AQUALOOP Membrane station and controller AL-MS-CU-V2

Installation and operating instructions

WATER, WE'RE IN OUR ELEMENT

www.intewa.com

Index

1. Introduction and general instructions 2
2. Safety instructions 3
3. Conformity declaration, Standards, Enviroment 3
4. Scope of delivery 5
5. Technical data 6
   5.1. Controller 6
   5.2. Membrane station 7
   5.3. Float switch 8
6. Instructions for controller 9
   6.1. Electronic connections 9
   6.2. Controller settings 11
      6.2.1. Operation display 11
      6.2.2. Menu settings 12
      6.2.3. Menu Overview 17
7. Installation 23
   7.1. Installing the membrane station 23
   7.2. Installing controller and switching power supply bracket 25
   7.3. Float switch setting 26
8. System start-up process 27
9. Maintenance 29
   9.1. Maintenance and replacement intervals 29
10. Chemical Cleaning 30
   10.1. Chemical Cleaning Solution 30
   10.2. In-Situ chemical cleaning 31
   10.3. Intensive chemical cleaning 34
11. Trouble Shooting 35
   11.1. Errors and messages with display Indicators 35
   11.2. Errors without display Indicators 39
12. Accessories and spare parts 40
13. Warranty / Contact 43

1. Introduction and general instructions

AQUALOOP components are designed for water treatment / sanitation of wastewater. The following types of raw water can be treated and sanitized with AQUALOOP:

- Clear water
- Surface and ground water
- Clear discharge water
- Grey water
- Rain water
- Fish farming water
- Pool water

Five AQUALOOP components are combined and dimensioned depending on the existing input water quality or use.

Figure 1: AQUALOOP components

Standardized systems are available for greywater and rainwater treatment.

The updated application range of all AQUALOOP components, along with their application examples, and the operational dimensioning of each AQUALOOP component related to treatment, water quality and required tank volume for the bioreactor and clear water tank, can be found at:

https://www.intewa.com/en/water-treatment/

General background knowledge for water treatment and grey water utilization can be found at:

http://wiki.intewa.net/index.php/Wasseraufbereitung_und_Grauwassernutzung/en

This manual describes the assembly, settings and start-up procedure of the membrane assembly, which is the basis of each application.

2. Safety instructions

This installation and operating manual of this device is to be read carefully before installation. The specified instructions are to be followed exactly otherwise any respective warranty claim may be voided. This also applies to any separate modifications made to the mechanical and electrical components.

The electronic housing of the current-carrying components may only be opened by a certified electrician or approved installer.

The electrical circuit used for the system must be secured by a circuit breaker (16 A). Likewise, an ELCB (earth leakage circuit breaker), with the maximum operating current of 30mA is to be inserted, if not already present.

The owner/operator is responsible for compliance of safety and installation provisions.

3. Conformity declaration, Standards, Enviroment

Certification signs: Switching power supply

Kindly recycle the packaging in an environment-friendly way.

Do not dispose of the electronic components in domestic trash! According to European Guidelines 2002/96/EC on electronic and old electronic devices and their application in European countries, components should be collected separately and disposed through the use of environment-friendly recycling.

1 **EU Konformitätserklärung**
EU- Declaration of Conformity

de /en

---

2 **Diese EU-Konformitätserklärung wurde in alleiniger Verantwortung von INTEWA GMBH ausgestellt.**
This declaration of conformity is issued under the sole responsibility of INTEWA GmbH.

3 **Dokument-Nr.:** **03/10/2022**
Document-No.:

4 ***Hersteller:*** *INTEWA GmbH* 5 *Anschrift:* *Auf der Hüls 182*
Manufacturer: *Address:* D – 52068 Aachen

6 **Produktbezeichnung:** 7 AQULOOP Control Unit 8 Typenbezeichnung: ALMS-CU, ALMS-CU-V2
Product designation:

9 **Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:**
The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

10 **2014/35/EU:** **Niederspannungsrichtlinie**
2014/35/EU: *Low Voltage Directive*

11 **2014/30/EU:** **EMV Richtlinie**
2014/30/EU: *Directive relating to electromagnetic compatibility*

12 **2011/65/EU:** **RoHS-Richtlinie**
2011/65/EU: *RoHs Directive*

/

13 **Angewandte harmonisierte Europäische Norm:**
Applied harmonised European Standard:

- EN60335-1:2012+A11:2014
- EN IEC 61000-6-1:2019
- EN 61000-6-3:2007 +A1:2011
- EN 61558-1: 2019
- EN 61558-2-6:2010

14 **Ort, Datum:** **Aachen, 25.02.2025**
Place, Date:

15 **Rechtsverbindliche Unterschrift:**
Legal signature:

16 Geschäftsführer Oliver Ringelstein
Manager

4. Scope of delivery

1. Permeate backwash container
2. Pump unit with filtration and backwash pump incl. 2 O-Ring seals
   2. a. Brushless controller for Filtration pump
   2. b. Brushless controller for Back wash pump
3. Permeate - distribution nozzle incl. 5 pc. screw caps each with flat seal
4. Central aeration pipe with 2 pc. flat seals
5. Aeration distribution nozzle incl. 5 pc. closing caps (each with flat seal)
6. DC switching power supply incl. network cable
7. DC switching power supply part - wall bracket
8. Controller with LCD Display incl. network cable
9. 2 pcs. Float switch incl. counterweight

Figure 2: Scope of delivery

5. Technical data

5.1. Controller

	ALMS-CU-V2
Dimensions (H x W (incl. switching power supply) x T):	201 x 198 (329) x 110 mm
Mains supply central controller (230V-IN):	110-230 V AC/50-60 Hz
Switching power supply input:	110-230 V AC/50-60 Hz
Switching power supply output:	24 VDC, 4.0A
Cable length of mains supply:	3 x 1.0 mm² x 1.5 m
Cable length of AC switching power supply:	3 x 0.75 mm² x 2.0 m
Power outputs (depends of the mains supply):	110-230 V AC / 50-60 Hz max. 15 A
Blower Membrane (BR-MEM)	110-230 V AC / 50-60 Hz max 7A
Blower Diffusor (BR-DIFF)	110-230 V AC / 50-60 Hz max 7A
Sludge pump (Sludge):	110-230 V AC / 50-60 Hz max 7A
Low voltage outputs:	
Filtration Pump	24 V DC, max. 2 A
Backwash Pump	24 V DC, max. 2 A
Pre-filtration Backwash	24 V DC, max. 0,5 A
Signal inputs floating switches:	
Bioreactor minimum (BR min):	Open/Closed contact
Clear water tank maximum (CL max):	Open/Closed contact
Signal inputs:	
Pressure sensor Filtration/Backwash S (Filtr./Backw.)	4 … 20 mA
Pressure sensor blower membrane S(BL-MEM)	4 … 20 mA
Pressure sensor Diffusor S (BL-DIFF)	4 … 20 mA
Programmed connection pin:	6 pol., RM 2.53
Protection type:	IP54
Floating switch	
Function:	Normally open (MIN = contact closed)
Cable length:	15 m x Ø8 mm, 2 x 0,75mm²
Protection type:	IP54

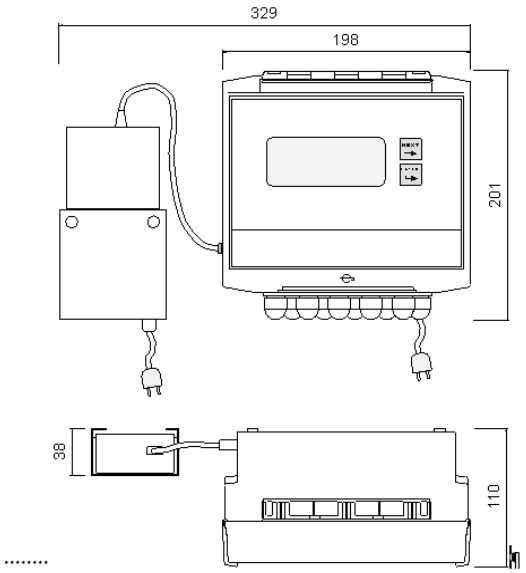
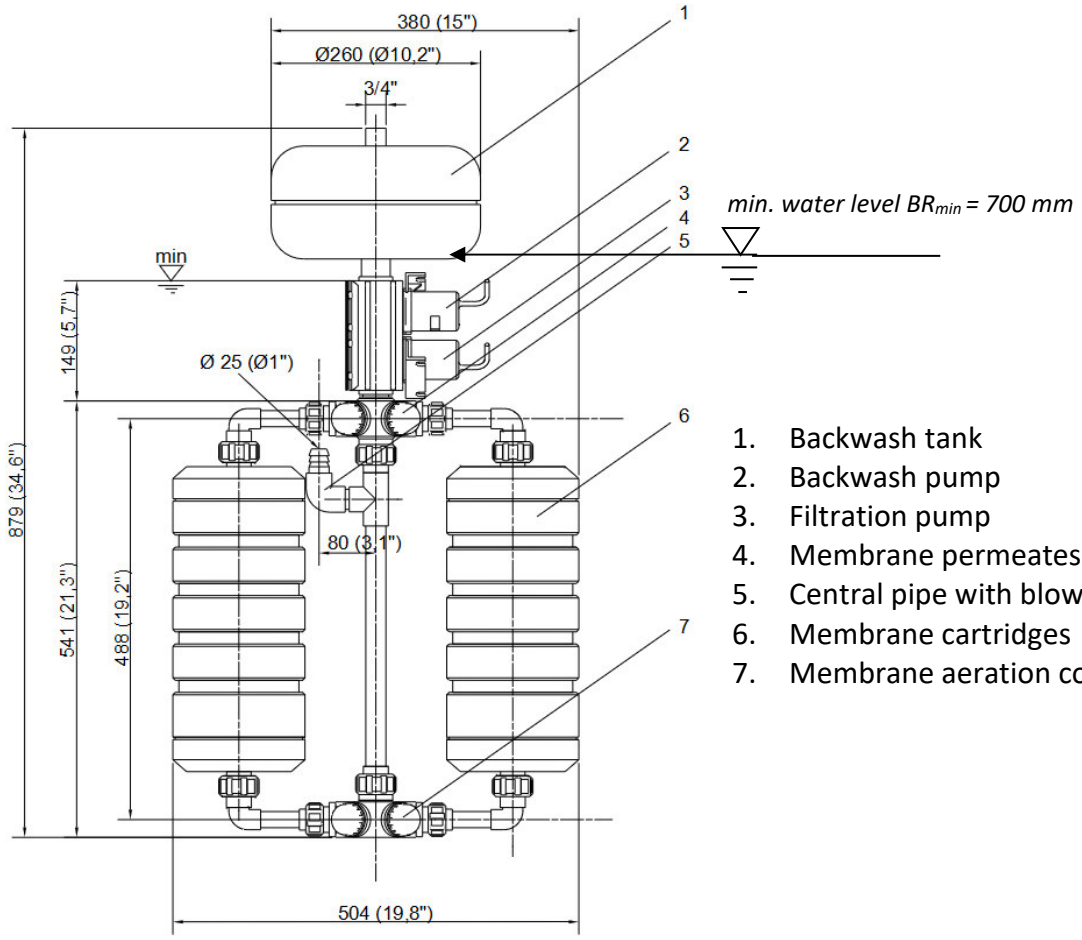


Figure 3: Dimensions of controller with DC switching power supply (Front and top view)

5.2. Membrane station

	AL-MS
Dimension (Ø x H):	Max. Ø 504 x 879 mm (20 x 34.6”)
Central blower connection:	Barbed End, Ø 25 mm (1”)
Treated water connection:	¾” External Thread
Height of the treated water outlet:	879 mm
Power consumption suction / backwash pump:	30-90W (dependent on number of membranes)
Max. water level, total:	2 m (6.6 ft.)
Max. pipe length / height of treated water:	10m / 2 m (32 ft. /6.6 ft.)
Pump cable each:	0.75mm² x Ø 6mm, 3 m (0.0012 inch² x Ø 0.3” 9.8 ft.)
Pump protection type:	IP68
Material:	PVC (fittings), ABS (pump-body), PE (pump), ceramic (pump axle) SS304 (backwash tank)
Weight without membranes:	3.5 kg (7.8 lbs.)
Total weight (6 membranes):	11.0 kg (27.6 lbs.)



