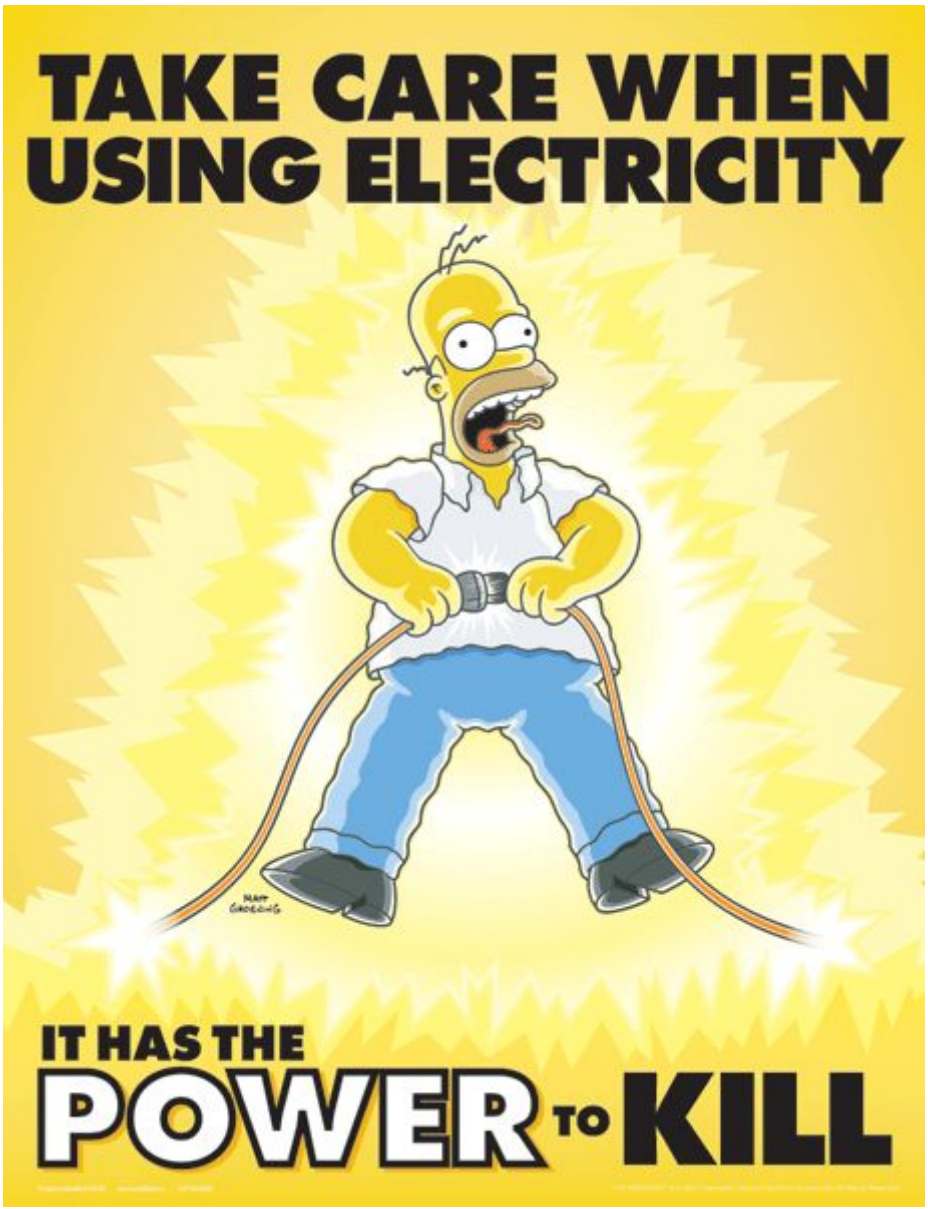
Electric Brewing // Automating the Mashing Phase – 120 Volts // 1,650 Watts // 13.5 Amps



Up to now – we have been brewing with natural gas or propane, while this works really well, and there are many advantages, like nice strong boils, etc…, there are also some draw backs – as with everything.

Here are some of the benefits of using electric over gas:

- no carbon-monoxide gas is created, as you are not burning gas, so safer
- it is much (again) safer to control electricity with un-attended automation over gas
- save time by pre-heated over night to strike temperature using a smart PID controller – read here: http://byo.com/malt/item/299-brewing-on-autopilot-with-pid-controllers this way, you can get straight to mashing and not waste time heating the water with gas
- no need to waste time buying and hauling propane no more
- since you are saving time, you could fit 2 batches in the same day; just fill the water, set your temp goal on the PID and go to do something else…
- Electric is much more efficient, 100% of the energy transfers into the wort, where as with gas only about 25% (the other 75% is byproduct of heat), which you have to ventilate for.
- many more…

Voltage Choice ?

