# Installation Manual

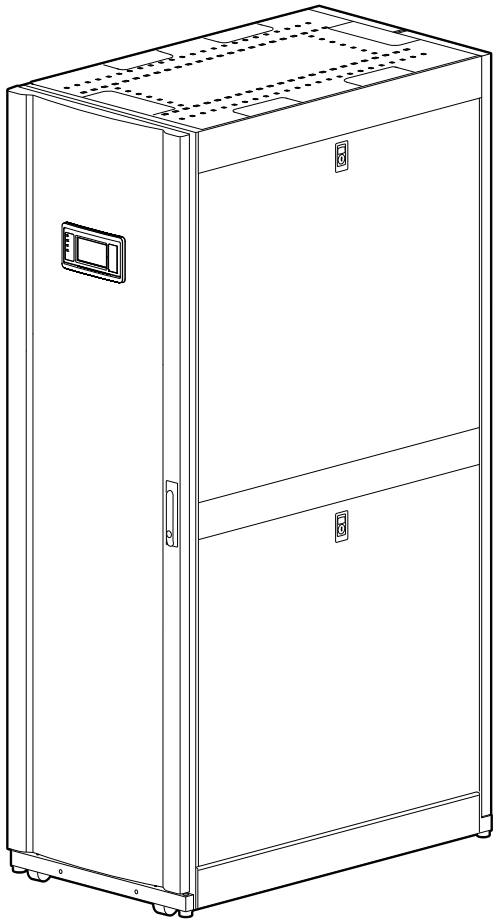
## InRow® Direct Expansion Air Conditioners

## InRow RD DX

## ACRD600, ACRD601, ACRD602, ACRD600P, ACRD601P, ACRD602P

**990-5711D-001**

**Publication Date: September 2017**



Schneider Electric

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# Table of Contents

# Safety

## Important Safety Information

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

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

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

**⚠ DANGER**

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

**⚠ WARNING**

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

**⚠ CAUTION**

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

***NOTICE***

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

# Safety Considerations While Installing This Equipment

## ⚠ ⚠ DANGER

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must be installed and serviced by qualified personnel only.
- Turn off all power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this 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

**HAZARD TO EQUIPMENT OR PERSONNEL**

All work must be performed by Schneider Electric qualified personnel.

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

## ⚠ WARNING

**HAZARD OF EQUIPMENT FALLING OVER**

- Use two or more persons at all times to move or turn this equipment.
- Always push, pull, or turn while facing the front and rear of this equipment. Never push, pull, or turn while facing the sides of this equipment.
- Slowly move this equipment across uneven surfaces or door thresholds.
- Lower leveling feet to floor when this equipment is at rest.
- Lower leveling feet and attach joining brackets to adjacent racks when this equipment is in final position.

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

# General Information

## Overview

### Save these instructions

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

### Symbols used in this manual

Indicates that more information is available in another location.

## Equipment Disposal

### Waste Electrical and Electronic Equipment (WEEE) disposal

Schneider Electric products comply with international directives on the Restriction of Hazardous Substances (RoHS) in electronic and electrical equipment and the disposal of Waste Electrical and Electronic Equipment (WEEE). Dispose of any waste electronic or electrical equipment with the appropriate recycling center. Contact Schneider Electric for assistance.

## Inspecting the Equipment

Your InRow air conditioner has been tested and inspected for quality assurance before shipment from Schneider Electric. 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 Schneider Electric Worldwide Customer Support for information on how to file 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 and contact Schneider Electric.

# Storing the Equipment Before Installation

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

| *NOTICE* |
| --- |
| **HAZARD TO EQUIPMENT**<br><br>Leaving the equipment uncovered and exposed to possible damage from the environment will void the factory warranty.<br><br>**Failure to follow these instructions can result in equipment damage.** |

# Moving the Equipment

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

**Pallet Jack**

**Forklift**

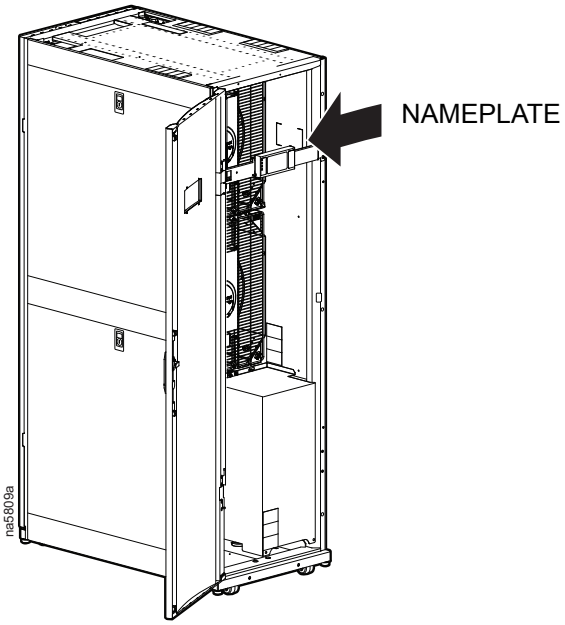
**NOTE:** The equipment can be rolled to its final location using its casters if the floor is smooth and clean.

# Model Identification

## Standard unit

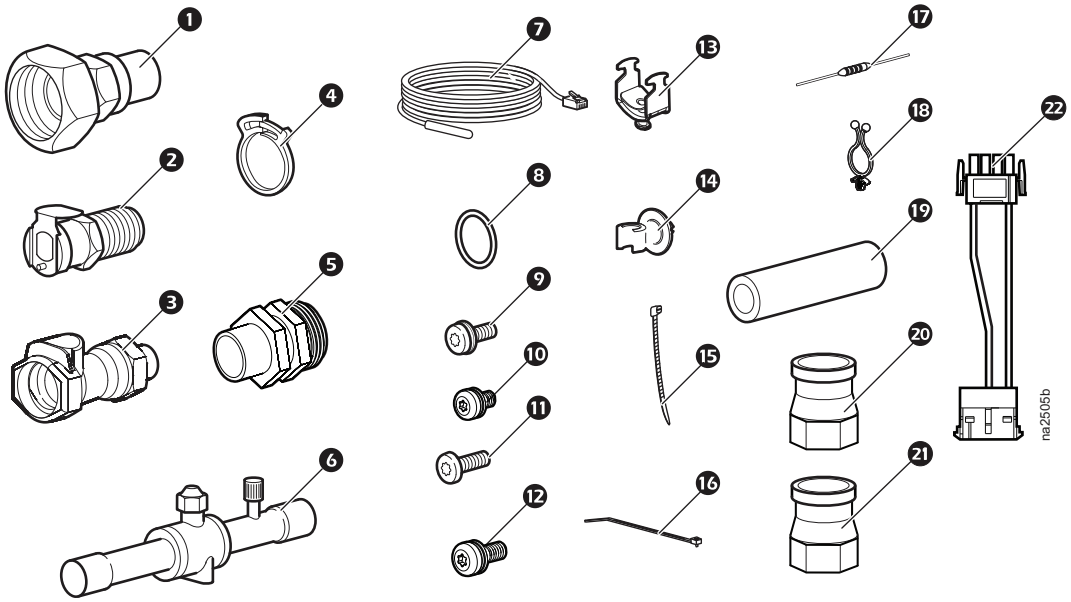
The model number can be found on the outside of the shipping crate and on the nameplate located inside the equipment as shown. Use the table below to verify that the equipment is the correct size and voltage.

| Model | Configuration | Voltage | Frequency | Reheat | Humidifier | Air Pattern |
|---|---|---|---|---|---|---|
| **ACRD600** | Air-cooled | 200-240 | 50-60 Hz | N/A | N/A | Back to front |
| **ACRD601** | Air-cooled | 460-480 | 60 Hz | N/A | N/A | Back to front |
| **ACRD602** | Air-cooled | 380-415 | 50-60 Hz | N/A | N/A | Back to front |
| **ACRD600P** | Air-cooled | 200-240 | 50-60 Hz | Electric | Steam canister (replaceable) | Back to front |
| **ACRD601P** | Air-cooled | 460-480 | 60 Hz | Electric | Steam canister (replaceable) | Back to front |
| **ACRD602P** | Air-cooled | 380-415 | 50-60 Hz | Electric | Steam canister (replaceable) | Back to front |



# Component Identification

## Install kit inventory

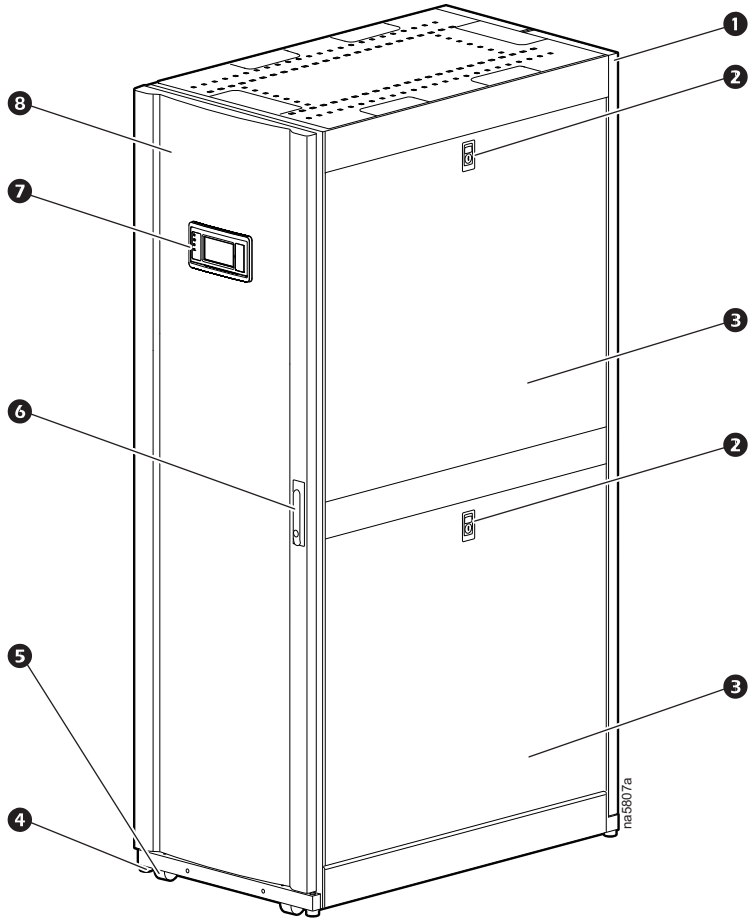



| Item | Description | Quantity |
|---|---|---|
| ❶ | Threaded ring seal straight fitting, female, 1 1/4-in. to 3/4-in.* I.D. | 4 |
| ❷ | Humidifier inlet water connection, shutoff | |
| | • 1/4-in. NPT*** and 1/4-in. BSPT** (ACRD600P) | 1 each |
| | • 1/4-in. NPT*** (ACRD601P) | 1 |
| | • 1/4-in. BSPT** (ACRD602P) | 1 |
| ❸ | Condensate drain outlet, shutoff, 3/8-in. BSPT** | 1 |
| ❹ | Condensate overflow hose adapter clamp, double snap | 2 |
| ❺ | Threaded ring seal male straight - 3/4-in.* I.D. | 2 |
| ❻ | Gas shutoff valve, 3/4-in. I.D. | 2 |
| ❼ | Temperature sensor | 3 |
| ❽ | Rotalock gasket, 1 1/4-in. | 4 |
| ❾ | M5 x 10-mm TORX® screw with washer (spare parts) | 5 |
| ❿ | M6 x 12-mm TORX screw with washer (spare parts) | 5 |
| ⓫ | M6 x 10-mm self-tapping TORX screw (spare parts) | 5 |

| Item | Description | Quantity |
|---|---|---|
| ⓬ | M6 x 16-mm TORX screw with washer | 5 |
| ⓭ | Strain relief, metal (ACRD602 and 602P only) | 2 |
| ⓮ | Wire clip | 9 |
| ⓯ | Tie wrap, 200 mm (8 in.) | 10 |
| ⓰ | Tie wrap, 390 mm (15.3 in.) | 3 |
| ⓱ | Resistor, 150 Ohm | 1 |
| ⓲ | Cable tie | 10 |
| ⓳ | Condensate overflow hose adapter | 1 |
| ⓴ | Reducer, 3/8-in. to 1/2-in. BSPT** | 1 |
| ㉑ | Reducer, 3/8-in. to 1/2-in. NPT*** | 1 |
| ㉒ | Voltage jumper | **** |

*Standard wall thickness
**British Standard Pipe Thread
***National Pipe Thread
****Quantity and wire connections vary depending on model number. See “Voltage selections—ACRD60x units” on page 53.

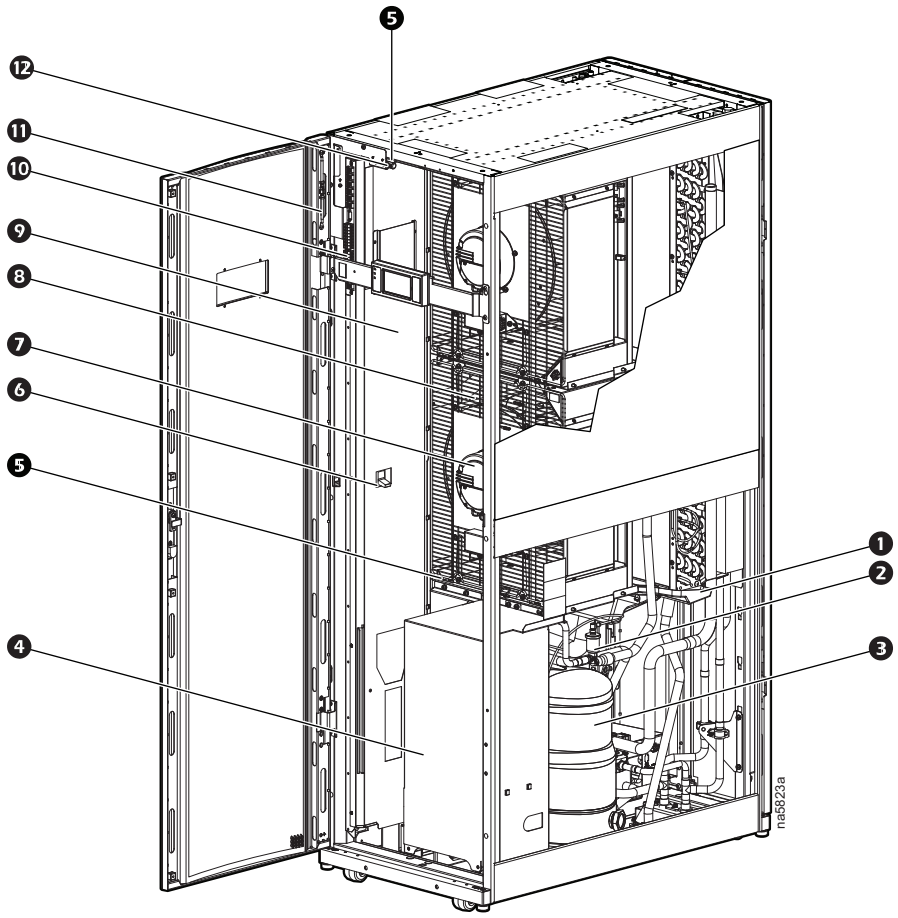
## Exterior components




| Item | Description | Item | Description |
|---|---|---|---|
| 1 | Removable rear doors | 5 | Caster |
| 2 | Side panel lock | 6 | Door handle and lock |
| 3 | Removable side panel | 7 | Display interface |
| 4 | Adjustable leveling foot | 8 | Removable front door |

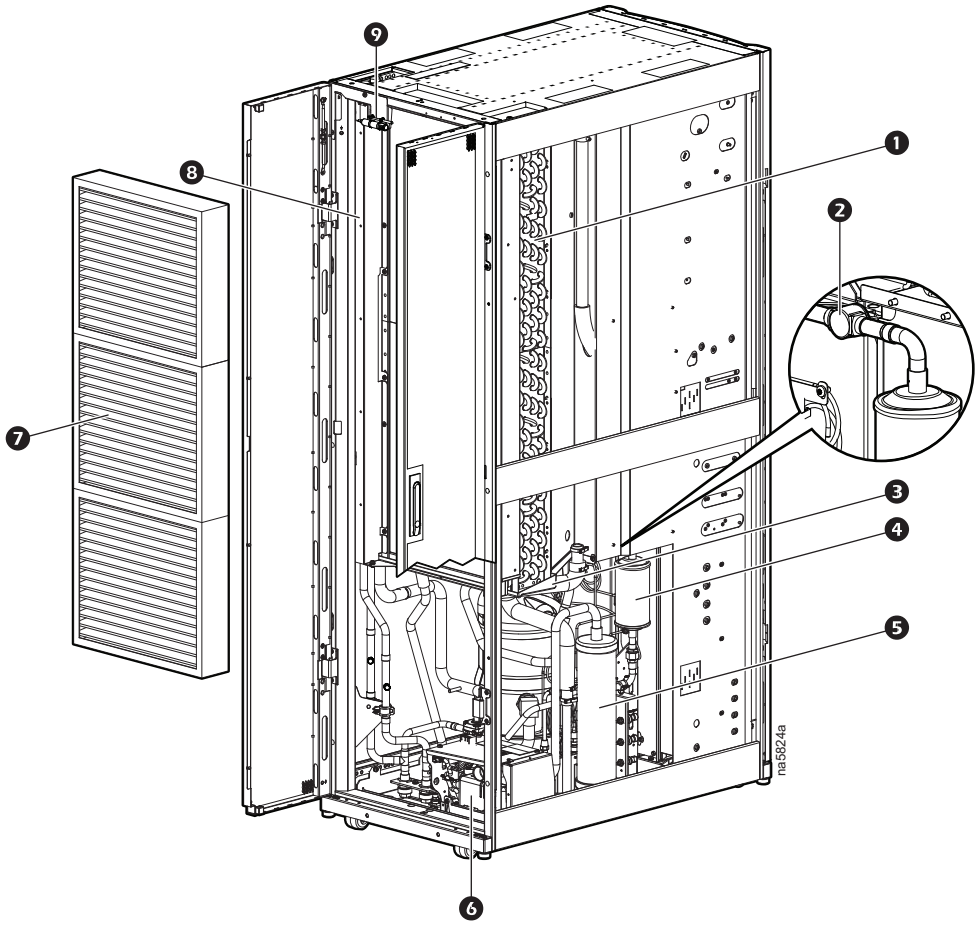
## Interior components (ACRD60x)

### Front




| Item | Description | Item | Description |
|---|---|---|---|
| ❶ | Condensate drain pan | ❼ | Fan (2) |
| ❷ | Electronic expansion valve | ❽ | Fan guard (2) |
| ❸ | Compressor | ❾ | Electrical panel |
| ❹ | Variable frequency drive (for compressor) | ❿ | Communication and external device connectors |
| ❺ | Supply air temperature sensor | ⓫ | Ground lug |
| ❻ | Main circuit breaker | ⓬ | Humidity sensor |

