Users Guide & Installation Instructions

Balboa Direct

The ECOmatic™ system provides crystal clear water naturally.

FOR MODELS:

ESC 16
ESC 24
ESC 36
ESC 48

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Packing List

Your ECOmatic product consists of the following components.
Please confirm all components before attempting to install your ECOmatic.

1 – Power Pack (Please confirm the Input Voltage is as ordered – 230V or 110V)
1 – Cell (Including clear plastic Cell Housing)
1 – Pack containing Mounting Screws, Wall Plugs and Spare Fuses
1 – Warranty Card

Welcome to the healthy luxury of a salt water swimming pool

We at ECOmatic are dedicated to providing you with the most luxurious, healthy, 'natural' pool water you have ever experienced, as well as the most reliable product and the best after-sales service you could hope for.

Reading this Guide will help ensure that your ECOmatic system functions correctly and efficiently, help avoid the expense of unnecessary service calls and make you aware of certain maintenance procedures which, if left undone, may void warranties offered by the manufacturer. Please refer to the Trouble-Shooting section of this Guide before calling for in-field service.

Overview of the ECOmatic Salt Water Pool System

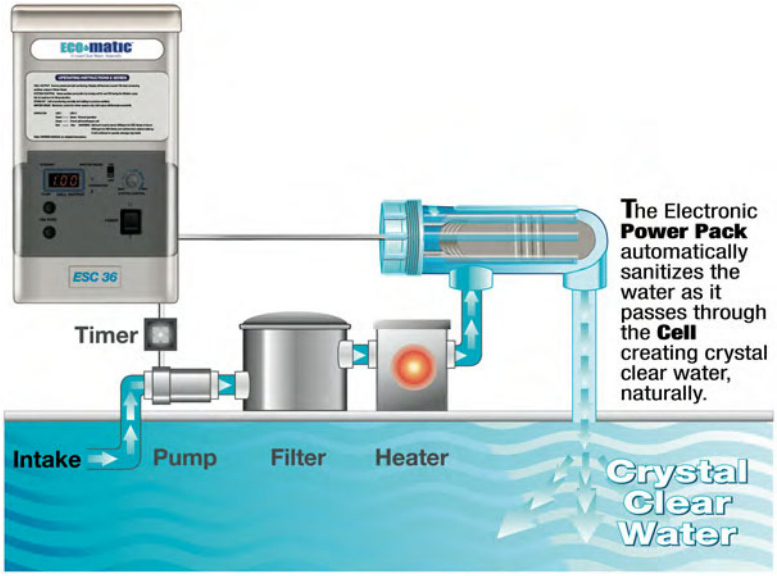
When salt (pure, natural evaporated ocean salt) is dissolved in pool water and then subjected to simple electrolysis (by way of the in-line ECOmatic 'Cell'), the chloride portion of the salt (sodium chloride) is transformed into an effective sanitizer,* which has the ability to oxidize (kill) bacteria, virus, algae and other such radicals which would otherwise flourish in the water. This process is reversible, so does not consume the salt, which is simply used over and over again.

Sized to suit your particular pool or spa, your ECOmatic system will provide all of the sanitizer necessary to maintain your pool/spa water in perfectly healthy condition, in an environmentally-perfect manner, by using and recycling a natural product – salt. Your ECOmatic will do exactly the same thing as 'pool chlorine' would do, but without the need to add (or swim in) potentially harmful, toxic man-made sanitizing chemicals.

*(HOCl the same effective sanitizer as would result if 'pool chlorine' was added to the water – but without the potentially dangerous chlorine compounds and the obnoxious 'chemical' effects commonly associated with manual chlorination – and without the need to handle chemicals.)

Your ECOmatic Equipment

When correctly installed, your ECOmatic will operate ONLY WHEN THE FILTER PUMP IS OPERATING and water is flowing through the 'Cell'. Your ECOmatic must **NOT** be able to operate while the filter pump is OFF. If your ECOmatic continues to operate after the filter pump is switched OFF (as indicated by bubbling and cloudiness at the 'Cell'), **turn it off immediately**, contact your ECOmatic Dealer or the person who installed your ECOmatic immediately and ensure that the fault is rectified.



Installation Check List

Your ECOmatic installation is complete when the following have been completed:

- 'Cell Housing' installed into plumbing.
- 'Cell Housing' should be mounted 'horizontally'.
- 'Cell Housing' should be located downstream from filter, heater and all other accessories, and before any spa valve.
- Water flow direction should be away from the head of the 'Cell' in poor flow rate conditions.
- 'Cell' properly in place in 'Cell Housing'.
- 'Power Pack' mounted in place.
- 'Power Pack' connected to main power (be sure your 220/240V or 110V ECOmatic is connected to correct voltage).
- You must check and confirm that your ECOmatic 'Power Pack' switches ON and OFF coincidentally with the filter pump.
- 'Power Pack' connected to 'Cell' (including the **Gas-Sensor** connection).
- Sufficient salt dissolved into pool water.

Understanding the ECOmatic System

Your ECOmatic uses the dissolved salt in the water to produce the sanitizer necessary to maintain your pool/spa water in a safe and healthy condition.

The amount of sanitizer produced by the ECOmatic and the quantity of salt (the salinity) in the water are related, but must be maintained and controlled as <u>two separate factors</u>:

Sanitizer:

The amount of sanitizer required for your pool varies from time to time and depends upon a number of variables, including the number of swimmers in the pool, water temperature, etc.

To determine whether your ECOmatic is producing sufficient sanitizer for YOUR pool/spa, the sanitizer level in the pool/spa must be measured using a normal 'chlorine' Test Kit. The sanitizer level in the water can then be adjusted up or down as desired, by adjusting the quantity of sanitizer being produced by the ECOmatic (refer to **System Control**).

Low sanitizer levels should not be confused with a low salt level, and adding more salt will not necessarily increase the sanitizer level. The salt level should be controlled and maintained separately – see below.

Salt Level (Salinity):

Your ECOmatic will indicate (Control Panel) whether the salt level in the water has fallen below the desired minimum operating level. The system will continue to produce sanitizer in low salt conditions (at a decreased rate, and only until the automatic Cut-Out applies – if your product includes this feature) but low salt conditions cause increased wear on the 'Cell' and will shorten the life of the 'Cell'. When your ECOmatic indicates a Low Salt condition, add salt to the water to correct the situation. Measure and control sanitizer levels separately, as described above.

Note: Never add salt in order to increase sanitizer level. Only add salt, as necessary, to maintain minimum salt level.

The Amount of Sanitizer Produced by ECOmatic Depends Upon:

a) The daily operating time of the equipment (pump/filter and ECOmatic). Suggested operating times vary depending on weather conditions, pool usage, etc (as little as 4 hours in winter, to 8-12 hours in summer or more in certain adverse conditions).

b) The **System Control** setting (high or low)

c) The condition of the ECOmatic 'Cell' (clean or dirty)

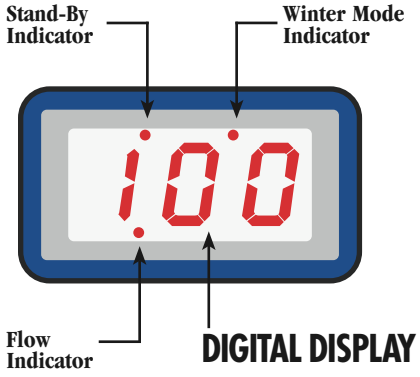
The rate of sanitizer production will decrease as the 'Cell' (ESR Models) accumulates scale (calcium, etc), or if the salt level in the water decreases and, in time, as the 'Cell' nears the end of its life.

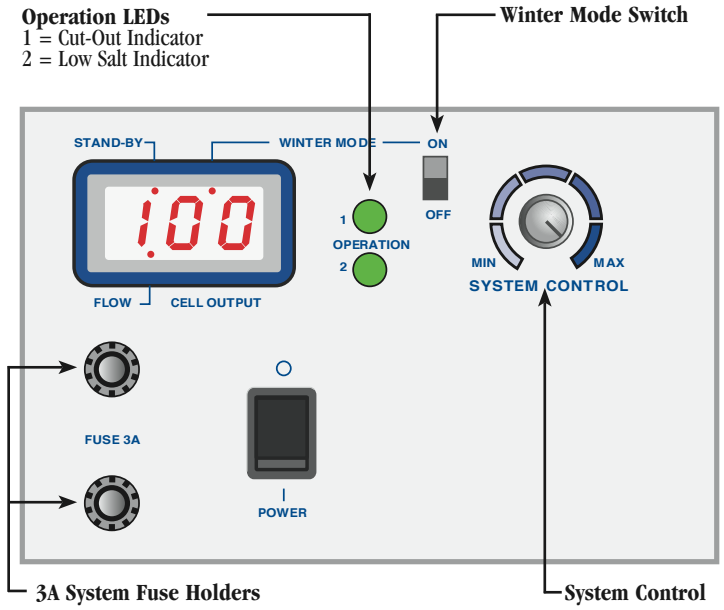
Note: Your Test Kit is your ONLY INDICATOR of whether your ECOmatic is producing sufficient, too little, or too much sanitizer for your pool.

