



# BLUEWORKS BLH Series

## ELECTRONIC CHLORINE GENERATOR

### Installation and Operation Manual

### IMPORTANT SAFETY INSTRUCTIONS

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

#### **Cautions:**

Please note, the total working hours for the T-Cell should be less than 8 hours total per day. If you are using a variable speed pump for 24 hours a day be sure to adjust the chlorine output to 25-30%. If the pump is only running 10 hours per day adjust the chlorine output between 60-80%.

You can use this calculation to calculate the appropriate chlorine output for your pool, suggest at 6 hours per day.

Pump running 24(Hours a day) \*25% (Chlorine Output) =6hr (cell run time per day at 25%).

Pump running 20(Hours a day) \*30% (Chlorine Output) =6hr (cell run time per day at 30%).

Pump running 15(Hours a day) \*40% (Chlorine Output) =6hr (cell run time per day at 40%).

Pump running 12(Hours a day) \*50% (Chlorine Output) =6hr (cell run time per day at 50%).

Pump running 8(Hours a day) \*75% (Chlorine Output) =6hr (cell run time per day at 75%).

Start the VS pump on a low speed and kick the speed up until the salt system works.

## **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 grounded by connecting a continuous copper wire, equivalent in size to the circuit conductors supplying the equipment. Use the means provided in the electric supply service panel to connect the terminal to the grounding.
- Includes one bonding lug for US models (two for Canadian models) located 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.

# SAVE THESE INSTRUCTIONS

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### **OPERATION**

The BLH is an automatic chlorine generation system for pool & spa sanitation. The operation requires a low concentration of salt (sodium chloride) in the pool water at levels low enough that it normally cannot be tasted. The BLH automatically sanitizes your pool by converting the salt into free chlorine, which kills bacteria and algae in the pool through a process called electrolysis.

The BLH is designed to handle the purification needs of the average residential swimming pool up to 40,000 gallons (150,000 liters). The actual amount of chlorination required to properly sanitize a pool varies depending upon the bather load, rainfall, air temperature, water temperature, pool's exposure to sunlight, pool's surface, and cleanliness.

**Note:** It is not recommended using the BLH 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 BLH.

### **WATER CHEMISTRY**

As with any pool, you must maintain proper water chemistry of the pool water. Proper water chemistry will include pH, alkaline content, and calcium levels. The only special requirement for the BLH is to maintain proper levels of salt and stabilizer. It is important to maintain these levels to prevent corrosion or scaling and to ensure maximum enjoyment of the pool, by testing your water periodically. It is recommended that pool water is professionally tested a minimum of twice per season. Your local pool store can provide you with the chemicals and procedures to adjust the water chemistry. Be sure to tell the pool store that you are using a salt-chlorine generator.

## IDEAL CHEMICAL LEVELS

<b>Salt</b>	<b>3000 to 4000 ppm</b>
<b>Free chlorine</b>	<b>1.0 to 3.0 ppm</b>
<b>pH</b>	<b>7.2 to 7.6</b>
<b>Cyanuric Acid (Stabilizer)</b>	<b>50 to 100 ppm</b>
<b>Total Alkalinity</b>	<b>80 to 120 ppm</b>
<b>Calcium Hardness</b>	<b>200 to 400 ppm</b>
<b>Metals</b>	<b>0 ppm</b>
<b>Saturation Index</b>	<b>-.2 to .2</b>

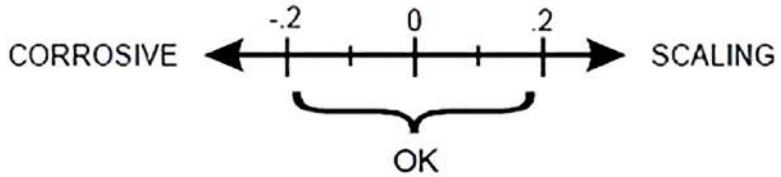
### Saturation index

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
			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.

	<b>Gallons</b> (pool size feet)	<b>Liters</b> (pool size in meters)
<b>Rectangular</b>	$\text{Length} \times \text{Width} \times \text{Average}$ $\text{Depth} \times 7.5$	$\text{Length} \times \text{Width} \times \text{Average}$ $\text{Depth} \times 1000$
<b>Round</b>	$\text{Diameter} \times \text{Diameter} \times \text{Average}$ $\text{Depth} \times 5.9$	$\text{Diameter} \times \text{Diameter} \times \text{Average}$ $\text{Depth} \times 785$
<b>Oval</b>	$\text{Length} \times \text{Width} \times \text{Average}$ $\text{Depth} \times 6.7$	$\text{Length} \times \text{Width} \times \text{Average}$ $\text{Depth} \times 893$

- The ideal salt level is between 3000-4000 ppm. (parts per million) with 3400 ppm being the optimal level. Calculate the number of gallons in the pool and add salt according to the chart on page 10.
- A LOW salt level will reduce the efficiency and result in low chlorine production,



making the pool water unsafe for swimmers.

- Excessively HIGH salt levels will cause the BLH to shut down, making pool water unsafe for swimmers.

