



## PREMIUM MEDIA PREPARATOR

### *USER MANUAL*



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## 1. Introduction

This machine has been developed and produced according to the latest technical innovations. This means that the machine complies with the applicable European directives concerning safety and health. The machine is CE marked and carries the required certificates (e.g. TÜV, Lloyd's, ASME, ...)

The machine was developed and produced for heating, sterilizing, cooling and dispensing medium for cloning plant material in plant tissue culture and seed laboratories. The operation of the machines must be done by people with a laboratory training, who master one of the languages used in the control panel. Lab Associates rejects any liability, if the machine is used for other purposes or is used differently than described in this manual.

The operator should select his/her native or professional language on the control panel, when using the machine.

Lab Associates B.V. is not liable for unsafe situations, accidents and damage, which are the result of:

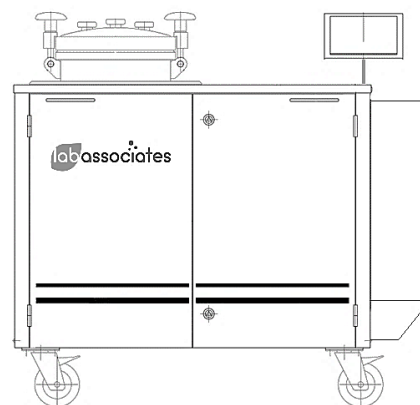
- Ignoring warnings or instructions as displayed on the control panel;
- Insufficient maintenance;
- Use for other applications than specified; and
- Modifications to the machine and changes made to the control program or the supply and drain of decalcified water, reversed osmosis water and the drainage of the cooling water and condensate pipes without prior consultation with and approval from Lab Associates.

Applicable reference documents:

- ✓ Wiring box connection diagram
- ✓ Completion document + declaration of conformity
- ✓ Applicable certificates

This user manual contains useful operating instructions for use, maintenance and repair. These instructions must be respected and followed at all times.

**Furthermore, our General Terms and Conditions for Delivery and Payment apply.**



The machine is equipped with nameplates for the steam generator and the medium vessel. The two unique certification numbers (as shown in the Certificate) for the medium vessel is located just above the worktop at the front of the lid, at the top of the medium vessel. The unique certification number of the steam generator is located at the front of the steam generator.

## 2. Safety



This manual has been written for safety reasons. Read the instructions carefully before installing and / or using the machine. Ensure that this manual is kept close to the machine so that it can be consulted in case of doubt in its use or maintenance.

### 2.1 Important

Please read the following notes carefully and respect them while using the machine.

- Only use products that are part of a media composition, such as:
  - Biochemicals, gelling agents, buffers;
  - Salts;
  - Sugars;
  - Growth regulators;
  - Antibiotics; and
  - Reversed osmosis water.
- Do not use the media preparator for other purposes than heating, sterilizing, cooling and dispensing of medium for cloning plant material in plant tissue culture and seed laboratories.
- In some cases, dangerous components can be part of a media mixture. In this case **be careful** with the use of dangerous goods for the media mixture. Make sure that the correct quantity is used, and only if absolutely necessary.

**List of hazardous materials:**

- Explosive substances;
- Ignitable substances;
- Flammable substances; and
- Flammable gas.
- Do not use the machine for the production of narcotics like alcohol, drugs, medicines, etc.
- Absolutely do not attempt to modify or change this machine (hardware or software) without consulting Lab Associates.
- **Beware!** Some parts of the machine (medium vessel, lid, steam generator, etc.) will become very hot during the operation of the machine. Touching these parts can therefore lead to burns!
- Besides the lid, the inside of the medium vessel and the stirrer can also become very hot. Make sure to properly protect yourself against this heat when cleaning the inside of the medium vessel after completing a program.
- Only connect the power cord to a power supply that suits with the appropriate voltage.
- If any abnormalities occur (e.g. abnormal sounds, smells, smoke, etc.) shut off the power and reach out to the mechanic to evaluate the situation.
- Make sure that there are no hard objects in the medium vessel while the machine is operating.
- The stirrer contains extremely strong magnets, therefore beware of your fingers. Mobile phones and magnetic cards can become unusable if they come closer than 50 cm to the stirrer.
- If the stirrer is running, no hands may be placed in the medium vessel. If something should fall into the medium vessel during this process, the program must be stopped immediately!
- As far as possible, leave the doors of the machine and the electrical box closed during operation of the machine.
- Before every use of the machine, check if all the tubes are placed in the appropriate drain pipes in the wall. Possible supply taps for cooling and R.O. water should be opened.
- The steam generator must be turned on in order to start a program. When the steam generator is turned off because of safety reasons (for example: the steam generator is turned off by the machine because of too high pressures in the vessel), a program can not be started.



**Do take all necessary measures to protect operating personnel!**



## 2.2 Safety warnings for use, maintenance and repair

### General

- When transporting the machine using a forklift truck, wooden blocks must be placed under the frame of the machine to prevent any damage to the piping and the bottom of the media preparator. The stirrer should be removed from the machine and properly packed in a box before the transportation of the machine. This to prevent damages on the inside of the medium vessel.
- You should not deviate from the "Lists of parts" to be replaced without written notice. The technical department should keep an agenda for the period in which the parts have to be replaced and carry out these periodic activities. A notification of these activities needs to be made in the machine's logbook.
- The electrical cabinet may only be opened by your technical department. If a situation arises where this is not possible, first turn OFF the main switch (and secure it with a padlock or tie-wrap) and unplug the machine from the wall socket before opening the electrical box.



### Heating of the medium vessel

- Before the sterilization program can be started, the valve on the dispensing unit or dispensing station must always be opened and the laminar flow cabinet must be turned on. When a Lab Associates dispensing system is used, this is done by the program. This valve must be opened manually if another dispensing system is used. This to prevent the build-up of steam in the dispensing tube, which could cause a burst of the tube.
- When the temperature in the medium vessel is above 100 °C, the pressure in the medium vessel will make it impossible to open the cover screws by hand. It is only possible to open the lid after the program has been stopped and the pressure has been removed from the medium vessel.

### Steaming process of the dispensing system

- Make sure that the steam of the dispensing system is collected in a steam / condensate tank or bottle. An additional silicone tube can also be used for this. This tube is temporarily placed on the dispense nozzle, with the other end of the tube in the tank/bottle next to the laminar flow cabinet. Make sure that this tube can not reach the bottom of the collection vessel. The air in the tube cools down very quickly when the steaming process is stopped, which immediately causes a vacuum. This could contaminate the dispensing system.
- If the external dispensing valve is closed during the steaming process, the silicone tube could burst. The tube can tolerate a temperature of maximum 180 °C, but very little pressure. If this dispensing tube tears or bursts open, hot steam can come out of this tube and it can cause serious burns.
- The steam generator and the medium vessel each have their own pressure guards. The program continuously monitors the pressure during the processes. If the pressure rises to 2.8 bar, the steam generator will be turned off and a notification will be shown on the control panel. If the pressure still rises and reaches 3.0 bar, a pressure safety valve will open to assure a depression of the vessel. The pressure will be lowered to approximately 2.5 bar.

### Others

- If the amperage in a relay is too high, the program is stopped automatically and a notification will be shown on the control panel. You can continue working with the machine after acknowledgment on the control panel. However, when the system deems it necessary, the machine will give a notification when a problem arises that needs to be solved by the technical department. In this case the technical department needs to be notified and the operation of the machine must be stopped.

### 3. Technical specifications

#### 3.1 Spec sheet Lab Associates "Premium" media preparator 70L

Dimensions and weight	
Frame dimensions (WxDxH) [cm]	165 x 80 x 130
Worktop height [cm]	90
Frame material	Stainless steel 304
Weight [kg]	325
Power supply	480 V, 60 Hz, 3 phase + neutral + ground
Power required [kW]	36
Process data	
Sterilization cycle time [min]	15
Total sterilization process time ca. [60 °C - 121 °C - 60 °C]	35
Stirring speed R.P.M.	Slow: 35      Fast: 135
Error detection	Yes
pH check [at desired and hold temperature]	Yes
Controller system	
Glass high resolution capacitive touchscreen control	10"
Graphical representation of temperatures	Yes
Graphical representation of pressures	Yes
Graphical representation of batch durations	Yes
Adjust dispensing volume [cc.]	Yes
Media vessel	
Material	Stainless steel 316L
Gross volume vessel [liters]	93
Min. + max. capacity (net volume) [liters]	25 - 70
Max. pressure [bar]	3.5
Max. temperature [°C]	130
Valves	
Type valves	Air pressure valves (sanitary)
Material of critical valves [in contact with water]	Stainless steel 316
Piping	
Material	Stainless steel 316
Steam generator	
Volumes [liters]	55
Max. pressure [bar]	3.5
Max. temperature [°C]	150
Water	
Min. supply pressure [bar]	4
Water quality cooling/steam production	Decalcified water and R.O. water
Drain volume R.O. water per batch [liters]	0.2 – 1
Drain volume decalcified water per batch [liters]	160
Air	
External air supply [liters/min.]	50
Internal air compressor	No
Software	
Failure detection	Yes
Graphic display	Yes
Available languages	English and Dutch
Ethernet connection	Yes

### 3.2 Additional components

A semi or fully automatic dispensing system is available for single or multiple dispensing. Optical sensors are optional for several dispensing systems.

Other optional components can be delivered with the media preparator, such as:

- Oil free air compressor;
- No break power supply ('UPS');
- Semi-automated dispensing system;
- Fully-automated dispensing system; and
- Communication module (wifi / 4G).

### 3.3 Warranty

The media preparators have a standard warranty period of 1 year. This warranty applies when the following terms are respected:

- Onsite installation and instructions of the media preparator by a technician of Lab Associates.
- One year warranty on material and/or construction faults based upon sending new spare parts or DAP shipment to Oudimbosch, NL, for repairment.
- No modifications/changes to the machine are done without consulting Lab Associates.
- User errors are never included in the warranty.

### 3.4 Service

Our technical department can always be reached by your operators or technical department in case of any urgent situations. Often, small failures can be handled by phone directions provided by our technical experts. When this is not the case, our team will be at your service to provide a solution in the shortest possible period. Contact our technical team by phone (+31 85 047 98 61) or via service@labassociates.com.

### 3.5 Service and maintenance agreement

We can provide a service and maintenance agreement for all the technical equipment that is delivered to your company by Lab Associates B.V.. This agreement will assure a well structured maintenance schedule and timely replacement of parts when needed. In this way, your machine will have the best possible service and as little downtime as possible.



## 4. Installation and maintenance of the media preparator

### 4.1 Installation

#### Preparations

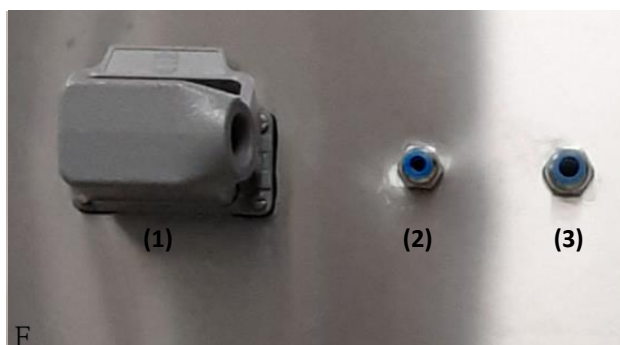
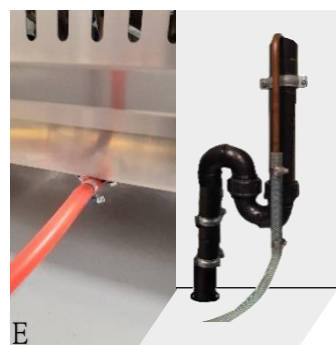
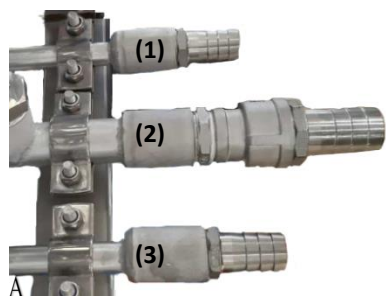
Before our technical experts can proceed with the installation of the machine, it is essential that all necessary connections are present in the lab. Think of the power and water supply, as well as the water drain.