If your ECOmatic is producing TOO MUCH SANITIZER, turn the **System Control** DOWN, or reduce the daily operating time (being sure to maintain at least the minimum recommended daily filtering time).

If your ECOmatic is producing TOO LITTLE SANITIZER, turn the **System Control** UP, or increase the daily operating time of the equipment (and refer to trouble-shooting, including stabilizer/conditioner level).

Controls and Display Panel





The rate at which your ECOmatic produces (sanitizer for your pool) varies (see below) and is indicated on the DIGITAL DISPLAY (Eg: 90 – 100 or in winter mode 75 – 85).

There are two lights on the Control Panel – LED 1 and LED 2 – which will indicate whether the system is working as intended or whether there may be faulty or damaging operating conditions (such as low salt levels). If these warnings are ignored, the Unit will either **Cut-Out** (only if your ECOmatic includes the Cut-Out feature) OR otherwise, continued operation will result in damage to the 'Cell'.

Start Up

1. Turn the POWER ON (first time only). Power setting "|". Switch filter pump ON (ECOmatic also gets power). ECOmatic power switch can then be left ON and filter power control will also control the ECOmatic.

2. The unit will enter a START-UP PHASE (which will repeat itself at the start of each filtration period). The STANDBY light will be ON, but there will be no 'Cell' output (sanitizer production).

3. After the Start-Up delay, the DISPLAY should indicate around 90 – 105 (unless set in the Winter Mode). With the correct amount of salt added and dissolved, both LED 1 and LED 2 will be GREEN. If LED 2 is RED, there is insufficient salt in the pool. See the table on the page 6 for other installation related problems.

Digital Display

The **DIGITAL DISPLAY** indicates how the ECOmatic is performing, compared to its maximum design output. 90(%) – 100(%) range is common. Normal Winter Mode readings 75 – 85.

Indicators - What They Mean

Output readings on the DIGITAL DISPLAY can fall due to any (or combination of) the following: cooler water temperatures, warming of power pack (in heated equipment rooms for example), lower than normal power voltage, lower salt levels, scaling occurring on 'Cell'.

Provided LED 1 and LED 2 are both GREEN (and the 'Cell' is not scaling excessively), your ECOmatic is performing (producing) satisfactorily.

Indicator	Display	LED 1	LED 2	What's Happening
STAND-BY ON	Blank	Green	Green	1. Unit is in **start-up** mode. 2. 'Cell' is in OFF cycle during normal operation. (refer **System Control**) 3. **System Control** set at MIN.
FLOW ON	Blank	Green	Green	1. Insufficient flow through 'Cell' (gas or air at STAND-BY ON 'Cell', check pump/pipes for damage, leaks). 2. Gas Sensor lead not connected to 'Cell'. 3. System is wired incorrectly.
	Approx 90-100	Green	Green	System operating normally.
	Approx 90-100	Green	Red	1. 'Cell' is dirty, scale build-up. Clean 'Cell'. 2. Water temperature cold. Switch to **Winter Mode**. 3. Salt Level below minimum. Add salt. 4. 'Cell' failing. Test and/or replace 'Cell'.
	Varying	Red	Red	Unit preparing to **Cut-Out**. (see **Low Salinity Indicator** and **Cut-Out**) Units without the Cut-Out feature will continue to operate but with potential shortening of 'Cell' life. 1. 'Cell' is dirty, scale build-up. Clean 'Cell'. 2. Water temperature cold. Switch to **Winter Mode**. 3. Salt Level below minimum. Add salt. 4. 'Cell' failing. Test and/or replace 'Cell'.
STAND-BY ON	Blank	Red	Red	System Protection activated. Unit has **Cut-Out**. Follow above procedures
WINTER MODE ON	Approx 75-85	Green	Green	System operating normally - in **Winter Mode**. Only operate in **Winter Mode** if water is very cold. Red LED(s): Scaled 'Cell' or Low Salt Level.

Operation of the ESC Models

The ESC Models operate similarly to the ESR Models, as shown above. The ESC Models have the following additional features:

a) **Polarity Indicator**: The + or - symbol appears before the **Digital Output Display**, to indicate the polarity in which the system is operating (i.e. positive or negative direction of 'Cell' current). The symbol will alternate according to pre-set factory settings and does not effect the normal operation of the unit.

b) **System Control**: When the **System Control** is being adjusted, the ESC units will indicate (flashing) the percentage of time that the 'Cell' will operate during the filtration cycle (for a few seconds, then display reverts to 'Cell' Output display).

c) **'Cell' Cleaning**: The ESC units use a patented Electronic Auto-Cleaning system for the 'Cell'. 'Cells' may eventually scale in extreme hard water conditions and will require manual cleaning if this occurs.

d) The second **Low Salinity** warning phase (Red + Red LED's) is very short. Therefore on first warning phase (Red + Green LED's) prompt action is recommended to avoid **Cut-Out**.

Stand-by Indicator

The **Stand-By** indicator will be ON when the Unit is preparing to produce sanitizer. This will be either during the system's initial **Start-Up** or when the 'Cell' is in an OFF cycle during the filtration cycle (refer **System Control**). Stand-By indicator can also be ON after System Protection Cut-Out has activated. (ie: when unit has shut down).

Flow Indicator

If there is a problem with water flow or gas is detected in the 'Cell Housing' the **Flow** indicator will be ON. When this occurs the pump or pipes should be inspected for damage and the **Gas Sensor** on the 'Cell' checked for correct connection (and scale build-up on bolt head).

System Control (Output Control)

The **System Control** allows you to control the amount of sanitizer to be produced during any filtration cycle (filter operating time).

The setting on the **System Control** determines the amount of time for which the ECOmatic will operate during the filtration cycle. The **System Control** dial is graduated approximately as follows: 0% (MIN), 20%, 40%, 60%, 80%, (MAX) 100%.

The **System Control** will not vary the rate at which the 'Cell' will produce sanitizer (as indicated on the DISPLAY), just the 'time' for which the ECOmatic will produce sanitizer. For example:

Daily Filter Operating Time	System Control Setting	Hours of Sanitizer Production
8 hours	60%	4.8 hours (60% of 8 hours)
12 hours	20%	2.4 hours (20% of 12 hours)
8 hours	100%	8 hours (100% of 8 hours)
6 hours	50% (halfway)	3 hours (50% of 6 hours)

When the **System Control** is set to MIN, the 'Cell' will be OFF for the duration of the filtration cycle.

When the **System Control** is set to MAX, the 'Cell' will be ON for the full duration of the filtration cycle.

The **System Control** is graduated in steps of 20% from MIN (OFF) to MAX (ON). (Refer diagram to the right)

Note: If the ECOmatic is controlled by ORP chemical automation, turn the control knob to MAX.

During any filtration cycle, when the **System Control** is set between MIN and MAX, the 'Cell' will be turned ON and OFF a number of times each hour. Using the previous example (of 60%), the 'Cell' will operate for about 36 minutes each hour. This 36 minute operating time will be made up of a number of smaller operating periods. As an example, the 'Cell' may turn ON 12 times (for a period of 3 minutes each time) to make up the 36 minutes. This enables the electronic circuitry to re-adjust to any changes in the pool water condition. For example, dilution from winter rains, the addition of salt, etc.

If the 'Cell' is OFF and you wish to check its operation, simply turn the **System Control** to MAX and the 'Cell' will turn ON. Once checked, adjust the **System Control** back to the desired position and after a few minutes the 'Cell' will turn OFF again.

To turn the 'Cell' OFF, simply turn the **System Control** to MIN. This will be convenient when backwashing filter.

Low Salinity Indicator and Cut-Out

Your ECOmatic is fitted with a number of protective features including the **Low Salinity Indicator**, and on some models, a **Cut-Out** feature.

As the salt level in the pool decreases, the wear on the 'Cell' increases. Although salt is not consumed in the ECOmatic process, it is lost through splashing, back-washing and on bathers as they leave the pool. The salt level is also reduced by rain, which causes dilution. Salt is not lost to evaporation. As the salt level in the pool falls toward the minimum, **LED 2** will turn RED. At this point the salt level should be increased by adding approximately 50 lbs of salt per 5000 gallons of water. If no action is taken and the salt level continues to fall, the **Low Salinity Cut-Out** will activate and **LED 1** will also turn RED. It is advisable to satisfy yourself that the salt level is in fact low, prior to adding salt, as LEDs 1 and 2 can activate for reasons other than 'low salt'. Salt Tests Strips can be used to confirm the salt level in the water. If you have no means of measuring salt level, add the suggested amount of salt and dissolve it by vacuuming or sweeping onto floor drain. If the LED indicators do not change, the salt level in the water MUST be measured prior to adding additional salt (take a sample to your local pool store or send a sample to your ECOmatic Dealer for testing). This will prevent adding too much salt when 'low salt' may not be the problem.

