



Installation and Operating Instructions

FOR COMMERCIAL SERIES II MODELS:

COMM1200

COMM2400

COMM4000



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

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Welcome to the healthy luxury of a salt water swimming pool

Davey are dedicated to providing you with the most luxurious, healthy, 'natural' pool water you have ever experienced, as well as the most reliable product and solid after-sales service you could hope for.

Reading this Guide will help ensure that your ECO-matic COMM system functions correctly and efficiently, help avoid the expense of unnecessary service calls and make you aware of certain maintenance procedures which, if left undone, may void warranties offered by the manufacturer. Please refer to the Trouble-Shooting section of this Guide before calling your dealer.

Overview of the ECO-matic COMM Salt Water Pool System

When pure natural salt is dissolved in pool water and then subjected to simple electrolysis (by way of the in-line ECO-matic COMM 'Cell'), the chloride portion of the salt (sodium chloride) is transformed into an effective sanitizer*, which has the ability to oxidize (kill) bacteria, algae and other such organics which would otherwise flourish in the water. This process recycles, so it does not consume the salt, which is simply used over and over again.

Sized to suit your particular pool or spa, your ECO-matic COMM system will provide the sanitizer necessary to maintain your pool/spa water in perfectly healthy condition, in an environmentally friendly manner, by using and recycling a natural product – salt. Your ECO-matic COMM will do exactly the same thing as

'pool chlorine' would do, but without the need to add (or swim in) potentially harmful, man-made sanitizing chemicals.

*(HOCl the same effective sanitizer as would result if 'pool chlorine' was added to the water – but without the potentially dangerous chlorine compounds and the obnoxious 'chemical' effects commonly associated with manual chlorination – and without the need to handle chemicals.)

Your ECO-matic COMM Equipment

When correctly installed, your ECO-matic COMM will operate ONLY WHEN THE FILTER PUMP IS OPERATING and water is flowing through the 'Cell'. Your ECO-matic COMM must NOT be able to operate while the filter pump is OFF.



WARNING:

- 1. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.**
- 2. Children should be supervised to ensure that they don't play with the appliance.**
- 3. This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.**
- 4. Children shall not play with the appliance.**
- 5. Cleaning and user maintenance shall not be made by children without supervision.**
- 6. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.**
- 7. Means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.**

“IMPORTANT SAFETY INSTRUCTIONS”

- a) READ AND FOLLOW ALL INSTRUCTIONS.
- b) A green coloured terminal or a terminal marked G, GR, Ground, Grounding or the international grounding symbol is located inside the supply terminal box or compartment. To reduce the risk of electric shock, this terminal must be connected to the grounding means provided in the electric supply service panel with a continuous copper wire equivalent in size to the circuit conductors supplying this equipment.
- c) At least two lugs marked “BONDING LUGS” are provided on the external surface or on the inside of the supply terminal box or compartment. To reduce the risk of electric shock, connect the local common bonding grid in the area of the hot tub or spa to these terminals with an insulated or bare copper conductor not smaller than No.6 AWG.
- d) Warning – To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
- e) Warning – Risk of electric shock. Connect only to a grounding type receptacle protected by a ground fault circuit interrupt (GFCI) or residual current device (RCD). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.
- f) Warning – To reduce the risk of electric shock, do not use extension to connect unit to electric supply; provide a properly located outlet. Do not bury cord. Locate cord to minimize abuse from lawn mowers, hedge trimmers, and other equipment.
- g) WARNING – To reduce the risk of electric shock, replace damaged cord immediately.
- h) This unit is to be installed in accordance with the installation instructions, the National Electrical Code, and the requirements of the authority having jurisdiction.
- i) For indoor use: Vertical PVC piping shall be minimum 6 in. long to the inlet and outlet of the chlorinator cell. For outdoor use: Vertical PVC piping shall be minimum 6 in. long to the inlet and outlet of the chlorinator cell. The cell shall be free standing and not secured or clamped to any rigid backing surface.
- j) “SAVE THESE INSTRUCTIONS.”

“LES CONSIGNES DE SÉCURITÉ IMPORTANTES”

- a) lire et suivre toutes les INSTRUCTIONS.
- b) une borne de couleur verte ou une borne marquée G, GR, sol, la terre ou l'international symbole de la terre se trouve à l'intérieur de la boîte à bornes d'alimentation ou du compartiment. Pour réduire le risque de choc électrique, ce terminal doit être branché sur les moyens de mise à la terre fournis dans l'électricité alimentation panneau de service avec un fil de cuivre continue équivalent en taille pour les conducteurs du circuit fourniture de ce matériel.
- c) au moins deux cosses identifiées “BONDING LUGS” sont fournies sur la surface externe ou à l'intérieur de la boîte à bornes d'alimentation ou du compartiment. Pour réduire le risque de choc électrique, connecter le local grille de liaison commune dans le domaine de l'ou spa à ces bornes avec un isolé ou nu conducteur en cuivre pas plus grand que n ° 6 AWG.
- d) Avertissement - Pour réduire le risque de blessure, ne laissez pas les enfants utiliser ce produit, sauf s'ils sont étroitement et constamment surveillés.
- e) Avertissement - Risque de choc électrique. Connectez uniquement à un réceptacle relié à la terre, protégé par un disjoncteur différentiel avec fuite à la terre. Contactez un électricien si vous ne pouvez pas vous assurer que le réceptacle est protégé par un disjoncteur différentiel avec fuite à la terre.
- f) Avertissement - Pour réduire le risque de choc électrique, n'utilisez pas de rallonge pour connecter l'appareil au réseau électrique ; prévoyez une prise correctement située. Ne pas enterrer le câble. Localisez le câble pour éviter qu'il soit endommagé par des tondeuses à gazon, taille-haies, ou autres équipements.
- g) AVERTISSEMENT - Pour réduire le risque de choc électrique, remplacez le câble endommagé immédiatement.
- h) Cette unité doit être installée conformément aux instructions d'installation, au code d'électricité national, et aux exigences de l'autorité compétente.
- i) Pour une utilisation en intérieur : la longueur de la tuyauterie PVC verticale doit être au minimum de 6 pouces/15cm pour l'entrée et la sortie de la cellule du chlorinateur.
Pour une utilisation en extérieur : la longueur de la tuyauterie PVC verticale doit être au minimum de 6 pouces/15cm pour l'entrée et la sortie de la cellule du chlorinateur. La cellule doit être totalement libre et non attachée ou fixée a quelconque surface rigide.
- j) Conservez ces INSTRUCTIONS.

Installation Instructions

Packing List:

PART	QTY
POWER SUPPLY	1
FLOW SWITCH ASSEMBLY & LEAD	1
CONTROL PANEL	1
GAS SENSOR & LEAD	1
MOUNTING BRACKETS	4
CELL CABLE SET	1
CONTROL CABLES SET	1
KEY	1
INSTALLATION & OPERATION MANUAL	1

General

This system is **not intended** for outdoor installation. If a pump/filter room is not available, a shelter providing shade and weather protection will be necessary. Please note that the installation area should be well ventilated and free of substances that could cause corrosion. **Installation must be done in accordance with any local regulations AND MUST BE PERFORMED BY AN AUTHORIZED ECO-matic COMM DEALER.**

When deciding on the position of the unit, take care to allow for the cable lengths available. Approximate maximum placement distances are:

Power Supply to Control Panel – 3m (approximately 9ft)

Power Supply to Electrolytic Cell – 10m (approximately 32ft)

Control Panel to Gas Sensor (Cell) – 4m (approximately 13 ft)

Flow Switch to Gas Sensor (Cell) – 4m (approximately 13ft)

Actual distances will depend on how the cables between units are run. Check prior to installation.

IMPORTANT: DO NOT PLACE ANY COMPONENT NEAR SOURCES OF HEAT OR CHEMICAL VAPORS (e.g. ACID DRUMS).

The Power Supply and Electrolytic Cell are very heavy, allow for this during installation. If any components are dropped, damage will occur.

The Components of Your ECO-matic COMM

Power Supply

Should be wall mounted **using brackets provided**. The brackets provide a gap between the back of the unit and the wall for air flow. The unit should be mounted at about head height. That is approximately 1.5 meters (approximately 5ft) above ground level. The brackets are designed for masonry bolts/wall plugs. The unit can be lifted on/off.

Note: this unit is heavy. Please allow for this when installing.

Instructions for mounting bracket use are provided in the package containing the brackets.

Control Panel

Should be mounted at approximately the same height as the Power Supply to allow easy access and viewing. This unit has a “keyhole” mount at center/top/rear. Once the unit has been hung on this mount, two locating screws can be placed at the bottom corners of the unit. These are under the lower cover plate on the front of the unit.

Electrolytic Cell Assembly

Should be installed vertically on its legs and positioned downstream from the filter after all other accessories (such as heater), but before the pipe divides if there is more than one return to pool line. The cell is heavy and great care should be taken in fitting the legs. **If the cell is dropped the internal housing can be damaged.**

Select the approximate position for the cell and with (at least) two people lift the cell clear of the cardboard packaging and gently lie down horizontally on the ground. Remove the legs from the cell and turn around so they are facing down, secure the legs tightly and then lift the cell back to a vertical position ready for installation.

