Innovations for clean water

ATB

AQUA 8

Installation/Operating Instructions

!!! IMPORTANT !!!

PRIOR TO USING THE UNIT

- Anybody involved MUST imperatively read and fully understand the unit's O&M manual.
- It is most important that the O&M manuals remain with the operator for future reference.

GENERAL

- No foreign objects such as hard materials, plastic bags, etc... are allowed in the basins. These objects can cause extensive damage and/or for example create unbalance to the impeller.

PLEASE NOTE

- This O&M manual is valid for both, the AQUA 8-M with single-phase alternating current motor and for the AQUA 8-T with high-voltage current motor. Instructions which refer to the AQUA 8 in general are valid for both versions of the product.

Contents

1 Introduction

1.1 General and Safety Information

The AQUA 8 surface aerator has been developed for the aeration and agitation of wastewater in wastewater treatment plants based on the activated sludge process. The machine is suitable for mechanically pretreated, domestic wastewater and commercial wastewater, so far as it is comparable with domestic wastewater, which are free of solid and fibrous matter. Any other use is not allowed and leads to the loss of the guarantee and liability. The aerator may not run dry.

Changes in the device or the opening of the engine part are prohibited. The aerator may never be pulled, transported or fastened at the connecting cable. Avoid absolutely abrasions and defects in the connecting lead. Do not operate any equipment that has a damaged connecting line / connection cable or plug, which indicates a faulty function, has been dropped or has been damaged in any way.

Only the manufacturer or an authorized technician may repair defective engines. Moreover, only original spare parts may be used. All other changes in the device lead to the loss of the guarantee claims.

With the intended employment there are no hazards emanating from the equipment. Nationally applicable regulations as well as technical data are to be observed.

Explanation of the warnings used:

 Attention!

 Hazard due to rotating parts

 Hazard due to electrical voltage

1.2 Product characteristics

- Agitation and aeration using only one unit
- Pre-treatment in a settling facility required
- Process easy on activated sludge flocs
- Maximum surface 7.5m², maximum tank diagonal 3.5m
- Minimum water depth 1m, maximum water depth 2.5m
- Separable float for ø 600mm tank openings
- Motor with propeller individually removable
- Single phase motor for 230V, 50/60Hz with condenser (AQUA 8-M) and three-phase alternating current motor for D-230/Y-400V, 50/60Hz (AQUA 8-T)
- Motor protection class IP68
- Motor insulation class F
- Motor completely submerged, thus even ambient conditions
- All components made from AISI304 or PE
- 15m connection cable with 5m protective hose (AQUA 8-M) resp. 10m connection cable (AQUA 8-T)
- High energy efficiency
- Simple handling
- Low maintenance

2 Installation and Commissioning

2.1 Installation instructions

The aeration unit AQUA 8 consists of a separable float with suction pipe (1) and the motor unit with propeller and distributor (2). All materials are made of V2A stainless steel or plastic and are thus suitable for use in wastewater.

For tank openings (3) smaller than 800mm, the two-part float can be opened on one side and inserted into the tank. It must then be screwed back into the tank. The clear diameter of the tank opening should be at least 600mm. When delivered, both halves of the float are usually only screwed together hand tight.