### **Type of Salt to Use**

It is important to use only sodium chloride (NaCl) that is 99% pure. This is a common food seasoning or water softener salt available in 40-80-pound bags, at your local 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 in your pool water. It is recommended to use salt with more than 1% of yellow prussiate of soda (sodium ferrocyanide), salt with more than 1% of anti-caking additives, or iodized salt.

### **How to Add or Remove Salt**

- IN GROUND POOLS: Turn the filter pump on and add the salt directly into the pool at the shallow end.
- 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 (use the pool vacuum if there is no 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. -----ELIMINATE THE FOLLOWING--(Run the filter pump for 24 hours with the suction coming from the main drain (use the pool vacuum if there is no main drain) to allow the salt to evenly disperse throughout the pool).

DO NOT ADD SALT DIRECTLY TO THE SKIMMERS OR DIRECTLY INTO THE MAIN DRAIN, ON ANY Pool. 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 the BLH for 24 hours with the pump and filter still

operating. This will help to evenly distribute the salt. The salt display may up to 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 3400 PPM**

**Gallons and (Liters) of Pool/Spa water**

### **STABILIZER (CYANURIC ACID)**

**POUNDS and (Kg) OF SALT NEEDED FOR 3200 PPM**

Current salt level ppm	Gallons and (Liters) of Pool/Spa 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)	24,000 (90,000)	26,000 (97,500)	28,000 (105,000)	30,000 (112,500)	32,000 (120,000)	34,000 (127,500)	36,000 (135,000)	38,000 (142,500)	40,000 (150,000)
0	213 (97)	207 (97)	320 (121)	427 (164)	480 (184)	533 (201)	587 (221)	640 (241)	693 (261)	747 (281)	800 (301)	854 (321)	907 (341)	960 (361)	1013 (381)	1067 (401)	1167 (431)
200	200 (81)	250 (91)	300 (114)	350 (136)	400 (158)	450 (180)	500 (202)	550 (224)	600 (246)	650 (268)	700 (290)	750 (312)	800 (334)	850 (356)	900 (378)	950 (400)	1000 (422)
400	187 (85)	233 (100)	280 (127)	327 (140)	373 (151)	419 (161)	465 (172)	511 (183)	557 (194)	603 (205)	649 (216)	695 (227)	741 (238)	787 (249)	833 (260)	879 (271)	933 (282)
600	173 (78)	217 (98)	260 (118)	303 (143)	347 (168)	390 (193)	433 (218)	477 (243)	520 (268)	563 (293)	607 (318)	650 (343)	693 (368)	737 (393)	780 (418)	823 (443)	867 (468)
800	160 (70)	200 (91)	240 (109)	280 (127)	320 (145)	360 (163)	400 (181)	440 (199)	480 (217)	520 (235)	560 (253)	600 (271)	640 (289)	680 (307)	720 (325)	760 (343)	800 (361)
1000	147 (67)	183 (83)	220 (100)	257 (111)	293 (133)	330 (150)	367 (167)	403 (183)	440 (200)	477 (217)	513 (233)	550 (250)	587 (267)	623 (283)	660 (300)	697 (317)	733 (333)
1200	133 (61)	167 (81)	200 (97)	233 (108)	267 (121)	300 (138)	333 (152)	367 (167)	400 (182)	433 (197)	467 (212)	500 (227)	533 (242)	567 (257)	600 (272)	633 (288)	667 (304)
1400	120 (55)	150 (68)	180 (82)	210 (96)	240 (109)	270 (123)	300 (136)	330 (150)	360 (164)	390 (177)	420 (191)	450 (205)	480 (219)	510 (232)	540 (246)	570 (260)	600 (273)
1600	107 (48)	133 (61)	160 (75)	187 (85)	213 (97)	240 (109)	267 (121)	293 (133)	320 (145)	347 (158)	373 (170)	400 (182)	427 (195)	453 (207)	480 (219)	507 (231)	533 (243)
1800	93 (42)	117 (53)	140 (64)	163 (74)	187 (85)	210 (95)	233 (106)	257 (117)	280 (127)	303 (138)	327 (148)	350 (159)	373 (169)	397 (180)	420 (190)	443 (201)	467 (211)
2000	80 (36)	100 (45)	120 (55)	140 (64)	160 (73)	180 (82)	200 (91)	220 (100)	240 (109)	260 (118)	280 (127)	300 (136)	320 (145)	340 (154)	360 (163)	380 (172)	400 (181)
2200	67 (30)	83 (36)	100 (43)	117 (50)	133 (57)	150 (64)	167 (71)	183 (78)	200 (85)	217 (92)	233 (100)	250 (107)	267 (114)	283 (121)	300 (128)	317 (135)	333 (142)
2400	53 (24)	67 (30)	80 (35)	93 (42)	107 (49)	120 (56)	133 (63)	147 (70)	160 (77)	173 (84)	187 (91)	200 (98)	213 (105)	227 (112)	240 (119)	253 (126)	267 (133)
2600	46 (21)	50 (23)	60 (27)	70 (30)	80 (34)	90 (38)	100 (42)	110 (46)	120 (50)	130 (54)	140 (58)	150 (62)	160 (66)	170 (70)	180 (74)	190 (78)	200 (82)
2800	27 (12)	33 (15)	40 (17)	47 (20)	53 (23)	60 (26)	67 (29)	73 (31)	80 (34)	87 (37)	93 (40)	100 (43)	107 (46)	113 (49)	120 (52)	127 (55)	133 (58)
3000	13 (6)	17 (8)	20 (9)	23 (10)	27 (11)	30 (12)	33 (14)	37 (15)	40 (16)	43 (17)	47 (18)	50 (19)	53 (20)	57 (21)	60 (22)	63 (23)	67 (24)
3200	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal
3400	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
3600+	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute	Dilute

