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Installation

NetworkAIR® FM DX Precision Air Conditioner

40KW, 50Hz

FM40H-AGB-ESD

This manual is available in English on the enclosed CD.

Instrukcja Obsługi w jezyku polskim jest dostepna na 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.

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

Contents

General Information

Overview

Save these instructions

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

Intended users

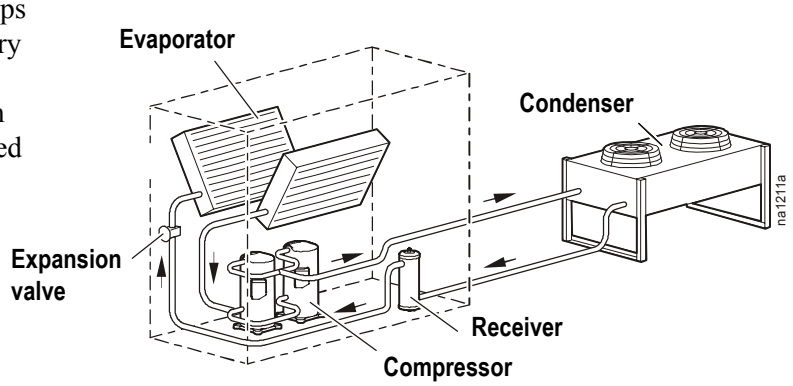
This manual is intended for **American Power Conversion (APC) authorized personnel**. It provides component specifications and instructions for installing and commissioning the equipment.

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.

Configuration

The equipment is air-cooled, ships with a holding charge (usually dry nitrogen), and requires onsite installed refrigerant piping. Each installation requires an engineered piping solution.



Safety symbols that may be used in this manual

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

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

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

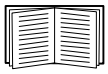
Heavy: Indicates a heavy load that should not be lifted without assistance.

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

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

Note: Indicates important information.

Cross-reference symbols used in this manual



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

Safety

Note: All work should be performed by APC authorized personnel only.

Follow all local and national codes when installing this equipment.

Only a licensed plumber may connect water lines.

For indoor use only.

Caution: Keep your hands, clothing, and jewelry away from moving parts.

Check for foreign objects before closing the doors and starting the equipment.

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

The equipment has a high center of gravity. Use extreme caution when unpacking and moving.

When using a forklift to move the equipment, make sure to lift only from the bottom.

Electrical Hazard: Only a licensed electrician or APC Field Service Engineer may connect the equipment to UPS power.

Only a licensed electrician may connect the equipment to utility power.

This equipment has multiple power sources. Disconnect all energy sources before servicing the equipment.

Do not wear jewelry when working near energized components.

Modules, Systems, and Groups

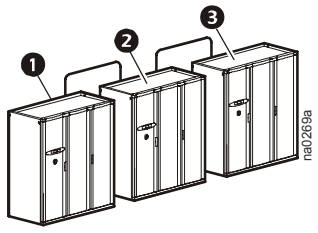
NetworkAIR *Modules* and *Expansion Modules* can be combined electronically to create *Systems* and *Groups*.

Module

A *Module* is an independent Computer Room Air Conditioner (CRAC) which operates based on its own temperature and humidity sensors.

System

A *System* is a set of one to three Modules or CRACs. Their operation is based on an average of the combined temperature and humidity sensors of all the Modules in the System. The Modules in a System work together as a single unit to increase cooling capacity.



- ❶ Main Module
- ❷ Expansion Module 1
- ❸ Expansion Module 2

In a System, one of the Modules is designated as the “Main Module” and the rest of modules are designated as “Expansion Modules”. The Main Module is the controller for all the Modules in the System. It contains the PCIOM boards, the webcard, and establishes communications with the Building Management System (BMS).

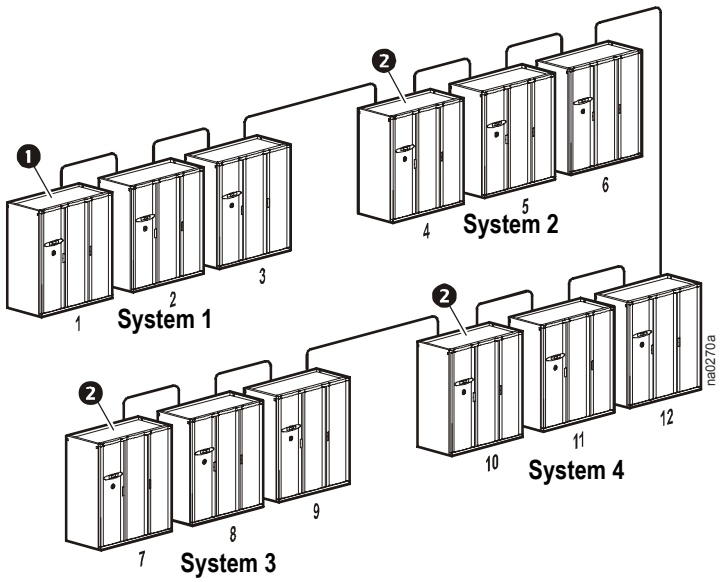
Note: When using the system configuration, only the main module display will be operational. The other expansion module displays will not operate.

Group

A *Group* is a set of two, three or four Systems that work together to provide redundancy and load sharing capabilities.

To enable the Modules to work in a System or Group, the only requirement is to connect them together with a CAT 5 cable terminated with RJ-45 connectors and to set the dip switches on the controller board of each module to assign the Main Module, the Expansion Modules, and the System number..

❶ Main Module



Inspecting the Equipment

Your equipment has been tested and inspected for quality assurance prior to shipment from APC. To ensure that the equipment has not been damaged during transit, carefully inspect both the exterior and interior of the equipment immediately upon receipt.

Verify that all parts ordered were received as specified. See “Inventory” on page 7.

Filing a claim

If damage is identified on receipt of the equipment, note the damage on the bill of lading and file a damage claim with the shipping company. Contact APC for information on filing a claim with the shipping company. The shipping claim must be filed at the receiving end of the delivery.

Note: In case of shipping damage, do not operate the equipment. Keep all packaging for inspection by the shipper and call APC at one of the numbers listed on the back cover of this manual.

Storing the Equipment Before Installation

Caution: Leaving the equipment uncovered and exposed to the elements can cause damage and will void the factory warranty.

Moving the Equipment

Moving the equipment through door openings

Depending upon your installation, you may need to modify the equipment to fit through smaller door openings.

Refer to the dimensional drawing and “Dimensions” on page 14 to help determine if this is necessary.

If modifications are necessary, you can decrease the width of the equipment by removing the front kick panel, hard points, and main circuit breakers.

See “Removing Doors and Panels” on page 17 for more information.

Move the equipment to its final location

Tip Hazard: Use extreme caution to prevent tipping when unpacking or moving the equipment to its final location.

Moving the equipment requires two people for safety. Push the equipment from the front only.

Warning: When using a forklift to move the equipment, make sure to lift only from the bottom. Do not use a forklift if the equipment has been removed from its pallet.

Heavy: Do not attempt to move the equipment without assistance. Moving this requires two people.

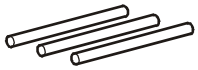
Select the appropriate tools for moving the equipment. Each site will have different needs and considerations.

Pallet jack

Furniture dollies (2)

Forklift

Roller bars



Wheeled lever

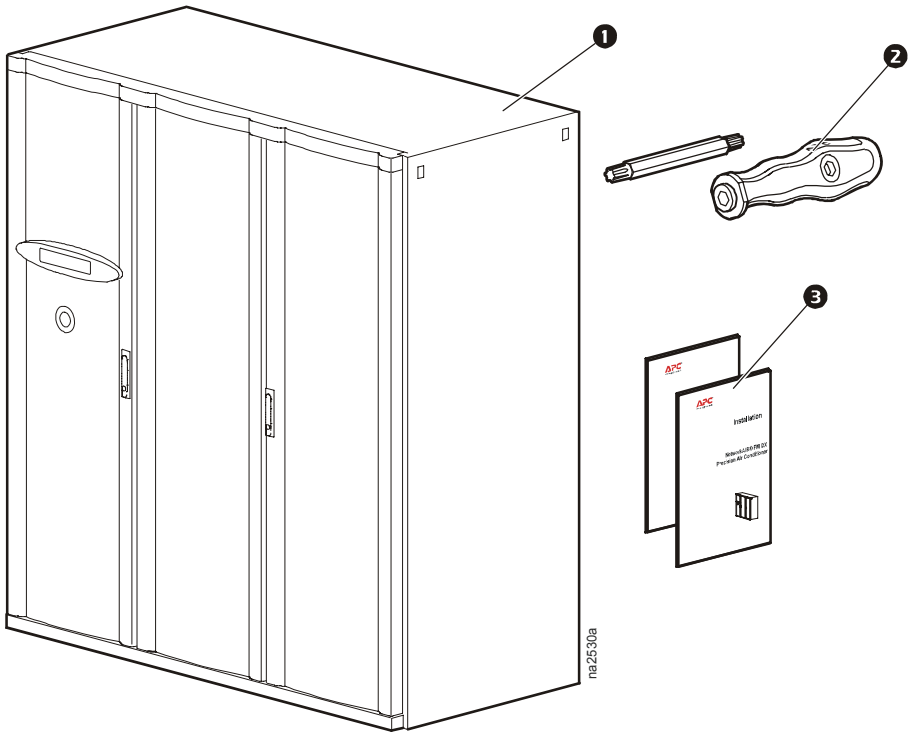
Model Identification

The model number is on the outside of the shipping carton and on the ratings label located on the lid of the electrical box.

