

# Anthead

ASSEMBLY MANUAL



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### TABLE OF CONTENTS

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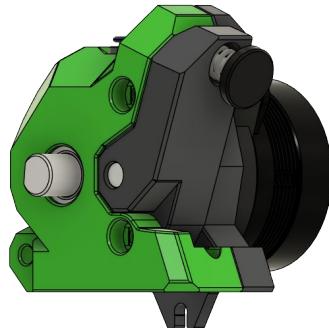
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AntHead is a modular toolhead that allows the usage of many different hot ends and extruders. If you are using a different extruder or hot end from this, you may have to adjust what parts you print and possibly make other hardware adjustment as well. Below are the standard extruder and hot end provided in the kits at this time.

### Extruder

The stock extruder for the AntHead is the G2 kit used in conjunction with AntHead's modified WristWatch variant. This functions like a standard WristWatch G2, but adds filament run out sensors to the extruder.



### Hot End

The stock hot end for AntHead is the Revo Voron. There are three heater cores for this hot end. It does not matter which one you have, they all use the same mounting and hardware.



## Leaf Cutter

AntHead is able to be configured as a filament cutter as well. This variation is referred to as the Leaf Cutter. If you wish to set up the toolhead as a Leaf Cutter, you will need to use a few different parts.

It is also worth noting that this uses the front left corner of your extruder to pivot your cutting arm. So, if you are using this variation, you will need to use the G2 or BMG AntHead extruder.

The overall assembly of the toolhead is still the same until you reach the end. Therefore, the assembly of the leaf cutter arm and blade holder has been added to the end of the manual as you would install these once the toolhead is complete anyway. Just be sure you use the proper duct as it has a cutout for the blade holder in it.

### **Left Fan Duct**

This can be found in the same place as the normal fan duct, but in a subfolder labeled Leaf\_Cutter.

### **Cutting Arm & Blade Holder**

Both of these files can be found in the Leaf\_Cutter folder in the main STL folder of the AntHead repository.

### STL FILE KEY

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The STL naming convention used for AntHead is the same as that used for VORON printers:

#### PRIMARY COLOR

**Example**

**ant\_head\_main\_body\_micron\_o2\_sf.stl**

These files will have nothing at the start of the filename.

#### ACCENT COLOR

**Example [a]\_hex\_grill.stl**

These files will have "[a]" at the front to mention that they are intended to be printed with an accent color.

#### QUANTITY REQUIRED

**Example**

**[a]\_z\_drive\_baseplate\_a\_x2.stl**

If a file ends with "\_x#", that is telling you the quantity of that part required to build this system..

#### Clear/Transparent

**Example [c]\_diffuser\_micron.stl**

If a file starts with "[c]", that is telling you the part should be done in a clear or transparent filament. Light from a LED will need to be able to go through this part.

#### Opaque

**Example [o]\_light\_shield\_micron.stl**

If a file starts with "[o]", that is telling you the part should be done opaque. Something such as a solid black is recommended.

### PRINT GUIDELINES

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The recommended print settings are also those used for VORON printers:

#### FDM MATERIAL

AntHead was designed for ABS. Use other plastics at your own discretion.

#### LAYER HEIGHT

Recommended : 0.2mm

#### EXTRUSION WIDTH

Recommended : Forced 0.4mm

#### INFILL PERCENTAGE

Recommended : 40%

#### INFILL TYPE

Grid, Gyroid, Honeycomb, Triangle, Cubic, Adaptive Cubic.

#### WALL COUNT

Recommended : 4

#### SOLID TOP/BOTTOM LAYERS

Recommended : 5

#### SUPPORTS REQUIRED

If the part needs supports, they are built into the model.

### WHERE TO FIND FILES AND GET HELP

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We have done our best to document as much as we can here, and give the best instructions we could on how to build this toolhead. You may however still have further questions. We have an active discord channel for AntHead issues where you should be able to find help. You can also check the Github page for the latest releases.

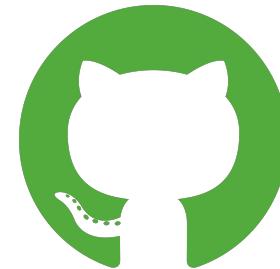
#### DISCO? OH ...DISCORD

If you need assistance with your toolhead you can head over the DOOMCUBE Discord server and post your questions (typically in the [#anthead-dev](#) channel). It is the primary help channel for the Micron, but AntHead questions should be able to be resolved there as well.

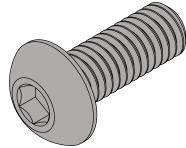


#### GIT GUD

If you want to stay up to date on the latest files for AntHead. The github page is the only source for the latest files.

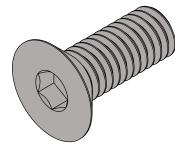


## HARDWARE - REFERENCES



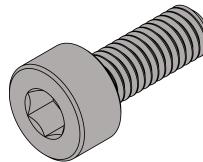
**BUTTON HEAD CAP SCREW (BHCS)**

Metric fastener with a domed shaped head and hex drive.



**FLAT HEAD CAP SCREW (FHCS)**

Metric fastener with a cone shaped head and a flat top.



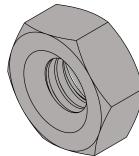
**SOCKET HEAD CAP SCREW (SHCS)**

Metric fastener with a cylindrical head and hex drive.



**GRUB SCREW (GS)**

Metric Socket Cup Point Set Screws (also called Hollow Point Grub Screws) are fitted with a concave cup point, which allows them to fit closely against a rounded surface such as a motor shaft.



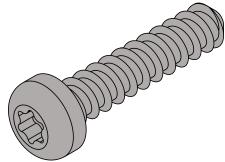
**HEX NUT**

Hex nuts couple with bolts to create a tight, secure joint.



**HEAT SET INSERT**

Heat the inserts with a soldering iron so that they melt the plastic when installed. As the plastic cools, it solidifies around the knurls and ridges on the insert for excellent resistance to both torque and pull-out.



#### SELF TAPPING SCREW

Fastener with a pronounced thread profile that is screwed directly into plastic.



#### SHIMS

Not to be confused with stamped washers. These are used in all Shim call-out locations in this manual.



#### ATTENTION BUBBLE

This logo denotes steps that are common areas that mistakes can occur.



#### MICRON Logo

Look for Micron Logo next to the printed part, this is a direct link to the file on the github repo. This will appear next to the part the first time it occurs in the manual.

M3x8 SHCS

Look for the **GREEN** call outs to mention the various hardware used

# PRINTED PART PREP

This section covers both headset inserts,  
built in support removal and ecas collets



## HEATSETS

### **Because nothing says “permanent” like molten plastic and brass.**

To make building the toolhead easier, we’re first going to install all required heatset inserts, then build both sub assemblies independently.

Once complete, we’ll move on to connecting wiring to the toolhead board.

#### **What you will need:**

- Soldering Iron with Heatset Insert Tip
- M3 Heatsets
- Printed Parts for AntHead WWG2 and AntHead Main Body

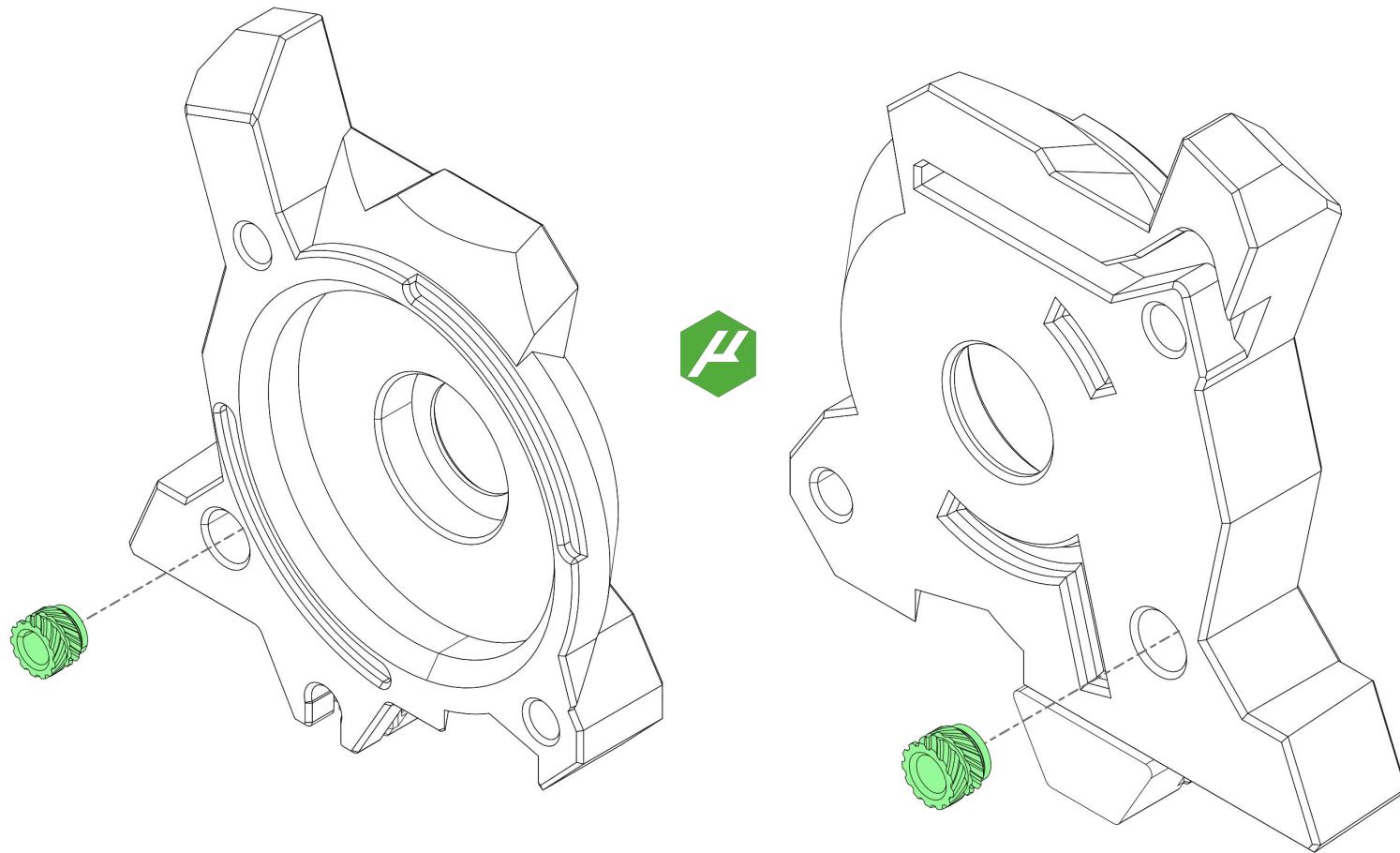
#### **Things to keep in mind:**

Try to press your heatsets as close to directly in as possible. If the heatset does not go in perpendicular to the face you may have binding issues when trying to insert your screws. Some find using a heatset press helpful for this, but it is not needed if you are careful.

Try to use as low a temperature as possible when inserting heatsets. You want the heatset to slide in smoothly keeping the plastic as solid as possible. If the plastic gets too hot it may burn and become brittle.

Make sure after installing your heatsets you allow them to cool before starting to assemble! If you don’t, they may twist in the part and not hold properly. This will mean you to reprint the part.

## G2 HEATSETS

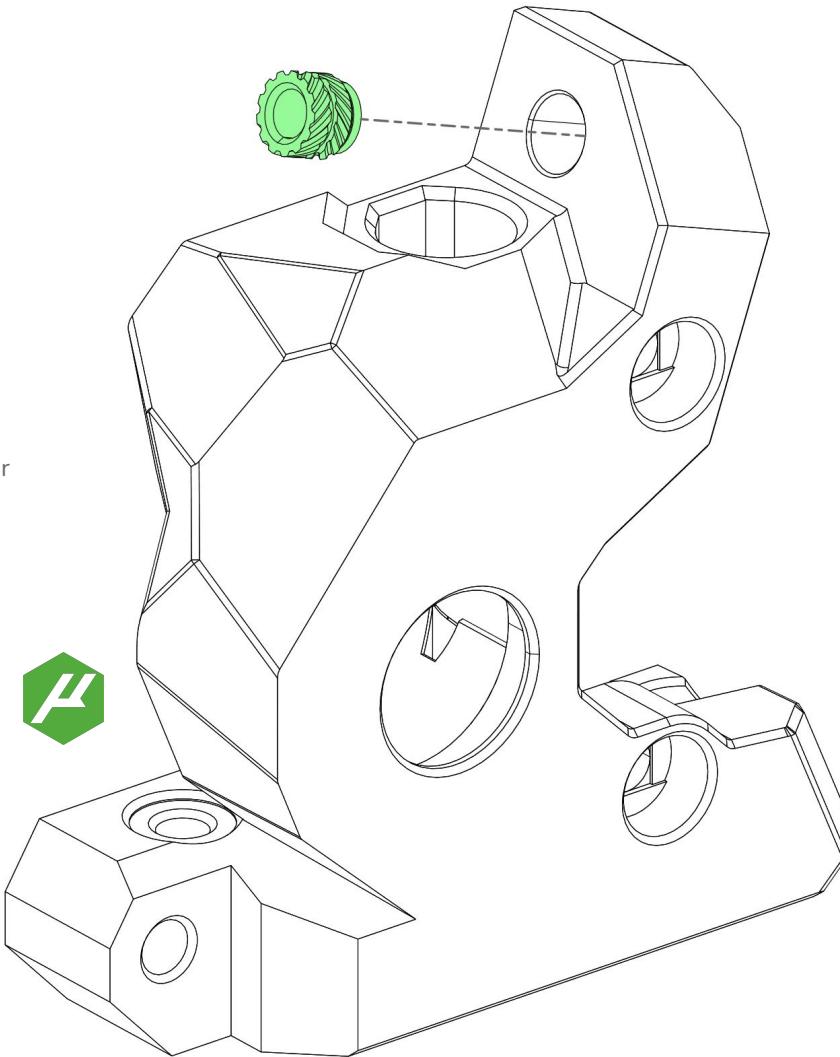


### Heatset Placement

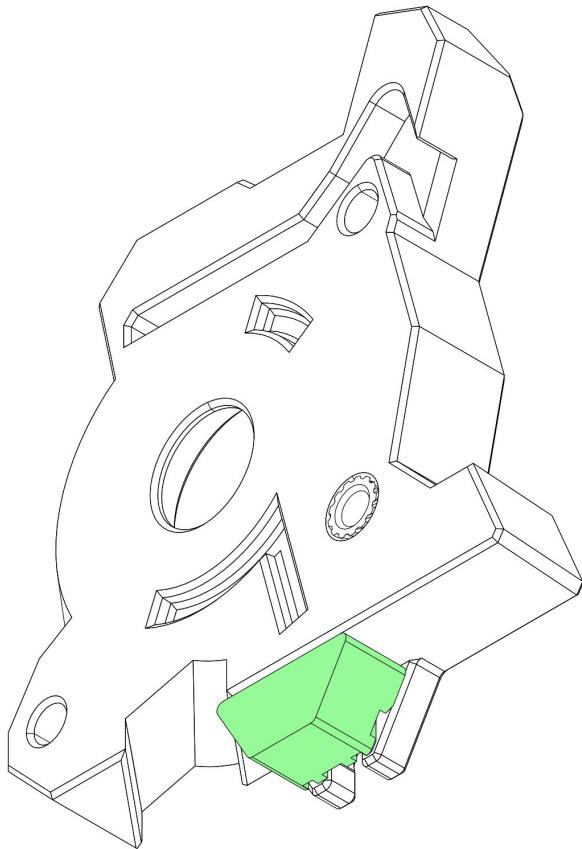
This heatset needs to be inset not level with the surface. You will notice the wider hole width for the heatset goes more than halfway down the depth of the hole. Press the insert in so that it goes to the bottom of this wider area.

If not, you may have issues with your tensioning spring and thumb screw reaching far enough down.

Also note that if you do not get it deep enough at this point, you will probably burn your ECAS fitting trying to press it further later.



