



# **Model ES-3**

## **Pool Sanitizing System**

### **Operating Manual**



**enviro****swim**

## IMPORTANT SAFETY INSTRUCTIONS

**Attention Operator:** This manual contains important information about the operation and safe use of this product.

- **WARNING - READ AND FOLLOW ALL INSTRUCTIONS. IMPORTANT SAFETY INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS**
- **WARNING** – This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety. Children should be supervised to ensure they do not play with the appliance.
- **WARNING** – Children less than eight (8) years shall be kept away unless continuously supervised. This appliance can be used by children aged from eight (8) years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the use of the appliance in a safe way and understand the hazards involved. Children should not play with the appliance. Cleaning and user maintenance should not be made by children without supervision.
- **WARNING** – When mixing acid with water, ALWAYS ADD ACID TO WATER, NEVER ADD WATER TO ACID.
- **WARNING** – Do not open Electronic Control Unit. There are no serviceable elements in the control box. Always return to Enviroswim for repair.
- **WARNING** – Do not operate electrolytic cell without proper flow or water circulation. A build-up of gases will result in hazardous conditions.
- **CAUTION** – Use of chemicals other than those recommended may be hazardous. Follow the Chemical Manufacturer's Instructions. Do not add undiluted chemicals directly to the pool as staining may occur. Undiluted Calcium Hypochlorite reacts with copper and silver and can cause staining, an alternative such as liquid chlorine (Sodium Hypochlorite) or a non-chlorine oxidiser is recommended if shock treatment is required. Do not use Cyanuric Acid (Stabiliser) as this will inhibit oxidation processes.
- **CAUTION** – This unit is for use with permanently – installed pools. Do not use with storable pools. A permanently – installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it is capable of being readily disassembled for storage and reassembled to its original integrity.

**If you employ a pool maintenance contractor, ensure that they read and follow these instructions as an Enviroswim System pool differs from common chlorine/salt pools.**

The best results with the Enviroswim system are obtained by following a few simple rules:

- **Do not use stabilizer (Cyanuric Acid)**
- **Do not use bromine compounds**
- **Do not use aluminium based or any other flocculants**
- **Do not use Soda Ash (Sodium Carbonate)**
- **Do not use Granular Chlorine.** The use of Granular Chlorine (Calcium Hypochlorite) may cause black staining of the pool rendering it unusable if it is added undiluted to a pool treated by an Enviroswim System. Use only unstabilised liquid chlorine (Sodium Hypochlorite) or OxyShock (non chlorine Oxidiser).
- **Do not throw un-dissolved chemicals into the pool.**
- **Clean the pool filter regularly.**

Due to the many different test kits on the market, we recommend that you follow the manufacturer's instructions supplied with each test kit.

**SAVE ALL THESE INSTRUCTIONS**

**For advice phone 1300 888 457**

**Outside Australia email [info@enviroswim.com](mailto:info@enviroswim.com)**

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# 1 Operating Instructions

Thank you for purchasing the Enviroswim ES-3. Following these basic instructions will allow you to enjoy the benefits of low maintenance and exceptional water quality achievable with this system. **During periods of intense use or when there has been significant water dilution or contamination more frequent testing and active management may be required.**

## Warning:

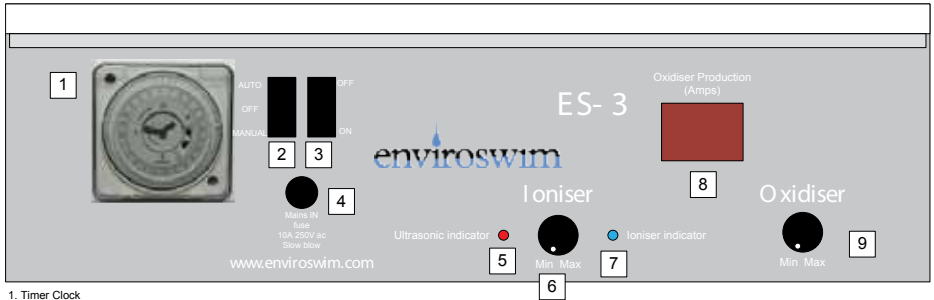
**It is important that the ES-3 system only be allowed to operate when the pool pump is running so that water is flowing through the ionization/oxidation chamber and the ultrasonic emitter when they are in operation. Ensure that variable speed pumps maintain sufficient water flow.**

## 1.1 System operation

Water that is totally acceptable for drinking purposes may have a definite mineral imbalance for use in a swimming pool. In parts of the world where mineral excesses or deficiencies exist in natural water, the pool will need initial balancing. A balanced pool is necessary for proper disinfection and will assure freedom from staining and scaling problems. Mineral imbalance and improper pH control can significantly complicate maintenance and have a serious deteriorating effect on the pool itself. After initial balancing of the water, mineral balance must be maintained within the proper parameters to provide continued protection and ease of maintenance. Frequency of testing is dependent on weather and pool load.

