

Systeme für Aquakultur,
Aquaristik, Labore und
zur Wasseraufbereitung

Systems for aqua culture,
sea water aquaria, labs and
water desalination and purification

Systèmes pour aquacultur,
aquariums eau de mer,
laboratoires et traitements d'eau



AquaCare GmbH & Co. KG
Am Wiesenbusch 11
D-45966 Gladbeck
Tel.: +49-2043-375758-0
Fax: +49-2043-375758-90
<http://www.aquacare.de>
e-mail: info@aquacare.de

Instruction manual of Lime Water Reactor KWR size 400 and more



Abbildung ähnlich

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1. Safety Instructions

1.1. General information

This manual contains basic information that are important for assembly, operation, and maintenance. This should be read before mounting by the assembly operator and the responsible operator and/or qualified personnel. This instruction must be disposable the at unit at any time.

Pay attention to this safety instruction as well as to the special instructions within the other chapters. In addition local laws and safety instruction must be minded.

1.2. Indication of information



If safety information are important for life or health for persons they are marked with the relevant hazard symbol according DIN 4844-W9.



Safety information marked with this symbol can cause danger for the machine and its function if not respected.



This hints can ease the work with the machine and its maintenance.

At the machine directly marked information as rotation arrow, fluid connections and setting points should be noticed. These marks should be readable at any time.

1.3. Qualification of the personnel

The staff for operation, maintaining, inspection and assembly must be qualified for these work. Responsibility and controlling of the personnel should be directed by the operator.

1.4. Dangers if safety information are not minded

If safety information are not minded persons, environment, and the machine can be endangered. Failure of observe lead to loss of the warranty.

Failure of observe can coarse:

- Failure of important functions of the machine.

- Failure of stipulated methods for maintenance.
- Endanger of persons with electric, chemical or mechanical impacts.

1.5. Safe working

Working with the machine is only allowed if all safety information of this manual, national laws and rules for preventing accidents and internal working, operating and safety rules of the operator must be minded.

1.6. Safety information for the operator

Contact protection for rotating or moving parts should not be removed while operation.

Risks of electrical energy must be averted. Please pay attention to the local laws and information, too.

1.7. Safety information for maintaining and assembling personnel

The operator must take care that all works for assembling, inspecting and maintaining are made by authorized and qualified personnel. These persons must be informed about the machine and the works by reading the manual or otherwise.

Working at the machine is only permitted if unit is out of operation. The described procedure of putting out of operation must be redeemed. Immediately after the work safety and protection facilities must be mounted and put into function.

Before starting again all issues treated in the chapter “putting into operation” must be minded.

1.8. Arbitrary reconstruction and spare parts production

Reconstruction or modifying the unit are only proper if the manufacture agrees. Original spare parts and authorized accessories by the manufacture are made for the safety. The use of other parts can destroy the warranty demands.

1.9. Illegal operation

Safety is only guaranteed if the unit is running within the field of application described in „designated use“ in this manual. The technical limits mentioned in manual (chapter “Technical data and unit protocol”) must be redeemed.

1.10. Linked aggregates

The listed information dealing with safety and operation in manuals of linked aggregates must be redeemed, too.

2. Transport

2.1. Mechanical conditions



The unit may transported only with suitable lifting tools. Pay attention to the transport weight listed in chapter “Technical data and unit protocol”.

Do not tilt the unit more than 10% out of the horizontal position.

Before transporting the unit it must be totally empty.