Do not attempt to pivot the cell on the legs, as they are not designed to carry a load in this way.

The cell is now ready to be plumbed into the pool system.

Output and Flow Rates

The following flow rates through the cell are recommended for optimum efficiency:

Model	Cell Chlorine Output*		Required Flow Rates			Approx. Pressure Drop (Based on Mins)	
	g/hr	lbs/day	Liters per Minute	m3 per Hour	Gallons per Minute	KPa	PSI
1200	120	6.3	200-400	12-24	53-106	3.0	0.4
2400	240	12.7	400-800	24-48	106-211	2.0	0.3
4000	400	21.2	650-1300	39-78	172-343	12.0	1.7

***Rated output is only achieved at 220-240V input, with 5000ppm pool water salinity**

Note: Please adjust flow rate such that the minimum values are achieved even when the filters are dirty, and ensure the maximum flow rates are not exceeded when the filters are clean. Keeping flow rate closer to the minimum value will provide the best removal of harmful chloramines from the pool water.

Testing Cell Flow Rate

A flow meter may be installed into the cell line to verify correct flow (sold separately). Install the flow meter per manufacturer's instructions on the 2" or 3" by-pass line leading to the electrolytic cell.

A simple alternative method of ensuring correct water flow is to test the chlorine residual at the cell outlet (with the unit producing at 100%). If the residual measures between 5-10ppm the flow rate is correct and the cell is operating efficiently, if not the flow rate should be adjusted accordingly.

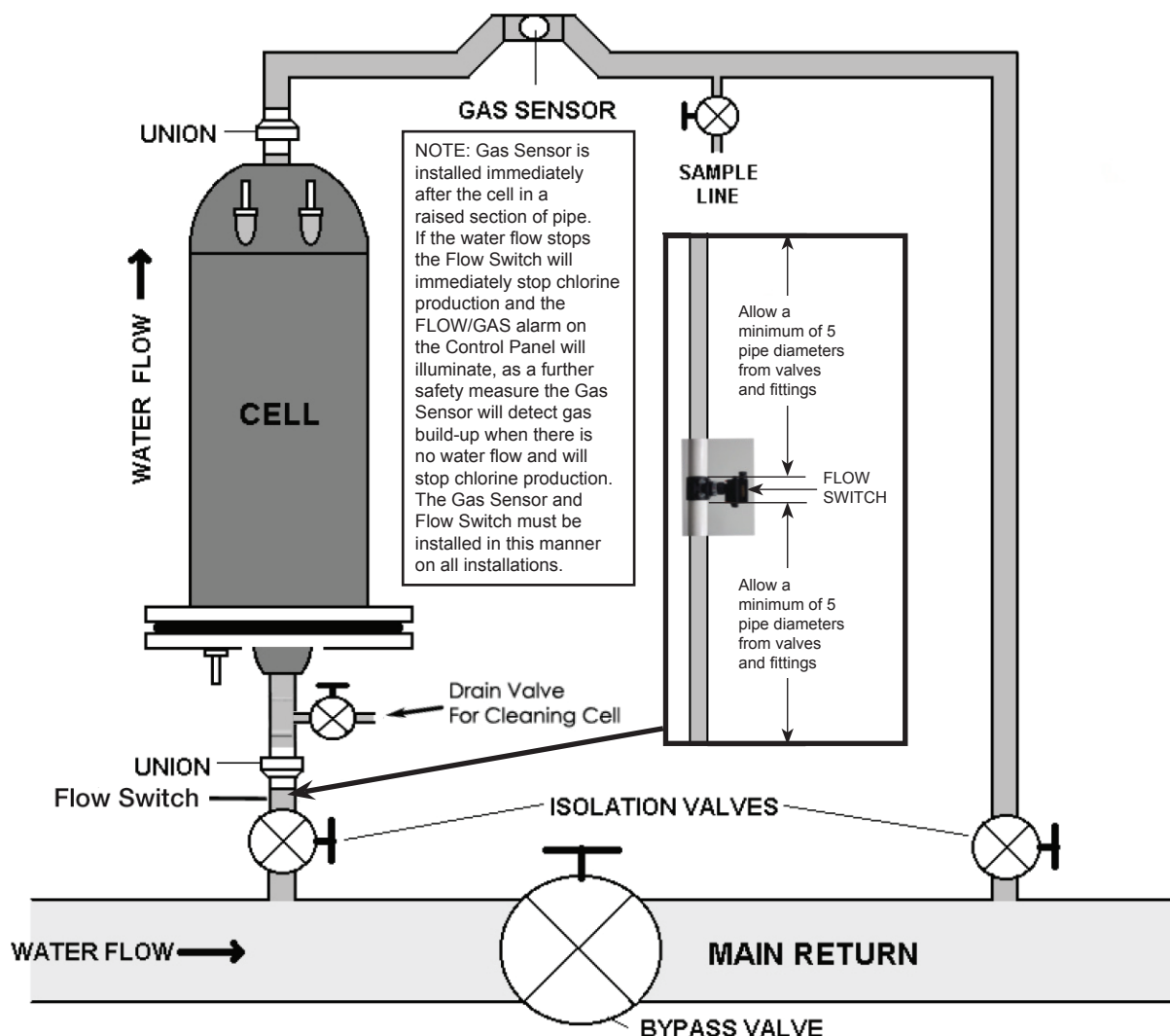
Electrolytic Cell Plumbing

The Electrolytic Cell has been designed to operate in a bypass on the return to pool line. Water flow through the cell must be in the flow range specified above and the water from the cell should be returned to the pool as quickly as possible.

A sample line must be installed after the cell to allow testing of chlorine residual at the cell outlet, this will facilitate flow setup and provides confirmation of correct chlorinator operation. A drain valve should also be installed to facilitate cleaning of the cell and allowing measurement of the incoming pool water.

A number of possible installation methods follow:

Simple Bypass Installation

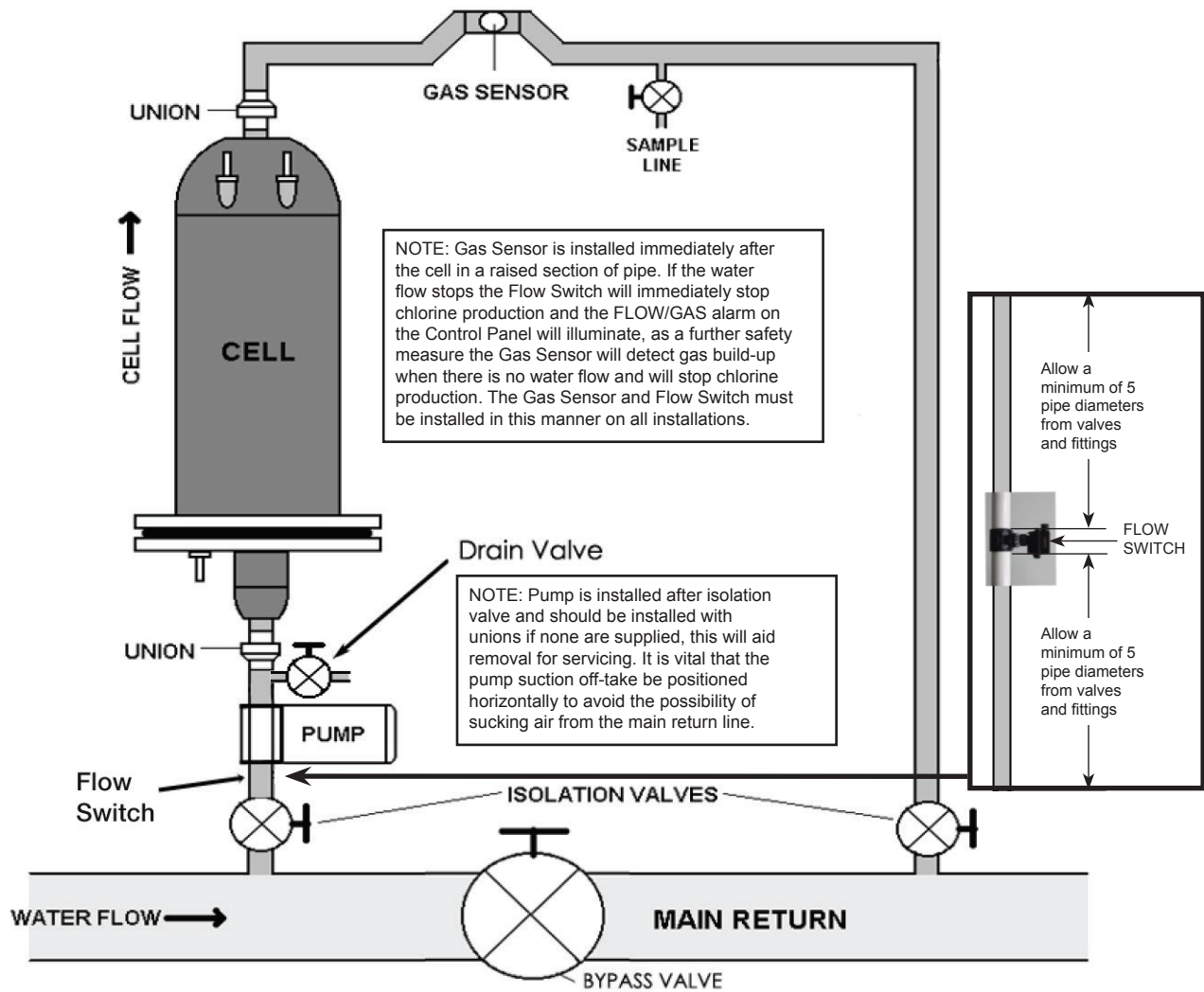


In this installation the bypass valve is partially closed to force water into the cell bypass and back to the pool return. This will increase the back pressure to the pool pump/filter but should not affect performance unless the pump/filter performance is already poor.

