



## APC PowerStack 250/450

### Uninterruptible Power Supply User's Manual

990-5017 Revision 1 7/98

English

#### Installation

To obtain warranty coverage, please fill out and return the warranty registration card now.

##### Inspection

Inspect the APC PowerStack 250/450 Uninterruptible Power Supply (UPS) upon receipt. Notify the carrier and dealer if there is damage. The packaging is recyclable; save it for reuse or dispose of it properly.

##### Battery Connection

Before beginning installation of the UPS, please follow the Battery Connection instructions on the front of the unit, or follow the steps under *Replacing the Battery Pack*.

##### Placement

**Warning!** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the warranty.

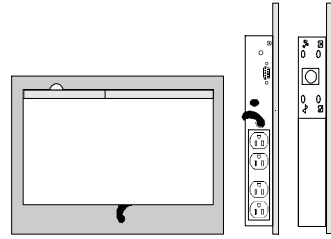
##### Rack Mounting

The UPS comes with standard 19" (46.5 cm) rack mount brackets. It is supplied with four (4) screws to attach the mounting brackets (ears) to the chassis.

Select a rack location with adequate air flow that is free from excessive dust. Ensure that the air vents on the sides of the UPS are not blocked. Do not operate the UPS where temperature or humidity are outside the limits in the *Specifications* section of this manual.

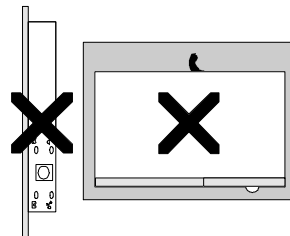
##### Wall Mounting

The brackets on the UPS can be rotated 90° for wall mounting. Remove the screws, rotate the brackets, and insert the screws in the appropriate holes.



Wall-mount the unit with the controls towards or at the top, not at the bottom of the unit.

The illustrations above show the proper positions for wall mounting the unit



##### Warning!

Do not mount the unit on the wall as shown in the illustrations at left. Doing so could result in a safety hazard.

##### Rear View

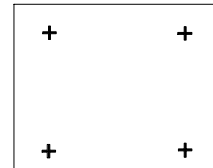


**Once the UPS is mounted, please follow the installation instructions in the *Smart-UPS Quick Reference Guide*.**

##### Desktop Use

This UPS is provided with four adhesive-backed rubber "feet" for desktop use. Attach the feet to the bottom of the unit and remove the ears to use it on a desktop.

The recommended placement of the feet is shown by a small + on the bottom corners of the unit:



##### Check the Site Wiring Fault Indicator

**Caution!** If the site wiring fault indicator lights, get a qualified electrician to correct the building wiring.

##### Computer Interface Port

The interface port is used for communicating with the UPS. See enclosed documentation for details.

##### Connect the Battery Pack

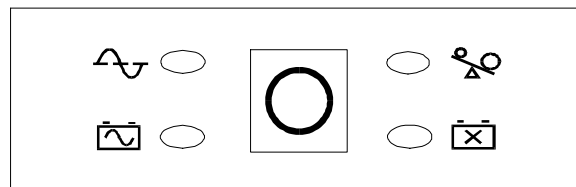
The UPS is shipped with the battery pack disconnected. To connect the battery pack, follow the procedure in *Replacing the Battery Pack*, below.

##### Charge the battery pack

The UPS charges its battery pack whenever it is connected to utility power. The battery pack will charge fully during the first 4 hours of normal operation. Do not expect full battery back-up runtime during this initial charge period.

#### Operating Instructions

##### Switch On — Switch Off



With the UPS plugged in, press and release the on/off/test button to supply power to the loads.

The loads are immediately powered while the UPS performs a self-test. Press and release the button again to turn off power to the loads. It may be convenient to use the UPS as a master on/off switch for the protected equipment.

The green on-line LED illuminates when the UPS is supplying utility power to the loads.

##### Self-test

The UPS performs a self-test automatically when turned on, and every two weeks thereafter. Automatic self-test eases maintenance requirements by eliminating the need for periodic manual self-tests.

During the self-test, the UPS briefly powers the loads on-battery. If the UPS passes the self-test, it returns to on-line operation.

If the UPS turns off during the self-test and emits a fading tone, the batteries are not connected properly.

