

User's manual

## Biorinse Treatment System Biorinse-BD300



Complete the following information as soon as you take delivery of your Hoopman equipment & engineering machine. This information is important in the event of a breakdown or when ordering parts in the future.

Machine number : .....

Type designation : .....

Date of commissioning : ..... - ..... - ..... .....

(copy the above information from the type-plate on your machine)

**Hoopman equipment & engineering B.V.**

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Pictures and technical data are indicative only. We reserve the right to make changes at all times and without advance notification. Hoopman equipment & engineering b.v.. cannot be responsible for damages due wrong use of the machine.

## TABLE OF CONTENTS

2	Declaration of Conformity .....	5
3	Technical Information.....	8
3.1	Description of the process .....	8
3.1.1	Liquid supply .....	8
3.1.2	Neutralizing system.....	8
3.1.3	Drying.....	8
3.2	Plant layout.....	9
3.3	Technical information.....	10
4	Safety instructions.....	10
4.1	Specific safety descriptions .....	10
5	Place and install .....	11
5.1	Electrical connection.....	11
5.2	Other connections:.....	11
5.3	Internet connection for remote support.....	11
6	Operating Biorinse .....	12
6.1	Operating panel .....	12
6.2	Protecting devices .....	13
6.3	Start the machine.....	14
6.4	Stop the machine.....	17
6.5	Pausing production.....	17
6.6	Emergency stop with complete reset.....	17
6.7	Inserting a recipe .....	18
6.8	Screens Biorinse.....	21
6.8.1	Production screen .....	21
6.8.2	Process screen .....	22
6.8.3	Manual control screen.....	23
6.8.4	Alarm screen .....	23
6.8.5	Recipe screen .....	24
6.8.6	Logging screen .....	24
6.8.7	Settings .....	25
6.8.8	System settings screen.....	27
7	Operating the pumpstation.....	28
7.1	Main operation .....	28
7.2	Production screen.....	28
7.3	Process screens .....	28
7.3.1	Process supply.....	29
7.3.2	Process water .....	30
7.3.3	Process Waste .....	31
7.4	Manual control .....	31
7.5	Alarm .....	33
8	Cleaning and maintenance .....	34
8.1	Cleaning the container.....	34
8.2	Cleaning of the circulation pump and heater .....	34
8.3	Cleaning the boiler.....	34
8.4	Cleaning the tubing.....	34
8.5	Cleaning the rinsing station .....	34
8.6	Replacing the filter bag .....	34
8.7	Flow regulators on pneumatic cylinders .....	35
8.8	Calibrating the weighing scale (bleach tank) .....	35
8.9	Calibrating pH and chlorine sensors.....	35
9	Troubleshooting .....	36
10	Alarms .....	37
11	Incident & repair list .....	39
12	Ordering spare parts .....	39
13	Warranty.....	40
14	Explanation of Safety decals.....	41
15	Memo .....	42





## 2 DECLARATION OF CONFORMITY

Machine : Biorinse Treatment Station  
Brand : Hoopman equipment & engineering b.v.  
Type : Biorinse BD-300

Machine no. : 19E71-0151

Construction date : 01-2020

### **NL - Verklaring van conformiteit**

Wij, Hoopman equipment & engineering b.v., Dinxperlosestraatweg 145, NL-7122 JP Aalten, Nederland, verklaren hiermee dat de hier vermelde machine, waarop deze verklaring betrekking heeft, in overeenstemming is met de normen en normatieve documenten, overeenkomstig de bepalingen van de EG-richtlijn 2006/42/EG (en wijzigingen zoals laatstelijk gewijzigd), onder onze exclusieve verantwoordelijkheid valt.

### **D - Konformitätserklärung**

Wir, Hoopman equipment & engineering b.v., Dinxperlosestraatweg 145, NL-7122 JP Aalten, Niederlande, erklären hiermit, dass die bezeichnete Maschine aufgrund ihrer Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der EG-Maschinenrichtlinie 2006/42/EG entspricht.

### **GB - Declaration of Conformity**

We, Hoopman equipment & engineering b.v., Dinxperlosestraatweg 145, NL-7122 JP Aalten, The Netherlands, declare on our exclusive responsibility that the machine described, to which this declaration refers, conforms to the norms and normative documents as defined in the provisions of 2006/42/EC.

### **F - Déclaration de conformité**

Nous, Hoopman equipment & engineering b.v., Dinxperlosestraatweg 145, NL-7122 JP Aalten, Pays Bas, déclarons que l'outil sous-mentionné, qui fait l'machine de la déclaration, se trouve, sous notre responsabilité exclusive, en conformité avec les normes et documents normatifs conformément aux dispositions des directives 2006/42/CE.

### **DK - Overensstemmelsesattest**

Vi, Hoopman equipment & engineering b.v., Dinxperlosestraatweg 145, NL-7122 JP Aalten, Holland, erklærer, at det her anførte maskine, som erklæringen referer til, ene og alene står under vores ansvar i overensstemmelse med standarderne og de normgivende dokumenter, svarende til bestemmelserne i henhold til 2006/42/EG.

### **I - Dichiarazione di Conformità**

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Aalten, \_\_\_\_\_ (date)

\_\_\_\_\_ (signature)

\_\_\_\_\_ (name)

## **DECLARATION OF CONFORMITY**



Machine : Biorinse Treatment Station  
Brand : Hoopman equipment & engineering b.v.  
Type : Biorinse BD-300

Machine no. : 19E71-0152

Construction date : 01-2020

### **NL - Verklaring van conformiteit**

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Aalten, \_\_\_\_\_ (date)

\_\_\_\_\_ (signature)

\_\_\_\_\_ (name)

**DECLARATION OF CONFORMITY**

Machine : Liquid Processing Station  
Brand : Hoopman equipment & engineering b.v.  
Type : LPS-Biorinse

Machine no. : 19E71-0153

Construction date : 01-2020

**NL - Verklaring van conformiteit**

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Aalten, \_\_\_\_\_ (date)

\_\_\_\_\_ (signature)

\_\_\_\_\_ (name)

### **3 TECHNICAL INFORMATION**

#### **3.1 Description of the process**

Two stainless seed containers can be placed into the lifting frame of the BioRinse BD300. After putting the seeds into the container the operator will place a mesh cover on top of it in order to keep the seeds inside the container during the treatment process. This container can hold up to 300-325 liters of seeds in each batch. The operator stacks two containers and places them in the machine. Prior to the production the operator can already start the boiler to pre-heat the treatment liquid to the desired temperature.

After putting the container in place the operator can start the treatment. First the clamping frame will come down and the station will be filled with the pre-set amount of liquid (pumped out of the liquid supply system). When the required level is reached, the lift frame will go downwards to put the container with seeds into the liquid.

The liquid consists of a mixture of water and up to three additives. It will sustain its temperature and pH as it is pumped continuously through an inline heating system and a pH sensor. This way the liquid keeps moving and the temperature is being sustained within  $\pm 1^{\circ}\text{C}$ . If needed, additives are added to correct the pH value.

Depending on the put-in protocol the container will move up and down to be sure that all the seeds are homogenously treated and keep in movement.

After the treatment procedure, and depending on the set protocol, the liquid will be drained to one of the two reuse water tanks and the seeds can be rinsed with cold water to flush down the active liquid and cool down the seeds. This water is supplied with several nozzles on top of the clamping frame. The protocol is capable of changing the liquid multiple times in one production, if needed.

When the rinsing time is done, the container slowly moves upwards and the outside of the container will be rinsed during this lift in order to get rid of any contamination.

When the container is in the upper position and all the liquids are drained, the operator can remove the container and place a new one in order to start the next batch.

##### *3.1.1 Liquid supply*

The liquid supply system consists of a boiler, a pump for fresh water and a station which can add up to three additives to the process.

The boiler is equipped with a 55kW heating element to be able to pre-heat water from  $10^{\circ}\text{C}$  to a  $50^{\circ}$  within 4 hours. After pressing start the boiler will be filled to the top level. When the top level is reached the filling stops and the heating starts. By circulating the water with the small pump a homogenous heating will be acquired.

The Biorinse can be filled with cold water from the fresh water tank, pre-heated water from the boiler or from one of the two reuse tanks. Besides the water, three additives can be added to the Biorinse: Bleach, Acid and Tween. The bleach is dosed on weight, when creating the protocol, the required amount should be calculated. The acid is dosed in afterwards, until a certain pH value is reached. During the process the pH is monitored, and when needed, extra acid can be dosed. The amount of tween is based on the amount of rotations of the pump multiplied by the pump capacity per revolution.

##### *3.1.2 Neutralizing system*

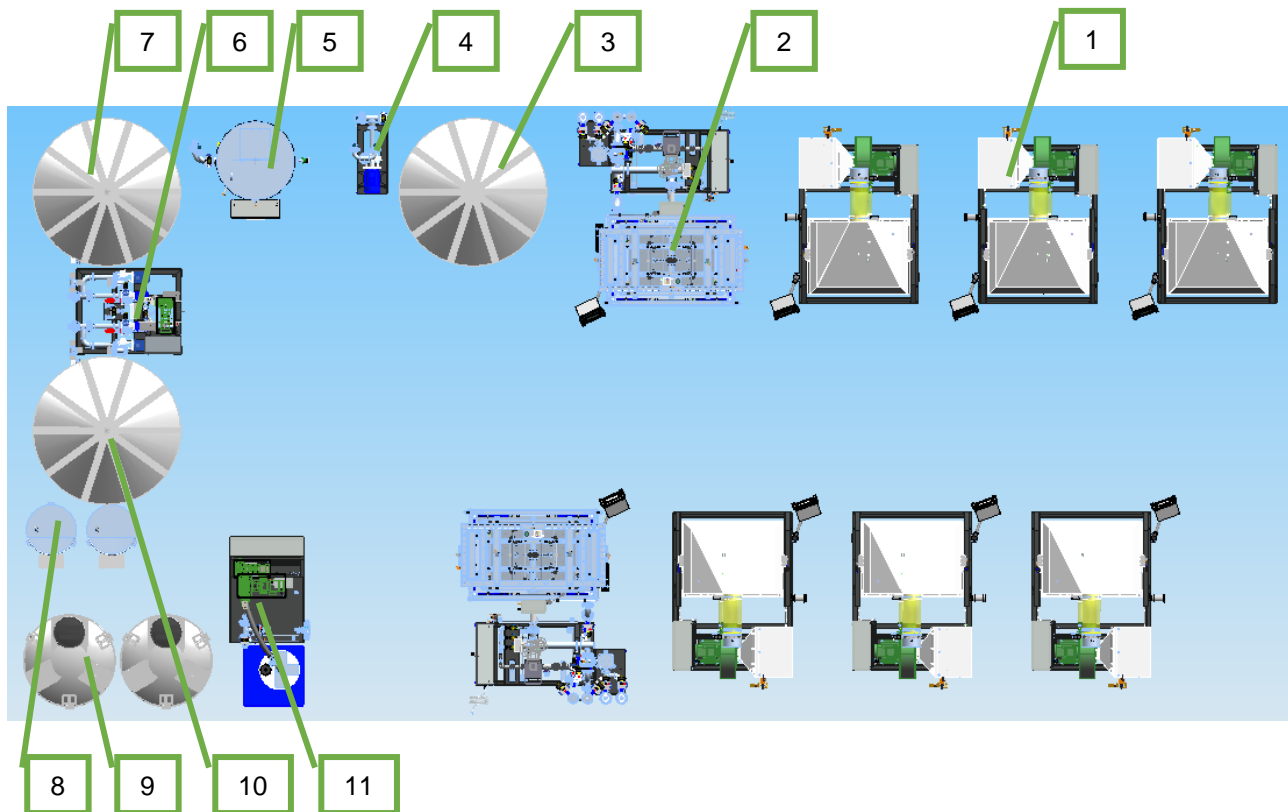
After the rinsing process, the liquid is pumped to one of two waste water tanks. Before it can be drained to the sewer, it needs to be neutralized. In order to do this, two additives are added to the waste water. pH and chlorine level are constantly monitored. When the chlorine level and pH are within the limits the liquid can be pumped into the sewer system.