3. Designated use

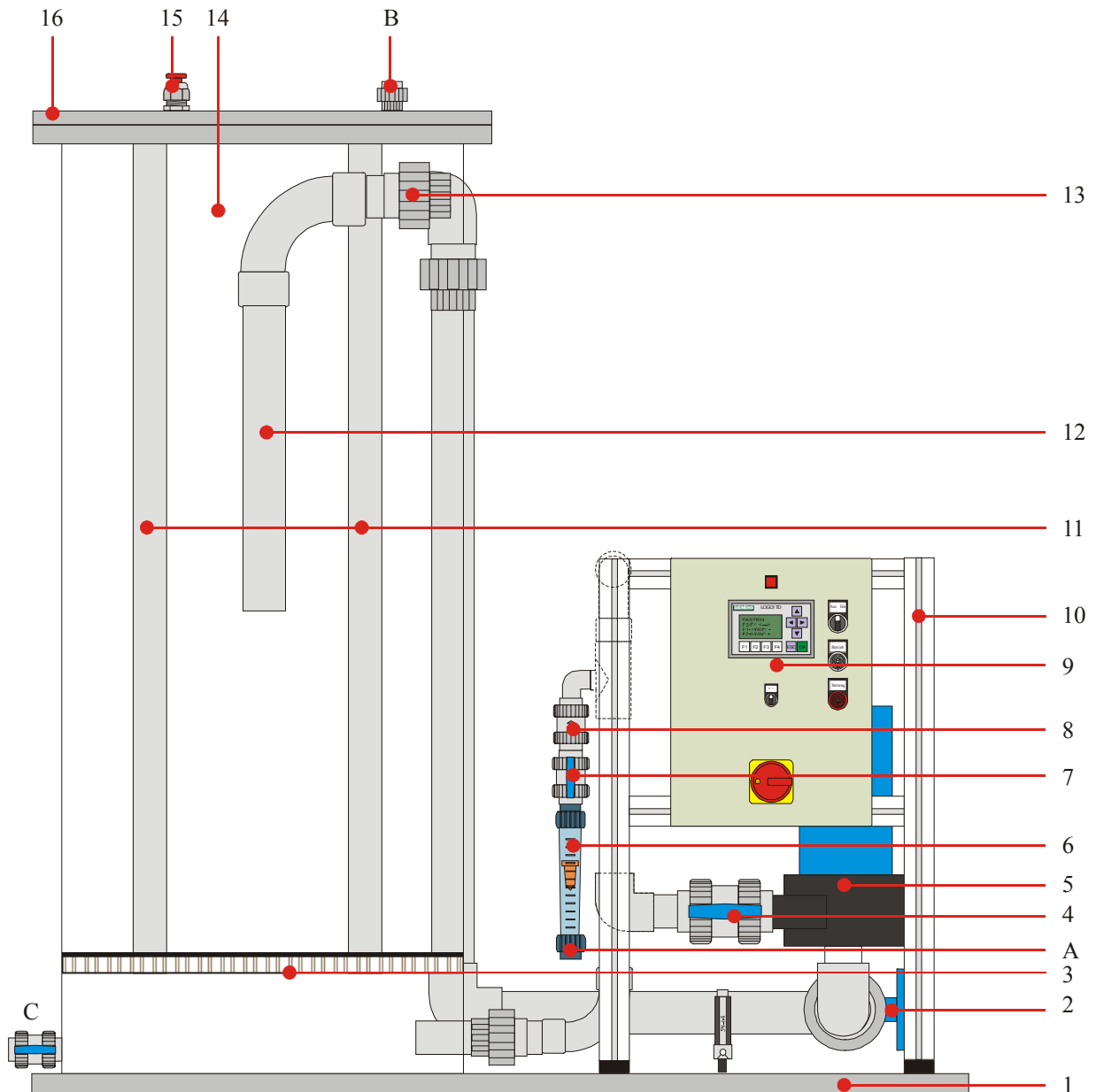
AquaCare Lime Water Reacators are made only for preparing Wasser for aquaria and aquaculture systems. The incoming water should have a very low electrical conductivity (low hardness) – best is reverse osmosis water.

Other purposes are only allowed after consultation with AquaCare.

4. Ausstattung

The AquaCare Lime Water Reactor KWR is completely delivered. You have to erect it. It must be supplied with water and electricity. Please control the delivery if it is complete and not broken.

