



## VORON TRIDENT ASSEMBLY

We build space shuttles with gardening tools  
so anyone can have a space shuttle of their own.

---

VERSION 2022-08-14



Before you begin on your journey, a word of caution.

In the comfort of your own home you are about to assemble a robot. This machine can maim, burn, and electrocute you if you are not careful. Please do not become the first VORON fatality. There is no special Reddit flair for that.

Please, read the entire manual before you start assembly. As you begin wrenching, please check our Discord channels for any tips and questions that may halt your progress.

Most of all, good luck!

THE VORON TEAM

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### PART PRINTING GUIDELINES

The Voron Team has provided the following print guidelines for you to follow in order to have the best chance at success with your parts. There are often questions about substituting materials or changing printing standards, but we recommend you follow these:

#### 3D PRINTING PROCESS

Fused Deposition Modeling (FDM)

#### INFILL TYPE

Grid, Gyroid, Honeycomb, Triangle or Cubic

#### MATERIAL

ABS

#### INFILL PERCENTAGE

Recommended: 40%

#### LAYER HEIGHT

Recommended: 0.2mm

#### WALL COUNT

Recommended: 4

#### EXTRUSION WIDTH

Recommended: Forced 0.4mm

#### SOLID TOP/BOTTOM LAYERS

Recommended: 5

### PRINT IT FORWARD (PIF)

Often times community members that have issues printing ABS will bootstrap themselves into a VORON using our Print It Forward program. This is a service where approved members with VORON printers can make you a functional set of parts to get your own machine up and running.

Check Discord if you have any interest in having someone help you out.

### FILE NAMING

By this time you should have already downloaded our STL files from the Voron GitHub. You might have noticed that we have used a unique naming convention for the files. This is how to use them.

#### PRIMARY COLOR

Example `z_joint_lower_x4.stl`

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

#### ACCENT COLOR

Example `[a]_tensioner_left.stl`

We have added “[a]” to the front of any STL file that is intended to be printed with accent color.

#### QUANTITY REQUIRED

Example `[a]_z_belt_clip_lower_x4.stl`

If any file ends with “\_x#”, that is telling you the quantity of that part required to build the machine.

### HOW TO GET HELP

If you need assistance with your build, we’re here to help. Head on over to our Discord group and post your questions. This is our primary medium to help VORON Users and we have a great community that can help you out if you get stuck.



<https://discord.gg/voron>

## REPORTING ISSUES

Should you find an issue in the documentation or have a suggestion for an improvement please consider opening an issue on GitHub (<https://github.com/VoronDesign/Voron-Trident/issues>).

When raising an issue please include the relevant page numbers and a short description; annotated screenshots are also very welcome. We periodically update the manual based on the feedback we get.

## THIS IS JUST A REFERENCE

This manual is designed to be a simple reference manual. Building a Voron can be a complex endeavour and for that reason we recommend downloading the CAD files off our Github repository if there are sections you need clarification on. It can sometimes be easier to follow along when you have the whole assembly in front of you.



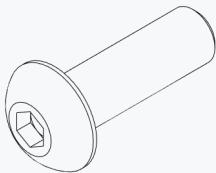
<https://github.com/vorondesign>



<https://docs.vorondesign.com/>

## HARDWARE REFERENCE

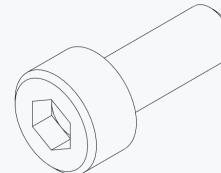
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### BUTTON HEAD CAP BOLT (BHCS)

Metric fastener with a domed shape head and hex drive. Most commonly found in locations where M5 fasteners are used.

ISO 7380-1



### SOCKET HEAD CAP BOLT (SHCS)

Metric fastener with a cylindrical head and hex drive. The most common fastener used on the Voron.

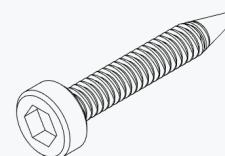
ISO 4762



### FLAT HEAD COUNTERSUNK BOLT (FHCS)

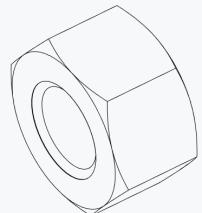
Metric fastener with a cone shaped head and a flat top.

ISO 10642



### SELF TAPPING SCREW

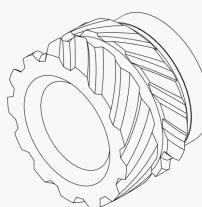
Fastener with a pronounced thread profile that is bolted directly into plastic.



### HEX NUT

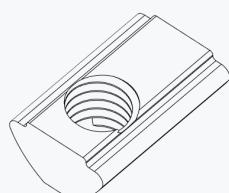
Hex nuts couple with bolts to create a tight, secure joint. You'll see these used in both M3 and M5 variants throughout this guide.

ISO 4032



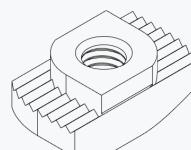
### HEAT SET INSERT

Heat inserts with a soldering tip 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.



### POST INSTALL T-SLOT NUT (T-NUT)

Nut that can be inserted into the slot of an aluminium profile. Used in both M3 and M5 variants throughout this guide. Often also called "roll-in t-nut".

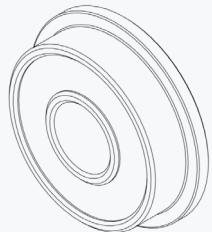


### HAMMERHEAD NUT

Nut that can be inserted into the slot of an aluminium profile. Used exclusively for panel mounting, all other components use T-Slot nuts.

## HARDWARE REFERENCE

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### F695 BEARING

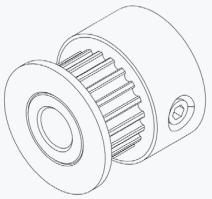
A ball bearing with a flange used in various gantry locations.



### SHIM

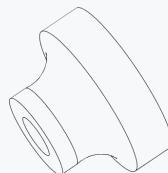
Not to be confused with stamped washers. These are used in all M5 call-out locations in this manual.

DIN 988



### PULLEY

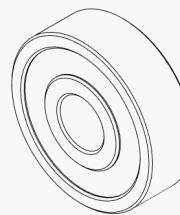
GT2 pulley used on the motion system of the Voron.



### THUMB NUT

Used in the print bed as a spacer.

DIN 466-B



### 625 BEARING

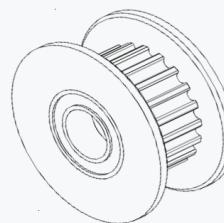
A ball bearing used on the Voron Z drives.



### WASHER

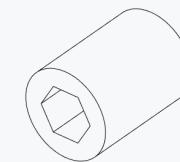
Usually stamped from sheet metal this type of spacer is not as consistent in thickness as the shims are. Only used in M3 size.

DIN 125



### IDLER

GT2 idler used in the motion system of the Voron.



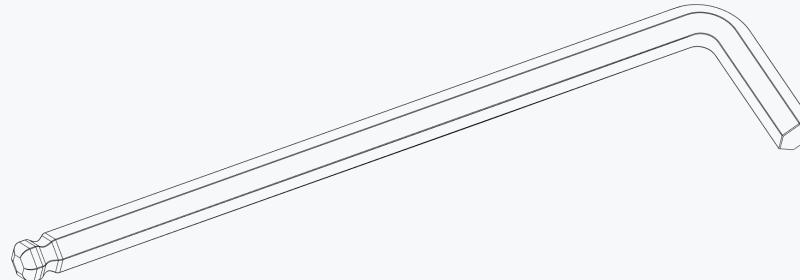
### SET SCREW

Small headless fastener with an internal drive. Used in pulleys and other gears. Also called a grub screw.

ISO 4026

### BALL-END DRIVER

Some parts of this design require the use of a ball-end hex driver for assembly. We recommend you get a 2.0mm, 2.5mm and 3mm one.



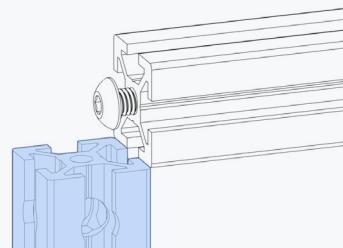
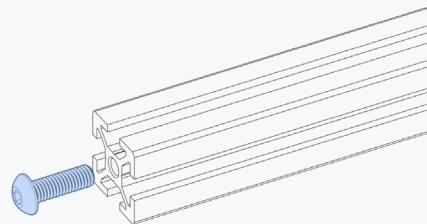
### 2.5MM HEX DRIVER

The 2.5mm hex driver will see a lot of use in this build. A quality driver is strongly recommended. Refer to the sourcing guide for suggestions.



### ADDITIONAL TOOLS

We provide additional tool recommendations in our sourcing guide. Visit [https://vorondesign.com/sourcing\\_guide](https://vorondesign.com/sourcing_guide) and switch to the "Voron Tools" tab at the bottom of the page.



### BLIND JOINT BASICS

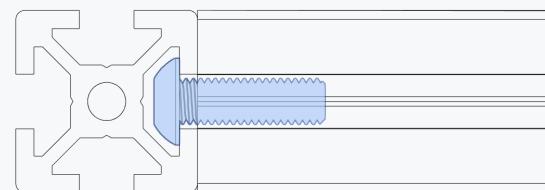
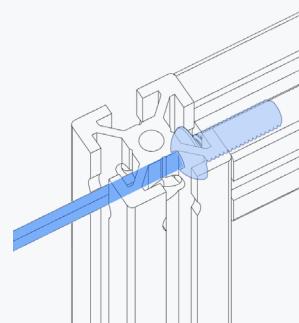
Blind Joints provide a cost effective and rigid assembly method.

The head of the BHCS is slid into the channel of another extrusion and securely fastened through a small access hole in the extrusion.

If you've never assembled one before we recommend you watch the linked guide.



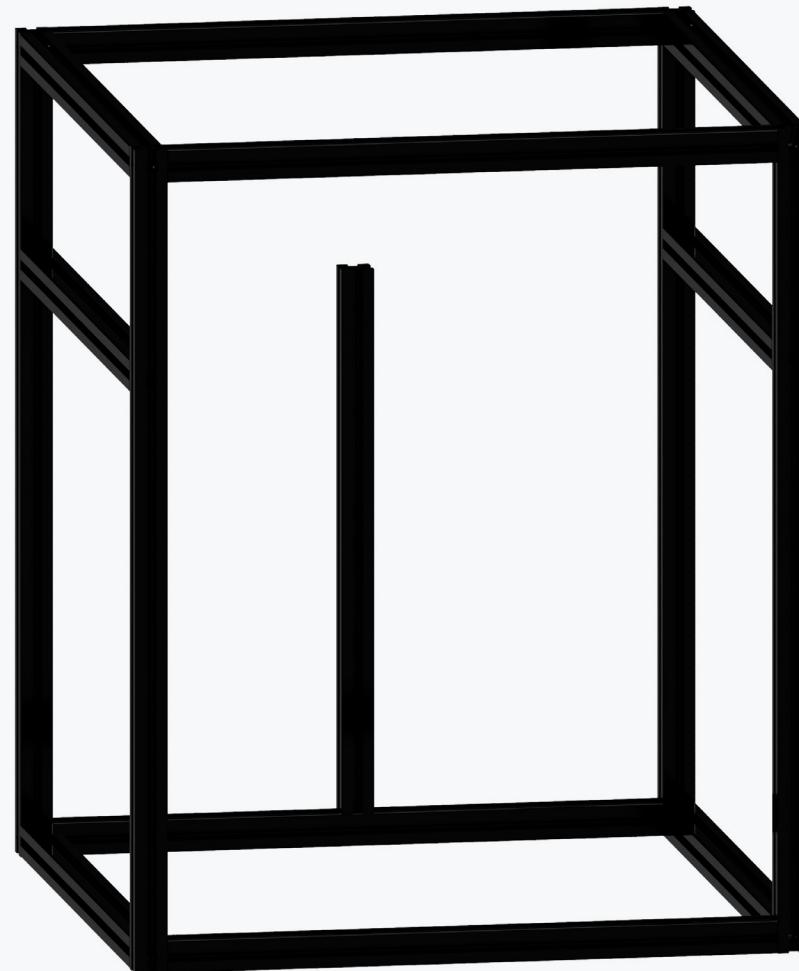
<https://voron.link/onjwmcd>

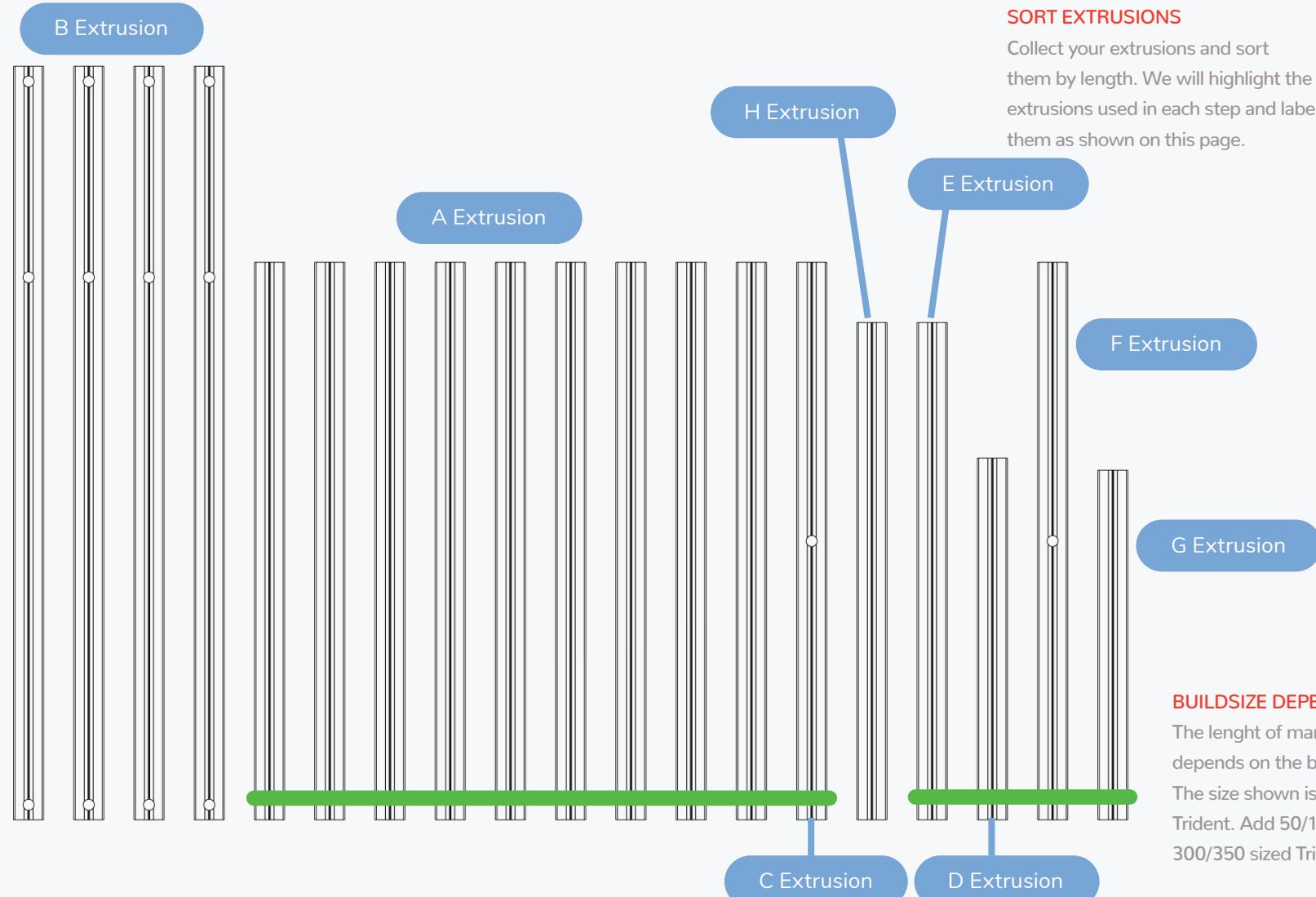


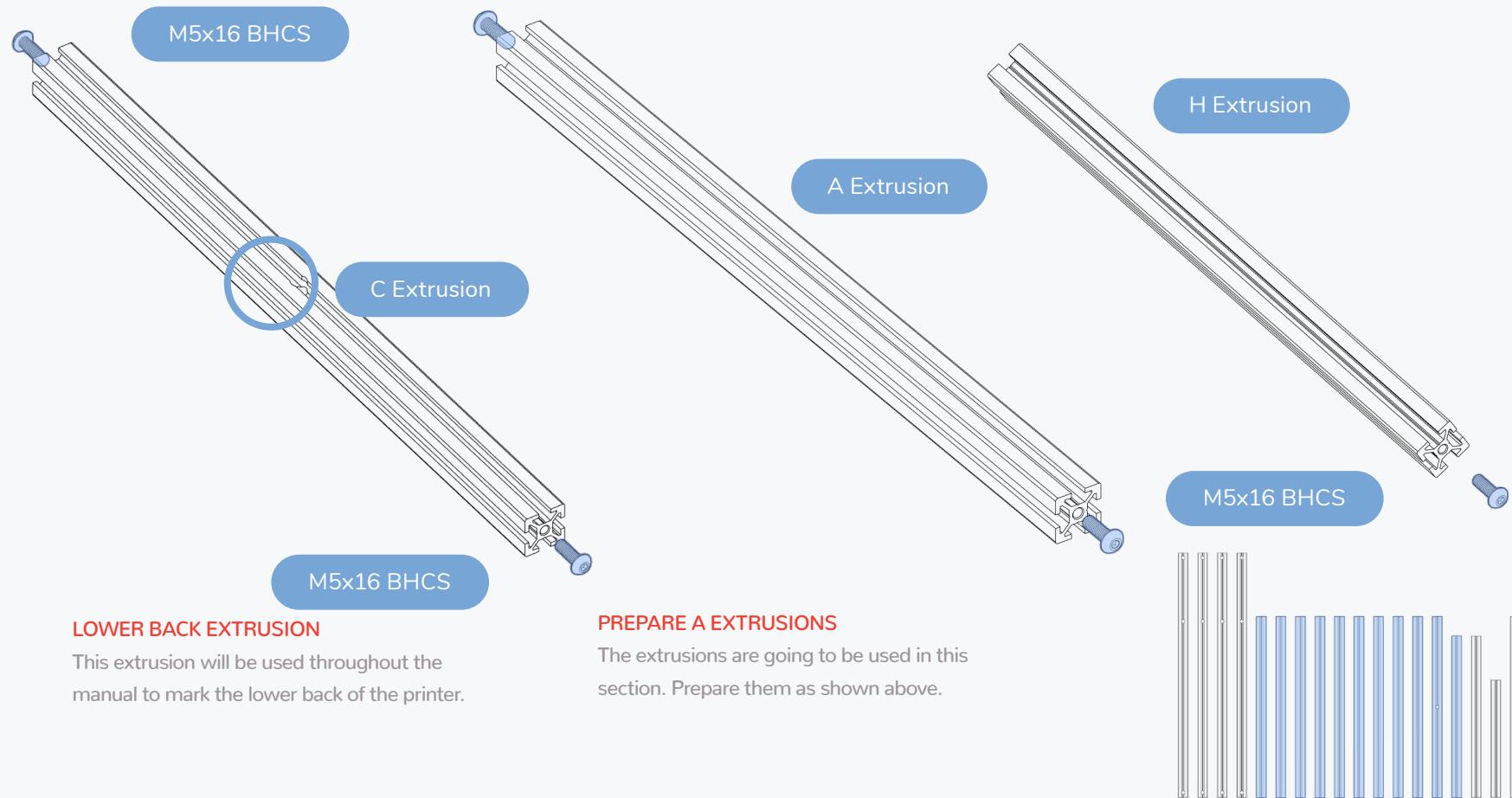
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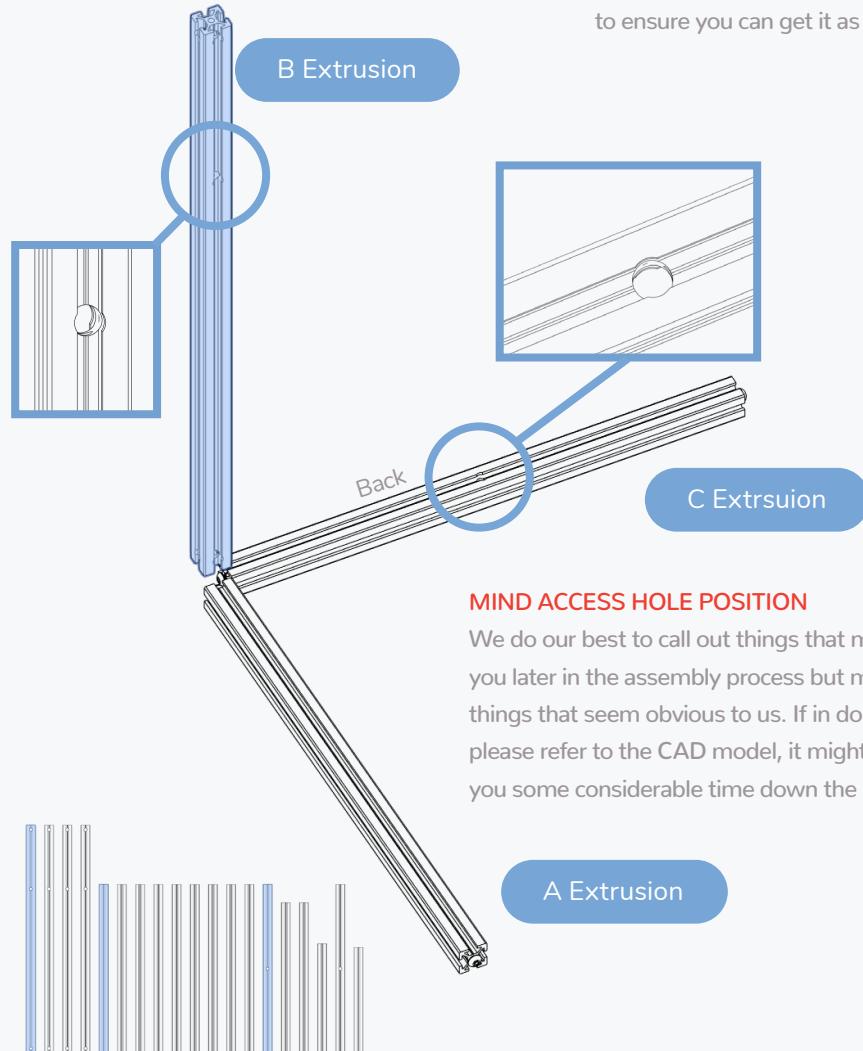
FRAME

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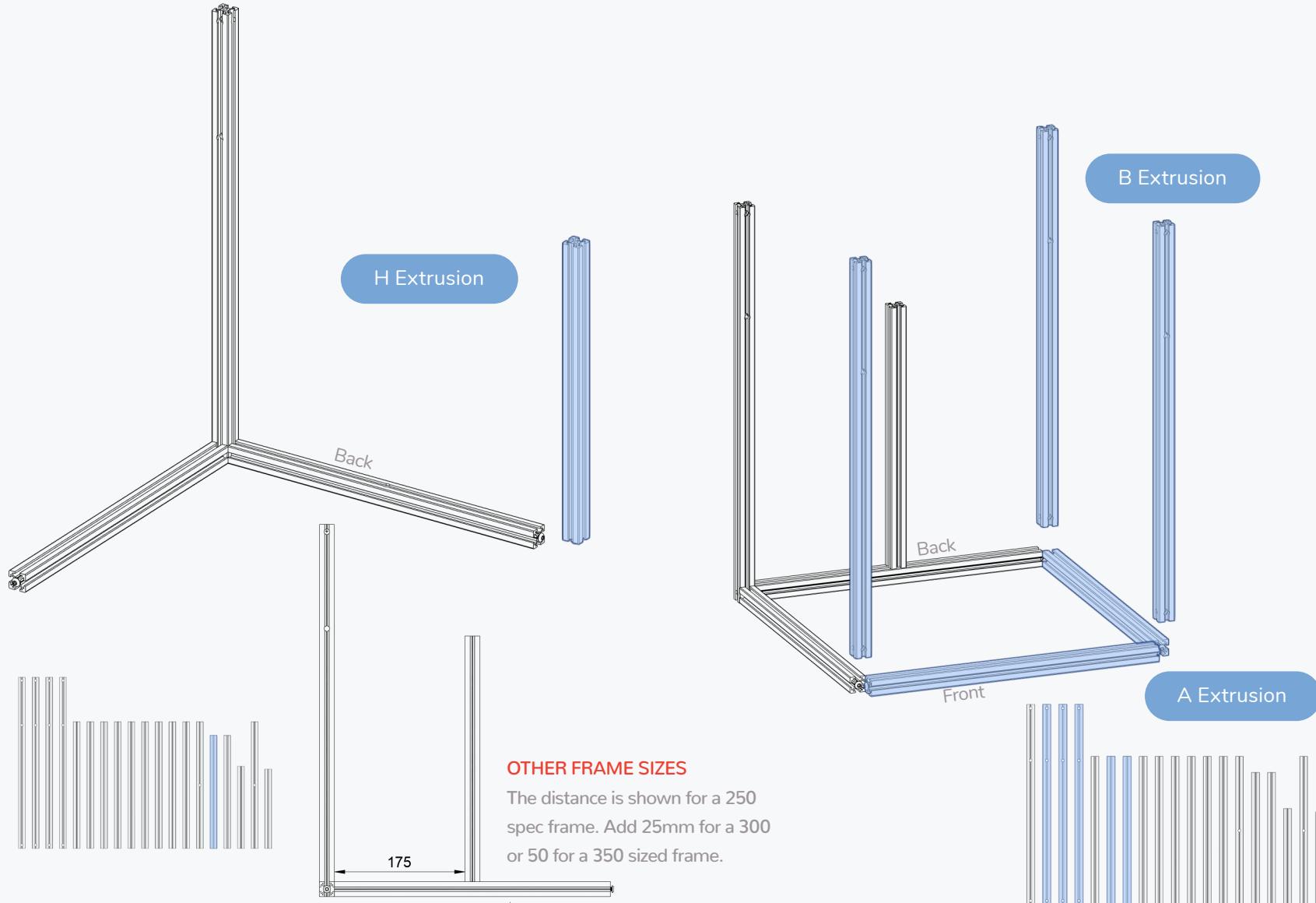


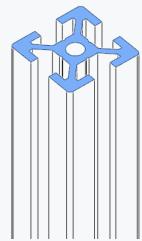






<https://voron.link/onjwmc>





E Extrusion

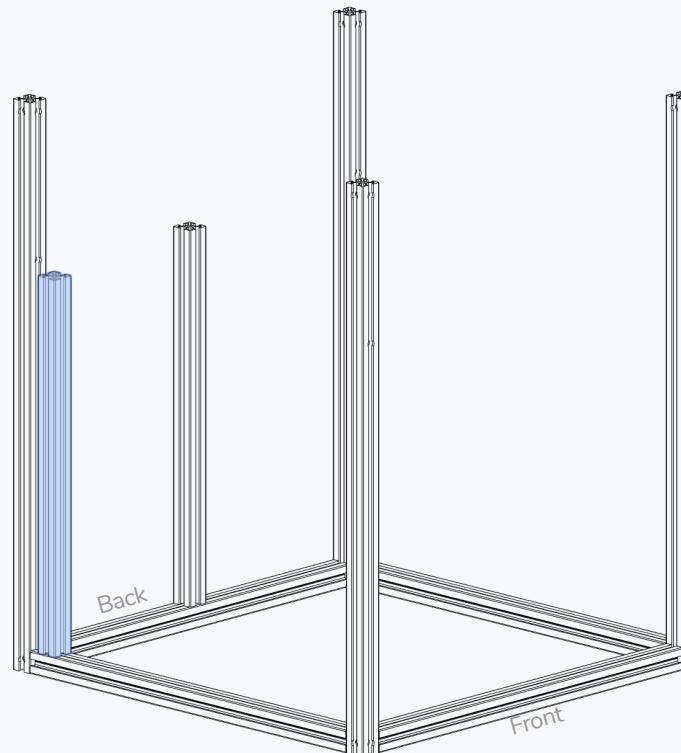


#### COVER IN TAPE

We'll be using an extrusion as a spacer.

Apply a single layer of tape to the ends to prevent scratches.

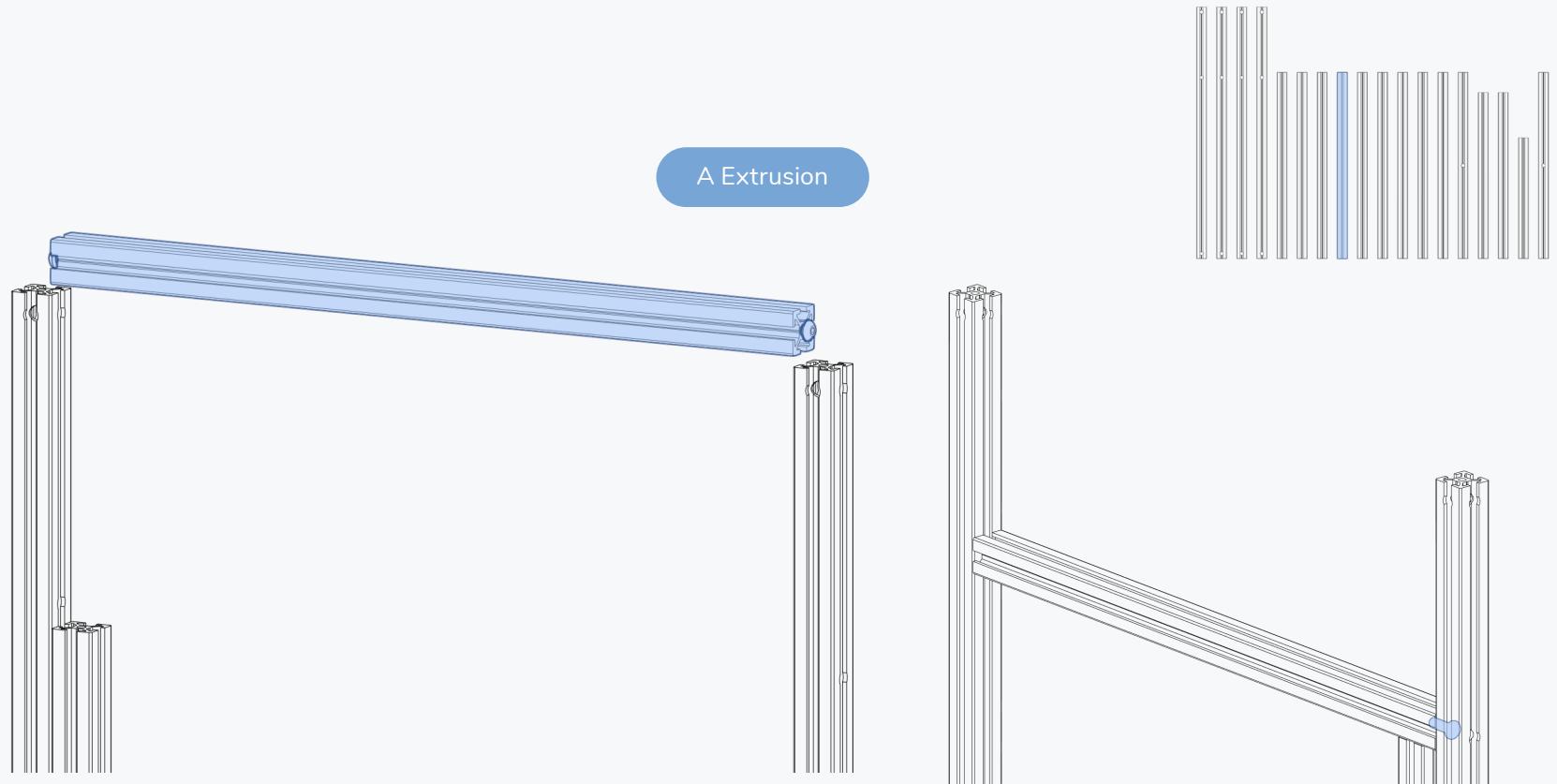
If you're not confident in the length and squareness of your extrusions print the included spacer instead.



#### FINDING THE RIGHT POSITION

If you are building a 250 size Trident use the 330mm E extrusion as a spacer to locate the Y extrusions.

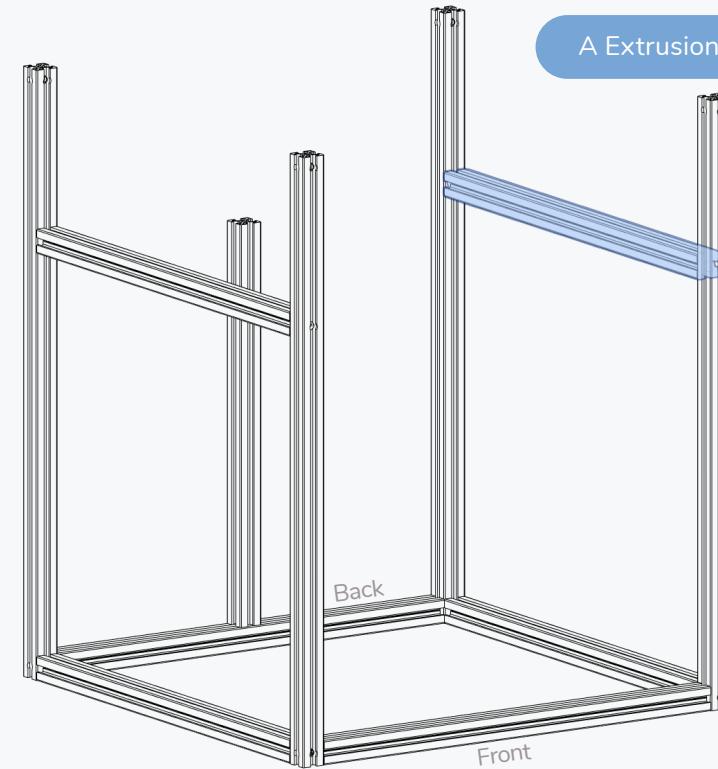
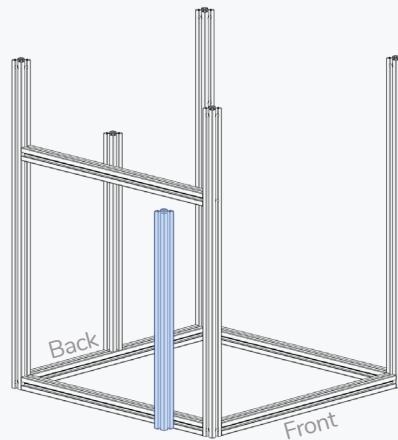
Alternatively you can print the spacer that is included in the released files.



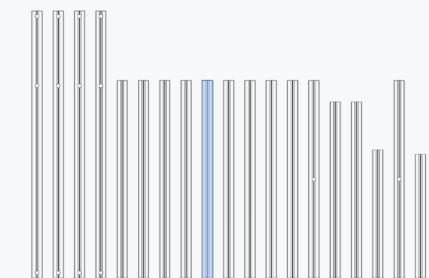
#### FINDING THE RIGHT POSITION

Using the 330mm extrusion as a spacer insert the Y rail and secure it using the access holes in the upright extrusions.

Make sure that the extrusions sit at an  $90^{\circ}$  angle and are free of any rotation/twist. The outsides of the extrusions should be flush.

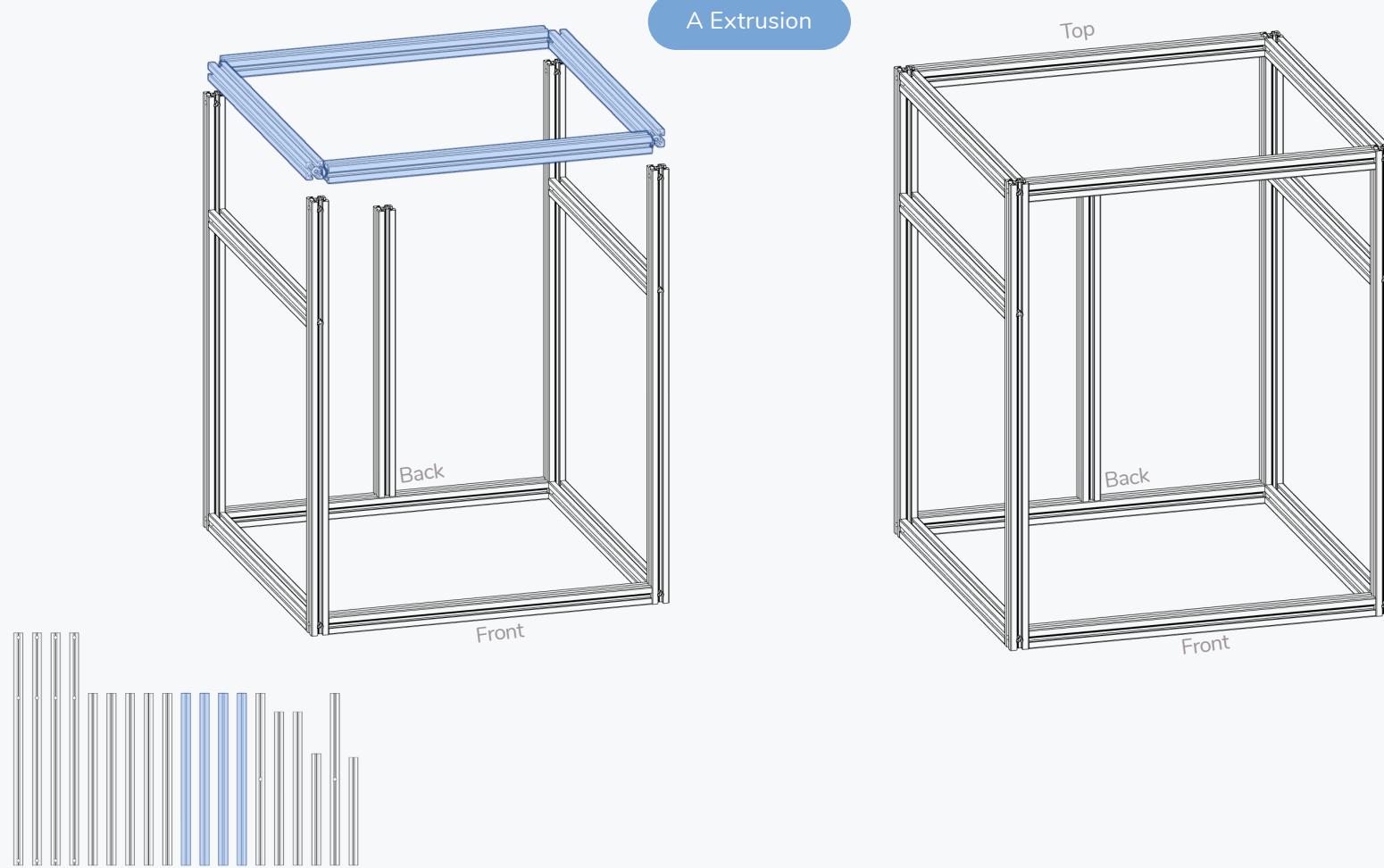
**RINSE AND REPEAT**

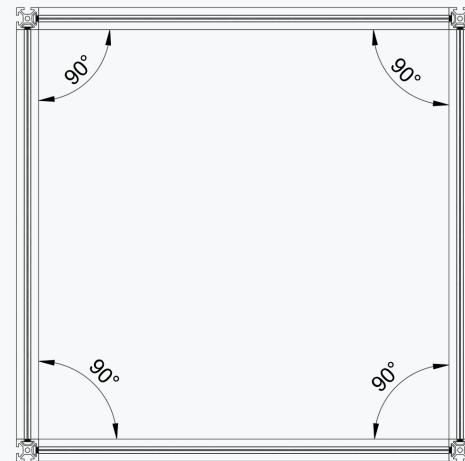
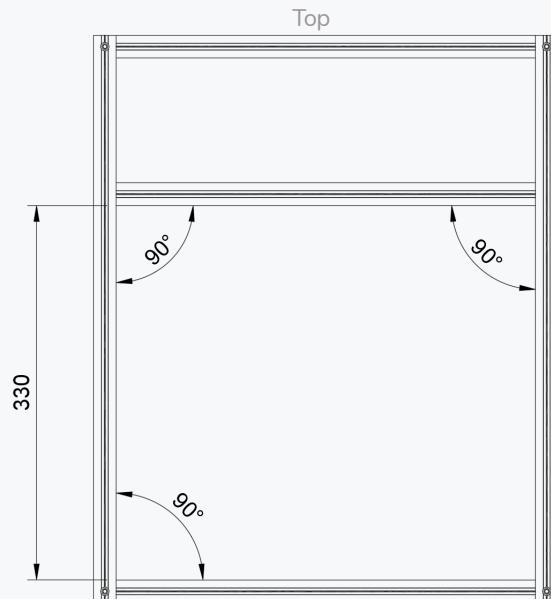
Remove the spacer and repeat the steps for the other Y extrusion.