##### *3.1.3 Drying*

The process is completed after the seeds are dried. The dryers of this system have their own user manual, so this part of the process will not be covered in this manual.



### 3.2 Plant layout



**Figure 3-1 Plant layout**

In Figure 3-1 a top-view of the complete plant is shown. A short description of the individual parts:

1. Dryers (6x): This is where the seeds are dried after the rinsing process.
2. Biorinse (2x): This is where the rinsing process takes place.
3. Fresh water tank: This tank contains a volume of fresh water. This is used to fill the boiler, directly fill the Biorinse, and feed the spray nozzles in the Biorinse
4. Fresh water pump: This pump is used to fill the boiler from the fresh water tank, and the Biorinse from the boiler or the fresh water tank. This pump is also used to feed the spray nozzles in the Biorinse with water from the fresh water tank.
5. Boiler: This tank is used to pre-heat the water for a hot-water treatment. This is an pressure less, open tank with an electric heating element.
6. Waste water skid: This piece of equipment is used to recirculate the water in the reuse/waste tanks (7 and 10) and to pump the water from these tanks back to the Biorinse. During recirculating, chemicals can be added to neutralize the solution in these tanks to be able to drain the contents of the tank into the sewer.
7. Water reuse tank: This tank is used to store the 'clean water' for reuse purposes. When this water is not needed anymore, it can be neutralized until the chlorine concentration and pH are on spec, then it can be drained towards the sewer.
8. Liquid mix tanks (2x): These mix tanks are used to prepare the ascorbic acid and soda ash solution for neutralizing the water. From these tanks the chemicals are pumped into the reuse tanks (7 and 10).
9. Storage tanks bleach and acid (2x): These are the stock tanks for the bleach and acid, which are used in the Biorinse process.
10. NB reuse tank: This tank is used to store the NB solution for reuse purposes. When this solution is not needed anymore, it can be neutralized until the chlorine concentration and the pH are on spec, then it can be drained towards the sewer.
11. Additives dosing station (also known as pumpskid / pumpstation): This piece of equipment contains three pumps to dose bleach, acid and tween into the Biorinse. This part also contains the control panel for the water supply, chemical supply and the neutralization station.

### 3.3 Technical information

The technical specifications of the BioRinse BD300 system:

Dimensions machine (LxWxH)	: 2550 x 2750 x 4500 mm (width x depth x height)
Required power	: 50kW (treatment station, 2x) + 55kW (Boiler station) + 15kW (additives) 3~480+N+Earth Vac 60Hz
Capacity	: ca. 100-600 litre (depending on seed lot)
Noise	: 75 dB (A)

All specifications are under reservation. Technical modifications be reserved.

## 4 SAFETY INSTRUCTIONS

1. Before use, make sure that the manual has been carefully read. Become familiar with the controls so as to use the machine correctly. Obey all safety instructions.
2. The plates and safeties fitted on the machine are part of it and must not be removed or spoiled for any reason.
3. Before use, check the machine.
4. Keep children and visitors away from the working area.
5. Do not force the machine. It will do the job better and safer at the rate for which it was intended.
6. Use the machine only for the purpose for which it was designed.
7. Maintain the machine with care. Keep the parts clean (and sharp) for better performance. Correct machine servicing is necessary with a view to reliable and safe working.
8. Disconnect the power before maintenance.
9. Check damaged parts. A part that is damaged should be repaired or replaced directly.
10. Never leave the machine unattended.
11. Stay alert, watch what you are doing and use your common sense. Do not operate the machine when you are tired or under the influence of alcohol, drugs or medicines.
12. Always pull out the power plug, stop engine, PTO and/or moving parts before adjusting, cleaning or lubricating the machine.
13. All covers and safety devices have to be properly fitted before the machine is switched on. All guards and safety devices have to be refitted immediately after transport or completion of any repairs or maintenance.
14. **Warning:** The warnings, cautions and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

### 4.1 Specific safety descriptions

1. Never take the machine in use before you have fully installed the machine.
2. Install the machine on a power supply which has the same specifications as written in the technical specifications.
3. When a part of the machine is damaged, removed or is not functioning well, you should shut down the machine immediately and repair or replace the part.
4. Never put any body parts in a running machine
5. Watch out for any sharp or stinging parts
6. **When working with chemicals, use the proper protection materials!!**

#### **Warning!!**

Do not allow your familiarity with the machine to turn into carelessness. It takes only fractions of a second for carelessness to result in serious injuries.

## 5 PLACE AND INSTALL

### 5.1 Electrical connection

Place the machine on a flat surface, to prevent any movement during operation. Connect the Biorinse treatment stations to the floor with anchors, to prevent moving when loading a container into the machine. Both Biorinse stations, the additives station and the boiler need a fixed electrical connection. The liquid mixers are equipped with a 3 phase plug.

#### Connection to power supply

- Connect the machine to the power supply with the installed connector
- Before you connect the machine to the power supply you should check if the specifications of your supply matches the specifications mentioned in chapter 1.2
- Check the power connection

#### Disconnection of the power supply

Be sure that the machine is disconnected from any power supply, if:

- Maintenance and/or repair activities are executed
- Equipment is not used for a longer period of time

#### Earth

The machine should always be connected to a power supply which has an earth connection.

### 5.2 Other connections:

- Compressed air approx. 8 bar or more, connected to pressure regulator on the control cabinet of each Biorinse and the control cabinet of the additives supply station. The pneumatic cylinders are equipped with flow regulators which can be adjusted for smooth operation. (see paragraph **Fout! Verwijzingsbron niet gevonden.**)
- Water filling line capable to deliver 4500L of water in approximately 15-30 minutes, connected to the fresh water tank.
- Waste water connection, connected to the waste outlet of the waste water neutralisation station.

### 5.3 Internet connection for remote support

For remote support and easy problem solving an internet connection is required. A VPN box is placed inside the control panel of the additives station. This VPN box gives Hoopman access towards the PLC/HMI of both Biorinse treatment stations, the pumpstation and the dryers. Not towards local network connections.

When a working network line with free internet is placed into 'Uplink 1', we can access the machine from our factory. This will make support / problem solving easy and gives you the opportunity to receive software updates when necessary.

**Hoopman will never access the equipment without your knowledge/permission!**

When you disconnect the Uplink1 port we cannot access the system anymore. Optionally you can use this to block access when not necessary.



Figure 5-1 VPN box

## 6 OPERATING BIORINSE

This chapter gives an overview of operating the Biorinses (both are practically identical). There is a lot of communication between the Biorinses and the Pumpstation. This chapter will show how to operate the Biorinses. Chapter 7 will show how to operate the pumpstation. Some parts of the Pumpstation can be operated by the HMI of the Biorinse. The chapters will give an overview of all functions that can be controlled from that HMI.

### 6.1 Operating panel

This paragraph gives an overview of the different operating elements. The numbers correspond with the numbers in Figure 6-1.

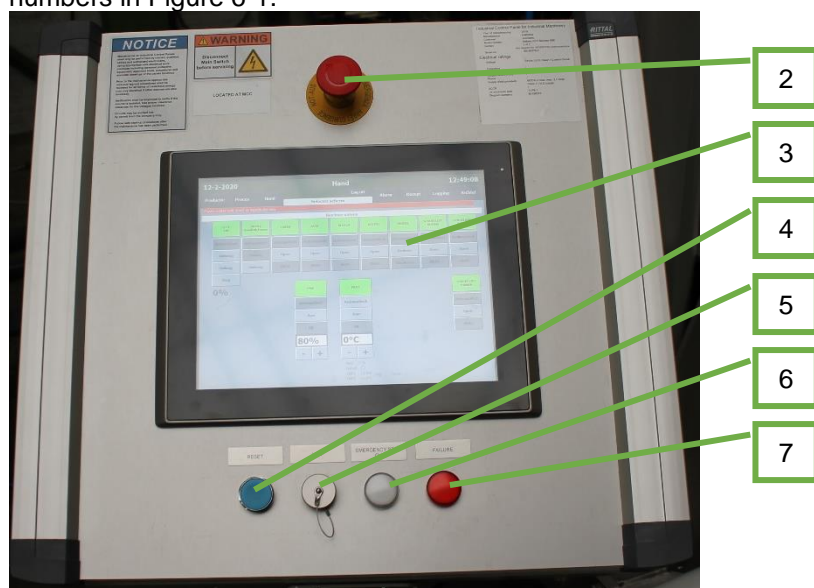


Figure 6-1 Control panel

- 1) **Main switch (located on main control panel at the back of the machine)**  
Rotate this switch to turn on/off the main power.
- 2) **Emergency stop**  
Whenever there is an emergency situation, you should press this button. To release the button again, pull it towards you.
- 3) **Touch panel**  
The machine is controlled with this touch panel.
- 4) **Reset button**  
Push this button to switch on the control current and reset dissolved alarms. The process starts from the point where it was stopped.
- 5) **USB connector**  
When a USB flash drive is put into this USB connector, recipes can be imported or exported, and the logged data can be exported in order to save it externally and access it with a PC. The data will be exported as a CSV file.
- 6) **Emergency stop OK**  
This light will be on when the emergency stop is not activated, and there are no errors.
- 7) **Failure**  
When an error occurs, a message will appear on the screen, and this light will be on.

## 6.2 Protecting devices

In the main control box several electric components are secured by automatic fuses (Figure 6-2), red arrow). When a short circuit occurs, the connected fuse will shut off automatically. When the problem is solved the fuse can manually be switched on again by moving the lid upwards.

The motors are secured by several thermal fuses inside the frequency controllers (Figure 6-2, blue arrow). When a motor is overheated this thermal fuse will turn off the machine. When the motor reaches the sustained temperature again, the thermal fuse can manually be switched on again. To reset the frequency controllers push the reset button on the controller with the error message. When the thermal fuse system turns off the motor frequently, another cause can be the problem and it is strongly recommended to solve the problem first.

Sensors and other 24volt parts are secured by an automatic fuse box (Figure 6-2, green arrow). The lights above the fuses will indicate the state of the fuse. Green: o.k. / red: error. When these fuses turn off frequently, another cause can be the problem and it is strongly recommended to solve the problem first. To reset the fuse, push the red coloured button and it should turn to green again.

