Pacific Sun

Professional Aquatic Equipment

Internal Bypass Reactor

Calcium Reactor

User Manual

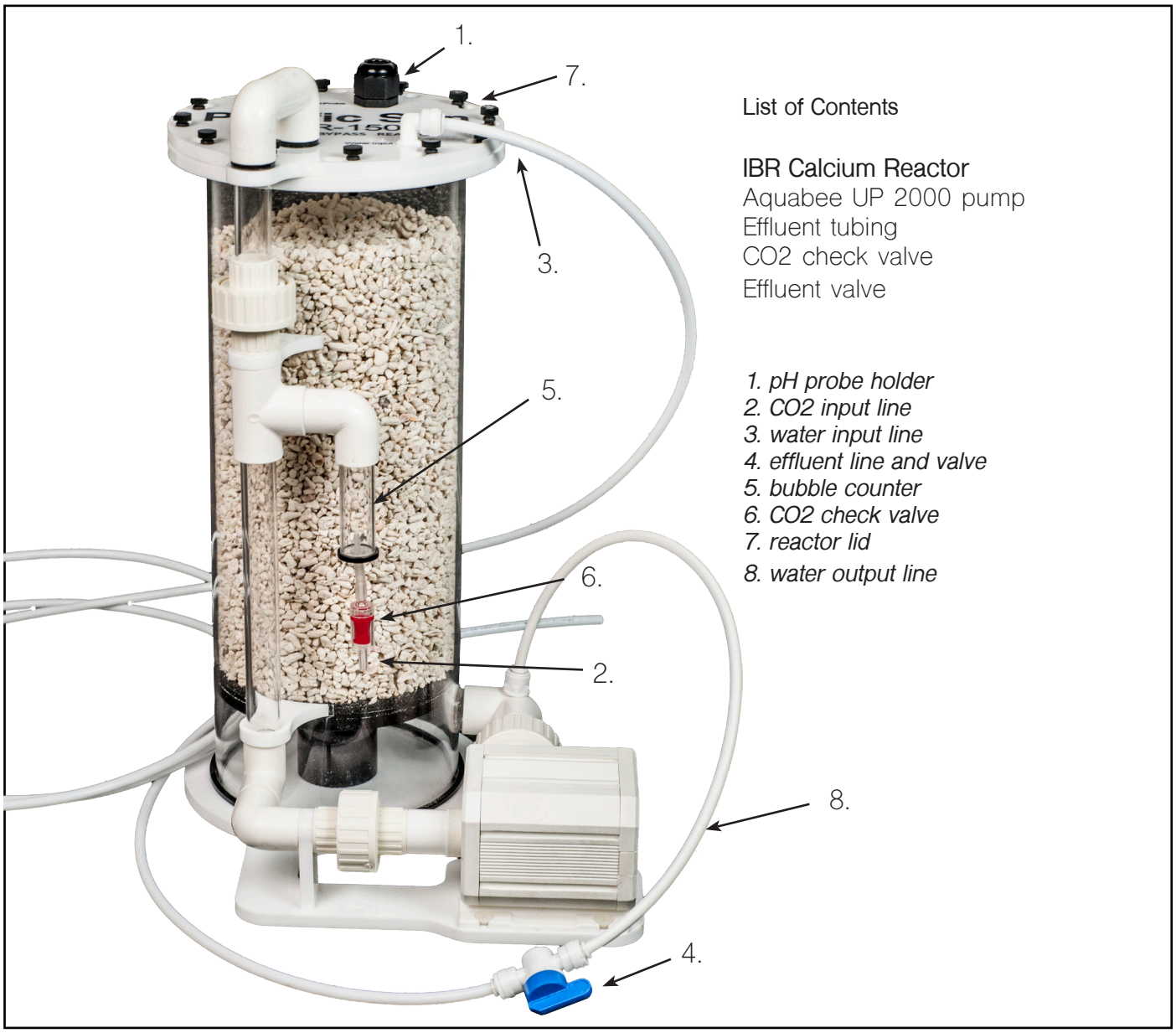
Model

IBR 150
IBR 200
IBR 250

Dear Customer,
Thank you for purchasing an Pacific Sun ***IBR Calcium Reactor****.*
With the purchase of this unit you have selected a top quality product. It has been specifically designed for aquaristic purposes and has been tested by experts. With this unit you are able to adjust the calcium level as well as the carbonate hardness in your seawater tank efficiently and to keep it on an optimum level.