Drawings of connections and machines can be sent to the technical department in advance, to make sure that all the necessary connections are present in the laboratory in advance of the installation.

#### Connections

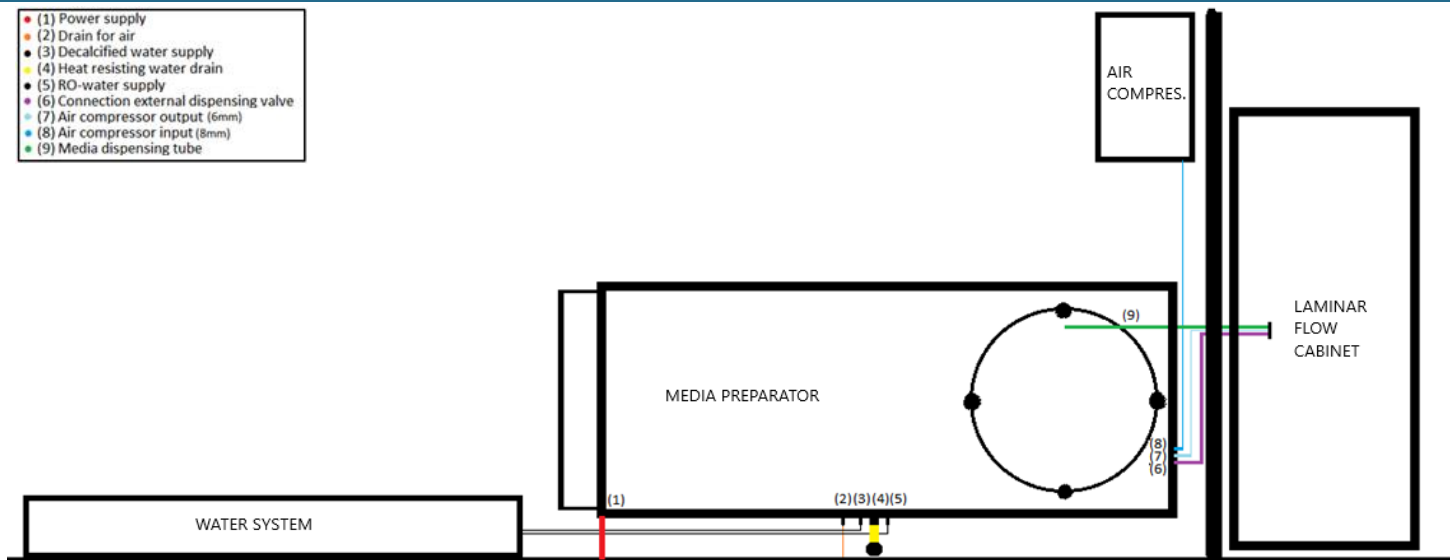
This chapter will provide an overview of the different connections that are applicable for the media preparator.

- A (1) : Water supply for steam generator: reversed osmosis water,  $\geq 3$  Bar
- A (2) : Heat resisting tube for water drain
- A (3) : Cooling water: decalcified water, preferably  $\geq 3$  Bar
- B : Power cable connection (electrical cabinet)
- C : Wall connection for power cable
- D : Power plug
- E : Tube for air drain
- F (1) : Cable for the external dispensing valve
- F (2) : 6mm air output
- F (3) : 8mm air input
- G : Medium dispensing tube





- (1) Power supply
- (2) Drain for air
- (3) Decalcified water supply
- (4) Heat resisting water drain
- (5) RO-water supply
- (6) Connection external dispensing valve
- (7) Air compressor output (6mm)
- (8) Air compressor input (8mm)
- (9) Media dispensing tube



*Schematic overview of the media preparator connections*

### Installation

The installation will be done according to the latest safety regulations. The following actions are mandatory while installing the media preparator. Therefore read them carefully.

- Check voltage at wall socket.
- Check connection of power plug + secure the connection by tightening the safety clamp.
- Flush the water tubes to remove any dirt that is in the tubes.
- Attach the watertube to the appropriate water inlet.
- Connect the heat resisting water drain (make sure there is no counter pressure in the drain).
- Check pressure of the external compressor.
- Connection of dispensing tube and dispensing system.
- Perform a first test program with decalcified water only.
- Check the stirring direction. (The stirrer should turn counter clock-wise when viewed from above)
- Check the electrical phases.

The technical experts will install the media preparator and all its optional components, such as:

- Oil free air compressor
- No break power supply ('UPS')
- Semi-automated dispensing system
- Fully-automated dispensing system
- Communication module (wifi / 4G)

### Testing and training

After the installation, your technician will extensively test the machine and all the programs. The installation is completed after the approval of our technician that all tests have been completed successfully.

A training for your operating personnel can be provided to assure a safe and correct way of working with the media preparator.

### 4.2 Use and maintenance



To prevent contaminations, all parts that come into contact with the medium must be checked and cleaned regularly. These parts are the interior of the medium vessel, the lid and all parts of the machine that are polished and completely sanitary (including the valves).

## User

### Clean conditions in the lab

- Use of proper tools
- Use of decalcified cooling water
- Use of RO water for the steam generator
- Quality check of water and ingredients
- Use of separate steam collection tank or bottle for the dispensing system

### Regular check of components

- Medium vessel interior + stirrer
- Medium vessel lid
- Pressure gauge on the lid / membrane of sanitary manometer
- Polished parts
- Sanitary parts (valves and tubes)
- Connections
- Check the microfilter for moisture. Contact the technical department when there is moisture in the first collection box. (See picture →)
- Check rubber septum (lid) and replace it when leaking
- Stop operations while solving simple problems. Contact the appropriate technician in case of any unsolvable/"difficult" alarms.



## Mechanic

- Replacement of tubes when damaged
- Check and possible replacement of sensors
- Replacement of critical membranes every one or two years
- Check if the drain is functioning correctly / shows no damages / no counter pressure!
- Maintenance of the compressor (supply of clean air)
- Update the maintenance logbook
- Replacement of the microfilters (every year)
- Solving alarms when not solved by end-user
- Check the stirrer bearings and replace in time (more frequent when (active) charcoal is used to prepare media)
- Check if magnets of the stirrer don't touch the bottom of the medium vessel
- Check the machine for leakages
- All technical actions, changes and repairs are to be recorded in the logbook by date and time.

### 4.3 Working clean

As described in chapter 1, this machine was built and developed for heating, cooling, sterilizing and dispensing medium in order to propagate or root plantlets in special designed glass jars, bottles or plastic (gamma sterilized) vessels.

A media preparator requires less time to sterilize the medium as compared to sterilization in an autoclave, among others thanks to its direct heat transfer to the medium. However, sterilization is not a process designed to kill all fungi, bacteria and especially trace elements. For example, large containers with agar are not always properly and dryly sealed and could therefore produce large amounts of spores which in those cases could only be killed by gamma sterilization, and not by the sterilization process of the media preparator.



Therefore it is very important to use clean and especially dry spoons or scoops to take the desired amount of powder from the container and close the container immediately after use.

**When producing large amounts of medium it pays off to regularly check the quality of the water, ingredients and equipment (including the air coming from the HEPA filter in the laminar flow cabinet).**

The medium vessel interior, the lid and all parts of the machine that come into contact with medium are polished and completely sanitary (including the valves). Scratches, pits and grooves can eventually protect millions of spores, which will then increase their resistance against heat and could therefore contaminate the medium. To prevent this, all parts that come into contact with the medium must be checked and cleaned regularly.

Any damages in the medium vessel or the valves must be removed when detected. Tarnish in the medium vessel must be removed regularly without the use of scratch-causing agents. Tarnish can often easily be removed by placing a small platter with a little bit of acid on the bottom of a hot vessel and with a properly closed lid during the weekend. The acid vapor easily loosens the tarnish.

## 5. Operation of the machine

### 5.1 Preparations

- Before starting the machine, check if the water and air taps are open and check if all drains are properly connected to the appropriate drain pipes on the wall.
- When making use of a steam collection tank or bottle next to the flow cabinet, make sure that the tube is properly connected to the dispensing nozzle.
- Ensure that all ingredients and the pH meter with regulators are ready to use. It could be useful to place these items on a plastic tray, to assure easy transport and access to the items.

### 5.2 Use of the media preparator

1. Turn on the main switch. The PLC now checks the communication and all conditions to start. If something is wrong, a notification will be shown on the control panel. If everything is OK, the main menu will appear on the control panel of the machine.
2. Open the lid of the media preparator by loosening the 6 clamps **crosswise**, 2 clamps at a time, on opposite sides of the lid.  
*For example; number 1 and 1, followed by number 2 and 2, and number 3 and 3. See picture below.*



It might occur that the inside of the medium vessel contains some pressure, with the result that the lid can not be opened. If this is the case, press the 'Vessel depression' button on the control panel of the main menu. The valve that takes care of this 'vessel depression' automatically closes after a while. If that time is not sufficient for removing all pressure or vacuum in the medium vessel, press the 'Vessel depression' button on the control panel again.

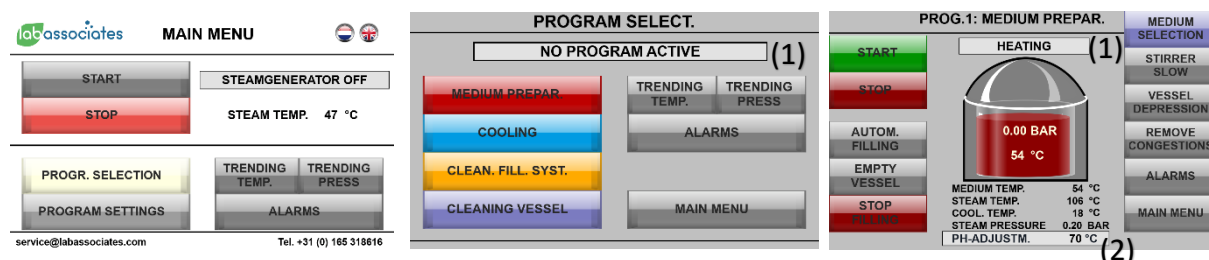


3. Now check the content of the medium vessel for liquids or loose parts and remove them if necessary.

### 5.3 Heating and sterilization program

4. After pressing the 'Program selection' button select the desired program from the program selection menu and press the desired button on the control panel.
5. Select 'Medium preparation' to enter the medium selection screen.

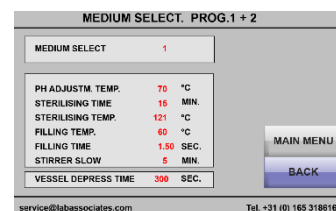
\* The grey notification bar on the top (1) of the screen will show the currently active program. The grey notification bar on the bottom of the screen (2) will give an indication of the next phase of the program.