Note the use of the Gas Sensor, Flow Switch, Isolation Valves and Sample Line. The sample line is a simple tap used to collect samples of water after the cell for chlorine residual testing.

The off-take to the cell inlet should be positioned horizontally to avoid the possibility of air in the main return line finding its way into the cell.

Powered Bypass Installation:



This installation uses a pump to create flow in the cell bypass, where required to maintain correct flow rates through the cell.

Please note that care must be taken at the suction point to avoid air entering the bypass.

IMPORTANT: The Bypass Pump must be electrically interlocked to the main pool pump(s).

Use of Gas Sensor and Flow Switch

GAS (AND
TEMPERATURE)
SENSOR

SENSOR
CONNECTOR



GAS SENSOR

PADDLE FLOW
SWITCH

FLOW SWITCH
/ GAS SENSOR
INTERCONNECTION
CABLE



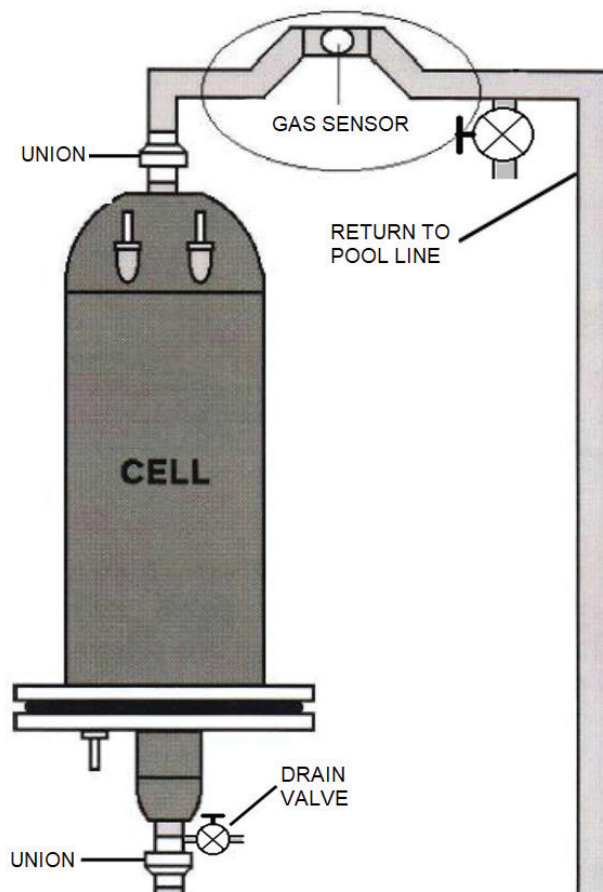
TAPPING SADDLE
COMPLETE WITH
O-RING AND
FASTENERS

MOUNTING
SCREWS, NUTS
& WASHERS

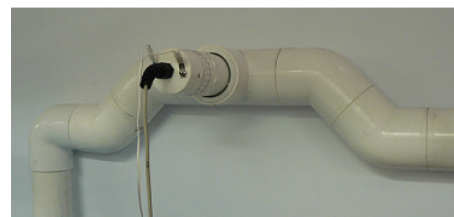
FLOW SWITCH ASSEMBLY

Gas Sensor Installation

The Gas Sensor should be installed after the Cell in the following manner:



GAS SENSOR DETAIL



NOTE: the Gas Sensor has a 50mm/2" BSP threaded end for fitting into the water line. The water line will be either 50mm/2" or 80mm/3" and so appropriate fittings and pipe will be a T-Piece and four 45 Elbows of the appropriate size needed.

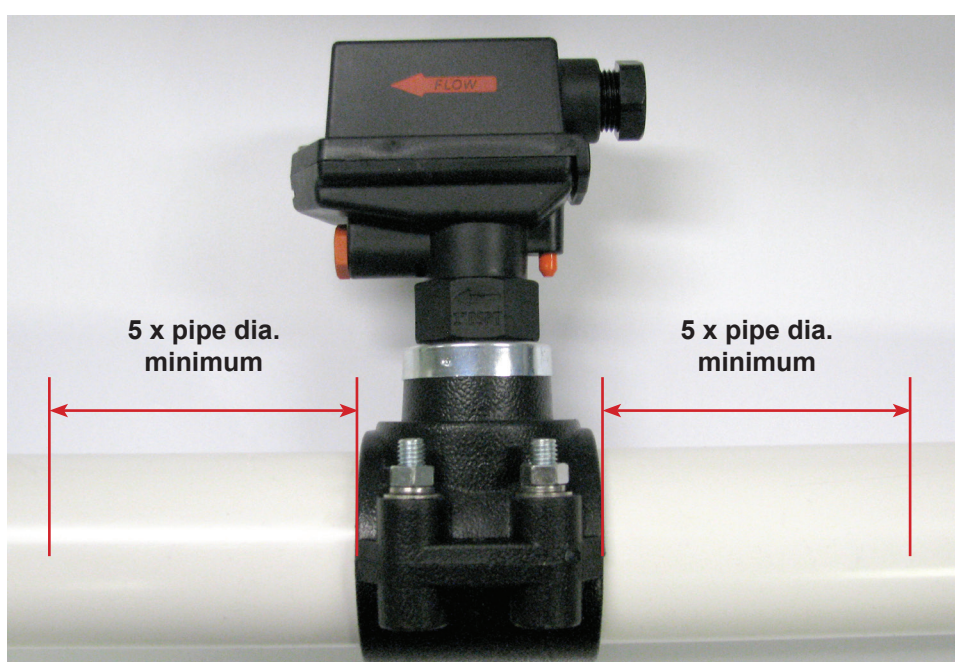
The Gas sensor is always mounted **horizontally** and in a raised position to aid the accumulation of gas from the Cell.

If the water flow ceases, the gas produced in the cell will collect at the highest point – the Gas Sensor – and when enough gas has been collected chlorine production will cease until flow is restored. It is recommended that 4 x 45° elbows be used for Gas Sensor Installation, with Gas Sensor mounted horizontally. Note that there are two pipe sizes available for use with the Cell – 50mm/2" and 80mm/3". Appropriate fittings and pipe will be required.

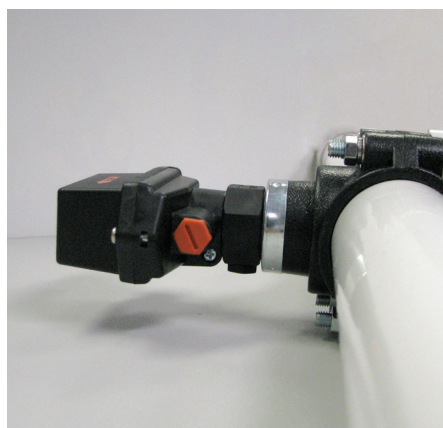
NOTE: The gas sensor is a secondary safety protection device; the flow switch is the primary protection device and will immediately shut off chlorine production when water flow through the cell falls below the minimum requirement. This will prevent any gas build up within the system.

Flow Switch Installation

Locate a suitable position to install the flow switch in the bypass line before the cell. The flow switch should be installed on a straight section of pipe with a minimum of 5 pipe diameters, in either direction, between the flow switch and any pumps, valves, or fittings. This will ensure that the paddle is exposed to non-turbulent flow and giving a steady and stable response.



The flow switch must be installed in horizontal pipes, either on the side or on the top of the pipe.



The flow switch **should not** be mounted on the underside of horizontal pipes.



Once a suitable location is selected, drill a 32mm diameter hole in the pipe.



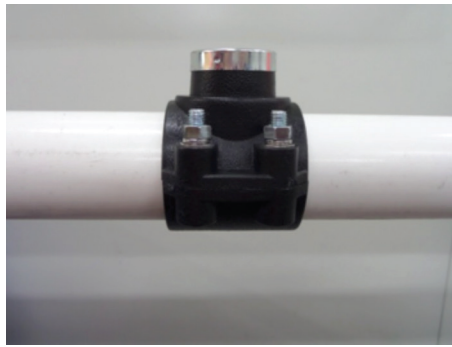
Place the O-ring in the groove on the inside face of the top half of the pipe clamp.



Place the top half of the pipe clamp onto the pipe ensuring that the hole in the pipe clamp is aligned with the hole in the pipe.



Position the lower half of the pipe clamp onto the pipe and secure with the fasteners provided. Tighten sufficiently to prevent leakage.



