SALT GENERATOR FOR ABOVEGROUND POOLS

Installation and Operation Manual

IMPORTANT SAFETY INSTRUCTIONS

- When using electrical equipment, basic safety precautions should always be exercised, including the following:

READ AND FOLLOW ALL INSTRUCTIONS

- Disconnect all AC power during installation.
- Do not permit children to use this product.
- A green colored screw is located inside the wiring compartment, against the back panel. To reduce the risk of electric shock, this terminal must be connected to the grounding means provided in the electric supply service panel with a continuous copper wire equivalent in size to the circuit conductors supplying the equipment.
- One bonding lug for US models (two for Canadian models) is provided on the external surface. To reduce the risk of electric shock, connect the local common bonding grid in the area of the swimming pool, spa, or hot tub to these terminals with an insulated or bare copper conductor not smaller than 8 AWG US/6 AWG Canada.
- All field-installed metal components such as rails, ladders, drains, or other similar hardware located within 10 feet (3 meters) of the pool, spa or hot tub shall be bonded to the equipment grounding bus with copper conductors not smaller than 8 AWG US/ 6 AWG Canada.

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WARRANTY

OPERATION

- The SPS is an automatic chlorine generation system for pool & spa sanitation designed specifically for above ground pools. The operation requires a low concentration of salt (sodium chloride) in the pool water at levels low enough that it normally cannot be tasted. SPS automatically sanitizes your pool by converting the salt into free chlorine, which kills bacteria and algae in the pool, through a process called electrolysis.
- SPS is designed to handle the purification needs of the average residential swimming pool up to 20,000 gallons (75,000 liters). The actual amount of chlorination required to properly sanitize a pool varies depending upon bather load, rainfall, air temperature, water temperature, pool's exposure to sunlight, pool's surface, and cleanliness.

NOTE: **It is not recommended to use the SPS to generate Bromine. If your pool has natural stone as coping or decking, please check with a stone installation specialist for the maintenance of the stone before installing the SPS.**

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.**

IDEAL CHEMICAL LEVELS

Salt	3200 to 4000 ppm
Free Chlorine	1.0 to 3.0 ppm
pH	7.2 to 7.6
Cyanuric Acid (Stabilizer)	50 to 100 ppm
Total Alkalinity	80 to 120 ppm
Calcium Hardness	200 to 400 ppm
Metals	0 ppm
Saturation Index	-.2 to .2 -.5 to .5

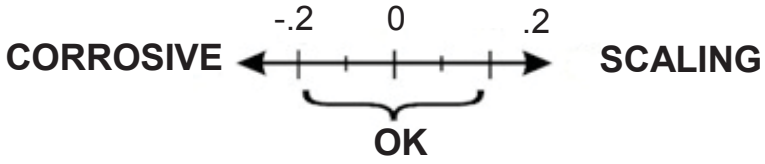
SATURATION INDEX

- 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 ±.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 on page 5 to determine the saturation index.

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

°C	°F	Ti	Calcium		Total Alkalinity	Ai
12	53	.3	75	1.5	75	1.9
16	60	.4	100	1.6	100	2.0
			125	1.7	125	2.1
19	66	.5	150	1.8	150	2.2
24	76	.6	200	1.9	200	2.3
			250	2.0	250	2.4
29	84	.7	300	2.1	300	2.5
34	94	.8	400	2.2	400	2.6
			600	2.4	600	2.8
39	103	.9	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 -.2 or less corrosion or irritation may occur.



SALT LEVEL

- Use the chart below to determine the amount of salt needs to be added to reach the recommended levels. Use the equations below to determine the size of your pool.

	GALLONS (Pool size feet)	LITERS (Pool size in meters)
Rectangular	Length×Width×Average Depth×7.5	Length×Width×Average Depth×1000
Round	Length×Width×Average Depth×5.9	Length×Width×Average Depth×785
Oval	Length×Width×Average Depth×6.7	Length×Width×Average Depth×893

- The ideal salt level is between 3200-4000 ppm. (parts per million) with 3600 ppm being the optimal level. Calculate the number of gallons in the pool and add salt according to the chart on page 8.
- A LOW salt level will reduce the efficiency of the SPS and result in low chlorine production.
- Excessively HIGH salt levels will cause the SPS to shut down, making pool water unsafe for bathers. LOW salt levels can cause the SPS to not operate efficiently, causing the same.

