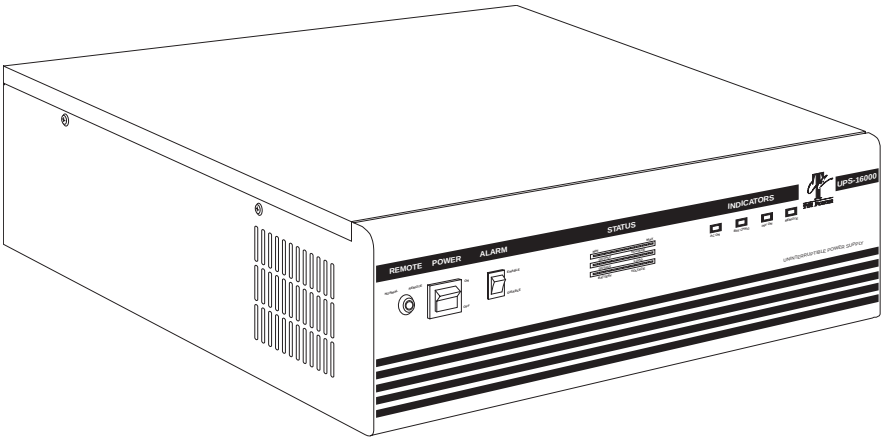
TSi POWER

Operating Instructions

UPS-10000/1000B
16000/EXT-8000



Uninterruptible Power Supply

SAVE THESE INSTRUCTIONS

This Manual Contains Important Safety Instructions.

CONSERVER CES INSTRUCTIONS

Cette Notice Contient Des Instructions Importantes Concernant La Sécurité.

This manual contains important instructions for models UPS-10000, UPS-16000 and EXT-8000 that should be followed during installation and maintenance of the UPS and batteries.

Nominal Battery Voltage of the battery supply inside the UPS and Battery Extension Unit is 48 volts.

When you are using the rack, cabinet or wall mounting kits, please see the section on Installation Procedure for Mounting Kits for important safety information.

IMPORTANT NOTICE FOR SERVICING PERSONNEL

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

B. When replacing batteries, use the same number and the following type batteries: SEALED LEAD-CALCIUM.

C. **CAUTION** — Do not dispose of battery or batteries in a fire. The battery may explode.

D. **CAUTION** — Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

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

   1. Remove watches, rings, or other metal objects.
   2. Use tools with insulated handles.

Table of Contents

Quick Installation Guide

To get the UPS up and working immediately, please follow these instructions:

- Unpack the UPS from the box. Save the packing material for future use.

CAUTION: You should not attempt to carry the UPS by yourself. Ask at least one other person to help you.

- Place the UPS at a convenient location, within 6 feet of an electrical outlet and near the equipment you want backed up. Be careful, it's heavy!

- Plug the AC cord into a properly grounded, 3-prong, 120V/60Hz 15A electrical outlet.

- Plug in your equipment to the outlets provided at the rear of the UPS. *Please, no refrigerators or space heaters!*

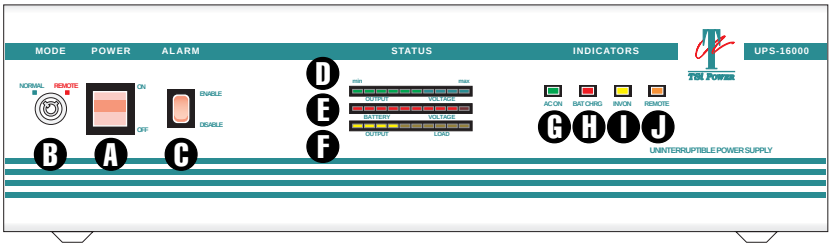
- Remove the tape from the large power switch at the front of the UPS, and turn the UPS on with the power switch. After an initial delay of about 5 seconds, all your equipment hooked up to the UPS should be ready to power up.

For more information about the bargraph displays, see page 7.

- As a quick check, confirm that the top green bargraph shows between 4 and 6 light segments turned on, and that the middle red bargraph shows at least 5 light segments turned on.

Congratulations! You've already taken a large step toward protecting your valuable equipment from potential power problems. We suggest however that you read the rest of this manual to derive the most benefit from your investment in TSi Power's UPS's. If you've encountered any problems in this quick installation procedure, please read on. You can also refer to the troubleshooting guide on p. 14.

Front Controls, Functions & Indicators



A Power Switch

Use this switch to turn the UPS on.

See p. 9 for more information about Remote UPS Access. ►

B Mode Key Switch

In the NORMAL position, UPS operates normally. In the REMOTE position, power is supplied to the equipment only when the telephone line is active.

C Alarm Switch

In the ENABLED position, alarm will sound when AC outage occurs. In the DISABLED position, alarm is not sound. However, when battery voltage is low, alarm will sound regardless of the position of this switch.

See p. 7 for more information about UPS status bargraphs. ►

D UPS Output Bargraph (Green)

Displays the UPS output voltage from 112Vac to 130Vac.

E Battery Level Bargraph (Red)

Displays the battery voltage from 40.6Vdc to 56Vdc.

F Load Level Bargraph (Yellow)

Displays the output load level from 11% to 110%.

G AC On Light (Green)

This light is on when AC power is normal.

H Battery Charging Light (Red)

This red light is on when batteries are being charged.

