

Operation manual GB



6-stage water treatment system for reef aquaria up to 1500 l.

With the purchase of this filtration system, you have selected a top quality product. It has been specifically designed for aquaristic purposes and has been tested by professionals.

With this unit - if used correctly - you are able to reduce organic substances and other pollutants of your aquarium water to non-toxic levels.

The filtration system consists of two mechanical pre-filters, a motor driven protein skimmer with post-switched trickling filters, an anaerobic denitrifying filter, a Calcium reactor and an automatic water refilling device.

The filtration system **Reef 2000** convinces by its compact and functional design and its clear arrangement.

1. Product description

The outside filtration system **Reef 2000** is placed in a separate glass tank. The skimmer **Turboflotor 5000 Shorty Compact** and both return pumps are placed next to the glass tank.

The dimensions over all are 155 x 45 x 62 cm (L x W x H).

The system consists of the following components:

1. Glass tank, the dimensions are: 90 x 45 x 40 cm (L x W x H).
2. Protein skimmer **Turboflotor 5000 Shorty Compact** with post-switched mechanical filter (sponge) and biological wet/dry trickle filter, filled with **Bactoballs**.
3. Second mechanic pre-filter sponge with smaller post-switched wet/dry trickle filter, filled with **Bactoballs**.
4. **Nitratereducator NR 1000** with integrated circulation pump.
5. **Calciumreactor KR 1000** with integrated circulation pump.
6. 2 pcs. circulation pump **Ocean Runner OR 3500**.
7. **Refill pump SP 3000**, with level sensor.
8. Top-up tank with hose connection for completing evaporated water.

2. General description of the system

The water flows out of the aquarium via overflow chamber or another overflow device (e. g. an AB Aqua Medic **Overflow Box**) into the filter. The water flow is divided at a T-piece. One part is directed to the Turboflotor Shorty Compact, the rest flows directly through a mechanic sponge filter to the wet/dry biological filter. The water flow between skimmer and biofilter can be adjusted with 2 ball valves. From the protein skimmer, the water flows to a second smaller but similar built unit of mechanic filter and wet/dry biofilter. From the biofilters, the water flows into the filter sump.

The **Nitratereducator** and **Calciumreactor** are supplied with water via a bypass. This water is taken from the pressure tube which pumps the purified water upwards back to the tank. To facilitate the water supply for these filters, a dosing pump (SP 3000) may be used.

The top-up tank with re-fill water is placed inside the filter sump on a plastic base. The refill (peristaltic pump SP 3000) is supplied with a level sensor. It should be placed above the storage tank. The level sensor is fixed in the tank of the filter and marks the optimum water level in the filter sump.

During installation of the pumps and plumbing, it has to be ensured that no resonance bodies are created because these may cause - depending on the type of pumps used - nasty noises.

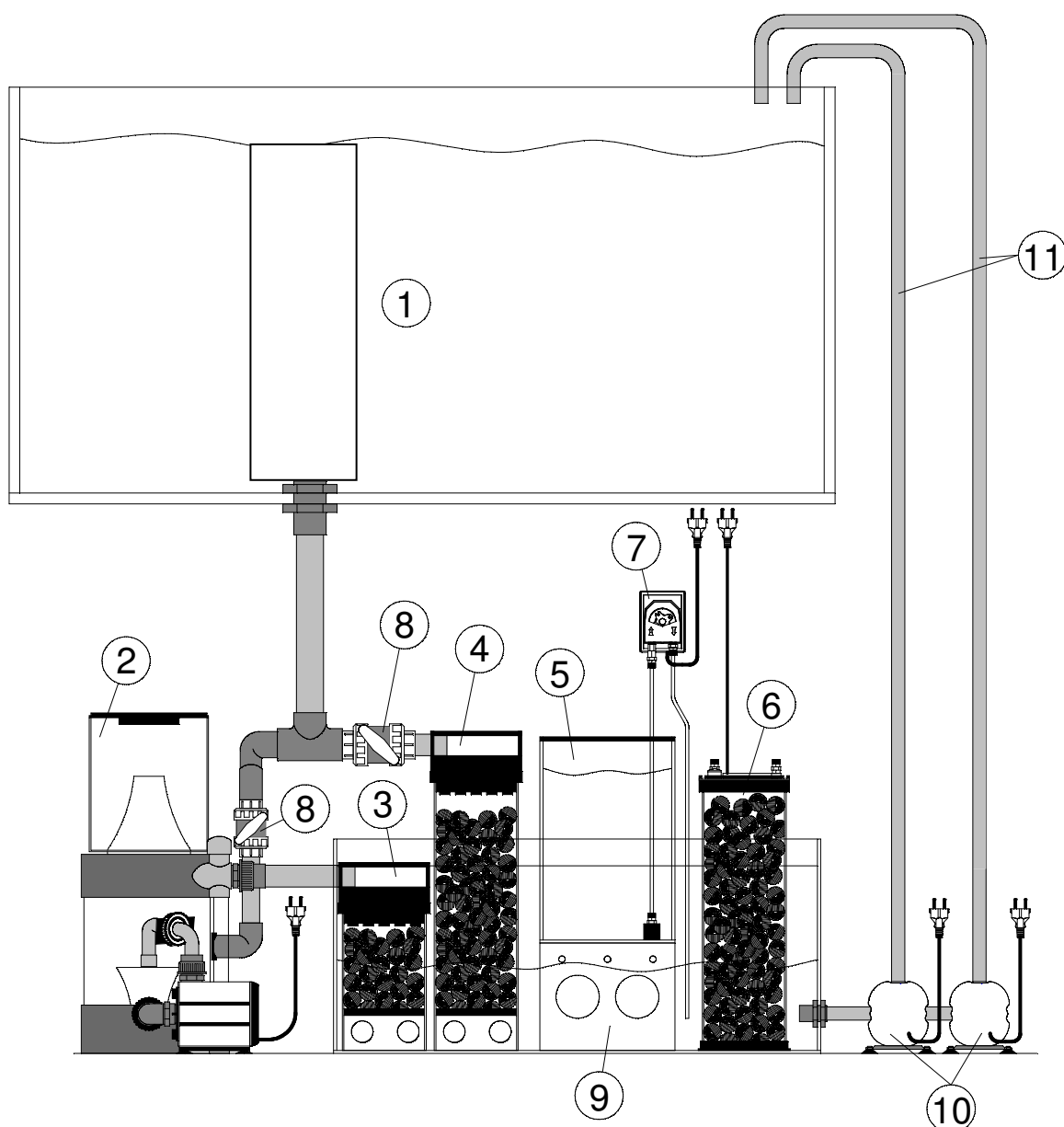


Fig.: Filtration system Reef 2000 with aquarium

1. Aquarium with overflow chamber
2. Turboflotor 5000 Shorty Compact
3. Trickle filter at the outlet of the Turboflotor (2 pcs. 15 x 15 cm)
4. Trickle filter, bypass to Turboflotor (2 pcs. 15 x 15 cm)
5. Re-fill tank with hose connection
6. Nitrareductor (Calcium reactor is hidden behind)
7. Peristaltic pump SP 3000 with level sensor as re-fill pump
8. 2 ball valves for adjustment of water flow between Turboflotor and trickle filter
9. Filter tank, water level shown
10. 2 pcs. return pumps OR 3500
11. Pressure lines, back to the aquarium

3. Set-up of the filter

The outside filtration system **Reef 2000** is supplied in a ready-to-use-condition in a glass tank. This tank has the dimensions 90 x 45 x 40 cm .

It can be placed in the cabinet of all standard aquaria. Because it is an open system, it should be taken care that the cabinet is a water-proof system.

Inflow to the filter:

The plumbing from aquarium to the filter should be performed with a PVC-pipe or a flexible tube of 50 mm (2") diameter. The connection to the filter system is a screw connection for 50 mm pipes (included). At this position, the system can easily be disconnected.

It may be useful to install a ball valve between tank and filter to avoid following water drops during the disconnection.

Suction pipe of the pump:

The pumps should be placed aside the filter tank. The suction pipe for the pump is performed with a PVC pipe of 32 mm (1.25 inch). Also here, it is useful to install a ball valve between filter tank and pump because the pump can easier be removed for maintenance purposes.