When the Cut-Out feature activates, the ECOmatic will no longer produce sanitizer, but will switch itself ON a number of times each hour and assess whether the problem(s) (low salt for example) have been corrected. If the problem still exists, the unit will switch OFF once again.

Other factors which can activate the **Cut-Out** feature:

1. **Heavy Rain** - can cause very dilute pool water to pass over the 'Cell' due to surface skimming. The Unit will turn back ON after the rain has been mixed into the water unless the salt level has been reduced by dilution/overflow.

2. **Scaled 'Cell'** - a scaled 'Cell' will not draw as much electrical current as a clean 'Cell' when first started. This will cause the **Cut-Out** to operate. This is very beneficial as a scaled 'Cell' can cause an overload if it is operated for a few hours. Heavy scale build-up also increases the wear on the 'Cell'.

3. **Cold Water** - cold pool water reduces the ability of a 'Cell' to carry electrical current. (Refer **Winter Mode** below).

4. **Failing 'Cell'** - as 'Cell' ages there will come a time when the electrical current draw will drop. This can be compensated for with the addition of extra salt. A 'Cell' is considered failed when it draws less than 80% of maximum current. To keep a failed 'Cell' in operation, **Winter Mode** can be used along with extra salt. There will come a time when the 'Cell' will not respond to either extra salt or **Winter Mode**. It will then need to be replaced.

Winter Mode

When the 'Cell' draws electrical current from the Power Supply, the amount of current drawn is dependent upon a number of factors. Two of these factors are **Salinity** and **Water Temperature**.

The **Low Salinity Indicator** and/or **Cut-Out** on your ECOmatic are designed to operate at swimming season water temperatures. When the pool begins to cool in the off season the temperature drop causes the 'Cell' to behave differently – it will draw less electrical current. This can cause the **Low Salinity Indicator** and/or **Cut-Out** to assume that the salinity has fallen even if the salinity has remained relatively constant.

When the temperature of the pool water drops (typically when it is too cold to swim), the **Winter Mode** Switch should be placed in the ON position. The **Winter Mode** Indicator will then be ON.

Winter Mode setting has two effects:

1. It alters the setting of the **Low Salinity Indicator** and/or **Cut-Out**.

2. It reduces the Cell Output by approximately 15%.

The Unit will now respond to a cold pool environment. **Winter Mode** should not be used in the swimming season as it reduces the **Cell Output**, leading to less sanitizer, and it alters the setting of the **Low Salinity Indicator** and/or **Cut-Out**, which could lead to premature 'Cell' failure. It is recommended to turn off and stop using the ECOmatic at temperatures below 50˚F (10˚C). This is usually not a problem because bacteria and algae stop growing at this temperature.

Gas Sensor

The smaller of the three leads which connect to the 'Cell' head is the **Gas Sensor**. Whenever the head of the Gas Sensor bolt loses contact with the water (due to gas or air pocket in 'Cell', or scale build-up on sensor bolt head), your ECOmatic will **Cut-Out**.

Day to Day Operation of ECOmatic

Your ECOmatic must operate daily in order to produce sufficient sanitizer for your pool. In average summer weather conditions, with average family use of a pool, the daily operating time should be the daily operating time should be as recommended by your filter manufacturer or pool maintenance person - in average summer climates usually 6 - 8 hours per day, but in hot climates and if pool is heavily used as much as 12 or 14 (or more) hours per day. Your TEST KIT is the ONLY means of determining whether your ECOmatic is producing sufficient sanitizer for your pool.

It is suggested that the daily operating time be broken down into 2 sessions – one in the early morning and one in the late afternoon, early evening. This will optimize the effectiveness of the sanitizer which the ECOmatic produces.

Shocking the Pool

Periodically, especially in very hot climates and if the pool is heavily used, it may be necessary to boost the amount of sanitizer in the pool in order to maintain absolute sanitation of the water. This can be achieved simply by operating the ECOmatic for an extended period (say 24 hours) with the System Control set at MAXIMUM.

Maintenance of Your ECOmatic

The 'Power Pack'

The POWER PACK should require very little (if any) maintenance – except maybe for occasional replacement of blown fuses. However, damage to certain components may result from improper maintenance of the 'Cell' (see below). Always ensure that the POWER PACK is located in a well ventilated area free of corrosive fumes from any acid or chemical containers in the vicinity.

Important Note: *The two most important maintenance requirements for your ECOmatic are:*

1. Cleaning the 'Cell' and

2. Maintaining sufficient salt level in the pool.

The 'Cell'

Maintenance of the 'Cell' is quite simple, but very important. ECOmatic 'Cells' are comprised of expensive materials and even with proper care and maintenance the delicate coating on the 'Cell' anode will eventually wear away and the 'Cell' will 'die' and will no longer be able to produce sufficient sanitizer for the pool. Proper care (and cleaning) will ensure the maximum life for the 'Cell'. Operating your 'Cell' on lower-than-recommended salt levels will shorten 'Cell' life and void 'Cell' warranties.

Cell Life

The life expectancy of ECOmatic 'Cells' may vary considerably from one installation to the next, due to variations in daily operating time, water quality and composition, system and 'Cell' maintenance.

The ESC48 and ESC24 models use the same size 'Cell'. However, due to the increased 'Cell' output of the ESC48, its 'Cell' will have a shorter life than that of the ESC24.

Please ensure that when it is time to replace your 'Cell', you use only ECOmatic replacement 'Cells. The use of imitations (or copies) of the ECOmatic 'Cell' may harm the internal components of your ECOmatic Power Pack and will void warranties.

Cleaning The 'Cell'

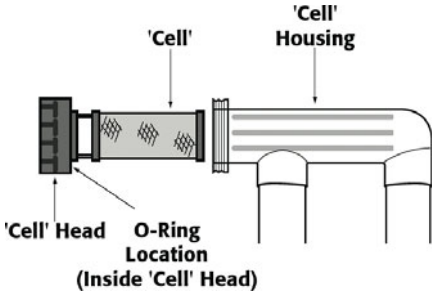
Mineral salts, calcium, etc. (scale) will accumulate onto the 'Cell' and will effect the efficiency of the 'Cell' in its production of sanitizer. If allowed to build up unchecked, this scale can damage the 'Cell'. It is therefore essential that the 'Cell' be cleaned whenever necessary, as indicated by visual inspection, a drop in Output and/or RED LED(s).

The rate at which the scale accumulates on the 'Cell' varies from pool to pool and is influenced mostly by the Total Hardness, Total Alkalinity and the ratio of these two important components of water balance. Rapid scaling on the 'Cell' indicates the need to adjust either the Total Hardness and/or the Total Alkalinity of the pool water (refer to Maintenance of the Water).

Removing The 'Cell' For Cleaning

There should be no need to disconnect the 'Cell' from its leads for normal 'Cell' cleaning. However, it may be necessary at some time to disconnect the cell ('Cell' replacement, warranty or service reasons).

The 'Cell' leads connect to the 'Cell' Head with push-in bayonet type connectors. Simply twist and pull each connector to disconnect. The Gas Sensor lead is a push-on connection, simply pull to disconnect. Do not attempt to remove by pulling on the wires. Be sure to color-match the connectors when reconnecting.



How To Clean The 'Cell'

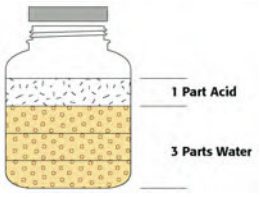
- Turn OFF filter pump before attempting to clean the 'Cell'.
- Remove the 'Cell' from the 'Cell Housing' by unscrewing the 'Cell' Head (Note: left-hand thread. Turn in direction of 'OPEN' arrow on 'Cell' Housing). No need to disconnect 'Cell' leads.
- Immerse the 'Cell' into the weak acid solution (see below) for as short a time as necessary for the scale to be dissolved off the 'Cell'
- If necessary, remove the 'Cell' from the weak acid solution, brush with a soft brush (never use a metal brush) to help remove stubborn scale, then re-immerse into the weak acid solution. Repeat until 'Cell' is completely clean of scale.
- Remember to also clean scale off head of **Gas Sensor** bolt (on inside of 'Cell' head).
- Either rinse the acid solution off the 'Cell' using fresh water, or immediately replace the 'Cell' into the 'Cell Housing and start the filter (so the pool water rinses the 'Cell').

NEVER tap or knock the 'Cell' against hard objects to help remove scale. 'Cell' will break.
NEVER clean the 'Cell' in undiluted acid solution (always dilute in water – see below).
NEVER leave the 'Cell' immersed for long periods in the acid solution (remove and rinse as soon as scale is removed).

When re-inserting the 'Cell' into the 'Cell Housing', ensure that the O-ring is in place (seated in the groove in the 'Cell' Head). If it is difficult to have the O-ring stay in its groove, apply lube gel to O-ring, then re-fit into groove. Do not over-tighten the 'Cell' (hand tight is OK).

Weak Acid Solution

Add 3 parts water to the 'Cell' cleaning container, then add 1 part acid (pool acid, muriatic acid) to the water, to a total depth which allows all of the 'Cell' to be immersed.



