



Salt & Swim™

Chlorine Generator for Above Ground
Swimming Pools up to 23,000 gallons

Owner's Manual



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SAS-ABG
SAS-ABG-TL

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Hayward Pool Products
620 Division Street, Elizabeth NJ 07207
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When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

- **READ AND FOLLOW ALL INSTRUCTIONS**
- TO REDUCE THE RISK OF DROWNING FROM HAIR AND BODY ENTRAPMENT, INSTALL A SUITABLY RATED SUCTION GUARD TO MATCH THE MAXIMUM FLOW RATE MARKED. ATTENTION : LES PRISES D'ASPIRATION DOIVENT ETRE EQUIPEES DE GRILLES CONVENANT AU DEBIT MAXIMAL INDIQUE.
- WARNING - To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
- WARNING – Risk of Electric Shock. Connect only to a grounding type receptacle protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.
- Do not bury cord. Locate cord to minimize abuse from lawn mowers, hedge trimmers, and other equipment.
- WARNING – To reduce the risk of electric shock, replace damaged cord immediately.
- WARNING – To reduce the risk of electric shock, do not use extension cord to connect unit to electric supply; provide a properly located outlet.
- “CAUTION: To reduce the risk of electric shock, install at least 10 feet (3 meters) horizontally from the inside walls of a pool or spa/hot tub. Do not use an extension cord.” ATTENTION : MAINTENIR UNE DISTANCE MINIMALE D'UN METRE, MESUREE DANS UN PLAN HORIZONTAL, ENTRE LE BASSIN ET LES APPAREILS ET COMMANDES.
- For Canadian Units: At least two lugs marked “BONDING LUGS” are provided on the external surface or on the inside of the supply terminal box or compartment. To reduce the risk of electric shock, connect the local common bonding grid in the area of the hot tub or spa to these terminals with an insulated or bare copper conductor not smaller than No. 6 AWG.
- **SAVE THESE INSTRUCTIONS**



LIMITED WARRANTY (effective 12/01/12) Hayward warrants its Salt & Swim chlorination products to be free of defects in materials and workmanship, under normal use and service as follows:

Control Box - 3 year limited warranty, parts only
SAS-CELL - 1 year limited warranty

Hayward warrants all accessories and other replacement parts for the above-identified chlorination products for a period of one (1) year.

Each of these warranties is not transferable and applies only to the original owner.

Proof of purchase is required for warranty service. If written proof of purchase is not provided, the manufacturing date code will be the sole determinant of the date of installation of the product. To obtain warranty service or repair, please contact the place of purchase or the nearest Hayward authorized warranty service center. For more information on authorized service centers please contact the Hayward Technical Service Support Center (61 Whitecap Road, North Kingstown RI, 02852) or visit the Hayward website at www.hayward.com.

WARRANTY EXCLUSIONS:

1. Damage resulting from improper installation including installation on pools larger than the product rating.
2. Problems resulting from failure to install, operate or maintain the product(s) in accordance with the recommendations contained in the owners manual(s).
3. Problems resulting from failure to maintain pool water chemistry in accordance with the recommendations in the owners manual(s).
4. Problems resulting from tampering, accident, abuse, negligence, unauthorized repairs or alternations, fire, flood, lightning, freezing, external water, degradation of natural stone used in or immediately adjacent to a pool or spa, war or acts of God.

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NO WHOLESALE, AGENT, DEALER, CONTRACTOR OR OTHER PERSON IS AUTHORIZED TO PROVIDE, SUPPLEMENT OR MODIFY ANY WARRANTY ON BEHALF OF HAYWARD.

THESE WARRANTIES ARE VOID IF THE PRODUCT HAS BEEN ALTERED IN ANY WAY AFTER LEAVING THE FACTORY. FOR THE ABOVE-IDENTIFIED CHLORINATION PRODUCTS, THESE WARRANTIES ALSO ARE VOID IF, DURING THE WARRANTY PERIOD, YOU USE A REPLACEMENT CHLORINATOR CELL OTHER THAN AN UNMODIFIED, NEW HAYWARD CHLORINATOR CELL PURCHASED FROM HAYWARD. IF A WARRANTY BECOMES VOID, YOU STILL MAY PURCHASE SERVICE AND/OR TELEPHONE TECHNICAL SUPPORT AT THE THEN CURRENT TIME AND MATERIAL RATES.



Introduction

The Hayward Salt & Swim™ SAS-ABG and SAS-ABG-TL are automatic chlorine generation systems for Above Ground Pool sanitization. The SAS-ABG model offers a standard blade type 120V linecord for power and PVC adapters for return jet mounting. The SAS-ABG-TL model offers a twist lock type 120V linecord for power and PVC adapters for return jet mounting.

The Salt & Swim requires a low concentration of salt (sodium chloride) in the pool water. It automatically sanitizes your pool by converting the salt into free chlorine which kills bacteria and algae in the water. Chlorine will revert back to sodium chloride after killing bacteria. These reactions will continuously recycle virtually eliminating the need to add sanitizing chemicals to your pool.

These Salt & Swim models can handle the purification needs of most residential swimming pools up to 23,000 gallons (87,000 liters). These unique low cost chlorine generators use a replaceable electrolytic Cell that is designed to produce 155 lbs of 100% available chlorine over its lifetime.

Note that the actual amount of chlorination required to properly sanitize a pool varies due to bather load, rainfall, temperature, and the pool's cleanliness.

NOTE: Before installing this product as part of a saline water purification system in a pool or spa using natural stone for coping or for immediately adjacent patios/decking, a qualified stone installation specialist should be consulted regarding the appropriate type, installation, sealant (if any) and maintenance of stone used around a saline pool with electronic chlorine generator in your particular location and circumstances.

