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# ***TSi POWER***

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## **Operating Instructions**

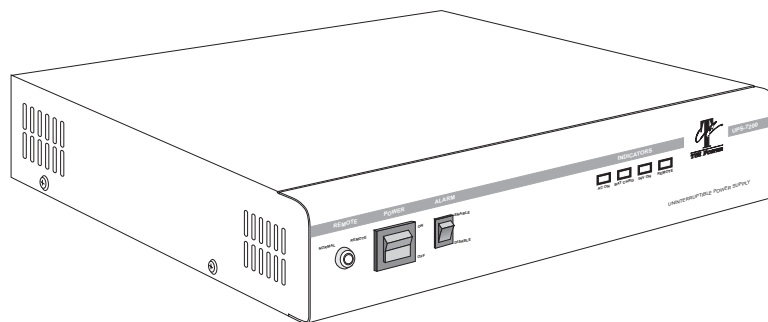
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# **UPS-550B**

# **UPS-720B**

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## **Uninterruptible Power Supply**



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# **SAVE THESE INSTRUCTIONS**

**This Manual Contains Important Safety Instructions.**

## ***CONSERVER CES INSTRUCTIONS***

***Cette Notice Contient Des Instructions  
Importantes Concernant La Sécurité.***

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This manual contains important instructions for models UPS-550B and UPS-720B that should be followed during installation and maintenance of the UPS and batteries.

Nominal Battery Voltage of the battery supply inside the UPS is 24 volts.

Maximum Operating Ambient Temperature for the UPS and Battery Extension Unit is 40 degrees Celsius

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.

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## Quick Installation Guide

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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.
- ▶ 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 one end of the detachable AC power cord to the rear of the UPS (marked "AC IN")
- ▶ Plug the other end of the AC cord into an 120V/60Hz electrical outlet. You should now see the green AC ON light turn on in front of the UPS.
- ▶ Plug in your equipment to the outlets provided at the rear of the UPS. *Please, no laser printers, refrigerators or space heaters!*
- ▶ Remove the shipping tape from the large power on/off switch in the front of the UPS, and turn the UPS on. All your equipment hooked up to the UPS should now be ready to power up.

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 & Indicators

Note: Some models may not be equipped with all the features shown.



## **A Power Switch**

Use this switch to turn the UPS on.

See p. 8 for more information about Remote UPS Access.

## **B Mode Key Switch (some models)**

With this switch in the NORMAL position, UPS operates normally. When this switch is in the REMOTE position, power is supplied to the equipment only when the telephone line is active.

## **C Alarm Switch**

With this switch in the ENABLED position, alarm will sound when AC outage occurs. When this switch is in the DISABLED position, alarm is disabled. However, when battery voltage is low, alarm will sound regardless of the position of this switch.

## **D AC On Light**

This green light is on when AC power is present.

## **E Battery Charging Light**

This red light is on when battery is being charged.

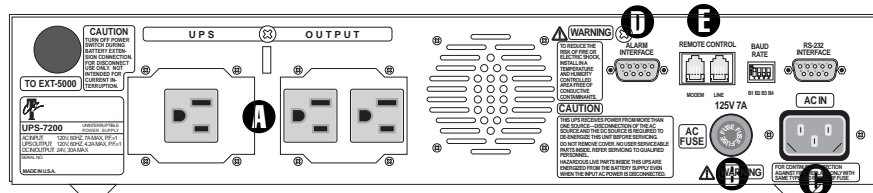
## **F Inverter On Light**

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

## **G Remote Mode Light (some models)**

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

## Rear Controls & Functions



If you are not sure about how much power your equipment draws, see accompanying table, "Load Ratings for Typical Equipment"

### **A** UPS Output Receptacles

Outlets for the equipment to be supported by the UPS. The power drawn from these receptacles should not exceed 360 watts for UPS-550B and 500 watts for UPS-720B.

### **B** AC Fuse

Replace only with same type and rating.

### **C** AC IN Socket

AC mains power input connector. International standard CCE-22 type.

### **D** Alarm Interface (some models)

Connects to a file server, PC or workstation for UPS monitoring.

