

# CHEMIGEM

## D-10

# DOMESTIC CHEMICAL CONTROLLER

## INSTALLATION AND OPERATING MANUAL (SOLENOID VALVES VERSION)

**DO NOT DISCARD THIS MANUAL WHEN THE  
INSTALLATION IS COMPLETE AS IT PROVIDES  
IMPORTANT INFORMATION FOR OPERATING THE  
UNIT.**

**Important: If the Power Cord is damaged the unit must be  
returned to Pool Controls or its Service Agent for repair.**

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# IMPORTANT SAFETY INSTRUCTIONS

**CAREFULLY READ THE ENTIRE CONTENTS OF THIS MANUAL CAREFULLY READ THE FOLLOWING POINTS BEFORE INSTALLING THE CHEMIGEM**

**WARNING: It is important that the Chemigem is installed and operated in accordance with the instructions provided in this manual.**

**WARNING:** There is the risk of electric shock. Ensure all connections from the Chemigem to the electricity supply are made in accordance with local safety codes.

**WARNING:** Do not bury any electricity supply cords unless strictly following local safety codes. Locate all cords, wires and tubes away from places where they may become damaged by garden equipment.

**WARNING:** The Chemigem contains microprocessors that may be disturbed by the operation of electrical devices within a 5 metre radius.

**WARNING:** The Chemigem must be connected so that it only operates when the pool pump is running, otherwise incorrect pool water readings will occur and concentrated chemicals may flow into the pool water pipes and/or the chemical drums, where they can mix and produce poisonous Chlorine gas.

**WARNING:** Before operating the Chemigem, bring the pool water chemical levels to within the ranges given in this manual, but pay attention to the specific requirements of the pool builder.

**WARNING:** To ensure the desired chemical levels are being maintained, check the pool water with a good quality test kit. This should be performed daily for the first two weeks and on a regular basis thereafter.

**WARNING:** Always take water samples from a point near the skimmer box, for this is where the water is completely mixed, giving the most accurate readings. Never take water samples near the pool returns (“eye-balls”) where the Chemigem may have freshly dosed the pool water.

**WARNING:** It is very important that the reagents in the test kit are well within their use-by date, otherwise false readings may result. If in doubt, take a water sample to a pool shop for testing.

**WARNING:** Chemicals must be carefully diluted according to the size of the pool or spa. Always add the concentrated chemical to the water and never add the water to the concentrated chemical. Some chemicals react violently with water and can splash into face and eyes. Always wear protective face-shield and gloves for such operations. Fully observe all the chemical manufacturer’s safety instructions when handling pool chemicals.

**WARNING:** Ensure the chemical supplies (liquid Chlorine and pool Acid) are kept in visually different containers to avoid wrong connection. Use colour or size differences or both. When these two concentrated chemicals are mixed together out of the pool water, poisonous gas is produced.

**SAVE THESE SAFETY INSTRUCTIONS**

# MESSAGE TO THE OWNER

**Thankyou for choosing a Chemigem to look after your pool.**

## Ensure that the Unit Matches the Mains Power

**The Chemigem requires a mains supply of 220/250 volts AC**

Although the unit has an in-built surge protector, it is recommended that a voltage surge protection device be fitted to the electricity supply.

## Prior to Installation and Operation

**It is important that a full water test be done with a quality test kit and the pool water is correctly balanced prior to the operation of the Chemigem.** The pool builder often estimates the first dose of chemicals and adjustment is sometimes required.

## Chemigem Installation and Operation

This unit is one of the most advanced pool chemistry controllers of its kind. It is important that it is installed and operated in accordance with the instructions provided. The Chemigem is designed to automatically assist in keeping the levels of Chlorine and pH correctly balanced in swimming pools and spas.

It continuously monitors and adjusts pH and Chlorine levels required through state of the art solenoid valves, utilising the natural suction of the pool recirculating pump to add Chlorine and pool Acid as and when required.

Stable controlling of the Chlorine and pH levels of the pool water should be achieved during the first two weeks of operation. During this period, check the level of Chlorine, Total Alkalinity and pH regularly with a good quality test kit to confirm that the unit is keeping to the desired levels (Refer to pages 19 & 27).

The chemical levels are set by the keypads using a Menu System. Once the correct levels have been set for the pool water they should remain constant and do not have to be changed from season to season. However in winter the pool pump running times can be reduced. If the pool operator requires the levels to be altered, refer to page 24.

## Electronic Clock / Timer & Pool Pump Times

The in-built electronic clock requires setting to your local time (see page 39). Please read the Timer Overview on page 33. The Timer has selectable default operating times:

Def No.	Total Time	Run Times		Def No.	Total Time	Run Times	
1	8 hrs	6-8am	5-11pm (factory)	6	10hrs	6-11am	6-11pm
2	8 hrs	6-10am	6-10pm	7	8 hrs	8-12noon	2-6pm
3	10hrs	6-9am	5-12midnight	8	8 hrs	8-12noon	3-7pm
4	8 hrs	9am - 5pm (solar)		9	8 hrs	10pm - 6am (offpeak)	
5	6 hrs	6-8am	5-9pm	times may change – see unit for choices			

See pages 33 & 38 for more information. Note that the above defaults use all 4 Cycles for easy seasonal adjustment – see page 33 for details (*never change a time again !*)

## Pool Water Circulation

To enable the Chemigem to work efficiently, the mixing of the pool water has to be as quick and complete as possible. Positioning the return nozzles (eyeballs) to the pool so that the main water-body rotates is the best way to achieve this. Under no circumstances should the eyeballs be positioned to produce opposing circulation patterns. The unit's multi-electrode (probe) monitors the Chlorine and pH levels as the water travels towards the pump.

If the mixing of the pool water is slow, the multi-electrode (probe) will not receive the signal until large amounts of chemicals have been added to the water. When the multi-electrode (probe) finally receives the signal, the pool water may be overdosed and the excess warnings will operate.

## Heated Pool

**If the one pool pump is required to service both the pool heating system and the Chemigem, the pool heating plumbing must be bypassed. (Refer to pages 12 & 16)**

## CONTACT POOL CONTROLS

If problems are encountered in the installation or operation of the unit and the problems persist after checking the Problem Solving suggestions and other relevant sections of this manual, contact Pool Controls.

**Pool Controls contact details are:**

**Phone:** 1300 550 010  
**Fax:** 1300 895 231  
**E-mail:** [service@poolcontrols.com.au](mailto:service@poolcontrols.com.au)  
**Website:** [www.poolcontrols.com.au](http://www.poolcontrols.com.au)  
**Address:** 20 Abrams Street, Balcatta  
 Western Australia 6021

### IMPORTANT Mains Cable

Should the mains electricity supply cable ever become damaged in any way, the complete controller must be returned to the manufacturer or its authorised service agent for repair.

# PREPARATION

## ITEMS SUPPLIED

A brief description of the items supplied and the purpose of each item:

### Chemigem

The sealed unit is connected to the solenoid valves and assists in keeping the levels of Chlorine and pH correctly balanced in swimming pools and spas. (Refer to diagram on page 13)

Key features:

- A menu-driven digital controller
- An automatic pool pump timer
- An easy-to-read screen showing chemical settings and actual chemical readings
- Indicators that monitor whether pool water chemical levels are within the required range

### Multi-Port Injection Fitting or Tapping Band

The Multi-Port Injection Fitting is intended for new pools and can replace the elbow prior to the pump. The fitting can be installed vertically (elbow) or horizontally (in-line).

Pool Controls can also provide a Tapping Band which is intended for retro-fit installations and is inserted into the PVC pipe on the inlet (suction) side of the pool pump (Refer to diagram on page 13). A detailed diagram of the Tapping Band is provided on page 14.

The purpose of these fittings is to house the multi-electrode (probe) and to provide an injector nozzle for chemicals being dosed into the pool water via the solenoid valves.

### Multi-Electrode (probe)

The one multi-electrode (probe) is fitted horizontally into the Injection Point which is installed on the PVC pipe running from the pool to the pool pump.

The one multi-electrode (probe) monitors both the ORP/Chlorine and pH levels.

Chemical readings obtained by the multi-electrode (probe) are monitored by the Chemigem, resulting in Chlorine and/or pool Acid being dosed into the pool water as and when required via the solenoid valves and Injection Point nozzle. (Refer to diagram on pages 13 & 14)

### Solenoid Valves

The solenoid valves contain the only two moving parts in the Chemigem package. The purpose of the solenoid valves is to control the flow of Chlorine and/or pool Acid from the chemical drums as and when required and to inject the chemical(s) into the pool water via an injector nozzle on the Injection Point.

(Refer to diagram on pages 13 & 14)

### Coil of Plastic Tubing

The plastic tubing is connected from the solenoid valves to the chemical drums and the multi-port injection fitting. (Refer to diagram on page 13)

### Filters

There are two types of filter:

- In-Line Filter
- Drum Filter

The In-Line Filters are connected to the plastic tubing for both the Chlorine and pool Acid tube lines, between the respective chemical drums and the solenoid valves. (Refer to diagram on page 13)

The Drum Filters are connected to the plastic tubing. One is placed in the Chlorine drum and the other is placed in the pool Acid drum. (Refer to diagram on page 13)

### Sinker Sets

The Sinker sets are fitted above the Drum Filters. The purpose of the sinkers is to provide added weight to the Drum Filters so that the filters do not float but remain positioned close to the bottom of the chemical drums. (Refer to diagram on page 13)

### Wall Anchors and Screws

There are **six** wall anchors and screws for the affixing of the unit to a solid surface.

Wall anchors and screws are also supplied to affix the solenoid valves to a solid surface.

## TOOLS REQUIRED & THEIR PURPOSE

**19mm Hole Saw & Wrench for Tapping Band:** To drill a hole in the PVC pipe and for tightening the nuts/bolts. Refer to page 10 & diagram on page 14. A hole saw can be purchased from most hardware stores

**Spirit Level:** For fitting the Chemigem horizontally to a solid surface. (Refer to page 13)

**Electric or cordless drill:** For drilling screws to hold the Chemigem and Solenoid valves

### Drill Bits:

- 5mm masonry drill bit for wall anchors
- 3mm drill (for metal sheet or wood fixing)
- 10mm drill (for making holes in the lids of chemical drums)

**Knife:** For cutting the plastic tubing to required lengths

**Screwdriver:** For affixing self tapping screws

**Tape Measure:** To measure for the location of Chemigem components

## OTHER ITEMS REQUIRED & THEIR PURPOSE

**Pool Water Test Kit:** A good quality kit is essential for testing pool water. **The pool water must be tested & balanced before the Chemigem is turned on.**

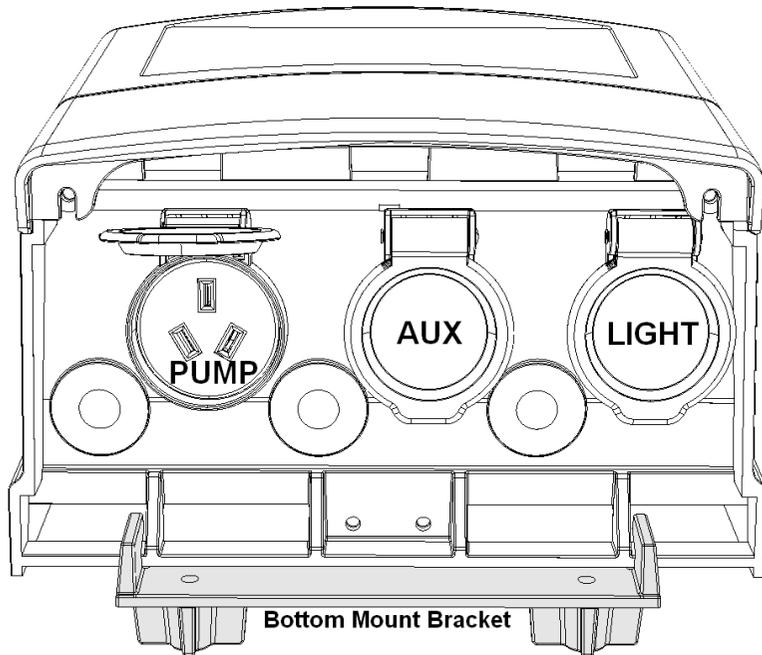
**Chemicals:** Refer to page 19 for initial chemical levels before turning Chemigem on.

**PVC Tape:** For use on the chemical drums, solenoid tubing and loose wires. (Refer to pages 11 & 12).

**Protective Face Shield and Gloves:** For use when diluting chemicals. (Refer to page 19)

## CHEMIGEM OUTLET SOCKETS & THEIR PURPOSE

There are three 240V socket outlets in the bottom of the Chemigem. These are marked as shown in the diagram:



**TAKE CARE TO PLUG THE CORRECT DEVICE INTO THE CORRECT SOCKET !**

# INSTALLATION

## Refer to Installation Sheet supplied with Unit.

If the unit is not a retro-fit the Multi-Point Injection Fitting (MPIF) can be used. This is simply installed in the inlet pipe to the pump. It can be installed as an elbow or in-line - refer to page 13. Instructions for the Multi-port injection fitting follow on this page.

## LOCATION

For ease of installation and for safety, the Chemigem must be installed as follows:

- In a normal upright position (with the printing on the front reading horizontally) and protruding cords facing toward the ground.
- Attached to a solid vertical surface to provide easy access to the power supply and should preferably be fixed at eye level. (refer to page 13)

To obtain maximum life for the unit it is recommended that it be located in a sheltered and shaded position.

**(Refer to pages 12, 15 & 16 for the special procedures required for the placement of Chemigem when the pool pump and filter are located below pool water surface level and/or when the pool has a heater unit)**

## POWER CONNECTION

It is important that the Chemigem only operates when the pool pump is running.

To ensure this happens, plug the pool pump into the socket in the base of the Chemigem and then plug the Chemigem into the power supply.

If the Chemigem is left switched on when the pool pump is off, the Multi Electrode (Probe) will quickly pick up false readings from the non-moving water causing warnings until the unit is switched off.

## CHEMIGEM INSTALLATION

Position the Chemigem within 3 metres of the injection point at a convenient height for easy operation, preferably at eye level. (Refer to diagram on page 13).

If it is impractical to install the unit at eye level because of site restrictions, install it at any height **above the solenoid valves** that provides ease of access and operation in a normal upright position (with the printing reading horizontally and protruding cords facing toward the ground).

