

Installation and Operations Manual

Pooled Energy Systems



The energy savers

welcome

Dear Customer,

Congratulations on your choice!

By selecting a Pooled Energy system, you are:-

- Reducing your energy and chemical consumption
- Gaining a highly-advanced automation system
- Gaining access to extensive information to help you monitor and manage your pool
- Gaining a much better swimming experience with better quality water
- Making a major contribution to the environment

We are delighted to welcome you to Pooled Energy and enclose a guide with four main sections:-

1. Preparing the Site
2. The Installation Process
3. Operating Instructions
4. Managing your Pool

Please also see the FAQs at www.PooledEnergy.com

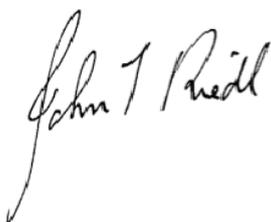
Your Service is a bundle of Electricity for your whole residence, with:-

- Pool Automation and Monitoring
- Pool Energy Efficiency and Management Services

Please call our Hotline on 1300 364 703 or email us at info@pooledenergy.com for any of your electricity or pool equipment or service needs, including maintenance and upgrades. Pooled Energy supplies, installs and supports filters, pumps, pool sweeps, robots and heaters at competitive prices. Our Network Operating Centre staff can provide access to highly experienced advice on your pool needs.

Please note that since, you now have an automated system, it's important that any equipment additions or replacements be correctly chosen, installed and configured if the system is to continue to work correctly. If you plan to make changes to your pool or its equipment, please contact us first so that we can check that your automation will not be impacted.

With Best Wishes



John Riedl
Chairman and Co-Founder

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PREPARING FOR INSTALLATION

You will need to provide:-

- 1. Ready Access**
- 2. Adequate Power Points on circuits with Safety Switches (RCDs)**

We are very concerned to ensure that you have a safe electrical environment in your home.

Most modern houses already have RCDs (Residual Current Detectors), also called ELCBs (Earth Leakage Circuit-Breakers) or 'Safety Switches' installed. These are normally located in the main household electricity "fuse-box" where the electricity supply is connected for distribution through your house.

RCDs are an essential safety requirement for every house (and pool) and not just houses with Pooled Energy pools. RCDs are designed to achieve electrical safety for all of the appliances and electrical wiring in your home to protect you, your family and your home from electrical faults. Typically, the installation cost of an RCD is small compared to the consequences of an electrical fault.

Please understand that we will not apply power to your Pooled Energy system until Safety Switches are operational. This is for your safety.

All electric equipment must be connected to adequately rated power-points which are wired in accordance with electricity standards. We cannot connect our system to extension leads.

If you are unsure whether your house electricity system is suitable, please contact us. We can supply contact numbers of authorised electricians to install RCDs and fix wiring problems.

- 3. Sewer Connection.**

It is a legal requirement that backwash water from pool filters be drained to the sewer (typically known as the gully point). If you have an existing sand filter, this connection should already be in place. If not, we will offer to install a filter backwash pipe for you (at extra cost), or you may choose to organise the installation yourself. If so, please use 50mm PVC pipe.

- 4. Supplementary Pool (Muriatic) Acid (if you have a new or chemically active surface):**

The pH of pool water must be managed within a range that is both comfortable and allows the sanitation chemistry to work. In conventional chlorine pools, this range is small and usually requires the regular and preferably automated addition of pool acid (also called hydrochloric or muriatic acid).

Pooled Energy's Advanced Water Chemistry operates in a much wider range of pH than conventional chemistry, and so most Pooled Energy pools will not require acid addition to operate reliably.

4. Supplementary Pool (Muriatic) Acid (Contd)

However, some pool surfaces, such as Marblesheen, Quartzon and Pebblecrete are very chemically active, especially when new. Even with Pooled Energy, these may need pool water pH to be managed with pool acid for at least the first few years after they are installed.

This can be achieved by periodic, manual dosing using the pH reading shown on the Pool App, or preferably by an optional, automatic acid dispenser to manage the pH from an acid container which will require only occasional replenishment.

5. Salt for Salt Water Pools

Most Australian pools use salt water chlorinators to make chlorine for sanitation. If you have a saltwater chlorinated pool, it is your responsibility to add salt when your Pool App shows the salt level reading is below 3,500 ppm, or if we ask you. We will supply and add salt for an extra fee if you wish, but most customers prefer to add the occasional few bags themselves, from an inexpensive source such as local hardware stores.

Note that it very important that the salt water chlorinator is in good operating condition and working correctly, otherwise the pool will be unable to maintain its sanitation level.

6. Liquid Chlorine for Liquid Chlorine Pools

If you have selected liquid chlorine as the sanitiser, you will need to replenish the liquid chlorine levels in the container periodically and ensure that it does not run out. In summer, liquid chlorine consumption can be significant and so replenishment will be frequent. We recommend purchase of liquid chlorine from locations with high stock turnover because the shelf life is typically only a few months.

For extra convenience, you may purchase an optional, liquid-chlorine, flow sensor from Pooled Energy. We will install this and it will advise you via the Pool App when the liquid chlorine container has emptied (&/or the liquid chlorine pump system has failed).

Acid and Liquid chlorine must **NOT** be allowed to run out as the pool can turn green in just one hot, sunny day without sanitisation. Salt can normally be added with less urgency.

Acid and Liquid Chlorine containers must be located in well vented and level locations, well away from heat sources.

Always follow the safety directions when handling pool chemicals and wear protective glasses and gloves.

THE INSTALLATION PROCESS

Your Installation will be scheduled in advance and generally takes up to half a day for a standard installation with ready access. Installation may be delayed by weather, the complexity of your particular site, or other events. The installation will involve:-

1. **Sensors.** We supply water quality and water flow sensors and install them into the pool plumbing. These become your property. They typically need to be checked annually (by a Pooled Energy Service Technician) and sometimes will require recalibration or cleaning.
2. **Intelligent Pool Controller (IPC).** We supply, install and maintain an electronics cabinet that mounts on a wall near the pool equipment. The IPC remains our property.

