



by **Schneider** Electric

User Manual Smart-UPS™ C 420/620 VA 110/120/230 Vac Tower

Important Safety Information

SAVE THESE INSTRUCTIONS - This manual contains important instructions that should be followed during installation and maintenance of the Smart-UPS and batteries.

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol either to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Product Handling Guidelines



<18 kg
<40 lb



18-32 kg
40-70 lb



32-55 kg
70-120 lb



>55 kg
>120 lb



Safety and General Information

- Adhere to all national and local electrical codes.
- All wiring must be performed by a qualified electrician.
- Changes and modifications to this unit not expressly approved by APC by Schneider Electric could void the warranty.
- This UPS is intended for indoor use only.
- Do not operate this UPS in direct sunlight, in contact with fluids, or where there is excessive dust or humidity.
- Do not operate the UPS near open windows or doors.
- Be sure the air vents on the UPS are not blocked. Allow adequate space for proper ventilation.
Note: Allow 20 cm clearance on all sides of the UPS.
- For a UPS with a factory installed power cord, connect the UPS power cable directly to a wall outlet.
Do not use surge protectors or extension cords.
- The equipment is heavy. Always practice safe lifting techniques adequate for the weight of the equipment.
- The battery typically lasts for two to three years. environmental factors impact battery life. Elevated ambient temperatures, poor quality AC power, and frequent short duration discharges will shorten battery life.
- Additional safety information can be found in the Safety Guide supplied with this unit.

Deenergizing safety

- The UPS contains internal batteries and may present a shock hazard even when disconnected from AC and DC power.
- The AC and DC output connectors may be energized by remote or automatic control at any time.
- Before installing or servicing the equipment check that the:
 - Mains circuit breaker is in the **OFF** position
 - Internal UPS batteries are removed
 - XLBP battery modules are disconnected

Electrical safety

- For models with a hardwired input, the connection to the branch circuit (mains) must be performed by a qualified electrician.
- 230 V models only: In order to maintain compliance with the EMC directive for products sold in Europe, output cords attached to the UPS must not exceed 10 meters in length.
- The protective earth conductor for the UPS carries the leakage current from the load devices (computer equipment). An insulated ground conductor is to be installed as part of the branch circuit that supplies input power to the UPS. The conductor must have the same size and insulation material as the grounded and ungrounded branch circuit supply conductors. The conductor will typically be green and with or without a yellow stripe.
- The UPS input ground conductor must be properly bonded to protective earth at the service panel. If the UPS input power is supplied by a separately derived system, the ground conductor must be properly bonded at the supply transformer or motor generator set.

Battery safety

- Replace batteries with the same number and type of batteries as originally installed in the equipment.
- Batteries typically last for two to three years. Environmental factors impact battery life. Elevated ambient temperatures, poor quality utility power, and frequent short duration discharges will shorten battery life. Batteries should be replaced before end of life.
- Replace batteries immediately when the unit indicates battery replacement is necessary.
- Schneider Electric uses Maintenance-Free sealed Lead Acid batteries. Under normal use and handling, there is no contact with the internal components of the battery. Over charging, over heating or other misuse of batteries can result in a discharge of battery electrolyte. Released electrolyte is toxic and may be harmful to the skin and eyes.
- CAUTION: Before installing or replacing the batteries, remove jewelry such as wristwatches and rings.
High short circuit current through conductive materials could cause severe burns.
- CAUTION: Do not dispose of batteries in a fire. The batteries may explode.
- CAUTION: Do not open or mutilate batteries. Released material is harmful to the skin and eyes and may be toxic.

General information

- Always recycle used batteries.
- Recycle the package materials or save them for reuse.
- Select a location sturdy enough for the combined weight of the units.
- Operate the UPS within the specified environmental limits.
- Be sure to deliver the used battery to a recycling facility or ship it to APC by Schneider Electric in the replacement battery packing material.

Product Overview

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

This user manual is available on the APC by Schneider Electric Web site, www.apc.com.

Package Contents

Inspect the contents upon receipt. Notify the carrier and dealer if the unit is damaged.

