

DAVEY[®]

ChloroMatic[®]

Salt Water Pool System



Installation & Operating Instructions

Models

MCS16C

MCS16CTP

MC16C

MCS24C

MCS24CTP

MC20C

MCS36C

MCS36CP

MC30C

MCS40C

MCS50C

Please pass these instructions on to the operator of this equipment.

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DAVEY

WATER PRODUCTS

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davey.com.au



DAVEY®

ChloroMatic®

Salt Water Pool System

Congratulations! You are now the proud owner of the renowned ChloroMatic® Salt Water Chlorinator. Please read all information in this manual carefully before installing or operating your ChloroMatic® Salt Water Pool Chlorinator.

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Packing List

For ESC only:

MCS16C / MCS24C / MCS36C / MCS40C

1. Power Supply / Controller
2. Electrolytic Cell
3. 2 x 50 x 40PVC Reducing Brush
4. Mounting Kit and Spare Fuse

MCS50C

1. Power Supply / Control Unit
2. Electrolytic Cell for ESC50
3. 1 x Cell adaptor (50mm)
4. 1 x Cell adaptor with earth bolt (50mm)
5. Mounting Kit and Spare Fuse
6. 2 x 80/50mm reducing sockets
7. 2 x 80mm Nut
8. 2 x 80mm Socket

Refer to catalogue for other models

IMPORTANT NOTICE

FACTORS THAT WILL IMPROVE THE PERFORMANCE AND LIFE OF YOUR SALT WATER CHLORINATOR PLEASE READ THIS BEFORE OPERATING YOUR CHLORINATOR

POOL BUILDERS: Please cover this information with your customer during the new pool “Hand over Session”

Salt Water Chlorinators are a valuable piece of pool sanitising equipment and must be cared for to get the best performance and life span from it.

There are **THREE** main factors that will damage your chlorinator and reduce the life of the product. Please monitor the following factors in accordance with your installation & operating instructions.

1. MAINTAIN OPTIMUM SALT LEVELS:

OPTIMUM SALT LEVELS: 4000-6000ppm

- Run chlorinator at the Optimum Salt Levels stated within this document and on the product to ensure optimum sanitiser output and cell life.
- Operating this device at low salt levels will damage the cell and reduce its life.
- The control panel displays red LED indicator warnings when the salt levels are low.
- If no action is taken to rectify the salt levels, damage to the cell may result which will not be covered under warranty.

2. MONITOR & MAINTAIN YOUR CHLORINATOR CELL:

- To keep your salt water chlorinator in the best possible condition, regular monitoring of the electrolytic cell is recommended. The ‘Cell’ is the clear plastic housing containing the removable cell head.
- During the chlorination process a white powdery Calcium scale may naturally build up on the titanium plates in the cell. Monitor the cell to prevent excessive scale build up. Excessive scale build up will cause damage to your cell, and dramatically reduce its efficiency and lifespan.
- Reverse Polarity models are low maintenance models that minimise scale build up.
- The control panel displays red LED indicator warnings when the cell requires cleaning.
- If Calcium scale builds up please clean the cell, following the cleaning instructions provided on page 11.
- **NEVER:** Use concentrated acid to clean your cell.
- **NEVER:** Leave cell in cleaning solution for extended periods of time
- **NEVER:** Use metal implements, scourers or brushes to clean your cell

3. BALANCED POOL WATER CHEMISTRY:

- Salt levels **MUST** be maintained at 4500-6000ppm for optimum performance and lifespan
- Calcium Hardness levels **MUST** be kept to ideal ranges of **200-275ppm** (for Concrete and Tiled Pools) and **100-225ppm** (for other surfaces) to prevent excessive scale build up and damage to equipment.
- pH levels **MUST** be kept to ideal levels to prevent damage to equipment and pool surfaces and to obtain optimum sanitiser effectiveness.
- Total Alkalinity and Stabiliser levels must also be kept in an ideal range.

Note: Please refer to the **RECOMMENDED POOL WATER CHEMISTRY** chart on page 14 for more information.



Note: The Chlorinator is not intended for use by young children or infirm persons without supervision. Please ensure that young children are supervised to ensure that they do not play with the Chlorinator.



Power connections and wiring must be carried out by an authorised electrician.

INSTALLATION INSTRUCTIONS FOR CHLOROMATIC® (ESR and ESC)

Note: For ESCpH models, please read all instructions then refer to page 15-17 for more information.

INSTALLING THE POWER SUPPLY:

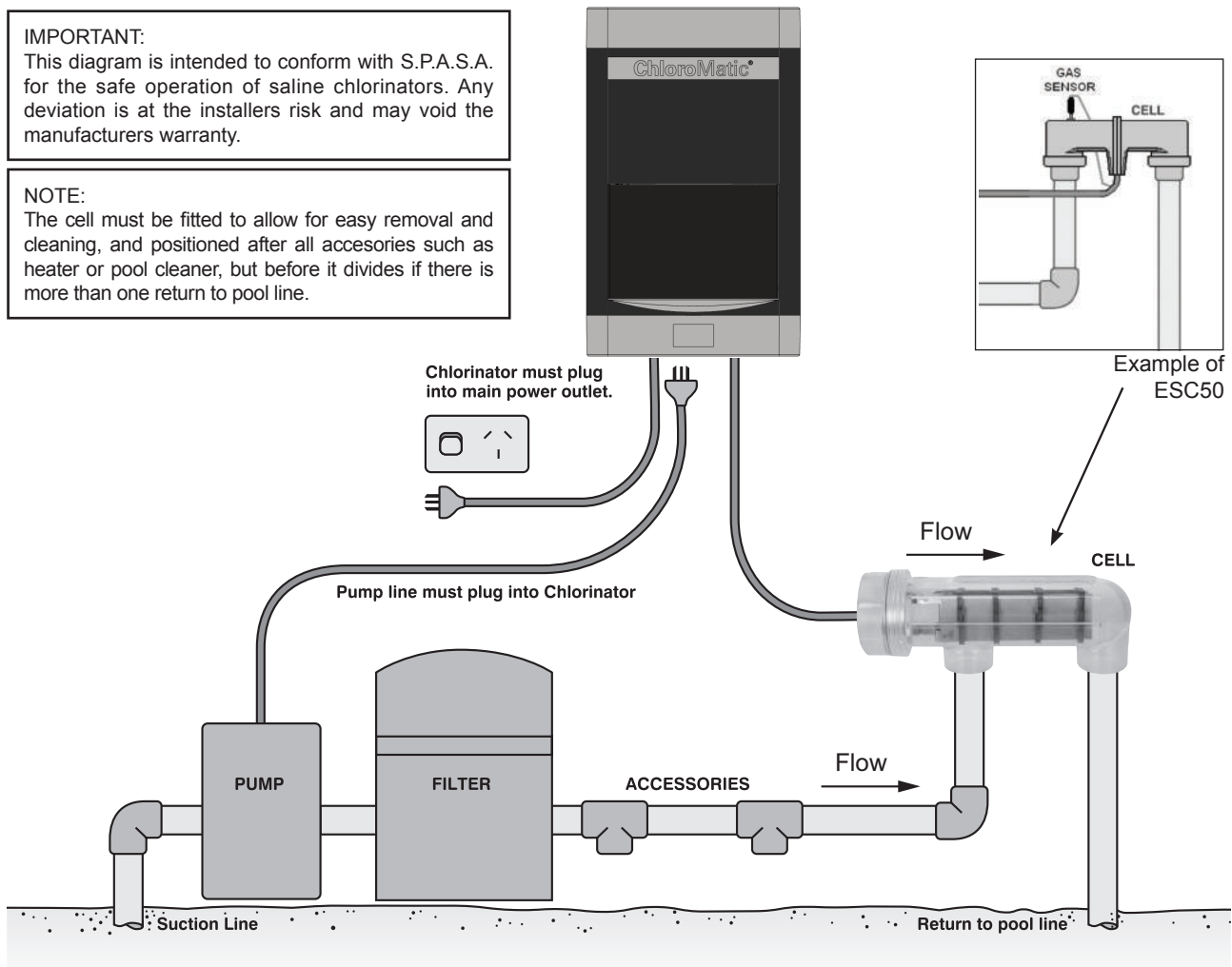
Select a convenient well-ventilated location within one metre of filter equipment and mount the Power Supply vertically onto a post or wall 1.5 metres above ground level. Australian Standards requires that the Power Supply shall not be located within 3 meters of the pool water. Plug Power supply into a suitable weatherproof outlet and plug pump into the power outlet of the Power Supply Unit. The Unit must be kept away from acid and other chemical storage areas. Acid and chemical vapours will corrode the electronics inside the Unit. It must also be kept away from heat sources. Good ventilation is necessary for correct operation.