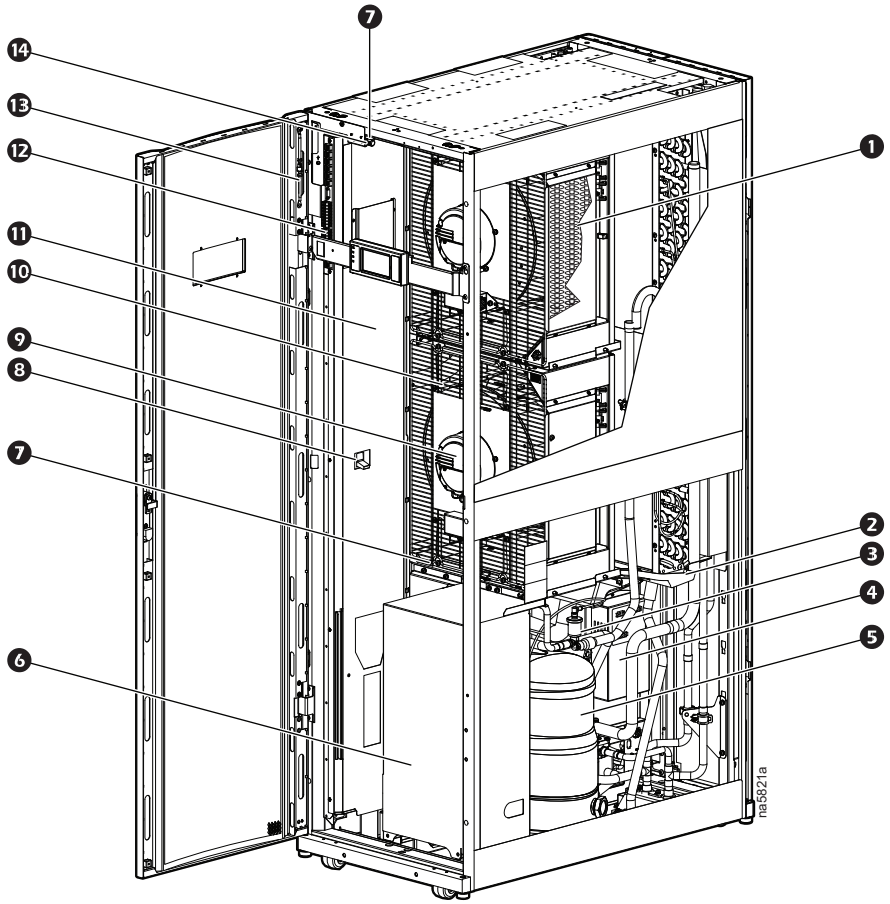
**Rear**




| Item | Description | Item | Description |
|---|---|---|---|
| ❶ | Evaporator coil | ❻ | Condensate pump |
| ❷ | Sight glass | ❼ | Air filters |
| ❸ | Condensate drain pan | ❽ | Pipe chase |
| ❹ | Filter drier | ❾ | Return air temperature sensor |
| ❺ | Oil separator | | |

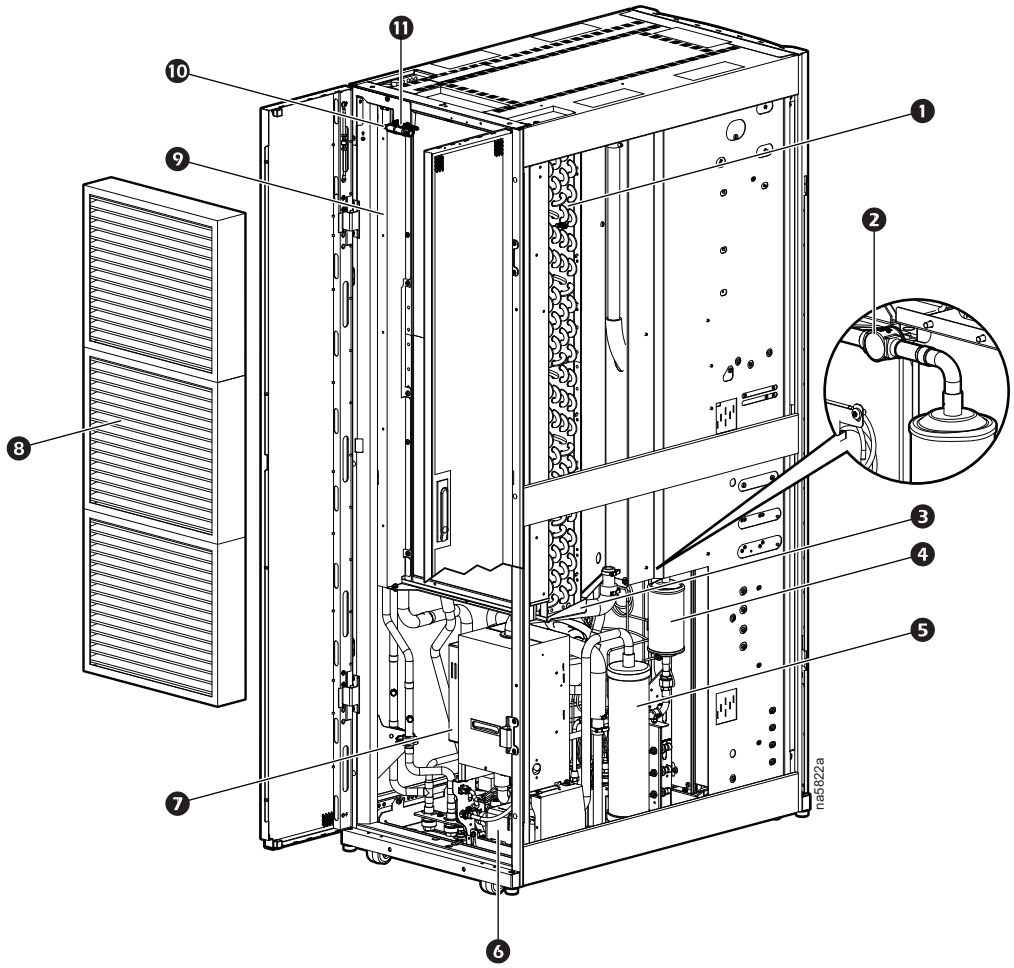
## Interior components (ACRD60xP)

### Front




| Item | Description | Item | Description |
|---|---|---|---|
| ❶ | Electric heater | ❽ | Main circuit breaker |
| ❷ | Condensate drain pan | ❾ | Fan (2) |
| ❸ | Electronic expansion valve | ❿ | Fan guard (2) |
| ❹ | Humidifier | ⓫ | Electrical panel |
| ❺ | Compressor | ⓬ | Communication and external device connectors |
| ❻ | Variable frequency drive (for compressor) | ⓭ | Ground lug |
| ❼ | Supply air temperature sensor | ⓮ | Humidity sensor |

**Rear**

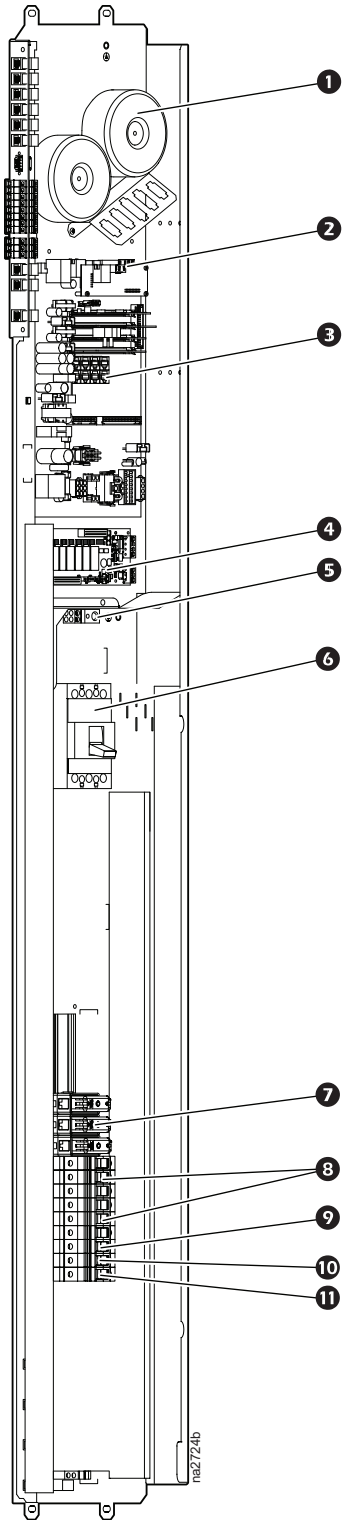



| Item | Description |
|---|---|
| ❶ | Evaporator coil |
| ❷ | Sight glass |
| ❸ | Condensate drain pan |
| ❹ | Filter drier |
| ❺ | Oil separator |
| ❻ | Condensate pump |

| Item | Description |
|---|---|
| ❼ | Humidifier |
| ❽ | Air filters |
| ❾ | Pipe chase |
| ❿ | Humidity sensor |
| ⓫ | Return air temperature sensor |

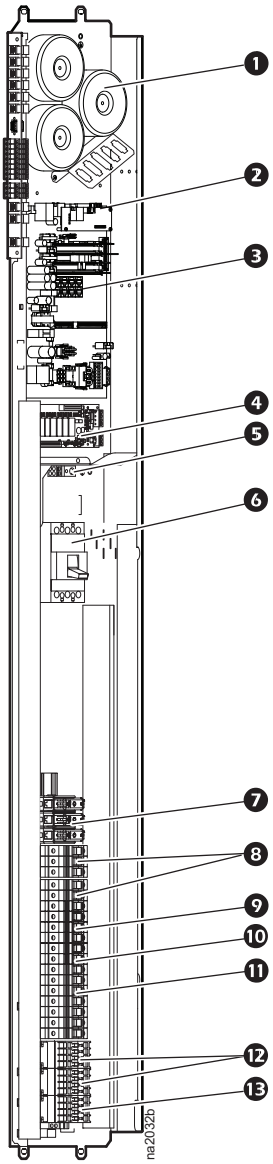
## Electrical panel

### ACRD600, ACRD601, ACRD602



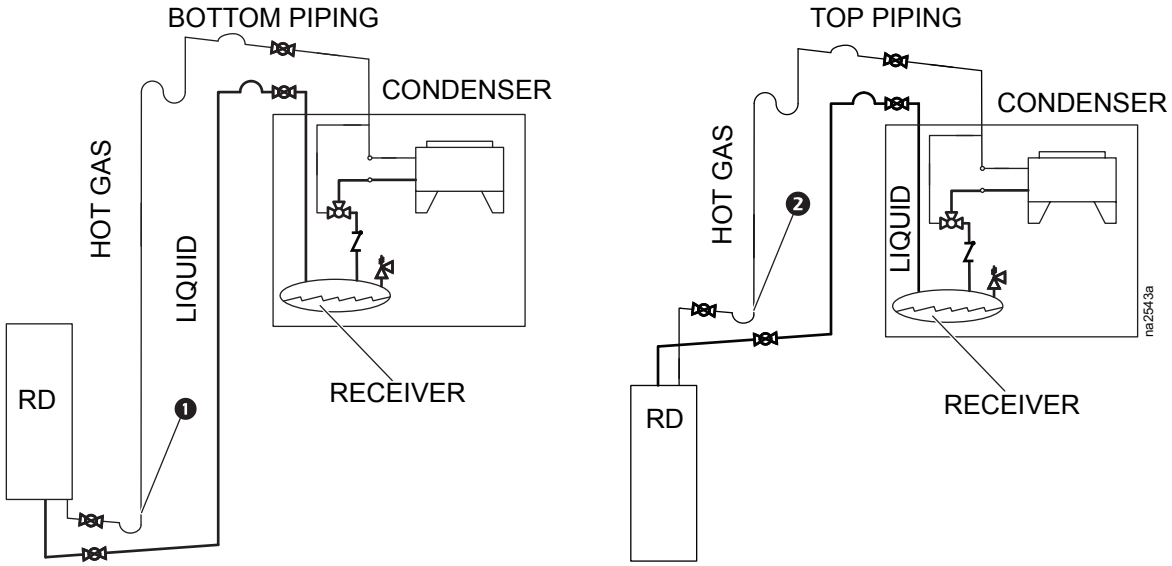

| Item | Description |
|---|---|
| ❶ | Transformers |
| ❷ | Display interface connectors |
| ❸ | Main controller board |
| ❹ | Relay board |
| ❺ | Ground lug |
| ❻ | Main circuit breaker |
| ❼ | Compressor fuse block (ACRD600, ACRD601)<br>Compressor circuit breaker (ACRD602) |
| ❽ | Fan circuit breakers |
| ❾ | Fuse not populated |
| ❿ | Transformer A fuse |
| ⓫ | Transformer C/MB fuse |

**ACRD600P, ACRD601P, ACRD602P**




| Item | Description |
|---|---|
| ❶ | Transformers |
| ❷ | Display interface connectors |
| ❸ | Main controller board |
| ❹ | Relay board |
| ❺ | Ground lug |
| ❻ | Main circuit breaker |
| ❼ | Compressor fuse block (ACRD600P, ACRD601P)<br>Compressor circuit breaker (ACRD602P) |
| ❽ | Fan circuit breakers |
| ❾ | Controller fuse |
| ❿ | Heater circuit breaker |
| ⓫ | Humidifier circuit fuse |
| ⓬ | Heater contactors |
| ⓭ | Humidifier contactor |

## Refrigeration piping diagram




| Item | Description |
|---|---|
| ❶ | Pitch in direction of refrigerant flow |
| ❷ | Reduction of piping diameter for vertical piping run (if necessary) |
| | Shutoff valves |
| | Head pressure control valve |
| | Check valve |

| Item | Description |
|---|---|
| | Pressure relief valve |
| | P-trap |
| | S-trap |
| | Inverted P-trap |

**NOTE:** All lines are Type L ACR hard-drawn copper pipes.

**NOTE:** Shutoff valves shown nearest to the condenser are provided in receiver kit.

**NOTE:** Pitch all lines in the direction of refrigerant flow: 4 mm per m (1/2 in. per 10 ft).

**NOTE:** Route piping through the top or bottom of the InRow RD cooling unit.

**NOTE:** Trap the vertical discharge line every 6 m (20 ft) to ensure proper oil return.

**NOTE:** The maximum piping run is 91 m (300 ft) equivalent length. Size the piping pursuant to accepted refrigeration practice.

**NOTE:** Condenser can be placed up to 4.5 m (15 ft) below the indoor cooling unit for equivalent line lengths of 8 m (25 ft) or less.

| For Condensers Mounted Below the Level of the Indoor Unit | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Piping Equivalent Length – m (ft)** | 91 (300) | 76 (250) | 61 (200) | 46 (150) | 30 (100) | 15 (50) | 8 (25) |
| **Allowable Distance From Bottom of Condenser to Bottom of Indoor Unit* – m (ft)** | 0.3 (1) | 1.5 (5) | 2.1 (7) | 2.7 (9) | 3.3 (11) | 3.9 (13) | 4.5 (15) |

*When condenser is installed below unit level, use 7/8 in. pipe for liquid line.
Note: Condenser can be placed higher than indoor cooling unit but height shall be no more than 27 m (90 ft), regardless of piping length.

## Connections overview

All connections to and from the equipment can be made through either the top or the bottom of the equipment. Once the corresponding connectors are sweated or soldered into place, the equipment can be disconnected without additional soldering, welding, or gluing. See the following tables for information about the sizes and types of connectors.

## Power connections

| Model | Voltage | Minimum Circuit Ampacity (MCA) | Maximum Overload Protection (MOP) | Full Load Amperes (FLA) | Compressor | | Power (kW) |
|---|---|---|---|---|---|---|---|
| | | | | | Locked Rotor Amperes (LRA) | Compressor Rated Load Amperes (RLA) | |
| ACRD600 | 200-240 V, 50/60 Hz | 52.6 | 80 | - | 29.7* | 36.6 | 14.6 |
| ACRD601 | 460-480 V, 60 Hz | 24.4 | 40 | - | 28.1* | 16.6 | 14.6 |
| ACRD602 | 380-415 V, 50/60 Hz | 31.1 | 50 | 25.2 | 28.1* | 16.6 | 14.6 |
| ACRD600P | 200-240 V, 50/60 Hz | 78.6 | 110 | - | 29.7* | 36.6 | 23.5 |
| ACRD601P | 460-480 V, 60 Hz | 36.9 | 50 | - | 28.1* | 16.6 | 23.5 |
| ACRD602P | 380-415 V, 50/60 Hz | 45.8 | 60 | 34.2 | 28.1* | 16.6 | 23.5 |

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

## Piping connections

| Connection | Type | ACRD600 ACRD600P | ACRD601 ACRD601P | ACRD602 ACRD602P |
|---|---|---|---|---|
| Refrigerant discharge | 1 1/4-in. Rotalock* | 3/4-in. ID | 3/4-in. ID | 3/4-in. ID |
| Refrigerant liquid | 1 1/4-in. Rotalock* | 3/4-in. ID | 3/4-in. ID | 3/4-in. ID |
| Humidifier water supply (ACRD600P, ACRD601P, ACRD602P only) | Quick coupling | 1/4-in. NPT or 1/4-in. BSPT | 1/4-in. NPT | 1/4-in. BSPT |
| Condensate drain | Quick coupling | 1/2-in. female NPT or 1/2-in. female BSPT | 1/2-in. female NPT or 1/2-in. female BSPT | 1/2-in. female NPT or 1/2-in. female BSPT |

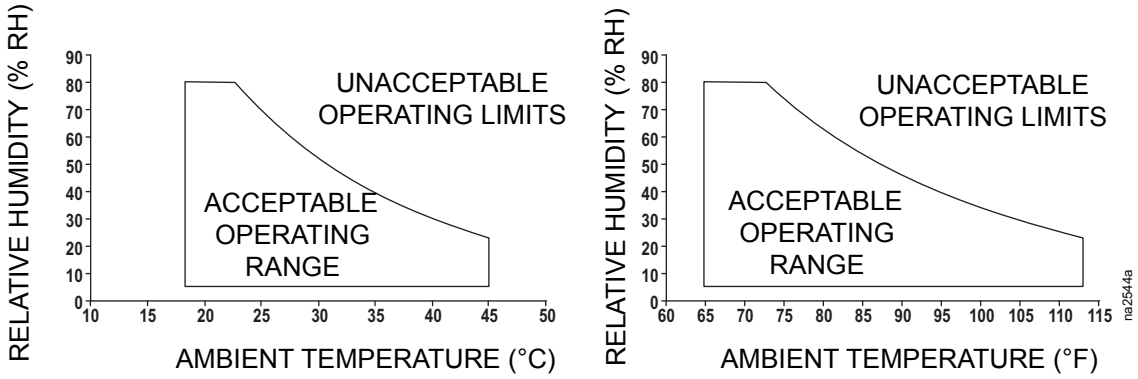
* Use a new Teflon gasket (supplied) to prevent leakage. Tighten Rotalock nut to 90 Nm (66 ft-lb).

## Communication connections

| Connection | Type | Wire Size | | Torque |
|---|---|---|---|---|
| | | Minimum | Maximum | |
| Rack temperature 1 | RJ-45 | - | - | - |
| Rack temperature 2 | RJ-45 | - | - | - |
| Rack temperature 3 | RJ-45 | - | - | - |
| A-Link IN | RJ-45 | - | - | - |
| A-Link OUT | RJ-45 | - | - | - |
| Network port | RJ-45 | - | - | - |
| Customer output, Normally Closed (NC) | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Customer output, Common (COM) | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Customer output, Normally Open (NO) | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Supply GND | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Supply 12 Vdc | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Supply 24 Vdc | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Customer input + | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Customer input – | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Modbus D1 | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Modbus D0 | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |
| Modbus GND | Screw connector | AWG 24 (0.2 $mm^2$) | AWG 18 (0.75 $mm^2$) | 0.6 Nm |

# 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. In addition, the room temperature and humidity combination should conform to the environmental operating envelope as defined in the following graphics.




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. Reduce fresh air to the minimum required by local and national codes and regulations. Fresh air imposes extreme load variation on the cooling equipment from summer to winter and causes increased system operating costs.

## Air distribution

The equipment distributes air in a back-to-front discharge pattern, removing hot air from a hot aisle and discharging cooled air into a cold aisle.

**NOTE**: The equipment is designed for free air discharge or for use with the Rack Air Containment System or EcoAisle Containment System. The equipment is not intended to be connected to a duct system.

