

## **UPS Warranty**

POWERVAR warrants its uninterruptible power conditioners or UPC (known hereafter as the "product") to be free from defects in materials or workmanship for a period of two years from the date of shipment. The product will be repaired or (at POWERVAR's option) replaced at no charge during this warranty period. Product must be returned prepaid to the factory.

POWERVAR makes no warranties, expressed or implied, of merchantability, fitness for a particular purpose, performance, condition, capacity or otherwise. POWERVAR is not liable for incidental or consequential damages, monetary loss, loss of sales, or loss of business resulting from the failure or malfunction of the product.

Warranty is void on any product that is misused, misapplied, abused, altered or repaired by any unauthorized personnel or where evidence of tampering exists. The foregoing constitutes the sole and exclusive remedy of the purchaser and is in lieu of all other warranties. No greater degree of liability is imposed on POWERVAR.

## **User Operating Manual**

## **Uninterruptible Power Conditioner**

### **Models**

**ABCE400 ABCE600 ABCE800 ABCE1250  
ABCE600MED ABCE800MED ABCE1250MED  
ABCEG400 ABCEG600 ABCEG800 ABCEG1250**

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## **Notice**

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference in which case the user will be required to take appropriate measures to correct the interference at the user's expense.

## Computer Interface

Pin Number	Signal Description
1	UPC Input RS232, High from computer shuts down UPC
2	UPC Output RS232, High from UPC signals AC line failure
3	Closure signals low battery
4	Computer ground, common for closures
5	Closure signals AC line failure
6	UPC output RS232, High from UPC signals low battery
7	UPC input RS232, High from computer causes UPC to operate from battery
8	Not used
9	Computer ground, common for RS232 signals

If the AC input line voltage to the UPC is below 102 volts or exceeds 132 volts, the output AC sine wave power will be supplied from the battery. If the line failure continues for more than a few seconds, an amber front panel light comes on and an RS232 interface line signals the computer that the AC line has failed and that an orderly shut down should be initiated.

A second RS232 output line is provided to signal the computer when the energy stored in the battery is nearly depleted and only about two minutes of backup time remains. This signal may be used as an alternate to the "line failure" signal (depending on system requirements) to initiate computer shutdown. This signal may also be used in testing the condition of the UPC battery (see below).

Two RS232 input lines to the UPC are provided. One allows the computer to shut down the UPC so that the battery is not unnecessarily depleted after computer shut down.

The second input line signals the UPC to operate from the battery even though the AC line voltage is normal. This input can be used in combination with the low battery output signal to measure the backup time available with your specific load.

If backup time is measured and recorded every three months or so, this feature can be used to avoid a system failure due to a worn out battery. When backup time becomes approximately 75% of its original value, battery replacement should be scheduled.

This battery condition test can be performed automatically by your computer or manually using the front panel test button and the "low battery" front panel indicator.

A DB9 connector provides the facility for two-way communication between, the UPC and the computer. Pin assignments are as follows:

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The models 400, 600, 800, 1250, 600MED, 800MED, and 1250MED Uninterruptible Power Conditioners (UPC) are designed to protect your computers, instruments, telephone systems and other electronic equipment by providing power during electrical failures, protecting against spikes and surges and filtering out radio frequency noise. These models, unlike many UPS systems, provide isolation from the power line for the elimination of all common mode noise, spikes, and surges.

All of the UPC models above have been designed and approved to Underwriters Laboratories safety standards. MED suffix models are listed to standard UL 544 "MEDICAL AND DENTAL EQUIPMENT." All others are listed to standard 1778 "UNINTERRUPTIBLE POWER SUPPLY EQUIPMENT."

When electrical power is available, these models provide continuous power conditioning and noise isolation from input to output. During electrical power failures, an internal maintenance-free battery supplies backup power. Battery backup allows the time necessary to store your work and do an orderly system shutdown. These models also include a computer interface that, with proper software, can perform an automatic shutdown in the absence of a computer operator.

## Environment

NOTE: This equipment is designed for use in a temperature and humidity controlled environment. Use or storage at high temperature may severely reduce battery life.

Temperature	0 to 35°C operating - 15 to 40°C storage
Humidity	90% non-condensing
Altitude	To 10,000 feet
Cooling	Convection

On-Off - Rocker Switch. Note: Unit must be plugged in and turned on to charge the battery.

