

NetworkAIR[®] Rack Air Removal Unit

ACF102BLK

Installation



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General Information

Introduction

The American Power Conversion NetworkAIR[®] Rack Air Removal Unit removes heat generated by the exhaust of equipment contained in a NetShelter VX or NetShelter EP EIA 19-inch enclosure. The three fans provide increased air flow needed to cool densely-packed equipment and allow air to bypass obstacles in the rear of the enclosure such as power and data cables. An optional duct kit removes the heat entirely from the data center.

Features

Features of the Rack Air Removal Unit:

- Variable fan settings — based on power load and user-definable exhaust temperature
- Dual input connectors — for redundant power
- Three individually fused fans — allows unit to be used for redundancy or higher capacity
- Alarm LEDs — system status, fan status, and thermal control status
- Duct kit — for removal of heat from the air-conditioned space (optional)
- Integrated smoke detector (optional)
- APC Environmental Management System — for remote control and monitoring of the Rack Air Removal Unit (optional)

Safety Information



For computer-room use only.

Install the Rack Air Removal Unit only on racks that are loaded with equipment, counter-weighted, or stabilized to avoid tipping of the rack.

Inspect the Rack Air Removal Unit for damage before installation.

Disconnect power to the Rack Air Removal Unit before installing it into the rack. Failure to do so may result in personal injury or damage to equipment.

Do not apply power to the unit until the installation is complete. The Rack Air Removal Unit contains moving parts, which are potentially hazardous when operated outside of the rack.

Do not attempt to move a heavily-loaded enclosure by yourself. Doing so introduces risk of injury due to muscle strain or to tipping of the enclosure. Fully-loaded enclosures require at least two people to move safely.

Do not attempt to install the Rack Air Removal Unit by yourself. Doing so introduces risk of injury due to muscle strain or to tipping of the enclosure. The Rack Air Removal Unit requires at least three people to install safely.

Check that the power cord plugs and sockets are in good condition before installation.

Connect the Rack Air Removal Unit to 230V IEC C-13 outlet. The outlet must be connected to appropriate branch circuit/mains protection (fuse or circuit breaker). Connection to any other type of outlet may result in a shock hazard.

This equipment contains potentially hazardous voltages. Do not attempt to disassemble the unit.

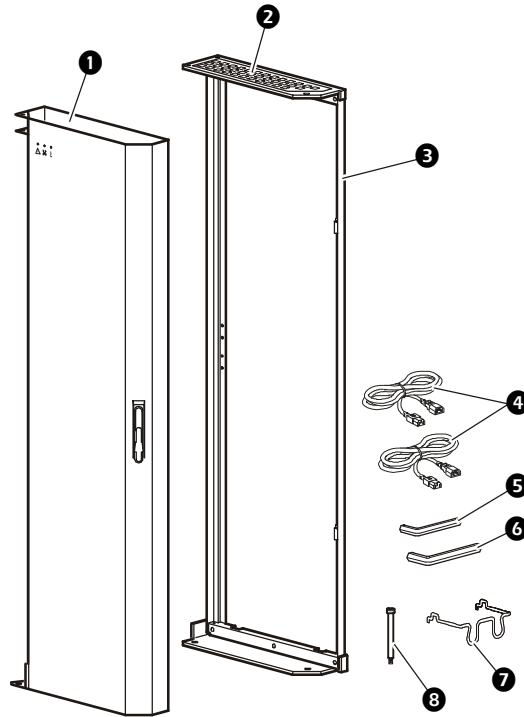
Always install and operate the Rack Air Removal Unit as shown in this manual.



Installing the Rack Air Removal Unit requires three people. Do not attempt to lift the Rack Air Removal Unit without assistance.

Before You Begin

Inventory



Item	Description	Quantity
1	Fan assembly	1
2	Exhaust vent	1
3	Fan frame	1
4	Power cords (IEC 320)	2
5	5/32" hex wrench	1
6	M5 hex wrench	1
7	Cord retainer	2
8	Hinge screw	1

Before You Begin

Tools required



5/32" hex wrench
(provided)



M5 hex wrench
(provided)

Receiving inspection

Inspect the package and contents for shipping damage, and make sure that all parts were sent. Report any damage immediately to the shipping agent, and report missing contents, damage, or other problems immediately to APC or your APC reseller.

