Bransonic® Ultrasonic Cleaners

The Power of Precision Cleaning

BRANSON
Sound Business Solutions

BRANSONIC® PRECISION CLEANING POWER

Ultrasonic cleaning is faster, more consistent, and safer than any other method. Hand scrubbing, soaking, or steams don't even come close. It's powerful enough to remove heavy oils, buffing compounds, or proteins, consistent enough to manage difficult laboratory cleaning every time, and safe enough for those delicate electronic components or fine jewelry.

Ultrasonic sound waves moving through a cleaning solution create an effect called cavitation, the rapid formation and collapse of microscopic bubbles. This powerful collapse, along with the cleaning chemistry, scrubs every wetted surface. The deep cleaning action of ultrasonics removes the most stubborn contaminants, even from blind holes and internal surfaces; the addition of heat enhances this process.

No one knows ultrasonics better than Branson. Over sixty years ago we pioneered ultrasonic cleaning, and ultrasonics is still our primary business. Bransonic cleaners incorporate everything we've learned from our experience, our research, and especially our customers.

Sweep Frequency - Industrial Transducers Improve Performance

The Bransonic® cleaners include the same high power, rugged transducers found on industrial systems sold to the automotive, electronics, and metalworking industries. These Langevin-type metal/ceramic devices use engineered ceramics to assure both durability and superior power. Coupled with sweep frequency capability, you get the best possible cleaning every time, all the time. With these features, the Bransonic ultrasonic cleaners will operate all day, every day, for years – at peak performance.

Industrial type ultrasonic transducers assure maximum power in the cleaning tank.

Designed With You In Mind

Bransonic cleaners have been designed to be functional, reliable, and most important, easy to use. All controls are mounted in an easily accessible control panel above and behind the cleaning tank. They're easily seen and are above any liquid for safety and reliability. Smaller models feature convenient built-in pour drains while the larger models incorporate tank drains with valves. Because we designed the Bransonic units to respond to your needs and requests, there's a great mix of features. You can choose from models including:

- ***Ultrasonics with digital heat control, digital timer, and temperature monitor***
- ***Ultrasonics with heat and mechanical timer***
- ***Ultrasonics with mechanical timer***

Digital models feature microprocessor controlled timer and thermostat with fingertip input and clear LED readout of parameters.

Digital models offer you maximum control of cycle time up to 99 minutes and bath temperatures to 69° Celsius. Clear readouts and one-touch setting make this a great choice. You can count on batch-to-batch consistency because the unit automatically resets to the last setting. Just reload the tank and restart! Our rugged mechanical timers are adjustable up to 60 minutes and incorporate a hold feature for continuous cleaning. There are five Bransonic cleaners sized from 1/2 gallon to 5 1/2 gallons (1.9 to 20.8 liters) capacity. Check the product/feature matrix for the Bransonic unit that best meets all of your needs!

Rugged 60 minute mechanical timer features a hold position for continuous operation.

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All-Spec Industries
Wilmington, NC

Ph: 800-537-0351
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Web: www.all-spec.com
Email: sales@all-spec.com

BRANSONIC® TYPICAL APPLICATIONS

Scientific Labs

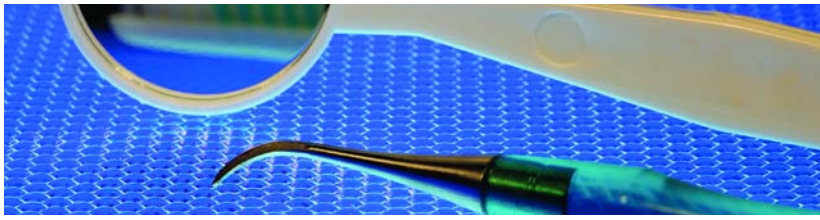
Thoroughly removes blood, protein, and contaminants.

- Lab Glassware, Test Tubes, Pipettes
- Optical and Contact Lenses, Eyeglass Frames
- Scientific Instruments, Components
- Cell Separation
- Sample Preparation
- Degas Liquids

Medical and Dental Labs

Used with sterilization, it's a safer, surer way to clean dental and medical instruments.

- Cannulae, Syringe Parts, Surgical Instruments, Blood Oxygenators
- Dental Instruments, Burs, Dentures, Caps, Plates



Industry

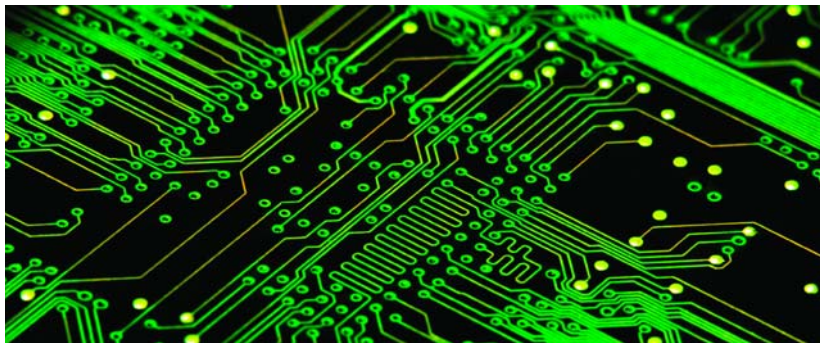
Deep cleans to remove dirt, grease, waxes and oils.

- Switches
- Assemblies
- Gears
- Precision Bearings
- Metal and Plastic Parts
- Relays and Motors
- Degas Liquids

Electronics

Removes flux and contaminants instantly, thoroughly.

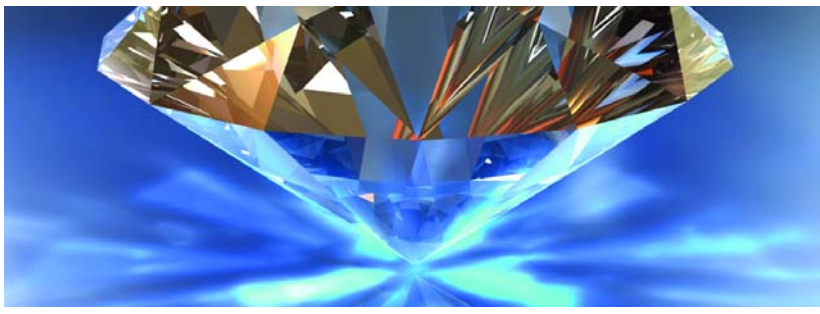
- PC Boards, SMDs
- Packaging Components
- Quartz Crystals
- Ceramic Substrates
- Capacitors
- Lapping Heads
- High-resolution Glass Plates

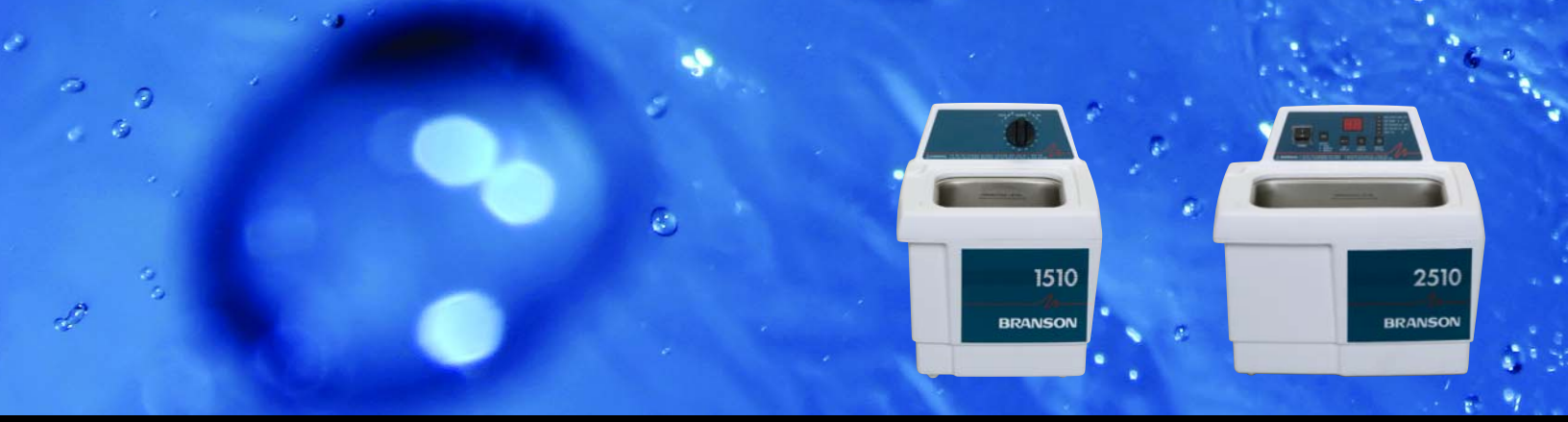


Jewelry

Cleans thoroughly, restores brilliance.

