USER MANUAL

Aquarius

Reverse Osmosis

Version: 2021-09

MANDATORY REQUIREMENTS

J. Moor Filtertechniek B.V. works constantly on innovating its products and their components, and reserves the right to make changes and/or improvements to its products without prior notice.

The contents of this document are supplied without any kind of warranty. Unless required by applicable law, no warranty, express or implied, is given regarding the accuracy, reliability or contents of this document, including but not limited to implied warranties regarding the merchantability and fitness for a particular purpose. J. Moor Filtertechniek B.V. reserves the right to change or withdraw this document at any time without prior notice.

CONTENTS

1. INTRODUCTION

1.1. Intended use of the manual

This manual contains important information about how an Aquarius reverse osmosis (RO) system works and how to operate, use and maintain your Aquarius. It is important that you carefully read the manual and all other enclosed information about your system, and that you act in accordance with this information. You must strictly comply with warnings and safety requirements. Incorrect use of the system can be dangerous!

If you have any questions after reading this manual, please contact your supplier.

1.2. Glossary of terms

RO	Reverse osmosis.
Membrane	Rolled-up fabric with advanced “filter operation”.
Pressure cylinder	Cylinder in which the membrane is fitted.
Raw water	Incoming water containing contaminants.
Permeate	The treated water.
Concentrate	The concentrated wastewater flow.
Recycling	The part of the concentrate that is re-used.
Feed water	Mixture of recycled and raw water that is pumped to the pressure cylinders.
Clean rinse water	A small amount of the permeate that is used after production or during a long production stop to rinse the membranes.
Antiscalant	Liquid that is added in very small quantities by means of a dosing pump. This liquid prevents scaling in the membranes and is discharged from the RO with the concentrate.
Recovery	Amount of permeate generated from raw water, expressed as a percentage: (permeate/raw water) x 100%.

2. SAFETY, LAWS AND REGULATIONS

To ensure safe working with your Aquarius, you must comply with a number of safety requirements. The most important of these are listed below:

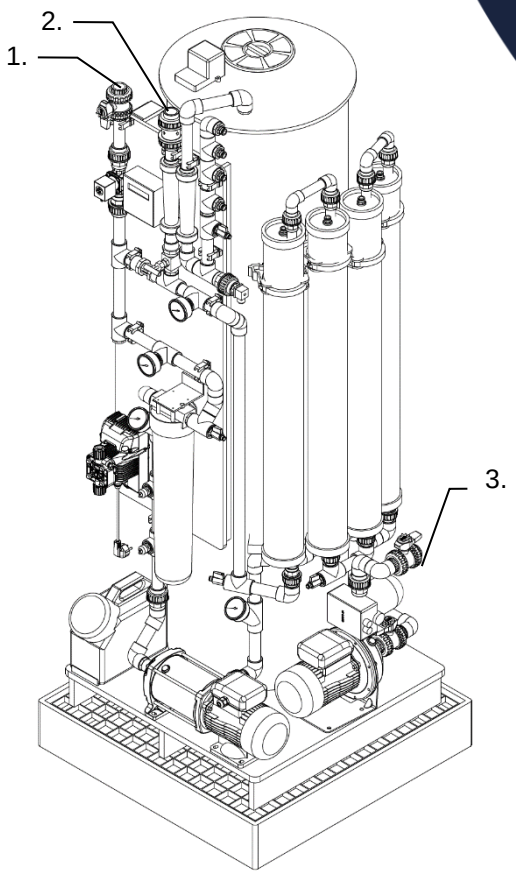
- The water produced is not suitable for consumption.
- Backflow protection must be provided for the Aquarius system.
- Comply with the laws and regulations applicable at the location of the Aquarius system.
- Ensure that the system, components and accessories are kept out of reach of children.
- Do not use the treated water until you have ascertained that it satisfies the applicable regulations.
- Avoid contact with the antiscalant.
- Incompetent handling is dangerous. It can damage the system and can also cause other damage or personal injury.
- Always rinse the pipe network before first use, if little or no water has been consumed for some time.
- Although the Aquarius RO in principle removes bacteria and viruses from the water, the supplier can never be held responsible for the formation or presence of bacteria, viruses or organic contaminants in the route after the water treatment system. The end user is obliged to assume this responsibility and also to take any necessary precautionary measures.

3. HOW THE AQUARIUS WORKS

3.1. Connections

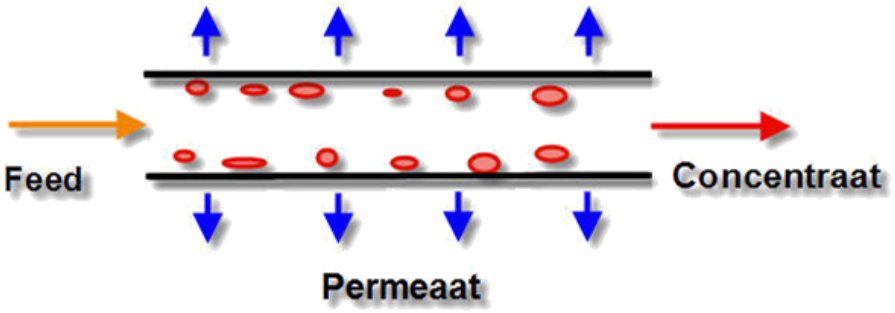
The following pipes and cables are required for connecting the Aquarius:

1. Mains water supply.
   Note: Backflow protection is compulsory.
   PVC Ø 32 mm
2. Connection to sewer.
   PVC Ø 32 mm
3. Connection of the permeate (clean water) to the end user.
   Note: Use plastic or stainless steel pipes for this water.
4. Electricity connection: 1x 16A plug.