IMPORTANT:

This diagram is intended to conform with S.P.A.S.A. for the safe operation of saline chlorinators. Any deviation is at the installers risk and may void the manufacturers warranty.

NOTE:

The cell must be fitted to allow for easy removal and cleaning, and positioned after all accesories such as heater or pool cleaner, but before it divides if there is more than one return to pool line.



Two self-tapping screws and wall plugs have been provided for fast and simple installation. Simply cut out Template at bottom of page 19 for location of drill entry points. Use a 7mm masonry drill bit when fitting Power Supply to a brick or concrete wall. When mounting to a post drill pilot holes and fit screws provided. Once screws are in position simply hang chlorinator via bracket on back of Unit.

CONNECTING THE ELECTROLYTIC CELL TO THE POWER SUPPLY:

The Power Supply is fitted with a flexible lead terminated with brass connectors. These must be correctly fitted to the connections on the inside of the Cell Head. To prevent incorrect connection the fittings have been colour coded.

ESR	Black to Black & White to White
ESC / ESCpH	Either Black Terminal

The Blue Gas Sensor connector should be pushed onto the thread of the small bolt. The power outlet on the bottom of the Power Supply is dedicated to the POOL PUMP ONLY.

	Do not use a double adaptor to connect more than one pump - it can cause overload to the system and could void your warranty. *Does not relate to MCS50C.
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Important: The Cell must be installed so that the water flows through the Cell Housing via the Cell head end in accordance with the arrow on the cell housing. This is to ensure correct operation of the gas sensor.

PRE - START UP PROCEDURE:

Before operating your ChloroMatic® please ensure the following items have been added to your pool:

- **SALT** - Load salt into the pool at the following rates:
 - All ChloroMatic Models – Around 45-60kg per 10,000 litres (4500-6000ppm)

Connect manual vacuum system and slowly vacuum until salt dispersal is complete. Place vacuum head into deepest end of pool and allow vacuum to continue for a further 2 or 3 hours. Salt should now be completely mixed. Never add salt directly into skimmer box.

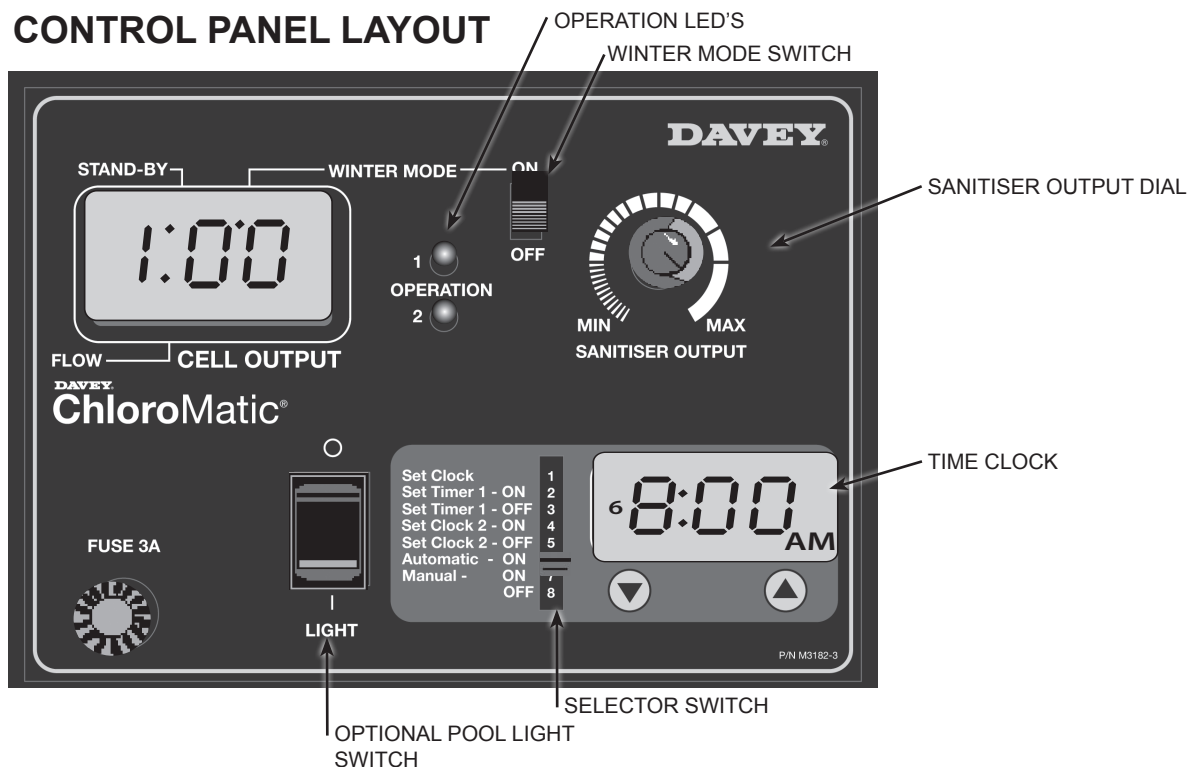
- **CHLORINE** - For a new pool installation that has not been chlorinated, add sufficient Chlorine (liquid or granular) to achieve a reading of 3 ppm (with a suitable test kit), or run the chlorinator system continuously for at least 24 hours or until a reading of 3 ppm is reached.
- **STABILISER** - It is essential that pool stabiliser be added and maintained at the rate of 30 - 50 ppm at all times. Do not exceed 100 ppm.