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/Spa water**

POUNDS and (Kg) OF STABILIZER (CYANURIC ACID) NEEDED FOR 80 PPM

Current Stabilizer Level (ppm)	Gallons and (Liters) of Pool/Spa 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)	24,000 (90000)	26,000 (97500)	28,000 (105000)	30,000 (112500)	32,000 (120000)	34,000 (127500)	36,000 (135000)	38,000 (142500)	40,000 (150000)			
0 ppm	5.3 (3.6)	6.7 (4.3)	8.0 (4.3)	9.4 (4.3)	10.7 (4.9)	12.0 (5.4)	13.4 (5.1)	14.7 (6.7)	16.0 (7.3)	17.3 (7.9)	18.7 (8.5)	20.0 (9.1)	21.3 (9.7)	22.7 (10.3)	24.0 (10.9)	25.3 (11.5)	26.7 (12.0)			
10 ppm	4.7 (3.2)	5.8 (3.7)	7.0 (3.2)	8.2 (3.7)	9.4 (4.3)	10.5 (4.8)	11.7 (5.3)	12.9 (5.9)	14.0 (6.4)	15.2 (6.9)	16.4 (7.4)	17.2 (8.0)	18.7 (8.5)	19.8 (9.0)	21.0 (9.5)	22.2 (10.0)	23.3 (10.5)			
20 ppm	4.0 (2.7)	5.0 (3.2)	6.0 (3.2)	7.0 (3.2)	8.0 (3.6)	9.0 (4.2)	10.0 (4.5)	11.0 (5.0)	12.0 (5.4)	13.0 (5.9)	14.0 (6.4)	15.0 (6.8)	16.0 (7.2)	17.0 (7.7)	18.0 (8.1)	19.0 (8.6)	20.0 (9.0)			
30 ppm	3.3 (2.3)	4.2 (2.7)	5.0 (2.3)	5.8 (2.7)	6.7 (3.0)	7.5 (3.4)	8.4 (3.8)	9.2 (4.2)	10.0 (4.5)	10.8 (4.9)	11.7 (5.2)	12.5 (5.8)	13.3 (6.0)	14.2 (6.3)	15.0 (6.7)	15.8 (7.1)	16.7 (7.5)			
40 ppm	2.7 (1.8)	3.3 (2.1)	4.0 (1.8)	4.7 (2.1)	5.4 (2.4)	6.0 (2.7)	6.7 (3.0)	7.4 (3.3)	8.0 (3.6)	8.7 (3.9)	9.3 (4.2)	10.0 (4.5)	10.7 (4.8)	11.3 (5.1)	12.0 (5.4)	12.7 (5.7)	13.3 (6.0)			
50 ppm	2.0 (1.4)	2.5 (1.6)	3.0 (1.4)	3.5 (1.6)	4.0 (1.8)	4.5 (2.0)	5.0 (2.3)	5.5 (2.5)	6.0 (2.7)	6.5 (2.9)	7.0 (3.2)	7.5 (3.4)	8.0 (3.6)	8.5 (3.9)	9.0 (4.1)	9.5 (4.3)	10.0 (4.5)			
60 ppm	1.3 (0.9)	1.7 (1.1)	2.0 (0.9)	2.3 (1.1)	2.7 (1.2)	3.0 (1.4)	3.3 (1.5)	3.7 (1.7)	4.0 (1.8)	4.3 (2.0)	4.7 (2.1)	5.0 (2.3)	5.3 (2.4)	5.7 (2.6)	6.0 (2.7)	6.3 (2.8)	6.7 (3.0)			
70 ppm	0.7 (0.48)	0.8 (0.54)	1.0 (0.45)	1.2 (0.54)	1.4 (0.64)	1.5 (0.68)	1.7 (0.77)	1.8 (0.82)	2.0 (0.91)	2.2 (1.0)	2.3 (1.1)	2.5 (1.2)	2.7 (1.2)	2.8 (1.3)	3.0 (1.3)	3.2 (1.4)	3.3 (1.5)			
80 ppm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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) on saltwater sanitizing systems. The poly algaecide is sold at 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**

**MAIN SWITCH**

- **AUTO:** For normal operation, the main switch should be left in the AUTO position.

