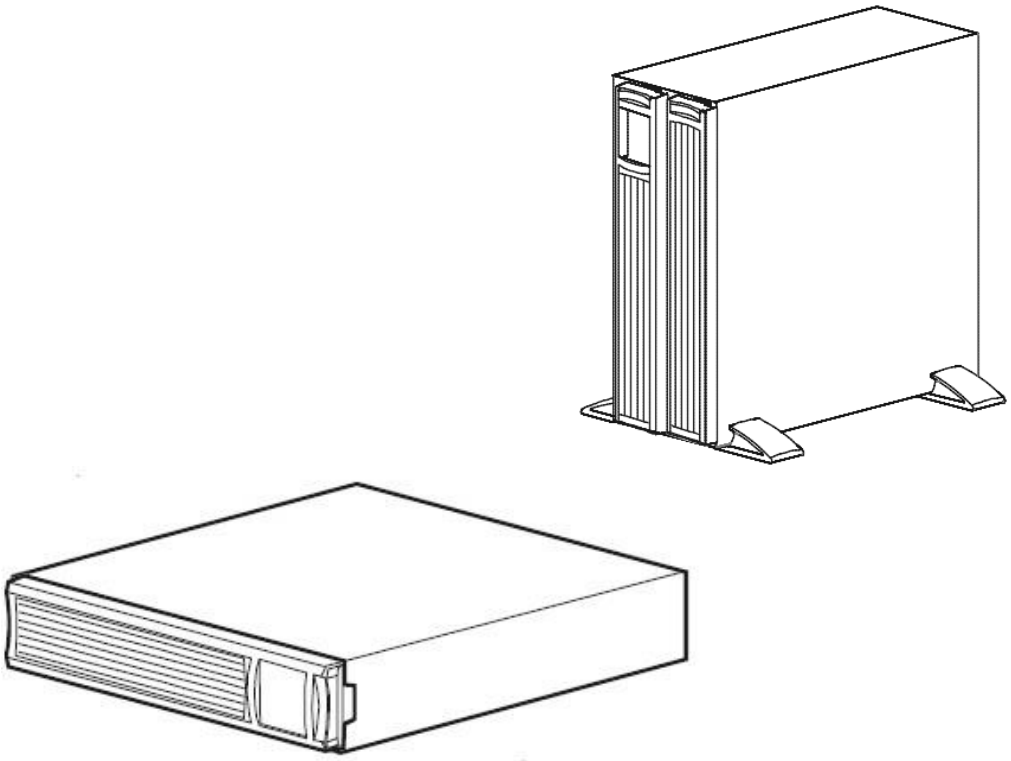
Bid Specifications for APC™ by Schneider Electric Smart-UPS SMX family 120, 208 and 230VAC Uninterruptible Power Supplies



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Note: Specification parameters contained herein are subject to change without notice.

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PART 1 - GENERAL

1.1 SUMMARY

A. This specification describes the operation and functionality of a high-performance, line-interactive, single-phase, solid-state, static Uninterruptible Power System (UPS), hereafter referred to as the UPS.

B. The UPS utilizes line-interactive topology designed to provide clean, reliable AC power to and protect electronic equipment. The UPS also features automatic internal voltage regulation.

C. For applications that have non standard environments, the Smart-UPS SMX family offers these UPS models with a Rack/Tower convertible form factor. The UPS comes with the necessary hardware to mount the devices in either a tower or rack mount configuration. The rack mounting hardware is for standard 19" rack systems.

D. The UPS and associated equipment shall operate in conjunction with a primary power supply to provide quality uninterrupted power for mission critical, electronic equipment load.

E. All programming and miscellaneous components for a fully operational system as described in this specification shall be available as part of the UPS.

F. American Power Conversion offers a full range of power management software and accessories for use with all members of the Smart-UPS family.

G. This specification specifies the following models:

Format	120V Models	208V Models	230V Models	Battery Pack
Standard Depth	SMX750 SMX1000 SMX1500RM2U SMX1500RM2UNC SMX2000RMLV2U* SMX2000RMLV2UNC* SMX2200RMLV2U* SMX3000RMLV2U* SMX3000RMLV2UNC*		SMX750I SMX1000I SMX1500RMI2U SMX1500RMI2UNC SMX2200RMHV2U**	SMX120RMBP2U
Short Depth	SMX2000LV* SMX2000LVNC* SMX3000LV* SMX3000LVNC*	SMX3000HVT	SMX2200HV** SMX3000HV** SMX3000HVNC**	SMX120BP

***LV – Low Voltage models have a user selectable voltage setting of 100-127V**
****HV - High Voltage models have a user selectable voltage setting of 200-240V**

STANDARDS

The UPS complies with the following standards:

H. 120VAC, 208VAC, LV models:
   1. UL 1778
   2. CSA 107.1
   3. FCC Part 15 Class A
   4. Energy Star

I. 230VAC and HV models:

   1. EN 62040-1-1
   2. EN 62040-2: 2006, Category C2
   3. EN 50091-2
   4. GOST/EAC
   5. IEC60950-1
   6. IRAM
   7. C-Tick
   8. VDE GS
   9. KC
   10. TISI
   11. ISO 9001
   12. ISO 14001

1.2 MODES OF OPERATION

A. Online: Under normal line conditions, the UPS provides power from the utility line to the output loads. The UPS's bi-directional inverter is always running. When operating on-line the inverter runs backward to charge the batteries and maintain an optimum float charge on the internal battery. A surge suppression and filtering network protects the load from surges, spikes, lightning, EMI/RFI noise, and other power disturbances.

B. Boost and Trim Automatic Voltage Regulation (AVR): During input power source abnormalities the system compensates for high and low input voltages by boosting or trimming the utility voltage without drawing power from the battery When power is stable, the UPS may bypass the AVR system to achieve higher operating efficiency. This is known as “green mode”.

C. On Battery: The UPS continuously monitors the line in anticipation of utility failure and prepares the inverter for synchronous transfer of the load. Upon occurrence of a utility voltage failure such as a blackout, severe brownout or overvoltage, the UPS transfers the load to power derived from the internal battery. The voltage wave shape delivered during battery operation is a low-distortion sine wave. Resynchronization and retransfer to power derived from the utility is automatic upon recovery of the line voltage to within the normal range.

D. Battery Charging: The battery voltage is maintained at a constant “float” level for maximum battery life and minimal heat dissipation. The UPS’s battery charger operates continuously whenever the UPS is plugged in and the utility voltage is within normal limits.

1.3 SUBMITTALS

A. Proposal Submittals:

1. Product catalog sheets or equipment brochures.

2. Product guide specifications.

3. Installation information, including weights and dimensions.

B. Delivery Submittals:

1. Installation manual, which includes instructions for storage, handling, examination, preparation, installation, and start-up of UPS.

2. User manual, which includes operating instructions.

PART 2 - PRODUCT

2.1 MECHANICAL DESIGN

A. The enclosure of the Smart-UPS is from a thermoplastic with flammability ratings of UL 94-5V and CSA A00 and is contained in a rugged steel cabinet.

B. Standard depth versions are provided with a set of 19" rack mounting ears and 4-post rail kits.

C. Short depth versions are provided with 2-post rack mounting hardware

D. The UPS dimensions can be provided in the submittal drawings.

2.2 SYSTEM CHARACTERISTICS

A. Input frequency range: 50/60 Hz +/- 3 Hz (auto sensing)

B. Input Voltage

120V Units: Nominal 120V, Input voltage range for main operation 82 - 143V, Input voltage adjustable range for mains operation 75 - 154V

208V Units: Nominal 208V, Input voltage range for mains operations 141 - 255V, Input voltage adjustable range for mains operation 131 - 268V

230V Units: Nominal 230V, Input voltage range for main operation 160 - 286V, Input voltage adjustable range for mains operation 151 - 302V

C. Output waveform: Sine wave, with total harmonic distortion less than 5% at full load.

D. Output frequency:
1. 50/60 Hz +/- 3 Hz tracking input sine wave when online tracking,
2. 50 (230VAC models) or 60 (120 and 208VAC models) +/- 0.1 Hz when on battery.

E. Output voltage:

1. 120VAC (120V models),
2. 208VAC (208V models)
3. 230VAC (factory default), 220V, 225V or 240V (user selectable)
4. Low Voltage (LV) – 120V (factory default), 100V,120V,127V (user selectable)
5. High Voltage (HV) – 230V factory default), 200V, 208V, 220V, 230V, 240V(user selectable)

F. Output Voltage Distortion: Less than 5% at full load

G. Output Frequency: Sync to mains, 47 - 53 Hz for 50 Hz nominal,57 - 63 Hz for 60 Hz nominal

H. Battery recharge time: 3 hours from 0% to 90% (internal batteries only)

I. Noise filtering: Full time multi-pole noise filtering : 0.3% IEEE surge let-through, zero clamping response time, meets UL 1449

2.3 ENVIRONMENTAL

1. Storage Ambient Temperature: 5°F to 113°F (-15°C to 45°C).

2. Operating Ambient Temperature: +32°F to 104°F (0°C to 40°C). (77°F (25°C) is ideal for most battery types).

3. Relative Humidity: 0 to 95% non-condensing

4. Storage altitude: 50,000 feet (15000m) above sea level

5. Operating altitude: 10,000 feet (3000m) above sea level. At altitude of 10, 000 feet the UPS must be loaded up to 90% of its nominal capacity only.

