

User Manual

English

APC Smart-UPS[®]

1000/1500 VA 100/120/230 VAC

750/1000XL VA 120/230 VAC

Tower Uninterruptible Power Supply

Introduction

American Power Conversion Corporation (APC) is the leading national and international manufacturer of state-of-the-art uninterruptible power supplies, redundant switches, power management software, and related equipment. APC products protect hardware, software, and data from power disturbances in business and government offices throughout the world.

The APC Uninterruptible Power Supply (UPS) is designed to prevent blackouts, brownouts, sags, and surges from reaching your computer and other valuable electronic equipment. The UPS filters small utility line fluctuations and isolates your equipment from large disturbances by internally disconnecting from the utility line. The UPS provides continuous power from its internal battery until the utility line returns to safe levels or the battery is discharged.

1: INSTALLATION

Read the Safety Instruction sheet before installing the UPS.

Unpacking

Inspect the UPS upon receipt. APC designed robust packaging for your product. However, accidents and damage may occur during shipment. Notify the carrier and dealer if there is damage.

The packaging is recyclable; save it for reuse or dispose of it properly.

Check the package contents. The package contains the UPS, a literature kit containing one CD, one serial cable, one USB cable, product documentation and Safety Information.

230V models: Two IEC jumper cables are included for use on servers with permanently attached power cords.

The UPS is shipped with the battery disconnected.

Positioning the UPS

The UPS is heavy. Select a location sturdy enough to handle the weight.

Do not operate the UPS where there is excessive dust or the temperature and humidity are outside the specified limits.



Connecting Equipment and Power to the UPS

SMART-UPS REAR PANEL

230V MODELS



120V/100V Models



- 1. Plug in the battery connector **O**.
- 2. Connect equipment to the UPS. Note: Do not connect a laser printer to the UPS. A laser printer draws significantly more power than other types of equipment and may overload the UPS.
- 3. Add any optional accessories to the Smart-Slot **2**.
- 4. Using the power cord, plug the UPS into a two-pole, three-wire, grounded receptacle only. Avoid using extension cords.
 - *120V/100V models*: The power cord is permanently attached to the rear panel of the UPS.
- 5. Turn on all connected equipment. To use the UPS as a master ON/OFF switch, be sure all connected equipment is switched ON. The equipment will not be powered until the UPS is turned on.
- 6. To power up the UPS press the (t_{rest}^{l}) button on the front panel.
 - The UPS charges its battery when it is connected to utility power. The battery charges to 90% capacity during the first three hours of normal operation. *Do not* expect full battery run capability during this initial charge period.
 - *120V Models:* Check the site wiring fault LED located on the rear panel. It lights up if the UPS is plugged into an improperly wired utility power outlet. Refer to *Troubleshooting* in this manual.
- 7. For additional computer system security, install PowerChutePlus[®] UPS Power Management and Diagnostic Software.

BASIC CONNECTORS

Serial Port ⊚ [™] ©	USB PortPower management software and interface kits can be used with the UPS. Use only interface kits supplied or approved by APC.	
SIDP Use the APC supplied cable to connect to the Serial Port. DO NOT use a standard serial interface cable since it is incompatible with the UPS connector.		
Both	Serial and USB Ports are provided. They cannot be used simultaneously.	
External Batter Pack Connecto	 <i>XL models:</i> Use the battery pack connector to connect optional external battery pack(s). These units support up to ten external battery packs. See the APC web site, www.apc.com/support for the correct external 	
	battery pack model number for your UPS.	
\triangle	Note: UPS only supports Sealed Maintenance-Free (SMF) batteries.	
TVSS Screw	The UPS features a transient voltage surge-suppression (TVSS) screw for connecting the ground lead on surge suppression devices such as telephone and network line protectors.	
	When connecting grounding cable, disconnect the unit from the utility power outlet.	

2: OPERATION

SMART-UPS FRONT PANEL

Power Off

Power On



Load		Battery C	harge
120V	230V/100V	120V	230V/100V
084%	084%	O 96%	096%
0 67%	Ō67%	Ō72%	Ŏ72%
050%	Ō50%	0 48%	048%
033%	0 33%	024%	024%
016%	O16%	00%	00%
Load		Battery Charge	Ē

Online රු

The online LED illuminates when the UPS is supplying utility power to the connected equipment. If the LED is not lit, the UPS is either not turned ON, or is supplying battery power.

AVR Trim This LED illuminates to indicate the UPS is compensating for a high utility voltage.