Apply Teflon tape to the thread on the flow switch and screw the flow switch into the pipe clamp. Tighten the flow switch using the spanner flats on the body. Avoid tightening the switch via the electrical enclosure as this can damage the switch.



Alignment of the flow switch is critical to correct operation. The switch should be in line with the pipe and the flow arrow in the direction of flow.

Remove the lid on the electrical enclosure and insert the wires into the cable entry. Connect the wires to the terminals labeled "COMM" and "NO".



Fit the lid onto the electrical enclosure and secure via the screw.

The female connectors on the other end of the cable are connected to the 2 x 6.3mm or ¼" spade terminals on the Gas Sensor. The flow switch must activate when the pumps are on and deactivate when they are off (i.e. when there is no water flow).



Please note that the voltage at the Gas Sensor is Safety Extra Low Voltage (SELV) and does not pose a shock hazard.

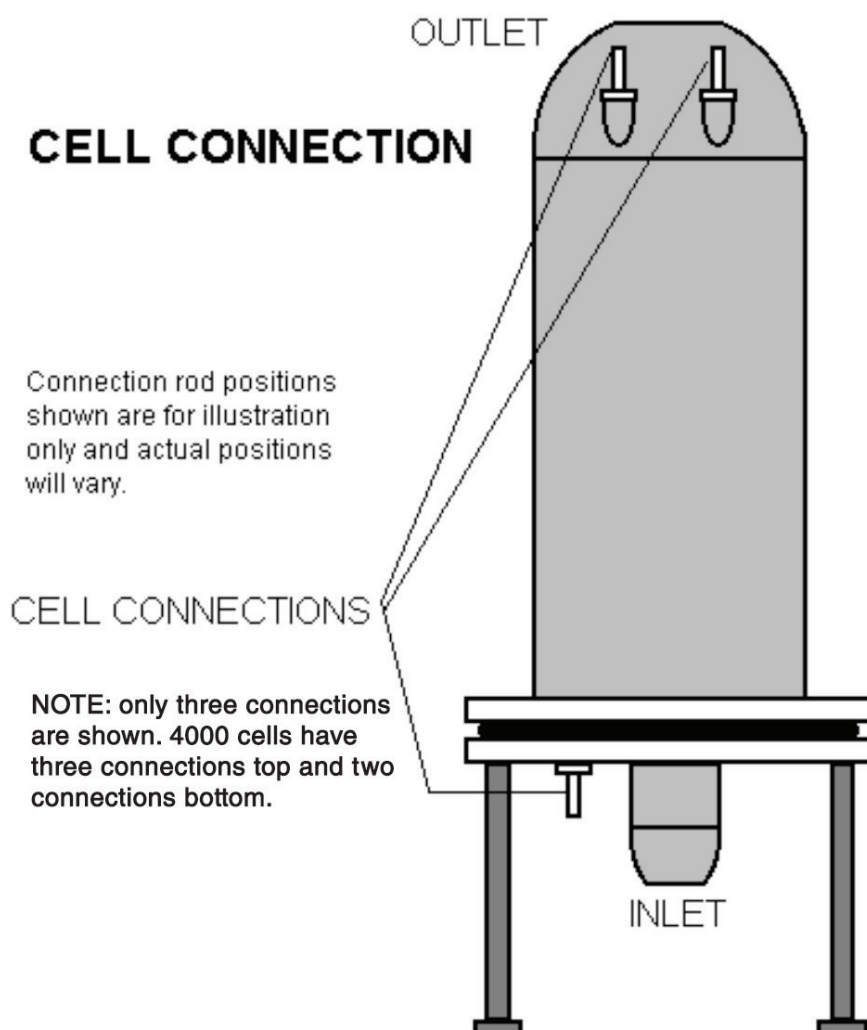
Electrical Connections

Mains Power

The Power Supply has a power cord attached to the left-hand side of its bottom panel. The Earth must be connected. The Connection Point to which the unit is connected must be protected by a Ground Fault Circuit Interrupter (GFCI) or Residual Current Device (RCD) (see local electrical regulations). **If the supply cord is damaged it must be replaced by a similar cord according to local electrical regulations.**

The electrical supply to the unit must be interlocked to the main pump(s) using a timer or contactor/relay so that when the main pump(s) are turned off, power to the unit is also turned off. Power to the unit should be supplied via a separate electrical circuit with its own circuit breaker. This is very important when the Powered Bypass Installation is used, in which case the bypass pump should also be interlocked to the main pump(s) supply.

A clean (insulated) ground must be provided to the Power Supply.

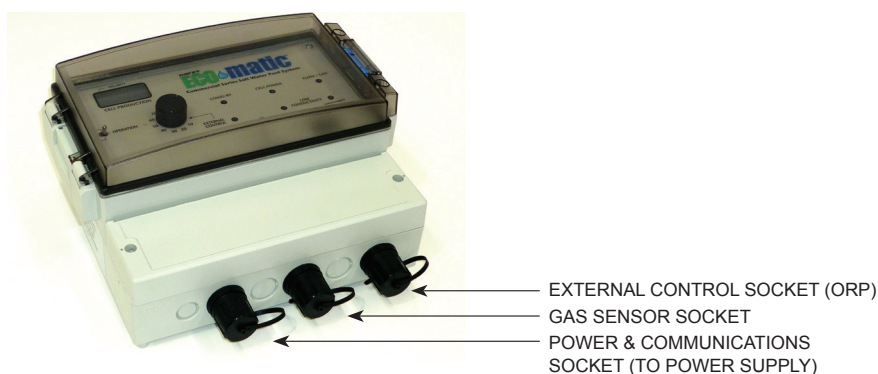


The cell has connections both top and bottom. These protrude through the cell housing. You will find that the cell cables are terminated in male plugs and brass terminal blocks. Simply fit the brass terminals to the cell connections. Ensure that the brass terminals are connected tightly using the bolts and retaining nuts.

The male plugs should be inserted into their colour matching sockets on the right hand side at the bottom of the Power Supply. To insert, simply push them in slowly until a click is heard, then gently try to pull them out. If they are locked in place the connection is correct.

If it is necessary to disconnect the cable, push the connector in further until a click is heard and then remove the connector. This should only be done when power to the cell is off as arcing can result. Arcing will damage the connector. **All connections should be kept clean to ensure long life.**

Control Panel



There are three connectors under the Control Panel (when it is mounted). From left to right, the first is for power and other signals to and from the Power Supply. This connector should be inserted and locked in place first. Do not attempt to connect the units with the power on - damage may result. The connectors are keyed and cannot be inserted the wrong way. **DO NOT FORCE THE CONNECTORS AS DAMAGE WILL RESULT** – the pins and socket contacts can be forced out of their positions if force is used to insert the connectors.

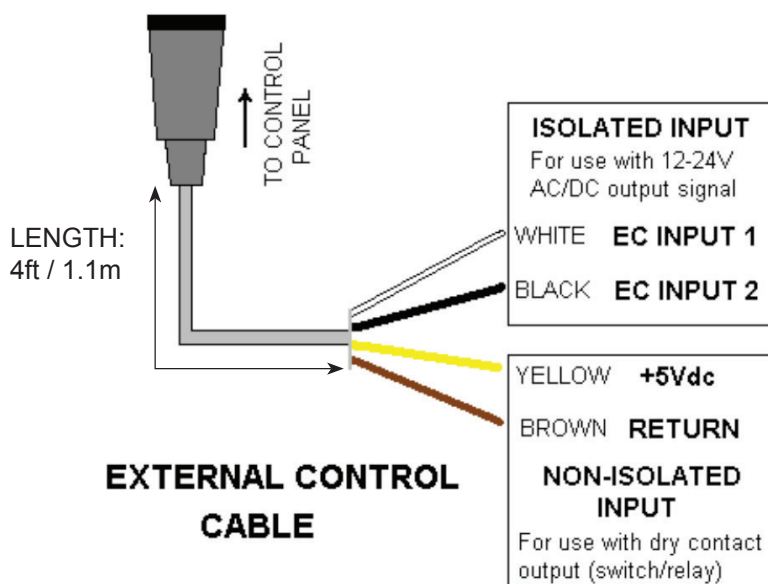
The second connector is for the Gas Sensor and should be connected only after the Gas Sensor has been installed. If the Gas Sensor must be removed it should be disconnected first.

The third connector is for EXTERNAL CONTROL and is normally left capped. A connector is supplied (with a length of lead) for interconnection to another controller, such as a timer or Chlorine Controller. Please note that the external controller must output 12 to 24V A.C/D.C. or have an isolated relay output (closed) to turn the Chlorinator on. Voltages in excess of those detailed will damage the unit. To use the EXTERNAL CONTROL simply connect the correct wires to your controller output. See EXTERNAL CONTROL detailed information below.

Connecting the Chemistry Controller - External Control

An EXTERNAL CONTROL Cable is supplied with the unit. The cable can be connected in a number of ways and extreme care must be exercised when it is connected into any external control device. The EXTERNAL CONTROL will respond to any input signal of 12V to 24V AC or DC (1 Watt maximum) – this input is electrically isolated from the unit. There is also provision for the connection of a relay output – there is 5Vdc and a return wire available.