FM40H-AGB-ESD						
Capacity (kW)	**Refrigerant**	**Configuration**	**Voltage**	**Reheat**	**Humidification**	**Air Pattern**
40	R407C	A = Air-cooled	GB = 400/3/50	E = Electric	S = Steam Canister (Replaceable)	D = Downflow

Inventory

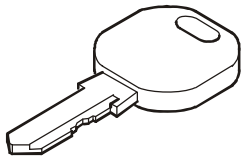
The following items are included:



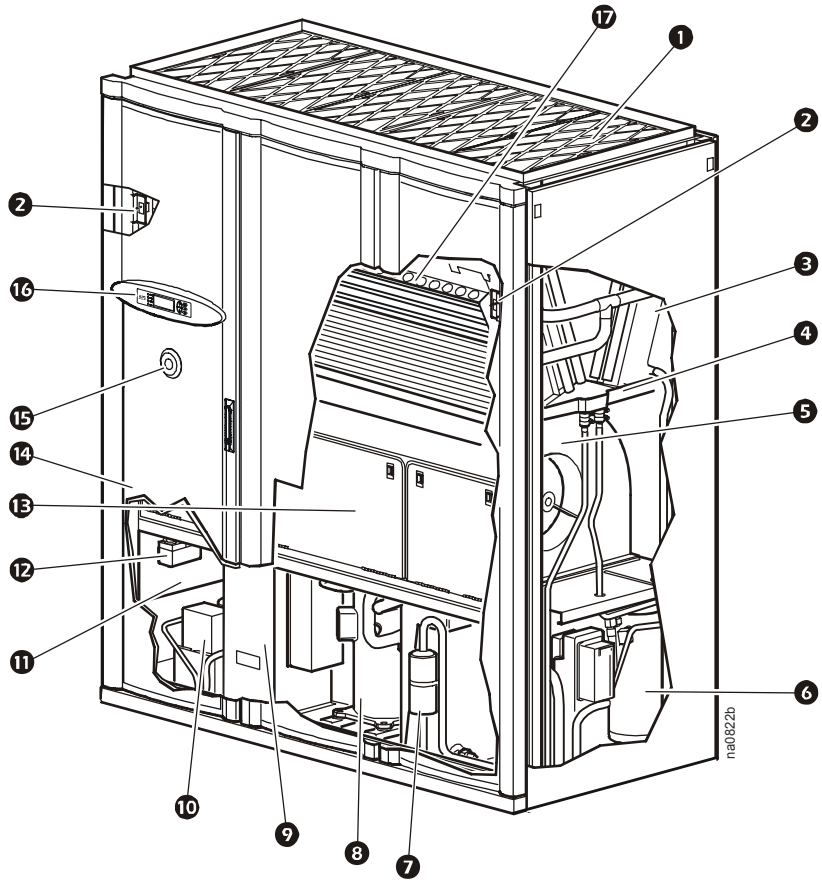
1. Precision air conditioner
2. Torx® screwdriver (T20 and T30)
3. Documentation package

Door locks

The left- and right-hand doors can be locked using the key located inside the front-left door.

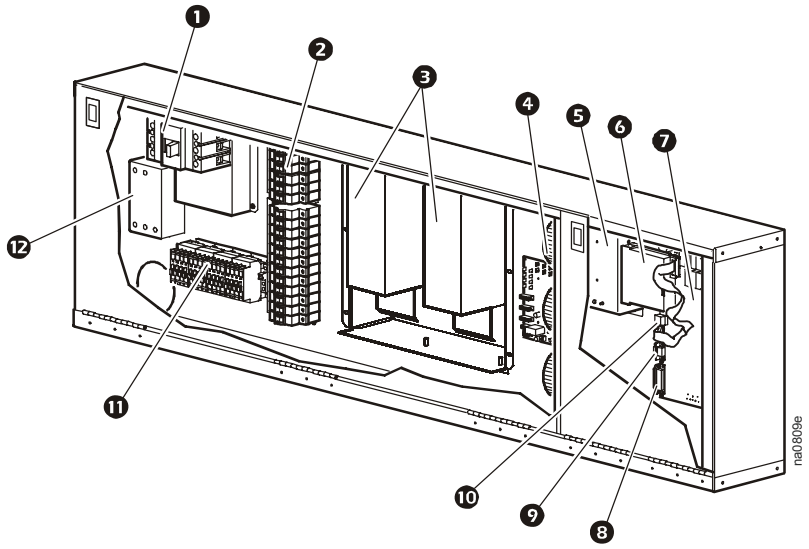


Component Identification



1. Air filters
2. Fan interlock switch
3. DX coil
4. Condensate pan
5. Motor and fan assembly
6. Liquid refrigerant receiver
7. Filter dryer
8. Tandem compressors
9. Humidifier
10. Condensate pump (optional)
11. User interface box
12. Firestat (optional)
13. Electrical panel
14. Steam head (not shown)
15. Main power interrupt switch
16. Display interface
17. Electric reheat coil

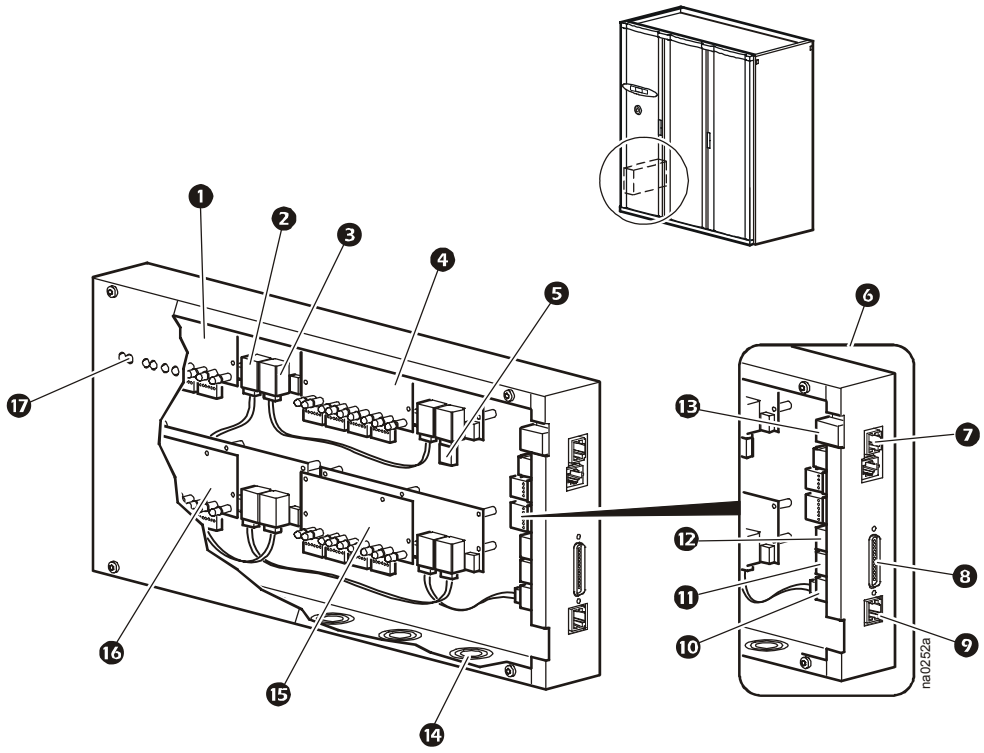
Electrical panel components



1. Input circuit breaker—main power
2. Circuit breakers
3. Variable frequency drive (VFD) for blowers
4. Control transformers
5. Smoke detector (optional)
6. Network management card (NMC)
7. Controller board
8. DB25 (user interface) port
9. Console port
10. Display interface port
11. Contactors
12. Reheat silicon-controlled rectifier (SCR) control

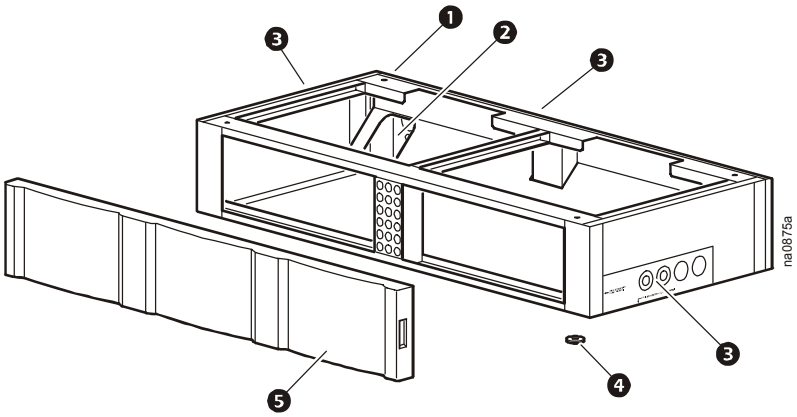
Note: Your electrical panel may differ slightly from the one shown above.

