
USER'S GUIDE

HIGH INTENSITY ULTRASONIC PROCESSOR

Model VC50AT

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The Ultrasonic Atomizer supplied with this instruction manual is constructed of the finest material and the workmanship meets the highest standards. It has been thoroughly tested and inspected before leaving the factory and when used in accordance with the procedures outlined in this manual, will provide you with many years of safe and dependable service.

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IMPORTANT SAFEGUARDS

READ BEFORE INSTALLING OR USING THE EQUIPMENT

Your Ultrasonic Atomizer has been designed with safety in mind. However, no design can completely protect against improper usage, which may result in bodily injury and/or equipment damage. Please observe the following warnings at all times, read the operating instructions carefully before operating the equipment, and retain this instruction manual for future reference. If the Ultrasonic Atomizer is used in a manner contrary to that specified in this instruction manual, the protection features designed into the unit may be impaired.

When mounting the probe, always clamp the upper portion of the converter housing. Never clamp the probe.

Make sure the Ultrasonic Atomizer is properly grounded via a 3-prong outlet.

High voltage is present in the power supply. Do not remove the cover. Refer all servicing to qualified service personnel.

To avoid electric shock, disconnect the electrical power cord before removing the cover prior to servicing.

Never operate the power supply unless it is connected to the converter.

Never secure anything to the probe, except at the nodal point (point of no activity).

Never touch a vibrating probe.

Never allow a microtip to vibrate in air for more than 10 seconds.

It is recommended that a sound abating enclosure or ear protection be used when operating the Ultrasonic Atomizer.



WARNING or CAUTION

Where you see this alert symbol and WARNING or CAUTION heading, strictly follow the warning instructions to avoid personal injury or equipment failure.



SECTION 1 – INSTALLATION

INSPECTION

Prior to installing the Ultrasonic Atomizer, perform a visual inspection to detect any evidence of damage, which might have occurred during shipment. Before disposing of any packaging material, check it carefully for small items.

The Ultrasonic Atomizer was carefully packed and thoroughly inspected before leaving our factory. The carrier, upon acceptance of the shipment, assumed responsibility for its safe delivery. Claims for loss or damage sustained in transit must be submitted to the carrier.

If damage has occurred, contact your carrier within 48 hours of the delivery date. **DO NOT OPERATE DAMAGED EQUIPMENT.** Retain all packing materials for future shipment.

ELECTRICAL REQUIREMENTS

The Ultrasonic Atomizer requires a fused, single phase 3-terminal grounding type electrical outlet capable of supplying 50/ 60 Hz at 100 volts, 115 volts, 220 volts, or 240 volts, depending on the voltage option selected. For power requirements, check the label on the back of the unit.



WARNING

For your personal safety, do not, under any circumstances, defeat the grounding feature of the power cord by removing the grounding prong.



INSTALLING THE ULTRASONIC PROCESSOR

The Ultrasonic Atomizer should be installed in an area that is free from excessive dust, dirt, explosive and corrosive fumes, and extremes of temperature and humidity.

SECTION II – OPERATION

PRINCIPLES OF ULTRASONIC ATOMIZATION

The ultrasonic power supply converts 50/60 Hz line voltage to high frequency 20 kHz (20,000 cycles per second) electrical energy. This electrical energy is transmitted to the piezoelectric transducer within the converter, where it is changed to mechanical vibrations. The ultrasonic vibrations are intensified by the nozzle and focused at the tip where the atomization takes place. The liquid travels through the nozzle, and spreads out as a thin film on the atomizing surface. The oscillations at the tip disintegrate the liquid into micro-droplets, and then eject them to form a gentle, low velocity spray.

Unlike conventional atomizing nozzles that rely on pressure and high-velocity motion to shear a fluid into small drops, the Ultrasonic Atomizer does not require any pressure, and instead uses only low ultrasonic vibrational energy for atomization. The liquid can be dispensed to the nozzle by either gravity feed or a small metering pump, and atomized continuously or intermittently. In contrast to pressurized systems, the velocity of the droplets generated is very low—only 0.2 to 0.4 m/sec., compared with 5 to 20 m/sec.

FUNCTIONS OF KEYS, CONTROLS, INDICATORS, AND CONNECTORS

POWER SWITCH	ON position – energizes the power supply. OFF position – de-energizes the power supply. Illuminates when the power supply is energized.
OUTPUT CONTROL	Controls the amplitude of vibrations at the probe tip.
POWER MONITOR (METER)	Indicates in watts the amount of ultrasonic power delivered to the probe.
TUNE CONTROL	Optimizes power supply performance by tuning the power supply to the converter / probe assembly.
25-50 SCALE SELECT SWITCH Increases or decreases the POWER MONITOR sensitivity	In the 25 position the POWER MONITOR indicates the percentage of ultrasonic power delivered to the probe up to 25 watts. In the 50 position the POWER MONITOR indicates the percentage of the ultrasonic power delivered to the probe up to 50 watts.

REAR PANEL	
FOOTSWITCH CONNECTOR	Connects to footswitch cable.
OUTPUT CONNECTOR	Connects to converter cable.
POWER CORD	Connects to power supply to electrical outlet.
FUSE(S)	Protects against electrical overload.

PREPARATION FOR USE

CAUTION

Do not operate an Ultrasonic Atomizer that has been in a very cold or hot environment for a prolonged period of time. Wait until it has reached room temperature

1. Ensure that the AMPLITUDE is set to OFF.
2. Plug the electrical line cord into the electrical outlet.
3. If the optional footswitch is used, insert the plug into the jack located on the rear panel. Make sure that the plug is inserted forcefully all the way in.
4. If the converter / probe assembly is not already assembled; using the wrenches provided, screw securely the probe into the converter.