- Watches
- Chains, Charms
- Precious Metals and Gemstones
- Intricate Settings
- Clock Movements
- Coins





Bransonic Features

		Model 1510	Model 2510
	Tank Size (L-W-D)	6" x 5.5" x 4"	9.5" x 5.5" x 4"
	Overall Size (L-W-D)	10" x 12" x 11.5"	13.5" x 12" x 11.5"
	Tank Capacity (Liters)	0.5 gal. (1.9 l.)	0.75 gal. (2.8 l.)
	Weight	7 lbs.	9 lbs.
	Frequency	40 kHz	40 kHz
	Drain	NO	NO
Digital Control Plus Heat and Timer (DTH)	120V Models	B1510-DTH *CPN-952-118*	B2510-DTH *CPN-952-218*
	230/240V Models	B1510E-DTH *CPN-952-138*	B2510E-DTH *CPN-952-238*
Mechanical Timer Plus Heat (MTH)	120V Models	B1510-MTH *CPN-952-117*	B2510-MTH *CPN-952-217*
	230/240V Models	B1510E-MTH *CPN-952-137*	B2510E-MTH *CPN-952-237*
Mechanical Timer (MT)	120V Models	B1510-MT *CPN-952-116*	B2510-MT *CPN-952-216*
	230/240V Models	B1510E-MT *CPN-952-136*	B2510E-MT *CPN-952-236*

Part numbers are in italics

B-200 Jewelry and Optical Cleaner

Branson's Model 200 cleaner is compact and stylish, with the convenience of plug-in-anywhere operation. This model has the ultrasonic cleaning ability to handle a wide variety of applications; it is specifically designed to clean jewelry and optical pieces quickly and effectively. A 5-minute timer, cover and parts basket are included. One-year warranty.

Tank Size (L-W-D):	**6.5″ x 3.5″ x 2.25″**
Overall Size (L-W-D):	**8.75″ x 4.5″ x 5″**
Tank Capacity:	**15 oz. (0.4 liter)**
Weight:	**3 lbs.**
Frequency:	**40 kHz**
B-200, 120 V	***100-951-010***
B-200, 230 V	***100-951-011***

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****Parts should not be allowed to rest on the tank bottom.***

Model 3510	Model 5510	Model 8510
11.5" x 6" x 6"	11.5" x 9.5" x 6"	19.5" x 11.5" x 6"
16" x 12" x 14.5"	16" x 15.5" x 14.5"	24" x 18" x 14.5"
1.5 gal. (5.7 l.)	2.5 gal. (9.5 l.)	5.5 gal. (20.8 l.)
12 lbs.	14 lbs.	26 lbs.
40 kHz	40 kHz	40 kHz
YES	YES	YES
B3510-DTH *CPN-952-318*	**B5510-DTH** *CPN-952-518*	**B8510-DTH** *CPN-952-818*
B3510E-DTH *CPN-952-338*	**B5510E-DTH** *CPN-952-538*	**B8510E-DTH** *CPN-952-838*
B3510-MTH *CPN-952-317*	**B5510-MTH** *CPN-952-517*	**B8510-MTH** *CPN-952-817*
B3510E-MTH *CPN-952-337*	**B5510E-MTH** *CPN-952-537*	**B8510E-MTH** *CPN-952-837*
B3510-MT *CPN-952-316*	**B5510-MT** *CPN-952-516*	**B8510-MT** *CPN-952-816*
B3510E-MT *CPN-952-336*	**B5510E-MT** *CPN-952-536*	**B8510E-MT** *CPN-952-836*

Models 1510, 2510, 3510, 5510, and 8510 are supplied with a cover.*

Standard 2-year Warranty.

ISO 9001:2000 Certified

All Branson products meet FCC, CSA, and CE standards

CE NRTL /C

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*** B-300 DISCONTINUED WITH NO REPLACEMENT.**

B-300 Ultrasonic Cleaner

Branson's Model B-300 cleaner will provide a quick, consistent, high quality cleaning over a wide variety of applications; specifically designed to clean parts or instruments in just minutes. Unit comes with a 15-minute timer, cover, and parts basket. One-year warranty.

Tank Size (L-W-D):	**11.8″ x 3.9″ x 2.9″**
Overall Size (L-W-D):	**13.2″ x 5.3″ x 5.9″**
Tank Capacity:	**.5 gal. (1.9 liter)**
Weight:	**4.6 lbs.**
Frequency:	**40 kHz**
B-300, 120 V	***CPN-951-028***
B-300, 230 V	***CPN-951-026***

B-3 Pint Size Ultrasonic Cleaner

Branson's Model B-3 pint size ultrasonic cleaner is especially useful for cleaning small items, quickly and efficiently. Useful in lab, medical, hobby, jewelry and small industrial applications. One-year warranty. Unit comes with a cover and parts basket.

Tank Size:	**3.5″ D x 3″ dia.**
Overall Size (L-W-D):	**5.25″ x 5.25″ x 6.25″**
Tank Capacity:	**1 pint (0.47 liter)**
Weight:	**3 lbs.**
Frequency:	**55 kHz**
B-3, 117 V	***000-951-005***
B-5, 230 V	***000-951-103***

BRANSONIC® ACCESSORIES

	Cover (Supplied with unit)	Perforated Tray	Mesh Basket
Model 1510	**A12-1** *100-032-320*	**A12-3** *100-410-160*	*100-916-333*
Model 2510	**A22-1** *100-032-321*	**A22-3** *100-410-162*	*100-916-334*
Model 3510	**A32-1** *100-032-322*	**A32-3** *100-410-164*	*100-916-335*
Model 5510	**A52-1** *100-032-323*	**A52-3** *100-410-166*	
Model 8510	**A82-1** *000-917-050* *(Stainless Steel)*	**A82-3** *100-410-168*	

Parts should not be allowed to rest on the tank bottom.

PC-620 Ultrasonic Cleaner

The PC-620 at 40 kHz is ideal for cleaning pipettes, lab glassware, and other items requiring general cleaning. One-year warranty.

Tank Size (L-W-D):	**19.5″ x 5.75″ x 6″**
Overall Size (L-W-D):	**20.25″ x 6.25″ x 10.5″**
Tank Capacity:	**2.75 gal. (10.4 liters)**
Weight:	**23 lbs.**
Frequency:	**40 kHz**

PC-620 R-1, 117 V	***000-951-030***
PC-620 R-2, 117 V heated	***000-951-330***
PC-620 E-1, 230 V	***000-951-130***
PC-620 E-2, 230 V heated	***000-951-430***
Cover (sold separately)	***000-410-105***
Basket (sold separately)	***CPN-916-033***

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Higher Capacity DHA-1000 Ultrasonic Cleaner

This low-cost 40 kHz ultrasonic cleaner is designed especially for medium and heavy duty industrial applications. It is fully integrated, with ultrasonic generator and cleaning tank in a single enclosure. Solution capacity is 10 gallons – enough to handle large, bulky parts or for batch cleaning of small components. It's the only industrial size ultrasonic cleaner of its type available today. One-year warranty.

