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**IMPORTANT  
SAFETY RULES**

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Read all instructions **BEFORE**  
assembling and using  
this product.  
**KEEP THIS MANUAL.**

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**OWNER'S MANUAL**

MODEL 4816

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**IMPORTANT  
DO NOT RETURN PRODUCT TO STORE**

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For technical assistance and missing parts, call Customer Service toll-free

**1.888.382.5988**

(press 135 at any time)

Monday through Friday, 8 am to 5:00pm MST





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**IMPORTANT**

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**Read all instructions BEFORE setting up and using this product.  
KEEP THIS MANUAL.**

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# 1. ABOUT ePOOL™

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## *The Chemistry Monitor and Treatment Advisor for Your Pool or Spa*

Congratulations, you've just purchased the most exciting innovation in the pool and spa industry. ePOOL is a revolutionary accessory for your pool or spa which eliminates the tedious calculations and visual interpretation of confusing test strip kits. The ePOOL system measures your pool chemistry and advises you how to OPTIMALLY maintain your pool or spa for maximum safety and comfort. It achieves this through an easy-to-follow personalized setup process.

ePOOL provides you with the freedom to tailor your installation by offering the following choices:

- Installation Type: Pool or Spa
- Pool or Spa Type: Regular, Salt Water or Copper Ion
- Measurement Units: Fahrenheit/Gallons or Celsius/Liters
- Pool or Spa Volume: Based on Your Pool or Spa Size (see page 25)
- Chlorination Products: Liquid, Dry, 1" or 3" Tablets, 2" Sticks, Bromine Powder or Tablets

The ePOOL chemistry monitor and treatment advisor system takes the guesswork out of pool maintenance because it tells you exactly what you need to do to keep your pool balanced, safe and healthy.

## **Simple to Use**

ePOOL functions as a two piece system, a floating sensor and an indoor receiver. The sensor floats in the pool and senses the chemical levels in the water. This information is wirelessly transmitted to the indoor receiver. The receiver then analyzes this data and alerts you to your pool's condition via its LCD display. When your pool's chemical balance is good, the receiver will display a good reading. When your pool needs attention, i.e. your chemicals are out of balance, the receiver will alert you by flashing a red LED light and displaying the note "Pool Needs Attention." With the push of a button, the receiver will then display exactly what the problem is, what treatment is needed and how much product to add to bring your pool back into balance. It really is that simple.

## **Accurate**

ePOOL contains advanced chemical sensing technology and is programmed with patented chemical analyzing algorithms that enable it to accurately identify, analyze and advise on chemical treatment. During setup, you will supply ePOOL all the information it needs to give you precise instructions on how to achieve and maintain a perfect pool.

## Versatile

While we refer to the pool throughout this manual, it is important to point out that ePOOL works with all types of pools and spas. Whether you have a chlorine pool, mineral ion pool, salt water pool or a spa, ePOOL will make maintenance easier.

*RELAX, let ePOOL do the chemical testing and calculating for you!™*

## 2. SAFETY WARNINGS

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**Read all WARNING and NOTE messages prior to setup and use.**

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**FOR MAXIMUM SAFETY AND PERFORMANCE, THE CUSTOMER MUST COMPLY WITH ALL WARNING NOTICES BELOW.**

- The ePOOL water monitoring system is not a toy.
- The ePOOL floating sensor should be removed from the water during use of the pool or spa to avoid damaging it or injuring yourself.
- Misuse or abuse of the ePOOL floating sensor can result in damage to the sensor cell and/or the plastic body housing the sensor. Do NOT jump on, strike, hit, kick, throw, or submerge the floating sensor. Do NOT use the sensor to strike or hit other objects of any kind.
- The ePOOL system ONLY monitors pH, ORP (oxidation reduction potential), and temperature. It does NOT monitor other critical constituents of your pool water and is not intended to entirely eliminate pool water testing. Failure to maintain water chemistry within established limits can result in unsafe swimming conditions and damage to pool surfaces and equipment.
- The ePOOL floating sensor is NOT a safety device and is not intended to be used as a flotation device.
- ePOOL does NOT monitor human or pet activity in the pool. Children should NEVER be left unsupervised in a pool or spa.
- The LCD display receiver unit is intended for INDOOR use only.
- To avoid electrical shock, do NOT handle the receiver display unit or power adapter if your hands are wet, or if you are standing in water.
- Leaving the ePOOL floating sensor out of the water for extended periods of time can result in damage to the sensor system and/or reduced sensor life. The floating sensor may be stored in a cool, dry place (see page 18 for storage information).
- Avoid touching the sensor surfaces. The sensor array within the housing is a sophisticated analytical instrument and should be handled with care.

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**Failure to comply with ALL Safety Warnings could void warranty.**

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### 3. GETTING STARTED

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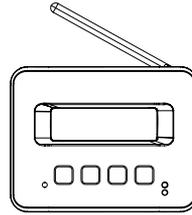
#### A. Package Contents

Ensure that the following components are included in the packaging.

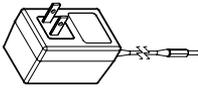
Pool Sensor



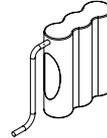
Remote Receiver



Receiver AC/DC adapter



Battery Pack



Manual

**NOTE:** *Parts not shown to scale*

#### B. Know Your Pool or Spa

ePOOL formulates its chemical analysis and treatment recommendations based on your pool's specific characteristics. Therefore, before you can properly use the ePOOL system, you will need to know a couple of facts about your pool (or spa). During the ePOOL setup, you will be asked to answer the following questions:

- Are you monitoring a pool or spa?
- What kind of pool or spa?
  - Regular/Chlorine
  - Salt Water
  - Copper/Mineral Ion
- What is your "Pool or Spa Volume" (in gallons or liters)?

If you do not know your pool's volume, i.e. how many gallons (liters) of water your pool holds, contact the builder or refer to the work sheet included at the end of this manual to help you calculate your pool's volume (see page 25).

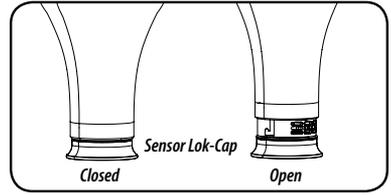
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**NOTE: Entering a grossly incorrect volume will result in inaccurate analysis and treatment recommendations.**

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## 4. QUICK SETUP

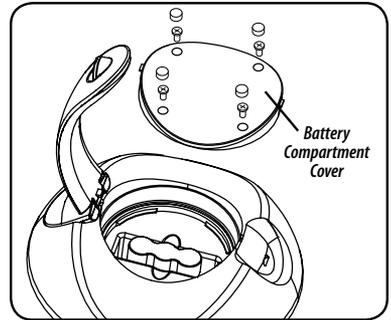
1. Remove the protective plastic wrap from the ePool sensor. Twist the ePOOL sensor LOK-CAP into the OPEN position by turning it counter-clockwise and pulling downward. Then turn the cap clockwise until it clicks into the OPEN-LOK position. If the cap comes completely off, slide it back on and turn clockwise at the top notch.