2.4 LINE-INTERACTIVE DESIGN

A. The line-interactive design of the Smart-UPS maintains a suitable output voltage regardless of the input voltage (within specified acceptable input voltage limits). This system consists of Boost and Trim Automatic Voltage Regulation (AVR). As the input voltage rises from nominal, the UPS utilizes AVR Trim to maintain the output voltage. If the input voltage then exceeds the ability of the AVR Trim system, the UPS operates on-battery. Similarly, as the input voltage falls from the nominal level, the UPS uses AVR Boost to correct the output. If the input voltage then falls below the ability of the AVR Boost system to correct, the UPS again operates on-battery

B. The Smart-UPS includes power fault detection circuitry that enables the system to address power problems intelligently. In the case of a blackout, for instance, the UPS knows to switch to on-battery operation immediately, rather than to use AVR Boost.

C. Transfer voltage is defined as a limit to which the output voltage will be regulated. An upper transfer voltage is the limit that the output voltage will never exceed, and the lower transfer voltage is the limit that the output voltage will never go under. Transfer voltages may be set by the user with power management software or optional accessories.

2.5 BATTERY CHARACTERISTICS

A. The UPS battery system is comprised of user replaceable, hot swappable, battery modules.

B. The battery jars housed within each removable battery module are of the Valve Regulated Lead Acid (VRLA) type.

C. The UPS incorporates the Intelligent Battery Management system to continuously monitor the health of each removable battery module as well as external battery modules installed in extended run battery cabinets. This system shall notify the user in the event that a failed or weak battery module is found.

D. The UPS incorporates a unique battery replacement date indicator. This provides the user the month and year that they should anticipate replacing the battery. This allows for proper maintenance planning. The UPS monitors the battery temperature and adjusts the date accordingly.

E. Charging:

1. The intelligent battery management system contains a temperature monitoring circuit and compensation algorithm that regulates the battery charging current so as to optimize battery life.

2. The battery charging circuit remains active when in the online state.

F. The UPS is shipped with battery modules preinstalled but disconnected pertaining to US transportation regulations. User must connect the batteries prior to using the UPS.

G. The service life of the battery is inversely related to the typical operating ambient temperature. For operating ambient temperatures between 0°C to +30°C (32°F to 86°F), the battery life is typically 3 to 6 years. For operating ambient temperatures between +30°C to +40°C (86°F to 104°F), the battery life is typically 2 to 3 years. Continual operation at temperatures between +40°C and +45°C (104°F and 113°F) will limit battery life.

2.6 DISPLAY AND CONTROLS

A. Control Logic: The UPS is controlled by an embedded microcontroller which performs the following functions:

1. Monitoring quality of output voltage;

2. Monitoring vital parameters of the UPS;

3. Executing the state machine;

4. Intelligent battery management;

5. Remaining runtime calculation;

6. Self-diagnostics, self-test and proactive fault detection;

7. Communication to the host server via serial or USB port;

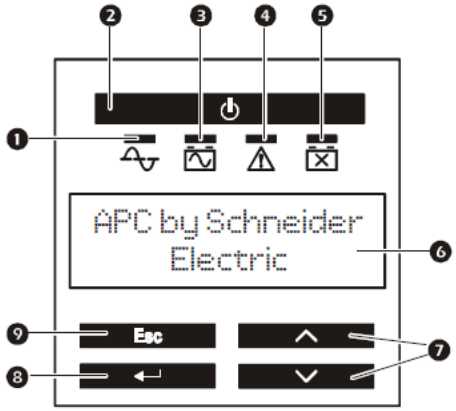
8. Communication to the Network Interface Card or another SmartSlot accessory card if equipped.

9. Other communication, monitoring and management functions.

B. LCD user interface: A display/control unit comprised of an LCD display screen, four status LEDs and four control keys is on the front of the UPS as shown below.

Display Panel

1. **Online** LED
2. UPS ON/OFF key
3. **On Battery** LED
4. **Site Wiring Fault** LED
5. **Replace Battery** LED
6. Display interface
7. UP/DOWN arrow keys
8. ENTER key
9. ESCAPE key



C. The on/off key is used to turn the UPS output on and off. The up and down arrows are used to navigate specific menus, the return key is used to enter/select and the ESC key is used to return to the previous screen.

D. The LCD display may be configured to show a standard or advanced set of menus. In addition it may be set to display up to 7 language options (depends on the model). Choices include; English (default), French, German, Spanish, Italian, Portuguese and Japanese.

