

ChloroMatic[®]

Salt Water Pool Systems

INSTALLATION & OPERATING INSTRUCTIONS

Model ESR, ESC Series
& ESCpH Systems



**IMPORTANT:
PLEASE READ THIS
DOCUMENT
CAREFULLY.**

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

IMPORTANT NOTES:

1. In areas with hard water, self clean systems may require occasional manual cleaning.
2. 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 between 2 - 4 hours during winter. A 24 hour super chlorination is recommended after heavy pool use.

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S E R I E S
BY DAVEY WATER PRODUCTS

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ChloroMatic®

Salt Water Pool Systems

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 - ChloroMatic®

Included with your ChloroMatic® System are the following items, please check the contents of the box carefully prior to attempting to install the system:

1. Power Supply / Controller
2. Electrolytic Cell
3. 2 x PVC Cell Adaptors
4. Mounting Kit & Spare Fuse



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)

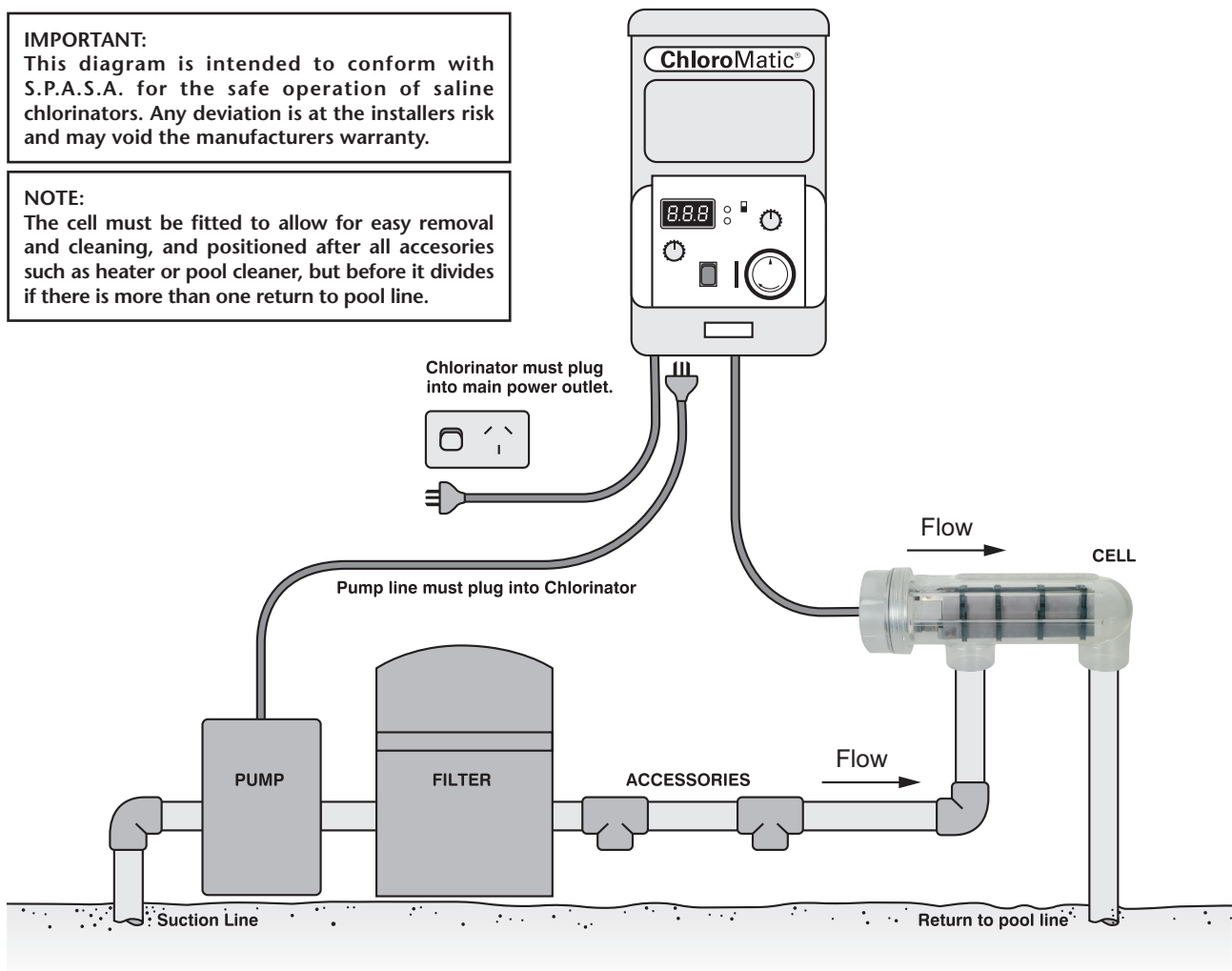
Note: For ESCpH models, please read all instructions then refer to page 12-14 for more information.

