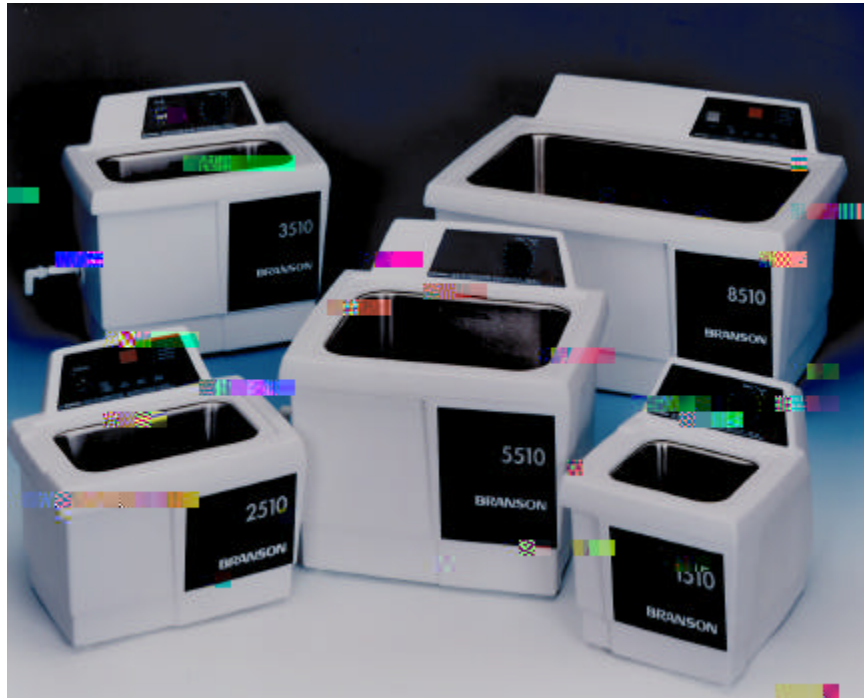


CPN-214-142  
Rev. A

## 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

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## **1 Safety Precautions**

***To prevent damage to the cleaner:***

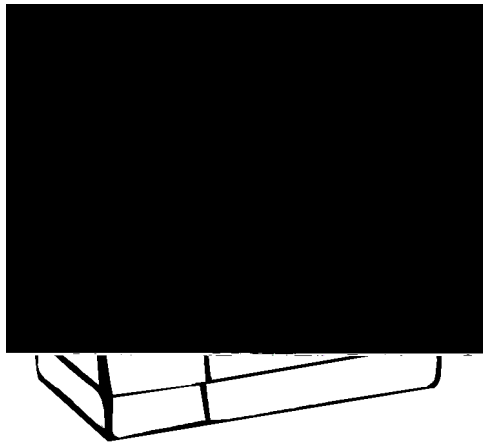
- Do change your solution regularly.
- Do not cover vents on the cover.
- Do not operate the cleaner dry.
- Do not place parts or containers directly on the bottom of the cleaning tank; use a tray or wire to suspend items. Failure to comply may cause transducer damage and will void your warranty.
- Do 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.

**2 Safety Precautions**

## 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

### ***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***

<b>Tank Capacity</b>	<b>Tank Size</b>	<b>Overall Size</b>	<b>Weight</b>	<b>Max Input Power</b>	<b>Heater Power</b>	<b>Max. Draw Power Req. (Watts)*</b>
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

## **5 Introduction**



### ***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:

## **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***

Mi

***Before You Start Cleaning***

<b>Step</b>	<b>Action</b>
1	Select your cleaning solution (refer to page 23 for solution effects on metals).

### ***Degassing***

<b>Step</b>	<b>Action</b>
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”. <b>NOTE:</b> Refer to page 17 for information on degassing.

### ***Cleaning Items***

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

<b>Step</b>	<b>Action</b>
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	<b>Slowly</b> lower the tray or beakers into the tank. Do not allow items to contact the tank bottom. Do not stir the solution.

