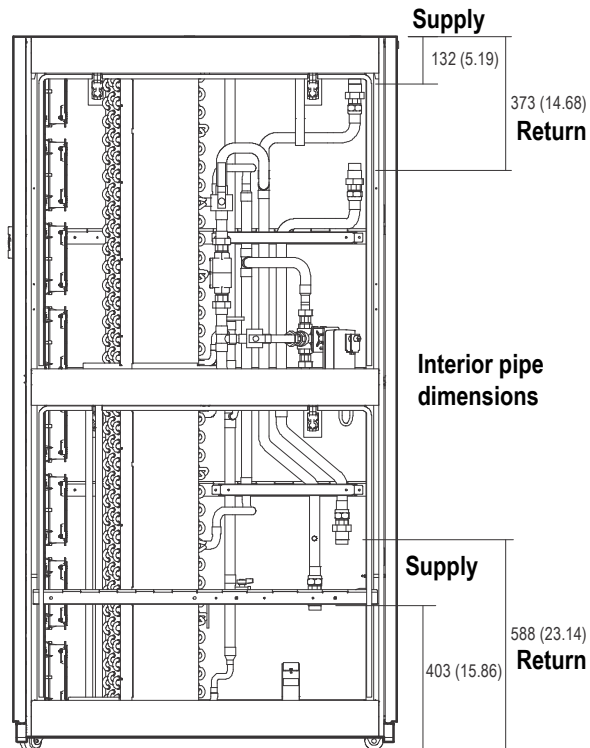
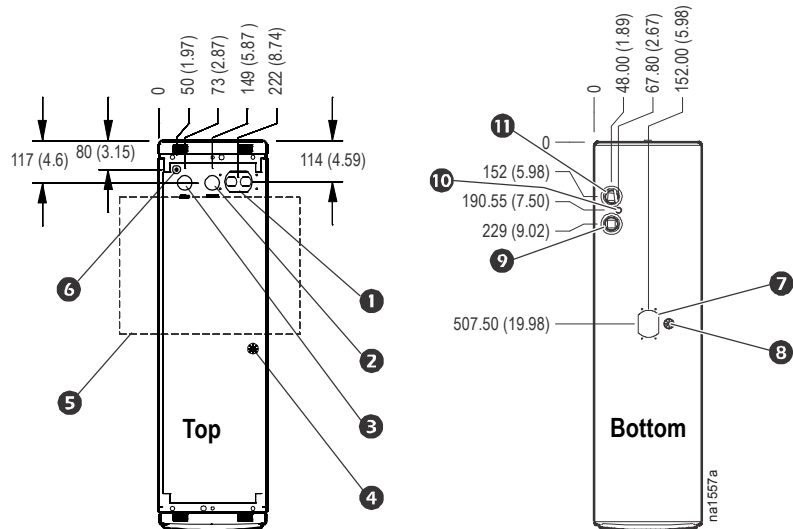
Note: Top or bottom entry can be chosen individually for each type of connection, i.e. power, condensate drain, humidifier water supply, chilled water supply and chilled water return. Top piping configurations will have the same valves and strainers as bottom piping configurations.

Internal piping diagram



- | | |
|---------------------------------------|--|
| ① Entering water union (top piping) | ⑧ Entering water union (bottom piping) |
| ② Leaving water union (top piping) | ⑨ Bottom condensate pan |
| ③ 3-way actuator control valve—3/4 in | ⑩ Bottom coil |
| ④ Bypass shutoff ball valve—3/4 in | ⑪ Top condensate pan |
| ⑤ Condensate drain | ⑫ Top coil |
| ⑥ Leaving water union (bottom piping) | ⑬ Flow meter |
| ⑦ Condensate pump | ⑭ Inlet shutoff valve—1 in |

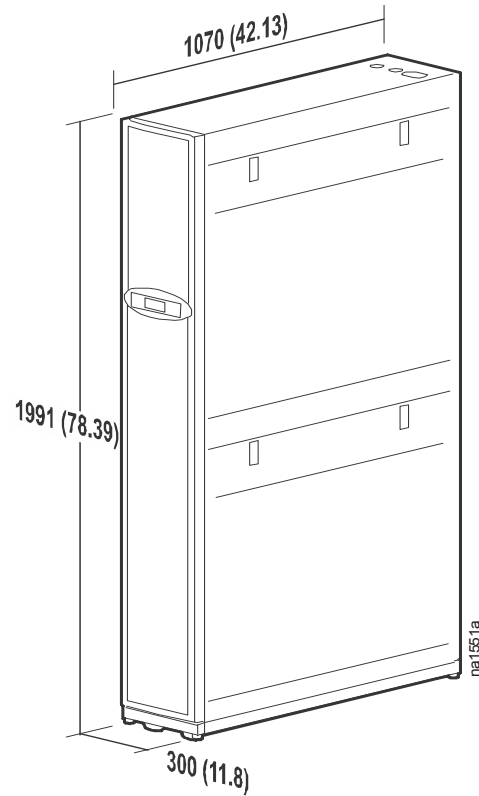
Piping and electrical access locations



Dimensions are shown in mm (in).

- | | |
|--|---|
| ❶ Power connections | ❷ Power connections |
| ❸ 1-in NPT female (return) | ❸ Low voltage input wiring (customer) |
| ❹ 1-in NPT female (supply) | ❹ 1-in NPT female (supply) |
| ❺ Low voltage input wiring (customer-supplied) | ❺ Condensate line—0.25 in ID/0.38 in OD |
| ❻ Cable trough location | ❻ 1-in NPT female (return) |
| ❼ Condensate line—0.25 in ID/0.38 in OD | |

Weights and Dimensions



Dimensions are shown in mm (in).