FRAME

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#### CHECK FOR SQUARENESS

Verify the angle of all corners and the overall squareness by measuring the diagonals. Refer to the second half of the linked video for additional information.

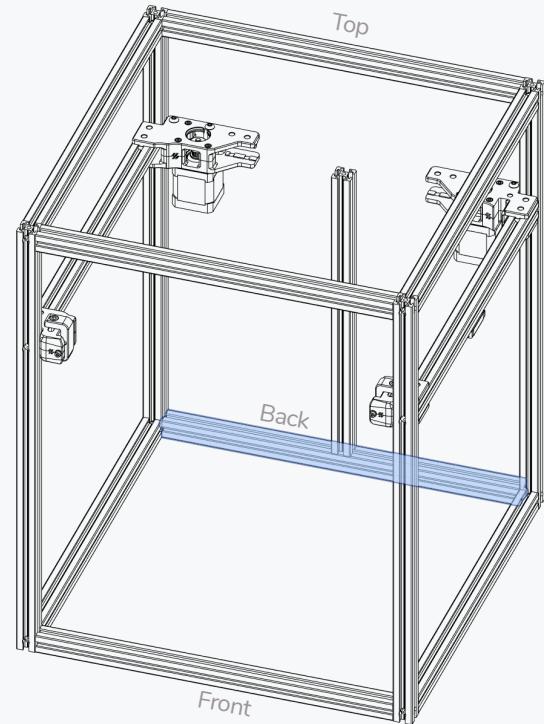


<https://voron.link/kdtpzam>

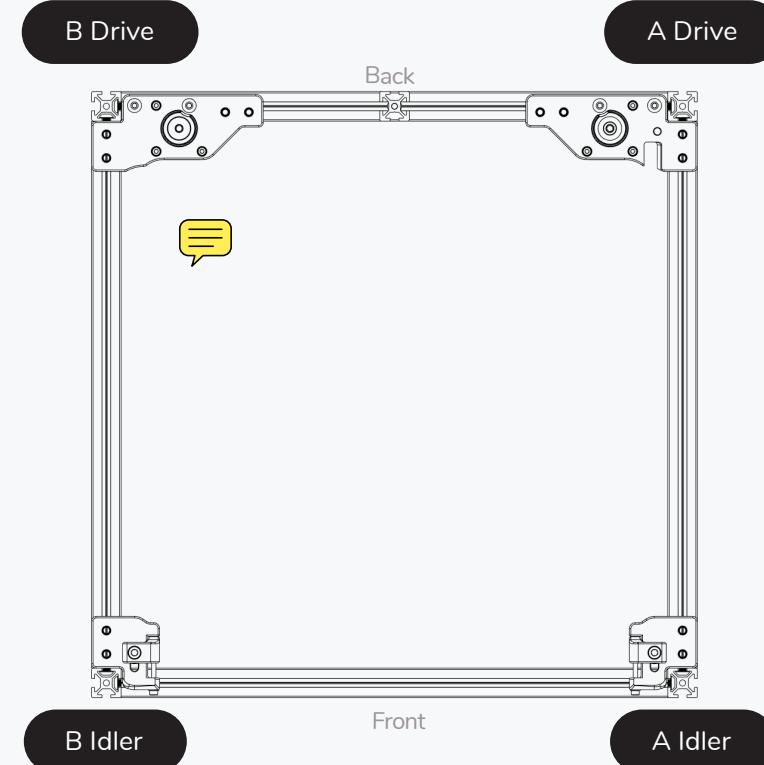
A/B DRIVE AND IDLER

[WWW.VORONDESIGN.COM](http://WWW.VORONDESIGN.COM)

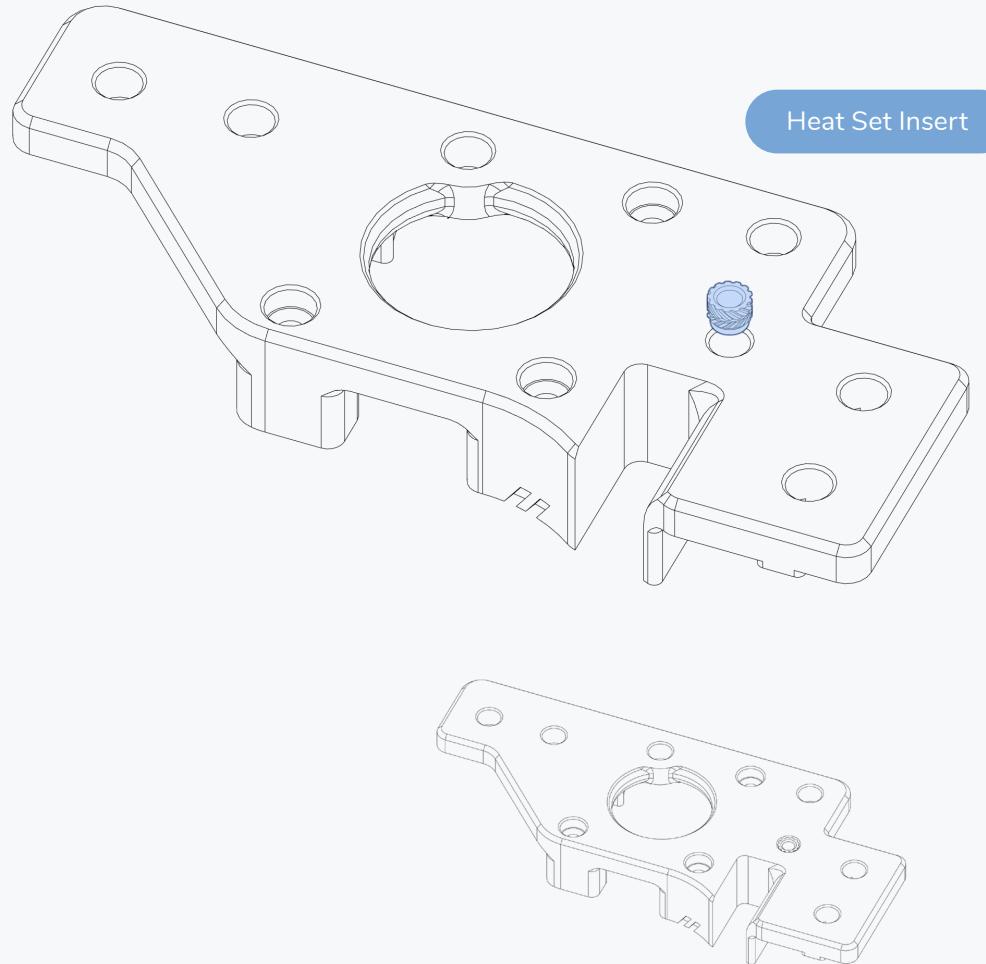


**WHY IS THIS HERE?**

As you likely skipped over the advice to flip through the entire manual we added graphics like these to assist you with the orientation of the part before you actually put them on the printer.

**OVERVIEW**

Individual chapters start with an overview of the components that will be built/added to the printer in the chapter.



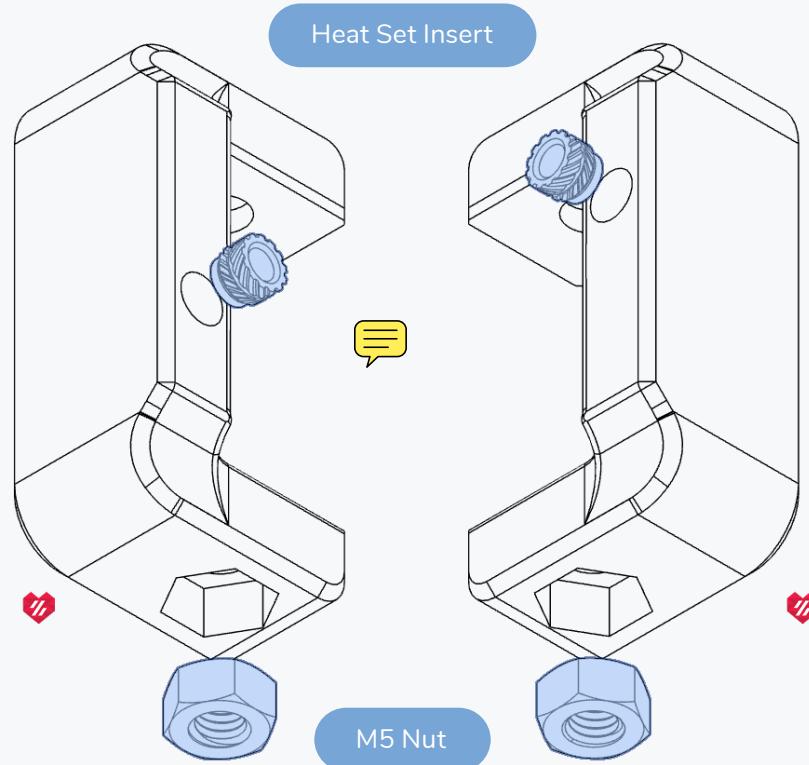
#### HEAT SET INSERTS

This design relies heavily on heat set inserts. Make sure you have the proper inserts (check the hardware reference for a close up picture and the BOM for dimensions).

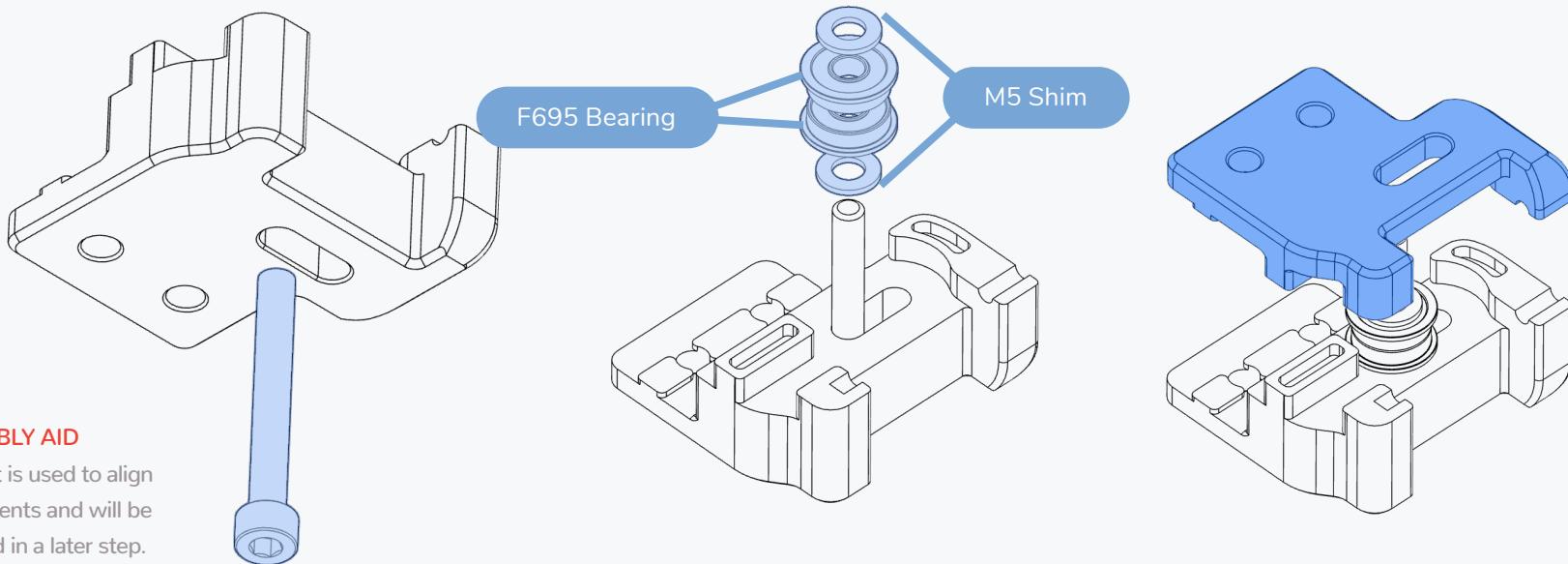
If you've never worked with heat set inserts before we recommend you watch the linked guide.



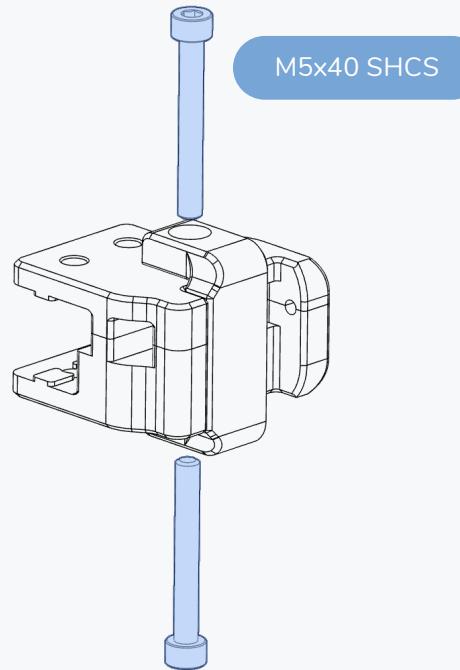
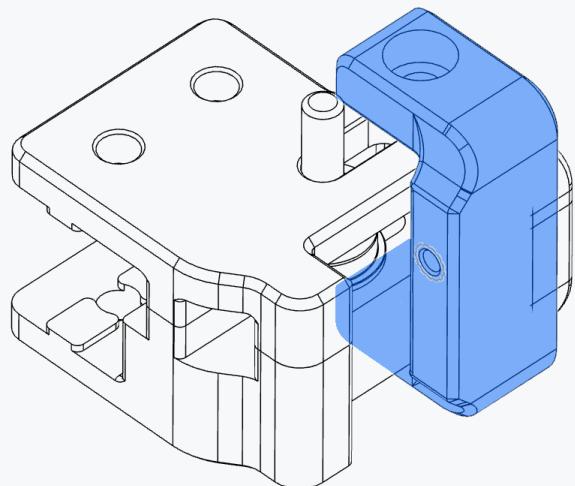
<https://voron.link/m5ybt4d>

**ACCENT PART?**

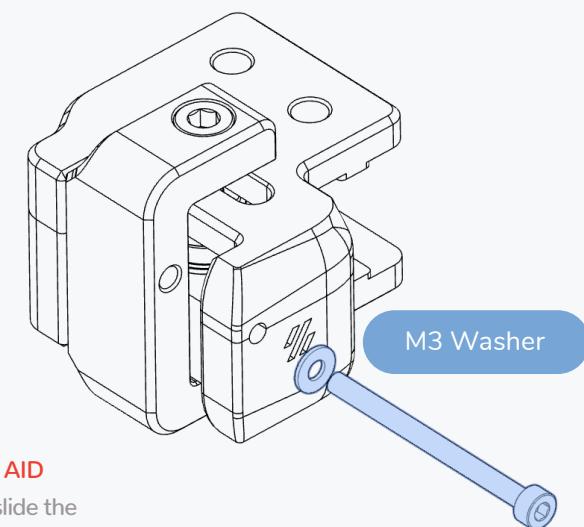
Look for Voron heart next to the part.  
It indicates that this is an accent part.

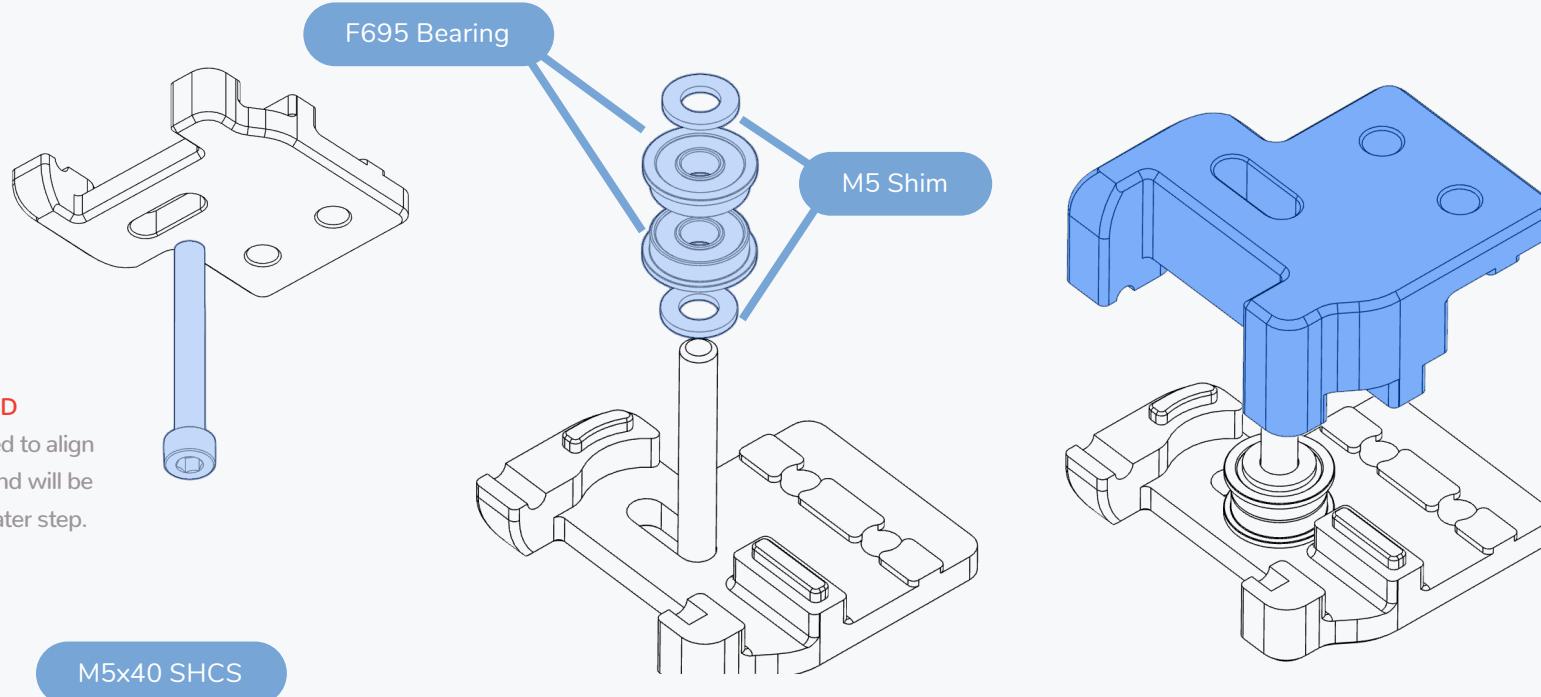


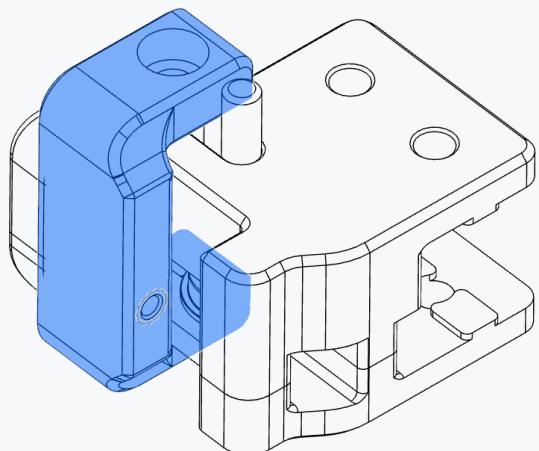
M5x40 SHCS

**REMOVE ASSEMBLY AID**

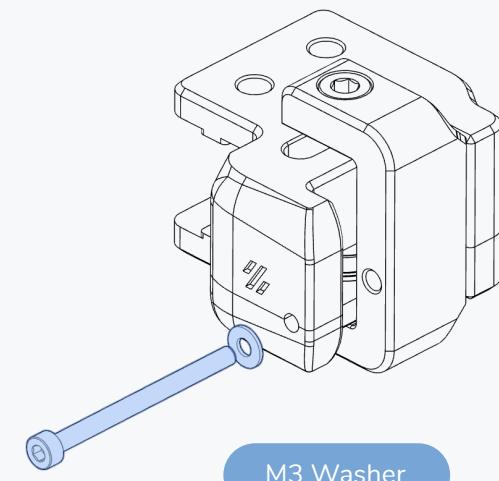
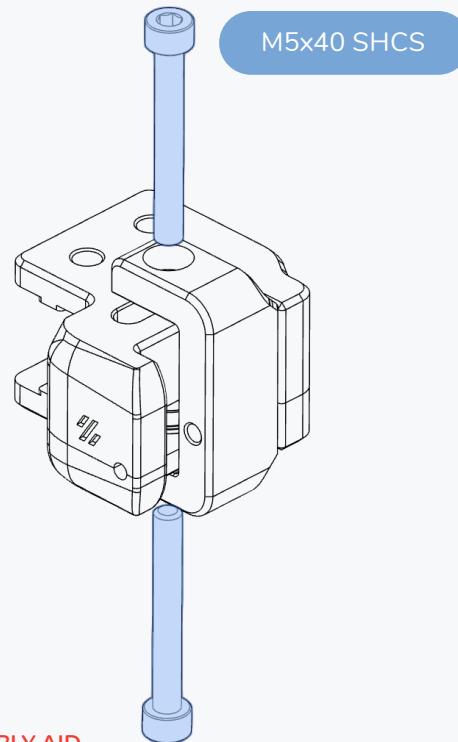
Remove the bolt and slide the tension arm into place.



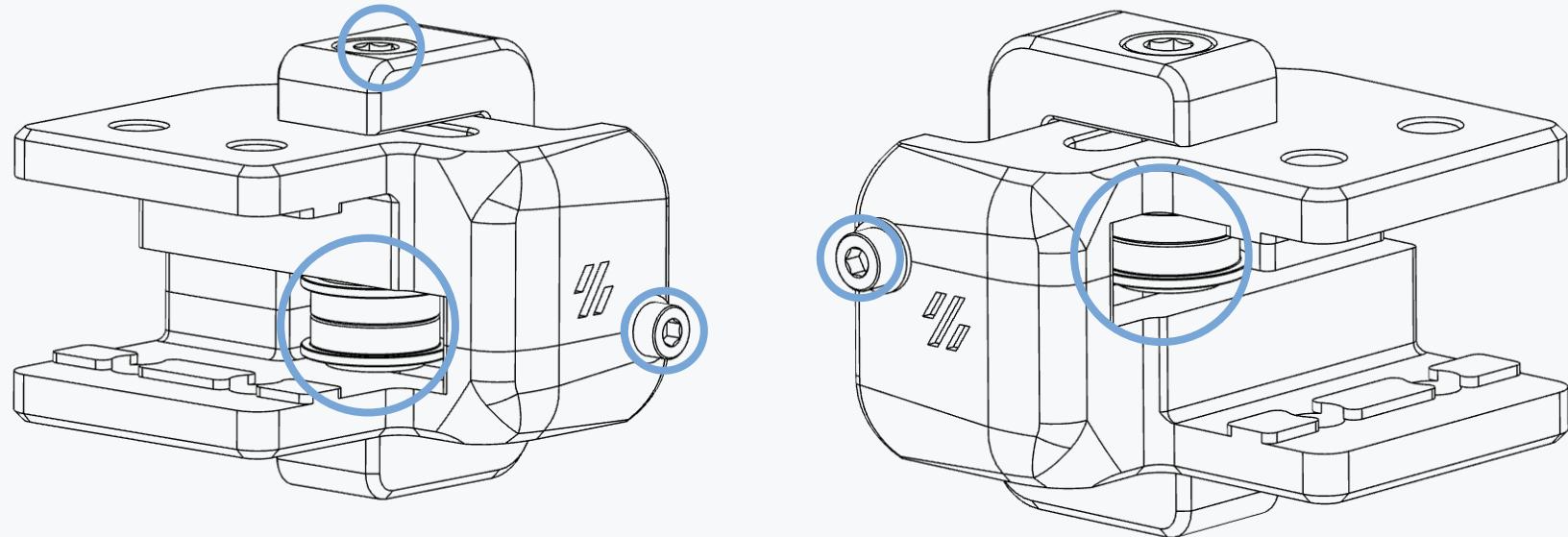


**REMOVE ASSEMBLY AID**

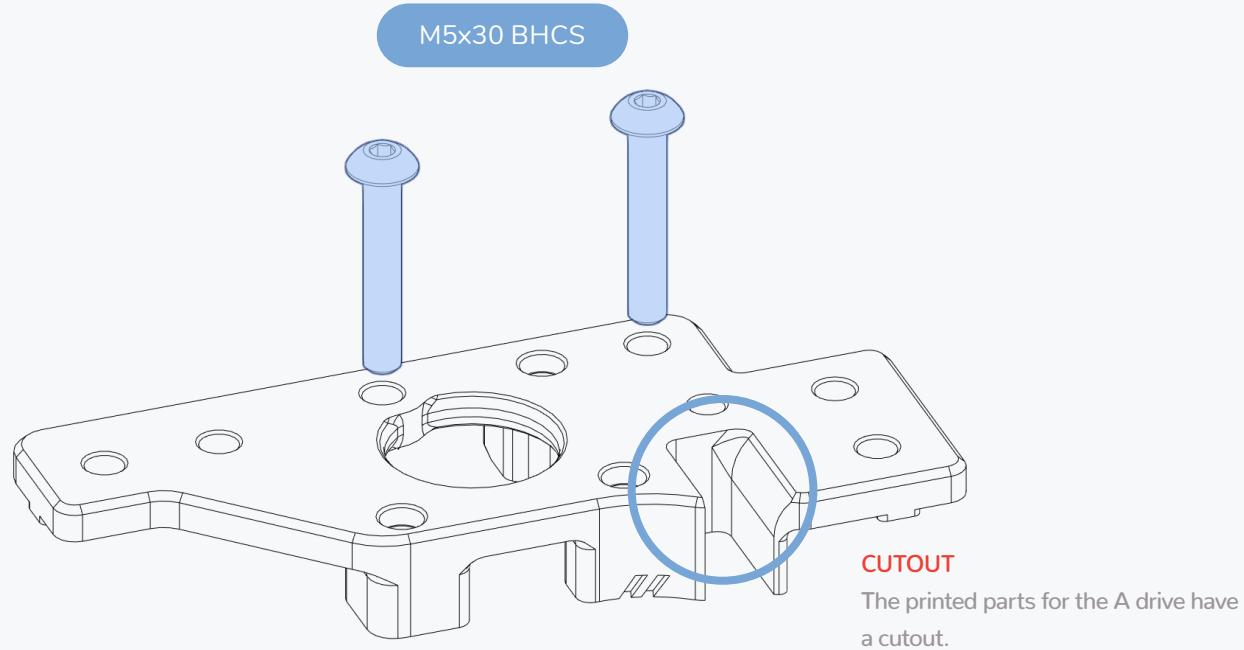
Remove the bolt and slide the tension arm into place.

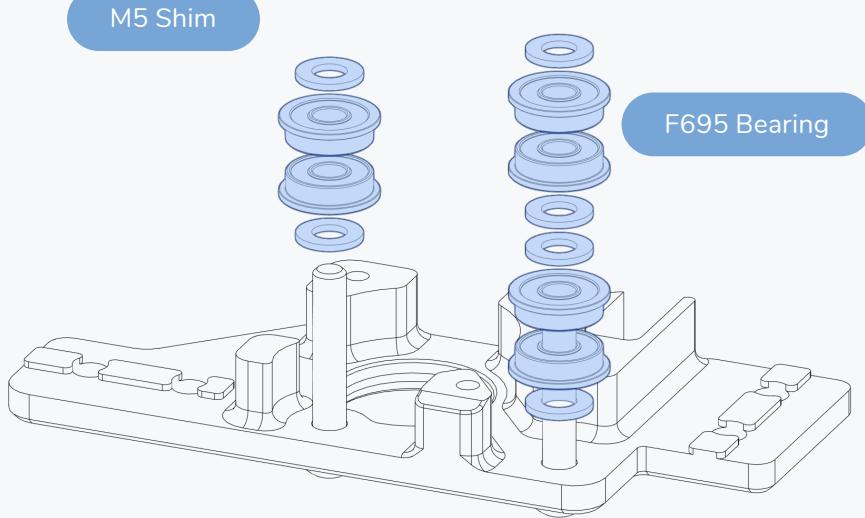


M3x40 SHCS

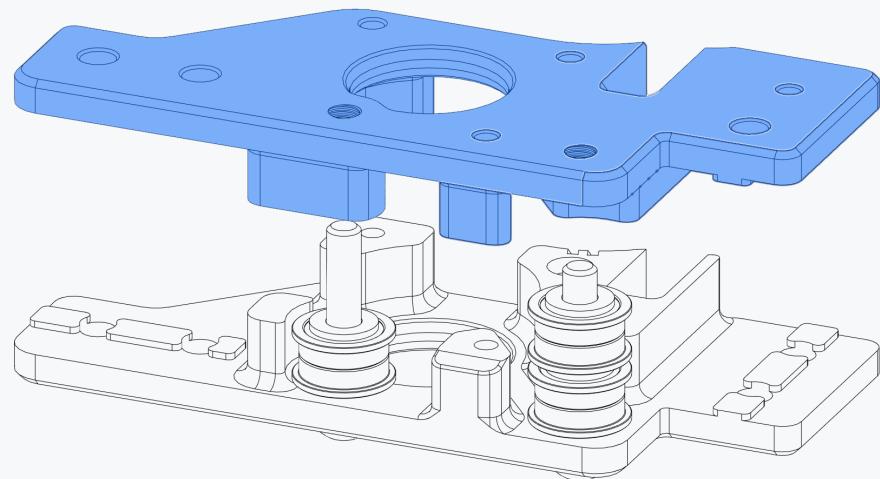
**CHECK YOUR WORK**

Compare your assembled parts  
to the graphics shown here. Pay  
attention to the features highlighted  
by the circles.

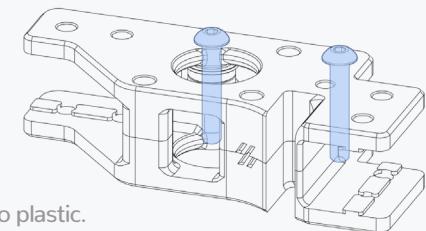


**UPSIDE DOWN ASSEMBLY**

For ease of assembly we recommend to assemble the A and B drives upside down.

**DON'T OVER TIGHTEN**

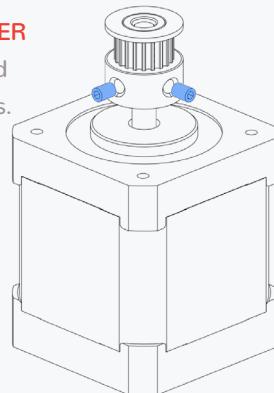
The M5 bolts are threaded directly into plastic.



## GT2 20 Tooth Pulley

## APPLY THREAD LOCKER

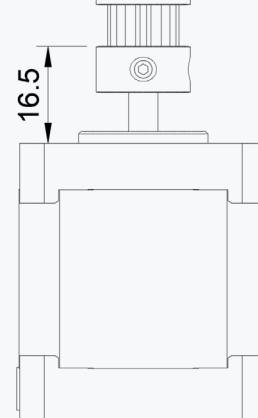
Make sure to use thread locker on the set screws.



## NEMA17 Stepper



<https://voron.link/fx10m8e>



## SET SCREW

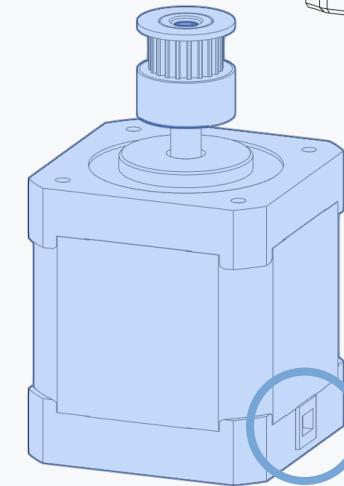
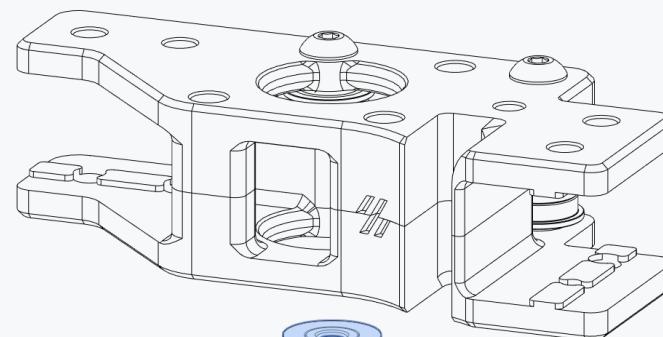
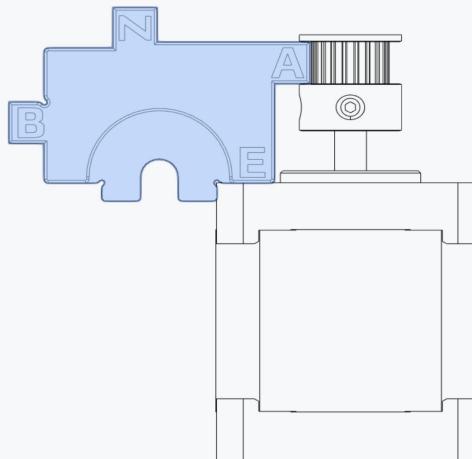
## AKA THE ROOT OF ALL ISSUES

Insert both set screws and use thread locker on all set screws.

Use a high quality hex driver to prevent the hex profile from stripping. Ball-end drivers are not recommended.

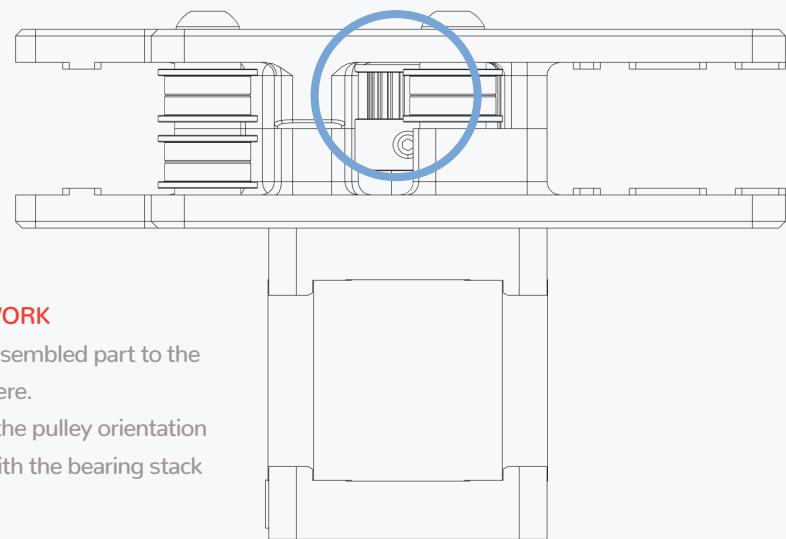
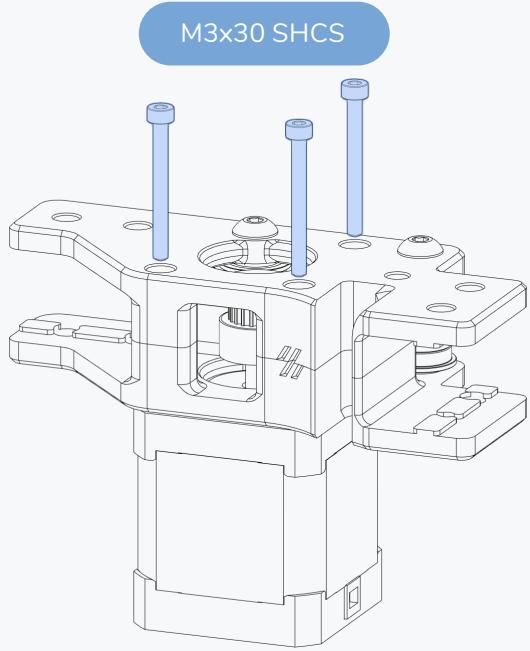
Loose set screws account for the majority of issues that our users report. Save yourself hours of troubleshooting and apply thread locker to all set screws during the build.

See the product's application notes for instructions - keep away from printed parts.