**The solenoid valves **MUST** be above the height of the chemical drums.**

## INJECTION POINT INSTALLATION

**Multi-Port Injection Fitting (MPIF) OR Tapping Band**

### Air Leaks

Before commencing the installation of the injection point, check for air leaks in the suction line by switching on the pool pump and checking the lint pot. If there are large quantities of air bubbles swirling around which do not clear within 2 to 3 minutes, it is likely the system has an air leak in the suction line between the pool and the pool pump.

If a pool-cleaning device is in use, carefully check the flexible hose for small pinholes that allow the entry of air into the suction line.

## Installation

Turn off the pool pump before commencing the installation of the injection point.

Refer to the diagrams on pages 13 and 14 showing:

- The components to be connected to the PVC pipe
- The connection of the multi-electrode (probe) to the injection point
- The location of the multi-electrode (probe) and injection point

It is imperative to fit the injection point to the inlet (suction) side of the pool pump (Refer to diagram on page 13) unless using a venturi system. (Refer to pages 12 & 16) The required range of pressure/suction is negative 20 kPa to negative 70 kPa

After selecting the position for the injection point on the pool pump inlet pipe, ensure that it is as near as possible to the pool pump.

**It is essential that the multi-electrode (probe) and injector nozzle be in a rapid water stream. If not, the Chemigem will display incorrect and erratic readings and may cause excess additions of concentrated chemicals.**

The injection point can be positioned on either horizontal or vertical pipes, provided the multi-electrode (probe) is fitted exactly horizontally.

- If the multi-electrode (probe) is positioned with the sensor tips aiming downwards it will trap air bubbles and cause erratic and false readings
- If the multi-electrode (probe) is positioned with the sensor tips aiming upwards it will trap dirt or debris and cause erratic and false readings

### Drilling the Tapping Band Holes (where fitted)

- Drill a hole using a 19mm hole-saw through both sides of the PVC pipe
- Ensure the surround to the hole at the "O" ring contact is smooth and clean
- Fit the tapping band, first checking that the "O" rings are in position and that the arrow on the tapping band fitting points **toward** the pool pump

**Do not use grease or sealing compound on this fitting.**

To check the accuracy of the tapping band fitting position look through the multi-electrode (probe) arm (feel with your finger or use a mirror if the position is inaccessible) making sure the multi-electrode (probe) is lined up exactly with the holes. Tighten by hand and then give the nuts half a turn with a wrench. If the tapping band is over tightened it will split.

### Inner Shell of Tapping Band

The inner shell of the tapping band is used if the PVC pipe has a 40mm diameter.

If 50mm diameter PVC pipe is used, the inner shell of the tapping band is not required. (Refer to diagram on page 14).

## MULTI-ELECTRODE (PROBE) INSTALLATION

Remove the multi-electrode (probe) protective cap, before fitting to the injection point (Refer to diagrams on page 13-14). **Retain the protective cap for future use.**

For the MPIF simply insert the probe and twist to lock. Take care not to deform the o-ring or the probe may not seal.

For the Tapping Band fully insert the multi-electrode (probe) (with "O" ring fitted) and **hand tighten only.**

**Do not use grease or sealant on this connection to avoid contaminating the sensing part of the multi-electrode probe.**

## SOLENOID VALVE INSTALLATION

- The valves must be fitted as near as possible to the injection point (Refer to diagram on page 13)
- The valves must be screwed to a vertical surface above the top of the chemical drums and no more than 750mm from the ground so that the pool pump may easily raise the chemicals from the drums

To meet special needs, a Venturi system can be connected to the solenoid valves. (Refer to page 12)

## SOLENOID VALVE TUBING INSTALLATION

- Connect a length of tubing between the centre nipple on the solenoid valve base and the multi-port injection fitting or tapping band injector nozzle
- Connect a length of tubing to the Chlorine in-line filter and lay it neatly to the Chlorine drum (Refer to diagram on page 13)
- Connect a length of tubing to the pool Acid in-line filter and lay it neatly to the pool Acid drum (Refer to diagram on page 13)

Ensure that the tubing is absolutely clean and free from sand and dirt before fitting, as particles may enter the valve and cause leakage.

Do not use any tubing other than that supplied. To do so may result in damage to the Chemigem and negate the Warranty. If additional tubing is required for the installation of the unit, it will be supplied at no cost.

## CHEMICAL DRUMS INSTALLATION

**Ensure the Chlorine and pool Acid are kept in visually different drums to avoid wrong connection. Use colour or size differences, or both.**

Refer to the cutaway diagram of chemical drum on page 13 for a representation of the following:

- Position the Chlorine and Acid drums in a safe and secure location about 2 metres from the Chemigem
- Drill a 10mm hole in each of the screw-on drum caps (slightly larger than the diameter of the tubing) to allow venting and to prevent the drum walls from being sucked in as the chemicals are used
- Pass a length of supplied tubing through the hole in the appropriate drum cap
- Place the supplied sinkers onto the tubing and attach the appropriate drum filter (Refer to page 13)
- When placing the tubing into the drums, measure the tubing against the outside of each drum so that the drum filter will be 10-15mm above the bottom of the drum and then apply several turns of PVC tape at a point above the cap to prevent the tubing from slipping further into the drum
- Lower the drum filter and sinker into the drum and screw on the cap (Refer to pages 27 & 28) for Chlorine and pool Acid dilution details.

## FITTING CHEMIGEM TO A HEATED POOL

If the pool heating system is controlled by a separate pool pump, there are no factors that affect the installation of a Chemigem. **If the one pool pump is required to service both the pool heating system and the Chemigem, the pool heating plumbing must be bypassed. This will necessitate the installation of a Venturi system at an additional cost. Refer to diagram on page 16**

## FITTING CHEMIGEM BELOW POOL WATER LEVEL

(Diagram page15)

The following instructions assume the installer has some knowledge of the operation of the pool and the parts described. If the installer is not experienced in pool operation and maintenance, contact the supplier of the Chemigem or a qualified pool maintenance technician with any questions before attempting to carry out the steps described in this section.

The Chemigem must be installed within 3 metres of the Injection Point and in an upright position and attached to a solid vertical surface, preferably at eye level.

If it is impractical to install the unit at eye level because of site restrictions, install it at any height above the solenoid valves that provides ease of access and operation. The solenoid valves **MUST** to be above the height of the chemical drums.

When the pool pump and filter are fitted below the pool water surface level, the suction line may be under positive pressure even with the pump running. In this case an isolating valve **must** be fitted to enable the pump and filter to be serviced.

Fit the Injection Point between the isolating valve and the pool pump and close the isolating valve sufficiently to obtain the required suction so as to allow the unit to operate effectively.

The required suction range is negative 20kPa to negative 70 kPa when the pool pump is running and the filter is clean.

Methods to obtain improved suction involve using venturi devices or orifice plates. Contact the supplier of the Chemigem or a qualified pool maintenance technician for information on these.

**If the pool pump is more than one metre below the pool water surface it is essential to fit Non Return Valves into the chemical supply tubing to prevent back-flow into the chemical drums.**

Failure to prevent the back-flow into the chemical drums would cause spillage from the drums, which in turn may result in the two concentrated chemicals mixing together out of the pool water and producing poisonous chlorine gas. **In addition, there is the serious possibility of personal injury from contact with the chemicals and breathing the fumes.**

## VENTURI SYSTEM

A venturi system is required for:

- Special needs, such as fitting a Chemigem below the pool water surface level (Refer above and to page 15)
- Pools that are heated (Refer to pages 12&16)

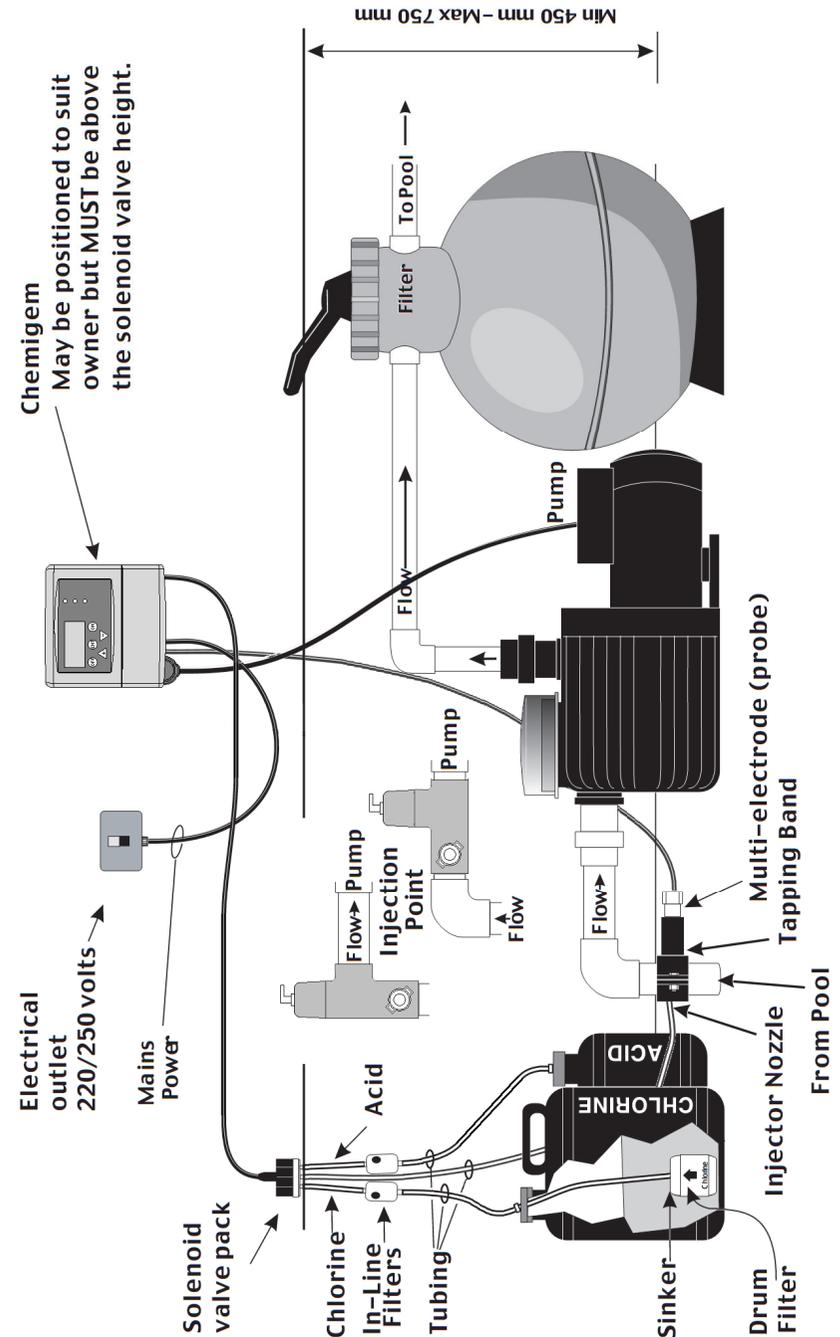
Pool Controls provides information on the installation procedure for a venturi system.

Pool Controls provides the venturi system at an additional cost.

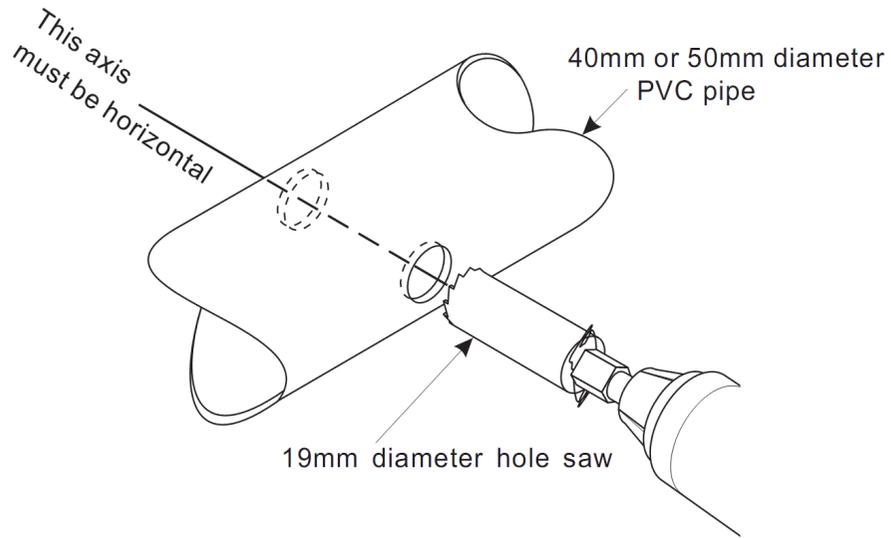
## NEATENING UP

Finish the installation by taping all loose wires and tubing together and place off the ground to prevent damage and possible electrical shorting.