***Operating Your DTH Cleaner***

/

<b>Control</b>	<b>Function</b>
Function Indicators	Lights indicate the option selected by pressing SELECT OPTION. SOLUTION TEMP: Displays current solution temp. (10 - 75°C, ± 4°C). SET TEMP: Set tank temperature (01 - 69°C). 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***

<b>Step</b>	<b>Action</b>
1	Select your cleaning solution.
2	Allowing for the volume of the parts you will be cleaning and for

### ***Degassing***

<b>Step</b>	<b>Action</b>
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.

### **Cleaning Items**



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

<b>Step</b>	<b>Action</b>
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	<b>Slowly</b> 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 <b>slowly</b> remove the items from the cleaner.
6	Rinse clean items with clean, warm water and dry, if necessary.

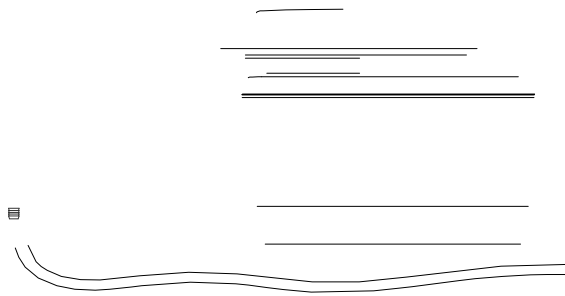


- **To repeat a timed cleaning cycle** - press ON/OFF once while in the Set Sonics mode. This cleaning cycle time will remain in memory until



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 an adjustable or a 21mm wrench. Tighten the valve no more than one full turn when using the wrench until the handle is on top. <b>CAUTION:</b> 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.



## ***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 50°  
MTH/DTH cleaner with a cover 62°

*continued...*

**Over temperature protection (DTH only)** - the cleaner will shut down at 75°C 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**

## ***Application Hints***



***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.

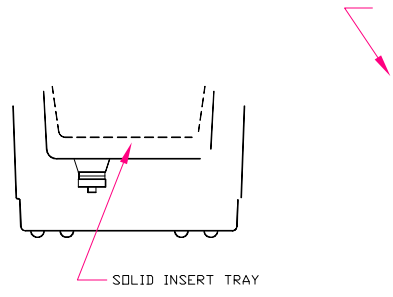
### ***Cleaning Methods***

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***

ITEMS IN PF

**Indirect Method**



## **Cleaning 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.

<b>Alkaline strength</b>	<b>Removes:</b>
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***

<b>Cleaning Agent</b>	<b>Steel</b>	<b>Brass</b>	<b>Aluminum</b>	<b>Magnesium</b>	<b>Zinc</b>	<b>S. Steel Copper</b>	<b>Tin</b>
Optical (1)	none	none	none	none**	none**		

## **Troubleshooting**

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

<b>Problem</b>	<b>Cause</b>	<b>What to do</b>
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 **WARNING** 

<b>Problem</b>	<b>Cause</b>	<b>What to do</b>
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. <b>DTH</b> - 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 <i>Optimizing Your Cleaner</i> .
Decreased ultrasonic activity. NOTE: Refer to page 27 for cavitation check.	Solution is not degassed.  Solution is spent. Solution level is incorrect for load.  Tank bottom is covered with soil particles.  Using deionized water in the tank.	Make sure that tank was filled with warm tap water plus cleaning solution and has run 5-10 minutes.  Change solution. Adjust solution to within 3/8 inch of the tank's operating level line with load.  Empty, then clean tank with warm water. Wipe with a nonabrasive cloth.  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.

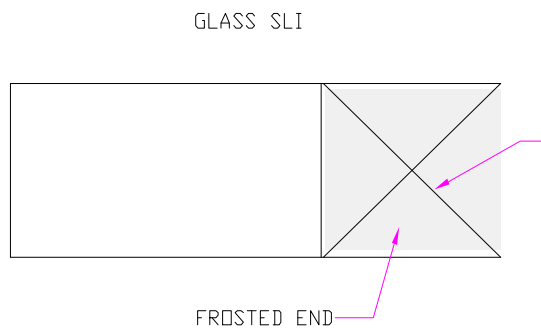
### ***Glass Slide Test***

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 (120° - 140°F).
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.



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.



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.		

Authorized Service Centers



**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
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