## Incoming power supply requirement

**⚠ ⚠ WARNING**

**ELECTRICAL HAZARD**

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

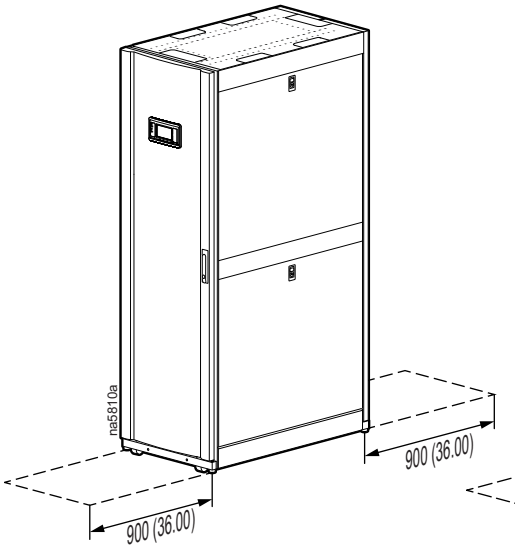
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Service access

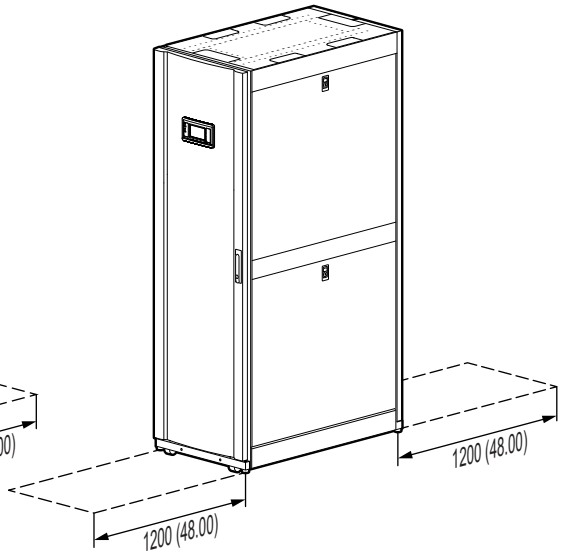
A minimum of 900 mm (36 in.) of clear floor space in front of and behind the equipment is recommended for service. All required normal maintenance is performed from the front and rear of the equipment.

Most of the cooling components in the equipment can be replaced while the unit is installed in row and without the use of heavy lift equipment or a welding torch. However, if it is necessary to remove the unit for repair, use the casters on the equipment to remove it from the row. An area of minimum 1200 mm (48 in.) of clear floor space in front of or behind the equipment is recommended to roll out the equipment.

**NOTE**: Check local and national codes and regulations for further service access requirements.



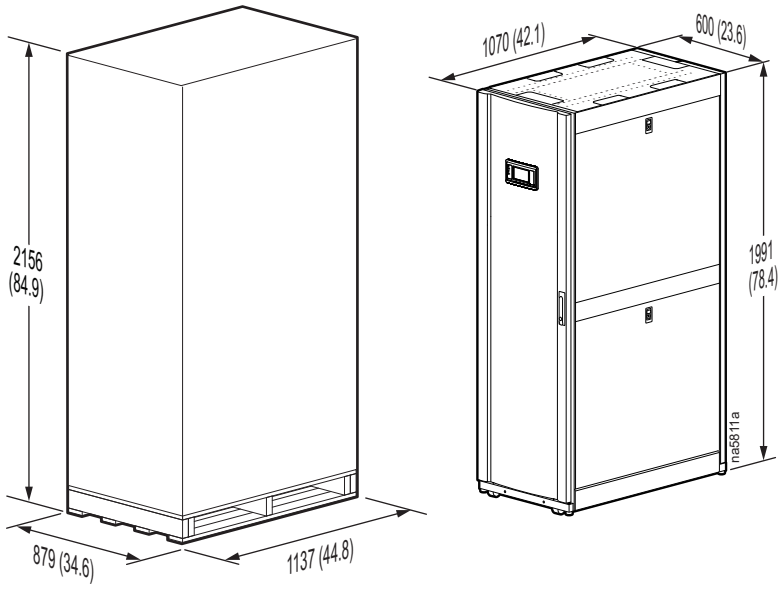

SERVICE ACCESS REQUIRED WHEN EQUIPMENT IS INSIDE THE ROW




FREE SPACE NEEDED TO MOVE EQUIPMENT OUTSIDE THE ROW

Dimensions are shown in mm (in.).

# Weights and Dimensions

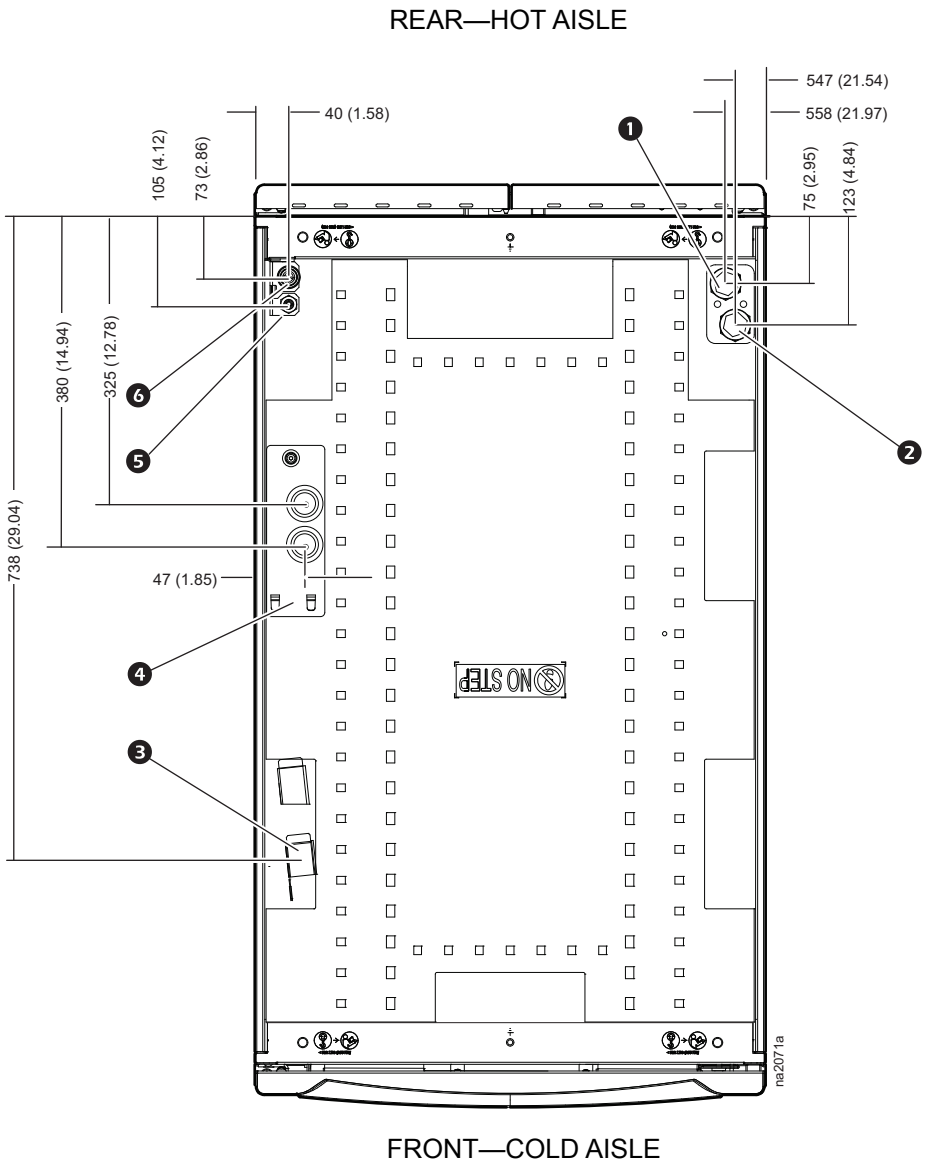



Dimensions are shown in mm (in.).

| Model | Net Weight – kg (lb) | Shipping Weight – kg (lb) |
|---|---|---|
| ACRD600 | 402 (886) | 447 (986) |
| ACRD601 | 391 (862) | 436 (961) |
| ACRD602 | 391 (862) | 436 (961) |
| ACRD600P | 413 (911) | 458 (1,010) |
| ACRD601P | 402 (886) | 447 (986) |
| ACRD602P | 402 (886) | 447 (986) |

# Access Locations

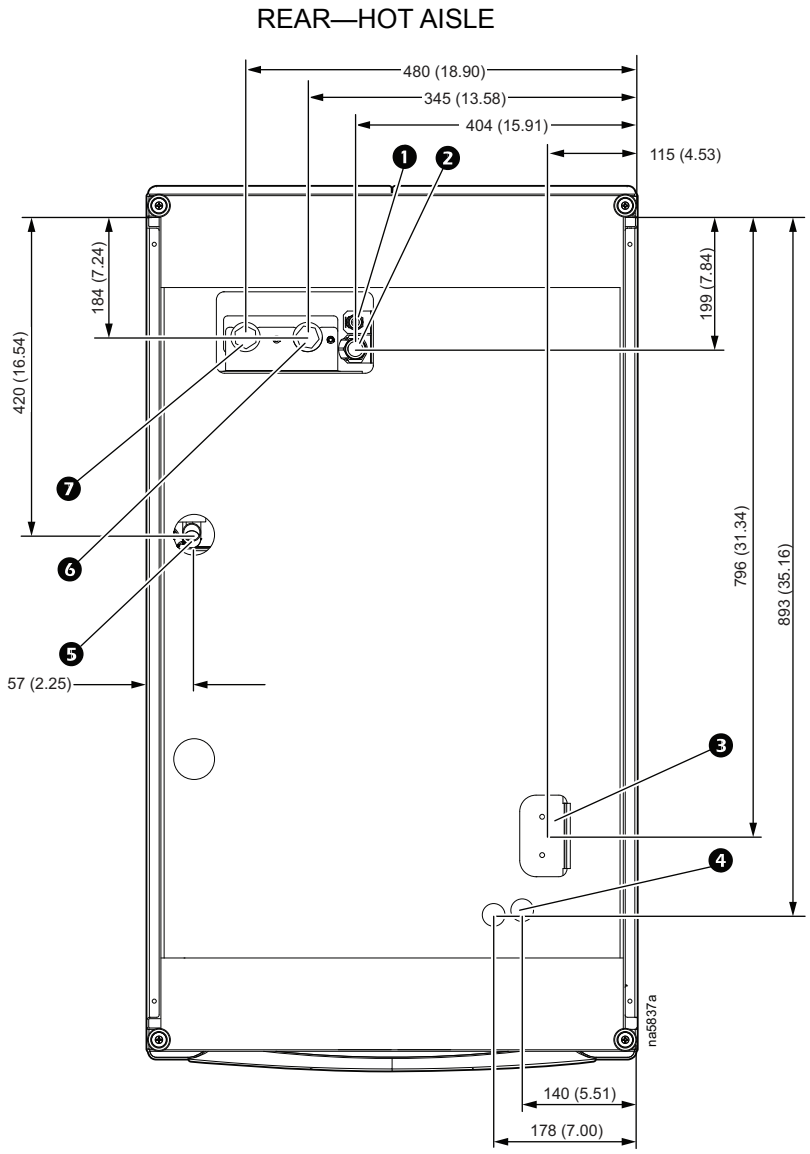
## Top piping and power access locations—top view, looking down (ACRD600/P series)




| Item | Description |
|---|---|
| ❶ | Refrigerant discharge line |
| ❷ | Refrigerant liquid line |
| ❸ | Trough for communication cables |
| ❹ | Power connections |
| ❺ | Humidifier water supply (ACRD600P series only) |
| ❻ | Condensate drain |

**NOTE:** Dimensions are shown in mm (in.).

## Bottom piping and power access locations—bottom view, looking up (ACRD600/P series)




| Item | Description |
|---|---|
| ❶ | Humidifier water supply (ACRD600P series only) |
| ❷ | Condensate drain |
| ❸ | Power connections |
| ❹ | Communication connections—27.80 mm (1.09 in.) |
| ❺ | Condensate overflow—50.00 mm (1.97 in.) |
| ❻ | Refrigerant discharge line |
| ❼ | Refrigerant liquid line |

**NOTE:** Dimensions are shown in mm (in.).

# Equipment Guidelines

## Working Conditions and Environmental Limits

InRow DX units have a minimum heat load to ensure proper operation. Failure to operate the unit with at least the minimum load will result in one or more of the following conditions:

- Decreased operating efficiency
- Equipment on/off cycling
- Inadequate dehumidification
- Increased wear and tear caused by frequent on/off cycles
- Decreased group control effectiveness
- Potential increase in cost of ownership

| Limit Working Conditions | | | |
|---|---|---|---|
| **Models** | **ACRD600<br>ACRD600P** | **ACRD601<br>ACRD601P** | **ACRD602<br>ACRD602P** |
| **Power Supply** | 200–240 V<br>3-Phase<br>50/60 Hz | 460–480 V<br>3-Phase<br>60 Hz | 380–415 V<br>3-Phase<br>50/60 Hz |
| **Minimum Recommended Load** | 8 kW (27,296 BTU/hr) | | |

## Removing the Doors and Panels

**⚠WARNING**

**MOVING PARTS HAZARD**

All doors and side panels must be locked during normal operation. Do not open the side panels while the fans are operating.

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

***NOTICE***

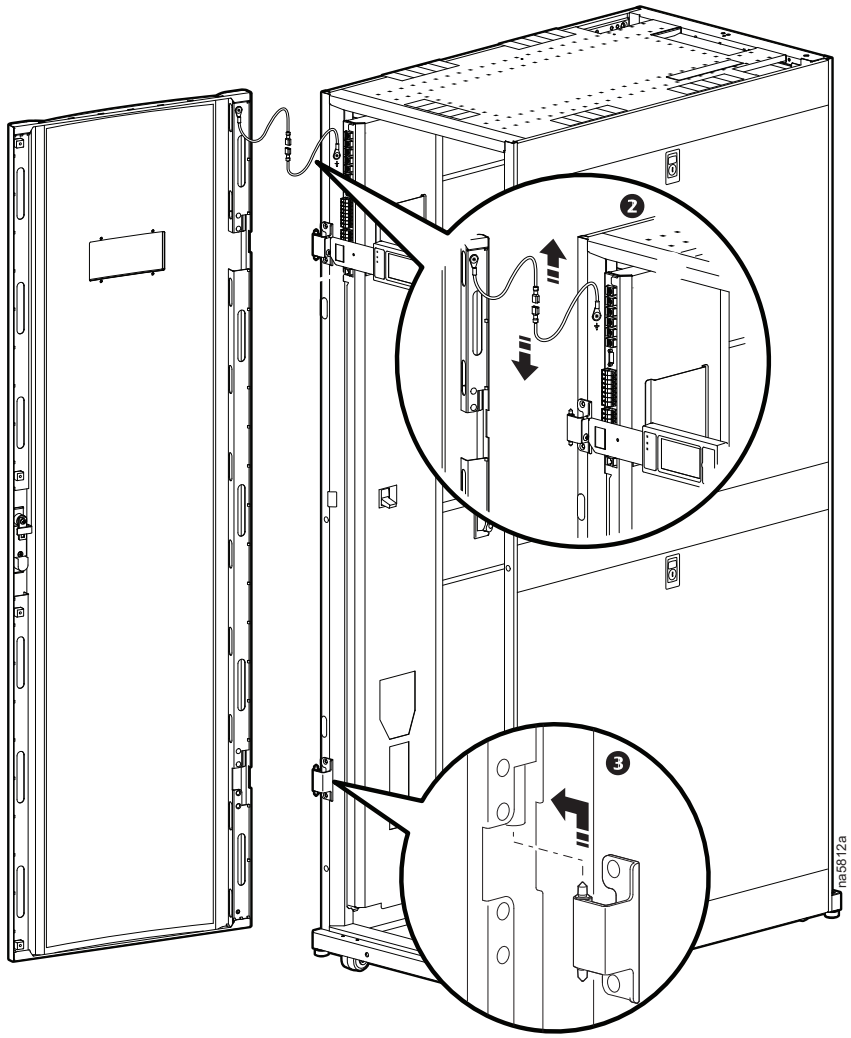
**EQUIPMENT DAMAGE**

Do not lean the doors against a wall with the side panel latches facing the wall. This can deform the latches and prevent them from properly working.

**Failure to follow these instructions can result in equipment damage.**

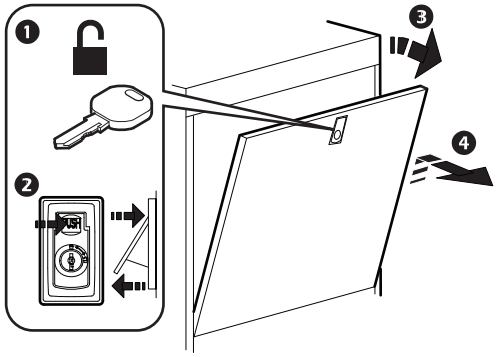
## Removing the front and rear doors

1. Unlock and open the door 90 degrees.
2. Unplug the ground wires.
3. Lift the door up and off the hinges.

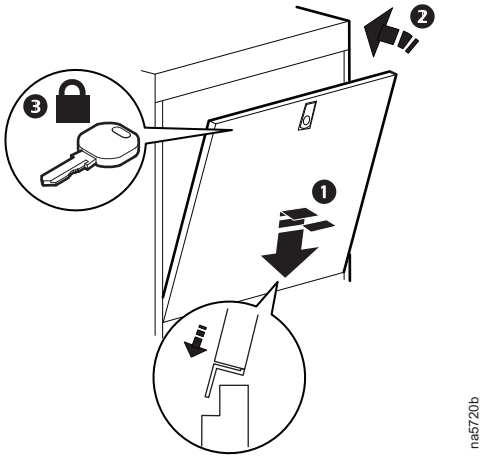


## Removing and installing the side panel

REMOVING THE SIDE PANEL




INSTALLING THE SIDE PANEL



## Removing the electrical panel cover

**⚠WARNING**

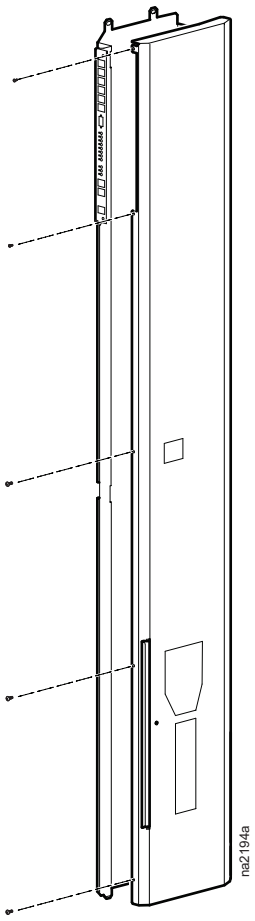
**ELECTRICAL HAZARD**

Ensure all wiring is not energized before routing cables into this equipment. Only qualified service and maintenance personnel should work on this equipment.

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

Remove the electrical panel cover to install the main power cable.

1. Remove the five M4 screws securing the cover.
2. Remove the cover by opening it and sliding it toward the front of the equipment.

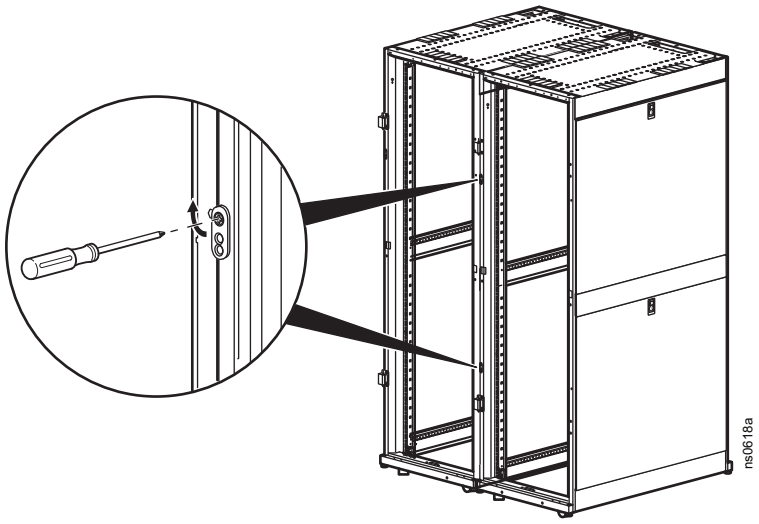


# Joining the Equipment to Enclosures

## Joining to NetShelter™ SX enclosures

The equipment comes with four joining brackets (two for the front and two for the rear).