3.2. Working principle

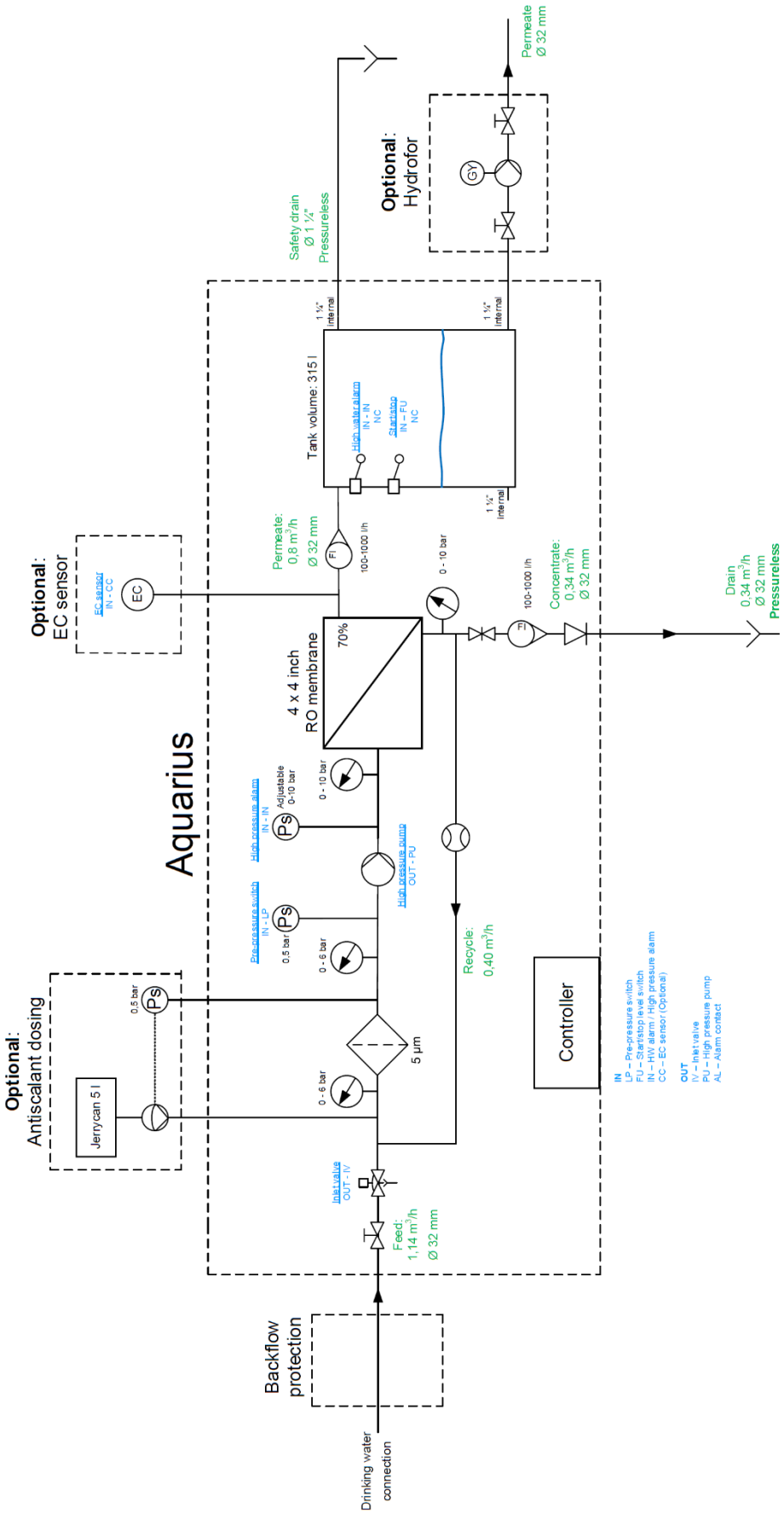
Reverse osmosis is a separation technique that uses membranes with very small pore sizes: so small that almost only water molecules can go through them. These membranes are extremely effective in removing dissolved salts, such as sodium.



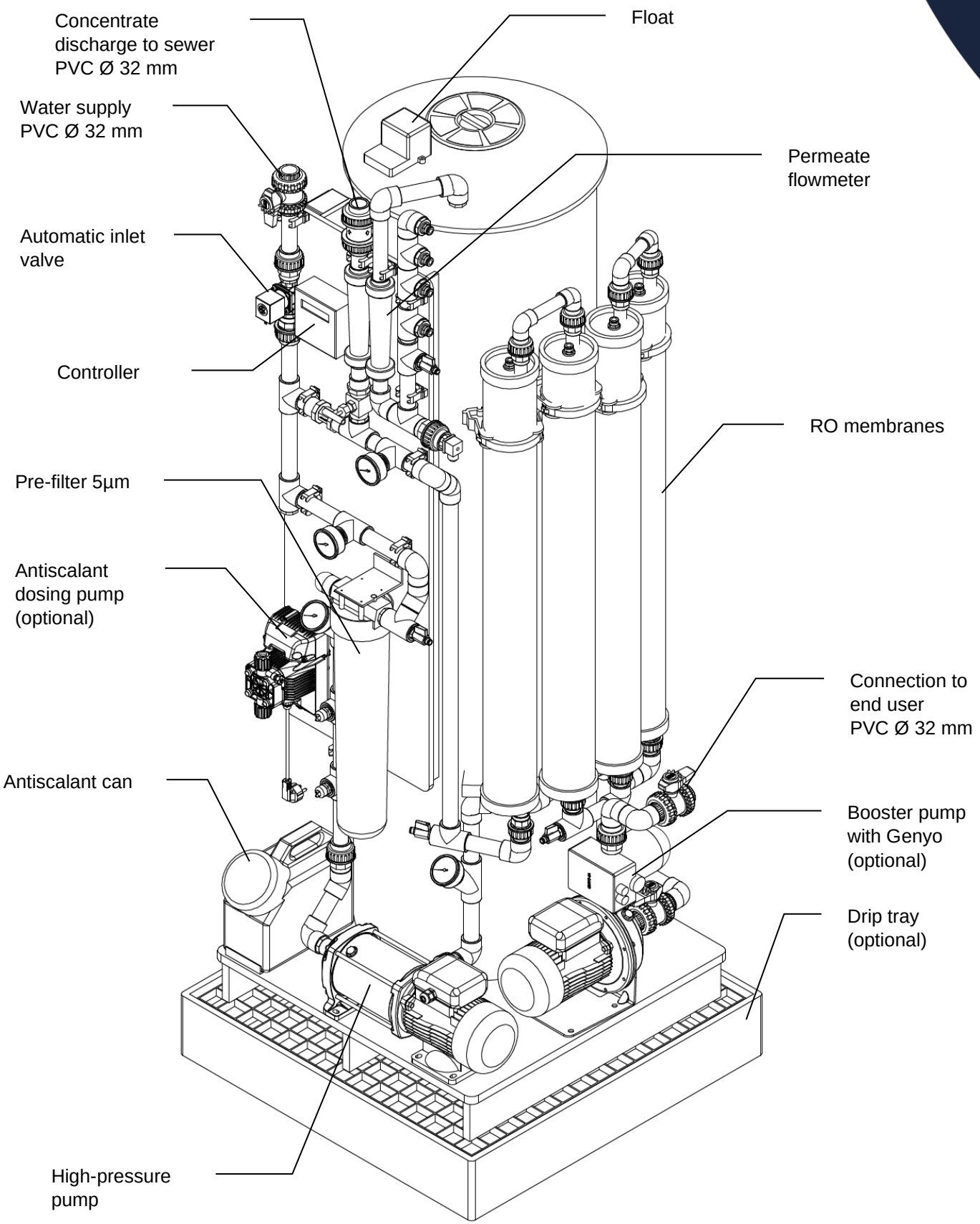
The raw water (feed) is pumped into the pressure cylinders and along the surface of a membrane by the system pump. After these pressure cylinders, the water flow is constricted by means of a needle control valve, which raises the pressure in the cylinders. At this increased pressure, permeate is produced by the membranes. The ratio of permeate to raw water is called the “recovery rate”.

3.3. Flow diagram

The flow diagram of the Aquarius is shown on the next page.


Aquarius
Optional:
Hydrofor
Permeate
Ø 32 mm
Safety drain
Ø 1 ¼"
Pressureless
Tank volume: 315 l
High water alarm
IN - IN
NC
Start/stop
IN - FU
NC
1 ½" internal
Permeate:
0,8 m³/h
Ø 32 mm
100-1000 l/h
Optional:
EC sensor
EC sensor
IN - CC
EC
0 - 10 bar
Concentrate:
0,34 m³/h
Ø 32 mm
Drain
0,34 m³/h
Ø 32 mm
Pressureless
4 x 4 inch
RO membrane
70%
High pressure alarm
IN - IN
Adjustable
0-10 bar
Ps
High pressure pump
OUT - PU
Pre-pressure switch
IN - LP
0,5 bar
0 - 6 bar
Recycle:
0,40 m³/h
Optional:
Antiscalant dosing
Jerrycan 5 l
5 µm
Controller
IN
LP – Pre-pressure switch
FU – Start/stop level switch
IN – HW alarm / High pressure alarm
CC – EC sensor (Optional)
OUT
IV – Inlet valve
PU – High pressure pump
AL – Alarm contact
Inlet valve
OUT - IV
Feed:
1,14 m³/h
Ø 32 mm
Backflow
protection
Drinking water
connection

3.4. System components



3.5. Controller and program logic

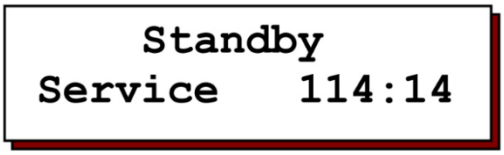
The Aquarius is designed as a fully automatic system. The system itself decides when production should take place, on the basis of a float in the tank.