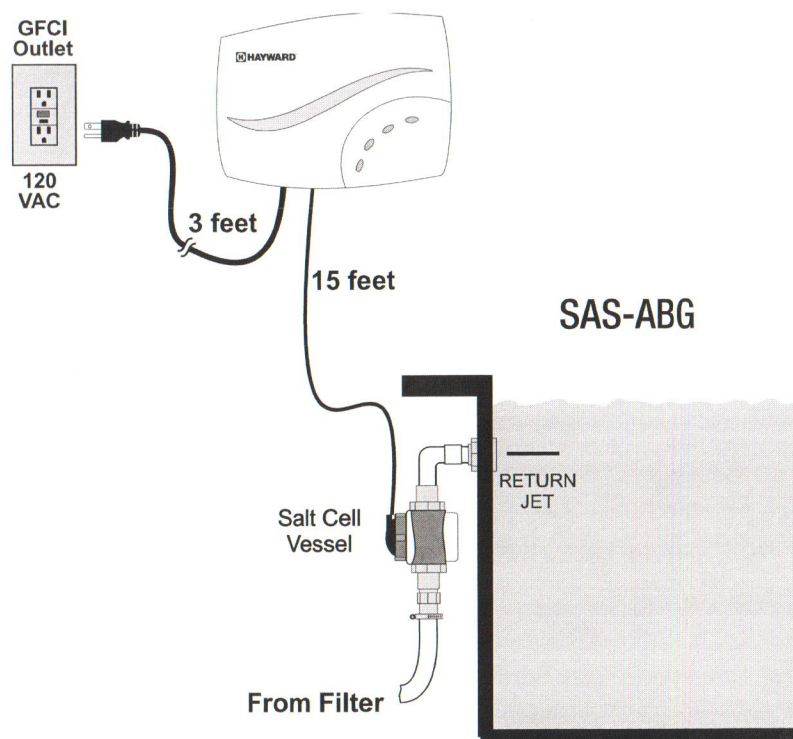
NOTE: The use of dry acid (sodium bisulfate) to adjust pool pH is discouraged especially in arid regions where pool water is subject to excessive evaporation and is not commonly diluted with fresh water. Dry acid can cause a buildup of by-products that can damage your chlorinator Cell.



Installation

Remove power to the pool filter pump before starting this installation. Installation must be performed in accordance with Local and NEC codes. The Control Box shall be mounted within 3 ft from a GFCI outlet, and within 15 ft from where the Cell will be installed. Take care to protect the Cell Cap connector pins while handling the Salt & Swim unit during installation. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

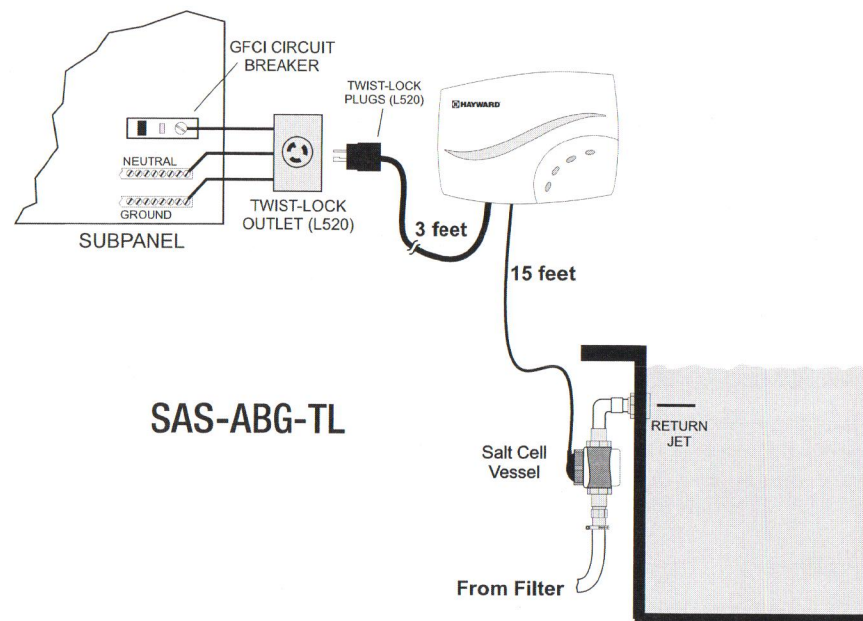
Overview



LED BLINKING

POSSIBLE ACTIONS

MIN LED or LED 2	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Inspect the Cell. If dirty, follow the Cell cleaning procedure. 3. Check the salt level in the pool and verify the salt level is greater than 2600ppm but also less than 3400ppm. 4. Inspect the Cell Vessel and verify the Cell plates are fully covered by moving water. 5. Contact Hayward Technical Service.
LED 3	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Verify that the Salt & Swim is receiving 120VAC input. 3. Contact Hayward Technical Service.
LED 4	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Contact Hayward Technical Service.
LED 5 or LED 6	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Check that the salt level in the pool is no greater than 3400ppm and/or the temperature does not exceed 104F. 3. Inspect the Cell Vessel and verify the cell plates are fully covered by moving water. 4. Contact Hayward Technical Service.
LED 7	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Contact Hayward Technical Service.
LED 8	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Inspect the Cell. If dirty, follow the Cell cleaning procedure. 3. Inspect the Cell Vessel and verify the cell plates are fully covered by moving water. 4. Inspect the cable that connects the cell to the system. Make sure the cable is secure and undamaged. 5. Contact Hayward Technical Service.
LED 9	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Contact Hayward Technical Service.
MAX LED	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Inspect the cable that connects the cell to the system. Make sure the cable is secure and undamaged. 3. Contact Hayward Technical Service.
Inadequate Water Flow	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Perform "Flow Switch Calibration" procedure. 2. Contact Hayward Technical Service.
Standing By	<ol style="list-style-type: none"> 1. Recycle power to the Salt & Swim by unplugging the linecord for two minutes and then plugging it back in. 2. Check that the pool temperature does is more than 50°F and less than 104°F. 2. Contact Hayward Technical Service.