Tank Size (L-W-D):	**14″ x 16″ x 10.5″**
Overall Size (L-W-D):	**17″ x 19″ x 19″**
Tank Capacity:	**10 gal. (37.8 liters)**
Weight:	**70 lbs.**
Frequency:	**40 kHz**

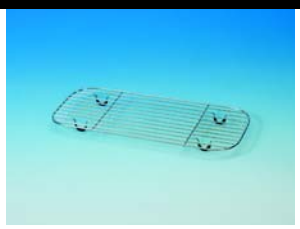
DHA-1000, 120 V	***000-914-506***
DHA-1000, 230 V	***000-914-606***
Cover (sold separately)	***100-246-802***
Basket (sold separately)	***CPN-916-032***

Solid Insert Tray

A12-2 *100-410-170*	
A22-2 *100-410-172*	
A32-2 *100-410-174*	
A52-2 *100-410-176*	
A82-2 *100-410-178*	

Beaker Positioning Cover

A12-4 (1x600ml) *CPN-246-010*	
A22-5 (2x600ml) *CPN-246-011* **A22-6** (2x250ml) *CPN-246-015*	
A32-4 (3x250ml) *CPN-246-016* **A32-5** (2x600ml) *CPN-246-012*	
A52-4 (4x600ml) *CPN-246-013*	
A82-4 (6x600ml) *CPN-246-014 (Stainless Steel)*	



Support Racks

CPN-916-039
CPN-916-040
CPN-916-041
CPN-916-042
CPN-916-043

Beakers (For All Models)

A250
250 ml Glass
000-140-001

A400
400 ml Polypropylene
000-265-061

A600-1
600 ml Glass
000-140-004

A600-2
600 ml Stainless Steel
000-410-055

Integrated Ultrasonic Cleaning Systems – Models 1216 and 1620

Branson's IC Series ultrasonic cleaning systems offer a full range of features to meet most precision cleaning requirements. These compact units incorporate 3/16, 14 gauge, all stainless steel construction, digital controls with cycle time up to 99 minutes and batch temperatures up to 69° celsius, a modern solid-state ultrasonic generator, and 25 or 40 kHz industrial transducers to deliver precise cleaning quickly, consistently, and cost effectively. The IC Series units, with their greater power per unit volume, can reduce cleaning cycle time or handle more difficult industrial applications including more densely-packed, smaller parts; heavier or more tenacious soils; investment removal from cast parts, and larger machined components. Includes cover and basket. Two-year warranty.

	IC 1216	IC 1620
Tank Size (L-W-D):	**12″ x 16″ x 13″**	**16″ x 20″ x 16″**
Overall Size (L-W-D):	**20.75″ x 19″ x 16.75″**	**24.75″ x 23″ x 20.75″**
Tank Capacity:	**10 gal. (37.8 liters)**	**21 gal. (79.5 liters)**
Weight:	**80 lbs.**	**120 lbs.**

IC 1216-25-12, 208 V, 25 kHz	***CPN-908-011***
IC 1216-40-12, 208 V, 40 kHz	***CPN-908-012***
IC 1216-25-12, 230 V, 25 kHz	***CPN-908-013***
IC 1216-40-12, 230 V, 40 kHz	***CPN-908-014***
IC 1620-25-18, 208 V, 25 kHz	***CPN-908-021***
IC 1620-40-18, 208 V, 40 kHz	***CPN-908-022***
IC 1620-25-18, 230 V, 25 kHz	***CPN-908-023***
IC 1620-40-18, 230 V, 40 kHz	***CPN-908-024***

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BRANSONIC® AQUEOUS SOLUTIONS

Pour on the cleaning power! Always specify Branson aqueous cleaning solutions for your new Bransonic ultrasonic cleaner. Whether you're gently cleaning delicate optics or stripping rust of oxides, there's a Branson chemistry developed specifically for the job.

NOTE: Sold by the case: 12 quarts per case, 4 gallons per case. Larger sizes available. Ordering numbers are per case.

OC Optical Cleaner	Removes general soils, fingerprints, cerium oxide, pitch, and blocking waxes from optical lenses, and polishing compounds from glass and optical surfaces prior to deposition of coatings.	*100-955-722* Quart *100-955-726* Gallon
JC Jewelry Cleaner	Removes general soils, particulates, fingerprints, oils, and oxides that accumulate with normal use.	*000-955-214* Quart *000-955-216* Gallon
EC Electronics Cleaner	Removes oils, resins, rosins, and other soils from hard surfaces encountered in the electronic, plating, and other related industries.	*100-955-920* Quart *100-955-914* Gallon
IS Industrial Strength Cleaner	Removes grease, oils, and particulates from automotive, aircraft, and similar mechanical components: cleans shop oils and light carbon deposits from valves fittings, and similar components.	*000-955-114* Quart *000-955-116* Gallon
OR Oxide Remover	Removes rust and oxides from all metals.	*000-955-514* Quart *000-955-516* Gallon
BC Buffing Compound Remover	Removes the most difficult buffing compounds and agents, tripoli, rouge, lime, diamond tripoli, etc.	*000-955-314* Quart *000-955-316* Gallon
RSL Rust Stripper	Used for derusting and descaling of ferrous metals.	*CPN-955-008* Quart *CPN-955-003* Gallon
GP General Purpose	Removes general soils, fingerprints, dust, light oils and greases.	*000-955-014 Quart* *000-955-016 Gallon*
GP General Purpose (Powder)	Removes general soils, fingerprints, dust, light oils and greases.	*CPN-955-007* *(3) 2 lb. Containers*
MC-1 Metal Cleaner	Remove oils, greases and a wide variety of soils from aluminum and aluminum alloys, copper, brass, and steel substrates. Removes fabricating cutting and polishing oils. Displaces soils to allow for easy removal manually, or by use of a skimmer.	*100-955-830* Quart *100-955-824* Gallon
MC-2 Metal Cleaner	Removes oils, greases and a wide variety of soils from ferrous metals, steel alloys, titanium alloys, copper and copper alloys and stainless steel (not recommended for aluminum and aluminum alloys).	*100-955-840* Quart *100-955-834* Gallon
MC-3 Metal Cleaner	Remove oils, greases and a wide variety of soils from aluminum and aluminum alloys, copper, brass, and steel substrates. Removes fabricating cutting and polishing oils. Emulsifies, preventing soils from redepositing.	*100-955-850* Quart *100-955-844* Gallon

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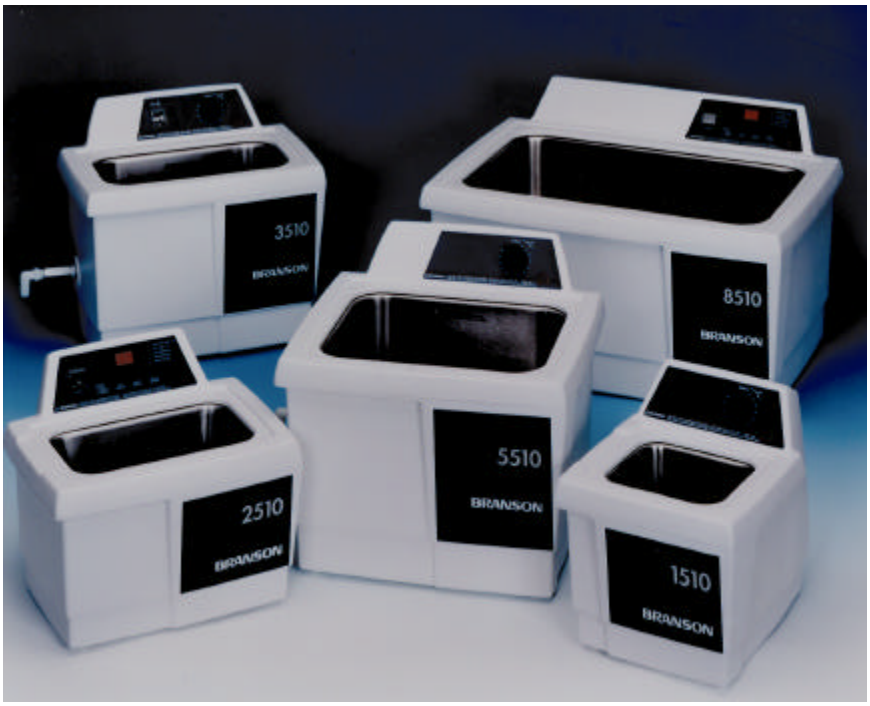
EMERSON
Industrial Automation