In this position, the BLH will produce chlorine according to the “Desired Level %” adjustment setting for the entire filtering / pumping cycle.

- **SUPER CHLORINATE:** 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, set the Main Switch in the SUPER CHLORINATE position. This electronically “super 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 super chlorination period, be sure to put the switch back into the AUTO position.
- **OFF:** The OFF position, prevents the BLH from energizing the electrolytic cell. In this position there is no chlorine generation.

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

### **DESIRED OUTPUT LEVEL CONTROL**

This setting is used to control the amount of chlorine the BLH generates. Adjust this setting to increase or decrease the chlorine output level percentage. The reading is from 5 % output to 100% output capacity of the BLH.

### **INDICATOR LED**

- **POWER:** When illuminated solid, the BLH has input power.
- **GENERATING:** This LED is illuminated solid during normal operation. When flashing, the pool water is too hot or cold to operate.
- **SUPER CHLORINATE:** Illuminates solid during Super Chlorination. See description above for more information.
- **REMOTE CONTROLLED:** This part is controlled by a remote-control system.
- **NO FLOW:** When illuminated, the flow switch has detected no flow and the BLH is NOT generating chlorine. A flashing LED indicates that the flow has been

restored, but there will be a 60-second delay before the generation is reestablished.

- **CHECK SALT:** When flashing, the salt level is low (below 2500ppm) and the BLH is generating at low efficiency. When illuminated solid, the salt level is too low and the BLH has shut down.

**Note:** Before adding large quantities of salt, it is advisable to have your salt level professionally checked.

- **HIGH SALT:** When illuminated, the salt level is too high and the BLH has shut down. The pool water must be diluted with fresh water before the system operation is restored.
- **INSPECT CELL:** If flashing, either the cell efficiency is reduced, or it is time for regularly scheduled cell inspection. In either case, inspect the cell and clean it if necessary. Pressing the “diagnostic” button next to the display for 3 seconds will stop the flashing LED. When illuminated steady, cell efficiency is greatly reduced and the BLH has stopped producing chlorine. Inspect, clean or replace if necessary.

## **SALT DISPLAY**

The Salt Display shows the current salt concentration of the pool water. Readings are in ppm (parts per million). If Metric units (grams per liter) are preferred, push the “diagnostic” button next to the display once. The display will now show the pool water temperature in degrees Fahrenheit. With the temperature displayed, move the main switch from AUTO to SUPER CHLORINATE to AUTO. **The temperature display will instantly change to degrees Celsius. Repeat this process to switch back to USA units (Fahrenheit).**

## **Diagnostic Displays**

Sequential pushes of the small "diagnostic" button next to the LCD-display will cause the system display the following information:

1. Pool temperature (xx degrees Fahrenheit or Celsius)

2. Cell voltage (typically 21.0 to 27.0 volts when chlorine is being generated, otherwise 16-25V)
3. Cell current (typically 2.50 to 7.80 amps when chlorine is being generated, otherwise 0 amps)
4. Desired Output % ("0%" -- "100%" depending on knob position or input from remote pool automation controller)
5. Instant salinity (-XXXX ppm) or (-X.XX grams/Liter)
6. Product name sent to the pool automation control display
7. Software revision level
8. Cell type.

On the 8th push of the button, the display will revert to the original default salt display. Also, if the button is not pushed for 30 seconds, the display will revert to the original default salt display.

## **OPERATION**

By familiarizing yourself with the operation of the BLH 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. These factors will directly impact the amount of chlorine the BLH will generate.

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

To find the optimum "Desired Level %" setting, start at a 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 to maintain the ideal setting. The BLH 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 BLH will remind you to do this by flashing the "Inspect Cell" LED

after approximately 500 hours of operation. After you inspect the cell (and clean, if necessary) press the small “diagnostic” button next to the display for 3 seconds to stop the flashing “Inspect Cell” LED and start the timer for the next 500-hour inspection period.

The BLH 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 quality 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. The “Inspect Cell” LED remains on after a thorough cleaning, the cell may be worn and may require replacement.

### **Servicing and Cleaning the cell**

- Turn off power to the BLH 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 still visible, 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 and remove from the plates. **DO NOT USE A METAL SCRAPER AS THIS WILL SCRATCH THE FINISH AND DAMAGE THE PLATES.** Note that any 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.

### **Mild Acid Washing:**

Use only in severe cases where flushing and scraping will not remove majority of deposits.

To acid wash:

- Turn off power to BLH.
- Remove the cell from the 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).

**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 BLH electrolytic cell and flow detection switch will be damaged by freezing water, like similar 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 can withstand any winter weather and should not be removed.

### **Spring Start-up**

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

## **INSTALLATION**

**Installation must be performed in accordance with and by following the Local NEC codes.**

Preparing Pool Water:

The pool's chemistry must be balanced BEFORE activating the BLH. It is recommended that you consult a pool professional for the initial balancing each season.

**NOTE:** At the beginning of each season, add metal remover and polymer-based algaecide to the pool, per manufacturer's instructions. This ensures a quick, trouble-free transfer to the BLH system.