Warning: NEVER add water-to-acid. ALWAYS add acid-to-water

The weak acid solution can be stored in a safe place (some place where the kids can't get at it) and re-used for some time before becoming ineffective (saves having to make the solution each time). Avoid getting the weak acid solution on skin or in your eyes. If you accidentally do so, wash off immediately with fresh water (or use the pool/spa water).

Please do not hesitate to contact your ECOmatic Dealer for any assistance regarding 'Cell' cleaning.

Maintaining The Salt Level

It is important to always maintain at least the minimum recommended salt level (4000 ppm for ESR models, 3000 ppm for ESC models and 3000 ppm for ultra low salt ESR models) in the pool water (in some cases, spas can be operated at lower salt levels – check with your ECOmatic Dealer). Follow the advice of your pool maintenance person and/or your pool contractor or pool equipment supplier. Always maintain the specified minimum salt level for your ECOmatic model.

Operating your ECOmatic at lower than recommended salinity level will shorten the life of your 'Cell' and will void warranties on the 'Cell'. An excess of salt (up to 6000 ppm) is acceptable and will not harm the ECOmatic (in fact, the system operates more efficiently at higher salt levels).

Checking The Salt Level

Your ECOmatic has a **Low Salt Indicator (LED 2)**. When the level of salt in the water falls below the minimum level, **LED 2** will turn RED. The Unit will continue to produce sanitizer, but the situation should be corrected quickly. Otherwise the **Low Salinity Cut-Out** will shut down the ECOmatic (if your product has this feature).

The **Low Salt Indicator** (LSI) has been factory calibrated (plus or minus) to the minimum salt level (4000 ppm for ESR, 3000 ppm for ESC and 3000 ppm for ultra low salt ESR models) so could therefore activate at slightly higher salinity than the designed minimum salinity. If the LSI activates when you think there is sufficient salt in the water, a physical test kit measurement of the salinity is necessary to determine the facts (before questioning the **LED** indicators).

Salt Test Kits

Under normal circumstances you should not need to measure (test) the salt level in the pool/spa water. If you believe that the salt level may be exceedingly high, or if you do not trust the **Low Salt Indicator** on your ECOmatic, you may wish to measure salt level.

Various 'salt' test kits are available, and less expensive salt test strips can be purchased at most pool stores (test strip accuracy sometimes leaves a little to be desired). Some pool shops test for salt. You can also send water samples to your ECOmatic Dealer for testing.

How Salt Is Lost From Your Pool

The ECOmatic process does not consume the salt – it merely re-uses it over and over. No salt is lost through evaporation. However, salt is lost from the pool when water is lost – back-flushing filter, splash-out, overflow in rainy periods, leaks in the pool.

Note: Some ECOmatic owners find it convenient to add 5 - 10 lbs of salt after each back-flushing of the filter.

Adding Salt To The Water

Salt is generally available in 25 lb, 40 lb, 50 lb or 80 lb bags - available at most pool supply stores, home improvement centers, hardware stores, etc. Use ordinary rock salt, evaporated ocean salt – the same as would be used for a water softener (avoid salt pellets). Call your ECOmatic Dealer if you need assistance in locating a source of salt.

Add the salt by tipping it directly into the pool. Dissolve by sweeping the salt to the deep-end floor drain and/or by vacuuming the pool. The heavier-than-water saline 'syrup' will remain on the floor of the pool if not mixed properly. Some pool owners like to add a little salt (10 lbs or so) after each filter backwash.

How Much Top-up Salt To Add

When topping-up the salt level, we suggest adding salt at the rate of approximately 100 lb per 10,000 gallons of water. Remember: A slight excess of salt is not a problem, but too little salt causes damage to the 'Cell'. When the added salt is dissolved, check that **LED 2** remains GREEN. Measure the salinity if in doubt. DO NOT continue to add salt if LED 1 and/or LED 2 remain RED. Measure salinity before adding more salt to prevent over-salting the pool.

You should always be sure that your pool water is 'in balance'. The person who maintains the pool should already be checking and adjusting the water for the following. If you need verification of any of the following, take a water sample to your local pool shop for testing (or send to your ECOmatic Dealer for testing).

Adding 'chemicals' To Your Pool

Your ECOmatic will eliminate the need for you to add '*pool chlorine*', algaecides and 'shock' chemicals to the water. Many pool owners and pool service people are in the habit of 'shocking' their pool water periodically, but this is no longer necessary with ECOmatic and we advise against adding such chemicals (including copper-based algaecides, non-chlorine shock, etc). If the need to add '*pool chlorine*' should ever arise, you can do so without risk of harming your ECOmatic equipment.

In the event that your sanitizer level has fallen too low, or that you feel a need to 'shock' the pool, simply let your ECOmatic operate at **MAX** output for an extended time (say for 24 hours).

Conditioner/Stabilizer

It is important to maintain 50 - 80 ppm of conditioner (cyanuric acid) in the pool water, in order to prevent the sunlight from destroying the sanitizer (especially important in hot, sunny areas). If the conditioner level is too low, "good-bye sanitizer" – you will find it difficult to maintain a good residual of sanitizer in the water – and your ECOmatic will need to work twice as hard as it would if the conditioner level was correct.

pH Level

Pool water pH should be maintained in the range 7.2 - 7.8. At higher pH levels, the sanitizer loses its effectiveness, allowing algae growth etc even though your Test Kit may indicate sufficient sanitizer in the water. If you have difficulty maintaining the pH in the correct range, this is an indication that the Total Alkalinity (TA) is not at the correct level. It is always necessary to bring the TA within the correct range before pH can be properly maintained.

Total Alkalinity (TA)

(TA) determines the speed and ease of pH change. TA can also greatly effect the frequency of having to clean the ECOmatic 'Cell'. The ideal range for TA is generally 80 - 120 ppm, but really depends upon the Total Hardness (TH) of the water and should be set at the level which suits the TH of your pool. The harder the water in a pool, the lower the TA should be. Your TA is correct when the pH becomes stable and easy to maintain.

If the TA is TOO LOW	If the TA is TOO HIGH
pH 'bounce'	Almost constant acid demand
Stains on plaster walls	Promotes 'Cell' scaling
Etching of plaster walls	
Corrosion of metal parts	

Total Hardness (TH)

The Total Hardness (not just calcium hardness) if too high, can promote rapid scaling of the ECOmatic 'Cell'. TH also determines the desired level of TA.

General Rule: If the pool water TH is greater than 500 ppm and is at least 300 ppm above the TH of the fill water (tap water) - then dump the water and re-fill the pool.

Warning: Be aware that pools in high water-table areas should not be emptied without first consulting your pool builder or pool service.

Note: All water balance parameters (Hardness, conditioner/stabilizer, pH, TA) should be maintained within the normal recommended ranges.

Sanitizer (or 'chlorine')

Recommended Level	1.0 - 3.0 ppm
How to Test	Normal 'chlorine' Test Kit (free-chlorine test)
Frequency of Testing	Test and adjust daily, initially, until you achieve consistent readings. Then test at least weekly, or whenever pool conditions or usage changes.
How to Adjust	Use the ECOmatic **System Control** (and/or vary filter operating time, being sure to run filter at least the recommended daily hours).
Why Sanitizer?	Micro organisms, germs, algae want to grow in your pool water. Correct sanitizer levels (in combination with other various levels) prevent the growth of such radicals and will maintain your pool water in a healthy and safe condition.
Sanitizer Demand	The amount of sanitizer required for your pool varies from time to time, depending upon such factors as: the number of swimmers, water temperature, pool environment, hours of sunlight.

Total Alkalinity (TA)

Recommended Range	80 - 120 ppm. Note: Or follow the advice of our pool maintenance person or pool supply store.
Correct level	Depends upon the Total Hardness of the water. The harder the water, the lower the TA should be kept. Check with your local pool service or pool supply store.
How to Test	Normal 4-in-1 pool Test Kit. If your Test Kit does not have a TA Test, have your water tested by your local pool store.
Frequency of Testing	After initial adjustment, check every couple of weeks.
How to Adjust	There are various methods of adjusting TA. Check with your local pool service or pool supply store. Lowering TA is achieved by addition of 'acid'. TA can be raised by adding sodium bicarbonate (baking soda).
Why TA is Important	TA determines the speed and ease of pH change (if you get the TA correct, pH control will become very simple). TA level effects the frequency of 'Cell' scaling.
High TA	Makes pH maintenance difficult. Increases potential for scale to form on 'Cell', on pool walls, etc.
Low TA	Causes etching, staining of plaster pool walls, corrodes metals, makes pH control very difficult.

pH Level

Recommended Range	7.2 - 7.8
How to Test	Normal pool Test Kit
Frequency of Testing	If the Total Alkalinity (TA) is within the correct range for your pool, the pH will become more stable - reducing the need to test frequently. Test at least weekly. If pH always needs adjusting, check and adjust TA.
How to Adjust	Lower pH by adding 'pool acid' (muriatic acid). Disperse acid by pouring into water around perimeter of pool. Raise pH using soda ash.
Why pH is Important	Properly maintained pH means much fewer pool problems. High pH reduces sanitizer efficiency (makes it more difficult for the sanitizer to do its job) and increases scaling (on 'Cell' and on pool walls etc). Low pH will cause etching of plaster pool walls, corrodes metal components, stains pool walls, eye irritation, destruction of Alkalinity.