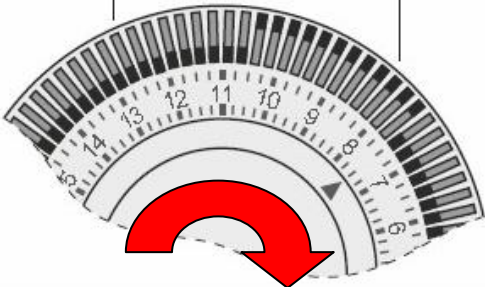
Avoid prolonged running of the pool with a high pH and or high copper levels. This is easily avoided by regular testing. Enviroswim recommends that you test the pool water every two weeks.

The only chemicals necessary to keep your pool balanced and healthy will be a buffer such as sodium bicarbonate and hydrochloric acid. Naturally, you'll continue to remove leaves and dust as usual, as these eat up the sanitizer and provide nutrients for algae and bacteria.



1. Timer Clock
2. Off/Manual/Auto Switch
3. Enviroswim functions on/off switch
4. Fuse
5. Ultrasonics Operation Indicator
6. Ioniser timer control
7. Ioniser Polarity Indicator
8. Oxidiser Amperage display
9. Oxidiser Output Control

## 1.1.1 Controls

No.	Name	Operation
1	Timer Clock	<p>If using the timer this is set by</p> <p>Tappets in OFF position</p> <p>Tappets in ON position</p>  <p>1. To set current time, rotate minute hand <b>clockwise</b> until arrow head aligns with correct time. <b>Note: This will need to be reset whenever the power is disconnected from the unit and for daylight saving time changes. Note: Only rotate clockwise to set. Rotating incorrectly will damage the time clock.</b></p> <p>2. To set ON/OFF times, move required tappets to appropriate position. Inner position for OFF and outer position for ON. <b>Note : proper operation requires that the appropriate switch settings below are enabled.</b></p>