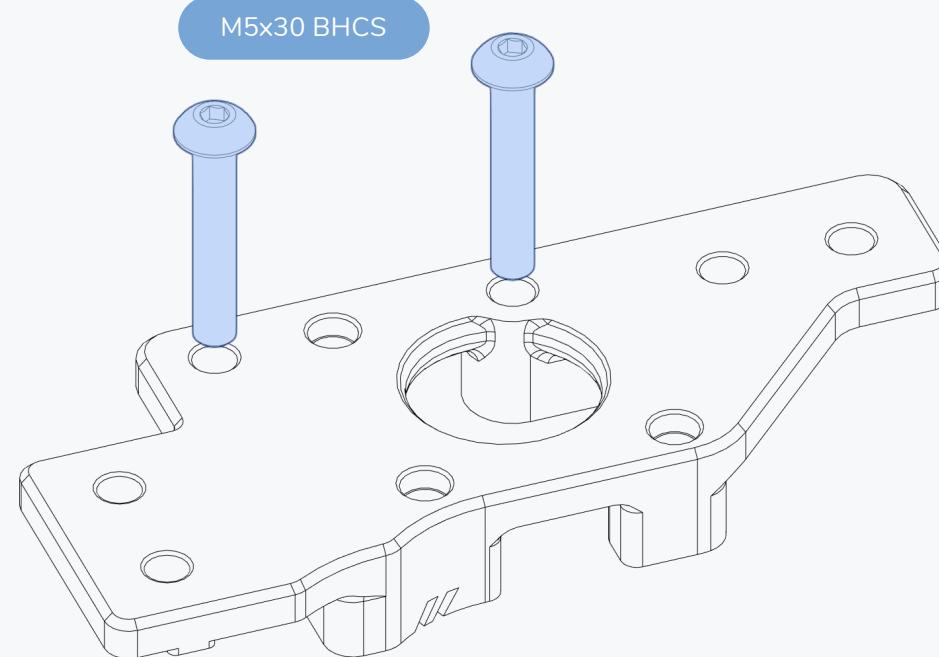


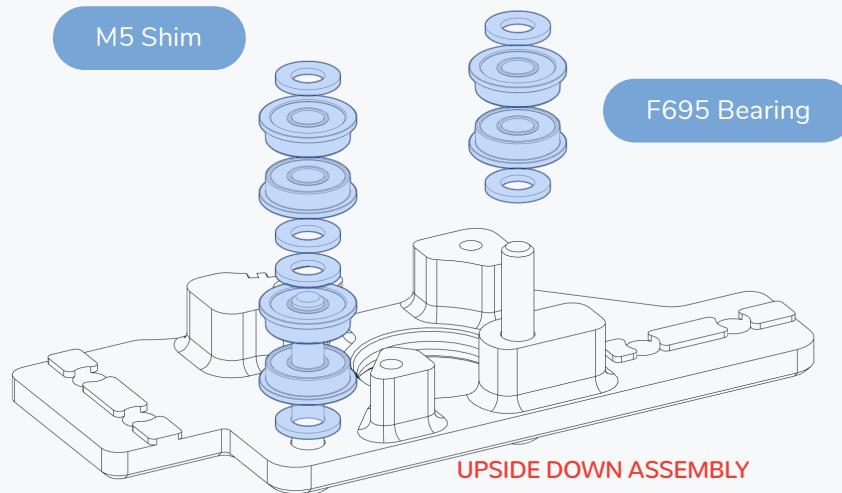
## MOTOR ORIENTATION

Pay attention to the orientation of the cable exit. The wires from the motors will be pointing away from each other once fully assembled.

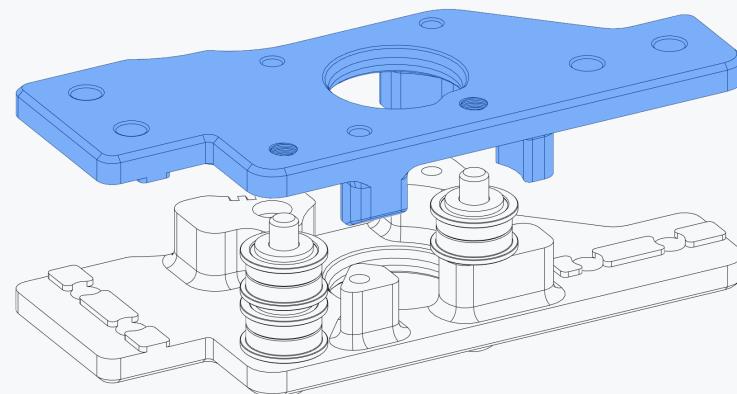
**CHECK YOUR WORK**

Compare your assembled part to the graphic shown here.  
Pay attention to the pulley orientation and alignment with the bearing stack ups.

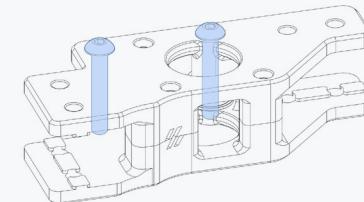


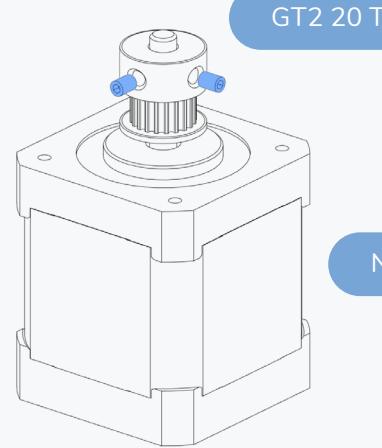
**UPSIDE DOWN ASSEMBLY**

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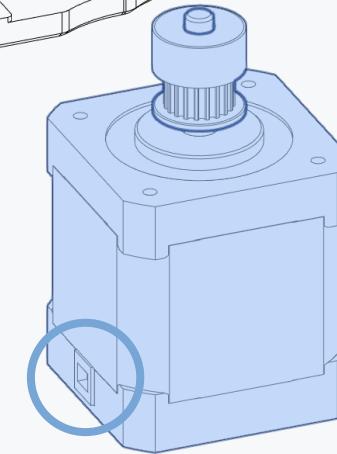
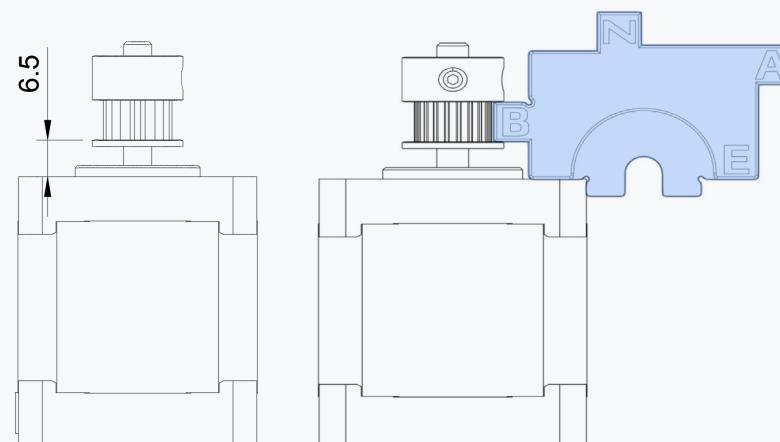
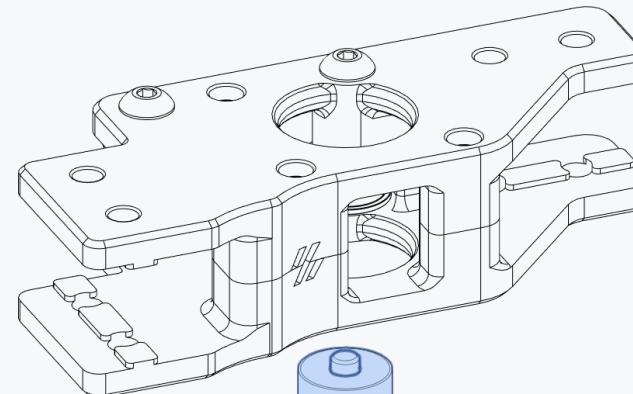
**DON'T OVER TIGHTEN**

The M5 bolts are threaded directly into plastic.

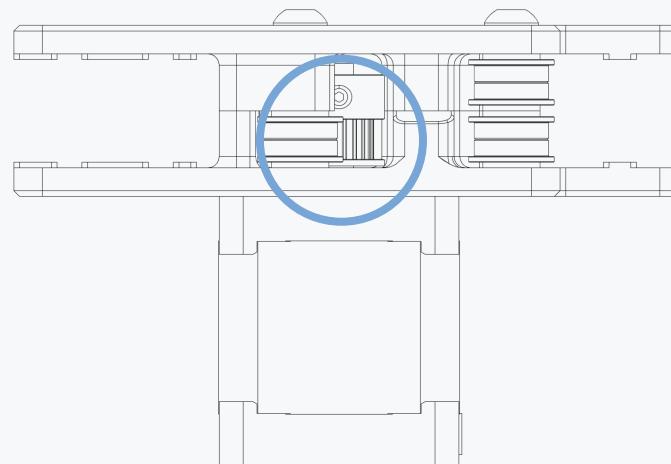
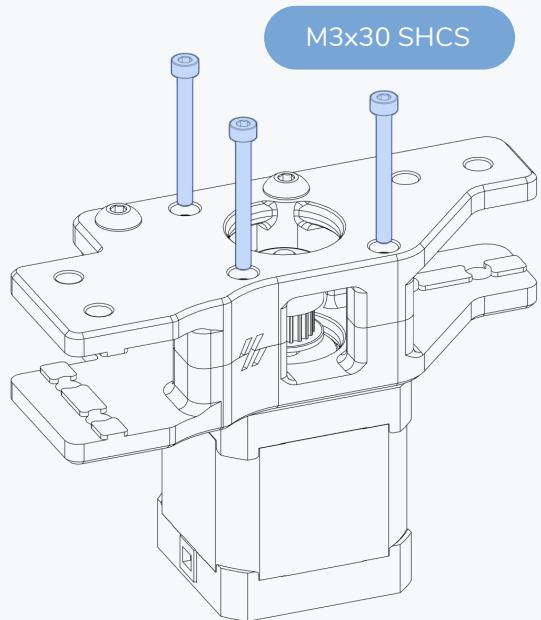




NEMA17 Stepper

**MOTOR ORIENTATION**

Pay attention to the orientation of the cable exit.



#### CHECK YOUR WORK

Compare your assembled part to the graphic shown here.

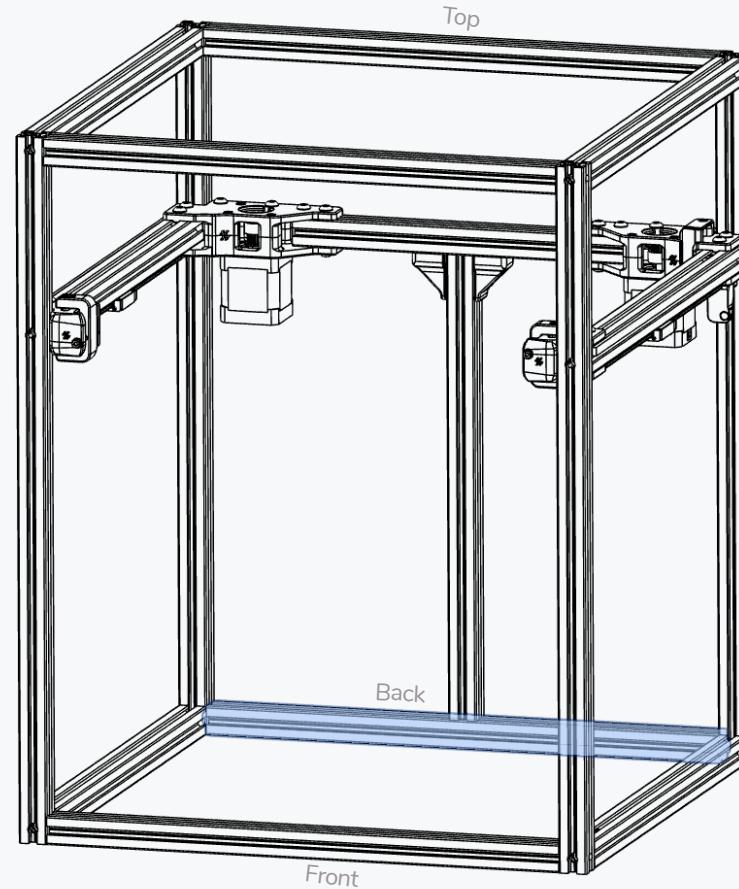
Pay attention to the pulley orientation and alignment with the bearing stacks.

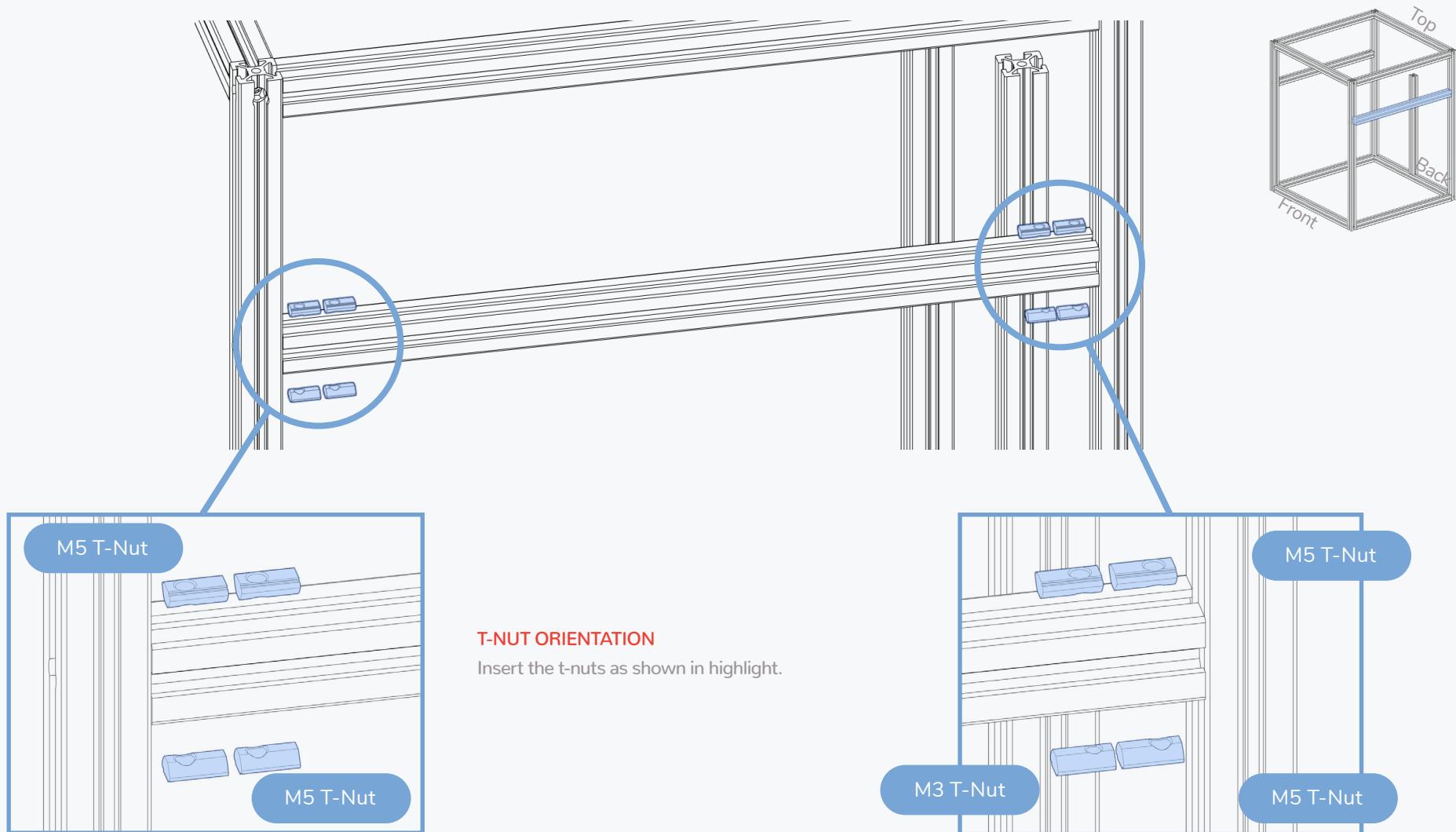
The first Voron printer was released to the public on March 10 2016.

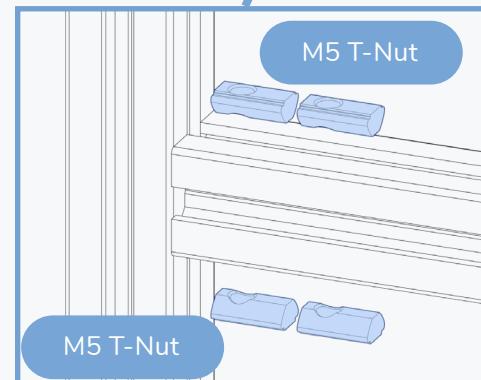
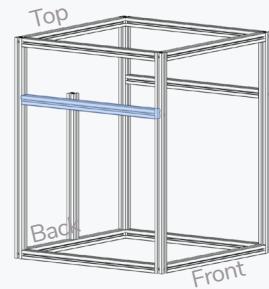
Y AXIS

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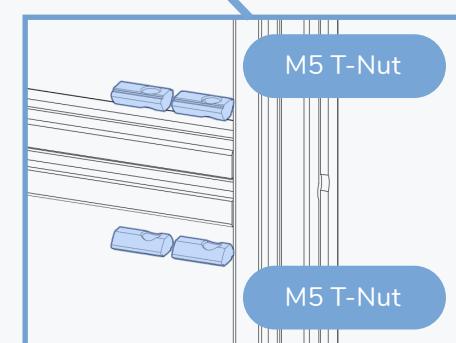
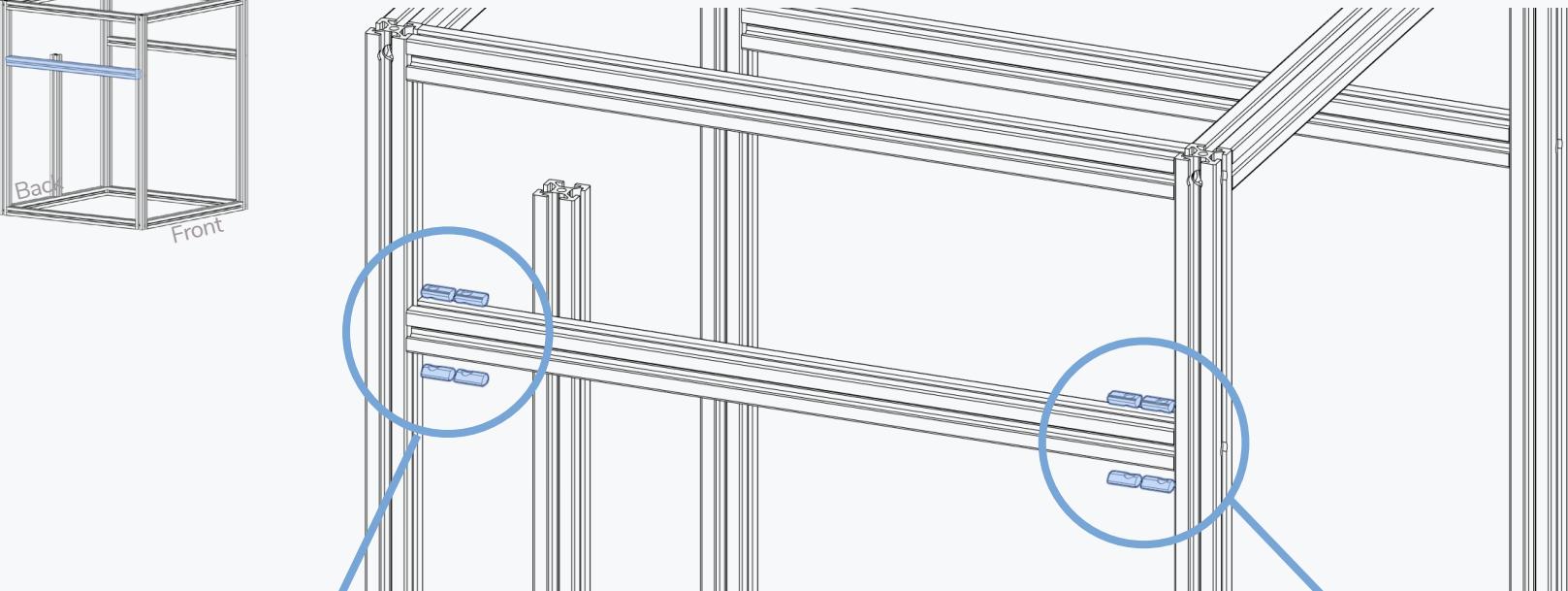








M5 T-Nut

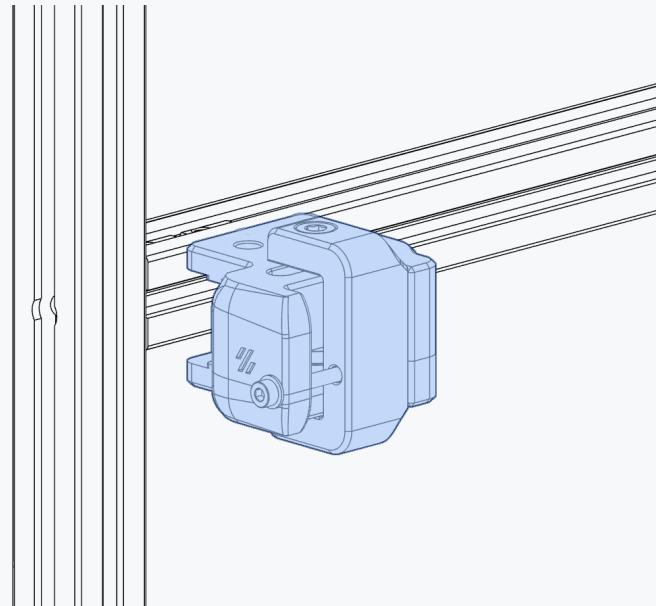


M5 T-Nut

M5 T-Nut

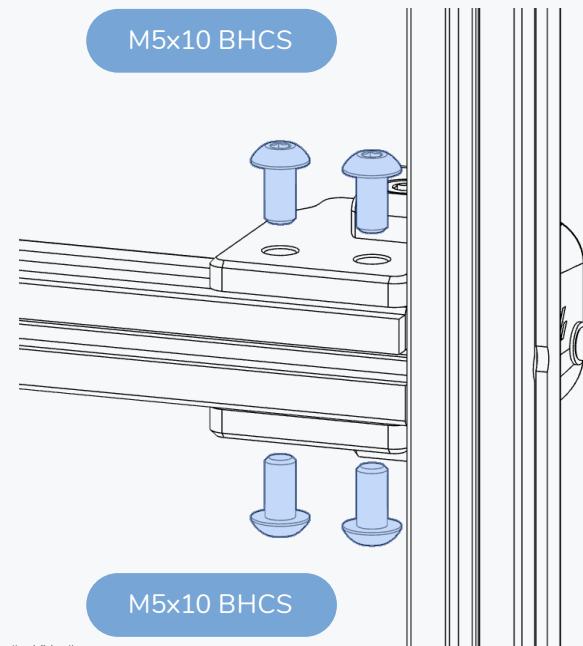
#### T-NUT ORIENTATION

Insert the t-nuts as shown in highlight.

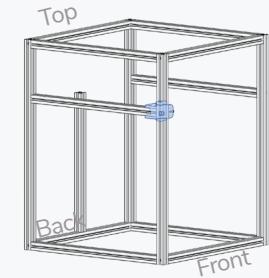
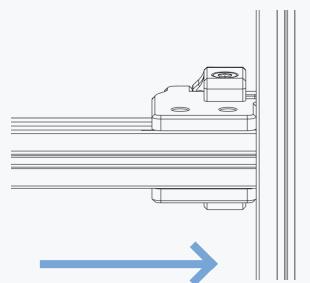
**SLIDE INTO PLACE**

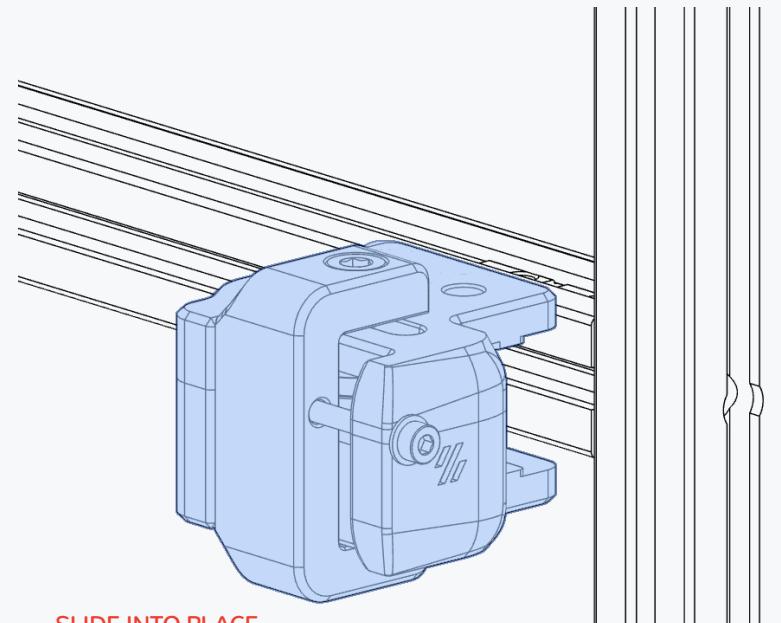
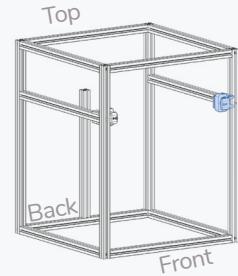
Slightly loosen the M5 bolt and slide into place.

M5x10 BHCS



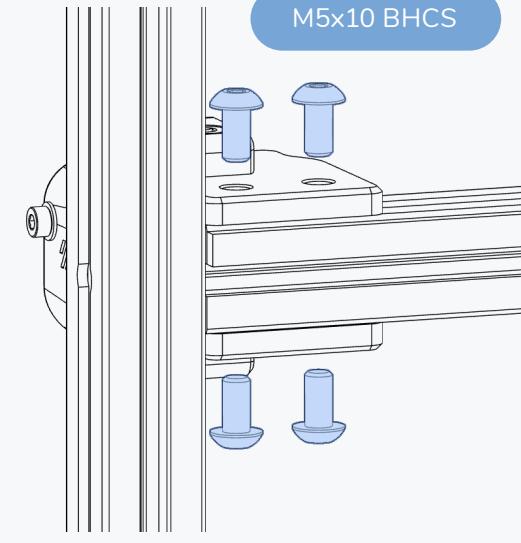
M5x10 BHCS



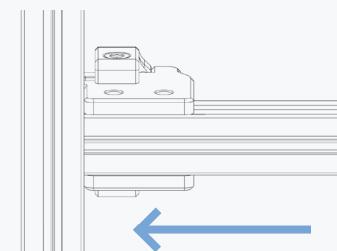


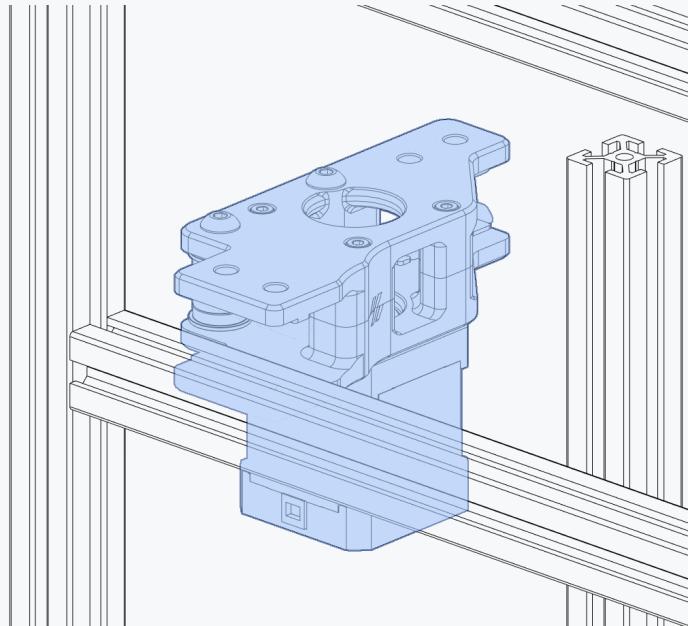
SLIDE INTO PLACE

Slightly loosen the M5 bolt and slide into place.

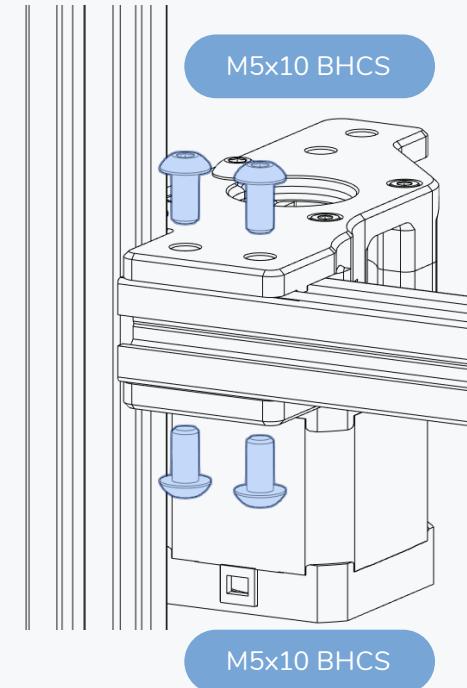
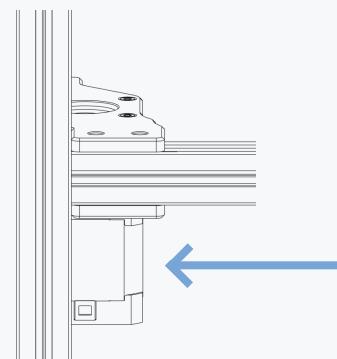


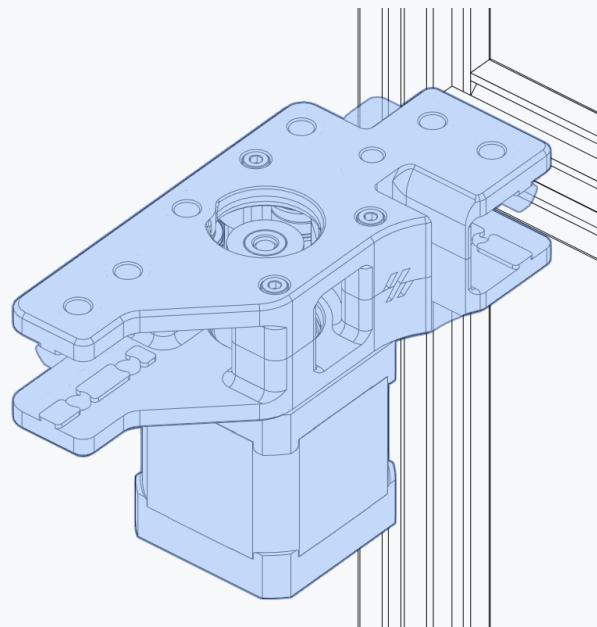
M5x10 BHCS



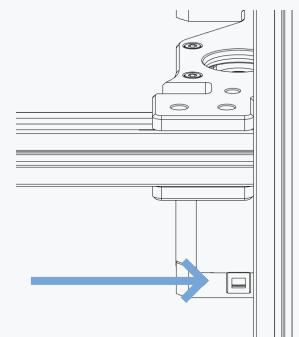
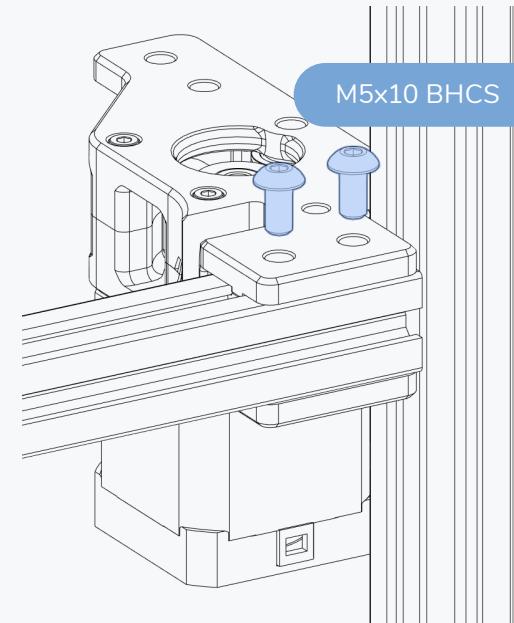
**SLIDE INTO PLACE**

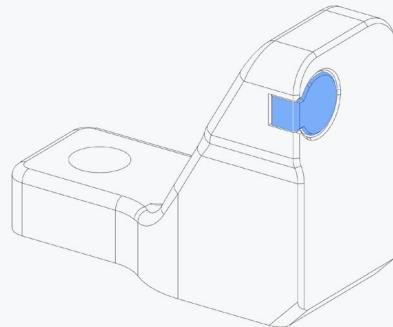
Loosen the bolts and slide into place.

**M5x10 BHCS****M5x10 BHCS**

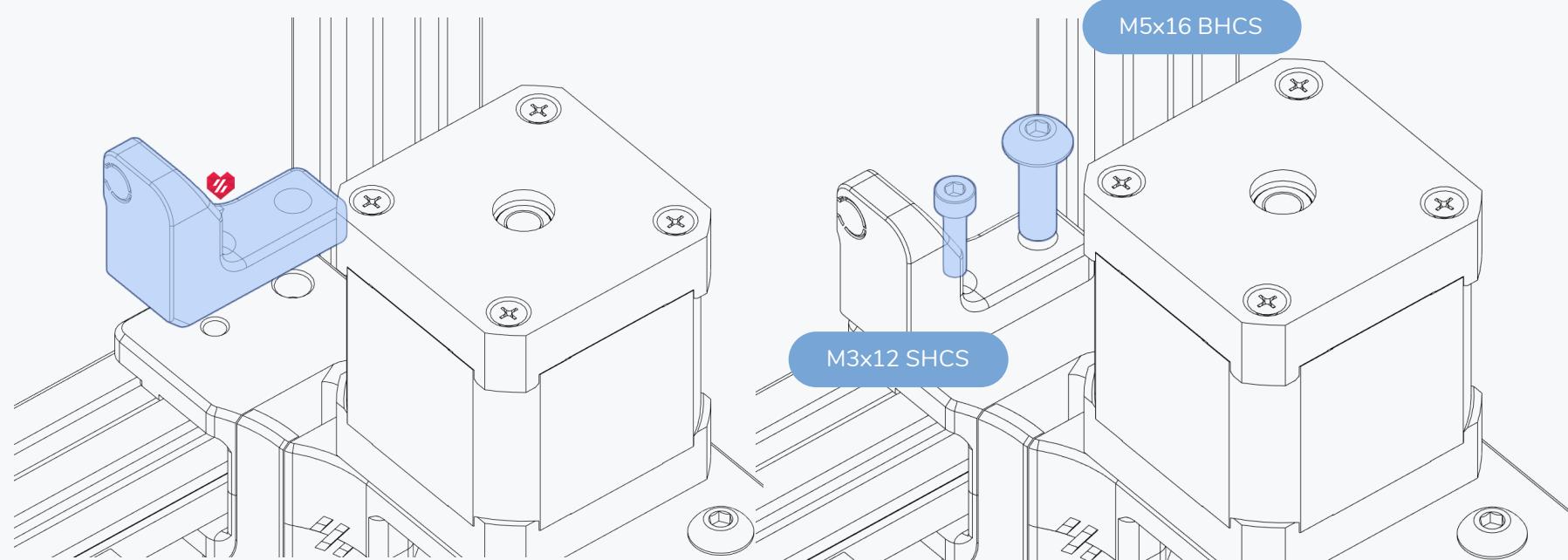
**SLIDE INTO PLACE**

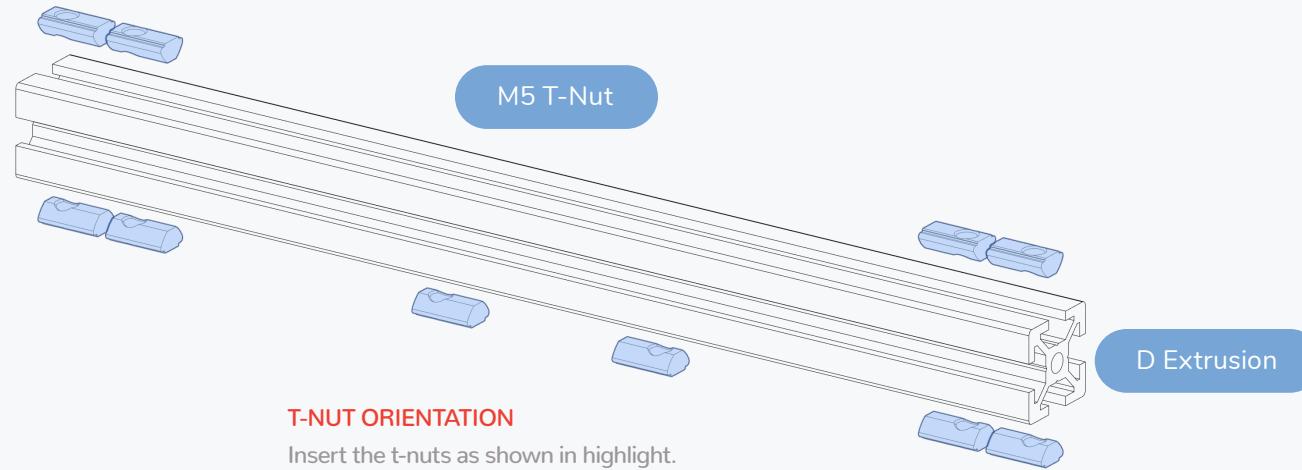
Loosen the bolts and slide into place.



**OPTION: HALL EFFECT ENDSTOP**

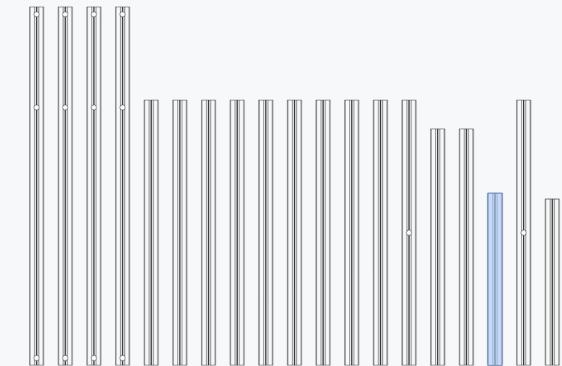
If you are using a Hall Effect Endstop board remove the highlighted part. Replace it with a magnet during initial calibration. See: <https://voron.link/hxd3cv0>

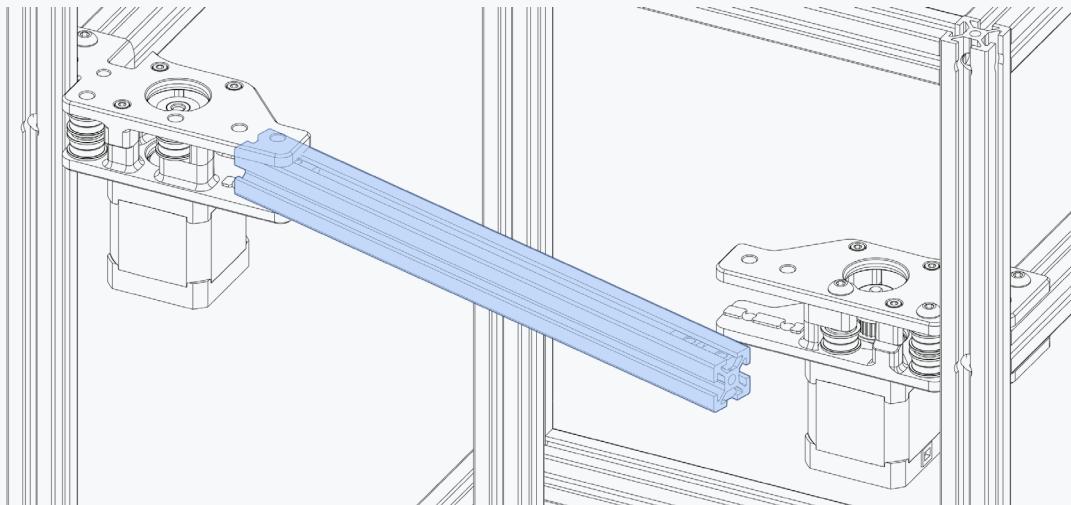




**T-NUT ORIENTATION**

Insert the t-nuts as shown in highlight.



