



ON Series® 700 - 2000 VA UPS User Instruction Manual

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS.

Please read and save these instructions. This manual contains important instructions for the ON Series UPS family. Follow these instructions during the unpacking, installation and maintenance of the UPS and batteries. If you have a problem with the UPS, please refer to this manual before calling POWERVAR Technical Services. The Troubleshooting section on page 51 addresses most UPS-related issues.

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Introduction

Thank you for selecting this uninterruptible power source (UPS). POWERVAR's ON Series offers the most reliable protection from the harmful effects of electrical line disturbances for your computing and communications equipment.

POWERVAR's ISO 9001 certification represents our commitment to building world-class products. We take pride in every unit that leaves our manufacturing facility.

Registering Your UPS

To ensure that your ON Series model and serial number are registered, complete and mail the enclosed postage-paid warranty card or register on line at www.powervar.com.

Technical Support

POWERVAR, Inc. offers 24-hour technical support. Contact POWERVAR Technical Services:

- North America: (800) 369-7179,
(847) 596-7000
- Europe: +44 (0) 1793 553980
- email: rmaservice@powervar.com

***NOTE:** All calls received before 7 a.m. or after 7p.m. Central Standard Time are forwarded to a cell phone. An POWERVAR Technical Service Representative will return your call within one half hour between 5 p.m. and 10 p.m. Central Standard Time. Except for emergencies, calls received between 10 p.m. and 7 a.m. will be returned during normal business hours.*

Please check with POWERVAR Technical Services before attempting to repair or return any POWERVAR product. If a POWERVAR UPS needs repair or replacement, POWERVAR Technical Services issues a Return Material Authorization (RMA) number along with instructions on how to return the UPS.

**FCC
Compliance**



ATTENTION: *Changes or modifications to this unit not expressly approved by the party responsible or in FCC compliance could void the user's authority to operate the equipment.*

This equipment was tested and complies with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the UPS is operating in a commercial environment. The UPS generates, uses, and can radiate radio frequency energy. If installation and use is not in accordance with the instruction manual, it may cause harmful interference to radio communications.



ATTENTION: *Operation of this equipment in a residential area may cause harmful radio communications interference. The user is responsible for correcting the interference.*

Safety

(English)



WARNING: *This equipment services power from more than one source. The output receptacles may have voltage even when the unit is unplugged.*

UPSs present a different safety issue than most electrical equipment because unplugging the UPS puts it into backup mode. Unplugging the UPS does not remove the electrical charge. To ensure that the UPS is off, turn the power switch OFF before unplugging the UPS from the wall outlet.



CAUTION: *Operating this equipment without proper grounding may present a risk of electrical shock.*

Do not use AC adaptors with only two conductors to connect the input line cord to the wall socket as this will not connect the earth ground to the equipment.



WARNING: *Dangerous voltages are present within this unit! There are no user-serviceable parts inside. Any repairs or modifications by the user may result in out-of-warranty repair charges, unsafe electrical conditions, or violation of electrical code.*

Do not remove the cover. All repairs should be done by qualified service personnel. Voltages inside the UPS may be lethal. Internal components are powered even when the power switch is in the OFF position. Even with the battery disconnected and the unit unplugged, energy is stored in high voltage capacitors and represents a severe shock hazard.

Sicherheitshinweise

(Deutsch)



ACHTUNG: Dieses Gerät erhält seinen Strom von mehr als einer Quelle. Die Ausgangssteckdosen führen unter Umständen Spannung, selbst wenn der Stecker des Gerätes ausgesteckt wurde.

Für USVs müssen andere Sicherheitsmaßnahmen als für die meisten Elektrogeräte ergriffen werden, da die USV durch Ausstecken in den Reservebetrieb gebracht wird. Wenn der Stecker der USV abgezogen wird, wird die elektrische Ladung hierdurch nicht entfernt. Um sicherzustellen, daß die USV ausgeschaltet ist, muß der Netzschalter auf AUS (OFF) gestellt werden, bevor der Stecker der USV aus der Wandsteckdose gezogen wird.



VORSICHT: Durch Betreiben dieses Gerätes ohne ordnungsgemäße Erdung können Elektroschocks riskiert werden.

Keine Wechselstromadapter mit nur zwei Stromleitern verwenden, um das Netzkabel an die Wandsteckdose anzuschließen, weil das Gerät hierdurch nicht an die Erde angeschlossen wird.



ACHTUNG: In diesem Gerät sind gefährliche Spannungen vorhanden! Im Inneren dieses Gerätes befinden sich keine vom Benutzer zu wartenden Teile. Durch etwaige Reparaturen oder Modifikationen durch den Benutzer können nicht von der Garantie gedeckte Reparaturkosten, gefährliche elektrische Zustände oder Verstöße gegen Stromvorschriften entstehen.

Abdeckung nicht entfernen. Alle Reparaturen sollten von qualifizierten Wartungstechnikern durchgeführt werden. Die Spannungen im Inneren der USV können tödliche Verletzungen zur Folge haben. Die internen Komponenten führen Strom, selbst wenn der Stromschalter auf AUS (OFF) steht. Auch wenn die Batterie nicht angeschlossen und der Stecker des Gerätes ausgesteckt ist, wird Energie in Hochspannungskondensatoren gespeichert, und dies bedeutet eine ernsthafte Elektroschockgefahr.

Mesures de sécurité

(Français)



AVERTISSEMENT : *Cet équipement est alimenté par plus d'une source. Des tensions peuvent être présentes aux prises de sortie, même lorsque l'unité est débranchée.*

Le problème de sécurité sur l'UPS diffère de celui de la plupart des équipements électriques, car lorsqu'il est débranché, il se met en mode de réserve. Son débranchement n'élimine pas la charge électrique. Pour s'assurer que l'UPS est hors tension, mettre l'interrupteur d'alimentation sur ARRÊT (OFF) avant de débrancher l'UPS de la prise murale.



ATTENTION : *Si cet équipement fonctionne sans être correctement mis à la terre, un risque de choc électrique peut en résulter.*

Ne pas utiliser d'adaptateurs CA n'ayant que deux conducteurs pour brancher le cordon d'alimentation dans la prise murale, car l'équipement ne serait pas mis à la terre.



AVERTISSEMENT : *Cet équipement renferme des tensions dangereuses! Il ne contient aucune pièce réparable par l'utilisateur. Toutes réparations ou modifications effectuées par l'utilisateur peuvent entraîner des frais de réparation non couverts par la garantie, un danger électrique ou l'infraction à un code électrique.*

Ne pas enlever le couvercle. Confier toutes les réparations à un personnel d'entretien qualifié. Les tensions présentes dans l'UPS peuvent être mortelles. Les composants internes de l'unité sont sous tension, même lorsque l'interrupteur d'alimentation est sur ARRÊT (OFF). Même lorsque la batterie est déconnectée et l'unité débranchée, de l'énergie est stockée dans des condensateurs à haute tension et représente un grave risque d'électrocution.

Seguridad

(Español)



ADVERTENCIA: Este equipo suministra alimentación desde más de una fuente. Los tomacorrientes de salida pueden tener voltaje aun cuando la unidad esté desenchufada.

Las UPS (fuentes de alimentación ininterrumpibles) cuentan con una característica de seguridad diferente a la mayoría de los equipos eléctricos, ya que al desenchufarse, quedan en el modo de reserva. Al desenchufar una UPS no se elimina la carga eléctrica. Para cerciorarse de que una UPS esté apagada, gire el interruptor de alimentación a la posición APAGADO (OFF) antes de desenchufar el UPS del tomacorriente mural.



PRECAUCION: El hacer funcionar este equipo sin la conexión a tierra adecuada representa un riesgo de descargas eléctricas.

No utilice adaptadores de CA con sólo dos conductores para conectar el cable de la línea de entrada al enchufe mural debido a que éste no conectará el equipo a tierra.



ADVERTENCIA: ¡Esta unidad tiene voltajes peligrosos!. En su interior no hay piezas que pueda reparar el usuario. Las reparaciones o modificaciones hechas por el usuario pueden dar como resultado cargos de reparación no cubiertos por la garantía, y producir situaciones de riesgo eléctrico o violación de los códigos eléctricos.

No retire la cubierta. Todas las reparaciones deben ser realizadas por personal de servicio calificado. Los voltajes del interior de las UPS pueden ser mortales. Los componentes internos tienen electricidad aun cuando el interruptor esté en la posición APAGADO (OFF). Incluso si la batería está desconectada y la unidad desenchufada, se almacena energía en capacitores de alto voltaje, lo cual representa un peligro grave de descarga.

Theory of Operation

The ON Series UPS has two operating modes: Conditioned AC Power and Conditioned Battery Backup.

AC Power Mode

When AC utility power is present and within the correct voltage range, the UPS provides fully conditioned power:

- Computer based equipment is protected from harmful transient voltage spikes and other electrical noise.
- UPS detector circuits continuously monitor the utility power for blackout, low voltage, and overvoltage events.

During extended low voltage periods the UPS uses ONBoost[®], a voltage boosting capability, which keeps equipment functioning properly without depleting battery power. When a line sag is detected, ONBoost raises the output voltage to keep it within an acceptable range without depleting the battery.

Battery Backup Mode

In an over- or under-voltage situation, the detector circuits determine that utility AC power is no longer in an appropriate voltage range. The UPS switches to battery power to supply continuous conditioned power.

While in backup, detector circuits monitor the return of utility AC power. The UPS synchronizes with the utility's frequency when utility AC power is available. A four- to five-second waiting period ensures that the return of utility power is more than momentary. If no further interruption occurs, the UPS switches to conditioned utility power. The equipment is supplied continuously with conditioned power even when running in battery backup mode.

Theory of Operation

If the battery becomes exhausted while maintaining the load, battery backup terminates and the UPS output turns off. A low battery warning is sounded and transmitted via the communications port approximately two minutes prior to termination of battery backup. The UPS monitors the line and provides output when utility power is restored to normal operating range.