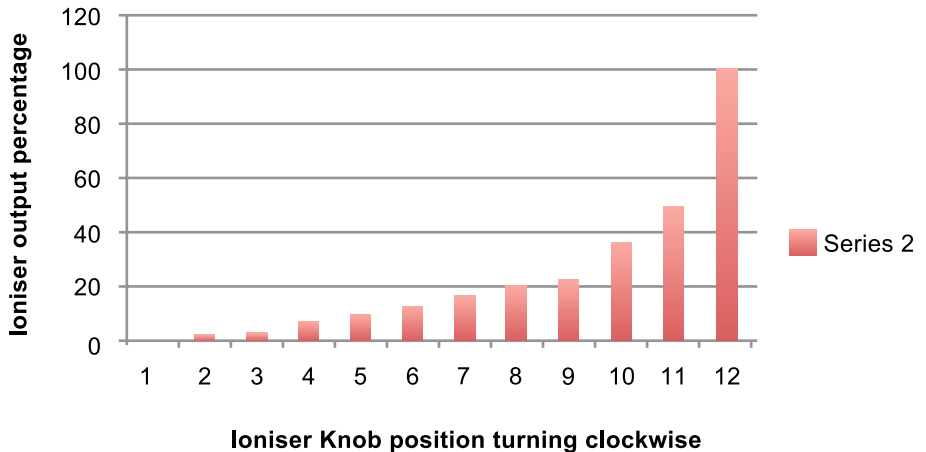
No.	Name	Operation																										
2 & 3	Enviroswim Power and mode switches	<p>These switches allow for manual or automatic (timer controlled) operation of the Enviroswim system either in conjunction with the pump or the pump on its own. <b>Note : The Enviroswim processes should never be operated unless the pump is running and the system when properly installed should preclude this.</b></p> <p>The following Switch Settings are possible</p> <table border="1" data-bbox="370 400 917 820"> <thead> <tr> <th colspan="2" data-bbox="370 400 619 443"></th> <th colspan="2" data-bbox="619 400 917 443">Switch 3 (OFF/ON)</th> </tr> <tr> <th colspan="2" data-bbox="370 443 619 523" rowspan="3">Switch 2 (AUTO/OFF/MANUAL)</th> <th data-bbox="619 443 771 459">OFF (0)</th> <th data-bbox="771 443 917 459">ON (I)</th> </tr> </thead> <tbody> <tr> <td data-bbox="370 523 619 528">OFF Disabled (0).</td> <td colspan="2" data-bbox="619 459 917 528">Pump and Enviroswim Functions disabled regardless of timer.</td> </tr> <tr> <td data-bbox="370 528 619 676">On MANUAL untimed settings (I)</td> <td data-bbox="619 528 771 676">Pump only operational independent of timer.</td> <td data-bbox="771 528 917 676">Pump and Enviroswim functions operational independent of timer.</td> </tr> <tr> <td data-bbox="370 676 619 820">AUTO Timed settings (II)</td> <td data-bbox="619 676 771 820">Pump only operational as per timer settings.</td> <td data-bbox="771 676 917 820">Pump and Enviroswim functions operational as per timer settings.</td> </tr> </tbody> </table>			Switch 3 (OFF/ON)		Switch 2 (AUTO/OFF/MANUAL)		OFF (0)	ON (I)	OFF Disabled (0).	Pump and Enviroswim Functions disabled regardless of timer.		On MANUAL untimed settings (I)	Pump only operational independent of timer.	Pump and Enviroswim functions operational independent of timer.	AUTO Timed settings (II)	Pump only operational as per timer settings.	Pump and Enviroswim functions operational as per timer settings.									
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4.	Fuse	Only replace with specified 240V 10A slow blow																										
5.	Normal operation indicator	This LED cycles through several colours indicating normal operation.																										
6.	Ioniser Timer Control	<p>The ioniser timer control has 12 settings. *</p> <table border="1" data-bbox="370 979 619 1318"> <thead> <tr> <th data-bbox="370 979 471 1007">Setting</th> <th data-bbox="471 979 619 1007">% Output</th> </tr> </thead> <tbody> <tr><td>1</td><td>Off</td></tr> <tr><td>2</td><td>2</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>7</td></tr> <tr><td>5</td><td>10</td></tr> <tr><td>6</td><td>13</td></tr> <tr><td>7</td><td>17</td></tr> <tr><td>8</td><td>20</td></tr> <tr><td>9</td><td>23</td></tr> <tr><td>10</td><td>37</td></tr> <tr><td>11</td><td>50</td></tr> <tr><td>12</td><td>100</td></tr> </tbody> </table> <p>*Refer to page 12 for graph and detailed output settings</p>	Setting	% Output	1	Off	2	2	3	3	4	7	5	10	6	13	7	17	8	20	9	23	10	37	11	50	12	100
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No.	Name	Operation														
7.	Ioniser Polarity Indicator	This LED changes colour from red to green approximately every sixty minutes to indicate that the polarity of the Ioniser electrodes has changed. Changing the polarity assists in cleaning the electrodes and ensures that they wear evenly.														
8.	Oxidiser production digital display	<p>This display shows the status of the Oxidiser plates and has a range of values.</p> <table border="1" data-bbox="372 371 1000 1449"> <thead> <tr> <th data-bbox="372 371 493 403">Value</th> <th data-bbox="493 371 1000 403">Indication</th> </tr> </thead> <tbody> <tr> <td data-bbox="372 403 493 595">01 – 15</td> <td data-bbox="493 403 1000 595">A value in the range of 1-15 indicates the Amperage current being applied to the Oxidiser plates. The Enviroswim unit is limited to a maximum of 15 Amps. When the ORP Current Control is at maximum the display should show 15 amps. If the display at maximum is below 15 amps this is most likely due to a low TDS level. Refer to section 3.</td> </tr> <tr> <td data-bbox="372 595 493 699">OF</td> <td data-bbox="493 595 1000 699">The current being applied to the plates is negligible or non-existent. This will be the most likely reading when the ORP Current Control is set to minimum</td> </tr> <tr> <td data-bbox="372 699 493 818">d6</td> <td data-bbox="493 699 1000 818">The system is in de-gas mode. When the unit reverses polarity approximately every 24 hrs it goes onto the de-gas mode, (no power to the cell) for approx 1 hour. This purges the cell before powering up in the opposite polarity</td> </tr> <tr> <td data-bbox="372 818 493 1026">Pb</td> <td data-bbox="493 818 1000 1026">This will be a flashing display that indicates that the system is not applying current to the oxidiser plates due to any of <ul style="list-style-type: none"> <li>• Air in the system</li> <li>• Insufficient water flow</li> <li>• Calcium build up on plates.</li> <li>• Water Sensor wire not attached or loose.</li> </ul> </td> </tr> <tr> <td data-bbox="372 1026 493 1233">OL</td> <td data-bbox="493 1026 1000 1233">This will be a flashing display that indicates that current is no longer being applied to the oxidiser plates. This is done to protect the Enviroswim unit due to excessive current draw that may be caused by <ul style="list-style-type: none"> <li>• Excessive TDS (greater than 3000ppm)</li> <li>• Undiluted chemicals added to skimmer</li> <li>• Short circuit across the plates.</li> </ul> </td> </tr> <tr> <td data-bbox="372 1233 493 1449">SU</td> <td data-bbox="493 1233 1000 1449">Indicates the unit is in its start-up self-check mode. The start-up mode lasts for 10 seconds during which time the Control Unit checks and monitors the system configuration. If any faults are found these are shown on the display with the appropriate indicator. If no fault is found the output currents ramp up to their preset mode as determined by the Ioniser and Oxidiser Current Controls.</td> </tr> </tbody> </table>	Value	Indication	01 – 15	A value in the range of 1-15 indicates the Amperage current being applied to the Oxidiser plates. The Enviroswim unit is limited to a maximum of 15 Amps. When the ORP Current Control is at maximum the display should show 15 amps. If the display at maximum is below 15 amps this is most likely due to a low TDS level. Refer to section 3.	OF	The current being applied to the plates is negligible or non-existent. This will be the most likely reading when the ORP Current Control is set to minimum	d6	The system is in de-gas mode. When the unit reverses polarity approximately every 24 hrs it goes onto the de-gas mode, (no power to the cell) for approx 1 hour. This purges the cell before powering up in the opposite polarity	Pb	This will be a flashing display that indicates that the system is not applying current to the oxidiser plates due to any of <ul style="list-style-type: none"> <li>• Air in the system</li> <li>• Insufficient water flow</li> <li>• Calcium build up on plates.</li> <li>• Water Sensor wire not attached or loose.</li> </ul>	OL	This will be a flashing display that indicates that current is no longer being applied to the oxidiser plates. This is done to protect the Enviroswim unit due to excessive current draw that may be caused by <ul style="list-style-type: none"> <li>• Excessive TDS (greater than 3000ppm)</li> <li>• Undiluted chemicals added to skimmer</li> <li>• Short circuit across the plates.</li> </ul>	SU	Indicates the unit is in its start-up self-check mode. The start-up mode lasts for 10 seconds during which time the Control Unit checks and monitors the system configuration. If any faults are found these are shown on the display with the appropriate indicator. If no fault is found the output currents ramp up to their preset mode as determined by the Ioniser and Oxidiser Current Controls.
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No.	Name	Operation	
		<p style="color: red; text-align: center;">TP</p>	<p>This indicates an undesirable internal temperature in the Control Unit. If this occurs the unit will shutdown to prevent any damage to the System Controller. Likely causes of this message are:</p> <ul style="list-style-type: none"> <li>• Excessively low TDS</li> <li>• Air-flow vents on the underside of the unit are blocked</li> <li>• Excessive ambient temperatures</li> </ul>
9.	ORP Output Control	<p>This control is used to adjust the current being applied to the plates. The effect of adjusting this control when the Enviroswim unit is operational will be displayed on the Oxidiser production digital display.</p>	

