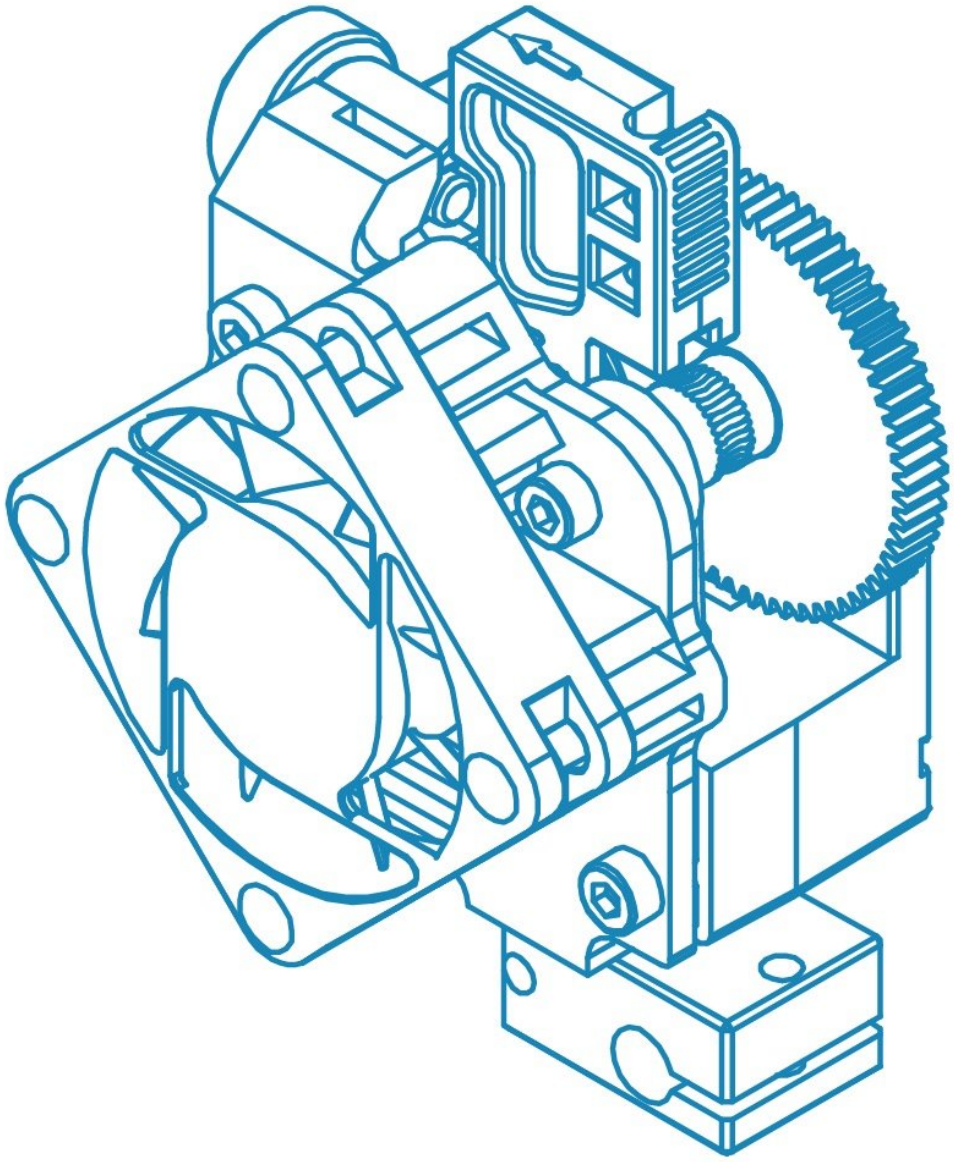
Titan Aero Assembly

Learn to assemble your Titan Aero

Written By: Gabe S.



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INTRODUCTION

The Titan Aero is a very similar build to a Titan and a V6 put together (which shouldn't come as much of a surprise).

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 Titan Aero is capable of printing up to 285°C, do not exceed these temperatures unless you have replaced the thermistor cartridge with a PT100, the aluminium heater block with a Plated copper heater block, and the Brass nozzle for a Plated copper, Hardened steel or Nozzle X.
- 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.

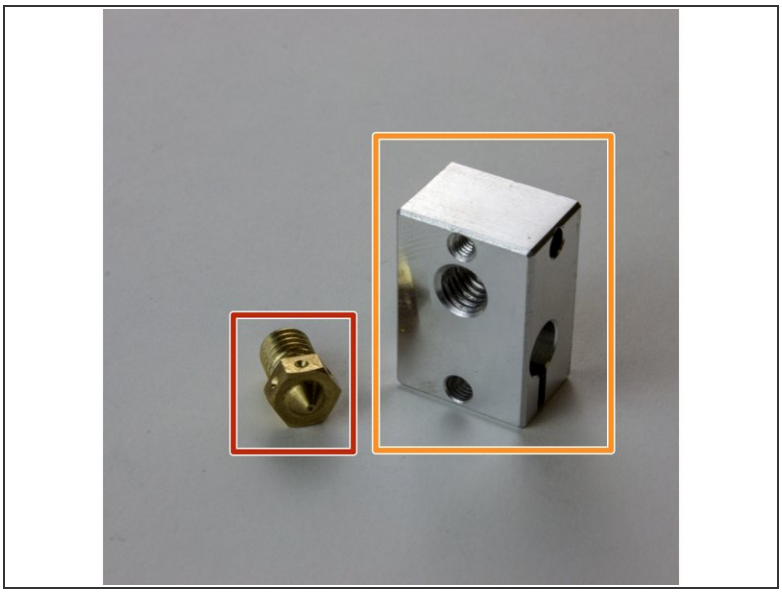
TOOLS:

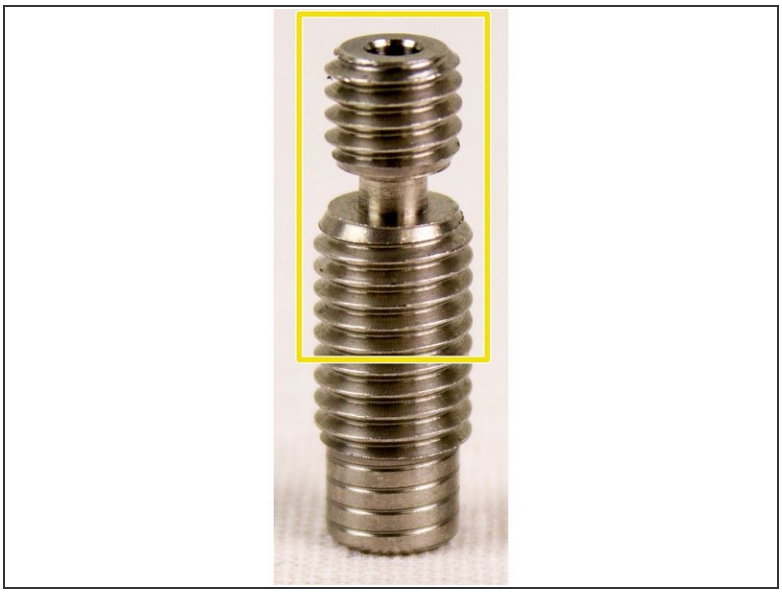
- Hex Wrench 3mm (1)
- Hex Wrench, 2.5mm (1)
- Hex Wrench, 1.5mm (1)
- Nozzle Spanner (1)
- Adjustable Wrench (not for sale) (1)

PARTS:

- V6 Heater Block (1)
- V6 Nozzles (1)
- V6 Heat Break (1)
- Thermistor Cartridge (1)
- Heater Cartridge (1)
- M3 Grub Screw (2)
- M3x10 Socket Dome Screw (1)
- Extension Wires (1)
- Titan Extruder Body (1)
- Titan Idler Lever (1)
- Titan Filament Guide (1)
- Steel Pinion Gear (1)
- Delrin Gear with Filament Drive Shaft (1)
- PTFE Tubing (1)
- M3x8 Screw (1)
- M3x30 Screws (3)
- M3x25 Screw (1)
- M4 Thumbscrew (1)
- M4x10 Button Head Screw (1)
- Idler Spring (1)
- Shake-proof Washer (1)
- Titan Aero Lidsink (1)
- 9mm Roller Bearing (1)
- 40mm Fan (1)
- Silicone sock (1)
- Compact but powerful motor (optional extra) (1)

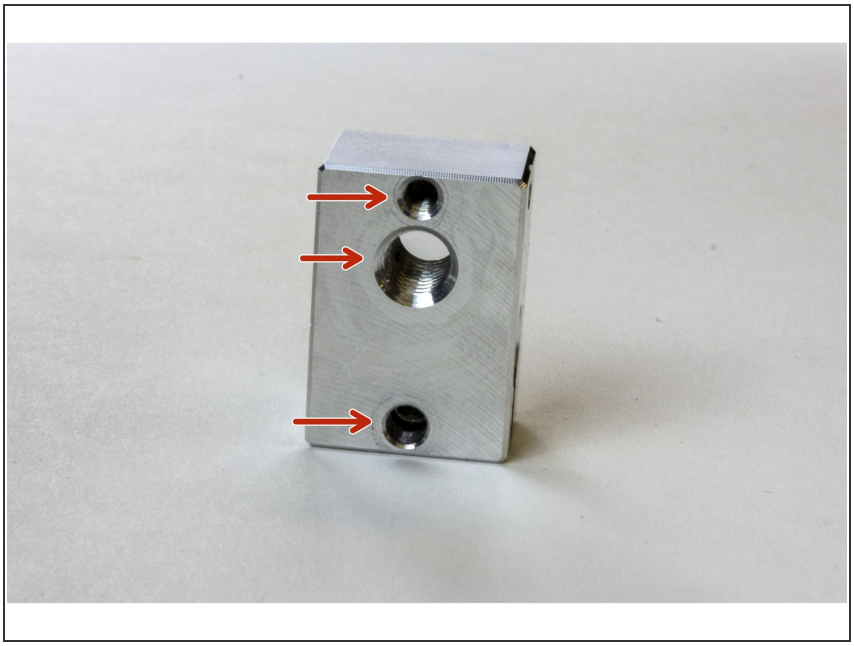
Step 1 — Gather parts





- Gather the nozzle, heater block and heat break:
  - Nozzle
  - Heater Block
  - Heat Break

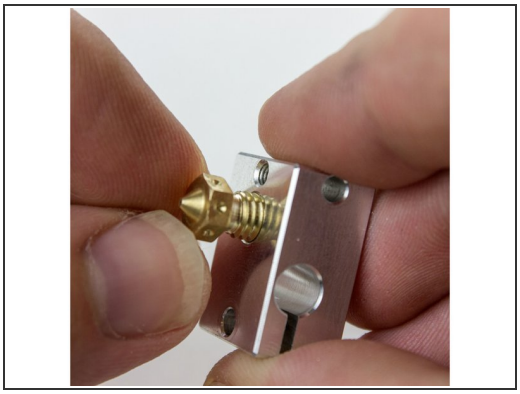
Step 2 — Orientate heater block

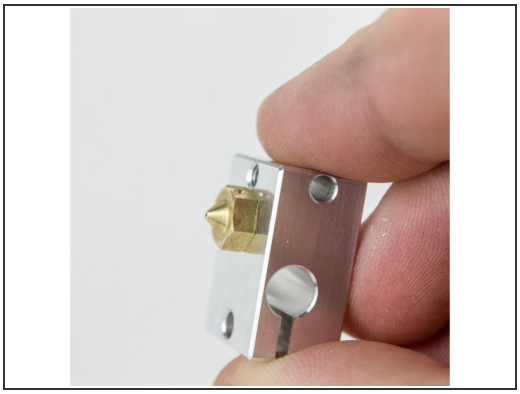


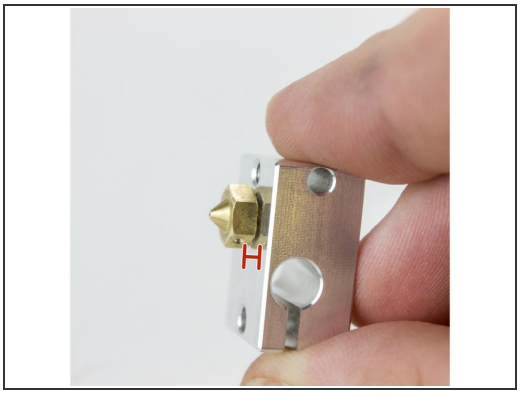
Before starting work on your heater block, make sure that you'll going to screw your nozzle into the correct side.