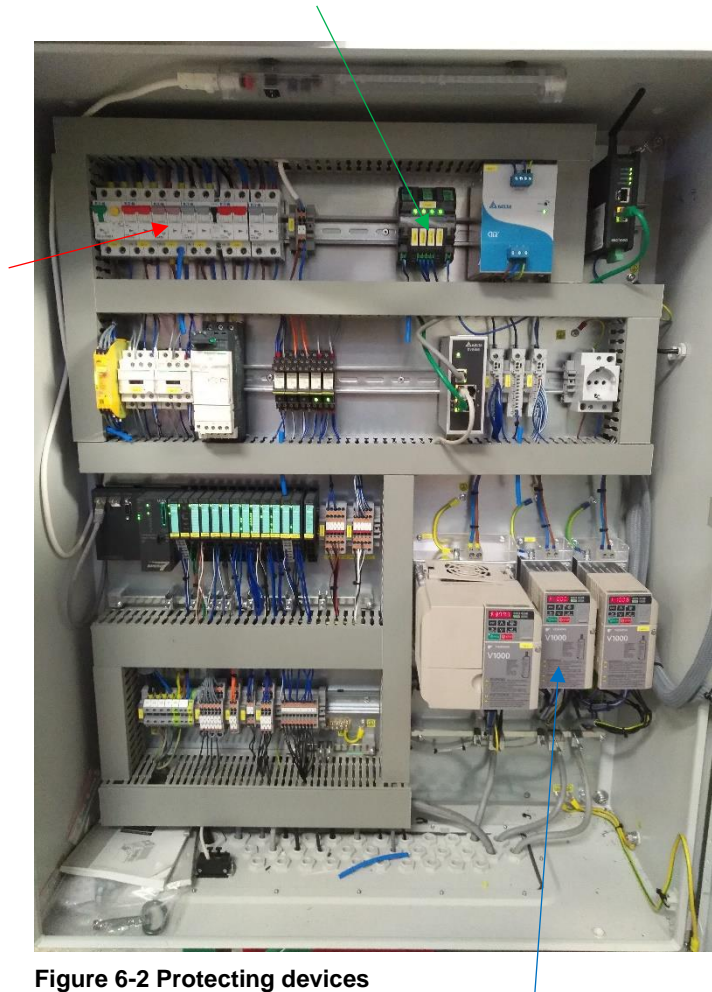
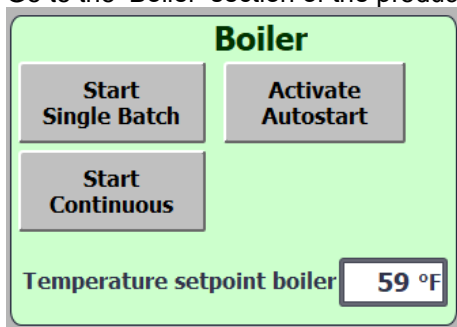


Figure 6-2 Protecting devices

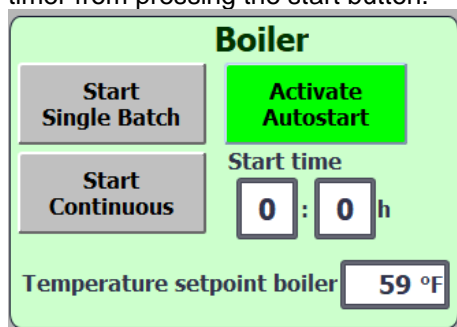
### 6.3 Start the machine

The following steps should be taken to start the machine:

- 1) Switch on the main switch of the BioRinses, Boiler station and both control panels of the pump station.
- 2) Push all reset buttons to switch on the control current. (emergency alarm disappears)
- 3) Reset any alarms on the screen.
- 4) Make sure all butterfly valves are open, to prevent pumps from running dry and/or prevent problems from overpressure.
- 5) If you want to use hot water, then first let the Boiler pre-heat in order to start
  - a. Go to the 'Boiler' section of the production screen



- b. Enter the required water temperature
- c. Now choose how you want to start the boiler
  - i. **Start Single Batch:** Start immediately and stop after the batch has been pumped into the Biorinse.
  - ii. **Start Continuous:** Start immediately and refill and start heating again after the Biorinse has been filled.
  - iii. **Activate Autostart:** This is a timer function. When pressing this button, a text field shows up where you can enter the time that the boiler should start filling and heating. **Remark:** This is the actual time when the boiler will start, no countdown timer from pressing the start button.



If you want to cancel the autostart procedure, simply press the green blinking 'Activate Autostart' button again. The timer will stop and the button will turn grey again.



- 6) To choose the treatment protocol you want to run, go to the Recipe screen:


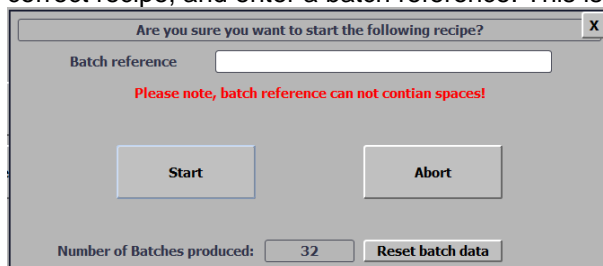
- Choose the right recipe from the drop-down menu. If needed, make any changes to the recipe (see chapter 6.7 for more information on recipes).
  - After having checked that everything is correct, press the save button  to save the recipe and directly load it into the PLC.
- 7) Be sure that there is no function in manual mode. The hand in Figure 6-3 should not be shown next to the navigation button for the manual control screen.
- 8) To start the Biorinse, go back to the Production screen. There are two options to start the machine, start directly and with an autostart timer.



Figure 6-3  
Manual

a. Start directly

- i. Press the 'Start' button. A pop-up appears. Check whether you have chosen the correct recipe, and enter a batch reference. This is used to identify the logfiles.



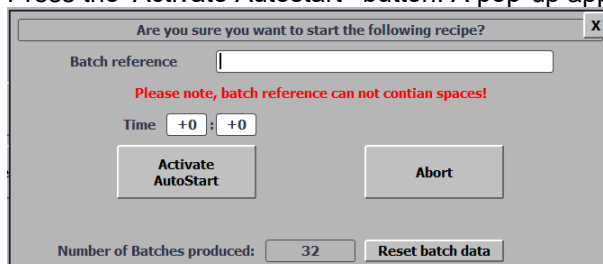
- ii. Press the Start button in this pop-up to start the process.
- iii. If the containers with seeds are not already placed, then proceed placing the containers with seeds in the machine.

Operate this button when the container  
is in place

- iv. Press Operate this button when the container  
is in place to acknowledge that you have placed the containers.
- v. The programmed recipe will now be started

b. Autostart

- i. Press the 'Activate Autostart' button. A pop-up appears:



- ii. Check once more whether you chose the correct recipe. Then enter a batch reference, and enter the time when you want the machine to start. After this, press the 'Activate Autostart' button to confirm.
  - iii. The 'Activate Autostart' button in the production screen will keep blinking green, to indicate that the machine is waiting to start.
  - iv. If the containers with seeds are not already placed, then proceed placing the containers with seeds in the machine.
- Operate this button when the container  
is in place
- v. Press Operate this button when the container  
is in place to acknowledge that you have placed the containers.
  - vi. The recipe will start at the requested time.

If you want to cancel the autostart procedure, simply press the green blinking 'Activate Autostart' button again. The timer will stop and the button will turn grey again.

**Remark:** When using chemicals in a process, the operator is prompted to manually start the dosing of the materials into the Biorinse, and afterwards acknowledge that the correct concentrations have been reached. If you would use autostart on a recipe with chemicals, the machine will wait during the filling step until an operator doses the chemicals into the Biorinse. For a hot water protocol, or a protocol where you first want to pre-soak the seeds, this function can be useful.

If the recipe requests water from the boiler, and the boiler has not reached the requested temperature yet, a notification will appear in the production screen and the Biorinse will wait until the temperature is reached. After the temperature is reached, the Biorinse will be filled automatically. **If the boiler is not running at all, the operator has to start the boiler. Starting the boiler is a manual action.**



## 6.4 Stop the machine

To stop the machine, take the following steps:

- 1) In general the machine automatically stops after the treatment protocol is ready, after the protocol is ready the next button appears in the process screen:

**Operate this button when the tray is removed**

- You can now remove the container and press this button to finalize the batch
- 2) If you want the process to stop earlier, then press the 'Stop' button in the production screen. The machine will stop and the lift will go upwards. If the machine still contains liquid, this will not be drained. This has to be done manually by the operator.
  - 3) Switch off the main power supply.

**EMERGENCY SITUATION!!** Turn off the machine immediately by pushing the emergency stop.

## 6.5 Pausing production

When you want to pause the production to take a sample or for any other reason, take the following steps:

- 1) Press the 'Pause' button in the production screen.
- 2) The procedure pauses
- 3) Press the 'Restart' button to restart the production again.

**WARNING!!** When pausing the machine while the seeds are in the liquid, the seeds will stay in the liquid as well and the temperature will not be sustained. Always manually set the lift in the upper position to prevent damaging the seeds. Before restarting, set the elevator to automatic.

## 6.6 Emergency stop with complete reset

Whenever there is an emergency situation, you should press this button. To release the button again, pull the button towards you.

- 1) The emergency stop is activated.
- 2) Release the emergency button.
- 3) Press 'Total Reset Machine' in the process screen for 5 seconds.
- 4) Clean out the station
- 5) The machine can be restarted.

## 6.7 Inserting a recipe

In the recipe screen, new recipes can be made, or existing recipes can be changed.

4/15/2021
12:53:05 AM
Recipes

Production Process Manual Select screen Log out Alarm Recipe Logging Archive

Wastewater unit is in manual operation

Export Recipe Import Recipe

Beet

	St1	St2	St3	St4	St5	St6	St7	St8	St9	St10	St11	St12	St13	St14	St15	Total
Fill container	Yes	No		Yes	No		No	No	No	No	No	No	No	No	No	
Drain container		No	Yes		No	Yes	No	No	No	No	No	No	No	No	No	
Liquid [%]	85			85												
Bleach [kg]	0			40												
pH	0.0			0.0												
Hydrochl. acid [ltr]	0			23												
Tween [ml]	500			500												
<span style="border: 1px solid black; padding: 2px;">I</span> Fill option	F1			F4												
Tank choice			WTR			WTR										
Nozzles outside			Yes			Yes										
Rinse			On			On										
<span style="border: 1px solid black; padding: 2px;">I</span> Drain option			D2			D1										
Rinse time [min]			1			1										
Time [min]		10			10		0	0	0	0	0	0	0	0	0	0
Temperature [°F]		0			0		0	0	0	0	0	0	0	0	0	0
Height [%]		10			10		0	0	0	0	0	0	0	0	0	0
Up/Down		On			On		Off	Off	Off	Off	Off	Off	Off	Off	Off	Off

The recipes can be made in virtually any way you want. You are free to choose for each step whether you want to fill the Biorinse, have a treatment step, or empty the Biorinse. This gives you the option for example to reuse the water from a rinsing step. First you run a recipe in which the Biorinse is filled, and the seeds are treated, without draining. For the next batch you create a recipe without a filling step, so the existing water is being used, and after the treatment the water can or cannot be drained, depending on your plans for the next batch.

To create a new recipe, press . A blank recipe will be created. In the top bar, you can enter a name for this recipe. For each step, you can choose whether it is a filling step, a treatment step, or a drain step.

**Tip:** It is possible to connect a standard keyboard and/or mouse to the HMI, as it is basically a windows PC. Plug it into the USB port on the HMI enclosure, or directly into the HMI if you open the enclosure.

### Create a filling step

To create a filling step, set the 'Fill container' button to yes. Now only the text fields and buttons that have to do with filling the Biorinse will be shown.

- **Liquid [%]:** This is the total fill level, including water and chemicals.
- **Bleach [kg]:** The amount of bleach that you want to add. If set to 0kg, no bleach will be added.
- **pH:** The desired pH level after adding the chemical. When the chemicals are added, and the pH is still too high, the machine will dose extra acid until the desired pH level is reached. If set to 0, only the desired amount of chemicals will be added.
- **Hydrochl. Acid [ltr]:** The amount acid that you want to add in liters.
- **Tween [ml]:** The amount of tween that you want to add in milliliters.
- **Fill option:** The source of the water. Press the 'I' button on the left side for information on the options.
  - F1: Fresh water tank
  - F2: Boiler
  - F3: Reuse water tank
  - F4: Reuse NB tank

**Chemicals manual**  
Manual addition of chemicals  
after filling from Return  
water or NB

**Tween**  
0ml/0ml

**Acid**  
0.0ltr/0.0ltr

**Bleach**  
0.5kg/2.5kg

During a filling step, the tank will first be filled to a certain percentage of the filling level (can be set in the settings screen). Then the chemicals are added. A pop-up appears with the amounts set in the recipe. The operator can change these amounts if needed, and for each individual component press start. The pump starts running and the chemical is dosed into the Biorinse. If needed, the amount can be changed afterwards, and the pump cycle can be started again to reach the desired concentrations. For instance, if the recipe value for Bleach is 50kg, you first start dosing this. After the 50kg is dosed, you take a sample and conclude that you need 5kg more. You can alter the 50kg into 55kg and press start again. The machine will now dose 5kg, until the total dosed amount is 55kg.

