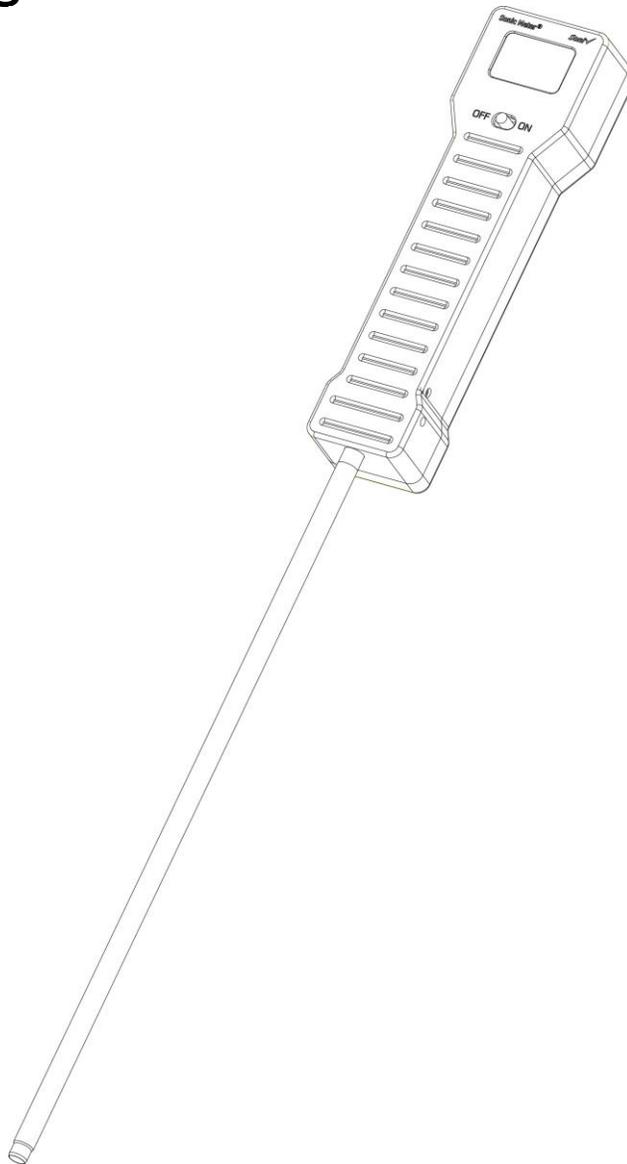


Sonic Meter®

Soni ✓

Operating Manual



Rev. C

Important: Do not attempt to operate this instrument without completely reading this manual and understanding the correct operating procedures.

For online technical support and further information refer to our web site at **www.sonicmeter.com**

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1. Safety Issues:

1.1 Batteries:

The **Sonic Meter *Soni* ✓** is powered by 4 AAA Nickel Metal Hydride (NiMH) batteries rated at 800mAh. The meter is fault protected against reverse polarity via a resettable circuit breaker. The meter ships with 8 AAA batteries. The 4 AAA batteries in the meter were charged at the time of shipping. The other 4 AAA batteries are not charged.

CAUTION: Shorting the batteries (positive terminal connected to negative terminal) is extremely dangerous and could cause serious injury. Extreme caution should be used when handling and charging the batteries.

Do not store meter for long periods with the batteries installed. When disposing of batteries follow all state and local laws.

1.2 Charger:

The battery charger is powered by 120/240Volts AC at 50/60Hz. Use of charger with any other voltage input will damage the charger and could cause serious injury.

1.3 Meter:

The **Sonic Meter**'s housing is *not* waterproof. If the meter becomes immersed in water do not attempt to use it. Do not attempt to repair it. Return the meter to SyncroCraft® for authorized repair.

1.4 Probe:

The probe is integrated into the housing of the **Sonic Meter *Soni* ✓**.

1.5 Electromagnetic Compatibility:

The **Sonic Meter *Soni* ✓** complies with EN 61326-1:1997. The meter is CE approved.

Important: The **Sonic Meter *Soni* ✓** is not designed for use as a medical device.

