

# Brewing

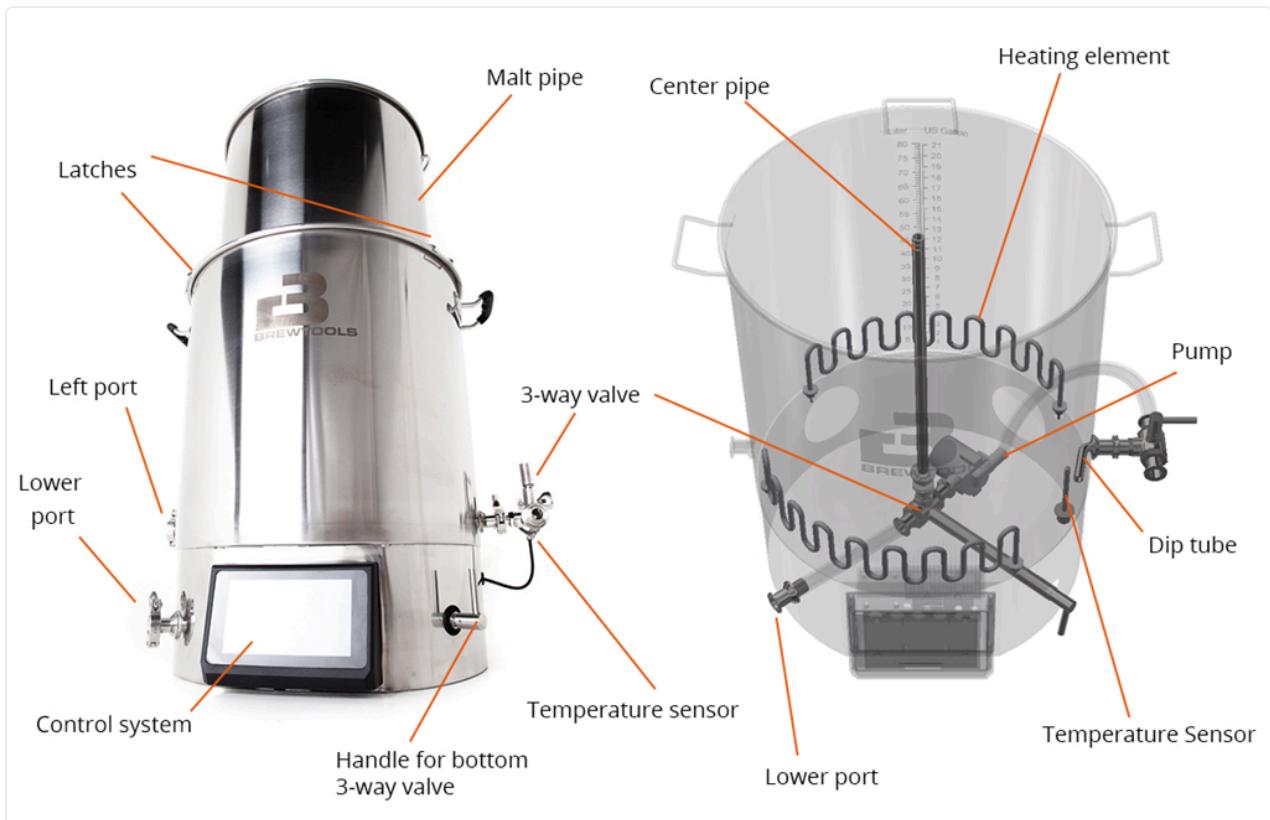
## The Brewtools System

The Pro Series Brewing Systems are designed for maximum flexibility. There are many ways of using the systems based on personal preference, what kind of accessories you have and how your brewing area is set up. Below, we will explain the principles of the system and some of the possibilities it gives you.

The tank and malt pipe are built from SS304 stainless steel with a thickness of 1.0/1.2mm. All outlets and ports on the tanks and valves are Tri-Clamp for maximum flexibility. The flanges and steel parts are cast in SS304 stainless steel, and CNC machined. The pump features a 24V brushless motor. It's quiet and powerful and the speed is controlled from the touch-screen. All tubes are 16x25mm food grade high quality silicone with high transparency. The entire system is designed and built to withstand years of use.

The basic principle in the system is a tank with a conical bottom with heating elements, a temperature sensor, a center pipe that's easily removable, an outlet port on each side and a 3-way valve in the bottom which makes it possible to circulate both over the grain bed and through the lower outlet and counterflow cooler or tube at the same time with full flow control. This makes it easy to maintain accurate temperatures outside the malt pipe as you circulate the wort around and up through the malt pipe and over the grain bed. The standard dip-tubes has two o-rings that make them easy to adjust to the desired angle. If you brew with a lot of hops, you can adjust the dip-tube accordingly to prevent too much hops in the circulation and into the fermenter.

The right 3-way valve is used to choose the input for the pump. You can pump from the inlet dip-tube or from a second tank, usually for sparge water. In the standard setup without extra 3-way valves, this valve is also used to pump the wort to the fermenter.



# Pro Series Brewing System

## Safety instruction

 Keep children away from packaging materials. Plastic bags can cause choking.

Make sure the power cable(s) are undamaged. Do not use the product if the power cable(s) are damaged due to risk of fire and electric shock.

The product must be positioned on a flat and stable surface before use.

Connectors and clamps should be checked and tightened if necessary before each use to avoid leaks.

 The surface of the product gets very hot. Do not touch hot steel parts during use due to risk of scalding and burns.

Learn the function of the valves before you fill the tank with water. Use blind caps on unused output ports due to risk of spillage of boiling/hot liquid that may cause scalding and burns.

Do not fill the tank passed the maximum mark. During boiling, reduce the power to avoid boil over. Risk of scalding and burns.

The product has a powerful pump. Before using the pump, make sure valves are set to the correct position. The pump speed can be adjusted on the touch screen. Too much flow through the pump, for example during circulation over the grains can cause liquid to spray outside the tank. Risk of scalding and burns.

 The heating elements are designed to heat liquids and must not be turned on without being completely submerged. Boiling liquids will evaporate and reduce the volume in the tank over time. During circulation, the liquid around the malt

pipe will be reduced. Make sure there is always enough flow to keep the heating elements covered. The product must not be used without supervision



Make sure the power cables are inserted correctly. There are grooves in the connectors that needs to match the sockets.

During cleaning, the power supply must be disconnected. The machine must not be sprayed down on the outside. The electrical control system is protected from water splashes, but not spraying water.

The product is mostly constructed of highly conductive materials. Only use the product on circuits with a residual circuit breaker due to risk of electric shock in the event of an electric component failure.

The power cable(s) must be disconnected when the product is not in use.

If you find a fault with the product that may pose a risk, stop using the product and contact the manufacturer or the reseller.

## Introduction

The Pro-series Brewing Systems are built without compromise and is the product series that will always offer the highest level of flexibility, accessories and support for high-end solutions. The Pro-series consist of 3 models of different brew volumes, but they are all based on the same design principle and uses the same control system. The model name tells you the maximum recommended boil volume.



The key concept of these brewing systems is to use Tri-Clamp connections for tool-free and sanitary use. These offer great flexibility and offers the user the choice of different setups based on their preference.



TC 34mm silicone gasket, tri clamp and 19mm hose barb

This user manual will teach you how to prepare the system for the first time, how to use it, clean it and maintain it. You'll also find an FAQ which addresses some questions that might arise during use.

## First-time use

This chapter will tell you how to do the necessary steps to prepare your system for use.

## Software

The control system for the Brewtools units will automatically receive software updates OTA (Over the air) as long ad the microSD card is installed (fitted as standard) and the unit is connected to Wi-Fi. Software updates are free and will incorporate bugfixes as well as new features. Since the software is under continuous development, we have decided to put all software related information available online.

Check out our user manual for the software:

Control system >

## Assembly

Unpack all the parts and place the brewing system upside down. Connect the power cables and other accessories like the return temperature sensor if you have that. The power cables should exit one of the service holes on the back of the system. The connectors have grooves that only allows the connector to be installed correctly. Do not use excessive force when plugging in the connectors. The optional return temperature sensor should go through the left silicone grommet that is already installed.



- To protect the surface where the brewing system will be placed, we suggest using standard rubber edge trim on the bottom edge. Either as full trim coverage or three short pieces.



Flip the system the right way up and install the 3-way valve on the right side as shown below. Install the pump temperature sensor in the sensor adapter included with a gasket between the sensor and the adapter. Install the assembled sensor adapter on the rear outlet using a TC clamp with a gasket. Cut a part of the included silicone tube and install it between the sensor adapter and the pump. Make sure the tube has a nice curve to avoid blockages.



3-way valve on the right side with sensor adapter and pump inlet tube.

Install the gasket inside the bottom part of the sparge pipe and inside the mash hat as shown below. Use a small screwdriver or similar to push the gasket into place. The two gaskets are identical.



Install the large silicone gasket on the top of the sparge pipe as shown below.



- (i) Note that this design is only valid for systems produced after December 15th 2019.

Install two O-rings marked 18x2mm on the dip tube. The dip tube position can be adjusted freely. More on this subject in the “Using the system” section.

- (i) The silicone parts and O-rings should be lubricated with Haynes Silicone Grease. The center pipe should also have a thin coat of silicone grease to reduce wear on the silicone gaskets.



Install 3 blind caps on the open ports indicated below to avoid spilling. If you have extra valve(s), you can use the blind caps as preferred.



B80pro – Recommended blind cap placement

Install the 3 legs of the malt pipe using an allen key. Take note that the latches must be installed as shown below, and the wing nut must be used on the outside of the malt pipe. Alternatively, you can use a normal hex nut (not included). Install the silicone leg protectors to avoid scratching the bottom of the main tank during use.

- (i)* Please note that the design of the malt pipe leg might have some variation based on model.



Combined leg and holder for malt pipe

## Check for leaks

When filling the tank with water for the first time, make sure the taped threads on the pump and the sensor and heating elements gaskets are not leaking. Tighten if necessary. Also check that all TC clamps are tightly installed. The TC clamps might require tightening after use, due to the variations in temperature.

## The filter

The filter included is made from expanded metal and might have some tension. Make sure the filter is flat. Flatten by hand if necessary. The filter should be cleaned before use to remove any residue from production.

## Cleaning

The system should be thoroughly cleaned before use to remove polishing compounds and flux from the production process. Use Trisodium Phosphate (TSP) or other chemicals designed for this type of cleaning. Use a microfiber cloth to wipe all surfaces clean.

## Passivation

We recommend passivating the steel before first-time use and 1-2 times a year. Use StarSan or similar acid-based chemicals. Fill the tank with lukewarm water. Use approximately 5ml StarSan per liter and leave it for 15-20 minutes.

## Electrical connection

The system must be connected to an earthed socket with a residual circuit breaker. The control system supports two individual circuits. This feature is used on the B40pro 110V version, the B80pro and the B150pro due to the power requirements. The 240V versions of the B40pro runs on one circuit. The software offers the possibility to reduce the average maximum power to adapt to your circuit breaker limitations. You can choose between 10A, 13A, 15A and 16A for each circuit in the control system. Take note that this feature is based on standard voltage ranges, and variations may occur. We recommend testing different settings to find the best option for your location.

-  The display and the control system are always powered by the main power input. If you lose power on the main circuit, the system will turn off. The second power supply is only used to power the second heater on some models, and the control system will not recognize the loss of power on the second circuit.

## Simple function test

Fill the tank with water to cover the heating elements. Start the system in manual mode, and check the following:

- Temperature is correctly read by all sensors.
- The pump is running and can be adjusted on screen.
- Both heating elements are working (bubbles will form on the elements)

## Using the system

This section explains how to use the system and gives you some good advice and recommendations for use.

For more information regarding the system and different setups, please see our system guide by clicking the link below.

## The control system

The systems are equipped with a 7" touch screen controller. The software can be updated for free through the built-in WiFi-module. When a new version of the software is available, it will automatically download and prompt the user to install it. If the user does not update right away, the new software will automatically be installed during the next startup.

The software is constantly being updated and new features added, so we will not cover the software in this user manual. Visit our website, [www.brewtools.com](http://www.brewtools.com) to get the latest

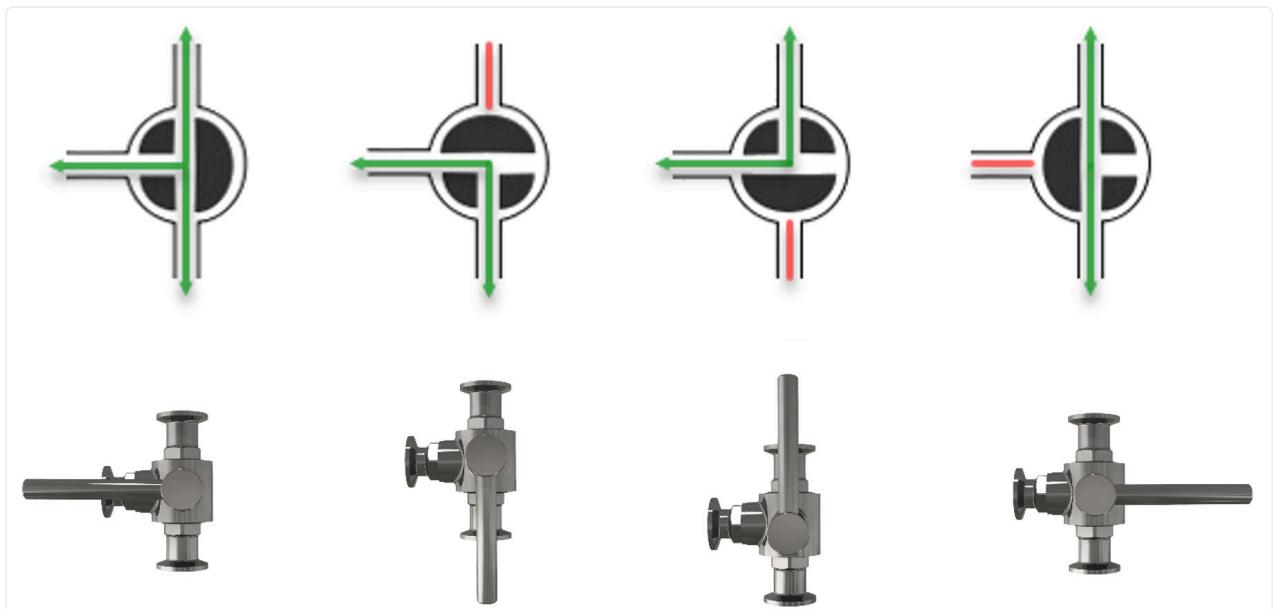
information on our Pro series software.

## Valves

The system two T-type 3-way ball valves as standard. One side valve, and one bottom valve. The valves only close the port opposite to the direction the handle is pointing. If the handle points toward the middle port (as shown below), all ports are open.

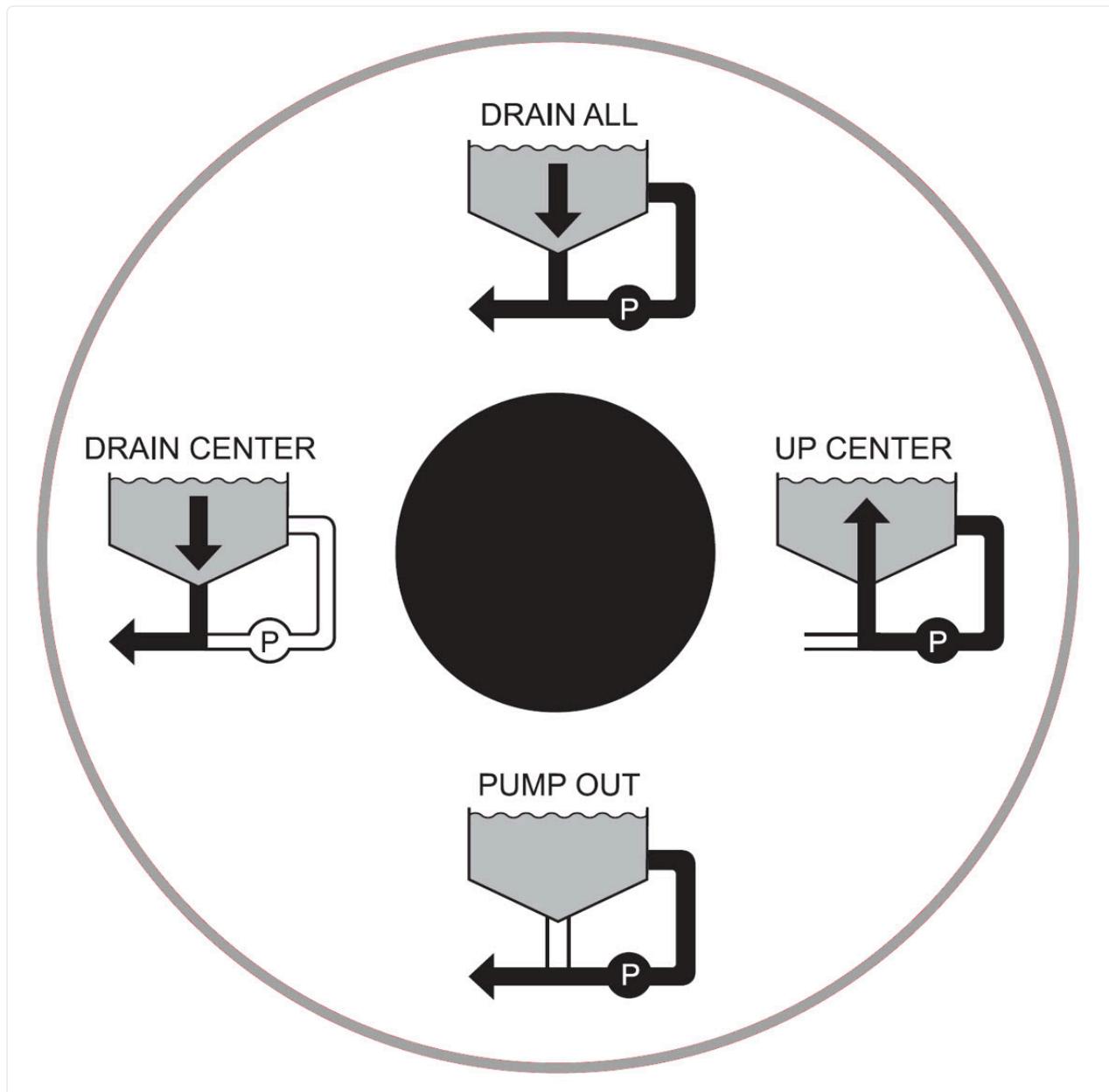


3-way valve shown with all ports open



The illustrations show the fluid flow in the 3-way valves based on the handle position

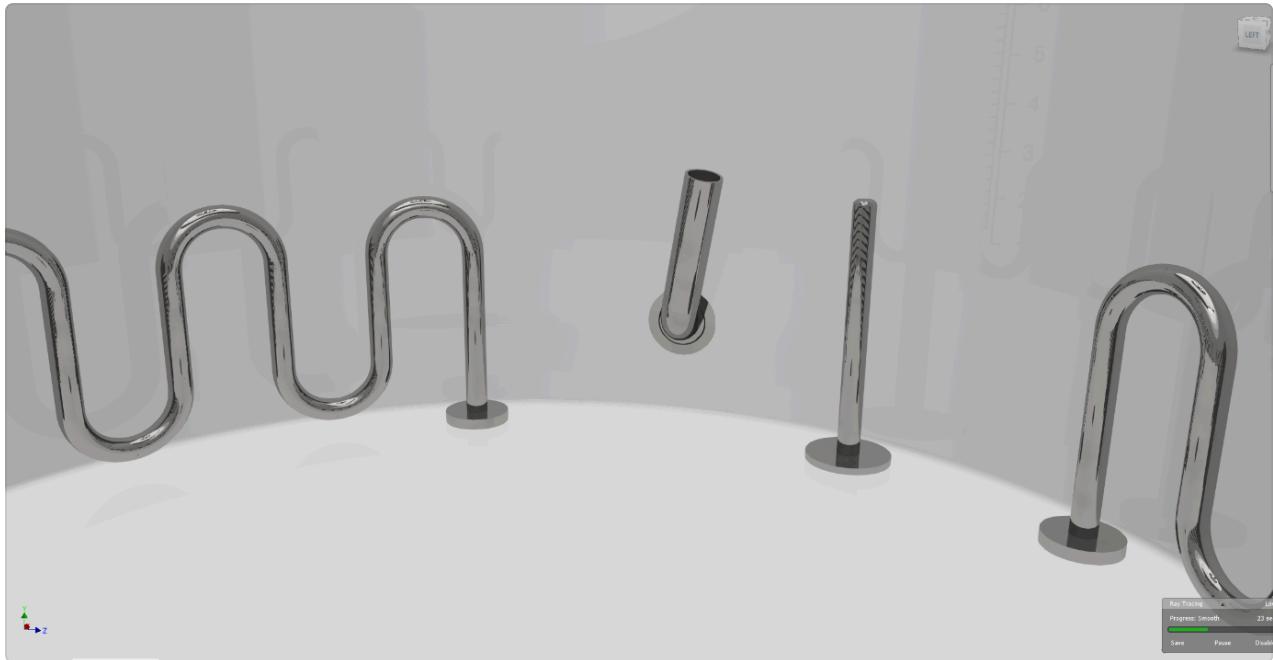
The bottom valve has an extended handle which makes it possible to control from the right side of the control system. There is a sticker showing the flow based on the handle direction.