Pressure pipe:

The pressure pipes of both pumps are performed - according to their capacity- with a flexible tube or with a PVC pipe of 25 mm diameter. In each case, a junction in one pressure pipe has to be performed to supply the **Calciumreactor** and **Nitratereducter** with water. It is advisable to perform at least one part of the pressure pipe with a flexible tube (PVC silicone) to avoid vibrations. This eliminates the transfer of vibrations from pump to aquarium and consequential noises.

Circulation pump:

The filter system is equipped with 2 pump suction openings for 2 circulation pumps, model Ocean Runner 3500. The use of 2 pumps ensures the operation of the system in case of a failure of one pump. Of course, also the filter can be pursued with a pump. This should have a capacity of 3,500 l/h minimum. Otherwise, the **Turboflotor** will not work perfectly.

4. Water reservoir - Water level in the filter tank

All open filter systems have to be planned in a way that in case of a circulation pump failure they can take up water flowing back from the aquarium without creating an overflow. The volume of water is depending on the construction of the overflow device, pump capacity, circulation pump and aquarium surface. The water volume can be calculated by taking the aquarium surface (length x width) and the build-up above the overflow level resp. overflow comb. In most cases, the build-up is 2 - 3 cm.

During normal operation, the filter tank can only be filled to a height that this water volume is taken up in case of emergency. The minimum water level is determined through the height of the pump suction opening. It has to be made sure that the pump does not suck any air. Otherwise, fine air bubbles are blown into the water which create a lot of slurp noises. If the pump runs dry, it may get damaged irreversibly. The water which evaporates within the aquarium, is only missed in the filter chamber - in the aquarium itself, the water level will be maintained. For this reason, the water level has to be controlled and replenished regularly. The re-filling can be made easier by using the automatic top up system (peristaltic pump SP 3000 with level sensor and re-fill tank) in order to keep the water level constant. Nevertheless, it is suitable to mark minimum and maximum levels directly at the tank.

We recommend to use only pre-treated tap water (reverse osmosis) for re-filling.

Large aquaria - equilibration tank:

If the reserve volume of the filter tank is not sufficient with large aquaria to take up water during a pump failure, an equilibrium tank has to be added. Possibly, you can get an appropriate tank from your local aquarium manufacturer. This tank has to be fixed at the filter tank with a pipe connection. The circulation pump sucks water from the equilibration tank and pumps it into the aquarium.

5. Automatic top-up system

The Reef 2000 is supplied with an automatic top-up system. The storage tank (5) is filled with pre-treated tap water (reverse osmose). The tank can be re-filled during operation without opening the lid. At the right side, there is a hole for the included bulkhead fitting and hose connector. The water can be filled by a hose and help of a pump or from a bucket.

The level sensor that is connected to the peristaltic pump is fixed in the filter tank with the rubber succers. The height where it is fixed depends on the aquarium (see item 4 water level). The sensor has to be fixed as low as possible, but minimum in a height that the pumps do not suck in air or run dry, and maximum in a height that the filter tank can take water flowing back from the aquarium when the pumps are shut off.

To prevent any accidents, the rubber succers of the level sensors can be glued to the filter tank with a drop of silicone – once the optimum position has been determined.

6. Installation of the filter

When the plumbing is finished and all joins are dry, the system is ready to use. The following points should be checked:

- Are all unions tight? Maybe, they have to be tightened. Check for leaks.
- Is the water distribution between trickle filter and **Turboflotor** ok, so the skimmer operates perfectly.
- The pumps at the **Calciumreactor** and the **Nitratereductor** must be filled completely with water before they are taken into operation.

7. Warranty

Should any defect in material or workmanship be found within twelve months of the date of purchase AB Aqua Medic GmbH undertakes to repair or, at our option, replace the defective part free of charge – always provided the product has been installed correctly, is used for the purpose that was intended by us, is used in accordance with the operating instructions and is returned to us carriage paid. The warranty term is not applicable on the all consumable products.

Proof of Purchase is required by presentation of an original invoice or receipt indicating the dealer's name, the model number and date of purchase, or a Guarantee Card if appropriate. This warranty may not apply if any model or production number has been altered, deleted or removed, unauthorised persons or organisations have executed repairs, modifications or alterations, or damage is caused by accident, misuse or neglect.

We regret we are unable to accept any liability for any consequential loss.

Please note that the product is not defective under the terms of this warranty where the product, or any of its component parts, was not originally designed and / or manufactured for the market in which it is used.

These statements do not affect your statutory rights as a customer.

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Before calling your dealer please ensure you have read and understood the operating instructions. If you have any questions your dealer cannot answer please contact us.

Our policy is one of continual technical improvement and we reserve the right to modify and adjust the specification of our products without prior notification.

AB AQUA MEDIC GmbH - Gewerbepark 24 - 49143 Bissendorf/Germany

- Technical changes reserved – 08/2010

Operation Manual GB



Protein skimmer for aquariums up to 1,500 litres (400 Gallons)

Powerful skimmer for in-cabinet installation.

With the purchase of this protein skimmer, you have selected a top quality product. It has been specifically designed for aquarium use and tested by professionals.

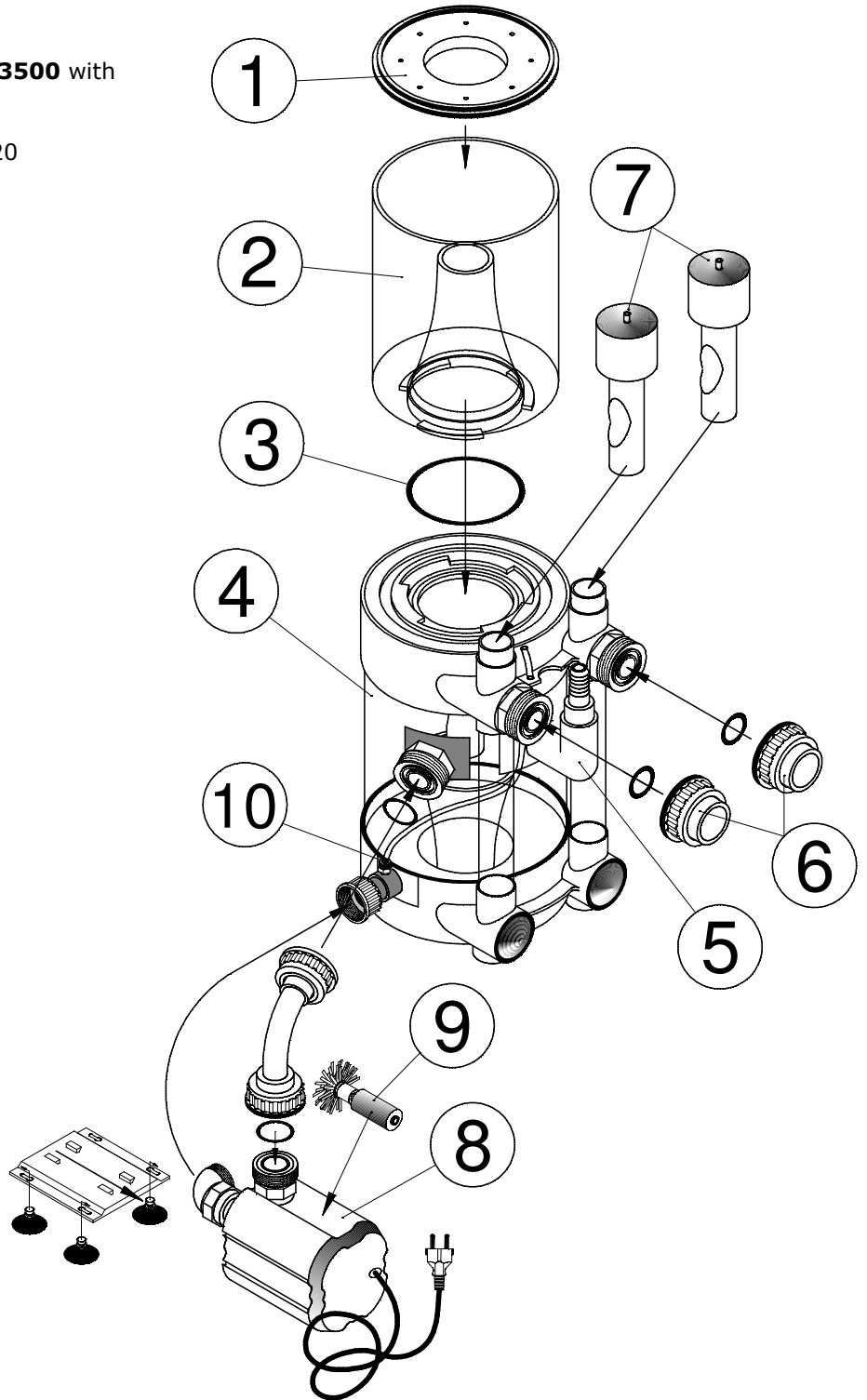
This unit will effectively remove organic substances from your aquarium water.