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 accessories 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 14 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 female 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	Either Terminal

The Blue Flow Sensor 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.
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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 flow sensor. Refer page 7 for connection of pool light on optional light transformer models.

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 a **minimum** rate of 40kg per 10,000 litres (0.4%) for ESR systems and 30kg per 10,000 litres (0.3%) for ESC systems.

Connect 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.

- **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.

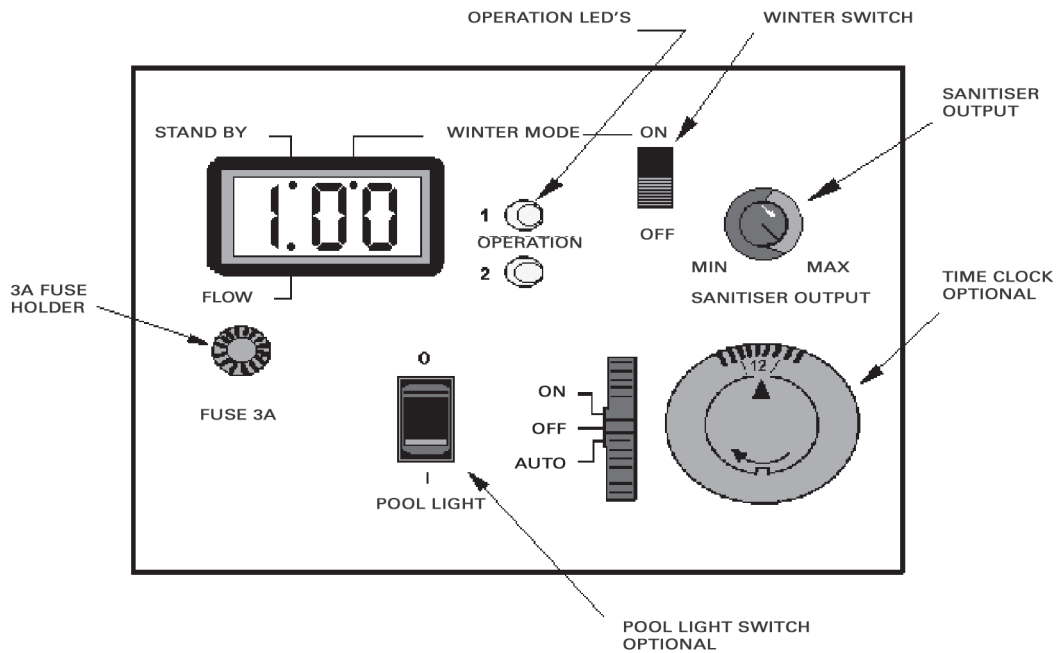
- **STABILISER** - It is essential that pool stabiliser be added and maintained at the rate of 30 - 50 mg/l (30 - 50 ppm) at all times. Do not exceed 100 ppm.

(Refer **Day to Day Operation** page 9 for further information).

OPERATION OF CHLOROMATIC® ESR SYSTEM:

Cell Output is expressed as a percentage. The Digital LED 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	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	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	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	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 7).

OPERATION OF CHLOROMATIC® ESC SYSTEM:

The ChloroMatic® ESC system operates similarly to the ESR System described above. The ESC system has the following additional features:

1. **POLARITY INDICATOR ON OUTPUT Display** - The \pm 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 Self Cleaning system to clean your Cell and therefore you should not have to clean your ESC cell unless you have extreme water conditions.
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.

