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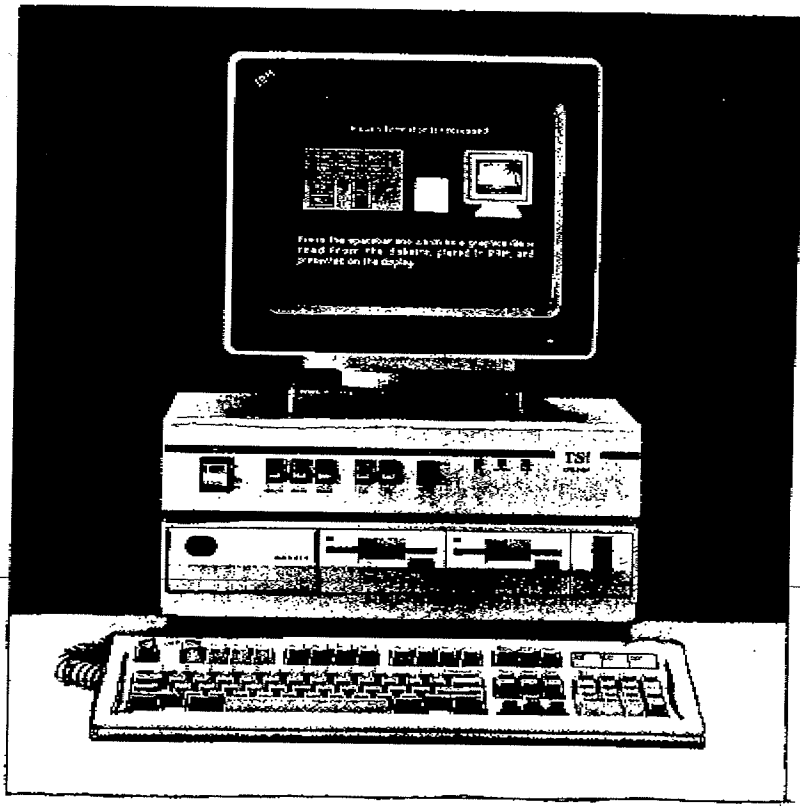
Find the *TSi Power UPS-3160P* at our website: ***Click HERE***

DOCUMENT NUMBER UM-UPS3160-2

USER'S MANUAL

UNINTERRUPTIBLE POWER SUPPLY SYSTEM
(UPS-3160 SERIES)

UPS-3160P/H
AND
EXT-3360



TSi®

TAESUNG INDUSTRIES, INC

*Please read this manual before using equipments

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TSi LIMITED WARRANTY

UPS-3160 products are warrantied against defects for 1 year from the date of purchase from TSI and authorized distributors. Bring your sales slip (or attach copies) to distributors or to TSI, and we will repair it without charge for parts and labor. Warranty does not cover transportation costs. Damage by misuse or unauthorized tampering of the product is not covered by the warranty.

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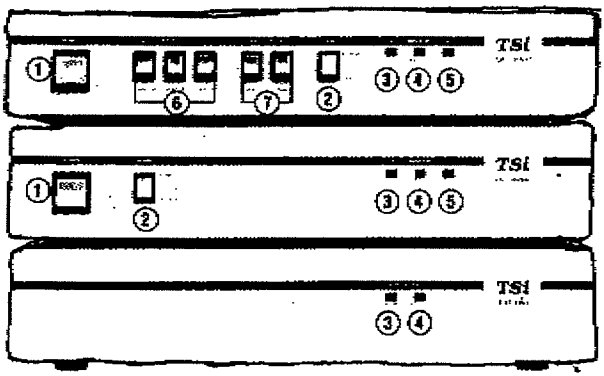
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FRONT VIEW

UPS-3160P

UPS-3160H

EXT-3360



1. **MASTER POWER SWITCH**

   Use this switch to turn on the UPS-3160 P/H.
   * Keep this switch in OFF position when unit is in storage.

2. **ALARM ENABLE/DISABLE SWITCH**

   Use this switch to enable or disable the audible alarm.