ON Series UPS: Block Diagram of Architecture

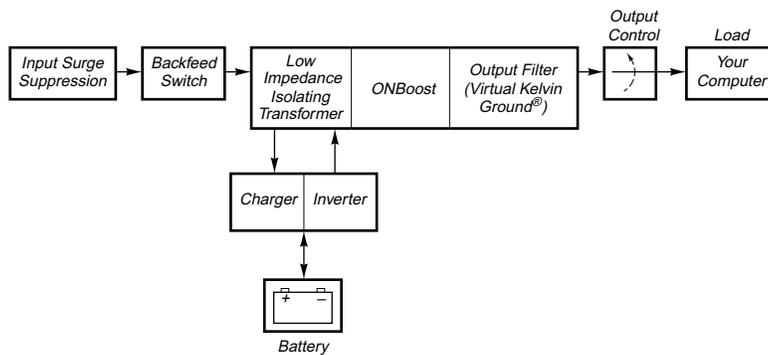


Fig. 1: ON Series UPS Architecture

Inrush Tolerance

The UPS load meter may initially display “c8” during the computer power-up sequence due to momentary current surges. The front panel display returns to “99” or less as long as the load of the running equipment is at 100 percent or less.

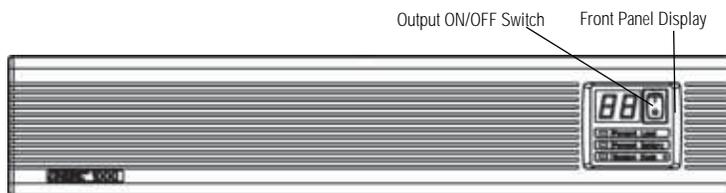


Fig. 2: ON Series UPS Front View

Output Overload Protection

During normal operation, electronic output overload protection is active. If the output is loaded to more than 105 percent of the UPS rating, battery power to the UPS is not available. The digital display for output overload is “c8.” If the output load exceeds 125 percent, the output turns off completely after two seconds and the digital display reads “c9.” To reset, turn the UPS OFF, remove some of the load, then turn the UPS ON. (For GS compliance: The power distribution system for all models is type TN.)

Input Protector

A grossly overloaded UPS trips the rear panel circuit breaker. The front panel display reads “c1.” To reset the circuit breaker, push the button in.

- If the circuit breaker trips repeatedly following reset, unplug the equipment from the UPS output receptacles and reset the circuit breaker once again.
- If operation appears to be normal, check the total equipment load. Add your equipment to the output one device at a time. Check the front panel display after each device is powered ON.
- If the circuit breaker trips with nothing plugged into the output receptacles, there may be an internal problem with the UPS. Call POWERVAR Technical Services for assistance (refer to page 1).

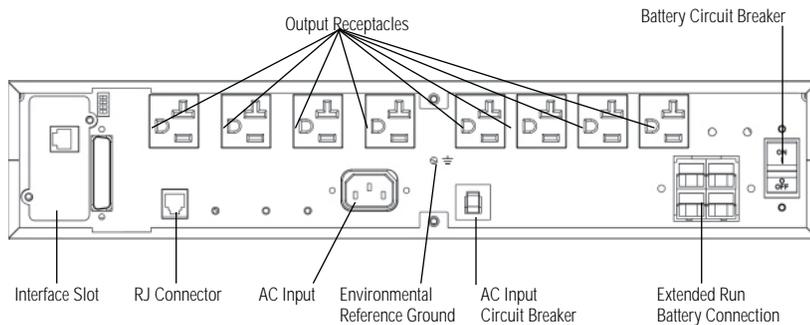


Fig. 3: Back View of an ON700A, ON1000A or ON1500A

Setup and Installation

Inspection and Unpacking

Previous experience with UPS operation is not required prior to operating ON Series units.

Before shipment, this product was tested, inspected, and found to be free of mechanical and electrical defects. Upon receipt of your UPS, carefully examine the packing containers for any sign of physical damage. Notify the carrier immediately if damage is present.

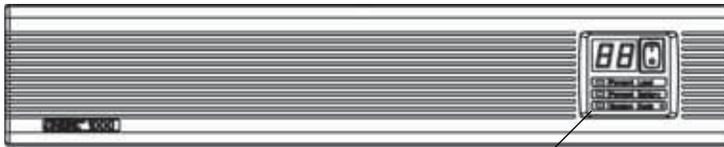
Carefully unpack the UPS. Retain the packaging materials for reuse (refer to page 56, Return Procedure) or dispose of the materials properly.

Once unpacked, inspect and test the unit for any hidden damage that may have occurred in transit. If any damage is evident, contact POWERVAR Technical Services immediately (refer to page 1) to correct the problem.

 **CAUTION:** Do not attach laser printers to the UPS. A laser printer periodically draws significantly more power during use and may overload the UPS.



Testing



Front Panel Display

Fig. 4: ON Series Front View

Before connecting the UPS to other equipment, plug the UPS into an AC-powered wall outlet and turn the battery circuit breaker and the UPS ON. When selecting a location for your UPS, be sure that the unit is near the wall outlet and is easily accessible. After the self-tests are completed, the digital display

on the front should read “00” and the “Percent Load” light should be on. If the digital display reads differently, refer to System Status Codes beginning on page 53. When the digital display reads “00,” the UPS is ready for use.

***NOTE:** If the battery is not fully charged, the digital display may read “c4.” This condition may exist for 4 – 12 hours if a unit has been stored.*

Environmental Reference Ground®

The UPS provides a common ground point for system components and static protection devices; network cable segments that require shield grounding; static control devices such as floor mats, table mats, static-free work benches; or any other device that requires a reference ground connection. For use, remove the green screw on the back panel (fig. 3), attach a ground cord connector, and reinstall the screw.

Setup Precaution

The percent of UPS capacity in use is displayed on the front panel of the UPS. As long as the display reads “99” or less when the AC line is present and your equipment is running, the UPS is not overloaded. If the front panel displays “c8” or “c9,” the unit is overloaded. Remove some of the load until the front panel displays “99” or less.

Long Term Storage

Improper long-term UPS storage may damage the UPS battery and invalidate the battery warranty. Unplugging a UPS from its AC utility power source for an extended period of time results in lost battery charge. Restoration of charge to maximum capacity requires 24 – 48 hours. For standard models, the System code may show a “c4” for 2 – 4 hours after utility power is restored. For extended runtime models, the system code “c4” may show for 2 – 4 hours per battery cabinet.

To keep the battery enclosure fully charged and to maximize the life of the battery, plug the UPS into an outlet while it is in storage. If the UPS is stored

Setup and Installation

without power access, plug it into a power source for 24 hours at least once every 4 – 6 months.



ATTENTION: *If the storage temperature is greater than 30°C (86°F) plug the UPS into a power source for 24 hours every 2 to 3 months.*



ATTENTION: *The UPS should not be stored at temperatures below -15°C (+5° F).*

Ventilation

The ventilation requirement for ON Series UPSs is 2 inches (50 mm) minimum clearance on all sides. When rack mounted, other equipment may be mounted immediately above and below.

Grounding the Unit

To eliminate shock hazard, connect the unit to a properly grounded AC receptacle.

Before applying power, verify that the available line voltage matches the voltage listed on the rear-panel label.



CAUTION: *Interruption of the protective grounding conductor or disconnection of the protective earth terminal presents a potential shock hazard that could result in personal injury and damage to the equipment.*

NOTE: *When connecting the UPS, make sure that the receptacle has power available and is not controlled by a wall switch.*

Rack Mounting UPSs or External Battery Cabinets

The Universal Mount ON Series UPSs and the ONXBCU-417 External Battery Cabinet are designed to be rack mounted in either two-post telecomm style frames or four-post full cabinet style frames. The UPS and external battery cabinets use identical mounting hardware and the procedure for mounting either is the same.

NOTE: *The Rackmount UPS draws cooling air from the front. If the rack has a door on the front, make sure that there is some clearance between the vents and the rack door.*

Because of the weight of these cabinets two people are recommended to lift and hold into position while all fasteners are secured. Please use only the supplied fasteners to attach the supplied mounting brackets to the UPS or External Battery Cabinet.

Before installing, you will need to determine which mounting configuration is appropriate for your installation and proceed to the Center Mounting or Four-Post Mounting instructions. You should also determine the appropriate fasteners for your rack if they were not provided by the rack manufacturer. Each UPS and External Battery Cabinet requires eight (8) fasteners and sixteen (16) for the ON2000 UPS.

If ONXBCU-417 External Battery Cabinets are included in your installation, please mount them first and as low as possible. Start with the lowest available position and work up. Your UPS should be installed last and end up on the top of all the battery cabinets for proper cable routing.



ATTENTION: Use all supplied mounting hardware on each UPS and External Battery Cabinet. NEVER depend on lower devices to support other devices.

After mechanical installation is complete, follow the instructions in “Connections” on page 24. Connect your UPS and external battery cabinets.

Center Mounting For 19” Two-Post Style Racks



ATTENTION: Two people are recommended for safe installation.

1. Attach one small angled mounting bracket to each side of the cabinet at the forward mounting holes (see fig. 5) (two angled mounting brackets for each side of the ON2000 Universal Mount. See fig. 7).
2. Place four (4) of the #6-32 screws, provided, through the four round single holes in each bracket (see fig. 5). Use all eight (8) screws for the ON2000 Universal Mount (See fig. 7).

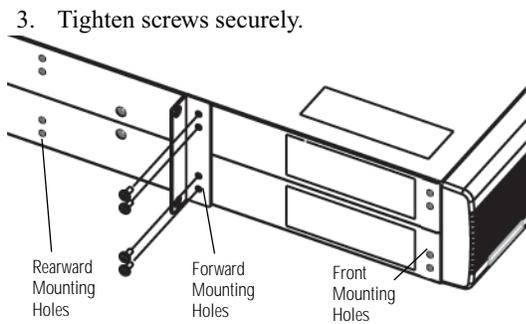


Fig. 5: Attaching the Angled Brackets (700, 1000, and 1500 models)

4. Using two people, lift the cabinet into position from the front of the rack.
5. Secure the ears of the brackets to the front side of the rack posts with four (4) fasteners (not provided) (see fig 6). The ON2000 Universal Mount uses eight (8) fasteners (not provided). See figure 7.
6. Attach one large angled mounting bracket to each side of the cabinet at the rearward mounting holes (two angled mounting brackets for each side of the ON2000 Universal Mount. See figure 7.).
7. Place four (4) of the #6-32 screws provided through the four long slotted holes in the long side of each bracket. Use all eight (8) #6-32 screws provided for the ON2000 Universal Mount. Do not tighten completely.
8. Slide the rearward mounting brackets forward to contact the rack posts and attach with four (4) fasteners (not provided) - eight (8) fasteners for the ON2000 (see fig 6).
9. Tighten all fasteners securely.

Setup and Installation

NOTE: DO NOT OVER TIGHTEN since these are thread forming screws.