1. Backwash tank
2. Backwash pump
3. Filtration pump
4. Membrane permeates connections
5. Central pipe with blower connection
6. Membrane cartridges
7. Membrane aeration connections

Figure 4: Dimensions of Membrane Station (Membranes not scope of the delivery)

5.3. Float switch

	ALMS-SCHW3m
Function:	Normally open contact (MIN = closed contact)
Cable length x Diameter:	3m x Ø8 mm
Protection type:	IP68
Weight	1 kg

Figure 5: Standard float switch with adapter plug

Note: In addition to the standard version, a vertical float switch is available on request. This variant is designed for applications favoring vertical mounting and offers installation options for flexible spatial configurations. Further information on this product can be found in the Chapter “12-Accessories”.

6. Instructions for controller

6.1. Electronic connections

The component's electrical connections are configured to the controller as per the terminal diagram provided below.

Note: Only cable connections that are delivered by INTEWA are listed. No information is given about the power supply and the bus cable since they are not in the scope of the delivery.

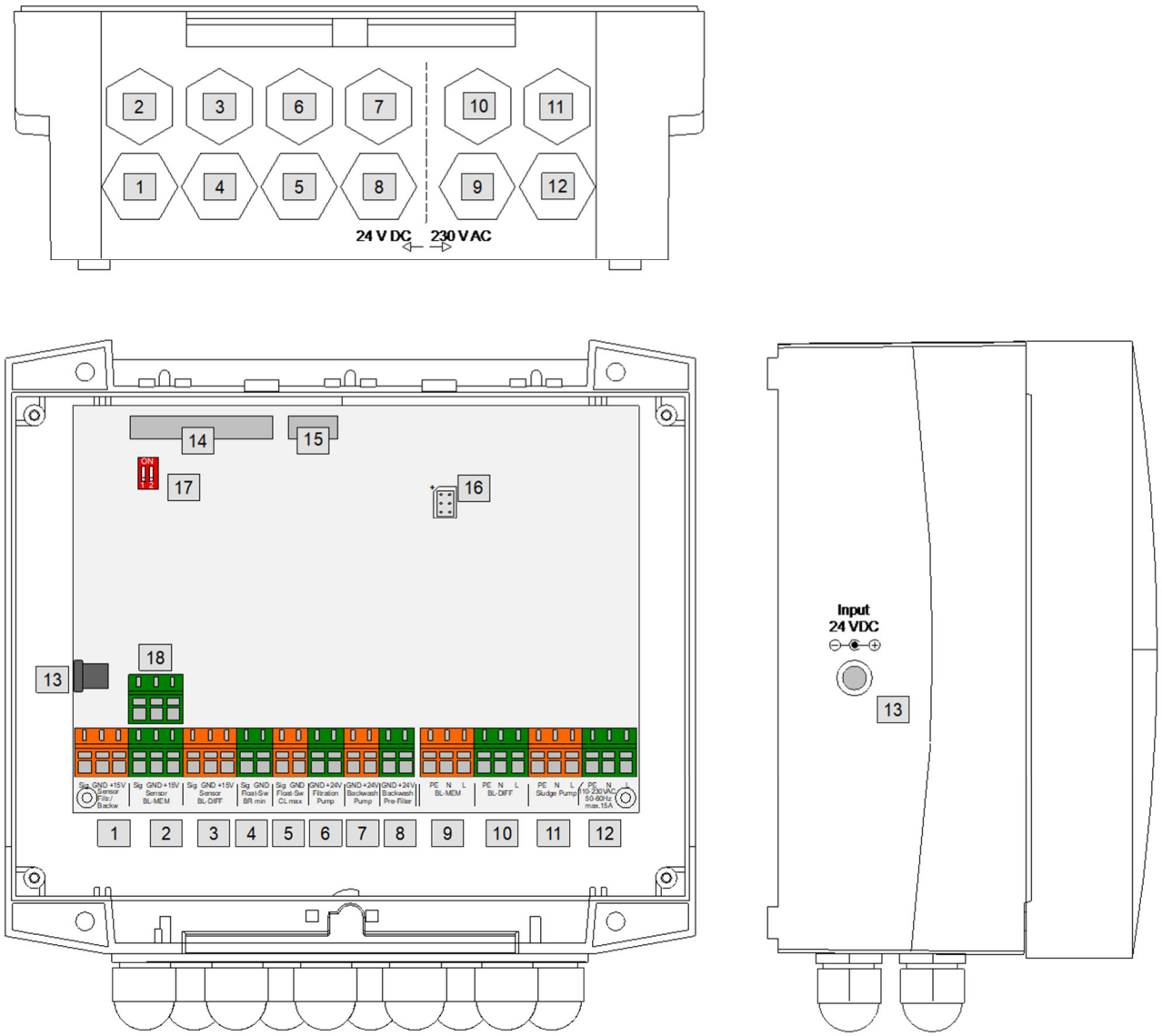


Figure 6: Electrical connections of control board and assigning cable routings

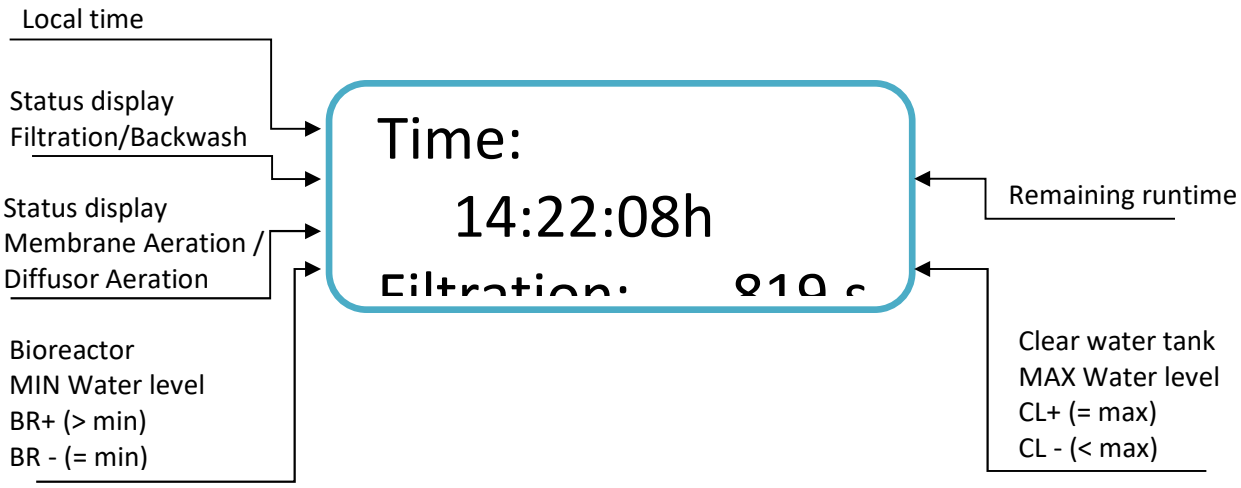
Table 1: Terminal Diagram

Pos.	Connection	Description	Connecting Contact/Function
1	Sensor Filtr./Backwash *(AL-PCS)*	Analogue pressure sensor for monitoring filtration and backwash pump	Sig = green GND = gray Ub + = brown
2	Sensor BL-MEM *(I-CON-BCS)*	Analogue pressure sensor, for monitoring Membrane blower 	Sig = black (PIN2) GND = gray (⏚) Ub + = brown (PIN1)
3	Sensor BL-DIFF *(I-CON-BCS)*	Analogue pressure sensor, for monitoring Diffusor blower 	Sig = black GND = gray Ub + = brown
4	Float Sw BR min	Float switch in bioreactor for minimum water level	Pot. free contact, normally open contact, no polarity
5	Float Sw CL max	Float switch in clear water tank for maximum water level	Pot. free contact, normally open contact, no polarity
6	Filtration Pump	24 VDC filtration pump	GND = blue + = brown
7	Backwash Pump	24 VDC backwash pump for cleaning the membrane	GND = blue + = brown
8	Backwash Pre-Filter	24 VDC backwash valve for cleaning the Purain Filter	GND = blue (⏚) + = brown (PIN1)
9	BL-MEM *(AL-BLxx)*	Blower connection for Membrane	PE = Green/yellow N = blue L = brown
10	BL-DIFF *(AL-BLxx)*	Blower connection for Diffusor	PE = Green/yellow N = blue L = brown
11	Sludge Pump *(VIP-130-6)*	Sludge pump)	PE = Green/yellow N = blue L = brown
12	230V-IN	Mains voltage supply 110- 230 VAC / 50-60Hz	PE = Green/yellow N = blue L = brown
13	24 V DC-IN	24 VDC from switching power supply 110- 230 VAC / 50-60Hz	Stereo jack Ø5.5mm, Centre positive
14	CON1	34-pin connection to LCD	IDC multi ribbon cable
15	CON2	4 pin wire connector to the button PCB	Molex four wire cable
16	CON3	6-pin programmed connection (only for programming)	
17	S1	DIL switch Factory setting 1 = ON Factory setting 2 = ON	1=ON : Alarm tone after power failure 1=OFF : No alarm tone after power failure 2=ON : Power failure message 2=OFF : No power failure message
18	CON6	Potential free alarm output	1+2 (N/C): normally close , in case of an alarm open 2+3 (N/O): normally open , in case of an alarm closed

6.2. Controller settings

6.2.1. Operation display

Homepage:
The homepage display primarily provides information on the status of the Filtration/backwash cycle, blowers, and water levels in the tanks.



A distinction is made between different operating states for the various applications:

- Aeration MEM/DIFF
- Filtration / backwash
- Sludge pump mode
- Pause

In BL-DIFF aeration mode, oxygen is introduced for biological treatment. As a rule, aeration does not run continuously, but at intervals to save energy. The exact mode of operation can be set individually in the control unit. If aeration is not required (e.g. for rainwater treatment), the aeration parameter is set to zero (BL-DIFF ON/OFF = 0/0).
In aeration mode BL-MEM, air is introduced to discharge sludge from the membrane cartridge. The aeration does not run permanently, but at intervals to minimize the mechanical load on the membrane. The cycle time can be set individually in the control unit.

In filtration mode, the biologically treated water is filtered through the membranes and fed into the clear water tank. Backwashing takes place automatically after each filtration interval. In pause mode, neither aeration nor filtration takes place.

The filtration and backwash process is paused whenever either the water level in the bioreactor tanks drops below the minimum threshold **(BR-)** or the water level in the clear water tank exceeds the maximum limit **(CL+)**. The following information is indicated.

6.2.2. Menu settings

The system settings can be configured via the controller using the two available buttons, “NEXT” and “ENTER”. The controller is organized into menus in order to visualize or change the parameters.

Each menu can be called up by selecting NEXT on the operating display. The menu settings can be accessed by selecting ENTER. Upon exiting the menu, the display returns to the standard operating display.

Generally, inputs or settings are displayed in relation to NEXT and ENTER buttons.

Each menu entry must be set to the corresponding default setting the first time the controller is used. All settings are stored permanently in the internal memory and can be overwritten at any time.

RESET Function / Factory settings:

The device can be reset to factory settings by the simultaneous pressing of both the NEXT and ENTER buttons (for approx. 5 s).

1.	Time:	12:00:00 hrs.
2.	Number of membranes:	MEM = 1
3.	Blower Membrane:	BL-MEM ON / OFF = 1 min/ 8 min
4.	Blower Diffusor:	BL-DIFF ON / OFF = 5 min / 5 min
5.	Sludge pump:	SLP/t = 1 / 6 (days/sec.)
6.	Pre filter backwash:	P-Filter: = 1 day/ 60 s / 2 loop
7.	Language:	English

Pre-defined Filtration/Backwash routine:

The filtration and backwash run times in the system are pre-defined and cannot be modified. They are constant throughout the system.

The cycle time for filtration and backwash of the system is pre-defined in the controller as followed.

Filtration:	900 sec
Break:	2 sec
Backwash:	15 sec
Break:	15 sec

Figure 7: Filtration and backwash pump cycle

The additional settings that could be changed via the menu options are described in the following section *"6.2.2-Menu settings"*.

Menu 1: Status overview

The overview mode can be called up at any time. All other activities such as ventilation mode and pump cycle continue to run in the background. All current settings and operating statuses can be viewed in this mode.