6. On this screen you can select several options related to the medium preparation program. The central part of this screen will provide information regarding the currently selected program and temperatures plus pressures. First the "medium" will be black and after starting the program this color will change depending on the stage of the program.

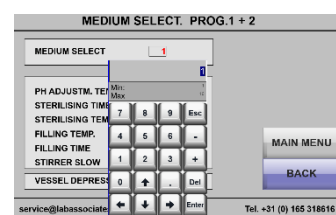


7. Now press the 'medium selection' button (see step 7 / top right corner of the screen) to enter the screen where you can select the program for the medium that you are planning to produce. In this screen you can also change the program-specific data, such as pH check temperature, dispensing temperature, dispensing time, dispensing pressure, stirrer slow motion, venting time vessel.



8. Now set all the necessary information for the medium, such as;

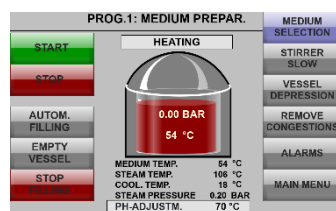
- pH adjustment temperature
- Sterilization time
- Sterilization temperature
- Dispensing temperature
- Dispensing time
- Stirrer slow motion time
- Venting time vessel



The data can be entered by placing a finger on the red numbers. The program is protected against entering too high temperatures in order to protect the machine and operators. Fill in the desired value and press Enter. Esc can be pressed for corrections. As long as the program is stopped the medium on the screen remains black.

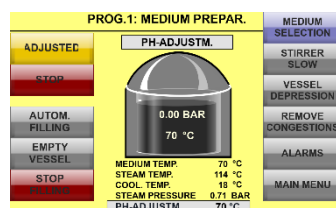
9. Now fill the medium vessel with the desired quantity of reversed osmosis water.

10. Press the program 'Start' button in order to start stirring and heating. The text on the status bar changes to 'Heating' and the temperature now rises to the previously set pH adjustment temperature or sterilization temperature (as indicated on the control panel), depending on the protocol. The "medium" color will now change from black to red.



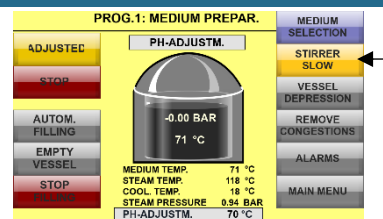
11. Add the ingredients gradually at the back of the vessel and make sure to add the ingredients to the water in the correct order. By adding the ingredients at the back of the vessel, you make sure that large amounts of sugar or powders will not accumulate above the medium vessel outlet at the front of the vessel bottom.

12. Once all the ingredients have been mixed in the water, the pH can be regulated at the preset temperature if the protocol prescribes this. Try not to spill acid on the worktop or vessel top edge and store the acids immediately after the pH adjustments. It is recommended to use the 'Slow stirring' function while checking/adjusting the pH.



The slow stirrer button will become yellow when this function is active.

Press the 'Slow stirring' button for **2 seconds** to turn off the slow stirring. The machine will now continue to stir at the preset maximum stirring speed.

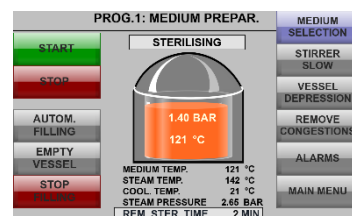


13. Close the lid and center the lid firmly on the medium vessel, after which the 6 cover clamps are gradually and crosswise tightened. (see point 2 for a further explanation of the crosswise method) Make sure that the gap between lid and medium vessel is the same everywhere so that the lid also closes properly and can not leak if the medium vessel is pressurized.

14. When the temperature is just below 100 °C (medium temperature), the first valve on the lid opens to prevent overpressure in the medium vessel.

If the pressure on the pressure gauge increases while the temperature is still under 100 °C, make sure to check that the venting tube is not being pinched in the drain pipe. When the venting tube is blocked/pinched, the pressure in the medium vessel could rise too high, which may cause damages to the medium vessel and could result in fluid running through the safety valve on the lid of the vessel.

15. The image on the control panel changes the color of the medium from black to red as soon as the medium is heating up. The red color changes to orange as soon as the set heating or sterilization temperature is reached. The text 'Sterilizing' now appears in the status bar.



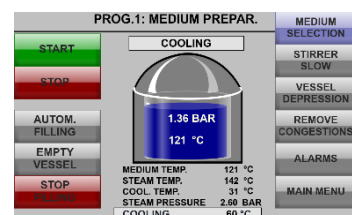
16. As soon as the sterilization time has only 10 minutes or less to go, the steam valve under the medium vessel will open in order to sterilize all sanitary valves and tubes that come into contact with the medium. The used steam will have a temperature of approximately 138 °C.

Make sure that the steam can enter the steam collection tank or bottle unhindered and check again if the flow cabinet is switched on when the dispensing valve is opened.

17. The amount of steam can be regulated with a stainless steel knob that is located close to the microfilters. This tap is set up in such a way that an approximately 15 - 20 cm long visible steam plume is created under the dispense nozzle in the flow cabinet. **Normally it stays that way.** It should only be used in special cases if there is an obstruction in the dispensing tube or dispensing nozzle. If the steam valve is opened further than normal, set it back to its normal position when finished.



18. When the sterilization time has lapsed, the color of the medium on the control panel will change from orange to blue. The text 'Cooling' appears in the status bar. The medium now cools very quickly to the set dispense temperature on the screen. This temperature can still be changed during the process, as well as other values.



19. As soon as the medium temperature comes close to the set dispense temperature, the program will stop cooling and the shell temperature will warm up again. The medium must not deviate 1 °C from the set dispense temperature. Regularly check this on the trending graph of the temperatures.

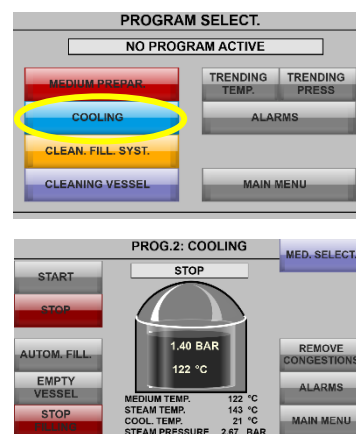


## 5.4 Seperate cooling program

As described above (point 19 of chapter 5.3), the sterilization program includes a cooling phase. This cooling process will start after the completion of the sterilization process. In some cases the sterilization program needs to be interrupted.

The separate cooling program can be used to cool the medium fast and then quickly empty the medium vessel in a collection vessel.

- Example 1: the wrong ingredients were added to the medium which makes this batch unusable. There is no need for sterilizing the medium. The program can be stopped and the medium can be cooled down quickly, after which the medium vessel can be emptied.
- Example 2: the medium has already been heated to a temperature between 80 °C and 110 °C but the operator has forgotten to adjust the pH or add one of the ingredients. You then have the option to stop the sterilization program, go to the main menu and choose the 'Cooling' program in order to cool the medium to the pH adjustment temperature, add the ingredient and/or adjust the pH. It is important to press the 'stop' button when the 'cooling' program has reached the pH adjustment temperature.



After the closing of the lid, the sterilization program can be resumed by going to the media preparation screen and press the 'Start' button. This will reactivate the sterilization program.

## Limitations of this program

If the temperature has already been quite high, the medium will be thermally stressed for a longer period of time if a second heating cycle will be started. As a result of which the nutritional values of the medium will decrease.

The medium can also become too soft as a result. You can optionally choose to shorten the sterilization time in the second round for a few minutes, by adjusting the sterilization time in the medium program settings. In any case, the culture vessels must be marked as 'possibly contaminated' after being filled.

## 5.5 Trends

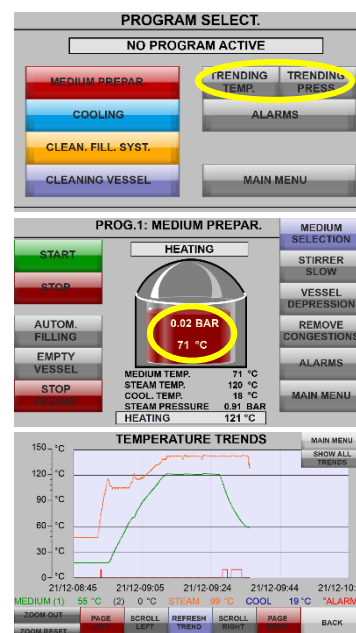
The machine can show the current progress of the program as well as the historical data of the processes of the last couple of weeks. We recommend the end-user to regularly perform a data extraction in order to save the process data in the end-user files.

There are two types of charts that can be viewed on the screen of the media preparator, the temperature trends and the pressure trends.

These charts can be reviewed at all time, by following these steps:

1. Press the 'Main menu button'
2. Press the 'Program selection' button
3. Now press the 'Trending Temp' or 'Trending Press' button, depending on the graph that you want to review.

Another possibility to access the trends is to click on the picture of the medium vessel at the medium preparation screen.

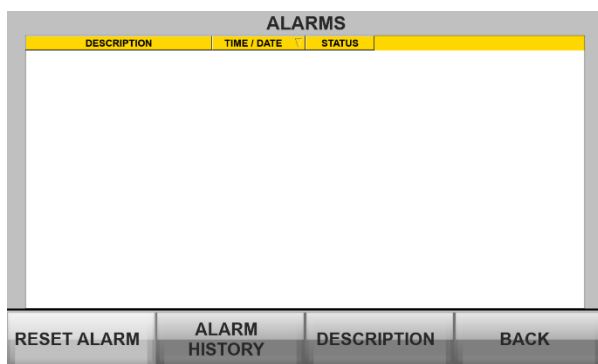




*Trend example after a cycle*

## 5.6 Alarms

Not only will the media preparator show all errors on the screen, but it will also save the information on the screen for a period of 4 weeks. This means that the supervisor will be able to quickly check the alarms that have occurred in the last 4 weeks. When clicking on the 'Alarm history' button a selection can be made for the historical period that needs to be reviewed on the screen. The appropriate period can be selected by clicking on the button on the top left corner of the screen.



## Alarm overview

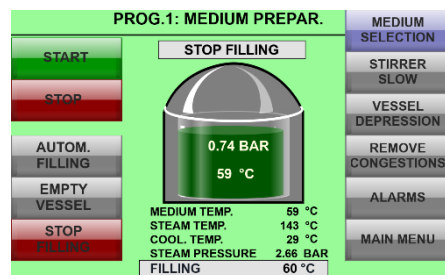


### Alarm history

## 6. Dispensing of the medium

### 6.1 Preparations for dispensing

- The color of the screen changes from blue to green as soon as the dispensing temperature is reached. The text 'dispensing' appears on the status bar.
- The amount of medium that will be dispensed per vessel or glass jar is depending on the dispensing pressure and dispensing time.
  - The pressure that was set on the blue dispensing pressure control knob that is located next to the microfilters and;
  - The 'dispensing time' as it was set.



The upper 2 - 3 cm of the vessel should not contain any splashes, since this will attract fungi into the culture vessels. These splashes are caused by too much dispensing pressure. However, if the dispensing pressure is too low, the dispensing process will take too long. Therefore, the optimal dispensing pressure should be tested before dispensing.

The media preparator already starts cleaning the dispensing tube during the sterilization process of the medium. Therefore, the dispensing tube is already sterile when the dispensing temperature is reached and the dispensing process can start without losing time.

