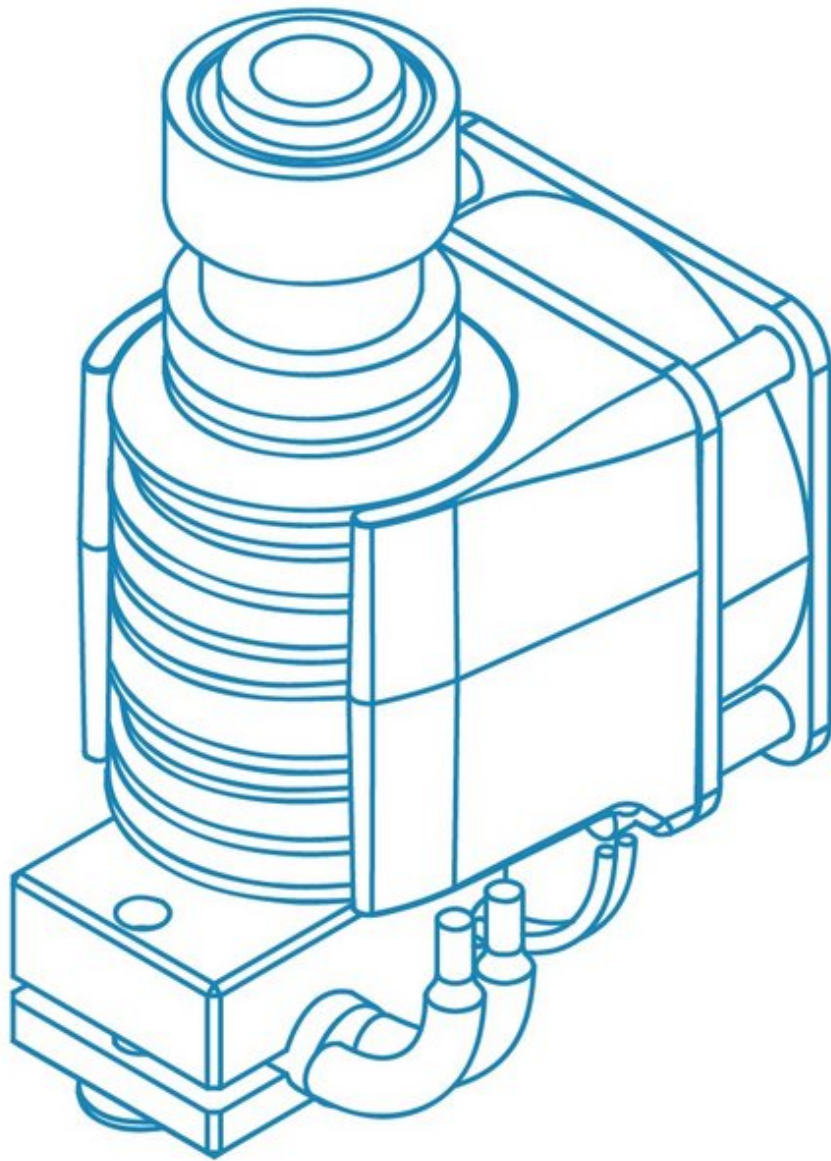


# Lite6 Assembly

Here you'll learn to assemble your Lite6!

Written By: Gabe S.



## INTRODUCTION

The Lite6 Assembly is easy, and we provide most of the tools you'll need. Please note, though, that you should be very careful of the following safety cautions:

- Be aware of your electronics. Don't work on your printer while it is plugged in or turned on.
- Be aware when you heat up your new hotend not to burn yourself on the heater block nozzle or heater cartridge.
- The standard V6 is capable of printing up to 240°C, do not exceed these temperatures, as this will risk melting the PTFE tube. The same applies for Capricorn tubing you should not exceed 240°C for the Lite 6. If you are interested in printing at higher temperatures then you should look into the v6.
- The firmware modification is not optional it is a mandatory step,
- Make sure you have ordered and received the correct voltage heater and fan to match the power supply of your printer. All of our current heater cartridges should have the voltage and wattage laser engraved on the cartridge.
- Connecting 12v parts to a 24v power supply can result in overheating, component damage, or fire. If you are unsure double check the rating on your power supply.
- Your HotEnd and your printer are your responsibility. We cannot be held responsible for damages caused by the use, misuse or abuse of our products.



## TOOLS:

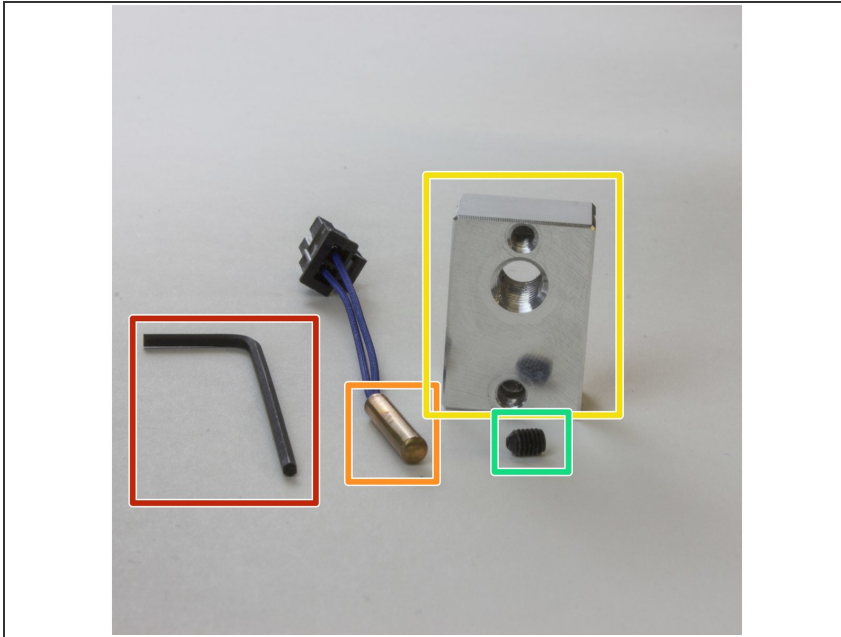
- [Multimeter](#) (1)
- [Hex Wrench](#) (1)  
2.5mm  
*Included in Kit*
- [Hex Wrench, 1.5mm](#) (1)  
*Included in Kit*
- [Screwdriver](#) (1)  
Philips Head



## PARTS:

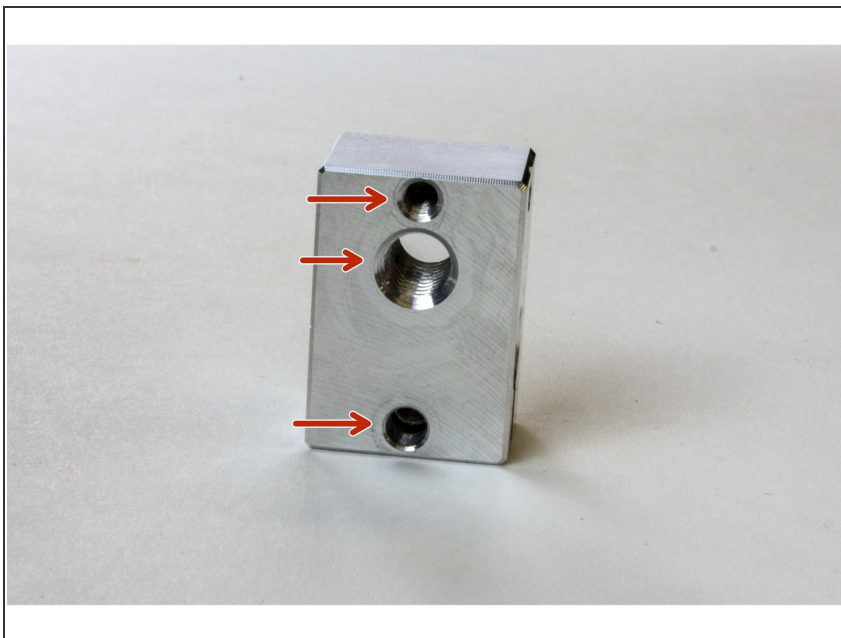
- [V6 Heater Block](#) (1)
- [V6 Nozzles](#) (1)  
*Brass 0.40mm Nozzles Come Standard*
- [Lite6 Heatsink](#) (1)
- [Cable Tie](#) (1)
- [Collet](#) (1)
- [Collet Clip](#) (1)
- [Heater Cartridge](#) (1)
- [Thermistor Cartridge](#) (1)
- [Extension Wires](#) (2)
- [Fan Duct](#) (1)  
Red  
*Color of duct doesn't matter*
- [M3 Washer](#) (1)
- [M3x10 Socket Dome Screw](#) (1)
- [M3 Grub Screw](#) (1)
- [Plastic Screws](#) (4)
- [PTFE Tubing](#) (1)  
4mm OD  
*For 1.75mm Filament*
- [Silicone sock](#) (1)