Status 1:

Software version	Firmware:	AL04.01
Number of membranes	MEM:	1

Status 2:

Aerator setting:	BL-MEM ON/OFF:	1 / 8 min
		BL-DIFF ON/OFF: 5 / 5 min

Status 3:

Sludge pump	Sludge Pump:	
	1d / 6s (every day for 6 seconds)	
Execution starts in:	Execution starts in	
	0 d 17h 49s	

Status 4:

Pre-filter backwash:	Pre-filter backwash	
	x d / x sec / x loop	
	Execution starts in	
	0 d 10h 49s	

Status 5:

Pressure sensors P(ADg):	S(PUMP) :	-1.200 bar (if no sensor is connected)
	S(BL-MEM) :	-0.150 bar (if no sensor is connected)
	S(BL-DIFF) :	-0.150 bar (if no sensor is connected)

Status 6:

Power supply voltage :	Supply:	23.6 V
Number of power failures	Supply failures:	11
Number of power failures during:		x
Filtration During filtration:		x

Menu 2: Test mode

Via the Test menu, the following components of the system can be individually controlled and tested

- filtration pump
- backwash pump
- sludge pump
- blower membrane
- blower diffusor
- pre-filter backwash

The test mode can be terminated at any time with NEXT/ENTER. The time until automatic stop (max. 6 min) is shown on the display by a count-down stopwatch.

Note: A test can be carried out at any time, however for a pump test (i.e. filtration/backwash/sludge) there must be a sufficient amount of water to activate the pump (BR min +). If the water level falls below the minimum (BR min -), the display indicates that a test is not possible.
After each test, the display returns to the main menu. To carry out another test, you must call up the test menu again.

Menu 3: Set number of membranes

(MEM = 1 to 6)

With this setting, the number of installed membranes is confirmed. This has reference to the best setting for pump performance in the filtration process.
Note: MEM can always be modified even while filtration/backwash is in progress.

Menu 4: Sludge Pump settings

(Sludge pump SLP=0 to 40 [days], t=1 to 120 [sec])

This setting determines the cycle of sludge pumping in days, along with the runtime of the pumping in seconds.
The sludge pump starts at specified period with aeration runs simultaneously.

If the pump runtime is interrupted by "BR min – ", it resumes again once "BR min + " is achieved.

Only when the sludge pump has operated for the entire running time t this mode is exited.
Recommendation: The running time t should be selected so that the sludge pump pumps out 3% of the feed volume every day.

Dimensioning example for a grey water system 1800L/day:
V_{sludge} = 3% x V_{in}/day = 3% x 1800 L/day= 54 L/day

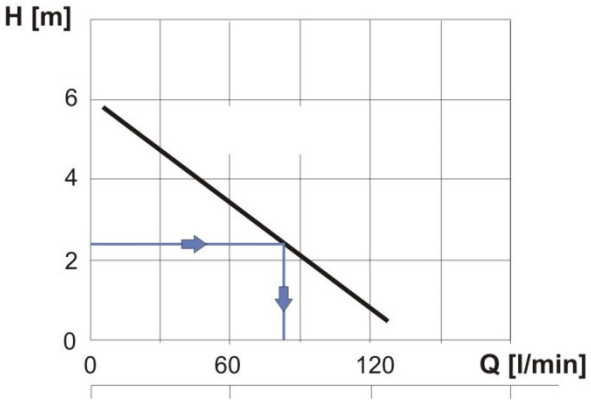


Figure 8: Pump characteristic curve of the sludge pump

Pressure loss (due to pressure head and hose length)
H_{Lost} =2,7m => Q_{max}=82l/min

Runtime of the sludge pump: $t_{sludge}=V_{sludge}/Q_{max} = \frac{54\left[\frac{L}{day}\right]\times 60\left[\frac{sec}{min}\right]}{82\left[\frac{L}{min}\right]} = 40\left[\frac{\text{sec}}{day}\right]$

Menu 5: Set time for Blower Membrane(BL-MEM)

(Blower-MEM ON time = 0 to 15 [mins], OFF time =0 to 15 [mins])

The blower run time (Air ON) and the blower pauses (Air OFF) can each be set in the range from 1 to 15 minutes.
The maximum permissible aeration time of the membrane depends on the air volume. The higher the air volume, the shorter the aeration time must be (limiting the mechanical load on the membrane).

Aeration time at minimum water level:	Aeration interval BL-MEM ON/OFF
100 L/min/MEM = max. 3 hours /Tag	1 / 8
60 L/min/MEM = max. 6 hours /Tag	2 / 6
30 L/min/MEM = max. 12 hours /Tag	5 / 5

100 L/min/MEM = max. 3 hours /day
60 L/min/MEM = max. 6 hours / day
30 L/min/MEM = max. 12 hours / day

<u>Examples for aeration settings:</u>
Timed aeration: BL-MEM ON/OFF = 1 / 8 (1 Minutes aeration, 8 Minutes break)
Deactivated aeration: BL-MEM ON/OFF = 0 / 15

Menu 6: Set time for Blower Diffusor(BL-DIFF)

(Blower-DIFF ON time = 0 to 15 [mins], OFF time =0 to 15 [mins])

Note: The use of diffuser aeration is only of interest for MBR applications.
Fine bubble aeration supplies the biology with oxygen. The dimensioning of the aeration interval can be calculated or verified by oxygen measurements.

The default setting is an interval of BL-DIFF ON/Off = 5/5 min. In the INTEWA complete systems manuals an interval is defined for the respective system sizes.

Menu 7: Pre filter Backwash settings

(Pre-Filter backwash: cycle= 0 to 30 [days], t = 1 to 120 [secs], recur = 1 to 3[times])

The settings for pre filter backwash cycle for frequency (once every x days), run time and recur could be adjusted sequentially in the menu

Examples for various pre-filter backwash settings

Twice a day for 60 secs each:	1 [day], 60 [secs], 2 [recur]		
Deactivated setting:	0 [day], ** [secs], 0 [recur]	(or)	* [day], 00 [secs], 0 [recur]

Menu 8: Set Actual time

In this menu, the appropriate local time can be adjusted in [hours]: [mins] sequentially. This adjusted time is reflected in the Homepage.

Menu 9: Language

In this menu, you can select the controller display languages among English and Czech.

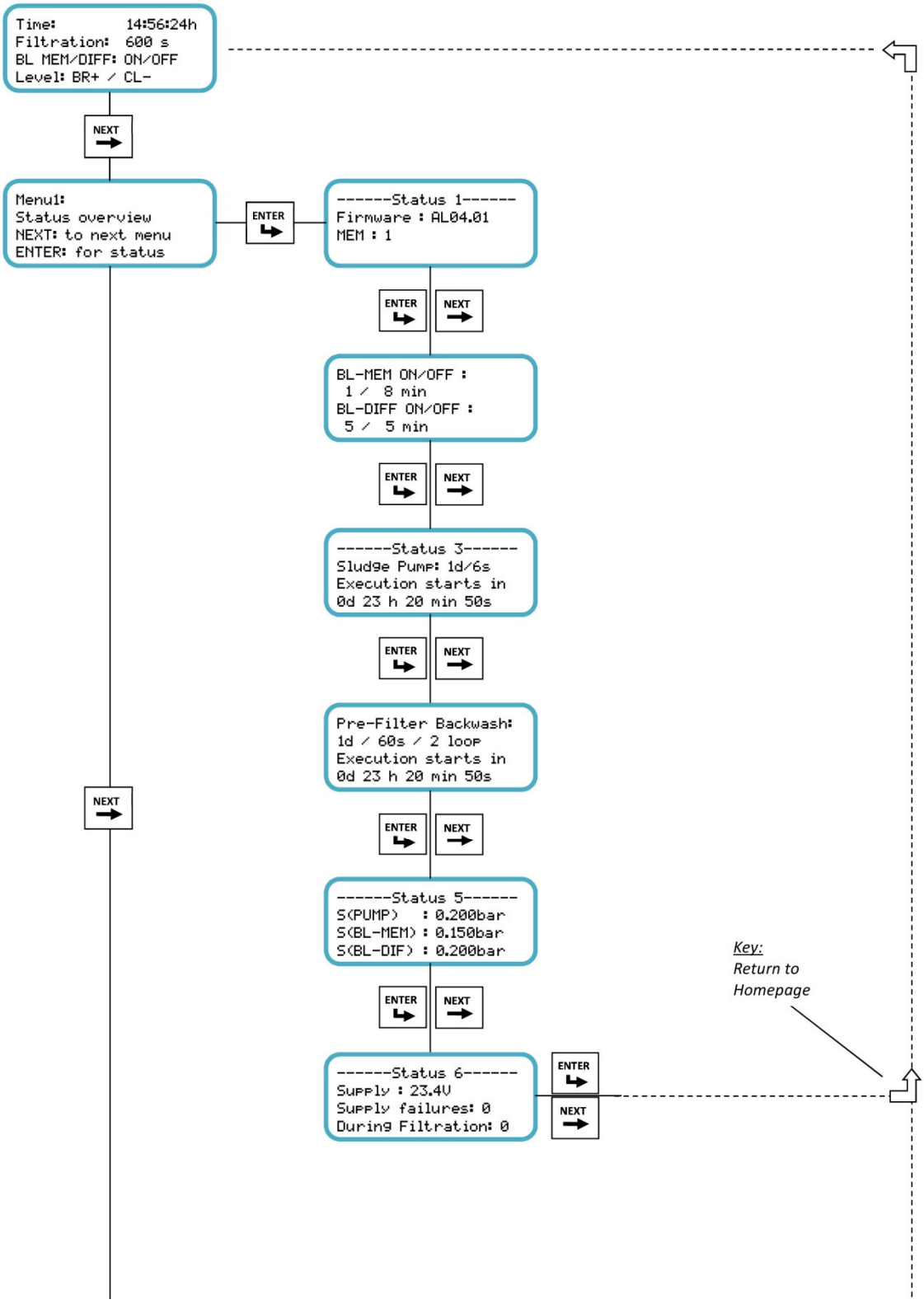
Menu 10: Chemical Cleaning

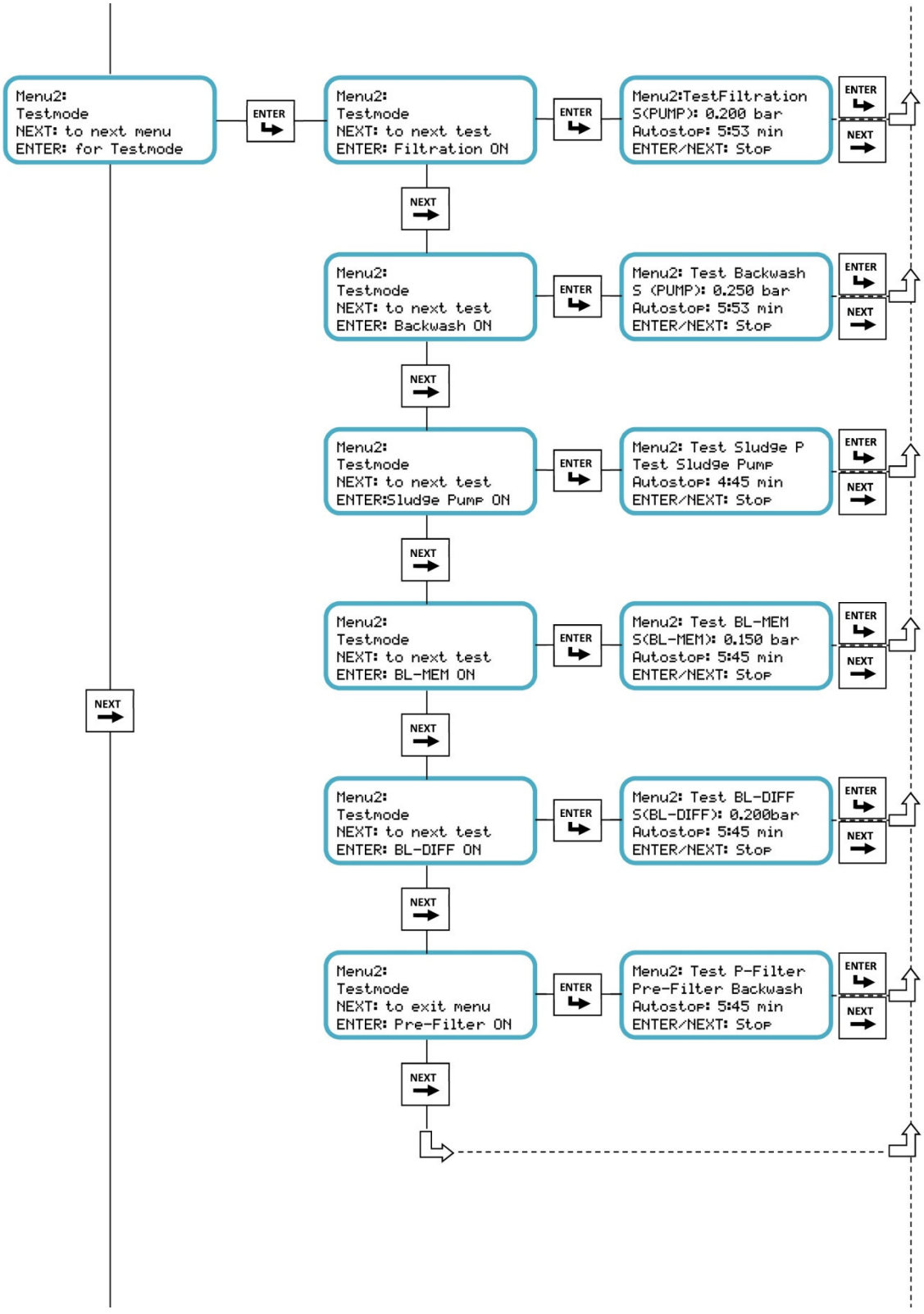
As the components running over a period of time, require maintenance, so as the membrane. The in-situ membrane cleaning process could also be performed by using the controller is guided in steps via this menu as shown below.