Installation

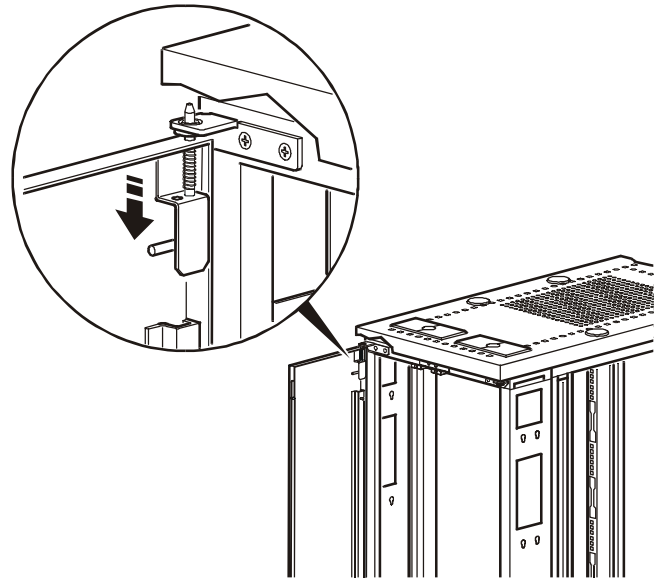
Remove the rear doors



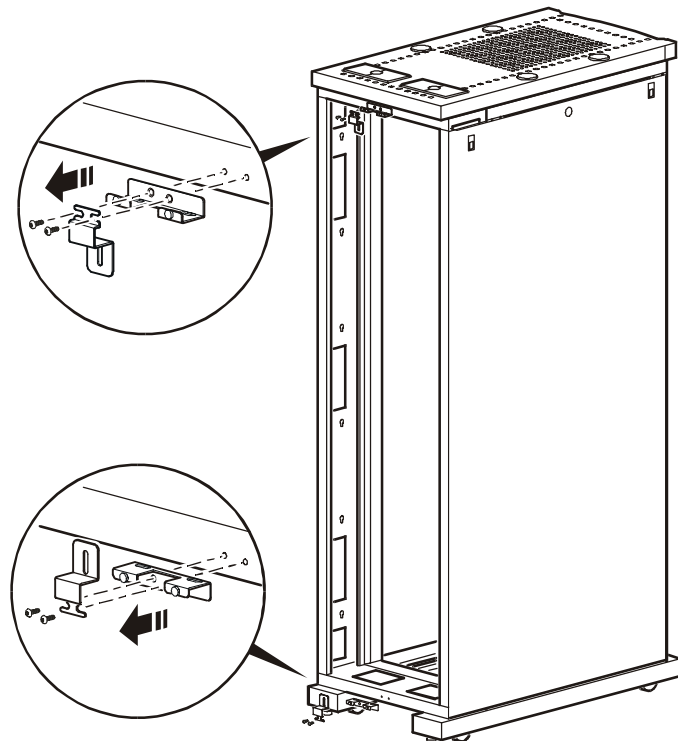
Warning

To avoid personal injury or damage to the enclosure, one person should support the door while another removes it from the frame.

1. If necessary, move the rack to allow for at least 30 inches of clearance to install the Rack Air Removal Unit.
2. Open the rear doors and pull down on the spring-loaded hinge pin attached to the top of the door. Lift the door from its frame and set it safely aside.
3. Repeat this step with the other rear door.



4. Using the included M5 hex wrench, remove the door bumpers at the top and bottom of the door frame.



Install the fan frame



Warning

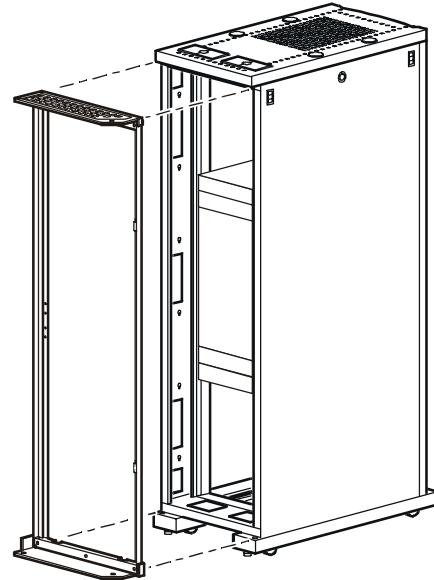
To avoid personal injury or damage to the enclosure, one person should support the fan frame while another places the fan frame onto the enclosure.