## Step 1 — Gather Thermistor Parts



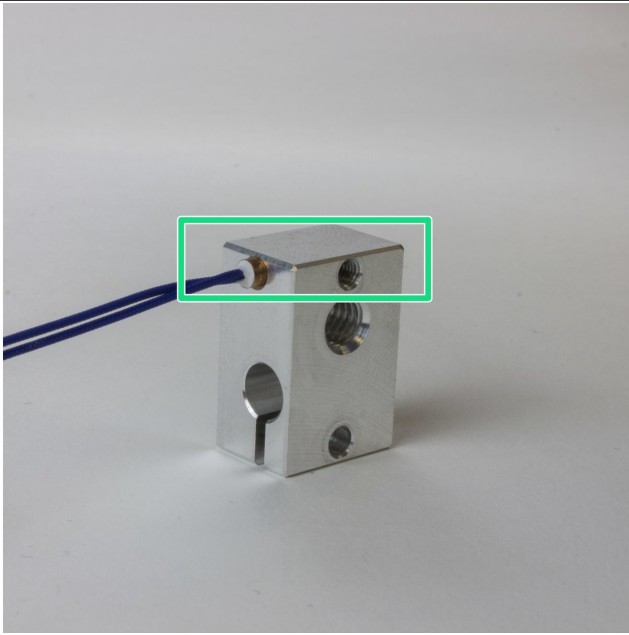
- Gather the parts you'll need to install the thermistor:
  - The Smaller, 1.5mm Hex Wrench
  - Thermistor Cartridge
  - Heater Block
  - M3 Grub Screw

## Step 2 — Orient your Heater Block



- ① Before starting work on your heater block, make sure that you are going to screw your nozzle into the correct side.
- You should be looking at the side of the heater block with three holes in it

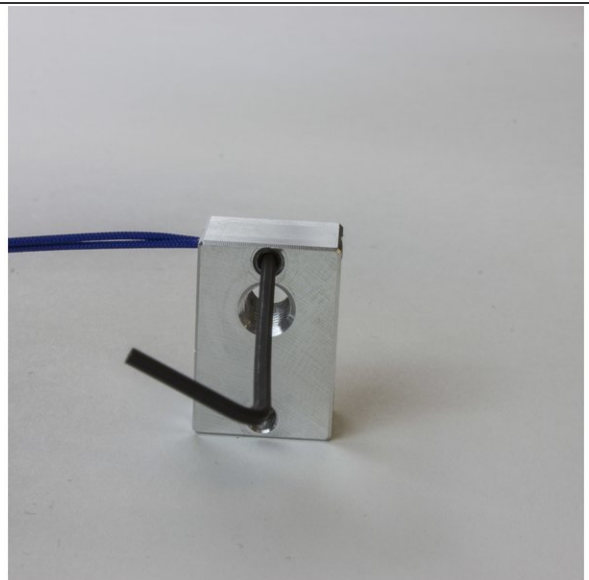
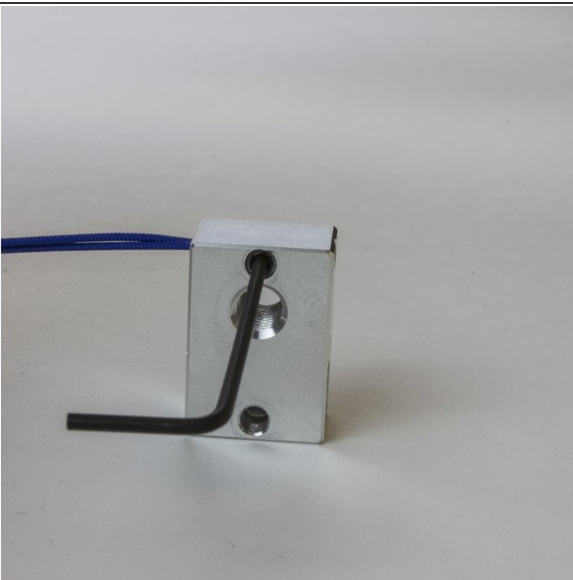
### Step 3 — Slide in Thermistor



- Slide in the thermistor cartridge.

**i** You can slide the cartridge in either direction so that the wires extend from one side or the other of your heater block. Think about how you'll be organising your wiring to decide which makes sense for your printer.

### Step 4 — Screw in Grub Screw



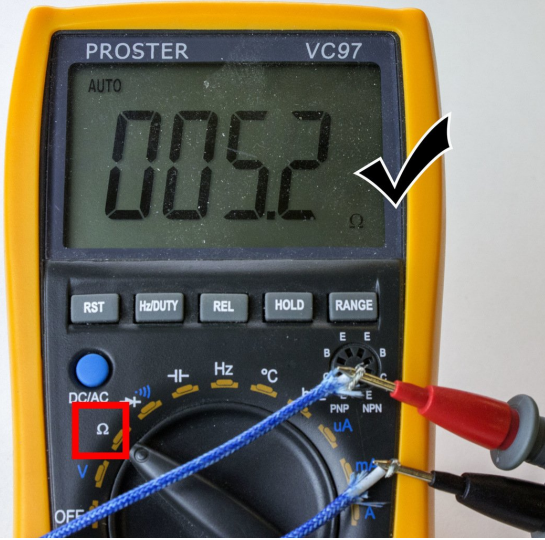
- Screw in grub screw until it just touches the thermistor.
- Tighten M3 grub screw by an 1/8 of a turn.



Do not over tighten the screw. The thermistor cartridge is soft, and you might deform it if you over-tighten the screw.

## Step 5 — Test Heater Cartridge

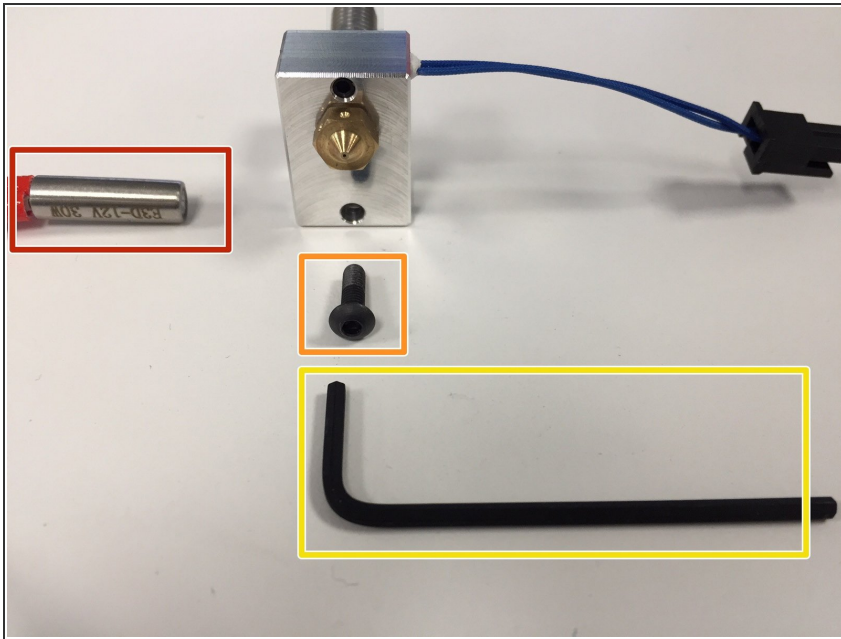
This is within acceptable bounds  
for a 12v heater cartridge



- Before you install your heater cartridge, you should double check that you both purchased and received the correct voltage cartridge. Cartridges are laser etched with their voltage, but all it is worth double-checking anyway. *This process is less annoying than putting out a house fire.*
- If you have a 12v30w heater cartridge, your multimeter should read 4.8Ω
- If you have a 24v30w heater cartridge, your multimeter should read 19.2Ω
- Your cartridges resistance may deviate slightly from these numbers, which is fine. We're mostly interested in verifying which cartridge type you have.