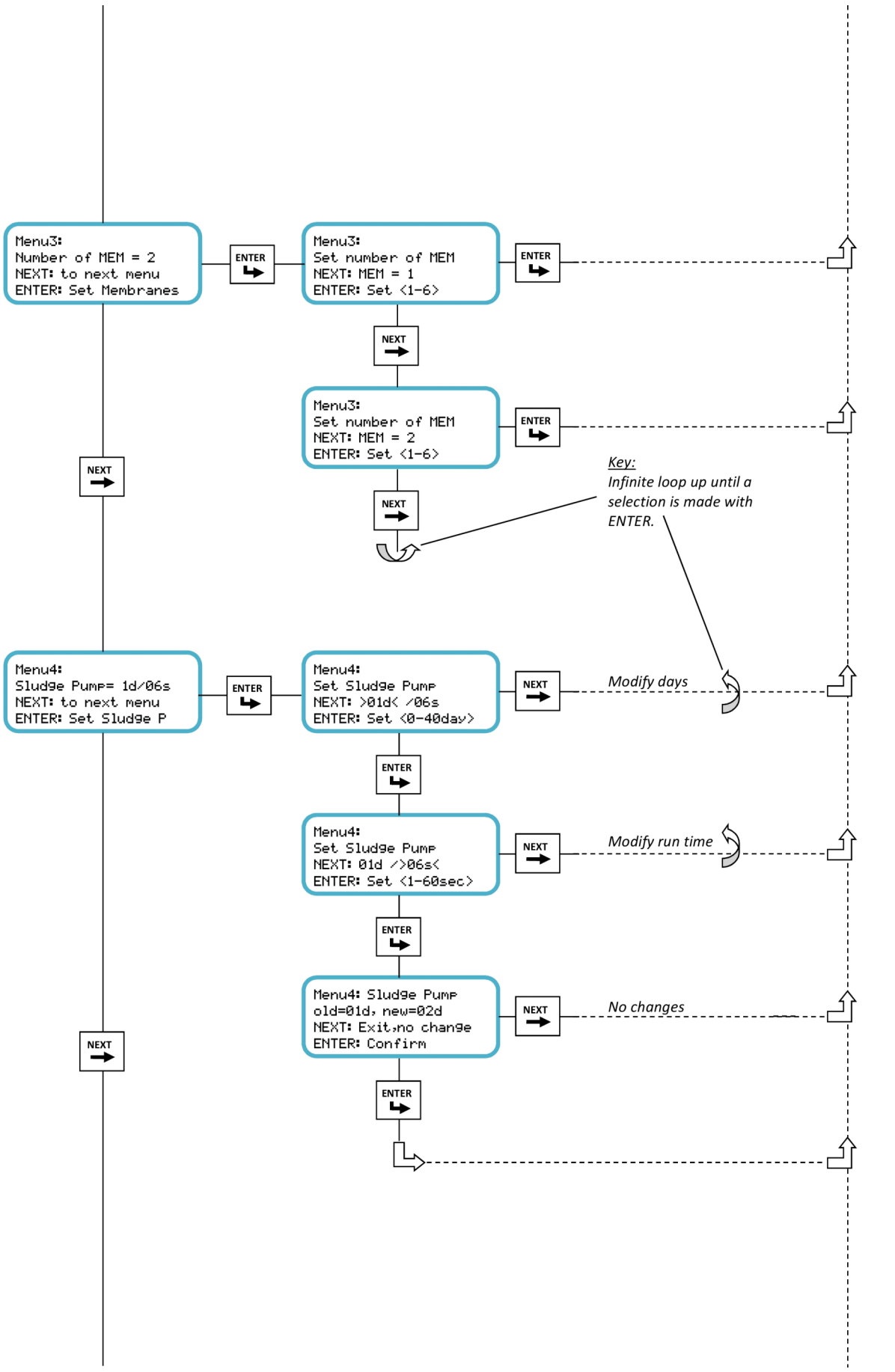
Step 1	Confirm cleaning start
Step 2	Sludge pump ON
Step 3	Backwash ON [30-180sec runtime]
Step 4	Manual chemicals filled
Step 5	Chemical cleaning in progress [63:30 run time]
Step 6	Clear water flushing in progress [6:30 run time]

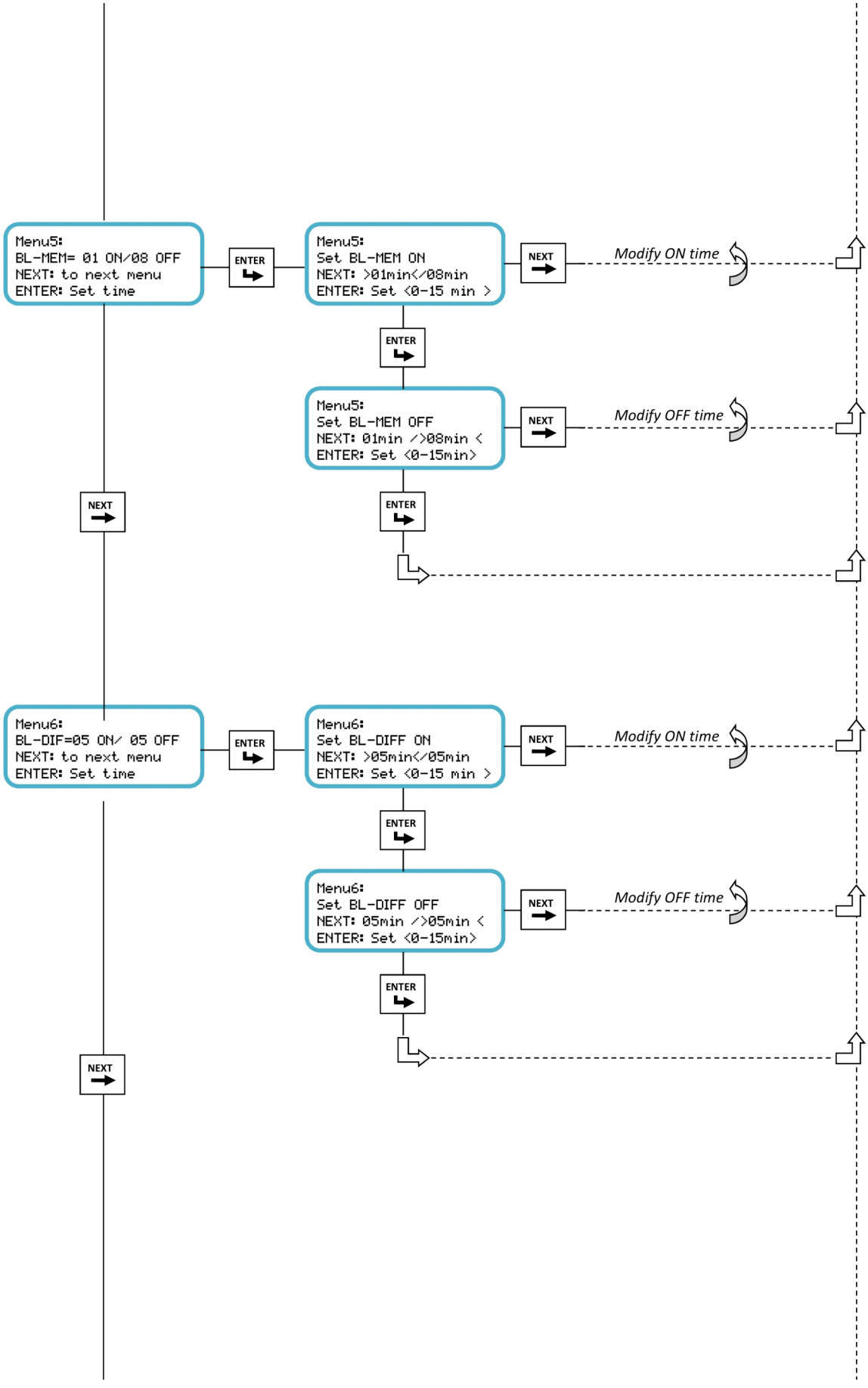
The detail clean routine for the AQUALOOP system is explained in section 10.2