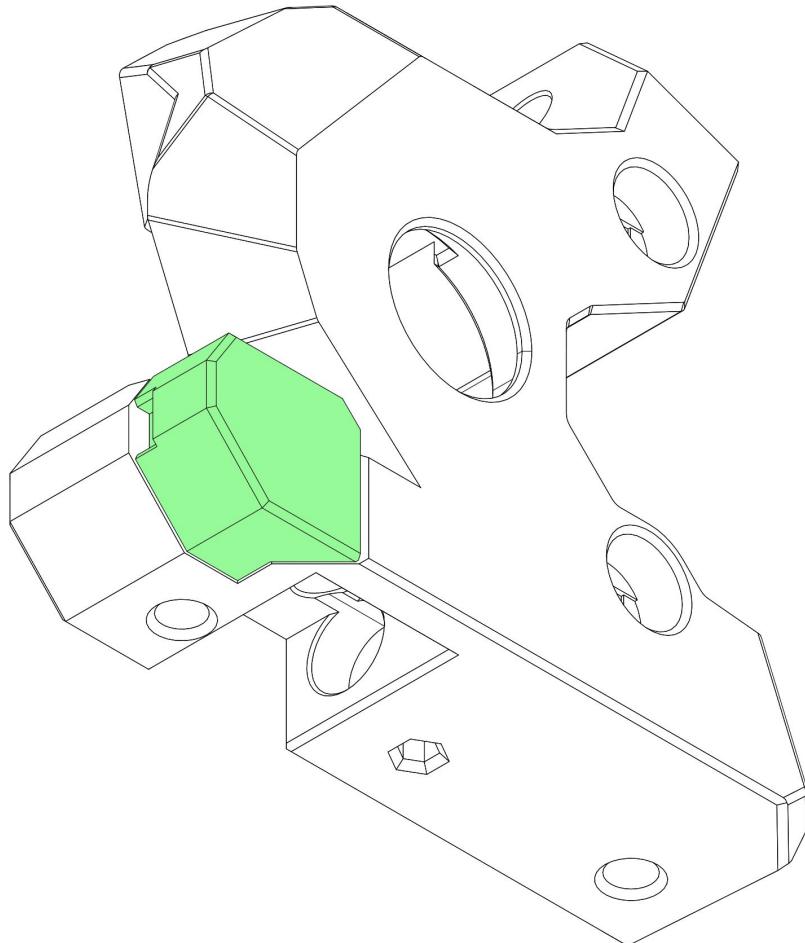
## G2 SUPPORT REMOVAL



### Print in Place Support

The print in place support will need to be removed. This can be achieved by carefully prying the highlighted section away from the main part. This can usually be done with your hands requiring no tools, but if there was more layer adhesion than desired you may need to use a small flathead screwdriver or something to lightly pry this apart. Be careful not to stab yourself in the process if you must use a tool.

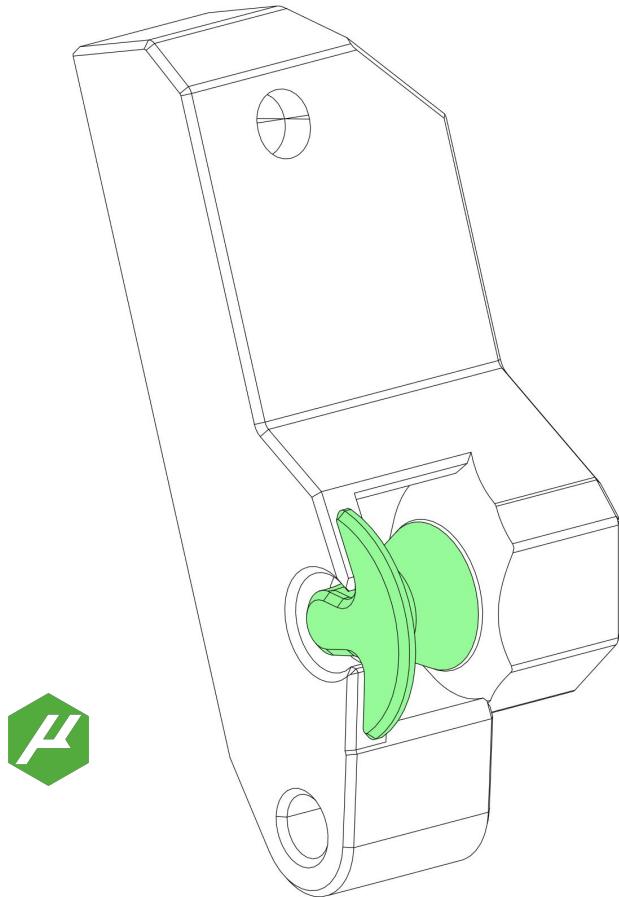
## G2 SUPPORT REMOVAL



### Print in Place Support

The print in place support will need to be removed. This can be achieved by carefully prying the highlighted section away from the main part. This can usually be done with your hands requiring no tools, but if there was more layer adhesion than desired you may need to use a small flathead screwdriver or something to lightly pry this apart. Be careful not to stab yourself in the process if you must use a tool.

## G2 SUPPORT REMOVAL



### Print in Place Support

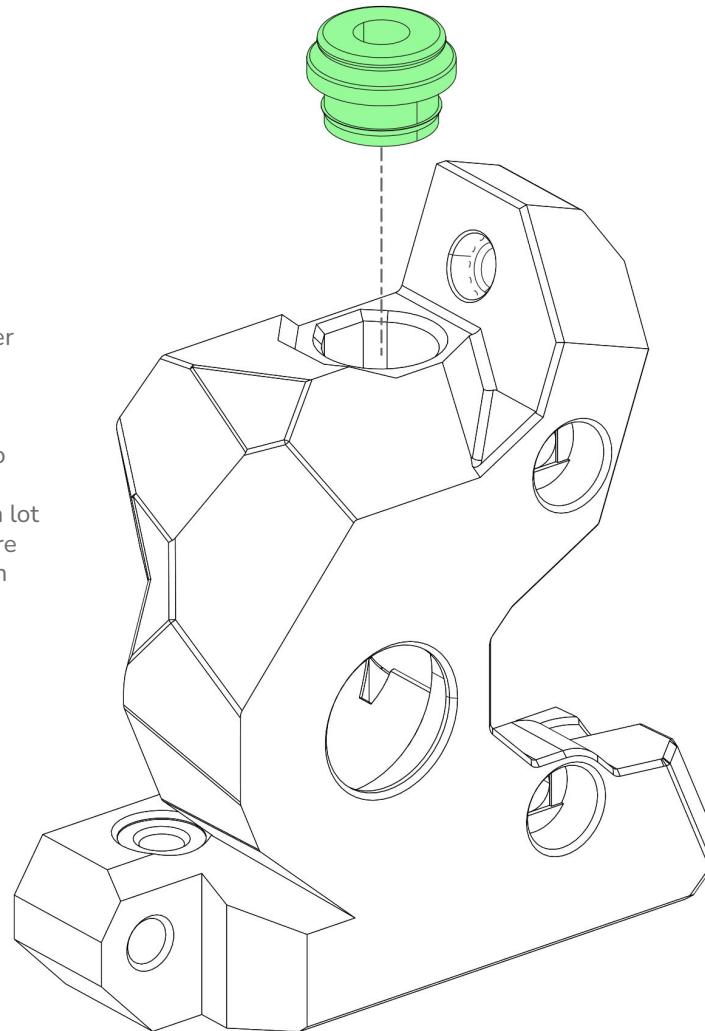
The print in place support will need to be removed. This one should easily separate and may have come off while removing the part from the bed. If it has not already come off, this can be achieved by carefully prying the highlighted section away from the main part.

## ECAS COLLET

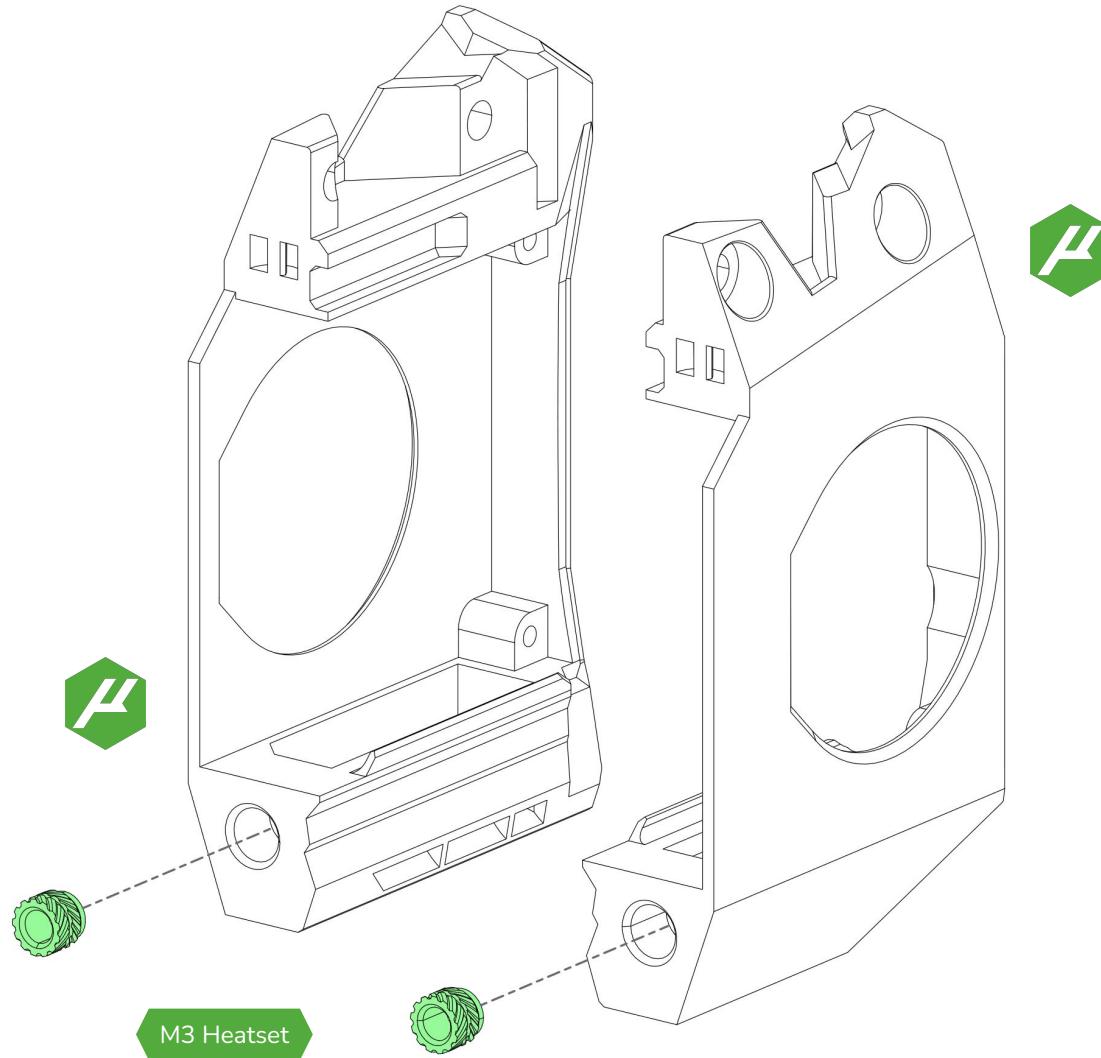
### ECAS Fitting

You will need to remove the rubber seal from the bottom of the ECAS fitting.

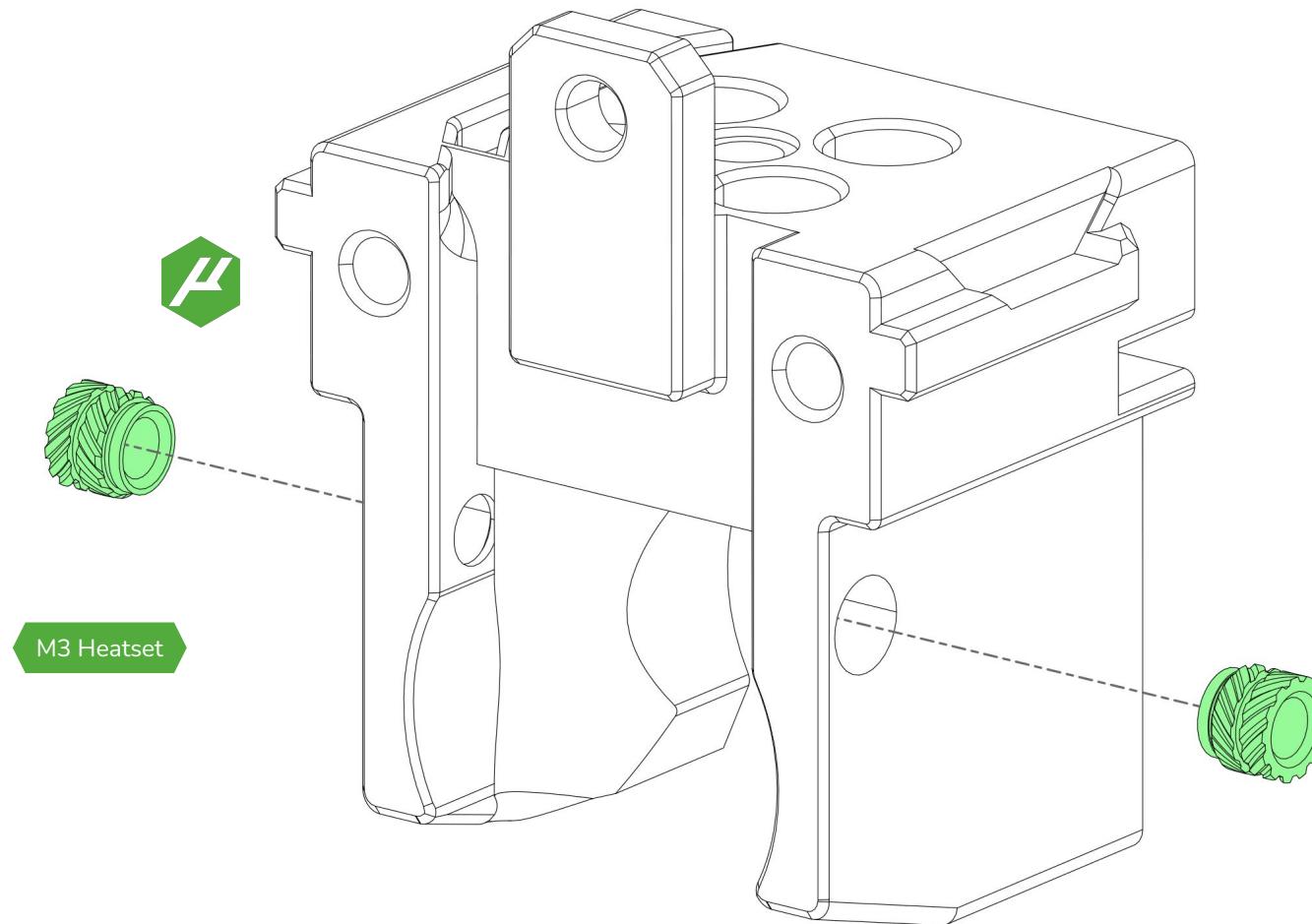
The ECAS fitting should press into the part. There should be some resistance, but it should not take a lot of force to get it to go in. If you are having troubles, check for uglies in the walls of the hole.



## DUCTS HEATSETS



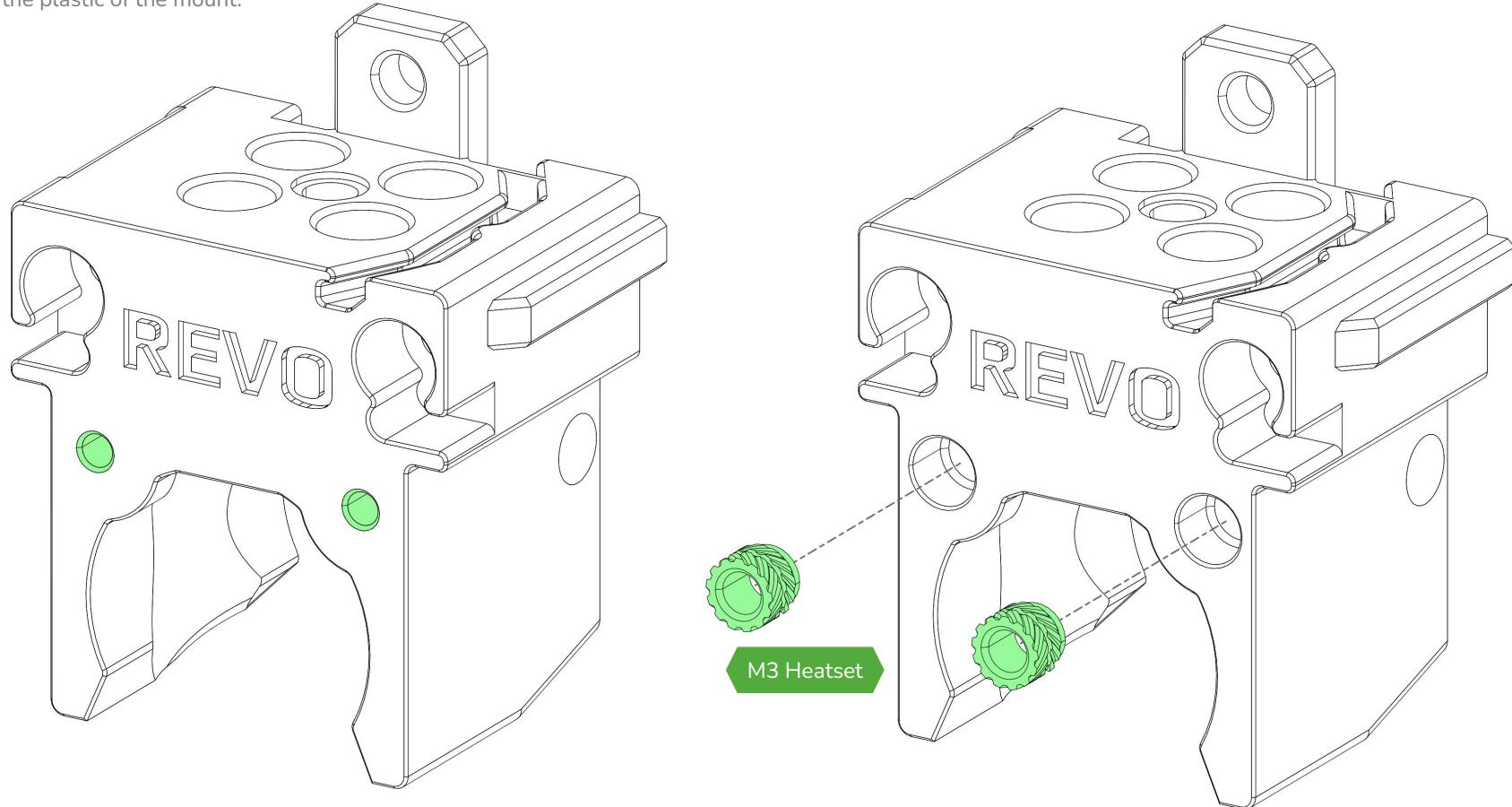
## HOTEND MOUNT HEATSETS



## HOTEND MOUNT HEATSETS

### Which screws do i choose....hey that rhymed!

Depending on your 2510 fan you use, you might need to use M2.5 screws which screw directly into the plastic of the mount.