The packaging is recyclable; save it for reuse or dispose of it properly. Check the package contents:

- UPS
- UPS literature kit containing
 - Product documentation, safety and warranty information
 - PowerChute™ download guidance
 - Serial communication cable
 - 230 V models: Two jumper cables

Note: The UPS is shipped with the battery disconnected.

Specifications

Environmental

Temperature	Operating	0 °C to 40 °C (32 °F to 104 °F)
	Storage	-15 °C to 45 °C (5 °F to 113 °F)
Humidity	0% to 95% relative humidity, non-condensing	
Note: The UPS is heavy. Follow all lifting guidelines.		

Start Up

CAUTION

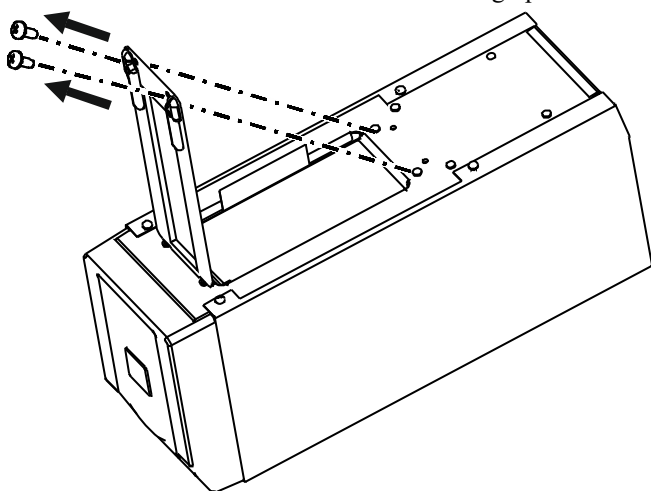
RISK OF ELECTRIC SHOCK

- Adhere to all national and local electrical codes.
- All electrical work must be performed by a qualified electrician.
- Turn off all power to this equipment before working on the equipment.
- Do not wear jewelry when working with electrical equipment.

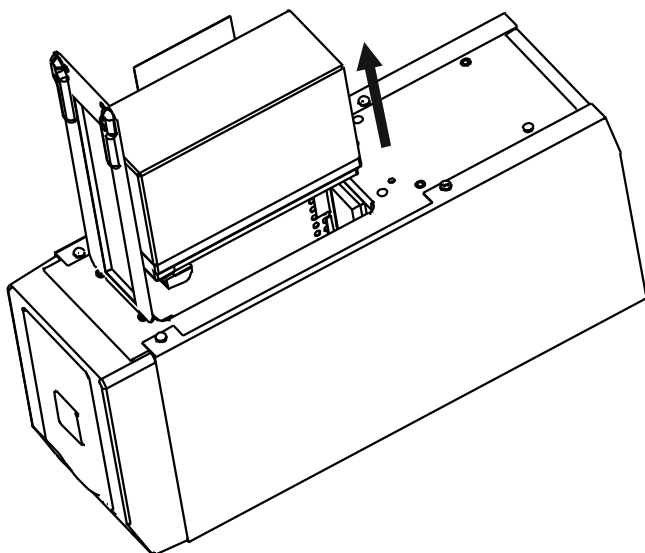
Failure to follow these instructions could result in minor or moderate injury.

Connect battery

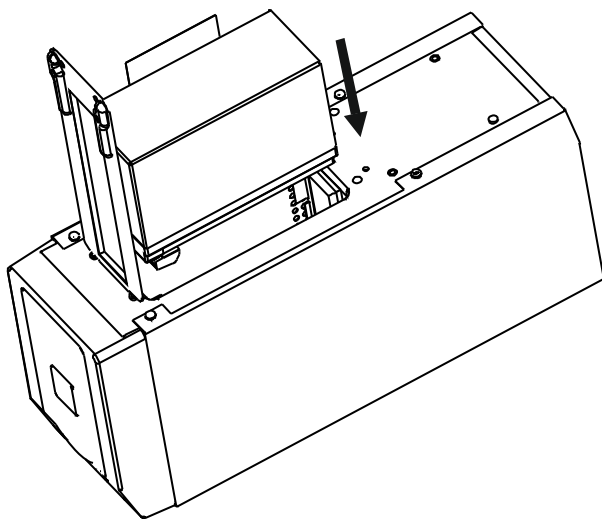
- ❶ Place the unit such that the bottom of the unit is facing upwards.



