



Warranty Station Service Manual - Table of Contents

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Crystal Clear Water. Naturally.

Installation and Operating Instructions

FOR MODELS:

ESC 16

ESC 24

ESC 36

ESC 48

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Packing List

Your ECO-matic product consists of the following components.

Please confirm that you have all components when attempting to install your ECO-matic.

- 1 – Power Pack (Please confirm the Input Voltage is as ordered – 220-240V or 110V)
- 1 – Cell (Including clear plastic Cell Housing)
- 1 – Pack containing Mounting Screws, Wall Plugs and Spare Fuses



Welcome to the healthy luxury of a salt water swimming pool

We at ECO-matic 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 ECO-matic 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 if you are experiencing problems.

Overview of the ECO-matic Salt Water Pool System

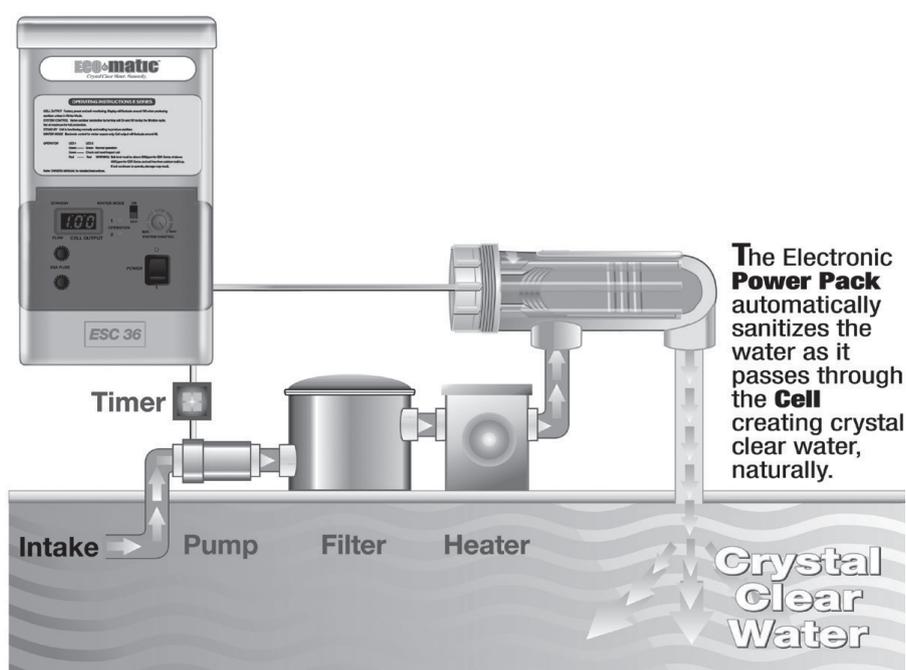
When pool salt is dissolved in pool water and then subjected to simple electrolysis (by way of the in-line ECO-matic 'Cell'), the chloride portion of the salt (sodium chloride) is transformed into an effective sanitizer,* which has the ability to oxidize (kill) bacteria, virus, algae and other such radicals 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 ECO-matic 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 ECO-matic 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 ECO-matic Equipment

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



Installation Check List

Your ECO-matic installation is complete when the following have been completed:

- 'Cell Housing' installed into plumbing.
- 'Cell Housing' must 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 ECO-matic is connected to correct voltage).
- You must check and confirm that your ECO-matic 'Power Pack' switches ON and OFF in time with the filter pump.
- 'Power Pack' connected to 'Cell' (including the Gas-Sensor connection).
- Sufficient salt dissolved into pool water.

Understanding the ECO-matic System

Your ECO-matic 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 ECO-matic and the quantity of salt (the salinity) in the water are related, but must be maintained and controlled as two separate factors:

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 ECO-matic 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 ECO-matic (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 ECO-matic 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 (but at a decreased rate, and only until the automatic Cut-Out applies) but low salt conditions cause increased wear on the 'Cell' and will shorten the life of the 'Cell'. When your ECO-matic 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 ECO-matic Depends Upon:

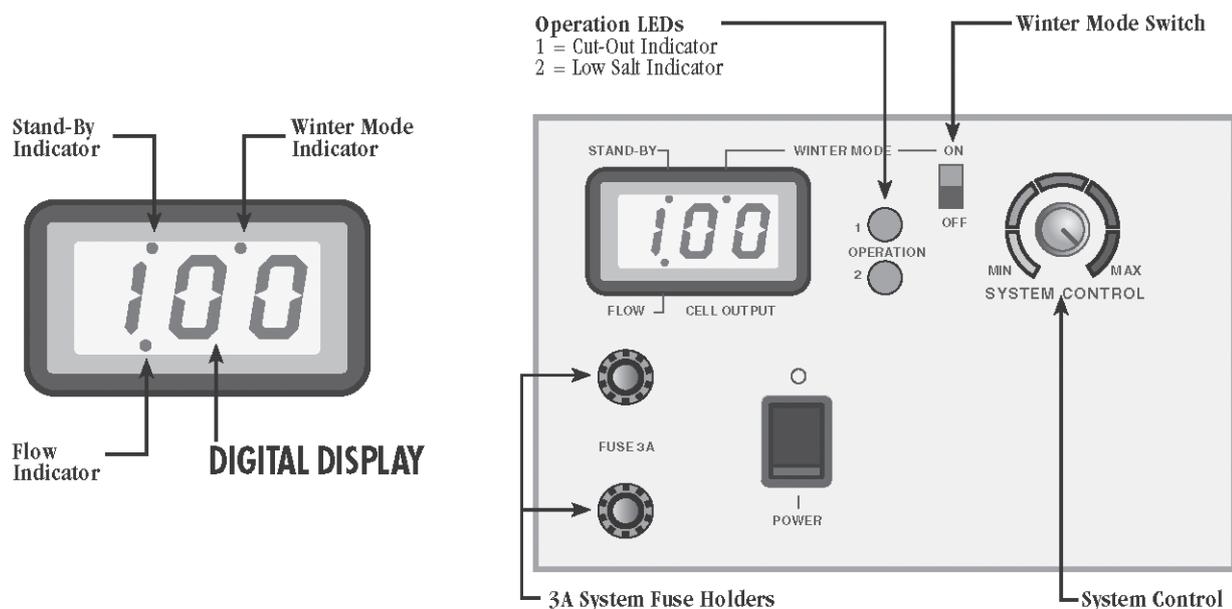
- a) The daily operating time of the equipment (pump/filter and ECO-matic). Suggested operating times vary depending on weather conditions, pool usage, etc (as little as 4 hrs in winter, to 8-12 hrs in summer or more in certain adverse conditions).
- b) The **System Control** setting (high or low)
- c) The condition of the ECO-matic 'Cell' (clean or dirty) The rate of sanitizer production will decrease as the 'Cell' 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 ECO-matic is producing sufficient, too little, or too much sanitizer for your pool.

If your ECO-matic 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 ECO-matic 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 ECO-matic 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** OR otherwise, continued operation will result in damage to the 'Cell'.

Start Up

1. Turn the POWER ON (first time only). Power setting "1". Switch filter pump ON. ECO-matic power switch can then be left ON and filter power control will also control the ECO-matic.
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 ECO-matic 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, low salt levels, scaling occurring on 'Cell'.

Provided LED 1 and LED 2 are both GREEN (and the 'Cell' is not scaling excessively), your ECO-matic 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) 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 have the following features:

- 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.
- 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).
- '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.
- 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 of Gas Sensor).

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 ECO-matic 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 ECO-matic 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).

Note: If the ECO-matic 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 ECO-matic is fitted with a number of protective features including the **Low Salinity Indicator** and 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 ECO-matic 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 ECO-matic 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 ECO-matic 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 ECO-matic 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.

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 ECO-matic will **Cut-Out**.

Day to Day Operation of ECO-matic

Your ECO-matic 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 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 ECO-matic 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 ECO-matic produces.

Always operate the pool filter and ECO-matic while the pool is being used.

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 ECO-matic for an extended period (say 24 hours) with the System Control set at MAXIMUM.

Maintenance of Your ECO-matic

The 'Power Pack'

The POWER PACK should require very little (if any) maintenance. 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 ECO-matic 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. ECO-matic '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 ECO-matic '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 ECO-matic replacement 'Cells. The use of imitations (or copies) of the ECO-matic 'Cell' may harm the internal components of your ECO-matic Power Pack and may void warranties.

Maintenance of Your ECO-matic (Continued)

Cleaning The 'Cell'

Mineral salts, calcium, etc. (scale) will accumulate onto the 'Cell' and may 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).

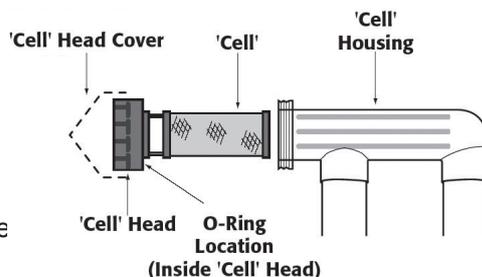
The rate at which the scale accumulates on the 'Cell' varies from pool to pool and is influenced mostly by the Total Hardness, Total Alkalinity and the ratio of these two important components of water balance. Rapid scaling on the 'Cell' indicates the need to adjust either the Total Hardness and/or the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

Removing The 'Cell' For Cleaning

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.

If a 'Cell' Head Cover is fitted to your 'Cell' it can be removed by undoing the screw which holds it in place.



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).
- 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-immerses 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).

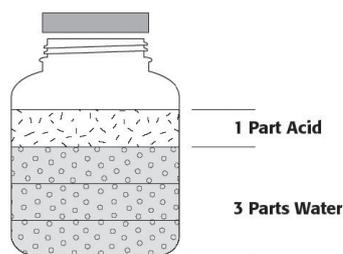
When re-inserting the 'Cell' into the 'Cell Housing', ensure that the O-ring is in place (seated in the groove in the 'Cell' Head). If it is difficult to have the O-ring stay in its groove, apply lube gel to O-ring, then re-fit into groove. Do not over-tighten the 'Cell' (hand tight is OK).

Weak Acid Solution

Add 10 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' mesh 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 (where children cannot access it) and re-used several times before becoming ineffective (saves having to make the solution each time). Avoid getting the 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 ECO-matic Dealer for any assistance regarding 'Cell' cleaning.

Maintenance of Your ECO-matic (Continued)

Maintaining The Salt Level

The optimum salt levels for best chlorinator efficiency is 4500-5000ppm. It is important to always maintain at least the minimum recommended salt level of 3500ppm in the pool water. Always monitor and maintain the optimum salt level for your ECO-matic model.

Operating your ECO-matic 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 ECO-matic (in fact, the system operates more efficiently at higher salt levels).

Checking The Salt Level

Your ECO-matic 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 ECO-matic.

The **Low Salt Indicator (LSI)** has been factory calibrated (plus or minus) to a salt level 3000 ppm 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.

Salt Test Kits

Various 'salt' test kits are available, and less expensive salt test strips can be purchased from your local pool professional. Some pool shops will test your salt levels.

How Salt Is Lost From Your Pool

The ECO-matic 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.

Adding Salt To The Water

Pool salt (sodium chloride) is available in bags of various sizes from your local pool professional. Call your ECO-matic 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.

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

How Much Top-up Salt To Add

When topping-up the salt level, we suggest adding salt at the rate of approx 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.

Maintenance of the Water

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 ECO-matic Dealer for testing.

Adding 'chemicals' To Your Pool

Your ECO-matic 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 ECO-matic 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 ECO-matic 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 ECO-matic 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 sunlight from destroying the sanitizer (especially important in hot, sunny areas). If the conditioner level is too low you will find it difficult to maintain a good residual of sanitizer in the water – and your ECO-matic 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 ECO-matic '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 ECO-matic '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.

Water Testing • What to Test For • Recommended Levels

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 ECO-matic 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 and/or the contractor who plastered your pool.
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 baking soda.
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.

Water Testing • What to Test For • Recommended Levels (Continued)

Why Conditioner?	Low levels of conditioner causes loss of sanitizer, especially in sunny locations. Low conditioner levels mean your ECO-matic 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	Concrete and Tiled Pools: 200-275ppm. Other surfaces: 100-225ppm
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 ECO-matic 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

ECO-matic Not Working

1. No power getting to 'Power Pack' (Main power OFF).
2. ECO-matic 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. ECO-matic 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.

ECO-matic 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.

ECO-matic 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.

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. 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 équipement, les precautions de base d'usage doivent etre suivies, 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 électrique de couleur verte ou une borne marquée G, GR, prise de terre ou avec le symbole internationale de prise de terre se trouve à l'intérieur de la boîte de contrôle (source de courant). Pour réduire tout risque de choc électrique, cette borne doit être connectée à la prise de terre qui se trouve dans le panneau électrique à cet effet, lequel est identifié par un fil de cuivre de la même grosseur que le circuit conducteur qui alimente cet équipement.
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 écrous marqués "Écrous d'encrage" sont fournis sur la surface externe ou sur le côté de la boîte de contrôle (source de courant). Pour réduire le risque de choc électrique, brancher la grille de jonction commune du bain tourbillon, spa ou piscine à ces terminaux avec un fil isolé 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 ECO-matic should be installed. Refer to the following pages for detailed instructions and helpful hints.

1. Install the ECO-matic '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 at the same times). 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.

The Components of Your ECO-matic

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 ECO-matic 'Cell', as well as the other various operating and control functions of the ECO-matic system.

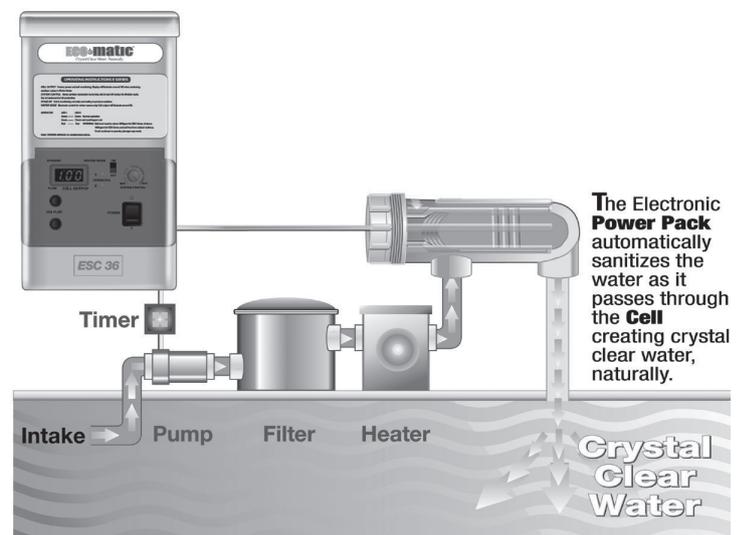
The 'Cell'

The ECO-matic '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 ECO-matic's intended purpose.

The Salt

A basic ingredient of the ECO-matic process is Pool Salt.

The salt is added directly into the pool or spa water to produce the water salinity required to enable your ECO-matic to function properly. Pool Salt is available in bags of various sizes from your local pool professional.



Before Installing Your ECO-matic...

How good is the water in your pool/spa?

In most instances, pools can be simply converted to the ECO-matic 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 ECO-matic 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 ECO-matic Owner's Guide for important instructions – how to prevent overproduction of sanitizer in your spa.

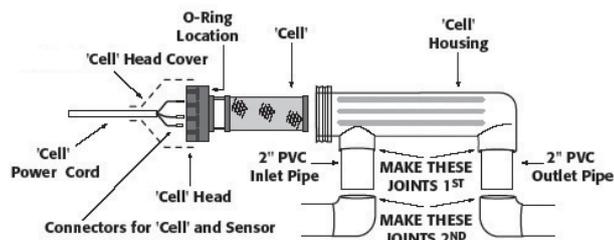
If there is a solar heater attached to the pool, locate the 'Cell' so that it has water flowing through it whenever the filter pump is operating regardless of whether water is flowing through the solar heater panels.

Installing the 'CELL HOUSING'

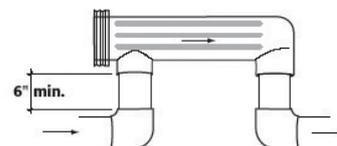
Once the correct location for the 'Cell' has been established, the 'Cell Housing' must be installed into the plumbing at that selected location. The clear plastic 'Cell Housing' is PVC compatible, so use ordinary PVC solvent (glue) to attach the 'Cell Housing' to the pipework. Remove the 'Cell' from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

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

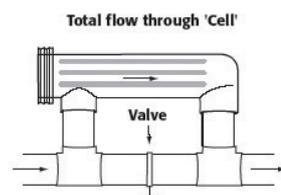
- * 'Cell Housing' must be installed in a HORIZONTAL position.
- * Water flow should be in the direction indicated by the ARROW on the clear plastic 'Cell Housing' (in the direction flowing away from the 'Cell' head).
- * The Inlet and outlet pipes must be pointing vertically DOWN, to form an inverted '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



SKETCH 3b

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 backpressure 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'). Note: The 'Cell' cord can be extended if absolutely necessary, but you must first contact your ECO-matic Dealer for important instructions.
- * For cord-connected units, locate the 'Power Pack' so its cord is within reach of the point where it is to be connected to mains power (eg: pool Timer).
- * The 'Power Pack' is weather-proof so 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 ECO-matic gets power **ONLY WHEN THE FILTER PUMP IS 'ON'** and water is flowing through the 'Cell'. The power supply to the ECO-matic Power Pack must therefore be controlled by the same switch or timing device which controls power to the filter pump.

Voltage

Your ECO-matic '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 to load, Green to Ground. For 110V units, connect Black to load, White 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.

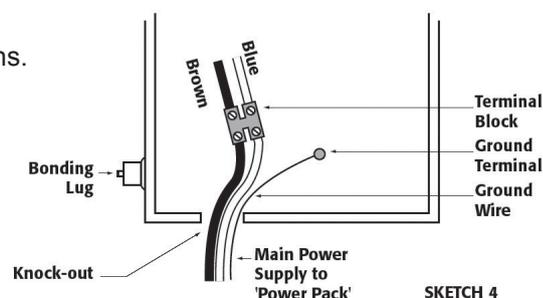
For Permanently Connecting 'Power Packs'. (refer Sketch 4)

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).



Bonding Lug Connection (if applicable)

The 'Power Pack' comes with 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).

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 circular 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.

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

Adding Salt to Your Pool

Your ECO-matic requires an optimum water salinity of 4500-5000ppm. 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 ECO-matic Dealer with the dimensions of the pool (length, width, average depth etc) for assistance. Multiply the water volume (in gallons) by 0.0460 for ESC models, to get the required amount of salt to be added (in lbs). Round off salt weight to nearest multiple of salt bag weight (eg: 15,000 gallon pool x 0.0460 = 690.5 lbs of salt. Use 14 - 50 lb bags of salt = 700 lbs, or 17 - 40 lb bags of salt = 680 lbs).

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

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

ECO-matic 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')

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

NOTE: The ON/OFF switch on the front control panel of your ECO-matic can be left in the ON position (other than at times when you want the ECO-matic 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 ECO-matic ON and OFF (providing the electrical connection to the 'Power Pack' has been done correctly).

What To Do - Day 1

Once your ECO-matic 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 ECO-matic can be left OFF until the chlorine level drops)

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

Ongoing Adjustment Of The ECO-matic

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 ECO-matic 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 ECO-matic Owner's Guide.

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 ECO-matic is producing sufficient, too much or too little sanitizer each day.

Warranty Information:

(This warranty is applicable to the USA and Canada only)

The ECO-matic® & EcoSalt® product is warranted that if any component, other than fuses, proves to be defective within a period of **3 years** from the date of purchase, that the defect will be repaired or the product will be replaced free of charge. ECO-matic and EcoSalt replacement cells are warranted for a period equal to the greater of A) **1 year** from the date of purchase or B) the remainder of the full warranty on the unit.

During the Warranty period any defective product shall be repaired or replaced by an authorized warranty station or returned by the customer to its place of purchase, accompanied by proof of date of purchase. Product will either be repaired or replaced and returned freight prepaid. If proof of date of purchase is not available, then the manufacturer's data code stamp on the unit and/or cell will be used to determine warranty qualification.

There is 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 Instructions or unauthorized alterations or modifications to the product. No responsibility or liability accepted for any extended warranties or variations to this warranty offered by re-sellers.

ECO-matic Manufactured by:

Davey Water Products Pty Ltd

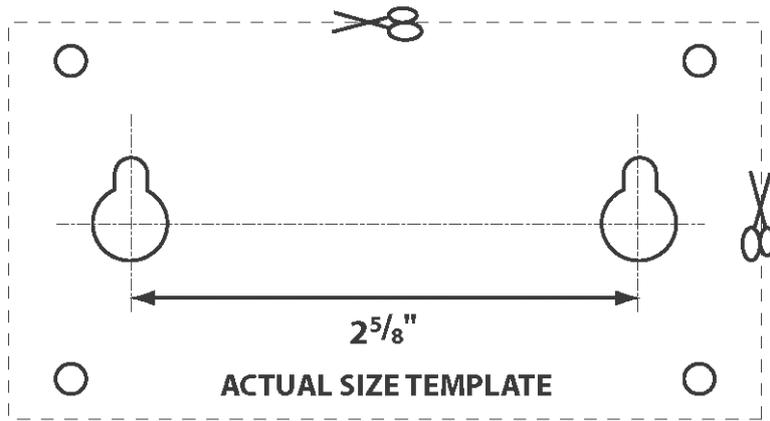
Member of the GUD Group
ABN 18 066 327 517

Head Office and Manufacturing

6 Lakeview Drive,
Scoresby, Australia 3179

Help to find a Dealer: help@ecomatic.com Parts or Service: Phone 877-885-0585

Your local ECO-matic Dealer:



SCREW POSITION TEMPLATE

Use this template for mounting 'POWER PACK'
See page 18 for details.

ECO  **matic**[™]
Crystal Clear Water. Naturally.

DEPEND ON
DAVEY

WATER PRODUCTS

ECO-matic ESC Chlorinator



SERVICING INSTRUCTIONS

ESC SERVICE GUIDE



WARNING: ALL ELECTRICAL WORK TO BE PERFORMED BY SUITABLY QUALIFIED ELECTRICAL PERSONNEL.



Always disconnect from electrical supply BEFORE any work is carried out.



Handle components carefully to avoid personal injury.

Tools Required

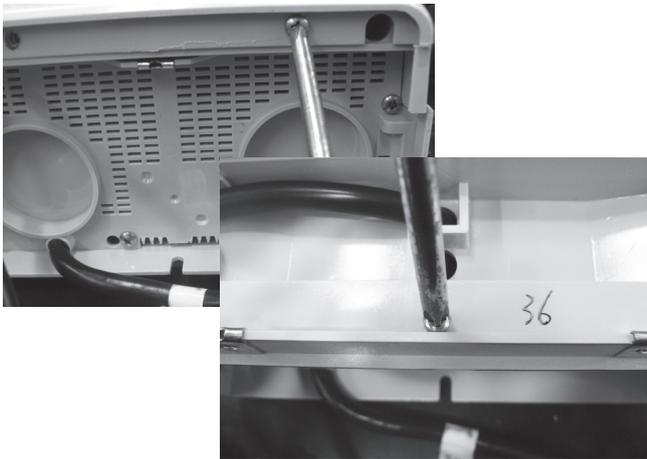
- 8mm spanner
- Phillips head screwdriver – One point
- Phillips head screwdriver – Two point
- Phillips head screwdriver – Long blade two point
- Flat blade screwdriver – 3mm
- Long nose pliers
- Side cutters
- Soldering iron
- Solder
- De-soldering tool
- Universal Cell Tester

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Disassembling/ Assembling the Housing

Disassembly

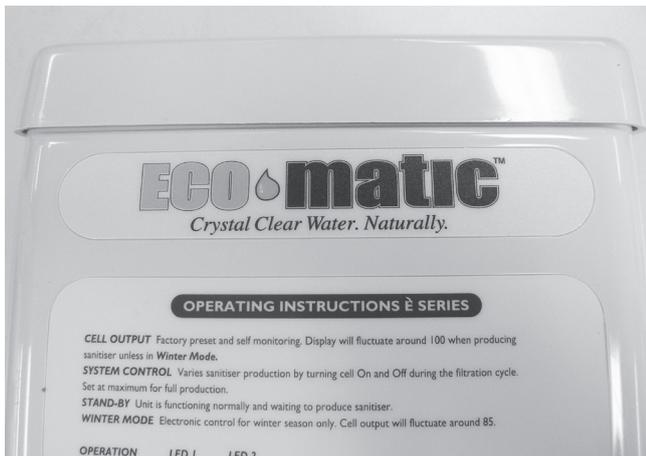


Step 1 – Using a Phillips head screwdriver (two point) remove the screws in the panel housing the cell cord assembly & remove the panel then remove the screw connecting the two chlorinator halves.



Step 2 – Using both hands lift the front panel up & slide it out from the top panel, keep sliding until the top of the chlorinator comes free & the housing is able to be flipped open.

Assembly



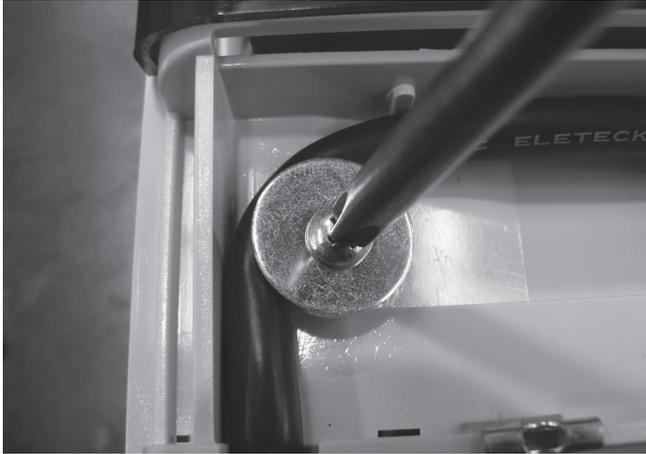
Step 1 – Place the top of the chlorinator flush with the top panel.



Step 2 – Push the bottom of the front panel into place; panel is correctly placed when the screw connecting the two chlorinator halves can be placed through its connection & tightened. Reconnect front panel screws with a Phillips head screwdriver (two point).

Replacing the Cell Cord Assembly

Disassembly



Step 1 – After opening front panel of the chlorinator use a Phillips head screwdriver (two point) to remove the holding plate allowing the cell cord assembly to be more easily manoeuvred.

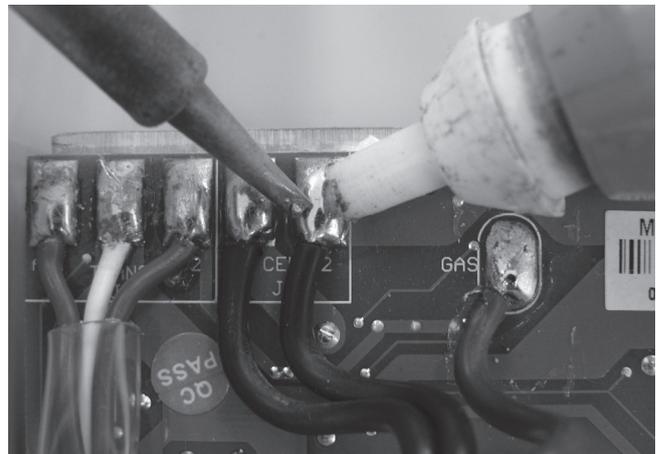


Step 2 – Remove the appropriate cable ties with side cutters. Take special care not to cut or damage the wiring

Note position of cable ties for easier reassembly

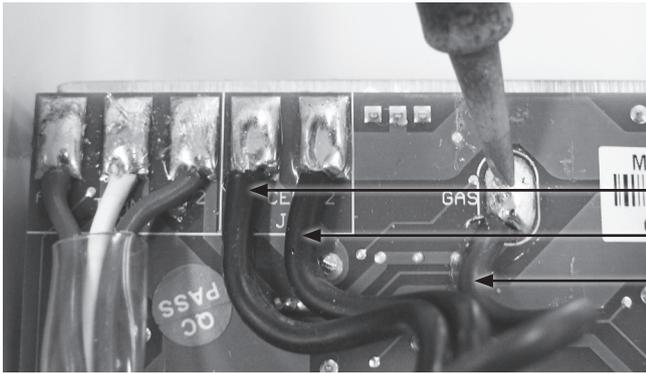


Step 3 – Remove the screws holding the protective covering on the PCB using a Phillips head screw driver (one point). This will expose the cell cable connections.



Step 4 – With a soldering iron & solder sucker or solder wick remove the wires for the cell cables & gas sensor. When the metal has cooled remove the cell cords.

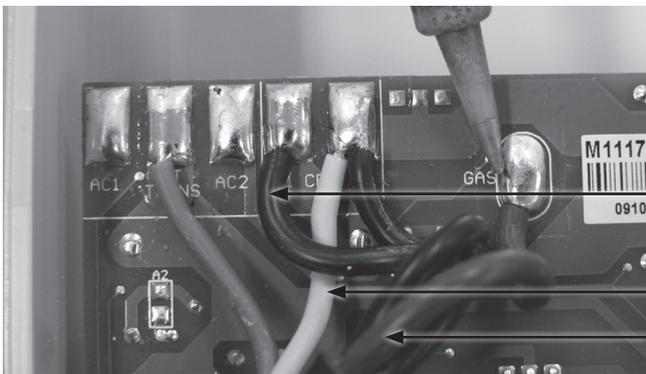
Assembly



- 1. BLACK
- 2. BLACK
- 3. DARK BLUE

Step 1 – With a soldering iron & unleaded solder reattach the cell cables & gas sensor cable to the PCB.

ESC 16 – 24 110V & 220V: The order for soldering the cell cables back onto the PCB from left to right is 1) black, 2) black, 3) dark blue. The gas sensor is the dark blue cable which should be soldered onto the position on the PCB marked Gas.

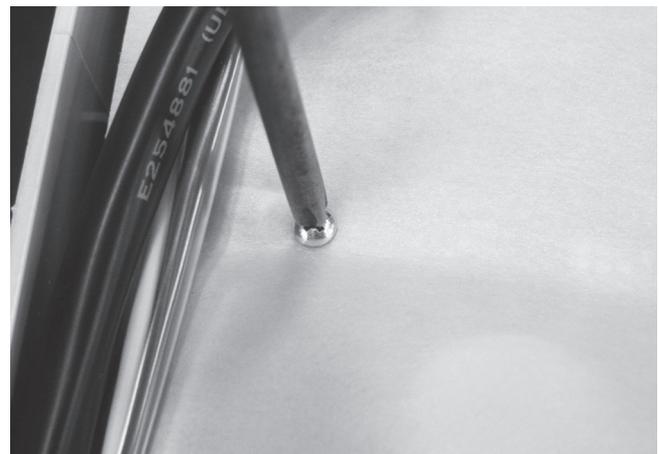


- 1. BLACK
- 2. LIGHT BLUE & BLACK
- 3. DARK BLUE

ESC 36 – 48 220V: The order for soldering the cell cables back onto the PCB from left to right is: 1) black cell cable, 2) light blue transformer cable & black cell cable in the same slot, 3) dark blue cell cable which goes in the slot marked Gas.



Step 2 – Place cell cord assembly into position & secure with the holding plate using a Phillips head screwdriver (two point).

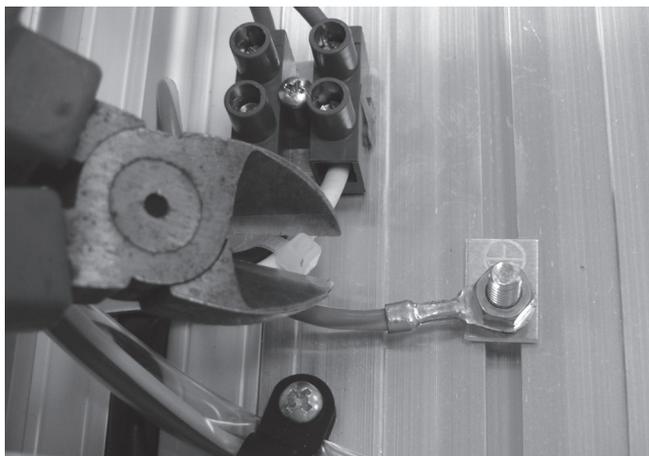


Step 3 – Replace any cable ties that were removed then replace the protective covering on the PCB with a Phillips head screwdriver (one point).