**NOTE: The ePool sensors require a moist environment during transit. Upon opening the sensor LOK-CAP, some liquid may spill out. This water-based solution is non-toxic. A moist sponge is permanently mounted inside the cap to provide a moist environment for the sensors during periods of extended storage. DO NOT REMOVE.**

2. To open the top handle, turn the thumbscrew counterclockwise until the notch is vertical. Pull up on the handle to open. Remove the 4 screw plugs on the battery compartment cover. Remove the screws and take off the cover.

3. Plug the battery pack connector into the into the battery compartment connector. Insert the battery pack into the slot provided.
4. Replace the battery compartment cover and reassemble. Make sure the screws are fastened securely to ensure a water-tight seal.



5. Place the handle in the closed position and turn the thumbscrew clockwise to lock it in place.
6. Gently place the sensor into the pool or spa.\*
7. Place the ePOOL receiver on a flat surface near an electrical outlet in the desired location in your home (a frequently trafficked location is preferred).
8. Plug the AC/DC adapter into a wall outlet and the other end of the AC/DC adapter into the receiver unit.
9. Follow the ON-SCREEN setup instructions in the next section.

**\*Your pool should be adjusted to the proper chemical balance before using the ePOOL system. For BEST results we recommend taking a sample of your pool or spa water into your local pool supply retailer for a free water chemical analysis, then bring your pool into balance before placing the floating sensor in your pool. ePOOL is not guaranteed to work on pools or spas with grossly unbalanced chemical levels.**

## 5. RECEIVER PROGRAMMING

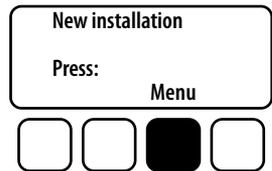
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This section guides you through your personalized setup process. Refer to Part A to setup the receiver for a pool. Refer to Part B for a spa. Please have your pool or spa information, such as type and volume available before beginning (See page 5). Begin **ONLY** after all steps have been completed in Section 4.

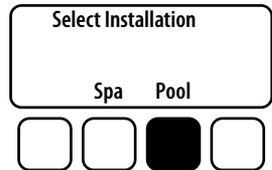
### A. Pool Receiver Setup

The screen shots below will guide you through the initial receiver setup using a regular chlorine pool as an example. If you are setting up the system to monitor another type of pool, the procedure remains the same only you would answer the questions accordingly.

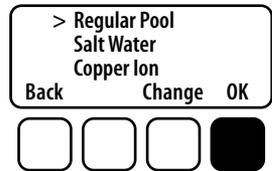
- 1) Press the MENU button to start the POOL Installation/ Setup Process.



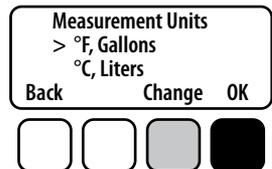
- 2) Choose POOL for type of installation.



- 3) Select your pool type.
  - Regular Pool: Chlorine Sanitizer
  - Salt Water: Salt Water Chlorination
  - Copper Ion: Ionization Chlorination
- 4) Use the CHANGE button to scroll through the pool choices.
- 5) Press OK after you've made your selection.



- 6) Use the CHANGE button to select your unit of measurement:
  - US: °F (temp), Gallons (volume)
  - Metric: °C (temp), Liters (volume)
- 7) Press OK after making your selection.



- 8) Enter your POOL VOLUME to the nearest increment (example shows US measure).
- 9) Use the “+” button to increase the volume in increments of 5000 gallons; the “-” to decrease in increments of 5000 gallons.
- 10) Select OK.

Pool Volume			
5000 Gallons			
Back	-	+	OK
<input type="button" value="□"/>	<input type="button" value="□"/>	<input type="button" value="□"/>	<input type="button" value="■"/>

- 11) Select your preferred type of chlorinator.
- 12) Use the CHANGE button to scroll through the different choices:
  - Liquid, Sodium Hypo
  - Dry, Cal-Hypo
  - 1" Tablets TriChlor
  - 2" Sticks TriChlor
  - 3" Tablets TriChlor
- 13) Press OK when you've made your choice.

Chlorination Product			
3" Tablets, TriChlor			
Back		Change	OK
<input type="button" value="□"/>	<input type="button" value="□"/>	<input type="button" value="□"/>	<input type="button" value="■"/>

This screen allows you to alter the IDEAL pH range of 7.3 – 7.6 preprogrammed in the software. To adjust the pH range:

- 14) Use the “+” button to increase.
- 15) Use the “-” button to decrease.
- 16) Select OK when finished.

pH Offset			
0.0			
Back	-	+	OK
<input type="button" value="□"/>	<input type="button" value="□"/>	<input type="button" value="□"/>	<input type="button" value="■"/>

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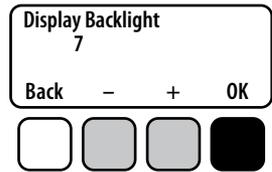
**ePOOL is preset at the factory for the recommended ideal pH range of 7.3 – 7.6 for residential swimming pools. However, you may adjust this range by adjusting the pH offset depending on your preference. We recommend leaving this in the DEFAULT setting.**

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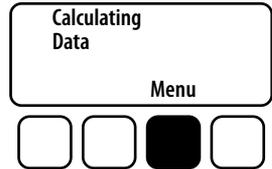
- 17) Use the “+” or “-” buttons to adjust the display contrast.
- 18) Press OK when finished.

Display Contrast			
5			
Back	-	+	OK
<input type="button" value="□"/>	<input type="button" value="□"/>	<input type="button" value="□"/>	<input type="button" value="■"/>

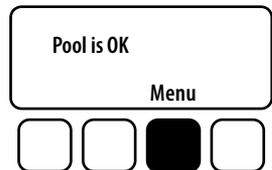
- 19) Use the “+” or “-” buttons to adjust the display backlight.  
 20) Press OK when finished.



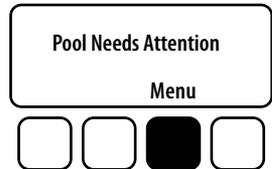
- 21) This screen appears while ePool analyzes your pool chemistry. It may take up to one hour before the ePool receiver shows a Pool is OK or your Pool Needs Attention screen.



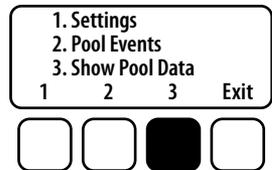
- 22) If your POOL is within the IDEAL chemical range the “Pool is OK” message will appear on the screen.  
 23) Select MENU to enter the main menu screen.