### **Mounting the BLH Control**

The BLH is contained in a rain tight enclosure that is suitable for outdoor mounting. The control box must be mounted a minimum of 5 ft. (2 meters) the horizontal distance (or more if local codes require) from the pool/spa.

The control box is designed to mount vertically on a flat surface with the knockouts facing downward. Since 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 unit.

Do not mount the BLH in a panel or tightly enclosed space.

### **Plumbing**

Ensure that the BLH installation does not constitute a cross-connection with the local potable water supply, by consult local plumbing codes.

The cell and flow switch are plumbed in the return line to the pool. Install after (downstream) all the pool equipment (filter, heater, solar, etc.). The kit included in the BLH provides the necessary plumbing components for:

- 2" (51mm) rigid PVC piping installation for in-ground pools
- 1 1/2-1 1/4" (38-32mm) flexible hose connections for above ground pools

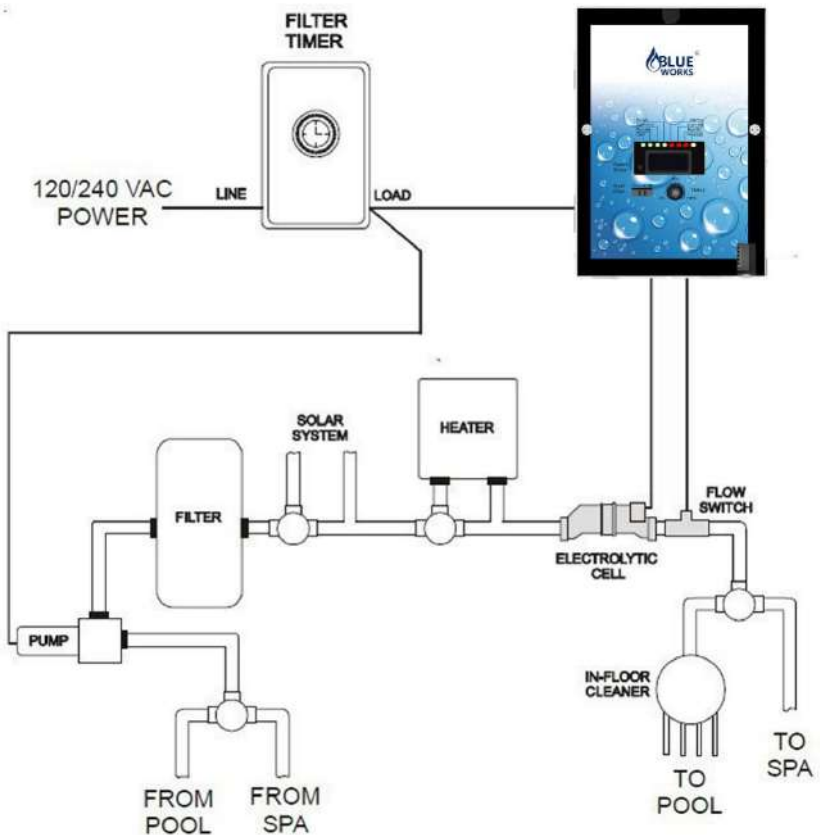
For proper plumbing, refer to the overview diagram below

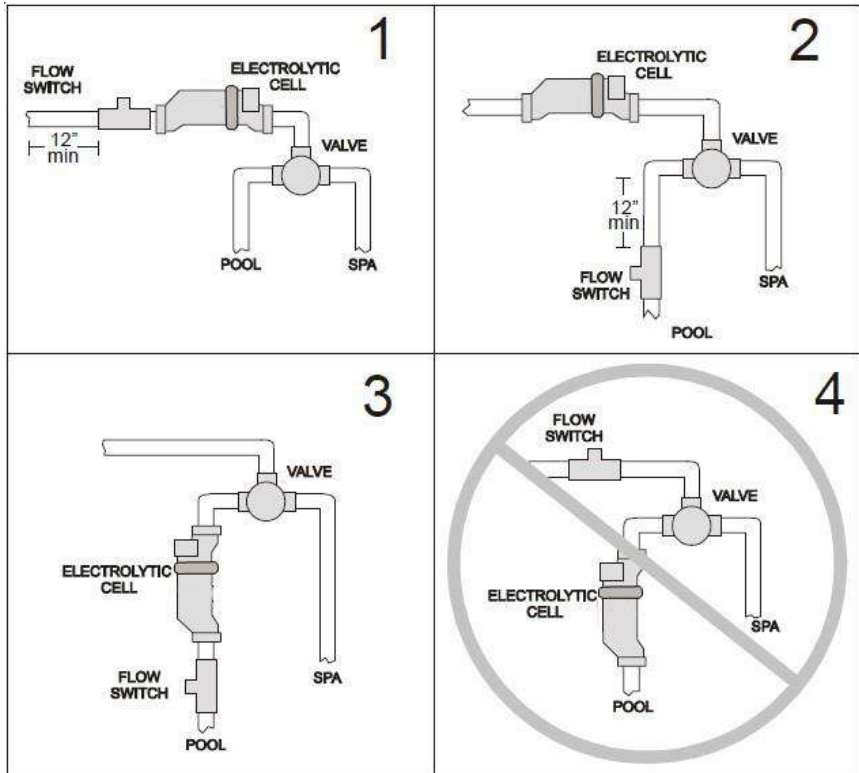
### **Flow switch:**

**IMPORTANT:** To ensure proper operation, verify that the arrow on the flow switch (located **on the side**) points in the same direction of water flow.