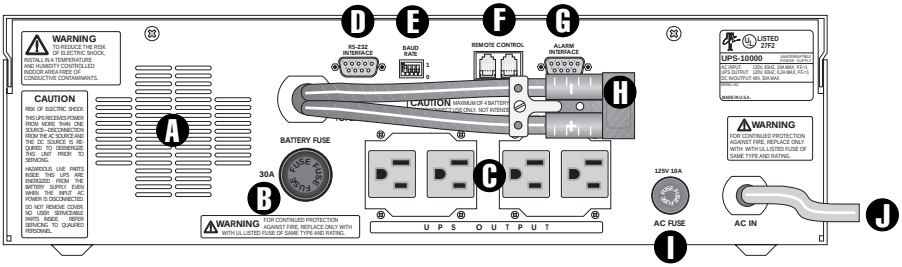
I Inverter On Light (Yellow)

This light blinks when AC power is abnormal and UPS is operating on battery.

J Remote Mode Light (Orange)

This light blinks when UPS is placed in REMOTE mode using the MODE switch.

Rear Panel Controls & Functions



Leave at least 2" of clearance to ensure proper air flow. ►

Ⓐ Ventilation Holes

Cooling fan will always be on during UPS operation.

Ⓑ Battery Extension Fuse

30A fuse protects against short or overload in the EXT-8000 circuit.

If you are not sure how much power your equipment draws, see insert, "Load Ratings for Typical Equipment". ►

Ⓒ UPS Output Sockets

Connect equipment to be backed up to these outlets. UPS-10000 has 4 sockets and maximum output power of 750 watts. UPS-16000 has 6 sockets and maximum output power of 1200 watts.

See p. 10 for more information about serial communications. ►

Ⓓ RS-232C Serial Port (only on UPS-10000S or UPS-16000S models)

For serial communication between UPS and an external device (e.g. a PC).

Ⓔ Baud Rate Switch

Selects baud rate for the RS-232C serial port.

See p. 9 for more information about Remote UPS Access. ►

Ⓕ Remote Control Phone Connectors

Telephone equipment connectors for remote access. Connect incoming telephone line to the LINE jack. Connect phone equipment to the MODEM jack.

See p. 8 for more information about connecting your UPS to a network. ►

Ⓖ Alarm Interface Port

For communication between UPS and a file server. Requires monitoring software.

Ⓗ Battery Extension Connector (only 10000/16000)

Connects to the EXT-8000 Battery Extension Unit. 48Vdc/30A maximum.

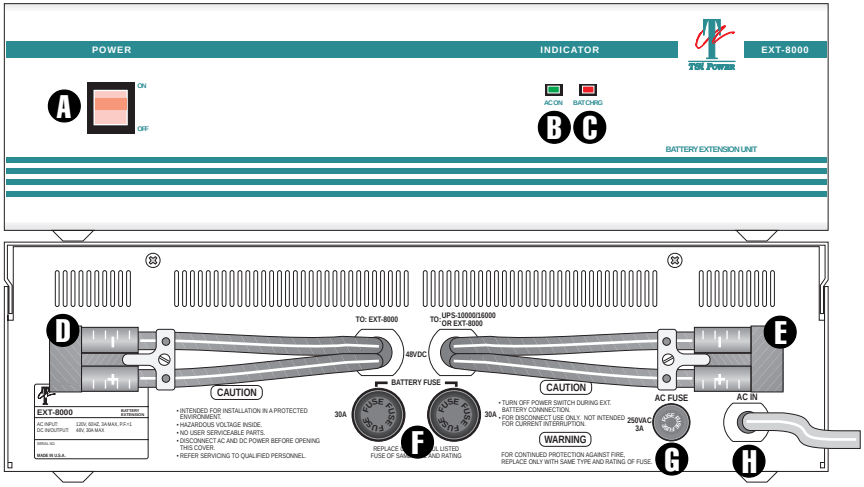
Ⓘ AC Fuse

Protects agains short or overload in the AC circuit.

Ⓙ AC Power Cord

Plugs into the AC outlet.

EXT-8000 Controls, Indicators & Functions



A Power Switch
Use this switch to turn on the Battery Extension Unit.

B AC ON Light (Green)
This light is on when the EXT-8000 is turned on and AC power is normal.

C Battery Charging Light (Red)
This light turns on when batteries are being charged.

See p. 13 about connecting EXT-8000 to your UPS. ►

D Battery Extension Connector (Not for 1000B)
Connects to another EXT-8000 Battery Extension Unit.

To find out how much holdup time you can expect, consult the chart on p. 12. ►

E Battery Extension Connector
Connects to a UPS-10000, UPS-16000 or another EXT-8000 Battery Extension Unit.

F Battery Extension Fuses
protects against short or overload in the battery extension circuit.

G AC Fuse
Protects agains short or overload in the AC circuit.

H AC Power Cord
Plugs into the AC outlet.

About Your UPS

Normally, your TSi Power UPS-10000 and UPS-16000 Uninterruptible Power Supplies work as constant voltage regulators and line conditioners, filtering out noise and irregularities to provide pure sinewave power to your equipment. However, when incoming AC voltage is too low or too high, or when a power outage occurs, they provide the same pure uninterrupted sinewave power from their internal batteries.