User interface box



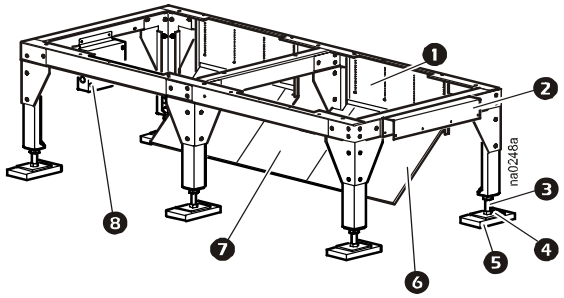
1. Programmable Customer Input/Output Modules (PCIOM) #3
2. CAN bus input
3. CAN bus output
4. PCIOM #4
5. Terminator
6. User interface module
7. To bulkhead ethernet connection
8. To bulkhead controller interface connection
9. To CAN bus component (temperature, humidity, and pressure sensors)
10. Module CAN bus input (PCIOM)
11. System CAN bus output (PCIOM)
12. System CAN bus input
13. Ethernet port (customer connection point)
14. Knock-outs
15. PCIOM #1
16. PCIOM #2
17. LED input/output (I/O) indicators

Optional sub-base assembly



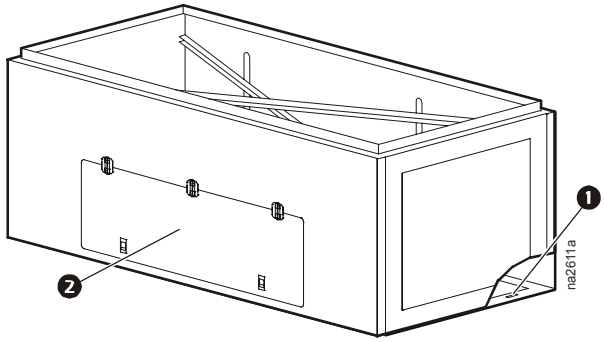
1. Removable rear panels
2. Rear-piping access chase
3. Utility access
4. Washer pads (6)
5. Discharge air panel

Optional floorstand



1. Air blocks
2. Joining bracket
3. Adjustable legs
4. Pedestal
5. Pad
6. Turning vane
7. Turning vane extension
8. Electrical distribution box (optional)

Optional plenum—return



1. Mounting holes
2. Door panel

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. 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 as well as causing increased system operating costs.

Raised floor. Pay special attention to the location of pipe chases, electrical conduits, and other under-floor obstructions. These objects can block air circulation and increase air pressure drops, creating a condition which reduces system efficiency and causes possible hot spots in the room.

Incoming power supply requirements

Note: The equipment requires three-phase electrical service. Electrical service must conform to national and local electrical codes and regulations. The equipment must be grounded.

Supporting the equipment

Floorstand. Downflow discharge equipment can be installed directly on the raised floor after ensuring that the floor can support it. A floorstand can be used where the floor cannot support the equipment.

Note: Consult your raised floor manufacturer for weight capacities if you are installing the equipment directly on the raised floor.

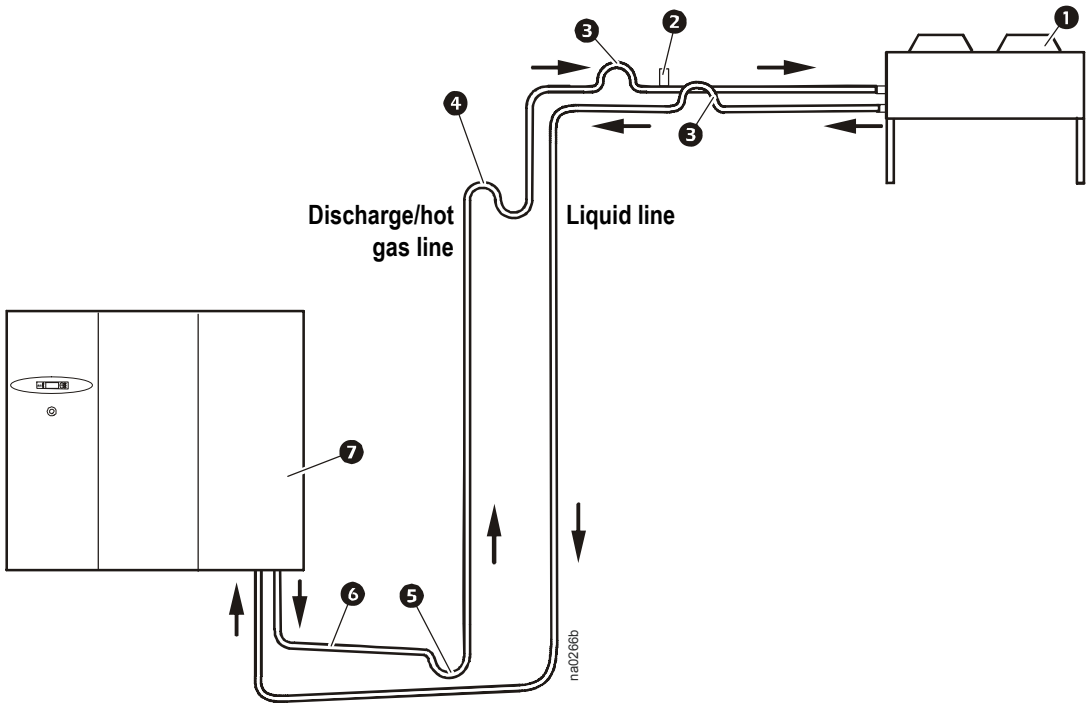
Air distribution

Downflow discharge. If the installation location has a raised floor, the space between the raised floor and sub-floor can be used as an air distribution plenum.

- When installing equipment on a raised floor, maintain sufficient free area to allow proper air movement.
- Consider under-floor obstructions that might prevent conditioned air from being properly distributed throughout the room.
- Install an adequate number of perforated floor tiles to allow for the predetermined air distribution in the conditioned space. Install more perforated tiles near heavier heat loads.

Note: All equipment is designed for a maximum of 1016 Pa (0.3 in) of external static pressure.

Piping Diagram



1. Condenser
2. Pressure relief valve
3. Inverted “P” trap
4. “S” trap (used on the discharge line every 6 meters of vertical rise)
5. “P” trap
6. Pitch in direction of refrigerant flow, 13 mm per 3 m (1/2 in per 10 ft)
7. FM precision air conditioner

