

Chemigem

CM55

Commercial & Semi-commercial Water Management System



User Manual



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IMPORTANT

If the power cord is damaged the unit must be returned to Pool Controls for repair.

Always read the instructions and warnings on chemical containers before using chemicals.

Serial Number.....

Date of Installation.....

Installed by.....



Manufacturer's Warranty for COMMERCIAL INSTALLATIONS

Pool Controls products come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. The benefits under this warranty are in addition to other rights and remedies under a law in relation to the goods.

1 YEAR WARRANTY ON COMMERCIAL INSTALLATIONS

Pool Controls warrants its products used in commercial installations to be free from defects in material and/or workmanship for a period of 1 year from the original date of purchase.

1 YEAR WARRANTY ON REPLACEMENT PARTS USED IN COMMERCIAL INSTALLATIONS

Pool Controls warrants its replacement parts used in domestic installations, including multi- electrodes (probes), solenoid valves and electrolytic cells (but excluding wearing parts such as tubing and squeeze tubing) to be free from defects in material and/or workmanship for a period of 1 year following purchase.

EXCLUSION FOR WEARING PARTS

This warranty does not extend to wearing parts, in particular the squeeze tubes fitted in peristaltic dosing pumps. Squeeze tubes should be replaced every THREE months by a suitably qualified technician. Pool Controls is not liable for any failure of its products or other damage caused by failure of a squeeze tube that has been used for more than THREE months.

WARRANTY OBLIGATIONS OF POOL CONTROLS

If a defect in workmanship or materials in any Pool Controls product covered by this warranty is discovered during the term of the warranty, and provided the warranty holder follows the procedure set out below, Pool Controls will, at its option repair or replace that item.

PROCEDURE FOR CLAIMING UNDER THIS WARRANTY

In order to claim under this warranty, the warranty holder must:

- Contact Pool Controls Service as soon as possible after the discovery of the defect and in any event, within the relevant warranty period;
- Confirm date of installation;
- Confirm that the installation was completed by a suitably qualified technician, as set out in the installation manual; and
- If required, arrange for the relevant Pool Controls' product to be returned to Pool Controls for repair, and the warranty holder is responsible for the cost and risk of any freight or transportation to and from Pool Controls.

CALL OUT FEES

This is a "Back to Base" Warranty, which means that if the Pool Controls product needs to be serviced, replaced or repaired at a place other than Pool Controls' premises, a call out fee will be charged to cover the cost of travel by an authorised Pool Controls technician. Please note that this call out fee will NOT be charged when the relevant Pool Controls product is returned to Pool Controls for repair. If an authorised Pool Controls technician repairs or replaces a Pool Controls Product and this warranty does NOT apply, a fee for labour and parts supplied will be charged in addition to the call out fee. If the Pool Controls product needs to be returned for repairs under this warranty, the warranty holder is responsible for the cost and risk of any freight or transportation to and from Pool Controls.

WARRANTY EXCLUSIONS

This warranty extends to the original owner only, beginning on the date of purchase and is not enforceable by any other party without the prior written consent of Pool Controls. Pool Controls is not responsible for any cost of freight or transportation to or from its Service Department. Pool Controls is not liable under this warranty if the installation of the Pool Controls product was not carried out by a suitably qualified technician.

To the extent permitted by law, Pool Controls is not liable for: any incidental or consequential loss incurred in connection with the removal or replacement of the Pool Controls product under this warranty; or product failure resulting from misuse, freezing, accident, negligence, improper installation or inadequate maintenance.

To the extent permitted by law, Pool Controls disclaims all other warranties, either express or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose with regard to Pool Controls products, parts and/or any accompanying written materials.

It is important that the Chemigem CM55 is installed and operated in accordance with the instructions provided in this manual.

IMPORTANT

If the power cord is damaged the unit must be returned to Pool Controls for repair.

Always read the instructions and warnings on chemical containers before using chemicals.

GENERAL WARNINGS:

1. Do not permit children to use this unit unless they are closely supervised at all times.
2. To reduce the risk of electric shock, replace damaged cord immediately.
3. Do not use extension cord to connect unit to electric supply; provide a properly located outlet.
4. Ensure all connections from the Chemigem to the electricity supply are made in accordance with local safety codes.
5. 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.
6. The Chemigem contains microprocessors that may be disturbed by the operation of electrical devices within a 6 metre radius.
7. 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.
8. 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.
9. 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.

10. 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.
11. 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.
12. 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.
13. Always wear protective face-shield and gloves for such operations. Fully observe all the chemical manufacturer’s safety instructions when handling pool chemicals.
14. 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.
15. A qualified electrician must affix the electrical outlet (housing the power to the pool) and, if required, to hard-wire the unit to the power source.
16. If it is decided to turn off the Chemigem audible alarm for any reason, the unit will no longer have that warning capability and the pool owner will have to rely on their own ability to monitor the indicator lights on the face of the unit to verify that the Chlorine and pH levels are within acceptable limits.

IMPORTANT SAFETY MEASURES:

- Always add concentrated chemicals to water – not the other way around!
- Don’t allow chemicals to mix – dangerous, highly corrosive fumes will be produced.
- Always wear protective clothing, footwear, gloves and eye protection when handling pool chemicals to avoid injury.
- If a spill occurs, wash the affected area with fresh water immediately and seek medical attention.
- Work in a well ventilated area and avoid inhalation of fumes.
- Read and follow safety instructions on chemical drums.

SAVE THESE SAFETY INSTRUCTIONS

Prior to Installation and Operation

Initial pool balance

Before you begin using the Chemigem CM55 make sure your pool water is balanced as follows:

Chlorine - general

If it is a new installation, add enough chlorine (liquid or granular) to achieve a reading of 3ppm on an appropriate test kit.

Stabiliser - general

If the pool is outdoors, it is vital that stabiliser (also known as cyanurate and cyanuric acid) be added and maintained at 50ppm. This compound reduces chlorine destruction due to sunlight. However, too much stabiliser will reduce the effectiveness of chlorine and can result in poor quality water so ensure stabiliser does not exceed 80ppm.