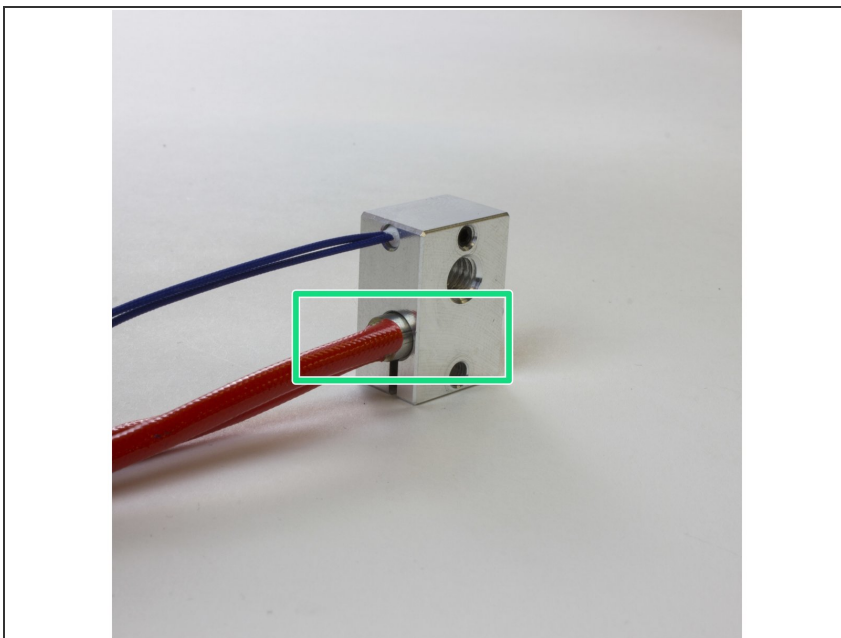


## Step 6 — Gather Heater cartridge Parts



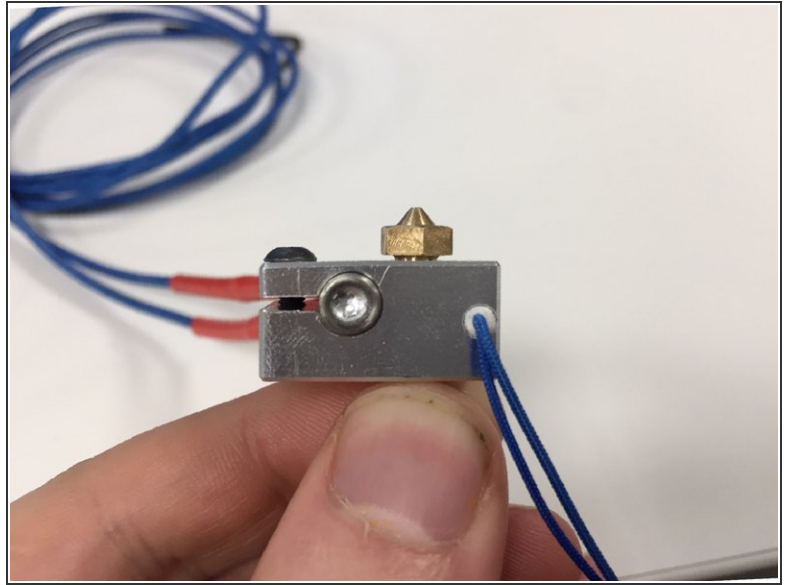
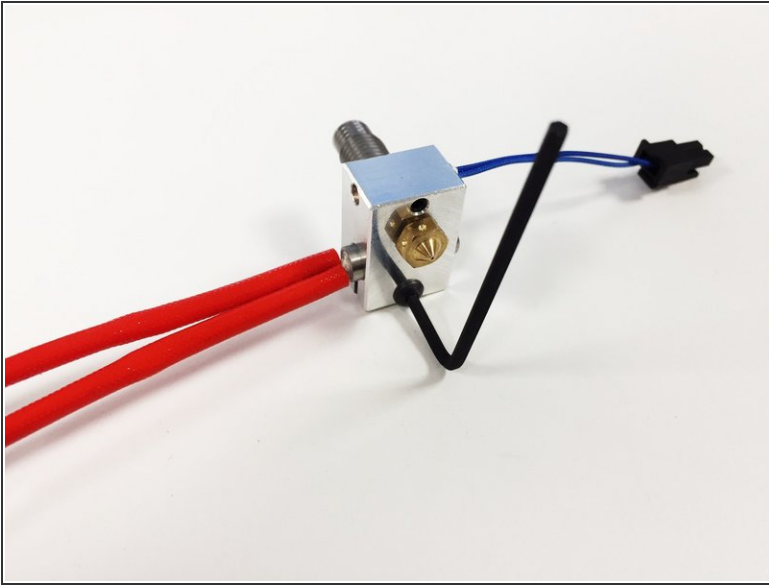
- Gather the parts you'll need to install your heater cartridge:
  - Heater Block
  - Heater Cartridge
  - The Larger, 2mm Hex Wrench
  - One of the longer, M3x10 Screws.

## Step 7 — Slide in Heater Cartridge



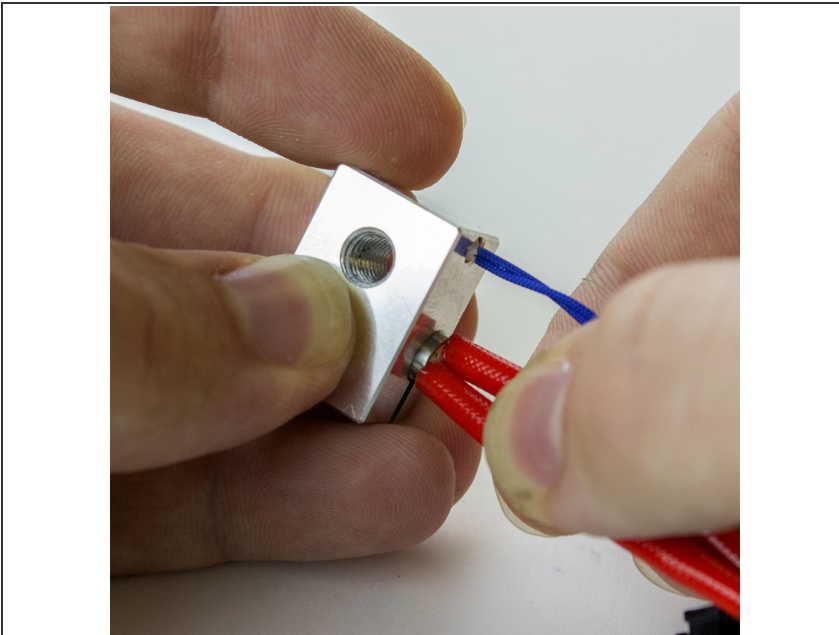
- Slide in the heater cartridge. Typically you'd want the wires to come out the same side as your thermistor wires.

## Step 8 — Screw in M3 x 10 Screw



- Tighten the M3 x 10 socket dome screw (with the M3 washer on it) with 2 mm hex key until the clamp deforms slightly (as shown in the second picture).

