

WATERMAID®

PROVEN PERFORMANCE

SINCE 1971

POOL CHLORINATION WITH SALT

Owner's Handbook

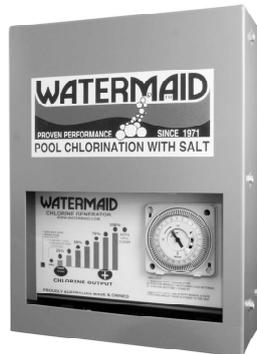


WM40

WATERMAID®

WM40 Power Supply

(Time Clock optional)



The WM40 Power Supply can be connected to any of the following Cells (shown below):



QT300 Cell
40 mm (1½") unions
Salt Level: 6000 ppm



QT400 Cell
40 mm (1½") unions
Salt Level: 4000 ppm



XT300 Cell
50 mm (2") unions
Salt Level: 6000 ppm



XT400 Cell
50 mm (2") unions
Salt Level: 4000 ppm



EZ300 Cell (*Patented Design*)
40 or 50 mm (1½ or 2") T-Piece
Salt Level: 6000 ppm



VTR300 Cell
40 or 50 mm (1½ or 2") T-Piece
Salt Level: 6000 ppm

Please note: The grey Cell cable is not shown in the above photos.

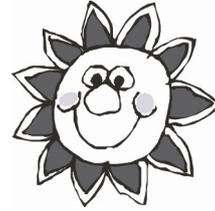
If using seawater (at 35,000 ppm salt), the WM40 Power Supply can be coupled to a QT100 Cell.

This Owner's Handbook contains information relating to WATERMAID® salt water chlorinators as well as general information on pool maintenance.

Please read the IMPORTANT SAFETY INSTRUCTIONS before first use.



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1. ESSENTIALS FOR A HEALTHY POOL

The recommended daily levels for swimming pools and spas as determined by a test kit are given in the table below. Check the expiry date on the test kit, as test results may be inaccurate if used after that date.

	Pools	Spas
Free Available Chlorine (ppm)	1.0 – 3.0	3.0 – 5.0
pH	7.2 – 7.8	7.2 – 7.8
Total Alkalinity (ppm)	100 - 200	100 – 200

There are three fundamental requirements for maintaining a swimming pool or spa:

- a) Filtration
- b) Chlorination
- c) PH

A pool or spa should be looked at daily to check that the water is clean and clear and the finest details of the walls can be seen at the deepest part. This will indicate whether the pool or spa has had enough filtration and chlorination for the load conditions that were applicable the day before. Any other condition requires testing and rectification before swimmers enter the water.

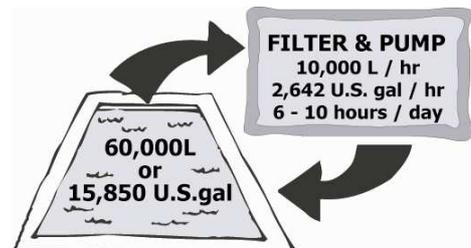
a) FILTRATION

It is first necessary to pass water through a filter to remove debris. A standard sized pool pump with normal filter pressures will pump about 10,000 litres (2,642 U.S. gal) an hour, so an average 60,000 litre (15,850 U.S. gal) pool then requires six to ten hours of filtration a day in summer conditions. This will turn over the equivalent of 1 - 1½ times the total volume of water. **However, about 65% only of the actual water and debris will have passed through the filter.**

For spas, the water usually turns over several times per hour.

Generally, at dawn and at dusk, any wind will die down, and are the best times to commence filtration. Leaves and floating debris will be swept to the skimmer box without restriction if the pool is well designed.

Longer filtration cycles can reduce the chlorine requirement and conversely, more chlorine can reduce the filtration requirement.



b) CHLORINATION

The WATERMAID® pool chlorinator takes care of the chlorination requirement. **As mild saline water flows through the WATERMAID® Cell, it is converted by electrolysis into chlorine as sodium hypochlorite.** Chlorine is required after filtration to react with any remaining debris (both visible and invisible), remove stains by oxidation and sterilise the water of harmful bacteria.

A chlorine residual (or reserve) is required for any imminent bather load. A total of 1 to 3 ppm for pools and 3 to 5 ppm for spas of free available chlorine is required to maintain a clean clear condition.

Because of its instability, chlorine has a half-life of some 35 minutes in strong sunlight and even less in the presence of contaminants. Therefore, the use of a **chlorine stabiliser is strongly recommended** for outdoor pools as it lengthens the half-life of chlorine to about 140 minutes and helps maintain a residual of chlorine in the pool on hot sunny days. At the beginning of the summer season, chlorine stabiliser (isocyanuric acid) should be added to the pool.

For an average 60,000 litre (15,850 U.S. gal) pool, add 2½ kg (5½ lb) of chlorine stabiliser. After this initial dose, the pool should be topped up with chlorine stabiliser throughout the hot summer period to maintain a level between 30 and 50 ppm.



Please Note:
Indoor pools do not require the addition of chlorine stabiliser. Nor do spas due to the high turnover rate of the water.

**Recommended chlorine stabiliser level: 30 - 50 ppm
Do NOT exceed 80 ppm**

Factors such as, sunlight, filter and pump efficiency, stabiliser level, bather load, debris, water temperature, salt level, water level, chemical balance and age of the Cell, all affect the final chlorine level.

c) PH

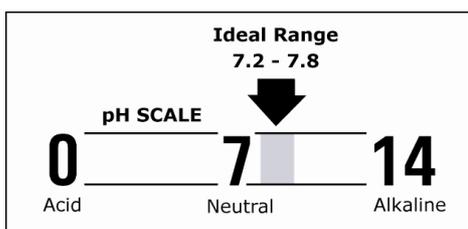
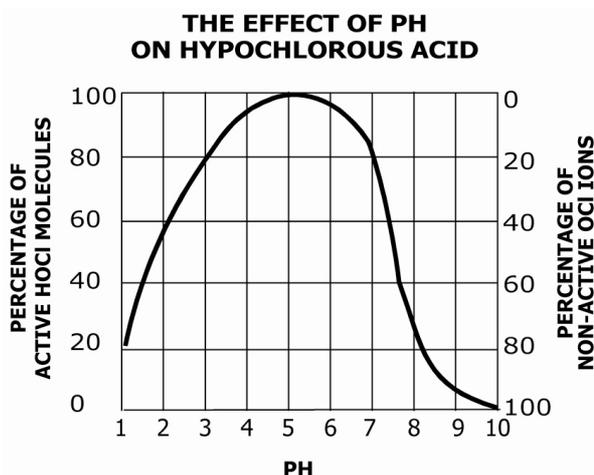
PH is a measure of the concentration of hydrogen ions in a solution, or in simpler terms the acidity or alkalinity of a solution. A solution with pH 7 is neutral; below 7 is acidic; and above 7 is alkaline.

By electrolysis, the WATERMAID® Cell produces sodium hypochlorite (NaOCl), which in water dissociates into sodium (Na+) and hypochlorite (OCI-) ions. It is the hypochlorite ions that then form with the hydrogen (H+) ions (from the water) to form **hypochlorous acid** (HOCl), the active agent that destroys bacteria and algae, and oxidizes organic matter.

The chart (right) shows the effect of pH on the reversing reaction of hypochlorous acid in water. The greater the percentage of active hypochlorous acid molecules in the water, the better the sanitising effect.

From the chart, it can be seen that at pH between 3 and 7, the percentage of active hypochlorous acid molecules in the water is at its highest, although it is not suitable for swimming because the water is acidic. And at pH 8.0, the chlorine in the water will only be 21% effective.

A pH above or below the ideal range can also cause irritation to the eyes and skin.



The ideal pH range for swimming conditions is between 7.2 and 7.8.

Marblesheen, pebble, quartzon and tiled pools stabilise naturally between pH 7.6 and 8.2 so the effects of chlorine are disadvantaged. For these pools it is recommended that "**pH buffer**" (**sodium bicarbonate**) be used as this will help stabilise the pH between 7.6 and 7.8, as well as raise the total alkalinity.

Total alkalinity is a measure of the alkaline chemicals in the water such as bicarbonates and carbonates. It affects the speed and ease of pH change. If the total alkalinity is too high, keeping the pH within the desired range is difficult. Keeping the total alkalinity between 150 and 200 ppm will help keep the pH below 7.8.

Adding sodium bicarbonate will also help to protect newly-surfaced marblesheen, pebble, quartzon and tiled pools, as it will react with calcium salts and form a coating of calcium carbonate over the surface. This in turn will slow down the leaching out of lime from the fresh cement (which contains up to 60% calcium oxides), thereby making it easier to achieve the desired water balance.

For an average sized pool, about 10 kg (22 lb) of sodium bicarbonate will raise the total alkalinity 80 ppm. See [section 11](#) for raising total alkalinity.

The pH remains stable and within the required range for pools with inert surfaces such as fibreglass, fibreglass concrete, painted concrete and vinyl-lined surfaces, which also have a naturally occurring total alkalinity of 80 - 100 ppm. As this is an ideal situation, there is no need to add pH buffer to these pools.

If **hydrochloric acid** is to be used to lower pH, **it should be added SPARINGLY** and only according to the instructions given by an 'Acid-Demand' test kit. Any excess acid will attack the pool walls causing calcium to be released into the water, which will then build up on the electrodes.

2. IMPORTANT SAFETY INSTRUCTIONS

WATERMAID® ELECTROLYTIC CHLORINATOR MODEL WM40 CHLORINE GENERATING DEVICE DOMESTIC - FOR RESIDENTIAL POOLS & SPAS

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

READ AND FOLLOW ALL INSTRUCTIONS IN THIS OWNER'S HANDBOOK AND ON THE PRODUCT LABEL(S) BEFORE USE.

1. **WARNING:** To reduce the risk of electric shock, the ground wire of this device must be connected to the grounding means provided in the electricity supply service panel with a continuous copper wire equivalent to the circuit conductors supplying the equipment.
2. **WARNING:** KEEP OUT OF REACH OF CHILDREN.
3. **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. **WARNING:** Do not bury cord. Locate cord to minimise abuse from lawn mowers, hedge trimmers and other equipment.
5. **WARNING:** To reduce the risk of electric shock, replace damaged cord immediately. If damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person.
6. **WARNING:** To reduce the risk of electric shock, do not use an extension cord to connect unit to the electricity supply; provide a properly located outlet.
7. **CAUTION:** to prevent electric shock, switch OFF the power at the electrical power outlet before dislodging the WATERMAID® Power Supply. Do NOT remove the cover as there are no user serviceable parts inside. Refer to the manufacturer, its service agent or a similarly qualified person for repair.
8. **WARNING:** Improper installation or operating the WATERMAID® electrolytic chlorinator model WM40 without adequate water flow through the Cell can cause a build-up of flammable gases, which can result in FIRE or EXPLOSION.
9. **CAUTION:** The unit MUST be installed AT LEAST 3 metres (10 feet) from the inside wall of the pool.
10. **WARNING:** Do **not** apply any harsh solvents (e.g. methylated spirits, priming fluid etc.) or lubricating agents (e.g. hydra-slip spray) or similar products containing perchloroethylene (also known as tetrachloroethene) to the cell casing or its unions, as damage may occur and void warranty.
11. **WARNING:** Store ALL chemicals AT LEAST 1 metre (3.2 feet) away from the WATERMAID® chlorinator and ensure the area is well ventilated.

Retain Owner's Handbook for future reference.

3. INSTALLATION

The installation of the chlorinator should be carried out by a suitably qualified person in accordance with the Australian wiring rules AS/NZS 3000. The WATERMAID® Power Supply should be located within the correct pool zone in accordance with AS/NZS 3000 and connected to the mains supply via an outlet that is protected by a residual current device (RCD) with a rating that does not exceed 30mA. The power outlet should have a degree of protection suitable for the pool zone. Ensure that equipotential bonding of all parts of the pool installation is carried out.

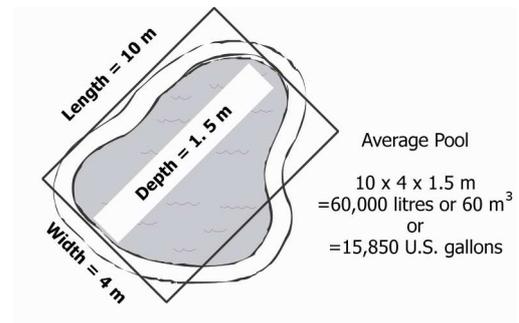
US and Canadian models require a qualified electrician to hard wire the chlorinator to run in conjunction with the pump.