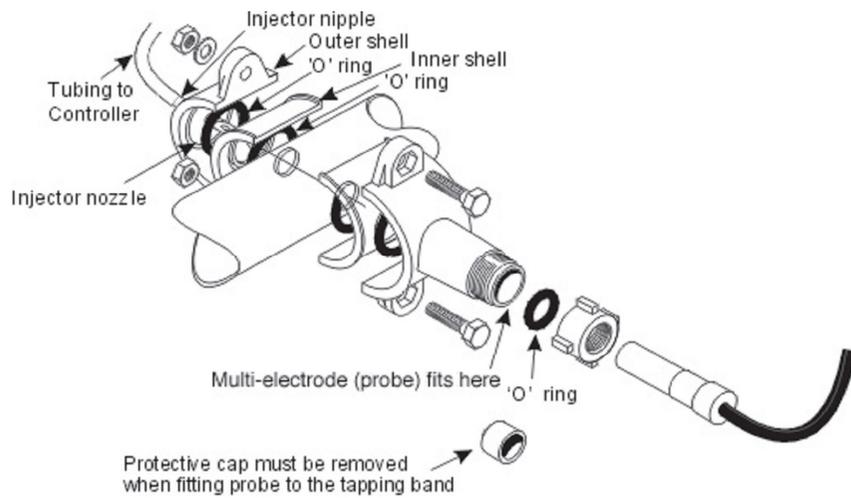
## INSTALLATION DIAGRAM



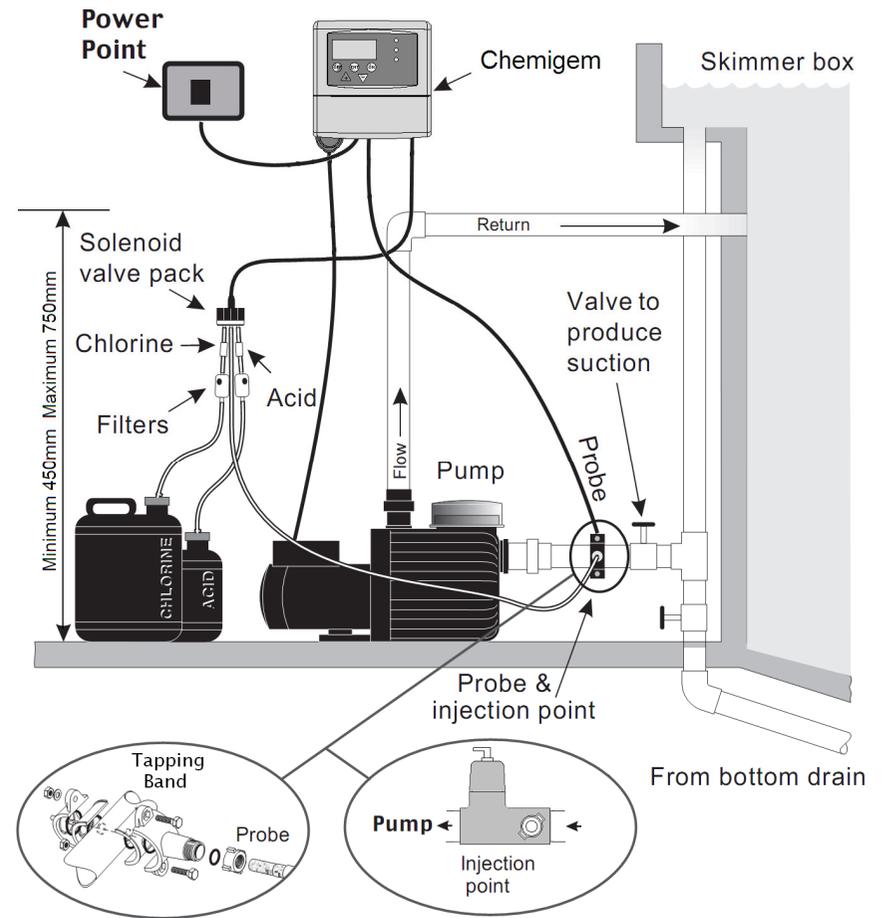
## DRILLING TAPPING BAND HOLES



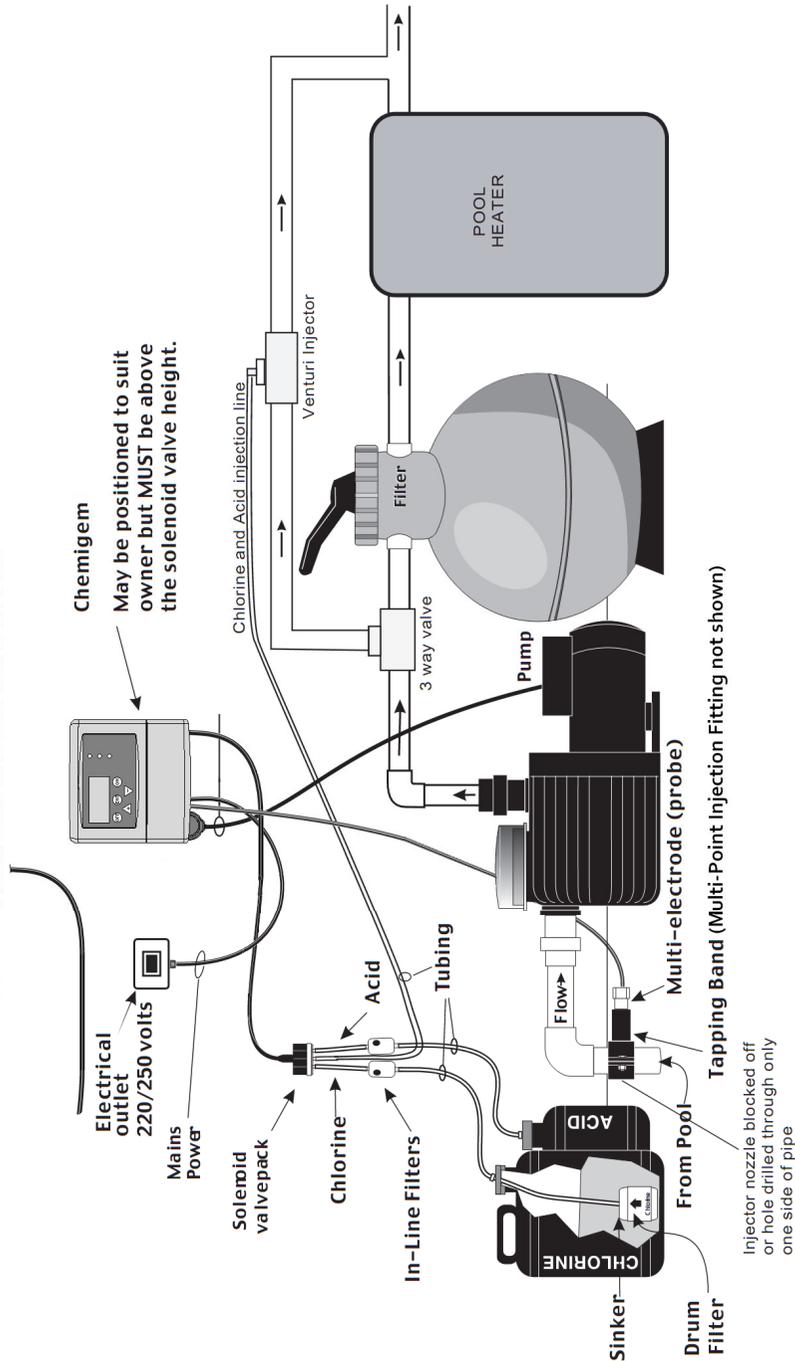
## TAPPING BAND & MULTI-ELECTRODE



## FITTING CHEMIGEM BELOW POOL WATER LEVEL



## FITTING CHEMIGEM WHEN HEATER IS IN CIRCULATION, USING VENTURI INJECTOR DEVICE



# OPERATION

## INTRODUCTION

The Chemigem is designed to measure and automatically adjust the Chlorine and pH levels of the water in all types of pools. Once levels are finally set or adjusted, the unit should be left alone. The unit has been factory-set to achieve 650mV (milliVolts) ORP (Chlorine) and 7.6pH.

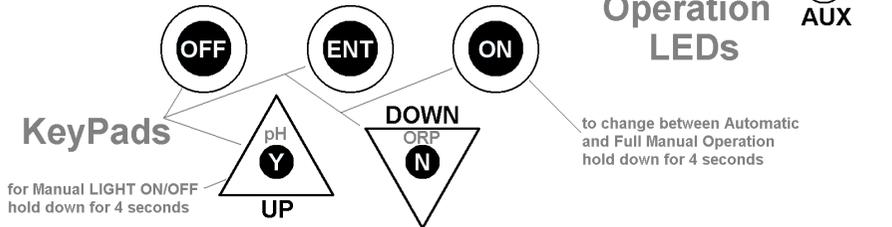
If the unit is used with these factory-set points as the selected levels, it should obtain approximately 2-4ppm Chlorine and 7.6pH, providing the stabiliser level is at 50ppm. If the stabiliser level is 30ppm or less, the Chlorine will be around 1ppm or less. **Stabiliser reduces chlorine consumption.**

## READING THE DISPLAY PANEL

### LCD Display

Line 1	15:27	NORMAL	Auto
Line 2	AutoON → AutoOFF@ 21:00		
Line 3	ORP=670mV	SET=650mV	
Line 4	pH= 7.5	SET= 7.6	

READ OPERATION MANUAL FOR DETAILED INSTRUCTIONS



## Timer Operation: Lines 1 & 2

Line 1 shows the time (24-hour) followed by the mode of operation (3:27pm shown).  
Line 2 shows the actual timer operation. In the example above this line can be read as: "Auto-ON with next Auto-OFF at 21:00 (9pm)".

## What do the Chlorine (Line 3) and pH (Line 4) Numbers Represent ?

The Chlorine (ORP) is the activity of the chlorine (see explanation of ORP next page) and is measured in milliVolts (mV).

The pH is the measure of acid / alkalinity and is displayed in units of the pH scale.

## What is ORP?

Chlorine kills pathogens (eg harmful bacteria) in water by oxidation. The oxidation level in the water is measured with an ORP sensor, which produces a voltage related to the ORP of the water. This voltage is a measure of the activity (effectiveness) of Chlorine in the water. It has been found that if ORP is maintained at 650mV, the kill time of E-coli type bacteria is about one second. If the ORP is lowered to 550mV, the same organisms could take up to 2 hours to be eliminated.

A test kit will measure Chlorine as parts per million (ppm) but the activity level of the Chlorine (and therefore the kill-time) depends upon other materials dissolved in the pool water. **For an ORP controller to work properly the pH, Total Alkalinity (TA), stabiliser (cyanuric acid) and Total Dissolved Solids (TDS) must be maintained within the recommended levels given on pages 19 & 27.**

## Left Hand Side of Display Screen

The numbers on the left hand side of the display screen are the values the multi-electrode (probe) is registering for the **actual** levels of Chlorine and pH of the pool water.

The Chemigem will work to achieve the same values as those “**SET**” on the right-hand end of the display.

## Right Hand Side of Display Screen

The numbers on the right-hand side of the display screen are the values “**SET**”.

The unit has been factory-set to achieve 650mV Chlorine (ORP) and 7.6pH as the preferred levels for Chlorine and pH respectively.

These settings may be raised or lowered using the Menu System by pressing the UP/DOWN pads for pH and ORP respectively.

## ELECTRONIC CLOCK

The Chemigem has an in-built electronic clock with a trickle-charge backup battery (gives approximately 24hr back-up depending on usage) that controls the automatic switching on and off of the pool pump and pool light. (Refer to pages 4, 38 - 40)

## DOSING OF CHEMICALS

Dosing of chemicals will only commence after a few minutes to allow for adequate mixing and accurate sensing.

Every 3 minutes Chlorine will feed for 8 seconds and then pool Acid will feed separately for 7 seconds, until the required chemical levels are reached. Depending upon how the unit has been programmed, the standard procedure is that the first time that the unit operates it will take approximately 120 minutes to fully adjust to the required levels of Chlorine and pH. In some pools the ORP may overshoot by up to 50mV due to a lag with the reduction of the pH. Thereafter it will normally restore the required levels in approximately 30 minutes. **Ensure that the pool pump is running for a sufficient period to carry out these adjustments.**

## BEFORE STARTING THE CHEMIGEM

**Before switching on the Chemigem carry out a full water test with a good quality test kit and balance the pool water to the levels shown below.**

**If the pool water is not balanced when the unit is first turned on, the unit may fail to correctly control the pool water.**

**Calcium Hardness, Total Alkalinity and pH should be adjusted first, followed by Chlorine and then Stabiliser (cyanuric acid).**

Initial set up by the pool builder often includes the addition of the first amounts of chemicals. These may be estimated amounts and may require adjustment.

- Adding chemicals will take only a few minutes but removing the chemicals depends upon the natural dissipation from the pool, which could take weeks
- pH is lowered by the addition of acid
- Do not overdose the pool with Chlorine, pool Acid or Stabiliser
- Always add the various pool chemicals slowly and with care, allowing sufficient time for complete dissolving and mixing throughout the pool water
- Finally, carry out careful water tests to determine whether the correct amounts have been added

If unsure how to carry out a water test and/or initially balance the pool water, request a qualified pool maintenance technician to do this for you.

It is suggested that swimming pool water should be maintained within the following ranges and that these ranges are confirmed with your local authorities as meeting their standards:

- |                                |                              |
|--------------------------------|------------------------------|
| • CHLORINE                     | 1.0 to 3.0 ppm or 3.0 mg/l   |
| • pH                           | 7.2 to 7.8                   |
| • CALCIUM HARDNESS             | 90 to 300 ppm or 300 mg/l    |
| • STABILISER                   | 30 to 50 ppm or 50 mg/l      |
| • TOTAL ALKALINITY             | 80 to 300 ppm or 300 mg/l    |
| • TOTAL DISSOLVED SOLIDS (TDS) | 300 to 1500 ppm or 1500 mg/l |

Pay particular attention to the instructions on the chemical drums. Add each chemical separately and slowly allowing plenty of time for them to dissolve. Always test between additions with a good quality test kit.

When diluting chemicals **always** add the concentrated chemical substance to the water and **never** add the water to the concentrated chemical. Some chemicals react violently with water and can splash into the face and eyes. **Always** wear a protective face shield and gloves for such operations.

After the pool water has been correctly balanced and the unit is switched on, it will measure and automatically adjust the Chlorine and pH levels. Chlorine and pool Acid will feed separately for a few seconds approximately every 3 minutes until the required levels are reached - depending on how the unit has been programmed.

## THE FIRST TWO WEEKS

The day following the installation of the Chemigem and after the pool pump has been running for 30 minutes, check the level of Chlorine and pH with a good quality test kit. If either of the levels is not exactly at the levels required, alter the settings a little. The unit will bring about the changes to the chemistry of the pool water as the pool pump circulates the water.

During the two weeks after a pool is first filled, the water chemistry will be settling down. It is likely that chemical levels will fluctuate during this time, so keep a check on the pool water with a good quality test kit or obtain confirmation by seeking help from a qualified pool maintenance technician.

It is not uncommon for new plaster/marblesheen pools to use more acid during their first month or two but do not let the pH and Total Alkalinity remain below recommended levels, or the lifetime of the pool surface may be shortened.

Depending upon how the unit has been programmed, the standard procedure is that the first time that the unit operates it will take approximately 120 minutes to fully adjust to the required levels of Chlorine and pH. Thereafter it will normally restore the required levels in approximately 30 minutes.

**Ensure that the pool pump is running for a sufficient period to carry out these adjustments.**

If the actual chemical levels being achieved by the unit are not closely matching the “SET” levels, make minor adjustments (either up or down as the circumstances warrant) to the “SET” levels and re-test after 24 hours.

Additions by the unit are made in minutes, but removing excess chemicals may be difficult and require weeks.

Do not go outside the ranges given on pages 19 and 27 and pay attention to any specific requirements given by the pool builder.

Always take samples at a point near the skimmer box, for this is where the water is completely mixed giving the most accurate readings, **never** near the pool returns (eyeballs) where the water may have been freshly dosed by the unit.

Always follow the specific requirements of the pool builder when setting the chemical levels for the pool.

## REGULAR CHECKS ON THE QUALITY OF POOL WATER

As a precautionary measure to ensure that the desired pool water chemical levels are being maintained and that the Chemigem is functioning correctly, regularly check the pool water quality with a good quality test kit.