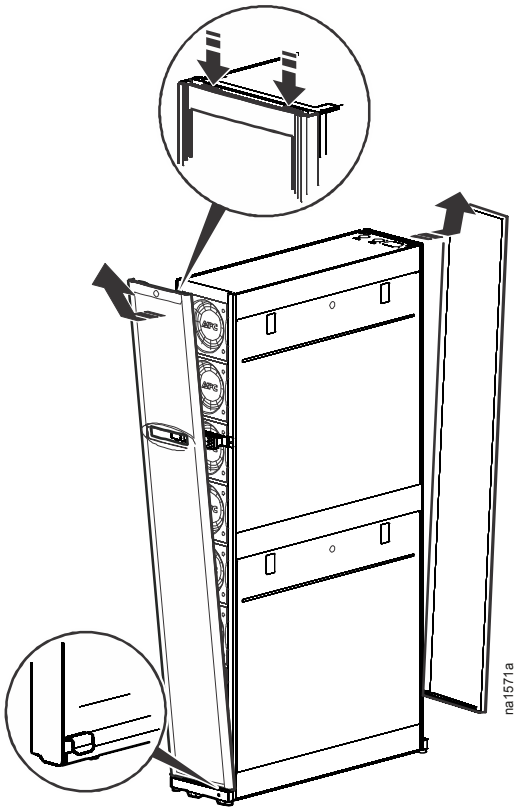
Net weight (equipment only) 162.77 kg (358.5 lb)

Installation

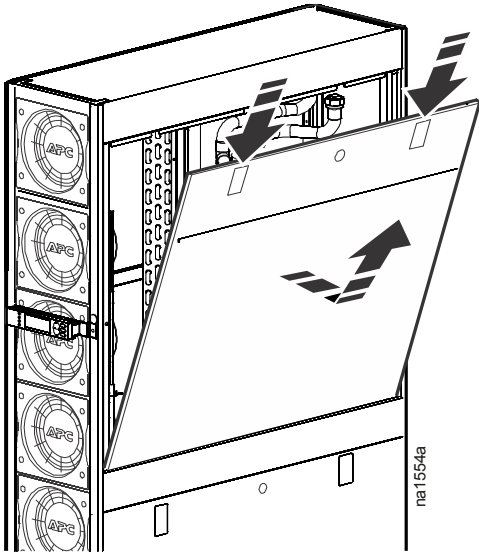
Removing Doors and Panels

⚠ WARNING
MOVING PARTS HAZARD <ul style="list-style-type: none">• Do not open doors and panels if the equipment is operating Failure to follow these instructions can result in death, serious injury, or equipment damage.
⚠ CAUTION
UNPROTECTED PARTS <p>Be careful when placing doors when removed from the equipment. Spring latches are easily damaged.</p> Failure to follow these instructions can result in equipment damage.

Door removal



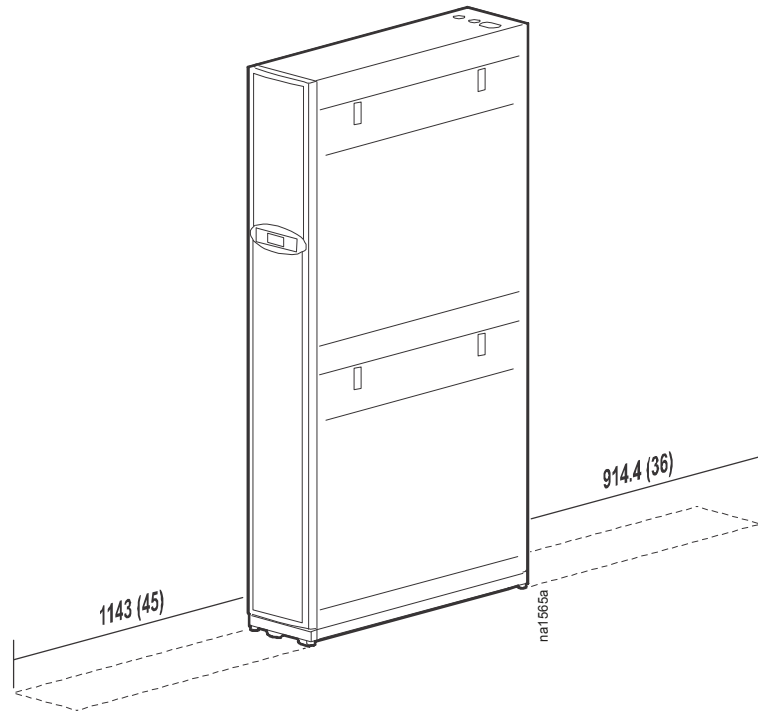
Side panel removal



Positioning the Equipment

Service access

An area of 1143 mm (45 in) of clear floor space in front and 914.4 mm (36 in) in back of the equipment is required for service. All required maintenance can be performed from the front or back of the equipment.



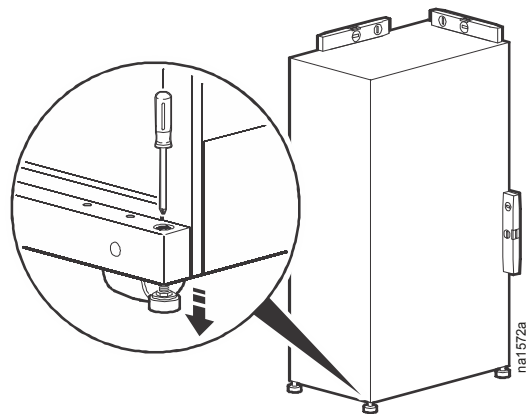
Dimensions are shown in mm (in).

Leveling

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

Once the equipment is in its intended location, use a screwdriver to turn each leveling foot until it makes contact with the floor. Adjust each foot until the equipment is level and plumb.

You can remove the casters and leveling feet to allow the equipment to rest directly on the floor.



Stabilizing the Equipment

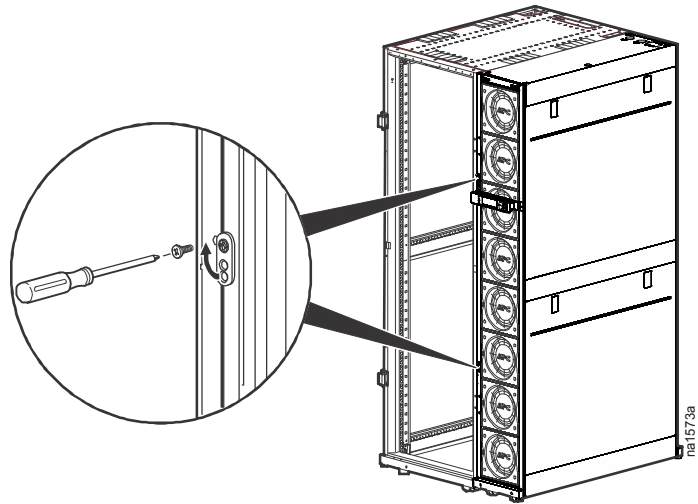
Floor brackets

To prevent the equipment from moving from its final location (if it is not joined with an enclosure), use the included bolt-down kit (AR7701). Follow the installation instructions included with the kit.