CPN-214-142
Rev. A

Ultrasonic Cleaners

Models 1510, 2510, 3510, 5510, 8510



Operator's Manual

Warranty

Ultrasonic Cleaners, when used in accordance with manufacturer's instructions and under normal use, are guaranteed for **two years after date of shipment.** Within the period guaranteed, manufacturer will repair or replace free of charge, at its sole discretion, all parts that are defective because of material or workmanship, not including costs for removing or installing parts.

Liability, whether based on warranty, negligence or other cause, arising out of and/or incidental to sale, use or operation of the transducer elements, or any part thereof, shall not in any case exceed the cost of repair or replacement of the defective equipment, and such repair or replacement shall be the exclusive remedy of the purchaser, and in no case will we be responsible for any and/or all consequential or incidental damages including without limitation, and/or all consequential damages arising out of commercial losses.

CAUTION

- Do not place parts or containers directly on the bottom of the cleaning tank; use a tray or wire to suspend items.
- Do not allow the solution to drop more than 3/8 inch below the operating level line with the cleaner on.
- Do not ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire or explosion. Use only water-based solutions.
- Do not use mineral acids. These could damage the tank.

Contents

⚠ Safety Precautions ⚠

Before using your Ultrasonic Cleaner, please read and thoroughly understand these safety precautions. Failure to follow them may result in serious personal injury or property damage.

To avoid electrical shock:

- Do unplug from power source before filling or emptying the tank.
- Do keep the control panel and the area around the cleaner clean and dry -- wipe up solution which spills over the tank brim. Water and high voltage can cause electrical shock.

- Do not operate the cleaner without proper grounding.
- Do not remove the grounding prong on the line cord plug.
- Do not disassemble your cleaner -- high voltage inside the cleaner is dangerous.
- Do not immerse the cleaner in water.

To prevent personal and/or property damage:

- Do operate the cleaner with a vented cover or no cover.
- Do use water-based solutions.

- Do not ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire or explosion and will void your warranty. Use only water-based solutions.
- Do not ever use mineral acids. These could damage the tank.
- Do not touch the stainless steel tank or cleaning solution -- they may be hot.
- Do not allow fluid temperature to exceed 70ºC (160ºF).
- Do not place your fingers or hands into the tank while the cleaner is operating. Doing so may cause discomfort and possible skin irritation. Avoid contact with solutions and provide adequate ventilation.
- Do not use solutions containing chlorine bleach.

To prevent damage to the cleaner:

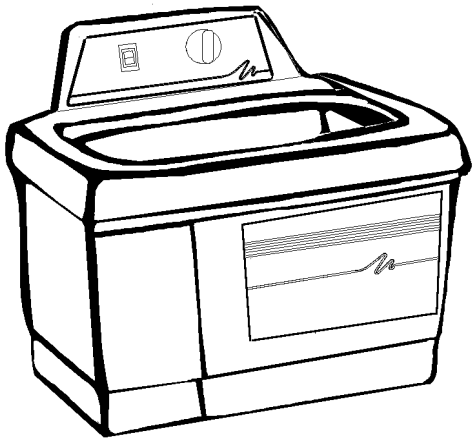
- Do change your solution regularly.

- Do not cover vents on the cover.
- Do not operate the cleaner dry.
- Do not place parts or containers directly on the bottom of the cleaning tank; use a tray or wire to suspend items. Failure to comply may cause transducer damage and will void your warranty.
- Do not allow the solution to drop more than 3/8 inch below the operating level line with heat or ultrasonics on. Failure to comply may cause transducer and/or heater damage and will void your warranty.

Introduction

Ultrasonic Cleaners

This line of ultrasonic cleaners include five models with sizes ranging from 1/2 gallons, 3/4 gallons, 1-1/2 gallons, 2-1/2 gallons and 5-1/2 gallons. Each model is constructed using durable industrial style 40kHz transducers. These provide increased cleaning power along with built in sweep frequency to ensure uniform cleaning activity throughout the bath. The 1/2 and 3/4 gallon models have a molded dip in their rims to facilitate emptying of solution from the tank. The three larger sizes have built in drains and are supplied with tank drain kits. Each model can be purchased in three different configurations -- with a Mechanical Timer (MT), with a Mechanical Timer plus Heat (MTH) and with Digital Control, plus Heat and Timer (DTH).



When you first fill your unit, or refill it with fresh solution, use warm water for the solution. Turn on the heater (press the HEAT switch, if available), turn on the ultrasonics (press SONICS or rotate the Timer knob), add the cover and the solution will heat quickly to temperature.

Accessories For Your Cleaner

Accessories include regular and beaker positioning covers, solid and perforated insert trays, mesh baskets and beakers.

Unpacking Your Cleaner

Please check your cleaner and its carton carefully for any external or internal damage. **If you find damage, contact your shipping carrier immediately,** before contacting your distributor. Please retain your packaging for future use.

Installing Your Cleaner

Check the plate on the back of the cleaner for correct power requirements. Position your cleaner within easy reach of a standard grounded electrical outlet. Do not place the cleaner on a circuit which could become overloaded.

If your cleaner does not operate correctly, first refer to the troubleshooting section for possible causes, or contact an authorized service center listed at the back of this manual, for additional information.

Equipment Specifications

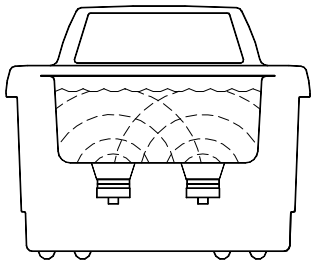
Tank Capacity	Tank Size	Overall Size	Weight	Max Input Power	Heater Power	Max. Draw Power Req. (Watts)*
1/2 gal. (1.91 L)	L: 6” W: 5.5” D: 4”	L: 10” W: 12” D: 11.5”	7 lbs. (3.2KG)	80W	0 63 63	80 143 143
3/4 gal. (2.81 L)	L: 9.5” W: 5.5” D: 4”	L: 13.5” W: 12” D: 11.5”	9 lbs. (4. KG)	130W	0 109 109	130 239 239
1-1/2 gal. (5.71 L)	L: 11.5” W: 6” D: 6”	L: 16” W: 12” D: 14.5”	12 lbs. (5.4 KG)	130W	0 205 205	130 335 335
2-1/2 gal. (9.51 L)	L: 11.5” W: 9.5” D: 6”	L: 16” W: 15.5” D: 14.5”	14 lbs. (6.4 KG)	185W	0 284 284	185 469 469
5-1/2 gal. (20.81 L)	L: 19.5” W:11.5” D: 6”	L: 24” W: 18” D: 14.5”	26 lbs. (11.8 KG)	320W	0 561 561	320 881 881

NOTE:

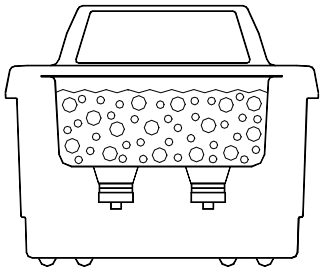
- All models have a frequency of 40kHz.
- In DTH cleaners, the temperature readout accuracy is ± 4ºC.
- 120V ± 10%, 60Hz is optimum voltage for all cleaners.
- All cleaners have CSA approval and comply with FCC regulations.
- All 220V units meet CE standards.
- * indicates power levels for MT, MTH and DTH cleaners, in that order.
- Units will cause GFI sockets to trip.
- All units have a ground leakage current less than .50ma.