Good stabiliser level keeps good chlorine levels and reduces maintenance.

pH

For chlorine to be effective, the pH must be within a certain range. This is usually between 6.8 (fibreglass/liner pools) or 7.2 (concrete/plaster) and 7.8.

Adjust pH down with acid – powder, liquid sulphuric or liquid hydrochloric. Be very careful with acid as it can be harmful and corrosive.

Total Alkalinity (TA)

Total alkalinity is also known as carbonate hardness or TA for short. The recommended level is between 80 and 120ppm.

TA is related to pH in that it stops the pH from varying quickly with small additions of acidic or alkaline chemicals. When the TA is low it is almost impossible to control the pH.

To raise the TA, buffer (sodium bicarbonate) is added. This must be done slowly as buffer will also cause the pH to rise. As an approximate rule every increase of 20ppm of TA will also cause a 0.1 rise in pH. Once buffer is added it should be left to mix in the pool for a few hours before reducing the pH.

Phosphates and Nitrates

Phosphate and ammonia nitrogen will make your garden green – and they will do the same thing to your pool. Check for phosphates and add phosphate remover if necessary. Don't let fertiliser get into your pool! Phosphates are also in some cleaning products – check the label if using around your pool.

Check local council requirements

Chemigem CM55 Operation

It is important that it is installed and operated in accordance with the instructions provided in this manual.

The Chemigem CM55 is designed to automatically assist in keeping the levels of Chlorine and pH correctly balanced in swimming pools and spas and can cope with extreme variations in bather load that is experienced in commercial pools. The unit continuously monitors and adjusts pH and Chlorine levels while the pool pump is running, 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.

The chemical levels are set by the keypads. Once the correct positions 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). The unit has been factory-set to achieve 650mV (milliVolts) Chlorine (ORP) and 7.7pH as the preferred levels for Chlorine and pH respectively.

Electronic Clock

The Chemigem CM55 has a built-in real-time clock that may require setting to your local time. It has a battery back-up (which should last for several years) that controls the automatic switching on and off of the pool pump.

Pool Pump Times

The factory-set pool pump times are referred to on page 25. To change pumping times or to turn the timer off refer to pages 25-27.

Pool Water Circulation

To enable the Chemigem CM55 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 Chemigem CM55'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 probe will not receive the signal until large amounts of chemicals have been added to the water. When the 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 filter and the pool heating system, the pool heating plumbing may need to be bypassed. (Refer to page 15)

ITEMS SUPPLIED

Chemigem CM55 Commercial Chemical Controller

Key features:

- A see-through protective faceplate covering the front of the unit
- A computerised on-screen **HELP** menu
- An automatic pool pump timer
- An easy-to-read screen showing chemical settings and actual chemical readings
- Indicator light and audible alarm showing if pool water chemical levels are in range

Multi-electrode (Probe)

The Probe is fitted on the inlet (suction) side of the pool pump and one Probe monitors both the Chlorine and pH levels. Chemical readings obtained by the Probe are monitored by the Chemigem, and Chlorine and/or pool Acid is dosed into the pool water as required.

Where 40 or 50mm pipe is used, the Probe can be fitted via an injection manifold (sold separately). Where larger pipe is used, the Probe is fitted inside of the Reducing Nipple that is then inserted directly into the PVC pipe running to/from the pool.

Tubing

To connect the delivery system to the chemical drums and the injection point.

Do not use any tubing other than that supplied. To do so may result in damage to the Chemigem CM55 and negate the Warranty.

Filters & Sinkers

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.

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 and are positioned close to the bottom of the chemical drums.

Solenoid Valves or Peristaltic Pumps

Depending on the Chemigem model selected, the controller may be supplied with a set of solenoid valves or peristaltic pumps.

INSTALLATION

Select a good location

For ease of installation and for safety, the Chemigem CM55 should 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

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

To avoid the risk of electric shock do not use extension cord to connect unit to electric supply. Provide a properly located outlet.

Refer to pages * for the special procedures required for the placement of the Chemigem when the pool pump and filter are located below pool water surface level and when the pool has a heater unit

Installing the Power Supply

Position the Chemigem CM55 within 2.5 metres of the Probe at a convenient height for easy operation, preferably at eye level.

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

Installation diagrams

The diagram on the next page shows the standard installation method for a Chemigem CM55 utilising peristaltic pumps and the "Drill & Tap" installation method for large diameter pipe.

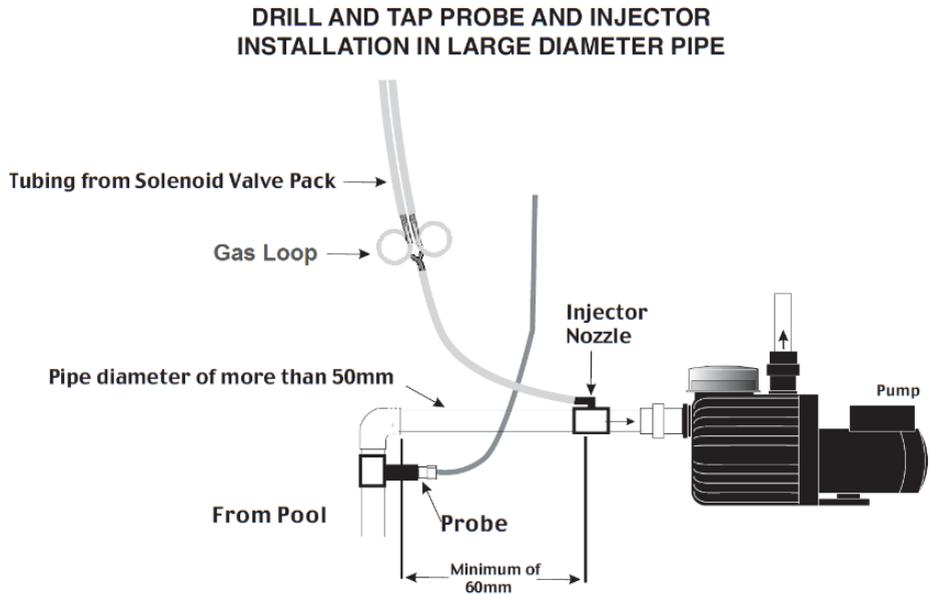
“Drill & Tap” Installation for Large Diameter Pipe

The “Drill and Tap” method for fitting the Probe and Injection Elbow is used when the pipe size is more than 50mm and can be used for both peristaltic pump and solenoid valve models.