NOTE: The 5Vdc and return wires are not isolated from the unit and can only be used where an electrically isolated switch or electrically isolated relay is available.



Operation of the ECO-matic COMM System

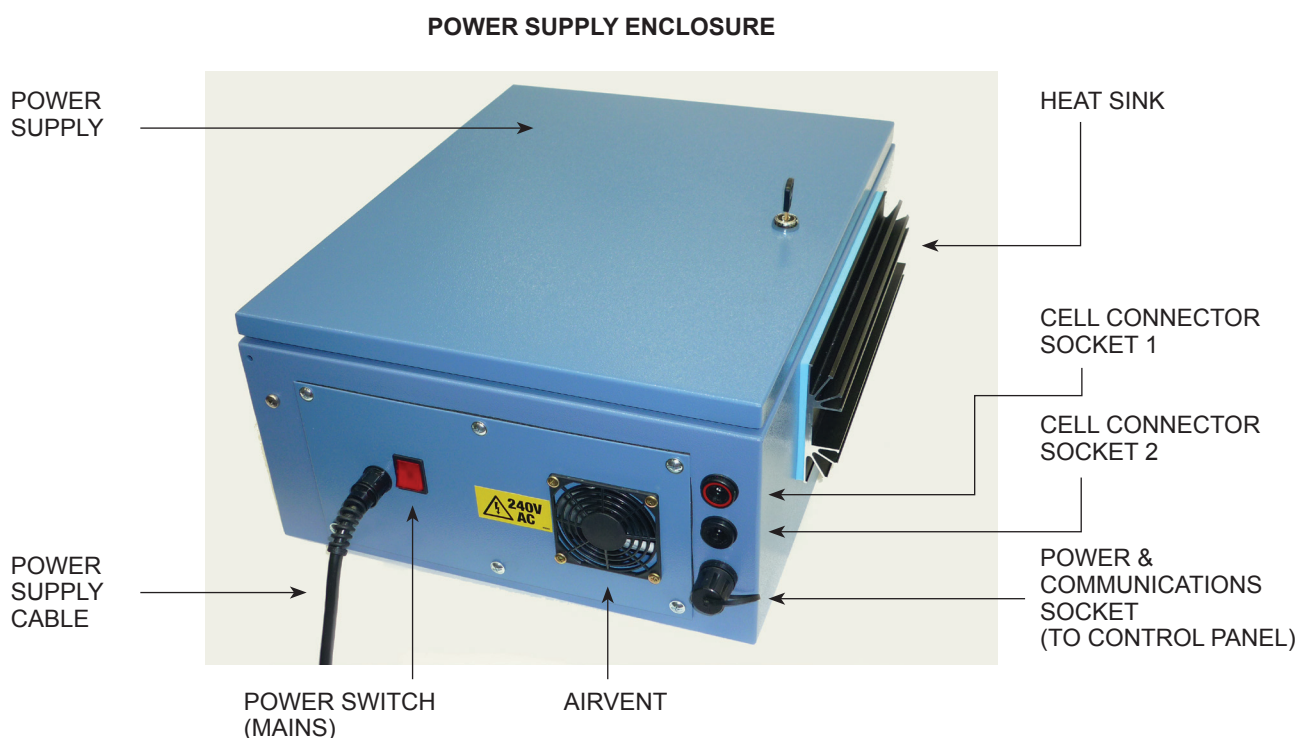
The ECO-matic COMM System passes an electrical current through an electrolytic cell filled with a flowing mild salt solution. The electrolysis that takes place causes the production of a number of chemicals that act as oxidation agents and biocides. The predominant product is chlorine - the same type that occurs when chemical chlorine is added to pool water. The lesser products are usually oxygen compounds, some of which are extremely reactive and very useful in attacking contaminants that are not usually totally destroyed by chlorine alone. This is one of the reasons that salt systems usually produce a higher water quality than chemical only systems.

Your ECO-matic COMM System is made up of three main components:

1. Power Supply
2. Control Panel (includes Flow Switch & Gas Sensor)
3. Electrolytic Cell

The operation of the Electrolytic Cell, the Power Supply and Control Panel is detailed below:

Power Supply



This component houses all the high power, heat generating elements of the ECO-matic COMM System. This enclosure should remain closed at all times as mains voltages are present at some points.

Safety isolation and AC to DC current rectification takes place inside this unit. There are two heat sinks on either side of the enclosure which will become hot to the touch when operating. The inside of the enclosure is fan-cooled to help dissipate heat generated by the transformer and other components.

Inside the lower portion of the Power Supply is a plastic enclosure with a clear cover. Inside the enclosure is the Power Supply Control (COMPOW) PCBA.

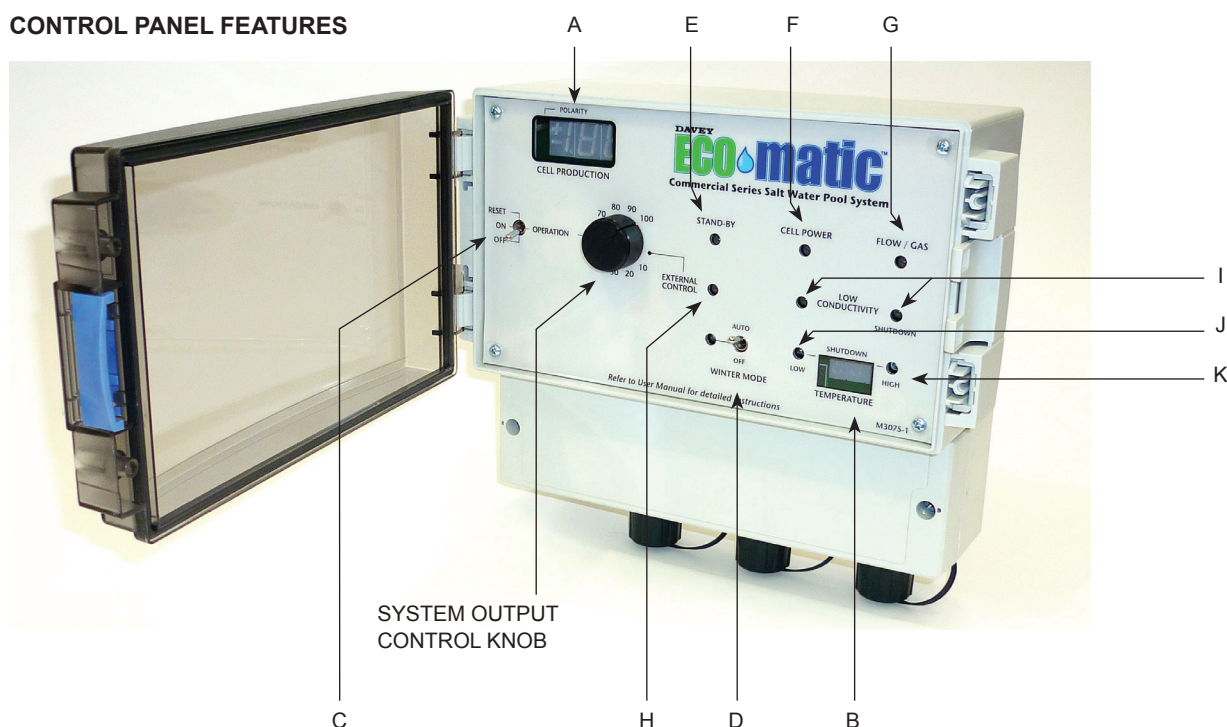
It has a number of switches and displays that represent the operation of the Power Supply. The operation of these Power Supply sub-systems will not be described in this instruction, training can be provided during commissioning and further information can be obtained through your Davey dealer.

It should be noted that the switches should be in certain positions for normal operation and that any deviation from their normal positions during operation may damage the unit. ONLY authorized ECO-matic service agents should make adjustments to these.

Control Panel

This enclosure determines the operation of the ECO-matic COMM System. The enclosure is protected to IP68 to stop the penetration of dust and/or corrosive/moist atmospheres. The transparent door should be closed at all times other than when using the control panel.

CONTROL PANEL FEATURES



The Control Box has a number of features:

Cell Production & Polarity Indicator (ITEM A)

Shows the magnitude and polarity of the electrical current applied to the cell. The Cell Production is shown as a percentage of maximum system output. It will read around 100 unless the unit is in Winter Mode, where it can read down to 65. If the Cell Power is off, it will be blank. Polarity is shown as “+” (positive, forward) or “-” (negative, reverse).

Temperature Indicator (ITEM B)

Displays the temperature of the water passing through the Cell (in degrees Celsius or Fahrenheit). This temperature is monitored and used by the Control Panel to adjust the unit's operation (see Winter Mode and High and Low Temperature Shutdown). The temperature sensor is integrated into the Gas Sensor fitting.

Operation Switches – Output Control (ITEM C)

- OFF** - Cell Power is not applied
- RESET** - Resets all alarms and places unit into STANDBY mode.
Cell Power cannot be applied for approximately 2 minutes.
- ON** - Allows Cell Power to be applied from 10% to 100% (all the time), or from the EXTERNAL CONTROL input (see below).