TYPE OF SALT TO USE

- It is important to use only sodium chloride (NaCl) that is 99% pure. This is common food quality or water softener salt which is available in 40-80 lb/bag at your local pool store. 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 more than 1% yellow prussiate of soda, salt with more than 1% of anti-caking additives, or iodized salt.

HOW TO ADD OR REMOVE SALT

- ABOVE GROUND POOLS WITH MAIN DRAINS: Add directly in front of the return jet to pool. Run the filter pump for 24 hours with the suction coming from the main drain to allow the salt to evenly disperse throughout the pool.
- ABOVE GROUND POOLS WITHOUT MAIN DRAINS: Add directly into the pool. Brush the salt to speed up the dissolving process—to not allow the salt to sit in a pile on the bottom of the pool (use the pool vacuum if there is no main drain) to allow the salt to evenly disperse throughout the pool).

ON ANY POOL, DO NOT ADD SALT DIRECTLY TO THE SKIMMERS OR DIRECTLY ONTO THE MAIN DRAIN. THIS WILL SHUT DOWN OR SHORTEN THE LIFE OF THE CELL DUE TO HIGH SALT CONCENTRATION AND REDUCED FLOW TO THE PUMP.

If added incorrectly, immediately turn off SPS for 24 hours with the pump and filter operating This will help to evenly distribute the salt. The salt display may take 24 hours to respond to the change in salt concentration.

SALT DOES NOT EVAPORATE FROM POOL

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

POUNDS AND (Kg) OF SALT NEEDED FOR 3600 PPM

- Gallons and (Liters) of Pool water

CURRENT SALT LEVEL PPM	6,000 (22,500)	8,000 (30,000)	10,000 (37,500)	12,000 (45,000)	14,000 (52,500)	16,000 (60,000)	18,000 (67,500)
0	180 (82)	239 (109)	301 (136)	360 (163)	419 (190)	481 (218)	540 (245)
200	170 (78)	226 (103)	284 (129)	340 (154)	396 (180)	454 (206)	510 (232)
400	160 (73)	213 (97)	267 (121)	320 (145)	373 (170)	427 (194)	480 (218)
600	150 (69)	200 (91)	250 (114)	300 (136)	350 (159)	400 (182)	450 (205)
800	140 (64)	187 (85)	233 (106)	280 (127)	327 (148)	373 (170)	420 (191)
1000	130 (59)	173 (79)	217 (98)	260 (118)	303 (138)	347 (158)	390 (177)
1200	120 (55)	160 (73)	200 (91)	240 (109)	280 (127)	320 (145)	360 (164)
1400	110 (51)	147 (67)	183 (83)	220 (100)	257 (117)	293 (133)	330 (150)
1600	100 (46)	133 (61)	167 (76)	200 (91)	233 (106)	267 (121)	300 (136)
1800	90 (41)	120 (55)	150 (68)	180 (82)	210 (95)	240 (109)	270 (245)
2000	80 (36)	107 (48)	133 (61)	160 (73)	187 (85)	213 (97)	240 (109)
2200	70 (32)	93 (42)	117 (53)	140 (64)	163 (74)	187 (85)	210 (95)
2400	60 (27)	80 (36)	100 (45)	120 (55)	140 (64)	160 (73)	180 (82)
2600	50 (23)	67 (30)	83 (38)	100 (45)	117 (53)	133 (61)	150 (68)
2800	40 (18)	53 (24)	67 (30)	80 (36)	93 (42)	107 (48)	120 (55)
3000	30 (14)	40 (18)	50 (23)	60 (27)	70 (32)	80 (36)	90 (41)
3200	OK	OK	OK	OK	OK	OK	OK
3400	OK	OK	OK	OK	OK	OK	OK
3600	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal
3800	OK	OK	OK	OK	OK	OK	OK
4000	OK	OK	OK	OK	OK	OK	OK
4200+	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute

STABILIZER (CYANURIC ACID)

- Always test for stabilizer (cyanuric acid) level, when testing for salt. This test should be done at least once per month. Use the chart below to determine how much stabilizer must be added to raise the level to 80 ppm .