If the pool is heavily used (such as in hot weather) it must be checked more frequently.

As a general guide it is recommended that the check should be made at least twice weekly in the swimming season and once each two weeks in the non-swimming period.

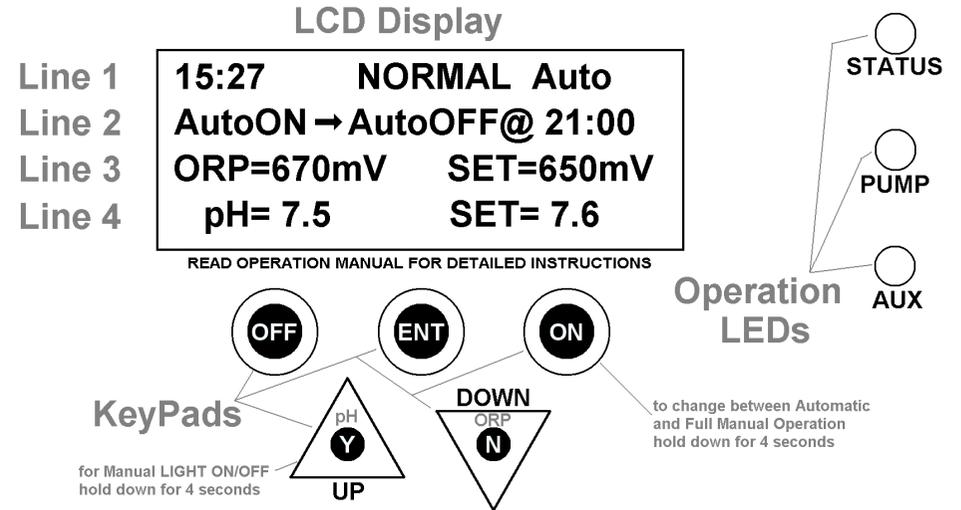
Seek guidance from your local authority or qualified pool maintenance technician.

## REGULAR CHECKS OF THE SOLENOID VALVE TUBING

Regularly check the solenoid valve tubing to ensure that it has not become brittle.

**If the solenoid valve tubing becomes brittle, it must be replaced immediately.**

## KEYPADS & OPERATION LEDs



## GENERAL OPERATION

The Chemigem has a digital control system that is adjusted by Menus. There are also keypads for making fast alterations to the unit operation. The use of Menus is necessary to avoid having more keypads than would fit on the entire face of the unit !

**OPERATION LEDs:** These LEDs show if the unit is functioning correctly. The STATUS LED will be green for correct operation and red for a warning – read the LCD display to know what the warning is for, see page 25 for details. The **PUMP & AUX LEDs** show if the PUMP and AUX outlets in the bottom of the unit are powered and if the item attached to the outlet is functioning correctly (green for OK and red for a problem).

The following information will allow you to start using your Chemigem immediately. There is more detailed information about the Operating System beginning on page 32.



**KEYPAD “OFF”**

This keypad is used to turn the pump (and unit operation OFF) if the pump is operating. If the pump is already OFF the unit will move into a “No Auto” mode that will stop the pump from turning ON automatically. This is for doing service work on the pool such as cleaning the Multi-electrode (probe) or emptying the pump leaf basket. To leave the No Auto mode simply press ON keypad to start the pump for priming the filtration system. Note that the Chemigem is always in Auto Mode unless it is placed into Full Manual Mode for control by an external timer. The “No Auto” mode is temporary !



## KEYPAD “ON”

This keypad has a number of functions. If the pump is OFF a single press will turn the pump and Chemigem ON. Another press will activate a feature that allows you to select a specific run time. Further presses will adjust the number of hours that the unit will run – up to 48 hours. An ENT-press is used to lock in the number of hours selected and start the countdown. The unit will revert to normal Auto operation after the times elapsed.

If the ON-pad is held down for approximately 4 seconds the Chemigem will change to Full Manual Mode for operation with an external timer/controller. To change back to Auto Mode simply hold the ON-pad for another 4 seconds.



## KEYPAD “ENT” (short for “ENTER”)

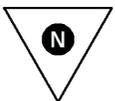
The ENT-pad is used to access the Menu System and ENTER any selections made. An ENT-press will bring up the first Menu on the LCD. From there another ENT-press will access the displayed Menu and an UP/DOWN-press will move to the next Menu available. There are Menus within Menus – for example the TIMER MENU has sub-Menus such as SET TIME and ADJUST CYCLES (there are more). If a Menu calls for an adjustment this is done using the UP/DOWN keypads.



## KEYPAD “UP” (and “Y” FOR YES plus pH Menu shortcut)

The UP-pad has a number of functions. From normal operation it is used as a shortcut to the pH MENU. This Menu is used to check/change the settings for the pH Control System of the Chemigem. It also functions within the Menu System to move through Menus, as an adjuster of values (increase) and as YES when answering questions.

When held for approximately 4 seconds it also functions to turn the Light Outlet (in bottom of unit) ON / OFF for manual operation of a pool light.



## KEYPAD “DOWN” (and “N” for NO plus ORP Menu shortcut)

The DOWN-pad has a number of functions. From normal operation it is used as a shortcut to the ORP MENU (for control of chlorine levels). This Menu is used to check/change the settings for the ORP Control System of the Chemigem. It also functions within the Menu System to move through Menus, as an adjuster of values (decrease) and as NO when answering questions.

## EMPTYING THE POOL AND FREEZING CONDITIONS

- If the pool water is emptied from the swimming pool, pool pump, pool filter and associated pool piping for any reason (such as when the pool is being serviced)
- During periods of freezing conditions (below 32 degrees Fahrenheit or zero degrees Celsius)

**It is essential to remove the multi-electrode (probe) and to cover the sensing end of the multi-electrode (probe) with the white protective cap that is provided (refer to pages 10 and 14) and also to temporarily seal the resultant exposed hole in the multi-port injection fitting/tapping band with tape or wine-bottle cork (to avoid water seepage or sand and dirt entering the pool piping).**

Failure to carry out these functions may damage the multi-electrode (probe) and negate the Warranty.

Refer to page 10 for the re-installation of the multi-electrode (probe).

Contact the supplier of the Chemigem or a qualified pool maintenance technician if assistance is required for the removal and re-installation procedures.

## TURNING ON AND OFF THE CHLORINE AND POOL ACID

Do not turn off either the Chlorine or pool Acid supply without advice from a qualified pool maintenance technician or the supplier of the Chemigem.

Turning off the supply of either of the chemicals is not normally necessary and could lead to unbalanced pool water that may not be safe for swimming.

In the event that it is necessary to turn off (disable) the Chlorine or pH function, the Chemigem has an easy means of doing this (**pH and ORP MENUS see details page 46**):

### To Turn Off the Chlorine (ORP)

From normal operation make a DOWN-press. This will get into the ORP MENU. The display will prompt for ON- or OFF-press to Enable or Disable the ORP Control respectively. An OFF-press will turn the ORP (chlorine) System OFF.

### To Turn On the Chlorine

From normal operation make a DOWN-press. This will get into the ORP MENU. The display will prompt for ON- or OFF-press to Enable or Disable the ORP Control respectively. An ON-press will turn the ORP (chlorine) System ON. There are other questions in this Menu that must be answered before normal operation resumes. See detailed description of the ORP MENU on page 46.

### To Turn Off the Pool Acid (pH)

From normal operation make an UP-press. This will get into the pH MENU. The display will prompt for ON- or OFF-press to Enable or Disable the pH Control respectively. An OFF-press will turn the pH System OFF.

### To Turn On the Pool Acid (pH)

From normal operation make an UP -press. This will get into the pH MENU. The display will prompt for ON- or OFF-press to Enable or Disable the pH Control respectively. An ON-press will turn the pH System ON. There are other questions in this Menu that must be answered before normal operation resumes. See detailed description of the pH MENU on page 46.

## MANUAL DOSING

If as a result of a pool water test it is determined that the Chlorine and/or pH are not within acceptable levels, the Chemigem can perform a manual dosing operation to rapidly add Chlorine or pool Acid. Note that the pump must be running to add chemical.

Make an UP/DOWN-press to enter the appropriate pH/ORP MENU. An ON-press will Enable the system and the display will read "Manual Feed Y/N ?". An UP-press will answer Yes and the display will then read "FEED 5 Sec/50mL" – this can be adjusted by using the UP/DOWN pads. When the desired dose is displayed an ENT-press will then ENTER the selection and after a 2 second wait the system will revert to normal operation and the Chemigem will add the selected quantity of the chemical. See page 46.

*Note: the volume displayed is an estimate only !*

## ADJUSTING THE SET POINT

If a different set value is required an adjustment can be easily made. A set value of pH 7.6 is assumed in this example.

Make an UP/DOWN-press to enter the appropriate pH/ORP MENU. An ON-press will Enable the system and the display will read "Manual Feed Y/N ?". A DOWN-press will answer No and the display will then read "ADJUST SET POINT ?" An UP-press will answer Yes and the display will then read "SET POINT 7.6" – this can be adjusted by using the UP/DOWN pads. An ENT-press will then ENTER the selection and after a 2 second wait the system will revert to normal operation and the Chemigem will show the new value for the Set Point. See page 46.

## RE-CALIBRATING pH

The Chemigem has been equipped with a quick procedure to re-calibrate pH values.

If for any reason the factory-settings are not the required levels, the unit can be re-calibrated.

**Do not re-calibrate until identical pH readings have been obtained from at least three test kit results from around the pool. Be sure of the pH reading before calibration !**

The following information assumes a pH of 7.8 is currently measured as an example.

Make an UP-press to enter the pH MENU. An ON-press will Enable the system and the display will read "Manual Feed Y/N ?". A DOWN-press will answer No and the display will then read "ADJUST SET POINT ?" A DOWN-press will answer No, there will be a short delay and the display will then read "CALIBRATE PROBE ?" An UP-press will answer Yes and the display will then read "PROBE pH = 7.8 ADJUST TO + 0.0" – this can be adjusted by using the UP/DOWN pads. The new value for pH as well as the adjustment amount is shown. An ENT-press will then ENTER the selection and after a 2 second wait the system will revert to normal operation and the Chemigem will show the new value for pH. See page 46.

## RE-CALIBRATING CHLORINE

Recalibrating ORP (chlorine) is not needed and it should not be attempted without the prior advice of Pool Controls.

# ALARMS – STATUS LED

**It is the pool owner's responsibility to monitor their pool and check its operation. While the Chemigem will show problems as they occur the owner must look at the Chemigem and test the pool water with a quality test kit to confirm that all is well. The Chemigem will balance pH and Chlorine (ORP) – it can not balance other factors such as Total Alkalinity or stabiliser level. Checking these regularly is necessary for the correct functioning of the Chemigem.**

## THE NORMAL RANGE

When the pool pump is running the Chemigem shows a green STATUS if the pH and ORP (chlorine) levels are within the normal range.

To ensure the unit is maintaining the pool water at the required levels, check the pool water on a regular basis with a good quality test kit.

The unit operates to keep the activity of Chlorine in the pool at a level where micro-organisms are killed in about 1 second. For this to happen both the Chlorine (ORP) and pH must be kept within a fairly narrow band. (Refer to page 19 & 27)

## OUTSIDE THE NORMAL RANGE & LOW pH SHUTDOWN

If the levels of chemicals move outside the optimum band the Chemigem will indicate this in two ways.

- STATUS will become red
- A warning will be shown on the LCD indicating the problem
- **In some circumstances the pump will turn OFF to avoid damaging conditions in the pool – this is to stop further chemical additions as the system uses pump suction.**

**This booklet contains sections on what remedial action to take should the warnings operate.**

**If the unit is indicating that the chemical levels are outside the normal range do not use the pool for bathing unless the problem is resolved. Study the Problem Solving guide on page 31. Failure to take these safety precautions when the unit is indicating it is outside normal ranges may be dangerous, as outlined below:**

- Low Chlorine means the water could be carrying live and dangerous germs
- High Chlorine will bleach swimwear and may irritate sensitive skin
- Low pH is acidic and may irritate eyes and skin and/or damage pool surfaces
- High pH makes the Chlorine less effective – this can lead to a Low Chlorine Alarm

## STATUS LED is RED - STEPS TO TAKE

**Alarms must not be ignored. Immediately investigate the causes and until it is certain that the pool water is safe, do not use the pool. Seek professional help from a qualified pool maintenance technician if it is not fully understood what is happening.**

- Read the message on the screen. This will advise which chemical is out of the normal range
- Make a test of the pool water with a good quality test kit to check if the Chemigem has similar readings
- It is very important that the chemical reagents in the test kit are well within their use-by date. If in doubt, take a fresh sample of pool water to a pool shop for an independent test
- If the Chlorine is too low, or the pH too high, check the drums of chemical to determine whether they have run out
- If the Chlorine is too high or the pH too low, switch off the one that is incorrect and as an extra precaution, remove the tube from the drum and place it in a bucket of water

Consult the Problem Solving section on pages 29 - 31 and see page 28 for suggestions on how to deal with chemical excesses.

# CHEMICALS

## CHEMICAL FEEDING

Depending upon how the unit has been programmed, the standard procedure is that the first time that the unit operates it will take approximately 120 minutes to fully adjust to the required levels of Chlorine and pH. Thereafter it will normally restore the required levels in approximately 30 minutes.

**Ensure that the pool pump is running for a sufficient period to carry out these adjustments. Note that in the case of new pool start-ups (or conditions far from the set points) the ORP may overshoot the set point by around 50mV. This is possibly due to high pH taking longer to be brought within range (high pH leads to low ORP readings).**

## VALUABLE TIPS

The pH setting will determine how much acid is used in the pool as well as how much buffer (sodium bicarbonate) is required over the long term. If pH is set at the lower levels more acid will be required to maintain it and more buffer will be consumed. If the pH is set at the higher levels (7.6 to 7.8) then the minimal amount of acid and buffer for your pool will be consumed. Stabiliser (cyanurate) will reduce your chlorine usage, which in turn will reduce your acid and buffer usage. Maintain stabiliser at around 50ppm at all times.