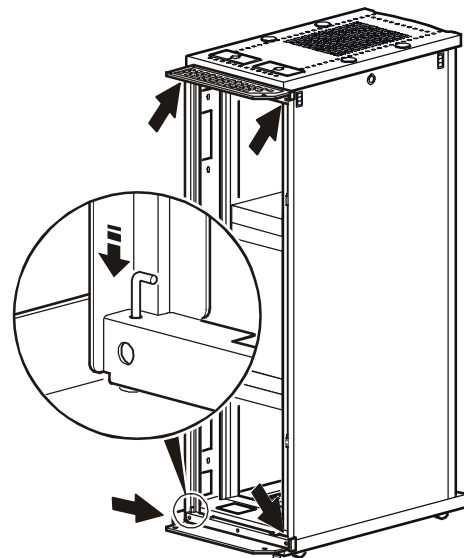
Warning

Install the Rack Air Removal Unit only on racks that are loaded with equipment or are counter-weighted to avoid tipping of the rack.

1. With the exhaust vent at the top of the fan frame, align the four corners of the fan frame to the four corners of the enclosure. The spring-loaded pins at the bottom of the fan frame will line up with the hinge-pin brackets on the enclosure.



2. Insert the spring-loaded pins at the bottom of the fan frame into the holes.
3. Pull the spring-loaded pins at the top of the fan frame and release the pins into the holes.



Install the fan assembly



Warning

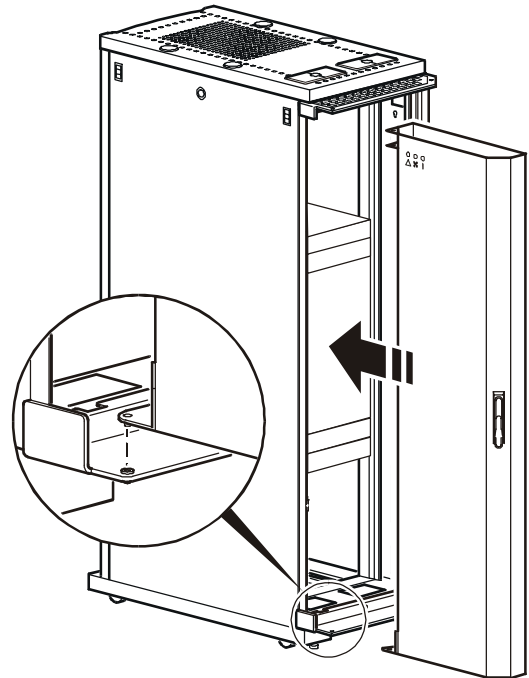
To prevent the enclosure from tipping, all four pins must be engaged in the enclosure frame before installing the fan assembly.



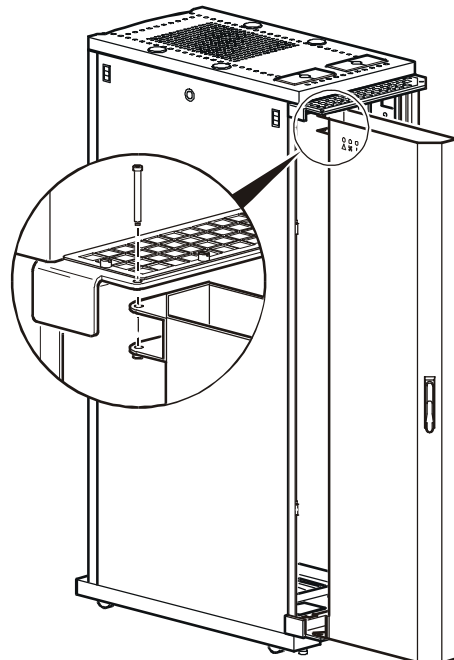
Warning

To avoid personal injury or damage to the Rack Air Removal Unit or the enclosure, two people should support the fan assembly while another places the fan assembly onto the enclosure.