Important: Never operate the **Sonic Meter *Soni* ✓** and probe in areas where high voltage potentials are not properly contained.

NOTE: Please read and understand the entire manual before operating the **Sonic Meter *Soni* ✓**.

2. Introduction:

The **Sonic Meter *Soni* ✓** is a *pressure sensitive* measuring device. It is designed to help maintain the quality and integrity of parts during cleaning cycles in ultrasonic cleaners.

Ultrasonic cleaners utilize a transducer attached to the tank's exterior. The transducer outputs pulsating mechanical energy at high frequencies (ultrasonic), which cause the liquid in the tank to agitate.

The agitation at this high frequency level is what gives ultrasonic cleaners their cleaning ability. As the liquid becomes agitated, a phenomenon known as cavitation takes place. Cavitation is the almost instantaneous formation and implosion of small bubbles and cavities in the cleaning liquid.

As the liquid cavitates, the minute bubbles and the coincidental implosions cause the surrounding liquid to impinge forcefully upon the surface areas of the part being cleaned. The force that the liquid applies to the area of the part is commonly referred to as the *scrub-force*.

This scrub-force action takes place throughout the tank. However, the scrub-force can vary significantly due to the placement of the tank's transducer and the constructive and destructive interference caused by the shape of the tank and parts being cleaned.

These process variations in scrub-force throughout the tank can be referred to as hot spots or cold spots in the liquid. Hot and cold spots are locations of high and low intensity scrub-force relative to a mean value scrub-force. These process variations can significantly alter the cleanliness or integrity of the parts being cleaned. Some parts may not have been thoroughly cleaned for the next process, or the stresses due to the cleaning action may have altered the integrity of the parts. With the **Sonic Meter** these process variation situations can be minimized.

With the **Sonic Meter**'s slender probe, operators can probe ultrasonic cleaners to pinpoint areas of optimum intensity in which to place each part. The **Sonic Meter**'s LCD displays the intensity variations. Parts can be varied in their z-height or their x and y positions via an adjustable array fixture. The operator can determine the location for each part so that all parts are placed in regions of the same specified *pressure* reading (scrub-force).

The **Sonic Meter *Soni* ✓** measures pressure in units of 10^4 Pascal (e4Pa). The ***Soni* ✓** works with tanks that use frequencies up to 500kHz.

3. Description:

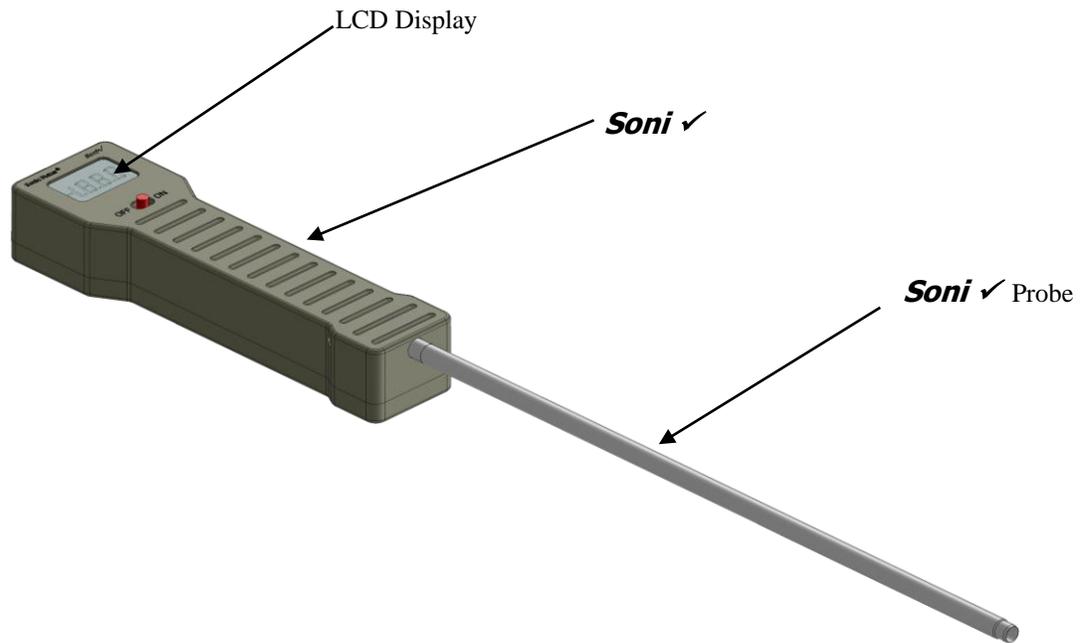


Figure 1

Figure 1 shows the main components of the **Sonic Meter Soni ✓**.