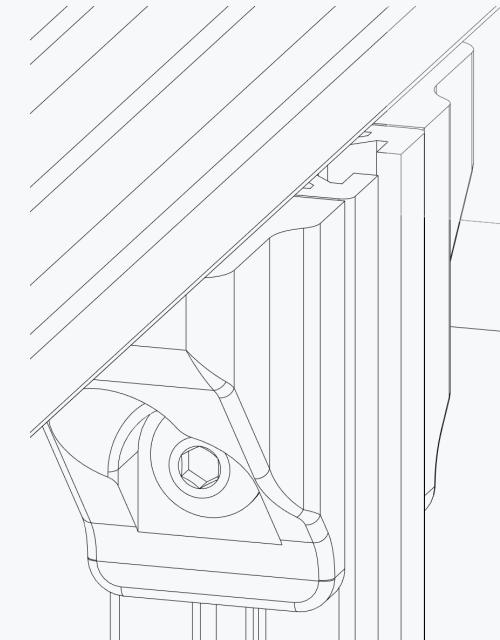
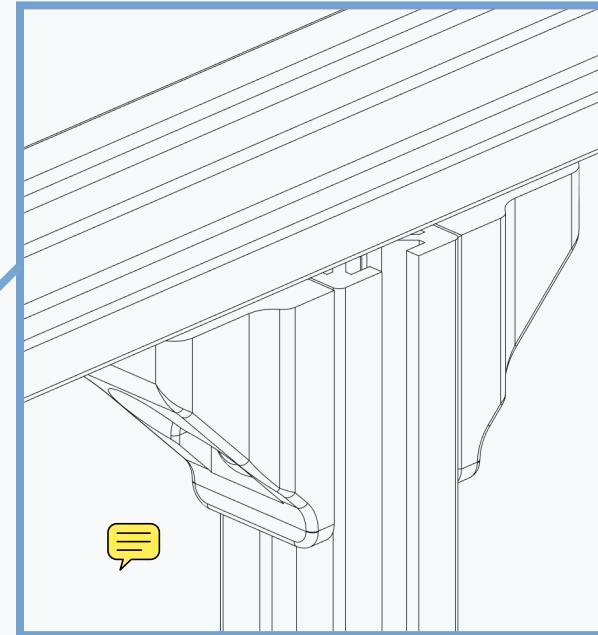
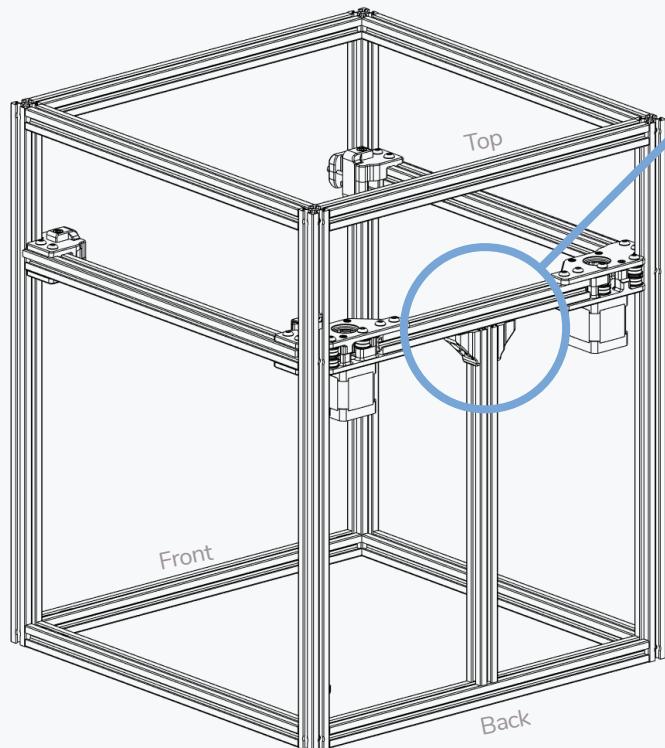
**SLIDE INTO PLACE**

The rear crossbar can be slid into place. You may need to loosen the M5 bolts.



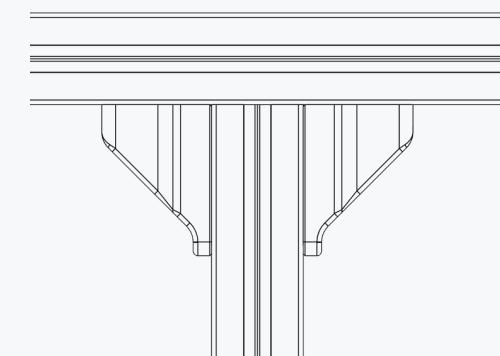
## REAR BRACE

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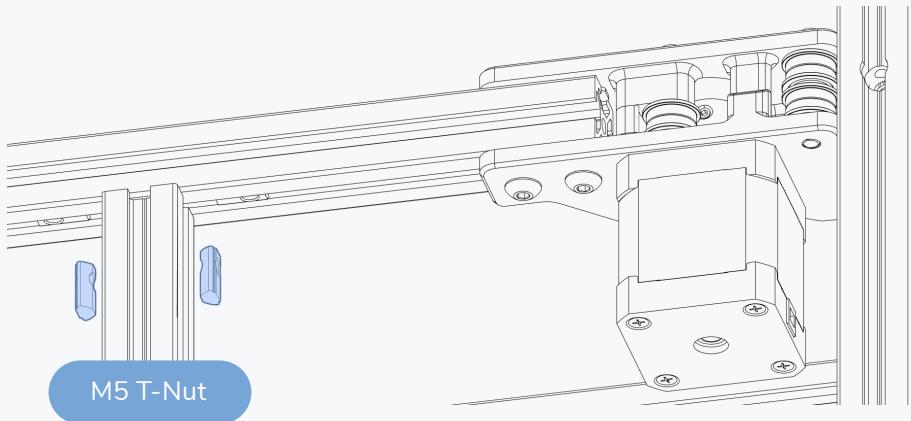
### OFFSET EXTRUSION

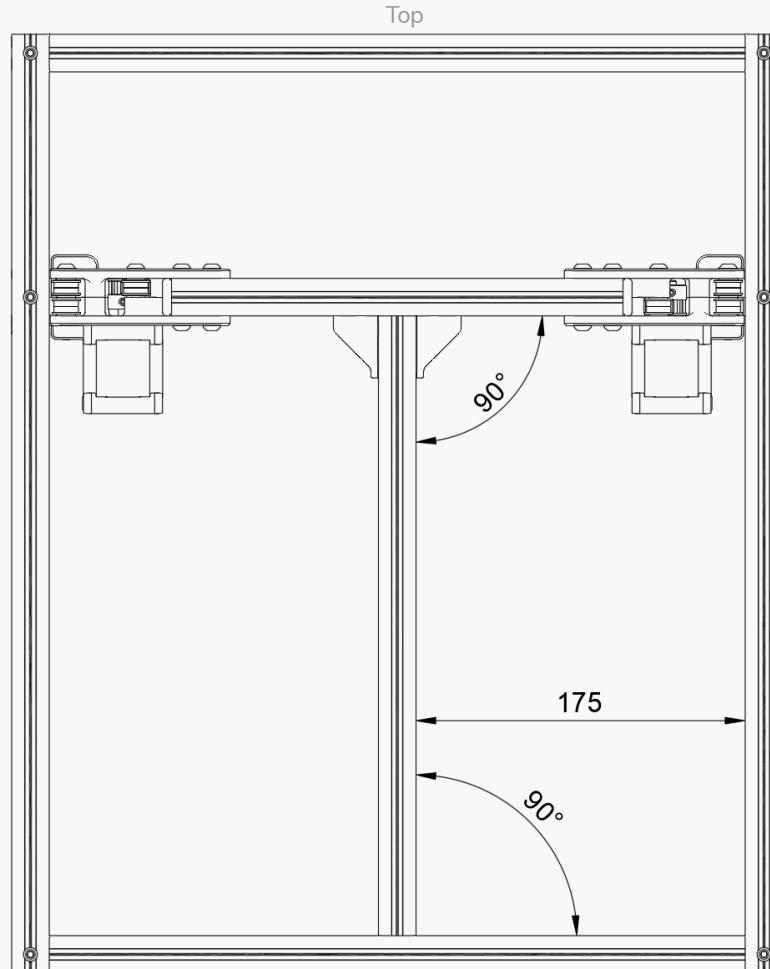
The extrusion between the A and B drives is offset inwards. The upright extrusion extends past it towards the back of the printer.



## REAR BRACE

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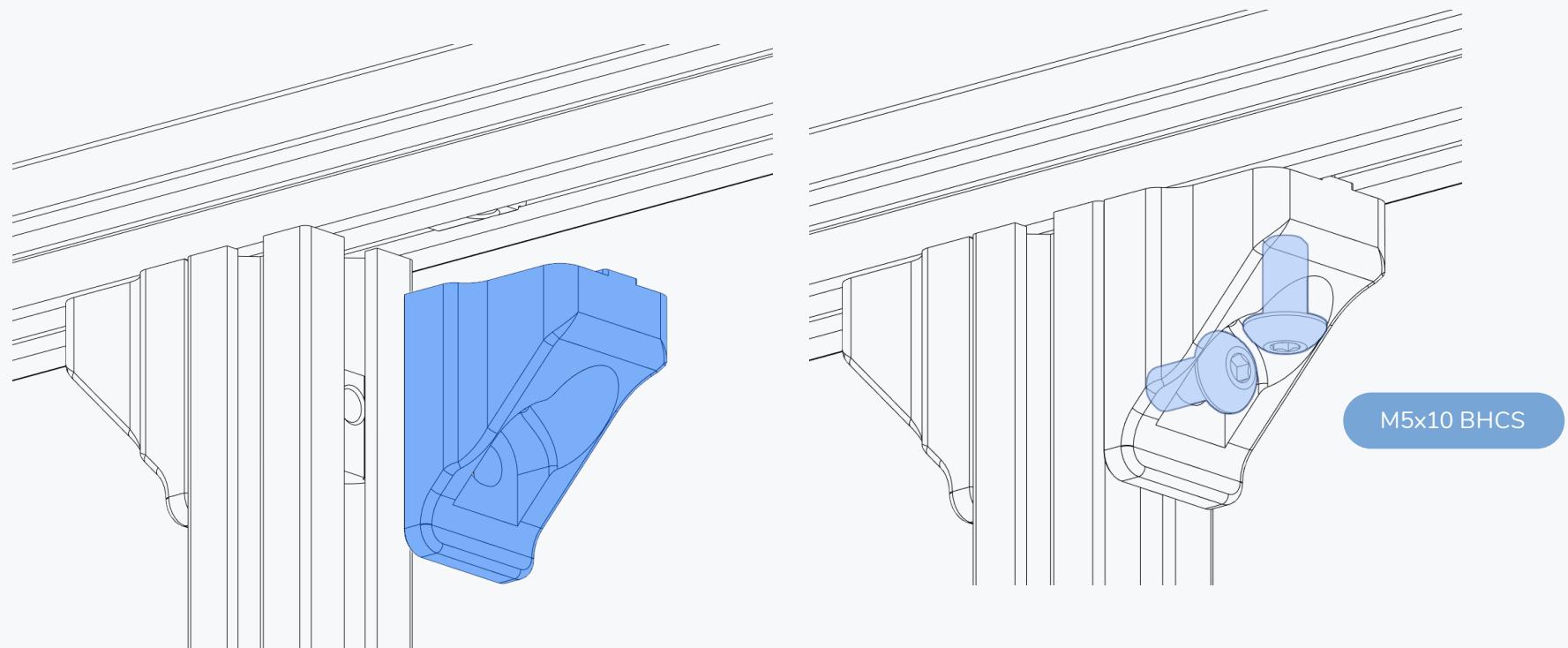
#### ADJUST POSITIONING

Adjust the position of the rear extrusion to match the dimensions shown on the right.

Ensure that the rear is parallel with the frame uprights.

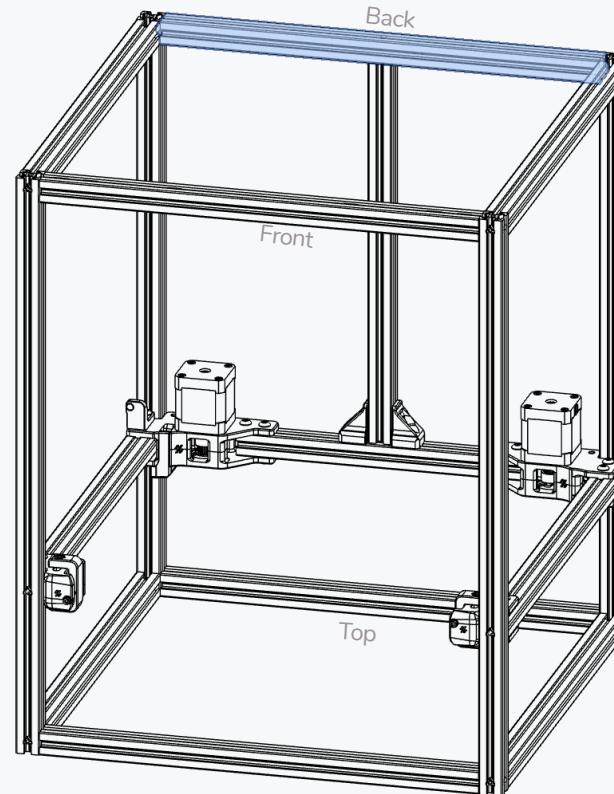
#### OTHER FRAME SIZES

The distance is shown for a 250 spec frame. Add 25mm for a 300 or 50 for a 350 sized frame.



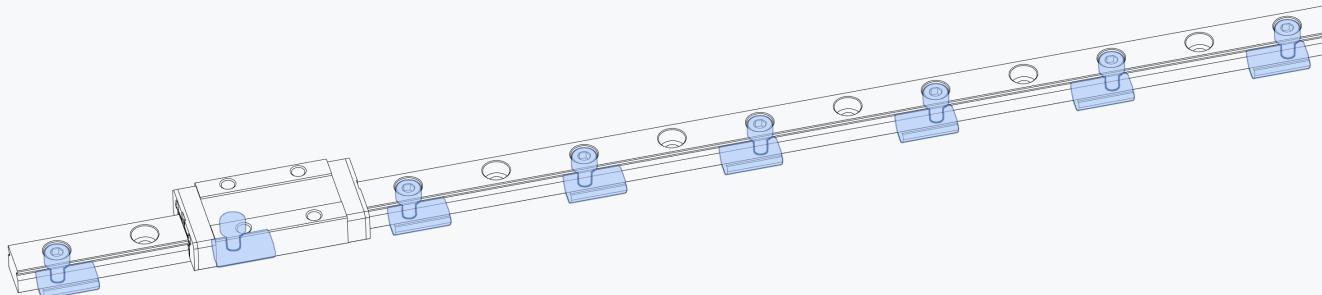
**UPSIDE DOWN ASSEMBLY**

For ease of assembly we recommend to flip the printer on its head for the next steps.



**HANDLE WITH CARE**

The carriage can slide off the rail if not handled properly. Dropping the carriage will likely damage it. Any marks, dents or nicks might cause the linear rail to misbehave in operation.

**LINEAR RAILS - PREPARATION AND MOUNTING**

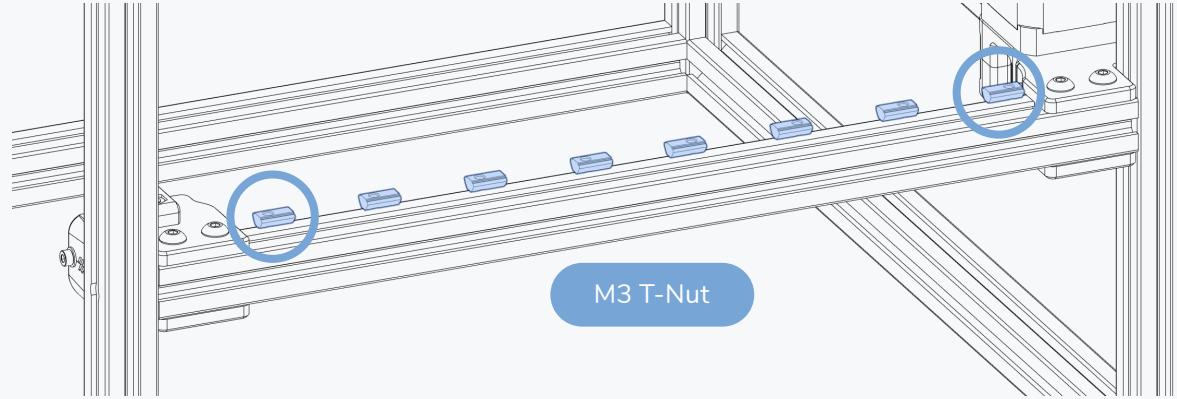
Most linear rails arrive with shipping oil. To ensure a smooth gliding motion and long service life, this oil needs to be removed and its rail carriage greased. See the Voron sourcing guide for a recommended list of lubricants. We attached a link to a video guide to get you started.

We opted to skip every other mounting hole in the linear rail when designing the mounting pattern for this printer. This cuts down on mounting hardware and still meets the requirements for our use case.

When tightening the bolts tighten them from the center outward to ensure that the rail sits flush on the extrusion.

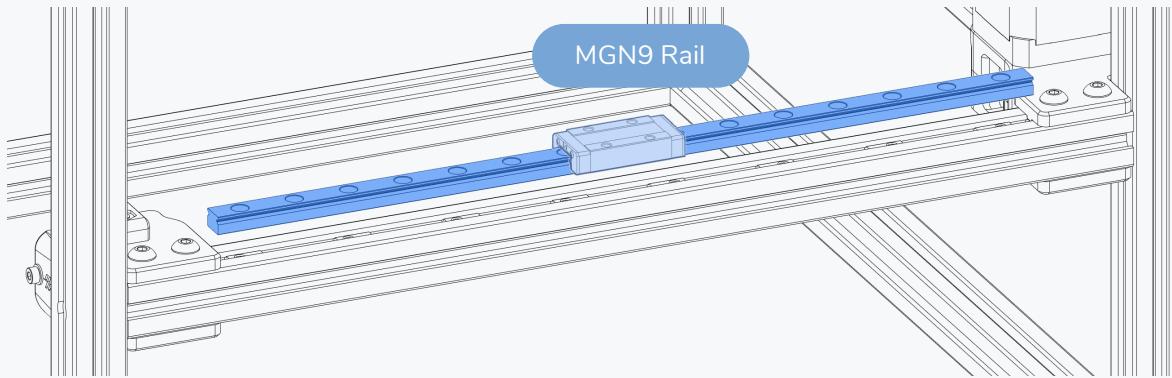


<https://voron.link/aguOnes>



#### T-NUT ORIENTATION

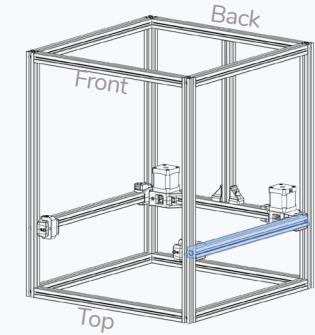
Insert the t-nuts as shown in highlight.  
Every other hole in the rail will be left empty.

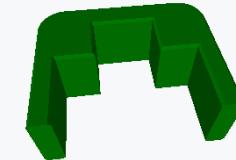
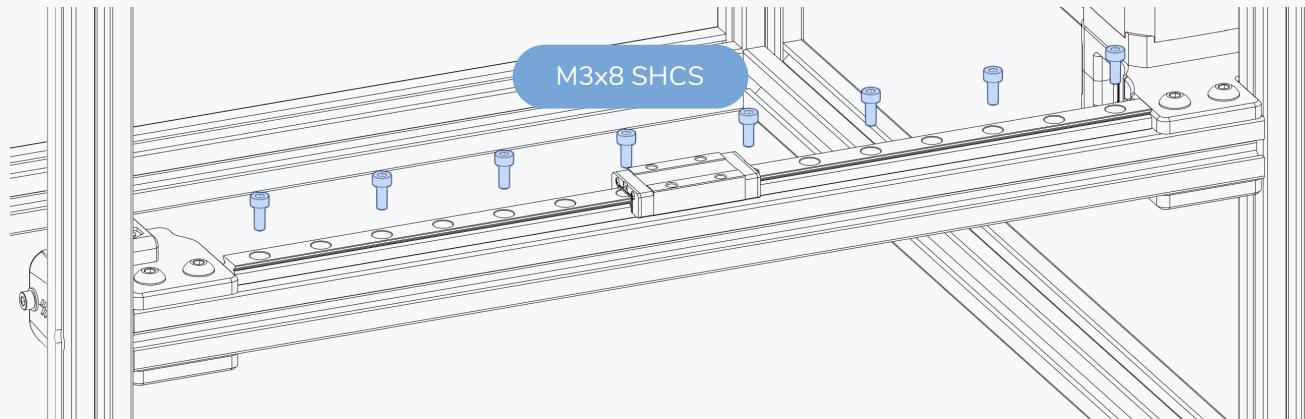


#### MIND THE CARRIAGE

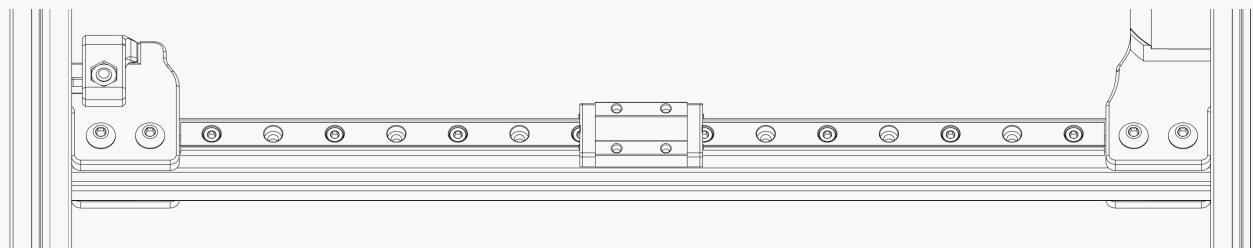
The carriages are designed to slide along the rail easily.  
This unfortunately also includes sliding off the rails.

Dropping the carriage will likely damage it.



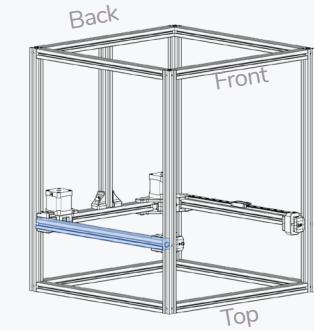
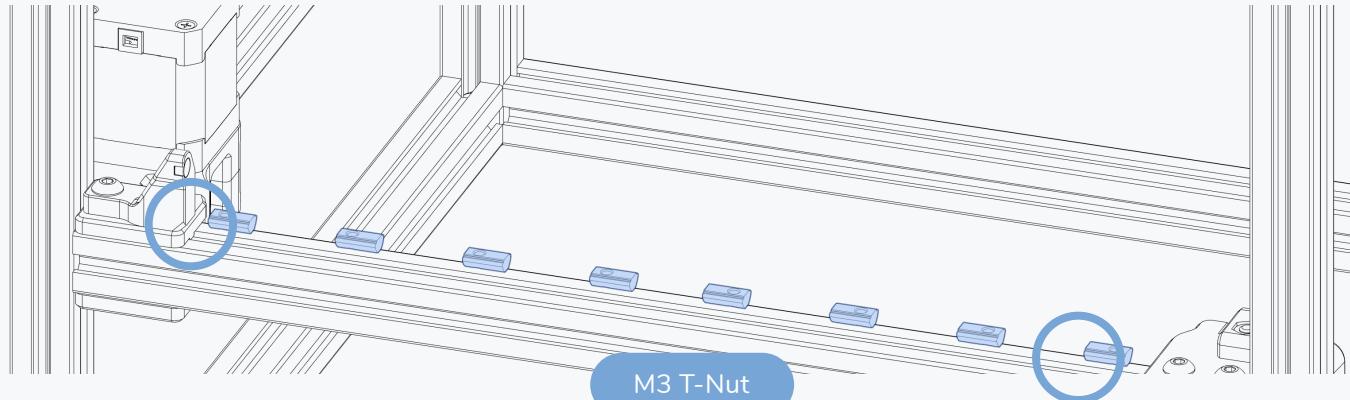
**CENTRED RAIL INSTALLATION GUIDE**

Use the MGN9 guides to position the rail in the centre of the extrusion prior to fastening the bolts.



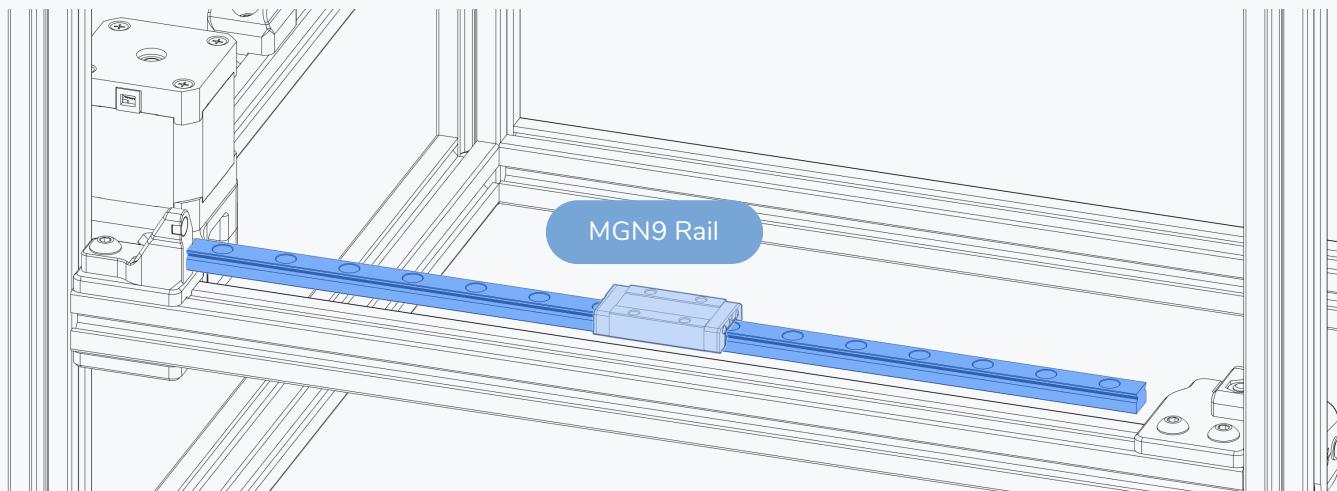
Y AXIS

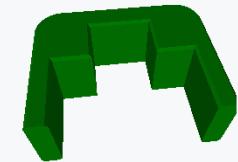
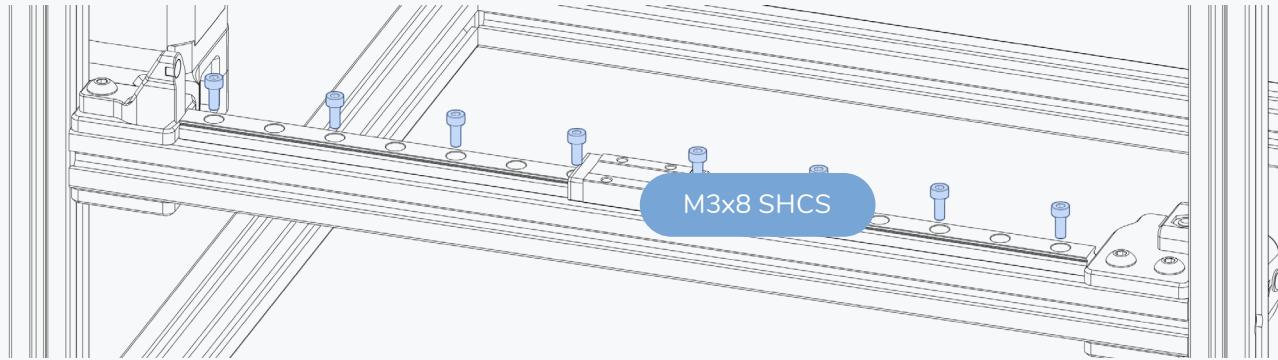
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**T-NUT ORIENTATION**

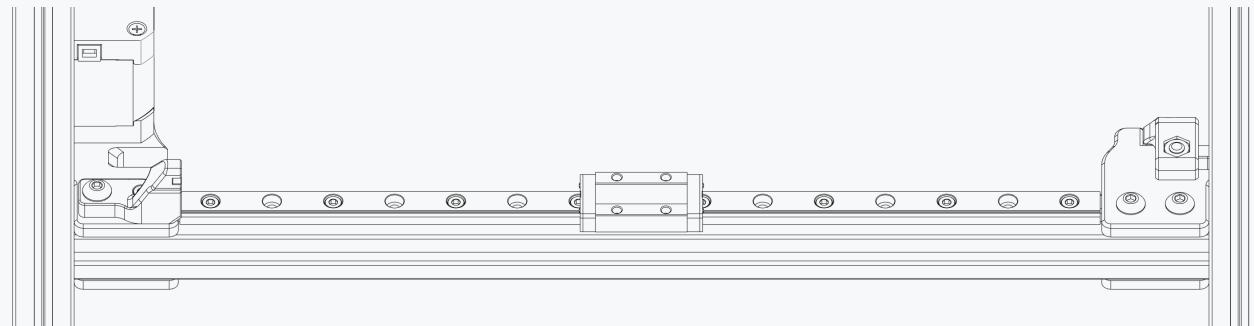
Insert the t-nuts as shown in highlight.





#### CENTRED RAIL INSTALLATION GUIDE

Use the MGN9 guides to position the rail in the centre of the extrusion prior to fastening the bolts.

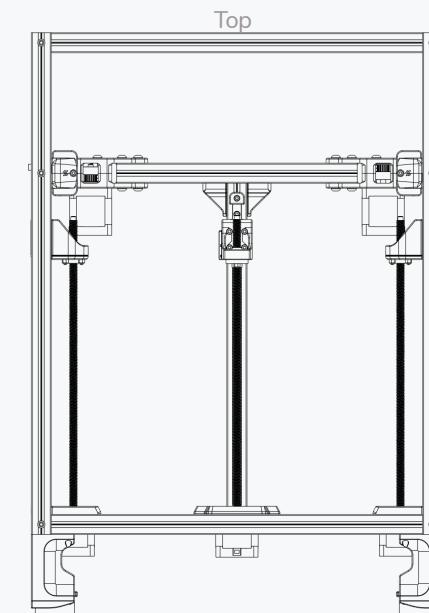
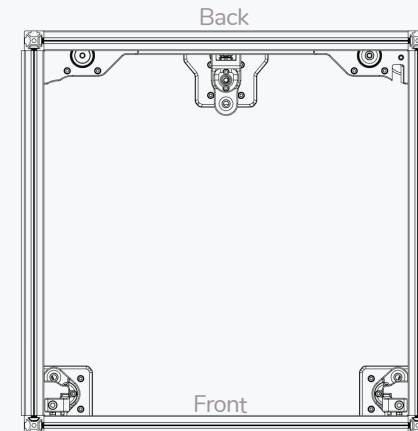
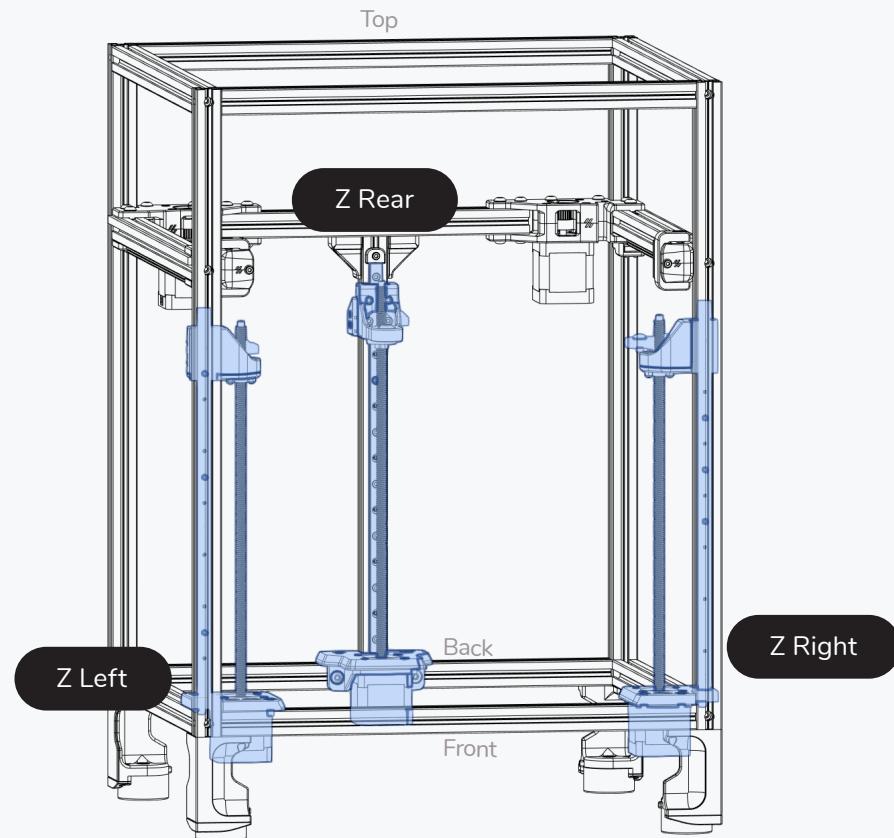


The first design released under the name Voron was the “Voron Geared Extruder”. This was on January 28 2015.

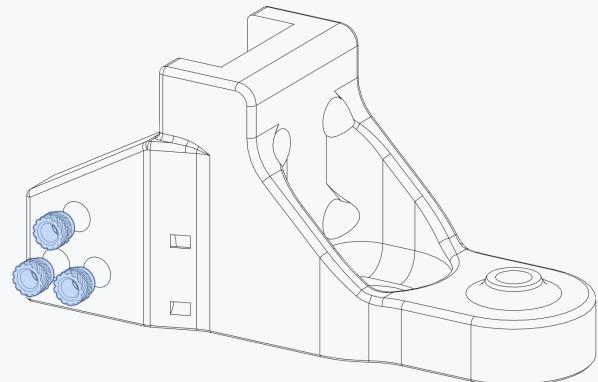
Z AXIS

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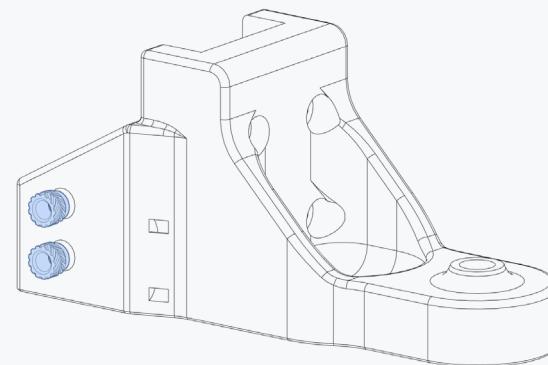


Heat Set Insert



#### GENERIC CABLE CHAIN

The 3 hole pattern is usually found on generic cable chains.



#### IGUS CABLE CHAIN

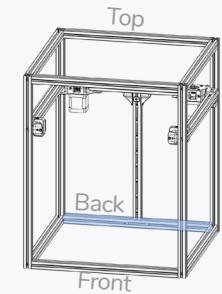
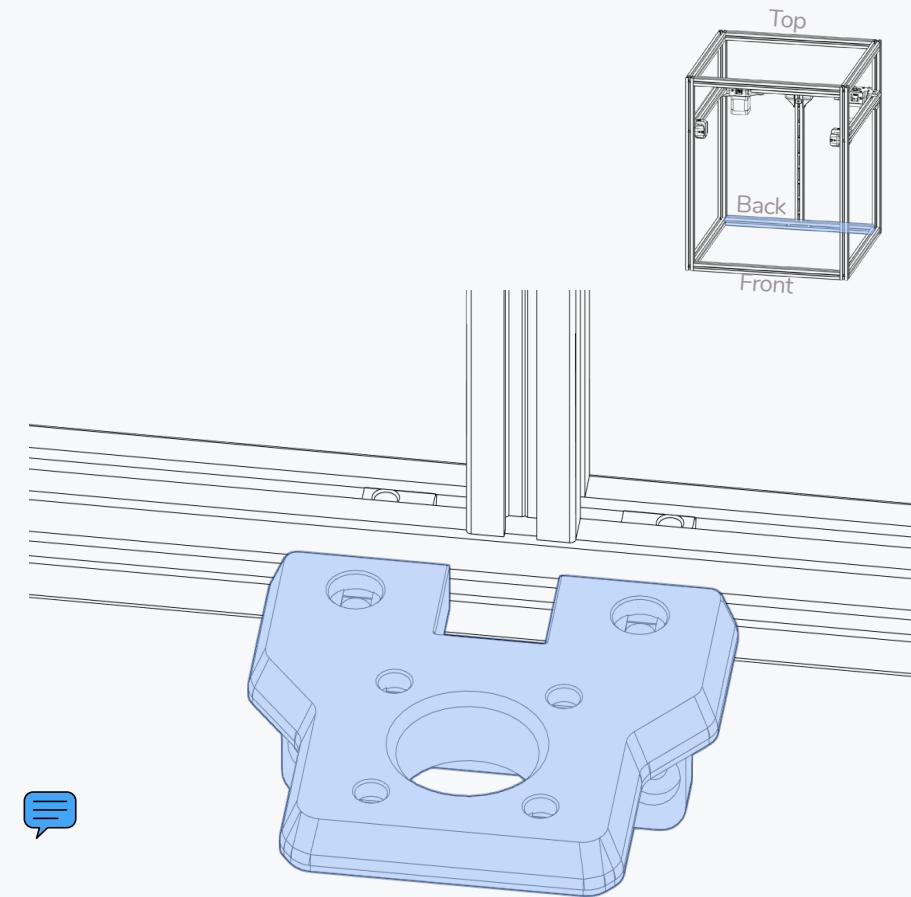
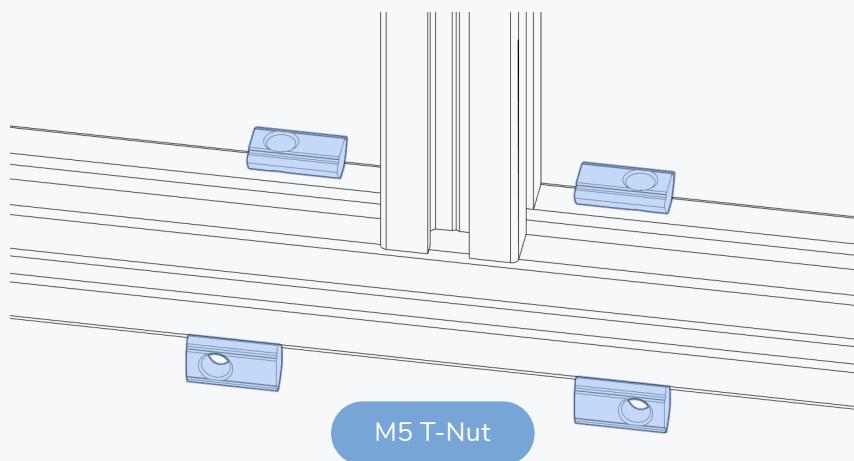
IGUS chain have 2 mounting holes.