- Press the 'Start' button to begin the dispensing process. The steam supply will stop automatically and the medium is now sent to the external dispensing valve. The dispense valve opens during the set "Dispense time" on the control panel as soon as the hand or foot control button is pressed, or via an optical eye. When a Lab Associates dispensing system is used, this is done by the program. This valve must be opened manually if another dispensing system is used. This to prevent the build-up of steam in the dispensing tube.
- It is recommended to place the on / off switch of the dispensing device within reach of the operator in order to block the signal of the optical sensor to the PLC of the machine quickly, if necessary. This could, for example, be done to clean the worktop of the flow cabinet for a moment. When the switch is turned on again, the media preparator will automatically respond to the optical cell again.

#### NOTE

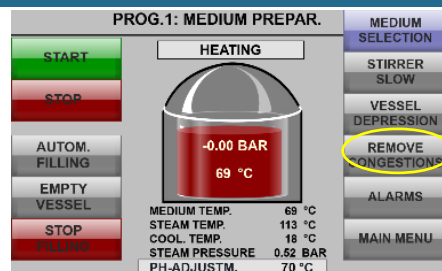


- If you need to stop dispensing for a period longer than a few minutes, the 'Start' button must be pressed again to prevent the medium in the dispensing tube from hardening. It is important to note that the dispensing valve under the medium vessel now closes and steam is immediately sent through the dispensing tube. The external dispensing valve is opened by the PLC immediately. It is therefore necessary to ensure that a steam collection tank or bottle is placed under the dispense nozzle before this 'Start dispensing' button is pressed.

*As soon as the 'Start dispensing' button is pressed again, you can continue with the dispensing process.*

### Remove congestions:

The 'unclog' program can be selected to clear congestions from the dispensing valve on the bottom of the medium vessel.



- When the medium vessel is almost empty, the medium will start splashing out of the dispense nozzle because air will come with the medium. Make sure that the other end of the tube is in the steam collection tank next to the flow cabinet. This end of the silicone tube must never be placed deep into the collection vessel because of the risk of contaminations. Make sure that this tube is attached to the vessel, because it should never come loose during the flow. The steam coming out of that tube is still 138 °C hot and therefore very dangerous for the skin and eyes!



- Now press the 'Empty vessel' button on the control panel. As a result, as much residual medium as possible will come out of the medium vessel. Let it sputter for about 1 minute, but make sure that this does not take too long.



- Press the 'Empty vessel' button once more to stop emptying the medium vessel and start steaming the pipe and tube again. In a few minutes, the last residues of medium are now pushed out of the valves, the silicone tube and the dispensing nozzle at a **high temperature**. Stop the program after a few minutes (no longer!) by pressing the 'Stop' button.

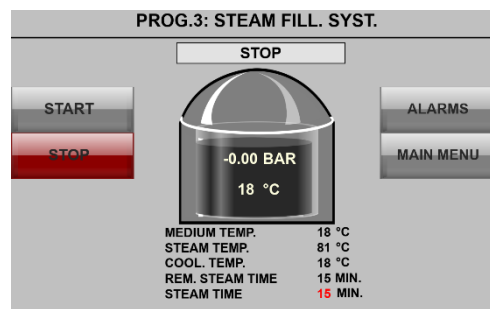


- Now remove the silicone tube from the dispense nozzle and place a piece of aluminum foil with a ball of 70% alcohol-sprayed cotton wool around the dispense nozzle, so that no contamination can happen.
- When the program is finished, the button 'Vessel depression' can be pressed to release the pressure and to open the lid. The medium vessel can not be vented if another program is active. Do not forget to open the clamps crosswise (two opposite clamps simultaneously) and beware of the temperature in the medium vessel, which can still be about 60 °C.
- The media preparator is now ready to be used for another batch, or to be emptied and cleaned.

## 7. Dispenser steaming program

This program is intended to clean the dispensing system with steam. A prerequisite for running this program is that the steam temperature is 138 °C.

With this program, all valves that come into contact with the medium will be steamed and sterilized. This includes the valves under the medium vessel, the external dispensing valve, and the dispensing tube.



If necessary, do not forget to open the external dispensing valve before starting with this program. If the external valve is operated by the program, manual actions do not have to be taken. Ensure that a steam collection tank or bottle is placed under the dispensing nozzle(s) before the program is started.

If the machine has not been used for a longer period, the silicone tube has been renewed, the machine has been out of the lab for maintenance, or if there is a blockage in the dispensing system, this program can be used with an empty medium vessel to provide extra cleaning for the dispensing system. Do not run this program unnecessarily long.



Remember that this program creates a lot of moisture in the room (especially without steam collection tank). This is a hazard for contamination, because fungi are attracted to the moisture. In addition, it must be taken into account that the steam generator may become empty if it is constantly on. The steam generator is large enough to supply steam for 1 day. Every time the machine is started, the contents of the tank will be checked and, if necessary, refilled. In the meantime, this is not topped up because during the filling of the steam generator the steam temperature can drop considerably.

**The steam generator can only be refilled at a temperature below 98 °C.**

It is recommended to keep the dispensing system as clean as possible. Immediately after the steaming of the dispensing system the dispensing nozzle can be closed with a plug 70% alcohol-sprayed cotton wool. The cotton wool can be held in place by closing the dispensing nozzle with a piece of aluminum foil.

When the bacterial pressure is very high in the kitchen (e.g. during the summer) and the machine has not been used for a number of days, some laboratories first sterilize half a vessel with RO-water, after which the sterile liquid is flushed completely through the dispensing system. Thereafter, another 5 minutes of steam should pass through the dispensing system.

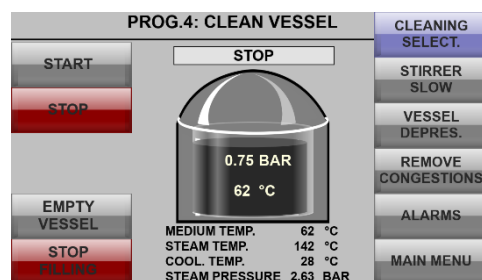
## 8. Cleaning program



**This program works optimal with machines that are equipped with an external dispensing valve controlled by the PLC program!**

This program is intended to extra clean the machine and emptying the system at the end of the week or just before a business holiday.

- Fill the medium vessel with 20 liters of RO-water and close the lid.
- Connect the steam collection tank to the dispensing nozzle with a tube and open the external dispensing valve if necessary. Select the cleaning program on the main menu and press the 'Start' button. The program automatically stops when the program is finished.



## 9. Settings

The parameters for the programs can be set in the settings.

On this screen, the system settings, alarms and program settings can be reviewed or adapted.

Usually, the system settings are not used by the operator. For changes in the other settings, the manager should be consulted.

- The 'Medium vessel depression time' can be adjusted here. This will regulate the number of seconds after which the depression valve on the lid is automatically closed again. If the 'Medium vessel depression' button, which can be found on multiple screens, is pressed a second time, the valve closes again.
- During the sterilization program, the stirrer can be temporarily set to slow rotation to check or adjust the pH of the medium. It is important that the stirrer does not run slowly during the entire sterilization process because then it will take considerably longer. The time set here must just be enough to control the acidity of the medium. You can also press the slow stirring button again if this time is too short. Here too, when the stirrer is set to 'slow', press the 'Stirrer Slow' button (**for 2 seconds**) to allow it to return to the normal stirring speed.

SETTINGS				
<div>DIFF. TEMP. SENSORS</div> <div>BUZZER</div>	MAX. DIFF. MEDIUM TEMP. SENSORS	1 °C		
	SPEED STIRRER SLOW	40 %		
	SPEED STIRRER HIGH	90 %		
	AUTOM. EMPTY VESSEL TO	0.10 BAR		
	STOP COOL. BEFORE FILL. TEMP.	1 °C		
	START STEAM. FILL. SYST.	-10 MIN.		
	STEAM. TIME AFTER FILLING	5 MIN.		
	SHUT OFF TIME STEAMGENERATOR	180 MIN.		
LOG IN	SYSTEM SETTINGS	PLC I/O	ALARMS	MAIN MENU

## 10. The PLC I/O screen

If there is an error, the 'ALARMS' button will light up red. By pressing this button you can see which error (s) has occurred.

If this button is gray, there are no alarms or faults. The program knows for which error the help of the technical department is needed. This is also indicated on the normal sterilization screen.

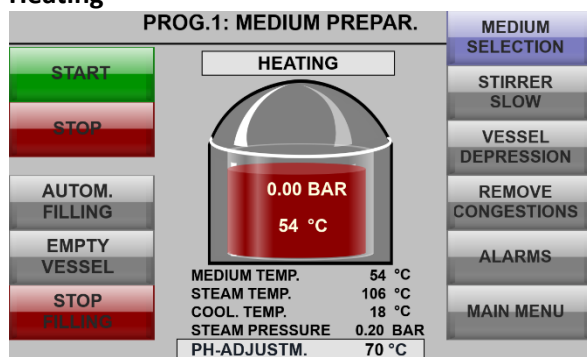
PLC I/O											
PLC INPUT				PLC OUTPUT BASE				PLC OUTPUT EXP.			
0	1	2	3	0	1	2	3	16	17	18	19
4	5	6	7	4	5	6	7	20	21	22	23
8	9	10	11	8	9	10	11				
12	13	14	15	12	13	14	15				
16	17	18	19								
20	21	22	23								
				</							



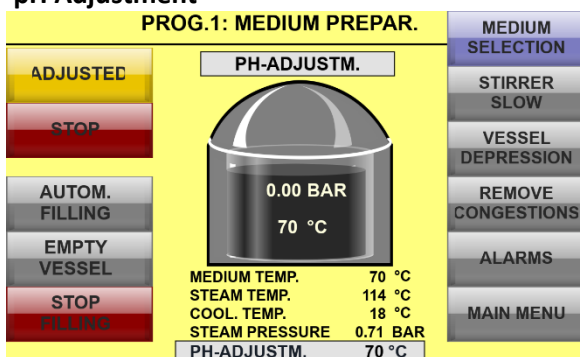
## APPENDIX I – Program colors

The below shown pictures will give you an overview of the screen- and “medium” colors during the different stages of the medium preparation program.