You will have with two choices, which you need to think about and consider for your needs and goals. You can build your system around 120 volts or 240 volts. Obviously it is easier to use 120 volts, since all electrical outlets by default have that everywhere in the US and only Driers and Oven ranges would have the cabling setup for 240 volts, unless you live in Europe :-) then you have 220 volts.

A good way to wet your feet is to start with 120 volts and automate the heating for the mashing phase of the brewing. Since mash out temps. are about 170F Max and everything between at lower ranges, you won't really have the need to heat beyond that, so you can use lower wattage heating elements.

Drills or Punches ?

You have a choice of either making the holes using drills or hole punches. There are many videos on youtube on that, so search away for your pot type and size. We drill a hole and then thread it for smaller holes and for bigger holes, we drill a hole (threading has little value) because the thickness of the material is not sufficient enough to have the proper threads – so you will have to use rubber seals and lock nuts. If you know how to weld, you don't need instructions from us :-)

For this project we used a 1,650 watt stainless steel heating element, using 120 volts. 1650 watts / 120 volts = 13.75 Amps. So when you buy a Relay, make sure it is rated above that, always good to have a nice buffer when it comes to electricity. Most SSR Relays start in about the 25 Amp range, so you are good to go.

PID – great info from BYO magazine, many different ones exist, don't buy cheap ones and make sure it supports F if you don't like C for temp., its best to get familiar with options and specs, so do some research – http://byo.com/malt/item/299-brewing-on-autopilot-with-pid-controllers

We ***do really*** recommend that you buy the more expensive American made Auber controller, their quality is much better and they are rated for 10Amps without the need for a Relay, if you are going to stay under 1200watts. Our experience with the cheaper Chinese made PIDs like the MYPIN, etc.. were poor, a lot of wasted time, it breaks easily, just cheap overall construction and I doubt their QA process // but you might have other luck – be warned, you do actually get what you pay for, that's why people say this :-)

We don't recommend the MyPIN or any other Brands out of China – seriously, their quality is not that good, on the other hand, there are good ones coming out of Japan, but do your research first.

The FOTEK solid state relays seem to perform well – time will tell if they still work after 5 years. Make sure the model of your PID will work with a solid state Relay and will support your temperature probe. Not all PIDs work with solid state, check the specs and ask before ordering.

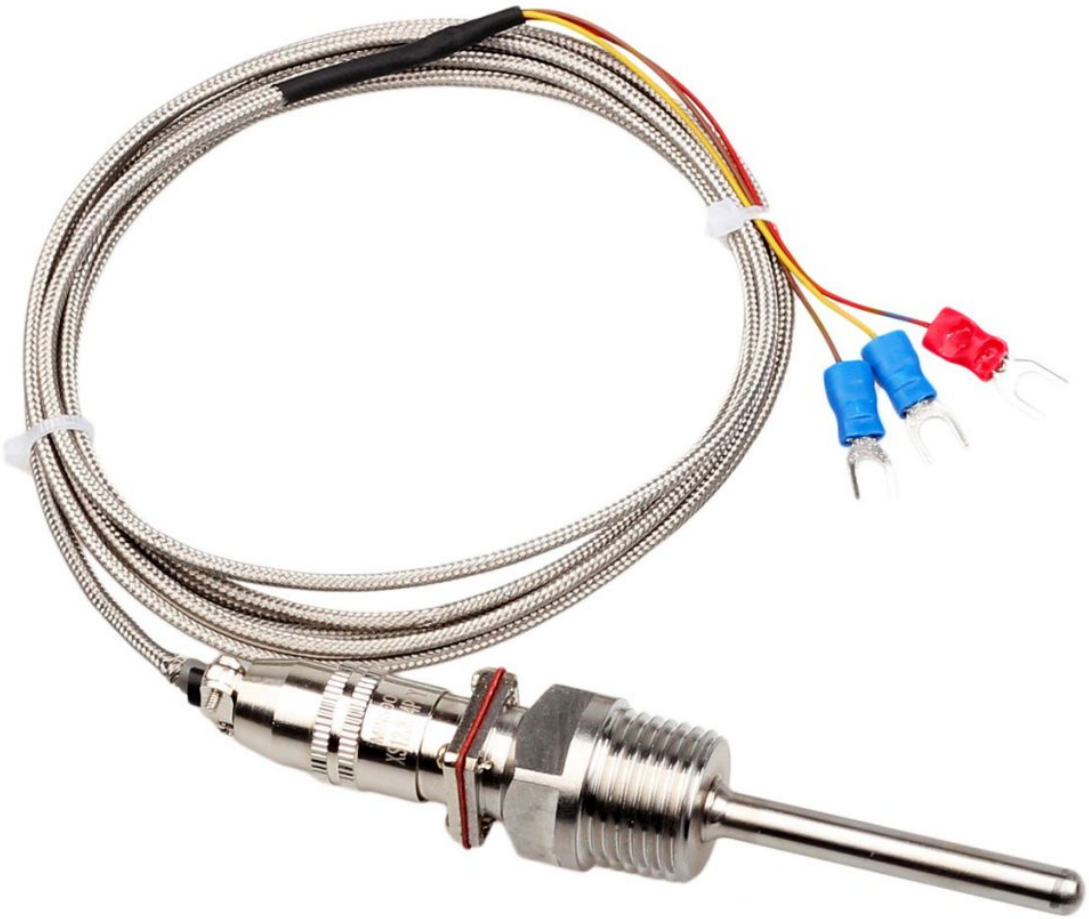
We Recommend the Auber PID – see the manufacturers web site for different kinds:

http://www.auberins.com/?main_page=index&cPath=1

we use this one: http://www.auberins.com/index.php?main_page=product_info&products_id=3

Here is what we used (1,650 watts stainless steel), but again – there are many different wattages and even shapes, so do your research – we recommend stainless!!!

This is the heating probe that we used – RTD Pt100 Temperature Sensor Probe Cable 3 Wires 1/2″ NPT 750°F for Temp Control – don’t get a cheap one and think about its placement relative to your needs and batch volume size.



Hooking it up ?

Most people will install the PID inside some kind of a Control Panel casing // here you can be as creative as you want, since this is for #homebrew, just try everything safely and properly, take your time and research, if you are not sure.

Many great videos exist on youtube – we recommend, you do some research again // Video will be posted later of final control panel.

Counter Pressure Bottle filling // a must for every beer brewer

A Counter Pressure bottle filler is a great device that is almost a need to have for any serious home brewer. You can make your own too, but it is recommended to just buy one – unless you have a proven design and access to good parts.

You will get clear, sediment free beer :-)

We really like the one valve design with a pressure relief valve on the left side, this allows for pressure to escape as you fill the bottle with beer/co2 – otherwise the beer flow would stop… it also allows for foam to escape once it is towards the top.

Tip: Many people recommend that you cool down the beer before filling as this eliminates foam problems, but we found that if you release all the built-up pressure in the Keg first, before connecting the co2 input for this process, it almost eliminates all the foam issues even when filling warm beer that has not been cooled at all – and you can totally skip this step.

In this video we show how the bigger bottle was filled… this was warm beer from the keg at room temperature.

As you can see from the pictures below, you can fill all kinds of bottle sizes and after a few bottles you will get a hang of it really quickly. We fill our bottles at about 11 psi… with

a T splitter from the co2 bottle (meaning) that we split the gas line, and left side goes to feed the Keg and right side goes to feed the counter pressure device.

1. Purge all the air from the bottle with co2, squirt some gas as you insert the device into the bottle
2. adjust your pressure relief valve
3. once bottle is fully under pressure and the oxygen (air) is out
4. switch to beer side and let it rip
5. some foam is good, because you want to cap-on-foam // so this is a no big deal

Happy capping!

How To Transfer beer between 2 Kegs

How To Transfer beer between 2 Kegs, video link below:

Tip: Using the Out for both Kegs, prevents beer foaming into the incoming keg as the beer fills in slowly from the bottom of the keg.

If you connect into the incoming Keg using the In – that will cause beer splashing and foaming inside the Keg.

Howto convert a beer keg into a Fermentor, 15.5 gallons

If you have an extra standard beer keg, with a little effort, you can turn it into a 15.5 gallon stainless steel fermentor. In this video I show you how I did it. Benefits are the adoption of something existing that you have with little extra cost, versus buying expensive kits that sell for a few hundreds of dollars $$$

Not to say that there is anything wrong with them, they are in fact very nice kits, you just end up saving some money.

The beer won’t know any different, it will come out the same…

Portable Home Beer Brew Pump March/Chugger ON/OFF switch with GFIC protection

Tips:

1) make sure that the pump you get does not have a one-way-rubber-valve installed on the inside of the output plumbing… this will put a resistance on the output and reduce your flow considerably… **by more than half!!!**

2) air trapped in your output tubing will also severely impede the output rate especially when it is longer (which we like to use, gives you flexibility), its best after connecting the wort/water input into the pump, by putting the your output hose flat on the ground // below your input – turn the pump on and this will force easily all the water out mixed with the air bubbles (you will be amazed how much better, even a small pump will work), like the one in this tutorial – very good flow and almost no noise… a 1/2 gallon growler fills in under 10 seconds.

