D-D The aquarium solution ltd.

Operating Instructions for Deltec KM Series Calcium Hydroxide Mixers incorporating instructions for Deltec Aquastat Top Up Units.

87008 - Kalkwasser mixer KM500T - Suitable for systems up to 1575 lts (350 gallons).
87009 - Kalkwasser mixer KM500ST - Suitable for systems up to 6750 lts (1500 gallons).
87010 - Kalkwasser mixer KM800T - Suitable for systems above 1500 gallons (doses 300lts (67 gallons)/day).

Congratulations on your decision to purchase a **Deltec Calcium Hydroxide Mixer or Aquastat Top-Up Unit.**

Kalkwasser.

Kalkwasser, (saturated limewater), is one of the oldest and most widely established methods of adding calcium to the reef aquarium first introduced by Peter Wilkinson a Swiss aquarist.

Kalkwasser is made by dissolving calcium hydroxide powder in freshwater to produce a strongly alkaline saturated solution that contains free calcium and hydroxide ions. The solution however is highly reactive with CO2 in the air and must be produced and stored in airtight conditions to prevent a reaction forming insoluble calcium carbonate. The reaction with CO2 significantly reduces the free calcium ions from 900mg/l in the fresh solution at pH 12.4 to 5-6mg/l at pH 10.

In addition to adding calcium, Kalkwasser also has the benefit of adding hydroxide ions, which react to neutralise organic acids in the aquarium that otherwise would exhaust the buffering capacity of the system. It also helps precipitate phosphates from the water, which fuel nuisance algae growth and inhibits calcification of stony corals and counters the natural tendency within the aquarium towards falling pH. Kalkwasser contains no other ions that would otherwise cause an imbalance in the water chemistry.

All Deltec Kalkwasser mixers are supplied with 500g of RowaKalk calcium hydroxide powder. Deltec recommends this product as it dissolves easily within the mixer and has a high purity of 98.9%.

Additional Equipment.

In order for the Kalkwasser Mixer to operate correctly it is necessary in addition to provide; 1. - a method of monitoring and replacing the evaporative loss within the tank; 2. – a supply of freshwater under pressure from a pump, RO or gravity feed; ‘3’ – a non return valve for some types of installation.

Controlling Evaporative Loss.

The loss of water from the aquarium system by evaporation is of fresh water only which increases the salinity within the aquarium This is normally replenished using a float switch and controller such as the Deltec Aquastat Type A, (Item number 90100), shown in the diagram overleaf. As the float switch rises and falls it switches the controller on and off, which in turn controls a pump or solenoid to top up the lost water.

Operation and Installation of the Deltec Aquastat Unit.

The Aquastat unit is a simple system, which should be operated as follows.

Securely fasten the level sensor on the edge or bracing bars of the sump or tank using the adjustable bracket supplied so that the float is positioned just out of the water. (A freestanding Aquastat unit is also available, Type P - Item number 90100). Plug the controller/plug bar in to the mains supply and switch on using the rocker switch (Item 7).

The plug bar is fitted with two LED’s (item 5). The green LED indicates that the power is on to the controller and the yellow LED comes on when the socket on the plug bar is live, i.e. when there is a demand for water. As the float switch is currently set out of the water the plug bar will have both of the LED’s illuminated.

Slide the float section down the main support tube, immersing the float until the yellow LED just goes off. This is now positioned at the upper set point.

As water is lost in the tank or sump, the float in the level sensor drops until it reaches the lower set point. At this position the magnet inside the float operates a set of contacts, which energises the controller to provide a live supply at the plug socket. The controller remains live until the water level returns to its upper set point at which time the power supply is cut off.

Options for Fresh Water Supply.

Water can be supplied to the Kalkwasser Mixer in numerous ways however most will be a variation of pumped, gravity or solenoid control from a mains or RO unit.

1. Pumped Top Up: The diagram overleaf shows a conventional freshwater supply from a reservoir situated beside the sump or tank. The volume of the reservoir should be chosen such that it is allows a reasonable number of days between refilling.

Install a suitable pump in the fresh water reservoir and connect the outlet, via reducers, to a length of small-bore tubing that will reach to the Kalkwasser Mixer.