Replacing the Bottom Panel

IMPORTANT NOTE: Power **MUST** be switched off before removing power lead.

Disassembly

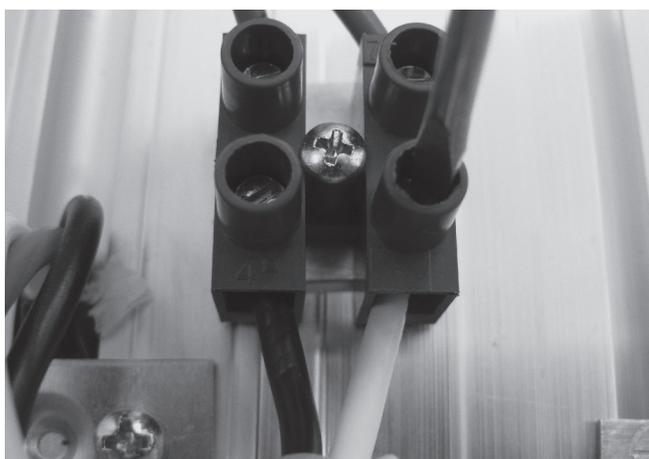


Step 1 – Remove the appropriate cable ties with side cutters. Take special care not to cut or damage the wiring.

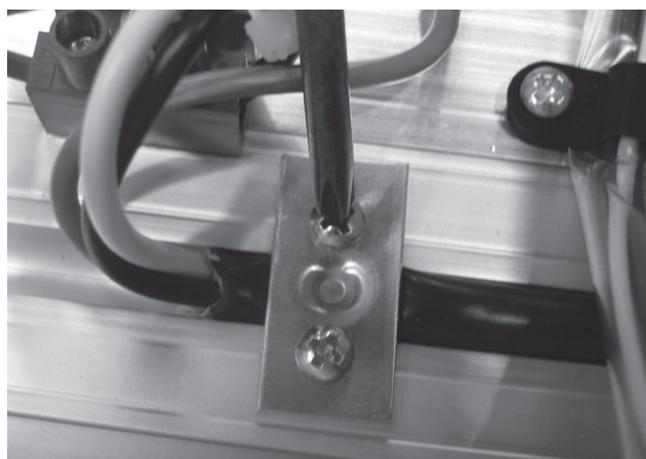
Note position of cable ties for easier reassembly.



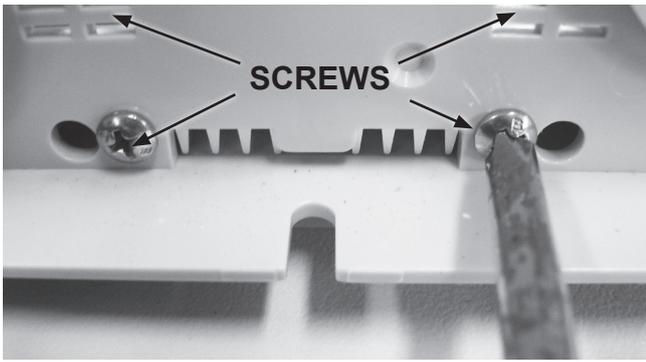
Step 2 – Remove the nut holding down the green Earth lead using an 8mm spanner.



Step 3 – Remove the black & white cables coming from the power cord cable & connecting to the terminal strip using a flat blade screwdriver (3mm). Mark the wires to allow for easier reconnection.

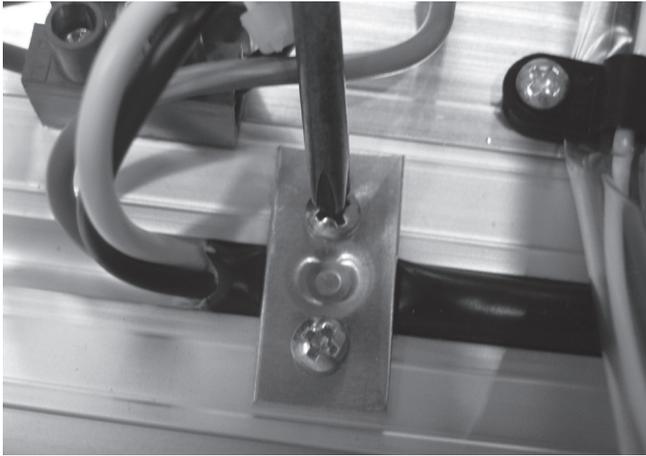


Step 4 – Remove the screws on the holding plate using a Phillips head screwdriver (two point) which will allow the removal of the power cord.



Step 5 – Remove the bottom panel by using a Phillips head screwdriver to remove the 4 screws holding it in place.

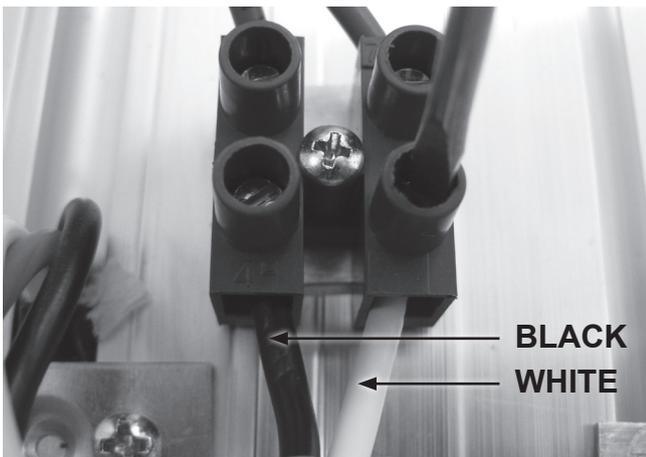
Assembly



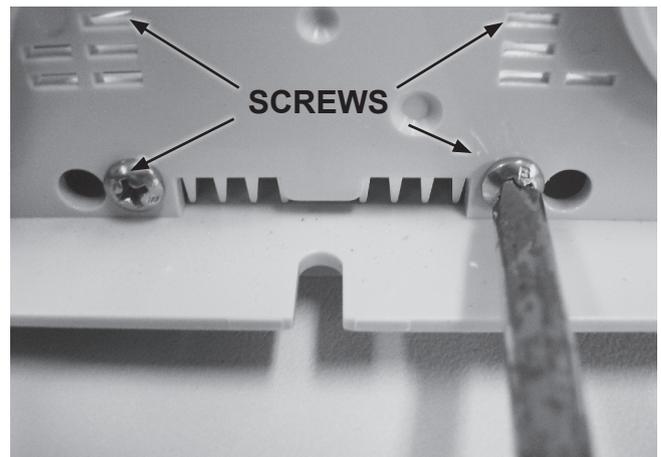
Step 1 – Feed the power cord through the slot in the bottom panel & replace the holding plate onto the power cord using a Phillips head screwdriver (two point).



Step 2 – Reattach the green power cord Earth lead, use an 8mm spanner to tighten nut.



Step 3 – Reconnect the black cable to the left & the white cable to the right of the terminal strip using a flat blade screwdriver (3mm) & replace any cable ties that were removed.



Step 4 – Tighten the four screws on the bottom panel to hold it in place using a Phillips head screwdriver (two point).

Replacing the Door

Disassembly



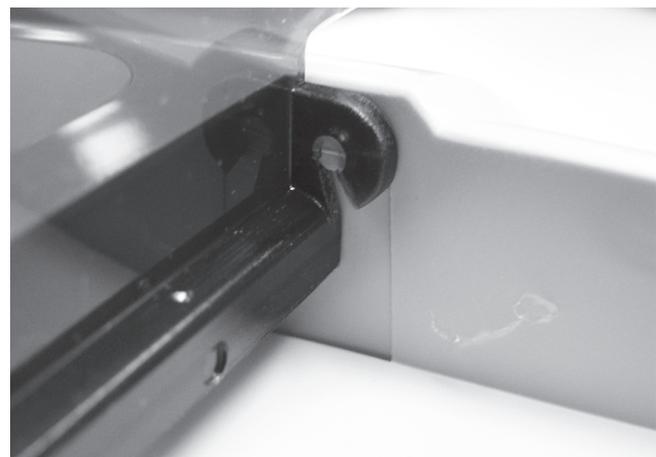
Step 1 – Remove the screws holding the cover on the PCB with a Phillips head screwdriver (one point).



Step 2 – Remove the sanitiser output knob which will allow you to move the PCB to the side. May need to use two flat blade screwdrivers to lever the knob off if it is fastened too tight to remove by hand. If using screwdrivers be careful not to damage the control panel.

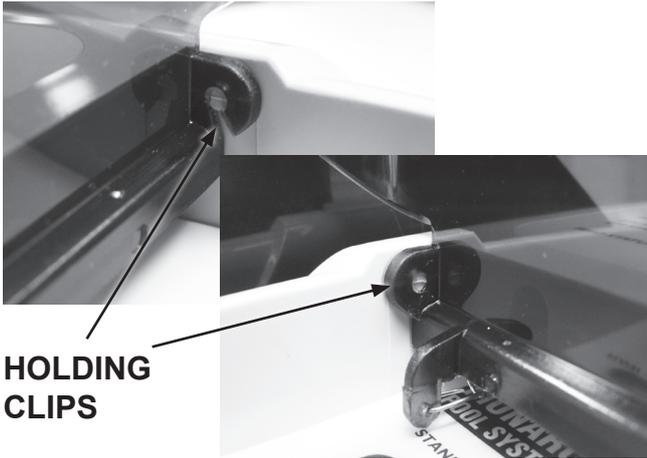


Step 3 – Manoeuvre the spring so that it is able to be unhooked, may need to use long nose pliers to enable this.



Step 4 – From the front of the chlorinator unhook holding clips & remove door. This is best done by doing the right hand side first.

Assembly



Step 1 – Attach door to holding clips on side of chlorinator.



Step 2 – Reattach spring to clip located on inside of chlorinator.



Step 3 – When PCB is in place the sanitiser output holder will be visible poking through the front panelling. Reconnect sanitiser output knob to its holder ensuring it is able to be adjusted to both minimum & maximum settings.

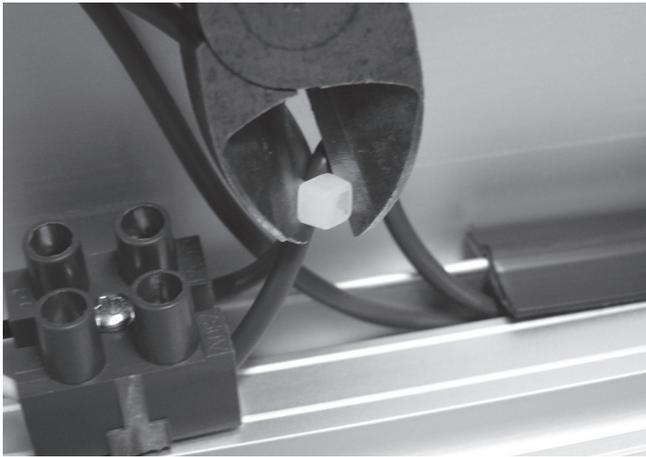


Step 4 – Replace the protective covering on the PCB using a Phillips head screwdriver (one point).

Replacing the Transformer – ESC 16 110V

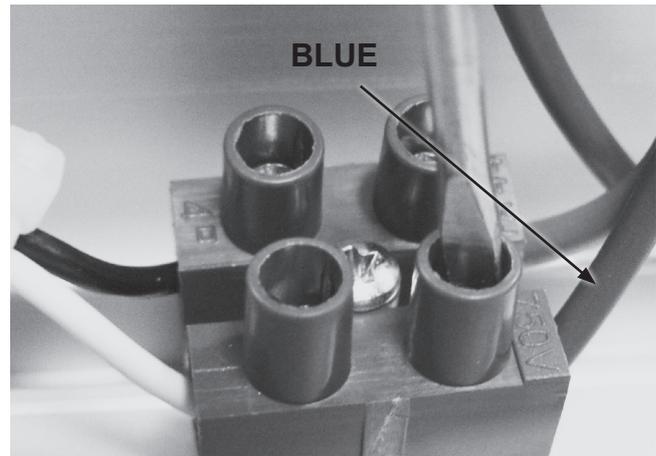
IMPORTANT NOTE: Power **MUST** be switched off before removing transformer.

Disassembly

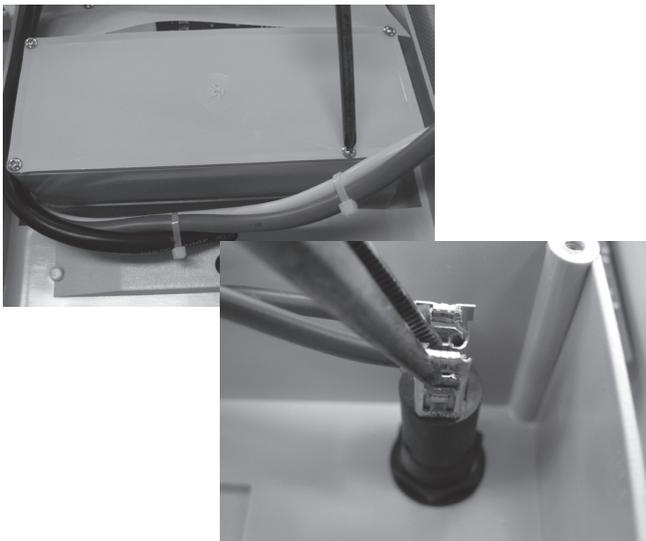


Step 1 – Remove all applicable cable ties with a pair of side cutters. Take special care not to cut or damage the wiring.

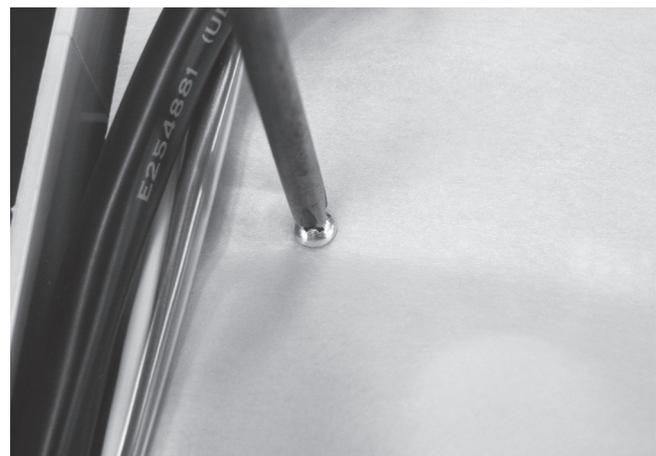
Note position of cable ties for easier reassembly.



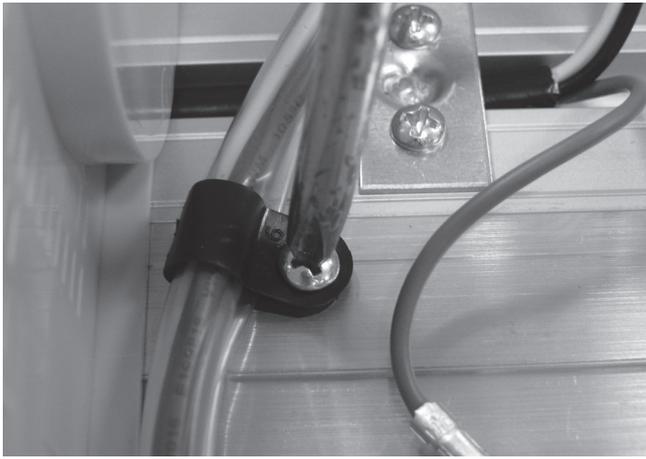
Step 2 – Remove the blue wire connecting the transformer to the terminal strip using a flat blade screwdriver (3mm).



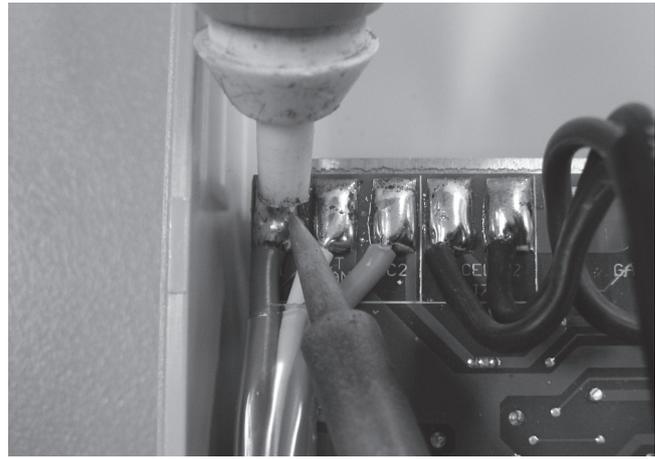
Step 3 – Open the terminal box using a Phillips head screwdriver (one point) & remove the brown transformer wire from the lower terminal on the fuse housing using a pair of long nose pliers.



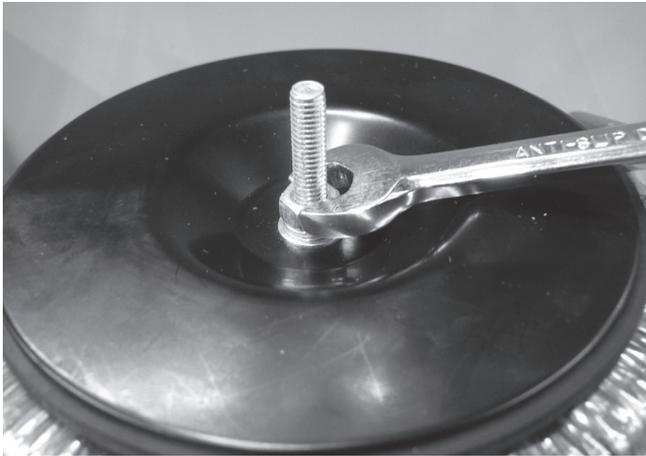
Step 4 – Remove the screws holding the protective covering on the PCB using a Phillips head screw driver (one point).



Step 5 – Remove the cable clamp holding down transformer cables using a Phillips head screwdriver (two point).



Step 6 – With a soldering iron & solder sucker or solder wick remove the 3 transformer wires. The transformer wires are the red, white & orange wires on the top left corner of the PCB. When the metal has cooled remove the transformer wires.



Step 7 – Remove the nut on the top of the transformer with an 8mm spanner then lift off the black heat dispersion disk which when removed allows for the transformer to be lifted out of the chlorinator. When removing heat dispersion disk also remove the flat washer & spring washer located beneath the nut.

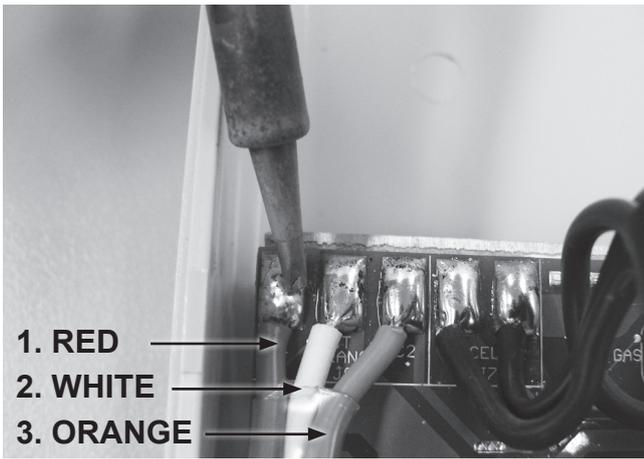
Assembly



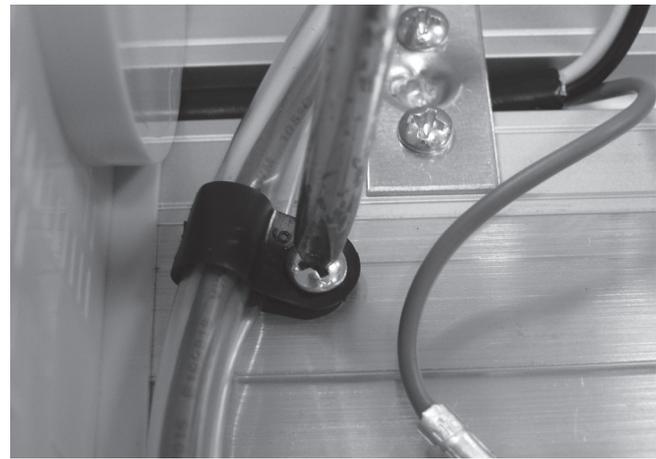
Step 1 – Place transformer over the locating screw.



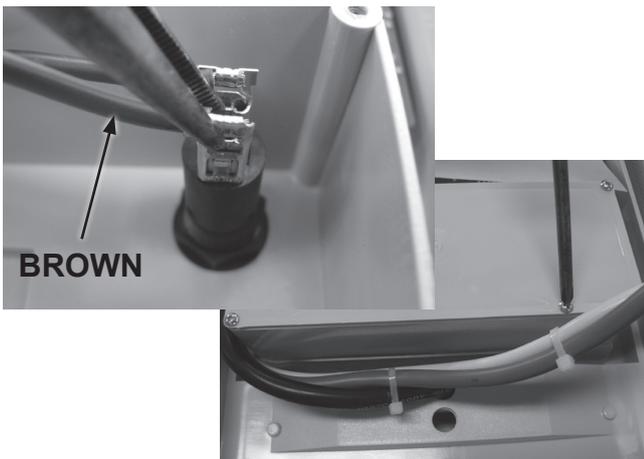
Step 2 – Place heat dispersion disk over the transformer with the shiny metallic side face up. Place flat washer with the spring washer on top of it in place over the locating screw, tighten the transformer nut using an 8mm spanner.



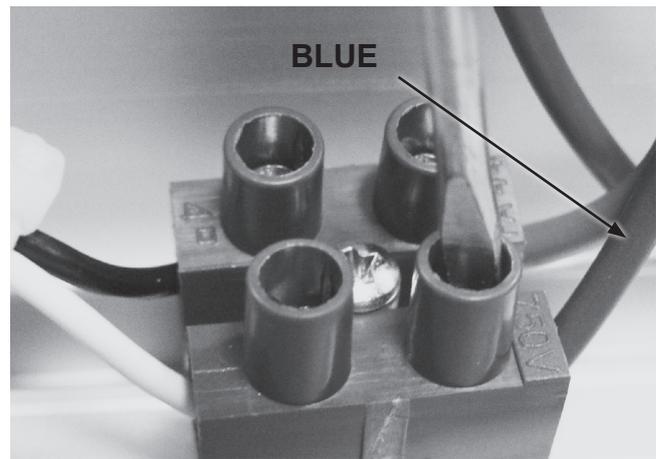
Step 3 – After feeding the transformer wires through the clear tubing use a soldering iron with unleaded solder to attach the wires to the PCB. The order for connecting the wires from the left of the PCB is 1) red, 2) white, 3) orange.



Step 4 – Tighten cable clamp using a Phillips head screwdriver (two point).



Step 5 – Replace brown transformer wire from the primary side of the transformer to the fuse housing terminal using a pair of long nose pliers, the brown transformer wire slots onto the lower terminal on the fuse housing. Close the terminal box using a Phillips head screwdriver (one point).



Step 6 – Replace the blue transformer wire into its slot on the terminal strip using a flat blade screwdriver (3mm), the blue wire goes in the top right slot of the terminal strip. Replace any cable ties that were removed.

Replacing the Transformer

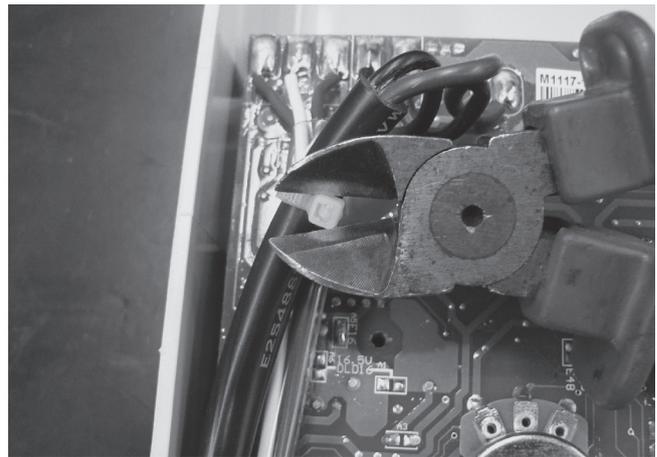
– ESC 16 220V & ESC 24 110V & 220V

IMPORTANT NOTE: Power **MUST** be switched off before removing transformer.

Disassembly



Step 1 – Remove the screws holding the protective cover on the PCB with a Phillips head screwdriver (one point).

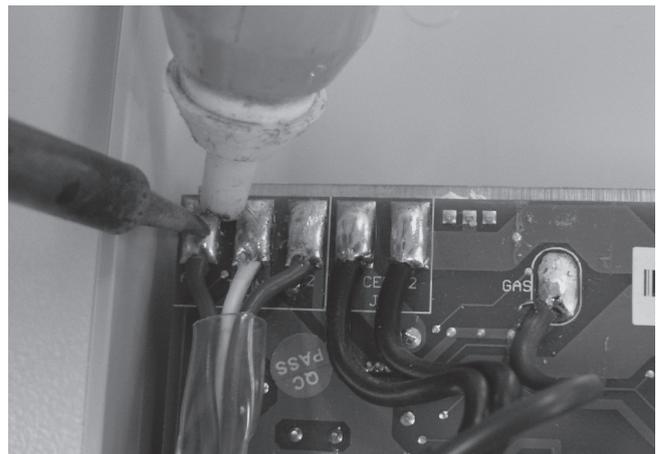


Step 2 – Remove all applicable cable ties with a pair of side cutters. Take special care not to cut or damage the wiring.

Note position of cable ties for easier reassembly.



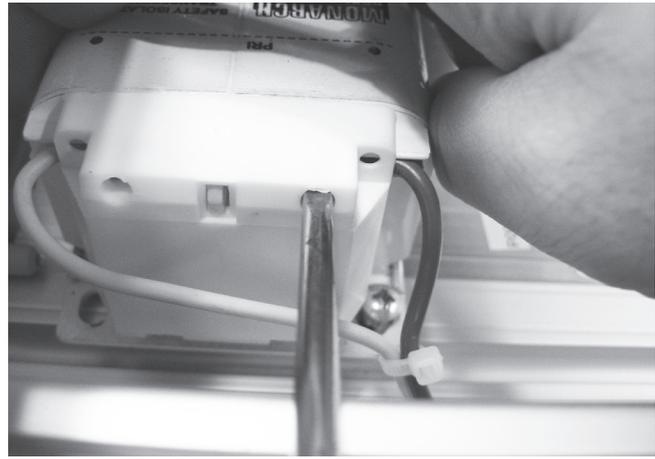
Step 3 – Remove wire clamp holding the transformers secondary wires in place on the chlorinator using a Phillips head screwdriver (two point).



Step 4 – With a soldering iron & solder sucker or solder wick remove the 3 transformer wires. When the metal has cooled remove the cell cords.

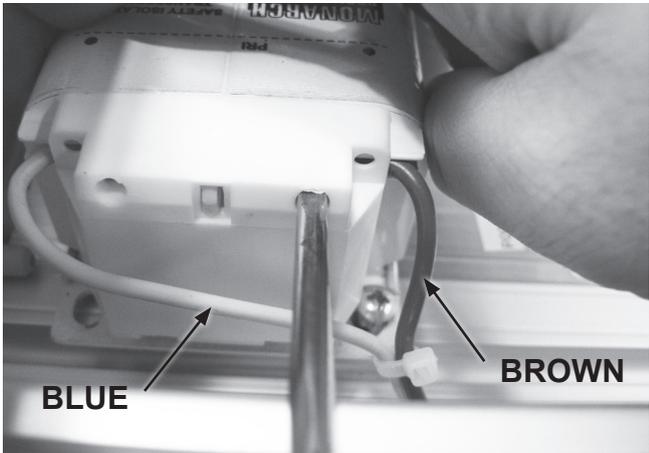


Step 5 – Remove the locating screws connecting the transformer to the chlorinator. Remove the front two first using a Phillips head screwdriver (two point) then using a long blade Phillips head screwdriver remove the rear screw.



Step 6 – Mark the wire connections on the **PRIMARY** side of the transformer to allow for easy reconnection. Remove the 2 wires with a flat blade screwdriver (3mm) & remove the transformer.

Assembly



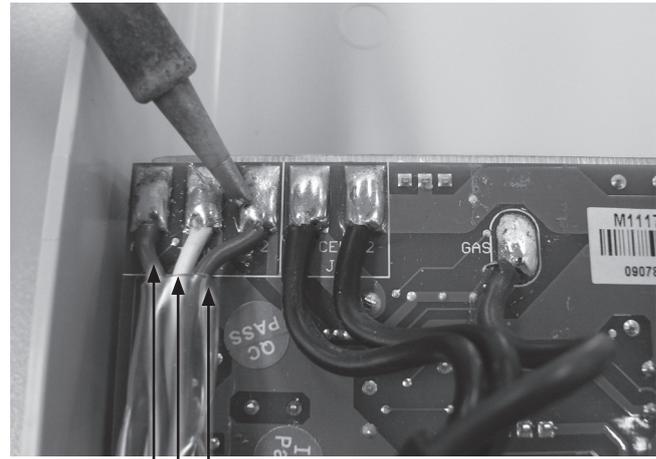
Step 1 – Replace previously marked wires back into correct locations on **PRIMARY** side of transformer with a flat blade screwdriver (3mm). The blue wire connects to the rear of the transformer & the brown wire connects to the front.



Step 2 – Place transformer in correct location, replace the rear screw first using a long blade Phillips head screwdriver then the front two screws using a Phillips head screwdriver (two point).



Step 3 – Feed the secondary transformer wires through the clear tubing then using the wire clamp, fasten the wires back onto the chlorinator using a Phillips head screwdriver (two point).



- 1. RED
- 2. WHITE
- 3. RED

Step 4 – Replace transformer wires on the PCB using a soldering iron with unleaded solder. The order for replacing the transformer wires back onto the PCB from left to right is 1) red, 2) white, 3) red.

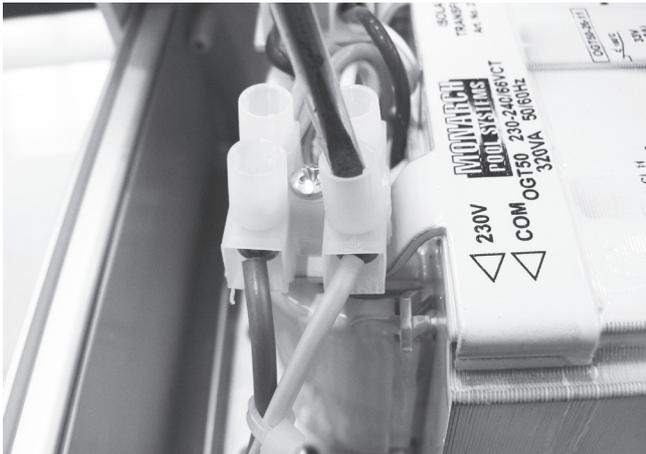


Step 5 – Replace any cable ties that were removed then replace the protective covering on the PCB with a Phillips head screwdriver (one point).

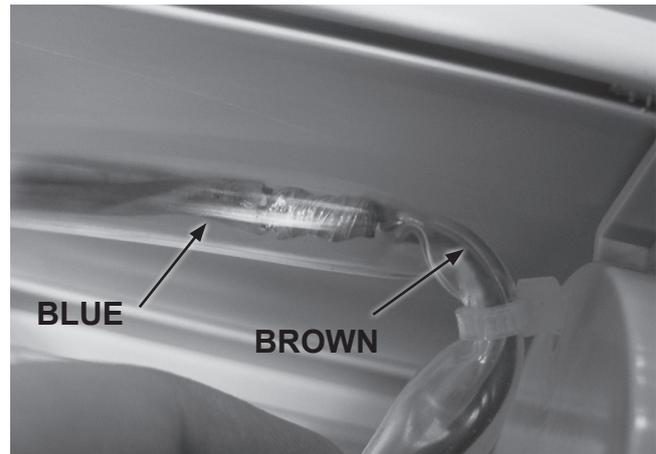
Replacing the Transformer – ESC 36 - 48 220V

IMPORTANT NOTE: Power **MUST** be switched off before removing transformer.

Disassembly



Step 1 – Remove the screws connecting the transformers **PRIMARY** wires to the terminal strip with a flat blade screwdriver (3mm).



Step 2 – Remove the clear tubing covering the blue wire & using a soldering iron & a solder sucker disconnect the blue & brown wires connecting the transformer & the PCB.



