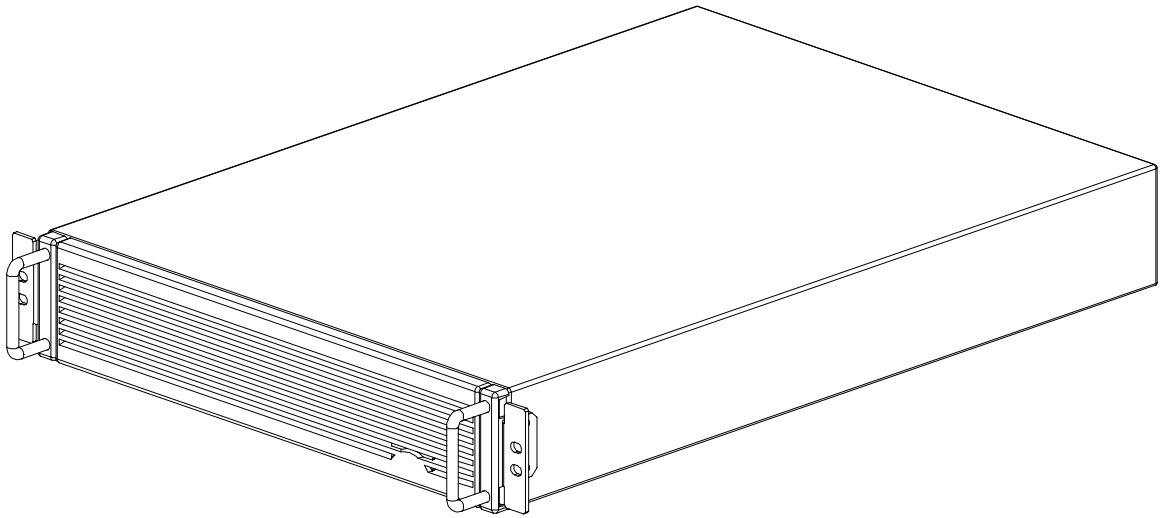


APC Step-Down Transformer

Model AP9621 User's Manual



APC[®]
www.apcc.com

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990-2071, Revision 1, Oct 99

This Safety Guide contains important instructions that should be followed during installation and maintenance of the APC equipment and batteries. It is intended for APC customers who setup, install, relocate, or maintain APC equipment.

This equipment is intended for installation in a temperature-controlled indoor area (see *Specifications*, page 8, for exact temperature range), free of conductive contaminants.



Electrical Safety

To reduce the risk of fire, connect only to a circuit provided with 30 Amp maximum branch circuit overcurrent protection in accordance with the National Electrical Code ANSI/NFPA.



CAUTION! Deenergizing Safety

- To deenergize this equipment toggle the rear input circuit breaker to the OFF position, then disconnect the equipment from the AC power outlet.
- Use of this equipment in life support applications where failure of this equipment can reasonably be expected to cause the failure of the life support equipment or to significantly effect its safety or effectiveness is not recommended.

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About Your New Step-Down Transformer

This American Power Conversion Step-Down Transformer converts power from 208 VAC to 120 VAC; a common voltage level used to operate many computers and accessories. The unit is rated for continuous duty from 0 to 5 KVA (0 to 3750 Watts) at an ambient temperature of 25 °C. The transformer can be used with a Smart-UPS® 5000RMT uninterruptible power supply (UPS), as a stand-alone device, or with any UPS that has a 208 VAC output.

The input of the transformer requires a 208 VAC, single phase, 30 Amp branch rated circuit. There is a 30 Amp input circuit breaker on the rear panel that serves as a current limit on the input side, and as the unit's on/off switch. The transformer comes standard with a 3 ft (1 meter) input power cord terminated by an L6-30 plug. The transformer is also configurable to accept a hard wire input connection.

The transformer has an efficiency of 90% and therefore draws more power from its input than it supplies on its output. While this loss is nominal, the transformer, if powering a load greater than 4500 VA can overload a 5000 VA UPS. **DO NOT** exceed the output capacity of the UPS supplying power to the transformer. Consult your UPS user's manual for details on output capacity. This restriction applies to the transformer whenever power is supplied through its input power cord since the power cord is only rated for 24 Amps. If the input of the transformer is hard wired to the power source, and the source can provide 5500 VA, the transformer can support a full load of 5000 VA.

