UPS-1000-Li-2

User Manual

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This product may be covered by one or more claims of the following patents or published patent application:

U.S. Patent Nos.: RE39,466; 2,461,332; 4,870,528; 4,870,534; 5,136,455; 6,040,969; 6,728,089; 6,744,613; 6,947,266; 7,068,487; 7,184,252; 7,511,934; 7,541,696; and 7,551,412; 8,482,885; 8,520,349; 8,547,672; 8,614,866; 9,166,396; 9,225,534; 9,310,870; 10,014,680; 10,090,622; 10,114,395

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I. **INTRODUCTION** 1
1. SAFETY INSTRUCTIONS……..1

II. CONTROLS AND INDICATORS 2
1. CONTROL PANEL…….....2

III. **INSTALLATION INSTRUCTIONS** 3
1. INSTALLATION…… 3
2. CONNECTING THE BATTERIES…… 3
3. CONNECTING THE UPS-1000-LI-2 TO AN AC SOURCE…… 3
4. CHECKING THE SITE WIRING FAULT…… 3
5. CHARGING THE BATTERY..…… 3
6. CONNECTING YOUR EQUIPMENT…… 4
7. USB COMMUNICATION PORT CONNECTION (OPTIONAL)…… 4
8. POWER MONITORING SOFTWARE…… 4

IV. **OPERATION** 4
1. TURNING THE EQUIPMENT ON / OFF……4
2. TEST BUTTON……..…..4
3. ALARM SILENCE BUTTON……..4
4. SCROLL BUTTON……4
5. LCD SCREEN……..5
6. SELF-TEST……..……5
7. ALARMS……..5

V. **TROUBLESHOOTING** 6

VI. **REPLACING THE BATTERY** 7
1. Battery Replacement Procedure……8

VII. **SPECIFICATIONS** . 9

I. INTRODUCTION

1. SAFTY INSTRUCTIONS

CAUTION! The maximum ambient operating temperature for the UPS-1000-Li-2 is 40°C ("0 ~ 40°C" for Ambient Operation).

- The external vents and openings on this product are provided for ventilation. To ensure reliable operation and to protect this product from over- heating, these vents and openings must not be blocked or covered. Do not insert any object into any of the vents or openings that may hinder the ventilation.
- Install in a well-ventilated area, away from excess moisture, heat, dust, flammable gas or explosives.
- Leave space around all sides of the UPS-1000-Li-2 for proper ventilation.
- Do not mount the UPS-1000-Li-2 with its front or rear panel facing down at any angle.
- Before usage, you must allow the UPS-1000-Li-2 to adjust to room temperature (20°C~25°C or 68°F~77°F) for at least one hour to avoid moisture condensing inside the UPS-1000-Li-2.

CAUTION! This product is **ONLY** intended to be installed in an indoor temperature-controlled environment that is free of conductive contaminants. It is not intended for use in a computer room as defined in the Standard for the Protection of Electronic Computer/Data Processing Equipment ANSI/NFPA 75.

CAUTION! Connect the UPS-1000-Li-2- to a two pole, three wire grounded AC wall outlet. The receptacle must be connected to the appropriate branch protection (circuit breaker or fuse). Connection to any other type of receptacle may result in a shock hazard and violate local electrical codes. Do not use extension cords or adapter plugs, or surge protectors.

CAUTION! To reduce the risk of fire, connect only to a utility powered circuit provided with 20 amperes maximum branch circuit over-current protection in accordance with the National Electric Code, ANSI/NFPA 70.

CAUTION! To reduce the risk of electrical shock with the installation of this UPS-1000-Li-2 equipment and the connected equipment, the user must ensure that the combined sum of the AC leakage current does not exceed 3.5mA.

CAUTION! To reduce the risk of electrical shock in conditions where the load equipment grounding cannot be verified, disconnect the UPS-1000-Li-2 from the AC wall outlet before installing a computer interface cable. Reconnect the power cord only after all signaling connections are made.