See p. 8 for more information about Remote UPS Access

### **E** Remote Control (some models)

Dual RJ-11 phone and modem connectors for remote access. Connect the incoming phone line to LINE connector, other phone equipment (telephone, fax, modem etc.) to the MODEM connector.

## About your UPS

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An UPS (Uninterruptible Power Supply) is basically a high-tech filter between the local power company and your electronic equipment. Normally in the USA, the power companies provide dependable service. But power outages still occur. If you work regularly with computers, you've probably experienced several occasions when the "lights went out" while you were working (or playing) on your computer. Perhaps you've even lost hours of work because you forgot to "save" your files. Other forms of power disturbances include spikes & surges, frequently occurring during thunderstorms, that can blow fuses and even destroy equipment. A properly designed UPS can filter most of such power problems and provide clean, uninterrupted (hence the name) power to protect your valuable equipment and data.

### Features of your TSi Power UPS

- TSi Power's UPS-550B & UPS-720B series perform the basic function explained above, and much more. Its architecture is that of a standby UPS (or off-line UPS), whose inverter is only activated when the line AC becomes irregular. This has the advantage of lower cost and greater reliability, since the electronic components don't have to work all the time. The traditional disadvantage of off-line UPSs, longer switchover time, has been virtually eliminated by advanced detection and transfer electronics that reduce the switchover time to 4 to 8 ms.

*See p. 6* ► • The UPS-550B & UPS-720B can communicate with most popular network OS's such as Novell NetWare, UNIX, AppleShare and Windows 3.11/95/NT to provide power protection and automatic shutdown to network users.

*See p. 8* ► • The UPS-550B & UPS-720B also have remote dial-up capability, which lets you power up your computer or other equipment via the phone or modem at any time from anywhere.

# Detailed Operating Instructions

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*If you just want to get the UPS up and running quickly, see p.1 for Quick Installation Instructions.*

► *Caution: To protect against shock hazards, do not use a 3-prong to 2-prong adaptor with this UPS.*

(1) Place the unpacked UPS near a grounded (3-pronged) AC outlet, rated at 120 volts, 60 Hz, 15 amps. Make sure that the POWER switch is in the OFF position and that the REMOTE switch is in the NORMAL position.

(2) Plug in one end of the enclosed AC power cord to the rear of the UPS, and plug the other end into the AC outlet. The green light marked AC ON should now turn on.

► *A typical desktop PC or Mac with VGA monitor draws between 200 and 300 watts. A fully loaded file server may draw up to 500 watts.*

(3) Plug in all the equipment that you want backed up into the sockets labeled UPS OUTPUT, but make certain that the maximum power rating is not exceeded. The maximum amount of power that each of your equipment will draw should be printed in the rear of each equipment, near the power cord. Their sum should not exceed 360 watts for UPS-550B and 500 watts for UPS-720B.

(4) Turn on the power switch. If you have connected more than the rated load to the UPS, it will shut off in several seconds. Remove the excess load and try again by turning the UPS off and then on with the power switch.

► *If you are not sure about how much power your equipment draws, see accompanying table, "Load Ratings for Typical Equipment"*

Make sure that the equipment connected to the UPS is working properly. [Note: depending on the battery voltage, the BAT CHRG light (red) may be on, indicating that the battery is being recharged. This is normal.]

(5) As a test, you may simulate a power outage by unplugging the UPS power cord from the AC outlet. All your equipment connected to the UPS should continue working without interruption. The UPS has just made a switchover from AC to inverter. The INV ON light (yellow) will flash and an audible alarm should "beep" about once a second (if the ALARM switch is in the ENABLED position.) *WARNING: Under no circumstances should you connect more than the rated load of the UPS while the INV ON light is flashing.*

(7) You can turn off the alarm placing the ALARM switch in the DISABLED position. However, if the power outage continues and the battery voltage drops below a certain threshold (~22VDC), the audible alarm will



Your UPS will hold up a typical desktop PC for about 10 to 20 minutes during a power outage. However, as the batteries inside your UPS get older, your holdup times will go down. You may wish to test your UPS about twice a year to prevent against battery failure.