Some Features of your UPS-10000 and UPS-16000

- Automatic voltage regulation, isolation, line conditioning, common & differential noise filtering with ferro-resonant transformer.
- Zero transfer time—resulting in uninterrupted pure sinewave output.
- Extended backup time possible with additional Battery Extension Units.
- Brownout & overvoltage protection.
- 3-way voltage surge protection by heavy duty Surge Suppressors.
- Two-tone audible alarm warning for AC failure and low battery.
- Overload protection at 110% of maximum output.
- Novell, UNIX, VMS, OS/2, Windows 3.11/95/NT, Mac OS & other LAN compatible UPS alarm reporting.
- Optional true RS-232 alarm port on selected models.

Please consult the backup time chart on p. 12 for more detailed information. Just remember that actual holdup times with your equipment could vary. ►

Typical Backup Time Table

Configuration		Holdup Time with Load (hh:mm)			
UPS	EXT-8000	300W	600W	900W	1200W
UPS-10000	none	0:25	0:11	n/a	n/a
	1	1:33	0:42	n/a	n/a
	2	2:47	1:17	n/a	n/a
	3	4:06	1:54	n/a	n/a
	4	5:28	2:33	n/a	n/a
UPS-16000	none	0:35	0:18	0:11	0:08
	1	1:37	0:51	0:33	0:23
	2	2:46	1:28	0:56	0:39
	3	3:57	2:06	1:21	0:57
	4	5:12	2:46	1:47	1:16

Operating Instructions

For the UPS-16000, a dedicated AC socket (no other equipment on the same line) is recommended. ►

1) Place the UPS near a grounded (3 pronged) AC outlet, rated at 120V, 60Hz, 15A. Plug the power cord of the UPS into the AC socket. Note that the UPS will only start up when AC power is present. Therefore the UPS should be left on at all times when uninterrupted power is required.

2) Make sure that the POWER switch is OFF. Verify that the MODE switch is in the NORMAL position. Plug in the equipment to be backed up into the outlets in the rear of the UPS. Turn the equipment off for now.

CAUTION: Make sure that your equipment does not draw more the maximum power rating of the UPS. For the UPS-10000, the maximum power rating is 750W. For the UPS-16000, the maximum power rating is 1200W.

For a more complete and up-to-date guide to power requirements, please check the accompanying insert, "Load Ratings for Typical Equipment". Also, you can usually find the power consumption printed in the rear of the equipment. ►

- A PC draws between 150W and 250W (without the monitor).
- A 14" color monitor draws about 75W.
- A big screen monitor (17" & up) draws between 100W and 200W.
- A laser printer draws between 600W and 1000W.

CAUTION: A laser printer should not be backed up by your UPS unless absolutely necessary. A laser printer draws high pulsed power that may interfere with sensitive equipment.

3) Turn on the POWER switch. You should immediately hear the UPS "humming" as it is energized. The following indicators should now turn on:

- AC ON green light.
- BAT CHRG red light should be on or flickering.
- OUTPUT VOLTAGE green bar-graph should show between 4 and 6 light segments turned on.
- BATTERY VOLTAGE red bar-graph should show between 4 and 9 light segments turned on.

CAUTION: It is recommended that you not exceed 90% of your UPS's maximum output (8 yellow light segments). This reduces the likelihood that your equipment will accidentally trigger the overload shutoff circuitry of the UPS. ►

4) About 5 seconds after turning on the POWER switch, your equipment will be supplied with power. As you turn your equipment on one by one, you should see the OUTPUT LOAD yellow bar-graph turn on, with increasing number of lights. Verify that all your equipment is working properly.

5) The LED bar-graph indicators give a quick and complete overview of

the status of the UPS. They can be read as follows:

# OF ON SEGMENTS	BARGRAPH DISPLAY	OUTPUT VOLTAGE	BATTERY VOLTAGE	OUTPUT LOAD
1		112 Vac	40.6 Vdc	11%
2		114 Vac	42.2 Vdc	22%
3		116 Vac	44.8 Vdc	33%
4		118 Vac	46.4 Vdc	44%
5		120 Vac	48.0 Vdc	55%
6		122 Vac	49.6 Vdc	66%
7		124 Vac	51.2 Vdc	77%
8		126 Vac	52.8 Vdc	88%
9		128 Vac	54.4 Vdc	99%
10		130 Vac	56.0 Vdc	110%

6) As a test of your UPS, you can simulate an AC power outage by unplugging the UPS from the AC outlet. As soon as you unplug the UPS, the green AC ON light should go off and the yellow INV ON light should begin to blink, indicating an AC power failure. All your equipment should continue operating normally. Also, if the ALARM switch is in the ENABLE position, the audible alarm should "beep" about once every second. You can turn off the alarm by placing the ALARM switch in the DISABLE position.

7) Plug the UPS's power cord back into the AC outlet. After about 3 seconds, the AC ON light will turn on, the yellow INV ON light will turn off, and the red BAT CHRG light will turn on. Your equipment should continue operating normally.

The Low Battery Audible Alarm ► cannot be turned off. It will sound regardless of the position of the ALARM Switch.

8) If the power outage had been real and prolonged, the battery voltage will drop until there is only a few minutes of battery power left (3 or fewer red BATTERY VOLTAGE light segments on.) At this time, the audible alarm will come on as a continuous tone (or if the ALARM switch had been enabled, change from a beep once a second to a continuous tone.) At the same time, a warning will be sent via the alarm ports in the rear of the UPS to a file server or computer to prepare for shutdown.