Incorrect installation may result in failure and may also void warranty.

(I) CALCULATE THE SALT REQUIREMENT

The size of a pool determines the amount of salt to add. If the pool shape is rectangular, then the length, breadth and average depth are multiplied. If the pool has an irregular shape, then the average of the measurements can be taken.

Pools that have used liquid chlorine for many years prior to having a chlorinator may already have a significant salt level in the water. It is advisable to check the salt level before adding salt. This can be done by either using a WATERMAID® hydrometer or taking a sample of water to a pool shop.



The QT300, XT300, EZ300 and VTR300 Cells require a 6000 ppm* salt level. If there is no salt in the pool already, then the amount of salt required is worked out by the following calculation:

$$\text{SALT REQUIRED (kg)} = \text{POOL VOLUME (Litres)} \times 0.006 \text{ or}$$

$$\text{SALT REQUIRED (lb)} = \text{POOL VOLUME (U.S. gal)} \times 0.006 \times 8.3468$$

The QT400 and XT400 Cells require a 4000 ppm* salt level. If there is no salt in the pool already, then the amount of salt required is worked out by the following calculation:

$$\text{SALT REQUIRED (kg)} = \text{POOL VOLUME (Litres)} \times 0.004 \text{ or}$$

$$\text{SALT REQUIRED (lb)} = \text{POOL VOLUME (U.S. gal)} \times 0.004 \times 8.3468$$

For a pool that already has salt in it, calculate:

$$\text{SALT REQUIRED (kg)} = (\text{DESIRED SALT LEVEL} - \text{SALT LEVEL ALREADY IN POOL}) \times \text{POOL VOLUME (Litres)}$$

* ppm = "parts per million". e.g. 6,000 ppm = 6,000 / 1,000,000 = 0.006

(II) ADDING SALT

Empty the contents of the required salt bags into the shallow end of the pool. Run the filter and pump simultaneously to circulate the water and dissolve the salt. If the WATERMAID® chlorinator has already been installed, the switch on the underside should be turned off while salt is dissolving.

Quality pool salt (with low levels of iron and other impurities) should be used. Finer grades dissolve faster. Salt may take 24 - 48 hours to dissolve in summer and longer in winter. Alternatively, sea water may be used. The salt bag should not be thrown into the pool as chemicals and inks can interfere with the water balance.

WARNING: Never add chemicals directly to the skimmer basket as this may damage the Cell.

(III) MOUNT THE WATERMAID® POWER SUPPLY

The WATERMAID® Power Supply MUST be installed AT LEAST 3 metres (10 feet) from the inside pool wall. Ideally it should be enclosed within a splash-proof housing (e.g. filter box) and mounted in a position that complies with local electrical regulations.

- (i) Locate a suitable position for the WATERMAID® Power Supply which allows for box dimensions of 240 mm wide x 320 mm high x 130 mm deep (9.4 x 12.6 x 5.1 inches respectively). Leave a gap of at least 20 mm (0.8 inches) between the top of the WATERMAID® Power Supply and any structure or fitting above.
- (ii) Mounting onto brick work:
 - » Drill two 8 mm (0.3 inches) diameter holes, 30 mm (1.2 inches) deep that are 156 mm (6.1 inches) apart and level.
 - » Insert two 8 mm (0.3 inches) diameter wall plugs into the holes drilled.
 - » Place the screws through the holes of the bracket and into the wall plugs, and then tighten.
- (iii) Mounting onto timber:
 - » Drill two 4 mm (0.2 inches) diameter holes into the timber, 30mm (1.2 inches) deep, that are 156 mm (6.1 inches) apart and level.
 - » Place the screws through the holes of the bracket and tighten.
- (iv) Lift the WATERMAID® Power Supply onto the bracket ensuring that it is secure on the wall.

WARNING: The appliance must be installed so that the power cord and plug are accessible.

(IV) INSTALL THE WATERMAID® CELL

Before installing the Cell:

- (i) Unplug the pump and WATERMAID® Power Supply. This is advisable so that the pump will not start inadvertently if a time clock already exists.
- (ii) If the pool equipment is located below the actual pool, close off any necessary valves. Alternatively, if there are no valves, block off the inlet and outlet with rubber stoppers.

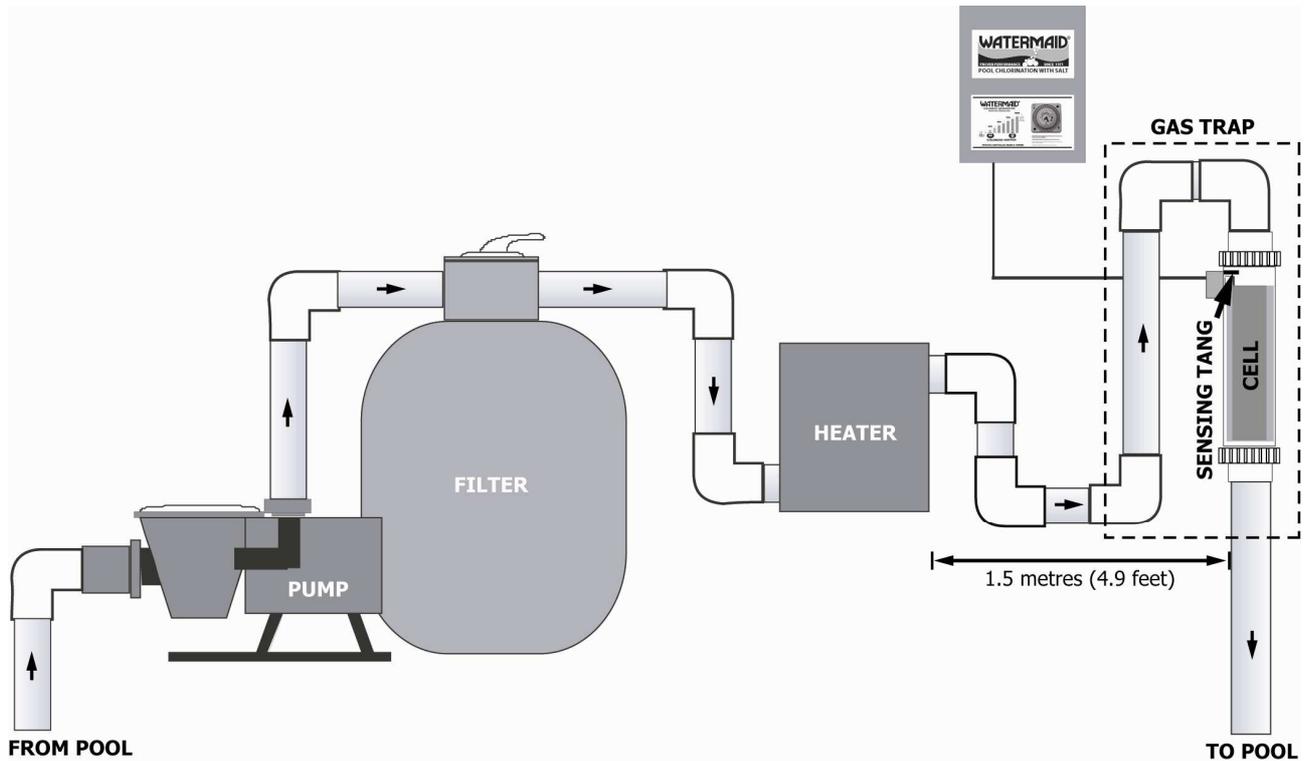
The WATERMAID® Cell should then be installed as per the model-relevant installation diagram given below.

Cell Model	Relevant Installation Diagram
QT300	Vertical Full Flow, Horizontal Full Flow or QT Venturi
QT400	Vertical Full Flow, Horizontal Full Flow or QT Venturi
XT300	Vertical Full Flow or Horizontal Full Flow
XT400	Vertical Full Flow or Horizontal Full Flow
EZ300	EZ / VTR Venturi
VTR300	EZ / VTR Venturi

Please note: The QT Cells are packed with the "Full Flow" installation pieces as standard. If the QT Venturi installation is required, then additional installation pieces are needed, which are available from Watermaid Pty Ltd.

WATERMAID®

VERTICAL FULL-FLOW INSTALLATION QT & XT CELLS



For QT & XT Cells, a **GAS TRAP** must be installed to prevent the accumulation of hydrogen gas in the filter if the pump ever fails.

The Cell must be installed so that ALL the water from the filter passes through the Cell BEFORE any diversions or breakouts to devices such as dual outlets, spa lines and pressure type cleaners.

The Cell must be installed AFTER any heater and a distance of AT LEAST 1.5 metres (4.9 feet) away from the heater, otherwise distortion to the Cell casing may occur.

Use TYPE P PRESSURE SOLVENT CEMENT (glue).

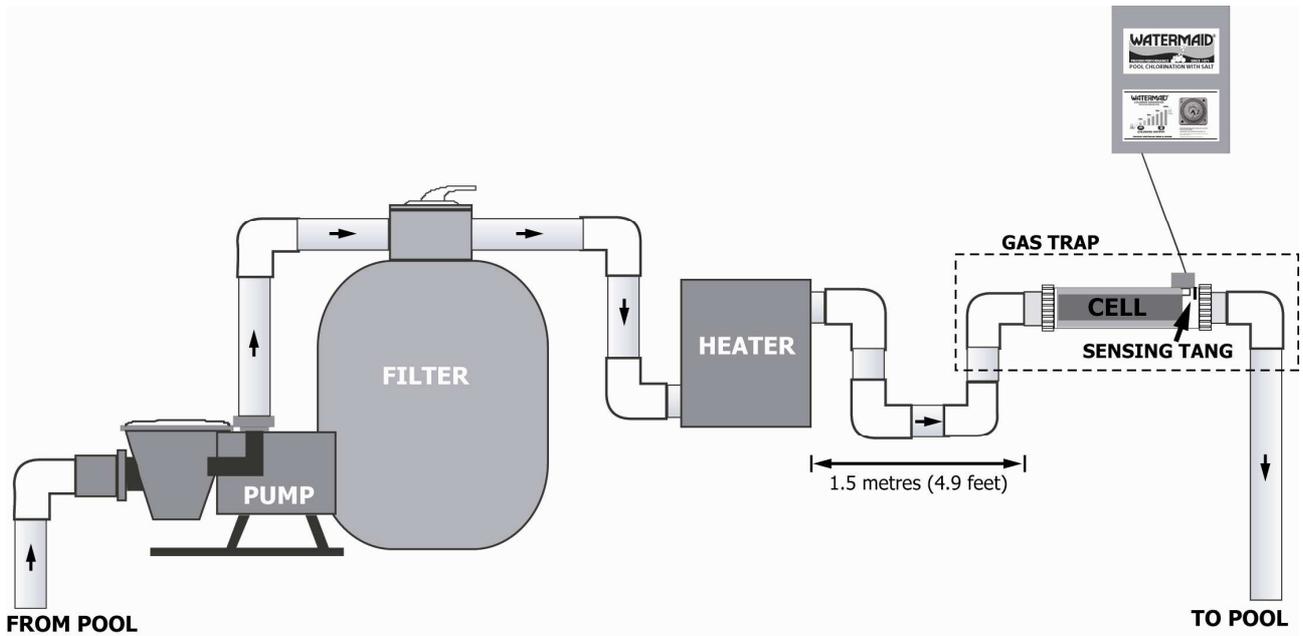
Ensure the **SENSING TANG** is positioned at the HIGHEST POINT.

WARNING: Improper installation or operating the WATERMAID® electrolytic chlorinator model WM40 without adequate water flow through the Cell can cause a build-up of flammable gases, which can result in FIRE or EXPLOSION.

WATERMAID®

HORIZONTAL FULL-FLOW INSTALLATION

QT & XT CELLS



For QT & XT Cells, a **GAS TRAP** must be installed to prevent the accumulation of hydrogen gas in the filter if the pump ever fails.

The Cell must be installed so that ALL the water from the filter passes through the Cell BEFORE any diversions or breakouts to devices such as dual outlets, spa lines and pressure type cleaners.

The Cell must be installed AFTER any heater and a distance of AT LEAST 1.5 metres (4.9 feet) away from the heater, otherwise distortion to the Cell casing may occur.