- You should be looking at the side of the heater block with three holes in it

Step 3 — Screw in nozzle

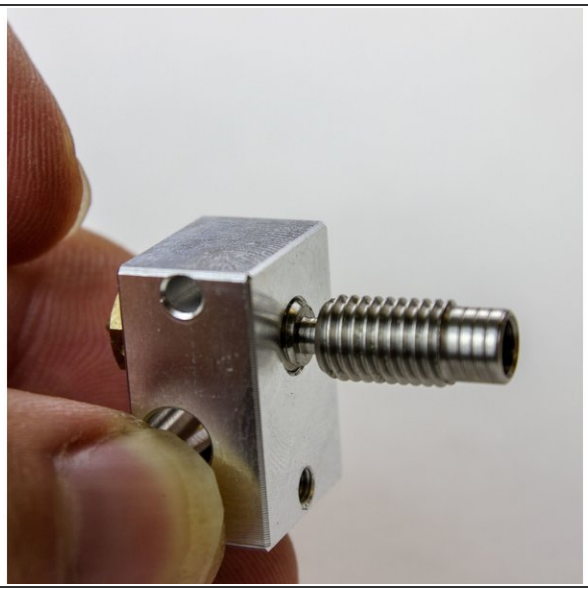






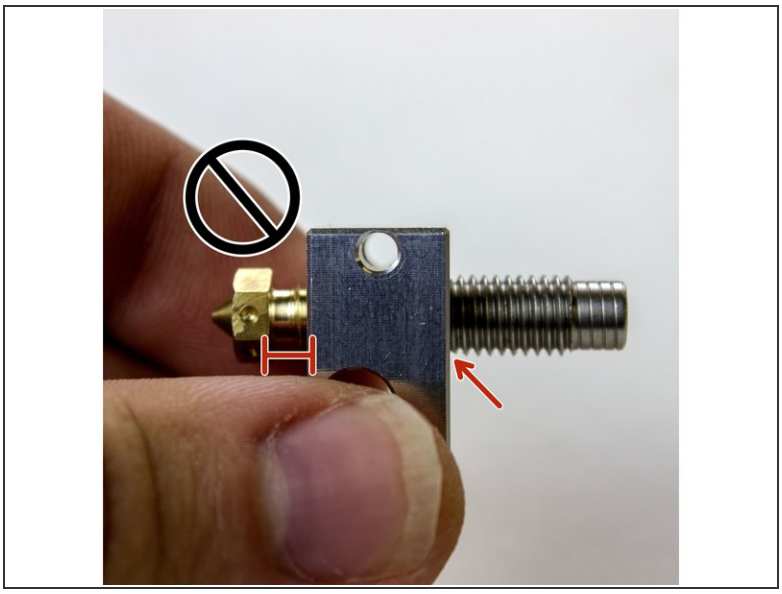
- Screw in the nozzle all the way into the heater block. Don't worry about tightness yet.
- Then, unscrew the nozzle by a 1/4 of a turn. This will leave a little space to tighten after screwing in the heat break.

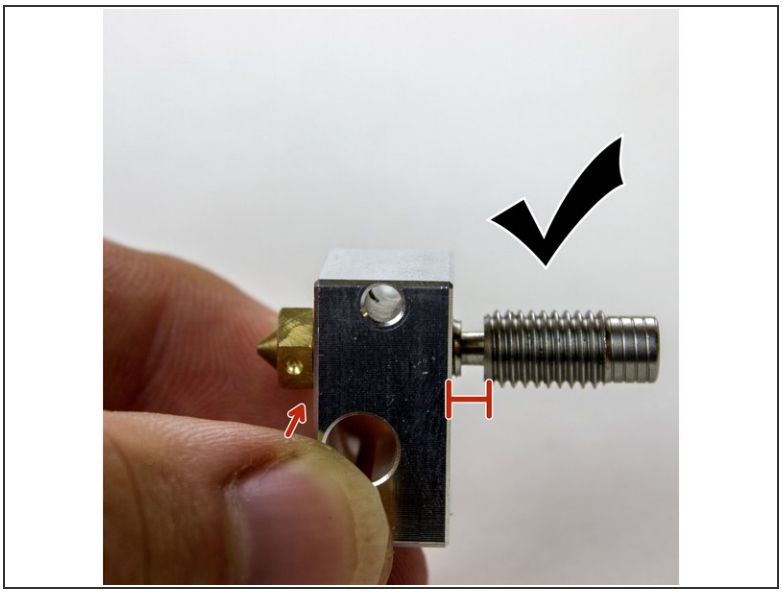
Step 4 — Screw in heat break



- Screw in the heat break until it touches the nozzle.
- Tighten the nozzle against the heat break. No need to over tighten, we'll be hot-tightening later.

Step 5 — Check nozzle

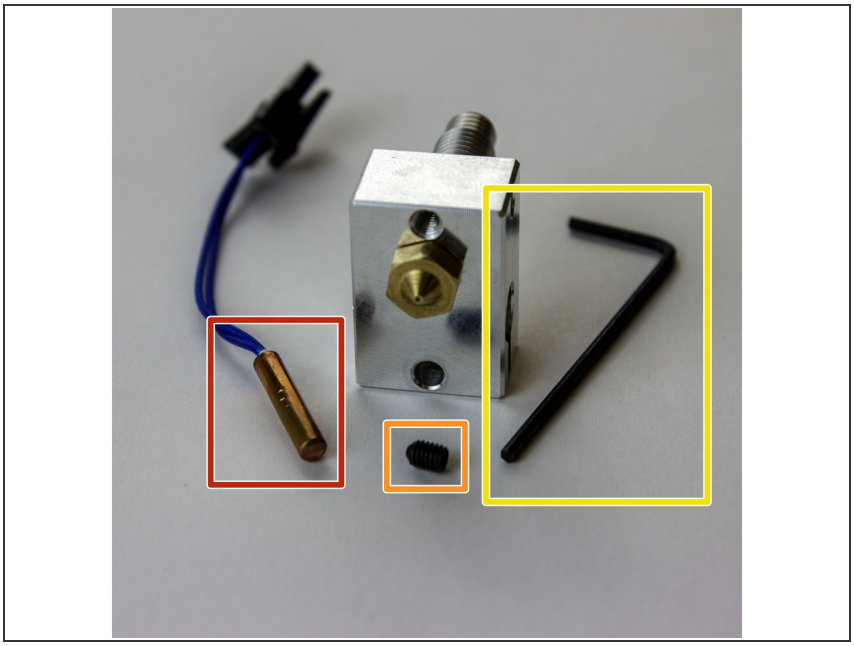




⚠ Double check that your nozzle is still almost flush with your heater block.

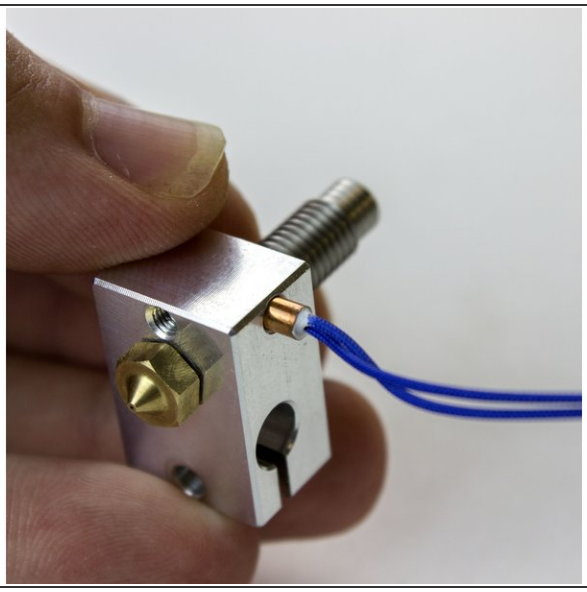
- If there is significant space between the nozzle top and the heater block you should re-adjust your nozzle and heat break to eliminate that space.

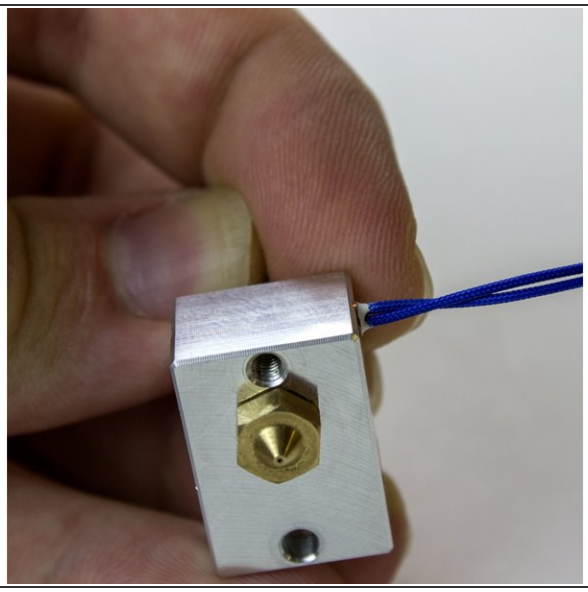
Step 6 — Gather Thermistor Parts



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

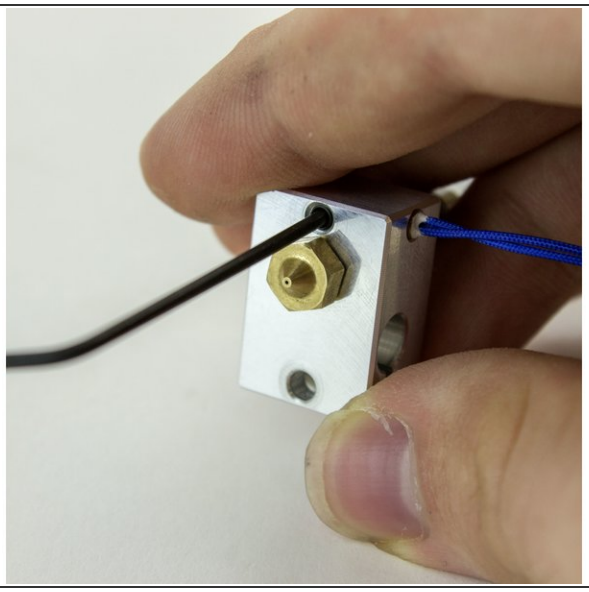
Step 7 — Slide in Thermistor

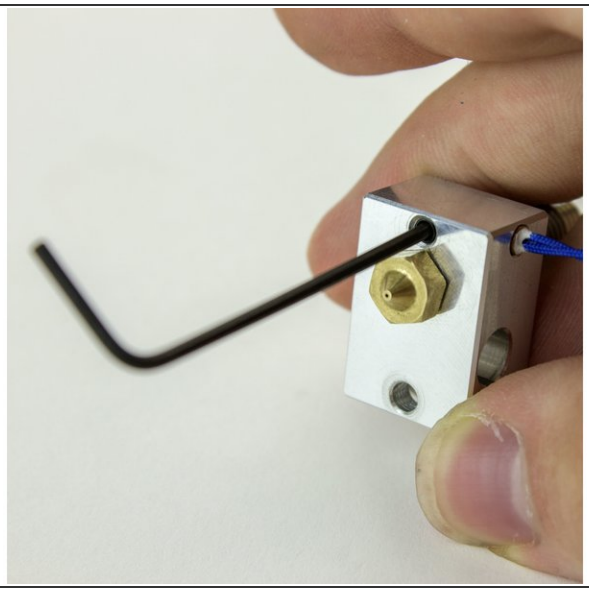




- Slide in the thermistor cartridge.
- You can slide the cartridge in either direction so that the wires extend from one side or the other of your heater block. Think about how you'll be organising your wiring to decide which makes sense for your printer.