(Refer **Day to Day Operation** page 12 for further information).

OPERATION OF YOUR ChloroMatic® SYSTEM:

Cell Output on the digital LED display is expressed as a percentage. The Display will fluctuate around 100 when producing sanitiser - unless in Winter Mode, in which case the Display will fluctuate around 85. (Refer Winter Mode page 8). The Unit is fitted with an electronic control and warning system. This regulates the output of the Unit to the preset maximum. The warning system consists of two Operation LED's that will glow Green, or Red to indicate possible faults with the Unit or damaging operating conditions.

CONTROL PANEL LAYOUT



Once the salt level in the pool is correct the unit may be switched on. Set **Sanitiser Output** to Max (100%). The **STAND - BY** indicator will be On and no **Cell Output** will be seen for approx 30 seconds, this allows the pump and filter to prime and the Cell Housing to fill with water. After this start - up delay, the display should show 100 (ESR Models (+/-2), unless in **Winter Mode** where it will display 85 (ESR Models (+/-2)). At this point both **Operation LED's** should be Green; if not there may be a problem. (Refer table).

DISPLAY / INDICATOR	LED 1	LED 2	REASON / ACTION
STAND - BY ON	Green	Green	<ol style="list-style-type: none"> 1. Start-up delay functioning. 2. Sanitiser Output set below max. Cell is turned off. (Refer Sanitiser Output page 7)
FLOW STAND - BY ON	Green	Green	<ol style="list-style-type: none"> 1. Gas detected. Check pump/pipes for damage 2. Gas sensor not connected to cell.
FLUCTUATING AROUND 100	Green	Green	System operating normally.
	Green	Red	<ol style="list-style-type: none"> 1. Salt level too low. Add salt at a rate of 25kg per 25,000L. 2. Cell is calcified. Clean cell. 3. Water temperature low. Switch to Winter Mode.
	Red	Red	<ol style="list-style-type: none"> 1. Salt level below minimum. Add Salt. 2. Cell is calcified. Clean cell. 3. Water temperature very cold. Switch to Winter Mode. Continued operation may cause damage to system – Consult dealer for problem rectification.

PLEASE NOTE: When Winter Mode switch is On Unit will operate similar to above except Display will fluctuate around 85. (Refer Winter Mode page 8).

ChloroMatic® MODEL ESR, ESC and ESCpH SERIES FEATURES:

STAND- BY:

The **Stand - By** indicator will be On when the Unit is preparing to produce sanitiser. This will be either during the systems initial start up or when the Cell has been turned Off during the filtration cycle.

FLOW:

If there is a problem with water flow or gas is detected in the Cell Housing the flow indicator will be On. When this occurs the pump or pipes should be inspected for damage and the Flow Sensor connection checked.

SANITISER OUTPUT CONTROL:

The Sanitiser Output Control varies the amount of time the Cell operates during the filtration cycle.

The **Sanitiser Output Control** will not vary the electrical current supplied to the Cell. (As shown on the Display).

As an example, if one filtration cycle is set at 5 hours, and the **Sanitiser Output Control** is set to 80%, then the total amount of time the Cell will operate during the 5-hour cycle will be 4 hours. If the **Sanitiser Output Control** is set to 60%, the Cell will operate for 3 hours total over the 5-hour filtration cycle.

When the **Sanitiser Output Control** is set to MIN, the Cell will be OFF for the duration of the filtration cycle. When the **Sanitiser Output Control** is set to MAX, the Cell will be ON for the duration of the filtration cycle.

The **Sanitiser Output Control** is graduated in steps of 10% from MIN (OFF) to MAX (ON).

During the filtration cycle, the Cell will be turned ON and OFF a number of times each hour, unless the **Sanitiser Output Control** is set at MIN or MAX. Using the previous example (of 60%), the Cell will operate for about 36 minutes each hour. This 36-minute operating time will be made up of a number of smaller operating periods. As an example, the Cell may turn ON 12 times (for a period of 3 minutes each time) over the hour to make up the 36 minutes.

This enables the electronic circuitry to re - adjust to any changes in the pool water condition. For example, dilution from winter rains, the addition of salt etc.

If the Cell is OFF and you wish to check its operation, simply turn the **Sanitiser Output Control** to MAX and the Cell will turn ON. Once checked, adjust the **Sanitiser Output Control** back to the desired position and after a few minutes the Cell will turn OFF again.

To turn the Cell OFF, simply turn the **Sanitiser Output Control** to MIN. This will be convenient for backwashing.

LOW SALINITY INDICATOR

Your ChloroMatic® is fitted with a number of protective systems including the **Low Salinity Indicator (operation LED's)**. As the salt level in the pool decreases, the wear on the Cell increases. Although salt is not consumed in the ChloroMatic® process, it is lost through splashing, back - washing and on bathers as they leave the pool. The salt level is also reduced by rain, which causes dilution. Salt is not lost to evaporation.

As the salt level in the pool falls toward the minimum **Operation LED2** will turn RED. At this point the salt level should be increased by adding 25kg of salt per 25,000 litres of pool water. The addition of salt should not affect the ChloroMatic® as it is protected against overloads. If no action is taken and the salt level continues to fall damage to the system may result.

OPERATION OF ChloroMatic® ESC SYSTEM:

The ChloroMatic® ESC system has the following additional features:

- 1. POLARITY INDICATOR ON OUTPUT Display** - The ± **Symbol** appears before the cell output display to indicate which polarity the system is in, i.e. positive or negative. This symbol will alternate and is factory pre set.
- 2. SANITISER OUTPUT** - When adjusting the **Sanitiser Output (refer following section)** the ESC system's Cell Output Display flashes the control setting (i.e. percentage of time that the Cell operates during the filtration cycle) for a few seconds then resumes displaying Cell Output, or standby light (if in waiting).
- 3. CLEANING OF CELL** – The ESC System uses a patented Electronic reverse polarity system to clean your Cell, providing the convenience of lower maintenance.
- 4. PUMP CUT-OUT** – The ESC System features a protective interlock system which cuts off power to the pool pump if there is no water flowing through the cell housing. This is especially helpful if the pump 'runs dry' and hence may stop the pump motor from burning out.

There are other factors that can cause the Unit not to work correctly:

1. **Heavy Rain** - can cause very diluted pool water to pass over the Cell due to surface skimming.
2. **Scaled Cell** - a scaled Cell will not draw as much electrical current as a clean Cell when first started.
3. **Cold Water** - cold pool water reduces the ability of a Cell to carry electrical current. (Refer Winter Mode below).
4. **Failing Cell** - as the Cell ages there will come a time when the electrical current draw will drop. This can be compensated for with the addition of extra salt. A Cell is considered failed when it draws less than **80 % of maximum** current. To keep a failed Cell in operation **Winter Mode** can be used along with extra salt. There will come a time when the Cell will not respond to either extra salt or **Winter Mode**. It will then need to be replaced (see pg11 for replacement cell codes). Please note that the **Low Salinity Indicator** is not like T.D.S. meters, which are temperature compensated Scientific Instruments. The accuracy will be within 500ppm salinity and they are water temperature dependent, just as the Cell is.