Step 3 – Using a soldering iron & a solder sucker remove the wires connecting the transformer to the Triacs. Mark the wires to allow for easier reconnection.

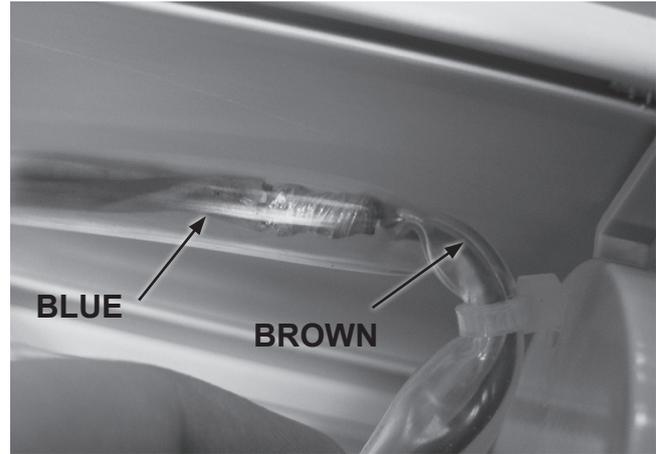


Step 4 – Remove the screws holding the transformer in place using a Phillips head screwdriver (two point).

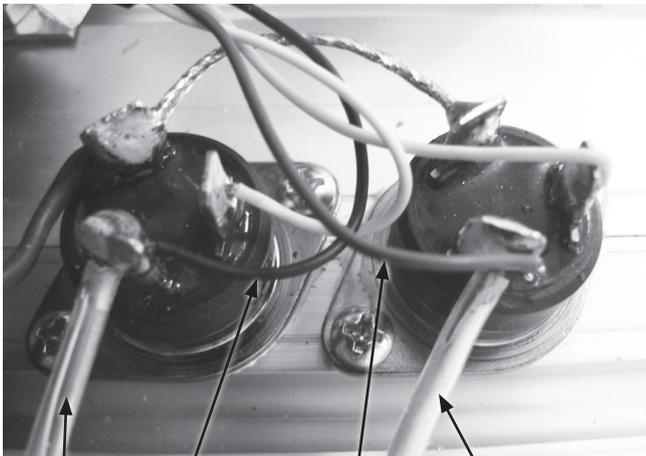
Assembly



Step 1 – Replace the screws holding the transformer in place using a Phillips head screwdriver (two point).

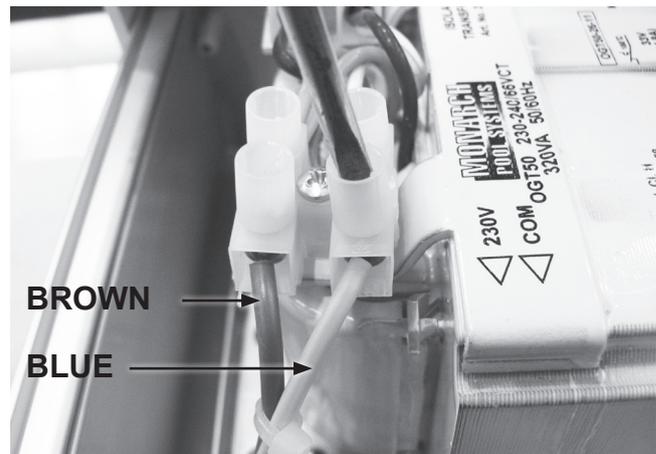


Step 2 – Solder the blue transformer wire to the brown PCB wire which connects the transformer to the PCB & replace the clear covering. Alternatively use crimping pliers & a crimp connector to fasten the wires together.



WHITE
BLACK **GREEN**
WHITE

Step 3 – Using a soldering iron reconnect the secondary transformer wires to their respective position on the Triacs with the PCB wires. Connections on the lower Triac are the white transformer wire on the right terminal with the black PCB wire on the same terminal. The top Triac has the white transformer wire on the right terminal with the green PCB wire on the same terminal.



Step 4 – Connect the transformer wires to the **PRIMARY** terminal strip with a flat blade screwdriver (3mm) & replace any cable ties that were removed. The brown wire should be fastened to the left side of the terminal strip with the light blue wire belonging on the right of the terminal strip.

Replacing the Triacs – ESC 36 - 48 220V

Disassembly



Step 1 – Using a soldering iron & a solder sucker remove the wires connected to the Triacs. Mark the positioning of the wires to assist in reconnection.

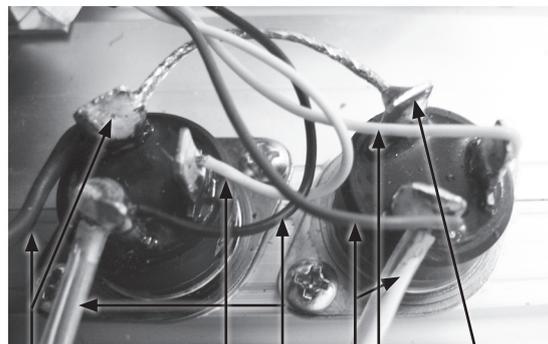


Step 2 – Remove the screws connecting the Triacs to the chlorinator using a Phillips head screwdriver (two point) & remove the Triacs.

Assembly



Step 1 – When placing the Triacs back onto the chlorinator use a heat transfer compound such as Unick to assist with heat dispersion during operation. Unick is generally available from electrical repair stores & some electronic retailers. Fasten the Triacs down using a Phillips head screwdriver (two point).

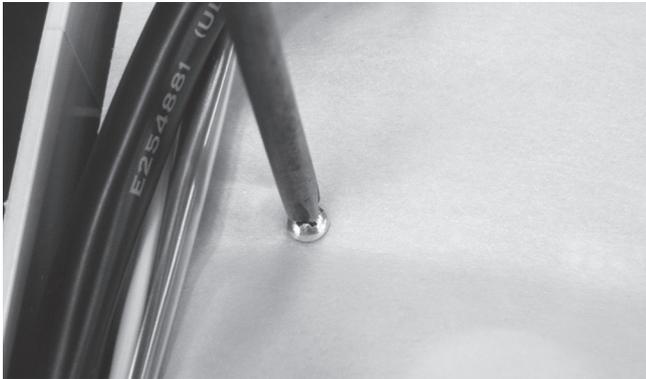


- | | |
|--------------------------|--------------------------|
| 1. BLUE/SOLDER BRIDGE | 4. SOLDER BRIDGE |
| 2. WHITE | 5. YELLOW |
| 3. WHITE, WITH BLACK PCB | 6. WHITE, WITH GREEN PCB |

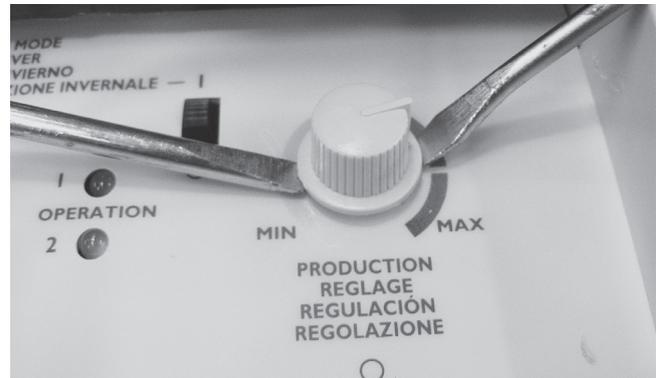
Step 2 – Using a soldering iron reconnect Triac wires to their correct locations. The position of the wires to solder back onto the lower Triac from left to right is 1) Blue PCB wire & Solder Bridge, 2) White PCB wire, 3) White transformer cable with the black PCB wire. The position of the wires on the top Triac from left to right is 4) Solder Bridge, 5) Yellow PCB wire, 6) White transformer cable with green PCB wire.

Replacing the PCB

Disassembly



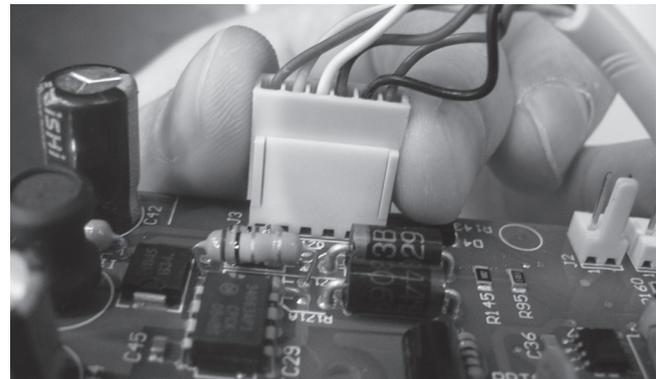
Step 1 – Remove the screws holding the protective cover on the PCB with a Phillips head screwdriver (one point).



Step 2 – Remove the sanitiser output knob which will allow you to move the PCB to the side. May need to use two flat blade screwdrivers to lever the knob off if it is fastened too tight to remove by hand. If using screwdrivers be careful not to damage the control panel.

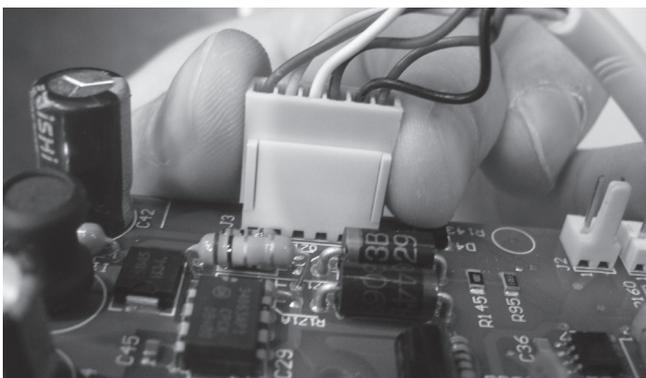


Step 3 – With a soldering iron & solder sucker or solder wick remove all the wires for the cell cables, gas sensor & transformer.

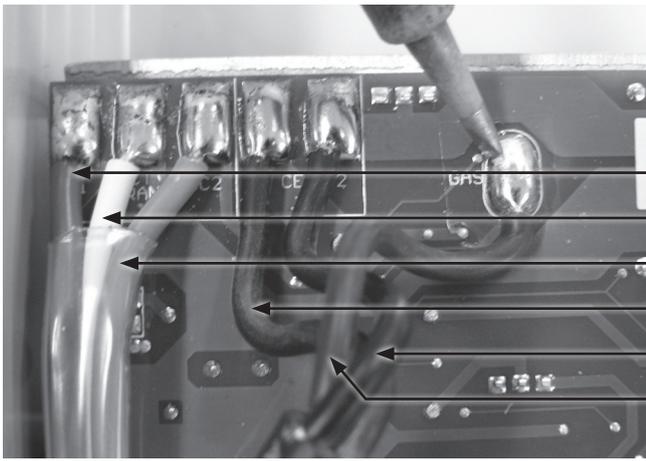


Step 4 – On ESC 36 - 48 it's also necessary to remove the Triac plug.

Assembly



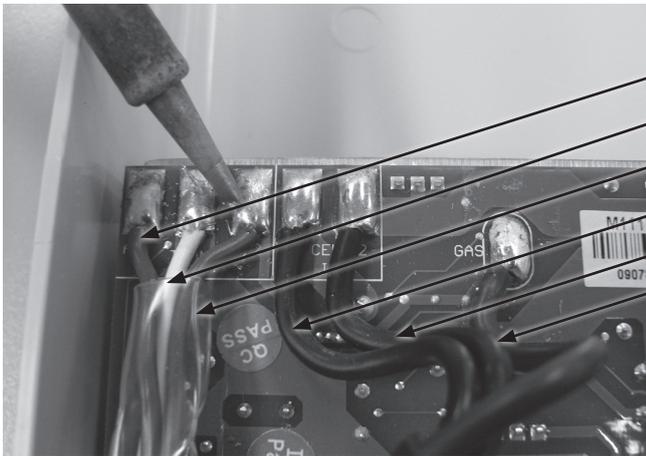
Step 1 – On ESC 36 – 48 reattach the Triac plug to the PCB.



- 1. RED
- 2. WHITE
- 3. ORANGE
- 4. BLACK
- 5. BLACK
- 6. BLUE

Step 2 – Use a soldering iron with unleaded solder to reattach the transformer & cell cable wires to the PCB.

Esc 16 110V: Connections from left to right on the PCB are as follows, first the three transformer cables, 1) red, 2) white 3) orange. The cell cables are in the next three slots positioned 4) black, 5) black 6) blue. The blue cell cable goes to the slot marked Gas.



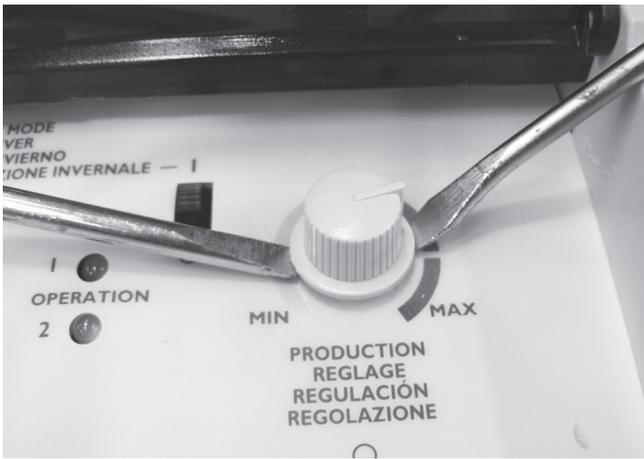
- 1. RED
- 2. WHITE
- 3. RED
- 4. BLACK
- 5. BLACK
- 6. BLUE

Esc 16 220V – 24 110V & 220V: Connections from left to right on the PCB are as follows, first the three transformer cables, 1) red, 2) white 3) red. The cell cables are in the next three slots positioned 4) black, 5) black 6) blue. The blue cell cable goes to the slot marked Gas.

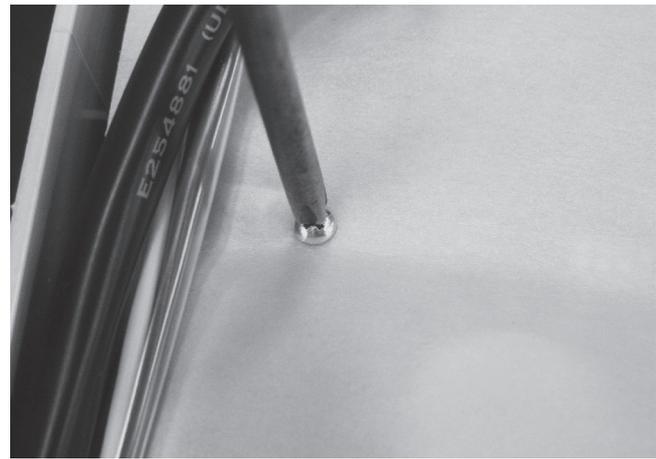


- 1. BROWN
- 2. BLACK
- 3. LIGHT BLUE & BLACK CELL
- 4. DARK BLUE

Esc 36 – 48 220V: Connections from left to right on the PCB in the 6 slots are as follows: blank slot, 1) brown transformer wire, blank slot, 2) black cell cable, 3) light blue transformer wire & black cell cable, 4) blue gas sensor cable in slot marked Gas.



Step 3 – When PCB is in place the sanitiser output holder will be visible poking through the front panelling. Reconnect sanitiser output knob to its holder ensuring it is able to be adjusted to both minimum & maximum settings.

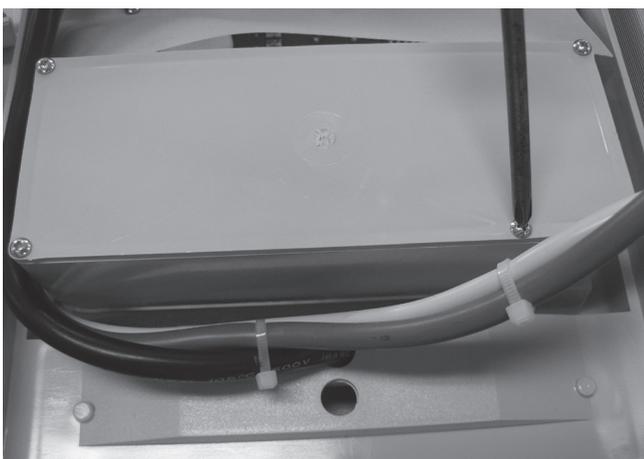


Step 4 – Screw the protective cover for the PCB back on using a Phillips head screwdriver (one point).

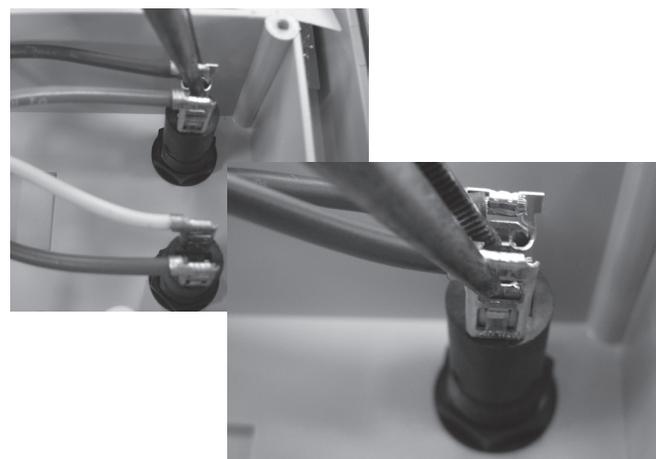
Replacing the Fuse Housing

Note that ESC 16 – 24 110V has only one fuse whereas all 220V models have 2 fuses.

Disassembly



Step 1 – Open the terminal box using a Phillips head screwdriver (one point).



Step 2 – Using long nose pliers remove the clips from the fuse housing terminals.



Step 3 – Using a pair of long nose pliers undo the nut holding the fuse housing in place.



Step 4 – Remove the fuse housing.

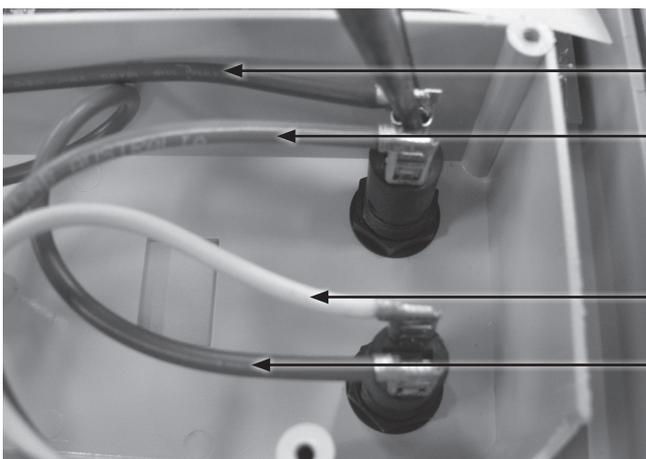
Assembly



Step 1 – Replace the fuse housing.



Step 2 – Replace the nut that holds the fuse housing in place & tighten using long nose pliers.



4. DARK BROWN

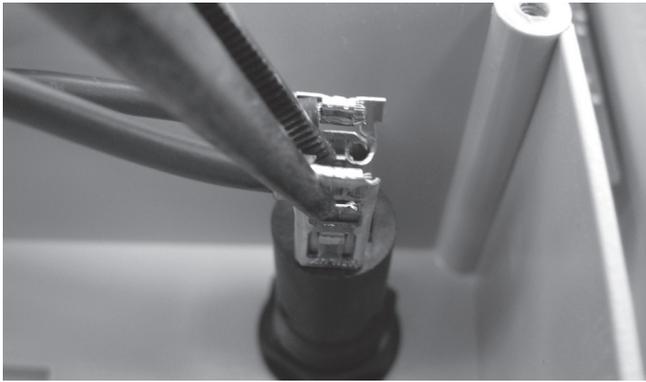
3. BROWN

2. LIGHT BLUE

1. DARK BLUE

Step 3 – Being careful not to bend the terminals on the fuse housing put the clips back in place. Use long nose pliers to slide the clips onto the terminals.

All 220V models: From the bottom of the chlorinator the correct positioning of the wires on the 2 fuse housings is as follows: 1) dark blue wire from the power switch, 2) light blue wire from the transformer, 3) brown wire from the transformer, 4) dark brown wire from the power switch.



All 110V models: The correct positioning of the wires to the fuse housing has the brown wire from the primary (left) side of the transformer connected to the bottom terminal & the brown wire from the top right terminal on the power switch connected to the top fuse terminal.



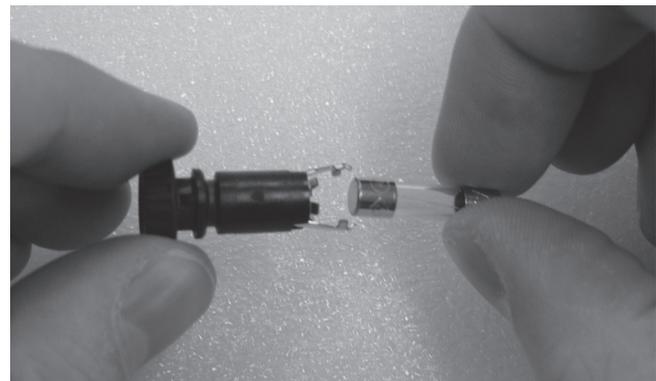
Step 4 – Replace the covering on the terminal box using a Phillips head screwdriver (one point).

Replacing the Fuse

Disassembly

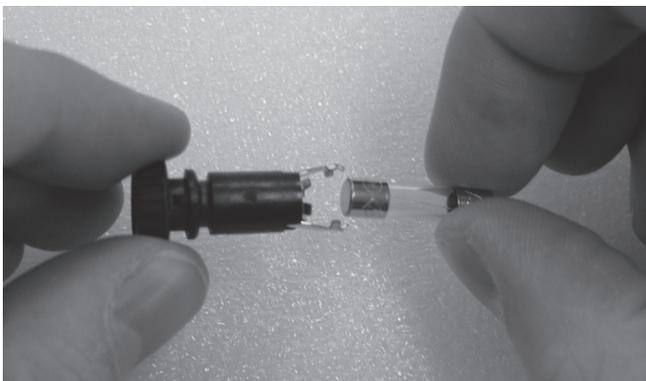


Step 1 – Push down on the fuse & twist to the left.



Step 2 – Remove the fuse from its holder.

Assembly



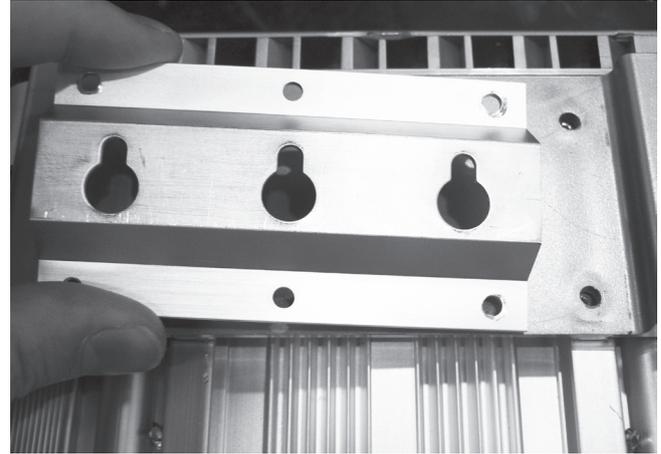
Step 1 – Place fuse back in its holding.



Step 2 – Place fuse into fuse housing & pushing gently down twist to the right to lock in place.

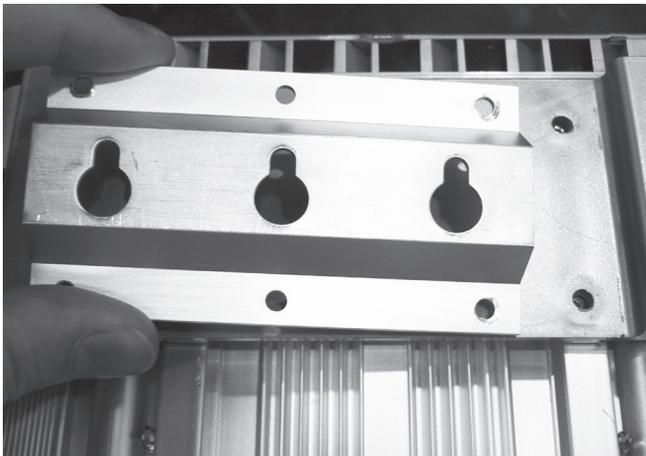
Replacing the Hanging Bracket

Disassembly



Step 1 – Remove screws holding the hanging bracket in place with a Phillips head screwdriver (two point) & remove the hanging bracket.

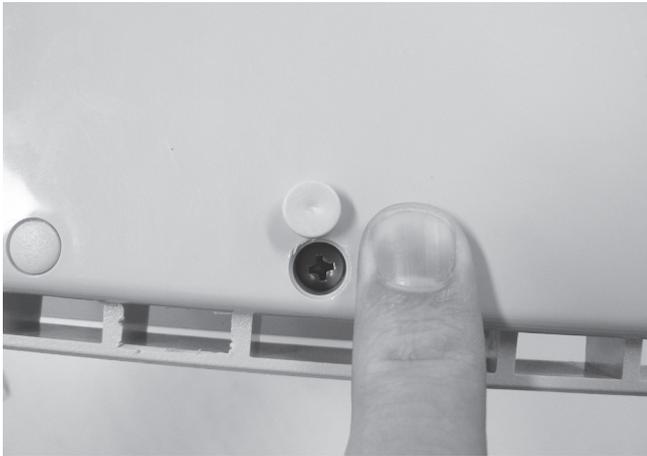
Assembly



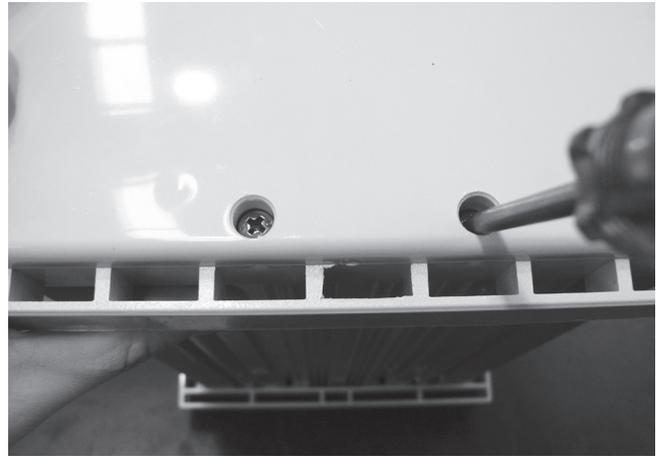
Step 1 – Place hanging bracket in position over screw holes & replace screws using a Phillips head screwdriver (two point).

Replacing the Top Panel

Disassembly



Step 1 – Pry the tabs covering the screws on the top panel off. These tabs are not reusable & will need to be replaced after removal (Part number M1500GRY).



Step 2 – Remove the screws holding down the top panel using a Phillips head screwdriver (one point).

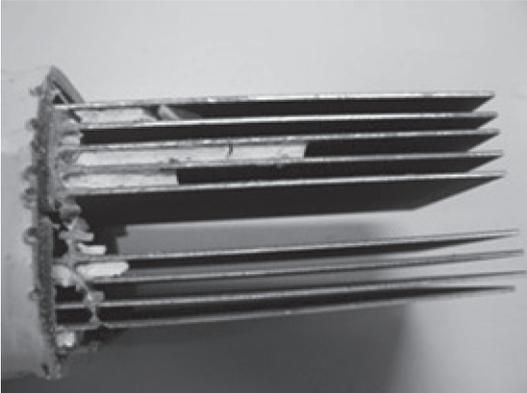
Assembly



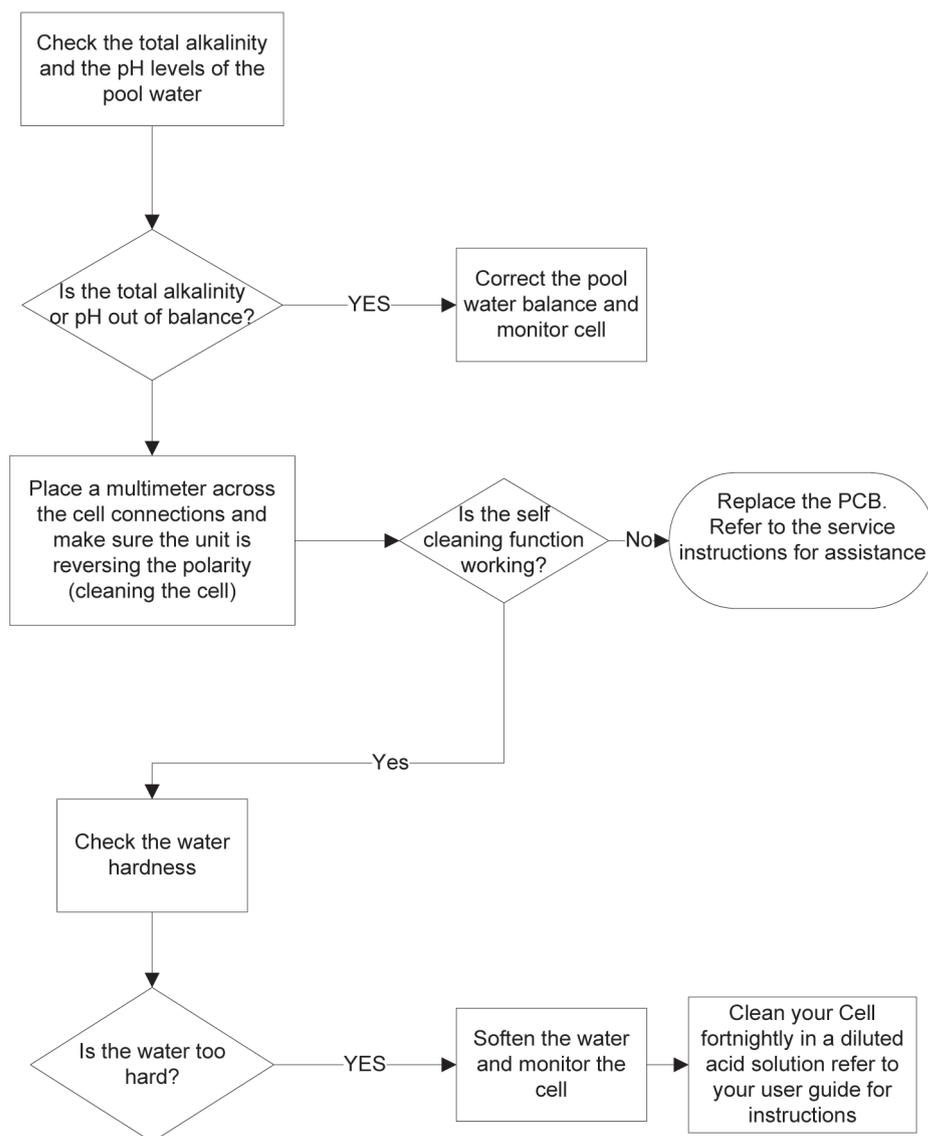
Step 1 – Replace the screws holding down the top panel using a Phillips head screwdriver (one point) & press tabs back into place, (Part number M1500GRY).