1. Align the lower pin with the hole in the hinge pin bracket on the fan frame and insert the pin into the hole.



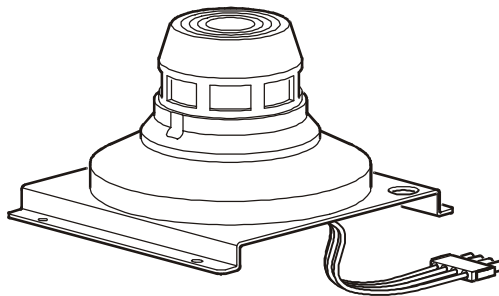
2. Align the upper hinge hole with the hole in the upper hinge pin bracket and insert the hinge screw into the holes.
3. Tighten the hinge screw with the included 5/32" hex wrench.



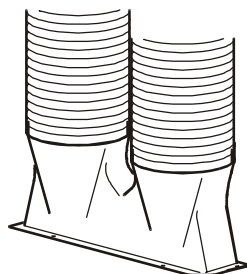
Optional Items

American Power Conversion offers additional products (not included) for the Rack Air Removal Unit:

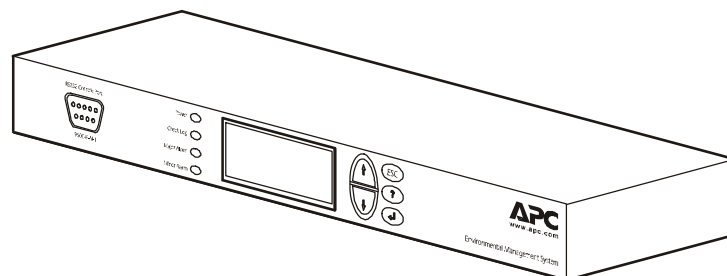
- Smoke Detector Kit (ACF121) — mounting plate and smoke detector for use inside the Rack Air Removal Unit.



- Air Duct Kit (ACF120) — for removal of heat from the air conditioned area. If using the optional duct kit with the temperature setpoint mode, you will need to monitor the room temperature for the first 24 hours, and adjust your setpoint to maintain the proper temperature differential (see “How to set the fans based on temperature” on page 14).



- APC Environmental Management System (AP9320) — monitoring unit and A-Link connections for monitoring and controlling the Rack Air Removal Unit from a remote location.



Operation

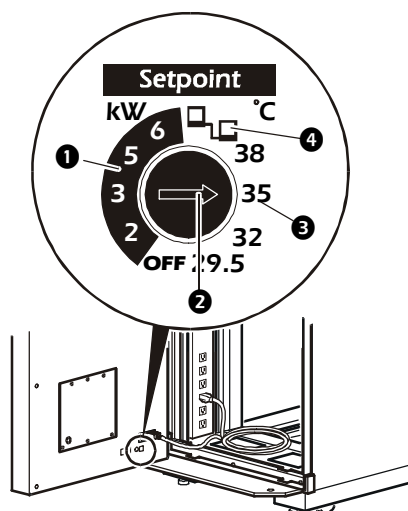
Start-up



Warning

Do not remove the air intake guards.

Use the fan speed selector to set the fan speed based on either the wattage output of the equipment in the rack or the desired exhaust temperature.