Input AC Line. Green LED indicates that AC line is normal. When flashing, this lamp indicates that the battery is being charged. A solid glow means that the battery is fully charged.



Input Power Fault. Yellow LED indicates that the input AC voltage is not present or is below or above the normal range and that the UPC is operating from battery power.



Overload. Red LED lamp glows when the load exceeds the power handling capability of the UPC. The lamp will remain on if battery operation is terminated by the overload.



Low Battery. Red LED indicates that the battery backup time is nearly used up. This lamp will remain on if low battery shut down occurs before the AC line power returns or if UPC shutdown is the result of a computer command.



Site Wiring Fault. Red LED lamp provides a warning that the outlet supplying AC power to the UPC may be faulty. It checks for an open or faulty ground, and reversal of the hot and neutral lines. Do not operate equipment if this lamp is on. Have the wall outlet checked by an electrician.



Alarm Silence/Test – Push Switch. Causes transfer to battery power.

## Physical

Dimensions    400/600/800 11" high x 5.5" wide x 14.6" long  
                   1250 12" high x 7.5" wide x 16.6" long

Model	<b>400</b>	<b>600</b>	<b>800</b>	<b>1250</b>
Unit Weight	44 lbs.	44 lbs.	46 lbs.	66 lbs.
Shipping Weight	46 lbs.	46 lbs.	48 lbs.	69 lbs.

# Front Panel Features

## Power Switch

This switch turns the UPC system and all equipment plugged into the rear receptacles ON and OFF. In the ON position the switch will display red at the top.

## Input AC Line/Charging Lamp

The Input AC Line Charging Lamp (green lamp) will be illuminated steadily when the AC line voltage is within acceptable limits and the battery is fully charged. When the battery is charging this lamp will flash. If this lamp is not illuminated the AC line voltage has dropped below acceptable limits. When this condition exists, the battery supplies output power.

## Input Power Fault Lamp

The Input Power Fault Lamp (amber lamp) illuminates to indicate that the UPC is operating on battery power.

## Overload Lamp

The Overload Lamp (red lamp) indicates that the load plugged into the UPC is greater than the rated capacity of the unit. \* When this lamp is on, the load must be reduced by removing some of the attached equipment.

**\*NOTE:** The overload indicator light functions in both the normal and backup mode. In the normal mode, a severe overload can cause the AC line circuit breaker to trip (located on the rear panel) and in the backup mode will cause the inverter to shut down. To restart the inverter after a shutdown, cycle the front panel Power Switch off and on.

## Low Battery Lamp

The Low Battery Lamp (red lamp) will illuminate to indicate that approximately 2 minutes of the backup time is remaining.

## Site Wiring Fault Lamp

The Site Wiring Fault Lamp (red lamp) illuminates to indicate that a site-wiring fault is present. It will illuminate if the ground circuit is faulty or if the line and neutral circuits are reversed. Do not operate the system if this lamp is on. An electrician should be called to correct the wall outlet wiring.

## Test/Alarm Silence Button

The test feature is provided to enable the user to operate the UPC in the back-up mode without disconnecting the unit from the wall outlet. This feature will test the UPC's ability to power the load in the event of an AC power failure. If the user wishes to determine the backup time for the existing load, he may depress and hold the test button, timing the period until the Low Battery Lamp illuminates (the time determined by the above procedure represents approximately 80% of the total backup time).

If back-up time is measured and recorded every three months or so, this feature can be used to avoid a system failure caused by a worn out battery. When the measured time becomes approximately 75% of its original value, battery replacement should be scheduled.

When the unit is operating in backup mode a beeping alarm sounds. The user can silence the alarm by pressing the Test/Alarm Silence button. If the system remains in the backup mode until the low battery level is reached, the alarm will become a continuous tone rather than a beep. The alarm silence button will not affect this continuous tone.

- Protection:
  - Current limiting.
  - Shutdown on continuous current limiting overload.
  - Output surge suppressors and capacitive filter provide protection from surges and spikes whether present on the incoming line or generated by equipment at the output.
- Audible alarm: 2.5 kHz bursts at 2 second intervals indicates that the system is operating from battery power. Steady tone indicates low battery.
- Typical backup time versus load (minutes):

Load		Model			
VA	/ Watts	400	600	800	1250
1250	900	-	-	-	8
800	600	-	-	7	15
600	400	-	13	13	26
400	300	20	20	20	40
200	140	45	45	45	85
100	75	100	100	100	180

- Output receptacles: NEMA 5-15R: four on Models 400/600/800, six on Model 1250. Hospital grade on MED units.

