

# CSG1X INSTRUCTIONS FOR USE (IFU)



DOC. NO. 123-100-7000 REV 0.0

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## 1. INTRODUCTION

### 1.1. Scope

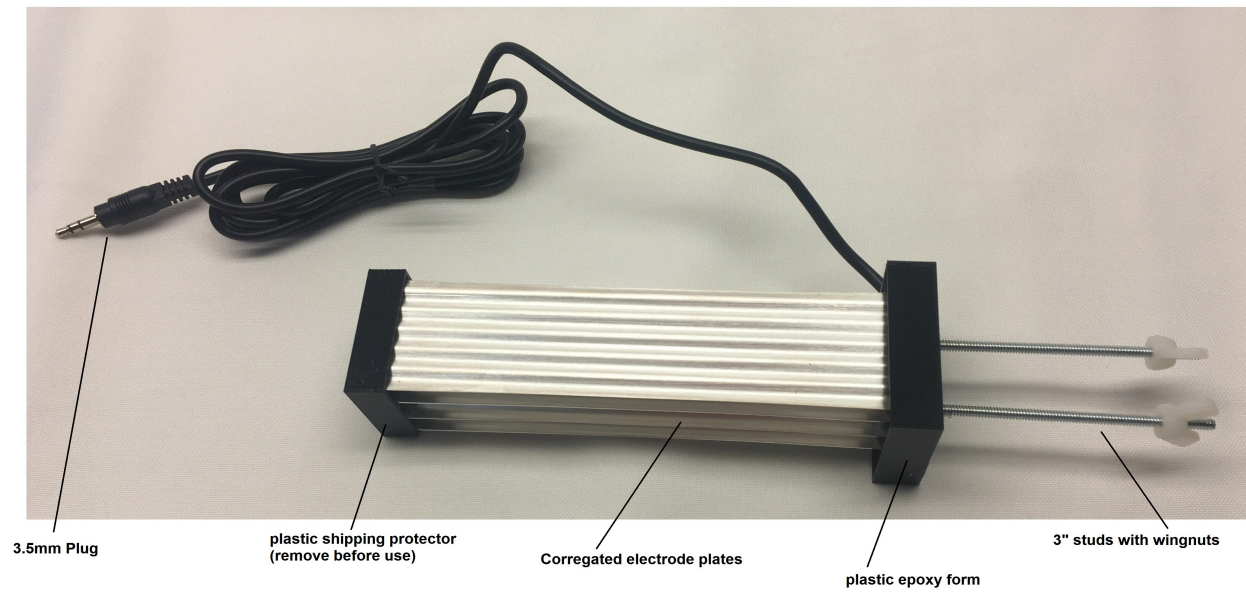
The **"CSG1X"** is an 120VAC powered Colloidal Silver Generator with single channel that drives one 99.99% pure silver electrode assembly. The unit and electrodes need to be setup properly before applying power. This IFU will cover setup, operation, control and status indications.



Illustration 1: Front of unit



**Illustration 2: Rear of unit**



**Illustration 3: Electrode Assembly**

## **2. ELECTRODE SETUP**

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### **2.1. Before applying Power**

Do not apply power to the unit until the electrodes are mounted and suspended in the container with distilled (or RO) water at the correct depth and plugged into the connectors on the rear of the enclosure of the CSG1X.

Electrode assemblies consist of 4 corrugated silver plates mounted in epoxy and are very fragile. To ensure the gap between the plates is maintained each Electrode Assembly is shipped with a plastic protector that needs to be carefully removed before use. Do not dispose of the plastic shipping protector, it should be reused when electrode assemblies are cleaned or stored. Two 3" studs come out of the top of each electrode assembly and are used along with spacers and wingnuts to suspend the assembly in distilled water to generate the colloidal silver. Mount the Electrodes Assemblies so that most of the electrode plates are covered in distilled water. Use the appropriate spacers and adjust the water level until it reaches about 0.25" from the plastic epoxy form around the assembly. It is best to keep the water level below the epoxy form so there is never any silver buildup on the epoxy. Extreme care needs to be taken with the electrodes so the plates do not get bent and the plates remain parallel (about 0.42" apart).

## **3. CSG1X SETUP**

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### **3.1. Before applying Power**

Ensure the Power Switch on the front of the CSG1X is in the "Off" position. Plug the AC Power Cord into the AC receptacle on the rear of the unit. Plug the electrode cable into the jacks on the rear of the unit. The water pump in the container needs to be on and circulating water around the all of the electrode plates. Set the Autoshutoff control knob fully clockwise to set the conductivity threshold to the maximum level and prevent premature shutdown.