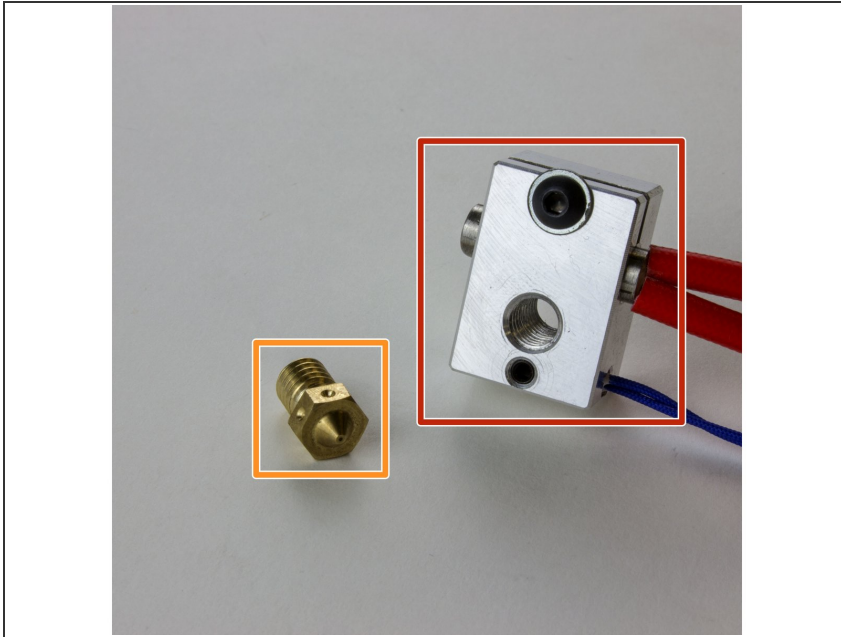
## Step 9 — Tug Test



- Before moving on, gently tug on your thermistor and heater cartridge wires. We don't want them slipping out during a print!

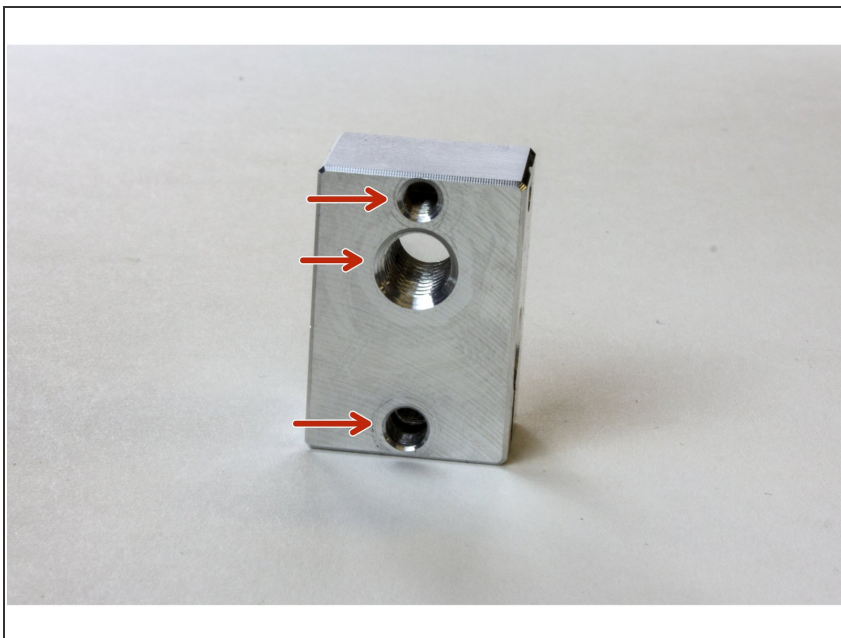


## Step 10 — Assemble Nozzle and Heat Break



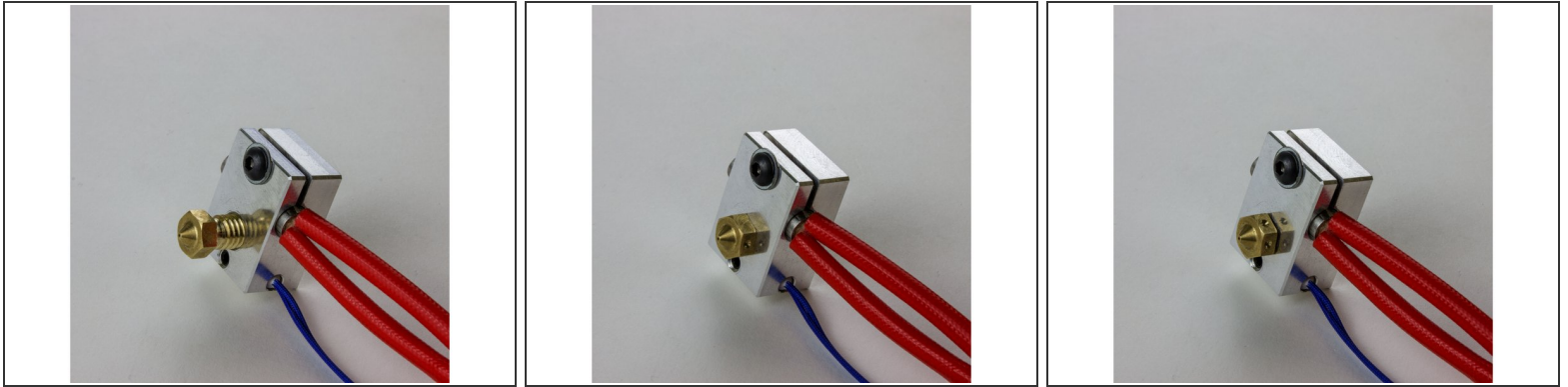
- You'll need the following parts:
  - Heater Block
  - Nozzle

## Step 11 — Re-Check Orientation



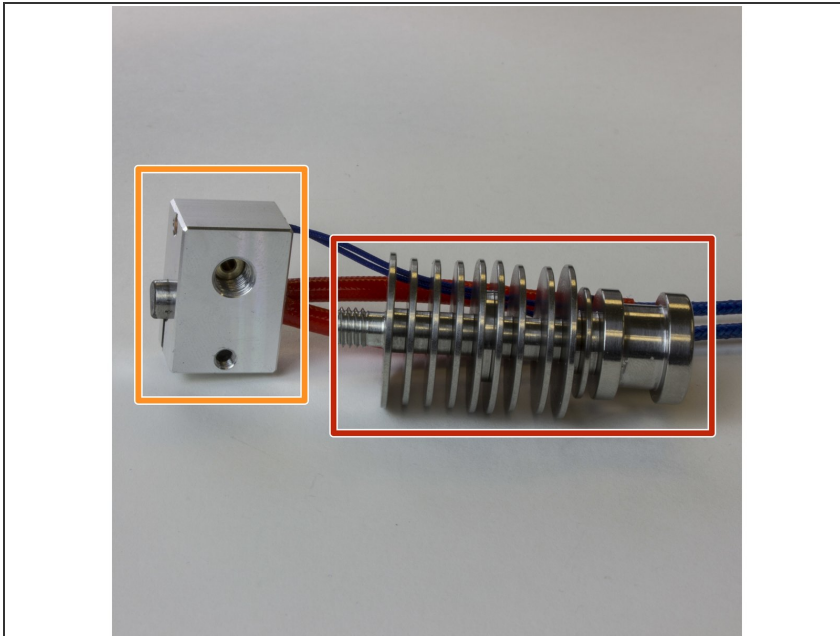
- Triple check once again that you're about to screw your nozzle into the side of the heater block with three holes on it.

## Step 12 — Screw in Nozzle



- Screw in the nozzle all the way into the heater block. Don't worry about tightness yet.
- Then, unscrew the nozzle by a 1/4 of a turn. This will leave a little space to tighten after screwing in the heat break.

## Step 13 — Gather Parts for the Heatsink



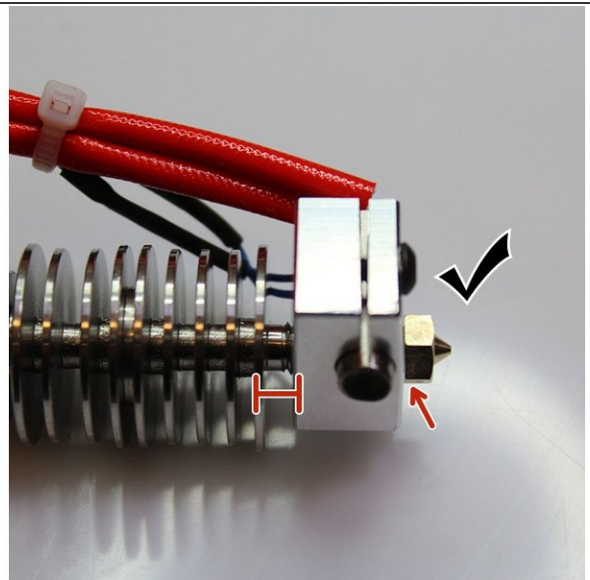
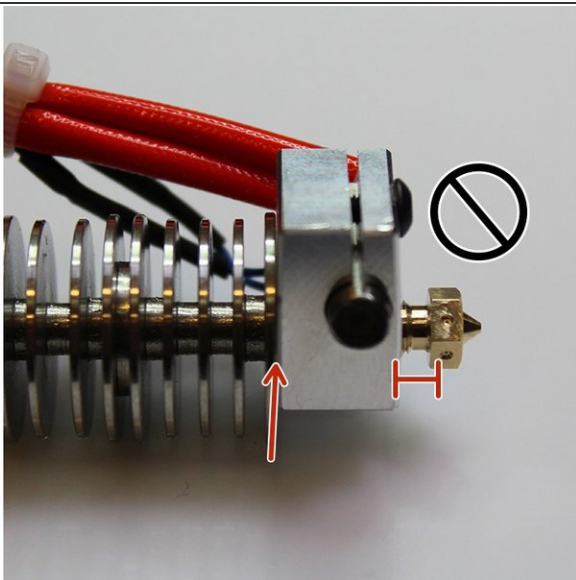
- Gather the following parts:
  - Heater Block
  - Heatsink

## Step 14 — Screw in Heatsink



- Screw in your heatsink. It should only be hand-tight at the moment.