## Ioniser Timer Control

### Ioniser output settings



#### Ioniser knob Position

1. (ioniser knob fully anticlockwise) off
2. produces copper 2% of the running time.
3. produces copper 3% “ “
4. produces copper 7% “ “
5. produces copper 10% “ “
6. produces copper 13% “ “
7. produces copper 17% “ “
8. produces copper 20% “ “
9. produces copper 23% “ “
10. produces copper 37% “ “
11. produces copper 50% “ “
12. produces copper 100% “ “

**Note:** Positions 11 & 12 are mainly used to build the copper levels following initial filling with pool water when copper levels are very low or following heavy dilution from rainfall or floods. Use these setting with care to avoid overdosing and unnecessary wear of electrode.

If the copper is accidentally overdosed the ioniser output can be turned off for weeks or even months until the level drops to the recommended operating level. The system will continue to perform 100% using just the ultrasonics & oxidiser.

#### The daily copper output is influenced in two ways.

1. The daily run hours of the enviroswim system
2. The set position of the ioniser knob.

Increasing either one of the above will increase copper production likewise decreasing either will reduce copper production.

## 1.1.2 Pool Balance

Suggested testing frequencies are recommendations only for average use domestic pools. More frequent testing may be required.

Balance Parameter	Symptoms	Ideal Range	Measurement	Adjustment
Alkalinity	<ul style="list-style-type: none"> <li>pH difficult to maintain</li> <li>pH bounce</li> <li>Bather discomfort</li> <li>Corrosion</li> <li>Cloudy Water</li> </ul>	80-150 ppm	<p>Use supplied test kit or Pool Shop Free testing.</p> <p><b>Frequency : Monthly</b></p>	<p>Raise by using Sodium Bicarbonate. Approx 450 grams per 10,000 litres (e.g. 2.25kg for 50,000 litres) to raise from 60ppm to 100ppm.</p>
pH	<ul style="list-style-type: none"> <li>Reduced sanitation effectiveness</li> <li>Plaster and concrete etching</li> <li>Corrosion</li> <li>Cloudy water</li> <li>Bather discomfort</li> </ul>	pH 7.1-7.5	<p>Use supplied test kit or Pool Shop Free testing.</p> <p>We recommend checking the pH level of the water every 2 weeks. <b>New concrete or plaster pools require weekly checks of the pH for 2-3 months, until the concrete has fully cured.</b> Quartzzone pools should be tested daily until stabilised. Allow the acid to fully mix before testing.</p> <p><b>Frequency : Fortnightly</b></p>	<p>The pH of your pool water is increased by adding sodium bi-carbonate, and reduced by adding hydrochloric acid or sodium bisulphate (dry acid).</p> <ul style="list-style-type: none"> <li>Dry acid at the rate of 50 grams per 10,000 liters.</li> <li>Hydrochloric acid add 50 ml per 10,000 liters.</li> <li><b>When mixing acid with water, ALWAYS ADD ACID TO WATER, NEVER ADD WATER TO ACID</b></li> </ul> <p>Test pH again; and if it is still high repeat until the correct pH level is obtained.</p>

Balance Parameter	Symptoms	Ideal Range	Measurement	Adjustment
Water Hardness	<ul style="list-style-type: none"> <li>Etching and Corrosion</li> <li>Cloudy Water</li> </ul>	200-250ppm	Take sample to pool shop.  <b>Frequency : Monthly</b>	In order to reduce calcium, you will need to dilute the pool water by draining part of the water and adding new water. Calcium chloride can be added to the pool in order to raise calcium hardness. In order to raise calcium hardness by 10 ppm, you can add 150 grams of calcium chloride per 10,000 litres of pool water.
<ul style="list-style-type: none"> <li>Total Dissolved Solids (TDS)</li> </ul>	<b>Low</b> <ul style="list-style-type: none"> <li>poor ORP and Ion dispersal</li> </ul> <b>High</b> <ul style="list-style-type: none"> <li>Excessive current load on ES2</li> <li>Bather discomfort</li> </ul>	1000 - 1500 ppm	Take sample to pool shop.  <b>Frequency : Monthly</b>	If TDS is low adding 5kg of pool salt per 10,000 litres of water will raise the TDS by around 500ppm.  If TDS is too high dilution is required. Calculate dilution requirement taking into account the TDS of the diluting water.