How Ultrasonics Cleaning Works

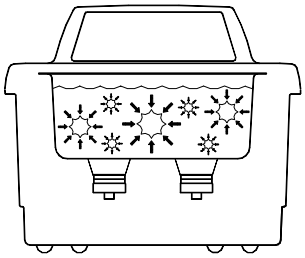
Ultrasonic sound is sound transmitted at frequencies generally beyond the range of human hearing. In your ultrasonic cleaner, ultrasonic sound (sonics) is used for cleaning materials and parts. This is how it works:



- As the sound waves from the transducer radiate through the solution in the tank, they cause alternating high and low pressures in the solution.



- During the low pressure stage, millions of microscopic bubbles form and grow. This process is called CAVITATION, meaning "formation of cavities".



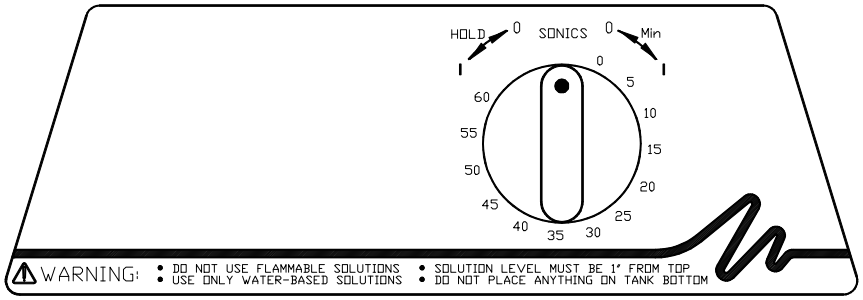
- During the high pressure stage, the bubbles collapse, or "implode" releasing enormous amounts of energy. These implosions act like an army of tiny scrub brushes. They work in all directions, attacking every surface and invading all recesses and openings.

Operating Your Cleaner

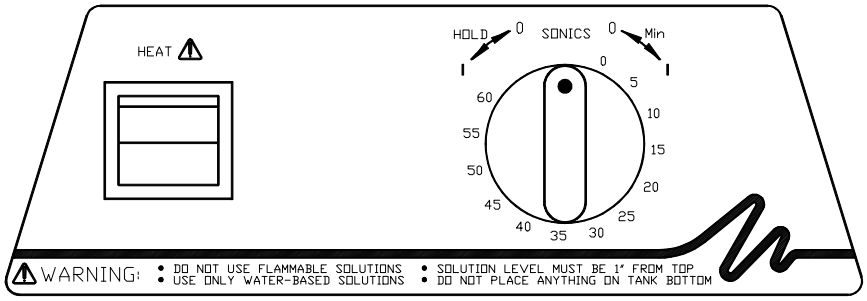
If this is the first time you are using the cleaner, please read this whole section before operating your cleaner.

Operating Your MT or MTH Cleaner

MT Cleaner



MTH Cleaner



Explanation of Controls

Control	Function
HEAT (MTH only)	Activates heat to 60ºC maximum. NOTE: Refer to pages 16 and 17 for further temperature information.
TIMER	Activates ultrasonics and sets time. Use to turn unit Off.
	Turn clockwise for variable time 0-60 mins. Turn counterclockwise to hold position for continuous operation.

Before You Start Cleaning

⚠ CAUTION ⚠

- Do not place parts or containers directly on the bottom of the cleaning tanks; use a tray or wire to suspend items.
- Do not allow the solution to drop more than 3/8 inch below the operating level line with the cleaner on.
- Do not ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire or explosion. Use only water-based solutions.
- Do not ever use mineral acids. These could damage the tank.

Failure to comply with these cautions will void your warranty.

Step	Action
1	Select your cleaning solution (refer to page 23 for solution effects on metals).
2	Allowing for the volume of the parts you will be cleaning and cleaning solution, fill the tank with warm tap water to the operating level line (one inch from the top).
3	Add cleaning solution to the tank water.
4	Plug the cleaner into a grounded outlet.
5	For maximum efficiency, refer to page 16, “Optimizing Your Cleaner” before proceeding.

NOTE:
If this is the first time you are running the cleaner, or if you have changed cleaning solution, you must degas the solution. If not, skip to ***“Cleaning Items”***.

Degassing

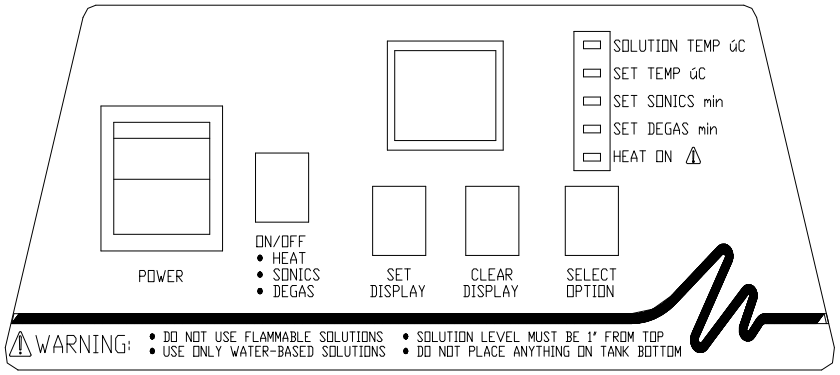
Step	Action
1	Turn the HEAT ON (MTH Cleaner only).
2	Turn the TIMER to 5-10 and let the cleaner run to allow the solution to “degas”. **NOTE:** Refer to page 17 for information on degassing.

Cleaning Items

NOTE: To stop ultrasonics at any time, turn the TIMER to zero.

Step	Action
1	Set the TIMER for the amount of time you wish the items to be cleaned.
2	Place the items into a basket, perforated tray, or beakers in a positioning cover.
3	If using beakers or a solid tray, add cleaning solution to beakers or tray to cover the items.
4	**Slowly** lower the tray or beakers into the tank. Do not allow items to contact the tank bottom. Do not stir the solution.
5	When items are clean, **slowly** remove them from the cleaner.
6	Rinse the clean items with clean water and dry them, if necessary.

Operating Your DTH Cleaner



Explanation of Controls

Control	Function
POWER	Press to activate/deactivate power to the cleaner.
ON/OFF	After you press SELECT OPTION and set the LED Display for the selected option, press to activate HEAT (SET TEMP), SONICS (SET SONICS) and/or DEGAS (SET DEGAS).
LED Display	Indicates the tank temperature, set temperature, ultrasonics time or degas time setting, depending on your SELECT OPTION choice.
SET/ CLEAR DISPLAY	Used in conjunction with SELECT OPTION to set or clear the LED display. Press CLEAR DISPLAY to clear the LED display to 00. Press SET DISPLAY to reach your selection.
SELECT OPTION	When pressed, toggles through the Function Indicators. This allows you to check or set the tank temperature and set ultrasonic cleaning or degas time.

Continued...

Control	Function
Function Indicators	Lights indicate the option selected by pressing SELECT OPTION. SOLUTION TEMP: Displays current solution temp. (10 - 75ºC, ± 4ºC). SET TEMP: Set tank temperature (01 - 69ºC). SET SONICS: Set ultrasonic time (01 - 99 mins., 60 mins. default). SET DEGAS: Set degas time (01 - 99 mins., 5 mins. default). HEAT ONE: Indicates heat is activated and has been set (SET TEMP).