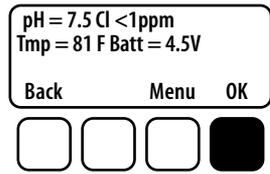
- 24) If the pool chemicals are not within an IDEAL range a “POOL NEEDS ATTENTION” screen will appear. Wait for 24 hours before proceeding on any dosage recommendations as ePOOL requires 24 hours to adjust to its new environment.



- 25) Select MENU to enter the main menu screen.  
 26) From the main menu screen you have 3 choices to choose from:
- Settings: Will return you to the beginning of the POOL SETUP process.
  - Pool Events: Will show you the last message or notification that ePOOL provided.
  - Show Pool Data: Will show the current pool values for pH, chlorine, temperature and the sensor battery level.
- 27) Select “3”, Show Pool Data.



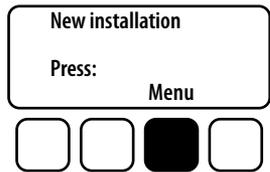
- 28) You have now finished the ePOOL setup process. ePOOL will continuously monitor your pool chemicals and will advise you when, what and how much to add.



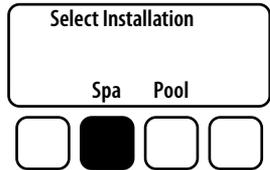
## B. Spa Receiver Setup

The screen shots below will guide you through the initial receiver setup using a regular chlorine spa as an example. If you are setting up the system to monitor another type of spa, the procedure remains the same only you would answer the questions accordingly.

- 1) Press the MENU button to start the SPA Installation/Setup Process.

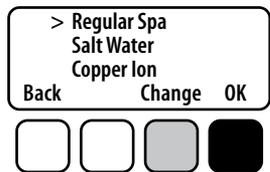


- 2) Choose SPA for type of installation.



- 3) Use the CHANGE button to scroll through the spa choices.  
4) Select your spa type.

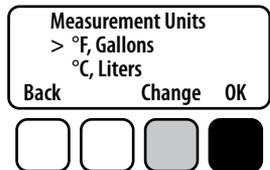
- Regular Spa: Chlorine Sanitizer
- Salt Water: Salt Water Chlorination
- Copper Ion: Ionization Chlorination



- 5) Press OK after you've made your selection.

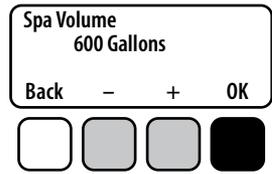
- 6) Select your unit of measurement:

- US: °F (temp), Gallons (volume)
- Metric: °C (temp), Liters (volume)

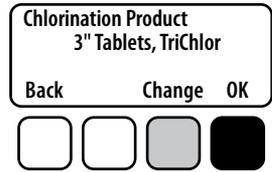


- 7) Press OK after making your selection.

- 8) Enter your SPA VOLUME to the nearest increment (example shows US measure).
- 9) Use the "+" button to increase the volume in increments of 200 gallons.
- 10) Press OK.

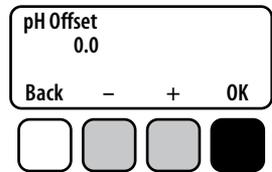


- 11) Select your preferred type of chlorinator.
- 12) Use the CHANGE button to scroll through the different choices:
  - Liquid, Sodium Hypo
  - Dry, Cal-Hypo
  - 1" Tablets TriChlor
  - 2" Sticks TriChlor
  - 3" Tablets TriChlor
  - Bromine Powder
  - 1" Tablets Bromine
- 13) Press OK when you've made your choice.



This screen allows you to alter the IDEAL pH range of 7.3 – 7.6 preprogrammed in the software. If you prefer a different pH range:

- 14) Use the "+" button to increase.
- 15) Use the "-" button to decrease.
- 16) Select OK when finished.

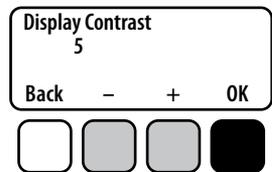



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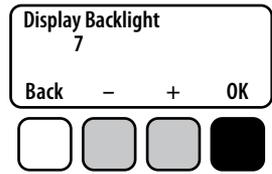
**ePOOL is preset at the factory for the recommended ideal pH range of 7.3 – 7.6 for residential swimming pools. However, you may adjust this range by adjusting the pH offset depending on your preference. We recommend leaving this in the DEFAULT setting.**

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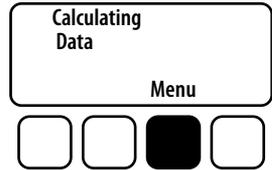
- 17) Use the "+" or "-" buttons to adjust the display contrast.
- 18) Press OK when finished.



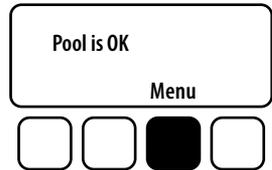
- 19) Use the “+” or “-” buttons to adjust the display backlight.  
 20) Press OK when finished.



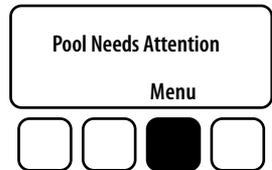
- 21) This screen appears while ePool analyzes your spa chemistry. It may take up to one hour before the ePool receiver shows a Pool is OK or your Pool Needs Attention screen.



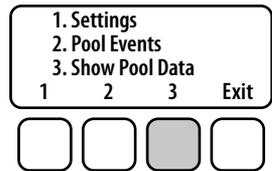
- 21) If your SPA is within the IDEAL chemical range the “Pool is OK” message will appear on the screen.  
 22) Select MENU to enter the main menu screen.



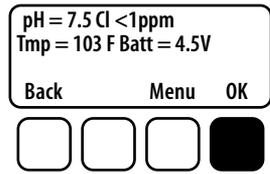
- 23) If the pool chemicals are not within an IDEAL range a “POOL NEEDS ATTENTION” screen will appear. Wait for 24 hours before proceeding on any dosage recommendations as ePOOL requires 24 hours to adjust to its new environment.



- 24) Select MENU to enter the main menu screen.  
 25) From the main menu screen you have 3 choices to choose from:
- Settings: Will return you to the beginning of the SETUP process.
  - Pool Events: Will show you the last message or notification that ePOOL provided.
  - Show Pool Data: Will show the current spa values for pH, chlorine, temperature and the sensor battery level.
- 26) Select “3”, Show Pool Data.



- 27) You have now finished the SPA setup process. ePOOL will continuously monitor your spa chemicals and will advise you when, what and how much to add.



## 6. RECOMMENDATIONS

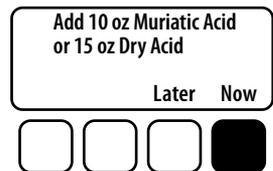
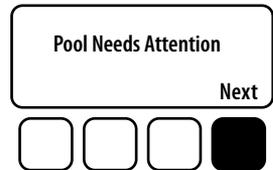
Once the ePOOL receiver is properly configured and the floating sensor is powered and in your pool, the system will begin to monitor the pH and chlorine levels in your pool. When ePOOL determines that your pool chemical levels are no longer in the IDEAL range - it will advise you EXACTLY what to add – this is referred to as a "POOL EVENT".