1. Remove the front and rear doors. See “Removing the front and rear doors”.
2. Locate the four joining brackets. Rotate each bracket ninety degrees toward the adjoining enclosure so the bracket is parallel to the floor and install using the screws provided with the enclosure.




For more information, see the *Unpacking, Installation, and Customization* manual for the NetShelter SX Enclosure.

## Joining to NetShelter VX and VS enclosures

For information on joining the equipment to NetShelter VX and VS enclosures, see the installation sheet *NetShelter™ SX to VX or VS External Joining Kit—AR7601, AR7602.*

# Leveling the Equipment

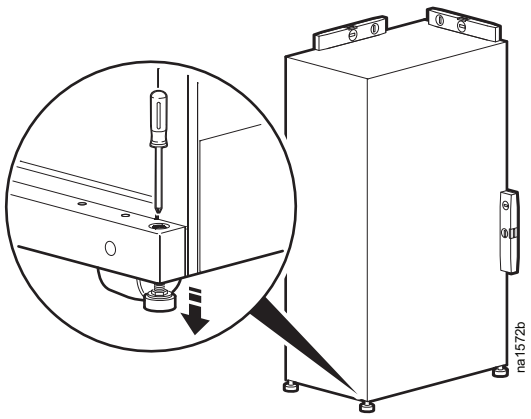
| *NOTICE* |
| --- |
| **WIRING HAZARD**<br><br>After re-installing the front door, reconnect all wires previously disconnected.<br><br>**Failure to follow these instructions can result in equipment damage.** |

**NOTE:** The leveling feet at the corners of the equipment provide a stable base if the floor is uneven, but they cannot compensate for a badly sloped surface.

1. Remove the front and rear doors.

   **NOTE:** Before removing the front door, unplug the ground wires and any other wire connections that may interfere with the removal of the doors.

2. For each leveling foot, insert a Phillips PH2 or standard screwdriver into the screw above the leveling foot. Turn the screw to the right to extend the leveling foot until it makes firm contact with the floor.
   **NOTE:** Use a 13-mm open-ended wrench to level the equipment without removing the doors.
3. Re-install the front and rear doors.



# Mechanical Connections

## Refrigeration piping

The equipment must be connected to a condenser—either a remote outdoor condenser or an indoor centrifugal condenser. Systems with remote outdoor or indoor centrifugal condensers must have discharge and liquid lines from the equipment to the condenser. Install all refrigerant lines in accordance with applicable industry guidelines as well as local and national codes and regulations.

Calculate an equivalent length based on the actual linear length of the run, including valves and fittings.

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

**NOTE:** Change the size of the pipe after the P-trap. See “Refrigeration piping diagram” on page 20.

Make all refrigerant lines as short and direct as possible. Horizontal discharge lines must be pitched downward at a minimum of 4 mm per m (1/2 in. per 10 ft) in the direction of flow to aid in oil return. Trap vertical discharge lines approximately every 6 m (20 ft) to ensure proper oil return. Traps are normally not necessary at the base of discharge lines; however, the line should be looped toward the floor before running it vertically to prevent the drainage of oil back to the compressor during shutdown periods.

Isolate piping from structural surfaces using vibration clamps.

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

The following table provides ASHRAE standards for equivalent piping lengths of fittings and valves.

| Type of Fitting or Valve—Equivalent Length of Pipe in m (ft) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Nominal Pipe Size** | **ACR Tubing Size** | **Gate Valve** | **Angle Valve** | **Globe Valve** | **Standard Elbow 90°** | **Contraction 1/2** | **Tee Branch** | **Tee Straight** |
| 3/4 in. | 7/8 in. | 0.27 (0.9) | 2.74 (9) | 6.71 (22) | 0.61 (2.0) | 0.30 (1.0) | 1.22 (4) | 0.43 (1.4) |
| 1 in. | 1 1/8 in. | 0.30 (1.0) | 3.66 (12) | 8.84 (29) | 0.79 (2.6) | 0.37 (1.2) | 1.52 (5) | 0.52 (1.7) |
| 1 1/4 in. | 1 3/8 in. | 0.46 (1.5) | 4.57 (15) | 11.58 (38) | 1.01 (3.3) | 0.55 (1.8) | 2.13 (7) | 0.70 (2.3) |

| Recommended Line Sizes | | | |
|---|---|---|---|
| **Equivalent Length [$L_e$] m (ft)** | **Line Type** | **Length Details** | **Pipe Size** |
| 0 (0) to 18 (60) | Discharge line (Horizontal/Vertical) | All lengths | 7/8 in. |
| | Liquid line | All lengths | 5/8 in.* |
| 18 (60) to 46 (150) | Discharge line (Horizontal) | All lengths | 1 1/8 in. |
| | Discharge line (Vertical) | Less than 9 m (30 ft) | 7/8 in. |
| | | More than 9 m (30 ft) | 1 1/8 in. |
| | Liquid line | All lengths | 7/8 in. |
| 46 (150) to 61 (200) | Discharge line (Horizontal) | All lengths | 1 1/8 in. |
| | Discharge line (Vertical) | Less than 3 m (10 ft) | 7/8 in. |
| | | More than 3 m (10 ft) | 1 1/8 in. |
| | Liquid line | All lengths | 7/8 in. |
| 61 (200) to 91 (300) | Discharge line (Horizontal) | All lengths | 1 1/8 in |
| | Discharge line (Vertical) | All lengths | 1 1/8 in. |
| | Liquid line | All lengths | 7/8 in. |

* When a condenser is installed below unit level, use 7/8 in. pipe for liquid line.
NOTE: Actual vertical height of the condenser cannot exceed 90 ft.

## Connect refrigerant lines

Be sure to use only clean, air conditioning/refrigeration (ACR) pipe and follow standard procedures for pipe size selection for air-cooled equipment. All refrigerant piping must be Type L ACR hard-drawn copper pipes (soft/annealed coper is unacceptable) and must be 700 psig UL rated or equivalent. The maximum allowable equivalent length between the evaporator and condenser is 90 equivalent m (300 equivalent ft). Vertical runs (hot gas) require a trap every 6 m (20 ft) of rise.

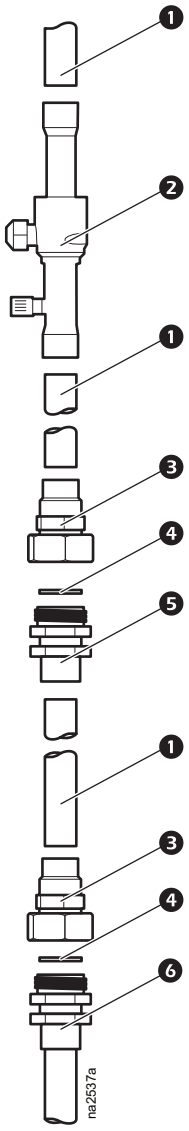
**NOTE:** When brazing field-installed copper refrigeration lines, use a nitrogen purge to minimize contamination of the refrigeration system during the brazing process.

The air-cooled equipment has been dehydrated at the factory and is shipped with a holding charge of nitrogen. Test refrigerant connections for leaks before replacing the holding charge.

**NOTE:** Remove the nitrogen holding charge tag from the lines after nitrogen removal and product startup.

Connect both refrigerant lines to the equipment, using all fittings as shown. See “Install kit inventory” on page 12.

| Item | Description |
|---|---|
| ❶ | 3/4-in. copper tubing (field supplied and installed) |
| ❷ | Ball valve (supplied) |
| ❸ | 3/4-in. female Rotalock connector (supplied) |
| ❹ | Gasket (supplied) |
| ❺ | 3/4-in. male connector (supplied) |
| ❻ | 3/4-in. male connector (factory installed inside the equipment) |




## Condenser

Install and pipe the condenser in accordance with the provided instructions.

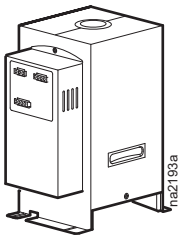
**NOTE:** If no receiver kit is being installed, a field-supplied pressure relief valve must be installed.

## Flooded receiver

Install the flooded receiver in accordance with the instructions included with the kit.

## Humidifier (ACRD60xP only)

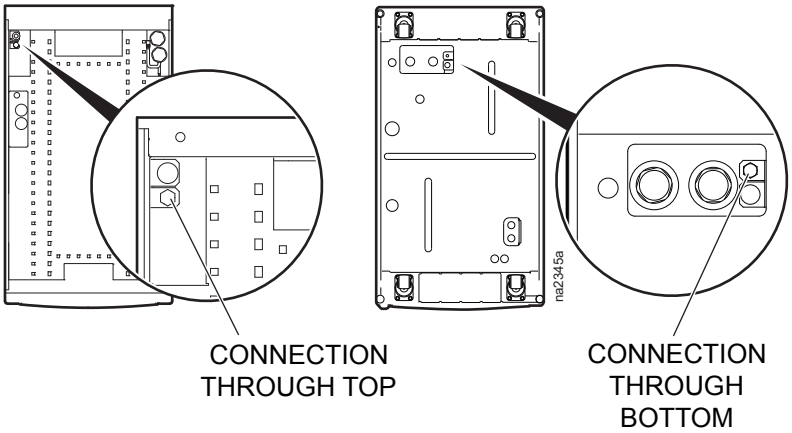
The humidifier water supply line is routed to the unit in flexible tubing (or alternative tubing approved by local building codes) that will allow the humidifier water supply line connector to be moved approximately 25 mm (1 in.) away from the equipment. This facilitates removing the equipment from a row.




A factory-installed quick-connector for connecting the tubing to the equipment is supplied. The quick connector has a male 1/4-in. NPT or male 1/4-in. BSPT to connect to a compression fitting. The quick-connector has a shut-off function, so no separate shut-off valve is necessary.

The humidifier water supply line can be connected through either the top or the bottom of the equipment as shown. Male quick-connectors are positioned in both the top and the bottom of the equipment.

Water pressure should be between 100 and 800 kPa (15 and 115 psi) for proper humidifier operation. Dirty water must be filtered before it is supplied to the humidifier. Water temperature must be between 1°C and 40°C (34°F and 104°F). Do not use softened, de-mineralized, or de-ionized water.

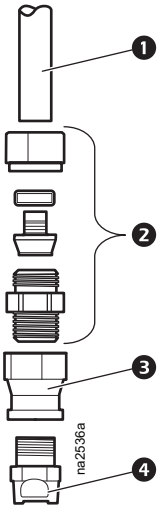



See the manual included with the humidifier for more information about water quality, mineral content, hardness, and minimum/maximum levels for conductivity.

**NOTE:** Before making any connections, clear any debris that may have accumulated during assembly from the humidifier water supply line.
**NOTE:** It is recommended that a solenoid water valve be installed in the humidifier supply line, connected to a leak detector.
**NOTE:** Perform all piping in accordance with applicable industry guidelines as well as local and national codes and regulations.

Connect the fittings to the humidifier water supply line as shown, then connect the water supply line quick-connector to the top or bottom humidifier input.

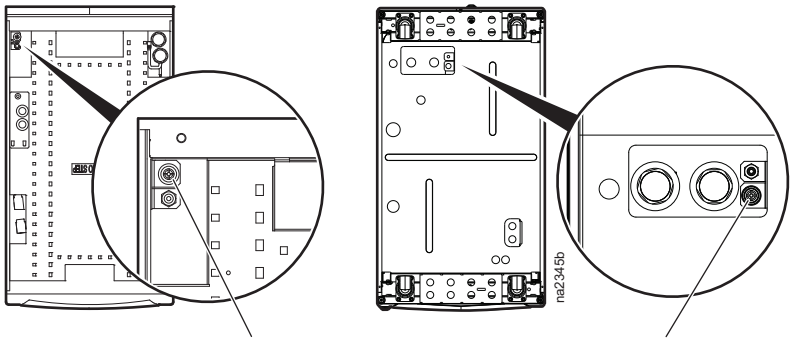
| Item | Description |
|---|---|
| ❶ | Flexible tubing (field supplied and installed) |
| ❷ | Compression fitting (field supplied and installed) |
| ❸ | Straight reduction (supplied) |
| ❹ | Quick connector (supplied) |



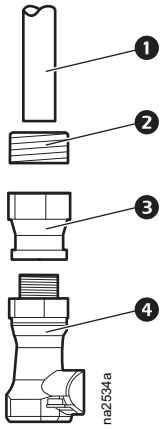
## Condensate pump

| NOTICE |
|---|
| **HAZARD TO EQUIPMENT**<br><br>• Failure to properly route the condensate pump drain line before operation could result in water damage.<br>• Do not route drain or supply lines above computer equipment, Uninterruptible Power Supply (UPS) units, Power Distribution Units (PDUs), or light fixtures.<br><br>**Failure to follow these instructions can result in equipment damage.** |

The pump is factory-wired and piped internally to the condensate drain pan. The pump can move liquid a maximum of 18 m (60 ft), which may include a maximum lift of 3.5 m (11.5 ft) at a flow rate of 32 l/hr (8.45 gph). For example, if your lift is 3 m (10 ft), you will have 15 m (50 ft) of usable run remaining. The pump uses an on-board condensate high level float switch wired into the equipment for alarm capabilities.




The condensate drain line can be connected through either the top or the bottom of the equipment using factory-installed male quick connectors and tubing approved by local building codes that will allow the drain line connector to be moved approximately 25 mm (1 in.) away from the equipment. This facilitates removing the equipment from a row. Female quick connectors and reduction fittings are supplied with the equipment. Connect the fittings as shown, then connect the drain line quick connector to the top or bottom condensate pump output line.



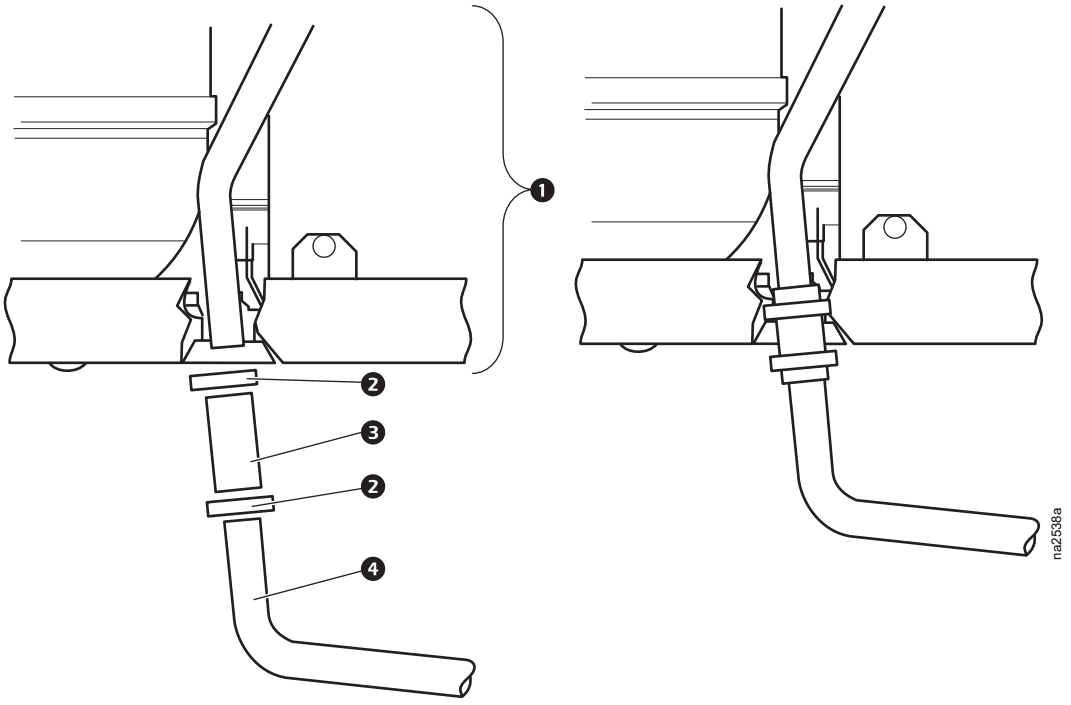

| Item | Description |
|---|---|
| ❶ | Tubing (field supplied and installed) |
| ❷ | 1/2-in. male NPT or 1/2-in. male BSPT fitting (field supplied and installed) |
| ❸ | Straight reduction (supplied) |
| ❹ | Quick connector (supplied) |

**NOTE:** Perform all piping in accordance with applicable industry guidelines as well as local and national codes and regulations.

## Condensate overflow

| *NOTICE* |
| --- |
| **WATER DAMAGE**<br><br>Failing to perform the following procedure may result in condensate pan overflow and possible damage to the data center.<br><br>**Failure to follow these instructions can result in equipment damage.** |

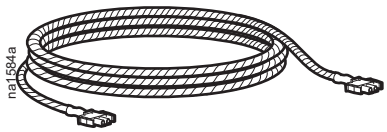
Connect the equipment condensate overflow line to an external drain using the fittings, as shown.



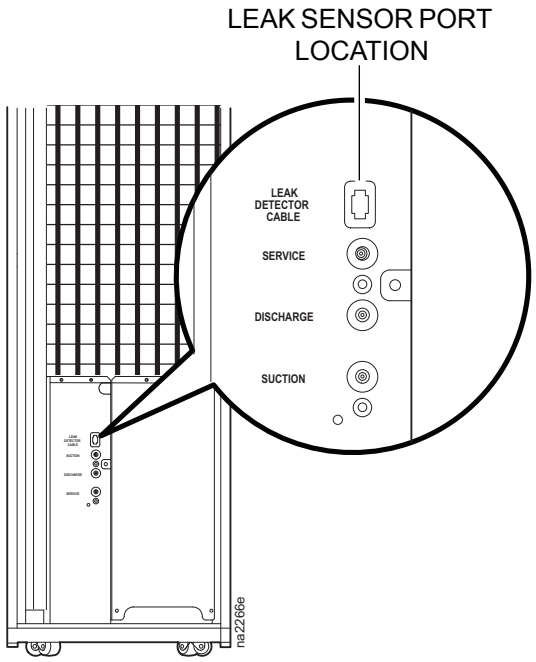

| Item | Description |
| --- | --- |
| ❶ | InRow RD |
| ❷ | Hose adapter clamp (supplied) |
| ❸ | Hose adapter (supplied) |
| ❹ | 7/8-in. copper tubing (field supplied and installed) |

## Leak sensor (optional)

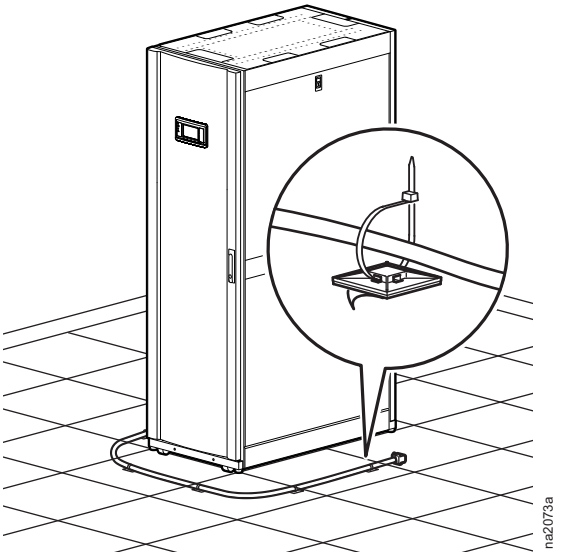
Install up to four leak sensors (AP9326) in series, as needed.




1. Connect the leak sensor to the equipment using the plug located on the service bracket, as shown.




2. Position the leak sensor inside or outside the equipment.
   **NOTE:** Install leak sensors on a clean surface, and do not allow them to touch metal that is in an air stream.
3. Route the leak sensor to the outside of the equipment through the hole provided in the base.
4. Secure the leak sensor wire to surfaces using cable ties and cable tie holders (provided with the leak detector).