Bottom valve sticker

## Dip tube

The dip tube position is adjustable and is normally used in the two positions shown below. We recommend positioning the dip tube in the upper position during mashing (especially when getting to know the system) to prevent the heaters becoming exposed. Exposing the heating elements will burn them and make them difficult to clean. They might also warp/expand due to the high heat. You can use the mash paddle or equivalent to push the dip tube down when the mashing is complete to get as much wort as possible pumped to the fermenter later in the process.



Dip tube in the upper position



Dip tube in the lower position

## The Pump

The pump must never run without fluid in the chamber. This will cause damage to the magnetic impeller. In the beginning of the brew, air may be trapped inside the pump. To vent it, start the pump for a few seconds, stop it, and start it again. Repeat if necessary.

The pump must be installed as shown below. If you install it in a different position, it may affect the lifetime of the pump and make it difficult to vent the air out.



Correct position of the pump



Correct position of the pump

## Preheating

We recommend heating the strike water before you install the center pipe and malt pipe for an even temperature. We also recommend circulating the water. The bottom valve handle must point to the “UP CENTER” position.

## Crushing the grains

We recommend using grains that's not too finely crushed to get the maximum flow through the grain bed. If you use a lot of special grains like wheat or oats, or you push the limits of the malt capacity, we recommend using rice hulls to increase the flow. The systems ship as standard with the coarse malt pipe filter and our recommended crush grade is 1.1-1.3mm.

## Adjusting the malt pipe holders

The latches on the malt pipe may need some adjustment. They should move freely. Push them together to remove it from the latch holder. Adjust as necessary and reinstall the latch. The lower “pin” on the latch can be bent to position using a suitable tool

## Lifting the malt pipe

The handle on the malt pipe is designed to be easily removed for cleaning and use of future accessories.

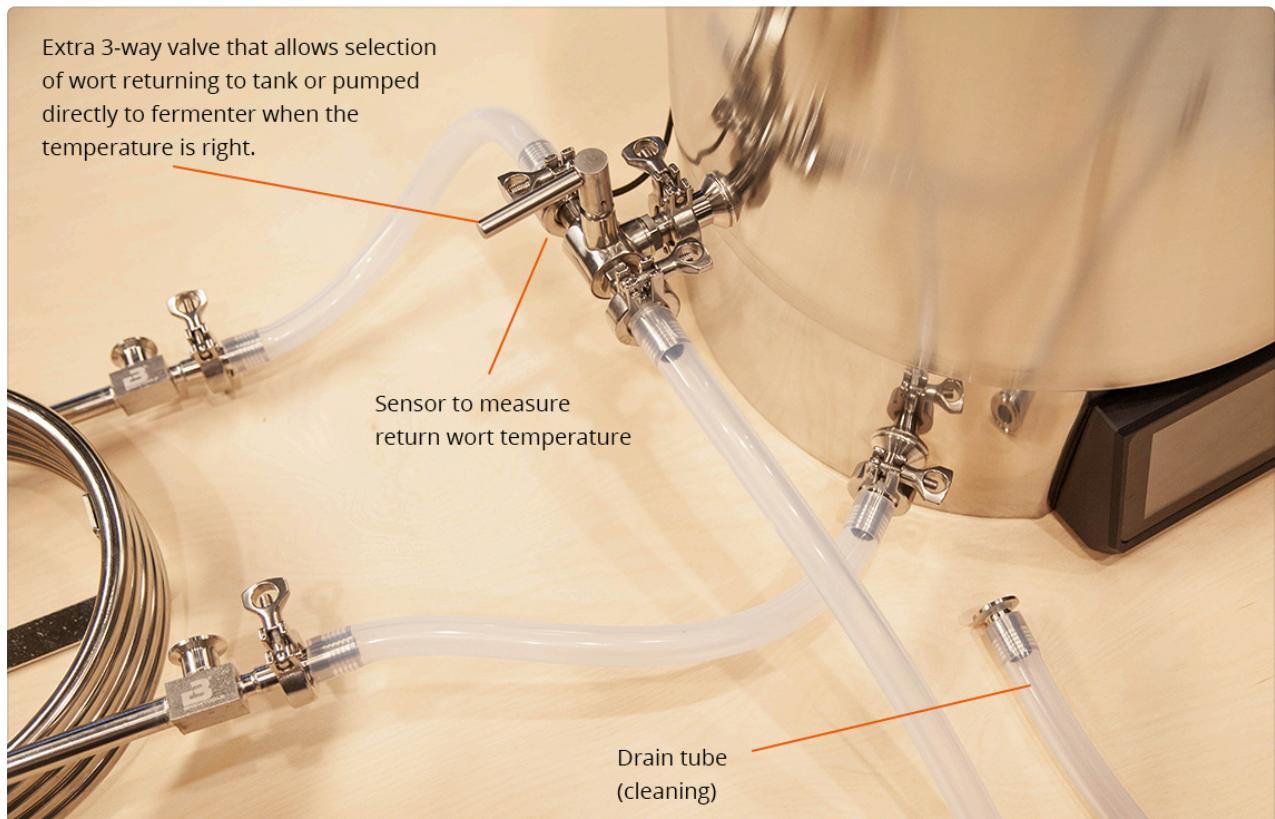
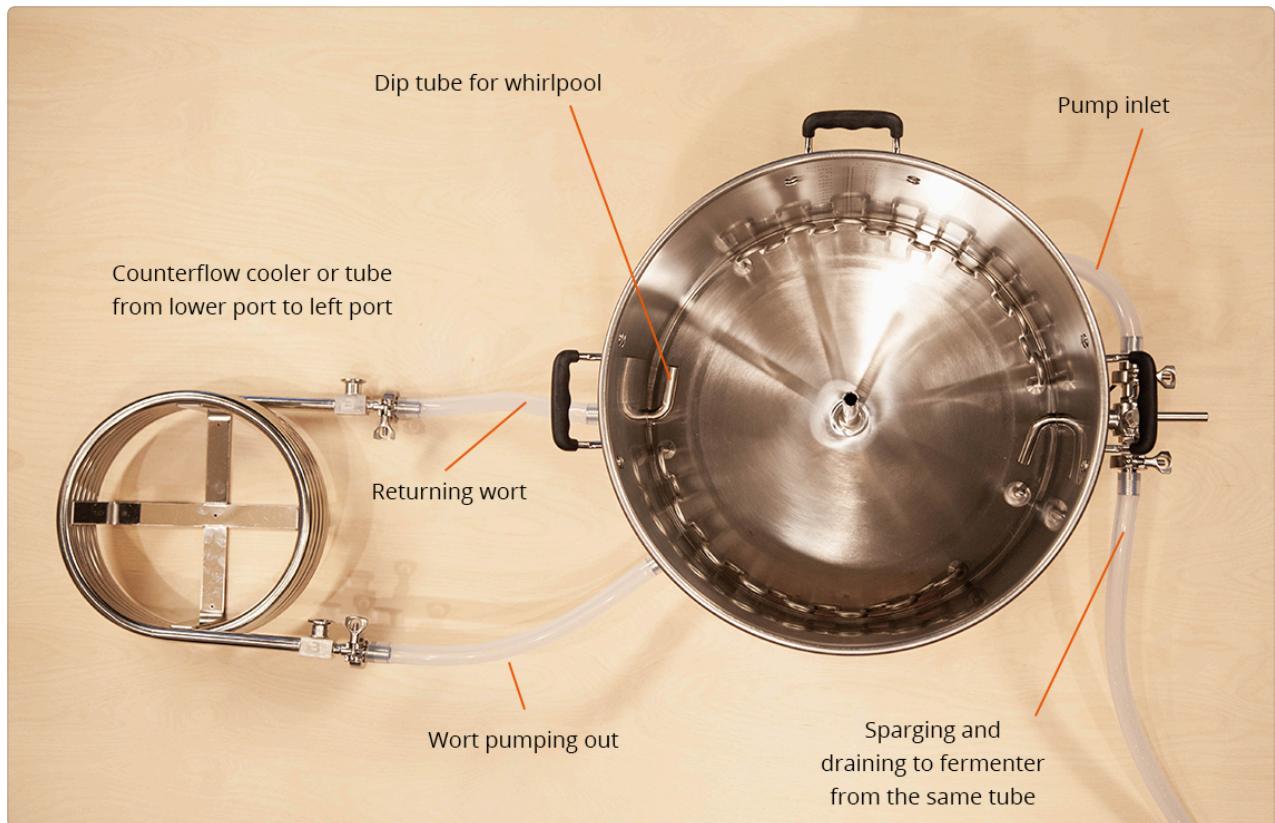
- ⚠ Make sure to always lift the malt pipe from the center of the handle to avoid it coming loose.

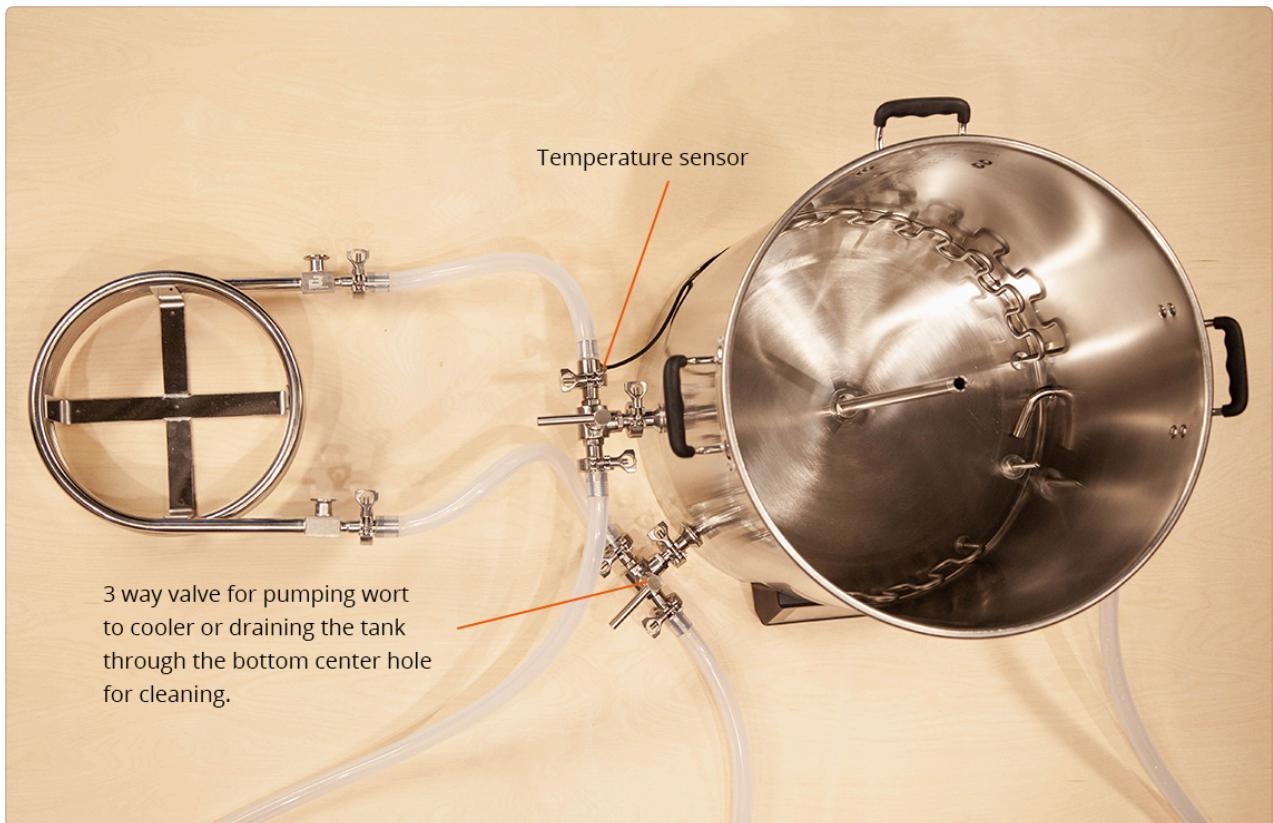
On the larger systems, the malt pipe can be very heavy. We recommend using a lifting system if available.

When lifting the malt pipe, make sure to only lift it high enough for the 3 latches to fall out and grab the edge. If you lift the bottom of the malt pipe higher than the center pipe, you may have difficulties getting the malt pipe seated back on the center pipe.

## Different setups

The system can be set up in many ways. Below, we show 3 recommended options based on your accessories.





For more details on the different setups, click at the link below.

## Circulating during mashing

We always recommend resting the mash for 20 minutes after stirring in. In this period, we recommend circulating on the outside of the malt pipe. This is done by pumping the wort out through the lower left port and into the tank again on the upper left port. Use a dip tube to make sure the wort is circulating around the malt pipe. This will give you a more accurate temperature and prevent the heating elements burning the sugars. You can circulate through the counterflow cooler, if you have that.

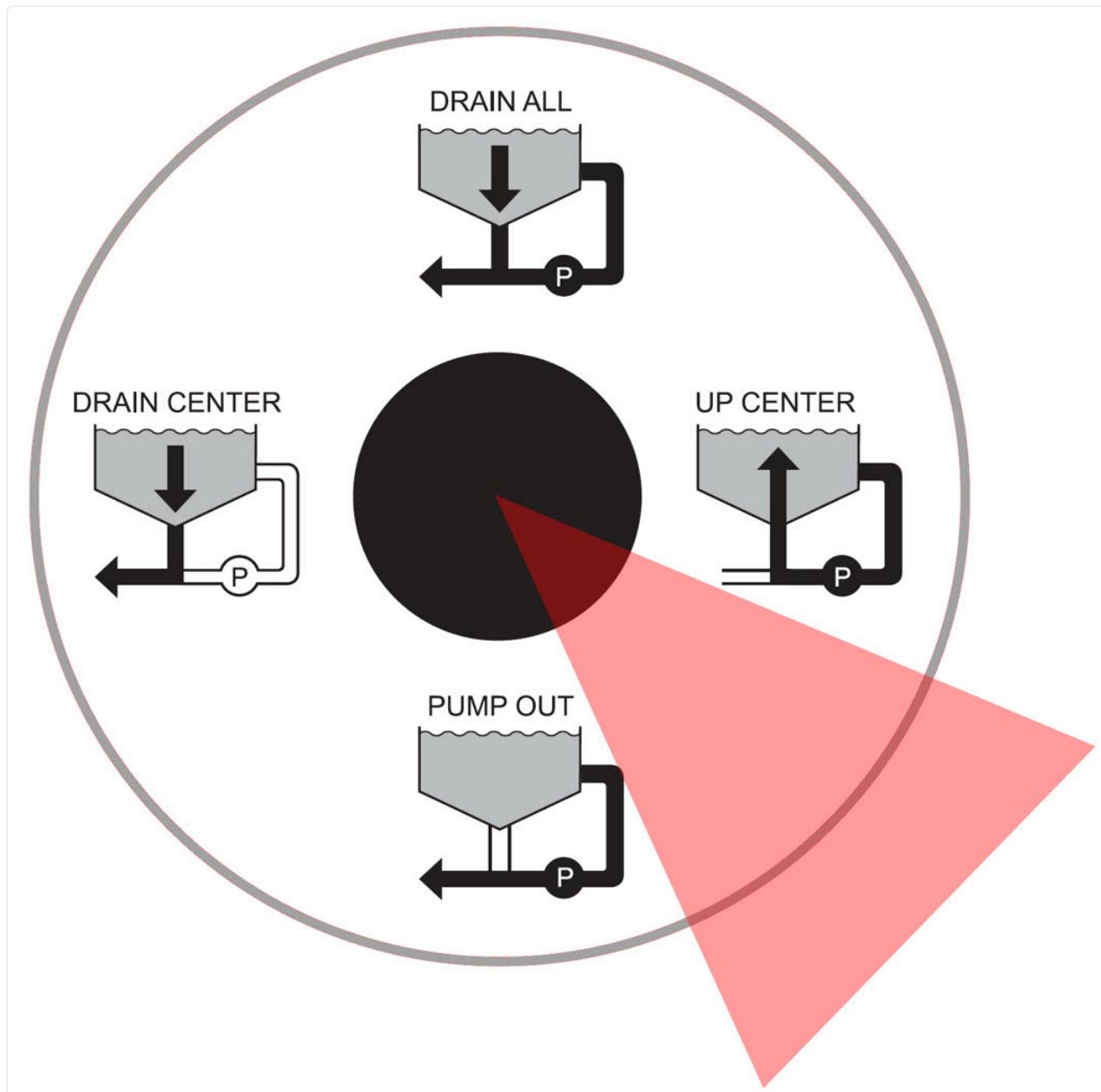


When step mashing it's critical to circulate around the heating elements and reducing the power a lot to avoid risk of burning the elements as they may be turned on for a long time.



B40pro – Circulating during the mash

By setting the bottom valve in a middle position shown below, you can circulate both outside the malt pipe and over the grain bed. With this solution you can set the pump power high (70-100%). Make sure the liquid level outside the malt pipe is stable and the heating elements never expose. As recommended earlier, the right dip tube can be set in the upper position to prevent this. Use the bottom valve to adjust the flow over the grains based on your flow rate through the grain bed.



Sticker for bottom valve showing the area you should operate on during combined circulation

## Sparging

The system ships as standard with a sparge pipe. This pipe will sit outside the center pipe during the mashing process. When lifting the malt pipe, the sparge pipe will lift with it thus extending the center pipe. If you are sparging from a second water heater, we recommend connecting the sparge water on the front-facing port on the right 3-way valve. This allows you to pump the sparge water up the center pipe from the water heater, using the internal pump. Adjust the pump speed as needed. Make sure to not sparge with more water than the main tank can hold.

- ⓘ When lifting the malt pipe during sparging, the liquid level will drop and expose the heating elements. It is important that you turn off the heating elements before lifting the malt pipe.

## Boiling

Boiling can be done without a lid (open boil) or using a steam hat (accessory), if you have a ventilation system. You can also use the steam hat with our steam condenser (accessory) if you don't have a ventilation system. During the boiling process it is important to adjust the power to get a satisfactory boil.

- ⓘ Take note that adding hops might cause the wort to boil over.

It is not recommended to use the pump during the whole boiling process, as hop pellets might clog the dip tube and pump. We recommend adding hop pellets on the opposite side of the pump intake. Whole hops should not be used directly in the tank as they will clog the pump intake. To disinfect the counterflow cooler and tubes, circulate through the cooler at least 10 minutes before starting the cooling process. Take note that you might need more power to keep the boil going when running the pump. Additionally, using the pump while boiling increases cavitation inside the impeller house causing more noise from the pump. It is therefore recommended to reduce the speed and not run it at full speed.

## Cooling and transferring

You can use your preferred method for cooling the wort. An immersion chiller will work but will limit the whirlpool functionality.

