



by **Schneider** Electric

User Manual

Smart-UPSTM

Uninterruptible Power Supply

500 VA

100 Vac

750 VA

100/120/230 Vac

Tower

For Professional Business Applications – Not For Consumer Use

Smart-UPS™

Uninterruptible Power Supply

**500 VA
100 Vac**

**750 VA
100/120/230 Vac**

Tower

Introduction

The APC™ by Schneider Electric Smart-UPS™ is a high performance uninterruptible power supply (UPS). The UPS provides protection for electronic equipment from utility power blackouts, brownouts, sags, surges, small utility power fluctuations and large disturbances. The UPS also provides battery backup power for connected equipment until utility power returns to safe levels or the batteries are fully discharged.

This user manual is available on the enclosed CD and on the APC by Schneider Electric web site, www.apc.com.

1: INSTALLATION

The User Manual and Safety Guide are accessible on the supplied User Manuals CD and on the APC by Schneider Electric web site, www.apc.com.

Unpack

Attention: Read the safety instruction sheet before installation.

Inspect the UPS upon receipt. Notify the carrier and dealer if there is damage.

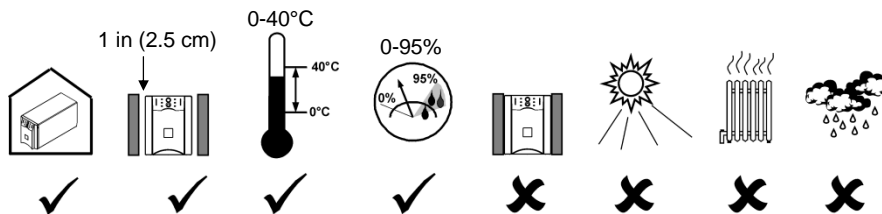
The packaging is recyclable; save it for reuse or dispose of it properly.

Check the package contents:

Attention: The UPS comes with battery disconnected.

- UPS
- UPS literature kit containing:
 - Product documentation, safety and warranty information
 - Documentation CD
 - 120V and 230V models: PowerChute™ CD
 - 120V and 230V models: Serial and USB communication cables
 - 230V model: Two jumper cables

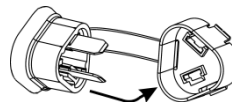
Position the UPS



Connect the Battery

The battery connector is located on the rear panel.

For battery connection, push the tethered jumper plug into the corresponding port.



Connect Equipment and Power to the UPS



1. Connect equipment to the UPS.

Note: A laser printer draws significantly more power than other types of equipment and may overload the UPS.

2. Add accessories to the SmartSlot (optional).
3. Connect ground leads to the TVSS screw (optional). To make the connection, loosen the screw and connect the surge suppression device ground lead. Tighten the screw to secure the lead.
4. Plug the UPS into a two-pole, three-wire, grounded receptacle only. Avoid using extension cords.

100V/120V models: The power cord is attached to the UPS. The input plug is a NEMA 5-15P.

230V model: The power cord is supplied in the UPS literature kit.

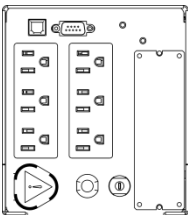
5. *120V model:* Check the *site wiring fault* LED  located on the rear panel. It will be illuminated if the UPS is plugged into an improperly wired utility power outlet (see *Troubleshooting*).
6. Turn on all connected equipment. To use the UPS as a master *on/off* switch, be sure all connected equipment is on.
7. Press the  button on the front panel to power the UPS.

Note: The battery charges to 90% capacity during the first four hours of normal operation. Do not expect full battery run capability during this initial charge period.

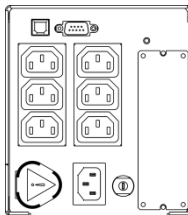
8. For optimal computer system security, install PowerChute Smart-UPS monitoring software.

Rear Panels

100V/120V



230V



Basic Connectors

Serial Port



USB Port



TVSS Screw



Use only interface kits approved by APC by Schneider Electric.