The filter pump is controlled by the IPC and plugged into it using its 3 pin power plug. The IPC contains the electronics that make your pump a true, variable-speed pump that will change speed as required by operations. Other pool equipment, such as chlorinators, heaters, pool cleaners and pool lights, may also be controlled by the IPC via their 3 pin power plugs or via WiFi power switches. The IPC also monitors the individual power consumption of all controlled equipment.

Wi-Fi Communication: The IPC communicates via your home Wi-Fi network to both the Pool App in your SmartPhone or Tablet, and to the Pooled Energy Network Operating Centre in the Internet 'Cloud'. The amount of data is small, but required for the system to operate at full capability. To allow the IPC to connect, please supply the details of your wireless network before or at the time of the installation. This can be done by communicating the Wi-Fi details of Wireless SSID and Password to our Network Operating Centre or alternatively, if you do not want to share your password, you need to be available on site when the installation occurs, to enter your Wi-Fi details into the system, yourself.

You may change the Wi-Fi details via the Pool App at any time after the system is installed. Wi-Fi security details are stored in the IPC using one-way encryption which ensures that your password cannot be decrypted and is never visible to Pooled Energy. Furthermore, Pooled Energy does not retain any Wi-Fi security passwords.

3. **Advanced Water Chemistry (AWC) Set-up.** The initial load of AWC chemicals is added to the pool at the time of installation. The AWC needs to be periodically replenished primarily because of dilution due to rainfall. Typically, we find this needs to occur at intervals ranging from seven to ten months depending on the pool circumstances. This replenishment is via a small container of AWC chemicals which is couriered to your home for simple and easy addition to the pool. Alternately we can offer a service to load the chemicals for you. They are typically just a few kilos.
4. **Any Essential Equipment Repairs, Replacements & Additions.** We may find during the installation process that there are issues with your existing pool equipment, for example, pumps that won't prime or worn-out chlorinators. Such things need to be fixed for the system to operate correctly. We will ask your approval to replace any defective or missing equipment (at an extra cost) that we may find before proceeding to complete the installation.

All pools require at least skimmer weirs, a filter, pump and chlorinator (salt water or liquid chlorine dispenser) in good working order if the Pooled Energy system is to operate correctly.

If your existing piping/plumbing looks like a pretzel, or has a significant number of bends, it will be inefficient from an energy perspective and will add to your pump's electricity costs because of increased water flow resistance. This also impacts pool water circulation and overall pool water quality. We can offer a service to re-plumb such piping. The cost is usually recovered in reduced operating costs over time, as well as improved pool quality.

If you want to add a heater or a pool sweep or a new chlorinator, or to fix a nagging long-standing pool issue, the best and least expensive time to do such things is normally at the time of the Pooled Energy system installation. We provide such devices at competitive prices or you can, of course, purchase them from other sources. If you do choose to purchase pool equipment through a different channel, we have a lot of experience with different pool equipment brands and can provide expert recommendations on what will be most suitable for your site.

Salt Chlorinators typically have a lifetime of 3-5 years for the chlorinator cell and 5-6 years for the electronics. In many instances, it is not easy to diagnose that a chlorinator is close to or at "end of operating life," without advanced monitoring. Our installer will review the chlorinator operation after the system has been installed and our Network Operating Centre will continue to monitor it. If an issue, which requires repair or replacement of the chlorinator system is detected, we will advise you and you can elect to have the remedial work performed by us or an alternate supplier.

5. **A Smart Meter.** If you do not have a Smart Meter, we will arrange for an authorised meter provider to install one free-of-charge (at a time other than the installation of the pool equipment), unless you advise us you do not wish to change the meter.

The Smart Meter remains the property of the Authorised Meter Provider, who also manages all of the meter data and supplies this data to Pooled Energy for electricity billing. The meter is read daily by the Meter Provider via the phone network, which means that your monthly electricity bills will be based on actual readings of your electricity consumption rather than estimates.

A Meter Reader person will no longer need to periodically visit your house to read the meter. Smart Meters also allow more timely and detailed analysis of your electricity use, should you request it. They also give you the ability to choose your Tariff from either Time-of-Use or Anytime tariffs. The Tariff at your home can be changed annually.

The month after you get the Smart meter, you will receive 2 bills (via email), one for the period covered by the old meter and one for the period covered by the new meter.

7. **Site Clean-up.** This should only be required if your pool equipment required plumbing changes. It may occur on the day following the installation and only applies to Pooled Energy activities.
8. **Start-Up and Tuning.** The pool will typically be operated on an initial start-up program for up to a week or two to 'learn' the pool, after which it will switch over to normal automatic operation.

Options during the installation process

1. **Optional Filter Media Change-out.** Most pool filters utilise sand as the filtering media. If the sand in your filter is five years or older, you should consider asking us to inspect it and we can change it out for you if it has degraded. Sand degrades over time and, as a result, the filter typically has a lower flow rate and uses more “pumping energy” to filter than new media. Your visual water quality will typically improve noticeably. We replace sand with glass beads, which has a longer life, further extended with Pooled Energy lower-power filtration control.
2. **Energy Control for the Whole House.** The IPC has the capability to control and monitor the energy consumption of other appliances as well as the pool. This capability is built into your system and we will advise you when it become available.

Landscaping and New Pools

New landscaping and newly constructed pools can sometimes result in soil entering into the pool, broken pipes from the construction phase or concrete lumps and large concrete particles in the plumbing. Issues such as this have a major impact on pool water quality and pool equipment. Please understand that if remedial action is required to fix such problems left behind by other contractors, we will need to charge you for the extra work.