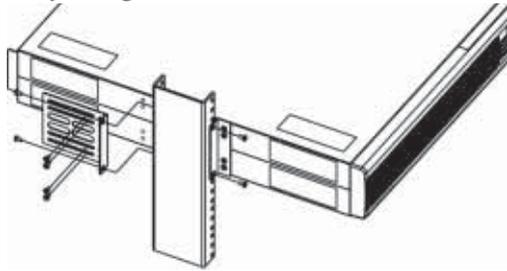


Fig. 6: Positioning the Unit onto the Center Mount Rails

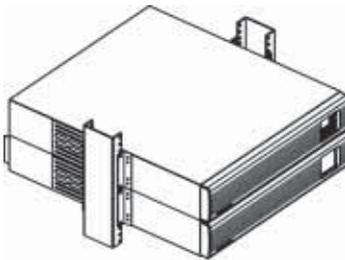


Fig. 7: Attached Angled Brackets (2000 model)

After mechanical installation is complete, follow the instructions in “Connections” on page 24. Connect your UPS and external battery cabinets.

Four-Post Mounting For Cabinet Style Racks



ATTENTION: Two people are recommended for safe installation.



WARNING: Never attempt to mount the UPS or external battery cabinet with the front mount ears only. Continuous support is required throughout the mounting procedure to prevent damage or injury.

1. Attach one small angled mounting bracket to each side of the cabinet at the front mounting holes (two angled mounting brackets are required for each side for the ON2000 Universal Mount).

Setup and Installation

- Place four (4) of the #6-32 screws provided through the four round single holes in each bracket on each side (fig. 8). Use all eight (8) #6-32 screws provided for the ON2000 UPS on each side.
Tighten securely.

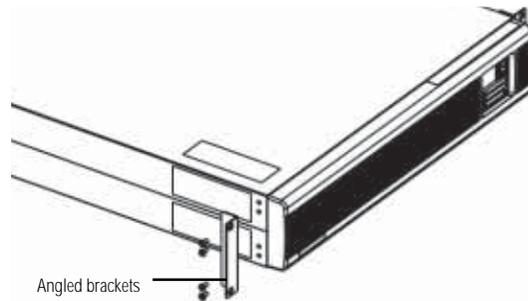


Fig. 8: Attaching Angled Brackets (700, 1000, 1500 models)

- Determine the exact height and mounting location for the installed cabinet.
- Place the two large angled mounting brackets at the rear rack support rails with the long sides facing inward (fig. 9). Secure with four (4) rack fasteners (not provided). The ON2000 Universal Mount uses eight (8) fasteners (not provided).

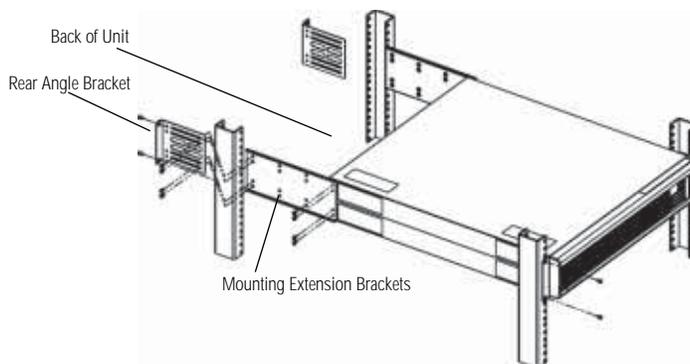


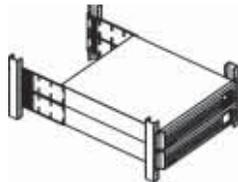
Fig. 9: Attaching the Back Angled Brackets

Setup and Installation

5. Measure the distance from the front side of the front support rail to the rear side of the rear support rail.

NOTE: *If this distance is greater than 22" you will need to use the mounting extension brackets. If mounting extension brackets are necessary, proceed to step 6. If they are not necessary, proceed to step 7.*

6. Mounting extension brackets are flat with a small lip along each long side. The lip should face away from the cabinet. Attach one to each side of the cabinet using four (4) of the #6-32 screws, provided, through the four (4) round clearance holes (fig. 9) and tighten securely.
For the ON2000, attach two mounting extension brackets to each side of the cabinet using eight (8) of the #6-32 screws, provided, through the eight (8) round clearance holes and tighten securely. See figure 10.
7. Using two people, lift the cabinet into position from the front of the rack and slide the extension brackets (if used) into the rear angled mounting brackets.
8. Secure the ears of the front brackets to the front side of the rack posts with four (4) rack fasteners (not provided). The ON2000 Universal Mount uses eight (8) fasteners (not provided).
9. Secure each rear angled mounting brackets to the cabinet or extension brackets with four (4) of the #6-32 screws provided, eight (8) for the ON2000 Universal Mount (fig 9). Tighten securely.



10. Attached Angled Brackets (2000 model)

After mechanical installation is complete, follow the instructions in “Connections” on page 24. Connect your UPS and external battery cabinets.

Floor Standing UPS and External Battery Cabinets

The ON Series XAU UPSs and the ONXBCU-417 External Battery Cabinet are designed to be floor standing as an alternative to rack mounting. The UPS and external battery cabinets use identical mounting hardware and the procedure for mounting is the same for both.



ATTENTION: Use all supplied mounting hardware on each UPS and External Battery Cabinet.

Please use only the supplied fasteners to attach the supplied mounting brackets to the UPS or External Battery Cabinet. Each UPS and External Battery Cabinet requires eight (8) of the #6-32 screws provided per side.

After mechanical installation is complete follow the instructions in the section titled “Connections” on page 24 to connect your UPS and external battery cabinets.

Display Rotation

When the ON Series UPSs are to be floor standing vertically, the front panel LED display can be rotated to a vertical orientation for easier viewing.

Setup and Installation

NOTE: When in the vertical orientation, the end with the vents must be used as the bottom.

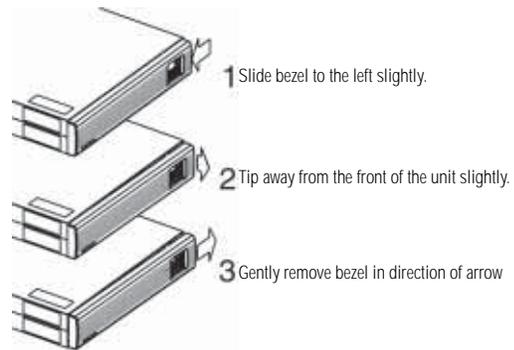


Fig. 10: Removing Front Bezel

1. Slide the bezel to the left (bottom) slightly, tip away from front of the unit slightly and then gently pull away from the UPS in direction of arrow (see fig. 10, number 3) to remove.
2. Carefully grasp the display and rotate clockwise one quarter turn (90°), to the desired position.

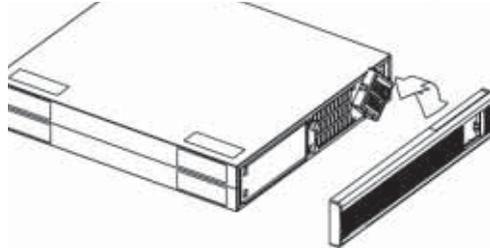


Fig. 11: Rotating Display

3. Replace the front bezel by reversing all three steps in fig 10.

Vertical Floor Standing UPS

1. Set the UPS horizontally.
2. Attach the two stabilizing foot brackets to the bottom (vent end) of the UPS using eight (8) of the #6-32 screws provided (fig. 12).

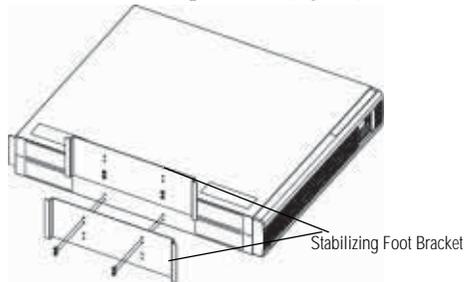


Fig. 12: Attaching Foot Brackets

3. Lift the top of the UPS to stand the unit onto its stabilizing feet (fig. 13).

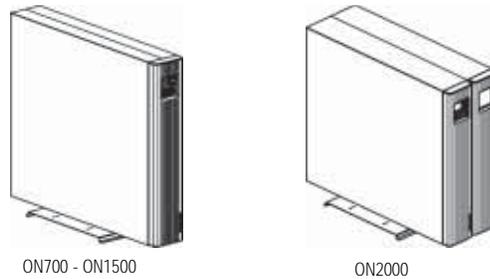


Fig. 13: Vertical Floor Standing UPS

Vertical Floor Standing UPS Plus External Battery Cabinet

1. Set the battery cabinet horizontally.
2. Attach the two stabilizing foot brackets to the bottom (vent end) of the battery cabinet using eight (8) of the #6-32 screws provided (fig. 14).

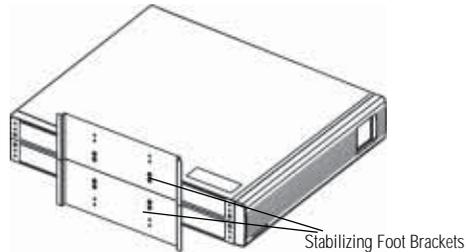


Fig. 14: Attaching Foot Brackets to External Battery Cabinet

3. Position the UPS on top of the External Battery Cabinet so that the holes in the bottom of the UPS cabinet align with the extra holes in the External Battery Cabinet's stabilizing foot bracket. Secure with the four (4) #6-32 screws provided (fig. 15).

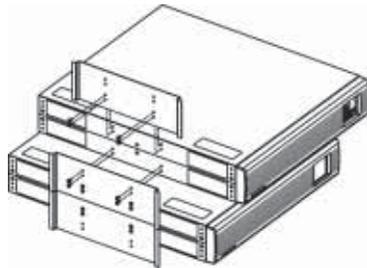


Fig. 15: Attaching Foot Brackets to the UPS

4. Attach one of the UPS's stabilizing foot brackets to the bottom of the UPS just above the joining foot bracket already installed. Use four (4) of the #6-32 screws provided (fig. 15). Make sure all of the screws on the bottom of the set are tightened securely.

Setup and Installation

5. Attach the remaining foot bracket to the top of the External Battery Cabinet/UPS combination to bridge the two cabinets. Securing with the eight (8) #6-32 screws provided (fig. 16).