WARNING: This product contains potentially hazardous voltages. Do not attempt to disassemble the UPS-1000-Li-2 beyond the battery replacement procedure. This product contains no user serviceable parts. Repairs and Battery replacement must be performed by **QUALIFIED SERVICE PERSONNEL ONLY.**

WARNING: **Qualified Service Personnel ONLY** must perform the Installation and Servicing of the UPS-1000-Li-2. AMETEK Electronic Systems Protection accepts no liabilities and is not limited to: injury to the Service Personnel, or damages to; the product, or the connected equipment caused by the incorrect installation or servicing of the UPS-1000-Li-2 system.

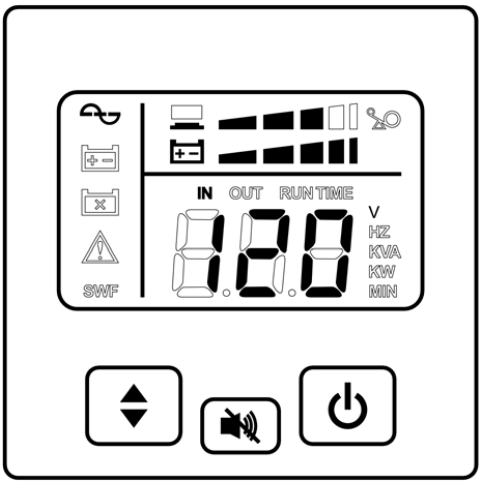
WARNING: Risk of Electrical Shock. Hazardous live parts inside these power supplies are energized from the battery even when the AC input is disconnected.

CAUTION! To de-energize the outputs of the UPS-1000Li:

1. If the UPS-1000-Li-2 is on press and release the On/Off/Test Button.
2. Disconnect the UPS-1000-Li-2 from the AC wall outlet.
3. To de-energize the UPS-1000-Li-2 completely, disconnect the battery.

II. Controls and Indicators

1. Control Panel



The AC normal icon illuminates when the UPS-1000-Li-2 is on and operating in the AC normal mode. The AC normal icon will extinguish when operating in the Battery mode. The AC normal icon will blink when it is operating in the Boost mode.

The On-Battery icon illuminates when the UPS-1000-Li-2 is operating in the Battery Mode. The On-Battery icon will extinguish when operating in the AC normal mode and the Boost mode.

The Weak/Bad Battery icon illuminates when the UPS-1000-Li-2 detects a weak battery, bad battery or if the battery is disconnected. The Weak/Bad Battery icon is extinguished when the battery's condition is good.

The Fault icon illuminates when the UPS-1000-Li-2 detects an internal fault. The Fault icon is extinguished when the UPS-1000-Li-2 is operating properly.

SWF The Site Wiring Icon illuminates when the UPS-1000-Li-2 detects a site wiring problem. The SWF icon is extinguished when the UPS-1000-Li-2 is connected to proper site wiring.

Load Capacity Bar Graph: Displays the amount of load connected to the UPS-1000-Li-2 in the AC and Battery mode as 20%, 40%; 60%, 80%,100%.

When the amount of load attached to the UPS-1000-Li-2 exceeds 110% of its power rating; the Overload icon will flash Off and On, all of the LEDs in the Load Level Bar Graph will be illuminated and the UPS-1000-Li-2 will sound a constant alarm to indicate that there is an Overload condition.

Battery Capacity Bar Graph: Displays the amount of Battery Capacity available in the AC and Battery mode as 20%, 40%; 60%, 80%, 100%.

UPS-1000-Li-2 Parameters:

- Input - Voltage and Frequency
- Output - Voltage and Frequency
- KVA - Kilo Volt Amperes
- KW - Kilowatts
- Estimated Runtime (minutes) - AC normal and Battery mode.

The Multi-Function On/Off/Test Button functions as follows: When the UPS-1000-Li-2 is Off, press and release the On/Off/Test button after one beep to turn the UPS-1000-Li-2 On.