Step 8 — Screw in Grub Screw





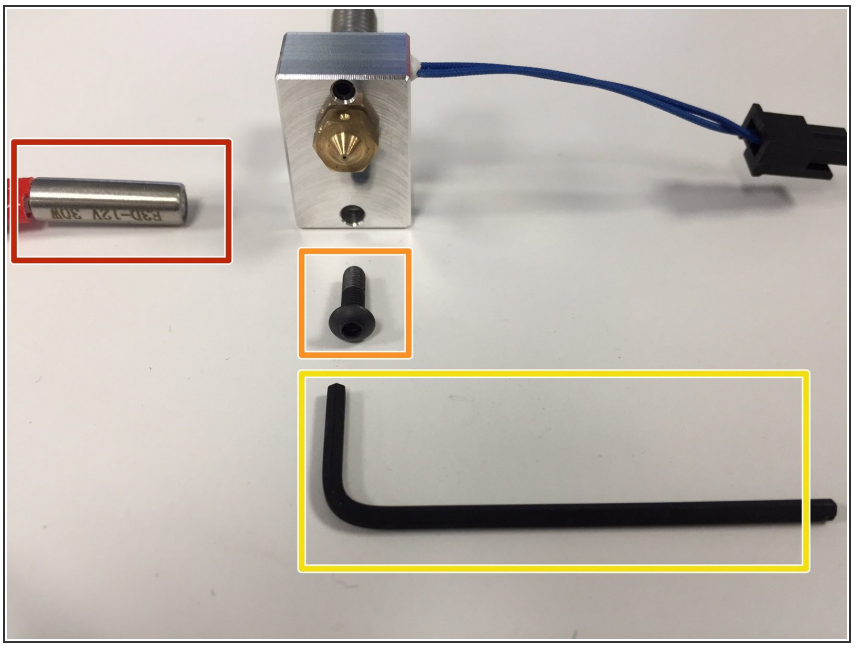
- Screw in grub screw until it just touches the thermistor.
- Tighten M3 grub screw by an 1/8 of a turn.

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

Step 9 — Test Heater Cartridge

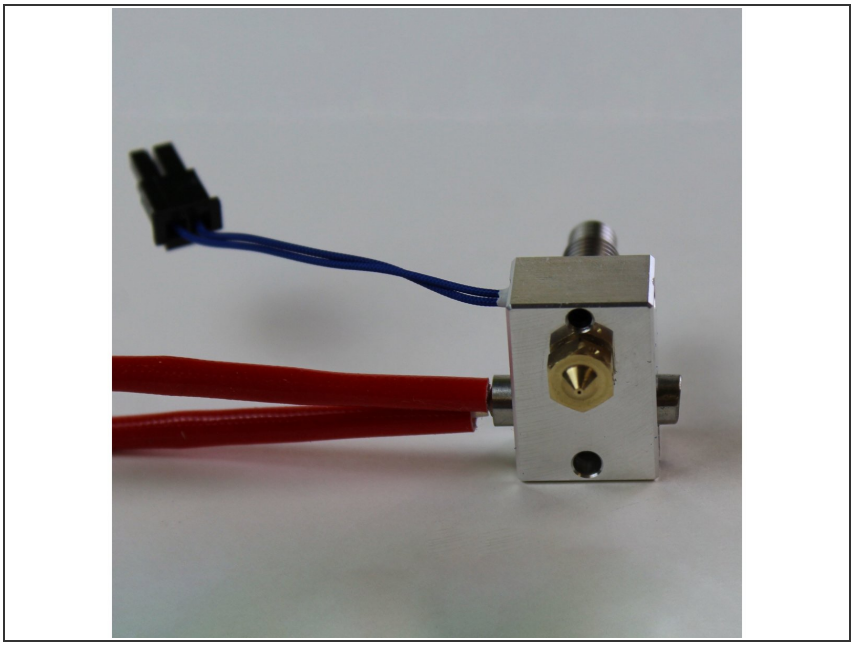
- Before you install your heater cartridge, you should double check that you both purchased and received the correct voltage cartridge. *This process is less annoying than putting out a house fire.*
- Your heater cartridge will be either 30w or 40w, with blue and red wires receptively.
- If you have a 12v heater cartridge, your resistance reading will be (about) 3.5 or 4.8 Ω for 40w and 30w respectively.
- If you have a 24v heater cartridge, your resistance reading will be (about) 14.4 or 19.2 Ω for 40w and 30w respectively.

Step 10 — Gather Heater Cartridge Parts



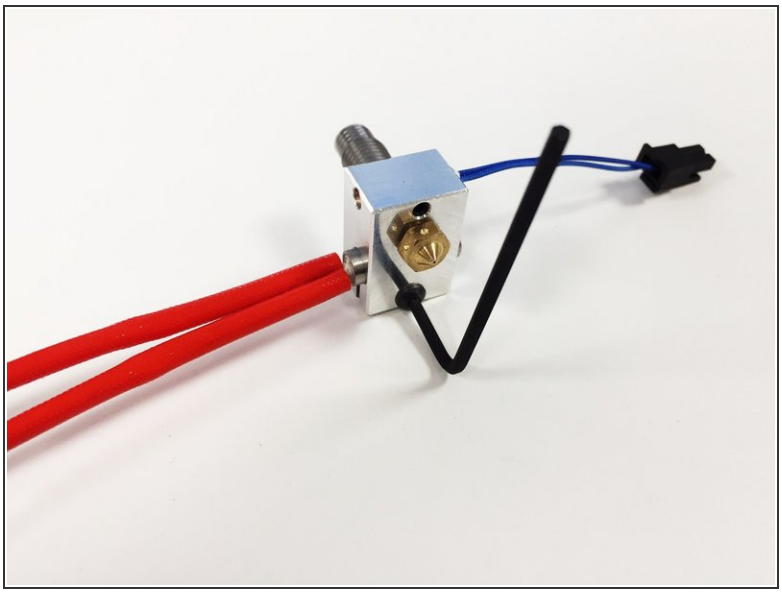
- Gather heater block, heater cartridge, 2mm hex key and M3x10 screw with washer:
  - Heater Block
  - Heater cartridge
  - 2.5mm, Hex Wrench
  - One of the longer M3x10.

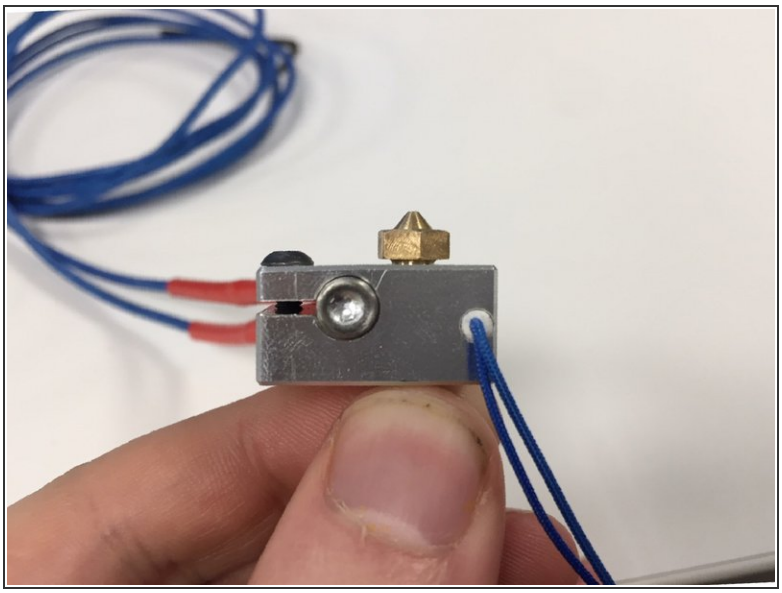
Step 11 — Slide in Heater Cartridge



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

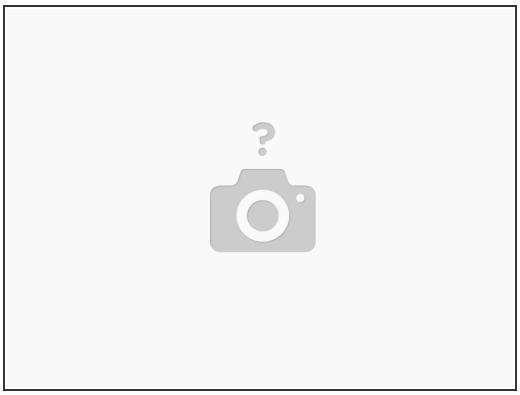
Step 12 — Screw in M3x10 Screw





- Tighten the M3 x 10 socket dome screw with 2.5 mm hey key until the clamp deforms slightly (as shown in the second picture).
- Gently tug the heater and thermistor wires to check they won't slide out

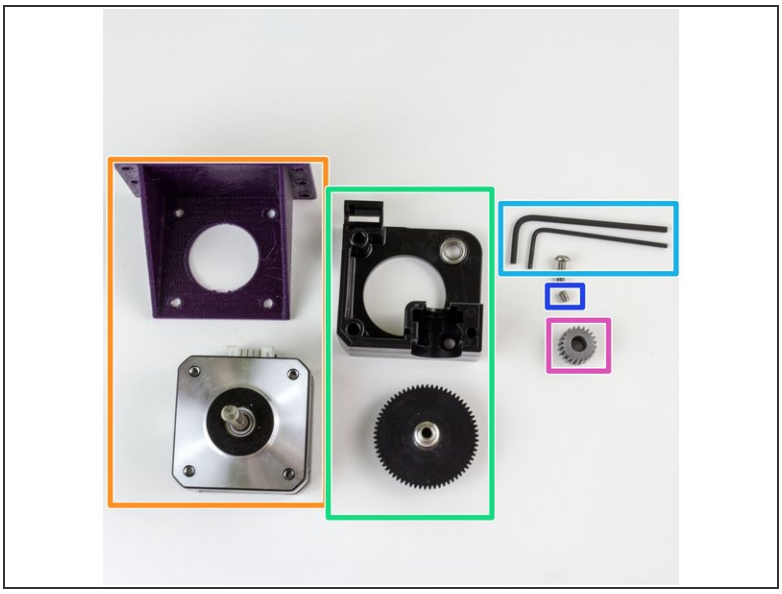
Step 13 — Prep: Mounting Your Titan

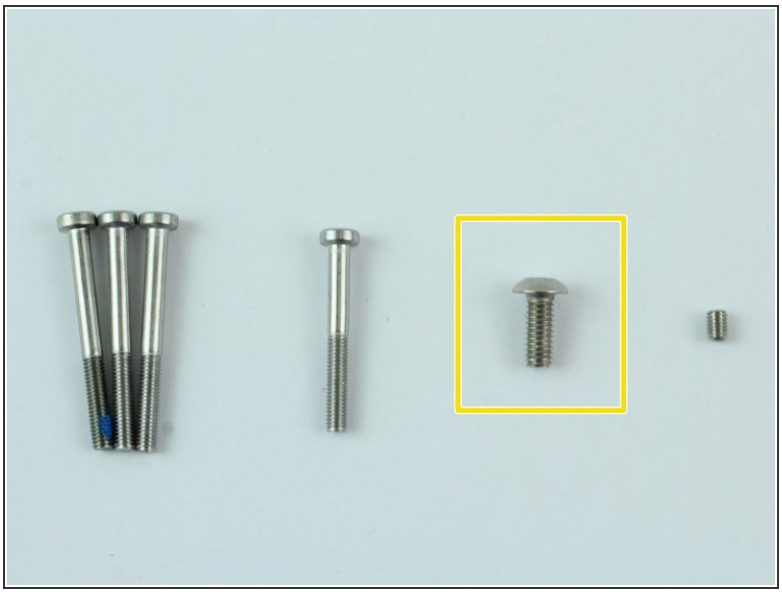


- Before beginning your build, make sure that you have an appropriate mount for your extruder. If you have a commonly upgraded printer (Ultimaker 2, Taz 5/6, Prusa i3, etc) you'll likely be able to find 3D models of well designed Titan mounts on your favourite 3D model sharing site.
- When installing the Titan, you must have something to separate the motor from the extruder body by 2 mm. Typically, a piece of your mounting bracket will attach here and provide this space (for reference take a look at our Prusa Mounting Bracket). Having a separation of more than 2mm will mean you need longer screws to hold the assembly together.