The output of the transformer is 120 VAC, single phase, available at twelve 5-15R receptacles located on the rear panel. The receptacles are divided into four circuits; each circuit is protected by a 15 Amp circuit breaker.

The Step-Down Transformer is designed to be mounted in a standard 19" rack and consumes 2U of rack space. Together with a Smart-UPS 5000RMT, the units occupy 7 U-space. The transformer includes mounting rails to facilitate rack mounting.

Limited Warranty

American Power Conversion (APC) warrants its products 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. To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from customer support (see **Service**, page 7). Products must be returned with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase. This warranty does not apply to equipment which 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 who must have properly registered the product within 10 days of purchase.

EXCEPT AS PROVIDED HEREIN, AMERICAN POWER CONVERSION MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states 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.

APC Contact Information

Internet address<http://www.apcc.com/support/contact>

North America

Phone 1.800.800.4272
Fax 1.401.788.2743

Latin America

Argentina	0800.9.APCC (0800.9.2722)	Mexico.....	95.800.804.4283
Brazil	0800.12.72.21	Uruguay.....	000.413.598.2139
Colombia.....	980.15.39.47	Venezuela	8001.2856
Email.....	apctchla@apcc.com		

Unpacking

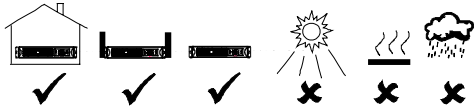
Inspection

Inspect the Step-Down Transformer upon receipt. Notify the carrier and dealer if there is damage. The packaging is recyclable; save it for reuse or dispose of it properly.

Contents

The shipping package contains the Step-Down Transformer [with a 3 ft (1 meter) power cord attached], mounting rails, and mounting hardware.

Placement



Install the transformer in a protected area that is free of excessive dust and has adequate air flow. Do not operate the transformer where the temperature and humidity are outside the specified limits.

Installation

The Step-Down Transformer comes with standard 19" (46.5 cm) rack mount brackets (ears) installed. It is supplied with mounting rails (L channel supports). These supports must be used with this model to ease installation for a 19" rack.

Note:

If you are using the Step-Down Transformer with an SU5000RMT UPS use mounting rails to support each unit. Do not rest the SU5000 UPS on the transformer.

If you are using the transformer with an SU5000 tower UPS, you can place the UPS on top of the transformer. The cover of the transformer has four circular indents that mate up with the feet of the SU5000 tower.

Here is an overview of the installation process.

- Install the transformer in the rack.
- Connect the transformer to the power source.
- Connect the equipment to the transformer.
- Turn on the transformer.
- Turn on the equipment.

Each step is explained below.

Install the Step-Down Transformer in the Rack

Installing the transformer in a rack involves a four-step process:

1. Determine the location of the unit in the rack.
2. Install the mounting rails in the rack.
3. Load the unit into the rack.
4. Attach the mounting brackets to the rack.

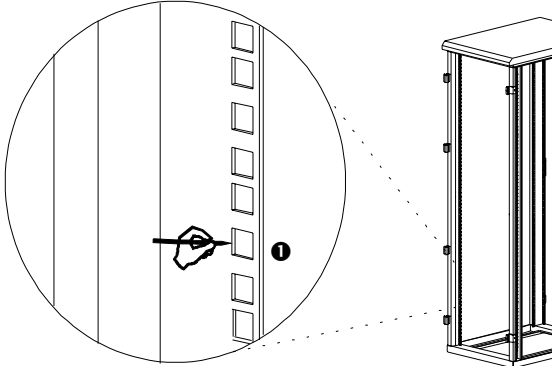
This section describes each step in detail.