When the UPS-1000-Li-2 is On, press and release the On/Off/Test Button after one beep to turn the UPS-1000-Li-2 Off.

When the UPS-1000-Li-2 is in the Normal AC mode, press and hold the On/Off/Test button for four beeps, then release the button. The UPS-1000-Li-2 will perform a 10-second Self-Test.

When the unit is operating in Battery mode, pressing the Alarm Silencer Button will silence the audible alarm. Once the UPS-1000-Li-2 reaches the LBW (Low Battery Warning) threshold the alarm will be re-activated. The alarm cannot be

silenced during the LBW alarm. Once the UPS-1000-Li-2 transfers to the AC mode the alarm will be reset to default.

The Scroll Button allows the user to scroll through the UPS-1000-Li-2 parameters that are available on the LCD screen.

NOTE: The LCD backlight will illuminate for 20-seconds when the UPS-1000-Li-2 switches to the Battery mode and then turn off. When the UPS-1000-Li-2 has an event and/or an error code the LCD backlight will turn on and remain on to alert the user that an event has occurred.

III. INSTALLATION INSTRUCTIONS

1. Installation

Be sure to read the installation placement and all the cautions before installing the UPS-1000-Li-2. Place the UPS-1000-Li-2 in the final desired location and complete the rest of the installation procedure. **The UPS-1000-Li-2 is shipped with the internal batteries disconnected. The batteries must be connected before putting the UPS-1000-Li-2 into service.** See Connecting the Batteries to connect the batteries.

2. Connect the Batteries (QUALIFIED SERVICE PERSONNEL ONLY)

Please read all of the **WARNINGS** and **CAUTIONS** before attempting to connect the batteries.

1. Use **CAUTION**, the UPS-1000-Li-2 is heavy. Remove the UPS-1000-Li-2 from the shipping box and set on a desk or a bench top.

NOTE: A screwdriver is required for removing the battery cover.

2. Unscrew the cover, and then set it aside.
3. Verify proper polarity. Connect the battery connectors together.

NOTE: Some sparking might occur; this is normal.

4. Reinstall the battery cover onto the UPS-1000-Li-2.
5. Continue with the rest of the Installation.

3. Connecting the UPS-1000-Li-2 to an AC Source

CAUTION **-** To reduce the risk of fire, connect only to a utility powered circuit provided with 20 amperes maximum branch circuit over-current protection in accordance with the National Electric Code, ANSI/NFPA 70. Plug the UPS-1000-Li-2 into a two pole, three wire, grounded receptacle only. DO NOT PLUG THE UPS-1000-Li-2 INTO EXTENSION CORDS, ADAPTER PLUGS, SURGE PROTECTORS OR POWER STRIPS. DO NOT CUT THE INPUT PLUG OFF AND ATTEMPT TO HARDWIRE THIS UPS-1000-Li-2, DOING SO WILL VOID THE WARRANTY.

4. CHECKING THE SITE WIRING FAULT

After plugging the UPS-1000-LI-2 into the AC wall outlet, check the Site Wiring Fault (SWF) icon on the front panel of the UPS-1000-Li-2. If the SWF icon is illuminated and the LCD is displaying error code E08, the UPS-1000-Li-2 is plugged into an improperly wired AC wall outlet. If the UPS-1000-Li-2 indicates a Site Wiring Fault (SWF), have a Qualified Electrician correct the problem

5. CHARGING THE BATTERY

The UPS-1000-Li-2 will charge the internal batteries whenever the UPS-1000-Li-2 is connected to an AC source and there is an acceptable AC voltage present (90 - 140VAC). It is recommended that the UPS-1000-Li-2 battery be charged for a minimum of 4 hours before use. The UPS-1000-Li-2 may be used immediately, however, the “On Battery” runtime may be less than normally expected.

Typical battery life is 3 to 5 years. Environmental factors do affect battery life. High temperatures, poor utility power, and frequent, short duration discharges have a negative impact on battery life. **NOTE:** If the UPS-1000-Li-2 is going to be out of service or stored for a prolonged period of time, the batteries must be recharged for at least twenty-four hours every ninety days.