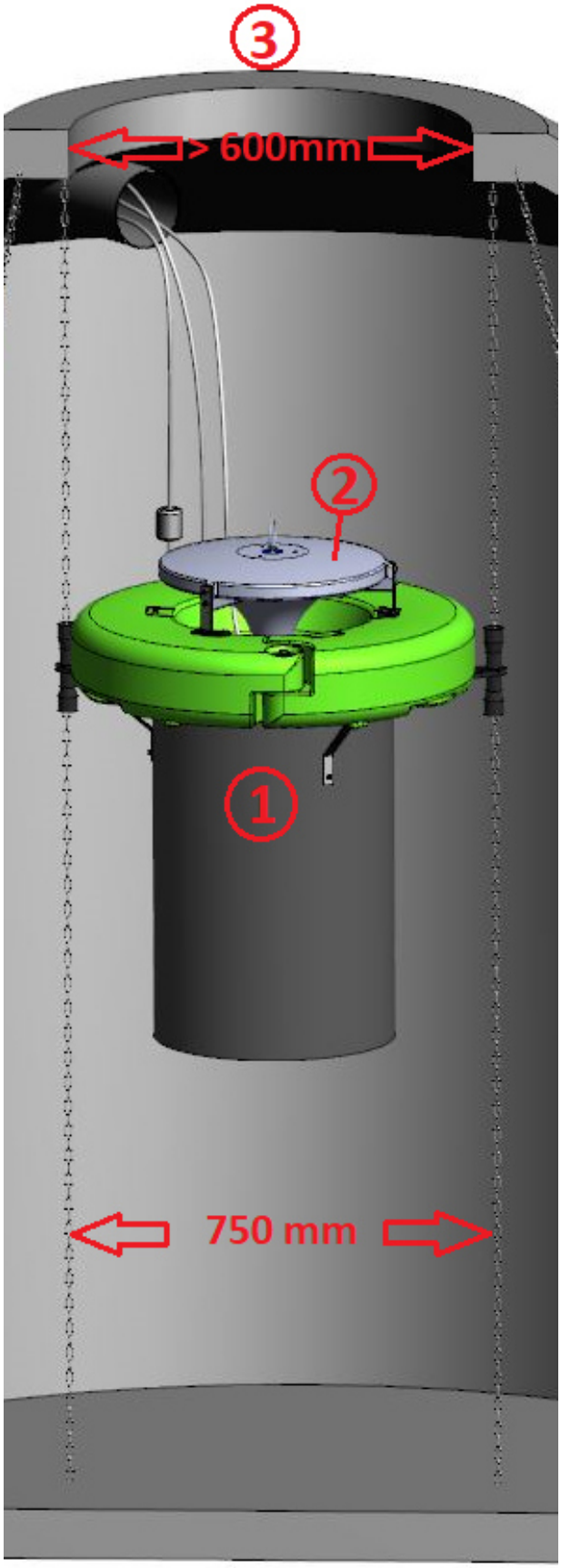
The intake pipe is to be screwed together with the float to form a unit. To do this, turn the pontoon upside down and screw the stainless-steel pipe to the float using the retaining brackets. To do this, use the corresponding threaded inserts on the pontoon and the drill holes in the stainless-steel pipe.

The float with suction pipe is then positioned on the tank bottom centrally under the maintenance opening.

Then the positions for the heavy-duty anchors of the guide chains are measured in the area of the tank opening so that the chains can run vertically at a distance of approx. 75 cm through the guide elements on the float and can hang down to the tank bottom.

For the assembly of the guide chains, the turnbuckles are turned up to maximum length and fastened to the heavy-duty anchors with ring nuts and shackles. The vertically hanging guide chains determine the lower fixing points. The lower heavy-duty anchors are now mounted here and connected to the lower chain ends. The chain must be shortened to the required length. Attention Free chain ends can be sucked in by the aerator and cause damage.

The guide chains are then tensioned over the turnbuckles and fixed with the lock nut.



The motor unit with the baffle plate is not irmly connected to the float and can be loosely inserted at the end of assembly.

For maintenance purposes, the motor unit can be removed from the tank via the tank opening using a loosely enclosed catch chain.

The tightness of all screws must be checked and retightened.

2.2 Electrical connection and start-up

A professional check before commissioning must make sure that the demanded electric preventive measures exist. A Residual-Current-Device (RCD) with a releasing nominal current to 30 mA is prescribed. A pre-fuse of 6A is recommended.

The tension given on the type plate must agree with the power supply voltage on site. The electrical connection must correspond to the wiring diagram from the documents to the control unit.

The aerator may not run dry. The tank has to be filled up to the minimal water level with water before commissioning (at least 1 m).

Before switching the power on, be sure that no people can be endangered by the rotating propeller and the propeller can work unhindered. The motor part should be inserted into the float and no objects should float in the water that can be sucked in by the AQUA 8.

Only AQUA 8-M:

The motor is a single-phase alternating current motor with integrated operating capacitor. The electrical connection of the three wired motor cable with phase (L), neutral (N) and potential earth (PE) should be carried out by a skilled craftsman. The nominal current consumption of the motor is approx. 4.8 – 5.2A.