As the flow rate that is required for the Kalkwasser Mixer is low, it is recommended that a bypass system is constructed after the outlet of the pump so that some of the water is returned to the reservoir thus lowering the pressure on any hose connections and reducing the likelihood of a large pump blowing off one of the pipes. The bypass can be simply constructed from a T connector, a length of hose and a small tap, (Item 12).

Important Note: If the reservoir water level is expected to fall below the fill level in the Kalkwasser Mixer it is recommended that a non-return valve should be fitted after the pump and bypass to prevent back siphoning.

2. Gravity Top Up: It is possible to feed the Kalkwasser Mixer by gravity from a reservoir fitted above the level of the mixer inlet. If this option is utilised it is important that a good quality solenoid valve, or two valves fitted in series, is used to prevent overdosing of the Kalkwasser mix due to failure. The hose from the solenoid valve can be connected directly to the inlet tap on the Kalkwasser Mixer.

3. Top Up Directly from an RO Unit:. Due to the potential for solenoid, failure and subsequent flooding of the aquarium and room with an infinite supply of fresh water we have chosen to cover this type of installation in detail in a second diagram.

Note that this is for information only and we strongly recommend that a professional should carry out this type of work.

When feeding directly from an RO unit, the volume of fresh water that is generally produced is in excess of the drip rate required for the Kalkwasser Mixer and therefore a bypass system should be constructed to run off the excess water. This is simply a T coupling with a further length of hose and a flow valve or tap on the end. When the RO unit is energised, any excess water will run through the bypass where it can be either sent to waste or collected for later water changes.

The volume of water that a mains supply RO unit can produce is infinite and therefore potentially disastrous to the aquarium. We would therefore always recommend that the there are at least three safety cut off devices operating on the system. These are:-

1. - The float switch and Aquastat itself.
2. - A primary and secondary solenoid valve operated in series. It is possible for one to fail or to be contaminated with grit.
3. - Use of a socket timer prior to the float switch. This is described below and considered essential for mains feed installations.

It is also very important to fit a non-return valve item 'J', as calcium hydroxide will attack the RO membrane should it siphon back.

If the local mains pressure is low then a booster pump can be supplied by your D-D outlet. This must also be wired into the level controller so that it only supplies water on demand. D-D also provides a range of high pressure solenoids and non return valves.

As an alternative it is possible to purchase a separate float switch for most RO units, which can be used to independently control top up of the reservoir in option '1' above. In this way as long as the reservoir overflows to outside of the aquarium system to waste the potential for infinite addition of fresh water is removed.

Installation and General Operation of the Kalkwasser Mixer

The Kalkwasser mixer can be positioned inside or outside of the sump or stood inside the freshwater reservoir as long as the distance from the outlet 'F' to the point of introduction to the system is not too far.

Fill the body 3/4 full with R.O. water and carefully spoon in the powder, stirring manually with each addition until there is 1/2 an inch of undissolved powder on the bottom. More powder can be added later if required after the solution has cleared. Put the stirrer lid, motor and stirrer rod in position by mating the grove on the lid with the top of the stirrer body. Position the unit and plug the transformer into the mains, the rod should now be turning. Leave the mixer running until the top of the solution starts to clear. This prevents undissolved calcium hydroxide from entering the aquarium.

Important: 1. - Care should be taken not to breath in the fine calcium hydroxide dust and also with the freshly mixed solution as it is caustic and will dissolve clothing or similar items. If you have prolonged contact with your skin or get any in your eyes flush well with copious quantities of fresh water.

2. - The transformer supplied is fitted with a variable output. This is factory set and should not be operated above 7.5V.

Connect the fresh water supply tube to the inlet control tap 'D' which should be closed. Falsely raise the level sensor until a fresh water supply is available at the inlet tap and open the valve carefully to allow the water level to rise slowly within the mixer. Once the solution starts to exit from the nozzle 'F' adjust the tap until the flow is reduced to a slow drip, which should enter the tank in a position of strong flow to allow rapid dispersion. It is possible to extend the outlet with a suitable length of hose however care should be taken that the hose runs downhill to prevent the solution from standing and being exposed to CO2 between additions.