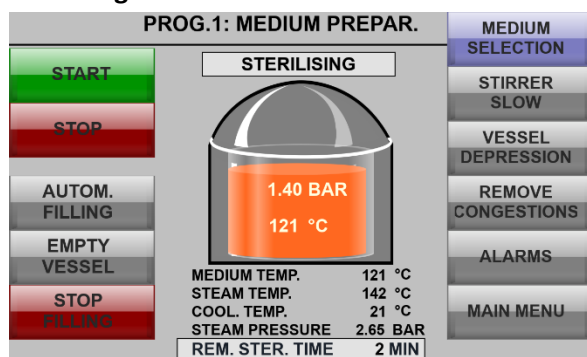
### Heating



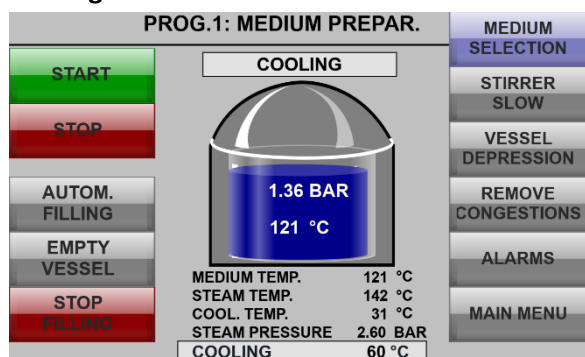
### pH Adjustment



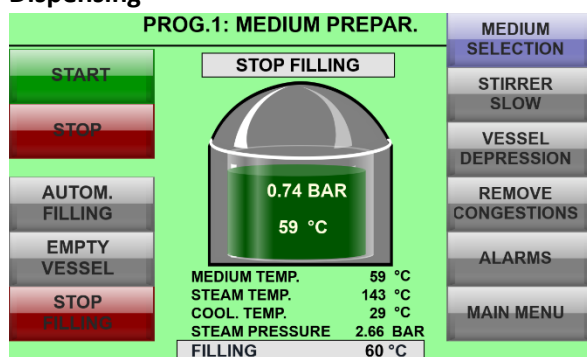
### Sterilizing



### Cooling



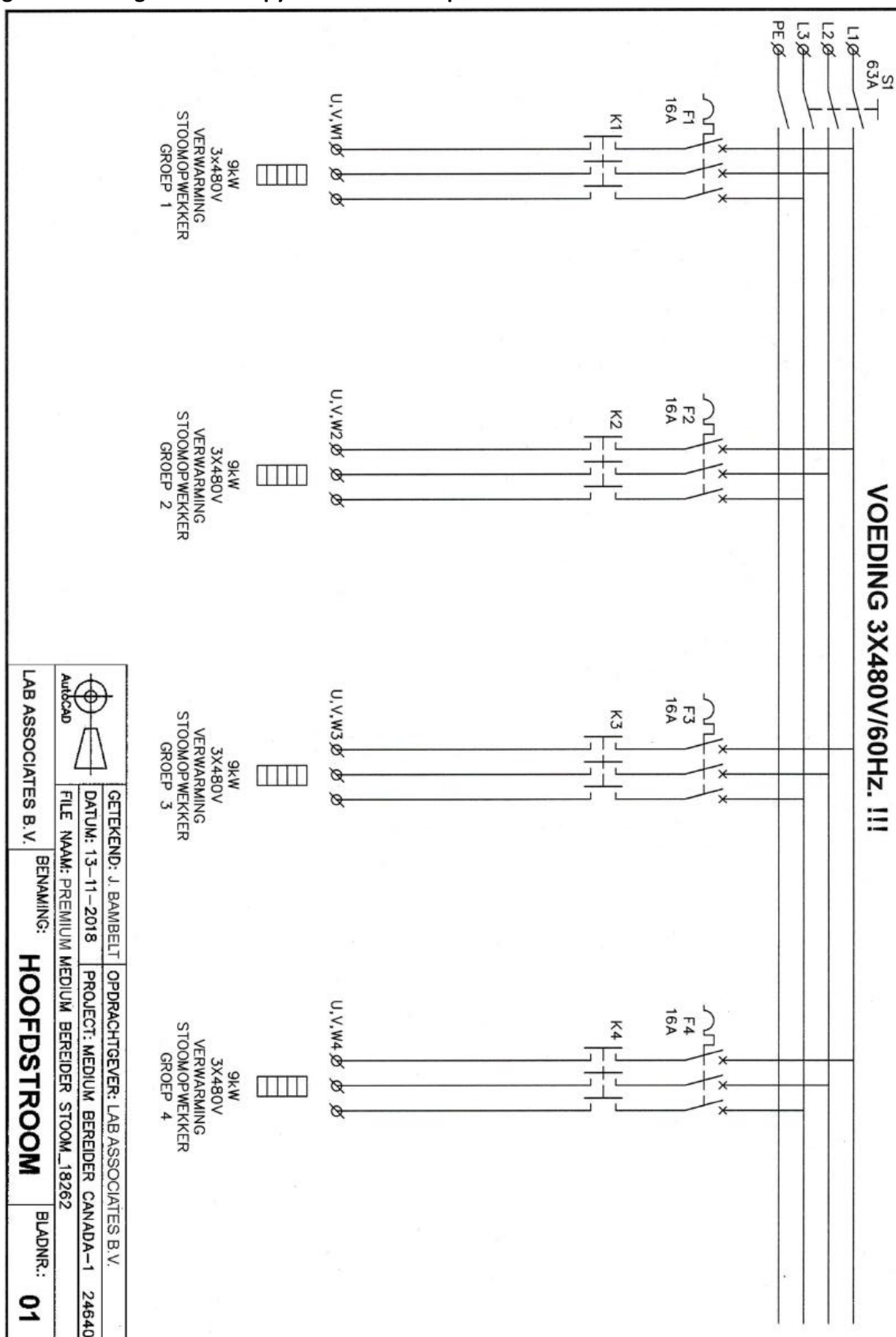
### Dispensing

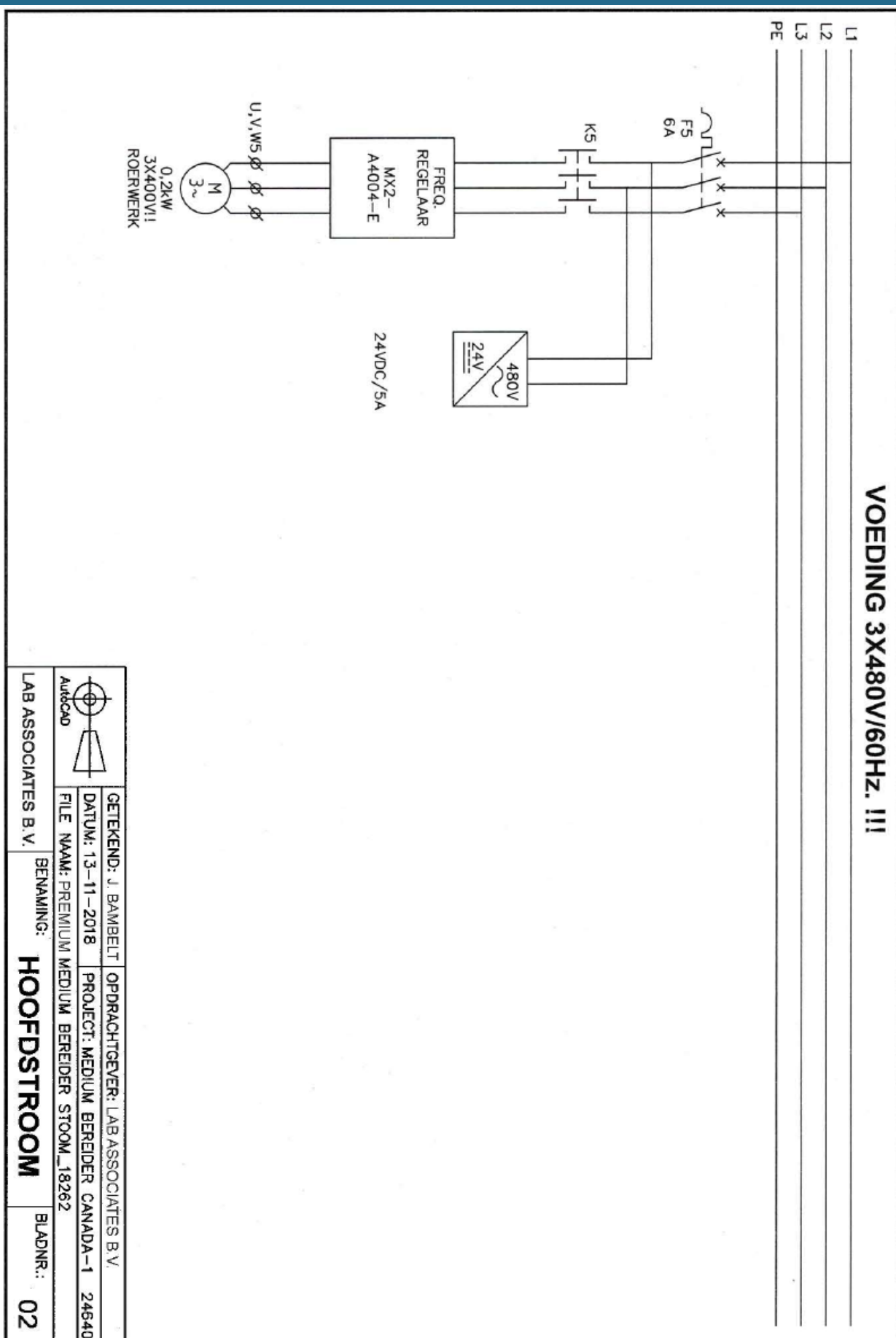


