WATERMAID®

EcoBlend®
CHLORINATOR

Owner's Handbook

Australian Made

Version: AUS21122020

INSTALLATION / OPERATION MANUAL

AUSTRALIAN APPROVAL NUMBER: ULL-101710

Manufactured by:

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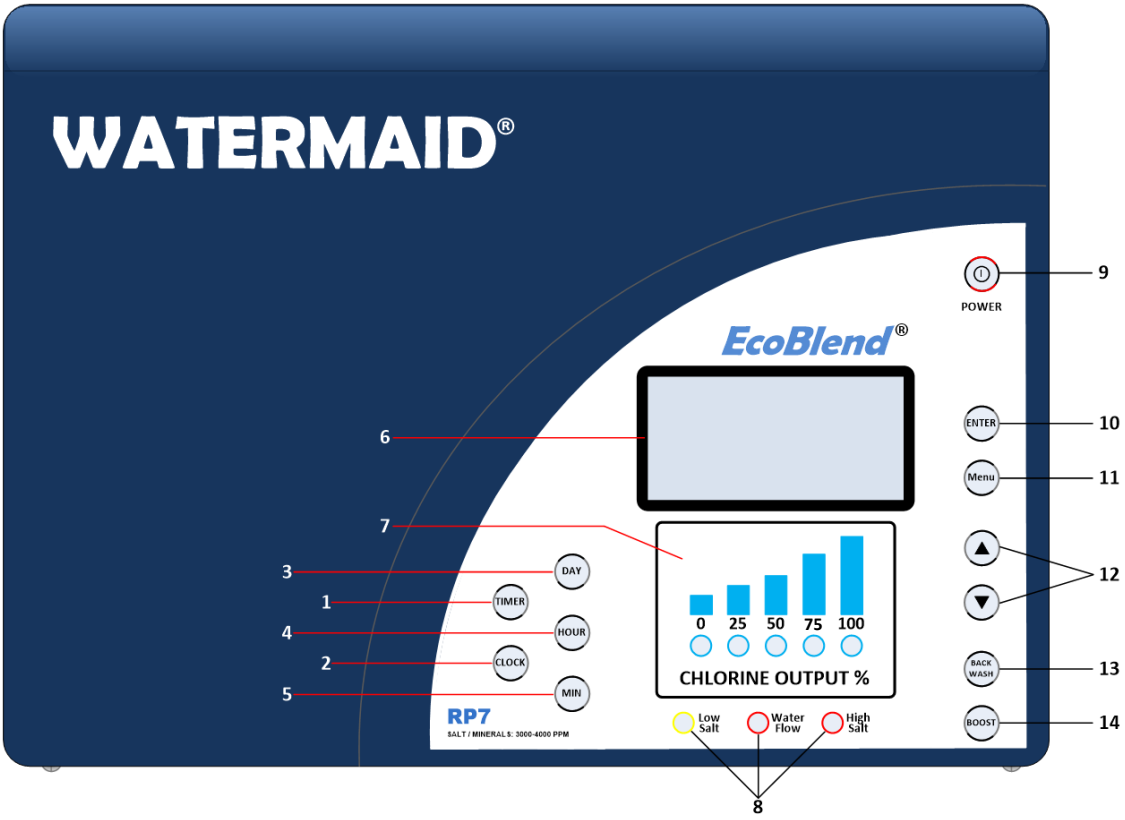
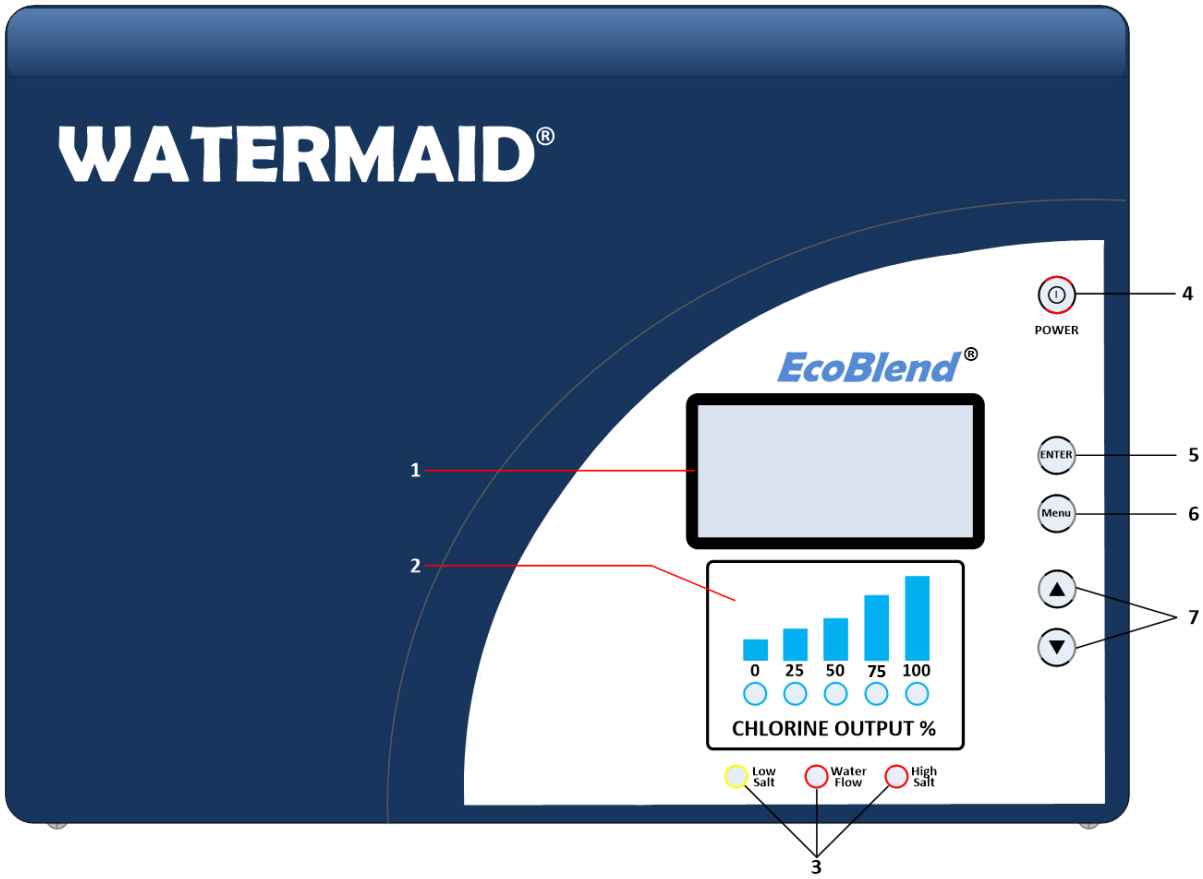
1 Chlorinator Overview

RESIDENTIAL MODEL



1.	TIMER button	Used to set and enable timers
2.	CLOCK button	Used to set the clock
3.	DAY button	Used to set the day in timer and clock setting
4.	HOUR button	Used to set the hour in timer and clock setting
5.	MIN button	Used to set the minute in timer and clock setting
6.	LCD screen	Main user display
7.	Chlorine Output Display	Shown as five blue lights to display output from 0% to 100%
8.	Warning lights	Three warning lights: Low Salt/Water Flow/High Salt
9.	POWER button	Manually turns unit On/Off
10.	ENTER button	Used to confirm a setting or enter a menu
11.	MENU button	Used to enter system menu or return to the previous screen
12.	▲ / ▼ buttons	Used to scroll up and down
13.	BACKWASH button	Used to perform filter backwash
14.	BOOST Button	Used to perform boost cycle

COMMERCIAL MODEL



1.	LCD screen	Main user display
2.	Chlorine Output Display	Shown as five blue lights to display output from 0% to 100%
3.	Warning lights	Three warning lights: Low Salt/Water Flow/High Salt
4.	POWER button	Manually turns unit On/Off
5.	ENTER button	Used to confirm a setting or enter a menu
6.	MENU button	Used to enter system menu or return to the previous screen
7.	▲ / ▼ buttons	Used to scroll up and down

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2 Options for the EcoBlend® Unit

The EcoBlend® unit has the following variables depending on the unit purchased.
These options are configured at the factory during manufacture.

Feature	**Residential Model**	**Commercial Model (hardwired)**
Clock	X	X
Timer	X	X
Auxiliary Timer		X
Backwash	X	X
Boost	X	X
Low Salt Warning	X	X
Water Flow	X	X
High Salt Warning	X	X
Plug/Socket	X	X
Liquid Tight Conduit Connector		X
Liquid Tight Compression Connector		X
External Pump Control		X
External Auxiliary Control Box External Pump Control + ORP Control of the Cell Output		X

X = Default factory setting
X = Option

3 Important Safety Instructions

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

1. **WARNING:** READ AND FOLLOW ALL PRODUCT LABELS AND INSTRUCTIONS IN THIS MANUAL.

2. **WARNING:** Risk of electric shock. If the electrical power cord is damaged, it should be replaced by the manufacturer, its service agent or a similarly qualified person in order to avoid a hazard.

3. **WARNING:** To reduce the risk of electric shock, do not use an extension cord to connect power supply to the electricity supply. A properly located outlet should be provided.

4. **WARNING:** Do not bury electrical power cord. Locate cord away from any other equipment (e.g. lawn mowers, hedge trimmers etc.), which may cause damage.

5. **WARNING:** to prevent electric shock, switch off the power at the electrical power outlet before dislodging or moving 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 suitably qualified person for repair.

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

7. **CAUTION:** The unit MUST be installed AT LEAST 3 metres (10 feet) from the inside wall of the pool.

8. **WARNING:** The EcoBlend® power supply carries an IP23 rating. It is not designed to be installed out in the weather, nor other areas where water or moisture ingress is likely to occur. Steps should be taken to install the power supply in a dry, well ventilated area such as a filter box or equipment shed or steps should be taken to provide a cover for the power supply. The power supply should also be installed against a flat surface.

9. **WARNING:** Keep out of reach of children.

10. **WARNING**: Do not apply any 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 to prevent corrosion. Ensure the pool equipment area is well ventilated.

12. **WARNING**: If additional chlorine is required due to heavy bather loads, liquid chlorine or chlorine free from calcium is preferred. Do not add directly to the skimmer as this may damage the cell.

13. **WARNING**: Maintaining high salt and chlorine levels above the recommended range may damage the pool, spa and/or equipment.

14. **WARNING**: When replacing the cell, use only a genuine replacement and one that contains a label that clearly states it is the correct replacement to suit the model of power supply (EcoBlend RP7, RP9, RP11 or RP13).

Retain this Owner's Handbook for future reference.

AUSTRALIAN APPROVAL NUMBER: ULL-101710

4 Installation

The installation of the WATERMAID® 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.

The Commercial model requires 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.