E. The standard menu configuration consists of the following items and functions.

Menu	General Functions	
Status	View UPS information: • Operating Mode • Efficiency • Load Power • Load VA • Battery Charge state • Estimated Runtime	 • Battery Temp • Input • Output • Last Transfer • Last UPS Self Test
Configuration	Configure UPS settings: • Language • Local Power Quality: Good, Fair, Poor • Menu Type: Standard or Advanced • Audible Alarm	 • Display (Auto Dim, Auto Off, Always On) • Battery Install Date • Reset to Factory Default
Test & Diags	Perform UPS tests and diagnostic functions: • UPS Self Test • UPS Alarms Test • Calibration Test	
About	View UPS information: • UPS Model • UPS Part No. • UPS Serial No. • UPS Manufacture Date	 • Battery Part No. • Battery Install Date • Replace Battery by • UPS Firmware 1

F. The advanced menu configuration adds the following items and functions.

Menu	General Functions
Status	View detailed UPS information: • Operating Mode • Efficiency • Load Power • Load VA • Load Amps • Load Energy • Battery Charge state • Estimated Runtime • Battery Voltage • Battery Temp • Input • Output • Last Transfer • Last UPS Self Test • Outlet Group 1 (if Controlled Outlet is available) • NMC IP Address (if NMC is available)
Configuration	Configure advanced UPS settings: • Language • Local Power Quality • Menu Type • Audible Alarm • Display (Auto Dim, Auto Off, Always On) • Sensitivity • Low Transfer • High Transfer • Low Battery Warning • Auto Self Test • Battery Install Date • Reset Energy Meter • Enter Setup Wizard • Firmware Update (standby mode) • Reset to Factory Default • Config Main Group Outlets • Config Group 1 Outlets (if Controlled Outlet is available) • Config NMC (if NMC is available)
Control	Control the Main and Switched Outlet Group to turn on, turn off, shutdown, or reboot.
Test & Diags	Perform UPS test and diagnostic functions: • UPS Self Test • UPS Alarms Test • Calibration Test
Log	View the event and error logs for information about UPS events and faults that have occurred.
About	View UPS information: • UPS Model • UPS Part No. • UPS Serial No. • UPS Manufacture Date • Battery Part No. • Battery Install Date • Replace Battery by • UPS Firmware 1 • UPS Firmware 2 • UPS Firmware 3 • UPS Firmware 4 • NMC Model No.* • NMC Serial No.* • NMC Hardware Version* • NMC Manufacture Date* • NMC MAC Address* • SmartSlot FW 1* • SmartSlot FW 2* • SmartSlot FW 3* *If NMC is available

G. Audible Alarms: Using audio signal, the UPS will notify the user about important events. The following is the list of distinct audio alarms. Note that all alarms, except the one for low battery, may be muted using the interface. In addition touching the display buttons during an active alarm will also mute that alarm.

1. The UPS is on battery;

2. The UPS is on battery and the remaining battery capacity is low;

3. The UPS has shutdown due to low battery capacity;

4. The battery needs to be replaced;

5. The UPS is overloaded;

Part 3 - ACCESSORIES

3.1 SOFTWARE AND CONNECTIVITY

A. Network Adaptor: APC SmartSlot Network Management Card shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments or via web interface.

B These models support serial and USB HID communication.

Please refer to APC application notes 176, 178 and 181 for details at www.apc.com.

C. Unattended Shutdown

1. The UPS, in conjunction with a Network Management Card and PowerChute management software, shall be capable of gracefully shutting down one or more operating systems when the UPS is on battery mode. The SmartSlot Network Management Card is available and must be purchased separately for all Smart-UPS below 5kVA and those that do not include “NC” in the part number.

2. The UPS is also capable of using a serial or USB port to communicate to the host computer as to gracefully shut down one or more operating systems during an on battery situation. The PowerChute management software is included with every Smart-UPS.

3.2 REMOTE UPS MONITORING, CONFIGURATION AND CONTROL

A. The following methods of remote UPS control, configuration and monitoring are available:

1. Smart-UPS monitoring, configuration and control are available via PowerChute management software supplied with the UPS

2. Web Monitoring: Remote monitoring, configuration and control are available via a web browser such as Internet Explorer provided the UPS is equipped with a SmartSlot Network Management Card

3. Dry contact monitoring and control provided the UPS is equipped with APC SmartSlot Relay I/O Card.

3.3. SOFTWARE COMPATIBILITY

A. Included with the UPS is PowerChute® Business Edition management software.

The software supports graceful shutdown and remote monitoring for a variety of operating systems. Please use this link for specific version compatibility.

Part 4 - Warranty

4.1 Warranty

A. APC™ warrants its Smart-UPS (products) to be free from defects in materials and workmanship for a period of three (3) years, excluding the batteries, which are warranted for two (2) years from date purchase. APC's obligation under the warranty is limited to repairing or replacing, at its own sole option, any such defective products. Repair or replacement of a defective product or part thereof does not extend the original warranty period.

B. Worldwide service: APC has a worldwide service organization, optional on-site warranties and extended warranties available. The service organization offers 24 hours a day, 7 days a week, 365 days a year service support.