OPERATING YOUR NEW POOLED ENERGY POOL

QUICK START GUIDE

The Operating Plan

- Your pool equipment will operate according to time-of-day, time-of-year, amount of swimming, water chemistry, electricity costs and prices, electricity grid conditions, weather, forecast and preferences you advise us.
- **Automation should be disabled when cleaning or maintaining pool equipment to avoid pumps unexpectedly starting or stopping.** This is very important as the system can start anytime if the Automation is enabled. Operating the equipment when you are performing maintenance functions could cause damage to the equipment or person.
- Use the Pool App to disable the system.
- You may override the automation and manually control pool equipment by using the Pool App.
- **If you disable the automation, don't forget to re-enable it when your maintenance is complete.** If the system is left OFF or in “manual” mode, the automation will not operate, causing poor water quality and potentially requiring costly remediation.

Your Pool maintenance and cleaning requirements

- Visually inspect the pool regularly. The sensors cannot detect all fault conditions.
- Regularly clear leaves and debris from skimmer boxes, weirs and leaf strainers to ensure good water flow and circulation. This is critical for water quality, especially in summer. Even a day of poor flow can lead to algal infection, poor quality water and associated remediation costs.
- Check pool water level. It should normally be set at a height of ~60% of the skimmer box height from the bottom of the skimmer box. If the water level is allowed to fall below the bottom of the skimmer box there will be NO water circulation. If the water level is too high, then the Skimmer will be unable to operate correctly, leading to poorer water quality.
- If the water level consistently falls, this typically indicates a leak in the pool system. Leaks increase chemical consumption, affect water quality and can be quite costly in the replacement of pool chemicals and water. They should be addressed as soon as possible.
- Operation of the pool equipment will automatically stop if the pool does not have sufficient water or water flow. This protects your equipment.
- Water quality is improved by regular cleaning and the removal of any decaying organic matter which can harbour sources of pool infection such as algae.
- If your pool has a pool cleaner, regularly empty leaves from it.
- Regularly brush pool steps, walls and areas where pool sweeps don't reach or circulation is poor. Many pools have "dead zones" where sanitisation is insufficient and algae can build up over time potentially causing issues with the rest of the pool.

Advanced Water Chemistry (AWC)

- AWC is used in all Pooled Energy pools unless otherwise agreed.
- For salt water pools, except for salt, we recommend that you don't add chemicals to your pool unless requested by Pooled Energy.
- Pooled Energy will advise when Advanced Water Chemistry replenishment chemicals are required, typically a few kilos once or twice a year, depending on rain and water loss. You can then order these and Pooled Energy will arrange delivery.
- Add only the correct type of salt (sodium or magnesium or mineral) to your pool.
- AWC Pool water parameters are quite different to conventional pool chemistry.
Standard test kit and pool shop recommendations are not applicable.

In particular, AWC will typically operate at higher pH and lower alkalinity and calcium than conventional pool chemistry. It is not necessary to adjust these levels. Conventional chemistry needs the pH to be held within tight limits (pH 7.2-7.6) to work correctly. This requires regular addition of pool acid which is dangerous to handle and can damage pool surfaces.

- Most Pooled Energy pools do not require the addition of pool acid. Pools operate at the balanced, natural pH of the pool in most cases. The Pool App will issue a notification if acid is required.

Start-up and Tuning the Pool

It may take a week or two to tune your pool following installation. Each pool has different characteristics. After a week, please call us if you would like to change the equipment operating schedule (PLAN) or discuss any other aspect. You can see the pool equipment operating schedule on the Pool App. Please note that the filter pump and sweep run-times shown are MUST RUN times, but the chlorinator is a PERMISSION WINDOW during which the chlorinator may run if required by the sensors and intelligent controller. This allows the chlorination system to "catch up," for example, if there was an extremely hot day that required additional sanitation. If the chlorinator runs, it will force the filter on at the same time.

In most cases the operating PLAN is only changed between the swimming and non-swimming seasons as it is self-adapting to a large extent. However, we can change it up to three times per year at no cost to you.

The control algorithms used by Pooled Energy are intended to give a balance between electricity usage, water cleanliness and water chemical state. They vary with the type of use you make of your pool and the pool's environment...shady, sunny, windswept, indoor, outdoor, heated or otherwise.

Electricity

Your Electricity Bills may take up to 3 months for the benefits of the Pooled Energy system to show on your invoices depending on the billing cycle.

Pooled Energy is now the Electricity Retailer for your whole house. Your electricity is physically delivered to your house by the 'Poles and Wires' company known as your Electricity Distributor. In NSW, this will be one of Ausgrid, Endeavour or Essential. The distributor does not change if you change your retailer.

You will have previously been supplied with your electricity meter which is read by an Authorised Meter Reading company. Most electricity meters in NSW use old technology, which must be manually read at your home, typically every 3 months, although sometimes it is even less frequently because of access issues or failures by the Meter Reader. Pooled Energy issues a bill every month as the Australian Energy Regulator (AER) is encouraging all Retailers to provide their customers with monthly bills to better manage their finances.

Between older style manual meter reads, the metering company estimates your consumption using a Regulatory defined Estimate process based on past history and other factors. Your bill is based on this estimate. **It is therefore unfortunately not unusual for our customers to have higher than expected bills for 2-3 months due to this estimation process, and then get a credit adjustment after the next meter read. Please allow the billing process to settle down.**

If you get a high initial bill, please call to check but don't worry. It is often an error in the estimation process and Pooled Energy are unable to address it until the next meter read. When a meter read occurs, the differences between Estimated and Actual are reconciled on the next billing cycle, however, without a smart meter, this can take up to three months to occur.

With a Pooled Energy system, the pool component of your household electricity consumption is historically about 40% of the total of a typical house, will generally be significantly reduced. This may not show up in your bills for 3 months as a result of the estimates process, the timing of your actual installation, and the installation of your new Smart Meter. The Smart Meter is installed by a separate Authorised Meter Provider. While our goal is to install the Smart Meter as soon as possible, and ideally coincidentally with your automation system, the Authorised Meter Providers are not always able to achieve this goal.