4.1. Basic equipment



The unit is built on a stable PVC plate (12) and consists off:

2. Ball valve inlet pump
3. Grid of reactor
4. Ball valve outlet pump
5. Pump
6. Water inlet flow meter
7. Ball valve water inlet
8. Check valve water inlet;
9. Option: electric box
10. Aluminium frame (not KWR400)
11. Holder for inner sieve (not all models)
12. Water inlet tube
13. Union water inlet tube
14. Reactor main tube

15. Connector for pH probe

16. Cap of main tube

A. water inlet (from pure water tank);

B. water outlet (to the aquarium);

C. Ball valve to drain

4.2. Options

As an option following parts may be installed:
 Grenzwertkontakt für Wasserzulauf,
 pH measure system for monitoring the water
 quality,
 electric box with mini-PLC.

5. Principle of function



Calcium hydroxid and its aqueous solution is very corrosive. Please mind all necessary safety precautions for this chemicals (goggles, protective gloves, protective clothing, see data sheet of calcium hydroxid).

The calcium hydroxid in the reactor is mixed with incoming pure water. The clear supernatant (lime water) flows to the aquarium.

The circulation pump arrange the mixing of the solid calcium hydroxid with water (lime milk) at the bottom of the reactor main tube (14.). The incoming pure water (A.) is mixed and formed to lime milk. Over the lime milk the clear lime water flow upwards to the water outlet (B.). The settling of the lime milk takes time, so the maximum inlet water flow is limited (see technical data).

The maximum inlet water flow depends on the total calcium hydroxid volume, too. The more calcium hydroxid powder is in the system the lower the maximum inlet water flow.

There are two ways to determine whether the system is able to produce lime water:

1. You can see a definite phase boundary between white lime milk and clear lime water (optical control).
2. The pH value of the outgoing water is over 11.

6. Installation

6.1. Setting up



To guarantee a faultless operation of the filter the unit should be erected on an even and stable ground. Uneven parts of the floor must be flattened with floor pavement or a suitable base.



If the operation location is over 1000 meter above the sea level the motor (if air-cooled) must be larger dimensioned to protect it against overheating.



If lime water or lime milk is spilled or if it is leaking the chemicals must be neutralized and specialistic disposed. A suitable collecting tray is useful if leaving chemicals may cause dangers.

6.2. Water connections

For operating the unit it must be connected with water supply and the aquarium.



The connection with PVC-U must be glued only with approved adhesion. The processing regulation of the adhesion should be minded.

The water inlet (A.) has to be connected with a pure water source (e.g. reverse osmosis water). The incoming pressure has to overcome the static pressure of the system. Backflow of water is prevented with the check valve (8.).

The water outlet (B.) should go to the aquarium or filter tank.



The backflow tube should be as short as possible to hinder the forming of chalk crusts. Longer tubes should have unions to enable descaling.



Mark the outlet of the system as a source of danger to protect the personnel.

Never head the lime water in the near of pump inlet places and in the near of calcium reactor outlets.

The drain ball valve (C.) is only for draining the system.

6.3. Electrical connection

The electrical connection must be done by authorized and qualified according with the local regulation only.



Before opening a terminal box and before every disassembling of electrical components the supply voltage must be disconnected at all phases (contact opening minimum 3 mm).

The electrical supply must be conform with the data at the rating plate. The filter and the pump must be protected with fuses.



The circulation pump of the models with electric box are guarded with a motor protection switch. Models without electric box should be protected with an external motor protection switch or with a soft starter or frequency controller.



If the power supply is not stable a voltage guard may be installed. If the phase are not stable a phases guard should be installed.



The rotation direction of the pump must be conform with the arrow at the pump body. If the pump runs in the wrong direction faults can occur. The change the direction of rotating two phase must be interchanged. (not KWR 400)

6.4. Filling up with water



Before filling the system with calcium hydroxid a test operation only with water should be done. Not before possible leaks are repaired you may fill in calcium hydroxid.

To fill the unit **completely** with water you have to dismantle the reactor cap (16.) and remove the inner water inlet tube (12.) at the union (13.).

Now fill in the water through the water inlet (A.) or directy into the main tube. The main tube must completely filled with water to de-aerate the pump.

Now you can assemble the inner water inlet tube again. Install the tube exact vertically.

Close the reactor with the cap – please check the sealing before.



Do not fix the flange screws with more than 3 Nm.

7. Start up the unit



Before start up the unit check out of all connections are done well. Make sure that all

PVC-unions are tight and their o-ring seals are in the correct position.