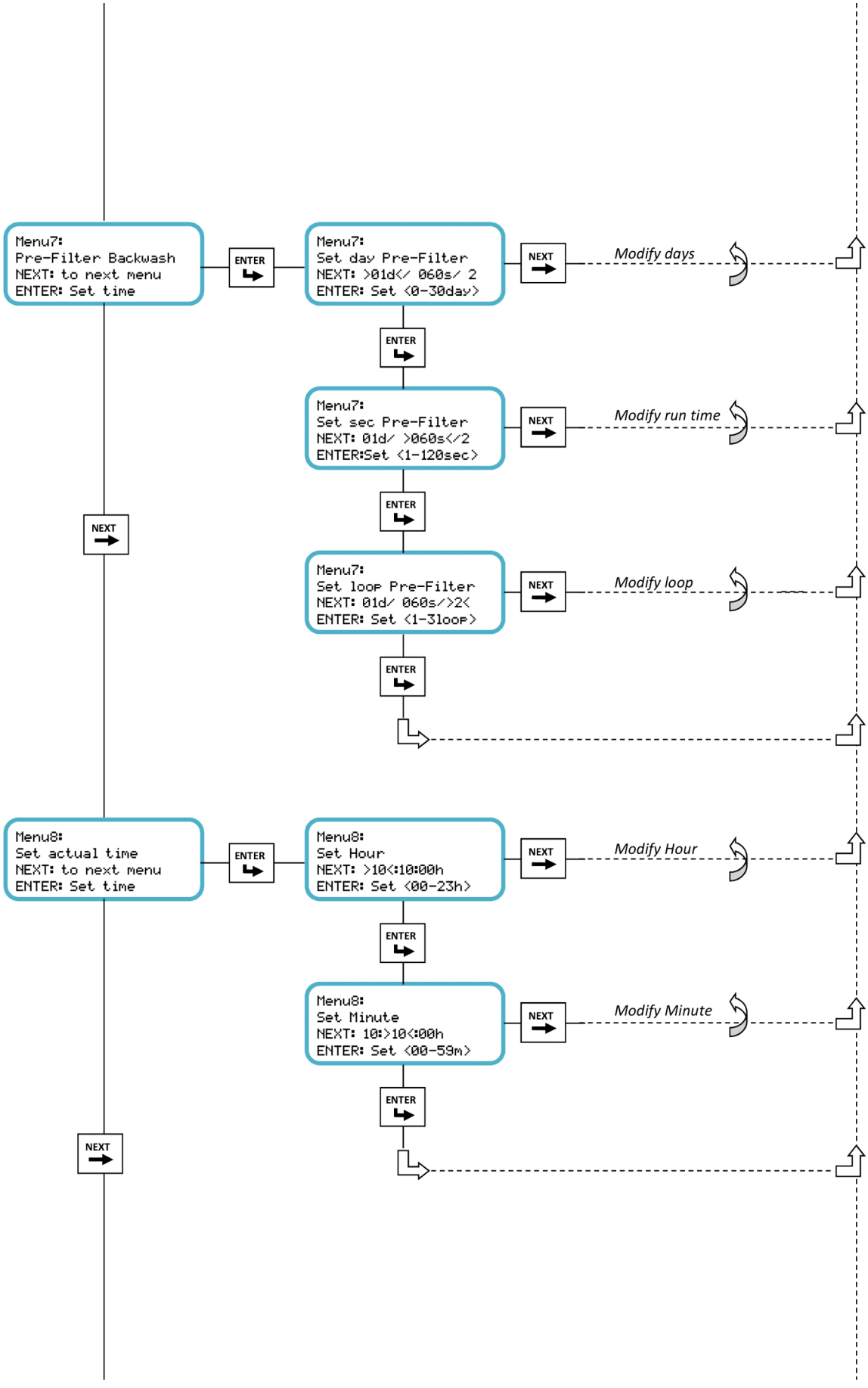
6.2.3. Menu Overview

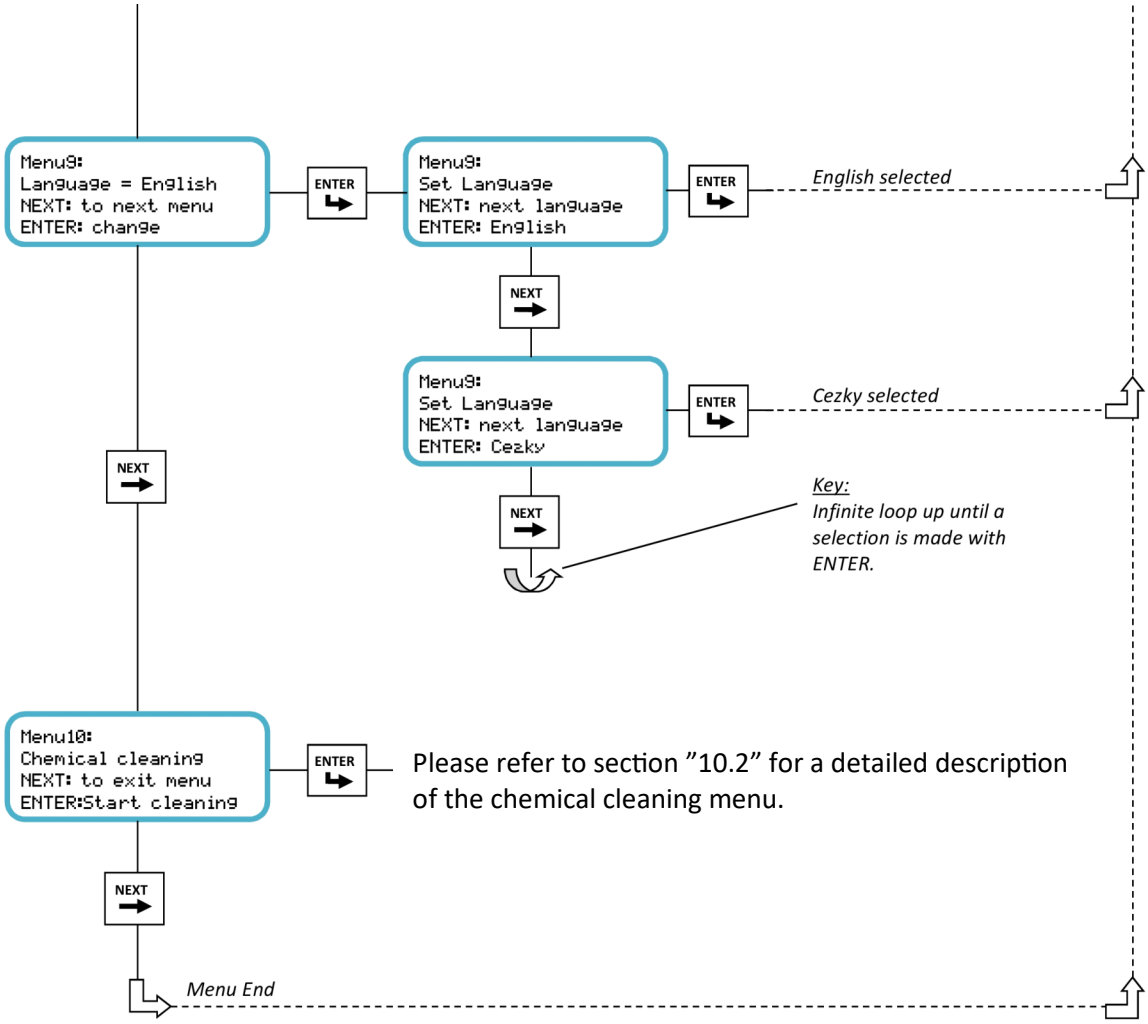



Menu2:
Testmode
NEXT: to next menu
ENTER: for Testmode
ENTER
Menu2:
Testmode
NEXT: to next test
ENTER: Filtration ON
ENTER
Menu2:TestFiltration
S(PUMP): 0.200 bar
Autostop: 5:53 min
ENTER/NEXT: Stop
ENTER
NEXT
NEXT
Menu2:
Testmode
NEXT: to next test
ENTER: Backwash ON
ENTER
Menu2: Test Backwash
S (PUMP): 0.250 bar
Autostop: 5:53 min
ENTER/NEXT: Stop
ENTER
NEXT
NEXT
Menu2:
Testmode
NEXT: to next test
ENTER:Sludge Pump ON
ENTER
Menu2: Test Sludge P
Test Sludge Pump
Autostop: 4:45 min
ENTER/NEXT: Stop
ENTER
NEXT
NEXT
Menu2:
Testmode
NEXT: to next test
ENTER: BL-MEM ON
ENTER
Menu2: Test BL-MEM
S(BL-MEM): 0.150 bar
Autostop: 5:45 min
ENTER/NEXT: Stop
ENTER
NEXT
NEXT
NEXT
Menu2:
Testmode
NEXT: to next test
ENTER: BL-DIFF ON
ENTER
Menu2: Test BL-DIFF
S(BL-DIFF): 0.200bar
Autostop: 5:45 min
ENTER/NEXT: Stop
ENTER
NEXT
NEXT
Menu2:
Testmode
NEXT: to exit menu
ENTER: Pre-Filter ON
ENTER
Menu2: Test P-Filter
Pre-Filter Backwash
Autostop: 5:45 min
ENTER/NEXT: Stop
ENTER
NEXT
NEXT


Menu3:
Number of MEM = 2
NEXT: to next menu
ENTER: Set Membranes
ENTER
Menu3:
Set number of MEM
NEXT: MEM = 1
ENTER: Set <1-6>
ENTER
NEXT
Menu3:
Set number of MEM
NEXT: MEM = 2
ENTER: Set <1-6>
ENTER
NEXT
NEXT
Key:
Infinite loop up until a selection is made with ENTER.
Menu4:
Sludge Pump= 1d/06s
NEXT: to next menu
ENTER: Set Sludge P
ENTER
Menu4:
Set Sludge Pump
NEXT: >01d< /06s
ENTER: Set <0-40day>
NEXT
Modify days
ENTER
Menu4:
Set Sludge Pump
NEXT: 01d />06s<
ENTER: Set <1-60sec>
NEXT
Modify run time
ENTER
Menu4: Sludge Pump
old=01d, new=02d
NEXT: Exit,no change
ENTER: Confirm
NEXT
No changes
ENTER
NEXT


Menu5:
BL-MEM= 01 ON/08 OFF
NEXT: to next menu
ENTER: Set time
ENTER
Menu5:
Set BL-MEM ON
NEXT: >01min</08min
ENTER: Set <0-15 min >
NEXT
Modify ON time
ENTER
Menu5:
Set BL-MEM OFF
NEXT: 01min />08min <
ENTER: Set <0-15min>
NEXT
Modify OFF time
ENTER
NEXT
Menu6:
BL-DIF=05 ON/ 05 OFF
NEXT: to next menu
ENTER: Set time
ENTER
Menu6:
Set BL-DIFF ON
NEXT: >05min</05min
ENTER: Set <0-15 min >
NEXT
Modify ON time
ENTER
Menu6:
Set BL-DIFF OFF
NEXT: 05min />05min <
ENTER: Set <0-15min>
NEXT
Modify OFF time
ENTER
NEXT


Menu7:
Pre-Filter Backwash
NEXT: to next menu
ENTER: Set time
ENTER
Menu7:
Set day Pre-Filter
NEXT: >01d</ 060s/ 2
ENTER: Set <0-30day>
NEXT
Modify days
ENTER
Menu7:
Set sec Pre-Filter
NEXT: 01d/ >060s</2
ENTER:Set <1-120sec>
NEXT
Modify run time
ENTER
NEXT
Menu7:
Set loop Pre-Filter
NEXT: 01d/ 060s/>2<
ENTER: Set <1-3loop>
NEXT
Modify loop
ENTER
Menu8:
Set actual time
NEXT: to next menu
ENTER: Set time
ENTER
Menu8:
Set Hour
NEXT: >10<:10:00h
ENTER: Set <00-23h>
NEXT
Modify Hour
ENTER
Menu8:
Set Minute
NEXT: 10:>10<:00h
ENTER: Set <00-59m>
NEXT
Modify Minute
ENTER
NEXT


Menu9:
Language = English
NEXT: to next menu
ENTER: change
ENTER
Menu9:
Set Language
NEXT: next language
ENTER: English
ENTER
English selected
NEXT
Menu9:
Set Language
NEXT: next language
ENTER: Cezky
ENTER
Cezky selected
NEXT
Key:
Infinite loop up until a selection is made with ENTER.
NEXT
Menu10:
Chemical cleaning
NEXT: to exit menu
ENTER:Start cleaning
ENTER
Please refer to section ”10.2” for a detailed description of the chemical cleaning menu.
NEXT
Menu End

7. Installation

7.1. Installing the membrane station

The membrane station is delivered assembled if it is a pre-assembled system. All connection points are sealed with O-rings or flat gaskets. Individual components can be easily replaced during maintenance or servicing.

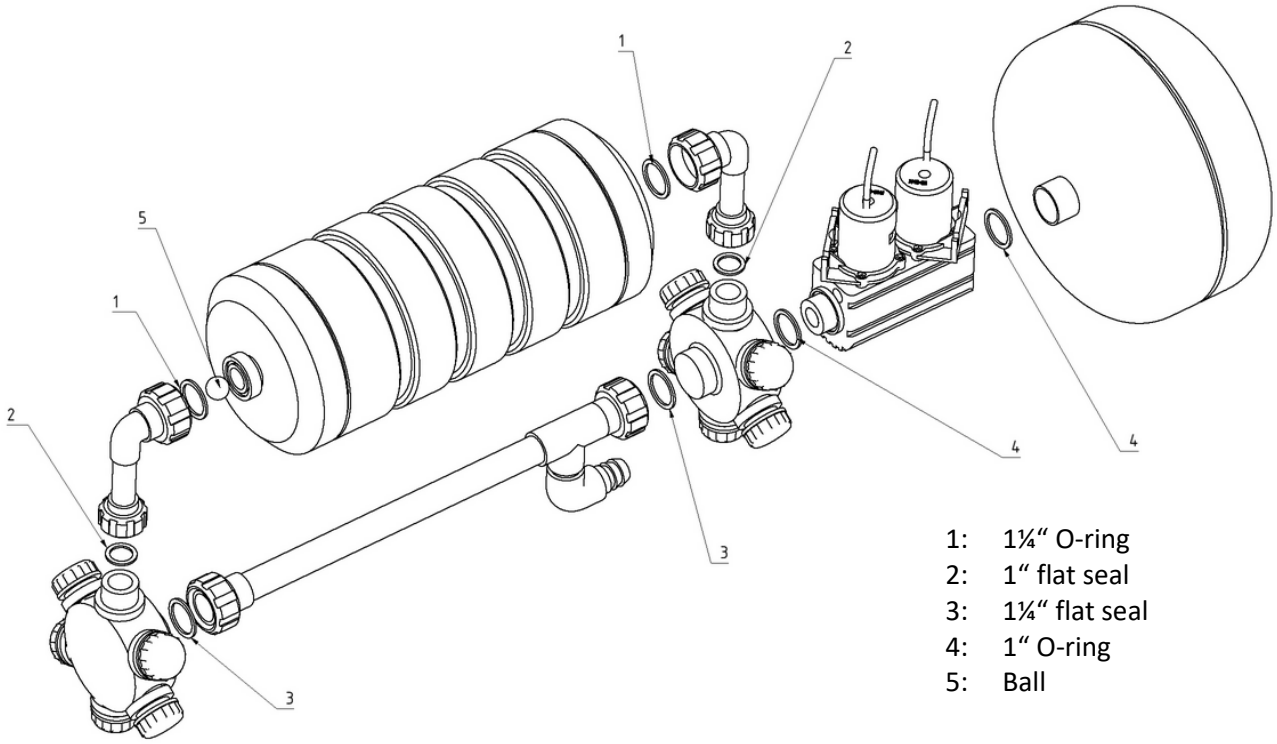


Figure 9: Connections of the membrane station

For individual systems the Membrane Station has to be assembled with t

Installation sequence:

- The central pipe is connected with top and bottom distributor.
- Assemble the membrane cartridge with supplied elbows and screw them into the distributors.