ⓘ Please note that there may be extra bolts in the titan fixing kit bag that will be unused.

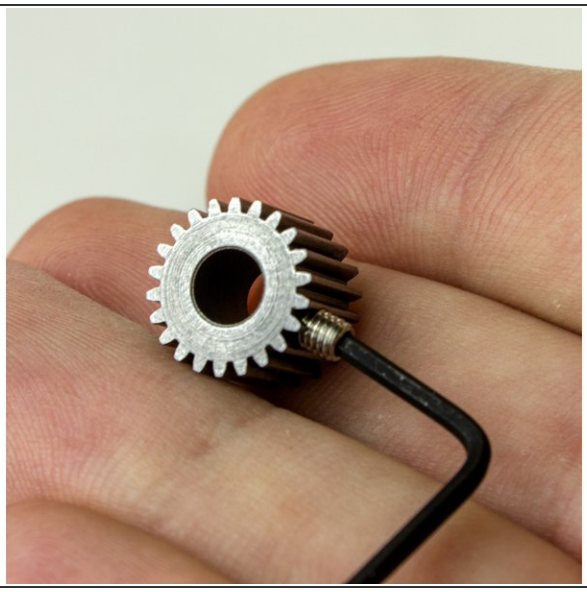
Step 14 — Gather Titan Body

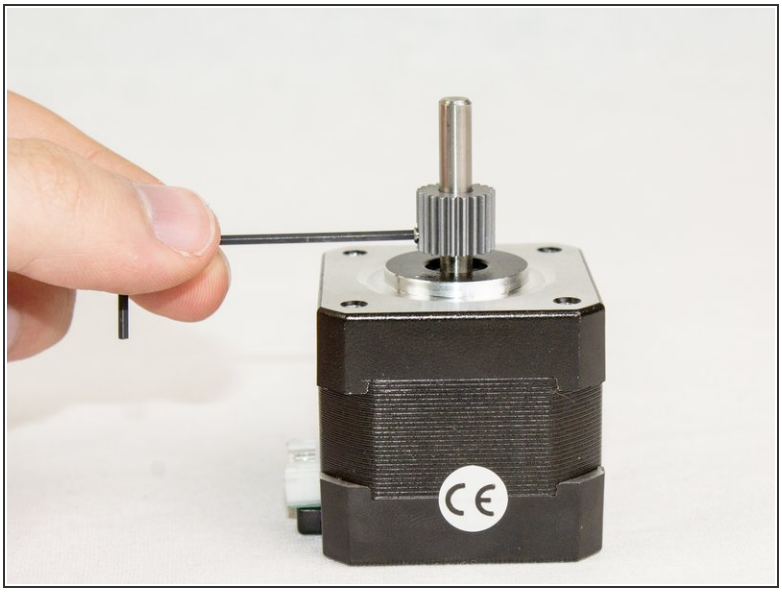




- Gather
  - The motor you'll be using + mounting bracket
  - Extruder Body + Large Gear
  - M3x8mm Screw
  - M3 Grub Screw
  - Pinion Gear
  - The Smallest, 1.5mm Hex Wrench, and Mid-sized, 2.5mm Hex Wrench

Step 15 — Attach Pinion Gear to Motor



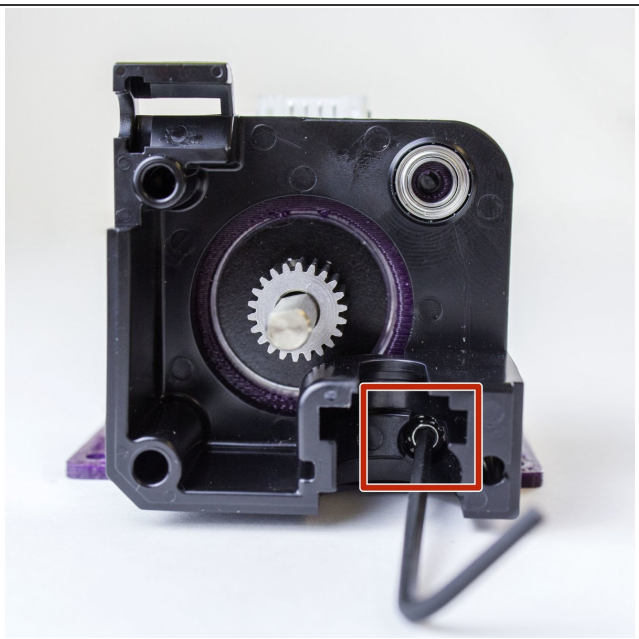


- Thread the M3 grub screw into the pinion gear slightly so you don't lose it
- Slip the pinion gear onto the motor shaft with the grub screw facing down, towards the motor.
- Slide it about 3/4 of the way down the shaft and tighten the screw.

ⓘ The compact but powerful motor has a fully round shaft. - some of the older kits used the slimline motor which has a flat on the shaft.

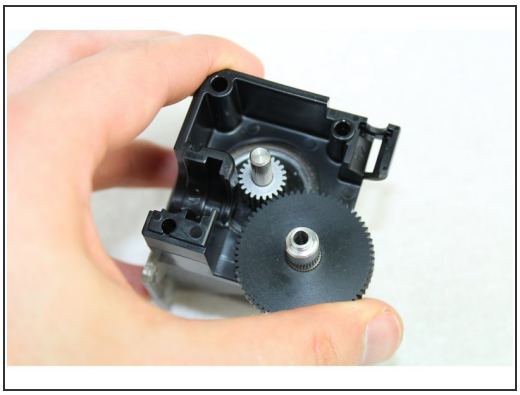
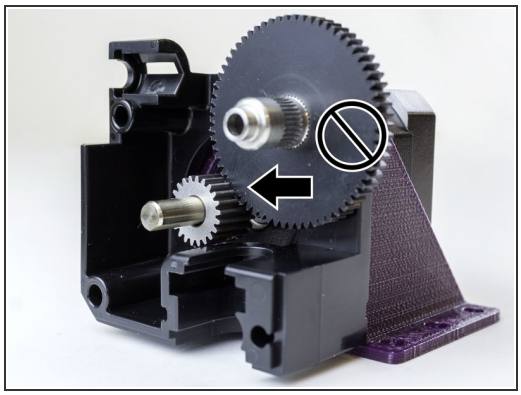
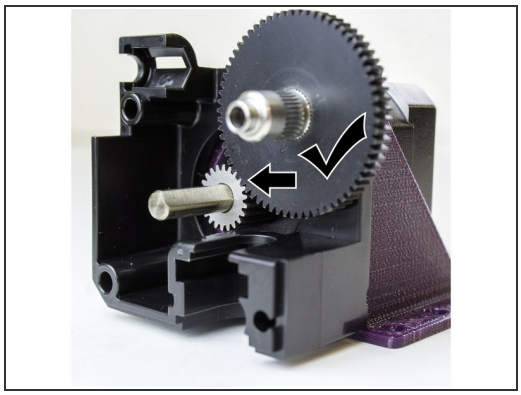
ⓘ As of March 2019 the compact but powerful now has a flat ground on the shaft.

Step 16



- Take your M3 screw that you picked out before and slip it through the hole extruder body in the groove mount (lower leftmost screw hole).
- Slip the screw through your mounting bracket (including spacer if you're using one) and screw it into your motor.

Step 17 — Place the Hobb Gear

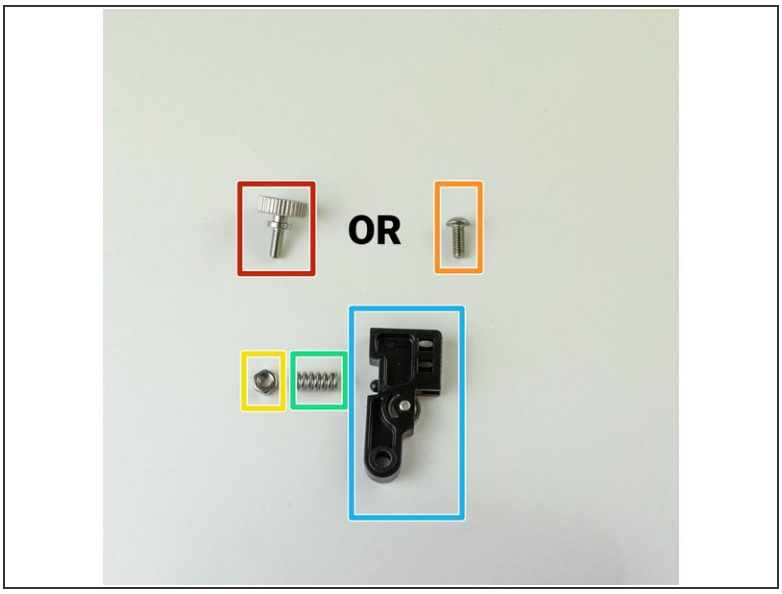




- Slot in the Hobb gear (attached to the other gear)
- You need to have the top of the pinion gear flush with the top of the Hobb gear.
- If it isn't—and it likely won't be on the first try—loosen the grub screw and adjust the positioning of the pinion gear on the motor's shaft. You may need to unscrew the extruder body to get at the grub screw.
- When you think you've got it, try pressing down on the Hobb gear lightly to see how it will fare when the whole extruder is screwed in and make sure it's still flush.

⚠ If the pinion gear is mounted too high you will risk pinching the idler arm against the heat sink which will cause excessive friction.

⚠ If the pinion gear is mounted too low it will not make full contact with the Hobb gear which risks causing uneven wear.

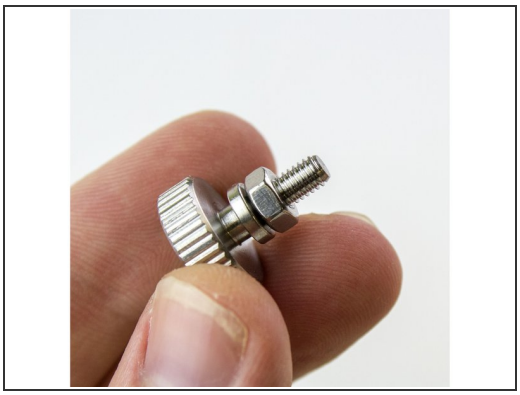
Step 18 — Gather

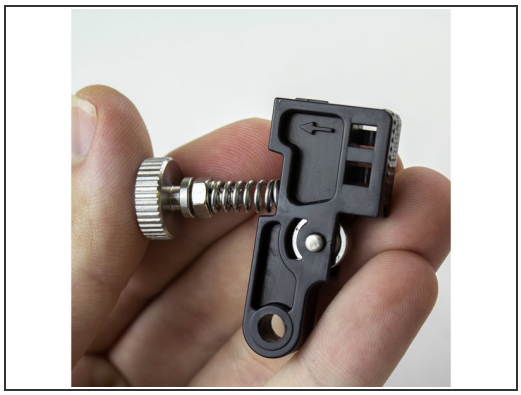


- M4 Thumbscrew
- OR M4 Button Head Screw
- M4 Nut
- Spring
- Idler Lever

The only difference between the thumbscrew and the button head one is ease of use vs. space. If you can, we suggest using the thumbscrew.