IMPORTANT: The chlorinator must run in conjunction with the pump. Incorrect installation may result in failure and void warranty.

4.1 Cell 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.

If a heater has been installed, ensure the cell is installed at least 1.5M (4.92ft) away from the heater.

Type P pressure cement must be used for all plumbing. Allow 24 hours for the pressure cement to dry.

The pressure in the cell must not exceed 150kPa (21.76psi) and the water temperature must not exceed 45°C (113°F).

If a variable speed pump has been installed, ensure there is **adequate water flow through the cell at all times**.

No gases should be allowed to accumulate in any part of the pipe-work.

The EcoBlend® cell has been supplied with plumbing to suit either 40 or 50mm (1½ or 2 in) pool pipe.

See following diagram for correct installation.

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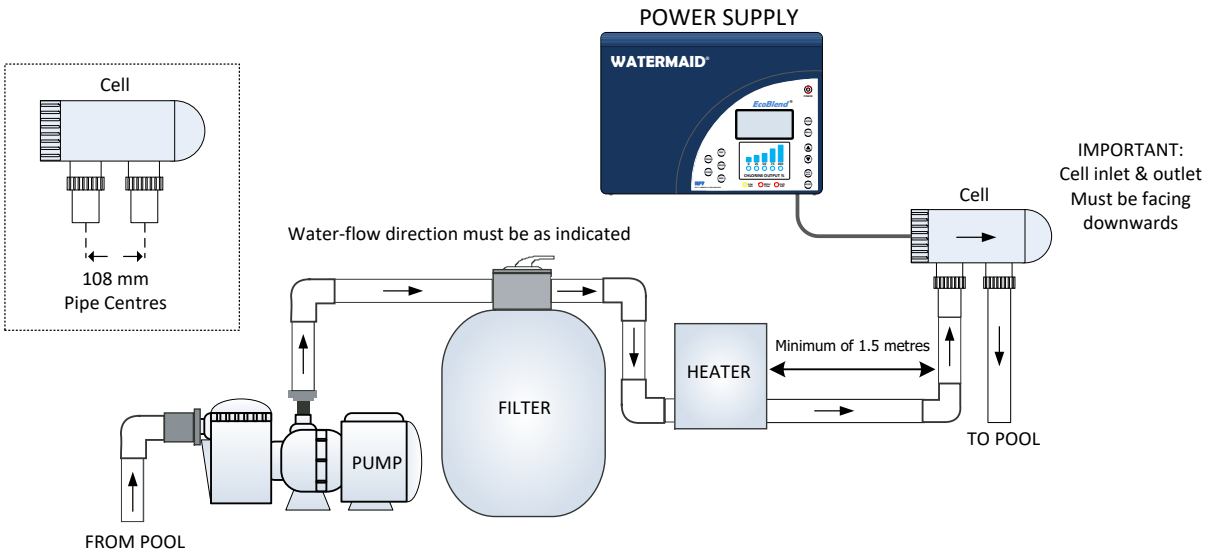
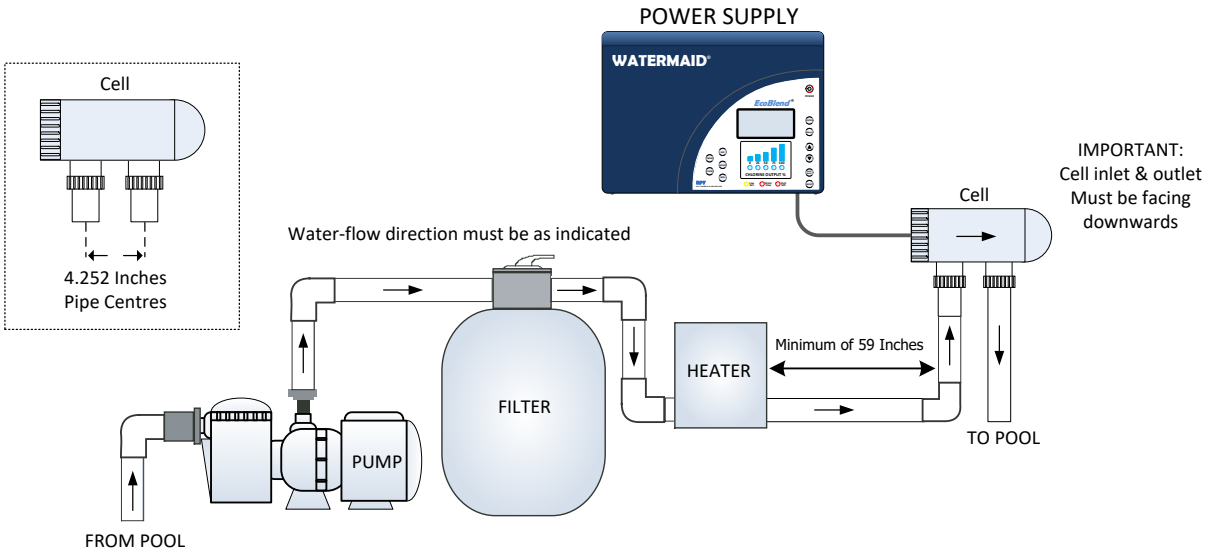
Installation Diagram (Metric)



<u>WARNING</u>: Improper installation or operating of the EcoBlend® electrolytic chlorinator without adequate water flow through the cell can cause a build-up of flammable gases, which can result in FIRE or EXPLOSION.

Installation Diagram (Imperial)



<u>WARNING</u>: Improper installation or operating of the EcoBlend® electrolytic chlorinator without adequate water flow through the cell can cause a build up of flammable gases, which can result in FIRE or EXPLOSION.

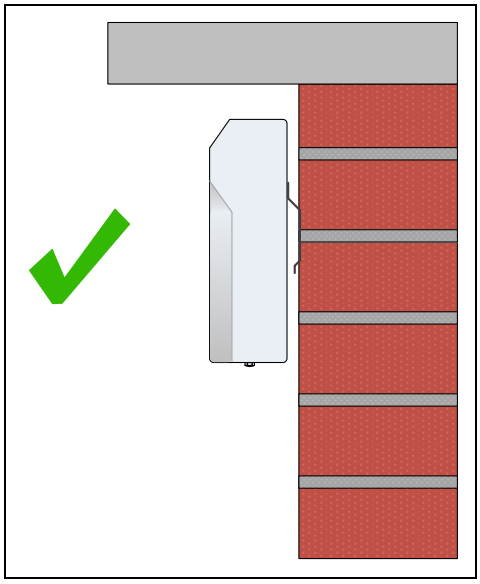
4.2 Power Supply Installation

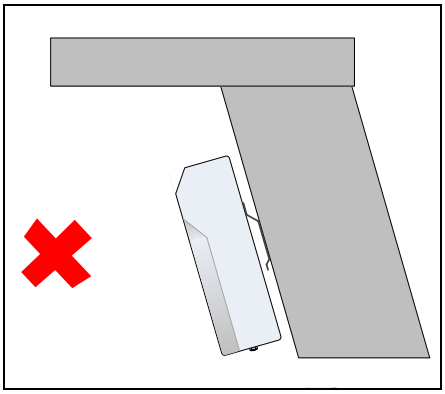
If the EcoBlend® is to replace an older model WATERMAID® chlorinator (purchased after 1994), installation should be as simple as lifting the old power supply (upwards) off the wall bracket and placing the new EcoBlend® on the existing bracket. There is no need to install a new bracket unless the existing one has deteriorated.

For all other installations, the stainless steel wall bracket (supplied) will need to be installed. A firm surface able to carry up to 15 kg (33 lb) is required, such as timber, brick or concrete.

The bracket design is simple and only requires two (2) stainless steel screws (supplied). Please note: masonry plugs are required for brick/concrete installations.

The EcoBlend® should be installed **flush with the wall surface**, as shown in the diagram (right).



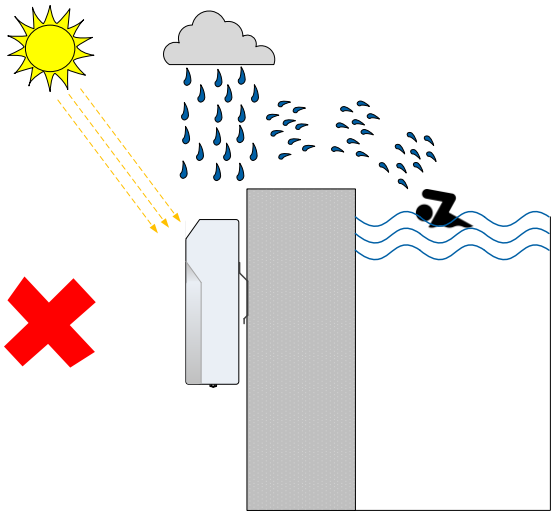


WARNING: The EcoBlend® power supply is not designed to be installed on a slanted angle. This may allow water to enter the back of the unit, which can cause damage to internal electrical components.

WARNING: The EcoBlend® power supply carries an IP23 rating. It is not designed to be installed out in the weather, nor other areas where water ingress is likely to occur.

Steps should be taken to install the power supply in a dry, well ventilated area such as a filter box or equipment shed, or steps should be taken to provide a cover for the power supply.

WARNING: Exposure to direct sunlight may damage the plastic front cover.



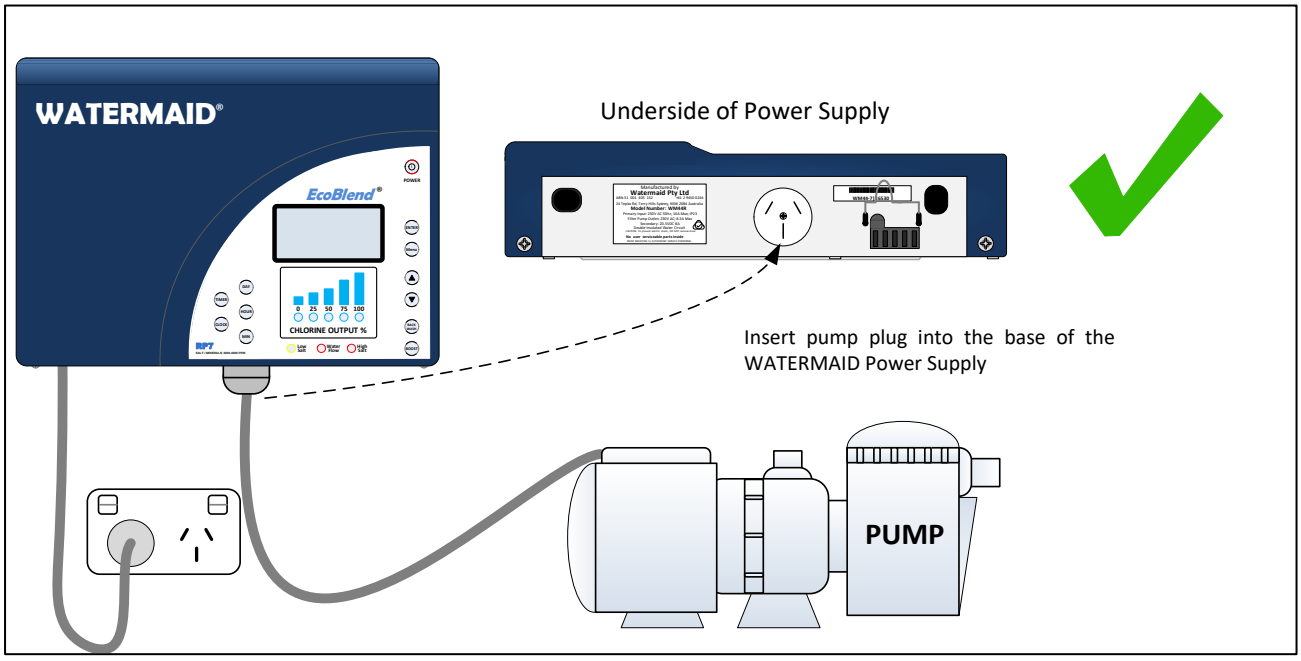
4.3 Connecting Pool Equipment

Once the EcoBlend® power supply and cell have been installed, and 24 hours have passed for the pressure cement to dry, the EcoBlend® is ready for start-up.