6. CONNECTING YOUR EQUIPMENT

Plug the mission critical equipment into the Battery & Surge output receptacles on the rear panel of the UPS-1000-Li-2. Plug the noncritical equipment into the Surge Only output receptacles on the rear panel of the UPS-1000-Li-2. Ensure that the connected equipment does not exceed the maximum output rating of the UPS-1000-Li-2 (refer to the information label on the UPS-1000-Li-2 or the electrical specifications in this manual). DO NOT PLUG EXTENSION CORDS, ADAPTER PLUGS, SURGE STRIPS OR POWER STRIPS INTO THE OUTPUT RECEPTACLES OF THE UPS-1000-Li-2. NOTE: Risk of damaging the UPS-1000-Li-2 and/or connected equipment.

7. USB COMMUNICATIONS PORT CONNECTION (OPTIONAL)

This UPS-1000-Li-2 supports USB communications. The power monitoring software and interface cable can be used with the UPS-1000-Li-2. Use only the interface cable that come with the UPS-1000-Li-2s. The USB communications protocol is HID. The HID USB driver comes standard in the Windows OS. Simply connect the USB cable to the USB communications port on the rear panel of the UPS-1000-Li-2. Connect the other end of the USB cable to the device that will be monitoring/ controlling the UPS-1000-Li-2 and then follow the prompts on the screen. **NOTE:** When using the UPS-1000-Li-2's USB port with Windows XP, 7 or 8 the Power Options in the Control Panel may need to be configured. Connecting to the Communications Port is optional. The UPS-1000-Li-2 works properly without this connection.

8. POWER MONITORING SOFTWARE

This product supports Power Monitoring Software. Please go to our web site at https://www.ametekesp.com/surgex/ups-protection/ups-protection-120-208v then look under Downloads, and then Software to download..

IV. OPERATION

1. Turning the Equipment On/Off

To turn the UPS-1000-Li-2 on: press and hold the On/Off/Test Button until the alarm sounds one beep and then release. The UPS-1000-Li-2 will perform a five second internal self-test. Once the UPS-1000-Li-2 has passed its internal self-test the UPS-1000-Li-2 will provide an output and the load will be powered. To turn the UPS-1000-Li-2 off: press and hold the On/Off/Test Button until the alarm sounds one beep and then release.

2. Test Button

To perform a ten-second user invoked battery test: With the UPS-1000-Li-2 in the AC normal mode, press and hold the On/Off/Test Button until the alarm sounds four beeps, and then release. During the test, the UPS-1000-Li-2 will switch to the Battery mode, the On-Battery icon will illuminate and the alarm will sound.

3. Alarm Silencer Button

When the unit is operating in Battery mode, pressing the Alarm Silencer Button will silence the audible alarm. Once the UPS-1000-Li-2 reaches the LBW (Low Battery Warning) threshold the alarm will be re-activated. The alarm cannot be silenced during the LBW alarm or any fault condition. Once the UPS-1000-Li-2 transfers to the AC mode the alarm will be reset to default.

4. Scroll Button

Press the Scroll Button to scroll through the UPS-1000-Li-2 parameters. The UPS-1000-Li-2 parameters are displayed on the LCD screen.

5. LCD Screen

The LCD provides the user with a variety of useful information. The LCD has a real- time meter to display, in numeric fashion, the following data:

- Input Voltage and Frequency
- Output Voltage and Frequency
- Connected Load KVA and KW
- Estimated runtime in the AC and DC mode Connected Load Capacity Bar Graph Battery Capacity Bar Graph

The LCD will include dedicated icons for the following information:

- AC Normal / AVR Mode (Boost: The AC Normal icon will flash) On Battery
- Weak/Bad Battery
- UPS-1000-Li-2 Fault
- Site Wiring Fault
- Overload

The LCD backlight will turn on when the UPS-1000-Li-2 is turned on. After approximately 20-seconds the backlight will turn off to conserve energy. When an event (alarm) occurs, such as going to the battery mode, the backlight will turn on for approximately 20-seconds to alert the user that an event has occurred and then the back- light will turn off. While the Scroll button is in use the backlight will remain on. Approximately 20-seconds after the Scroll button has stopped being used the back- light will turn off to conserve energy.