When a POOL EVENT screen appears on the receiver, simply follow the ON-SCREEN instructions and treat your pool as recommended.

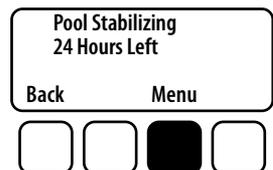
After you follow the treatment recommendation, allow ePOOL 24 hours for the treatment to stabilize. After 24 hours, ePOOL will advise you if your pool chemical levels are balanced by displaying the "POOL IS OK" message. If further treatment is needed, ePOOL will give you further instructions.

*The table below is an example of a POOL EVENT:*

- 1) You will see the following message displayed on the receiver along with a "Flashing" red LED.
- 2) Select NEXT to see what the ePOOL message is. . .
  
- 3) ePOOL tells you to add 10 ounces of Muriatic Acid or 15 ounces of Dry Acid.
- 4) Select NOW if you plan to add the dose immediately.

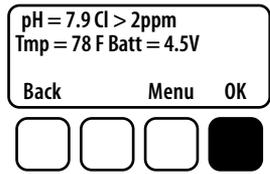


- 5) This starts the 24 hour stabilization period.

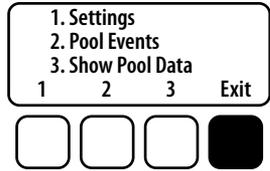


- 6) ePOOL then displays the LIVE chemical values:  
pH is 7.9 (ph = 7.9), chlorine is greater than 2 part per million (Cl >2ppm), temperature is 78°F (Tmp = 78 F) and the sensor battery is 4.5 volts (Batt = 4.5V).

As you can see, the pH value is too high, so ePOOL is advising you to bring the pH level back down to the optimum value of 7.5 by following the treatment recommended in the second screen view above.



- 7) If you're not sure what the last dosing recommendation was, simply select MENU from the previous screen, which will bring you to the MAIN MENU screen at right.
- 8) Select "2. Pool Events" and it will show you the last dosing recommendation.

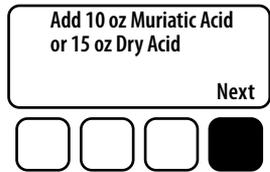


- 9) Select NEXT to find out what ePOOL recommended to return your pool chemical levels back to the IDEAL range.

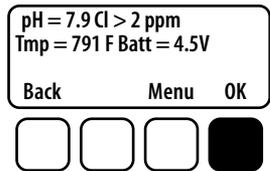


- 10) It will again tell you what was recommended. . .

- 11) Select NEXT to return to the LIVE pool chemical value level display.



- 12) Live chemical value screen.



## 7. MAINTENANCE, CARE & STORAGE

### A. Out of Water Instructions

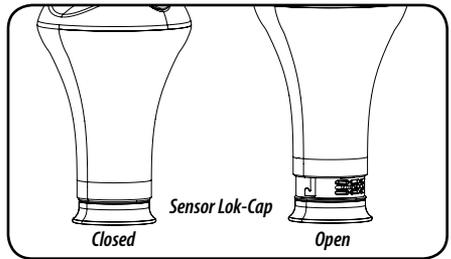
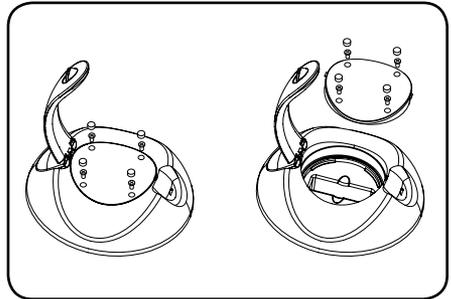
Within the floating ePOOL sensor there is a sensing module that must be moist at all times. Therefore, when you remove the sensor from your pool or spa it is important to close and lock the end cap at the base of the unit (see instructions below). This is especially important if the sensor will be out of the water for longer than 72 hours (3 days).

### B. Extended (Winter) Storage Procedure

Due to their inherent design, the sensor nodes require a moist environment. When the sensor is removed from the pool or spa for more than 72 hours (3 days), it must be properly stored to protect the sensor nodes.

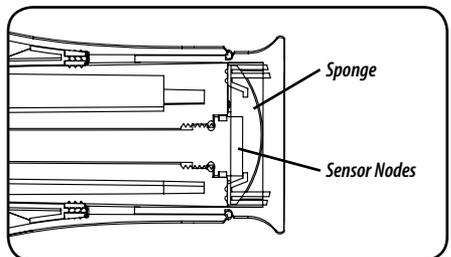
The following procedure outlines the required steps for proper extended storage.

- 1) UNPLUG the receiver power cord from the wall socket.
- 2) Store the receiver in COOL, DRY environment.
- 3) Remove the ePOOL sensor from the pool or spa.
- 4) To open the top handle, turn the thumbscrew counterclockwise until the notch is vertical. Pull up on the handle to open. Remove the 4 screw plugs on the battery compartment cover. Remove the screws and take off the cover.
- 5) Remove the battery and disconnect the power connector.
- 6) Replace the battery inside the compartment but LEAVE CORD DISCONNECTED.
- 7) Reassemble and close handle.
- 8) The sensor CLOSURE CAP must be secured in the CLOSED-LOCK position during extended storage.
- 9) Store the sensor in a cool, dry and safe environment.



### To Close the sensor Cap

Twist the CAP counter-clockwise and at the same time push with an upward motion. (This will allow the cap to slide upward into the sensor housing.) Then twist the CAP clockwise into the CLOSED-LOCK position. This position allows an internal sponge to keep the sensor nodes moist.



## C. Battery and pH Sensor Replacement

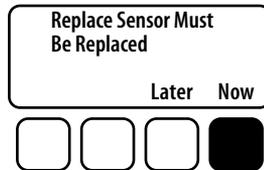
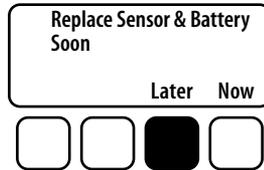
The ePOOL sensor contains two components that require annual replacement to ensure stable and accurate performance. The two components are:

- Battery pack
- pH sensor

The ePOOL receiver will advise you after 11 months that the sensor and battery pack should be replaced soon. Your pool supply store can provide you with the replacement part kit for the ePOOL sensor. The pH sensor is the ONLY sensor that requires replacement. Be aware that if either the sensor or battery is in need of replacement, chemical sensing and treatment recommendations may be inaccurate. If you have any questions about sensor or battery replacement call GAME toll free at 888-382-5988.