Determine the Location of the Transformer in the Rack

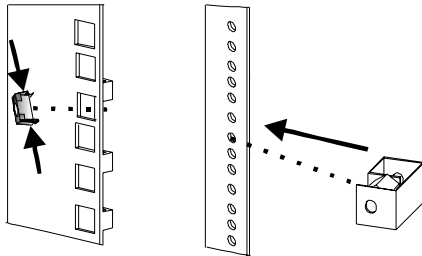
- The Step-Down Transformer is heavy. Select a rack location sturdy enough to handle the weight. Mount the unit at or near the bottom of the rack.
- If using the Step-Down Transformer with a Smart-UPS 5000RMT, place the transformer above the UPS, if possible (this is the preferred mounting position). Each unit should be supported with mounting rails.
- Select a rack location with adequate air flow that is free from excessive dust. Ensure that any air vents on the unit are not blocked. Do not operate the transformer where temperature or humidity are outside the limits listed under *Specifications*, page 8.

Caution:


Do not block the air vents on the front and rear panels of the transformer. Insufficient air circulation will cause the transformer to overheat, which will degrade its performance and may cause self protection devices to trip. This will interrupt the power to equipment plugged into the transformer without warning.





1. Determine where in the rack you'll mount the Step-Down Transformer. The transformer itself requires a space of 2U. When the transformer is used with an SU5000 UPS, the combination requires a space of 7U. Some racks have tick marks to indicate the U-spaces.
2. Locate and mark the bottom hole in the designated U-space ❶. The bottom screw on the mounting rail will attach to the bottom hole in the U-space.
3. Repeat step 2 for the remaining three rack posts.



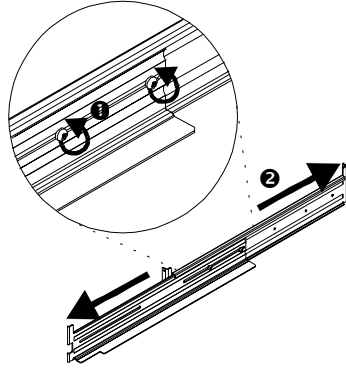
4. Prepare the rack holes, if necessary. Racks with threaded holes require no preparation.

If your rack has round holes, insert clip nuts , provided, into the third hole from the bottom of the U-space (marked in step 2). Repeat for each rack post.

If your rack has square holes, insert either clip  or cage  nuts into the third hole from the bottom of the U-space (marked in step 2). The example shows cage nuts. Repeat for each rack post.

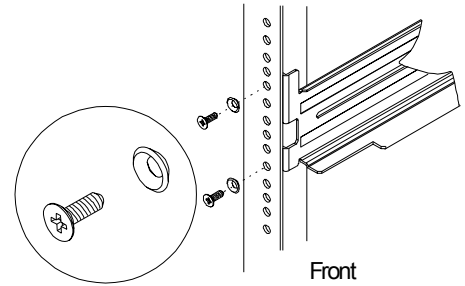
Install the Mounting Rails in the Rack

1



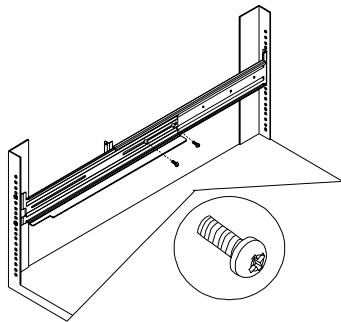
Remove the two screws ① that hold the rails together so that the rails can slide outward ②. Do not detach the rails.

2



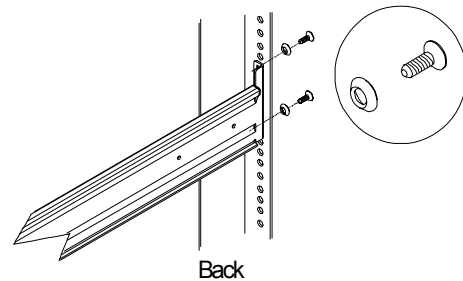
Align the bottom hole on the mounting rail with the bottom hole in the U-space (marked in step 3 above). Use the flat, Phillips head screws (10-32) and conical washers to attach the front rail to the rack. Position the rails so that the lip of the rail is on the bottom.

3



Expand the rails so that it spans from the front rack post to the back rack post. Replace the two screws (removed in step 1) that hold the rail sections together.