The **System Output Control** operates by a form of Pulse Width Modulation. This form of control works by switching the Cell current on and off over a period of time with the result that the system output is averaged. For example, if the control is set at 50(%) the unit will operate at its normal output for only half the time that the unit is on with the averaged output being 50%.

Winter Mode Switch (ITEM D)

When Winter Mode is selected the unit will adjust its output to suit the water temperature of the pool. The amount of current that the Cell can draw is determined by the water conductivity, which in turn is influenced by salinity and water temperature. As the water temperature falls, so does its conductivity. If there was no modification of the unit's operation this reduction in conductivity would result in the eventual shutdown of the unit via the Low Conductivity Shutdown. With Winter Mode selected the output of the unit will reduce with temperature.

When Winter Mode is in operation (< 70°F approx.) the display LED will be Blue. See also High and Low Temperature Shutdown.

Stand By (ITEM E)

Red shows that the unit is waiting to produce chlorine; this occurs at polarity reversal, RESET and power - up of the unit. The STAND-BY delay is approximately 2 minutes. After the delay the LED will be Green indicating readiness to produce chlorine.

Cell Power (ITEM F)

Red shows that the cell is not powered, Green shows that the cell is on. **If the output is set at less than 100 the Cell will turn on and off automatically** – this is how the output is reduced.

Flow/Gas (ITEM G)

Red shows a problem with either water flow and/or a gas build up at the Gas Sensor. Green shows normal operation. When Red, the Cell Power will be turned off until the problem is rectified.

External Control (ITEM H)

EXTERNAL CONTROL is a means of controlling the unit's operation from an external Chemistry Controller or Timer. The External Control LED will be Red to show that the external controller has the Cell Power turned OFF. Green shows the Cell Power is turned ON and that the external controller has activated chlorine output.

Low Conductivity Display & Shutdown (ITEM I)

This display consists of two LEDs, one to display LOW CONDUCTIVITY and the other to display the LOW CONDUCTIVITY SHUTDOWN. The first LED will show Red when the conductivity falls below a certain point. If the conductivity continues to fall the second LED will go Red and this will cut power to the Cell until the problem has been rectified. The LEDs will be Green for normal operation. In cases where the water temperature is dropping the unit should be operated in Winter Mode as low temperatures can cause these alarms to operate. For more information read "Water Conductivity".

Low Temperature Shutdown (ITEM J)

Will be Blue if the water temperature falls below 50 - 54°F (10 - 12°C). Cell Power is turned off to protect the cell. At these temperatures people will not swim and algae cannot reproduce. The filter can be run to keep the pool clean. When the temperature rises again the unit will turn back on automatically.

High Temperature Shutdown (ITEM K)

Will be Red if the cell water temperature rises to approximately 113°F (45°C). This is a safety feature included as the Cell can heat water. In the unlikely event of the failure of the flow switch in a Powered Bypass Installation, the water would heat up and could possibly boil if given enough time. When the cell water temperature exceeds approximately 113°F, Cell Power is turned off.

NOTE: if the Cell Power has been turned off by any of the fault conditions, an automated check procedure takes place approximately every 2 hours to see if the fault conditions have been rectified. The use of RESET will also re-start the system to see if the fault condition still exists.

Water Conductivity

As the salt level in the pool decreases, the wear on the Cell increases. Although salt is not consumed by the production of chlorine, it is lost through splashing, backwashing and on bathers as they leave the pool. The salt level is also reduced in an outdoor pool by rain, which causes dilution. Salt is not lost to evaporation. As the salt level in the pool falls toward the minimum, the LOW CONDUCTIVITY LED will turn Red. At this point the salt level should be tested and increased to 4,000ppm minimum (Note: Maximum salt level is 7,000ppm).

The addition of salt should not affect the ECO-matic COMM as it is protected against overloads. If no action is taken and the salt level continues to fall, the LOW CONDUCTIVITY SHUTDOWN will also turn Red and turn off Cell Power.

The unit will not produce sanitizer in this state. It will turn ON approximately every 2 hours to check if salt has been added. If salt has not been added the Cell will turn OFF again:

There are other factors that can cause the Unit to shutdown.

1. **Heavy Rain** - Can cause very dilute pool water to pass over the Cell due to surface skimming. The unit will turn back ON after the rain has been mixed into the water unless the salt level has been reduced by dilution.
2. **Cold Water** - cold pool water reduces the ability of a Cell to carry electrical current. (Refer to Winter Mode). More salt can be added if desired.
3. **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.

Please note that the **Low Conductivity** and **Low Conductivity Shutdown** are not like T.D.S. meters, which are temperature compensated. Their 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 CONDUCTIVITY and LOW CONDUCTIVITY SHUTDOWN on your ECO-matic COMM 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 CONDUCTIVITY and LOW CONDUCTIVITY SHUTDOWN 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 **AUTO** position (it can be left in AUTO all the time if desired).

This has two effects:

1. It alters the setting of the LOW CONDUCTIVITY and LOW CONDUCTIVITY SHUTDOWN Systems.
2. It reduces the **Cell Output** as the water temperature falls.

The Unit will now respond better to a cold pool environment.

The approximate temperature and Cell outputs are:

TEMPERATURE		% OUTPUT
> 72°F	> 22°C	100
< 70°F	< 21°C	85
< 64°F	< 18°C	75
< 59°F	< 15°C	70
< 54°F	< 12°C	65

Chemistry for ECO-matic COMM Series

Salt

At startup of the Chlorinator System there must be at least 4,000ppm of salt (sodium chloride) in the pool water. The salt level should not exceed 7,000ppm. This is simple to achieve if the following steps are taken:

NOTE: Do not use Salt that contains Iodine or Anticaking Agents. Salt should be Fine or Medium Grade Pool Salt at 99.4% PURE Sodium Chloride (NaCl)

1. Determine, with reasonable accuracy, the pool volume.
2. Measure the pool water TDS (Total Dissolved Solids) prior to adding salt.
NOTE: The TDS Meter should be calibrated for sodium chloride.
3. Calculate the required start-up salt dose and add it to the pool. For a new pool, the required dose is:
Salt (kg) = Pool Volume (m³) x 4.5 or Salt (lbs) = Pool Volume (gal) x 0.0376
E.g. 100m³ pool requires 450kg of salt and 50,000 gallon pool requires 1,880lbs salt
If the pool is already operating as a salt pool, simply add enough salt to bring the level to 4,500ppm.
4. Backwash the filters and add the salt along the deep end of the pool.
DO NOT load all the salt into one area, as it will take longer to dissolve.
During the time the salt is dissolving, do not backwash the filters. Heavier salted water will tend to flow into the deep end of the pool and could be backwashed out via the bottom drains. Brush salt to ensure mixing.

If the TDS is higher than expected, then the pool volume may have been over estimated. This is not a cause for concern as more salt is far better than not enough! (Unless the salt level is above 7,000ppm).

Pool Stabilizer (Cyanuric acid / Cyanurates)

NOTE: For Outdoor Pools Only.

1. Measure the stabilizer level using an appropriate test kit. It should be between 25 and 50ppm.
2. If the pool has never had stabilizer added, then approx. 25ppm of stabilizer should be added. Follow the directions for adding it or load it directly into the pool pump inlets.
NOTE: Stabilizer is very slow to dissolve and if it is loaded into the pump inlets it can sit in the filters for several days. If the filters are backwashed it will be lost. Monitor the stabilizer prior to back washing.
3. If there is some stabilizer present, but it is below 25ppm, add enough to make up the 25ppm.

IMPORTANT: Stabilizer is for use in outdoor pools only. It is used to reduce the loss of chlorine due to the effect of sunlight. **It should NEVER be used in indoor pools.**

Other Chemical Levels

The other chemical levels to be aware of are pH, Total Alkalinity and Calcium Hardness.

Davey recommends that you test and balance your water to L.S.I. (Langlier Saturation Index) on a weekly basis.

Simply follow basic pool guidelines, bearing in mind the following:

1. Chlorine should be maintained within a range of 1ppm to 3ppm
2. pH should be maintained within a range of 7.4 to 7.6 and adjusted with hydrochloric/Muriatic acid or CO₂.
3. TA range should be 80 to 120ppm. Lower with Acid, increase with Sodium Bicarbonate (pH Buffer)
4. Calcium Hardness should be kept between 200ppm and 300ppm, while maintaining pool balance per L.S.I.
5. **NOTE: High Hardness levels in the water may present a problem to the Self-Cleaning properties of the system and will therefore require additional cell inspections and cleanings.**
6. Phosphates: should be less than (<) 300 ppb (Parts per billion)
Phosphates are food for algae and will increase chlorine consumption thus shortening cell life if present in water. Remove phosphates with approved Phosphate Remover.

Possible Chemistry Problems

1. The use of sulphate containing chemicals may promote the production of oxygen compounds at the cell. This can lead to lower chlorine production, higher cell wear, and the production of chemicals which can adversely affect ORP probes. Chemicals to avoid are Sulphuric acid and Sulphate flocking compounds.

NOTE: the use of Potassium Mono Persulphate is acceptable.

