OPERATION MANUAL

E-1200 System

Table of Contents

Specifications

Model	E-1200
Power	AC 110/220V 50/60HZ 700W
Dimensions	35 x 24 x H 52 cm (13.8 x 9.5 x 20.5 in)
Weight	21.2 kg (47 lbs.)
Production Cell Type	Single cell electrolysis for generating hypochlorous acid (HOCl)
Concentration Range	20 to 400 ppm of free available chlorine (FAC)
Ampere Settings	20 to 65 amp
Pump Speed Settings	0 to 19 (max. speed to min. speed)

Requirements

Ambient Temperature	5 to 50 °C (41 to 122 °F)
Feed Water & Brine Temperature	10 to 30 °C (50 to 86 °F)
Feed Water & Brine Water Quality	Hardness < 80 ppm (higher will damage the electrolysis cells)
Humidity	Less than 96% Relative Humidity (RH)
Minimum Flow Rate	4 L/min (lower flow rates will damage the electrolysis cells)
Maximum Water Pressure	50 PSI

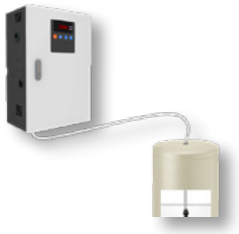
Buttons and Display

No	Description
1	LED display
2	System is running
3	Check error code in LED display
4	System RUN On/Off
5	Mode button (see uses below)
6	Set button (see uses below)
7	Reset alarm to resume running

System Alarms

Error Code	Reason	Action
Err1	Low Flow	Check the flow of the feed water into the equipment. Once corrective action has been taken to sustain the water flow above 4 L/min, press the “Reset” button to cancel the alarm. If unresolved, contact the service center.
Err2	Low Current	Check the concentration of the additive and confirm no disruption of intake flow of the additive. Press the “Reset” button to cancel the alarm. If unresolved, contact the service center.
Err3	High Current	Check the concentration of the additive and confirm no disruption of intake flow of the additive. Press the “Reset” button to cancel the alarm. If unresolved, contact the service center.
Err4	Low Voltage	The voltage is abnormally low. Please contact the service center for further assistance.
Err5	Fan Error	The cooling fan is not functioning. Please contact the service center for further assistance.

Settings & Performance

Voltage (v)	The voltage is a performance measurement and is not adjustable. Displaying the voltage: When the machine is running, press “Mode” button until voltage (v) setting is displayed.
Liters per Minute (L)  Gate Valve	The Liters per Minute (L) or flow rate can be controlled by tightening or loosening the water inflow gate valve. A higher flow rate will decrease the concentration of free available chlorine (FAC) and a lower flow rate will increase the concentration of FAC. Adjusting the liters per minute: 1. When the system is running, press “Mode” button until the liters per minute (L) is displayed. 2. The water inflow can be adjusted by tightening or loosening the gate valve found inside the front chamber of the system (pictured to the left).
Ampere (A) Max. ampere: 65 Min. ampere: 20	The ampere is an adjustable setting. The range is from 20 to 65 ampere. Higher settings will increase the concentration of free available chlorine (FAC). Adjusting the ampere: 1. Press “Mode” button until ampere (A) setting is displayed. 2. Press “Set” button to increase the ampere. Press “Reset” button to decrease the ampere.
Pump Speed (PS) Max. speed: 0 Min. speed: 19	The pump speed is an adjustable setting. The range is from 0 to 19. Lower settings will increase the pump speed and thus increase the additive dosed into the electrolysis cell. For most purposes, the pump speed should be kept in mid-range. 1. Press “Mode” button until pump speed (PS) setting is displayed. 2. Press “Set” button to increase the pump speed. Press “Reset” button to decrease the pump speed.

Safety Precautions	Brine / Additive Formulas
Ventilation Risks	Electrolyzed water contains small quantities of hydrogen gas (H2) that is released from solution into the air. These gases, if accumulated, can be explosive. Electrolyzed water contains free chlorine molecules. Free chlorine molecules have potential to form chlorine gas (Cl2) when pH of solution becomes acidic. Chlorine gas, if inhaled, can cause respiratory irritation or injury and is a health risk. Equipment must be installed in a well-ventilated area to avoid accumulation of gases. Do not install equipment near heat sources over 400°C (750°F).
Electric Shock and Fire Risks	Only use certified outlets. Do not place the equipment in water or allow the equipment to be exposed to external sources of water. Do not operate equipment if electric cord is damaged. Do not operate equipment in environments of relative humidity greater than 95%. In the event of an electric shock or fire, equipment must be removed from the power source immediately.

Additive

The total hardness of the water used to make the additive must be less than 80 ppm. Using ground water or any other water with a total hardness greater than 80 ppm will quickly develop mineral deposits on the electrolysis cells and cause damage. The salt must be composed of sodium chloride (NaCl) and cannot contain iodine or other mineral additives. Using the wrong salt can cause damage to the electrolysis cells.

Instructions for filling additive tank:

1. Fill additive tank with water (tap water, reverse osmosis water or distilled water)
2. Add salt and mix until water is fully saturated with salt.

Note: Maintaining a constant level of undissolved salt at the bottom of the additive tank will help ensure that the additive is fully saturated with salt. The saturation of salt in water is typically in the range of 28 to 32%.

Controlling pH

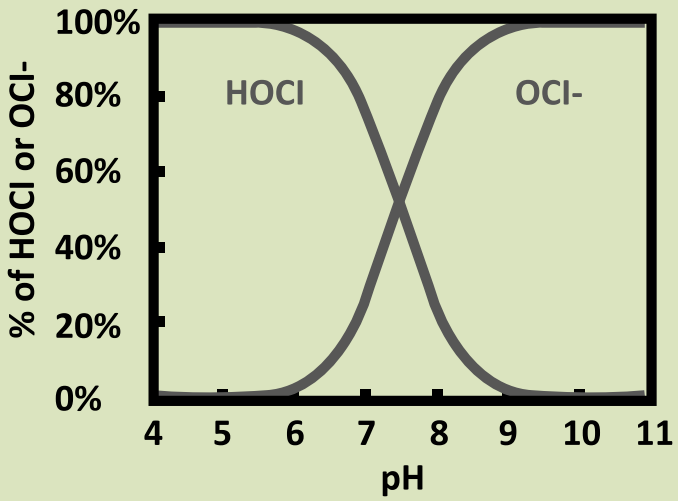
<u>Why is pH important?</u>
The pH of a free chlorine solution is important because the pH determines which chlorine molecules will be dominant. Hypochlorous acid (HOCl) dominates at pH 5. As the pH rises above 7.5, hypochlorite (OCl-) becomes more dominant.

At pH 5, over 99% of the free chlorine molecules will be HOCl.

At pH 6, over 90% of the free chlorine molecules will be HOCl.

At pH 7, over 80% of the free chlorine molecules will be HOCl.

At pH 8, only 20% of the free chlorine molecules will be HOCl.



Two Methods for Optimizing pH of Free Chlorine Solution

1. Adding hydrochloric acid (HCl) to additive tank (acceptable method if system settings will always be constant)
2. Dosing hydrochloric acid (HCl) to inflow water with pH Dosing System (preferred method)

How to Acidify the Additive

Acidifying the additive is done by adding hydrochloric acid (HCl) to the additive tank. The amount of HCl to add depends on the system settings therefore we have made it easy by adding the pH control system made by EcoloxTech.

Important: Generating HOCl for food contact requires Food Chemicals Codex (FCC) grade hydrochloric acid (HCl 35-37%). For general sanitation, technical grade hydrochloric acid (HCl 32%) may be used. Proper personal protective gear required when preparing additive with hydrochloric acid (HCl).

How to Acidify the Inflow Water with the pH Dosing System
EcoloxTech offers a pre-built dosing system with pH sensor and controller to optimize the pH of the inflow water. For more details visit Store.ecoloxtech.com The water inflow can be lowered as needed until the system outflow of free chlorine is optimized for hypochlorous acid
(HOCl) between pH 5 and pH 6.

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Controlling Concentration

The concentration is measured in parts per million (ppm) of free available chlorine. The 3 variables below can be adjusted to change the concentration.

1. Flow Rate (L/min) – controlled by gate valve allowing feed water to flow into system
2. Ampere (A) - controlled by system settings
3. Pump Speed (PS) - controlled by system settings

Measuring Concentration

The concentration of free available chlorine (FAC) can be measured with standard chlorine test paper. The range and sensitivity measurable are 10, 50, 100, and 200 ppm.

For greater accuracy or to measure high range free available chlorine levels, the chlorine concentration can be measured with a high range chlorine photometer.

Supplies for measuring free chlorine concentration can be found at: **store.ecoloxtech.com** and search SKU listed below.

Chlorine Test Paper (SKU: P-1050)
Chlorine Photometer (SKU: P-1047)

Maintenance

Over time and depending on use, mineral scale can build-up on the electrolysis cells. Mineral scale build-up depends on the quality of the inflow water. If the hardness of the inflow water is less than 80 ppm, scale will build up very slowly and the system may not require maintenance for many years. Using the incorrect salt can cause mineral scale to build up very quickly. If mineral scale does build up, the electrical current required to generate a free chlorine solution of hypochlorous acid will be disrupted.

When to do Maintenance:

When the actual Ampere of the system drops to a level below 90% of the set Ampere, the systems electrolysis cells should be descaled of mineral deposits.

To clean the electrolysis cells, use the maintenance additive formula below:

Formula for Maintenance Additive

1. 1800 mL of Water
2. 200 mL of hydrochloric acid (35-37% HCl)

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Steps for Performing Maintenance

1. Open the gate valve to raise the flow rate to above 16 L per minute.
2. Substitute the normal additive for the Maintenance Additive
3. Run system for 45 minutes

The system will run as usual dissolving any deposits on the electrolysis cell. The actual Ampere on the system should rise back to near the set Ampere. If the Ampere does not rise, repeat the above maintenance up to 3 times. If unresolved, please contact EcoloxTech for assistance. The electrolysis cell may be due for replacement.