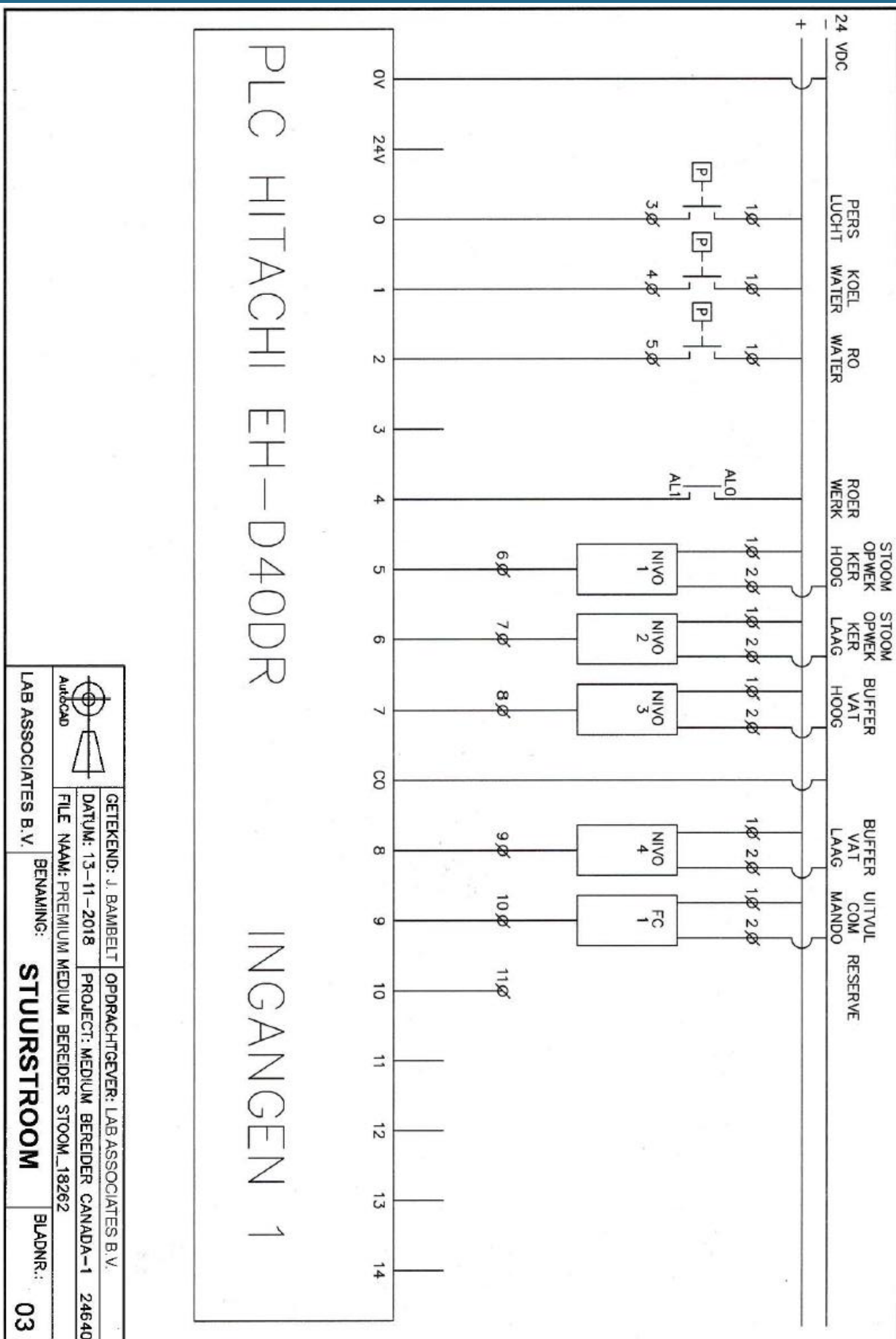
## APPENDIX II – Electrical diagrams

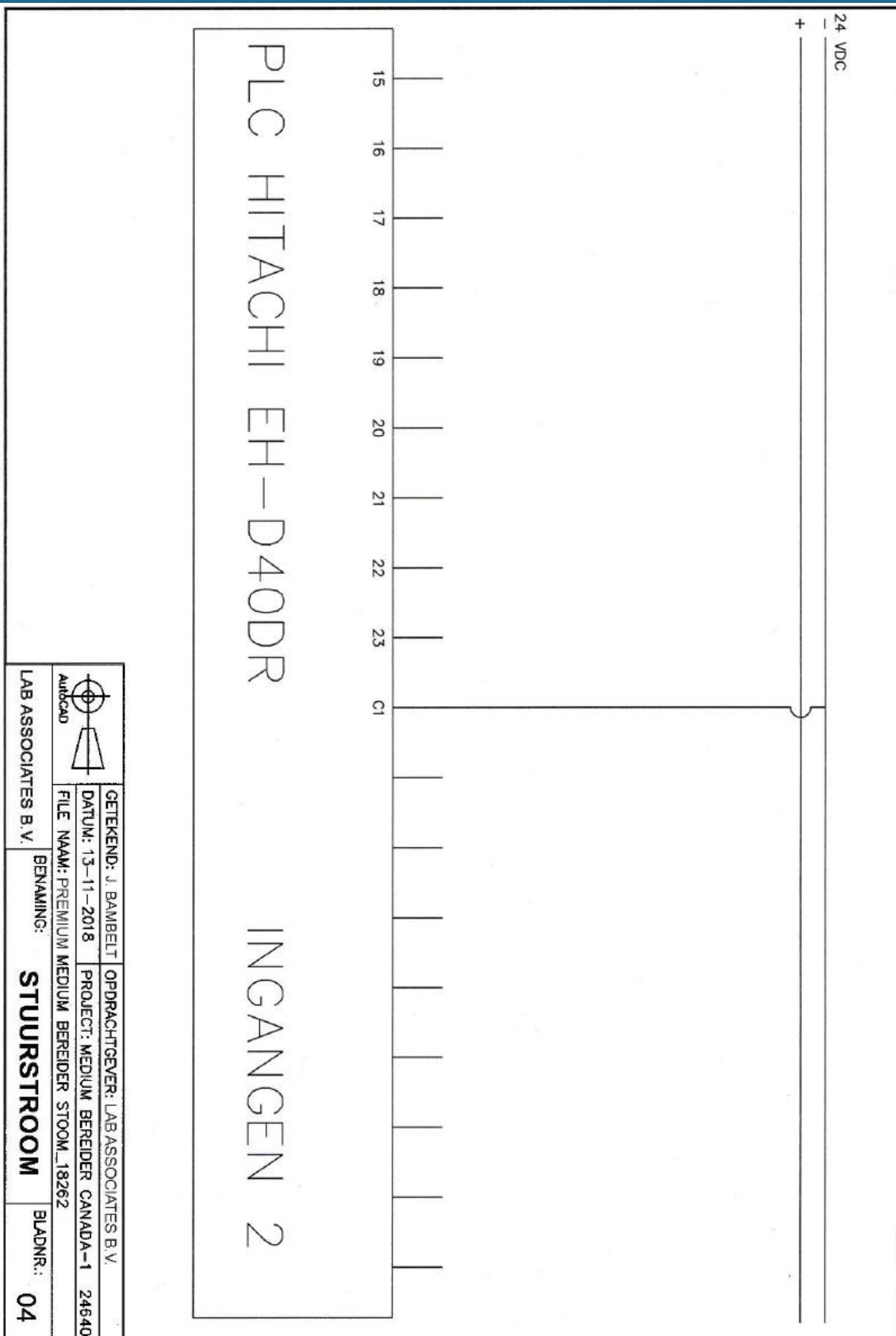


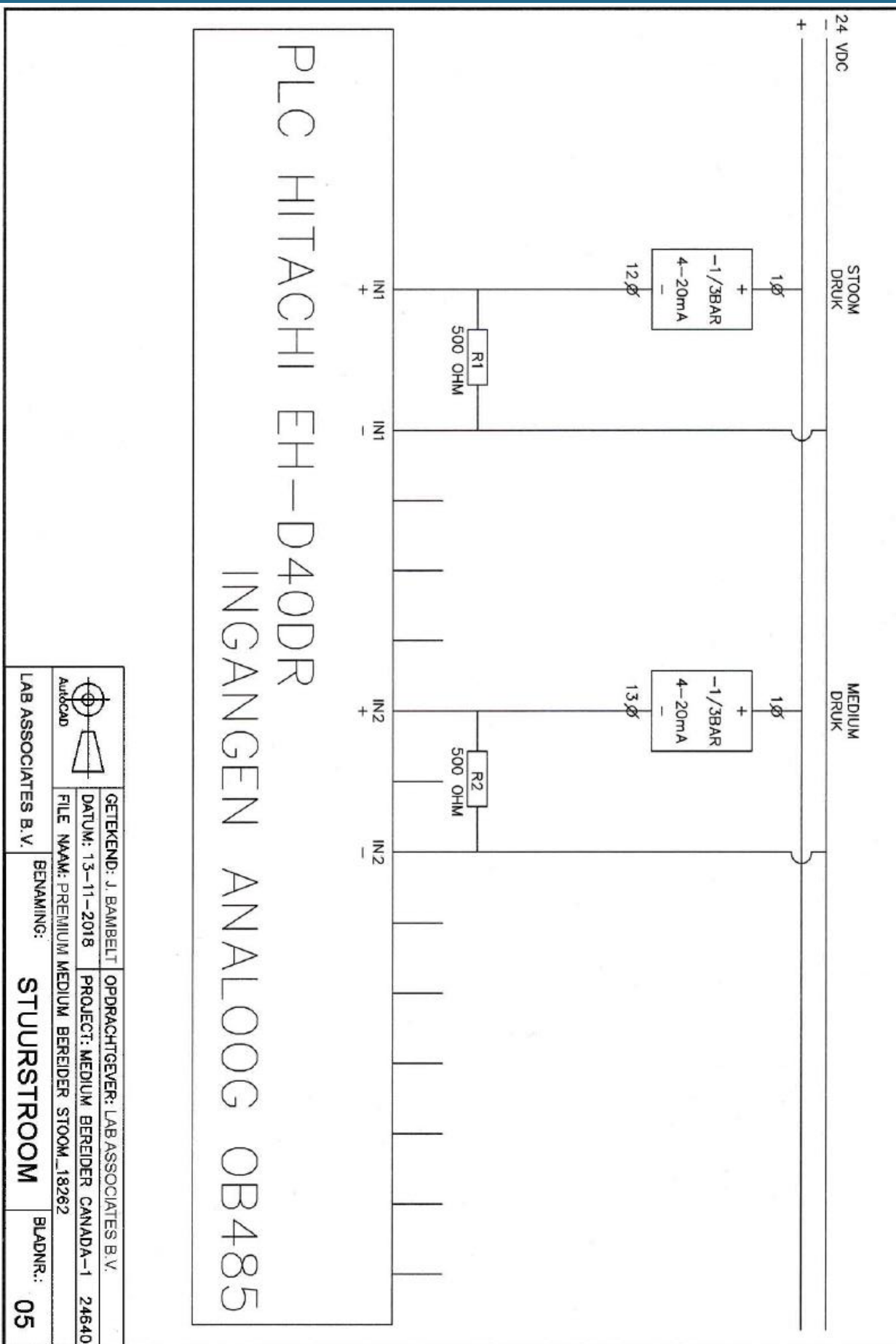
The electrical diagrams remain the intellectual property of Lab Associates. It is not permitted to send or give these diagrams or a copy thereof to third parties.