Joining to enclosures

NetShelter™ SX enclosure. Two joining brackets are installed on the front and rear of the equipment. Depending on how the holes on the joining brackets are used, you have the option of either 24-in or 600-mm spacing.

1. Remove the front and two rear doors from the equipment. See “Door removal” on page 13.
2. Locate the four joining brackets on the equipment. Rotate each bracket 90° toward the adjoining enclosure so that the bracket is parallel to the floor.
3. Install the brackets using the Phillips screws provided with the equipment.



NetShelter VX enclosure. The equipment may be joined to a NetShelter VX enclosure (24-in spacing only) by using an accessory kit (AR7602), sold separately.

Mechanical Connections

Piping



Note: Ensure coolant water quality complies with guidelines set forth in IB0125GB001.

Water. Install shutoff valves for routine service and emergency isolation of the equipment. When a CDU is not used, you must install circuit setters to regulate the chilled water flow for each InRow RC air conditioner. See “Piping Diagrams,” beginning on page 8.

Layout and piping considerations.

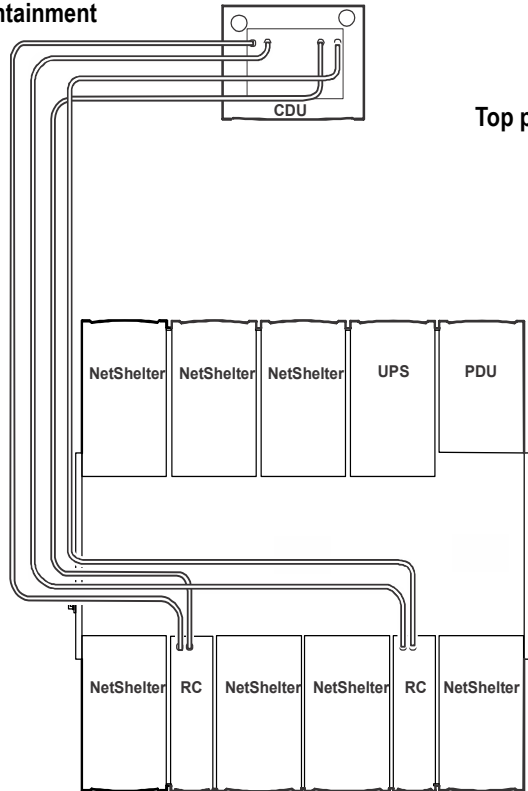
Fluid pipes are not allowed directly above electrical equipment. All piping must be installed above the aisles as shown. If any piping makes a turn, or must be routed over electrical equipment, there must be a drip tray under the pipe that will protect the equipment from condensation and leaks. All piping must be kept separate from any electrical runs or wiring.

Insulation. Insulate water lines to protect personnel and to minimize condensation.



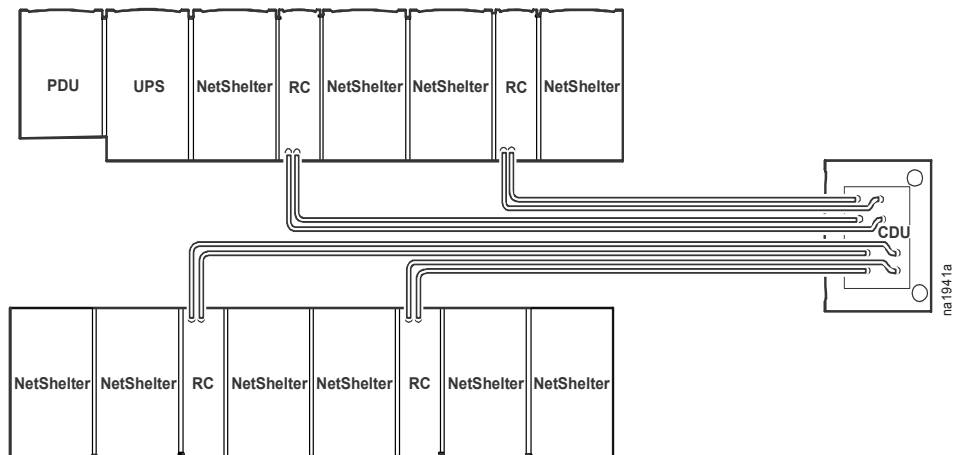
Note: Using either tape or glue, completely seal the insulation boots covering the unused supply and return connections.

Hot Aisle Containment



Top piping examples shown

InRow



na194-1a

Connect piping



See “Piping Diagrams,” beginning on page 8, for recommended valve, flexible adapter, and strainer installation locations.

1. Route all piping **1** to the InRow RC in compliance with all local and national codes.



Note: Circuit setters are required to regulate the flow of chilled water to each piece of equipment. When a CDU is used in conjunction with the equipment, circuit setters are not required, as the CDU provides the flow-regulating function.



Note: The figure shows a top piping installation with a PEX fitting. Bottom piping installations or rigid piping fittings are handled similarly.

2. Disassemble the union on the entering or exiting water line:

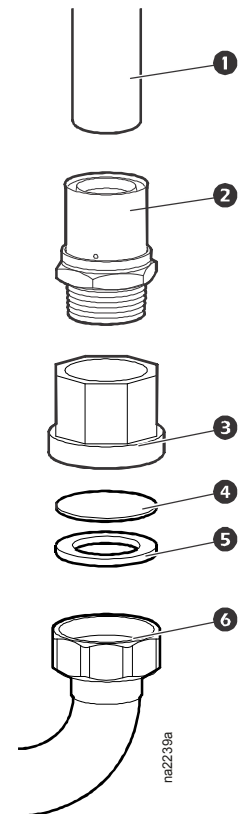
- a. Remove the nut **3** from the body **6**.
- b. Remove the disc **4** and gasket **5**. Save the gasket.
- c. The disc **4** prevents water flow through the union. Discard the disc **4**.

