# Your new 50 Amp Brewery controller

Thanks for buying your controller from us!!! The mash side of your controller is based on the MYPIN TA4 series PID controller. Unlike cheap REX branded controllers, MYPIN controllers are manufactured in China using modern Surface Mount technology. This is the same technology used to manufacture your high quality cell phone. The boil side of your controller uses a PWM controller we designed and we also use modern Surface Mount technology for our controllers.

## How your controller works


**Your new controller has six controls, six outlets and one K type thermocouple input:**

A red mushroom button at the bottom right that serves as an on/off switch as well as a panic stop button
The MYPIN TA4 PID controller at the top right that manages your mash temperature.
The dial at the immediate left of the PID sets your rate of boil.
A mode switch right below the dial that switches between boil and mash.
To the left are pump 1 and pump 2 switches and right below the switches are pump 1 and pump 2 outlets. Each switch and outlet are capable of running any pump drawing up to 5 Amps, providing the total current for your pumps & elements does not exceed 50 Amps

Your controller has a 12' 6 gauge heavy duty power cord and a 50 Amp 4 prong range style plug. This controller also ships with four standard 3 prong twist lock 30 Amp rated power sockets. This controller can safely manage two pairs of heating elements as large as 5500 Watts, for a total of 11000 watts switched at one time. Your 50 Amp home brewery

controller is designed to manage up to two boil elements in tandem or up to two mash / HERMS elements in tandem, depending on the mode switch selection.

All units come with a water tight K type thermocouple with ¼" MPT type threads.

## This Controller is used most often in the following Configurations

1. **Hot Liquor Tank X Boil Pot** – This configuration is used if you already mash in a cooler and have no plans to switch over to a RIMS Tube or heated Mash Tun. The PID controlled element heats your initial strike water and any water to be used for temperature adjustments. Then right after mash the controller heats your sparge water. The PWM controller controls your rate of boil.

2. **Mash TUN / RIMS Tube X Boil Pot** – The PID controller heats your mash through a RIMS tube or direct heat. The PWM controller controls your rate of boil. If you are only using one pot the initial strike water, sparge water and final boil are managed by the PWM controller.

3. **Mast TUN / RIMS Tube X Boil Pot & Hot Liquor Tank** - The PID controller heats your mash through a RIMS tube or direct heat. The PWM controller controls your rate of boil. The PWM controller plug is switched over to your hot liquor tank for your initial strike water and sparge water. The PWM controller plug is switched back to your brew pot for final boil.
4. **Full HERMS System** - The PID controller heats your HERMS tank and the stable temperature transfers through your HERMS coil to your mash tun. After mash-out, the PID temperature is raised to your sparge temperature and the water in your HERMS tank is used to sparge your mash. During you brew session, the mode switch is flipped and the PWM controller controls the rate of boil in your brew pot.

## GFCI Protection

Your controller was tested behind GFCI and is GFCI ready. We highly recommend that you install a 50 Amp spa panel that incorporates GFCI, or you install a GFCI breaker in your main panel to protect you and your brewery. For most home brewery installs, a spa panel is the cheaper of the two options plus the breaker inside the spa panel provides a convenient disconnect near your brewery.

## Pump Control

This controller provides full 120V pump control for two pumps. The two pump control circuits run independent of your other controller settings.

## MYPIN Controller Features


**Top Row** – Displays the current temperature
**Second Row** – Displays the set temperature (the temperature you want to regulate to
**Out1** – Is on - red when the element is on & off when the element is off
**Out2/AL2** – Not used in our application
**AL1** – Turns on when AL1 value is crossed. We set AL1 to 170F.
**AT** – On when in auto tune mode

SET - Hold down to go into programming mode

SET + AT - Change the set temperature – Press SET then AT until the second row, right digit is flashing to change temp.

AT - Press to select the set temperature digit you want to modify

- Press to move digit up or down

AT - Hold down to auto tune

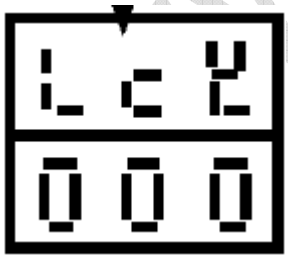
## Basic MASH Operation

For single-step mash you should set the controller to your mash temperature and leave it set. For convenience we test all of our controllers at 145F, the most common temperature for a single step mash, and if you mash at 145F you may not need to make any changes at all!

For a multi-step mash you should start at the lowest temperature then increase the temperature based on your mash schedule. We suggest that you do a trial run with water while monitoring the temperature mid-way down your mash tun so that you understand how long it takes for the temperature change to propagate through your system. Temperature changes will not be instant because of the time it takes for your pump to circulate water through your system.