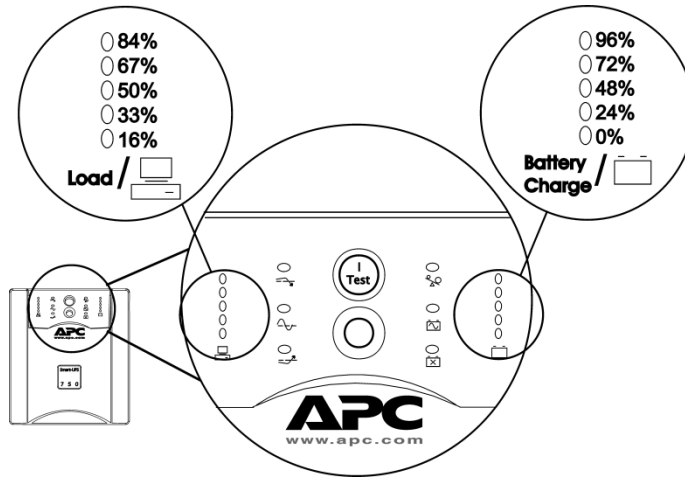
Use only the supplied cable to connect to the Serial Port. A standard serial interface cable is incompatible with the UPS. **Serial and USB Ports cannot be used simultaneously.**









The UPS features 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 UPS from utility power.

2: OPERATION

Front Display Panel




INDICATOR	DESCRIPTION
Online 	The UPS is supplying utility power to the connected equipment.
AVR Trim 	The UPS is compensating for a high utility voltage.
AVR Boost 	The UPS is compensating for a low utility voltage.
On Battery 	The UPS is supplying battery power to the connected equipment.
Overload 	The connected loads are drawing more than the UPS power rating.
Replace Battery/ Battery Discon- nected 	The battery is disconnected or must be replaced.
FEATURE	FUNCTION
Power On 	Press this button to turn on the UPS. Read on for additional capabilities.
Power Off 	Press this button to turn off the UPS.

FEATURE	FUNCTION																					
Self-Test	<p>Automatic: 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 equipment on battery.</p> <p>Manual: Press and hold the  button for a few seconds to initiate the self-test.</p>																					
Cold Start	<p><i>120V and 230V models only:</i> Supply battery power to the UPS and connected equipment in the absence of utility voltage</p> <p>(see <i>Troubleshooting</i>). Press the  button for one second and release. The UPS will beep briefly and go quiet. Press and hold the button again, but for approximately three seconds. The unit will emit a sustained beep. Release the button during this beep.</p>																					
Diagnostic Utility Voltage <table border="0"> <tr> <td>100V</td> <td>120V</td> <td>230V</td> </tr> <tr> <td>0 119</td> <td>0 133</td> <td>0 266</td> </tr> <tr> <td>0 109</td> <td>0 124</td> <td>0 248</td> </tr> <tr> <td>0 100</td> <td>0 114</td> <td>0 229</td> </tr> <tr> <td>0 91</td> <td>0 105</td> <td>0 210</td> </tr> <tr> <td>0 81</td> <td>0 96</td> <td>0 191</td> </tr> <tr> <td></td> <td>Battery Charge</td> <td></td> </tr> </table>	100V	120V	230V	0 119	0 133	0 266	0 109	0 124	0 248	0 100	0 114	0 229	0 91	0 105	0 210	0 81	0 96	0 191		Battery Charge		<p>The UPS has a diagnostic feature that displays the utility voltage.</p> <p>The UPS starts a self-test as part of this procedure. The self-test does not affect the voltage display.</p> <p>Press and hold the  button to view the utility voltage bar graph display. After a few seconds, this five-LED <i>battery charge</i>  display on the right of the front panel will show the utility input voltage.</p> <p>Refer to the figure at left for the voltage reading (values are not listed on the UPS).</p> <p>The display indicates the voltage is between the displayed value on the list and the next higher value (see <i>Troubleshooting</i>).</p>
100V	120V	230V																				
0 119	0 133	0 266																				
0 109	0 124	0 248																				
0 100	0 114	0 229																				
0 91	0 105	0 210																				
0 81	0 96	0 191																				
	Battery Charge																					

Battery Operation

The 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  button to silence this alarm. If the utility power does not return, the UPS continues to supply power to the connected equipment until the battery is fully discharged.

If PowerChute is not being used, files must be manually saved and the computer must be turned off before the UPS fully discharges the battery.

Refer to www.apc.com for on battery runtimes.