It is very important that fresh Kalkwasser is added drop wise as too high a flow rate can cause a localised calcium concentration, which, if high enough, can drop the calcium out of solution. High flow rates may also raise the pH too quickly within the aquarium.

The level sensor can now be returned to its correct position at which point, if correctly set up initially, the fresh water supply should switch off and the drips from the Kalkwasser Mixer will stop.

The Kalkwasser stirrer should stir the solution continuously 24-7 however it is possible to experiment with additions of Kalkwasser outside of the aquarium photoperiod, i.e. at night, to reduce the drop in pH which naturally occurs when photosynthesis stops. This is achieved by installing a timer on the supply prior to the level controller.

The timer can also act as a safety backup should the float switch or controller fail and is therefore recommended.

To use the timer in this way it is necessary to first determine the time that the mixer takes to replenish the loss from one 24-hour period. To measure this total time, install a conventional timer into the switched socket on the controller and set it to midnight. Run the system for 24 hours with the top up system functioning normally. As the switched socket only becomes live when there is a demand for water, the timer will only count round during this period, therefore after 24 hours it is a simple matter of reading off the number of hours after midnight that the timer has operated.

With this information, remove the timer from the switched socket and plug it in ahead of the level controller. The timer can now be set to just longer than the required time for full top up. If the level controller now fails, the timer will still switch off the fresh water supply and the aquarium will not be flooded with Kalkwasser. Be aware that his fill time may vary seasonally with evaporation rate.

If Kalkwasser is administered in conjunction with a calcium reactor or evaporative cooler you must be careful not to overdose as the calcium may drop out of solution in the tank if its concentration gets too high. To alleviate this problem it is recommended that you create a further bypass so that fresh water can be added to the sump along with the Kalkwasser.

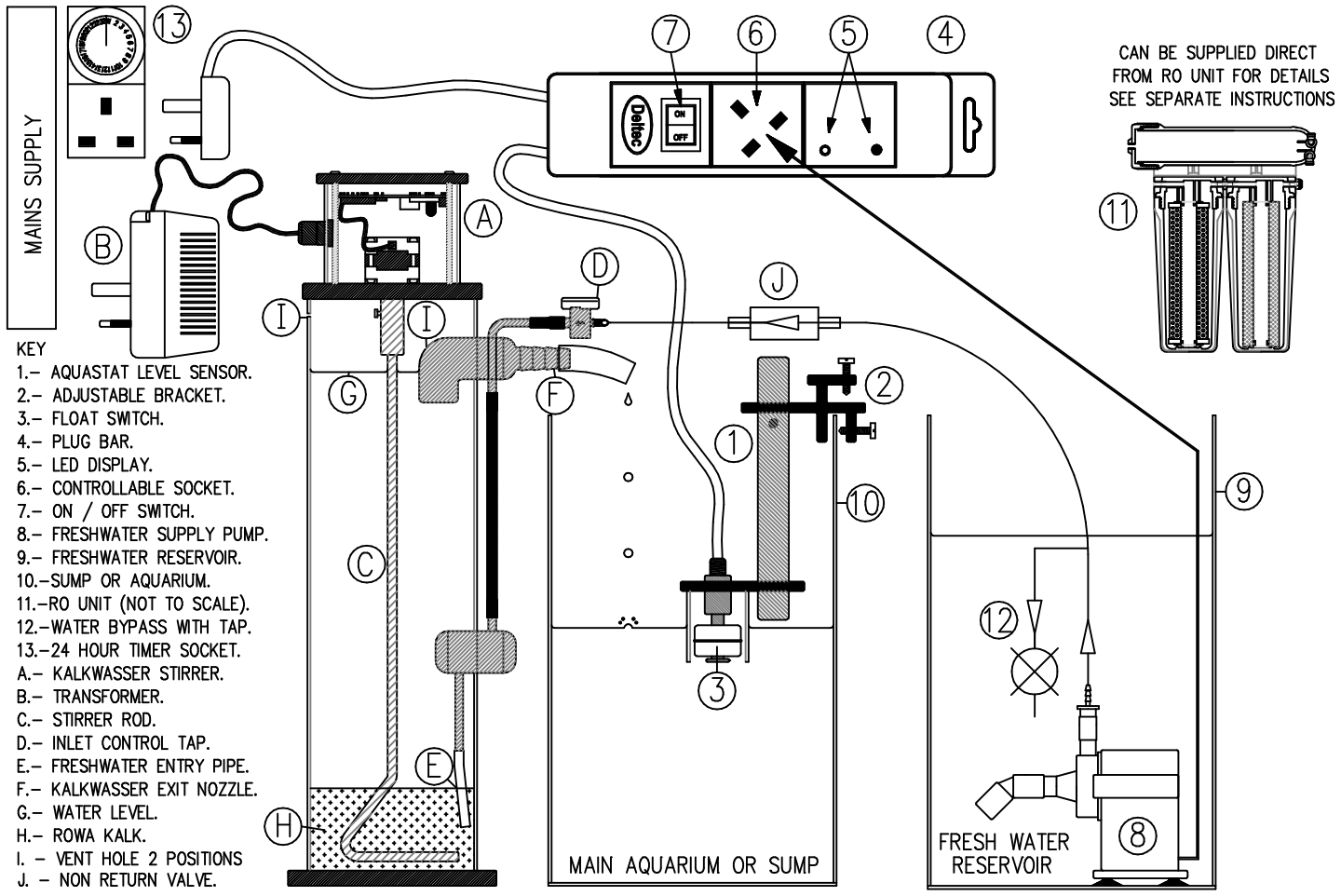
Use of Kalkwasser with a plenum system must be carried out with great care as the sand bed may start to solidify due to formation of calcite if the calcium level gets too high. This will render the plenum inoperative.