Troubleshooting Guides

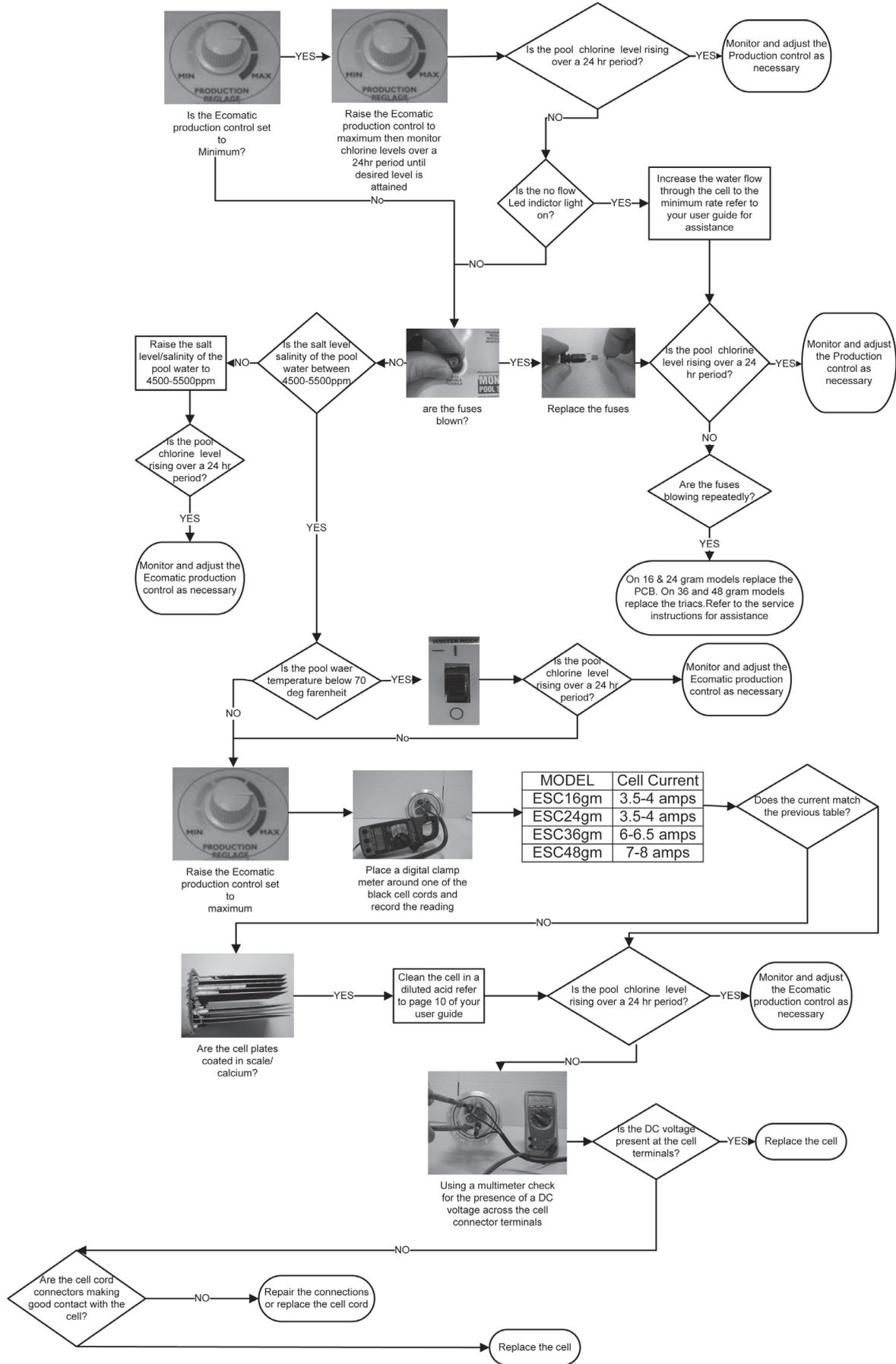
Ecomatic Cell Calcification



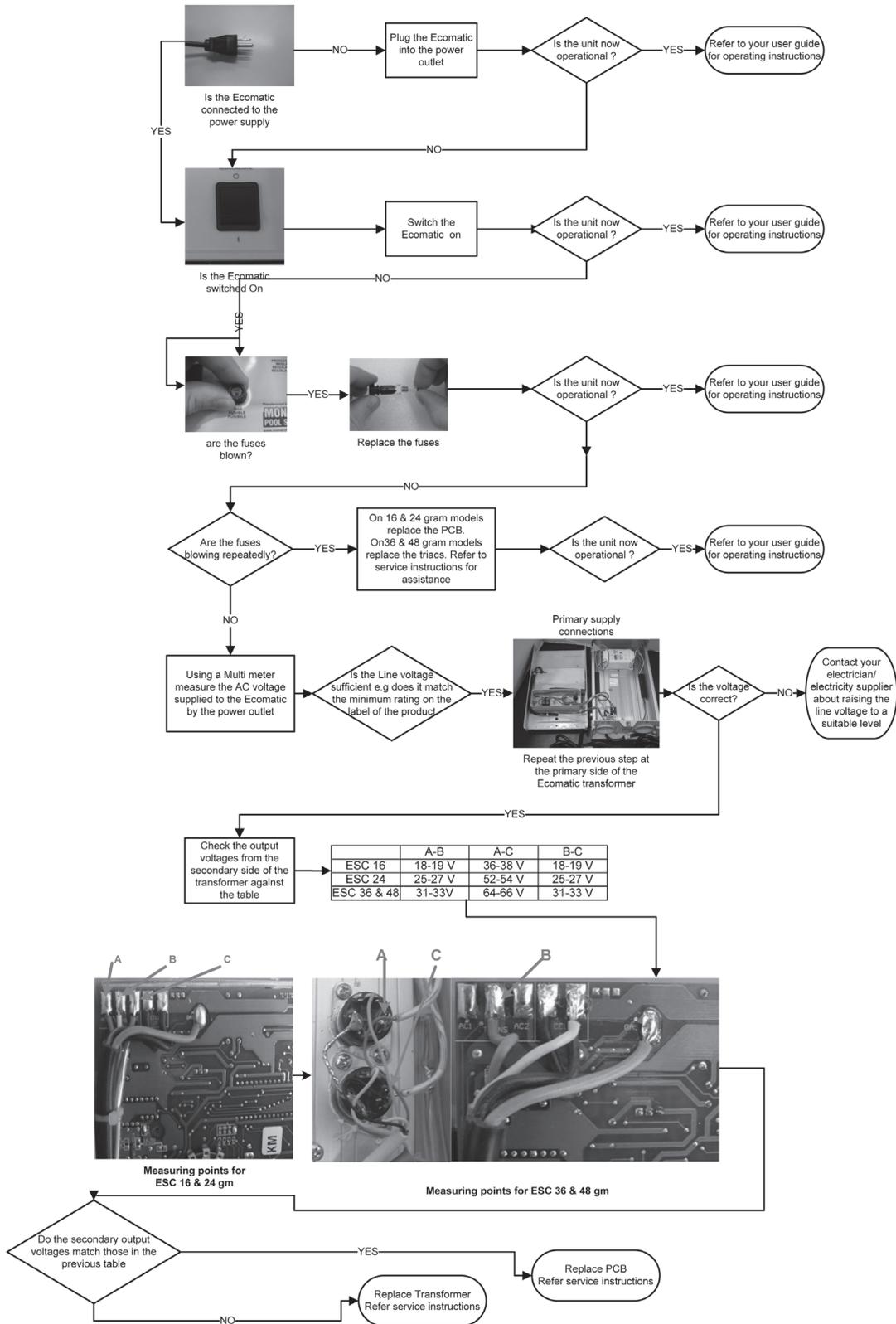
Dissected Calcified Cell-Note the white Calcium build up between the plates



Ecomatic Not Producing Sanitizer



Ecomatic Will Not Turn On E.g No Lights No Display



Maintenance Guide – Controller

A1. ECO-matic ESC & ESR

A Salt Water Pool System has 3 potential sources to cause failure:

- The control box
- The cell
- The quality of the pool water or the incorrect installation of the unit.

Diagnosis of a potential fault by phone is important as the problem may come from the control box, from the cell or from the environment (quality of the water or installation). Correct diagnosis by phone helps to avoid call out fee's and unnecessary dismantling of units.

This troubleshooting guide is to assist in assessing a fault by phone by demonstrating the correct questions to ask the pool trader or the pool owner.

ESC Control Panel



A.1.1 The indicated production is lower than 100 – There are 1 or 2 red alarms.

One red alarm (or the two) is ON and the indication of production is lower than 100 (between 15 & 100) and the production control is set at maximum output.

Note: If the unit is set in Winter mode, the number 85 will be displayed (instead of 100).

There are 4 questions to ask:

A.1.1.1: Is the salt content of the water high enough? The minimum salt content required is 3g/l, at the beginning of the new swimming season it is advised that salt content be set to approximately 4 g/l at the beginning of the season.

IMPORTANT: Be wary when a customer's answer is **Yes, salt content is OK** since measurements are often made with strips which can vary in accuracy thus misleading the pool owner. If unsure about the accuracy of the salt level then ask for the customer to obtain a water sample to be tested by their local pool dealer or water specialist. If owner does not want to obtain a water test & you still have doubts ask the owner to add 1Kg of salt per m³ (meter cubed) of water and check if the indication of the production is then increasing (possibly reaching 100 eliminating problem).

Note: An excess of salt in the pool (5 or 6 g/l) will not create a problem to the pool.

A.1.1.2: Is the cell clean? The maintenance of the cell is imperative to ensure that there is no or minimal scale buildup between the plates of the cell. If there is scaling occurring (white deposit on plates), the cell needs to be removed and submerged in a mixture of water and hydrochloric acid (1/3 acid – 2/3 water).

Install the cell again and start the unit to check if the production increases.

A.1.1.3: Is the cell worn out? Date of installation of the unit?

Refer to section A.2 on cells. The cell will incur wear over time and needs to be changed every 4 to 7 years.

To check the fabrication date it is engraved on the cell near the connectors:

First letter: The month of fabrication: A: January, B: February, C: March, D: April, E: May, F: June, G: July, H: August, I: September, J: October, K: November, L: December

Second letter: The year of fabrication : H: 2009, I: 2008, J: 2007, K: 2006, L: 2005, M: 2004, N: 2003, O: 2002, P: 2001

E.g.: DN indicates date of fabrication: April 2003

A.1.1.4: Are the cables of the cell correctly connected?

For ESC cells, check that there is no inversion between the black connector and the blue connector (indicates presence of gas in the cell housing). The two female connectors in black must be connected to the black male connectors. In the case of such error, the indication of production is 1 or 2.

For ESR cells, check that the white male connector is connected into the white female connector (same for black connectors).

Note: Check that the blue connector (detects gas in the cell housing) is connected.

A.1.2 :There is no production displayed on indicator

A.1.2.1: Check the electrical connection. The unit should have the LED indicators ON when the pump is running & should have LED lights OFF when pump is not running.

A.1.2.2: Check that the Flow indicator (small red dot on LED panel) is not ON?

If this dot is ON, it indicates that the unit detects a presence of gas in the cell housing.

Check that when the unit is in operation there is no bubble of air in the top part of the cell housing.

Note: The housing must be installed horizontal, with the inlet on the side of the threaded plug of the cell. (The direction of flow is indicated with an arrow on the cell housing). If there is gas in the housing the blue connector of the cell detects this gas and the unit will not operate. This bubble has to be eliminated: make sure that the unit is installed correctly at the inlet & outlet to prevent the bubble forming in the housing.

If there is no gas in the cell housing and the red dot is indicating there is “flow”, the problem may come from the PCB. Refer to the trouble shooting of the control box.

If this dot is not ON, Refer to the trouble shooting of the control box. .

A.1.3 : The water is not clear or is green

Need to first establish if the problem comes from the unit.

A.1.3.1: Does the digital display of the unit show 100 when the unit operates?

Make sure that the chlorine production control is at maximum, if the display is showing 100, (between 95 and 105 is within acceptable levels), the problem does not come from the unit as it is functioning correctly. If this is the case the water chemistry is likely to be incorrect.

If the display does not show 100, (one or two red alarms ON), refer to chapter **A.1.1**.

A.1.3.2: Is the value of the pH correct?

Check that the pH of the water is not above recommended levels (between 7 and 7.4). The correct pH level ensures maximum efficiency of the salt electrolysis process.

A.1.3.3: Is there some stabilizer in the water?

Without the presence of stabilizer in the water, (isocyanuric acid), chlorine is rapidly destroyed by UV (Ultra Violets rays from the sun) and its effectiveness becomes very limited. The chlorine of the water needs to be protected by **40 to 70 ppm of stabilizer in the water** (40 grams of stabilizer per m³ of water).

A.1.3.4: Is the filtration time sufficient?

The warmer the water is, the longer the filtration time should be. The number of hours of filtration every day should be a minimum of half of the temperature of the water in °C.

Example : Water at 26°C. Filtration time should be 13 hours/day.

If the filtration time is not sufficient, the electrolysis will not be sufficient since the electrolysis works only during the filtration time.

A.1.3.5: Is the size of the unit adapted to the swimming pool?

ESC, ESCpH and ESR units are designed for private pools not exceeding 200 m³ (meters cubed). For semi-public or public pools, larger units such as units in the range of SC Max are more appropriate.

A.1.4 :There is no chlorine in the water

In salt chlorination applications, the amount of chlorine in the water is often very limited (from 0.5 ppm to 1 ppm) so the owner may not feel that the unit is working correctly. We have to first ensure that the unit is working; the following questions will enable this to be established:

A.1.4.1: Does the display of the unit show 100 when the unit operates?

Make sure that the chlorine production control is at maximum, if the display is showing 100, (between 95 and 105), the problem does not come from the unit as it is functioning correctly. If this is the case the water chemistry is likely to be incorrect, refer to section A.1.3.2

If the display does not show 100, (one or two red alarms ON), refer to section **A.1.1**.

A.1.4.2: How did you check the presence of chlorine?

How was the chlorine measured? Was a test kit used? If a test kit was not used then the test will be inaccurate. The presence of chlorine should be checked by taking a water sample at the eye return of the pool water, when the salt chlorinator is in operation.

A.1.4.3: Is there some stabilizer in the water?

Check water for presence of stabilizer, there should be between 40 & 70 ppm of stabilizer to protect against chlorine evaporation from UV. Refer to section **A.1.3.3**

Maintenance Guide – Cell

B- Checking of cells EcoMatic ESC & ESR & EcoSALT BMSC

The cell is the most important part of the chlorinator and also the most expensive part. For the EcoMatic ESC & ESR cells, the manufacturing date of the cell is engraved on the transparent plastic head.

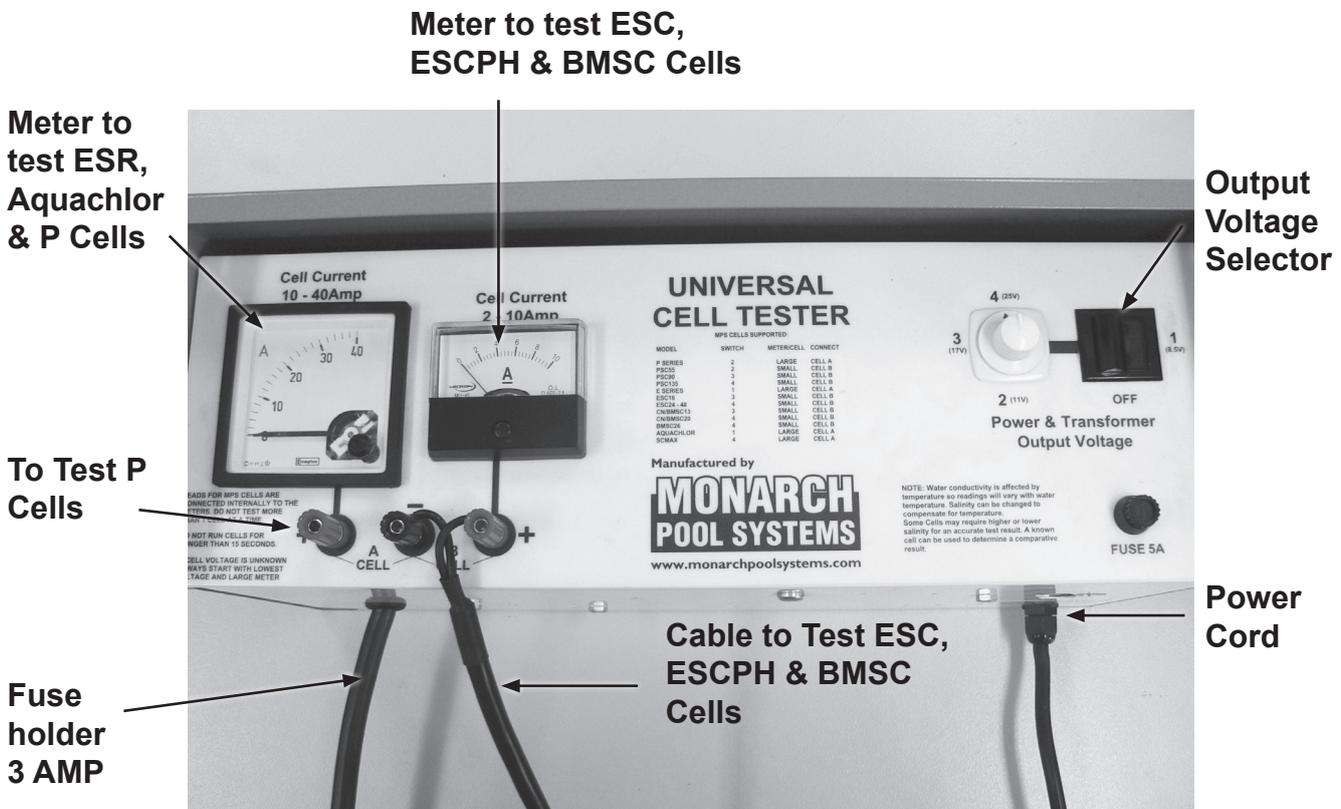
For the EcoSALT BMSC cells, this date is engraved on the transparent body, near the connectors:

First letter: Month of Manufacturing: A: January, B: February, C: March, D: April, E: May, F: June, G: July, H: August, I: September, J: October, K: November, L: December

Second letter: Year of Manufacturing: H: 2009, I: 2008, J: 2007, K: 2006, L: 2005, M: 2004, N: 2003, O: 2002, P: 2001.

e.g.: **DN** means a manufacturing date of **April 2003**

The cell can be tested either by connection with a chlorinator or by connecting it to the MONARCH universal Tester.



B.1. The production of the cell is not sufficient

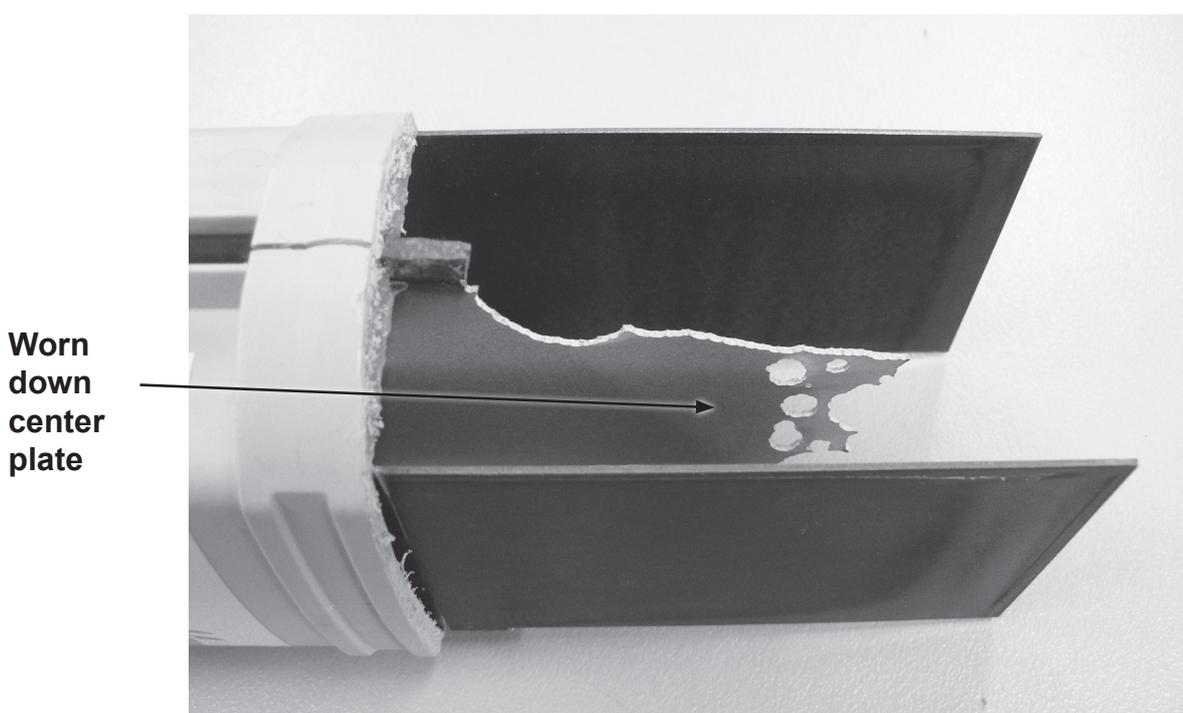
There are two possible reasons for a cell having low production: The wearing of the cell and the scaling of the cell.

Wearing

Normally, an ESC or ESR cell should last 5 years under normal conditions with correct maintenance & operating in swimming seasons ranging from April to October.

The cell will incur more significant wear & tear if used for a higher frequency for an extended period of time (e.g.; cell sanitizing swimming pools for medical use).

Below is an example of a cell which has had its central plate worn out by heavy use.



It is recommended that the unit be turned off when the water temperature falls lower than 15°C.

Scaling of the cell

Scaling of the cell can occur when the pH of the water is too high, although the units ESC & BMSC are self cleaning, it is still possible to find the cell full of scales. In case of scaling of an ESC or BMSC cell, the pH of the water of the pool has to be adjusted lower (between 7 and 7.4).

Clean the cell with a mixture of 2/3 of water and 1/3 hydrochloric acid. The owner will then have to maintain the pH of the water at its normal value (between 7 and 7.4) by adding some “pH minus” when necessary.

B2. The cell is full of scale (white deposit on plates)

Refer to above chapter (**Scaling of cell**) which is a cause of scale production that can make the unit inefficient. This is not common for self cleaning units such as the EcoMatic ESC, ESCpH and also EcoSALT but is more common for units without self cleaning system such as the EcoMatic ESR.

B3. The cell has got a leak around the connectors.

The leak can often be found at the gland of the cell connectors. To check for leaks install the unit on the pool system & check the gland when the filtration pump is in operation.

B.4 The cell housing is cracked

This cracking can typically occur when the pressure sharply increases in the cell housing. This high pressure can occur **only if the salt chlorinator is in operation with the isolating valves closed.**

This fault is the consequence of a mistake made by the pool owner having mistakenly closed the valves and having forgotten to open these valves when the chlorinator was started.

Important: In order to avoid this type of problem, it is strongly advised that a **Non return valve** be installed in the pipe work between the cell & the pool return.

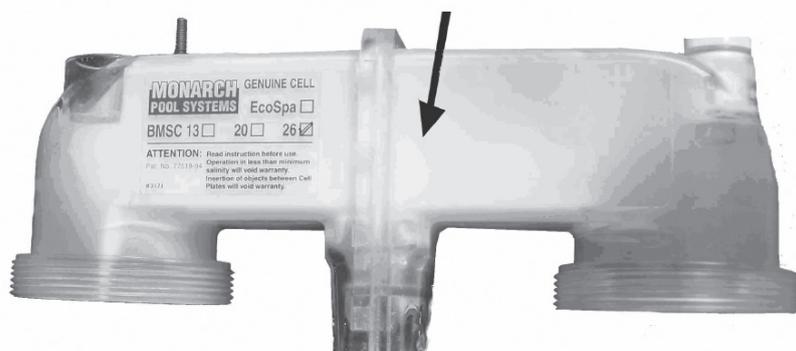
B.5 The wall of the housing is not transparent anymore

Overheating of the cell will result in you no longer being able to see through the cell housing to the cell plates. This overheating occurs when the flow through the cell housing is insufficient. This lack of flow can happen for the following reasons:

One valve closed or partially closed on the filtration circuit. This will result in the flow to the cell being blocked or restricted thus causing overheating.

A cell full of scale: If the cell is scaled the flow going through the cell housing is restricted, more common in the case of the EcoSALT cell.

Wall of the cell not
transparent anymore
(cell housing overheated)



Cell EcoSALT damaged
(coming from a lack of flow
in the cell housing)

B.6 Brown or black traces on plastic part of the ESC cell

Brown or black traces on the cell indicate the presence of metals in the water. The water coming from wells often contain metals that can damage the cell. These traces can also be found in pools located in close proximity to vineyards which have been treated with copper sulphates. Davey advises against using water drawn from wells to fill up a swimming pool.

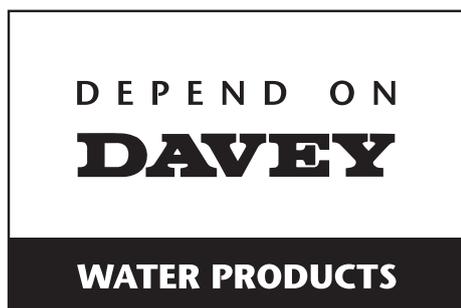
Note:

Product specifications may change without notice.

Drawings are indicative only, product appearance may change slightly.

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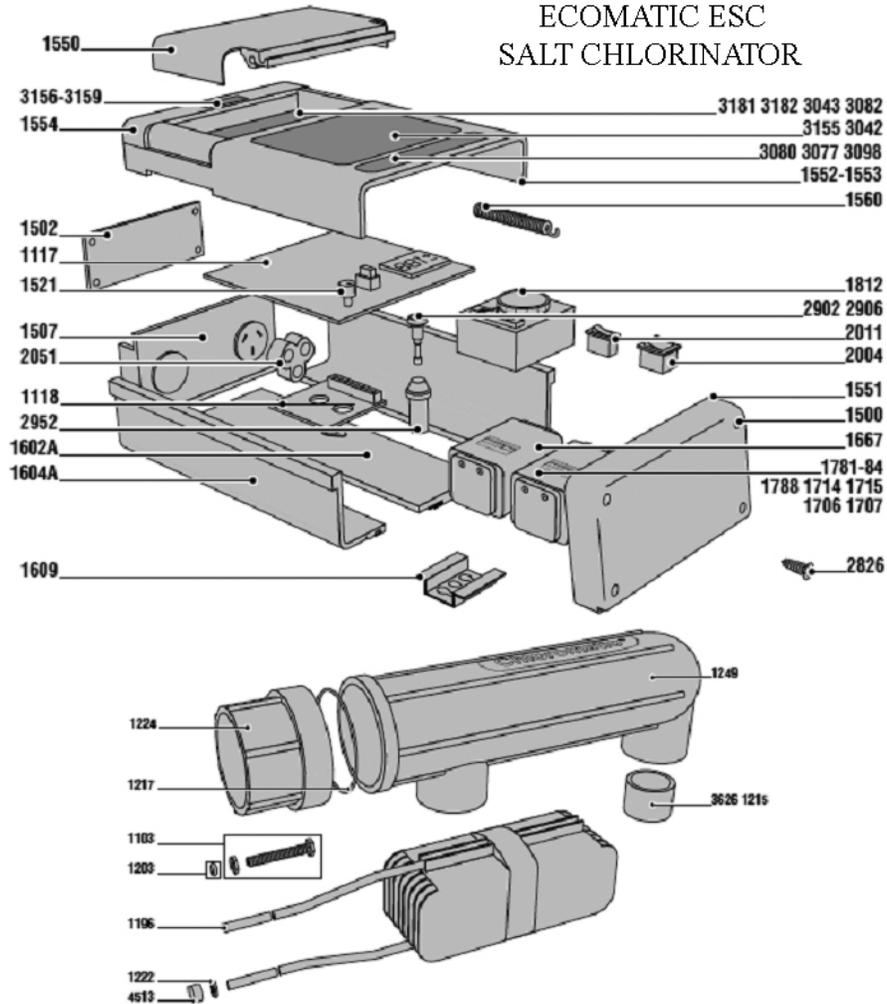
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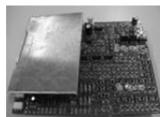
CATALOG NUMBER	ESC SERIES SALT CHLORINATOR	MFG. NUMBER
ECM-45-950	Replacement Cell ECOSPA	M0653
ECM-45-933	Replacement Cell ESC & ESCpH 16	M0656USA
ECM-45-934	Replacement Cell ESC & ESCpH 24/36/48	M0657USA
ECM-45-940	Replacement Cell BMSC 13	M0681EX
ECM-45-941	Replacement Cell BMSC 20	M0682EX
ECM-45-942	Replacement Cell BMSC 26	M0683EX
ECM-45-920	Replacement Cell, ESC110	M0741EX
ECM-45-921	Replacement Cell, ESC160	M0753EX
ECM-45-922	Replacement Cell, ESC200	M0755EX
ECM-45-923	Replacement Cell, ESC300	M0759EX
ECM-45-931	Cell Cables, All ESC & ESCpH Models	M2679
ECM-45-924	Cell Cables, All ESR Models	M2686
ECM-451-1053	Screw-Gas Detector	M1103
ECM-451-1017	PCB, ESC 16	M111717USA
ECM-451-1020	PCB, ESC 24	M111724USA
ECM-451-1018	PCB, ESC 36	M1117A36USA
ECM-451-1019	PCB, ESC 48	M1117A48USA
ECM-451-1070	PCB, ECOSPA	M1119USA
ECM-451-1071	PCB, BMSC 13	M112013USA
ECM-451-1072	PCB, BMSC 20	M112020USA
ECM-451-1073	PCB, BMSC 26	M112026USA
ECM-451-1010	O-Ring - Sensor Clip, All ESC & ESCpH Models	M1203
ECM-451-1005	O-Ring for Cell Head, All ESC, ESCpH & ESR Models	M1217
ECM-451-1002	Blanking Cap w/ O-Ring, All ESC, ESCpH & ESR Models	M1219
ECM-451-1030	Cell Head Repair Kit, All ESC & ESCpH Models	M1248
ECM-451-1000	Cell Housing, All ESC, ESCpH & ESR Models	M1249
ECM-451-1028	Chlorine Control Knob, All ESC, ESCpH, ESR & BMSC Models	M1521
ECM-451-1023	Transparent Door, All ESC, ESCpH & ESR Models	M1550
ECM-451-1027	E-Series Connector Cover Front, All ESC, ESCpH & ESR Models	M1554
ECM-451-1074	Transformer, 110V, ESC & ESCpH 16	M1706
ECM-451-1075	Transformer, 110V, ESC & ESCpH 24	M1707
ECM-451-1076	Transformer, 220V, ESC & ESCpH 16	M1714
ECM-451-1077	Transformer, 220V, ESC & ESCpH 24	M1715
ECM-451-1079	Transformer, ESC 36/48	M1788
ECM-451-1080	Triac, ESC & ESCpH 36/48	M1904
ECM-451-1022	Switch, All ESC, ESCpH, ESR & BMSC Models	M2004
ECM-451-1024	Fuse Holder w/ 3A Fuse, ESC/ESCpH 16/24, ESR & 220V BMSC	M2952UL
ECM-451-1025	Fuse Holder w/ 5A Fuse, ESC 36/48 Models	M2954UL
ECM-451-1021	Cable Gland Cell Connector, All ESC & ESCpH Models	M4513
ECM-451-1029	Cell Head Repair Kit, All ESR Models	M1254
ECM-451-1078	Transformer, 220V, ESCpH 36	M1717
ECM-451-1026	Fuse Holder, ECOSPA	M2953
ECM-451-1081	pH Probe, All ESCpH Models	M5001WB
ECM-451-1082	ORP Probe, ECOSPA	M5002WB

ESC SERIES SALT CHLORINATOR

ECOMATIC ESC SALT CHLORINATOR



BMSC 13/20/26
CELL



PCB ECOSPA



pH PROBE



SCREW-GAS
DETECTOR



ECOSPA CELL



PCB BMSC 13/20/26



ORP PROBE



BLANKING CAP



ESR CELL



CELL CABLES

DEPEND ON
DAVEY

WATER PRODUCTS

EcoSalt BMSC Chlorinator



SERVICING INSTRUCTIONS

ECOSALT SERVICE GUIDE



WARNING: ALL ELECTRICAL WORK TO BE PERFORMED BY SUITABLY QUALIFIED ELECTRICAL PERSONNEL.



Always disconnect from electrical supply BEFORE any work is carried out.



Handle components carefully to avoid personal injury.