Check out if the electrical connection is made correctly

7.1. Starting the system without calcium hydroxid

If the reactor is complete filled with water (see chapter “Filling up with water”) you may start the main pump.



The pump is not made for running dry. A large gas bubble may hinder the water flow and the pump gets broken. It is very important to fill up the system with water completely.

Start the pump and check if the direction of rotation is as marked on the pump (not KWR400). If the motor is running in the wrong direction please change two phases.

The pump must run very silently. Small bubbles should go out into the main tube very quickly.

7.2. Filling with calcium hydroxid

Stop the circulation pump and the incoming water flow (A.).

Open the cap (16.) of the main tube (14.).

Drain about $\frac{1}{4}$ of the water volume by opening the drain vave (C.).

Now fill in the calcium hydroxid powder.



Calcium hydroxid and its aqueous solution is very corrosive. Please mind all necessary safety precautions for this chemicals (goggles, protective gloves, protective clothing, see data sheet of calcium hydroxid). Calcium hydroxid is dusting very heavily!

The maximum filling weight is marked in chapter technical data.

Close the main tube with the cap.

Start the main pompe (5.) for some minutes if everything is mixed well.

Wait for minimum 2 hours. In this time the calcium hydroxid powder sinks to the bottom.

After that time you must see clearly the phase border between chalk milk (white) and chalk water (clear to slightly turbid).

Start the circulation pump. The phase border will be approximately at the half of the main tube. If you white chalk milk is higher that throttle the pump flow with the ball vave (4.) at the pressure side of the pump (5.).

The new balance need some hours to appear.



Never close the ball valve at the pump inlet side (2.). This valve is only for maintenance.

7.3. Adjusting the water inlet flow

If the chalk milk level is adjusted correctly (about half of the reactor) you may start the water inlet flow.

The incoming water raises the chalk milk level. **This level should never reach the top of the reactor.**

The maximum water inlet flow is shown in the table.

KWR size	400	600	1000	1500
Max. continuous water inlet flow in l/h	18	42	120	270
Max. discontinuous wate inlet flow in l/h	54	126	360	810

You may operate with a continuous inlet flow or you may combine the KWR with a refill system.



The maximum water inlet flow depends on the volume of calcium hydroxid. The more calcium hydroxid is filled into the filter the lower is the maximum water inlet flow.

If the lime milk is totally converted to lime water you have to fill new calcium hydroxid into the main tube.

8. Shut down the unit

If the unit is shut down the rest of the lime milk and lime water has to be neutralized and special-istic disposed.

After it clean the whole unit totally.

9. Maintain the unit

The AquaCare Lime Water Reactor has to be cleand regularly to prevent damages at the pump.

Always use reverse osmosis water to prevent above-average chalk forming.

9.1. Runtime of the circulation pump

The circulation pump should run all the time. Every start generates high abrasion at pump bearings.

9.2. Descaling the system

After every 10th new calcium hydroxid filling the condition of the circulation pump should determined. Therefor stop the system before filling in new calcium hydroxid. Close ball valve (7.) and shut down the circulation pump.

Open the reactor and drain the complet water. Flush with fresh clear water.



Check the pH of the flushing water. If the pH is higher than 8.0 flush with more fresh water.

Close ball valves (4., 2.) completely. Unscrew the unions near the pump.

Unscrew the screws of pump cap (for KWR400 look into the pump manual) and take of the cap very carefully. The ceramic bearings are very sensitve. Mind the instruction manual of the pump, too.

If the inner parts of the pump have chalk crust – in particular the bearings – you must clean them. Do not use mechanical tools – only chemical cleaning is allowed.



Mind the instruction of the cleaning acid: use goggles, protective gloves, protective clothing, see data sheet of calcium hydroxid.

If all parts are descaled assemble the pump again and put the system into operation again.

10. Trouble shooting

If you cannot eliminate the disturbance ask your service partner or AquaCare.

10.1. The phase boundary between chalk milk and chalk water is not established

Too high water inlet flow:

reduce the water inlet flow by throttling the ball valve (7.).