6. Self-Test

The self-test feature is useful to verify the correct operation of the UPS-1000-Li-2 and the condition of the batteries. The start-up and user invoked test are used to measure the battery's capability to support the connected load. If the UPS-1000-Li-2 fails one of these tests, one of the icons or the information displayed on the LCD will remain illuminated indicating the type of problem. **NOTE:** The UPS-1000-Li-2 will automatically perform a self-test on start-up.

7. Alarms

ON BATTERY

When the UPS-1000-Li-2 is operating on the batteries, the AC normal icon will extinguish, the On-Battery icon will illuminate, the LCD will display the estimated runtime remaining and the alarm will sound one beep every 10 seconds. Once the UPS-1000-Li-2 returns to the normal AC mode, the alarm will stop, the On-Battery icon will extinguish and the AC normal icon will illuminate.

LOW BATTERY WARNING

When the batteries reach the predetermined level, the alarm will sound two beeps every five seconds, the Battery Bar Graph will display the remaining battery capacity and the LCD will display error code E07. This information is to inform the user that there is approximately two minutes of runtime remaining before the UPS-1000-Li-2 shuts down. This condition will continue until either AC returns or the UPS-1000-Li-2's self-protection circuit shuts the UPS-1000-Li-2 down to protect the battery from over discharging.

WEAK/BAD BATTERY

The UPS-1000-Li-2 automatically tests the battery's condition. If the battery is weak, bad or disconnected, the Weak/Bad Battery icon will illuminate and the Battery Capacity Bar Graph will turn off and the alarm will sound three beeps every five minutes until the battery is either reconnected or replaced. This alarm will be repeated until the batteries pass a self-test. It is recommended that the UPS-1000-Li-2 be allowed to charge overnight before performing a battery test to confirm a Weak/Bad Battery condition.

OVERLOAD

When the amount of load attached to the UPS-1000-Li-2 exceeds its power rating, the Overload icon will illuminate and the alarm will sound continuously (AC and Battery modes). This alarm will remain on until the excess load is removed or the UPS-1000-Li-2's self-protection circuit shuts the UPS-1000-Li-2 down.

To clear the overload alarm when the UPS-1000-Li-2 has shutdown requires that the UPS-1000-Li-2 perform a battery test. First remove part of the load, then turn the UPS-1000-Li-2 on, the Overload icon and the alarm will be on. Second either use the Test Button or unplug the input power cord to perform the battery test.

UPS-1000-Li-2 FAULT

When the UPS-1000-Li-2 detects an internal fault, the Fault icon will illuminated and an error code will be displayed on the LCD screen, the alarm will sound continuously and the output will be turned off. The fault condition, in some instances, may be cleared by turning the UPS-1000-Li-2 off and then on. If the fault condition does not clear the UPS-1000-Li-2 must be sent in for service. See the Troubleshooting section.