NOTE:

1. In areas with hard water, self clean systems may require occasional manual cleaning.
2. 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 between 2 - 4 hours during winter. A 24 hour super chlorination is recommended after heavy pool use.

ChloroMatic® MODEL ESR and ESC SERIES SPECIAL 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.

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.

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.

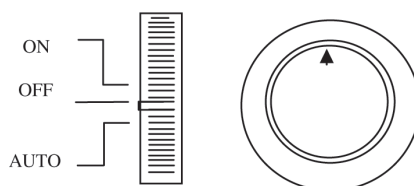
When the temperature of the pool water drops, the **Winter Mode** Switch should be placed in the ON position. The **Winter Mode** Indicator will then be ON. This has two effects:

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 (optional)

If your Power Supply is fitted with an automatic time clock (optional) 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.

MODELS WITH OPTIONAL POOL LIGHT TRANSFORMER:



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

Your Monarch Series ChloroMatic® has one of two types of pool light transformer connections as follows:-

TYPE 1: TERMINAL BLOCK CONNECTION BEHIND COVER PANEL BELOW DOOR

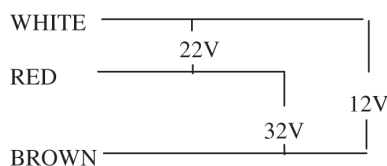
- (a) 12V – Operates only 12 volt lights
- (b) Multi-voltage – Operates 12 volt, 22 volt or 32 volt lights.

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.

CONNECTION OF LIGHT TRANSFORMER	
NOTE – WIRES FROM LIGHT ARE NOT COLOUR CODED	
CONNECT LIGHT WIRES TO VOLTAGE	
WHITE / BROWN	12V
RED / WHITE	22V
RED / BROWN	32V



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 **3 Amp 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.

NOTE:

1. In areas with hard water, self clean systems may require occasional manual cleaning.
2. 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 between 2 - 4 hours during winter. A 24 hour super chlorination is recommended after heavy pool use.

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 Self Cleaning Model ESC48 cells will require earlier replacement than ESC24 Models operating under equivalent conditions. Model ESC48 systems use the same cell as the ESC24. The correct ChloroMatic® Replacement cells to use are:

ChloroMatic® ESR Standard			ChloroMatic® ESC Self Clean		
ESR Standard Systems Model	ESR Replacement Cell Model to order	ESR Replacement Cell Code	ESC Self Clean Systems Model	ESC Replacement Cell Model to order	ESC Replacement Cell Code
110	110	M0741	16	16	M0656
160	160	M0753	24	24/36/48	M0657
200	200	M0755	36	24/36/48	M0657
300	300	M0759	48	24/36/48	M0657

ESC SYSTEMS Please Note that unless you have extreme water conditions the Cell should not become scaled and you should not have to clean the Cell. In areas of extremely hard water it may be necessary to clean your cell periodically.

To clean the cell, 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 5 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.



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 Other pools – 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. To lower the pH add HYDROCHLORIC ACID. To raise the pH level add SODIUM BICARBONATE OR SODA ASH.

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.

To lower, add HYDROCHLORIC ACID (a little at a time). To raise, add SODIUM BICARBONATE.

3. SALT LEVELS:



The salt level MUST NEVER BE LESS THAN **4000 ppm for the ESR Systems** and **3000 ppm for the ESC Systems**. Operating the Unit with too little salt in the pool will cause damage to your Cell. For ESR Systems there is no need to exceed 7000 ppm. Please note ESC Systems – salt level must not exceed 6000ppm. Consult your local ChloroMatic® Dealer for more information.

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.

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 7).

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

The ChloroMatic® has a built in warning system 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:

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.

SUPER - CHLORINATION:

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:

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%)
Model ESR	Model ESC	pH				
110			11.0	16.9	88	135
160	16	16	16.0	24.6	128	197
200			20.0	30.8	160	246
240	24	24	24.0	36.9	192	295
300			30.0	46.2	240	369
	36	36	36.0	55.4	288	443
	40		40.0	61.5	320	492

GENERAL INFORMATION:

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.