3. Repeat step 2 for the union on the other water line.

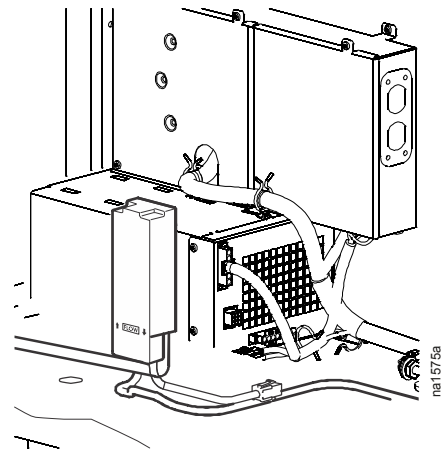
4. Assemble the union on the entering or exiting water line:

- a. Use thread sealant and thread sealing tape in accordance with local and national codes.
- b. Slide the nut **3** onto the fitting **2**.
- c. Seat the gasket **5** into the body **6**.
- d. Tighten the body **6** onto the nut **3**, using a properly-sized open end wrench.

5. Repeat steps 1 through 4 for the union on the other water line.



Condensate pump. The pump is factory-wired and piped internally to the lower condensate pan. The pump is capable of moving liquid a maximum of 15.2 m (50 ft), including a maximum lift of 4.9 m (16 ft). For example, if your lift is 3 m (10 ft), you have 12.2 m (40 ft) of usable run. The pump also uses an on-board condensate high level float switch, which is wired into the InRow RC alarm input for local and remote alarm capabilities.

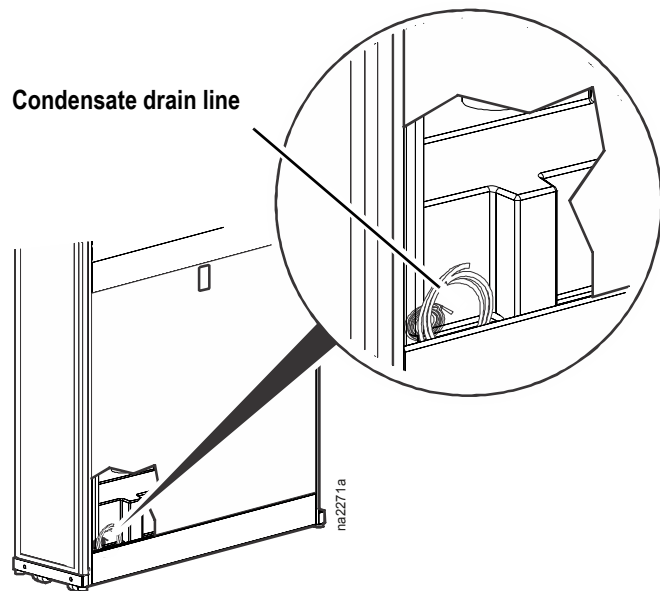


⚠ CAUTION
CONDENSATE DAMAGE
<ul style="list-style-type: none"> • Do not exceed the lift or the run length of the drain system. • To prevent equipment damage from condensate, do not leave the condensate drain line coiled inside the equipment. Route the condensate drain line out the top or bottom of the equipment before operation.
Failure to follow these instructions can result in equipment damage.

Condensate pump drain connection.

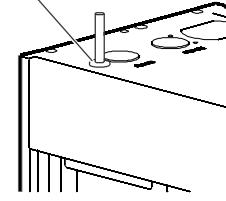


Note: Sufficient PVC drain line is supplied to route the drain to the outside of the equipment. To route the drain line to a remote drain, obtain additional hardware.



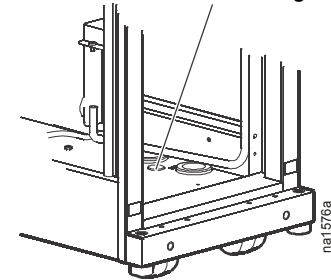
Condensate pump drain installation. The condensate drain line is coiled inside the equipment, allowing you to route the condensate drain line for either top or bottom use. See the table “Piping and electrical access locations” on page 11 for more information. Use the provided grommets to properly secure and protect the condensate drain line.

Top routing



Note: Comply with all local codes when installing the condensate drain line to the proper drain system.

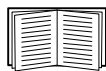
Bottom routing



Chiller

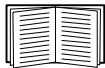
There are three types of chillers to which the equipment can be connected:

- APC size-matched chiller/thermal storage system
- Building chilled water system
- Existing dedicated chiller



See the chiller documentation: (installation, operation, and maintenance manuals) for proper installation procedures.

CDU



See the *CDU Installation* manual for proper installation procedures.

Accessories and spare parts

Accessories are available for the equipment, including flexible pipe adapters, data troughs, data partitions, and height adapters for use with other APC equipment. For more information, contact APC as directed on the back cover of this manual.