1. Product description

The **Turboflotor 5000 Shorty Compact** consists of:

- Reaction pipe, 200 mm (8 inch) diameter and bayonet socket
- Conical collection cup
- Venturi pump **OCEAN RUNNER 3500** with AB Aqua Medic needle wheel
- Two large outlet ports (40 mm)
- Inlet with hose connection 22 x 20
- Air tube for venturi pump

1. Top lid
2. Foam cup
3. O-ring
4. Reaction pipe
5. Water inlet
6. Outlet fittings
7. Adjustment valves
8. Venturi pump
9. Needle wheel impeller
10. Air injection nozzle with connection for air tube



Type	Outlet height	Total height	Venturi pump	Power consumption	Capacity
Turboflotor 5000 SHORTY COMPACT	30.5 cm (12")	62 cm (25")	OCEAN RUNNER 3500 with needle wheel	65 Watts	up to 1,500 400 Gallons

2. Principle of Operation

The aquarium water is pumped to the skimmer using a separate pump (not included in delivery) which should have a capacity of approx. 2,000 - 4,000 litres/hour. The relative positions of the inlet and outlet ports ensures the maximum contact time of air bubbles in the counter-current. If the SHORTY COMPACT is mounted in the cabinet, it can be supplied with water directly from the overflow of the aquarium. In this case, a bypass should be installed so the volume of water can be adjusted.

The venturi pump draws water from the skimmer and mixes it with air. Within the pump housing, the bubbles are cut into very fine pieces by the AB Aqua Medic needle wheel. The air/water mixture is pumped back into the skimmer.

The treated water flows out of the bottom of the skimmer and is pumped through the two transparent pipes positioned outside the skimmer back into the aquarium or filter sump.

3. Installation

- Check that the sealing rings for the unions are in place.
- Slot the holding plate for the venturi pump to one side of the skimmer. Push pump on to the holding plate and connect the pump to its union.
The PVC air tube should be fed so that the end is higher than the water level in the skimmer. **This air tube must not hang down.** It should only be out just 5 cm at the top.
Connect the bottom end of the tube to the air intake of the pump.
- The water inlet is located at the same side as the outlet pipes. Attach the union and hose tail (20 mm).
- We recommend a pump with a capacity of 2,000 to 4,000 litres/hour for the water supply or direct connection to the aquarium overflow.
- Fit the rubber sealing ring for the bayonet socket of the reaction pipe.
Push foam cup into its seating and turn it to lock.

The drain from the skimmer has to run freely into the aquarium. A PVC pipe (40 mm dia) can be glued into the drain ports. It is possible to let both drains flow into one pipe but the diameter of the pipe must not be reduced. If the drains are left separate, a reduction in pipe size to 32 mm is possible.

The skimmer can now be filled by pumping directly from the aquarium. Ensure that the water level of the aquarium is not lowered too much. As soon as the water level in the skimmer reaches the height of the venturi pumps, these pumps should be started.

Top up with sea water as necessary.

After first use or after cleaning the skimmer, it takes some time for the initial foam to build up in the reaction pipe of the collection cup. This is because the cleaned acrylic initially reacts with water until a build up of fatty acids naturally takes place.

After approx. 24 hours, the foam should be pushed slowly and evenly into the collection cup. The quantity of liquid and organic substances depends on the pollution of the aquarium.

4. Maintenance

- **Collection cup:** Depending on the organic load, the cup should be cleaned daily to weekly.
Reaction pipe: This only needs occasional cleaning. We recommend intervals from 6 to 12 months.
- **Venturi pump:** The maintenance of the pump should be done at the same time as the reaction pipe:
Drain the water out and dismantle the pump. Flush the pump housing and needle wheel with clean water.
The same should be done with the **air injection nozzle**.

5. Failures

Failures may arise if:

- the ratio between supplied air and water volume is not correct.

Cause:

The air injection nozzle is clogged or the pump chamber containing the needle wheel is dirty.

Action:

Dismantle venturi pump, clean it thoroughly, carefully clean the air injection nozzle with a thin brush or blunt instrument and re-assemble the pump again.

- the venturi pump does not re-start after an interruption of power supply.

Cause:

The water pressure is too high.

Action:

Let the water out up to the height of the pump to lower the water pressure.
Re-start the pump.

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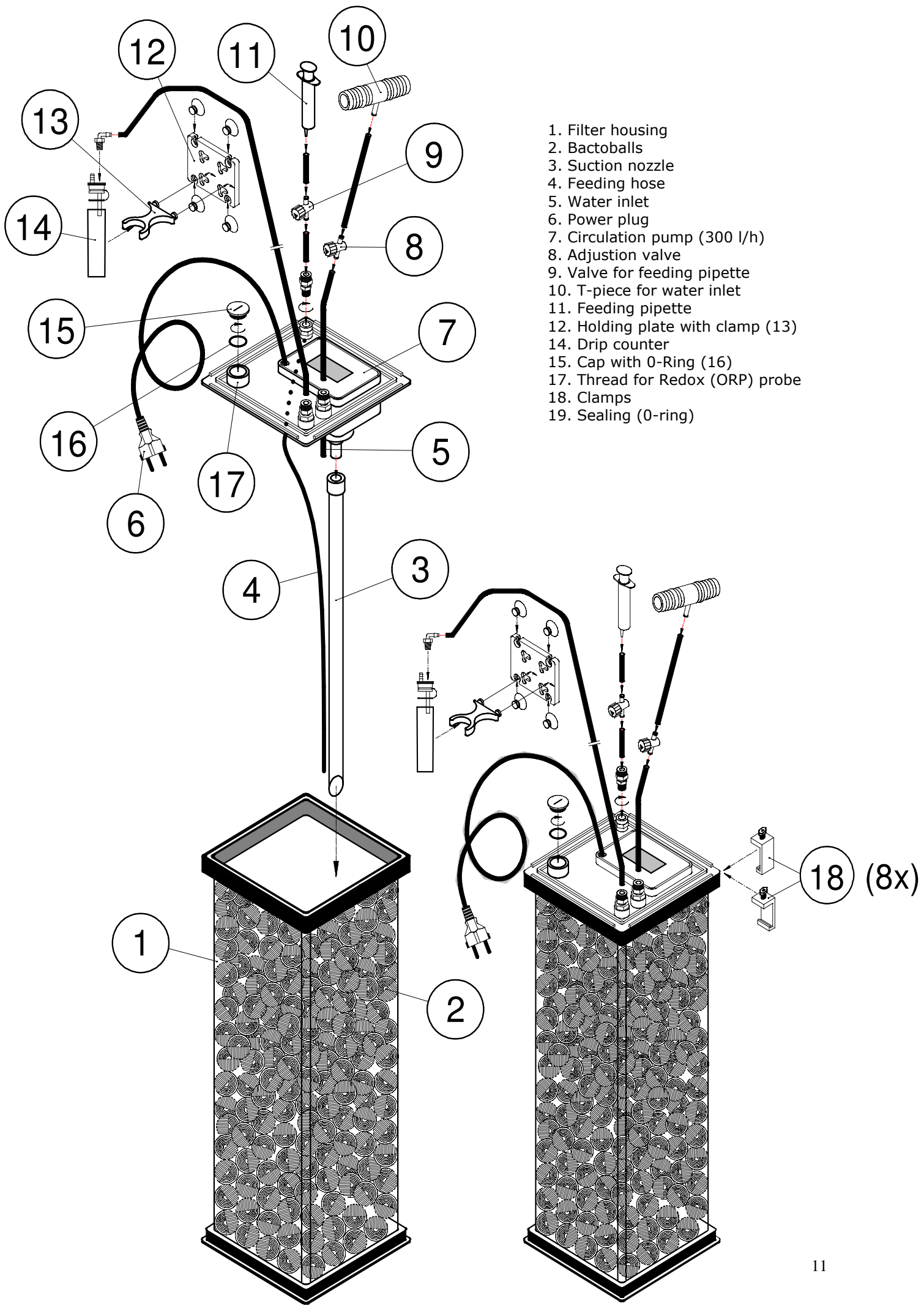
Operation Manual GB



Denitrifying filter for fresh and sea water aquaria from 200 up to 1,000 l .