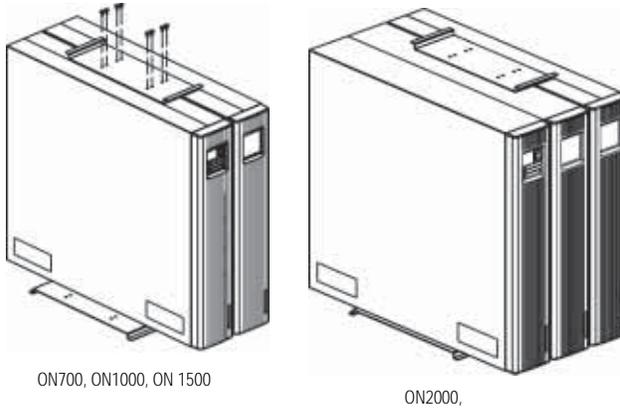


Fig. 16: Attaching Bracket to Top of Units

6. Lift from the top end of the UPS to stand the unit onto its stabilizing feet.

Fig. 17: Vertical Floor Standing UPS Plus External Battery Cabinet

After mechanical installation is complete, follow the instructions in “Connections” on page 24. Connect your UPS and external battery cabinets.

Horizontal Floor Standing UPS and External Battery Cabinets

1. Set the battery cabinet horizontally.
2. Position one foot bracket to each side of the battery cabinet half way above the cabinet so that the bottom holes in the foot align with the upper holes in the cabinet (fig. 18). Secure each sides with four (4) of the #6-32 screws provided.

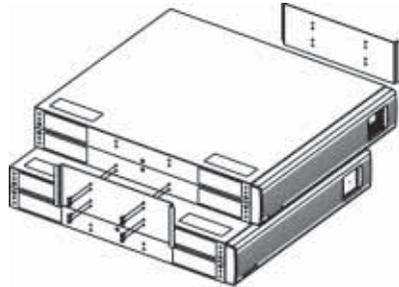


Fig. 18: Attaching Foot Brackets

3. Position the UPS on top of the External Battery Cabinet so that the holes in the bottom align with the extra holes in the External Battery Cabinet's stabilizing foot bracket. Secure each sides with the four (4) #6-32 screws provided (fig. 18).

Connections

Connecting Stand Alone UPS

1. Attach the AC line cord to the input on the back panel of the UPS and then to a properly grounded AC wall receptacle.
2. Make sure the battery circuit breaker in the ON position.
3. Plug the load equipment into the UPS.
4. Turn the front-panel switch ON.

Connecting External Battery Cabinets

To extend runtime by adding ONXBCU-417 external battery cabinets, there are two connections that need to be made: the battery power cable and the RJ cable.

The six-pin RJ cable allows the power unit to count the number of battery cabinets connected. If the connection is incorrect or incomplete, runtime reporting and assessment of the batteries will be inaccurate.

Connecting the UPS and One Battery Cabinet

Standard and Rack-Mount Systems

POWERVAR ONXBCU-417 battery packs can be installed or replaced without turning off the power or disrupting the protected equipment. However, a change in the number of external battery cabinets will not be logged until the UPS has been shut down and re-started.

NOTE: *The extended run battery back up is not available if the battery circuit breaker is in the "OFF" position.*

1. Remove the terminating plug (with wire loop) from the six pin RJ connector on the UPS and set aside.
2. Connect an RJ data cable (supplied with each Battery Cabinet) from the Battery Cabinet's eight-pin RJ connector (marked "IN") to the six-pin RJ connector on the UPS.

ON Series User Instruction Manual

Setup and Installation

A terminating port plug (with wire loop) is supplied in each Battery Cabinet's six-pin RJ connector port (marked "OUT"). **Leave it in place.** The UPS will not operate properly with the termination plug removed.

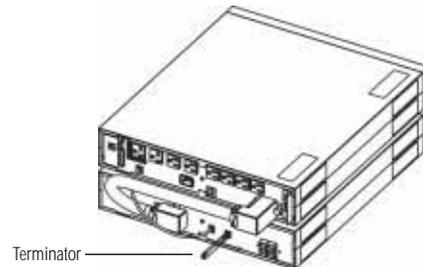


Fig. 19: Connecting One Battery Cabinet

3. Connect the Battery Cabinet's power cable to the UPS. Secure the cable with captive screws at each side flange. The Battery Cabinet's power input is not used.
4. Turn the battery circuit breaker to the "ON" position.
5. Attach the AC line cord to the input on the back panel of the UPS and then to a properly grounded AC wall receptacle.
6. Plug the load equipment into the UPS.
7. Turn the front-panel switch ON.

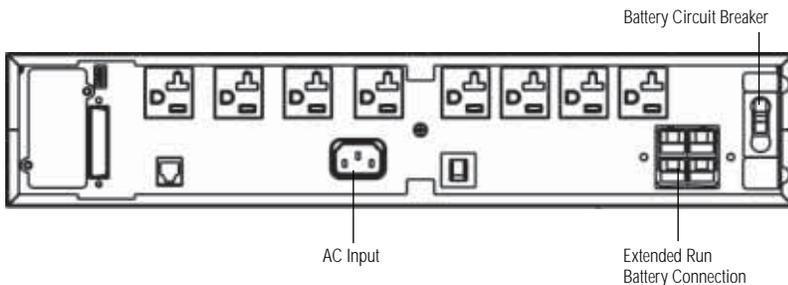


Fig. 20: Rear View of UPS

Connecting the UPS and Multiple Battery Cabinets

Standard and Rack-Mount Systems

POWERVAR ONXBCU-417 battery packs can be replaced without turning off the power or disrupting the protected equipment. However, a change in the number of external battery cabinets will not be logged until the UPS has been shut down and re-started.

NOTE: *The extended run battery back up is not available if the battery circuit breaker is in the "OFF" position.*

1. Remove the terminating plug (with wire loop) from the six-pin RJ connector on the UPS and all but the last Battery Cabinet. Set these aside. Only one terminating plug is required for the system.
2. Connect an RJ data cable (supplied with each Battery Cabinet) from the closest Battery Cabinet's eight-pin RJ connector (marked "IN") to the six-pin RJ connector on the main unit.
3. Connect another RJ data cable from the next Battery Cabinet's eight-pin RJ connector (marked "IN") to the closest Battery Cabinet's six-pin RJ connector (marked "OUT"). Continue this process until RJ cables connect all Battery Cabinets in a "chain."
4. ***Leave the terminating plug installed in the last Battery Cabinet's six-pin RJ port (marked "OUT"). The UPS will not operate properly with this termination plug removed.***

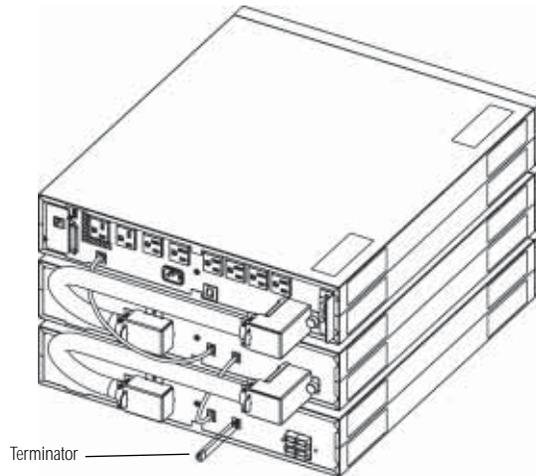


Fig. 21: Connecting Multiple Battery Cabinets

5. Connect the closest Battery Cabinet's power cable to the UPS. Secure the cable with captive thumb-screws (supplied) at each side flange.
6. Connect the next Battery Cabinet's power cable to the closest Battery Cabinet's power input. Secure the cable with captive thumb-screws on each side flange. Continue this process until power cables connect all Battery Cabinets in a "chain." The last Battery Cabinet's power input is not used.
7. Be sure the battery circuit breaker on the UPS is in the "ON" position.

Setup and Installation

8. Attach the AC line cord to the input on the back panel of the UPS and then to a properly grounded AC wall receptacle.
9. Plug the load equipment into the UPS.
10. Turn the front-panel switch ON.

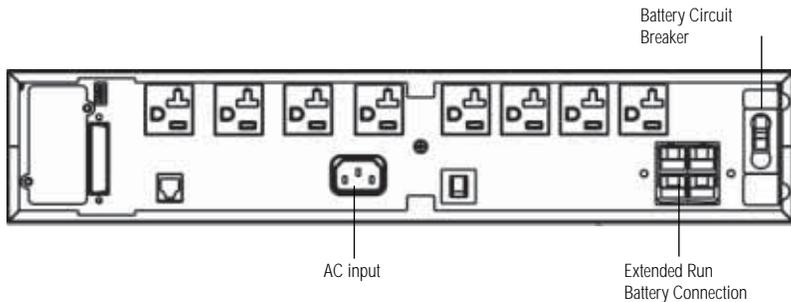


Fig. 22: Rear View of UPS

Front Panel Features and Controls

Power ON/Standby Switch

With the UPS plugged in, operate the ON (|) switch to supply power to the loads. The loads are immediately powered.



Fig. 23: ON Series UPS Power Switch

To turn OFF the UPS's output power, press the standby (⏻) power switch. The UPS ON switch can be used as a master ON/OFF switch for the protected equipment.

NOTE: This switch controls output power only. The UPS will continue to operate the battery charger and control circuits even when front panel switch is in standby (⏻) position.

NOTE: If the battery is not fully charged, the digital display may read "C4." This condition may exist for 4-12 hours if a unit has been stored.

Front Panel Display

Three display lights operate in conjunction with a digital display on the front panel to show system status:

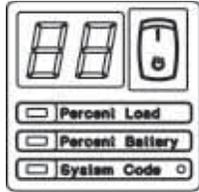


Fig. 24: Front Panel Display

Table 1. Front Panel Display Light Description

1	Percent Load	When the "Percent Load" light is on, the digital display shows the percentage of capacity in use, in one percent increments, with full load displayed as "99".
2	Percent Battery	When the "Percent Battery" light is on, the digital display indicates the relative amount of battery runtime available, in five percent increments, during an AC line power failure.
3	System Code	When the "System Code" light is on, an unusual condition exists. Refer to pages 53 and 53 for the System Status Code labels included in the rear of this manual to interpret the reading.

NOTE: The front panel display on the universal mount ON Series UPS can be rotated for easier viewing. See "Display Rotation" on page 18 for complete instructions.

Setup and Installation

Back Panel DIP Switch Settings

DIP switches are located on the rear panel of the UPS.