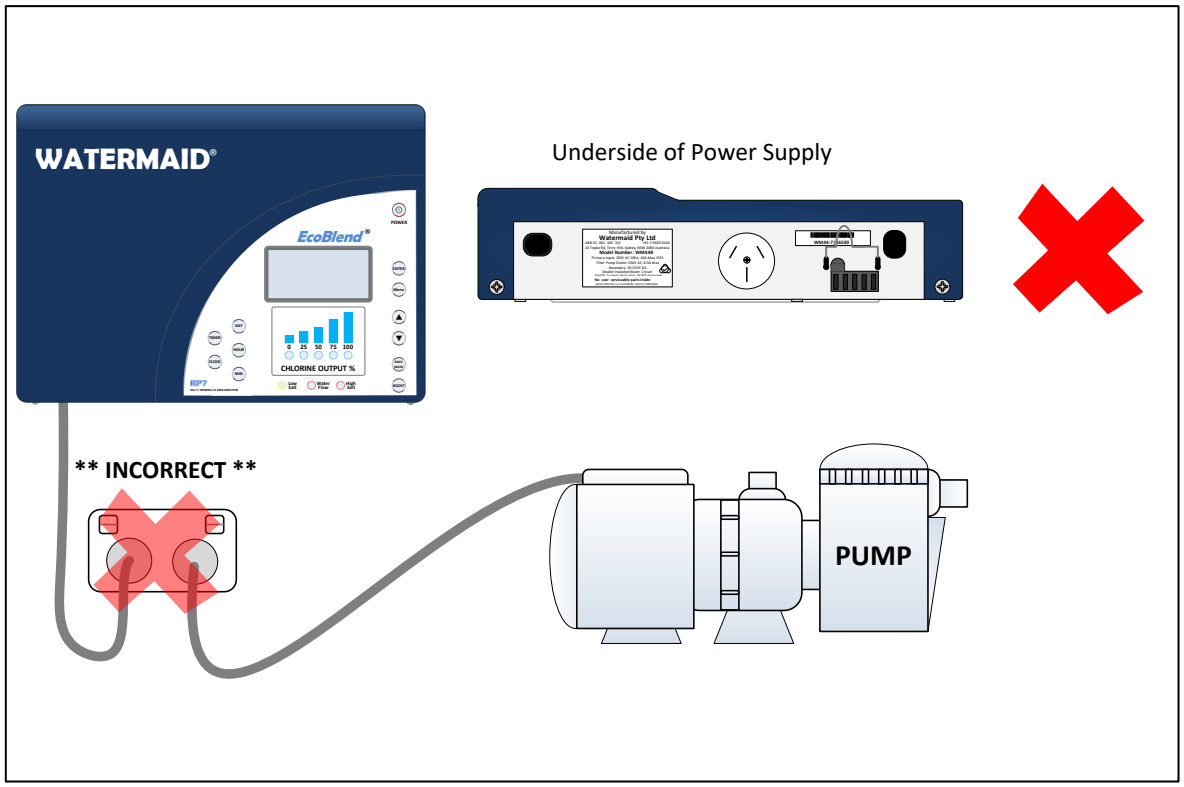
Residential Model:

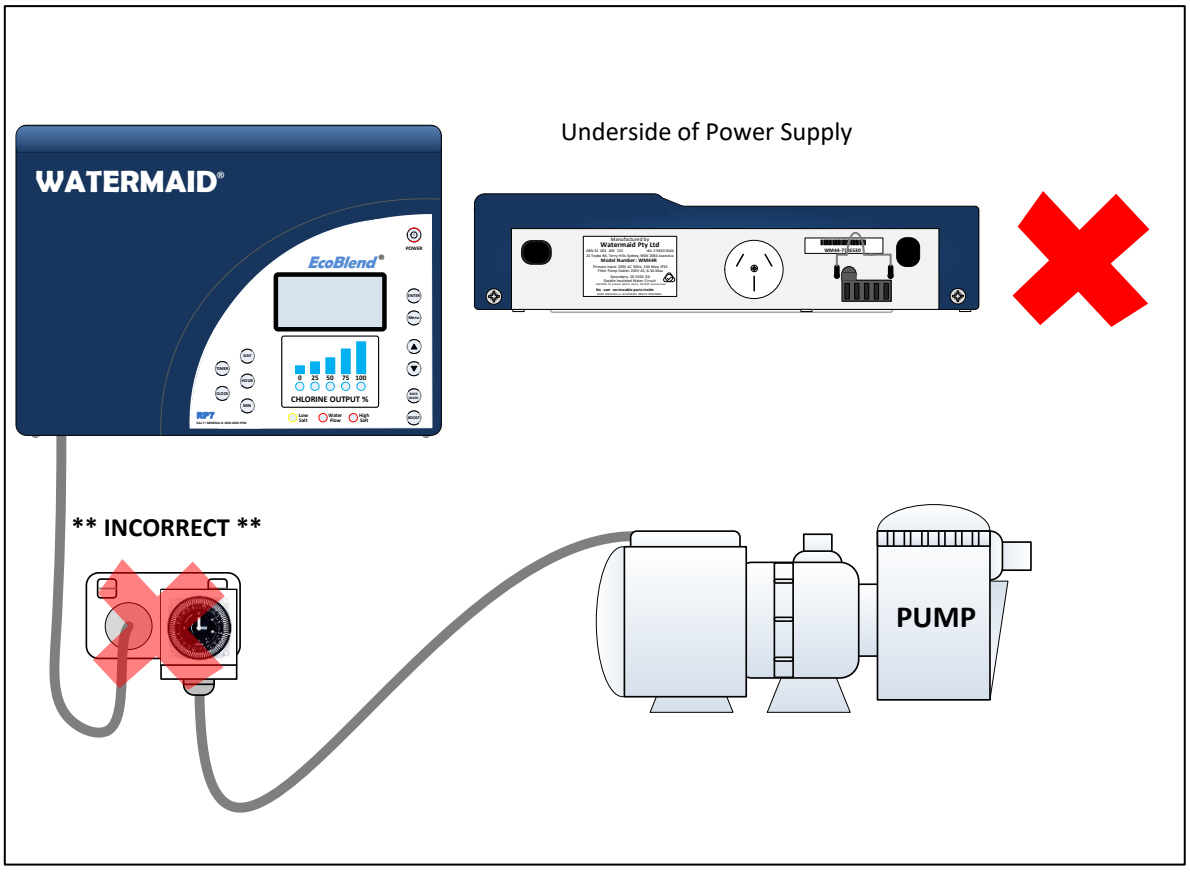
1. Plug the pump's power cord into the socket located at the base of the EcoBlend® power supply.
2. Plug the EcoBlend® power cord into the mains 240V power point. See following diagrams.
3. Turn on mains power and proceed to sections 5 and 6 for operating modes and system configuration.

POWER CONNECTIONS – USING THE INTERNAL TIME CLOCK

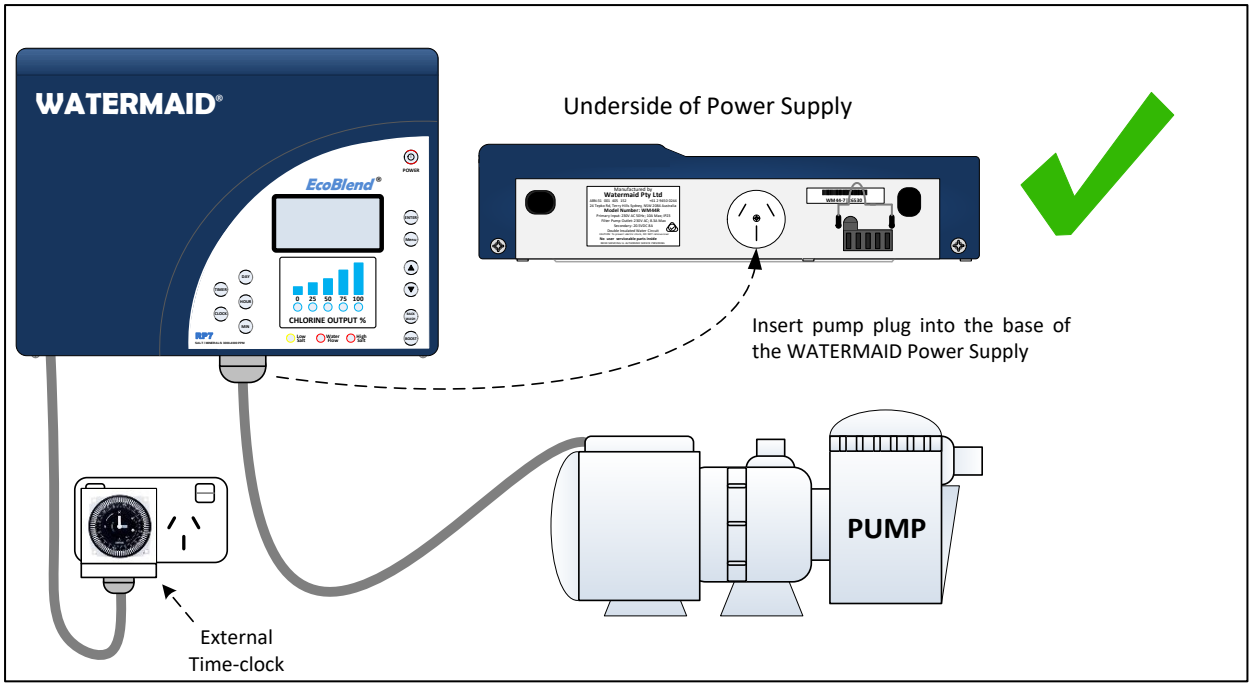


The following diagram shows an incorrect installation (marked with a red cross). To correct the installation, the pump MUST be plugged into the base of the WATERMAID® chlorinator so that the pump and chlorinator run simultaneously.