SAS-ABG-TL

Preparing Pool Water

To prepare the pool water for Salt & Swim operation, the pool's chemistry must be balanced and salt must be added. This must be done **BEFORE** activating the Salt & Swim. Some adjustments to your pool chemistry may take several hours, so start the procedure well before you intend to operate the Salt and Swim.

To prepare your pool water, follow the instructions on the included Pool Chemistry Quick Start Guide and refer to page 9 of this manual.

Adding Salt: Add salt several hours or, if possible, 1 day prior to operating the Salt & Swim. Take care not to exceed the recommended salt level. Measure salt 6-8 hours after adding to the pool.

NOTE: If the pool does not have new water, add 1 quart (1 liter) of metal remover and 1 quart (1 liter) of non-copper based algaecide to the pool, per manufacturer's instructions. This ensures a quick, troublefree transfer to the Salt & Swim system.



Salt & Swim Installation

Refer to the following sections for more detailed installation information.

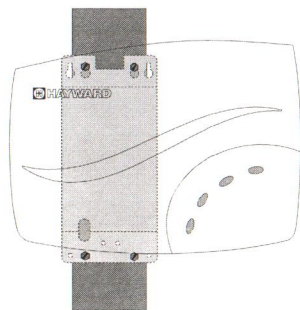
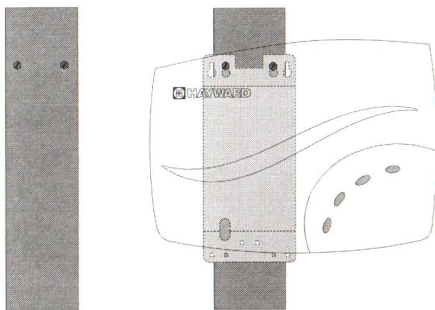
Mounting the Salt & Swim Control Box

The Salt & Swim is contained in a raintight enclosure that is suitable for outdoor mounting. The Control Box uses a 3 ft linecord that must plug into a GFCI protected outlet. The Cell must be installed within 15 ft of the Control Box using the attached cable.

The Control Box is designed to mount vertically on a flat surface with the cables facing downward. Because the enclosure also acts as a heat sink (disperses heat from inside the box), it is important not to block the four sides of the Control Box. Do not mount Salt & Swim inside a panel or tightly enclosed area.

Before securing the Control Box to the intended location, make sure that the power cord will reach the GFCI protected outlet and that the Cell cable will reach the location where the Cell Vessel will be installed. Refer to the diagram below.

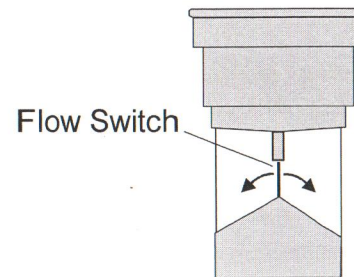
Screw in top fasteners leaving 1/8" space between screw head and surface Hang Control on fasteners



Screw in bottom fasteners securely.



If the condition persists, remove the Cell from the Vessel and check that the flow switch is free to move in both directions. Refer to the diagram below.



5. CELL LIFE LOW LED illuminated

The Cell has reached the end of its life. Replace as soon as possible

6. PROBLEM DETECTED LED illuminated AND MAX LED blinking

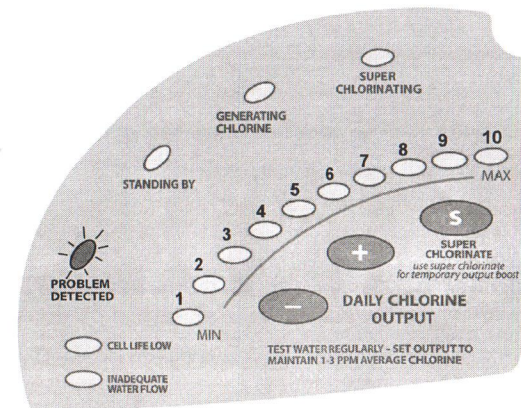
There is a communication error with the Cell. Check that the Cell cap is properly plugged in and that the wire to the Control Box is not cut or damaged.

7. PROBLEM DETECTED LED illuminated AND MIN LED blinking

- The salt level may be too low. Adjust salt to recommended levels.
- Remove and inspect the Cell for scale. If the Cell is scaled, follow the directions on page 15 for Cell cleaning.

8. PROBLEM DETECTED LED illuminated AND a DAILY CHLORINE OUTPUT LED is blinking

The Salt & Swim may display an error by illuminating the PROBLEM DETECTED LED and blinking one of the DAILY CHLORINE OUTPUT LEDs. There are ten DAILY CHLORINE OUTPUT LEDs that each indicate a different error. These LEDs are labeled with a number on the diagram below. Refer to the table for their corresponding errors.



Troubleshooting

Visit www.hayward.com or call 855-429-9274 for helpful information on operation, maintenance and troubleshooting your Salt & Swim Electronic Chlorine Generator.

Common Problems and Solutions

The Salt & Swim's various LEDs show the operation status as well as alert the user to any problems that may have occurred. Some indications may require a combination of LEDs to illuminate. To aid in interpreting these indications, Hayward has created an interactive tool located at www.hayward.com. Use this tool and the information below to identify and correct problems that may arise.