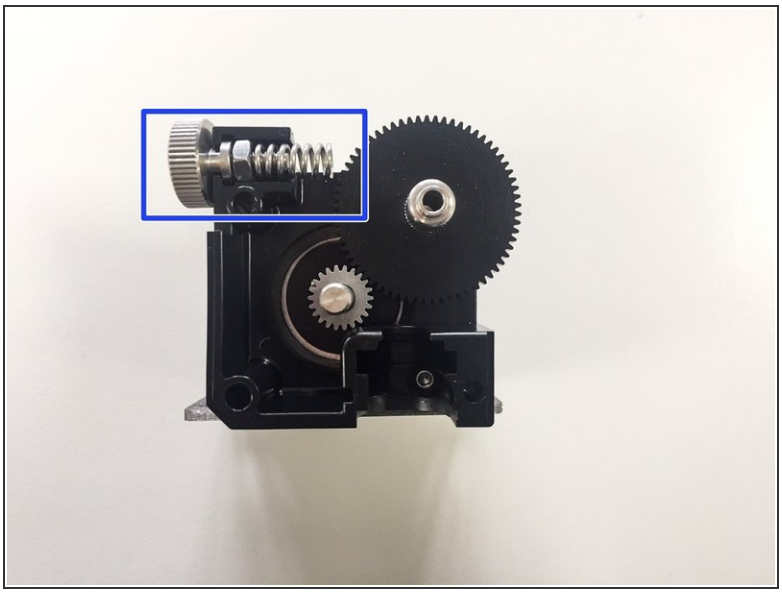
Step 19 — Prep Idler

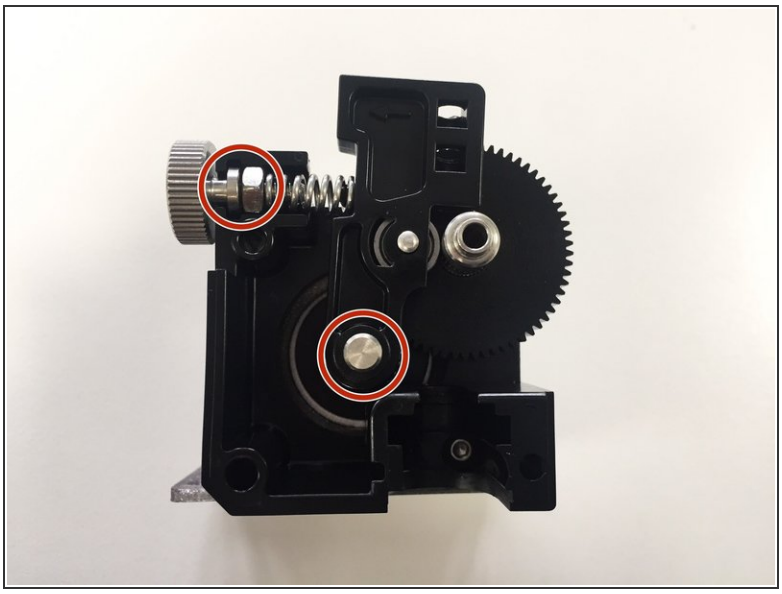




- Screw the M4 nut all the way onto the M4 Screw or Thumbscrew.
- Push the spring over the threaded part of the screw. The nut will eventually let you adjust the tension on your extruder by travelling down the screw and compressing the spring.
- Position the other end of the spring on the little bump on the idler lever.

Step 20





- Drop the thumb screw / nut / spring assembly into the extruder body.
- The screw will slot into the nut-channel in the extruder body, and the idler arm will slip onto the motor shaft.

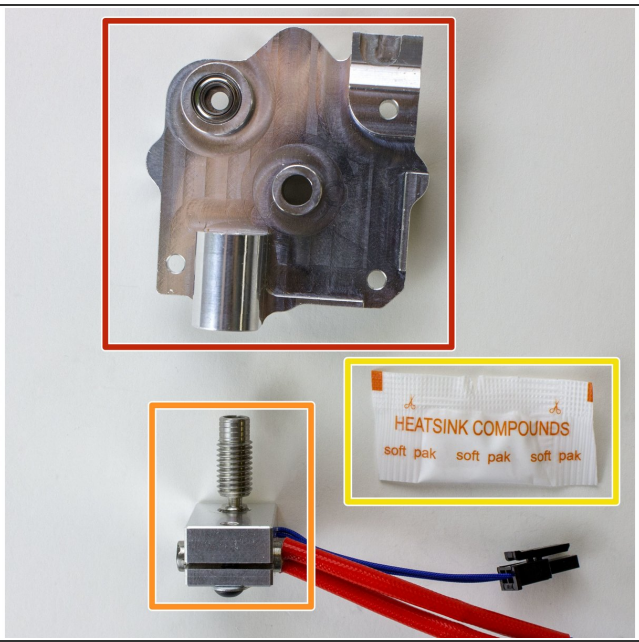
It is normal that the shaft sticks out slightly from the lever.

- Make sure that the nut slots into the channel fully and that the idler arm is pressed all the way onto the motor shaft.

Your assembly may look like either photo above, depending on whether you're using the thumbscrew or the dome screw.

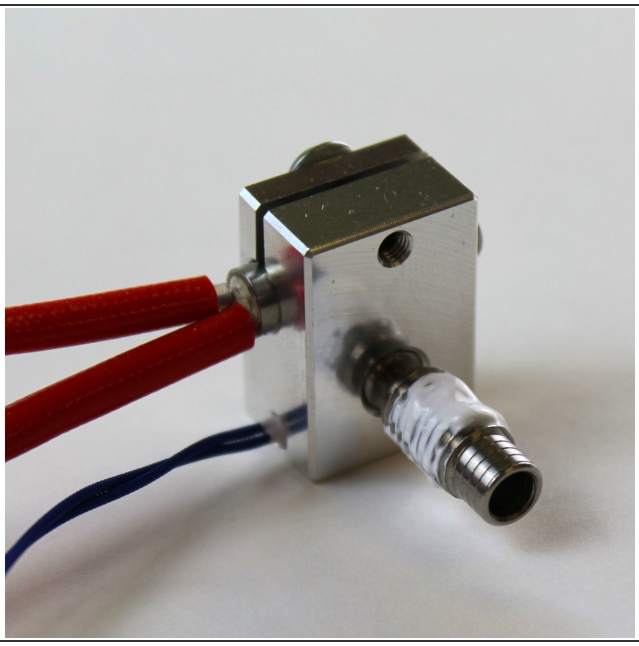
Do not compress the spring without the Titan lid on!!! It will go flying out and you will lose it. And it could hit someone in the face.

Step 21 — Gather Lid Parts



- Gather:
  - Titan Aero heat sink
  - Assembled Heater Block
  - Thermal Paste Sachet

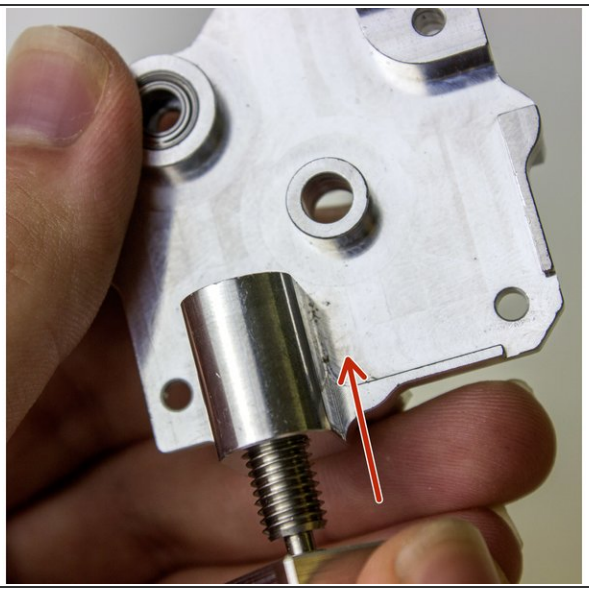
Step 22 — Apply Thermal Paste

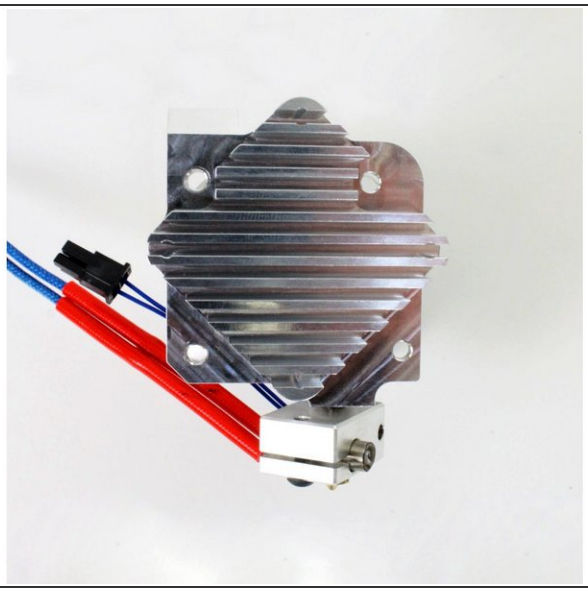


- Apply the thermal paste to the heat break.

ⓘ You don't need to use the whole sachet

Step 23 — Screw in the Heat Break



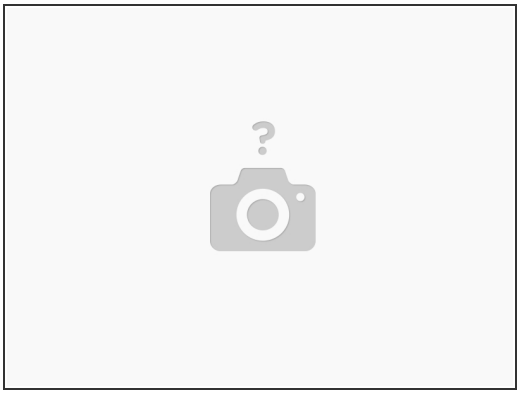


- Screw in heat sink and tighten by hand—no need to over-tighten.
- Wipe away any excess thermal paste.

Don't use thermal paste on any other parts of the HotEnd.

