

## Using the PyraMed

Fig. 1 shows the PyraMed in operation using a 600 ml tall form beaker and steam distilled water. Ensure the vessel is cleaned regularly and rinsed with distilled water, and always empty the colloidal silver (after filtering) into a dark glass bottle for storage.



Fig. 1

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# PyraMed<sup>®</sup>

Aquasilver Colloidal Silver Generator with Firmware Control

Models: CS1/CS1A/CS1B/CS1AB

Firmware version: V3.0

## Operating Instructions



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## Before use

The CS1 range of Aquasilver Electro Colloid Generators can be used to make a clear solution of colloidal silver at a concentration of 10ppm (parts per million) using steam distilled water, and high purity silver electrodes.

**It is important to use only steam distilled water (not de-ionised) having less than one ppm of total dissolved solids (TDS).** This can be obtained by using a good quality water distiller, such as the H2Olabs 100E. Domestic tap water is unsuitable since it can contain residual chlorine and other chemicals, which will combine with silver to make molecules of various sizes. When pure distilled water is used the silver particles produced are in the range 2-8 nm (nanometers) and so are easily absorbed (and eliminated) by body tissues.

Water also contains dissolved oxygen, and it is inevitable that silver oxide will be produced. This is normal, and silver oxide is not harmful in the small quantities produced. Since a deposit will form on the electrodes, it is important to clean them frequently.

When the production cycle has completed, filter the colloidal silver using filter paper or a coffee filter (kitchen paper with good absorption can also be used).

## Models

Model	Function
CS1	Generator powered from 12V DC source
CS1A	CS1 with analogue output for monitoring ppm
CS1B	CS1 with internal re-chargeable NiMH 9V battery
CS1AB	CS1 with options A and B fitted

*Table 1*

## Options

### CS1A Generator with Analog Out connector

This unit is identical in operation to the CS1 unit with the addition of an output circuit for monitoring ppm on a digital multimeter (part no. DM830).

### Operation

Plug the connecting lead (part no. LDphono) into the meter using the 4mm plugs. Ensure that the red plug connects to the right hand terminal (VΩmA) and the black plug connects to the 'COM' terminal.

Connect the phono plug into the PyraMed phono socket (on the base of the PyraMed) and start the CS1A generator.

Set the dial on the multimeter to 2 volts DC. The meter is then ready to display a voltage reading on the LCD display.

To convert from volts to ppm, simply multiply by a factor of ten.

e.g. a reading of 0.20 volts will correspond to a value of 2ppm.

Towards the end of the production cycle, the rate of production of CS slows down - this is deliberate and part of the software coding. It is done to make sure the particle size remains small. At any time the meter reads 1.00 volts, the PyraMed can be turned off - it has reached 10ppm.

## Options

### CS1B Generator with internal rechargeable NiMH battery

#### Stand-alone operation

This unit has an 8.4V Nickel Metal Hydride PP3 battery fitted to the printed circuit board and will require charging using the PSU1 or PSU2 mains adapter (or equivalent ) before use. Charge the battery initially for a 12 hour period. To do this, plug the PSU1/2 into the PyraMed using the 2.1mm connector and plug the PSU unit to the wall socket. Do not switch on the PyraMed. Turn on the mains power and leave to charge.

After 12 hours, unplug the PSU unit from the PyraMed. Turn off the mains power to the PSU. Do not leave the PSU connected to the PyraMed with the PSU turned off, this will cause the battery to discharge.

The PyraMed is now ready to use. Turn on the PyraMed and follow the instructions shown for the CS1 unit.

When the CS1B needs to be re-charged, a short beep will be heard (see table 3).

#### Using the CS1B with the PSU1/2 mains adaptor

Follow the instructions shown earlier in this document (The CS1 unit). Provided the internal battery has sufficient charge, the CS1B can be used either with or without the PSU mains adaptor.