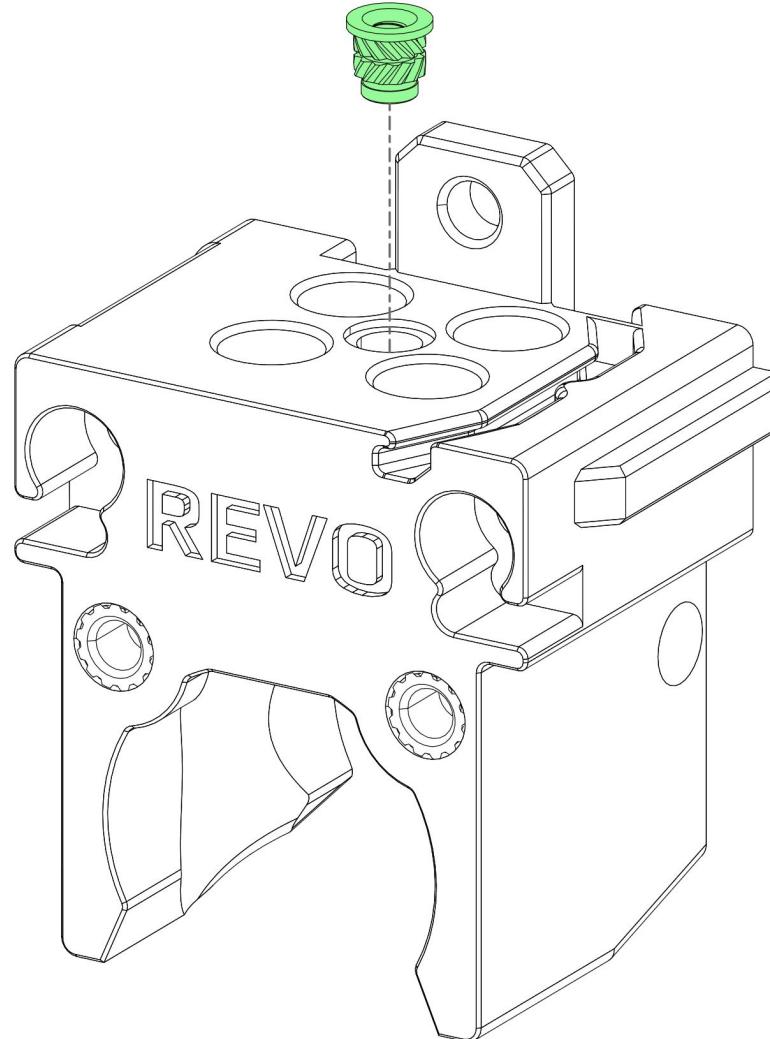
## HOTEND MOUNT HEATSETS

### Cutting-edge technology...literally

If you are installing the Leaf Cutter filament cutter, there is a flanged M2 headset that gets installed in the filament path. After the headset is installed it is recommended to drill it out with a 2mm drill bit and then chamfer the opening to help with filament loading

### No blade? No problem.

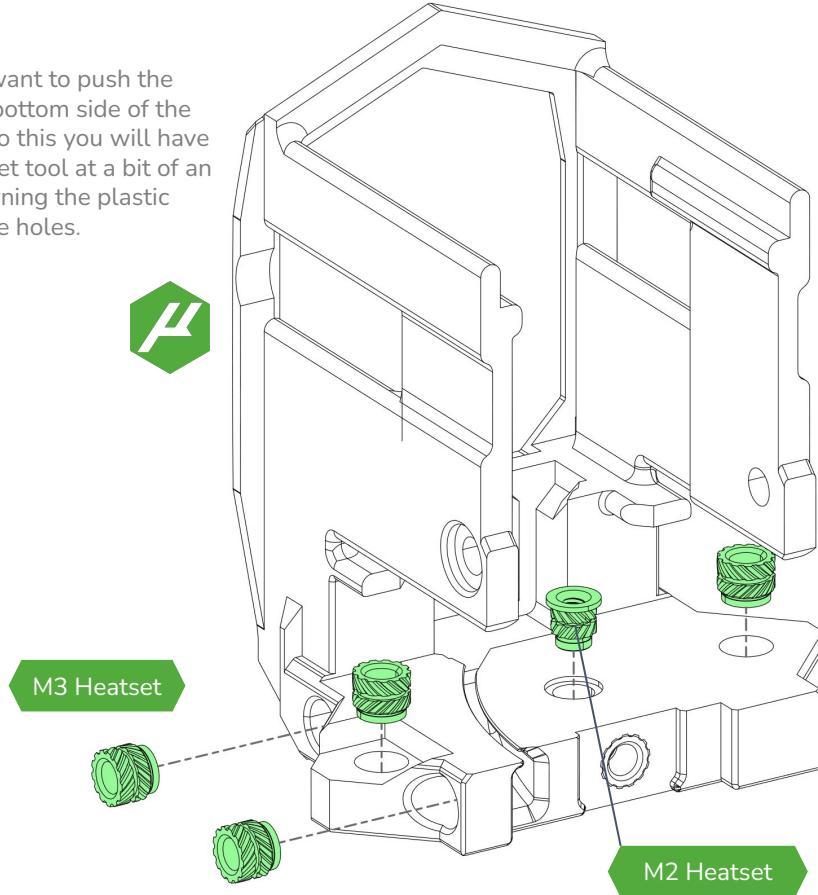
If you are not using the Leaf Cutter, it is recommended to drill out the filament path with a 4mm drill bit so the PTFE tubing can pass through into the hotend.



## MAINBODY HEATSETS

### Be Careful

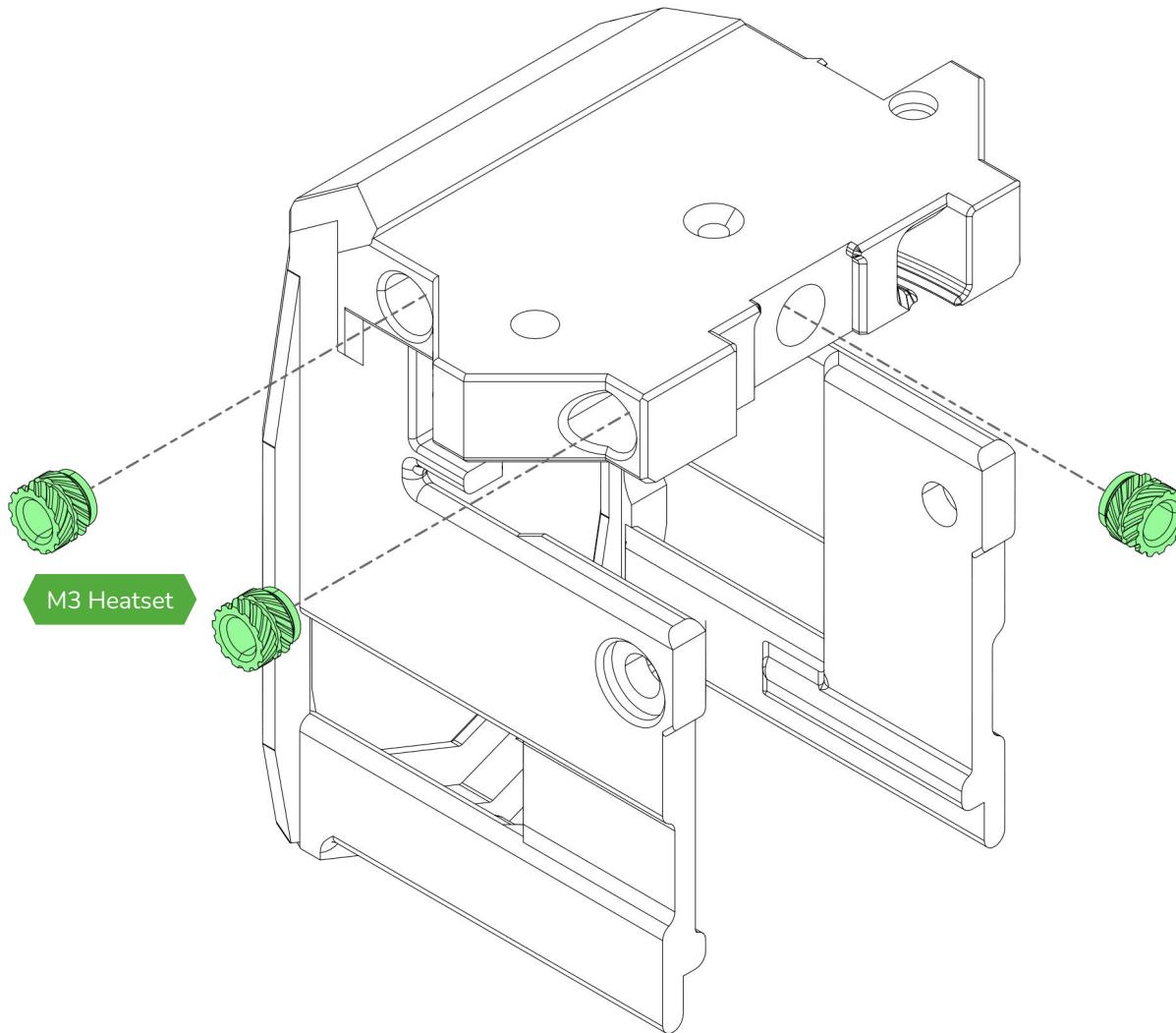
You are going to want to push the heatset from the bottom side of the top surface. To do this you will have to use your heat set tool at a bit of an angle to avoid burning the plastic that overhangs the holes.



### Cut it out...

If you are installing the Leaf Cutter filament cutter, there is a flanged M2 headset that gets installed in the filament path.

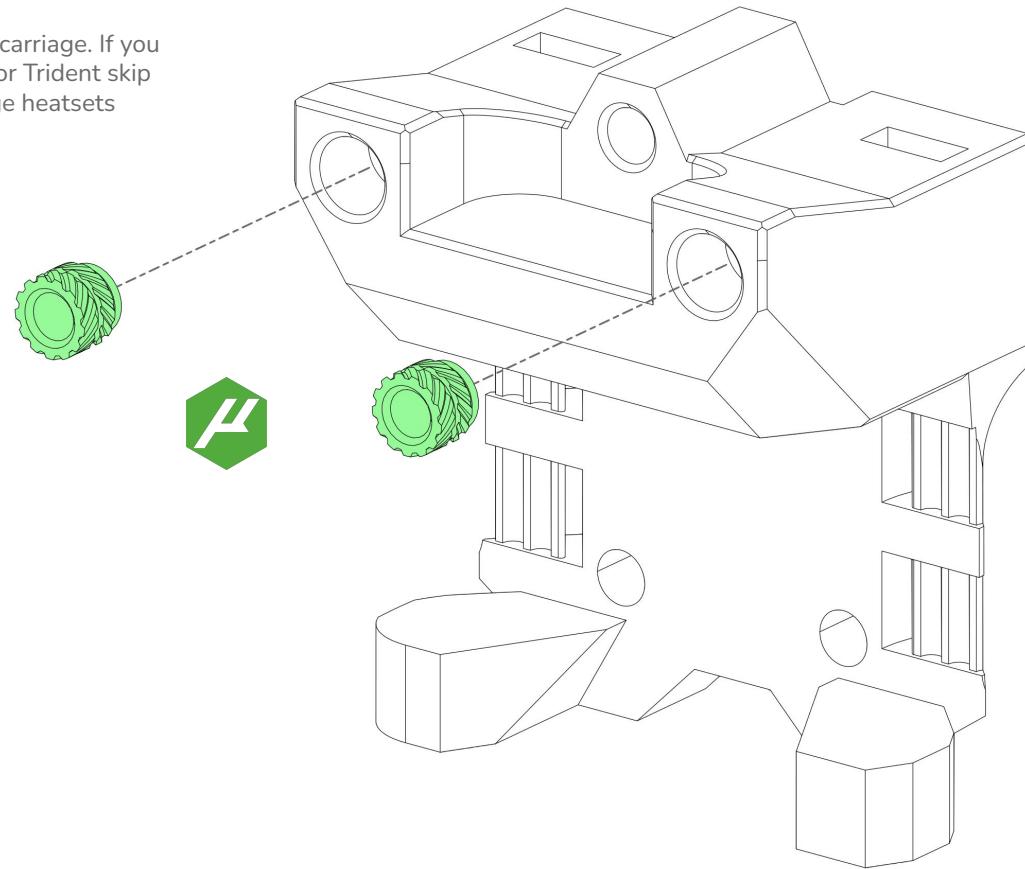
## MAINBODY HEATSETS



## MICRON CARRIAGE HEATSETS

### PFA X Carriage

This is the Micron/Salad\_fork X carriage. If you are installing Anthead on a V2 or Trident skip to page [26](#) for the 2020 Carriage heatsets