Before You Start Cleaning

Step	Action
1	Select your cleaning solution.
2	Allowing for the volume of the parts you will be cleaning and for the cleaning solution, fill the tank to the operating level line (one inch from the top) with warm tap water.
3	Add a cleaning agent to the tank water.
4	Plug the cleaner into a grounded outlet.
5	Turn the POWER switch On. The cleaner will run through a three-second self-test. Wait until the LED Display shows 05 and the SET DEGAS Function Indicator lights.

NOTE:
If this is the first time you are running the cleaner, or if you have changed cleaning solution, you must degas the solution. If not, move to *Setting Operating Parameters.*

Degassing

Step	Action
1	Degas for 5-10 minutes. If necessary, use SET/CLEAR DISPLAY to alter this setting. Default degas time is 5 minutes. NOTE: Refer to page 17 for information on degassing.
2	Press ON/OFF once to start the degas process.
3	After completing the degas time, you are ready to set operating parameters.

Setting Operating Parameters

Step	Parameter	Action
1	Set Time	The cleaner is now in Set Time mode with a default time of 60 mins. If necessary, use SET/CLEAR DISPLAY to alter this setting. Press ON/OFF once to activate timed ultrasonics.
2	Set Temp.	To set the tank temperature, press SELECT OPTION until the SET TEMP LED lights. Then press SET DISPLAY to alter the setting until the LED display indicates the tank temperature you wish to maintain. Press ON/OFF once to activate heat. The heat indicator lights.
3	Solution Temp.	To monitor the solution temperature, press SELECT OPTION until the SOLUTION TEMP LED lights. The LED display will indicate the actual temperature of the solution.

Cleaning Items

⚠ CAUTION ⚠

- Do not place parts or containers directly on the bottom of the cleaning tank; use a tray or wire to suspend items.
- Do not allow the solution to drop more than 3/8 inch below the operating level line with the cleaner on.
- Do not ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire or explosion. Use only water-based solutions.
- Do not ever use mineral acids. These could damage the tank.

Failure to comply with these cautions will void your warranty.

NOTE: Select Set Time then press ON/OFF once to stop ultrasonics at any time.

Step	Action
1	Place the items into a basket, perforated tray, or beakers in a positioning cover.
2	If using beakers or a solid tray, add cleaning solution to beakers or tray to cover the items.
3	**Slowly** lower the tray or beakers into the tank. Do not stir.
4	Press ON/OFF once to activate ultrasonics.
5	When the items are clean, press ON/OFF once to deactivate ultrasonics, then **slowly** remove the items from the cleaner.
6	Rinse clean items with clean, warm water and dry, if necessary.

- ***To repeat a timed cleaning cycle*** - press ON/OFF once while in the Set Sonics mode. This cleaning cycle time will remain in memory until reset or you turn off the power to the cleaner.

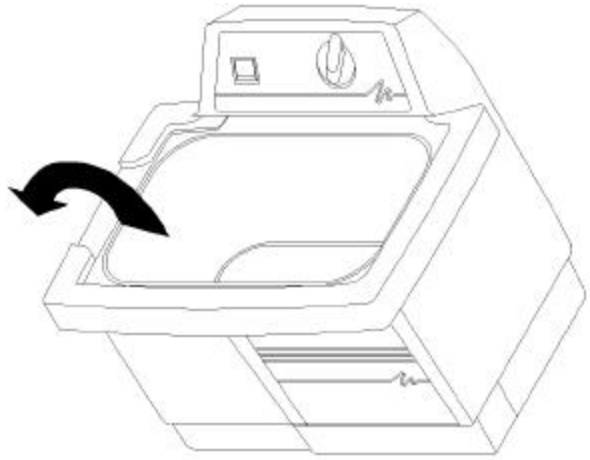
- ***To reset ultrasonics time during a cleaning cycle*** - press ON/OFF once, press SELECT OPTION until the SET SONICS LED lights. To increase time, press SET DISPLAY to your desired setting. To decrease time, press CLEAR DISPLAY, press SET DISPLAY to set the time, then press ON/OFF once to resume the cycle.

- ***To monitor the solution temperature*** - press SELECT OPTION until the SOLUTION TEMP LED lights. The LED Display will display the solution temperature in degrees Centigrade (± 4ºC). The cycle will continue during this process.

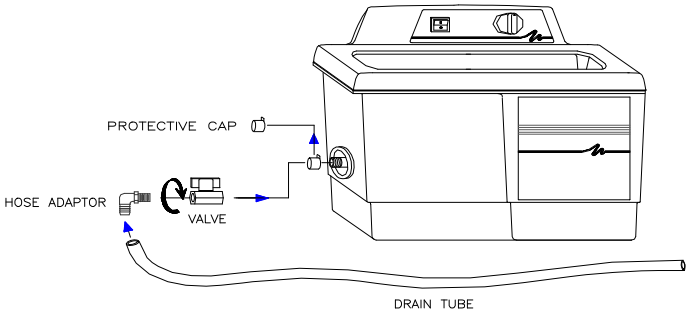
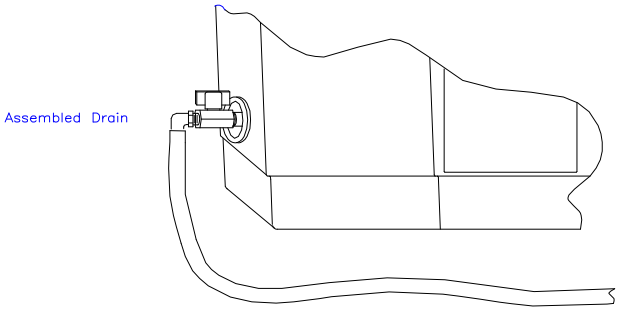
Draining Your Cleaner

⚠ WARNING ⚠
Do not immerse the cleaner in water.
Unplug the cleaner from the power source.

½ and ¾ gallon models do not have a drain. To empty, use the indented side of the rim to pour the used solution into a waste disposal unit, rinse the tank thoroughly and refill with new solution.



1-1/2, 2-1/2 and 5-1/2 gallon models include a drain and valve kit.

Step	Action
1	Place the cleaner to allow easy reach of the drain tube into a waste disposal unit.
2	Remove the thread protecting cap from the end of the cleaner's drain pipe. This will expose the white teflon sealing tape on the drain pipe's threads.
3	Hand tighten the drain valve onto the drain pipe over the white teflon sealing tape. Finish tightening the valve in place using on adjustable or a 21mm wrench. Tighten the valve no more than one full turn when using the wrench until the handle is on top. CAUTION: Over tightening of the valve can cause damage to the ultrasonic tank. Always use teflon sealing tape or a sealing paste designed for use with stainless steel if retightening or refitting of the drain valve is required. 
4	Hand tighten the hose adaptor into the end of the drain valve. Slide the drain tube over the barbed hose adaptor end. 
5	Close the drain valve by turning the handle perpendicular to the valve body and the cleaner is ready to fill with solution. To open the valve and drain the cleaner, turn the handle so that it is in line with the valve body.

Optimizing Your Cleaner

Tanks

Cleaning - check the tank for contamination whenever you change solution. If necessary, remove contaminants with a nonabrasive cloth and water.

Emptying - always unplug the cleaner before emptying the tank. Empty the solution into a waste disposal unit.

Filling - always unplug the line cord before filling the tank. Fill the cleaner to the operating level (one inch from the top with beaker/tray in place), using warm tap water.

Low solution level - will cause the cleaner to fail. When you remove heavy or bulky loads from the cleaner, the solution level may drop below the operating level. If so, be sure to replace lost solution and degas, if necessary, depending on the amount used.