WINTER MODE:

When the Cell draws electrical current from the Power Supply, the amount of current drawn is dependent upon a number of factors. Two of these factors are **Salinity** and **Water Temperature**.

The **Low Salinity Indicators** on your ChloroMatic® are designed to operate at swimming season water temperatures. When the pool begins to cool in the off-season the temperature drop causes the Cell to behave differently - it will draw less electrical current. This can cause the Low Salinity Indicator to assume that the salinity has fallen even if the salinity has remained relatively constant.

When the temperature of the pool water drops, the **Winter Mode** Switch should be placed in the ON position.

The **Winter Mode** Indicator will then be ON. This has two effects:

1. It alters the setting of the **Low Salinity Indicator**.
2. It reduces the Cell Output by approximately 15%

The Unit will now respond to a cold pool environment. Winter Mode should not be used in the swimming season as it reduces the Cell Output, leading to less sanitiser, and it alters the setting of the Low Salinity Indicator, which could lead to premature Cell failure.

AUTOMATIC TIME CLOCK OPERATION:

Your ChloroMatic salt water chlorinator is fitted with one of two types of automatic timer

- (1) Digital
- (2) Analogue

(1) Models with Digital Timer:

The digital timer includes a backlit Liquid Crystal Display which displays time of day in 12-Hour format with AM / PM indication and a selector switch position indicator. The digital timer has up and down buttons for incremental settings.



Timer Setting and Functions:

To set your clock and various functions please refer to the table of instructions following.

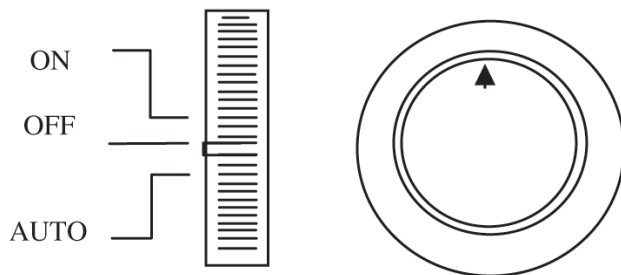
NOTE:

When you first turn on the power to the chlorinator, it will take approximately 5 seconds for the LCD to appear on the screen.

Function Description	Selector Switch Position	Functions and Instructions
Set Clock	1	Set the current time on the digital clock.
		Select the Set Clock position on the selector switch to enable the time of day to be input. A number '1' will appear at the left of the screen. (a) The display will flash on and off as long as the selector switch remains at this position. Use the up ▲ and down ▼ buttons to reach the desired times. Hold the buttons down for fast increments.
Set Timer 1 – ON	2	Set the start time for the first run time sequence.
		Select the Set Timer 1 – ON position on the selector switch. A number '2' will appear at the left of the screen. This time is factory pre-set to 6am. Proceed as per (a) in the 'Set Clock' instruction to change time. To disable this timer, move up or down to 11.59PM. Press the UP button one more time to turn OFF. NOTE: This step will also disable the time for 'Set Timer 1 – OFF'.
Set Timer 1 – OFF	3	Set the completion time of the first run time sequence.
		Select the Set Timer 1 – OFF position on the selector switch. A number '3' will appear at the left of the screen. This time is factory pre-set to 8am. Proceed as per (a) in the 'Set Clock' instruction to change time.
Set Timer 2 – ON	4	Set the start time for the second run time sequence.
		Select the Set Timer 2 – ON position on the selector switch. A number '4' will appear at the left of the screen. This time is factory pre-set to 5pm. Proceed as per (a) in the 'Set Clock' instruction to change time. To disable this timer please refer to selector switch position 2 above.
Set Timer 2 – OFF	5	Set the completion time for the second run time sequence.
		Select the Set Timer 2 – OFF position on the selector switch. A number '5' will appear at the left of the screen. This time is factory pre-set to 11pm. Proceed as per (a) in the 'Set Clock' instruction to change time. To disable this timer please refer to selector switch position 4 above.
Automatic ON	6	Filtration system switches on and off automatically according to your set times.
		Select the Automatic ON position on the selector switch. A number '6' will appear at the left of the screen.
Manual ON	7	Overrides the automatic time clock settings and switches filtration system ON.
		Select the Manual ON position on the selector switch. A number '7' will appear at the left of the screen. NOTE: Chlorination will be constant until turned OFF or back to Automatic ON. Over chlorination may occur if left for long durations.
OFF	8	Overrides the automatic time clock settings and switches filtration system OFF.
		Select the OFF position on the selector switch. A number '8' will appear at the left of the screen. NOTE: Chlorination / sanitisation will cease. Not recommended for long durations.

(2) Models with Analogue Timer

If your Power Supply is fitted with an analogue time clock the operating time(s) can be easily set by pushing the small pins forward or backwards to the desired operating time(s). The unit comes pre-set for 8 hours operation per day. The ON-OFF-AUTO switch functions as follows:



- On - Over-rides automatic time clock, Filtration System switched on.
- Off- Over-rides automatic time clock, Filtration System switched off.
- Auto- Filtration System switches on and off automatically according to times set.

OPTIONAL POOL LIGHT TRANSFORMER:



Power connections and wiring must be carried out by an authorised electrician.

Your Davey ChloroMatic® is fitted with one of two types of pool light transformer connections as follows:-

TYPE 1: TERMINAL BLOCK CONNECTION BEHIND COVER PANEL BELOW DOOR

(a) 12V – Operates only 12 volt lights.

Take off Cover Panel below Door by removing the two self-tapping screws at bottom.

- 12V connections:
 - Insert the two wires from your pool light into either of the wire terminals of the Terminal Block provided. Fasten screws.
- Multi-voltage connections:
 - Refer to table and diagram below for wiring instructions.

Please Note: Only one light can be connected to each light transformer. If more than one light is required please refer to your ChloroMatic® dealer.

TYPE 2: BLACK & RED TERMINAL SOCKET IN BASE OF UNIT

This terminal socket may accept light connection in two ways:

- “Banana” plugs into the bottom of the terminal
- Wires into the terminal holes at right angles, and fastened by screw

SAFETY NOTICE

IMPORTANT Certain local electrical regulations state “If the supply cord is damaged, it must be replaced by a special cord available from the manufacturer or its service agent”.

MAINTENANCE OF POWER SUPPLY:

Little or no maintenance is normally required with the exception of replacing blown Fuses. These Fuses can be sourced from your local ChloroMatic® Dealer. However it is essential that the wall or post to which the Unit is installed be sprayed (not the Unit itself) periodically with a good surface type insect repellent, since penetration by insects may cause damage, which is not covered by your warranty.

The back of the Unit has been designed as a heat sink. It is normal for this area to become very hot.


MAINTENANCE OF ELECTROLYTIC CELL:

The cell is composed of precious materials, and although proper maintenance can prolong its life to the maximum, eventually the process of electrolysis will wear away its delicate coating, at which time it gradually ceases to produce chlorine.