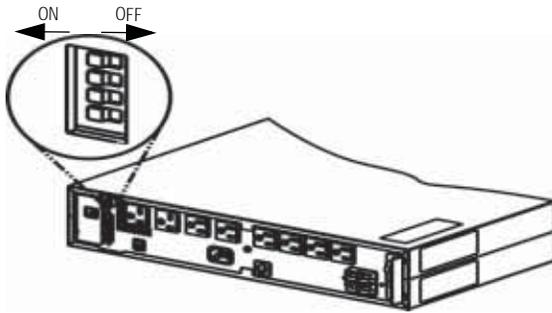


Fig. 25: ON Series Dip Switches

The following table describes the switch settings and their corresponding configurations.

Table 2. DIP Switches

Switch	Description	Off	On
1	Interface port configuration	ADVANCED	BASIC
2	Interface port baud rate	1200	9600
3*	UPS frequency	50 Hz	60 Hz
4	Reserved		

Switches 1 and 2: Units are shipped with the interface preset to “Advanced” and “9600” to support POWERVAR's most popular UPS monitoring software accessory kits. Follow the special instructions in the accessory kit, or refer to Appendix A for information on supporting third party interface software.

*Switch 3: This switch is only applicable to the 50/60 Hz switchable models. Its setting has no affect on the 120 V, 60 Hz “A” models.

Features and Specifications

The ON Series product family was designed for various power environments. Each part number includes a letter. This letter identifies the power environment. Please specify the part number and letter when ordering

- 120, 60Hz applications=A.
Example: ON700XAU-SN.

Features

- Full output isolation and power conditioning with Virtual Kelvin Ground output filtering
- Five-year warranty on power and control systems
- Two-year warranty on batteries
- Sinusoidal inverter wave form, load regulated
- Intelligent battery management system:
 - Battery condition monitoring and status alerts
 - Low battery indication
 - ONBoost, low line voltage compensation without battery depletion
 - Inverter shutdown control
 - Hot-Swap, user replaceable batteries
 - Battery charge indicator
- Agency listings/approvals: UL, cUL, FCC
- System intelligence and communications:
 - Basic Interface supports Novell, BANYAN, Lan Server, and Windows NT
 - Advanced RS-232 UPS control language support information required for IETF UPS MIB conformance
 - Auxiliary interface expansion port
 - Programmable switchover thresholds
 - Intelligent runtime estimates
 - Unit identification stored in memory for remote asset management
 - Digital load meter with output overload protection and recovery indication

Features and Specifications

UPS Monitoring Interfaces

UPS monitoring interfaces are powerful network management tools. They enhance systems fault tolerance by providing automatic shutdown and restart, and allow network managers to access vital power and UPS status information. Basic interfacing provides signals to shutdown Lan Manager, Lan Server, and Windows NT environments.

Physical and Electrical Specifications

Performance Characteristics For All Models

Surge voltage withstand capability: ANSI/IEEE C62.41 Category A&B, 6 kV/200 & 500 Amp, 100 kHz Ringwave

Surge voltage let-through (max): less than 10 V Normal mode (L-N), less than 0.5 V Common mode (N-G) when subjected to 6 kV ANSI/IEEE C62.41 Cat. A

Normal & common mode clamping response time: instantaneous

Transfer time (typical/max): < 3.0 / 3.5 milliseconds

ONBoost: boosts output voltage 11% above input voltage if between -21% & -15% of nominal

Load power factor range (crest factor): full load .7 to 1.0 (3) — will support smaller loads rated 0.5 to 1.0 (<5)

Inverter waveform total harmonic distortion: < 3% THD Sinewave, no load, typical

Environmental Considerations: Ambient operation is 10,000 feet (3,000 meters) maximum elevation, 0 – 95% humidity non-condensing, and 32 – 104°F (0 – 40°C)

Batteries: sealed, maintenance-free lead acid with a 3 – 6 year typical lifetime

Recharge time to 60% available capacity: 4 hours per battery cabinet

All units have temperature sensitive chargers and provide thermal isolation for battery pack.

Features and Specifications

Specifications

Table 3. ON Series 700-1000 VA UPS and Battery Specifications

	ON700	ON1000	ONXBCU Ext. Battery
Part numbers (60 Hz, SN models) (60 Hz, TN models) (60 Hz, CN models) 50/60 Hz, SN models	ON700XAU-SN NA ON700XAU-CN ON700XIU-SN	ON1000XAU-SN NA ON1000XAU-CN ON1000XIU-SN	ONXBCU-417
Input connector* (60 Hz, SN model) (60 Hz, CN model) (50/60 Hz, SN model)	5-15P L5-20P IEC320/C14	5-15P L5-20P IEC320/C14	NA
Output sockets: NEMA (60 Hz, SN model) NEMA (60 Hz, CN model) (50/60 Hz, SN model)	(8) 5-20R (T)** (4) L5-20R & (4) 5-20R (T)** (8) IEC320/C13		NA
Maximum height - in (cm)	3.5 (9)	3.5 (9)	3.5 (9)
Maximum width - in (cm)	17.25 (44)	17.25 (44)	17.25 (44)
Maximum depth - in (cm)	19.5 (50)	19.5 (50)	19.5 (50)
Net weight - lbs (kg)	55 (25)	55 (25)	75 (34)
Shipping weight - lbs (kg)	65 (30)	65 (30)	85 (39)
Nominal input voltage (VAC): 60 Hz 50/60 Hz	120 230	120 230	NA NA
Waveform	sine wave	sine wave	NA
Maximum capacity (volt-amps) (watts)	700 490	1000 700	NA
Batteries: sealed, maintenance-free lead acid, 3–6 yr. typical life	Four, 12 V, 5 AH	Four, 12 V, 5 AH	Four 12 V, 17 AH
Runtime by system load*** half load full load	32 min. 14 min.	21 min. 9 min.	NA NA
Efficiency (%) on utility, 100% load	90	90	NA
<p>* 60 Hz units include a 6 ft. detachable input cord. 50/60 Hz units include an IEC320 M/F detachable cord. ** "I-slot" output connector will accept either 5-15P or 5-20P plugs. *** Due to application specific conditions, runtimes may vary.</p>			

Features and Specifications

Table 4. ON Series 1500 and 2000 VA UPS and Battery Specifications

	ON1500	ON2000	ONXBCU Ext. Battery
Part numbers (60 Hz, SN model) (60 Hz, TN model) (60 Hz, CN model) (50/60 Hz, SN model)	ON1500XAU-SN NA ON1500XAU-CN ON1500XIU-SN	ON2000XAU-SN ON2000XAU-TN ON2000XAU-CN ON2000XIU-SN	ONXBCU-417
Input connector* (60 Hz, SN model) (60 Hz, TN model) (60 Hz, CN model) (50/60 Hz, SN model)	5-15P NA L5-20P IEC320/C14	5-20P L5-20P L5-20P IEC320/C20	NA
Output sockets: NEMA (60 Hz, SN model) NEMA (60 Hz, TN model) NEMA (60 Hz, CN model) (50/60 Hz, SN mode)	(8) 5-20R (T)** NA (1) L5-20R & (4) 5-20R (T)** (8) IEC320/C13	(8) 5-20R (T)** (4) L5-15R & (4) 5-20R (T)** (2) L5-20R & (4) 5-20R (T)** (8) IEC320/C13	NA
Maximum height - in (cm)	3.5 (9)	7 (18)	3.5 (9)
Maximum width - in (cm)	17.25 (44)	17.25 (44)	17.25 (44)
Maximum depth - in (cm)	19.5 (50)	19.5 (50)	19.5 (50)
Net weight - lbs (kg)	61 (28)	96 (44)	75 (34)
Shipping weight - lbs (kg)	71 (32)	112 (51)	85 (39)
Nominal input voltage (VAC): 60 Hz 50/60 Hz	120 230	120 230	NA NA
waveform	sine wave	sine wave	NA
Maximum capacity (60 Hz) volt-amperes (watts) (50/60 Hz)	1440 (1000) 1440 (1000)	1920(1345) 2000 (1400)	NA
Batteries: sealed, maintenance-free lead acid, 3-6 yr. typical life	Four 12 V, 5 AH	Eight 12 V, 5 AH	Four 12 V, 17 AH
Runtime by system load*** half load full load	13 min. 5 min.	15 min. 6 min.	NA NA
Efficiency (%) on utility, 100% load	90	90	NA
<p>* 60 Hz units include a 6 ft. detachable input cord. 50/60 Hz units include an IEC320 M/F detachable cord. ** "T-slot" output connector will accept either 5-15P or 5-20P plugs. *** Due to application specific conditions, runtimes may vary.</p>			

Features and Specifications

Runtime Estimates

Table 5. UPS Runtimes with Internal Batteries

Percent of Capacity	ON700	ON1000	ON1500	ON2000XAU	ON2000XIU
Runtimes are expressed in hours:minutes. Typical runtimes based on fully charged, new batteries operating under typical load conditions. Runtimes are affected by battery age, ambient temperature, site specific UPS usage patterns and load characteristics. Your actual runtime may be different.					
10	2:42	2:00	1:27	1:14	1:12
20	1:27	1:00	0:40	0:40	0:38
30	0:57	0:38	0:25	0:26	0:25
40	0:41	0:27	0:17	0:19	0:18
50	0:32	0:21	0:13	0:15	0:14
60	0:26	0:17	0:10	0:12	0:11
70	0:21	0:14	0:09	0:10	0:09
80	0:18	0:12	0:07	0:08	0:08
90	0:16	0:10	0:06	0:07	0:07
100	0:14	0:09	0:05	0:06	0:06

NOTE: Runtimes in the above chart are based on tests using switched-mode power supply.

Features and Specifications

Table 6. ON700 Extended Runtime UPS Runtimes

Percent of Capacity	Number of Battery Cabinets							
	1	2	3	4	5	6	7	8
<p><i>Runtimes are expressed in hours:minutes.</i> <i>Typical runtimes based on fully charged, new batteries operating under typical load conditions.</i> <i>Times estimated assuming a switch mode power supply.</i> <i>Runtimes are affected by battery age, ambient temperature, site-specific UPS usage patterns and load characteristics.</i></p>								
10	14:44	30:13	47:58	67:30	88:31	110:50	134:17	158:47
20	7:52	16:07	25:36	36:01	47:14	59:09	71:40	84:44
30	5:09	10:33	16:45	23:35	30:55	38:43	46:55	55:28
40	3:44	7:40	12:10	17:07	22:27	28:06	34:03	40:16
50	2:53	5:55	9:24	13:14	17:21	21:44	26:20	31:08
60	2:20	4:47	7:35	10:40	14:00	17:31	21:14	25:06
70	1:56	3:58	6:18	8:52	11:38	14:34	17:38	20:52
80	1:39	3:23	5:21	7:32	9:53	12:23	15:00	17:44
90	1:26	2:55	4:38	6:32	8:33	10:43	12:59	15:21
100	1:15	2:34	4:04	5:44	7:31	9:24	11:24	13:29

NOTE: Runtimes shown are based on calculated values.

