Ultrasonic Cleaners

User Manual

XPD-USeries

Warranty

Ultrasonic Cleaners, when used in accordance with manufacturer's instructions and under normal use, are guaranteed for **one year parts and labor and an additional year of parts only.** 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 1"1/2 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 use mineral acids. These could damage the tank.

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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:

- Unplug from power source before filling or emptying the tank.
- 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:

- Operate the cleaner with a vented cover or no cover.
- 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 70°C (160°F).
- 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:*

- Change your solution regularly.
- Do not cover vents on the housing.
- 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 1½ inch from top of tank with heat or ultrasonics on. Failure to comply may cause transducer and/or heater damage and will void your warranty. The fill line is 1" from top of the tank.

Introduction

Ultrasonic Cleaners

These XPD-USeries line of ultrasonic cleaners includes four models with sizes ranging from 4L – 11 Liter. Each model is constructed using durable industrial style 32/40 kHz transducers. These provide increased cleaning power along with built in sweep frequency to ensure uniform cleaning activity throughout the bath. The five larger sizes have built in drains. Each model has a digital timer and mechanical thermostat, with a power switch/fuse in the rear of the machine.

When you first fill your unit, or refill it with fresh solution, use warm water for the solution. Turn on the heater, set timer and turn on the ultrasonic (press the ON/OFF touch screen button, and use the arrow buttons for timing purposes), place the cover, and the solution will heat to temperature.

Optional Accessories for Your Cleaner

Accessories include a cover and a mesh basket.

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. Take pictures of any damage while machine is still in the crate.

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. Connect the Machine to GFI outlet.

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	Ultrasonic Frequency Khz	Unit Dimensions (L x W x H)	Tank Dimensions (L x W x H)	Weight	Power Supply	U.S. Power (Watts)	Warranty	Heat (w/ Temp Control)
4 Liter (1 Gallon)	40 Khz	14" x 7" x 10.5" (L x W x H)	11.75" x 6" x 4" (L x W x H)	15 lbs.	AC 100 ~ 120v, 50 / 60Hz	240 W	1yr prts/lbr + 1 yr parts.	Yes
6 Liter (1.5 Gallon)	40 Khz	14" x 7" x 12.5" (L x W x H)	12" x 6" x 6" (L x W x H)	20 lbs.	AC 100 ~ 120v, 50 / 60Hz	360 W	1yr prts/lbr + 1 yr parts.	Yes
8 Liter (2.2 Gallon)	40 Khz	14.5" x 12" x 10" (L x W x H)	11.5" x 9.5" x 4" (L x W x H)	30 lbs.	AC 100 ~ 120v, 50 / 60Hz	360 W	1yr prts/lbr + 1 yr parts.	Yes
11 Liter (3 Gallon)	40 Khz	12" x 9" x 6" (L x W x H).	14" x 11" x 12" (L x W x H)	35 lbs.	AC 100 ~ 120v, 50 / 60Hz	450 W	1yr prts/lbr + 1 yr parts	Yes

How Ultrasonics Work

Dirty items come clean in ultrasonic cleaning systems when millions of superheated bubbles scrub grime and oxidation away with stunning results. How? Through the process of de-cavitation.

Ultrasonic cleaning systems send high frequency sound waves ripping through an ultrasonic cleaning solution leaving superheated bubbles in the waves' wake. When these bubbles, called cavitations, collapse, called decavitation, the heat and energy of their implosions work with the specially formulated ultrasonic cleaning solution to remove dirt, oils, residue, and oxidation from the surface of the contaminated item.

Imagine the ability to get into the tiniest of nooks and crannies where dirt and grime hide, and then imagine scrubbing that surface ultra clean. With conventional cleaning – brushes, rags and elbow grease – this task seems impossible. But the cavitating cleaning action of an ultrasonic cleaning system does just that – It goes where brush bristles can't.

What is Ultrasonic Cleaning Technology?

Ultrasonic cleaning technology is high frequency sound waves creating a phenomenon in a fluid called cavitating action, or cavitations. Cavitations, the superheated bursting of bubbles in a fluid, are what make ultrasonic cleaning work.

How Can Sound Waves and Ultrasonic Cavitations Clean?