Before powering the unit the conductivity of the circulating water should be measured with a PWT and recorded.

#### **4. CSG1X POWER UP**

Once the electrodes are setup and submersed in distilled water then switch the Power Switch on the front of the CSG1X to the "On" position. The blue power indicator will flash and then stay on. There is a bi-color (red/green) Channel Status LED for each of the single channel. The LED will begin to illuminate once the electrode for that channel draws about 13mA. The amount of current that each electrode draws is a function of the conductivity of the water. Several factors influence whether the Channel Status LEDs will illuminate immediately upon power up. With a new clean container, a new pump, fresh distilled water and new electrodes the water may measure  $< 1 \text{ uS/cm}$  so may not initially draw 13 mA. It may take several minutes for the conductivity to increase to the point where the LED begins to illuminate. In cases where a batch is started and there is CS residue in the container and pump and the electrodes have been previously used and not cleaned it may increase the initial conductivity of the water and cause the LED to illuminate immediately after power up.

#### **5. AUTOSHUTOFF CONTROL**

Once the unit is operating the PPM concentration of Colloidal Silver will increase over time. Once the conductivity of the distilled water is high enough to cause current limiting the drive voltage will decrease as the conductivity continues to increase over time. There is a rough correlation between the drive voltage and the conductivity and the PPM measurement. The Autoshutoff Control Knob is used to set the drive voltage threshold for powering down the electrode drive circuits for the electrode allowing the unit to stop producing Colloidal Silver once the desired PPM has been reached. The Autoshutoff circuit is comparing the Channel 1 drive voltage with the knob setting and will power down the channel once the threshold is met. Good water flow through the electrodes is required for proper operation of the Autoshutoff feature. If water flow is insufficient then Colloidal Silver build up around the electrodes causing the drive voltage to reduce to the point where it may shut off prematurely.

If multiple instances of the CSG1X are used in the same container then the Autoshutoff may occur at slightly different times since they all operate independently.

For initial batches it is recommended to start with the Autoshutoff Control fully clockwise and to monitor the PPM by PWT measurement during initial generation. Once the desired PPM is achieved slowly rotate the Autoshutoff knob counterclockwise until the channel status shuts off (LED goes out). This setting (knob position) is the approximate threshold for Autoshutoff for that PPM value.

The Autoshutoff feature operates somewhat like a circuit breaker. Once the conductivity has increased to the point where the channel drive voltage is lower than the knob setting voltage then the channel shuts off (LED goes out). The only way to turn the drive voltage back on is to turn the power switch off and then back on. If the channel drive voltage is still lower than the knob setting voltage then the channel shuts off again (LED goes out). To achieve a higher PPM once Autoshutoff has occurred it is necessary to turn the control knob more clockwise and then cycle the power off and back on. It would then run until the PPM increases and the channel drive voltage reduces to the knob setting voltage where it would then shut off drive to that channel.

If a manual approach to stopping production at the desired PPM value is preferred over Autoshutoff then the unit power is just manually turned off once the desired PPM has been measured and achieved. The Autoshutoff feature can essentially be disabled by just leaving the control knob in the full clockwise position since it may not shutoff until it reaches over 30 PPM.

## **6. CHANNEL STATUS LEDS**

The single channel status LED is used to indicate the current flow to each electrode as well as the polarity of the electrode plate pairs. If an electrode assembly is drawing less than 13 mA then the status LED for that channel may be completely off or just slightly illuminated. Once the conductivity of the water increases to the point where electrodes are drawing 13mA or more then the channel status LED begins to illuminate. The Channel Status LED is green when the outer electrode plates are positive and the inner electrode plates are negative. The Channel Status

LED is red when the outer electrode plates are negative and the inner electrode plates are positive. The polarity of each electrode plate changes 30 seconds. Toggling the electrode polarity reduces build up on the electrode plates and minimizes the need to clean electrodes after use.

If the Autoshutoff function shuts off drive current to all of the electrodes then the channel status LED is off (the blue power indicator remains on but flashing).

## **7. ELECTRODE CLEANING**

Periodic cleaning of the electrode plates will ensure consistent colloidal silver generation. Removing electrode assembly from the container and reapplying the plastic shipping protector will reduce the risk of damaging the electrode. Extreme care should be taken to make sure the plates do not get bent or misaligned. Washing the plates with isopropyl alcohol and then wiping with paper towels followed by rinsing in distilled water will remove residue.