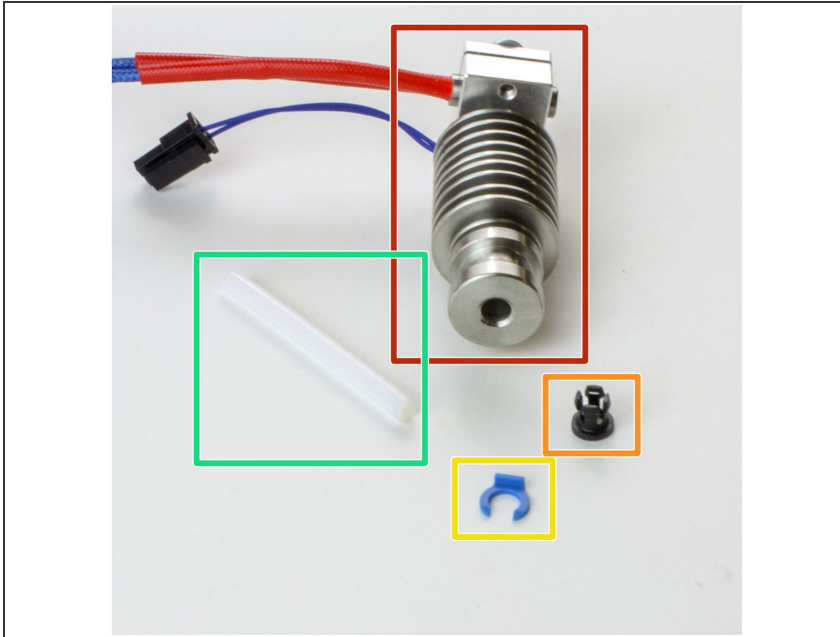
## Step 15 — Heat Break Check



⚠ Double check that your nozzle is still almost flush with your heater block.

- If there is significant space between the nozzle top and the heater block you should re-adjust your nozzle and heatsink to eliminate that space.

## Step 16 — PTFE Tubing



- Pushing in PTFE Tubing is **not optional** when building a Lite6, even if you're using a direct extrusion setup.
- Gather the following parts:
  - Assembled Hotend
  - Collet
  - Collet Clip
  - PTFE Tubing (at least 7cm long, longer if you're printing with a bowden extruder setup)

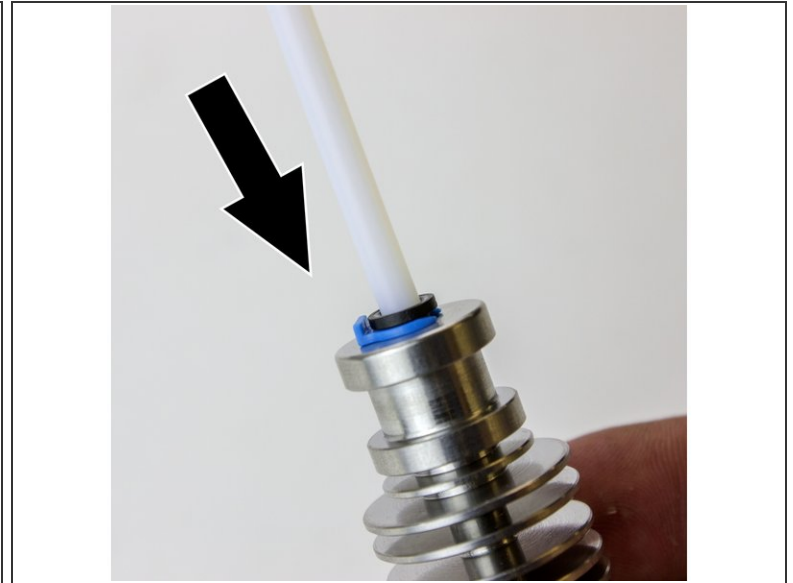
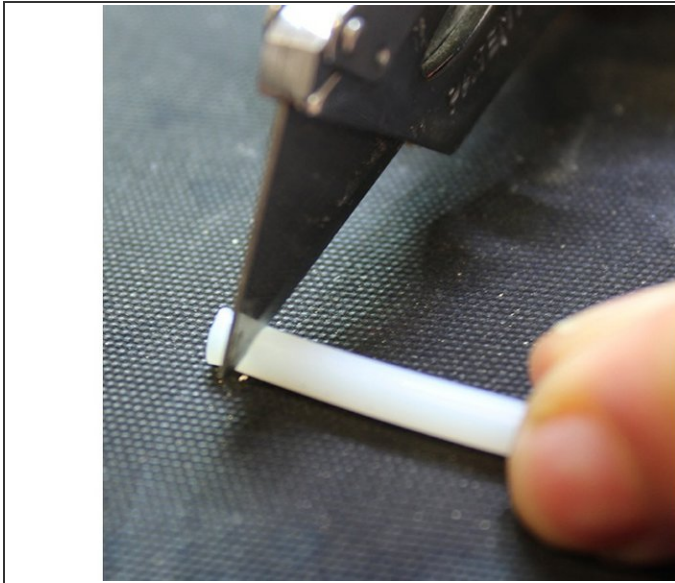
## Step 17 — Insert Collet



- Insert the small black collet into the top of the Heatsink, the side with the four small legs should push into the brass ring in the top of the heatsink with gentle finger pressure.
- Slip the collet clip underneath the collet, holding it up.



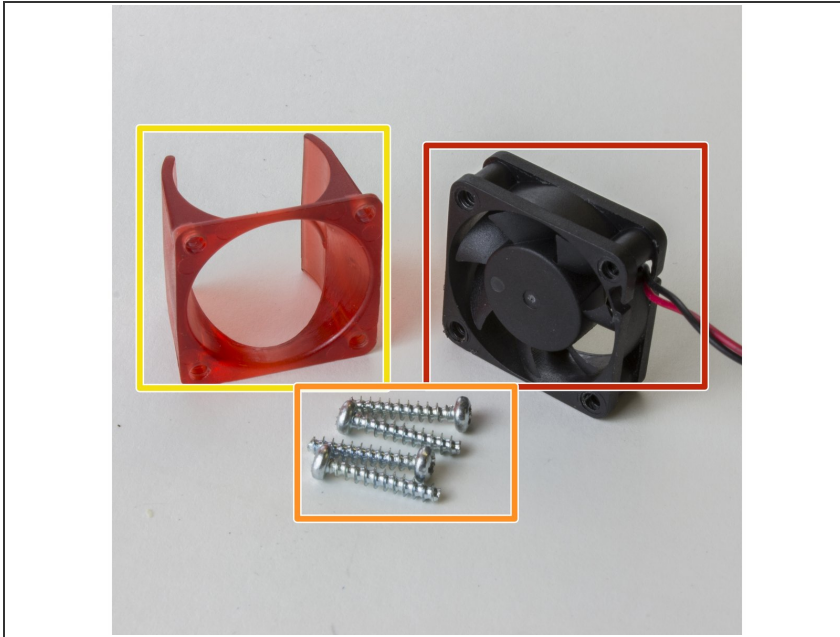
## Step 18 — Prep PTFE Tubing



- To make sure that the end of the PTFE tubing that will sit inside your hotend is square and flat, cut a slice off with a very sharp knife (a craft knife with razor sharp blade is recommended for this).
- Insert the PTFE tubing. The collet clip should pre-tension the tubing and lock it into the hotend; the tubing should be held securely downwards without any ability to wiggle or move.
- ⓘ To release, remove the collet clip, and push down on the collet while pulling the tubing.
- ⚠ The PTFE lining in a Lite6 HotEnd is very important for printing successfully. Make sure that your tubing is all the way in the hotend and butting up against your nozzle (this is different from a V6, where the tubing stops above the heat break).