With the purchase of this Nitratereducator, you have selected a top quality product. It has been specifically designed for aquaristic purposes and has been tested by professionals.

With this unit, you are able to reduce the nitrate concentration of your aquarium water efficiently to a harmless level.



1. Filter housing
2. Bactoballs
3. Suction nozzle
4. Feeding hose
5. Water inlet
6. Power plug
7. Circulation pump (300 l/h)
8. Adjustment valve
9. Valve for feeding pipette
10. T-piece for water inlet
11. Feeding pipette
12. Holding plate with clamp (13)
14. Drip counter
15. Cap with O-Ring (16)
17. Thread for Redox (ORP) probe
18. Clamps
19. Sealing (O-ring)

1. Product description

The AB Aqua Medic **Nitratereducator** consists of the reaction vessel (height = 50 cm, volume approx. 10 l).

The reaction vessel is filled with AB Aqua Medic **Bactoballs**. In the top of the filter, the circulation pump (capacity of 300 l/h) is placed.

One can with **Denimar -Powder** to feed the bacteria is included.

2. Theory

Nitrate is coming into the aquarium via 2 different ways:

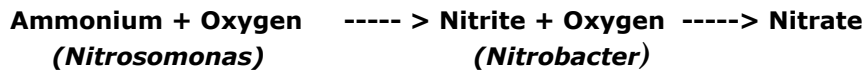
- with the tap water, with every water change or with the replacement of evaporated water
- by biological reactions in the aquarium

These biological reactions are responsible for the farmost biggest part of the increase of the nitrate level.

How is nitrate produced in the aquarium?

When the animals are fed with dried, living or frozen food, proteinaceous substances get into the aquarium. These are the basics of the diet for the animals. A big part of the nitrogen from the food is, however, excreted into the water. This nitrogen is metabolized by bacteria living in the aerobic filter via the toxic intermediate substances ammonium and nitrite to the less toxic nitrate. These biochemical reactions take place in the presence of oxygen:

The bacterium *Nitrosomonas* oxydizes Ammonia to Nitrite, the bacterium *Nitrobacter* the Nitrite to Nitrate.



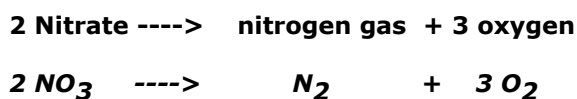
In most aquaria, nitrate is the endproduct of bacterial metabolism and accumulates in the water. Only higher water plants and algae are able to remove this nitrate from the aquarium water.

What is the effect of nitrate in the aquarium?

1. Overfertilization/eutrophication: The aquarium is overfertilized, the algae growth increases and cannot be controlled anymore.
2. Toxic effects to the animals: Many invertebrate animals in sea water tanks are very sensitive to higher nitrate levels.

3. Working principle of the **Nitratereducator**

In the AB Aqua Medic **Nitratereducator** the water is treated anaerobically. In the absence of oxygen, many bacteria are able to use nitrate as a substitute for oxygen for their metabolism.



The oxygen is used for the metabolism, the nitrogen is excreted into the water. Nitrogen gas is a natural compound of the water and totally harmless.

It is, however, necessary to increase the metabolism of the bacteria so that they can reduce enough nitrate. For this reason, the nitrate removing bacteria have to be fed with organic substances. The tablet feed **Denimar** contains organic substances that can be used completely by the bacteria. The only waste product is CO₂.

In the **Nitratereducator**, either **Denimar** or **Deniballs** can be used for feeding.

The flow rate through the **Nitratereducator** is very slow. This is a main difference to other aquarium filters where the water is often treated once per hour or even more often. The water in the **Nitratereducator** should have a retention time of at least 4 hours. It is, however, sufficient to treat it once per week. If the filter is adjusted correctly, the water leaves the filter nearly free of nitrite and nitrate.

4. Description of the **Nitratereducator**

The AB Aqua Medic **Nitratereducator** consists of a reaction vessel (1) of 10 l volume. To provide surface material for bacteria, the filter is filled with AB Aqua Medic **Bactoballs (2)**. They create an ideal microclimate for denitrification.

To avoid dead zones, the water is recirculated internally in the **Nitratereducator**. A recirculation pump (7) is placed in the top.

In denitrifying filters, especially in units where the water has to pass through a long way, it can occur that there is no even flow in the filter. Zones with a very low redoxpotential are created, where hydrogensulfide is produced (the filter starts to smell badly). On the other side, zones with a rather high flow may arise where nitrate is reduced only to nitrite. In each case, the conditions vary in the different zones of the filter and it is nearly impossible to find its right working point.

These unpleasant effects are avoided by the construction of the AB Aqua Medic **Nitratereducator**. The recirculation ensures a complete mixing and the same redox potential level in the whole filter. Zones with a very low redox potential and the production of hydrogen sulfide are avoided. The redox potential can be used for controlling the filter. The effectivity and reliability of the filter can be increased.

Connections

In the lid of the **Nitratereducator**, there are the following connections:

1. Inlet (5): Here, you can connect a 6/4 mm air tube. At the inflow, you find an adjustment valve to adjust the flow rate. The best value is approx. 1 – 1.5 l/h (approx. 1 drop per second). The adjustment at the inflow causes a delay until you can read the adjusted drop number at the drop counter (14) at the water outlet. The drop counter is mounted inside the aquarium, close to the water level. If the flow rate is regulated in the outlet, the valve may not be closed completely in order to allow produced nitrogen to escape. During the start phase in the first weeks, the outlet valve should stay completely open. The inlet has an internal elongation to prevent gas entering the inlet tube.

2. Feeding: Through this opening (4), you can inject Denimar-Powder with a syringe to enhance denitrification. Dissolve the powder before in some water. The valve has to be cleaned after every feeding and closed.

3. Redox electrode (17): Through this opening, you can put the pressure resistant ORP electrode with standard thread (PG 13,5) Aqua Medic No: 220.18.

4. Outflow to aquarium (14): Here, you can connect an air tube 6/4 mm.

5. Set-Up

The **Nitratereducator** is a hermetically closed system. The produced gas (nitrogen and CO₂) can escape through the water outlet. For this reason, the outlet should never be completely closed because an eventual overpressure may escape through the water inlet and interrupt the inflow.

The **Nitratereducator** has to be placed in a way that water can flow off either directly back into the aquarium or filter chamber. In a seawater aquarium, it is advantageous if the outflowing water is flowing into the inlet of the protein skimmer or trickling filter. In the protein skimmer, the water is saturated with oxygen before it flows back into the aquarium.

Inflow: The inflow into the reductor can be realized as a bypass from the main circulation pump with the included T-pieces (10). The flow rate is adjusted with valve (8) and drop counter (14).

6. Starting

Before starting, the **Nitratereducator** is filled with aquarium water and controlled for leaking and the right position of the sealing. Take care for exact positioning of the O ring. Close the 8 clamps tightly. The internal circulation pump can be switched on.

Connection to an existing aquarium

If the **Nitratereducator** is connected to an existing aquarium with a rather high nitrate level, the inflow of aquarium water should not immediately be started. Bacterial growth is enhanced by adding 4 dosing spoons **Denimar-Powder**. If, after 8 - 10 days, the nitrite has disappeared from the reductor - a residual concentration of nitrate is harmless - the water flow can be switched on.

Connection to a new aquarium

If connected to a new aquarium, the bacteria does not have to be fed within the first 4 weeks, as the nitrate forming bacteria Nitrosomonas and Nitrobacter need this time to develop and oxydize the whole amount of ammonia and nitrite into nitrate.

Feeding

The feeding has to be adjusted according to the nitrate loading of the aquarium. It can be controlled with a redox probe (see options). In a normal loaded tank, one dosing spoon **Denimar-Powder** per day is sufficient. It is possible to feed several dosing spoons (up to 5) at one time. Then the filter needs no feeding for several days.