3) as you are heating up your strike water – have some of that hot water run through your pump system to clean it out, so try to account for that by adding this extra water for your total water needed (mash + sparge) // use a online calculator to help your self out! Google it

4) you can control the speed of the pump with the ball value on your kettle (start at a lower speed when you re-circulate to clear up the beer after mashing…). Increase the speed when you are transferring beer for bigger batches like 10+ gallons…

Main video:

https://www.youtube.com/watch?v=Qu71HXeITMg

Main Article:

With a pump system you can do:

1. use it to re-circulate the wort after mashing to clear up the beerPreview Changes
2. use it to transfer larger brews of 10 gallons+ // no need to move or lift heavy brew kettles full of hot liquids and a gravity based system is no longer required…

You are looking at a portable GFIC protected march pump connected to ON/OFF switch – with extra GFIC outlets, nice to have for future needs.

Adjust all of your ideas from reading any articles on our blog to your own situation and need, you don't need to make it exactly the same as we did

The first thing you need to learn about is the basics of available pump types, the 2 major ones that are used to transfer beer are March pumps and Chugger pumps. You want to buy a pump that is rated fitting for transfer of hot liquids and food grade safe.

Here we like to use March pumps because these are made in the US and we like to support made in the u.s.a. (whenever we can), so that is always #1 on our list, stay away from cheap chugger pumps made in china on ebay, not to say that there are not any quality chugger pumps out there… [you get what you pay for], but do your research.

Most pumps are rated for standard household 115Volts, that is your standard electrical socket at home, we would recommend that you stick with that, only more powerful pumps would require 230 volts, for bigger breweries – not home a.k.a hobby brewery.

The pump will have its rating printed on its side label, including how many gallons per minute it is rated for and stuff like that… March pumps come in small to medium sizes and even bigger sizes, so you need to think about your current needs and future needs (think about both).

Here will will show you how we wired a medium sized march pump that we use for re-circulation and transfer (can be used for anything really), into a standard 115 volt household 3-prong socket.

If you are not familiar with the 3 prongs, here it is:

Basically Ground is used when there is an electrical fault – so that the electricity can be safely moved into ground. The black wire is the HOT wire that delivers the 115 volt 60 Hertz A/C current. The white is a (neutral) wire, that is used to complete the circuit loop to make the electricity flow when you turn things ON/OFF. Without a loop, the principles of how electric current works and flow would not work, there is also a loop in D/C current too, but that is outside of this article scope.

We decided to use a heavy duty ON/OFF switch connected to the pump in-line with a GFIC outlet, so that if we need to plug-in additional things in the future, we can.

The GFIC provides ground-fault interrupt protection, and it will flip its self off without affecting the main electrical box in your house when there is a ground-fault. These usually are installed in bathrooms and kitchens, etc… for like hair

dryers (fall into water), etc… since beer brewing involves water, better be safe than sorry!

I made a short video on how this kind of works and how we wired this…

https://www.youtube.com/watch?v=Un5gFHIg14I

If you have never worked with GFIC connections, please watch a few videos on youtube made by electricians that will make it clearer, but basically its like this:

Get a 3-prong PC power cable (an extra one that you have) and cut-off the end of the female end of this cable, not the part that plugs into the a/c outlet (male end), clearly you are going to need that…. strip the wires and wire that into the GFIC in-line…

Then Connect the ON/OFF switch to the load of the GFIC (again watch those videos), the load extends the protection beyond the GFIC 2 outlets into whatever is connected to it, in this case our ON/OFF switch is, so it extends the GFIC protection to the pump through the ON/OFF switch.

The trick is to now correctly wire the ON/OFF switch – watch our video, but basically you need to realize that an ON/OFF switch in an A/C circuit was designed to connect one wire, like the HOT wire and the circuit is cut off with the switch, you NEVER want to wire in both the HOT and NEUTRAL wires to both ends of the switch – as soon as you flip the switch, your circuit breaker in the electrical box will flip off, this means that you done this part incorrectly……

Most people wire their switches and outlets to their brew stands, into permanent connections, but you can also set this up into a portable system – as most home brewers brew out doors using make shift setups of all kinds… so this will allow you to take it anywhere, including your friends house or a brew club or where-ever and not have it tied down to only one

place.

In addition, you can extend this design, and buy another pump, a more powerful one, and mount it above the one in the picture and add an addition A/B switch to the ON/OFF switch, when you need various pump types because of whatever need.

Below is a video of a test that we did once the pump wiring was done (used an old wood pallet to make the stand), yes there are some small drips, we left that in the video to again show you some of the things that you will need to check, we strongly recommend that you do a dry test, and identify all leaks and fix them and next do also a hot-water dry test, without any malt and make sure everything works at the temperatures that you will actually brew at….

Also you might want to now consider quick disconnects for the connections, also make sure to use tubbing that is food safe and was also made to withstand your working temperatures…

https://www.youtube.com/watch?v=6FyEgzU9Bbs

Have fun brewing!