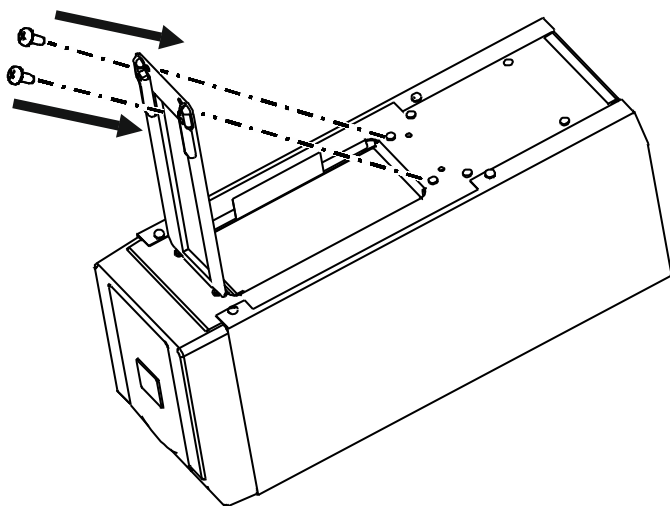
- ② Connect black wire to battery (Red wire is already connected).
Note: Small sparks at the point of battery connection are normal.



③



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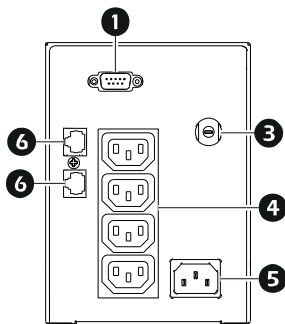
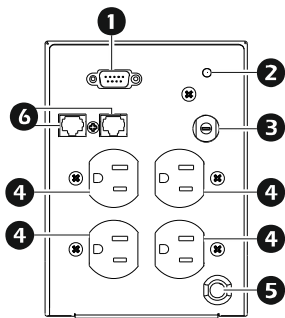


Connect equipment to UPS

Rear panel

110/120 V

230 V



The top off white outlet helps to provide surge protection only. Equipment plugged into this 500 VA outlet should require surge protection, but should not require power during a utility power failure. The lower three outlets help to provide battery backup protection, as well as protection from surges.

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

1	Serial Port
2	Site Wiring Fault LED
3	Circuit Breaker
4	Backup Outlets
5	Backup Inlet
6	Telephone/Network Surge Suppression Port

Connect UPS to Network (if applicable)

Note: Use only interface kits approved by APC by Schneider Electric.

Serial Port	Use only the supplied cable to connect to the Serial Port. A standard serial interface cable is in-compatible with the UPS.
Telephone/ Network Surge Suppression Port	The UPS features optional telephone/network surge suppression. Connect a single line telephone or a 10 Base-T/ 100 Base-Tx network cable into the RJ-45/RJ-11 telephone/network surge protection IN jack on the back of the UPS. Use the telephone cable (not supplied) or network cabling (not supplied) to connect the OUT jack to a fax, modem or network port.

Start the UPS

1. Plug the UPS into a two-pole, three-wire, grounded receptacle only. Avoid using extension cords.
 - 110/120 V models: The power cord is attached to the UPS; the input plug is a NEMA 5-15P.
 - 230 V models: The power cord set is supplied in the UPS literature kit.
2. 110/120 V models: 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” on page 18).
3. Turn on all connected equipment. To use the UPS as a master on/off switch, be sure all connected equipment is turned on.
4. Press the **POWER** button on the front panel to power the UPS.