2. The use of quaternary ammonium compounds (Quats) as an algaecide can promote turbidity (cloudiness). This is caused by the very high chlorine levels in the cell reacting with the Quats compound. A common Quats compound is benzalkonium chloride.
3. The use of Citric Acid as a “black spot remover” will cause the chlorine residual reading in the pool to fall to zero for an extended period of time.
4. Hydrogen peroxide, peroxygen chemicals and peroxide in general do not interfere with the ECO-matic COMM System but can seriously affect the ORP probes (redox probes) on chlorine/redox/ORP controllers.
5. The use of copper based algaecides can create a blueish/green scale build up on the cell that may present a problem to the Self-Cleaning properties of the system and will therefore require additional cell inspections and cleanings.

NOTE: We recommend that you **do NOT use any Copper Based Algaecides** with your ECO-matic COMM system.

Maintenance

Daily

1. Ensure all indicator lights are Green on the Control Panel
2. Ensure fan is running in the Power Supply
3. Ensure all cables and connections are secure

Weekly

1. Ensure water chemistry is correct and balanced to L.S.I.
2. Ensure Flow Rate to the cell is within specifications

Monthly

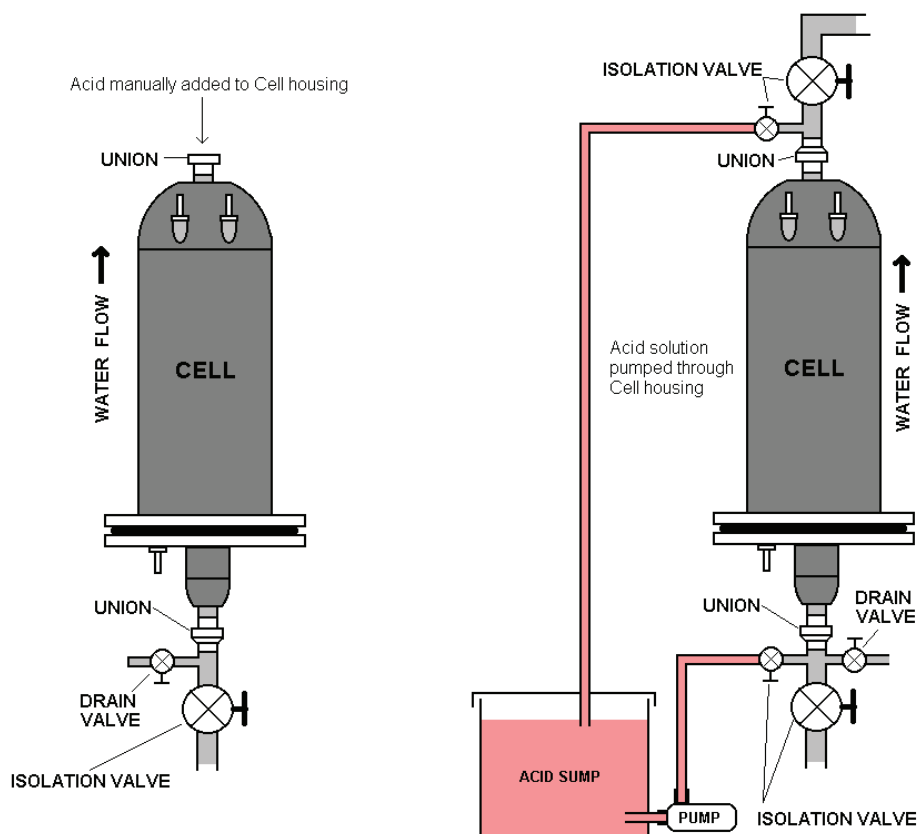
1. Ensure cell connections are clean and tight, clean contact surfaces if necessary
2. Inspect cell for build-up between the plates and clean if necessary

Cleaning the Cell

It is possible for the Cell to become scaled in some waters. The problem waters can be characterised by high calcium hardness (TH > 300ppm), high pH and/or higher than normal mineral levels. **If scale is forming it must be removed at regular intervals or the operation of the system will be compromised and damage to the cell will occur.**

Scale is removed by soaking the electrodes in a solution of hydrochloric (Muriatic) acid, usually no stronger than one part acid in four parts water.

Rather than strip the Cell down it is easier to add the acid to the cell. Please refer to the following methods:



METHOD 1:

During installation a drain valve is added to the cell inlet in the position shown.

1. Turn off power to the unit and stop water flowing through the Cell.
2. Isolate the cell from the pool plumbing using the isolation valves.
3. Open the top Cell union to allow acid to be poured into the cell housing
4. Drain approximately half the water from the Cell using the bottom drain valve.
5. Add hydrochloric acid to the Cell. For a 1200 Cell add approximately 8 litres and for a 2400 or larger Cell add approximately 15 to 20 litres. **Hydrochloric acid is corrosive and should be handled with care – read the handling instructions.** Note that the acid can foam when added to the cell – be prepared.
6. If the acid has not foamed significantly in the cell add water to cover the top of cell.
7. Leave the cell to soak for approximately one hour and inspect the cell for scale (shine a torch down into the cell to see the electrodes). If the Cell is badly scaled it may take a few hours to clean.
8. After cleaning drain the acid/water into a drum(s) via the drain valve. It may be possible to re-use the acid/water for future cleaning.

METHOD 2:

During installation a semi-automated cleaning system is set up. This will consist of an acid tank or sump, and acid transfer pump, top and bottom drain valves and plumbing to suit.

1. Turn off power to the unit and stop water flowing through the Cell.
2. Isolate the cell from the pool plumbing using the isolation valves.
3. Drain the water from the Cell using the bottom drain valve then close it.
4. Open the top and bottom valves connected to the acid washing system and turn on the acid transfer pump. Acid should be pumped into the Cell until it circulates through the Cell. It should be noted that the acid sump should be able to contain at least 120 litres of acid solution (note – diluted).
5. Once the Cell is clean turn off acid pump and allow acid to drain back into acid sump from the Cell. Isolate the acid plumbing using the valves and restart water flow through the Cell.
6. The acid solution can be used a number of times before it is replaced.

NOTE: In some cases where the pool water has high levels of silica, the scale will not react sufficiently with the acid. In these instances, the cell must be disassembled to gain access to the inner cell housing and a high pressure jet of water used to physically remove the scale from the electrodes.

Trouble Shooting

Little or no maintenance should be required for your ECO-matic COMM System. Its operation should be checked at least daily or whenever the operator is in the pump room or near the unit. Of particular importance is the fan at the rear of the Power Supply, if it is found in a failed state the unit should be turned off until it is replaced. Problem checklist:

1. Power to Power Supply, but Control Panel does not operate.

- Check all leads from the Power Supply to the Control Panel.
- Open the Power Supply and inspect the displays in the plastic enclosure in the lower portion of the Power Supply. They should be lit. If the Control Panel is not operating (is not lit) contact your ECO-matic COMM distributor.
- If the LED's are not lit, check the Power Supply overload in the bottom of the unit. If tripped, reset it and reconnect power. If the overload trips immediately, contact your ECO-matic COMM distributor.



RESETTABLE
OVERLOAD

2. System will not produce chlorine (keeps shutting down).

- Check all Cell connections and Power Supply connections are clean and tight
- Check Control Panel to see which of the systems is causing the shutdown. If it is temperature related, check the pool temperature. If it is conductivity related, check the pool salt level. Remember it can be a combination of both temperature and salinity that can cause the Low Conductivity Shutdown.

3. Unit keeps shutting down when all chemical levels and temperatures are correct.

- Cell may have failed or is badly connected. The cell has a limited life span. This is dependent on many factors such as runtime, output setting, salinity, other minerals in the water and water temperature.
- When the cell has failed contact your ECO-matic COMM distributor. Please note that it is the internal component of the cell that will be replaced, not the external housing.

4. Power Supply and Control Panel Faults.

- Should there be a problem with these components please contact your ECO-matic COMM distributor.

NOTE: Always ensure that your ECO-matic COMM System is repaired only by an authorized ECO-matic COMM Service Agent and that only genuine ECO-matic COMM parts are used.

Technical Information

DIMENSIONS AND WEIGHT:	Width mm/ins	Height mm/ins	Depth mm/ins	Approx. Weight kg/ lbs
Assembled:				
Control Panel all units	240 / 9.4	260 / 10	115 / 4.5	1 / 2.2
Power Supply 1200 & 2400	460 / 17.9	500 / 9.5	210 / 8.1	32 / 70.4
Power Supply 4000	460 / 17.9	500 / 9.5	210 / 8.1	42 / 92.4
Electrolytic Cell with Legs 1200*	450 / 17.5	1300 / 50	450 / 17	70 / 154
Electrolytic Cell with Legs 2400*	600 / 23.4	1400 / 54	600 / 23	109 / 240
Electrolytic Cell with Legs 4000*	600 / 23.4	1360 / 53	600 / 23	112 / 246
Leg Height			550 / 21	
Packed on skid for shipping:				
1200	1100 / 42.9	550 / 21.5	1000 / 39	105 / 231
2400	1200 / 46.8	700 / 27	1000 / 39	142 / 312
4000	1200 / 46.8	700 / 27	1000 / 39	145 / 319

NOTE: Cells are cylindrical in shape; Width/depth of cell shown above is diameter of cell at widest point.