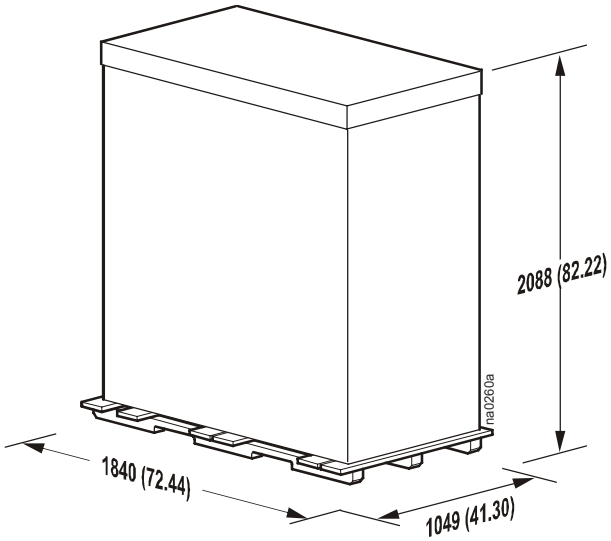
Weights and Dimensions

Weight

MODEL FM 40	
Weight (kg)	841.5
(lb)	1854

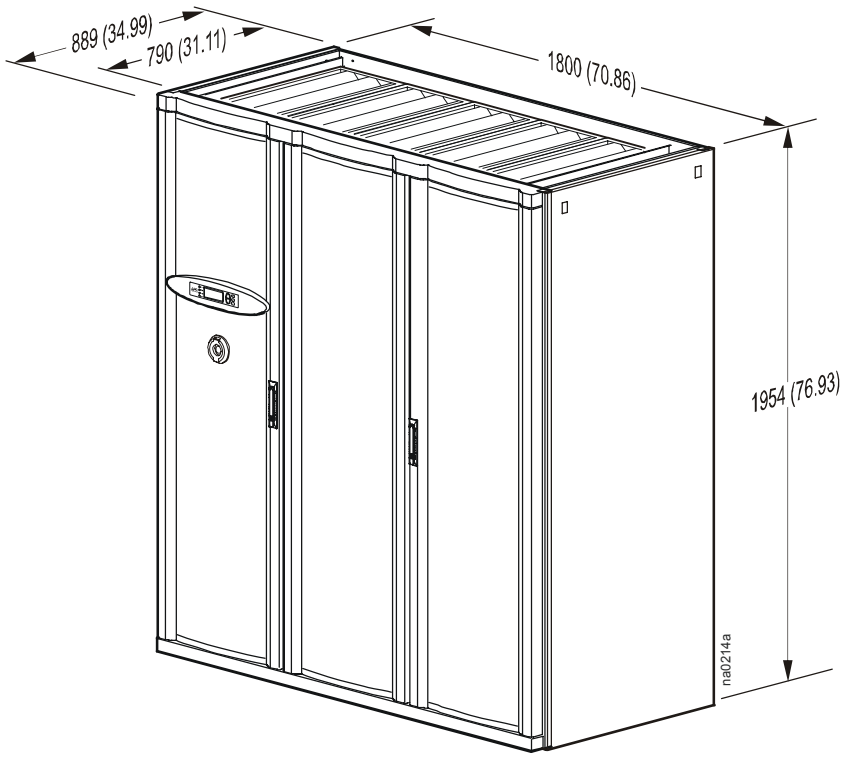
Dimensions

Packaged with shipping crate



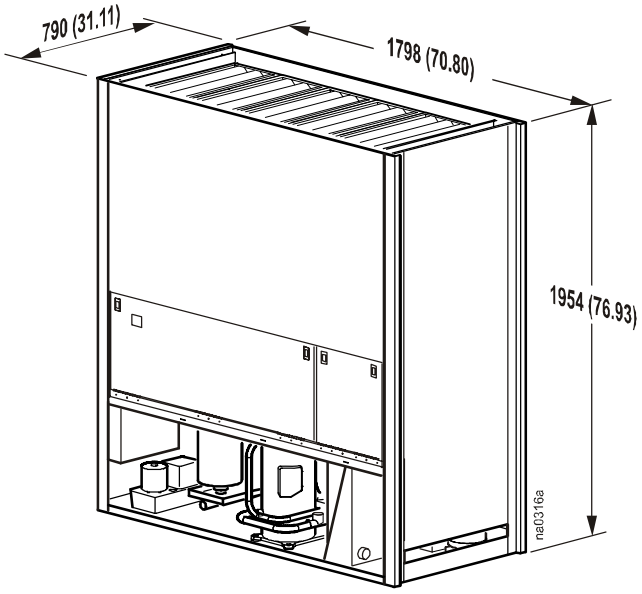
Dimensions are shown in mm (in).

Exterior dimensions



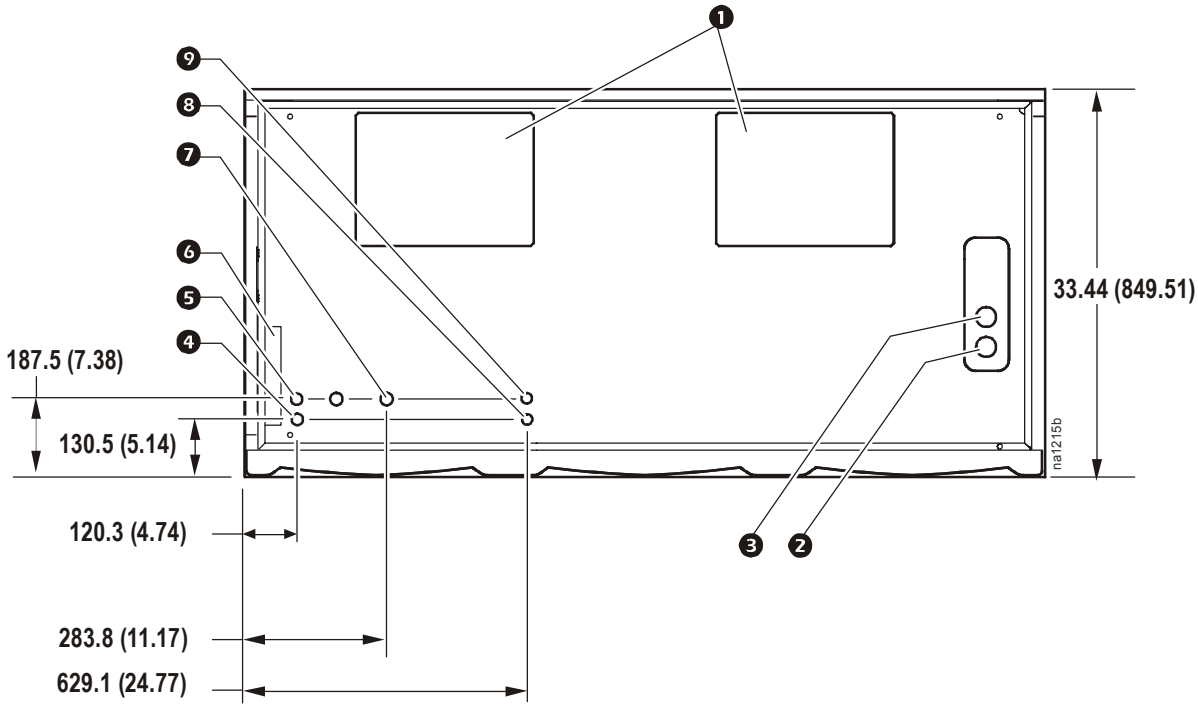
Dimensions are shown in mm (in).

Doors, panels, and main circuit breaker removed



Dimensions are shown in mm (in).

Piping access location in bottom pan—top view



Dimensions are shown in mm (in).

1. Air outlets (downflow only)
2. Refrigerant discharge line
3. Refrigerant liquid line
4. Control interface access
5. Main power in
6. Downflow power entry
7. Condensate pump out
8. Humidifier fill
9. Spare

Installation

Removing Doors and Panels

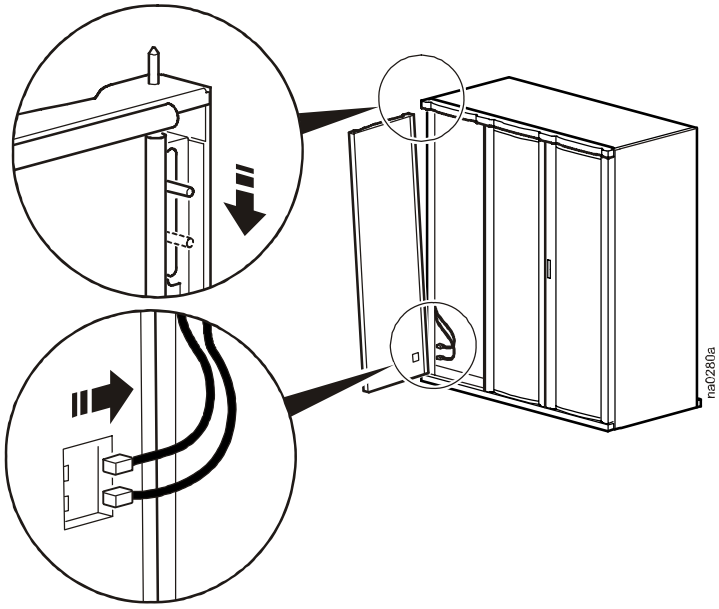
When moving the equipment, it may be necessary to modify it to fit through smaller door openings. Decrease the depth by removing the front doors, front fascia, kick panel, rear panels, and main circuit breaker.

Heavy: Doors and panels are heavy. For safety, have at least two people lift and move them during removal or installation.

Caution: The equipment must stay upright at all times. Tilting the equipment more than a few inches from the vertical may cause internal damage.

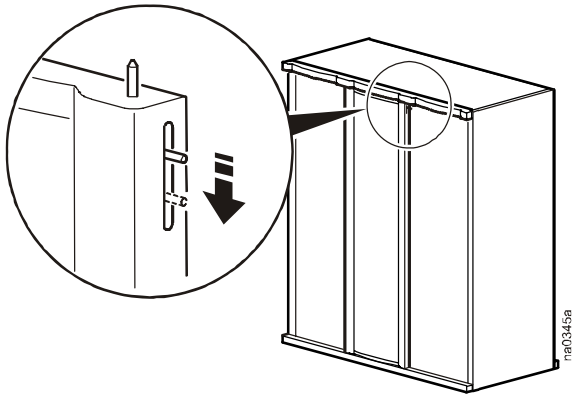
Removing the outer front doors

1. Open the door.
2. Before removing the left door, remove the display interface and the main power interrupt switch connections as shown.
3. Pull down on the spring-loaded hinge pin located in the top of the door. Tilt the door forward and lift up to release it from the lower hinge pin.