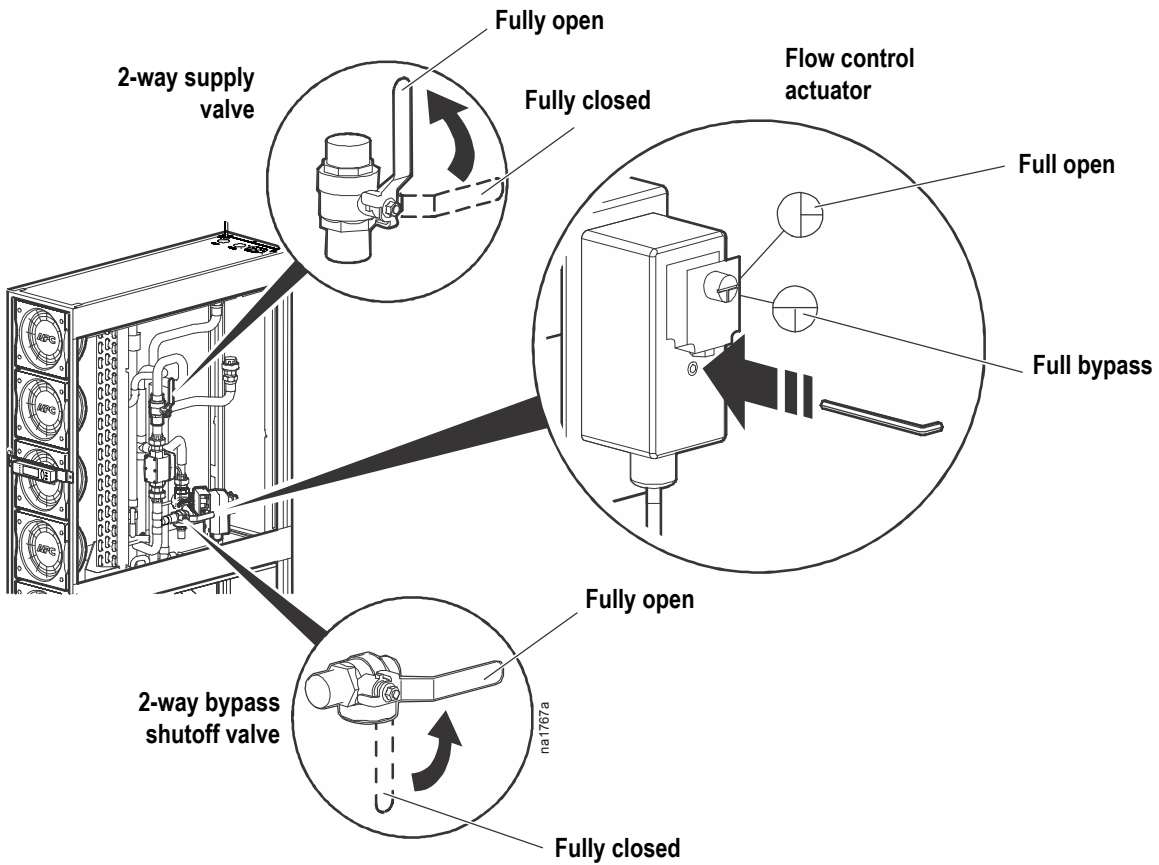
Many serviceable components are available as spare parts. For more information, contact APC as directed on the back cover of this manual.

Filling and Purging

When the equipment is properly piped, begin the filling process (top piping configuration shown).

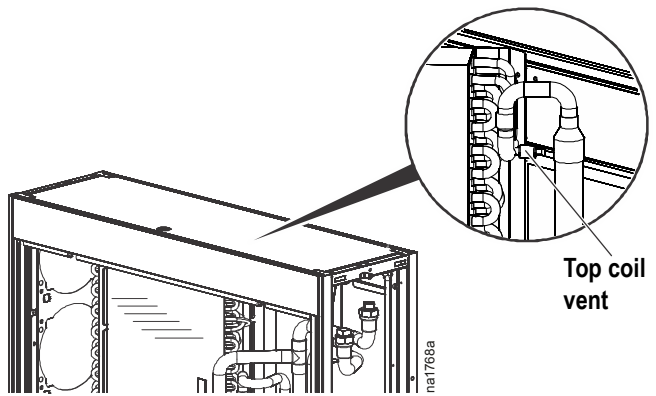
⚠ DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
Turn off all power supplying this equipment before working on the equipment.
Failure to follow these instructions will result in death or serious injury.

1. Open the 2-way supply valve and the 2-way bypass shutoff valve.
2. Using a 2.5-mm hex key, turn the flow control actuator to the fully open position.



3. Slightly open the top coil vent.
4. At the water supply, open the appropriate valves to begin letting water slowly enter the equipment.
5. At the equipment, close the top coil vent when water begins slowly flowing out of the vent.

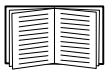
6. At the water supply:
 - a. Open all valves (no greater than 76 l/m [20 gpm]), allowing the water supply to reach the highest possible flow to the equipment for 45 seconds.
 - b. Close the valves to a 3.8–11.4 l/m (1–3 GPM) flow for 60 seconds.
 - c. Open the valves to maximum flow for another 45 seconds.
 - d. Balance the system to provide the designed flow rate to all equipment.



Electrical Connections

The following electrical connections are required in the field:

- Feeds A and B
- A-Link
- Network Management Card
- Temperature sensor
- Communication (building management system)



See the electrical schematic (located on the lid of the electrical box) for all electrical connections.

Make all electrical connections in accordance with national and local codes.

See the InRow RC nameplate for voltage and current requirements.

A power disconnect is required to isolate each InRow RC for maintenance and service.

All low-voltage connections, including data and control connections, must be made with properly insulated wires. The low-voltage connections must have 300-V minimum insulation.

⚠ DANGER
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
<ul style="list-style-type: none">• Turn off all power supplying this equipment before working on the equipment.• Use a voltmeter to ensure that power is turned off before making any electrical connections.
Failure to follow these instructions will result in death or serious injury.



