



ARTECHNO

INSTALLATION MANUAL



AQUALUX

These are the original English instructions/Translation of the original English instructions

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Product Modifications

YEAR	TYPE	MODIFICATIONS
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1 GENERAL INFORMATION

1.1 Description of the User

This manual is intended for the installers and dealers of the Aqualux. The installer or his employees are expected to have knowledge of mechanical, electrical and software engineering. The installer has to be approved by Artechno before being starting their first installation of this product. If necessary the installer can contact Artechno for more information and documentation on correct installation of the product.

This document is intended for the dealers and installers of the Aqualux.

1.2 Conventions Used in This Manual

The following style conventions are used in this document:

Bold

Names of product elements, commands, options, programs, processes, services, and utilities
Names of interface elements (such as windows, dialog boxes, buttons, fields, and menus)
Interface elements the user selects, clicks, presses, or types

Italic

Publication titles referenced in the text
Emphasis (for example a new term)
Variables

Courier

System output, such as an error message or script
URLs, complete paths, filenames, prompts, and syntax

User input variables

< > Angle brackets surround user-supplied values

[] Square brackets surround optional items

| Vertical bar indicates alternate selections – the bar means “or”

1.3 Explanation of Safety Warnings

⚠ DANGER

DANGER INDICATES A HAZARD WITH A HIGH LEVEL OF RISK WHICH, IF NOT AVOIDED, WILL RESULT IN SERIOUS INJURY OR DEATH.

⚠ WARNING

WARNING INDICATES A HAZARD WITH A MEDIUM LEVEL OF RISK WHICH, IF NOT AVOIDED, COULD RESULT IN SERIOUS INJURY OR DEATH.

⚠ CAUTION

CAUTION INDICATES A HAZARD WITH A LOW LEVEL OF RISK WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY.

NOTICE

INDICATES INFORMATION CONSIDERED IMPORTANT, BUT NOT HAZARD-RELATED.

1.4 Retaining Instructions

Read and understand this manual and its safety instructions before installing the product. Failure to do so can result in serious injury or death.

Follow all the instructions. This will avoid fire, explosions, electric shocks or other hazards that may result in damage to property and/or injuries.

The product shall only be installed by persons who have fully read and understand the contents of this installation manual and have been properly educated in the workings of the product.

Ensure that each person who installs the product has read these warnings and instructions and follows them.

Keep all safety information and instructions for future reference.

The manufacturer is not liable for cases of material damage or personal injury caused by incorrect installation or non-compliance with the safety instructions. In these cases, the warranty will be voided.

1.5 Obtaining Documentation and Information

1.5.1 Internet

There is no version of this manual to be found on the internet. If documentation is required please check subparagraph "1.5.2 Ordering Documentation".

1.5.2 Ordering Documentation

Documentation, user instructions and technical information can be ordered by calling Artechno at +31 (0) 174512051 or by sending an email to info@artecho.nl.

1.5.3 Other languages

This is the English user manual. Manuals in other languages are available upon request, the requesting party may be charged for translation costs.

1.5.4 Documentation Feedback

Comments and feedback regarding this document can be submitted on the support website www.artecho.nl or sent to info@artecho.nl.

Comments regarding the improvement of the manual are appreciated.

1.5.5 Support and service

For information regarding special tools, materials, questions, information, technical assistance or ordering user instructions, please contact:

Artechno Growsystems B.V., Pastoor
Verburghlaan 20, 2678 NE De Lier
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2 DESCRIPTION OF THE PRODUCT

2.1 Intended Use and Reasonably Foreseeable Misuse

The Aqualux is intended to be used for cleaning the nutritional water allowing for eco-friendly draining of the water in a system and/or reentry in the current system. The Aqualux is available with or without a couple of optional modules see paragraph "4.3 Optional modules". On further note it is recommended to take additional measures to ensure hygiene of the water and environment.

2.2 Process Overview

The process of the Aqualux depends on the modules chosen by the client. In this paragraph a general overview of states is given using a state machine diagram (Figure 1).

NOTICE

NEVER RUN THE AQUALUX WITHOUT AN OPERATING FILTER TO FILTER OUT WASTE THAT CAN DAMAGE PARTS INSIDE THE UV CHAMBERS.

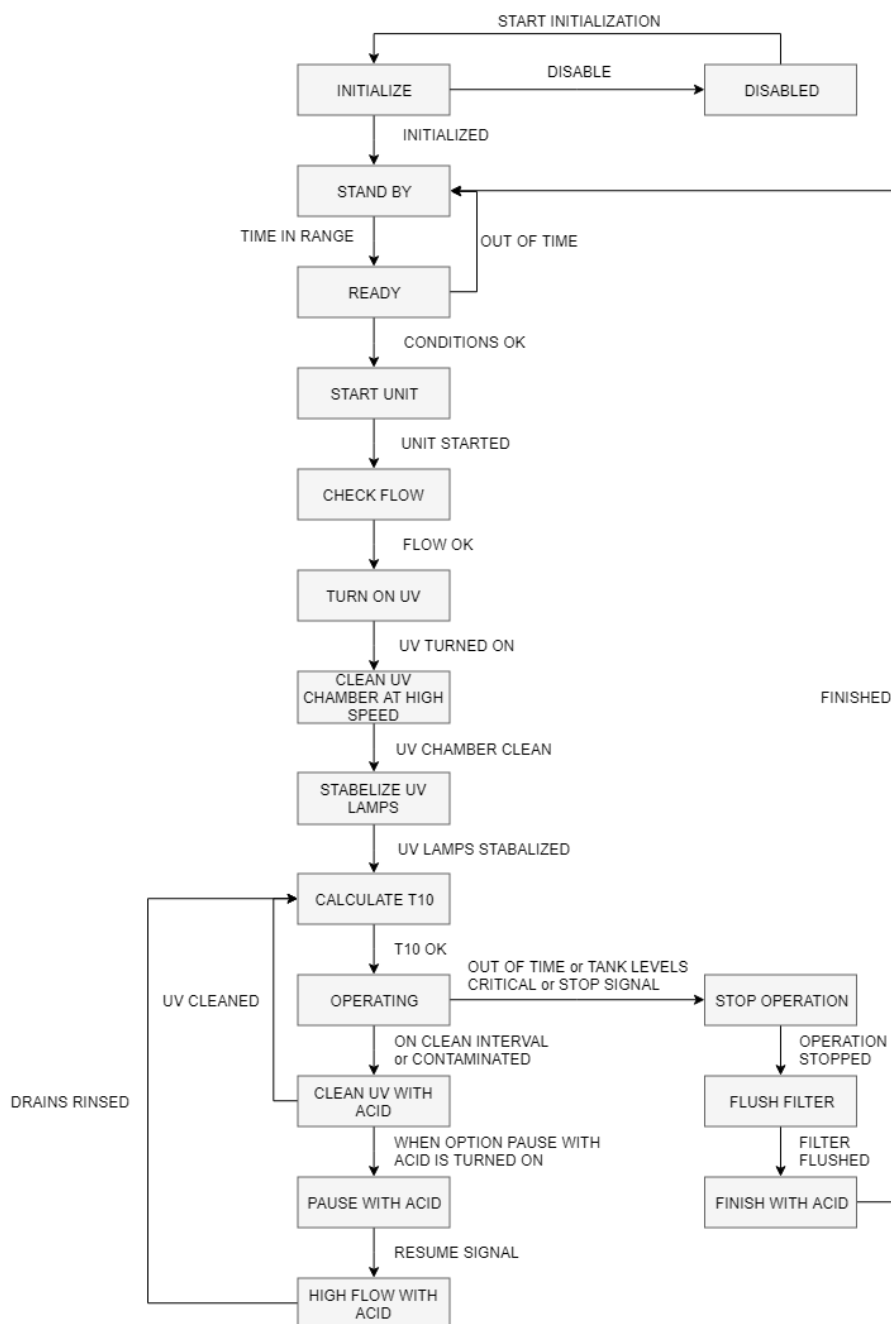


Figure 1 State machine diagram

2.2.1 During Start-Up

The Aqualux only starts between the set time (From) and set time (Till) interval. A batch that has started between this interval will always finish its operation even if the stop time has been reached. Before the Aqualux starts the Aqualux has to satisfy one of the following requirements:

- The water level in the contaminated water tank is above the set start value and the disinfected water tank is below the set start value;
- The manual start button is pressed on the touchscreen.

The Aqualux will stop automatically when:

- The contaminated water level gets below the set stop value.
- The disinfected water level gets above the set stop value.

During the start-up phase the 3-way valve stays in the return to contaminated drain orientation unless, the limit switch of the contaminated water tank is made and the limit switch of the disinfected water tank is broken.

When the starting requirements are met the system pump and UV lights are turned on immediately. Subsequently the pH regulation is initiated to regulate the pH value of the water to the desired pH value. If the optional hydrogen peroxide module is present it will initiate together with the pH regulation procedure.

It takes approximately 3-5 minutes for the UV lamps to reach their operating temperature. The flow will be adjusted to the UV dosage generated by the UV lamps in real time.

When the flow and dosage are stable the transmission value (T10) will be determined. This is done once and only when the Aqualux is in the start-up phase. This is necessary to ensure the quartz tubes are clean (see stop acid regulation). Determining the T10 value is always done after a certain interval after the starting the Aqualux. The parameters to calculate this value are the measured flow by using the flow indicator and the dosage applied to the water.

If the T10 value is below a set lower limit and the dosage is above the upper limit taking the dead zone in to account the 3-way valve will switch to redirect the water to the disinfected water tank.

A couple of counters start running when the Aqualux starts:

- Total amount of start-ups for the UV lights.
- The time the UV lights are in operation. Subsequently this counter adds one hour of time for each UV start-up cycle.

2.2.2 During Operation

During operation the dosage is regulated by regulating the flow of the water in the system. This causes the dosage to be stable on the set value in between the set dead zone (The maximum offset of the actual value).

The pH value is constantly measured and regulated to a set value using acid from the acid reservoir tank. A couple of times per hour (setting 11) the pH value will be regulated to a pH value of 3 to rinse the quartz tubes. Appropriately.

When the optional module hydrogen peroxide is integrated into the system the amount of hydrogen peroxide inserted is regulated. The amount of hydrogen peroxide added to the water is dependent on the flow of the water in the system.

During disinfection a couple of security precautions are thoroughly monitored namely:

- If all UV lights are turned on,
- If all power applied to the UV lights is approximately the same with a maximal offset of +/- 10% respectively,
- If the temperature of the water in the system is within set limits,
- If the pH regulation is functioning properly,
- If the dosage is the desired value, if the desired value is not met for a set time interval the 3-way valve will be set to send the water to the contaminated water tank.
- If the flow is between the set minimal and maximal flow (depending on the amount of UV chambers)
- If the thermostat of the system pump is within set limits.
- If the pressure difference between the screen filter / sand filter input and output is within set limits.

It is optional to mix clean water with the system water when the T10 value is too low or if the user desires to add clean water to the contaminated water. The user can set the amount the valve that regulates the amount of clean water added to the system in percentages. If the desired value is changed during operation the current batch will be finished and a new T10 value is determined on the next start-up cycle.

2.2.3 During Backflow Cycle

There are two filters available for the Aqualux, depending on the type of filter the required operations are executed.

2.2.3.1 Screen Filter

Backflow in a screen filter happens during operation. A backflow sequence is initiated when the pressure difference between the input and output water is a set value. The decline of the filter has to be at least 12 m³/hr with a pressure of 2 bar before rinsing starts. A rinse cycle takes approximately 20 seconds.

If the flow is greater than 12 m³/hr the flush valve and the backflow motor will be activated. The flow through the UV chambers will temporarily decrease making the UV dosage higher. This is not a problem. When the flow is lower than 12 m³/hr actions need to be taken to ensure a flow of at least 10 m³/hr before rinsing. To increase the flow the performance of the system pump needs to increase. To ensure that the dosage of the UV does not get too low because of the increase in flow the flush motor has to be pinched while increasing the pump capacity to the desired 10 m³/hr

2.2.3.2 Sand Filter

Backflow in a sand filter happens during the standby phase of the Aqualux. Furthermore a couple of requirements have to be met before initiating the backflow cycle in a sand filter, namely:

- De starting time is reached and the pressure difference during disinfection has been bigger than the set value;
- The amount of disinfection hours has been exceeded;
- The amount of disinfected cubic meters of water has been exceeded.

During the backflow cycle the valves the for sand filter in and sand filter out have to be open. Furthermore the backflow valve and the filter flush valve have to be opened as well.

During the inflow cycle which happens directly after the backflow cycle, the valves for sand filter in and the inflow crane have to be opened.

When the cycle starts during operation (start time is reached) the disinfection process stops and the sand filter will only go through its inflow cycle. If the inflow cycle has finished the inflow valve will be closed and the start procedure will be initiated.

2.2.4 During Stand By

If one of the water tanks indicates that its level is out of bounds the stop procedure will start. The 3-way valve will let the water flow to the contaminated tank and subsequently turns off the UV lights. The system pump stays activated in overrun time. During this overrun time the pH regulator regulates to a value of 3 pH if "Paused with Acid" is activated.