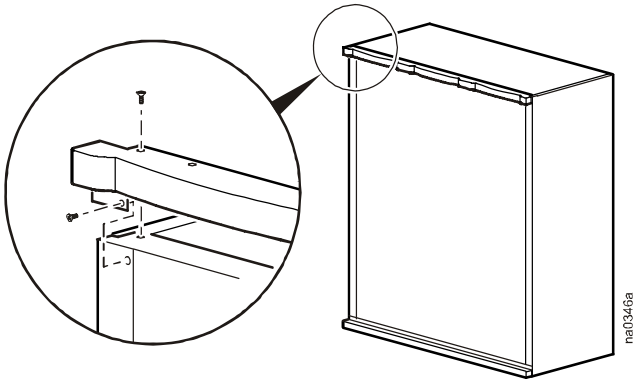
Removing the center front door

1. Open the left- and right-hand doors to gain access to the center panel release mechanisms.
2. Pull down on the spring-loaded hinge pins located in the top of the door. Tilt the door forward and lift up to release it from the lower hinge pin.



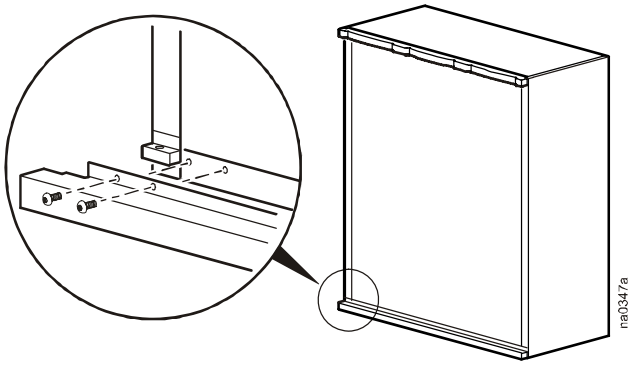
Removing the front fascia

To remove the front fascia, remove the five Torx® screws located at the top of the fascia and the two Torx screws located on the front of the fascia.



Removing the kick panel

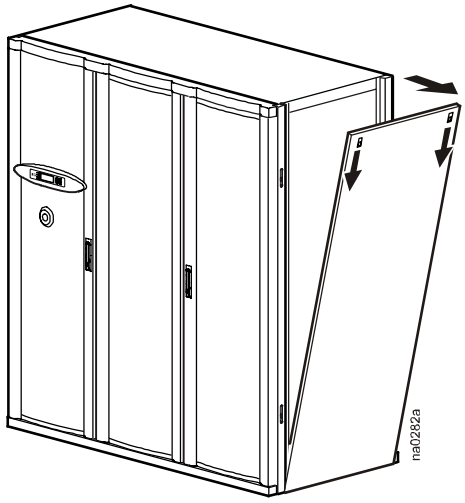
To remove the kick panel, remove the eight Torx screws from the top flange of the kick panel.



Removing and installing side panels

Remove side panels to access internal components or to join equipment.

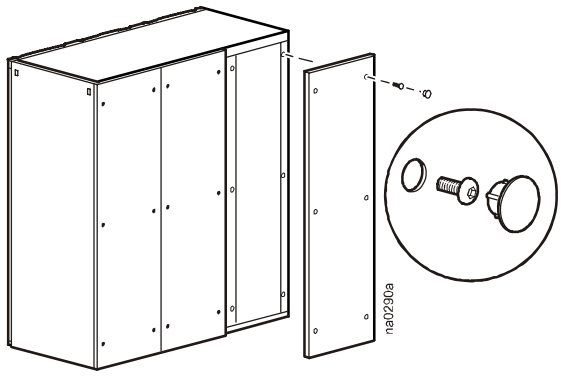
1. Slide both panel latches down and pull the top of the panel toward you.
2. Lift the panel up and out of the channel located at the bottom of the frame.
3. Reverse the above steps to install the panels.



Removing the rear panels

To remove the rear panels:

1. Remove the cap plugs (six per panel).
2. Remove the Torx screws (six per panel).



Removing the Main Circuit Breaker

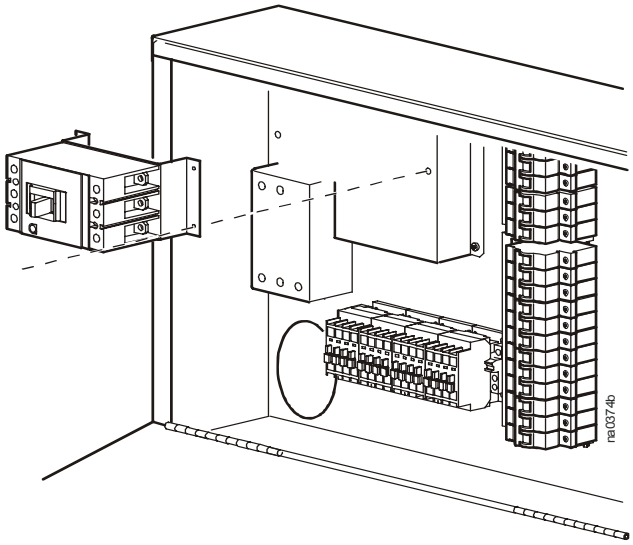
To decrease the depth of the equipment to 800 mm (31.5 inches), the main circuit breaker, located in the electrical panel, must be removed.

Caution: Before removing any electrical components, be sure to note the orientation of the electrical component and label all wires with their location.

Electrical Hazard: Only authorized APC personnel should remove and replace the main circuit breaker.

1. Mark and disconnect the wires at the main circuit breaker.
2. Remove the main circuit breaker by removing four Torx screws.
3. Reinstall by reversing the above procedure.

Caution: When connecting wires to the circuit breaker, torque the terminal screws to the proper value. See torque values marked on the circuit breaker.



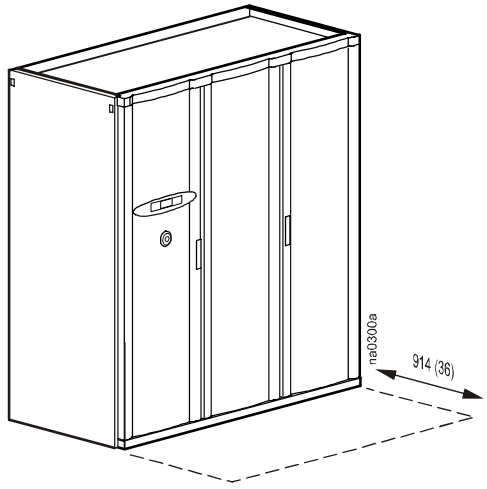
Positioning the Equipment

Service access

An area of 914 mm (36 in) of clear floor space in front of the equipment is required for routine service. When possible, allow 914 mm (36 in) of clear floor space on all sides for optimal service access and repairs. All required routine maintenance can be performed from the front of the equipment.

Rigging

The equipment is manufactured with a formed steel frame for maximum strength and integrity. However, care must be taken to properly rig the equipment. When using a forklift to move the equipment, use the shipping pallet to protect the bottom. When using chains, cables, or rope to lift the equipment, use spreader bars to prevent damage to the finished panels.



Dimensions are shown in mm (in)

Caution: The equipment has a high center-of-gravity. Use extreme caution when moving.

Heavy: Do not attempt to move the equipment without assistance.

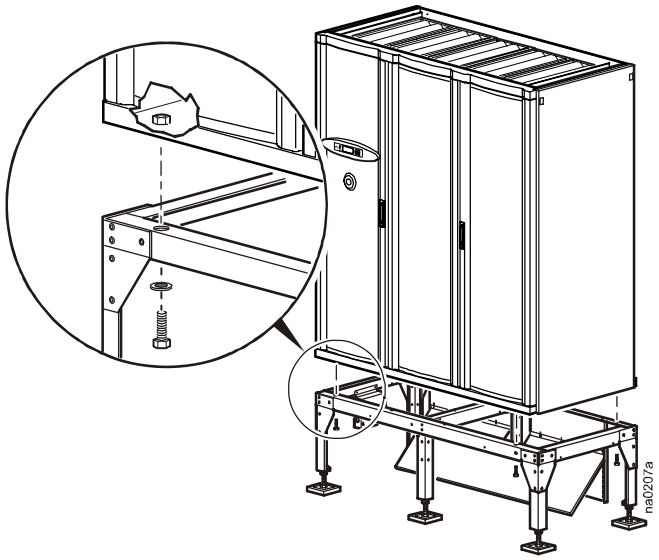
Note: When rigging, remove the exterior panels to prevent damage to the finish of the panels.

Stabilizing the Equipment

Optional floorstand

1. Place the equipment on the floorstand and align the mounting nuts of the equipment to the mounting holes of the floorstand.
2. From the bottom of the floorstand, secure the equipment using four M8 x 20 bolts and washers, one at each corner.

See the instructions supplied with the floorstand.