Hint: Your UPS can self-start, i.e. start providing AC power even when there is no utility AC power. Just turn on the Power Switch.

sound (as a continuous tone) regardless of the position of this switch. This means that there is about 2 minutes of backup time left (at full load.)

(8) Plug the power cord back into the AC outlet. The AC ON light will come back on and after a few seconds, the INV ON light will go off. The UPS has just made a transfer from inverter back to AC. All your equipment should continue to operate without interruption.

(9) If the power outage had been real and prolonged, the UPS may have shut off due to low battery voltage. If AC power returns, the UPS will resume normal operation and charge the batteries. Turning the power switch off and on again will restart the UPS regardless of battery voltage or AC power condition.

(10) In some rare cases you may find that after leaving the UPS unattended for a power outage lasting several days, the UPS will not turn on and operate even after AC power returns. This is because the protection circuitry has activated to prevent damage to the batteries. To restart the UPS, first make sure that the UPS is plugged in to an AC outlet and that the green AC ON light is on. Next, turn off the UPS and leave it off for at least 5 minutes. Now turn the UPS on again. The UPS should come back on and the batteries will begin to recharge. Allow the batteries to recharge for at least 24 hours.

(11) When an overload occurs and the UPS shuts off, you must remove the excess load and reset the UPS by turning it off and then on, before the UPS will resume proper operation.

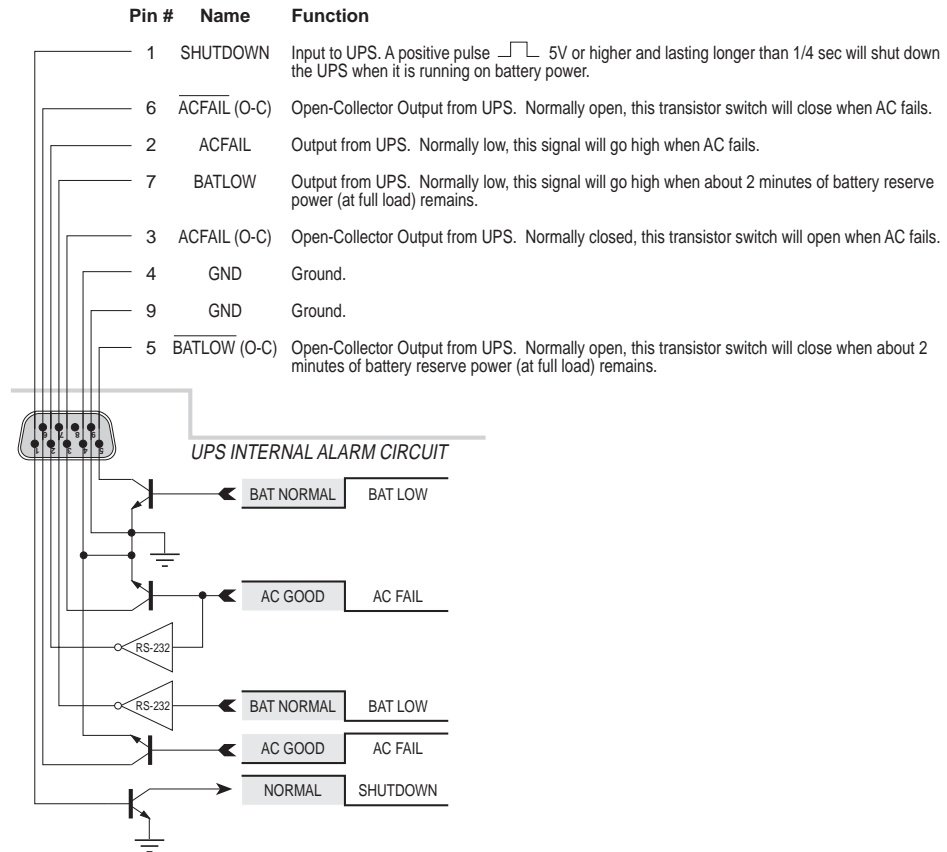
## Network Installation & Alarm Interface

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See accompanying list of accessories for information about ordering network power monitoring software and cables.