Tools Required

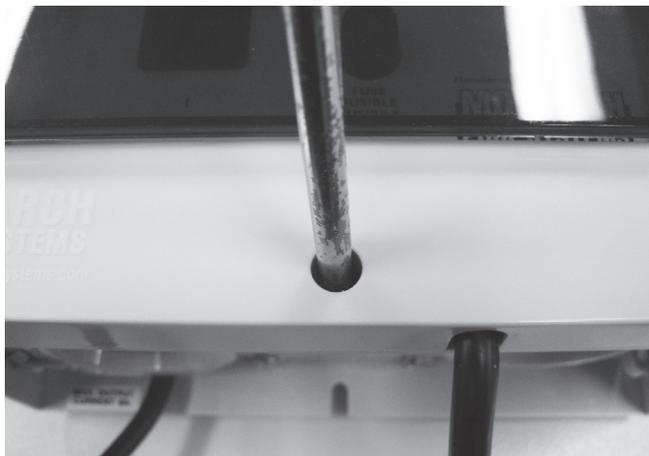
- 8mm spanner
- Phillips head screwdriver – One point
- Phillips head screwdriver – Two point
- Flat blade screwdriver – 3mm
- Long nose pliers
- Side cutters
- Soldering iron
- Solder
- De-soldering tool
- Universal cell tester

Contents

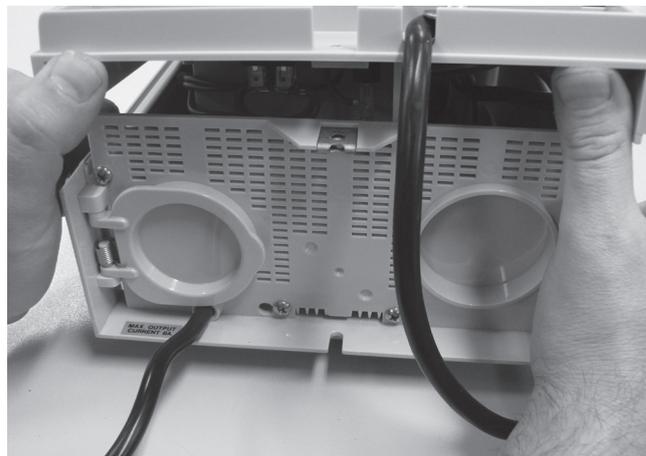
Disassembling/Assembling the Unit	3
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Replacing the Bottom Panel	6
Replacing the Door	8
Replacing the Transformer	
– BMSC 13 220V & BMSC 13/20/26 110V	9
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Disassembling/ Assembling the Unit

Disassembly

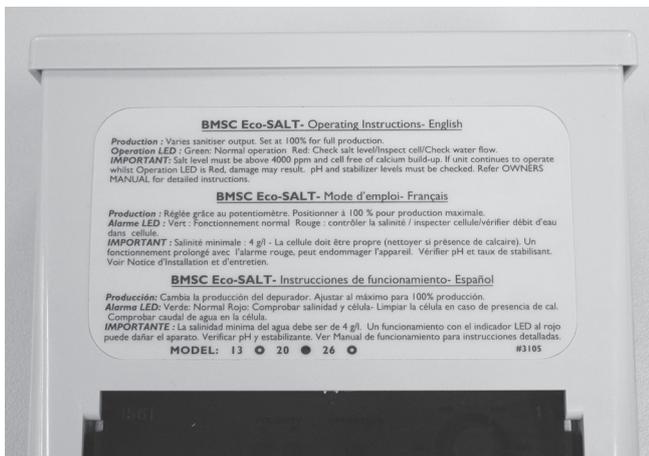


Step 1 – Remove the screw in the front panel using a Phillips head screwdriver (two point) then lift the front panel off.



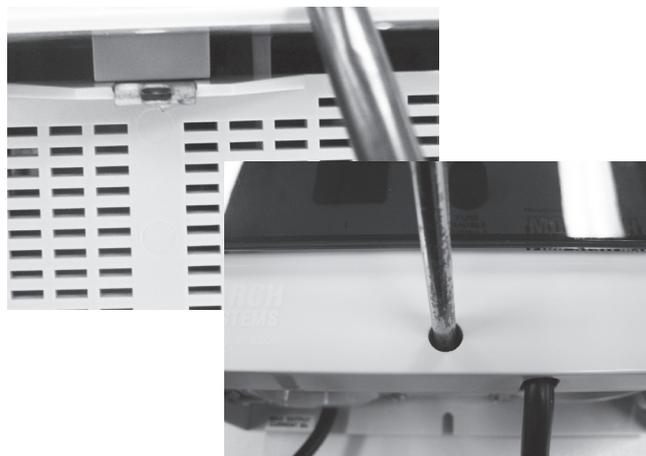
Step 2 – Using both hands lift the top half approximately 15mm up from the chlorinator & slide out until the top half is free then flip open the front cover.

Assembly



Step 1 – Place the top half of the chlorinator flush with the top panel

Note: Before closing unit ensure that wiring loom which connects to the PCB is correctly placed behind the internal panel & is not preventing the unit from closing.



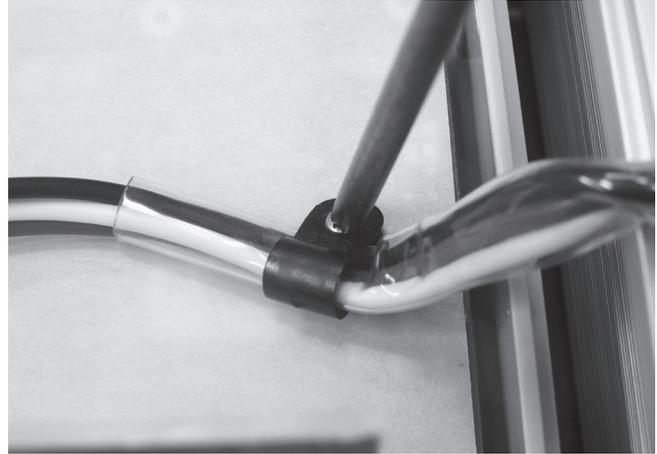
Step 2 – When closing unit note the locating lug has to be inside the chlorinator otherwise it will not close. With the locating lug on the interior of the chlorinator move the top half of the chlorinator into place over the screw hole & tighten screw using a Phillips head screwdriver (two point).

Replacing the Cell Cord Assembly

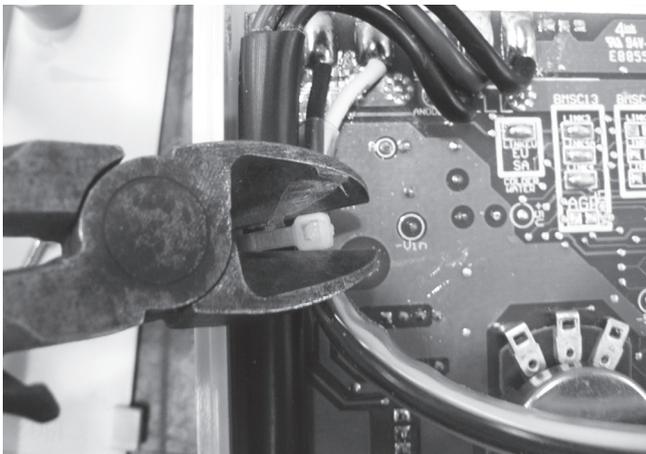
Disassembly



Step 1 – After opening the front panel of the chlorinator use a Phillips head screwdriver (two point) to remove the holding plate allowing the cell cord assembly to be more easily manoeuvred.

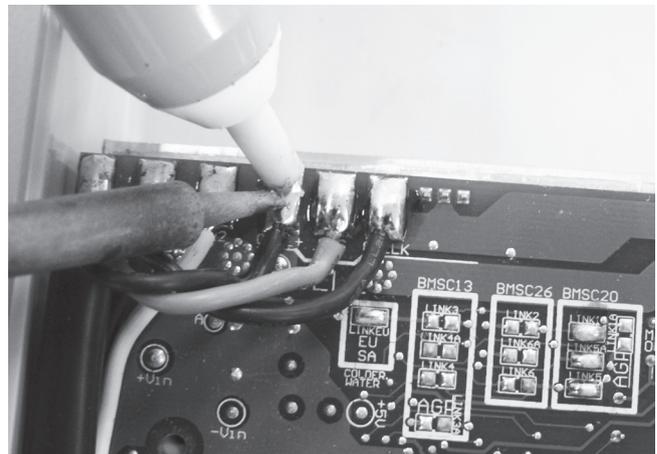


Step 2 – Remove the screws holding the protective covering on the PCB using a Phillips head screw driver (one point).



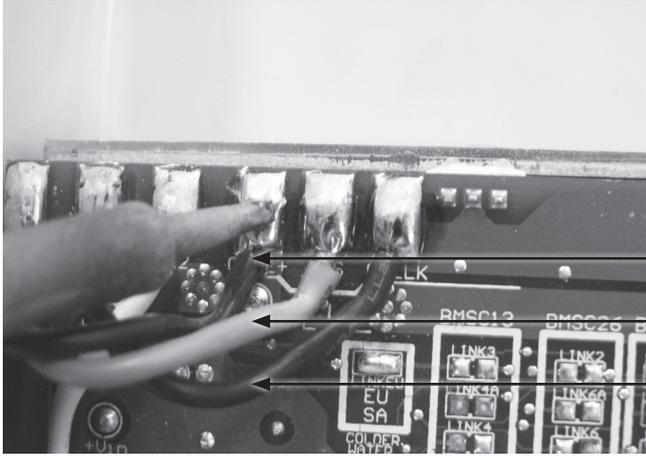
Step 3 – Remove the appropriate cable ties with side cutters. Take special care not to cut or damage the wiring.

Note position of cable ties for reassembly.



Step 4 – With a soldering iron & solder sucker or solder wick remove the 3 wires for the cell cables & gas sensor, note these are the 2 black wires & 1 blue wire located to the right of the three transformer wires. When the metal has cooled remove the cell cords.

Assembly

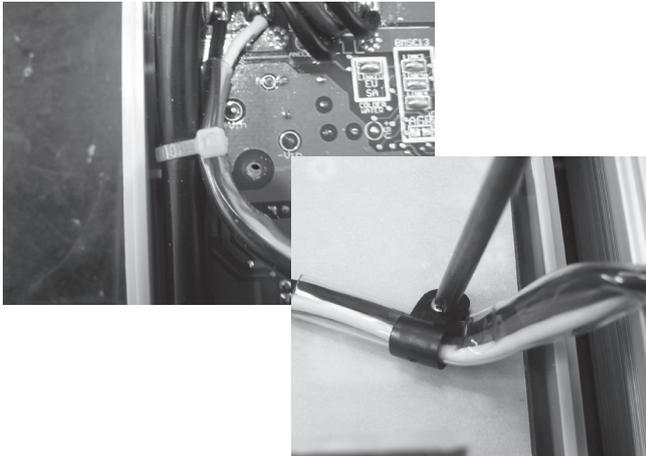


1. BLACK

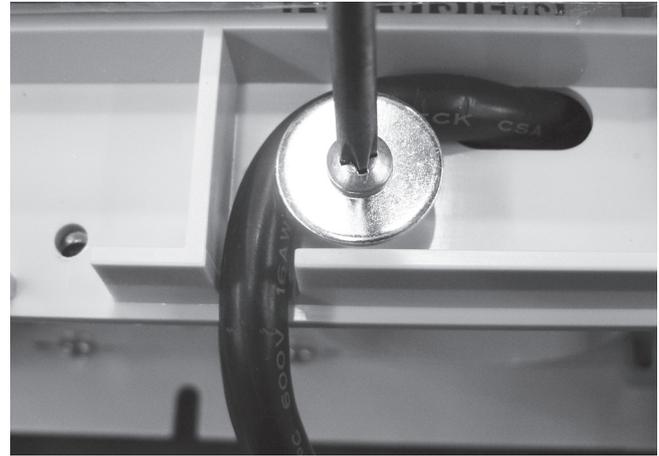
2. BLUE

3. BLACK

Step 1 – With a soldering iron & unleaded solder reattach the cell cables & gas sensor cable to the PCB. These are ordered 1) black, 2) blue 3) black on the PCB with the blue wire representing the Gas sensor which is marked on the PCB with the word Gas.



Step 2 – Replace any cable ties that were removed then replace the protective covering on the PCB with a Phillips head screw driver (one point).

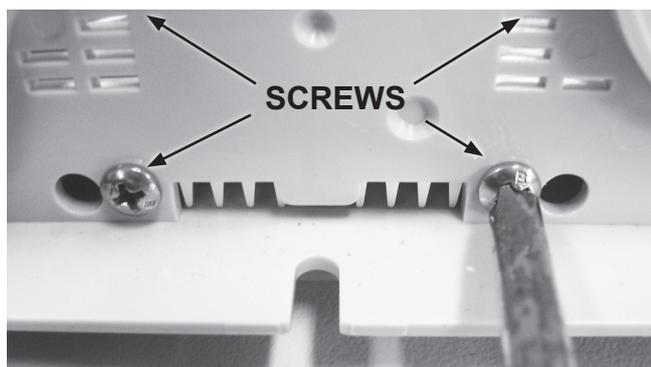


Step 3 – Place cell cord assembly into appropriate position & secure lock in place with the holding plate. Secure the holding plate using a Phillips head screwdriver (two point).

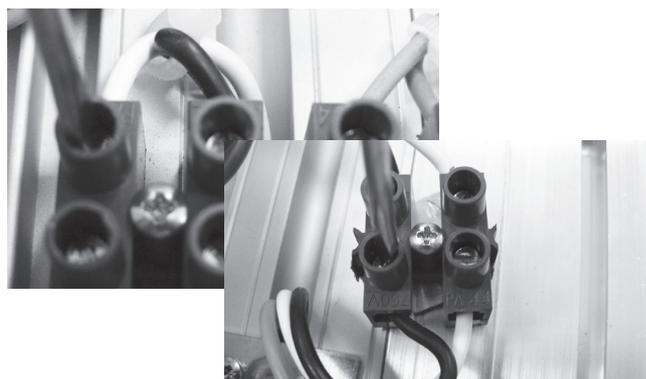
Replacing the Bottom Panel

IMPORTANT NOTE: Power **MUST** be switched off before removing power lead.

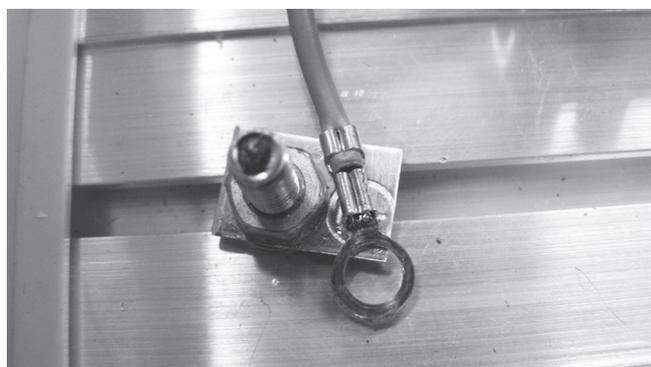
Disassembly



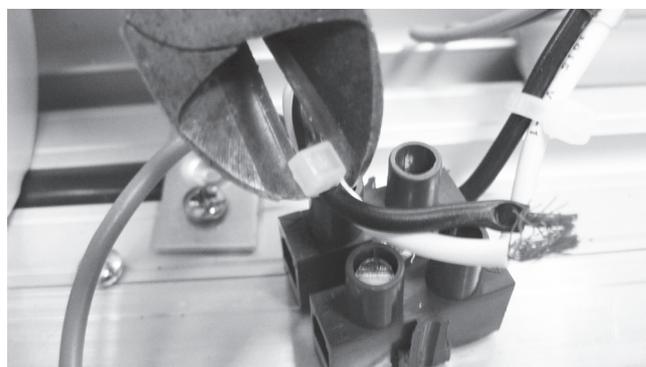
Step 1 – Remove the 4 screws on the bottom panel using a Phillips head screwdriver (two point).



Step 2 – Remove the black & white power point terminal wires from the terminal strip using a flat blade screwdriver (3mm). Before removing the wires ensure that they are connected to the power lead.

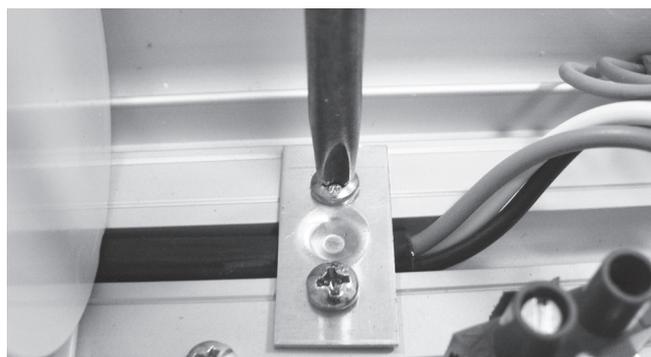


Step 3 – Remove the nut holding down the green Earth lead from the power point terminal with a spanner (8mm).



Step 4 – Remove the appropriate cable ties with side cutters. Take special care not to cut or damage the wiring

Note position of cable ties for reassembly.

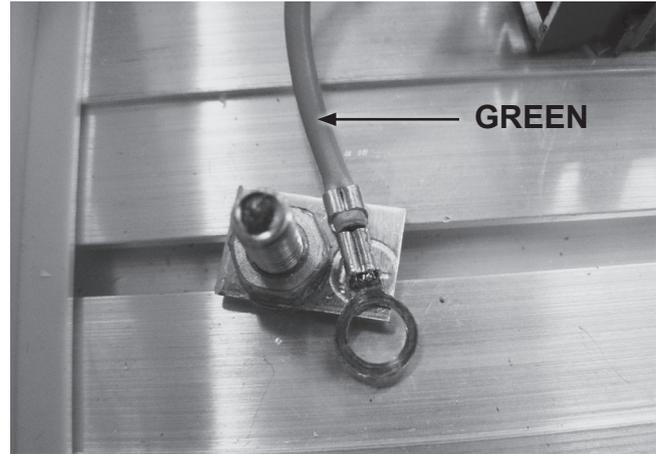


Step 5 – Remove the screws on the holding plate using a Phillips head screwdriver (two point) allowing the power cord to be removed through the slot in the bottom panel. When the power cord has been removed the bottom panel is able to be taken off.

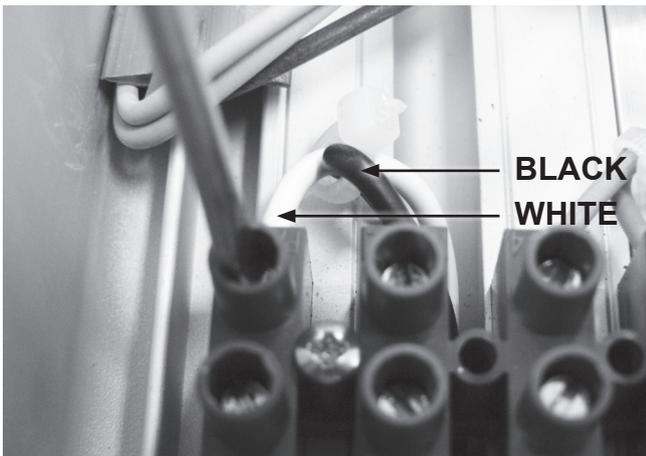
Assembly



Step 1 – Feed the power cord through the bottom panel & place power cord lead in correct position on the backing plate. Replace the holding plate using a Phillips head screwdriver (two point).

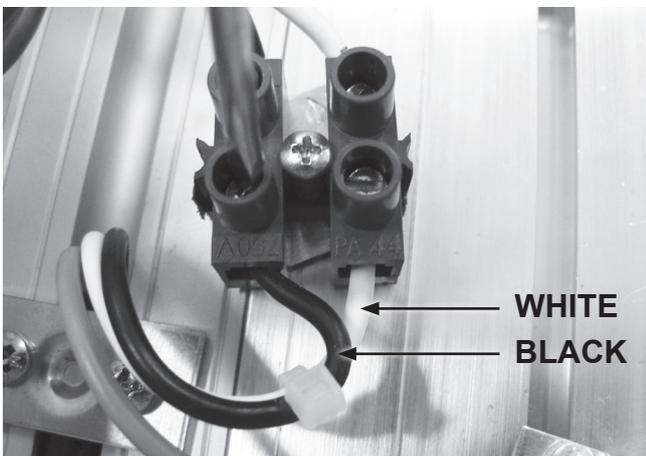


Step 2 – Reattach green Earth lead using a spanner (8mm) to tighten nut.

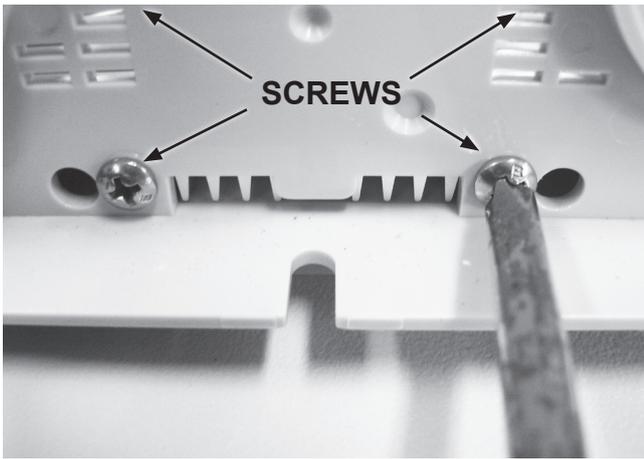


Step 3 – Reconnect power point terminal wires to their correct position on the terminal strip using a flat blade screwdriver (3mm) & replace any cable ties that were removed.

BMSC 13/20/26 110V & BMSC 13 220V: The white wire goes in the first slot on the top left of the terminal strip with the black wire next to it on the right hand side.



BMSC 20 – 26 220V: The black wire goes in the first slot of the terminal strip on the bottom left with the white wire on the right hand side.



Step 4 – Place the bottom panel in its correct position & secure the 4 screws using a Phillips head screwdriver (two point).

Replacing the Door

Disassembly



Step 1 – With one holding the chlorinator in place use your free hand to lift up on the left side of the chlorinator door. Have the door fully upright when lifting up the door. When you have disconnected the left hand side from its knob the right side will pull away. Use minimal force to avoid breaking the door.

Assembly



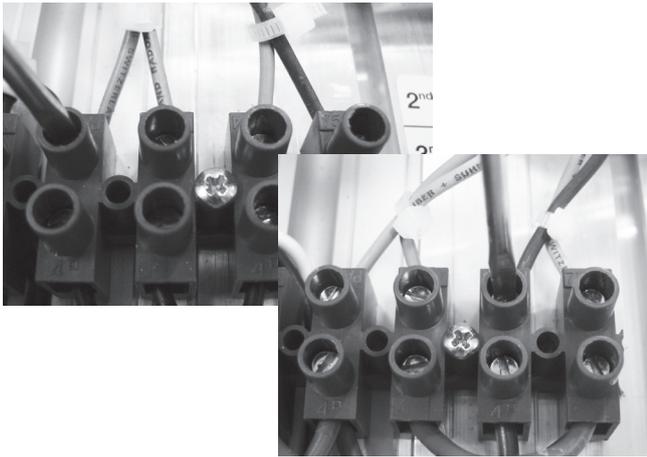
Step 1 – First attach the door to the right hand lug then with the door completely upright push down on the left side to clip the door in place over the right lug. Check door opens & closes completely to check correct installation.

Replacing the Transformer

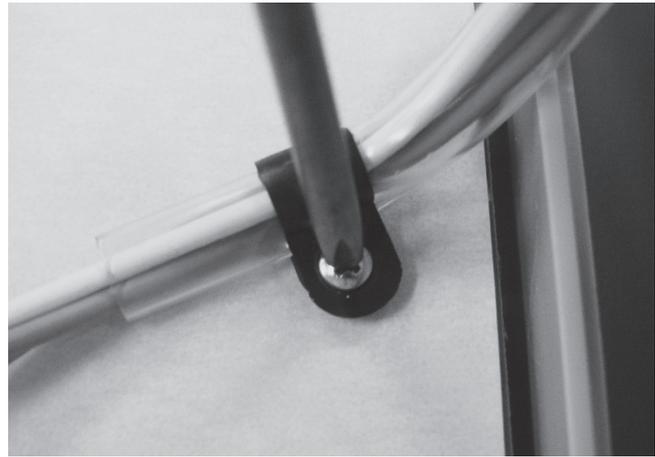
– BMSC 13 220V & BMSC 13/20/26 110V

IMPORTANT NOTE: Power **MUST** be switched off before removing transformer.

Disassembly



Step 1 – Remove the four transformer wires from the terminal strip using a flat blade screwdriver (3mm).



Step 2 – Remove the screws holding the protective covering on the PCB using a Phillips head screw driver (one point).



Step 3 – Remove the cable clamp holding down transformer cables using a Phillips head screwdriver (two point).



Step 4 – With a soldering iron & solder sucker or solder wick remove the 3 transformer wires. The transformer wires are the orange, white & pink wires on the top left corner of the PCB. When the metal has cooled remove the transformer wires.



Step 5 – Remove the nut on the top of the transformer with an 8mm spanner then lift off the black heat dispersion disk which when removed allows for the transformer to be lifted out of the chlorinator. When removing heat dispersion disk also remove the spring washer & flat washer located beneath the nut.

Assembly



Step 1 – Place transformer over the locating screw.

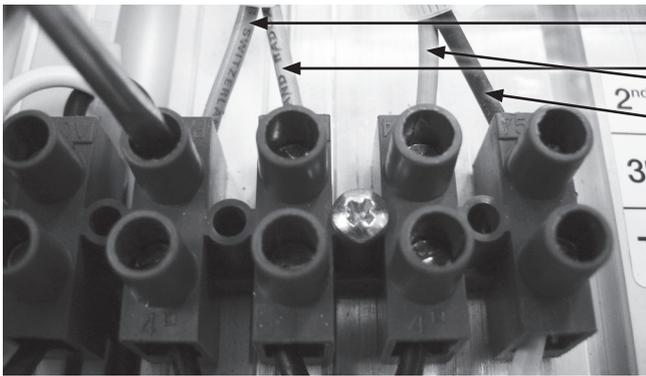


Step 2 – Place heat dispersion disk over the transformer with the shiny metallic side face up. Place flat washer & spring washer in place over the locating screw; tighten the transformer nut using an 8mm spanner.



Step 3 – After feeding the transformer wires through the clear tubing use a soldering iron with unleaded solder to attach the wires to the PCB. The order for connecting the wires from the left of the PCB is 1) orange, 2) white, 3) pink.

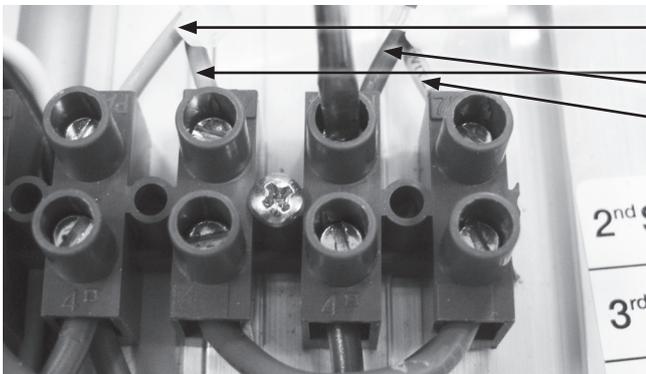
1. ORANGE
2. WHITE
3. PINK



- 1. BROWN
- 2. LIGHT BLUE
- 3. PURPLE
- 4. BLACK

Step 4 – Replace the transformer wires to their respective positions on the terminal strip using a flat blade screwdriver (3mm).

BMSC 13 220V: From left to right on the terminal strip the transformer wires are colored 1) brown, 2) light blue, 3) purple, 4) gray. The white & black wires in the first two slots are the power cord wires.



- 1. LIGHT BLUE
- 2. BROWN
- 3. BLACK
- 4. PURPLE

BMSC 13/20/26 110V: From left to right on the terminal strip the wires are colored 1) light blue, 2) brown, 3) gray, 4) purple. The white & black wires in the first two slots are the power cord wires.



Step 5 – Tighten cable clamp using a Phillips head screwdriver (two point) & replace any cable ties that were removed.



Step 6 – Replace the protective covering on the PCB using a Phillips head screw driver (one point).

Replacing the Transformer – BMSC 20-26 220V

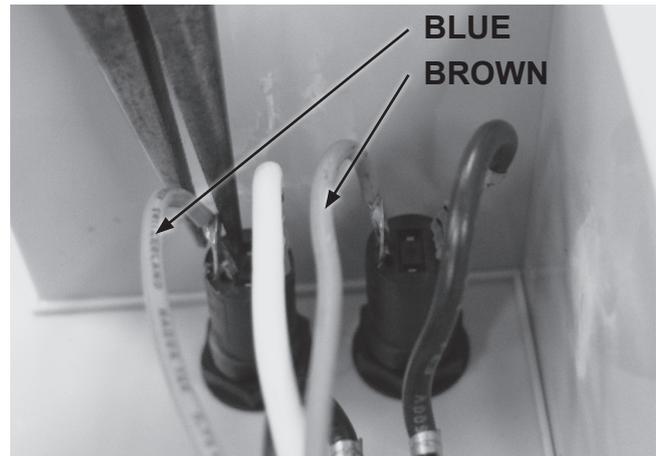
IMPORTANT NOTE: Power **MUST** be switched off before removing transformer.

Disassembly

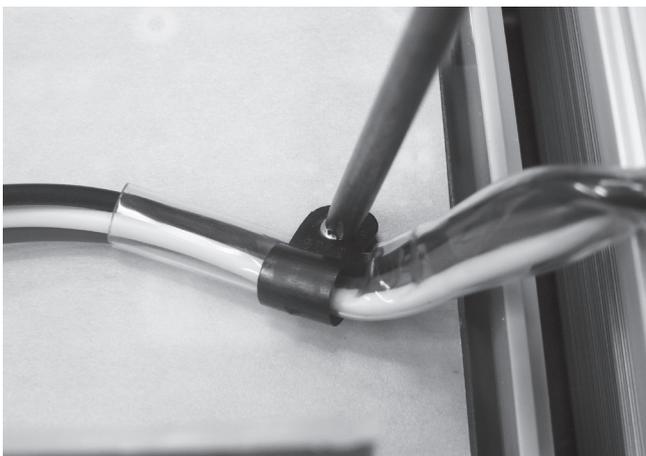


Step 1 – Remove all applicable cable ties with a pair of side cutters. Take special care not to cut or damage the wiring.

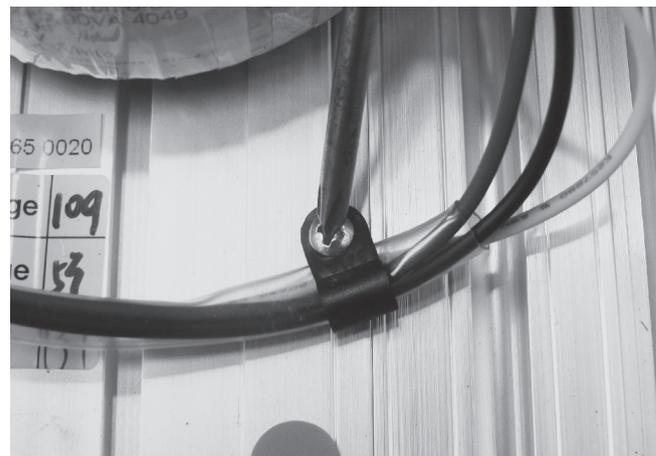
Note position of cable ties for easier reassembly.



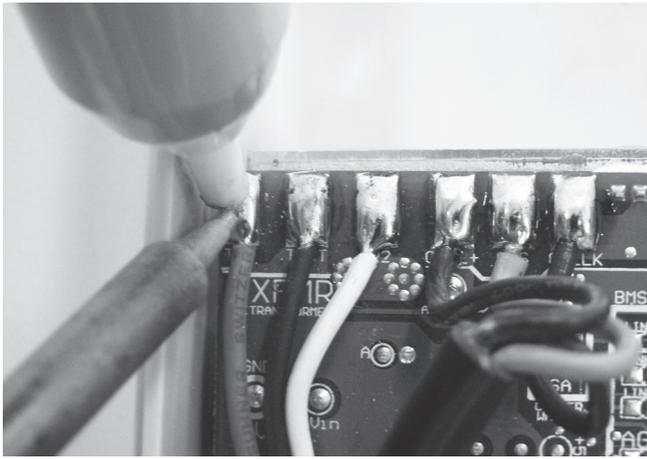
Step 2 – Remove the blue & brown transformer wires connected to the fuses using a pair of long nose pliers.



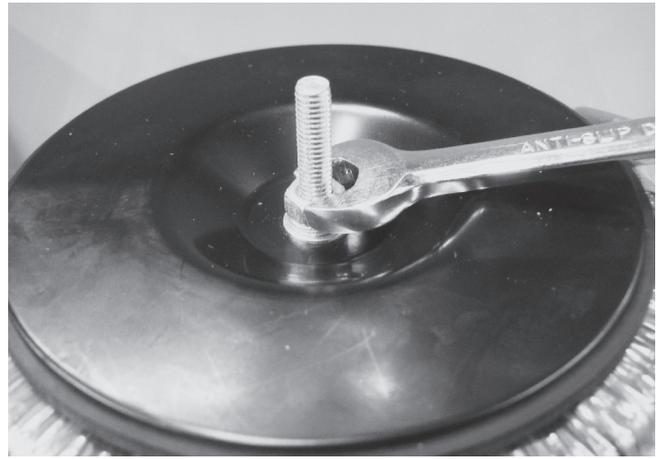
Step 3 – Remove the screws holding the protective covering on the PCB using a Phillips head screw driver (one point).