Security precautions that are monitored during the standby phase are:

- If all UV lights are turned off;
- The temperature of the water in the system.
- The temperature switch (If the temperature inside the UV chamber exceeds 50 degrees Celsius the power will be cut off);
- pH regulation is monitored.

2.3 Product Elements

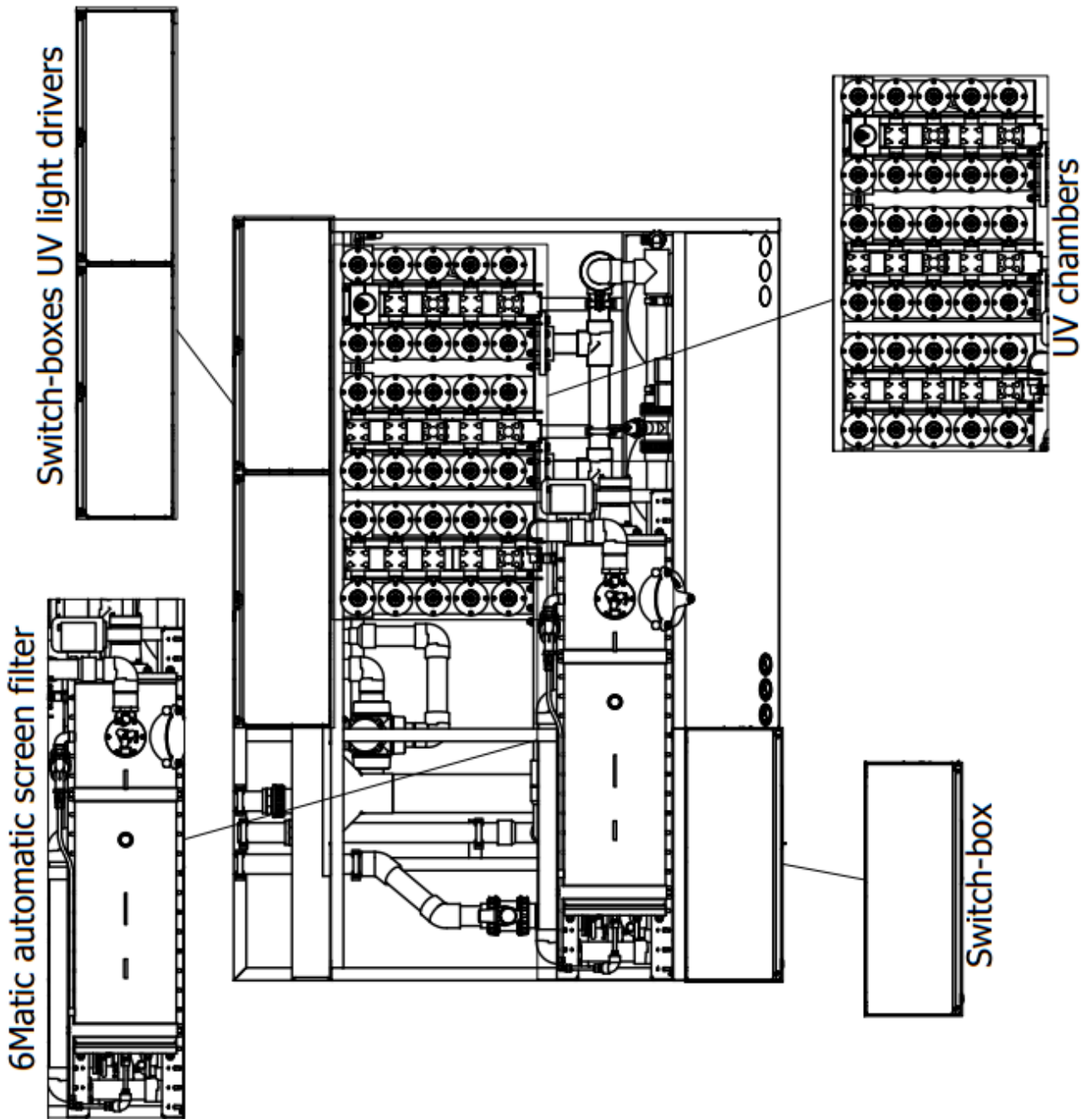


Figure 2 General overview

2.3.1 Switch-boxes UV light drivers

In the UV light drivers switch boxes light drivers are mounted inside that regulate the power supplied to the UV lights inside the UV chambers.

2.3.2 Flow indicator

The flow meter measures the latest flow of the water.

2.3.3 UV chambers

The UV chambers are made of a stainless steel outer shell with an inner shell made of quartz.

NOTICE
THE QUARTZ INNER SHELL IS FRAGILE.
⚠ CAUTION
BEFORE APPLYING MAINTENANCE TO THE UV-CHAMBERS ALWAYS MAKE SURE THAT THE PH VALUE OF THE WATER IS NEUTRAL.

The UV lights are located in de inner shells of the UV chambers.

NOTICE
NEVER TOUCH THE LAMPS WITH BARE HANDS, USE SAFETY GLOVES. ACIDS AND GREASE THAT REMAINS AFTER TOUCHING WITH BARE HANDS WILL EVENTUALLY CAUSE DAMAGE TO THE LAMP.

2.3.4 Switch-box

The Switch-box contains the electrical components that control the functioning of the system. Furthermore on the touchscreen display of the switch-box alarms and/or notification will be displayed. Control settings for the functioning of the system can be adjusted here as well.

2.3.5 Suction line

In the suction line a under pressure is generated by the system pump to generate a water flow.

2.3.6 UMI-6-Matic automatic screen filter

The screen filter keeps dirt that resides in the water from getting in the system. This prevents the dirt particles from blocking the UV light in later stages.

NOTICE
TO GUARANTEE A WELL WORKING FILTER CONSULT THE BASIC INTERVALS IN PARAGRAPH "5.1.3 MAINTENANCE PLANNING".

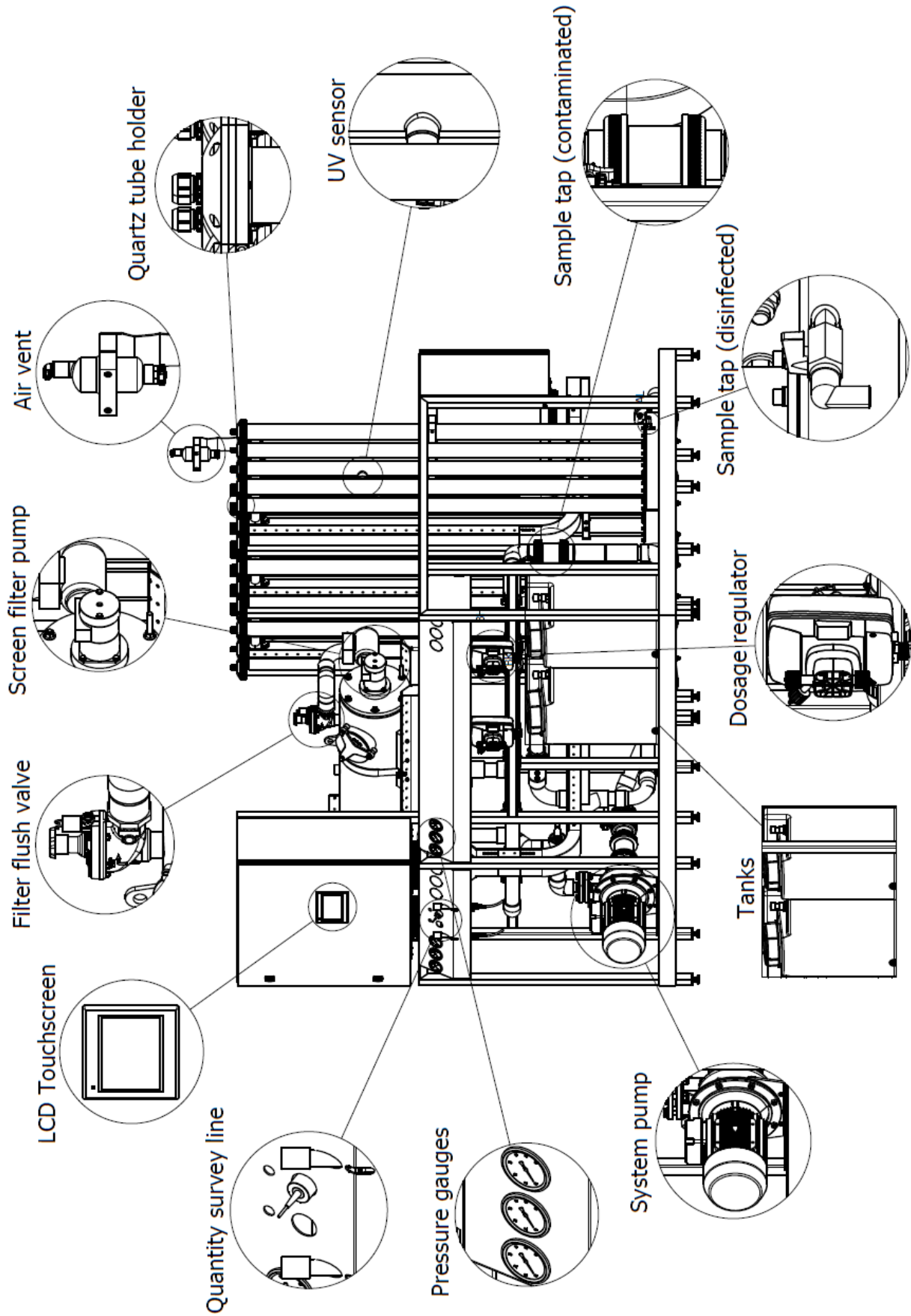


Figure 3 Descriptive parts (Front)

2.3.7 LCD Touchscreen

The human machine interaction is generally done using this LCD Touchscreen. The screen notifies the users of any events happening in relation to the system and gives the user the freedom to change relevant settings of the system. Dealers can adjust the more advanced settings using the same screen.

2.3.8 Filter flush valve

This valve opens if the screen filter wants to start cleaning itself to allow a backflow to be generated.

2.3.9 Filter gear drive

Subsequently with the filter flush valve the controller activates the gear motor to rotate the screens inside the filter generating a backflow that cleans the screens from residual debris.

2.3.10 Air vent

The air vent automatically removes most of the air out of the system to prevent multiple errors shown in paragraph "2.7. Alarms".

2.3.11 Quartz tube holder

The quartz tube holder is used to hold the quartz tube in place to prevent the water from pushing it out of place.

2.3.12 UV sensor

The UV sensor is located in a "immersion sleeve" which is a watertight sleeve that is bolted to the UV chamber. The UV sensor is used to measure the amount of fluency in the chamber allowing the system to regulate its transmission value (T10) to apply the desired UV dosage.

2.3.13 Sample tap (Contaminated)

This tap is used to drain a sample of the contaminated water to determine its properties manually.

2.3.14 Sample tap (Disinfected)

This tap is used to drain a sample of the disinfected water to determine its properties manually. This tap is commonly used for calibrating the UV sensor and the transmission value (T10).

2.3.15 Dosage regulator

The dosage regulator is used for acid and optionally hydrogen peroxide regulation. The dosage regulator for dosing acid is equipped with acid resistant materials. These materials are only resistant to acid concentrations up to 40%. It is advised to use an acid compound of max. 38%.

The dosage pump for hydrogen peroxide is equipped with materials resistant too hydrogen peroxide. These materials are only resistant up to a concentration of max. 30%. Make sure to only use a concentration that does not exceed this limit.

⚠ CAUTION
BEFORE APPLYING MAINTENANCE TO THE DOSAGE REGULATOR FOR ACIDS ALWAYS PUT ON SAFETY GOGGLES AND SAFETY GLOVES.
⚠ CAUTION
NEVER HAVE AN OPEN FLAME PRESENT WHEN APPLYING MAINTENANCE TO THE HYDROGEN PEROXIDE DOSAGE REGULATOR.

2.3.16 Reservoir Tanks

There is a maximum of three reservoir tanks. The righter most tank is most commonly the acid tank storing the acid used by the system also indicated with the ACID label on the tank. The other two tanks are optional depending on the configuration. To determine the contents of the tank notify the labels on the tank.

2.3.17 System Pump

The system pump is controlled using and frequency inverter. This inverter makes sure the correct flow and/or pressure of the pump are achieved. Furthermore a pump house (where the system pump is placed) is outfitted with a temperature sensor to guard the pump from overheating. To measure if the flow of the system is correct a flow meter is also implemented.

NOTICE
THE PUMP MAY NEVER RUN WITHOUT WATER.

2.3.18 Pressure gauges

The pressure gauges display the water pressures on the input and the output of the filter and the general pressure of the water in the system.

2.3.19 Quantity survey line

The quantity survey line measures certain quantities and qualities of the water using a pH probe to measure the pH value of the water and optionally a EC probe to measure the electrical conductivity of the water.