Too strong internal circulation:

reduce the circulation flow by throttling the ball valve (4.).

Too much calcium hydroxid:

reduce the volume of calcium hydroxid.

10.2. The pump will not start

Electrical connection is missing or is wrong:

connect the system with the right voltage. Use

motor protection switch and mind the direction of rotation.

Large air bubbles is inside the pump:

Fill the reactor totally with water (see chapter „Filling up with water“. Or open the unions (12.) at the pump very carefully for de-aeration.

Scaling inside the pump:

Clean the pump as described in the chapter “Des-caling the system”, mind the instruction manual of the pump, too.

10.3. The system scales very fast

Too much CO₂ in the water inlet:

use only reverse osmosis water or install an CO₂ filter.

11. Warranty

You have 24 months warranty on all AquaCare units excepts spare parts like pump bearings and rotors. You have no warranty if parts are broken by violent (for example totally closed water inlet). For consequential losses AquaCare is not liable.

12. Protocol and technical data

Kundennr. / customer no.: Tel./phone: Fax: Email: Kom.	 <p style="text-align: right;"> <small>www.aquacare.de</small> AquaCare GmbH & Co. KG Josefstrasse 35-37 · D-45699 Herten · Germany Tel.: +49 / 23 66 / 3 25 52 · Fax: +49 / 23 66 / 10 43 85 http://www.aquacare.de · e-mail: info@aquacare.de </p>
Anlagentyp / Type of unit	KWR400
Anlagennr./unit no.	1-2011-00
Abmessungen L×H×B / Dimensions L×W×H	× × m
Leergewicht / empty weight	kg
Transportgewicht / transport weight	kg
Betriebsgewicht / operation weight	kg
max. Arbeitsdruck / max. working pressure	0,3 bar
max. Zulauf / max. feed flow	
Arbeitstemperatur / operation temperature	4...40°C
Umgebungstemperatur / ambient temperature	4...45°C
Hauptpumpe / main pump Hersteller / manufacturer Typ / type Nr. / No. minimale Fördermenge / minimum flow	Magnetisch gekoppelte Kreiselpumpe / magnetic coupled circulation pump IWAKI MX-400 AV5E 5 m ³ /h
Motor: Hersteller / manufacturer, Nr. / No. Anschluss / electrical connection, No.	VEM: K21R 71 K2
Steuerung / control: Hersteller / manufacture Einstellungen im Auslieferungszustand / parameter in delivery condition	- - -
Wasseranschlüsse / water connections	Zulaufwasser / feed water: DN15, d20 PVC Ablaufwasser / outlet water: DN20, d25 PVC Ablass / drain: DN15, d20 PVC
Dichtigkeitstest / leakage test	___ Stunden / hours

Betriebstest / running test:	Testbedingungen / test conditions	Normleistung / normal conditions
Elektrische Daten / electrical data:		
Spannung / voltage L1-L2	V	400 V ± 10%
dito L1-L3	V	.
dito L2-L3	V	.
dito L1-N	V	230 V ± 10%
dito L2-N	V	.
dito L3-N	V	.
Strom / current L1	A	A
Strom / current L2	A	.
Strom / current L3	A	.
Strom / N	A	0,8 A

Datum / date: 16.01.2009

AquaCare: Herr B. Ramsch

Kunde / customer:

Unterschrift / signature:

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13. Appendix: switch board

14. Appendix: CE Declaration of conformity

Konformitätserklärung gemäß EG-Richtlinie 98/37/EG, 2001/95/EG

Wir die Firma:
AquaCare GmbH & Co. KG
Am Wiesenbusch 11
D-45966 Gladbeck

erklären, dass die Produkte


Kalkwasserreaktor KWR

mit den Richtlinien
98/37/EG und
2001/95/EG
der europäischen Gemeinschaft

übereinstimmen.

Gladbeck, 19.11.2011

AquaCare GmbH & Co. KG
* Aquatic Systems Research *
INNOVA-Park, Am Wiesenbusch 11
Tel.: 02043-375758-0 Fax: 375758-90
email: info@aquacare.de
D-45966 Gladbeck



15. Appendix: pump

16. Appendix: motor