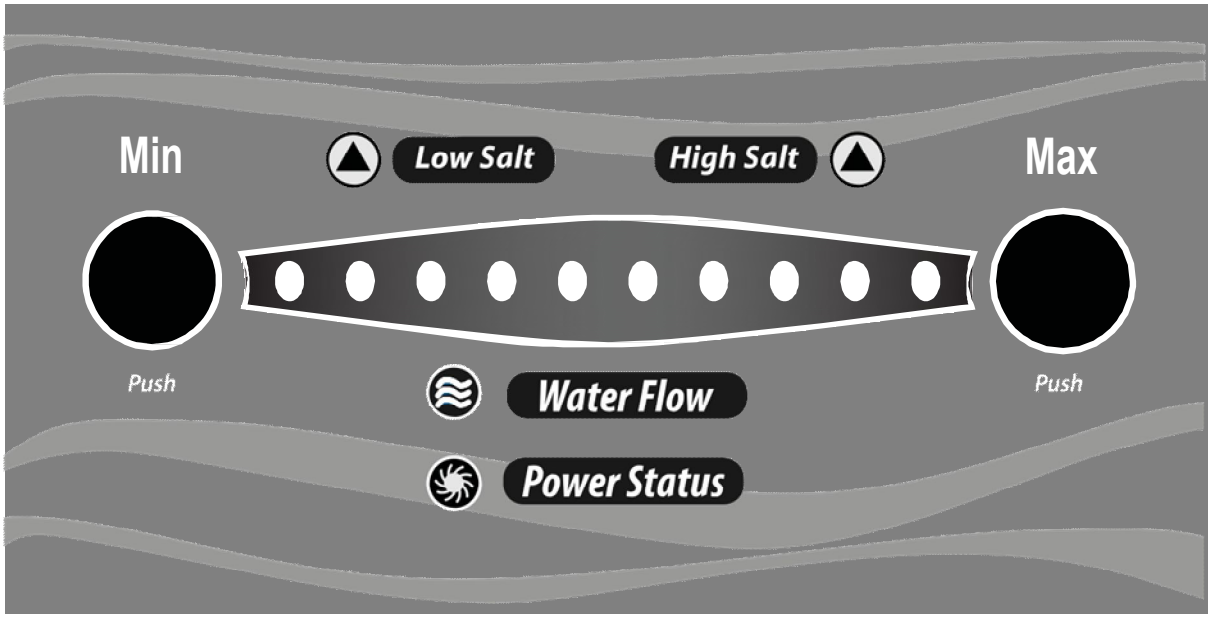
POUNDS AND (Kg) OF STABILIZER (CYANURIC ACID) NEEDED FOR 80 ppm

- Gallons and (Liters) of Pool water

CURRENT STABILIZER LEVEL (ppm)	6,000 (22,500)	8,000 (30,000)	10,000 (37,500)	12,000 (45,000)	14,000 (52,500)	16,000 (60,000)	18,000 (67,500)
0	4.0 (1.8)	5.3 (2.4)	6.7 (3.0)	8.0 (3.6)	9.4 (4.3)	10.7 (4.9)	12.0 (5.4)
10 ppm	3.5 (1.6)	4.7 (2.1)	5.8 (2.6)	7.0 (3.2)	8.2 (3.7)	9.4 (4.3)	10.5 (4.8)
20 ppm	3.0 (1.4)	4.0 (1.8)	5.0 (2.3)	6.0 (2.7)	7.0 (3.2)	8.0 (3.6)	9.0 (2.2)
30 ppm	2.5 (1.1)	3.3 (1.5)	4.2 (1.9)	5.0 (2.3)	5.9 (2.7)	6.7 (3.0)	7.5 (3.4)
40 ppm	2.0 (.9)	2.7 (1.2)	3.3 (1.5)	4.0 (1.8)	4.7 (2.1)	5.4 (2.4)	6.0 (2.7)
50 ppm	1.5 (.7)	2.0 (.9)	2.5 (1.1)	3.0 (1.4)	3.5 (1.6)	4.0 (1.8)	4.5 (2.0)
60 ppm	1.0 (.5)	1.3 (.6)	1.7 (.8)	2.0 (.91)	2.4 (1.1)	2.7 (1.2)	3.0 (1.4)
70 ppm	0.5 (.2)	0.7 (.3)	0.8 (.4)	1.0 (.45)	1.2 (.54)	1.4 (.64)	1.5 (.68)
80 ppm	0.0	0.0	0.0	0.0	0.0	0.0	0.0

POLYMERS

- It is advised to use polymers (commonly sold as poly algaecide) when using salt water sanitizing systems. The poly algaecide is sold in 30% and 60% concentrations.
- Application rate is 1 quart of Poly30 (or ½ quart of Poly 60) per 15,000 gallons (60,000 liters) of pool water, per month. Apply directly in front of the return jet.



CONTROLS

SPS aboveground Salt Generators have an Auto control system with a very simple operation.