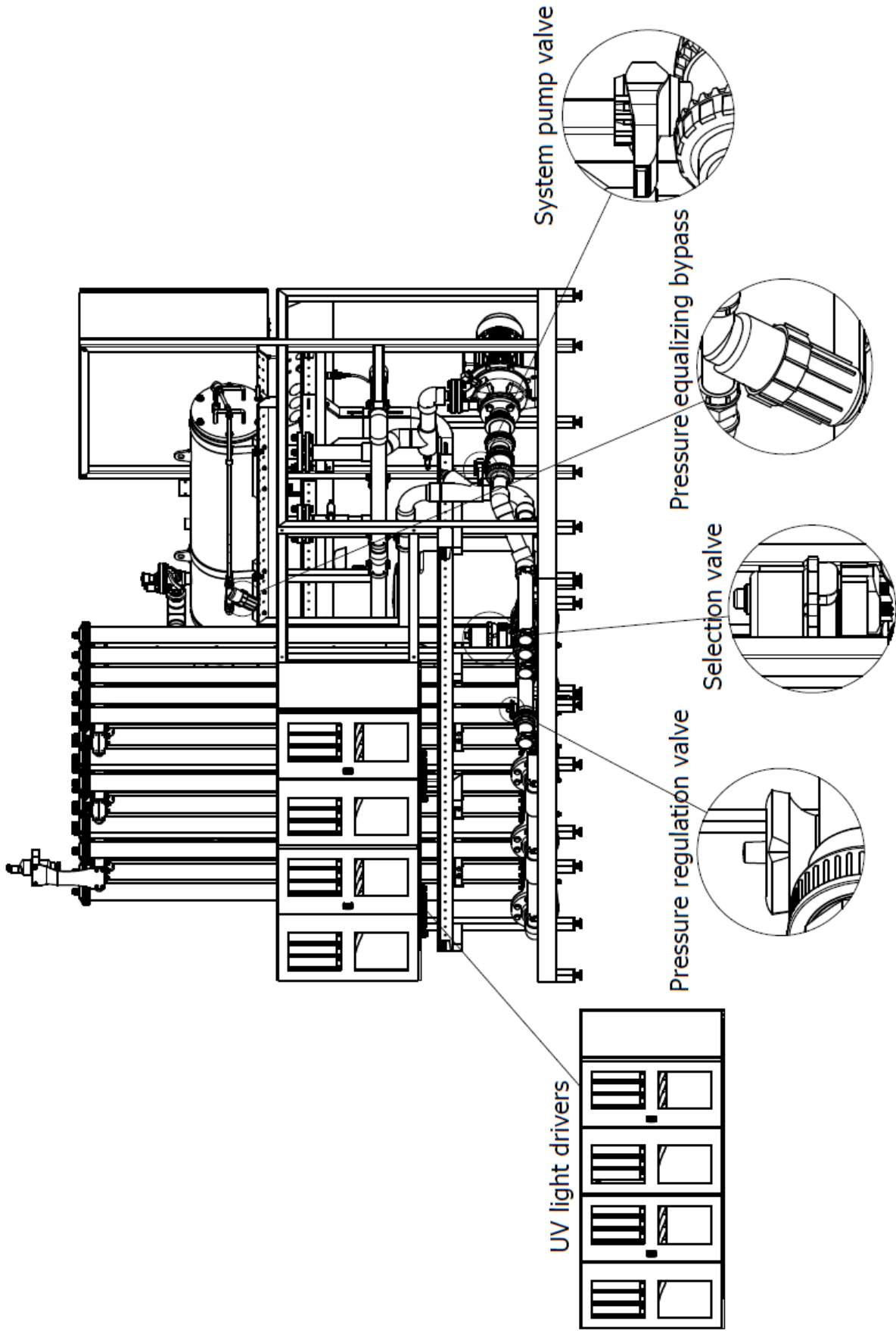


Figure 4 Descriptive parts (Back)

2.3.20 UV light drivers

The UV light drivers are used to regulate the power output of the UV lights to achieve the desired UV dosage.

2.3.21 Pressure regulation valve

The pressure regulator is used to optimize the systems generated pressure.

2.3.22 Selection valve (contaminated / disinfected)

The valve is located in the pressure tube of the system. Standard orientation of this valve is “return to contaminated drain”. When the system is cleaned the valve will be switched to the disinfected drain(disinfection).

2.3.23 Pressure equalizing bypass

Using the pressure equalizing bypass a similar pressure on both sides is required for the backflow of the filter to run smoothly.

2.3.24 System pump valve

This valve is used to disconnect the system pump form the rest of the system to apply maintenance to the system pump or to depressurize the system.

2.4 Technical Data

Table 1 Technical specifications

PARAMETER	UNIT
DEVICE NAME	AQUALUX
DESIGNATION	DISINFECT WATER BY USING UV-LIGHT
TYPE	AGRICULTURAL MACHINE
TECHNICAL LIFE SPAN	10-20 YEARS (DEPENDING ON THE ENVIRONMENT AND MAINTENANCE BY THE USER)
CAPACITY	DEPENDS ON CONFIGURATION
ENERGY CONSUMPTION	DEPENDS ON CONFIGURATION(LABEL IN SWITCH BOX)
PERFORMANCE DATA	DEPENDS ON CONFIGURATION(LABEL IN SWITCH BOX)
CHEMICAL COMPOSITION	STAINLESS STEEL AND COMPOSITES
SUPPLY DATA FOR POWER, GAS, WATER AND OTHER CONSUMABLES	POWER CONSUMPTION: DEPENDS ON CONFIGURATION* OPERATING PRESSURE WATER : 3 BAR (43.5 PSI)
EMISSION OF NOISE AND WASTEWATER	EMISSION OF NOISE = 84DB, NO WASTE WATER

2.5 Product Compliance

This product complies to all relevant European Directives. The Declaration of Conformity can be found in the appendix. The Product is in compliance with:

- DIRECTIVE 2006/42/EG relating to Machinery,
- DIRECTIVE 2014/30/EU relating to electromagnetic compatibility,
- DIRECTIVE 2014/35/EU relating to low voltage appliances.

2.6 Operating Panels

The user interface of the Aqualux is fully operated with the LCD touchscreen. The Aqualux can also be operated remotely, too operate the Aqualux remotely a user account has to be activated. Contact the dealer for more information.

NOTICE

THE TOUCHSCREEN CAN ONLY BE OPERATED BY USING ONE FINGER AT A TIME. DO NOT USE ANY SHARP OBJECTS, PENCILS AND/OR STYLUS TO OPERATE THE SCREEN TO PREVENT DAMAGE TO THE SCREEN.

2.6.1 Basic Navigation

Every window is provided with basic navigation items. Basic navigation is divided into an upper bar (Figure 5) and a lower bar(Figure 6).



Figure 5 Upper bar

- Home : Brings the user back to unit overview window
- Window name : The window name is displayed in the center of the upper bar. Showing the user what window is open.

- Date/Time : The current date and time are displayed on the right-hand side of the upper bar.



Figure 6 Lower bar

Alarm Indicator : The lower bar blinks red when an alarm is active.

Back : Return to the previously used window.

User Menu : Navigates to the user menu window.

Dealer Menu : Navigates to the dealer menu.

Alarms : Navigates to the alarm window.

2.6.1.1 Screensaver Mode

If the user interface is not used for 15 minutes the LCD touchscreen automatically switches over to its screensaver (Figure 7).

2.6.1.2 Sleep Mode



Figure 7 Screensaver screen

the LCD touchscreen goes in sleep mode after the screensaver is displayed for 15 minutes generating a black window. The LCD touchscreen wakes up when pressed on any location.

2.6.2 Unit Overview

The window unit overview gives the user an overview of the status of the unit.

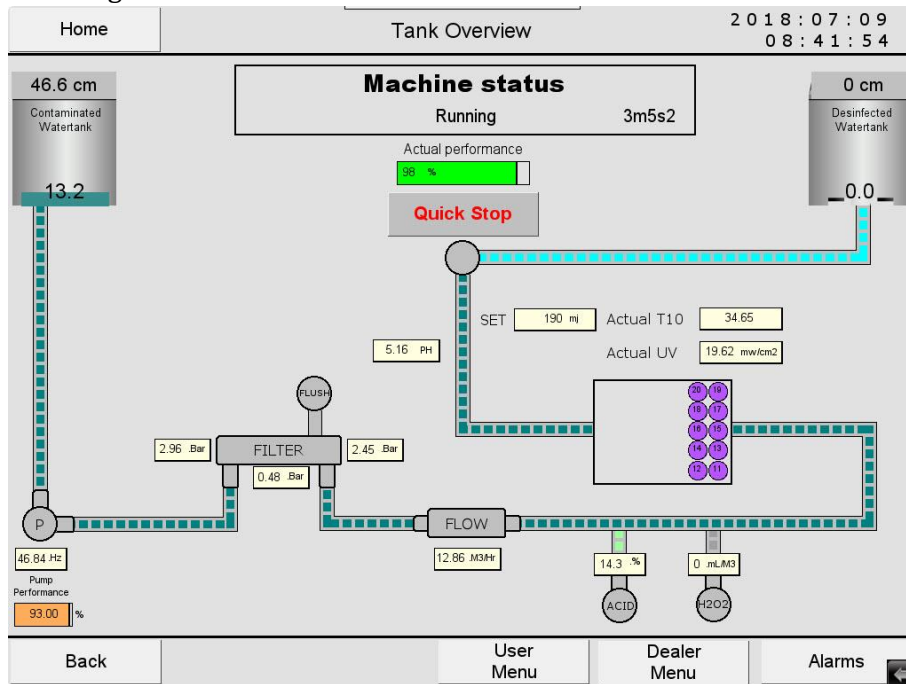


Figure 8 Unit Overview winter

Machine status STATE minutes : seconds

Shows the status of the machine and the amount of time it is has this status.

Actual performance (0 – 100)%

Shows the performance of the machine in percent.

Contaminated water tank height xx.x cm

Shows the height of the water in the water tank.

Contaminated water tank capacity (0 – 100)%

Shows the relative volume of the tank.

Disinfected water tank height xx.x cm

Shows the height of the water in the water tank.

Disinfected water tank capacity (0 – 100)%

Shows the relative volume of the tank.

Freshwater valve (0 – 100)%

Shows the performance of the fresh water valve in percent.

System pump performance (0 – 100)%

Shows the occupation of the system pump.

System pump frequency (0.00 – 50.00) Hz

Shows the frequency the pump is running at.

FILTER pressure IN (2 – 4) bar

Shows the pressure of the coming into the filter.

FILTER pressure difference (0 – 0.5) bar

Shows the pressure difference between the in- and outgoing water.

FILTER pressure OUT (2 – 4) bar

Shows the pressure of the outgoing water.

FLOW (0 – max. flow) m³/hr

Shows the flow of the water in the system in m³/hr.

ACID (0 – 100)%

Shows the performance of the acid valve in percent.

H2O2 (0 – 100)%

Shows the performance of the hydrogen peroxide valve in percent.

UV lights state

Shows the state of the lamps using the following reference chart.

- Drive OK
- Lamp starting
- Lamp On - pre heating
- Lamp On - full power
- Lamp On - power problem
- Lamp / drive error

UV dosage SET (0 – 250) mJ

Shows the set UV dosage in millijoules.

UV dosage T10 (0 – 100)%

Shows the transmission value (T10) of the water.

UV dosage UV (0 – 250) mW/cm²

Shows the dosage of UV light in milliwatts per square centimeter.

pH measurement (0.00 – 14.00) pH

Shows the pH value of the output water.

EC measurement (0.00 – 10.00) EC

Shows the electrical conductivity level of the output water.

2.6.3 User Menu

The user menu is used by the dealer and the user and is secured with a 4 digit login code. The login code can be changed by the user when desired. The default login code is [1234].The login code unlocks the user menu for a couple of minutes before returning to tank overview window.

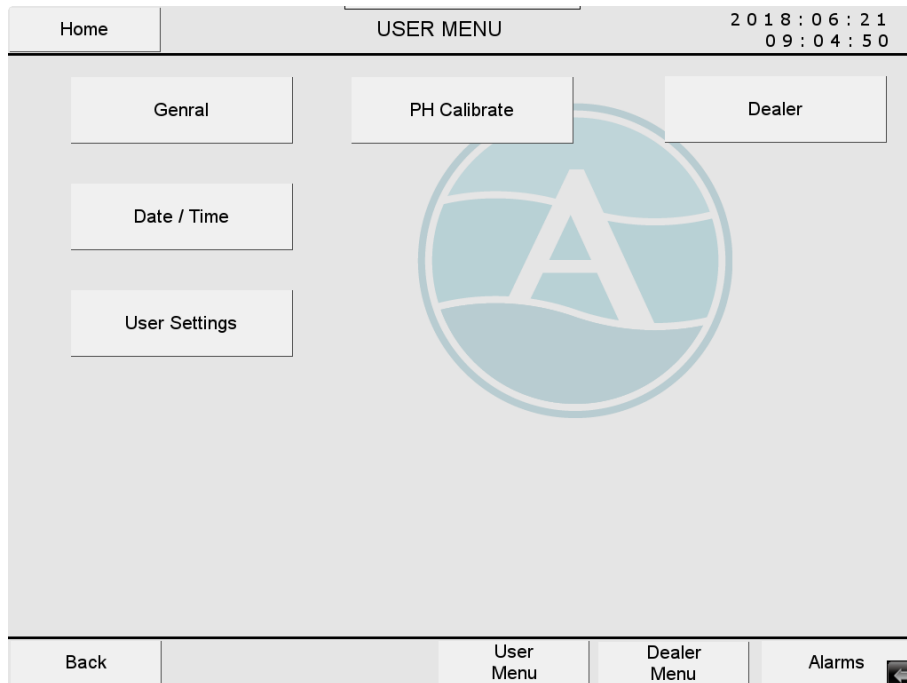


Figure 9 User menu navigation window

2.6.3.1 Login Window

To unlock the user menu :

1. Press on the input field where the login code has to be entered Figure 10).
2. A 'keypad' for user input appears.
3. Type in the correct login code and press [Enter].
4. Press [Confirm User Code].