3: USER CONFIGURABLE ITEMS

NOTE: SETTINGS ARE ADJUSTED THROUGH POWERCHUTE SOFTWARE OR OPTIONAL SMARTSLOT 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	Set the interval at which the UPS will execute a self-test.
UPS ID	UPS_IDEN	Up to eight characters (alphanumeric)	Uniquely identify the UPS, i.e. server name or location for network management purposes.
Date of Last Battery Replacement	Manufacture Date	mm/dd/yy	Reset this date when you replace the battery module.
Minimum Capacity Before Return from Shutdown	0 percent	0, 15, 30, 45, 50, 60, 75, 90 percent	Specify the percentage to which batteries will be charged following a low battery shutdown before powering connected equipment.
Voltage Sensitivity The UPS detects and reacts to line voltage distortions by transferring to battery operation to protect connected equipment.	High	High sensitivity, Medium sensitivity, Low sensitivity	Note: In situations of poor power quality, 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.
Alarm Delay Control	Enable	Enable, Mute, Disable	Mute ongoing alarms or disable all alarms permanently.
Shutdown Delay	90 seconds	0, 90, 180, 270, 360, 450, 540, 630 seconds	Set the interval between the time when the UPS receives a shutdown command and the actual shutdown.

**NOTE: SETTINGS ARE ADJUSTED THROUGH POWERCHUTE SOFTWARE
OR OPTIONAL SMARTSLOT ACCESSORY CARDS.**

FUNCTION	FACTORY DEFAULT	USER SELECTABLE CHOICES	DESCRIPTION
Low Battery Warning	2 minutes PowerChute software provides automatic, unattended shutdown when approximately 2 minutes of battery operated runtime remains.	2, 5, 8, 11, 14, 17, 20, 23 minutes Times are approximate.	The UPS will beep when 2 minutes of battery runtime remains. Change the low battery warning interval setting to the time that the operating system or system software requires to safely shut down.
Synchronized Turn On Delay	0 seconds	0, 60, 120, 180, 240, 300, 360, 420 seconds	Specify the time the UPS will wait after the return of utility power before turn on to avoid branch circuit overload.
High Transfer Point	<i>100V model:</i> 108 Vac <i>120V model:</i> 127 Vac <i>230V model:</i> 253 Vac	<i>100V model:</i> 108, 110, 112, 114 Vac <i>120V model:</i> 127, 130, 133, 136 Vac <i>230V model:</i> 253, 257, 261, 265 Vac	Set the high transfer point higher to avoid unnecessary battery usage when the utility voltage is usually high and the connected equipment is specified to operate with input voltages this high.
Low Transfer Point	<i>100 V model:</i> 92 Vac <i>120 V model:</i> 106 Vac <i>230 V model:</i> 208 Vac	<i>100 V model:</i> 86, 88, 90, 92 Vac <i>120 V model:</i> 97, 100, 103, 106 Vac <i>230 V model:</i> 196, 200, 204, 208 Vac	Set the low transfer point lower when the utility voltage is usually low and the connected equipment is specified to operate with input voltages this low.
Output Voltage <i>230V model only</i>	230 Vac	220, 230, 240 Vac	Select the output voltage.

4: STORAGE, AND MAINTENANCE

Storage

Store the UPS covered in a cool, dry location, with the battery fully charged.

At -15° to $+30^{\circ}$ C ($+5^{\circ}$ to $+86^{\circ}$ F), charge the UPS battery every six months.

At $+30^{\circ}$ to $+45^{\circ}$ C ($+86^{\circ}$ to $+113^{\circ}$ F), charge the UPS battery every three months.

Battery Module Maintenance

The UPS battery life differs based on usage and environment. Consider replacing the battery every three years.

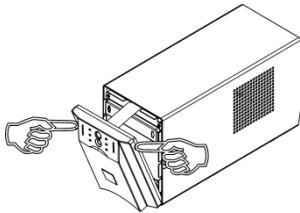
This UPS has an easy to replace, hot-swappable battery. Replacement is a safe procedure, isolated from

electrical hazards. You may leave the UPS and connected equipment on during the replacement procedure. See your dealer or contact **APC by Schneider Electric** (see *Contact Information*) for information on replacement batteries.

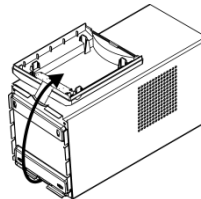
Note: Upon battery disconnection, equipment is not protected from power outages.

Removing the Front Bezel and Battery Module

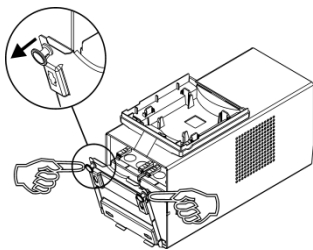
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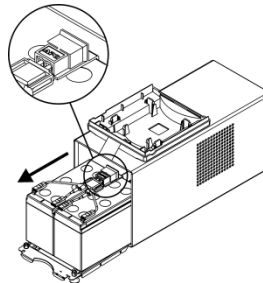
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4



Replacing the Battery Module

Reverse the instructions for *Removing the Front Bezel and Battery Module*. Note: To close the battery door, ensure the plungers are in the extended position, push the door shut, and push the plungers into the locked position.