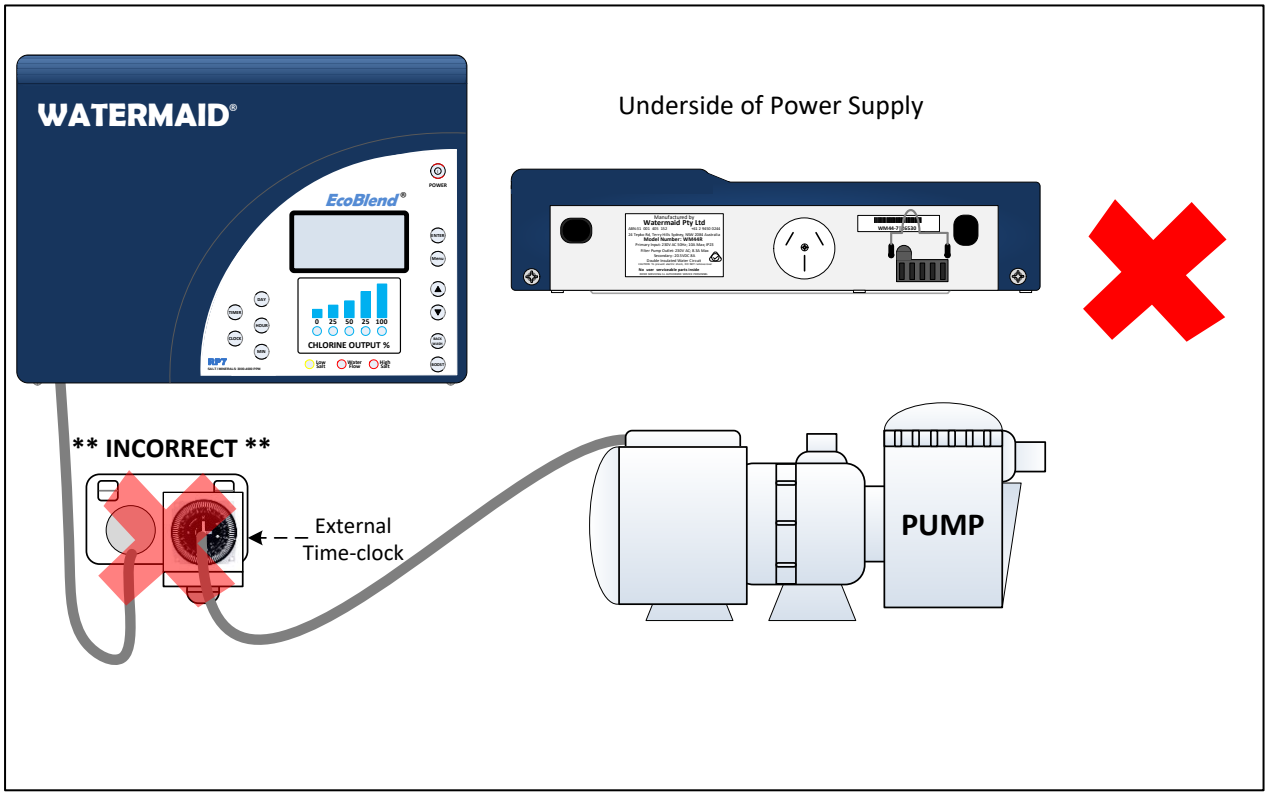




POWER CONNECTIONS - USING AN EXTERNAL TIME-CLOCK



The following two diagrams show incorrect installations (marked with a red cross). To correct the installation, the pump MUST be plugged into the base of the WATERMAID® chlorinator so that the pump and chlorinator run simultaneously.



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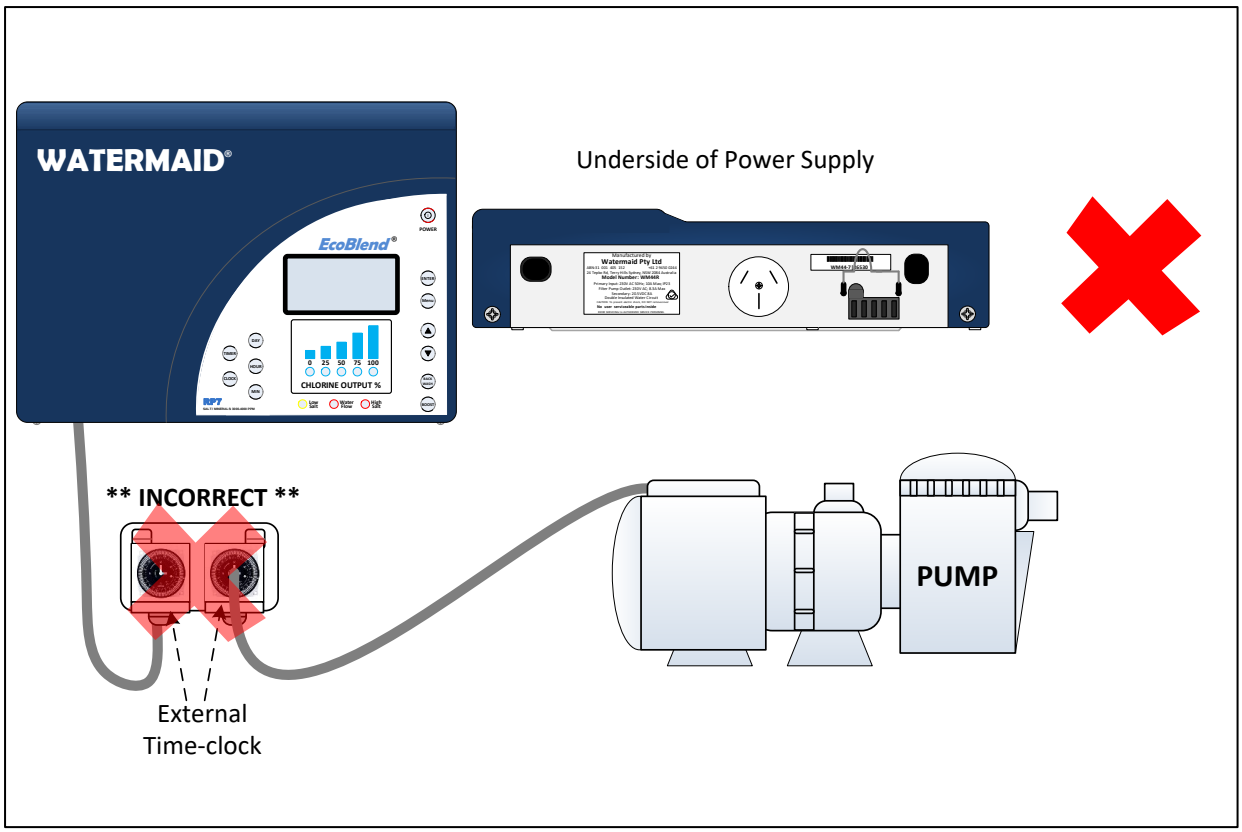
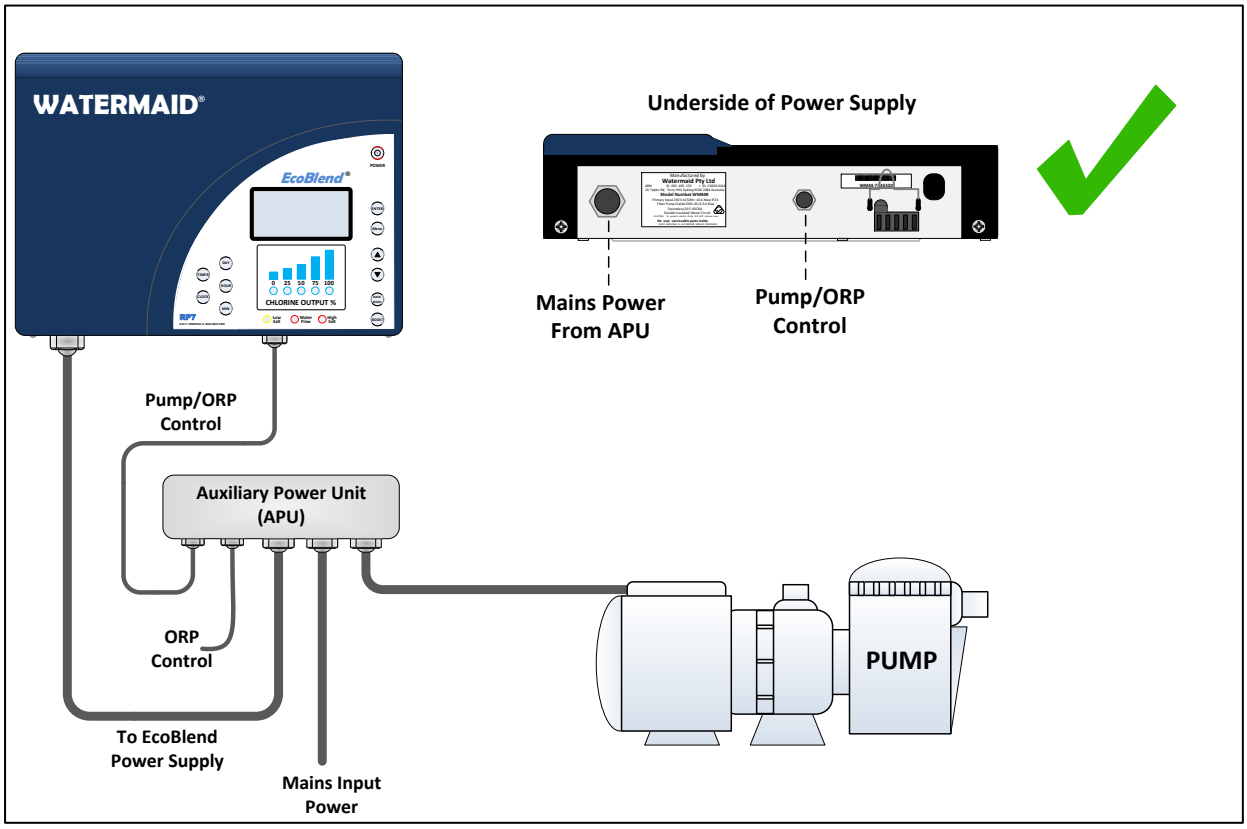


Commercial Model:

POWER CONNECTIONS USING INTERNAL TIME-CLOCK AND AUXILIARY POWER UNIT (APU)



5 Operating Modes

The EcoBlend® offers seven operating modes as detailed below. Prior to configuring the chlorinator, determine the operating mode that best suits your requirements.