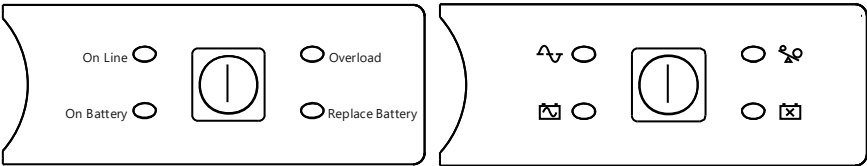
Note: The battery charges fully during the first four hours of normal operation. Do not expect full battery run capability during this initial charge period. Refer to www.apc.com for battery runtime charts.
5. For optimal computer system protection, install PowerChute management software to fully configure UPS shutdown and audible alarm settings.

Operation

Front Display Panel

110/120 V model

230 V model



Indicator	Description
On Line 	The UPS is supplying utility power to the connected equipment.
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 	The battery must be replaced.

Feature	Function
POWER Button 	Press this button to turn the UPS on or off. Read on for additional capabilities.
Self-Test	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. Manual: Press and hold the POWER button for a few seconds to initiate the self-test.

Feature	Function
Cold Start	To supply battery power to the UPS and connected equipment in the absence of utility voltage (see “Troubleshooting” on page 18), press the POWER button for one second and release. The UPS will beep briefly and go quiet. Press and hold the POWER button again, but for approximately three seconds. The unit will emit a sustained beep. Release the button during this beep.

User Configurable Features

Note: Settings are adjusted through PowerChute Software.

Function	Factory Default	User Selectable Options	Description
Automatic Self-Test	Every 14 days (336 hours)	• Every 7 days (168 hours) • Every 14 days (336 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, (that is, 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 percent • 15 percent • 50 percent • 90 percent	Specify the percentage to which batteries will be charged following a low battery shutdown before powering connected equipment.

Function	Factory Default	User Selectable Options	Description
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.
Audible Alarm Delay After Line Fail	5 seconds	• 5 seconds delay • 30 seconds delay • At low battery condition, No alarm	Set the delay to avoid audible alarms for minor power glitches.
Shutdown Delay	60 seconds	• 60 seconds • 80 seconds • 300 seconds • 600 seconds	Set the interval between the time when the UPS receives a shutdown command and the actual shutdown.
Low Battery Alert	2 minutes	• 2 minutes • 5 minutes • 7 minutes • 10 minutes (Times are approximate)	The UPS will beep when 2 minutes of battery runtime remains. Change the low battery alert interval setting to the time that the operating system or system software requires to shutdown. Note: PowerChute Business Edition software provides automatic, unattended shutdown when approximately 2 minutes of battery operated runtime remains.

Function	Factory Default	User Selectable Options	Description
Synchronized Turn-on Delay	0 seconds	• 0 seconds • 60 seconds • 180 seconds • 300 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	110/120 V model: 127 Vac 230 V model: 253 Vac	110/120 V model: 127, 130, 133, 136 Vac 230 V model: 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	110/120 V model: 106 Vac 230 V model: 208 Vac	110/120 V model: 97, 100, 103, 106 Vac 230 V model: 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.

Storage and Maintenance

CAUTION

RISK OF HYDROGEN SULPHIDE GAS AND EXCESSIVE SMOKE

- Replace the battery at least every 5 years.
- Replace the battery immediately when the UPS indicates battery replacement is necessary.
- Replace battery at the end of its service life.
- Replace batteries with the same number and type of batteries as originally installed in the equipment.
- Replace the battery immediately when the UPS indicates a battery over temperature condition, or when there is evidence of electrolyte leakage. Power off the UPS, unplug it from the AC input, and disconnect the batteries. Do not operate the UPS until the batteries have been replaced.
- *Replace all battery modules (including the modules in External Battery Packs) which are older than one year, when installing additional battery packs or replacing the battery module(s).

Failure to follow these instructions could result in equipment damage and minor or moderate injury.

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

Refer to “Specifications” on page 5 for more information.