When the inserted login code is correct the user menu will be displayed on the window (Figure 9).

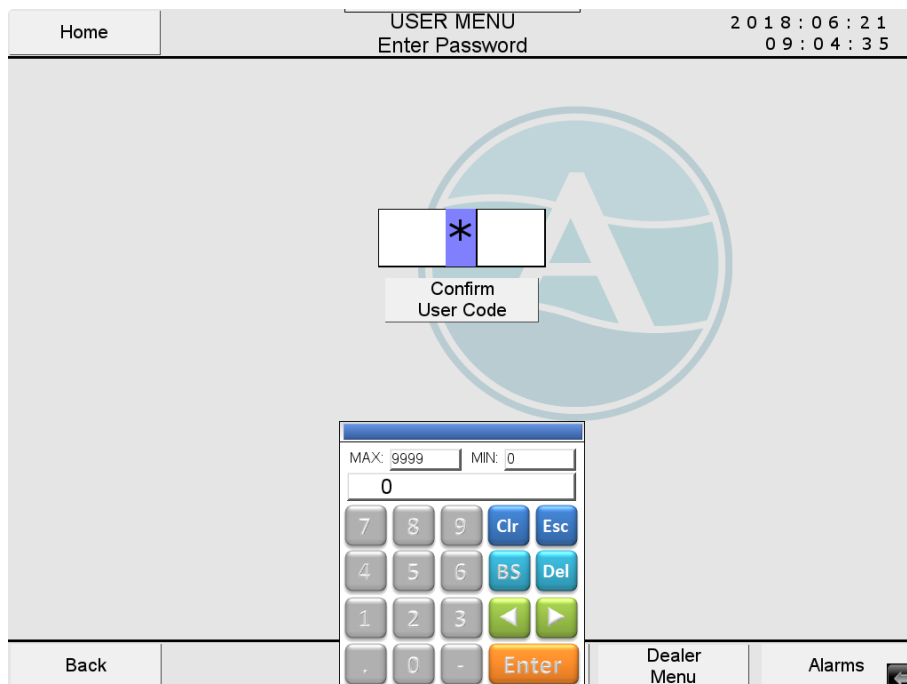


Figure 10 Login window

2.6.3.2 General Information

When the button general is pressed the general info window (Figure 11) will be displayed on the window.

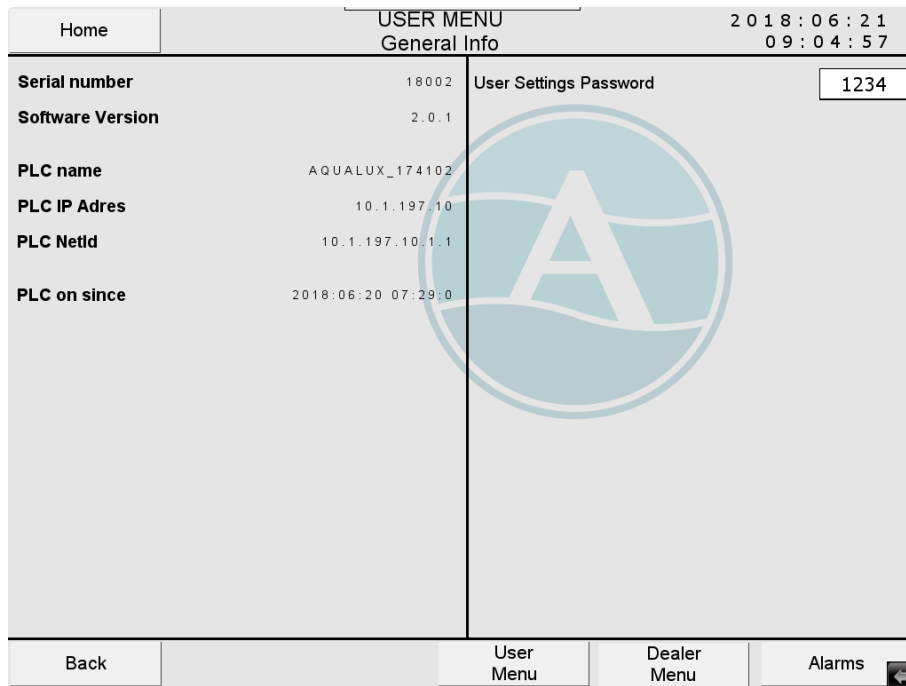


Figure 11 General information window

In Figure 11 the system information is displayed on the left-hand side. On the right there is a possibility to adjust the login code.

2.6.3.3 Date / Time

By pressing the Date/Time button in the user menu the window shown in Figure 12 will be displayed.

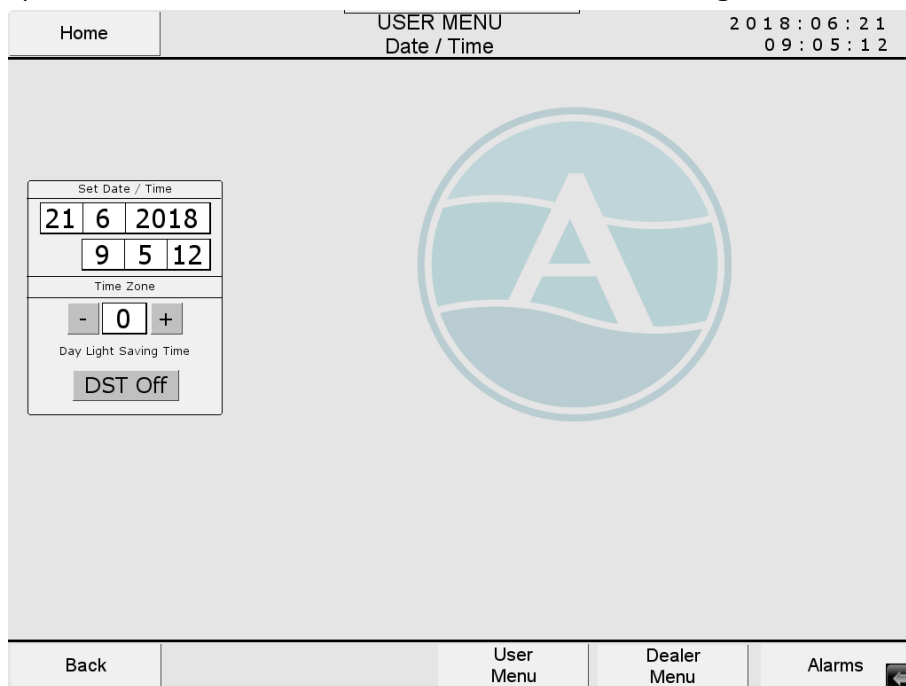


Figure 12 Date/Time window

Set Date *day : month : year*
Adjusts the date.

Set Time *hours : minutes : seconds*
Adjusts the time.

Time zone *+/- xx GMT*
Adjusts the time zone.

Daylight Saving Time(DST) *On/Off*
(De)activates DST.

2.6.3.4 Unit Settings

By pressing unit settings in the user menu the unit settings displayed in Figure 13 will be shown.

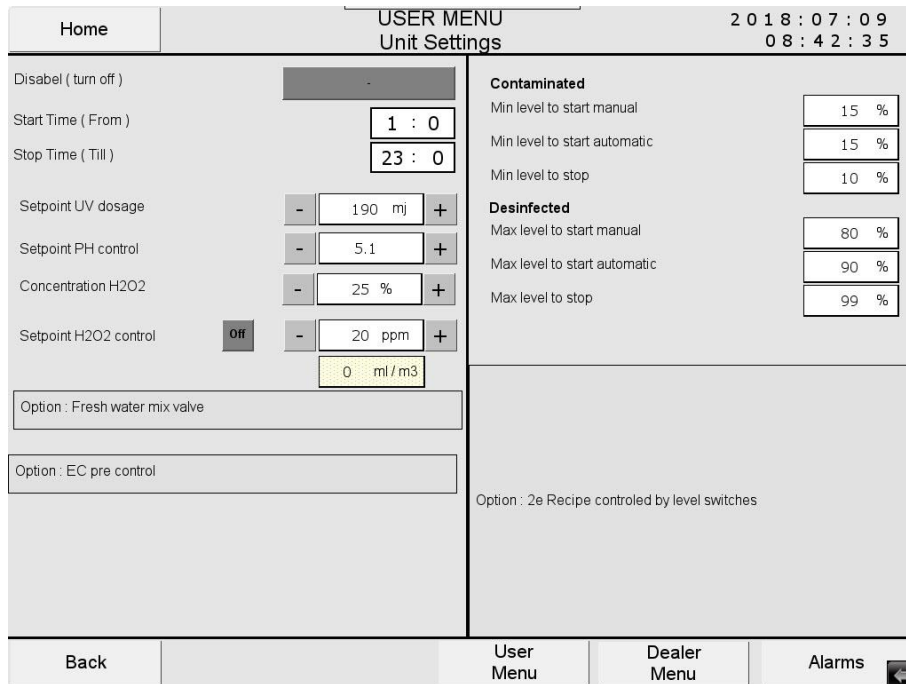


Figure 13 Unit settings window

Start time (From) hours : minutes

The time the Aqualux starts at.

Stop time (Till) hours : minutes

The time the Aqualux stops at.

Setpoint UV dosage (80 – 250) mJ/cm²

The dosage at which the unit has to disinfect.

Setpoint pH control (0 - 14) pH

The desired pH value of the outgoing water.

Setpoint clean water mix (0 – 100)%

The desired valve position(only without EC control)

Setpoint EC control (0 – 10) EC

The desired EC value of the outgoing water (only without clean water blender).

Setpoint hydrogen peroxide (0 – 100) ml/m³

The desired dosage of hydrogen peroxide in ml/m³

Min level to start manual (0 – 100)%

Minimal water level required to allow a manual start.

Min level to start automatic (0 – 100)%

Minimal water level required to start automatically.

Min level to stop (0 – 100)%

When the water level reaches this height the Aqualux stops.

Max level to start manual (0 – 100)%

Maximum water level at which a manual start is allowed.

Max level to start automatic (0 – 100)%

Maximum water level at which the Aqualux starts automatically.

Max level to stop (0 – 100)%

When the water level reaches this height the Aqualux stops.

2.6.3.5 pH Calibrate

By pressing the PH calibrate in de user menu the PH calibrate window (Figure 14) is shown.

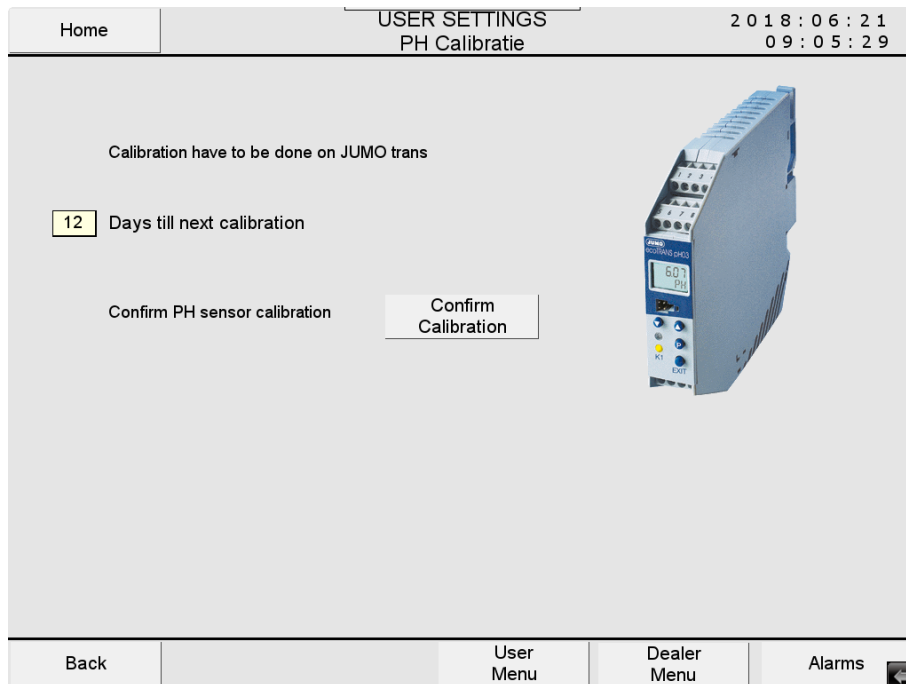


Figure 14 pH calibrate window

This window shows the amount of days until the next pH sensor calibration cycle is required. Check chapter “6. Installation” for reference on how to calibrate the sensor.