1. Possible causes of little or no free chlorine residual

- DAILY CHLORINE OUTPUT adjustment setting is too low
- Low stabilizer (Cyanuric Acid)
- Filter pump time too short (8 hours for average size pools, more for large pools)
- Salt level too low (below 2400 ppm)
- Salt level too high
- Very warm pools increase chlorine demand--increase Output %, or filter run time
- Cold water below 50°F causes Salt & Swim to stop generating
- Cold water between 50°F - 60°F causes Salt & Swim to reduce output regardless of DAILY CHLORINE OUTPUT setting
- Excessive scaling on Cell.
- High level of Nitrogen in pool water.
- "Yellow Out" or similar treatment recently used. Some yellow algae treatments will use chlorine at a very high rate and deplete the residual free chlorine. Manually shock the pool if indicated in the directions on the algae treatment. It still may be a matter of days before the pool returns to "normal" and chlorine tests will show the desired 1-3ppm free chlorine reading.

2. LEDs not on

Depending on current conditions, there should always be at least one LED illuminated when the Salt & Swim is powered. If no LEDs are on, check to make sure that the linecord is plugged in and that the GFCI outlet is powered. If no power is detected, the GFCI may have to be reset.

3. STANDING BY LED blinking

The Salt & Swim has shut down because the temperature of the pool/spa water is too high (120°F) or too low (50°F). The system will not resume operation until the water temperature returns to normal. Note: This condition can sometimes happen if the pool/spa temperature is already high and the heater is running. The temperature coming out of the heater and into the Cell could possibly be high enough to shut down the Salt & Swim.

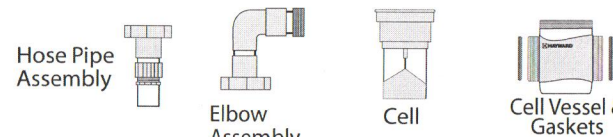
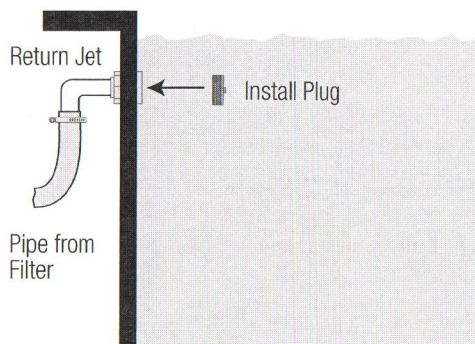
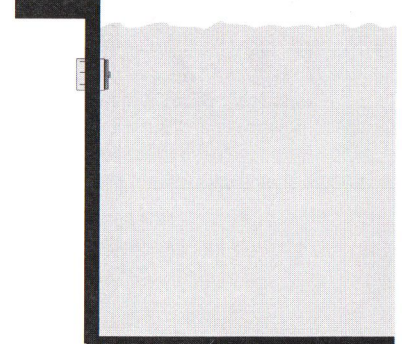
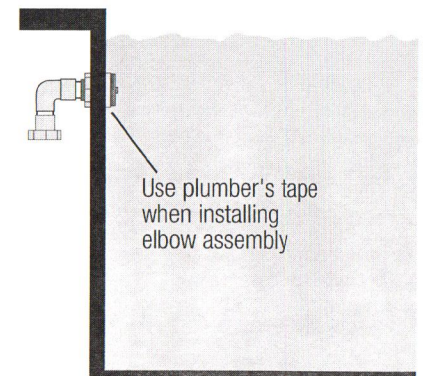
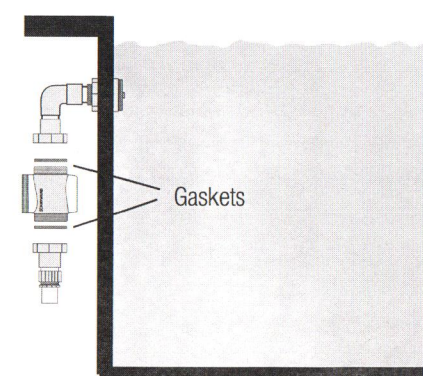
4. INADEQUATE WATER FLOW LED illuminated

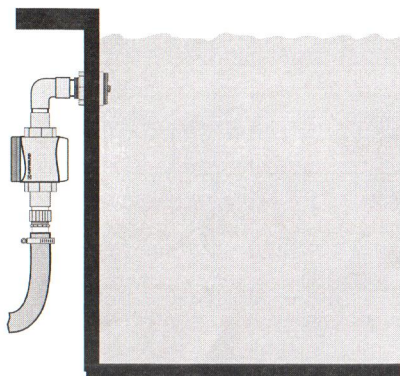
The Salt & Swim has sensed a low flow or no flow condition and has stopped generating chlorine.

- Verify that the filter pump is running and there are no obstructions or restrictions in the pool plumbing.
- Backwash the pool filter.
- Increase the speed of your variable speed pump

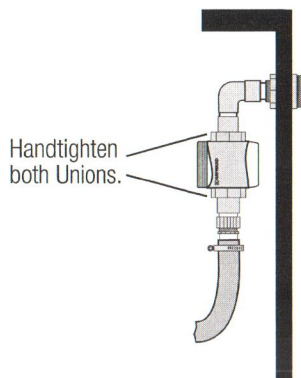
Plumbing

The Cell is designed to install in the return jet fitting on the pool wall using the supplied parts. Refer to the following instructions.

- 
1. Install plug in return jet to prevent water flow.
 