### Battery System

- Battery. 24 volt sealed lead calcium battery requires no maintenance and may be operated in any position.
- Battery Charger. A battery charger maintains the battery at the correct float voltage  $\pm 0.1$  volts to assure maximum battery life. The charger is rated at 1 amp on Models 400/600/800 and 2 amps on Model 1250. Recharge time: 8 to 12 hours to 85% percent of capacity when fully discharged.

## Specifications

Models 400, 600, 800, 1250, 600MED, 800MED, and 1250MED Line Isolated Uninterruptible Power Conditioners

All models are listed to UL1779 and certified to CSA Product Class 5311 05. MED models are listed to UL544 and certified to CSA Product Class 8711 01.

### Input

- 120 VAC, 60 Hertz, 105 to 128 VAC for continuous line operation.
- Transfers to battery operation when the input power fails or the voltage is outside the above limits.
- Transfer time: 4 milliseconds typical, 9 milliseconds max.
- Power cord: 6 ft., NEMA 5-15P plug (hospital grade on MED units)

### Output (when Operating From Power Line)

- Output Voltage: Input Voltage  $\pm 3$  VAC
- Frequency: Same as input
- Waveform: Sinewave, power line
- Protection
  - AC Resettable Circuit Breaker
  - Double 4500 amp surge suppressors
  - Radio frequency noise filter effective above 10 kHz
  - ANSI/IEEE C62.41 Category A & B 6000V/200A/500A. 0.5 $\mu$ sec rise-time 100kHz decay. Let through voltage max. 10V line-neutral, 0.5V neutral-ground.

### Output (when operating from battery)

- Voltage: 120 volts rms  $\pm 3\%$
- Frequency: 60 Hz  $\pm 1\%$ , Synchronized prior to retransfer to the line
- Waveform: Sinewave, 2% total Harmonic distortion typical.

## Rear Panel Features

### Line Cord

The line cord is a six foot, three wire cord with a NEMA 5-15P plug. Models with "MED" suffix are supplied with a hospital grade plug.

### Resettable Circuit Breaker

This input circuit breaker protects the UPC circuitry from equipment overload conditions.

### Output Receptacles

There are four NEMA 5-15R receptacles (six on 1250 models) on the rear panel. All outlets are protected by backup power. Connect equipment to be protected to these outlets. Output power is controlled by the front panel Power Switch. Models with "MED" suffix are supplied with hospital grade receptacles.

### Computer Interface

The female DB9 connector near the bottom right of the rear panel is for the computer interface connections. For detailed information refer to the Computer Interface section in the back of this manual.

# Installation

## Important Safety Instructions-Save These Instructions

### Instructions Importantes Concernant La Sécurité Conserver Ces Instructions

This manual contains important instructions that should be followed during installation and maintenance of the UPC and batteries.

### Inspection

Remove your UPC from the shipping container and inspect it for shipping damage. Do not operate the unit if it appears damaged. Instead, notify the carrier and seller immediately.

### Environment

This product is designed for indoor use only, install only in areas where it will not be exposed to excessive dust, moisture or corrosive fumes. Make sure there is adequate airflow around the unit. If the UPC is to be out of service for an extended period of time, it is recommended that it be stored in an air-conditioned area. Use or storage at high temperature may severely reduce battery life.

### Safety

#### WARNING-ELECTRIC SHOCK HAZARD

The UPC has its own power source (battery) and the outlets on the back panel can be live even when the UPC is not connected to an AC power source.

# Battery Replacement

Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

When replacing batteries, use the same number and type of batteries: YUASA NP10-6/250 or equivalent rated 10 ampere-hour, 6 volts/ YUASA NPG18-12 or equivalent 18 ampere-hour, 12 volt for 1250 models.

**Pour le remplacement, utiliser le même nombre de batteries du modèle suivant: YUASA NP10-6/250. YUASA NPG18-12 or equivalent for 1250 models.**

**CAUTION** - Do not dispose of batteries in a fire. The battery may explode. Do not dispose of batteries in a trash container, they are classified as HAZARDOUS WASTE.

**CAUTION** - Do not open or mutilate the batteries. Released electrolyte is toxic and is harmful to the skin and eyes.

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

- Always wear eye protection.
- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.