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

5: TROUBLESHOOTING

Use the chart below to solve minor UPS installation and operation problems. Refer to www.apc.com with complex UPS problems.

PROBLEM AND/OR POSSIBLE CAUSE	SOLUTION
UPS WILL NOT TURN ON	
UPS not connected to utility power supply.	Check that the power cord from the UPS to the utility power supply is securely connected at both ends.
Battery not connected properly.	Check that battery connector on the rear panel is fully snapped into position.
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, unplug the battery connector on the rear panel, and have it serviced immediately.
UPS BEEPS OCCASIONALLY	
Normal operating UPS beeps when running on battery.	None. The UPS is protecting the connected equipment from occasional utility power irregularities.
UPS IS NOT PROVIDING EXPECTED BACKUP TIME	
The UPS battery is weak due to a recent outage or is near the end of the service life.	Charge the battery. Batteries require recharging after extended outages, and wear faster when frequently put into service or when operated at elevated temperatures. If the battery is near the end of the service life, consider replacing even if the <i>replace battery</i> LED is not yet illuminated.
LEFT HALF, RIGHT HALF, OR CENTER SECTION OF FRONT PANEL LEDS ARE FLASHING	
Internal UPS fault. The UPS has shut down.	Do not attempt to use the UPS. Turn off the UPS, unplug the battery connector on the rear panel, and have it serviced immediately.
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 or 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/OR POSSIBLE CAUSE	SOLUTION
<i>THE OVERLOAD LED IS ILLUMINATED AND THE UPS EMITS A SUSTAINED ALARM TONE</i>	
The UPS is overloaded. The connected equipment is drawing more VA than the UPS can sustain.	<p>The connected equipment exceeds the specified “maximum load.”</p> <p>The alarm remains on until the overload is removed. Disconnect nonessential equipment from the UPS to eliminate the overload.</p> <p>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.</p> <p>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.</p>
<i>THE REPLACE BATTERY/BATTERY DISCONNECTED LED IS ILLUMINATED</i>	
This LED flashes and a short beep is emitted every two seconds to indicate the battery is disconnected.	Check that the battery connector on the rear panel is 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.	<p>The UPS emits short beeps for one minute and the <i>replace battery</i> LED illuminates. The UPS repeats the alarm every five hours.</p> <p>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.</p>
<i>THE SITE WIRING FAULT LED ON THE REAR PANEL IS ILLUMINATED (120V MODEL ONLY)</i>	
The UPS is plugged into an improperly wired utility power outlet.	<p>Wiring faults detected include missing ground, hot neutral polarity reversal, and overloaded neutral circuit.</p> <p>Contact a qualified electrician to correct the building wiring.</p>
<i>THE INPUT CIRCUIT BREAKER HAS TRIPPED</i>	
The UPS is overloaded. The plunger on the circuit breaker has popped out.	Reduce the load on the UPS by unplugging equipment. Press in the plunger on the circuit breaker.
<i>THE AVR BOOST OR AVR TRIM LEADS ARE ILLUMINATED</i>	
The system is experiencing excessive periods of low or high voltage.	Seek qualified service personnel to check your facility for electrical problems. If the problem continues, contact the utility company for further assistance.

PROBLEM AND/OR POSSIBLE CAUSE	SOLUTION
UPS OPERATES ON BATTERY ALTHOUGH UTILITY VOLTAGE EXISTS	
The UPS input circuit breaker has tripped.	To reduce the load on the UPS, unplug equipment and press in the plunger on the circuit breaker.
The line voltage is very high, low or distorted.	Move the UPS to a different outlet on a different circuit, as inexpensive fuel powered generators may distort the voltage. Test the input voltage with the utility voltage display (see <i>Operation</i>). If acceptable to the connected equipment, reduce the UPS sensitivity (see <i>User Configurable Items</i>).
BATTERY CHARGE AND LOAD LED BARGRAPHS FLASH SIMULTANEOUSLY	
The UPS has shutdown. The internal temperature of the UPS has exceeded the allowable threshold for safe operation.	Check that the room temperature is within the specified limits for operation. Check that the UPS is properly installed, allowing for adequate ventilation (see <i>Position the UPS</i>). Allow the UPS to cool down. Restart the UPS. If the problem continues, contact APC by Schneider Electric (see <i>Contact Information</i>).
DIAGNOSTIC UTILITY VOLTAGE	
All five LEDs are illuminated.	The line voltage is extremely high and should be checked by an electrician.
There is no LED illumination.	If the UPS is plugged into a properly functioning utility power outlet, the line voltage is extremely low.
ON-LINE LED	
There is no illumination.	The UPS is running on battery, or it must be turned on.
The LED is blinking.	The UPS is running an internal self-test.