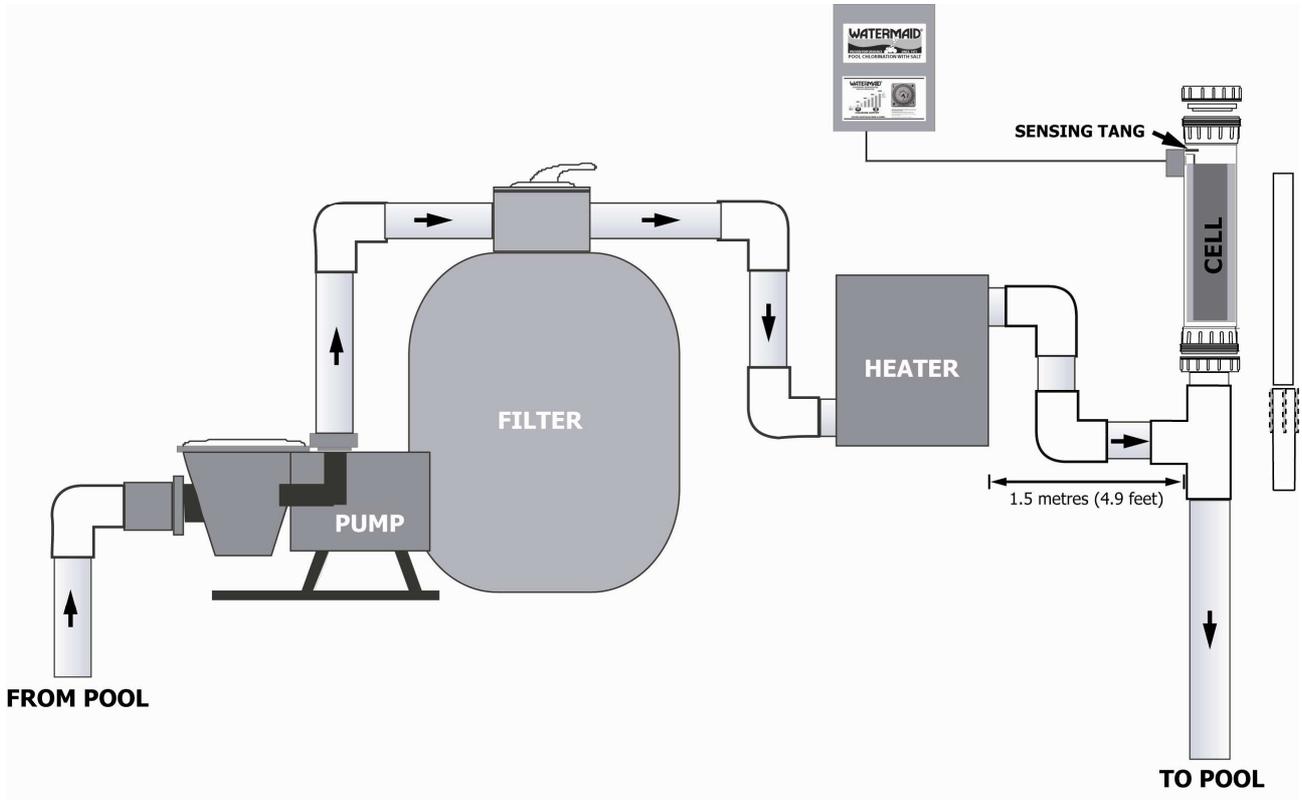
Use TYPE P PRESSURE SOLVENT CEMENT (glue).

Ensure the **SENSING TANG** is positioned at the HIGHEST POINT.

WARNING: Improper installation or operating the WATERMAID® electrolytic chlorinator model WM40 without adequate water flow through the Cell can cause a build-up of flammable gases, which can result in FIRE or EXPLOSION.

WATERMAID®

QT VENTURI INSTALLATION



Please note: The QT Cells are packed with the "Full Flow" installation pieces as standard. If the QT Venturi installation is required, then additional installation pieces are needed, which are available from Watermaid Pty Ltd.

The Cell must be installed so that ALL the water from the filter passes through the Cell BEFORE any diversions or breakouts to devices such as dual outlets, spa lines and pressure type cleaners.

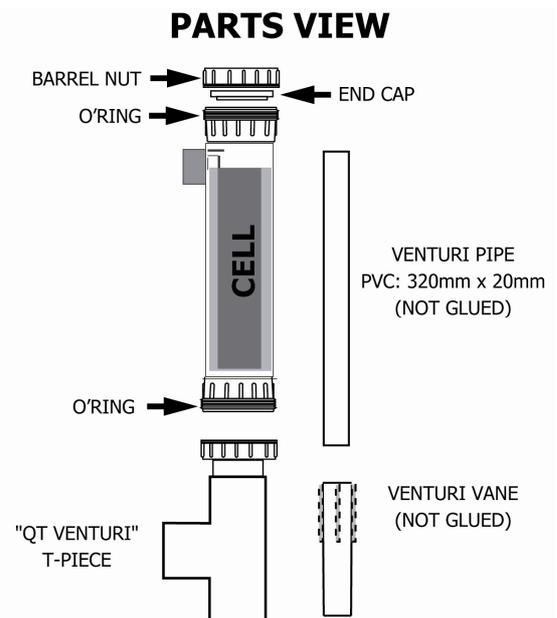
The Cell must be installed AFTER any heater and a distance of AT LEAST 1.5 metres (4.9 feet) away from the heater, otherwise distortion to the Cell casing may occur.

Use TYPE P PRESSURE SOLVENT CEMENT (glue).

Ensure the **SENSING TANG** is positioned at the HIGHEST POINT.

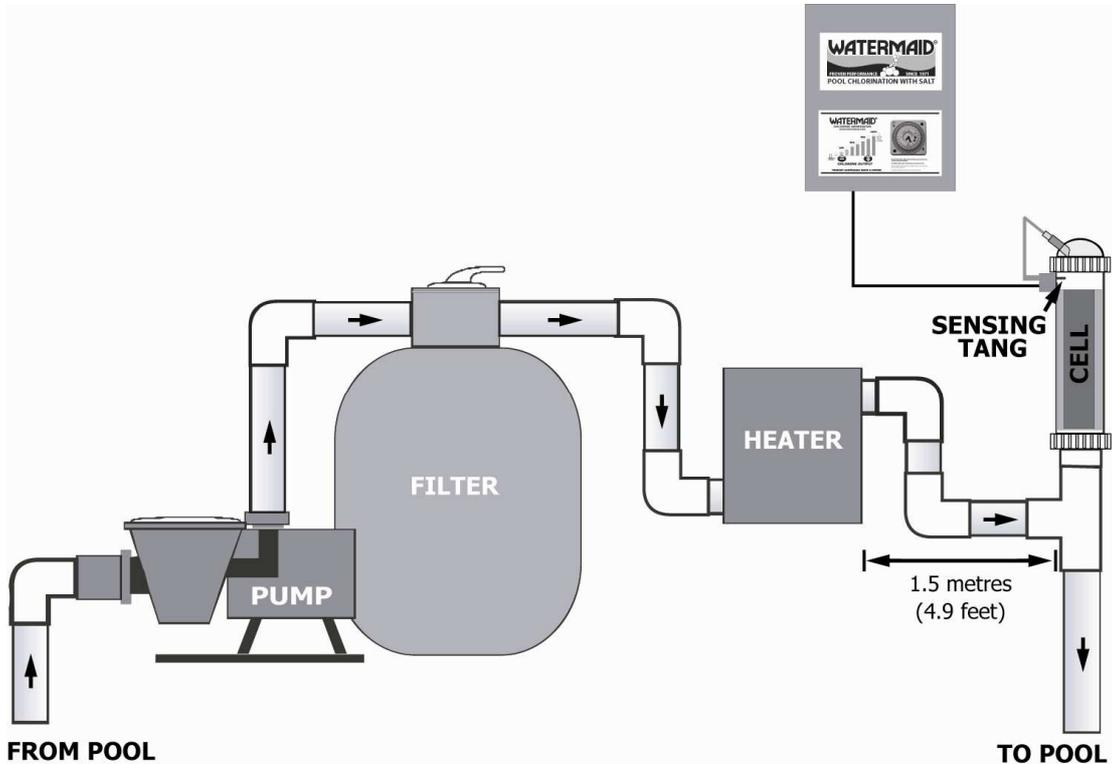
Note: This method of installation incorporates a gas trap into the design.

WARNING: Improper installation or operating the WATERMAID® electrolytic chlorinator model WM40 without adequate water flow through the Cell can cause a build-up of flammable gases, which can result in FIRE or EXPLOSION.



WATERMAID®

EZ & VTR VENTURI INSTALLATION



The Cell must be installed so that ALL the water from the filter passes through the Cell BEFORE any diversions or breakouts to devices such as dual outlets, spa lines and pressure type cleaners.

The Cell must be installed AFTER any heater and a distance of AT LEAST 1.5 metres (4.9 feet) away from the heater, otherwise distortion to the Cell casing may occur.

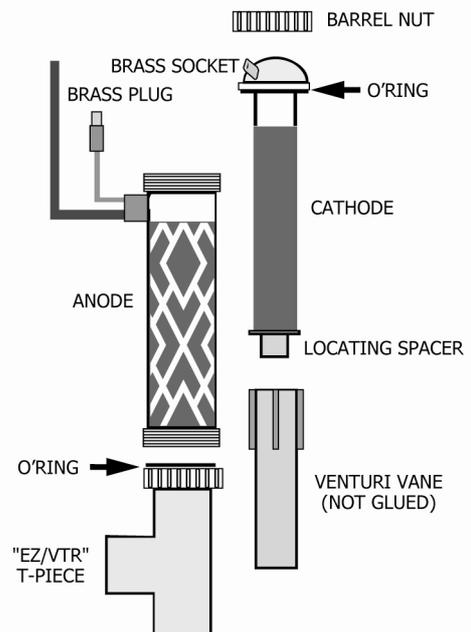
Use TYPE P PRESSURE SOLVENT CEMENT (glue).

Ensure the **SENSING TANG** is positioned at the HIGHEST POINT.

Note: EZ and VTR Cells incorporate a gas trap in their vertical design.

WARNING: Improper installation or operating the WATERMAID® electrolytic chlorinator model WM40 without adequate water flow through the Cell can cause a build-up of flammable gases, which can result in FIRE or EXPLOSION.

EZ300 PARTS VIEW

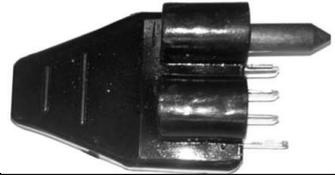


(V) CONNECTION OF CELL TO POWER SUPPLY

(i) Plug Connection

Insert the plug from the Cell into the socket located on the underside of the WATERMAID® Power Supply.

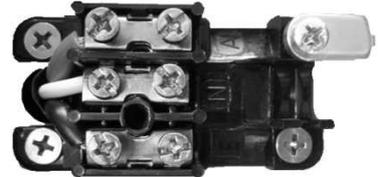
Pull the metal clip over the plug to secure it into place.



(ii) Junction Box Connection

The three wires from the WATERMAID® Cell will need to be connected correctly to the wires from inside the WATERMAID® Power supply, at the junction box (right) located on the underside of the WATERMAID® Power Supply.

IMPORTANT: Use a flat head screwdriver to screw up the brass terminals.