Conditioner, Stabilizer (Cyanuric acid)

Recommended Range	50 - 80 ppm (may vary in some areas)
How to Test	Some pool Test Kits include this Test. You can also purchase a Cyanuric Acid Test Kit, or have your pool service test for you, or take a water sample to your local pool supply store.
Frequency of Testing	Once or twice per year is normal. More frequently if water is lost from pool by way of leaks, splash-outs, etc.

Why Conditioner?	Low levels of conditioner (such as Cyanuric Acid) causes loss of sanitizer, especially in sunny locations. Low conditioner levels mean your ECOmatic will have to work harder (produce more sanitizer) in order to achieve and maintain correct sanitizer levels. Indoor pools need very low or no conditioner, stabilizer, or cyanuric acid (some states have prohibited it's use on indoor pools), check with your local health department or pool supply store.
How to Adjust	Add cyanuric acid to the water. Get instructions as to how to add conditioner from your pool service or local pool supply store. Give 48 hours to dissolve, don't backflush filter too soon. Alternative is to dissolve into warm water and pour into pool. Another idea – get your pool service to do it.

Total Hardness (TH)

Ideal Range	Below 500 ppm
How to Test	Some pool Test Kits include this Test. You can purchase Total Hardness Test Kits.
Frequency of Testing	The water used to fill your pool has its own TH, depending upon its source. Over time, the TH of the pool water will increase as the Hardness is left in the pool when water evaporates. Fill water adds more Hardness. Test at least once or twice per year.
When to adjust TH	If the TH of the pool water is greater than 500 ppm, and is 300 ppm above the TH of the fill water, it is recommended that you dump the water and re-fill the pool.
How to Adjust TH	Replacing the water is the only way to reduce the TH of the pool water. Be sure to consult your pool builder or pool service before emptying your pool. Serious structural damage can result if pools are emptied in certain ground conditions and ground water levels.
Calcium Hardness	Always maintain calcium hardness within the range suggested by your pool builder or pool service.

Phosphates

Phosphates in swimming pool water can reduce the level and effectiveness of sanitizer in pools, causing the ECOmatic to work harder than necessary; any amount (over 50 ppb) of phosphate should be removed by using a phosphate-removing chemical available at your local pool supply. We recommend having your pool water tested for phosphates annually to insure good performance and long cell life.

Trouble Shooting

ECOmatic Not Working

1. No power getting to 'Power Pack' (loose or faulty connection inside Time Clock, Main power OFF).
2. ECOmatic switched OFF.
3. **System Control** set to MIN.
4. Blown fuse(s).
5. **Gas Sensor** Lead not connected securely. Scale build-up on **Gas Sensor** bolt head.
6. ECOmatic has **Cut-out** – insufficient Salt in the water, or 'Cell' needs cleaning, or water temperature cold.
7. 'Cell' needs replacing.

Rapid Salt Loss

1. Check for leaks in pool. Turn off any automatic fill device, check for water loss.
2. Heavy rain can dilute salt level.

ECOmatic Producing, But Sanitizer Level Low

1. 'Cell' dirty.
2. **System Control** set too low.
3. Insufficient operating time.
4. Low Salt level.
5. Conditioner level too low.
6. Filter pump needs cleaning.
7. Poor flow rate may be creating air pocket in 'Cell'.
8. Check for nitrates and phosphates.
9. Winter Mode on during swimming season.

ECOmatic Scaling Too Frequently

1. Total Alkalinity (and pH) too high.
2. Total Hardness too high.

Water Leaking At 'Cell' Head

1. Loose O-ring or O-ring out of its groove.

ECOmatic FAQ's

1. *Will my pool taste salty?*
   The pool will have a "flat" taste instead of the usual chlorine taste.
2. *Will I still need to add chlorine?*
   The Ecomatic produces natural chlorine, which eliminates the need for the adding of packaged chlorine
3. *How do I test for sanitizer in the pool?*
   Any test kit that is used for testing chlorine can test the sanitizer produced by the ECOmatic.
4. *How often will I need to add salt?*
   Salt-water chlorinators don't consume salt; they convert the salt to pure chlorine. On average, a residential pool only requires additional 50lbs bags of salt due to periods of heavy rain, splash out, or backwashing 1 to 3 times per year.
5. *At start-up, how much salt will I need to add?*
   The start -up amount for new installations is 27.5 lbs per 1000 gallons of pool volume for all ESC models.
6. *How is the salt added to the pool?*
   Salt can be added directly into the pool at the deep end or into the skimmer while the pump is running . If added to the deep end of the pool, the salt must be brushed over the main drain in a back-and-forth motion until fully dissolved. If added directly to the skimmer, add the salt slowly with the skimmer basket in place until the salt is fully dissolved.
7. *The ECOmatic states that it is "self cleaning" so does that mean maintenance is free?*
   No. Self-cleaning systems require maintenance on average 1-4 times per year.
8. *How does the system indicate that it needs maintenance?*
   The ECOmatic has indicator lights that turn from green to red when the system needs attention due to low salt, dirty cell, or cold water (below 60 degrees).
9. *How do I clean the "cell"?*
   The "cell" can be easily removed from the clear cell housing and soaked from 5 to 20 minutes in a bucket of 1 to 3 ratio of acid/ water mixture.
10. *How often will the "cell" need cleaning?*
    Assuming the pool water is properly balanced and depending on the water hardness, the ECOmatic cell will require cleaning 1 to 4 times per year.
11. *How long does the "cell" last?*
    On average, the cell life is approximately 8,000-10,000 hours.
12. *How big of a pool can the ECOmatic be installed on?*
    Ecomatic has systems that can be installed on residential pools up to 60,000 gallons.
13. *How long is the ECOmatic warranty?*
    On all residential applications, the ECOmatic Salt Water Chlorinator is warranted for 5 years (2 years full parts and labor, then prorated for the remaining 3 years) from date of installation

Important Safety Instructions - USA

When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

1. READ AND FOLLOW ALL INSTRUCTIONS
2. WARNING – To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
3. (For cord and plug-connected units) WARNING – Risk of electric shock. Connect only to a grounding type receptacle protected by a ground fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.
4. (For cord and plug-connected units) WARNING – Do not bury cord. Locate cord to minimize abuse from lawn mowers, hedge trimmers and other equipment.
5. (For cord and plug-connected units) WARNING – To reduce the risk of electric shock, replace damaged cord immediately.
6. (For cord and plug-connected units) WARNING – To reduce the risk of electric shock, do not use extension cord to connect unit to power supply; provide a properly located outlet.
7. This unit is to be installed in accordance with these Installation Instructions, the National Electrical Code and the requirements of the authority having jurisdiction.
8. The 'Cell' cord shall be located at least 5 feet from the inside walls of the pool/spa.
9. WARNING - The filter pump must be on when the ECOmatic is operating.
10. SAVE THESE INSTRUCTIONS

Important Safety Instructions - Canada
Instructions de Securite Importantes – Canada

When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:
Durant l'installation et l'usage de cet equipement, les precautions de base d'usage doivent etre suivis, et mis en considération:

1. READ AND FOLLOW ALL INSTRUCTIONS
1. LIRE ET SUIVRE TOUTES LES INSTRUCTIONS
2. A green colored terminal or a terminal marked G, GR, Ground, Grounding, or the international ground symbol is located inside the power control box ('Power Pack'). To reduce the risk of electric shock, this terminal must be connected to the grounding means provided in the electric supply panel with a continuous copper wire equivalent in size to the circuit conductors supplying this equipment.
2. Une borne electrique de couleur verte ou une borne marquee G, GR, prise de terre ou avec le symbole internationale de prise de terre se trouve a l'interieur de la boite de contrôle (source de courant). Pour reduire tout risque de choc electrique, cette borne doit etre connectée a la prise de terre qui se trouve dans le paneau electrique a cet effet, lequel est identifié par un fil de cuivre de la meme grosseur que le circuit conducteur qui alimente cet equipement.
3. At least two lugs marked 'Bonding Lugs' are provided on the external surface or on the inside of the power control box ('Power Pack'). To reduce the risk of electric shock, connect the local common bonding grid in the area of the hot tub or spa or pool to these terminals with an insulated or bare copper conductor not smaller than No. 6 AWG.
3. Au moins deux ecrous marqués "Ecrous d'encrage" sont fournis sur la surface externe ou sur le coté de la boite de contrôle (source de courant). Pour reduire le risque de choc electrique, brancher la grille de jonction commune du bain tourbillon, spa ou piscine a ces terminaux avec un fil isole ou un fil conducteur de cuivre d'un calibre de non moins qu'un No. 6 AWG.
4. SAVE THESE INSTRUCTIONS
4. GARDER CES INTRUCTIONS

Installation Summary

This is a quick guide as to how the ECOmatic should be installed. Refer to the following pages for detailed instructions and helpful hints.