When all chemicals are dosed and the operator approves the actual concentrations (which can be measured manually), he can press 'Ready and continue'. Then the machine completes the filling step by adding more water until the desired fill level is reached.

**Remark!!** Do not overfill the Biorinse. For instance, if you fill it up to 100% with the elevator in upper position, and you lower the elevator with filled containers, the water level will rise to over the edge. The maximum filling level is limited by a setting in the settings screen. Here you can set the maximum fill level, depending on the amount of seeds you are using.

Theoretically it is also possible to add chemicals to an existing liquid mixture which is already in the Biorinse. Simply make a new filling step, set the fill level to the desired level (same as existing or higher) and add the chemicals. This could be useful when starting a new production with NB treatment completely with fresh water. For the first batch (or 2), you can first create a filling step with water, do the pre-rinse, then add the chemicals to the same water and do the active soak step. Then you drain this to the reuse NB tank to be able to reuse this solution for a next batch.

### Create a treatment step

When the machine is filled, a treatment step can be created. This can be done by setting both 'fill container' and 'drain container' to no. At the bottom there are four options to set:


- **Time [min]:** The time of the treatment step. This timer starts as soon as the step starts. In most cases the elevator will be up at the start of the step, so the time of lowering the elevator should be calculated in the total step time.
- **Temperature [°F]:** The water temperature that should be maintained. If the temperature is set to 0, the heater will not do anything. Remark: The heating element is only designed to maintain a certain temperature, not to heat up the liquid. So it is important to heat up the boiler to the correct temperature before putting the liquid into the Biorinse.
- **Height [%]:** The setpoint of the height of the elevator to go up and down during the process, when the button below is switched to on.
- **Up/Down:** If switched on, the elevator will go up and down between 0% and the above set percentage. If switched off, the elevator will stay all the way down during this step.

You can put multiple treatment steps after another, for instance you can vary the elevator height to agitate the product more or less.



### Create a drain step


When you want to empty the Biorinse in one of the two reuse-neutralisation tanks, a drain step can be created by setting 'Drain container' to yes. This step contains draining the Biorinse, and if wanted the spray nozzles can be used to spray onto the seeds and clean the machine. The following options can be set:


- **Tank choice:** here you can choose to which of the two tanks the Biorinse should be drained.
- **Nozzles outside:** when set to yes, the nozzles on the inside edge of the Biorinse treatment tank will be on during the rinse step, to rinse off the outside of the product container. When set to off, these nozzles will remain off.
- **Rinse:** when set to on, the nozzles on the elevator will be on during the rinse cycle.
- **Drain option:** There are several options for the order of draining and rinsing. Press the 'I' button on the left side for information on the options.
  - D1: Drain before and after rinsing  
First the Biorinse will be drained with the elevator up. Then valve closes, elevator goes down and the rinsing cycle starts. After the rinsing cycle the elevator goes up and the Biorinse will be drained again.
  - D2: Drain before and during rinsing  
First the Biorinse will be drained with the elevator up. When the Biorinse is empty, the elevator goes down and the rinsing cycle starts. Every time the water level in the Biorinse gets above the set 'empty' level, the pump starts to drain. After the rinsing cycle, the Biorinse is empty.
  - D3: Drain during rinsing  
With this option, the rinsing cycle starts immediately, without first draining the Biorinse. The cycle ends when both the step time is over, and the Biorinse is empty.
- **Rinse time [min]:** This is the time that the spray nozzles are open.

After the recipe is made or changed, it should be saved with the  button. When doing this, it is automatically loaded to the PLC as the current active recipe. This means that after pressing the save button, you can start this recipe in the production screen.

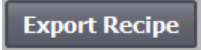
**ATTENTION!!** Always save a recipe after creating or changing, otherwise changes will be lost!!

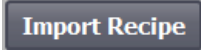
Press  to 'save as'. This can be useful if you want to make a copy of an existing recipe and make some changes to it. Go to the recipe you want to copy, and press the button. Then you can enter a name for the recipe, make any changes you want and press save: .

Press  to delete the recipe that is shown currently.

The  can be used to load the current recipe to the PLC, but that is also done by the save button.

Recipes can be imported/exported from/to a USB flashdrive (formatted FAT32). This can be useful when you want the same recipes to be available on both machines. The file path to import/export to is set in the settings screen (see chapter about settings).

Press  to export all recipes to a single CSV file on the USB flashdrive. It is not possible to only export one recipe.

Press  to import the recipes from the USB flash drive. When this button is pressed, only the recipes that are on the USB flash drive will be altered/created. If there are existing recipes on the machine, which are not on the USB flash drive, these recipes will be ignored during importing, and they will remain as they were before. If you want to have the same recipe database on both machines, it is advised to make changes on one machine, and then export/import the recipes to the other machine. If this is done after each change, the databases should remain the same.

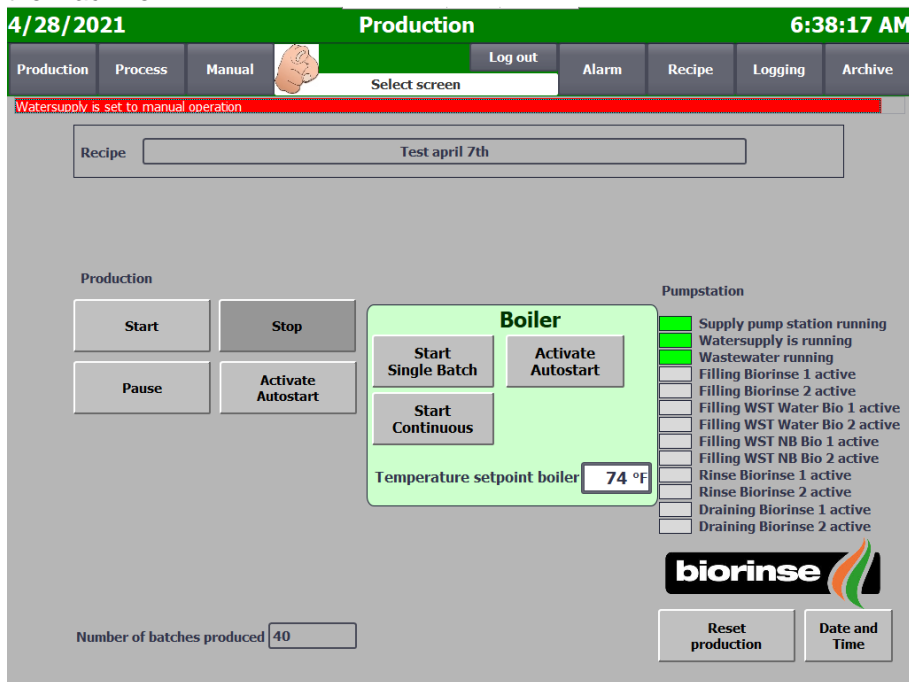
**Remark!!** For both exporting and importing, make sure that the correct file path is set in the settings.

## 6.8 Screens Biorinse

This paragraph gives an overview of all the screens in the Biorinse.

### 6.8.1 Production screen

This is the screen where the production is started, and it is also the screen that is shown first after start-up of the machine.



Below the navigation buttons, the active recipe is shown. If the Biorinse is started, this recipe will be started. Starting and stopping the Biorinse and boiler is already explained earlier in this chapter.

On the right side some status indicators are shown that indicate some statuses of the pump station.

- The top three are whether the individual components are switched on (see chapter about production screen of pump station).
- **Filling Biorinse 1/2 active** indicates whether one of the Biorinse is currently being filled with water from the boiler or fresh water tank. Only one Biorinse at a time can be filled with this pump. If the other Biorinse is already requesting water from that pump, this Biorinse will wait until the other Biorinse has completed the fill cycle.
- **Filling WST xxx active**. Only one Biorinse at a time can be filled from either WST tank. It is possible to fill one Biorinse from one tank, and the other Biorinse from the other tank, as these tank have separate pumps.
- **Rinse Biorinse 1/2 active**. The spray nozzles are supplied by the water pump. When one Biorinse is in a rinsing cycle, the other Biorinse cannot be filled or rinsed with that pump.
- **Draining Biorinse 1/2 active**. Only one Biorinse at a time can be drained.

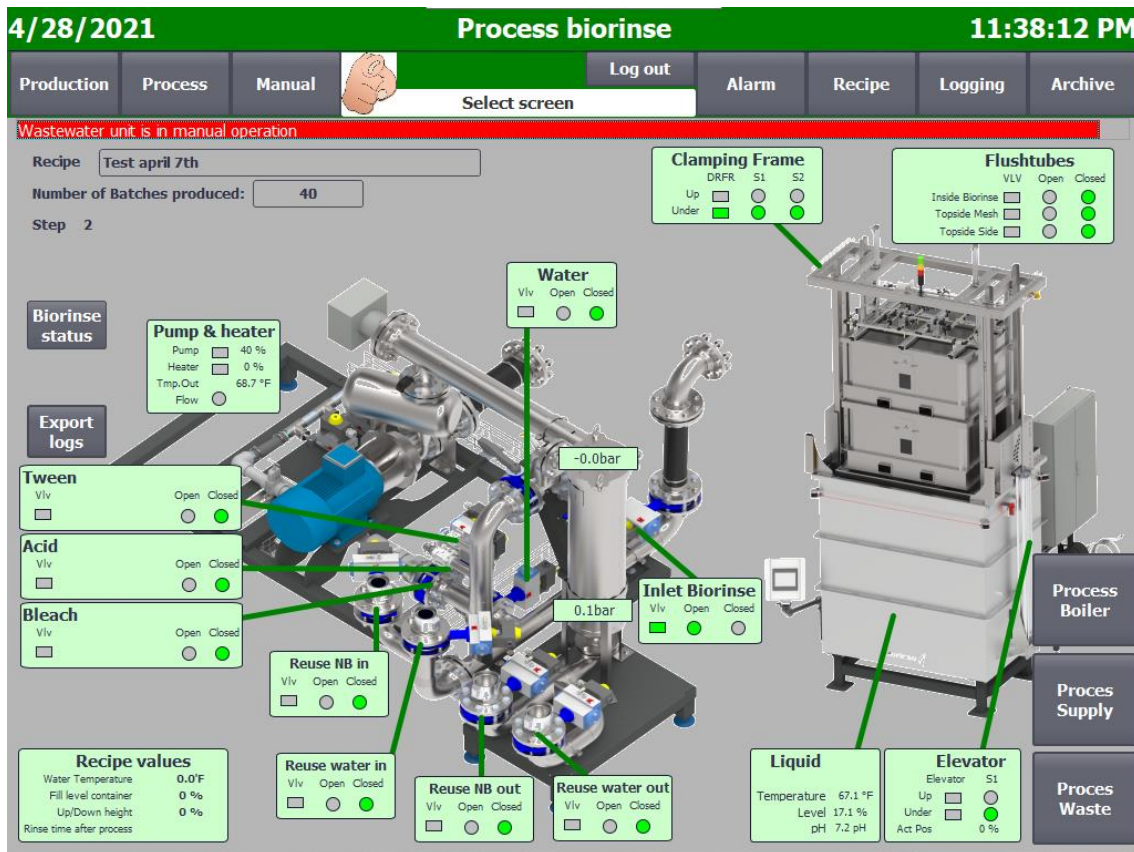
The software is programmed in such a way that the machine will wait when a certain step cannot be executed. These indicators will give you an indication for instance why the machine will not start filling.