- **DESIRED LEVEL:** There are 10 LEDS, each LED is 10%, chose the “desired level %” by pressing Min to decrease or Max to increase. The SPS will produce chlorine according to the “Desired Level %” adjustment setting for the entire filter cycle.
- **MAX:** Press Max to increase the level up to 100%, when you have an abnormally high bather load, heavy rainfall, cloudy water conditions, or any other condition which requires that a large amount of purification be introduced, Push Max until all 10 LEDS ARE ON. This electronically “Max chlorinates” (shocks) the water for 24 hours (filter pump must be on during this time) or until the power has been turned off, whichever comes first. **At the end of the Max chlorination period, be sure to push Min to decrease level back to the desired level position**.
- **MIN:** Press Min to decrease the desired level. When all of the 10 LEDs are OFF, it will prevent the SPS from energizing the electrolytic cell. In this position there is no chlorine generation.
- **LOW SALT:** When flashing, the salt level is low (below 2500 ppm) and SPS is generating at low efficiency. When illuminated steady, the salt level is too low and SPS has shut down.

NOTE: In times of servicing, the OFF switch is not to be used. To service the SPS, turn power off at circuit breaker.

INDICATOR LED

- **POWER:** When LED is on the SPS has input power.
- **NO FLOW:** When illuminated, the flow switch has detected no flow and SPS is NOT generating chlorine. A flashing LED indicates that the flow is restored, but there will be a 60 second delay before generation is reestablished.
- **LOW SALT:** When flashing, the salt level is low (below 2500 ppm) and SPS is generating at low efficiency. When illuminated steady, the salt level is too low and SPS has shut down.
- **Note:** Before adding large quantities of salt, it is advisable to have your salt level professionally checked.
- **Note:** If the Salt level is at the correct level but the LOW SALT LEVEL is still on, the cell has to be replaced.
- **HIGH SALT:** When illuminated the salt level is around 4200 ppm. When illuminated steady, salt level is higher than 4200 ppm and SPS has shut down. The pool water must be diluted with fresh water before operation is restored.

OPERATION

By familiarizing yourself with the operation of the SPS generator, you can achieve maximum performance for your pool. When chemical levels are in the recommended range, there are FOUR factors that you can control which directly contribute to the amount of chlorine the SPS will generate:

- Filter time each day (hours)
- The amount of salt in the pool
- The “Desired Level %” setting
- Stabilizer level in the water.

To find the optimum “Desired Level %” setting, start at a fairly high setting and work downward. It will take a few days of adjustments to find the ideal setting for your pool. Once determined, it should only take minor adjustments. The SPS control will not produce chlorine at temperatures below 50°F. If your pool water is colder than 50°F, you must chlorinate manually.

MAINTAINING THE SYSTEM

- To maintain maximum performance, it is recommended that you remove and visually inspect the cell every 3 months.
- The SPS electrolytic cell has a self-cleaning feature incorporated into the electronic control’s logic. In most cases this self-cleaning action will keep the cell working at optimum efficiency. In areas where water is hard (high calcium and/or mineral content) and in pools where the water chemistry has gotten “out of balance”, the cell may require periodic cleaning every 3 months. After cleaning, if the LOW SALT is always ON even with a good salt level, the cell may be worn and require replacement.

SERVICING AND CLEANING THE CELL

- Turn off power to the SPS before removing the CELL.
- Once removed, look inside the cell and inspect for scale formation (light colored crusty or flaky deposits) on the plates and for any debris that has passed through the filter and gotten 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 to scrape deposits off of the plates. DO NOT USE A METAL SCRAPER AS THIS WILL SCRATCH THE FINISH AND DAMAGE THE 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 will need to clean the cell more frequently. The simplest way to avoid this is to bring the pool chemistry to recommended levels, as specified on page 5.

MILD ACID WASHING

Use only in severe cases where flushing and scraping will not remove the majority of deposits. To acid wash:

- Turn off power to SPS.
- Remove cell from piping.
- In a clean plastic container, carefully mix a 4:1 solution of water to muriatic acid (one gallon of water to one quart of muriatic acid).

NOTE: **Always pour acid into water (Never pour water into acid)**
Be sure to wear protective glasses, clothing and chemical resistant gloves

- The level of the solution in the container should just reach the top of the cell so that the wire harness compartment is NOT submerged. It may be helpful to coil the wiring before immersing the cell.
- The cell should soak for FIVE minutes, then rinse with a high-pressure garden hose.
- If any deposits are still visible, repeat soaking and rinsing.
- Replace cell and inspect again periodically.

