Initial Start-Up

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

Inspection

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.

Placement

Install the UPS in a protected area that is free of excessive dust and is damage. The packaging is recyclable; save it for reuse or dispose of it properly.

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

Installation

To install this UPS, please follow the installation instructions in the Smart-UPS Quick Reference Guide. This UPS is equipped with a SmartSlot for accessories. See the APC Website (www.apc.com) for available accessories.

Check the Site Wiring Fault Indicator

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

Charge the Battery

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

Operating Instructions

Switch On — Switch Off

With the UPS plugged in, press and release the large upper on/test button to supply power to the loads. The loads are immediately powered while the UPS performs a self-test.

Press and release the small, lower off button 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.

Note: Whenever the UPS is plugged in and utility voltage is present, the charger maintains battery charge.

The 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 (by default). Automatic self-test causes maintenance requirements by eliminating the need for periodic manual testing. During the self-test, the UPS briefly operates the loads on-battery. If the UPS fails the self-test, it returns to on-line operation.

If the UPS fails the self-test it immediately returns to on-line operation and lights the replace battery LED.

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

SmartTrim

The SmartTrim LED comes on to indicate that the UPS is compensating for a high voltage.

SmartBoost

The SmartBoost LED comes on to indicate that the UPS is compensating for a low voltage.

Voltage Sensitivity

The UPS detects line voltage distortions such as sags, notches, dips, and swells, as well as distortions caused by operation with inappropriate fuel-powered generators. By default, the UPS reacts to distortions by triggering to on-battery operation to protect the loads. Where power quality is poor, the UPS may frequently transfer to on-battery operation. If the loads can operate normally under such conditions, battery capacity and service life may be conserved by reducing the sensitivity of the UPS.

To reduce sensitivity, press the configuration button on the rear panel. Use a pointed object such as a pen to press the button. Press it once to set the UPS’s sensitivity to reduced. Press it again to set the sensitivity to normal. Press the button a third time to reset normal sensitivity.

Low Battery Warning Interval

By default, the low battery warning occurs when there are approximately two minutes of on-battery run time remaining. This may not be enough time to gracefully shut down some protected computer systems.

To change the warning interval, press the rear panel configuration button while pressing and holding the front-panel on/test button.

Cold Start

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

Note: Cold start is not a normal condition.

Overload

When loads exceed the UPS’s capacity, the overload LED illuminates, the UPS emits a sustained tone, and the input circuit breaker may trip (the resettable center plunger of the circuit breaker pops out). The alarm remains on until the overload is removed. Disconnect nonessential load equipment from the UPS to eliminate the overload. If there is AC power and the circuit breaker does not trip during overload, the loads are still powered.

If the circuit breaker trips and the UPS attempts to go on-battery, the output AC will shut down.

Utility Voltage Bar Graph

The UPS has a diagnostic feature that displays the utility voltage. With the UPS plugged into the normal utility power, press and hold the on/test button to see the utility voltage bar graph display. After approximately four seconds the 5-LED display on the right of the front panel shows the utility input voltage. Refer to the figure below for the voltage reading.

Load Bar Graph

The display indicates that the voltage is between 115 and 123 VAC.

If no LEDs come on and the UPS is plugged into a working AC power outlet, the line voltage is extremely low.

If all five LEDs come on, the line voltage is extremely high and should be checked by an electrician.

Note: The UPS starts a self-test at this point. The self-test does not affect the voltage display.

Storage

Storage Conditions

Extended storage

Store the UPS covered and upright in a cool, dry location, with its battery fully charged. Before storing, charge the UPS for at least 4 hours. Disconnect any cables connected to the computer interface port to avoid unnecessarily draining the battery.

- At -15 to +30 °C (+5 to +86 °F), charge the UPS’s battery every 6 months.
- At +30 to +45 °C (+86 to +113 °F), charge the UPS’s battery every 3 months.

