

Operation Manuel for the
 **AQUA MEDIC**

Calcium reactor
closed version

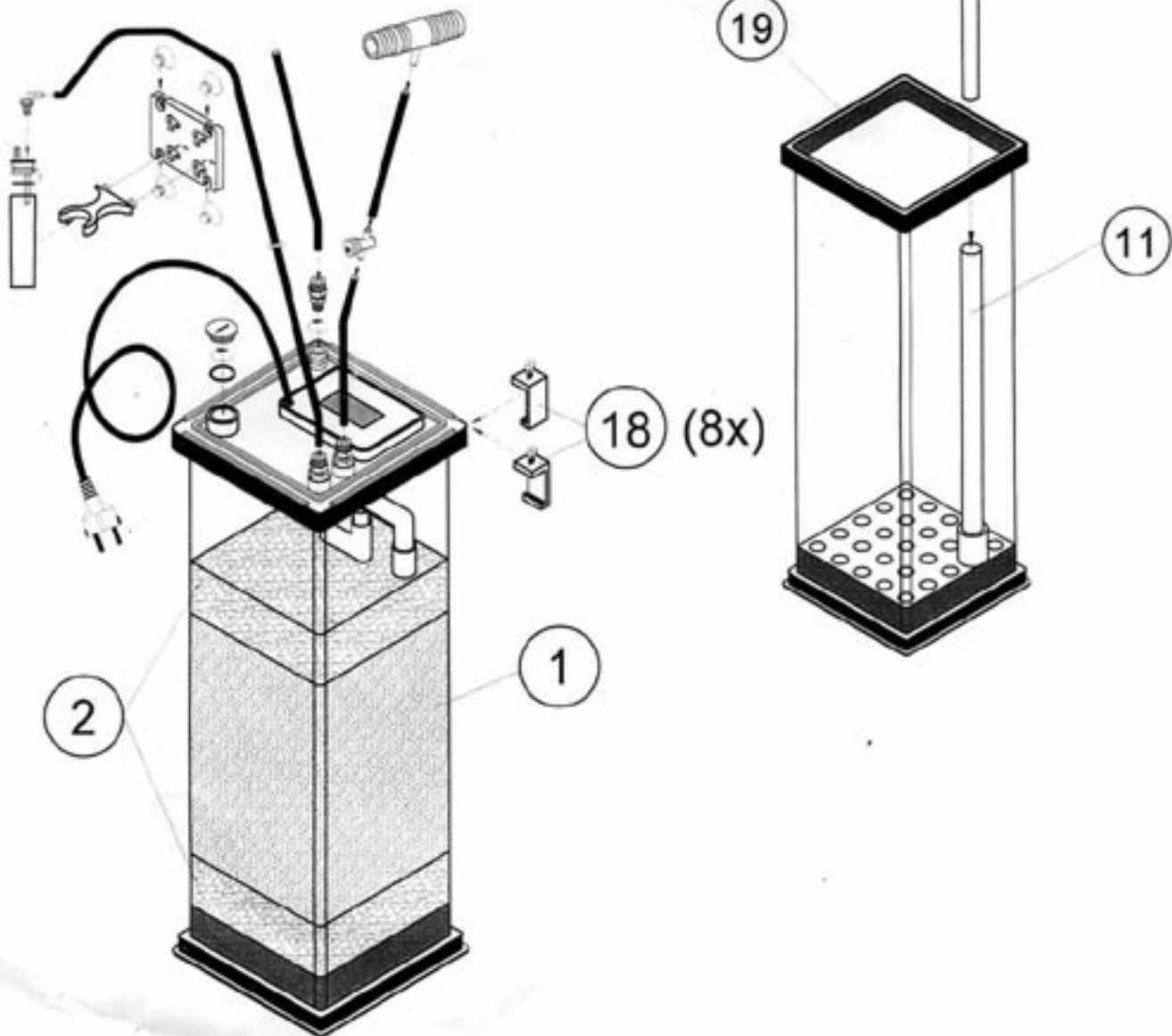
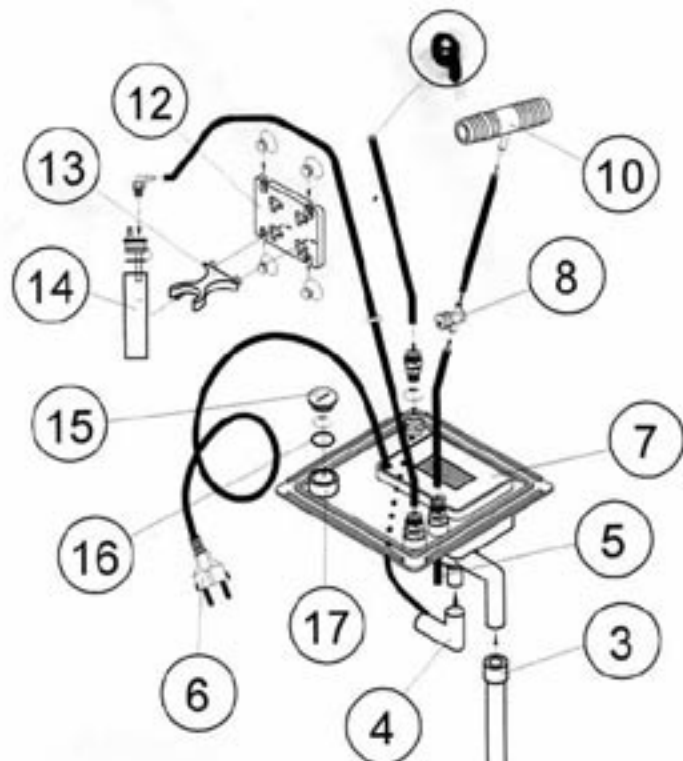
Filter for the adjustment of a natural equilibrium between calcium and carbonic acid in aquaria. For seawater aquaria from 200 up to 1000 l.