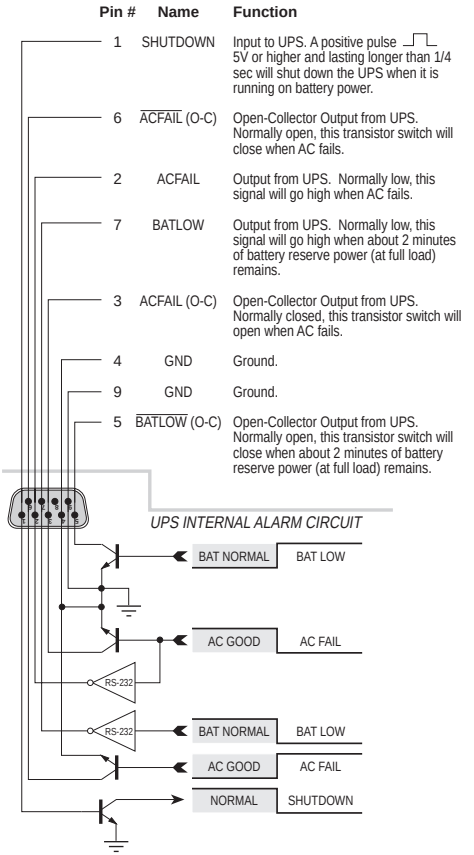
9) If the AC power outage continues, and the battery drops below 42 Vdc, the UPS will shutoff, and all power to your equipment will be turned off.

If the batteries are fully drained, it will take longer for the BAT CHRG light to go off completely, sometimes as long as 24 hours. However, when it flickers, that indicates that the batteries are more than 90% charged. ►

10) When AC power returns, the UPS will restart automatically, restore power to your equipment, and begin recharging the batteries. As the batteries approach full charge, in about 4 to 6 hours, the red BAT CHRG light will begin to flicker, and eventually turn off after several more hours.

11) In the event of an overload or short-circuit, the UPS will shut off immediately. When this occurs, the overload or short-circuit must be removed, and the POWER switch must be turned off, then on again, in order to re-start the UPS.

Network Alarm Interface & Installation



Your UPS-10000 and UPS-16000 provide UPS alarm reporting for Novell NetWare, UNIX, Windows for Workgroups, Windows 95, Windows NT, Mac OS & other file servers and workstations. See accompanying insert, "Accessories and Software" for a full listing of currently available UPS monitoring & shutdown software.

LAN connections are made through the ALARM port located in the rear. You should follow the instructions in your network or workstation documentation on attaching a UPS. This ALARM port is a DB-9 female connector which you can adapt for your own hardware and software to monitor the UPS.

The diagram on the left shows the pin-outs of the alarm interface port. Note that some older units may not be equipped with all the functions shown. Please contact TSi Power for more information.

If you wish to use the alarm interface port for custom applications, take into consideration the following limitations.

• Pins 3, 5 & 6 are open-collector transistor outputs, limited to switching 40V and sinking 20mA of current.

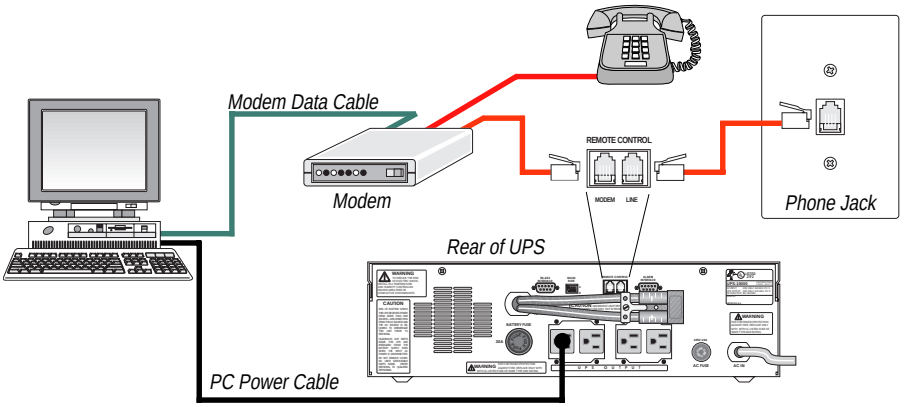
• Pins 2 and 7 are RS-232 compatible outputs. They will switch from RS-232 low (about -10V) to high (about +10V), and can drive a 25mA load.

• A positive (> 5V) pulse lasting longer than 1/4 second at pin 1 is required to shut down the UPS during power failures. This pin is inactive when the AC mains is normal.

• For performance & safety, your alarm monitoring circuit should be isolated (via transformers, relays or optocouplers) from the rest of your network.

Remote UPS Access

The power to the equipment connected to your UPS can be controlled remotely by dialing in to a phone line connected to the UPS.



(1) Make the connections to the phone line, your phone and modem (if any) as shown above. The LINE connector of the UPS always connects to the incoming phone line. The MODEM connector of the UPS connects to telephone equipment such as phone, modem or fax.

The UPS will not interfere with the modem or telephone—it will however protect them from surges and spikes on the telephone line. ►

(2) When you are ready to place your equipment in the remote mode, turn the MODE switch (the rotary key switch) to the REMOTE position. *Caution: the power to your equipment will be immediately removed. Make sure you have saved all your work and were ready to shut off the system before taking this step.* The amber light marked REMOTE should flash. Leave the UPS on. The system is now in the REMOTE mode.