Only AQUA 8-T:

The motor is a three-phase alternating current motor for DOL operation. For the electrical connection a 6 wires cable is to be used: 3xphases (L1, L2, L3), one ground wire (PE), 2 wires for the thermal protection contact (NC). The wiring should be carried out by a skilled craftsman. The current consumption of the motor is approx. 3,8A in 400V star-operation or 5,8A in 230V delta-operation.

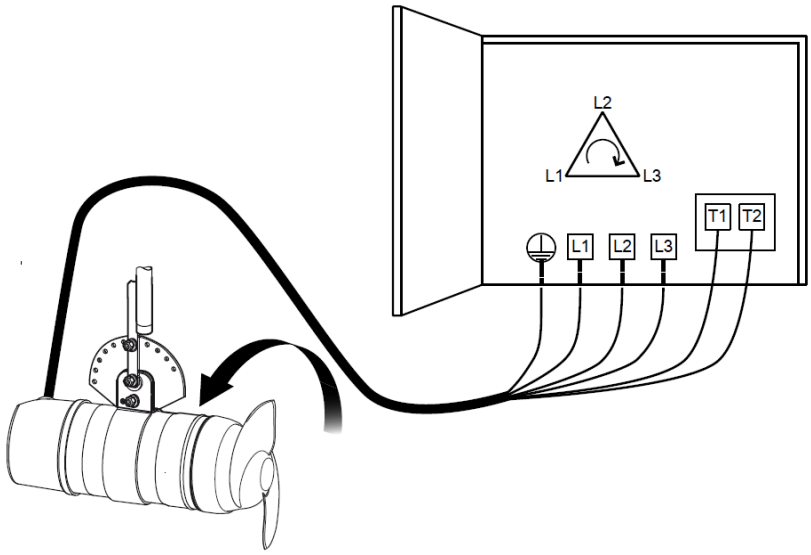
The motor of the AQUA 8-T is always equipped with temperature sensors (between T1 and T2) which are integrated in the stator.

The following applies to the engine monitoring equipment:

- The stator is equipped with temperature sensors connected in series, which trigger the alarm in case of excess temperature.
- The temperature sensors respond at 140 °C.
- The sensors must be connected to a suitable monitoring assembly (closed under normal condition and open when temperature is exceeded)
- The monitoring equipment must be designed so that an automatic restart is impossible.

Connection and start of the AQUA 8-T:

- Connect the main lines (L1, L2, L3 and ground) to the control unit according to the wiring diagram.
- Connect the control conductors for temperature T1 and T2 to their monitoring equipment.
- Start the motor briefly to check the direction of rotation. The correct direction of rotation of the propeller is counterclockwise when looking at the engine from the propeller.



The maximum permissible number of starts per hour is 30.

If the device is supplied as a component part of an AQUAMAX®-PRO system, the motor can be started in manual mode via the control unit. In this operating mode, the current consumption is shown on the display.

3 Maintenance

3.1 AQUA 8-M

3.1.1 Periodical check

The aerator / agitator AQUA 8 works nearly maintenance-free. Within the scope of a servicing of the whole installation merely the device is to be cleaned and to examine for damages. For this it is necessary to pull the engine part out of the tank.

Attention – first disconnect the plant from power supply! Aerator may not be pulled out on the motor cable. Use the enclosed chain with hook (threading in caching ear).

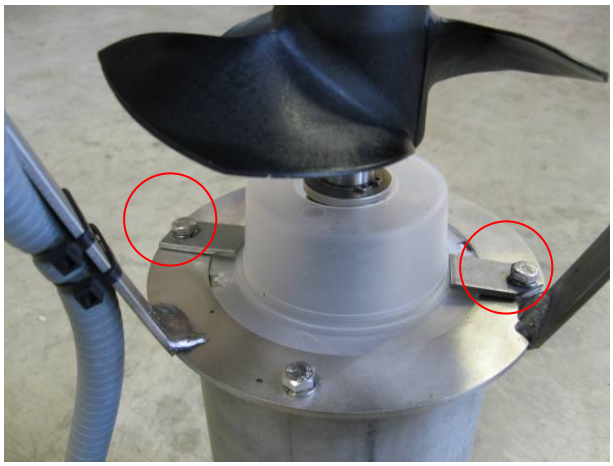
At least once a year the smooth run of the propeller and the state of the thick flange in the engine is to be checked.