The wires should be matched as follows:

CURRENT MODELS

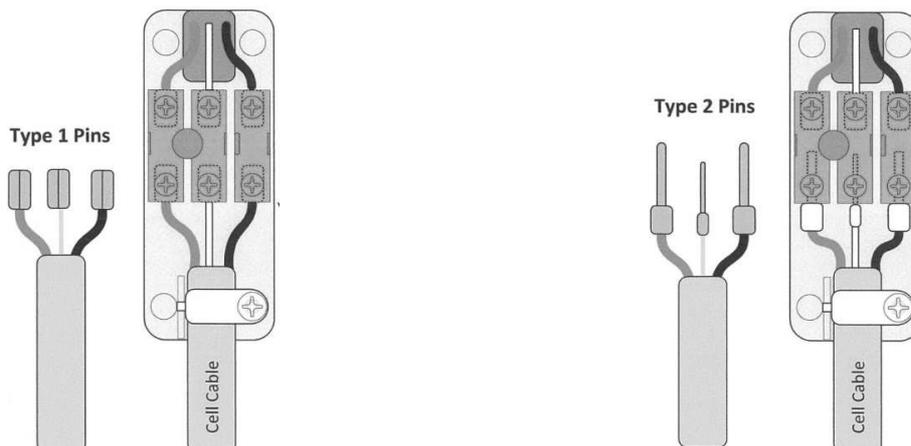
CELL WIRES		POWER SUPPLY WIRES
RED	to	RED
WHITE	to	WHITE
BLACK	to	BLACK

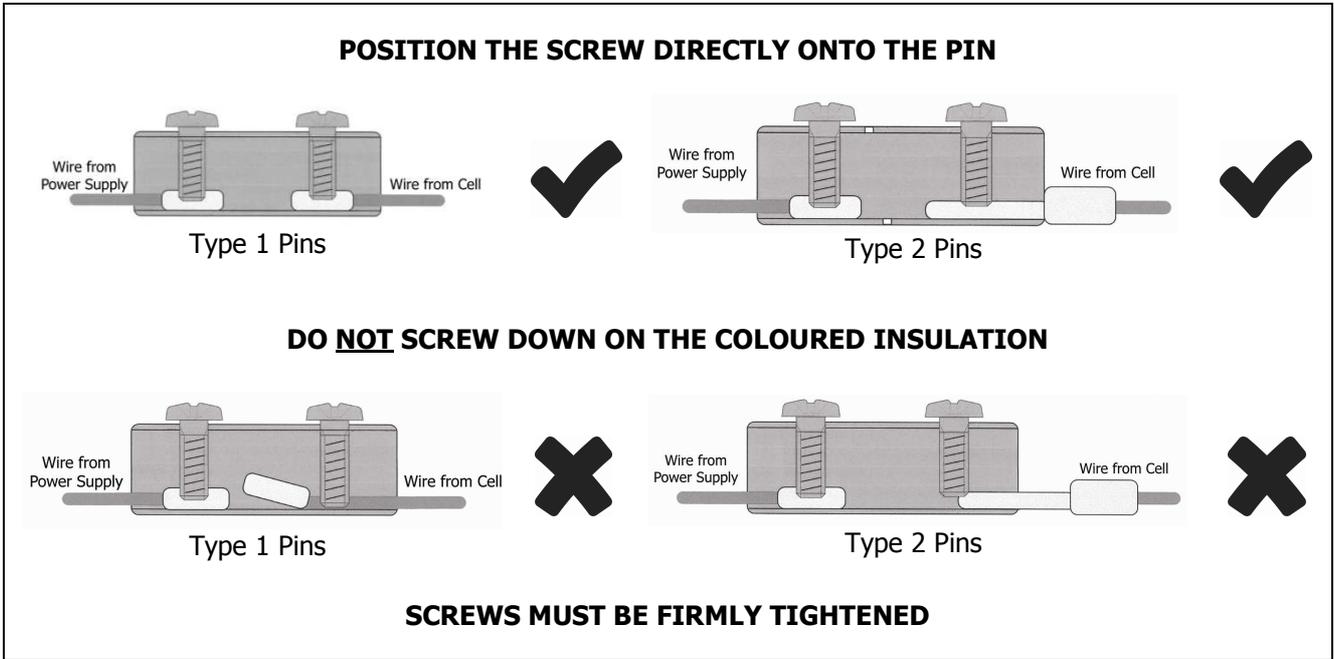
OLDER MODELS

CELL WIRES		POWER SUPPLY WIRES
BROWN	to	RED
WHITE	to	WHITE
BLUE	to	BLACK

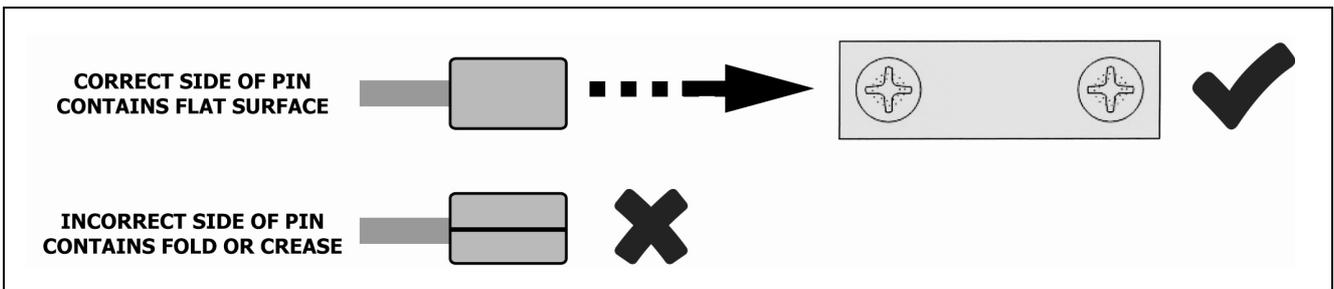
WARNING: Ensure the wires are connected using the correct colours, otherwise damage to the Power Supply and/or Cell may occur.

There are currently two types of pins used for the ends of the Cell wires (see diagram below):





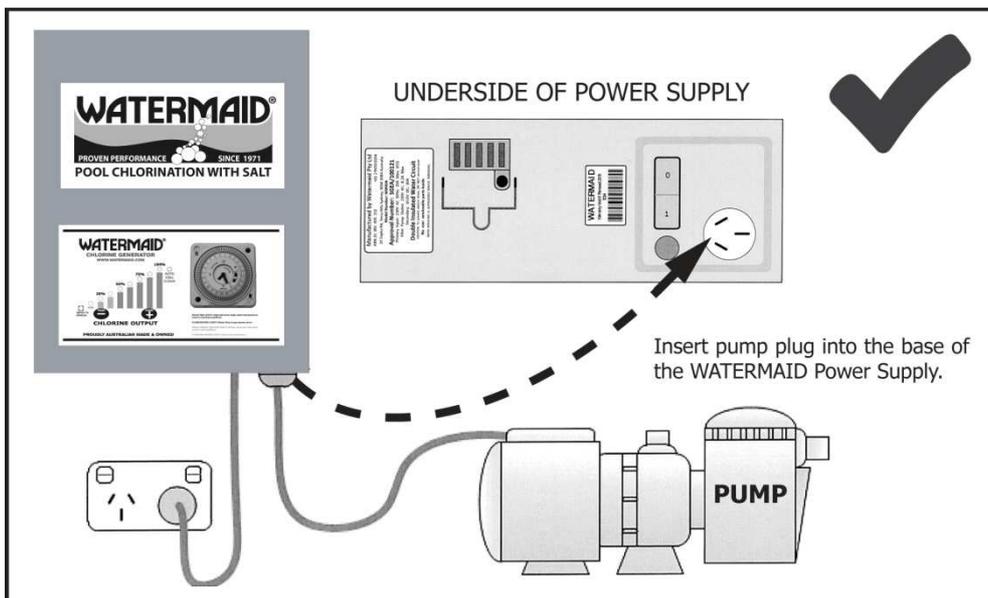
TYPE 1 pins have a flat surface on one side of the pin and a fold or crease on the other side of the pin. **ENSURE SCREWS ARE TIGHTENED ON THE FLAT SIDE OF THE PIN** (see below).

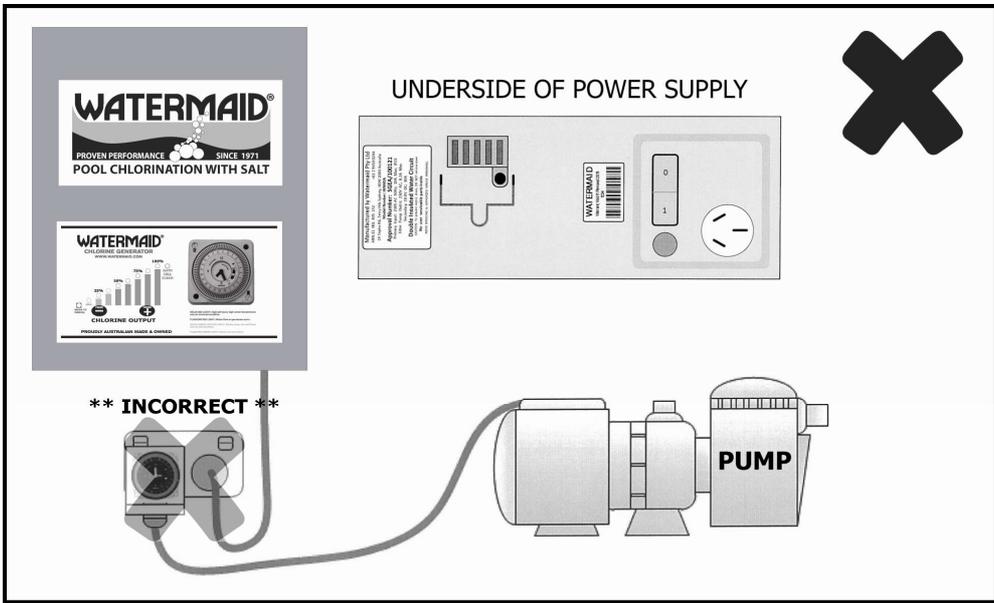
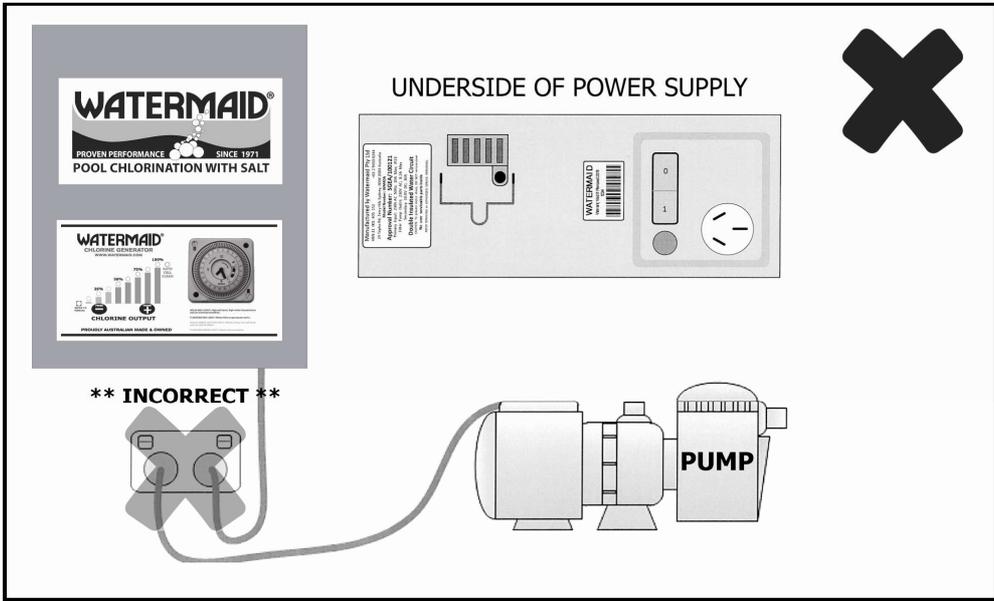


WARNING: If the pins are damaged or missing, do not tighten screws directly onto bare wires as they may overheat and burn.