#### CABLE CHAIN MOUNTING PATTERN

There are multiple mounting patterns for cable chains on the market. Pick the part that matches with the hole pattern on your mounting chain. The remainder of the manual will only show the “generic” pattern.

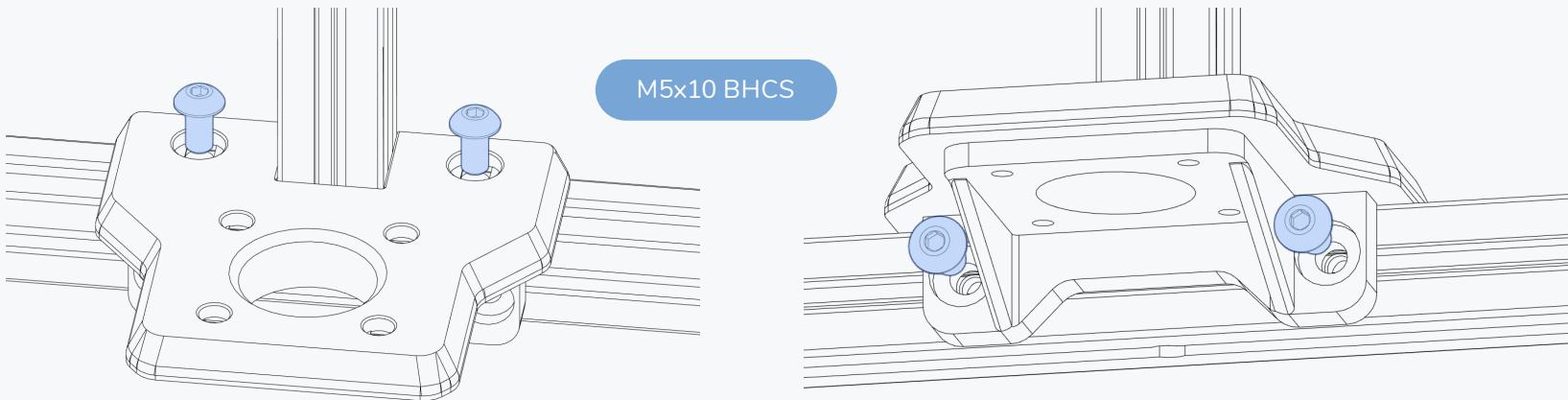
## Z AXIS

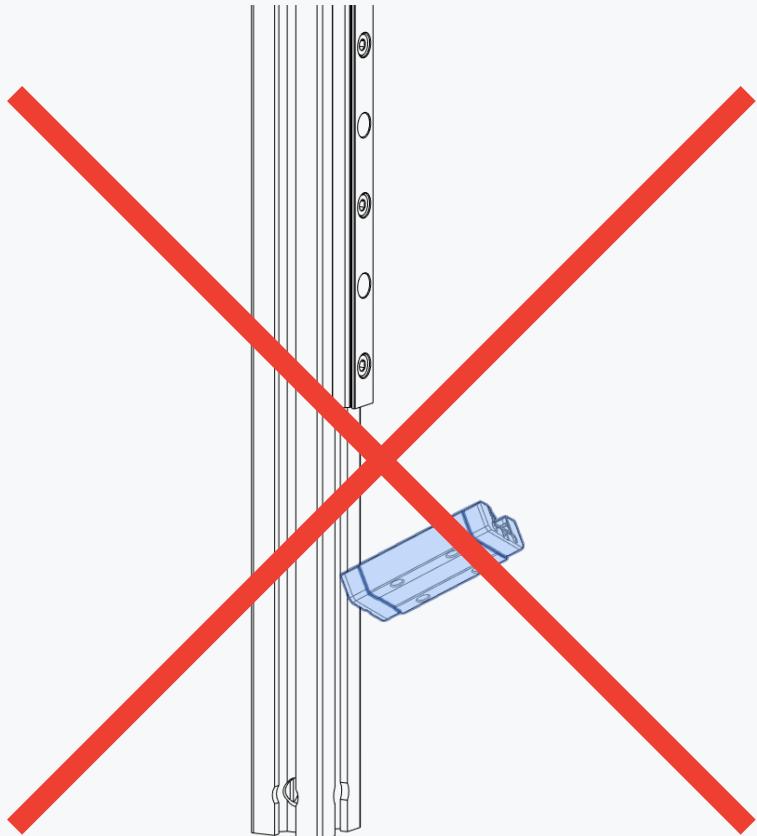
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Z AXIS

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For illustration purposes only. Do not attempt to replicate.

#### RAIL SAFETY

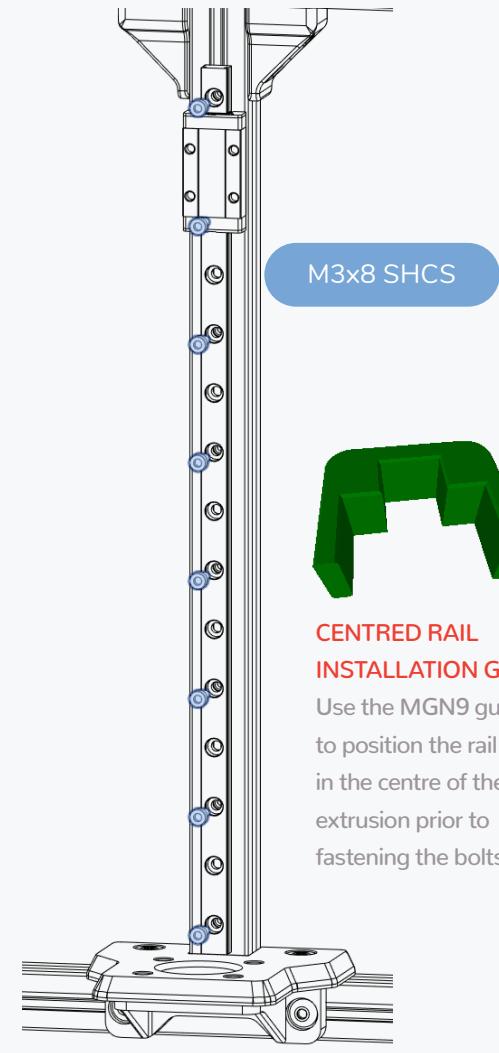
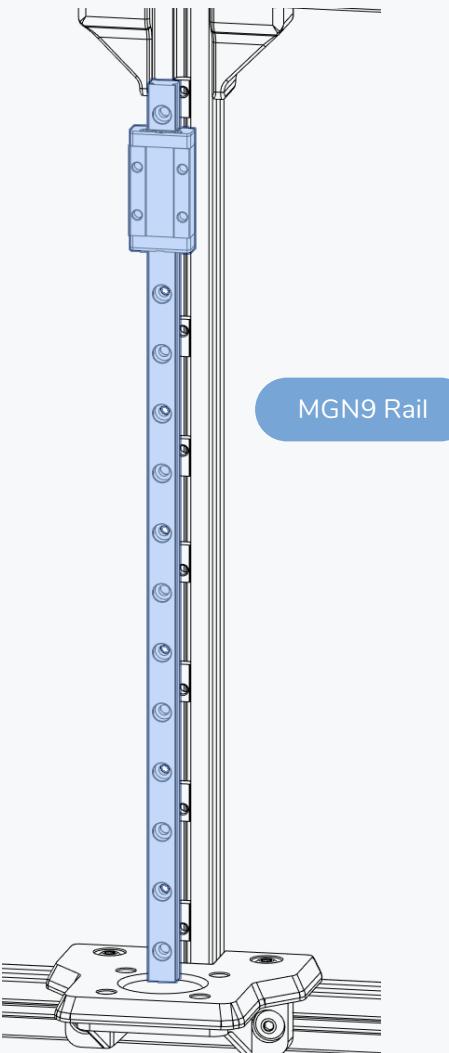
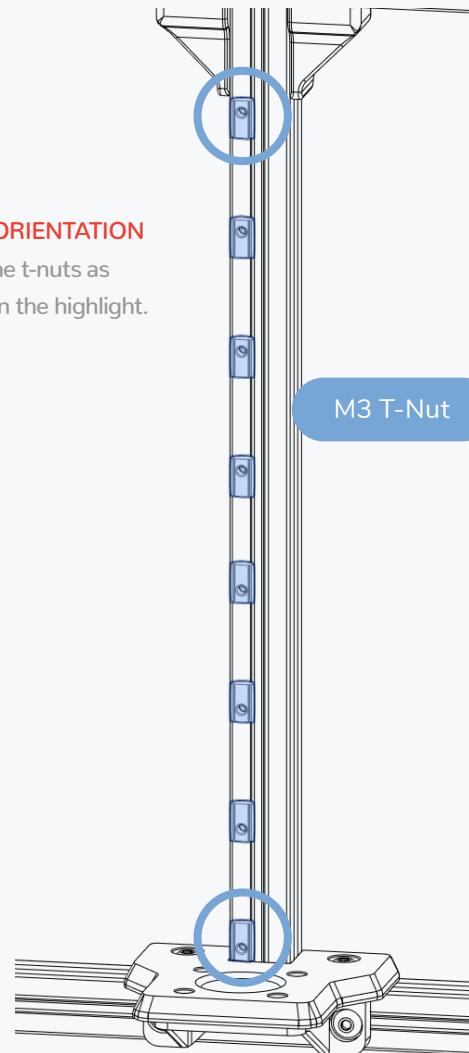
Mind the rail carriage during installation.

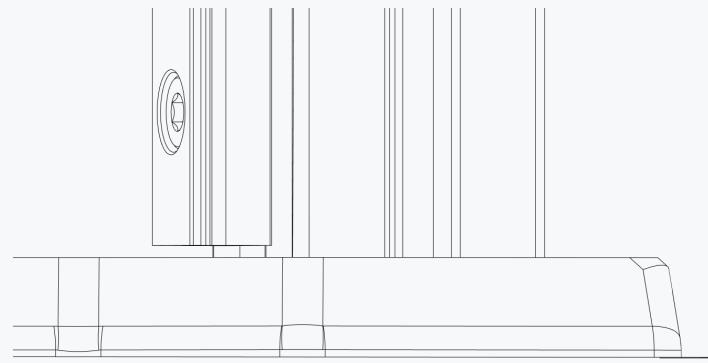
If your rails were delivered with plastic stoppers you can also temporarily reinstall them to prevent carriages from falling off their rails and spilling their bearing balls..



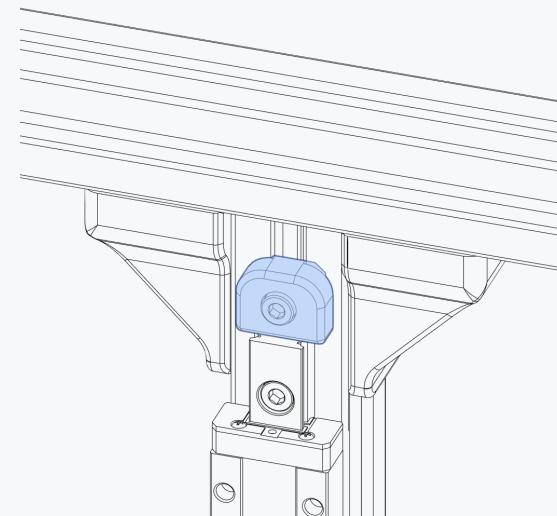
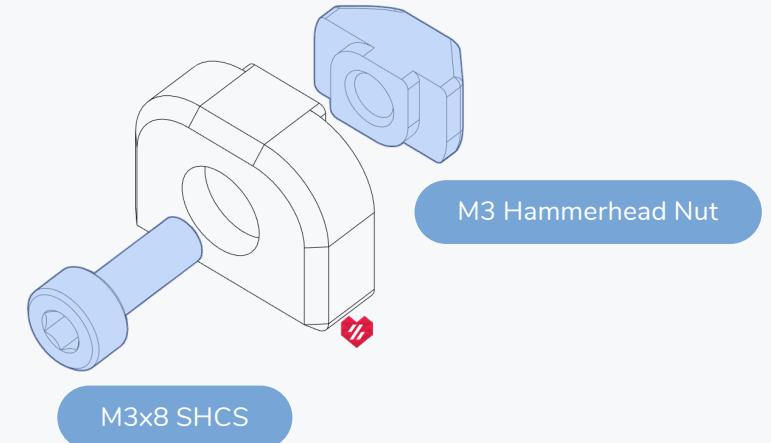
**T-NUT ORIENTATION**

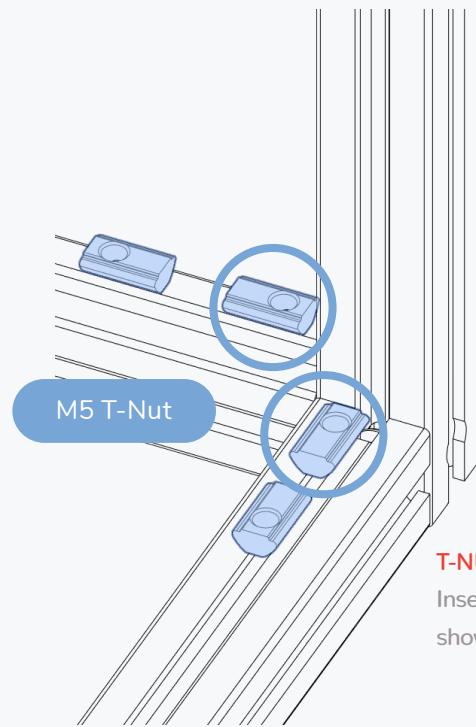
Insert the t-nuts as shown in the highlight.



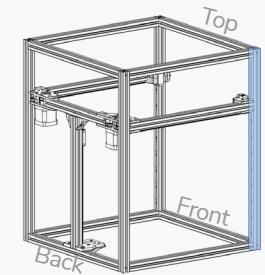
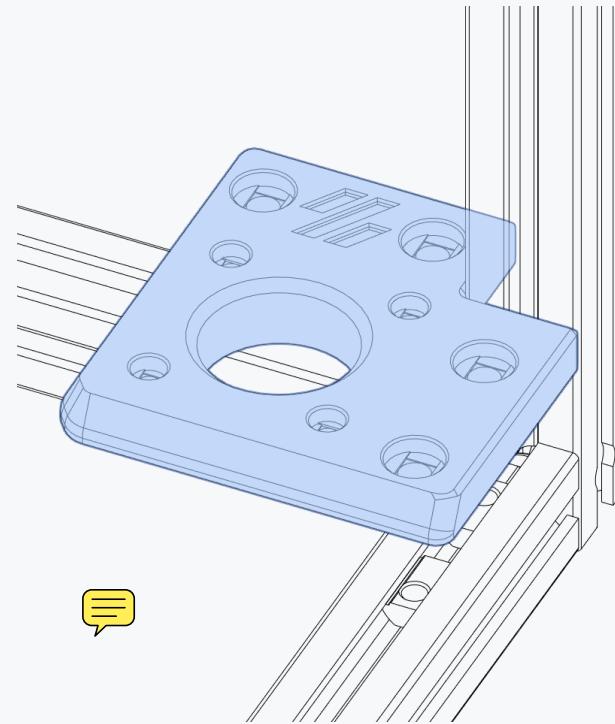
**BOTTOM GAP**

Leave a small gap between the printed part and the rail. 1-2mm is fine.



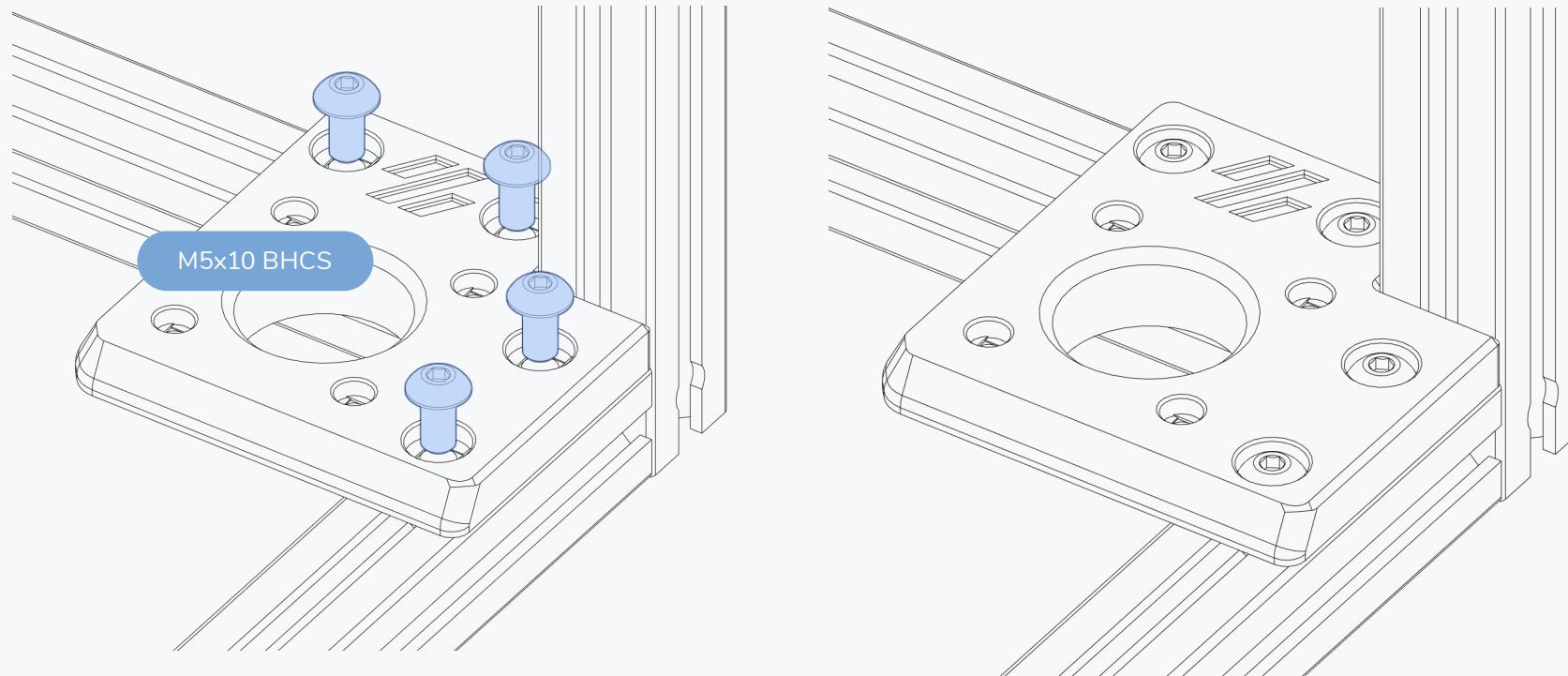
**T-NUT ORIENTATION**

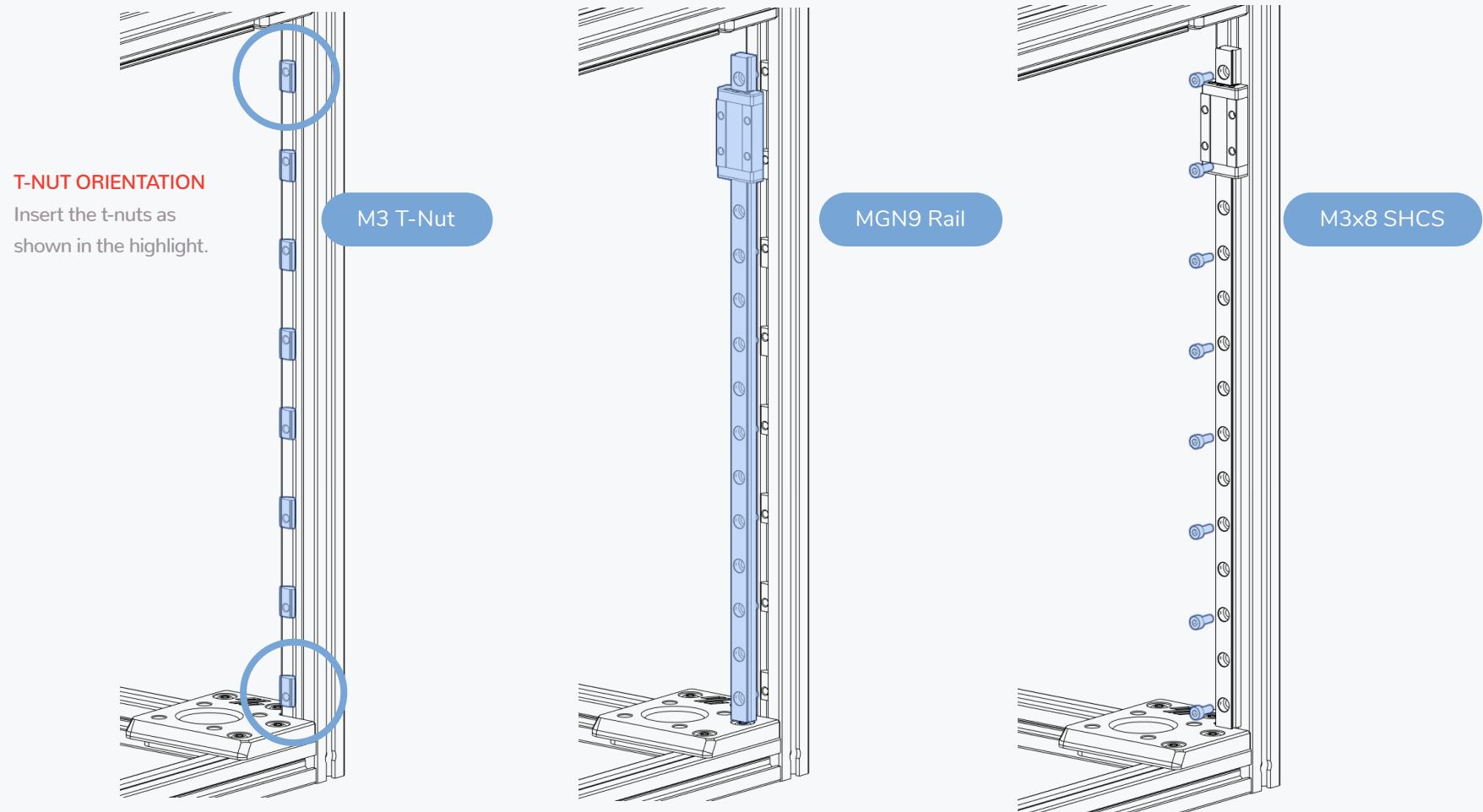
Insert the t-nuts as  
shown in the highlight.

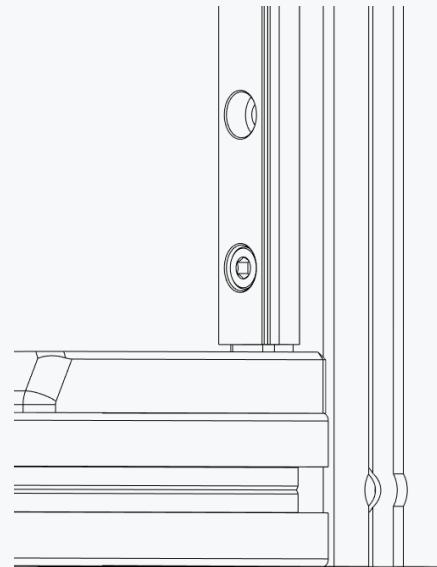


Z AXIS

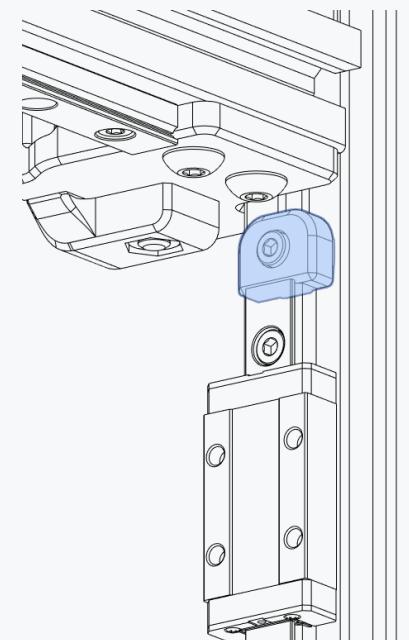
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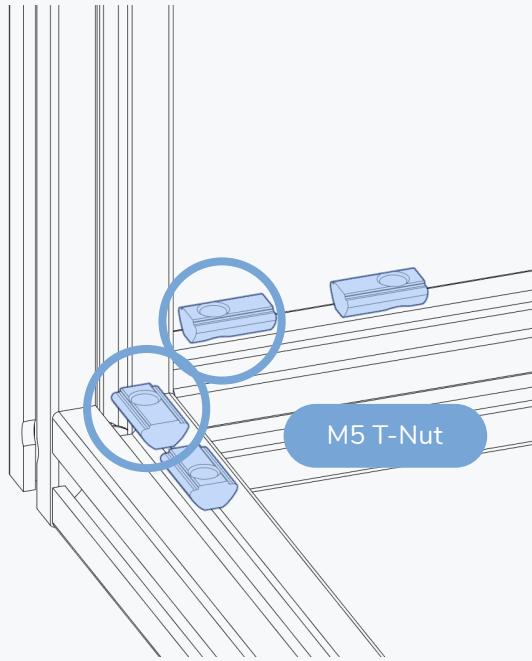
**BOTTOM GAP**

Leave a small gap between the printed part and the rail. 1-2mm is fine.

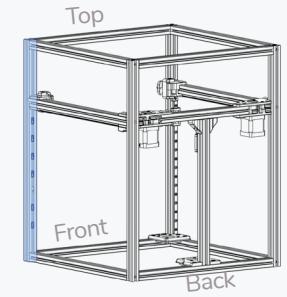
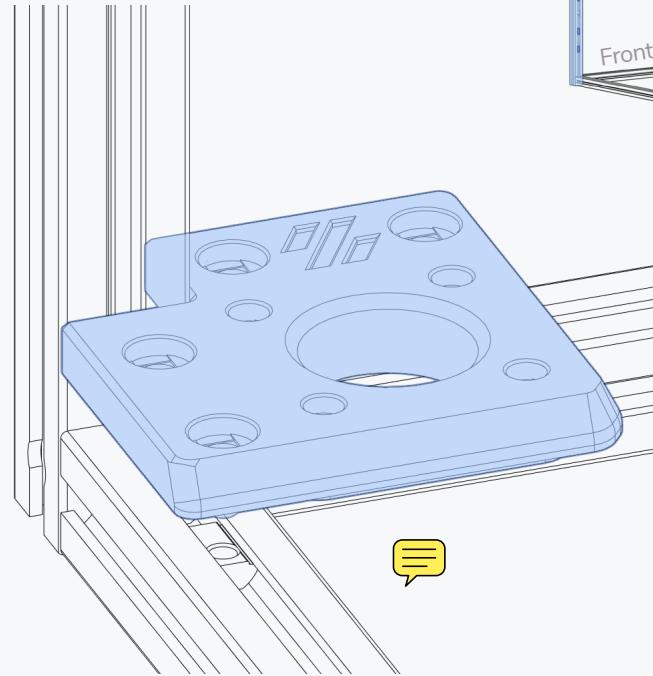


M3 Hammerhead Nut

M3x8 SHCS

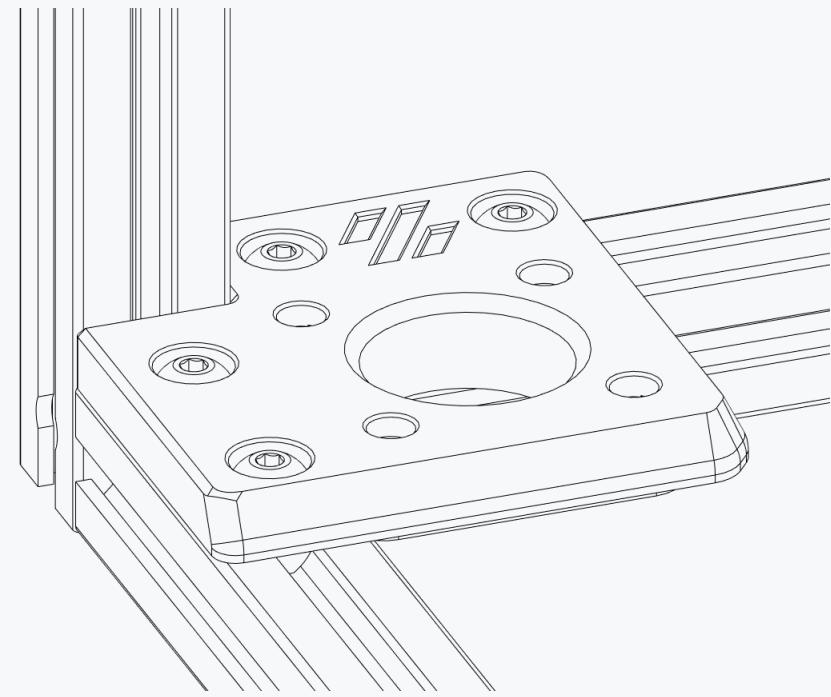
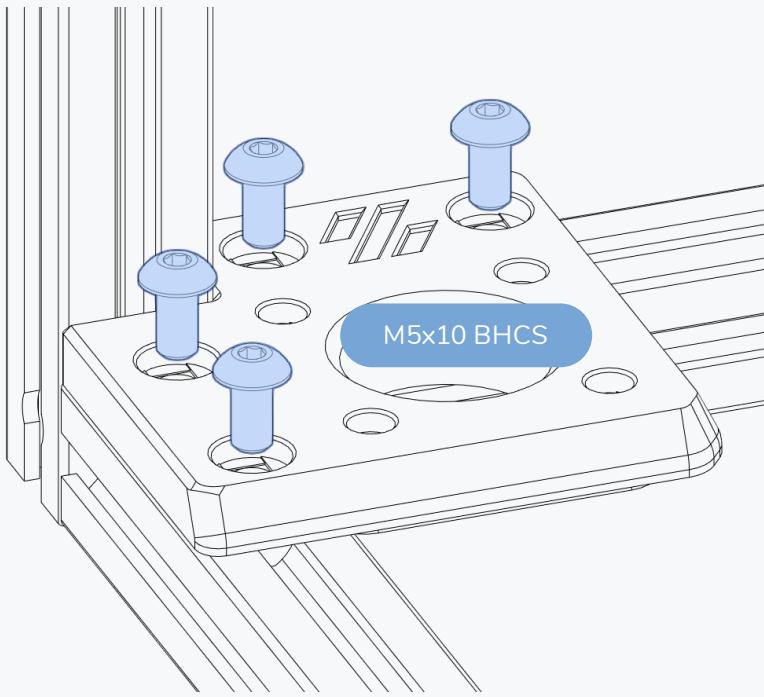
**T-NUT ORIENTATION**

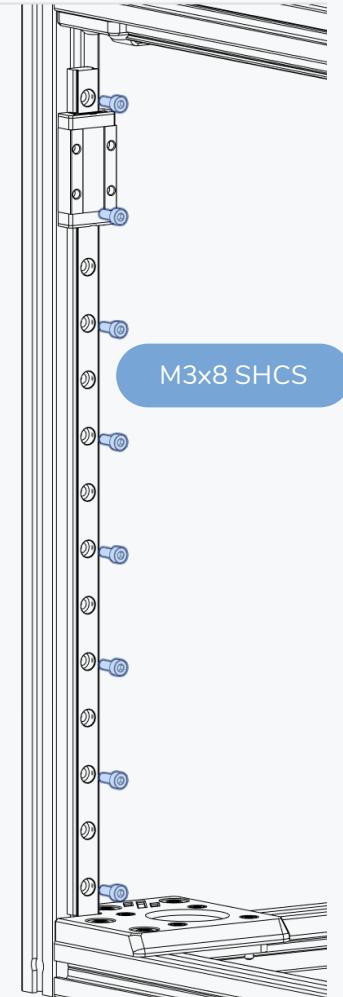
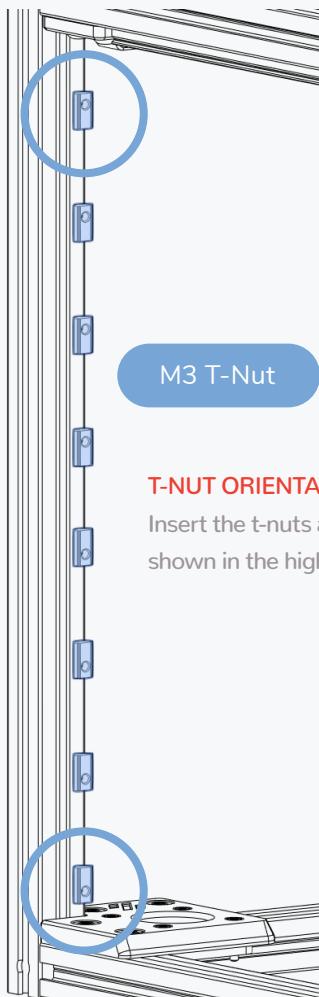
Insert the t-nuts as  
shown in the highlight.

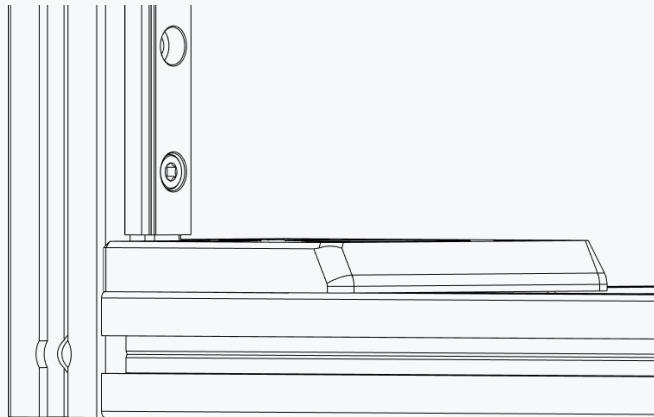


Z AXIS

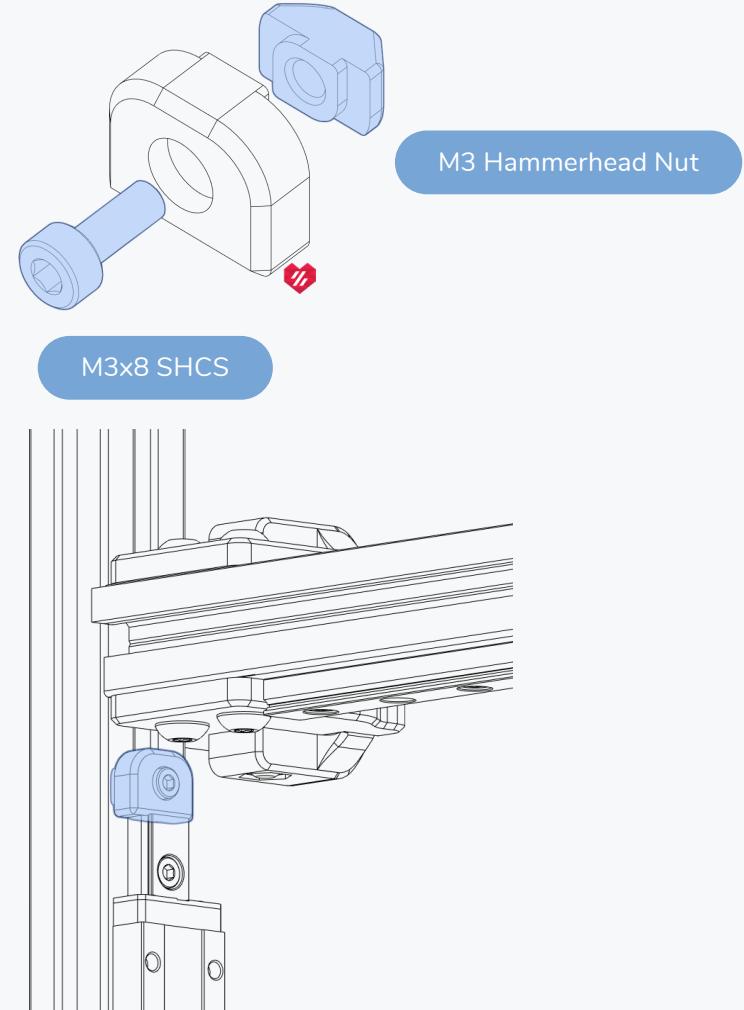
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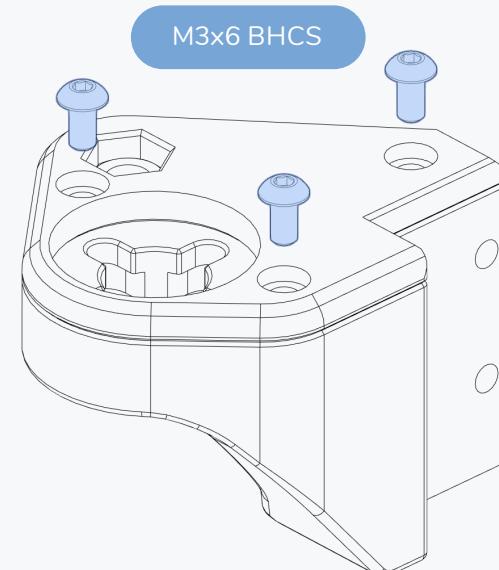
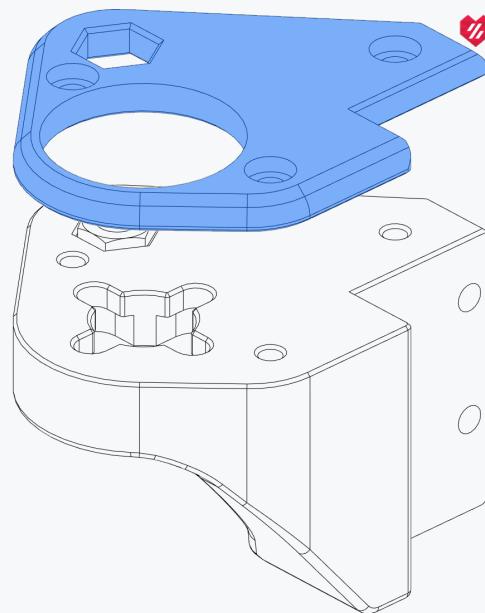
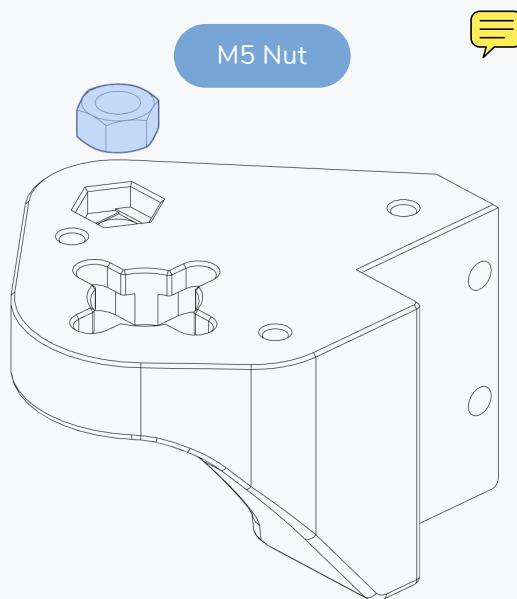
**BOTTOM GAP**

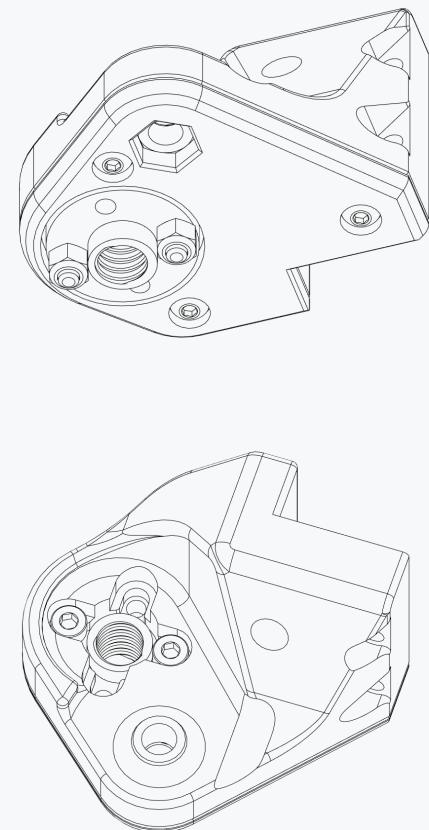
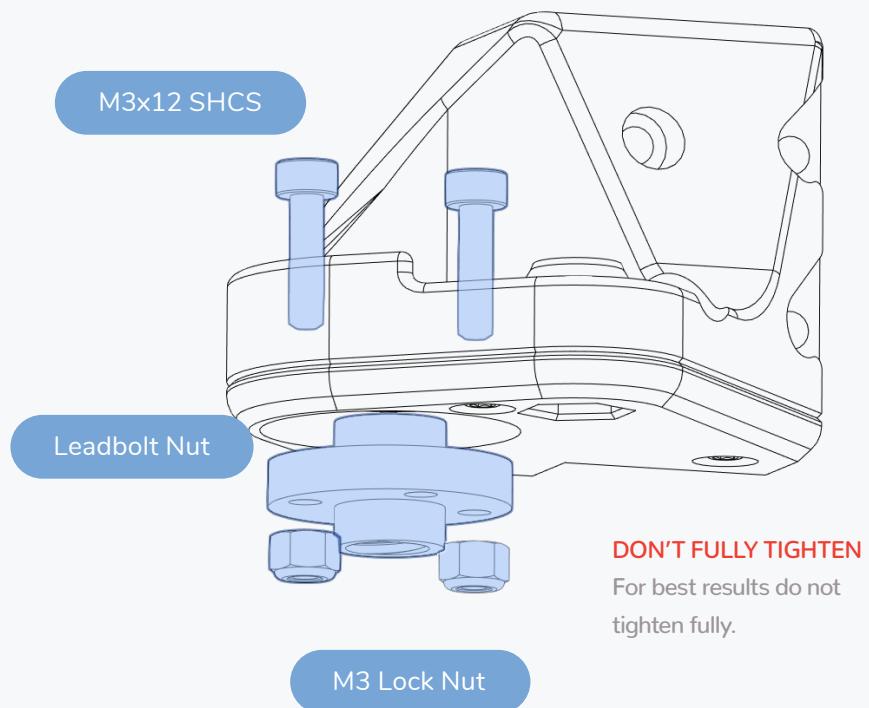
Leave a small gap between the printed part and the rail. 1-2mm are fine.