After cleaning the motor, the current consumption should be checked in manual operation

3.1.2 Changing the propeller

Tools needed:
Water-pump-pliers, 10mm screw wrench, 5mm hexagonal socket-key

1. Loose the tabs with a 10mm screw wrench



2. Remove the hexagonal screw

3. Hold on the shaft with the water-pump-pliers and unfasten the propeller manually against clockwise

4. If present, pull the protective cap upwards

5. Remove carefully any debris from shaft and bearings.

3.2 AQUA 8-T

3.2.1 Maintenance requirements and intervals

Following control and maintenance work must be carried out on a regular base:

After 4.000 working hours or after 1 years of operation, whichever comes first:

- Check the propeller for wear
- Clean device
- Check the running values of the voltage and amperage (in manual operation mode and with aerator submersed). Value of the current should be around 3,8 A
- General inspection
- Check for wear. If necessary, replace
- Check the consumption of the zinc anode

Attention – Always disconnect and lock out power before servicing! Do not pull out the motor part with the power cable. Use for pulling out the delivered chain with hook.

After 12.000 operating hours or 3 years of operation, whichever comes first (overhaul):

- Maintenance works as specified above
- Replacement of key components

This maintenance works have to be carried out at an authorized workshop!

3.2.2 Inspections performed on-site on a regular base:

Service item	Action
Power cable	Check for damage. If necessary, replace the power cable. Check the cable support. If necessary, adjust it.
Oil housing	Check the oil. If necessary, change it. Replace the O-rings of the filling plug.
Control cabinet	Check the power connections.
Stator protection	Check the thermal contacts. Normally closed circuit, interval 0–1 ohm. Check the resistance of the thermistors. The correct value is between 20–250 ohm. The maximum measuring voltage is 2 VDC.
Insulation	Use a megger maximum 1000 V. Check that the resistance between the ground (earth) and phase lead is more than 5 megohms. Do a phase-to-phase resistance check, maximum 50 ohm.
Motor condition	Check the running values of the voltage and amperage.
Propeller	Check for wear. If necessary, replace parts. Check the direction of the rotation.
Zinc anode	If applicable, check the consumption. If necessary, replace the zinc anode.

3.2.3 Overhaul

The overhaul is performed at an authorized workshop. Maintenance as specified above plus:

Service item	Action
Bearings	Replace the bearings.
O-rings	Replace the O-rings.
Mechanical seals	Replace the mechanical seals.
Junction box	Check that the junction box is clean and dry. Check the power connections.

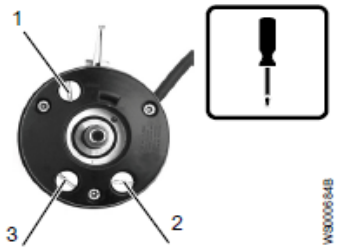
3.2.4 Service in case of alarm

Alarm source	Action
FLS	Check the connection chamber for any leakage and drain if necessary. Check mechanical seals and O-rings and replace any damaged seals with new ones.
Thermal contact	Check the connections and the electrical motor. Check the temperature and viscosity of the mixed liquid. Check that the position is according to the installation requirements
Overload protection	Check that the propeller can rotate freely.

3.2.5 Inspect the stator housing

A screwdriver is required for this procedure.

1) Attach the mixer in a screw vice. Use the lifting handle as an attachment.
2) Loosen and remove the inspection plug and O-ring.



1. Oil plug (filling)
2. Oil plug (drainage)
3. Inspection plug

3) Undo the mixer from the screw vice and turn the mixer upside down over an oil tray.

4) If any liquid runs out, replace the seal.

3.2.6 Change the propeller

CAUTION: Cutting Hazard
Sharp edges. Wear protective clothing.