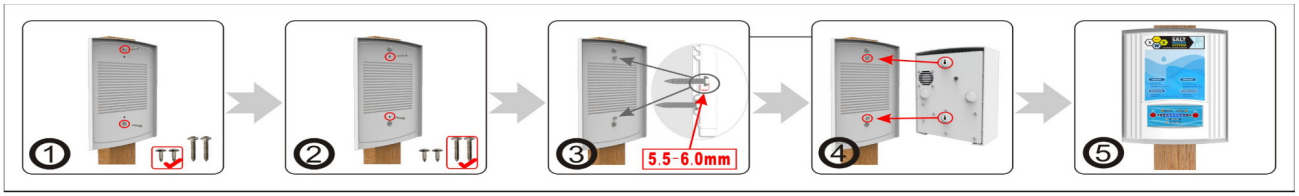
WINTERIZING

- The SPS electrolytic cell and flow detection switch will be damaged by freezing water, similar to other pool components that require proper winterization. In areas of the country that 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 electronic control is capable of withstanding any winter weather and should not be removed.

HORAS DE FILTRACIÓN	VOLUMEN PISCINA m^3							
	25	50	75	100	125	150	175	200
4	15 g/h	25 g/h						
6	10 g/h	20 g/h	25 g/h	35 g/h				
8	10 g/h	15 g/h	20 g/h	25 g/h	35 g/h	35 g/h		
10			15 g/h	20 g/h	25 g/h	35 g/h	35 g/h	
12				20 g/h	25 g/h	25 g/h	35 g/h	35 g/h

En base al número de horas que depura la piscina y el volumen de agua en una instalación con pocos bañistas obtengo la producción necesaria en el clorador de piscina privada o familiar

MOUNTING THE SPS CONTROL



SPRING START-UP

- DO NOT turn SPS on, until the pool water chemistry has been balanced to proper levels.

INSTALLATION

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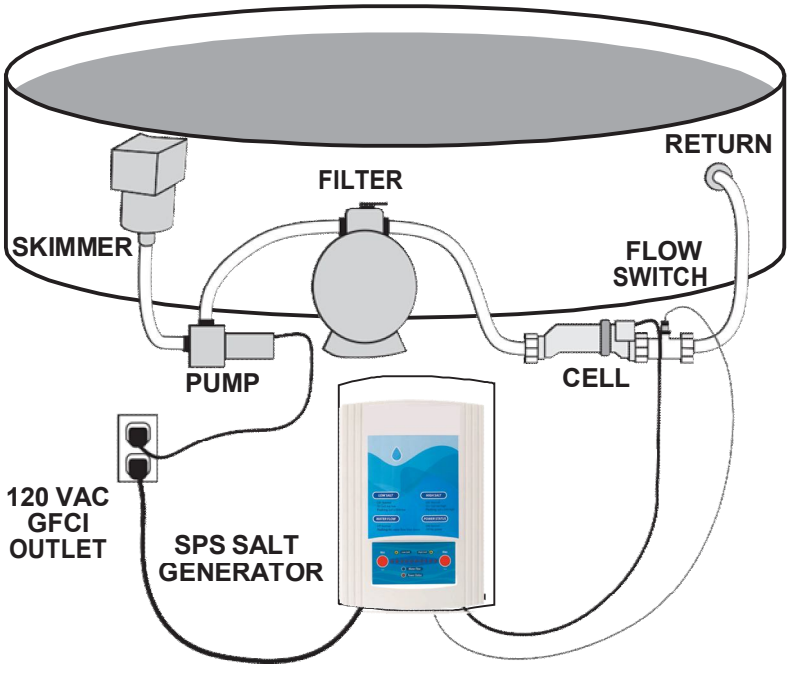
- The electronic control is capable of withstanding any winter weather and should not be removed.

- The SPS control panel must be mounted a minimum of 5 ft. (2 meters) horizontal distance (or more if local codes require) from the pool.
- The control is designed to mount vertically on a flat surface with the knockouts facing downward and not to block the four sides of the control.
- Do not mount the SPS in a panel or tightly enclosed space.