After some time, a slimy bacterial biomass is formed in the **Nitratereducator**. This is a normal process. A high bacteria population ensures a high removal rate of nitrate.

7. Feeding with Deniballs

AB Aqua Medic **Deniballs** are made of a biodegradable plastic material. This plastic material is also produced biologically - the raw material is produced by bacteria. This new plastic material is completely biodegradable. It can be used by denitrifying bacteria in the **Nitratereducator** to remove nitrate. The **Deniballs** supply the surface area and food for the bacteria at the same time. This means that a **Nitratereducator** filled with **Deniballs** has not to be fed for a longer period - up to one year. The quantity of **Deniballs** which are necessary for a **Nitratereducator** depends on the loading of the tank. For a normal loading, 1,5 - 2 l are enough. The rest of the filter is filled with standard **Bactoballs**. **Deniballs** need - especially in a seawater tank - a longer period to reach their full capacity. During this time (6 - 8 weeks) the Nitratereducator has to be fed with Denimar-Powder.

8. Maintenance

1. Controlling the flow rate: The flow rate through the filter has to be checked regularly. The optimum is at approx. 1 to 1,5 l/h. This has to be readjusted from time to time.
2. Recirculation pump: The recirculation pump has to be controlled regularly on clogging. The pump housing has to be opened and the magnet with needle wheel removed. Both is cleaned under fresh water and mounted again.
3. Cleaning: If the bacterial biomass has increased after some years, the **Bactoballs** can be removed, cleaned with aquarium water and filled in again.
4. Renewal of **Deniballs**: The **Deniballs** have to be refilled/replaced once per year.

5. Feeding with **Denimar**: Without **Deniballs**: 1 dosing spoon/day.

6. From time to time, measurement of nitrite and nitrate concentrations in the outlet of the **Nitratereducator** has to take place.

9. Options

With a redox potential control, the function of the **Nitratereducator** can be optimized and the reliability can be increased.

The optimal working point of the **Nitratereducator** can be determined by a measurement of the redox potential.

Denitrification and redox potential

The redox potential is a parameter which can be measured electronically. The value is a measurement for the equilibrium between reducing and oxydizing reactions in the water.

The positive redox potential in the aquarium itself is kept at a few hundred Millivolt. In the seawater tank, it should be between 300 and 440 mV. This high redox potential indicates that oxydation reactions dominate over reduction reactions. Oxydation reactions are biochemical reactions where a substance is oxydized, e. g. by oxygen.

A negative redox potential indicates the absence of oxygen and is lethal for most aquarium inhabitants.

The biochemical conditions in the **Nitratereducator** differ completely from those in the aquarium: Nitrate has to be reduced to nitrogen gas. This is only possible if there is no oxygen dissolved in the water.

The redox potential is low or even negative. The ideal range is between -50 and -250 mV.

If it exceeds -50 mV, the denitrification reaction may stop at the nitrite stage!

If it falls below -300 mV, all the nitrate is reduced. The bacteria then start to use sulphate. This is a very undesired process because the end product of this reaction is Hydrogensulfide. Hydrogensulfide (H₂S) is toxic and smells very strange like fouling eggs.

If a little bit of Hydrogensulfide is entering the aquarium, this is not critical. It is immediately oxydized to sulphate. The closed version of the Nitratereducator causes no problems with bad smell.

Controlling the Nitratereducator

The **Nitratereducator** can be controlled by the rate of feeding or the flow rate of water:

If the redox potential exceeds -50 mV or even gets positive, the dosage of food can be increased or flow rate decreased.

If the redox potential sinks below -300 mV, the feeding can be reduced or flow rate increased.

Feeding with **Denimar-Powder**: You should keep the flow rate constant and vary the food supply.

10. Failures

Problems with denitrification are mostly caused by wrong adjustment of the flow and feeding rate. They can only be determined by measurements of nitrite and nitrate concentrations in the filter or by measurements of the redox potential.

- The **pump produces noise**: If the pump housing contains air or gas, this causes a strong noise. In this case, the pump is pumping little or no water and its cooling is insufficient. The pump may overheat and be destroyed. The plastic elbow at the pump outlet has a small hole where air and gas can escape. If this hole is blocked, it has to be cleaned by using a needle.

- **Nitrite in the outlet of the filter**: If the outlet of the filter contains high amounts of nitrite, the feeding rate is too low. Increase feeding or lower flow rate. In most cases, the redox potential is too high (above -50 mV).

- **Nitrate in the outlet of the filter**. High residual concentrations of nitrate often occur together with high nitrite values. **Caution!** Most nitrate tests are disturbed by high nitrite concentrations! In this case, the redox potential is also too high. Increase feeding rates, decrease flow rate.

- **Hydrogen sulphide in the outlet of the filter:** The filter smells like fouling eggs. In most cases, the redox potential is too low (below -300 mV). Reduce the feeding, check the flow rate and increase it, if necessary.

11. Warranty

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Operation Manual GB



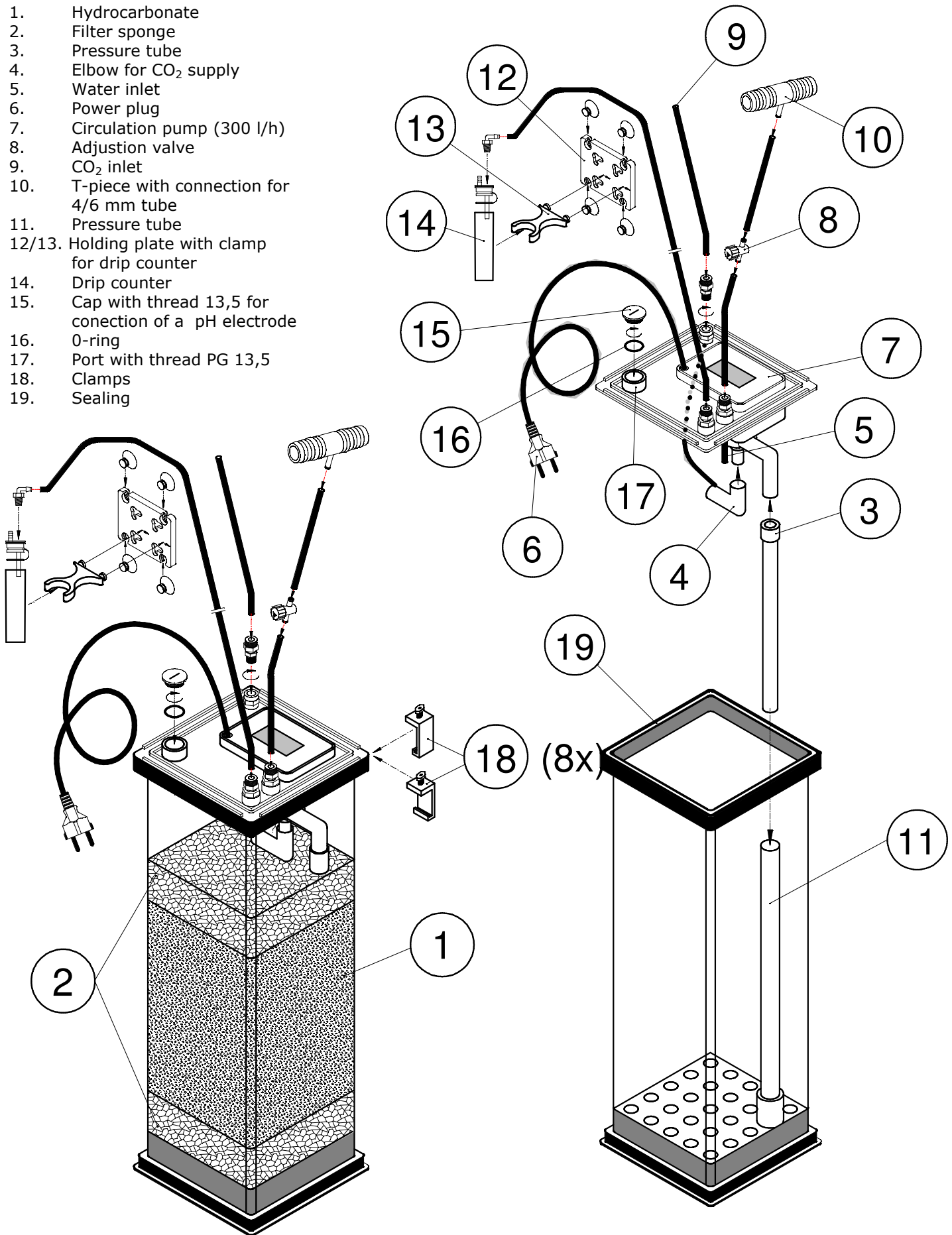
**Filter for adjusting a natural equilibrium between calcium and carbonic acid in aquaria.
For seawater aquaria from 200 up to 1,000 l.**

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.