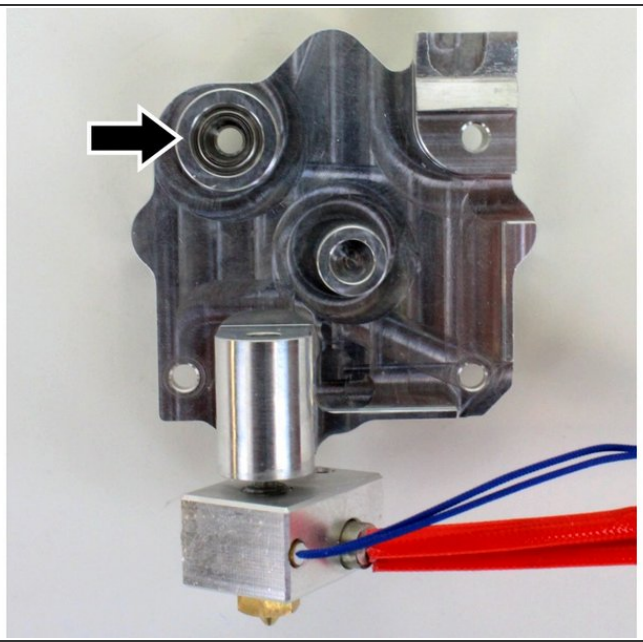
Wash your hands after working with Thermal Paste

Step 24 — Gather Bearing



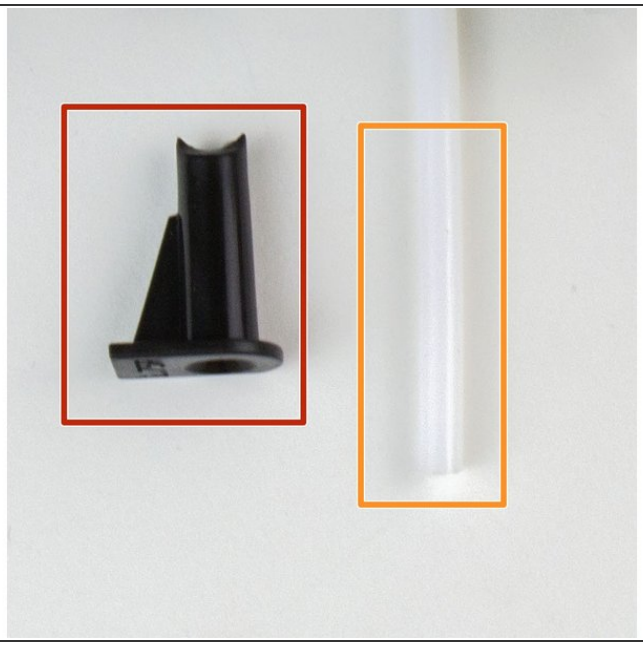
- Gather:
  - 9mm Bearing
  - Titan Aero Lid

Step 25 — Press in Bearing



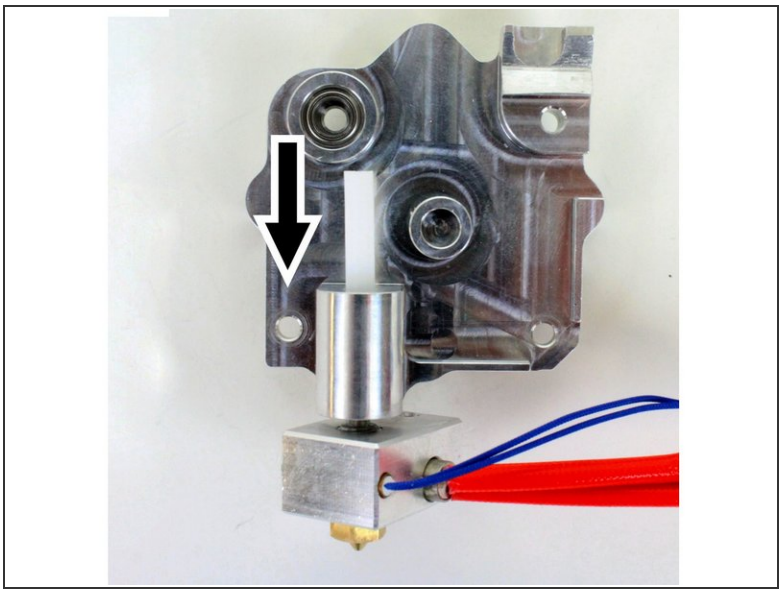
- Insert the 9mm diameter bearing into the the back of the Aero heatsink, this is designed to be a tight fit but you should be able to push it in by hand.

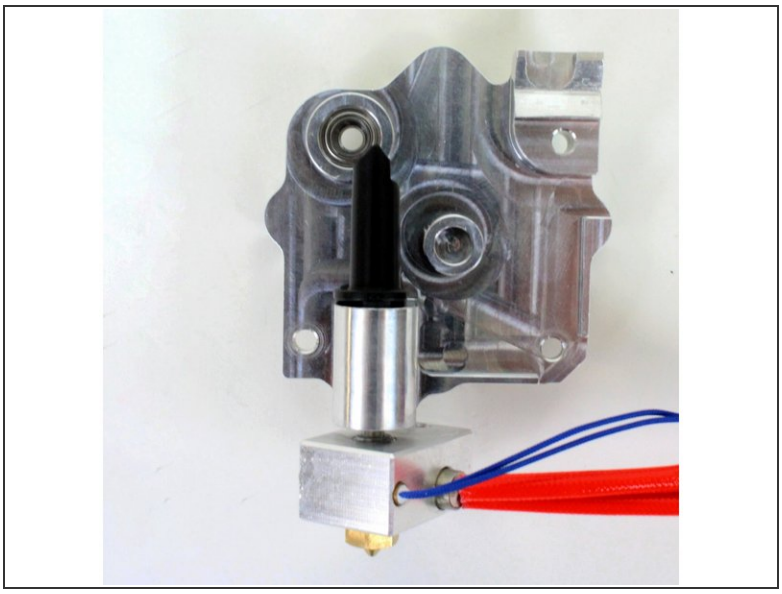
Step 26 — Filament Guide parts



- Gather:
  - Filament Guide (1.75mm or 3.00mm)
  - PTFE Tubing (for 1.75mm filament only)

Step 27 — Assemble Filament Guide



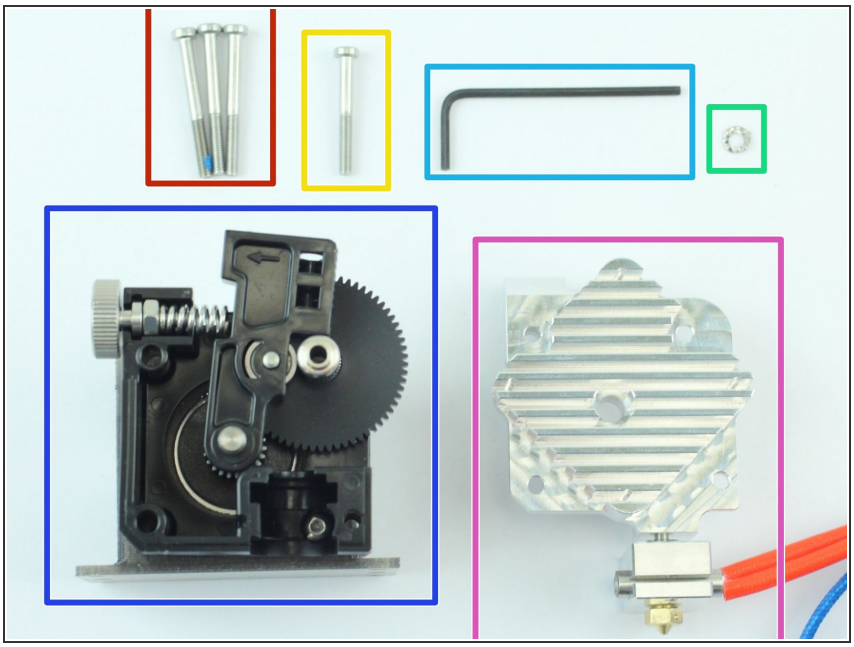


- **For 1.75mm Filament:**
  - Cut a 23mm length of PTFE and insert it fully into the top of the heatbreak.
  - To reduce the possibility of jams, ensure that both ends of the PTFE are cut squarely and the ends are not deformed, we recommend using a sharp knife rather than scissors for this.
  - Slide the 1.75mm filament guide over the protruding PTFE. The flat side of the guide should be flat with the back of the lid.

⚠ Ensure that the guide sits flush against the Aero sink. It is preferable to get the tubing too short, rather than too long

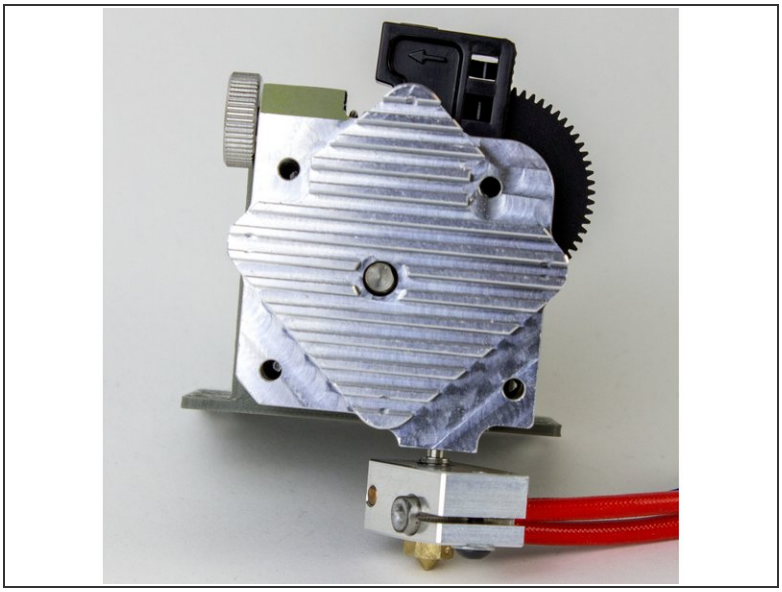
- **For 3.00mm Filament:**
  - Simply slide on the filament guide, and hold it in place when pushing the lid on the Titan body. The flat side of the guide should be flat with the back of the lid.

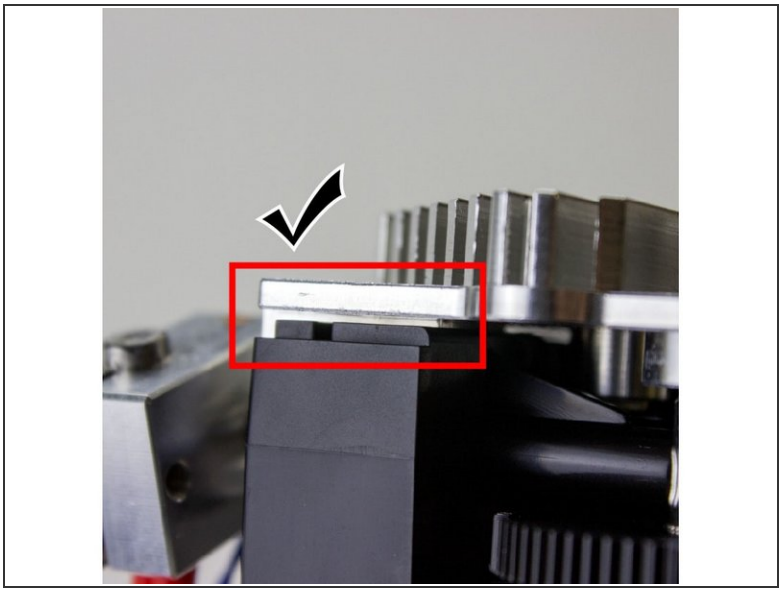
Step 28 — Gather Aero Lid Parts



- Gather:
  - M3x30 screws
  - M3x25 Screw (the shortest M3 screw)
  - Shake-proof Washer
  - Assembled Body
  - Assembled Lid
  - The mid-sized 2.5mm Hex Wrench

Step 29 — Press Lid over Extruder

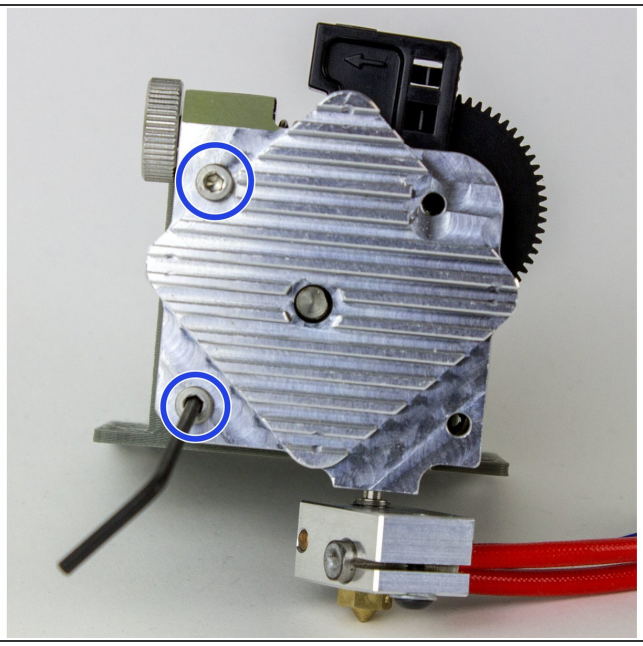




- Press the heatsink onto your extruder. It's a bit of a tough fit, but it will all fit in.