If the pipe size is 50mm or less, it may be preferable to use an injection manifold – please discuss with Pool Controls the best installation method for your application.

There are two separate installations for the “Drill and Tap” method: one for fitting the Probe and one for fitting the Injection Elbow.

When drilling and tapping, select a position where the work can be carried out satisfactorily on the pool pipe. The recommended minimum distance between the Probe and the Injection Elbow is 100mm. The Injection Elbow is fitted between the Probe and the pool pump.



Installing the Probe

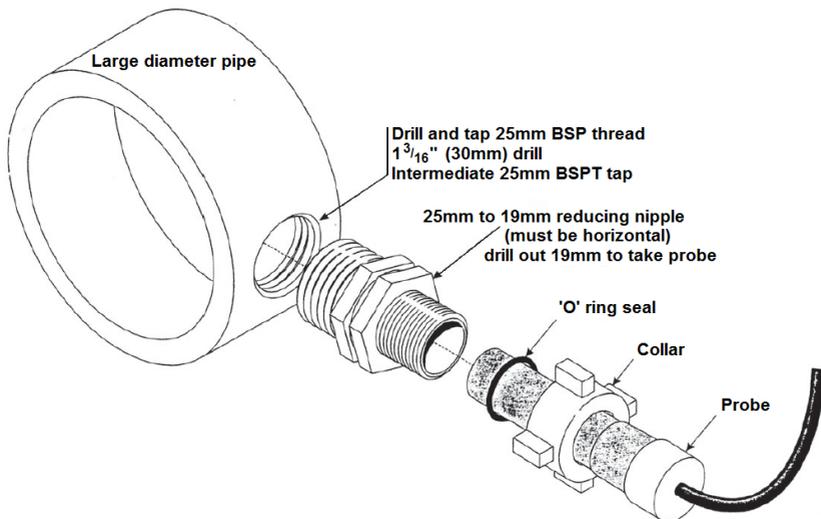
- Remove the Probe protective cap before fitting the Probe
- The protective cap should be retained for possible future use.
- Fully insert the Probe (with “O” ring fitted) into the reducing nipple.
- Two probe O rings are required when using drill and tap method.
- To avoid contaminating the sensing part of the Probe, do not use grease or sealant on this connection.

When the Chemigem is working it is essential that the Probe and Injection Elbow be in a rapidly moving laminar water stream. If not, the unit will display incorrect and erratic readings and may cause additions of concentrated chemicals. Avoid installing the Probe and Injection Elbow close together after an elbow in the pipe.

Note that the Probe must be fitted **horizontally**.

- If the Probe is positioned with the sensor tips aiming downwards it will trap air bubbles
- If the Probe is positioned with the sensor tips aiming upwards it will trap dirt or debris

Drill and Tap Probe Installation Diagram



Commercial tap kits are available from pool controls. These include all tools required for a drill and tap installation. (Part number: 08455022)

Injection Elbow Installation

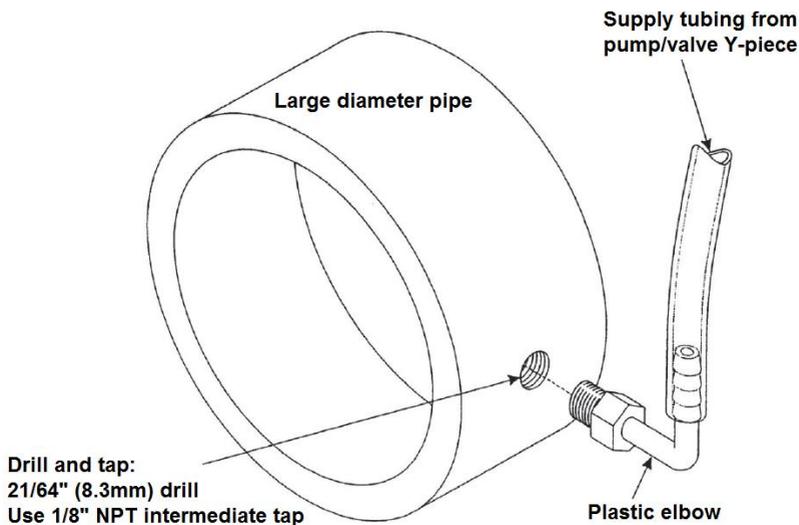
Air Leaks

Before commencing the installation of the Injection elbow, check for air leaks in the suction line by switching on the pool pump and checking the 'strainer'. If there are a lot 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.

Turn off the pool pump before commencing the installation. Refer to the general diagram on page *:

- The components to be connected to the PVC pipe
- The connection of the Probe to the inlet line
- The location of the Probe must be prior to the Injection Elbow in the water flow.

Drill and Tap Injection Elbow Installation Diagram



Installing Peristaltic Pumps

If peristaltic pumps are being used to deliver chemicals, these can be installed on the pressure side of the pump, after equipment such as heaters. See diagram on page 9.

Fix the peristaltic dosing pump unit to the wall close to the Chemigem CM55 Power Supply but not directly beneath.

The Injection Elbow is supplied with a gas loop (see illustration on next page). The outlet of each dosing pump is to be connected to each arm of the gas loop. The pumps are marked for Acid or Chlorine.

Cut a length of tubing that will reach from the base of the peristaltic pump to the injection elbow **including enough for a loop to act as a gas-trap**. Connect one end of the tubing to the outlet side of the peristaltic pump (the direction of flow is indicated by an arrow on the front cover of the pump.) Connect the other end of the tube with loop to the Y-piece near the Injection Elbow.