Mineral salts and calcium (scale) are deposited on the outer and the inner plate as electrolysis takes place. This build up – will interfere with the flow of electrical current in the Cell and thus lowers sanitiser production. It is essential to inspect the Cell regularly and clean when necessary. The rate at which deposits will form on the plate differs with each pool and can be influenced by the following:

- Calcium hardness of the water
- Water Temperature
- pH control
- Water which has been chlorinated with calcium hypochlorite for an extended period
- Calcium in the plaster surfaces of a concrete pool

Because these conditions vary so much, check the Cell at least weekly to begin with to see when either scale or a blue/green soapy substance appears on the plate. You will then be able to determine the cleaning cycle necessary for your pool (obviously more in summer). The intervals between cleaning could get longer to the point where cleaning is only necessary a few times each year. One exception is the use of bore water or ground water, in which case cleaning may always need to be as frequent as once a week.

	<p>NOTE: In areas with hard water, reverse polarity systems may require occasional manual cleaning.</p>
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Life of ChloroMatic® electrolytic cells vary substantially from one installation to another due to variations in operating time, water quality and composition, system and cell maintenance. Please ensure that when cell replacement is necessary you use the correct genuine ChloroMatic® replacement cell to match your system. Due to increased cell output reverse polarity Model ESC40 cells will require earlier replacement than ESC24 Models operating under equivalent conditions. Model ESC40 systems use the same cell as the ESC24. The correct ChloroMatic® Replacement cells to use are:

ChloroMatic® ESR Standard			ChloroMatic® ESC / ESCpH: Reverse Polarity Cells		
ESR Standard Systems Model	ESR Replacement Cell Model to order	Code	ESC / ESCpH Systems Model	ESC Replacement Cell Model to order	Code
110	110	M0741	16	16	M0656
160	160	M0753	24	24/36/40	M0657
200	200	M0755	36	24/36/40	M0657
300	300	M0759	40	24/36/40	M0657
			50	50	M4922

To clean the cell: Turn off chlorinator. Remove all leads connected to the Head Assembly. Unscrew the Cell by turning the Head Assembly clockwise – as per instructions, and withdraw from the Cell Housing.

METHOD 1

Add 1 part HYDROCHLORIC ACID to 10 parts WATER in a suitable container and immerse the Cell in this solution. It should not take longer than a few minutes to clean, if it does the Cell should be cleaned more frequently. If the build – up is not excessive it may be possible to clean the cell plates with a jet of running water. Return the Cell to its Housing and connect leads to the Head Assembly.

METHOD 2

As an alternative, an approved commercial Cell cleaning solution can be used a number of times effectively.



WARNING: Follow safety instructions provided with the Hydrochloric Acid or cleaning solution. When handling Hydrochloric Acid, the use of eye protection, mask and gloves are highly recommended. Extreme caution should be taken whenever handling Hydrochloric Acid or Cell Cleaning Solution.

SAFETY DEVICE:

Hydrogen Gas is a by – product of the chlorine producing process. A Gas Sensor has been incorporated into the Unit and Cell, which will switch off chlorination if gas is detected in the Cell Housing or there is no water flow. ChloroMatic® Units are also fitted with a Thermal Cut – Out to prevent overheating. If the temperature rises too high, power is automatically disconnected. The Unit will resume operation when it cools down.

DAY TO DAY OPERATION:

Four Prime rules must be observed if your unit is to give the best possible service:

1. STABILISER

The importance of pool stabiliser cannot be over – emphasised. It is essential in helping retain chlorine in your pool. Chlorine is rapidly dissipated by sunlight and the use of stabiliser will reduce this dissipation substantially. Without stabiliser, it may be necessary to run the Unit for up to three times as long!

Stabiliser should be added at the rate of 500 grams for every 10,000 litres of water. Stabiliser should be maintained at a level of 30 – 50 ppm. Before adding more stabiliser, have your pool water analysed at your pool shop to ensure that you do not add too much.

2. pH AND TOTAL ALKALINITY:

A correct pH level must be maintained to prevent problems such as black spot, staining, cloudy water, etc. An incorrect pH level can damage the pool. Correct pH levels are as follows; Fibreglass – 7.2 to 7.4 Concrete & tiled – 7.4 to 7.6 If you allow the pH level to rise to 8.0 or above, the chlorine required could be as much as three times the normal amount.

Total Alkalinity should not be confused with pH, although the two are closely related. Total Alkalinity determines the speed and ease of pH change. It is measured in ppm – the ideal range is 80 – 150 ppm, or refer to your pool professional.

You should use a test kit which includes a test for Total Alkalinity. Low Total Alkalinity can cause unstable pH levels – i.e. An inability to keep the pH constant may cause staining, etching and corrosion of metals. High Total Alkalinity will cause constantly high pH levels.

3. SALT LEVELS:



Warning: Some people recommend that you put salt directly in the skimmer box. This is a very poor practice as it allows very high concentrations of salt to be passed through your filtration and other pool equipment.

Salt is the essential element by which your Unit operates. Not enough salt means not enough chlorine - this simple rule governs the total operation of your ChloroMatic®, and insufficient salt will damage your Cell.

RECOMMENDED SALT LEVEL RANGE: 4000 - 6000ppm

Salt is NOT used up in the process of producing chlorine or by evaporation. Salt is only lost through back - washing, splash - out, overflow or by leakage from the pool or plumbing. Winter rains can dilute the salt solution in your pool; therefore salt levels should be checked during this season. In colder water, the ChloroMatic should be set to **Winter Mode**. (Refer **Winter Mode** page 8).

Low salt levels will destroy the coating on the Anode plates and will void all Warranty.

The ChloroMatic® has built in warning indicators to minimise damage resulting from insufficient salt levels, however, the ultimate responsibility is on the owner to ensure adequate salt levels are maintained all year round.

4. RUNNING TIMES:

These instructions cover ChloroMatics for residential use only.

If you run your chlorinator for 24 hours a day, or for long periods, the Cell life will be greatly reduced. It is important that the correct model ChloroMatic® has been installed on your pool. Many models are available to cope with small courtyard pools up to commercial applications. (Consult your local ChloroMatic® Dealer for more information).

CHLORINE PRODUCTION:

The ChloroMatic® must be run daily to generate sufficient chlorine to sanitise the pool. During Summer this is approximately eight hours per day, preferably in two periods - between 6.00 and 8.00am and between 5.00 and 11.00pm. Night time is preferable because chlorine dissipates rapidly in direct sunlight. If these running times are observed, and the Cell is functioning correctly, your pool will have sufficient chlorine when tested in the morning.

If the level is too low either longer running times are required or the **Sanitiser Output Control** needs to be adjusted to maximum. Harsh local conditions such as traffic pollution or windborne dust require different running times, in which case, seek advice from your pool shop. During Winter approximately 4 to 6 hours a day should provide enough chlorine. Without sufficient filtration/chlorination, your pool will never function correctly. **ALWAYS RUN THE FILTER WHEN SWIMMING IN THE POOL.** In extremely hot weather or during periods of heavy bathing loads, the running time may need to be extended to 10 - 14 hours per day.