The Aquarius will also rinse itself when it is not being used. To enable this, it is important that the machine is never switched off but always remains in operation.

Status	Description	Outputs
Production	If the start/stop float is low, the Aquarius will start production (unless there is a fault).	Inlet valve High-pressure pump
Standby	If the start/stop float is high, the Aquarius will wait until there is demand.	
Rinse	If the Aquarius is in standby, rinsing of the membranes will start after a short period.	Inlet valve
Interval rinse	After a long period in standby, rinsing will start once again.	Inlet valve

The controller is programmed in such a way that in normal operation no adjustments need to be made.

During production and standby, the working hours counter is displayed, alternating with the conductivity (optional).



Working hours counter Conductivity (optional)
Service … (hh:mm) CD … µS/cm

If the Aquarius is in the alarm status, it can be reset (after the fault has been rectified) by completely switching off the controller.

If settings do actually need to be adjusted, the cover must be unscrewed and removed; three push buttons can then be seen in a vertical row on the right-hand side in the box, which can be used to adjust the settings. See Chapter 9 for a detailed description of this controller and all the possible settings.

Dosing pump (optional)
The dosing pump that is used, the Injecta Athena MT2, has the following default settings:

- Manual

4. INSTALLATION

Chapter 3 contains a description of how the system works, including a flow diagram and drawings at the component level. The system must be installed in accordance with this flow diagram.

When installing the system, you must comply with the following:

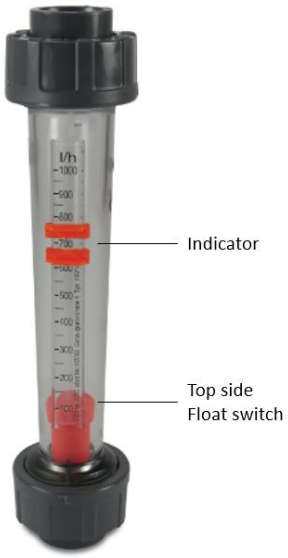
- The system must be carefully used in accordance with its nature and purpose. It is especially important that the conditions, preconditions and change instructions stated below are complied with. The system must be periodically maintained in accordance with the manufacturer's instructions as set out in the manual for the system.
- The system's settings have been configured by or on behalf of the manufacturer to function optimally under the specific circumstances stated by the user. The user must therefore ensure that the system's factory settings are not changed, and that no changes take place or are made in the circumstances known to the manufacturer when configuring the system's settings.
- The room in which the machine is located must be kept frost-free at all times.
- The water presented for treatment must be free from air bubbles or micro-air bubbles. The water temperature must never be higher than 20 degrees Celsius and never lower than 10 degrees Celsius.
- The antiscalant used must never be exposed to direct sunlight.
- Only use antiscalant that is supplied and prescribed by the manufacturer.
- The machine must have a constant and unhindered supply of raw water and clean rinse water.
- The machine must be connected and remain connected to a constant and reliable power supply (approved electricity network).
- The electrical voltage supplied may not vary by more than 4% from the required voltage, which is 230 V.
- The intake pressure of the raw water must be and remain almost constant. This water pressure must have a fixed value between 1 and 2.5 bar. Fluctuations of no more than 0.5 bar are permitted.
- The draining of concentrate must take place at atmospheric pressure at all times. The system's concentrate pipe may therefore never be interrupted by a shut-off valve.
- When components are replaced, only the original components used and prescribed by the manufacturer may be used. Any divergence from this requirement is only allowed with the written permission of the manufacturer, in which case the permission is restricted to the requested component in the pre-specified situation.
- Any maintenance other than described in this manual may be performed only by designated maintenance personnel authorised by Moor Filtertechniek B.V.

5. START-UP

Note: The system should be started up only by trained personnel. Moor Filtertechniek offers a start-up service for systems worldwide.

However, if you choose to start up the system yourself, then generally you will need to go through at least the following steps:

1. Check that the piping is in accordance with the flow diagram.
2. Ensure that the plug is not yet inserted into the socket.
3. Also take the plug of the booster pump (“hydrofor”) out of the socket and close the taps at the booster pump.
4. Check that there is a cartridge filter in the filter housing.
5. Open the manual supply tap to the Aquarius.
6. Open the recovery control tap with a couple of turns.
7. Insert the main plug into the socket. The Aquarius will now start automatically (if the storage tank is empty).
8. Open all the bleed valves in turn to remove all the air from the Aquarius.
9. When most of the air has been removed from the Aquarius, you can slowly close the recovery control tap. This should not be closed further than a recovery rate of 70%. Use the following table for this:



Permeate production (l/h)	Concentrate minimum (l/h)
1000	428
900	386
800	343
700	300
600	257
500	214
400	171
300	129

Note: A lower recovery rate (less permeate production and/or more concentrate production) is generally better for preserving the membranes. A higher recovery rate can cause scaling (membranes becoming fouled).

10. Record the operating parameters on the log sheet.
11. Leave the Aquarius in production until the storage tank is full and check that it stops automatically at the top float level.
12. After production, the Aquarius will perform a rinse and then go into the standby phase.

Booster pump (“hydrofor”)

13. Open the tap in the suction section of the booster pump.
14. Insert the plug of the booster pump into the socket.
15. Slowly open the tap in the discharge section of the booster pump and bleed the air from all the subsequent piping.

6. SHUTDOWN

Note: It is important for preserving the membranes that the system is kept switched on. The system can then rinse itself every 24 hours to preserve the membranes.

If the system needs to be completely shut down, you should contact your supplier, because the system can be filled with “preservative solution”.

7. INSPECTION AND MAINTENANCE

To ensure that your system functions properly, it is important to conduct frequent inspections of the most vital components and, where necessary, to carry out simple maintenance. In the sections below, the activities to be performed for each checking point are explained step-by-step.

7.1. Inspection

We recommend that you check a number of operating parameters quite regularly, to ensure that maintenance of the system can take place promptly. If this is not done, in an extreme case it may be necessary to replace the membranes. If a reduction in capacity is detected in time, it may be enough to simply clean the system.

See the log sheet for the operating parameters that should be checked.

7.2. Maintenance

We recommend that maintenance is performed once a year by trained personnel. Moor Filtertechniek can perform this maintenance either on request or as part of a maintenance contract.

Some maintenance activities can also be performed by other parties. These activities include:

- Replacing the pre-filter(s);
- Replacing/refilling the antiscalant jerrycan (if applicable).

Replacing the pre-filters (bag or candle filters)
If you find when performing a check that the filter needs to be replaced, follow the steps below:

1. Take the plug of the Aquarius out of the socket.
2. Close the manual supply tap.
3. Depressurise the filter housing by opening the shut-off valves at the top of the filter and then closing them again.
4. Use the large plastic spanner to open the filter housing. Do this gently, to avoid too much strain on the mountings.
5. Change the cartridge filter for a new 5µm filter.
6. Check the O-ring between the filter housing and the cap for any damage.
7. If applicable: Lubricate the O-ring with glycerine.
8. If applicable: Place the O-ring very carefully in the groove of the filter housing.
9. Carefully put the cap back on the filter housing and screw it tight again.
10. Open the manual supply tap.
11. Put the plug of the Aquarius back in the socket.
12. Bleed the air from the filter housing by opening the shut-off valves at the top of the filter.
13. Rinse the filter for a few minutes.
14. Fill in the user logbook.