Cut another length of tubing that will reach from the base of the peristaltic pump to the base of the chemical drum. Connect the end of this tube to the inlet side of the peristaltic pump - the direction of flow is indicated by an arrow on the front cover of the peristaltic pump.

Installing Solenoid Valves

The procedure for installing solenoid valves is very similar to that for the peristaltic pumps, however, special considerations for valve installations are set out on page *

The solenoid valves must be fitted as near as possible to the injection elbow and the Chemigem CM55 power supply. Ensure that the tubing is clean and free from sand and dirt before fitting, as particles may enter the valve and cause leakage.

The valves must be screwed to a vertical surface, above the top of the chemical drums and no more than 75mm from the ground so that the pool pump may easily raise the chemicals from the drums. The chemical drums must be **below** the valves.

The Injection Elbow is supplied with a gas loop (see illustration on next page). The outlet of each solenoid valve needs to be connected to each arm of the gas loop. The valves are marked for Acid or Chlorine.

Cut another length of tubing that will reach from the base of each valve to the base of the chemical drum. Position the chemical drums in a safe and secure location, preferably about 2 metres from the Chemigem CM55 Power Supply.

Each valve outlet should have a long run of tube with a gas-trap loop close to the Y-piece near the injection point. (See diagram on next page)



Gas Loops Prior to Injection Elbow

Ensure that there are loops to trap gas when chemicals mix at the Y-piece and injector.

The gas can cause the valve diaphragms or squeeze tubes to deteriorate faster than normal resulting in increased maintenance.

Chemical Drum 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 16:

Position the Chlorine and Acid drums in a safe and secure location about 2 metres from the Chemigem CM55

Drill a hole in each of the screw-on drum caps (slightly larger than the diameter of the tubing)

Pass each 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. When placing the tubing into the drums, measure the tubing against the outside of each drum so that the drum filter will be 2cm 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 page 30 for chemical dilution details.

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.

SPECIAL CONSIDERATIONS FOR VALVE MODELS

A typical installation of a solenoid valve model Chemigem CM55 is illustrated on the next page.

It is imperative to fit the Injection Elbow to the inlet (suction) side of the pool pump for Solenoid Valve installations. The required minimum negative pressure/suction is negative 20 kPa.

In selecting the position for the Injection Elbow on the pool pump inlet pipe, ensure that it is as near as possible to the pool pump.

Installation Below Pool Water Level

See diagram on page 17

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 Elbow 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.

Minimum suction is negative 20kPa 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.

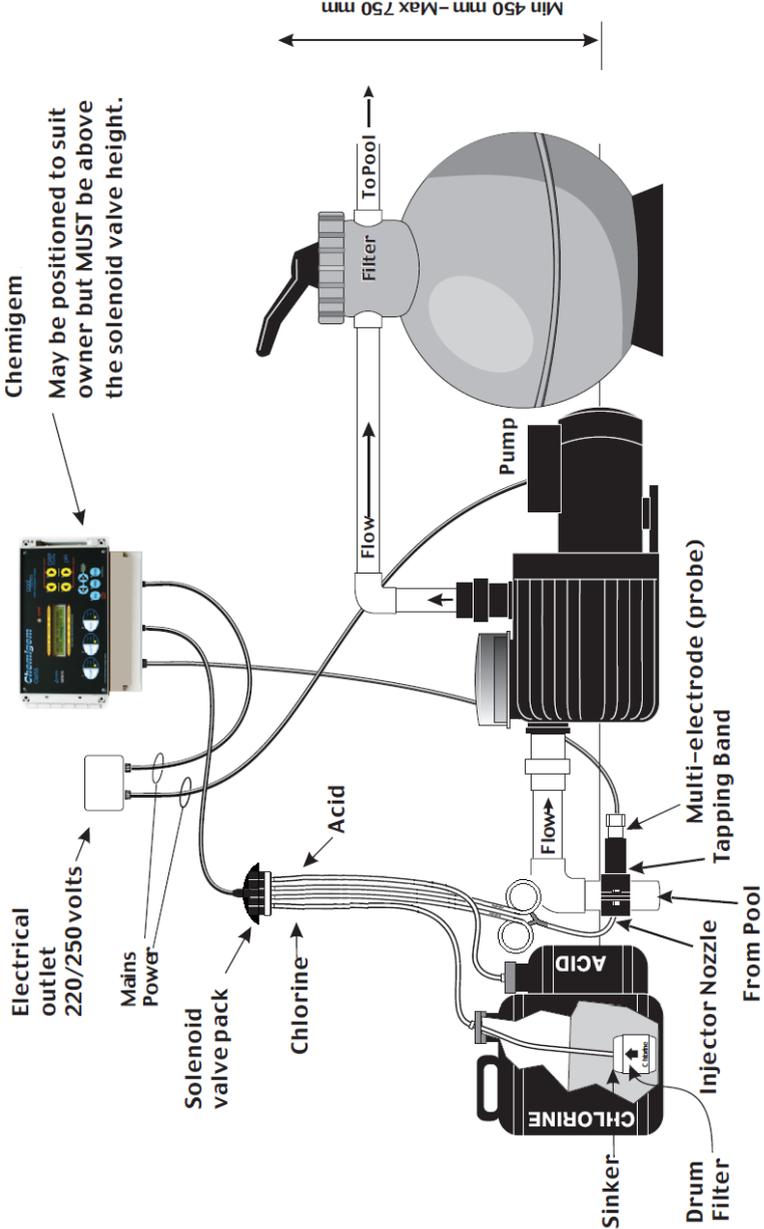
Failure to prevent the back-flow into the chemical drums would cause spillage from the drums, which in turn may result in the two concentrated chemicals mixing together out of the pool water and producing poisonous chlorine gas. In addition, there is the serious possibility of personal injury from contact with the chemicals and breathing the fumes. (Refer to diagram on page 17)

Installation to a Heated Pool

Where solenoid valves are used to dose the pool and one pool pump is required to service both the pool heating system and the filter, the pool heating plumbing must be bypassed. This is typically done with a Venturi System which allows chemicals to be injected on the return (pressure) side of the filtration system.