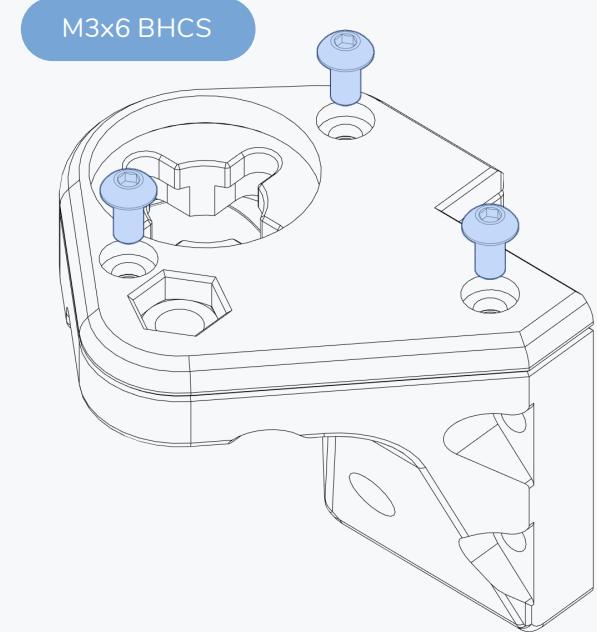
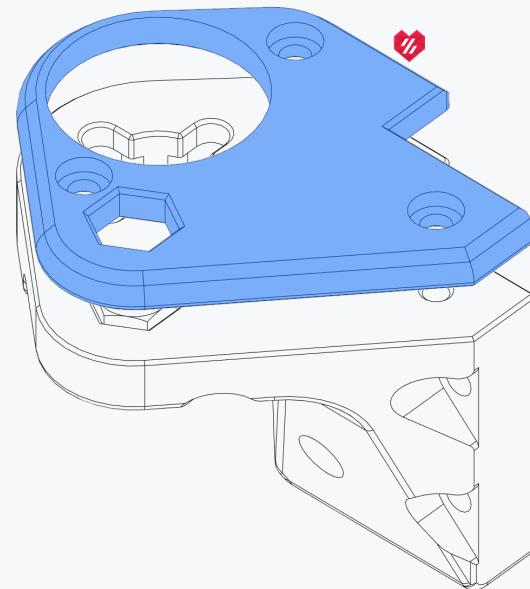
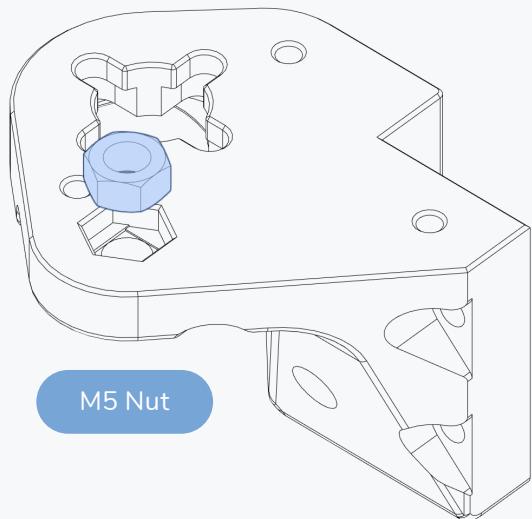


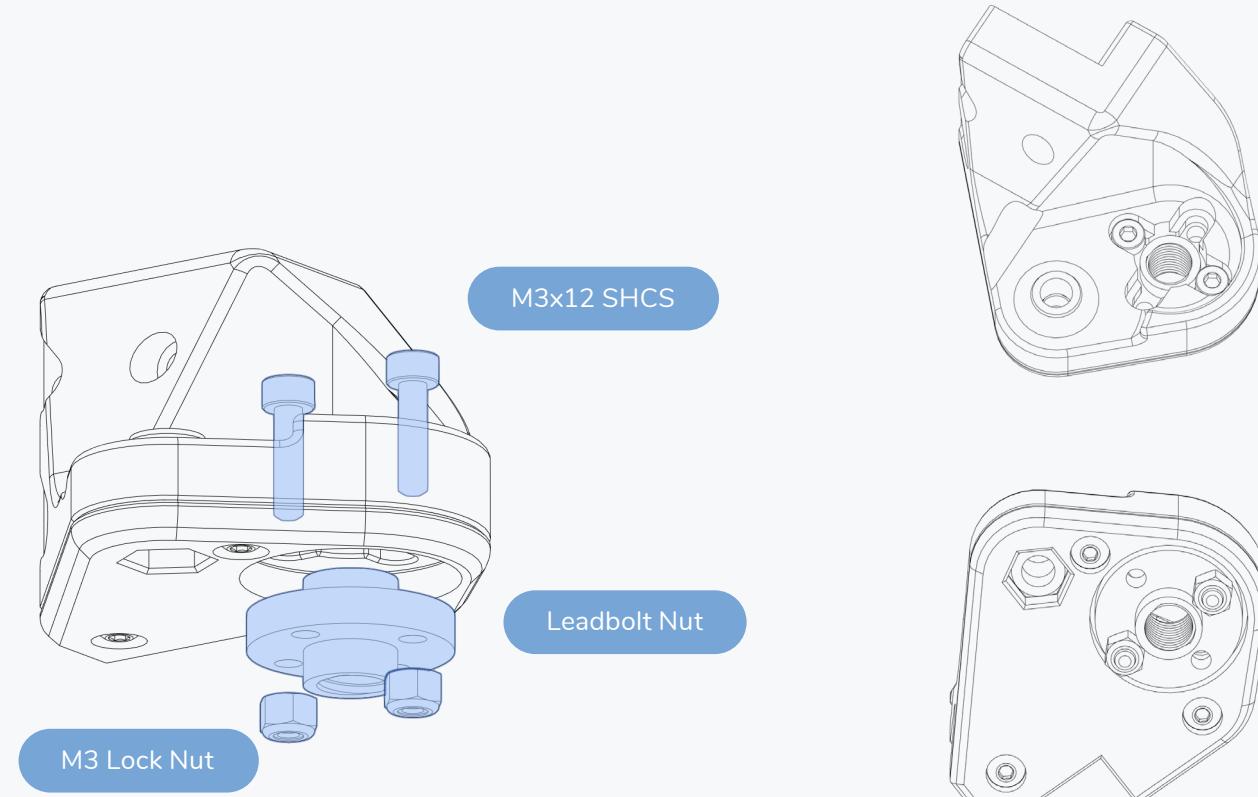
LEFT Z JOINT

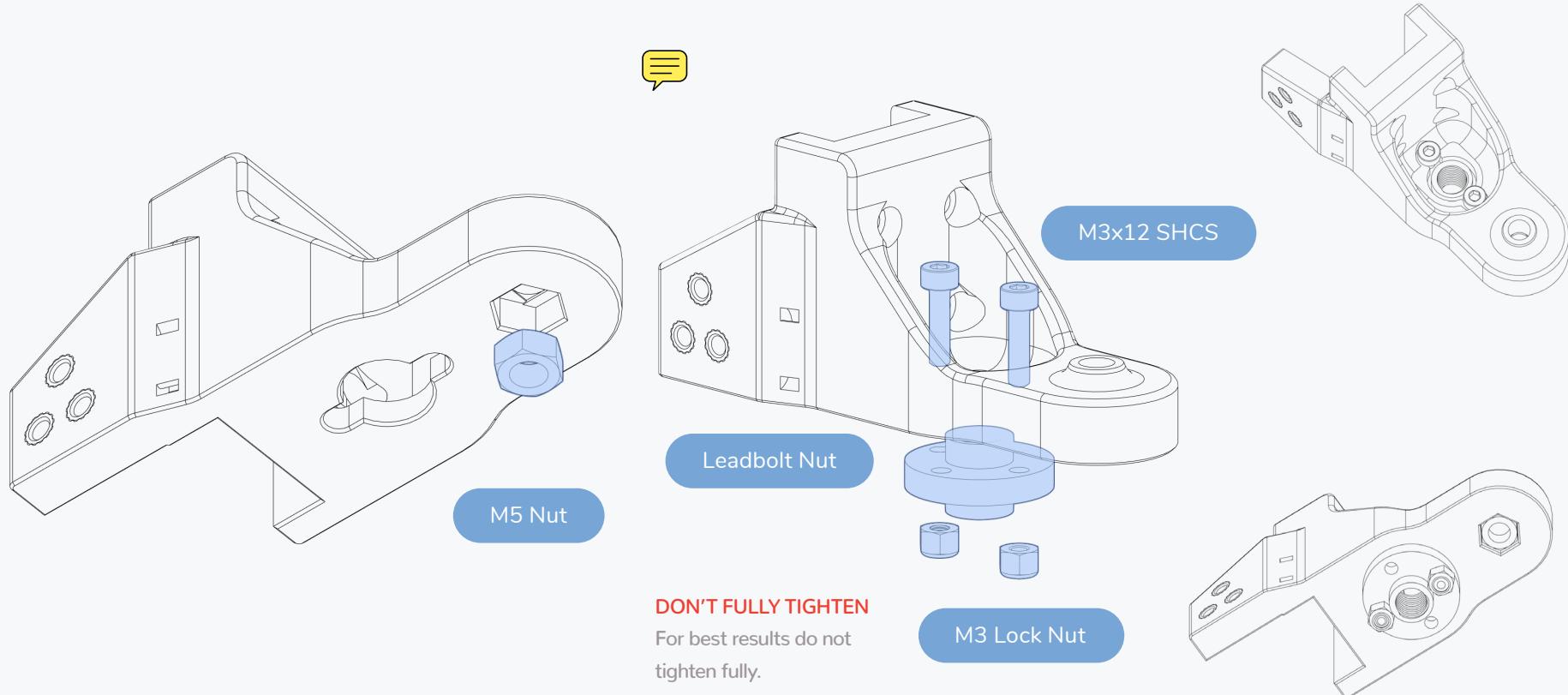
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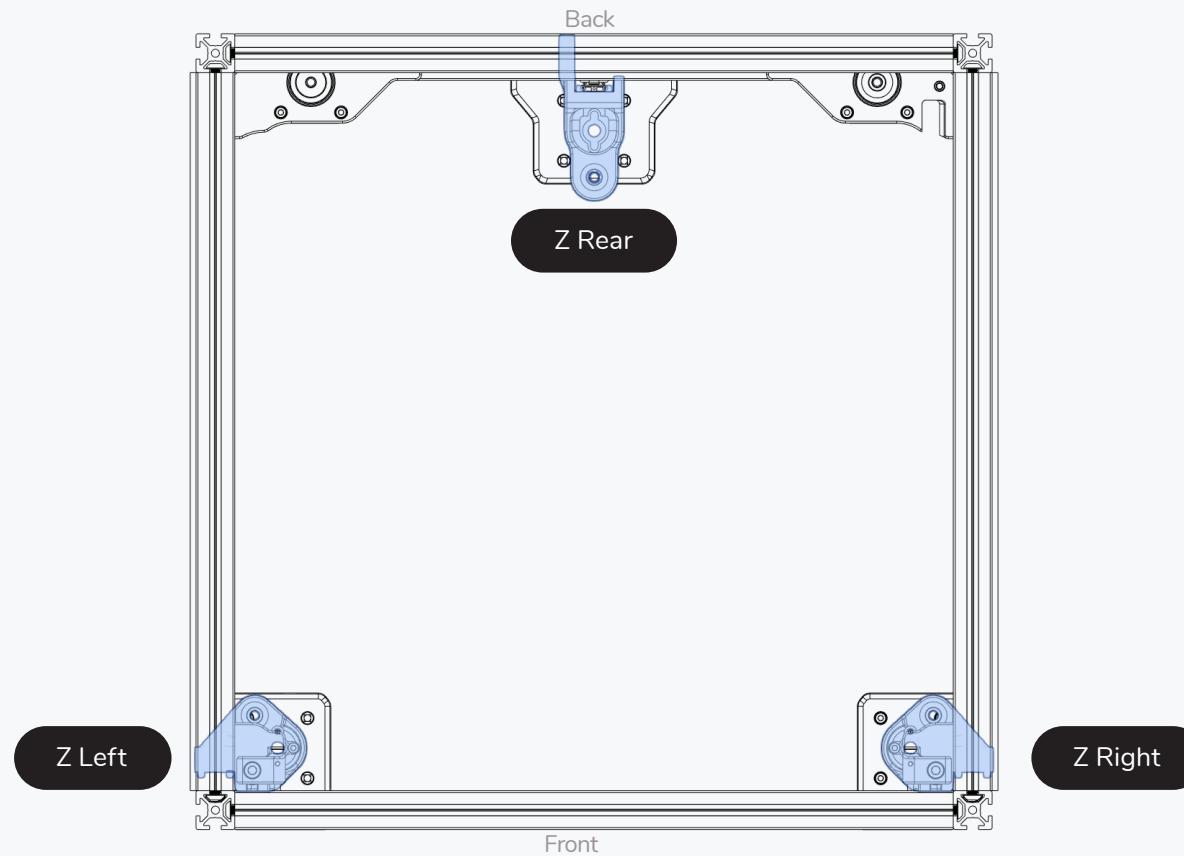






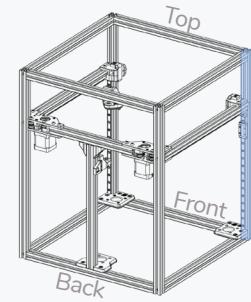
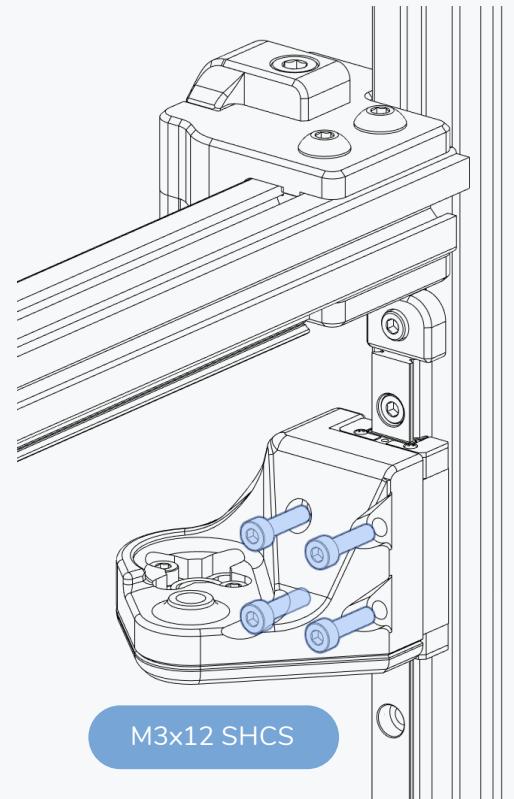
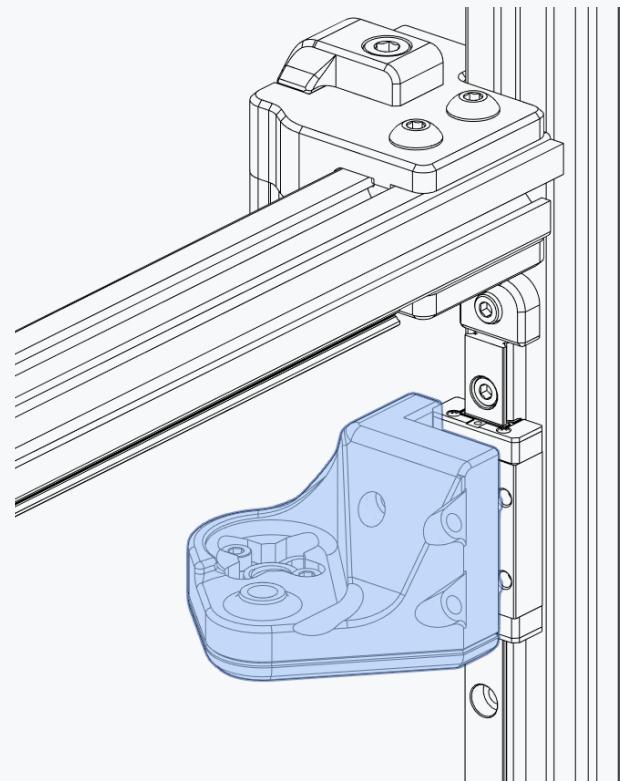






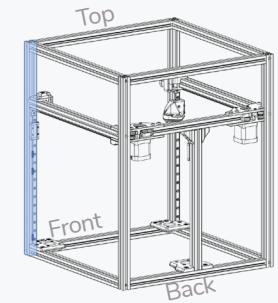
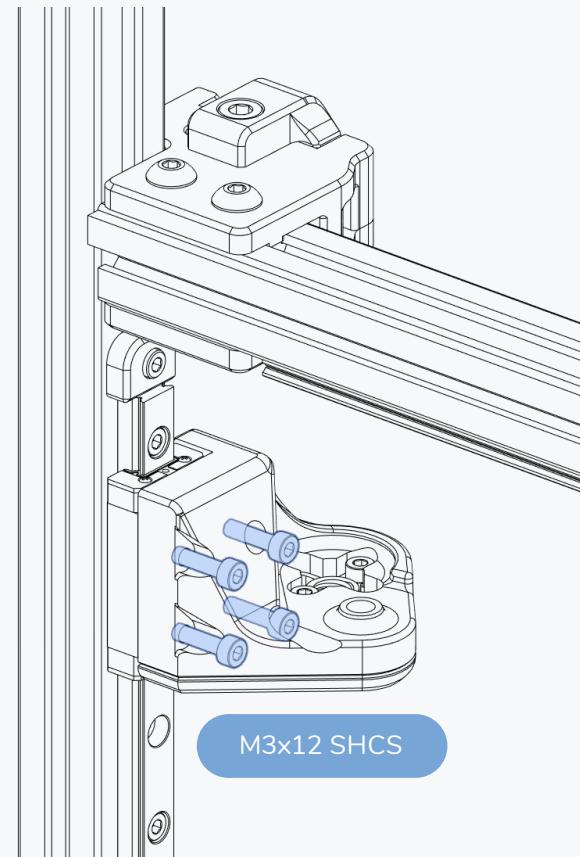
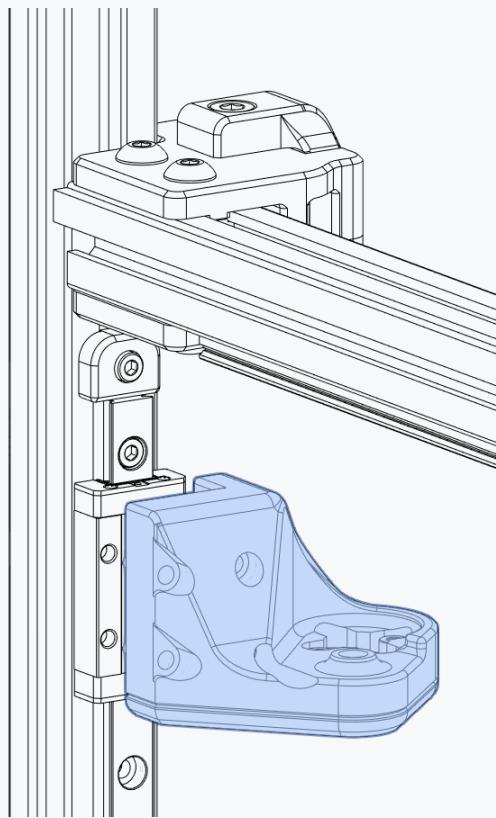
LEFT Z JOINT

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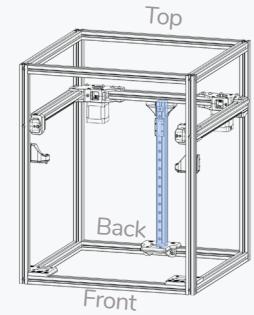
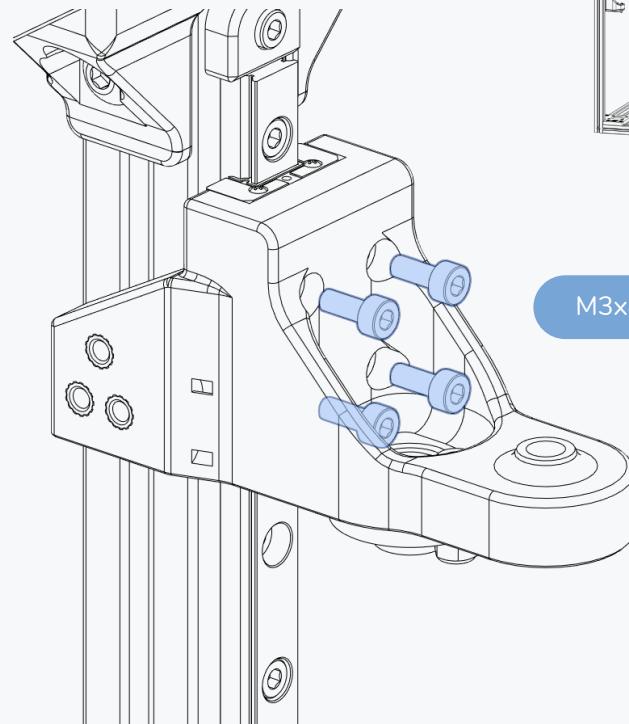
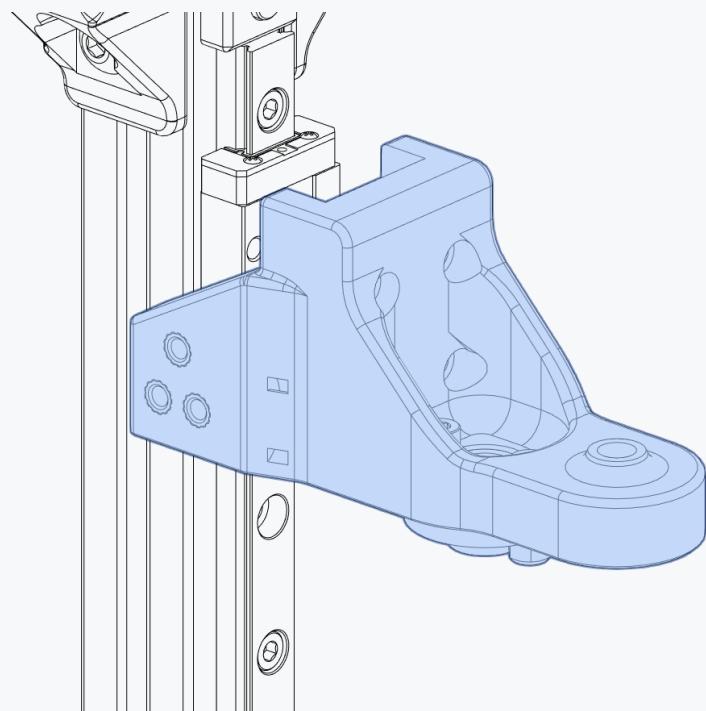
RIGHT Z JOINT

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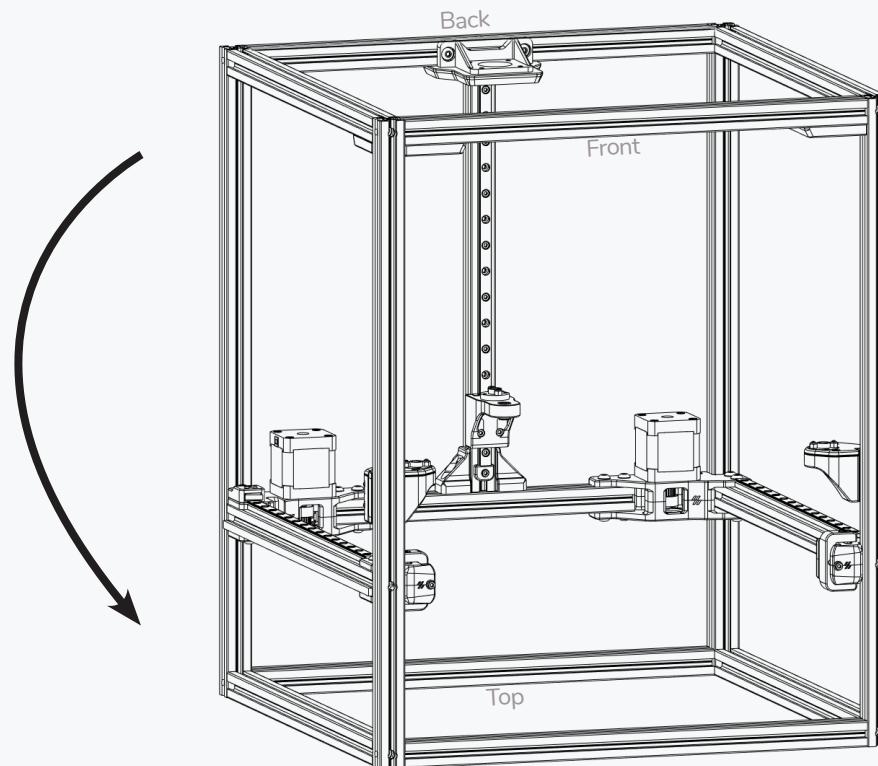


## REAR Z JOINT

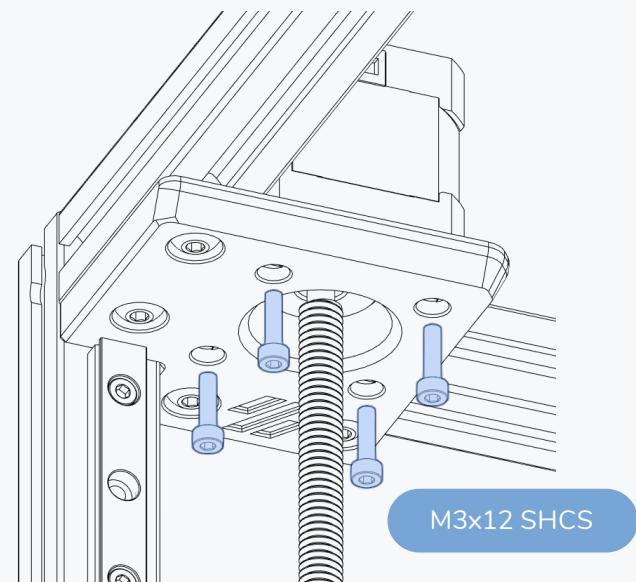
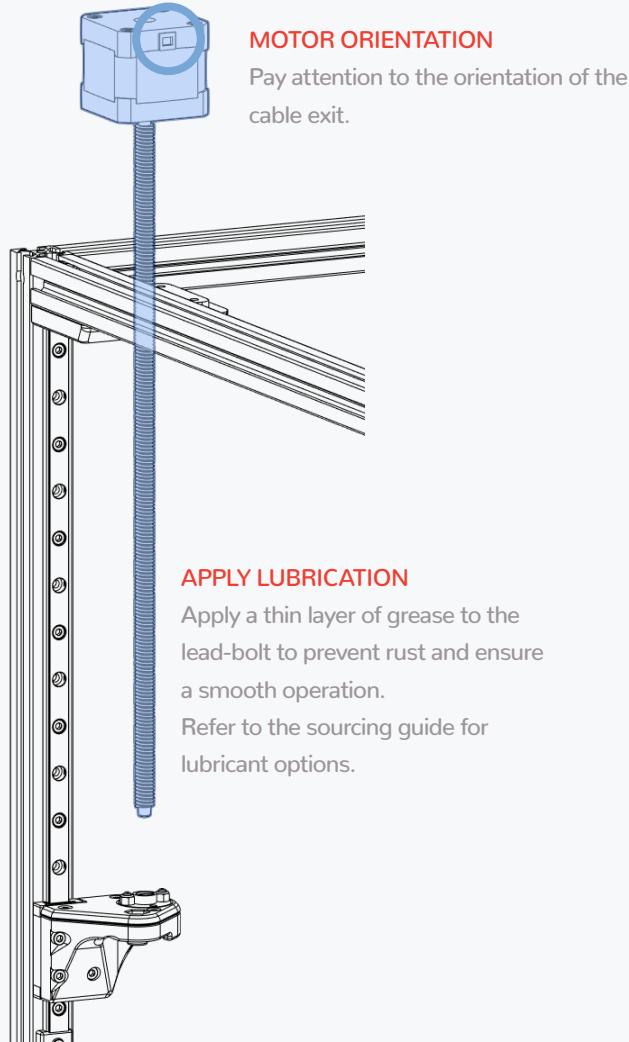
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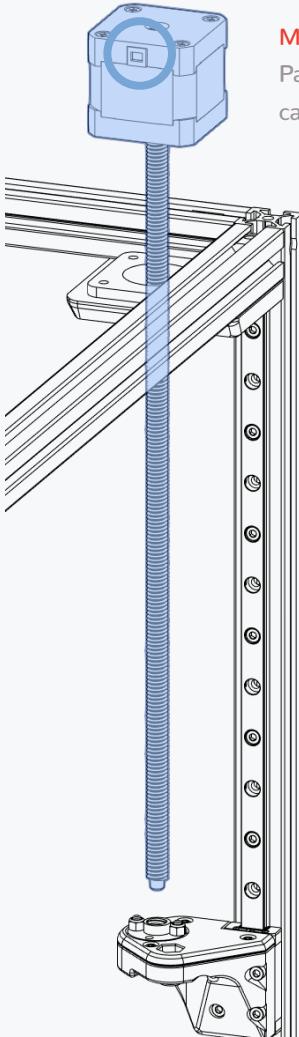


M3x8 SHCS

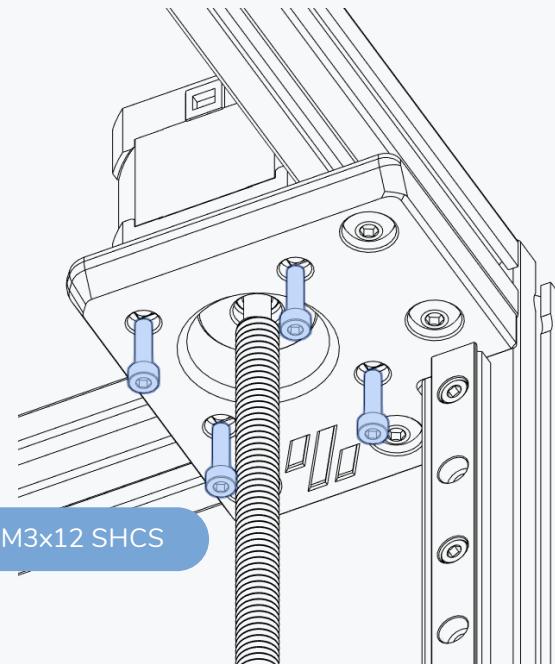
**FLIP UPSIDE DOWN**

Turn the printer upside down for the next assembly steps.

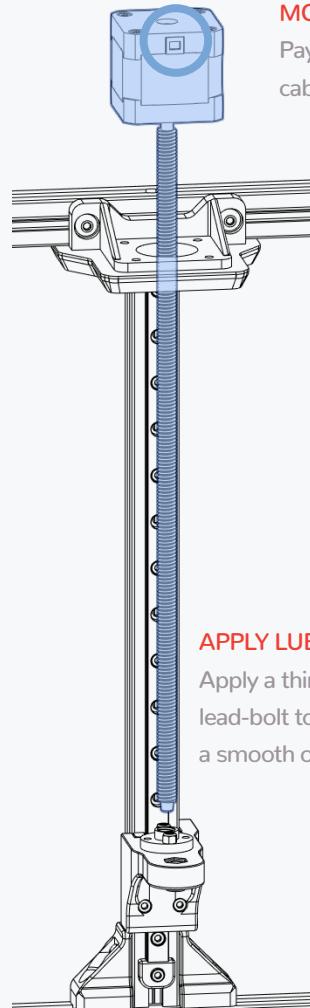


**MOTOR ORIENTATION**

Pay attention to the orientation of the cable exit.

**APPLY LUBRICATION**

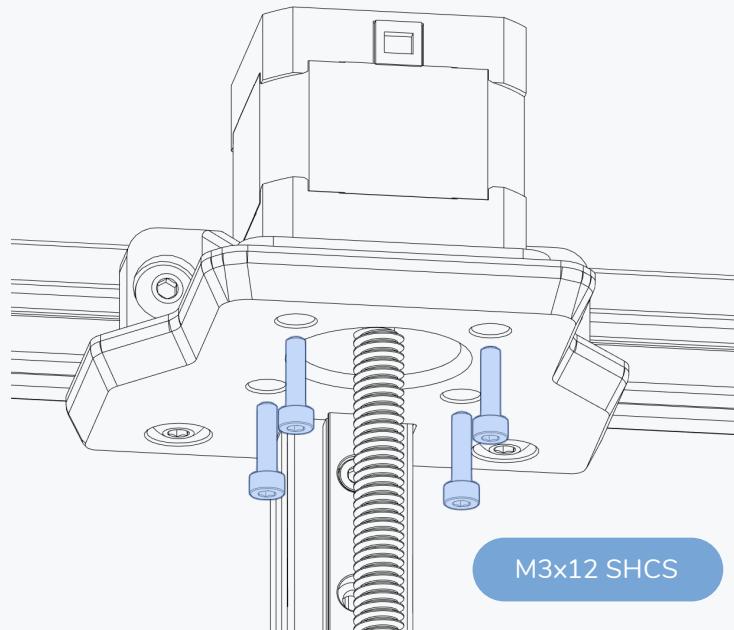
Apply a thin layer of grease to the lead-bolt to prevent rust and ensure a smooth operation.

**MOTOR ORIENTATION**

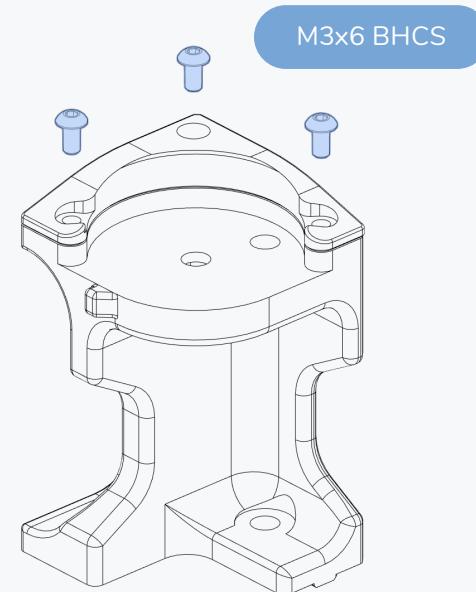
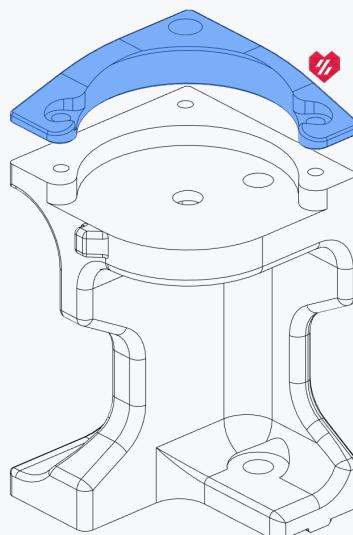
Pay attention to the orientation of the cable exit.