Once you have a smart meter installed, your bills will be based on actual data and no longer on estimates which can be significantly in error.

Overview of your new Pooled Energy Pool Control Service

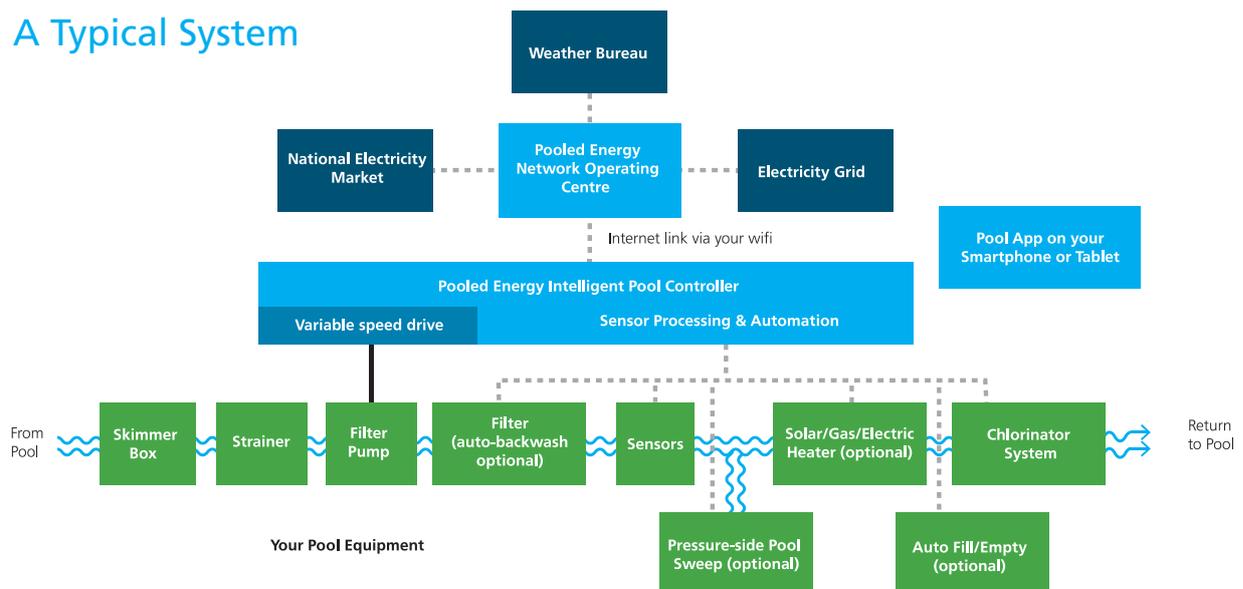
Pooled Energy's concept is to achieve a balance between energy use, water quality, pool resilience to unexpected usage or chemical changes, and your lifestyle.

Your pool is configured to operate with the dual goals of energy reduction and high quality water while being a member of a family of pools being managed to adapt to conditions on the National Electricity Market and the Electricity Grid, hence the name Pooled Energy.

The system is designed with a goal to help you operate your pool considering many factors, such as: water chemistry, swimming usage, the minimum required run-times for cleanliness, the time of day and season, the price and cost of power, the state of the Electricity Grid, the water flow through the filter, some blockages and some low water-level conditions and the type of equipment operating. Some operations use weather information for control.

The functionality of your pool automation system is progressively evolving as part of Pooled Energy's continuing R&D program and there will be software updates from time-to-time.

A Typical System



As shown in the diagram, A typical household pool system will at least consist of:-

1. A skimmer box in the pool,
2. A filter pump with strainer,
3. An Intelligent Pool Controller (IPC) including:-
 - a. a variable speed drive for the filter pump,
 - b. power switching for pool equipment,
 - c. telecommunications,
4. A filter filled with sand or preferably glass filter media,
5. Water quality sensors, flow sensor and electricity sensors,
6. A salt-water chlorinator (or alternative liquid chlorine system),
7. A Pool App.

The Intelligent Pool Controller (IPC) is owned and maintained by Pooled Energy. This will typically control the filter pump and chlorinator and may control additional equipment associated with the pool or elsewhere. This may include automatic valves, heaters and pool cleaners, and, from later in 2018, other household appliances.

The IPC connects to the Internet and Pooled Energy's central Network Operating Centre (NOC) via your home Wi-Fi Internet (or optionally and at extra cost, cellular wireless at some sites). The NOC also communicates with the Weather Bureau, the National Electricity Market and the Grid.

Automated Features

Operation of your pool equipment is largely automated under the control of the IPC, which is monitored and adjusted by the NOC, and also by actions you take on your Pool App. Some actions require manual intervention/operation.

If you have Time-of-Use electricity, your pool will typically be operated at night during off-peak electricity pricing periods, unless you have solar heating, or you have advised us of preferred times when you want the pool equipment to operate. If extended running beyond off-peak periods is required, operation may extend into shoulder periods during hot times of year.

If you have Anytime (flat tariff all day) electricity, the equipment will usually operate during the daytime.

You may see the pool equipment operate for just a few minutes from time-to-time, anytime. This is normal and is required to improve water circulation, stir the pool, skim the surface, dispense chemicals and take a fresh sample of water past the sensors.

In summer, the pool equipment typically operates for an hour or two around noon, but still outside peak electricity pricing periods. The high, solar, Ultra-Violet rays experienced during summer significantly reduce available chlorine sanitiser, requiring supplementation of chlorine during the middle of the day.

We describe the operation of your pool equipment on any day as its "PLAN or SCHEDULE." If you want an adjustment to your PLAN please contact us. We are happy to make adjustments within the limits we consider necessary for safe operation.