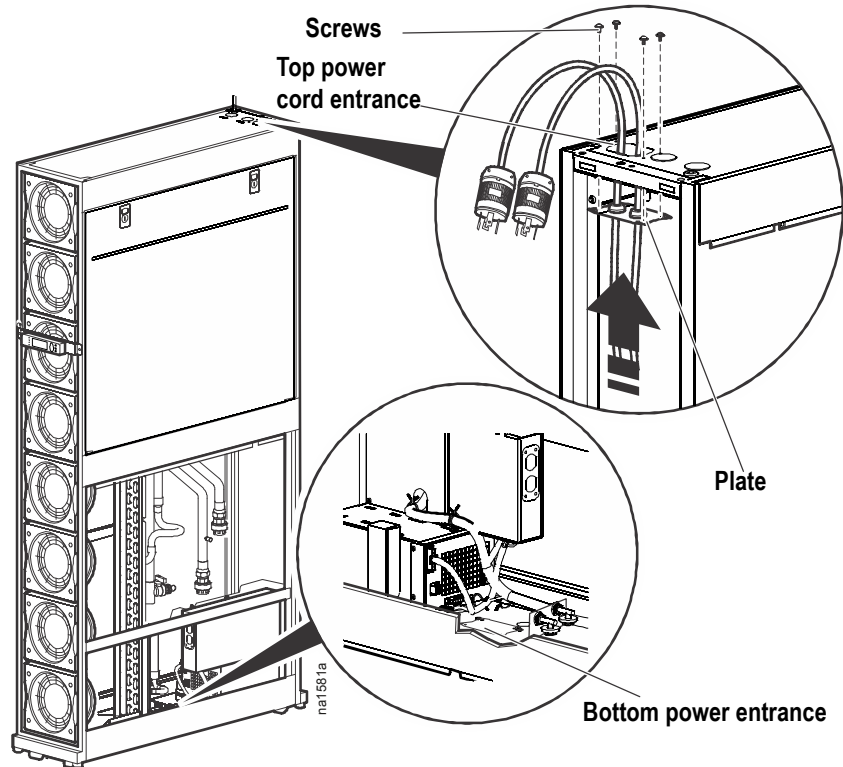
Note: Single phase service is required. Electrical service must conform to national and local electrical codes. The InRow RC is grounded through the power cord.

Power connections

Power cords may be routed through the top of the equipment (standard) or through the bottom (optional).

Top wiring configuration (standard).

1. Route power cords through the equipment to the top power cord access, as shown.
2. Push the power cords through the hole at the top power cord entrance.
3. Secure the plate to the underside of the equipment top with four Phillips screws (provided).
4. Secure the power cords at appropriate locations inside the equipment using the provided tie wraps.



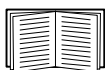
Bottom wiring configuration (optional).

1. Remove the blank plate from the bottom power cord entrance. Save the plate and the four Torx screws.
2. Route the power cords through the equipment to the bottom power cord access, as shown.
3. Feed the power cords through the hole at the bottom power cord entrance and secure the plate to the bottom of the equipment with the four Torx screws you saved in step 1.
4. Secure the blank plate to the top power entrance with four Phillips screws (provided).
5. Secure the power cords at appropriate locations inside the equipment using the provided wire ties.

Feeds A and B. The equipment is capable of receiving power through one of two separate feeds, feed A or feed B. Use the display interface to configure the unit to receive power through feed A, feed B, or both). If connected, feed B is the primary power input to the equipment by default; feed A is the backup power input. The equipment receives power through feed B regardless of whether feed A is receiving power. If power is removed from feed B, feed A takes over and supplies power to the equipment (if feed A is connected). Connect the feed A and feed B cables to individual, breaker-controlled branch circuits or to PDUs backed by separate Uninterruptible Power Supplies (UPS).

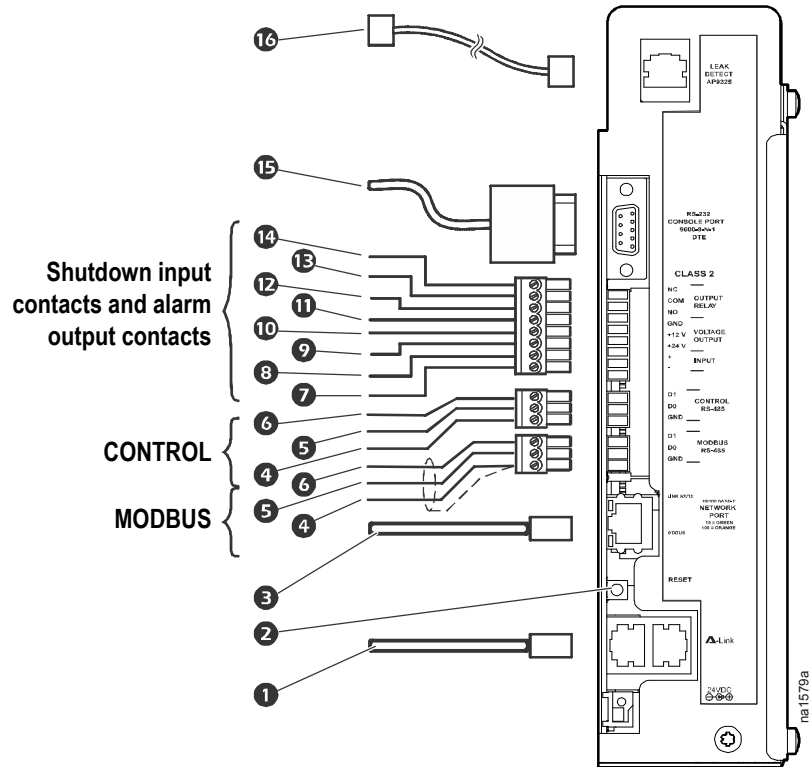


Note: Feed A and feed B must not use the same branch circuit, PDU, or UPS.



For more information on configuring power input feeds, see the *InRow RC Operation and Maintenance* manual.

User interface connection pinout



- | | |
|--|---|
| <p>1 A-Link port
Pin 1=High; Pin 2=Low;
Pins 3, 6=Perf Power; Pins 4, 5=Ground</p> <p>2 Reset button</p> <p>3 Network port</p> <p>Pins 1-8 = Standard RJ-45</p> <p>4 Shield/ground</p> <p>5 A-=True</p> <p>6 B+=True</p> <p>7 Shutdown -</p> <p>8 Shutdown +</p> | <p>9 24 Vdc (bias)</p> <p>10 12 Vdc (bias)</p> <p>11 Return (bias)</p> <p>12 NO (normally open contact)</p> <p>13 COM (common contact)</p> <p>14 NC (normally closed contact)</p> <p>15 RS-232 console port (see the InRow RC <i>Service Manual</i>)</p> <p>16 Leak detector (AP9325)</p> |
|--|---|