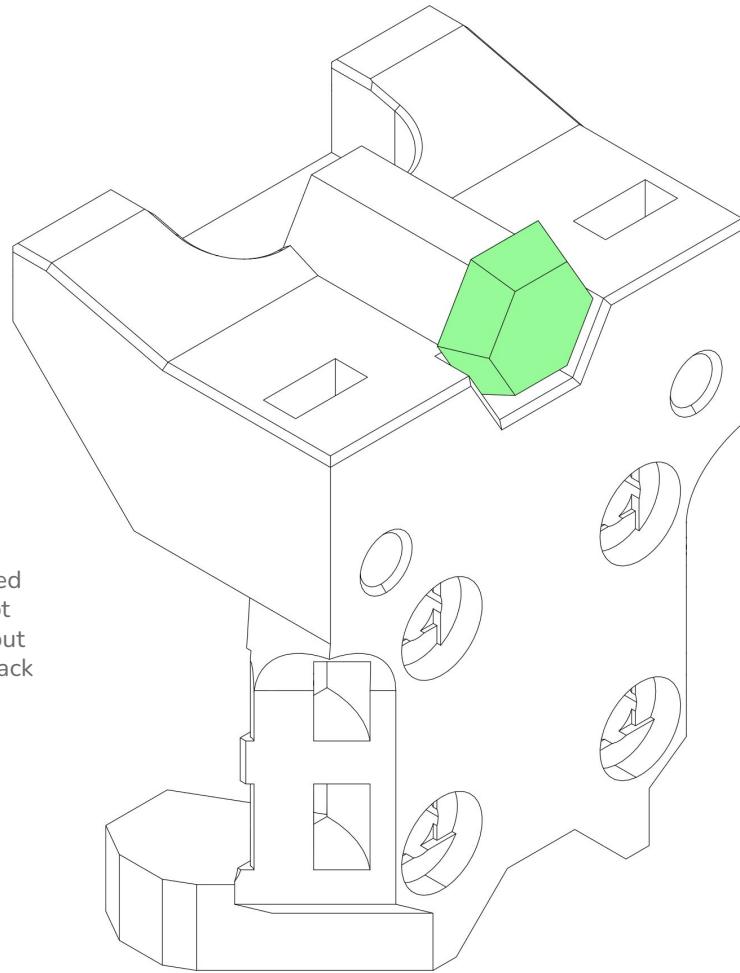


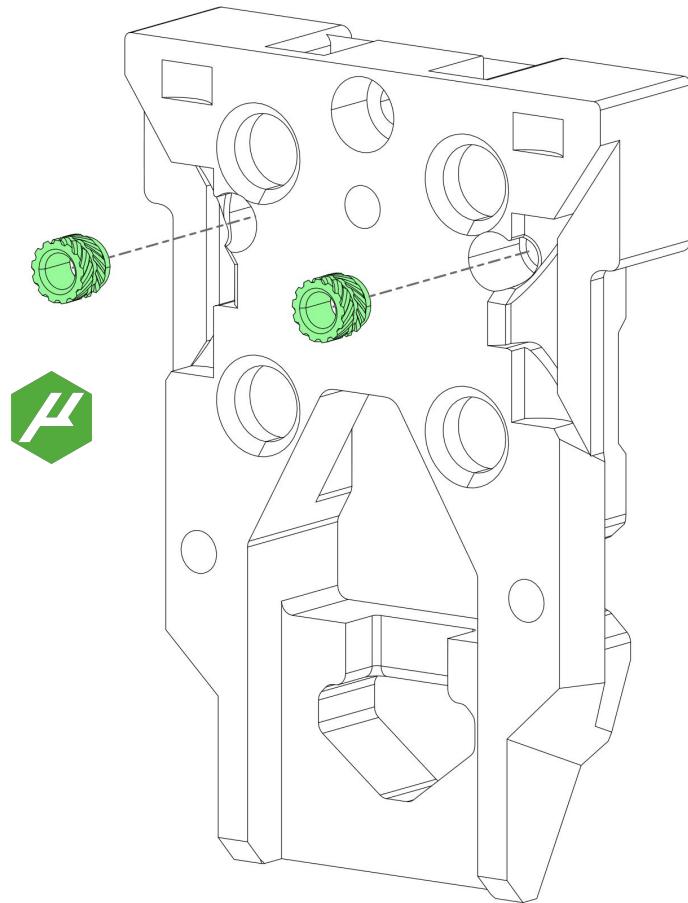
## PFA CARRIAGE SUPPORT REMOVAL



### Print in Place Support

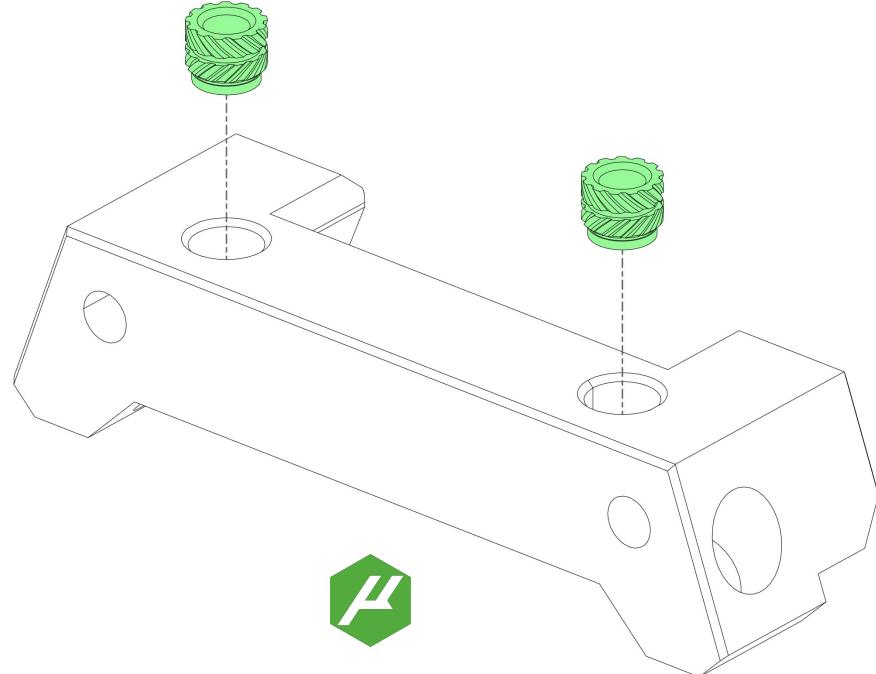
The print in place support will need to be removed. If this one does not remove easily, you can pop it off but pushing through the hole in the back with a screwdriver to pop it off

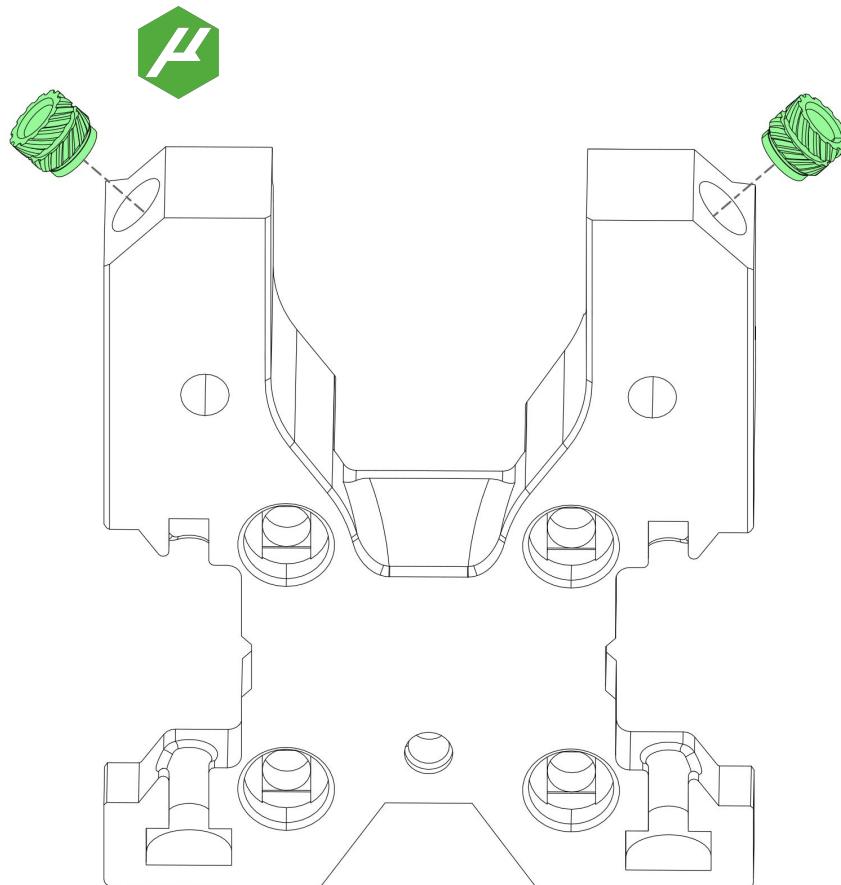




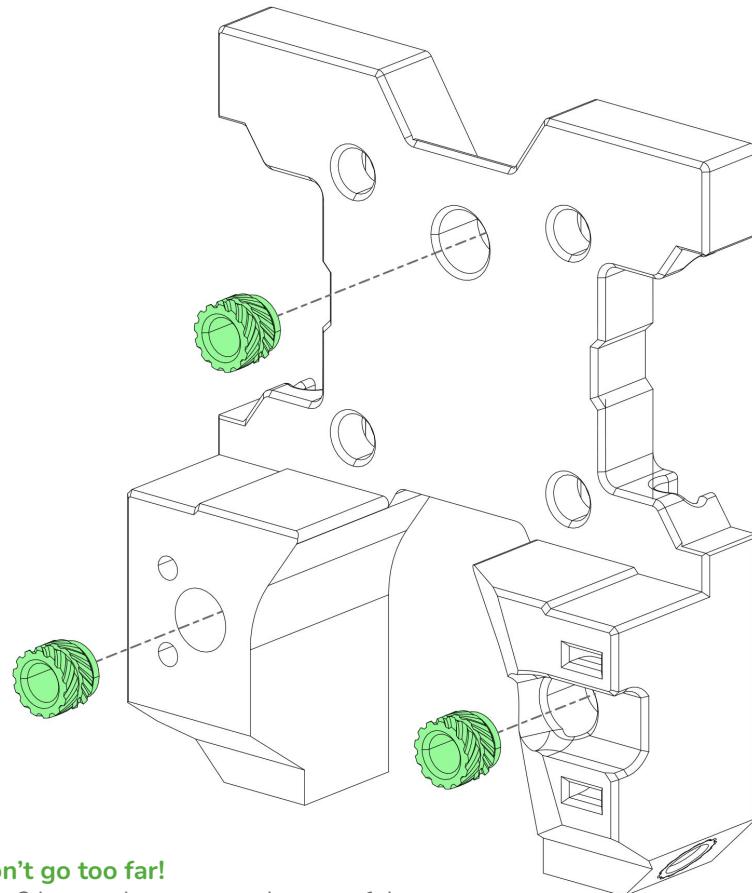
### 2020 X Carriage

Tiny toolhead on a big printer? why not, this carriage is for use on V2.4 and Trident. At the moment the only supported probe is Beacon or Cartographer



**Don't go too far!**

The 2 bottom heatsets on the rear of the carriage need to go deeper than usual. They do not sit flush with the printed part



## Assembly

### Assembly

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That should finish all of the heatsets. You can move your heatset tool out of your workspace and let it cool off.

You will also want to give your heatsets a chance to cool off. This is a great time to find a snack or refill your drink or whatever for the next 5-10 minutes ish to ensure the heatsets have enough time to fully cool off before trying to use them.

Our Favorite Snack is Ants on a Log!



#### Ants on a Log

If you need instructions on how to make this wonderful snack you are in luck, as we have you covered and have a manual ready to teach you! Just click the link below to find our official manual on how to make this joyous snack!



### Extruder Assembly –

The AntHead G2 Wrist Watch variant assembles in mostly the same way as the stock one. The main difference being the two filament run out switches.

We will point out the proper installation for these, but you will want to reference the standard WWG2 manual for full assembly of the toolhead.

#### Filament Run Out Switches

To install your filament run out switches you will need 2 steel ball bearings that are 5.5mm in diameter, 2 micro limit switches, and 4 self tapping m2x10 screws.

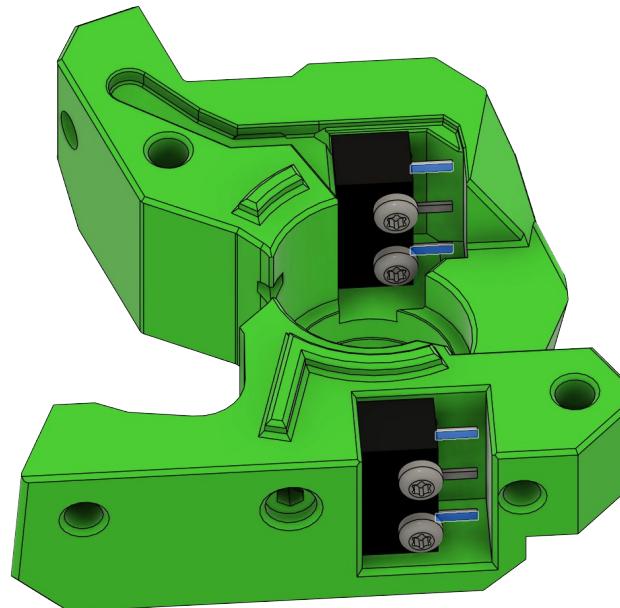
It is easiest to solder wiring pigtails onto the switches on the outer two legs before mounting them. Make sure the pig tails have enough room to route through the extruder and reach the toolhead board.

Once that is done, insert a ball bearing into the hole to the left of where the switch mounts. Place your switch in place to hold the bearing in and then insert 2 of the M2x10 self tapping screws to contain everything.

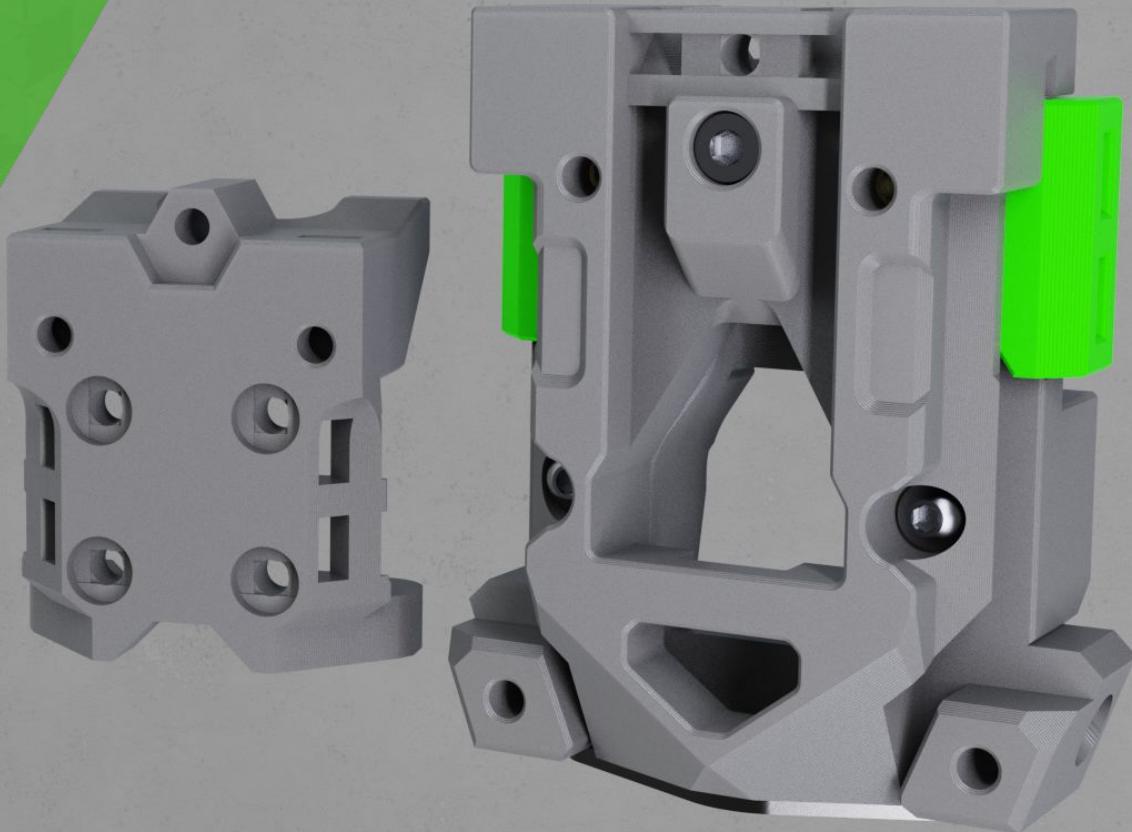
Do this again for the other switch.

#### WWG2 Assembly Instructions

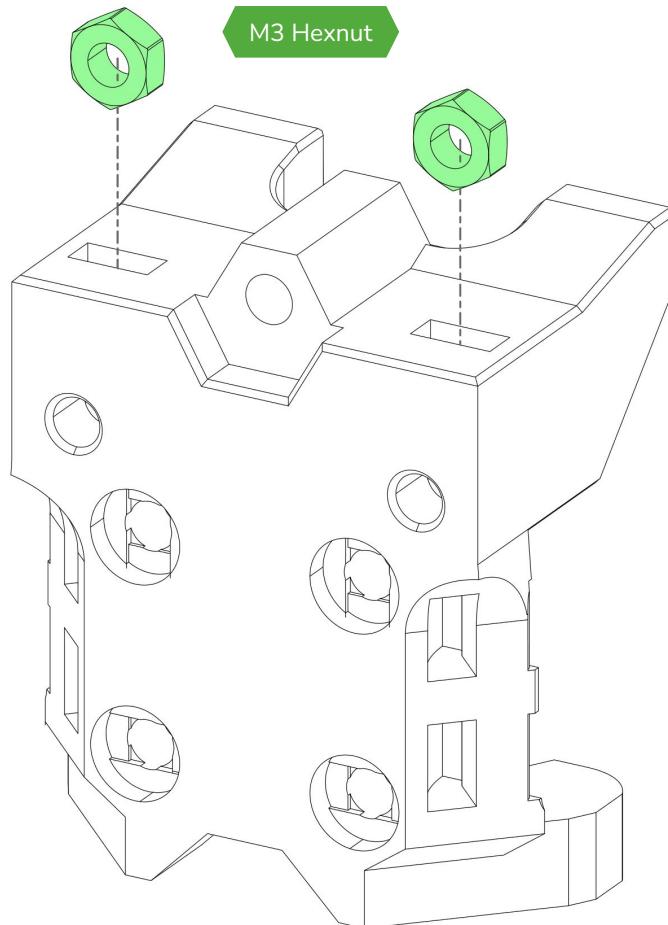
Follow the link provided here for the instructions for WWG2 assembly.



# X CARRIAGE



## Micron Carriage - Assembly

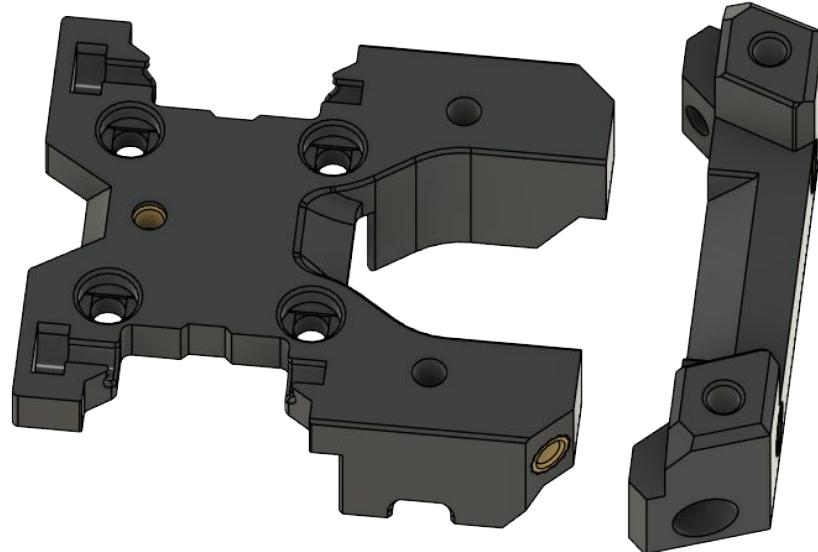


### Micron Carriage Assembly

The Micron carriage has multiple probe options, in this manual only beacon/cartographer probe installation will be covered

Carriage Assembly – Back Plate

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**Back Plate Assembly**

The Beacon/Cartographer mount will need to be installed at the bottom of the back plate as shown.