Power Consumption	1200	2400	4000
Power Consumption Kilowatts approx.	0.9	1.2	2.1
Output 100% equivalent Chlorine grams per hour	120	240	400
Input Current Amps	3.8	5.0	8.5

All systems require 220-240 volt single phase 50 or 60 cycle power supply.

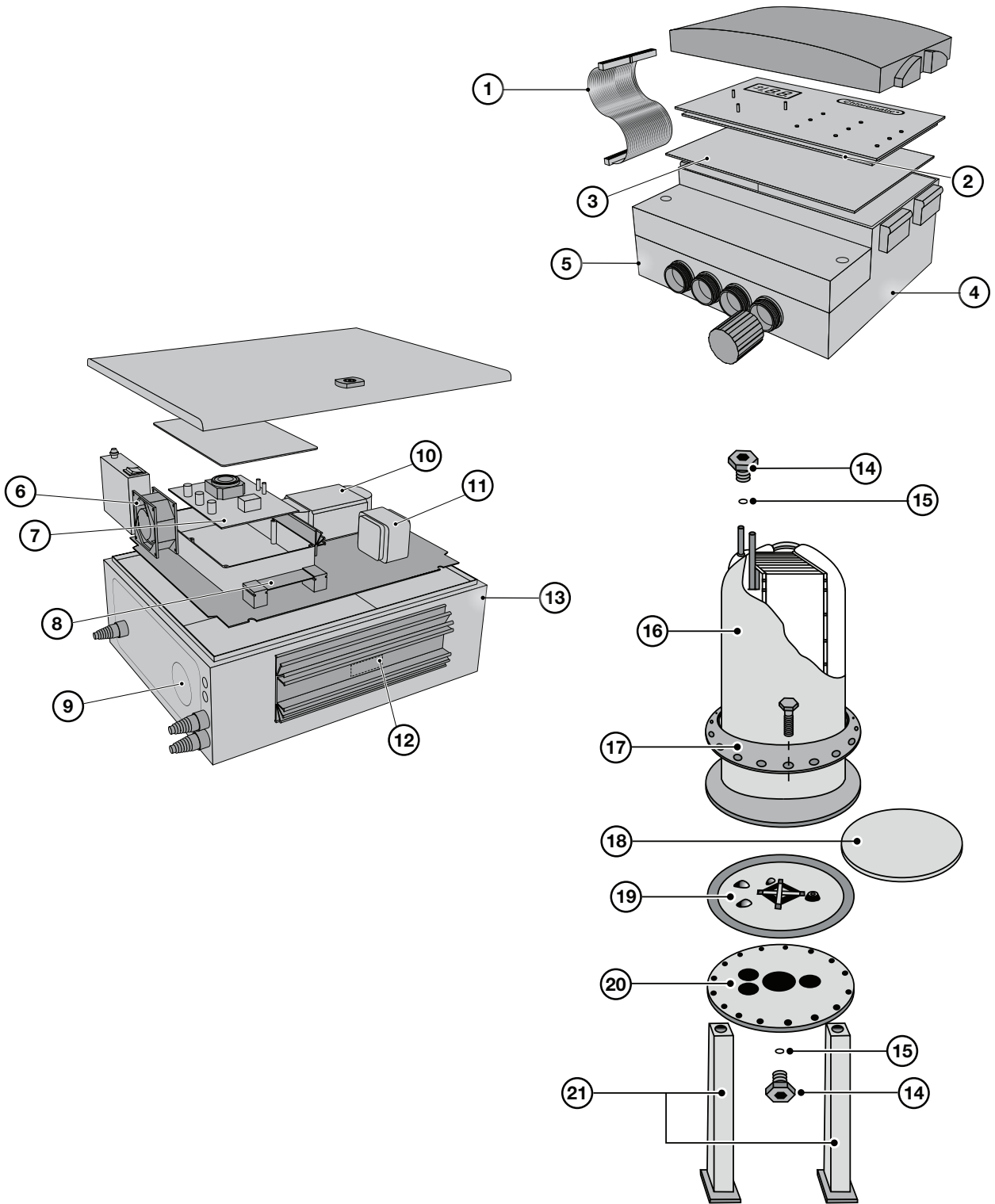
Flow Rates for Optimum Cell Efficiency:

See page 6

Parts List

Commercial Control Unit & Cell	M4900USA	M4901USA	M4902USA
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Notes: A. The Secondary Transformer is being phased out & will be included with the Main Transformer.
 B. The Seal kit contains items 14, 15 & 18.
 C. Kits contain an interconnection cable, pipe clamp & flow switch



Parts List

Commercial Control Unit & Cell			M4900USA	M4901USA	M4902USA
ITEM	NOTES	DESCRIPTION	QTY REQ'D	PART NO.	
1		Loom	1	M4782F	
2		PCB Control A	1	M4770-05MSP	
3		PCB Control B COMM 1200	1	M4771-1200SP	
3		PCB Control B COMM 2400	1	M4771-2400SP	
3		PCB Control B COMM 4000	1	M4771-4000SP	
4		Control Unit Housing	1	M4503	
5		Control Panel Complete	1	M4800	
6		Fan	1	M4504	
7		PCB Power Supply COMM 1200	1	M4769-1200SP	
7		PCB Power Supply COMM 2400	1	M4769-2400SP	
7		PCB Power Supply COMM 4000	1	M4769-4000SP	
8		Shunt COMM 1200, 2400	1	M4517	
8		Shunt COMM 4000	1	M4518	
9		Fan Guard - Plastic	1	M4504A	
9		Fan Guard - Metal	1	M4505B	
10		Transformer (Main) COMM 1200	1	M1761	
10		Transformer (Main) COMM 2400	1	M1760	
10		Transformer (Main) COMM 4000	1	M1758	
11	A	Transformer	1	M1762	
12		Thyristor	2	M4585	
13		Complete Power Supply - COMM 1200	1	M32542	
13		Complete Power Supply - COMM 2400	1	M32538	
13		Complete Power Supply - COMM 4000	1	M32540	
14		Hex Plug COMM 1200	3	M4525-1	
14		Hex Plug COMM 2400, 4000	As required	M4525-2	
15		O-ring Hex Plug COMM 1200	3	401847	
15		O-ring Hex Plug COMM 2400, 4000	As required	49359	
16		Cell Housing COMM 1200	1	M4610	
16		Cell Housing COMM 2400	1	M4611	
16		Cell Housing COMM 4000	1	M4612	
17		Flange - Top COMM 1200	1	M4542P	
17		Flange - Top COMM 2400, 4000	1	M4541P	
18	B	Seal Kit - COMM 1200	1	32597	
18	B	Seal Kit - COMM 2400	1	32595	
18	B	Seal Kit - COMM 4000	1	32596	
19		Baffle COMM 1200	1	M4613-10	
19		Baffle COMM 2400, 4000	1	M4613A	
20		Flange - Bottom COMM 1200	1	M4543P	
20		Flange - Bottom COMM 2400, 4000	1	M4544P	
21		Cell housing Legs	1	M4549	
-		Cell Cable COMM 1200 Not Illustrated	4	M4780	
-		Cell Cable COMM 2400 Not Illustrated	1	M4781	
-		Cell Cable COMM 4000 Not Illustrated	1	M4782	
-		Control Knob - Controller Not Illustrated	1	M7922	
-		PCB Thermistor Not Illustrated	1	MNTC20	
-		Soft Start PCB Power Supply COMM 2400, 4000	2	M1129MSP	
-		Complete Internal Cell Assy COMM 1200	1	M4600	
-		Complete Internal Cell Assy COMM 2400	1	M4601	
-		Complete Internal Cell Assy COMM 4000	1	M4602	
-		Gas Sensor MK2	1	M4586	
-		Flow Switch COMM 1200	1	F21-1280	
-		Flow Switch COMM 2400	1	F21-2400	
-		Flow Switch COMM 4000	1	F21-4000	
-		Pressure Switch	1	M4500	
-	C	Flow Switch Kit - 2" COMM 1200	1	32838	
-	C	Flow Switch Kit - 63mm COMM 1200	1	32839	
-	C	Flow Switch Kit - 2.5" & 75mm COMM 1200	1	32840	
-	C	Flow Switch Kit - 3" & 90mm COMM 1200	1	32841	
-	C	Flow Switch Kit - COMM 2400	1	32842	
-	C	Flow Switch Kit - COMM 4000	1	32843	
-		Strain relief H-4404 cable gland	1	M4514	
-		Bracket Wall Mount Power Supply	1	M4507	
-		Comm Control Cable	1	M14055	
-		Comm External Control Cable	1	M14056	
-		Saddle Clamp	1	402145	

Warranty Details

COMM1200, 2400, 4000

Davey warrants to the original purchaser of the ECO-matic COMM systems (including the COMM1200, COMM2400, & COMM4000) that if any component, other than the Electrolytic Cell, proves to be defective within a period of 12 months from the date of commissioning, that the defect will be repaired or the product replaced free of charge. Warranty does not include onsite labour, freight, shipping or handling. Product must be installed in accordance with the provided installation instructions in order for the warranty to be valid.



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