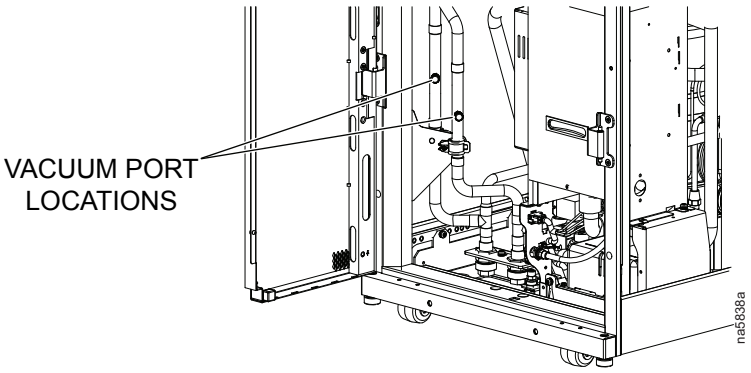
## Adding a holding charge

| NOTICE |
| --- |
| **DAMAGE TO THE BALL VALVE**<br><br>Install a ball valve before the micron gauge to prevent damage to the micron gauge during charging.<br><br>**Failure to follow these instructions can result in equipment damage.** |

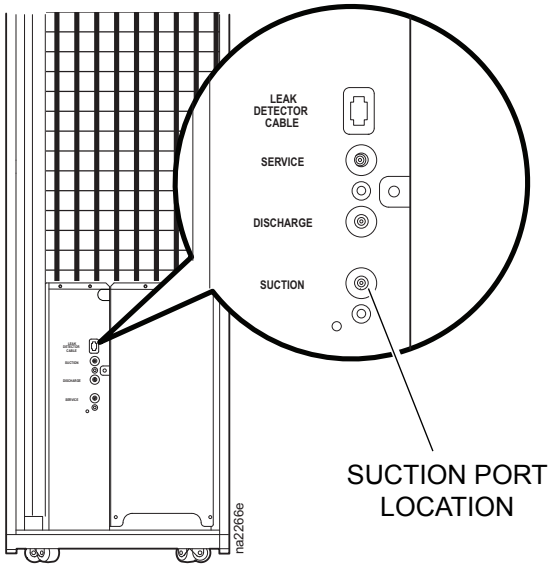
R-410A is a mixed refrigerant. When charging this equipment with mixed refrigerant, only liquid refrigerant must be charged.

**NOTE:** The equipment must be charged only with R-410A. The installing contractor is responsible for providing sufficient refrigerant for a complete system charge during start-up.

1. Pressurize the system to 17.2 bar (250 psi) with nitrogen (use the service and discharge ports). Leave the system pressurized for 24 hours, and check the gauges for a drop in pressure.
2. Use a deep vacuum pump and pull the first vacuum down to 750 microns (use the two vacuum ports on the connection piping). The initial pull down can take up to 24 hours.




3. Once the vacuum level has reached 750 microns, close the manifold gauge valves and turn off the vacuum pump. Wait for one hour (the vacuum should not rise above 1500 microns) and then break the vacuum with nitrogen gas (use the service and discharge ports) until the system pressure equals atmospheric pressure.
4. Pull a final vacuum down to 300 microns for a minimum of two hours.
5. Charge with liquid R-410A through service port and needle valve on condenser until the pressure equalizes with the refrigerant canister.
6. Open the ball valves and then start the system and charge the refrigerant slowly through the suction port.




## Adding compressor oil

Unit shall be field charged with 0.44 l (15 oz.) POE oil during startup to make sure oil separator functions normally.

# Electrical Connections

**⚠ ⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Potentially dangerous and 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.
- Three-phase electrical service is required. Electrical service must conform to local and national electrical codes and regulations. The equipment must be grounded. Check the equipment nameplate for correct ratings.
- 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.**

The following electrical connections are required in the field:

- Controls (customer interface, Network Management Card)
- Communication (A-Link, Building Management System)
- Power to the InRow RD cooling unit (3-phase plus ground)
- Power to flooded receiver heater

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

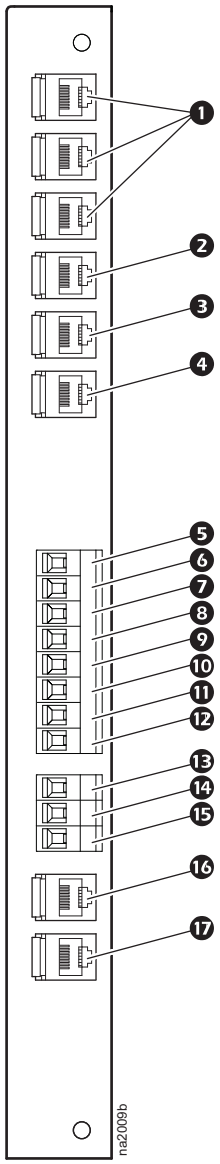
See the equipment nameplate for voltage and current requirements.

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.

## Customer interface connections

**NOTE:** Wire all input and output connections as Class 2 circuits.

Depending on the configuration, additional customer interface connections may be required for the A-Link remote communications through the Network Management Card support or traditional equipment-monitoring software.



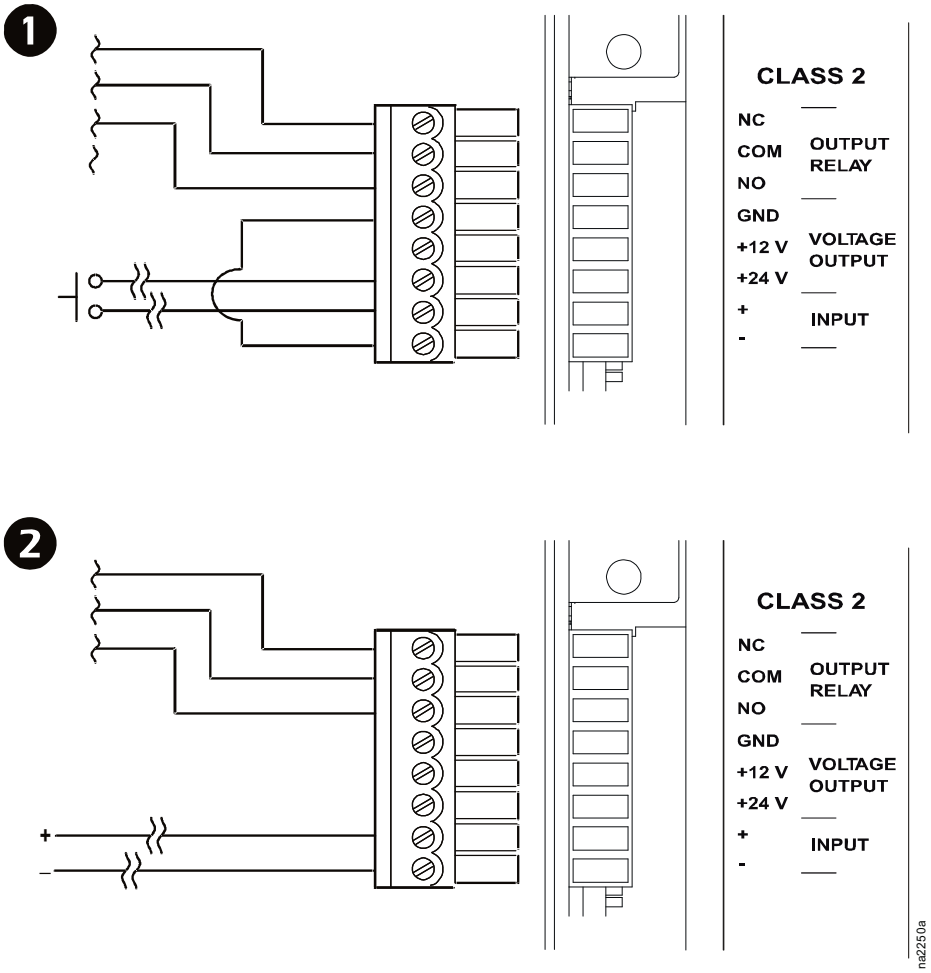

| Item | Description |
|---|---|
| ❶ | Rack inlet temperature sensors 1, 2, 3 |
| ❷ | A-Link IN |
| ❸ | A-Link OUT |
| ❹ | Network port |
| ❺ | Customer output, NC (normally closed) |
| ❻ | Customer output, COM (common) |
| ❼ | Customer output, NO (normally open) |
| ❽ | Supply GND (Ground) |
| ❾ | Supply 12 Vdc (current limit: 20 mA) |
| ❿ | Supply 24 Vdc (current limit: 20 mA) |
| ⓫ | Customer input + (12–30 Vac/Vdc, 24 Vdc @ 11 mA) |
| ⓬ | Supply COM |
| ⓭ | Modbus D1 |
| ⓮ | Modbus D0 |
| ⓯ | Modbus GND |
| ⓰ | Supply air temperature sensor (front) |
| ⓱ | Supply air humidity sensor (front) |

**NOTE:** For a top installation, route control wiring through the wire channel located at the top left hand corner just above the customer interface connectors.

For a bottom installation, route the control wiring to the customer access hole in the bottom of the equipment through wire clamps from the customer interface connectors. Then, route the wiring down along the electrical panel and secure with wire clamps.

| Item | Description | |
|---|---|---|
| ❶ | Rack temperature sensors 1, 2, 3 | Three temperature sensors which must be installed on the cold aisle side of the server racks. See “Rack temperature sensors” on page 46. |
| ❷ | A-Link IN | In and out connections for A-Link. The terminators supplied with the equipment must be plugged into the first A-link port and the final A-Link port for the group. |
| ❸ | A-Link OUT | |
| ❹ | Network port | 10/100 Base-T Network port. Connects the equipment to the network; Status and Link LEDs indicate network traffic.<br>• Status LED—blinks orange and green at startup; indicates the status of the network connection (solid green—IP address established; blinking green—attempting to obtain an IP address).<br>• Link LED—blinks to indicate network traffic (green—operating at 10 mbps; orange—operating at 100 mbps). |
| ❺ | Customer output, Normally Closed (NC) | Customer-configurable output relay which can be activated for all types of alarms or critical alarms. The relay can be connected to external equipment using 30 Vac/dc, 2 A. |
| ❻ | Customer output, Common (COM) | |
| ❼ | Customer output, Normally Open (NO) | |
| ❽ | Supply GND | Can be used for customer input and output interface. |
| ❾ | Supply 12 Vdc | Can be used for customer input and output interface. Current limit is 20 mA. |
| ❿ | Supply 24 Vdc | Can be used for customer input and output interface. Current limit is 20 mA. |
| ⓫ | Customer input + | Used for remote shutdown of an InRow RD unit. Voltage is applied from the internal power supply or by using an external power supply. |
| ⓬ | Supply COM– | Ground connection point for remote shutdown supply source. |
| ⓭ | Modbus D1 (RXTX+) | Connections for Building Management System. Wire a 150-Ohm terminator resistor (supplied) into the final InRow RD, between Modbus D0 and Modbus D1. |
| ⓮ | Modbus D0 (RXTX–) | |
| ⓯ | Modbus GND | |
| ⓰ | Supply air temperature sensor (front) | Temperature sensor installed on the front of the equipment. |
| ⓱ | Supply air humidity sensor (front) | Humidity sensor installed on the front of the equipment. |

## Form C alarm contacts and shutdown input



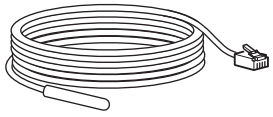

See items 5 through 12 in “Customer interface connections” on page 44. A relay internal to the customer interface is controlled by a user-defined alarm (for example, malfunctioning fans). Before an alarm condition, the signal on the COM (common) terminal is routed to the NC (normally closed) terminal. When the alarm is activated, the relay is energized, causing the signal on the COM terminal to be routed to the NO (normally open) terminal. The NO and NC terminals could be connected to remote indicator lights, a warning buzzer, or another device to alert an operator to the presence of an alarm condition.

The equipment may be remotely disconnected by supplying a voltage to the shutdown inputs as shown above. Option ❶ shows a remote switch that uses internal +12 Vdc or +24 Vdc supply to manually stop operation. Option ❷ shows how any external source of 12 Vac/dc or 24 Vac/dc may be connected to the shutdown input.

## Rack temperature sensors

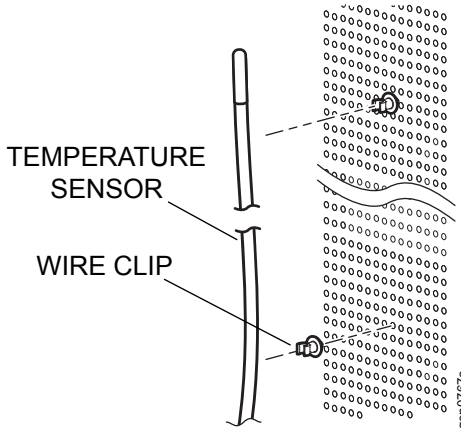
The rack temperature sensors control the equipment airflow and ensure adequate supply of cooling air to the server racks in the data center.

The equipment is supplied with three external rack temperature sensors. See “Install kit inventory” on page 12. These sensors, along with cable ties and wire clips, are included in the installation kit shipped with the equipment.



**How to install the rack temperature sensors**

1. Insert the rack temperature sensor connector in the temperature sensor port at the customer interface connections. See “Customer interface connections” on page 44.
    a. For a top installation, push the rack temperature sensor through the wire channel located at the top of the equipment in the left hand side just above the customer interface connectors.
    b. For a bottom installation, route the sensor through the wire clamps along the electrical panel and then push the sensor through the customer access hole in the bottom of the equipment.
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 “Install kit inventory” on page 12.
   **NOTE:** Remote rack temperature sensors must be installed for proper operation.




The sensors should be located on racks that are adjacent to the cooling unit. The optimum position of the rack temperature sensors will vary from installation to installation, but should be located in close proximity to fan-cooled IT equipment to ensure 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:

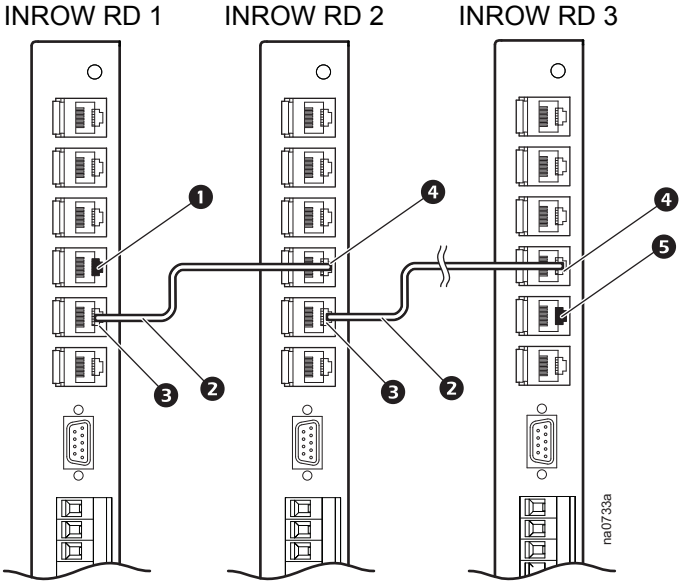
a. Servers positioned at the top of a rack
b. Servers positioned at any height in the last rack at an open end of a row
c. Servers positioned behind flow-impairing obstacles such as building elements
d. Servers positioned in a bank of high-density racks
e. Servers positioned next to racks with Air Removal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

## Communication connections

**A-Link connections:** The A-Link bus connection allows multiple InRow RD units (up to twelve) to communicate with one another. Only one InRow RD unit needs to be defined through the display interface; other InRow RD units are numbered automatically.

To enable the InRow RD units to work as a group, link them using standard (Category 5 or higher) Ethernet cables with RJ-45 connectors. A supplied terminator (150 Ohm, 1/4 W) is factory installed in the A-Link port, and must remain inserted into the A-Link ports of the first and final InRow RD units only.

The maximum wire length for the entire group may not exceed 1000 m (3,280 ft).

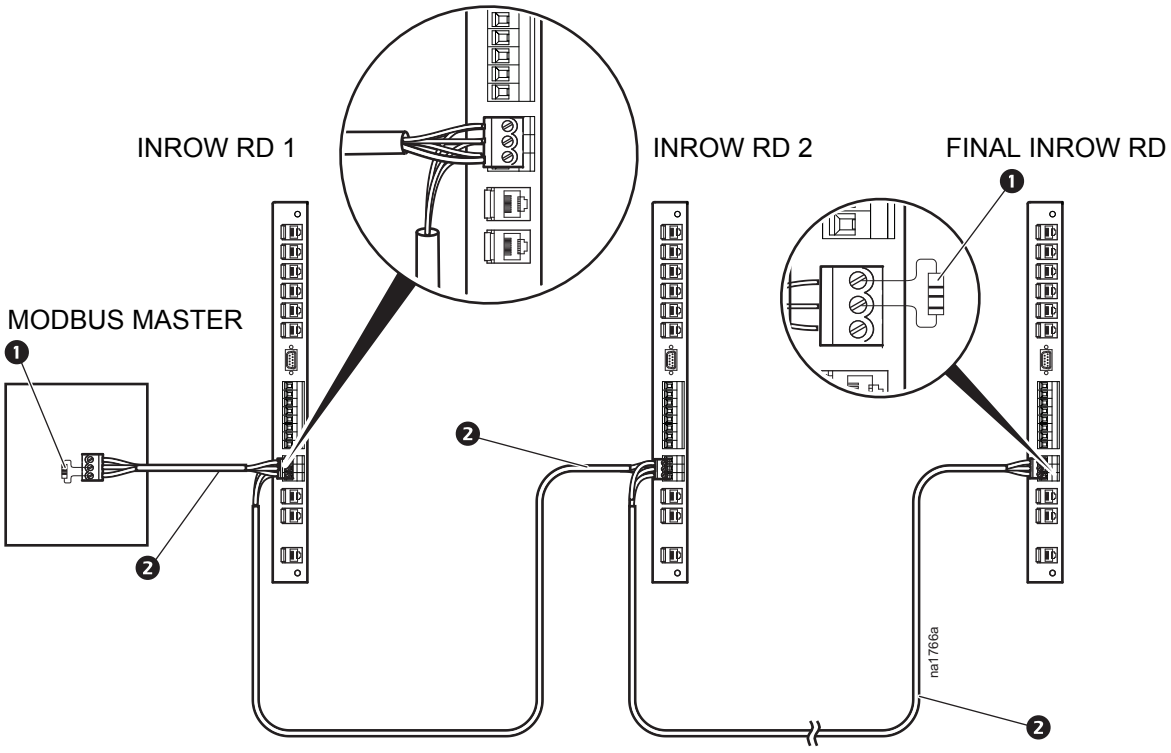



| Item | Description | Item | Description |
|---|---|---|---|
| ❶ | A-Link in (with provided RJ-45 terminator) | ❹ | A-Link in |
| ❷ | A-Link cable (CAT-5 Ethernet cable) | ❺ | A-Link out (with provided RJ-45 terminator) |
| ❸ | A-Link out | | |

**Building Management System (BMS):** The Modbus interface allows each InRow RD cooling unit to communicate with the BMS. Use a three-wire cable to connect each InRow RD cooling unit in turn. Wire a terminator resistor (150 Ohm, 1/4 W) into the Modbus master and the final InRow RD cooling unit between Modbus D0 and Modbus D1. This terminator is included in the installation kit (see “Install kit inventory” on page 12).

Each cooling unit has a three-wire Modbus terminal on the customer interface connections. A connector with screw terminals is used to attach wiring.