**APPLY LUBRICATION**

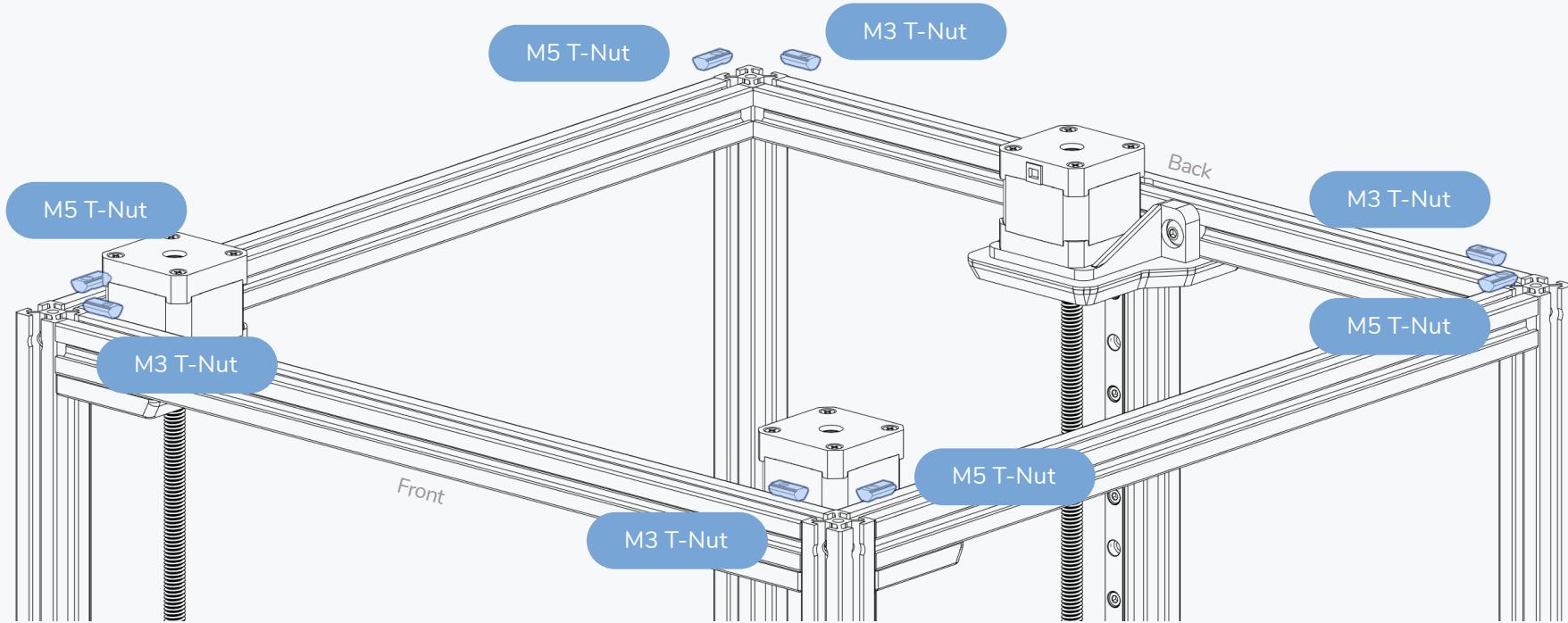
Apply a thin layer of grease to the lead-bolt to prevent rust and ensure a smooth operation.



M3x12 SHCS

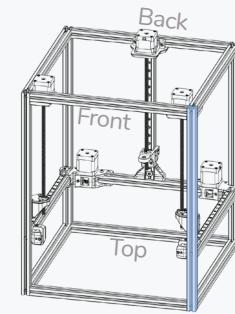
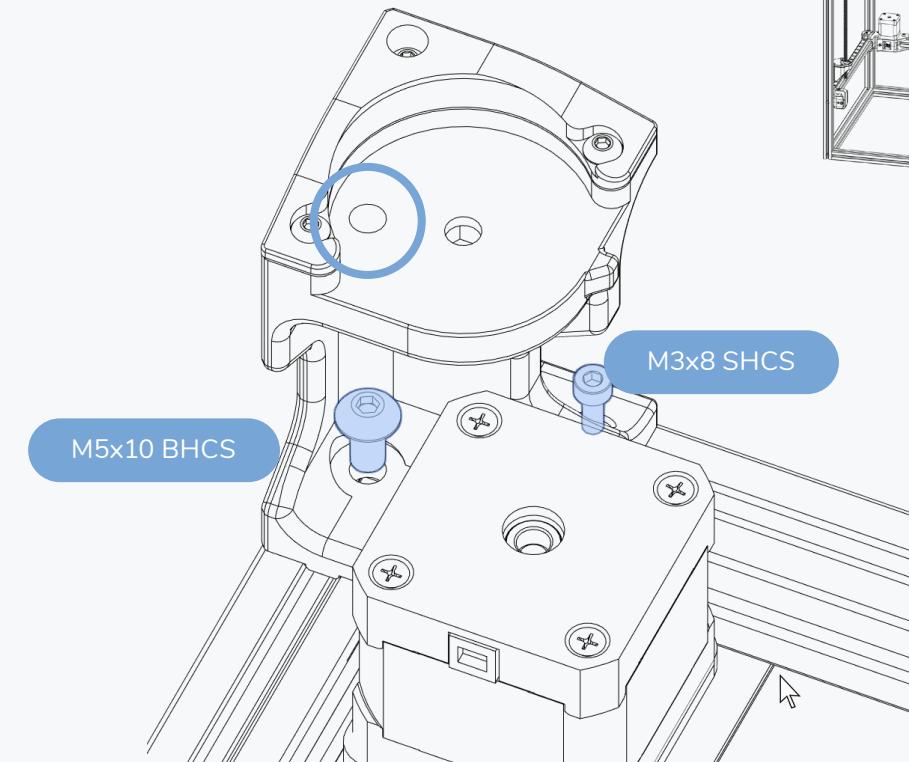
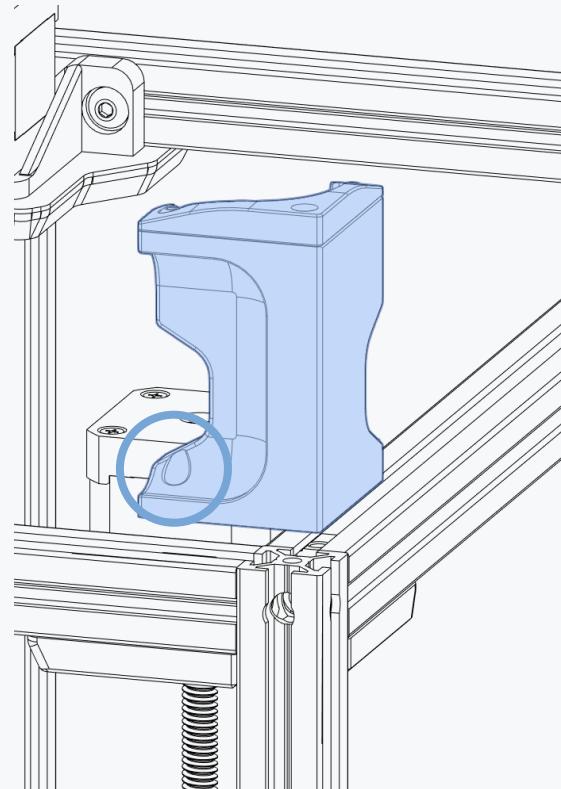
**ASSEMBLE FOUR FEET**

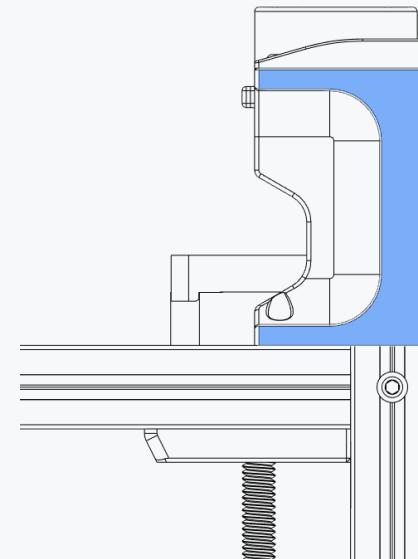
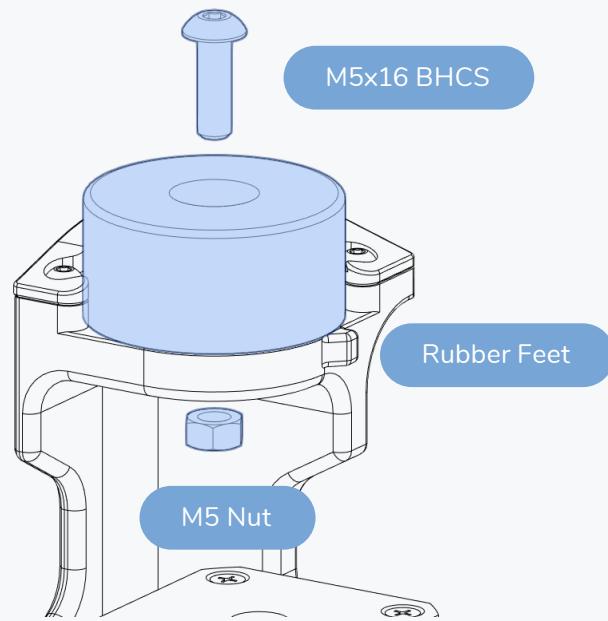
Repeat the instructions and assemble all four feet.



FEET

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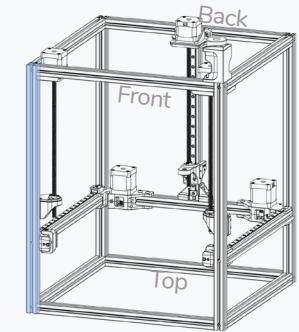
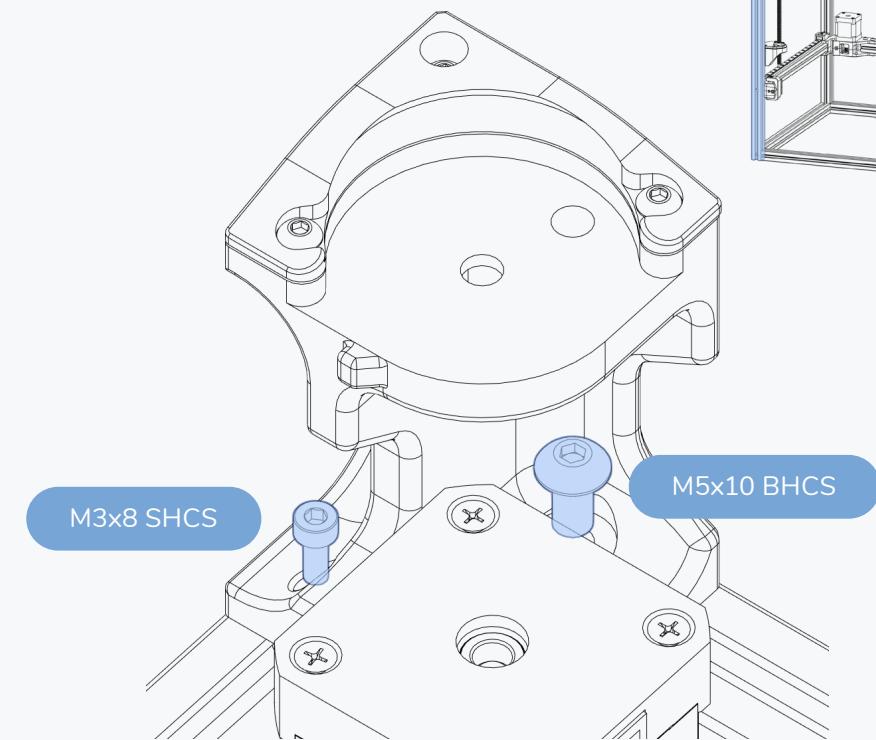
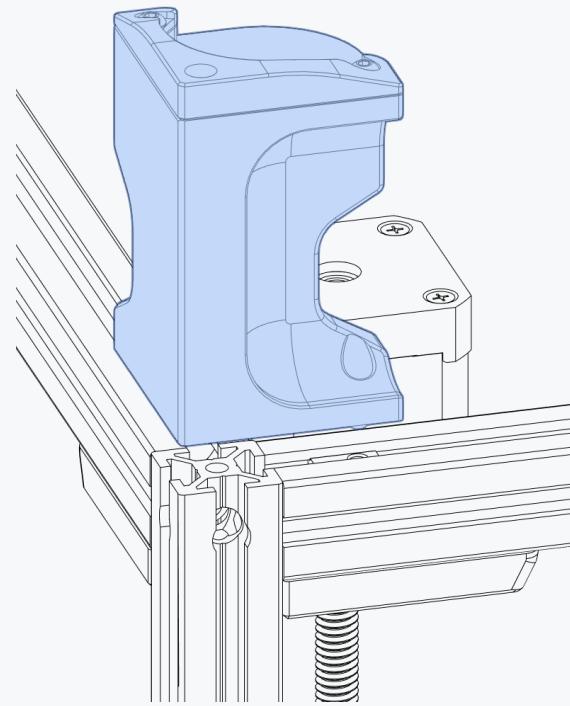


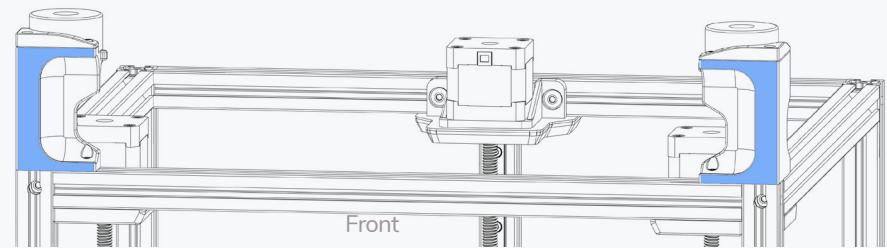
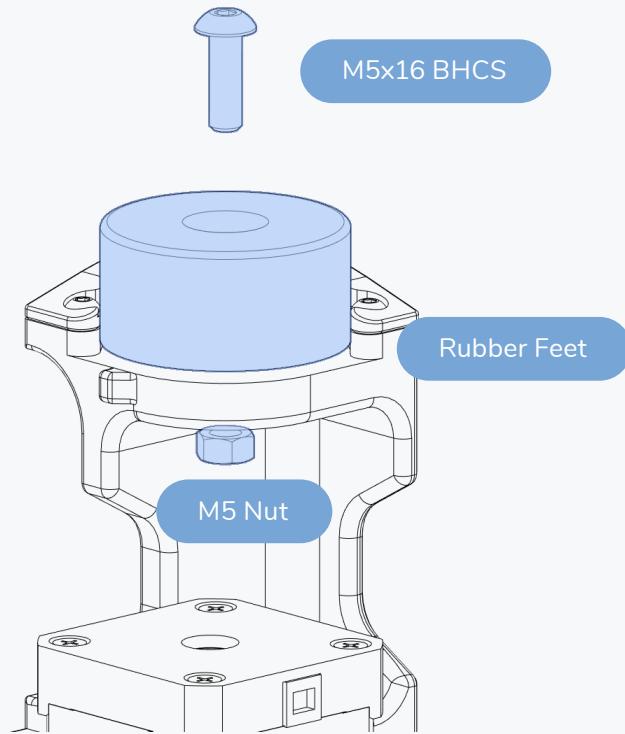
#### MIND THE PART ORIENTATION

The profile shown above are towards the front and rear of the printer.

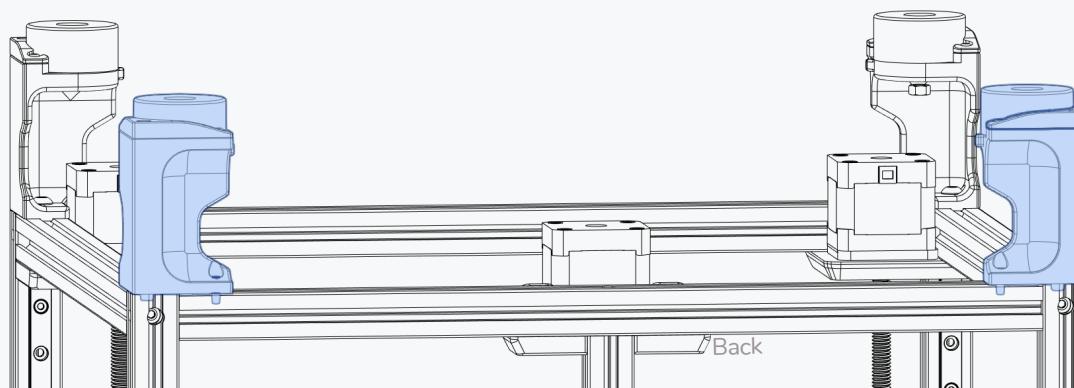
FEET

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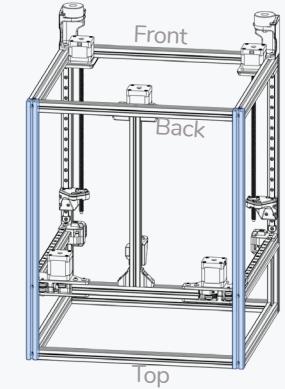


**MIND THE PART ORIENTATION**

The profile shown above are towards the front and rear of the printer.

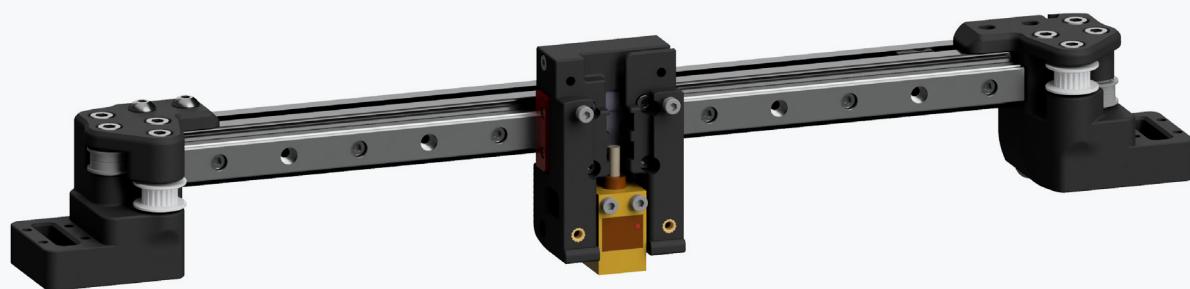
**MIND THE PART ORIENTATION**

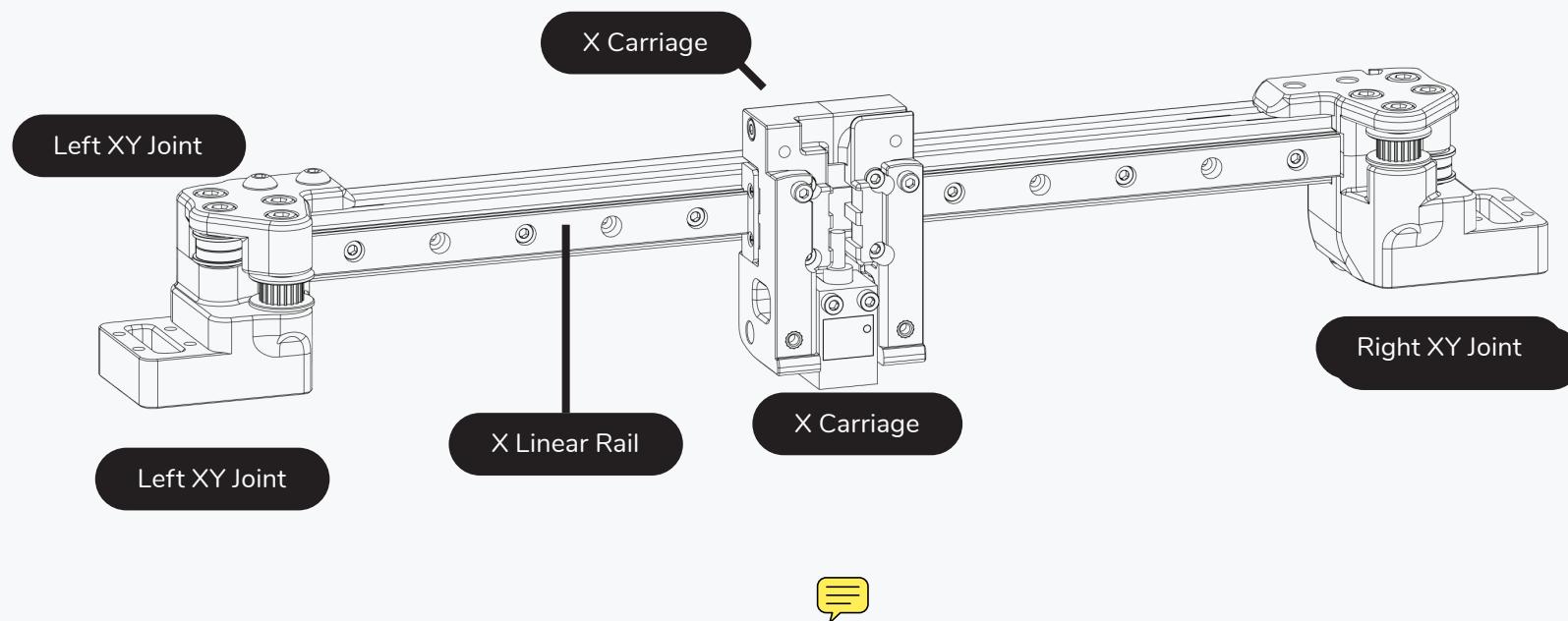
The profile shown above are towards  
the front and rear of the printer.

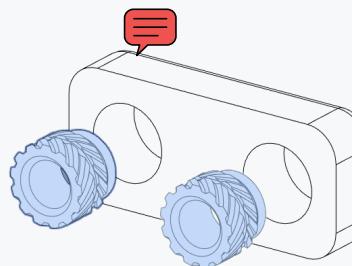


X AXIS

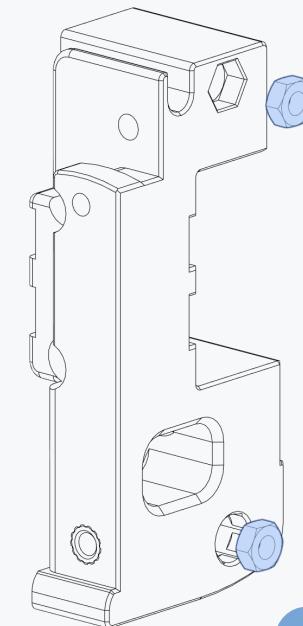
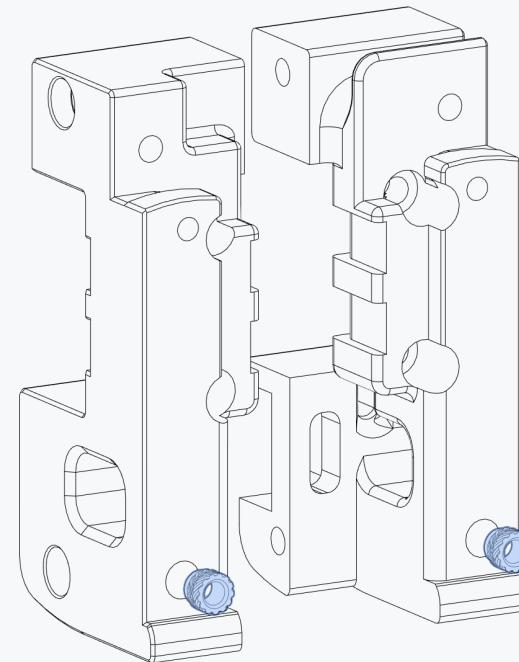
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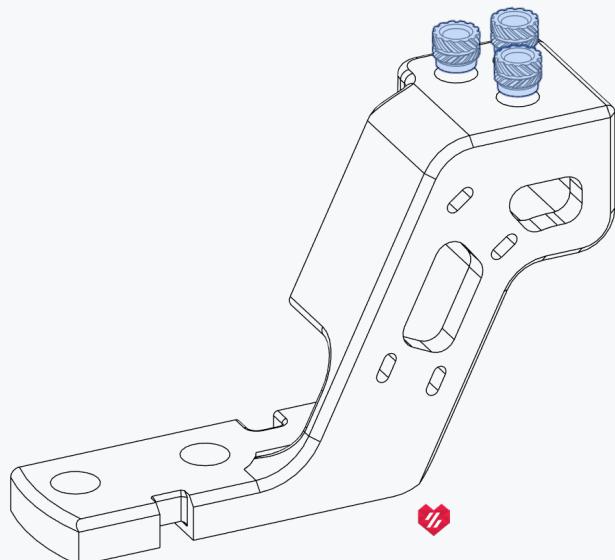
Heat Set Insert



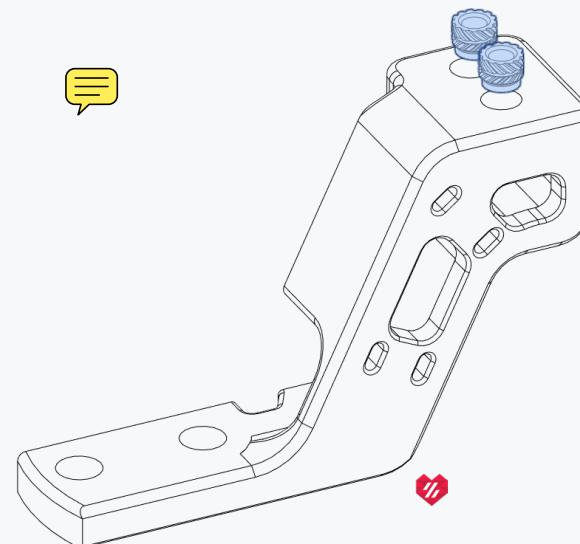
M3 Nut

**GENERIC CABLE CHAINS**

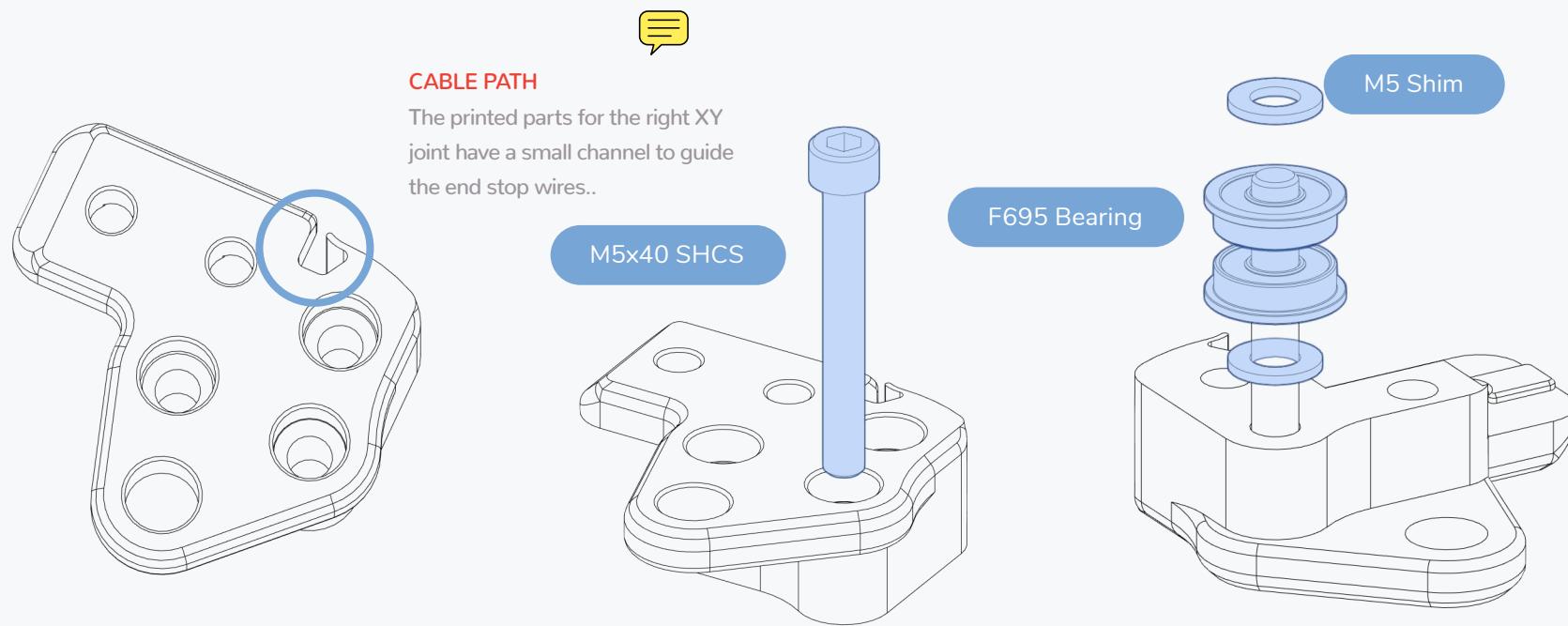
The 3 hole pattern is usually found on generic cable chains.

**IGUS CABLE CHAINS**

IGUS chains have 2 mounting holes.

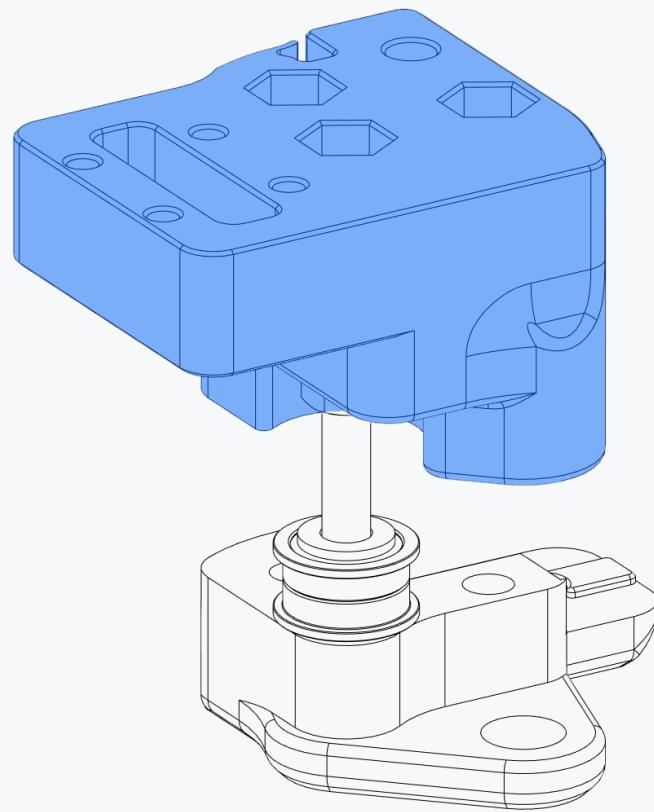
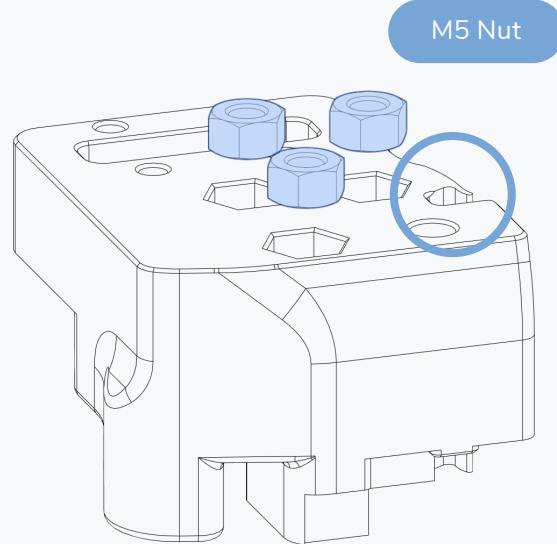
**WHICH TO CHOOSE?**

Pick the style that matches the mounting pattern of your cable chains.



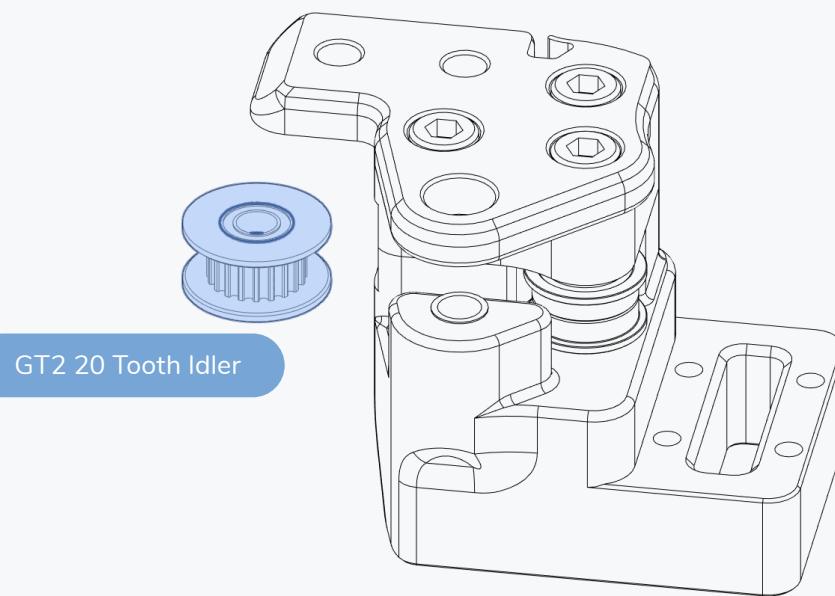
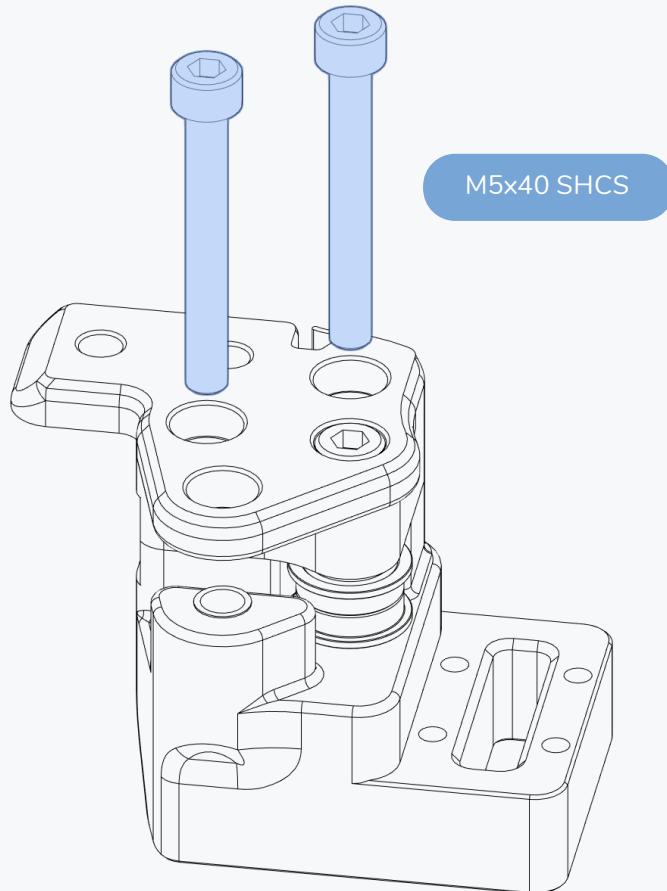
RIGHT XY JOINT

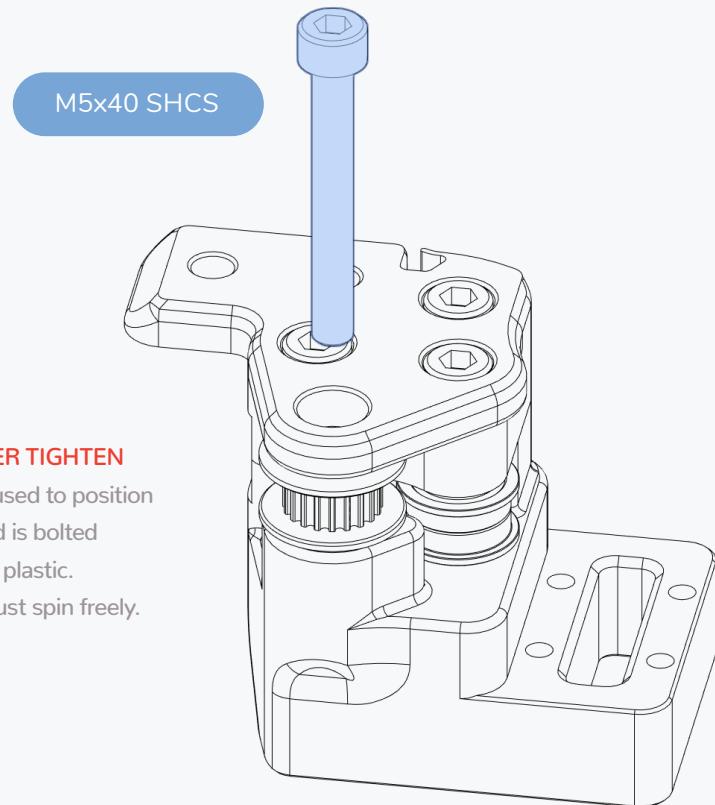
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RIGHT XY JOINT

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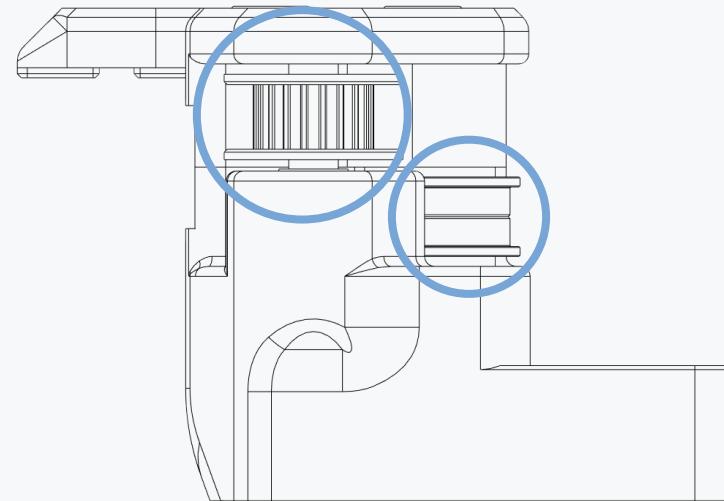


**DON'T OVER TIGHTEN**

The bolt is used to position the idler and is bolted directly into plastic. The idler must spin freely.

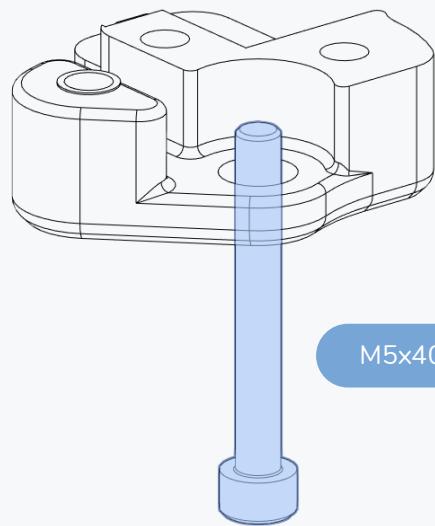
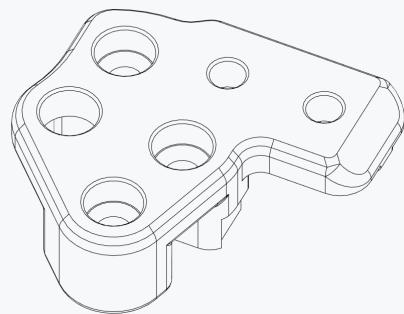
**CHECK YOUR WORK**

Compare your assembled part to the graphic shown here.