In some cases you may find your chlorine level to be too high. To determine if this is the case, run your filter/ chlorinator for the suggested times/chlorine production level and test your pool water on the morning after operation. If your chlorine test shows a high level of chlorine, either the running times can be reduced slightly, or the **Sanitiser Output Control** can be turned anti - clockwise. Test your chlorine level again the following morning at around the same time. If your chlorine level is still high, repeat the above process until the correct level is attained.

“SHOCK” TREATMENT:

Periodically, especially during extremely hot conditions, it may be necessary to boost the amount of chlorine in your pool in order to maintain absolute sanitation of the water. This can be achieved by adding either liquid or granulated chlorine. If granulated chlorine is added, the Cell must be checked regularly, since the additives from this product will clog the electrodes. Alternatively, extend the running time of your ChloroMatic®.

CHLORINE TYPES AND COMPARISONS / MAX POOL SIZE:

Many chlorinator manufacturers calibrate their units to compare with 65% granulated chlorine, making it necessary to adjust their readings to a lower level in order to determine true chlorine production. The Display on your ChloroMatic® expresses production as pure 100% chlorine so you will know the exact output of your Unit. Below is a comparison table of the available types of chlorine used to sanitise pools.

ChloroMatic®			Production maximum grams/hour (100%)	Production* grams/ hour (65% equivalent)	Chlorine produced over 8 hours grams (100%)	Equivalent in dry granulated chlorine grams (65%)	MAX POOL SIZE (litres)		
Model ESR	Model ESC	pH					COOL CLIMATES	TEMPERATE CLIMATES	HOT & TROPICAL CLIMATES
110			11	17	88	136	55,000	34,000	24,000
160	16	16	16	25	128	200	80,000	50,000	35,000
200			20	31	160	248	100,000	62,000	44,000
240	24	24	24	37	192	296	120,000	75,000	55,000
300			30	46	240	368	150,000	94,000	66,000
	36	36	36	55	288	440	180,000	112,000	80,000
	40		40	62	320	496	200,000	125,000	100,000
50			50	67.5	351	579	250,000	200,000	160,000



NOTE: The appropriate chlorinator size for your pool is dependent on the local climate and the bather load of the pool. Please note that chlorinator cell life can be increased with shorter running times during winter and lower output settings. Davey recommends that a chlorinator is run for between 6 - 8 hours a day during summer, and 4 hours during winter.

GENERAL INFORMATION:

RECOMMENDED POOL WATER CHEMISTRY						
POOL WATER BALANCING	Free Chlorine (ppm)	pH	Total Alkalinity TA (ppm)	Calcium Hardness (ppm)	Stabiliser – Cyanuric Acid (ppm)	Optimum Salt Level (ppm)
Ideal Reading / Range	1 – 3	Concrete & Tiled Pools: 7.4-7.6 Other Surfaces: 7.2-	Concrete & Tiled Pools – 80-120. Other Surfaces – 125-150	Concrete & Tiled Pools – 200-275. Other Surfaces – 100-225	25 – 50	4000 – 6000
To Increase	Increase output of chlorinator. Add chlorine. Increase filtration time.	Add buffer or soda ash (Sodium Carbonate)	Add Sodium Bicarbonate	Add Calcium Chloride	Add Cyanuric Acid	Add Salt
To Decrease		Add Muriatic Acid	Add Muriatic Acid or Dry Acid	Partially drain & refill pool with lower hardness water to dilute	Partially drain & refill pool to dilute	Partially drain & refill pool to dilute
Frequency of Testing	Weekly	Weekly	Weekly	Weekly	Regularly	Regularly

COMMON TERMS:

Algae - Microscopic forms of plant life which enter the pool by rain, wind and dust. There are numerous varieties - some are free floating whilst others grow on walls and in cracks and come in different colours. Some are more resistant to chemical treatment than others.

Bacteria - The germs that contaminate your pool. Introduced by swimmers, dust, rain storms and other elements.

Balanced Water - The correct ratio of mineral content and pH level that prevents pool water from being-corrosive or scale forming.

Chloramines - Compounds formed when chlorine combines with nitrogen from urine, perspiration, etc. Chloramines cause eye and skin irritation, as well as unpleasant odours.

Chlorine Demand - The chlorine required to destroy germs, algae and other contaminants in the pool.

Chlorine Residual - The amount of chlorine remaining after chlorine demand has been satisfied. This is the reading obtained with your test kit.

Cyanuric Acid - Also known as stabiliser or conditioner. It reduces dissipation of chlorine by direct sunlight.

Liquid Acid - Chemical used to reduce the pH and total alkalinity in the pool water, and for cleaning chlorinator Cell.

ppm - An abbreviation for Parts Per Million the accepted measurement of chemical concentration in swimming pool water. 1 ppm- 1 mg/L.

IMPORTANT NOTES:

1. The ChloroMatic guarantee does not apply to commercial or semi-commercial installations, i.e. where the system runs more than an average of 8 hours per day over the year. Guarantee on commercial and semi-commercial installations is 12 months only on both power supply and cells.

2. ALWAYS INSIST ON GENUINE CHLOROMATIC REPLACEMENT PARTS. If it is necessary to replace the Electrolytic Cell, beware of "look alikes". Only the Genuine ChloroMatic Cell is designed and warranted to operate with the ChloroMatic Power Supply.

SERIOUS DAMAGE MAY RESULT TO THE ELECTRONICS INSIDE THE UNIT IF COPY ELECTRODES ARE USED AND WILL VOID WARRANTY.

TROUBLE SHOOTING:

No Chlorine Production - Check for

1. Main power outlet switched off
2. Chlorinator not plugged into main outlet
3. Pump not plugged into Chlorinator
4. Time Clock set to Off position/Power switch turned Off
5. **Sanitiser Output Control** turned to lowest setting
6. Chlorinator fuse blown
7. Dirty Cell
8. Filter needs backwashing
9. Gas Sensor not connected
10. Running times incorrect
11. Main house fuse blown
12. Pump motor faulty

Low Chlorine Production - Check for

1. Dirty Cell - clean if required
2. Filter needs backwashing
3. Display not at correct production level/Cell failing
4. **Winter Mode** turned On
5. Pool stabiliser too low
6. pH too high
7. Salt level too low
8. Chloromatic running time inadequate
9. Sanitiser output control set too low

ChloroMatic® ESC-pH SYSTEM

The ESC-pH unit is a combination of the ESC Chlorinator and a pH Controller. Please refer to the relevant chapter in this Manual for information on how to operate the chlorinator. It should be noted that there are minor differences in chlorinator operation as compared with the standard ESC system described in this Manual. The Chloromatic ESCpH unit **does not** display the output control setting or include run dry pump protection.

The pH Control system functions are located on the Chloromatic instrument panel in the dark-coloured area marked "**pH CONTROL**".

LED DIGITAL DISPLAY

- The digital display is used to provide information on the chlorinator output, pH and pH set point.
- The display will alternately show the chlorine production and pH
- When the pH Control switch is placed in the SET position the display will show the pH set point

FEED & pH STATUS LEDs

The pH STATUS LED is used to indicate if the pH is within a range of ± 0.3 pH of the set point. If the pH is more than 0.3pH above the set point the LED will flash red/green. If the pH is less than 0.3pH below the set point the LED will flash red.