990-7016B, Revision 3
### Battery Replacement Procedure - 2200 - 3000 VA Models

1. Grasp the top edge of the bottom front cover and lift it out.
2. Use a flat-blade screwdriver or a coin to remove the two battery door screws and open the door.
3. Grasp the wires for the front set of batteries and pull firmly to disconnect the connector from the battery compartment.
4. Pull the white cord on the front battery connector to remove the battery from the compartment.
5. Set aside the foam spacer located between the batteries.
6. Replace the battery in the compartment.
7. Reconnect the battery connector and the connector to the rear connector of the battery compartment.
8. Slide the new set of batteries into the unit. Hold the connector down below the top of the batteries and toward the door, otherwise the assembly will not fit. Guide the connector over the top of the batteries and press firmly to connect it to the rear connector of the battery compartment.
9. Set all the alarm delays normal after disconnecting the batteries.
10. Replace the screws, and replace the lower front cover.

### Guidance

- **Note:** Be careful removing the batteries - they are heavy.

### 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.apc.com).
4. Contact the supplier in the packing material for the new battery.
5. Dispose of the old battery properly at an appropriate recycling facility or return it to the supplier in the packing material for the new battery.

### Specifications

**For Computer Interface Port Specifications, see the APC Website (www.apc.com).**

### User Configuration Items

**Note:** Setting these items requires optional software or hardware.

<table>
<thead>
<tr>
<th>Function</th>
<th>Factory Default</th>
<th>User Selectable Choices</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Self-Test</td>
<td>Every 14 days</td>
<td>Every 7 days (50 hours)</td>
<td>Sets the interval at which the UPS will execute a self-test.</td>
</tr>
<tr>
<td>UPS ID</td>
<td>UPS_MODE</td>
<td>Use this feature to define the UPS.</td>
<td></td>
</tr>
<tr>
<td>Date of Last Battery Replacement</td>
<td>Date of Battery Replacement</td>
<td>Reset this date on battery replacement.</td>
<td></td>
</tr>
<tr>
<td>Minimum Capacity Below Return from Shadows</td>
<td>25%, 75%, 95%</td>
<td>The UPS will charge the batteries to the specified percentage before returning from a shutdown.</td>
<td></td>
</tr>
<tr>
<td>Saturability</td>
<td>Normal</td>
<td>Reduced, Low, or Normal</td>
<td></td>
</tr>
<tr>
<td>Duration of Low Battery Warning</td>
<td>2 minutes</td>
<td>Sets the time before shutdown at which the UPS issues a low battery warning.</td>
<td></td>
</tr>
<tr>
<td>Alarm Delay After Load Fail</td>
<td>2 seconds delay</td>
<td>Sets the delay on battery output when the UPS fails to detect a load on the output.</td>
<td></td>
</tr>
<tr>
<td>Shutdown Delay</td>
<td>30 seconds</td>
<td>Sets the interval between when the UPS receives a shutdown command and when shutdown occurs.</td>
<td></td>
</tr>
<tr>
<td>Synchronised Transfer Delay</td>
<td>0 seconds</td>
<td>Sets the delay before circuit overload, the UPS will wait the specified time after the output has detected a circuit overload before detecting a circuit overload.</td>
<td></td>
</tr>
<tr>
<td>High Transfer Point</td>
<td>135 VAC</td>
<td>To avoid unnecessary battery usage, so the High Transfer Point is set if the utility voltage is excessively high and the load is known to work well under this condition.</td>
<td></td>
</tr>
<tr>
<td>Low Transfer Point</td>
<td>105 VAC</td>
<td>Set the Low Transfer Point before at the utility voltage is excessively low and the load can tolerate this condition.</td>
<td></td>
</tr>
</tbody>
</table>

**Battery Replacement Procedure - 450 - 1400 VA Models**

1. Grasp the top of the front cover and lift it out and down.
2. Unlock the bottom section of the front cover from the chassis and set it aside. Use a flat-blade screwdriver or a coin to remove the two battery door screws and open the door.
3. Grasp the wires for the front set of batteries and pull firmly to disconnect the connector from the battery compartment.
4. Pull the white cord on the front battery connector to remove the battery from the compartment.
5. Set aside the foam spacer located between the batteries.
6. Replace the battery in the compartment.
7. Reconnect the battery connector and the connector to the rear connector of the battery compartment.
8. Slide the new set of batteries into the unit. Hold the connector down below the top of the batteries and toward the door, otherwise the assembly will not fit. Guide the connector over the top of the batteries and press firmly to connect it to the rear connector of the battery compartment.
9. Set all the alarm delays normal after disconnecting the batteries.
10. Replace the screws, and replace the lower front cover.