PLUMBING

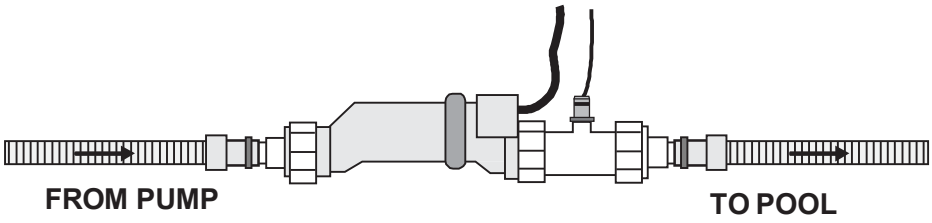


- The cell and flow switch are plumbed in the return line to the pool. Install after all the pool equipment (filter, heater, solar, etc.). The kit included in the SPS provides the necessary plumbing components for either 1½" (38 mm) rigid PVC piping glue installation or 1½" (38mm) threaded installation.

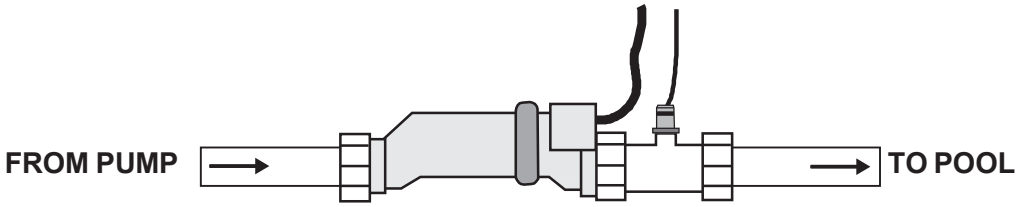
HOSE PIPE INSTALLATIONS (-HP Option)

- Install the cell and flow switch as shown in the diagrams below. Always make sure that the flow switch is after the cell. When using the hose adaptors, remove the O-ring from the pipe union tailpiece and install them in the hose tailpieces. Tighten all union nuts BY HAND for a watertight seal.

HOSE ASSEMBLY



PIPE ASSEMBLY



WIRING

- Power must be turned off before performing any wiring. Be sure to follow Local and NEC electrical codes. To provide safe operation, SPS must be properly grounded and bonded.

INPUT POWER

- Wire the SPS to the LOAD SIDE of the filter pump timer. **It is very important that the SPS is powered only when the pump is running.**

ELECTROLYTIC CELL AND FLOW SWITCH

- The electrolytic cell and flow switch cables are terminated with connectors that plug into the SPS for easy attachment and removal. The flow switch plugs into a connector (similar to a telephone jack) located outside, on the bottom of the enclosure.

TROUBLESHOOTING

1 "Power" LED not on

Check to make sure 120V AC input power is connected to the control. Verify input voltage with a voltmeter. If there is input power, the fuse may have blown. The board is protected by a 5 amp mini ATO fuse located on the circuit board above the cell connector.

2 "No Flow" LED illuminated or flashing

The SPS has sensed a no flow condition and has stopped generating chlorine. Check that the flow switch is plugged into the connector on the bottom of the control unit and that the wire is not cut or damaged. Make sure you have at least 12" of straight pipe before the flow switch. If there is adequate flow and the LED is still on, check that the arrows on the flow switch are pointing in the direction of flow.

3 LOW SALT LED illuminated or flashing

Check salt level in pool. If salt level is low, add salt according to chart on page 8. Before adding large quantities of salt, it is advisable to have your salt level professionally checked.

NOTE: If salt level is correct after the cleaning of the cell but the LOW SALT LED still ON, the cell may be worn and needs replacement.

4 High Salt LED illuminated or flashing

Check salt level in pool. If salt level is too high, lower salt level by draining some of the pool water out of the pool and replace with fresh water. Continue until the salt concentration is at recommended levels.

5 Replace the new cell

Remove and inspect the cell for scale. If the cell is scaled, follow the directions on page 12 for cell cleaning. If the pool has the proper amount of salt and the LOW SALT LED is still illuminated, the cell may be depleted and needs to be replaced.

6 Possible causes of low chlorine or no chlorine

- SPS switch in OFF position.
- Desired Level% adjustment setting is too low.
- Low stabilizer (Cyanuric Acid).Chlorine is being produced but the pool water is unable to hold on to the chlorine, due to low stabilizer.
- Filter pump switched off or filter pump time too short (8 hours for average size pools, more for large pools).
- Salt level too low (below 2500 ppm, Low Salt LED on).
- Salt level too high (high Salt LED on).
- Low pH. Low pH oxidizes chlorine quickly, making it difficult to maintain desired chlorine levels. Adjust pH levels to re-balance water.
- Warm pool water increases chlorine demand—increase Desired Level% or filter run time.
- Cold water (below 50F) can cause SPS to stop generating
- Excessive scaling on cell.
- High level of phosphates in pool water.
- 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.