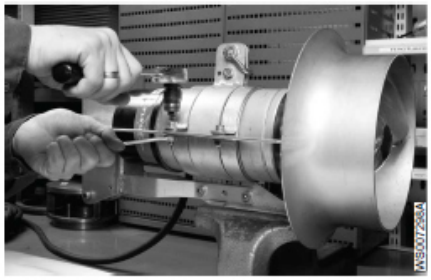
The following special tools are needed for this procedure:

- Hexagon socket wrench (13 mm)
- Hexagon socket head cup wrench (6 mm)
- Screwdriver
- Tool 82 93 11
- Torque wrench (6 mm)

Remove the jet ring, guiding claw, and propeller
The following tools are used in this procedure:

- Hexagon socket wrench (13 mm)
- Hexagon socket head cup wrench (6 mm)
- Screwdriver

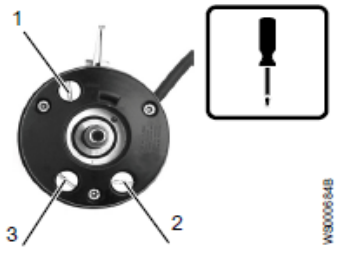
1) Loosen the guiding claw
   a) Remove the screws, washers, and nuts



   b) Remove the guiding claw

2) Remove the propeller
   a) Remove the plastic plug.
   b) Loosen the central screw and washer.
   c) Remove the propeller together with screw and washer.

3) Check for seal leakage:
   a) Attach the mixer in a screw vice.
      Use the lifting handle as an attachment.
   b) Loosen and remove the inspection plug and O-ring.



1. Oil plug (filling)
2. Oil plug (drainage)
3. Inspection plug

c) Undo the mixer from the screw vice and turn the mixer upside down over an oil tray.

d) If any liquid runs out, replace the seal.

Assemble the propeller and guiding claw

Before following this procedure, you must fill the oil. See “Fill the oil”
The following tools are used in this procedure:

- Hexagon socket wrench (13 mm)
- Hexagon socket head cup wrench (6 mm)
- Strap mounting tool 82 93 11
- Torque wrench (6 mm)

1) Mount the protective ring.

2) Press it down towards the oil housing until it bottoms out.

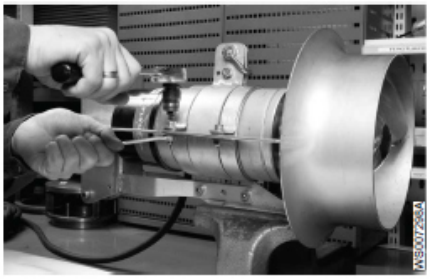
3) Put on the strap and tighten it 7±2 mm from the bottom edge

4) Mount the propeller onto the shaft.

5) Fit the screw and tighten it to 17 Nm

6) Press the plastic plug in place

7) Attach the mixer to the screw vice and mount the guiding claw.



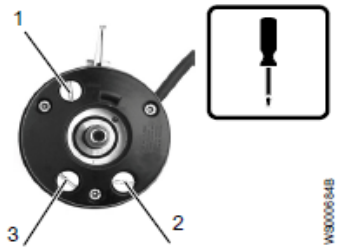
3.2.7 Change the oil

Propeller has to be removed before changing the oil.

Drain the oil

CAUTION: Compressed Gas Hazard
Air inside the chamber may cause parts or liquid to be propelled with force. Be careful when opening. Hold a rag over the plug to prevent liquid from spraying out.

1) Unscrew the two oil plugs.



1. Oil plug (filling)
2. Oil plug (drainage)
3. Inspection plug

2) Hold the mixer over a cup and allow the oil to run out.
Turn the mixer back and forth to make sure that all oil is drained.

3) Check for water in the oil. If there is water in the oil, do as follows:
a) Replace the shaft seal and the O-rings.
b) Check the oil housing for any damage, and replace if necessary.

Fill the oil

CAUTION: Compressed Gas Hazard
Air inside the chamber may cause parts or liquid to be propelled with force. Be careful when opening. Hold a rag over the plug to prevent liquid from spraying out.