3.1 Sonic Meter:

The **Sonic Meter Soni ✓** is packaged in an ergonomic T-shaped housing. The housing is made of aluminum with a durable anodized surface. The housing is not waterproof.

3.2 LCD Display:

The LCD is a three digit, high contrast display. The units are in Pascals (e4Pa)

3.3 Sonic Meter Probe:

The probe is made of 304 stainless steel with the sensing transducer located at the bottom tip. The probe has a unique *sensitivity* value associated with the sensing transducer. The *sensitivity* value is calibrated to the meter. The top of the probe is engraved with a serial number.

3.4 Battery charger:

The battery charger can only be used to charge Nickel Metal Hydride (NiMH) type rechargeable batteries. **Do not attempt to charge NiCd batteries or mix other batteries with NiMH batteries.**

The battery charger should only be powered by 120/240Volts AC at 50/60Hz. The plug type is NEMA 5-15.

3.5 Batteries:

The **Sonic Meter *Soni*** ✓ ships with 8 AAA Nickel Metal Hydride (NiMH) batteries. The meter uses 4 AAA NiMH batteries rated 1.2V/800mAh or higher. The batteries should reach full charge in 5hrs or less.

Do not attempt to charge these batteries on any other charger than the unit shipped with the meter.

4. Operation:

4.1 Changing the Batteries

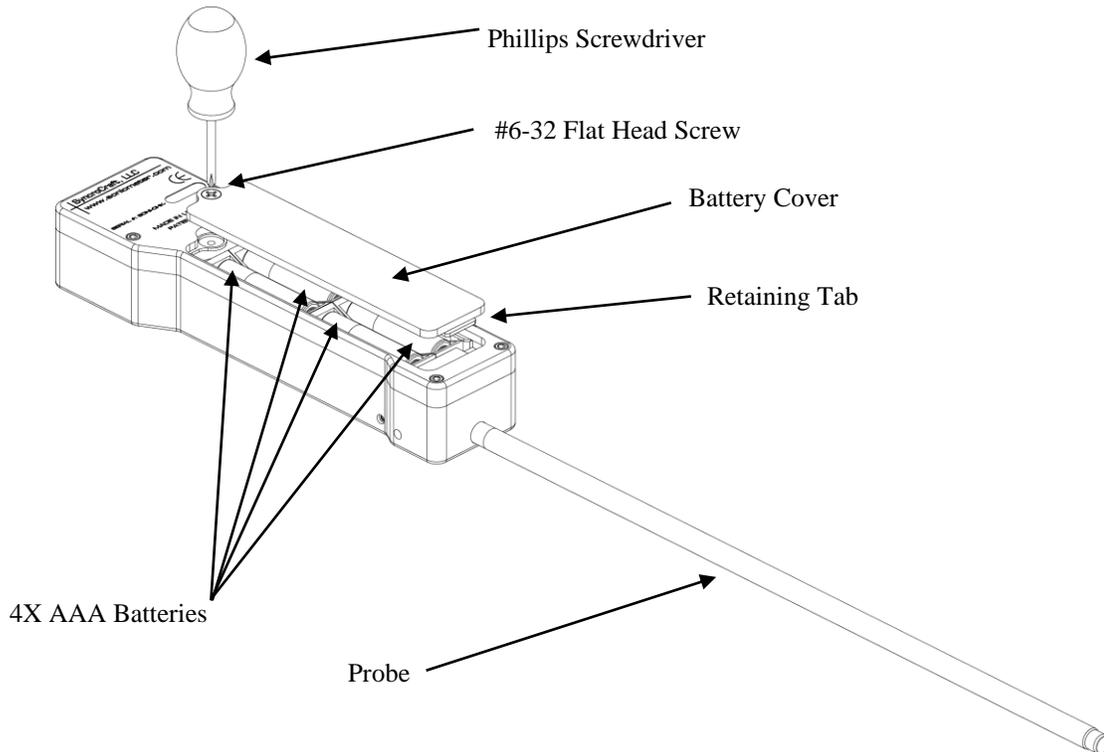


Figure 2

Figure 2 shows how the 4 AAA batteries are removed.