Make sure the feet protrude up from the flat surface of the back plate as later these will attach to your fan ducts.

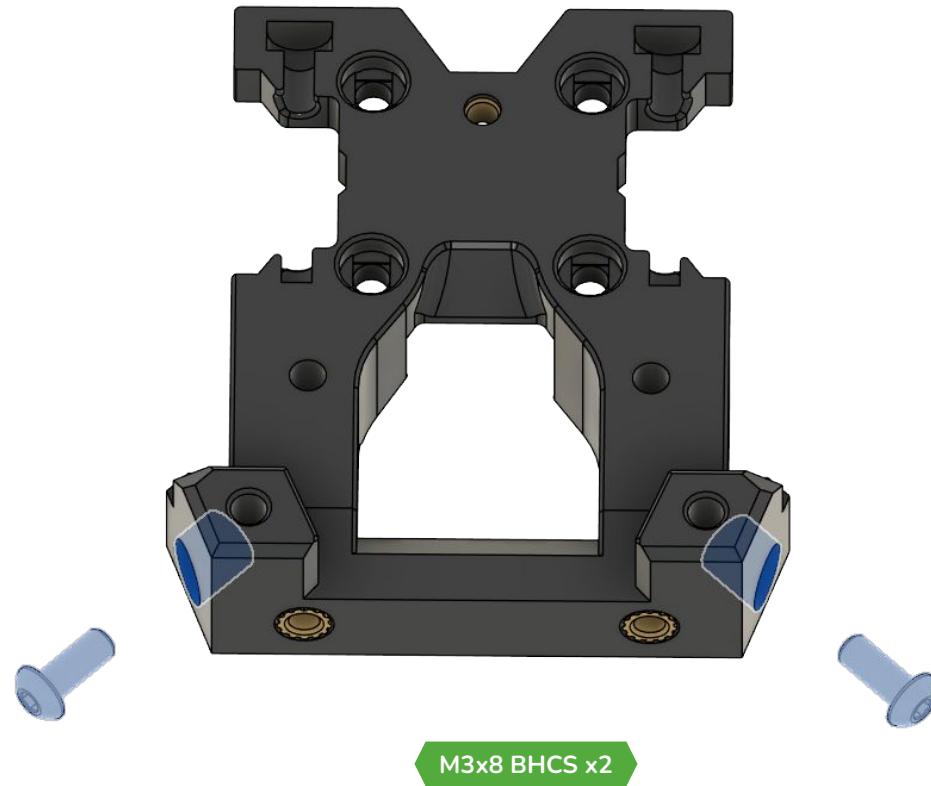
Carriage Assembly – Back Plate

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**Back Plate Assembly**

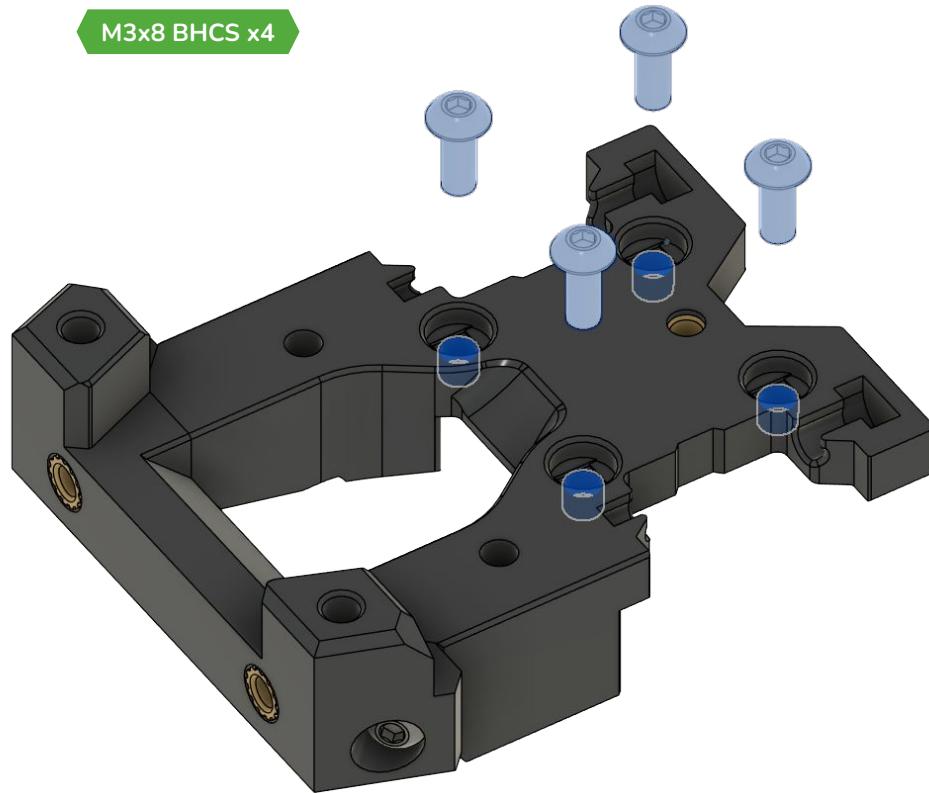
Use two M3x8 BHCS to attach the mount to the back plate.

Ensure the screws are snug.



### Carriage Assembly – Mounting Back Plate

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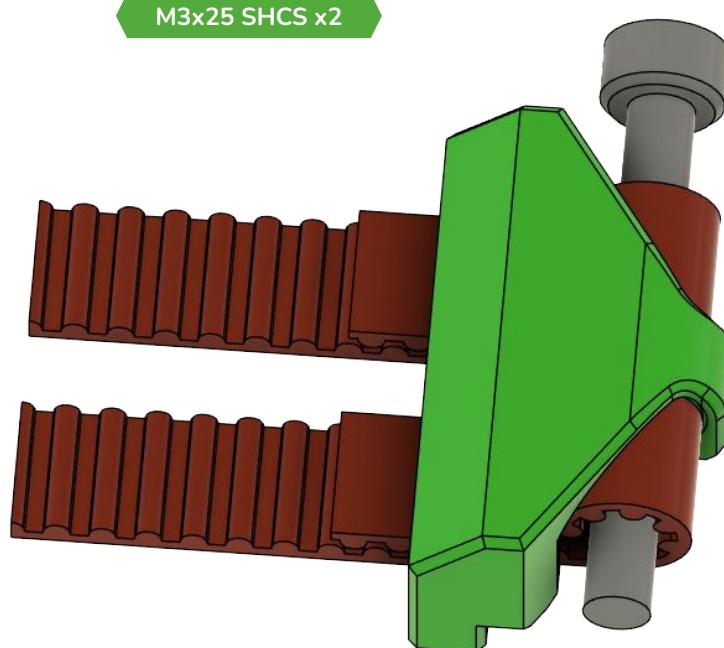
#### Carriage Mounting

Use four M3x8 BHCS to attach the back plate to your MGN12 or MGN9 Rail.

Ensure the screws are snug and that there is no wobble between the carriage and the back plate.

Carriage Assembly – Belt Prep

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**Belt Prep**

Feed your belts through the belt retainer. Then feed them back out creating a small loop. Ensure you have the same number of belt teeth fed through on the upper and lower belts.

Use a single M3x25 SHCS to feed through the loops in the belts and the belt retainer. The cap of the screw should be at the top of the belt.

Do this again for the other side, mirroring the first.

### Carriage Assembly – Attaching Belts

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#### Belt Mounting

Ensure your Front Idlers have been loosened all the way as far as they can be.

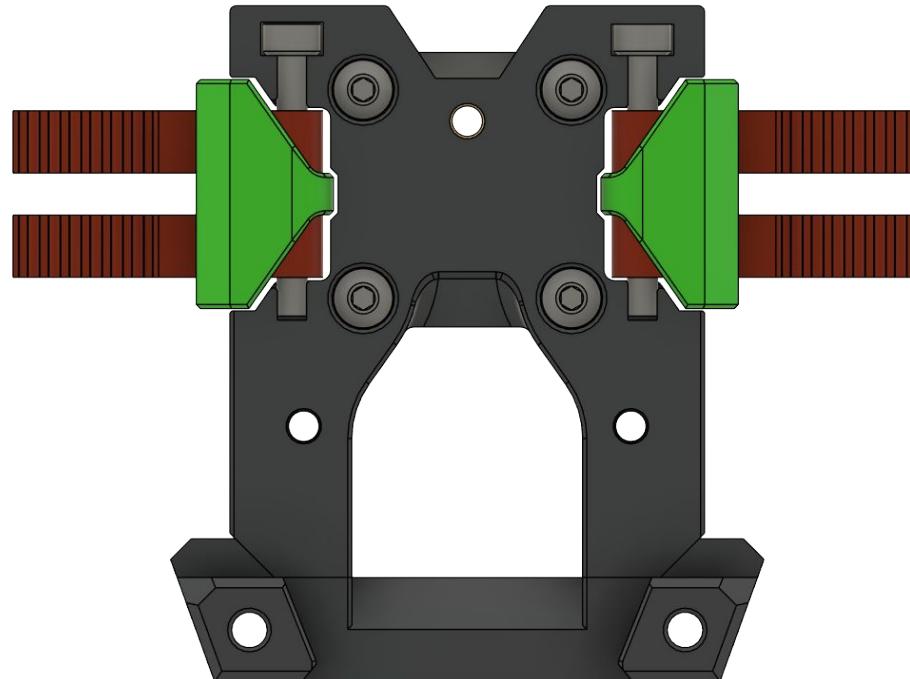
Pull the belt retainers with screws until they pop into the holes in the back plate as shown.

If the belts are too tight you may have to remove some of the tension by feeding a few teeth back through the retainer.

If the belts are too loose, you may want to adjust this by pulling a few more teeth through the retainer.

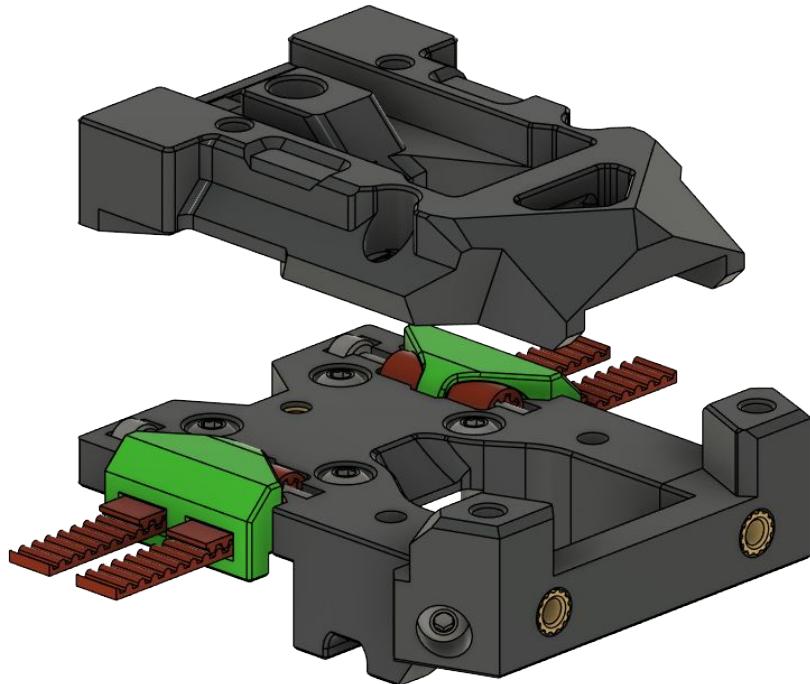
The belts should not be too tight or too loose. You do want them snug, as in time they will settle. If you have already used full travel of your idlers to tension, when they become too loose you may have to disassemble everything to adjust later.

Always ensure your belts are the same length and that you have the same number of teeth pulled through on each side. This ensures your X and Y travel the same distance.



### Carriage Assembly – Joining Plates

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#### Joining Carriage Plates

You will want to place the front plate over the back plate as shown. This will contain the belt retainers and provide mounting for the toolhead.

### Carriage Assembly – Joining Plates

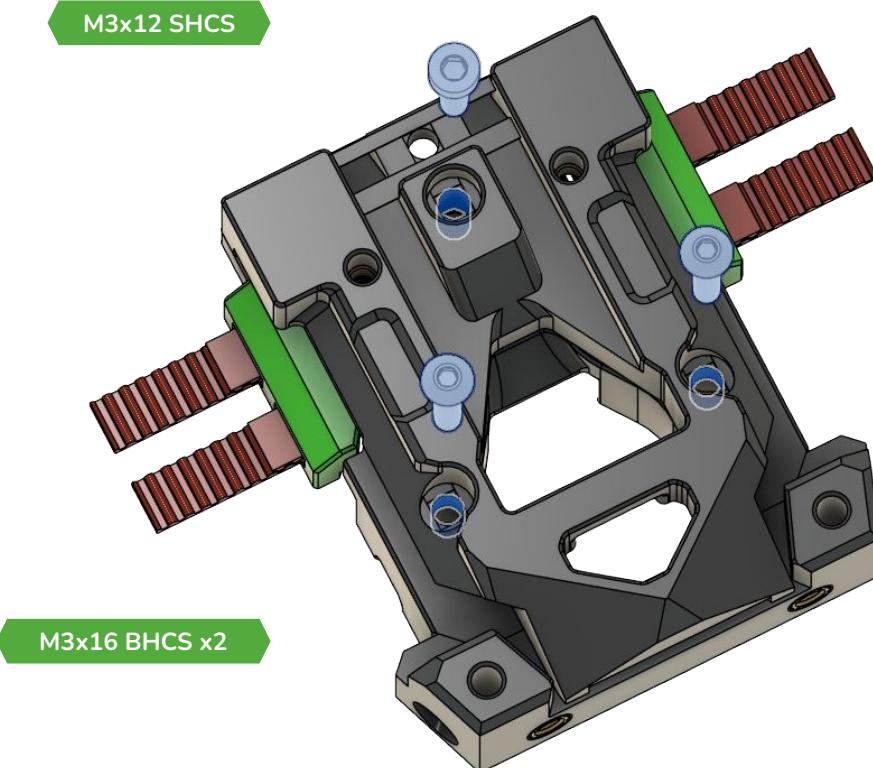
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#### Joining Carriage Plates

Insert a single M3x12 SHCS in the top center of the front plate.

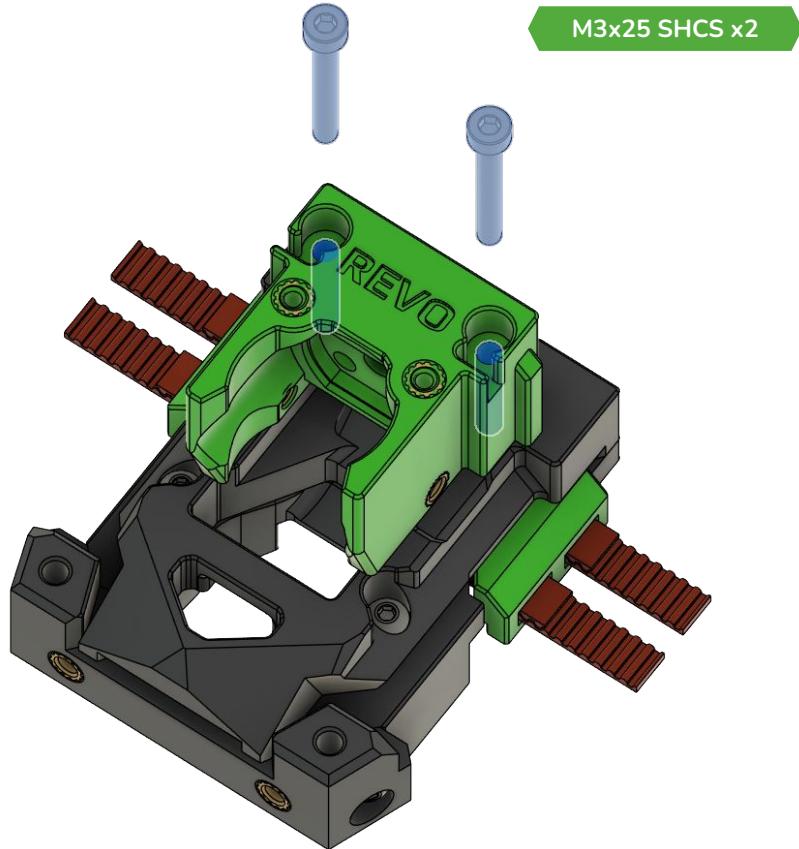
Insert two M3x16 BHCS in the lower portion.