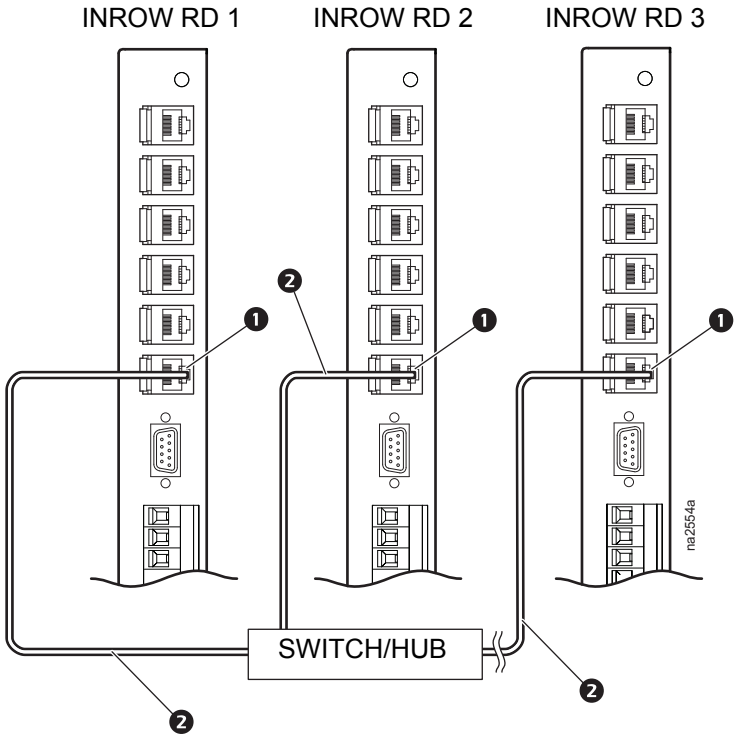
See “Customer interface connections” on page 44 for specific layout of the customer interface connections. For information on setup of Modbus parameters, see the *InRow RD Operation and Maintenance Manual*.




| Item | Description |
|---|---|
| ❶ | Termination resistor (provided) |
| ❷ | Modbus cable (RS-485) |

## Network port

The network port allows communication from the cooling unit to the network.




| Item | Description |
|---|---|
| ❶ | Network port |
| ❷ | LAN cable (10/100 Base-T) |

# Power Connections

## Wiring configurations

Route incoming power from the PDU or electrical service panel to the electrical panel located in the left side of the equipment. Route power either through the top or the bottom of the equipment.

**⚠⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must be installed and serviced by qualified personnel only.
- Turn off all power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

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

**⚠⚠ WARNING**

**ELECTRICAL HAZARD**

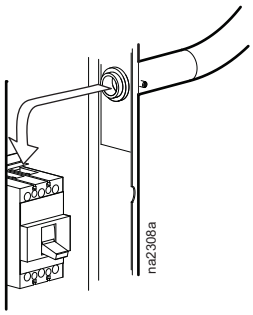
- Electrical service must conform to local and national electrical codes and regulations.
- The equipment must be grounded.

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

**NOTE:** To ease installation and later removal of the equipment for repairs, use flexible conduit for the power wiring.

## Top routing

1. Remove the electrical panel cover. See “Removing the electrical panel cover” on page 32.
2. Locate the power connection plate at the top of the equipment. See “Top piping and power access locations—top view, looking down (ACRD600/P series)” on page 26.
3. Loosen the screw securing the connection plate, and remove the plate.
4. Attach the conduit connector using the pilot hole in the connection plate.
5. Route the cabling to the main breaker as shown.
6. Connect the power wiring to the top of the main circuit breaker using the torque specified on the breaker. Connect the phases as marked next to the terminals.
7. Connect the ground wire to the ground terminal block located above the main circuit breaker.
8. Reinstall the connection plate and the electrical panel cover.



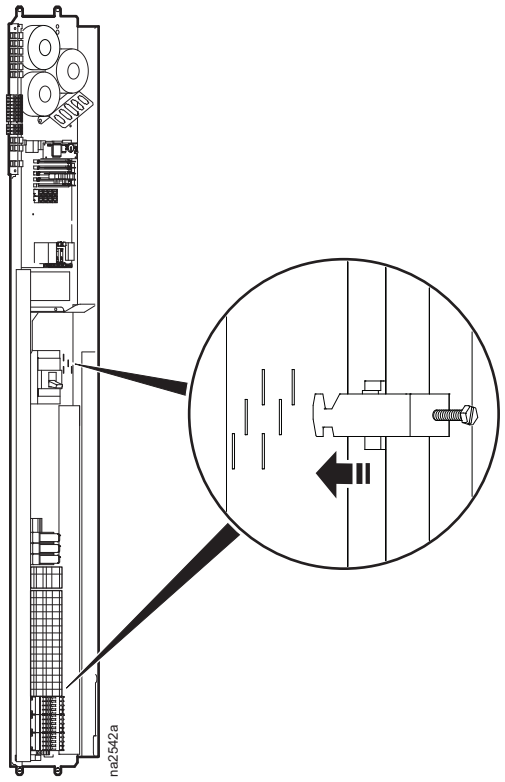
## Bottom routing

1. Remove the electrical panel cover. See “Removing the electrical panel cover” on page 32.
2. Locate the power connection plate in the bottom of the equipment. See “Bottom piping and power access locations—bottom view, looking up (ACRD600/P series)” on page 27.
3. Loosen the screw securing the connection plate, and remove the plate.
4. Attach the conduit connector using the pilot hole in the connection plate.
5. For ACRD602 and ACRD602P, perform the steps in “Strain relief (ACRD602/602P only)” on page 52.
6. Route the cabling to the main circuit breaker as shown.
7. Connect the power wiring to the top of the main circuit breaker using the torque specified on the breaker. Connect the phases as marked next to the terminals.
8. Connect the ground wire to the ground terminal block located just above the main circuit breaker.
9. Fasten the cabling inside the equipment with the provided tie wraps. See “Install kit inventory” on page 12.
10. Reinstall the connection plate and the electrical panel cover.

## Strain relief (ACRD602/602P only)

Adjustable metal strain relief brackets are provided. See “Install kit inventory” on page 12.

1. Hook one strain relief into a pair of slots in each of the two locations shown.
2. Route the electrical cable up from the bottom of the equipment, passing through the strain reliefs.
3. Tighten the screws on the strain reliefs to capture the electrical cable, taking the weight off of the inner conductors.
4. Continue connecting electrical wiring to the circuit breaker.



## Connect flooded receiver heater

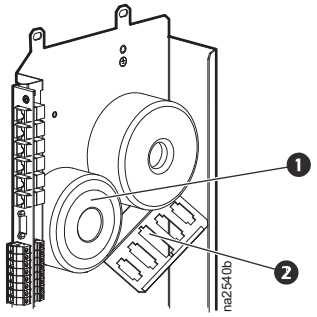
| ⚠ ⚠ WARNING |
| --- |
| **ELECTRICAL HAZARD**<br><br>Electrical service must conform to local and national electrical codes and regulations.<br><br>**Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

The flooded receiver is equipped with a heater to keep the refrigerant warm during extremely cold weather conditions. If your location is subject to subfreezing temperatures for extended periods of time, you must connect the self-regulating heater to a convenient source of electrical power. If you are not sure your location or application requires the heater, contact Schneider Electric Customer Support.

See the documentation included with the flooded receiver for more information on voltage requirements.

### Voltage selections—ACRD60x units

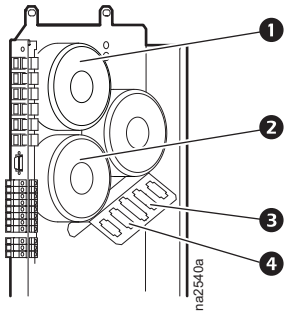
Your equipment can operate at various supply voltages, provided the proper voltage jumpers are connected to the input transformers. Read the part number on the jumpers connected at the factory and compare that number to the table below. If the correct jumpers for your input voltage are not connected, remove them and connect the proper jumper. See “Install kit inventory” on page 12.




| Jumper Connections |
| --- |
| ❶ Transformer A connected to J50 ❷ |

| Model | Input Voltage | Use Jumper Part Number |
| --- | --- | --- |
| ACRD600 | 208 (50/60 Hz) | 0W2540 (default) |
| | 230 (50/60 Hz) | 0W2541 |
| ACRD601 | 460 (60 Hz) | 0W2545 |
| | 480 (60 Hz) | 0W2546 (default) |
| ACRD602 | 380 (50/60 Hz) | 0W2542 |
| | 400 (50/60 Hz) | 0W2543 (default) |
| | 415 (50/60 Hz) | 0W2544 |

## Voltage selections—ACRD60xP units




| Jumper Connections |
|---|
| ❶ Transformer B connected to J51 ❸ |
| ❷ Transformer A connected to J50 ❹ |

| Model | Input Voltage | Use Jumper Part Number |
|---|---|---|
| ACRD600P | 208 (50/60 Hz) | 0W2540 (default) |
| | 230 (50/60 Hz) | 0W2541 |
| ACRD601P | 460 (60 Hz) | 0W2545 |
| | 480 (60 Hz) | 0W2546 (default) |
| ACRD602P | 380 (50/60 Hz) | 0W2542 |
| | 400 (50/60 Hz) | 0W2543 (default) |
| | 415 (50/60 Hz) | 0W2544 |

# Charging with Refrigerant

## Calculating R410A charge

Use the following table and formula when calculating the total R410A charge.

| Condenser Model | Schneider Electric SKU | Selected Ambient Temperature – °C (°F) | Condenser Summer Charge – kg (lb) | Condenser Flooded Charge for Different Minimum Outdoor Ambient Temperatures – kg (lb) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 4°C (40°F) | –7°C (20°F) | –18°C (0°F) | –29°C (–20°F) | –40°C (–40°F) |
| LCS5213-099-2C | ACCD75228 | 35.0–40.6 (95–105) | 6.1 (13.3) | 9.7 (21.4) | 9.7 (21.4) | 10.3 (22.8) | 10.4 (22.9) | 10.8 (23.7) |
| LCS5213-113-2C | ACCD75229 | 46 (115) | 8.1 (17.9) | 13.0 (28.6) | 12.9 (28.5) | 13.8 (30.4) | 13.9 (30.6) | 14.3 (31.6) |
| LCS5213-099-4C | ACCD75230 | 35.0–40.6 (95–105) | 6.1 (13.3) | 9.7 (21.4) | 9.7 (21.4) | 10.3 (22.8) | 10.4 (22.9) | 10.8 (23.7) |
| LCS5213-113-4C | ACCD75231 | 46 (115) | 8.1 (17.9) | 13.0 (28.6) | 12.9 (28.5) | 13.8 (30.4) | 13.9 (30.6) | 14.3 (31.6) |
| CAP2001P | ACCD75232 | 35.0–46.0 (95–115) | 7.7 (17.0) | 12.4 (27.2) | 12.4 (27.2) | 13.1 (28.9) | 13.2 (29.1) | 13.7 (30.1) |
| CAP2001P | ACCD75232-C | 35.0–46.0 (95–115) | 7.7 (17.0) | 12.4 (27.2) | 12.4 (27.2) | 13.1 (28.9) | 13.2 (29.1) | 13.7 (30.1) |
| CAP2001P.0005 | ACCD75233-C | 35.0–46.0 (95–115) | 7.7 (17.0) | 12.4 (27.2) | 12.4 (27.2) | 13.1 (28.9) | 13.2 (29.1) | 13.7 (30.1) |
| LCV8211-009-2C | ACCD75234* | 35.0–40.6 (95–105) | 6.1 (13.3) | 9.0 (19.9) | 9.3 (20.6) | 9.9 (21.7) | 10.0 (21.9) | 10.4 (23.0) |
| LCV8211-009-4C | ACCD75235* | 35.0–40.6 (95–105) | 6.1 (13.3) | 9.0 (19.9) | 9.3 (20.6) | 9.9 (21.7) | 10.0 (21.9) | 10.4 (23.0) |
| * Make-to-order. | | | | | | | | |

Total charge = Equipment charge + condenser summer charge + condenser flooded charge (for minimum possible ambient temperature) + liquid R410A in liquid pipe

Equipment charge: 5.5 kg (12.1 lb)

Liquid line charge for 7/8 in. ACR copper tube: 0.28 kg/m (0.186 lb/ft)

Density of liquid R410A at 40.6 °C (105 °F) and 27.5 bar (400 psig): 0.975 g/cm$^3$ (60.9 lbm/ft$^3$)

Example: Calculate the total R410A charge for an ACCD75232 condenser with 7.6 m (24.9 ft) of 7/8-in. liquid piping. Outdoor temperature is –18°C (0 °F).

Total R410A charge:

- Metric: 5.5 + 7.7 + 13.1 + (7.6 * 0.28) = 28.4 kg
- Imperial: 12.1 + 17.0 + 28.9 + (24.9 * 0.186) = 62.6 lb

## Charging the equipment

**⚠ WARNING**

**HAZARD TO EQUIPMENT OR PERSONNEL**

All work must be performed by Schneider Electric authorized personnel.

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

**⚠ CAUTION**

**HAZARD OF HIGH PRESSURE REFRIGERANT OR EQUIPMENT DAMAGE**

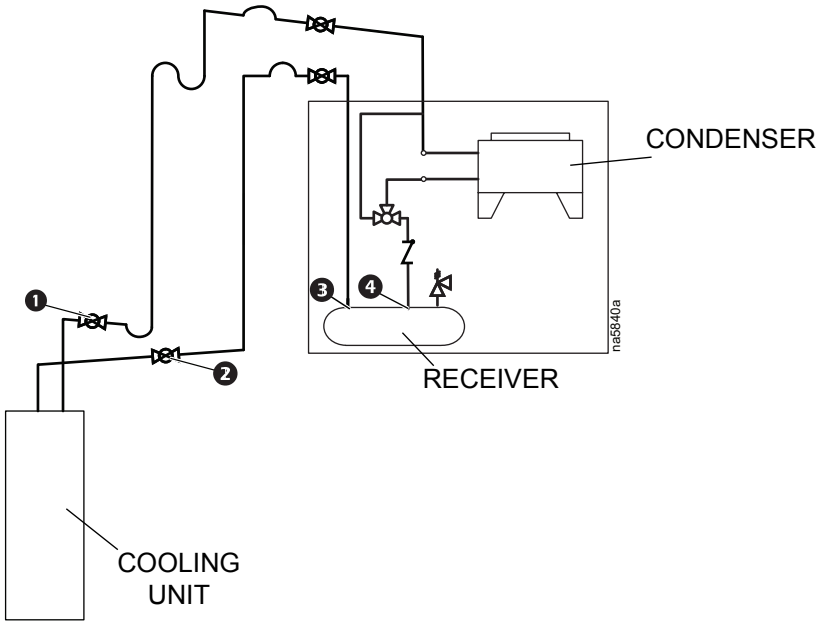
- Use R410A refrigerant only.
- Use hose and manifold set suitable for R410A.
- The unit display interface should be used to obtain pressure readings.

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

| NOTICE |
| --- |
| **HAZARD TO EQUIPMENT**<br><br>Introducing a fast charge of liquid refrigerant through the suction port may damage the compressor.<br><br>**Failure to follow these instructions can result in equipment damage.** |

Perform the “Add initial refrigerant amount—“fast charge” method:” on page 56 first, and then select one of the following to complete charging the system: “Top off the system refrigerant charge—“fast charge” method:” on page 57 or “Top off the system refrigerant charge—“slow charge” method:” on page 58.

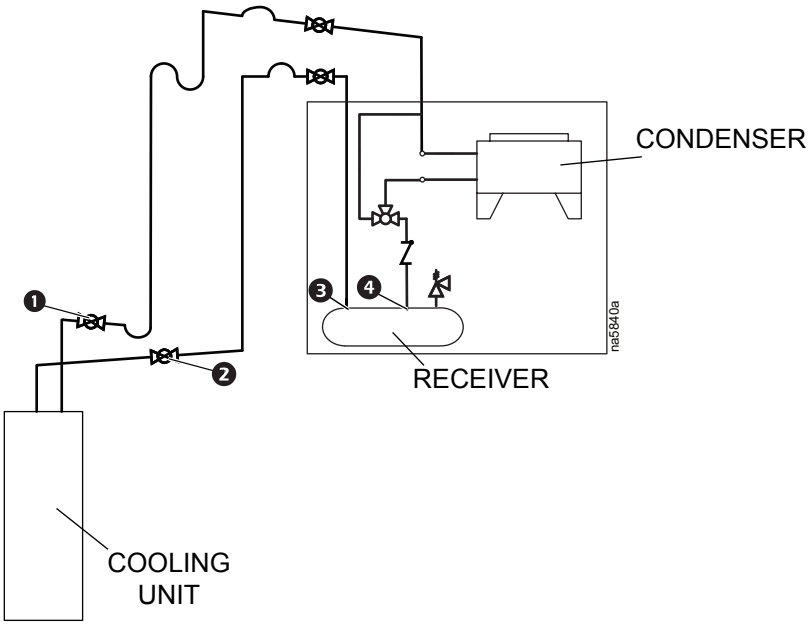
**Add initial refrigerant amount—“fast charge” method:** Perform the following with the system not in operation.




| Item | Description | Item | Description |
| --- | --- | --- | --- |
| ❶ | Discharge isolation valve | ❸ | Receiver outlet |
| ❷ | Liquid line isolation valve | ❹ | Receiver inlet |

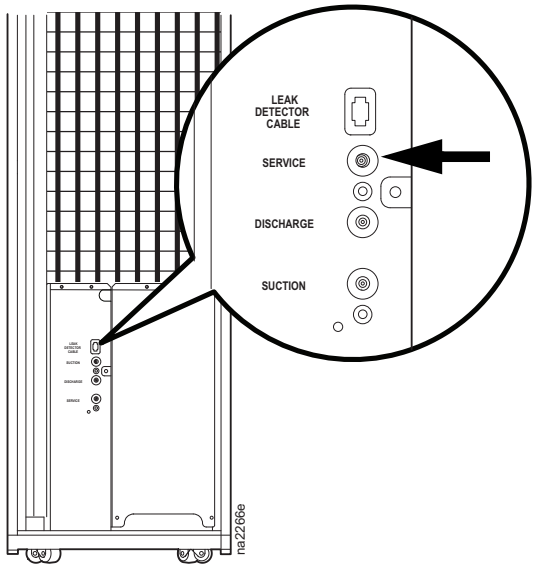
1. Open the discharge isolation valve, the liquid line isolation valve. The receiver outlet valve and receiver inlet valve should be back seated.
2. Attach a refrigerant cylinder and charging hose to the receiver outlet valve and purge the hose if necessary.
3. Open the receiver outlet valve and add the liquid refrigerant until the calculate initial amount is charged into the system.
4. Close the receiver outlet valve, and remove the refrigerant cylinder and charging hose.

**Top off the system refrigerant charge—"fast charge" method:** Perform the following with the system in operation.

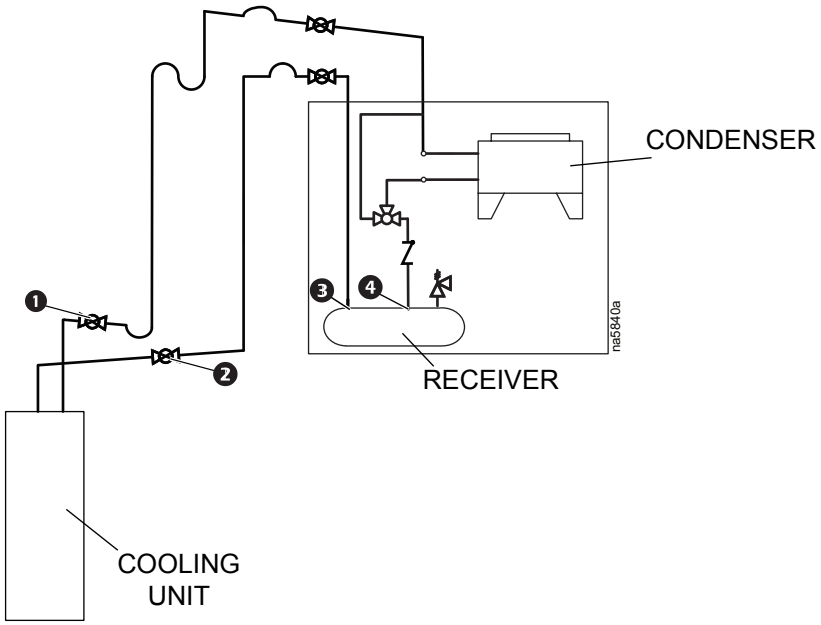



| Item | Description | Item | Description |
|---|---|---|---|
| ❶ | Discharge isolation valve | ❸ | Receiver outlet |
| ❷ | Liquid line isolation valve | ❹ | Receiver inlet |

1. Attach a refrigerant cylinder and charging hose to the service port on the cooling unit and purge the hose if necessary.
2. Close the liquid line isolation valve and wait for bubbles to appear in the liquid line sight glass.
3. Open the refrigerant cylinder valve and add refrigerant.
4. When charging is complete, close the refrigerant cylinder valve and remove the charging hose from the service port.
5. Slowly open the liquid line isolation valve.