Timer Mode: This is the most commonly used mode which turns the chlorinator on at user-defined times of the day. Refer to section **6.3** of this manual for information on setting timers.

Manual Mode: This mode is selected when an external timer is used to control the scheduled run times (Please note: inbuilt timers will need to be disabled). Refer to section **6.6** and **6.7**.

Boost Mode: During periods of high chlorine demand (such as high bather load or a heat wave), it may be desirable to use the boost feature. The EcoBlend® allows boost to be set for periods between 1 and 24 hours running time at 100% production. Simply set the desired boost time and when the cycle is complete, the EcoBlend® will revert to its normal operating state. Refer to section **9** for information on boost mode.

Summer Mode: In Summer Mode, chlorine output is adjustable between 0% and 100% by using the ▲ and ▼buttons. Refer to section **7.2** for information on summer mode.

Winter Mode: In Winter Mode, the chlorine output has been **re-scaled to a maximum of HALF** of the original specified capacity of the unit. It is adjustable between 0% and 75% by using the ▲ and ▼buttons. (The 100% light will not show in this mode intentionally, to signify a reduced output). Refer to section **7.2** for information on winter mode.

Spa Mode: In Spa Mode, the chlorine output has been **re-scaled to a maximum of a QUARTER** of the original specified capacity of the unit. It is adjustable between 0% and 75% by using the ▲ and ▼buttons (the 100% light will not show in this mode intentionally to signify a reduced output). Refer to section **7.2** for information on spa mode.

Backwash Mode: The EcoBlend® has a backwash feature to minimise the risk of any damage to the pool equipment whilst backwashing the filter. Refer to section **8** for information on performing a backwash.

(Please note: Not all operating modes may be available on the commercial model)

6 System Configuration

The EcoBlend® has been designed to allow ease of configuration and operation. To assist in configuring the chlorinator, please note the following;

- Words in uppercase signify the use of a button (to enter a menu, confirm a setting or exit a menu) or are a menu heading. ▲ and ▼ signify the use of the "up" or "down" buttons. (Refer to section **1** for button names and locations).

- **Within a menu, only illuminated buttons are used to configure specific features. All other button lights will be off.**

- When setting timers, the ENTER button is only used to select the Timer mode (On/Off) and the individual timers (T1 to T6) to be set. As stated above, if the ENTER backlight is not illuminated, it is not required to confirm a particular setting.

- All of the following procedures are shown starting at the home screen. Please note, the text displayed on the actual home screen may vary from that written in this manual due to the mode it is operating in and whether the system is running.

6.1 Adjusting the Output

The EcoBlend® uses an ascending series of five (5) blue lights (or "LEDs") to indicate the output from 0% to 100% of chlorine production. The "0%" light indicates true and means there is no chlorine production taking place.

In Summer Mode: the chlorine output is **adjustable between 0% and 100%** by using the ▲ and ▼buttons.

1. From the home screen, press the ▲ and ▼ buttons to set the desired chlorine output from 0% to 100%. This can be done when in "RUNNING" or "STANDBY" mode.

In Winter Mode: the chlorine output has been **re-scaled to a maximum of HALF** of the original specified capacity of the unit. It is **adjustable between 0% and 75% lights** by using the ▲ and ▼buttons (the 100% light will not show in this mode intentionally, to signify a reduced output).

In Spa Mode, the chlorine output has been **re-scaled to a maximum of a QUARTER** of the original specified capacity of the unit. It is **adjustable between 0% and 75% lights** by using the ▲ and ▼buttons (the 100% light will not show in this mode intentionally, to signify a reduced output).

6.2 Setting the Clock

(Please note: This feature may not be available on the commercial model)

The inbuilt clock employs a state of the art LCD display and has battery back-up. After a power outage, the EcoBlend® will recall the last previously saved settings, including those for the clock and timers. This ensures that the pool is adequately sanitised at all times.

To set the clock:

Step	Action	Display
1	From the home screen, press CLOCK.	CLOCK Day: Monday Time: 16:02
2	Press DAY (day field will now flash) and then use the ▲ and ▼ buttons to select the current day of the week.	CLOCK Day: Monday Time: 16:02
3	Press HOUR (hour field will now flash) and then use the ▲ and ▼ buttons to select the current hour.	CLOCK Day: Monday Time: 16:02
4	Press MIN (minute field will now flash) and then use the ▲ and ▼ buttons to select the current minute.	CLOCK Day: Monday Time: 16:02
5	Press CLOCK to save the time settings and return to the home screen.	STANDBY Next start will be on Tuesday at 06:00 or press POWER to start. Monday 16:02

6.3 Setting Timers

(Please note: This feature may not be available on the commercial model)

The EcoBlend® has six (6) inbuilt main timers. The commercial model may have an additional two (2) inbuilt auxiliary timers (to control an external device). Any number between one (1) and six (6) timers may be used at any one time for the main timers and the auxiliary timers can be either interlocked (controlled by the main timers) or non-interlocked (separate to the main timers).

Timers may be set for all days of the week (Monday to Sunday), individual days, weekdays, weekends or off completely. If multiple timers are set that conflict with each other, the EcoBlend® will default to the timer with the longest run time.

The factory default main timer setting is "On" commencing at 06:00 for a period of eight hours, every day of the week.

Auxiliary timers require an external relay box (or Auxiliary Power Unit).

In the following example, Timer 1 will be changed from the factory default to operate for 8 hours commencing at 9:00 a.m., every day of the week.

NOTE: *When setting timers, the ENTER button is only used to select the Timer mode (On/Off) and the individual timers (T1 to T6) to be set.*

To set a timer:

Step	Action	Display
1	Press TIMER. Ensure "Timers On" is displayed. If "Timers Off" is displayed, press ENTER to enable the timers.	TIMERS ▷ Timers On T1:ALL 06:00 – 08 hours T2:Off T3:Off
2	Use the ▲ and ▼ buttons to select the desired timer to be used (T1 - T6) for main timers or select "Aux: On" for auxiliary timers. The ▷ symbol indicates the selected timer. Pressing the ▼ button past "Aux: On" will present the option to reset timers back to the factory default (which is Timer 1: All days, commencing at 6:00 a.m. for 8 hours).	TIMERS Timers On ▷ T1:ALL 06:00 – 08 hours T2:Off T3:Off
3	Press ENTER to display desired timer screen (Timer 1 is used for this example).	TIMER 1 Day: All days Time: 06:00 Press TIMER for run time.
4	Press DAY (day field will now flash) and then use the ▲ and ▼ buttons to select the desired running day(s). The highlighted "Day" field will cycle through the following options each time the ▲ is pressed; All days, Off (only shown for T2 – T6), Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, Weekdays and Weekends.	TIMER 1 Day: All days Time: 06:00 Press TIMER for run time.
5	Press HOUR (hour field will now flash) and then use the ▲ and ▼ buttons to select the start time hour.	TIMER 1 Day: All days Time: 06:00 Press TIMER for run time.
6	Press MIN (minute field will now flash) and then use the ▲ and ▼ buttons to select the start time minutes.	TIMER 1 Day: All days Time: 09:00 Press TIMER for run time.
7	Press TIMER and then use the ▲ and ▼ buttons to set the length of operation (in hours).	TIMER 1 Run for 08 hours
8	Press TIMER to save the timer settings. To program additional timers, press the ▲ and ▼ buttons to scroll through the available timers and then press ENTER to select (and follow steps 4 to 8 again).	TIMERS Timers On ▷ T1:ALL 09:00 – 08 hours T2:Off T3:Off
9	Press MENU to exit the timer menu and return to the home screen. If the timer has been set to run within a period that incorporates the current time (i.e. timer set to run from 09:00 until 17:00 and the current time is 16:02), the chlorinator will turn on (displaying "RUNNING" on the LCD screen) when returning to the home screen.	STANDBY Next start will be on Tuesday at 09:00 or press POWER to start. Monday 16:02 or RUNNING Timer 1: 07h 59m remain Monday 16:02

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6.4 Disable an Individual Timer (T2 – T6)

Please note: T1 cannot be turned off individually, as it is the default timer. To disable T1, all inbuilt timers will need to be disabled (refer to section **6.6**).

(Please note: This feature may not be available on the commercial model)

Step	Action	Display
1	Press TIMER to display "TIMERS" menu.	**TIMERS** **Timers On** **▷ T1:All 09:00 – 08 hours** **T2:All 22:00 – 04 hours** **T3:Off**
2	Press the ▼ button to scroll to "T2".	**TIMERS** **T1:All 09:00 – 08 hours** **▷ T2:All 22:00 – 04 hours** **T3:Off** **T4:Off**
3	Press ENTER to display "T2" settings.	**TIMER 2** **Day: All Days** **Time: 22:00** **Press TIMER for run time**
4	Press DAY, at which point the selected field will flash.	**TIMER 2** **Day: All Days** **Time: 22:00** **Press TIMER for run time**
5	Press ▲ ▼ buttons until "Off" is displayed.	**TIMER 2** **Day: Off** **Time: 22:00** **Press TIMER for run time**
6	Press TIMER, at which point "Run Hours" will be displayed. Press TIMER again to return to the main "Timers" menu. "Off"' should now be displayed next to "T2". Press MENU to return to the home screen.	**TIMERS** **T1:All 09:00 – 08 hours** **▷ T2:Off** **T3:Off** **T4:Off**

6.5 Reset All Timers to the Factory Default

(Please note: This feature may not be available on the commercial model)

Step	Action	Display
1	Press TIMER. The "TIMERS" menu is displayed. N.B: The "Reset Timers" option cannot be accessed if "Timers Off" has been set. Refer to Section 6.3 to set "Timers On".	TIMERS Timers On ▷ T1:All 09:00 – 08 hours T2:Off T3:Off
2	Press the ▼ button to scroll to "Reset Timers".	TIMERS T4:Off T5:Off T6:Off ▷ Reset Timers
3	Press ENTER to select the "Reset Timers" option.	TIMERS ▷ Cancel Reset to default
4	Press the ▼ button to select "Reset to default" and press ENTER.	TIMERS Cancel ▷ Reset to default
5	The Timers have now been reset to the default settings (which are: "On" commencing at 06:00 for a period of eight hours, every day of the week).	TIMERS T4:Off T5:Off T6:Off ▷ Reset Timers
6	Press the ▲ button until the cursor is highlighting "Timers On". The default settings should now appear at T1. Press MENU to return to the home screen.	TIMERS ▷ Timers On T1:ALL 06:00 – 08 hours T2:Off T3:Off

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6.6 Disabling All Inbuilt Timers

(Please note: This feature may not be available on the commercial model)

When using an external timer or a hard-wired timer, please ensure the timers are disabled in the "TIMERS" menu.