**Electrolytic Cell:**

Install using the unions provided. Tighten these by **HAND** for a watertight seal. For pool/spa combination systems with spillover, use configurations #2 or #3 below to allow chlorination for both the pool and spa during spillover but preventing over chlorination when operating the spa only.





### Wiring

Power must be turned off at the circuit breaker before performing any wiring. Be sure to follow Local and NEC electrical codes. To provide safe operation, the BLH must be properly grounded and bonded.

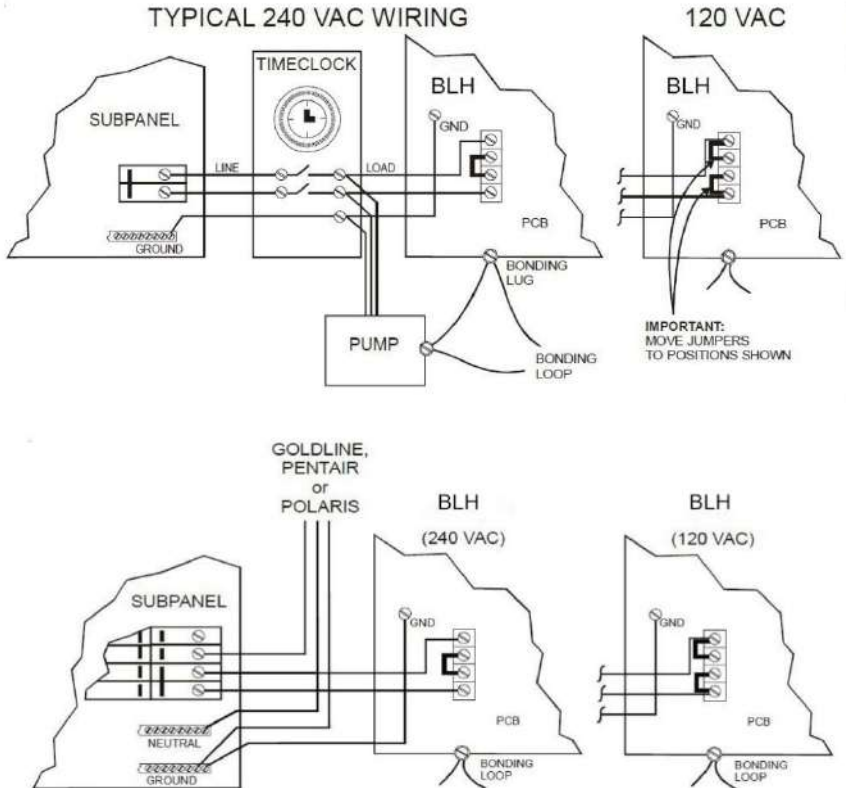
#### **Input Power for stand-alone operation:**

Wire the BLH to the LOAD SIDE of the filter pump timer. The BLH being powered only when the pump is running is extremely important.

Refer to the wiring label on the BLH as well as the diagram below, to determine correct wiring connections. The BLH is shipped from the factory with the configuration jumpers in a separate bag. Until the jumpers are installed for the desired voltage, the unit should NOT be

turned on.

- For Canadian models, the BLH shall be connected to a circuit protected by a class A ground fault interrupter. Be sure to connect the GROUND wire to the green ground screw terminal located on the INSIDE WALL of the enclosure.



**Note:** Wire the pump directly to the time clock—do not use the BLH as a junction box.

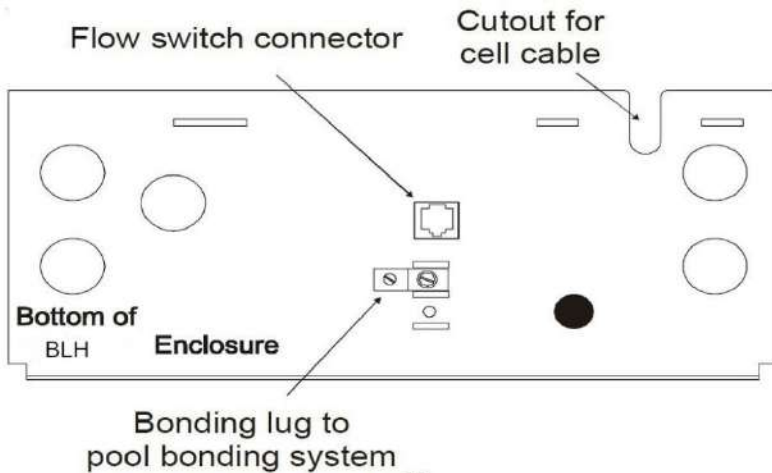
**Bonding:**

A lug used for bonding is attached to the bottom of the BLH enclosure (see diagram below). The BLH must be bonded with an 8 AWG copper wire (6 AWG Canada) to the pool bonding

system.