## Initial MYPIN Settings

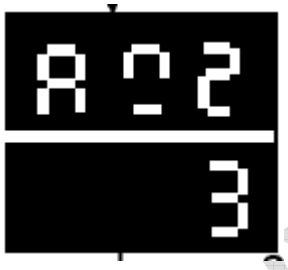
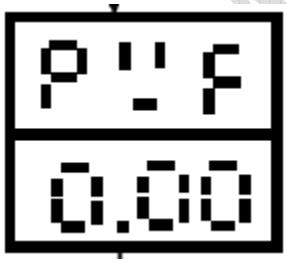
We set the initial settings and calibrate the thermocouple before shipping your controller to you. In most cases you will not need to make any changes but because no two systems are exactly alike you may need to modify these setting to make your home brewery perform better. To go into programming mode hold down the SET button. Once in programming mode pressing the SET button will go through each of these menus in order.

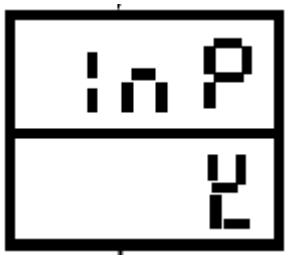
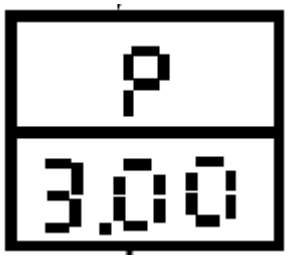
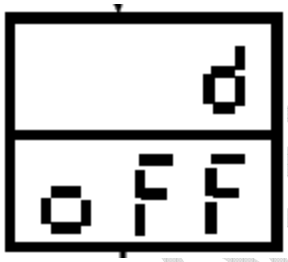
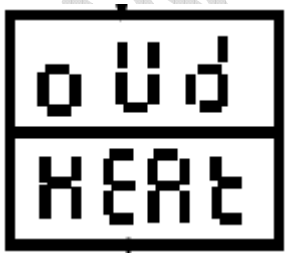


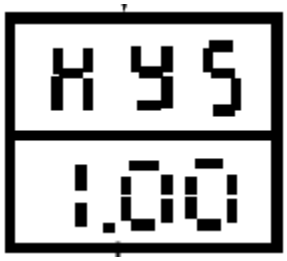
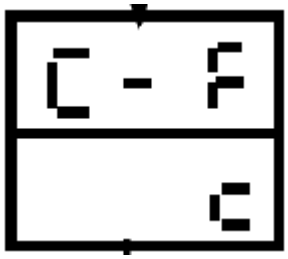

### Lock Screen

This is the first screen you enter programming mode. The value should stay set to 000.

Press the SET button to advance to the next step.

| | |
|---|---|
|  | **AL1**<br><br>The factory value is 900 – we set to 170 because 170F is the denature temperature of your mash enzymes. You can change the value to anything you like without impacting the PID's operation. |
|  | **AL1 Mode**<br><br>2 is the default and we leave the setting at 2. |
|  | **AL2**<br><br>We do not use this. |
|  | **AL2 Mode**<br><br>We do not use this. |
|  | Offset value used to calibrate your thermocouple. All thermocouples must be calibrated before they can be used because small differences in the alloys used cause errors in their measurements. A thermocouple only needs to be calibrated once.<br><br>Also, any new thermocouple must be calibrated before use or your measurements will be off.<br><br>**We have already calibrated your thermocouple**<br>and the calibration (PUF setting) is _____ |

| | |
|---|---|
|  | Temperature input type.<br><br>This PID will accept K, J, T, E & S thermocouples and will also accept Pt100 type RTDs. We use K type thermocouples and the input is set to K. |
|  | **Proportional Band**<br><br>This modifies how hard the heating element comes on based on the percentage the temperature is away from your set temp.<br><br>Default value is 3 but we found that a value of 2 works better for the systems we tested with.<br><br>If your temperature tends to overshoot and run high then you should reduce this value only after trying the I value first. If your temperature tends to stay low then you should increase this value only after trying the I value first. |
|  | **Integral Time Range**<br><br>This modifies how hard the heating element comes on based on how long your temperature is outside your set temp.<br><br>Default value is 240 but we found that a value of 180 works better for the systems we tested with.<br><br>If your temperature tends to overshoot and run high then you should reduce this value. If your temperature tends to stay low then you should increase this value. |
|  | **Derivative Time Range**<br><br>This is only used when managing large areas like the temperature of a large room.<br><br>Default is off and we leave it off. |
|  | **Control Direction**<br><br>The MYPIN controller can be used no manage heat or cool.<br><br>Default is heat which is exactly what we need. |

| | |
|---|---|
|  | **Control Hysteresis**<br><br>This sets the amount the temperature is allowed to drift before the PID controller will attempt to correct the temperature.<br><br>Default is 1 and we leave it set at 1. |
|  | **Output Control Mode**<br><br>This sets the control (on/off) cycle time in seconds<br><br>Default time for the model we use is 2 and we leave it set at 2. |
|  | **Measurement and Display**<br><br>C – Celsius, F = Fahrenheit<br><br>Default is C and we change the value to F before shipping |