When a sound wave travels through fluid, it stretches and compresses the fluid to transmit sound. When the sound wave's amplitude increases to a threshold level, when the fluid cannot hold the "stretch" of the sound wave, the sound wave energy literally tears the water apart and vacuum bubbles are formed.

Each vacuum bubble grows in size until it can grow no more – equilibrium is reached between the bubble and the fluid – at equilibrium, the bubble is compressed by the surrounding fluid pressure until it collapses. At collapse, a tiny liquid jet is created in the bubble's place.

Each liquid jet creates estimated temperatures and pressures of over five thousand degrees Celsius and ten thousand PSI when the collapse occurs. The extreme pressure and temperature of the jet provides the phenomenon responsible for the effective ultrasonic cleaning action. This action occurs millions of times, over and over, while the sound waves are traveling through the fluid.

Ultrasonic Cleaning Cleans Every Nook and Cranny

When the item being cleaned is submerged in the ultrasonic tank's fluid, the millions of jets created by ultrasonic energy are capable of reaching into fine depressions and intricate details. Every surface area is exposed to the ultrasonic cleaning action; cracks, crevices and hard to reach corners of every nook and cranny get cleaned by the ultrasonic cavitating action. Ultrasonic sweep cleaning technology enhances the system's ability to clean.

Ultrasonic Sweep Cleaning Technology

Ultrasonic sweep cleaning "sweeps" multiple ultrasonic frequencies through a single ultrasonic tank. This sweeping controls the creation of standing waves, allowing no single frequency to resonate in the tank thus eliminating the root cause of standing waves, and tank dead spots.

Ultrasonic Cleaning Power and Frequency

Ultrasonic system power is rated in how much energy, in watts, is generated in the ultrasonic tank. Higher power systems generally mean shorter part immersion times in the fluid.

The ideal cleaning frequency is determined by the size of dirt being cleaned. Simply speaking, higher frequencies are more capable it is of removing smaller particles, lower frequencies are better suited for large dirt particles. Many SharperTek® ultrasonic systems can be configured with multi-frequency technology, giving you the benefit of multiple cleaning frequencies in a single design package.

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 1 ½" from top of 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.

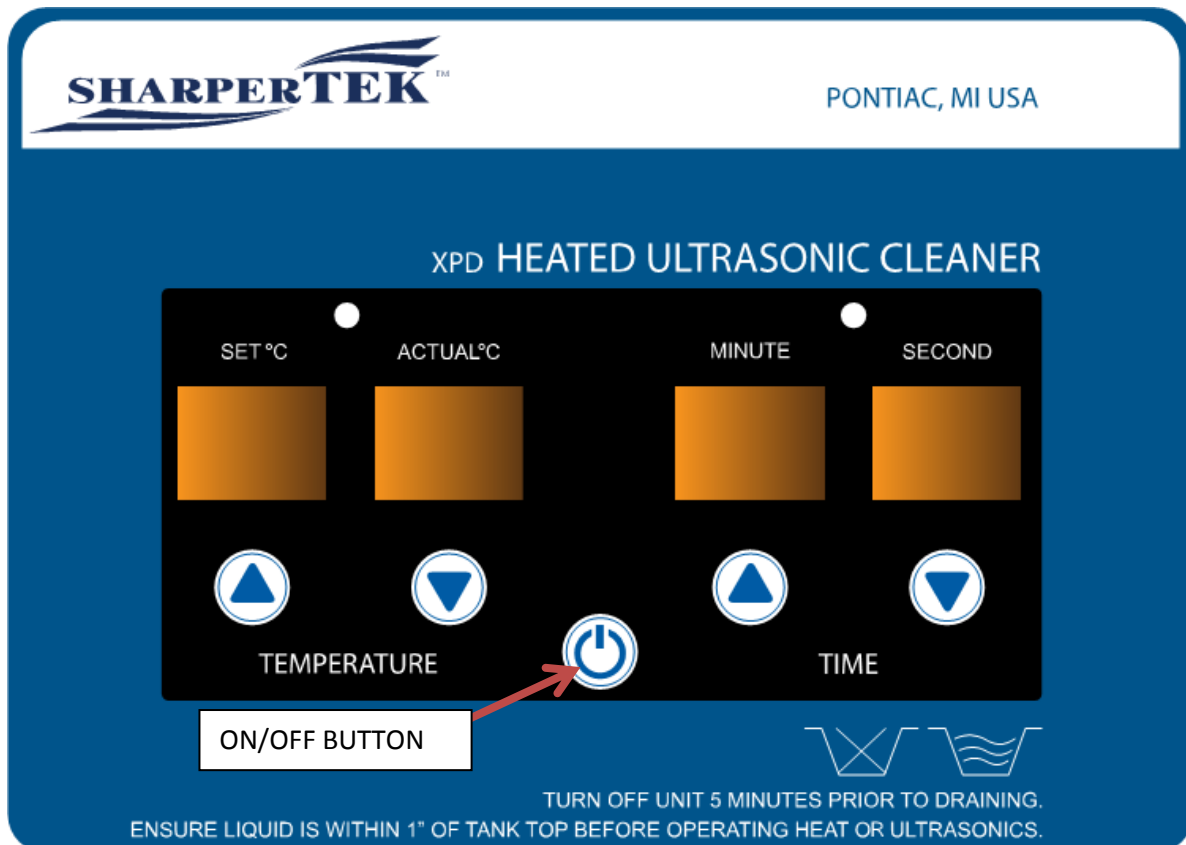| Step	Action
1	Select your cleaning solution (refer to "Cleaning Solutions" section)
2	Consider the volume of the parts you will be cleaning. With parts, solution should reach operation level line (one inch from the top)
3	Add cleaning solution to the tank of water
4	Plug the cleaner into a ground outlet