Ensure these are snug and there is no gap or play between the two plates.



Main Body Assembly – Hotend Mount

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M3x25 SHCS x2

**Hotend Mount**

Use two M3x25 SHCS to attach the hotend mount to the carriage assembly.

### Main Body Assembly – Hotend Mounting

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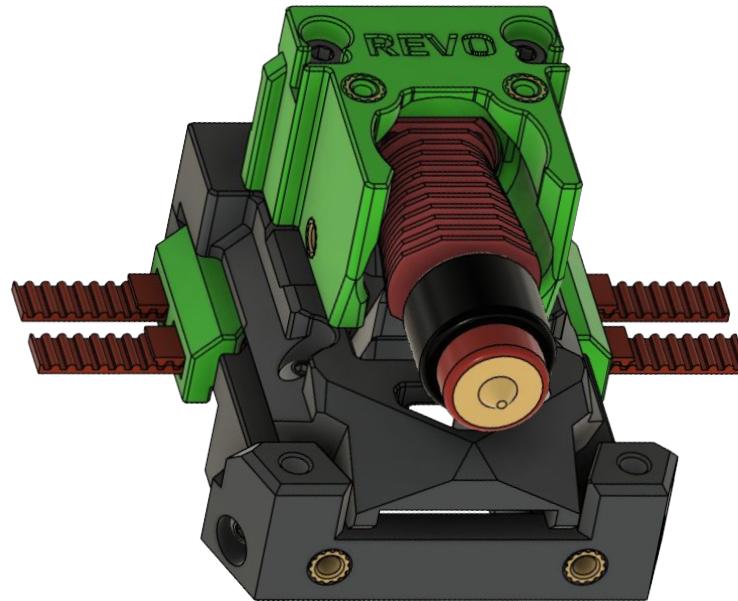
#### Hotend Mounting

There are two options for wire routing for your hot end. You will decide which will work best for you.

First version is to run the hot end wiring between the carriage and hot end mount in the two channels in the rear. This will direct the wires up and capture them between the printed parts

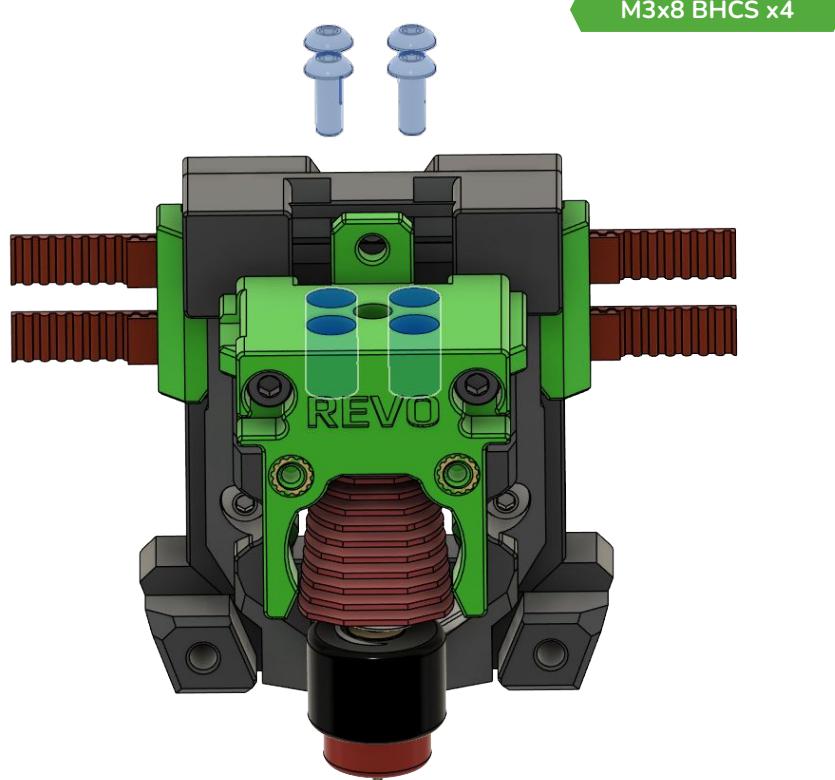
The second method is to pass the hot end wiring through the lower center back hole of the front carriage body. You will generally use this if your wiring is too thick to pass through the channels used in the first method.

Move the hot end into place with the base snug to the mount.



Main Body Assembly – Hotend Mounting

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**Hotend Mount**

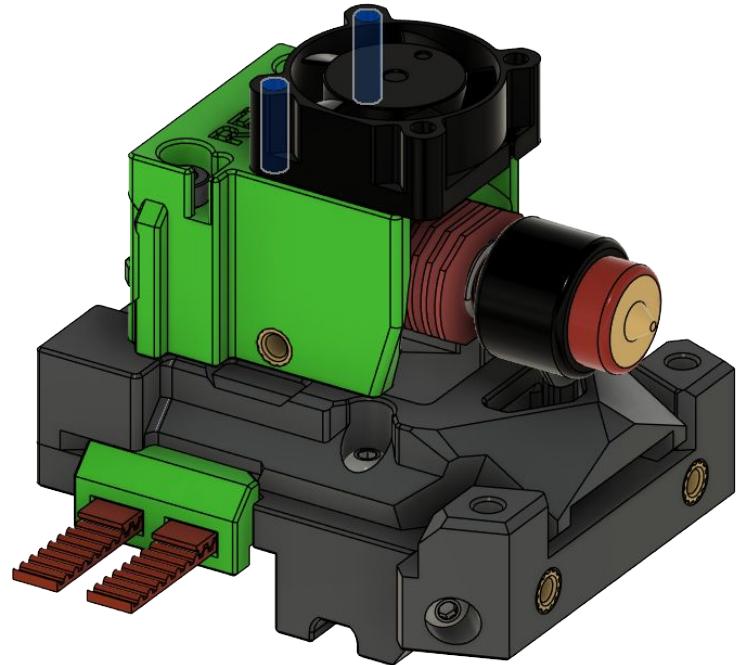
Use four M3x8 BHCS to attach the hotend mount to the carriage assembly.

Main Body Assembly – Hotend Fan Mounting

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**Hotend Fan Mounting**

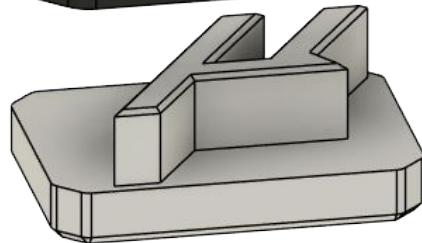
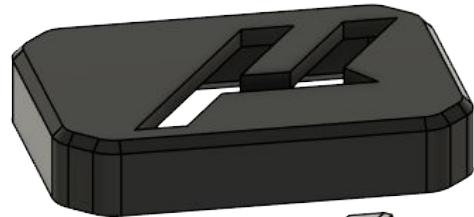
Use two M3x12 BHCS to attach the hotend fan to the hot end mount.



## Assembly

### Main Body Assembly – LED Assembly

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#### LED Assembly

Insert the clear LED diffuser into the light shield.



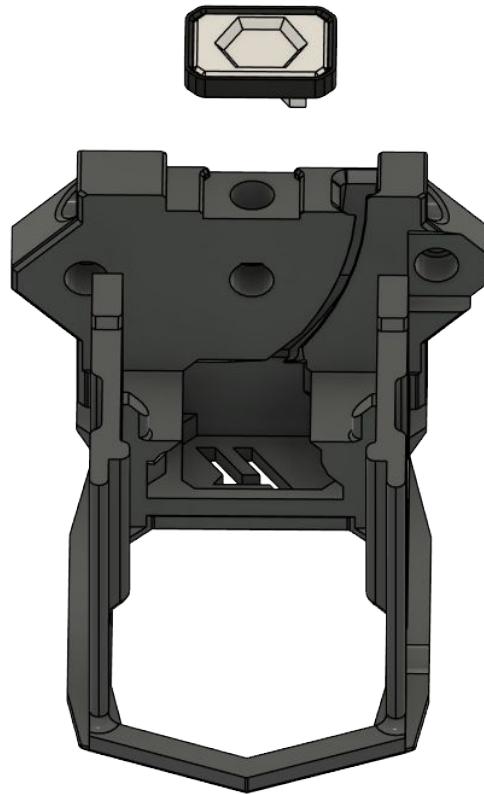
## Assembly

### Main Body Assembly – LED Assembly

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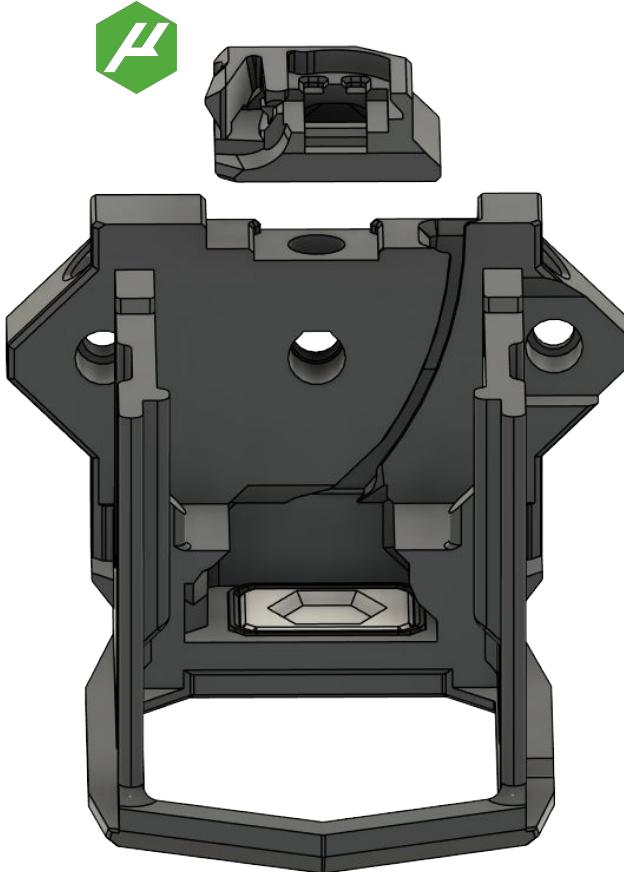
#### LED Assembly

Insert the LED diffuser and light shield into the main body.



Main Body Assembly – LED Assembly

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**LED Assembly**

Place LED carrier into the main body in the space over the LED diffuser.



Be sure to pay attention to the orientation or things will not go in smoothly.

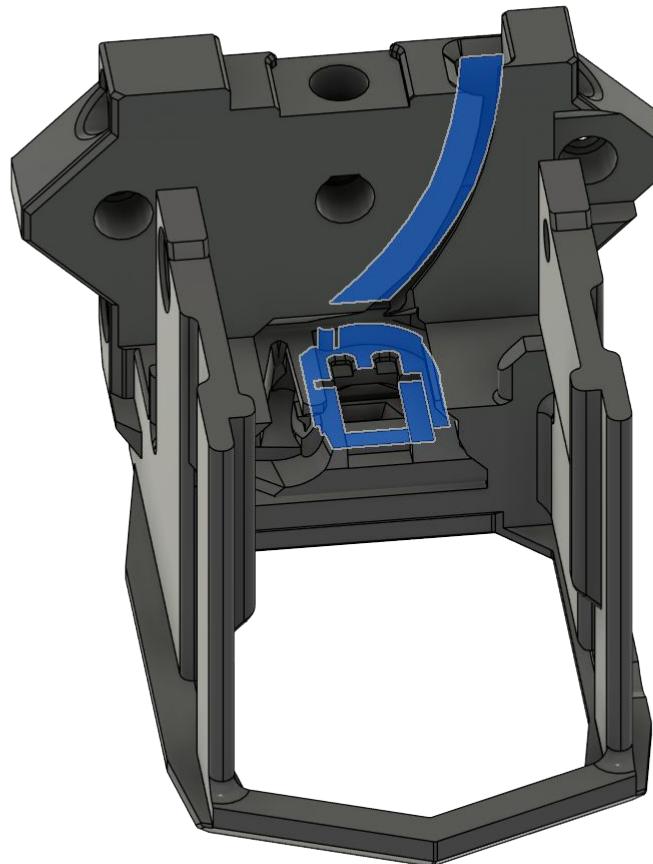
### Main Body Assembly – LED Assembly

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#### LED Assembly

Insert your NeoPixel into the LED carrier. Ensure the LED is pointed down so that it will light the side with the transparent diffuser.

Insert wiring for your LED into the channel in the main body.



Main Body Assembly – Grill Assembly

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**Grill Assembly**

Insert the grill into the main body. There is a bit of a channel it goes in and inserting it with the top flat side in first usually makes this a little easier.

It may take a little pressure to press it into place. Just be careful not to break the edges of it. You may have to lightly sand the edges to get it to go in.

Main Body Assembly – Main Body Assembly

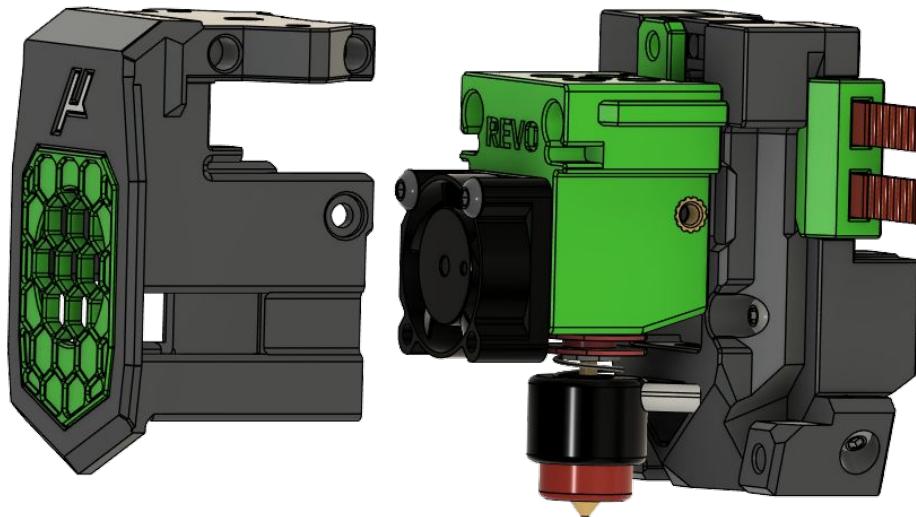
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**Main Body Assembly**

Feed the hot end fan out either the left or right side of the main body near the grill. This will pass back down the side of the main body later in the cable channel there.

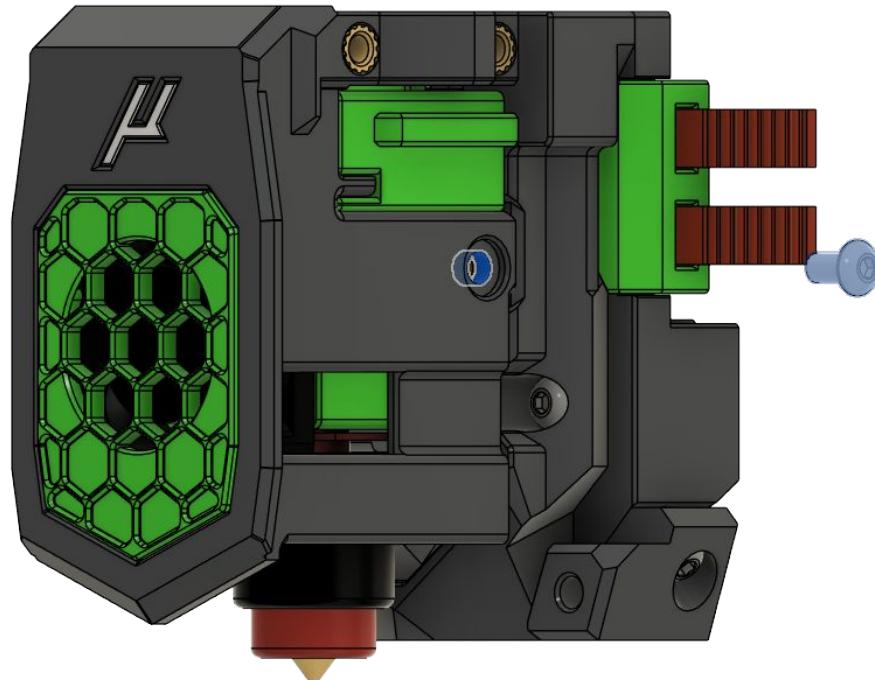
Slide your main body onto the assembly on the carriage.

Insert wiring for your LED into the channel in the main body.