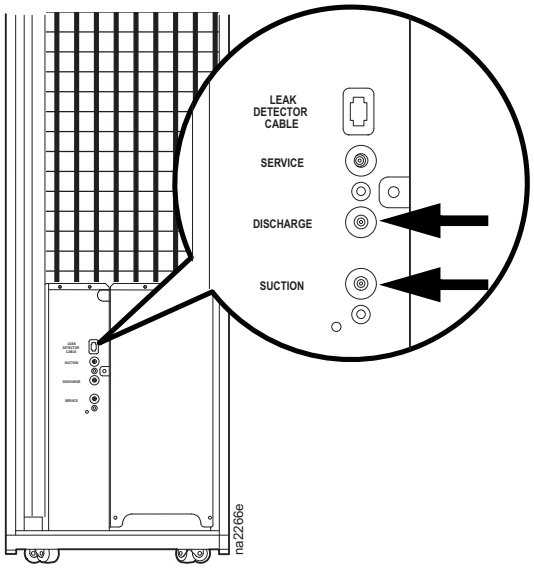


**Top off the system refrigerant charge—"slow charge" method:** Perform the following with the system in operation.




| Item | Description | Item | Description |
|---|---|---|---|
| ❶ | Discharge isolation valve | ❸ | Receiver outlet |
| ❷ | Liquid line isolation valve | ❹ | Receiver inlet |

1. Attach a refrigerant gauge manifold to the discharge and suction ports on the cooling unit.
2. Attach a manifold charging hose to the refrigerant cylinder and purge the hose if necessary.
3. Add liquid refrigerant very slowly through the suction port at a pressure of about 1 bar (15 psig) above the suction pressure. Do not charge for longer than two-minute intervals; stop charging and wait 3–5 minutes for the system to stabilize.
4. Repeat step 3 as necessary.
5. When charging is complete, close the refrigerant cylinder valve and remove the charging hose from the suction port.
6. Slowly open the liquid line isolation valve.



# Compressor Oil Charge

**⚠WARNING**

**HAZARD TO EQUIPMENT OR PERSONNEL**

All work must be performed by Schneider Electric authorized personnel.

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

## Oil charging procedure

***NOTICE***

**HAZARD TO EQUIPMENT**

Do not overcharge the compressor, or compressor damage could result. The only way to drain oil from the compressor is to remove the compressor from the equipment, which cannot be done when the equipment is in the row.

**Failure to follow these instructions can result in equipment damage.**

***NOTICE***

**DAMAGE TO EQUIPMENT**

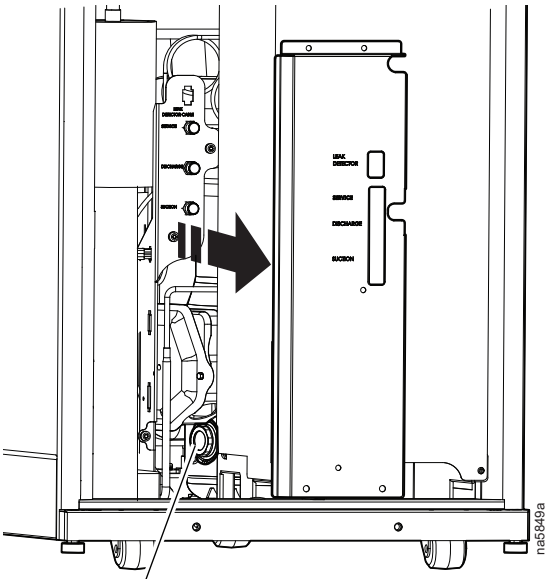
Be careful not to charge more oil than is necessary. Excessive oil in the system may cause system damage, including the following:

- Failure of valves and pistons due to oil slugging.
- Excessive oil carryover.
- Loss of evaporator performance due to oil level build-up in the low-pressure side of the system.

**Failure to follow these instructions can result in equipment damage.**

1. Prepare to add oil:
   a. Use a new sealed oil can and a manual oil pump. The pump hose must be sized for 1/4 in. flare fittings and must include a valve depressor at its end, which will open the valve on the suction port of the compressor.
   b. Use high quality polyolester (POE) type 160SZ oil or equivalent.
2. Purge the pump and hose:
   a. Ensure that the oil pump is clean. Insert the pump in the oil container and make sure that the container is open to the atmosphere for as short a period of time as possible. When available, use a plug adapter kit to further reduce the exposure of the oil to the atmosphere.
   b. Bleed all air from the pump and hose with a few strokes of the pump. Purging the pump removes the moisture-saturated oil left inside the hose from previous usage.
   c. Connect the hose to the suction port of the compressor immediately after purging to avoid moisture contamination.

3. While the equipment is running, charge 0.44 l (15 oz.) POE oil through the suction port. Pump the oil very slowly. (This is to ensure the oil separator is functioning properly.)
4. Other than the amount required for the oil separator, no additional oil should be required.
   Let the compressor run at full capacity for at least one hour and check the oil level in the oil sight glass. The level should be between 1/4 and 3/4 full, or within the limit shown on the oil level sticker. If the oil is not within the acceptable limit, check the oil return line for restrictions. When oil is flowing properly, the oil return line should feel warm to the touch.
   **NOTE:** Dispose of the oil waste appropriately.



# Accessories

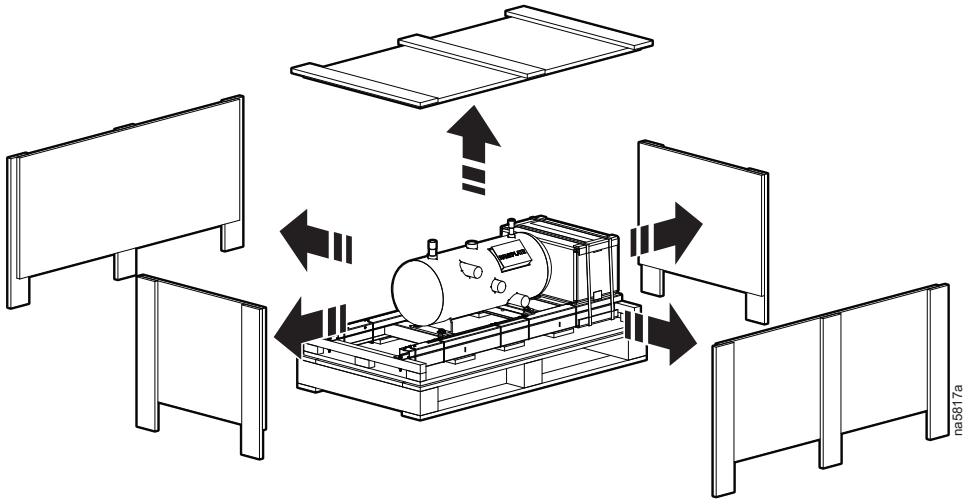
## Low Temperature Kit

The low temperature kit provided by Schneider Electric includes a pressure relief valve on the liquid receiver vessel. If the low temperature kit is not installed, then Schneider Electric recommends the installation of a pressure relief valve on the discharge pipe near the condenser. The pressure relief valve selection and installation is the responsibility of the installer and shall comply with local authorities.

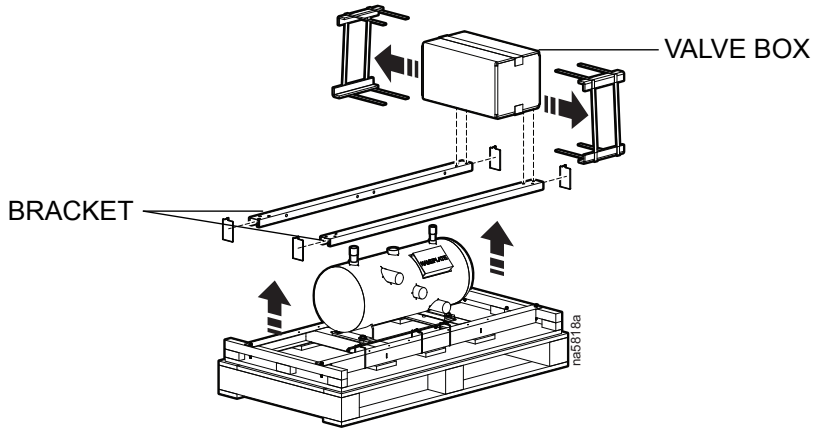
### Unpacking

**GCN-GB and EMEA-PED versions (ACAC75013 and ACAC75015)**

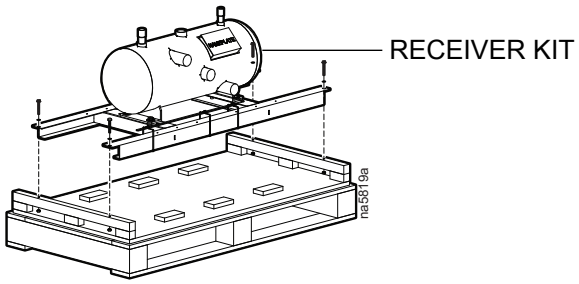
1. Remove plywood top and sides from the pallet.




2. Remove the valve box (contains safety valve, ball valve, head pressure valve, and check valve).
3. Remove brackets.

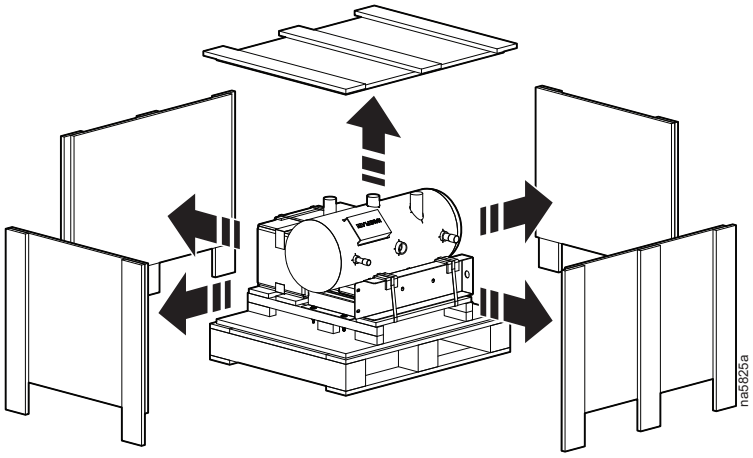


4. Remove receiver kit.

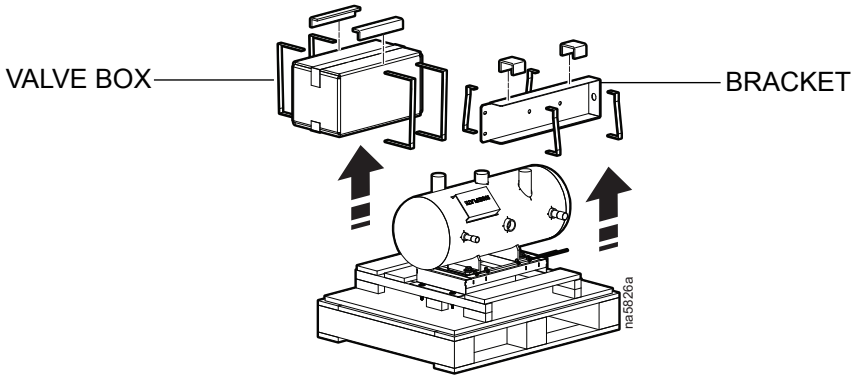



**NAM-ASME versions (ACAC75014)**

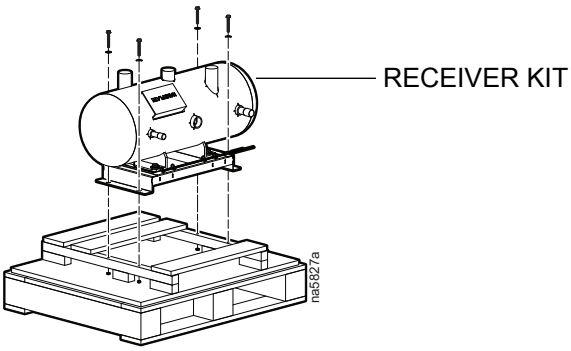
1. Remove plywood top and sides from the pallet.




2. Remove the valve box (contains safety valve, ball valve, head pressure valve, and check valve).
3. Remove brackets.

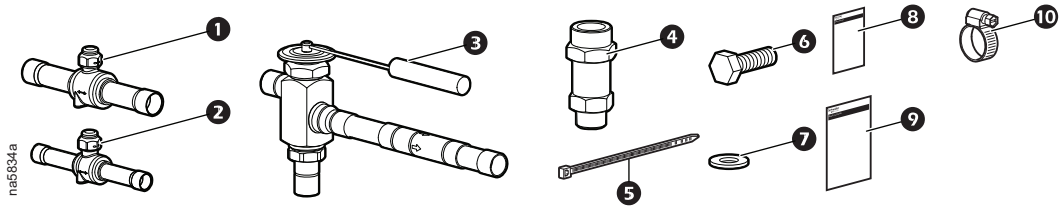



4. Remove receiver kit.



## Install kit inventory

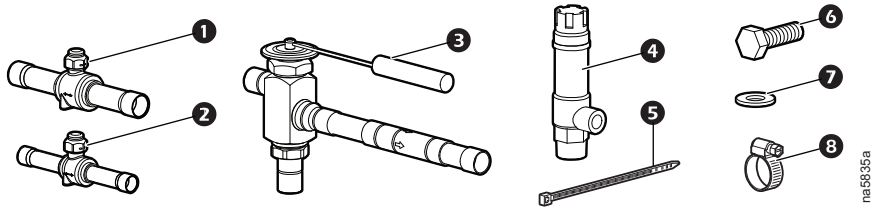
### GCN-GB versions (ACAC75013)




| Item | Description | Quantity |
|---|---|---|
| ❶ | Ball valve, 7/8 in. (inlet) | 1 |
| ❷ | Ball valve, 5/8 in. (outlet) | 1 |
| ❸ | Head pressure valve and check valve | 1 |
| ❹ | Safety valve (GB) | 1 |
| ❺ | Tie wrap, 1 1/4 in. | 11 |

| Item | Description | Quantity |
|---|---|---|
| ❻ | Bolt, M6 | 16 |
| ❼ | Washer flat, M6 | 16 |
| ❽ | Quality certificate for receiver (GB) | 1 |
| ❾ | Quality certificate for safety valve (GB) | 1 |
| ❿ | Hose clamp | 2 |

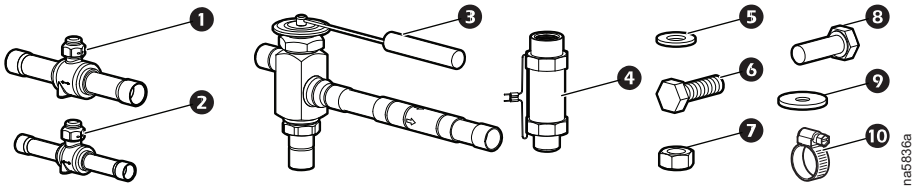
### EMEA-PED versions (ACAC75015)




| Item | Description | Quantity |
|---|---|---|
| ❶ | Ball valve, 7/8 in. (inlet) | 1 |
| ❷ | Ball valve, 5/8 in. (outlet) | 1 |
| ❸ | Head pressure valve and check valve | 1 |
| ❹ | Safety valve (PED) | 1 |

| Item | Description | Quantity |
|---|---|---|
| ❺ | Tie wrap, 1 1/4 in. | 11 |
| ❻ | Bolt, M6 | 16 |
| ❼ | Washer flat, M6 | 16 |
| ❽ | Hose clamp | 2 |

### NAM-ASME versions (ACAC75014)

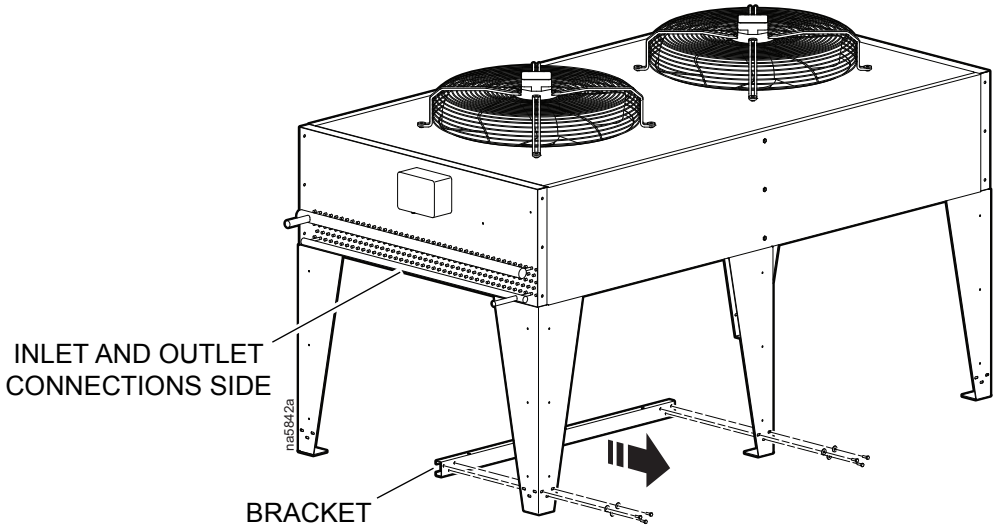



| Item | Description | Quantity |
|---|---|---|
| ❶ | Ball valve, 7/8 in. (inlet) | 1 |
| ❷ | Ball valve, 5/8 in. (outlet) | 1 |
| ❸ | Head pressure valve and check valve | 1 |
| ❹ | Safety valve (ASME) | 1 |
| ❺ | Washer flat, 1/4 in. | 2 |

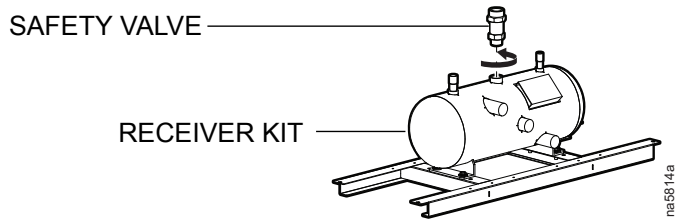
| Item | Description | Quantity |
|---|---|---|
| ❻ | Bolt, 1/4 in. | 2 |
| ❼ | Nut, M10 | 4 |
| ❽ | Bolt, M10 | 4 |
| ❾ | Washer flat, M10 | 4 |
| ❿ | Hose clamp | 2 |

### GCN-GB and EMEA-PED versions (ACAC75013 and ACAC75015)

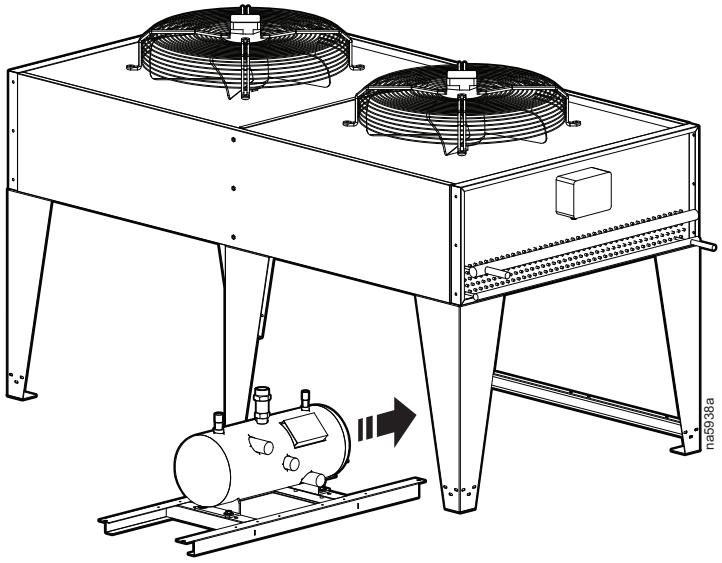
1. Facing the inlet and outlet connections, attach the first bracket to the right-side condenser legs.