It may take about a minute after the UPS is turned on before the MODE switch becomes operational. ►

(3) When you want to turn on the equipment connected to the UPS at a

later time from another location, simply dial the number of the phone line to which the UPS is connected. After 3 to 5 rings, the UPS will detect the ringing and supply power to the equipment. Also, if the phone line becomes busy—e.g. when a modem establishes connection—the UPS will continue to supply the equipment with power.

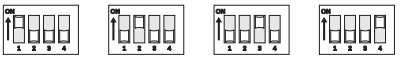
(4) When you hang up the phone, the UPS will remove power to the equipment after 30 to 40 seconds. You can redial the number and keep the equipment on within this time.

For example, suppose you wished to access a remote PC from your home. Normally, you would have to keep your remote PC turned on all the time, thus reducing its life and wasting electricity. With your TSi Power UPS, you can keep the remote PC off, and only turn it on when necessary. You would configure the remote PC to run a communications program—such as pcAnywhere or Carbon Copy—upon boot-up, and then place the UPS in the REMOTE mode, turning the remote PC off. At home, when you need to access the remote PC, you would dial the UPS, turn on the remote PC, and let your home modem and remote modem establish a connection. When finished, you can hang up, and power to the PC will be turned off automatically after 30 to 40 seconds. This process can be repeated as many times as necessary.

Many other applications are possible, to make the UPS an integral part of your computer system.

Serial RS-232 Communications (UPS-10000S & UPS-16000S only)

In the models equipped with the "S"-option, there is an additional way to communicate between the computer and the UPS. Using the RS-232 protocol for serial communications, these models can exchange information via the serial port, at rates of 1200, 2400, 4800 or 9600 baud. The baud rate is set by the DIP switches marked BAUD RATE, next to the serial connector, as shown.



See accompanying list of accessories for information about ordering cables. ►

The cable connection is made through the female DB-9 connector marked RS-232 INTERFACE, located in the rear of the UPS. Cables that link the UPS with the computer are available as an option. If you wish to make your own cable, the table below shows the pinouts of the serial ports of the UPS and typical IBM compatible PC's.

RS-232 Signal	UPS (DB-9 female)	PC (DB-9)	PC (DB-25)
RXD	Pin 3	Pin 2	Pin 3
TXD	Pin 2	Pin 3	Pin 2
TDR	Pin 4	Pin 4	Pin 20
GND	Pin 5	Pin 5	Pin 5

You can test the operation of the serial port with the appropriate cable and modem software. ►

The communications format is: 8 data bits, 1 stop bit, no parity. To communicate with the UPS, the computer can send any character (byte) over the serial line. The UPS will respond within 50 ms with two bytes, containing information about the status of the UPS. Furthermore, when the status of the UPS changes—e.g. a power outage occurs—the UPS will transmit the new status to the computer automatically. The characters corresponding to the UPS status are:

AC Status	Battery Status	Characters Transmitted (HEX)
Fail	Low	0C 0D
Fail	Normal	0D 0D
Normal	Low	0E 0D
Normal	Normal	0F 0D

In a typical cycle the sequence of events may go something like this:

1) In response to a query, the UPS will respond with `0F 0D`, corresponding to normal AC and battery conditions.

2) When a power outage occurs, the UPS transmits `0D 0D`.

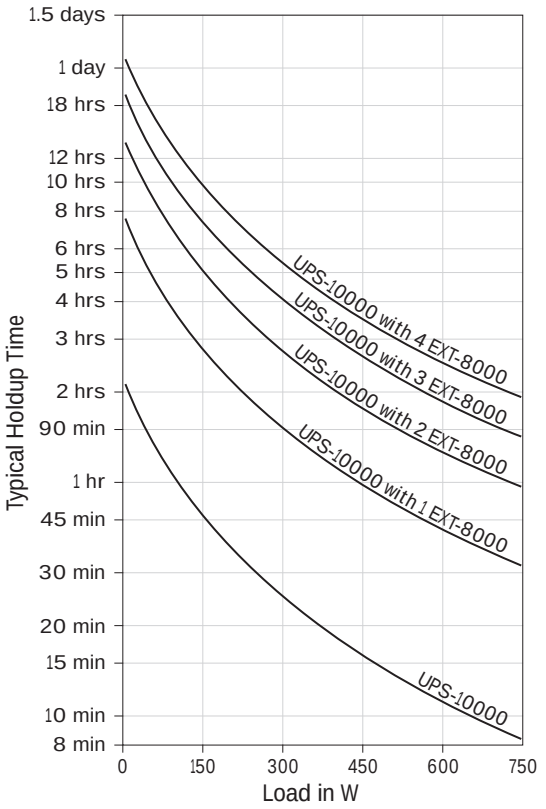
3) As the power outage continues and the battery level drops, the UPS will transmit `0C 0D`.

4) When AC power returns, the UPS will transmit `0E 0D`, then later as the battery becomes recharged, `0F 0D`.