 **AQUA MEDIC** GmbH
Gewerbepark 24, 49143 Bissendorf, Germany

Fig. 1: Calciumreactor KR 1000

1. Hydrocarbonate
2. Filter sponge
3. 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
11. Pressure 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 PG 13,5
18. Clamps
19. Sealing



1. Product description

The AB Aqua Medic **Calciumreactor KR 1000** consists of the following parts:

- reaction vessel (height: 50 cm, volume approx. 10 l),
- filling with AB Aqua Medic **Hydrocarbonate**, fine grain

In the top of the filter, there are the water inflow and outflow, connection port for CO₂ as well as the circulation pump of the reactor.

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 AB Aqua Medic **Calciumreactor** 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 using a pH Controller. This method does not change the pH-value of the aquarium water.

Chemical reaction



Calciumcarbonate + Carbonic acid + Water -----> 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

The **Calciumreactor** is supplied with water from the top. The flow rate should be adjusted between 1 and 3 l/h. The circulation pump 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 AB 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 there, 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 **Calciumreactor** 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 **Calciumreactor** with a 6 mm pipe. The inflowing water quantity has to be adjusted in a way that approx. 1 - 3l/h (1 - 4 drops/sec.) flow 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 **Calciumreactor** is placed in the right position and all connections are ready, The water flow can be started. Then the reactor is filled up with water until water comes out of the outlet.

If the **Calciumreactor** is placed beside the filter tank or above the aquarium, all connections and the reactor itself must be controlled for tightness. Then the CO₂ can be switched on. The quantity of CO₂ has to be adjusted so that the pH-value in the aquarium does not drop below pH 7.8. Within the reactor itself, the pH-value should drop to pH 5.9 - 6.0. 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 AB Aqua Medic **pH Controller**, to adjust the pH-value in the aquarium reliably. 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 **Calciumreactor**, 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 AB 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

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Operation Manual GB



Current pump for fresh and salt water aquariums.

In purchasing this pump, you have selected a top quality product. It has been specifically developed for aquarium use and extensively tested by experts.

 **AQUA MEDIC** GmbH
Gewerbepark 24, 49143 Bissendorf, Germany

1. Features

The **Ocean Runner PH** series of magnetically coupled power head pumps are very quiet in operation. They have fully encapsulated synchronous motors and can operate completely safely either submerged or out of water. The polished ceramic shaft and bearing is practically wear resistant, ensuring a long operating life. The pumps can easily be taken apart for cleaning. All materials are salt water resistant.

IMPORTANT NOTE:

Only operate the pump at the voltage shown on the product label.

2. Table 1: Technical Data

Model	<u>Ocean Runner PH 2000</u>	<u>Ocean Runner PH 2500</u>	<u>Ocean Runner PH 3000</u>
Line voltage:	230 V~/50 Hz	230 V~/50 Hz	230 V~/50 Hz
Power consumption:	19 watts	37 watts	43 watts
Maximum flow:	2,000 l/h (33 l/min.)	2,500 l/h (40 l/min.)	3,000 l/h (50 l/min.)
Maximum head:	1.5 m (5.0 ft)	2.6 m (8.6 ft)	1.6 m (5.3 ft)
Hose connection:	1/2"	1/2"	1/2"
Cable length:	2.8 m (9 ft)	2.8 m (9 ft)	2.8 m (9 ft)
Protection Rating:	IP68	IP68	IP68
Max. depth:	1 m (3 ft)	1 m (3 ft)	1 m (3 ft)
Max. water temperature:	35°C	35°C	35°C

3 . Connections

Suction side: The suction side may be connected with flexible hose, using the hose fitting (2) included. If the pump is used as a current pump submerged in the aquarium, the filter basket (12, 15) and the sponge (10) have to be used.

Pressure side: The pressure side can be connected with a flexible hose, using the hose fitting (2) included. This hose fitting must also be fitted if the pump is used as a pure current pump.

If the pump is used as return pump, it can be directly connected to PVC (25 mm, 1") pipe by using an optional threaded connector.

4. Exploded parts diagram

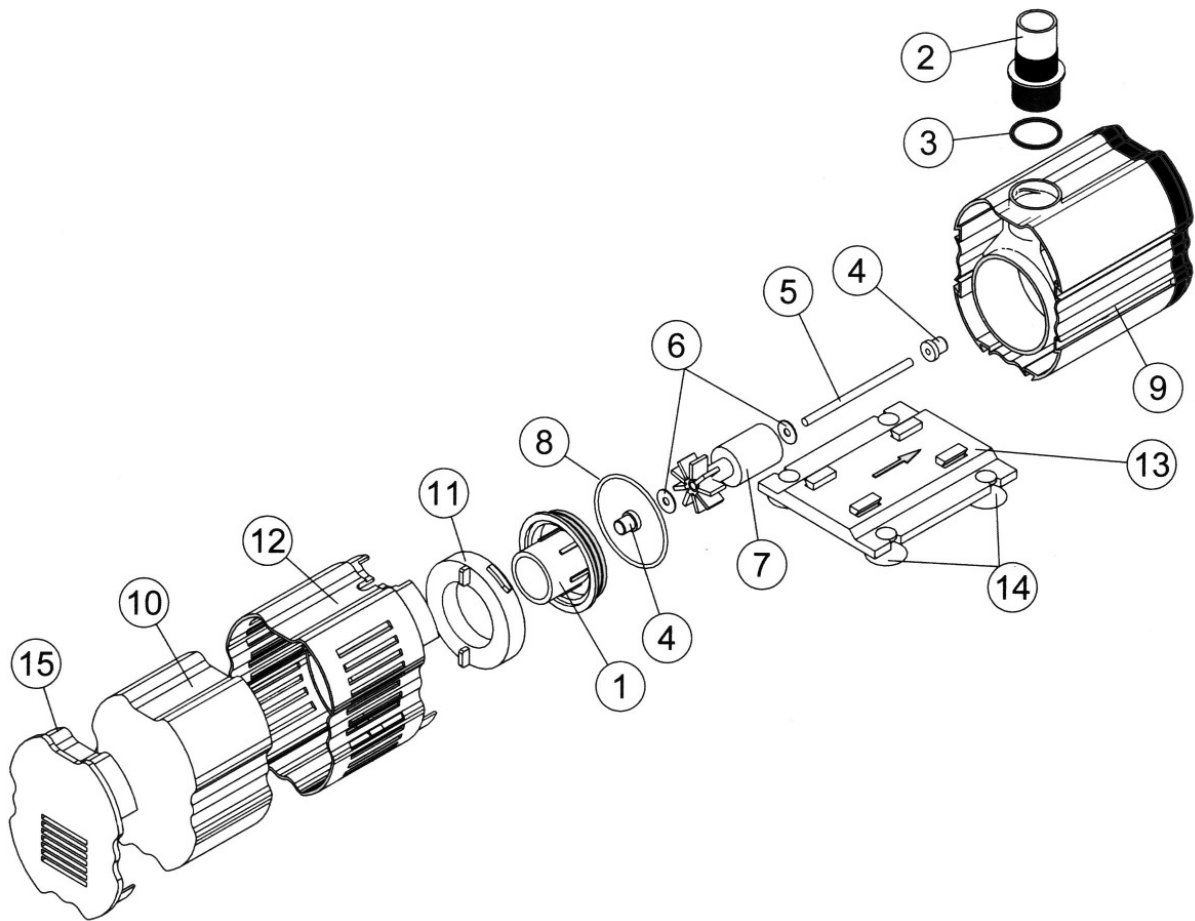


Fig.: Parts List

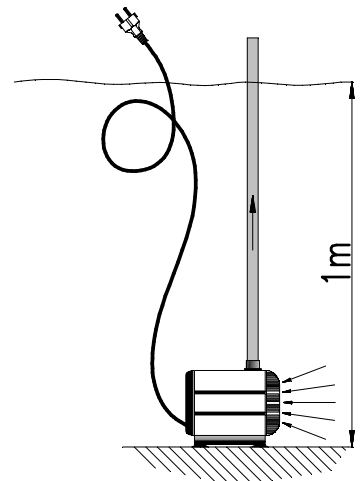
- | | | |
|----------------------------|---------------------|------------------------------|
| 1. lid of the pump housing | 6. washers (2 pcs.) | 11. bayonet lock |
| 2. hose connection 1/2" | 7. rotor / magnet | 12. filter basket |
| 3. O-Ring pressure side | 8. O-Ring | 13. holding plate |
| 4. rubber bearing (2 pcs.) | 9. motor housing | 14. rubber sucker (4 pcs.) |
| 5. ceramic shaft | 10. filter sponge | 15. lid of the filter basket |