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.

Fig 1: Calcium reactor, closed version

Hydrocarbonate

- 2. filter sponge
- 3. /11 pressure tube
- 4. elbow for CO₂ supply
- 5. water inlet
- 6. power plug
- 7. circulation pump (300 l/h)
- 8. adjustment valve
- 9. CO₂ inlet
- 10. T- piece with connection for 4/6 mm tube
- 12/13. Holding plate with clamp for drip counter
- 14. drip counter
- 15. cap with thread 13,5 for conection of a pH electrode
- 16. O-ring
- 17. port with thread PG13,5
- 18. clamps
- 19. sealing



1. Product description

The **DO AQUA MEDIC** Calcium reactor (closed version) consists of the following parts:

- the reaction vessel (height: 50 cm, volume approx. 10 l),
- Filling with **DO AQUA MEDIC** Hydrocarbonate, fine grain.

The water in- and outflow for connection to a 6/4 mm air tube, the circulation pump and the injection port for CO₂ are placed in the top of the filter.

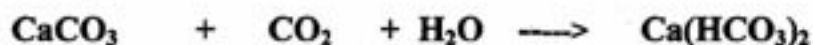
2. Theory

The equilibrium between calcium and carbonic acid in a seawater aquarium is destroyed due to the biological activity of the animals. For the construction of their calcareous skeletons they take calciumcarbonate out of the water. As a result, it comes to a lack of calcium and an increase of the pH value.

The **DO AQUA MEDIC** Calcium reactor is a module for the adjustment of the natural equilibrium between calcium and carbonic acid in the aquarium. It is filled with Hydrocarbonate, a highly purified calciumcarbonate. Because this calciumcarbonate is not soluble at pH values common in seawater tanks, it is necessary to blow carbonic acid into the reactor. This results in a local drop of the pH value and simultaneously to the dissolving of calciumbicarbonate.

To avoid an overdosage, the addition of carbonic acid can be controlled by use of a pH Controller. This method does not change the pH value of the aquarium water.

Chemical reaction



Calciumcarbonate + Carbonic acid + Water \longrightarrow Calciumbicarbonate

This reaction only takes place at neutral resp. acidic pH values. At pH 8.2, calciumcarbonate is not soluble.