## ADJUSTMENTS TO CHEMICAL LEVELS

The day following the installation of the Chemigem and after the pool pump has been running for 30 minutes, check the level of Chlorine and pH with a good quality test kit. If either of the levels is not exactly at the value required, alter the settings a little using the appropriate Menu. The Chemigem will bring about the changes to the chemistry of the pool water as the pool pump circulates the water. It is suggested that swimming pool water should be maintained within the following ranges and that these ranges are confirmed with your local authorities as meeting their standards:

• CHLORINE	1.0 to 3.0	ppm or 3.0 mg/l
• pH	7.2 to 7.8	
• CALCIUM HARDNESS	90 to 300	ppm or 300 mg/l
• STABILISER	30 to 50	ppm or 50 mg/l
• TOTAL ALKALINITY	80 to 300	ppm or 300 mg/l
• TOTAL DISSOLVED SOLIDS (TDS)	300 to 1500	ppm or 1500 mg/l

The Chemigem will work at maintaining Chlorine (ORP) levels within a range of 600 - 700 millivolts when set at 650 and pH levels within 0.2 pH units of that set. The pH scale runs from 1 to 14, with 1 being strongly acid and 14 being strongly alkaline.

pH values at the upper and lower ends of this scale are **very dangerous**.

Pool water should be between pH 7.0 and 7.8 (which is almost neutral) so it is not harmful to humans.

pH is also very important in keeping pool surfaces from degrading too rapidly. Too much acid (too low a pH value) will cause plaster surfaces to degrade quickly. The unit is factory-set to help maintain pH at 7.6 to keep the pool plaster in good condition. If after a few days the unit is not able to keep within these ranges, check Problem Solving on page 31 in this manual and/or contact the supplier of the Chemigem or a qualified pool maintenance technician.

## POOL CHEMICAL DILUTIONS

### Chlorine

The Chemigem is designed to automatically help keep the correct level of Chlorine (and pH) in pool water by continuously monitoring the water chemistry while the pool pump is operating. Chlorine (and pool Acid) is dosed into the pool water as and when necessary. The Chlorine in common use is a sodium hypochlorite solution. The Chemigem uses this chemical.

**Diluting Chlorine is strongly recommended as follows:**

- Pools larger than 90,000 kilolitres..... 20 litre drum or larger (full strength)
- 20,000 to 90,000 kilolitres..... 20 litre drum (full strength)
- 10,000 to 20,000 kilolitres..... 20 litres diluted 1:1 with water
- Spas/pools 2,000 to 10,000 kilolitres ..... 20 litres diluted 1:15 with water
- Spas less than 2,000 kilolitres ..... 10 litres diluted 1:20 with water

# PROBLEM SOLVING

## Pool Acid

The Chemigem is designed to automatically keep the correct level of pH (and Chlorine) in pool water by continuously monitoring the water chemistry while the pool pump is operating. Pool Acid (and Chlorine) is dosed into the pool water as and when necessary.

There are two kinds of pool Acid in common use and the unit is able to use both:

- Hydrochloric Acid (muriatic acid).
- Non-Fuming Pool Acid (dilute sulphuric acid)

**It is strongly recommended that the non-fuming pool Acid be used as Hydrochloric Acid gives off corrosive / irritating fumes in its concentrated form. It must be kept at least 6 feet from the unit unless diluted at least 5 to 1 with water.**

**Diluting Pool Acid is strongly recommended as follows:**

- Pools larger than 90,000 kilolitres..... 15 litre drum, full strength
- 50,000 to 90,000 kilolitres..... 15 litres diluted 1:5 with water
- 10,000 to 50,000 kilolitres..... 15 litres diluted 1:10 with water
- Spas/pools 2,000 to 10,000 kilolitres ..... 15 litres diluted 1:15 with water
- Spas less than 2,000 kilolitres ..... 15 litres diluted 1:20 with water

**IMPORTANT: Always add concentrated Acid to the water not the water to the concentrated Acid. Small quantities of water will react violently with concentrated Acid, giving off heat and boiling the water that may splash Acid.**

## IMPORTANT POINTS TO NOTE

- Adding chemicals will take only a few minutes but removing the chemicals depends upon the natural dissipation from the pool water, which could take weeks
- Add pool chemicals slowly and with appropriate care, allowing sufficient time for complete dissolving and mixing throughout the pool water and then carry out water tests to determine whether the correct amounts have been added
- Take samples at a point near the skimmer box, for this is where the water is completely mixed, giving the most accurate readings. Never take samples near the pool returns (eyeballs) where the Chemigem may have freshly dosed the pool water
- Do not overdose the pool water with either Chlorine, pool Acid or Stabiliser
- pH is lowered by the addition of pool Acid
- Excess pool Acid (low pH) is neutralised with Sodium Carbonate (strong) or Sodium Bicarbonate (less strong)
- Excess Chlorine is neutralised with Sodium Thiosulphate
- Excess Alkalinity is neutralised with Hydrochloric acid (Muriatic acid) or pool acid (equivalent sulphuric acid)

## EXCESS CHEMICAL ADDITIONS - REMEDIES

- pH is lowered by the addition of pool Acid
- Excess pool Acid (low pH) is neutralised with Sodium Carbonate (strong) or Sodium Bicarbonate (less strong)
- Excess Chlorine is neutralised with Sodium Thiosulphate
- Excess Alkalinity is neutralised with Hydrochloric acid (Muriatic acid) or pool acid (equivalent sulphuric acid)

## LOW CHLORINE ALARM

This indicates that the Chlorine level in the pool water is considerably lower than the level that was set.

The Chemigem will restore the level by feeding Chlorine approximately every 3 minutes until the set level is reached again (however feeding may be inhibited by one of the factors listed below). As the Chlorine level in the water approaches the set level the red warning light will switch off

**Low Chlorine levels could be due to the following:**

- Excessive bather load
- The Chlorine drum is empty
- Increasing the set level by a large amount
- The filter has been off for a long period on a hot day
- The Stabiliser level is too low
- The pH is too high
- The filter requires backwashing
- The strainer (part of the pump) requires cleaning out.
- Inadequate pool water circulation
- The injector nozzle in the multi-port injection fitting is clogged
- The venturi system (if fitted) is clogged
- A faulty solenoid valve
- Multi-electrode (probe) requires cleaning (Refer to page 30)

## HIGH CHLORINE ALARM

This indicates that the Chlorine level in the pool is considerably higher than that which was set. Should this be due to an intentional overdose (super chlorination or shock treatment) it may be some days or even weeks before the level drops and the warnings turn off.

**High Chlorine levels could be due to the following:**

- Manual overdosing with Chlorine
- The pH is too low (too much pool Acid)
- Changing the set level to a much lower setting
- High total dissolved Solids (TDS) level (above 2000 ppm)
- Inadequate pool circulation
- The solenoid valve is faulty
- Multi-electrode (probe) requires cleaning (Refer to page 30)

## LOW pH ALARM (Excess Acid)

This indicates that the pH level in the water is considerably lower than that which was set. As a safeguard the unit operates a lock on any more additions of Acid (that would only make matters worse) until the pH is brought back into the normal range with the addition of some Sodium Carbonate or Sodium Bicarbonate.

If the pH falls to below 5.8 the Chemigem will shut down pump operation to ensure no more acid gets into the pool.

### Low pH levels could be due to the following:

- Manual overdosing with pool Acid
- Poor pool water circulation leading to over-dosing.
- Excessive rainfall (that is slightly acidic) neutralising the alkalinity of the pool.
- A faulty solenoid valve.
- Multi-electrode (probe) requires cleaning (Refer to Cleaning Instructions below)

## HIGH pH ALARM (Insufficient Acid)

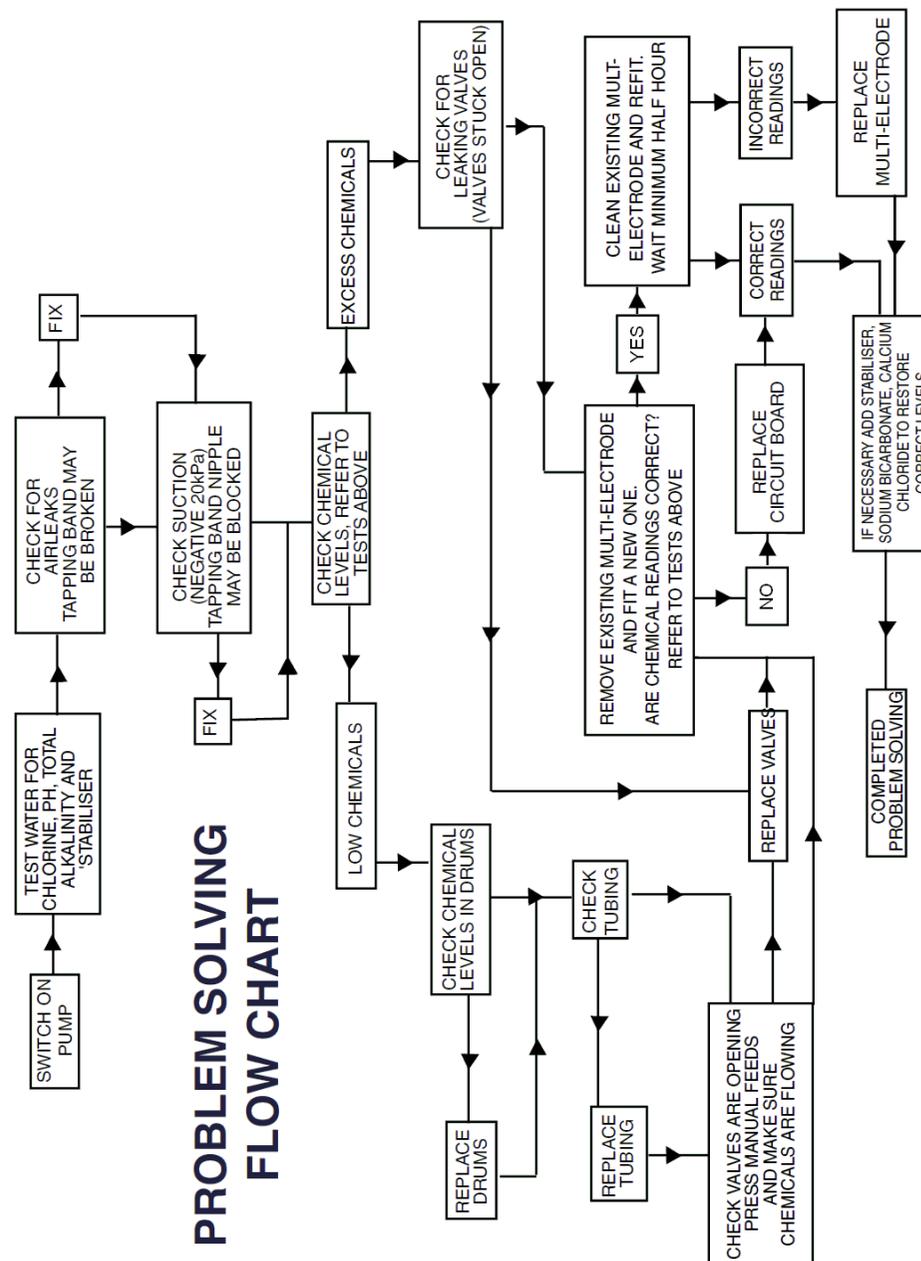
This indicates that the pH level in the water is considerably higher than that which was set.

### High pH levels could be due to the following:

- Initial conditions in a new plaster lined pool being very alkaline and overwhelming the unit's ability to dose sufficient acid.
- The unit has a ratiometric acid setting that may have been adjusted to add insufficient acid (for concrete pools)
- The Acid drum may be empty
- Super chlorinating the pool
- The injector nozzle in the multi-port injection fitting is clogged
- The venturi system (if fitted) is clogged
- A faulty solenoid valve
- The filter needs backwashing
- Multi-electrode (probe) requires cleaning (Refer to Cleaning Instructions below)

## CLEANING THE MULTI-ELECTRODE (PROBE)

- Remove from the injection point by unscrewing the retaining nut or twisting bayonet and pulling out the multi- electrode (probe)
- Holding the cable, gently swirl the multi-electrode (probe) sensing components in a dilute solution of Hydrochloric Acid (normal pool Acid) for a minute or two
- Rinse the multi-electrode (probe) in clean water
- Replace the multi-electrode (probe), making sure the "O" seal is in place
- Screw up the nut with fingers only or twist bayonet to lock. (Refer to page 10)



# Detailed Operation – Automatic & Manual

## Low pH Pump Shutdown

If the Chemigem unit detects a low pH condition acid feeding will be turned OFF. If the pH falls below 5.8 the Pump will also be turned OFF. The STATUS light will be red to warn of a problem.

## Power Failure Operation

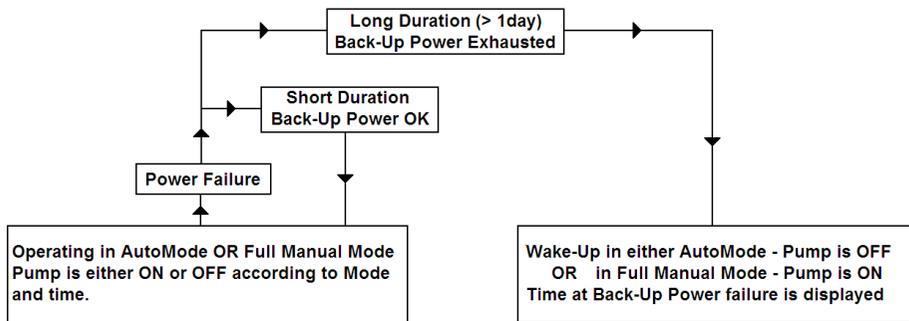
The Chemigem unit comes with a timer function built into the operating software. The timer is a 24-hour type with quartz-crystal control and has a battery back-up in case of a power failure. The battery is a rechargeable NiMH type so it will never need replacing.

If a power failure is of a short duration (a few hours) the Chemigem will keep time and maintain AutoMode functions. If a Filter Cycle is active when power is returned the pump will be turned ON.

If a power failure occurs over an extended period of time the Chemigem will save all its operating information to a special memory. When power eventually returns it will wake up remembering everything except the current time – it will show the time at which the Back-Up Power was exhausted. If the unit is in AutoMode the pump will be OFF waiting for the next Filter Cycle to become active. If the unit is in Full Manual Mode the pump will be turned ON immediately.

For future reference information that is retained in the special memory cannot be lost and is said to be *non-volatile*. Information that can be lost during an extended power failure is said to be *volatile*.

Power Fail Operation is shown in the following diagram:



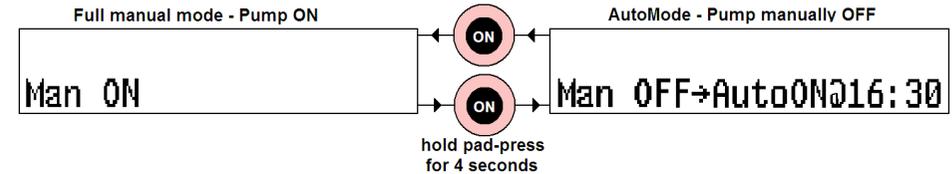
The Chemigem can operate automatically or manually in AutoMode, or it can be set to operate in Full Manual Mode (FMM). Both modes are non-volatile – a unit will always wake up in the mode to which it is set. Modes can be changed by the user however it is unlikely that this will be required – nearly all units (in Australia) will use the built-in timer.