The FEED STATUS LED is used to indicate the operation of the acid dosing pump:

RED	ACID PUMP OFF
GREEN	ACID PUMP AVAILABLE
GREEN FLASHING	ACID PUMP DOSING

pH CONTROL

The control switch has three positions:

- RUN – In this position the acid dosing pump will operate according to the value of the pH set point and measured pH
- SET – This will allow adjustment of the controller set point using adjustment tool. Turn clockwise to increase the set point. Note that acid pump is off when adjusting set point
- OFF – Disables the acid dosing pump and control functions

SIMPLE DESCRIPTION OF OPERATION

The pH control has been designed to provide an acid feed in proportion to the difference between the actual pH and the pH set point. The control also operates on a cycle to allow the acid being fed to mix with the pool water. The cycle is approximately five minutes duration. If the pH is 0.3pH or more above the set pH at the start of a cycle the acid dosing pump will operate continuously until the pH falls below the set point plus 0.3pH. When this happens the amount of time the pump operates each cycle will reduce as the pH gets closer to the set point. The acid dosing pump will turn off when the set point is reached. The proportional system is designed to keep pH relatively constant with little or no overshoot (pH falling below the set point). The Total Alkalinity (TA) plays a vital role in the maintenance of the pH. A low TA can distort the reading the unit receives from the sensor probe, and as a result excessive acid may be fed into the pool. **ALWAYS MAINTAIN TA ABOVE 100ppm.**

INSTALLING THE PUMP MODULE:

IMPORTANT: KEEP BARE HANDS AWAY FROM POOL ACID AND ALWAYS USE CAUTION WHEN HANDLING POOL CHEMICALS.

1. Select a convenient position within 2 metres of the ESCpH Control Unit, and 1.5 metres above ground level. Ensure chemical drum is placed as far away as possible from the Control Unit and Pump Module to avoid corrosive damage. Control Unit and Pump Module must be a minimum of 1.0 metre horizontally from drum.
2. Use the same mounting procedures as for the Control Unit. (Refer page 4).
3. **Connecting Pump Module to Control Unit.**
Plug the mains lead into the GPO in the bottom right of the unit (marked 'pH pump module only').
4. Remove cap from drum and clean in water.
5. Drill a 9mm hole through the centre of cap. Feed the clear tube through the cap, then the tube weight, then the barbed fitting. Push enough tube through the cap to allow the tube weight to sit at the bottom of the drum.
6. Re - fit cap to acid drum.
7. Place chemical drum away from the Control Unit and Pump Module to avoid possible corrosive damage from chemical vapour. Minimum distance horizontally between Pump Module and Chemical Drum is 1.0 metres.
8. Using PVC cement fit Probe/Injector Housing to suction or return line (before the cell and ensure probe is horizontal to the ground). NOTE: if return has a high backpressure use the suction line. The Housing has 50mm standard fittings with reducers supplied for 40mm applications. Ensure Housing is fitted with arrows pointing in the direction of water flow.
IMPORTANT: ENSURE SENSOR PROBE ALWAYS REMAINS MOIST. A NON-RETURN VALVE MAY NEED TO BE FITTED IN POOL FILTRATION LINE TO STOP DRAINAGE IN THE PLUMBING. SENSOR PROBE MAY BE DAMAGED BEYOND REPAIR IF LEFT TO DRY OUT. WARRANTY WILL BE VOID IF THIS TYPE OF DAMAGE IS APPARENT.
9. Remove cap from sensor probe and discard travel solution. Remove plug from housing and carefully screw pH Sensor into housing. **Keep cap in a safe place for future sensor removal.**
Note: The glass sensor on the pH probe is very delicate. Take care not to break when handling.
10. Connect wire from sensor probe to the connector on the base of the control unit. Ensure water (garden sprayers, reticulation etc) does not splash or spray onto the connector. This is likely to cause erroneous operation and may damage the sensor probe, voiding warranty.
11. Fit Injector to Housing and connect the 6mm diameter clear tubes. Cut Clear tube can be softened in hot water to enable easier connection. Tube may change colour and/or become opaque in use. A one way check valve may be required if installing on a flooded suction situation.
12. Push tube onto barb connectors of dosing pump nearest arrows facing down and secure with plastic clamps provided.
13. Connect clear tube from the chemical containers then fit tube as described previously.
14. Ensure that hydrochloric acid is diluted by 1 Part Acid to minimum of 2 Parts water, if using Sulphuric Acid it must be no greater than 10% strength.

INITIAL SET-UP

1. After installation leave pH Control off and run pool pump for an hour. While this is being done it is a good time to ensure that the pool balance is correct.
2. Using a pool test kit measure the pH.
3. Using the tool supplied adjust CAL until the pH display matches the test kit result. The display will alternate between pH and the chlorine cell production so this may take a little time to get right.

4. Switch the pH Control to SET and adjust to the desired pH if necessary. NOTE: for concrete pools it is possible that a pH set point of around 7.4 or below will lead to high acid consumption and frequent additions of buffer. To reduce this effect a set point of 7.7 may be more economical.
5. Switch pH Control to RUN and allow unit to operate.
6. Retest pool pH with test kit over the next few days to fine tune control if necessary
7. **Important – correct maintenance of pH requires the Total Alkalinity of the pool to be above 100ppm. Failure to maintain TA above this level may result in excess acid being injected into the pool which can have undesirable effects.**