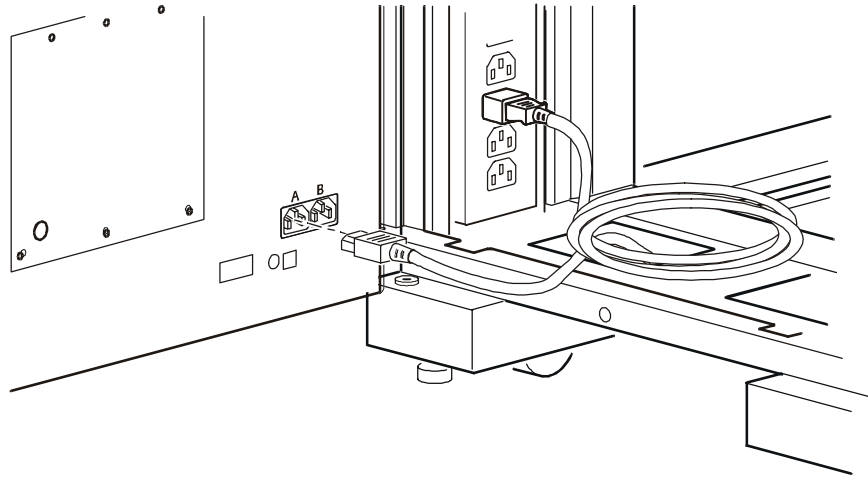


Fan Speed Selector

Item	Description
❶ KW settings	Set the fan speed according to the wattage output of the equipment in the rack.
❷ Fan speed selector	Control the fan speed by wattage output or exhaust temperature.
❸ Exhaust temperature settings	Set the Rack Air Removal Unit to set the fan speed based on the exhaust temperature.
❹ Remote Setting	Set the Rack Air Removal Unit to be controlled by a connected APC Environmental Management System.

Connect the power supply

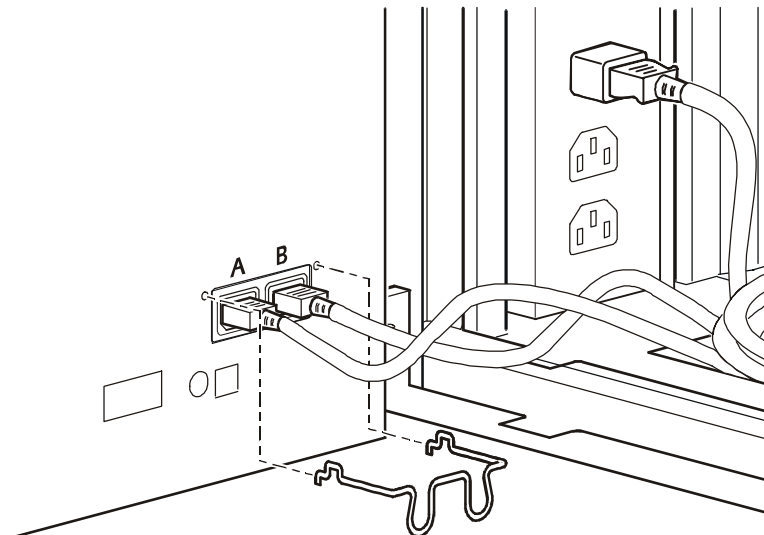
1. Set the fan speed selector to OFF.
2. Using one of the supplied power cords, connect the female end to the "A" input socket on the inside of the unit. Plug the male end into a power-protected socket. Ensure that there is adequate power for the fans to run at 100% (230V 4 A). The UPS in the rack must be sized properly to power this unit.



Warning

Use the Rack Air Removal Unit only with a 3000 watt UPS or higher. The UPS should not be loaded above 80% when using the Rack Air Removal Unit.

3. To provide redundant power to the unit, use the "B" input socket to connect to a second source of protected power.
4. Attach the cord retainer to lock the cords in place.



Note

Cords may be bundled and tie-wrapped to provide clearance for other components.

To check operation of the unit:

5. Apply power to the fans by turning the fan speed selector from the OFF position to one of the four exhaust temperature settings.
6. Make sure the fans are moving.
7. Turn off the power to the unit.

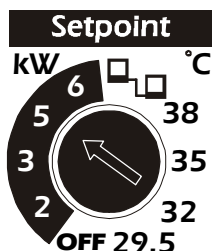


Note

If no air is flowing from the Rack Air Removal Unit, check the power connection.

How to set the fans based on wattage

Determine the wattage of your equipment and set the fan speed selector to the corresponding kW setting.



Warning

Setting the kW setpoint too low could damage the equipment in the enclosure. If the amount of kW in your enclosure falls between two of the numbers on the setpoint dial, choose the higher number or set based on exhaust temperature.



Note

When the temperature override is enabled and the temperature in the rack rises above 40.5° C (105° F), the Rack Air Removal Unit will automatically increase the fan speed to bring the temperature below 40.5° C (105° F).