We recommend using our custom counterflow cooler (accessory). It is designed for maximum flow to get a good whirlpool while cooling the wort. We recommend circulating through the counterflow cooler and back into the tank on the left side with a dip tube on the inside to create a whirlpool. When the desired return temperature is reached (can be

measured with optional return temperature sensor), the wort is pumped directly to your fermenter by adjusting the left port 3-way valve (accessory, based on setup).

## Cleaning

Regular cleaning is critical to keep the quality of your beer, and also to make your brewing system last you a long time. We recommend using a cleaning agent that does not harm Teflon (PTFE). Our 3-way valves uses PTFE bushings. PBW is not recommended to use for more than 30 minutes at a time.

During cleaning, we recommend using the pump to circulate through the counterflow cooler and all tubes. To empty the tank, remove the center pipe. The bottom valve handle is turned to drain the through the lower port. Use a bucket or a tube going directly to a floor drain.

If you have access to pressurized air, this is a great option to blow water out of the pump and pipes. Take note that the silicone tubes are not designed for high pressure.

## Maintenance

Normal cleaning, rinsing and drying the tank, tubes, and cooler is sufficient. Tubes should be replaced when severely discolored.

If valves start leaking due to wear or stuck particles, we offer a rebuild kit for them.

O-rings and gaskets are replaced as needed.

The pump impeller should be checked from time to time to make sure no particles or grains are stuck.

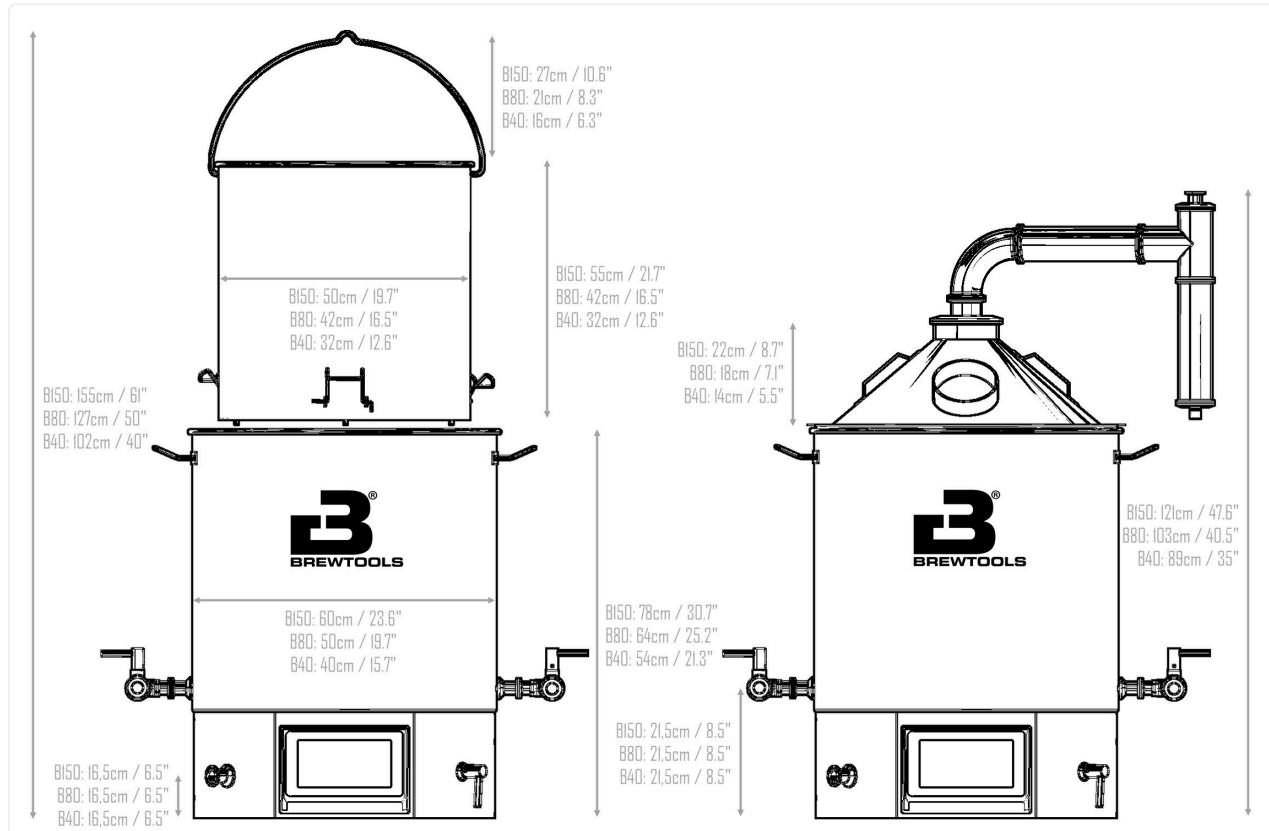
## FAQ

See the separate section for FAQ by following the link below.

FAQ



# Specifications



## B40 Pro

Dimensions excl. packaging:	58 (h) x 52 (w) x 52 (d) cm
Dimensions with one side valve:	58 (h) x 62 (w) x 52 (d) cm
Dimensions with two valves:	58 (h) x 72 (w) x 52 (d) cm
Packaging dimensions:	70 (h) x 55 (w) x 55 (d) cm
Weight excl. packaging:	20 kg
Weight incl. packaging:	24.5 kg
Tank dimensions:	Ø40 cm, height 36 cm

Tank volume:	46 liters (rec maximum boil volume – 40 liter)
Malt pipe dimensions:	Ø32 cm, height 32 cm
Malt pipe volume:	25.7 l
Max recommended grain quantity:	9 kg
Minimum liquid volume:	15 l
Build material:	1.0 mm stainless steel (SS304)
Heating elements:	230V, 3200W (2x1600W)
Watt density:	6.3W/cm <sup>2</sup> (40.4W/in <sup>2</sup> )
Pump:	24VDC brushless, max 25 l/min, max head 4.5 m, stainless steel head, stepless speed control from touch display
Controller:	ARM Cortex M4 180mhz, 7" Touch display
Connectivity:	WiFi 802.11 b/g/n, Bluetooth 4.2, MicroSD
Hoses:	16x25mm silicone, food grade

## B80 Pro

Dimensions excl. packaging:	67.5 (h) x 62 (w) x 62 (d) cm
Dimensions with one side valve:	67.5 (h) x 72 (w) x 62 (d) cm
Dimensions with two valves:	67.5 (h) x 82 (w) x 62 (d) cm
Packaging dimensions:	83 (h) x 62 (w) x 62 (d) cm
Weight excl. packaging:	27.5 kg
Weight incl. packaging:	34 kg
Tank dimensions:	Ø50 cm, height 46 cm
Tank volume:	90 liters (rec maximum boil volume – 80 liter)
Malt pipe dimensions:	Ø42 cm, height 42 cm

Malt pipe volume:	58 l
Max recommended grain quantity:	20 kg
Minimum liquid volume:	25 l
Build material:	1.0 mm stainless steel (SS304)
Heating elements:	230V, 6000W (2x3000W) (two individual circuits)
Watt density:	9.1W/cm <sup>2</sup> (58.8W/in <sup>2</sup> )
Pump:	24VDC brushless, max 25 l/min, max head 4.5 m, stainless steel head, stepless speed control from touch display
Controller:	ARM Cortex M4 180mhz, 7" Touch display
Connectivity:	WiFi 802.11 b/g/n, Bluetooth 4.2, MicroSD
Hoses:	16x25mm silicone, food grade

## B150 Pro

Dimensions excl. packaging:	79 (h) x 72 (w) x 72 (d) cm
Dimensions with one side valve:	79 (h) x 82 (w) x 72 (d) cm
Dimensions with two valves:	79 (h) x 92 (w) x 72 (d) cm
Packaging dimensions:	97 (h) x 72 (w) x 72 (d) cm
Weight excl. packaging:	37.5 kg
Weight incl. packaging:	45 kg
Tank dimensions:	Ø60 cm, height 60 cm
Tank volume:	169 liters (rec maximum boil volume – 150 liter)
Malt pipe dimensions:	Ø50 cm, height 55 cm
Malt pipe volume:	108 l

Max recommended grain quantity:	35 kg
Minimum liquid volume:	35 l
Build material:	1.0 / 1.2 mm stainless steel (SS304)
Heating elements:	230 V, 6600W (2x3300W) (two individual circuits)
Watt density:	8.9W/cm <sup>2</sup> (57.2W/in <sup>2</sup> )
Pump:	24VDC brushless, max 25 l/min, max head 4.5 m, stainless steel head, stepless speed control from touch display
Controller:	ARM Cortex M4 180mhz, 7" Touch display
Connectivity:	WiFi 802.11 b/g/n, Bluetooth 4.2, MicroSD
Hoses:	16x25mm silicone, food grade

These products are handmade. As a result of this, the products might have minor cosmetic irregularities without affecting its function.

## Declaration of Conformity

Follow the link below.

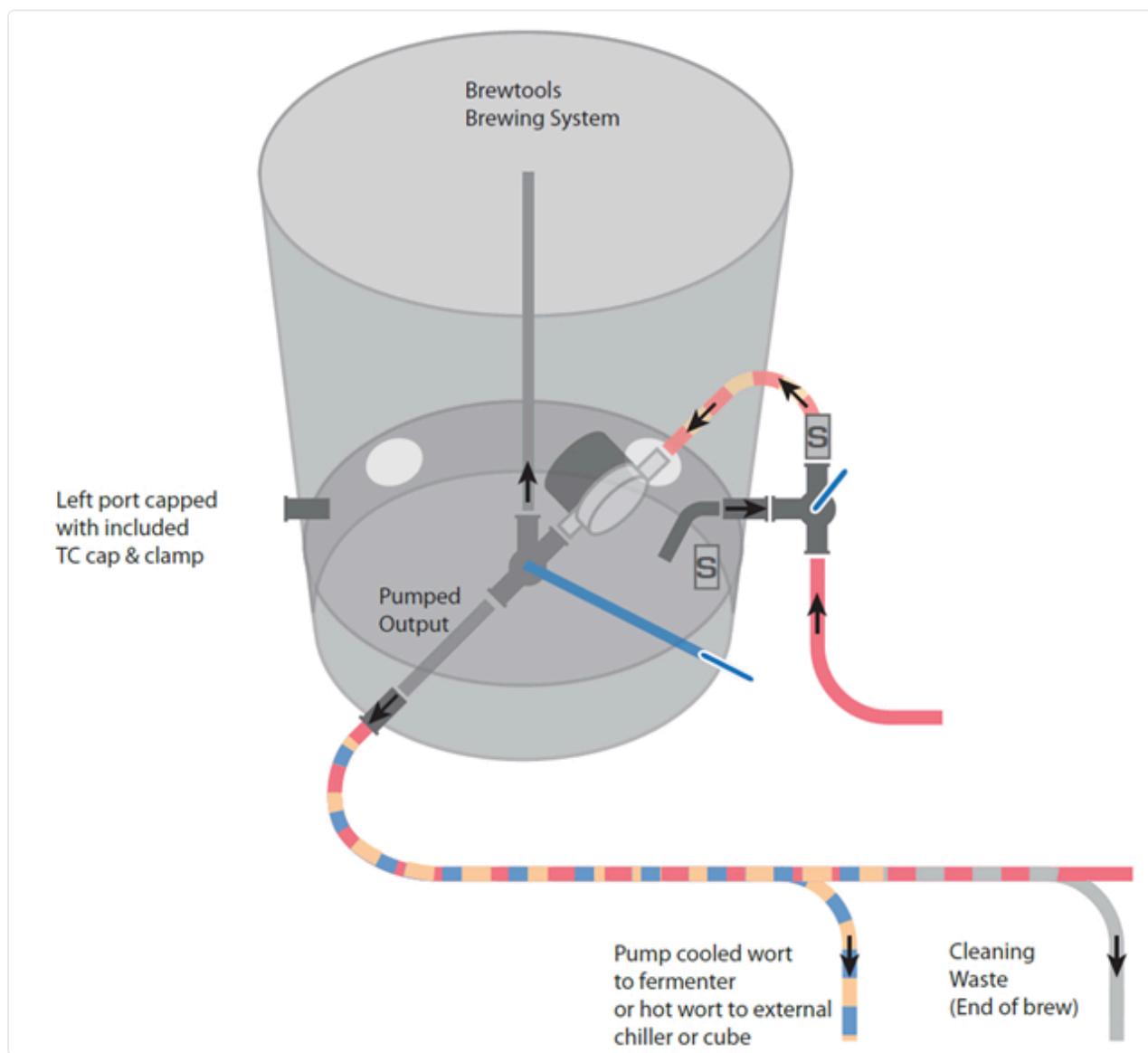
All documents

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# Setup: Standard

The Brewing Systems ships standard with one 3-way valve. This will normally be placed on the right side of the system, but if you don't want to sparge using the internal pump, you can install it on the left side to enable whirlpooling. Remember to get an extra dip tube if you want to use this option

By adding more valves, the flexibility will increase, and you can partly or completely avoid having to disconnect tubing or pipes during your brewday. What setup is the best, is subjective. A general advice is to start with the 2-valve starter pack and expand as you get more experience.



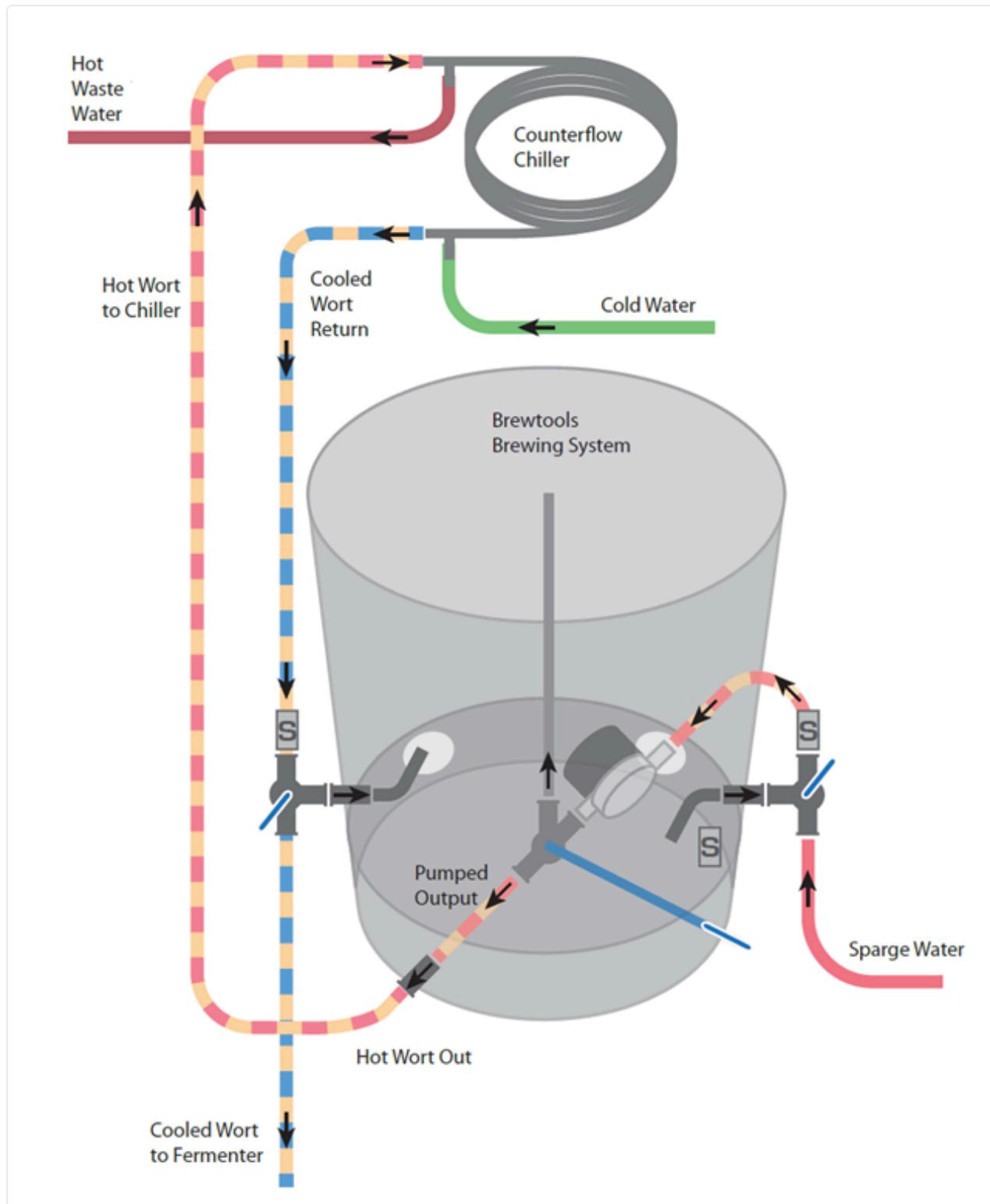
Standardoppsett

S = Temperatur sensor

# Setup: 2 valves

The 2-valve setup is based on using a valve on each of the side ports as shown below. You also add a dip tube inside the left port. This allows the wort to be pumped out from the lower port, through the counterflow chiller and back into the left side port through the valve.

With this setup you can take advantage of a whirlpool during cooling. Proteins and hops will form a cone in the middle of the tank thus decreasing your losses to trub. We also recommend circulating outside the malt pipe during mashing to improve temperature stability. By using the bottom 3-way valve in a middle position, you can split the flow around the malt pipe and over the grain bed. We recommend running the pump on 80-100% power and circulating both ways at the same time.



2-ventilersoppsett

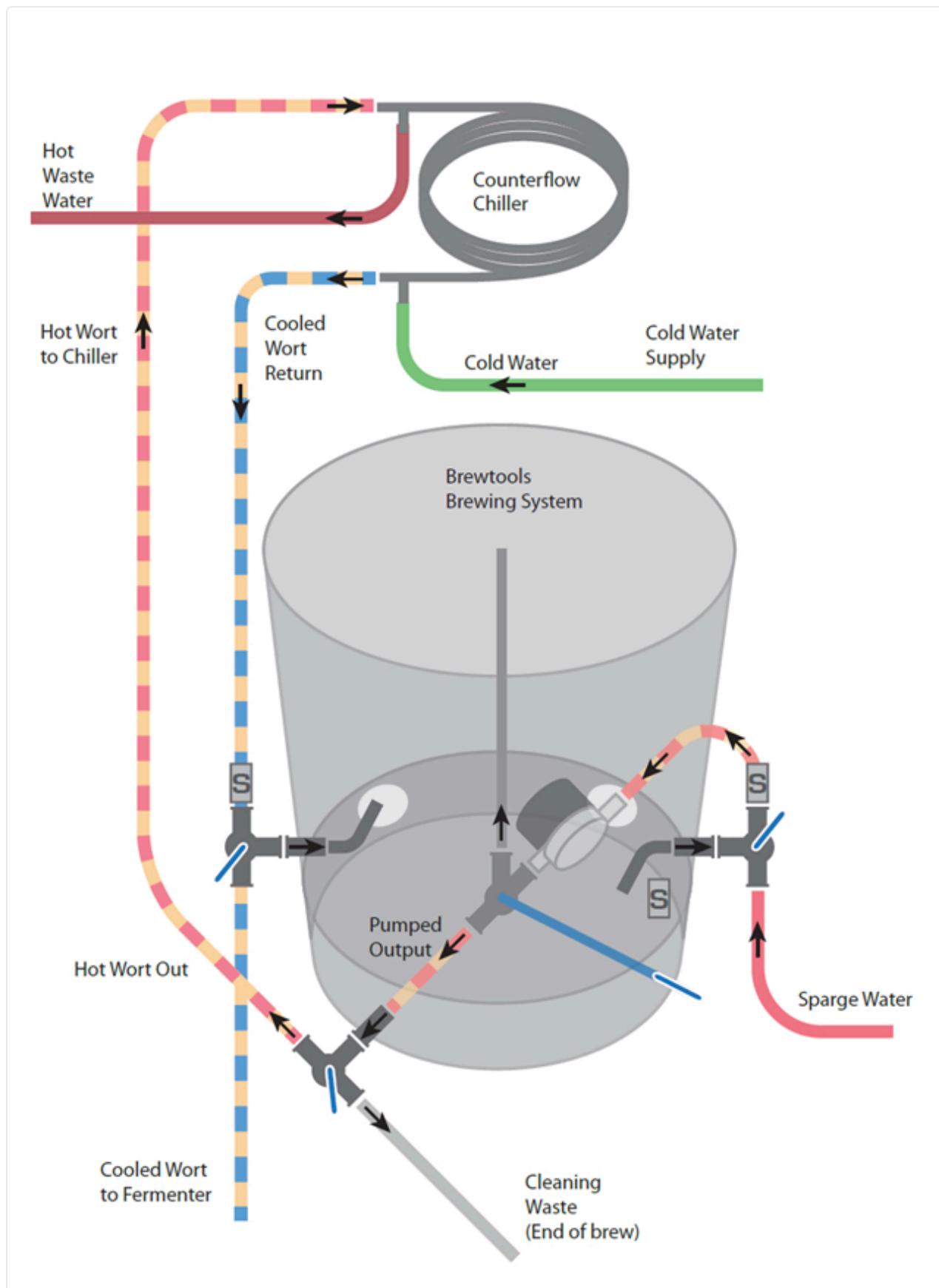
S = Temperature sensor

# Setup: 3 valves

The 3-valve setup is based on using a valve on each of the side ports as shown below. You also add a dip tube inside the left port. This allows the wort to be pumped out from the lower port, through the counterflow chiller and back into the left side port through the valve.