 2. Drain water from pool piping. Remove flex pipe and fitting from the return jet.
 
 3. Screw the Elbow Assembly into the return jet using plumber's tape on the threads.
 
 4. Using the supplied gaskets, attach the Cell Vessel to the Elbow Assembly and Hose Pipe Assembly. Do not tighten.
 

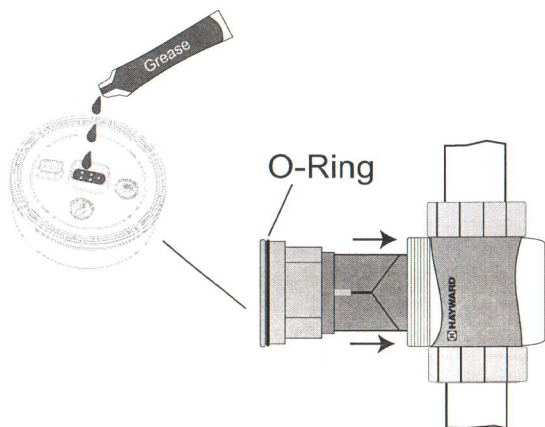


5. With the Hose Clamp already on the flexible pipe, slip the pipe on to the Hose Pipe Assembly as shown. Tighten the Hose Clamp firmly.



6. Position the Vessel in a manner where the Cell can be easily inserted and removed. Secure the Vessel by handtightening both Unions.

Remove the foam protector from the Cell. Fully cover Cell pins with the supplied grease. Verify that the O-ring is attached to the Cell before inserting the Cell into the Cell Vessel as shown.



Prevent over-chlorination during cold weather: Check chlorine levels periodically. Most pools require less chlorine during cold weather and the DAILY CHLORINE OUTPUT should be lowered accordingly.

Maintaining the Salt & Swim System

The replaceable Cell uses the same electronic self cleaning technology as the popular Hayward Turbo Cell. In most cases this self cleaning action will keep the Cell working at optimum efficiency. In areas where water is hard (high mineral content) and in pools where the water chemistry has been allowed to get "out of balance," the Cell may require periodic cleaning.

Servicing and Cleaning the Salt & Swim Cell

Unplug the Salt & Swim from the GFCI outlet and remove power from the pump before attempting to remove the Cell. Unplug the Cell cord from the Cell. Remove the Cell from the Vessel by unscrewing the Retaining Nut and gently pulling the Cell out of Vessel. Once removed, look inside the Cell and inspect for scale formation (light colored crusty or flaky deposits) on the plates and for any debris which has passed through the filter and caught on the plates. If no deposits are visible, reinstall. If deposits are seen, use a high pressure garden hose and try to flush the scale off. If this is not successful, use a plastic or wood tool (do not use metal as this will scratch the coating off the plates) and scrape deposits off of plates. Note that a buildup on the Cell indicates that there is an unusually high calcium level in the pool (old pool water is usually the cause). If this is not corrected, you may have to periodically clean the Cell. The simplest way to avoid this is to bring the pool chemistry to the recommended levels as specified.

Mild Acid Washing: Use only in severe cases where flushing and scraping will not remove the majority of deposits. To acid wash, mix a 4:1 solution of water to muriatic acid (one gallon of water to one quart of muriatic acid) in a clean plastic container. ALWAYS ADD ACID TO WATER - NEVER ADD WATER TO ACID. Be sure to wear rubber gloves and appropriate eye protection. Place the Cell in the container. The solution should reach the top of the Cell so that the cylindrical electronics compartment is not submerged. Soak the Cell for a few minutes and then rinse with a high pressure garden hose. If any deposits are still visible, repeat soaking and rinsing. Replace Cell and inspect again periodically.

Winterizing

The Salt & Swim replaceable Cell will be damaged by freezing water just as your pool plumbing would. In areas of the country which experience severe or extended periods of freezing temperatures, be sure to drain all water from the pump, filter, and supply and return lines before any freezing conditions occur. The Control Box and plumbed in Cell Vessel are capable of withstanding any winter weather and should not be removed.

Spring Start-up

DO NOT turn the Salt & Swim on until the pool water chemistry has been brought to the proper levels. This information can be found on page 9.



Operation

The Salt & Swim does not have an ON/OFF switch. The unit is designed to be plugged into a GFCI rated outlet at all times. There should be no need to remove power from the Salt & Swim unless pool components are being serviced or the pool will be closed.

When power is first applied to the Salt & Swim, an initialization routine will run for approximately 30 seconds. During this time, various LEDs will illuminate. This is perfectly normal and does not require any input from the user. When the routine is finished, the Salt & Swim will begin normal operation.

If the water chemical levels are in the recommended range, there are three factors that you can control which directly contribute to the amount of chlorine the Salt & Swim will generate:

1. filter time each day (hours)
2. the DAILY CHLORINE OUTPUT setting
3. the amount of salt in the pool

The filter pump timer should be set so that all of the water in the pool passes through the filter at least once each day. For pools with high chlorine demand, the timer may have to be set longer to generate enough chlorine.

Daily Chlorine Output Setting

You can adjust the amount of chlorine that is generated using the "+" and "-" button on the Salt & Swim unit. The DAILY CHLORINE OUTPUT LEDs will display the current setting. Push "+" to increase and "-" to decrease the current setting. Each DAILY CHLORINE OUTPUT LED represents 6 minutes of chlorine generation out of 1 hour. For example, if 5 LEDs are illuminated, the Salt & Swim unit will generate chlorine for $5 \times 6 = 30$ minutes out of every hour of operation. During this time, the GENERATING CHLORINE LED will be lit. The unit will be idle for the remaining 30 minutes at which time the GENERATING CHLORINE LED will turn off and the STANDING BY LED will illuminate.

