

# Operating Instructions for the KW Reactor™ 300

## Technical Data

Capacity	Use with up to a maximum of <b>1cup calcium hydroxide.</b>
Aquarium size	One reactor for aquariums up to 300 gallons (1135 Liters).
Recommended pump size	ca. 200 - 300 gal/hr (760 - 1140 L/hr). The pipes automatically reduce the flow to a small stream.
Connection for hoses	1/2 inch (12.7 mm) i.d. The inlet and outlet flexible 90° fittings rotate to suit your installation.

**Important Notes:** Do not restrict flow out of the exit pipe. The outflow must flow downward. If dosing directly into aquarium, there must be strong circulation to avoid concentrating kalkwasser on inverts. Dose in sump only where strong water movement will quickly disperse it (diagrams 1 & 2).

**Description** The KW Reactor™ 300 creates saturated kalkwasser solution every time the feed pump is switched on to replenish evaporated water. Gentle mixing is achieved with a rotating sprinklerhead that is “powered” by the pressurized water feed. Designed by Julian Sprung, patent pending.

**1. Preparing the Reactor** Unpack the reactor. Open reactor lid by turning counter clockwise. Check parts list to confirm that all parts are present. The reactor is supplied with all the parts needed to operate it except for the hose and pump, and a switching device such as a level switch or a programmable timer. The pump used can be any powerhead with approximately 200 to 300 gal/hr (760 to 1140 L/hr) capacity.

Connect the center pipe (D) to the sprinkler head (F) and the reducer fitting (H) using the short silicone hose pieces (K). The connections should be close as shown in Diagram 4, and it may be necessary to briefly heat the silicone hose in hot water so that it slips onto the pipe (D) easily. Connect the 1/2 inch end of the reducer fitting (H.) to one of the soft 90 pieces (C). Insert the wider end of the short pipe adaptor (G) into the other end of the soft 90, and insert the entire assembly into the reactor column. The short pipe adaptor (G) fits into a hole located inside the top portion of the reactor at the positions of the barbed hose connections, see diagram 5. Make sure sprinkler hangs to the center, as shown. Add R.O. water to fill the reactor approximately 3/4 full.

**1a. Water input and output** The input and output locations depend on where the user positions the short pipe adaptor (G). See diagram 5. Normally the output is located over the hanger so that it can flow directly into the sump or aquarium. Diagram 2 shows a set up where the opposite arrangement would be used. **Do not restrict flow out of the exit pipe. There should be no long run of hose on the output that could collect water and block free flow. The outflow must flow downward.** See diagrams. The supplied short length of 1/2” hose (J) used with connector (I) and a soft 90 (C) extends the connection over the rim of the aquarium or sump. To extend the reach of the outlet, a length of 1/2” I.D. hose can be used, but **it should be as short as possible and run straight so that water cannot collect in the line.** Diagrams 1-3 give suggested installation options.

**1b. Lid** Inside the top of the lid there is a flat plastic washer and on top of it an O-ring. Rotate lid on the threads until it stops (hand-tight) to close the reactor. It is not necessary to seal the reactor since it is not pressurized and will not leak, even if the lid is removed while the reactor is operating. Do not overtighten! The flat washer allows slippage and makes it easier to open the reactor. It is otherwise not necessary.

**2. Locating the reactor** The KW Reactor 300 can be seated upright inside the filter sump, hanging on the side of the sump, on the side of the reservoir, or the rear of an aquarium. For hanging installations, use the screw provided in the base plate to level it against the aquarium or sump wall, Figure 1. The reactor must be upright and level to operate properly. The reactor outlet must be higher than the sump or aquarium where the kalkwasser is being sent. Typically the outlet is hung over the sump.

**3. Connecting the Check Valve** Use 1/2” I.D. hose to connect the check valve vertically in the water feed line as shown in Figure 2. Be sure to use the correct diameter hose so that the check valve fits snugly in the hose. The check valve should be located as close as possible to the pump and it should be positioned vertically. Note that the check valve must be oriented so that the flapper is in the upper position.



A. Reactor body; B. Lid; C. Soft 90 (Qty: 3); D. 3/16” pipe (Qty: 1); E. Check valve (Qty: 1); F. Sprinkler head (Qty: 1); G. short pipe adaptor (Qty: 1); H. Reducer fitting (Qty: 1); I. Connectors (Qty: 2); J. short 1/2” ID. hose (Qty: 1); K. short 3/16” silicone hose (Qty: 2). L. barbed port on side of reactor.

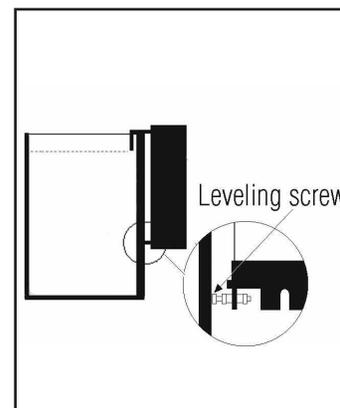


Figure 1

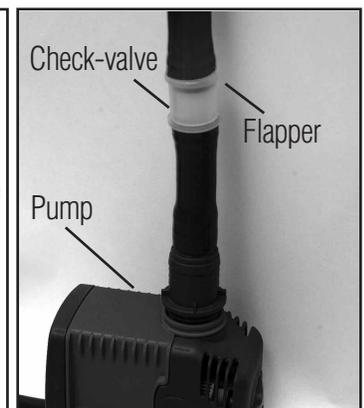


Figure 2

## 4. Connecting the pump and check valve to the reactor

Use a length of 1/2” I.D. hose to connect from the check valve to a barbed port (L.) on the side of the reactor. A barbed connector (I.) and a soft 90 fitting (C.) may also be used to connect the hose to port (L.) as shown in the Assembled Reactor photo. It is not necessary to use hose clamps to secure the hose connections on the supplied fittings because they are barbed. It may be necessary to use a hose clamp to secure the connection to the pump.