⚠️Attention ⚠️

Machine shuts down automatically if not in use for a prolonged

period of time

Operating Your Cleaner

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

1. Plug in your machine and flip on the On/Off control switch in the back of the unit.
2. Fill the machine with your water/chemicals. Pay close attention to the directions for temperature and duration from the chemicals SDS information paperwork (Included in your package or available on our website).
3. Remove the basket put the lid back on the unit..
4. First set the desired temperature by pressing the up arrow "temperature button" Second set the ultrasonic cycle time by pressing on the time up arrow "time button". After setting the temperature and the time, press the ON/OFF middle button to start the unit.
5. Keep the basket out and the lid on while it is heating up to quicken the waiting period. You can also run the ultrasonic for an additional 10 degrees per hour.
6. Place the basket back into the unit with parts for cleaning.
7. When the cleaning cycle is complete, you can rinse the parts in the sink, and dry. Strain the chemicals with a cheese cloth to keep them fresh for the next cleaning. If you are removing oils, you can find an "oil diaper" online for reasonable price and quantity. This can be placed on the water surface and will absorb the oils. This way the parts will not be coated again once the cleaning is complete. We do not offer the cheese cloths or the oil diapers.

SHARPERTEK™

PONTIAC, MI USA

XPD HEATED ULTRASONIC CLEANER

| SET °C | ACTUAL°C | | MINUTE | SECOND |

TEMPERATURE   ON/OFF BUTTON   TIME

TURN OFF UNIT 5 MINUTES PRIOR TO DRAINING.
ENSURE LIQUID IS WITHIN 1" OF TANK TOP BEFORE OPERATING HEAT OR ULTRASONICS.

AUTOMATIC DEGAS / SWEEP TECHNOLOGY

This unit has automatic degas and sweep technology, the first 5 minutes of usage. The Degas will expel all the gasses and/or air out of the water in the tank, for better cavitation for the ultrasonic power. The Sweep will move the cavitation around in the tank in a more uniform fashion making the ultrasonic cavitation more efficient.

Operating Temperature

To activate the heat, you will have to turn on the switch in the back of the machine. Then you can set the temperature with the up and down arrows on the left side. It should be marked temperature. On the right side are the ultrasonic timer controls, you can set that also. The on/off button for the ultrasonics/heater is towards the bottom and the middle. The heater and the ultrasonics are turned on when the on/off button is pressed.

Once that is done the heat and the ultrasonics will be activated if the ultrasonic timer is not on zero and the heat set temperature is higher than the actual temperature. If the set temp is lower than the actual temperature the heater won't come on. If the ultrasonic timer is at zero minutes and zero seconds the ultrasonics won't be activated. The ultrasonics and the heater have red status indicator lights. The light for the heat or ultrasonics will turn red when the status is on.