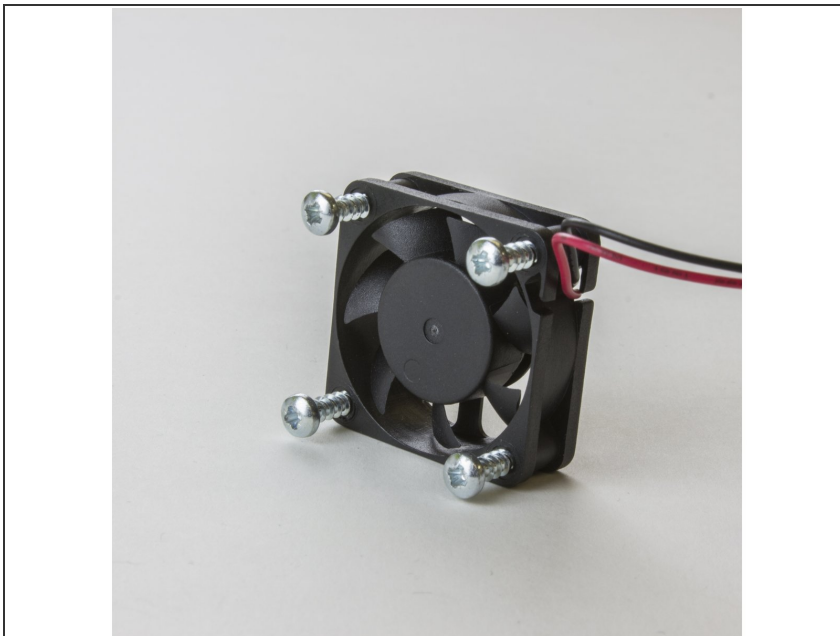


## Step 19 — Fan and Duct Parts



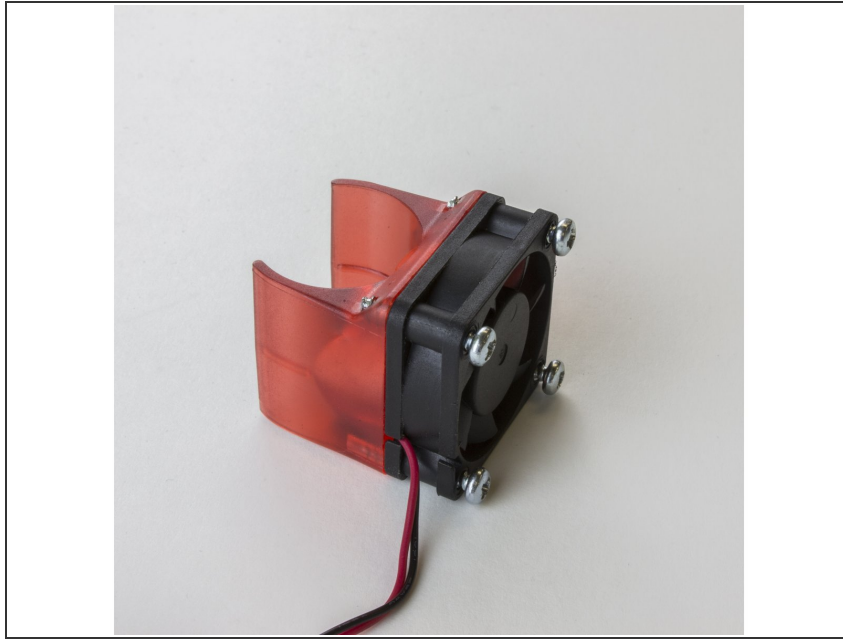
- Gather the Following
  - Hotend
  - 30mm Fan
  - 4 Plast-fast Philips-head Self-tapping Screws
  - Fan Duct

## Step 20 — Screw Plastfast Screws into Fan



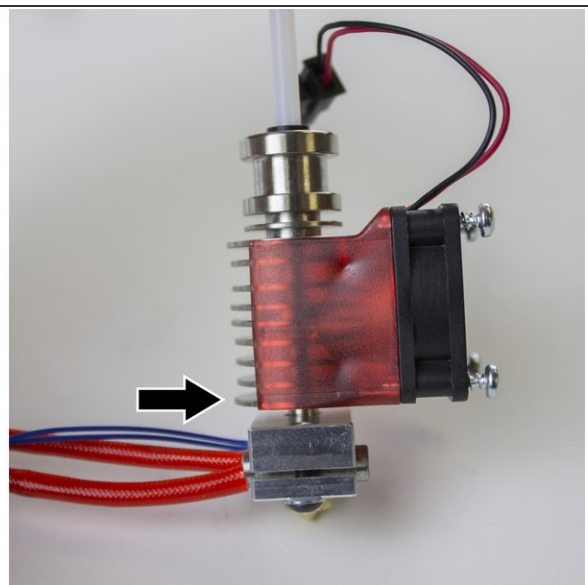
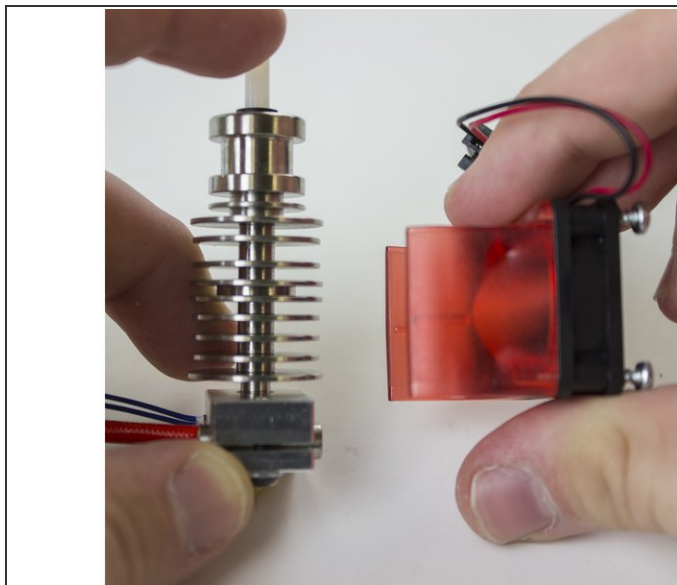
- ⚠ Make sure the screw heads are on the non-sticker side on the fan.
- Screw the Plastfast screws partially into the fan.
- ⓘ The screws should not be sticking out of the opposite side yet.

## Step 21 — Screw Fan into Fan Duct



- i** Think about where you want your fan's wires to come out before screwing it on. (You can mount the fan duct facing either way on your HotEnd)
- Screw the fan onto the fan duct. You may require a lot of torque and will therefore need a good fitting screwdriver.
- Don't worry about getting the screws 100% tightened, you just need to secure the fan.