The button 'Reset production' is a reset button to reset any alarms or the emergency stop. The blue reset button below the touch screen has the same functionality.

The date and time at the top of the screen can be adjusted by pressing the 'Date and Time' button.

### 6.8.2 Process screen

The process screen gives a visual over the machine and all its functions. From the Biorinse HMI, the process screens for water supply, chemical supply and waste water treatment can also be seen with a little less detail than on the pump station. The process screens of the pump station will be described in chapter 7.



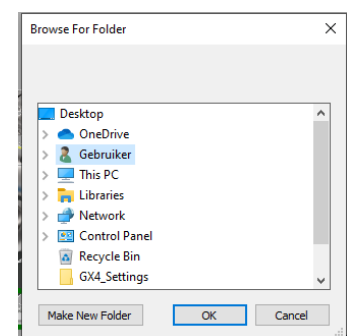
At the left top is shown what the active recipe is, the amount of batches produced since last reset and in which recipe step the machine currently is.

Below there is are two buttons:

**Biorinse status:** This gives an overview of which statuses are active (see explanation later in this paragraph).

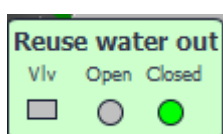
**Export logs:** With this button the log files can be exported to a USB flash drive. To do so, take the following steps:

1. Place a flash drive in the USB port
2. Press the 'Export logs' button.
3. A popup (Figure 6-4) appears where you can choose the export location
4. Navigate to the desired location and press 'Ok'.
5. The log files will now be copied to this folder, and remain available on the HMI of the machine. To delete the files from the HMI, you will need to leave the Runtime and delete the files in the Windows environment.



**Figure 6-4 Export pop-up**

In the lower left corner, the setpoints of the current recipe step are shown.



All other green fields give information on certain valves, actuator and sensors. As shown here, the square indicates whether the valve gets a start signal from the PLC (same for cylinders and motors). The circles are indicators for the sensors. In the case of a butterfly valve, the circles indicate the position sensor.

In the lower right corner there are navigating buttons towards the process screens of the pump station. These will be explained in chapter 7.3.



### 6.8.3 Manual control screen

All actuators can be controlled manually in this screen. For safety reasons, there are some conditions for the pump and heater to start. If these conditions are not met, the actuator will not start.

It is strongly advised to set all functions to automatic before starting a recipe, unless you have specific reasons to leave a certain function in manual control. If a function is set to manual control, the title bar of that function will turn yellow and the hand symbol in the navigation menu will appear.

### 6.8.4 Alarm screen

The alarm screen gives an overview of all alarms and warnings that are currently active. Alarms stay active until you reset them with the blue reset button, or the reset button on the production screen. If you press one of these buttons, and the source of the alarm is gone, the alarm will be reset.

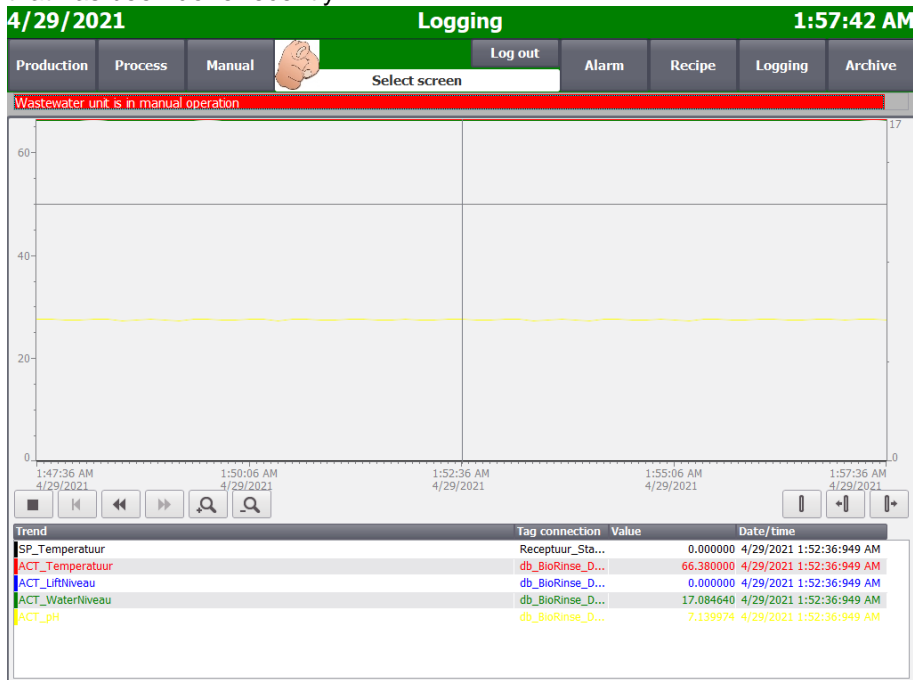
With the button 'Deactivate sound alarm', you can temporarily deactivate sound alarms from the buzzer.

### 6.8.5 Recipe screen

This screen has been fully covered in paragraph 6.7.

### 6.8.6 Logging screen

This screen shows a graph of the temperature setpoint, actual temperature in the Biorinse container, elevator level, water level and the pH. This is purely a graphic display of those values so you can review a production that has been done recently.



The logging of automated batches into the csv files is done completely separate from this screen. These data are logged independent of the state of this screen.



### 6.8.7 Settings

In this screen all main settings can be set.

4/29/2021
2:18:48 AM
Settings

Production Process Manual Select screen Log out Alarm Recipe Logging Archive

Wastewater unit is in manual operation

**General**

Setting lift level at 20ma (set automatic) 101.21 %

Setting water level at 20ma 170.00 %

Speed pump while draining 90%

Drain ready when level below 5%

Water filter pressure difference alarm 1.00 bar

Maximum elevator level in recipe 100%

**Heater**

P Gain PID Heater 2.0000

I Time PID Heater 40.000s

Log interval 2.0s

Run-time pump after heating is turned off 120s

Tolerance temperature 3°F

Tolerance time temperature 120s

Minimum water level for recirculation 15 %

Speed pump while circulating 70%

Maximum Temp setting in recipe 140°F

**Supply System**

First fill level 80%

Pause time pH measurement 120s

Pulsetime Acid after pH measurement 1.0s

Time recirculation after filling for pH measurement 60s

Min level reuse tank clean water 80%

Min level reuse tank chemical water 15%

Maximum fill level in recipe 85%

Language
System settings

The 'Language' button toggles the language of the HMI between Dutch and English.

The 'System settings' button navigates to the System settings screen. This screen can also be accessed from the white drop down menu at the top center of the screen.

The next table will describe every setting.

General	
<b>Setting lift level at 20mA</b>	This is a value that is set automatically each time the elevator is in upper position to give a proper display of the height of the elevator.
<b>Setting water level at 20mA</b>	This is a setting for the pressure sensor in the Biorinse container which indicates where the 100% level is. <b>Do not change this unless you are absolutely sure what you are doing, because there is a risk of overfilling the Biorinse when changing this.</b>
<b>Speed pump while draining</b>	This is the speed of the pump while draining into one of the waste tanks.
<b>Drain ready when level below</b>	This is the level in the Biorinse that indicates it is empty. When this level is reached during draining, and sustained for 10 seconds, the pump will stop and the valve will close.
<b>Water filter pressure alarm</b>	The bag filter is equipped with two pressure sensors. When the filter bag gets clogged, the pressure difference between the two sensors will rise. This value should be determined experimentally, i.e. keep an eye on the filter bag and check the pressure difference <b>during draining</b> when the filter bag is clogged. If you set that value in this setting, the next time this difference occurs, the operator will get a notification that the filter should be checked and/or replaced.
<b>Maximum elevator level recipe</b>	This value limits the recipe value for the elevator height in a treatment step.
Supply system	
<b>First fill level</b>	When filling the Biorinse with water and chemicals, the Biorinse will first be filled with water to this percentage of the set level in the recipe. Then the chemicals will be added. After the operator acknowledges the amount of chemicals dosed, water will be added to the level set in the recipe.

<b>Pause/pulse time pH measurement</b>	When a desired pH level is set in the recipe, first the amount of chemicals from the recipe are pumped into the Biorinse. If the pH is still too high, the machine will add more acid until the desired pH level is reached. This works with a pulse-pause system. A shot of acid is given (pulse time is the duration that the pump is on). Then the machine will recirculate the water to mix it for a proper pH measurement (pause time). After this pause time, the pH level is compared to the recipe value again, and if the pH is still too high, this process is repeated until the desired pH level is reached.
<b>Time recirculating after filling</b>	This is a recirculating/mixing time between filling the Biorinse and the pulse-pause system to correct the pH value. This also happens if no chemicals are added, to make sure the liquid is consistent and there are no layers with different composition and/or temperature.
<b>Min. level reuse tank (2x)</b>	This is the minimum level of liquid in the reuse tanks to be able to pump back to the Biorinse. If the actual level gets below this, the operator gets a pop-up to choose where the remaining amount of water should come from.
<b>Max. fill level in recipe</b>	This value limits the maximum fill level in the recipe. When this value is changed, the text field in existing recipes that exceed this limit will turn red, to give a warning to the operator when he wants to start that recipe. When making a new recipe or changing a recipe, the operator gets a warning when he wants to enter a value that is too high. <b>Be sure to set this correctly. The Biorinse is filled with water when the elevator is in upper position. When the elevator with seed containers is lowered into the machine, the water level will rise.</b>
<b>Heater</b>	
<b>P Gain PID heater</b>	The P-gain setting of the PID controller of the heater.
<b>I time PID heater</b>	The I setting of the PID controller of the heater.
<b>Log interval</b>	During an automatic process, data is logged with an interval that can be set here.
<b>Run-time pump after heater</b>	After the heater is switched off, the pump should keep running for a certain amount of time to cool down the heating element.
<b>Tolerance temperature</b>	This is the tolerance on the water temperature in the Biorinse.
<b>Tolerance time temperature</b>	If the temperature is out of tolerance for more than this time, the operator will get an alarm.
<b>Min. water level recirculation</b>	The water level in the Biorinse should be above this level for the recirculation and heating to start. This level should be above the temperature sensor in the Biorinse tank for proper functionality.
<b>Speed pump circulating</b>	The speed of the pump during recirculating and heating.
<b>Max. temp setting in recipe</b>	This limits the water temperature in the recipe.