Step 4 – Remove the cable clamp holding down transformer cables using a Phillips head screwdriver (two point).



Step 5 – With a soldering iron & solder sucker or solder wick remove the 3 transformer wires. The transformer wires are the red, black & white wires on the top left corner of the PCB. When the metal has cooled remove the transformer wires. Note the placement of the wires on the PCB so as to enable easier reassembly.



Step 6 – Remove the nut on the top of the transformer with an 8mm spanner then lift off the black heat dispersion disk which when removed allows for the transformer to be lifted out of the chlorinator. When removing heat dispersion disk also remove the flat washer located beneath the nut.

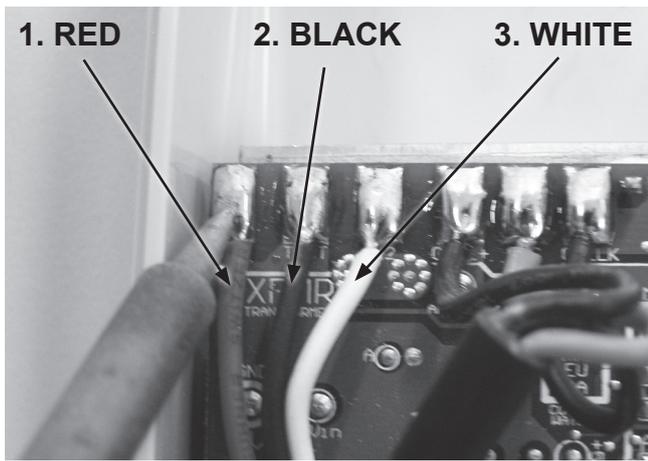
Assembly



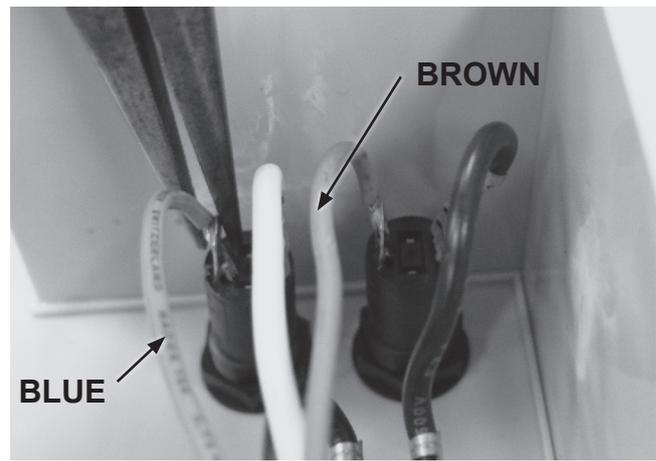
Step 1 – Place transformer over the locating screw.



Step 2 – Place heat dispersion disk over the transformer with the shiny metallic side face up. Place flat washer in place over the locating screw, tighten the transformer nut using an 8mm spanner.



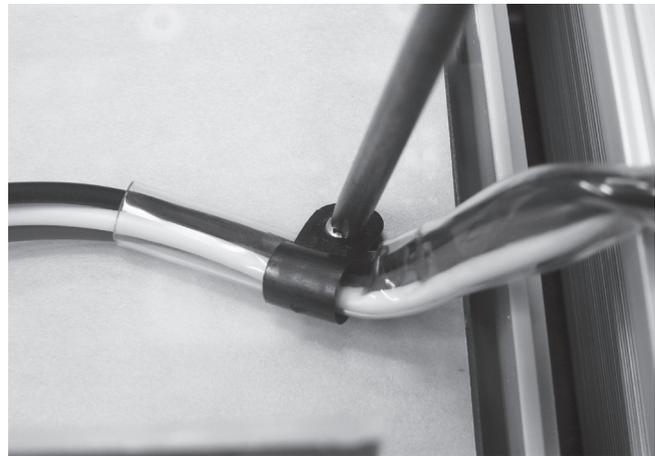
Step 3 – After feeding the transformer wires through the clear tubing use a soldering iron with unleaded solder to attach the wires to the PCB. The order for connecting the wires from the left of the PCB is 1) red, 2) black 3) white.



Step 4 – Being careful not to bend the terminals on the fuse housing put the blue & brown clips connecting the transformer to the fuse housing back in place. Use long nose pliers to slide the clips onto the terminal. The blue wire connects to the lower terminal of the fuse at the bottom of the chlorinator. The brown wire connects to the lower terminal of the top fuse.



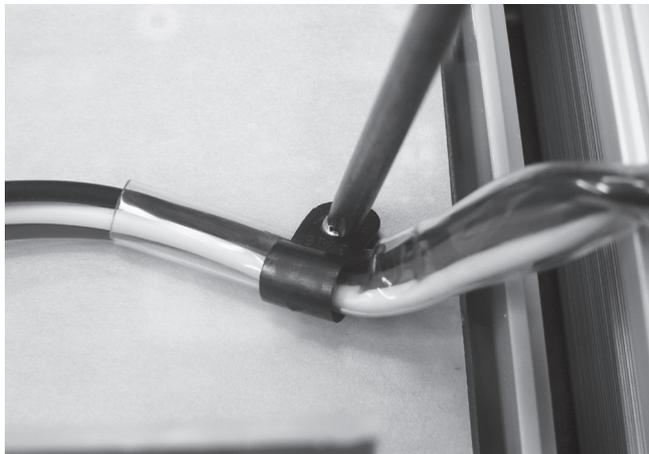
Step 5 – Tighten cable clamp using a Phillips head screwdriver (two point) & replace any cable ties that were removed.



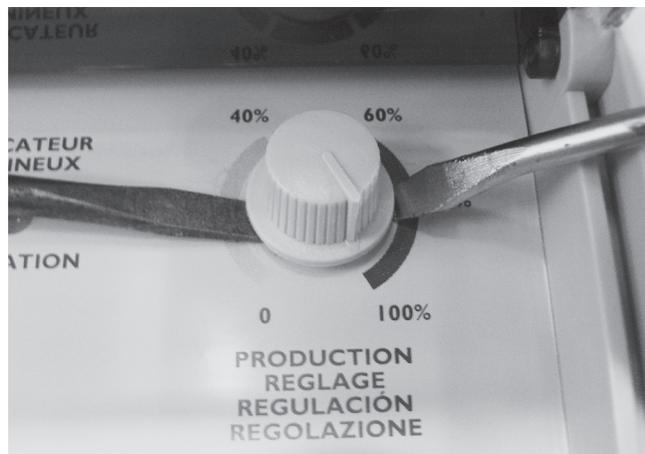
Step 6 – Replace the protective covering on the PCB using a Phillips head screw driver (one point).

Replacing the PCB

Disassembly



Step 1 – Remove the screws holding the protective covering on the PCB using a Phillips head screw driver (one point).

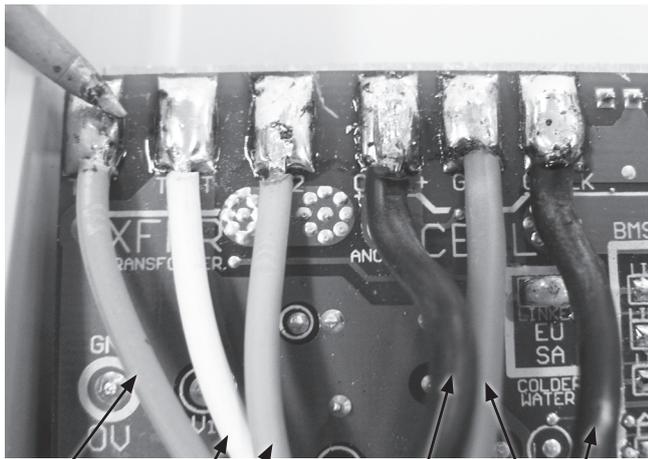


Step 2 – Remove the sanitiser output knob which will allow you to move the PCB to the side. May need to use two flat blade screwdrivers to lever the knob off if it is fastened too tight to remove by hand. If using screwdrivers be careful not to damage the control panel.

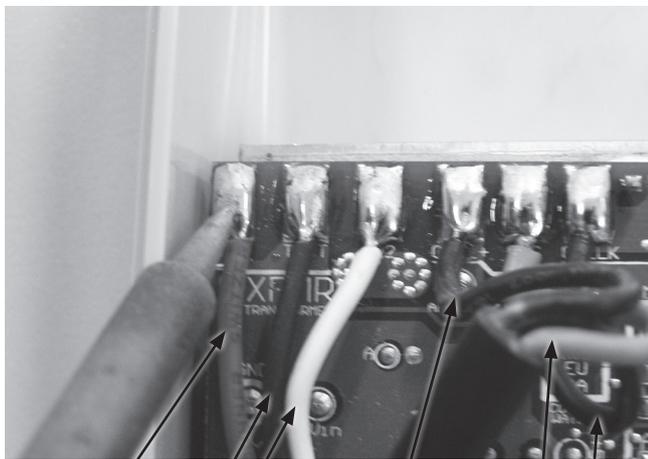


Step 3 – With a soldering iron & solder sucker or solder wick remove all the cables connected to the PCB.

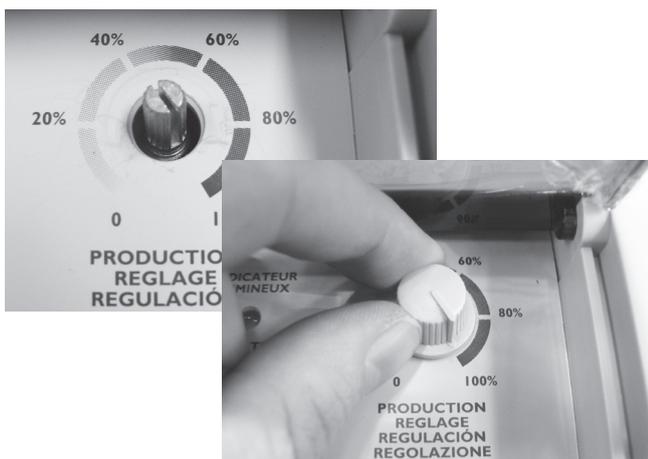
Assembly



- 1. ORANGE
- 2. WHITE
- 3. PINK
- 4. BLACK
- 5. BLUE
- 6. BLACK



- 1. RED
- 2. BLACK
- 3. WHITE
- 4. BLACK
- 5. BLUE
- 6. BLACK

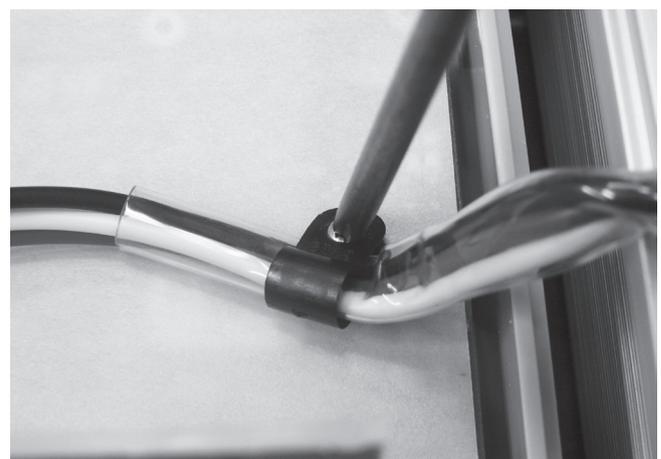


Step 2 – When PCB is in place the sanitiser output holder will be visible poking through the front panelling. Reconnect sanitiser output knob to its holder ensuring it is able to be adjusted to both minimum & maximum settings.

Step 1 – Use a soldering iron with unleaded solder to reattach the transformer & cell cable wires to the PCB.

BMSC 13/20/26 110V & BMSC 13 220V: The order for reattaching the wires to the PCB from left to right are 1) orange, 2) white, 3) pink which are the transformer wires, the cell cable wires are soldered onto the next three slots, the order is 4) black, 5) blue, 6) black. The blue cable represents the Gas sensor which is marked on the PCB with the word Gas.

BMSC 20 – 26 220V: From left to right the order for the cables to be soldered are 1) red, 2) black & 3) white which are the transformer wires, the cell cable wires are soldered onto the next three slots, the order is 4) black, 5) blue, 6) black. The blue cable represents the Gas sensor which is marked on the PCB with the word Gas.



Step 3 – Screw the protective cover for the PCB back on using a Phillips head screw driver (one point).

Replacing the Fuse Housing

Note that BMSC 13/20/26 110V has only one fuse whereas all 220V models have 2 fuses.

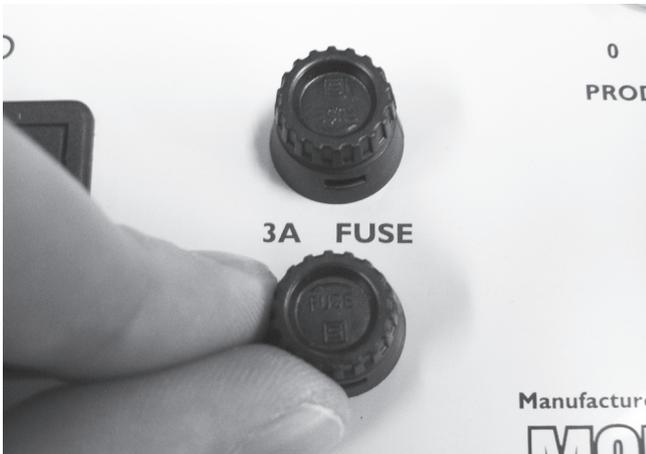
Disassembly



Step 1 – Using long nose pliers remove all the clips from the fuse housing terminals. Mark the positioning of the wires to assist with reassembly.

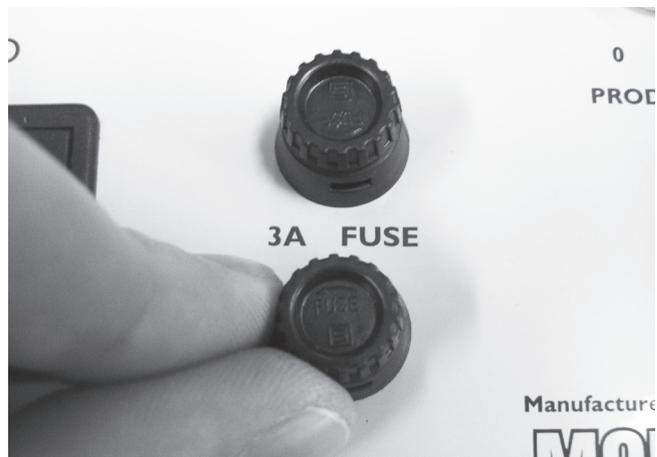


Step 2 – Using a pair of long nose pliers undo the nut holding the fuse housing in place.

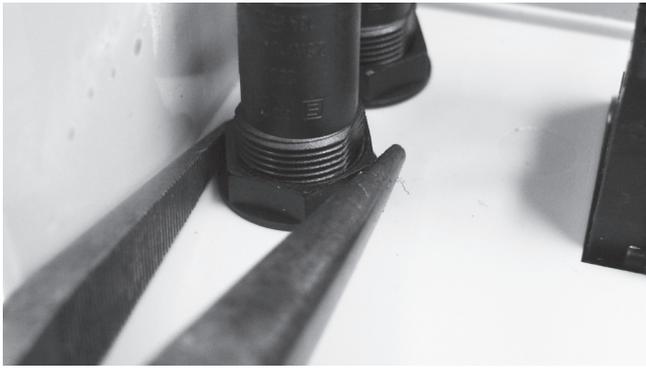


Step 3 – Remove the fuse housing.

Assembly



Step 1 – Replace the fuse housing.



Step 2 – Replace the nut that holds the fuse housing in place & tighten using long nose pliers.



- 1. WHITE
- 2. WHITE
- 3. BLACK
- 4. BLACK

Step 3 – Being careful not to bend the terminals on the fuse housing put the clips back in place. Use long nose pliers to slide the clips onto the terminals.



- 1. BLUE
- 2. WHITE
- 3. BROWN
- 4. BLACK

BMSC 13 220V: The correct positioning of the wires on the fuse housing terminals when looking from the bottom of the chlorinator is: 1) white wire from the final slot of the terminal strip, 2) white wire from the top right terminal on the power switch 3) black wire from the third slot on the terminal strip 4) black wire from the power switches top left terminal.

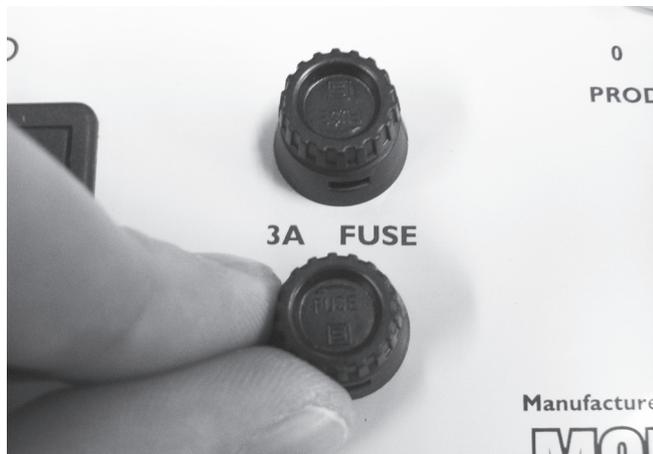
BMSC 20 – 26 220V: The correct positioning of the wires on the fuse housing terminals when looking from the bottom of the chlorinator is: 1) blue wire from the transformer 2) white wire from the terminal strip 3) brown wire from the transformer 4) black wire from the top left terminal of the power switch.



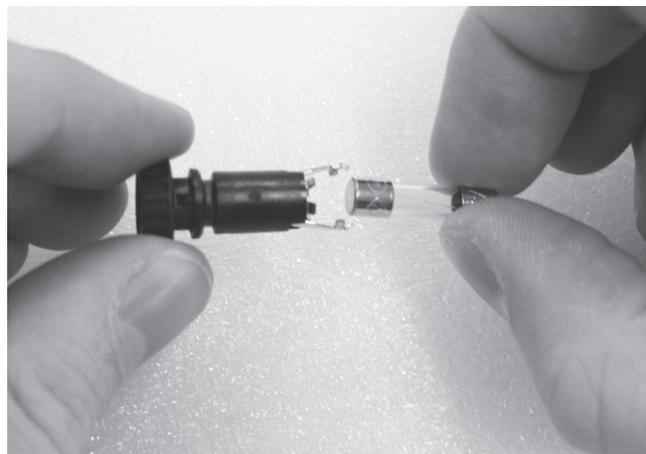
BMSC 16/20/26 110V: The lower terminal on the fuse has the brown wire from the bottom right slot on the terminal strip connected to it & the brown cable on the top terminal comes from the top left terminal on the power switch.

Replacing the Fuse

Disassembly

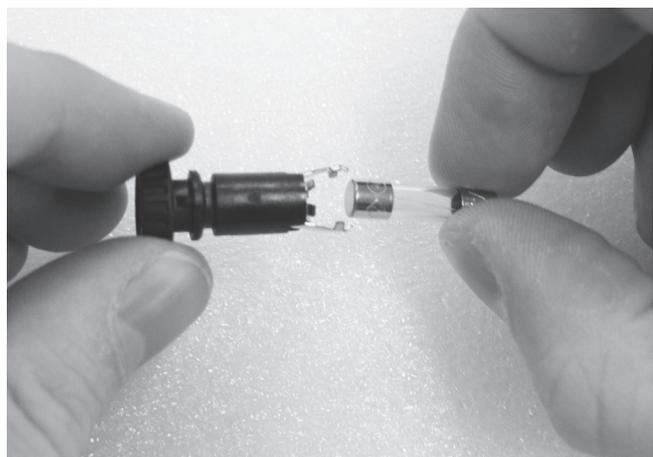


Step 1 – Push down on the fuse & twist to the left then lift up to remove fuse from the fuse housing.

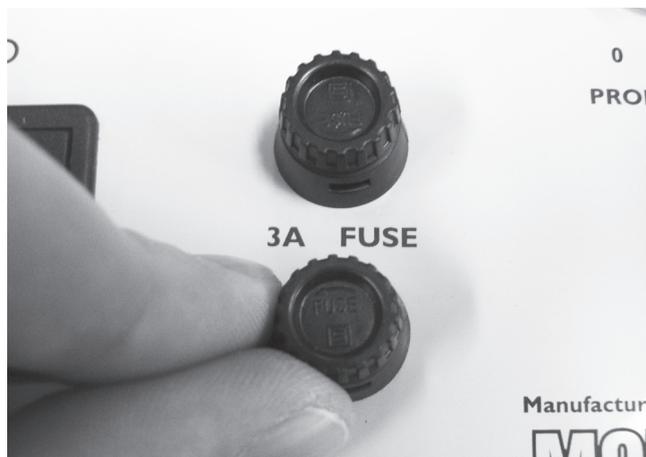


Step 2 – Remove the fuse from its holder.

Assembly



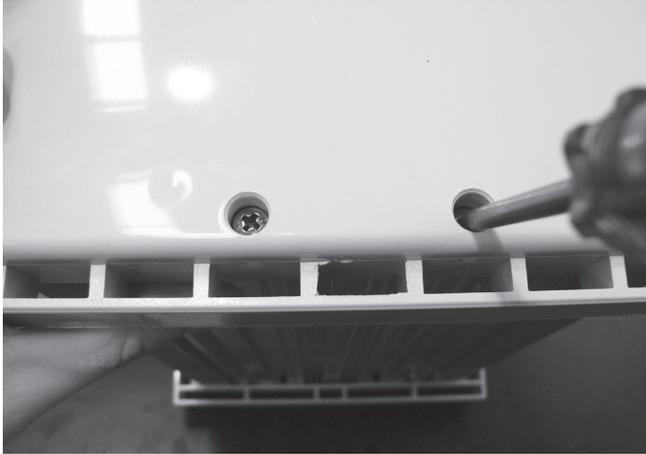
Step 1 – Place fuse back in its holder.



Step 2 – Place fuse into fuse housing & pushing gently down twist to the right to lock in place.

Replacing the Top Panel

Disassembly



Step 1 – Remove the screws holding down the top panel using a Phillips head screwdriver (two point).

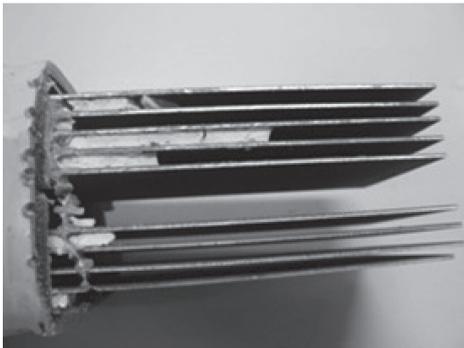
Assembly



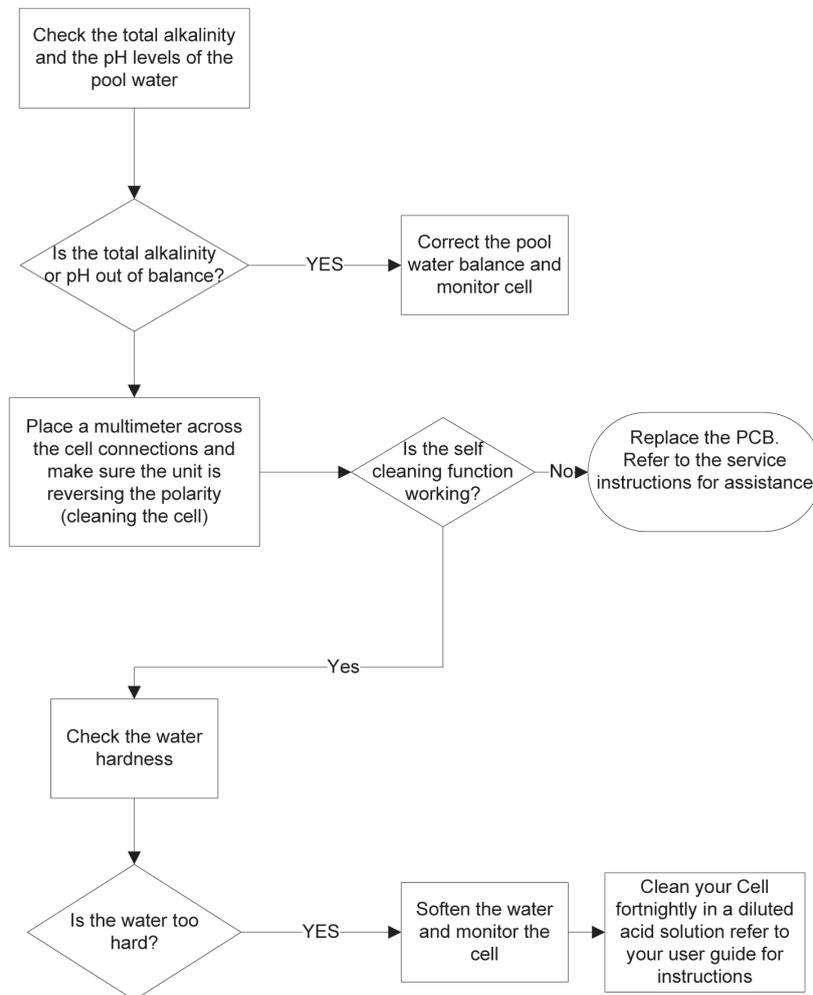
Step 1 – Replace the screws holding down the top panel using a Phillips head screwdriver (two point).

Trouble Shooting Guides

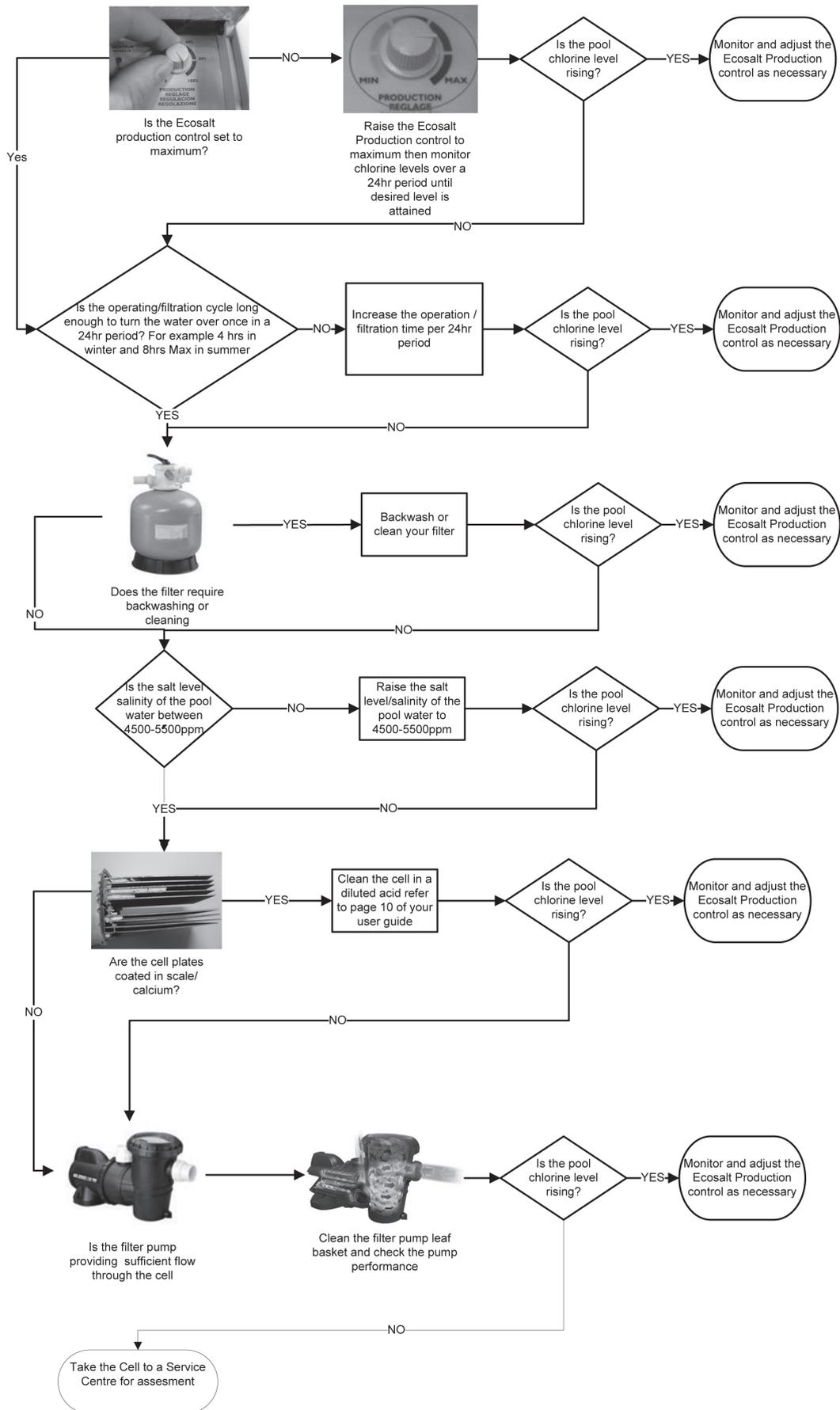
Ecosalt Cell Calcification



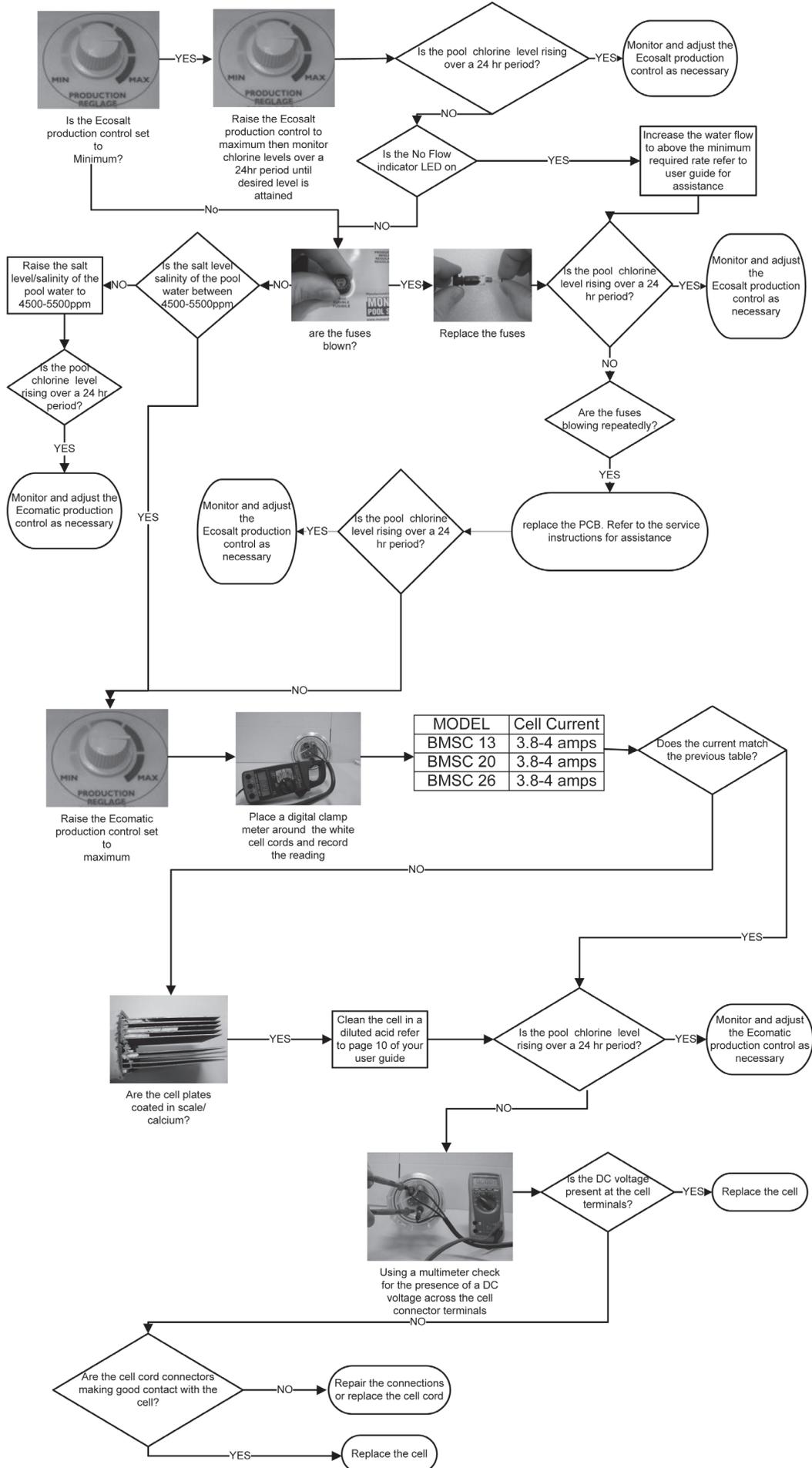
Dissected Calcified Cell-Note the white Calcium build up between the plates