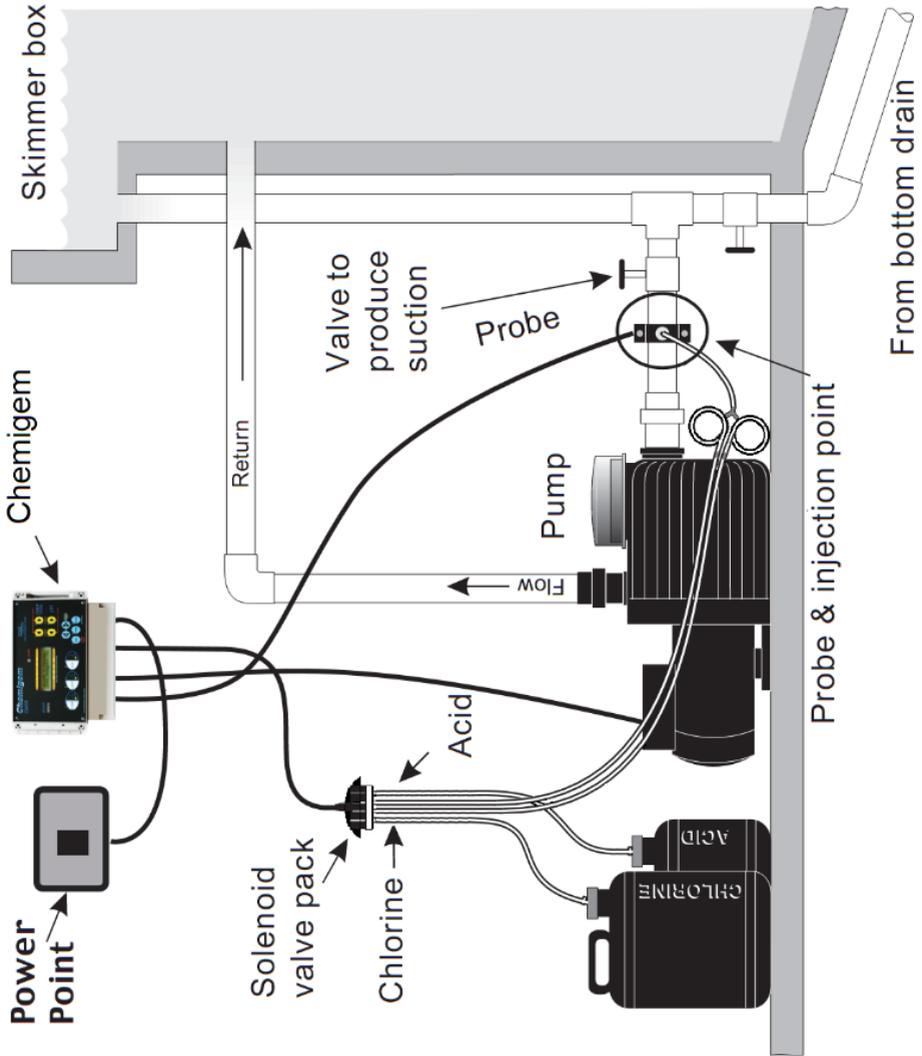
Note that it is simpler to use peristaltic pumps for these types of installations.

CHEMIGEM COMMERCIAL CHEMICAL CONTROLLER INSTALLATION DIAGRAM



FITTING SOLENOID VALVE MODEL CHEMIGEM CM55 BELOW POOL WATER SURFACE LEVEL

Note: inlet and outlet isolation valves required for these types of installations.
The injection point should have a suction level of $-30/50$ kPa.



OPERATION OF THE CHEMIGEM CM55

What is ORP?

For over 30 years operators in many parts of the world have used Oxidation-Reduction-Potential (ORP or Redox) values as a measure of Chlorine activity in water. ORP is a measure of the oxidising properties of the Chlorine in the water and is easily monitored by the Chemigem probe (also called a multi-electrode). When the probe is placed into water containing Chlorine it behaves like an electric cell and creates a small but measurable electric voltage. This voltage is a measure of the activity (effectiveness) of Chlorine in the water.

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) Chlorine (ORP) and 7.7pH. 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.

If the unit is used with these factory-set points as the selected levels, it should obtain approximately 2-4ppm Chlorine and 7.7pH, providing the stabilizer level is at 50ppm. If the stabiliser level is 30ppm or less, the Chlorine will be around 1ppm.

A test kit will measure Chlorine as parts per million (ppm) but the activity level of the Chlorine depends upon the other materials dissolved in the pool water.

Dosing of Chemicals

Dosing of chemicals will commence a few minutes after the pool pump has been switched on to allow for adequate mixing and accurate sensing. Similarly, the safety warning sounds and alarm signals will not operate for the first 4 minutes.

READING THE DISPLAY PANEL

600	SET	650	CHLORINE (ORP)
7.2	SET	7.7	pH

What do the Chlorine and pH Numbers Represent?

- The Chlorine (ORP) number is the activity of the chlorine (see explanation of ORP (Below) and measures in millivolts. (Refer to pages 19 and 30 to 32)
- The pH number is the measure of acid / alkalinity and is displayed in units of the pH scale.

Left Hand Side of Display Screen

The numbers on the left hand side of the display screen are the values the Probe is registering for the **actual** levels of Chlorine and pH within 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 650 millivolts Chlorine (ORP) and 7.7pH as the preferred levels for Chlorine and pH respectively. These settings may be raised or lowered using the keypads 7 and 8 for pH and 9 and 0 for Chlorine (ORP) to the right of the display screen.

KEYPADS

Password

The Chemigem is protected by a password (if enabled). The number will be required when operating the function changing keypads.

The screen provides information as to how to select a three-number password. The unit cannot be disabled without the use of the password numbers.

Ensure that the password numbers are retained in a safe location for later reference.

KEYPAD 1: “PUMP”

When the power has been switched on the screen will light up, however the pool pump will not operate unless the time is within a PUMP-ON period.