Overload - do not rest any items on the tank bottom. Weight on the tank bottom dampens sound energy and will cause damage to the transducer. Instead, use a tray and/or beaker positioning cover to support all items. Allow at least one inch between the tank bottom and the beaker or receptacle for adequate cavitation.

Covers - allow the cleaner to heat up faster, to a higher temperature, and avoid excessive liquid evaporation. However, obstructing the cover vents will cause the cleaner to overheat.

Temperature

Heater - the heater may cause some discoloration of the tank wall. This is normal and will not affect the performance of the unit.

Solution - the fastest method to heat your cleaner is to fill with warm solution, use heat, ultrasonics (which also adds heat), and a cover.

Approximate stabilization temperatures with ultrasonics and heat running continuously:

MTH/DTH cleaner without a cover 50º
MTH/DTH cleaner with a cover 62º

continued...

Over temperature protection (DTH only) - the cleaner will shut down at 75ºC and the LED display will blink “75”. Turn the cleaner off and allow it to cool down. For a faster cooldown, replace some of the warm solution with cold solution.

Solution

Solution activity - the amount of visible activity is not necessarily related to optimum cavitation for cleaning.

Degassing - fresh solutions contain many dissolved gases (usually air), which reduce effective ultrasonic action. Although solutions will naturally degas over time, using Degas mode speeds up the degassing process. Solutions that have been sitting unused for 24 hours or longer have reabsorbed some gases.

Heat - increases the chemical activity of cleaning solutions.

Surface tension - can be reduced by adding solution to the bath. Reduced surface tension will increase cavitation intensity and enhance cleaning.

Solvents - never use solvents. Vapors of flammable solutions will collect under the cleaner, where ignition is possible from electrical components.

Renewal - replace cleaning solutions often to increase ultrasonic cleaning activity. Solutions, as with most chemicals, will become depleted over time. Solutions can become contaminated with suspended soil particles which coat the tank bottom, inhibiting ultrasonic activity.

Application Hints

⚠ CAUTION ⚠

- Never clean *novelty or inexpensive jewelry* in the cleaner. The combination of heat and vibration may loosen a cement-held setting.
- Never clean *gemstones* such as emerald, amethyst, pearl, opal, coral, turquoise, peridot or lapis lazuli in the cleaner.

First time cleaning - first experiment with one piece, then proceed with the remainder.

Solution level - Be sure to maintain solution level within 3/8 inch of the tank's "operating level" line. Surface activity can vary with liquid level.

Load size - It is faster and more efficient to run several small loads rather than a few big loads.

Placing items - Never allow items to sit on the bottom of the tank. Always place them in a tray or beaker or suspend in the solution.

Rinsing items - After cleaning, use a clean water bath to rinse away chemicals adhering to items.

Lubricating items - When necessary, re-lubricate items immediately after cleaning.

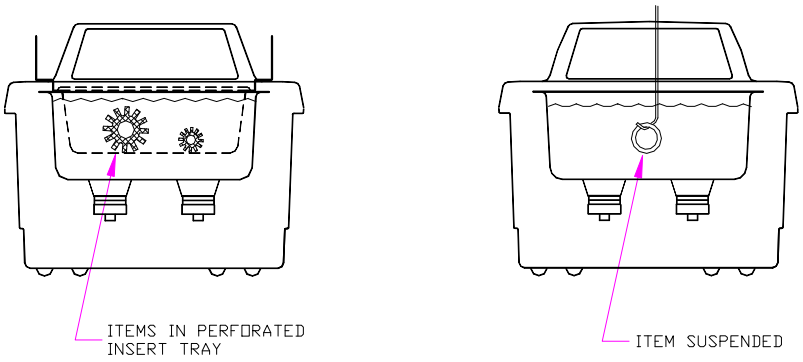
Drying items - Air drying at room temperature works for some items. Place parts requiring faster drying time under hot air blowers or in ovens.

Please call your local distributor if you have application questions.

Cleaning Methods

There are two methods of cleaning - direct and indirect. Each has advantages and disadvantages. When in doubt, run test samples using both methods to decide which one produces the best results for you.

Direct Method

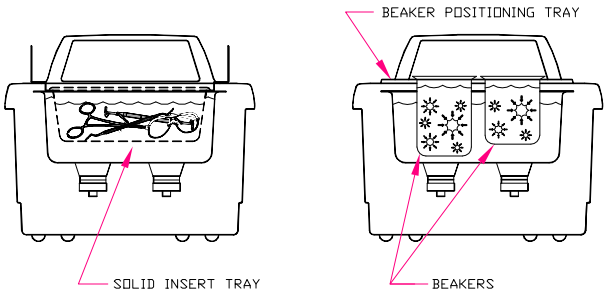


How it works:

- Fill the tank with warm water and a cleaning solution.
- Place the items to be cleaned in a perforated tray and lower them into the tank. You can also suspend items on a wire and then immerse them in the solution.

The advantages of this method are the simplicity of operation and cleaning effectiveness.

Indirect Method



How it works:

- Fill the tank with warm water and a cleaning solution.
- Pour your solution medium into one or more beakers or into a solid insert tray.
- Place the beakers in a beaker positioning cover or a solid insert tray to fit your cleaner. Beakers should not touch the tank's bottom.

The advantages of this method are:

- Removed soil stays in the beaker or tray so you can easily examine, filter or discard it.
- You can use one or more solutions at the same time.
  - two completely different cleaning solutions.
  - one beaker or tray with a cleaning solution and one with a rinse solution.
- Cleaning solution in your tank needs to be changed less often.

Cleaning Solutions

⚠ CAUTION ⚠

Do not use alcohol, gasoline, bleach, mineral acids, solutions with a flash point, semi-aqueous or combustible liquids in ultrasonic tanks, or you will void the warranty. Only use non-flammable solutions and water-based solutions.

Solution Types

Water-based solutions are either slightly acidic or alkaline. They include detergents, soaps and industrial cleaners designed to remove specific soils.

Acidic water-based solutions: remove rust, tarnish or scale. They range from mild solutions that remove tarnish, to concentrated, inhibited acidic solutions that remove investment plaster, milk-stone, zinc oxide and rust from steel and cast iron as well as smut and heat-treat scale from hardened steel.

Alkaline water-based solutions: include carbonates, silicates and caustics. These cause emulsifying action, which keeps soil from redepositing on the cleaned surface, and improves cleaning action in hard water.

Alkaline strength	**Removes:**
Mild	Light oils and greases, cutting oils and coolant compounds.
Mild to strong	Heavy grease and oil, waxes, vegetable oils, inks, wax or fat-base buffing and polishing compounds, milk residues and carbohydrates.
Heavy-duty	Mill scale, heat-treat scale, corrosion or oxides.

Change the cleaning solution periodically. Cleaning solutions can become contaminated with suspended soil particles which coat the tank bottom. This coating dampens the ultrasonic action and reduces cleaning efficiency. Certain solutions will cavitate better than others. Contact your local distributor for further information.

Heat and cavitation: increase the chemical activity of cleaning solutions. Some materials may be damaged by this stronger chemical action. When in doubt, test run samples of items to be cleaned.

Caustic solutions: used to remove rust from steels, metal alloy corrosion and a variety of tenacious soils.

Solution Amounts

Solution amounts may vary. The amount you use depends on the detergent and the type of soil to be removed. Follow instructions on the solution container and refer to the table below for the effects of solutions on metals.

Chemicals Harmful to Your Tank

The following chemicals will harm your ultrasonic tank and the action of ultrasonics and higher operating temperatures will increase their chemical activity. Do not use these or similar chemicals directly or in dilution in your ultrasonic tank or you will void your warranty.