1. Install the ECOmatic 'Cell' into the return line, downstream from all other equipment. The 'Cell' must be horizontal. The water flow direction through the cell housing should be 'flowing away from the Cell Head'. Inlet and outlet piping to be a minimum of 6" in length (to provide for easy Cell Housing replacement if this becomes necessary in the future). Refer to following pages for details.
2. Mount the 'Power Pack' onto a wall, fence or post, etc., within reach of the 'Cell' cord. Connect to power so that 'Power Pack' receives power only when the filter pump is operating (both components should switch on and off coincidentally). Refer to following pages for important wiring instructions.
3. Connect 'Cell' to 'Power Pack'. Refer to following pages for connection details.
4. Add salt to the pool water. Quantity of salt required (pounds) for regular ESR units = gallons of water x 0.0375. Quantity of salt required (pounds) for ESC units and ultra low salt ESR units = gallons of water x 0.0275. Refer to the following pages regarding type of salt and how to dissolve.

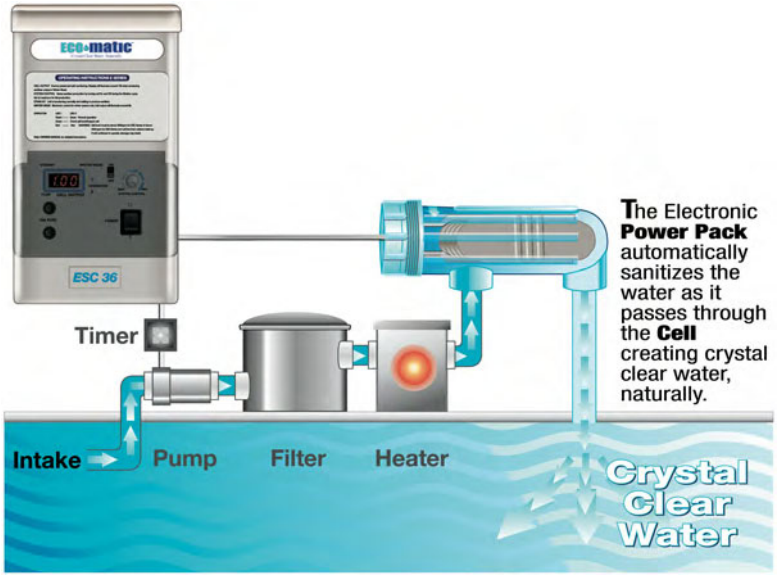
The Components of Your ECOmatic

The 'Power Pack'

The 'Power Pack' (or Power Control) contains the electrical components which transform the mains power supply to the low voltage DC current required to operate the ECOmatic 'Cell', as well as the other various operating and control functions of the ECOmatic system.

The 'Cell'

The ECOmatic 'Cell' is the component which comes into contact with the pool/spa water and which, through a process of electrolysis, produces (from the 'natural' salt dissolved in the water) the sanitizer/oxidizer necessary to maintain the water in a healthy condition. The 'Cell' is comprised of sophisticated materials specifically designed and engineered for ECOmatic's intended purpose.



The Salt

A basic ingredient of the ECOmatic process is SALT (nature's own salt, pure evaporated ocean salt, or table salt – sodium chloride). The salt is added directly into the pool or spa water to produce the water salinity required to enable your ECOmatic to function properly. The salt may or may not have been included in the purchase price of your ECOmatic. Salt is available at most pool supply stores, home improvement centers, hardware stores, etc, usually in 25 lb, 40 lb, 50 lb, or 80 lb bags – and is the same salt sold for use in most domestic water softeners, mostly referred to as 'rock' salt. Be sure to use 'sodium chloride' and not 'potassium chloride'. Salt must not contain: anti-caking agent, soda salt, yellow prussiate of soda, iodized salt, potassium chloride, or road salt. **Recommended salts include course granular kiln dried solar salt, food grade rock salt, and mill grade salt.**

Before Installing Your ECOmatic...

How good is the water in your pool/spa?

In most instances, pools can be simply converted to the ECOmatic system without the need to change the pool water. However, if the water is 'old' (older than say 3 years), or if the water has been subjected to high degrees of chemical dosing, or has been kept in generally poor condition, you may want to consider dumping that water and refilling the pool.

Pool water has a tendency to become 'harder' over time. Evaporation leaves the 'hardness' in the water and when top-up water is added to the pool, additional hardness is added. This additional hardness, together with residuals from previous chemical treatments etc can make the pool generally more difficult to maintain (regardless of the purification method being used).

A simple water hardness test (Total Hardness, not just calcium hardness) can determine whether it is preferable to dump the water and refill. Although water hardness varies from one area to another, the following general rule can be used as a guide:

If the pool water Total Hardness exceeds 500 ppm (parts per million) AND is more than 300 ppm above that of the fill water (tap water), it is recommended that you drain and refill the pool.

The same general rule applies to spas, however the smaller volume of water and relative ease of changing the water in a spa, suggests that it is generally the advisable thing to do.

WARNING: Before emptying your pool or spa, consult your pool builder, Pool Service or local Pool Shop and determine whether it is safe to do so. Emptying a pool in certain ground-water conditions can cause serious structural damage to the pool.

Note: Pools that have been sanitized with non-chlorine systems (bi-guinia or copper saged) should be drained and refilled before converting to salt sanitation.

Choosing the 'CELL' Location

The location in which the 'Cell' is to be installed is important. The 'Cell' must be located as follows:

* In the return-to-pool line (the pipe carrying filtered water back to the pool)
* AFTER (down-stream from) all other equipment (filter, heater etc). Contact your ECOmatic Dealer for instructions if the 'Cell' cannot be located AFTER all other equipment.
* Locate the 'Cell' so that its power supply cord (attached to 'Power Pack') can reach the 'Cell' from the 'Power Pack' location.
* The 'Cell' cord must be at least 5 feet distance from the inside walls of the pool/spa (at least 5 feet from the nearest water in the pool/spa).

Other considerations regarding 'Cell' location:

When correctly installed, the 'Cell' will produce sanitizer only when water is flowing through it – and, obviously, the sanitizer is carried in the water, to wherever the water is being directed, so ... If there is a spa attached to the pool, be sure to locate the 'Cell' in the line carrying water to the pool/spa, preferably before (upstream from) the valve which directs water flow to either the pool or spa – and not after (downstream from) the valve in the line to the 'spa only' (in which case no sanitizer would be sent to the pool during normal filtering periods).

IMPORTANT: Refer to your ECOmatic Owner's Guide for important instructions – how to prevent over-production of sanitizer in your spa.

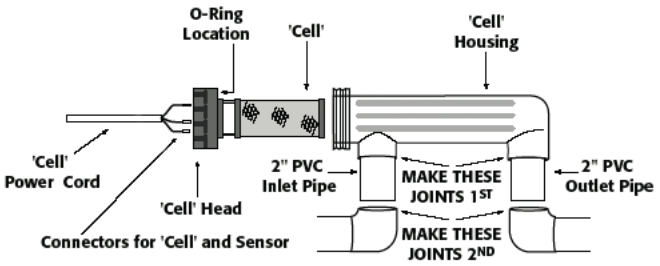
If there is a solar heater attached to the pool, locate the 'Cell' so that it has water flowing through it whenever the filter pump is operating regardless of whether water is flowing through the solar heater panels.

Installing the 'CELL HOUSING'

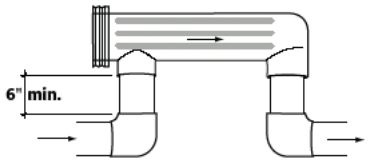
Once the correct location for the 'Cell' has been established, the 'Cell Housing' must be installed into the plumbing at that selected location. The clear plastic 'Cell Housing' is PVC compatible, so use ordinary PVC solvent (glue) to attach the 'Cell Housing' to the pipework. **Remove the 'Cell' from the 'Cell Housing' before attempting to install the 'Cell Housing'.**

IMPORTANT The 'Cell Housing' must be installed as follows:

* 'Cell Housing' must be installed in a HORIZONTAL position.
* Water flow should be in the direction indicated by the ARROW on the clear plastic 'Cell Housing' (in the direction flowing away from the 'Cell' head).
* The Inlet and outlet pipes must be pointing vertically DOWN, to form an inverted 'U' configuration with the 'Cell Housing'.
* The vertical inlet and outlet PVC piping must be a minimum of 6" in length (refer Sketches 3a, 3b)
* The 'Cell Housing' shall be free standing and not secured to any rigid backing surface (such as a wall).
* Installation should allow easy removal of the cell from the housing.

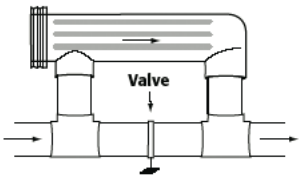


SKETCH 2



SKETCH 3a

Total flow through 'Cell'



SKETCH 3b

'Cell' on a by-pass (partial flow through 'Cell')

Water Flow: In most cases (for 1.5" and 2" PVC) the total water flow can be directed through the 'Cell Housing' (as shown in Sketch 3a) without significantly effecting the flow rate and/or back-pressure on the filter etc. However, if flow rate is a concern (high horse-power pump, large diameter piping etc), the 'Cell' can be installed on a by-pass (as shown in Sketch 3b). Note the need for a valve to ensure a good flow of water through the by-pass.

