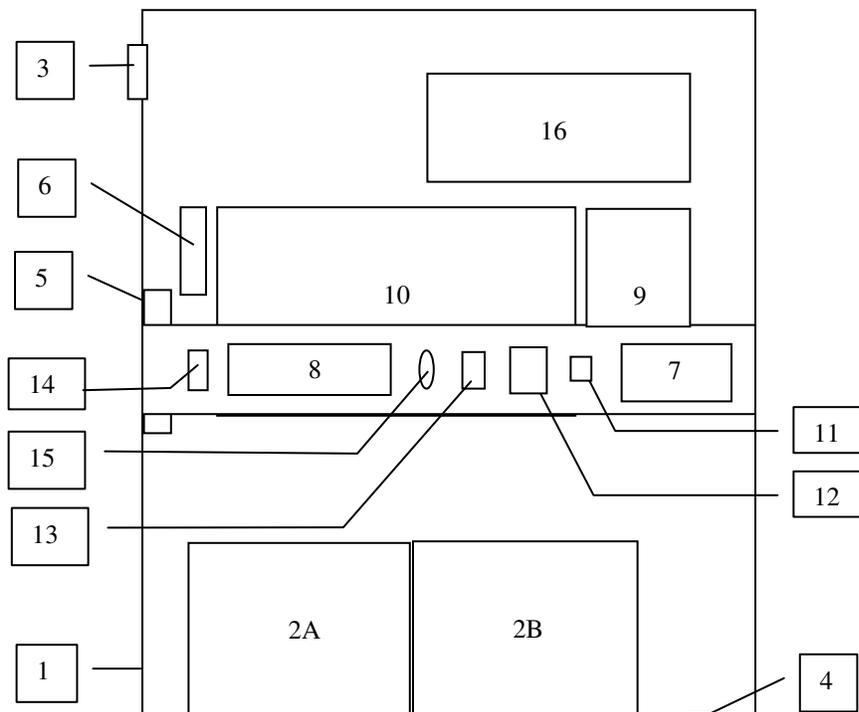


OutdoorXUPS-600AHV-8364

TSi Power's OutdoorXUPS-600AHV-8364 provides secure and uninterrupted 230 vac power to critical loads.

- 1) Weather-tight metal cabinet (IP44 or NEMA 3R rated)
- 2) 2A and 2B are wide temperature batteries (two batteries are connected in series to form a 24 volt battery bank)
- 3) Air vent
- 4) AC input power cord & UPS output power cord entry holes
- 5) AC input surge protection board assembly
- 6) DC fan (for cooling heat sinks on the main UPS board assembly)
- 7) AC input and UPS output connectors (terminal blocks)
- 8) UPS status display board assembly (with status indicator LED's & bargraphs)
- 9) UPS transformer (with AC voltage regulation, inverter & charger windings)
- 10) Main UPS board assembly (with four aluminum heat sinks)
- 11) AC input circuit breaker (press to reset)
- 12) AC input on/off switch
- 13) 24 vdc (battery) circuit breaker
- 14) UPS on/off switch
- 15) DB-9 status signal (alarm interface) connector
- 16) NEMA 4X rated plastic box (for customer's equipment)





Installation of UPS cabinet

1. Perform a thorough visual inspection of the UPS cabinet under bright lights and make sure that there is no visible sign of physical damage to the parts inside the UPS or loose wire that might have occurred during transportation or installation.

Caution: UPS unit is very heavy; therefore, exercise extra caution when lifting.

2. Connect the outdoor rated AC input and UPS output cords (or flexible conduits with wires inside) through the power cord entry holes (#4).

Caution: Make sure that the AC input wires are de-energized.

3. Make sure that UPS on/off switch (#14), DC input circuit breaker (#13) and AC input switch (#12) are all in OFF positions.

Connect AC input wires

4. A dedicated 230 vac, 4A circuit must be provided to the INPUT TERMINAL (#7) pins marked as LI, NI and G (LINE IN, NEUTRAL IN & GROUND).

Warning: In order to avoid injury to personnel due to electric shock, please make sure that the 230 vac input circuit is de-energized before stripping the end of wires & connecting to the AC INPUT terminals.