Acetophenone	Chloracetic Acid	Hydrocyanic Acid
Aluminum Chloride	Chloric Acid	Hydrofluoric Acid
Aluminum Fluoride	Chlorine, Anhydrous	Hydrofluosilicic Acid
Aluminum Sulphate	Chromic Acid	Iodoform
Ammonium Bifluoride	Copper Chloride	Mercuric Chloride
Ammonium Chloride	Copper Fluoborate	Muriatic Acid
Ammonium Hydroxide	Ethyl Chloride	Phosphoric (crude)
Amyl Chloride	Ferric Chloride	Sodium Hypochlorite
Antimony Trichloride	Ferrous Chloride	Potassium Chloride
Aqua Regia	Ferris Sulfate	Stannic Chloride
Bromine	Fluoboric Acid	Stannous Chloride
Calcium Bisulfate	Fluorine	Sulfur chloride
Calcium Bisulfite	Hydrobromic Acid	Sulfuric Acid
Calcium Hypochloride	Hydrochloric Acid	Zinc Chloride

Solution Effects on Metals

Cleaning Agent	Steel	Brass	Alumi-num	Magne-sium	Zinc	S. Steel Copper	Tin
Optical (1)	none	none	none	none**	none**	none	none**
Jewelry (1)	none	none	none	none	none	none	none
Buffing (1) compound	none	slight stain	none	none	attacks	none	none
Oxide (2) remover	slight etch	none	slight attack	attacks	attacks	none	none
Electronic cleaner (1)	none	none	slight attack	none	none	none	none
General(1) purpose	none	none	slight attack	none	none	none	none
Industrial strength(1)	none	none	slight attack	none	none	none	none
Metal (1) cleaner 1	none	none	none	none	none	none	none
Metal (1) cleaner 2	none	none	slight attack	none	none	none	none
Metal (1) cleaner 3	none	none	none	none	none	none	none
Rust (3) stripper	none	none	attacks	attacks	attacks	none	slight attack

(1) = Alkaline; (2) = Acidic; and (3) = Caustic.

WARNING

***Free hydrogen may be released if solution comes in contact with reactive metals.**

** No effect if solution temperature is less than 140ºF.

Troubleshooting

If your cleaner does not operate satisfactorily, please check the tables below for possible causes before calling your authorized service center.

⚠ WARNING ⚠
High voltage inside - dangerous shock hazard.
DO NOT attempt to disassemble or repair the cleaner.

Problem	Cause	What to do
Cleaner will not start.	Cleaner not plugged in properly.	Plug into functioning electrical outlet.
	MT - Mechanical timer not ON.	Turn timer clockwise.
	DTH - POWER switch not ON.	Press power switch ON.
	DTH - Start button malfunctioning.	Call nearest authorized service center.
	Blown fuse.	Call nearest authorized service center.
Cleaner operates but does not heat solution	Heater malfunctions.	Call nearest authorized service center.
	MTH - HEAT not ON.	Turn heat ON
	DTH - HEAT not set properly.	See *Operating Your DTH Cleaner*.
	DTH - membrane malfunctioning.	Call nearest authorized service center.
Clogged drain	Clogged drain.	Call nearest authorized service center.

⚠ WARNING ⚠

High voltage inside - dangerous shock hazard.
DO NOT attempt to disassemble or repair the cleaner.

Problem	Cause	What to do
Cleaner operates but does not maintain set temperature	Malfunctioning heater or sensor components.	Call nearest authorized service center.
Cleaner operates but display does not function.	Interrupted calibration sequence. ***DTH*** - timer board malfunctioning.	Press SET DISPLAY Call nearest authorized service center.
Cleaner stops operating and display blinks “75”.	Overheat condition.	Turn cleaner off. Allow cleaner to cool, check solution level, then restart. Refer to *Optimizing Your Cleaner.*
Decreased ultrasonic activity. NOTE: Refer to page 27 for cavitation check.	Solution is not degassed.	Make sure that tank was filled with warm tap water plus cleaning solution and has run 5-10 minutes.
	Solution is spent.	Change solution.
	Solution level is incorrect for load.	Adjust solution to within 3/8 inch of the tank’s operating level line with load.
	Tank bottom is covered with soil particles.	Empty, then clean tank with warm water. Wipe with a nonabrasive cloth.
	Using deionized water in the tank.	Deionized water does not cavitate as actively as soapy tap water.

Check your cleaner periodically to test the level of activity of the ultrasonic cavitation. Frequency of testing will depend on your use of the cleaner.

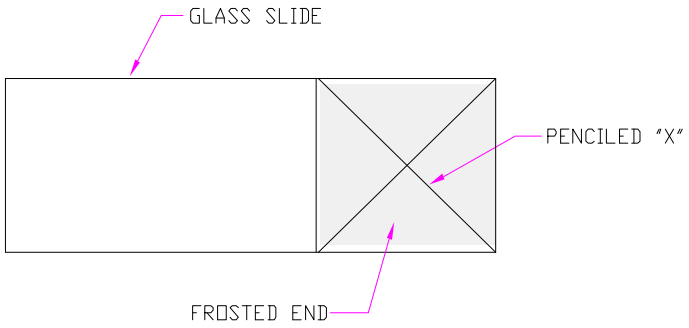
Glass Slide Test

You will need the following equipment:

- Frosted microscope glass slide (1" x 3"), such as ESCO #2951F, or equivalent;
- No. 2 lead pencil; and
- General purpose household cleaning solution, such as "Dawn" liquid soap.

Test procedure:

1. Prepare a fresh solution with general purpose household cleaning solution (concentration 1%) and warm tap water (120º - 140ºF).
2. Fill the cleaner to within 3/8 inch of the "operating level" line.
3. Turn the ultrasonics on for at least five to ten minutes to allow for degassing.
4. Prepare the glass slide by first wetting the frosted portion with tap water.



5. With the No. 2 pencil, on the frosted portion make an "X" from corner to corner.
6. Immerse the frosted end of the slide into the solution. Hold the slide vertically and center it in the solution.
7. Make sure that model DTH cleaners are in SET SONICS mode, not degas mode, then turn ultrasonics On.

The ultrasonics will begin immediately to remove the lead from the slide. All lead should be removed within 10 seconds. If your cleaner passes this test, its ultrasonic cavitation is acceptable.

NOTE:
To ensure consistency from test to test, be sure to repeat test conditions - use the same solution concentration, liquid level, temperature, type of pencil, length of degassing, etc.

Service Information

With normal use, your Ultrasonic Cleaner should not require servicing. However, if it fails to operate satisfactorily, first try to diagnose the problem by following the suggestions in the Troubleshooting Guide.

⚠ WARNING ⚠

You will void the warranty if you disassemble your cleaner. High voltage inside the cleaner is dangerous.

If you find that your cleaner needs repair, carefully pack and return it to your local distributor. If under warranty, remember to include proof of purchase.

Your cleaner will be shipped by ground service unless you specify otherwise.

Authorized Service Centers

Name	Address	Tel/Fax Number
Alpha Omega Electronics Corp.	2821 National Drive Garland, TX 75041	Tel: 972-271-5569 Tel: 1-800-540-4967 Fax: 972-840-3668
Crystal Electronic Inc.	140 Centre Street Aurora Canada L4G 1K0	Tel: 905-841-5762 Fax: 905-841-9688
Paragon Electronics	11075 N.E. 6th Ave. Miami, FL 33161	Tel: 305-757-0631 Fax: 305-754-6877
Master Sonics Repair Center	445 West Queen St. Southington, CT 06489	Tel: 800-737-2198 860-621-9466 Fax: 860-621-0283

Notes:

Technical Support:

Branson Ultrasonics Corp.	41 Eagle Road P.O. Box 1961 Danbury, CT 06813-1961	Tel: 203-796-0339 Tel: 203-796-0557 Fax: 203-796-2240