ⓘ It will not be flush like the plastic Titan lid would be, as the heatsink is flat on the backside. It is intended that there will be small gaps between the extruder body and the heatsink where the old lid would have fit in.

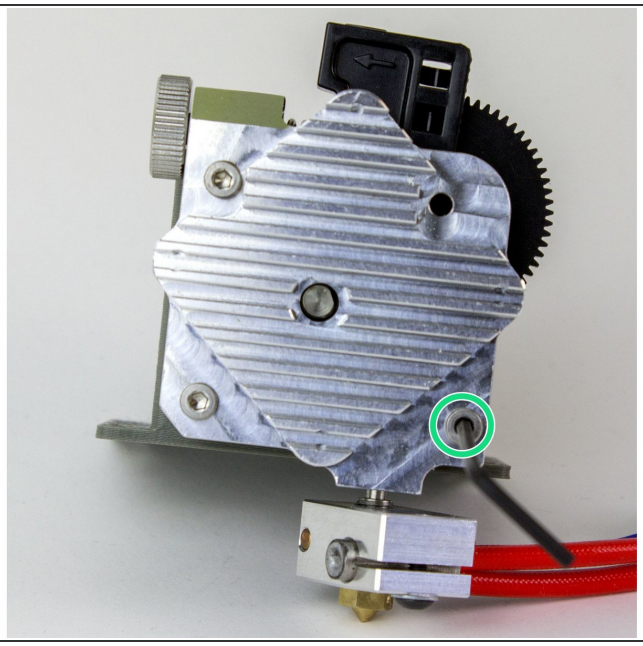
Step 30 — Screw in Lid 1



- Screw two of the longer 30mm M3 screws you're using on the right two holes on the lid.

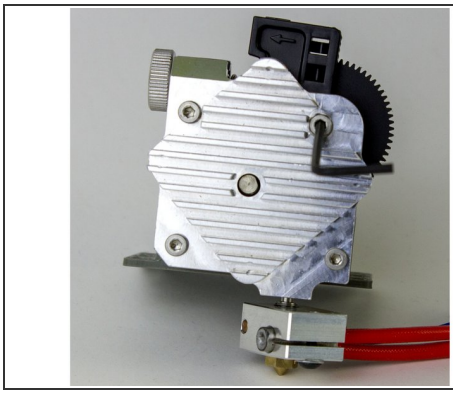
Because the extruder is only attached to the motor by one screw at the moment, you may need to wiggle it a little to get them to thread into the motor.

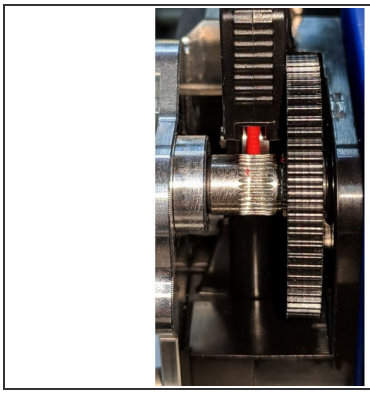
Step 31 — Screw in Lid 2



- Screw your short screw into the lower right hand corner of the lid.
- This screw goes into the brass insert on the back of the extruder body, not your motor.

Step 32 — Screw in Lid 3





- Slip the shake-proof washer onto the screw with the blue patch lock on it.

⚠ WARNING - this screw goes through the bearings and so when it is tightened it creates an axial load on the bearings, if this screws is overtightened even once it may cause permanent damage to your bearings which will result in bearing failure -PROCEED WITH CAUTION.

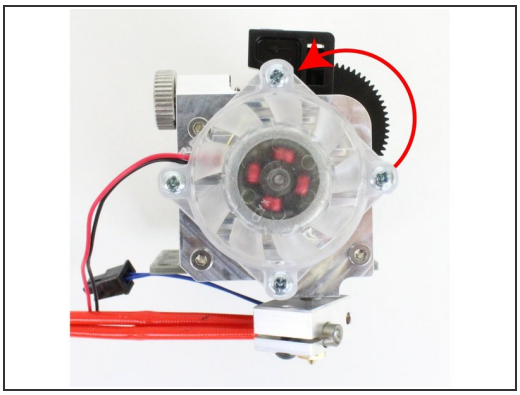
- Screw in this screw until it is finger tight and no more.

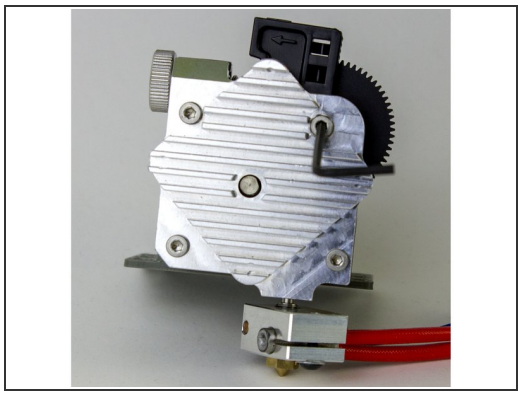
ⓘ The shake-proof washer will prevent this screw from coming loose.

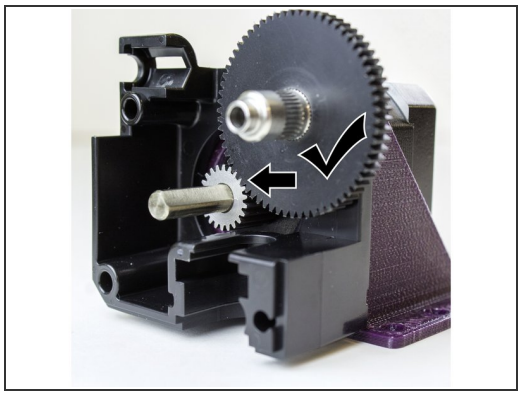
ⓘ There may be some slight visual misalignment of the idler and teeth, this is due to an inconsequential machining error of the filament drive gear. The toothed portion of the shaft is wide enough to accommodate this minor misalignment with no effect on how the teeth engage the filament.

- If you find that the screw is not biting it may be due to the teeth on the slip proof washer protruding slightly which increases the thickness, try to flatten out the teeth before trying again.

Step 33 — Check Gear Alignment

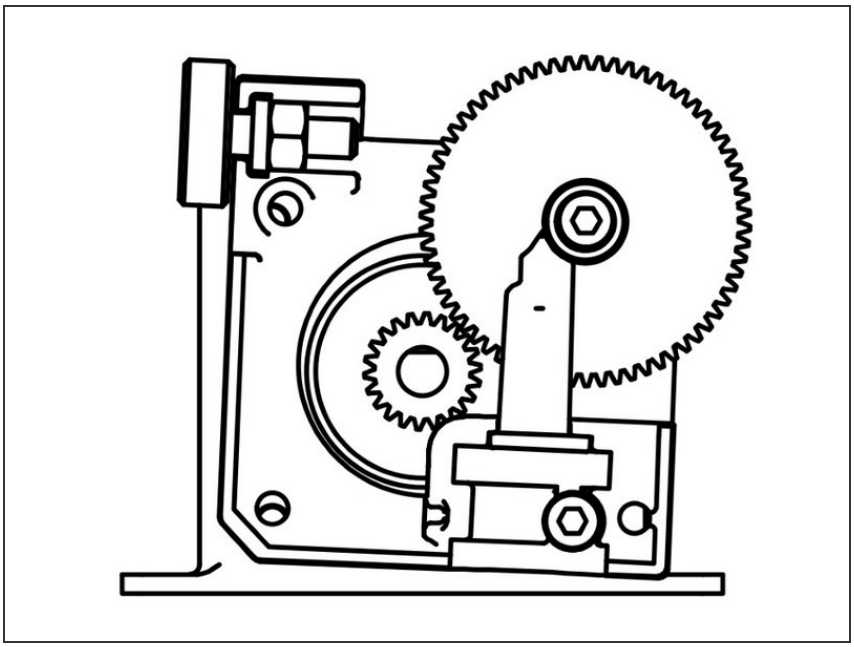






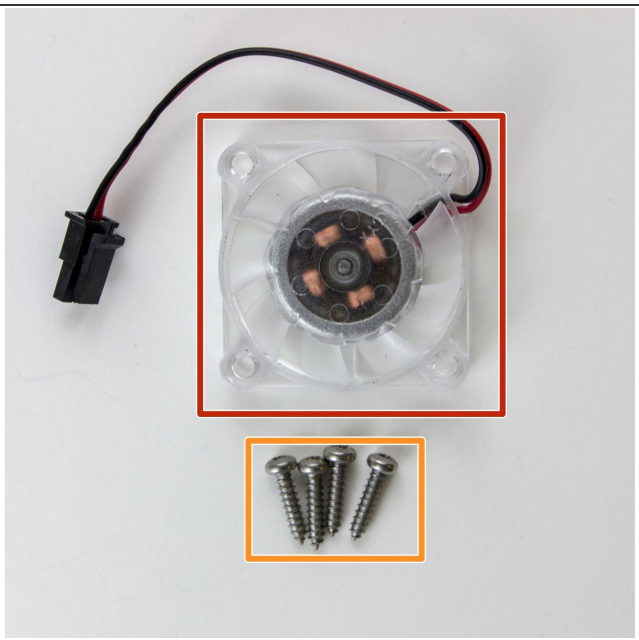
- Try to rotate the large acetal gear to see if it moves smoothly.
- If it is hard to rotate, check the position of the steel pinion gear, it may be too far forward. Adjust it so that it is flush with the front face of the acetal gear and try again.
- If this does not solve the issue, then the screw with the shake-proof washer on it may have been overtightened. If loosening this screw allows the acetal gear to run smoothly then the screw has been overtightened and permanent damage may have been caused to the bearings; seek replacement bearings if this is the case.

Step 34 — Check for Backlash



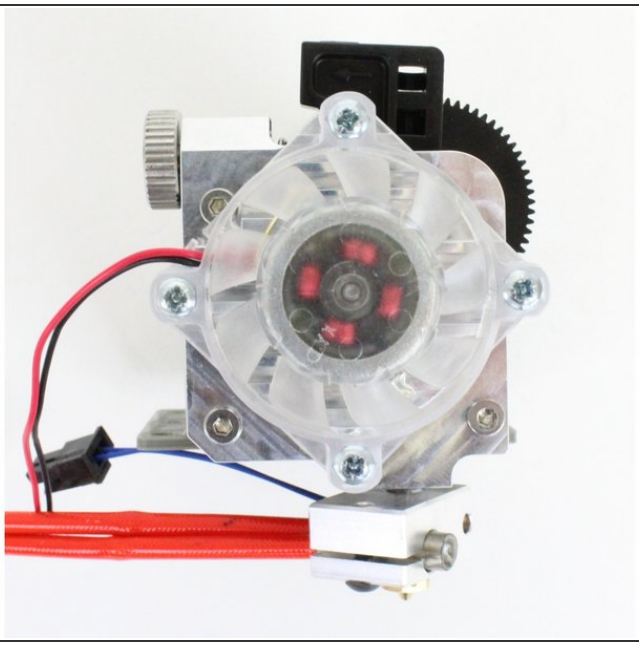
- If the large gear exhibits “backlash” (there's play between the large plastic gear and the metal one on the drive shaft), loosen all screws on the lid and rotate the body such that the gears fully mesh.
- Re-tighten the screws as described in the previous steps.