4

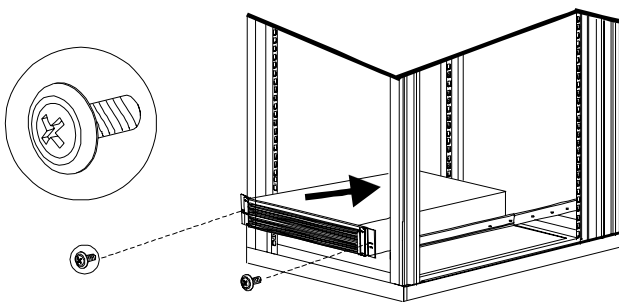


Attach the rail to the back rack post using the same hardware (10-32 flat head screws and conical washers) used in step 2. Repeat the process for the other rails.

Load the Transformer into the Rack

Caution:

Loading the unit in the rack requires two people due to the weight of the transformer.



Supporting the transformer from the front and back, carefully align the unit with the rails. Slide the transformer into position.

Attach the Mounting Brackets to the Rack

Use the ornamental screws supplied with the transformer to attach the mounting brackets to the rack post.

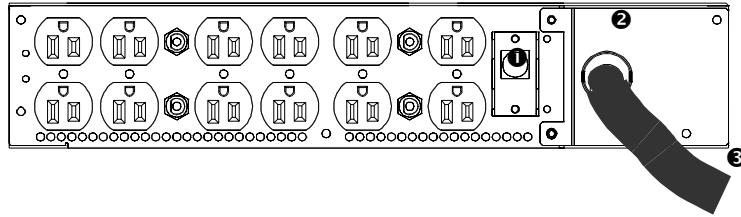
Connect the Transformer to the Power Source

The transformer is shipped with a 3 ft power cord, terminated by a standard 208 VAC L6-30 plug. Connect the power cord to a 30 Amp 208 VAC outlet.

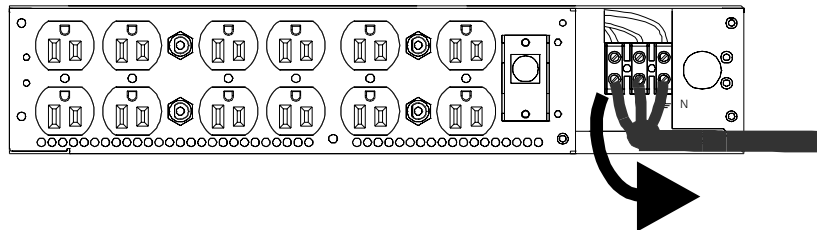
If desired, you can have a qualified electrician disconnect the power cord and hard wire the transformer, according to these instructions.

How to Hard Wire the Step-Down Transformer

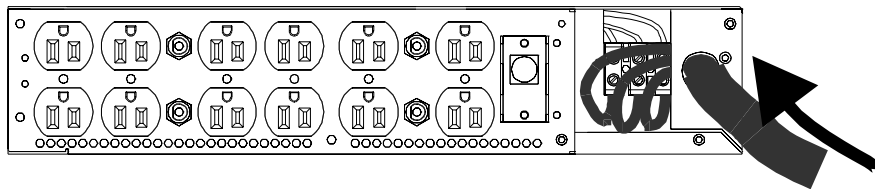
1. Make sure the input circuit breaker ❶, located on the rear panel, is in the OFF position.
2. Disconnect the input cord from its power source.
3. Remove the four (4) Phillips head screws that attach the plate ❷ to the chassis.



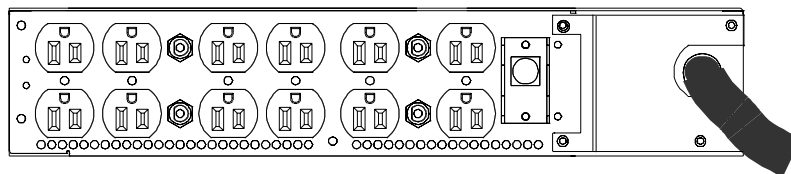
4. Grasp the input cord and move the plate out to the side to expose the terminal block. The internal wires have sufficient length to allow the plate to move to the side.
5. Use a flat blade screwdriver to disconnect the power cord wires from the terminal block. Set the power cord and plate aside.



6. Feed the new wire through the opening (0.875 inch diameter) to the right of the terminal block using a standard electrical conduit connector and connect the wires to the terminal block. Each terminal on the block is labeled. Clamp the wire into place by tightening the screw in the connector.