  Note: Mount the membranes on the right-way-up! See mounting instruction AQUALOOP Membrane! All screws must first be loosely attached to prevent jamming. Only when all membrane cartridges are positioned should all union nuts be tightened.
- The pump unit is screwed onto the upper distributor as far as it will go (seal via integrated O-ring in pump screw connection). Ensure the direction of the pump unit (filtration pump at the bottom, backwash pump at the top).
- The backwash tank (1) is screwed onto the top of the pump connection until it is tight.

Fastening of the membrane station in the tank

The membrane station must be fixed (material not in the scope of delivery) to prevent it from buoyancy.

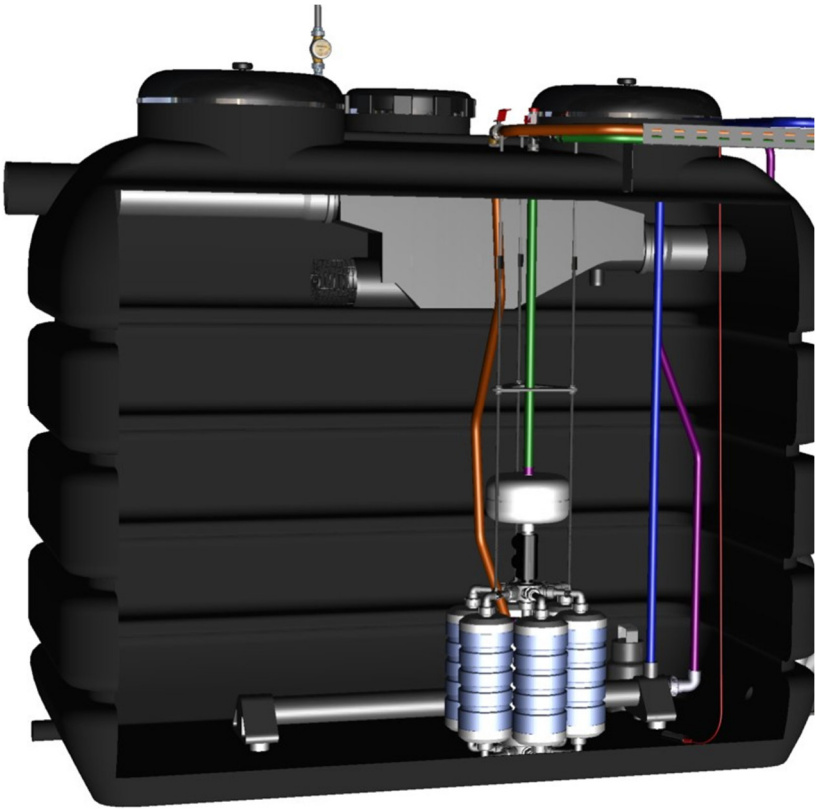


Figure 10: Example fixed Membrane station in the bio reactor

Note: If the treatment system is installed on site, it must be secured in the same way.

The membrane station must be aligned vertically and straight so that the air flows evenly through the membrane cartridge to prevent one-sided sludge build-up. For this purpose, the station must be mechanically fixed and the permeate hose must be mounted tightly upwards on the tank and aerator hose in such a way that a skewed position is avoided.

7.2. Installing controller and switching power supply bracket

The controller housing and power supply brackets are mounted to the wall next to each other.

Note: Pay attention that there is space to open the housing lid above the housing and a place for cable routings below the housing installation space (each at least 190 mm).

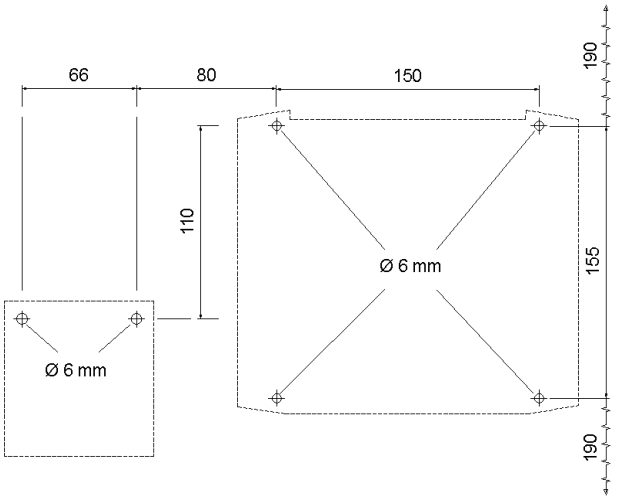


Figure 11: Drilled hole distances of controller housing and DC switching power supply brackets

General:

For regular maintenance and service works, it should be noted that the membrane station can be pulled out of the tank even, when full with water.
The electric pump cables should be measured to ensure that the entire membrane station can be extracted without first having to disconnect the wiring from the controller. The blower and clear water hose should be installed with quick detachable connections, so that simple removal of the membrane station is possible. This facilitates easy maintenance and service works.

Electric connections

Connect the cable of the corresponding component to the controller as described in section "*6.1-Electronic connections"*

- All electric cables are now to be connected to the controller. The spring terminal is opened with the supplied screwdriver.

  1.) Insert slotted screwdriver in the top opening, then press from top (arrow direction) and hold.

  2.) Insert cable in the opening underneath. Then release the screwdriver (terminal closes) and remove.

  Note: It must be observed during connection of the electrical wiring that the bottom pump is the filtration pump (clamp terminal: filtration pump) and the top pump is the backwash pump (clamp terminal: backwash pump).

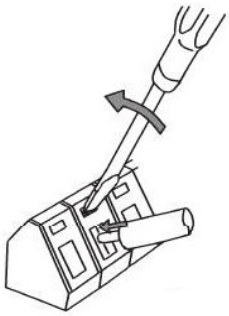


Figure 12: Operating mode spring terminal

7.3. Float switch setting

Counterweight

The float switch has a counterweight to balance its movement. Secure the counterweight at a distance of 150mm (15 cm), for each float switch as shown in the figure.

Float switch in Bio reactor tank:

Position the float switch approximately 700 mm above the tank base, as shown in the figure, so that the top surface of the float switch aligns with the bottom surface of the backwash tank.

Float switch in Clear water tank

Position the float switch in clear water tank, so that the top of the counterweight aligns with the lower edge of the emergency overflow, as show in the figure. This following arrangement offers an overall safety reserve of 90 mm water level.

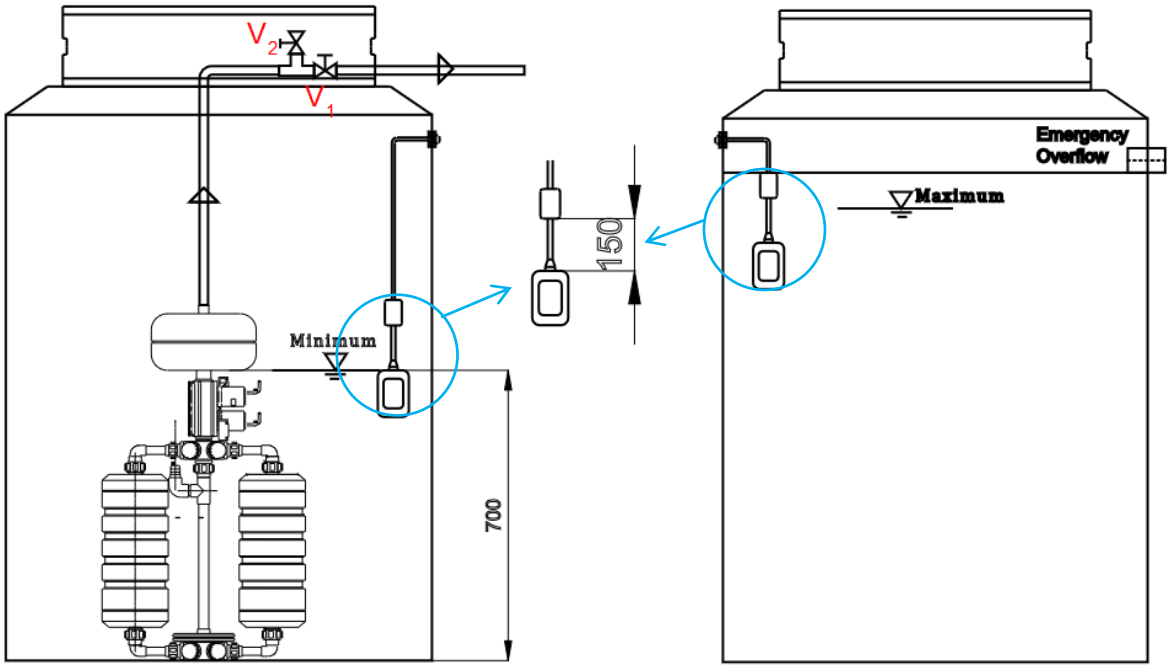


Figure 13: Diagram on functions of float switches e.g. in the AQUALOOP 300L/day System

8. System start-up process

Before we put the system into operation, we recommend a leak tightness test to ensure that the proper operation functionality of the system.

Leak tightness test:

Attention:

The water tightness of all screw fixings is particularly important so that none of the contaminated water contaminates the clear water. Furthermore, any wastewater which accidently enters through poorly tightened screw fittings is sent to the membranes hollow fibers which may cause clogging of the fibers. Therefore, a water tightness test must be performed before the start-up process.

Before connecting the blower hose to the aeration pipe, it should be connected to the ¾" connection on top of the backwash tank in order to pressurize the membrane station with pressure (0.2bar).

Suggestion: If the tank is so deep that the connections are not easily accessible, the test can be carried out in a separate container.

- The membrane station is then immersed in tank water up to the mid line of the backwash tank.
- Then the blower is started in test mode.
- If no bubbles can be seen in the water then all screw connections are water tight and the assembly can be finally installed.

! Note: run the test for 5 minutes!

Blower and clear water connection

The ready to install membrane station is set up in the tank. Blower and membrane station are connected to each other via a flexible hose (Ø26mm internal).
Note: The central connection is simply left open when using the system without aeration.

Figure 14: *Blower hose connection*

The clear water hose is connected to the backwash tank and then led to the clear water tank.
Note: Respect decline from clear water tank down to the tank with the membrane station to be able to fill in cleaning liquid for chemical cleaning later.

Parameter setting

Set the parameters according to the system capacity and the usage. Refer to the steps described in the section "*6.2.2 Menu settings*"

Start-up:

To start up the membrane station in the storage tank, the membrane station must be immersed in water up to the middle of the backwash tank. After approx. 30 minutes, the water will have reached the suction chamber of the pump. Only now can the test operation of the suction pump be started, as the pumps are not self-priming. The suction pump must now pump until water flows out of the clear water hose.

The backwash pump can only be checked indirectly in the system. To do this, it is activated in test mode for one minute and then the suction pump is activated again. If the suction pump now needs some time to refill the backwash tank before permeate flows out of the clear water hose again, this is proof that the backwash pump has worked.
Once test operation is complete, the system is ready for use.

9. Maintenance

The following described maintenance schedule can be performed only by trained operator. The safety instructions below must be followed strictly!