## 6.8.8 System settings screen

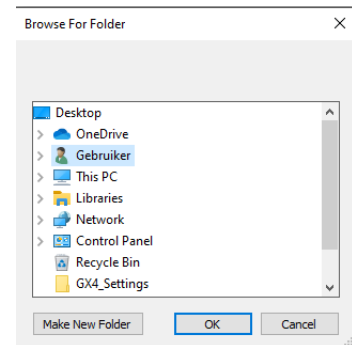
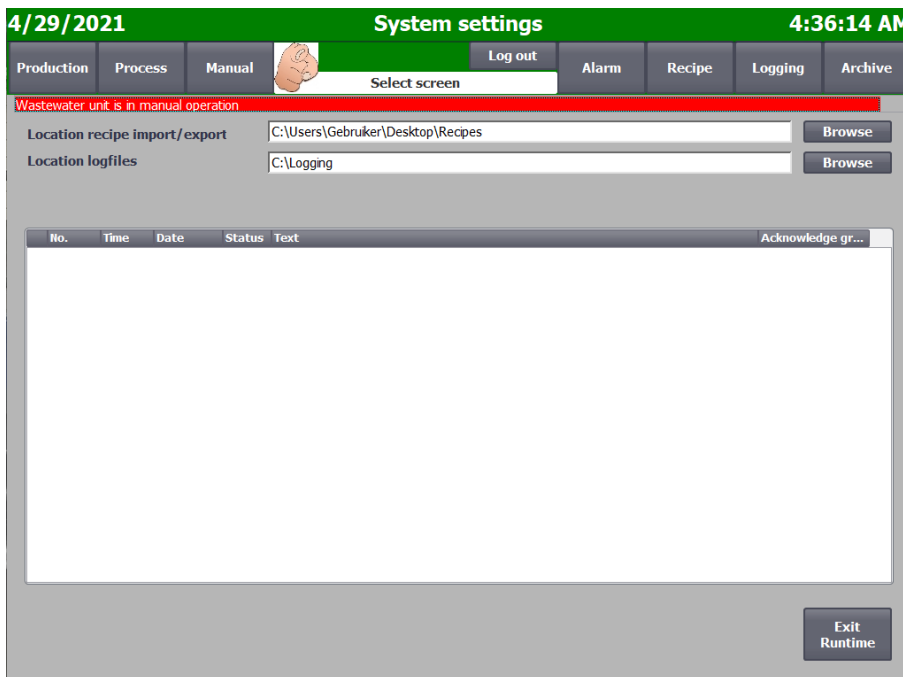


Figure 6-5 Browsing pop-up

**Location recipe import/export:** This is the location to and from where the recipes should be exported/imported. Press browse to select this location in a Windows-based pop-up (Figure 6-5).



**Location logfiles:** At this location the logfiles are stored on the HMI. When pressing the 'Export logs' button on the Process screen, the files are copied from this location to the export location you can select upon exporting.

**Exit runtime:** This shuts down the application that runs the machine, and lets you return to the Windows environment on the panel PC.

In the center of the screen, system alarms will be shown when these occur. These system alarms will also be shown in the alarm screen and the red bar at the top of the screen.

Log files are not deleted from the HMI upon exporting. If desired, these files can be deleted from the HMI by going to the file location and delete them manually.

**Tip:** Instead of pressing the 'Exit runtime' button, you can also go to the Windows environment by

pressing the  button twice on the virtual keyboard that shows when you alter a text field. When doing this, the start menu shows, and you can for instance open the Windows Explorer to minimize the Runtime application. Press the  button to return to the machine software without needing to restart the application.

**Tip:** If you want to select a file location, but the pop-up does not show, it might have appeared on the background behind the full-screen Runtime application. If you follow the instructions in the tip above (pressing the windows button on the keyboard twice), you can get the pop-up to the foreground from the taskbar.

**Tip:** As this HMI is basically a Windows PC, you can plug a keyboard and/or a mouse into the USB port on the HMI enclosure or directly into the HMI when you open the enclosure.

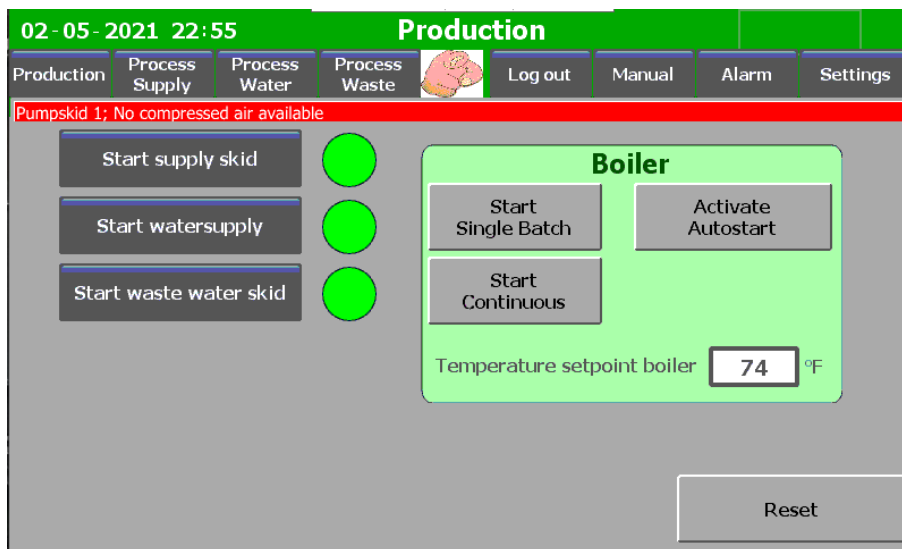
## 7 OPERATING THE PUMPSTATION

Most of the daily operator tasks will be done on the Biorinse HMI, but there are certain things that need to be done on the pumpstation HMI. This chapter will give an overview of the functionality on all the screens.

### 7.1 Main operation

When all functions are set to automatic, the operator has started the three main parts of the pumpskid (chemical supply skid, water supply and waste water skid), and the waste/reuse tanks are not full, all operating can normally be done from the Biorinse. Neutralizing and draining the waste water to the sewer should be done from the pumpstation HMI.

### 7.2 Production screen



The machine is started and stopped on this screen. The chemical supply (bleach, acid, tween), water supply (boiler and water pump) and the waste water skid can be started individually by pressing the corresponding buttons. If these are started, they will handle the commands from the Biorinses in an automatic process. If they are turned off, or functions are set manually, the operator will be warned on the Biorinse HMI.

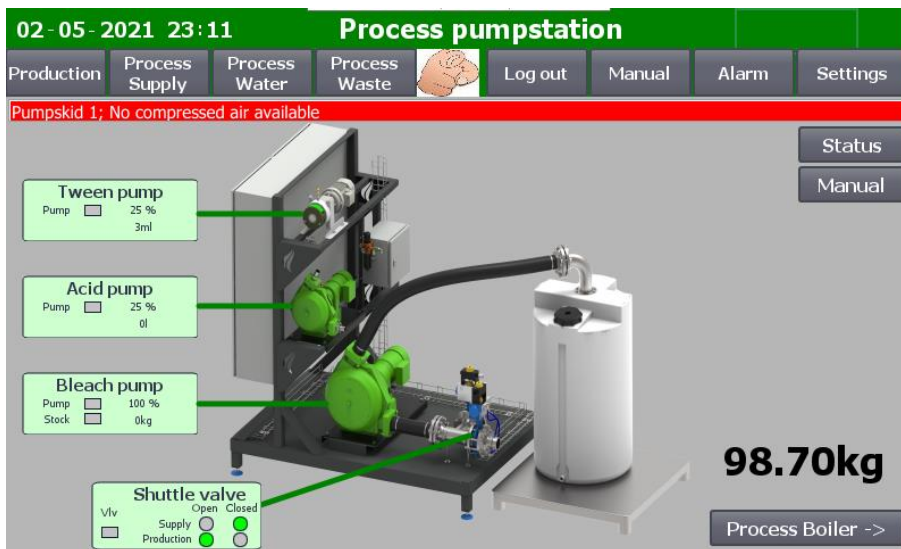
The boiler can also be started from this screen, this works exactly the same as described in paragraph 6.3, item 5).

The reset button is used to reset any alarms and the emergency stop. It has the same function as the blue reset button on the control cabinet.

### 7.3 Process screens

Each main part of the machine has its own process screen with a graphical overview and status screen. These will be described in the following paragraphs.

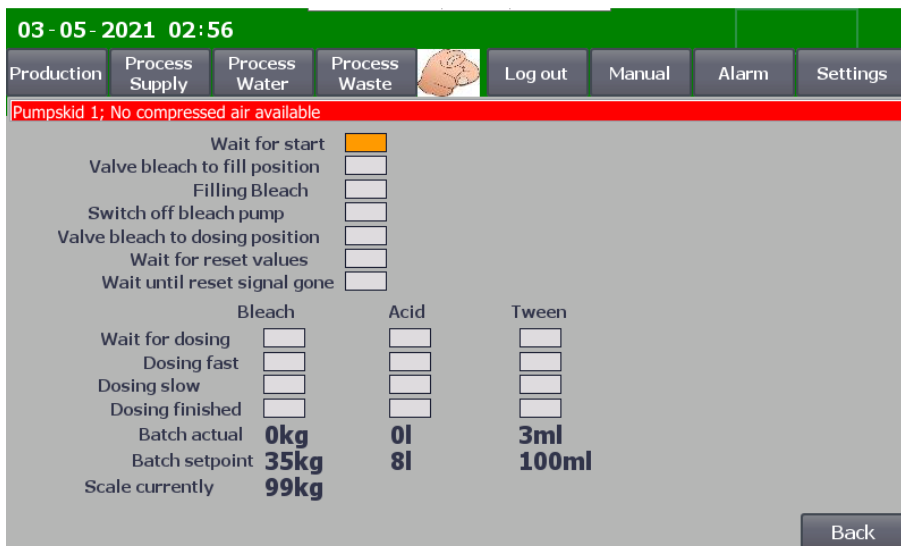
### 7.3.1 Process supply



For each pump, the current status (on/off), set speed, and amount dosed in this batch is shown. The counter for dosed amount is reset at the start of a filling cycle, so when the pump is not dosing, the actual amount of the last batch is shown. The bleach pump can rotate in both directions. Clockwise to fill the intermediate tank, and counterclockwise to pump the bleach from the intermediate tank towards the Biorinse. Two butterfly valves are placed in front of the pump to let the flow go to the right direction. On the right side, next to the scale the current weight on the scale is shown.

On the bottom right there is a navigating button to the process screen of the boiler/water supply. This has the same function as the navigating button to that screen in the main menu.

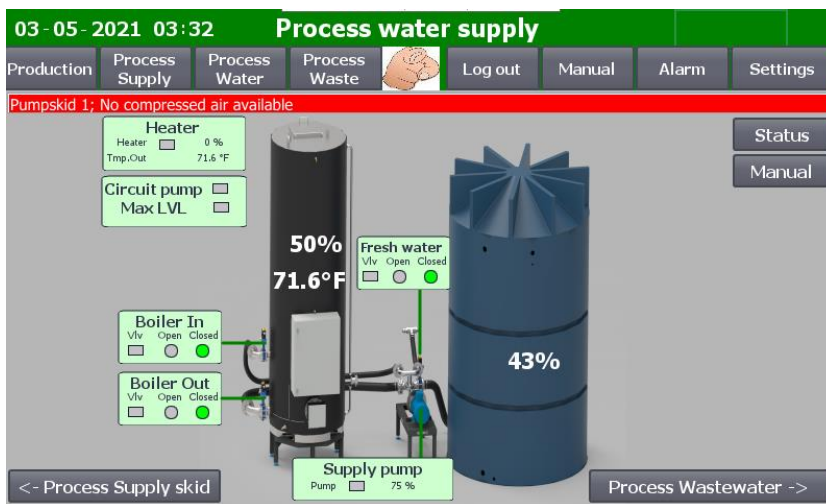
On the top right there are two navigating buttons towards the manual control of this part of the machine and a status overview. This status overview consists of the following:



Wait for start	The machine is in rest, waits for a command from the Biorinse.
Valve bleach fill position	The valves at the bottom connection of the bleach pump are set to fill the intermediate container from the stock container.
Filling bleach	The intermediate container is being filled from the stock container.
Switch off bleach pump	The pump is stopped after the desired weight in the intermediate container is reached. After the deacceleration of the pump, the valves are switched. This status is active during the deacceleration.
Valve bleach dosing position	The valves at the bottom connection of the bleach pump is set to dose bleach into the Biorinse.