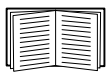
Outdoor Heat Exchanger (OHE)

Mount the OHE on a level surface with sufficient strength to support the weight of the OHE when fully charged. Use the mounting holes on the heat exchanger to prevent the equipment from shifting during operation.

Before operation, ensure that all heat exchangers satisfy the following requirements:

- Incoming voltages match the nameplate listed on the heat exchanger.
- All set screws are secure.
- Fan blades turn freely, do not wobble, and are not distorted.
- Fan blades rotate in the proper direction.

Provide a method to disconnect main power in order to isolate the heat exchanger during routine service or an emergency.



See the heat exchanger manufacturer installation, operation, and maintenance manuals for proper installation procedures.

Mechanical Connections

Refrigeration piping

Discharge lines are sized such that velocity in the line is between 5 m/s (1,000 ft/m) and 15 m/s (3,000 ft/m). The refrigerant velocity must be high enough to keep oil entrained in the flow. If the refrigerant velocity is too high, both the noise level and pressure drop will increase. Acceptable pressure drops in discharge lines are up to 70 kPa (10 psi).

Note: Give consideration to the loaded and unloaded state of the tandem compressors to ensure that the operational range stays within these limits.

All refrigerant lines should be as short and direct as possible. Pitch horizontal discharge lines downward a minimum of 42 mm per meter (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. Normally, traps are not necessary at the base of discharge lines, however. Loop the line to the floor before running it vertically to prevent oil from draining back to the compressor during shutdown periods.

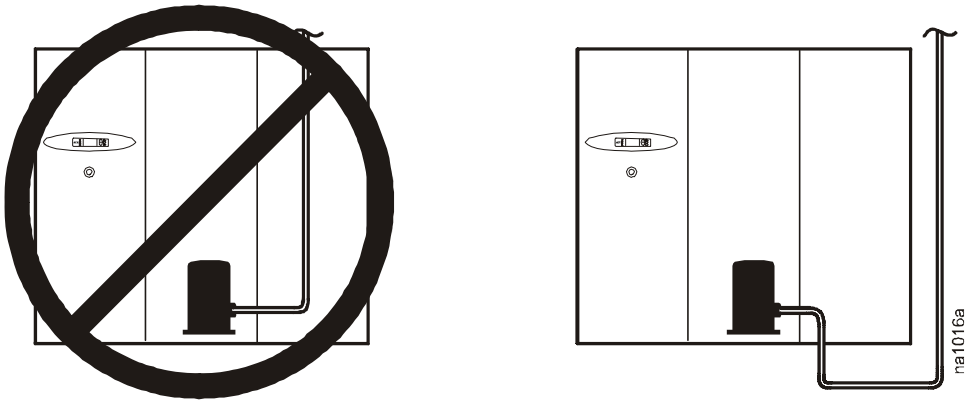
Insulate discharge lines to protect personnel and to minimize condensation of refrigerant during off cycles. Insulate liquid lines to prevent loss of subcooling when field piping is exposed to high ambient temperatures.

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 indoor equipment to the condenser. Install all refrigerant lines in accordance with applicable industry guidelines.

To size lines, see “Recommended line sizes” on page 23.

Calculate an equivalent length based on the actual linear length of the run, including valves and fittings. All fittings should be long-radius to minimize pressure drop.

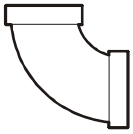
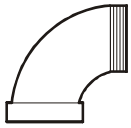
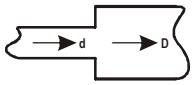
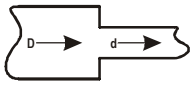
Incorrect and correct routing of refrigeration lines



Fitting losses

Fitting losses in equivalent feet of pipe

Type of Fitting or Valve - Equivalent Length of Pipe in Feet (Screwed, welded, flanged, flared, and brazed connections)

Size of Pipe in Inches (OD)	90° Standard*	90° Long Radius**	90° Street*	45° Standard*	45° Street*	Sudden Enlargement, d:D			Sudden Contraction, d:D		
											
						1:4	1:2	3:4	1:4	1:2	3:4
7/8	2.0	1.4	3.2	0.9	1.6	2.5	1.5	0.5	1.2	1.0	0.5
1-1/8	2.6	1.7	4.1	1.3	2.1	3.2	2.0	0.7	1.6	1.2	0.7
1-3/8	3.3	2.3	5.6	1.7	3.0	4.7	3.0	1.0	2.3	1.8	1.0

*R/D approximately equal to 1
**R/D approximately equal to 1.5

Recommended line sizes

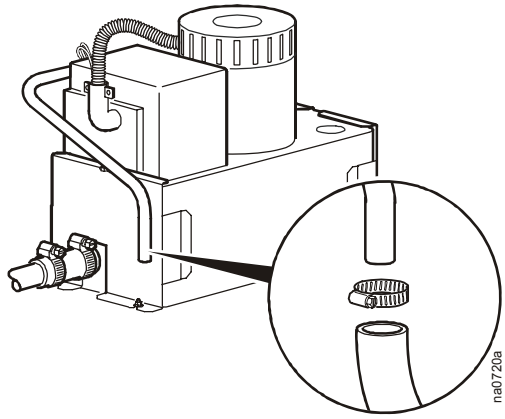
Equivalent Length m (ft)	Line type	FM40
15 (50)	Discharge Line (horizontal)	1 1/8
	Discharge Line (vertical)	7/8
	Liquid Line	7/8
30 (100)	Discharge Line (horizontal)	1 3/8
	Discharge Line (vertical)	1 1/8
	Liquid Line	7/8
46 (150)	Discharge Line (horizontal)	1 3/8
	Discharge Line (vertical)	1 1/8
	Liquid Line	7/8
61 (200)*	Discharge Line (horizontal)	1 3/8
	Discharge Line (vertical)	1 1/8
	Liquid Line	7/8

* Maximum allowable equivalent length

Pipe connection size

1 -1/8 in liquid in and hot gas out

Condensate pump. The condensate pump is factory-wired and piped internally to the condensate pan and humidifier discharge. The pump has its own internal check valve to prevent the pump from short-cycling. The pump also uses an on-board condensate high-level float switch, which is wired into the equipment alarm input for local and remote alarm capabilities.



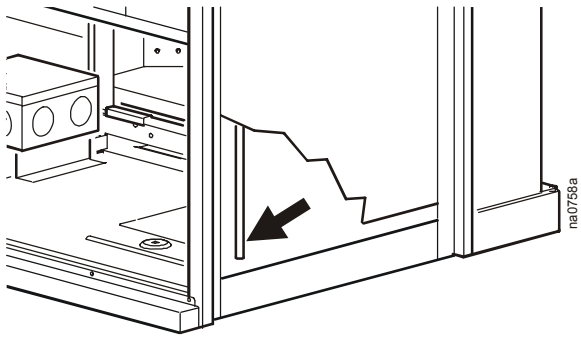
Condensate pump drain connection: Attach the drain line to the 13 mm (1/2 in) O.D. condensate drain tube and secure with a hose clamp. Route the drain line through an opening in the bottom of the equipment to an open drain. Maximum condensate pump lift is 18 m (58 ft) at 12.5 lpm (3.3 gpm).

When the condensate pump option is not selected, a 7/8-in outside diameter (OD) copper connection is provided for the installation of a field-installed drain line.

Warning: The condensate line may contain 100° C (212° F) water from the humidifier. It is highly recommended to use hard piping for the field-installed drain line.

Note: Use code-compliant piping practices when installing the condensate drain line to an open drain.

Overflow condensate drain pipe: This drain, located in the front-right corner of the equipment, provides a controlled overflow path and should be piped to an independent drain system.



Caution: This connection must be left open (not pinched off).

Warning: To avoid freezing, never route the condensate drain line to the outside of the building.

Warning: When installing field condensate connections in units without condensate pumps, ensure that the line route does not gain elevation within the equipment. Misrouted connections may cause the humidifier pan to overflow.

Piping connections

Use only clean, refrigerant-grade (Type L) pipe, and follow standard procedures for pipe size selection. The maximum allowable length between the evaporator and condenser is 61 equivalent meters (200 equivalent feet). Vertical runs (hot gas) require a trap every 6 m (20 ft) of rise.

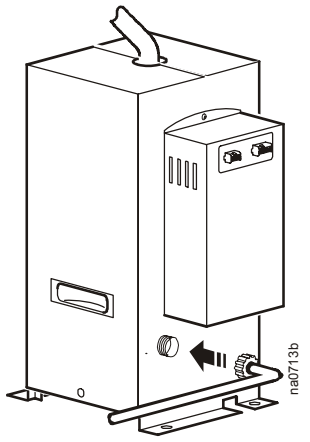
Note: When brazing copper field-installed refrigeration lines, use a nitrogen purge to minimize accumulation of scale during the brazing process.

After field piping has been completed, perform a leak test and evacuate the system before final system charging.