Connect the battery wire to battery terminal (if necessary)

5. Sometimes the red (+) battery wire is disconnected from battery terminal before UPS system is shipped from factory for safety reasons. Connect the positive battery wire to battery (+) terminal with the bolt and nut provided on the battery.

Caution: Make sure that the DC input breaker (#13) is in OFF position before connecting the battery wire (in order to prevent a spark during connection)

Connect a 100 watt light bulb to the UPS Output Terminal

6. In order to test the operation of the UPS, connect a 100 watt incandescent light bulb to the OUTPUT TERMINAL (#7) pins marked as LO and NO (LINE OUT and NEUTRAL OUT).

Energize 230 vac mains AC input supply

7. Energize 230 vac input circuit and turn on the AC input switch (#12).

Verify operation of UPS

8. Turn on the DC (battery) input circuit breaker (#13). Turn on the AC input on/off switch (#12), then turn on the UPS on/off switch (#14). All LED's on the UPS status display board (#8) must turn on one by one (this LED operation test takes about 5 seconds). The 100 watt lamp must turn on after a few seconds.
9. After about 5 seconds, the green "AC INPUT OK" LED must turn on. Battery Voltage LED bargraph shows battery voltage status (1 to 5 LED's will be illuminated depending on the battery charge level - if all 5 LED's are on, it means batteries are fully charged).

Note: If the 100 watt light bulb does not turn on within 5 seconds, there is a problem with 24 vdc battery input to the UPS board. Visually inspect that battery wires are securely connected to all positive & negative terminals of the batteries and ensure that there is continuity from the battery terminals to the DC input

terminals on the UPS board (disconnect all AC input power source when performing the continuity check).

Note: If the green “AC INPUT OK” LED is not on, but yellow “INVERTER ON” LED is on, then UPS is operating from the batteries & inverter instead of from mains 230 vac. Verify that AC input circuit breaker (#11) is not tripped. If the circuit breaker is tripped (indicating button is popped up), then push the button to reset the circuit breaker. If the circuit breaker keeps tripping (keeps popping up), then there is a short in the AC circuit inside the UPS that must be repaired.

Note: If the green “AC INPUT OK” LED still does not turn on, then AC input wiring must be checked to ensure that 230 vac is being supplied to the AC input connector of the UPS board. Measure the voltage between the AC input terminal (#7) pins marked LI and NI with a DMM (digital multimeter) and verify that AC input voltage is between 190 and 270 vac.

Note: Incoming AC waveform must be a clean 60 hz sinewave. Some cheap gasoline generators can produce highly distorted and noisy waveform that cannot be used by the UPS system (in some cases, very noisy AC waveform may cause a permanent damage to the UPS).

10. Verify that no red alarm LED's are lit on the UPS status display board (#8).
11. With a digital multi-meter (DMM) set on AC VOLTAGE mode, verify that voltage between UPS output terminal (#7) pins LO and NO is between 210 and 250 vac.

Verify UPS operation on battery

12. You are now ready to test the full UPS function by turning off the 230 vac mains AC supply. With the UPS switch ON (100 watt light bulb is ON), turn off the AC input switch (#12) which simulates an AC outage condition. The 100 watt light bulb must stay ON continuously as the UPS starts to operate on battery & inverter.

Note: Verify that the yellow “INVERTER ON” LED turns on and the green “AC INPUT OK” LED is off while the UPS is operating on battery. Buzzer will produce a beep every few seconds indicating that the UPS is now operating on battery.
13. Turn on the AC input switch (#12) and verify that 100 watt bulb remains ON continuously when UPS goes back to normal operation and that “INVERTER ON” LED turns off when “AC INPUT OK” LED turns back on after 3 to 10 seconds. Beeping buzzer sound must stop when the UPS is back on utility AC power mode.
14. Verify correct UPS operation by repeating steps 12 & 13 several times.
15. You have now verified that the UPS is working well with a 100 watt bulb load.

Connect the UPS output wires (test UPS with actual load equipment)

16. Connect the UPS output wires to the actual equipment to be powered by UPS. Make sure that the load is less than 420 watts (230 vac, 1.83A maximum).
17. You are now ready to test the UPS with actual equipment load. Connect the actual equipment wires to the UPS OUTPUT terminal block (#7) pins marked LO, NO and G (Line Out, Neutral Out and Ground).
18. Perform steps 12 ~ 14 with actual load equipment (instead of the 100 watt bulb load). Verify that 4 or less LED's of the OUTPUT LOAD bargraph are lit.