Warning

When in kW mode and using a UPS that is 3000 VA or lower, disable the temperature override to prevent the power draw from exceeding the limitations of the UPS.

The UPS should not be loaded above 80% when using the Rack Air Removal Unit.

Temperature override

The kW settings on the fan speed selector run the fans at a constant speed, while the exhaust temperature settings adjust the fan speed depending on the exhaust temperature of the equipment in the rack. The Rack Air Removal Unit is equipped with a temperature override that protects the equipment in the rack while the unit is in kW mode. If the unit is in kW mode, and the exhaust temperature rises above 40.5° C (105° F) (the override setpoint), the unit increases the fan speed to remove excess heat from the rack.

Temperature Override in each Fan Speed Mode

	kW mode	Exhaust temperature mode	Remote mode
Temp Override Enabled	Fan speed will increase when rack equipment exhaust temperature reaches 40.5° C (105° F)	No Effect	Depends on the fan speed selection of the remote device. Same as kW or exhaust temperature mode. In kW mode the temperature override setpoint can be set to 32.2–51.6° C (90–125° F)
Temp Override Disabled	No Effect	No Effect	No Effect

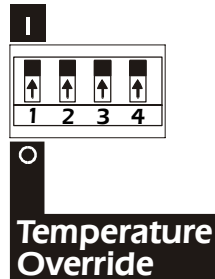


Note

If a Computer Room Air Conditioner fails, the subsequent rise in ambient temperature can cause the temperature override to activate. Increasing the fan speed can have an impact on the airflow in the room.

How to set the temperature override

The temperature override switch is recessed inside the space marked **A-Link Address**. Use a small tool such as a pocket screwdriver to set the DIP switch to the correct position. Set the DIP switch labeled 1 to the desired position according to the table below.



Symbol	Temp Override
1	Enabled
0	Disabled



When in kW mode and using a UPS that is 3000VA or lower, disable the temperature override to prevent the power draw from exceeding the limitations of the UPS.

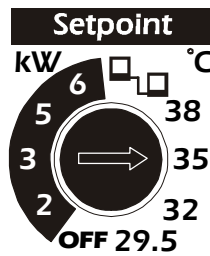


When using the APC Environmental Management System, you can change the temperature override setpoint.

How to set the fans based on temperature

A temperature probe is located in the intake vents of the Rack Air Removal Unit that measures the equipment exhaust air temperature. The unit will increase or decrease the speed of the fans to keep the equipment exhaust at the desired temperature.

The appropriate fan speed is based on the equipment's inlet air temperature and its temperature differential. The temperature differential is the rise in temperature between the inlet air and the exhaust air after it passes through the equipment. Refer to your equipment manual to determine the temperature differential.

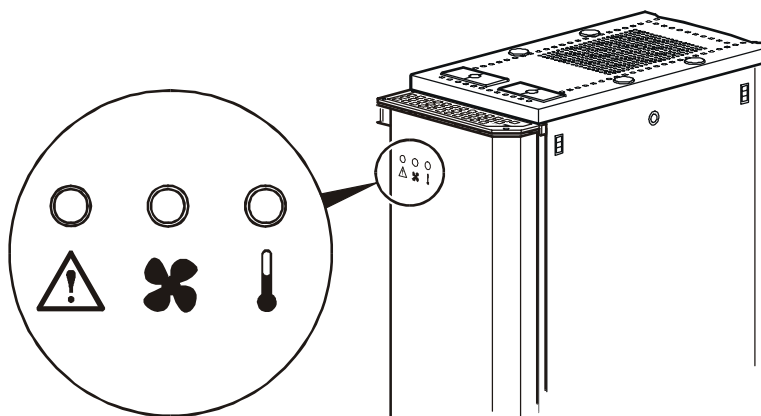


Warning




When using a UPS that is 3000 VA or lower, do not set the fan speed based on exhaust temperature. If the fan speed is set based on the exhaust temperature, the power draw may exceed the limitations of the UPS.

Alarm Settings

The Rack Air Removal Unit has three LEDs on the front of the door that indicate whether the system is in an alarm state.