3. **"AC ON" LED**

   This green LED turns on when AC is present.

4. **"BATTERY CHARGING" LED**

   This red LED turns on when batteries are being charged.
   It turns off when batteries are fully charged.

5. **"INVERTER ON" LED**

   This yellow LED turns on when AC is absent and UPS is operating.

6. **UPS-BACKED EQUIPMENT SELECTION SWITCHES**

   Computer, monitor, printer, or other UPS-backed equipment ON/OFF selection switches.

7. **SURGE & EMI/RFI PROTECTED EQUIPMENT SELECTION SWITCHES**

   ON/OFF selection switches for auxiliary equipment such as optional disk drive, tape drive, etc.

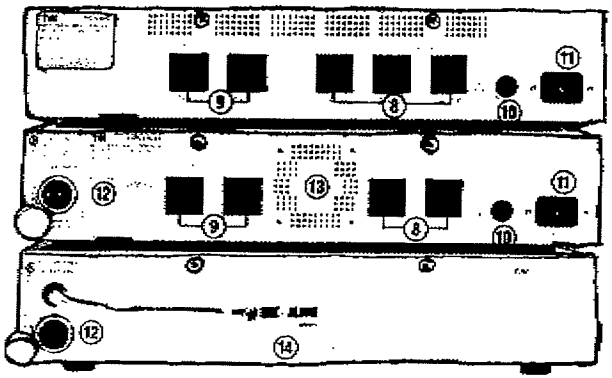
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REAR VIEW

UPS-3160P

UPS-3160H

EXT-3360



8. UPS OUTPUT SOCKETS (UPS-3160H has only 2 sockets)

These 3 sockets provide UPS, surge & EMI/RFI protected AC to computer, monitor, printer, or other equipment requiring AC back-up.

9. AC OUTPUT SOCKETS

These 2 sockets provide surge & EMI/RFI protected AC for auxiliary equipment such as optional disk drive, tape drive, etc.

10. AC FUSE

7 amp slow-blow fuse protects against overload or short conditions.

11. AC IN SOCKET

CCE-22 connector for AC input to the UPS-3160 P/H.

12. INTERCONNECTION SOCKET (UPS-3160H & EXT-3360 only)

Pin 1: AC earth GND, Pin 2: +24 VDC, Pin 3: AC LINE
Pin 4: AC NEUTRAL, Pin 5: +24 VDC return

13. HOT AIR EXHAUST FAN (UPS-3160H only)

This fan turns on only when AC is absent and UPS is in operation.

14. EXTENSION AC/DC POWER CABLE (EXT-3360 only)

This cable carries AC & DC power between UPS-3160H and EXT-3360.

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Your UPS-3160 series Uninterruptible Power Supply is a high performance AC power back-up system featuring a unique slimline and modular architecture.

UPS-3160P is a "Power Center" with 5 designated equipment ON/OFF selection switches. It can only be used as a stand-alone unit.

UPS-3160H is equipped with a battery extension connector. It can be used in a stand-alone mode like the UPS-3160P, or upto 4 Battery Extension Unit (EXT-3360) can be "daisy-chained" to a UPS-3160H to meet your specific back-up time requirement.

BACK-UP TIME TABLE

LOAD / CONFIGURATION	50 watt	150 watt	250 watt
UPS-3160P or H	1 hour	25 min	10 min
H with 1 EXT-3360	5 hours	1.5 hours	1 hour
H with 2 EXT-3360	9 hours	3 hours	2 hours
H with 3 EXT-3360	13 hours	4.5 hours	3 hours
H with 4 EXT-3360	18 hours	7 hours	4 hours

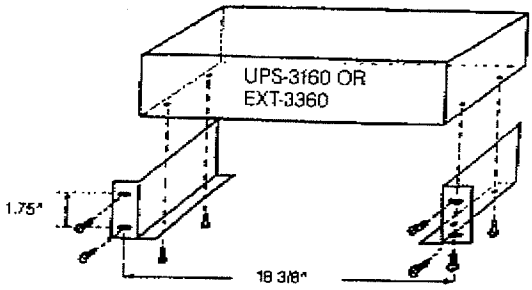
Standard features of the UPS-3160P and H are:

- Fast transition time (2.5mS typical, 4mS maximum)
- Complete AC power loss protection.
- AC brown-out protection (threshold is 100 VAC RMS).
- 3 way surge voltage protection by heavy duty metal-oxide varistors (AC LINE to AC NUETRAL, AC LINE to GROUND, and AC NEUTRAL to GROUND).
- Built-in EMI and RFI line noise filter.
- Audible alarm beeps during AC loss condition. Alarm changes to continuous tone when there is less than a few minutes of battery reserve left.
- Sealed, maintenance-free, leak-proof lead-acid batteries.
- Extremely reliable solid-state inverter generates pulse-width modulated square wave with excellent regulation.
- 3 second wait-out upon AC return to avoid transients.
- UPS OUTPUT overcurrent protection circuit shuts off the system if over-load of 130% or more exists.

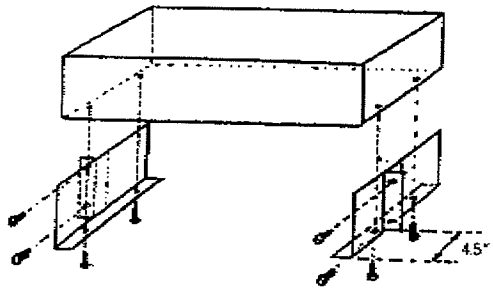
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OPTIONAL MOUNTING KITS & ACCESSORY HARDWARE

1. MK-3160A : Left & right mounting brackets, 8 bolts and 4 clip-nuts for standard 19" cabinet flush-mounting.

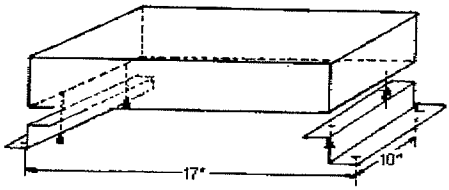


2. MK-3160B : Left & right mounting brackets, 8 bolts and 4 clip-nuts for standard 19" bay/cabinet recessed mounting



"Other dimensions are same as those of MK-3160A.

3. MK-3160C : Left & right brackets and 4 bolts. For flat wall mounting.



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1. Ensure that the power switch is in OFF position.

2. Plug in the enclosed AC cord to the rear of the unit, then plug it into a live AC socket.

WARNING: If the incoming AC LINE & NEUTRAL wires are reversed, severe damage will occur to both equipment and UPS-3160. Ensure correct incoming AC wiring using AC CIRCUIT TESTER such as IDEAL IND. INC's Model 61-035 or equivalent AC circuit tester.

3. Turn on the power switch. Unit may "beep" momentarily. All 3 indicator LED's should light for approximately 3 seconds, then "INVERTER ON" LED should turn off.

4. Now, you are ready to plug in your equipment. Plug in equipment that need back-up power such as computer, monitor, & printer into their designated UPS OUTPUT sockets (UPS-3160H has 2 non-designated sockets).

   Plug in auxilary equipment that require surge and EMI/RFI protection only (such as optional hard-disk drive, tape drive, etc) into the 2 AC OUTPUT sockets.

   CAUTION: If you use an additional surge suppressor between UPS-3160 and equipment, ensure that the rating of surge suppressor is 130 VAC or higher. Lower rated units may cause damage to both UPS-3160 and surge suppressor!

   NOTE: UPS-3160P & H includes a heavy-duty 3 way MOV surge suppressor; therefore additional surge suppressor is not required for most applications.

5. Now, turn on all the equipments, and ensure that they are working. All UPS OUTPUT and AC OUTPUT sockets are fully protected against EMI/RFI noise and surge voltages.

6. For the purpose of testing, simulate AC outage by unplugging the UPS-3160 AC cord. "INVERTER ON" yellow LED should turn ON. Also, if the ALARM switch is in ENABLE position, the audible alarm should "beep" once every few seconds.