Step 35 — Gather Fan Parts



- Gather:
  - Aero Asembly
  - 4x 2.9x13mm Self-Tapping Screws
  - 40mm Fan

Step 36 — Screw in Fan

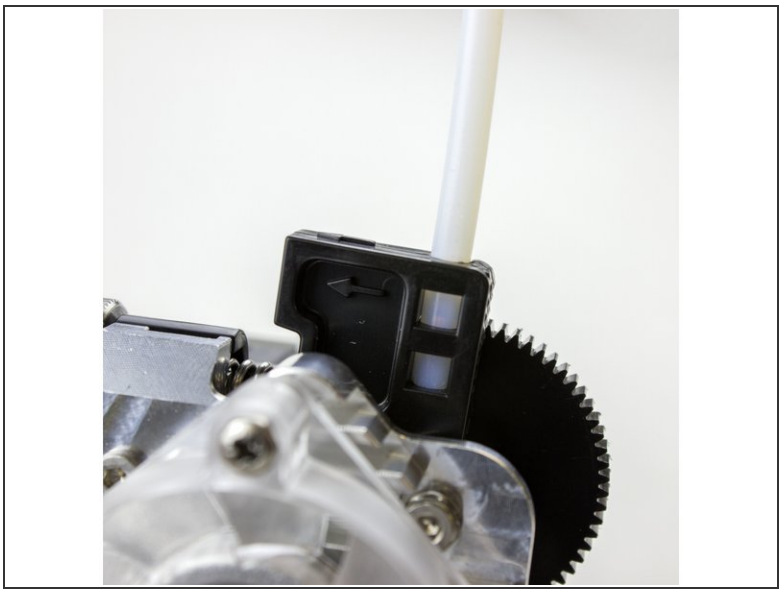


- Place the fan on top of the heatsink fins and use the 2.9x13mm self tapping screws to secure it in place.

⚠ Do not over-tighten the screws as this can crack the fan.

⚠ Make sure that there is adequate airflow over the heatsink. If your printer setup blocks the fan, you'll have printing problems.

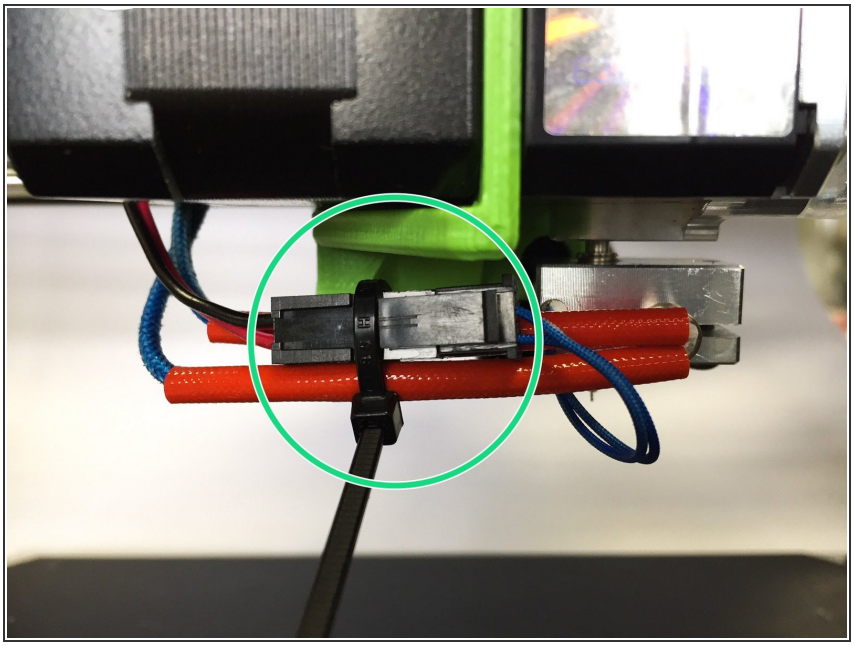
Step 37 — PTFE in Idler: 1.75mm Filament Only



- **If you're printing 1.75mm filament**, you can guide it a little better by putting a length of PTFE tubing in the top of the idler lever
- Press the tubing into the lever.

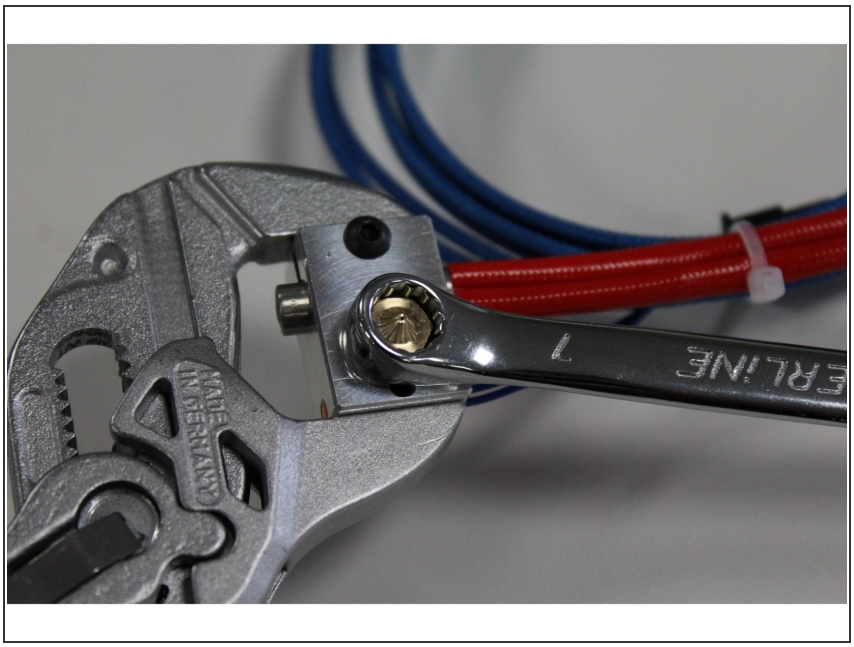
ⓘ It may be a very tight fit. You can file down the tube if it helps.

Step 38 — Strain relief



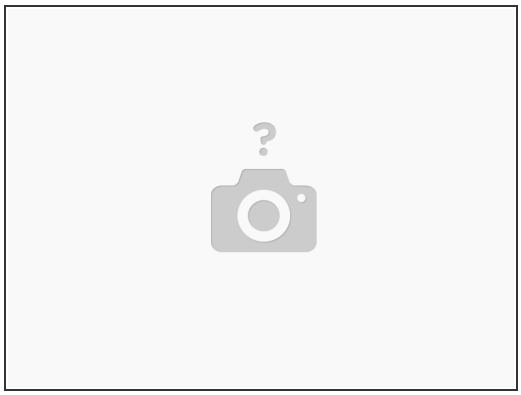
- To prevent damage to the fragile thermistor wires it is important to provide strain relief to provide protection against printer movements tugging at the wire.
- Failure to do this step will significantly reduce the lifespan of the thermistor cartridge .

Step 39 — Hot Tightening



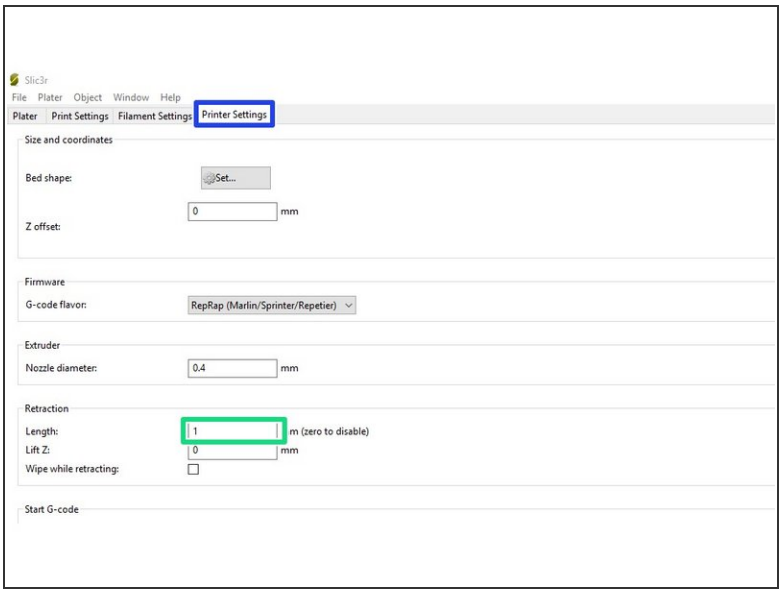
- Hot-tightening is the last mechanical step before your Aero is ready to go! Hot-tightening is essential to sealing the nozzle and heatbreak together to ensure that molten plastic cannot leak out of the hotend in use.
- Using your printer's control software (or LCD screen), set the hotend temperature to 285°C. Allow the hotend to reach 285°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.

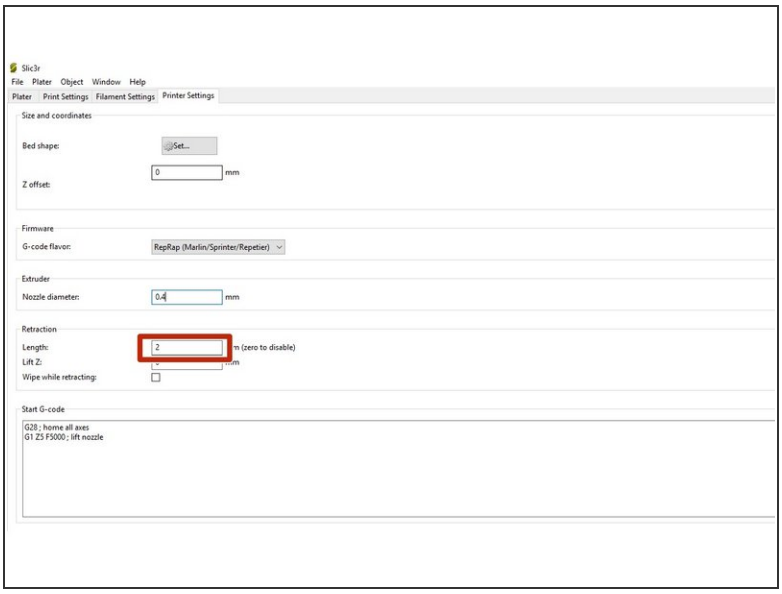
Step 40 — Firmware Configuration



- You're all set with assembly! All you have left is configuring your firmware to deal with your new extruder. Follow one of the links below to update your firmware:
  - Marlin
  - Repetier
  - Smoothieware
  - RepRap Firmware

Step 41 — Retraction Settings

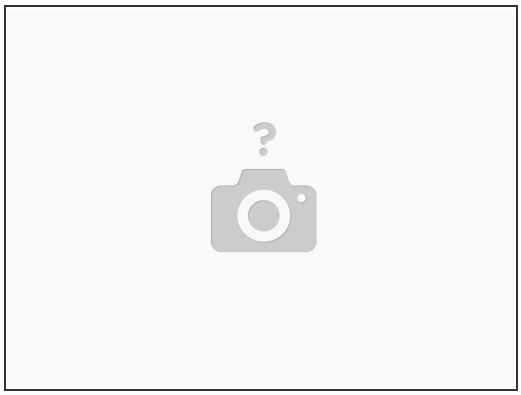




- In your slicer of preference find the retraction settings. In Slic3r this is in printer settings.
- Start with a retraction length of 0.5mm
- If you experience blobs or stringing on the surface of the print increase the retraction length to 2mm.

⚠ 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 42 — PID Tune



- Place the Silicone sock on the heater block.
- 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, Simplify3D, or MatterControl.
- Other, closed-source, printers may be better suited to their manufacturer's recommended printer control software.