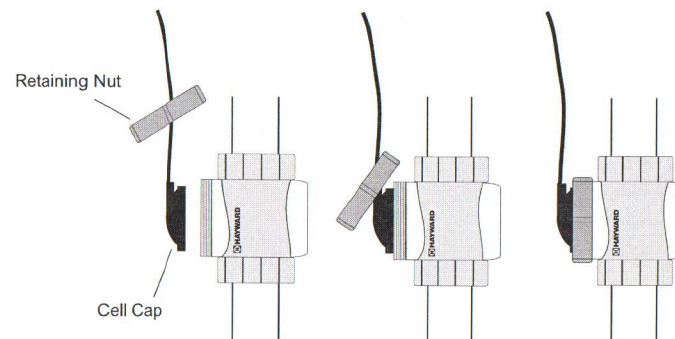
To find the optimum setting, start the operation with 5 DAILY CHLORINE OUTPUT LEDs illuminated. Test the chlorine level every few days and adjust up or down accordingly. It usually takes 2-3 adjustments to find the ideal setting for your pool and after that, it should only take minor, infrequent adjustments. Because the chlorine demand of the pool increases with temperature, most people find they have to adjust up at the peak of the summer and down during colder periods. The Salt & Swim automatically scales back to 12 minutes of output per hour (if set higher than 12 minutes) when the pool water is 50° - 60°F. This protects the unit as well as prevents possible over-chlorination. The Salt & Swim stops generating when the pool water temperature drops below 50°F. This is usually not a problem because bacteria and algae stop growing at this temperature. You can override these automatic low temperature operations by switching to SUPER CHLORINATE for a day.

NOTE: After the ideal DAILY CHLORINE OUTPUT setting has been found, you may need to raise the setting when the pool water temperature increases significantly, when there is higher than normal bather load or when the Salt & Swim Cell ages. You may need to lower the setting when the pool water temperature decreases significantly or there are long periods of inactivity.



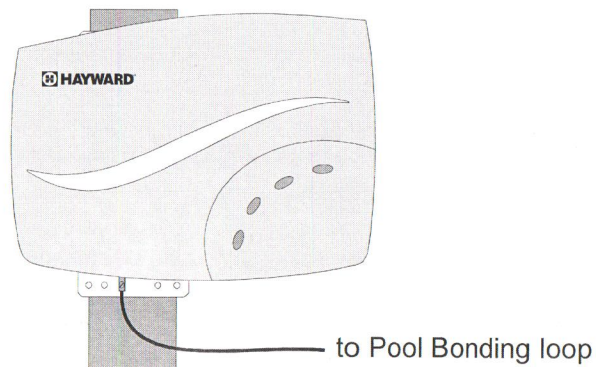
Connect and Fasten Cell Cap

Slip the Cell Cap through the Retaining Nut as shown below. Plug the Cell Cap into the Cell and secure with the Retaining Nut. Run the pump for 5 minutes and check for leaks.



Bonding

Pool bonding or "equipotential bonding" ensures that all pool components around the pool are at the same electrical potential. If bonding is required at your location (see Local and NEC codes), a bonding lug is provided at the bottom of the Salt & Swim enclosure. Run an eight gauge (8 AWG) solid copper wire from the bonding lug to your pool's existing bonding loop.

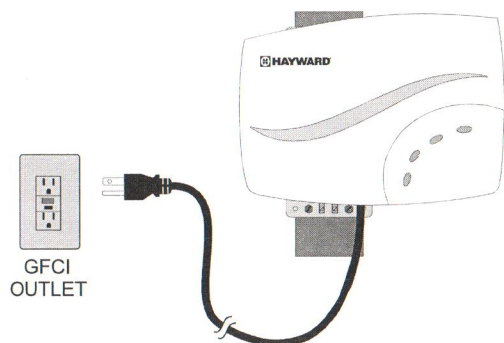


Flow Switch Calibration Procedure

IMPORTANT: Before going any further, the pool water must be balanced and salt must be added to your pool. If this has not already been done, refer to the included Chemistry Quick Start Guide as well as the "Water Chemistry" section of this manual for information on how to prepare your pool water for Salt & Swim operation.

At start-up, or when a new Cell is installed, the Salt & Swim will run a Flow Switch Calibration procedure to ensure that the Cell's flow switch is properly initialized. This will occur just once when a new Cell is installed. After the flow switch is initialized, the Salt & Swim will not perform this procedure again until the Cell is replaced. The Flow Switch Calibration procedure will require the user to cycle the pump on and off. Follow the instructions below:

1. Turn the filter pump OFF.
2. Plug the Salt & Swim's linecord into a ground fault circuit interrupter (GFCI) safety outlet or an outlet protected by a ground fault circuit breaker (GFCB). Follow Local and National codes.



After being powered on for the first time, the Salt & Swim will run a diagnostic routine which can take up to 30 seconds. During this time, various LEDs will turn on and off. When finished, the Salt & Swim will display a blinking INADEQUATE WATER FLOW LED and a solid STANDING BY LED. Keep the Salt & Swim powered for the remainder of this procedure and go to Step 3.