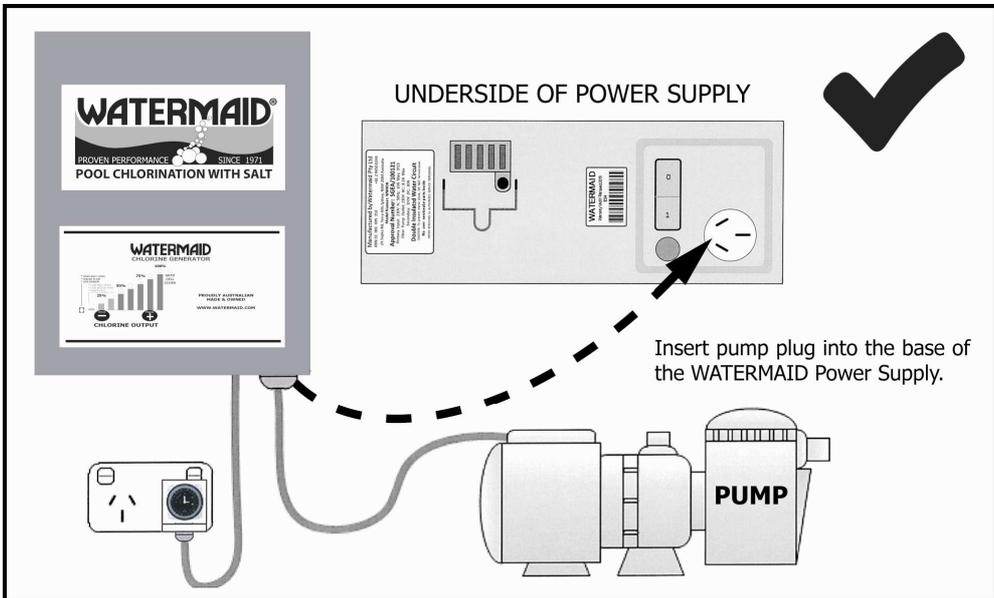
(VI) CONNECT TO THE POWER OUTLET

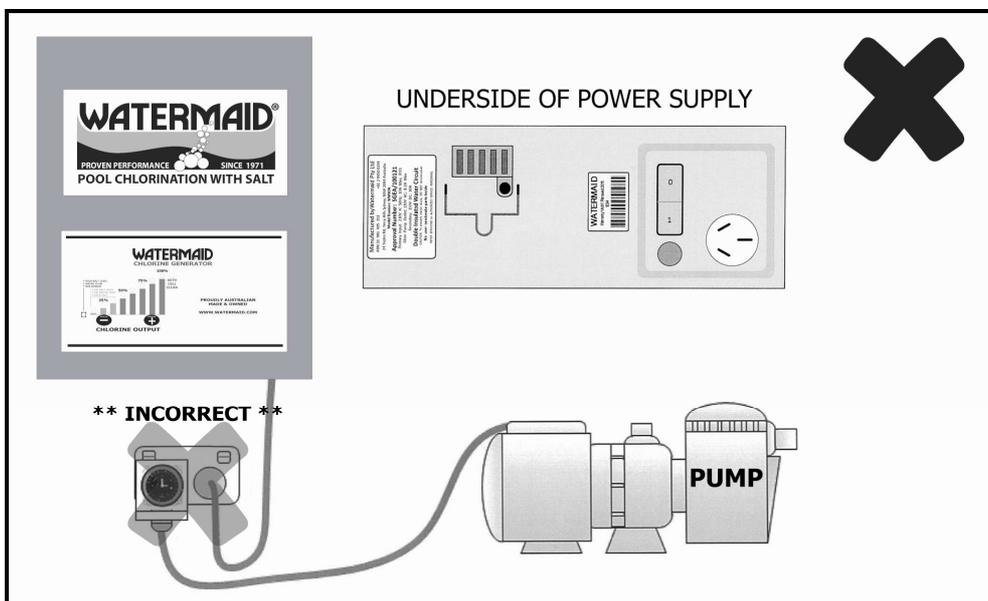
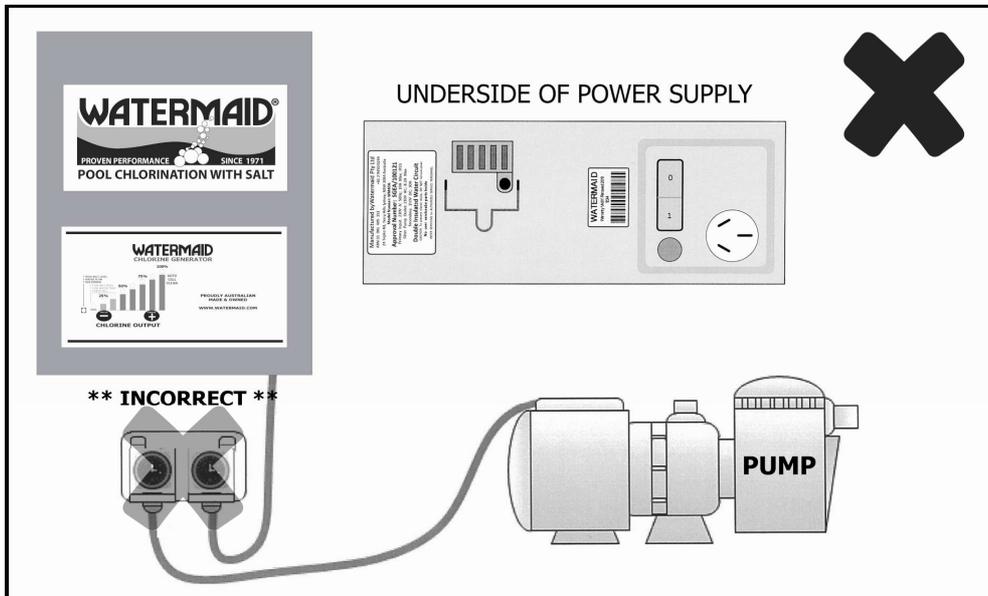
Australian & European TIME CLOCK Models





Australian & European STANDARD Models





U.S. & Canadian Models

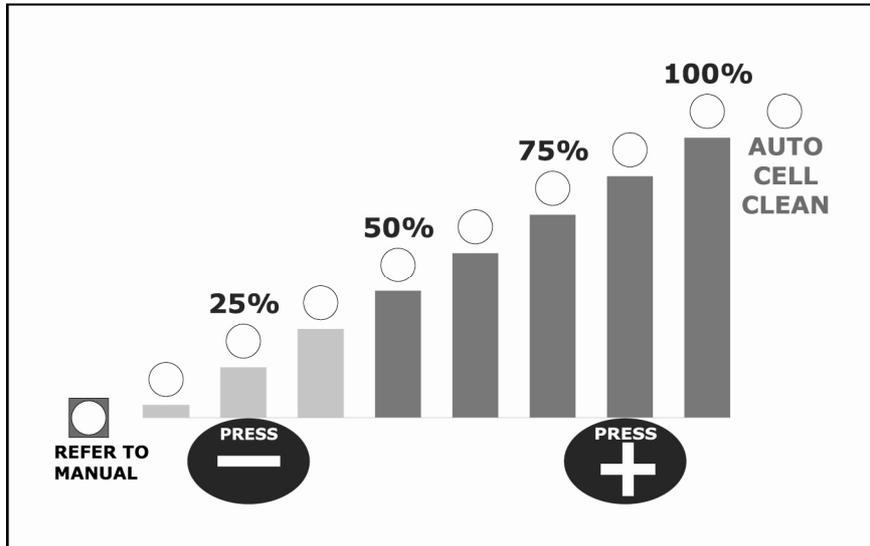
The WATERMAID® power cord should be hard wired by a qualified electrician to run in conjunction with the pump.

WARNING: The electrical power outlet must be hard wired by a qualified electrician so that no power is available to the unit if the pump is off.

4. THE WATERMAID® POWER SUPPLY

(I) CHLORINE PRODUCTION SCALE

The chlorine production scale (as pictured below) on the WATERMAID® Power Supply indicates how much chlorine per hour the unit is producing.



100% chlorine production will be shown by 3 amber AND 5 solid green lights simultaneously and is dependent on:

- (i) **Salt Level**
- (ii) **Water Temperature**
- (iii) **Cell size, age and condition**

The "+" and "-" buttons on the scale can be used to increase or decrease chlorine production, however this will depend on the above factors.

It is important to note:

- » Less chlorine is produced at lower salt levels and lower water temperatures.
- » A Cell with larger electrodes will produce more chlorine than a Cell with smaller electrodes.
- » As the Cell electrodes wear out, less chlorine will be produced each subsequent year.
- » Less chlorine will be produced from a Cell that is clogged with scale, as water flow may be restricted.

The maximum the WATERMAID® chlorinator can produce is 30 grams per hour of 100% available chlorine.

At 6000 ppm salt and 20°C (68°F) water temperature, a new QT300, XT300, EZ300 or VTR300 Cell should run at 100%.

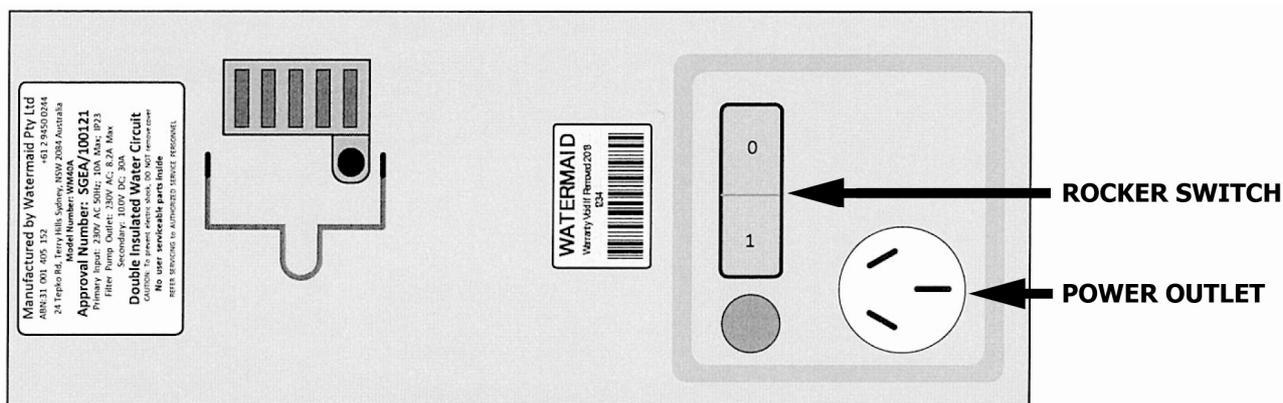
At 4000 ppm salt and 20°C (68°F) water temperature, a new QT400 and XT400 Cell should run at 100%.

Pools in hotter climates will need to compensate for the warmer water temperature with a lower salt level, of no more than around 4000 ppm.

For further explanation of the display lights on the WATERMAID® Power Supply, please refer to the [troubleshooting](#) section at the back of this handbook.

(II) ROCKER SWITCH

Located on the underside of the WATERMAID® Power Supply is an integrated rocker switch / circuit breaker. In the event of a power surge or current overload to the unit, this switch will need to be turned on again. In the diagram below, the '0' symbolises the "off" position and the '1' symbolises the "on" position.



It is recommended that this switch be turned off when dissolving salt, backwashing the filter, draining the pool or any other time when there is inadequate water flowing through the Cell.

(III) POWER OUTLET

The power outlet (Australian and European models only) on the underside of the WATERMAID® Power Supply is designed to power ONE pool pump only.

This power outlet is rated to a MAXIMUM of 10 amps and should not be overloaded with more than one device. Exceeding the outlet rating is not covered by warranty.

5. AUTO CELL CLEANING

The WATERMAID® Power Supply is programmed to perform the following cycle:

- (i) Once water is flowing through the Cell, the unit will produce chlorine for approximately 1 hour.
- (ii) Auto Cell Clean for 5 minutes (indicated by a blue flashing light).
- (iii) Perform a quick check for errors (indicated by a red flashing light). If an error is encountered, please refer to the [troubleshooting](#) guide at the back of this handbook.
- (iv) Repeat steps (i), (ii) and (iii) until the WATERMAID® Power Supply is turned off.

For optimum performance from the WATERMAID® chlorinator, it is recommended that 25 kg (55 lb) per year of magnesium chloride be added to the pool. Refer to section 7 for more information.

6. THE TIME CLOCK

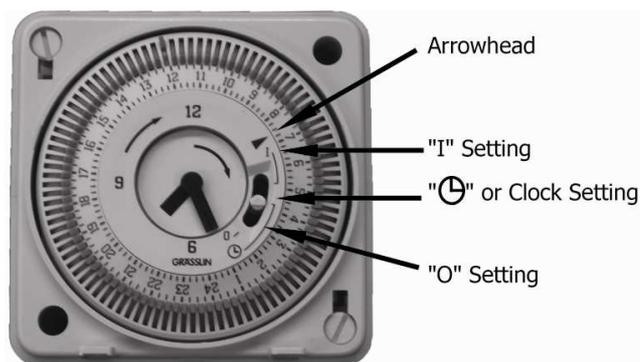
It is recommended that a time clock be used to control the pump and WATERMAID® chlorinator.

The current model of time clock (pictured right) on the front of the WATERMAID® Power Supply, has 3 settings which are as follows:

"I" setting = chlorinator will stay ON until it is manually switched off.