The loads are not affected by a failed test. Recharge the battery pack overnight and perform the self-test again. If the replace battery LED is still on, replace the battery pack using the *Replacing the Battery Pack* procedure.

##### On Battery

During on-battery operation, the yellow on-battery LED illuminates and the UPS sounds an audible alarm consisting of 4 beeps every 30 seconds. The alarm stops when the UPS returns to on-line operation.

##### Low Battery

When the UPS is operating on-battery and the energy reserve of the battery pack runs low, the UPS beeps continuously until the UPS shuts down from battery pack exhaustion or returns to on-line operation, if the utility power returns before the battery pack is exhausted.

##### Replace Battery

If the battery pack fails a self-test, the UPS emits short beeps for one minute and the red replace battery LED illuminates.

The UPS repeats the alarm every five hours. Perform the self-test procedure to confirm replace battery conditions. The alarm stops when the battery pack passes the self-test.

##### Cold Start

**Note:** Cold start is not a normal operating condition.

When the UPS is off and there is no utility power, it is possible to cold start the UPS to power the loads from the UPS's battery pack.

Press and hold the on/off/test button until the UPS emits a constant tone.

Release the on/off/test button during the tone to start the UPS.

##### Overload

When loads exceed the UPS's capacity, the red overload LED illuminates and the UPS emits a sustained tone. The alarm remains on until the overload is removed. Disconnect nonessential load equipment from the UPS to eliminate the overload.

If the overload is severe, the input circuit breaker may trip (the resettable center plunger of the circuit breaker pops out). Disconnect nonessential load equipment from the UPS to eliminate the overload and press the plunger back in.

If there is AC power and the circuit breaker does not trip during overload, the loads are still powered. If the circuit breaker trips or the UPS attempts to transfer to battery, the loads' power will be shut off. Turn the UPS off then back on to power the loads.

#### Storage

##### Storage Conditions

Before storing, charge the UPS for at least 8 hours. Cover the UPS and store it lying flat in a cool, dry location, with its battery pack fully charged.

##### Extended Storage

At -15 to +30°C (+5 to +86°F), charge the UPS's battery pack every 6 months.

At +30 to +45°C (+86 to +113°F), charge the UPS's battery pack every 3 months.

## Replacing the Battery Pack

This UPS has an easy to replace hot-swappable battery pack.

**Note:** Please read the cautions in the *APC Safety Guide*.

### Replacement Batteries

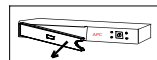
See your dealer or call the number in this manual for information on replacement battery pack kits. For 250 models, order **RBC17**. For 450 models, order **RBC18**.

### Battery Pack Replacement Procedure

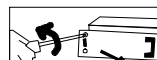
Battery pack replacement is a safe procedure, isolated from electrical hazards. You may leave the UPS and loads on for the following procedure.

#### Notes

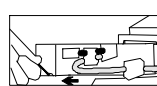
- **Once the battery pack is disconnected, the loads are not protected from power outages.**
- **Be careful removing the batteries - they are heavy.**
- **Small sparks at the battery connectors are normal during connection.**



1. Reach into the finger pull and remove the front cover.



2. Use a flat-blade screwdriver to turn the two battery door screws ¼ turn counterclockwise; open the door.

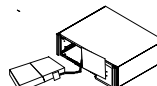


3. Grasp the clear plastic tab and gently pull the battery pack out of the UPS until the battery connector is visible.

**Warning! Do not force the battery pack out. This may damage internal wiring!**



4. Disconnect the battery connector by gripping both sides of the connector and firmly pulling them apart.



5. Slide the battery pack out of the UPS.

6. Slide the new battery pack three-fourths of the way into the UPS.



7. Connect the battery connector attached to the unit to the connector attached to the new battery pack.

8. Push the battery pack in as far as it will go. There are stops in the back to prevent it from going too far.

9. Close the battery door, turn the battery compartment screws ¼ turn clockwise, and replace the front cover.

10. Dispose of the old battery pack properly at an appropriate recycling facility or return it to the supplier in the packing material for the new battery pack. See the new battery pack instructions for more information.