With this setup you can take advantage of a whirlpool during cooling. Proteins and hops will form a cone in the middle of the tank thus decreasing your losses to trub. We also recommend circulating outside the malt pipe during mashing to improve temperature stability. By using the bottom 3-way valve in a middle position, you can split the flow around the malt pipe and over the grain bed. We recommend running the pump on 80-100% power and circulating both ways at the same time. More on this is found in the user manual.

You also add an extra 3-way valve on the lower port. This makes you able to also clean the system without disconnecting any tubes. As an option you can use the third valve to bypass the cooler.



3-ventilersoppsett

S = Temperature sensor

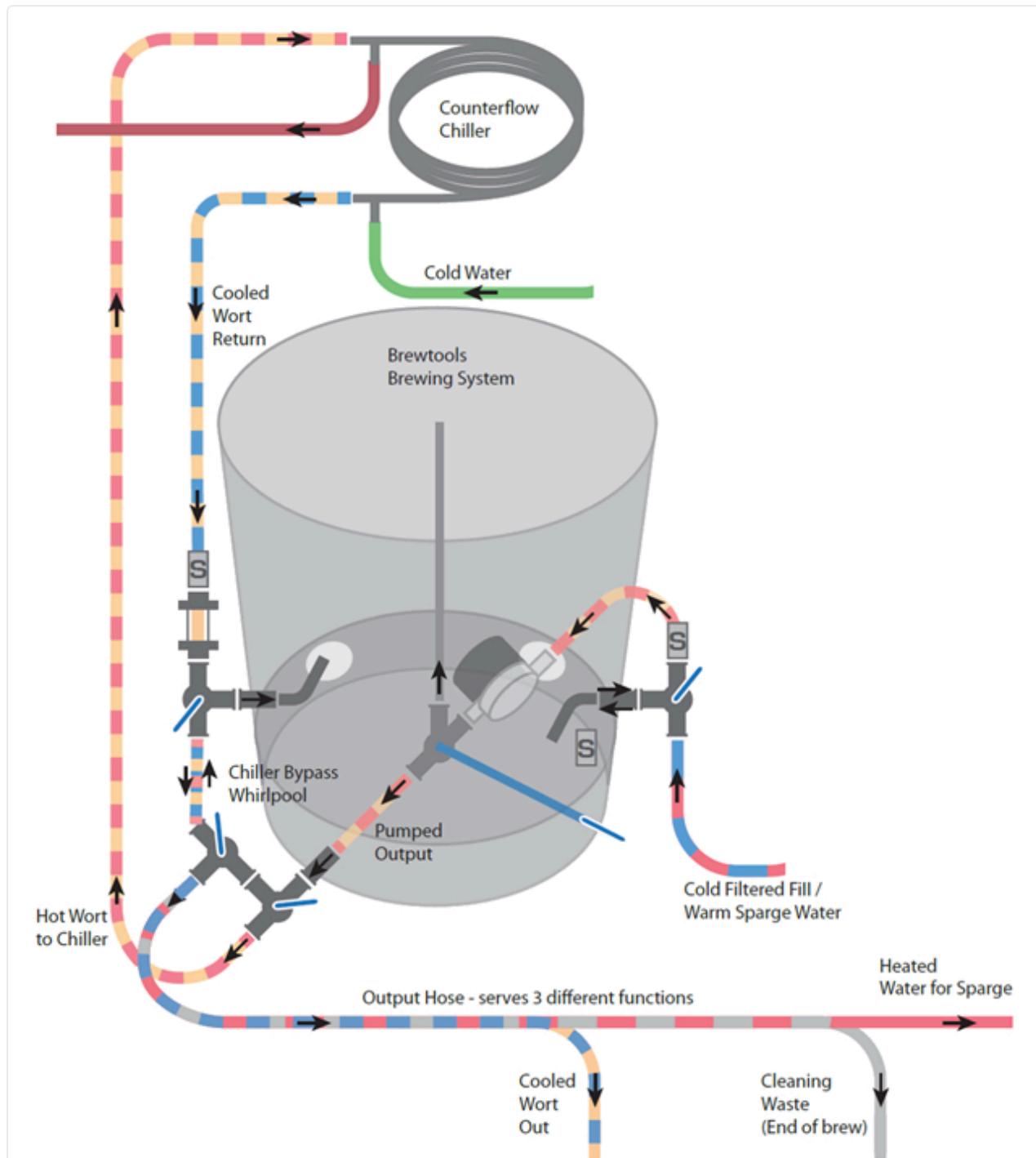
# Setup: 4 valves

The 4-valve setup is based on using a valve on each of the side ports as shown below. You also add a dip tube inside the left port. This allows the wort to be pumped out from the lower port, through the counterflow chiller and back into the left side port through the valve.

With this setup you can take advantage of a whirlpool during cooling. Proteins and hops will form a cone in the middle of the tank thus decreasing your losses to trub. We also recommend circulating outside the malt pipe during mashing to improve temperature stability. By using the bottom 3-way valve in a middle position, you can split the flow around the malt pipe and over the grain bed. We recommend running the pump on 80-100% power and circulating both ways at the same time. More on this is found in the user manual.

You also add two extra 3-way valve on the lower port. This makes you able to also clean the system without disconnecting any tubes. You can also bypass the cooler without disconnecting any tubes.

With 4 valves there are also a lot of other possible setups depending on your need.



4-ventilersoppsett

S = Temperature sensor

# Control system

Content based on version 1.8X

## Firmware version

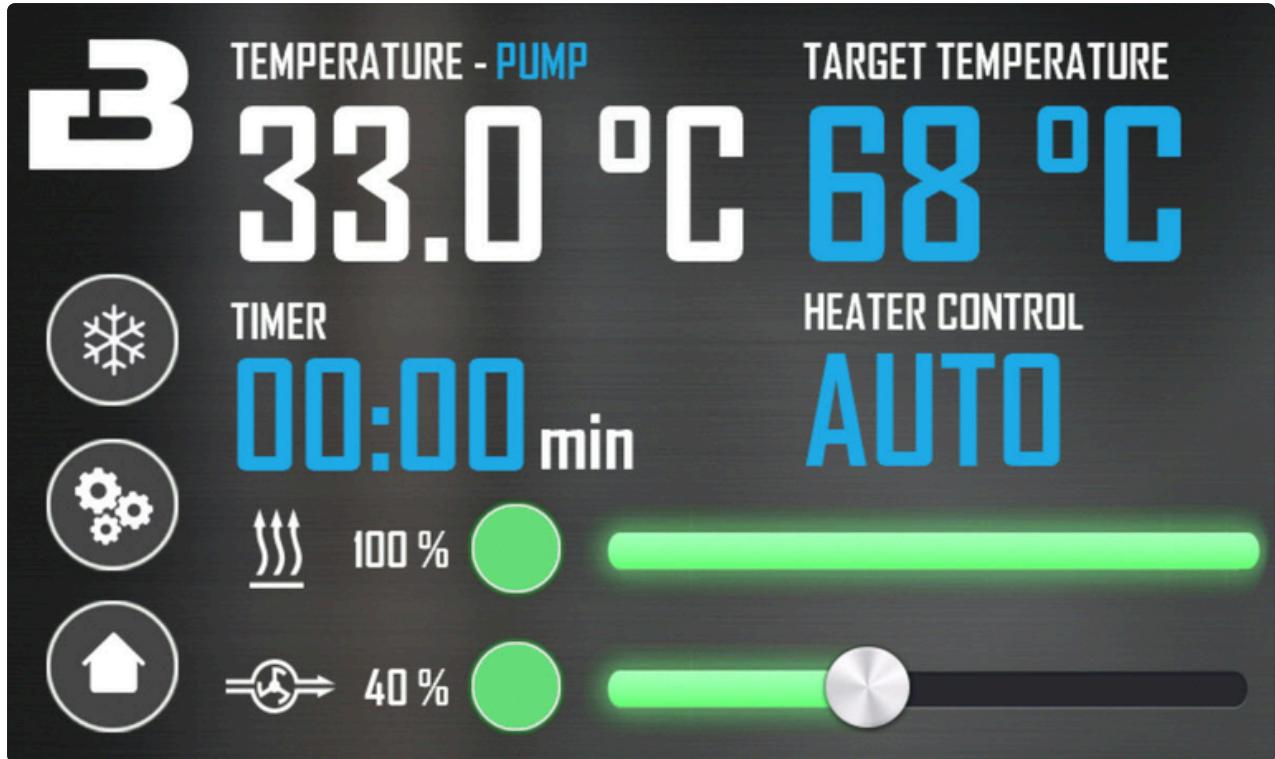
The current firmware version is displayed in the upper right corner on the home screen.



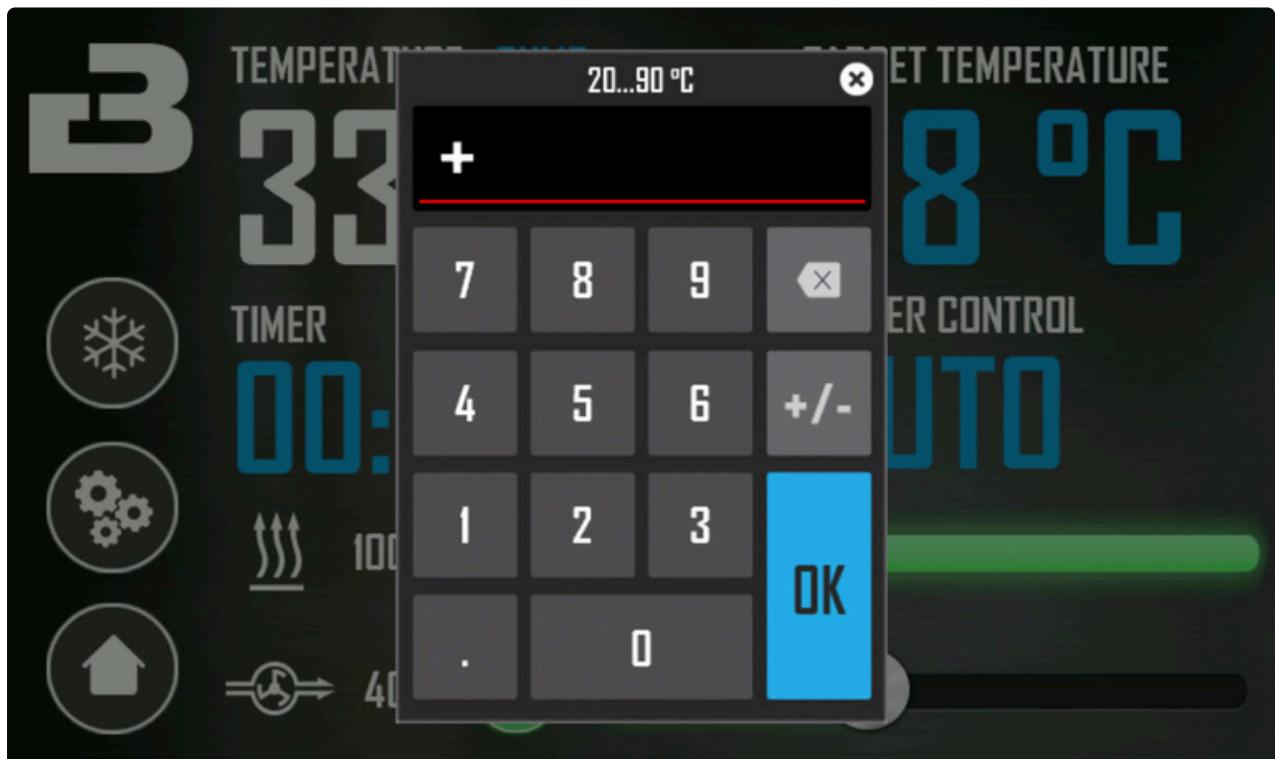
## General design principles

The device user interface utilizes some general design principles.

1. Blue text and blue digits indicate that it can be pressed to control a certain function.  
White text or white digits indicates that it has no function. Blue text or digits can have either one or two functions.
  - a. Push – First function
  - b. Push and hold – Second function
2. Green color is used to indicate that the heater or pump is turned ON.



3. Every place where the user is prompted to input a value a numeric pad will appear. The allowed numeric range is displayed at the top of the numeric pad. The displayed range is dynamic in terms of volume (liter/US gallon) and temperature (°C / °F) set in settings. If the user types an invalid number, nothing will happen when pushing «OK».



# Common functions

## Timer

A common timer function is made available from manual control, recipe, and delayed start. The timer has two functions.

1. Push – First function – set the timer
2. Push and hold – Second function – pause or resume timer

The timer made available in manual mode and recipe mode show remaining time in MM:SS format. Push to set a new time or push and hold to pause the timer. The timer will start to blink to indicate that the timer is paused. Push and hold once more to resume the timer. When the time is up, the built in buzzer will sound according to the settings. Please see separate section regarding settings.



The timer used for delayed start is slightly different. As it allows for up to 24 hours, the format is HH:MM:SS to provide a better user experience. Please see separate section for delayed start mode.



## Pump control

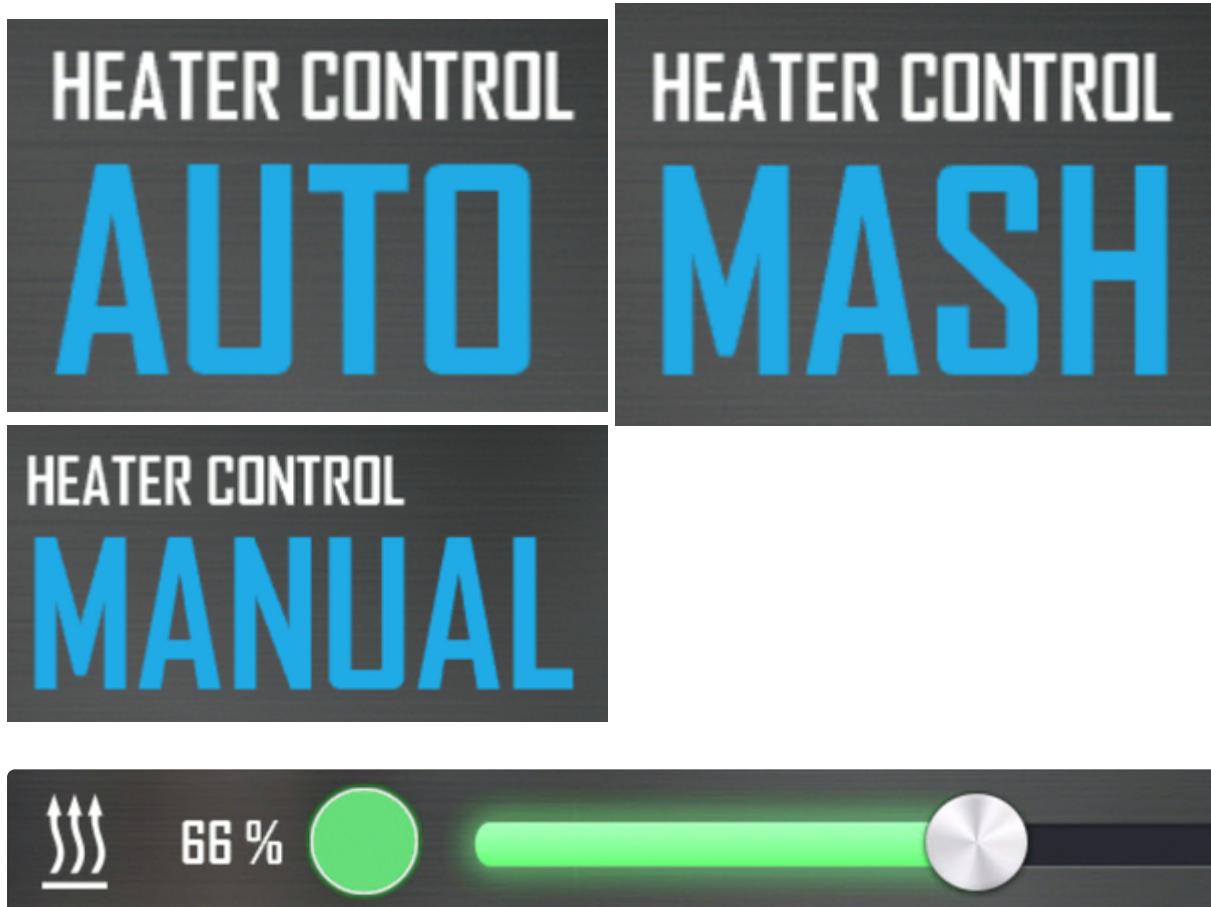
The pump can be turned ON and OFF using the round button to the left of the slider. The slider is used to control the pump speed.



## Heater control

The built-in heaters can be controlled in three different modes. Push the blue text to toggle between the modes.

1. AUTO – PID control limited by “Max current” set in settings menu.
2. MASH – PID control limited by “Mash mode power” multiplied by “Max current” set in settings menu.
3. MANUAL – Manual power control based on slider position. “Max current” set in settings menu define the scaling of power output.



The heaters can always be manually turned ON and OFF by pushing the round button on the left side of the slider.

The PID controller only use one temperature sensor at the time as process input. This means that it uses either the tank sensor or the pump in-line sensor. Indication to what sensor is currently in used as process input is indicated by the text above the actual temperature display.



In settings menu, a «sensor threshold» can be defined. This value is set in percentage and cohere to the pump speed. If the pump speed is set, using the slider, to a value higher than the threshold, the PID controller will automatically switch to using the pump in-line sensor. Similar, if the pump speed is set to a value lower than the threshold, the PID

controller will automatically switch to using the tank sensor. This is to ensure that the in-line pump sensor is not used as process input if the pump speed is too low to provide a satisfying temperature control. It is always possible to override what sensor that should be used by pushing the temperature value. Selected sensor is indicated by the text above the actual temperature value. If sensor selection is overridden, the text will be displayed as red as opposed to blue.