## Power supply (PSU)

The CS1 is powered by an external DC power source connected by a 2.1mm power jack at the rear of the unit. Please observe the correct voltage range, current requirements, and polarity as shown in Table 2.

Parameter	Specification
DC voltage	9 to 12 volts
DC current	<100mA
Polarity	Centre pin negative

*Table 2*

The recommended power supply for the CS1 range is the PSU2, or PSU1 for the UK version.

A 12V external battery may also be used, or a 12V outlet on a vehicle. (using adaptor part no. PSU4)

## Using the CS1

### *Preparation*

Insert the two silver electrodes supplied into the 2mm red and black sockets in the base of the unit. Ensure that the electrodes are straight, and parallel with each other. Use a 600ml glass beaker or equivalent for the production process (The tall form beaker is suitable - part no. BK600). Fill the beaker to the 500ml mark with steam distilled water.

Place the CS1 unit on top of the beaker. The bottom end of the electrodes should align with the 100ml mark on the beaker. If you are using a different vessel, ensure that the electrodes are immersed 9cm in the water.

It is important that only 2mm diameter electrodes, each 12cm long, and made of high purity silver are used (Part number AG9999). The unit is calibrated to give a ppm reading with reference to these dimensions.

Plug the mains adapter unit into an outlet where there is no moisture. Connect the low voltage power cord to the CS1 unit with the 2.1mm jack. If using a different adapter, please ensure that it meets the specification shown in Table 2.

Turn on the unit by pressing the on/off switch at the top of the PyraMed case. The unit will initialise by illuminating the LED's in turn and by sounding a beeper. This routine will be repeated three times in quick succession. If this does not happen, an error condition has occurred (See Table 3).

Indication	Fault	Action
Continuous beep. ppm LED on	Input voltage too high	Turn unit off. Replace PSU.
Short beep.	Input voltage too low	Check PSU or Recharge battery (CS1B)
No indicators	PSU or CS1 fault	Replace/repair

Table 3

#### Production cycle

Following normal initialisation, the unit will measure the ppm value of the solution. If distilled water is used as specified, no further indication will be shown until colloidal silver begins to form. If the water used is contaminated or contains dissolved solids, an error indication will be reported, and production will stop. (See Table 4).

Indication	Fault	Action
Long beep.	TDS value > 20ppm	Use pure water only

Table 4

The CS1 applies 35 volts between the electrodes initially for a preset time, after which the polarity reverses for an equal length of time. At the end of this cycle, the unit will measure the ppm concentration, and the blue ppm LED will flash a corresponding number of times.

It is recommended that the electrodes are cleaned at least once during the production cycle to remove any build-up of silver oxide (kitchen paper is sufficient for this). Due to the volume of water involved, and the precise control of production, the production time will be at least two hours. When the concentration has reached optimum level, the CS1 will stop the production cycle automatically. When this happens, the blue LED will stay on continuously, and the white LED will flash at ten second intervals. Total Silver Content (TC) = ionic + colloidal forms. Optimum concentration = 20 ppm TC.

Turn off the unit and disconnect the PSU. Filter the solution using a coffee filter or equivalent, and store the colloidal silver in a clean dark glass container. Allow the solution to settle for 24 hours (this will allow any larger particles to settle out). Decant the solution into small (250ml for example) dark glass bottles that have been rinsed with distilled water. Seal the bottles with lids and store in a dry area at room temperature. Keep out of direct sunlight.

Well settled, filtered and decanted colloidal silver will maintain its electrical charge and antibacterial properties for up to 12 months if stored correctly.

Clean the electrodes and store safely. Also, rinse the beaker with distilled water and wipe clean. (For subsequent batches, it is useful to 'seed' the distilled water with a small quantity (100ml) of previously made colloidal silver. This will speed up the production process).

Normal operating temperature: 10 degrees C. to 40 degrees C

Recommended distilled water temperature: 20-25 degrees C