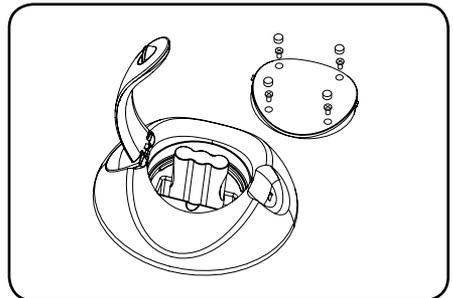
The following procedure provides detailed instructions for sensor and battery replacement.

- 1) After 11 months the ePOOL receiver displays this message . . .
- 2) Select LATER and visit your local pool supply store to purchase the ePOOL Sensor/Battery Replacement Kit.
- 3) Select NOW if you already have a replacement kit and move forward to Step 6 below.
- 4) After 12 months you will receive a message alerting you that the sensor must be replaced.
- 5) Select NOW.

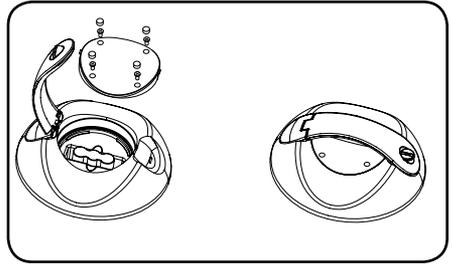


### To Replace the Battery Pack

- 6) Unplug the receiver power cord from the wall socket.
- 7) Pick up the floating sensor and unlock the handle thumbscrew.
- 8) Open the top handle. Remove the 4 screw plugs on the battery compartment cover. Remove the screws and take off the cover.



- 9) Remove the old battery pack and plug the new battery pack connector into the receptacle inside the battery compartment.
- 10) Place the battery pack inside the battery compartment.
- 11) Reassemble and close handle.
- 12) Lock the handle in the CLOSED position by turning the thumbscrew.



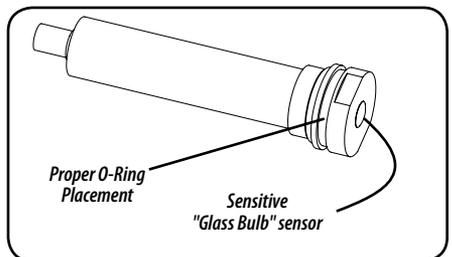
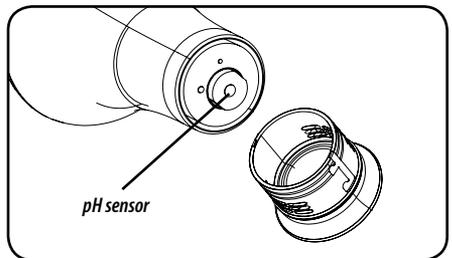
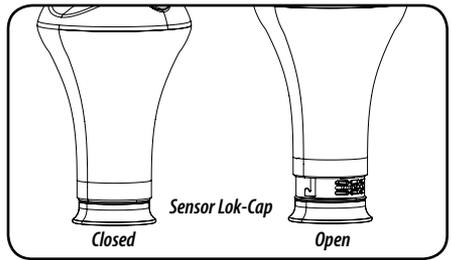
## To Replace the Sensor

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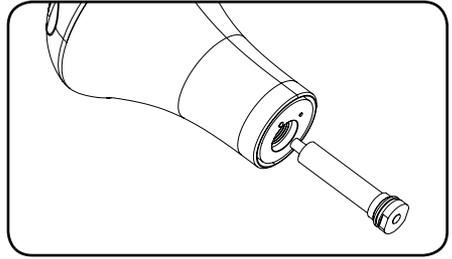
**The pH sensor cell is a sophisticated analytical instrument. It should be handled with care. AVOID touching the glass "sensing bulb" surface. Remove the sensor from its package and check that it is undamaged. If damaged contact your supplier for a replacement. Care should be taken when unpacking and handling the sensors.**

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- 13) Unplug the receiver power cord from the wall.
- 14) Twist the cap counter-clockwise. At the same time pull with a downward motion. This will allow the cap to be fully disconnected from the sensor housing.
- 15) With the cap removed this exposes the sensor nodes to the user.
- 16) Unscrew the old sensor cell, turning counter-clockwise.
- 17) Remove the old sensor cell and set aside.
- 18) Remove the replacement sensor from its box, being careful not to touch or damage the glass sensing bulb.
- 19) Ensure that the o-ring is seated properly on the pH sensor. This provides the watertight seal during submersion in the pool or spa.

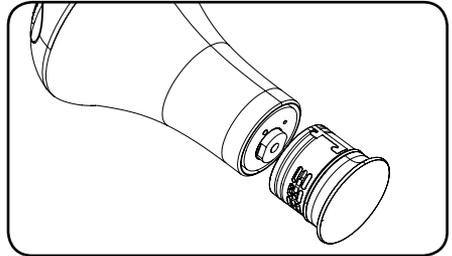


- 20) Peel off the plastic wrap around the new pH sensor and remove the black cap.
- 21) Pull off the plastic cover on the sensor. **AVOID** touching the glass sensing bulb surface.
- 22) Slide the new pH sensor into the sensor housing.
- 23) Screw the pH sensor cell by turning in a clockwise motion.
- 24) The sensor must be screwed in tightly to insure the o-ring seal will prevent water from entering the sensor housing interior.



**Any water inside the sensor housing will seriously impact the system performance, accuracy and reliability.**

- 25) Replace the sensor closure cap onto the sensor housing.
- 26) Turn the cap clockwise until it clicks into the OPEN-LOK position.
- 27) The sensor handle and sensor closure cap should both be secured properly before placing the unit back into the pool or spa.
- 28) Plug the receiver power cord into a wall socket.
- 29) Follow the receiver's "ON-SCREEN" instructions.

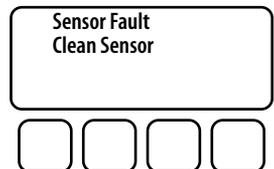


## D. Electrode Cleaning

The ePOOL receiver will advise you when the electrode should be cleaned.

**Warning: Never use any solvent or abrasive cleaning solutions or applicator on the ePool sensor, sensing pod, or receiver.**

- 1) The ePOOL receiver displays this message . . .
- 2) Remove the sensor from the pool and remove the protective cover from the bottom of the sensor (see page 20 , To Replace the Sensor).
- 3) Make a cleaning solution by adding a few drops of dishwashing liquid to a cup of water.
- 4) Dip a soft cloth into the cleaning solution and use the cloth to gently clean the sensor surface. Note: The sensors are fragile when exposed so avoid contact with the sensors and any hard object or surface. Also avoid touching the sensors directly with your fingers as oils from your skin may affect sensor performance or longevity.



- 5) Rinse with pool water, replace protective cover, and return the sensor to the pool.
- 6) After the sensor is cleaned it may take several hours for the sensors to stabilize and return to their original accuracy. Allow at least 24 hours for the sensor to stabilize before adding any chemicals to your pool or spa.