7. Use the four (4) screws removed in step 3 to attach the new rear panel plate (shipped in the plastic literature kit). The plate is necessary to cover and protect the wires.



8. Apply power to the input of the Step-Down Transformer through the hard wired connection.

Connect the Equipment to the Step-Down Transformer

The rear panel of the transformer has four groups of 120 VAC outlets; each group is protected by a 15 Amp circuit breaker. When connecting the equipment to the transformer, distribute the loads evenly on the four output circuits. The output circuits are clearly marked on the rear panel.

Turn on the Step-Down Transformer

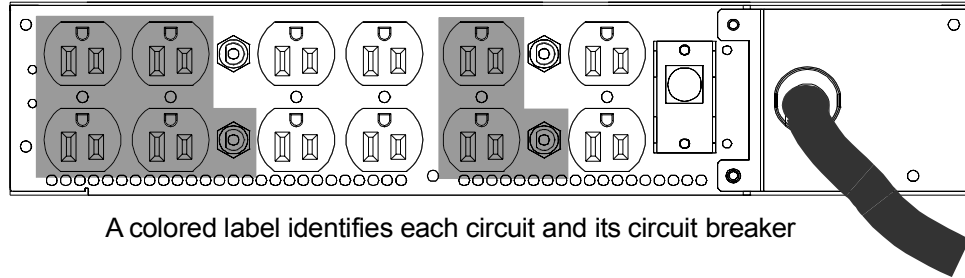
Turn on the Step-Down Transformer by switching the rear panel input circuit breaker to the ON position. The equipment will not be powered on until the transformer is turned on.

Turn on the Equipment

Turn on all connected equipment.

Electrical Description

The Step-Down Transformer requires a 208 VAC single-phase input from a power source with a minimum branch breaker rating of 30 Amps. The rear panel of the unit has twelve 120 VAC receptacles (5-15R). The twelve receptacles are divided into four individual circuits, each with a 15 Amp branch-rated circuit breaker. Two of the four circuits consist of four receptacles; the other two circuits consist of two receptacles. The outputs are designed to work with equipment that has a power factor between 0.5 and 1.0.



A colored label identifies each circuit and its circuit breaker

Using the Step-Down Transformer with a Smart-UPS 5000 UPS or other 5000 VA UPS

Connect the Step-Down Transformer to a 5000 VA UPS or larger for continuous power during a utility power failure. The transformer has an efficiency of 90% and therefore, draws more power from its input than it supplies on its output. While this loss is nominal, the transformer, if powering a load greater than 4500VA can overload a 5000 VA UPS. This restriction applies to the transformer whenever power is supplied through its input power cord since the power cord is only rated for 24 Amps.

The combination 5000 VA UPS – Step-Down Transformer provides an output of 4500 VA (3375 Watts) at 120 VAC. **DO NOT** exceed the output capacity of the UPS supplying power to the transformer. Consult your UPS user's manual for details on output capacity.

For the Step-Down Transformer to output the full 5000 VA of 120 VAC, a source of 5500 VA, hardwired to the transformer, is required.

Troubleshooting

Use this chart to solve minor installation problems. Contact APC Technical Support Staff (see *APC Contact Information*, page 1) for assistance with complex problems.

Problem and Possible Cause	Solution
No power to the connected equipment.	
Loose connection.	Check the input plug (L6-30) to make sure it is in its socket and twist locked in place. Check the input plug on the Step-Down Transformer to make sure it is connected to a 30 Amp 208 VAC source. Check each plug connected to a 120 VAC 5-15R receptacle on the rear panel. Make sure the plug is fully seated.
Step-Down Transformer turned off.	Check the input circuit breaker, on the rear panel of the transformer, it should be in the ON position.
Individual circuit breaker tripped.	Check each output circuit breaker. To reset a tripped circuit breaker, depress the appropriate circuit breaker button. A label on the rear panel identifies each circuit breaker and its group of receptacles.
Step-Down Transformer overheats and shuts off at full load.	Check the front of the unit to make sure that the air intake vents are not blocked. Check side vents near rear of unit to make sure air exhaust is not blocked.