Your UPS can communicate with a network file server, UNIX workstation or a PC using the alarm interface port. This port provides functions compatible with Novell, Windows 3.1/95/NT, Vines, 3COM, Lantastic, AppleShare and other network operating systems. With the proper software and interface cable, your file server can warn users of a power failure and, if necessary, shut down safely and automatically. For network installation, please refer to the instructions accompanying the software and your network documentation.

The diagram below shows the pin-outs of the alarm interface port.



Some older units may not be equipped with all the functions shown. Please call TSi Power for more information.

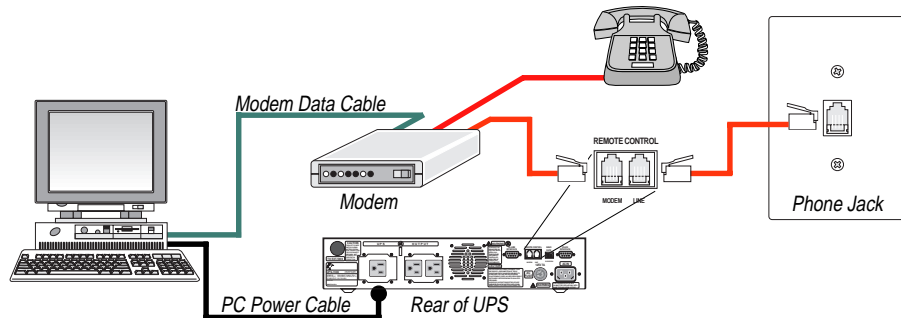
Should you have any questions related to the UPS hardware, please call TSi Power at (715) 623-0636. For software related questions, please contact your software vendor first.

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 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 best performance, 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.



The UPS will not interfere with the modem or telephone.. ►

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

(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.

(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.

(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.

## Typical Holdup Times

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The table below shows some typical holdup times with a computer load. Please note that actual holdup times with your equipment could vary.

*A typical desktop PC or Macintosh draws between 200 and 300 watts.* ►

	<b>Load connected to UPS</b>					
<b>UPS Model</b>	<b>75W</b>	<b>150W</b>	<b>250W</b>	<b>300W</b>	<b>360W</b>	<b>500W</b>
UPS-550B	56 min	29 min	16 min	13 min	10 min	n/a
UPS-720B	57 min	30 min	17 min	14 min	11 min	7 min

# 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 (715) 623-0636.

<b>Problem</b>	<b>Possible Causes</b>	<b>Suggested Solutions</b>
<b>Green AC ON light does not turn on.</b>	AC fuse has blown.	Replace with same type & rating of fuse.
	Bad AC outlet.	Use another outlet.
<b>UPS keeps shutting off.</b>	Overload.	Reduce load, then reset UPS (turn power switch off/on).
	Low Battery Voltage.	Let batteries recharge.
<b>No power to equipment even with power switch ON.</b>	Overload.	Reduce load, then reset.
	Internal DC fuse has blown.	Return UPS to authorized repair center for repair*.
<b>Yellow INV ON light is flashing even though AC mains is OK.</b>	AC mains voltage is too low, too high or too noisy.	Wait for normal AC to return.
		Reduce load.
		Correct line voltage with line conditioner**
<b>Insufficient holdup time.</b>	Batteries getting old.†	Return UPS to factory for replacement.*
<b>AC fuse keeps blowing.</b>	Fuse rating is wrong.	Replace with proper fuse.
	MOV's damaged after lightning strike.‡	Return UPS to authorized repair center or factory for repair.*
<b>UPS does not turn on (especially after a long power outage.)</b>	Battery drained. Battery protection circuit has activated.	Turn off UPS. Turn off all load connected to UPS. Wait 5 minutes. Turn on UPS. Let batteries recharge 24 hours.

\* Please call TSi Power to obtain RMA number before returning the UPS.

\*\* Some areas may experience chronic brownout conditions as a result of power shortages or overload. In addition, some buildings may have excessive AC line noise due to old air-conditioners, irregular loads, etc. A line conditioner/line filter between the UPS and the AC outlet is a possible solution in such cases.