## Return temperature and mash temperature

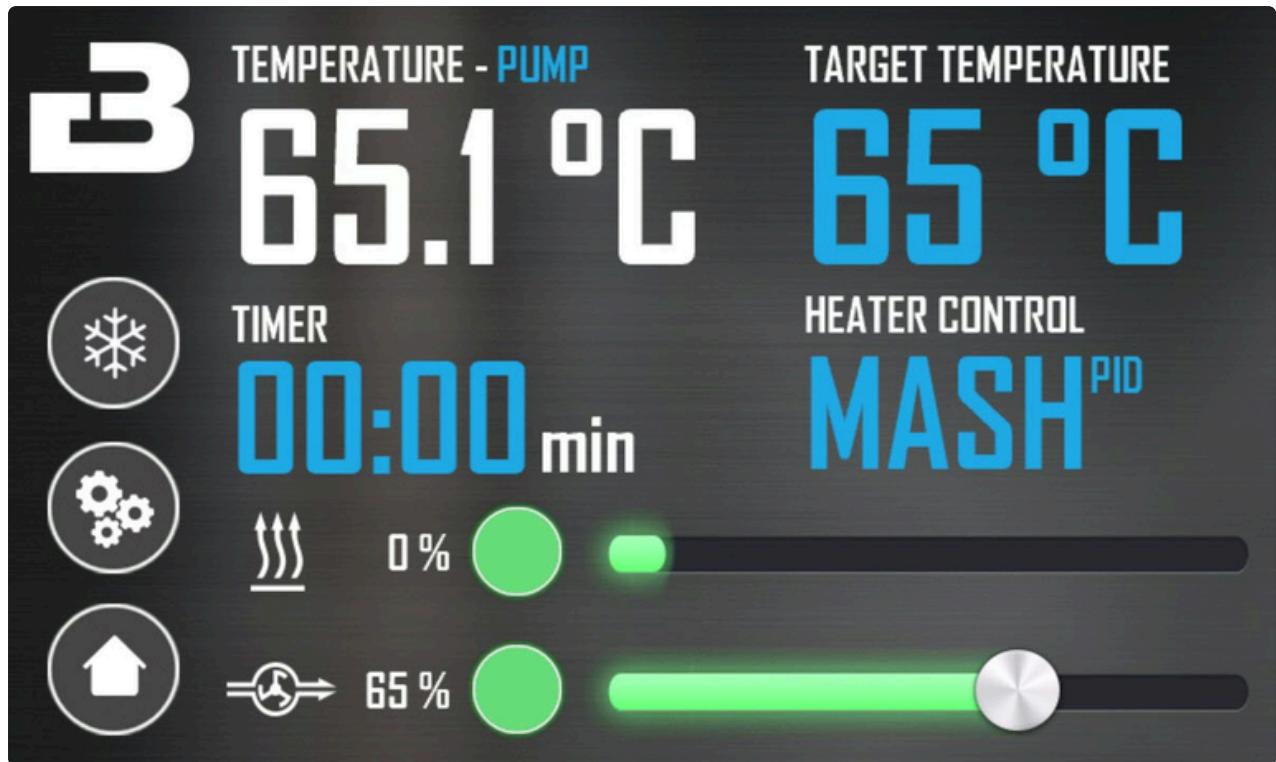
In addition to the Tank- and Pump sensor, further two temperature sensors can be connected to the control system.

- **Return temperature:** This sensor is normally placed on the outlet of the counterflow chiller.
- **Mash temperature:** This sensor is manually placed into the grains while mashing.

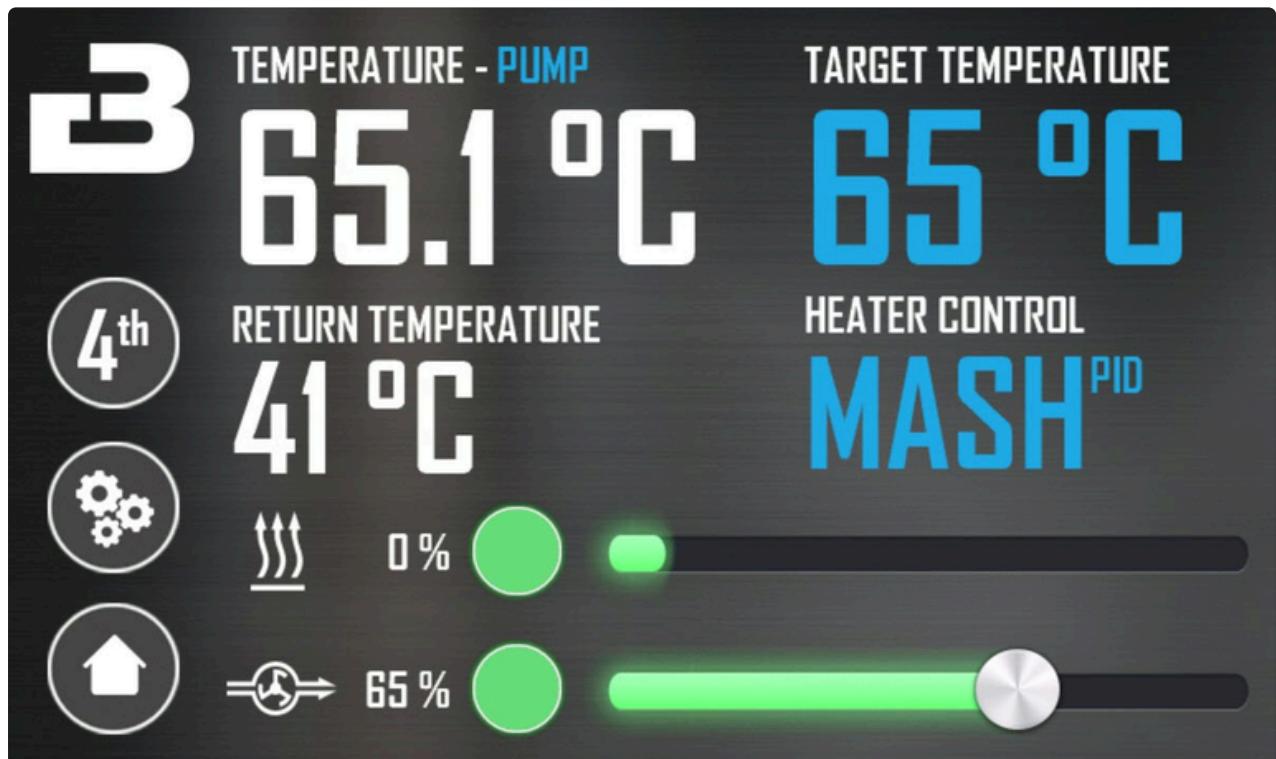
The temperatures can be seen on the display by clicking on the upper left button. This will toggle between:

- Timer
- Return temperature
- Mash temperature

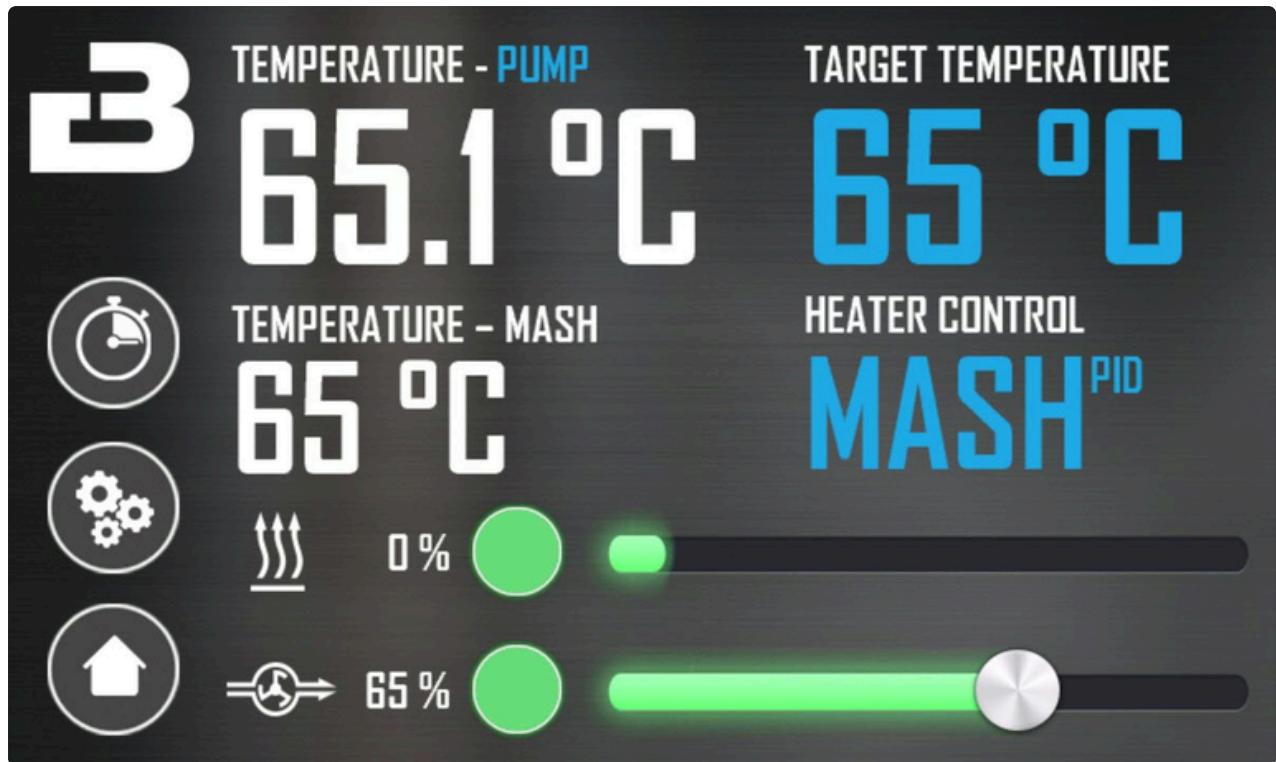
The following pictures show what happens when toggeling between the three displays.



Manual control - Timer



Manual control - Return temperature



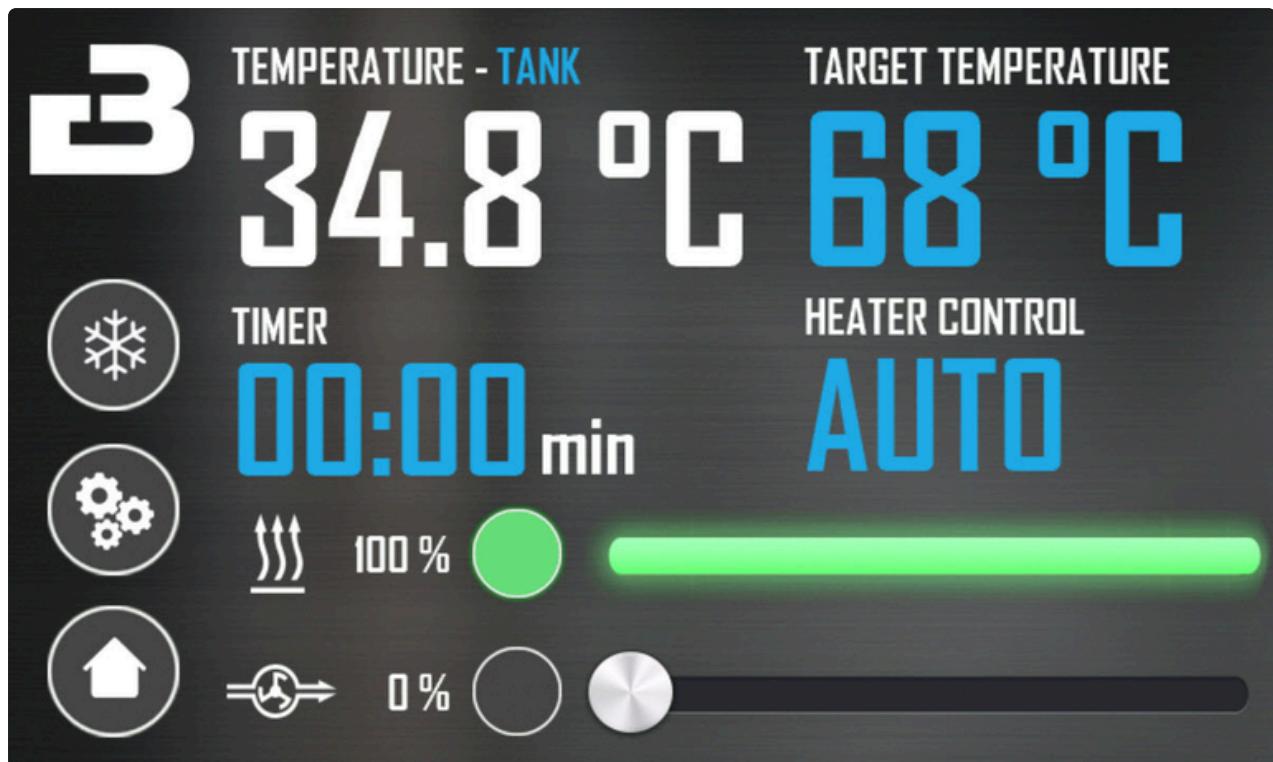
Manual control - Mash temperature

Note that, the heater control cannot be controlled using return- or mash sensors input. At least not for now :-)

## Manual control

Manuel mode is where you want to be if you want to have full control and continuous interaction with the equipment during the brewing process. Absolutely recommended as a starting point if you are new to the brewing equipment.

If you want to use the machine as a «Sous vide», manual mode is what you will be using.



From the manual mode screen, multiple functions can be performed e.g. changing the target temperature, toggle between the three heating control modes as well as using the timer. The pump can be controlled manually, and it is even possible to change settings live while brewing. By pushing the button with the snow crystal symbol, the timer will be swapped with the temperature from the third sensor (accessory). The timer will still run in the background and by pushing the same button the timer will reappear.

## Recipe

Recipe mode allow you to define the whole brewing session and let the control system guide you through the whole brewing process, keeping track of time and temperature. It is possible to store up to 20 custom recipes on the device. A new recipe can be added manually on the device by clicking the plus symbol. Recipes can also be imported from Brewfather by clicking at the Brewfather logo.

More details on how to import recipes from Brewfather, click the link below.

Brewfather integration

>

Stored recipes can be edited (pencil symbol), deleted (recycle bin symbol) or executed («play» button). Changes to recipes will not be automatically synchronized back to Brewfather.



Below is an example of how a recipe can look like. By taking the time to type the hop name and amount, you will experience that the text will appear during the brewing process which is of great help.

Recipe name  
**Brewtools IPA**

Strike overshoot temperature	<b>7</b>	°C
Boil time	<b>90</b>	min
Cooling target	<b>20</b>	°C
Sanitizing time	<b>10</b>	min
Mash water	<b>55.0</b>	liters
Sparge water	<b>12.0</b>	liters
Sparge temperature	<b>78</b>	°C

**Mash steps**

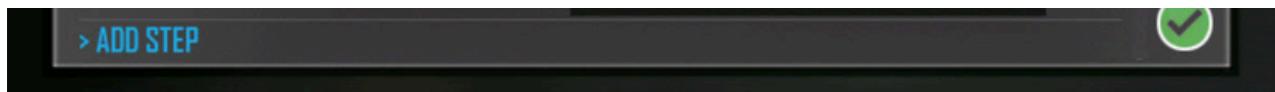
Step 1	<b>66</b>	°C	<b>60</b>	min	
> ADD STEP					

**Boil additions**

Addition 1	-	<b>90</b>	min	<b>Columbus 180g</b>	
Addition 2	-	<b>45</b>	min	<b>Columbus 180g</b>	
Addition 3	-	<b>30</b>	min	<b>Simcoe 180g</b>	
> ADD STEP					

**Hopstand additions**

Temperature	<b>80</b>	°C		
Time	<b>20</b>	min		
Addition 1	<b>Simcoe 270g</b>			
Addition 2	<b>Centennial 180g</b>			



**Recipe name** – Give the recipe a proper name to make it easier to find it.

**Strike overshoot temperature** – Set the strike temperature if you want to compensate for the grain temperature absorption.

**Boil time** – How long the boil will last.

**Cooling target** – Target temperature for transferring to fermenter.

**Sanitizing time** – Get a reminder before the boil time is over to start the pump to circulate boiling wort through the counterflow cooler and hose line to sterilize it.

**Mash water** – Amount of mash water to be used.

**Sparge water** – Amount of sparge water to be used.

**Sparge temperature** – Temperature of the sparge water.

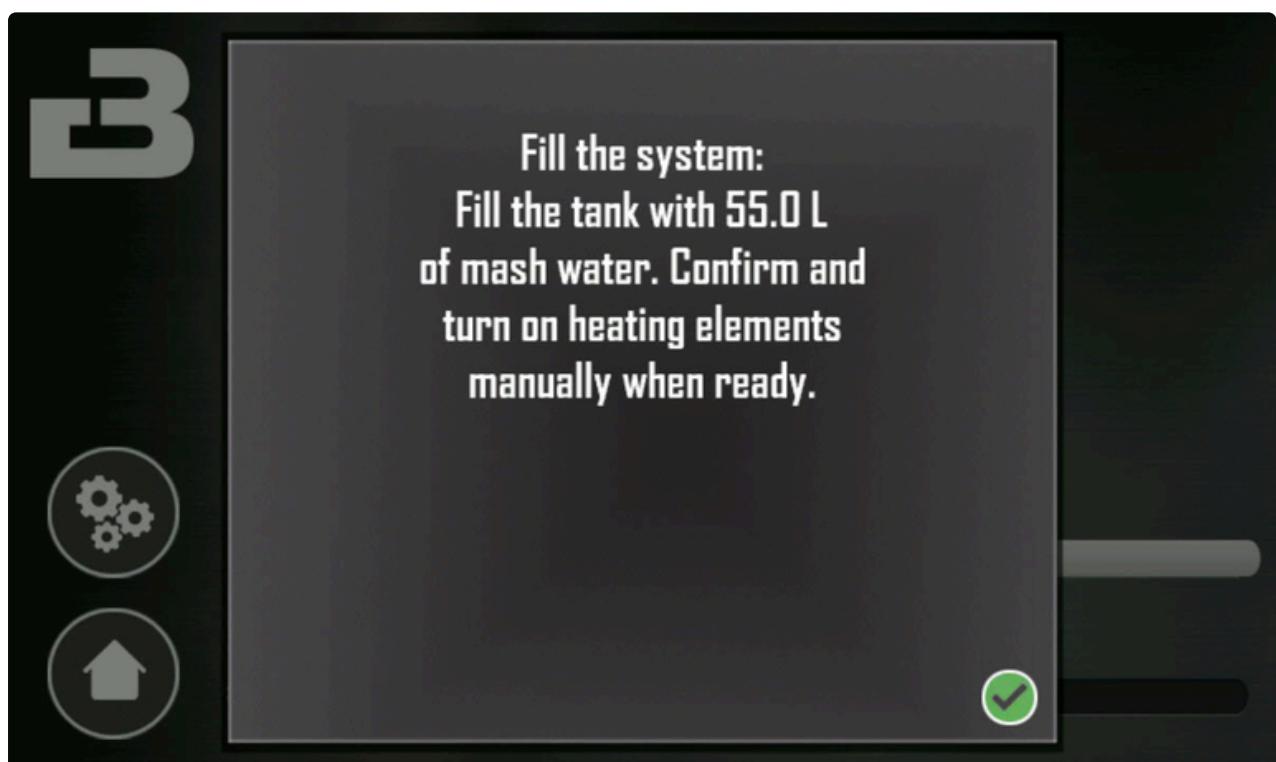
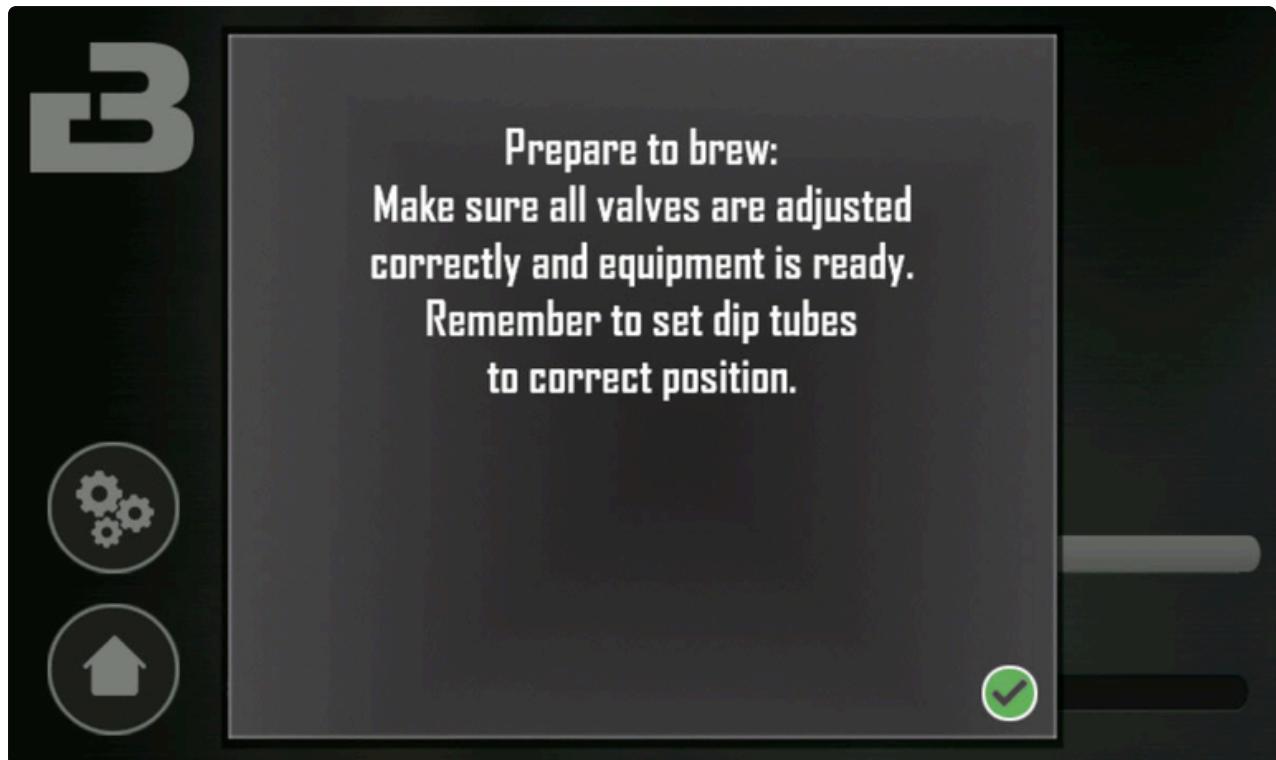
**Mash steps** – Define mash steps. Maximum 16 steps. Temperature must be incremental for each step.