# Timer Operation Overview Note: Chemigem uses 24-Hour time

## Selecting Full Manual Mode (FMM) or AutoMode

Most units will already be set for AutoMode operation. To change from one mode to the other:

- Press the ON-pad for 4 seconds to change to FMM
- Press the OFF-pad for 4 seconds to change to AutoMode

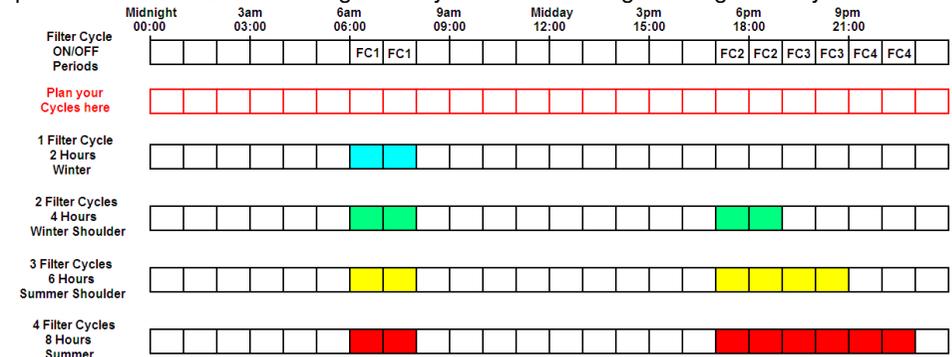


## ON & OFF Times for AutoMode

The automatic operation of the Chemigem uses 4 ON/OFF times each of which make up a Filter Cycle (FC). Each FC has a start time (ON) and a stop time (OFF). Each FC has a number of 1 to 4 so that the user can select how many FCs to enable. If 3 FCs are enabled then FC1, FC2 & FC3 will determine the Chemigem automatic operation.

If an FC has an ON time the same as another FC's OFF time then they can combine to form one longer FC. For example let us assume that FC1 has an ON time of 6am and an OFF time of 8am, and FC2 has an ON time of 8am and an OFF time of 11am. If the user enables only 1 FC then the Chemigem will turn the pump ON at 6am and OFF at 8am. If the user enables 2 FCs the Chemigem will still turn the pump ON at 6am but it will now turn OFF at 11am. This method of automatic operation is useful for increasing/decreasing the filtration hours as the seasons change – with no need to change the individual ON/OFF times. It is far simpler to enable/disable Filter Cycles.

The Chemigem comes with preset FCs (4 are enabled for a total of 8 hours per day operation). These are shown in the diagram below along with possible uses. Please note that pool chlorine demand varies significantly and these settings are a guide only.



The Filter Cycle ON & OFF times are fully adjustable – please see page 40. **The diagram above can be used to help plan alternative Filter Cycle timing to suit your pool. More on page 40. See Timer Defaults page 4 & 38.**

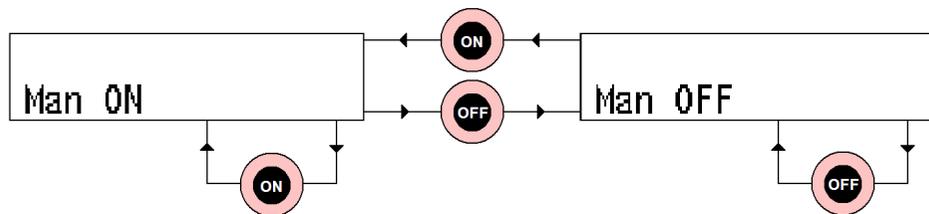
## AutoMode and Full Manual Mode

### **Full Manual Mode (FMM)**

FMM is used in situations where an external timer is required to run the Chemigem. FMM is a setting which starts the pump immediately on the application of power to the unit. A unit in FMM mode can have the pump turned OFF. This will mean that the pump will not turn back ON unless it is manually turned ON by the ON pad or a long power failure occurs.

The operation of the ON/OFF-pads in Full Manual Mode is shown below:

(Note: for clarity only Line2 of the LCD is shown)



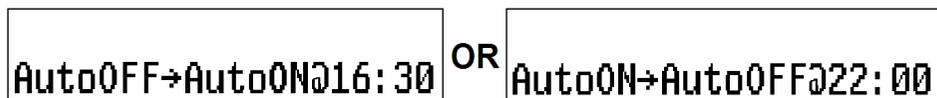
### **AutoMode**

The Timer in the Chemigem is very versatile and easy to use. It has 4 adjustable Filter Cycles that can be accessed from the TIMER MENU. All Filter Cycles can be overridden manually. Filter Cycle 1 is always enabled. The other 3 Filter Cycles can be enabled or disabled in order (ie select 1, 2, 3 or 4 Filter Cycles to be enabled). This allows a simple increase or decrease in running times to be achieved without adjusting the Filter Cycle ON/OFF times – simply add or remove cycles ! See page 39 for details.

In AutoMode the Chemigem will START (at first power-up or after a long power failure) with the pump OFF. It will then wait for the next available ON-time to start the pump and the rest of the system. If there is a power failure the system will continue to keep time for a number of days. During this time the pump ON/OFF-times will still be checked. When power is restored the system will wake up and turn the pump ON if it is during a Filter Cycle.

### **Automatic Operation:**

During Automatic Operation Line2 of the LCD will display whether the Pump is ON or OFF and the next OFF or ON time:

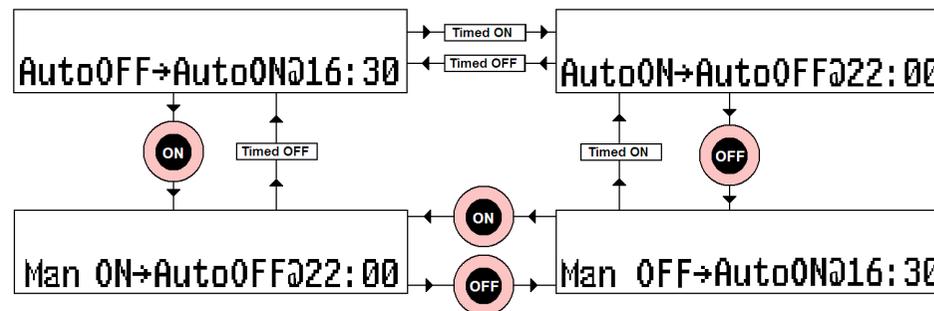


The displays read as: “Auto OFF next ON at 4:30pm” OR “Auto ON next OFF at 10pm”

### **Manual Operation While In AutoMode:**

It is often necessary to turn the pump ON/OFF Manually when it is in AutoOFF/ON. This is a very simple operation – press the ON/OFF pad once. The pump will start or stop immediately. The unit will still be in AutoMode and will respond to the next AutoOFF/ON – it will not remain ON/OFF indefinitely (unless that is desired see page 36).

The following diagram shows what will happen to Line2 of the LCD for a Manual ON/OFF during Auto OFF/ON and Manual OFF/ON:



### **Operate Pump Manually For a Number of Hours:**

It is sometimes desirable to run the pump for a period of time and then turn it OFF while still in AutoMode. The pump will then turn back on at the next AutoON. This feature can be used to superchlorinate over a 24, 36 or 48 hour period, or simply to run the pump for a couple of hours while the children have a swim.

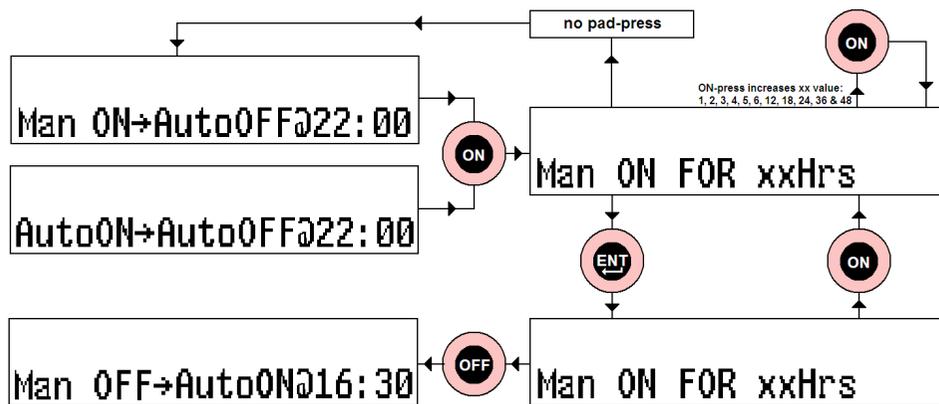
To achieve this the unit should be in AutoON or ManON – simply press the ON-pad and Line2 of the LCD will read “Man ON FOR 01Hrs”. Another press of the ON-pad (without release) increases the number of hours that the pump will operate in the following sequence: 1, 2, 3, 4, 5, 6, 12, 18, 24, 36 & 48 and then the sequence repeats from 1 again. To lock in the selected number of hours the ENTER-pad must be pressed. If this is not done the Chemigem will revert to AutoMode (ManON→AutoOFF) operation in approximately 10 seconds.

When in this mode of operation the time period can be changed by simply pressing the ON-pad and repeating the above steps.

This mode can be stopped by simply pressing the OFF-pad – this will return the unit to ManOFF→AutoON.

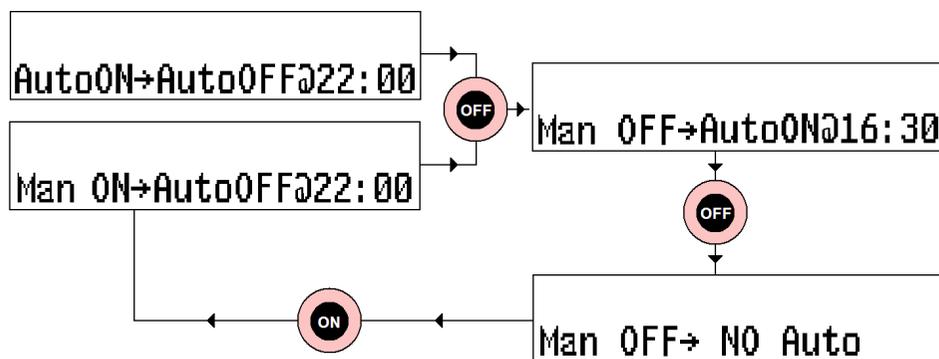
It should be noted that the LCD will count down the time left to run in this mode. When it gets to 1 hour it will then count down the remaining minutes prior to the pump being turned off and the unit reverting to AutoOFF→AutoON@hh:mm.

The following diagram shows Line2 of the LCD as the various pads are pressed:



### Turn Pump OFF with No AutoON (Pump OFF indefinitely):

If the pump is required to be OFF indefinitely (perhaps while work is being carried out on pool equipment) simply press the OFF-pad 1 or 2 times until the LCD reads "Man OFF -> NO Auto":

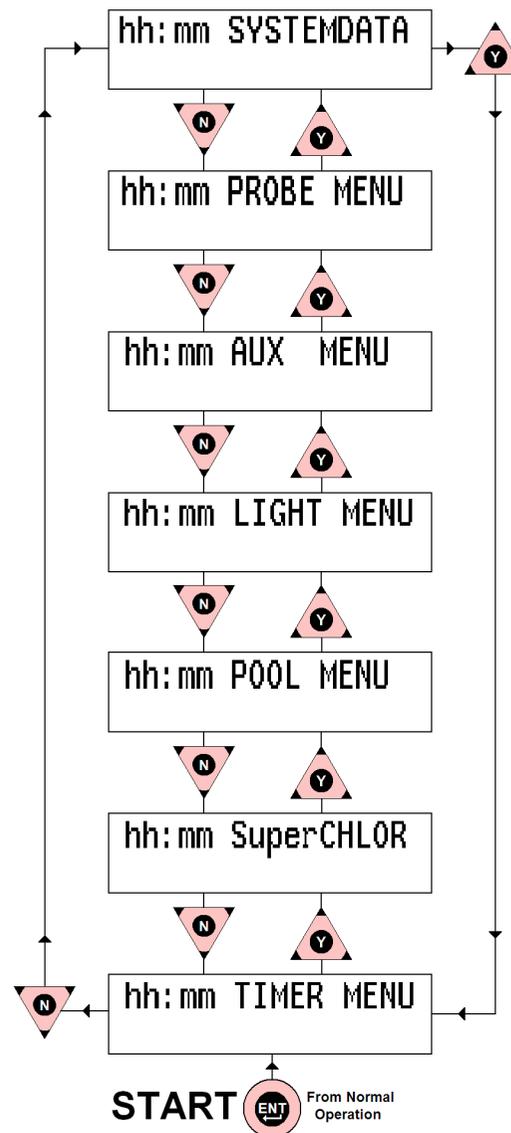


Note that if a long duration power failure occurs this setting is volatile – the Chemigem will wake in AutoOFF -> AutoON.

## The MENUS: Access & Operation

### MENU Overview & Access

The MENU system is a logical way of allowing easy access to the settings required to run the Chemigem. The **MAIN MENUS** are accessed by pressing the ENT(ER)-pad:



The Chemigem has 6 MAIN MENUS (shown in the diagram at left) and each MAIN MENU may have SUB-MENUS (described in the following pages). The MAIN MENUS are accessed from normal operation by a single ENT-pad press. The first MENU to be displayed is the TIMER MENU. Other MENUS are available by pressing the UP/DOWN-pads.

Once the desired MENU is displayed a ENT-pad press will enter that MENU.

If the ENT-pad is not pressed the Chemigem will go back to normal operation without any changes being made.

Once a MENU is entered both lines of the LCD will be used to display any SUB-MENUS or other information.