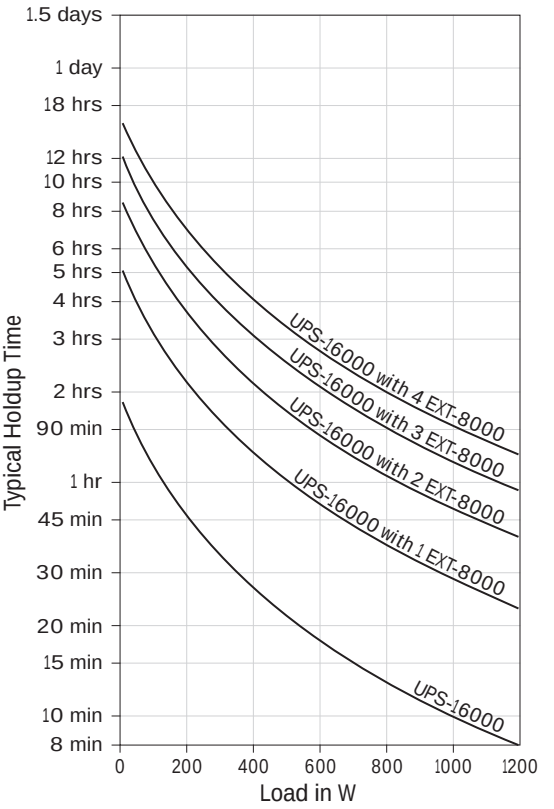
Backup Time Chart

If you are not sure how much power your equipment draws, check the rear panel for input power ratings. You can also consult the insert, "Load Ratings for Typical Equipment". ►

Some applications may require longer backup times than available with a standalone UPS. An easy and cost effective way to extend backup time is through TSi 's EXT-8000 Battery Extension Units. Connecting just one EXT-8000 to an UPS-16000 will increase total backup time to about 23 minutes at full load. Additional EXT-8000's can be daisy-chained for even longer backup times. The chart below shows backup times possible with various combinations of UPS-10000, UPS-16000 and EXT-8000.



UPS-10000 Holdup Time Chart



UPS-16000 Holdup Time Chart

EXT-8000 Battery Extension Units Installation

To connect one or more EXT-8000's to an UPS-10000 or UPS-16000, see the figure below and follow these steps.

(1) Turn off the UPS and the Battery Extension Units before proceeding!

If you need to place the Battery Extension Units further away from the UPS, you can purchase a 6 ft long battery extension cable (TSi Part # CA-8000A).

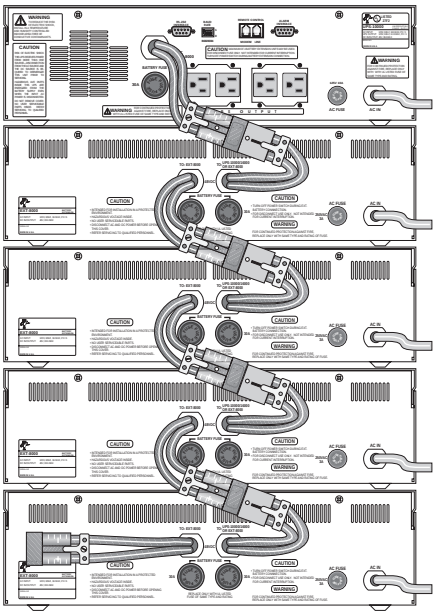
► (2) Stack the EXT-8000('s) under the UPS as shown below.

(3) Connect the EXT-8000('s) and the UPS to a wall AC socket.

(4) Take the battery extension connector from the UPS and connect it with the connector on the EXT-8000 marked TO UPS. If you have more than one Battery Extension Unit, they would be daisy-chained in a similiar manner. See figure below.

Note: The maximum load rating of your UPS has not increased—only the length of time it can back up that load. So you cannot hook up more equipment to your UPS, above the maximum power rating, just by adding EXT-8000's. For that, you need to use a larger UPS.

► (5) Turn the UPS and the Battery Extension Units on. You have just extended the backup time capability of your UPS.



UPS and Battery Extension Unit Connection

Trouble-shooting & Maintenance

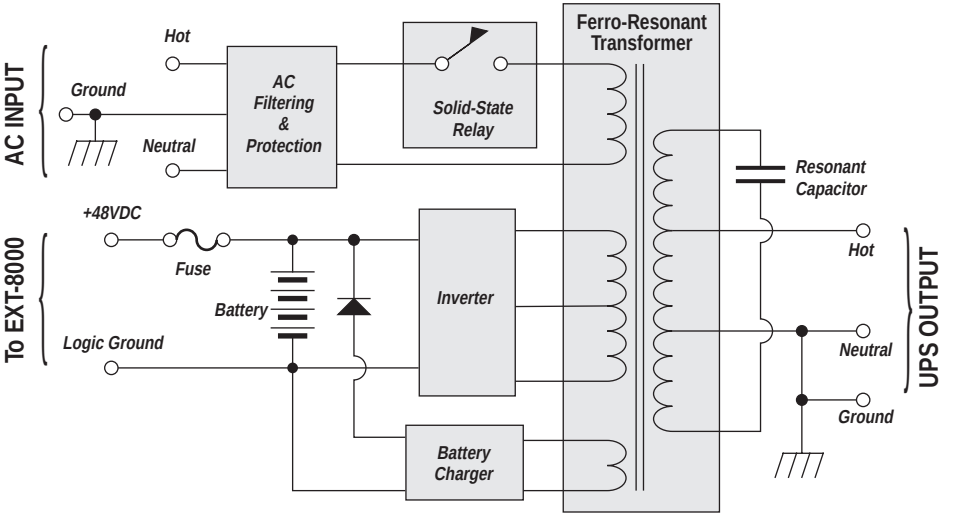
WARNING: Please do not open the case and attempt to repair the UPS. High voltages are present and there are no user servicable parts inside. Repairs can be performed only at the factory or at an authorized repair centers by qualified personnel with protective equipment. When you encounter difficulties with your UPS, please consult the relevant sections of this manual and check the trouble-shooting guide below. If you still have problems, please call TSi Power's Customer Service at (770) 263-6063.