Helpful HINT: When attaching the 'Cell Housing' into the pipework, attach the inlet and outlet pipes to the 'Cell Housing' FIRST – and then connect that assembly to the rest of the pipework (Refer Sketch #2). The inlet and outlet pipes should be pushed in, twisted, and held firmly in place until the PVC solvent holds. Note: While making these joints, hold the 'Cell Housing' horizontally, with the inlet and outlet pointing down, so that the liquid PVC solvent does not run into the 'Cell Housing' where it will look unsightly through the clear plastic.

Helpful HINT: Copper Pipes? Use PVC 'Flow-Lock' fittings (compression fittings) for easy connection of PVC to copper pipes.

Installing the 'POWER PACK'

Location of the 'Power Pack': Select a location to mount the 'Power Pack' onto a wall or fence etc, as follows:

* The 'Cell' location should already have been selected (see above). The 'Cell' power cord must reach the 'Cell' (with sufficient slack to allow removal of the 'Cell' from the 'Cell Housing').
* For cord-connected units, locate the 'Power Pack' so its cord is within reach of the point where it is to be connected to main power (eg: pool Timer).
* The 'Power Pack' is weather-proof so it can be located outdoors.
* It is important to ensure that 'Power Pack' be located in a well ventilated area – and that air can circulate between the back of the 'Power Pack' and the surface onto which it is mounted (stand-offs on back of 'Power Pack' provide ventilation for wall-mounted units).

Once a suitable location for the 'Power Pack' has been selected, use 2 - #8 screws to attach 'Power Pack' to a wall, fence or post etc (using wall plugs if necessary).

See actual size template on back page for mounting screw position.

Connecting 'POWER PACK' to Power Supply

IMPORTANT: It is essential that your ECOmatic gets power ONLY WHEN THE FILTER PUMP IS 'ON' and water is flowing through the 'Cell'. The power supply to the ECOmatic Power Pack must therefore be controlled by the same switch or timing device which controls power to the filter pump.

Voltage

Your ECOmatic 'Power Pack' has been designed to operate on either 110V or 220/240V AC. It cannot be switched from one voltage to the other, so must be ordered in the same voltage as the power to your filter pump. Note: Units for larger pools are available ONLY in 220/240V.

Cord Connected 'Power Packs'

UL and C-UL Listed Power Packs will not be fitted with a power cord. Refer to Permanently Connected 'Power Packs', below.

'Power Packs' with cords should be connected as follows:

Cord wires will generally be BLACK, WHITE and GREEN, or BROWN, BLUE and GREEN.

For 220/240V units, connect Black and White or Brown and Blue to load, Green to Ground. For 110V units, connect Black or Brown to load, White or Blue to neutral, Green to Ground.

Simply put, the power supply cord wires should be connected to the same Timer terminals as the filter pump – to insure that the 'Power Pack' receives the same voltage as the filter pump, and is switched ON and OFF coincidentally with the filter pump.

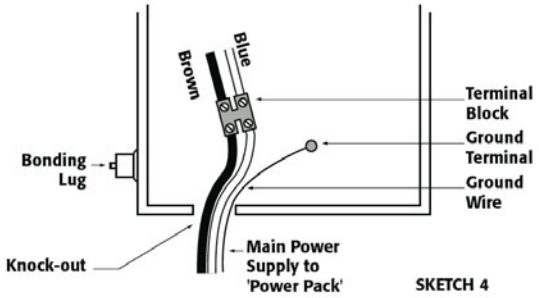
For Permanently Connecting 'Power Packs'. (refer Sketch 4)

Refer to IMPORTANT SAFETY INSTRUCTIONS at front of these instructions.

De-energize power supply circuit before connection to 'Power Pack'.

Remove the 'knock-out' in the base of the 'Power Pack' (if not already removed). The knock-out hole size will suit a standard conduit fitting.

Open the 'Power Pack' (see instructions below), remove attached cord and connect replacement power supply wires to terminal block and GROUND terminal (marked with standard GROUND symbol).



SKETCH 4

Bonding Lug Connection (if applicable)

If the 'Power Pack' comes with Bonding Lugs (USA one Bonding Lug, and in Canada two Bonding Lugs located externally on the side of the 'Power Pack') they must be connected to the local common bonding grid (which includes all metal parts of the swimming pool structure and to all electrical equipment, metal conduit and metal piping) in the area of the equipment, using either insulated or bare copper conductor not smaller than No. 6 AWG.

Opening The 'Power Pack' (refer Sketch 5)

Always de-energize power supply circuit before opening 'Power Pack'.

To open 'Power Pack' remove the 2 screws which hold removable panel in place. Remove the panel and loosen the single screw inside the recess. The front panel of the 'Power Pack' can now be removed by a) pulling bottom of front panel out (towards you), then b) slide the front panel down (so front of front of top panel slides out from under top panel).

SKETCH 5

When opened, the front cover of the Power Pack should be supported, so as not to put any strain on internal wiring, by connecting the front cover to the left hand side panel of the Power Pack, using the clip provided (refer Sketch 5).

When replacing the front panel, be sure that all internal wiring is clear of the side and bottom panels, to allow proper seating of the front panel. Insert sides of front panel into the slots at each side, slide the front panel UP so its top edge slides under the top panel. When the front panel is in place, re-tighten screw and replace cover plate.

Connecting 'Cell' to 'Power Pack'

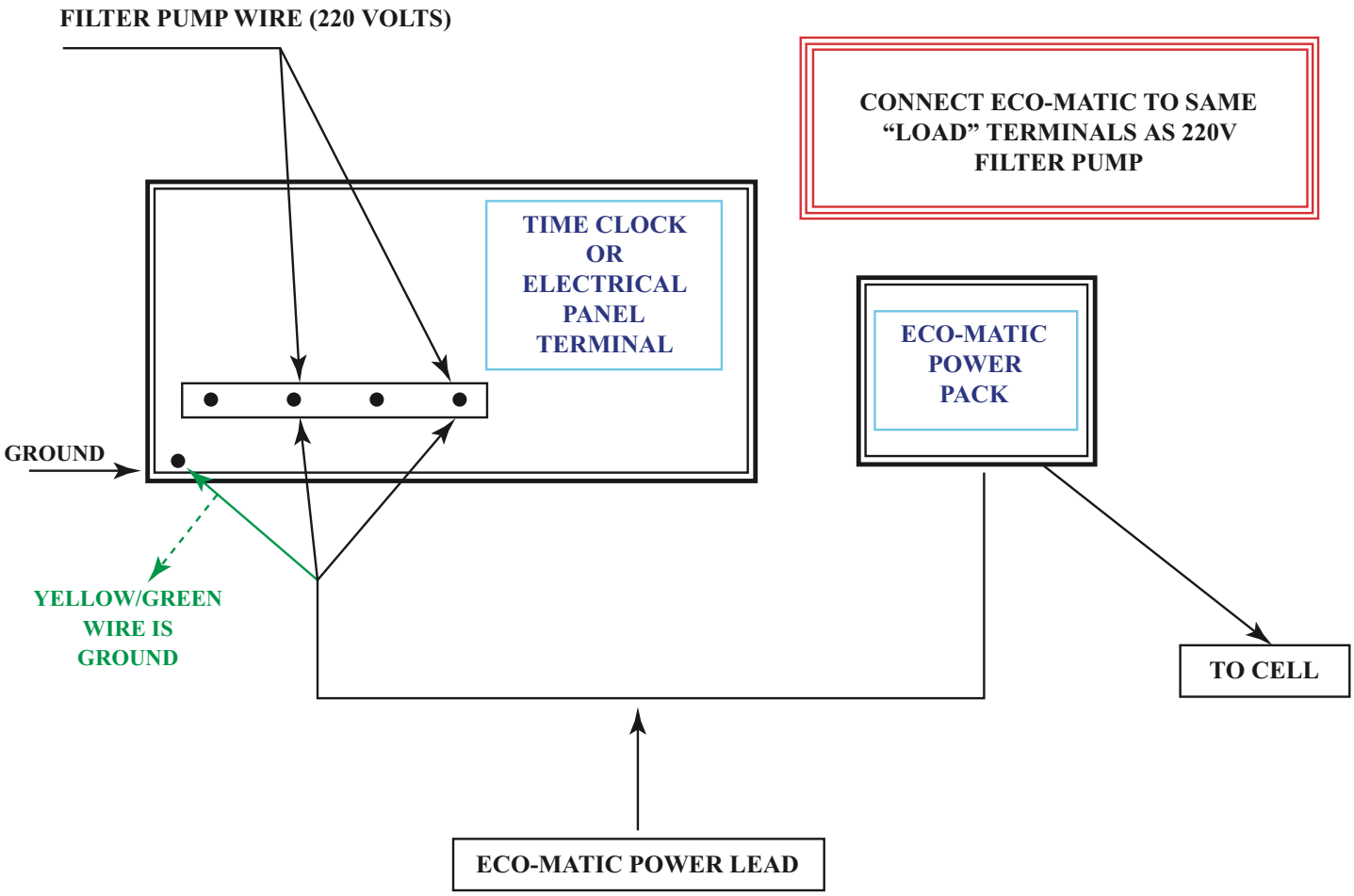
The 'Cell' connecting lead is factory-attached to the 'Power Pack', with connectors at the end of the lead for attachment to 'Cell' head.

