

# Troubleshooting a Sonicator with standard probes and tips



## Table of Contents

COMPONENTS OF AN ULTRASONIC SYSTEM .....	2
OBJECTIVE .....	3
ERROR MESSAGE .....	3
COMMON CAUSES AND RESOLUTIONS OF OVERLOADS .....	3
FREQUENTLY ASKED QUESTIONS .....	8
CONTACT US.....	8

## COMPONENTS OF AN ULTRASONIC SYSTEM

Your system has several components which could contribute to a system fault or overload message. Understanding the names and functions of each component will allow you to troubleshoot or communicate the issue to our service personnel.

### 1. Power Supply:

This is the box with the user interface that controls the system and sends the electrical signal to the rest of the system. Some manufacturers refer to it as a generator.



### 2. Converter Cable:

This cable carries the electrical signal from the power supply to the converter.



### 3. Converter:

This device converts the electrical signal from the power supply into mechanical motion and drives the probe/horn. A converter is also commonly called a transducer.



### 4. Standard Probe:

The standard #4220 probe is included with both the Q500 and Q700 systems and has a replaceable tip. The #4422 probe is included with the Q125 and Q55 units.



### 5. Replacement Tip:

This tip is threaded into the end of the #4220 standard probe. Replaceable tips are compatible with aqueous samples only.



### 6. Microtip:

A microtip is attached to the end of the #4220 standard probe. This is used for processing smaller volumes within small tubes.



## OBJECTIVE

The objective of this document is to enable anyone to troubleshoot a system error or an overload and get the unit back up and running with limited downtime.

Many errors can be cleared by following the instructions on the pages below. If you are unable to solve the issue, please fill out the Troubleshooting link on the website and you will be contacted within 24 hours for assistance. See the link here: [Sonicator Troubleshooting Assistance](#)

## ERROR MESSAGE

If the system detects that one or more components is not functioning properly, the screen will display “OVERLOAD” and the unit will shut down to protect itself from damage. Some overloads can be resolved by the user by following the steps called out in this document.

## COMMON CAUSES AND RESOLUTIONS OF OVERLOADS

**1. Microtip error** – Many factors can cause an overload with a microtip. The tip may be worn out, overheated or not tightened properly. By removing the tip and testing a standard flat tip on the 1/2” probe, we can quickly determine whether or not the issue is with the microtip or another component. Follow the steps below to determine the cause:



A worn-out Microtip is a common cause of an overload error. Please review the condition of the tip. If it is pitted and eroded, it should be replaced. Below is a photo of a worn and a new Microtip.



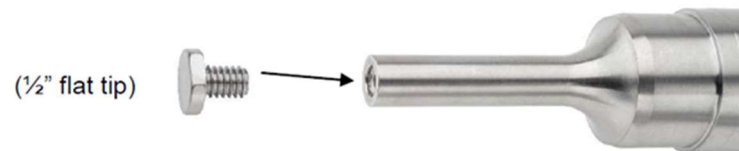
Check to confirm the tip is connected tightly (using the wrench set) and test again in water.

To confirm that the microtip is causing the overload (rather than another component), please follow these instructions:

1. Remove the microtip.



2. Once removed, the probe will have an open threaded end. You must attach the 1/2" diameter, flat tip before using the Sonicator. This flat tip was attached to the probe when it was originally shipped.



3. Attach the 1/2" tip tightly using the wrench set. Now the Sonicator is ready to be plugged in and tested.



4. Insert the tip into a 200mL (or similar volume) beaker with at least 100mL of water. The tip should be inserted about 1" deep into the water.



5. Test the Sonicator at various amplitude settings (25, 50, and 100%).

If the Sonicator works well and does not overload, the microtip is the confirmed cause of the overload and must be replaced.

**2. Overheating** – Several factors can cause the unit to overload due to heat. A 20kHz probe can operate in liquids up to approximately 60°C or 140°F. Higher temperatures can overload the unit.

In addition, operating the unit at high amplitude, for long time periods, can cause the Converter to overheat. The Converter should always remain near room temperature (21°C or 70°F). You can check the converter by simply touching the case. If the case is warm to the touch, shut off the sonicator and review the situation.

The Converter can be cooled via compressed air and instructions are located in the manual. If using a Floccell, the Converter must be air cooled at all times. Generally, if using the unit in a continuous mode (without pulse) for more than 10 minutes, we recommend air cooling.

- Resolution: Air cool the Converter. Check to ensure the liquid temperature remains below 60°C or 140°F.