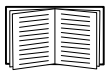
A-Link ports



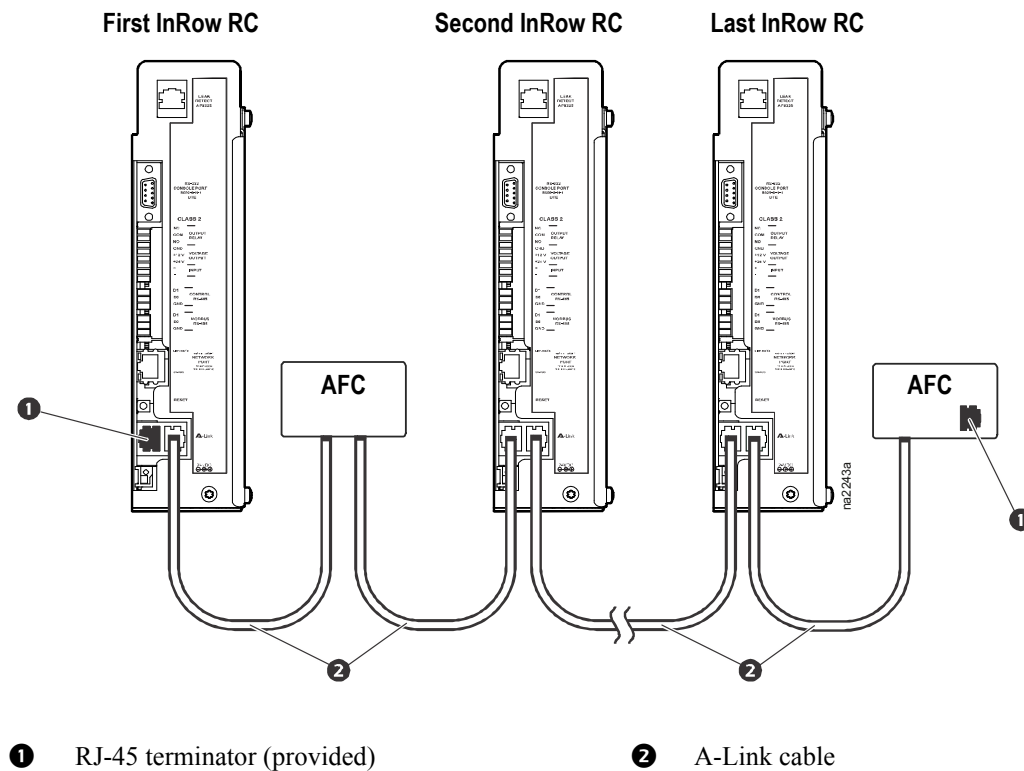
Note: All input and output connections should be wired as Class 2 circuits.

Depending on the equipment configuration, additional control connections may be required for the A-Link remote communications through APC Network Management Card support or other equipment-monitoring software. A special RJ-45 terminator is provided and must be installed if both A-Link ports are not otherwise used, as shown.

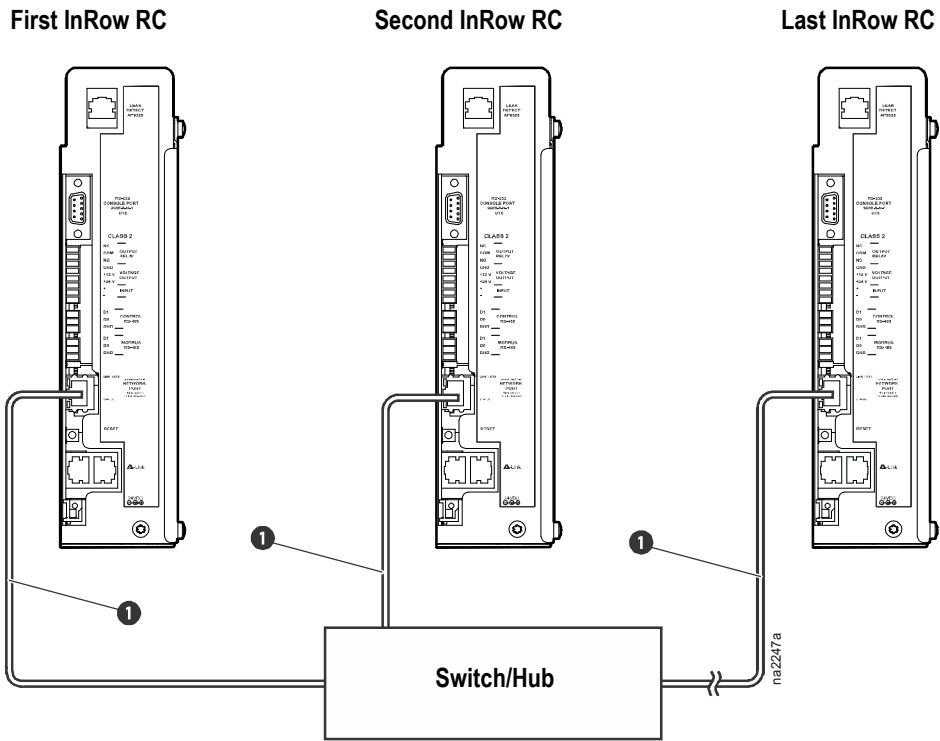
Active flow controllers (AFC). If AFC units are installed in the row, they are connected to the A-Link bus as shown.



See the *AFC Installation* manual for more information.