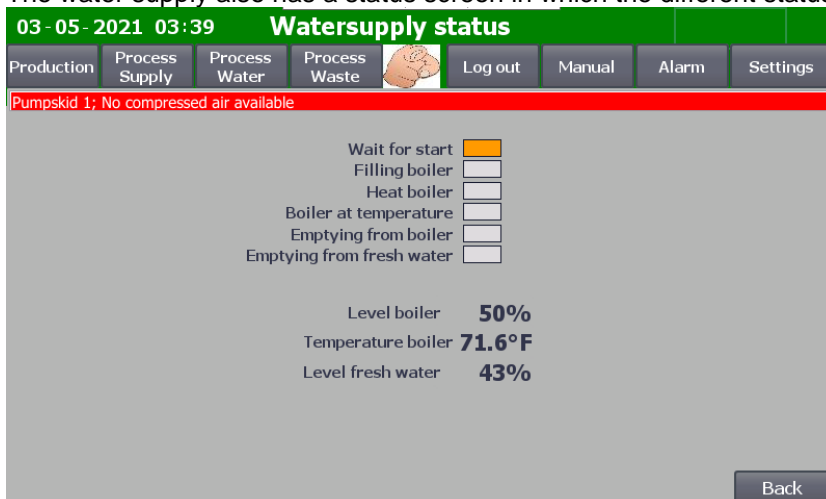
Wait for reset values	At the beginning of a dosing cycle the actual dosed values are reset.
Wait until reset signal gone	This reset signal is given for a certain amount of time. After that time the reset signal is deactivated and the process can continue.
Individual components	For each chemical component, individual statuses are shown.
Wait for dosing	The machine waits for a command from the Biorinse to start dosing.
Dosing fast	The dosing sequence is split in two parts: first a certain amount is dosed on a high (settable) speed. At a settable offset from the desired amount the pump slows down to a settable low speed to accurately dose the correct amount. This status is active during the first part.
Dosing slow	This status is active during the slow dosing step.
Dosing finished	When the desired amount is reached, the dosing step is finished and this status will become active.
Batch actual	The actual dosed amount in this batch.
Batch setpoint	The desired amount, as requested in the recipe and/or chemical dosing pop-up in the Biorinse.
Scale currently	The current weight on the scale of the bleach tank.

### 7.3.2 Process water



This screen gives an overview of the boiler, fresh water tank and water pump. In the tanks the actual water level is shown, and the boiler also shows the temperature inside. The green fields give information about that particular part.

The water supply also has a status screen in which the different statuses are shown:

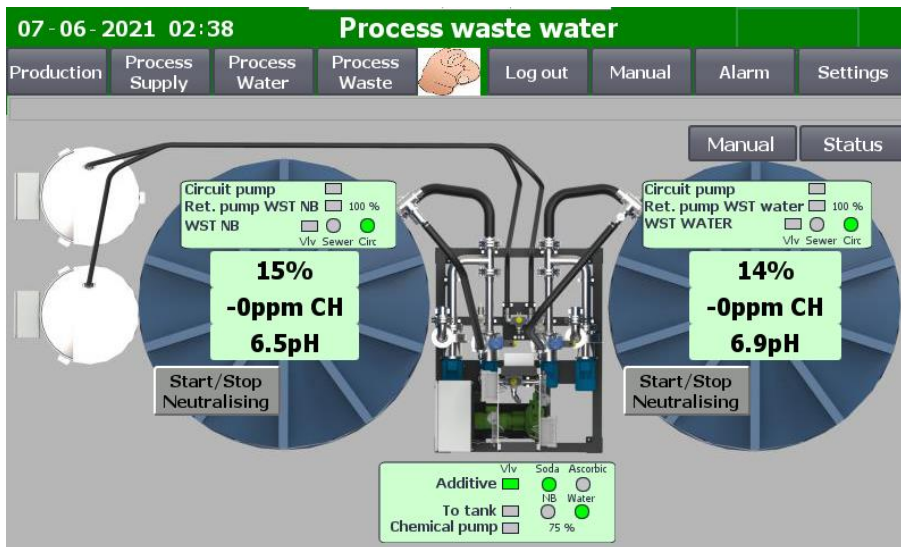


These statuses are pretty self-explaining.



### 7.3.3 Process Waste

This screen gives an overview of the waste water skid.



This screen gives an overview of the two waste/reuse tanks and the equipment to pump and deactivate the solution in these tanks. For each tank there is an indication of the current status of the circulating/drain pump, the valve that decides whether the water is being recirculated or drained and the pump to pump the solution back towards the Biorinse. Each tank shows its current filling level, chlorine concentration and pH.

At the bottom, some indicators for the neutralizing system are shown. The first valve chooses whether ascorbic acid or soda ash is dosed. The second valve shows the position of the three-way valve that decides whether the deactivating chemical is dosed into the left or right tank. The third indicator shows the status of the pump that doses the chemical.

For each tank there is a button 'Start/Stop Neutralizing'.

**Aanvullen met schermafbeeldingen zonder alarmen..**

### 7.4 Manual control

Each valve and pump can be manually controlled. Keep in mind that the manual control overrides any automatic sequence.

**Attention!!** When manually starting a pump, make sure that the correct valves at the inlet and outlet side of the pump are open, so the liquid can be pumped freely without creating an overpressure!!

**Tip:** In some cases, for instance when you manually want to dose a certain liquid into the Biorinse, it can be easier to make a recipe in the Biorinse and run that recipe. If you do that, and all functions are in automatic control, you are sure that all the correct valves are opened.

There are four screens for the manual control. These can be reached from the corresponding process screen, or by navigating between the different manual control screens with the buttons at the bottom left and right of the manual control screens. The working principle is the same as the manual control screen on the Biorinse.

03-05-2021 04:36
Manual control pump station

Production
Process Supply
Process Water
Process Waste
Log out
Manual
Alarm
Settings

Pumpskid 1; No compressed air available

SWAP BLEACH		PMP BLEACH	PMP ACID	PMP TWEEN
Automatic		Automatic	Automatic	Automatic
Open		Dosing	On	On
Closed		Fill	Off	Off
98.7kg		Off	25%	25%
<div> <div>T</div> <div> <div>+</div> <div>-</div> </div> </div>		100%	- +	- +
		- +		

Manual Water Supply ->

This is an overview of the manual control for the bleach-acid-tween pumps. The other screens are similar to this, and pretty self-explaining.



## 7.5 Alarm

The alarm screen gives an overview of the current alarms, the same way as on the Biorinse.

03-05-2021 04:39


Alarmdisplay

Production

Process Supply

Process Water

Process Waste



Log out

Manual

Alarm

Settings

Time	Date	Text
2:19:15...	3/27/1970	Pumpskid 1; No compressed air available
12:48:0...	3/27/1970	Pumpskid 1; Emergency stop active
12:48:0...	3/27/1970	Watersupply; Error frequency regulator supply pump
12:48:0...	3/27/1970	Wastewater; Storing frequency regulator Chemical-pump Asc Ash
12:48:0...	3/27/1970	Wastewater; No signal of Cl measurement WST water
12:48:0...	3/27/1970	Wastewater; No signal of pH measurement WST water

Alarms can be reset by pressing the reset button in the production screen or pressing the blue reset button on the control cabinet. In case of an emergency stop, then both Biorinses and the pumpstation should be reset.

## **8 CLEANING AND MAINTENANCE**

### **8.1 Cleaning the container**

The container can be cleaned with an pressure washer with or without steam. Place the container on a safe location to wash it.

### **8.2 Cleaning of the circulation pump and heater**

To clean the centrifugal pump & heater please look in the manuals for these systems. It is advised to clean them at least once a year.

### **8.3 Cleaning the boiler**

To clean the boiler:

- 1) Be sure that the boiler is empty, otherwise manually empty the boiler into one of the Biorinse
  - Open the bottom valve of the boiler (on HMI pumpskid).
  - Open the water inlet valve on the Biorinse (on HMI Biorinse).
  - Start the water pump (on HMI pumpskid).
  - Stop the pump when the boiler tank is empty.
- 2) Clean the inside of the boiler with an pressure washer
- 3) Check if everything is clean and close the valves by setting them in automatic mode again.

### **8.4 Cleaning the tubing**

To clean the tubing, you can do a "short" rinse with heated water only. We advise to do this at least each half year in order to prevent having dust/particles set down in the water lines. For this short rinsing you can set up a 15 minute / 50°C protocol.

### **8.5 Cleaning the rinsing station**

To clean the rinsing station take the next steps:

- 1) Be sure that the lifting device is in the bottom position
- 2) Turn off the complete system
- 3) Release the compressed air supply
- 4) Use a pressure washer (with or without steam) to clean the inside of the container
- 5) Drain the water into one of the waste tanks. There are two options:
  - i. Make a recipe to empty the machine into one of the waste tanks.
  - ii. Manually open the outlet valve towards the desired tank and start the pump on the Biorinse.

### **8.6 Replacing the filter bag**

The filter on the Biorinse is equipped with two pressure sensors. When the filter material gets clogged, the pressure difference between the flow before and after the filter will rise. With the correct settings in the settings screen, the operator gets a warning when the pressure difference is reached. When that is the case it is time to check the filter bag and if needed, replace it. To do this, take the following steps:

- 1) Finish the current production and make sure the Biorinse is empty
- 2) Turn off the power or press the emergency stop, to prevent the pumps/valves from moving
- 3) Open the top cover of the filter housing
- 4) Remove the filter bag and inspect it.
- 5) Inspect the inside of the filter housing for deposits and clean if needed.
- 6) If the filter bag indeed needs replacement, get a new one and place it back. If it does not require replacement yet, place the original filter bag back.
- 7) Close the top cover of the filter housing
- 8) Restart the machine and/or reset the emergency stop.

### 8.7 Flow regulators on pneumatic cylinders

The pneumatic cylinders of the elevator and the clamping frame are equipped with flow regulators to regulate the speed of the movement of the cylinder. Both ports of the cylinders have a regulator.

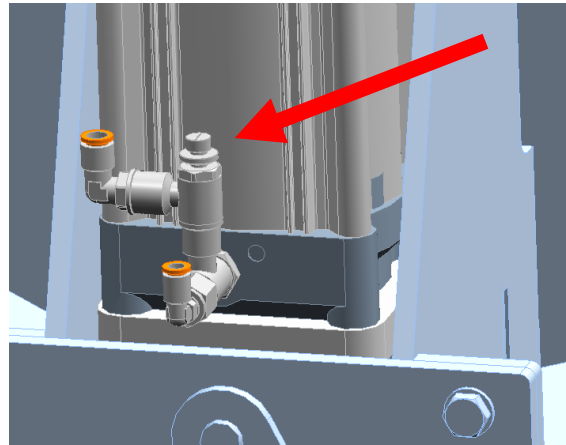
**Remark:** The regulator regulates the **outgoing** air of the port. For instance: if you want a cylinder to move downward more slowly, you need to close (clockwise) the regulator on the bottom port of the cylinder.

### 8.8 Calibrating the weighing scale (bleach tank)

### 8.9 Calibrating pH and chlorine sensors

Every once in a while it is good to calibrate the pH and chlorine sensors on the Biorinse and the wastewater skid.

For calibrating the pH sensors, buffer liquids are supplied, and can be ordered in the future if needed/desired. Calibrating is done on the measuring device. Please refer to the user manual of the measuring devices for instructions on how to calibrate.