1. Using dry refrigerant, pressurize the system to 14 kPa (2 psig).
2. Using nitrogen, pressurize the system to 689 kPa (100 psig) and check all pipe joints and fittings. Repair leaks as required and repeat this process until the system is leak-free.
3. Release all of the nitrogen charge from the system and attach a good quality vacuum pump and micron gauge to the system.
4. Evacuate the system to 500 microns, turn off the pump, and allow the system to stand for 2 hours. Ensure that the system has not risen above 2,000 microns after two hours. Repeat this procedure as necessary.
5. At this point, the system can be fully charged.

Humidifier. The humidifier water supply connection is 1/4-in OD copper tubing. Water pressure should be between 200 kPa (30 psi) and 600 kPa (85 psi) for proper humidifier operation. Extremely dirty water must be filtered before it is introduced into the humidifier. Do not use hot, softened, demineralized, or deionized water.

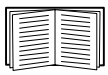
Pressure relief valve. All equipment is supplied with pressure relief valves on the receiver. Pipe these valves to the external ambient, particularly if the data center is equipped with a Halon fire-suppression system.



Electrical Connections

The following electrical connections are field-installed:

- Building Management System (BMS) control wiring
- Air cooled condenser input power wiring
- PCIOM control wiring
- NMC ethernet cable
- FM40 input power wiring



Refer to the electrical schematics supplied with the equipment for all electrical connections.

All electrical connections must be in accordance with national and local codes. Refer to the nameplate for voltage and current requirements. A power disconnect is required to isolate each FM precision air conditioner 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 600 V insulation for 400 V equipment.

All refrigeration control wiring must be installed in accordance with all applicable local and national codes.

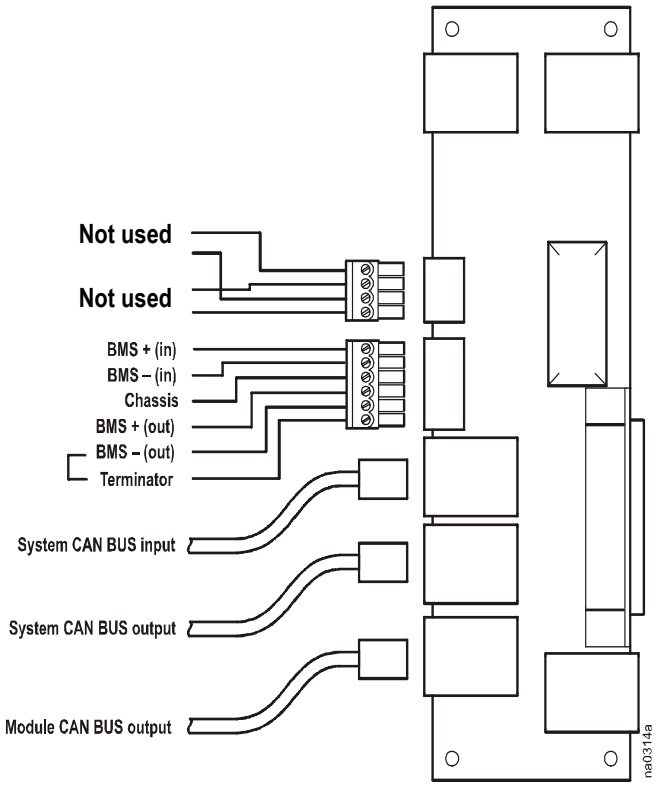
Electrical Hazard: Potentially dangerous and lethal voltages exist within this equipment. More than one disconnect switch may be required to energize or de-energize this equipment. Observe all cautions and warnings. Failure to do so could result in serious injury or death. Only qualified service and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

Warning: Lock out and tag out power, then use a voltmeter to ensure that power is off before making any electrical connections.

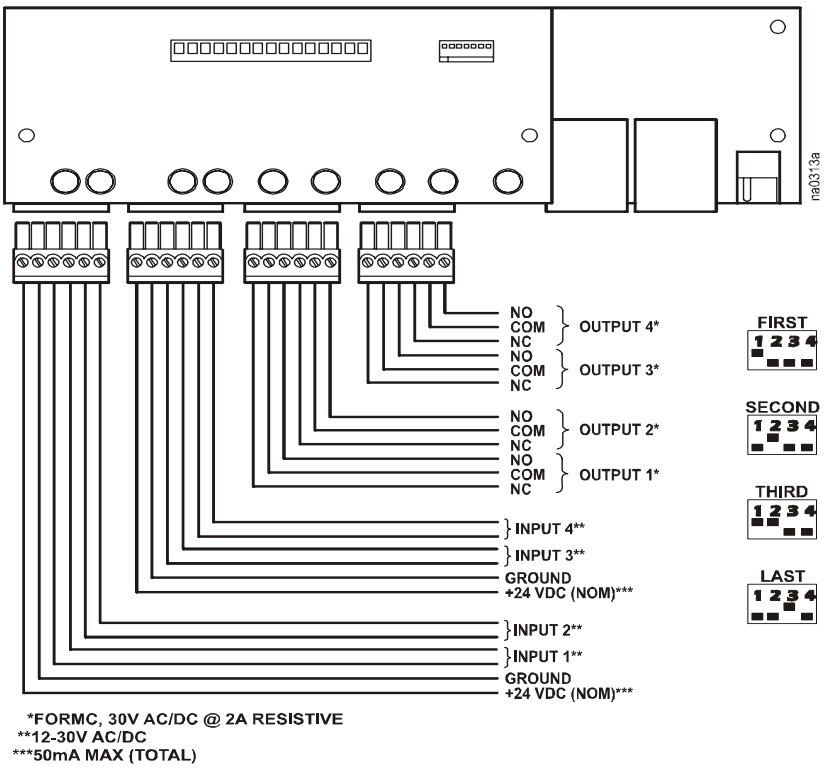
Control connections

Depending on the configuration, additional control connections may be required for the CAN bus, redundant equipment wiring, remote communications through APC NMC support, or traditional equipment-monitoring software.

Control connections



Input and output connections—PCIOM



Communication connections

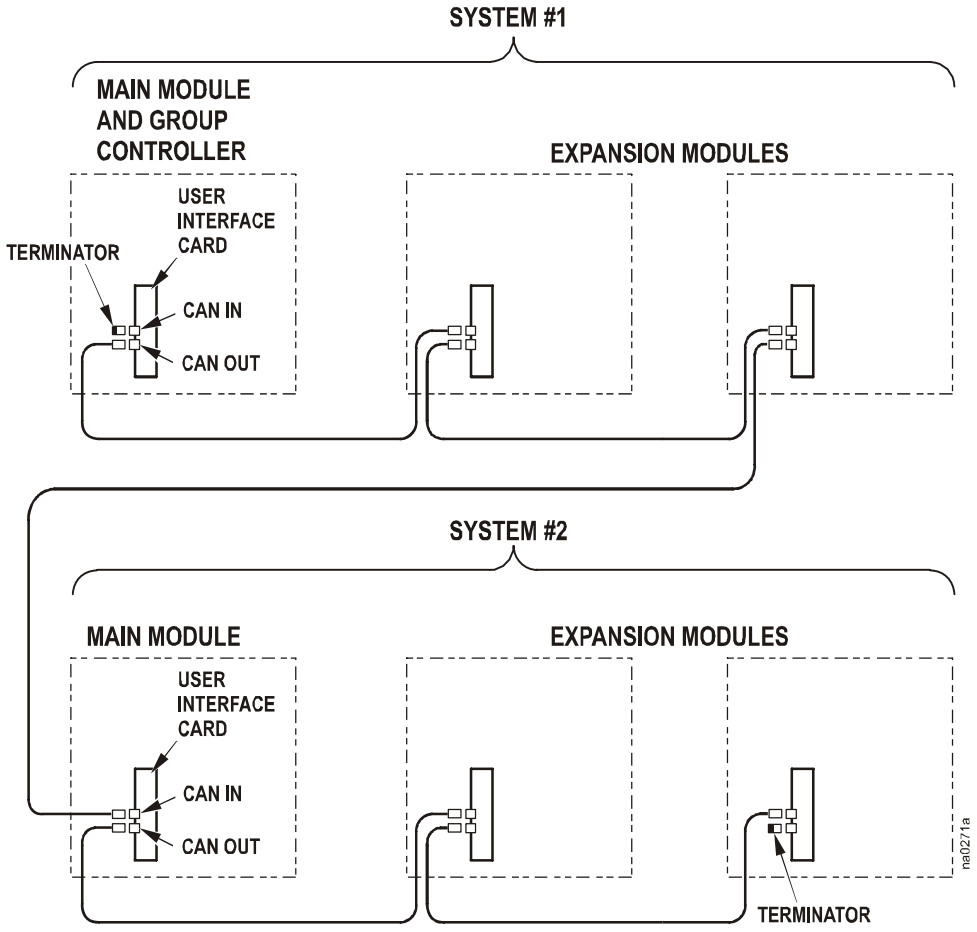
The communication connections consist of the following:

- MOD bus
- CAN (Controller Area Network)
- Ethernet

CAN connections. The CAN connection allows micro controllers to communicate with one another. Each equipment has a user-definable address that distinguishes one equipment from another.