### 1.1.3 Adjusting Copper/Silver Levels

The desired copper range is between 0.2 to 0.4 ppm. The Enviroswim system works best at these levels. To increase copper levels, increase the run time and/or ionizer output of the Enviroswim system. To reduce copper levels, turn down the ionizer output of the Enviroswim system. As a guideline, to reduce copper levels from 0.7 to 0.4 ppm, the Enviroswim ionizer system can be left off for 7-10 days, dependent on weather and bathing loads. Levels are easily checked by means of the supplied copper test kits (reorder from Enviroswim). Always ensure pH is balanced before testing copper levels in order to avoid getting a false reading.

It is very important that copper levels are not allowed to exceed 0.4 ppm for extended periods, as copper staining may appear. Prolonged high copper and/or high pH levels will lead to the copper coming out of suspension, and may produce a very light blue stain on the mortar of pebble pools. This effect is not harmful to swimmers or the pool, and if desired can be removed with some effort. Pool owners that have let this happen find the blue tint actually enhances the pool water's appearance.

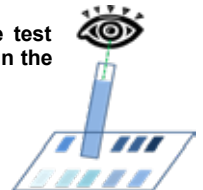
If the copper level rises above 0.4 ppm, turn down the Enviroswim ionizer unit and dilute the pool with fresh water to reduce the copper level to 0.4 ppm. Unlike chlorine, copper/silver are extremely stable in water making the level very easy to maintain.

**Note:**

**Enviroswim will not be held responsible for damage caused by excessive copper levels.**

**NOTE:** If you take a water sample to a pool shop for a copper test, you may get a false reading if the pool pH has been high during the 24-hour period prior to the sample being taken from your pool. Some types of testing equipment can also give a false reading due to the silver content in the sample. We strongly advise that you use the test kit and instructions provided with the Enviroswim system to avoid misleading results that can cause high copper levels and excessive wear of the copper/silver anodes.

When using the supplied test kit ensure that you look down the test tube when comparing to the colour chart. The colour is best read in the shade.



## 2 Basic Theory

There is no such thing as a maintenance-free pool. However, the Enviroswim system requires only a few minutes each week to keep your pool in top condition while it saves money. This section of the manual gives some basic insight into the theory of the processes at work on your pool when using the Enviroswim system.

### 2.1 Ionization

The use of copper and silver to sanitise water is well documented and the process has been used for thousands of years. Copper is a very powerful algaecide and silver is a very powerful biocide. When the two metals are combined and introduced to the water using electrolysis, they become a formidable sanitiser. The required residual level of copper and silver introduced to the swimming pool is well below acceptable drinking water standards making for a very safe residual sanitiser.

### 2.2 Electronic Oxidization (ORP generator)

Traditionally copper and silver ionisation systems have required an oxidiser to be added to the pool water to help burn out organic compounds (oils, dust, leaf stains etc.). The most common form of oxidiser used for this purpose has been chlorine. There is a growing concern regarding the adverse health effects of chlorine and its associated by-products (Chloramines)



Enviroswim has eliminated the need to add chlorine to the pool by incorporating an electronic oxidising unit into the system. ORP stands for Oxidation-Reduction Potential. In practical terms, it is a measurement of the ability to oxidise contaminants. ORP is the only practical method we have to electronically monitor oxidiser effectiveness. In some parts of the world, it is also known as Redox Potential. Using electrolysis the Enviroswim system produces the oxidiser in sufficient quantities to maintain an acceptable ORP.

### 2.3 Ultrasonics

Ultrasonics used in the Enviroswim system further helps to improve the water quality by removing existing scale and preventing the formation of scale caused by silica in the water. This process improves the efficiency and reduces the operating costs of the pool filtration/circulation and heating equipment.





### 3 Initial System Start-Up

**If you employ a pool maintenance contractor, ensure that they read and follow these instructions as an Enviroswim System pool differs from common chlorine/salt pools.**

**These instructions should be followed whenever the pool has been refilled or the Enviroswim system is restarted after a prolonged shutdown.**

For ideal operation Enviroswim requires a TDS level of between 1000 and 1500 ppm to provide conductivity for its electronic processes. When converting Salt Water Pools or pools where TDS exceeds 2000ppm please contact Enviroswim.

If TDS is low adding 5kg of pool salt per 10,000 litres of water will raise the TDS by around 500ppm.