For best results, please read through this instruction manual before installing the reactor on your system. During or after installation, do not hesitate to contact our technical support team at info@pacific-sun.eu if you have any questions about your new calcium reactor.

Pacific Sun Team



List of Contents

IBR Calcium Reactor
Aquabee UP 2000 pump
Effluent tubing
CO2 check valve
Effluent valve

1. pH probe holder
2. CO2 input line
3. water input line
4. effluent line and valve
5. bubble counter
6. CO2 check valve
7. reactor lid
8. water output line

We have included enough tubing for standard installations. If you require greater lengths of tubing, you can use standard 1/4" polyethylene tubing (RO tubing) supplied by your local hardware store.

Placement of the Reactor

Place the re
actor as close to your sump and CO2 tank as possible. The longer the tube length the longer it will take for adjustments to take effect. This makes adjusting a calcium reactor more difficult.

Technical data:

IBR-150 – fi150mm, total height 56cm. Media capacity: 7.0 liters. Foot print: 290x280mm.
Pump power: 10W. For aquariums up to 800 liters.
IBR-200 – fi200mm, total height 56cm. Media capacity: 12.5 liters. Foot print: 320x340mm.
Pump power: 10W. For aquariums up to 1200 liters.
IBR-250 - fi250mm, total height 56cm. Media capacity: 19.0 liters. Foot print: 380x380mm.
Pump power: 33W. For aquariums up to 2000 liters.

Things you will need to install, operate and tune in your reactor

Medium/Large grain reactor media (we recommend CaribSea ARM Coarse)
CO2 system complete with tank, regulator, needle valve and solenoid
pH meter, calcium and alkalinity test kits (recommend Salifert)

On the lid of reactor, is the water input connector, which can be fed by a variety of methods as detailed below:

a) Pressure feed - most recomended method
Water is taken directly from the aquarium or sump via a suitable pump
(we recommend the use of a precision constant flow pump such as a peristaltic pump for best results with a flow rate of around (20 – 80ml/min) and water is returned directly back to the aquarium / sump via the output from the reactor. This allows remote positioning of the unit at any height. Ensure that connections and hoses from the pump to the unit are suitable for the pressure developed.

b) Gravity feed
The unit can be operated on a siphon from the tank and into a sump thus negating the requirement for a separate powerhead or pump.
Important Note: If the unit is operated on a siphon (gravity feed) it is imperative that allowances are made in the positioning of the water inlet pipe from the tank, (i.e. only 1/4" below the water surface), so that in the case of a power or pump failure the volume of water that will continue to siphon will not overflow the free space in the sump before the siphon is broken.

c) Internal Bypass
IBR – the internal bypass enables using the overpressure/underpressure effect to feed the reactor precisely with the aquarium water.
The precision valve at the hose outlet (water output) enables wide adjustment of the water flow through the reactor so device may also be supplied with built-in internal bypass.
To do this, attach the end of the flexible hose (water inlet) to the dedicated holder and install the assembly at the edge of the sump/aquarium in such a way, that the ending of the hose was at least 6 cm above the water surface.
It is important to maintain fixed water level in the chamber, independently from the pump capacity/evaporated water volume.
If the reactor is in the sump, you can also use the dedicated bracket located outside the main reactor chamber, approx. 10 cm from the reactor base.

Drain volume adjustment
To adjust drain volume of the water passing the reactor, use the valve (no. 4, illustration on page 2)
To do this, attach the outlet hose end (water output line – no.8 at the illustration) to the dedicated holder, tighten the adjustment screw and adjust properly using the valve.
Using the measuring glass it is possible to measure drain rate from the reactor – insert the hose end (water outline) into an empty measuring glass and in specified period (ex. 60 seconds) collect the water coming out from the reactor.
Next multiply the result by 60 to determine the l/h rate for the reactor.

