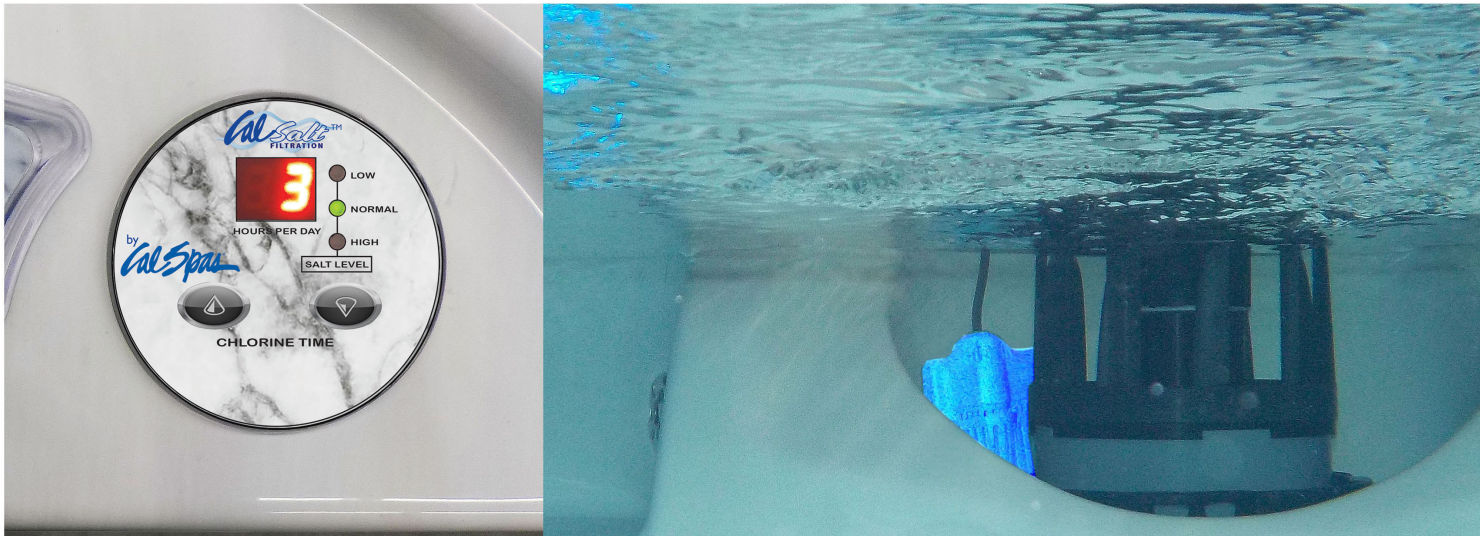




CalSalt™ FILTRATION



www.calspas.com

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OPERATION MANUAL

READ THIS MANUAL BEFORE USING SYSTEM

Toll Free: 1-800-225-7727
Fax: 1-909-629-3890

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Due to continuous improvement programs, all models, operation, and/or specifications are subject to change without prior notice.

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CONTACT INFORMATION

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LMS Customer Service Department
1462 East Ninth Street
Pomona, CA 91766.

INTRODUCTION

Your new Spa Sanitation System produces a pure form of chlorine by electrolysis of salt (NaCl) in order to sanitize your spa water. After the salt is converted to chlorine and the bacteria are killed, the chlorine converts back to salt and this process is ongoing. The salt concentration used is very low (less than that in a human tear). Chlorine output can be easily adjusted by the timer on the power supply unit. The chlorine level in your spa can be checked by using a standard chlorine test kit. One unit can treat up to 2,200L (600 gallons) of spa water (or up to 5700 L (1500 gallons) Swim Spa water).

IMPORTANT SAFETY INSTRUCTIONS. READ AND FOLLOW ALL INSTRUCTIONS

WARNING: Risk of Electric Shock. Connect only to a grounding type receptacle protected by a groundfault-circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.

WARNING: Make sure the power supply is unplugged from the wall outlet when using spa.

WARNING: To reduce the risk of injury or electric shock, do not allow children to use this product.

WARNING: Power supply should be installed in a shaded area to protect the transformer from direct sunlight.

WARNING: Disconnect the power supply from the outlet when not in use.

WARNING: Do not operate with a damaged cord or power supply.

WARNING: To avoid risk of electrical shock, do not put the power supply in the water.

WARNING: To reduce the risk of electric shock, do not use extension cords to connect unit to electric supply; if necessary, contact a qualified electrician to provide a properly located outlet.

WARNING: Make sure the power supply is unplugged from the wall outlet when cleaning/servicing the cell assembly

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similiary qualified persons in order to avoid a hazard.

SAVE THESE INSTRUCTIONS

SPECIFICATIONS:

Power Supply:

Size: For Spas or Swim Spas up to 5700L (1500 gallons)

INPUT:

120VAC, 50/60HZ, 0.33AMP
230VAC, 50/60HZ, 0.17AMP

OUTPUT:

5.0 VDC, 2.0 Amp (40°C / 104°F)

Cell:

Normal output equivalent to 32 grams (1.1 oz) of free available chlorine per day.

Reverse Polarity Function:

The Reverse Polarity Function is designed to automatically clean the cell plates, maximizing the cell's ability to manufacture chlorine.

WARNING: To reduce the risk of injury, do not permit children to operate the device.

WARNING: Heavy spa usage, and higher temperatures may require higher chlorine output to maintain proper free available chlorine residuals.

If additional chlorine is required due to heavy bather loads, use liquid chlorine to maintain an appropriate chlorine residual in the water.

DO NOT add spa chemicals directly to the skimmer. This may damage the cell.

Maintaining high salt and chlorine levels above recommended range can contribute to corrosion of spa equipment.

Check the expiry date of the test kit as test results may be inaccurate if used after that date.

The life expectancy of the electrode is 7,000 hours under normal use conditions.

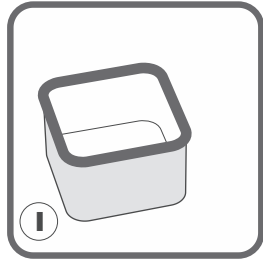
When replacing the electrode, only use replacement electrodes having a label that clearly states that it is a replacement electrode for the chlorine generating device.

For proper sanitation, spas should be completely drained periodically. The number of days between COMPLETE SPA DRAINAGE is equal to the volume of spa water in litres, divided by 10 times the maximum number of daily spa users. Refill spa with water and repeat DIRECTIONS FOR USE of the device.

Health and Hyperthermia warnings for spa devices:

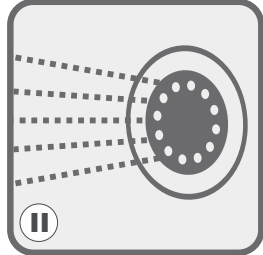
People with a medical condition should consult a physician before entering pool or spa water.”

Maximum spa water usage temperature is 40°C. Bathing in spa water at 40°C should not exceed 15 minutes.”



Operation of the Unit

- I. Turn on the power to the spa equipment.
- II. Turn on main spa pump.
- III. Add required type and amount of salt to spa. Spread over the surface and allow salt to dissolve for at least 20 minutes. (Add the required free chlorine residual before startup to have balanced water.)



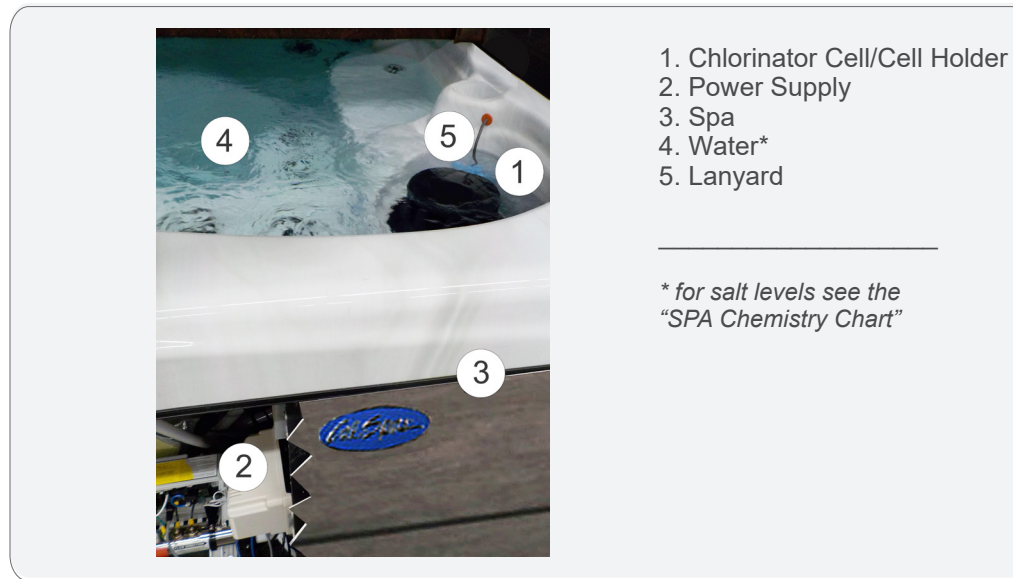
NOTE: The spa chemistry must be balanced before installing the system to the spa. (see pg 8)
During startup, add chlorine between 2-4 ppm as a base amount.
Be sure to test the chlorine level for the next few days and properly adjust the chlorine output by adjusting the Hours Per Day on the power supply front panel.



DO NOT EXCEED RECOMMENDED CHLORINE LEVELS!

Make the required adjustment and allow the spa to react to this change for a minimum of 2 days.
After 2 days, retest the spa water and make any further adjustments as required, until the unit maintains an adequate Free Available Chlorine residual.

NOTE: The system works based on a natural convection of water, not a forced convection as with in-line systems. This operation is independent of the main circulation pump. The cell must be submerged underwater for proper operation. As the cell is energized to generate chlorine, bubbles will appear and is normal. If the cell is removed from spa water, chlorine generation is automatically stopped.



POWER SUPPLY FUNCTION:

1. When the Power Supply is first plugged in:

All three LED lights and the display will be ON for approximately 3 seconds while the unit self-tests.

2. Normal Operation:

If your salt generator unit is operating properly, the Green LED light will display solid GREEN and the display will show the operation hours per day. This indicates that power is being delivered from the power supply unit to the cell and is producing sanitizer and your spa is being sanitized by Hypochlorous Acid (chlorine). NOTE: While sanitizer is being produced, bubbles can be seen coming from the cell!

3. Abnormal Conditions:

The LED lights will flash rapidly and/or the display will also flash to indicate a problem or failure. For further explanation of the abnormal conditions, please refer to the Troubleshooting Guide.

4. Chlorine Output Control

The chlorine output is controlled by the adjustment of the Timer of the power supply. The Timer regulates the hours per day of the amount of "ON" time the system requires to maintain the chlorine residuals as required.

The output is only regulated according to the chlorine Timer. It operates independently from your filter pump run time.

NOTE: Any interruption of power will cause the current memory cycle to reset itself when power is restored.

CHLORINE ADJUSTMENT

After everything is set up, the display will show you a default screen with the current hours of operation per day. You may change this setting anytime by holding down the Δ for 3 seconds straight. (See Fig.3) The display will flash indicating it is now ready for time setting changes. In order to determine the proper chlorine timer setting for your spa, measure the free chlorine level every day. Adjust the timer accordingly to achieve 2.0-4.0 PPM of Free Chlorine. It is advised to check the chlorine level at least daily to make sure the spa is properly sanitized. Weather, bather load, and sunlight have a major influence on the chlorine demand of the spa water.

Note: If the spa has reached an undesirable amount of chlorine, it is recommended to unplug the generator's unit power supply from the GFCI socket. Check chlorine levels each day until the desired level is achieved. Plug the power supply back into the GFCI socket once the chlorine level is within the desired limit.



Recommended Spa Water Conditions:

Salt Level: 2 000 - 3 000 p pm;
Free Chlorine: 2.0 - 4.0 p pm (Ideal 3.0 - 4.0 p pm);
pH: 7.2 - 7.8 (Ideal 7.4 - 7.6);
Stabilizer (Cyanuric Acid): 50 - 80 p pm

Power Supply Control Panel



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Salt Requirement

The best salt is a food-quality granulated salt, a 99.9% pure salt or solar salt. These types of salt should be purchased from a pool store and are designed for use with chlorine generators.

Do not use rock salt, iodized salt or salt with anti-caking additives. Do not use salt with more than 1% yellow prussiate of soda.

The optimum salt level is between 2000-2500 ppm. Use the chart below to determine the amount of salt for your spa. The column on the left is the amount of water in your spa. The column on the top is the current salt level measured in your spa. Always check your salt level before adding salt to the spa even if this is your first time.

Prior use of liquid chlorine and tablets could have caused an increase in salt levels. Salt should not be removed from the spa water unless the salinity exceeds 4000 ppm or the salinity of the water is undesirable. The only way to remove salt is by draining the water and adding fresh water.

NOTE: Turn unit off before adding sodium chloride and other chemicals, and wait until complete dissolution before turning it on.

Salt Table I: Amount of salt needed to achieve 2500 ppm level in your spa.

Spa Size in Gallons/ (Liters)	Salinity (ppm) measured in SPA						
	0	500	1000	1500	2000	2500	3000
378 Litres (100 Gallons)	1.0 kg (2.1 lbs)	0.8 kg (1.7 lbs)	0.6 kg (1.3 lbs)	0.4 kg (0.8 lbs)	0.2 kg (0.4 lbs)	0	0
757 Litres (200 Gallons)	1.9 kg (4.2 lbs)	1.6 kg (3.4 lbs)	1.2 kg (2.6 lbs)	0.8 kg (1.6 lbs)	0.4 kg (0.8 lbs)	0	0
1135 Litres (300 Gallons)	2.8 kg (6.3 lbs)	2.3 kg (5.0 lbs)	1.7 kg (3.8 lbs)	1.1 kg (2.5 lbs)	0.6 kg (1.3 lbs)	0	0
1514 Litres (400 Gallons)	3.8 kg (8.4 lbs)	3.0 kg (6.7 lbs)	2.3 kg (5.0 lbs)	1.5 kg (3.3 lbs)	0.8 kg (1.7 lbs)	0	0
1892 Litres (500 Gallons)	4.7 kg (10.4 lbs)	3.8 kg (8.4 lbs)	2.8 kg (6.3 lbs)	1.9 kg (4.2 lbs)	0.9 kg (2.1 lbs)	0	0
2271 Litres (600 Gallons)	5.7 kg (12.5 lbs)	4.5 kg (10.0 lbs)	3.4 kg (7.5 lbs)	2.3 kg (5.0 lbs)	1.1 kg (2.5 lbs)	0	0

Salt Table II: Amount of salt needed to achieve 3000 ppm level in your Swim SPA.

Swim Spa Size in Gallons/ (Liters)	Salinity (ppm) measured in Swim SPA						
	0	500	1000	1500	2000	2500	3000
3780 Litres (1000 Gallons)	11.3 kg (25 lbs)	9.5 kg (21 lbs)	7.6 kg (17 lbs)	5.7 kg (13 lbs)	3.8 kg (8 lbs)	1.9 kg (4 lbs)	0

Spa Size Calculation

Use these three formulas to calculate the volume of water in the spa:

Rectangular:

$\text{Length(M)} \times \text{Width(M)} \times \text{Average Depth(M)} \times 1000 = \text{Total Litres}$

$\text{Length(Ft)} \times \text{Width(Ft)} \times \text{Average Depth(Ft)} \times 7.5 = \text{Total U.S. Gallons}$

Round:

$3.14 \times \text{Radius(M)} \times \text{Radius(M)} \times \text{Average Depth(M)} \times 1000 = \text{Total Litres}$

$3.14 \times \text{Radius(Ft)} \times \text{Radius(Ft)} \times \text{Average Depth(Ft)} \times 7.5 = \text{Total U.S. Gallons}$

Free Form:

$\text{Average Length(M)} \times \text{Average Width(M)} \times \text{Average Depth(M)} \times 1000 = \text{Total Litres}$

$\text{Average Length(Ft)} \times \text{Average Width(Ft)} \times \text{Average Depth(Ft)} \times 7.5 = \text{Total U.S. Gal.}$

Unit Maintenance

Removing and Inspecting the Cell:

The cell should be inspected every 3 months. Unplug the unit from the GFCI socket. Inspect the cell for scaling (white, sugar-like) deposit. If scaling exists, the cell should be cleaned.

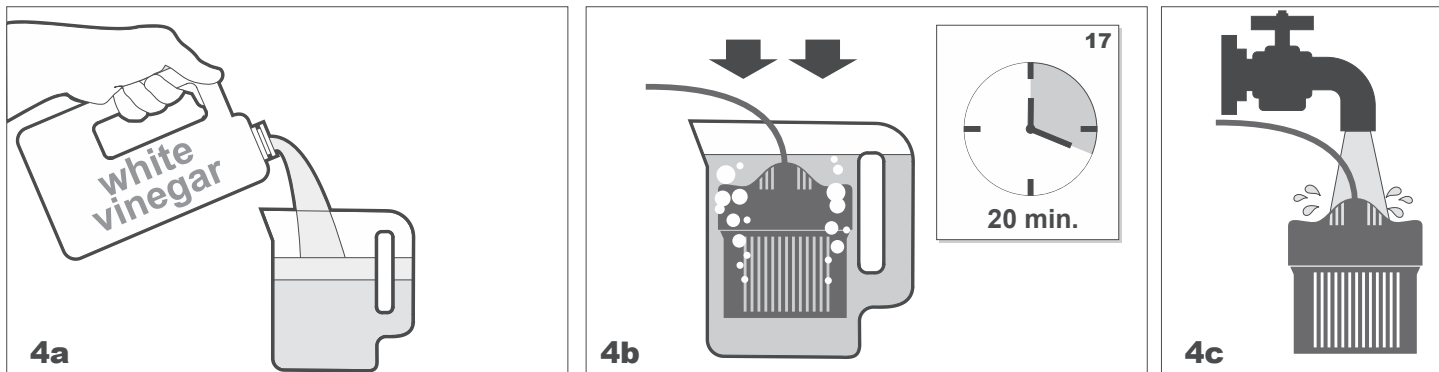


The Cell Is Attached to a Lanyard



Cleaning the cell:

To clean the cell, make sure the power supply is not plugged into the socket. A large cup should be used. Fill the cup with enough white vinegar to submerge the entire cell. Place the entire cell into the cup for 20 minutes. Remove the cell and make sure all scaling is gone. If the scaling remains, repeat the process. After the scale is removed, rinse the cell with fresh water. (See Fig.4)



Spa Chemistry Chart

The system is designed to automatically generate the chlorine for your spa. It is very important to note that chlorine is just one component of your spa water chemistry. Please make sure your spa water meets the optimum chemistry levels in the following Spa Chemistry Chart.

FACTORS	PREFERRED LEVELS
1 Salt _____	2000 – 2500 ppm (3000 ppm for Swim Spa)
2 PH _____	7.2 - 7.8
3 Free Chlorine _____	3.0 – 5.0
4 Total Alkalinity _____	100- 120 ppm
5 Calcium hardness _____	150-200 ppm

Operation Mode and Trouble Shooting

Operation Mode and Trouble Shooting

Symptom on Power Supply		Possible Causes	Solution	
Display	LED			
1	no display	no lights	1 - power outage 2 - power supply failure	Make sure there is power to the unit. Need to replace the power supply.
2	“- -”	no lights	unit in rest mode	No action is needed. If you want it to operate immediately, unplug/plug the power or adjust the timer. Both will start the operation right away.
3	“- -” and Hours (05 by default) alternating	no lights	1 - chlorinator cell is outside water 2 - open circuit in chlorinator cell 3 - salt level low	Put it back into the water. Check the wire connections and make sure no cut or broken wire. Add more salt to spa and allow time for it to dissolve.
4	“LO” and Hours (05 by default) alternating	Yellow light	1 - salt level low 2 - water temperature low 3 - chlorinator cell at its life end	Add more salt to spa and allow time for it to dissolve. Don't use if the water temperature is under 15 °C(65 °F). Need a new cell replacement
5	Hours (05 by default)	Green light	normal operation mode	No action is needed.
6	“HI” and Hours (05 by default) alternating	Red light	1 - salt level high 2 - water temperature high	No action is needed. Stop adding salt to water if you are doing so. Using unit for water temperature above 45 °C (110 °F) is not recommended.
7	“HI”	Red light blinking	1 - salt level too high or high TDS Levels 2 - water temperature too high 3 - short circuit in chlorinator cell	You will have to dilute your spa water with fresh water until the salt level is less than 3000 ppm. Dead Sea Salt can cause HI on the Mini. Also, check your TDS Levels. Stop using unit until water cools down. Check to make sure there are no metal objects caught in between electrode plates.
8	“8 8” blinking	All lights blinking	Power supply failure	Unplug and plug in the power cord to reset the power supply. If the problem persists, call customer service.
Symptom in Spa Water				
9	chlorine level is low	Hours set too low	Adjust the hours setting to higher number (the maximum is 24 hours/day). Make sure cyanuric acid level in your spa is between 50-80 PPM.	
10	chlorine level is too high	Hours set too high	Adjust the hours setting to lower number (the minimum is 0 hours/day).	

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