6: TRANSPORT AND SERVICE

Transport

- 1 . Shut down and disconnect all connected equipment.
- 2 . Disconnect the unit from utility power.
- 3 . Disconnect all internal and external batteries (if applicable).
- 4 . Follow the shipping instructions outlined in the *Service* section of this manual.

Service

If the unit requires service, do not return it to the dealer. Follow these steps:

- 1 . Review the *Troubleshooting* section of the manual to eliminate common problems.
- 2 . If the problem persists, contact APC by Schneider Electric Customer Support through the APC by Schneider Electric web site, **www.apc.com**.
 - a. Note the model number and serial number and the date of purchase. The model and serial numbers are located on the rear panel of the unit and are available through the LCD display on select models.
 - b. Call Customer Support and a technician will attempt to solve the problem over the phone. If this is not possible, the technician will issue a Returned Material Authorization Number (RMA#).
 - c. If the unit is under warranty, the repairs are free.
 - d. Service procedures and returns may vary internationally. Refer to the APC by Schneider Electric web site, **www.apc.com** for country specific instructions.
- 3 . Pack the unit properly to avoid damage in transit. Never use foam beads for packaging. Damage sustained in transit is not covered under warranty.
 - a. **Note: When shipping within the United States, or to the United States always DISCONNECT ONE UPS BATTERY before shipping in compliance with U.S. Department of Transportation (DOT) and IATA regulations.** The internal batteries may remain in the UPS.
 - b. Batteries may remain connected in the XBP during shipment. Not all units utilize XLBPs.
- 4 . Write the RMA# provided by Customer Support on the outside of the package.
- 5 . Return the unit by insured, prepaid carrier to the address provided by Customer Support.

7: LIMITED FACTORY WARRANTY

Schneider Electric IT Corporation (SEIT), warrants its products to be free from defects in materials and workmanship for a period of two (2) years from the date of purchase. The SEIT obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. Repair or replacement of a defective product or parts thereof does not extend the original warranty period.

This warranty applies only to the original purchaser who must have properly registered the product within 10 days of purchase. Products may be registered online at warranty.apc.com.

SEIT 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 or any third person misuse, negligence, improper installation, testing, operation or use of the product contrary to SEIT recommendations or specifications. Further, SEIT shall not be liable for defects resulting from: 1) unauthorized attempts to repair or modify the product, 2) incorrect or inadequate electrical voltage or connection, 3) inappropriate on site operation conditions, 4) Acts of God, 5) exposure to the elements, or 6) theft. In no event shall SEIT have any liability under this warranty for any product where the serial number has been altered, defaced, or removed.

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NOTHING IN THIS LIMITED WARRANTY SHALL SEEK TO EXCLUDE OR LIMIT SEIT LIABILITY FOR DEATH OR PERSONAL INJURY RESULTING FROM ITS NEGLIGENCE OR ITS FRAUDULENT MISREPRESENTATION OF TO THE EXTENT THAT IT CANNOT BE EXCLUDED OR LIMITED BY APPLICABLE LAW.

To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from customer support. Customers with warranty claims issues may access the SEIT worldwide customer support network through the APC web site: www.apc.com. Select your country from the country selection drop down menu. Open the Support tab at the top of the web page to obtain information for customer support in your region. 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.

APC by Schneider Electric Worldwide Customer Support

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

- Visit the APC by Schneider Electric web site, www.apc.com to access documents in the APC Knowledge Base and to submit customer support requests.
 - **www.apc.com** (Corporate Headquarters)
Connect to localized APC by Schneider Electric web site 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 the APC by Schneider Electric Customer Support Center by telephone or e-mail.
 - Local, country specific centers: go to **www.apc.com/support/contact** for contact information.
 - For information on how to obtain local customer support, contact the APC by Schneider Electric representative or other distributor from whom you purchased your APC by Schneider Electric product.

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