Note: The user interface display is disabled on a precision air conditioner configured as an expansion module.

Connecting the CAN network. Each equipment contains a user interface card. A terminator is required at the CAN IN connector in the first equipment and the CAN OUT connector in the last equipment in the group.



Assigning the CAN address. Assign the CAN address by setting the DIP switches located on the controller board in the electrical box. Refer to the chart below for proper DIP switch configuration settings.

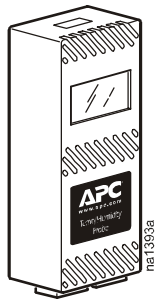
DIP switch configuration

		Switch number and position			
System number	**Module**	**1**	**2**	**3**	**4**
1	Main Module and Group master	Off	Off	Off	Off
1	Expansion Module 1	Off	Off	Off	On
1	Expansion Module 2	Off	Off	On	Off
2	Main Module	Off	On	Off	Off
2	Expansion Module 1	Off	On	Off	On
2	Expansion Module 2	Off	On	On	Off
3	Main Module	On	Off	Off	Off
3	Expansion Module 1	On	Off	Off	On
3	Expansion Module 2	On	Off	On	Off
4	Main Module	On	On	Off	Off
4	Expansion Module 1	On	On	Off	On
4	Expansion Module 2	On	On	On	Off

Note: In order for the System to function properly, Expansion Modules must be assigned in increasing order as Expansion Modules are added.

Temperature and relative humidity sensor

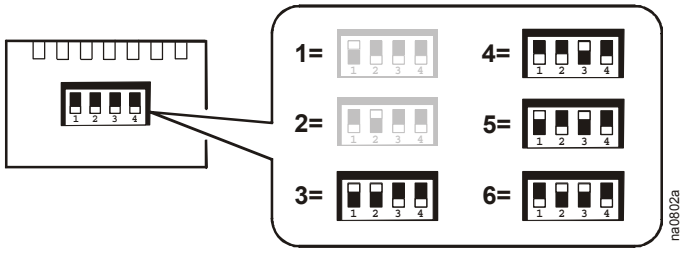
A temperature and relative humidity sensor kit comes with each equipment. Additional sensors can be purchased and connected together with A-link cables.



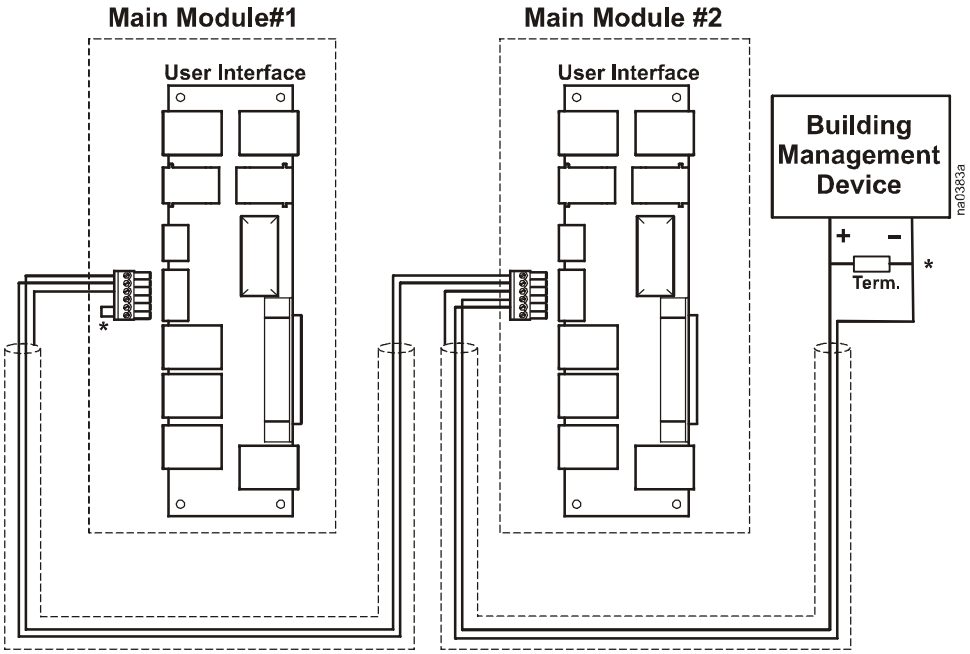
See the “Temperature and Humidity Sensor AP9520T, AP9520TH” installation manual, supplied with the kit, for installation.

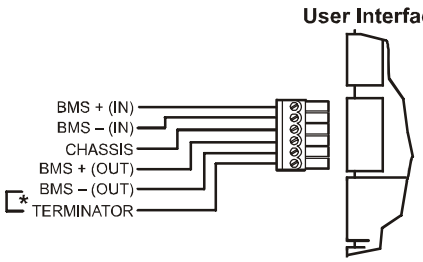
Note: Use no more than four remote temperature sensors (in addition to two internal sensors).

Set the DIP switches on each temperature and humidity sensor to a unique A-Link address. Addresses one and two are reserved for components within the equipment.



Building Management System connections





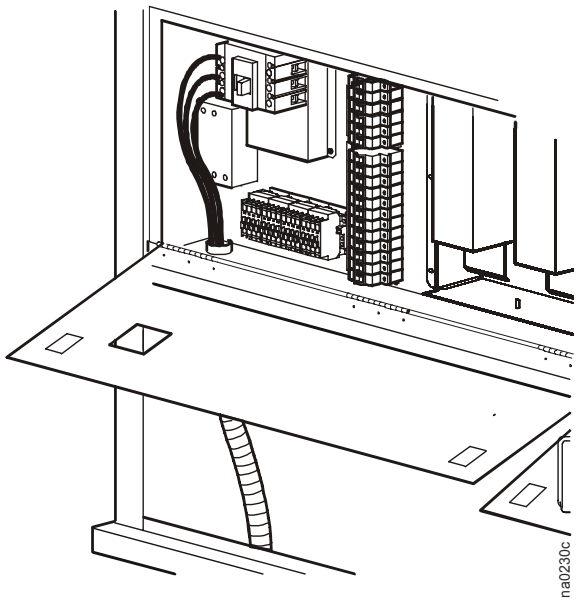
Note: A 100-ohm termination resistor (not included) is required as shown for systems having 9 or more precision air conditioners.

Main power connections

Note: Three-phase electrical service is required. Electrical service must conform to national and local electrical codes. The equipment must be connected to earth ground.

Check the equipment nomenclature for the correct Minimum Circuit Ampacity (MCA) and Maximum Fuse Size (MFS).

Run three-phase electrical service from the bottom left of the equipment and into the access holes provided in the bottom-left side of the electrical control box. Terminate the conduit at the electrical box. Connect power cables to the main circuit breaker and ground lug.



Note: Clockwise rotation is used for input power connections.

Warranty

One-Year Factory Warranty

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

Terms of warranty

American Power Conversion warrants its products to be free from defects in materials and workmanship for a period of one year from the date of purchase. The obligation of APC under this warranty is limited to repairing or replacing, at its sole discretion, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence or misapplication or has been altered or modified in any way. Repair or replacement of a defective product or part thereof does not extend the original warranty period. Any parts furnished under this warranty may be new or factory-remanufactured.

Non-transferable warranty

This warranty extends only to the original purchaser who must have properly registered the product. The product may be registered at the APC Web site, **www.apc.com**.

Exclusions

APC shall not be liable under the warranty if its testing and examination disclose that the alleged defect in the product does not exist or was caused by end user's or any third person's misuse, negligence, improper installation or testing. Further, APC shall not be liable under the warranty for unauthorized attempts to repair or modify wrong or inadequate electrical voltage or connection, inappropriate on-site operation conditions, corrosive atmosphere, repair, installation, start-up by non-APC designated personnel, a change in location or operating use, exposure to the elements, Acts of God, fire, theft, or installation contrary to APC recommendations or specifications or in any event if the APC serial number has been altered, defaced, or removed, or any other cause beyond the range of the intended use.

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NO SALESMAN, EMPLOYEE OR AGENT OF APC IS AUTHORIZED TO ADD TO OR VARY THE TERMS OF THIS WARRANTY. WARRANTY TERMS MAY BE MODIFIED, IF AT ALL, ONLY IN WRITING SIGNED BY AN APC OFFICER AND LEGAL DEPARTMENT.

Warranty claims

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

Warranty Procedures

Claims

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

Parts

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

APC Worldwide Customer Support

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

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

Direct InfraStruXure Customer Support Line	(1)(877)537-0607 (toll free)
APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702000 (Ireland)
Western Europe (inc. Scandinavia)	+800 0272 0272
Japan	(0) 3 6402-2001
Australia, New Zealand, South Pacific area	(61) (2) 9955 9366 (Australia)

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

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

990-3167-001

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