LED legend

LED	 System Status	 Fan Status	 Thermal Control Status
Description	Indicates the status of the controller boards	Indicates status of the three fans	Indicates the status of the temperature in the enclosure
Green	System OK	Fans OK	Temperature within range
Green Flashing	N/A	N/A	Exhaust temperature has exceeded the temperature override setpoint (kW mode only)
Red	Control failure, the fans will default to high speed when there is a board failure to keep air moving through the enclosure	Fan failure, remaining fans operate at full speed	High temperature, the unit has lost thermal control
Red/Green Flashing	N/A	Smoke Alarm (optional)	Smoke Alarm (optional)

How to Communicate Using the A-Link

The Rack Air Removal Unit can be used with an APC Environmental Management System that can monitor and control the unit. Connect the APC Environmental Management System any Rack Air Removal Units by using the in and out A-Link connections.

How to connect to the A-Link

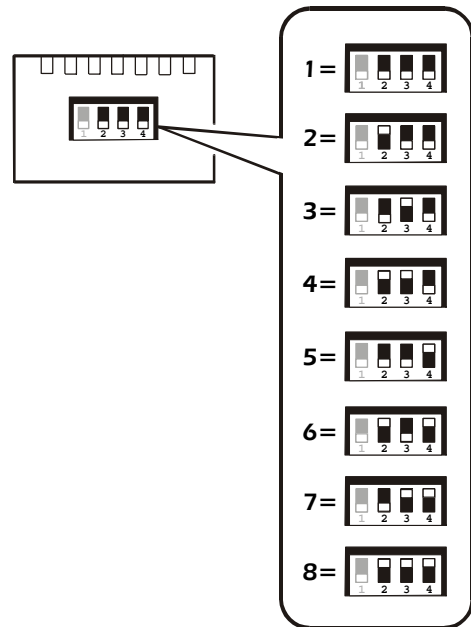
The Rack Air Removal Unit has two connections (IN and OUT) for linking several devices together using the A-Link. The Rack Air Removal Unit must be given an address to communicate with the APC Environmental Management System. The address DIP switch is recessed inside the space marked **A-Link Address**. Use a small tool such as a pocket screwdriver to set the DIP switch to the correct position.



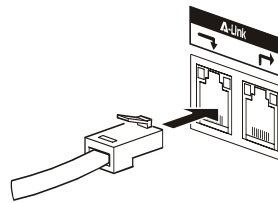
Remove power from the Rack Air Removal Unit before setting DIP switches or connecting other devices.

To remotely monitor the Rack Air Removal Unit:

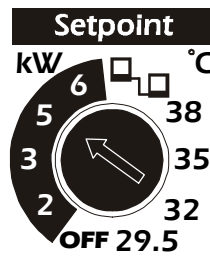
1. Set the second, third, and fourth DIP switches to give the Rack Air Removal Unit a unique A-Link address between one and eight, according to the chart.



2. Plug the device into the A-Link “IN” connector.



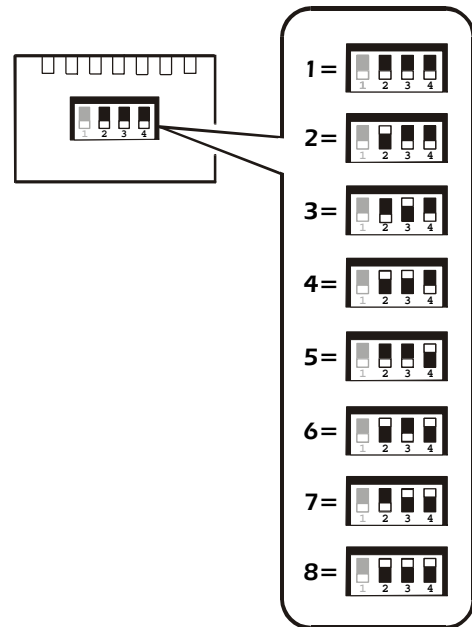
3. Set the fan speed selector to the desired exhaust temperature or enclosure wattage.



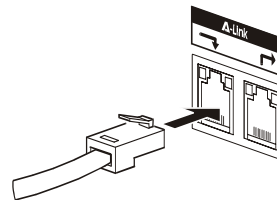
The APC Environmental Management System will be able to monitor the temperature and the alarms on the Rack Air Removal Unit.