Problem	Possible Causes	Suggested Solutions
Green AC ON light does not turn on.	AC fuse has blown.	Replace with same type & rating of fuse.
	Bad AC outlet or faulty ground wiring	Use another outlet or repair faulty wiring.
UPS keeps shutting off.	Overload.	Reduce load, then reset UPS (turn power switch off/ on.
	Excessive inrush current.	Reduce load during startup.
No power to equipment when AC power outage occurs.	Overload or Overtemperature.	Reduce load, then restart UPS.
	Low Battery Voltage.	Wait for normal AC power to return to recharge.
UPS becomes hot and shuts off.	Overtemperature.	Check that the cooling fan in the rear is working properly. Make sure air flow is not blocked.
	Faulty cooling fan.	Return UPS to factory for repair.*
Insufficient holdup time.	Batteries getting old.†	Return UPS to factory for battery replacement.*
Circuit breaker in the building's AC panel keeps tripping.	Improper circuit breaker rating.	Make sure the breaker is rated 20A or higher.
	Overload.	Remove other equipment from the same circuit served by the circuit breaker.

* Please call your dealer or TSi Power for before returning the UPS.

† Battery Replacement: Under normal conditions, the battery lifetime is approximately 4 to 5 years. Your authorized dealer or factory can replace batteries for a nominal fee. Under severe conditions (more than 150 full discharge-recharge cycles per year), the batteries may have to be replaced more frequently.

Specifications



UPS-10000 & UPS-16000 Block Diagram

Input	• 95~135V_{RMS}, 60±3Hz, sinusoidal or pseudo-sinusoidal.
Output	• 120V_{RMS}±5%, 60±1Hz sinewave, less than 5% total harmonic distortion. • 1,200 watt maximum (UPS-16000 series). • 750 watt maximum (UPS-10000 series).
Transfers	• Zero transfer time between AC and battery (no interruption of power). • Brownout threshold: 95±2V_{RMS}. • Overvoltage threshold: 135±2V_{RMS}.
Battery & Charger	• UPS-10000 series: 48Vdc, 7Ah battery, 1.5A half-wave charger. • UPS-16000 series: 48Vdc, 10Ah battery, 2A half-wave charger. • EXT-8000 series: 48Vdc, 17Ah battery, 2A half-wave charger. • Batteries are charged to a float voltage of 56Vdc at an optimum rate to ensure long life and maximum capacity. • Typical recharging time is 4 hours to return to 90% of capacity.
Surge/Spike Protection	• AC hot to neutral, AC hot to earth ground & AC neutral to earth ground

	are protected by 3 MOV's (metal oxide varistors), each rated at 150V & 6,500 amps of shunt current (8 × 20μs). • Ferroresonant transformer provides 2000:1 attenuation of spikes and 200,000 joules & 100,000A of surge suppression capacity. • Phone and modem connected to the dual RJ-11 connectors are protected by an MOV rated at 150V & 2,500 amps (8 × 20μs).
Isolation	• Ferroresonant transformer provides complete isolation from AC mains. Neutral is bonded to earth ground. • Qualifies as a separately derived power source under National Electric Code Article 250-5D and complies with FIPS Pub. 94, *Isolating Transformer and Grounding Recommendations.*
Noise Filtering	• Common mode noise is reduced ≥120dB at 20MHz. • Transverse mode noise is reduced ≥50dB at 20MHz. • All-steel chassis blocks radiated EMI/RFI noise.
Safety and Reliability Features	• Designed to meet UL1778 • Designed to meet FCC standards for EMI/RFI emissions. • External fuses protect all AC circuits and DC battery circuits. • Internal fuse protects inverter circuit. • Overload circuit disconnects the load at 110% of maximum load. • Polarized battery connector prevents accidents.
Size and Weight	• UPS-16000: 111 lbs (50kg). Width - 17"; Depth - 21"; Height - 6.5" (432mm x 533mm x 165mm). • UPS-10000: 80 lbs (36kg). Width - 17"; Depth - 21"; Height - 5" (432mm x 533mm x 127mm). • EXT-8000: 70 lbs (32kg). Width - 17"; Depth - 21"; Height - 5" (432mm x 533mm x 127mm).
Operating Environment	• Humidity: 0 to 95%, non-condensing. • Maximum withstanding weight: 400 lbs (180kg).
Warranty	• 2 years limited warranty, parts & labor (except for batteries). • Battery manufacturer's warranty on batteries (typically 1 year). • Extended warranty available.