Step	Action	Display
1	Press TIMER. The "TIMERS" menu is displayed with "Timers On" highlighted.	TIMERS ▷ Timers On T1:ALL 06:00 – 08 hours T2:Off T3:Off
2	Press ENTER and "Timers Off" will be displayed. All timers have now been disabled.	TIMERS ▷ Timers Off Unit will continue to Run until POWER button is pressed.
3	Press "MENU" to return to the home screen.	STANDBY Press POWER to start Monday 16:02
4	If an external timer is used, press the POWER button to turn on the chlorinator (the LCD screen will show "RUNNING" mode). The On/Off periods will now be determined by the external timer.	RUNNING Press POWER to stop Monday 16:02

Please note: the unit is now permanently on and will rely on an external timer or a person to turn off the unit manually by pressing POWER.

6.7 Manual On/Off

The EcoBlend® can be turned on or off temporarily at any time by pressing the POWER button. **Please note: if timers have been set, these will take priority and either turn the unit on/off during the next scheduled time event. To turn the EcoBlend® off permanently, the timers will need to be disabled.**

7 System Menus

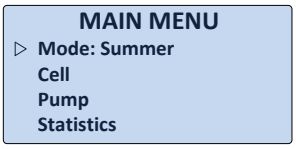
The main menu can be accessed by pressing MENU. Exiting the menu can also be achieved by pressing MENU until the previous screen or home screen is reached. The main menu consists of six (6) menu categories (shown below). Some of these menus are read-only menus and cannot be adjusted. They provide useful technical information to the manufacturer and pool service personnel when on-site.

1. Mode (Summer/Winter/Spa)
2. Cell
3. Pump
4. Statistics
5. History
6. Display

N.B: The ▼ button will need to be pressed to view History and Display.

7.1 Main Menu

1. Press MENU
2. Use the ▲ and ▼ buttons to scroll through any of the menu items
3. Press ENTER to select the desired menu
4. Press MENU twice to return to the home screen



N.B: Press ▼ to display the last two menu items.

7.2 Summer, Winter and Spa Modes

Summer Mode: In Summer Mode, chlorine output is adjustable between 0% and 100% by using the ▲ and ▼ buttons.

Winter Mode: In Winter Mode, the chlorine output has been **re-scaled to a maximum of HALF** of the original specified capacity of the unit. It is **adjustable between 0% and 75%** by using the ▲ and ▼buttons. (The 100% light will not show in this mode intentionally, to signify a reduced output).

Spa Mode: In Spa Mode, the chlorine output has been **re-scaled to a maximum of a QUARTER** of the original specified capacity of the unit. It is **adjustable between 0% and 75%** by using the ▲ and ▼buttons. (The 100% light will not show in this mode intentionally, to signify a reduced output).

Refer to the following procedure to change the current mode. In this example, the mode is changed from "Summer" to "Winter".

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Step	Action	Display
1	Press MENU to access the "MAIN MENU" screen.	MAIN MENU ▷ Mode: Summer Cell Pump Statistics
2	With the cursor highlighting "Mode", press the ENTER button to display the selectable options.	MODE Current Mode: Summer ▷ Summer Winter Spa
3	Press the ▼ button to move the cursor to highlight "Winter" and press ENTER. "Winter" will now be displayed next to "Current Mode:" and the 75% light will illuminate momentarily.	MODE Current Mode: Winter Summer ▷ Winter Spa
4	Press MENU twice to save and return to the home screen.	MAIN MENU ▷ Mode: Winter Cell Pump Statistics

7.3 Cell Menu

Situations may arise where it is necessary to run the pump without powering the cell (i.e. no chlorine production). The cell can be disabled through the "CELL" menu after which, the warning ***"PUMP ONLY"*** is displayed.

7.3.1 Turning the Cell Off

Step	Action	Display
1	Press MENU and use the ▼ button to scroll to the "Cell" menu.	MAIN MENU Mode: Summer ▷ Cell Pump Statistics
2	Press ENTER and the "CELL" menu will be displayed with the cursor highlighting "Cell On".	CELL ▷ Cell On Reverse Polarity Now
3	Press ENTER to select "Cell Off" (or press ENTER again to select "Cell On"). When the display shows the desired choice, press MENU twice to save and return to the home screen.	CELL ▷ Cell Off Reverse Polarity Now

7.3.2 Cell Reversing

PLEASE NOTE: The EcoBlend® is designed to reverse automatically at factory pre-set intervals. Excessive manual reversing will shorten the life of the cell and is only recommended to occasionally check the output of the cell in both (polarity) directions.

Step	Action	Display
1	Press MENU and use the ▼ button to scroll to the "Cell" menu.	MAIN MENU Mode: Summer ▷ Cell Pump Statistics
2	Press ENTER and the "CELL" menu will be displayed with the cursor highlighting "Cell On" or "Cell Off". Use the ▼ button to scroll to "Reverse Polarity Now".	CELL Cell Off ▷ Reverse Polarity Now
3	Press ENTER to select "Reverse Polarity Now". The message "Polarity is reversed!" will be displayed. Press MENU twice to save and return to the home screen.	CELL Polarity is reversed! (Press MENU to exit)

7.4 Pump Menu

PLEASE NOTE: Pump Protection is factory pre-set to "Off".

The EcoBlend® has the added feature of pump protection. This feature is designed to reduce the risk of pump and equipment damage in the event that water flow becomes partially or fully restricted. With this feature enabled, the pump will turn off automatically should a water flow issue be detected. The pump protection feature is designed to attempt restarts and then shut down if the water flow fault cannot be resolved.

Pump protection is a last line of defence only. It is extremely important that the pool's skimmer baskets are emptied regularly, no valves are left in the closed position, and other periodic maintenance is carried out regularly. In some pool installations, pump protection may not be advantageous, in which case it can be turned off (the factory set default is "Off"). The EcoBlend® cell must be installed as per the instructions set out in this handbook to maximise the effectiveness of the pump protection feature.

There are three adjustable values that can be set within the pump protection menu as follows:

- **Max dry runs (mins)** – This is the number of minutes (between 1 and 9) that the EcoBlend® will provide power to the pump after an interruption to the water-flow is detected. The factory default for this setting is 3 minutes.
- **Retry after (mins)** – This is the number of minutes (between 5 and 30) that the EcoBlend® will wait before reapplying power to the pump socket after an interruption to the water-flow is detected. The factory default for this setting is 5 minutes.
- **Max retries** – This is the maximum number of times (between 0 and 4) that the EcoBlend® will attempt to apply power to the pump socket after an interruption to water-flow is detected. The factory default for this setting is 2.

7.4.1 Turning Pump Protection On/Off

Step	Action	Display
1	Press MENU and use ▼button to scroll to the "Pump" menu.	MAIN MENU Mode: Summer Cell ▷ Pump Statistics
2	Press ENTER and the "PUMP" menu will be displayed with the cursor highlighting either "Protect On" or "Protect Off". Pressing ENTER multiple times will cycle between them. To turn pump protection off, cycle until the display shows "Protect Off", then press MENU twice to save and return to the home screen, or	PUMP ▷ Protect Off Warning! Protection is disabled. The pump will run even if dry.
3	To adjust pump protection settings: when "Protect On" is displayed, the factory pre-set values for pump protection will be displayed. Either press MENU twice to return to the home screen to leave the default settings or continue to step 4 to adjust these settings.	PUMP ▷ Protect On Max dry run (mins) 3 Retry after (mins) 05 Max retries 2
4	Use the ▼button to scroll to "Max dry run (mins)" and press ENTER. This value can be altered between 1 and 9 minutes using the ▲ and ▼buttons and then press ENTER to save.	PUMP Protect On ▷ Max dry run (mins) 3 Retry after (mins) 05 Max retries 2
5	Use the ▼ button to scroll to "Retry after (mins)" and press ENTER. This value can be altered between 5 and 30 minutes using the ▲ and ▼buttons and then press ENTER to save.	PUMP Protect On Max dry run (mins) 3 ▷ Retry after (mins) 05 Max retries 2
6	Use the ▼button to scroll to "Max retries" and press ENTER. This value can be altered between 0 and 4 using the ▲ and ▼buttons and then press ENTER to save. Pump protection set up is now complete. Press MENU twice to return to the home screen.	PUMP Protect On Max dry run (mins) 3 Retry after (mins) 05 ▷ Max retries 2

7.5 Statistics Menu

The statistics menu provides useful technical information to the manufacturer and/or service personnel. This menu is a read-only menu and there are no user adjustable settings.

Statistics Menu

1. Press MENU.
2. Use the ▼button to scroll to "Statistics".
3. Press ENTER.
4. Press MENU twice to return to the home screen.

MAIN MENU
Pump
▷ Statistics
History
Display

7.6 History Menu

The history menu provides useful technical information to the manufacturer and/or service personnel. This menu is a read-only menu and there are no user adjustable settings.

History Menu

1. Press MENU.
2. Use the ▼button to scroll to "History".
3. Press ENTER.
4. Press MENU twice to return to the home screen.

7.7 Display Menu

The LCD (Liquid Crystal Display) screen can be adjusted to suit personal preferences in terms of contrast, background colour and language. The contrast can be adjusted up or down to suit ambient lighting levels. The display colours can be inverted from the factory pre-set of dark blue characters on a light blue background to light blue characters on a dark blue background. The language used for the text on the display screen can also be changed.

To alter the display:

Step	Action	Display
1	Press MENU to display the "MAIN MENU" and use the ▼button to scroll past "Statistics" to the second page to position the cursor on "Display".	MAIN MENU Pump Statistics History ▷ Display
2	Press ENTER and the "DISPLAY" menu will be shown. With the cursor positioned on "LCD Contrast", press ENTER to adjust this setting.	DISPLAY ▷ LCD Contrast 10 Invert Language English
3	The current setting will be highlighted. Press the ▲ and ▼ buttons to adjust the contrast. Each time these buttons are pressed, the display contrast will adjust accordingly. Once the desired contrast level has been reached, press ENTER to save.	DISPLAY ▷ LCD Contrast 10 Invert Language English
4	Either press MENU twice to return to the home screen or press the ▼ button to highlight "Invert". To invert the display colours, press ENTER. To return to the original setting, press the ▼ button and press ENTER again.	DISPLAY LCD Contrast 10 ▷ Invert Language English
5	Either press MENU twice to return to the home screen or press the ▼ button to highlight "Language English".	DISPLAY LCD Contrast 10 Invert ▷ Language English
6	To change languages, press the ▼ button to cycle between choices. Press ENTER again. Press MENU twice to return to the home screen.	DISPLAY LCD Contrast 10 Invert ▷ Language French

8 Backwash

(Please note: This feature may not be available on the commercial model)

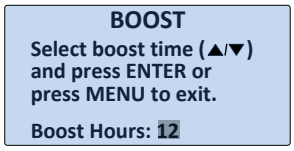
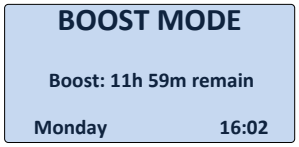
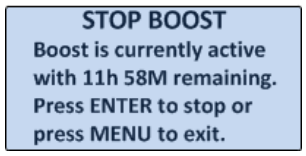
The EcoBlend® has a backwash feature to minimise the risk of any damage to the pool equipment whilst backwashing the filter.