## Step 22 — Clip Fan Duct onto Heatsink

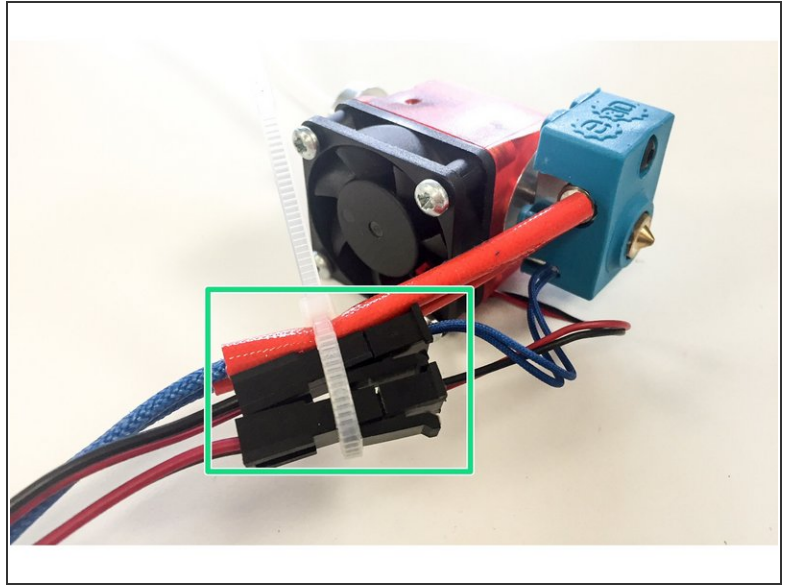
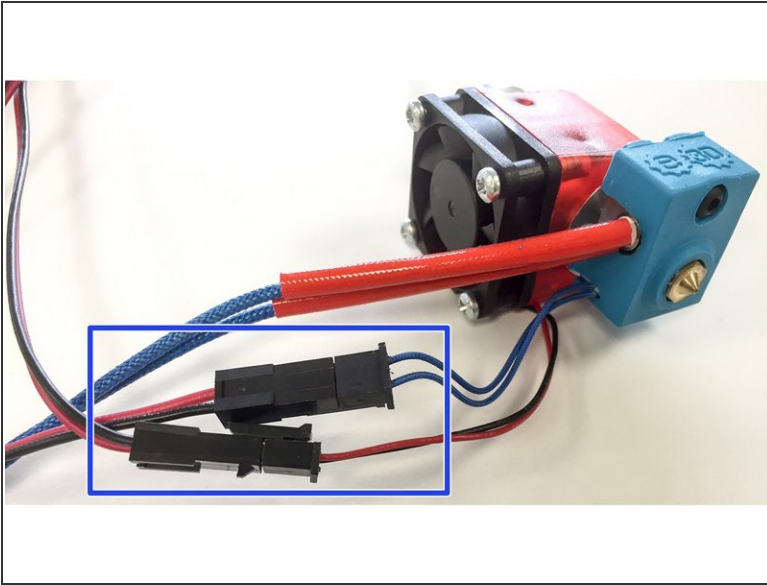


- Clip the duct onto heatsink

**!** Make sure the duct covers the fin closest to the heater block.

- The little over-hang can face up, down, depending on your setup. Make sure that it is not touching the heater block.

## Step 23 — Connect Extension Wires



- Plug the extension wires into your thermistor and fan. The other ends will go into your printer's electronics board.
- ❗ If you're replacing an old HotEnd, note where its wires were plugged in and mirror those for your new V6.
- ❗ If you're building a new printer, you may need to consult the documentation for your electronics board to see where to plug in everything.
- Use the included cable tie to link the connections together for strain relief.
- ❗ Take a little while to properly organise your wiring so that it doesn't get snagged on any corner of your printer.


## Step 24 — Firmware



- Configuring your firmware is different depending on the type your printer uses. Follow one of the links below for guides on how to update each of the most popular firmware. When you're done, continue in this guide.
- [Marlin](#)
- [Repetier](#)
- [Smoothieware](#)
- [RepRap Firmware](#)

## Step 25 — PID Tuning






-  Whenever you install a new hotend, it's important to run a PID tune. This will allow your printer to adjust some internal parameters so that it can learn how your hotend heats up. This way, your printer can anticipate how much power it needs to give your hotend to get it up to temperature, but not over.
- Use a computer to connect to your printer. If you have a typical RepRap printer, you can use PrintRun, Repetier Host, or MatterControl.
  - Other, closed-source, printers may be better suited to their manufacturer's recommended printer control software.

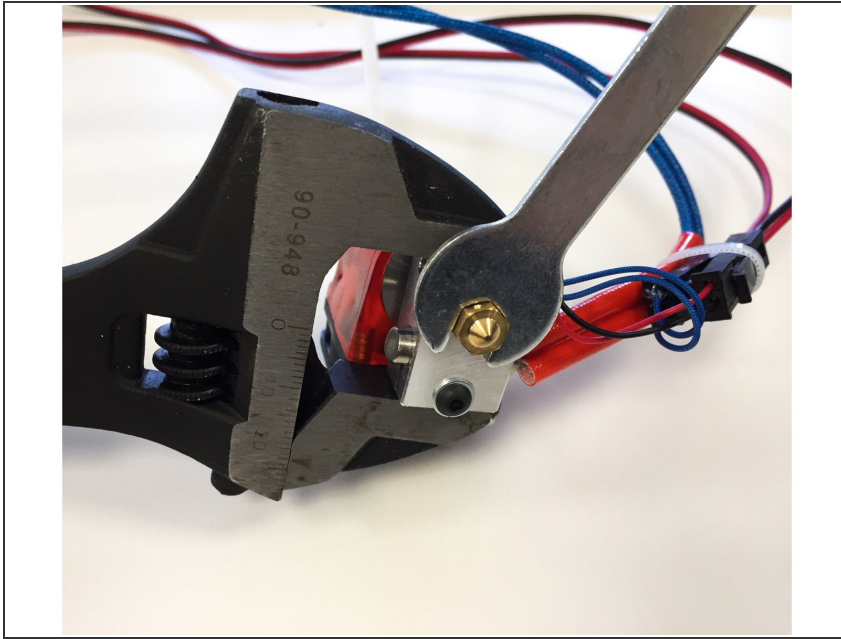


## Step 26 — PID Tuning



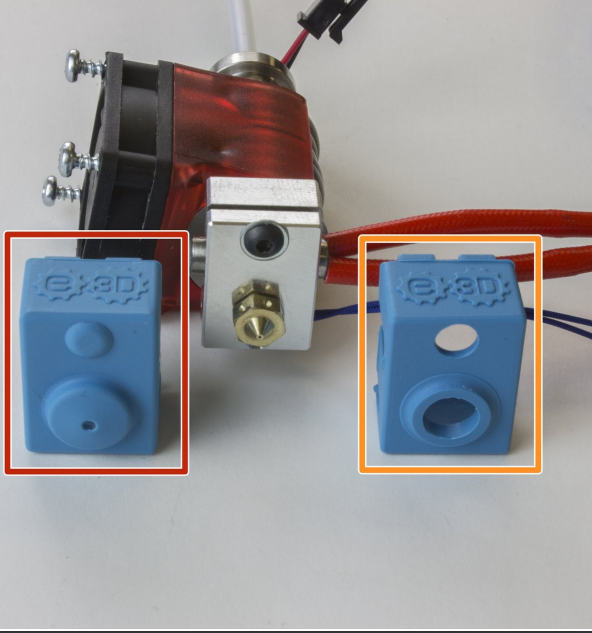
-  Make sure you have your hotend in a place where it can get hot without damaging anything or setting any fires! Mounted on your printer or held with a spanner will work fine. Take care not to touch your hotend when it heats up.
-  When you heat up your HotEnd for the first time, make sure it does not heat above 245°C. Any hotter, and the PTFE lining will start to degrade.
- Send the command M303 to autotune your PID. For more detailed instructions, check out [Thomas Sanladerer's](#) video guide for more information.
-  Not all firmware support PID autotuning, and you may need to tune manually.
- We recommend running two PID tunes for the V6, one now and one later at at normal printing temperatures, with filament in the hotend, sock attached, and with an active cooling fan on if you're planning on using one. This way your printer can finely tune its settings to match your real printing environment.

## Step 27 — Hot-Tightening



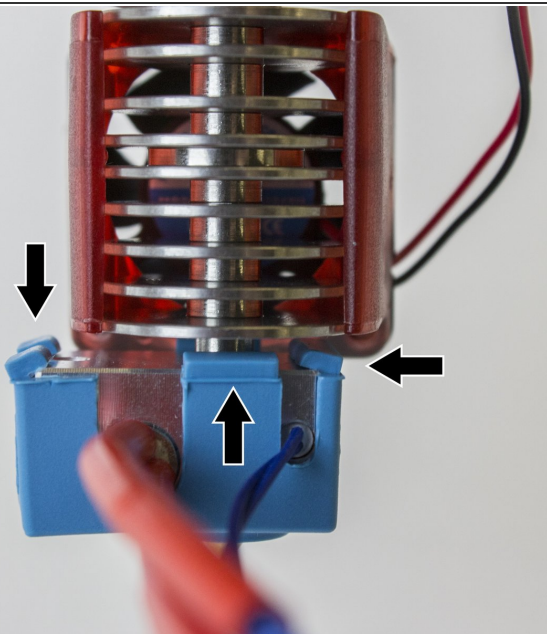
- Hot-tightening is the last mechanical step before your V6 is ready to go! Hot-tightening is essential to sealing the nozzle and heatsink together to ensure that molten plastic cannot leak out of the hotend in use.
- Using your printer's control software (or LCD screen), set the hotend temperature to 240°C. Allow the hotend to reach 240°C and wait one minute to allow all components to equalise in temperature.
- Gently tighten the nozzle whilst holding the heater block still with a spanner and using a smaller 7mm spanner to tighten the nozzle. This will tighten the nozzle against the Heatsink and ensure that your hotend does not leak.
- You want to aim for 3Nm of torque on the hot nozzle—this is about as much pressure as you can apply with one finger on a small spanner.