AVR Boost	This LED illuminates to indicate the UPS is compensating for a low utility voltage.
On Battery	When the <i>on battery power</i> LED is lit the UPS is supplying battery power to the connected equipment. When on battery, the UPS sounds an alarm—four beeps every 30 seconds.
Overload କ୍ଲୁୁୁୁ	The LED illuminates and the UPS emits a sustained alarm tone when an overload condition occurs.
Replace Battery	Failure of a battery self-test causes the UPS to emit short beeps for one minute and the <i>replace battery</i> LED illuminates. Refer to <i>Troubleshooting</i> in this manual.
Battery Disconnected	The <i>replace battery</i> LED flashes and short beep is emitted every two seconds to indicate the battery is disconnected.
Automatic Self-Test	The UPS performs a self-test automatically when turned on, and every two weeks thereafter (by default).
	During the self-test, the UPS briefly operates the connected equip- ment on battery.
	If the UPS fails the self-test, the <i>replace battery</i> LED Ights and immediately returns to online operation. The connected equipment is not affected by a failed test. Recharge the battery for 24 hours and perform another self-test. If it fails, the battery must be replaced.
Manual Self-Test	Press and hold the $\underbrace{(I)}_{\text{Test}}$ button for a few seconds to initiate the self-test.

On Battery Operation

The Smart-UPS switches to battery operation automatically if the utility power fails. While running on battery, an alarm beeps four times every 30 seconds.

Press the Test button (front panel) to silence the UPS alarm (for the current alarm only. If the utility power does not return, the UPS continues to supply power to the connected equipment until the battery is exhausted.

If PowerChute is not being used you must manually save your files and power down before the UPS turns off.

DETERMINING ON BATTERY RUN TIME

UPS battery life differs based on usage and environment. It is recommended that the battery/batteries be changed once every three years. See the APC web site, <u>www.apc.com</u>, for on battery run times.

3: USER CONFIGURABLE ITEMS

NOTE: SETTINGS ARE MADE THROUGH SUPPLIED POWERCHUTE SOFTWARE OR OPTIONAL SMART SLOT ACCESSORY CARDS.			
FUNCTION	Factory Default	USER SELECTABLE CHOICES	DESCRIPTION
Automatic Self-Test	Every 14 days (336 hours)	Every 7 days (168 hours), On Startup Only, No Self- Test	This function sets the inter- val at which the UPS will execute a self-test. Refer to your software manual for details.
UPS ID	UPS_IDEN	Up to eight characters to define the UPS	Use this field to uniquely identify the UPS, (ie. server name or location) for net- work management purposes.
Date of Last Battery Re- placement	Manufacture Date	Date of Battery Replacement mm/dd/yy	Reset this date when you replace the battery module.
Minimum Capacity Be- fore Return from Shut- down	0 percent	15, 30, 45, 50, 60, 75, 90 percent	The UPS will charge its batteries to the specified percentage before return from a shutdown.
Voltage Sensitivity The UPS detects and reacts to line voltage distortions by transferring to battery operation to protect the connected equipment. Where power quality is poor, the UPS may frequently transfer to battery operation. If the connected equipment can operate normally under such conditions, reduce the sensitivity setting to conserve battery capacity and service life.	☆ high☆ medium● low	Brightly lit: UPS is set to <i>high</i> sensitivity (default).Dimly lit: UPS is set to <i>medium</i> sensitivity.Off: Low battery warning interval is about eight minutes.	To change the UPS sensitiv- ity, press the <i>voltage sensi-</i> <i>tivity</i> button (rear panel). Use a pointed object (such as a pen) to do so. You can change the sensitiv- ity level through Power- Chute software.
Alarm Control	Enable	Mute, Disable	User can mute an ongoing alarm or disable all existing alarms permanently.
Shutdown Delay	90 seconds	0, 180, 270, 360, 450, 540, 630 seconds	Sets the interval between the time when the UPS receives a shutdown command and actual shutdown.