As the saturated solution within the mixer gets old the pH will fall due to reaction with dissolved CO2 from the supply water. For this reason it is recommended that the mixer is thoroughly cleaned out every 2 weeks or when ever the elevating effect on pH within the tank is seen to diminish. For this reason it is better to make regular small additions of calcium hydroxide powder rather than make one initial large batch. Take time whilst refilling to remove any calcium carbonate deposits and ensure that both vent holes and the outlet nozzle are clear. Fresh water reservoirs should be cleaned from time to time to prevent bacterial build up.

For further information on this or any of our other product range please contact us on:

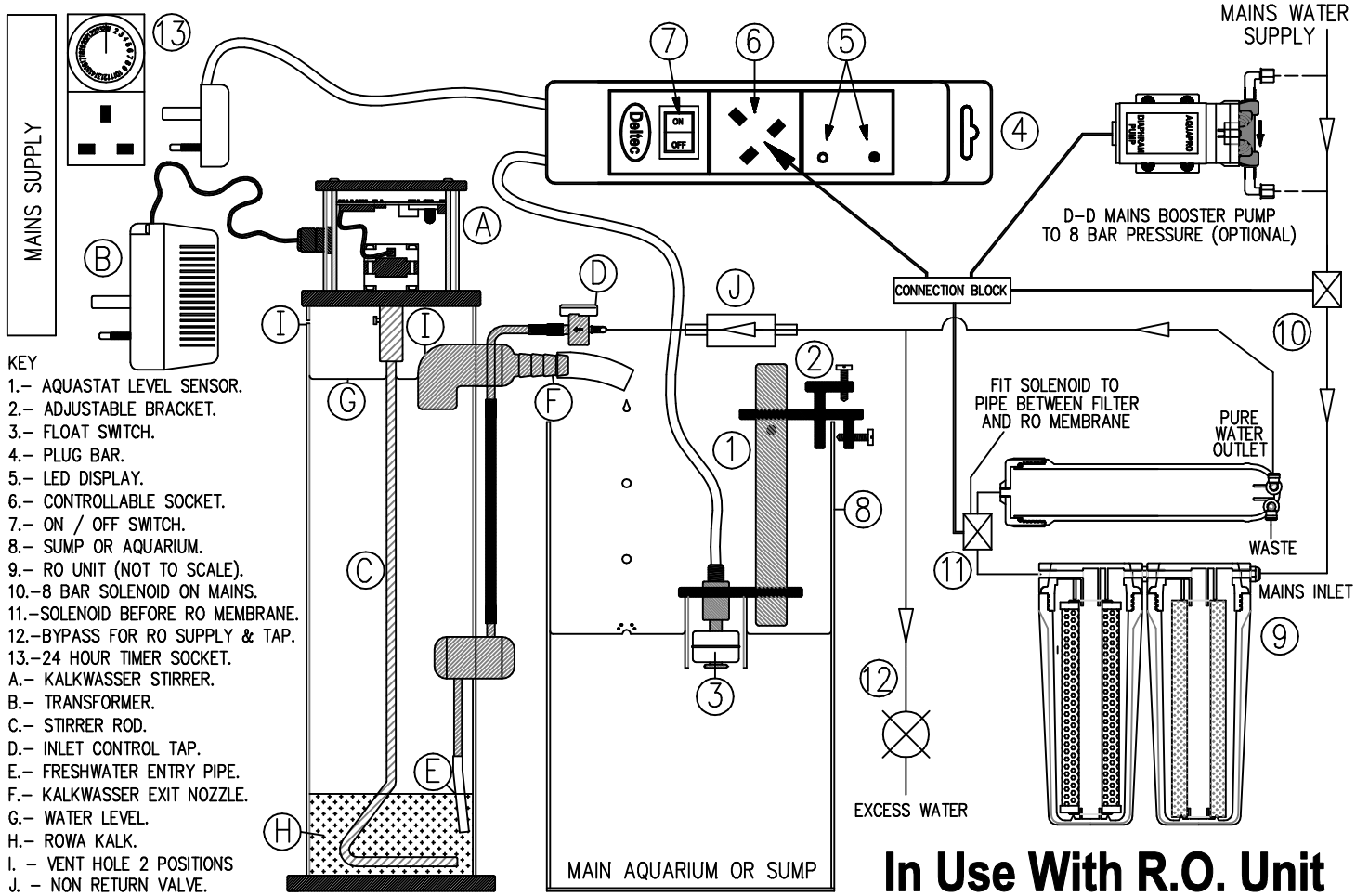
www.theaquariumsolution.com Telephone. 020 8501 2492 Fax. 020 8500 9102

D-Deltec Kalkwasser Mixer & Aquastat Top-up System



KEY
1.– AQUASTAT LEVEL SENSOR.
2.– ADJUSTABLE BRACKET.
3.– FLOAT SWITCH.
4.– PLUG BAR.
5.– LED DISPLAY.