Topping up the antiscalant
When the storage reservoir of the antiscalant is nearly empty, it must be topped up:

1. Check the nameplate of the system to determine the type of antiscalant. Contact your supplier/ dealer immediately if you are at all uncertain about the type of antiscalant.
2. Follow the guidelines in the Safety Data Sheet (summary of required safety measures) of the antiscalant concerned.
3. Unscrew the cap.
4. Fill up the reservoir with the prescribed antiscalant.
5. Replace the cap of the reservoir and screw it tight.
6. Remove any spilled antiscalant with plenty of water and disposable cloths.

8. FAULTS

If it appears that your system is not working properly, this must be resolved as soon as possible. However, there are a few points that you can check for yourself before contacting your manufacturer/ supplier.

8.1. Observations

The table below lists a few possible observations, together with their possible cause and the solution. In all other cases, you should contact your supplier/dealer immediately.

Observation	Possible cause	Solution
System does not activate; display also does not illuminate.	Power supply not switched on.	Switch on the power supply.
	Fuse of power supply has blown.	Replace the fuse or switch it back on.
	Cable is broken.	Check the power supply cable for any damage.
General alarm.	Antiscalant can is empty.	Fill up the can with antiscalant.
	Water level is too high.	Contact your supplier.
	External alarm has been activated, also causing the Aquarius to be stopped.	Resolve the external alarm.
Intake water pressure alarm.	Pressure in the water pipe for the Aquarius has fallen.	Resolve the problem with the intake water pressure.
	Pre-filter is clogged.	Replace the pre-filter.
The quality of the permeate is insufficient.	The membranes are fouled or damaged.	Contact your supplier.
	The composition of the raw water has changed.	Contact your supplier.
The system is leaking water.	One of the pipes or couplings is leaking.	Secure the pipes or couplings again.
	The filter housing is not properly sealed.	Screw the filter housing closed again and check that the filter and the O-ring are correctly in place.
	Other causes.	Switch off the system and contact your supplier.
No system pressure after the Aquarius.	Genyo has a fault.	Check the Genyo on the booster pump (“hydrofor”) and disconnect it from the power supply to reset it.
	Power supply not switched on.	Switch on the power supply.
Production capacity has decreased.	Recovery setting is incorrect.	Check the recovery setting: maximum 70% permeate and minimum 30% concentrate.
	Other causes.	Contact your supplier.

9. USER MANUAL FOR CONTROLLER

General description

The OS3020 controller is used to fully automatically monitor and control very simple water treatment systems, which operate according to the reverse osmosis principle.

The initial values that have been programmed into the controller can be changed at any time and are not erased in case of a power failure.

The controller has four switching steps, namely “PRODUCTION”, “STANDBY”, “RINSE” and “INTERVAL RINSE”.

“PRODUCTION” step
The start of the production depends on the number of programmed level switches and the position of these switches (inputs FU and EM). If only one level switch is programmed, the system will be switched on after a programmable delay. If two level switches are programmed, the system will be switched on after a fixed delay of 1 second.

In the “Production” step of the reverse osmosis system, first the inlet valve is opened. After an adjustable delay time of 1 - 999 seconds, the high-pressure pump is activated.

The following values are monitored:
- Conductivity below the minimum limit value
- Conductivity above the maximum limit value
- Low water pressure input
- Exceeded pressure input
- Tank high-level input
- Tank low-level input
- Stop

A built-in working hours counter registers the precise duration of the “Production” step from 1 minute to 65,000 hours.

“STANDBY” step
No water flows during the “Standby” step. The inlet valve is closed and the high-pressure pump is switched off.

The following values are monitored:
- Tank high-level input
- Tank low-level input

“RINSE” step
The step “Rinse” will be activated (if programmed in step 10.1) after finishing the step “Production”.

The concentrate valve will always be open. The inlet valve and the high-pressure pump can be programmed. The high-pressure pump can be switched on with a delay.

The following values are monitored:
- Low water pressure input (only when inlet valve is open)
- Exceeded pressure input
- Tank high-level input
- Tank low-level input
- Stop

“INTERVAL RINSE” step
The step “Interval Rinse” will be activated (if programmed in step 11.1) when there has been no water production for a programmable time.

The concentrate valve will always be open. The inlet valve and the high-pressure pump can be programmed. The high-pressure pump can be switched on with a delay.

The following values are monitored:
- Low water pressure input (only when inlet valve is open)
- Exceeded pressure input
- Tank high-level input
- Tank low-level input
- Stop

Measuring and function display

First LCD line
The first line of the LCD display shows the current phase of the system: “PRODUCTION”, “STANDBY”, “RINSE”, “INT.RINSE”.
If the system has been switched off on account of an alarm situation during one of the above phases, then this is indicated by the additional text “Alarm” (e.g. “Production Alarm”).

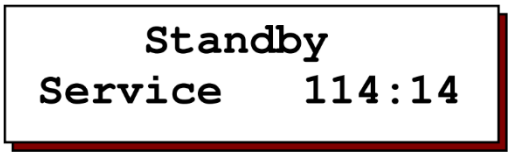
Second LCD line
Depending on the current phase of the system, the second line of the LCD display shows measuring and operating values.
ATTENTION: If, for a measuring value, the message “OFL” appears in the second line, the value to be measured lies outside the measuring range.

Second LCD line for the “Production” step
The second line of the LCD display shows the following information during the “Production” step:

Initially, the delay time is displayed in seconds, until the high-pressure pump is activated, for instance “Delay 10s”.

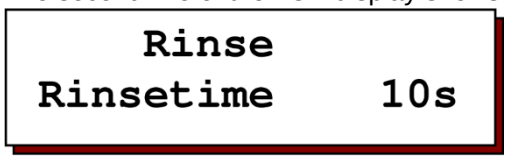
Also the value of conductivity 1 and the production hours are displayed alternately.
Conductivity 8.0 µS/cm
Service 114:14 (hours:minutes)

Second LCD line for the “Standby” step
The second line of the LCD display shows the following information during the “Standby” step:



Also the value of conductivity 1 and the production hours are displayed alternately.
Conductivity 8.0 µS/cm
Service 114:14 (hours:minutes)

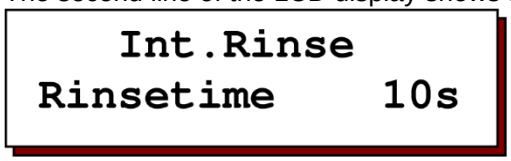
Second LCD line for the “Rinse” step
The second line of the LCD display shows the following information during the “Rinse” step:



Initially, the delay time is displayed in seconds, until the high-pressure pump is activated, for instance “Delay 10s”.
During the rinse, the remaining rinse time will be displayed.

Also the value of conductivity 1 and the production hours are displayed alternately.
Conductivity 8.0 µS/cm
Service 114:14 (hours:minutes)

Second LCD line for the “Interval Rinse” step
The second line of the LCD display shows the following information during the “Interval Rinse” step:

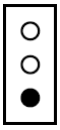


Initially, the delay time is displayed in seconds, until the high-pressure pump is activated, for instance “Delay 10s”.
During the rinse, the remaining rinse time will be displayed.

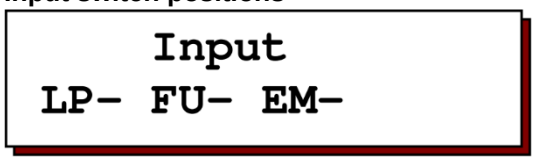
Also the value of conductivity 1 and the production hours are displayed alternately.
Conductivity 8.0 µS/cm
Service 114:14 (hours:minutes)

Info display

The information key can be used to retrieve various information. When you press the information key, the first information is displayed. You can obtain further information by pressing the key again.