"⌚" setting (position in the middle) - chlorinator will operate according to the time clock's programmed settings.

"O" setting - chlorinator will stay OFF until it is manually switched on. There is still power to the unit in this mode.



- *One revolution equals a 24-hour cycle.
- *The time is in 24 hour time (e.g. 18=6pm).
- *Each pin equates to a 15 minute interval.

TO SET THE TIME CLOCK

First turn off the power to both the WATERMAID® chlorinator and pump so that neither starts nor stops erratically whilst the time clock is being adjusted.

- Set the current time by turning the clock face in a clockwise direction so that the current time aligns with the arrowhead located at the top right of the time clock.
- Set the desired times for the chlorinator to switch on and off (refer to section 9 "Running Times") by aligning the pins as follows:

For ON settings, slide the pins away from the centre of the time clock.
For OFF settings, slide the pins towards the centre of the time clock.

- Now position the switch to the middle setting "⌚" (to run according to the time clock settings).

Please note: If the time clock on the WATERMAID® Power Supply is different to the one pictured above and has just two settings, only the "I" and "⌚" settings will be applicable.

7. THE WATERMAID® CELL

To ensure compatibility with the WATERMAID® WM40 Power Supply, only a genuine WATERMAID® replacement Cell should be fitted.

(I) RESIDUAL CHLORINE

To ensure a clean clear pool, there should be a residual of chlorine between 1 and 3 ppm, or for a spa, between 3 and 5 ppm. The chlorine level can be tested by taking a sample of water directly from the outlet flow, which should be greater than elsewhere in the pool by approximately 0.5 ppm.

(II) SCALE FORMATION

If the pool surface is fibreglass, fibreglass concrete, painted concrete, vinyl-lined, epoxy coated or some similar inert surface, then scale can only originate from the water supply or chemicals that have been added to the pool; and is therefore usually insignificant.

If the pool surface is marblesheen, pebble, quartzon or tiled, then scale can originate from the water supply, chemicals added to the pool or minerals that leach out of the walls.

It has been observed for many years, that salt chlorination Cells used in sea water conditions rarely foul up with hard crystalline deposits. The soft mushy deposit in these Cells can usually be cleaned with simply a strong jet of water.

By contrast, Cells used in marblesheen, pebble, quartzon or tiled pools that have had calcium hypochlorite (for hardness) or copious amounts of hydrochloric acid ("pool acid") added to the water, continually foul up with hard deposits which are difficult to remove from the electrodes. Usually, this can only be done by use of a dilute acid solution.

Deposit or "scale" is usually calcium carbonate, but can include traces of other compounds. It can stop the Cell from working within a few days, which over time can shorten the life of the Cell.

Sea water usually contains around 1700 ppm calcium and 400 ppm magnesium, whereas many swimming pools normally contain up to 400 ppm calcium but no magnesium. It has been noted that after the addition of magnesium, to a level of about 20 ppm or up to one quarter the level of calcium, Cells begin to mimic sea water conditions and the effect can last some 6 to 12 months.

It is strongly recommended that 25 kg (55 lb) of magnesium chloride be added to the pool water each year so that any build-up formed during the process of electrolysis remains soft and mushy, and thus easily removed. All 25 kg (55 lb) may be added at the one time.

Avoid the over-use of hydrochloric acid for pH balancing. In alkaline-surfaced pools, too much acid can dissolve calcium from the pool walls causing damage and contribute to excessive build-up on the Cell electrodes. Alternatively, the use of pH buffer (sodium bicarbonate) can stabilise these pools between 7.4 and 7.8. Alkaline pool surfaces include marblesheen, quartzon, tiled and pebblecrete.

Do NOT add any products containing calcium to the pool as this will increase the build-up on the Cell electrodes. Products containing calcium include granular chlorine and chemicals for hardness (e.g. calcium chloride). **Ideally the calcium level should be kept below 120 ppm.**

A calcium level above 200 ppm is considered excessive. To lower the calcium level, empty some water from the pool and top up with tap water or collected rain water. The salt will then need to be adjusted to the appropriate level.

As mentioned earlier in section 4, chlorine production is dependent on salt level and water temperature, as well as the age, size and condition of the Cell. The amount of scale that forms on a Cell can not only affect the amount of chlorine able to be produced (as it can restrict water flow), but also the life of the Cell. The more scale on the Cell electrodes, the less chlorine that is able to be produced and the shorter the Cell life.

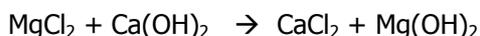
It is important to check periodically for scale on the Cell electrodes and, if significant, the electrodes should be cleaned, otherwise damage may result. The procedure for manually cleaning the Cell is given below.

As each pool situation is different, the amount of build-up that is generated will also differ. It is important for pool owners to maintain water balance (refer to [section 11](#)).

(III) WHY USE MAGNESIUM CHLORIDE?

When magnesium chloride (in water) is in the presence of calcium hydroxide (which is formed on the Cell during electrolysis), the chloride ion is exchanged with the hydroxide ion. Consequently, the magnesium hydroxide formed in the Cell is a soft and mushy precipitate, which does not foul the Cell; and the calcium remains soluble in the water.

The process that occurs is as follows:



Magnesium sulphate is not recommended as it may exacerbate any pre-existing cracks in concrete or alkaline surfaced pools (marblesheen, pebble, quartzon and tiled).

(IV) CLEANING THE CELL MANUALLY

1. Turn off the power to the chlorinator and pump. The Cell may be left connected to the Power Supply during cleaning, if the power has been switched off.
2.
 - a. For QT, XT and VTR Cells: Remove the Cell from the pipe work. Please Note: Barrel nuts at the top of the Cell will unscrew anti-clockwise and barrel nuts at the bottom of the Cell will unscrew clockwise.
 - b. For EZ Cells: Remove the centre electrode by unplugging the brass connector at the top and unscrewing the barrel nut anti-clockwise. Remove the scale from the centre electrode by using a strong jet of water or by wiping it clean with a rag. If the centre electrode is unable to be removed, then unscrew the barrel nut at the bottom of the Cell clockwise and remove the entire Cell for cleaning.

Please Note: If the barrel nut is difficult to unscrew, the use of rubber gloves will give a better grip. Alternatively, pour some hot (not boiling) water over it. A small amount of Vaseline over the thread for next time may make removal easier.

3.
 - a. For QT and XT Cells: Fit an end cap and barrel nut to block off one end.
 - b. For EZ and VTR Cells: Turn complete Cell upside-down and place to rest in a bucket.
4. A dilute acid solution may be mixed using the following procedure:
 - a. In a glass or strong plastic container, add 1,000 mL (2.1 pt) of warm (not boiling) water.
 - b. Wearing a pair of rubber gloves, add 100 mL (3.4 fl.oz) of hydrochloric acid to the water. WARNING: ALWAYS ADD THE ACID TO THE WATER.
 - c. Stir solution using a wooden spoon or similar. Then pour solution into the Cell.

Alternatively, white vinegar (without dilution) or a PHOSPHATE-FREE premixed "Cell-Cleaning Solution" (available from a pool shop) may be used.

5. Allow to stand for as long as the solution is effervescing (this may take several hours depending on the amount of build-up). Once the effervescing stops, the solution should be discarded. If not all the scale has been removed, then steps 4 and 5 may need to be repeated using a new solution.
6. Remove end cap and barrel nut for QT and XT Cells.
7. Rinse the electrodes with tap water.
8. Wipe the "sensing tang" clean with a rag. (The "sensing tang" is the small metal tab located above the two main electrodes, on the inside the Cell)
9. Return Cell to the pipe-work ensuring not to over tighten the barrel unions.
10. For EZ Cells, a small amount of electrically conductive grease (copper-based, if available) may be applied to the brass plug and socket to prevent corrosion, improve electrical connection and make removal easier for next time.

WARNING:

1. **NEVER pour undiluted (neat) acid directly into the Cell as damage to the Cell electrodes can occur.**
2. **Do NOT attempt to clean the mesh electrode by abrasion.**

- 3. Do NOT tap the Cell casing with ANY instruments.**
- 4. For EZ300 Cells, AVOID contact of the brass connection with the hydrochloric acid solution.**
- 5. Boiling water is NOT recommended in Cell cleaning as the casing may turn opaque.**
- 6. Always have either a hose or a bucket of water nearby for accidental spills. Please read the manufacturer's safety precautions when handling acid.**

(V) DISCONNECTING THE CELL FROM THE POWER SUPPLY

a. Plug Connection

Turn off the power to the WATERMAID® Power Supply at the power outlet.

Slide the metal clip over the plug.

Pull the plug out of the socket.

b. Junction Box Connection

Turn off the power to the WATERMAID® Power Supply at the power outlet.

Unscrew the cover of the black junction box located on the underside of the WATERMAID® Power Supply using a Phillips head screwdriver. Then unscrew the single screw holding the Cell Cable.

Using a flat head screw driver, unscrew the 3 brass screws holding the Cell wires.

To reconnect the wires, refer to section 2(V).

(VI) AGE OF THE CELL

After a number of years the active coating on the anode (mesh electrode) will wear away. At a much slower rate, the cathode (centre tube electrode) will also wear away. Calcification, acid cleaning, current density and solids in the water contribute to the wear rate of the electrodes.

Generally, the precious coating on the anode is lost at a rate of 1 microgram per amp hour. This means a WATERMAID® Cell should have an average 5 - 8 year life. **As the Cell wears out, it is normal to see a decrease in chlorine output.**

To check the Cell's performance, place it in a 25 litre (6.6 U.S. gal) bucket of pool water with 6000 ppm salt at 20°C (68°F). The EZ300 Cell's brass connection should not be submersed. Ensure the pool water covers the entire surface area of the electrodes. The Cell should produce a 1 ppm chlorine reading within 5 seconds. If the Cell fails this test and it has been cleaned, then a new Cell may be needed.

WARNING:

- 1.** The use of undiluted (neat) acid on the electrodes can damage electrodes and drastically shorten Cell life. Electrodes damaged by acid are evident by white patches on the mesh.
- 2.** Heavily encrusted electrodes can damage the electrodes and shorten Cell life. Ensure electrodes are inspected regularly and cleaned when required.
- 3.** Poor/restricted water flow can lead to overheating of the Cell. An overheated Cell's casing will turn white and opaque.

These three instances are NOT covered by warranty.

(VII) RESTRICTED WATER FLOW AND THE CELL

If water flow is restricted (e.g. in the case of blocked skimmers, closed valves, draining the pool or during backwashing), the switch on the underside of the WATERMAID® Power Supply as well as the pump should be turned off to prevent damage to the pool equipment. See section 13 for Backwashing Procedure.

8. SALT LEVEL

At the beginning of the swimming season, the salt level should be checked to ensure that it is correct. That is:

*** 6000 ppm (0.6 %) for WATERMAID® QT300, XT300, EZ300 and VTR300 Cells, or**

*** 4000 ppm (0.4 %) for WATERMAID® QT400 and XT400 Cells**

Each year, approximately one-third of pool water is lost, so the salt level will need to be adjusted accordingly. Refer to [section 3\(ii\)](#) for calculating how much salt to add.

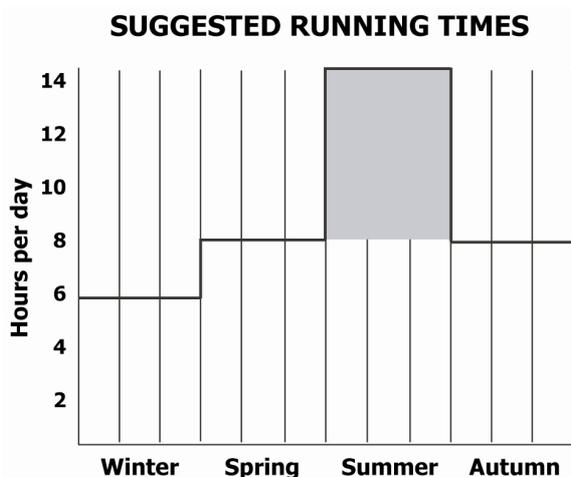
Salt is NOT lost by the process of electrolysis, nor when water evaporates. It is lost, only in the following ways:

1. Backwashing - after 20 backwashes approximately 1 bag of salt is lost.
2. Pool over-flow (rainfall, flooding etc).
3. Splash-out from bathers.
4. A leak in the pool or plumbing.