**Note:** Be careful removing the batteries - they are heavy.

**Note:** Small sparks at the battery connectors are normal during connection.

**Note:** For the 450 through 1000 VA models, connect the red wire to the positive (red terminal) and the black wire to the negative (-) terminal.

**Note:** For the 1400 VA model, connect the gray battery couplers to the UPS’s coupler.

**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.apc.com).
4. Contact the supplier in the packing material for the new battery.
5. Dispose of the old battery properly at an appropriate recycling facility or return it to the supplier in the packing material for the new battery.
6. Return the UPS by insured, prepaid carrier to the address given to you by Customer Service.

### North & Latin America

#### APC

- 132 Fairgrounds Road
- West Kingston, Rhode Island 02892 USA
- Galway, Ireland
- T: 1-800-800-4APC/1-401-789-5735
- 353-91-702020

#### Europe

- APC
- Ballibay Business Park
- Galway, Ireland
- T: 1800-1000-72000

#### Internet

- http://www.apc.com

#### E-Mail

- apctech@apc.com

### Specifications

#### For Computer Interface Port Specifications, see the APC Website (www.apc.com).

<table>
<thead>
<tr>
<th>Function</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable input voltage</td>
<td>115 VAC</td>
</tr>
<tr>
<td>Output voltage</td>
<td>115 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Protection</td>
<td>RCD (residual current device)</td>
</tr>
<tr>
<td>Frequency limits (in-phase operation)</td>
<td>50 or 60 Hz ± 5%</td>
</tr>
<tr>
<td>Transfer time</td>
<td>2 ms typ; 8 ms max</td>
</tr>
<tr>
<td>Maximum load</td>
<td>50 VAC 240 W</td>
</tr>
<tr>
<td>Input Protection</td>
<td>RCD (residual current device)</td>
</tr>
<tr>
<td>On-battery voltage</td>
<td>115 VAC</td>
</tr>
<tr>
<td>On-battery frequency</td>
<td>50 or 60 Hz ± 0.1 Hz</td>
</tr>
<tr>
<td>On-battery waveshape</td>
<td>Low distortion sine wave</td>
</tr>
<tr>
<td>Battery type</td>
<td>Spill proof, maintenance free, sealed lead-acid</td>
</tr>
<tr>
<td>Typical battery life</td>
<td>3 to 5 years, depending on number of discharge cycles and ambient temperature</td>
</tr>
<tr>
<td>Typical recharge time</td>
<td>2 to 5 hours from total discharge</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 to 40°C (32 to 104°F)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-15 to 50°C (5 to 122°F)</td>
</tr>
<tr>
<td>Operating and storage relative humidity</td>
<td>0 to 95%, non-condensing</td>
</tr>
<tr>
<td>Operating elevation</td>
<td>0 to 2000 m (0 to 6600 ft)</td>
</tr>
<tr>
<td>Surge protection</td>
<td>1000 VAC (EN61643-1-10)</td>
</tr>
<tr>
<td>Electromagnetic immunity</td>
<td>EN61000-4-2, 4-3, 4-4, 8-2, 8-3, 8-4</td>
</tr>
<tr>
<td>EMI shielding</td>
<td>EN55022, EN55024, 100 kHz to 10 MHz</td>
</tr>
<tr>
<td>Safety approvals</td>
<td>Listed to UL 1778, certified to CE IEC 62040-1, CUL 22311</td>
</tr>
<tr>
<td>EMC verification</td>
<td>PCC/DOC Class B certified, PCC/DOC Class A certified</td>
</tr>
</tbody>
</table>