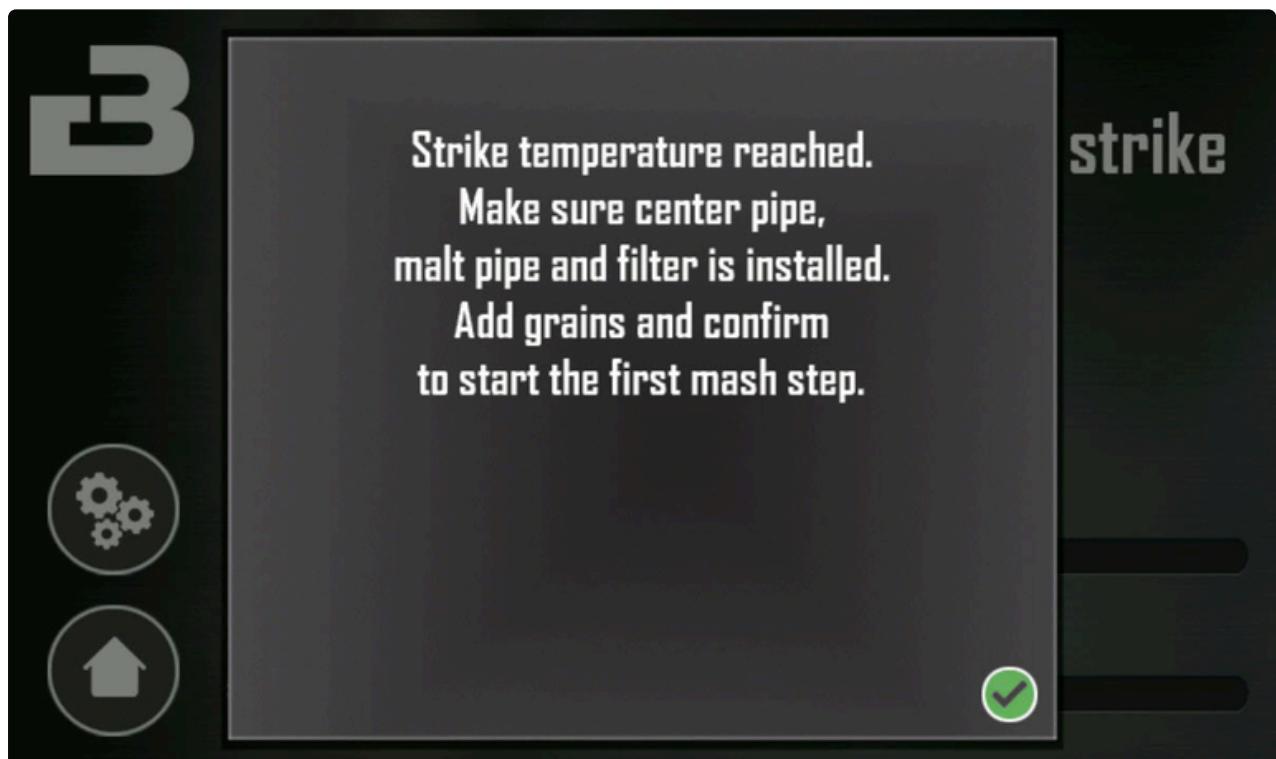
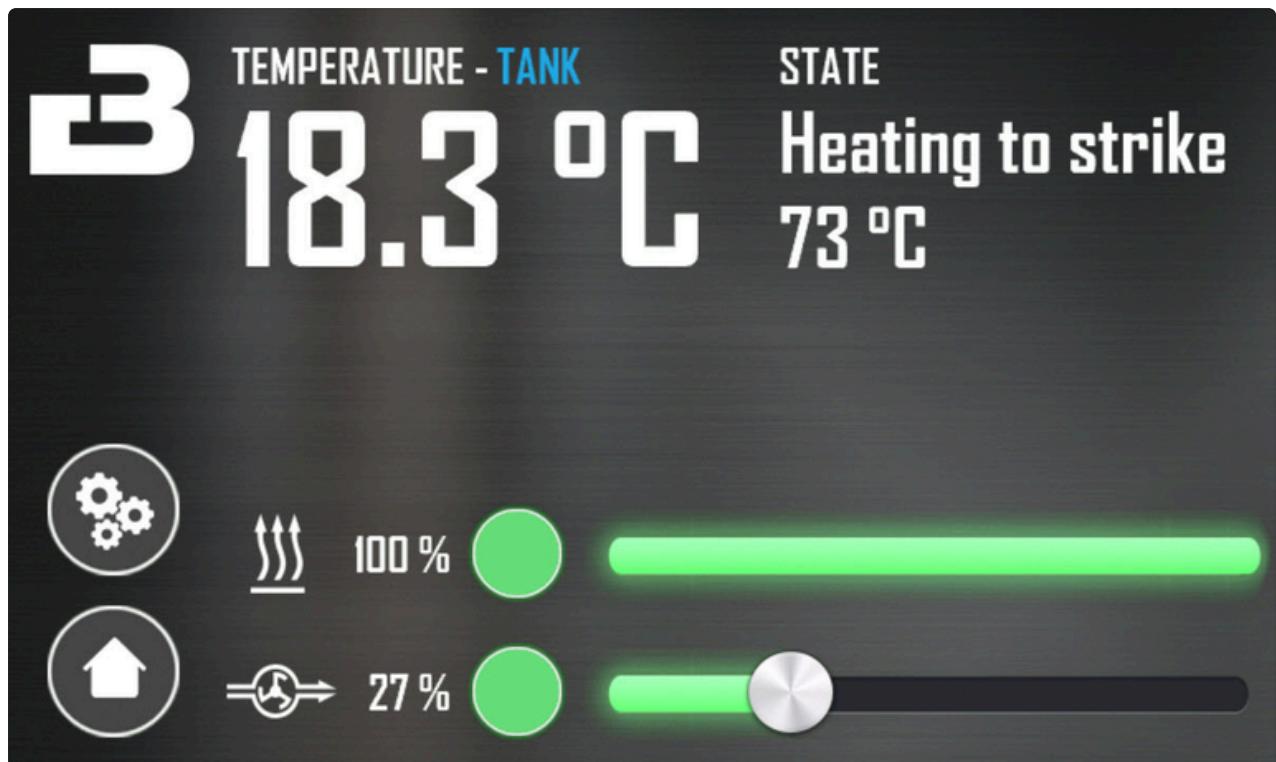
**Boil additions** – Define the additions used during boiling. Maximum 16 additions. Time for each addition is defined as how long it will be boiling. Time must be within total boil time defined above. Text is used as help as it will appear on the screen along the way.

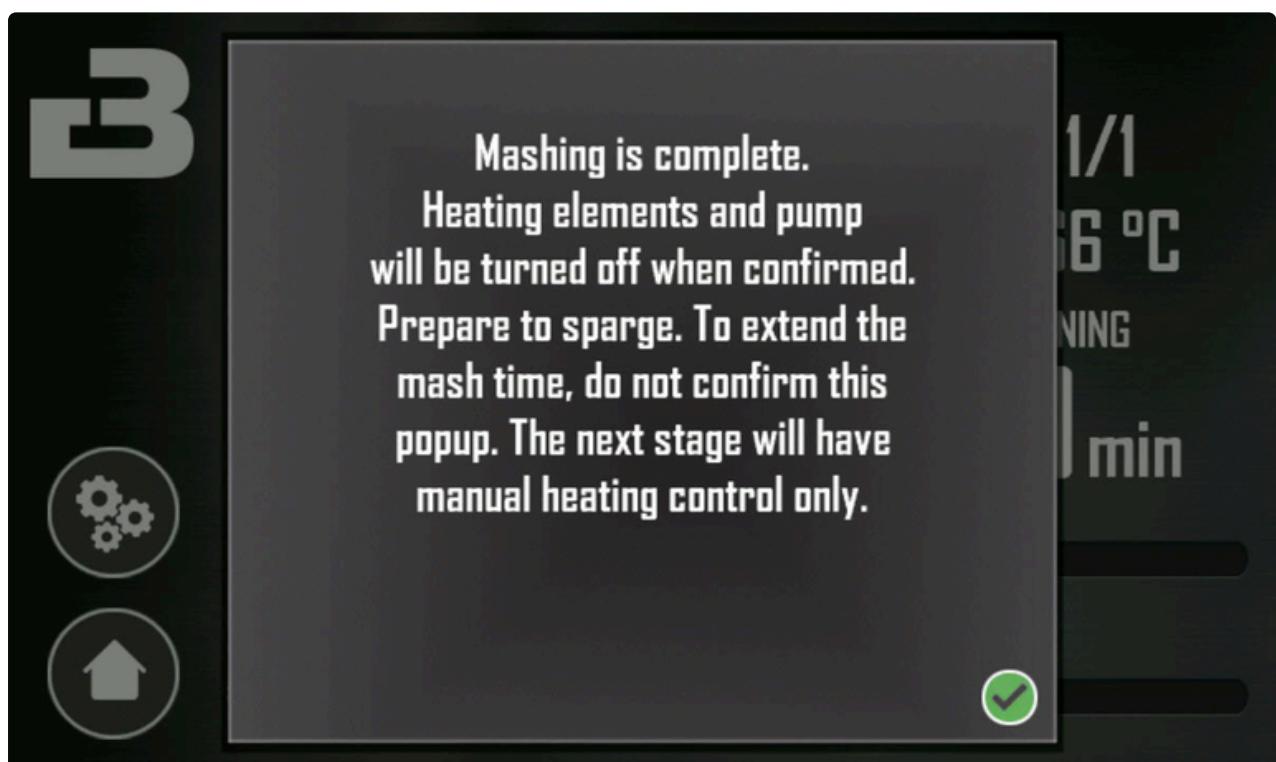
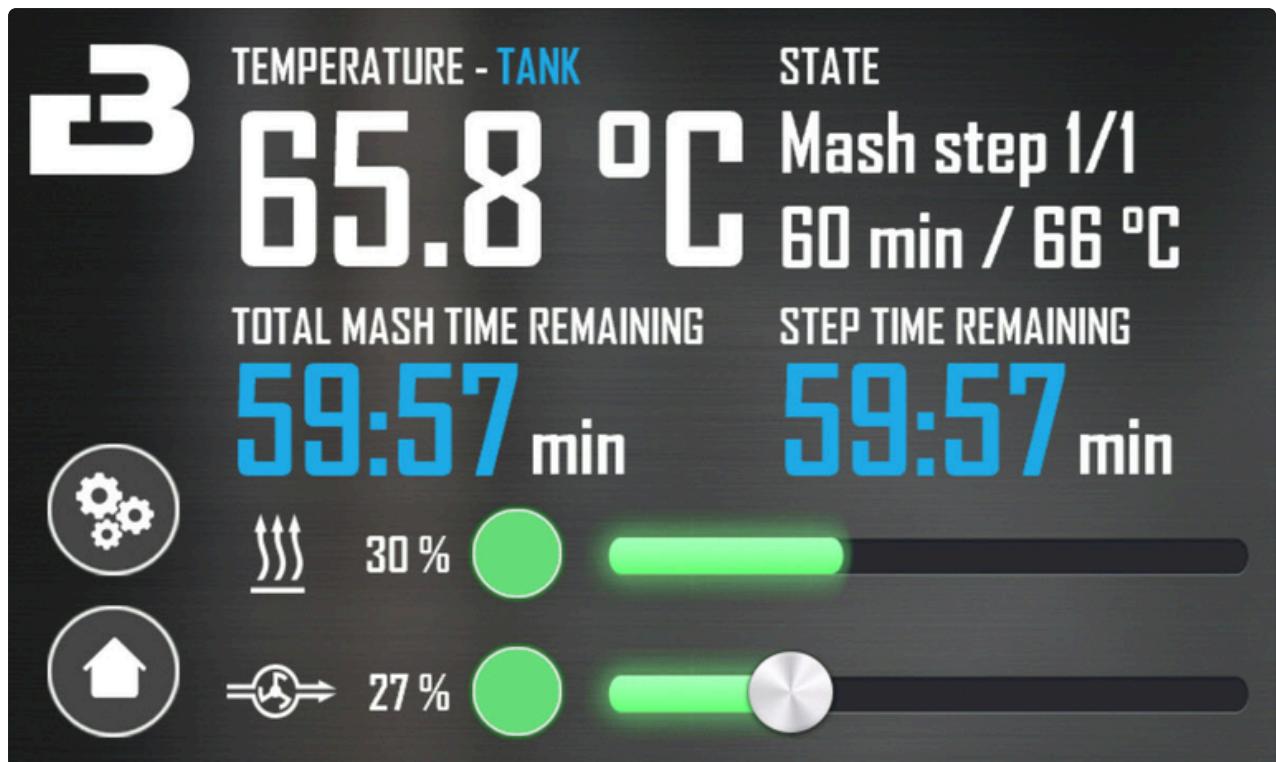
**Hopstand additions** – Define hop stand. Set time to «0» to skip hop stand.

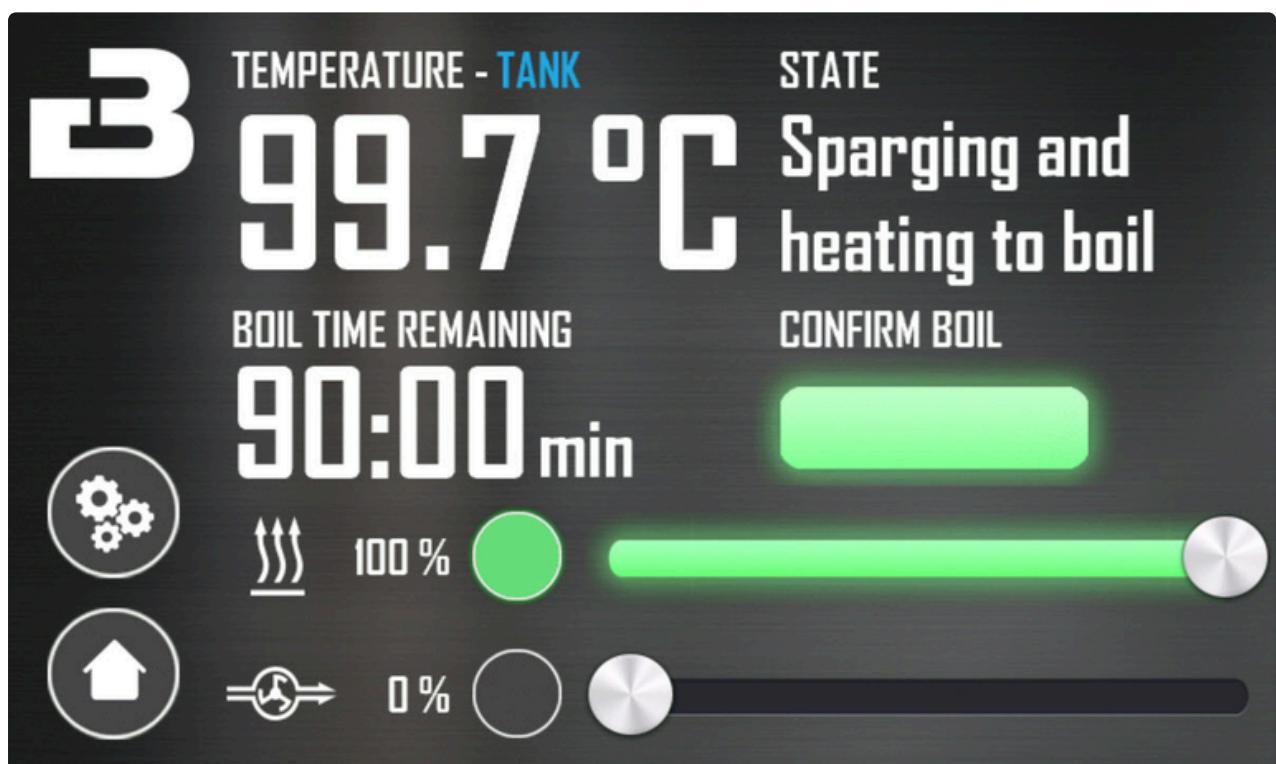
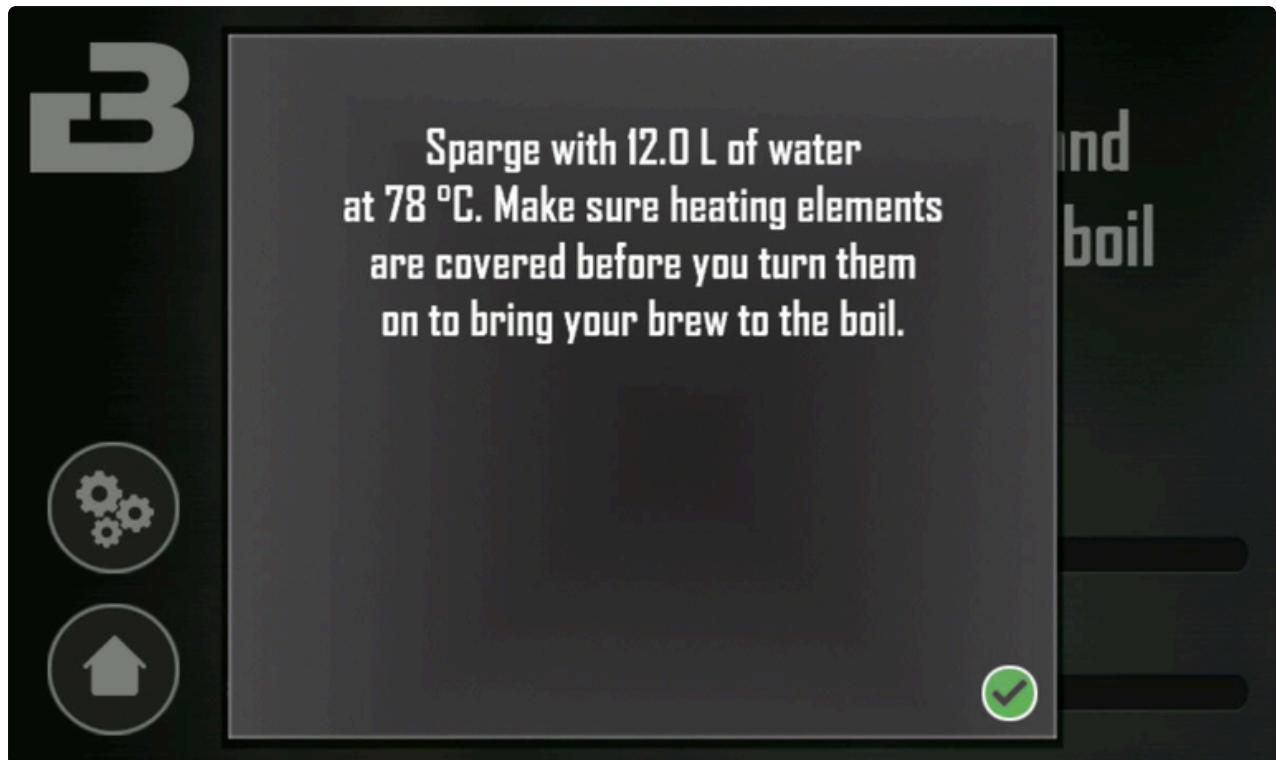
While running a recipe, notifications will pop up to guide you through the whole brewing session. A selection of notifications will also sound the buzzer according to settings.