Features and Specifications

Table 7. ON1000 Extended Runtime UPS Runtimes

Percent of Capacity	Number of Battery Cabinets							
	1	2	3	4	5	6	7	8
<i>Runtimes are expressed in hours:minutes. Typical runtimes based on fully charged, new batteries operating under typical load conditions. Times estimated assuming a switch mode power supply. Runtimes are affected by battery age, ambient temperature, site specific UPS usage patterns and load characteristics.</i>								
10	10:51	22:14	35:19	49:42	65:10	81:35	98:52	116:54
20	5:26	11:08	17:40	24:51	32:36	40:49	49:27	58:28
30	3:27	7:05	11:15	15:49	20:45	25:59	31:29	37:13
40	2:25	5:04	8:02	11:18	14:50	18:34	22:30	26:36
50	1:53	3:52	6:09	8:39	11:21	14:13	17:13	20:21
60	1:31	3:06	4:55	6:56	9:05	11:23	13:47	16:18
70	1:15	2:34	4:04	5:44	7:31	9:24	11:24	13:29
80	1:04	2:10	3:27	4:51	6:22	7:58	9:39	11:25
90	0:55	1:52	2:59	4:11	5:29	6:52	8:20	9:51
100	0:48	1:38	2:36	3:40	4:48	6:01	7:18	8:37

NOTE: Runtimes shown are based on calculated values.

Features and Specifications

Table 8. ON1500 Extended Runtime UPS Runtimes

Percent of Capacity	Number of Battery Cabinets							
	1	2	3	4	5	6	7	8
<p>Runtimes are expressed in hours:minutes. Typical runtimes based on fully charged, new batteries operating under typical load conditions. Times estimated assuming a switch mode power supply. Runtimes are affected by battery age, ambient temperature, site specific UPS usage patterns and load characteristics.</p>								
10	8:31	17:39	28:10	39:45	52:13	65:27	79:22	93:54
20	3:56	8:09	13:00	18:21	24:06	30:13	36:38	43:21
30	2:25	5:01	8:01	11:19	14:51	18:37	22:35	26:43
40	1:42	3:32	5:38	7:57	10:26	13:05	15:51	18:46
50	1:17	2:40	4:16	6:01	7:54	9:54	12:00	14:12
60	1:01	2:07	3:23	4:47	6:17	7:52	9:32	11:17
70	0:51	1:45	2:47	3:56	5:10	6:28	7:51	9:17
80	0:43	1:28	2:21	3:19	4:21	5:27	6:37	7:50
90	0:37	1:16	2:01	2:51	3:45	4:42	5:41	6:44
100	0:31	1:04	1:42	2:24	3:09	3:57	4:48	5:40

NOTE: Runtimes shown are based on calculated values.

Features and Specifications

Table 9. ON2000 “A” Model Extended Runtime UPS Runtimes

Percent of Capacity	Number of Battery Cabinets							
	1	2	3	4	5	6	7	8
<i>Runtimes are expressed in hours:minutes. Typical runtimes based on fully charged, new batteries operating under typical load conditions. Times estimated assuming a switch mode power supply. Runtimes are affected by battery age, ambient temperature, site specific UPS usage patterns and load characteristics.</i>								
10	4:36	8:45	13:28	18:38	24:10	30:02	36:11	42:36
20	2:28	4:42	7:14	10:00	12:59	16:08	19:26	22:53
30	1:37	3:05	4:45	6:34	8:31	10:35	12:45	15:01
40	1:11	2:15	3:27	4:47	6:12	7:42	9:17	10:55
50	0:55	1:44	2:40	3:42	4:48	5:58	7:11	8:27
60	0:44	1:24	2:09	2:59	3:52	4:48	5:48	6:49
70	0:37	1:10	1:48	2:29	3:13	4:00	4:49	5:40
80	0:31	1:00	1:32	2:07	2:44	3:24	4:06	4:49
90	0:27	0:52	1:19	1:50	2:22	2:57	3:33	4:11
100	0:24	0:45	1:10	1:36	2:05	2:35	3:07	3:40

NOTE: Runtimes shown are based on calculated values.

Features and Specifications

Table 10. ON2000 “I” Model Extended Runtime UPS Runtimes

Percent of Capacity	Number of Battery Cabinets							
	1	2	3	4	5	6	7	8
<p>Runtimes are expressed in hours:minutes. Typical runtimes based on fully charged, new batteries operating under typical load conditions. Times estimated assuming a switch mode power supply. Runtimes are affected by battery age, ambient temperature, site specific UPS usage patterns and load characteristics.</p>								
10	4:27	8:29	13:02	18:02	23:23	29:04	35:01	41:14
20	2:22	4:31	6:57	9:57	12:28	15:29	18:39	21:58
30	1:33	2:57	4:33	6:17	8:09	10:08	12:12	14:22
40	1:08	2:09	3:18	4:34	5:55	7:21	8:51	10:26
50	0:52	1:39	2:33	3:32	4:34	5:41	6:51	8:04
60	0:42	1:20	2:03	2:51	3:41	4:35	5:31	6:30
70	0:35	1:07	1:42	2:22	3:04	3:48	4:35	5:24
80	0:30	0:57	1:27	2:00	2:36	3:14	3:54	4:35
90	0:26	0:49	1:15	1:44	2:15	2:48	3:22	3:58
100	0:23	0:43	1:06	1:32	1:59	2:28	2:58	3:29

NOTE: Runtimes shown are based on calculated values.

Interface Specifications

Table 11. Pin # Signals

Pin #	Signal
1	Low battery – normally open
2	Rx
3	Tx
5	Line fail – RS-232 static levels
7	Signal ground
8	Low battery – RS-232 static levels
10	Line fail – normally open
11	Common for simulated relay closures
18	Line fail – normally closed
20	Shutdown (to UPS)
25	Low Battery – normally closed

For the RS-232 advanced interface port, pins 2 and 3 are receive and transmit, respectively, and pin 7 is the signal ground.

Pins 5 and 8 are RS-232 static levels (typically +/-12 VDC) indicate a “not true” condition (e.g., line fail = -12 indicates that the line has not failed). +12 VDC indicates a “true” condition (e.g., line fail = +12 indicates that the line has failed).

Pins 1, 10, 18, and 25 (simulated relay closures) are open collector transistor outputs which must be pulled up to a common reference supply no greater than +40 VDC. The transistors are NPN type 2N2222A capable of a maximum noninductive load of 25mA DC. Pin 11 is the common for all of the relay closure pins and is connected to the UPS chassis ground.

Pin 20 is used to shut down the UPS when it is operating on battery. A positive signal (3 to 24 VDC) with respect to pin 7 shuts down the UPS. A signal at or below ground allows the UPS to keep running.

The shell of the interface connector is connected to the UPS chassis ground.

**Options/
Accessories
UPS Monitoring
Software**

MopUPS® Professional

MopUPS Professional is UPS software for safe system shutdown and useful power management. With advanced features such as network shutdown, scheduled shutdown and restart, event messaging, event logging, data logging, real time viewing, UPS Diagnostics and remote access, MopUPS Professional has everything you need to preserve data and maximize system uptime.

Supported Operating Systems

Intel-Based Systems:

- Windows (95, 98, Me, NT, 2000 and XP)
- NetWare (4.11, 5.x, 6.x)
- Linux (Redhat 6.x/7.x/8.x, SuSe 7.x, Hancm 2.x)
- FreeBSD
- UnixWare
- Sun Solaris (2.8 and up)
- SCO OpenServer (Release 5.0.5)

RISC-Based Systems:

- Sun Solaris (2.5 and up)
- HP UX (11.0)
- IBM AIX (4.3.3)
- IRIX 6.5

Safe system shutdown

Preserve data integrity and minimize recovery delays with automated system shutdown. MopUPS monitors the UPS for power fail, low battery or other events that jeopardize computer power and initiates controlled system shutdown.

Safe network shutdown

Multiple computers on a shared power source also need to share power status information to enable safe shutdown of all systems. MopUPS offers several architectures that deliver flexibility, simplicity and reliability in network-based shutdown.

Remote messaging

MopUPS keeps you informed anywhere. Fault and recovery messages are sent via network messages, email, pager or SNMP trap.

Remote management

Site power and UPS status information can be accessed securely from any computer on your IP-based network. View event history and voltage logs for trend analysis. View UPS system status in real time for situational decision support. Access is based on User Authentication with 128bit, MD5 encryption.

Options

ManageUPS[®]NET Adapter

The ManageUPSnet Adapter provides an open approach to management of network power. ManageUPS delivers a complete set of manageability options including WEB, Telnet, and Out-Of-Band accessibility in addition to the full featured embedded SNMP agent. Event messages are reported through email as well as SNMP Traps. ManageUPSnet is a truly versatile tool for managing UPS systems in a network environment.

Remote messaging

ManageUPS keeps you informed anywhere – fault and recovery messages are sent via SNMP Trap or email. Email contents include URL link for quick access to UPS web page. Many pager systems will forward email to a wireless pager so you can be informed anywhere.

Remote management: in-band

Site power and UPS status information can be accessed securely from any computer on your IP-based network. View UPS system status in real time for situational decision support. Easily accessible via Telnet, SNMP NMS or WEB Browser. SNMP Agent conforms to RFC1628 standard UPS MIB.

Security

Telnet, WEB, FTP and SNMP servers can be individually disabled. SNMP server allows IP filtering and Communities to restrict access. WEB, Telnet and FTP servers have username and password access control. WEB server uses basic HTTP authentication.

Serviceability

FTP/FTP Server allows firmware or configuration files to be updated over the network for simpler maintenance.

BootP enabled

ManageUPS is BootP enabled which allows for simple network configuration.

Remote management: out-of-band

Console session support provides remote access via modem or terminal server to your network adapter.

Network shutdown

An embedded MopNET server allows MopUPS shutdown software to monitor UPS status over a TCP/IP network.