Service

If the Step-Down Transformer requires service do not return it to the dealer! Follow these steps:

1. Review the problems discussed in *Troubleshooting*, page 7, to eliminate common problems.
2. Verify that no circuit breakers are tripped. A tripped circuit breaker is a common problem.
3. If the problem persists, call Customer Service or visit the APC Internet Website (www.apcc.com).
 - Note the model number of the transformer, the serial number, and the date purchased. A technician will ask you to describe the problem and try to solve it over the phone, if possible. If this is not possible the technician will issue a Returned Material Authorization Number (RMA#).
 - If the unit is under warranty, repairs are free. If not, there is a repair charge.
4. Pack the transformer in its original packaging. If the original packing is not available, ask Customer Service about obtaining a new set.

Note:

Pack the unit properly to avoid damage in transit. Never use Styrofoam beads for packaging. Damage sustained in transit is not covered under warranty.

5. Mark the RMA# on the outside of the package.
6. Return the transformer by insured, prepaid carrier to the address given to you by Customer Service.

Specifications

Input voltage	
Range	185 to 230 VAC
Nominal	208 VAC
Maximum input current	
Line cord installation (L6-30)	24 Amps
Hard wire installation	26 Amps
Output voltage, nominal	120 VAC
Number of 120 VAC outlets	12 (L5-15R)
Maximum output load	5000 VA with hardwired option
($V_{in} = 205$ to 230 VAC) —see note 1	4500 VA with attached line cord
Size (W x H x D)	17.5" x 3.5" x 24" (44.5 cm x 8.9 cm x 61.0 cm)
Temperature	
Operating	0 to 40°C
Storage	-25 to 65°C
Humidity, relative	
Operating and storage	5 to 95% (non-condensing)
Elevation	
Operating	0 to +3,000 m (0 to +10,000 ft)
Storage	0 to +15,000 m (0 to +50,000 ft)
Weight	
Net	95 lbs (43 kg)
Shipping	110 lbs (50 kg)
Efficiency	90 to 95%
Safety approvals	Listed to UL 1778, certified to CSA 107.1
EMI verification	FCC/DOC Class A verified

Note 1: For continuous operation below $V_{in} = 205$ VAC, the output load must be reduced to limit the maximum input current to the amount specified in the table above. Continuous operation above the maximum specified input current may cause the unit to overheat and shutdown. For additional information please contact APC.

Regulatory Agency Approvals



LISTED 42C2
E95463



LR63938

Appendix A: Types of Racks and Mounting Hardware

This appendix describes the hardware required for the different types of racks and describes the type of racks that may be used in your industry. All APC rack mount units are shipped ready for 19-inch wide EIA/IEC rack cabinets.

Racks

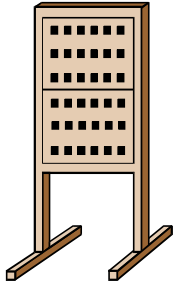
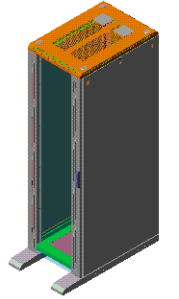
There are different types of racks:

- Equipment Rack - usually an open rack with threaded mounting holes or no threaded holes.
- APC Netshelter, IBM, Vero, others - enclosed rack with square holes.
- Dell, Compaq, Rittal - enclosed rack with square holes.
- HP Rack - enclosed rack with round holes.

These racks differ in the methods required for mounting equipment. They may have threaded holes (hardware not included), round holes (require clip nuts, provided) or square holes (require cage nuts, provided). Page 3 shows examples of cage and clip nuts.

- Telecomm Rack - open rack with two poles / four poles and threaded round holes (hardware not supplied by APC).

Check the table below of the type of rack you have and the hardware required for mounting.



Rack Type	Hole Type	Hardware Required	Hardware Included
Equipment Rack	Threaded or No Threads	See rack specifications if threaded. If not threaded use APC hardware.	N/A if threaded. If not threaded use APC hardware.
Netshelter/Compaq/IBM/Dell	Square	Cage nut, 10-32 screws	Yes
HP	Round	Clip nut, 10-32 screws	Yes
Telecomm	Threaded	See rack specifications	N/A