A salt level of 9000 ppm is isotonic with body tissue, and in the case of accidental immersion, water at close to this level (i.e. 6000ppm) will cause less damage to lungs and other body organs than water without salt.

9. RUNNING TIMES

Ideally, the time clock should be set to operate the WATERMAID® chlorinator from late afternoon (when the sun is off the pool) to continue throughout the night as necessary. As UV rays destroy chlorine, a chlorine stabiliser is recommended during summer for outdoor pools [refer to [section 1\(b\)](#)].



Running times will depend on pool volume, bather load, water temperature, time of year, pump efficiency, salt level, Cell age and condition, cyanuric acid levels, pH, sunlight, water chemistry and the effects of surrounding vegetation.

Suggested running times for an average-sized domestic pool are shown in the chart (left). **During summer, between 8 and 14 hours per day is recommended.**

In addition to normal running times, the WATERMAID® chlorinator, pump and filter should be run whenever bathers are in the pool.

If a **solar heater** is installed and running times are set for chlorination and filtration in the daytime, then extra chlorination in non-sunlight hours may be required.

The running times will need to be adjusted and the pool monitored with each change of season.

On a monthly basis in summer the WATERMAID® chlorinator, filter and pump should be run non-stop for at least 24 hours to **super chlorinate** and maintain a high polish in the pool.

The overall aim of sufficient running times, operation during bather hours and super chlorination is to produce a chlorine reading of 1 - 3 ppm. The finest detail must be discernible at the bottom of the deep end of the pool.

Running times for spas are dependent on the bather load of the spa. Daily testing initially will help determine the required running times. The overall aim of sufficient running times and operation during bather hours is to produce a chlorine reading of 3 - 5 ppm.

Public pools may require multiple chlorinators, pumps and filters, as well as 24-hour operation of the pool equipment.

A good 'rule of thumb' is 1 kg (2.2 lb) of 100% available chlorine per 20 bather hours (2 people/10 hrs etc).

10. ZERO CHLORINE

If the recommended level for residual chlorine cannot be obtained, check the following:

- (I) If an algaecide with main constituent "benzalkonium chloride" has been added to the pool within the last 4 weeks. Most algaecides contain ammonium compounds (approximately 20%), which will react with chlorine to leave a zero chlorine reading in the water. As a guide, about nine (9) times the amount of ammonium compound AS CHLORINE will need to be produced or added before there is a free chlorine level in the water. Any debris in the water will need additional chlorination.
- (II) If the filter is functioning properly. Take a sample of pool water in a clear glass and hold it up to the light. Floating debris will indicate that unfiltered water is getting back into the pool. Please note: The sand in a sand filter should be replaced around every 5 years as the edges become rounded over time due to the constant abrasion during filtering and will not work as effectively.
- (III) The bather load. With sufficient running times, the WATERMAID® chlorinator should be able to maintain a clean clear pool for about a 20 bather/hour ratio (e.g. 4 people/5 hrs, 10 people/2 hours etc). It is important to note that contamination from sunscreen, urine and pets will dramatically destroy the chlorine.
- (IV) Incorrect pH. Chlorine is not effective outside the correct pH range. Refer to chart, [section 1\(c\)](#).

11. THE LANGELIER INDEX

The Langelier Index was originally designed to protect boiler feed devices, such as steel boilers in steam engines, although it has been adopted by the pool industry as a means of determining non-scaling water in swimming pools. When using the Langelier Index to balance water in swimming pools with electrolytic chlorinators, never use calcium compounds; only use sodium bicarbonate or hydrochloric acid.

The Langelier Index calculation table (below) can be used to check the water balance of a pool. Readings of pH, water temperature (TF), calcium hardness (HF) and total alkalinity (AF) are needed. These readings are used to obtain the corresponding factor readings from the table (below) and then, to perform the Langelier Index calculation.

For example, if pool water had the following values; pH 7.4, temperature 24°C (or 75.2°F), calcium hardness 100 ppm, and total alkalinity 200 ppm, then the Langelier Index calculation would be worked out as follows:

Start with pH	+7.4
Add TF	+0.6
Add HF	+1.6
Add AF	+2.3

Subtract (K=12.1) -12.1
 Langelier Index = -0.2

LANGELIER INDEX CALCULATION TABLE						
Pool Water Temperature (°C) (°F)		Temp Factor (TF)	Calcium Hardness as CaCO ₃	Hardness Factor (HF)	Total Alkalinity as CO ₃	Alkalinity Factor (AF)
0	32.0	0.0	5	0.3	5	0.7
3	37.4	0.1	25	1.0	25	1.4
8	46.4	0.2	50	1.3	50	1.7
12	53.6	0.3	75	1.5	75	1.9
15	59.0	0.4	100	1.6	100	2.0
19	66.2	0.5	150	1.8	150	2.2
24	75.2	0.6	200	1.9	200	2.3
29	84.2	0.7	300	2.1	300	2.5
34	93.2	0.8	400	2.2	400	2.6
40	104.0	0.9	800	2.5	800	2.9
53	127.4	1.0	1000	2.6	1000	3.0

If the result is between -0.2 and +0.2, then the pool water is in balance.
If the result is lower than -0.2, then the pool water is corrosive.
If the result is higher than +0.2, then the pool water is scale-forming.

To rectify corrosive water, the total alkalinity will need to be raised by adding sodium bicarbonate (refer to table B, below). To rectify scale-forming water, the total alkalinity will need to be lowered by adding hydrochloric acid (refer to table A, below).

Please Note: the use of sodium bicarbonate in an inert-surfaced pool (fibreglass, fibreglass concrete, painted concrete or vinyl-lined) is unnecessary as the unchanging calcium level means that the total alkalinity becomes a function of pH and water temperature and will then find its own equilibrium with time.

The ideal water balance is:

Water Temperature	15°C - 30°C (59°F - 86°F)
PH	7.2 – 7.8
Calcium Level	60 - 120 ppm
Magnesium Level	> 20 ppm
Isocyanuric acid	30 - 50 ppm
Total Alkalinity	>150 ppm

To maintain water in balance for marblesheen, pebble, quartzon and tiled pools, the total alkalinity should be greater than 150 ppm if the pH is to be kept below 7.8. Consult tables A and B (below) to achieve the correct total alkalinity.

TO LOWER TOTAL ALKALINITY USING LIQUID POOL ACID (HYDROCHLORIC ACID)				TO RAISE TOTAL ALKALINITY USING SODIUM BICARBONATE			
LOWER ppm	POOL VOLUME IN LITRES			INCREASE ppm	POOL VOLUME IN LITRES		
	50,000	75,000	100,000		50,000	75,000	100,000
10	395mL	554mL	790mL	10	893gm	1.34Kg	1.79Kg
20	580mL	1.20L	1.60L	20	1.70Kg	2.60Kg	3.40Kg
30	1.22L	1.85L	2.45L	30	2.60Kg	3.90Kg	5.20Kg
40	1.60L	2.40L	3.20L	40	3.40Kg	5.20Kg	6.80Kg
50	2.00L	3.05L	4.00L	50	4.30Kg	6.50Kg	8.60Kg
60	2.40L	3.65L	4.80L	60	5.20Kg	7.80Kg	10.40Kg
70	2.82L	4.25L	5.65L	70	6.00Kg	9.10Kg	12.00Kg
80	3.20L	4.85L	6.40L	80	6.80Kg	10.40Kg	13.60Kg
90	3.60L	5.45L	7.20L	90	7.80Kg	11.70Kg	15.60Kg
100	4.05L	6.10L	8.10L	100	9.00Kg	13.40Kg	18.00Kg

Table A

Table B

TO CONVERT FROM
 Litres to U.S. Gallons:
 x 0.2642
 Kilograms to Pounds:
 x 2.205

12. ALGAE

A common problem for any type of pool is algae growth. There are 24,000 known types of algae, all distinguishable by being single-celled organisms capable of photosynthesis (they produce their own food), mitosis (all cells can divide) and meiosis (reproduction is possible by combining with other algal cells).

The ideal environment for algal growth is when there are periods of zero chlorine. Algae blooms can take less than a day to turn a pool green.

At the first sign of adversity, the algae population goes into a reproduction phase to produce spores. The size of these spores is less than 0.2 microns. D.E. filters are able to filter 5+ microns and sand filters are only able to filter 20+ microns.

Algae will die from doses of chlorine as low as 0.05 ppm concentration, but spores can resist chlorine levels up to 10 ppm. Domestic salt chlorinators cannot achieve such a level.

Spores, however, cannot tolerate copper salts as copper attaches to the shell or endospore preventing germination. Hence, the most effective algaecides contain copper salts. Avoid those with the main constituent 'benzalkonium chloride', which destroys chlorine.

For a few black algal spots, suspending 50 grams (1.7 oz) of stabilised chlorine in a weighted nylon bag over the trouble spots may remove them.

For a more serious algae problem, it is advisable to follow the procedure below:

1. Lower pH below 7, generally by the addition of up to 2 litres (4 pt) of pool acid, as this is an essential part of reducing algae resistance and dissolving the outer shell of the spores.
2. About 4 hours later, add a copper treatment to attain a 1 ppm copper level in the pool. An economical method is to mix about 1 heaped tablespoon of copper sulphate (approximately 70 grams or 3 oz) dissolved in 10 litres (21 pt) of water spread around the pool. Alternatively, any copper-based algaecide may be used.
WARNING: Do not swim in the pool for at least 24 hours, as the copper treatment may discolour hair and clothing.
3. After about 12 hours, a stainless steel brush and a garden hose fitted with a brass jet gurney (available from hardware stores) can be used to remove algae from the pool walls.
4. Floc the pool with a clarifier. After a few hours, a blanket of debris will settle on the pool floor and can then be vacuumed directly to waste (i.e. NOT through the filter). The switch on the underside of the WATERMAID® Power Supply should be turned OFF while vacuuming to waste. Following this procedure, the pool should gradually attain a clean, clear condition after continuous filtration and chlorination.
5. Finally, the use of lanthanum carbonate (or "Starver") is recommended to reduce the phosphorous content to less than 1 part per billion. This starves algae of an essential element for growth.

Please note: If a copper-based algaecide (which may contain nitrogen compounds such as benzalkonium chloride) or a quaternary-based algaecide is used, then a sufficient chlorine reading may be impossible to obtain for up to four (4) weeks, as chlorine is incompatible with nitrogen compounds.

As a guide, the WATERMAID® chlorinator may need to be run non-stop for several days to overcome the addition of an algaecide.

For spas, it is often best to drain, clean and refill. Follow the manufacturer's recommended procedure.

13. BACKWASHING PROCEDURE

1. Switch OFF the black switch on the underside of the WATERMAID® Power Supply (this turns off power to the Cell only).
2. Turn OFF the power to the pump:
 - i) if the WATERMAID® Power Supply has a time clock, move the small white switch on the face of the timer to the OFF position (bottom position, indicated by an "0") or
 - ii) at the electrical mains power point where the pump is plugged in.
3. Turn filter valve to BACKWASH.
4. Turn ON power to the pump and run for 3 minutes either by:
 - i) moving the small white switch on the face of the timer to ON (top position, indicated by an "I") or
 - ii) turning on the power at the mains power point where the pump is plugged in.
5. Turn OFF the power to the pump again:
 - i) if the WATERMAID® Power Supply has a time clock, move the small white switch on the face of the timer to the OFF position (bottom position, indicated by an "0") or
 - ii) at the electrical mains power point where the pump is plugged in.
6. Turn filter valve to RINSE.
7. Turn ON power to the pump and run for 20 – 60 seconds either by:
 - i) moving the small white switch on the face of the timer to ON (top position, indicated by an "I") or
 - ii) turning on the power at the mains power point where the pump is plugged in.
8. Turn OFF the power to the pump again:
 - i) if the WATERMAID® Power Supply has a time clock, move the small white switch on the face of the timer to the OFF position (bottom position, indicated by an "0") or
 - ii) at the electrical mains power point where the pump is plugged in.
9. Turn filter valve back to FILTER.
10. Turn ON power to the pump again by:
 - i) moving the small white switch on the face of the timer to TIMER (middle position, indicated by a picture of a clock) or
 - ii) turning on the power at the mains power point where the pump is plugged in.
11. Switch ON the black switch on the underside of the WATERMAID® Power Supply (to turn on the power to the Cell – for normal chlorine production). Backwash is now complete.