## 8. GOOD THINGS TO KNOW ABOUT POOLS & WATER

### A. Pool Water Balance

In order to maximize your pool enjoyment and at the same time protect costly pool equipment, ideal values for the various pool parameters have been established by the American National Standards Institute (ANSI) and the National Pool & Spa Institute (NPSI).

#### *Suggested NSPI Standards – Pools*

	<i>MIN</i>	<i>IDEAL</i>	<i>MAX</i>
<i>pH</i>	7.2	7.4 – 7.6	7.8
<i>Free Chlorine, ppm</i>	1.0	1.0 – 3.0	3.0
<i>TDS, ppm</i>	300	1000 - 2000	3000
<i>Total Alkalinity, ppm</i>	60	80 – 100	180
<i>Calcium Hardness, ppm</i>	150	200 – 400	500-1K
<i>Cyanuric Acid, ppm</i>	10	30 - 50	150*

*\*Except where limited by the Health department requirements, often to 100 ppm. (ppm = parts per million)*

#### *Suggested NSPI Standards – Spas*

	<i>MIN</i>	<i>IDEAL</i>	<i>MAX</i>
<i>pH</i>	7.2	7.4 – 7.6	7.8
<i>Free Chlorine, ppm</i>	1.0	1.0 – 3.0	10.0
<i>TDS, ppm</i>	300	1000 - 2000	3000
<i>Total Alkalinity, ppm</i>	60	80 – 100	180
<i>Calcium Hardness, ppm</i>	150	200 – 400	500-1K
<i>Cyanuric Acid, ppm</i>	10	30 - 50	150*

*\*Except where limited by the Health department requirements, often to 100 ppm. (ppm = parts per million)*

### B. Pool Water & pH

pH is the single most important element in swimming pool water chemistry. It affects every other chemical balance in pool water. pH is a measure of hydrogen ion (H+) concentration in water. It indicates the relative acidity or basicity of pool water. pH is measured on a scale of 0 (strong acid) to 14 (strong base) with 7 being the neutral pH.

In pools, a slight alkaline pH of 7.4 to 7.6 is ideal because it is the most comfortable to the human eye and provides for optimum use of free chlorine while maintaining water that is not corrosive or scale forming.

### **What happens when the pool is too acidic? (pH is low)**

- If your swimming pool surface is plaster, the pool water will begin to dissolve the surface, creating a roughness which is ideal for pool algae growth. A similar result occurs in the grouting of tiled swimming pools.
- Metals corrode - and this includes swimming pool equipment, pipe/pump connections, etc.
- As the swimming pool walls and metal parts corrode, sulfates are formed. These sulfates are released from the water onto the walls and floor of the swimming pool causing ugly brown and black stains.
- Chlorine, which is used as a disinfectant in the swimming pool water, is activated and lost to the atmosphere very quickly.
- When we swim, our eyes and nose burn; swimwear fades and perishes.

### **What happens when the pool is too alkaline? (pH is high)**

- The calcium in the swimming pool water combines with carbonates and forms scale. This calcification is seen most at the waterline, where it traps dust and dirt, turning black with time.
- The swimming pool water starts to become cloudy or murky and loses its sparkle.
- The calcium carbonate has a tendency to plate out on the sand in the swimming pool filter, effectively turning it into cement. So your sand filter becomes a cement filter, and loses its ability to trap dirt from the pool water.
- As the pH rises, the power of the chlorine to act on foreign particles is lost. At a pH of 8.0 the pool can only use 20% of the chlorine you put in. So 80% of it goes to waste and you would need 5 times the amount of chlorine to provide the disinfection you need.
- Eyes and nose burn and our skin becomes dry and itchy.

By neglecting to test and correct the pH of swimming pool water, we not only cause it to become unsightly, but we also cause ourselves physical discomfort.

ePOOL will let you know, based on your pool volume, the necessary chemicals that must be added to bring the pH to an ideal level of 7.5.

ePOOL will help you to maintain pH, free – and total chlorine. These are the most important values that need to be checked on a regular, i.e. weekly basis.

## C. Chlorination and Sanitation

Chlorine needs to be present in the pool at all times. It reacts instantly with waste products to sanitize and protect your pool water. The more waste you dump into your pool the more chlorine is needed. The amount of chlorine used by your pool is referred to as "Chlorine Demand".

All chlorine types disassociate in water into hypochlorous acid [HOCl] and hydrochloric acid [HCl]. Hypochlorous acid is the active sanitizer. It is also referred to as "Free Chlorine". Bromine chemistry is similar except hypobromous acid [HOBr] is the active sanitizer.

For pool or spa owners utilizing chlorine as their sanitizing agent take note of the following quote from the American Chemistry Council: "Chlorine is regularly fed into the pool water and should be tested daily, at a minimum, for proper disinfection. Routine chlorination kills harmful microorganisms that can cause health-related problems, such as gastroenteritis, Legionnaires disease, ear infections and athlete's foot. Learning how to properly test your water will allow you to identify the chlorine residual and demand in pool water. More frequent testing is needed if there is heavy bather use." ePOOL provides you with CONTINUOUS monitoring of your chlorine levels which results in a safe swimming environment.

CHLORINE - Basic Rules of Thumb (Courtesy of the American Chemistry Council)

- Always read and follow the manufacturer's instructions.
- Store chemicals in a cool, dry and shaded place.
- Never mix different types of chlorine - add each to the pool separately.
- Never mix chemicals together - add each to the pool separately.
- Avoid breathing fumes or vapors.
- Don't buy more pool chemicals than you'll use in a season - they lose effectiveness over time.
- Make sure pool chemicals are inaccessible to children.

Other properties such as Total Alkalinity (TA), Total Dissolved Solids (TDS), Calcium Hardness (CH), and Cyanuric Acid (CA), are important, but need to be checked on a much less frequent basis - typically only twice per year. We recommend taking a sample of your pool or spa water to your local pool supply store two times a year for a complete chemical analysis.

ePOOL, when used in conjunction with a chlorine generator (salt water pool), will also alert you when the "Total Alkalinity" in your pool is too high.

For more information on pH, ORP/Chlorine, Alkalinity, and Temperature, please refer to the glossary of terms (see page 28).

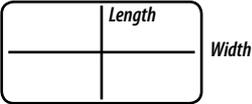
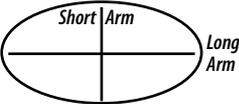
## 9. CALCULATING POOL/SPA VOLUME

Water volume is used to calculate the correct amount of chemicals (treatment recommendations) needed to keep your pool in optimum balance. The most accurate measure of your pool/spa volume should be provided by your pool/spa builder.

For the purposes of entering the pool/spa volume into the ePOOL system, the calculation work sheet below may be used with the understanding that the optimum treatment recommendations from the ePOOL system are based on accurate entry of your pool volume.

Entering a grossly incorrect volume will result in inaccurate treatment recommendations. Use the worksheet below to estimate your pool or spa volume in gallon units.