2.6.4 Dealer Menu

The dealer menu is to be used by the dealer only to adjust more advanced settings. The dealer is able to log in to this menu in the same way as logging in to the user menu but with a code specifically generated for the dealer.

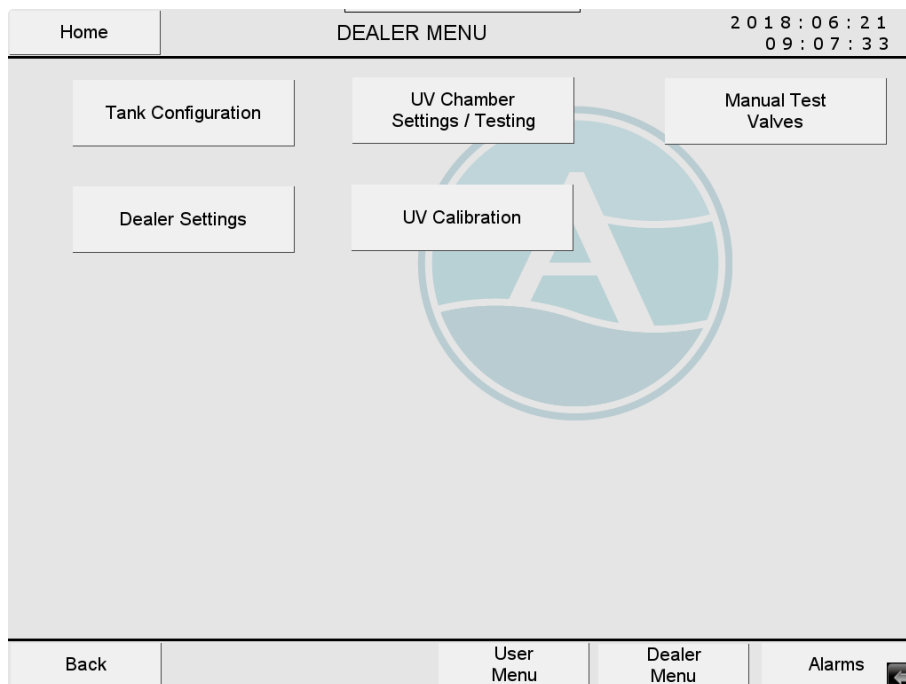


Figure 15 Dealer menu navigation window

2.6.4.1 Tank Configuration

By pressing the tank configuration button in the dealer menu the following window will be shown.

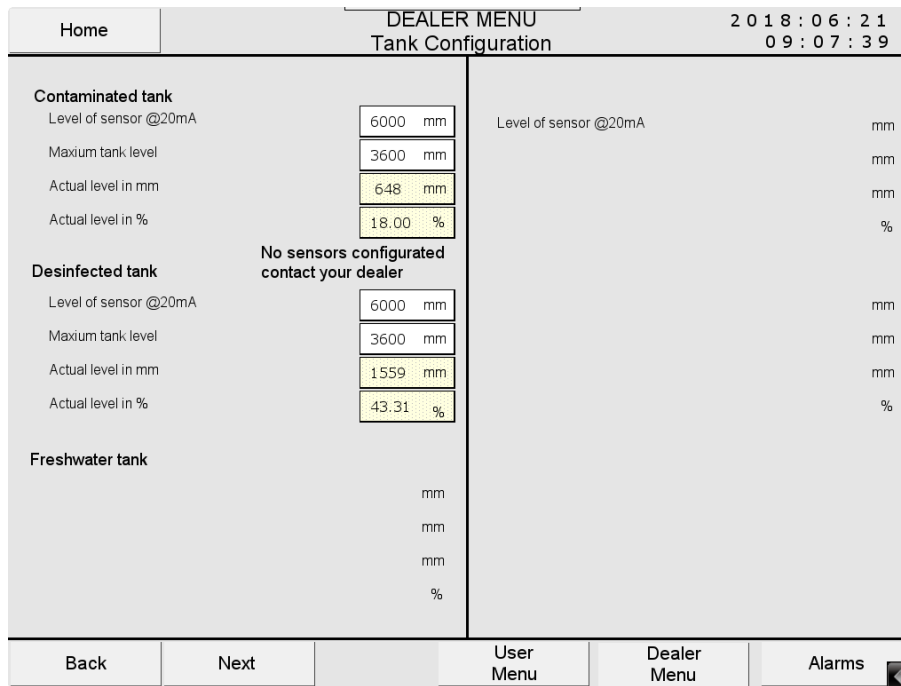


Figure 16 Tank configuration window

Level of sensor @ 20 mA	xxxx mm
Shows the maximum value in mm for the used sensor.	
Maximum tank level	xxxx mm
Shows the maximum height of the water in the tank.	

Actual level in mm	xxxx mm
The height of the water in the tank in millimeters.	
Actual level in %	(0 – 100)%
The height of the water in the tank in millimeters.	

2.6.4.2 UV Chamber Overview

By pressing the UV chamber overview button in the dealer menu the follow window appears. In this overview the dealer can see the numbers of the designated lamps, manually operate each lamp individually and adjust or view certain values.

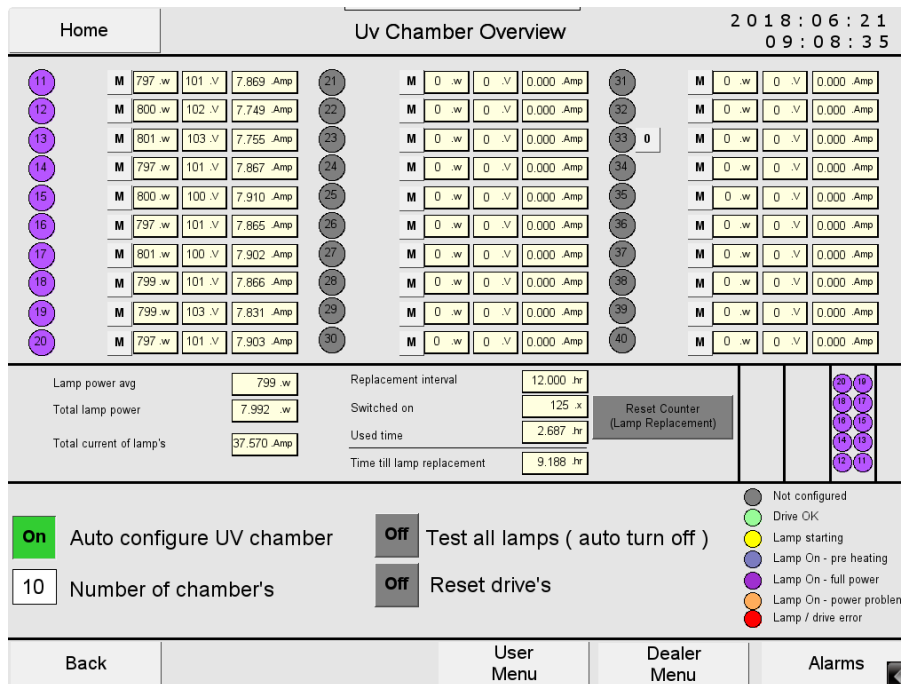


Figure 17 UV chamber overview window

- Lamp power** (0 – 1000) W
The power used by the specific lamp.
- Lamp voltage** (0 – 200) V
The voltage used by the specific lamp.
- Lamp current** (0 – 10) A
The current used by the specific lamp.
- Lamp power average** (0 – 1000) W
The average power in Watts generated used by the UV lamps.
- Total lamp power** (0 – 10000) W
The sum of the power in Watts used by the UV lamps.
- Total current of the lamps** (0 – 10) A
Total current used by the lamp drivers to drive the UV lamps. This value is independent from the displayed current used per UV lamp because a different voltage is used by the drivers.
- Replacement interval** (0 – 12000) hr
The set value for the time it takes for the lamps to be replaced.
- Switched on** (0 – 10000) x
The amount of times the UV lamps have switched off and on.

- Used time** (0-x) hr
The amount of time the current UV lamps are in the system where variable x is the set replacement interval time.
- Time till lamp replacement** (0-x) hr
The amount of time left before the UV lamps need to be replaced where variable x is the set replacement interval time.
- Reset lamp replacement time** On/Off
Resets the used time and switched on counters.
- Auto configure UV chamber** On/Off
Tells the lamp drivers to automatically turn a set amount of UV lamps on or off when this setting is turned on.
- Number of chambers** (0 – 30)
Displays the amount of available UV chambers.
- Test all lamps (auto turn off)** On/Off
Turns on all lamps to determine if there are any defect lamps. Automatically turns itself off.
- Reset drives** On/Off
Resets the state of the lamp drives when turned on. Automatically turns itself off.

2.6.4.3 Manual Mode

When the manual mode button in the dealer menu is pressed the following window is displayed. In this window the Aqualux can be operated manually. When the Aqualux has been disabled the manual control allowed light will turn green.

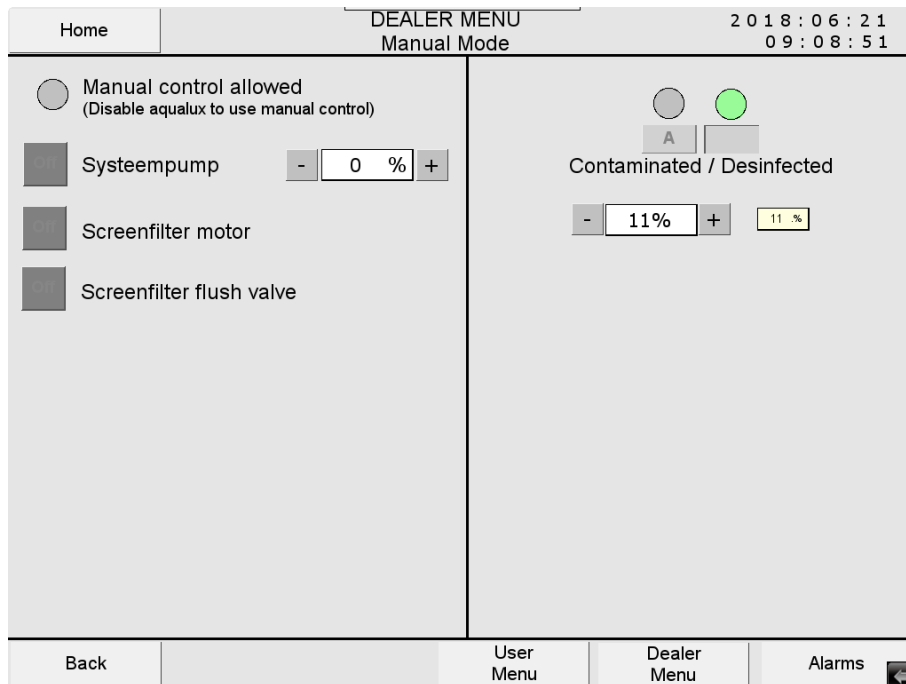


Figure 18 Manual mode window

System pump	On/Off
Turns the system pump on or off.	
System pump performance	(0 – 100)%
Sets the performance of the system pump.	
Screen filter motor	On/Off
Turns the screen filter motor on or off.	
Screen filter flush valve	On/Off
Turns the screen filter flush valve on or off.	

Selection valve	Contaminated/Desinfected
Changes the selection valve from flowing to the contaminated tank or disinfected tank.	
Freshwater valve	(0 – 100)%
The set amount of percentage the fresh water valve needs to be opened and the actual amount its open.	

2.6.4.4 Settings -1-

When the button dealer settings is pressed the follow window will be displayed. In this window the dealer can adjust certain setpoints and navigate to the second settings menu.

Home	DEALER MENU		2018:07:09
	Settings - 1 -		08:43:19
Uv cleaning			
1.1 Setpoint UV cleaning	-	190 mj	+
1.1 Minium allowed T10	-	5	+
Flow Meter			
2.1 Nominal frequntie @ 1m/s	-	49 hz	+
2.2 Tube inside diameter	-	59 mm	+
Filter Cleaning			
3.1 Press.dif. to start flushing (DP)	-	2.5 bar	+
3.2 Press.dif. delay for flushing (DP delay)	-	1.0 sec	+
3.3 Filterflush interval	-	120 min	+
Screenfilter installation			
4.1 Filterflush time	-	30 sec	+
4.2 Min.press. on flushing	-	2.5 bar	+
Sandfilter installation			
Back	Next	User Menu	Dealer Menu
			Alarms

Figure 19 Settings - 1 - window

1.1 Setpoint UV cleaning (0 – 250)mj

The setpoint for UV dosage applied to the water in millijoules.