Disconnect the power before working inside the tank or on electrical equipment.

Avoid direct skin contact with the greywater when cleaning the pre-filter and the membrane(s). Please use rubber gloves!

Note:

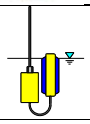
- Quality monitoring for turbidity, odor, and color is recommended daily.
- The worksheet for periodic maintenance of the system at intervals of 3 months up to 10 years is available from the subsequent page

General specifications of maintenance and mechanical cleaning of the membrane can be seen in the AQUALOOP Membrane manual.

9.1. Maintenance and replacement intervals

The following table represents an overview of regular maintenance and replacement intervals. Further information on maintenance can be found in the corresponding component manuals, which are labelled with.

Table 2: Overview of maintenance and replacement intervals

	Article Number	Product	Check interval [months]	Replacement interval
	ALMS-PVers.1.1 600703	AL-Filtration/ backwash pump	6	20.000 hrs. running time
	ALMS-FS15m 600702	Floating switch	6	-
	ALMS-N-4A EU 600701	24V Adapter	6	-
	ALMS-CUV2 600708	AQUALOOP Controller	6	-

Note: Components and replacement parts are listed on intewa.store.com
https://www.intewa.com/en/weiteres/downloads/downloads/instructions-and-data-sheets/

10. Chemical Cleaning

Chemical cleaning of the membranes can be carried out in two ways.

- In-situ, directly in the bioreactor
- Externally in a separate cleaning tank (intensive cleaning *)

* Intensive chemical cleaning of the membrane(s) is only carried out if the filtration performance is greatly minimized. (Further information can be found in the AQUALOOP membrane instructions).

The main differences between the cleaning methods are:

	In-Situ Cleaning	Intensiv Cleaning
Cleaning time	1-2 h	0,5 - 24 h
Cleaning result (rainwater application)	Depending on the condition of the membrane Up to approx. 1.5 l/min	Depending on the condition of the membrane Up to approx. 2.0 l/min
Cleaning result (grey water application)	Depending on the condition of the membrane Up to approx. 1.2 l/min	Depending on the condition of the membrane Up to approx. 1.5 l/min
Required accessories	Bracket and connection hose	separate cleaning container, container size depends of the membrane amount of the membrane station

10.1. Chemical Cleaning Solution

We recommend the cleaning solution be made from regular domestic cleaning agents and should be mixed as described in annual AL-MEM.

ATTENTION!

Never mix acids and alkali!
All pipes and connections must be rinsed well with water after being cleaned with acid before cleaning with alkali and the other way around!
Follow the warning and safety instructions of the chemicals used!
Protective gloves and glasses are to be used during all cleaning operations!

Table 3: Ratio of Chemical to water for in-situ chemical cleaning

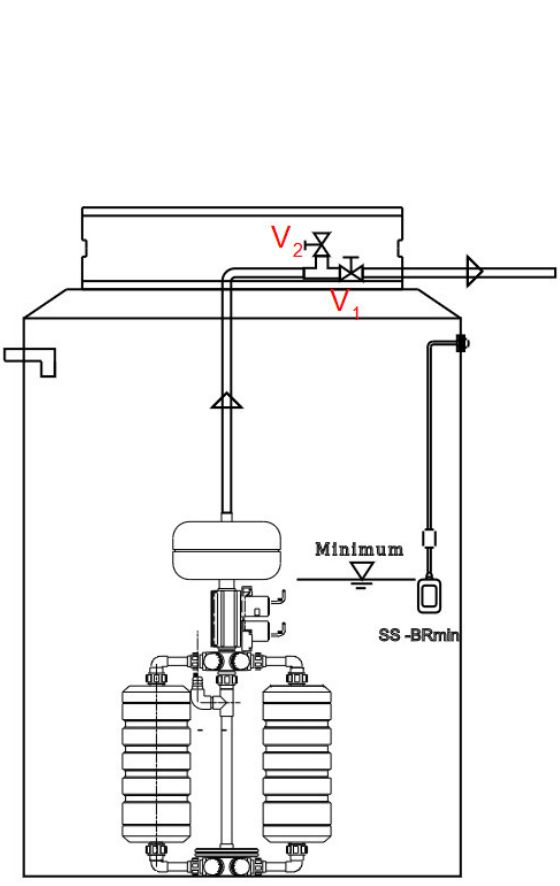
Initial concentration solution Citric acid or Chlorine	Target cleaning fluid concentration Citric acid	Mixing ratio Water / Citric acid	Target cleaning fluid concentration Chlorine	Mixing ratio Water / Chlorine
5%	1%	2 Liter / 500 ml	0,25%	2 Liter / 105 ml
10%	1%	2 Liter / 222 ml	0,25%	2 Liter / 83 ml
15%	1%	2 Liter / 124 ml	0,25%	2 Liter / 69 ml
20%	1%	2 Liter / 105 ml	0,25%	2 Liter / 25 ml
25%	1%	2 Liter / 83ml	0,25%	2 Liter /20 ml
30%	1%	2 Liter / 69ml	0,25%	2 Liter / 17 ml

10.2. In-Situ chemical cleaning

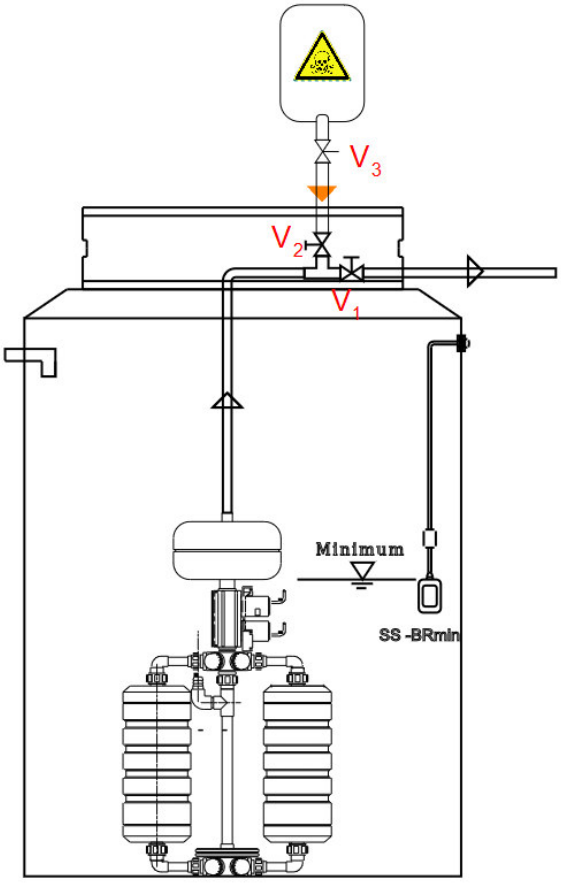
A cleaning option is available in the control menu of the AQUALOOP Membrane controller. A semi-automatic cleaning of membrane cartridges can be performed without the need to dismount the membranes.
Chemical cleaning dissolves biological build-up (fouling) and mineral deposits (calcium) accumulated inside of the hollow fibres.

Note: The chemical cleaning cycle allows the growth bodies to remain in the tank, the amount of chlorine does not affect the bacteria on the growth bodies, but only the BOD in the membrane, therefore the amount of chlorine must not be higher than specified in the manual (s. Table 3), this small amount is absorbed (oxidized) by the BOD in the membrane.

Chemical cleaning device:
The cleaning could be easily accessible with the help of a two way valve (AL-C-Kit) mounted above the tank for permeate flow. The Valves V1 and V2 in the below figure represents the AL-C-Kit.
(Note: AL-C-kit is not in the scope of delivery)



Cleaning device: normal filtration working
Shut off valve V_1 open
Shut off valve V_2 close



Cleaning device with connected canister (chem. fluid)
Shut off valve V_1 close
Shut off valve V_2 open
Shut off valve V3 open

Note:

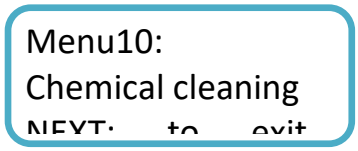
1. If cleaning is carried out without the AL-C-kit, the gradient from the clear water tank to the tank with the membrane station must be observed, to ensure that the chemicals do not get into the clear water tank.

2. In small tank systems with good accessibility (e.g. AL 300 system), the cleaning fluid can be filled directly into the backwash tank.

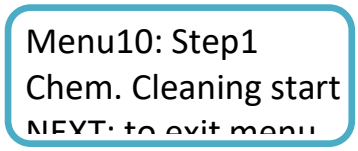
The steps of the semi-automatic chemical cleaning process using the control unit are shown below.

Menu start of cleaning routine

Selection of Chemical Cleaning

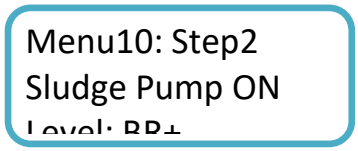


1.) Security prompt to start the cleaning routine

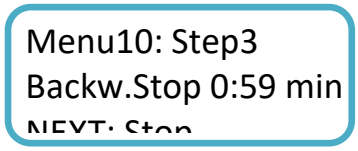


2.) Controller automatically starts the sludge pump until the minimum level of water is reached in the bioreactor (BR-).

Note: If no internal sludge pump is connected, then the bioreactor should be pumped with an external pump until "BR-" appears in the display (with a simultaneous sound of 5 beep tones)
Attention: The Filtration pump must not be allowed to run dry!

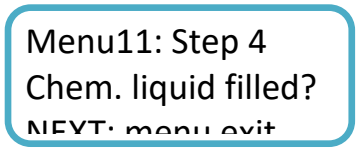


3.) If the controller shows "BR-", then a backwash process is automatically performed to empty the backwash tank. This procedure ends automatically or can also be terminated manually.

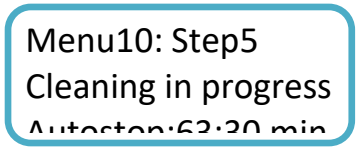


4.) Now the cleaning solution (see. Section 10.) can be added using the clear water hose

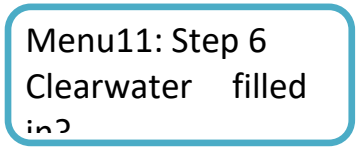
Note: The cleaning solution must be refilled during the cleaning process in case of more than three membranes installed as the backwash tank has only approx. 6 l holding capacity.



5.) If the cleaning solution is filled, then the cleaning cycle starts with ENTER. An internal routine now runs. The routine takes about one hour.



6.) After the completion of the cleaning routine a clear water flushing must be started. At least two liters of clear water are filled into the backwash tank for each membrane.



7.) With ENTER the clear water flushing is confirmed. The routine takes about max. 7 minutes.

Menu11: Step 7
Clearwater
flushing

8.) After the clear water flushing is completed, the operation mode concludes, the homepage is returned to the display and the normal program resumes operating according to the set parameters

Time:
14:22:
08h

For a further cleaning step the cleaning menu must be started again.

ATTENTION!
If chlorine cleaning is performed after acid cleaning, then the pipes must be sufficiently rinsed (see description Step 6.)

10.3. Intensive chemical cleaning

Description:
The AQUALOOP membrane station is taken out of the bioreactor and put in a separate cleaning container with a controller (optional accessories). If the membrane is covered in sludge, it must first be cleaned manually (see manual AQUALOOP AL-MEM). The cleaning container is filled with the cleaning solution (160 L in AL-CTank350L for a Membrane station up to 6 Membrane cartridge) with a waterlevel up to the top of the pump unit (700 mm). The cleaning concentration described in the table below.

The pump unit of the membrane station is connected with the AQUALOOP AL-MS control unit in the standard manner. (The full description you will find the manual AQUALOOP AL-MS). The goal is to circulate the cleaning solution under normal pressure and flow rate for 1 - 4 hours.

Therefore, the start times T1 and T2 and filtration cycles (A1/A2) have to be set as follows (the other settings of the control unit as blower times, sludge pump … can be ignore):

MEM:	MEM	= 1-6	(MEM is entered according to the number of installed membranes of the membrane station.)

After the cleaning process, the cleaning solution is disposed of and clear water is filled into the cleaning container to the top of the pump unit (700 mm). After flushing with clear water for one hour, the used clear water is disposed of. A second cleaning with clear water is made in the same way, after which the cleaning process is finished.
The membrane station is then put back into the bioreactor and connected to the original control unit.