**3. Parts are not tightened properly** - All converters, probes/horns, tips must be tightened using wrenches.

- Resolution: Disassemble each part and check the threaded connections. Clean and dry the threaded connections according to the instructions in the manual. Tighten using wrenches and test the system in water.

**4. Worn Tip** – An excessively worn tip will cause the unit to overload.

- Resolution: Install a new tip or probe.



**Worn vs. new tips**

**5. Liquid Inside Tip** – If liquid gets inside the threading of the tip, it will cause the system to overload. The standard probe with a replaceable tip should only be used with aqueous samples. Other solvents will work their way into the threading and overload the system. Note that it is possible for nanoparticles to get inside the threading of a replaceable tip if the mating surface of the tip and the end of the probe is worn. Inspect and clean tips on a regular basis.

- Resolution: Remove the tip. Clean and dry the tip. Reattach tightly with wrenches.
- If using solvents other than water, use you must use a solid probe/horn.

**6. Improper Clamping of the Converter or Probe** – If an active surface of the converter or probe is clamped, it will cause an overload.

- Resolution: Use a Qsonica clamp stand or follow the directions accordingly.



**7. Viscosity** – Sonicators run best in low viscosity liquids. Small probes may react differently than larger probes in the same viscosity, so it is difficult to give a viscosity limit. For example, a microtip will cut through higher viscosity liquids and may run well but a larger tip may overload when used in the same sample. It is estimated that 3,000cps may be the maximum viscosity for most probes.

For example, a liquid such as honey cannot be processed with a Sonicator. Your liquid should flow and pour freely.

- Resolution: Reduce the viscosity of the liquid being processed.

**8. Electrical Issue** – Each unit is made to operate at a specific line voltage. Be sure the outlet is working properly by testing other equipment in the same outlet. Check with your facilities staff to ensure the electrical service is working properly.

- Resolution: Check if the main fuses on the back of the power supply have blown. If they have, the unit and display will not turn on. However, replacing the fuses may not resolve the issue that caused the fuses to blow in the first place.
- Check the voltage rating on the back of the power supply on the silver label to see if it matches the wall voltage you are providing to the system. Power supplies will be labeled on the back with either 110V or 220V, both actually indicate a range, so if you have typical 120V outlets, this is compatible with the 110V rating.

**9. Damaged Cable** - It is possible for the K4 cable to become damaged if it is bent too sharply or if the power supply or converter has an issue. Inspect the cable for wear, exposed wires, kinks and a broken connector. This is an uncommon failure but should be checked.

- Resolution: Cable must be replaced.

**10. Unit stops unexpectedly without an error message** – This may be due to the Energy button being improperly programmed. The Energy feature stops ultrasonic activity at a programmed energy value (in Joules). If the programmed value is set too low or set by mistake, the unit will stop ultrasonics earlier than desired. Note: the Energy button will always stop ultrasonics whether running a program or during manual use.

- Resolution: Clear the values entered into Energy. Press the Energy button and then press Clear.

## FREQUENTLY ASKED QUESTIONS

### **Q1 – How do I send my unit in for repair?**

Answer – You must have a Return Material Authorization number (RMA) for us to accept your shipment. Fill out the form: [Sonicator Troubleshooting Assistance](#) and we will send the RMA which will include shipping instructions.

### **Q2 – How much does a repair cost?**

Answer – We cannot give an estimated repair cost over the phone until we see the unit. Out of warranty units are subject to a \$250.00 evaluation fee in order to give you a repair estimate. Once the evaluation is complete, our service department will send you a quotation for the parts and labor for the repair and will proceed once you approve provide payment.

### **Q3 – My unit is too old or too expensive to repair. What are my options?**

Answer – We can offer special discounts to upgrade to new equipment. It is often more cost effective to purchase a new unit instead of repairing an old device.

### **Q4 – How long does a repair take?**

Answer – Repair time varies based on the complexity of the issue and the current workload of the service department. We can give a lead time at the time of the repair.

### **Q5 – Where is my serial number?**

Answer - Each system will have a serial number label on the back of the power supply, as well as another serial number on the top of the CL-334 converter. The serial number has a date code at the end and allows us to quickly identify the age of your system, and to determine whether it is still within the 2-year warranty period.

## CONTACT US

Email: [service@sonicator.com](mailto:service@sonicator.com)

Phone: 203-426-0101

Web: [Sonicator Troubleshooting Assistance](#)