If you do not know the volume of your pool in gallons, have an odd shaped pool (such as kidney shaped) or you are unable to obtain this information from your builder/supplier, the internet offer many online resources for determining pool volume for various shaped residential pools.

<i>Pool Shape</i>	<i>Calculations</i>
	Length x Width x Average Depth x 7.5 = Pool Volume in Gallons _____ x _____ x _____ x 7.5 = _____
	Diameter x Diameter x Avg. Depth x 5.9 = Pool Volume in Gallons _____ x _____ x _____ x 5.9 = _____
	Long Arm x Short Arm x Avg. Depth x 5.9 = Pool Volume in Gallons _____ x _____ x _____ x 5.9 = _____

*If performing pool volume calculations base on the table above, note the following:*

- Dimensions use FEET for unit of measure
- Pool volume is calculated in U.S. Gallons

### *Common Pool Sizes and Gallon (US) Capacity*

<i>Round Pools 48" Deep</i>	<i>Above-Ground Ovals 48" Deep</i>	<i>Common In-Ground Sizes</i>
15 foot = 5,310 Gallons	12 x 24 = 4,502 Gallons	16 x 32 = 19,200 Gallons
18 foot = 7,646 Gallons	15 x 24 = 9,648 Gallons	16 x 34 = 20,400 Gallons
21 foot = 10,407 Gallons	15 x 30 = 12,060 Gallons	16 x 36 = 21,600 Gallons
24 foot = 13,593 Gallons	16 x 24 = 10,291 Gallons	18 x 36 = 24,000 Gallons
27 foot = 17,204 Gallons	16 x 32 = 13,721 Gallons	20 x 40 = 30,000 Gallons
28 foot = 18,502 Gallons	18 x 36 = 17,366 Gallons	24 x 44 = 39,600 Gallons

## **10. FREQUENTLY ASKED QUESTIONS**

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### ***1. How does ePOOL help me maintain my pool?***

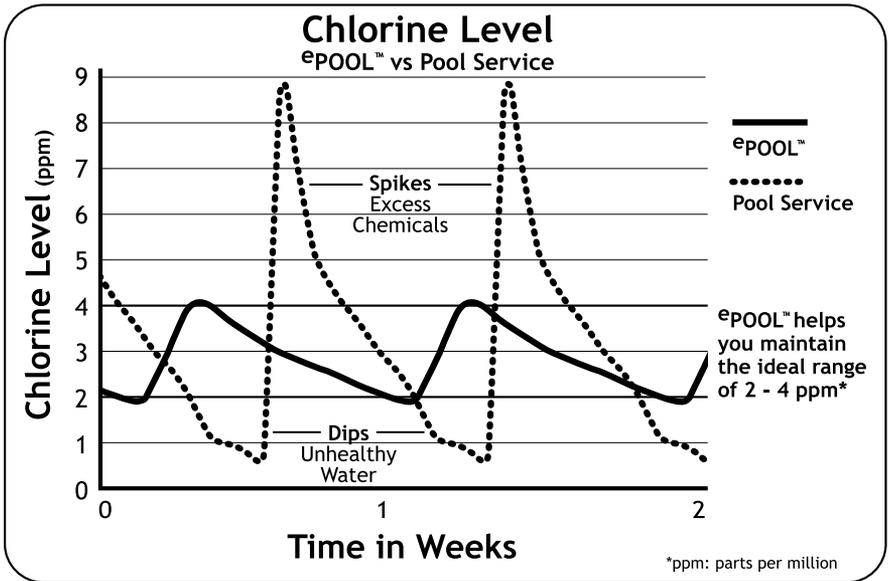
ePOOL continuously measures your pool pH, chlorine, and temperature. This information is transmitted from the ePOOL sensor in the pool to the receiver. The integrated intelligence in the receiver uses these values to determine whether your pool is within established normal (ideal) values or has drifted beyond accepted norms. When ePOOL determines that some action is required to optimize your pool chemistry, it calculates the specific chemistry addition using your pool's volume and other data entered into its memory.

### ***2. How does ePOOL extend the life of my pool surface and equipment?***

ePOOL provides information to the pool owner as soon as the pool drifts outside of optimal limits. This insures the pool owner can respond to pool changes quickly and accurately. Acidity and chlorine levels are not allowed to fluctuate significantly. Maintaining your pool within optimal ranges extends the life of your pool surfaces and equipment.

### ***3. I believe my pool maintenance company is doing a good job of maintaining my pool. Why do I need ePOOL?***

Pool maintenance companies normally maintain your pool weekly. When they service your pool they measure your pool's chemistry at that moment in time. They add chemistry to your pool based on this static measurement. The amount of chemistry added is expected to last a week for the temperature, weather, and estimated usage. Since you expect your pool to be safe for swimming the day before the next maintenance visit, enough chemistry is added to hopefully insure it will not be depleted within that week. This causes your pool chemistry to constantly fluctuate from a high level of chemistry to low levels of chemistry (see following graph).



ePOOL helps you to maintain your chemistry within recommended limits. Since it measures continuously, there is no need to overdose your pool to insure your chemistry is not depleted within a week.

#### **4. Should the sensor just float around in my pool?**

Yes, it is safe for the sensor float freely around your pool. The sensor may also be tethered to the side of your pool in a location where you expect good pool water circulation and minimal swimmer/diver traffic. It is recommended to remove it from the water when the pool/spa is in use.

#### **5. Does the ePOOL system require any maintenance?**

The ePOOL sensor is powered by a battery pack and uses a pH sensor cartridge to measure your pool's chemistry. These two items must be replaced periodically to maintain reliable performance. The ePOOL receiver will notify you when your sensor and battery require replacement.

#### **6. Do I need special chemistry or technical skills to use the ePOOL?**

ePOOL requires no special skills or expertise. It measures your pool's chemistry and makes specific recommendations about what type and how much to add to your pool. All you have to do is follow the instructions from the receiver and measure out the proper amount of chemicals to add to your pool/spa.

## 11. GLOSSARY OF TERMS

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The following is a glossary of terms pertaining to pool water chemistry.