- ***Weekend operation may be different to weekday operation as there are no peak tariffs on weekends.***
- ***This is an automatic system that can start anytime. Please turn the AUTOMATION OFF using the Pool App if you are working on the pool.***
- ***If you remove the pool sweep from the pool, use the Pool App to 'tell' the system that the sweep is out of the water to avoid inadvertent starts.***
- ***Good water circulation is critical to good pool health. Maintaining good water flow by cleaning strainers and skimmers (and pool sweeps) is key to good pool performance.***

Cleaning the Pool

Leaves should be removed promptly from the skimmers, the pool and the pool sweep leaf bag. Decaying leaves use up sanitizer and promote algae. They can also interfere with the filtration of your pool, reducing flow, or may even stop the filter pump entirely. It is a customer responsibility to ensure that this does not happen. The surrounds of pools should be kept clear of leaf matter and debris, and especially from dirt/soil and garden run-off at all times, to avoid contamination of the pool.

Pooled Energy does not offer manual pool cleaning services, however we can refer our customers to potential service suppliers.

Cleaning leaves from the skimmer box

We strongly recommend that you turn the **AUTOMATION OFF** using the Pool App when you clean the skimmer boxes, to avoid the pump starting inadvertently. This will minimise the potential for leaf material to enter the filter pump strainer and cause a range of issues including poor sanitation. Be sure to switch it back to AUTO again when you are finished.

Cleaning the pool sweep

Please check the Pool Sweep regularly to see if it needs cleaning. If you remove the pool sweep from the water, you must first switch SWEEP OPERATION OFF using your Pool App. This is necessary even if it is not running as it may be switched on suddenly by the IPC, and potentially cause injury or damage if left unattended. Remember to turn it on again, with SWEEP OPERATION AUTO, when you have finished.

If you take the pool sweep out of the water, we suggest you aim it so that if you forget to turn it off and it starts running, it will run back into the pool.

Algae & Brushing

Even with good sanitation, algae can still appear in places where:-

- the pool sweep can't access
- the circulation is poor
- the water is shallow and sunlight bright

This is often the case on pool steps or swim-outs or areas of poor water circulation. These and any other problematic water circulation areas should be manually brushed, regularly. If persistent, please sprinkle a small amount of powdered chlorine (calcium hypochlorite) on the affected area. Please avoid using blends that include cyanuric acid for this purpose.

If you find a problem with algae on surfaces, please advise us and we can, in some cases, suggest adjustments to increase circulation and sanitizer levels and mitigate these issues.

Backwashing

How often should I backwash my sand/media filter?

Please backwash approximately every 4 weeks in summer and 8 weeks in winter. The need to backwash will depend on the particular pool, its situation and usage. We may also advise you if the Central Network Operating Centre (NOC) determines that there is a flow problem and you need to backwash or clear the skimmers and strainers.

More frequent backwashing than recommended offers little benefit in energy consumption, but does increase the consumption of pool chemicals and tends to destroy the filter media.

How do I backwash my system?

The Pool App will guide you through the backwash.

Cartridge Filters

Cartridge Filters need periodic cleaning with intervals determined by filter and pool size. In summer, most filters need a clean at least every 6 weeks, but you will need to decide what is best for your filter.

- Please switch the AUTOMATION OFF using the Pool App
- Shut valves necessary to isolate the filter
- Remove the cartridge and hose it where the debris and dirt will not affect the surroundings as per manufacturer's instructions
- Replace
- Open the valves you closed earlier
- Switch the AUTOMATION ON using the Pool App
- Start the filter pump for a short period using the Pool App
- Bleed any air out of the cartridge using the bleed valve on top, if required

Filling and Emptying the Pool

Manually emptying the pool

Do a Backwash or,

1. If the pool equipment is below the water level, set the valve on top of the Filter to WASTE or BACKWASH. Restore the valve to the FILTER position when you have finished.
2. If the pool equipment is above the water level, set the valve on top of the Filter to WASTE or BACKWASH and turn the filter pump on using the Pool App. Restore the valve to the FILTER position when you have finished.

Automatic Filling and Emptying

There are optional solutions available from Pooled Energy which allow you to automatically add mains water to the pool or else, empty it, using the Pool App. You do not need to go to the pool equipment and adjust valves or use a hose to add water.

If you already have an automatic filling/emptying system in the pool it should work with the Pooled Energy system in most cases. Note that these systems typically dilute the chemicals in the pool at a faster rate than pools without them, which results in higher chemical consumption and associated costs.

Filter Pressure Gauge

With variable speed pumping, the pressure shown on the filter pressure gauge will be different to what you have been used to and you should ignore it unless it reads high (fault) conditions.

Valves

We strongly recommend that you do NOT adjust any of the system valves, unless you are sure of the effects. Please remember that this is an automatic system that can start at any time. If you put valves in incorrect positions, you may cause damage to the equipment or yourself.

Prior to changing any valve positions for operations such as a manual backwash for example, turn AUTOMATION OFF using the Pool App in the Pool Controls section. After you have executed the operation(s), restore the valves to their previous normal operation positions and then (& only then) place the system back into AUTOMATION ON.

There are some exceptions, such as the control of Fountains and Water-Features, which we will discuss with you at the time of installation.

Automated Valves

Automated valves are normally activated from the Pool App or automatically controlled by the IPC unless you have elected to control them via a separate system.

Advanced Water Chemistry (AWC)

Unless you have been otherwise advised, your pool water chemistry has been upgraded to our proprietary AWC.

AWC uses a blend of chlorine and bromine (which is a premium sanitiser normally reserved for hot-tubs and some indoor pools). The overall result is a cleaner pool with better, more reliable sanitation and better feeling water. AWC is designed to operate with the IPC and Pooled Energy's remote pool management system only. Do not add AWC chemicals to a non-Pooled Energy pool.

AWC has many benefits which are described in more detail in the FAQs on the website, but, importantly, it removes the need to regularly add acid in most pools. The pool can operate at its natural pH, which is more comfortable for swimming and reduces irritation and sore eyes.

