Operator's Manual

PC-620-1 & PC-620-2

Tabletop
Ultrasonic Cleaners

LAB Online Exhibition

Operation Manual

knowledge

Action movie

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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, we will repair or replace free of charge, at our 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, wire hook or other device to suspend items.
- Do not allow the cleaning solution level to drop more than one inch below the top of the tank.
- 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.

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⚠ 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 switches 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 use water-based solutions.
- Do not ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire, explosion, or serious personal injury 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 80ºC (175ºF).
- 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 operate the cleaner dry.
- Do not place parts or containers directly on the bottom of the cleaning tank; use a tray, wire hook or other device to suspend items. Failure to comply may cause transducer damage and will void your warranty.
- Do not allow the cleaning solution level to drop more than one inch below the top of the tank with heat or ultrasonics on. Failure to comply may cause transducer and/or heater damage and will void your warranty.

2 Safety Precautions

Introduction

PC620 General Information

This PC-620 ultrasonic cleaner is available in two models; the unheated PC-620-1 and the heated PC-620-2. Each model is constructed using durable industrial style 44 kHz transducers. These provide increased cleaning power and ensure uniform cleaning activity throughout the bath. Both models have drains and are supplied with tank drain kits. For customer convenience, both units are available in three voltages to meet requirements around the world. Be sure the unit you have purchased is correct for your area.

Accessories For Your Cleaner

A stainless steel cover and solid wall-perforated bottom parts basket are available for both models. Consult your distributor for price and delivery.

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 label on the back of the cleaner for correct input 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

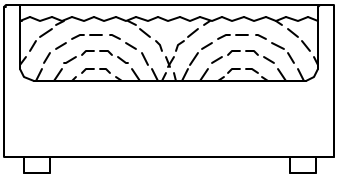
Model	Tank Volume	Tank Size	Overall Size	Weight	Heater Power	Input Power
PC620R-1	2.75 gal. (8.5 L)	L: 19.5" W: 5.8" D: 6"	L: 20.3" W: 6.3" H: 10.5"	23 lbs. (10.5Kg)	None	115 V 1.4A
PC620R-2					180 Watts	115 V 3.1A
PC-620E-1	2.75 gal. (8.5 L)	L: 19.5" W: 5.8" D: 6"	L: 20.3" W: 6.3" H: 10.5"	24 lbs. 10.9 Kg)	None	230 V .7A
PC620E-2					180 Watts	230 V 1.6A
PC-620J-1	2.75 gal. (8.5 L)	L: 19.5" W: 5.8" D: 6"	L: 20.3" W: 6.3" H: 10.5"	24 lbs. 10.9 Kg)	None	100 V 1.6A
PC-620J-2					135 Watts	100 V 3.1A

NOTE:

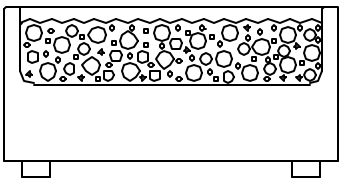
- All models have a frequency of 44 kHz.
- Cleaners have NRTL/CSA approval and comply with FCC regulations.
- All 230V units meet CE standards.
- Units may cause GFI outlets to trip.
- All units have a ground leakage current less than .50ma.

How Ultrasonic Cleaning Works

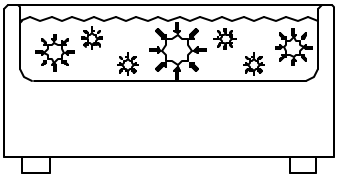
Ultrasonic sound is sound transmitted at frequencies generally beyond the range of human hearing. In your ultrasonic cleaner, ultrasonic sound (sonics) is used for cleaning materials and parts. This is how it works:



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



During the low pressure stage, millions of microscopic bubbles form and grow. This process is called CAVITATION.



During the high pressure stage, the bubbles collapse or “implode” releasing enormous amounts of energy. These implosions act like scrub brushes, eroding soils, away. 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 proceeding.

Before You Start Cleaning

⚠ CAUTION ⚠

- Do not place parts or containers directly on the bottom of the cleaning tanks; use a basket, wire hook or other device to suspend items.
- Do not allow the cleaning solution level to drop more than one inch below the top of the tank 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.