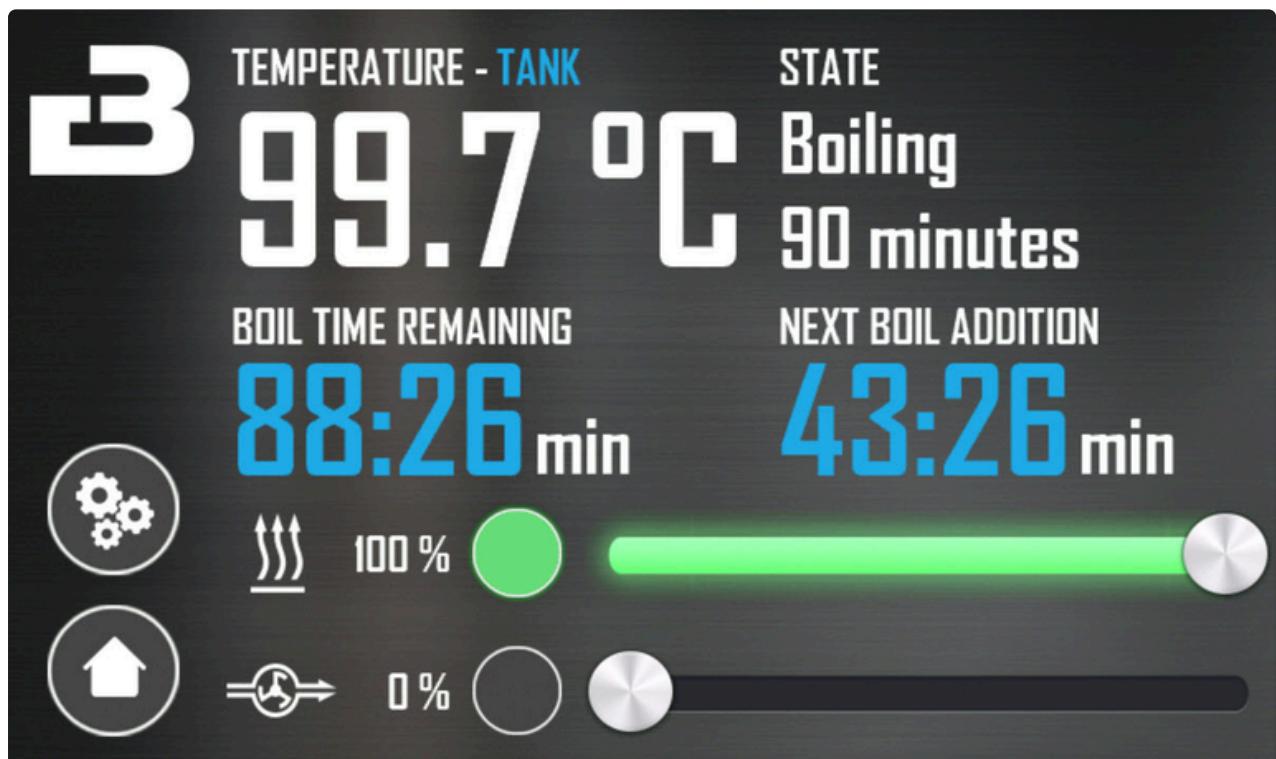
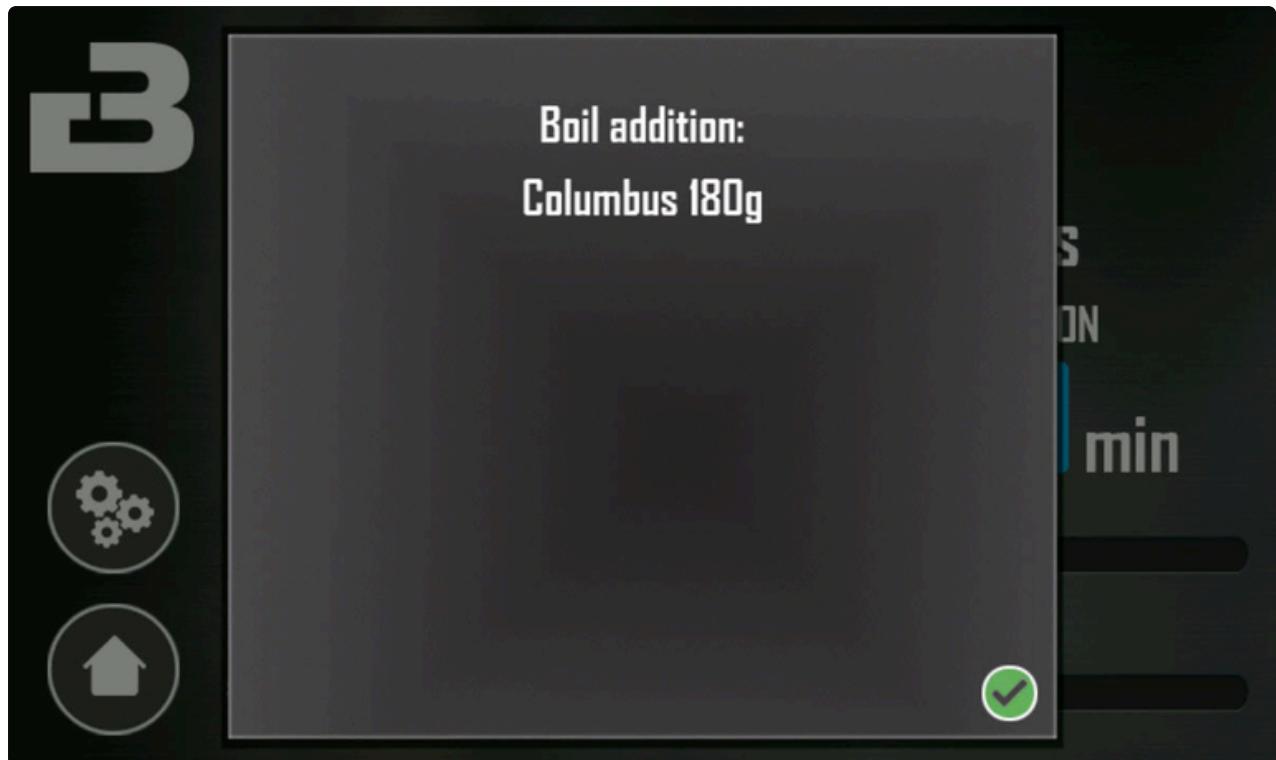
Below are some examples of how running a recipe mode will look like.









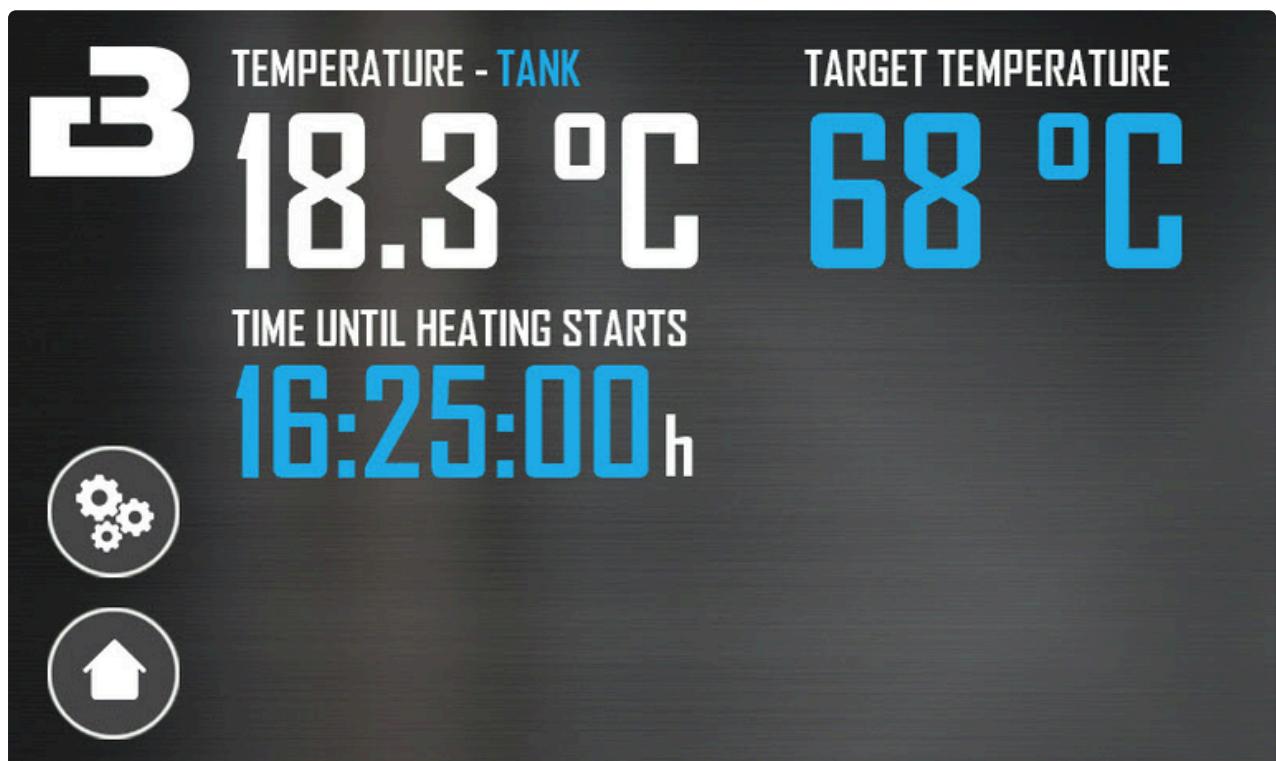


## Delayed start

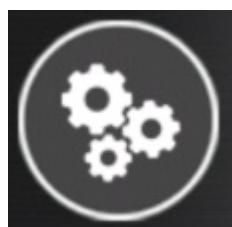
Delayed start is a mode that allows you to schedule the machine to automatically heat your strike water beforehand, saving time on the brew day. The timer can be set to

maximum of 24 hours countdown.

To use it, fill the tank with the right amount of mash water and set the timer to when the heating will start. Remember to allow necessary time for the water to heat, typically 30-60 minutes. When the set point temperature is reached, a safety mechanism is embedded to shut down the power after 4 hours. Time to shutdown will be displayed. This safety feature is implemented in case you forget or for some reason are prevented for conducting the brewing session. An additional safety feature is in place in case the sensors fails while delayed start is active. If sensor fails, the heaters will turn off or not starting at all.



## Settings



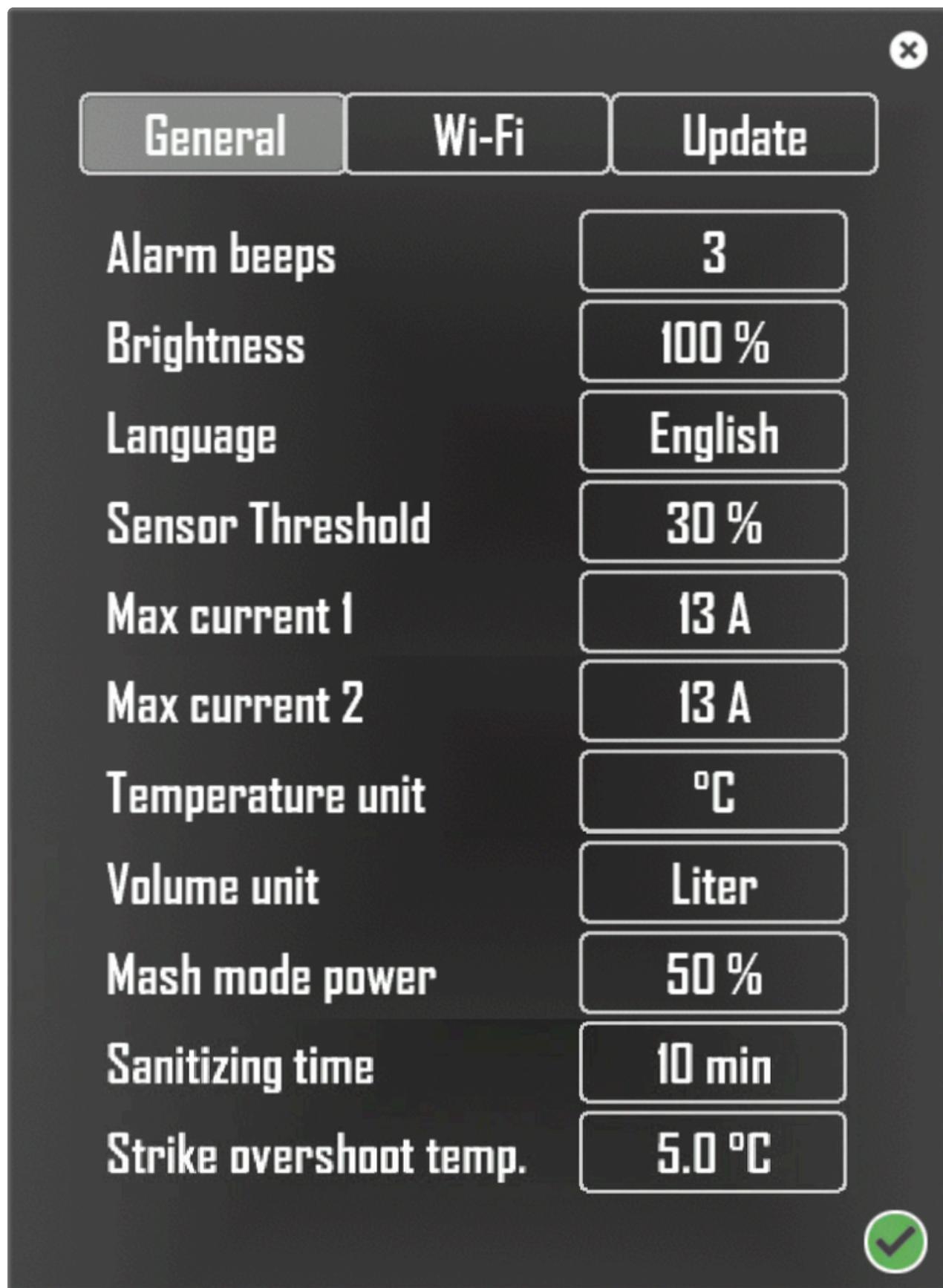
Settings are made accessible from multiple places in the control system

and will allow live changes without interrupting ongoing activity.

Settings are divided into 3 tabs.

## General

Under the «General» tab you will find most of the day to day settings.



**Alarm beeps** – Number of beeps when the buzzer is activated. Choose; none, 1,3,5 or continuous.

**Brightness** – Select screen brightness in 20% increments from 40% to 100%.

**Language** – Select language. English, Norwegian, Italian, German, Spanish or French.

**Sensor Threshold** – Set the pump speed threshold where the in-line pump sensor automatically will be used as opposed to tank sensor as process input for temperature control. Select either 20%, 30%, 40%, 50%, 60% or 70%. It is still possible to override this, please see heater control section further up.

**Max current 1** – Set the max power draw for power input 1. It is recommended to set it according to amperage rating on the circuit breaker feeding your power outlet. Available settings are: 10A, 13A, 15A and 16A.

**Max current 2** – Set the max power draw for power input 2. It is recommended to set it according to amperage rating on the circuit breaker feeding your power outlet. Available settings are: 10A, 13A, 15A and 16A. Note! B40pro 240V version does not use this setting as it only has one power input cable.

**Temperature unit** – Select Celsius (°C) or Fahrenheit (°F).

**Volume unit** – Select Liter or US Gallon (1 US Gallon = 3.785 liters)

**Mash mode power** – Select power limitation used in Mash mode. This is a nice feature to reduce or avoid burning of the heating elements in cases of using wheat grains and/or step mash programs. Toggle to select either 30%, 40%, 50%, 60%, 70%, 80% or 90% power during mash mode. The power reduction is related to any additional reduction set in Max current setting, so make sure total power available is enough to keep a stable temperature or perform a temperature increase during step mash at preferred pace. Other factors that will play a role are: surrounding temperature, whether lid is on or off, use of insulation jacket, volume in the kettle and voltage. It is recommended to test this prior to starting the brewing session, especially if you plan to use recipe mode as it will not allow you to change this on the fly.

To enable the power reduction, now called; mash mode, please see heater control section further up. If the text "MASH» is shown below the target temperature, you know it is activated. You will also see that the power slider indicator on the screen is locked to not

exceed the percentage value set. For recipe mode, the system will automatically select mash mode.

**Sanitizing time** - Select how long before the end of boil the system should notify user to start circulating through the countercurrent cooler to disinfect the equipment. The value is used by default every time you create a recipe on the device or in cases where it is not defined when a recipe is downloaded from Brewfather.

**Strike overshoot temperature** - Select how much warmer the water should be for strike to compensate for the temperature effect of the grains when it is poured into the brewing machine. The value is used by default every time you create a recipe on the device or in cases where it is not defined when a recipe is downloaded from Brewfather.

## Wi-Fi

To connect the device to a 2.4GHz Wi-Fi network with internet access, you will have to consent to Brewtools collecting anonymous data for the purpose of improving the services. Consent is given from the screen before filling in SSID and password.

Note! SSID is case sensitive meaning it distinguishes between small and capital letters. Additionally, some special characters are not supported by the system. Please check the keyboard on the device for allowed special characters.



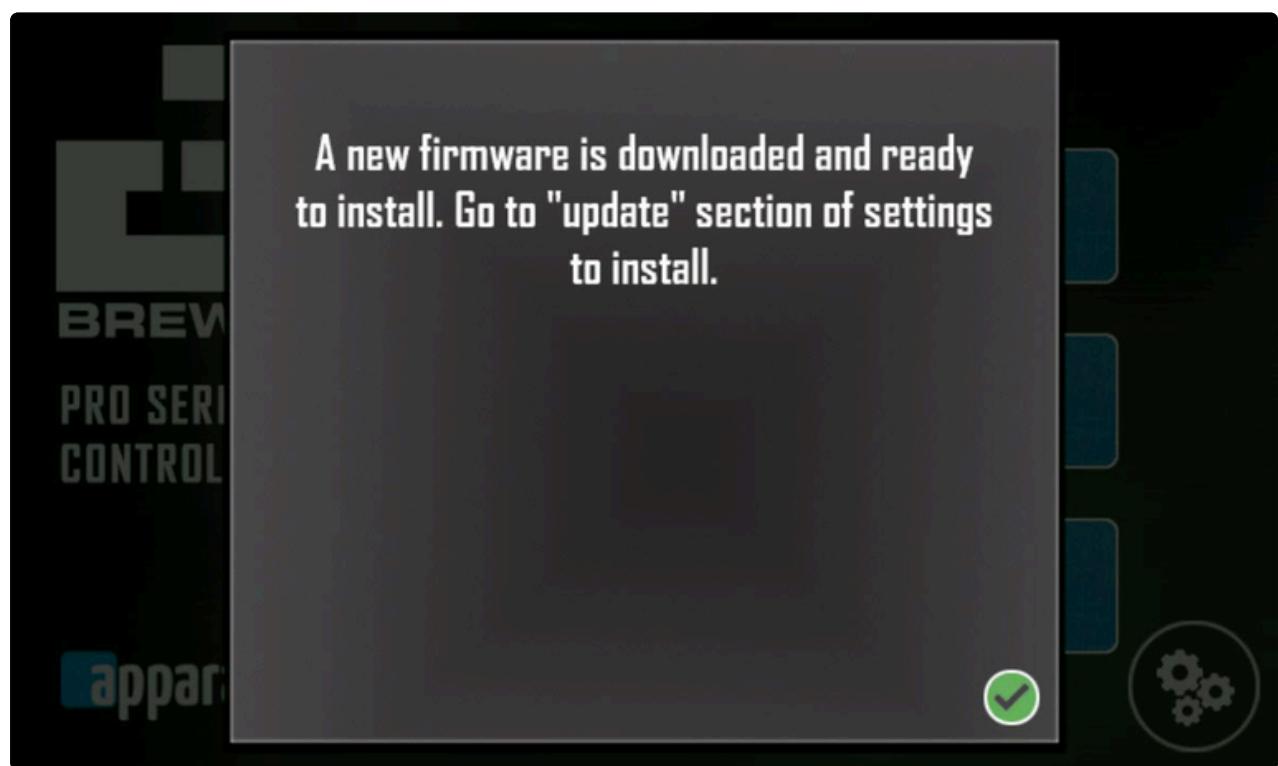
Connection status is shown to the right. To disconnect the device from Wi-Fi, press the thick box. Last used SSID and password will be stored locally at the device.