**Electrolytic Cell and Flow Switch:**

The electrolytic cell and flow switch cables are complete with connectors that plug into the BLH for easy attachment and removal. The door of the BLH must be open to access the cell cable connector. The flow switch plugs into a connector (like a telephone jack) located on the outer bottom of the enclosure. Refer to the diagram below for the location of these connections.



**Input power for use with Goldline, Pentair and Polaris controllers:**

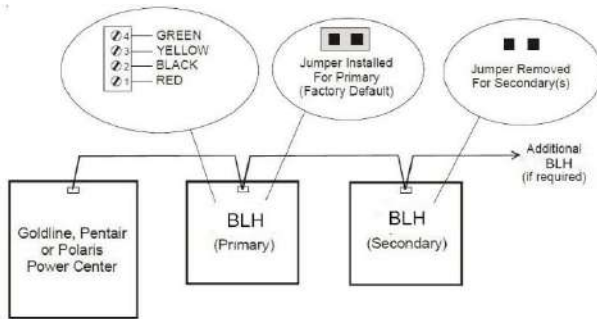
Wire the BLH® DIRECTLY TO 120/240vac POWER (not through timer or relay).

Optional Goldline, Pentair and Polaris controllers:

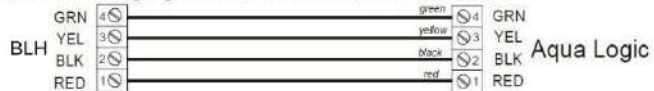
The Goldline, Pentair and Polaris controls use a 4-wire connection to communicate to the BLH and can be wire up to 500' apart. Any outdoor rated 4 conductor cable can be used. Refer to each manufacturer's instructions and the wiring diagrams below for proper wiring connection to the BLH.

**NOTE:** There must be only 1 "primary" unit. All additional BLH units must be configured as "secondary".

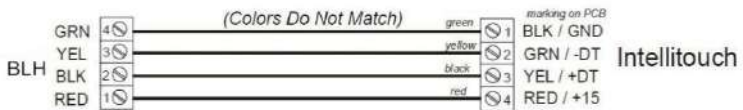
Goldline: Attach wires to proper screw terminals as shown below.



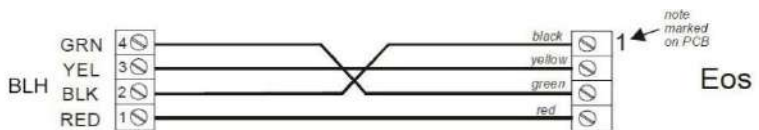
Goldline - Attach wires to proper screw terminals as shown below.



Pentair: Attach wires to opposite numbered screw terminals as shown below. Note that the colors marked on the Pentair PCB do not match the BLH.



Polaris: Attach wires to proper screw terminals as shown below. Note that the screw terminal "1" is marked on the Polaris PCB.



# TROUBLESHOOTING

## Common Problems and Solutions

### 1. "Power" LED not on

Check to make sure 120 / 240 VAC input power is connected to the control. Be sure the jumpers are set properly. Verify the input voltage with a voltmeter. If there is input power, the fuse may have blown. The board is protected by a 20-amp mini ATO fuse located on the circuit board above the cell connector.

### 2. "Generating" LED flashing

The temperature of the pool water is too high or low to operate. You can override this by switching the main switch to SUPER CHLORINATE. The BLH will run at maximum output for the remainder of the current pump cycle or 24 hours, whichever comes first.

### 3. "No Flow" LED solid or flashing

The BLH 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 (on top of hex) are pointing in the direction of flow. If the light is flashing, the flow is established and the BLH will turn on within 1 minute.

### 4. "Check Salt" LED illuminated or flashing

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

### 5. "High Salt" LED illuminated

Check the salt level in the pool/spa. If the 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.

### 6. "Inspect Cell" LED flashing

Inspect and clean cells according to the directions and guidelines. When done, press the "diagnostic" button for 3 seconds to stop the "Inspect Cell" LED flashing.



## 7. "Inspect Cell" LED illuminated

Remove and inspect the cell for scaling. If the cell is scaled, follow the directions on page 8 for cell cleaning. If the pool has the proper amount of salt and the "Inspect Cell" LED is still illuminated, the cell may be depleted and needs to be replaced.

## 8. Possible causes of low chlorine or no chlorine

- The BLH main switch is in the OFF position.
- Desired output % level setting is too low.
- Low stabilizer (Cyanuric Acid). Chlorine spacing is being produced but the pool water is unable to hold on to the chlorine, due to low stabilizer.
- The filter pump is switched off or the running time may be too short (8 hours is recommended for an average sized pool, increases for larger size pools)
- The salt level is too low (below 2500 ppm, Low Salt LED on).
- The salt level is too high (high Salt LED on).
- Low pH. – A lowered (power of hydrogen) or (measurement of alkalinity/acidity) oxidizes chlorine quickly, making it difficult to maintain desired chlorine levels. Adjust pH levels to re-balance water.
- Warm pool water increases the demand for chlorine - increase the desired level or filter run time to meet this higher demand.
- Cold-water (below 50F) can cause the BLH to stop generating (Generating LED flashing).
- 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.