Auxiliary Interface Port

The auxiliary interface port is located on the back panel of the UPS. POWERVAR offers optional interfaces which may be plugged into this port to connect it to a computer system or network. Refer to page 45 for special notes on installing interface cards. See page 42 for available accessories.

ONEPLUS™ Multi-Server “Y” Cable Accessory

ONEPlus “Y” cable accessory kit allows the sharing of communications from a single ON UPS, to initiate unattended system shutdown sequences on two or more servers when AC power fails and the servers

are operating from UPS battery power. (Not required if using networked communications.)

Installing and Removing Accessory Interface Cards

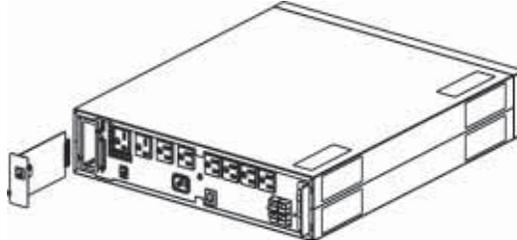


Fig. 26: Interface Card for ON Series UPS

To install an optional interface card in an ON Series UPS:

1. Shut down all UPS-powered systems. Turn the UPS OFF and unplug it.
2. Identify the interface port on the back panel of the UPS. Remove the plate if the UPS does not have an interface card. Set the two screws aside. The plate will not be used.

NOTE: This port may already have an interface card in it. If so, carefully remove it to make room for the new interface card.

3. Carefully slide the interface card into the UPS guide rails. Reinstall the plate screws.
4. Refer to specific instructions provided in the Accessory Kit.
5. Plug the UPS in and turn it ON.

NOTE: All POWERVAR interfaces are designed to connect to signaling systems which comply with National Electrical Code Class 2 limits.

Battery Considerations

Optional UPS Accessories

Table 12. Optional UPS Accessories

Part	Description	Part Number
ManageUPSNET	SNMP/Web/Telnet interface card	AK-MUN2-O
MopUPS ^{PROFESSIONAL} Kit	messaging management and shutdown software for Intel or UNIX based OS (includes serial cable)	SK-PROMOP-O
MopUPS ^{PROFESSIONAL} Kit	messaging management and shutdown software for RISC based OS (includes serial cable)	SK-PROMOPRU-O
Extended Run Battery Cabinet	extended run battery	ONXBCU-417
Replacement Battery Cabinet	replacement battery	ONXBCU-417R
Replacement Battery	replacement internal battery	ONBP-405*
Y-Cable	kit to share one comm port with two computers	CK-ONEPLUS
USB Converter Cable	Serial RS232 to USB converter	CK-7USB
Serial Cable	12 foot serial comm. cable	CA-9F+
Serial Cable	6 foot serial comm. cable	CA-9F
23 Inch Rack Kit	23 inch rack extender kit*	23RM-EXT-2U*

* 2 kits required for the ON2000 UPS.

Battery Considerations

The UPS must be adequately cooled to prevent system overheating and enhance battery life. Refer to “Ventilation” on page 12. Do not place other equipment or supplies in direct contact with the UPS.

To preserve the performance and warranty of your ON Series UPS, use only original equipment replacement batteries.



ATTENTION: The batteries in this UPS are recyclable. Dispose of the batteries properly.

Battery Maintenance

Customer maintenance of the ON Series UPS is limited to battery cabinet replacement. Contact POWERVAR Technical Services (refer to page 1, Technical Support) with any other servicing needs.

Battery Considerations

The UPS uses sealed, leak-proof, lead-acid batteries that do not emit corrosive gasses.

Ordering New Batteries

To ensure optimal performance and battery life, POWERVAR selects premium quality batteries and tunes the UPS battery charger and test circuits to the characteristics of these batteries. With safety in mind, POWERVAR uses patented, insulated battery enclosure assemblies to ensure safe handling and installation.

Original equipment replacement batteries may be ordered directly from POWERVAR at (800) 369-7179 ,on line at www.powervar.com, or email: rmaservice@powervar.com, in Europe, at +44 (0) 1793 553980, or from your local authorized representative or reseller.

Replacing Batteries

Battery replacement is a safe procedure that is isolated from electrical hazards. You can leave the UPS and attached loads powered on during the procedure.

If the unit is on, it will beep when the battery is disconnected and the front panel will display “c2.”

The internal batteries and the extended run external ONXBCU-417 battery pack can be replaced without turning off the power or disrupting the protected equipment.

Installing Battery Pack

Universal Mount: ON700, ON1000 and ON1500

This procedure is the same for rackmount and floor standing units.

To install a new battery pack in a standard ON Series UPS:

1. Slide the front bezel to the left (bottom) and then pull away from the UPS to remove (fig. 27)

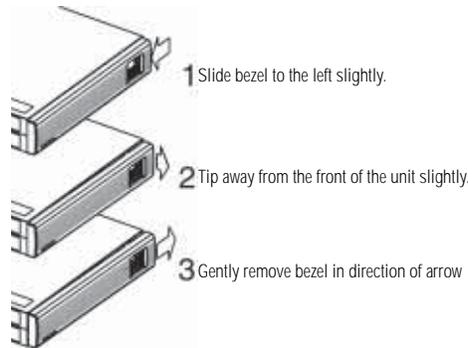


Fig. 27: Removing the UPS Front Bezel

2. Once the bezel is removed, unscrew the two thumb screws on the battery retention plate located on the left (bottom) side of the unit (fig. 28) and remove the plate.

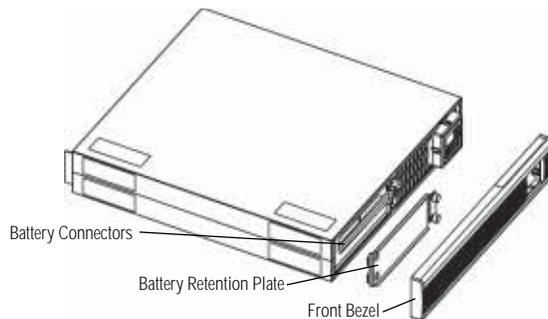


Fig. 28: Removing Front Bezel and Battery Retention Plate

Battery Considerations

3. Disconnect the battery from the UPS by grasping and pulling the battery connectors straight out. Do not pull on wires!
4. Slide battery out (fig. 29).

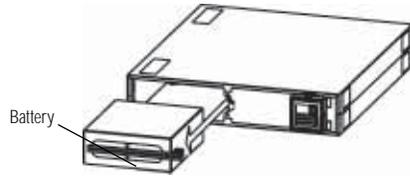


Fig. 29: Removing the Battery

5. Slide new battery into the UPS and reconnect the battery connector (fig. 30). The battery connector is polarized and will only fit one way. Make sure it is completely installed.

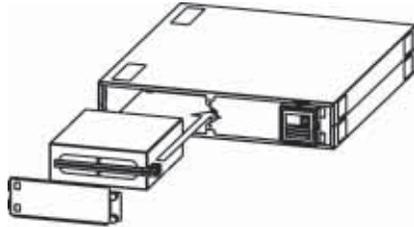


Fig. 30: Replacing the Battery

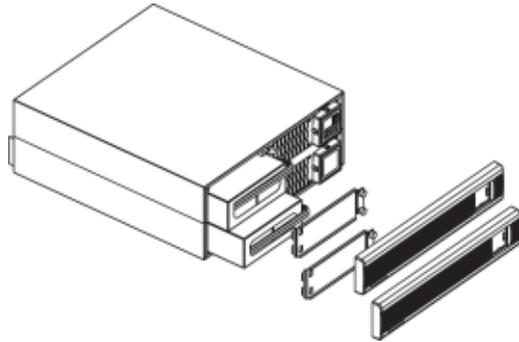
6. Replace and secure the battery retention plate with the thumb screws.
7. Replace the front bezel by reversing all three steps in figure 27.

NOTE: Do not replace the front bezel without first securing the battery retention plate.

Universal Mount: ON2000

Battery replacement procedure is the same as for the ON700, ON1000 and ON1500 units above.

However, there are two sets of batteries, each located behind the front bezels (fig. 31).



NOTE: Both sets of batteries must be replaced at the same time to ensure proper operation and expected runtimes.

Fig. 31: Replacing ON2000 UPS Batteries

Replacing External Battery Cabinets

The batteries inside the Extended Runtime Cabinets are not user-replaceable. The entire battery cabinet must be replaced or the cabinet may be returned to POWERVAR for battery replacement. For details, refer to “Connecting the UPS and Multiple Battery Cabinets” on page 26.

The ONXBCU-417 battery pack can be replaced without turning off the power or disrupting the protected equipment.

NOTE: Extended run battery back up is not available if the battery circuit breaker is in the “OFF” position.



ATTENTION: Place the UPS on the top or to the side of the stackable configuration.

Battery Disposal

UPS batteries contain toxic and acidic materials. Disposal method must adhere to local/national recycling laws. Dispose of the battery in one of three ways:

1. Return batteries prepaid to POWERVAR for proper recycling. Contact POWERVAR Technical Services (847) 596-7000, (call toll free, (800) 369-7179), for a Return Material Authorization (RMA) number. In Europe, contact POWERVAR Technical Services at +44 (0) 1793 553980. Mark the RMA number on the packing slip and shipping carton.
2. Phone POWERVAR for the number of a local battery collection site (US only).
3. Make arrangements with a local auto shop that collects automotive batteries for reprocessing.



CAUTION: *DO NOT dispose of batteries in a fire. The battery may explode. Do not open or mutilate the battery or battery cabinet. Released electrolyte is harmful to the skin and eyes and is toxic.*

UPS Disposal

Once your UPS has reached the end of its useful life and it is necessary to dispose of the unit:

1. Remove the batteries as instructed in “Replacing Batteries” on page 47.
2. Dispose of the batteries as instructed in “Battery Disposal” on page 51.
3. Dispose of the unit in accordance with local/national recycling or disposal ordinances.

Troubleshooting

Three display lights aid in digital display interpretation. “Percent Load” (top) indicates the UPS load. “Percent Battery” (middle) indicates the percentage of battery charge available while in the battery backup mode. “System Code” (bottom) is a message to the user.

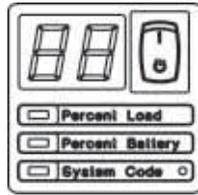


Fig. 32: Front Panel Display

Checking the Size of the Load

When all equipment is connected and the UPS is on, the digital display should read “99” or less. If it displays “c8” the UPS is overloaded. Remove some of the equipment or purchase a higher capacity UPS. If there is no display, ensure that the circuit breaker located on the rear panel is pushed in. Refer to page 9, Input Protector, for more information on resetting and troubleshooting the circuit breaker.