This keypad controls the operation of the pool pump and the controlling function of the unit. It has three positions and scrolls through them with each press on the keypad.

- The first press will move the pump status from “**AUTO**” to “**ON**” and the pool pump will then run for 30 minutes. The screen will show a message to confirm this
- Pressing the keypad again will move the pump status to “**OFF**” and the screen will confirm this
- With a third press the pump status will return to “**AUTO**” and the timer will then switch the pump on and off according to the times set

Dosing of chemicals will only commence after a few minutes to allow for adequate mixing and accurate monitoring. Similarly the safety warning sounds and alarm signals will not operate for the first 4 minutes. 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 on how the unit has been programmed.

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.

Should a manual “**ON-TIME**” longer than 30 minutes be required, proceed as follows:

- Press “**PUMP**” keypad 1 a few times until the screen message states that the pump is operating under “**AUTOMATIC TIMER**”
- Press once more and hold down continuously keypad 1 until the required “**ON-TIME**” in hours is displayed on the screen

The unit will then operate for that number of hours and when all manually set times have expired the unit will automatically return to “**AUTOMATIC TIMER**” to switch on and off the pool pump.

If the Chemigem inbuilt pool pump timer is disabled by the pool operator, the unit will lose the ability to turn the pool pump on manually with the “**PUMP**” keypad. To turn the pool pump on or off manually when the timer has been disabled, use the mains power switch.

To reinstate the inbuilt timer, set “**Automatic Pump Times**”

KEYPADS 2 and 3: “AUXILIARY”

To set **ON** and **OFF** times for Auxiliary equipment repeat the steps described for **PUMP** control and timer settings, selecting **AUX**

Examples of Auxiliaries are chemical dosing pumps.

KEYPAD 4: “ESCAPE” AND “ALARM MUTE”

The keypad has two functions: -

- When the setup of the Chemigem is completed or required changes made, pressing the **ESC** keypad will return to normal display.
- When alarms are sounding it can be pressed to mute the warning tone. The warning tone will be restored when the unit next switches on. The flashing red light remains on until the pool chemistry returns to the preset levels.

KEYPAD 5: “HELP”

This keypad gives a reminder to check the pool water with a quality test kit along with other helpful information.

KEYPAD 6: “ENTER”

The main feature of the keypad is to obtain the menu items and to select those that are made to flash.

- Pressing this keypad brings the **“MAIN MENU”** items on to the screen
- It will select any word that is flashing on the screen. To change the word that is flashing, use keypads ORP or pH (Manual Feed Pads), then press keypad No. 6 again to select it.

It also advances the digits when setting the clock and timer

When adjusting times in the **“CLOCK”** or **“TIMER”** functions, each press of the **ENTER** keypad advances the number which is flashing, by one digit. (Refer to pages 32& 33)

KEYPADS 7 and 8: “INCREASE AND DECREASE POOL ACID SET LEVELS”

Keypads 7 and 8 are used to set the level of pH required in the pool water. The keypads raise or lower the required level and the unit will then acquire and hold the set level.

If the pH level required is lowered using keypad 7 the unit will achieve the new level quickly by adding some pool Acid.

However if the pH level required is raised using keypad 8, the unit cannot make the changes rapidly. (If Chlorine is added to the pool water during the next few weeks it will slowly raise the pH of the pool water)

These two keypads are also used together to turn the pH function on and off.

To manually turn off the pH and to turn it on again, refer to page 23

KEYPADS 9 and 0:

“INCREASE AND DECREASE CHLORINE SET LEVELS”

Keypads 9 and 0 are used to set the level of Chlorine required in the pool water. The keypads raise or lower the required level and the Chemigem will then acquire and hold the set level.

If the Chlorine level required is to be lowered, keypad 9 will lower the set level. It may take some days or even weeks before the Chlorine level drops to the required setting.

However, if the Chlorine level is to be raised, press keypad 0. The unit will feed Chlorine every 3 minutes until the set level is reached.

To manually turn off the Chlorine and to turn it on again, refer to page 23

KEYPAD “ORP”: “CHLORINE MANUAL FEED”

If, as a result of a pool water test, it is determined that the Chlorine is not within acceptable levels, the Chemigem can perform a manual dosing operation to bring the level up rapidly.

The unit is equipped with the facility to override its normal operation and to dose Chlorine manually. Keypad “ORP” performs this function.

Refer also to keypad “pH” that manually feeds pool Acid (pH)

Normally it will only be necessary to manually dose either Chlorine or pH, however if for any reason keypads “ORP” and “pH” are both pressed at once, only the pH will operate.

As soon as the manual-feed keypad is pressed the main screen will appear blank for 2 seconds after which it will display which feed is taking place.

Feeding will continue for about 20 seconds, while the keypad is pressed.

When the display panel returns to normal the dosing stops.

Press again to repeat as many times as required.

After manually dosing with Chlorine, monitor the setting for several hours afterwards to make sure that the recommended levels have been restored.

KEYPAD “pH”: “POOL ACID MANUAL FEED”

If, as a result of a pool water test, it is determined that the Pool Acid (pH) is not within acceptable levels, the Chemigem can perform a manual dosing operation to **lower** the level rapidly.

The unit is equipped with the facility to override its normal operation and to dose pool Acid manually.

Refer also to keypad “ORP” that manually feeds Chlorine.

Normally it will only be necessary to manually dose either Chlorine or pool Acid, however if for any reason keypads “ORP” and “pH” are both pressed at once, only the pool Acid will operate.

As soon as the manual-feed keypad is pressed the main screen will appear blank for 2 seconds after which it will display which feed is taking place.

Feeding will continue for about 20 seconds, while the keypad is pressed.

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. However, 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.

To Turn Off the Chlorine

Press and hold down keypads 9 and 0 at the same time for 3 seconds. While doing so the display will show **“TO DISABLE CHLORINE HOLD FOR 3 SEC”** and at the end of the 3 seconds it will display **“CHLORINE OFF”**.