2.1 Nominal frequency @ 1m/s (0 – 50)Hz

The nominal frequency at a flow of 1m/s in Hertz.

2.2 Tube inside diameter x mm

The inside diameter of the tube the flow meter is mounted at.

3.1 Press. Diff. to start flushing(DP) x bar

The pressure difference between the input and output of the filter required to start flushing the filter.

3.2 Press. Diff. delay for flushing (DP delay) x sec

The time the pressure difference between the input and output of the filter has to be a set value before flushing.

3.3 Filter flush interval x min

Time between filter flushes if pressure difference to start flushing is not reached in this interval.

4.1 Filter flush time x sec

The time it takes for the filter flush to clean the screen filter.

4.2 Min. press. On flushing x bar

Minimal pressure required to start flushing the screen filter.

2.6.4.5 Settings -2-

By pressing next on the settings – 1 – menu the following window will be displayed on the window.

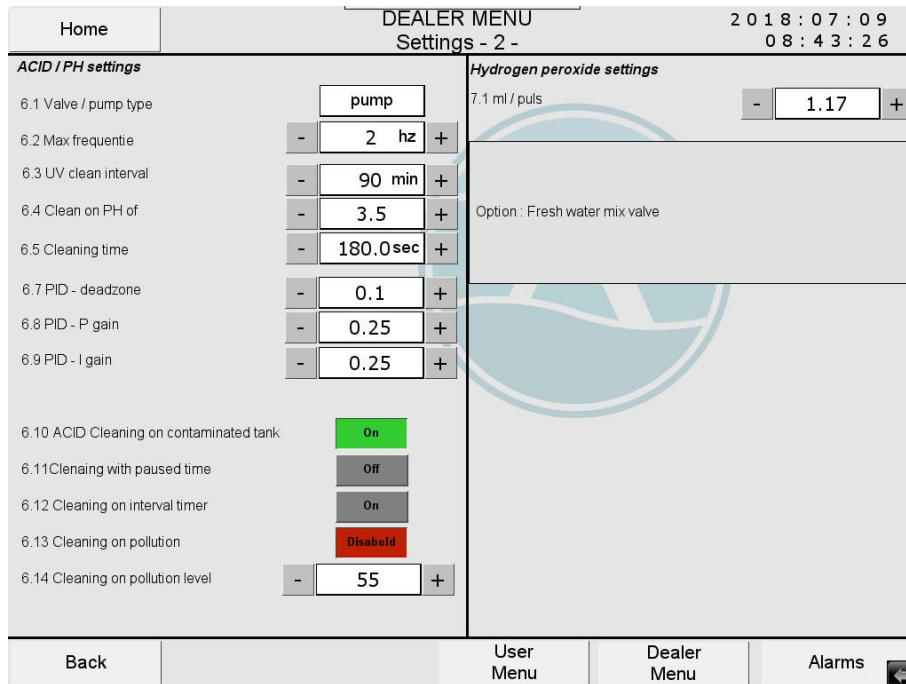


Figure 20 Settings - 2 - window

6.1 Valve / pump type	<i>valve/pump</i>
Shows the designated type used to dose acid.	
6.2 Max. frequency	<i>(0 – 10) Hz</i>
Sets the maximum frequency the acid pump pulsates at.	
6.3 UV clean interval	<i>x minutes</i>
The interval between cleaning sessions for the UV chambers.	
6.4 Clean when pH equals	<i>x pH</i>
The threshold pH value the UV clean sequence starts cleaning the UV chambers.	
6.5 Cleaning time	<i>x sec</i>
The time interval the UV chambers are cleaned.	
6.6 PID – dead zone	<i>x</i>
The maximum offset from the set	
6.7 PID – P gain	<i>x</i>
The proportional gain value of the acid pump.	
6.8 PID – I gain	<i>x</i>
The integral gain value of the acid pump.	

6.9 PID – D gain	<i>x</i>
The differential gain value of the acid pump.	
6.10 Cleaning on contaminated tank	<i>On/Off</i>
Turns cleaning on contaminated tank on and off.	
6.11 Cleaning with paused time	<i>On/Off</i>
Turns cleaning with paused time on and off.	
6.12 Cleaning on interval timer	<i>On/Off</i>
Turns cleaning on interval timer on and off.	
6.13 Cleaning on pollution	<i>On/Off</i>
Turns cleaning on pollution on and off.	
6.14 Cleaning on pollution level	<i>(0 – 100)%</i>
The setpoint of pollution when to start cleaning.	
7.1 Milliliters added per pulse	<i>x ml/pulse</i>
The amount of milliliters per pulse added by the regulator.	
8.1 Dead zone of valve	<i>(0 – 100)%</i>
The hysteresis allowed in the performance of the valve.	
8.2 Valve run time	<i>x sec</i>
The time the valve runs	

2.6.4.6 UV Calibration

When the UV calibration button in de dealer menu is pressed the following window is displayed. In this window the Aqualux its UV setting can be calibrated.

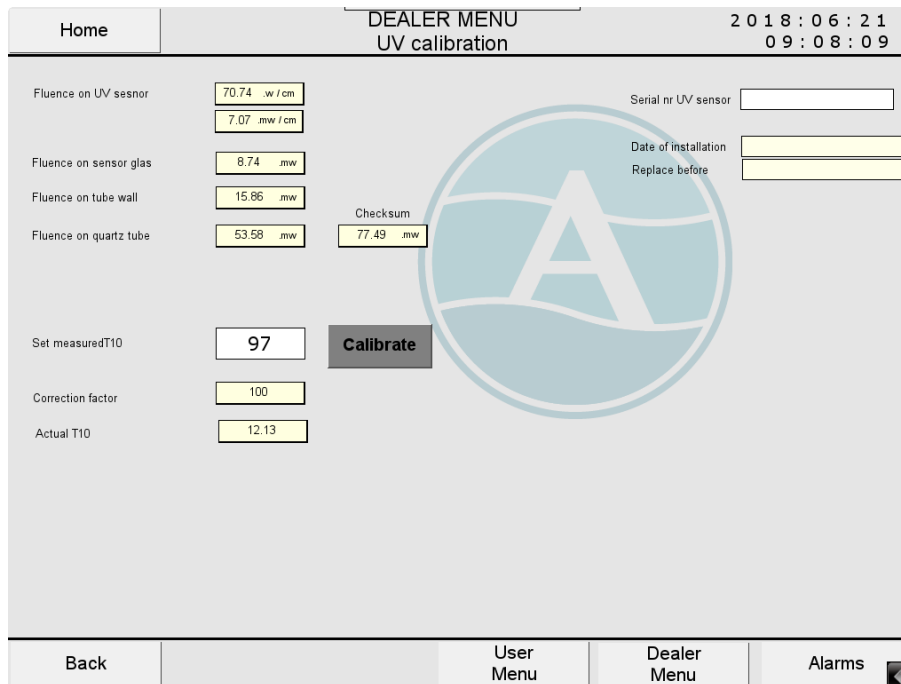


Figure 21 UV Calibration window

Fluency on UV sensor (0 – 10) W/cm²
The fluency in milliwatts measured on the UV sensor.

Fluency on sensor glass (0 – 100) mW
The fluency in milliwatts measured on the sensor glass.

Fluency on tube wall (0 – 100) mW
The fluency in milliwatts measured on the tube wall.

Fluency on quartz tub (0 – 100) mW
The fluency in milliwatts measured on the quartz tube.

Checksum (0 – 100) mW
Checksum is used to check the current power output with the theoretically calculated power output.

Set measured T10 (0 – 100)%
The manually measured transmission value (T10) of the sampled water.

Correction factor (0 – 100)
Displays the factor the actual transmission value (T10) is corrected with to reach the set measured T10 value.

Actual T10 (0 – 100)
The transmission value (T10) that the sensor is measuring.

Serial Nr. UV sensor xxxxxx
The serial number of the used UV sensor.

Date of installation day : month : year
The date the UV sensor is installed at.

Replace before day : month : year
Shows the date when the UV sensor has to be replaced.

2.7 Explanation of Signals

The system is equipped with multiple events and alarms. The user is required to know what each alarm and event means and how to take corrective actions to remedy the situation. For alarms that can cause hazardous situations the system will stop disinfecting. In all other cases the alarm or event will be generated while disinfection continues. In these cases the user is expected to take the appropriate action to prevent the alarm from repeating itself.

2.7.1 Possible Events and Alarms

When a notification and/or alarm is generated the lower bar on the window will start blinking in red. When the alarm and/or notification is resolved the notification on the display will disappear after a few minutes. To resolve the following alarms and events named in this subparagraph see chapter "6. Troubleshooting".

2.7.1.1 Alarms

System Pump Temp Not Ok;
System Pump No Flow Detected;
System Pump Drive Alarm;
System Pump Drive Fault;
Acid Tank Level To Low;
Hydrogen Peroxide Tank Level To Low (Optional);
UV Chamber Temp Not Ok;
UV Sensor Replacement Required;
UV Lamp Driver Error;
UV Sensor No Reliable Measurement;
UV Sensor T10 Can Not Be Defined;
UV Lamps Turned On And No Flow;
Quick-Stop Pressed;
pH Sensor Calibration Required;
Screen Filter Motor Has Alarm;
Screen Filter Flush Pressure Too Low.

2.7.1.2 Events

Working hours of the lights exceeded ;
Acid tank empty;
Hydrogen peroxide tank empty.

3 SAFETY INSTRUCTIONS

⚠ WARNING

READ AND UNDERSTAND THIS MANUAL AND ITS SAFETY INSTRUCTIONS BEFORE USING THIS PRODUCT. FAILURE TO DO SO CAN RESULT IN SERIOUS INJURY AND LOSS OF ANY RIGHT TO CLAIM WARRANTY.

3.1 How to Use the Product Safely

3.1.1 Safety information for vulnerable people

- This appliance may only be used by operators that have been properly educated in all the functions, risks and parts of the Aqualux,
- Do not let children play with the Aqualux,
- Cleaning, operation and maintenance may not be done by individuals with reduced physical, sensory or mental capabilities and / or lack of experience and knowledge.

3.1.2 Technical lifespan

If maintenance is not provided as specified in chapter “5 Maintenance” of the user manual the technical lifespan of the Aqualux will be reduced depending on the environment of the Aqualux and frequency of use.

NOTICE

MAKE SURE TO DRAIN THE UNIT AND THE PUMP FROM WATER WHEN TEMPERATURES ARE BELOW 0 DEGREES CELSIUS AND THE UNIT IS NOT OPERATING.

3.1.3 Safety information related to the intended use and reasonably foreseeable misuse

- Do not modify any parts of the machine without approval of the manufacturer,
- The machine is intended to be used to disinfect water,
- Do not apply maintenance to the system without wearing the appropriate personal protective equipment.

3.1.4 Maintenance safety information

- <Rotate the power switch to “0”> before starting maintenance operations.
- Use the tools and protective equipment as specified.






3.1.5 Cleaning safety information

- <Rotate the power switch to “0”> before starting cleaning operations.

3.2 Potential Health Consequences

The Aqualux is essentially harmless. The parts of the Aqualux that can be hazardous are the acid in the system and optionally the hydrogen peroxide in combination with open fire.

3.3 Personal Protective Equipment

PPE	INSTRUCTION
	WEAR EYE PROTECTION
	OPAQUE EYE PROTECTION MUST BE WORN
	WEAR EAR PROTECTION
	WEAR PROTECTIVE GLOVES
	WEAR SAFETY FOOTWEAR

















The personal protective equipment (PPE) symbols that can be present on the harvest line are as shown in Table 2.

Table 2 Personal protective symbols and instruction

3.4 Safety Symbols

The safety symbols that can be present on the harvest line are as shown in Table 3.

Table 3 Safety symbols and instructions

PPE	INSTRUCTION
	REFER TO INSTRUCTION MANUAL/BOOKLET
	GENERAL MANDATORY ACTION SIGN
	DISCONNECT BEFORE CARRYING OUT MAINTENANCE OR REPAIR
	WASH YOUR HANDS
	NO OPEN FLAME; FIRE, OPEN IGNITION SOURCE AND SMOKING PROHIBITED
	NO SMOKING
	GENERAL WARNING
	WARNING; EXPLOSIVE MATERIAL
	WARNING; NON-IONIZING RADIATION
	WARNING; OPTICAL RADIATION
	WARNING; OXIDIZING SUBSTANCE
	WARNING; HOT SURFACE
	WARNING; SLIPPERY SURFACE
	WARNING; ELECTRICITY
	WARNING; AUTOMATIC START-UP
	WARNING; CORROSIVE SUBSTANCE

4 TRANSPORTATION

In this chapter the information regarding the transportation of the Aqualux will be handled.

4.1 General Information

The Aqualux will be pre-assembled on delivery and transported inside of a container or truck depending on the designation. The quartz tubes and UV lights however need to be installed on site to prevent damage during transportation.

If the Aqualux cannot be installed directly upon delivery, close off all the outlet points and connections to prevent substances that can cause clogging or other undesirable situations from getting inside of the system.

The Aqualux is packaged with a carton sheet that protects the switch-box and is wrapped with packaging film to protect the system from getting dirty during transit.