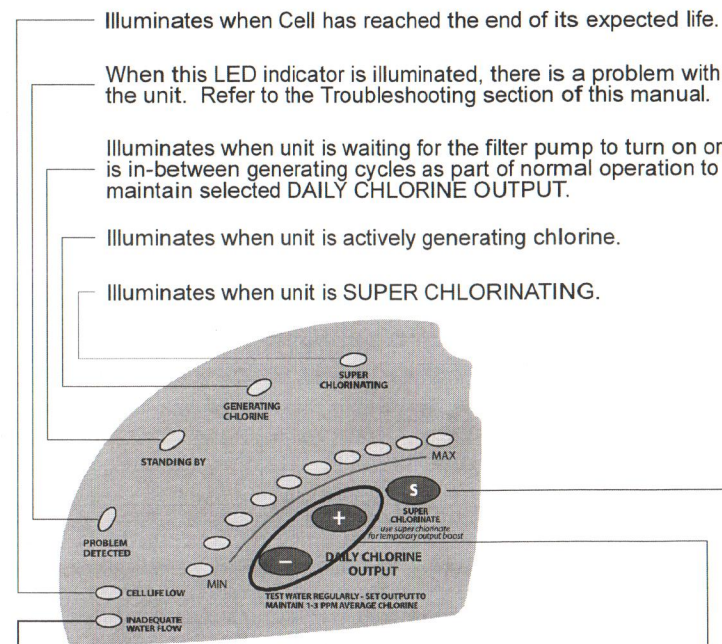
3. Turn the filter pump ON. Make sure that full flow is achieved (no air in the system) and run the pump for at least 15 seconds.
4. Turn the filter pump OFF.
5. The Salt & Swim should now display a solid INADEQUATE WATER FLOW and a solid STANDING BY LED. The Flow Switch Calibration procedure is complete. You can now turn on your filter pump and begin normal operation.

If the INADEQUATE WATER FLOW LED is still blinking after performing this procedure, refer to the Troubleshooting section of this manual.

Operation

Controls

The main controls and indicators are shown below.



ILLUMINATES when there is no flow or low flow through the Cell. The pool filter pump could be in its "off" cycle. If this is not the case, refer to the Troubleshooting section in this manual.

Blinks when performing the Flow Switch Calibration procedure.

Press (+) and (-) to increase or decrease the chlorine generation. The DAILY CHLORINE OUTPUT LEDs above these buttons will indicate the relative amount of chlorine being generated.

When you have an abnormally high bather load, a large amount of rain, a cloudy water condition, or any other condition which requires a large amount of purification to be introduced, press the SUPER CHLORINATING button. This electronically "super chlorinates" (boosts chlorine generation output) the water for 24 hours (filter pump must be on during this time). To cancel super chlorinating, press the SUPER CHLORINATING button again.

POUNDS and (Kg) OF STABILIZER (CYANURIC ACID) NEEDED FOR 40 PPM									
Current Stabilizer level (ppm)	Gallons and (Liters) of Pool Water								
	8,000 (30000)	10,000 (37500)	12,000 (45000)	14,000 (52500)	16,000 (60000)	18,000 (67500)	20,000 (75000)	22,000 (82500)	23,000 (86000)
0 ppm	2.7 (1.2)	3.4 (1.5)	4.0 (1.8)	4.7 (2.2)	5.4 (2.5)	6.0 (2.7)	6.7 (3.0)	7.4 (3.4)	7.7 (3.5)
10 ppm	2.0 (.9)	2.5 (1.1)	3.0 (1.4)	3.5 (1.6)	4.0 (1.8)	4.5 (2.0)	5.0 (2.3)	5.5 (2.5)	5.8 (2.6)
20 ppm	1.3 (.59)	1.7 (.77)	2.0 (.90)	2.3 (1.1)	2.7 (1.3)	3.0 (1.3)	3.3 (1.5)	3.7 (1.6)	3.9 (1.7)
30 ppm	0.7 (.31)	0.8 (.36)	1.0 (.45)	1.2 (.54)	1.4 (.64)	1.5 (.68)	1.7 (.77)	1.8 (.82)	1.9 (.87)
40 ppm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Water Chemistry

The table below summarizes the levels that are recommended by The Association of Pool and Spa Professionals (APSP). It is important to maintain these levels in order to prevent corrosion or scaling and to ensure maximum performance from your Salt & Swim chlorine generator. Have your water tested or use pool water test strips and refer to the Chemistry Quick Start Guide information on testing and adjusting your pool's water chemistry. Your Authorized Salt & Swim Dealer or most pool stores can provide you with the chemicals and procedures to adjust the water chemistry as well.

Note that pool water emanating from wells and municipal water supplies, along with the introduction of environmental contaminants, can contain chemistries that are deleterious to the life expectancy of the Cell.

CHEMICAL	IDEAL LEVELS
Salt	2700 to 3400 ppm
Free Chlorine	1.0 to 3.0 ppm
pH	7.2 to 7.8
Cyanuric Acid (Stabilizer)	30 to 50 ppm
Total Alkalinity	80 to 120 ppm
Calcium Hardness	200 to 400 ppm
Metals	0 ppm
Saturation Index	-.2 to .2 (0 best)

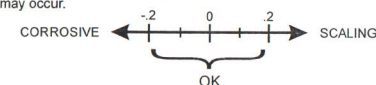
Saturation index

The saturation index (Si) relates to the calcium and alkalinity in the water and is an indicator of the pool water "balance". Your water is properly balanced if the Si is $0 \pm .2$. If the Si is below -0.2 , the water is corrosive and plaster pool walls will be dissolved into the water. If the Si is above $+0.2$, scaling and staining will occur. Use the chart below to determine the saturation index.

$$Si = pH + Ti + Ci + Ai - 12.1$$

°C	°F	Ti	Calcium Hardness	Ci	Total Alkalinity	Ai
12	53	.3	75	1.5	75	1.9
16	60	.4	100	1.6	100	2.0
19	66	.5	125	1.7	125	2.1
24	76	.6	150	1.8	150	2.2
29	84	.7	200	1.9	200	2.3
34	94	.8	250	2.0	250	2.4
39	103	.9	300	2.1	300	2.5
			400	2.2	400	2.6
			600	2.4	600	2.8
			800	2.5	800	2.9

How to use: Measure pool pH, temperature, calcium hardness, and total alkalinity. Use the chart above to determine Ti, Ci, and Ai from your measurements. Insert values of pH, Ti, Ci and Ai into the above equation. If Si equals .2 or more, scaling and staining may occur. If Si equals -0.2 or less corrosion or irritation may occur.