(Pools operating conventional chlorine chemistry require a pH of 7.2-7.6 for effective sanitation. Maintaining pH in this range often requires frequent addition of acid. AWC maintains sanitizer effectiveness at much higher pH, so acid is normally not needed. **Note: Some very alkaline pool surfaces, particularly new pools, may require supplemental acid**).

Please do not use your old test-kits or strips with AWC as they may give misleading results. They are not designed for use with this chemistry. Please do not ask the Pool Shop for advice. Most pool technicians and pool shops will be unfamiliar with a high pH protocol and may offer inappropriate recommendations. If you have any questions or concerns about your water chemistry please contact Pooled Energy.

Advanced Water Chemistry (AWC) (Contd)

For water chemistry status, please check the Pool App which uses multiple, electronic sensors to continually monitor your water chemistry. We will advise you via your Pool App (or by SMS/Email) if the water quality is out-of-range or if any other issues are detected. AWC typically requires the replenishment of its key chemicals typically once or twice a year, depending on the amount of rain and water loss.

We will advise when you need new AWC chemicals and ship the quantity required to you (at published prices) to maintain the chemical levels. These are typically a few kilograms of easily dissolving chemicals. Please add these to the pool in accordance with the safety directions on the packet. The quantity shipped should all be added into the water and allowed to fully dissolve and mix before swimming.

Pooled Energy's Advanced Water Chemistry uses low amounts of chemicals compared with conventional chemistry. Our customers tell us that this results in water more pleasant to swim in, as well as better sanitised water.

Winter Operations

Please do not shut your system off for the winter. Sanitation and filtration of the water is still required, although at a much lower level, and the system will adjust to a lower energy use through the winter. The operating cost using off-peak electricity in winter is typically less than 50 cents a day for most pools, including running the pool sweep, using a Pooled Energy system. If you shut the pool off, it will likely become infected with algae and the cost of the recovery will be more than any savings.

Pool App Operating Instructions

Overview

Your Pool App gives you easy monitoring and override control of your pool, at your fingertips.

With a Pooled Energy Automated Swimming Pool, you don't need to worry about your pool chemistry or when to run the pumps, filters or pool sweeps as these are all managed for you. Your Pool App will, however, allow you to fine-tune your pool automation or override the automatic operation should you wish.

You can use your Pool App to:-

- Power the AUTOMATION ON or OFF
- Check your pool water quality, water temperature and weather at your pool
- Run your pool sweep, filter, chlorinator or pool heater manually for additional periods
- Turn your pool sweep on and off
- Turn your pool heater on or off
- Log and check the status of your account
- Operate additional devices (including those added at a future time)

Pool App Operating Instructions (Contd)

Please note that you do not have to be concerned with dependent operations when using the App. As an example, if you ask the chlorinator or sweep to turn-on, the filter pump will automatically operate so as to provide water to it. The sweep operation will force the filter pump on, if required, and so on.

Getting the App and Login details

You can download the Pool App from the iTunes Store and the Google Play Store. Search for Pooled Energy on your iPhone, iPad, Android Smartphone or Android tablet to download.



Look for this app icon in the App Store:

Your usernames and passwords are provided by email. Please see the separate Pool App Guide for more details on how to log in.

Heaters

Connecting Solar, Gas and Electric pool heaters

You can ask us to connect any new pool heater to the Pooled Energy Intelligent Pool Controller (IPC). This will enable us to synchronise the heater operation with the other pool equipment, which typically saves energy and allows you to operate it remotely via the Pool App.

Integrated operation is particularly important with solar heaters as these tend to run in the more expensive times of the day for those with time-of-use electricity.

Integrated operations are also important for heat pumps, which typically require longer operating times than other types of heaters.

Pool heaters have differing water flow rate requirements and we configure the system to achieve these flows when the heater is running. We also configure the system to manage the water flow for the heater start-up and shut-down sequences so as to avoid overheating pool piping which can soften and burst or crush unless this is done correctly.

Operating Heaters

The IPC will switch the heater on at the times you have requested, and synchronise its operation with the other pieces of pool equipment. It will also manage water flows.

Pooled Energy operates your heater to a water temperature set point in a much more energy efficient way than a conventional, pool heater setup. Without a Pooled Energy system, the heater requires that the dependent pump, which provides water flow to the heater, be running at full capacity, regardless of whether the pool temperature is above or below the heater set-point. With a Pooled Energy system, the dependent pump for the heater is only turned on (or up to the required flow-rate) when the temperature is below the pool water temperature set-point. This can save you hours of pump electricity usage each day.

Gas Heaters

There are two alternative ways to do this.

1. Set the target temperature on the front panel of the heater and always leave the heater switched ON on its front panel. The IPC will signal the heater to heat in accordance with the operating PLAN. We recommend this method if you need to change the pool temperature set-point often, or
2. Set the target temperature on the front panel of the heater at least two degrees hotter than your target temperature and always leave the gas heater switched ON. Then, inform Pooled Energy of the actual target temperature you would like your heater to run to so we can configure the IPC accordingly. We recommend that you choose this method for maximum energy savings as we only run your dependent pump when heating is required to reach your target temperature. In a future version of the App you will have control to adjust the set point from there as well.

Heat Pumps

There are two alternative ways to do this.

1. Set the target temperature on the front panel of the heat pump and always leave the heater switched ON on its front panel. The IPC will signal the heater to heat in accordance with the operating PLAN. We recommend this method if you need to change the pool temperature set-point often, or
2. Set the target temperature on the front panel of the heat pump at least two degrees hotter than your target temperature and always leave the heat pump switched ON. Then, inform Pooled Energy of the actual target temperature you would like your heater to run to so we can configure the IPC accordingly. We recommend that you choose this method for maximum energy savings as we only run your dependent pump when heating is required to reach your target temperature. In a future version of the App you will have control to adjust the set point from there as well.