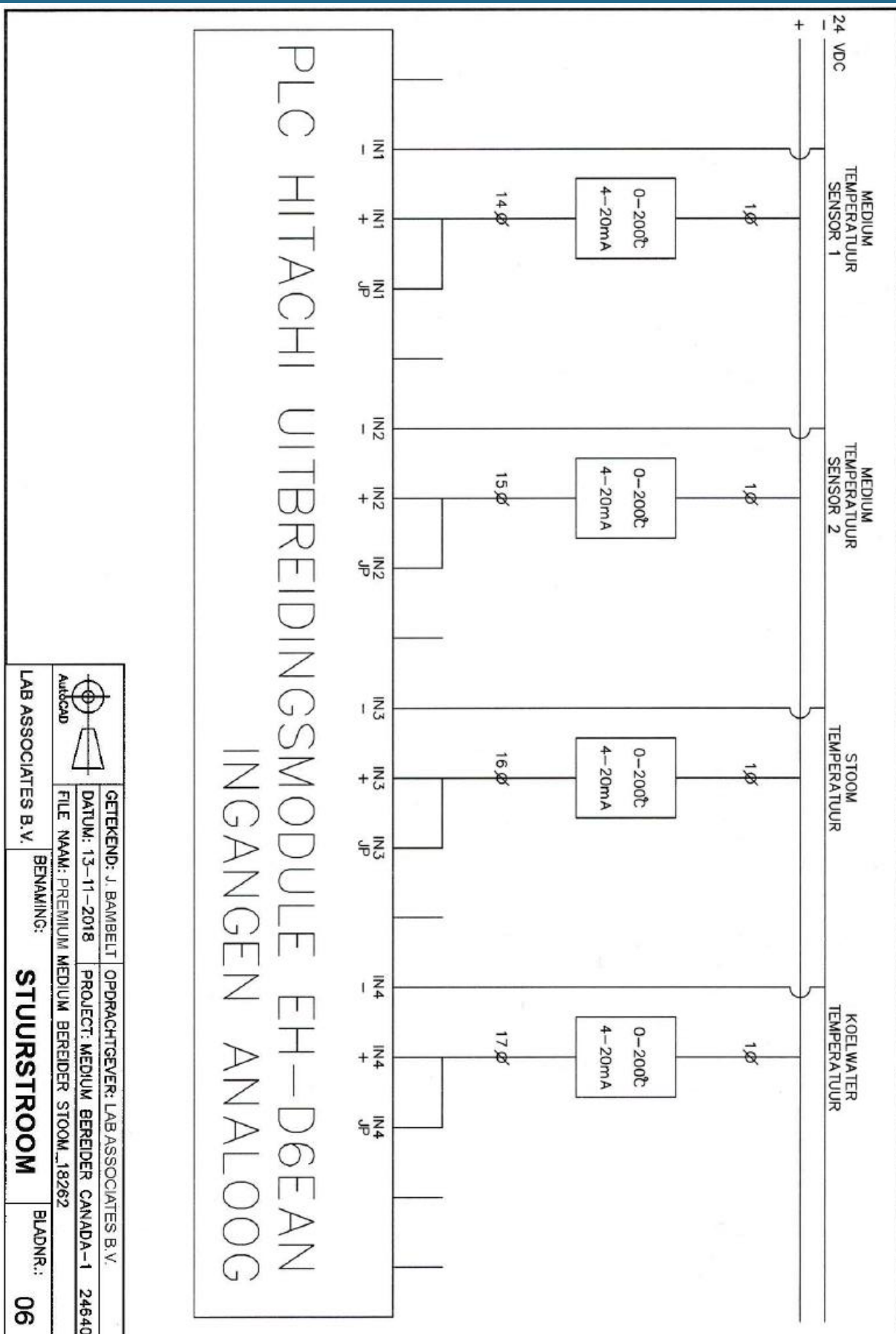







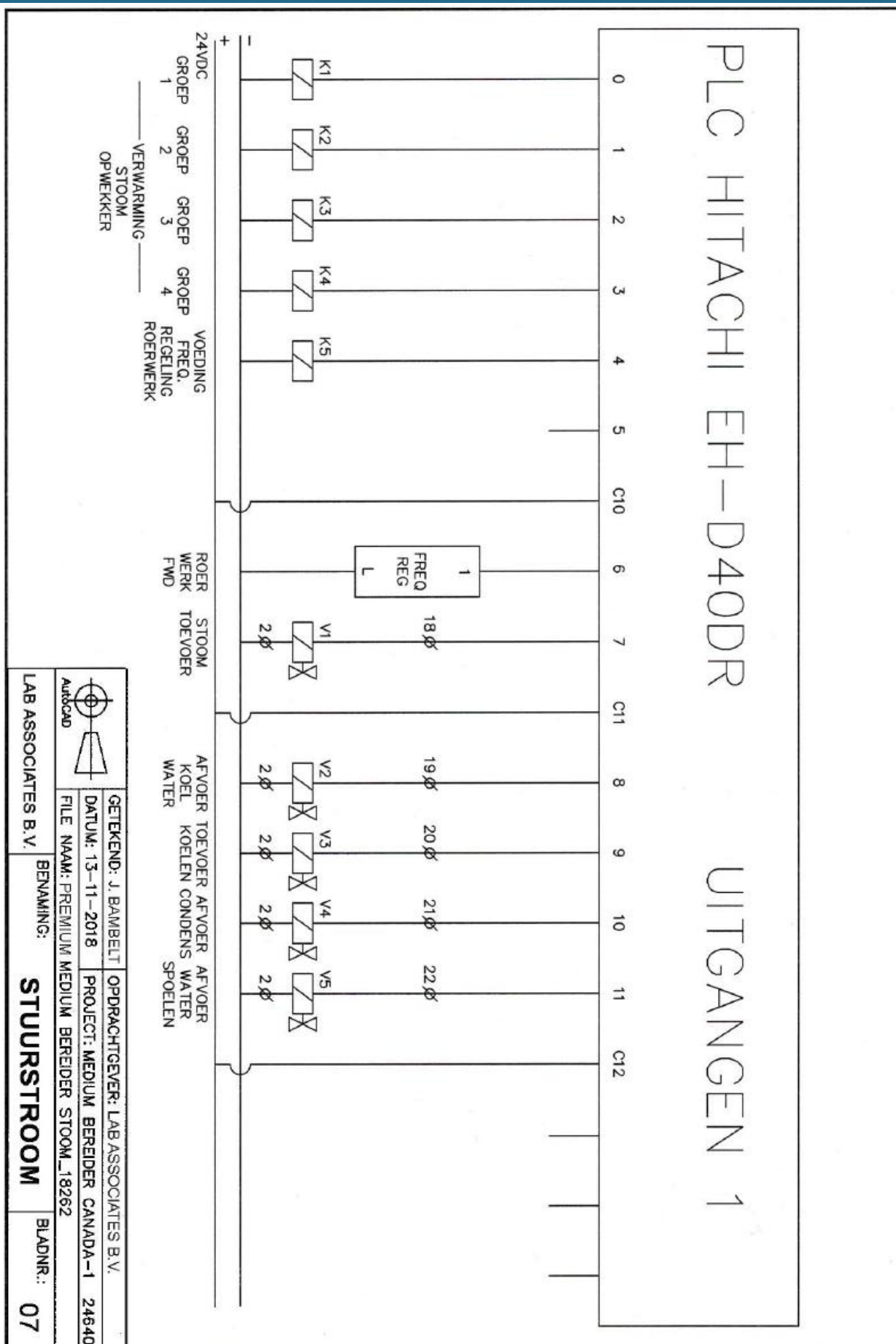


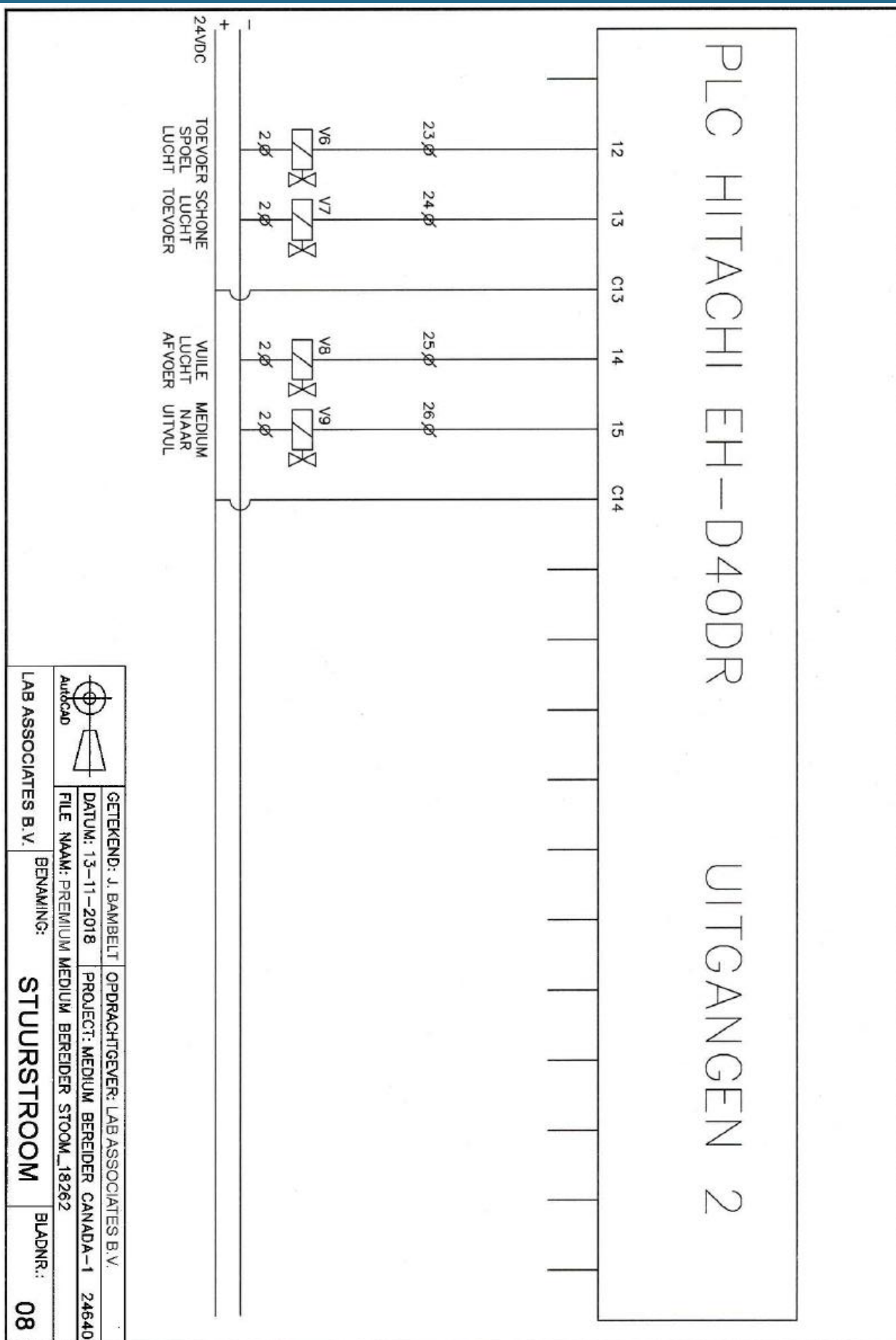


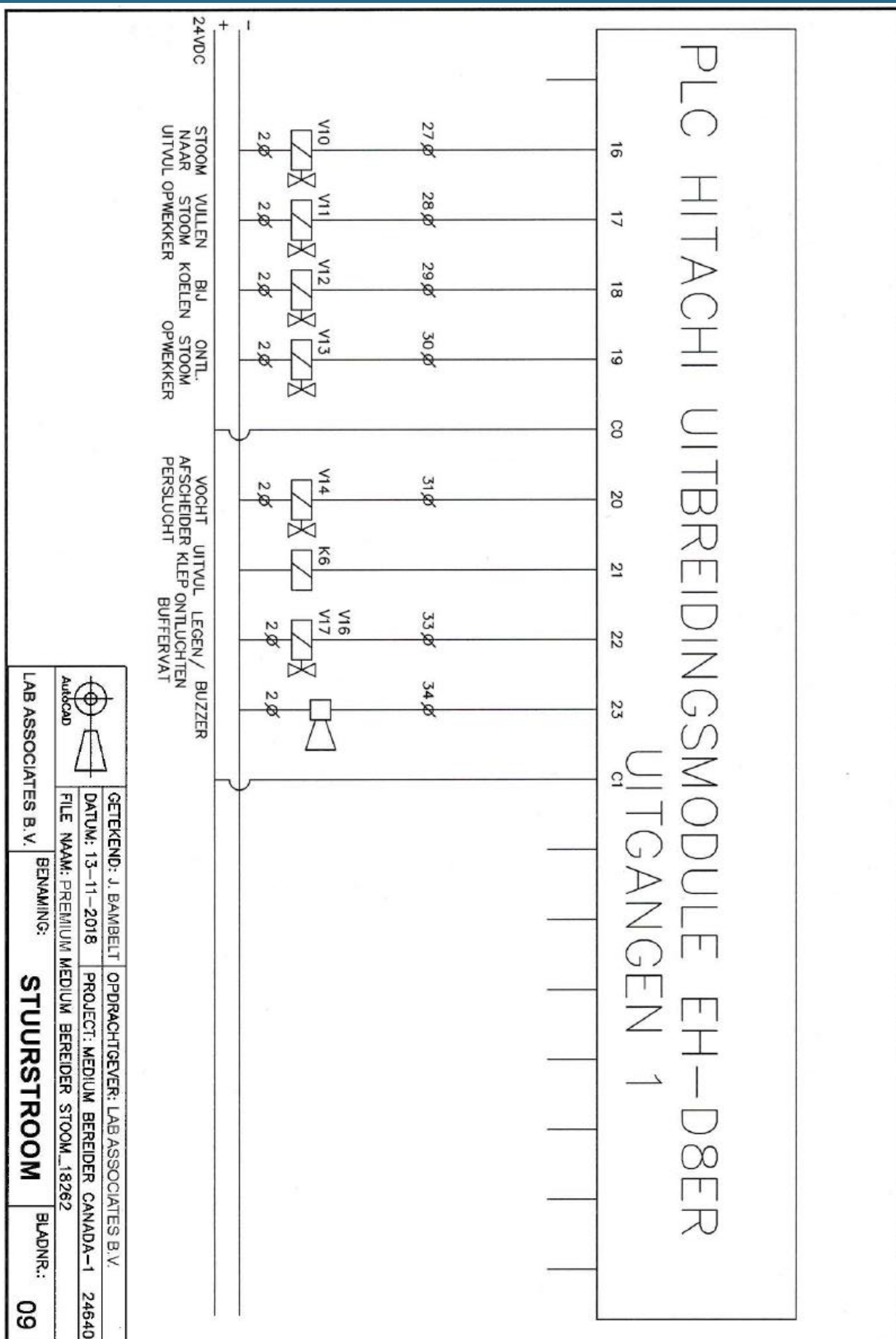


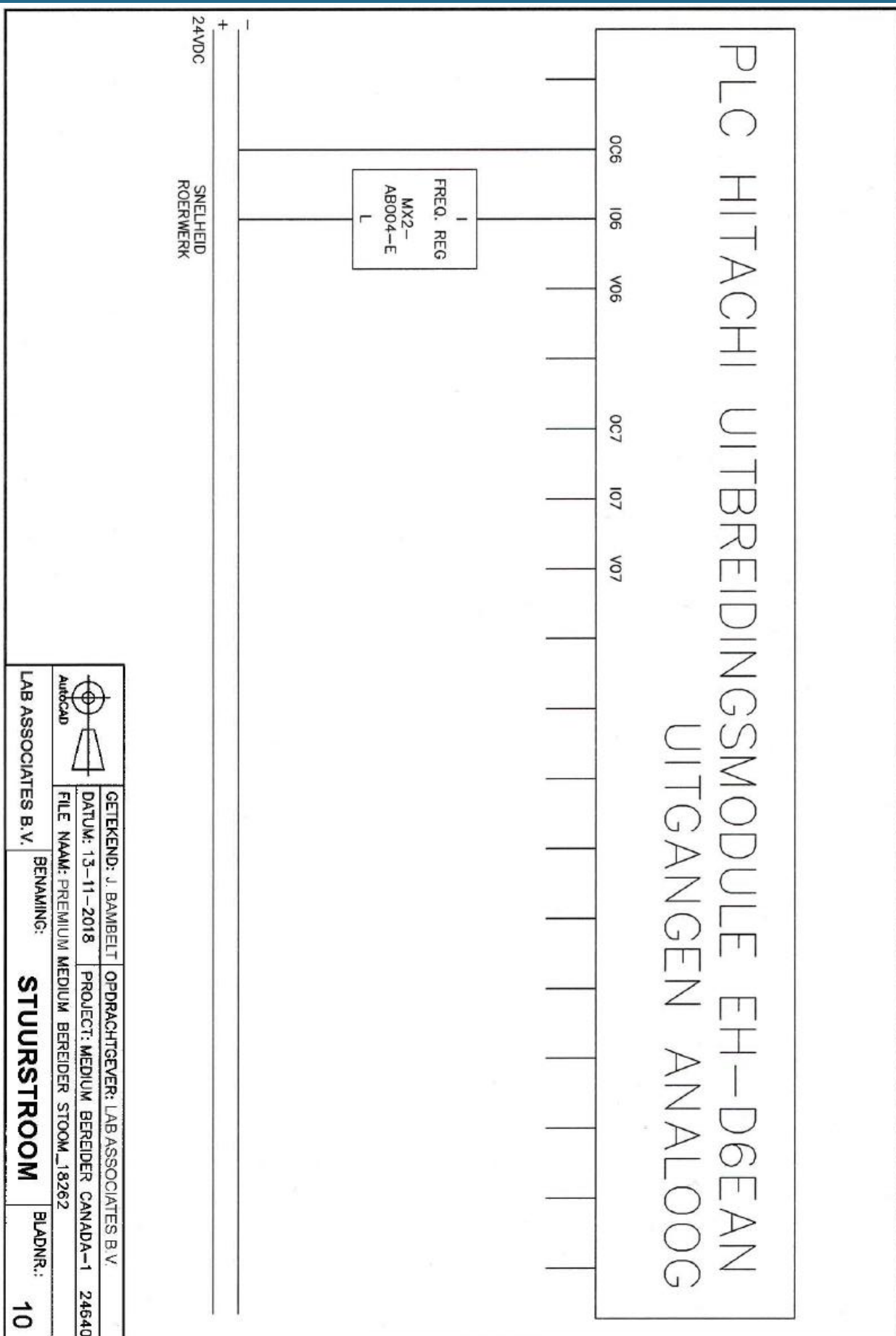
	GETEKENDE: J. BAMBELT	OPDRACHTGEVER: LAB ASSOCIATES B.V.
	DATUM: 13-11-2018	PROJECT: MEDIUM BEREIDER CANADA-1 24640
LAB ASSOCIATES B.V.	BENAMING: STUURSTROOM	BLADNR.: 06
















<div> <div>  </div> <div> <p>LAB ASSOCIATES B.V.</p> </div> </div> <div> <p>GETEKENDE: J. BAMBELT</p> <p>DATUM: 13-11-2018</p> <p>FILE NAAM: PREMIUM MEDIUM BEREIDER STOOM_18262</p> <p>BENAMING: <b>KLEMMENSTROOK</b></p> <p>BLADNR.: 12</p> </div>	L1	
	L2	
	L3	VOEDING 3X480V/60Hz.
	U1	
	V1	VERWARMING STOOMOPWEKKER GROEP 1
	W1	
	U2	
	V2	VERWARMING STOOMOPWEKKER GROEP 2
	W2	
	U3	
	V3	VERWARMING STOOMOPWEKKER GROEP 3
	W3	
	U4	
	V4	VERWARMING STOOMOPWEKKER GROEP 4
	W4	
	U5	
	V5	ROERWERK 3X400V!!!
	W5	
	1	+24VDC VOEDING
	2	-24VDC VOEDING
	3	CONTROLE PERSLUCHT AANWEZIG
	4	CONTROLE KOELWATERDRUK AANWEZIG
	5	CONTROLE R.O. WATERDRUK AANWEZIG
	6	HOOG NIVO STOOMOPWEKKER
	7	LAAG NIVO STOOMOPWEKKER
	8	HOOG NIVO BUFFERVAT
	9	LAAG NIVO BUFFERVAT
	10	UITVUL COMMANDO
	11	RESERVE INGANG
	12	DRUK SENSOR "STOOM" 4-20mA
	13	DRUK SENSOR "MEDIUM" 4-20mA
	14	TEMPERATUUR SENSOR 1 "MEDIUM" 4-20mA
	15	TEMPERATUUR SENSOR 2 "MEDIUM" 4-20mA
	16	TEMPERATUUR SENSOR "STOOMOPWEKKER" 4-20mA
	17	TEMPERATUUR SENSOR "KOELWATER" 4-20mA
	18	V1 KLEP "STOOM TOEVOER"
	19	V2 KLEP "AFVOER KOELWATER"
	20	V3 KLEP "TOEVOER KOELEN"
	21	V4 KLEP "AFVOER CONDENS"
	22	V5 KLEP "AFVOER WATER SPOELN"
	23	V6 KLEP "TOEVOER SPOELLUCHT"
	24	V7 KLEP "SCHONE LUCHT TOEVOER"
	25	V8 KLEP "VUILE LUCHT AFVOER"
	26	V9 KLEP "MEDIUM NAAR UITVUL"
	27	V10 KLEP "STOOM NAAR UITVUL"
	28	V11 KLEP "VULLEN STOOMOPWEKKER"
	29	V12 KLEP "BIJKOELEN"
	30	V13 KLEP "ONTLUCHTEN STOOMOPWEKKER"
	31	V14 KLEP "VOCHT AFSCHIEDER PERSLUCHT"
	32	V15 "UITVULKLEP"
	33	V16 + V17 "LEGEN/ONTLUCHTEN BUFFERVAT"
	34	BUZZER

## APPENDIX III – Part list

Pos.	Qty	Description	Art. Nr.
1	1	PT100, 100 mm	COM53317
2	2	PT100, 150 mm	COM53318
3	4	Fork level switch for liquids	COM53319
4	9	Cable 4 x 0,34, M12 connector	COM53320
5	1	Sanitary pressure sensor, 21	COM53321