CAUTION

Never place a washer between the probe and the converter.
Never apply grease to the mating surfaces or threads of the converter or microtip.

5. Mount the converter / probe assembly in a laboratory stand, secure the clamp to the upper section of the converter housing only. Do not secure the clamp to any other portion of the converter / probe assembly.
6. Push in the 1/8" (3.2 mm) liquid carrying plastic tubing into the nozzle liquid inlet.
7. Connect the converter cable to the power supply.

NOTE

Should it become necessary to remove a probe, use the wrenches supplied. If the probe has been attached to the converter for a long period of time it might be necessary to use a vise. Be sure the vise has soft jaws or other means to prevent scratching. Secure the wide diameter portion of the probe in the jaws of the vise. Never grip the converter in the vise. Using a wrench, twist the converter off the probe. A tap of a hammer may be applied to the end of the wrench. Never attempt to remove the probe by twisting the converter housing, as this may damage the electrical connections within the housing.

TUNING

Tune the power supply in accordance with the following procedures each time a new converter or probe is used.

1. Ensure that the probe is not immersed in the liquid and that it does not come in contact with anything.
2. Set OUTPUT CONTROL TO “100”.
3. Set 25-50 POWER MONITOR SCALE SELECT SWITCH to “25”.
4. Set POWER SWITCH to ON, and rotate the TUNE CONTROL clockwise or counterclockwise until **minimum** (not maximum) reading (usually less than 30) is obtained on the POWER MONITOR. If minimum reading cannot be obtained, make certain that the probe is tight. A loose probe will usually generate a loud piercing sound.
5. Set OUTPUT CONTROL to “60”.
6. Set POWER SWITCH to OFF.

CAUTION

The power supply should be tuned after the probe has reached operating temperature. When working with low or high temperature liquids, immerse the probe in the liquid for a few minutes, withdraw the probe out of the liquid, and **then**, tune the power supply.

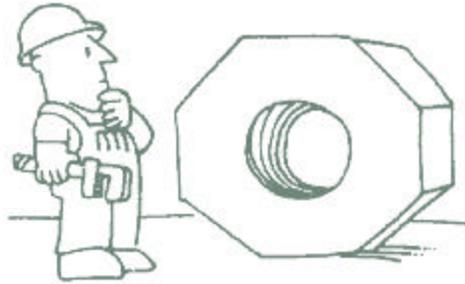
USING THE ULTRASONIC PROCESSOR

CAUTION

Do not operate the power supply unless it is connected to the converter.
High voltage is present in the power supply – do not operate with the cover off.

1. Ensure that the power supply is properly tuned.
2. Feed the liquid to the nozzle.
3. Set POWER SUPPLY to ON, if footswitch is used, depress footswitch.
4. Using OUTPUT CONTROL increase or decrease intensity as required.
5. Adjust liquid flow rate as desired.

SECTION III – SERVICE INFORMATION



Your Ultrasonic Atomizer was designed to provide you with years of safe and dependable service. Nevertheless, because of component failure or improper usage, the possibility does exist that it might not perform as it should, or that it will stop working all together. The most probable causes for malfunction are listed below and should be investigated.

The unit was plugged into an electrical outlet that provides a different voltage from that required. See *Electrical Requirements*.

The probe is not secured properly.

A fuse(s) has failed. If a fuse(s) has failed, proceed as follows:

1. Ensure that the power switch is set to OFF.
2. Open the fuse holder cover(s).
3. Replace the fuse(s).
4. Set the AMPLITUDE control to 50 and the power switch to ON. With the probe in air (out of sample), the wattmeter should read below 20 watts. If the reading exceeds 20 watts, set the power switch to OFF, and disconnect the probe from the converter.
5. Set the power switch back to ON. If the wattmeter reads below 20 watts, the probe has failed or is out of tune due to excessive erosion, and should be replaced. If the wattmeter reads above 20 watts, either the converter or power supply has failed and the complete Ultrasonic Atomizer should be returned for repair.

NOZZLE CLEANING

Whenever possible, flush the nozzle with water or an appropriate solvent after use.

Ensure that there is no material build-up on the atomizing surface. If material build-up is present, clean the atomizing surface with steel wool.

Clean the inside of the atomizing nozzle with a pipe cleaner or a small round brush. Do not under any circumstance use a drill to remove material build-up.

RETURN OF EQUIPMENT

It is suggested that an Ultrasonic Atomizer in need of repair be sent back to the factory.

In order to receive prompt service; always contact the factory before returning any instrument. Include date of purchase, model number and serial number. For instruments not covered by the warranty, a purchase order should be forwarded to avoid unnecessary delay. Care should be exercised to provide adequate packing to insure against possible damage in shipment. The Ultrasonic Atomizer should be sent to the “Service Department” with all transportation charges prepaid and return of shipment indicated.

Please obtain a *Return Authorization Number* prior to returning the instrument.

IMPORTANT

I CERTIFY THAT THE ULTRASONIC ATOMIZER AND / OR ACCESSORIES RETURNED FOR REPAIR ARE FREE OF ANY BIOHAZARDOUS OR RADIOACTIVE MATERIAL AND ARE SAFE FOR HANDLING.

DO NOT RETURN ANY EQUIPMENT UNLESS SUCH CERTIFICATION CAN BE MADE.