If you have a Solar Heater

Pooled Energy can manage your solar heater in three different ways, depending upon the type of solar heater that you have:

1. You have an **Independent Solar Heater**, that is, it has its own suction inlet and return pipe in the pool, and it can run independently of the pool filter. It has its own sensors, pump and solar controller. In this case, you can either leave it totally independent, or we can optionally connect it to the Pooled Energy Intelligent Pool Controller (IPC) at your request so as to schedule its operation.
2. You have an **In-Line Solar Heater** that requires the filter to also run when it operates. It has its own sensors, pump and solar controller, but it must run synchronised with the overall system. In this case, your solar controller must be connected to the IPC. Your solar pump will remain connected to your solar controller.
3. You have a solar heater that requires the filter pump to also run when it operates but no sensor and no solar controller. You do have a solar booster pump. In this case, the pump will be connected directly to the IPC and will be managed by it and will require additional cost components, which we can supply.

As an extension to the three solar heater options, you may also choose to opt-in to Pooled Energy's Solar Optimization for your solar pool heater. If you do, we will bypass your existing solar controller and control your solar pump using a smarter algorithm which draws on the daily weather forecast from the Bureau of Meteorology. This can have significant savings over conventional, thermometer-driven solar controllers which run additional minutes/hours of the solar pump each day in order to determine whether there is any benefit from running the solar pump.

Solar Heaters with their own Solar Controllers- Set-Up

Set the target temperature on the front panel of the solar controller and always leave the solar controller switched ON, on its front panel. The IPC will switch the solar controller power on and off in accordance with the PLAN.

You may override the PLAN anytime using the Pool App to turn any of these heaters ON for a period of time when you wish. This will also run the pump as required.

Types of Pool Sweep and how they are Managed

The Pooled Energy system manages the schedule of operation of pool sweeps and in-floor cleaners, via the PLAN. You are welcome and indeed encouraged to use one as it makes the pool much cleaner and easier to manage.

If you already have a pool sweep:-

a. If it is a pressure-side cleaner with its own pump, for example, a Polaris or a Jet-Vac, Pooled Energy will manage it from the Intelligent Pool Controller.

If you think the sweep should run longer or shorter hours than we recommend, please ask us to change it.

b. If it is a robot cleaner powered via an electric cord, you should operate it manually from a power point as most robot manufacturers recommend that the robot be removed from the water when not in use.

c. If your pool cleaner is an in-floor type powered by its own pump, it will continue to operate as now, but under the management of the Pooled Energy IPC.

d. If it is a suction-side cleaner powered via a hose from the skimmer box (Kreepy-Krawley type), then please talk to us about an upgrade. While the Pooled Energy system can operate with a suction-side cleaner, we generally do not recommend them for five reasons:-

i. Virtually all the debris in a swimming pool comes through the surface and the surface layer is the most highly contaminated in the pool and the one most essential to clean. The NSW Government Health Department and the World Health organisation recommend that as much as 90% of the water filtration in swimming pools be taken from the top layer of the water.

While the suction cleaner is busy cleaning the bottom of the pool, its suction hose is usually completely blocking the skimmer box and therefore the filter takes 100% of its water from the bottom. The surface layer will then become progressively more contaminated and debris that should have been skimmed, will now very slowly sink to the bottom making the water dirty and cloudy on the way. That makes for much more work (and energy usage) for both the suction cleaner and the filter. You will be very unlikely to achieve the normal Pooled Energy standard for water cleanliness if you use a suction cleaner. Moreover, the water will not be as well sanitised or as safe.

ii. Suction Cleaners are not well suited to automatic operation. If you have one, it is likely that you have a lot of leaves in your pool and you have to manually clean out the skimmer box quite often or else the efficiency of the filter will fall quickly due to the skimmer being blocked. Of course, skimmer boxes need cleaning anyway but the leaf load is better distributed between both a pressure-side cleaner and the skimmer, rather than being all in the skimmer.

iii. Suction cleaners tend to choke on larger debris and leaves and will not pick up such things as gum-nuts and small sticks, unlike pressure-side cleaners.

iv. Contrary to popular belief, suction cleaners do not run for free. In fact, they use a significant amount of filter pump energy which we are trying to save. Filters using suction cleaners need to run longer and harder, irrespective of the type of filter. US Electricity utility studies suggest that they consume as much as three-quarters of the energy of pressure side cleaners which use their own separate pumps (and, in our opinion, do a much better job in a much shorter time).

v. Some suction cleaners are noisy and not suitable for night time operation.

Pools with suction cleaners using the Pooled Energy system are typically set to allow the cleaner to operate with high filter power for a set-time and then to change to lower power. This usually gives a reasonable compromise between cleanliness, sweeping and energy use but we really think that you will get a better result with a robot or a pressure cleaner.

Pool Covers

Pool Covers help retain heat in your pool, keep dirt and leaves out, and reduce chemical use. The Pooled Energy system is compatible with pool covers and will adjust chlorination depending on whether the cover is in use.

Solar PV Panel and Heater Optimisation

If you have Time-of Use Electricity, we will make available our Solar Optimisation software for solar PV panels and solar heaters. Simplistically, this very clever software looks at the weather forecast and tries to run your pool from the lowest cost electricity.

On sunny days it will run from solar PV power with any required top-up from off-peak or shoulder electricity if needed. If rain is forecast, it will run from off-peak the night before, as much as it can. For spotty days, it will use a mixture. This way, it saves you both energy and \$\$.

Understanding Freshwater and Salt-Water pools

There are often misconceptions about 'fresh' water pools. Most people think that a liquid chlorine pool is a 'fresh' water pool with no salt concentration.

If you test the salt levels in so-called 'freshwater' pools, many of them are quite salty from accumulated salt from evaporation (tap water does contain salt), as well as from the salt that is included in liquid chlorine containers as a consequence of both the way it is made and the conversion that happens to liquid chlorine while it is stored. We often see 'fresh' pools with 1,000- 2,000 ppm (parts per million) of salt, with some at even higher levels. In those cases you may decide that the pool water should be diluted by the addition of tap water.