NOTE: SETTINGS ARE MADE THROUGH SUPPLIED POWERCHUTE SOFTWARE OR OPTIONAL SMART SLOT ACCESSORY CARDS.			
FUNCTION	Factory Default	USER SELECTABLE CHOICES	Description
Low Battery Warning. PowerChute interface software provides auto- matic, unattended shut- down when approxi- mately two minutes (by default) of battery oper- ated run time remains.	 ☆ 2 min. ☆ 5 min. ● 8 min. 	 Brightly lit: Low battery warning interval is about two minutes. Dimly lit: Low battery warning interval is about five minutes. Off: Low battery warning interval is about eight minutes. Possible interval settings: 2, 5, 8, 11, 14, 17, 20, 23 minutes. 	The low battery warning beeps are continuous when two minutes of run time remain. To change the warning in- terval default setting, press the <i>voltage sensitivity</i> button (use a pointed object such as a pen to do so), while press- ing and holding the button (front panel).
Synchronized Turn-on Delay	0 seconds	60, 120, 180, 240, 300, 360, 420 seconds	The UPS will wait the speci- fied time after the return of utility power before turn-on (to avoid branch circuit overload).
High Transfer Point	230V models: 253VAC 120V models: 127VAC 100V models: 108VAC	230V models: 257, 261, 265VAC 120V models: 130, 133, 136VAC 100V models: 110, 112, 114VAC	To avoid unnecessary bat- tery usage, set the high transfer point higher if the utility voltage is chronically high and the connected equipment is known to work under this condition.
Low Transfer Point	230V models: 208VAC 120V models: 106VAC 100V models: 92VAC	230V models: 196, 200, 204VAC 120V models: 97, 100, 103VAC 100V models: 86, 88, 90VAC	Set the low transfer point lower if the utility voltage is chronically low and the con- nected equipment can toler- ate this condition.
Output Voltage	230V models: 230VAC	230V models: 220, 240VAC	<i>230V models</i> ONLY, allow the user to select the output voltage.

4: STORAGE, MAINTENANCE, AND TRANSPORTING

Storage

Store the UPS covered and positioned as for proper functioning, in a cool, dry location, with the batteries fully charged.

At -15 to +30 °C (+5 to +86 °F), charge the UPS battery every six months. At +30 to +45 °C (+86 to +113 °F), charge the UPS battery every three months.

Replacing the Battery Module

This UPS has an easy to replace, hot-swappable battery module. Replacement is a safe procedure, isolated from electrical hazards. You may leave the UPS and connected equipment on for this procedure. See your dealer or contact APC at the web site, www.apc.com/support for information on replacement battery modules.



Be careful during the following steps-the battery module is heavy.

REMOVING THE FRONT BEZEL AND BATTERY MODULE

Step 1

Step 2





Step 3



Pull the battery module out of the compartment until the back of the module is flush with the outer edges of the UPS.

Disconnect the battery connector.



1000VA Model

Step 3



Disconnect the battery cable terminals before removing the battery module from the UPS.

Note: The red cable connects to the red colorcoded terminal; the black cable connects to the black color-coded terminal. This will be important during the battery replacement procedure.





Be sure to deliver the spent battery to a recycling facility or ship it to APC in the replacement battery packing material.

REPLACING THE BATTERY MODULE

To replace the battery module, reverse the directions above for *Removing the Front Bezel and Bat*tery Module.

Disconnecting the Battery for Transport



Always DISCONNECT THE BATTERY before shipping in compliance with U.S. Department of Transportation (DOT) regulations.

The battery may remain in the UPS; it does not have to be removed.

- 1. Shut down and disconnect any equipment attached to the UPS.
- 2. Shut down and disconnect the UPS from the power supply.
- 3. Unplug the battery connector (rear panel).



For shipping instructions and to obtain appropriate packing materials contact APC at the web site, www.apc.com/support/contact.

5: **TROUBLESHOOTING**

Use the chart below to solve minor Smart-UPS installation and operation problems. Refer to the APC web site, <u>www.apc.com</u>, for assistance with complex UPS problems.