With a Phillips screwdriver, unscrew the 6-32 flathead screw from the back of the meter. Lift the battery cover out from the meter. Remove the 4 AAA NiMH batteries, and replace with 4 charged batteries. Make certain that you replace the batteries into their sockets with the correct polarity. The polarity is clearly marked on the bottom of each battery socket. Reinstall the battery cover with the retaining tab positioned first in the bottom of the meter before securing the cover.

If the batteries are installed with the incorrect polarity, one of three situations will be evident:

1. One of the 4 batteries was installed with the incorrect polarity.

Observation: The meter will power on, but the battery percentage will not be displayed, and keypad keys will not function. Reinstall the battery correctly.

- Two or three batteries were installed with the incorrect polarity.

Observation: The meter will not power on. Reinstall the batteries correctly.

- All four batteries were installed with the incorrect polarity.

Observation: The 0.63Amp circuit breaker will disengage power. The meter will not power on. Remove all four batteries. Reset the circuit breaker. Reinstall the batteries correctly.

4.2 Resetting the circuit breaker

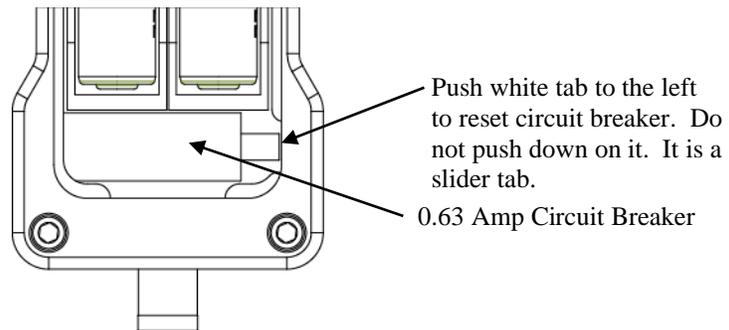


Figure 3



Figure 4

Figure 3 shows the circuit breaker located at the bottom of the meter just below the battery housing. Figure 4 shows the sequence for resetting the circuit breaker with a small flat screwdriver by pushing the white tab to the left.

Remove the battery cover. With a small screwdriver, push the small white tab of the circuit breaker to the left. A small click will sound when the reset tab has been moved all the way to the right. The circuit breaker is now reset.

The most probable reason for setting off the circuit breaker would be incorrectly installed batteries.

4.3 Powering up the meter

To power on the meter, slide the power (ON/OFF) switch to the right as shown in Figure 5.

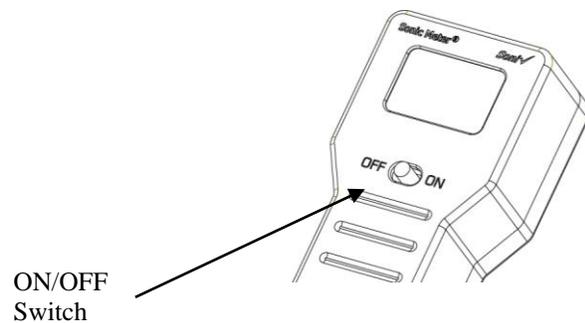


Figure 5

Press and release the Power ON key to power up the meter as shown in Figure 5.

Note: Before taking measurements, wait approximately 1 minute after powering up the meter. Waiting 1 minute allows the probe to come to full charge.

4.4 Reading the Display

When operating the *SoniV*, you will notice the output of the ultrasonic readings can vary. The *SoniV* reads in real time only. In order to take represented readings of your tank's output, a technique of *visual approximation* will have to be employed.