6	1	Sanitary pressure sensor, 23	COM53322
7	3	Tight fitting	COM53323
8	2	Free flow valve 3/4", stainless steel	COM53296
9	5	Free flow valve 1/2", stainless steel	COM53297
10	2	Free flow valve 1/2", stainless steel	COM53298
11	4	Stainless steel diaphragm. valve	COM53299
12	2	Free flow valve 3/8" stainless steel	COM53300
13	2	Free flow valve 3/8" stainless steel	COM53301
14	4	Screw in damper 1/8" stainless steel	COM53313
15	12	Screw in damper 1/4" stainless steel	COM53314
16	1	Festo valve unit	COM53272
17	1	Festo care unit	COM53267
18	3	Festo L-plug-in coupling 1/4-6	COM53275
19	3	Festo bulkhead transit 1/4-6	COM53276
20	6	Festo L-plug-in coupling 1/4-8	COM53277
21	1	Festo bulkhead transit 1/4-8	COM53278
22	1	Festo plug-in coupling 1/8-8	COM53279
23	2	Festo plug-in coupling 1/8-6	COM53283
24	1	Multiple distributor	COM53269
25	1	Pressure control valve 1/4"	COM53274
26	1	Manometer	COM53268
27	1	Festo check valve	COM53280
28	2	Air controle valve 1/8"	COM53273
29	1	Pressure switch 1/4"	COM53271
30	8	Festo L-plug-in coupling 1/8-6	COM53281
31	3	Festo double nipple 1/4"	COM53270
32	5	Festo plug	COM53282
33	3	Festo plug-in coupling 1/4-6	COM53284
34	1	Stirring engine premium preparator	COM53328
35	6	Screw plug heater – 9000W, 3x480V, UL/CSA	COM53285
36	1	Manometer stainless steel 0-6 bar	COM53333
37	1	Sanitary manometer -model 232.50, 1 to 3 bar	COM53141
38	1	Receiver 8.0ltr stainless steel	COM53308
39	1	Harting 6 pole STEKHS	COM53302
40	1	Harting 6 pole STICONTDR	COM53303
41	1	Harting 6 pole AANBHS	COM53304
42	1	Harting 6-pole BUSCONTDR	COM53305
43	2	Membrane pressure switch, stainless steel	COM53306



Pos.	Qty	Description	Art. Nr.
44	2	Protective cover for pressure switch	COM53307
45	2	Vacuum breaker	COM53294
46	1	Condensate float	COM53295
47	2	Stainless steel check valve ½'	COM53309
48	2	Stainless steel check valve ¾'	COM53310
49	1	Needle closure ½'' stainless steel	COM53312
50	1	Needle closure ¼'' stainless steel	COM53311
51	1	Y-shaped dirt trap, stainless steel ½' BSP	COM53370
52	3	Motor cable, LIY-CY	COM53372
53	9	Motor cable, LIY-Y	COM53373
54	3	Helu cable 1.5mm, grijs	COM53374
55	4	Silicone cable 4x0.75mm	COM53375
57	3	Transparante tube	COM53376