5. Mounting:

The pump may only be installed submerged. The maximum submergence is 1 m. However, it is not self priming and has to be installed below the water surface level. If used as a power head pump, we recommend to remove the hose connection (13) on the suction side and fit the filter basket (11). Please take care that the pump does not run dry.

The base plate (20) with the rubber suckers (19) can be fitted to the pump on 3 sides so the outlet position can be adjusted.

After setting up the pump, ensure you can always reach the power plug.



Safety advice:

The pump is constructed for indoor aquarium use only. Before working on the aquarium or pump, the power plug must be disconnected from the mains.

**The connection cable and the power plug must not be changed. If the power cable is damaged, the pump must not be taken into operation.
If the pump is used submerged, the filter (11, 12), hose and/or hose connection (13) must be used.**

6. Maintenance / Cleaning

CAUTION:

Disconnect the power before you start any work on the pump.

The pump is designed to have a low maintenance requirement and, under normal conditions, will be very reliable. However, the filter housing and all rotating parts must be cleaned regularly (1 to 5).

Remove the pipe connections and undo the bayonet (6) on the pump housing. Now remove the suction connection (7). **Caution:** This part is fixed tightly because it has an "O" ring seal and must be removed carefully so as not to break the ceramic shaft (4).

The complete impeller (4 - 7) can now be taken out, cleaned under running water and be re-assembled.

7. Failures

If the pump fails to operate check the power connection and fuse. If no fault is found, the pump may be blocked and must be cleaned – see maintenance / cleaning above.

If the pump is noisy, the pump head (1 to 8) has to be cleaned.

8. Warranty

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Before calling your dealer please ensure you have read and understood the operating instructions. If you have any questions your dealer cannot answer please contact us

We reserve the right to make technical changes to this product.

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Operation Manual GB



The SP 1500/3000 dosing pump is designed to pump small volumes of water and for dosing additives. It has been specifically developed for aquarium use, has been designed and manufactured to the highest standards and has been extensively tested.

1. Features

The SP 1500/3000 is a peristaltic pump in which liquid is transported by repeatedly kneading the pump hose. It can be used wherever small amounts of liquid have to be pumped.

In the aquarium, the pump can be used for two purposes:

- as feeding pump for low flow reactors like Nitratereductors, Calciumreactors or Phosphate Filters
- as a dosing pump for fertilizers in fresh water aquariums and for trace elements, calcium and bicarbonates in salt water aquariums.

The dosing pump is supplied with a long lasting synchronous motor and the pump hose is made of Santoprene®, a specially developed material resistant to many chemicals and with a very long life – typically in excess of 3 million compressions.

IMPORTANT NOTE:

The pump must be operated at the correct voltage (see type label).

2. Technical Data

Model	<u>Dosing pump</u> SP 1500	<u>Dosing pump</u> SP 3000
Power supply:	230 V / 50 Hz	230 V / 50 Hz
Power consumption:	4.5 watts	4.5 watts
Maximum flow:	1.5 litres/hour - 25 ml/min – 0.4 gph	3 litres/hour - 50 ml/min – 0.8 gph
Connections:	6/4 mm hose (¼")	6/4 mm hose (¼")
Motor:	synchronous	synchronous
Speed:	10 rpm	20 rpm
Motor life:	> 10,000 hrs	>10,000 hrs
Pump hose life:	> 3 Million turns	>3 Million turns
Continuous running possible:	yes	yes

3. Connections

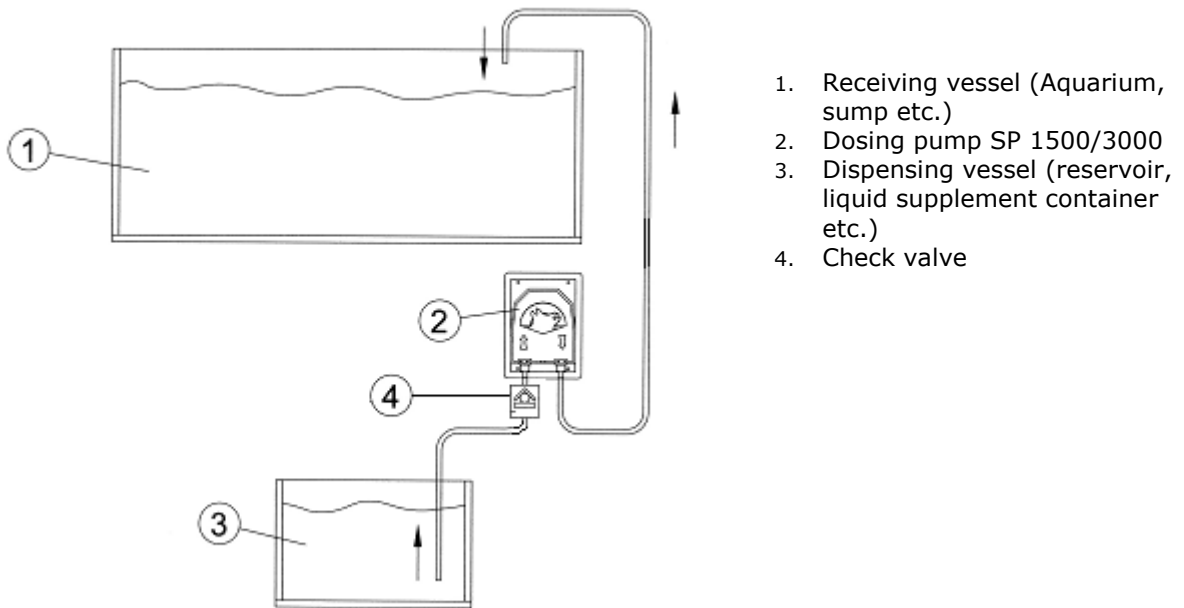
The pump is connected with aquarium air hose (6/4 mm), ¼". However, it should be assured that the hose is suitable for the chemical characteristics of the liquid being pumped.

4. Installation

The pump may only be operated in the dry, it is not designed for submersed use. It should be securely mounted using the keyhole slots provided in a dry place.