Step	Action	Display
1	Press BACKWASH to enter the "BACKWASH" menu.	**BACKWASH** Press ENTER to start a backwash or press MENU to exit.
2	Press ENTER to start the backwash program. Adjust the backwash time (in minutes) using the ▲ and ▼ buttons. Three minutes is the default time but can be adjusted from one to six minutes.	**BACKWASH** Select backwash time and press ENTER or press MENU to exit. Backwash Minutes: 3
3	Press ENTER and the LCD screen will prompt the user to "Set the multi-port valve on your filter to the BACKWASH setting".	**BACKWASH** Set the multi-port valve on your filter to the BACKWASH setting. ▷ Continue Cancel
4	Once the valve has been set to BACKWASH, press ENTER to "Continue" (backwash will commence) or press ▼ to "Cancel" this step, followed by ENTER twice. To skip the backwash after it has commenced, follow the prompt at the bottom of the LCD screen.	**BACKWASH** Backwashing now. Time remaining: 02m 59s. Please Wait! Press MENU to skip
5	Once complete, the LCD screen will prompt the user to "Set the multi-port valve on your filter to the RINSE setting"	**BACKWASH** Set the multi-port valve on your filter to the RINSE setting. ▷ Continue Cancel
6	Once the valve has been set to RINSE, press ENTER to "Continue" (rinse cycle will commence) or press ▼ to "Cancel" followed by ENTER twice. To skip the rinse cycle after it has commenced, follow the prompt at the bottom of the LCD screen.	**BACKWASH** Rinsing now. Time remaining: 30 Please Wait! Press MENU to skip
7	Once complete, the LCD screen will prompt the user to "Set the multi-port valve on your filter to the FILTER setting"	**BACKWASH** Set the multi-port valve on your filter to the FILTER setting and press ENTER to continue.
8	Once the valve has been set to FILTER, press ENTER to return to normal operation (home screen).	**BACKWASH** Backwash complete. Returning to standard operation...

9 Boost

(Please note: This feature may not be available on the commercial model)

During periods of high chlorine demand (such as high bather load or a heat wave), it may be desirable to use the boost feature. The EcoBlend® allows you to set a boost period between 1 and 24 hours running time at 100% production. Simply set the desired boost time and when the cycle is complete, the EcoBlend® will revert to its normal operating state.

Step	Action	Display
1	Press BOOST and use the ▲ and ▼ buttons to select the desired boost time (between 1 and 24 hours).	
2	Press ENTER to commence the boost cycle. Once the set time has lapsed, the EcoBlend® will revert to its original setting.	
3	**<u>To Cancel Boost (during its cycle):</u>** During the boost cycle, press BOOST followed by ENTER to stop. The EcoBlend® will revert to its original setting	

10 Warning Lights

10.1 Water flow warning light

The EcoBlend® uses technology to sense any significant disturbance to water flow and will automatically turn off power to the cell. A water flow event is indicated on the EcoBlend® with a red flashing "WATER FLOW" warning light and will also display the warning "Check water flow!" on the LCD screen. If pump protection is enabled, power to the pump will also be stopped once pre-set parameters have been reached. See troubleshooting for further details.

10.2 Low salt warning light

The EcoBlend® uses technology to indicate a low salt level. This level will vary depending on the cell model and water temperature [refer to "Table: Salt Level Required" (below)]. If the "LOW SALT" warning light is illuminated and the message "Salt too low!" is displayed on the LCD screen, then salt should be added to ensure adequate sanitation and prevent damage to the cell. See troubleshooting for further details.

10.3 High salt warning light

The EcoBlend® uses technology to indicate a high salt level. This level will vary depending on the cell model and water temperature [refer to "Table: Salt Level Required" (below)]. If the "HIGH SALT" warning light is illuminated and the message "Salt too high!" is displayed on the LCD screen, then it may be necessary to add fresh water until the salt level returns to the required level or turn down the output to less than 100%. The unit may automatically shut down if the salt level is too high to prevent component damage and will only restart once rectified. See troubleshooting for further details.

Table: Salt Level Required

EcoBlend® Cell Model	Salt Level Required
RP-7	3,000 – 4,000 ppm
RP- 9	3,000 – 4,000 ppm
RP-11	3,000 – 4,000 ppm
RP-13 (Low Salt)	1,000 – 2,000 ppm

11 Manual Cell Cleaning

The EcoBlend® uses the most up-to-date self-cleaning technology, known as *"reverse polarity"*. In simple terms, the polarity to the cell changes continuously at factory pre-set intervals from negative to positive which sheds the built-up calcium deposits from the electrodes.

If the calcium level is maintained below the maximum recommended level of 250 ppm, then manual cell cleaning may not be required. If manual cleaning is required, follow the procedure below. For further information, refer to section **14.5**.

Manual Cell Cleaning Procedure

1. Turn off all equipment at the power outlet and close any applicable valves.
2. Undo the nuts securing the inlet and outlet ports and remove the cell complete with its clear housing (casing).
3. Support the cell upside down and ensure it is away from people and animals.
4. Add 10 parts of water to a bucket.
5. **Using gloves and face protection**, add 1-part hydrochloric acid to the water

   N.B. Always add the acid to the water.
6. Stir the solution with a wooden spoon or similar.
7. Safely pour the solution into the cell and allow it to stand until the electrodes are clean.
8. Safely dispose of the solution and rinse the cell with fresh water.
9. Return the cell to the pipe work and open any applicable valves.
10. Turn on all equipment.

Please note: White vinegar can be used as an alternative to hydrochloric acid. Two (2) litres (4 pt) of white vinegar equates to about 300mL (10 oz) of hydrochloric acid. White vinegar does not need to diluted with water.

12 Power Outages

In some parts of the world where power outages are common, the EcoBlend® is designed to retain information if a running cycle is interrupted during any power outage. Once power is restored, the EcoBlend® will finish off any remaining time left on the cycle to ensure maximum sanitation.

In situations where more than one timer is in use and they subsequently overlap due to the power outage, the EcoBlend® will take the timer with the longest run time as priority to ensure maximum sanitation.

With any power outage during an active cycle, the EcoBlend® will operate past the original programmed off time to compensate for any time lost during the power outage. To override this at any time, simply press the POWER button to place the EcoBlend® in standby.

To revert to the original off time, press the TIMER or CLOCK button, and then press MENU. This will update the time remaining and finish at the normal time.

Tariff based outages

If located within a Tariff area which is subjected to power outages, it is advised to check with the local electricity provider and ascertain the times when the power outages are most likely to occur, and where possible, set the EcoBlend® timers around these power outages. This will ensure maximum and continuous sanitation.

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13 Troubleshooting

0% Blue light is flashing	* The output is turned down all the way
0% Blue light only is on	* Check the cell cable for any damage such as cuts * The cell may be at the end of its life in one or both polarities * Check the cell is on, in the cell menu
Low salt light is flashing	* Check salt level is correct to suit the cell model and increase if required * Water temperature may be low (e.g. during winter)
Water flow light is flashing	* Check the cell is plugged into the power supply * There may be air in the line * Check and empty skimmer box * Check and empty pump hair and lint pot * Check applicable valve(s) are open * Check for other obstructions preventing water flow * Run a filter backwash and rinse cycle
High salt light is on	* Check salt level is correct to suit the cell model and add fresh water if required * Water temperature may be high (e.g. tropical climate) * Turn down the chlorine output until the salt level decreases (over time)
No power to pump or chlorinator	* Check power point switch is on * Check mains power for a tripped circuit breaker or fuse * Try plugging the EcoBlend® power cord into a different power point that is on different circuit (*residential and commercial model 1 only*) or have an electrician check there is power to the circuit * Please contact an authorised service agent or Watermaid Pty Ltd for repair N.B. There are no user serviceable parts inside the EcoBlend® power supply
Clock not retaining time after power outage	* Battery will need to be replaced (please contact an authorised repair agent). In this mode, the EcoBlend® will revert to the default timers to ensure sanitation is maintained *Check for an error message on the display relating to the clock not being set. If present, press ENTER to continue. N.B. If the power is cycled with an expired battery, the clock will need to be set each time until the battery is replaced.
Unable to achieve 100% output	* Check in the cell menu that the cell is turned on * Check salt level is correct to suit the cell model * Water temperature may be low (e.g. winter time) * Check the unit is not in WINTER or SPA modes * Cell may be at end of its life in one or both polarity directions
Pool chemistry problems	*See Section 14 in this handbook

N.B. There are no user serviceable parts inside the EcoBlend® power supply.

14 Pool Chemistry and General Information

14.1 Essentials for a Healthy Pool

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 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.**

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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 outdoor pools. Please refer to the product label for the required quantity to add.

The pool should be topped up with chlorine stabiliser throughout the hot summer period to maintain a level between 30 and 50 ppm. Do not exceed 80 ppm. More information on chlorine stabiliser can be found at:

http://www.health.nsw.gov.au/environment/factsheets/Pages/stabiliser-cyanurate.aspx

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.

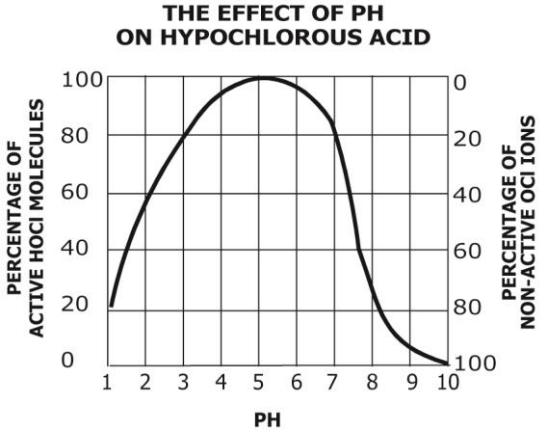
c) PH

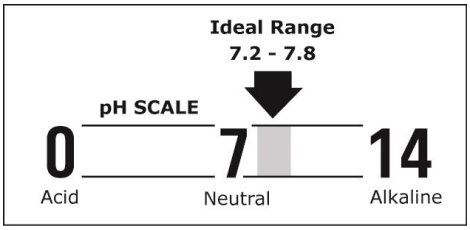
PH is a measure of the concentration of hydrogen ions in a solution, or in simpler terms the acidity or alkalinity of a solution. A solution with pH 7 is neutral; below 7 is acidic; and above 7 is alkaline.