Pressing the on/off button when the ultrasonics are running will pause the ultrasonics, if there is still time left for the ultrasonics. The heater will stay on if the set temperature hasn't reached the actual temperature. When the set temperature is equal to or +.05C the actual temperature the heat will turn off. The heat will turn back on automatically when the actual temp is 2.5 degrees less than the set temperature.

IF the ultrasonics are running and the on/off button is pressed the heat can be adjusted with the up and down arrows. This can only be done with the ultrasonics off. If the set temperature value is set below the actual temperature value the heat will go off. The heat going off will be indicated by the red indicator light going off. The heat can be turned back on by setting the set temperature above the actual temperature.

Draining Your Cleaner

> ## ⚠️Warning ⚠️
> Do not immerse the cleaner in water.
> Unplug the cleaner from the power source.

4L models do not have a drain. To empty, use the side of the rim to pour the used solution into a waste disposal unit, rinse the tank thoroughly and refill with new solution. The side drain is an optional feature for the 6L. The 8L & 11L come standard with the side drain with manual ball valve.

Optimizing Your Cleaner

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 to a higher temperature, faster and reduces excessive liquid evaporation.

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.

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. 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 1 ½" of top of the tank. 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.

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.

<u>Direct method</u>

- ➢ Items in perforated insert tray
- ➢ Item suspended

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.

<u>Indirect method</u>

- ➢ Items laid randomly in solid insert tray
- ➢ Items placed in beakers

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, and 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	Ammonium Chloride	Bromine
Aluminum Chloride	Ammonium Hydroxide	Calcium Bisulfate
Aluminum Fluoride	Amyl Chloride	Calcium Bisulfite
Aluminum Sulphate	Antimony Trichloride	Calcium Hypochloride
Ammonium Bifluoride	Aqua Regia	Chloracetic Acid

Chloric Acid	Fluoboric Acid	Muriatic Acid
Chlorine, Anhydrous	Fluorine	Phosphoric (crude)
Chromic Acid	Hydrobromic Acid	Sodium Hypochlorite
Copper Chloride	Hydrochloric Acid	Potassium Chloride
Copper Fluoborate	Hydrocyanic Acid	Stannic Chloride
Ethyl Chloride	Hydrofluoric Acid	Stannous Chloride
Ferric Chloride	Hydrofluosilicic Acid	Sulfur chloride
Ferrous Chloride	Iodoform	Sulfuric Acid
Ferris Sulfate	Mercuric Chloride	Zinc Chlorid

Solution Effects on Metals

Cleaning Agent	Steel	Brass	Alumi-num	Magne sum	Zinc	S. Steel	Tin
Optical (1)	None	none	none	none"	none"	none	none"
Jewelry (1)	None	none	none	none	none	none	none
Oxide (2) Remover SC31	Slight Etch	none	slight attack	attacks	attacks	none	none
Electronic cleaner SC20	None	none	slight attack	none	none	none	none
General(1) Purpose 1220	none	none	slight attack	none	none	none	none
Metal (1) SC52	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 140°F.

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

Troubleshooting

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

Problem	Cause	What to do
Cleaner will not start.	Cleaner not plugged in properly	Plug into functioning electrical outlet.
	Rear power switch not in on position. Lose terminal.	Press power switch ON. Lose
	Bad touch pad panel. *Digital timer* - Start button malfunctioning.	Call nearest authorized service center.
	Blown fuse.	Replace with identical fuse or Call service center. nearest authorized
Cleaner operates but does not heat solution.	Heater malfunction	Call nearest authorized service center.
	Mechanical Thermostat - HEAT not set to ideal temperature Lose terminal or bad heater.	Turn heat ON.

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. Timer board malfunctions. Bad touchpad panel.	Press SET DISPLAY. Call nearest authorized service center.
Decreased ultrasonic activity.	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 1 ½" from top of tank, filled with warm tap water. Empty, then clean tank with warm water. Wipe with a nonabrasive cloth. Deionized water does not cavitate as actively as soapy tap water.

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

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** ⚠️
High voltage inside the cleaner is dangerous.

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

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

Technical Support

Sharpertek	486 S Opdyke Road, (On Eames Street) Pontiac, MI 48341 USA	Tel: 248-340-0593 Fax: 248-340-6189 Sales@sharpertek.com