## Step 28 — Gather Sock Parts



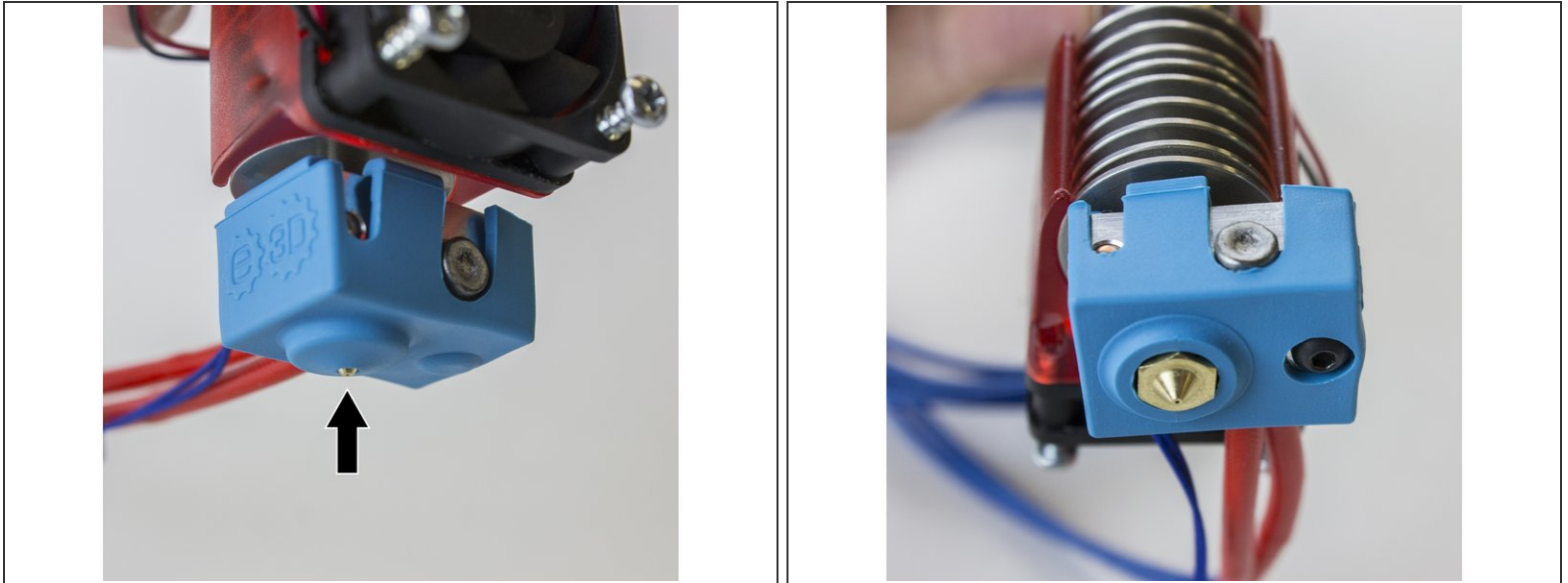
- Gather the following:
  - Silicone Sock, one of either:
    - Pro sock
    - Or Normal Sock
  - Your HotEnd

## Step 29 — Attaching Sock



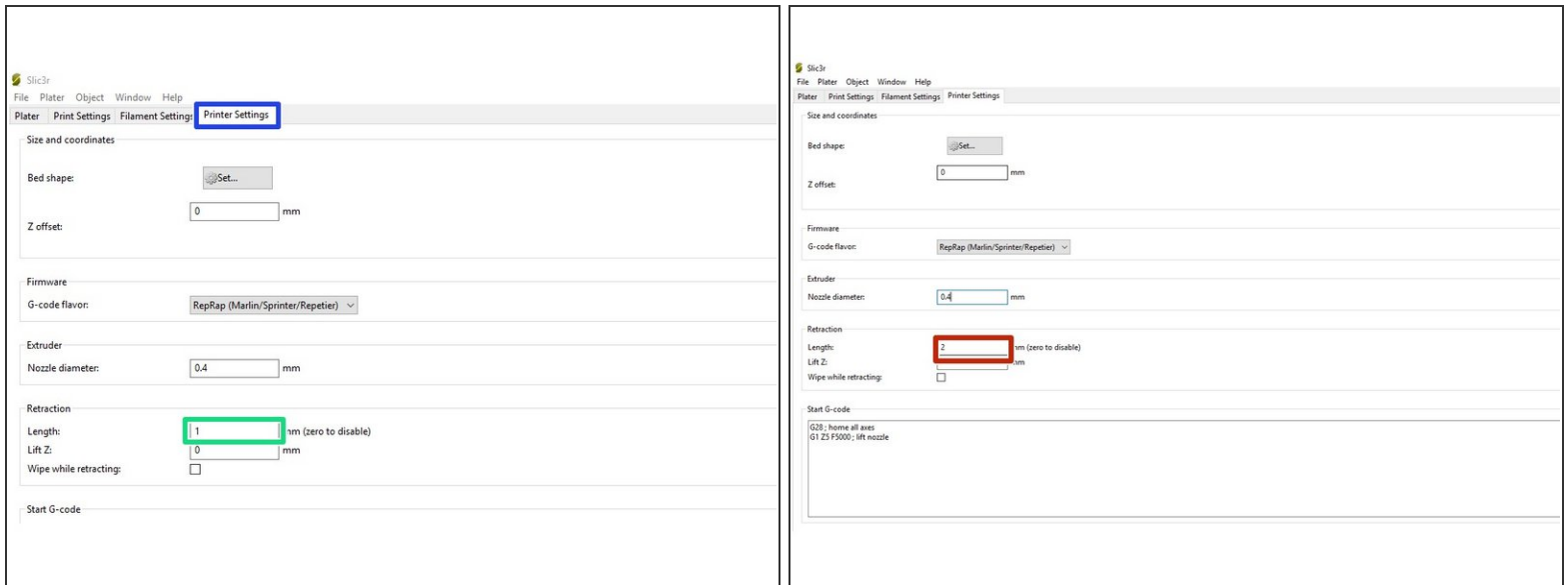
- First, let your hotend cool down.
- Slip your silicone sock over the hotend. Try to get each of the little clips on the top of the heat block so the sock will stay on better.
- ⓘ It may look like your sock doesn't quite fit. Don't worry, when you heat up your HotEnd, the sock will expand, and the clips will fit just fine.

## Step 30 — Final adjustments



- If you're using the pro sock make sure that the tip of the nozzle protrudes from the sock.
- If you're using a normal sock, it should look like the second picture when you're finished.

## Step 31 — Retraction Settings



- In your slicer of preference find the retraction settings. In Slic3r this is in printer settings.
- Start with a retraction length of 1 mm
- If you experience blobs or stringing on the surface of the print increase the retraction length to 2mm.
- ⚠ Do not increase the retraction length more than 2mm as this can lead to molten plastic being pulled into the heat break, increasing the likelihood of jams.



## Step 32 — CONGRATULATIONS



- You're now ready to go! Remember you'll have to update your slicer settings a little:
- Check your nozzle diameter in your slicer. All Lite6 kits ship with a 0.40mm brass nozzle.
- Having very long retraction settings will cause problems.
  - For direct extrusion systems you should use anywhere from 0.5mm–1.0mm of retraction.
  - For bowden systems you can use up to 2.0mm of retraction.
- Print PLAs at 205–215°C, and ABS at ~240°C. For other materials check with their manufacturer

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