Caution: If all 5 LED's are on, it is possible that UPS is overloaded (since all 5 LED's indicate 100% or more load condition).

Battery Discharge & Recharge Verification

19. Battery voltage should be about 27VDC when batteries are fully recharged.
20. UPS will turn off automatically when battery voltage drops below 21VDC to prevent damage to batteries & inverter circuit.
21. When mains 230 vac is restored, then UPS will turn back on automatically & battery charger will recharge batteries to full charge level (27VDC and all 5 battery voltage level bargraph LED's are illuminated) after about 8 hours.

Preventive Maintenance Procedure

All outdoor UPS systems should be visually inspected at least once a year for water penetration, dust build up or other abnormal conditions, battery charging voltage and battery discharge voltage curve.

When batteries are fully charged (all 5 battery charge status indicator bargraph LED's are on), each battery should measure 13.5 vdc +/- 0.3 volts. Note: voltage difference between batteries must be less than 0.3 volts.

Create a 10 minutes power outage by turning off the AC input switch (#12). After 10 minutes, measure the battery voltage for each and every battery. Battery voltage should be 12 vdc or higher. Again, voltage difference between batteries must be less than 0.3 volts.

Compare the new battery voltages from the battery voltages measured and recorded a year earlier. The voltages must remain approximately the same with less than 0.3 volts difference from previous year.

Note: If any of the new battery voltages is out of specification, all the batteries must be replaced at the same time. Mixing new batteries with old batteries will cause premature battery failure for the whole system (as old batteries will fail sooner than new batteries and even new battery lifetimes will be compromised by unbalanced battery charging & discharging voltages between batteries).

Mean-Time-Between Failure (MTBF) for Boards, Fans and Batteries

Electronic boards used in OutdoorXUPS-600AHV-8364 has calculated MTBF of about 15 years.

All fans and batteries should be replaced every 4 years to minimize chance of unexpected fan or battery failure.

Repair of Defective UPS systems in the field

OutdoorXUPS-600AHV-8364 is designed to facilitate quick replacement of board in the field. Therefore, trouble-shooting procedures described in this manual are limited to visual inspection and board and battery replacements only. More detailed trouble-shooting, repair & calibration can only be done at TSi Power's factory.

Most cost effective way to repair a defective system is to replace the board (and/or batteries). Boards & batteries can be ordered from TSi Power by calling the phone number shown below.

For customers with 20 or more active outdoor UPS units

Since board exchange can repair most failed outdoor UPS systems, it is recommended that customers keep at least 5% (one board set for every 20 UPS units in operation) in spare board sets in order to minimize downtimes while failed boards are being repaired at TSi Power.

For mission-critical applications, we recommend one extra (spare) whole outdoor UPS unit for every 30 units in operation. The spare unit should be always kept on and operational within in a short driving distance. This will ensure that a failed UPS will be guaranteed to be repaired (or replaced) within a few hours.

**RETURNING DEFECTIVE BOARDS FOR REPAIR OR REPLACEMENT
(or ordering spare boards, batteries, fans, etc.)**

1. Contact TSi via telephone, fax or e-mail to obtain a Return Material Authorization number (RMA) or to order spare parts such as boards, batteries or fans. TSi Power's phone/ fax/e-mail address information is provided below.
2. Make sure that returned boards are properly protected with anti-static bubble packs and packed in sturdy shipping box which will not be crushed when another heavy box is placed on top of it.
3. Mark shipping box with RMA number, using indelible marker pen.
4. We recommend FedEx 2 or 3 day service for shipment of failed & repaired boards. Do not use United Parcel Service if possible. International customers can use DHL, FedEx or UPS.
5. After receiving the failed or damaged part, TSi will determine if it is covered by warranty—warranty repair or replacement is performed without charge. TSi will quote repair costs for out-of-warranty parts before starting any repair work. If repair is not cost effective, TSi will quote the cost of a replacement part.
6. Shipping costs, duty and brokerage costs are the responsibility of the customer for all warranty and out-of-warranty repair or replacement services provided by TSi Power.