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NOTE: When there is only a few minutes left of battery reserve (when battery set voltage drops below 22 VDC), the audible alarm will change from "beeping" to a continuous tone. At the start of continuous alarm, files should be saved and equipment should be turned off.

7. Note that the equipment connected to the UPS OUTPUT sockets still have power while equipments connected to the AC OUTPUT sockets have lost power.

8. Reintroduce AC. "AC ON" and "BAT. CHARGING" LED's should turn ON. After approximately 3 seconds, "INVERTER ON" LED should turn OFF.

9. When AC is restored after a full discharge of the batteries, "BATTERY CHARGING" LED should remain ON for 4 to 5 hours, gradually dimming as battery voltage is restored to the fully charged level. It turns off when the batteries are fully charged.

10. When the AC outage lasts for a long time, and the batteries are discharged to less than 21 VDC (fully charged battery set should measure approximately 26 VDC), then UPS-3160 will automatically shut off. Continuous audible alarm remains ON.

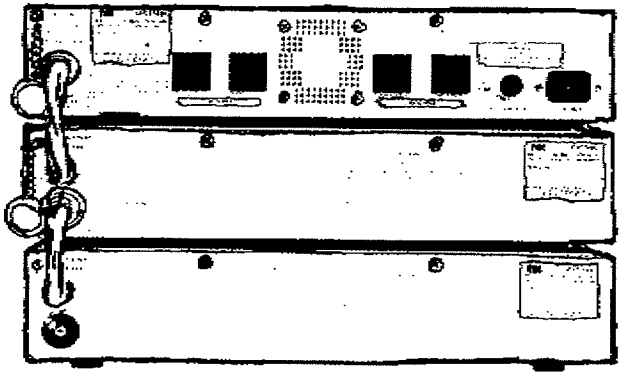
11. The shut-off condition will be removed automatically upon restoration of AC; or it can be manually reset by turning off the UPS-3160 power switch, then turning it back on.

    NOTE: Some computer power supplies require AC for start-up. For such computers, the computer power switch may have to be turned OFF, then back ON for a successful start-up. If you have a UPS-3160P, you can use the optional equipment switch.

12. If an over-load or short condition is introduced, UPS-3160 will shut off within a few seconds. The over-load condition must be removed; and UPS-3160 must be reset as mentioned in (11) before the system resumes normal operation.

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UPS-3160H WITH EXT-3360 BATTERY EXTENSION UNIT (S)



Example of an extended battery system (Rear View)

1. Ensure that UPS-3160H is working correctly.
2. Place EXT-3360('s) under UPS-3160H.
3. Ensure that the UPS-3160H power switch is in OFF position.
4. Plug in the EXT-3360 interconnection cable into the mating socket in rear of UPS-3160H. This cable carries DC power from EXT-3360 to UPS-3160H and AC power from UPS-3160H to EXT-3360. (See page 2, item 6 for pinout information).
5. Continue this "daisy-chaining" for all the battery extension units in the system. Up to 4 EXT-3360's may be connected to one UPS-3160H.
6. When the "daisy chaining" is completed, turn on the UPS-3160H power switch.
7. "AC ON" and "BATTERY CHARGING" LED's on EXT-3360 work the same way as the UPS-3160H LED's.
8. For an estimation of back-up time for your particular configuration, see the BACK-UP TIME TABLE in "FEATURES" section of this manual (page 4).

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TROUBLE-SHOOTING

SYMPTOM	TROUBLE-SHOOTING METHOD
"AC ON" lamp does not turn on.	• Check for blown AC fuse in the rear of UPS-3160. • Replace with 7A, 125 VAC slow-blow fuse.
UPS has been shut-off (with continuous alarm)	• Over-current condition may have caused the shut-off. • Unplug all equipment, then try again.
UPS OUTPUT is DEAD	• Check to make sure that the combined UPS-OUTPUT load is 300 watts or less.
UPS makes a loud noise when AC OUTAGE occurs.	• Return it promptly to factory for repair.
"BAT. CHARGING" LED repeats On/Off cycle	• The UPS-3160H may have been left unattended for more than a few days after a low battery shut-off, causing complete battery discharge. • FOR UPS-3160H ONLY: Connect one or more EXT-3360 to defective UPS-3160H. If "BAT. CHARGING" LED remains on continuously, then let batteries charge for a few hours and try again. • Return it promptly to factory for repair.
Insufficient back-up time	• Return to factory for repair or battery replacement.