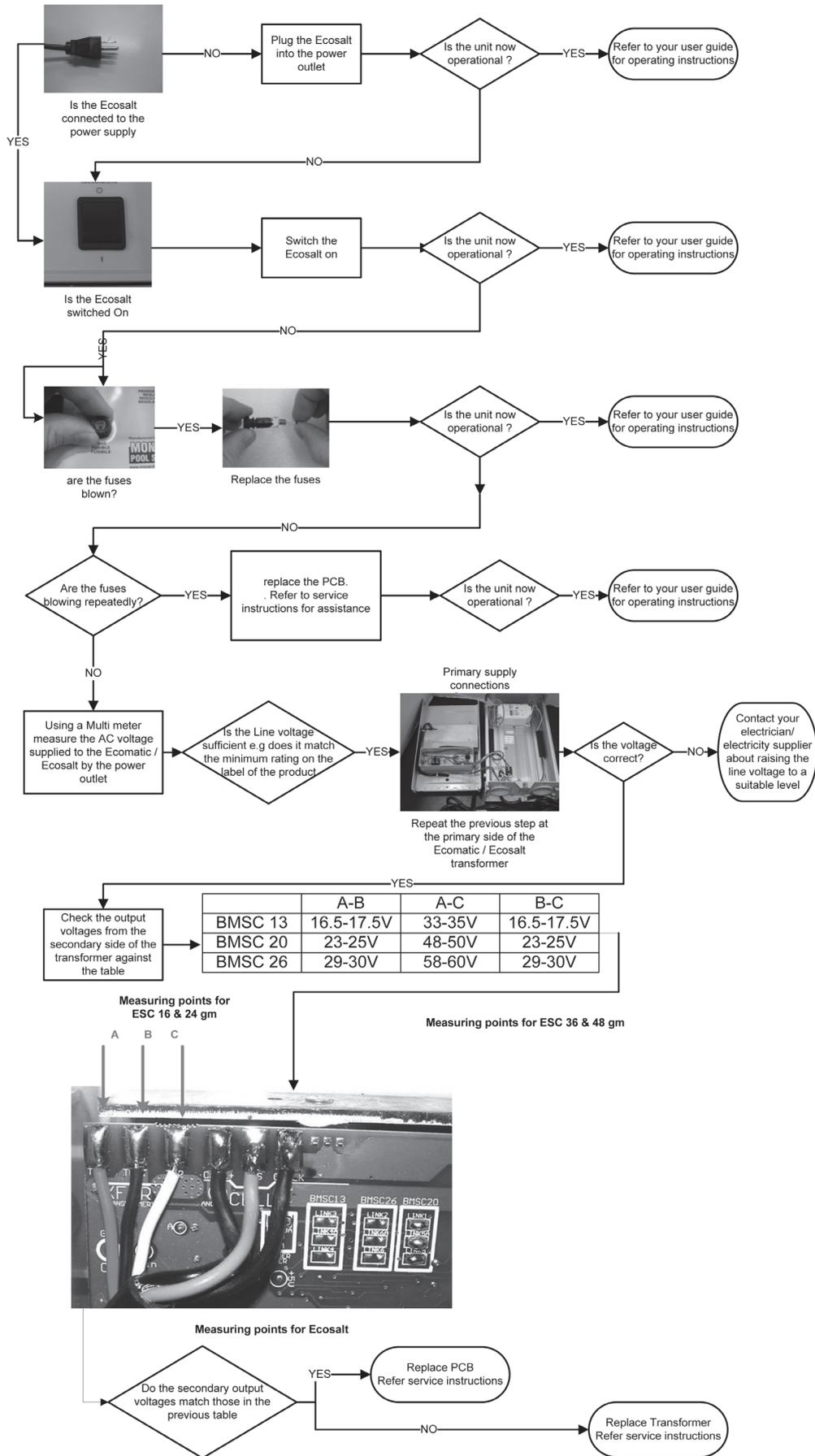
Ecosalt Not Producing Enough Sanitizer



Ecosalt Not Producing Sanitizer



Ecosalt Will Not Turn On E.g No Lights No Display



B.1. The production of the cell is not sufficient

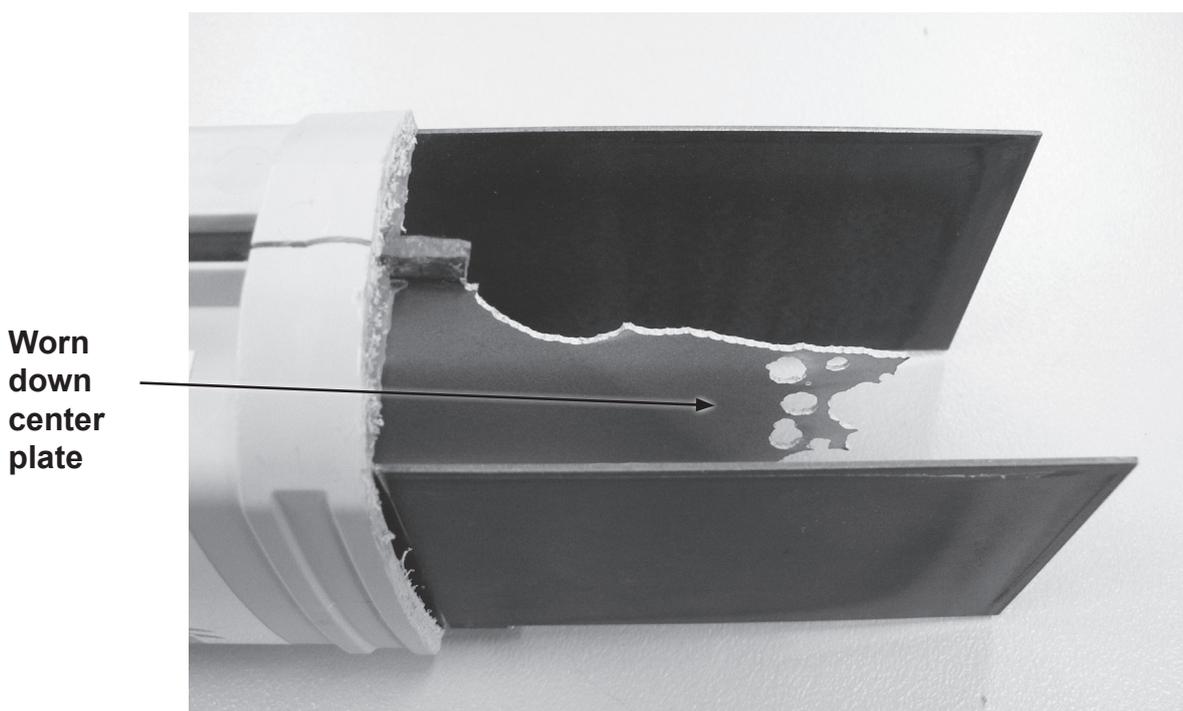
There are two possible reasons for a cell having low production: The wearing of the cell and the scaling of the cell.

Wearing

Normally, an ESC or ESR cell should last 5 years under normal conditions with correct maintenance & operating in swimming seasons ranging from April to October.

The cell will incur more significant wear & tear if used for a higher frequency for an extended period of time (e.g.; cell sanitizing swimming pools for medical use).

Below is an example of a cell which has had its central plate worn out by heavy use.



It is recommended that the unit be turned off when the water temperature falls lower than 15°C.

Scaling of the cell

Scaling of the cell can occur when the pH of the water is too high, although the units ESC & BMSC are self cleaning, it is still possible to find the cell full of scales. In case of scaling of an ESC or BMSC cell, the pH of the water of the pool has to be adjusted lower (between 7 and 7.4).

Clean the cell with a mixture of 2/3 of water and 1/3 hydrochloric acid. The owner will then have to maintain the pH of the water at its normal value (between 7 and 7.4) by adding some “pH minus” when necessary.

B2. The cell is full of scale (white deposit on plates)

Refer to above chapter (**Scaling of cell**) which is a cause of scale production that can make the unit inefficient. This is not common for self cleaning units such as the EcoMatic ESC, ESCpH and also EcoSALT but is more common for units without self cleaning system such as the EcoMatic ESR.

B3. The cell has got a leak around the connectors.

The leak can often be found at the gland of the cell connectors. To check for leaks install the unit on the pool system & check the gland when the filtration pump is in operation.

B.4 The cell housing is cracked

This cracking can typically occur when the pressure sharply increases in the cell housing. This high pressure can occur **only if the salt chlorinator is in operation with the isolating valves closed.**

This fault is the consequence of a mistake made by the pool owner having mistakenly closed the valves and having forgotten to open these valves when the chlorinator was started.

Important: In order to avoid this type of problem, it is strongly advised that a **Non return valve** be installed in the pipe work between the cell & the pool return.

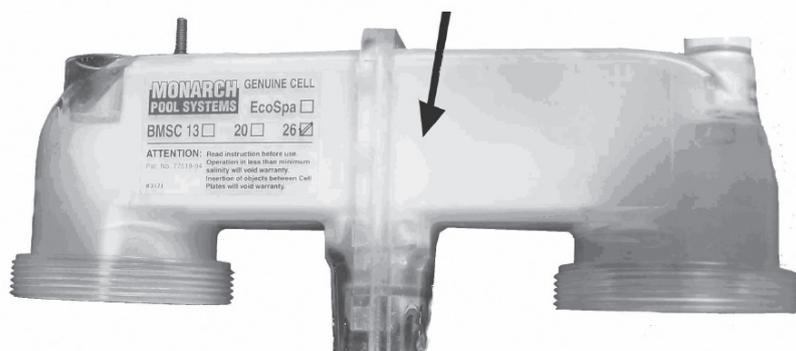
B.5 The wall of the housing is not transparent anymore

Overheating of the cell will result in you no longer being able to see through the cell housing to the cell plates. This overheating occurs when the flow through the cell housing is insufficient. This lack of flow can happen for the following reasons:

One valve closed or partially closed on the filtration circuit. This will result in the flow to the cell being blocked or restricted thus causing overheating.

A cell full of scale: If the cell is scaled the flow going through the cell housing is restricted, more common in the case of the EcoSALT cell.

Wall of the cell not
transparent anymore
(cell housing overheated)



Cell EcoSALT damaged
(coming from a lack of flow
in the cell housing)

B.6 Brown or black traces on plastic part of the ESC cell

Brown or black traces on the cell indicate the presence of metals in the water. The water coming from wells often contain metals that can damage the cell. These traces can also be found in pools located in close proximity to vineyards which have been treated with copper sulphates. Davey advises against using water drawn from wells to fill up a swimming pool.

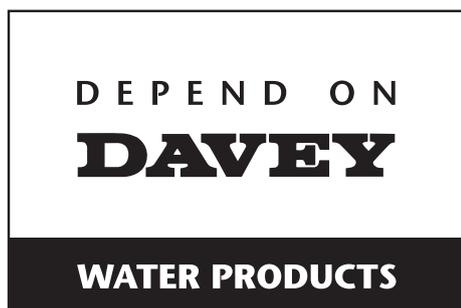
Note:

Product specifications may change without notice.

Drawings are indicative only, product appearance may change slightly.

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DEPEND ON
DAVEY

WATER PRODUCTS

EcoSpa[®] ORP Controlled Sanitising System



SERVICING INSTRUCTIONS

ECOSPA SERVICE GUIDE



WARNING: ALL ELECTRICAL WORK TO BE PERFORMED BY SUITABLY QUALIFIED ELECTRICAL PERSONNEL.



Always disconnect from electrical supply BEFORE any work is carried out.



Handle components carefully to avoid personal injury.

Tools Required

- 8mm spanner
- Phillips head screwdriver – One point
- Phillips head screwdriver – Two point
- Flat blade screwdriver – 3mm
- Long nose pliers
- Side cutters

Contents

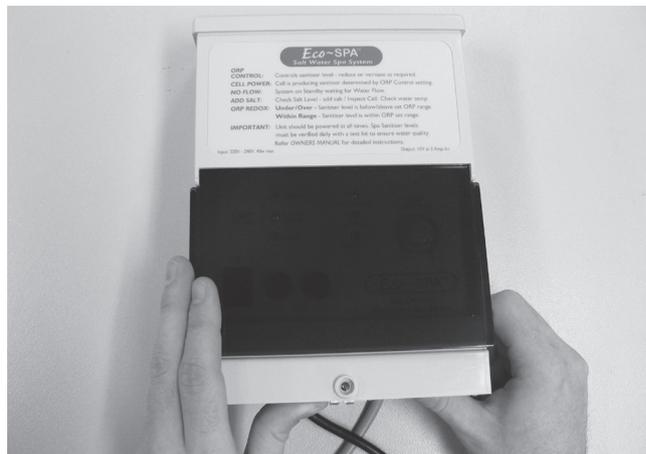
Disassembling/Assembling the Housing	3
Replacing the Transformer	4
Replacing the PCB	8
Replacing the Fuse Housing	11
Replacing the Fuse.....	14
Replacing the Top Panel.....	15
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Disassembling/ Assembling the Housing

Disassembly

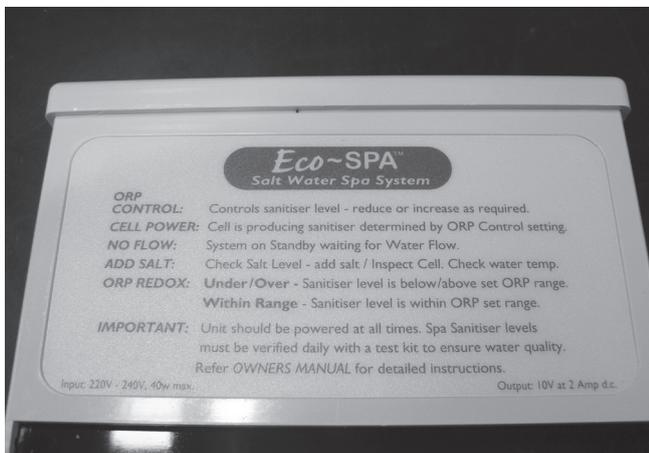


Step 1 – Remove the screw in the front panel using a Phillips head screwdriver (two point).



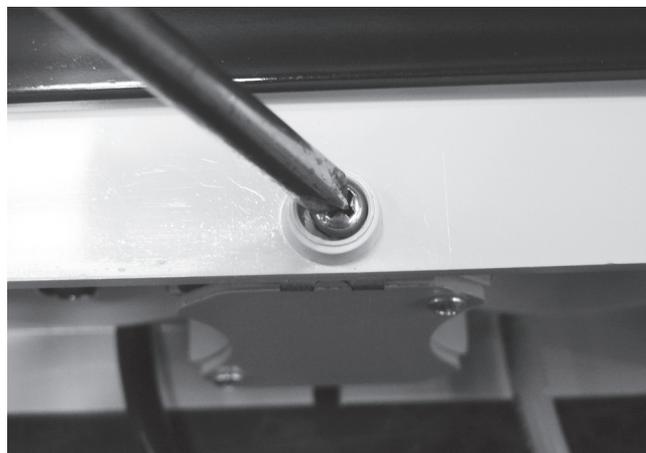
Step 2 – By hand lift the top half up from the chlorinator & slide it out until the top half is free.

Assembly



Step 1 – Place the top half of the chlorinator flush with the top panel.

Note: Before closing unit ensure that wiring loom which connects to the PCB is located inside the unit & is not preventing the unit from closing.



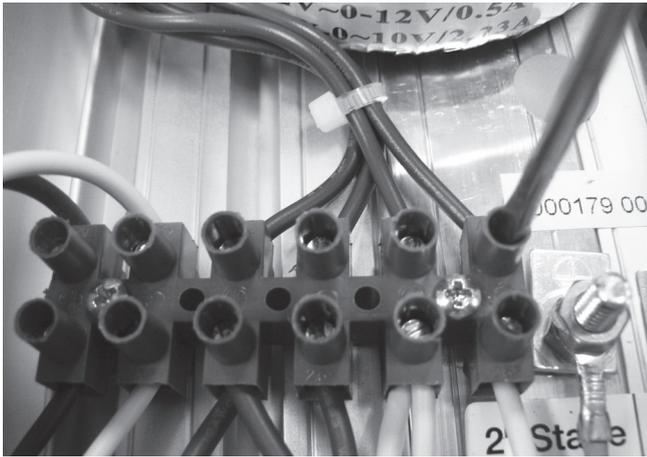
Step 2 – Close the unit & using a Phillips head screwdriver (two point) tighten the screw holding the chlorinator halves together.

Replacing the Transformer

IMPORTANT NOTE: Power **MUST** be switched off before removing transformer.

Note: Wiring assembly differs between 110V & 220V Ecospa where indicated.

Disassembly



Step 1 – Remove transformer wires from the terminal strip using a flat blade screwdriver (3mm). Mark the wires to enable easier connection on reassembly.



Step 2 – Remove the screws holding the protective cover on the PCB with a Phillips head screwdriver (one point).



Step 3 – Remove the ORP control knob which will allow you to move the PCB to the side. May need to use two flat blade screwdrivers to lever the knob off if it is fastened too tight to remove by hand. If using screwdrivers be careful not to damage the control panel.



Step 4 – Remove the wires connecting the transformer to the PCB using a flat blade screwdriver (3mm).

Note: this is all the wires on the PCB terminal strip except the brown & dark blue wires.

Mark the removed wires to enable easier connection on reassembly.



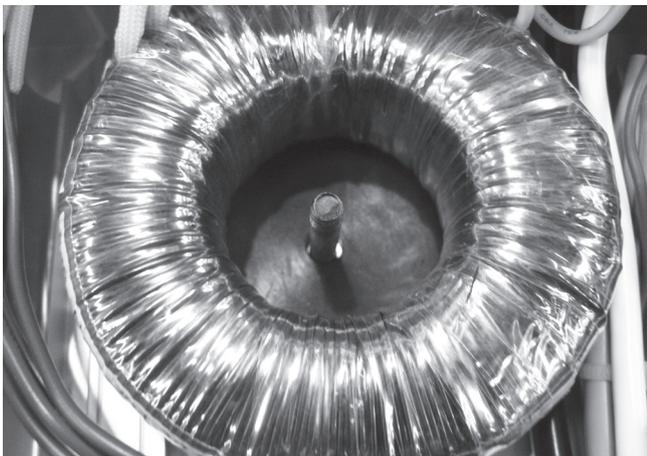
Step 5 – Remove the appropriate cable ties with a pair of side cutters. Take special care not to cut or damage the wiring.

Note position of cable ties for easier reassembly.



Step 6 – Remove the nut on the top of the transformer with an 8mm spanner then lift off the black heat dispersion disk which when removed allows for the transformer to be lifted out of the chlorinator. When removing heat dispersion disk also remove both the spring & flat washers.

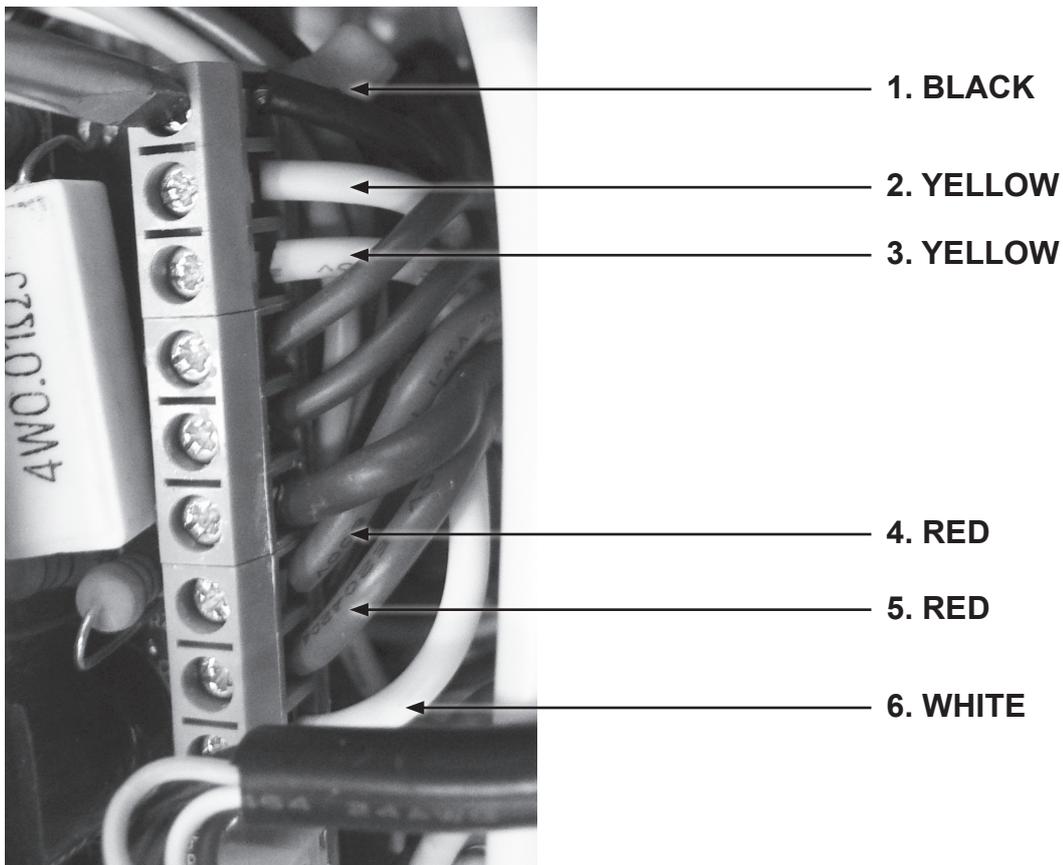
Assembly



Step 1 – Place transformer over the locating screw.



Step 2 – Place heat dispersion disk over the transformer with the shiny metallic side face up. Place flat washer in place over the locating screw with spring washer on top, tighten the transformer nut using an 8mm spanner.



Step 3 – Place previously marked transformer wires back in place on the PCB terminals, reconnect them using a flat blade screwdriver (3mm). From the top of the PCB the order that the wires need to be replaced are 1) black, 2) yellow, 3) yellow, 4) red, 5) red, 6) white.

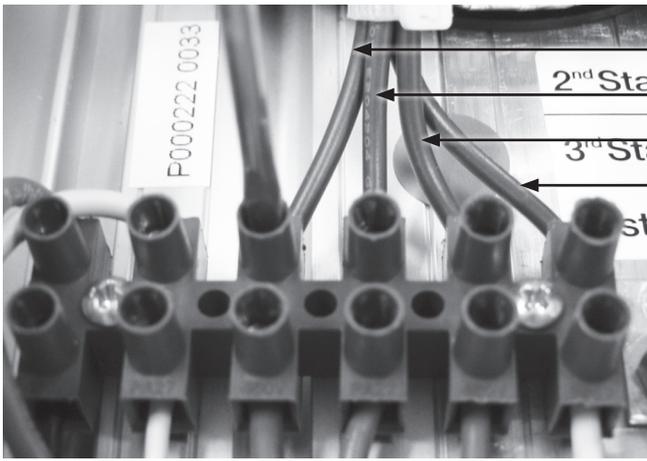
Note: The dark blue & brown wires should not be removed when removing the transformer.



Step 4 – When PCB is in place the ORP control holder will be visible poking through the front panelling. Reconnect ORP control knob to its holder ensuring it is able to be adjusted to both minimum & maximum settings.

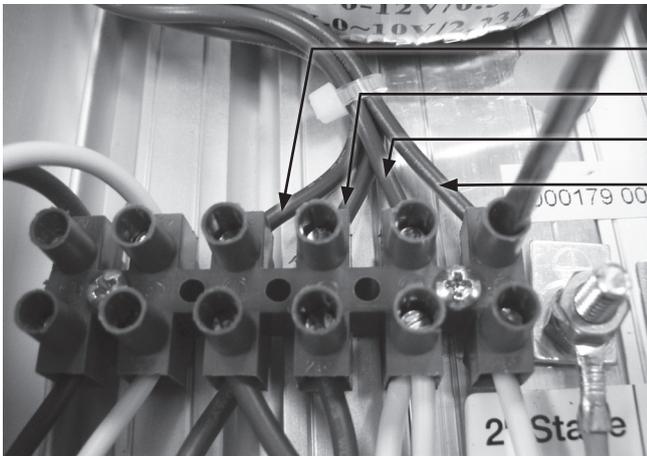


Step 5 – Replace the protective covering on the PCB using a Phillips head screwdriver (one point).



1. BROWN
2. DARK BLUE
3. BROWN
4. DARK BLUE

Step 6 – 220V EcoSPA: Reconnect previously marked transformer wires back to the terminal strip using a flat blade screwdriver (3mm) & replace any cable ties that were removed. The correct order for placing the transformer wires from left to right into the terminal strip for the **220V EcoSPA** is as follows, 1) brown, 2) dark blue, 3) brown, 4) dark blue. The first two slots on the left of the transformer wires should be filled by the brown & light blue wires from the fuse housings.



1. BROWN
2. BROWN
3. DARK BLUE
4. DARK BLUE

110V EcoSPA: Reconnect previously marked transformer wires back to the terminal strip using a flat blade screwdriver (3mm) & replace any cable ties that were removed. When placing the transformer wires in place on the **110V EcoSPA** the correct order from left to right on the terminal strip is 1) brown, 2) brown, 3) dark blue, 4) dark blue. The first two slots on the left of the transformer wires should be filled by the brown & light blue wires from the power switch.

Replacing the PCB

Disassembly



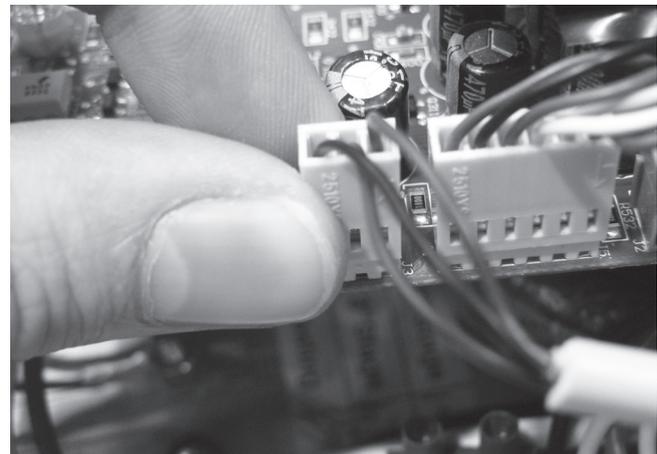
Step 1 – Remove the screws holding the protective cover on the PCB with a Phillips head screwdriver (one point).



Step 2 – Remove the ORP control knob which will allow you to move the PCB to the side. May need to use two flat blade screwdrivers to lever the knob off if it is fastened too tight to remove by hand. If using screwdrivers be careful not to damage the control panel.

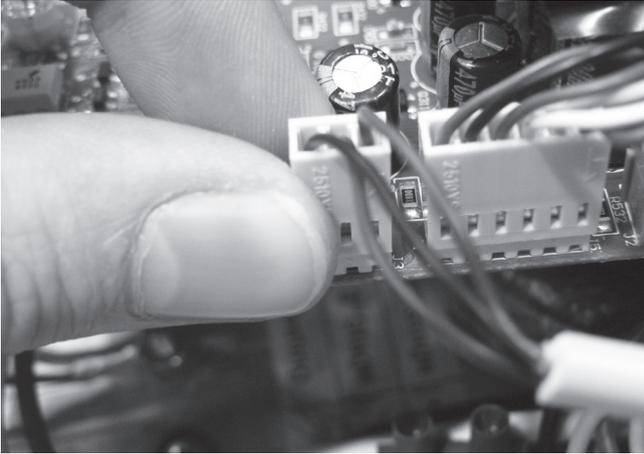


Step 3 – Remove the wires connecting the various components of the chlorinator to the PCB using a flat blade screwdriver (3mm). Mark the wires to enable easier connection on reassembly.



Step 4 – Remove the plugs from the ORP sensor & the Digital display that are connected to the PCB.

Assembly



Step 1 – Reconnect the plugs from the ORP sensor & the Digital display to the PCB.



1. BLACK
2. YELLOW
3. YELLOW
4. DARK BLUE
5. DARK BLUE
6. BROWN
7. RED
8. RED
9. WHITE

Step 2 – Place previously marked wires back in place on the PCB terminals, reconnect them using a flat blade screwdriver (3mm). From the top of the PCB the order that the wires need to be replaced are 1) black, 2) yellow, 3) yellow, 4) dark blue, 5) dark blue, 6) brown, 7) red, 8) red, 9) white.



Step 3 – When PCB is in place the ORP control holder will be visible poking through the front panelling. Reconnect ORP control knob to its holder ensuring it is able to be adjusted to both minimum & maximum settings.



Step 4 – Replace the protective covering on the PCB using a Phillips head screwdriver (one point).

Replacing the Fuse Housing

Note: 220V EcoSPA is fitted with 2 fuses, 110V EcoSPA has 1 fuse only.

Disassembly



Step 1 – Remove the cable ties holding the fuse wires in place with a pair of side cutters. Take special care not to cut or damage the wiring.

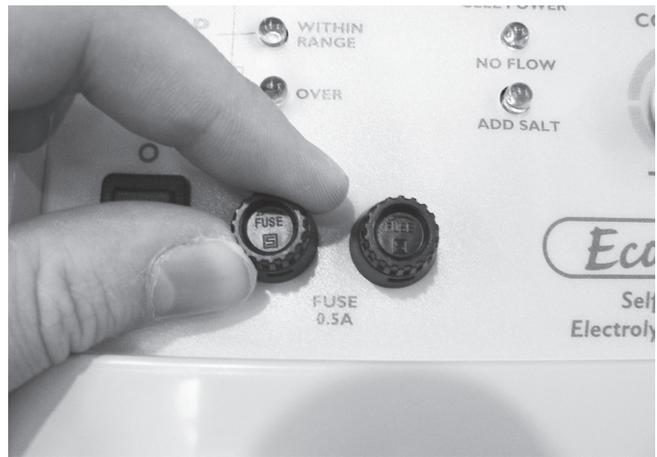
Note position of cable ties for easier reassembly.



Step 2 – Remove the terminal clips from the fuse housing.

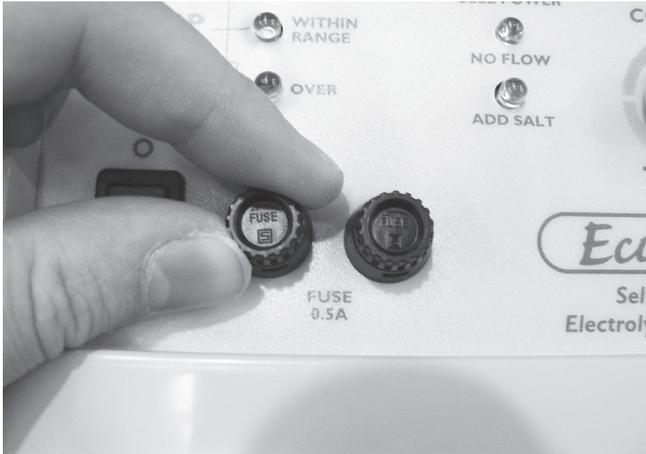


Step 3 – Using a pair of long nose pliers undo the nut holding the fuse housing in place.



Step 4 – Remove the fuse housing.