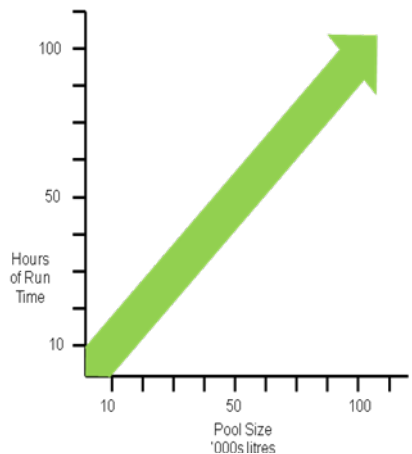
For new pools, or those that have just been refilled, add pool salt to ensure the conductivity of the water is high enough for the ionization process to take over. If retrofitting to an existing pool the conductivity of the water should be sufficient for the Enviroswim system process to initiate.

Ensure that the pool water is balanced (Alkalinity, pH and calcium hardness).

When the system is initially installed, it will need to be run continuously for a time to allow the various processes to take effect in the pool. The time taken to initialize the system will vary, depending upon the volume and conductivity of the pool water. Typically a 50,000 litre pool would take 24-48 hours of operation to build up the copper level to the required 0.25 ppm. Larger pools may take up to 2 weeks.

Perform the following steps to allow the Enviroswim system to be running in the start-up mode:

1. Balance the water as per above. Ensure all Enviroswim switches are set to OFF and variable controls (Ioniser and ORP) at minimum (fully counter-clockwise).
2. Turn on the pool pump so that water is flowing through the filtration system and the Enviroswim ionization/oxidation chamber and ultrasonic emitter pipe. Set the left hand switch on the Enviroswim unit to MANUAL. Make sure that the ionization/oxidation chamber is filled with water.
3. Turn on the right hand ON/OFF switch on the control box.
4. Turn the knob on the control box under the ORP meter slowly clockwise until the ORP meter reads between 13 - 15 Amps.
5. Turn the ioniser switch to maximum. Run the unit for approximately 1 hour per 1000 litres of water and test copper level.



6. Perform chemical tests to determine readings for pH, ORP, alkalinity, copper, and calcium hardness then adjust accordingly. Refer to Operating Manual for appropriate treatments.
7. Test the copper level and when in the range 0.2-0.4 ppm set the system for the appropriate run time and adjust the Ioniser output knob to position 9 (23%) (see page 12) and monitor copper levels every few days to ensure copper level is staying within the 0.2 - 0.4 ppm range. If not, adjust ioniser knob accordingly to the fine tune the setting for your pool after which you should routinely check copper level every 2 - 3 weeks.
8. Startup is now complete. Refer to the operating manual for a guide on run times. Remember every pool is different. Factors that will impact runtime are location, bather load, season, type of cover and water temperature.

### **When can I use the pool?**

It is OK to use the pool while the Copper levels are being established provided the Enviroswim system is processing the water continuously and the correct water balance (pH, alkalinity and hardness) is established. The Oxidation process will treat organic matter and as water flows through the cell it will be being treated with concentrated Copper and Silver ions. We recommend that the water is allowed to circulate at least once (allow 1 hour per 10,000 litres) before swimming.

### **High Cyanuric Acid levels**

Where a pool has been treated previously with chlorine (particularly with tablet feeders) there may be high residual cyanuric acid levels. This can adversely affect operation of the ES-3. Contact Enviroswim.

## 4 Maintenance

### 4.1 Basic Maintenance

The Enviroswim system is very low maintenance. Only the copper and silver electrodes are consumable and require periodic adjustment and replacement. The oxidizer plates and copper/silver electrodes are self-cleaning and the ultrasonic system is maintenance free.

#### 4.1.1 Fuse

Fuse replacement: 240 Volt, 10 Amp, Slow Blow

**WARNING:** There is a risk of electrical shock, fire and damage to the unit if an incorrectly sized fuse is installed in the fuse holder.

#### 4.1.2 Replacement of Electrodes



The copper/silver electrodes are a consumable and will require periodic replacement. The life of the electrodes will depend on many factors including pool use, maintenance, dirt and other debris that are allowed to build up in the pool. The electrodes should be changed before they become so small that they fall off the stainless steel threaded rod that holds them in place.

**Note:** Replacement electrodes can only be purchased through Enviroswim. Using any electrodes not supplied by Enviroswim will void any remaining warranty. Enviroswim will not be held liable for the performance or effectiveness of the system when other manufacturers' electrodes have been installed.

#### 4.1.3 Cleaning Oxidiser Plates

Plates should only be cleaned if severely scaled and the ES3 is unable to draw 15 amps (as per the digital display). Scaling on the plates generally indicates that the pH has been high for extended periods (above 7.6). Refer to section 5.1 on Langlier Saturation Index and make sure that the pool is operated with an appropriate LSI.

Before cleaning check the following

- TDS is within range – 1000-1500 ppm
- No loose connections.

Scale may be loosened by striking **gently** with wooden or



plastic objects. Take care not to damage the plastic separators.