† Battery Replacement: Under normal conditions, the battery lifetime is approximately 4 years. Contact factory to replace batteries. Under severe conditions (more than 150 full discharge-recharge cycles per year), the batteries may have to be replaced more frequently.

# UPS Technical Specifications

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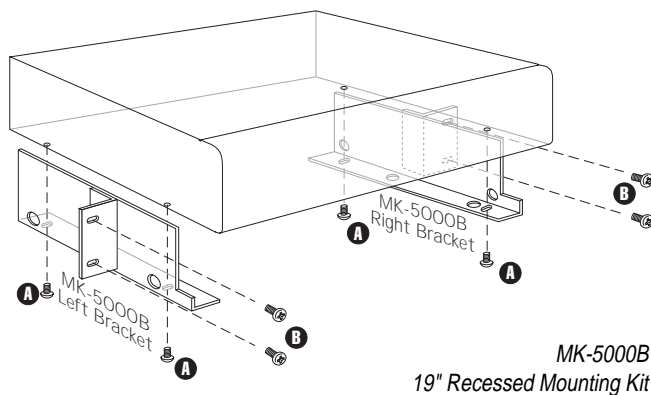
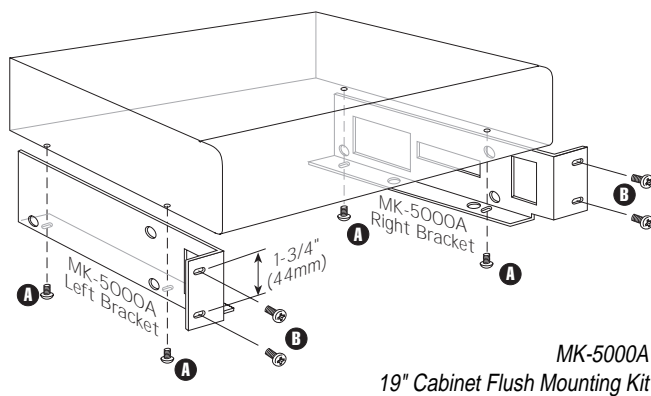
<b>Input</b>	<ul style="list-style-type: none"><li>• 100~130V<sub>RMS</sub>, 60±6Hz, sinusoidal.</li></ul>
<b>UPS Output (on battery)</b>	<ul style="list-style-type: none"><li>• 105~130V<sub>RMS</sub>, 60±1Hz, pulse-width modulated, modified sinewave.</li><li>• 360 watt maximum (UPS-550B). 500 watt maximum (UPS-720B)</li></ul>
<b>Transfer from AC to Inverter</b>	<ul style="list-style-type: none"><li>• Brownout threshold: 97±2V<sub>RMS</sub>. Overvoltage threshold: 133±3V<sub>RMS</sub>.</li><li>• Transfer Time: 1 ms maximum, phase locked to the AC.</li></ul>
<b>Transfer from Inverter to AC</b>	<ul style="list-style-type: none"><li>• The line voltage has to stabilize to between 100 and 130 V<sub>RMS</sub> for at least 2 seconds in order to transfer back to AC.</li><li>• Transfer Time: 1 millisecond, phase locked to the AC.</li></ul>
<b>Battery &amp; Charger</b>	<ul style="list-style-type: none"><li>• Two long-life, leak-proof, sealed lead-calcium batteries, each rated at 12V<sub>DC</sub>, 7A-h provide 168VA·h of capacity.</li><li>• Typical recharging time is 4-6 hours to return 90% of capacity.</li></ul>
<b>Safety and Reliability Features</b>	<ul style="list-style-type: none"><li>• Designed to meet UL/CSA/IEC standards of approval.</li><li>• External mains fuse protects all AC circuits. Internal fuses protect all DC circuits.</li><li>• Internal overload circuit disconnects the load if the maximum power of the UPS is exceeded for more than a few seconds.</li><li>• Battery protection circuit prevents complete drain and damage of battery under most circumstances.</li><li>• Durable, all steel case withstands transport in hostile environments, and installation and operation in any indoor application.</li></ul>
<b>Size</b>	<ul style="list-style-type: none"><li>• Width ~ 16"; Depth ~ 12"; Height ~ 3-1/8"</li></ul>
<b>Weight</b>	<ul style="list-style-type: none"><li>• UPS-550B &amp; UPS-720B: 36 lbs.</li></ul>
<b>Operating Environment</b>	<ul style="list-style-type: none"><li>• Operating Temperature: 0°C ~ 40°C (32°F ~ 100°F).</li><li>• Humidity: 0 to 95%, non-condensing.</li><li>• Estimated MTBF: 10 years (5 years for batteries).</li></ul>
<b>Warranty</b>	<ul style="list-style-type: none"><li>• Two years limited warranty, parts and labor (except for batteries).</li><li>• Battery manufacturer's warranty on batteries.</li><li>• Extended warranty available.</li></ul>