**ATTENTION. Une pile peut causer des brûlures en raison du courant de court-circuit élevé. Prendre les précautions ci-après pour travailler sur une pile:**

- **Porter des lunettes de sécurité.**
- **Ne pas porter de montre, de bague ni autre objet métallique.**
- **Utiliser des outils à manche isolé.**

# Troubleshooting

## ▼ If problems occur, conduct the following simple checks:

1. If Input Power Fault lamp remains lighted and the beeper continues to sound with the UPC connected to a wall outlet, plug unit into a different outlet or measure voltage at the outlet to check that line voltage is within the normal range (between 105 and 128 volts).
2. Check the resettable circuit breaker. Push the center to reset. A tripped circuit breaker is the result of an overload or a short circuit at the UPC outlets.
3. If your UPC has been in service for three or four years, it is possible that the battery is worn out. An UPC with a worn out battery will usually display one or more of the following symptoms:
  - The back up time is less than normal.
  - The UPC will support a very light load but shuts off with a normal load connected.
  - When the UPC power switch is turned on, there is a two-second delay before the attached equipment receives power.
  - When the UPC power switch is turned on, no power is delivered to the load.
4. If problems persist, contact the factory or your dealer for assistance.

## ▼ This unit contains voltages that are hazardous. For safe and reliable operation, please observe the following:

1. Do not attempt to disassemble the UPC. All repairs should be performed by trained service personnel.
2. Do not power the UPC from a receptacle other than a two-pole, three-wire grounded outlet.
3. Do not allow water or any foreign material to get inside the unit.
4. To avoid overheating, do not place the UPC in direct sun or near heat generating appliances.

## Installation Procedure

1. Plug the UPC line cord into a 120-volt grounded wall outlet.
2. Turn on the Power Switch. The UPC will initially operate from the battery and will "beep" once before transferring to normal power line operation. The Input AC Line/Charging lamp will flash while the battery is charging.

When the battery is fully charged this lamp will become solid green and will remain so during normal AC power line operation.

NOTE: The UPC is shipped from the factory with the battery fully charged, but it may lose some charge during shipping and storage. It is recommended that the battery be charged before use. The battery will charge with the Power Switch in the ON position only. The Input AC Line/Charging lamp will indicate when the battery is fully charged.

3. Connect the equipment to be protected to the rear panel receptacles of the UPC. Should the Overload lamp come on, reduce the load on the UPC by disconnecting the least critical items of equipment or contact your dealer for information on a higher power model.

# Operation

## Testing The UPC

To be sure that the UPC is working properly, follow the steps outlined here to simulate a power outage.

**NOTE:** This test should be performed with the battery fully charged. The Input AC Line/Charging lamp should be illuminated steadily, not flashing.

### ▼ Steps for testing the UPC with your system:

1. Turn on the equipment to be powered by the UPC. Only the green front panel lamp should be illuminated. Push and hold the Test/Alarm Silence button.
2. The green lamp will go out and after a short time the Input Fault (amber) lamp will come on. The attached equipment should continue to operate normally, without interruption.
3. When the Test button is released, there will be a short pause while the UPC becomes synchronized with the AC power line. The amber lamp will go out, and the green lamp will come on. (The green lamp will flash until the battery has been restored to full charge.)
4. The equipment being powered by the UPC should be unaffected by this test.

## Normal Operation

These UPC models are designed for completely automatic operation. The UPC is constantly providing conditioned and noise isolated power to the equipment attached to it, and is ready to switch to battery power if input power is lost.

## Power Loss

The UPC is continuously monitoring AC line power, and will switch immediately to battery operation if the line voltage is outside of acceptable limits. When input power returns to an acceptable voltage level, the UPC automatically switches back to line power and begins to recharge its battery.

When the UPC is operating in the back-up mode, it will sound a beeping alarm to alert the user that the battery is supplying power. If utility power does not recover, the UPC battery will gradually be drained. A protective circuit in the UPC will shut down the unit before the battery can be discharged beyond the recommended level.

When the battery reserve drops to approximately 20% of full capacity, the Low Battery lamp will light and the beeping alarm will become a solid tone. At this time the protected system should be shut down immediately. (Refer to the Specifications Section of this manual for approximate run times.) After system shutdown, the UPC power switch should be turned off to silence the alarm and to prevent total depletion of the battery.