V TROUBLESHOOTING

Symptom / Error Code	Cause / What To Do
Unit will not turn on.	Press the On/Off/Test button and release after one beep.
Unit operates in battery mode only, even though there is AC present.	Reset the input circuit breaker by pressing the plunger back in. If the input circuit breaker trips after restart, reduce the load on the UPS.
The AC Normal icon is blinking and the alarm is silent.	The unit is in Boost mode. It is performing its in- tended function.
The unit does not provide expected runtime.	Charge the batteries for 8-hours and retest. If the runtime is still less than expected, the batteries may need to be replaced.
The AC normal icon is illuminated, but there is no output.	Disconnect the computer cable from the unit, press the On button. If UPS works normally, the software has control of the UPS.
Fault icon is illuminated and a constant alarm.	The unit has an internal problem. Call for service.
Error Code: E01. UPS is shutdown.	The unit has detected a short-circuit on its output. Check the attached load.
Error Code: E02.Overload icon is illumi- nated and a constant alarm.	Check the specifications and remove part of the load. If the unit shuts down because of an Overload, the UPS must perform an Inverter function or a Self Test to clear the Overload Alarm.
Error Code: E03. Over Temperature Shut-down.	The internal or ambient temperature has exceeded the safe operating range for the unit. Check the specifications.
Error Code: E04: In- verter/Output Failure Shutdown.	The unit has an internal fault. Call for service.
Error Code: E05. Charger Failure Warning.	The charger has failed, call for service.
Error Code: E06.Weak/Bad Battery icon is illuminated.	Check the battery connections, charge the batteries for 8-hours and retest, or replace the batteries.
Error Code: E07. Low Battery Warning.	The unit's battery reserve is low. This condition will continue until AC returns or the UPS shuts down from battery exhaustion.
Error Code: E08. SWF icon is illuminated.	Have a qualified electrician correct the service wiring.

VI. REPLACING THE BATTERY (QUALIFIED SERVICE PERSONNEL ONLY)

Please read all of the **WARNINGS** and **CAUTIONS** before attempting to service the batteries. Typical battery life is 3 to 5 years. Environmental factors do affect battery life. High temperatures, poor utility power, and frequent, short duration discharges have a negative impact on battery life.

WARNING! This UPS-1000-Li-2 contains potentially hazardous voltages. Do not attempt to disassemble the UPS-1000-Li-2 beyond the battery replacement procedure. This UPS-1000-Li-2 contains no user serviceable parts. Repairs and battery replacement must be performed by **QUALIFIED SERVICE PERSONNEL ONLY.**

CAUTION: Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes and may be toxic.

CAUTION: Do not dispose of batteries in a fire. The batteries may explode. The batteries in this UPS-1000-Li-2 are recyclable. Dispose of the batteries properly. The batteries contain lead and pose a hazard to the environment and human health if not disposed of properly. Refer to local codes for proper disposal requirements.

CAUTION: The battery system can present a risk of electrical shock. These batteries produce sufficient current to burn wire or tools very rapidly, producing molten metal. Observe these precautions when replacing the batteries:

1. Remove watches, rings, or other metal objects.
2. Use hand tools with insulated handles.
3. Wear protective eye gear (goggles), rubber gloves and boots.
4. Do not lay tools or other metal parts on top of batteries.
5. Disconnect the charging source prior to connecting or disconnecting the battery terminals.
6. Determine if the battery is inadvertently grounded. If the battery is, remove the source of the grounding. Contact with any part of a grounded battery can result in an electrical shock. The likelihood of such shock will be reduced, if such grounds are removed during installation and maintenance.

CAUTION: Replace batteries with the same number and type as originally installed in the UPS-1000-Li-2. These batteries have pressure operated vents. These UPS-1000-Li-2s contain sealed non-spillable maintenance-free lead acid batteries.

BATTERY REPLACEMENT PROCEDURE

PLEASE READ THE CAUTIONS AND WARNINGS BEFORE ATTEMPTING TO REPLACE THE BATTERIES

Hot-swappable batteries mean that the batteries can be replaced without powering down the UPS-1000-Li-2.

NOTE: If there is a power interruption while replacing the hot-swappable batteries, with the UPS-1000-Li-2 on, the load will not be backed up. To hot-swap the batteries start with step number 6.

1. Turn off the equipment that is plugged into the output of the UPS-1000-Li-2.
2. Turn off the UPS-1000-Li-2.
3. Unplug the UPS-1000-Li-2's AC power cord from the AC wall outlet.
4. Unplug the equipment from the output receptacles of the UPS-1000-Li-2.
5. Unplug the computer interface cable from the rear panel of the UPS-1000-Li-2.