NOTE:

Please read instructions - in particular the section on Trouble Shooting, approximately 75% of all service calls are unnecessary and the expense and frustration to clients could have been avoided. We therefore strongly suggest that the owner **read and absorb all information thoroughly.**

This 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.

IMPORTANT: 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 mid setting
6. Chlorinator 3 amp 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

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 $\pm 0.3\text{pH}$ 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 3-4).
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

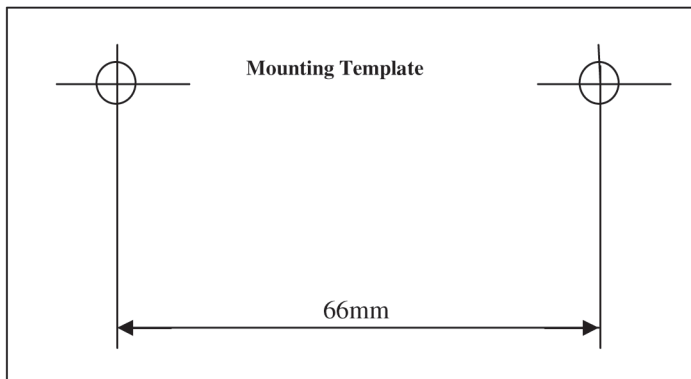
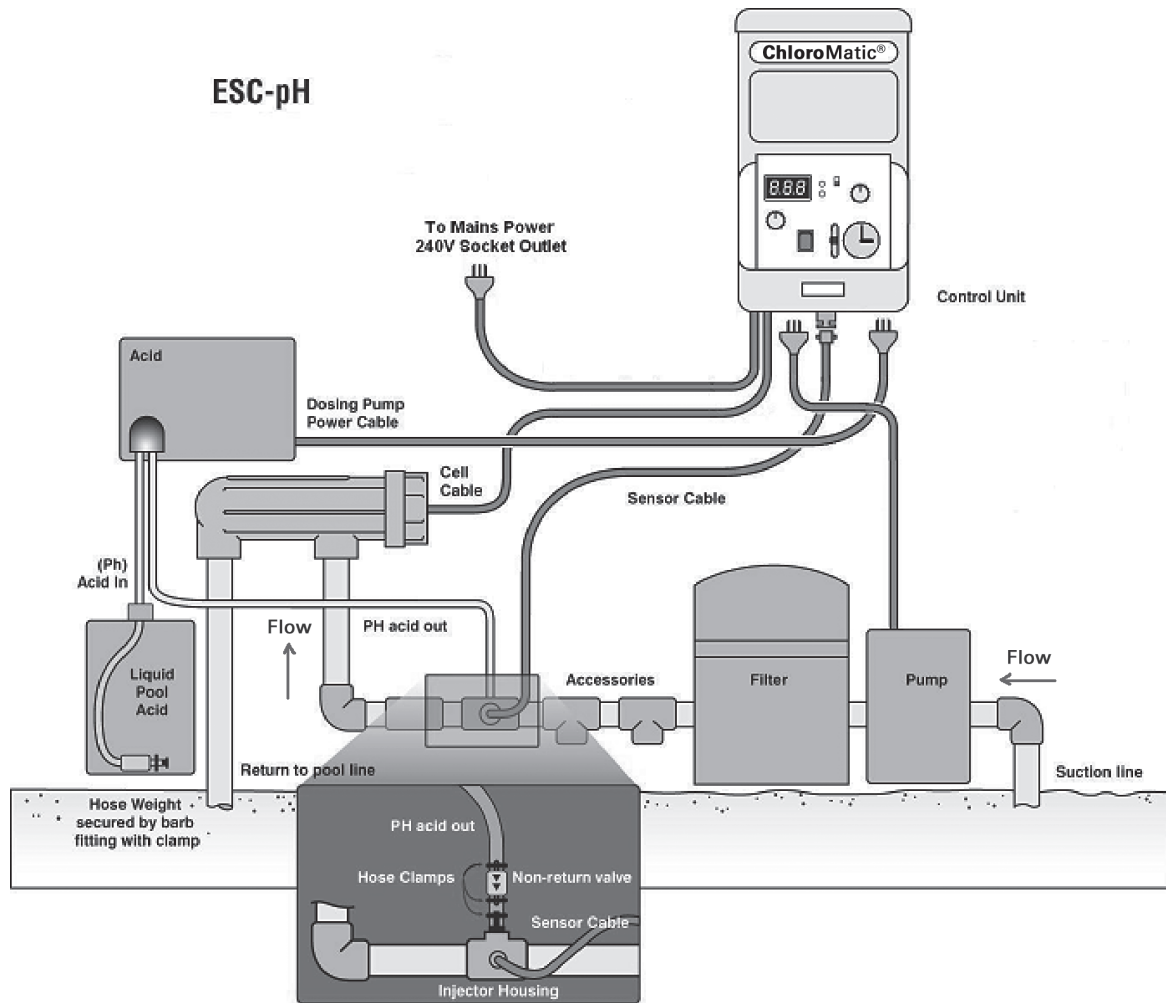
The pH Sensor can become fouled and/or scaled depending on the water quality and bather load of the pool. To clean the sensor it is necessary to wash it in a solution of 1 part hydrochloric acid and 9 parts water. Take care with the acid and read the warnings on the acid container. Dip the end of the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