Technical Support

POWERVAR offers 24-hour technical support. If you have questions or problems regarding your ON Series UPS:

1. Refer to the troubleshooting table on page 53 and page 55 for corrective or recommended action.
2. If you are unable to troubleshoot the problem, contact POWERVAR Technical Services. Refer to page 1, Technical Support, for the correct telephone number in your area. Technical Services will ask you to describe the problem. We will help solve the problem over the telephone or issue a Return Material Authorization (RMA) number along with instructions on how to return the UPS.

NOTE: You will need to supply the service representative with the UPS part number and serial number. You can access these numbers in two places on your UPS: On the back panel of the unit on a label located near the receptacles,

Troubleshooting

and behind the front battery cover.

Always check with POWERVAR Technical Services before attempting to repair or return any POWERVAR product.

System Status Codes

System status codes are displayed for two seconds, alternating with normal “Percent Load” or “Percent Battery” displays. If multiple alarm conditions exist, the system status code display cycles through all active alarm condition codes before returning to “Percent Load” or “Percent Battery”

When your UPS is on “inverter” it sounds a tone every 60 seconds. When your UPS reaches “low battery,” a continuous tone is sounded.

Table 13. System Status Codes

System Status Codes	Description	Corrective Action
c0	Battery test in progress. (No sound.)	None required.
c1	Rear panel input circuit breaker open. (Tone sounds every 60 seconds.)	Reset breaker on back panel.
c2	Battery disconnected. Or battery fuse blown. (Tone sounds every 60 seconds.)	Check the battery circuit breaker is ON. Check battery is plugged in, if still c2 call POWERVAR Technical Services.
c3	Over temperature, unit is too hot. (Continuous tone.)	Provide adequate ventilation.
c4	AC line returned, battery charging. (No sound.)	Normal, allow battery to charge (4 – 12 hours).
c5	Backup time is significantly degraded. (Tone sounds hourly.)	Contact Technical Services to order a replacement battery.
c6	Battery failure detected. Replace battery! (Tone sounds every 60 seconds.)	Contact Technical Services to order a replacement battery.

Troubleshooting

Table 13. System Status Codes

System Status Codes	Description	Corrective Action
c7	On inverter due to sustained overvoltage. (Tone sounds every 60 seconds.)	Contact your building facilities manager.
c8	Output overload – Inverter disabled. (Tone sounds every 60 seconds.)	Unplug devices until unit is loaded to 99 percent or less.
c9	Output will shut down due to severe overload. (Continuous tone until output off.)	Reduce load, turn the unit OFF, then ON to reset.
u0	Manual restart as requested by the user. (No sound.)	Turn front panel switch OFF then ON, or issue proper reset command to interface port.
u1	Internal charger fuse blown. (Tone sounds every 60 seconds.)	Call POWERVAR Technical Services.
u2	System restart is pending. (No sound.)	Wait for user configured delay to expire or turn the front panel switch OFF then ON to reset.
u3	System is counting a WAKEUP delay. (No sound.)	Wait for delay to expire or turn the front panel switch OFF then ON to reset.
u4	System is counting a SHUTDOWN delay. (No sound.)	Normal but may be stopped using control language or turn the front panel power switch OFF then ON to reset.
u5	Back feed relay failure detected. (No sound.)	Possible system fault. Contact POWERVAR Technical Services.
[]	No output. (No sound)	Plug in terminator or check RJ cables on the battery cabinet(s). (See page 24.)

NOTE: The tone can be controlled through Serial Port. Select On, Off, or Mute.

Troubleshooting

Table 14. Troubleshooting Guide

Problem	Recommended Action
<i>The UPS will not do anything.</i>	<i>The wall outlet may not have power available. The UPS will not start unless it is plugged into a working electrical outlet. Make sure the outlet has power and the terminator is in place on external battery cabinet.</i>
<i>The UPS front panel is active, but there is no output.</i>	<i>Check the System Status Code on the digital display. Refer to the chart on page 53.</i>
<i>The UPS works, but an alarm sounds.</i>	<i>May be a normal indication of AC line failure if front panel display indicates normal. Check the System Status Code on the digital display. Refer to the chart on page 53.</i>
<i>The UPS works, but the shutdown/monitoring software is not working.</i>	<i>Check the DIP switch settings on the rear panel of the UPS. Make sure they match the software requirements.</i>
<i>None of the above, but things are still not right.</i>	<i>Contact POWERVAR Technical Services.</i>

Warranty

Warranty UPS

POWERVAR products are warranted free from defects in materials and workmanship for five years. This warranty is limited to repairing or replacing, at POWERVAR's option, any defective component, circuit board, or module contained within the product only when it is returned with a POWERVAR Return Material Authorization (RMA) number to POWERVAR or to a POWERVAR-designated repair facility. In all cases, the customer is responsible for shipping charges to and from POWERVAR or the POWERVAR-designated repair facility.

Batteries

Certain modules or peripherals included with the product but not manufactured by POWERVAR, including but not limited to batteries or battery cabinets, are warranted for two years or the extent of the manufacturer's warranty, whichever is longer.

Limitations of Warranty

This limited warranty does not cover any losses or damage resulting from shipment to or from the customer, or from improper installation, inappropriate environment, abuse, modifications, adjustments, or unauthorized repair.

For full details of the warranty, see POWERVAR Warranty, Policy and Procedures (part number 955-053).

Exclusive Remedies

Except as set forth herein and except as to title, there are no warranties, express or implied, or any affirmations of fact or promises by POWERVAR for the products, their merchantability, or fitness for any particular purpose. In no event shall POWERVAR be liable for lost profits, goodwill, or any other special or consequential damages.

Return Procedure

To return an uninterruptible power supply (UPS), contact POWERVAR Technical Services (refer to page 1) for a Return Material Authorization (RMA) number. This number

must be marked on the shipping carton and packing slip of the unit returned. The customer is responsible for repair charges for damages incurred in shipment that result from inadequate or improper packing of the product.

**Appendix A:
Accessories
Interface
Capabilities**

BASIC Communications Capability

BASIC interface capability allows for automatic system shutdown in the event of a power failure. Rear panel DIP switches enable the BASIC interface capability (refer to “Back Panel DIP Switch Settings” on page 30). Two output signals, “power failure,” and “low battery,” and one input signal, “UPS shutdown,” are active in the BASIC interface mode.

Signals are provided both as simulated “Form C” relay contacts and RS-232 voltage levels on RS-232 handshake pins. These simple signals support automatic system shutdown for UPS monitoring modules provided in NetWare, BANYAN, Lan Manager, Lan Server, and Windows NT environments.

Interface kits for each operating environment include appropriate cable and documentation.

ADVANCED Communications Capability

ADVANCED interface capability allows access to vital power and UPS status information and enables unattended system shutdown.

Advanced features include AC line voltage reporting, UPS status condition alerting, and capacity and runtime estimates.

**Appendix B:
Operating in
Power
Environments
Below 110 V
Nominal**

Minimum and Maximum Allowed Output Voltages

The J models are set at the factory to anticipate a nominal input line voltage of 110 – 120 V rms. The default setting for Minimum output volts allowed (Min-Allow) is 95 V rms. The default setting for maximum output volts allowed (Max-Allow) is 138 V rms. If necessary, these settings can be changed in the field through the UPS serial communications port. The Min-Allow can be set to a minimum value of 90 V rms. The Max-Allow can be set to a minimum value 20 volts higher than the Min-Allow settings.

Operation of Low Voltage Boost and AC Inverter Systems

The output voltage boost circuit raises output voltage by 11% without depleting battery charge. This circuit is engaged whenever the incoming line voltage reaches the value set for Min-Allow. At the factory default setting, the boost circuit is engaged at 95 V and remains engaged until the line drops to 86 V rms or rises to 102 V rms. At 102 V the boost circuit is disengaged and output volts will match input volts. At 86 V rms, the battery and inverter system is engaged and supports the load as if a line failure has occurred. The battery and inverter system is also engaged whenever the incoming line voltage exceeds the Max-Allow setting (138 V rms default), protecting the load from unusually high line conditions by running the load from the battery and inverter system. The inverter is disengaged when the input AC line drops 7 volts below the Max-Allow setting (default at 131 V rms).

Changing the Min-Allow and Max-Allow Settings

To change the min/max output voltage settings you will need to connect an ASCII terminal to the UPS serial communications port on the back of the unit. The communications setting should be (9600,N,8,1) 9600 baud, No Parity, 8 Data Bits, 1 Stop Bit.

If you need to change the UPS min/max settings, use the change UPS utility pictured below. Refer to page 45 for further information on MopUPS.

Appendix C: Accessing Remote Off

Accessing Remote Off Functions for Shunt Trip EMO

These reference instructions offer a suggested method for integration into a shunt trip EMO scheme. A more complete discussion of EMO issues when a UPS power source is involved is offered in POWERVAR Tech Tips document

“Emergency Mains Off Circuitry - July 1999.” Control of the UPS inverter is available through the standard UPS communications port (see page 41). Setting the inverter “OFF” effectively allows UPS AC output to be controlled remotely through interconnection with a work-cell or facility EMO scheme. When “Inverter Off” is asserted remotely via the EMO mechanism, the normal battery backup operation of the UPS is disabled in the event of an EMO-activated AC input failure.

“Inverter Off” To Set

Dip switch #1 (left most when you look at the back panel) must be set in the “UP” or BASIC position. (The default is down, ADVANCED.) (See page 30.)

Appendix C: Accessing Remote Off

A positive DC voltage of at least 3 volts but not more than 24 volts must be applied to pin 20 with respect to pin 7 on the 25-pin communications port. The voltage needs to be present for 20 milliseconds in order to prevent the inverter from starting.

The inverter will remain off and the logic will stay that way until one of two events occur:

- AC returns -This restarts the UPS logic and the UPS will now control the inverter as under normal operations.
- A person holds the cold start button in with the point of a pen or paperclip and toggles the front panel switch to "ON."Cold start is an undocumented capability that is enabled thru the small hole near the front panel switch.

NOTE: *When AC returns, the UPS will supply AC power. The UPS will not supply inverter power when needed if the inverter control voltage is left in a positive 3-24 V state. So, the EMO needs to reset the voltage in order for the UPS to operate as expected during a natural AC failure.*