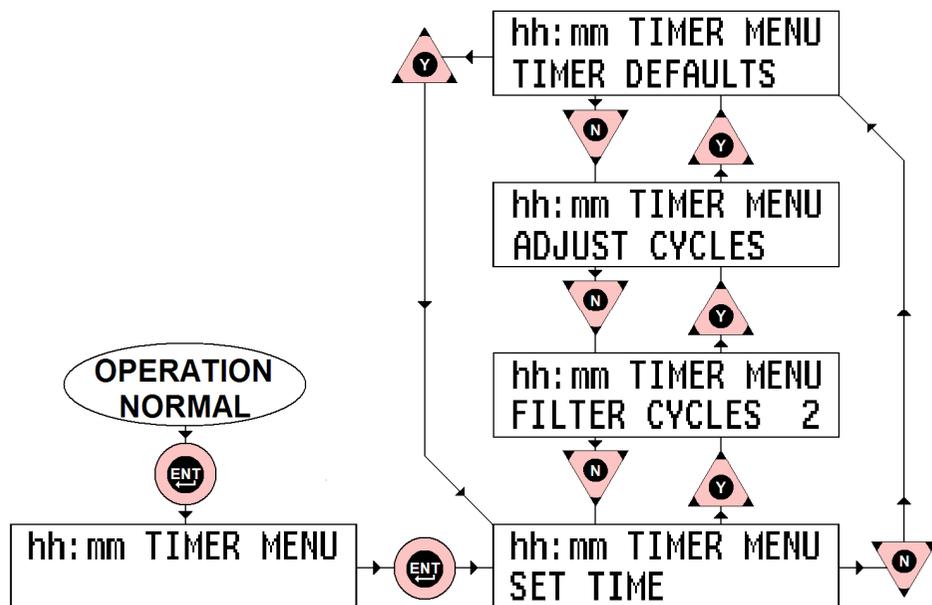
**IMPORTANT: THE AUX MENU IS CURRENTLY EMPTY AND CAN NOT BE USED. IT IS FOR FUTURE USE.**

**Note:** for clarity only the display lines involved are shown in these instructions.

## The TIMER MENU

### Accessing the TIMER MENU:

The TIMER MENU is accessed by a ENT(ER)-pad press from the MAIN MENU. Once the TIMER MENU is accessed the first Sub-MENU appears in Line2 – SET TIME. There are 4 Sub-MENUs: SET TIME, FILTER CYCLES, ADJUST CYCLES & TIMER DEFAULTS. These Sub-MENUs are accessed by the UP/DOWN-pads and entered by pressing the ENT-pad. The following diagram shows how to access the Sub-MENUs:



Note that the FILTER CYCLES Sub-MENU above has an associated number – 2. This is the number of Filter Cycles that are currently active. This number can have a value of 1 to 4. While the Sub-MENUs are in the display they can be entered by a single ENT-pad press.

### The TIMER DEFAULTS Sub-MENU:

The initial TIMER DEFAULT (TD) loaded is TD1. This runs from 6-8am and 5-11pm using FC1 thru FC4 and is shown on Page 40. There are a number of other TDs (page 4) selectable using the UP/DOWN-pads from a display that looks like this:

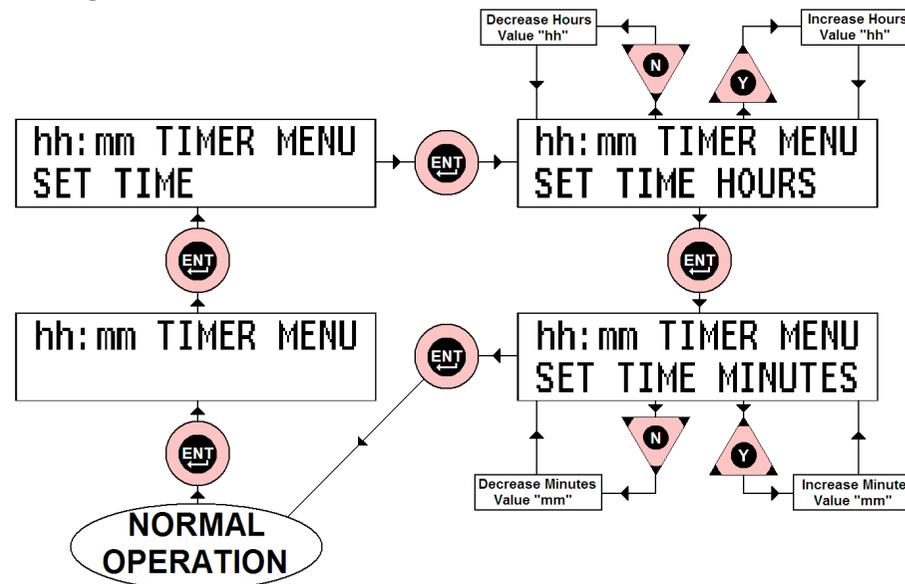
```

DEFAULT 2  8Hrs
6 - 10am  6 - 10pm
    
```

Simply press the ENT-pad to select the DEFAULT that you require and the unit will configure these times using FC1 thru FC4. These times can be adjusted if desired, see page 40. Check your Chemigem for available TD times or simply make up your own !

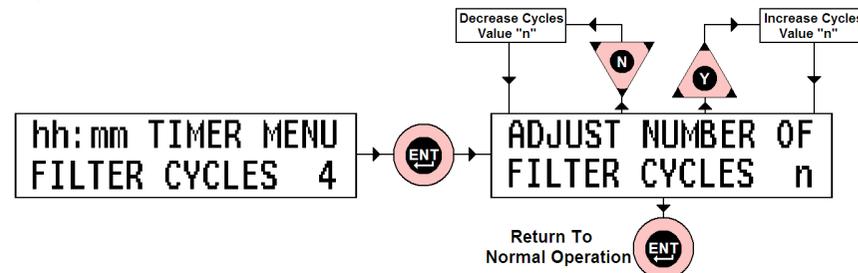
### Setting the Time – the SET TIME Sub-MENU:

To set the time of day simply go to the SET TIME Sub-MENU and press the ENT(ER)-pad. Line2 of the LCD will now read “SET TIME HOURS” – simply use the UP/DOWN-pads to adjust the Hours Value on the LCD. When complete a ENT-pad press will then move to show “SET TIME MINUTES” on Line2 and the UP/DOWN-pads can be used to adjust the Minutes Value. When complete press the ENT-pad to return to normal operation. The diagram below shows how to set the time:



### Enabling Filter Cycles – the FILTER CYCLES Sub-MENU:

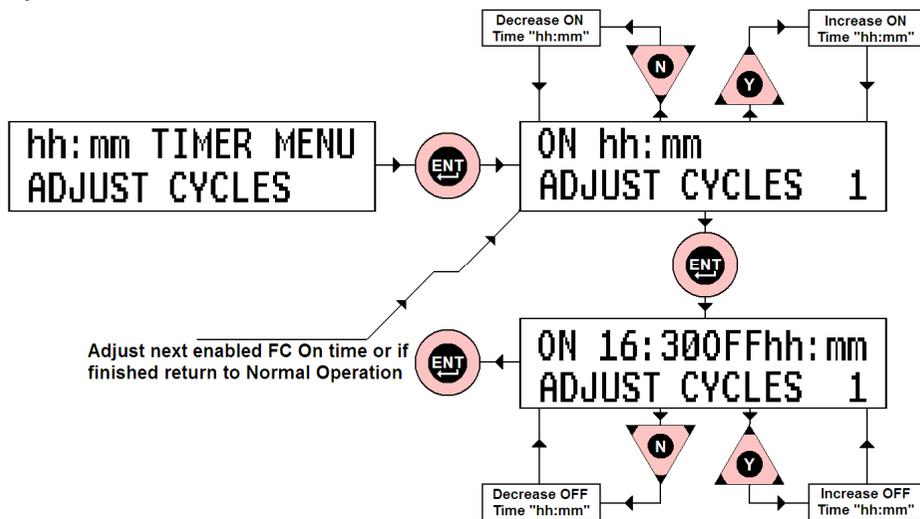
Using the ENT(ER)-pad and the UP/DOWN-pads go the FILTER CYCLES Sub-MENU (Line2 of LCD) and press ENT-pad – see “Accessing The Timer Menu” page 38. It will have an associated number – this is the number of enabled Filter Cycles (FCs). Using the UP/DOWN-pads this number can be easily changed. To make the change take effect the ENT-pad must be pressed – normal operation is then resumed. The effect of Filter Cycles is described on page 33.



## Changing the Filter Cycle ON & OFF Times – the ADJUST CYCLES Sub-MENU:

The ADJUST CYCLES Sub-MENU allows the user to change the ON & OFF times of the Filter Cycles (FCs) that are enabled. For example if there are 2 FCs enabled the user can adjust FC1 and FC2. To adjust all FC ON & OFF times all FCs must be enabled – see “Enabling Filter Cycles” page 39.

Using the ENT(ER)-pad and the UP/DOWN-pads go the ADJUST CYCLES Sub-MENU (Line2 of LCD) – see “Accessing The Timer Menu” page 38. When the ENT-pad is pressed Line1 of the LCD will now read the ON time of the Filter Cycle number shown at the end of Line2. This is adjusted with the UP/DOWN-pads. Once the desired time is reached the ENT-pad is pressed to store the ON time and the OFF time is then displayed. The OFF time is adjusted in the same way as the ON time. After ON/OFF times for the first enabled FC are adjusted the next enabled FC ON time is shown on the LCD. This process continues until all FCs are adjusted.



Note: Only enabled Filter Cycles are available for adjustment (starting with FC1). ENT-pad must be pressed to store the changed times and move through the process. If Times are to remain unchanged simply press ENT-pad and the original time is kept.

### Filter Cycle Planner:

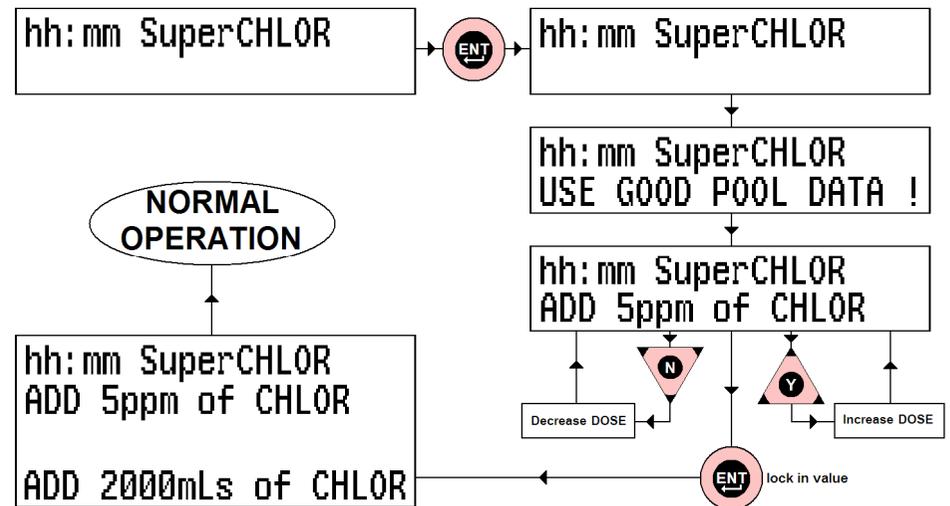
Default Filter Cycle ON/OFF Periods	Midnight 00:00	3am 03:00	6am 06:00	9am 09:00	Midday 12:00	3pm 15:00	6pm 18:00	9pm 21:00				
			FC1	FC1			FC2	FC2	FC3	FC3	FC4	FC4
Plan your Cycles here →												

## Automated Super-Chlorination - SuperCHLOR

Superchlorination is a process used to remove combined chlorine from a pool. Partially chlorinated nitrogen compounds (from reactions mainly with perspiration and urine) give rise to the “chlorine odour” from swimming pools. These compounds require higher than normal chlorine levels to be oxidised – usually greater than 5ppm. SuperCHLOR uses information about the pool (input from the POOL MENU – next page) to estimate how much chlorine to add to achieve the desired level of super-chlorination.

### Accessing SuperCHLOR:

The SuperCHLOR is accessed in the same way that all other MENUS are accessed – an ENT-pad press will shift to the MENU SYSTEM (TIMER MENU), then UP/DOWN-pad presses will shift to the SuperCHLOR. Once the LCD Line1 reads “hh:mm SuperCHLOR” – press ENT-pad to enter. The LCD will display “USE GOOD POOL DATA !” – if incorrect pool information is in the unit the result will be incorrect. The LCD will then show “ADD 5ppm of CHLOR” – use UP/DOWN-presses to adjust this value up to 10ppm (or lower if desired) – then an ENT-press will lock the value. The unit will then calculate/display how much chlorine is needed and proceed to add it.



The above example assumes a 50m<sup>3</sup> pool.

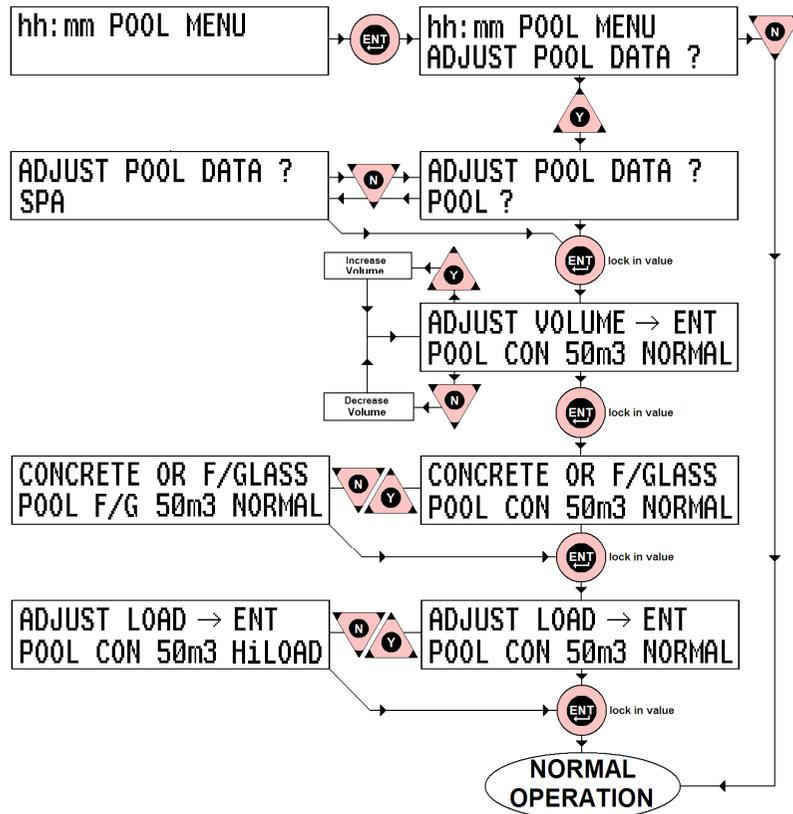
NOTE: the calculation is based on an estimated flow rate for the chlorine injecting device. It will not function correctly for erosion feeders and salt water chlorinators and should not be used if these devices are installed.