Main Body Assembly – Main Body Assembly

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**Main Body Assembly**

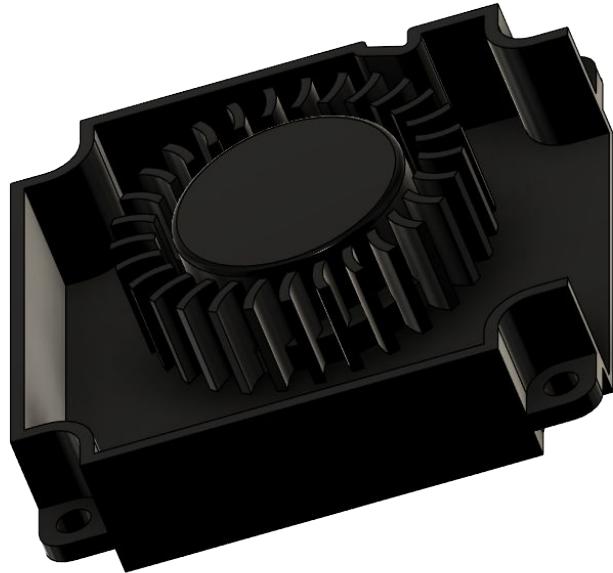
Use two M3x6 BHCS to attach the main body to the assembly once it is in place. There will be one on each side.



Be careful not to over tighten these as the plastic here is very thin and you do not want to crack it.

Main Body Assembly – Main Body Assembly

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**De-Lid Your Fan**

Carefully lift the cover off the 4010 blower fan. In most cases this can be done by hand, if you have to use a small tool to pry the lid off be careful while doing so.

## Main Body Assembly – Fan Duct Body Assembly

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### Fan Duct Body Assembly

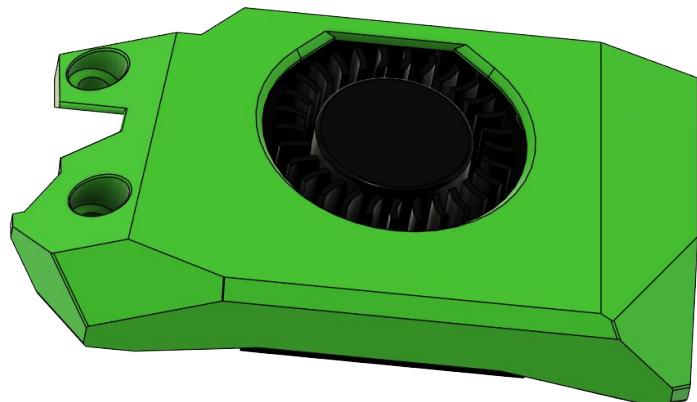
Insert the 4010 blower fan into the fan duct with the open duct in the port for the ducting in the body. Also, ensure the fan blades are aligned with the hole in the fan duct body.

Carefully remove the wire from the channel on the back of the fan if needed.

Secure the fan with 2 M2x6 BHCS at the front edge of the duct.

Do this for both fan duct bodies.

Also pay attention to the lip near the bottom of the duct body, as this will need to catch the main body when you install the fan duct body on the main assembly.



M2x6 BHCS x4



Main Body Assembly – Right Fan Duct Mounting

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**Right Fan Duct Mounting**

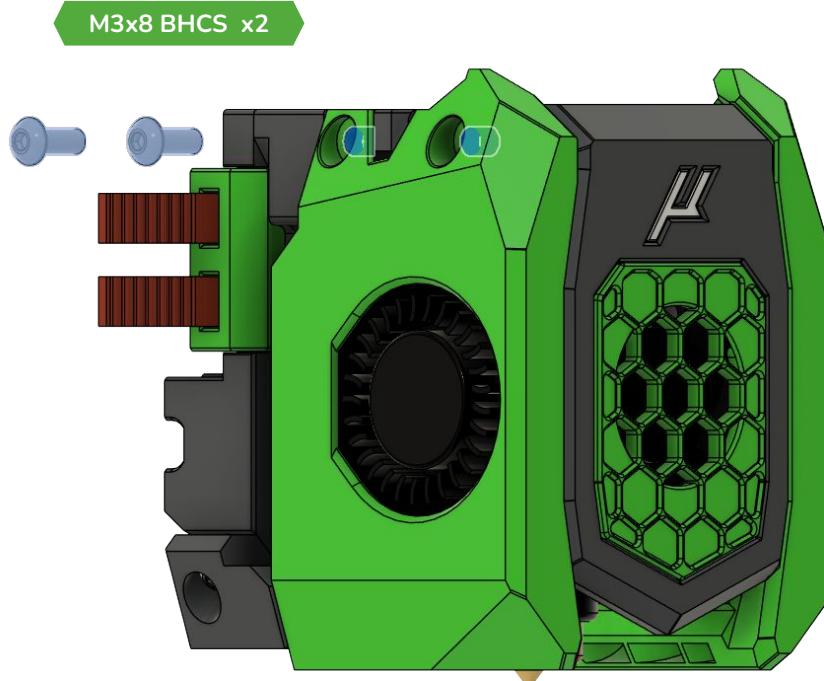
Ensure the lower ledge of the fan duct body catches the lower edge of the main body. Make sure you get your wiring adjusted so that it is not being pinched anywhere and slide the duct the rest of the way into place so that it is flat against the side of the main body.

Use two M3x8 BHCS to attach the fan duct to the side of the main body.



Main Body Assembly – Fan Duct Mounting

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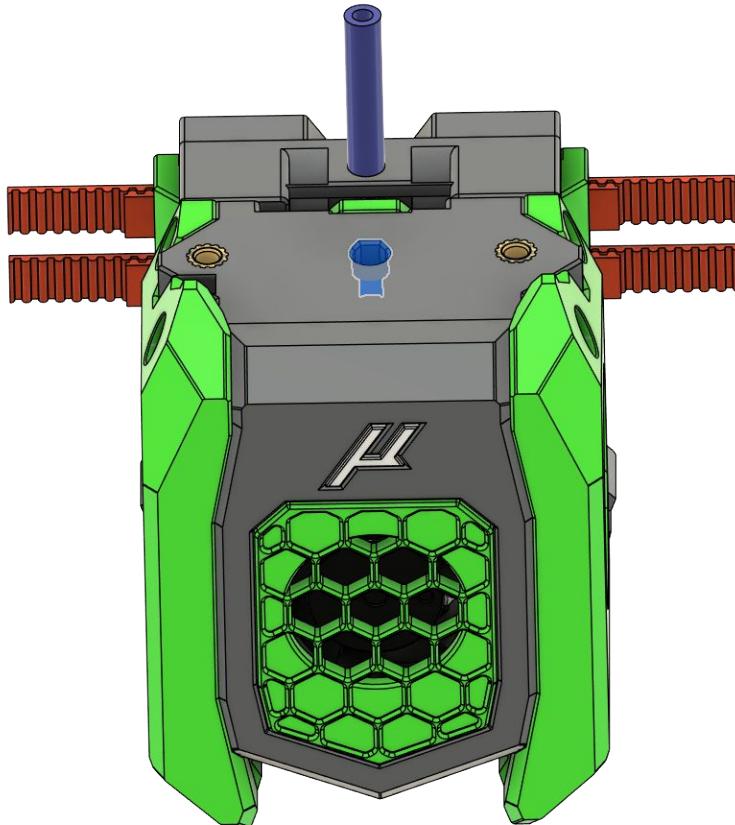


**Left Fan Duct Mounting**

Ensure the lower ledge of the fan duct body catches the lower edge of the main body. Make sure you get your wiring adjusted so that it is not being pinched anywhere and slide the duct the rest of the way into place so that it is flat against the side of the main body.

Use two M3x8 BHCS to attach the fan duct to the side of the main body.

### Main Body Assembly – Bowden Tube



#### Bowden Tube

The next thing we need to do is insert a Bowden tube into the main body. This will help guide your filament.

As every hot end and extruder are a little different this can be a different length on many builds.

To ensure yours is cut to the correct length, we will start with a section that is longer than needed, approximately 25-35mm. You will want to insert a section of Bowden into the main body all the way, so it bottoms out at the hot end.

Once you have that fully inserted you will now look at your extruder. On the bottom there should be a small hole for the Bowden to go into. You will want to see how deep this is, as you will need to leave that much Bowden above the top surface of the main body. Mark your Bowden tubing at the appropriate length, then remove it from the body and trim to that length.

Once the Bowden is cut, go ahead and reinsert it back in the main body and test fit the extruder on top. The extruder should rest on the main body, not be pushed on by the Bowden tubing.

If needed do a little final trim work to get this to the proper length.

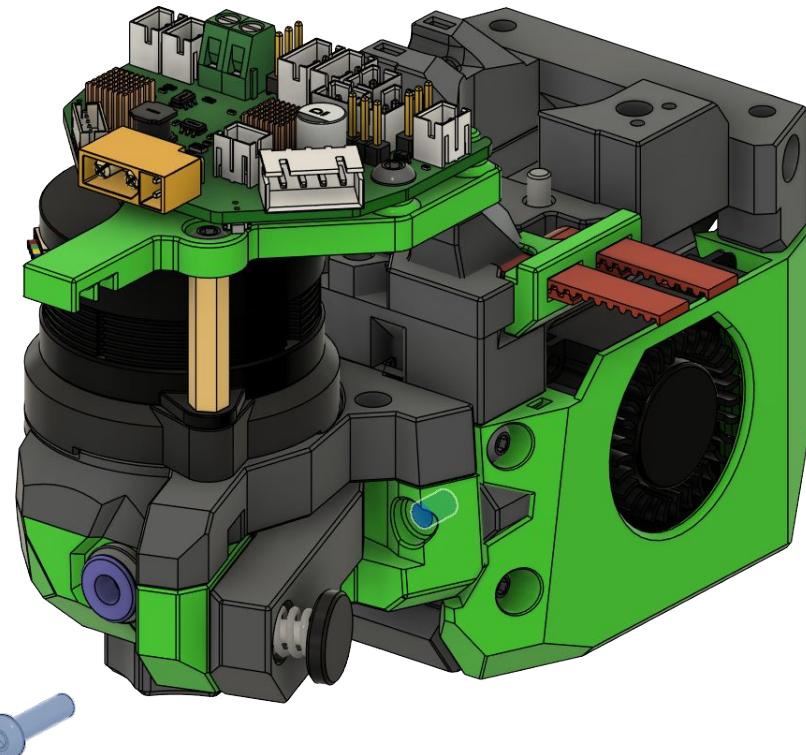
Main Body Assembly – Mounting the Extruder

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**Mounting the Extruder**

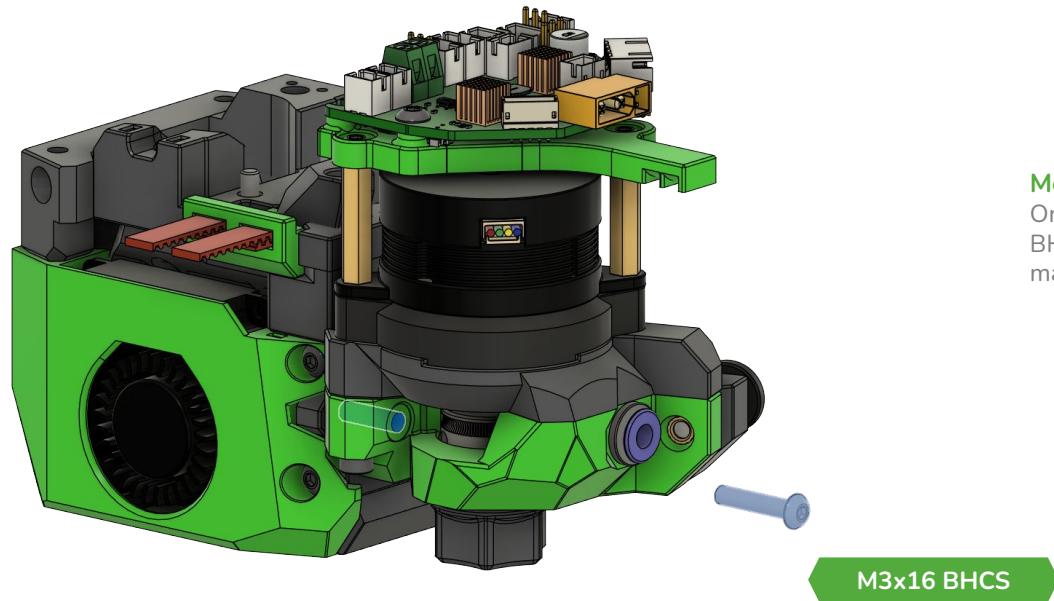
Put your extruder on top of the main assembly with the two mounting holes lined up.

On the right side use one M3x12 BHCS to attach the extruder to the main body.



Main Body Assembly – Mounting the Extruder

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**Mounting the Extruder**

On the left side use one M3x16 BHCS to attach the extruder to the main body.

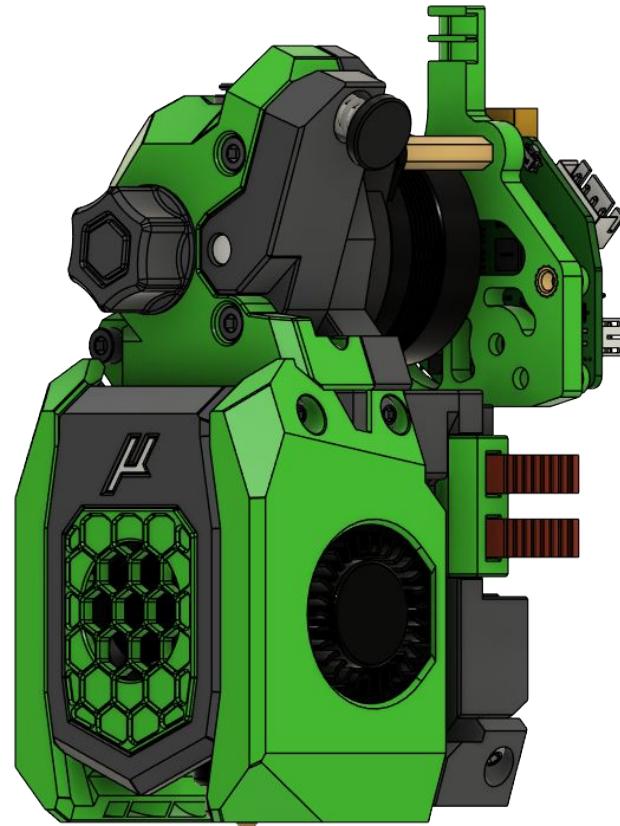
Main Body Assembly – Main Body Assembly

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**You Did It!!!**

You have now fully assembled your AntHead toolhead! You are now in the home stretch!

All that is left now is to plug in all those wires that are poking out the back of the toolhead and to tame them down.



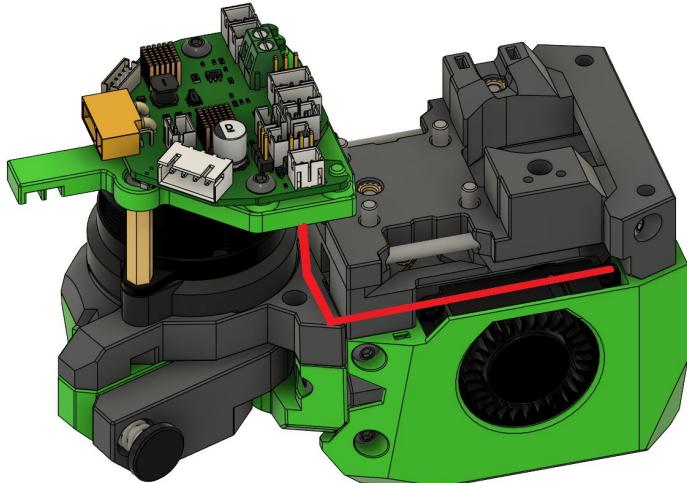
## Electronics

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Now comes the fun part, wiring and cable management. Take your time and be especially careful during this process.

To do this optimally you may need to solder wires and/or crimp connectors as you will want to make sure the wires are long enough to not have tension on them, but also not long enough to have a bunch of extra slack that can snag on things.

Once you have this done you will want to use zip ties to secure all your wiring to the rear of the toolhead to keep your wiring neat and out of the way. The suggested pathing is following the red line shown on each side.



### Examples

We have provided examples of suggested wiring locations for the NightHawk 36 as well as the EBB36 toolhead boards.



If you decide to stray from this set up, you will want to make sure you update your config files as well.

## Electronics – Wiring the Nitehawk 36

**Wiring**

You will want to plug things in as follows.