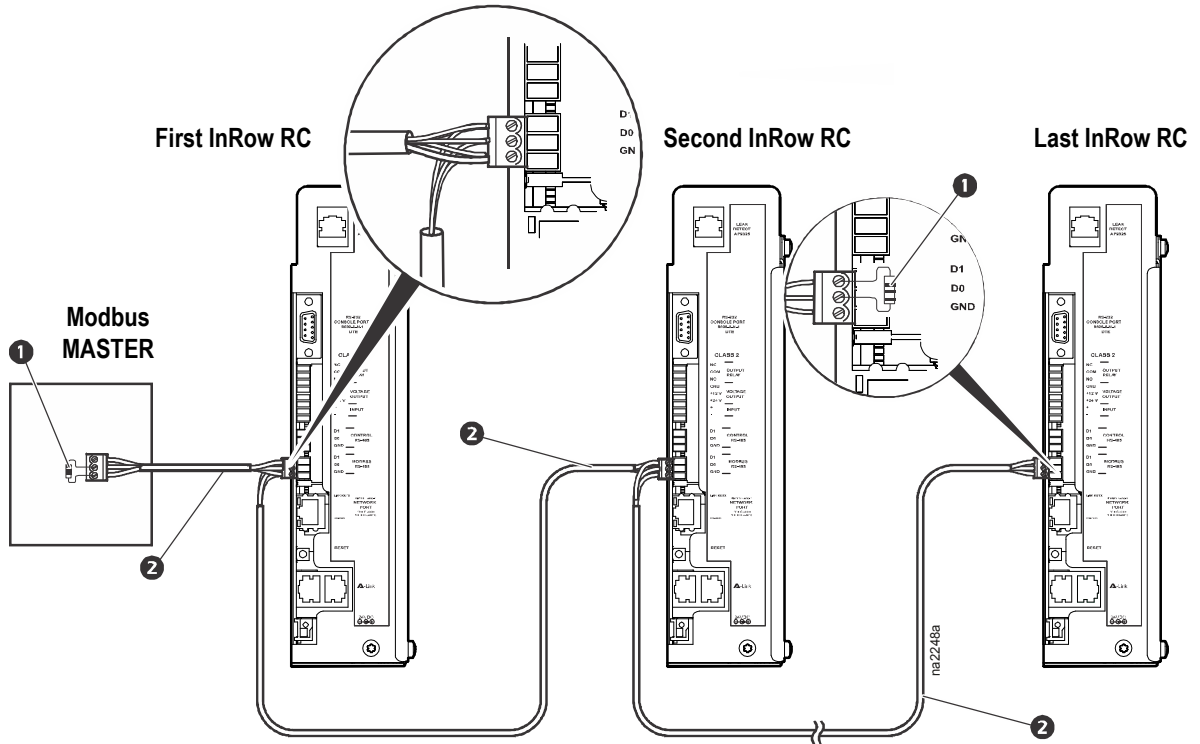


Network port



- 1 LAN cable (10/100 Base-T)

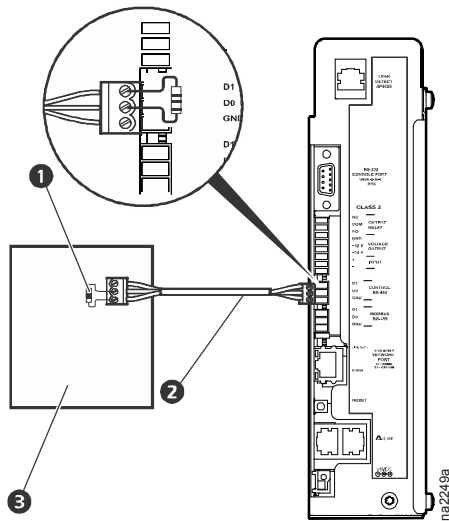
Modbus



❶ 150Ω termination resistor (provided)

❷ Modbus cable (RS-485)

Control connector



❶ 150Ω termination resistor (provided)

❸ Peripheral device (example: chiller)

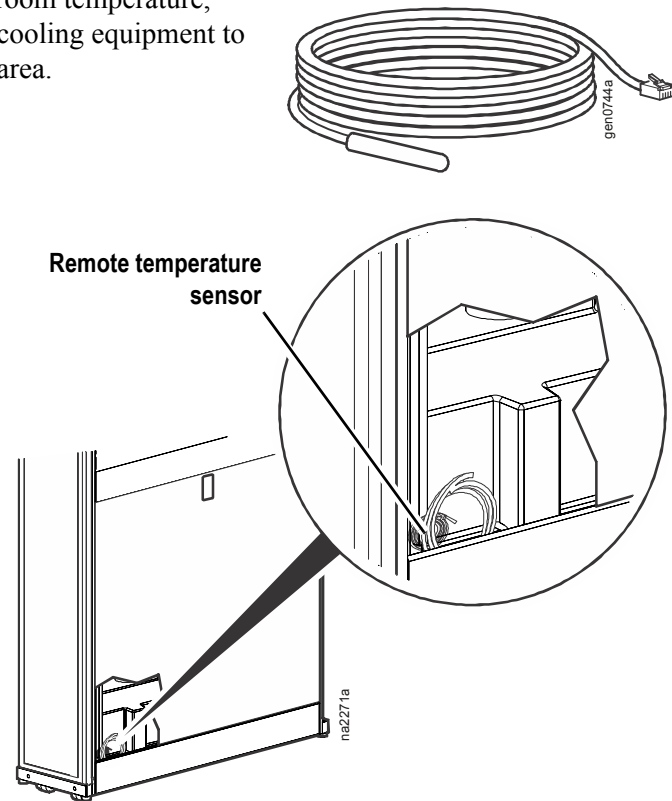
❷ Control cable (RS-485)

Temperature sensor

The remote temperature sensor monitors the room temperature, monitoring the environment surrounding the cooling equipment to ensure that the conditioned air is cooling the area.



Note: The remote temperature sensor comes coiled inside the equipment as shown, and must be mounted as follows, or the equipment will not operate properly.



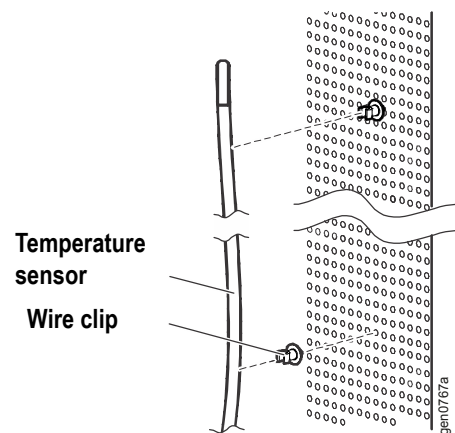
Install the temperature sensor.

1. Route the rack temperature sensor through the hole in either the top or bottom of the unit.
2. Route the sensor through either the top or the bottom of the adjacent server rack.
3. Secure the temperature sensor cable to the front door of the adjacent server rack at multiple locations using the provided wire clips as shown. See “Installation kit” on page 3.

The sensors must be installed 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 air or inadequately cooled 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 far from the equipment.
- g. Servers positioned very close to the equipment.



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