Operating Your PC-620-1 or PC-620-2 Cleaner

Explanation of Controls

Control	Function
ULTRASONIC POWER SWITCH	Activates and de-activates ultrasonic cavitation in the tank
HEATER SWITCH	Activates the external heater on the cleaning tank. The heater power has been selected to provide the optimum temperature for most cleaning applications.

Getting Ready

Step	Action
1	Select your cleaning chemistry (check with your chemical supplier for solution effects on metals).
2	Allowing for the volume of the parts you will be cleaning and cleaning chemistry, fill the tank with warm tap water to the operating level (one inch from the top).
3	Add cleaning chemistry to the tank water.
4	Plug the cleaner into a grounded outlet.
5	For maximum efficiency, refer to page 9, “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. This is done by setting the cleaner up for operation and allowing the ultrasonics to drive the warm solution for 5-10 minutes This will force out excess gas and assure optimum cleaning. You will likely notice a change in the sound of the unit as is degasses.

Cleaning Items

Step	Action
1	Place the items to be cleaned into a basket or perforated tray.
2	If using a solid container, add cleaning solution to the container to cover the items.
3	**Slowly** lower the tray into the tank. Do not allow items to contact the tank bottom. Do not stir the solution.
4	When items are clean, **slowly** remove them from the cleaner.
5	Rinse the clean items with fresh water and dry them, if necessary.

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. Dispose of the contents in an environmentally responsible way.

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 basket or other method to support all items. Allow at least one inch between the tank bottom and the parts or receptacle for adequate cavitation.

Covers - allow the cleaner to heat up faster, to a higher temperature, and avoid excessive liquid evaporation. However, leaving the cover on with heat and ultrasonics can cause the solution to boil, diminishing effectiveness.

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 get your cleaner to the best operating temperature is to fill it with warm solution, turn on both the heat and ultrasonics, and use a cover.

Application Hints

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

Solution level - Be sure to maintain solution level within one inch of the tank top. Surface activity will 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 basket or suspend in the solution.

Rinsing items- After cleaning, use clean water 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 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 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 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.

Chemistry Concentrations

Chemistry concentrations may vary. The amount you use depends on the detergent and the type of soil to be removed. Follow instructions on the chemistry container and refer to the table below for the effects of chemistry 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

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.
	Circuit board fuse blown	. Call nearest authorized service center.
Cleaner operates but does not heat solution	Heater malfunctions.	Call nearest authorized service center.
Decreased ultrasonic activity.	Solution is not degassed.	Make sure that tank was filled with warm tap water plus cleaning chemistry and has run 5-10 minutes.
	Solution is spent.	Change solution.
	Solution level is incorrect for load.	Adjust solution +/- 3/8 inch from current level.
	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.

Performance

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, however, we suggest running this test monthly.

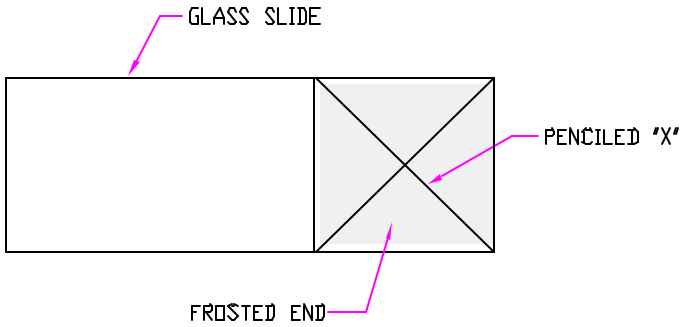
Glass Slide Test

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 dish detergent.

Test procedure:

1. Prepare a fresh solution with general purpose dish detergent (concentration 1%) and warm tap water (120º - 140ºF).
2. Fill the cleaner to within one(1) inch of the tank top.
3. Turn the ultrasonics on for at least five 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. Turn ultrasonic switch to "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

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 Service Center. If under warranty, remember to include proof of purchase. Your cleaner will be returned 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: 972-271-5571 Tel: 1-800-540-4967 FAX: 972-840-3668
Crystal Electronic Inc.	140 Centre Street Aurora, Ontario Canada L4G 1K1	Tel: 905-841-5762 FAX: 905-841-9688
Paragon Electronics	6861 SW 196th Avenue Pembroke Pines, FL 33332	Tel: 954-434-8191 Fax: 954-434-8385
Master Sonics Repair Center	77 Whiting Street Plainville, CT 06062	Tel: 800-737-2198 860-410-1700 Fax: 860-410-1704