Hot End Thermistor – Hotend Thermistor

Hot End Fan – Hotend Fan



Hot End – Hotend Cartridge

RGB – RGB Port

Part Cooling Fan Right – Part Fan (right side)

Part Cooling Fan Left – Part Fan (left side)

Extruder Motor – E Motor

X Endstop – X Endstop

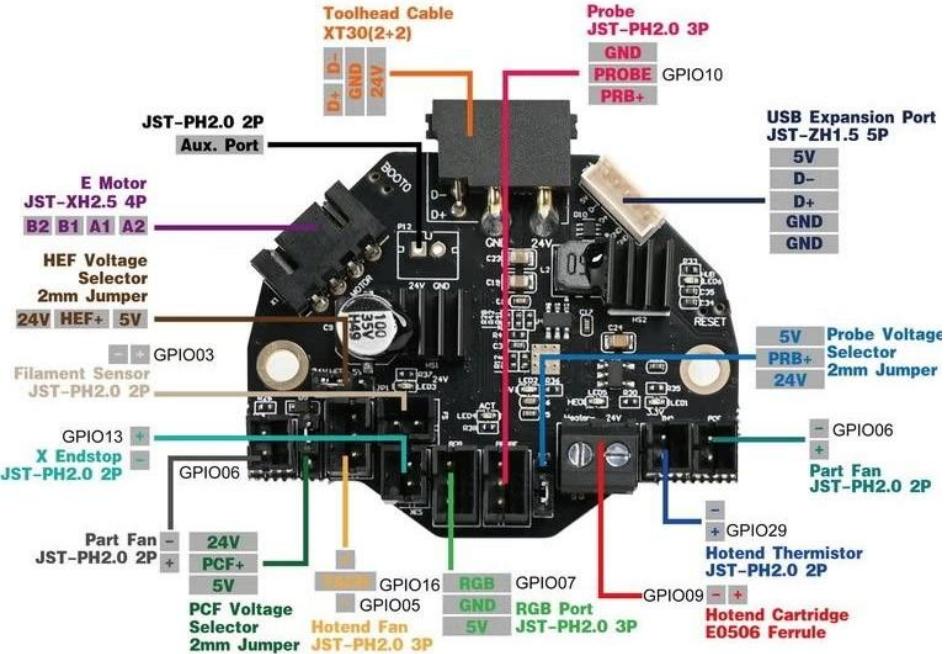
Upper Sensor – Filament Sensor

Lower Sensor – Probe or X Endstop \*

If using TAP or Boop – Probe

If using Cartographer/Beacon – USB Expansion Port

\* If you are using an Endstop and TAP/Boop you won't be able to use both filament run out sensors.



## Electronics – Wiring the EBB 36 v1.1 w/ Max Chip

### Wiring

You will want to plug things in as follows.

Hot End Thermistor – TH0 \*



Hot End Fan – Fan 1

Hot End – Hotend 0

RGB – RGB

Part Cooling Fans – Fan 2 \*\*

Extruder Motor – E-Motor

X Endstop – Endstop (GND, PB8)

Upper Sensor – Probe (GND, PB6)

Lower Sensor – Probe (GND, PB5)

If you are using TAP or Boop – Probe (GND, 5v, PB9)

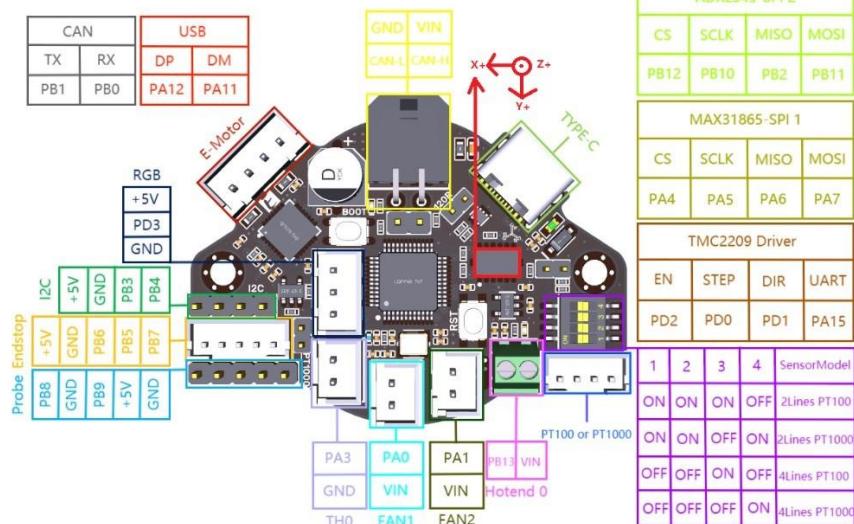
For Cartographer/Beacon I2C (5v, GND) / Can H, Can L (under Can Input)

\* If you are using a PT1000 you will need to set the jumper next to the port. If using PT100 you will need to use PT100 Port instead to the right side of the board.

\*\* You will have to either us a Y connector or solder your Part Cooling fans together to do this.

If you are using the non max version of the board most of the pinout is exactly the same. You will need to use a different Hotend pin.

- EBB36 CAN V1.1

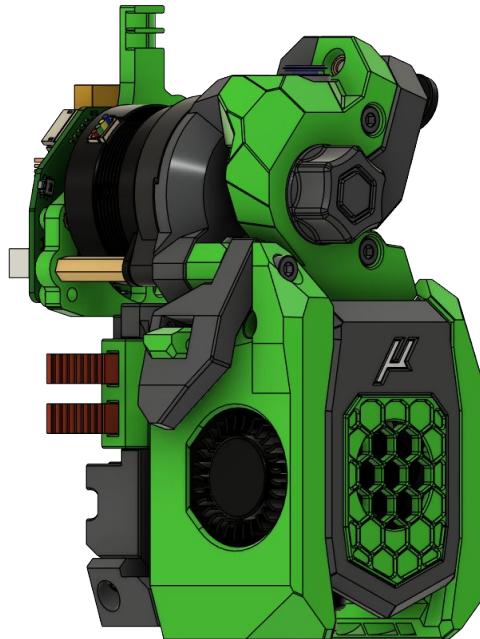


## LeafCutter Assembly

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If you are going to use the LeafCutter you will need to do a few extra assembly steps at this point.

Once you have everything prepped and ready to go you are going to have to hold things in place with one hand while adding others for the first couple steps to get the cutting arm in place. After this is in place we will add the blade holder.



### Be Careful!!!

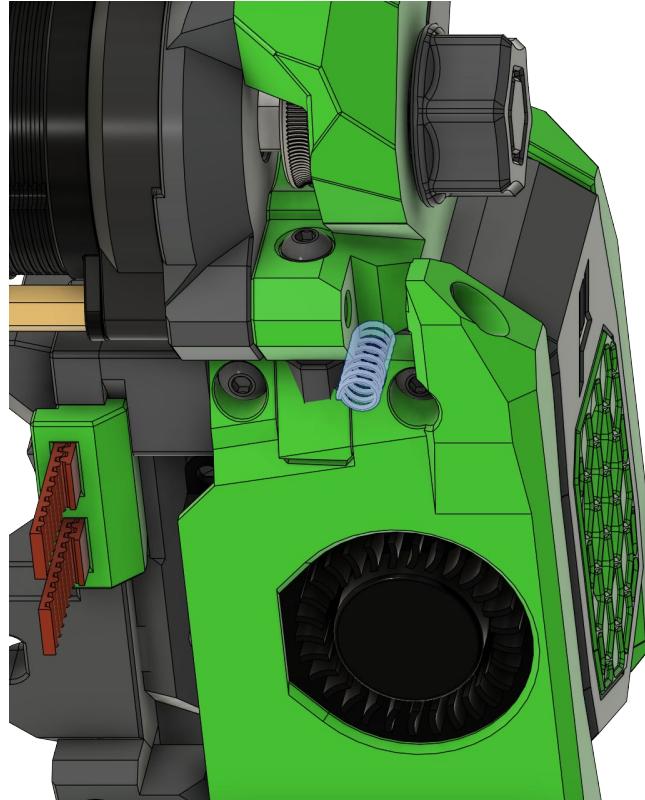
During this process you will be handling a cutting blade! Be careful, take your time, and do not cut yourself!

## LeafCutter Assembly

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### Spring Placement

Your spring will need to go in the capture channel in the side of the toolhead, where near where the duct and the body meet.



LeafCutter Assembly

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**Cutting Arm**

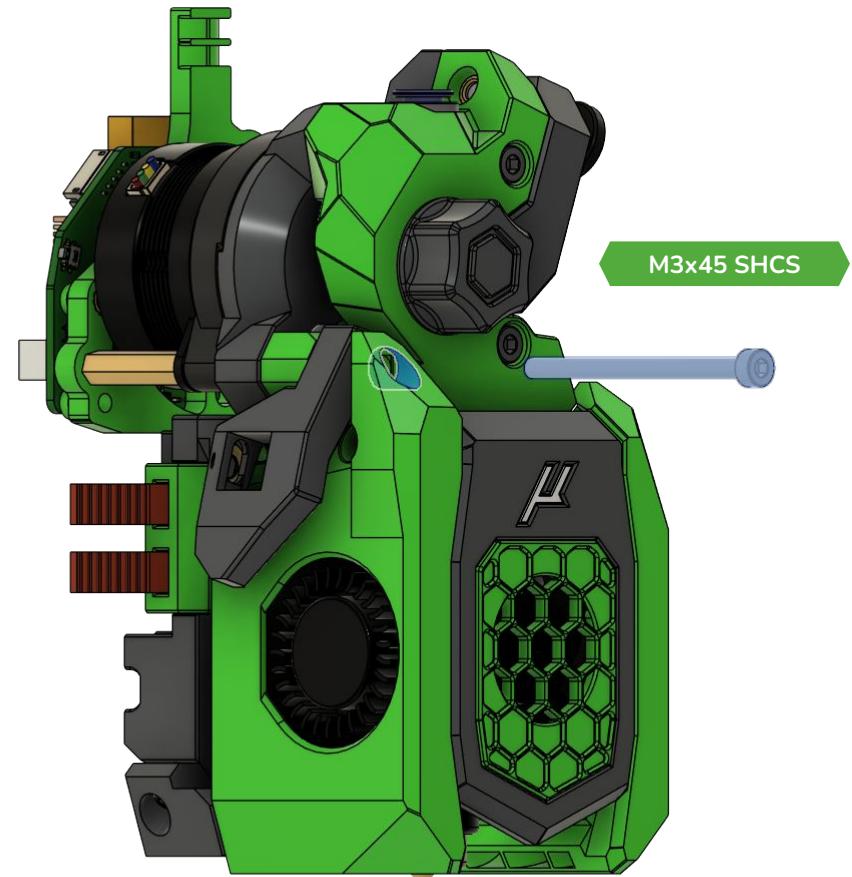
Keeping your spring in place, put your cutting arm in place over the top of it.

LeafCutter Assembly

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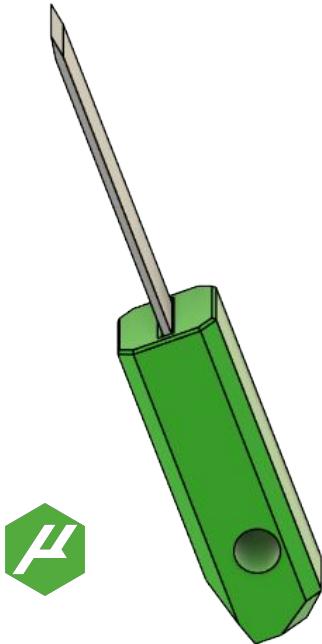
Put in your Screw

Insert your M3x45 SHCS.



## LeafCutter Assembly

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### Blade Install

Carefully press the butt of your blade into the blade carrier.

Use the blade check tool to ensure the blade is at the proper length. If it is too long you may have to trim your blade down slightly. If it is too short you may need a longer blade.

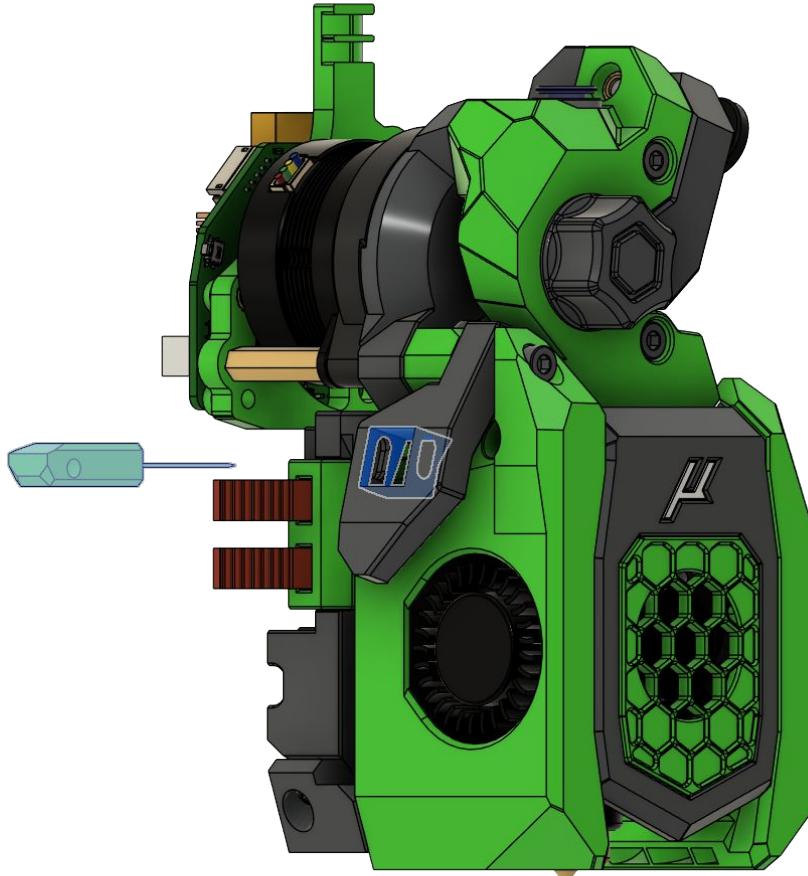


## LeafCutter Assembly

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### Blade Carrier Install

Carefully slide the carrier blade end first into the channel in the side of the toolhead passing through the cutting arm.



## LeafCutter Assembly

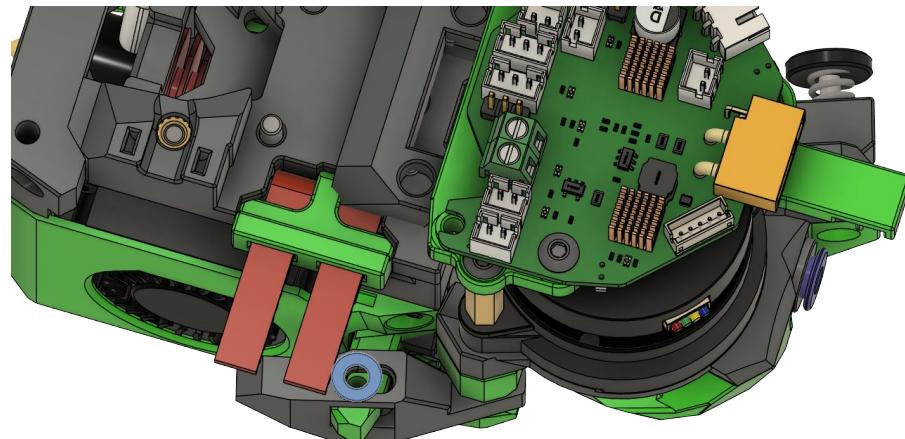
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### Blade Carrier Install

Adjust the blade carrier so that the hole in the carrier lines up with the hole in the cutting arm.

Place a M3 Washer over this as well.

Then use a M3x16 BHCS to capture this all in position. Do not over tighten as it will cause binding.

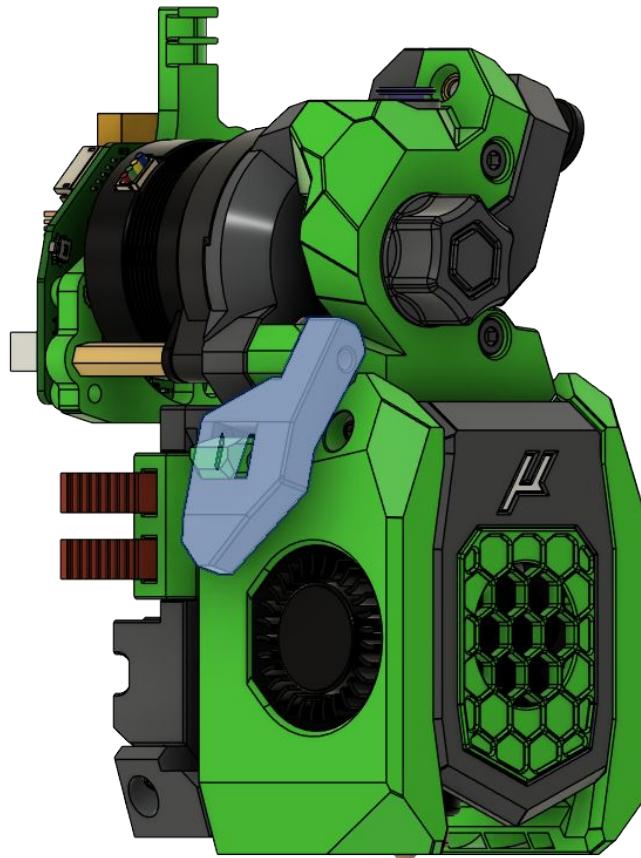


M3 Washer

M3x16 BHCS

## LeafCutter Assembly

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### Check For Smooth Function

Actuate the cutter arm several times and make sure it travels smoothly and is not binding on anything.

If it binds anywhere you may need to adjust screw tension to remove binding.

Once you it is moving smoothly you are done!