Once all excess scale is removed clean plates by soaking in a 75/25% ratio water/hydrochloric acid solution. A 1.25 litre softdrink bottle with the top cut off is an ideal size for bathing the plates. Do not leave the plates in the solution for extended periods - 3 minutes should be sufficient if excess scale has been removed. **Ensure that the water level sensor is cleaned.**

**Never use metal objects to clean the plates as this will damage the coating.**

**Remember : Always add Acid to Water when diluting.**

## 5 Troubleshooting

Problem	Possible Cause	What to do to fix it
Blown fuse	<ul style="list-style-type: none"> <li>• Undiluted chemicals added to pool or skimmer basket</li> <li>• Short circuit on oxidizer plates</li> <li>• Internal electrical fault</li> </ul>	<ul style="list-style-type: none"> <li>• Turn off power to control box. Replace fuse and allow clean water to circulate through the system before switching on.</li> <li>• Check for any short circuit and clear</li> <li>• Contact Enviroswim</li> </ul>
Copper level too low	<ul style="list-style-type: none"> <li>• Low conductivity</li> <li>• Excessive makeup water added due to leak in pool or equipment</li> <li>• Build up of scale on copper/silver electrodes</li> <li>• Electrodes worn away</li> <li>• Pool system not running long enough</li> <li>• pH not within 7.1 to 7.5 range for at least 12 hours before using copper test kit.</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to operating instructions</li> <li>• Repair leak</li> <li>• Clean rods and ensure that the chemical balance of pool water is correct</li> <li>• Replace with new electrodes</li> <li>• Refer to operating instructions</li> <li>• Stabilise pH at correct levels.</li> </ul>
Excessive scale build up on plates in oxidation chamber	<ol style="list-style-type: none"> <li>1. pH to high.</li> <li>2. High calcium content (water hardness) in pool water.</li> <li>3. Langlier saturation index at a scale forming level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce pH. Refer section 1.1.2. Maintaining correct pH should allow mild scale build up to dissipate.</li> <li>2. For severe scale build up refer to section 4.1.4 Plate Cleaning.</li> <li>3. Check Langlier Saturation Index – should be slightly negative – refer to 5.1 below.</li> </ol>
Flashing Oxidiser Production Digital Display	<p><b>Pb</b></p>	<p>This will be a flashing display that indicates that the system is not applying current to the oxidiser plates due to any of</p> <ul style="list-style-type: none"> <li>• Air in the system</li> <li>• Insufficient water flow</li> <li>• Calcium build up on plates.</li> <li>• Calcium build up on water sensor.</li> <li>• The wire to the water sensor is loose.</li> </ul>

Flashing Oxidiser Production Digital Display	OL	<p>This will be a flashing display that indicates that current is no longer being applied to the oxidiser plates. This is done to protect the Enviroswim unit due to excessive current draw that may be caused by</p> <ul style="list-style-type: none"> <li>• Excessive TDS (greater than 3000ppm)</li> <li>• Undiluted chemicals added to skimmer</li> <li>• Short circuit across the oxidiser connections or plates.</li> <li>• Short circuit across the loniser connections or electrodes</li> <li>• Short to ground on any of the control unit outputs</li> </ul>
Control Unit Overheating	TP	<p>Indicates an undesirably high operating temperature for the control unit. The unit will shutdown to prevent damage most likely caused by:</p> <ul style="list-style-type: none"> <li>• Excessively low TDS</li> <li>• Air-flow vents on the underside of the unit are blocked</li> <li>• Excessive ambient temperatures</li> </ul>
Control unit resets	Short to earth on controller outputs	<p>Remove all output connections and the resetting should stop. Check for and rectify any shorts to earth on the output leads/wet end components.</p>
Cloudy Water	<ul style="list-style-type: none"> <li>• Insufficient run time</li> <li>• Poor water balance</li> <li>• High Bather load</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust runtime. Call or email Enviroswim to consult.</li> <li>• Correct water balance (pH, alkalinity, Calcium Hardness)</li> <li>• Shock with Oxys shock or liquid chlorine.</li> </ul>

<p>Algae in Pool</p>	<ul style="list-style-type: none"> <li>• Low copper levels</li> <li>• Phosphates (fertiliser) in pool</li> </ul>	<ul style="list-style-type: none"> <li>• Test for copper using test kit. Run ES-3 for required time to achieve the required copper levels.</li> <li>• Test for phosphates. Use phosphate remover (remember to turn off ES3 cell power if adding to skimmer basket). Phosphates and Algae will both consume the copper. It is important to restore the copper levels by running the ES3 continuously. After a few days Algae should clear. Should you wish to clear faster shock dose with chlorine. Avoid the use of Algaecide.</li> <li>• Remember when treating to maintain pH levels between 7.2 and 7.4.</li> </ul>
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## 5.1 Langlier Saturation Index

**Maintaining good water balance will ensure trouble free operation, prevent scale build up and extend plate life.** Some Enviroswim users experience small amounts of scale from the Oxidiser plates appearing in their pools (only an aesthetic issue) or in extreme cases excessive scale build up on their plates requiring manual cleaning. Most users do not experience this and the self cleaning plates usually have very little scale build up.

The difference in these situations is the pool water balance across all of the balance elements. The most volatile pool balance parameter is pH. It is also one of the easiest to adjust. Maintaining pH only is not enough to prevent scale formation.