4.2 Bill of Delivered Components

In TABLE below the standard components that are included in the transport container are shown. The amount of UV lights and Quartz tubes depend on the amount of UV chambers the Aqualux unit has. Piping and spare parts can be included at an extra cost.

Table 4 Standard components

AMOUNT	COMPONENT
1	Pre-assembled Aqualux
1	Quartz tubes and UV lights set
16	Adjustable Feet
1	Set of Manuals

4.3 Lifting Information

⚠ CAUTION

BE CAREFUL NOT TO HIT ANY COMPONENTS WHEN PLACING THE FORKLIFT SPOONS. ARTECHNO WILL NOT BE HELD ACCOUNTABLE FOR DAMAGE CAUSED BY FAILING TO LIFT THE AQUALUX.

Use a forklift truck that can lift at least 1000 kg with long forklift spoons placed as far apart from each other as possible to guarantee stable lifting of the Aqualux. It is recommended to place the spoons on the locations indicated with red in Figure 22 while avoiding hitting any tubing.

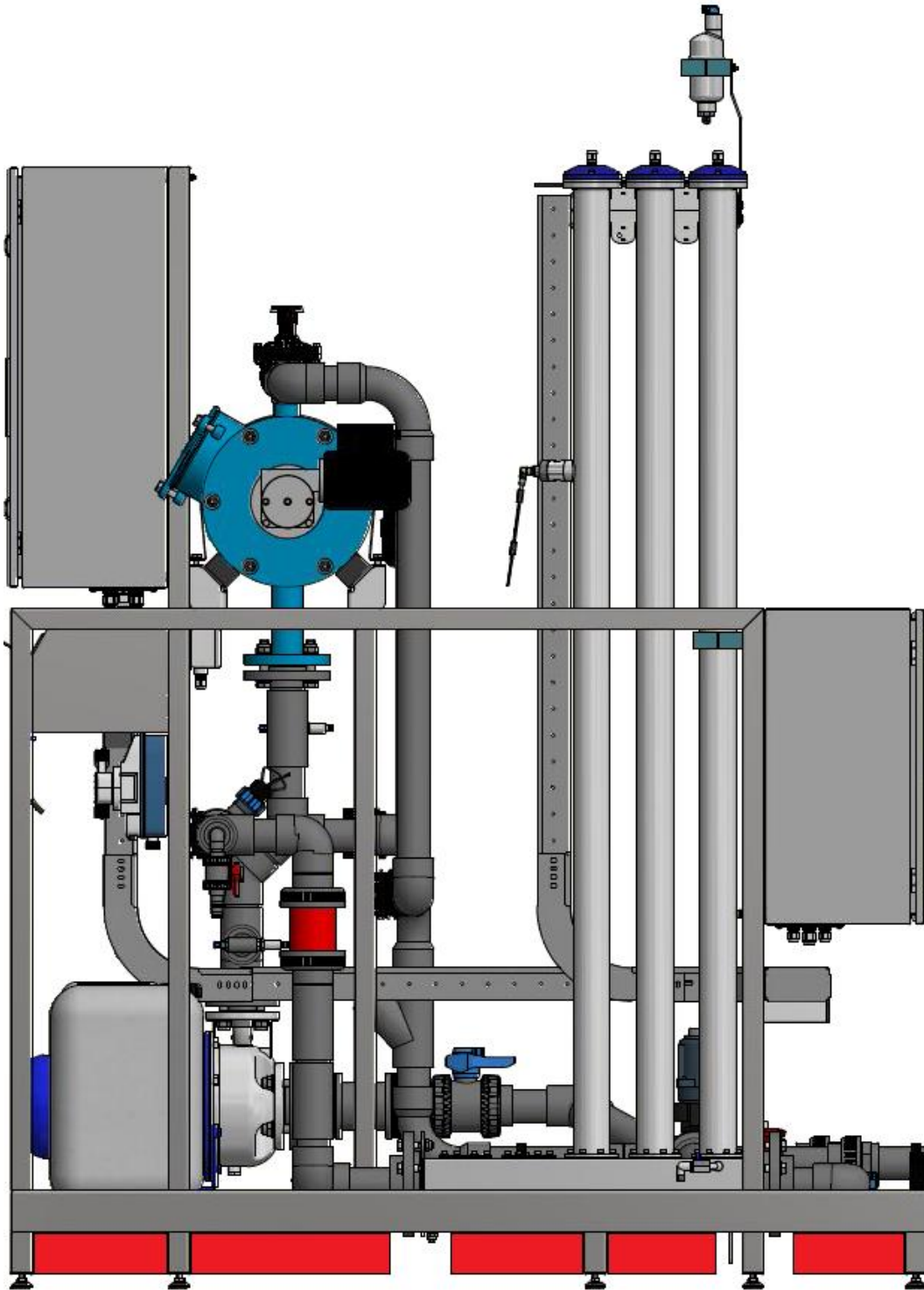


Figure 22 Lifting locations

5 PREPARATION

The preparations that are required before installing the Aqualux will be run through in this chapter.

5.1 Specification of Tools to be Used

In Table 5 the minimum tools that are required during installation and commissioning of the Aqualux are displayed.

Table 5 Tools to be used

AMOUNT	TOOL
3	Personal protective equipment set (Helm, Shoes, Ear-/Eye protection, Gloves, etc)
1	Tape measure 5 meters
3	Marker
3	Construction pencil
2	Utility knife with spare blades
1	Aluminium level 120 mm
1	Aluminium level 300 mm
1	Fine toothed PVC handsaw
1	Flathead screwdrivers set
1	Phillips head screwdrivers set
1	Soldering iron
1	Wire strippers
1	Combination pliers
1	Wire cutter
1	Long nose pliers
2	Combination wrench set 8 up to and including 30
1	Aluminum step ladder
1	Hammer 300 gram
2	Hexagonal wrench set with at least wrench 4 and 5
1	1 Liter PVC-C glue
1	1 Liter PVC-C cleaner
1	Box of cleaning cloths
1	Battery charger
2	Battery
1	Cordless grinder (A-Brand)
1	Lamel disc 125 mm
1	Cordless reciprocating saw
1	Reversible chain pipe wrench
1	EC measurement kit
1	pH measurement kit
1	T10 measurement kit

5.2 Location of Placement and Environment

The location of placement is generally inside of the water treatment room. The environment of placement has to be between 0 and 40 degrees Celsius while installing the Aqualux to prevent water that may be present inside the system from freezing and damaging components. Furthermore its recommended that the Aqualux is installed on a leveled basis that does not have the tendency to sag over time e.g. a concrete floor (Figure 23).

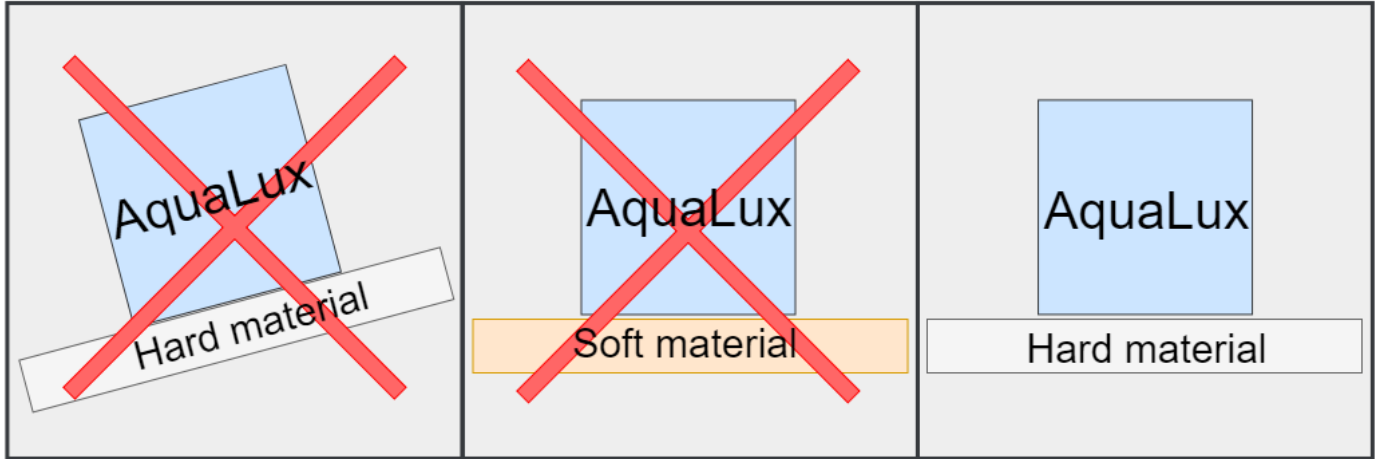


Figure 23 Correct placement

6 INSTALLATION

The installation of the Aqualux will be run through in this chapter.

6.1 Placing the Aqualux

Place the Aqualux on the position described in sub-paragraph "5.2 Location of Placement and Environment".

6.2 Installation of Quartz tubes, UV lights and air vent

NOTICE

WEAR SAFETY GLOVES TO PREVENT DAMAGE TO THE UV LIGHTS.

To Install the Quartz tubes and UV lights:

1. Remove all the water from the Aqualux.
2. Remove the blue cap by turning the four bolts counterclockwise.
3. Remove the springs and white cap.
4. Remove the last four bolts (they can be mounted very tightly), lose the ones that are easier to turn first.
5. Place the quartz tube.
6. Place the O-ring.
7. Mount everything back together, make sure to screw the bolts back in crosswise order and add assembly grease to the bolts.

NOTICE

DO NOT DROP THE UV LIGHTS WHEN LOWERING THEM INSIDE OF THE QUARTZ TUBES. THIS WILL CAUSE THE UV LIGHTS TO TEAR.

8. Place the UV light inside of the quartz tube chamber.
9. Connect the UV light to the connector.
10. Place the UV light connector.

To Install the Air Vent:

1. Locate the air vent at the side of the UV chambers. (After transport this air vent is mounted in a different orientation to prevent damage.)
2. Mount the air vent in the orientation indicated with the red rectangle in Figure 25.

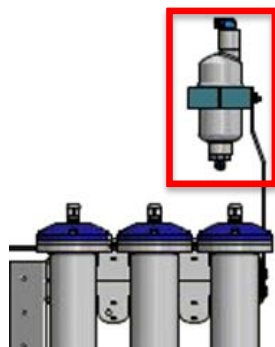


Figure 24 Air vent location

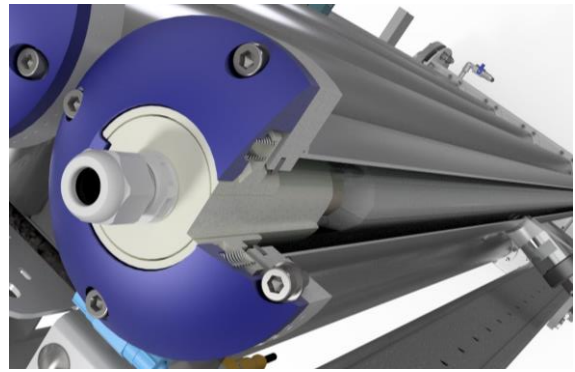


Figure 26 UV light chamber segment view

6.3 Installation of Piping

The components indicated with a dotted line in Figure 28 or Figure 29 (depending on the used filtration component) of Appendix I need to be installed by the installer. Take note to the pasted stickers located on the ingoing and outgoing piping for the piping designation. While installing the components the following advice has to be taken into account:

- Use wide bends, avoid using elbows which cause excessive flow resistance.
- The suction piping is perfectly sealed and air tight.
- The piping connected to the output pipes of the Aqualux have to be the same diameter.
- Use piping that has a PN value of at least 10 bar. It is recommended to use piping with a PN value of 16 bar to ensure a rigid connection.

6.4 Installation of Electronics

CAUTION

MAKE SURE THE POWER SWITCH IS TURNED TO "O" WHILE CONNECTING THE POWER CABLE.

The electrical cables that need to be installed are the power cable on to the power switch inside of the switch-box and the level sensor for the silo. Check if the phases are installed and wired correctly, for a 3 phase connection connect every phase on phase and connect the ground cable. For a 1 phase connection connect the phase, neutral and the ground wiring to the corresponding terminals. While installing the electrical leads the following advice has to be taken into account:

- Make sure that the electrical leads are protected from high temperature, vibrations, collisions and other environmental hazard

7 COMMISSIONING

For commissioning of the Aqualux the following steps have to be executed to ensure correct functioning of the system:

- Step 1. Turn the power switch to "I".
- Step 2. Disable the AutoStart cycle in the USER MENU.
- Step 3. Connect the ethernet cable to the router (eth0).
- Step 4. Install the level sensors for the Silo's inside the sensor tubes.
- Step 5. Configure the water level inside of the Silo using the DEALER SETTINGS.
- Step 6. Let all the air run out of the pipelines to the system pump.
- Step 7. Turn the system pump on manually using the USER MENU and open the sample tap (contaminated) to vent the system.