Note: Be sure that the room, in which the cleaning takes place is well ventilated!

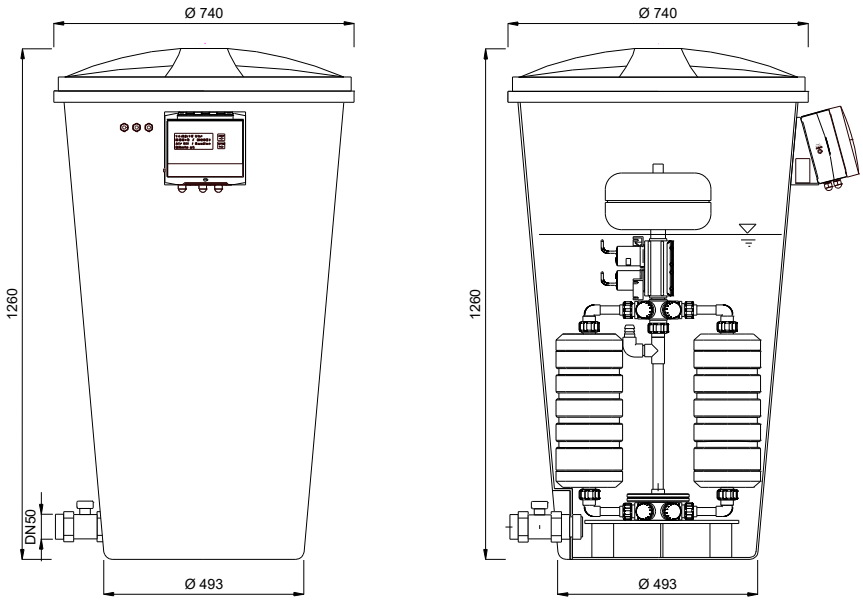


Figure 15: Cleaning container AL-CTank 350L (optional accessories) for 2-6 membrane cartridges with integrated AL-MS control unit

The mixing ratios are shown in the following tables:

Table 4: Mixing ratio of citric acid.

Initial concentration: citric acid	Target concentration: Citric acid	Mixing ratio water / citric acid per membrane station (6 membrane cartridges)
30 %	1 %	160 L / 5.52 L
50 %	1 %	160 L / 3.27 L
100 %	1 %	160 L / 1.60 L

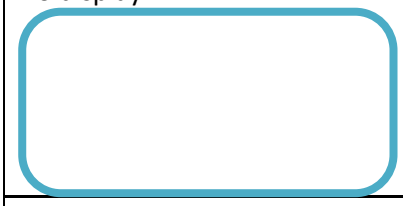
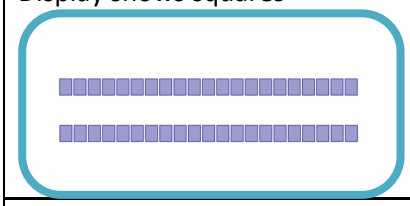
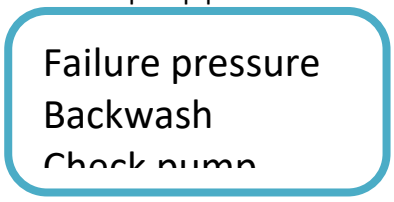
Table 5: Mixing ratio of chlorine.

Initial concentration: Chlorine	Target concentration: Chlorine	Mixing ratio water / chlorine per membrane station (6 Membrane cartridges)
5 %	0,25 %	160 L / 8 L
12 - 14 %	0,25 %	160 L / 3.1 L

11. Trouble Shooting

11.1. Errors and messages with display Indicators

Table 6: Possible errors, causes and remedies

Symptoms	Cause	Remedy
No display 	• Display cable is loose or defective	• Check display cable or change display
Display shows squares 	• Flat cable from PCB to the display not connected properly.	• Disconnect/connect the flat cable
Backwash pump pressure is low 	• A backwash pressure < 0.1 bar was detected in four consecutive backwash cycles (standard 0.3 - 0.5 bar)	• Carry out a backwash pump test via the test menu. • In case of error, replace backwash pump and/or pump controller

Display after power failure Power failure has occurred! Check power	• Display (for 30 seconds) after power failure of 24 V voltage supply	• Check the number of failures in status mode in a period of 24 h, for instance. If the number increases and the reason is not a general power failure, then the power supply is to be checked.
Display during pump failure Power failure during Filtration Check power	• Display with power failure during pump cycle	• Check pumps via test menu. If there is a power failure even in test mode, then check for defect in respective pump or power supply.
Power failure> 21 days Power failure > 21d? Check storage	• power failure for more than 1 week	• If power failure less than 21 days please confirm with NEXT • In case the storage time of 21 day was exceeded because of the power failure the clear water tank must be discharged manually.
Display does not respond Ooo/+-/ooo///+/-	• Control unit not responding/crashed	• Disconnect the unit from the mains and reconnect after 1 min • Disconnect the cable bridge (s. section 6.1) on control board and reconnect

<table>
<tr><th colspan="3">Info message during Test mode</th></tr>
<tr><th>Symptoms</th><th>Cause</th><th>Remedy</th></tr>
<tr><td>Filtration Test not possible
Menu2:TestFiltrat
ion
Test not possible</td><td rowspan="5">Water level of the clear water tank reached maximum
Water level of the bio reactor is below the membrane minimum required level
Floating switch CLmax not connected
Floating switch BRmin not connected</td><td rowspan="5">Check the water levels in tanks
Wait until the water levels allows the test mode
Check for the vertical floating switches position</td></tr>
<tr><td>Backwash Test not possible
Menu2:Test
Backwash
Test not possible</td></tr>
<tr><td>Sludge Pump Test not possible
Menu2: Sludge.P
Test not possible
Level: BR – / CL +</td></tr>
<tr><td>Water level minimum in Bioreactor
Time
4:56:24
Filtration Stop</td></tr>
<tr><td>Water level in the clear water tank has reached maximum
Time
4:56:24
Filtration Stop</td></tr>
</table>

Stagnation Display Storage time exceeded > 21 days	• The filtration operation was interrupted, e.g. due to holidays (no grey water inflow) and the clear water in the clear water tank was not changed for at least 21 days.	• Acknowledge the info display with NEXT or ENTER to reactivate filtration mode (see chap. 6.2) • Empty the clear water tank if necessary if the water quality is not sufficient. • A long stagnation time reduces the number of bacteria for biological treatment, i.e. restart the running-in phase if necessary

Stagnation indicator:

The retention time of the clear water in the clear water tank is monitored. After 21 days of stagnation, filtration operation is interrupted and the following warning message appears:

The user can now decide whether to empty the clear water tank or allow the system to continue running without further action.

After acknowledging the warning message with ENTER or NEXT, filtration mode is reactivated.

11.2. Errors without display Indicators

Some errors cannot be recorded electronically. These are described below.

Symptoms	Cause	Remedy
Low flux of the Membrane(s)	• Backwash pump does not flush the membrane regularly • Leakage clogs the membrane fibers	• Check backwash pump in test mode (see. start-up process) and change if necessary • Perform tightness test and remove source of leak if necessary
Pre-filter blocked	• Too much fouling on the wedge wire sieve • Backwash valve of the pre-filter is defect • Backwash nozzle is clogged	• Clean the sieve by hand and enlarge the cleaning runtime • Replace pre-filter valve • Demount and clean the backwash nozzle
Water level is detected incorrectly	• Position of the vertical float switch is incorrect	• Change position of float switch and adjust if necessary.
Filtration pump cycles	• dry-running protection of the pump activated.	• Place the membrane in the water (minimum water level 700 mm) and wait until the water has pressed itself back into the membrane.
No clear water delivery into the clear water tank -	• - Suction pump defective • Float switch BR min or Cl max incorrectly fitted or defective	• Check suction pump in test mode and replace if necessary • Check float switch position and function and replace if necessary

12. Accessories and spare parts

Article description	Drawing No. (s. chap. 4)	Order code / Art.-No.
AQUALOOP Steuergerät	[9]	ALMS-CU / 600 708
AQUALOOP Schaltnetzteil 24 V DC, 4A	[7]	ALMS-N-4A / 600 701
AQUALOOP Schwimmschalter 15 m	[10]	ALMS-SCHW / 600 702
AQUALOOP Saug- / Rückspülpumpe	[2]	ALMS-P / 600 703

Description: **AQUALOOP Membrane**
Code: **AL-MEM**

Ultrafiltration cartridge incl. connection material
Average pore size 0.02 µm
Max. backwash pressure 1.5 bar
Resistant to acidic, alkaline and chlorinated cleaning agents

Description: **AQUALOOP Pressure sensor for monitoring pump performance**
Code: **AL-PCS**

Measuring range:	-0.8 to +0.8 bar,
Connection:	4-20 mA, ventilated 3 line terminals
Cable:	Ø6mm, 3 m length

Description: **AQUALOOP Pressure sensor for monitoring blower performance**
Code: **I-CON-BCS**

Measuring range:	0 to +0.6 bar
Connection:	4-20 mA, 3 line terminals
Cable:	Ø5mm, 2 m length

Description:: **Submersible pump (sludge pump)**
Code: **VIP-130-6**

Operating voltage:	230 V AC/ 50 Hz, 4A
Dimension:	Ø165 x 290 mm
Lifting height:	max. 6 m
Lifting volume:	max. 120 l/min
Pressure connection:	1 ¼ “, hose bush Ø 25mm
Cable length:	10 m
Weight:	4 kg

Description: **AQUALOOP cleaning connection set**
Code: **AL-C-Kit**

Dimension:	155 x 90 mm
Permeate connector IN:	3/4" External thread
Permeate connector OUT:	3/4" External thread / Ø14 mm
Cleaning connector:	3/4" External thread / Ø14 mm
Material:	brass, PTFE
Weight:	0,74 kg

Description: **Vertical floating switch**
Code: **HW05-V-NSP3G1**

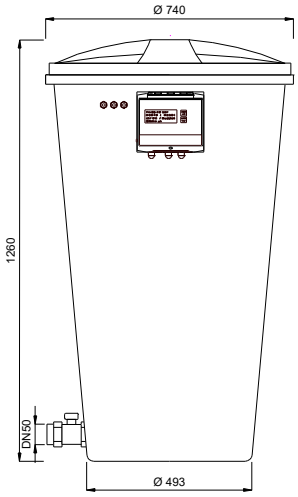
Dimension (Ø x H):	Ø60x235
Material:	PP
Hysteresis:	5 - 15mm
Protection:	IP 68
Weight:	270g
Cabel:	H07RN-F 3G1, 1.5m

Description: **AQUALOOP Floating switch**
Code: **ALMS-SCHW**

Dimension (Ø x H):	Ø60x150mm
Material:	PP
Cabel:	H07RN-F 3G1, 15m
Hysteresis:	15-40mm
Protection:	IP 68
Weight:	1kg

Description: **Backwash nozzle solenoid valve½ inch, 24 V DC**
Code: **PR-RSDS-MV½-24**

Voltage:	24 V DC
Size:	G ½"
Operation:	pilot operated
Position:	N.C. (normally closed)
Body material:	brass
Sealing material:	EPDM
Pressure stage:	0-10 bar
Kv value:	3.8 m^3/h
Weight:	0,2 kg



Description: **Cleaning container AL-CTank 350L**
Code: **AL-CTank 350L**

Size:	Ø740 x 1280
Operation:	with mounted ALMS-CU controll unit
Body material:	brass
Weight:	12kg

13. Warranty / Contact

The warranty provisions are included in our sales conditions, and can be viewed at:

https://www.intewa.com/en/terms/

CONTACT

For customers in Germany:
For any queries, ordering of spare parts as well as service requests, kindly contact INTEWA GmbH directly, quoting the model type, the serial number and the purchase invoice details.

INTEWA GmbH
Auf der Hüls 182
52068 Aachen, Germany

Tel.: 0049-241-96605-0
Fax: 0049-241-96605-10
Email: info@intewa.de
Internet: www.Intewa.com

For customers in other countries:
For any queries, orders for spare parts or service requests please get in touch with your local dealer or visit the service domain on the INTEWA website according to your country.

https://www.intewa.com/en/company/international-partners/

Always keep your purchase invoice, the model type and the serial number of the control unit handy.