14. ELECTRICITY COSTS

When an Australian 240VAC model WATERMAID® chlorinator is running at full capacity, it is using 300 watts of power. [POWER (watts) = VOLTS X AMPS]

Therefore the cost to run a WATERMAID® chlorinator at full capacity is worked out using the following formula:

$$\text{COST TO RUN} = \frac{\text{No. of Watts}}{1000} \times \text{Hours Run} \times \text{Cost Per kWh}$$

For example, to run a WATERMAID® WM40 chlorinator for 10 hours per day during off-peak hours, where the current off-peak rate of electricity is 11.90 cents/kWh, the electricity cost will be:

$$\begin{aligned} &= 300 \text{ (Watts)} \div 1000 \times 10 \text{ (Hours)} \times 11.90 \text{ (kWh)} \\ &= 36 \text{ c / day} \end{aligned}$$

Off Peak Hours = 10pm - 7am, 7 days

TROUBLESHOOTING



LIGHTS DISPLAYED

<p>100% CHLORINE PRODUCTION</p>	
<p>LOW RANGE CHLORINE PRODUCTION * Winter time / cold water temperature * Low salt level * Build up on Cell electrodes * Cell electrodes worn out</p>	
<p>FLASHING BLUE LIGHT - AUTO CLEAN MODE * Factory preset to 5 min / hour, after the first hour For optimum performance, ensure 25Kg of Magnesium Chloride has been added to the pool per year.</p>	
<p>SOLID RED LIGHT + COLOURED LIGHTS * High salt level: Unit has detected that the salt level is too high for the electrode size and water temperature, and has wound down the output to compensate. Unit is producing chlorine in this mode.</p>	
<p>SOLID RED LIGHT * High salt level: Unit has detected that the salt level is too high for the electrode size and water temperature. To rectify: once chlorine production lights come on sequentially, press the minus ("-") button 2 - 3 times, so that the unit is not running at 100%; or * Other overload condition: Check that the two metal electrodes are not in contact with each other.</p>	
<p>FLASHING RED LIGHT * Water flow problem / Gas sensor error * Check sensing tang is clean and free of deposit * Check white wire connection inside the junction box is free from corrosion and is connected metal-to-metal.</p>	
<p>FLASHING AMBER LIGHT * The red & black Cell wires are either matched incorrectly inside the junction box or affected by corrosion. * There is a break in the black wire. * After heavy rain, a layer of rain water, which is less dense and contains little salt will be at the top and feeding into the electrolytic Cell. * No load (Cell dead). * Standby mode - press the plus ("+") button to make a selection. * There is a problem inside the Power Supply.</p>	
<p>FLASHING RED & AMBER LIGHTS IN SEQUENCE * There is a break in the red wire.</p>	

DISPLAY LIGHTS - LAYOUT



TROUBLESHOOTING *(Continued)*



PROBLEM	POSSIBLE CAUSE	REMEDY	SECTION
Chlorine residual low or nil	Low or nil chlorine production	<ol style="list-style-type: none"> 1. Check unit is on and functioning correctly. 2. Check salt level is correct. 3. Inspect Cell electrodes and clean if required. 4. Check age of Cell. 5. Check running times are sufficient. 	4 & 7(I) 3(I)-(II) & 8 7(II)-(IV) 7(VI) 9
	PH too high	Lower pH.	1(c) & 11
	Poor circulation	<ol style="list-style-type: none"> 1. Check pump is functioning. 2. Empty skimmer and pump baskets. 3. Inspect filter. 4. Check pool water level. 5. Inspect Cell electrodes and clean if required. 	1(a) 7(II)-(IV)
	Filter problem	If the WATERMAID® chlorinator is registering 75 – 100%, but the pool water is cloudy, then there may be a problem with the filter. <ol style="list-style-type: none"> 1. Backwash the filter several times, rinsing in between each turn. 2. For sand filters, change sand every 5 years. 3. For D.E. filters, check D.E. level and adjust if required. Also clean grids if required. 	1(a) Refer to filter Owner's Handbook
	Algaecide with main constituent benzalkonium chloride added within last 4 weeks	<ol style="list-style-type: none"> 1. Manually add liquid chlorine. 2. Run equipment 24 hours per day until a chlorine residual is achieved. 	10
	Insufficient chlorine stabiliser	Add chlorine stabiliser	1(b)
No lights on Power Supply	No power	<ol style="list-style-type: none"> 1. Check switch on the underside of Power Supply is on. 2. Check time clock is functioning correctly. 3. Check connection to power outlet. 4. Check circuit breaker on mains electrical switchboard. 5. Problem inside Power Supply – refer to qualified service technician for repair. 	4(II) 6 3(VI)
Scale build-up on electrodes	High calcium level Insufficient magnesium	<ol style="list-style-type: none"> 1. Manually clean Cell. 2. Add magnesium chloride to prevent future build-up. 	7(II)-(IV)

WATERMAID® WARRANTY

Effective 1 October 2013.

Limitation of Liability, Warranties and Guarantees

Limitation of Liability

1. The obligation and liability of Watermaid Pty Limited ("WM") to you with respect to goods and services supplied and all terms, conditions, guarantees, warranties and representations that might otherwise be implied by statute or otherwise are hereby excluded to the maximum extent allowed by law. Certain legislation, including Schedule 2 of the Competition and Consumer Act 2010, imply guarantees and impose obligations upon WM which cannot be excluded, restricted or modified. Where such statutory provisions apply to the extent which WM is entitled to do so, its liability shall be limited at its option to:
 - (i) In the case of supply of goods, the replacement of the goods or supply of equivalent goods; or
 - (ii) The payment of the cost of replacing the goods or acquiring equivalent goods; or
 - (iii) The payment of the cost of having the goods repaired; or
 - (iv) The repair of the goods.
2. Where such statutory provisions apply, to the extent which WM is entitled to do so, its liability shall be limited at its option in the case of the supply of services, to:
 - (i) The supply of the services again; or
 - (ii) The payment of the cost of having the services supplied again.

Consumer

3. The following clause 4 only applies if you are a "consumer" as defined in section 3 of the Australian Consumer Law. It may not apply in your particular case.

Consumer guarantees

4. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Additional Warranties

- 5.1 The benefits to you given by the warranties which appear below, where they apply to you are in addition to your other rights and remedies under a law in relation to goods to which the warranty relates.
- 5.2 Where a valid claim is made under any of the following warranties, WM will, at its option:
 - (i) repair or replace the item or the affected part of it; or
 - (ii) wholly or partially recompense you if the item or part of it is defective.

Warranty for the WATERMAID® Power Supply (excluding any time clock component)

- 6.1 WM warrants that the WATERMAID® Power Supply (excluding any time clock component) shall be free of defects in manufacturing or workmanship for a period of three (3) years from the date of purchase from WM or one of its dealers.
- 6.2 Where a WATERMAID® Power Supply is repaired by WM after the warranty period has expired, a twelve (12) month defect free warranty applies to any replaced part. This warranty excludes any defect or failure caused by any condition outside the control WM.

- 6.3** If a problem with a WATERMAID® Power Supply occurs within the warranty period set out in clause 6.1, and it is:
- (i) a manufacturing fault – then it will be repaired or replaced (at WM’s option) at no charge;
 - (ii) caused by a condition outside WM’s control, then the cost to repair the Power Supply will be borne by the customer. See clause 9.1(i) for examples of such conditions.

Warranty for the time clock component

- 7** WM warrants that the time clock component contained in the WATERMAID® Power Supply shall be free of defects for a period of one (1) year from the date of purchase from WM or one of its dealers.

Warranty for the WATERMAID® Cell

- 8.1** WM warrants that the WATERMAID® Cell shall be free of defects in manufacturing or workmanship for a period of three (3) years from the date of purchase from WM or one of its dealers. Where there is a defect in manufacturing or workmanship during this period, then the provisions of clause 8.2 will apply.

- 8.2** If a defect arises within the warranty period set out in clause 8.1, and it is:

- (i) a manufacturing defect – then it will be repaired or replaced (at WM’s option) at no charge;
- (ii) caused by a condition outside WM’s control, then the cost to replace the Cell will be borne by the customer. See clause 9.1(i) for examples of such conditions.

Limitations on above non-statutory warranties

- 9.1** The warranties as outlined in paragraphs 6, 7, and 8 above DO NOT apply:

- (i) To any defect or failure caused by misuse, abuse, abrasion, build up on Cell electrodes, electrical faults, or any other event outside WM’s control including incorrect installations, closed valves, pump failures, pipe work blockages power surges (including lightning strikes), insect damage, harsh chemicals, incorrect water balance, wear and tear, accident, non-observance of installation, operating and/or cleaning instructions;
- (ii) If the product has been serviced by a person not authorised to do so by WM or with non-approved parts;
- (iii) If any serial number or compliance label has been removed or defaced;
- (iv) If the product has not been fully paid for or is repossessed under any financing agreements.
- (v) Where the WATERMAID® Power Supply or Cell has been subject to any use other than normal domestic pool use.

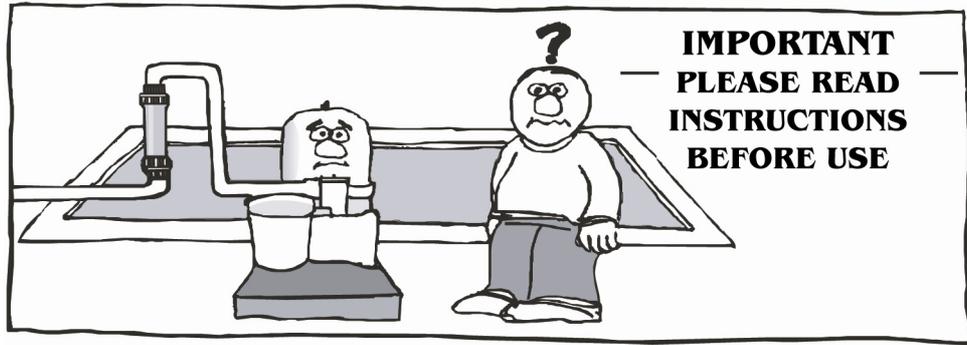
- 9.2** The warranties as outlined in paragraphs 6, 7 and 8 only extend to twelve (12) months where any product the subject of such a warranty is used in a commercial environment such as a caravan park, hotel or motel.

Remedies & Solutions

- 10.** WM will repair or replace a product within a reasonable time.
- 11.** WM reserves the right to charge for any goods or services not covered by any warranty, including freight costs.

To claim under any of the above Warranties

- 12.** To be entitled to claim under any of the above warranties you must contact WM as soon as you become aware of the defect and advise WM of the nature of the defect by phone, fax, mail or email and send a warranty claim, a copy of your receipt verifying the purchase, the product itself, and all subsequent communications in respect of the warranty claim to WM in accordance with its contact details given on the back cover page of the Owner’s Handbook or available from WM’s website www.watermaid.com. If a repair or replacement is made under warranty, the warranty period will not extend past the original expiration date of the warranty. The reasonable expenses you incur in claiming under a warranty are to be borne by you.



For customer service or advice, please contact:

WATERMAID PTY LTD

Physical Address: 24 Tepko Road TERREY HILLS NSW 2084 AUSTRALIA

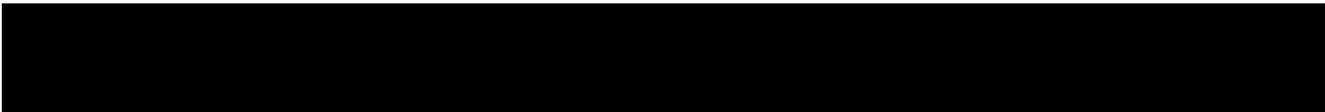
Postal Address: PO Box 460 TERREY HILLS NSW 2084 AUSTRALIA

	<u>Within Australia</u>	<u>From Overseas</u>
Phone:	(02) 9450 0244	+61 2 9450 0244
Fax:	(02) 9450 0188	+61 2 9450 0188
Email:	<u>info@watermaid.com</u>	
Website:	<u>www.watermaid.com</u>	

MODEL: WM40A for use on swimming pools & spas

**Australian Approval SGSEA/100121
Registration No. 28114 Pest Control Products Act (PCPA)**

**Conforms to: AS3136, UL STD 1081
Certified to: CAN/CSA STD C22.2 NUMBER 218.1 Class 3 Enclosure**



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