MAINTENANCE OF SENSORS AND PUMP MODULE

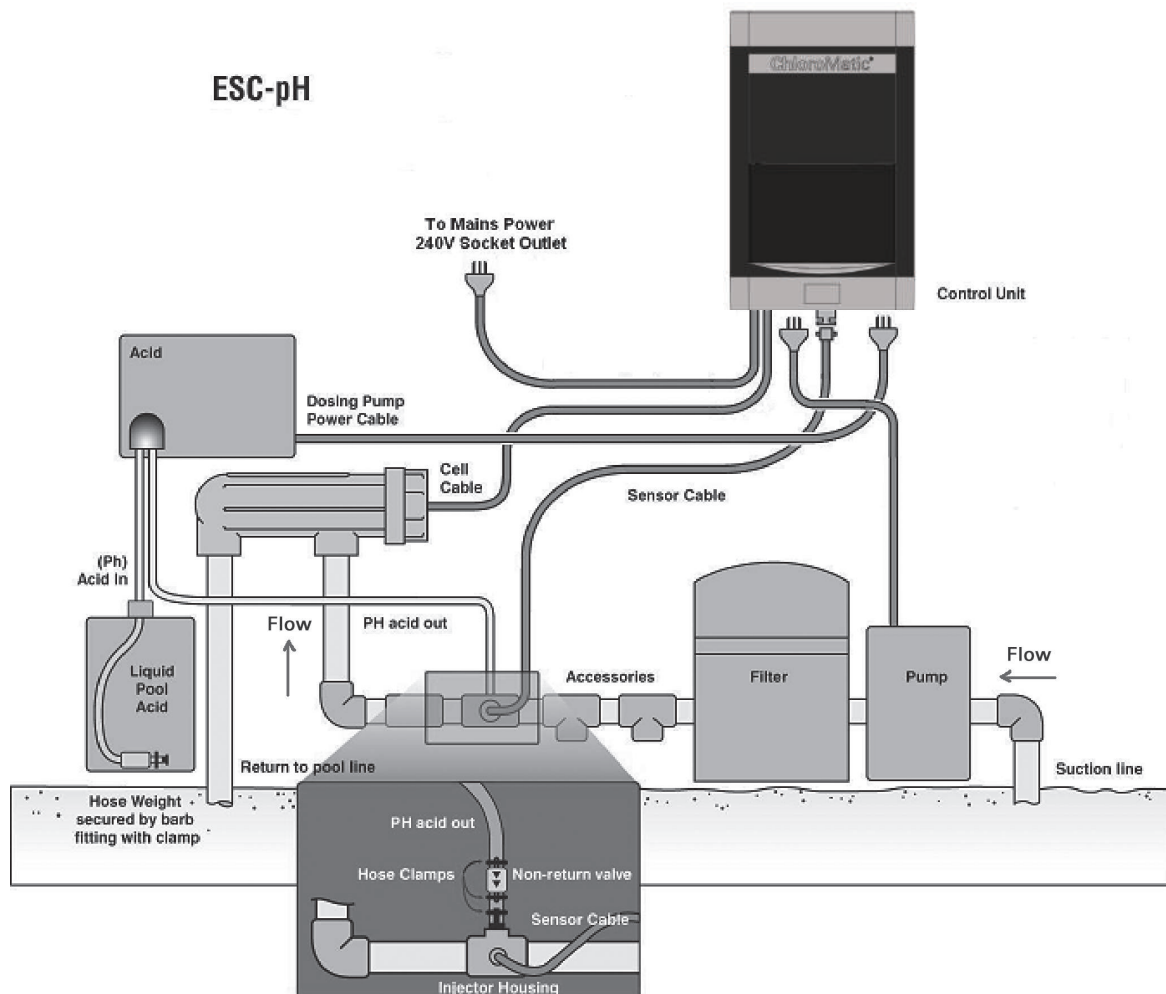
The **pH Sensor** can become fouled and/or scaled depending on the water quality and bather load of the pool. To clean the sensor it is necessary to wash it in a solution of 1 part hydrochloric acid and 9 parts water. Take care with the acid and read the warnings on the acid container. Dip the end of the sensor in the solution and move it around for about 20 seconds. Rinse the sensor and return it to the manifold.

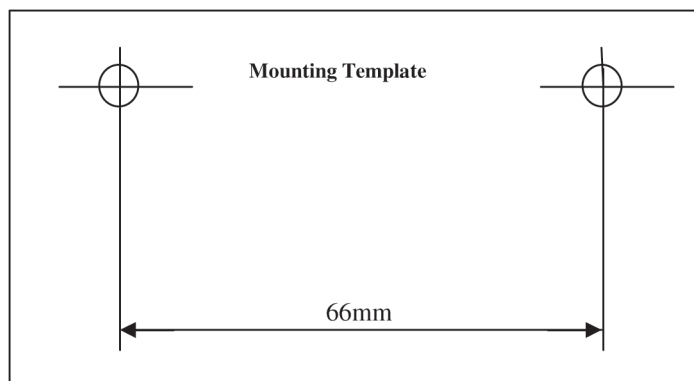
The pH Control should be turned off for at least 30 minutes to allow the sensor to settle. Check that it is reading correctly and calibrate if necessary. The pH Control can now be turned on.

The **Pump Module** uses a “squeeze” tube to pump the acid into the pool. This tube is perishable and must be replaced periodically. We recommend replacement approximately once per year. The tube should be visually inspected regularly for leaks or damage. Tube replacement is simple:

- 1 Disconnect acid lines (take care to avoid acid in lines) and remove the pump clear cover
- 2 Rotate roller arm by hand until it is vertical and pull bottom tube ends from the pump.
- 3 Rotate the roller arm until the squeezed section of the tube can be removed
- 4 New tube is inserted into the pump in reverse of removal procedure.

For further information on the operation and maintenance of the Davey Peristaltic Pump, please refer to the Peristaltic Pump Installation & Operating Instructions included with your ChloroMatic®.





Davey® Repair or Replacement Guarantee

In the unlikely event in Australia or New Zealand that this Davey product develops any malfunction within warranty periods beginning from the date of original purchase due to faulty materials or manufacture, Davey will at our option repair or replace it for you free of charge, subject to the conditions below.

Davey Guarantee Period

Power Supply - Two Years
Electrolytic Cell - Three Years

pH Pump Module - One Year
Sensor Probe - Three Years

Should you experience any difficulties with your Davey product, we suggest in the first instance that you contact the Davey Dealer from which you purchased the Davey product. Alternatively you can phone our Customer Service line on 1300 367 866 in Australia, or 0800 654 333 in New Zealand, or send a written letter to Davey at the address listed below. On receipt of your claim, Davey will seek to resolve your difficulties or, if the product is faulty or defective, advise you on how to have your Davey product repaired, obtain a replacement or a refund.

Your Davey Guarantee naturally does not cover normal wear or tear, replacement of product consumables (i.e. mechanical seals, bearings or capacitors), loss or damage resulting from misuse or negligent handling, improper use for which the product was not designed or advertised, failure to properly follow the provided installation and operating instructions, failure to carry out maintenance, corrosive or abrasive water or other liquid, lightning or high voltage spikes, or unauthorized persons attempting repairs. Where applicable, your Davey product must only be connected to the voltage shown on the nameplate.

Your Davey Guarantee does not cover freight or any other costs incurred in making a claim. Please retain your receipt as proof of purchase; you **MUST** provide evidence of the date of original purchase when claiming under the Davey Guarantee.

Davey shall not be liable for any loss of profits or any consequential, indirect or special loss, damage or injury of any kind whatsoever arising directly or indirectly from Davey products. This limitation does not apply to any liability of Davey for failure to comply with a consumer guarantee applicable to your Davey product under the Australian or New Zealand legislation and does not affect any rights or remedies that may be available to you under the Australian or New Zealand Consumer Legislation.

In Australia, you are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Should your Davey product require repair or service after the guarantee period; contact your nearest Davey Dealer or phone the Davey Customer Service Centre on the number listed below.

For a complete list of Davey Dealers visit our website (davey.com.au) or call:



AUSTRALIA

Davey Support Centre
6 Lakeview Drive,
Scoresby, Australia 3179
Ph: 1300 367 866
Fax: 1300 369 119
Website: davey.com.au

NEW ZEALAND

Davey Support Centre
7 Rockridge Avenue,
Penrose, Auckland 1061
Ph: 0800 654 333
Fax: 09 527 7654
Website: daveynz.co.nz

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P/N MMAN008-5 supersedes P/N MMAN008-4

* Installation and operating instructions are included with the product when purchased new. They may also be found on our website.