Saltwater chlorinated pools typically start at 3,500 ppm (where salt is generally not perceptible to taste), average around 4,500 ppm and don't typically exceed 6,000-7000 ppm. For comparison, the ocean is ~35,000 ppm. The permissible salt level may be constrained by your equipment. Some salt water chlorinators require the salt concentration to be at least 6,000 ppm. Gas heaters typically have a maximum salt level constraint with many being constrained to maximum salt levels of 4,500 ppm. In no case should the salt level be allowed to fall below 3,000 ppm as salt water chlorinators do not operate effectively below that level.

If you have a saltwater pool, you need to know the type of salt so that you can add more when required.

The types are:-

1. Common salt (most pools),
2. Magnesium salt (if you have sandstone or porous stone surrounds or want a softer water which is much nicer on the skin and hair),
3. Mineral salt, which is a premium magnesium/potassium blend that is functionally the same as Magnesium but has a slightly different taste.

Common salt is widely available through hardware stores and pool shops. Magnesium or mineral salts can be purchased typically from pool shops and some hardware stores, or can be provided by Pooled Energy at additional cost.

Spas

Spas that are physically connected to the pool in the sense that they share one body of water, may be partially managed via the pool's IPC. Please discuss with your installation team who will review the operations possible with your particular spa.

Faults

Remote Diagnosis of Faults

Pooled Energy's central Network Operating Centre (NOC) monitors your equipment and can often diagnose conditions such as low water, no water flow, pipe blockages, filter pump failures, sensor failures, aging chlorinator cells, overall chlorinator failures, some types of heater failures and some pool sweep failures. If we detect problems, we will advise you by SMS or email of such maintenance or service needs.

The NOC does not monitor or detect all possible problems. Some examples of these include too much water in the pool, debris or pollution following heavy rain, leaks, some modes of heater failures, some pool sweep and robot failures such as erratic running or wheel problems. If you notice a problem, you can notify our Call Centre and we can advise a course of action. In most cases we can offer referral to maintenance suppliers or organise that for you at a cost.

Please note that the ultimate responsibility for the safety of the pool, its equipment and its surrounds, remains yours. If you have any concerns, check and call us if appropriate.

Leaks and Broken Pipes

If you have a broken pipe or leak, put the entire system into AUTOMATION OFF using the Pool App. If water is splashing on electrical power points or equipment, please power off the entire area, via the fuse box, before entering.

Please shut any water valves you need to shut to stop the leak. You should then safely power down the IPC and advise the Response Centre that this is what you have done. We can, in some cases, offer a service to repair plumbing leaks and can also refer you to an additional service to analyse hidden leaks in the pool shell (using trusted sub-contractors).

Repairs, Changes and Upgrades

The Pooled Energy system is an integrated, automatic system that has been configured for the equipment installed at the time it was set to work. If you change the nature of its components, or reconfigure the system during repairs, then it may not work correctly.

All equipment repairs must be done with identical or functionally equivalent equipment. Often the best way for maintenance or replacement of non-Pooled-Energy equipment, is to ask Pooled Energy to provide this service. Pooled Energy provides competitive prices and rates for most functions associated with pool equipment.

Please check with us regarding any proposed equipment installations if you have others install them for you. It is important not to reconfigure plumbing and water flows without advising us, as these may require changes to the control PLAN for the pool.

Pooled Energy offers you a range of pool equipment at competitive prices, including:-

- Pool Heaters (with Heater Management via the Pool App)
Solar, Heat Pumps, Gas
- Pool Sweeps and Robots (with automatic control or via the Pool App)
- Filters, Pumps, Chlorinators
- Acid dispensers (for new, chemically-active pools).

For structural work, tiling, painting and enclosures, we can provide contact details of experienced sub-contractors.

Pool Sweeps and Robots Repairs and Replacements

Pooled Energy offers a service to repair or replace Jet-Vac and Polaris Cleaner heads and hoses, and iRoboter Robots at competitive prices. Please contact our Call Centre to arrange a replacement and obtain pricing.

Pooled Energy also offers a high quality, replacement, sweep pump if you would like us to supply and install it for you. Please contact our Call Centre to arrange a replacement and obtain competitive pricing.

SUMMARY

What you need to do

While the system is largely automated, you do need to do some things yourself to maintain water quality:-

1. Keep the pool, strainer, skimmer and sweep leaf-bag free of leaves and debris. This is essential for good water flow and quality.
2. If you don't have an automatic pool cleaner, please consider getting one. It is not possible to properly control the water chemistry of a pool that has leaves in it, especially decaying ones.
3. Keep the water level at a depth two-thirds of the height of the skimmer box opening.
4. Backwash the filter regularly.
5. Brush steps, swim-outs and areas of poor circulation.

Things you should not do

1. Do not add any chemicals without checking with us. Copper algaecides in particular can interfere with sensors and require sensor replacement. Calcium and buffer additions to conventionally recommended levels may cause scaling and should also be avoided.
2. Do not take the pool sweep out of the water without stopping it running using the Pool App.
3. Do not clean or work on any aspect of the pool system equipment without putting the Pooled Energy system into AUTOMATION OFF using the Pool App. Remember to turn it back on when you have finished.
4. Do not power-down the Intelligent Pool Controller or disconnect it from the Internet, except in emergencies.
5. Do not power down your home Internet or Wi-Fi Router if you go on holidays or any other time. If you do, your pool automation will still run, but it will not respond to changes in weather, season, or grid conditions, or communicate with our monitoring systems. If problems occur in your pool they will not be communicated and our Network Operating Centre will be unable to provide any support and you will not be able to use the Pool App.

Maintaining the Wi-Fi connection and keeping it operational is critical to the effective operation of the system.

Our Contact Details

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Emergency Contacts

Electricity Supply

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Endeavour: 13 10 03

Pool Services

Pooled Energy: 1300 364 703

Energy & Water Ombudsman

NSW Energy & Water Ombudsman

www.ewon.com.au

1800 246 545



The energy savers