To Turn On the Chlorine

Press and hold down keypads 9 and 0 at the same time for 3 seconds, after which time the unit will beep and resume displaying the set and actual values for the Chlorine (ORP) of the pool.

To Turn Off the Pool Acid (pH)

Press and hold down the keypads 7 and 8 at the same time for 3 seconds. While doing so the display will show

“TO DISABLE pH HOLD FOR 3 SEC” and at the end of the 3 seconds it will display **“pH OFF”**.

To Turn On the Pool Acid (pH)

Press and hold down keypads 7 and 8 at the same time for 3 seconds, after which time the unit will beep and resume displaying the set and actual values for the pH of the pool.

CALIBRATING THE UNIT

Do not re-calibrate until identical pH readings have been obtained from at least three test kit results from around the pool, or from a Probe in a Buffer solution.

Press **ENTER** - Use arrow across to **SERVICE**

Press **ENTER** - Enter 4 digit pin number 8934. Use arrow across to **SYSTEM**

Press **ENTER** – Use arrow across to **GLOBAL**

Press **ENTER** – Use arrow across to **CALIBRATE**

Press **ENTER** – **Choose pH** by moving arrow across

Press **ENTER** – use arrow to go to **DECREASE or INCREASE**

Press **ENTER** to change calibration

If the offset is more than 30mv the probe is at the end of its life.

RE-CALIBRATING CHLORINE

Recalibrating Chlorine(ORP)is **not needed** and it **should not be done** without the prior advice of Pool Controls.

TO CHANGE THE CLOCK TIME

Press **ENTER**

Select **SETUP** using keypad “pH” - Press **ENTER**

Enter the pin number if **ENABLED**

Select **CLOCK** using keypad “pH” - Press **ENTER**

Select **TIME** - Press **ENTER**

Select **MINUTES** using keypad “pH”

Press **ENTER** to increase the minutes

Select **HOURS** using keypad “pH”

Press **ENTER** to increase the hours

Select **OK** using keypad “ORP”

Press **ENTER** to get back to the clock setup

Press **ESCAPE** 3 times to get back to the main menu

TO SET THE DATE

Press **ENTER**

Press **SETUP** using keypad “pH” - Press **ENTER**

Enter the pin number if **ENABLED**

Select **CLOCK** using keypad “pH” - Press **ENTER**

Select **DATE** using keypad “pH” - Press **ENTER** to select the date

Select **DAY** using keypads “ORP” or “pH”

Use the **ENTER** keypad to select MON, TUE etc.

Select **MONTH** using keypad “ORP” or “pH”

Use the **ENTER** keypad to select the month

Select **YEAR** using keypads “ORP” or “pH”

Use the **ENTER** keypad to select the year

Press **ESCAPE** 4 times to get back to the main menu

(If the required date, day, month or year are bypassed, keep pressing the keypad until the required data is shown)

EMPTYING SWIMMING 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 Probe and to cover the sensing end of the Probe with the protective cap that is provided and to temporarily seal the resultant exposed hole in the Reducing Nipple (to avoid water seepage or sand and dirt entering the pool piping).

Failure to carry out these functions may damage the Probe and negate the Warranty.

Refer to page 11 for the re-installation of the Probe.

SETTING THE INBUILT POOL PUMP TIMER

The unit's built-in pump timer is factory set to two ON TIMES each day. If the built-in pump timer is not to be used (because an external pump timer is used), the built-in pump timer **must** be set to run from 00:05 to 23:55. This will ensure the Chemigem is always running.

If it is decided to turn off the automatic pool pump timer and use the manual switching of the pool pump on a daily basis, this may result in unbalanced pool water that is not safe for swimming. If necessary, obtain advice from a qualified pool maintenance technician.

PUMP ON MANUALLY

The following instructions apply if the unit's built-in pool pump timer is used, and not a separate pool pump timer:

To turn the pool pump on manually for 30 minutes - press keypad 1 until the **ON** light is illuminated

To increase the manual ON time:

Select **PUMP ON** and continue to hold down. After 5 seconds the length of time to run manually can be seen in the top right hand side of the unit's screen. This will increase every few seconds. Release the keypad when the required length of time is reached.

PUMP OFF MANUALLY

The following instructions apply if the unit's built-in pool pump timer is used, and not a separate pool pump timer:

To manually turn the pool pump off for 30 minutes - press keypad 1 until the **OFF** light is illuminated.

To increase the manual OFF time:

Select **PUMP OFF** and continue to hold down. After 5 seconds the length of manual off time can be seen in the top right hand side of the unit's screen. This will increase every few seconds. Release the keypad when the required length of time is reached.

PUMP AUTOMATIC ON and OFF

The following instructions apply if the unit's built-in pool pump timer is used, and not a separate pool pump timer:

Automatic Readings:

Press and release keypad 1 until **AUTO** is illuminated.

The unit has daily factory pre-set ON and OFF times of:

P1: 8am to 10am

P2: 6pm to 8pm.

P3& P4: Optional – to operate pool pumps more than twice per day

It is a 24-hour clock. For example, 8pm reads as 20.00 hrs.

Pre-set pump times will automatically turn the pool pump ON and OFF.

AUTOMATIC PUMP TIMER SETTINGS:

Changing Automatic Pump Start Times

When changing the automatic pump times, ensure that the START time is less than the STOP time.

Press **ENTER**

TIMERS will flash on screen - Press **ENTER**

Enter the pin number if **ENABLED**

Select **PUMP** - Press **ENTER**

Select the desired pump timer **P1 P2, P3 or P4** - Press **ENTER**

Select **START** - Press **ENTER**

Select **HOURS** using keypad “pH”

Press **ENTER** to change the **HOURS** figure

Press **ESCAPE** once.

select **MINUTES** using keypads “ORP” or “pH”

Press **ENTER** to select the desired **MINUTES**.