ESC-pH



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DAVEY PRODUCT GUARANTEE FOR AUSTRALIA & NEW ZEALAND

This Davey product is guaranteed to be free of material or manufacturing defects at the time of original purchase. Should the ChloroMatic® parts, shown below, fail within the time frame specified as a result of such defects, the part will be repaired free of charge.

- Power Supply – 2 Years
- Electrolytic Cell – 3 Years
- Sensor Probe – 3 Years
- pH Pump Module – 1 Year

TERMS AND CONDITIONS

1. This guarantee applies to all states and territories of Australia and New Zealand only and is subject to the provisions of the Trade Practices Act (Aust.), the Goods and Consumer Protection Legislation of the various Australian states and the Consumers Guarantee Act 1993 (NZ) as applicable.
2. The guarantee period commences on the date of original purchase of the equipment. Evidence of this date of original purchase must be provided when claiming repairs under guarantee. It is recommended you retain all receipts in a safe place.
3. This guarantee covers parts and workshop labour only. Goods should be forwarded, with proof of date of original purchase, to an Authorised Davey Service Centre freight paid. Any travel and removal/reinstalling charges for goods repaired infield will be to the owners account. Guarantee may be denied on goods not readily accessible for service personnel or mounted on exterior walls above single storey level.
4. This guarantee is subject to due compliance by the original purchaser with all directions and conditions set out in the Installation and Operating Instructions. Failure to comply with these instructions, damage or breakdown caused by fair wear and tear, negligence, misuse, incorrect installation, chemical or additives in the water, inadequate protection against freezing, rain or other adverse weather conditions, corrosive or abrasive water, lightning or high voltage spikes or through unauthorised persons attempting repairs are not covered under guarantee. The product must only be connected to the voltage shown on the nameplate.
5. Without limiting the original purchaser's entitlements under the Trade Practices Act (Aust.), the Goods & Consumer Protection Legislation of the various Australian states, or the Consumers Guarantee Act 1993 (NZ), 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 the product or any defect.
6. Where the Trade Practices Act (Aust.), the Goods and Consumer Protection Legislation of the various Australian states and the Consumers Guarantee Act 1993 (NZ) does not apply, Davey shall not be liable for any loss of profits or any consequential, indirect or special loss, damage or injury of any kind whatsoever suffered by the purchaser arising directly or indirectly from the product or any defect and the purchaser shall indemnify Davey against any claim by any other person whatsoever in respect of any such loss, damage or injury.
7. Nothing in this guarantee is intended to have the effect of contracting out of the provisions of the Trade Practices Act (Aust.), the Goods and Consumer Protection Legislation of the various Australian states and Consumers Guarantee Act 1993 (NZ) except to the extent permitted by the various Acts and this guarantee is to be modified to the extent necessary to give effect to that intention.
8. Davey may be collecting personal information from you in order to provide you with a service. Davey Water Products Pty Ltd promises only to use this information in accordance with the Provisions of the Privacy Act 1988 (Cth) and the Privacy Policy of Davey Water Products Pty Ltd which is available at davey.com.au.

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