## The POOL MENU

The pool MENU is used to “describe” the pool to the Chemigem Control System. The Chemigem will use this information in other Menus such as the SuperCHLOR on previous page.

### Accessing the POOL MENU:

The POOL MENU is accessed in the same way that all other MENUS are accessed – an ENT-pad press will shift to the MENU SYSTEM (TIMER MENU), then UP/DOWN-pad presses will shift to the POOL MENU. Once the LCD Line1 reads “hh:mm POOL MENU” – press ENT-pad to enter. Once into this Menu it must be completed to return to normal operation. The LCD will show “ADJUST POOL DATA ?” – currently an UP/Y-press is required. The LCD will now show “POOL ? Y/N” – an UP/Y-press will select POOL and a DOWN/N-press will select SPA. Further DOWN/N-presses will alternate between POOL & SPA. When the selection has been made an ENT-press will lock it in. The LCD will then show “ADJUST VOLUME → ENT” – an UP/DOWN-press will alter the volume number and an ENT-press will lock it in. The LCD will then show “CONCRETE OR F/GLASS” – an UP/DOWN-press will alternate between “CON” and “F/G” and an ENT-press will lock it in. The LCD will then show “ADJUST LOAD → ENT” – an UP/DOWN-press will then alternate the bather load between “NORMAL” and “HiLOAD” and an ENT-press will lock it in.



## The LIGHT MENU 240Vac Light Outlet in the bottom right of the unit.

The LIGHT MENU is used to select and adjust the automatic light control. The light power supply can be turned ON/OFF like a Filter Cycle, as well as being manually controlled. If the light automation is selected the light power supply will be controlled by the ON and OFF times. If the light is turned ON manually it will still be turned off at the OFF time. If the light automation is not selected the light can only be controlled manually.

### Manual Light Operation

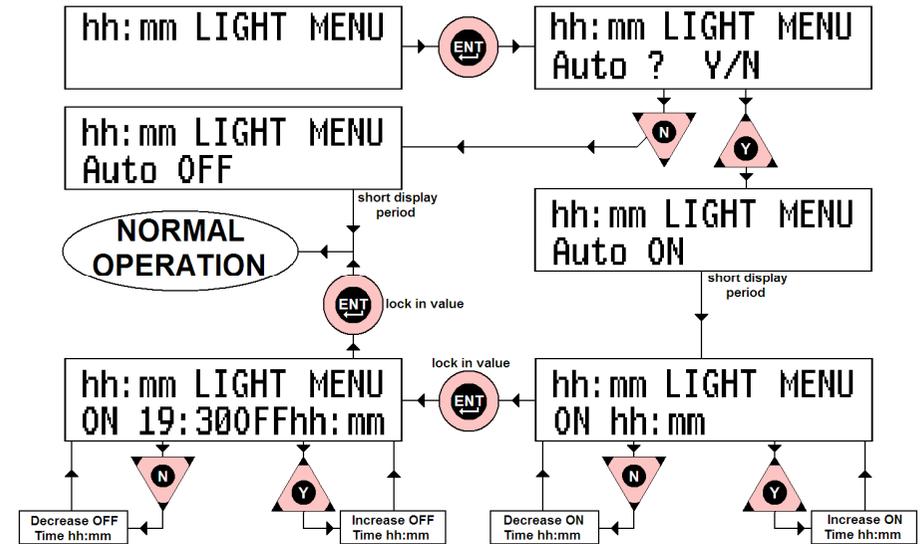
During normal operation the light can be turned ON manually by pressing the UP-pad for approximately 4 seconds. It can be turned OFF by again pressing the UP-pad for 4 seconds. Note that for LED Lights requiring a power pulse to change effects you will be prompted after turning the Light ON manually. An UP-press will pulse the light.

### Accessing the LIGHT MENU:

The LIGHT MENU is accessed in the same way that all other MENUS are accessed – an ENT-pad press will shift to the MENU SYSTEM (TIMER MENU), then UP/DOWN-pad presses will shift to the LIGHT MENU. Once the LCD Line1 reads “hh:mm LIGHT MENU” – press ENT-pad to enter.

Line2 will now read “AUTO ? Y/N”. To disable automatic light operation press the DOWN-pad. Line2 will read “Auto OFF” for short period then the system will return to normal operation and the light will only respond to Manual ON/OFF.

To enable automatic light operation press the UP-pad. Line2 will read “Auto ON” for short period before displaying “ON hh:mm”. The ON-time is adjusted using the UP/DOWN-pads. A ENT-pad press will lock in the new ON-time and the LCD will read “ON 19:30OFFhh:mm”. The OFF-time is adjusted by using the UP/DOWN-pads. A ENT-pad press will lock in the new OFF-time and the system will revert to normal operation.



## The PROBE MENU (use only when replacing a PROBE)

The PROBE MENU is used when a new PROPBE is attached to the Chemigem. The Chemigem keeps statistics on the amount of time it has operated. This data is non-volatile. **It is vital that the PROBE MENU only be used when adding a new probe. Information stored can be used to help validate a warranty claim. ONLY USE THIS MENU WHEN ADDING A NEW PROBE!** Average probe life is around 5 years.

### Accessing the PROBE MENU:

The PROBE MENU is accessed in the same way that all other MENUs are accessed – a ENT-pad press will shift to the MENU SYSTEM (TIMER MENU), then 4 UP-pad presses will shift to the PROBE MENU. It is also possible to access this MENU with 2 DOWN-pad presses. Once the LCD Line1 reads “hh:mm PROBE MENU” – press ENT-pad to enter.

The LCD will read on Line1: “PROBE REPLACEMENT” and  
on Line2: “ADD NEW PROBE Y/N”

A DOWN-press will make the Chemigem ignore the Menu and go to normal operation.

An UP-press will enter the Menu and the LCD will read a warning for a few seconds –

Line1: “SEE MANUAL UNDER” and  
Line2: “<CHANGING PROBE >”

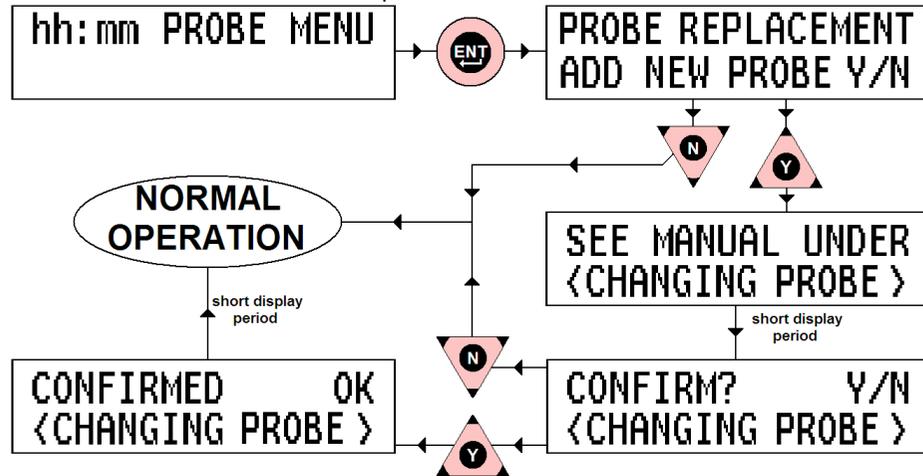
This is followed by Line1: “CONFIRM? Y/N” and  
Line2: “<CHANGING PROBE >”

A DOWN-press will make the Chemigem ignore the Menu and go to normal operation.

An UP-press will store the old Probe data and reset for new Probe. The LCD will read –

Line1: “CONFIRMED OK” and  
Line2: “<CHANGING PROBE >”

The unit will then revert to normal operation.



## SYSTEMDATA

SYSTEM DATA is used to display system information on the LCD. It is included as a tool for the user and service technician to determine various system settings with ease.

### Accessing SYSTEMDATA:

SYSTEMDATA is accessed in the same way that all other MENUs are accessed – a ENT-pad press will shift to the MENU SYSTEM (TIMER MENU), then 5 UP-pad presses will shift to the PROBE MENU. It is also possible to access this MENU with 1 DOWN-pad press. Once the LCD Line1 reads “hh:mm SYSTEMDATA” – press ENT-pad to enter.

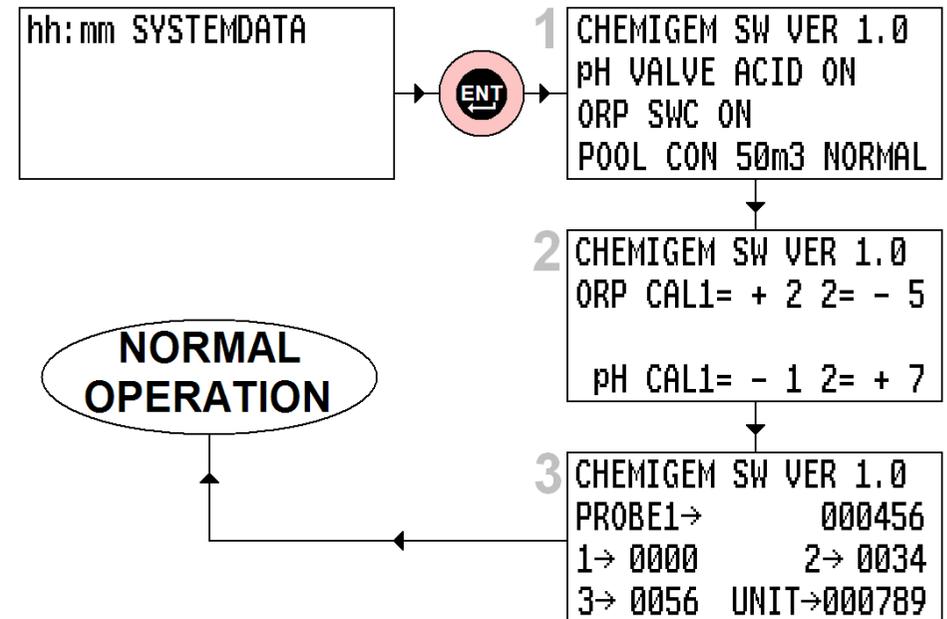
When selected SYSTEMDATA will show a number of displays on the LCD, WITH Line1 always showing CHEMIGEM SoftWare VERSION #.#. The examples following read as:

Display 1, Line2: pH dosing VALVE feeding ACID – system is ON  
Line3: ORP controlling Salt Water Chlorinator – system is ON  
Line4: set for POOL, CONcrete with volume of 50m3 and NORMAL load

Display 2, Line2: ORP CALibration1= +2 and calibration2= -5  
Line4: pH CALibration1= -1 and calibration2= +7

Display 3, Line2: PROBE1 has operated for 456 hours  
Line3: historical data probe1 has 0 hours and probe 2 has 34 hours  
Line4: and probe3 has 56 hours with the UNIT having run for 789 hours

An example set of displays will look like this:

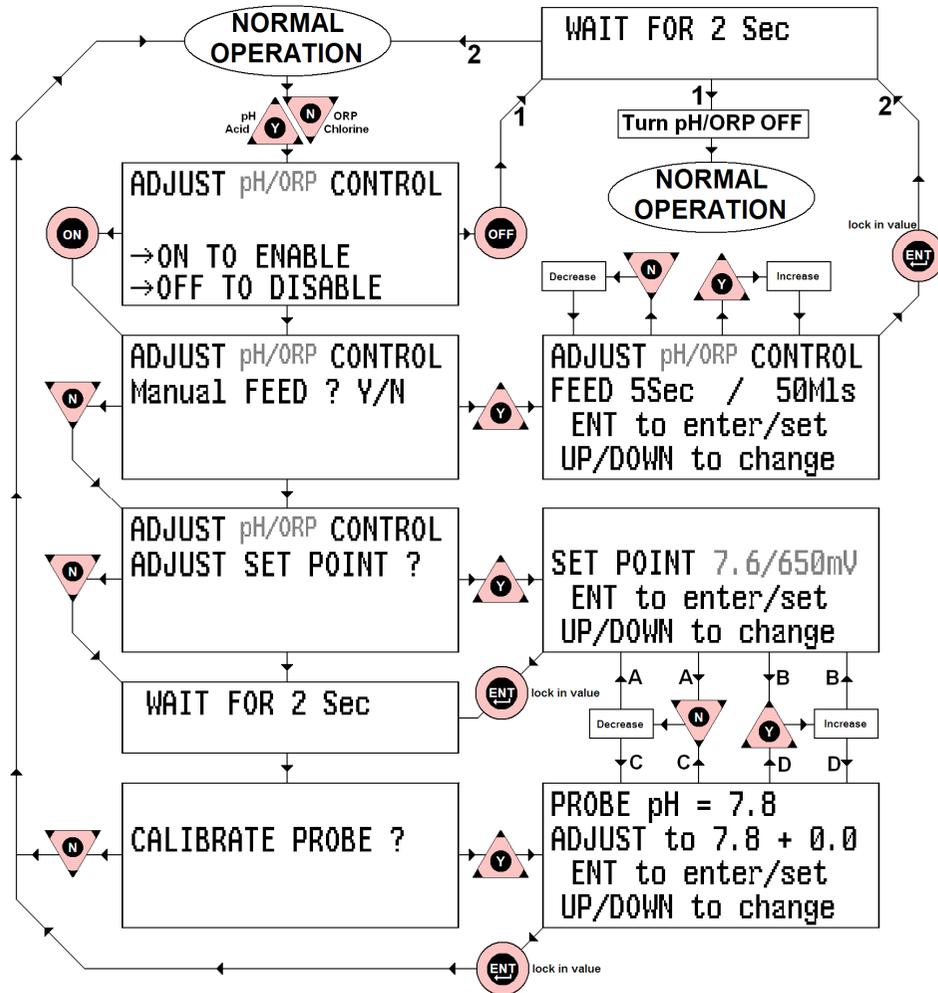


## pH and ORP Menus

The pH & ORP Menus are used to make changes to the way the Chemigem operates. The changes that can be made are: Turning the each system ON/OFF, Manual Dosing, changing the Set Point and Calibration (note ORP cannot be calibrated).

### Accessing pH and ORP Menus:

The pH MENU is accessed by an UP/Y-press from normal operation. Similarly the ORP MENU is accessed by a DOWN/N-press from normal operation. See pages 23-24 for other information. Following is a flowchart depicting the operation of these Menus:



FOR MORE INFORMATION VISIT OUR WEBSITE:

[www.poolcontrols.com.au](http://www.poolcontrols.com.au)

OR E-MAIL US AT:

[service@poolcontrols.com.au](mailto:service@poolcontrols.com.au)

Jan 2011