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Acid	Liquid (muriatic acid) or dry granular (sodium bisulfate) substance used to lower the pool's pH (toward a more acidic condition) or to lower total alkalinity levels.
Algae	Algae may form on your pool surfaces or it may bloom in suspension. Algae are typically known to be green but may also be yellow (mustard algae), black, blue-green, or any shade in between. It may form separate spots or seem to grow in sheets.
Alkalinity	Alkaline refers to the condition where the water's pH is above 7.0 (neutral) on the pH scale. It is the opposite of acidic. Alkalinity is the amount of carbonates and bicarbonates in the water, measured in "parts per million" (ppm) of Total Alkalinity.
Bromine	A member of the halogen family commonly used as a sanitizer in spas because of its resistance to hot water with rapid pH fluctuations.
Calcium hardness	The amount of calcium and magnesium in pool and spa water.
Calcium hypochlorite	A common type of chlorine used in pools and spas. A granular or tablet substance typically dissolved in water prior to adding it to the pool and spa water.
Chlorine	A chemical that works as a sanitizer or disinfectant in pool and spa water to kill bacteria and algae, and oxidizes ammonia and nitrogen compounds such as swimmer waste. The ideal range is from 1.0 to 3.0 parts per million (ppm) in pools and 1.5 - 3.0 ppm in spas.
Copper/Silver Ion Generator	Low voltage DC current is conducted into the water chamber and electrolysis takes place. Positively charged ions of copper and silver are released. Copper is a natural toxin to algae and bacteria, and silver to bacteria and virus.
Cyanuric acid	A stabilizer that works to keep a reserve of "free available" chlorine in pool and spa water, protecting it from direct sunlight. It is present in some sanitizers such as Trichlor and Dichlor.
Free available chlorine	The killing, active form of chlorine.
Hypochlorite	A family of chlorine compounds such as Calcium Hypochlorite and Lithium Hypochlorite, both granular, and the liquid Sodium Hypochlorite. When these compounds contact water, they release Hypochlorous Acid, the active sanitizing agent.
Muriatic acid	A liquid acid that is most commonly used to reduce pH and total alkalinity levels. It tends to be very strong and is not recommended for use in spas.
ORP	ORP stands for Oxidation-Reduction Potential. In practical terms, it is a measurement to oxidize contaminants. ORP is the only practical method to electronically monitor pool sanitizer effectiveness.

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pH	The scale of relative acidity or alkalinity, expressed in logarithmic numbers from 0 - 14, with 7.0 being neutral. What's really being measured is the hydrogen ion concentration.
Pool "Shocking"	Adding a large dose of chlorine or other chemicals to quickly increase the amount of free available sanitizers compared with the less effective, "combined" form of the sanitizer.
Sanitizer	A chemical agent used to remove unwanted contaminants.
Soda Ash	A base, used to counteract an acidic condition by raising pH.
Sodium Bicarbonate	Another base, however its properties will increase alkalinity more than pH. Used to raise Total Alkalinity levels.
Sodium Bisulfate	A granular form of acid, used to counteract a scaling condition by lowering pH and/or alkalinity.
Sodium Dichlor	A granular form of chlorine that is stabilized with cyanuric acid. Used for shocking and super-chlorination.
Test strips	Chemically treated strips that have the appropriate amounts of reagents on them which you must dip into water and then interpret the reactions.
Total alkalinity	Works in a buffering capacity, protecting the water from dramatic pH changes.
Total dissolved solids	The total amount of dissolved materials in pool or spa water. The ideal range is from 1,000 to 2,000 ppm in pools and 1,500 ppm above the start-up TDS in spas.
Water balance	Balanced water is the result all your chemical parameters being where they should be and thus balance each other. The key components of water balance are pH, Total Alkalinity, Calcium Hardness and Temperature.

## **12. LIMITED WARRANTY STATEMENT**

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The manufacturer warranties safe operation and reliability only under the following conditions:

- The product is installed and operated according to the assembly and operating instructions.
- Only original replacement parts are used.
- Consumable parts (battery and pH sensor) do NOT fall under the warranty

### **General Terms**

This Limited Warranty applies to the enclosed product (the "Product") distributed by Great American Duck Races, Inc., an Arizona corporation (doing business as Great American Marketing and Events) ("GAME").

GAME warrants that the Product will be free from defects in materials and workmanship under normal use for a period of one (1) year from the date of purchase. (Your dated sales or delivery receipt, showing the date of your Product purchase, is your proof of the purchase date.) During the warranty period, GAME will repair or replace any defective parts at no charge.

All defective parts that are replaced by GAME will be replaced, at GAME's discretion, with either new parts or used parts that meet or exceed performance specifications for new parts. All parts removed from the Product under this warranty will become the property of GAME. Repair or replacement of any parts will not serve to extend the one (1) year warranty period.

This Limited Warranty does not apply to expendable parts. This Limited Warranty does not extend to any product (a) from which the serial number has been removed or (b) that has been damaged or rendered defective (i) as a result of accident, misuse, abuse or other external causes; (ii) by operation outside the usage parameters stated in the manual that shipped with the Product; (iii) by the use of parts not manufactured or sold by GAME; or (iv) by modification or service by anyone other than GAME or an authorized GAME distributor.

If a defect is identified within the warranty period, please contact GAME.

**EXCEPT FOR THE LIMITED WARRANTY SET FORTH ABOVE, GAME EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ORAL OR STATUTORY (INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE). ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY LAW ARE LIMITED TO THE TERMS OF THE ABOVE LIMITED WARRANTY.**

### **Limitation of Liability**

**EXCEPT FOR THE LIMITED WARRANTY DESCRIBED ABOVE, IN NO EVENT WILL GAME HAVE ANY LIABILITY OF ANY KIND WHATSOEVER (WHETHER UNDER CONTRACT, TORT, OR ANY OTHER THEORY OF LEGAL LIABILITY) TO ANY PERSON WITH RESPECT TO THE PRODUCT (INCLUDING, WITHOUT LIMITATION, (A) ANY USE OR MISUSE OF THE PRODUCT, (B) ANY FAILURE OR MALFUNCTION OF THE PRODUCT, (C) ANY BODILY INJURY, DEATH, LOSS OF OR DAMAGE TO ANY PROPERTY, OR ANY OTHER DAMAGES RELATED TO OR RESULTING FROM THE PRODUCT OR ITS USE (INCLUDING, WITHOUT LIMITATION, ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, LOST PROFITS, LOSS OF USE), EVEN IF GAME OR GAME'S AUTHORIZED REPRESENTATIVES HAVE BEEN ADVISED OF THE POSSIBILITY OF ANY SUCH DAMAGES.**

### **Severability**

Any provision of this Limited Warranty which is prohibited or unenforceable in any jurisdiction will, as to such jurisdiction, be ineffective to the extent of such prohibition or unenforceability without invalidating the remaining portions hereof or affecting the validity or enforceability of such provision in any other jurisdiction.

### **Venue and Choice of Law**

This Limited Warranty is applicable in all countries. This Limited Warranty will be governed by the laws of the State of Arizona (regardless of any conflict of laws rules), and any disputes arising from this Limited Warranty will be resolved in Phoenix, Arizona.

### **Entire Agreement**

This Limited Warranty is understood to be the complete and exclusive agreement between GAME and the purchaser of the Product, superseding all prior agreements, oral or written, and all other communications between such parties relating to the Product. No employee or representative of GAME or any other party is authorized to make any warranty in addition to the limited warranty set forth above.

**IMPORTANT**  
**DO NOT RETURN PRODUCT TO STORE**

For technical assistance and missing parts, call Customer Service toll-free

**1.888.382.5988**

(press 135 at any time)

Monday through Friday, 8 am to 5:00pm MST

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