**Figure 8-1 Flow regulator**

## 9 TROUBLESHOOTING

Error	Cause	Action
Machine doesn't start	<ol style="list-style-type: none"> <li>1. Power supply is missing</li> <li>2. Main switch is turned off</li> <li>3. Frequency controller shows 00</li> </ol>	<ol style="list-style-type: none"> <li>1. Connect the power supply</li> <li>2. Turn the main switch to on</li> <li>3. Change the setting of the frequency controller</li> </ol>
Seed does not move	<ol style="list-style-type: none"> <li>1. The water circulation is too low</li> <li>2. The elevator does not move up and down</li> </ol>	<ol style="list-style-type: none"> <li>1. Set a higher pump circulation speed</li> <li>2. Change the protocol so that the elevator moves up/down longer</li> </ol>
Temperature is out of range	<ol style="list-style-type: none"> <li>1. The temperature is not set right</li> <li>2. The tolerance and time are to "limited"</li> <li>3. The PID settings are not OK</li> </ol>	<ol style="list-style-type: none"> <li>1. Change the temperature tot he correct one</li> <li>2. Change the tolerance</li> <li>3. Change the PID settings, see chapter <b>Fout! Verwijzingsbron niet gevonden.</b></li> </ol>
Touch panel does not work	<ol style="list-style-type: none"> <li>1. Power supply is missing</li> <li>2. A thermal fuse is shut off</li> </ol>	<ol style="list-style-type: none"> <li>1. Switch on the power supply</li> <li>2. Check the thermal fuses and switch them on again</li> </ol>
The boiler does not get filled	<ol style="list-style-type: none"> <li>1. There is no compressed air to open the valve</li> <li>2. There is no water line pressure and/or connected</li> </ol>	<ol style="list-style-type: none"> <li>1. Check if the compressed air is available</li> <li>2. Check the water lines and solve the issue</li> </ol>
The boiler does not get heated	<ol style="list-style-type: none"> <li>4. Power supply is missing</li> <li>5. Main switch is turned off</li> </ol>	<ol style="list-style-type: none"> <li>4. Connect the power supply Turn the main switch to on</li> </ol>
An alarm appears on the screen		<ol style="list-style-type: none"> <li>3. See chapter 9 for a list of all alarms</li> </ol>

This table is only a tool to solve errors with the machine. When you cannot solve the error in a safe way, you should contact authorized personnel.

**Pay attention!!** Maintenance on the electrical parts should only be executed by an authorized electrician.

## 10 ALARMS

No:	Alarm Message	Possible Cause	Possible Solution
9	Boiler; Temperature outside tolerance	1. Heater is not working and/or fuse is off 2. Tolerance is set to tight	1. Check the functionality of the heater and reset the fuse 2. Enlarge the tolerance so that it is accepted
10	Boiler; VLV7 not in position	1. The compressed air is failing 2. The valve is not working correctly or blocked 3. The valve unit is not corresponding	1. Check if the compressed air is available 2. Check if the valve is working properly 3. Check if the HDM unit is working properly
11	Boiler; VLV8 not in position	1. The compressed air is failing 2. The valve is not working correctly or blocked 3. The valve unit is not corresponding	1. Check if the compressed air is available 2. Check if the valve is working properly 3. Check if the HDM unit is working properly
12	Boiler; Thermal fuse heater is turned off	1. There was an overload 2. The thermal fuse was switched off	1. Check the motors and reset the fuse 2. Check and reset the fuse
13	Boiler; Thermal fuse pump is turned off	1. There was an overload 2. The thermal fuse was switched off	1. Check the motors and reset the fuse 2. Check and reset the fuse
14	Boiler; Requested minimum level not reached	1. There is no water supply 2. Top level sensor is not working correctly 3. Mid-level sensor is not working correctly	1. Change the water supply source and solve the issue 2. Check the functionality of the sensor 3. Check the functionality of the sensor
41	BioRinse; Emergency stop activated	1. An emergency stop is activated	1. Release the emergency stop and reset the control current
42	BioRinse; No compressed air available	1. The compressed air input is lost	1. Reconnect to compressed air and reset alarm
43	BioRinse; Water level not high enough	1. There is not enough water in the boiler station 2. The boiler station valve is not opened 3. The water level is not set correctly	1. Check if the boiler has been filled correctly and re-fill it 2. Check the functionality of the boiler and/or if the boiler has been started 3. Change the protocol water level
44	BioRinse; Clamping frame not in position	1. The compressed air is failing 2. The valve is not working correctly or blocked 3. The valve unit is not corresponding 4. The reed contact sensor is in the wrong position	1. Check if the compressed air is available 2. Check if the valve is working properly 3. Check if the HDM unit is working properly 4. Change the reed contact position
45	BioRinse; Elevator not in position	1. The compressed air is failing 2. The valve is not working correctly or blocked 3. The valve unit is not corresponding	1. Check if the compressed air is available 2. Check if the valve is working properly 3. Check if the HDM unit is working properly
46	BioRinse; Clamping frame not in position	1. The compressed air is failing 2. The valve is not working correctly or blocked 3. The valve unit is not corresponding 4. The reed contact sensor is in the wrong position	1. Check if the compressed air is available 2. Check if the valve is working properly 3. Check if the HDM unit is working properly 4. Change the reed contact position
47	BioRinse; VLV1 not in position	1. The compressed air is failing 2. The valve is not working correctly or blocked 3. The valve unit is not corresponding	1. Check if the compressed air is available 2. Check if the valve is working properly 3. Check if the HDM unit is working properly

48	Biorinse; VLV2 not in position	<ol style="list-style-type: none"> <li>1. The compressed air is failing</li> <li>2. The valve is not working correctly or blocked</li> <li>3. The valve unit is not corresponding</li> </ol>	<ol style="list-style-type: none"> <li>1. Check if the compressed air is available</li> <li>2. Check if the valve is working properly</li> <li>3. Check if the HDM unit is working properly</li> </ol>
49	BioRinse; Laserscreen is activated, reset alarm	<ol style="list-style-type: none"> <li>1. While moving downwards there was something seen by the screen</li> <li>2. The position of the laser beam is off</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove the obstruct and reset the alarm</li> <li>2. Change the position so that a green lamp will turn on when nothing is detected</li> </ol>
73	Pompstation; VLV3 not in position	<ol style="list-style-type: none"> <li>1. The compressed air is failing</li> <li>2. The valve is not working correctly or blocked</li> <li>3. The valve unit is not corresponding</li> </ol>	<ol style="list-style-type: none"> <li>1. Check if the compressed air is available</li> <li>2. Check if the valve is working properly</li> <li>3. Check if the HDM unit is working properly</li> </ol>
74	Pompstation; VLV4 not in position	<ol style="list-style-type: none"> <li>1. The compressed air is failing</li> <li>2. The valve is not working correctly or blocked</li> <li>3. The valve unit is not corresponding</li> </ol>	<ol style="list-style-type: none"> <li>1. Check if the compressed air is available</li> <li>2. Check if the valve is working properly</li> <li>3. Check if the HDM unit is working properly</li> </ol>
75	Pompstation; VLV5 not in position	<ol style="list-style-type: none"> <li>1. The compressed air is failing</li> <li>2. The valve is not working correctly or blocked</li> <li>3. The valve unit is not corresponding</li> </ol>	<ol style="list-style-type: none"> <li>1. Check if the compressed air is available</li> <li>2. Check if the valve is working properly</li> <li>3. Check if the HDM unit is working properly</li> </ol>
76	Pompstation; VLV6 not in position	<ol style="list-style-type: none"> <li>1. The compressed air is failing</li> <li>2. The valve is not working correctly or blocked</li> <li>3. The valve unit is not corresponding</li> </ol>	<ol style="list-style-type: none"> <li>1. Check if the compressed air is available</li> <li>2. Check if the valve is working properly</li> <li>3. Check if the HDM unit is working properly</li> </ol>
77	Pompstation; PMP1 frequency inverter error	<ol style="list-style-type: none"> <li>1. There was an overload</li> <li>2. The thermal fuse was switched off</li> </ol>	<ol style="list-style-type: none"> <li>1. Check functionality and reset the controller</li> <li>2. Check functionality and reset the fuse</li> </ol>
78	Pompstation; HEAT1 fuse not set	<ol style="list-style-type: none"> <li>1. There was an overload</li> <li>2. The thermal fuse was switched off</li> </ol>	<ol style="list-style-type: none"> <li>1. Check functionality and reset the controller</li> <li>2. Check functionality and reset the fuse</li> </ol>
79	Pompstation; HEAT1 out of temperature tolerance	<ol style="list-style-type: none"> <li>1. Heater is not working and/or fuse is off</li> <li>2. Tolerance is set to tight</li> <li>3. Water was too cold/hot when entered the station</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the functionality of the heater and reset the fuse</li> <li>2. Enlarge the tolerance so that it is accepted</li> <li>3. Change the pre-heated water temperature</li> </ol>

## 11 INCIDENT & REPAIR LIST

Whenever the machine has a malfunction or worn out parts you should write it down in this list. When the machine needs service, or has a frequent malfunction we can check this list what is the best solution to make the machine work properly again. It also can save much time for trouble shooting.

Date	Problem	Solution	Solved by

## 12 ORDERING SPARE PARTS

You can always order spare parts for your machine. Every spare part can be find in the parts list that is also delivered by your machine. It is important that you always mention the construction year, the type and the serial number of your machine when you order spare parts.

### 13 WARRANTY

Hoopman equipment & engineering b.v. works with the warranty rules beneath:

1. The contractor warrants the proper execution of the agreed performance for a period of six months after delivery or completion.
2. If the agreed performance consists in the carrying out of contracted work, the contractor warrants the soundness of the delivered construction and the materials used in the construction for the period referred to in paragraph 1, provided that he was free to choose such materials. If it transpires that the delivered construction or the materials used are unsound, the contractor shall repair or replace them. The parts which the contractor is to repair or replace must be sent to him free of charge. The dismantling and assembly of these parts and any travelling and accommodation expenses incurred shall be borne by the customer.
3. If the agreed performance consists in the processing by the contractor of materials supplied by the customer, the contractor warrants the soundness of the processing for the period referred to in paragraph 1. If it transpires that processing has not been carried out in a sound manner, the contractor shall choose whether:
  - to carry out the processing anew, in which case the customer must supply new material at his own expense
  - to repair the defect, in which case the customer must return the material free of charge to the contractor
  - to provide the customer with a credit note for a proportionate part of the invoiced amount.
4. If the agreed performance consists in the delivery of an item of goods, the contractor shall warrant the soundness of the delivered item during the period referred to in paragraph 1. If it transpires that the delivery has not been sound, the item of goods must be returned free of charge to the contractor. Thereafter the contractor shall choose whether:
  - to repair the item of goods;
  - to replace the item of goods;
  - to provide the customer with a credit note for a proportionate part of the invoiced amount.
5. If the agreed performance consists in part or in whole of the installation and/or assembly of delivered item of goods, the contractor warrants the soundness of the installation and/or assembly for the period referred to in paragraph 1. If it transpires that the installation and/or assembly has not been carried out in a sound manner, the contractor shall repair it. Any travelling and accommodation expenses shall be borne by the customer.
6. The factory warranty shall apply to parts in respect of which this has been expressly agreed in writing by the customer and the contractor. If the customer has had the opportunity to take cognizance of the content of the factory warranty, this shall take the place of the warranty under this article.
7. The customer must in all cases offer the contractor the opportunity to repair the defect or to carry out the processing anew.
8. The customer may invoke the warranty only after he has complied with all his obligations to the contractor.
9. (a) No warranty is given for defects that are a result of:
  - normal wear and tear;
  - injudicious use;
  - non-maintenance or defective maintenance;
  - installation, assembly, modification or repair by the customer or by third parties.
 (b) No warranty is given for delivered items of goods that were not new at the moment of delivery



## 14 EXPLANATION OF SAFETY DECALS



Carefully read operator's manual before handling the machine. Observe instructions and safety rules when operating.



Stay clear of rotating machine parts



Stay clear of raised gate unless safety lock is applied.



Never reach or climb into grain tank while engine is running.



Stay clear of gate swinging area while tractor engine is running



Secure lifting cylinder with locking device before getting in hazardous area.



Do not open or remove safety shields while engine is running.



Do not open or remove safety shields while engine is running.



Never reach into the crushing danger area as long as parts may move.



Wait until all machine components have completely stopped before touching them.



Lubricating point

[illegible]

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