Begin probing the tank with the meter. Notice the fluctuations in the readings. The readings on average usually fluctuate ± 5 e4Pa for most tanks, but can fluctuate higher depending on your tank and the shape of the part sitting inside of it.

You may notice more variation in the readings, e.g. 12 to 20 e4Pa. Hold the probe steady and watch the output. While watching the numbers fluctuate, estimate and approximate average.

Take 10 to 20 readings throughout the tank (more readings for larger tanks). Make sure to hold the probe steady while taking each average. Write down each reading. Then average these readings to get an overall pressure value for the tank.

Note: Higher accuracy is achieved by taking more readings. If mapped at different depths, a clear picture of the distribution can be determined. Additional methods for increased repeatability involve readings at tightly held locations using some sort of fixture or grid plate located over the tank with locating holes. Including multiple depths by using a lock collar along the body of the probe tube is very helpful.

Factors that determine the tanks pressure output:

Pressure levels can vary by as much as $\pm 10 \text{ e}4\text{Pa}$ each time a different set of measurements is taken.

The factors that determine this variance are:

- Degas time
- Tank temperature
- Part geometry
- Probe position

Degas the tank according to the manufacturer's specifications. The degas time is usually 15-20 minutes

Some tanks have a heat setting so that *temperature* can be controlled. Follow the manufacturer's specifications. Usually by the time the tank is degassed, the temperature has stabilized.

Part geometry: the shape of a part can cause a change in the pressure output. The part's shape can cause constructive and destructive interference.

Probe position is critical. Within only a few millimeters, the pressure can vary significantly (this variance differs by tank type). This is due to nodes of high and low pressure that develop within the liquid. For the highest level of precision, the probe should be held in some type of fixture that allows for x, y and z positions.

5. Appendices:

A. Specifications

Bandwidth: up to 500kHz

Resolution: $\pm 1 \text{ e4Pa}$

Pressure reading: 0-140 e4Pa, acceptance error 6% over working range.

Temperature Operating Range: -65 to 250 F or -55 to 120 C

Performance: Real time reading samples pressure every 50msec. Averaged reading can sample 0-40 readings at sample intervals of 10msec to 99.99sec.

Battery life (hours): The **Sonic Meter *Soni***✓ consumes current at a rate 150mA/hour. The NiMH batteries are rated at 800 to 1000mAh. For continuous use, the meter will run approximately 5 hours before batteries will need to be recharged.

B. Troubleshooting

Meter fails to power on:

1. Batteries need to be recharged.
2. Batteries were improperly installed. (refer to section 4.1)
3. Circuit breaker has tripped. (refer to section 4.1 and 4.2)
4. Circuit fault unknown (return to Authorized Dealer)

Meter fails to power off:

1. Circuit fault unknown (return to Authorized Dealer)

Pressure reads zero when tanks are on:

1. Probe fault unknown (return to Authorized Dealer)
2. Meter fault unknown (return to Authorized Dealer)

C. Parts list

1. Meter: # Soni-Chk-meter
2. Case: # Soni-Chk-case
3. Manual: # Soni-Chk-manual
4. Battery charger: # Soni-Chk charger
5. Batteries: # Soni-Chk-battery

D. Warranty

The manufacturer, SyncroCraft®, LLC, warrants the **Sonic Meter *Soni*✓** against defects in materials and workmanship for a period of 12 months from the date of shipment to the original purchaser. SyncroCraft®, LLC will, at its option, repair or replace products that prove to be defective.

The foregoing warranty shall not apply to defects resulting from improper use or modification.

No other warranty is expressed or implied. SyncroCraft®, LLC specifically disclaims warranties of merchantability and application for a particular purpose.

E. Authorized Dealers

For Sales or Service in the United States, North and South America, or Europe contact:

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Los Gatos, CA 95032
Tel: (408)438-0597
e-mail: syncrocrafft@comcast.net
URL: <http://www.sonicmeter.com>

For Sales or Service in Asia contact:

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Asahi-tamagawa building 2F, 1-636 Maruko-dori, Nakahara-ku, Kawasaki,
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