PROBLEM AND POSSIBLE CAUSE	SOLUTION	
UPS will not turn on		
Battery not connected prop- erly.		
	Check that the battery connector (rear panel) is fully engaged.	
(I) button not pushed.	Press the button once to power the UPS and the connected equipment.	
UPS not connected to utility power supply.	Check that the power cable from the UPS to the utility power supply is se- curely connected at both ends.	
Very low or no utility voltage.	Check the utility power supply to the UPS by plugging in a table lamp. If the light is very dim, have the utility voltage checked.	
UPS WILL NOT TURN OFF		
Internal UPS fault.	Do not attempt to use the UPS. Unplug the UPS and have it serviced imme- diately.	
UPS BEEPS OCCASIONALLY		
Normal UPS operation.	None. The UPS is protecting the connected equipment.	
UPS DOES NOT PROVIDE EXPECTED BACKUP TIME		
The UPS battery is weak due to a recent outage or is near the end of its service life.	Charge the battery. Batteries require recharging after extended outages. They wear faster when put into service often or when operated at elevated temperatures. If the battery is near the end of its service life, consider replac- ing the battery even if the <i>replace battery</i> LED is not yet lit.	
ALL LEDS ARE LIT AND THE UP	S EMITS A CONSTANT BEEPING	
Internal UPS fault.	Do not attempt to use the UPS. Turn the UPS off and have it serviced imme- diately.	
FRONT PANEL LEDS FLASH SEQUENTIALLY		
The UPS has been shut down remotely through software or an optional accessory card.	None. The UPS will restart automatically when utility power returns.	
ALL LEDS ARE OFF AND THE UPS IS PLUGGED INTO A WALL OUTLET		
The UPS is shut down and the battery is discharged from an extended outage.	None. The UPS will return to normal operation when the power is restored and the battery has a sufficient charge.	

PROBLEM AND POSSIBLE CAUSE	SOLUTION		
THE OVERLOAD LED IS LIT AND THE UPS EMITS A SUSTAINED ALARM TONE			
The UPS is overloaded.	The connected equipment exceeds the specified "maximum load" as de- fined in <i>Specifications</i> at the APC web site, <u>www.apc.com</u> .		
	The alarm remains on until the overload is removed. Disconnect nonessen- tial equipment from the UPS to eliminate the overload.		
	The UPS continues to supply power as long as it is online and the circuit breaker does not trip; the UPS will not provide power from batteries in the event of a utility voltage interruption.		
	If a continuous overload occurs while the UPS is on battery, the unit turns off output in order to protect the UPS from possible damage.		
THE REPLACE BATTERY LED IS L	ІТ		
Replace Battery LED flashes and short beep is emitted every two seconds to indicate the battery is disconnected.	Check that the battery connectors are fully engaged.		
Weak battery.	Allow the battery to recharge for 24 hours. Then, perform a self-test. If the problem persists after recharging, replace the battery.		
Failure of a battery self-test.	The UPS emits short beeps for one minute and the <i>replace battery</i> LED illuminates. The UPS repeats the alarm every five hours. Perform the self-test procedure after the battery has charged for 24 hours to confirm the <i>replace battery</i> condition. The alarm stops and the LED clears if the battery passes the self-test.		
THE SITE WIRING FAULT LED IS LIT			
The site wiring LED is lit (rear panel). 120V models only.	The UPS is plugged into an improperly wired utility power outlet. Wiring faults detected include missing ground, hot-neutral polarity reversal, and overloaded neutral circuit. Contact a qualified electrician to correct the building wiring.		
THE INPUT CIRCUIT BREAKER TRIPS			
The plunger on the circuit breaker (located above the input cable connection) pops out.	Reduce the load on the UPS by unplugging equipment and press the plunger in.		
AVR BOOST OR AVR TRIM LEDS LIGHT			
AVR Boost or Trim LEDs light	Have qualified service personnel check your facility for electrical prob- lems. If the problem continues, contact the utility company for further		
excessive periods of low r high voltage.	assistance.		

PROBLEM AND POSSIBLE CAUSE	SOLUTION		
UTILITY CIRCUIT BREAKER TRIPS			
Utility circuit breaker trips during normal operation.	<i>100V models:</i> In order to operate at the full VA rating of the 1500VA product, the supplied 15A plug must be replaced with a 20A plug. This change must be performed by qualified service personnel.		
UPS OPERATES ON BATTERY ALTHO	UGH NORMAL LINE VOLTAGE EXISTS		
UPS input circuit breaker tripped.	Reduce the load on the UPS by unplugging equipment and resetting the circuit breaker (on the back of UPS) by pressing the plunger in.		
Very high, low, or distorted line voltage. Inexpensive fuel powered generators can distort the voltage.	Move the UPS to a different outlet on a different circuit. Test the input voltage with the utility voltage display (see below). If acceptable to the connected equipment, reduce the UPS sensitivity.		
BATTERY CHARGE AND BATTERY L	DAD LEDS FLASH SIMULTANEOUSLY		
UPS has shutdown. The internal temperature of the	Check that the room temperature is within the specified limits for opera- tion.		
UPS has exceeded the allowable threshold for safe operation.	Check that the UPS is properly installed allowing for adequate ventila- tion.		
	Allow the UPS to cool down. Restart the UPS. If the problem continues contact APC at, <u>www.apc.com/supoport</u> .		
DIAGNOSTIC UTILITY VOLTAGE FEAT	TURE		
Utility Voltage	The UPS has a diagnostic feature that displays the utility voltage. Plug the UPS into the normal utility power.		
0266 0133 0119 0248 0123 0109	Press and hold the \underbrace{Test}_{Test} button to view the utility voltage bar graph dis-		
0248 0123 0109 0229 0115 0100 0210 0105 091 0191 098 081 Charge Charge Image	play. After a few seconds the five-LED, Battery Charge, , display on the right of the front panel shows the utility input voltage.		
	Refer to the figure at left for the voltage reading (values are not listed on the UPS).		
	The display indicates the voltage is between the displayed value on the list and the next higher value.		
	Three LEDs light, indicating utility voltage within the normal range.		
	If no LEDs are lit and the UPS is plugged into a working utility power outlet, the line voltage is extremely low.		
	If all five LEDs are lit, the line voltage is extremely high and should be checked by an electrician.		
The UPS starts a self-test as part of this procedure. The self-test does not affect the voltage display.			