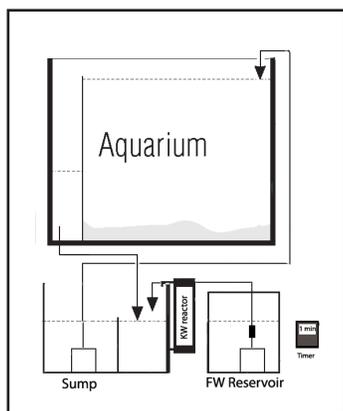


Diagram 1

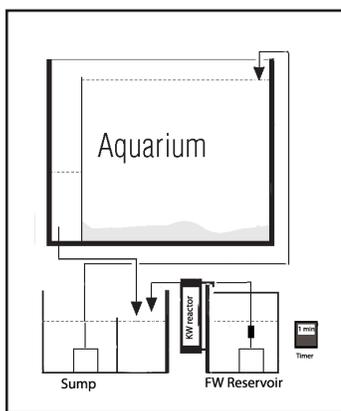


Diagram 2

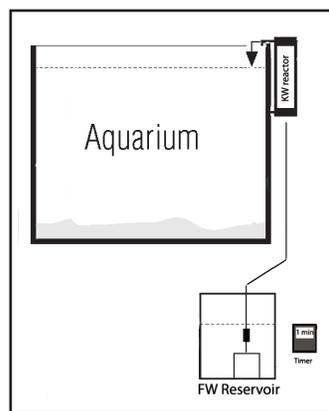


Diagram 3



NanoMag for cleaning off calcium



Assembled Reactor

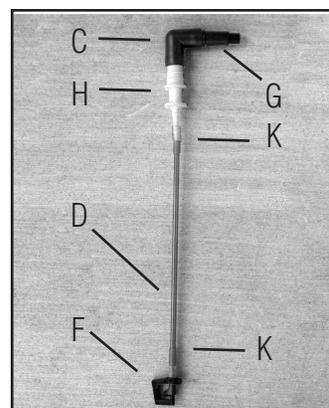


Diagram 4

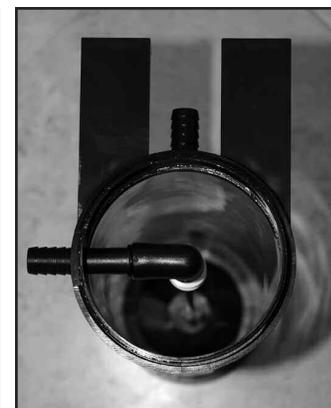


Diagram 5

Gallons/day	Gallons/week	Cups Biweekly
0.25	1.75	0.25
0.50	3.50	0.50
1.00	7.00	0.75
1.50	10.50	1.00

**Table 1** Recommended calcium hydroxide addition measured in cups based on evaporation top-off rate. Notes: saturated kalkwasser contains 2 teaspoons calcium hydroxide/gallon (0.5 teaspoons/L). 48 teaspoons = 1 cup. The table above uses excess calcium hydroxide to assure saturation is achieved.

**5. Initial Operation and Adjustment** Once the reactor is level, all of the hoses are securely attached, and the pump with check valve on the output is located in the freshwater reservoir, direct the return hose into the sump (or aquarium, per diagram 3), and connect the pump to the mains electricity to purge air from the line and allow water to fill the reactor. The average operating flow rate of 5.5 gal/hr (21 L/hr) is caused by the restrictions in the piping and sprinklerhead. Higher flow rates are possible with higher pressure pumps, though kalkwasser dosing is best done as slow as possible. Disconnect power and observe to verify that the check valve prevents backflow.

**6. Auto-top off system** The KW Reactor 300 must be used with a switching device to turn the pump on for short intervals, achieving a top-off of evaporated water. The switching can be accomplished with a level sensor or programmable timer capable of having intervals as short as 1 minute. It is important to note that when using a level sensing switch there is a risk of overdosing because the switch may remain on if there is a leak in the aquarium, or if something else prevents the switch from returning to the off position. Even the use of two level switches, which safeguards the failure of one, cannot prevent a continuous "on" switch caused by a leak in the plumbing. Timers are safer. It is also possible to combine a timer and level switch. With a timer a simple starting sequence is one minute dosing each hour. Adjust the on time (Max on time of 2 minutes) and/or number of "on" periods (Max 2 per hour) to match evaporation.

**8. Maintenance** Observe the reactor at least once per week to verify the check valve is working. Observe the exposed opening of the outflow pipe to be sure that it is not blocked by calcium carbonate deposits, and clear it as often as necessary, usually every few months. Use of the soft 90 or hose there makes this easy: just squeeze the end. Two Little Fishies NanoMag® can be used to clear off calcium carbonate deposits that will coat the walls of the reactor. Every four months the reactor should be cleaned, 2 weeks after the last addition of calcium hydroxide. Disconnect the feed hose by pulling the soft 90 fitting off of the barbed connector or port. Place reactor inside a bucket to catch any spilled water. Unscrew the top. Pour the water and residual calcium hydroxide from the reactor into a sink. Rinse with tap water, and soak the sprinklerhead and check valve briefly (5 minutes) in vinegar to remove any calcium carbonate deposits. Reassemble the reactor per the instructions and follow the initial operation and adjustment procedure.

**9. Replacement Parts** Order any replacement parts through your pet shop, which can order them directly from Two Little Fishies, Inc. or its distributors, or contact us at [info@twolittlefishies.com](mailto:info@twolittlefishies.com).