NOTICE

NEVER PUMP CONTAMINATED WATER TO THE DISINFECTED WATER TANK TO PREVENT THE DISINFECTED WATER TANK FROM GETTING CONTAMINATED.

- Step 8. Check if the water runs to the correct Silo if the unit is turned on.
- Step 9. Test the UV lights using DEALER MENU, check each UV light for correct connection.
- Step 10. Fill the ACID tank with max. 38% saltpeter acid.
- Step 11. Manually start the dosage pump (consult the dosage pump manual) and vent the air from the pump.
- Step 12. Turn the ACID pump back to external operation with pulse set to 1 on 1.

NOTICE

NEVER LET THE PH SENSOR OUT RUN DRY FOR MORE THAN 10 MINUTES!

- Step 13. Calibrate the pH sensor.
- Step 14. Enable the AutoStart cycle in the USER MENU.
- Step 15. If the correct starting conditions are reached the unit will start automatically.
- Step 16. Wait until the Aqualux has been turned on for 30 minutes.
- Step 17. Set the pH value to 3.
- Step 18. Wait until a pH value of 3 is reached.
- Step 19. Measure the transmission value (T10) of a sample using an external meter to determine the current T10 value.
- Step 20. Calibrate the UV sensor.
- Step 21. Put the setpoint for the pH value back to a pH value of 5.0 – 6.0.
- Step 22. Instruct the user regarding the correct use and risks of the machine.

To calibrate the pH-sensor:

1. Stop the operation.
2. Locate the JUMO interface (Located in the switch-box).
3. Locate the pH probe indicated by the red oval in Figure 27 or indicated by the blue dot on the panel.
4. <Remove the PVC ring by turning it counter clockwise>.
5. <Remove the probe pulling the blue synthetic with a clockwise motion>.
6. <Clean the probe with water and cloth>.

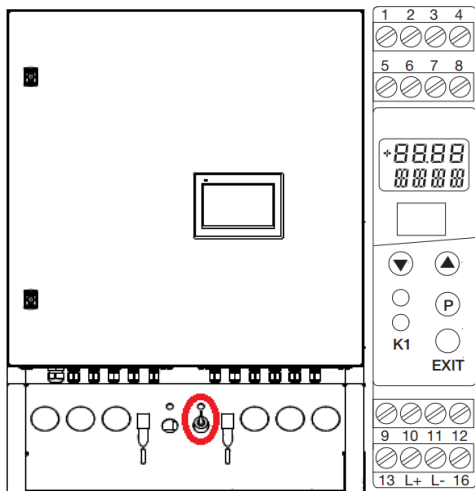


Figure 27 pH probe location (left) and JUMO interface (right)

NOTICE

DO NOT USE ANY CLEANING DETERGENTS AND / OR CHEMICAL DETERGENTS!

7. Follow the calibration process of Table 6.
8. <Reinsert the pH probe in the quantity survey line>.
9. <Confirm calibration on the display of the Aqualux>, this resets the alarm.

Table 6 pH calibration process

START	7.00 PH	<Hold P for 3 seconds>
1	USER	USER appears on the display, <press V > until CALIB appears on the display then <press P >.
2	110 CODE	The display shows a blinking 0, <use V A > buttons to navigate to CODE 110 and <press P >.
3	CAL 2-PT	Choose "2-pt" and <press P >.
4	25.0 $^{\circ}\text{C}$	<Enter the temperature of the calibration liquid>.
5	6.57 REF	<Put the sensor in the PH7 liquid> and wait until the measured value stabilizes, then <press P >.
6	6.57 REF	The value starts blinking. If the measured value deviates from the actual value this step allows the user to correct the value. To confirm <press P >.
7	4.12 REF 2	<Put the sensor in the PH4 liquid> and wait until the measured value stabilizes, then <press P >.
8	4.12 REF 2	The value starts blinking. If the measured value deviates from the actual value this step allows the user to correct the value. To confirm <press P >.
END	7.03 99.3	When the calibration process is completed the calculated deviation will be displayed. To confirm <press P >

8 DISPOSAL

⚠ CAUTION

WHEN DISASSEMBLING AQUALUX ALWAYS WEAR SAFETY BOOTS AND SAFETY GOGGLES.

8.1 How to Dispose the Product

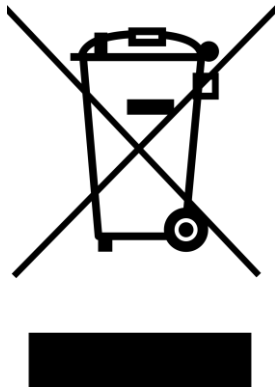
The Aqualux shall only be disposed of by a qualified company that specializes in disposal of machinery.

To dispose of the Aqualux:

- Cut off the Aqualux its power supply.
- Notify a qualified company for disposal of machinery.

8.1.1 Disposal of electronic components

If the symbol on the right is on the product, the accessories or packaging indicates that this device must not be treated as unsorted municipal waste, but must be collected separately! Dispose of the device via a collection point for the recycling of waste electrical and electronic equipment if you live within the EU and in other European countries that operate separate collection systems for waste electrical and electronic equipment. By disposing of the device in the proper manner, you help to avoid possible hazards for the environment and public health that could otherwise be caused by improper treatment of waste equipment. The recycling of materials contributes to the conservation of natural resources. Therefore do not dispose of your old electrical and electronic equipment with the unsorted municipal waste.



8.1.2 Disposal of packaging waste

The Aqualux is packaged with ISPM 15 certified packaging wood and sealed with packaging plastic, which may be disposed through your local recycling facilities. By disposing of the packaging and packaging waste in the proper manner, you help to avoid possible hazards for the environment and public health.



8.1.3 Disposal of UV-lights

The UV-lights are categorized as small toxic waste (because they contain mercury) and therefore need to be exposed of using the local rules for small toxic waste.

Appendix I Water technical schematics

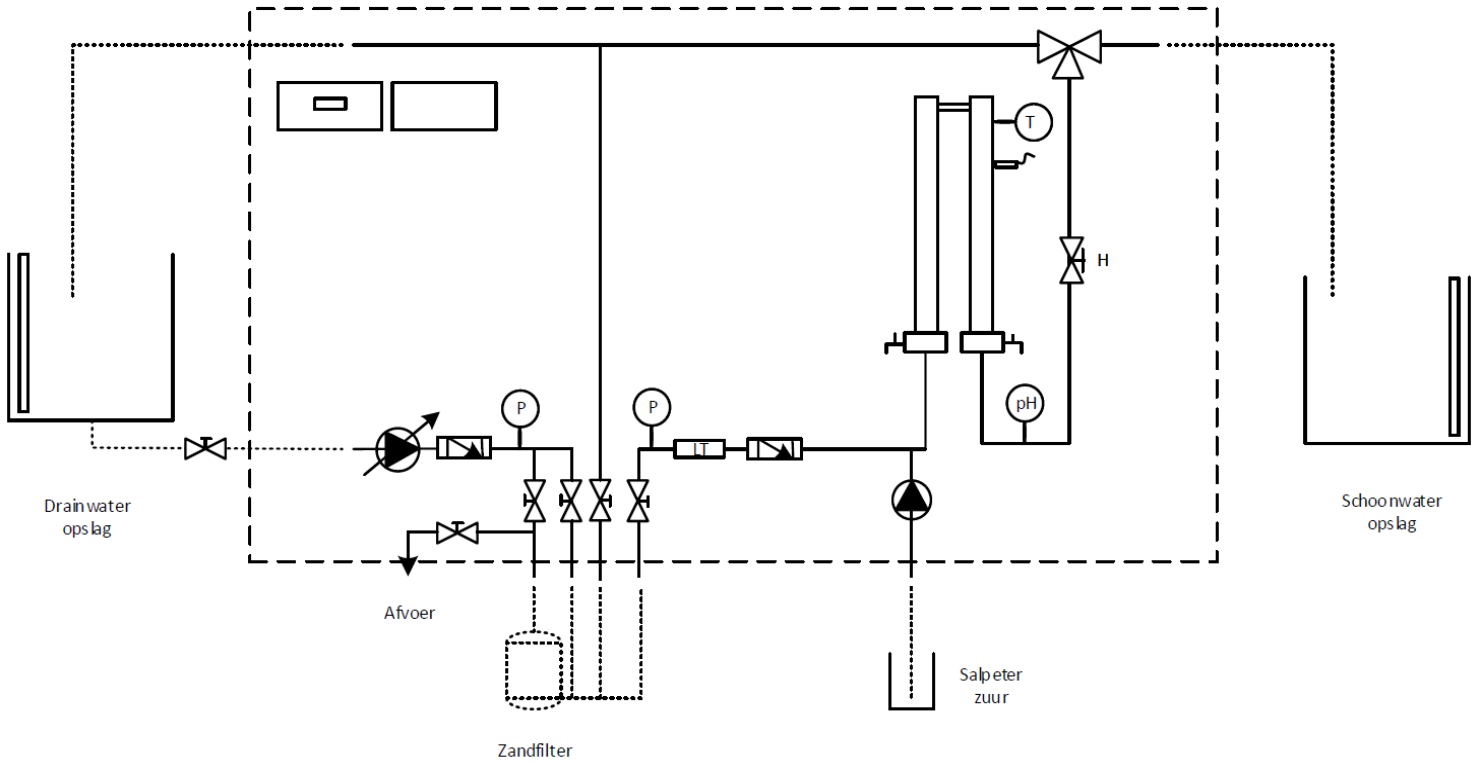
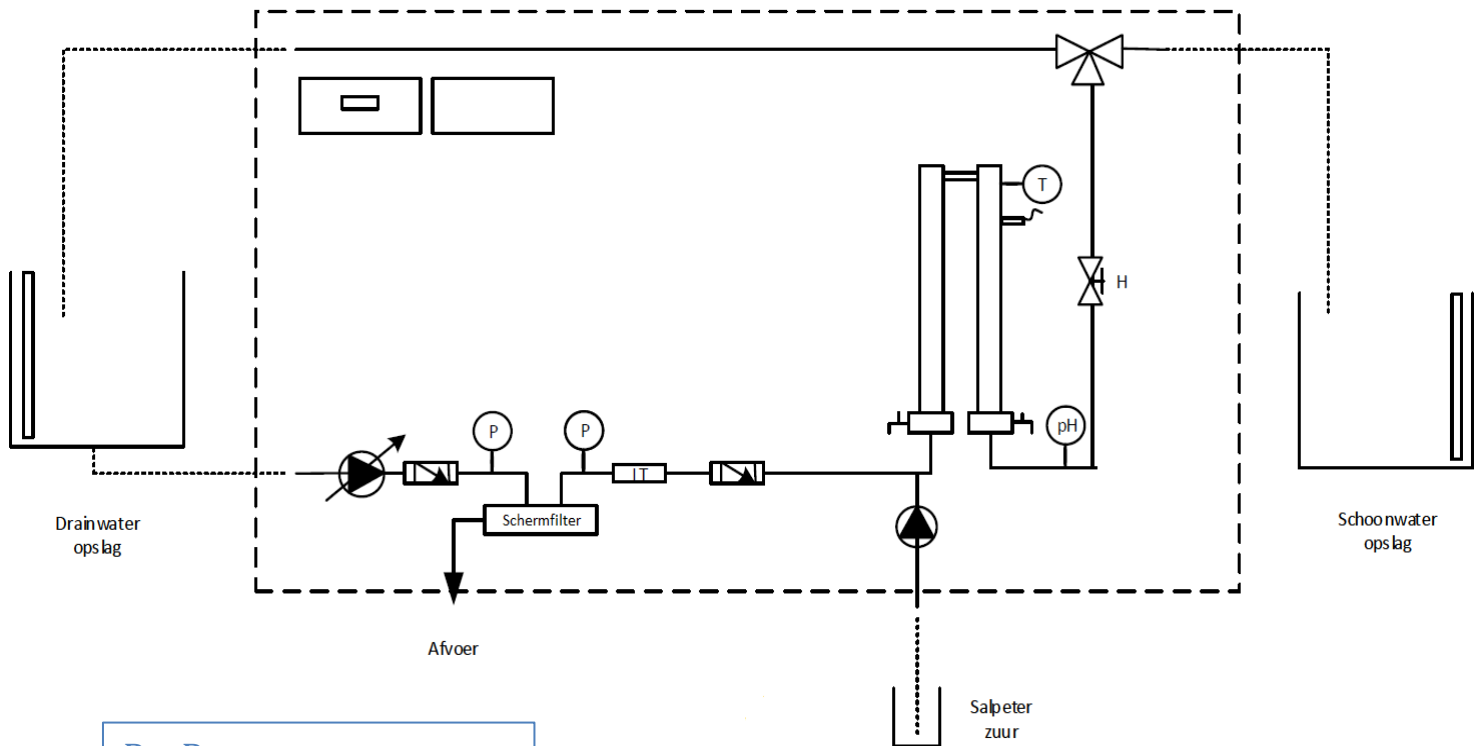


Figure 28 Zandfilter schema



P = Pressure sensor
 pH = pH sensor
 T = Temperature sensor

Figure 29 Schermfilter schema