How Calcium Reactors Work

It is very important to maintain the proper amounts of calcium and alkalinity in a reef tank. Both can be quickly depleted by growing organisms, and need to be supplemented in order to maintain levels equivalent to natural sea water. A calcium carbonate reactor is the easiest and most accurate method of maintaining calcium and alkalinity.

A calcium reactor works by dissolving small amounts of solid calcium carbonate media into liquid form, which is then dosed back to the tank. The concentrated liquid that is added back to the tank contains the correct ratio of calcium to alkalinity, which is essential to maintain the proper balance of water chemistry. Unlike most additives or kalkwasser, a properly functioning calcium reactor should maintain the appropriate balance between calcium and alkalinity over the longterm.

The reactor is filled with calcium carbonate media (such as reef sand, shells, ready to use media like ARM from CaribSea etc.) and saltwater. We recommend a grain size from 10mm upwards as this creates a better flow and will avoid partial compression of the granules at bottom of reactor.

A small amount of carbon dioxide is added to the water inside the reactor, which lowers the pH to a range of 6.5–6.8. At such a low pH, the calcium media begins to dissolve, thereby releasing the calcium and alkalinity ions so that they can be dosed back to the aquarium.

This solution is very concentrated, so only a small amount of liquid, or effluent, needs to be dripped back to the aquarium.

Over time, both the calcium media and carbon dioxide gas will become depleted.

The rate of consumption will depend on your aquarium's calcium demand, but in most cases you can expect the reactor to work for several months without any major maintenance.

It is important to periodically check the CO2 input rate (measured in bubbles per minute) and the effluent drip rate, to make sure that everything is flowing smoothly. Also, it is critical that you test your aquarium's calcium and alkalinity levels with a reliable test kit on a regular basis.

Installation

Acceptable Range for Calcium and Alkalinity
2.5-4.0 meq/L (7-11 dKH) alkalinity and 375-450 ppm calcium
Do not proceed if your results fall outside this range!

Step 1: *Thoroughly rinse the calcium reactor to remove any dust or fabrication debris. Before the first use wash the media thoroughly with fresh water to remove any fine dust. The water will then run clear when placed in the reactor.*

Step 2: *Loosen the screws that hold the cover of the reactor thab turn the lid of the calcium reactor clockwise. Fill the calcium reactor with the rinsed media, leaving approximately 3" of space from the top of the calcium reactor.*

Re-attach the lid, rotating anticlockwise, having first checked that the silicone O-ring is in position on the end of the reactor vessel than tighten the screws.

Step 3: *Connect the additional CO2 equipment as shown on the diagram overleaf and position calcium reactor. Connect water inline tubing, water output tubing to reactor and mount to sump wall using dedicated holder(be sure that water output/input is below water surface)*

Step 4: *Having successfully positioned, added media and supplied water to the calcium reactor we can now open the inlet tap fully to begin with and wait for the reactor to fill. Check again for leaks to ensure that the lid had been fully tightened. Wait till reactor is fully filled with water.*

Step 5:

Start Up Reactor - without pH probe(for advanced users)

1. Ensure effluent valve is open (vertical position).
2. Plug in the Aquabee pump. Adjust effluent valve to achieve a broken stream.
3. The CO2 can now be switched on. Refer to the manufacturers operating instructions supplied with the CO2 and regulator. Please make sure all CO2 connections are gas tight, so there are no CO2 leaks. Set the CO2 rate to one bubble per second as observed in the bubble counter and leave the system to run for 6 to 7 hours. After this period the pH of the water coming out of the calcium reactor should be measured with a suitable test kit. An initial target of 6.5 – 6.7 is recommended or follow media manufacturer's instructions.
If the reading is higher, then the CO2 flow rate should be increased slightly
or the water flow rate through the reactor decreased until the desired measurement is achieved. Conversely if the reading is too low then the volume of CO2 should be reduced or the water flow rate increased.
Important note: Do not restrict or block the outlet from the reactor to the sump/tank. Make only small adjustments one at a time and allow at least 6 – 7 hours for the change to be observed.
4. After 24 hours in operation, the effluent should be 20-36 dKH. The calcium in the aquarium should be between 400-500ppm and the dKH should be 8-12.
5. Please check the aquarium carbonate hardness (kH or dkH) daily for at least the first week. During the 1st week the reactor is "running in" and the output from the reactor can vary, affecting the carbonate hardness. This is due to the fact that after a period of time the media dissolves quicker, because the media surface is cleaned of fine particles and thus increases the effective reaction area.