Press **ESCAPE** 4 times to get back to the main menu

Setting the stop time follows the same procedure instead selecting **STOP**

Changing Period Settings

The unit has been pre-set to **DAILY** -Press **ENTER**

TIMERS will flash on screen - Press **ENTER**

Enter the pin number if **ENABLED**

PUMP will flash on screen - Press **ENTER**

Select **P1** - Press **ENTER**

START will flash on screen

Press **SELECT** with keypads “ORP” or “pH”

Scroll through the different options using the **ENTER** keypad (Explained below)

Press **ESCAPE** 4 times to get back to the main menu

Daily	Every day
Mon	Monday only
Tue	Tuesday only
Wed	Wednesday only
Thu	Thursday only
Fri	Friday only
Sat	Saturday only
MO - SA	Monday to Saturday inclusive
MO – FR	Monday to Friday inclusive
MO – TH	Monday to Thursday inclusive
FR – SU	Friday to Sunday inclusive
FR – SA	Friday to Saturday inclusive
SA – SU	Saturday and Sunday inclusive
SU – FR	Sunday to Friday inclusive
OFF	Off

Chemical Feeding

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.

Adjusting 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 levels required, alter the settings a little with keypads 7 and 8 or 9 and 0. The Chemigem will bring about the changes to the chemistry of the pool water as the pool pump circulates the water.

Regular water testing

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.

Always follow the specific requirements of the pool builder when setting the chemical levels for the pool, however, 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 (Buffer)	80 to 300 ppm or 300 mg/l
TOTAL DISSOLVED SOLIDS (TDS)	300 to 2000ppm or 2000 mg

- The Chemigem will work at maintaining Chlorine (ORP) levels within a range of 600 – 700mV (milliVolts) when set at 650mV 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 alkali. Pool water should be between pH 7.2 and 7.8 (which is almost neutral)
- pH values at the upper and lower ends of this scale are **very dangerous**.
- 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 7.7 to keep the pool plaster in good condition.

IMPORTANT: pH will NOT remain stable when Total Alkalinity is below minimum. An unstable pH will lead to chemical dumping in the pool. Maintain TA within range by adding Buffer

The First Two Weeks

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 concrete 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.

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 the previous page 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.

Diluting Chemicals

Pool Acid

The Chemigem is designed to automatically help 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.

Hydrochloric acid gives off corrosive and highly 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. If in a confined space good ventilation must be provided. The acid drum can be vented to the outside air using another length of tubing if necessary.

Consult your pool builder about the type of acid required.

Diluting Pool Acid is strongly recommended as follows:

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

Chlorine

The Chemigem CM55 uses a sodium hypochlorite solution to dose chlorine.

Diluting Chlorine is strongly recommended as follows:

Pools larger than 90kl.....	20 litre drum or larger full strength
20kl - 90kl.....	20 litre drum full strength.
10kl - 20kl.....	20 litre diluted 1:1 with water
Spas 2kl - 10kl.....	20 litre diluted 1:15 with water
Spas less than 2kl.....	10 litre diluted 1:20 with water

ALARMS

Note: the safety warning sounds and alarm signals will not operate for the first 4 minutes of operation.

Normal Range Indicator

When the pool pump is running the Chemigem shows a green light if the pool chemical 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.

Outside Normal Range

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

- It will sound an alarm, provided the alarm is switched on.
- The red light will flash at one-second intervals.

When the alarm is sounding and the red light is flashing the unit will also indicate on the screen the reason for the alarm.

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

What to do if there is an alarm

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 the same 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

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 warning sound and the red warning light will switch off, but the warning sound may be switched off at any time by pressing the **ESC** keypad No.4. This sound will come on again the next time the pool pump operates if the Chlorine level is still too low.

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 nozzle in the Injection Elbow is clogged
- The venturi system (if fitted) is clogged
- A faulty Solenoid Valve
- Probe requires cleaning

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
- Probe requires cleaning

Low pH Alarm (Excess Acid)

This indicates that the pH level in the water is considerably lower than that which was set. The Chemigem cannot do anything about this condition except warn about it. However, 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- "Buffer".

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.
- Probe requires cleaning

High pH Alarm (Insufficient Acid)

This indicates that the pH level in the water is considerably higher than that which was set. In this case the Chemigem will be in a locked condition and will not dose further pool Acid until the lock mechanism is overridden. This is carried out by pressing the **ESC** keypad No.4. The unit will then dose further pool Acid until the level for pH that was set has been reached.

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 proportional acid setting that may have been adjusted to add insufficient acid
- The Acid drum may be empty
- Super chlorinating the pool
- The nozzle in the Injector Elbow is clogged
- The venturi system (if fitted) is clogged
- A faulty Solenoid Valve
- The filter needs backwashing
- Probe requires cleaning (Refer to page 35)

Maintenance

Like all equipment the CM55 will look better and last longer if it is maintained and operated in accordance with these instructions.

Replace Squeeze Tubes Regularly

The squeeze tubes in peristaltic pumps should be checked regularly and replaced every 6 months.

Check Tubing regularly

Regularly check the tubing to ensure that it has not become brittle. **If the tubing becomes brittle, it must be replaced immediately.**

The CM55 Power Supply

The Power Supply has been designed for operation in full sun and weather. However, it will benefit from being under cover. Some Do's and Don'ts –

Don't:

- Install it in a small sealed enclosure (so it does not overheat)
- Install it in a very hot unventilated shed (so it does not overheat)
- Allow insects to nest in the unit (because they will prevent it from functioning)
- Install chemical drums under or close to the unit (to prevent corrosion)
- Forget about the unit once installed – it should be checked regularly to ensure that it is working for you

Do:

- Install it as per the instructions
- Check it regularly
- Make sure the pool balance is checked regularly

Cleaning the Multi-electrode (Probe)

If the CM55 is consistently giving readings different from those obtained from a test kit, it may be necessary to clean the multi-electrode.

To do this:

- Remove the probe from the reducing nipple by unscrewing the retaining nut and remove the o-ring
- Holding the cable, gently swirl the probe in a dilute solution of hydrochloric acid (pool acid) for two minutes
- Rinse the probe in clean water and then replace it in the reducing nipple, making sure that the “o-ring” is in place.
- Tighten retaining nut with fingers)