## Update

If the device is powered on and connected to internet, it will download new firmware as it become available:

- microSD card is installed in a slot on the backside of the control box.
- Connected to internet.

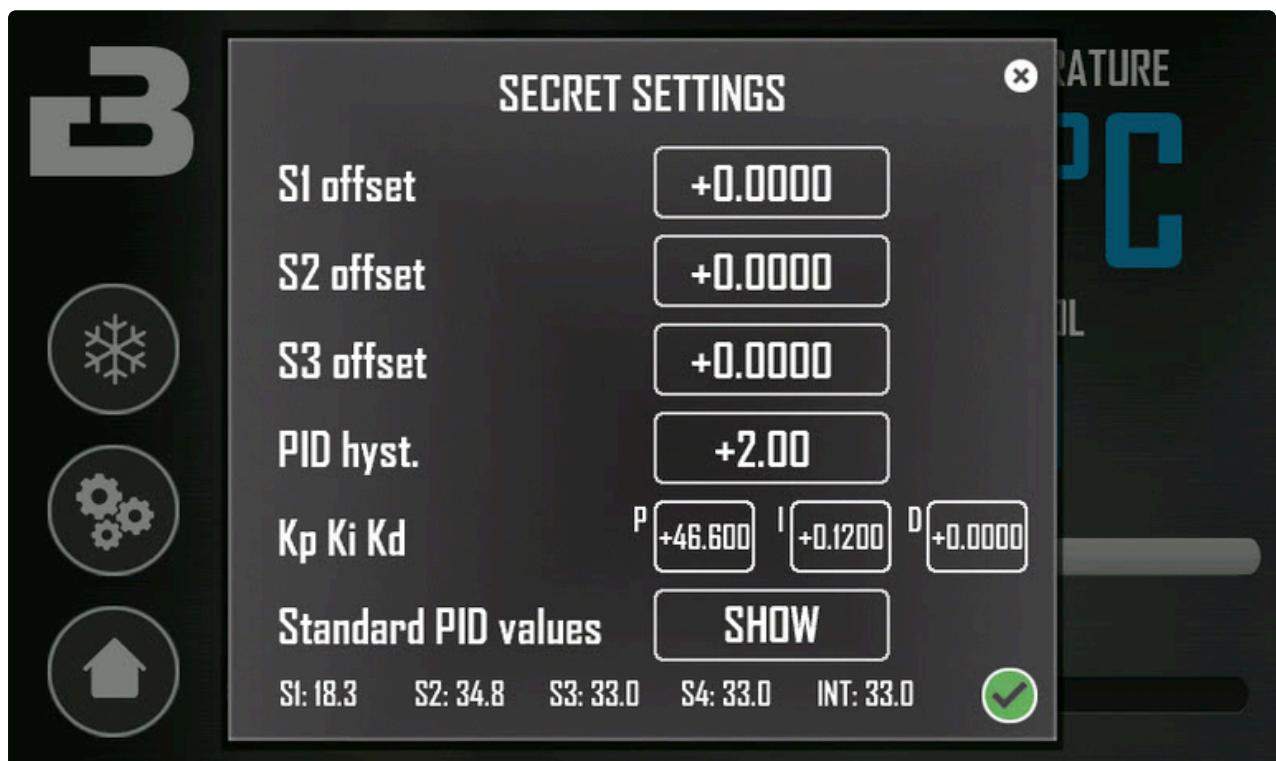
To check whether the device is downloading an update, please open the «Update» tab. When a new firmware is downloaded, user will get a notification. User then decide to install immediately or next time the device is powered on.



- (i) A [Trello](#) board has been made available for users to report bugs and propose new features. Check out [www.brewtools.com](http://www.brewtools.com) for more information.

# Secret settings

A secret settings menu is available from Manual mode or Delayed start. By pushing and holding the B-logo for more than 3 seconds you get access to settings that are considered more advanced and normally not relevant for most users. Offsetting temperature sensors and changing the PID controller parameters should not be done unless it is familiar to you.



Push «SHOW» button to see the default PID parameters.

From firmware version 1.6.0, standard PID parameters were changed to reduce temperature from overshooting/exceeding the target temperature.

Version 1.5.1 and previous: P=60 I=0.023 D=0

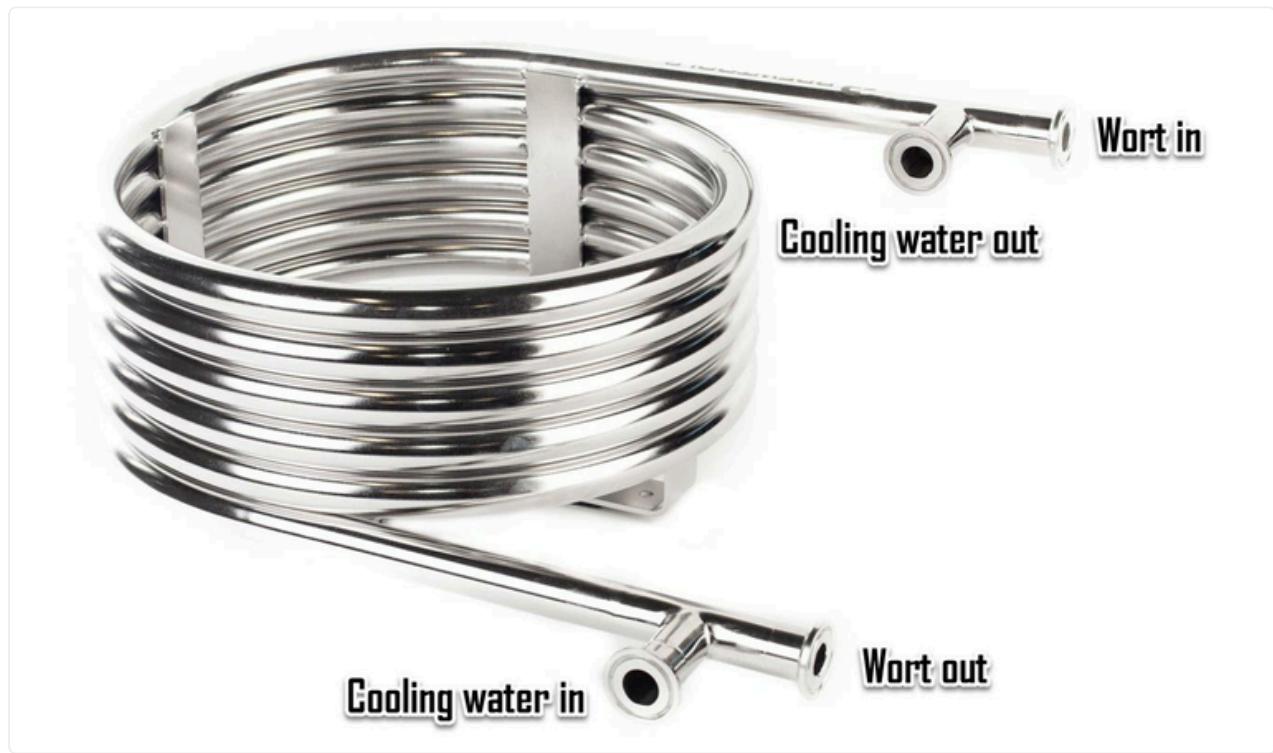
Version 1.6.1 -> : P=46.6 I=0.12 D=0



Note! The controller needs to be restarted for new PID parameters to be enable.

# Counterflow Cooler

The counterflow cooler is made with high quality steel pipes, and has a design that does not reduce flow too much. The wort can be pumped through the counterflow cooler and back into the kettle via the dip tube to create a whirlpool. The whirlpool will draw particles towards the center of the tank and reduce trub (hops and proteins) transferred to fermenter.



Counterflow Cooler

- ⓘ Using the Trubinator will help collect and hold the trub when emptying the tank at the end of the brew day. Read more [here](#).
  
- ⓘ The counterflow cooler is not designed for "one pass" cooling by letting the wort flow slowly and then straight to the fermenter.

## In use

In preparation for cooling, it is important that boiling wort is circulated through the cooler to ensure that the cooler's inner tube is sanitized.

Switch off heating elements before cooling starts. Set the bottom valve so that the liquid is pumped out and through the cooler. Follow the liquid flow to make sure that all valves are in the correct position before starting the pump. It is recommended to run the pump at full power (100%) in the beginning and slow down before the end to allow the trub to settle.

Select the return temperature display on the screen if you opted for this accessory. This way you can keep an eye on the temperature of the returning wort. Also monitor the tank temperature.

If you're doing a hop stand, the pump is stopped manually based on the tank temperature. Set the timer manually based on how long the hopstand should last, if not already set in recipe mode.

When the desired pitching temperature is reached (based on return sensor), change the flow direction after the cooler so that the wort goes to the fermenter and not back into the kettle.



Remember to connect the cooling water opposite direction of the wort flow.

## Product specification

- Length: 5.2m
- Inner pipe: 14.3mm
- Outer pipe: 22mm
- Fittings: 4x TC34mm
- Material: SS304
- Surface treatment: Electropolished
- Box size: Height 22cm, Length 41cm, width 45cm
- Weight: 5.5 Kg

## Performance test

A performance test has been carried out to demonstrate the performance of the counterflow cooler. Additionally three different ways of using the counterflow cooler has been tested to demonstrate the difference in performance.

The goal of the test is to cool 50 liters / 13.2 US gallons og boiling wort down to 20°C / 68°F. The cooling water holds 9°C / 48°F and has a flow rate of 19 liter per minute / 5 US gallons per minute.



### **Method #1 - Cooling the entire tank content before transferring to fermenter**

Pumping wort from the tank, through the cooler and back into the tank until all wort in the tank is 20°C / 68°F.

#### **Results:**

Time: 19 min.

Cooling water consumption: 361 liters / 95 US gallons.

100°C / 212°F to 80°C / 176°F in 2 min

80°C / 176°F to 40°C / 104°F in 7 min.

40°C / 104°F to 20°C / 68°F in 10 min.



### **Method #2 - Cooling until return temperature is 20°C / 68°F and then start the transfer to fermenter**

Pumping wort from the tank, through the cooler and back into the tank until the return temperature out of the cooler is 20°C / 68°F. Change the wort flow to start the transfer to fermenter.

#### **Results:**

Time: 16.5 min (13 min until transfer starts + 3.5 min to complete the transfer).

Cooling water consumption: 315 liters / 83.2 US gallons.



### Method #3 - "Single pass"

Pumping wort from the tank, through the cooler and directly to the fermenter. The flow needs to be restricted at the cooler output using a valve so that the temperature to the fermenter is 20°C / 68°F.

#### Results:

Time: 26 min.

Cooling water consumption: 500 liters / 132 US gallons.

## Summary

Based on the test, it becomes clear that our counterflow cooler is not designed to be used as a "single pass" method. The reason for this is due to the hugely sized 14.5mm inner diameter tube designed to minimize the flow restriction as that will negatively affect the whirlpool-function.

Method #2 is 2 minutes faster and saves 46 liters of water compared to method #1.

# Steam hat

Our pro steam hats are designed for maximum flexibility. The steam hat is made for a steam condenser (accessory) or connect a ventilation duct to remove steam and smell during the brewday - especially the boiling phase. It also allows for use of CIP cleaning adapters.

The 110mm inspection hole is useful when adding boil additions or keep an eye on the boiling process.



B80pro Steam Hat

## Included in the box

- Steam Hat
- Silicone plug for the 110mm inspection hole
- Lid seal (silicone)

## You also need

- TC 4" clamp
- TC 4" gasket

## The following accessories can be used:

- TC 4" flange for 100mm Ventilation duct.
- Steam Condenser
- TC 4" CIP adapter and CIP ball for cleaning

The steam hat comes with four clamps to clamp it to the kettle. This is useful when the steam condenser is mounted on top to secure it.



The steam hat is not insulated and can get very hot. Use the fixed, rubberized handles to avoid burns.

Hot steam can escape if the silicone plug is removed while the system is in use. Make sure to keep hands and face at distance before removing the plug.

# Steam condenser

Our steam condenser fits our steam hats and uses cold water to cool the steam until it becomes a liquid that runs out of the condenser to a bucket or directly to the drain. It is an excellent alternative to a ventilation system.

## Assembly

Assemble all parts together according to picture below. All TC connections need a gasket. The nozzle is screwed inside the top 2" to 34mm adapter.

Assemble your water supply parts to the top inlet in order to supply the unit with cold water (sold separately). Remember to use a garden hose or similar that can withstand the normal tap water pressure. Recommended fittings are either a TC34mm to garden connector or a TC34mm to hose barb. Remember to use a hose clamp.



We recommend using one or two TC34mm elbows to ensure the water hose connects on top without bending and reducing the flow of water.

Install a tube to the outlet hose barb on the steam condenser. Included in the kit is a 19mm hos barb adapter which fits our standard 16x25mm silicone tube. As the steam condenser creates a vacuum to suck out the steam, it is important that the drain hose is not causing counterpressure. We recommend letting the condensed steam flow vertically to a bucket or a drain in the floor. If your floor drain is not close enough, use a second hose from the bucket to the floor drain.

Installing the steam condenser to the steam hat requires a 4" TC clamp fitting and gasket (not included).

The unit ships with a nozzle that supplies 1.1 liters of water per minute at 4 bar pressure. We also offer other nozzles that offers higher or lower flow depending on the water pressure where the system is used and other factors (sold separately). A B40pro requires less cooling capacity than the 6kW+ systems so if water consumption is important to

you, you can try the smallest nozzle. Note that the condensated water coming out of the steam condenser will have a higher temperature.

The table below explain how much water flow (l/min) the three different nozzles have based on water supply pressure. The standard nozzle is called 3002.5.

Pressure (Bar)	Flow Rate (l/min)									
	1	1.5	2	3	4	6	7	10	15	20
Pressure (PSI)	15	22	29	44	58	87	102	145	218	290
3001.4	0.32	0.39	0.45	0.55	0.64	0.78	0.84	1	1.2	1.4
3002.5	0.57	0.7	0.81	0.99	1.1	1.4	1.5	1.8	2.2	2.5
3004	0.91	1.1	1.3	1.6	1.8	2.2	2.4	2.9	3.5	4.1

Pressure (Bar)	Spray Angle (°)		
	1	3	7
Pressure (PSI)	15	44	102
3001.4	17	30	31
3002.5	17	30	32
3004	26	30	32

 Please take note that you need much less power to keep the boil going with the steam condenser and the risk of the wort boiling over is high when too much power is used. Please reduce boil power accordingly.

To sustain the vacuum, the drain tube from the condenser must not have any counterpressure. We recommend draining to a bucket where the tube is not submerged in the water, or suspend the tube directly over a floor drain.



Steam Condenser assembly

Steam is sucked through the 4" fitting. Condensation happens when the cold water sprays the cold mist downwards. The condensed steam will drain out the bottom.

- ⓘ Tip: Save the hot water coming out of the steam condenser and re-use it for cleaning for save both water and power.

## Included in the box

- 1 pcs TC 4" to TC 2" adapter
- 2 pcs 20cm straight TC 2" pipe
- 1 pcs TC 2" Tee
- 1 pcs TC 2" Elbow
- 1 pcs TC 2" 1/8" nozzle adapter with TC34mm input
- 1 pcs TC 2" to 19mm hose barb adapter
- 6 pcs TC 2" Clamp
- 6 pcs TC 2" Gasket
- 1 pcs 1/8" BSP-T nozzle, 30 degrees, 1.1 liters per minute @ 4 bar
- 1 pcs Nozzle extension

## You also need

- Steam Hat for your brewing system
- TC 4" Clamp and gasket
- Connection for water inlet (TC34mm to suitable hose barb or Garden connector)
- Hose for condensated water (16x25 mm)

# Trubinator™

The Trubinator is a device that is placed at the bottom of the brewing system at the end of the boil process. When cooling starts, a whirlpool is generated. This makes the hops and proteins (trub) draw towards the center. When the cooling is finished and the wort is transferred to the fermenter, the whirlpool will slow down and the trub collected inside the Trubinator.

The Trubinator has a silicone part at the bottom that protects the bottom of the kettle as well as forming a seal to keep the trub inside. The silicone part has a built in guide to help center it in the kettle.

The filter is made from expanded metal in R2x5 size. One single M6 bolt with a wingnut holds it all in place and makes the cleaning quick and simple.

The Trubinator comes in three different sizes. The diameters are identical to the malt pipes of the brewing systems. Small has the same size as B40pro malt pipe, Medium as B80pro, and Large as B150pro. You can use a smaller model than your brewing system malt pipe size if you don't brew hop-heavy beers.



## Sizes and capacity

- S (Small) ( $\varnothing 320$ ) - (7.2 liter)
- M (Medium) ( $\varnothing 420$ ) - (12.4 liter)
- L (Large) ( $\varnothing 500$ ) - (17.6 liter)

## Product specifications

- Height: 90mm
- Material: SS304
- Surface treatment: Electropolished
- Filter: R2x5

# Overflow pipe kit

Safety solution for mashing

Our overflow pipe is an accessory kit that will assist in limiting the risk of exposing the heating elements in an event of stuck mash or too much flow over the grain bed. The principle is simple. If the flow up the center pipe and over the grain bed is greater than what naturally drains through the grain bed, the liquid level will increase and drain through the overflow pipe and end up in the bottom of the tank. This way it is more unlikely that the malt pipe will overflow and end up exposing the heating elements.



Note! The overflow pipe will have limited capacity compared to the powerful pump. The system limits the risk but is not a 100% guarantee to avoid exposing heating elements.



The overflow pipe kit is designed with three different length of telescopic pipes and will fit both B40pro, B80pro and B150pro.

-  To use this product, a laser cut filter is recommended, but you can also punch a hole in the expanded metal filter to use it. Use the 25mm hole punch.

## Assembly

Use a hammer and a blunt object to carefully punch out the hole in the laser cut filter, or make a hole in your filter with the hole punch.

Mount the base pipe with threads in the filter hole and fasten the nut. A gasket is not needed. Based on what brewing system you have and where the expected grain bed level will be, select one of the three extension pipes. Use the silicone joint grommet to hold the base pipe and the selected extension pipe together. Choose the filter you would like to use and insert it into the filter holder and mount the cap on top.



## In use

We recommend setting the filter a bit too high before adding the malt. When the malt is well mixed in, push the filter downwards to where you want it to be. Extending it afterwards is not recommended.

When sparging, make sure the sparge water level is not getting too high to avoid it from draining through the overflow pipe.

## Included in the box

- 1 pcs Base pipe with M24 threads, 180mm (fits laser cut filter)
- 1 pcs M24 hole cover (Fits the hole in the laser cut filter if the overflow pipe is not in use).
- 1 pcs M24 nut
- 1 pcs Extension pipe 20cm
- 1 pcs Extension pipe 30cm
- 1 pcs Extension pipe 40cm
- 1 pcs Silicone joint grommet (fits between the base pipe and the extension pipe)
- 1 pcs Silicone holder for filter
- 1 pcs Filter expanded metal (fine) Ø30mm
- 1 pcs Filter expanded metal (coarse) Ø30mm
- 1 pcs Filter laser cut Ø30mm
- 1 pcs Silicone top cap for filter