NOTE: A screwdriver is required for removing or installing the battery cover.

6. Slide the battery cover sideways, and then set it aside.
7. Disconnect the battery connectors.

CAUTION: Do not short the Battery positive wire to the Battery negative wire.

8. Grasp the battery pull tab and gently pull the battery module out of the UPS-1000-Li-2 and set aside.

CAUTION: DO NOT pull the battery module out by pulling on the battery wires.

9. Slide the new battery module into the UPS-1000-Li-2.
10. Verify proper polarity. Reconnect the battery connectors together.

NOTE: Some sparking might occur; this is normal.

VII. Specifications

SYSTEM SPECIFICATIONS	
Topology	Line-Interactive, Simulated Sine Wave
Maximum Power Capacity (Battery & Surge Outlets)	1000VA / 600W 8.3A
Maximum Power Capacity (Surge Only Outlets)	1800W 15A
INPUT	
Number of Phases	Single (1ø 2W +G)
Nominal Voltage	120VAC
Acceptable Input voltage	0 - 150VAC
Voltage Range	90 - 140VAC
Frequency Limits	60 Hz, +/-6Hz
Low Voltage Transfer Point	90V resets to Utility Power at 94V or higher
High Voltage Transfer Point	140V resets to Utility Power at 136V or lower
Input Protection	Resettable Circuit Breaker
OUTPUT NON-BATTERY OPERATION	
Voltage Range	104 - 140VAC
Voltage Regulation	120VAC: -13.3% - +16.7%
Frequency Range	60Hz: 54 - 66Hz
Efficiency (Line Mode)	>96% (Full Load)
OUTPUT BATTERY OPERATION	
Waveform Type	Simulated Sine Wave (Step Wave)
Nominal Voltage	120VAC
Voltage Regulation	Nominal +/-5% (until Low Battery Warning)
Frequency	60Hz, +/-0.5Hz (unless synchronized to utility)
Transfer Time	6 ms Typical
Overload Capacity	AC Mode: 110% for 1-minute then shutdown, 150% Shutdown Immediately DC Mode: 110% for 20-seconds then shutdown, 150% Shutdown Immediately
Protection	Over-Current, Short-Circuit Protected and Latching Shutdown
REGULATORY COMPLIANCE	
Safety and Approvals	Conforms to UL Stds 1778 & 1449 Certified to CSA Std C22.2 No. 8 & C22.2 No. 107.3 FCC Class B

BATTERY SYSTEM	
Battery Type	Sealed, Non-Spillable, Maintenance Free, Value Regulated Lead Acid
Typical Recharge Time	8-hours to 90% capacity from a full load discharge
Typical Battery Life	3 to 5 years. Environmental factors do affect battery life. High temperatures, poor utility power, and frequent, short duration discharges have a negative impact on battery life.
SURGE PROTECTION AND FILTERING	
Voltage Protection Rating (VPR)	330V Line-Neutral
Noise Filter	Normal Mode Battery : > 30dB 130kHz – 50MHz Surge Only : > 30dB 120kHz – 50MHz Common Mode Battery : > 10dB 300kHz – 50MHz > 20dB 1.3MHz – 50MHz Surge Only : > 10dB 280kHz – 50MHz > 20dB 2.1MHz – 50MHz
Audible Noise at 1 m (3 ft.)	<30 dBA
ENVIRONMENTAL	
Operating Temperature	0 to 40°C (+32 to +104°F)
Operating Elevation	0 to 3000m (0 to +10,000 ft)
Operating/Storage Humidity	0 - 95% Non-Condensing
Storage Temperature	-15 to +45°C (+5 to +113°F)
Storage Elevation	0 to 15,000m (0 to +50,000 ft)
PHYSICAL	
Size - Net L X W X H	10.75 x 19 x 3.5"
Weight - Net	32 lbs.
Size - Shipping L X W X H	21.5 x 6.5 x 6.5"
Weight - Shipping	35 lbs