To remotely control the Rack Air Removal Unit:

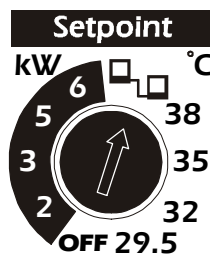
1. Set the second, third, and fourth DIP switches to give the Rack Air Removal Unit a unique A-Link address between one and eight, according to the chart.



2. Plug the APC Environmental Management System into the A-Link “IN” connector.



3. Set the fan speed selector to Remote.



Use the APC Environmental Management System to control the temperature in the rack and to monitor the Rack Air Removal Unit for any alarms.

Warranty and Service

Limited warranty

APC warrants the Rack Air Removal Unit to be free from defects in materials and workmanship for a period of two years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, 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. This warranty applies only to the original purchaser.

Warranty limitations

Except as provided herein, APC makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

Except as provided above, in no event will APC be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of this product, even if advised of the possibility of such damage.

Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights, which vary according to jurisdiction.

Obtaining service

To obtain support for problems with your Rack Air Removal Unit:

1. Note the serial number and date of purchase. This is found on the back of the Fan Assembly.
2. Contact Customer Support at a phone number on the back cover of this document. A technician will try to help you solve the problem by phone.
3. If you must return the product, the technician will give you a return material authorization (RMA) number. If the warranty expired, you will be charged for repair or replacement.
4. Pack the unit carefully. The warranty does not cover damage sustained in transit. Enclose a letter with your name, address, RMA number and daytime phone number; a copy of the sales receipt; and a check as payment, if applicable.
5. Mark the RMA number clearly on the outside of the shipping carton.
6. Ship by insured, prepaid carrier to the address provided by the Customer Support technician.

There are no customer serviceable items on the Rack Air Removal Unit. Do not attempt to open or repair the Rack Air Removal Unit.

Life-Support Policy

General policy

American Power Conversion (APC) does not recommend the use of any of its products in the following situations:

- In life-support applications where failure or malfunction of the APC product can be reasonably expected to cause failure of the life-support device or to affect significantly its safety or effectiveness.
- In direct patient care.

APC will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to APC that (a) the risks of injury or damage have been minimized, (b) the customer assumes all such risks, and (c) the liability of American Power Conversion is adequately protected under the circumstances.

Examples of life-support devices

The term *life-support device* includes but is not limited to neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators (for adults and infants), anesthesia ventilators, infusion pumps, and any other devices designated as “critical” by the U.S. FDA.

Hospital-grade wiring devices and leakage current protection may be ordered as options on many APC UPS systems. APC does not claim that units with this modifications are certified or listed as hospital-grade by APC or any other organization. Therefore these units do not meet the requirements for use in direct patient care.

Specifications — ACF102BLK

230 VAC; 50 Hz

Electrical	
Power source	230 VAC; 50 Hz
Rated current	4 A
Compliance	VDE
Physical	
Physical dimensions of fan assembly—h × w × d	193.55 × 60.78 × 17.78 cm 76.20 × 23.93 × 7.0 in
Net weight—unit only	65.77 kg (145 lb)
Shipping weight	95.27 kg (210 lb)
Shipping dimensions	74.93 × 59.69 × 205.74 cm (29.5 × 23.5 × 81 in)
Airflow (non ducted)	
2 kW	9.06 m ³ /min (320 CFM)
3 kW	13.59 m ³ /min (480 CFM)
5 kW	22.65 m ³ /min (800 CFM)
6.25 kW	28.32 m ³ /min (1000 CFM)

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 find answers to frequently asked questions (FAQs), 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 with FAQs, knowledge base, and e-support.
- Contact an APC Customer Support center by telephone or e-mail.
 - Regional centers:

APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702020 (Ireland)
Japan	(0) 3 5434-2021

- 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.

To obtain a repair authorization number for a NetworkAIR product, call APC NetworkAIR technical services between 8:00 A.M. and 5:00 P.M. Eastern time, Monday through Friday:

- Phone: (1)(888)695-6500 (USA and Canada, toll free)
- Fax: (1)(401)788-2691

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