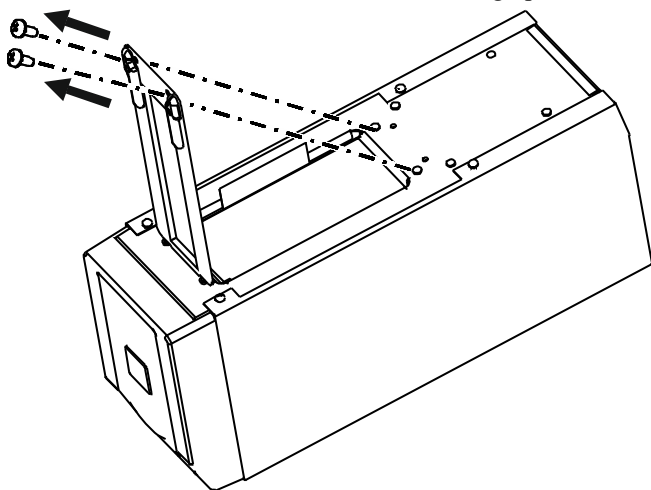
Battery Replacement

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

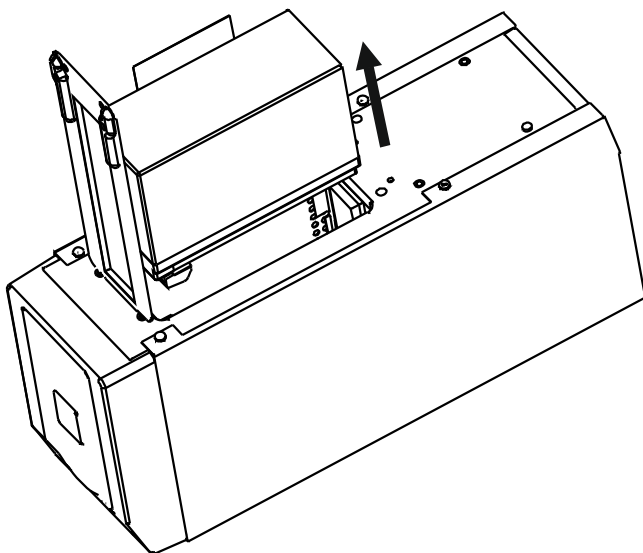
This UPS has swappable battery module. Refer to the appropriate replacement battery user manual for installation instructions. Contact your dealer or go to the APC by Schneider Electric Web site, www.apc.com for information on replacement batteries.

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

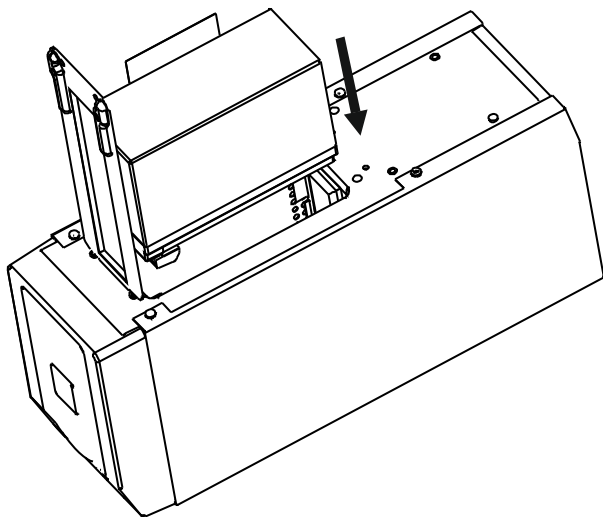
- ❶ Place the unit such that the bottom of the unit is facing upwards.