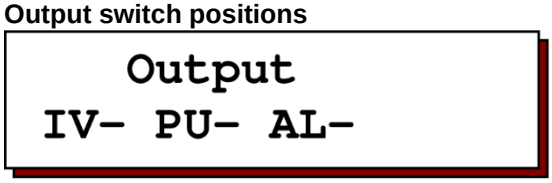


Input switch positions



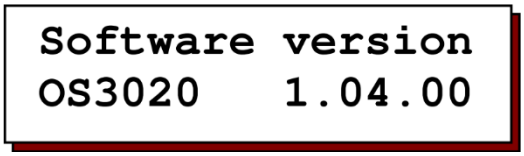
The current switch positions of the input functions are displayed.
LP = Low water pressure FU = High-level switch
EP = Exceeded pressure EM = Low-level switch
ST = Stop

Output switch positions



The current switch positions of the IV, PU and AL / CV outputs are displayed.
IV = Inlet valve
PU = High-pressure pump
AL = Alarm
CV = Concentrate valve

Software version

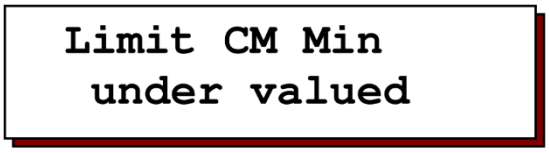


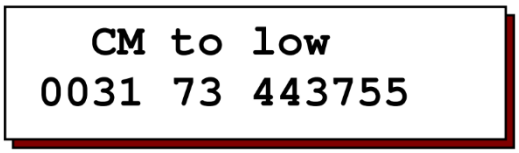
The factory regularly updates the software. Changes are made as necessary to adapt the product to the latest insights and requirements. The display shows the number of the built-in version.

Alarms

Below is an overview of the alarm messages that can appear in the LCD display. When a service number is programmed (steps 9.3 and 9.4), the display on the right-hand side will always appear; otherwise the left-hand display will appear.

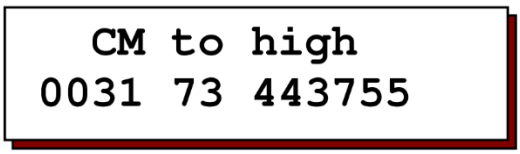
CD MIN



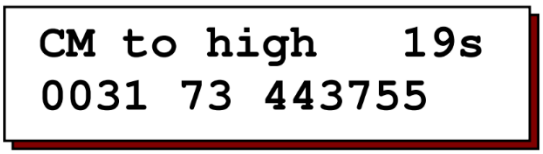


The conductivity value on the conductivity meter has fallen below the set minimum limit value. The system remains switched on. The message disappears as soon as the value again rises above the set minimum limit value. The alarm relay can be activated.

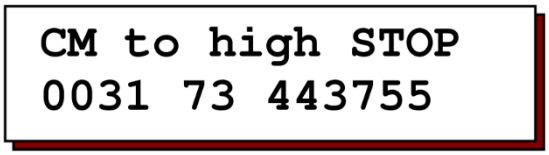
CD MAX



The conductivity value on the conductivity meter has exceeded the set maximum limit value. The system remains switched on. The message disappears as soon as the value again falls below the set limit value. The alarm relay can be activated.

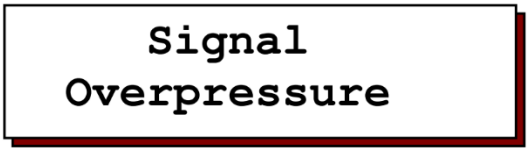


This message will appear if the system must be switched off when the conductivity is too high. In the top right-hand corner, the time remaining until the system is stopped will be shown. If the conductivity becomes correct again within this time, the system will not be stopped and the message will disappear automatically.



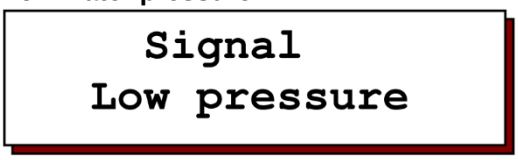
When the system has been stopped, this message is shown in the display. The system can only be restarted by switching the controller off and on again.

Exceeded pressure



The “Exceeded pressure” (“Overpressure”) input has been activated. The system is switched off and is automatically switched on again after a programmed delay time.
Possible cause: set value for the system was changed; membrane fouled.

Low water pressure



The “Low pressure” input has been activated.
The system is switched off and is automatically switched on again after a programmed delay time.
The message disappears as soon as the “Low pressure” signal has been cancelled.
Possible cause: no water pressure.

Stop

The “Stop” input has been activated.
The system is switched off and is switched on again when the signal at the input has been cancelled.
The message disappears as soon as the “Stop” signal has been cancelled.

Input functions

The “Low water pressure” (LP) and “Tank full” (FU) inputs are available as standard. The third “IN” input depends on the programming:
- “Tank empty” for two level switches
- “Exceeded pressure” for one level switch
- “Stop” for one level switch

Low water pressure
The “Low water pressure” (LP) input is used to prevent the pump from running dry.
In step 6.1 you can program the delay before the system is switched off. The LCD display shows the message “Low pressure”, and in step 9.1 you can set whether the alarm relay must be activated with this message.
The system switches on again automatically after the delay programmed in step 6.3.

The input function is activated when the contact is open.

Tank full / Tank empty
The input functions “Tank full” (FU) and “Tank empty” (EM) are used for automatically filling a storage tank.
In step 5.1 you can select whether one or two level switches are used.
If you only use one level switch, then the “IN” input is used for excess pressure protection.
Replenishment takes place after a programmable delay. You can program whether the level switches are activated when the contact is open or closed.

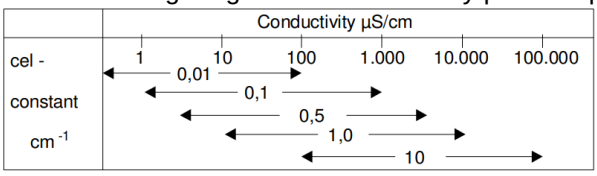
Exceeded pressure
The “Exceeded pressure” (EP) input function can only be used if just one level switch is used.
In step 6.2 you can program the delay before the system is switched off. The LCD display shows the message “Exceeded pressure” (“Overpressure”), and in step 9.1 you can set whether the alarm relay must be activated with this message.
The system switches on again automatically after the delay programmed in step 6.3.

Stop
The “Stop” (ST) input function can only be used if just one level switch is used.
In step 6.3 you can program the delay before the system is switched off. The LCD display shows the message “Stop”, and in step 9.1 you can set whether the alarm relay must be activated when this message appears.

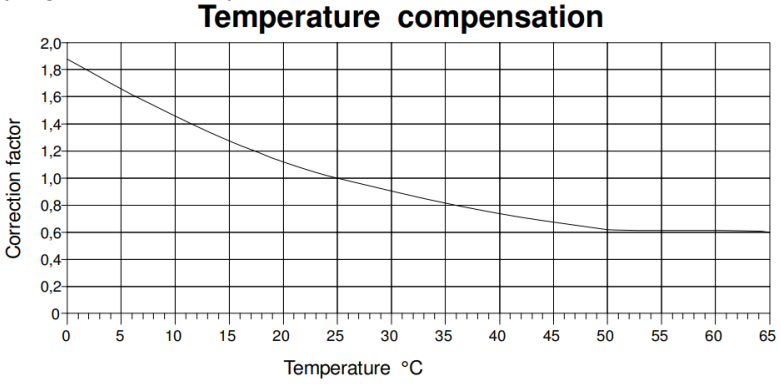
In step 6.6. you can program whether the function is activated when the contact is closed or open.