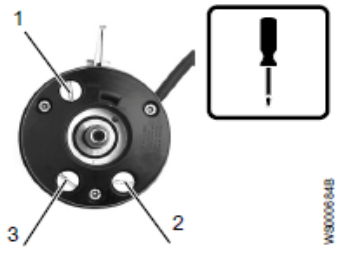
The mixer is delivered from the factory with paraffin oil with a viscosity close to ISO VG32.
Recommended oil: 90 17 52.
Examples of suitable oil types are the following:

- Statoil MedicWay 32™
- BP Enerpar M 004™
- Shell Ondina 927™
- Shell Ondina X430™

The required oil quantity is 0.15 L (0.16 qt).
The following tools are required for this procedure:

- Funnel
- Torque wrench

1) Unscrew the two oil plugs.



1. Oil plug (filling)
2. Oil plug (drainage)
3. Inspection plug

2) With the mixer in a vertical position, fill with new oil through the oil filling hole.

3) Replace the O-rings of the oil plugs and put the oil plugs back. Tighten the plugs.
   Tightening torque: 10 Nm
   If you replaced the shaft seals, then inspect the oil after one week of operation.

ENCLOSURE I: Technical Data

AQUA 8-M

Operating voltage	230 V
Frequency	50/60 Hz
Rated power P1	1,1 kW
Shaft power P2	0,75 kW
Rated current I_N	5,2 A
Cos φ	0,96
Propeller speed	1400 U/min
Protection class	IP68
Insulation class	F
SOTR	1,52 kg/h
Ø Float	800 mm
Total height	850 mm
Total weight	35 kg
Weight of the motor part	20 kg
Weight of the float	15 kg

AQUA 8-M Motor part

Limitation of use

Max. aerated surface	7,5 m²
Max. width to length ratio	2 to 1
Max. diameter	3,5 m
Min. water depth	1,0 m
Max. water depth	2,5 m
Water Temp.	5°C – 30°C

Item Numbers

Float	00040014
Spray	50000032
Assembly kit AQUA 8	50000044
Propeller AQUA 8-M	64000034
Motor with Propeller	85950009

AQUA 8-T

Operating voltage	Y400/D230 V
Frequency	50 (60 Hz optional)
Rated power P1	1,8 kW
Shaft power P2	1,5 kW
Rated current I_N	Y3,8/D5,8 A
Cos φ	0,77
Propeller speed	1385 U/min
Protection class	IP68
Insulation class	F
SOTR	1,98 kg/h
Ø Float	800 mm
Total height	850 mm
Total weight	39 kg
Weight of the motor part	24 kg
Weight of the float	15 kg

AQUA 8-T Motor part

Limitation of use

Max. aerated surface	7,5 m²
Max. width to length ratio	2 to 1
Max. diameter	3,5 m
Min. water depth	1,0 m
Max. water depth	2,5 m
Water Temp.	5°C – 40°C

Item Numbers

Float	00040014
Spray	50000032
Assembly kit AQUA 8	50000044
Motor for 400V Y	85950015
Motor for 230V D	85950016

ENCLOSURE II: Declaration of Conformity

DECLARATION OF CONFORMITY

(in accordance with enclosure II B of the Machinery directive)

Manufacturer : ATB WATER GmbH
Südstrasse 2
32457 Porta Westfalica
GERMANY

Herewith declares that:

The product : AQUA 8

Conforms to

The European Machinery Directives 2006/42/EC.
We hereby declare to be in conformity with the basic safety- and health claims concerning development and production of machinery.

By design, the motors, considered as components, comply with:

* the requirements of the standard **EN 60034**
and therefore comply with the provision of Low Voltage Directive 2014/35/EU

the EMC Directive 2014/30/EU concerning the intrinsic characteristics of emission and immunity levels.
*

During the design and construction of the aerator, following norms are used:

* EN 12100:2011: Safety of machinery: PART 1: Methodology and PART 2: Technical principles and specifications

* EN 60 034: Concerning safety precautions of electrical machinery

Remark: The machines mentioned above shall not be started until the installation, into which they have been incorporated, has been declared to be in conformity with the Machinery Directive.

This declaration of conformity is invalid if any constructive changes that affect the operating instructions or the technical specifications and/or the intended use have been made to the product.

Germany, Porta Westfalica, 1.03.2018

ATB WATER GmbH
Represented by its Manager

Markus Baumann