Assembly

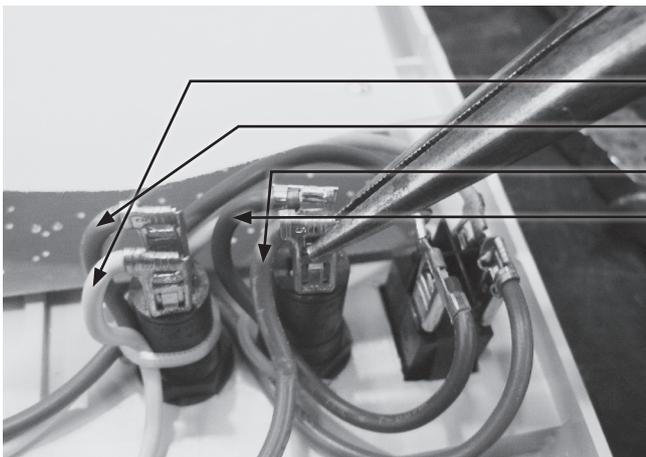


Step 1 – Place the fuse housing back into its location on the control panel.



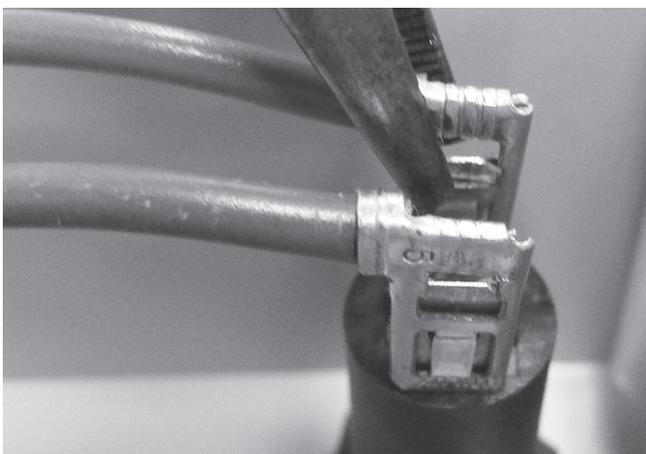
Step 2 – Replace the nut that holds the fuse housing in place & tighten using long nose pliers.

Step 3 – Being careful not to bend the terminals on the fuse housing put the clips to the fuse housing back in place. Use long nose pliers to slide the clips onto the terminal.



1. LIGHT BLUE
2. DARK BLUE
3. BROWN
4. DARK BROWN

EcoSPA 220V: The correct positioning for the wires on the left fuse housing are 1) lower terminal has the light blue wire from the last slot on the terminal strip, 2) top terminal has the dark blue wire from the power switch. The wires on the right fuse housing are positioned 3) lower terminal has the brown wire from the 3rd slot on the terminal strip, 4) top terminal has the dark brown wire from the power switch.



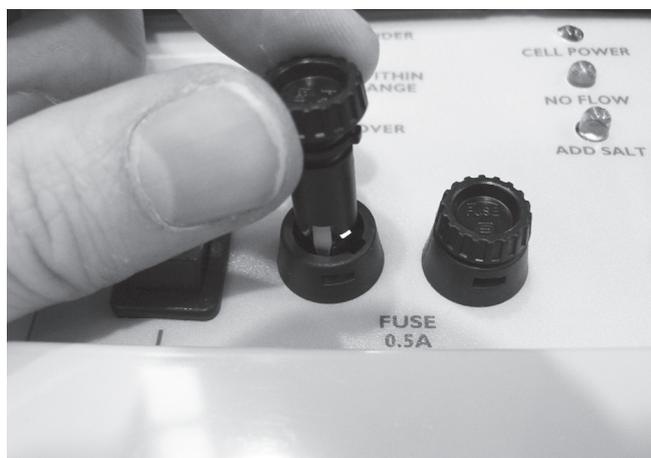
EcoSPA 110V: The top terminal on the fuse has the brown wire connected to the bottom left terminal on the power switch. The bottom fuse terminal wire which is also brown connects into the third slot from the left on the terminal strip; this is to the right of the white wire from the power cord.



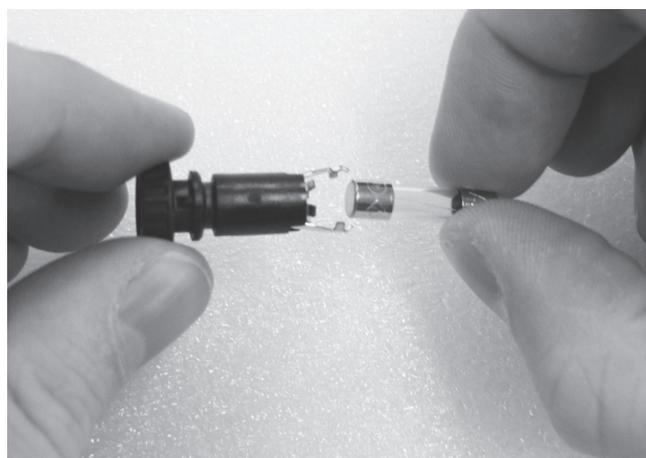
Step 4 – Place cable ties into position holding the fuse wires in place.

Replacing the Fuse

Disassembly

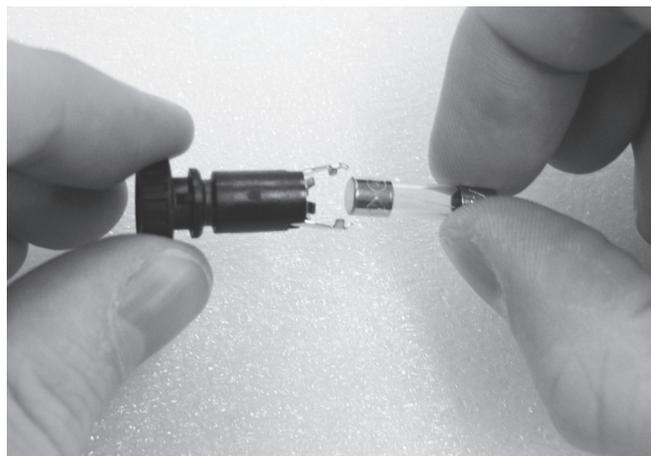


Step 1 – Push down on the fuse & twist to the left then lift up to remove fuse from the fuse housing.

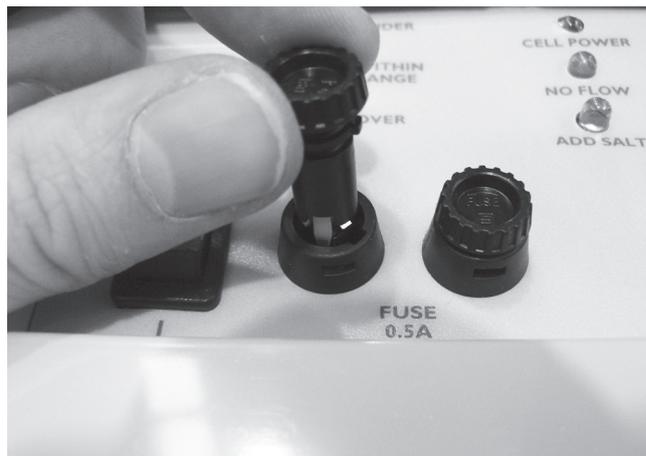


Step 2 – Remove the fuse from its holder.

Assembly



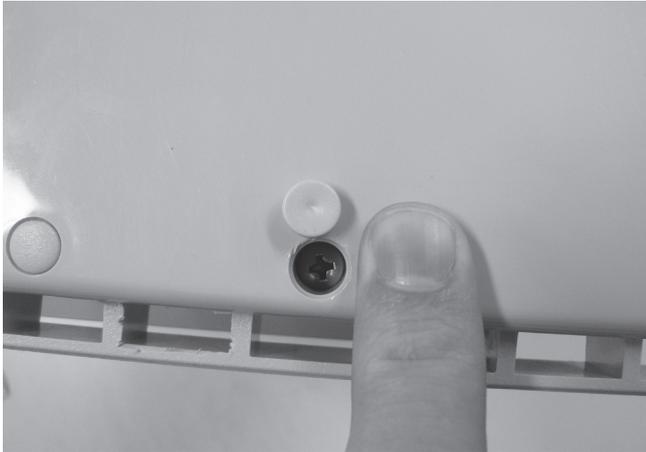
Step 1 – Place fuse back in its holder.



Step 2 – Place fuse into fuse housing & pushing gently down twist to the right to lock in place.

Replacing the Top Panel

Disassembly



Step 1 – Pry the tabs covering the screws on the top panel off. These tabs are not reusable & will need to be replaced after removal (Part number M1500GRY).



Step 2 – Remove the screws holding down the top panel using a Phillips head screwdriver (two point).

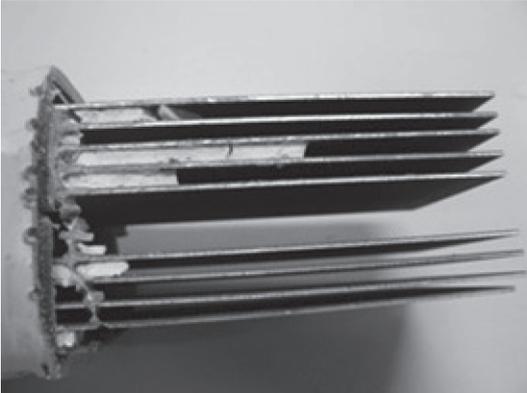
Assembly



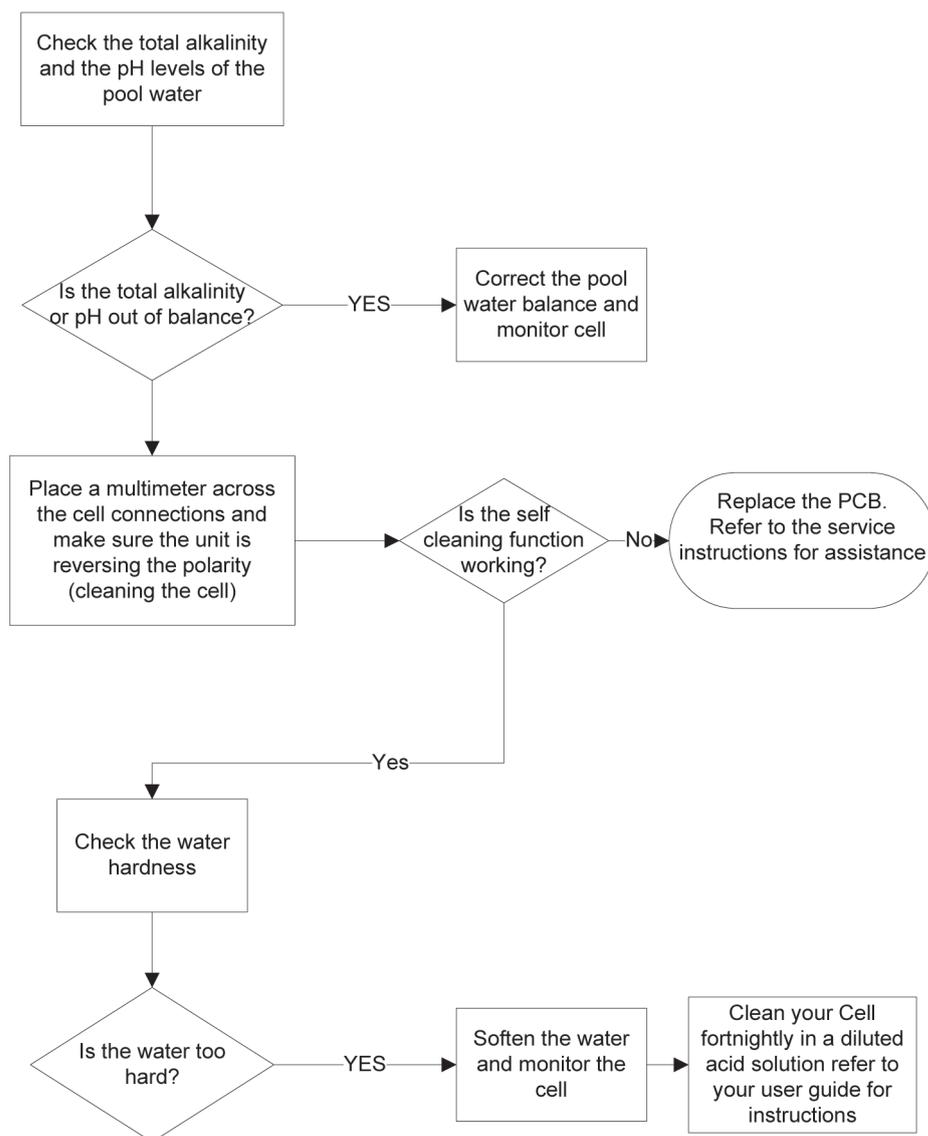
Step 1 – Replace the screws holding down the top panel using a Phillips head screwdriver (two point) & press tabs back into place, (Part number M1500GRY).

Trouble Shooting Guides

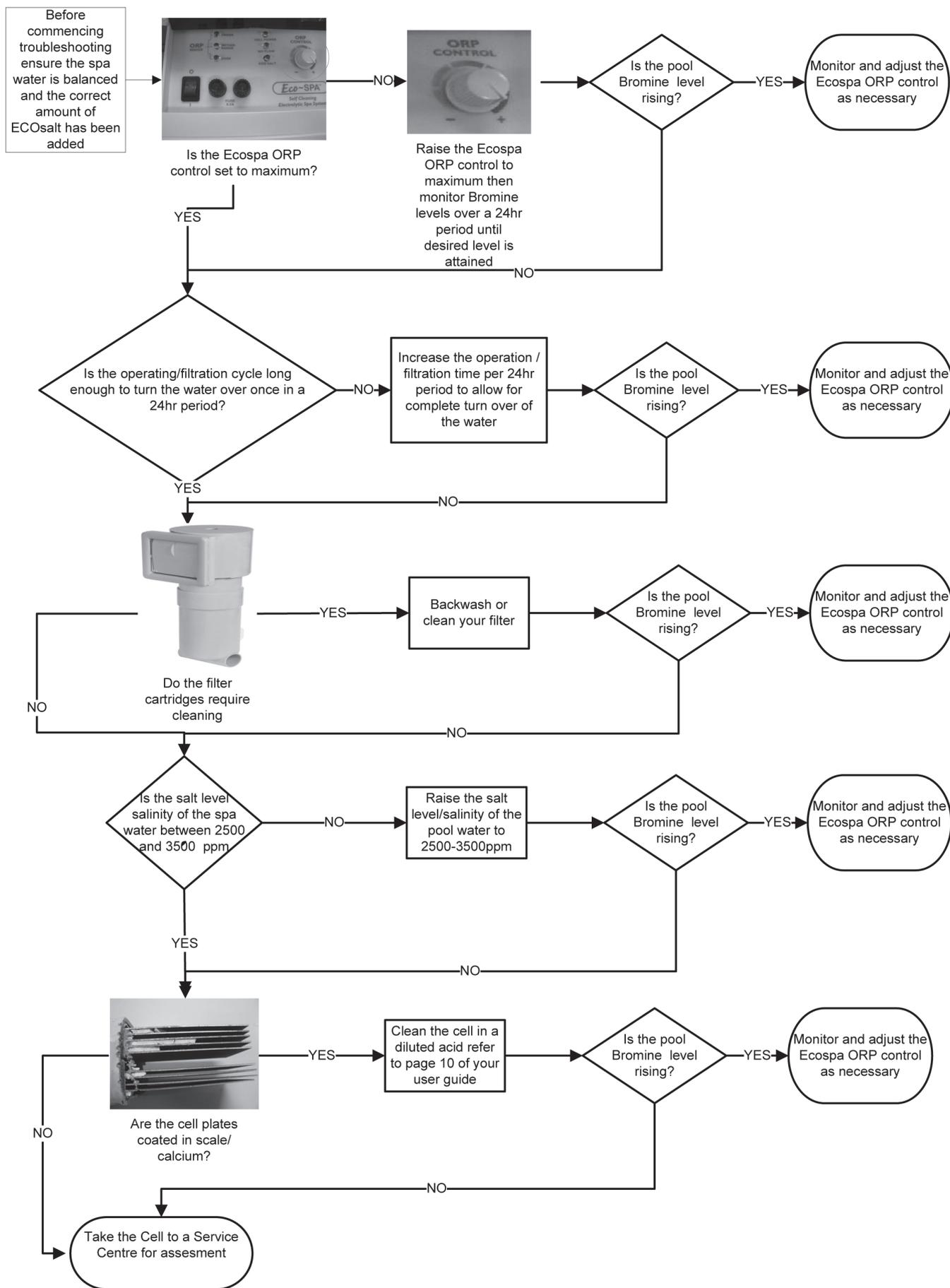
Ecospa Cell Calcification



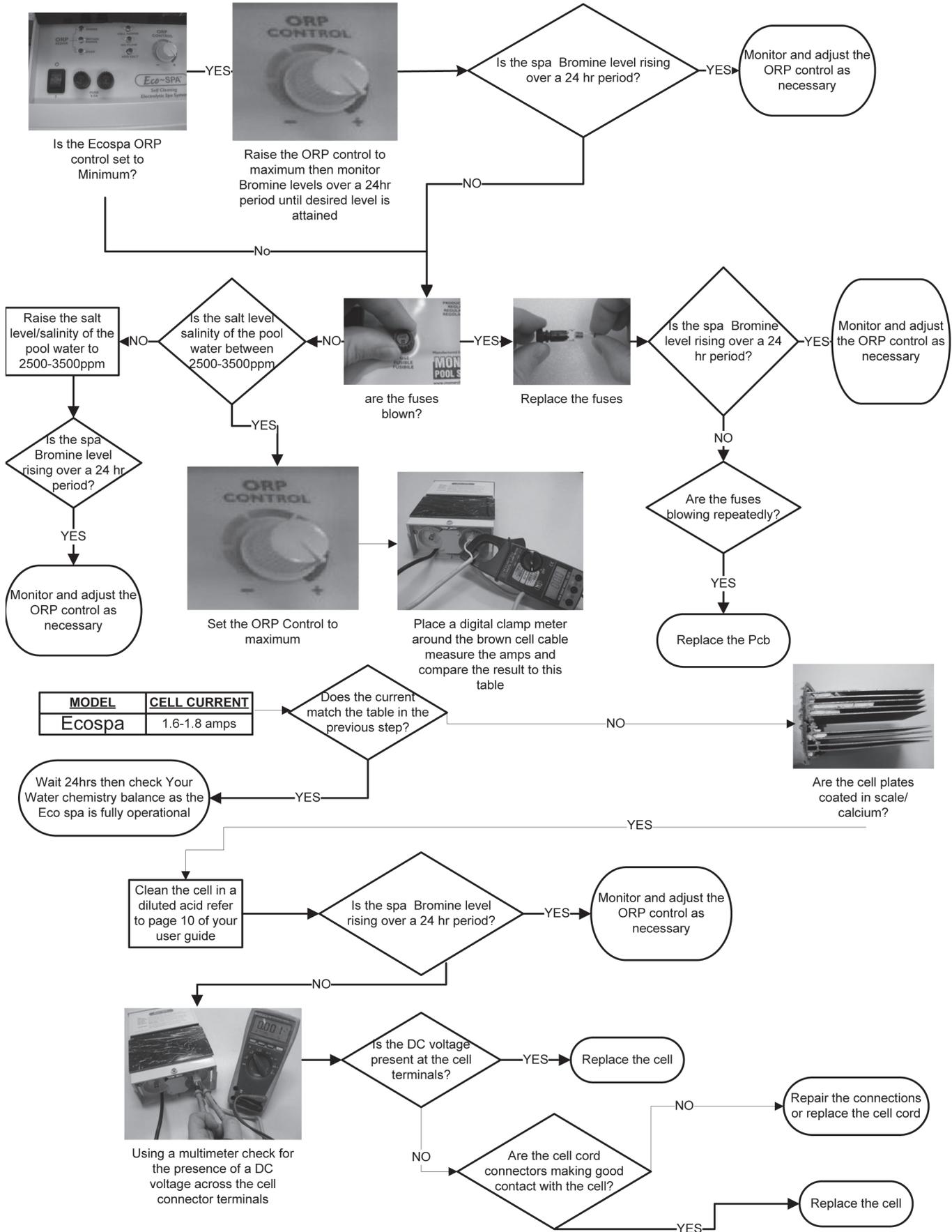
Dissected Calcified Cell-Note the white Calcium build up between the plates



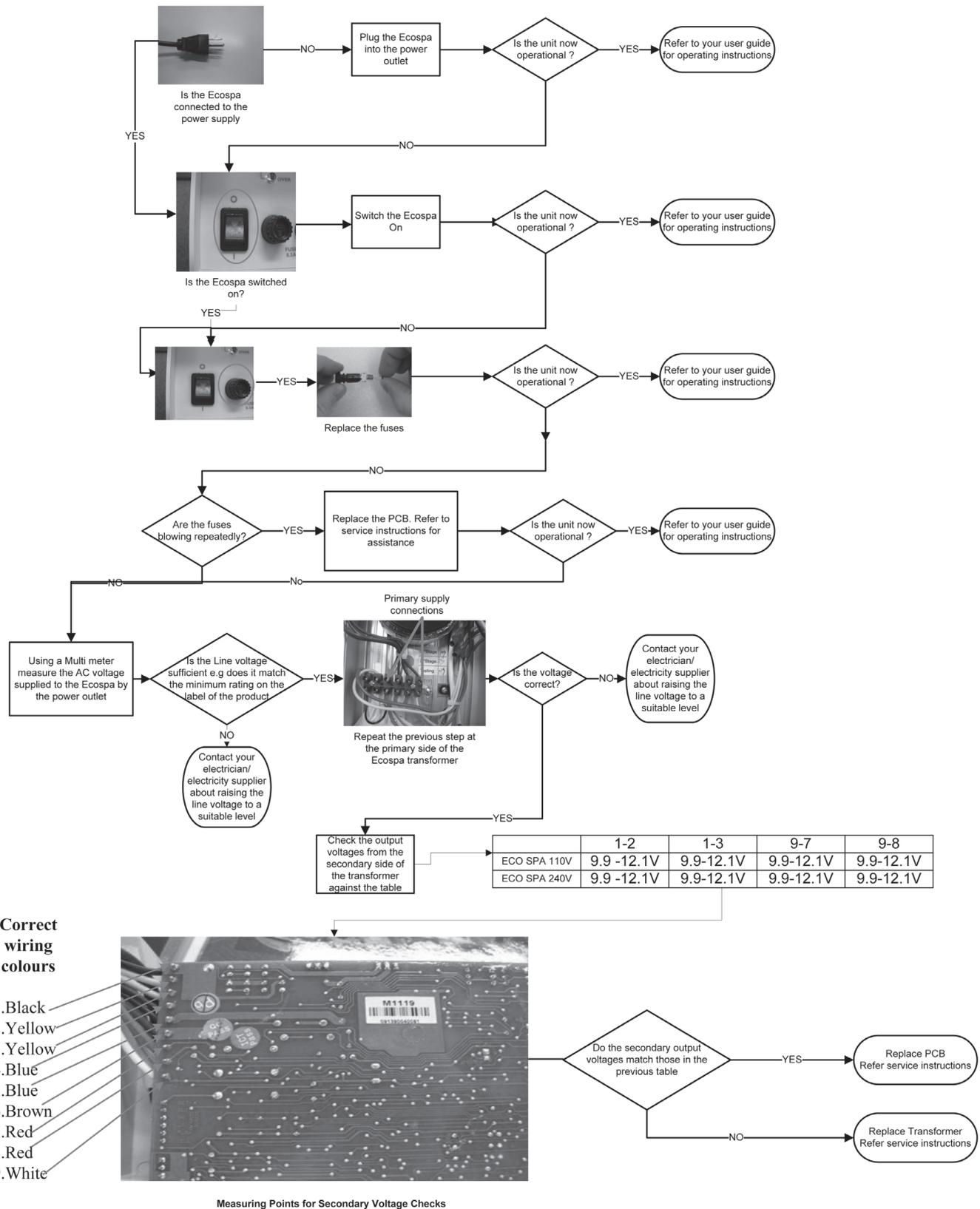
Ecospa Not Producing Enough Sanitizer



Ecospa Not Producing Sanitizer



Ecospa Will Not Turn On E.g No Lights No Display



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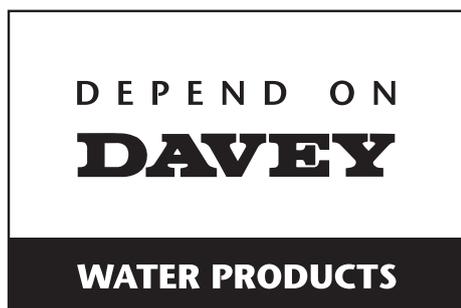
Note:

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Drawings are indicative only, product appearance may change slightly.

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DEPEND ON
DAVEY

WATER PRODUCTS

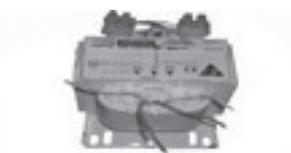
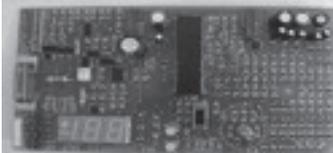
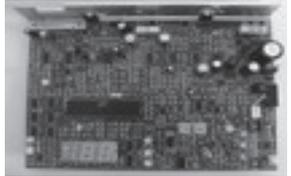
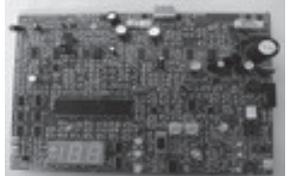
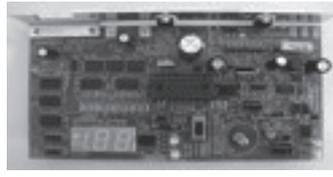
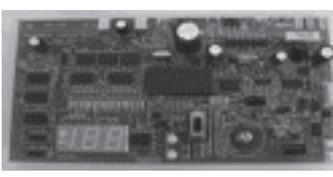
Salt Water Chlorinators SPARE PARTS GUIDE

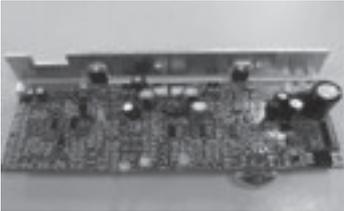
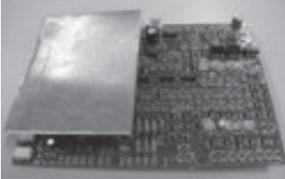


SPARE PARTS GUIDE

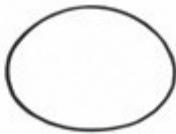
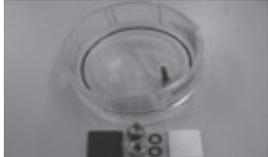
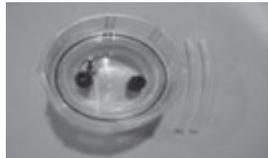
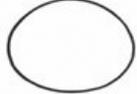
PART	DESCRIPTION	USED IN	PART No.
	SWITCH	All ESR, ESC, ESCpH and BMSC Models	M2004
	SWITCH	EcoSpa	M2000
	TRANSPARENT DOOR	All ESC, ESCpH and ESR models	M1550
	TRANSPARENT DOOR	ALL BMSC MODELS	M1561
	TRANSPARENT DOOR	ECOSPA	M1501
	FUSE HOLDER COMPLETE WITH 3A FUSE	ESC/ESCpH 16 & 24, ESR & all 220V BMSC	M2952UL
	FUSE HOLDER COMPLETE WITH 5A FUSE	ESC 36/48	M2954UL
	FUSE HOLDER	ECOSPA	32622
	E SERIES CONNECTOR COVER FRONT	All ESC, ESCpH and ESR models	M1554
	COVER FRONT of CONNECTORS	ALL BMSC MODELS	M1562
	CHLORINE CONTROL KNOB	All ESR, ESC, ESCpH and BMSC Models	M1521

PART	DESCRIPTION	USED IN	PART No.
	ORP CONTROL KNOB	EcoSpa	M1527
	TRANSFORMER 220V	ESR 70- 160 220V	M1701
	TRANSFORMER 220V	ESR 200 220V	M1702
	TRANSFORMER 220V	ESR 240 - 300 220V	M1705
	TRANSFORMER 110V	BMSC 13 110V	M1739
	TRANSFORMER 220V	BMSC 13 220V	M1739
	TRANSFORMER 110V	BMSC 20 110V	M1737
	TRANSFORMER 220V	BMSC 20 220V	M1732UL
	TRANSFORMER 110V	BMSC 26 110V	M1738
	TRANSFORMER 220V	BMSC 26 220V	M1733UL
	TRANSFORMER 110V	ESC & ESCpH 16	M1706
	TRANSFORMER 220V	ESC& ESCpH 16	M1714
	TRANSFORMER 110V	ESC & ESCpH 24	M1707
	TRANSFORMER 220V	ESC & ESCpH 24	M1715

PART	DESCRIPTION	USED IN	PART No.
	TRANSFORMER 220V	ESCpH 36	M1717
	TRANSFORMER	ESC 36/48	M1788
	TRANSFORMER	ECOSPA	M1789
	PCB	ESR 110	M1114110USA
	PCB	ESR 160	M1114160USA
	PCB	ESR 200	M1114200USA
	PCB	ESR 240	M1112240USA
	PCB	ESR 300	M1112300USA
	PCB	ESCpH 16	M1127PH16USA
	PCB	ESCpH 24	M1127PH24USA
	PCB	ESCpH 36	M1127PH36USA
	PCB	ESC 16	M111716USA
	PCB	ESC 24	M111724USA
	PCB	ESC 36	M1117A36USA
	PCB	ESC 48	M1117A48USA

PART	DESCRIPTION	USED IN	PART No.
	PCB	BMSC 13	M112013USA
	PCB	BMSC 20	M112020USA
	PCB	BMSC 26	M112026USA
	PCB	ECOSPA	M1119PCBA
	CELL CABLES	ALL BMSC	M2678
	CELL CABLES	ALL ESR	M2686
	CELL CABLES	All ESC & ESCpH	M2679
	CELL CABLE PLUG	EcoSpa	32619
	THYRISTOR	ESR 70 - 200	M1106
	THYRISTOR	ESR 240 - 300	M1107
	TRIAC	ESC & ESCpH 36/48	M1904

PART	DESCRIPTION	USED IN	PART No.
	PRESSURE SWITCH FOR FLOW SENSOR	ECOSPA	M4500
	ORP Probe	ECOSPA	M5002WB
	pH Probe	All ESCpH Models	M5001WB
	BNC Socket	all ESCpH & EcoSpa Models	M5113
	REPLACEMENT CELL	ESR 110	M0741EX
	REPLACEMENT CELL	ESR 160	M0753EX
	REPLACEMENT CELL	ESR 200	M0755EX
	REPLACEMENT CELL	ESR 300	M0759EX
	REPLACEMENT CELL	ESC & ESCpH 16	M0656USA
	REPLACEMENT CELL	ESC & ESCpH 24-36-48	M0657USA
	REPLACEMENT CELL	BMSC 13	M0681EX
	REPLACEMENT CELL	BMSC 20	M0682EX
	REPLACEMENT CELL	BMSC 26	M0683EX
	REPLACEMENT CELL	ECOSPA	M0653

PART	DESCRIPTION	USED IN	PART No.
	CELL HOUSING	ALL ESC, ESCpH AND ESR MODELS	M1249
	BMSC CELL HOUSING BLANK	ALL BMSC MODELS	M0684
	BLANKING CAP	ALL ESC, ESCpH AND ESR MODELS	M1219
	O'RING for CELL HEAD	ALL ESC, ESCpH AND ESR MODELS	M1217
	CELL UNION KIT	ALL BMSC MODELS	32621
	CELL UNION KIT	EcoSpa	32620
	CELL HEAD REPAIR KIT	ALL ESR MODELS	M1254
	CELL HEAD REPAIR KIT	ALL ESC & ESCpH MODELS	M1248
	CABLE GLAND CELL CONNECTOR	ESC ESCPH	M4513
	SCREW-GAS DETECTOR	ALL	M1103
	O Ring - sensor Clip	ALL ESC & ESCpH MODELS	M1203

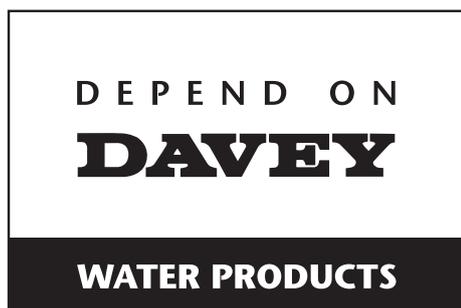
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