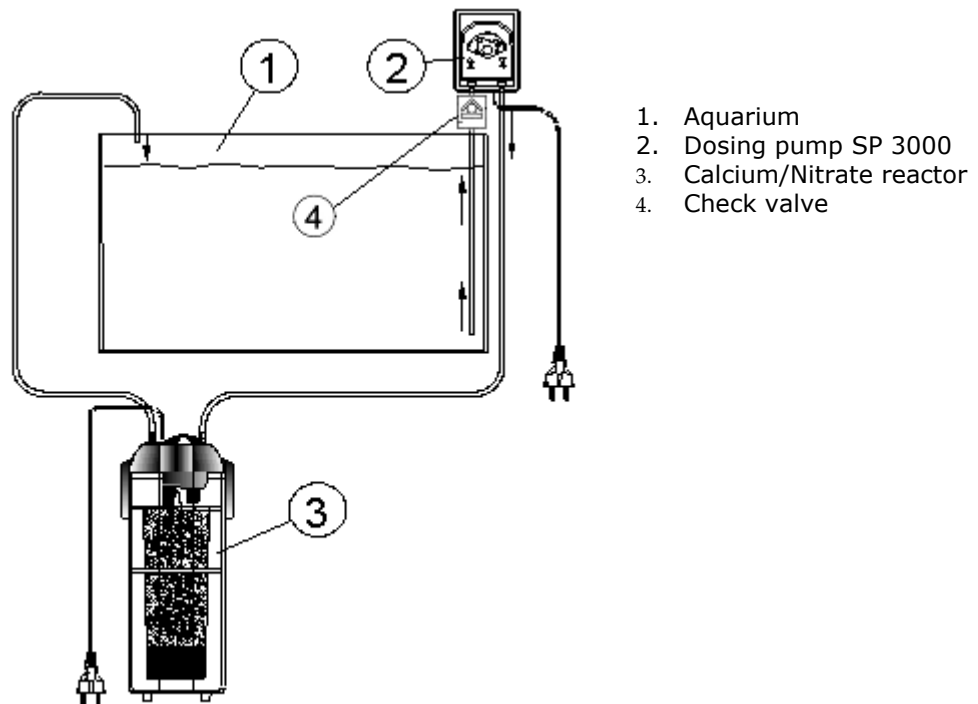
The pump may only be operated with check valve and should always be set up in such a way that it is placed above the water level of the storage vessel, tank or filter basin (see Fig. 1).

The outlet should always be positioned above the aquarium or sump. If the pump stops with the drive axle in the horizontal position then the pump will not act as a check valve. The air gap between the outlet hose and water prevents aquarium water being syphoned back into the liquid storage tank (see Fig. 2). If small amounts of water need to be precisely dosed then a check valve should be placed in the inlet hose of the pump. This prevents the pressure tube emptying and ensures that the same volume is dosed during each operating cycle (see Fig. 1).



1. Receiving vessel (Aquarium, sump etc.)
2. Dosing pump SP 1500/3000
3. Dispensing vessel (reservoir, liquid supplement container etc.)
4. Check valve

Fig. 1: Installation method for dosing from a dispensing vessel, including a check valve. The check valve will prevent water flowing back down the pressure hose. In any case, the outlet should always be positioned above the surface level of the receiving vessel. This prevents the storage tank syphoning out should the pump stop with the drive axle in a horizontal position.



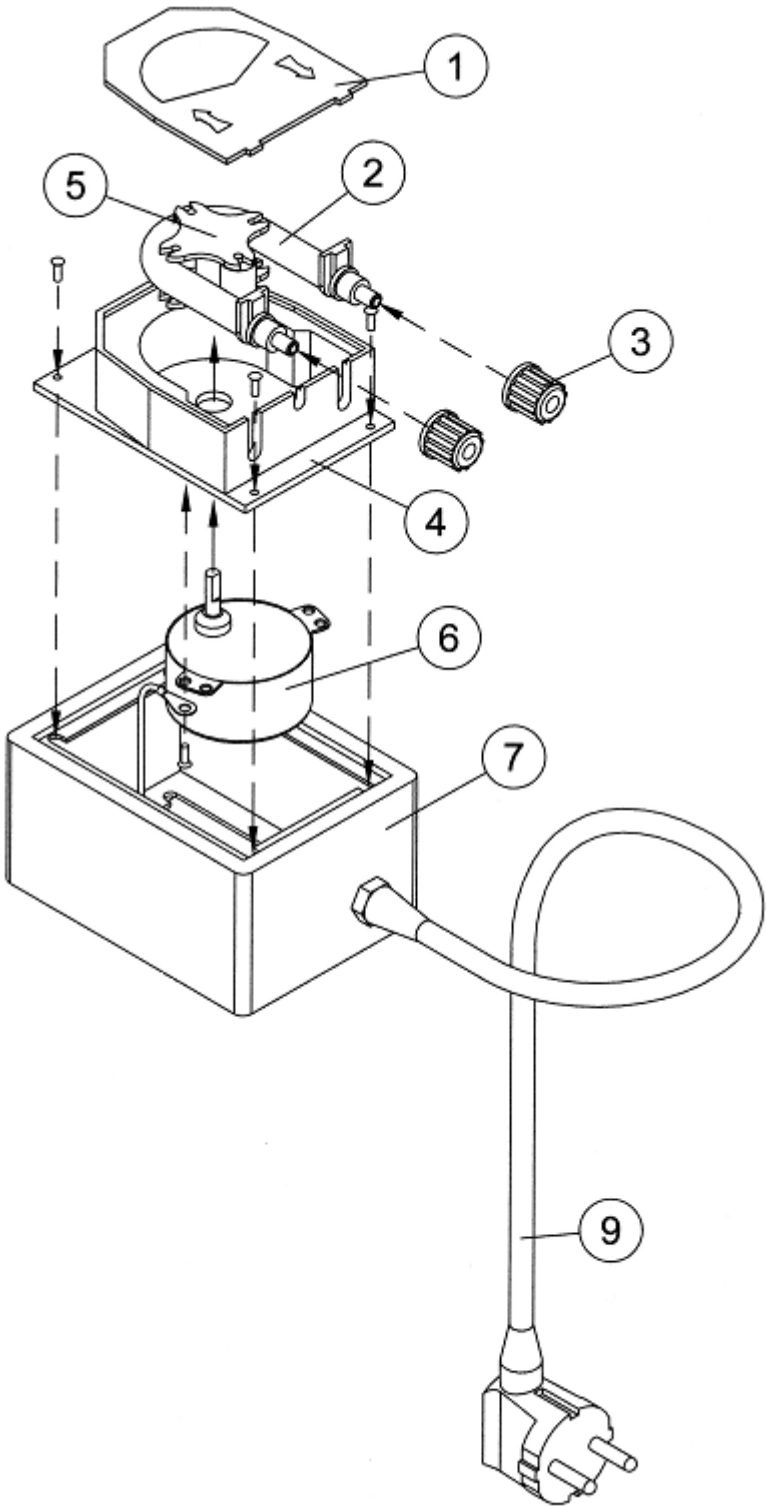
1. Aquarium
2. Dosing pump SP 3000
3. Calcium/Nitrate reactor
4. Check valve

Fig. 2: Installation method for operating a Calcium reactor or Nitratereducator with the SP 1500/3000.

The pump should be mounted above the aquarium or sump to prevent any problems that may arise should the pump hose leak. The outlet should always be positioned above the surface level of the aquarium.

5. Parts List Dosing Pump SP 1500/ SP 3000

- 1. Cover
- 2. Pump hose with fittings
- 3. Gland nut
- 4. Pump housing
- 5. Drive wheel with rollers
- 6. Motor
- 7. Housing
- 9. Power cable



6. Control

The synchronous motor of the pump operates at a fixed speed of 20 rpm. This cannot be changed. If smaller amounts of water are to be dosed or a smaller flow rate is required, the SP 1500/3000 can be switched on and off for varying periods of times. For exact dosing, a digital timer switch, programmable in minutes, should be used.

Important: Never use the pump together with a valve. If you want to reduce the flowrate, use a time switch (15 minutes "On", 15 minutes "Off" = ½ flow rate).

7. Maintenance

The pump hose and the motor are consumable and have to be maintained and changed regularly.

Pump hose: The pump hose has a lifetime of approx. 3 million rotations and after this usage, it needs replacement. If the pump is operated continuously, the hose should be changed every 3 – 4 months. We recommend to use only an original Aqua Medic spare pump hose assembly which is supplied complete with fittings.

Grease: Before the hose is installed it has to be greased. The pump will only operate properly if the hose is effectively greased.

Heat: During continuous operation the motor may heat up as high as 70°C. This is normal and has no effect on performance or the life. However, too little grease on the pump hose may cause malfunction of the motor and overheating.

Drive wheel with rollers: The plastic drive wheel and the rollers are designed for a long life. Nevertheless, it may become necessary to change it. The change can be done the following way: Remove the pump hose by pushing the fittings out of the housing. The drive wheel can now be pulled off the shaft as it is a pressed fitting.

Motor: The motor has a lifetime of >10,000 hours. To replace the motor remove the drive wheel assembly. Undo the 4 screws in the backplate. Now remove the backplate and protection plate. Undo the power cable connection from the connector block and remove the 2 screws securing the motor to the housing. To fit the new motor reverse the above process.

Safety instructions

The pump may only be used indoors. Before undertaking any work on the pump, disconnect the power plug from the mains!

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