The system switches on again automatically when the input is no longer active.

Conductivity probe
The connection for the conductivity probe is indicated by “CC”.
The measuring range of the conductivity probe depends on the cell constant.



The cell constant must be programmed in step 2.1.
You can also set the minimum and maximum limit value with a programmable delay time.
In step 9.1 you can set whether the alarm relay must be activated with the relevant message.
You can compensate the conductivity measurement for temperature. The water temperature must be programmed in step 3.



Example:

Set or measured water temperature:	T = 11°C
Measured conductivity value:	C11 = 100 µS/cm
Applied correction factor:	K = 1.4
Displayed conductivity value:	C25 = 140 µS/cm

Output functions

The outputs “Inlet valve” (IV) and “High-pressure pump” (PU) are available as standard.
Either one of the output functions “Alarm” (AL) and “Concentrate valve” (CV) can be selected for the third relay output (terminals 9,10 and 11).

Inlet valve
The inlet valve is opened as soon as the “Production” step, “Rinse” step (if programmed) or “Interval Rinse” step (if programmed) is activated.
The maximum current load on this output is 8A (fused).

High-pressure pump
The high-pressure pump is activated after the inlet valve has been opened, with a delay time that can be programmed in step 8.1.
The maximum current load on this output is 8A (fused).

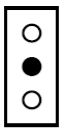
Alarm
The alarm relay can be activated in the case of certain events, such as:
- below minimum conductivity value
- maximum conductivity value exceeded
- low water pressure
- exceeded pressure (overpressure)
- stop

You can program whether the alarm relay is energised or not in the case of malfunction.

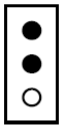
Concentrate valve
The concentrate valve is only opened during the rinse functions.

Display and modification of the initial values

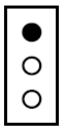
The Aquarius is supplied with factory settings. You can change these settings at any time and they are not erased in case of a power failure.



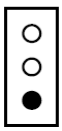
To prevent unwanted changes in the program, you must keep the key depressed for four seconds before the system will allow you to make changes. You can then use the same key to browse through the programming.



You leave the programming mode automatically about two minutes after the last keystroke or by pressing the key combination as shown.

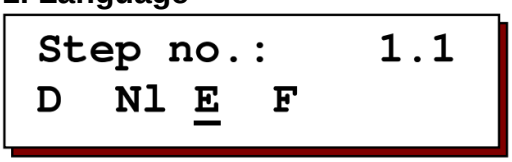


You can use the top key to move the cursor.



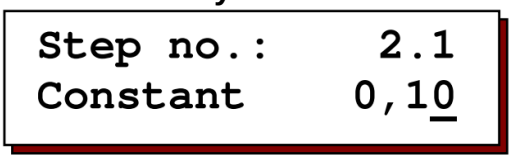
By pressing the bottom key, you can change numeric values, which you have first marked with the cursor, within the given range.
For questions offering a choice, you can also use this key to switch between “–” and “|”.

1. Language



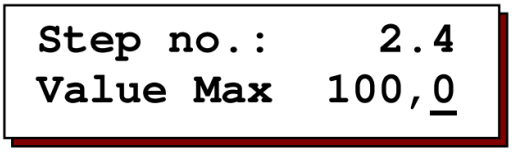
In this step, set the language.

2. Conductivity meter

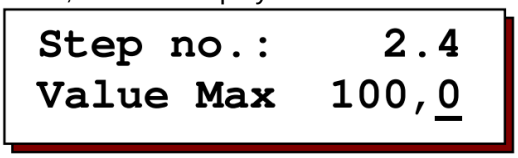


Select a measuring cell with an adjusted cell constant in accordance with the conductivity of the water. You can program a cell constant between 0.01 and 10.00 cm-1 for the conductivity meter.

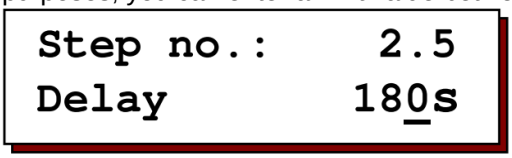
An electrical interruption of the measuring cell, electrical faults in the system or air in the measuring cell can produce a seemingly very low conductivity. For monitoring purposes, you can enter a limit value between 0.0 and 999 µS/cm.



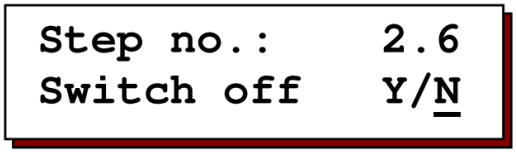
If, after a programmed delay time between 1 and 9999 seconds, the value is below the lower limit value, the LCD display shows the error message “Limit CD Min below limit value”.



A change in the quality of the supplied water may change the water conductivity. For monitoring purposes, you can enter a limit value between 0.2 and 6500.0 µS/cm.



If, after a programmed delay time between 1 and 9999 seconds, the upper limit value is exceeded, the LCD display shows the error message “Limit CD Max exceeded”.

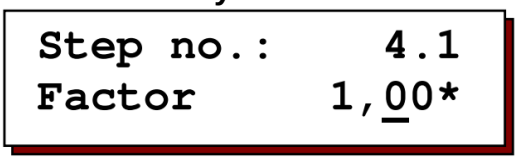


Here you can program whether the system must be switched off if the conductivity has been too high during the programmed delay. If the system is switched off, it can only be restarted by switching the controller off and on again.

3. Temperature

By entering the water temperature, you can compensate the displayed conductivity value in accordance with the current temperature. The conductivity measurement relates to a water temperature of 25°C. If the temperature is different, this can be compensated manually.

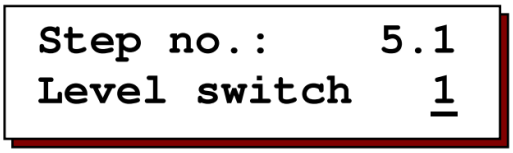
4. Conductivity correction factor



Other measuring errors, for instance as a result of polarisation or cable capacities, can be compensated here – at least for a certain range – by entering a correction factor. Here you can enter a correction factor for conductivity 1 between 0.10 and 5.0.
Take a water sample and measure the conductivity with an accurate conductivity meter; this is the calibration reference value. As the measured value, note the read-out of the controller.
You can then calculate the correction factor that must be entered as follows:

$$\frac{reference\ value}{measured\ value} = correction\ factor$$

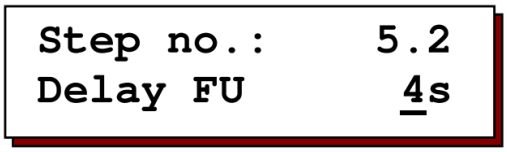
5. Level switches



The storage tank is replenished via level switches.

Level switch = 1:
The storage tank is replenished immediately when the water level falls below the full level. There is always a maximum volume available.
The “IN” input can then be used for excess pressure (overpressure) protection.

Level switch = 2:
Alternatively, the system can be filled via two level switches. In that case, the system is switched on when the low level is reached and switched off again when the high level is reached.
Advantage: the system is switched on and off less frequently.
The “IN” input is used for connecting the low-level switch.

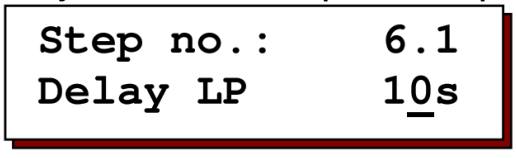


The switch-on delay for the high-level switch can be programmed between 1 and 99 seconds.

“|” Function is activated when contact is closed (NO).
“–” Function is activated when contact is open (NC).