Using a pH controller with IBR calcium reactor.

A pH controller can be used in conjunction with your IBR calcium reactor to regulate the flow of CO2 gas into the reaction chamber keeping the ef uent pH at your pre-set level.
Things you will need to install a pH controller.
- *pH controller with probe*
- *Electronic solenoid valve (normally built into the CO2 regulator)*

- *Teflon tape*

Installing the pH controller

1. With flow of water to reactor OFF remove the threaded plug located on the lid of the reactor.
2. Install the pH probe in place of the threaded plug. You will need to apply a few wraps of teflon tape to the thread of the adapter before installing. Thread the adapter in hand tight plus one half turn.
3. Loosen the compression nut on the adapter and insert the calibrated pH probe(calibrate your probe per manufacturer's instructions before installing into reactor.). Tighten the compression nut hand tight.
4. Plug the electronic solenoid into the pH controller. Set controller per manufacturers instructions.
5. Start your reactor.

You will now use the controller to regulate the flow of CO2 gas into the reaction chamber. When the pH in the chamber rises above your pre set level the controller will trigger your solenoid to open, allowing the ow of gas. Once your target pH value is reaches the controller will close the electronic solenoid shutting off the ow of gas. You will need to set the CO2 needle valve to allow gas to bubble through the counter with the solenoid is open. Bubbling gas too slow and your target pH will not be reached, the solenoid will never close. Bubbling gas too fast (needle valve wide open) will allow excessive gas to enter the reaction chamber, overpowering the ef uent drip rate and stopping ow. There is a wide range in-between too fast and too slow. Try setting the BPM around 90 as a starting point.

SAFETY INFORMATION

• The reactor unit should not be run 24-7 on small tanks (due to the pH lowering effects of a calcium reactor). To obtain the best results run the unit for 8 -10 hours per day. The reactor should start to run 4 hours after the lights have come on. This will enable the highest pH to be maintained within the aquarium.
• If the reactor is running at maximum capacity then to reduce the likelihood of carry over of excess CO2 into the tank run the outlet through a further cup of reactor media to degas the water before it returns to the tank.
• Use equipment only for its intended use.
• Do not install outdoors or near sources of extreme heat. Avoid exposure to UV.
• Install out of the reach of children - special attention should be given to ensure children cannot access the CO2.
• Check the reactor every 3 months, or at least when refilling. It is recommended to check the reactor output flow rate and pH on a weekly basis.
• Use media with a grain size of at least 10 mm, and preferably 12-15 mm or larger. This ensures optimum flow behavior.
• Media contains CO2 insoluble compounds and over time these will collect as "sludge" on the bottom of the reactor and should be removed at regular cleaning intervals.
• Use only the original tubing of the reactor (genio-system silicon tube). Normal PVC hoses become brittle when exposed to acidic water and CO2.
• Regularly check the circulation pump and impeller. To do this, drain the reactor and disconnect all cables. The pump motor can easily be removed from the impeller housing by twisting in an anti clockwise direction.

TROUBLE SHOOTING

Circulation pump not running
(no water circulation in the reactor):
• Air lock in reactor – turn off circulation pump than release gas build up by loosening gas collection trap screw. Before turning pump on, completely refill reactor with water.
• Check the CO2 supply rate.
• Check impeller not jammed with media/sludge.

Circulation pump is too hot during operation:
• See above.

Circulation pump rattles:
• Remove the circulation pump motor.
• Clean any granular particles or debris.

Discharge from the reactor is too low:
• Check flow in and flow out for blockages - replace the hoses if necessary.
No bubbles in the bubble counter:
• Check the CO2 bottle is not empty.
• Check supply hoses for leaks.