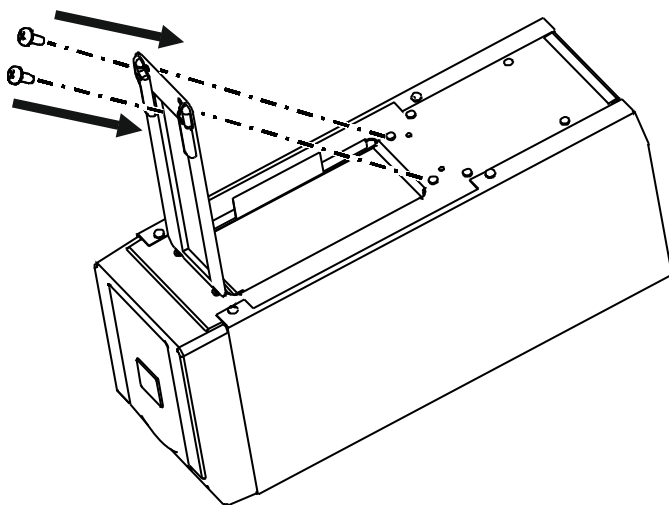
- ❷ Disconnect the battery wires.



- 3 Connect the new battery by matching red and black wires and connectors.
Note: Small sparks at the point of battery connection are normal.



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Troubleshooting

Use the chart below to solve minor Smart-UPS installation and operation problems. Refer to the APC by Schneider Electric Web site, www.apc.com, for assistance with complex UPS problems.

Problem and Possible Cause	Solution
UPS will not turn on	
Battery not connected properly.	Check that the battery connector is fully engaged.
UPS not connected to utility power supply.	Check that the power cable from the UPS to the utility power supply is securely 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	
The UPS has detected an internal fault.	Do not attempt to use the UPS. Unplug the UPS and battery connector and have it serviced immediately.
UPS beeps occasionally	
Normal operating UPS beeps when running on battery.	None. The UPS helps to protect the connected equipment from occasional utility power irregularities.
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 replacing the battery even if the replace battery LED is not yet illuminated.
On Line and Overload LEDs are flashing alternately	
The UPS was shutdown through PowerChute.	None. The UPS will restart when utility power returns.
All LEDs are illuminated or On Line and On Battery LEDs are illuminated	
The UPS has detected an internal fault. The UPS has shutdown.	Do not attempt to use the UPS. Turn off the UPS, unplug the battery and have it serviced immediately.

Problem and Possible Cause	Solution
All LEDs are off and the UPS is plugged into a wall outlet	
The UPS is shutdown 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.
The Overload LED is illuminated and the UPS emits a sustained audible alarm tone	
The UPS is overloaded. The connected equipment is drawing more VA than the UPS can sustain.	• The connected equipment exceeds the specified “maximum load”. • The audible alarm remains on until the overload is removed. Disconnect nonessential equipment from the UPS to eliminate the overload. • The UPS continues to supply power as long as it is on-line 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 replacement battery LED is illuminated	
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 replace battery LED illuminates. The UPS repeats the audible alarm every five hours. Perform the self-test procedure after the battery has charged for 24 hours to confirm the replace battery condition. The audible alarm stops and the LED clears if the battery passes the self-test.
The site wiring fault LED is illuminated (110/120 V models only)	
The UPS is plugged into an improperly wired utility power outlet.	Wiring faults detected include missing ground, line, neutral polarity reversal, and overloaded neutral circuit. Contact a qualified electrician to correct the building wiring.

Problem and Possible Cause	Solution
The input circuit breaker trips	
The plunger on the circuit breaker pops out.	Reduce the load on the UPS by unplugging equipment and press the plunger in.
UPS operates on battery although utility voltage exists	
UPS circuit input breaker has tripped.	Reduce the load on the UPS by unplugging equipment and reset the circuit breaker (rear panel) by pressing the plunger in.
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. If acceptable to the connected equipment, reduce the UPS sensitivity (see “User Configurable Features” on page 12).
On Line LED	
There is no illumination.	The UPS is running on battery, or it must be turned on.
The LED is flashing.	The UPS is running an internal self-test.

Transport and Service

Transport

1. Shutdown 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.

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 sole discretion, any such defective products or parts thereof. Repair or replacement of a defective product or part 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 or by mailing in the completed warranty registration card that is included with the documentation.

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, 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, 7) normal wear resulting from frequent use.

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To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from customer support with warranty claims issues may access the SEIT worldwide customer support network through the SEIT 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.