Service

If the UPS requires service do not return it to the dealer. Instead, follow these steps:

- 1. Review the problems discussed in the *Troubleshooting* section of this manual to eliminate common problems.
- 2. If the problem persists, contact APC Customer Service through the APC web site, <u>www.apc.com/support</u>.
 - Note the model number of the UPS, the serial number, and the date purchased. If you call APC Customer Service, 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 UPS is under warranty, repairs are free. If not, there is a repair charge.
- 3. Pack the UPS in its original packaging. If the original packing is not available, refer to the APC web site, <u>www.apc.com/support</u>, for information about obtaining a new set.
 - Pack the UPS properly to avoid damage in transit. Never use Styrofoam beads for packaging.
 Damage sustained in transit is not covered under warranty.



Always DISCONNECT THE BATTERY before shipping in compliance with U.S. Department of Transportation (DOT) regulations.

The battery may remain in the UPS; it does not have to be removed.

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

Contacting APC

Refer to the information provided at the APC Internet site,

http://www.apc.com/support.

6: REGULATORY AND WARRANTY INFORMATION

Regulatory Agency Approvals and Radio Frequency Warnings

230V MODELS



This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take corrective actions.

120V MODELS



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded signal cables must be used with this product to ensure compliance with the Class A FCC limits.

警告使用者: 這是甲類的資訊產品,在居住的 環境中使用時,可能會造成射頻 干擾,在這種情況下,使用者會 被要求採取某些適當的對策。

100V MODELS



この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準 に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波 妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず るよう要求されることがあります。

Declaration of Conformity

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EC Declaration of Comonity			
We, the undersigned, declare under our sole responsibility that the equipment specified below conforms to the following standards and directives:			
Standards to Wi	ich Conformity Declared:	EN50091-1, EN60950, EN50091-1-1, IEC60950	
Application of C	ouncil Directives:	23/23/EEC, 93/68/EEC 89/33/FEC 97/31/EEC 91/157/FEC	
Type of Equipm Model Numbers	ent: :	Uninterruptible Power Supply SUA1000I, SUA1500I, SUA1000IX219, SUA1500IX219, SUA750XLI, SUA1000XLI, APC10IA	
Manufacturer's	Name and Address:	American Power Conversion 132 Faraground Road West Kingston, Rhodo Idand, O2002, USA West Kingston, Rhodo Idand, O2002, USA Merican Power Conversion (A. P. C.) b. v. Ballybrint Business Park Galway, Ireland American Power Conversion Main Acorue, Poza American Power Conversion American Power Conversion Cavite Philippines Or American Power Conversion American Power Conversion Ameri	
Importer's Name and Address:		No. 189 Sunong Road, ChinarSingapore Suzhou Industrial Park Suzhou 215021, Jiangsu, P.R.C American Power Conversion (A. P. C.) b. v. Ballybritt Business Park Galway, Ireland	
Place:	N. Billerica, MA U.S.	Gele Of Samo 5 Jan 01	
		Richard J. Everett, Sr. Regulatory Compliance Engineer	
Place:	Galway, Ireland	Co. 6 father 5 Jan 01	
		Ray S. Ballard, Managing Director, Europe Phone: 353 917 02000 Fax: 353 9175 6909	

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. 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 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 who must have properly registered the product within 10 days of purchase.

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