The Enviroswim operating manual outlines the recommended values for water balance parameters. These are generally expressed as ranges such as pH in the range 7.1-7.5. These balancing chemicals interact in total with each other to establish an overall balance which is referred to as either scale forming or corrosive. Some of the balance elements are very stable and others such as pH are very volatile. As things are expressed in ranges – if all elements are present at the top end of their ranges it is likely that you will have a scale forming environment. If you are experiencing excessive scale buildup on your plates or having small flakes of scale from the plates appearing in your pool it is likely that your pool has a balance that is scale forming.

The Langlier Saturation Index (LSI) is a method for determining the scale forming potential of the water. Some pool shops will calculate this index for you and some understand its use, otherwise there are on-line calculators such as <http://www.cleanwaterstore.com/technical/water-treatment-calculations/langlier.php>

and now some smartphone apps. The LSI should be kept slightly negative to prevent scaling.

The parameters that are used in a complete LSI calculation are

- pH
- Calcium Hardness
- TDS
- Alkalinity
- Temperature

As a rule the higher the value for an element the higher the saturation index calculated and a high value for one element may be offset by a low value for another element. The recommended range for the index is from -0.5 to 0.0 – i.e. slightly negative. The entire range provides acceptable LSI values as it is only at values outside of the range -0.5 to 0.5 that action would usually be taken.

The table below shows the LSI calculation for the extremes of the recommended Enviroswim ES-3 balance ranges at 20 and 27 degrees Celsius.

Element	Bottom of Range		Top of Range		Ideal	
pH	7.0		7.5		7.2	
Calcium Hardness	200		250		200	
Total Dissolved Solids	1000		1500		1000	
Alkalinity	80		150		100	
Temperature (°C)	20	27	20	27	20	27
LSI	-0.24	-0.14	+0.47	+0.57	-0.04	+0.05
Analysis	Ideal	Ideal	Some Faint Coating	Some Faint Coating	Near Balanced	Near Balanced



## 6 Specifications, Warranty and Contacts

### 6.1 Standards

Type	Standard	
Electrical	AS/NZS 3136	Electrical Equipment for Spa and Swimming Pools
	EN 55014-2 EN 61000-3-2 EN 61000-3-3	Electromagnetic Compatibility
Chemical	APVMA	Australian Pesticides and Veterinary Medicines Authority Approval no. 58847
Efficacy	NSF/ANSI 50	Approved as a hybrid system by the National Science Foundation (US) Cert # 4D640-02
	NZS5826	New Zealand Pool Water Quality Standards
HSO		New Zealand Drinking Water Standards 2005

### 6.2 Warranty Information

The Enviroswim system has a two (2) year replacement warranty on the control box.

### 6.3 Contact Information

#### Watertech Services International

P O Box 5835  
GCMC Bundall  
Queensland 9726

Phone : 1300 888 457  
Outside Australia email [info@enviroswim.com](mailto:info@enviroswim.com)

**Email : [info@enviroswim.com](mailto:info@enviroswim.com)**

## 7. Winterise Your Enviroswim Pool

Winterising your Enviroswim treated pool is an area where large savings can be made. Once the water becomes too cold for bathing the daily run time of the pump/enviros swim can be reduced to save on electricity which is one of the highest pool running costs. The final winterised run time depends on the pools surrounding environment as the pump will need to run long enough for the filter to remove dirt and organic material that enter the pool. Many pools owners can reduce the run time to a few hours a week, others surrounded by falling leaves or dust require longer to oxidise and filter the rubbish.

The residual copper & silver will take care of algae and bacteria as they continue to work 24/7 regardless of the pump run time. This is because unlike chlorine they do not evaporate and maintain their residual level in the pool water for weeks even months when there are minimal levels of bacteria or algae for them to control. Therefore, it is important to continue to balance the pH & check copper levels regularly during the winter to ensure maximum efficiency of the ions and avoid possible overdose of copper/silver resulting in premature wear of the electrodes. The ioniser output should be reduced or even turned off for a while if copper levels start to increase above 0.3 ppm.

Research has shown that many enviros swim owners fail to monitor or adjust the copper & pH levels during the winter months, instead they rely on a visual look at the water believing everything is OK because the water is crystal clear. This is a mistake and can result in high ion levels and in severe cases copper dropping out of solution by the end of the winter. The analogy we use is it is a bit like dissolving sugar in tea or coffee, there is a point where the sugar level gets so high it cannot remain soluble. Cooler water and zero bathers equals less copper/silver demands. All it takes is a few minutes of testing each month to make sure your pool is kept in good shape for the summer.

Always run the oxidiser on maximum (15) during winterisation as the oxidiser is required to treat suspended solids that enter the water. Vacuum the pool as & when required to avoid sediment building up which can stain and cause extra demand and runtime of the system

**Reminder:** To ensure an accurate copper reading the pool water pH must be below 7.6 preferably 7.3 when the test sample is taken. High pH water will cause a false (lower than actual) copper reading. Follow these guidelines and you will save money and have a great pool ready for the coming summer.



For more detailed information on water balancing and getting  
the best out of your system please visit our pool school site  
[www.enviroswimpoolschool.com](http://www.enviroswimpoolschool.com)