## 9. "PCB" is displayed, and all 4 LED lights are illuminated.

A possible printed circuit board fault has been detected. Call for service.



The *BLH* Salt Chlorinator Systems carry the following Limited Warranty should failure occur due to faulty manufacture or materials, during normal use and service. For Commercial use (any pool that is not for private single-family use, or the use of which is subject to regulation), we warrant to the original purchaser that the equipment shall be free of manufacturer's defects at the time of sale, and upon examination shall provide replacement parts in accordance with the following schedule:

One (1) year limited warranty for residential use, but for commercial use 2 months only.

Two (2) years limited warranty for residential use, but for commercial use 1 year only..

**TERMS OF SALE:** If, after receiving this item you discover that it was not the one you wanted, simply return it for a full refund within 30 days. You will have to pay for the return shipping charges. Refund is void if you have installed, used or damaged the item in any way. Item must be returned with its original box, packing materials and instructions (if applicable) in the same perfect new condition. Cleared Payment via PayPal must be received within 3 days of transaction and prior to shipping.

This limited warranty is subject to the following terms, conditions, and exclusions:

1. To obtain the benefits of this warranty, contact the warranty department for troubleshooting.
2. Should a defect in any item or part covered by the warranty become evident during the warranty's term, Products will at its sole discretion repair or replace such item or part. Products reserves the right to replace defective parts with new or refurbished parts. This warranty does not include the cost of labor or transportation charges for equipment or component parts to or from Products, or the removal, reinstallation, or any such costs incurred in obtaining warranty replacements or repair.
3. This warranty extends to the original retail purchaser and original installation site only,

beginning at the original date of purchase, and is non-transferrable.

4. The warranty contains the following exclusions. O-Rings, rubber gaskets, electrical fuses, and circuit-breaker components are normal replacement items subject to wear and are excluded from the warranty. Product discoloration, or any other cosmetic or superficial damage or deterioration, regardless of its cause, is not covered by this warranty. The warranty is not applicable to problems arising from circumstances outside the control of Products, including, but not limited to the following:

A. Damage or premature wear due to improper pool chemistry, and failure to maintain pool water chemistry in accordance with the recommendations contained in the owner's manual.

B. Damage due to improper installation or connection to improper voltages, including materials and workmanship supplied by others.

C. Damage due to negligence or failure to properly maintain equipment, including the maintenance of clean and tight electrical connections.

D. Damage due to improper service, as well as unauthorized equipment modifications and use of non-genuine replacement parts.

E. Damage due to misapplication, misuse, abuse, overuse the cell lifetime (over 10 hours per day) or failure to operate equipment as specified in the owner's manual.

F. Problems resulting from tampering, accident, fire, flood, freezing, lightning, insects, or other natural elements, or other circumstances beyond the control of Products.

G. Damage due to over-tightening of threaded components or excessive pressure or stress.

H. Material supplied or workmanship performed by others in the process of installation.

The liability of Products shall not exceed the repair or replacement of defective items or parts under the referenced limited warranty terms. There are no implied warranties of merchantability or fitness for a particular purpose that apply to this equipment. Under no

circumstances shall Products, its agents, employees, and affiliates be liable for any loss, damage, injury, inconvenience or loss of time, incidental expenses such as labor and material charges, or any other incidental, or consequential damages, which may result from the use, installation, removal, or reinstallation of its equipment and parts.

This warranty is valid only in the United States of America. This warranty gives you specific legal rights and you may also have other rights, which vary from state to state. This warranty supersedes all previous publications. Any dispute between the original purchaser and Products will be settled by binding arbitration, conducted in Mecklenburg County, NC, under the rules of the American Arbitration Association.

Disclaimer: This limited warranty is the entire warranty. No other warranties apply, expressed or implied. This limited warranty gives you specific legal rights, which varies accordingly from state to state. Under no circumstances shall the manufacturer or authorized agents/installers be responsible for consequential, special, or incidental damage(s) of any kind, including but not limited to personal injury. Property damage or damage to or loss of equipment. The manufacturer or agents/installers are not liable for any other expenses that may be encountered during installation or servicing. Authorized agents/installers may charge a trip fee for warrantable service work.

Some states do not allow the exclusion of limitations of incidental or consequential damages. Listed exclusions and limitations may not apply to you.

During the full coverage warranty process, we cover all replacements, repairs and labor cost. The customer is responsible for shipping to and from our warranty center.

Phone: 1-888-909-0457 / Email: [Support@blueworkspool.com](mailto:Support@blueworkspool.com)

Hours: Monday-Thursday 9:30am-4:30pm (EST), Friday 9:30am-3:30pm (EST)

Closed Saturday & Sunday