Salt Level

Use the chart on page 11 to determine how much salt in pounds or (Kgs) need to be added to reach the recommended levels. Use the tables below (measurements are in feet/gallons and meters/liters) if pool size is unknown.

**Round Above Ground Pools
(Diameter)**

15 ft	5,310 gallons
18 ft	7,640 gallons
21 ft	10,400 gallons
24 ft	13,600 gallons
27 ft	17,200 gallons
28 ft	18,500 gallons
30 ft	21,420 gallons

Oval Above Ground Pools

12' x 24'	4,500 gallons
15' x 24'	9,650 gallons
15' x 25'	10,050 gallons
15' x 30'	12,060 gallons
16' x 24'	10,290 gallons
16' x 32'	13,720 gallons
18' x 33'	15,900 gallons
18' x 36'	17,370 gallons

	Gallons (pool size in feet)	Liters (pool size in meters)
Rectangular	Length x Width x Average Depth x 7.5	Length x Width x Average Depth x 1000
Round	Diameter x Diameter x Average Depth x 5.9	Diameter x Diameter x Average Depth x 785
Oval	Length x Width x Average Depth x 6.7	Length x Width x Average Depth x 893

The recommended salt level is between 2700-3400 ppm (parts per million) with 3200 ppm being ideal. If the level is low, determine the number of gallons in the pool and add salt according to the chart on page 11. A low salt level will reduce the efficiency of the Salt & Swim and result in low chlorine production. A high salt level can cause the Salt & Swim to shutdown and may begin to give a salty taste to your pool (generally, the salt will begin to be tasted at a level of about 3500-4000 ppm). The salt in your pool is constantly recycled and the loss of salt throughout the swimming season should be small. This loss is due primarily to the addition of water because of splashing, backwashing, or draining (because of rain). Salt is not lost due to evaporation.

Type of Salt to Use

It is important to use only sodium chloride (NaCl) salt that is greater than 99% pure. This is common food quality or water softener salt and is usually available in 40-80 lb. bags labeled "Coarse Solar Salt" or "Pool Salt". It is also acceptable to use water conditioning salt pellets, however, it will take longer for them to dissolve. Do not use rock salt, salt with yellow prussiate of soda, salt with anti-caking additives, or iodized salt.

How to Add or Remove Salt

For new plaster pools, wait 10-30 days (check with your local pool professional) before adding salt to allow the plaster to cure. Turn the circulating pump on and add salt directly into the pool. Brush the salt around to speed up the dissolving process--do not allow salt to pile up on the bottom of the pool. Run the filter pump for 24 hours with the suction coming from the main drain (use pool vac if there is no main drain) to allow the salt to evenly disperse throughout the pool.



The only way to lower the salt concentration is to partially drain the pool and refill with fresh water.

Always check stabilizer (cyanuric acid), when checking salt. These levels will most likely decline together. Use the chart on page 12 to determine how much stabilizer must be added to raise the level to 40 ppm.

POUNDS and (Kg) of SALT NEEDED FOR 3200PPM

Current salt level ppm	Gallons and (Liters) of Pool Water								
	8,000 (30,000)	10,000 (37,500)	12,000 (45,000)	14,000 (52,500)	16,000 (60,000)	18,000 (67,500)	20,000 (75,000)	22,000 (82,500)	23,000 (86,000)
0	213 (97)	267 (121)	320 (145)	373 (170)	427 (194)	480 (218)	533 (242)	587 (267)	613 (279)
200	200 (91)	250 (114)	300 (136)	350 (159)	400 (182)	450 (205)	500 (227)	550 (250)	575 (261)
400	187 (85)	233 (106)	280 (127)	327 (148)	373 (170)	420 (191)	467 (212)	513 (233)	536 (244)
600	173 (79)	217 (98)	260 (118)	303 (138)	347 (158)	390 (177)	433 (197)	477 (217)	498 (227)
800	160 (73)	200 (91)	240 (109)	280 (127)	320 (145)	360 (164)	400 (182)	440 (200)	460 (209)
1000	147 (67)	183 (83)	220 (100)	257 (117)	293 (133)	330 (150)	367 (167)	403 (183)	422 (192)
1200	133 (61)	167 (76)	200 (91)	233 (106)	267 (121)	300 (136)	333 (152)	367 (167)	382 (175)
1400	120 (55)	150 (68)	180 (82)	210 (95)	240 (109)	270 (123)	300 (136)	330 (150)	345 (157)
1600	107 (48)	133 (61)	160 (73)	187 (85)	213 (97)	240 (109)	267 (121)	293 (133)	307 (139)
1800	93 (42)	117 (53)	140 (64)	163 (74)	187 (85)	210 (95)	233 (106)	257 (117)	268 (125)
2000	80 (36)	100 (45)	120 (55)	140 (64)	160 (73)	180 (82)	200 (91)	220 (100)	230 (104)
2200	67 (30)	83 (38)	100 (45)	117 (53)	133 (61)	150 (68)	167 (76)	183 (83)	192 (87)
2400	53 (24)	67 (30)	80 (36)	93 (42)	107 (48)	120 (55)	133 (61)	147 (67)	154 (70)
2600	40 (18)	50 (23)	60 (27)	70 (32)	80 (36)	90 (41)	100 (45)	110 (50)	115 (53)
2800	27 (12)	33 (15)	40 (18)	47 (21)	53 (24)	60 (27)	67 (30)	73 (33)	77 (35)
3000	13 (6)	17 (8)	20 (9)	23 (11)	27 (12)	30 (14)	33 (15)	37 (17)	39 (18)
3200	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal
3400	OK	OK	OK	OK	OK	OK	OK	OK	OK
3600+	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute