User's Guide

POWER ENHANCED SERIES

Models 280ES, 420ES, 650ES, 1000ES, 1400ES

For your records

The serial number of your UPS is on the rear panel. You should note the serial number in the space provided below. Retain this booklet as a permanent record of your purchase to aid in identification in the event of theft or loss.

Model No:

Serial No.:

Purchase Date:

LIMITED WARRANTY

What the warranty covers:

We warrant this product to be free from defects in material and workmanship during the warranty period. If a product proves to be defective in material or workmanship during the warranty period, we will at our sole option repair or replace the product with a like product.

How long the warranty is effective:

Our UPS products which are purchased and installed in the contiguous United States or Canada are warranted for three (3) years for parts, two (2) years for labor and two (2) years for the batteries from the date of the first consumer purchase. For UPS products which are located outside of the contiguous United States or Canada, contact your dealer for warranty information.

Who the warranty protects:

This warranty is valid only for the first consumer purchaser.

What the warranty does not cover:

1. Any product on which the serial number has been defaced, modified or removed.
2. Damage, deterioration or malfunction resulting from:
   a) Accident, misuse, neglect, fire, water, or other acts of nature, unauthorized product modification, or failure to follow instructions supplied with the product.
   b) Repair or attempted repair by anyone not authorized.
   c) Any damage of the product due to shipment.
   d) Removal or installation of the product.
   e) Causes external to the product.
   f) Use of supplies or parts not meeting our specifications.
   g) Normal wear and tear.
   h) Any other cause which does not relate to a product defect.
3. Removal, installation and set-up service charges.

Limitation of implied warranties:

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION CONTAINED HEREIN INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Exclusion of damages:

OUR LIABILITY IS LIMITED TO THE COST OF REPAIR OR REPLACEMENT OF THE PRODUCT. WE SHALL NOT BE LIABLE FOR:

1. DAMAGE TO OTHER PROPERTY CAUSED BY ANY DEFECTS IN THE PRODUCT*, DAMAGES BASED UPON INCONVENIENCE, LOSS OF USE OF THE PRODUCT, LOSS OF TIME, LOSS OF PROFITS, LOSS OF BUSINESS OPPORTUNITY, LOSS OF GOODWILL, LOSS OF DATA, LOSS OF SOFTWARE, COSTS OF SUBSTITUTE EQUIPMENT, INTERFERENCE WITH BUSINESS RELATIONSHIPS, CLAIMS BY THIRD PARTIES, OR OTHER COMMERCIAL LOSS, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.
2. ANY OTHER DAMAGES, WHETHER INCIDENTAL, CONSEQUENTIAL OR OTHERWISE.
3. ANY CLAIM AGAINST THE CUSTOMER BY ANY OTHER PARTY.

Effect of state law:

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on implied warranties and/or do not allow the exclusion of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

Life Support:

We do not recommend the use of our UPS products for life support equipment or direct care where failure of a UPS product could cause failure of, or diminished effectiveness of the life support equipment or patient care.

*Except as expressly provided for by the UPS “Equipment Protection Policy”

EFFECTIVE October 1, 1997

TABLE OF CONTENTS

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS 

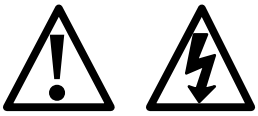
- WHEN REPLACING BATTERIES, USE THE SAME NUMBER AND THE FOLLOWING TYPE BATTERIES: SEALED LEAD-ACID MAINTENANCE FREE (280ES: One 7AH/12V) (420ES: One, 7AH/12V) (650ES: One, 12AH/12V) (1000ES: Two, 12AH/12V) (1400ES: Two, 12AH/12V)
- PROPER DISPOSAL OF BATTERIES IS REQUIRED. REFER TO YOUR LOCAL CODES FOR DISPOSAL REQUIREMENTS.

INSTRUCTIONS IMPORTANTES CONCERNANT LA SÉCURITE

- CONSERVER CES INSTRUCTIONS. CETTE NOTICE CONTIENT DES INSTRUCTIONS IMPORTANTES CONCERNANT LA SÉCURITE.
- POUR LE REMPLACEMENT UTILISER LE MÊME NOMBRE DE BATTERIES DU MODÉLE SUIVANT: (280ES: 1, 7AH/12V) (420ES: 1, 7AH/12V) (650ES: 1, 12AH/12V) (1000ES: 2, 12AH/12V) (1400ES: 2, 12AH/12V)
- L'ÉLIMINATION DES BATTERIES EST RÈGLEMENTÉE. CONSULTER LES CODES LOCAUX À CET EFFET.

DIESE ANLEITUNG ENTHÄLT WICHTIGE SICHERHEITSANWEISUNGEN. DIESE ANLEITUNG ZUR WEITERLEITUNG GRIFFBEREIT BEHALTEN.

- BEIM AUSTAUSCHEN DER BATTERIEN DIESELBE NUMMER UND FOLGENDES BATTERIENTYP BENUTZEN: BLEI-SÄURE WARTUNGSFREI (280ES: 1-7AH/12V) (420ES: 1-7AH/12V) (650ES: 1- 12AH/12V) (1000ES: 2-12AH/12V) (1400ES: 2-12AH/12V)
- RICHTIGE VERÄUßERUNG DER BATTERIEN IST ERFORDERLICH. IN DEN LOKALKODIZES UM DIE VERÄUßERUNGSERFORDERNISSE NACHSCHAUEN.

CAUTION: 

THE UPS CONTAINS VOLTAGES WHICH ARE POTENTIALLY HAZARDOUS. ALL REPAIRS SHOULD BE PERFORMED BY QUALIFIED SERVICE PERSONNEL.

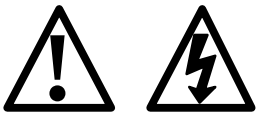
THE UPS HAS ITS OWN INTERNAL ENERGY SOURCE (BATTERY). THE OUTPUT RECEPTACLES MAY BE LIVE EVEN WHEN THE UPS IS NOT CONNECTED TO AN AC SUPPLY.

Safe and continuous operation of the UPS depends partially on the care taken by users. Please observe the following precautions.

- Do not disassemble the UPS.
- Do not attempt to power the UPS from any receptacle except a 2-pole 3-wire grounded receptacle.
- Do not place the UPS near water or in environments of excessive humidity.
- Do not allow liquid or any foreign objects to get inside the UPS.
- Do not block air vents on the side of the UPS.
- Do not plug appliances, such as hair dryers, into the UPS receptacles.
- Do not place the UPS under direct sunshine or close to heat-emitting sources.
- This UPS is intended for installation in a temperature controlled, indoor area free of conductive contaminants.

A certified detachable power supply cord is to be used with this equipment. For the 280ES, 420ES, 650ES, and 1000ES a type not lighter than SJT 18 AWG should be used.

For the 1400ES, a type not lighter than SJT 16 AWG should be used.

VORSICHT: 

DIE UPS* ENTHÄLT SPANNUNGEN, DIE MÖGLICHERWEISE GEFÄHRLICH SIND. ALLE REPARATUREN SOLLTEN VON QUALIFIZIERTEN MONTEUREN DURCHGEFÜHRT WERDEN.

DIE UPS HAT EINE EIGENE INNERE STROMVERSORGUNG (BATTERIE). DIE AUSGANGSANSCHLÜSSE KÖNNEN ALSO UNTER STROM STEHEN, SELBST DANN, WENN DIE UPS NICHT AN EINEN WECHSELSTROMKREIS ANGESCHLOSSEN IST.

Um die UPS auf Dauer sicher bedienen zu können, sollte der Benutzer auf folgende Vorsichtsmaßnahmen genau achten:

- Die UPS nicht auseinandernehmen.
- Die Stromversorgung sollte nur durch einen 2-poligen, dreiadrigen, geerdeten Anschluß erfolgen.
- Die UPS nicht in der Nähe von Wasser oder in Umgebungen übermäßiger Feuchtigkeit aufstellen.
- Flüssigkeiten oder Fremdobjekte dürfen nicht in das Innere der UPS dringen.
- Lufteinfuhr an der Vorderseite und Luftaustritt an der Rückseite sollten nicht behindert sein.
- Elektrogeräte, wie z. B. Haartrockner u.a. sollten nicht an die UPS angeschlossen werden.
- Die UPS nicht direkter Sonnenbestrahlung oder Heizgeräten aussetzen.
- Die Steckdose sollte nahe dem Gerät installiert und gut zugänglich sein, um sie vom Wechselstromeingang zu isolieren. Zur Trennung vom Wechselstromkreis den Stecker aus der Steckdose ziehen.

Zur Stromzufuhr sollte ein gesichertes, trennbares Kabel benutzt werden. Für eine Stromstärke bis 10A sollte dieses mit H05VV-F 3C; 0.75 mm² benutzt werden.

*UPS (Uninterrupted Power Supply) = Unterbrechungsfreie Stromversorgung

ATTENTION: 

L'UPS contient de la haute tension qui peut poser risques. Toute réparation doit être exécutéé par du personnel de service qualifié.

L'UPS a sa propre alimentation secteur interne (batterie). Les prises femelles peuvent être chargées même si l'UPS n'est pas relié à une alimentation secteur.

La sécurité de l'opération de l'UPS dépend des soins de l'utilisateur. Veuillez lire les précautions ci-dessous:

- Ne jamais démonter l'UPS.
- Ne jamais essayer de brancher l'UPS à une prise femelle sauf à une qui posséde une terre et 2 poles.
- Ne jamais mettre l'UPS prés de l'eau ou dans un milieu trop humide.
- Ne jamais faire entrer du liquide ou d'objet étranger dans l'UPS.
- Ne jamais boucher les ventilations d'air de l'UPS ou l'aération arrière.
- Ne jamais brancher d'appareils, comme les sèche-cheveux, à la prise femelle de l'UPS.
- Ne jamais placer l'UPS aux rayons directs du soleil ou près d'autre source de chaleur.
- La fiche d'alimentation secteur doit être installée tout près de cet appareil. Elle doit être facilement accessible pour l'isoler de la prise secteur de sortie. Pour couper la connexion, enlever la fiche de la prise femelle.

Un câble d'alimentation secteur amovible et certifié est utilisé avec cet appareil. Pour un courant jusqu'à 10A, un câble qui n'est pas plus légèr que 0,75mm² doit être utilisé.

FEDERAL COMMUNICATIONS COMMISSION (FCC)

WARNING:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CANADIAN DEPARTMENT OF COMMUNICATIONS (DOC)

This equipment does not exceed Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause Unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference. Cet équipement ne dépasse pas limites de Classe B d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Réglement sur le brouillage radioélectrique établi par le Ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entrainer le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

1. INTRODUCTION

1.1 Overview

The Enhanced Series of Uninterruptible Power Systems (*UPS*) was designed to prevent spikes, surges, sags, transients and blackouts from reaching your sensitive equipment. Your equipment may include such items as computers and computerized instruments to telecommunication systems. When AC power is present, the UPS filters the power continuously. When AC power fails, the unit employs its internal maintenance-free battery to supply back-up power without interruption.

1.2 Smart Buck and Boost Line Conditioning

The voltage from your AC power source can fluctuate above and below the normal rated input voltage. This microprocessor controlled UPS provides line conditioning via both buck (*step-down voltage*) and boost (*step-up voltage*) functions. For example, if the voltage fluctuates up by 15V, the buck function in your UPS steps it back down so that your equipment receives the normal rated voltage. If the voltage fluctuates down by 15V, the boost function automatically steps it back up. This provides your equipment with excellent voltage regulation and less possibility for the UPS to drain its battery.

1.3 User Replaceable Battery Design

The battery is the most critical part in a UPS. The average lifetime of a battery is between 3 and 5 years. The special user-replaceable battery design of this UPS provides significant savings and gives the UPS an almost unlimited life. You can replace the battery very easily, and without turning off your UPS or the equipment it is protecting (*see Chapter 6*).

1.4 Advanced Interface to Communicate with Computer

Many UPS's provide only a basic power failure warning. The Enhanced Series, together with OPTI-SAFE+ also provides you with important operating information. From your computer screen, you can determine input/output voltage and current, frequency, battery voltage, etc., and analyze power problems (*see Section 2.7*). If *OPTI-SAFE™+* is not part of your UPS package, you can purchase it from your local dealer.

1.5 User Configurable Settings

You can configure the operating parameters of your UPS to meet your individual needs (*see Section 2.6*).

1.6 Site Wiring Fault Indicator (for 100/110V/120V versions only)

The red Site Wiring Fault LED Indicator on the rear panel lights up if your UPS is plugged into an improperly wired AC power outlet (*see Section 2.5*). This feature warns you if the ground wire is missing, if the input line and neutral wires are reversed, or if the neutral wire is overloaded. This alerts you to potential safety problems.

*Note: Many older homes do not have grounded power and this will cause the Site Wiring Fault LED on the UPS to light.

1.7 Schedule Shutdown & Startup

Using *OPTI-SAFE™+* you can locally or remotely control the shutdown and startup of equipment connected to a UPS. A customized schedule can be developed to meet your specific requirements (*see the OPTI-SAFE™+ User' s Guide*).

1.8 Data-Line Surge Protection

The built-in data-line surge suppression on the rear panel completes your system protection. It provides an easy way to protect a network (*RJ45*) or modem (single line phone) connection from hazardous spikes (*see Section 2.8*).

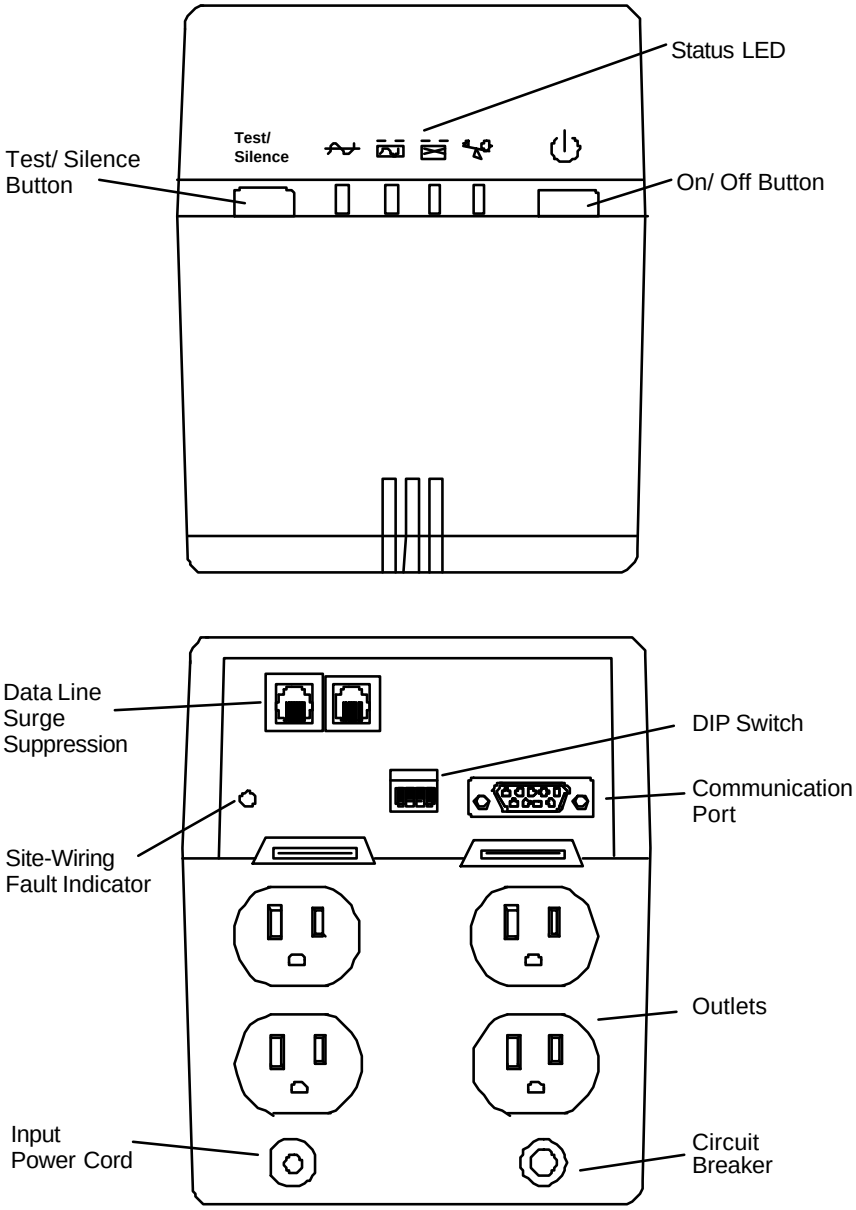
*Note: If you have a two line telephone system to protect, you will need to purchase a special Data-Line board directly from OPTI-UPS.

2. UPS CONTROLS

2.1 ***External Views*** *(see Sections 2.2 through 2.8 for more information, and Section 4.2 for the dimensions of all models)*

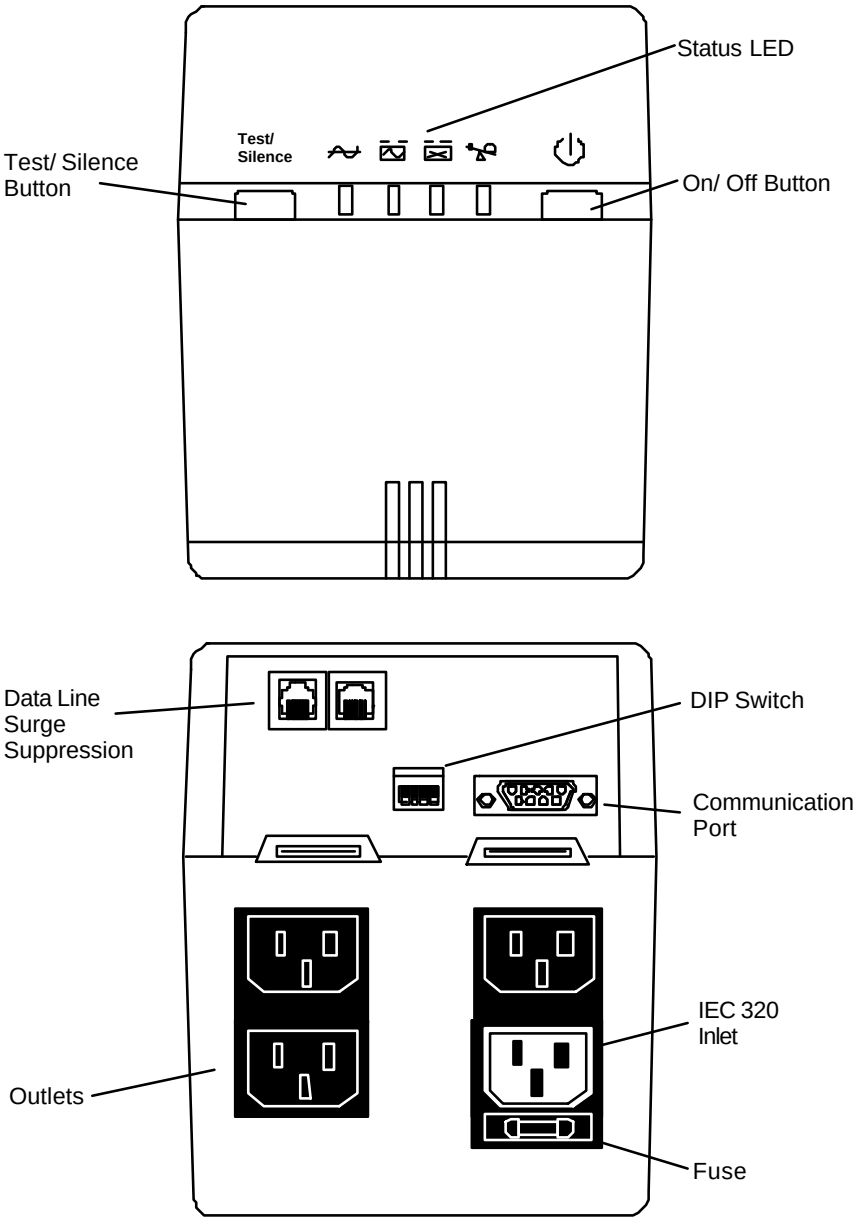
MODEL: 280ES, 420ES, 650ES.

100/110/120V Version

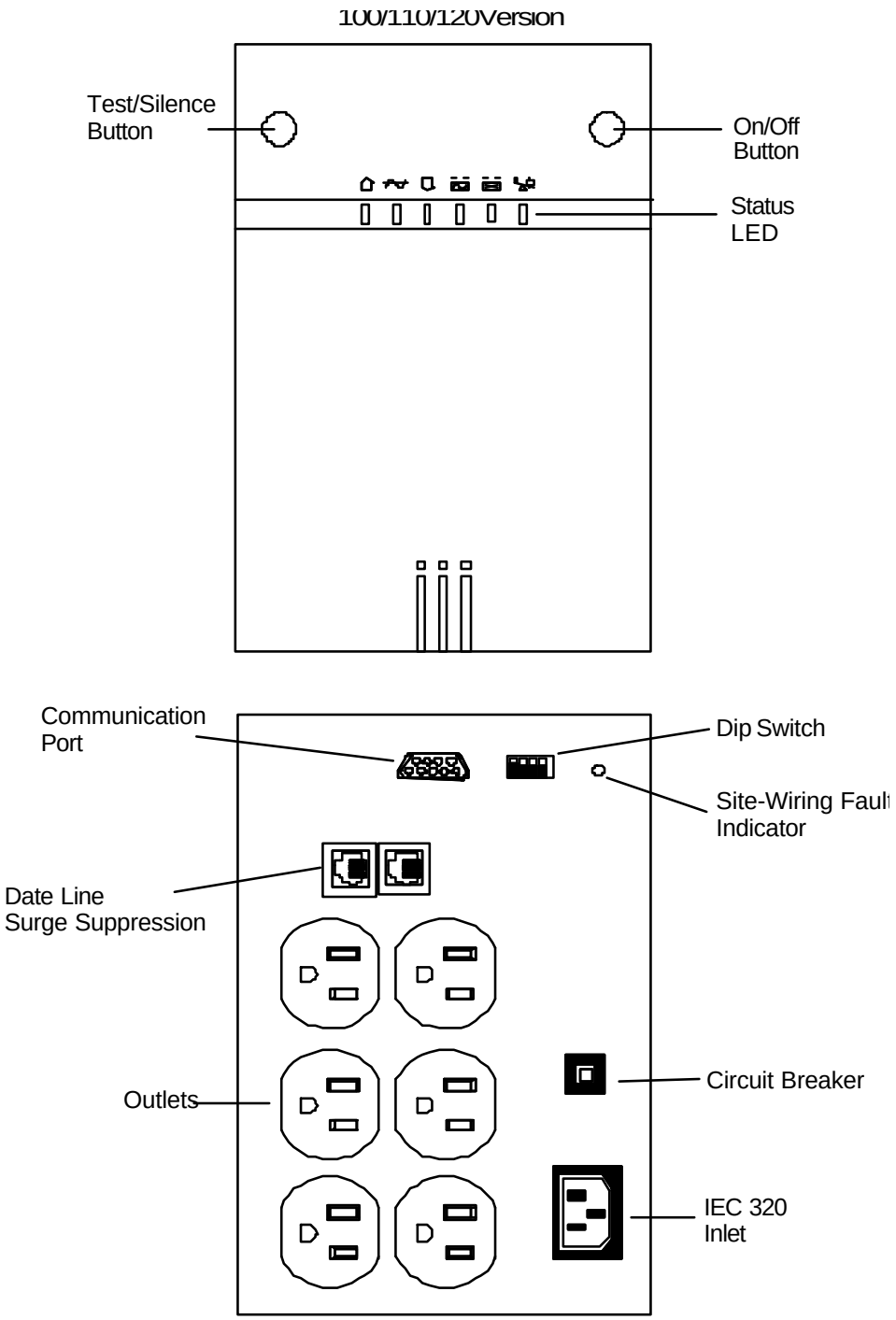


MODEL: 280ES, 420ES, 650ES.

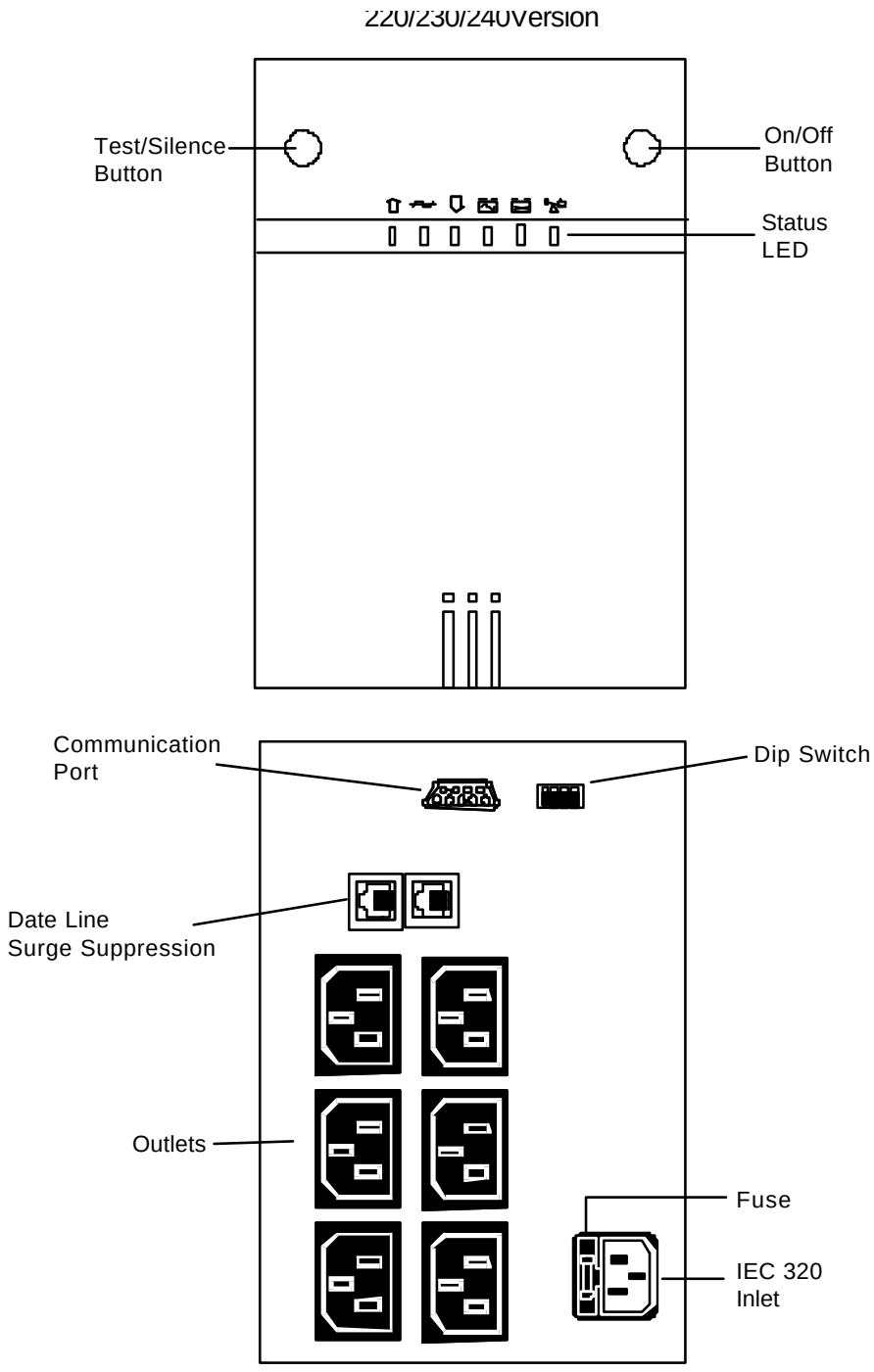
220/230/240V Version



MODEL: 1000ES, 1400ES.



MODEL: 1000ES, 1400ES.



Front Panel Controls

2.2 On/Off Button:

Hold the front panel On/Off button for two seconds to turn on the UPS and power the load. Hold the On/Off button again for two seconds to turn off the UPS and power to the load.

2.3 Test/Silence Button:

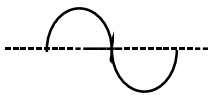
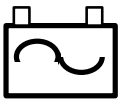
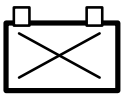
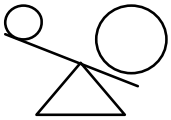
The Test/Silence Button has two functions:

1. Test Feature: It is a good idea to test the UPS once in a while to verify that the batteries are in good condition. If you press the Test/Silence Button when AC power is available, the UPS will test itself by switching to its internal battery for a few seconds. We recommend you close all your open files before initiating this test.

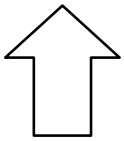
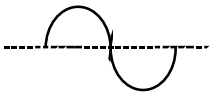
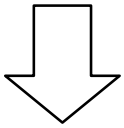
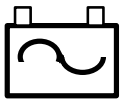
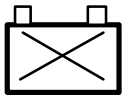
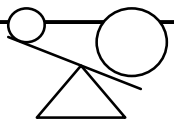
2. Silence Feature: When AC power fails, the UPS will warn you with an audible alarm. To silence the alarm, press the Test/Silence Button. The alarm will resume with a faster beeping when the UPS when the UPS battery is low. To silence the alarm again, press the Test/Silence Button.

2.4 Status Indication

Models 280ES / 420ES / 650ES: Front Panel LED's

	**Normal Mode:** When this LED is lit, the UPS is in normal mode, and providing power to your equipment. The output voltage will be equal to the input voltage. The UPS will continue to filter and provide surge protection.
	**Battery Mode:** When this LED is lit, the UPS is providing power from its battery. Also, this LED is lit when you press the Test/Silence Button to test the battery (*see Section 2.3*). After the UPS beeps twice, it will resume Normal Mode.
	**Battery Weak:** When this LED is lit, the battery voltage is low. This indicates that the battery either needs to be recharged or replaced.
	**Overload:** When this LED is lit, the UPS is overloaded. You must remove the least critical components connected to your UPS.

Models 1000ES / 1400ES: Front Panel LED' s

	**Boost Mode:** When this LED is lit, the UPS is correcting a brownout. The UPS raises the output voltage approximately 12% higher than the input voltage without using any battery power.
	**Normal Mode:** When this LED is lit, the UPS is in normal mode, and providing power to your equipment. The output voltage will be equal to the input voltage. The UPS will continue to filter and provide surge protection.
	**Buck Mode:** When this LED is lit, the UPS is correcting an overvoltage. The UPS lowers the output voltage approximately 12% lower than the input voltage without using any battery power.
	**Battery Mode:** When this LED is lit, the UPS is providing power from its battery. Also, this LED is lit when you press the Test/Silence Button to test the battery (*see Section 2.3*). After the UPS beeps twice, it will resume Normal Mode.
	**Battery Weak:** When this LED is lit, the battery voltage is low. This indicates that the battery either needs to be recharged or replaced. The UPS must be turned off and on again to clear.
	**Overload:** When this LED is lit, the UPS is overloaded. You must remove the least critical components connected to your UPS.

Rear Panel Controls

2.5 Site Wiring Fault Indicator (for 100V/110V/120V versions only)

The red Site Wiring Fault LED Indicator on the rear panel lights up if your UPS is plugged into an improperly wired AC power outlet. The Indicator warns you if the ground wire is missing, if the input line and neutral wires are reversed, or if the neutral wire is overloaded. Faulty wiring prevents the safety features and surge protection circuits built into the UPS from operating properly. Check this indicator during installation of your UPS, or whenever the wiring in your building has been serviced. If the red LED is lit, call a qualified electrician.

Note:

1. Do not leave the UPS ungrounded by using a 3-pin to 2-pin plug adapter.
2. The site wiring fault indicator is not a feature of the 220/230/240V models.

2.6 User Configurable Settings

You can configure the operating parameters of your UPS to meet your specific needs or geographical requirements. This configuration is done by using the OPTI-SAFE+ software (*see the OPTI-SAFE™+ User' s Guide*). The ES models also allow for some of the configuration to be made using the dip switches on the rear panel (*see the table on the following page*).

Two of the adjustable parameters are low and high voltage "transfer points." A transfer point is the predetermined voltage at which the UPS transfers to battery power. On the 120V UPS models, the low transfer point set by the factory is approximately 92.6V. The high transfer point is approximately 144V. In certain locations the voltage may fluctuate widely and a UPS may transfer to battery too often. As a result, the battery may not be at full capacity if there is a complete power failure. If this is the case in your area, you may need to adjust the low and high voltage transfer points so that your battery capacity is not unnecessarily drained.

The software adjustable parameters for the ES models are:

- **Low Voltage Transfer Point:** lowers the transfer point by 5V for 120V or 10V for 230V models.
- **High Voltage Transfer Point:** raises the transfer point by 5V for 120V or 10V for 230V models.
- **Low Battery Warning Time:** increases from two minutes to five minutes the low battery warning before shutdown. This adjustment is useful if your UPS is protecting a computer system that requires extra time to shut down before power loss.
- **Delay Audible Alarm in Backup Mode:** disables the audible alarm during a power failure until the battery power is low. This adjustment is useful in areas in which the alarm may be annoying because of frequent short power interruptions.

The Dip switch adjustable settings are:

- **Nominal Voltage:** Dip switches #1 and #2 can be used to set the voltage configuration of a 1x0V product between 100V, 110V, or 120V or of a 2x0V product between 220V, 230V, 240V.
- **Transfer Voltage:** If you are in an area with very wide voltage fluctuations, dip switch #3 can be used to widen the input voltage window causing the UPS to transfer to battery less frequently.
- **Startup On Battery:** Dip switch 4 is used to enable or disable the startup on battery function. The Startup on battery function is used to power up your equipment by cold starting the UPS when there is no incoming ac line power. Enable the Startup on Battery dip switch and press the on/off button on the front panel until the UPS starts beeping. Do not connect too much equipment to the UPS during the startup on battery operation.

Function	Switch Setting	Operation
Nominal Voltage	Dip1 off & Dip2 off	Default (factory setting)
	Dip1 on & Dip2 on	100V / 220V
	Dip1 on & Dip2 off	110V / 230V
	Dip1 off & Dip2 on	120V / 240V
Transfer Voltage	Dip3 off	Default
	Dip3 on	5V (120V) / 10V (230V) wider
Startup On Battery	Dip 4 off	Disabled
	Dip 4 on	Enabled

2.7 Communication Port and Pin Assignments

The communication port on the rear panel of the UPS allows for connection to a host computer. When used with *OPTI-SAFE*™ communication software you will have access to important operating information. From your computer screen, you can monitor input/output voltage, AC frequency, battery voltage, etc., and analyze power problems. *OPTI-SAFE*™ will also initiate automatic graceful shutdowns during extended power failures.

If *OPTI-SAFE*™ and a communication cable are not included in your UPS package, you can purchase it from your local dealer.

The following are some of the parameters you can monitor:

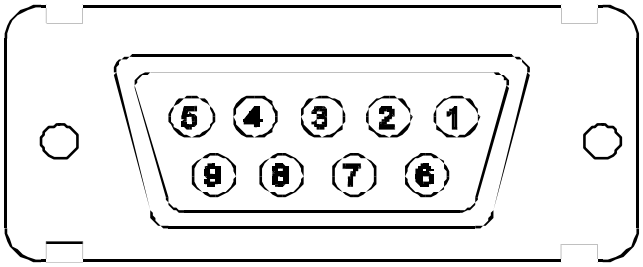
Input Voltage	Indicates the actual input voltage to the UPS when AC power is present
Output Voltage	Indicates the actual output voltage of the UPS
AC Frequency	Indicates the actual output frequency of the UPS
Battery Voltage	Indicates the actual DC voltage of the UPS battery
Change Battery	Indicates that the battery is dead and needs to be replaced
Percent Load	Indicates the percentage of UPS Voltage-Ampere (VA) capacity being utilized by your equipment
Temperature	Indicates the actual temperature inside the UPS

The Enhanced Series also supports software which relies on basic "contact closure signals" such as the built in UPS Service in Windows NT (you will need to purchase a special cable for this type of application). The major functions of this type of software normally include the following:

- To broadcast a warning when power fails.
- To close any open files before the battery reserves are exhausted.
- To turn off the UPS.

Note: You can connect your computer to your UPS without also connecting to the communication port. In this case, your UPS warns you of a power failure by beeping, but you have to manually shut down your UPS and computer.

Pin Assignments:



PIN1 Not connected.

PIN2 UPS simulates a relay closing between pin 2 and pin 4 when input power fails.

PIN3 Not connected.

PIN4 Common for pin 2 and pin 5.

PIN5 UPS simulates a relay closing between pin 5 and pin 4 when the battery inside the UPS has less than 2 minutes backup time left.

PIN6 User sends a RS232 high level (*5-15V*) for 3 secs. This signal will turn off the UPS until proper input voltage returns. It can operate only if UPS is in battery mode. This pin is also used as the RS232 receiver pin (*RXD*).

PIN7 Common for pin 6 and pin 9.
PIN8 Not connected
PIN9 RS232 transmitter pin (*TXD*).

Note:
1. Pin 2 and pin 5 are open collector outputs which must be pulled up to a common referenced supply, switch rating: +40V, 0.15A non-inductive.
2. Pin 4 and pin 7 should ***only*** be connected to ground.

2.8 Data-Line Surge Suppression

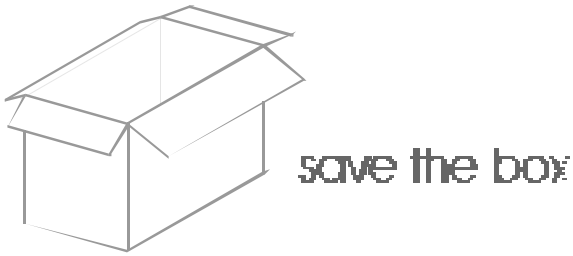
The data-line surge suppression on the rear panel provides an easy way to protect a network (*RJ45*) or modem (*RJ11*) connection from hazardous spikes. Connect your 10/Base-T network cable or a single line telephone cable to the "Line" socket. To complete the connection, connect another network cable or telephone line cable from the "System" socket to your computer. The network cable and telephone line are optional accessories, which may be purchased from your local dealer.

3. INSTALLATION AND OPERATION

Before installation, please read and understand the following instructions:

3.1 Unpacking and Inspection

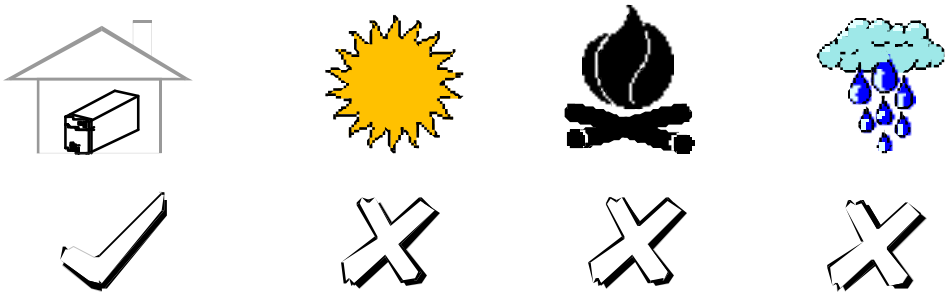
Examine the packing carton for damage. Notify the carrier immediately if damage is observed.



3.2 Placement

1. This unit is intended for indoor use only. Although your UPS is very rugged, its internal components are not sealed from the environment.

2. The UPS must be installed in a protected environment away from heat-emitting appliances such as heaters or radiators. Do not install this product where excessive moisture is present.



3. The location should provide adequate air flow around the UPS with one inch minimum clearance on all sides for proper ventilation.

3.3 Determining How Much Equipment You Can Connect to Your UPS

1. Make a list of all equipment that requires protection.

2. Each piece of equipment has voltage and current (*VA*) ratings printed on the back label (*see examples below*). Your equipment may have a voltage rating such as 88-264V. If you live in the United States you should use 120V in your calculations, since the standard voltage in the United States is 120V.

ViewSonic G810
120V 2.7A
50 / 60 Hz
SN: Q771515388

Computer Co
Pentium Pro 200MHz
120V 2.0A
50/60 Hz
SN: 123456

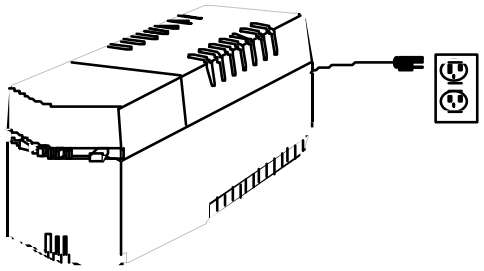
3. Multiply the voltage and current of each piece of equipment (*VA requirements*); for example, 120V x 2.7A = 324VA, 120V x 2.0A = 240VA.

   Add up the VA requirements for each device; for example, 324VA + 240VA = 564VA.

4. Make sure that your UPS has at least as much VA capacity as your equipment requires.

3.4 Powering Up Your UPS

1. For 100/110V/120V versions, connect the power cord to a grounded 3-wire receptacle. For 220V/230V/240V versions, please refer to Sec 3.5 .

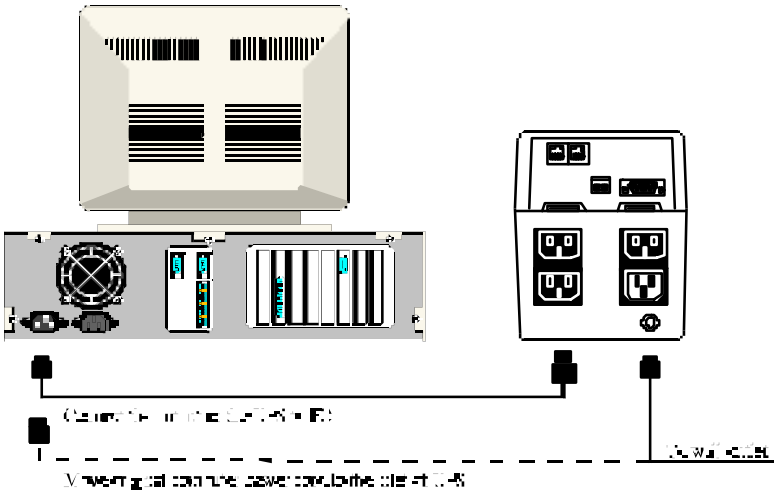


2. Power up the UPS by pressing the On/Off switch on the front panel for two seconds.

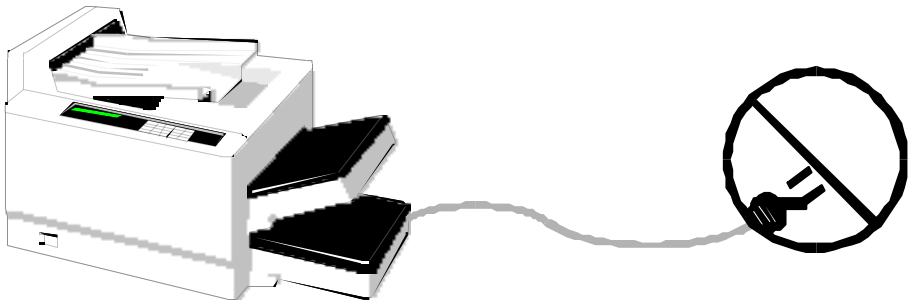
3. We recommend that you charge the battery for six (6) hours before first use of your UPS. **You may use the UPS immediately without charging the battery, but the backup time may be less than the rating. The UPS recharges the battery automatically whenever AC power is available.**

3.5 Connecting Your Equipment to the UPS

1. For all UPS models except the 2x0V versions: connect the power cord(s) of your computer equipment to the output receptacle(s) of the UPS. Switch on the computer equipment.
2. For 2x0V versions, as shown in the illustration below: connect the input power cord of your computer equipment to the inlet of the UPS and the wall socket. Use the power cord supplied with the UPS to connect from the outlet of the UPS to your equipment. Switch on the computer



3. **DO NOT PLUG LASER PRINTERS INTO THE UPS BECAUSE THEY TYPICALLY DRAW TOO MUCH POWER**



3.6 Operation and Functional Test

1. Connect the input power and turn on the UPS. The front panel Normal Mode LED will light.

2. The UPS may be overloaded if the UPS buzzer sounds continuously and the Overload LED lights. Unplug the least critical devices, such as a printer, etc. If the buzzer is still sounding, the battery or UPS may be faulty. Contact your local dealer for assistance.

   Note: Backup all unsaved files before you perform the following functional test.

3. To test the backup function, you may unplug the power cord of the UPS or simply press the Test/Silence Button on the front panel. During this test, observe that your equipment operates properly and without interruption. If you leave your UPS on continuously, it is a good idea to perform a backup function test at least once a month. You can configure *OPTI-SAFE*™ to automatically perform this periodic test.

   If you unplug the power cord, all models will beep once every 4 seconds and the Battery Mode LED will light. You can press the Test/Silence Button to silence the alarm. Plug the power cord back in after a few seconds.

   If you press the Test/Silence Button, all models will beep twice and the Battery Mode LED will light. When the test is over, the Normal Mode LED will light.

3.7 Storage Instructions

For extended storage in moderate climates, the battery should be charged for 12 hours every 3 months. Repeat it every 2 months in high temperature locations. Plug in the power cord to charge the battery. The main power switch does not need to be turned on.

4. SPECIFICATIONS

4.1 Electrical Specifications

		Output	
Product Name	**Frequency (Hz)**	**Voltage (V)**	**Current (I)**
280ES	50/60	100 / 110 / 120	2.80 / 2.54 / 2.33
	50/60	220 / 230 / 240	1.27 / 1.22 / 1.17
420ES	50/60	100 / 110 / 120	4.20 / 3.82 / 3.50
	50/60	220 / 230 / 240	1.91 / 1.83 / 1.75
650ES	50/60	100 / 110 / 120	6.50 / 5.91 / 5.42
	50/60	220 / 230 / 240	2.95 / 2.83 / 2.71
1000ES	50/60	100 / 110 / 120	10.0 / 9.1 / 8.3
	50/60	220 / 230 / 240	4.5 / 4.3 / 4.2
1400ES	50/60	100 / 110 / 120	14.0 / 12.7 / 11.7
	50/60	220 / 230 / 240	6.4 / 6.1 / 5.8

Input/Output Voltage

AC Line Voltage		
Version	**Lower Limit**	**Upper Limit**
100 / 110 / 120V	78 / 85 / 93V	120 / 132 / 144V
220 / 230 / 240V	171 / 179 / 187V	264 / 276 / 288V

Output voltage regulation: ± 5% (*Backup Mode*), ± 10% (*AC Mode*)

Input/Output Frequency Range

Input	47.0 Hz ~ 53.0 Hz / 57.0 Hz ~ 63.0 Hz
Output (*Inverter mode*)	50 Hz / 60 Hz ± 0.1 Hz

Wave Form :

AC Mode	sine wave
Back-Up Mode	step wave

Transfer Time:

Power failure AC Þ inverter	4 ms (*typical*)

Spike/Surge Protection:

Product name	Version	Continuous Voltage Vrms	Single pulse 8/20us	
			Imax	Joules
280ES/420ES/650ES	100/110/120	175V	6500A	790
280ES/420ES/650ES	220/230/240	300V	6500A	560
1000ES/1400ES	100/110/120	175V	6500A	475
1000ES/1400ES	220/230/240	300V	6500A	840

Data-Line Surge Suppression:

Telephone Line Surge Protection	+/- 6KV Peak (*1.2πS/50 Waveform*)
10 Base-T Protection Let Through Rating	<1% (*From 6KV/125A Normal Mode Surge*)

Audible Alarm:

Battery discharge at power failure	Beep every 4 seconds
Battery approaches final discharge	Beep every second
Overload	Continuous buzzer
UPS faulty	Continuous buzzer

BATTERY AND CHARGER

Battery type: Maintenance-free sealed-lead acid. Recharge time 4 to 6 hours typical from total discharge. (*UPS may be used immediately after discharge but will provide shorter backup time*)

Battery Specifications:

	280ES	420ES	650ES	1000ES	1400ES
DC voltage	12V	12V	12V	24V	24V
Type	12V 7AH	12V 7AH	12V 12AH	12V 12AH	12V 12AH
Quantity	1	1	1	2	2
Recharge time	4 hours (typical)				

4.2 Mechanical Specifications:

Product Name	Dimensions	Weight (Kg)	
	W ´ D ´ H (*mm*)	Net	Gross
280ES	120x345x172	6.5	7.5
420ES	120x345x172	7	8
650ES	120x345x172	9	10
1000ES	139x427x200	17.5	19
1400ES	139x427x200	18	19.5

4.3 Environmental Specifications:

	Operating	Storage and Shipment
Temperature	0 ~ 40°C (*32° ~ 104°F*)	-20° ~ +60°C (*-4° ~ +140°F*)
Humidity	5 ~ 90% (*non-condensing*)	5 ~ 90% (*non-condensing*)
Altitude	3,000 m (*10,000 ft*) (*Max*.)	12,000 m (*40,000 ft*) (*Max*.)

5. TROUBLESHOOTING

The TROUBLESHOOTING CHART on the next page covers most of the difficulties that you may encounter under normal working conditions. If the UPS fails to operate properly, please review the following steps before calling the repair center:

1. Is the UPS plugged into a proper working outlet?
2. Is the line voltage within the rating specified?
3. Does the circuit breaker on the rear panel need to be reset?

5.1 Troubleshooting Chart

Problem	Possible Cause	Corrective Action
UPS can not turn on and has no alarm.	UPS front panel on/off switch has not been pressed.	Hold the On/Off switch for two seconds.
Battery LED (*amber*) is lit and UPS beeps every 4 seconds when Incoming line is thought to be normal.	No incoming line or very low or very high line voltage.	Check the wall socket and test the input line voltage.
	UPS input power cord is not plugged in.	Plug in input power cord.
	Rear panel circuit breaker is tripped.	Reduce the load and press the circuit breaker button back in. (1x0V)
The UPS Overload LED (*red*) is always lit & there is a continuous sounding alarm.	UPS is overloaded.	Remove the least critical devices from the load.
The UPS Battery Weak LED (*red*) is always lit.	Too low battery voltage. Dead battery.	Recharge the battery and reset.
Site Wiring Fault LED is on.	Site wiring problem.	Call an electrician to check your wiring.
UPS transfers to back-up mode easily.	Transfer point voltage is set too high or too low.	Use *OPTI-SAFE*™, or the dip switches on the rear panel to lower the low voltage transfer point and raise the high voltage transfer point.
Backup time is less Than the rating.	Battery is not fully charged or battery is dead.	Plug the UPS into an AC outlet and recharge the battery for 6 hours. If problem remains, replace the battery.
UPS appears to be functioning normally but the computer won't turn on.	Computer input power cord is loose or not connected.	Check the computer input power cord.
UPS is in back-up mode but the alarm is not beeping.	The UPS has been configured to Delay the Audible Alarm.	Use *OPTI-SAFE*™ to reprogram the EEPROM of the UPS.
Software communication not working	Wrong interface cable.	Purchase the correct one from your distributor.

	The serial port of the computer has not been configured properly.	Check to see that the serial port is enabled in the CMOS settings. Also check for IRQ conflicts and make sure the settings match those of *OPTI-SAFE™.*
	The I/O card is defective	Replace I/O card.

6. USER REPLACEABLE BATTERY

The Batteries inside your UPS should last from between 3 to 5 years. If you suspect that the batteries are weak, allow the UPS to charge the batteries for at least six hours and then test the backup time. If the UPS still does not provide adequate backup time, follow the procedures below to replace the batteries. Please read section 6.1 before performing the procedure in sections 6.2 and 6.3.

6.1 Warning

Servicing of batteries should always be performed or supervised by personnel knowledgeable of batteries and required precautions. Please read the following cautions before replacing the batteries. Keep unknowledgeable (i.e., unauthorized) personnel away from the batteries.

CAUTION: Except for the battery, the unit contains no user serviceable parts. Repairs should be performed only by factory trained service personnel.

CAUTION: A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:

(1) Remove watches, rings, or other metal objects.

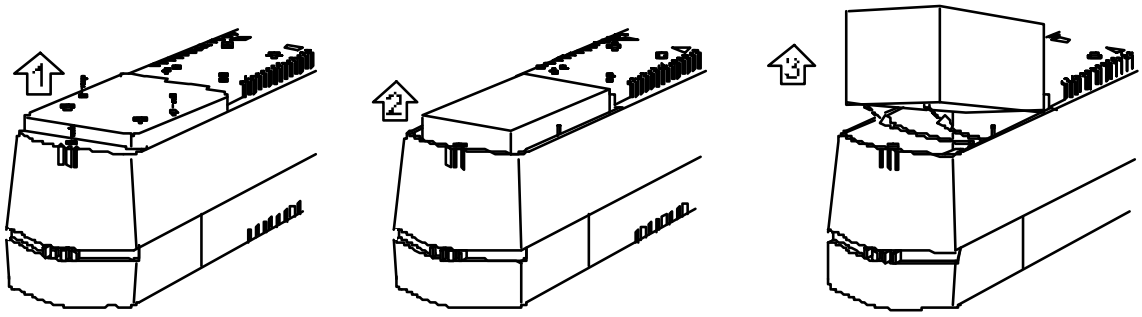
(2) Use tools with insulated handles.

CAUTION: Do not dispose of batteries in a fire. The batteries may explode.

CAUTION: Do not open or mutilate batteries. They contain an electrolyte which is toxic and harmful to the skin and eyes.

CAUTION: When replacing batteries, use the same number and the following type batteries: sealed Lead-Acid Maintenance Free (*280ES:* ***one 7AH/12V***) (*420ES:* ***one 7AH/12V***) (*650ES:* ***one 12AH/12V***) (1000ES: **two 12AH/12V**) (1400ES: **two 12AH/12V**)

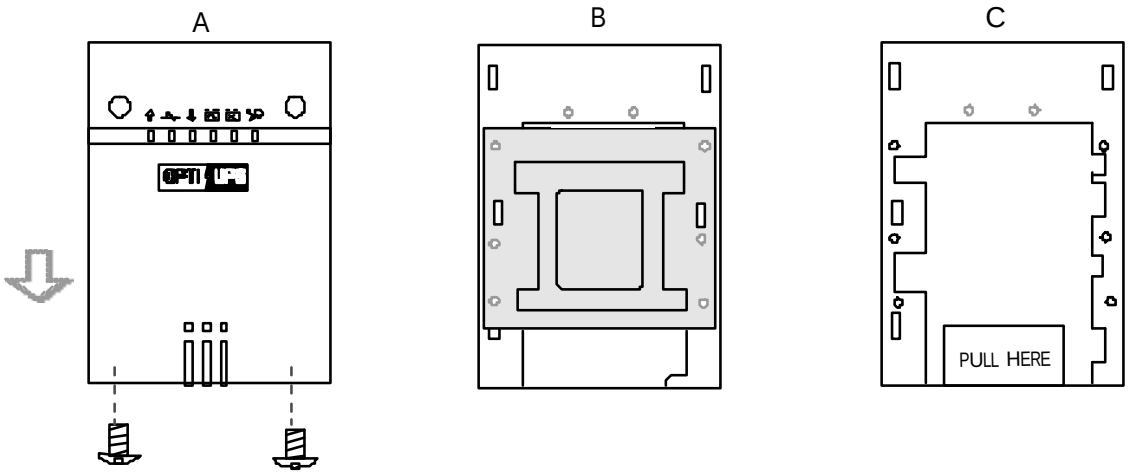
6.2 Battery Replacement Procedure for 280ES / 420ES / 650ES



Changing the batteries in your UPS is a safe and easy procedure. Since the battery is isolated from the AC input you may leave your UPS and computer or other equipment on during the following procedure. Please note that if you choose to leave the UPS on when the battery is removed, it will not be able to power your equipment if a power failure occurs. Please read the cautions in section 6.1 before performing the following steps.

1. Remove the three small screws from the bottom of the UPS plastic case.
2. Gently slide the battery plate off.
3. Gently pull out the battery by the tape attached to it.
4. Disconnect the two wires connecting the battery to the UPS.
5. Connect the wires to the new battery, making sure that the red wire is connected to the red battery terminal and the black wire is connected to the black battery terminal.
6. Push the new battery into place.
7. Reposition the battery retaining plate.
8. Tighten the three small screws on the bottom of the UPS plastic case.

6.3 Battery Replacement Procedure for 1000ES / 1400ES



Changing the batteries in your *OPTI-UPS*™is a safe and easy procedure. Since the battery is isolated from the AC input you may leave your UPS and computer or other equipment on during the following procedure. Please note that if you choose to leave the UPS on when the battery is removed, it will not be able to power your equipment if a power failure occurs. Please read the cautions in section 6.1 before performing the following steps.

1. Remove the two small screws from the bottom of the front panel.
2. Gently slide the front panel off.
3. Remove the battery retaining plate by loosening the six screws holding it in place.
4. Gently pull out the battery by the tape attached to it.
5. Disconnect the two wires connecting the battery to the UPS.
6. Connect the wires to the new battery, making sure that the red wire is connected to the red battery terminal and the black wire is connected to the black battery terminal.
7. Push the new battery into place.
8. Reposition the battery retaining plate and tighten the six screws.
9. Slide the front panel back into place.
10. Tighten the two small screws on the bottom of the front panel.