## Specifications

	250 VA	450 VA
Acceptable input voltage	0 - 160 VAC	
Input voltage (on-line operation)	81-143 VAC	
Output voltage	106-127 VAC	
Input Over Current Protection	Resettable circuit breaker	
Frequency limits (on-line operation)	47 - 63 Hz	
Transfer time	4 ms typical, blackout response time	
Maximum load	250 VA 165 W	450 VA 280 W
On-battery output voltage	115 VAC	
On-battery frequency	60 Hz, ±0.1 Hz; unless synchronized to utility during brownout	
On-battery waveshape	Stepped sine-wave	
Output Over Current Protection	Overcurrent and short-circuit protected, latching shutdown on overload	
Battery type	Spill proof, maintenance free, sealed lead-acid	
Typical battery life	3 to 6 years, depending on number of discharge cycles and ambient temperature	
Typical recharge time	4 to 8 hours from total discharge	
Operating temperature	0 to +40 °C (+32 to +104 °F)	
Storage temperature	-15 to +45 °C (+5 to +113 °F)	
Operating and storage relative humidity	5 to 95%, non-condensing	
Operating elevation	0 to +3,000 m (0 to +10,000 ft)	
Storage elevation	0 to +15,000 m (0 to +50,000 ft)	
Audible noise at 1 m (3 ft)	<38 dBA	
Size (H x W x D)	1.75 x 17.5 x 13.0 in.	
Weight - net (shipping)	18.5 (23) lbs	21.5 (26) lbs
Safety and approvals	UL1778, CSA 107.1	
EMC Emissions	FCC Part 15 Class A, VCCI Class A	
EMC Immunity	EN 50082-1	
RFI	IEC 1000-4-3	
EFT	EN 61000-4-4	
ESD	EN 61000-4-2	

## LEDs and Audible Alarms

Function	LED				Tone*
UPS is on	●	○	●	●	—
UPS is running on battery	○	●	—	—	4
UPS is performing self-test	○	*	●	●	—
Overload	—	—	○	—	1
Overload shutdown	—	—	○	—	1
Output short circuit	—	—	○	—	1
Transformer failure	—	—	○	—	1
Low Battery (while on battery)	○	—	—	—	1
Replace battery condition	—	—	—	○	2
Battery disconnected in self test	●	●	●	●	3
<b>UPS internal alarms:</b>					
boost/trim failure	*	*	●	●	1
transfer relay weld	*	*	*	*	1
Sleep Mode	—	*	*	—	—

#### Key:

— = irrelevant to condition	* 1 = sustained tone
○ = on steady	2 = 1 minute of beeping every 5 hours
* = flashing	3 = fading tone
● = Off	4 = 4 beeps every 30 seconds

## Service

**If the UPS requires service do not return it to the dealer!** Follow these steps:

1. Use the **Troubleshooting** section of the *Quick Reference Guide* to eliminate common problems.
2. Verify that no circuit breakers are tripped. A tripped circuit breaker is the most common UPS problem!
3. If the problem persists, call customer service or visit the APC Internet Website ([www.apcc.com](http://www.apcc.com)).
4. Note the model number of the UPS, 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 Return Merchandise Authorization Number (RMA#).
5. If the UPS is under warranty, repairs are free. If not, there is a repair charge.
6. Disconnect the batteries before packing the UPS.
7. Pack the UPS in its original packaging. If the original packing is not available, ask customer service about obtaining a new set.
8. Pack the UPS properly to avoid damage in transit. Never use Styrofoam beads for packaging. Damage sustained in transit is not covered under warranty.
9. Include a letter with your name, RMA#, address, copy of the sales receipt, description of the trouble, your daytime phone number, and a check (if necessary).
10. Mark the RMA# on the outside of the package.
11. Return the UPS by insured, prepaid carrier to the address given to you by Customer Service.

North & Latin America	Europe
<b>APC</b> 132 Fairgrounds Road West Kingston, Rhode Island 02892 USA  1-800-800-4APC/1-401-789-5735	<b>APC</b> Ballybritt Business Park Galway, Ireland 1800-702000 Toll-free within the Republic of Ireland only
Internet: <a href="http://www.apcc.com">http://www.apcc.com</a>	
<b>E-Mail:</b> North America: <a href="mailto:apctech@apcc.com">apctech@apcc.com</a> Latin America: <a href="mailto:apctchla@apcc.com">apctchla@apcc.com</a>	<b>E-Mail:</b> Europe: <a href="mailto:apceurtech@apcc.com">apceurtech@apcc.com</a>