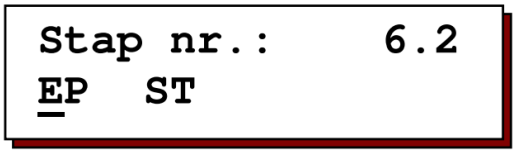
6. Delays

Delay for the “Low water pressure” input function



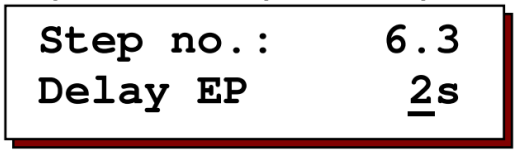
The delay for the low water pressure message can be programmed between 0 and 999 seconds.

Selecting the input function for “IN” input



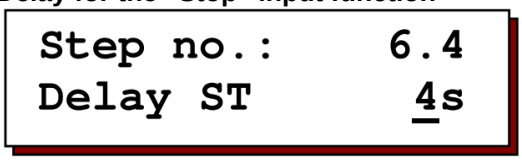
Select your choice of input function for input “IN” (EP = Exceeded pressure, ST = Stop).

Delay for “Exceeded pressure” input function



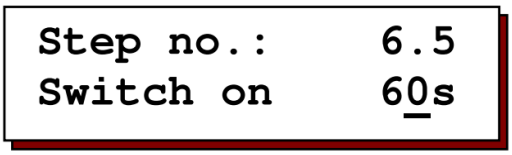
The delay for the exceeded pressure message can be programmed between 0 and 999 seconds.
This step is omitted if two level switches have been programmed.

Delay for the “Stop” input function

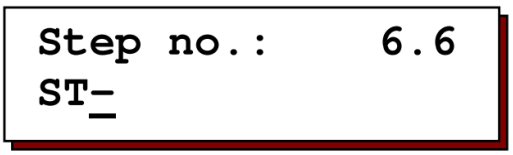


The delay for the stop message can be programmed between 0 and 999 seconds.
This step is omitted if two level switches have been programmed.

Automatic switch-on

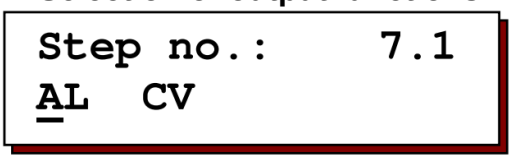


Program a delay between 1 and 999 seconds for the automatic switch-on of the system after it was switched off as a result of low water pressure or exceeded pressure.



“|” Function is activated when contact is closed (NO).
“–” Function is activated when contact is open (NC).

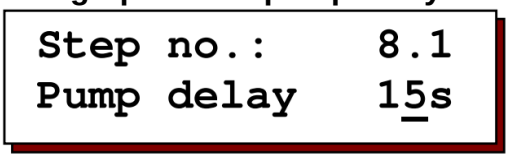
7. Selection of output functions



In this step, select the output function for relay output 3 (terminals 9,10 and 11).
AL = Alarm
CV = Concentrate valve

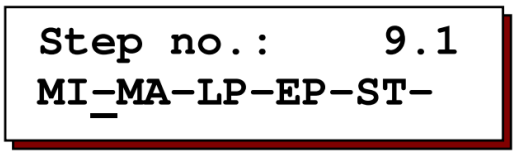
When the function “CV” is selected, the alarm function will not be available.

8. High-pressure pump delay



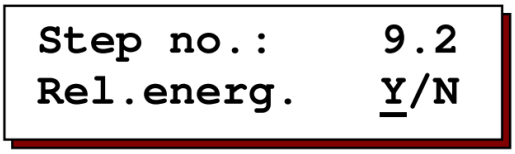
To prevent water shock when the system is switched on, in the “Production” step, first the inlet valve is opened and then after this delay time (0-999 sec.) the high-pressure pump is activated.

9. Alarm

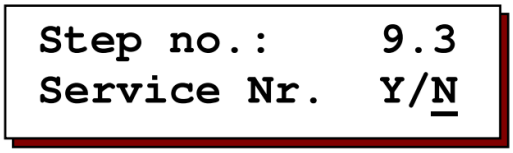


In this step, program the events for which the alarm relay must be activated (“–” = not activated, “|” = activated).

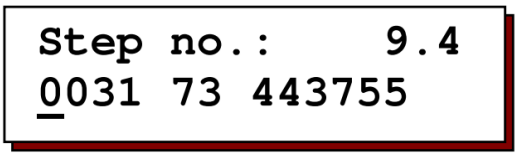
MI = Minimum conductivity EP = Exceeded pressure
MA = Maximum conductivity ST = Stop
LP = Low water pressure



Program whether the alarm relay is energised (Yes) or not (No) in the case of malfunction.

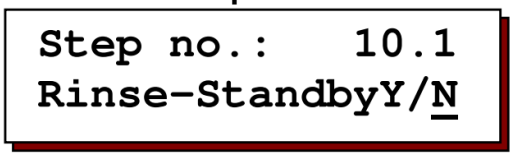


Program whether you want to display a service phone number together with an alarm message.

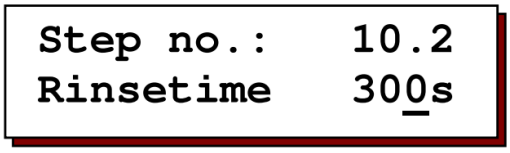


Program the service phone number.

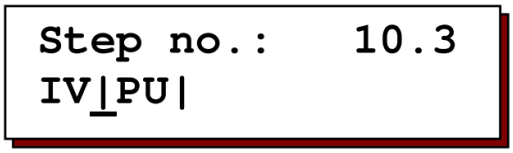
10. Rinse after production



Program whether the function “Rinse after production” must be activated.



Set a rinse time between 1 and 9999 seconds.

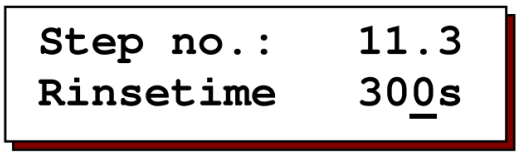


Program whether the inlet valve must be open (“|”) or closed (“–”) and whether the high-pressure pump must be activated (“|”) or not activated (“–”) during the rinse phase.
IV = Inlet valve PU = High-pressure pump

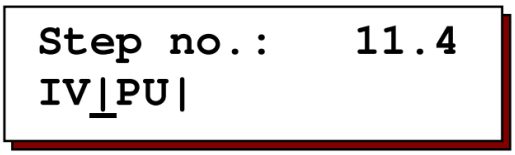
11. Interval rinse

Program whether the function “Interval rinse” must be activated.

Set the time lapse between the last production or rinse phase and the next rinse activity. An interval between 1 and 999 hours can be programmed.



Set a rinse time between 1 and 9999 seconds.