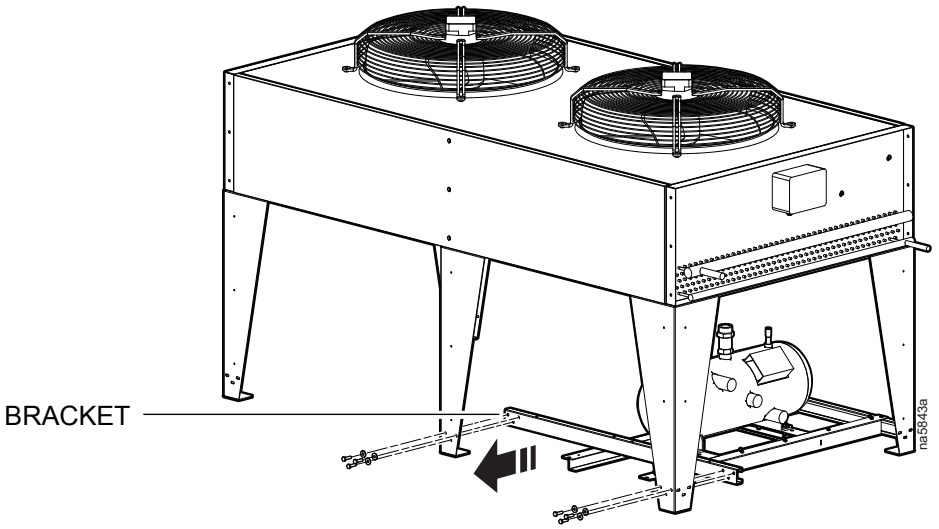

2. Install the safety valve onto the receiver kit. Use thread sealing adhesives or raw adhesive tape as necessary.



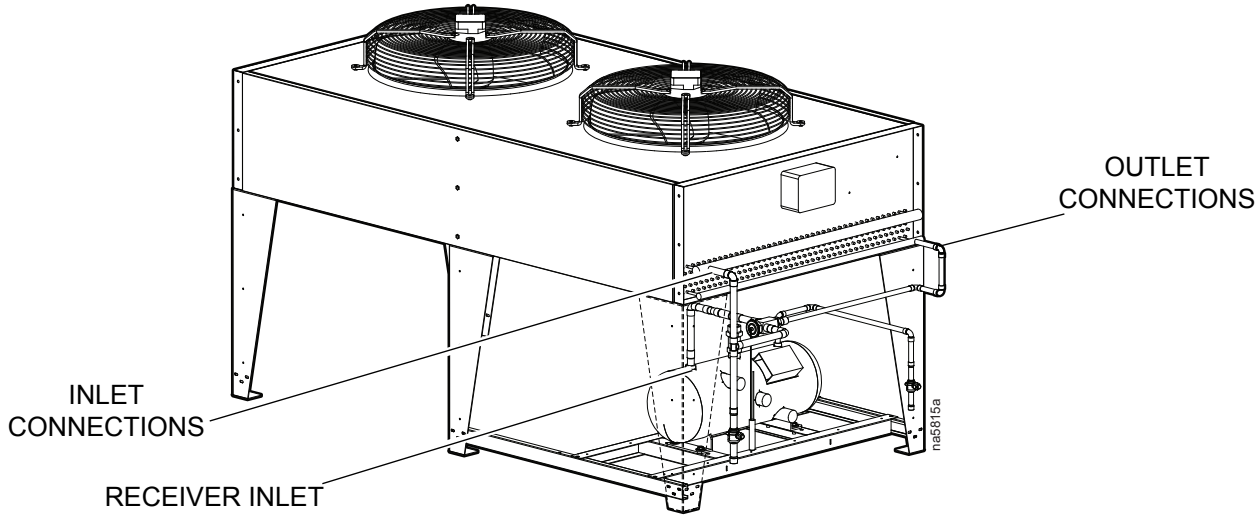

3. Install inlet piping onto the receiver kit.
4. Attach the receiver kit onto the previously installed bracket.



5. Install the second bracket on the opposite side of the first bracket to enclose the receiver kit.

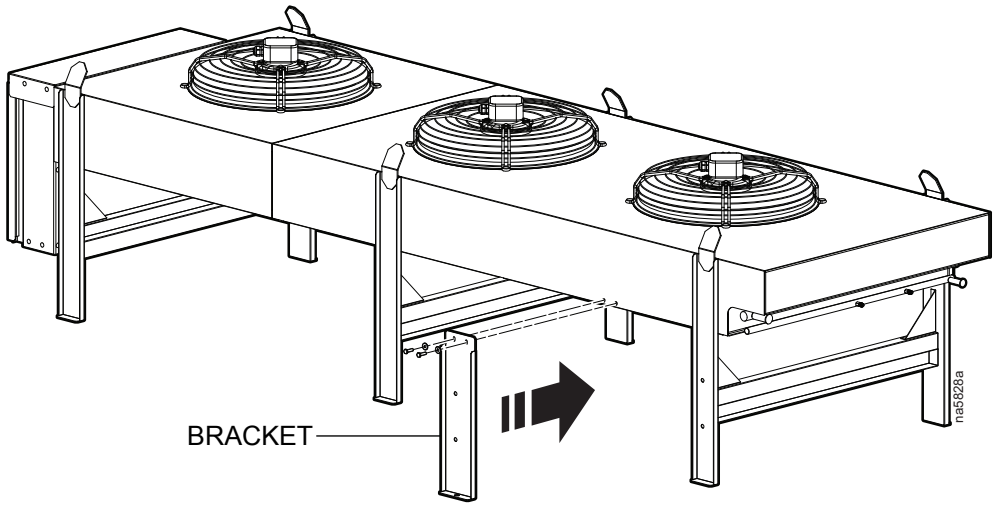



6. Install the included valve and pipes to the inlet and outlet connections on the condenser.



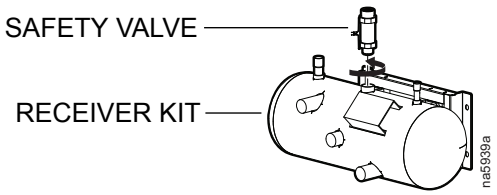
**NAM-ASME versions (ACAC75014)**

1. Install the bracket using the 1/4-in. washers and 1/4-in. bolts.

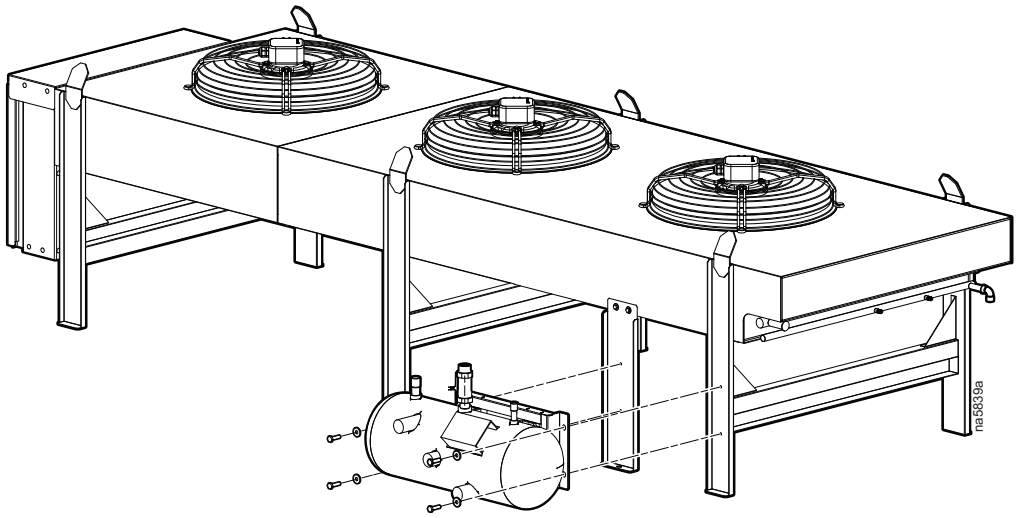



MODEL ACCD75228-231 SHOWN

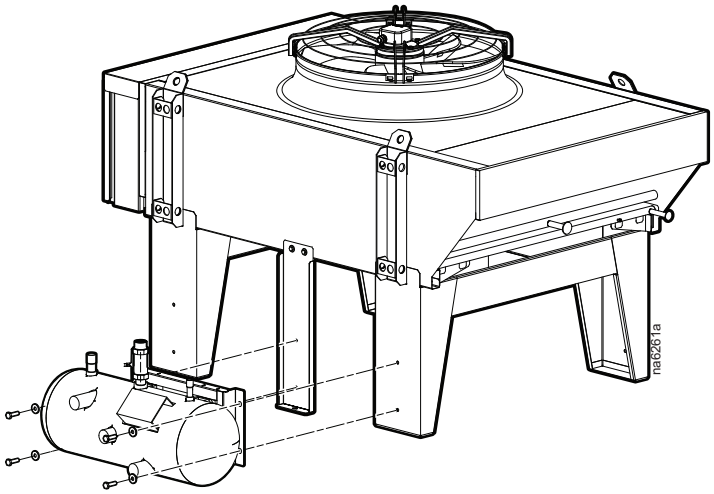
2. Install the safety valve onto the receiver kit. Use thread sealing adhesives or raw adhesive tape as necessary.



3. Install receiver kit using the M10 washers, M10 bolts, and M10 nuts.



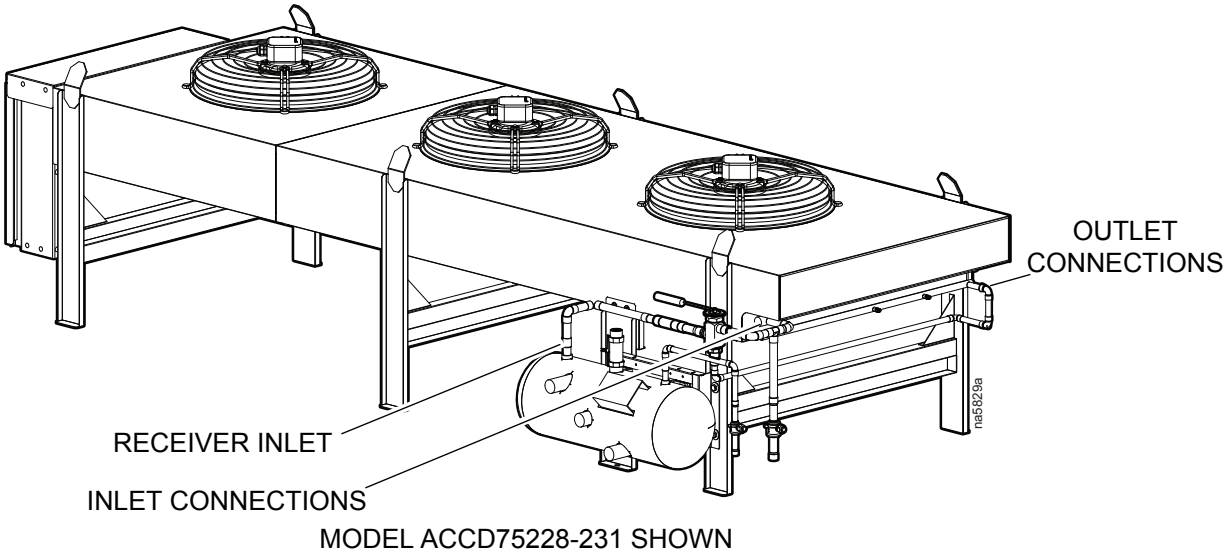

MODEL ACCD75228-231 SHOWN




MODEL ACCD75234/ACCD75235 SHOWN

**NOTE:** Make-to-order.

4. Install included valve and pipes to the inlet and outlet connections on the condenser.

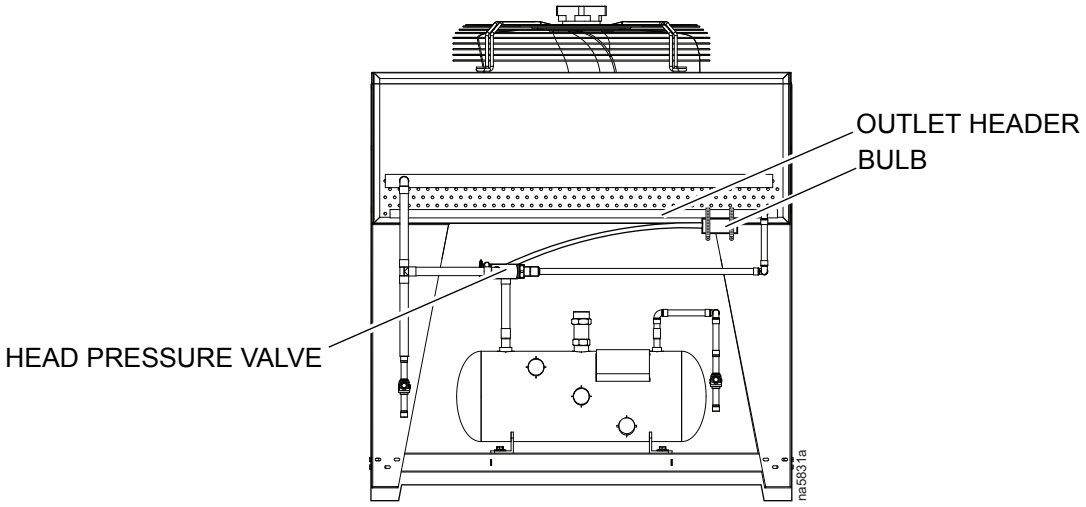



MODEL ACCD75228-231 SHOWN

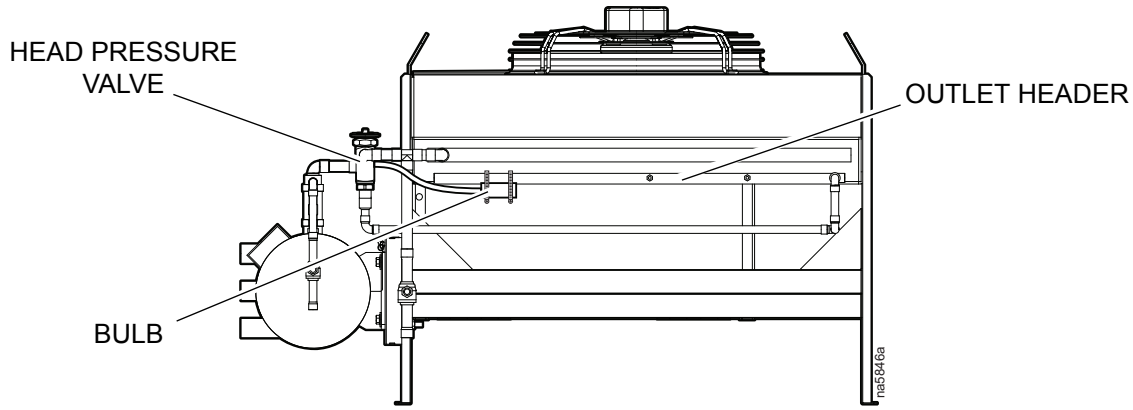
## Bulb location

Two clamps are provided to fasten the head pressure valve sensing bulb to the condenser outlet header.

**GCN-GB and EMEA-PED versions (ACAC75013 and ACAC75015)**




**NAM-ASME versions (ACAC75014)**



## Heater connection location

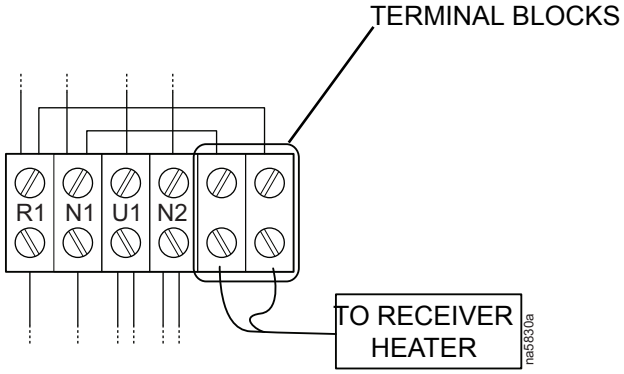
**⚠ ⚠ WARNING**

**ELECTRICAL HAZARD**

Electrical service must conform to local and national electrical codes and regulations.

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

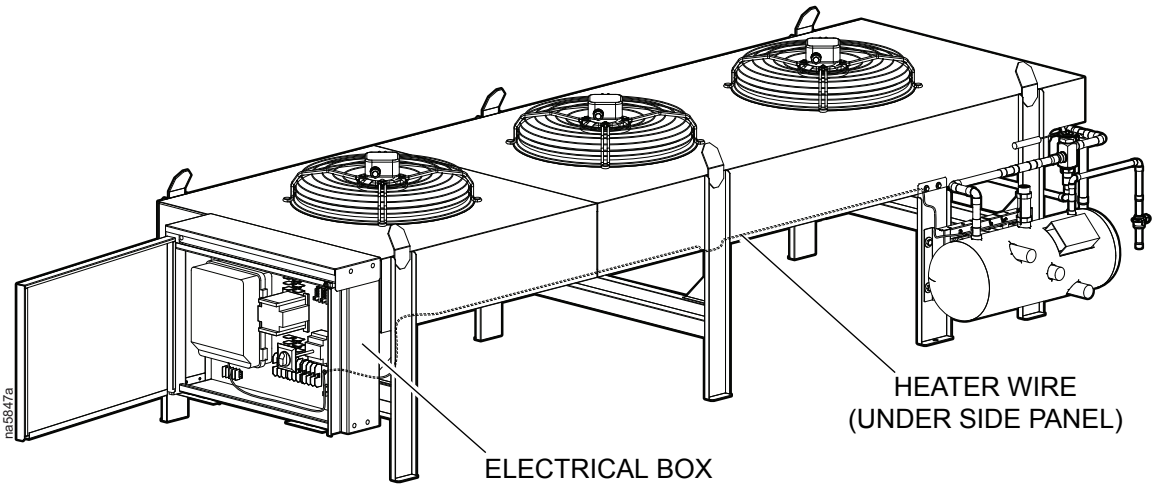
**GCN-GB and EMEA-PED versions (ACAC75013 and ACAC75015)**



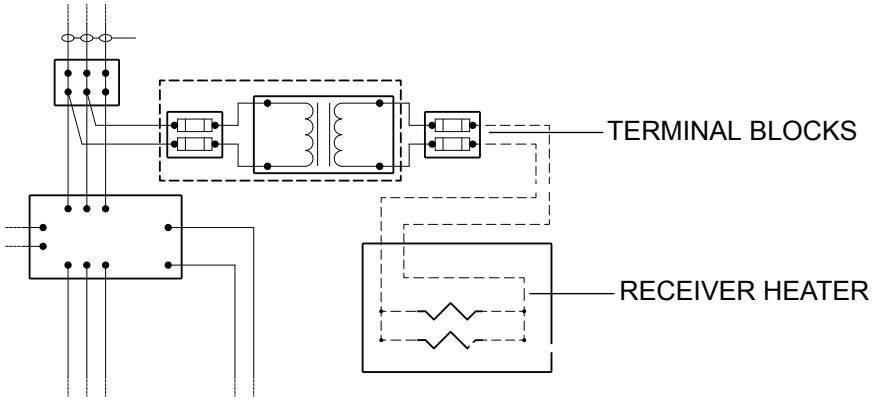

GCN AND EMEA

1. Remove the cap over the hole on the electrical box.
2. Install the grommet (supplied with condenser).
3. Connect the heater wire to the terminal blocks on the electrical box.

**NAM-ASME versions (ACAC75014)**




1. Open the door accessing the electrical box.
2. Connect the heater wire to the terminal blocks on the electrical box.



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  - **www.schneider-electric.com** (Corporate Headquarters)
    Connect to localized Schneider Electric Web sites for specific countries, each of which provides customer support information.
  - **www.schneider-electric.com/support/**
    Global support searching Schneider Electric Knowledge Base and using e-support.
- Contact the Schneider Electric Customer Support Center by telephone or e-mail.
  - Local, country-specific centers: go to **www.schneider-electric.com > Support > Operations around the world** for contact information.

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