By electrolysis, the WATERMAID® cell produces sodium hypochlorite (NaOCl), which in water dissociates into sodium (Na+) and hypochlorite (OCl-) 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.

It can also 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 is only 21% effective.





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

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

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. Please refer to the product label for the quantity required.

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.

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.

Avoid the over-use of hydrochloric acid for pH balancing. In alkaline-surfaced pools, too much acid can cause damage to the pool walls.

White vinegar can be used as an alternative to hydrochloric acid. Two (2) litres (4 pt) of white vinegar equates to about 300mL (10 oz) of hydrochloric acid. White vinegar does not need to be diluted with water.

14.2 Salt Level

For the chlorinator to produce chlorine, the correct amount of salt in the water is required. Please refer to the table below. The required salt level varies depending on the model of cell.

EcoBlend® Cell Model	Salt Level Required
RP7	3,000 to 4,000ppm
RP9	3,000 to 4,000ppm
RP11	3,000 to 4,000ppm
RP13 (Low Salt)	1,000 to 2,000ppm

For every eight (8) bags of salt added to the water, it is recommended that one (1) bag (25 kg or 55 lb) of magnesium chloride be added to protect the cell electrodes. The entire bag may be added at the one time, to the shallow end of the pool.

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14.3 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.

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 table (below).

Season	Suggested Running Times
Summer	8 - 14 hrs
Autumn	6 - 8 hrs
Winter	4 - 6 hrs
Spring	6 - 8 hrs

With each change of season, the running times and mode (Summer/Winter/Spa) on the EcoBlend® may need to be adjusted and the pool monitored closely. **The overall aim is to achieve a free chlorine reading of 1 - 3 ppm in the pool or 3 - 5 ppm for spas.** The finest detail must be discernible at the bottom of the deep end of the pool.

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

On a monthly basis in summer, the boost feature may be used to **super chlorinate** and maintain a high polish in the pool. Refer to section **9**.

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).

14.4 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 in 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 five (5) years as the edges become rounded over time due to the constant abrasion during filtering and will not work as effectively.

(iii) 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.

14.5 The Langelier Index

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

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.

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

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To rectify corrosive water, the total alkalinity will need to be raised by adding sodium bicarbonate.

To rectify scale-forming water, the total alkalinity will need to be lowered by adding hydrochloric acid or white vinegar. Please refer to the product labels for the quantity required. For white vinegar, about two (2) litres (4 pt) equates to 300mL (10 oz) of hydrochloric acid.

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 or acetic acid**.

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 listed in the following table.

Water Temperature	15°C - 30°C (59°F - 86°F)
PH	7.2 – 7.8
Calcium Level	120 - 250 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.

14.6 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', as it 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 power to the cell should be turned off while vacuuming to waste. Following this, 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 one 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.

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15 Useful Tables

15.1 How Much Salt Do I Need To Add?

Metric:

New or Re-filled Pool - Kilograms of salt Required to attain desired level (up to 4000 PPM) from zero salt-level															
Required Salt Level	**Pool Volume** (Litres)														
(PPM)	**10,000**	**20,000**	**30,000**	**40,000**	**50,000**	**60,000**	**70,000**	**80,000**	**90,000**	**100,000**	**110,000**	**120,000**	**130,000**	**140,000**	**150,000**
1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
1500	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225
2000	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
2500	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375
3000	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450
3500	35	70	105	140	175	210	245	280	315	350	385	420	455	490	525
4000	40	80	120	160	200	240	280	320	360	400	440	480	520	560	600

Increasing Salt Level to 4000 PPM From a Known Value - Kilograms of salt required															
Current Salt Level	**Pool Volume** (Litres)														
(PPM)	**10,000**	**20,000**	**30,000**	**40,000**	**50,000**	**60,000**	**70,000**	**80,000**	**90,000**	**100,000**	**110,000**	**120,000**	**130,000**	**140,000**	**150,000**
500	35	70	105	140	175	210	245	280	315	350	385	420	455	490	525
1000	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450
1500	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375
2000	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
2500	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225
3000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
3500	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75

Calculating required salt level based on pool volume in litres (L)

Salt needed (kg) = (Required salt level / 1,000,000) x Pool Volume (L)

1 kg of salt in 1,000 litres of water raises the salt level by 1,000 ppm

Converting Cubic Metres (m3) to Litres (L)

1 Cubic Metre = 1,000 Litres or 1 Litre = 10 Cubic Centimetres (10 cm^3)

Pool Volume in Litres = (Length x Width x Average Depth) x 1,000

If pool size = 10m long x 4m wide x average depth of 1.5m, the volume = 10 x 4 x 1.5 = 60m^3

60m^3 x 1,000 = 60,000L

Imperial:

New or Re-filled Pool - Pounds (lb) of salt Required to attain desired level (up to 4000 PPM) from zero salt-level										
Required Salt Level	**Pool Volume** (US Gallons)									
PPM	**4,000**	**8,000**	**12,000**	**16,000**	**20,000**	**24,000**	**28,000**	**32,000**	**36,000**	**40,000**
500	17	33	50	67	83	100	117	134	150	167
1000	33	67	100	134	167	200	234	267	300	334
1500	50	100	150	200	250	300	351	401	451	501
2000	67	134	200	267	334	401	467	534	601	668
2500	83	167	250	334	417	501	584	668	751	835
3000	100	200	300	401	501	601	701	801	901	1,002
3500	117	234	351	467	584	701	818	935	1,052	1,169
4000	134	267	401	534	668	801	935	1,068	1,202	1,335

Increasing Salt Levels From a Known Value- Pounds (lb) of salt required to increase salt-level to 4000 PPM										
Current Salt Level	**Pool Volume** (US Gallons)									
PPM	**4,000**	**8,000**	**12,000**	**16,000**	**20,000**	**24,000**	**28,000**	**32,000**	**36,000**	**40,000**
500	117	234	351	467	584	701	818	935	1,052	1,169
1000	100	200	300	401	501	601	701	801	901	1,002
1500	83	167	250	334	417	501	584	668	751	835
2000	67	134	200	267	334	401	467	534	601	668
2500	50	100	150	200	250	300	351	401	451	501
3000	33	67	100	134	167	200	234	267	300	334
3500	17	33	50	67	83	100	117	134	150	167

Calculating Required Salt-level based on Pool Volume in US Gallons

2.205 lb in 264.172 US Gallons of water raises the salt level by 1,000 ppm

1,000 Litres = 264.172 US Gallons

1 Kg = 2.205 Pounds (lb)

(2.205/264.172)/1000 = 8.3468

Salt Needed (lb) = (Required Salt Level / 1,000,000) x Pool Volume x [(2.205 / 264.172) x 1000]

or

Salt Needed (lb) = Pool Volume (gal) x (Required Salt Level / 1,000,000) x 8.3468

Converting Cubic Feet (cu ft) to US Gallons

1 Cubic Foot = 7.481 US Gallons

If Pool size = 30 ft Long x 15 ft Wide x Average Depth of 4 ft, Volume = (30 x 15 x 4) x 7.481 = 13,466 US Gallons

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15.2 Chlorine Output and Pool Capacity

Metric:

EcoBlend® Cell Model	Chlorine Output (grams / hour)	Salt Level Required (ppm)	Capacity Mild/Temperate (litres)	Capacity Tropical (litres)
RP-7	25	3000 – 4000	100,000	50,000
RP-9	30	3000 – 4000	120,000	75,000
RP-11	42	3000 – 4000	160,000	100,000
RP-13 (Low Salt)	30	1000 – 2000	100,000	50,000

Imperial:

EcoBlend® Cell Model	Chlorine Output (ounces / hour)	Salt Level Required (ppm)	Capacity Mild/Temperate (US gallons)	Capacity Tropical (US gallons)
RP-7	0.88	3000 – 4000	26,417	13,209
RP-9	1.06	3000 – 4000	31,700	19,813
RP-11	1.48	3000 – 4000	42,268	26,417
RP-13 (Low Salt)	1.05	1000 – 2000	26,417	13,209

16 Warranty

Effective 1 January 2017

Limitation of Liability, Warranties and Guarantees

Limitation of Liability

1. The obligation and liability of Watermaid Pty Ltd ("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® WM44 power supply

6.1 WM warrants that the WATERMAID® power supply 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.

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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 8.1(i) for examples of such conditions.

Warranty for the WATERMAID® cell

7.1 WM warrants that the WATERMAID® cell shall be free of defects in manufacturing or workmanship for a period of three (3) years or 10,000 hours (whichever comes first) 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 7.2 will apply.

7.2 If a defect arises within the warranty period set out in clause 7.1, 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.

Limitations on above non-statutory warranties

8.1 The warranties as outlined in paragraphs 6 and 7 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.

8.2 The warranties as outlined in paragraphs 6 and 7 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.

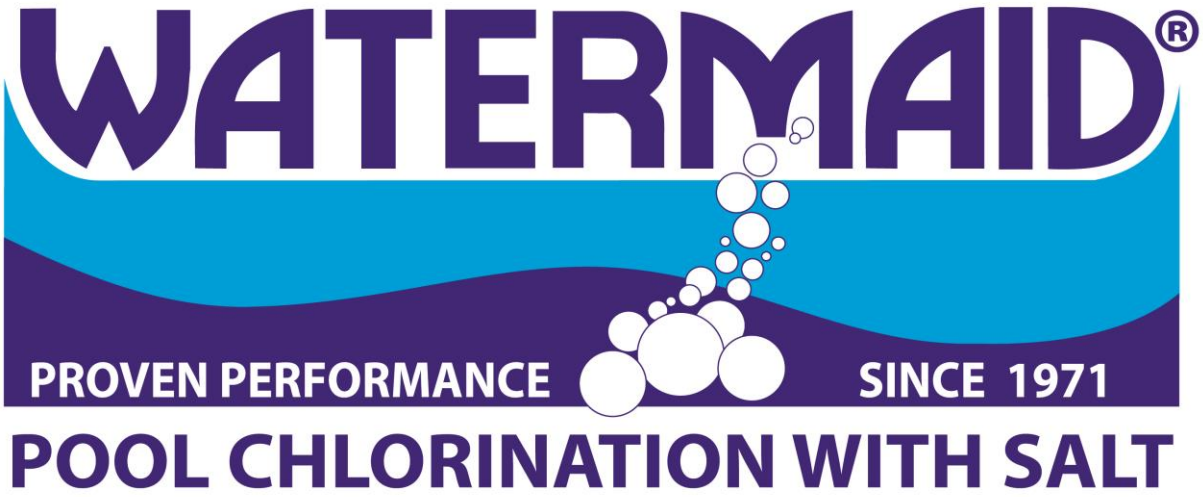
Remedies and Solutions

9. WM will repair or replace a product within a reasonable time.

10. 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

11. 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.



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