# Installation Procedure for Mounting Kits

Please follow these instructions when installing the UPS or Battery Extension Units using mounting brackets MK-5000A, MK-5000B or MK-5000C. For proper and safe installation, you will need a philips head screwdriver and two people to assist you in holding the unit.

## Installing the Brackets

- (1) Inspecting the drawings, verify that you have all the necessary brackets and bolts.
- (2) Turn the UPS or Battery Extension Unit upside down so that you are facing the bottom of the unit.
- (3) Place the left and right brackets so that the holes in them line up with the mounting holes on the bottom of the unit.
- (4) Use the 4 screws **A** (size #8-32, length 3/8", thread-forming) to fasten both brackets firmly to the unit.

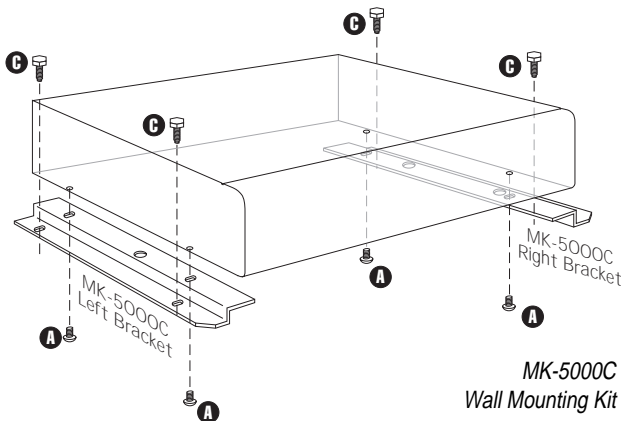


## Cabinet Installation (for MK-5000A & MK-5000B)

- (1) Make sure that the 19" cabinet is assembled properly with the equipment mounting rails securely installed at the intended location. This should be either in the front or rear of the cabinet for MK-5000A or in the center of the cabinet for the MK-5000B.
- (2) Place the clip nuts included with the rack-mounting kit at the intended height of the cabinet. The two clip nuts for each rail should be placed 1-3/4" apart, and at the same height on both rails.
- (3) Your two assistants should now hold the unit (at both ends), keeping it in position at



the desired height. Fasten the screws **B** (provided with the kit) through the mounting bracket into the rails using the clip nuts previously installed.



### Wall Mounting (for MK-5000C only)

(1) Make sure that the wall is properly prepared for the approximately 40lbs of weight it would have to support. A wooden or plywood wall should be at least 1/2" thick. A steel wall should be at least 1/8" thick. Mounting on plaster wall is not recommended.

(2) If the wall is made of wood or plywood, 4 wood screws size #10 or larger should be used to secure the units **(C)**. If the wall is made of steel, either 4 studs or 4 threaded holes of size #10 or larger must be placed at

the proper location before attempting to mount the unit. The holes should be placed 7" apart vertically, and at a horizontal distance of 16-1/2" (see figure).



(3) Your two assistants should now hold the unit (at both ends), keeping it in position at the desired height. Fasten the screws or bolts into the previously prepared mounting holes in the wall.

## **Limited Warranty**

TSi Power warrants this product to be free from defects in materials and workmanship for two (2) years<sup>†</sup> 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.

<sup>†</sup>Excluding batteries. Battery manufacturer's warranty applies on batteries.

## **Limitation of Liability**

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