BATTERY REPLACEMENT

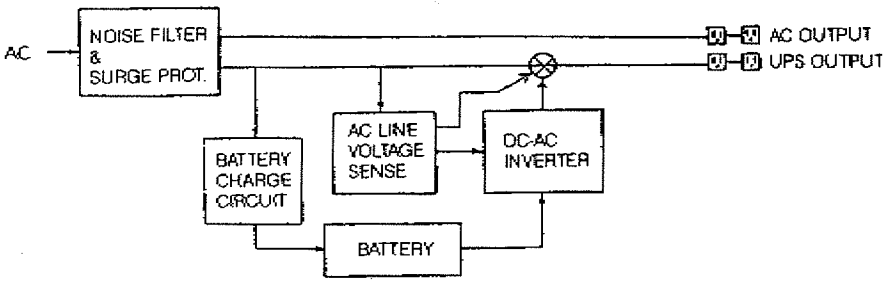
- Under normal environment, the battery lifetime is approximately 4 to 5 years. Factory or authorized distributor will replace batteries for a nominal fee.
- Under severe conditions (500 or more full discharge/recharge cycles occur in less than 4 years), the batteries may have to be replaced more frequently.

WARNING

- Never try to replace batteries yourself. Acid leaks or shorted terminals can cause severe injury! Wrong type of battery may explode!

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BLOCK DIAGRAM OF UPS-3160P/H



TRANSITION : From AC to UPS : 2.5mS typical (4mS max.)
From UPS to AC : 2.5mS typical (4mS max.)

INPUT : 105-129 VAC sine wave, 60 Hz.

OUTPUT : Nominal no load UPS output voltage is 128 VAC RMS. Nominal full load (300 watt) UPS output voltage is 105 VAC RMS.

Output is a modified square wave that is pulse-width modulated from 50% to 75% duty cycle depending on battery voltage.

*NOTE: Use true RMS AC voltmeter for UPS OUTPUT voltage measurements. If a regular AC meter is used, it will give a much lower reading than a true RMS meter.

BATTERIES : Two 12 volt 6.5 Amp-hour batteries in series provide 150 VA-hour of back-up energy for UPS-3160P/H

Four 12 volt batteries in series/parallel combinations provide 300 VA-hour of back-up energy for each EXT-3360.

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Battery charging circuit is voltage regulated at 27 volts and curren limited to 1.0 amp maximum charging current for UPS-3160P/H and EXT-3360.

SAFETY FEATURES : 7 amp, 125 VAC slow-blow main fuse protects all AC outputs.

Automatic over-current shutdown of UPS-OUTPUT occurs if load exceeds 400 +/− 50 watts.

Two slow-blow 15 amp battery fuses inside the unit protect DC circuit from overload or shorts.

Low battery voltage disconnection protects batteries from complete discharge.

Polarized interconnection connector protects against wrong insertion.

Case is earth grounded via AC earth ground prong.

PHYSICAL : Case size : 16"×11"×3" (W×D×H)

Weight : UPS-3160P/H: 35 lbs approx.
EXT-3360: 31 lbs approx.

Operating temperature range: 0°C to 40°C.
Storage temperature range: −20°C to 50°C.
Humidity Range: 0 to 95%, Non-condensing.
Maximum withstanding weight: 250 lbs.

EMI/RFI FILTERING : Both Line-to-Line interference and Line-to-Ground RFI are filtered.

SURGE PROTECTION : Maximum protection rating of each of the three M.O.V. (Metal oxide varistor)'s is 130 VAC, 180 VDC, 70 Joules of energy, and 6,500 instantaneous amperes (8×20μS).

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