Installation Procedure for Mounting Kits

Kit Parts List

MK-8000A (Front Brackets)

Item	Qty
MK-8000A Left	1
MK-8000A Right	1
#8-32 x 5/16" Screw (A)	4
G-shaped #10-32 Clip Nut	4
#10-32 x 3/8" Bolt (B)	4

MK-8000B (Rear Brackets)

Item	Qty
MK-8000B Left	1
MK-8000B Right	1
#8-32 x 5/16" Screw (A)	4
G-shaped #10-32 Clip Nut	4
#10-32 x 3/8" Bolt (B)	4

MK-8000D (24" Rack Adaptor)

Item	Qty
MK-8000D	1
#10-32 x 3/8" Bolt (B)	2

ASSEMBLY & INSTALLATION OF MK-8000A, MK-8000B & MK-8000D

WARNING

- Do not place any equipment heavier than 30 lbs (14 kg) on top of a rack-mounted UPS-10000, UPS-16000 or EXT-8000.
- It is strongly recommended that the UPS-10000, UPS-16000 or EXT-8000 unit is placed on top of a weight-bearing shelf capable of supporting a minimum of 200 lbs (90 kg). Use the MK-8000A or MK-8000B (with MK-8000D for 24" racks) only to prevent front-to-back or side-to-side movements.

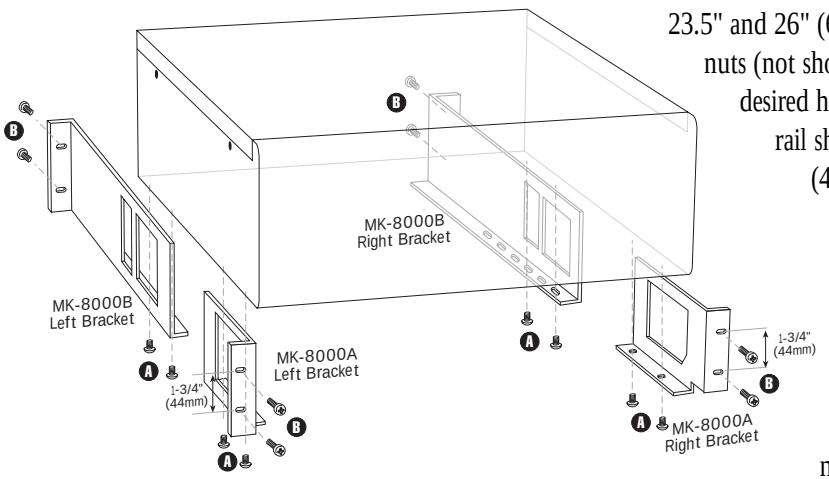
CAUTION

- Because the units are very heavy (80 to 130 lbs, or 36 to 60 kg), exercise extreme caution when lifting or turning over the units. Never try to handle the unit alone. Hydraulic jack or other safe and secure means of keeping the unit in placd should be used during installation. For a safe and secure lifting, moving or positioning, 4 strong adult assistants may be required.
- Use heavy duty leather gloves and steel-toed shoes to avoid personal injury. Do not drop the unit on a hard surface. A well-built wooden or metal stretcher with 4 long and sturdy handles may help with moving and positioning of the unit.

Installation Procedure (see drawing on p.18):

1. Make sure that you have *both* MK-8000A and MK-8000B (and 2 sets of MK-8000D for 24" racks), and that no parts are missing.
2. Attach the front brackets (MK-8000A left and right) to the unit by turning the unit upside down, then tightening with the #8 bolts (A). If the rack is 24" wide, then fasten the MK-8000D 24" rack adaptors (not shown) to the front brackets using the #10 bolts provided with the MK-8000D kit. Carefully turn the unit over to its upright position.
3. Inspect the rack or cabinet in which the unit is to be installed. Verify

that both the front and rear mounting rails are installed. The distance between the front and rear rails should be between 23.5" and 26" (60cm ~ 66cm). Place the 8 clip nuts (not shown, 2 in each rail) at the desired height. The two clip nuts in each rail should be separated by 1.75" (44mm). Verify that the clip nuts of the four rails are at equal heights from the floor.



4. Mount the rear brackets MK-8000B Left and Right to the rear mounting rails by tightening **B** into the 4 clip nuts already in position. If the rack is 24" wide, fasten the MK-8000D 24" rack adaptors first to the rear brackets.

5. With the help of your assistants, place the unit on top of a metal or wooden stretcher. Then lift, carry and position the unit inside the rack. Carefully slide the unit into the rack or cabinet. The rear of the unit (without the brackets) must enter the cabinet first, from the front of the cabinet.

6. While the unit is being held at the desired location and height by your assistants, you should secure the unit firmly to the cabinet by fastening the front mounting brackets of the unit into the front rails using **B** and 4 clip nuts already in place.

7. While the unit is still being held at the desired location and height, the rear brackets should be fastened to the unit (from the bottom of the unit) with **A** .

8. When the unit is being held firmly in position by the 4 brackets at all 4 corners by all 16 bolts (4 in front, 8 from bottom, 4 in rear), and all the bolts are tightly fastened, the stretcher may be removed from under the unit.

Limited Warranty

TSi Power warrants this product to be free from defects in materials and workmanship for two (2) years† from the date of purchase from TSi Power or its authorized representatives. TSi Power will repair (or at its option, replace) any defective component(s) during this warranty period.

To make a request or claim for service under this limited warranty, the original purchaser must return the product, in the original shipping container or equivalent, to TSi Power or its authorized distributor, accompanied by a written receipt showing the date of purchase, dealer's name, and both the model name and serial number of the product.

Warranty does not cover transportation costs. Damage by misuse, accident or unauthorized tampering of the product is not covered by the warranty. NO OTHER WARRANTIES ARE EXPRESSED OR IMPLIED. TSI POWER CORP. IS NOT LIABLE FOR CONSEQUENTIAL DAMAGES. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

†Excluding batteries. Battery manufacturer's warranty applies on batteries.

Limitation of Liability

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