ESR – the 2 main connectors (BLACK and WHITE) push into the female fittings on the 'Cell' head (be sure to match colors). The smaller connector (Gas Sensor) pushes on to the threaded bolt of the 'Cell'' head.

ESC – fit the BLACK connectors to either titanium rod. The BLUE Flow Sensor should be pushed onto the threaded shaft of the small bolt.

ECO-MATIC® Salt Water Pool System

EXAMPLE OF WIRING TO TIME CLOCK FOR ESC SERIES - 220 VOLTS



- In the above case, CONNECT ECO-MATIC to SAME "LOAD" TERMINALS AS 220 VOLT FILTER PUMP.
- THE "BLACK & WHITE or BLUE & BROWN" WIRES ARE LOADS WHEN WIRING TO 220 VOLTS. THE "BLACK or BROWN" ARE LOADS & THE "BLUE or WHITE" ARE NEUTRAL WHEN WIRING TO 110 VOLTS.
- For pool control systems: Connect on "Load Side" of filter pump relay.
- ECO-MATIC UNIT MUST BE "ON" ONLY when the PUMP IS "ON".
- POWER WIRE to time clock may be "hard-wired" to lengthen.

Adding Salt to Your Pool

Your ECOmatic requires a minimum water salinity of 4000 ppm (parts per million) or 3000 ppm (ESR & ESC models respectively). An excess of salt is OK (maximum 6000 ppm), but TOO LITTLE SALT WILL CAUSE DAMAGE TO, AND SHORTEN THE LIFE OF YOUR 'CELL' – and void warranties on the 'Cell'.

How Much Salt To Add

Calculate the volume of water in your pool - or call your ECOmatic Dealer with the dimensions of the pool (length, width, average depth etc) for assistance. Multiply the water volume (in gallons) by 0.0375 for ESR models OR by 0.0275 for ESC models, to get the required amount of salt to be added (in lbs).

ESR – Pool Water Volume (gallons) x .0375 = weight of SALT (lbs)
ESC and ESR (ultra low salt)– Pool Water Volume (gallons) x .0275 = weight of SALT (lbs)

NOTE: for In-ground spas - check with your ECOmatic Dealer for correct salinity level.

Round off salt weight to nearest multiple of salt bag weight (eg: 15,000 gallon pool x 0.0375 = 562.5 lbs of salt. Use 11 - 50 lb bags of salt = 550 lbs, or 14 - 40 lb bags of salt = 560 lbs).

If you under-estimate the amount of salt required, your ECOmatic will indicate 'Low Salt'. Simply add more salt (first being sure that original salt is properly dissolved) until the ECOmatic indicates sufficient salt – Refer to your ECOmatic Owner's Guide.

Adding and Dissolving The Salt

Tip the salt directly from each bag into the pool water.

Sweep the salt around the floor to help dissolve.

A short while after the salt has been added it will no longer be visible, however, the heavier-than-water syrup which forms initially will sit on the floor at the deep end until properly mixed throughout the pool. Dissolve by directing filter suction to the floor drain in the pool (if your pool has one) or by vacuuming the pool.

Installation Check List

Your ECOmatic installation is complete when the following have been completed:

* 'Cell Housing' installed into pipework
* 'Cell' properly in place in 'Cell Housing'
* 'Power Pack' mounted in place
* 'Power Pack' connected to main power (correct voltage)
* 'Cell' connected to 'Power Pack'
* Sufficient salt dissolved into pool water
* You have checked and confirmed that your ECOmatic 'Power Pack' switches ON and OFF coincidentally with the filter pump.
* You have checked all connections and joints for leaks (including 'Cell' head O-ring).

Installation Trouble-Shooting

ECOmatic does not come ON when filter switched ON

1. Check ON/OFF switch on front panel of 'Power Pack'
2. Power supply not properly connected to 'Power Pack' (make sure correct voltage is getting to 'Power Pack')
3. Check fuses (front panel of 'Power Pack')

ECOmatic starts up with 2 red LEDS and varying display

1. Incorrect voltage to 'Power Pack'. Check voltage.
2. Unit preparing to cut-out. Check salt level.

Start-Up Procedure

Refer to your ECOmatic Owner's Guide for an explanation of ECOmatic's various Operating Modes, including its 30-second Start-Up Phase (which occurs each time your ECOmatic is switched ON).

NOTE: The ON/OFF switch on the front control panel of your ECOmatic can be left in the ON position (other than at times when you want the ECOmatic to be OFF while the filter pump is operating). The Timing device or switch which turns your filter pump ON and OFF will also switch the ECOmatic ON and OFF (providing the electrical connection to the 'Power Pack' has been done correctly).

What To Do - Day 1

Once your ECOmatic is operational, adjust the System Control to suit the existing 'chlorine' reading in the pool water. If the existing 'chlorine' reading is low or zero, adjust the System Control to maximum and run the system until the desired sanitizer level is measured in the pool. If the existing 'chlorine' reading is high, the System control can be set low (or the ECOmatic can be left OFF until the chlorine level drops)

Operate the filter at least 12 hours (preferably all day)

What To Do - Day 2

Check the sanitizer level in the pool water (refer to Owner's Guide). Adjust the System Control and/or filter operating time accordingly (refer Owner's Guide).

It is best to check the sanitizer level at approx the same time of day (mornings are best) so you get a true indication of whether the ECOmatic is producing sufficient, too much or too little sanitizer each day.

Ongoing Adjustment Of The ECOmatic

Repeat the above (testing sanitizer level daily) until you get a consistent sanitizer reading each day. The Output Control (and/or daily filtering time) will then only need to be altered according to fluctuations in pool use, seasonal changes in the weather and pool water temperature. Your pool 'Test Kit' is your ONLY INDICATOR as to whether the Output Control or daily ECOmatic operating time needs to be altered.

NOTE: The SALT LEVEL and SANITIZER LEVEL are not the same thing and should both be maintained as per your ECOmatic Owner's Guide.

Warranty Details (Residential)

Balboa Instruments warrants to the original purchaser of an ECOmatic product that if any component, other than fuses, proves to be defective within a period of 24 months from the date of purchase, that the defect will be repaired or the product will be replaced free of charge. Defects which become evident during years 3, 4 and 5 of the Warranty will be repaired or product replaced at the following costs (% of current Suggested List price) to the ECOmatic owner: Year 3 - 25%, Year 4 - 35%, Year 5 - 45% of the current List price.

During the Warranty period any defective product shall be returned by the customer, accompanied by proof of date of purchase. ECOmatic will, at its option, either repair or replace the defective product and return it, freight prepaid.

ECOmatic accepts no responsibility other than the repair or replacement of defective product and this Warranty specifically excludes product failure due to accidental damage, abuse, misuse, negligence, damage due to non-compliance with Installation or Operating / Maintenance Instructions or unauthorized alterations or modifications to the product. ECOmatic accepts no responsibility and is not liable for any extended warranties or variations to this Warranty offered by re-sellers of ECOmatic products.

To validate this Warranty, Product Registration must be completed for each ECOmatic product purchased. Product Registration cards are included with each ECOmatic product, for return to ECOmatic. Also check our web site for Product Registration facilities (www.ecomatic.com).

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Your Local ECOmatic Dealer

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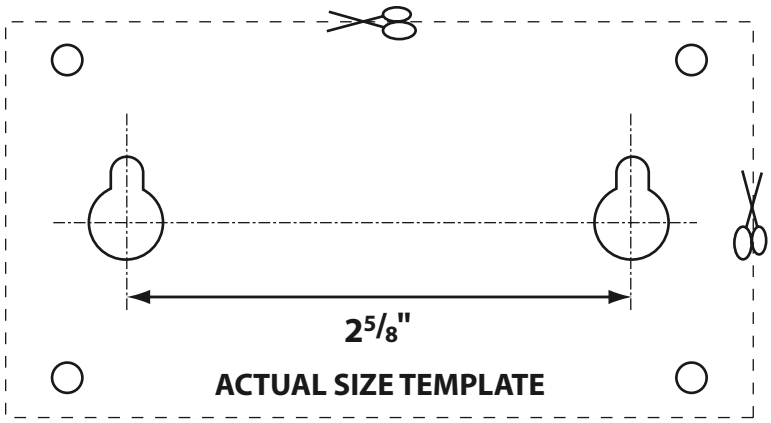

SCREW POSITION TEMPLATE

Use this template for mounting ‘POWER PACK’
See page 20 for details.

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