Program whether the inlet valve must be open (“|”) or closed (“–”) and whether the high-pressure pump must be activated (“|”) or not activated (“–”) during the rinse phase.
IV = Inlet valve PU = High-pressure pump

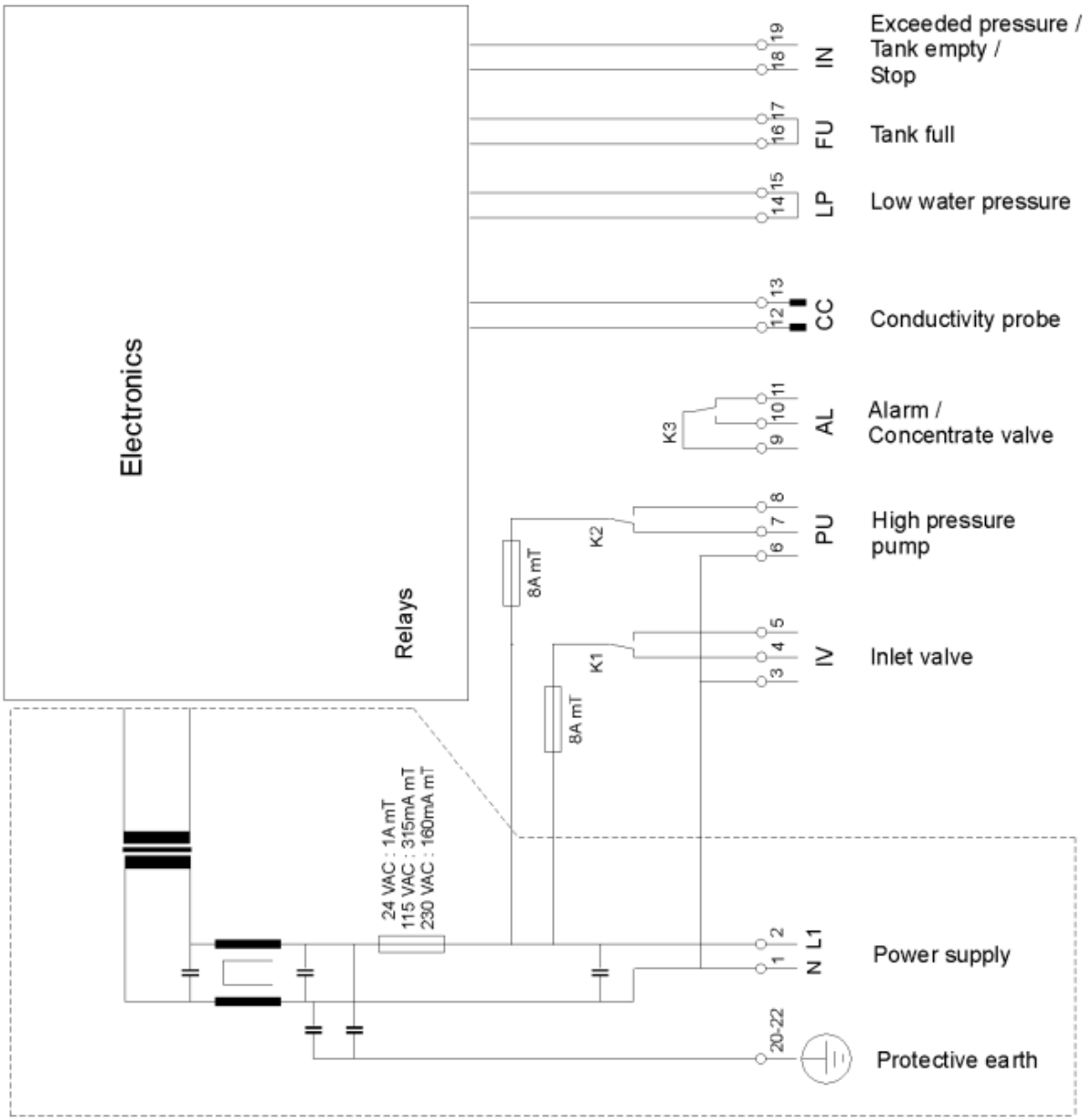
Standard values when supplied

Parameter	Description	Initial value
1	**Language**	
1.1	Choice of German, Dutch, English and French	NL
2	**Conductivity meter (optional)**	
2.1	Constant	0.1 cm^{-1}
2.2	Minimum conductivity	1.0 µS/cm
2.3	Delay time	60 s
2.4	Maximum conductivity	100 µS/cm
2.5	Delay time	180 s
2.6	Switch off if limit exceeded?	No
3.	**Temperature**	
3.1	Water temperature (not applicable)	25 °C
4.	**Conductivity correction factor**	
4.1	Factor	1.00
5	**Level switches**	
5.1	Number of level switches	1
5.2	Delay	10 s
5.3	Normally Open (|) or Normally Closed (–)	FU | EM (NO)
6.	**Delays**	
6.1	Delay for low water pressure	10 s
6.2	Select input IN (EP=exceeded pressure, ST=stop)	ST
6.3	Delay for exceeded pressure (EP)	2 s
6.4	Delay for stop (ST)	4 s
6.5	Switch-on time after alarm	60 s
6.6	Stop: Normally Open (|) or Normally Closed (–)	ST –
7	**Output functions**	
7.1	Alarm or concentrate valve (terminals 9, 10 and 11)	AL
8.	**High-pressure pump delay**	
8.1	High-pressure pump delay	15 s
9.	**Alarm**	
9.1	When alarm activated (|) or not (–)	MI – MA | LP | ST |
9.2	Alarm relay energised or not in case of malfunction	Y
9.3	Service phone number displayed with alarm message?	N
9.4	Service phone number	
10.	**Rinse after production**	
10.1	Activated yes or no	N
10.2	Rinse time	300 s
10.3	Inlet valve (IV) open and high-pressure pump (PU) activated?	IV | PU –
11.	**Interval rinse**	
11.1	Activated yes or no	J
11.2	At intervals of how many hours?	24 h
11.3	Rinse time	60 s
11.4	Inlet valve (IV) open and high-pressure pump (PU) activated?	IV | PU –

Settings of dosing pump

- - Trigger 1
- - 0.3% - 0.006 l/h

Connection diagram



Technical data

Mains connection:	230 VAC, 50-60 Hz, 160 mAT fuse
Power consumption:	4 VA
Inlet valve:	Voltage is equal to mains voltage, 8AT fuse
High-pressure pump:	Voltage is equal to mains voltage, 8AT fuse
Alarm output:	Max. load 250 V, 8 A
Inputs:	Loaded with 9 V, 8 mA
Protection class:	IP 65
Ambient temperature:	0 - 50 °C
Weight:	2 kg
Dimensions:	122 x 120 x 57 mm
Particulars:	Device protected against zero voltage

10. LOG SHEET FOR AQUARIUS RO

Date				
Name				
RO				
Q permeate	m^3/h	m^3/h	m^3/h	m^3/h
Q concentrate	m^3/h	m^3/h	m^3/h	m^3/h
Water pressure before pre-filter	bar	bar	bar	bar
Water pressure after pre-filter	bar	bar	bar	bar
Pressure before membranes	bar	bar	bar	bar
Pressure after membranes	bar	bar	bar	bar
Temperature	degrees	degrees	degrees	degrees
EC of permeate	µS/cm	µS/cm	µS/cm	µS/cm

Date				
Name				
RO				
Q permeate	m^3/h	m^3/h	m^3/h	m^3/h
Q concentrate	m^3/h	m^3/h	m^3/h	m^3/h
Water pressure before pre-filter	bar	bar	bar	bar
Water pressure after pre-filter	bar	bar	bar	bar
Pressure before membranes	bar	bar	bar	bar
Pressure after membranes	bar	bar	bar	bar
Temperature	degrees	degrees	degrees	degrees
EC of permeate	µS/cm	µS/cm	µS/cm	µS/cm

Date				
Name				
RO				
Q permeate	m^3/h	m^3/h	m^3/h	m^3/h
Q concentrate	m^3/h	m^3/h	m^3/h	m^3/h
Water pressure before pre-filter	bar	bar	bar	bar
Water pressure after pre-filter	bar	bar	bar	bar
Pressure before membranes	bar	bar	bar	bar
Pressure after membranes	bar	bar	bar	bar
Temperature	degrees	degrees	degrees	degrees
EC of permeate	µS/cm	µS/cm	µS/cm	µS/cm

Aartsdijkweg 23, 2676 LE Maasdijk, the Netherlands
+31 174 51 50 50 · info@vanderendegroup.com · www.vanderendegroup.com