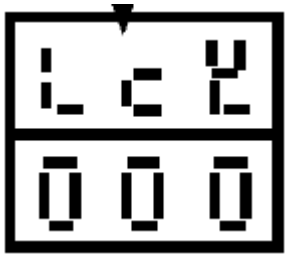
## Calibrating your Controller for maximum Accuracy

We already calibrate your controller at 212F – the boiling point of water, but thermocouples are not perfectly linear across their entire range. Your controller should do a great mash right out of the box but to get maximum accuracy you should calibrate your controller at the mash temperature you use most often. For single step mash this is likely in the 143F – 147F range. If you do step mashing you should calibrate to somewhere mid-range. When calibrated this way the other temperatures will be off by very little.

To calibrate you need to set the system up with water and use a thermometer you trust. If you don't have one you trust then you'll need to obtain at least three that you can compare. Most homebrewers have one or two and one or two they can borrow from friends.

To start calibration you should place your reference thermometer or thermometers as close to your RIMS tube outlet or as close to your mash tun thermocouple as possible. Set your mash temperature then start your mash cycle. Once your temperature stabilizes record your temperatures and use the process below to adjust the PID's offset.

*Note: If you use more than one reference thermometer don't be surprised if there is 5 or more degrees difference between them. We've seen as much as 10 degrees difference between household thermometers which is why we calibrate to the temperature of boiling water.*

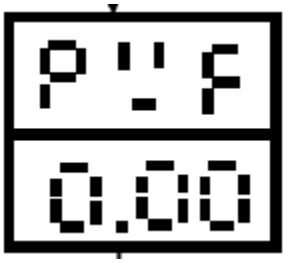



## To calibrate to your mash temperature

Press and hold the SET button until LcK shows in the top display

Leave the second line set to 000.

Press and release the SET button to advance to the PUF step.




**This is the offset value used to calibrate your thermocouple.**

Press the ‹‹/AT key to program the offset. As you press the ‹‹/AT key you will see each digit in the second line flash. Press the ▲ ▼ keys to move digit up or down

Note: The offset should be set the same direction as the error. For example, if the PID is 3 degrees F high then +3 is added to the offset that may already be programmed into the PUF value.

To exit, press and hold the SET button until the top display returns to normal

You may need to go through this cycle several times until calibration is perfect.

## Fine Tuning your Controller

Before using your controller to do a mash you should do a trial run with water. When set up correct you should see the temperature rise to your set temp, over shoot a little then come back down to your set temp. Then the temperature should fluctuate slightly above and below your set temp. How fast this happens depends on the water volume you use and your system's configuration. If your mash temperature over shoots your setting then stays high you should try reducing your PID's 'I' value then reducing your PID's 'P' value. If your mash temperature does not quite reach your set temperature and it stays low then you need to look at the first three items on the list below. If none of these are a correctable factor then start increasing the 'I' value until your temperature runs high then reduce until your temperature is in control. If changing 'I' value does not seem to have an impact then you should increase the 'P' value.

**Five main factors control the accuracy of your MYPIN controller.**

**Heating Element Size** – Your heating element size, or more correctly your heating element size relative to your mash size will impact the stability of your mash temperature. Generally speaking, a 5500 Watt element is more than large enough for up to a 20 gallon or larger grain bill, and can easily bring a 10 gallon grain bill from faucet temperature to mash temperature within 30 minutes.

It's easy to tell if your heating element is under size. Once you reach mash temperature your element should be off more time than on. You can monitor the element by watching the red OUT1 light on the PID. If the red light is on more than it's off then the element is working very hard to keep your mash up to temperature.

**Circulation** – Active mash temperature control depends on circulation. Without enough circulation your temperature will stratify. Even with circulation you should expect some delay between your PID setting and your overall mash temperature because the temperature change will move through your mash tun in a wave.

**Radiation and Evaporation Losses** – As you heat your mash you are also constantly loosing heat through the sides and top of your pot. Most heat is lost from the top surface of your mash because you lose radiant and evaporation heat from the top surface. You should always keep a cover on your pot to minimize both.

**The PID 'P' Setting** – This setting modifies how strong the heating element comes on relative to how far off your mash temperature is. The higher the 'P' setting the harder the element comes on. We found by experience that an initial value of 2 is best.

**The PID 'I' Setting** – This setting modifies how strong the heating element comes on relative to how long your mash temperature has been low. The higher the 'I' setting the harder the element comes on. We found by experience that an initial value of 180 is best.