6.– CONTROLLABLE SOCKET.
7.– ON / OFF SWITCH.
8.– FRESHWATER SUPPLY PUMP.
9.– FRESHWATER RESERVOIR.
10.–SUMP OR AQUARIUM.
11.–RO UNIT (NOT TO SCALE).
12.–WATER BYPASS WITH TAP.
13.–24 HOUR TIMER SOCKET.
A.– KALKWASSER STIRRER.
B.– TRANSFORMER.
C.– STIRRER ROD.
D.– INLET CONTROL TAP.
E.– FRESHWATER ENTRY PIPE.
F.– KALKWASSER EXIT NOZZLE.
G.– WATER LEVEL.
H.– ROWA KALK.
I. – VENT HOLE 2 POSITIONS
J. – NON RETURN VALVE.

D-Deltec Kalkwasser Mixer & Aquastat Top-up System



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3.– FLOAT SWITCH.
4.– PLUG BAR.
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6.– CONTROLLABLE SOCKET.
7.– ON / OFF SWITCH.
8.– SUMP OR AQUARIUM.
9.– RO UNIT (NOT TO SCALE).
10.–8 BAR SOLENOID ON MAINS.
11.–SOLENOID BEFORE RO MEMBRANE.
12.–BYPASS FOR RO SUPPLY & TAP.
13.–24 HOUR TIMER SOCKET.
A.– KALKWASSER STIRRER.
B.– TRANSFORMER.
C.– STIRRER ROD.
D.– INLET CONTROL TAP.
E.– FRESHWATER ENTRY PIPE.
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In Use With R.O. Unit