Calciumbicarbonate is easily soluble. It can be directly taken up by animals and plants and integrated into their skeletons. By doing this, calciumbicarbonate is changed back to calciumcarbonate. During this back reaction CO₂ is released which is used by Zooxanthellae for photosynthesis.

3. Working principle

Water enters the calcium reactor from the top. The flow rate should be adjusted between 1 and 2 l/h. The circulation pump that is placed in the top of the reactor, circulates the water internally. The CO₂ is connected at the injection port on top of the reactor. The pump sucks on CO₂. Through the rotation of the patented **DO AQUA MEDIC Needle Wheel** the CO₂ will be completely dissolved in the water. Then the CO₂ enriched water is pumped below the Hydrocarbonate and finally circulated. Thereby, calciumbicarbonate is extracted from the Hydrocarbonate. This is exactly the combination which corals need for their growth.

The outflow is located in the top of the filter. From here the water flows into the aquarium or back to the filter tank. The carbonic acid can be added from a pressure bottle.

4. Set-up

This version of the *Calcium reactor* is a closed system. The reactor can be installed below the aquarium from where the water can flow into a filter chamber or back into the aquarium.

Water inflow:

From the circulation pump which pumps the filtered water back into the aquarium, a bypass is performed to the water inlet of the *Calcium reactor* with a 6 mm pipe. The inflowing water quantity has to be adjusted in a way that approx. 1-2l/h (1-2 drops/sec) flows through the 6 mm pipe into the reactor. The adjustment and the quantity of CO₂ depends on the aquarium size and the calcium requirements of the animals. The quantity of calcium can be adjusted via a bubble counter (not included).

5. Starting

As soon as the *Calcium reactor* is placed in the right position and all connections are ready, The water flow can be started. Filled the reactor up with water until water comes out of the outlet.

If the *Calcium reactor* is placed beside the filter tank or above the aquarium, all connections as well as the reactor must be checked for tightness. The CO₂ can then be switched on. The quantity of CO₂ has to be adjusted so that the pH value in the aquarium does not drop below pH 8.0. Within the reactor itself, the pH value should drop to pH 6.5. It is possible to control the pH value in the reactor: in the top are holes to put in a pH electrode.

It is ideal to use a pH-Controller with magnetic valve, e.g. an **DO AQUA MEDIC pH 2001 C**, to adjust the pH value in the aquarium reliable. The value should be adjusted between 8.0 and 8.2, depending on the calcium demand of the animals. The back flow of the calciumbicarbonate enriched water into either the aquarium or the filter tank should be directed to a well flushed place in order to mix it immediately with the aquarium water. This avoids instabilities of the pH value.

Because of the limited water flow through the *Calcium reactor*, the pH lowering in the aquarium is only minimal. It will be sufficient to check the pH value in the tank occasionally and to refrain from a continuous adjustment.

6. Maintenance

The **DO AQUA MEDIC Hydrocarbonate** is consumed by the chemical reaction and has to be refilled from time to time. Every 2 years it should be replaced completely. Also the flow rate should be checked regularly. It has to be re-adjusted with a drop counter. In case of polluted water the adjustment valve in the water inflow has to be cleaned from time to time.

7. Warranty

DO AQUA MEDIC GmbH guarantee 12 months from the date of purchase on production and material defects. Further claims and claims resulting from improper use are excluded.

Operation manual for the



Electro-magnetic valve (Solenoid valve)

- for the control of the CO₂- addition to aquariums
- for the control of reverse osmosis systems

The **DO AQUA MEDIC CO₂ - solenoid valve** is a product of highest quality, safe and reliable for more pleasure with your aquarium. A time dependant CO₂ – intake can be realised using a timer together with this valve.

The solenoid valve may also be monitored via a pH controller to achieve a maximum degree of comfort with ideal carbon dioxide provision at all times.

Technical specifications:

Function	2/2 directions, non-current carrying connection
Material	brass, chrome plated