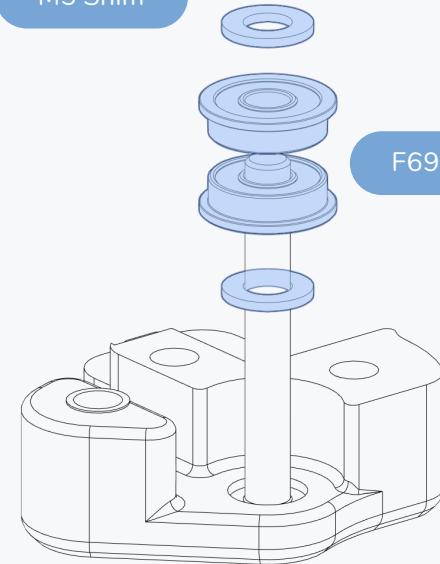
LEFT XY JOINT

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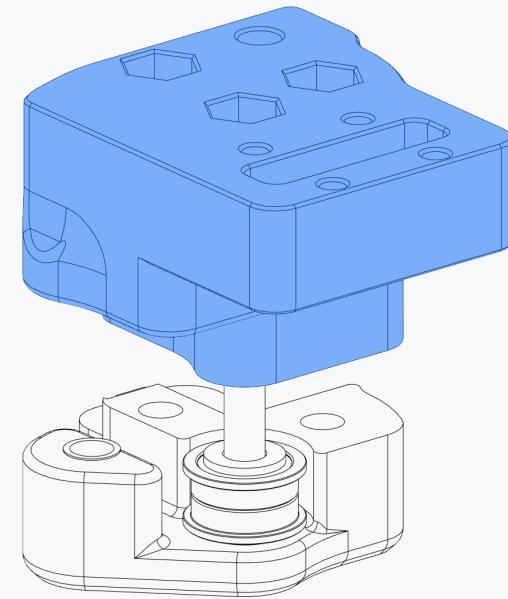
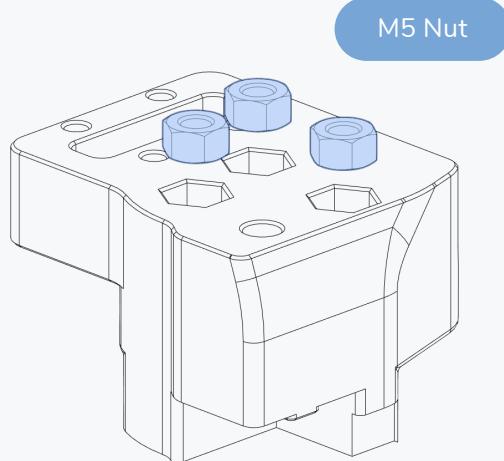
M5 Shim

F695 Bearing



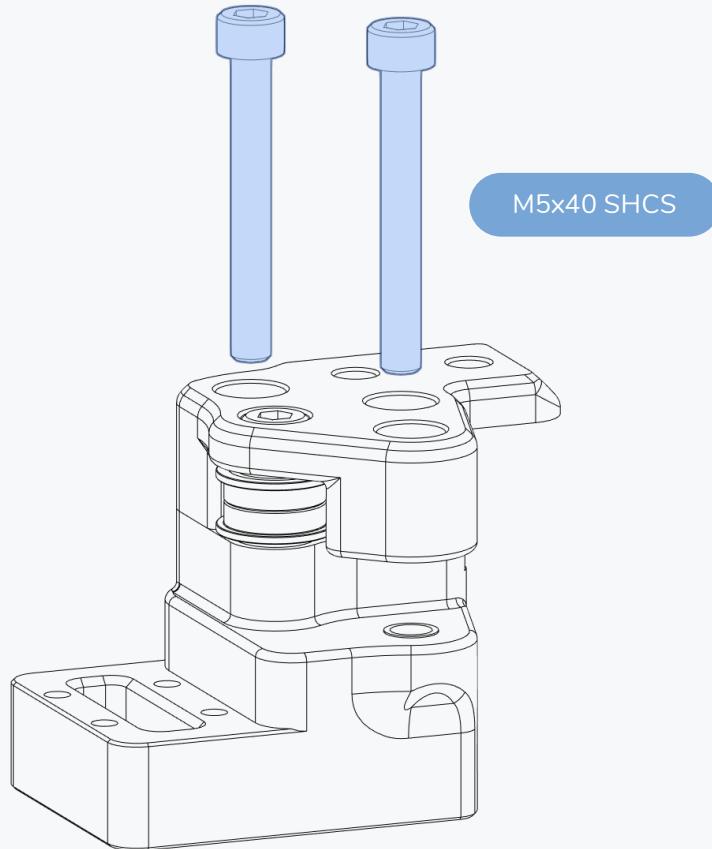
LEFT XY JOINT

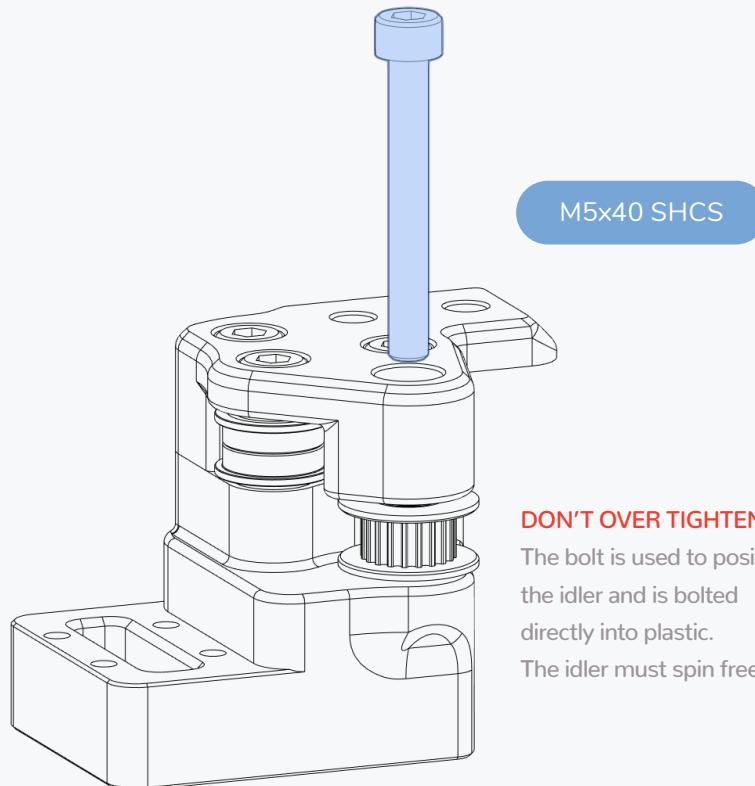
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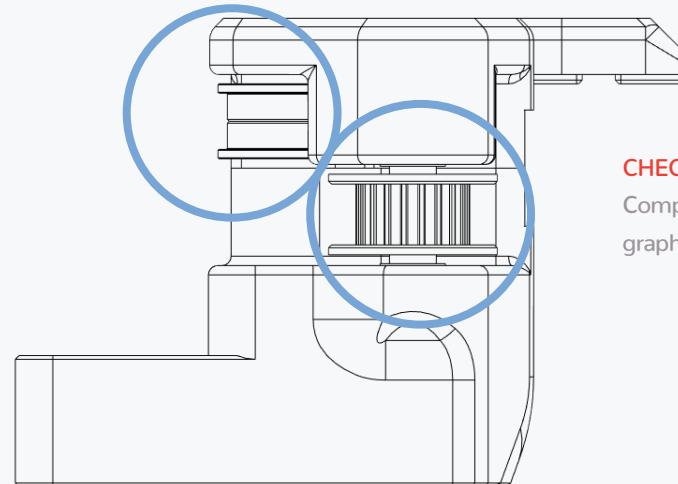
LEFT XY JOINT

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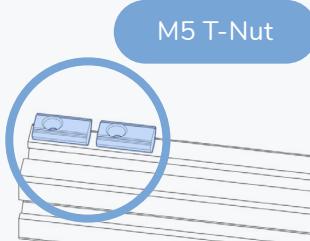


**DON'T OVER TIGHTEN**

The bolt is used to position the idler and is bolted directly into plastic. The idler must spin freely.

**CHECK YOUR WORK**

Compare your assembled part to the graphic shown here.

**T-NUT ORIENTATION**

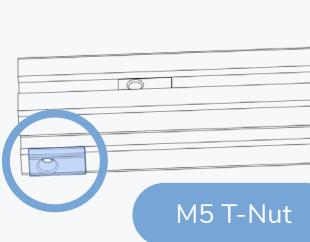
Insert the t-nuts as shown in the highlight.

E Extrusion

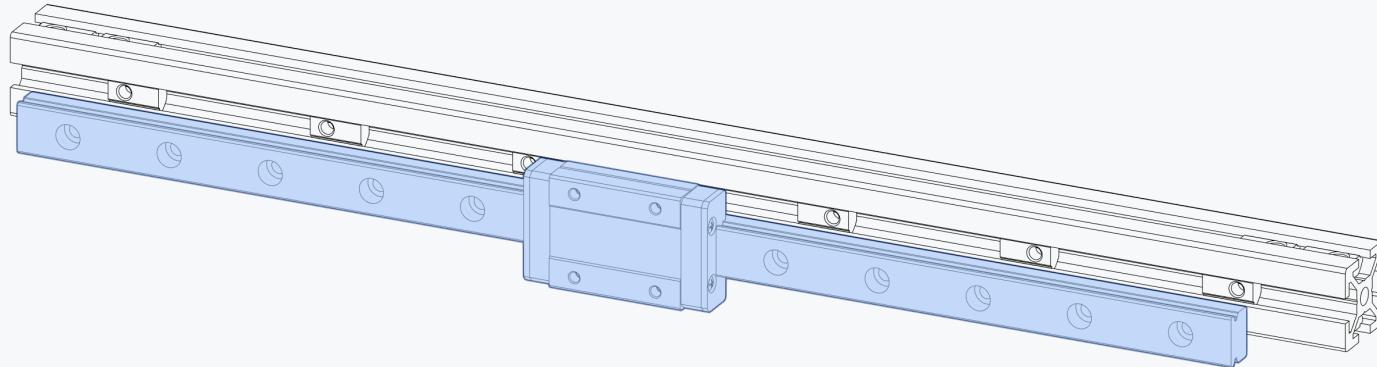
M5 T-Nut



M3 T-Nut



M5 T-Nut

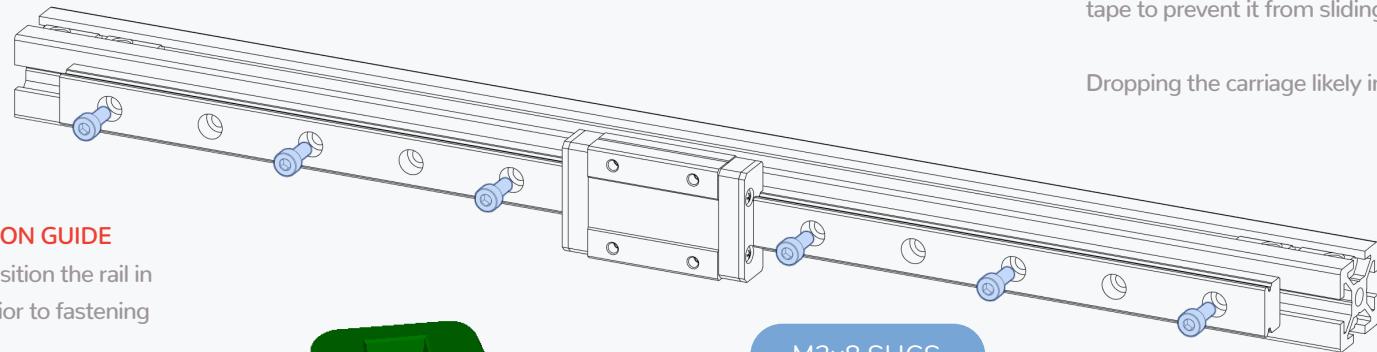


MGN 12 Rail

**MIND THE CARRIAGE**

Temporarily secure the carriage with a piece of sticky tape to prevent it from sliding off the rail.

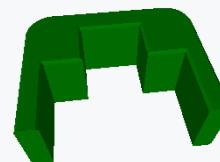
Dropping the carriage likely irreparably damages it.

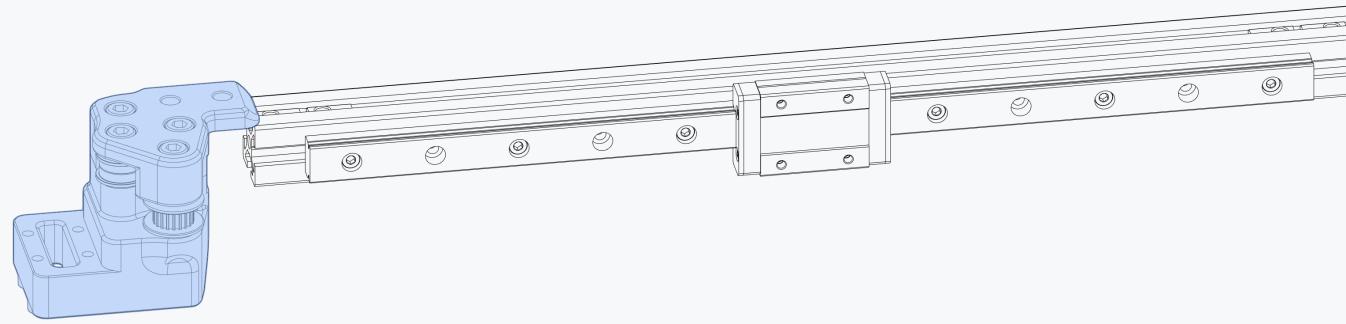


M3x8 SHCS

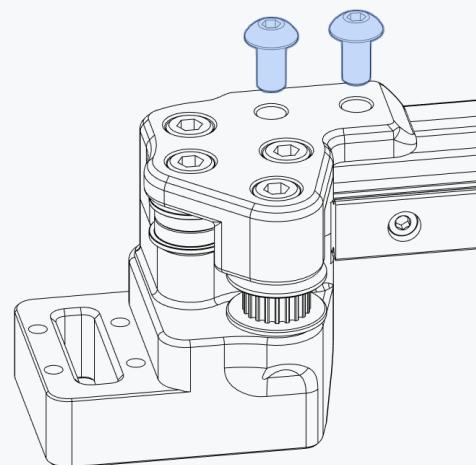
**CENTRED RAIL INSTALLATION GUIDE**

Use the MGN12 guides to position the rail in the centre of the extrusion prior to fastening the screws.

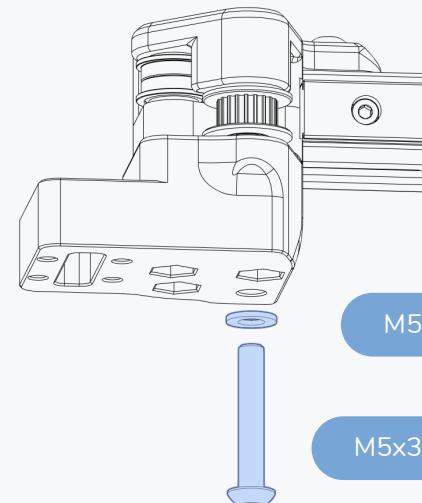




M5x10 BHCS

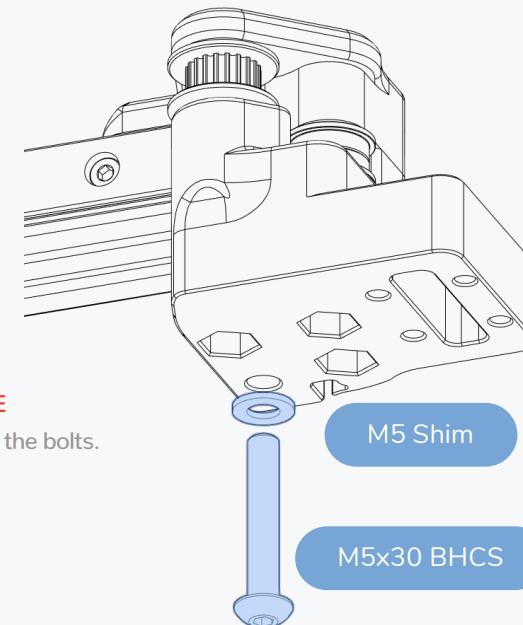
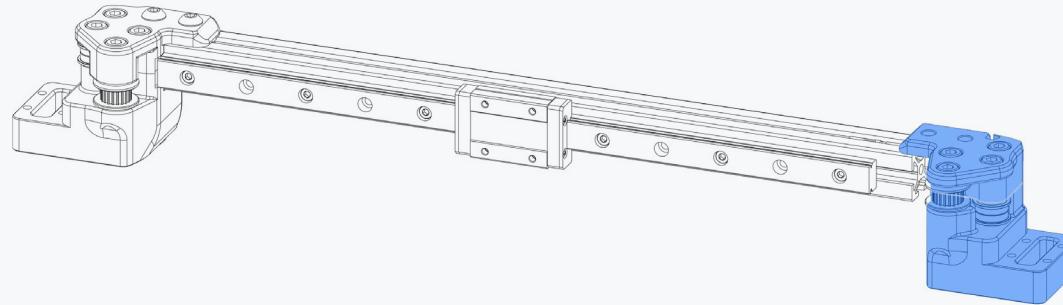


**LEAVE LOOSE**  
Lightly tighten the bolts.



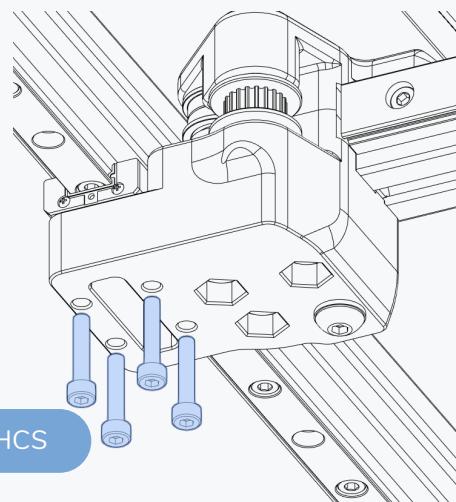
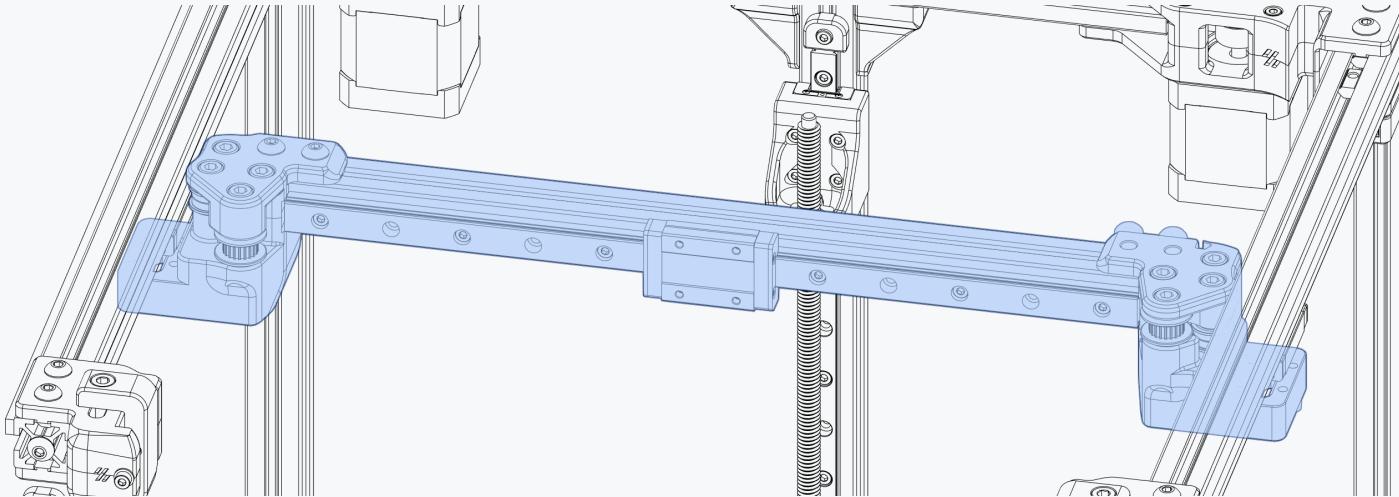
M5 Shim

M5x30 BHCS



M5 Shim

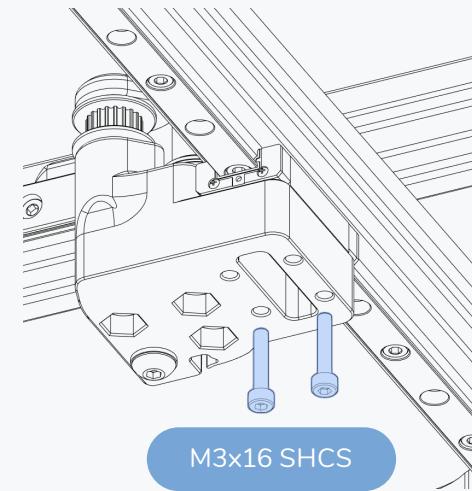
M5x30 BHCS



M3x16 SHCS

**MISSING SOME BOLTS?**

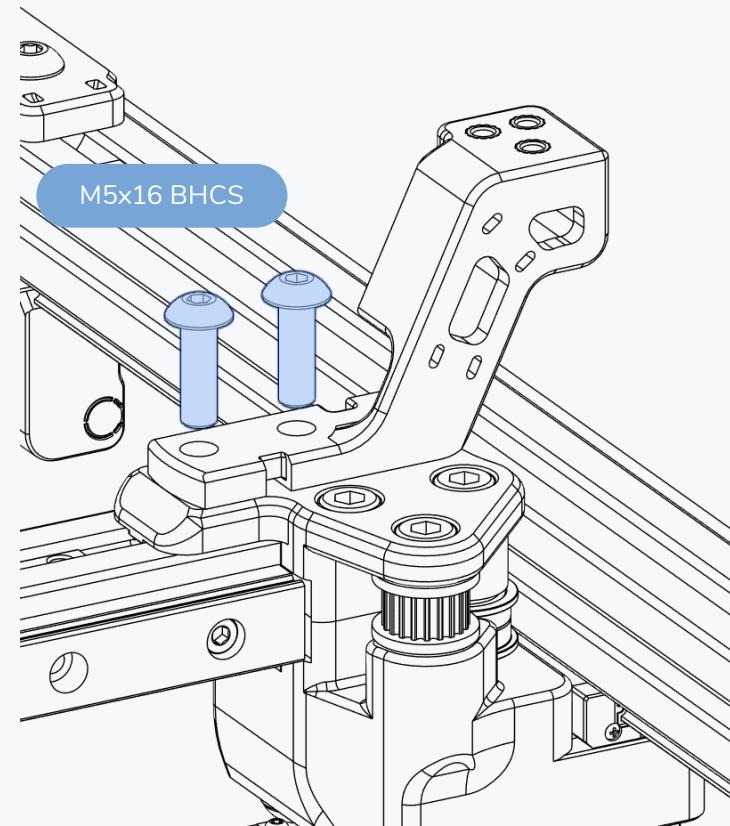
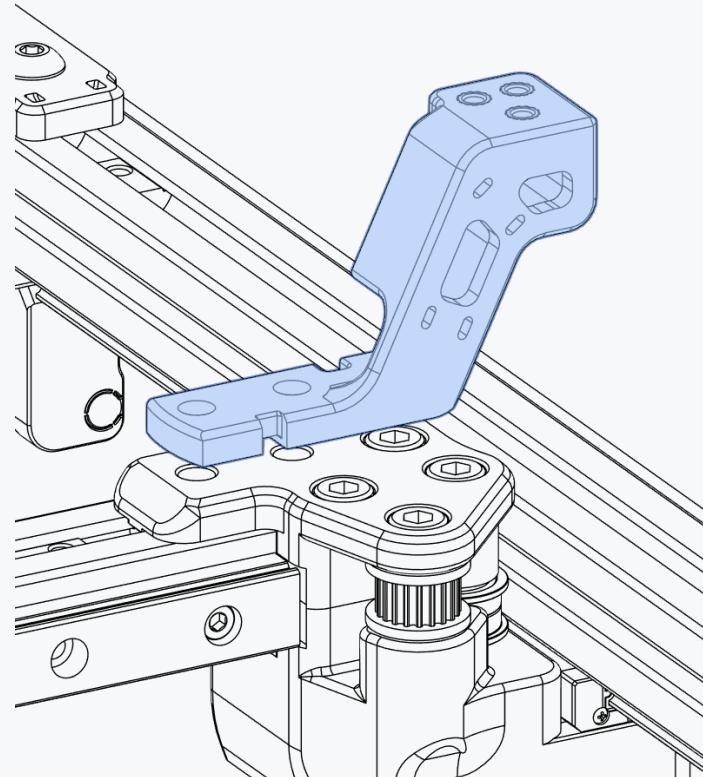
The other two bolts will be  
installed later.



M3x16 SHCS

XY CABLE BRIDGE

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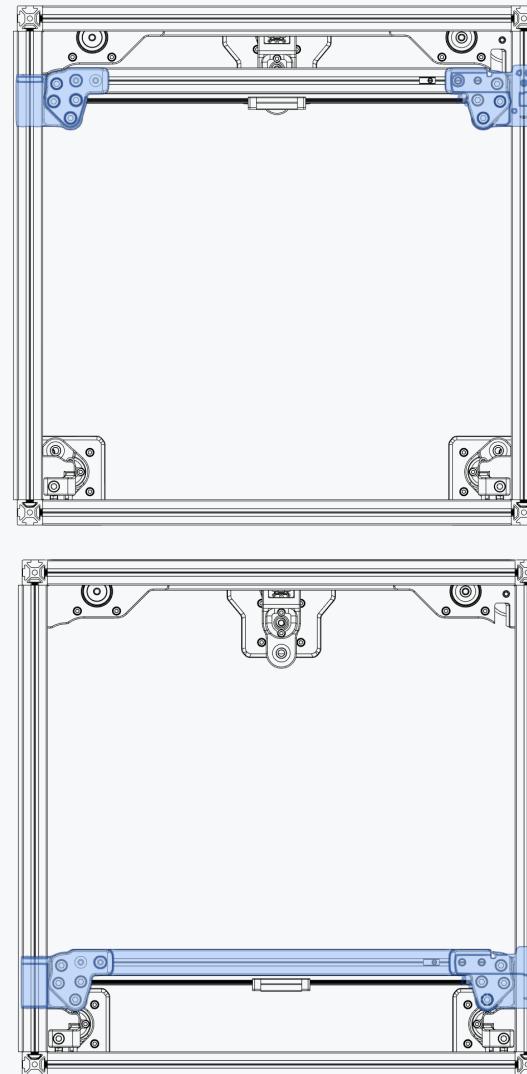
SQUARING THE GANTRY

Move the gantry all the way back until it hits the A and B drive on both sides.

Fully tighten all screws on the X axis.



<https://voron.link/cekh81>



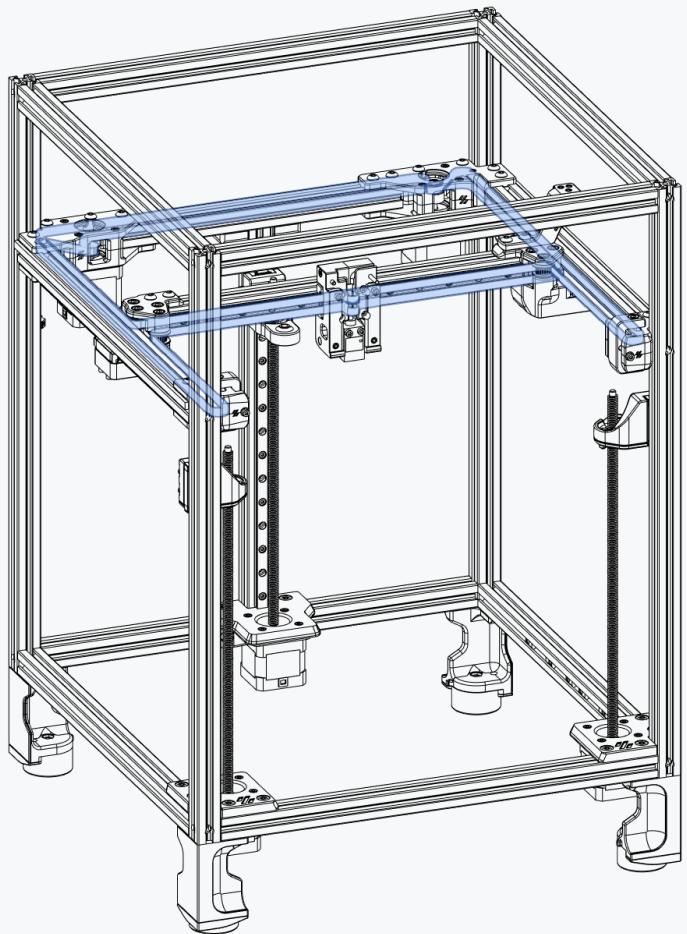
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The Voron Legacy is a modernized design true to the spirit of the original Voron 1.0.

BELTS

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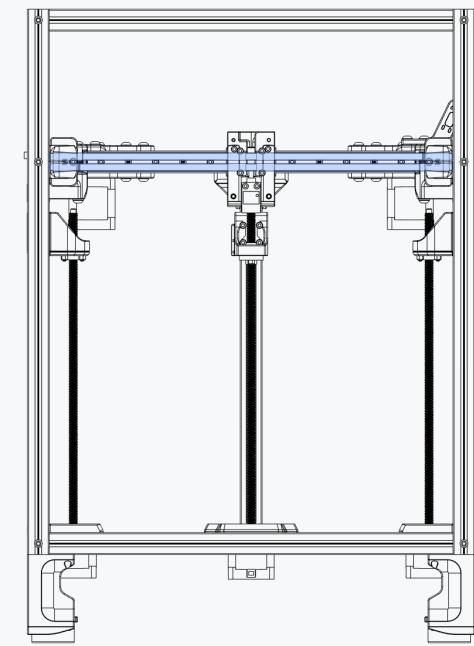
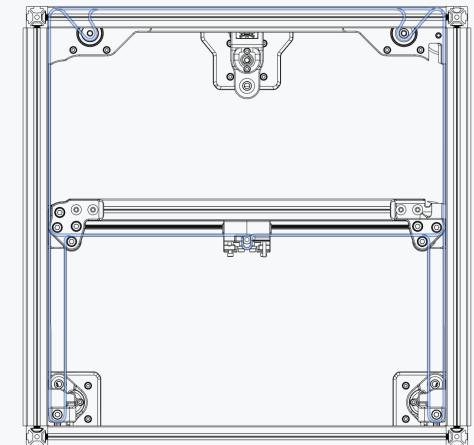
#### THE VORON BELT PATH

Voron printers use a belt path based on the popular CoreXY pattern.

The individual belt paths are stacked on top of each other and the crossing often found in CoreXY designs is omitted. Compared to many other implementations, the motors are moved to a less intrusive position. To learn more about the principles behind CoreXY visit <https://voron.link/ef72dd6>

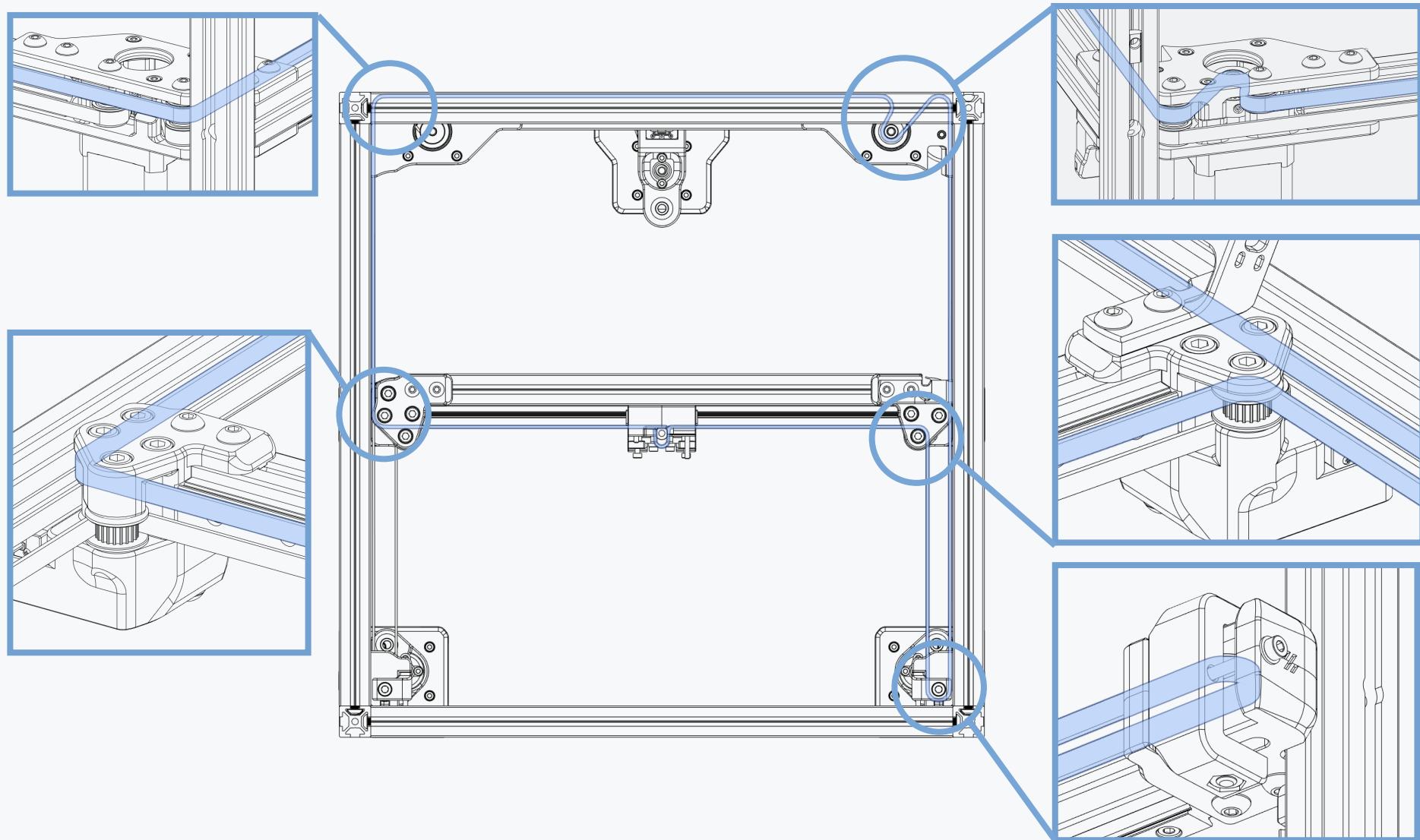
Equal belt tension is important to the proper function of a CoreXY motion system.

We recommend to run one belt to get the required length, remove the belt from the printer and cut the second belt to the exact same length. As both belt paths have the same length this is an easy way of getting a consistent tension.



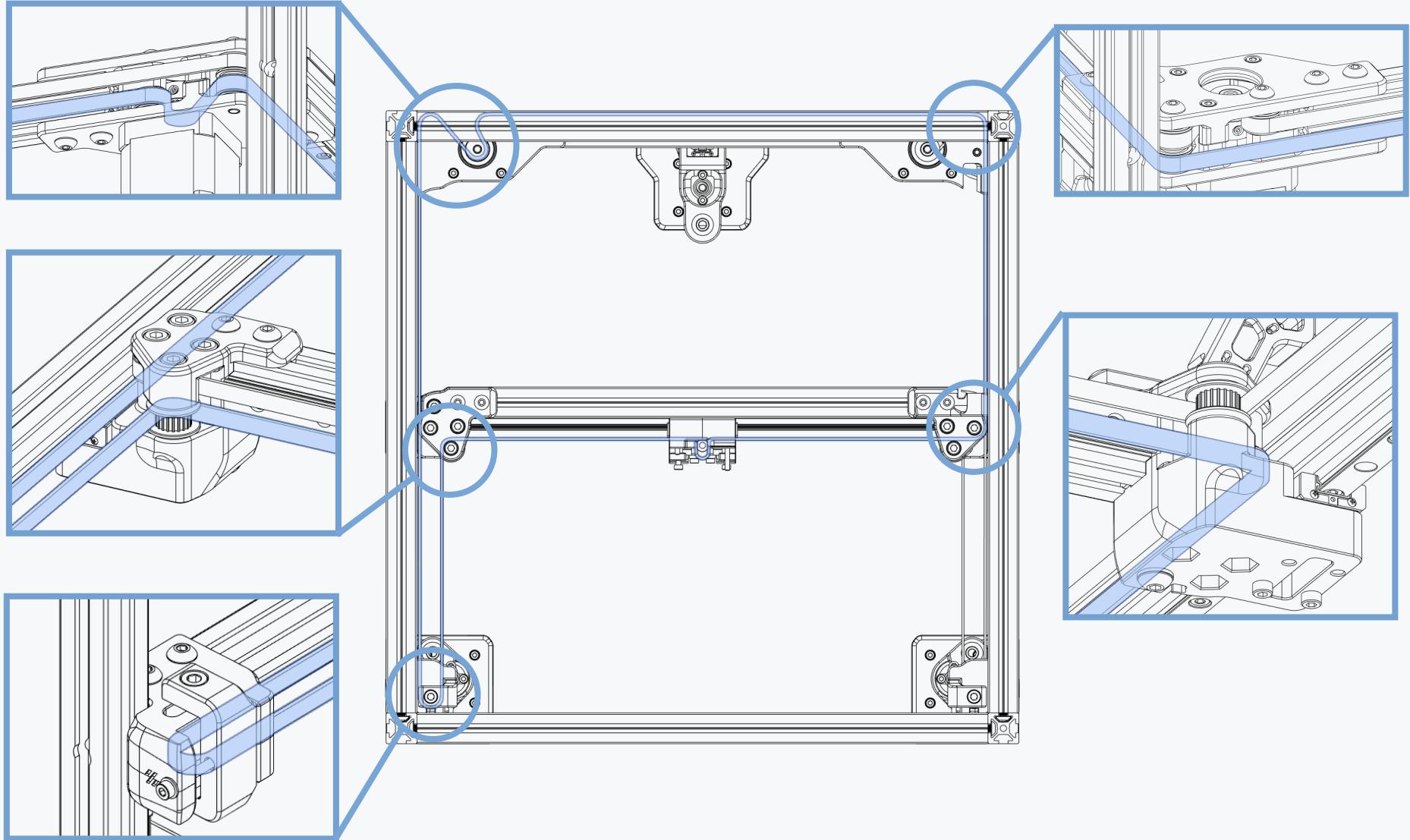
## BELTS

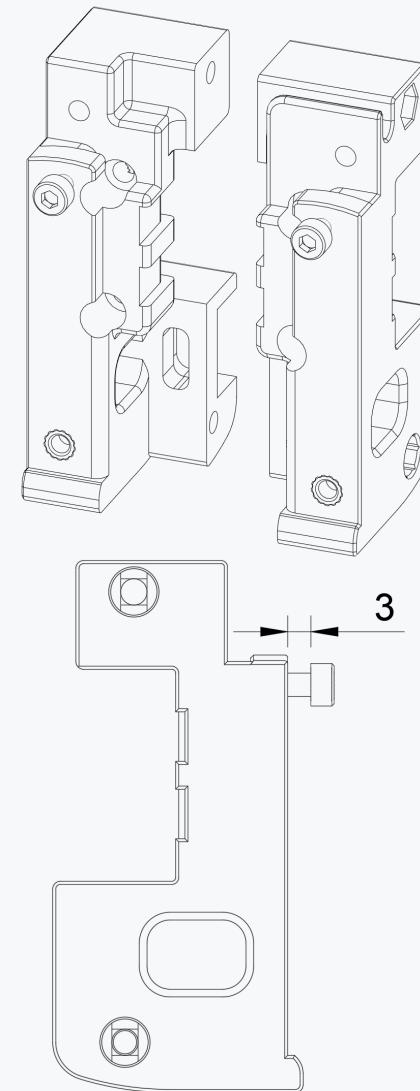
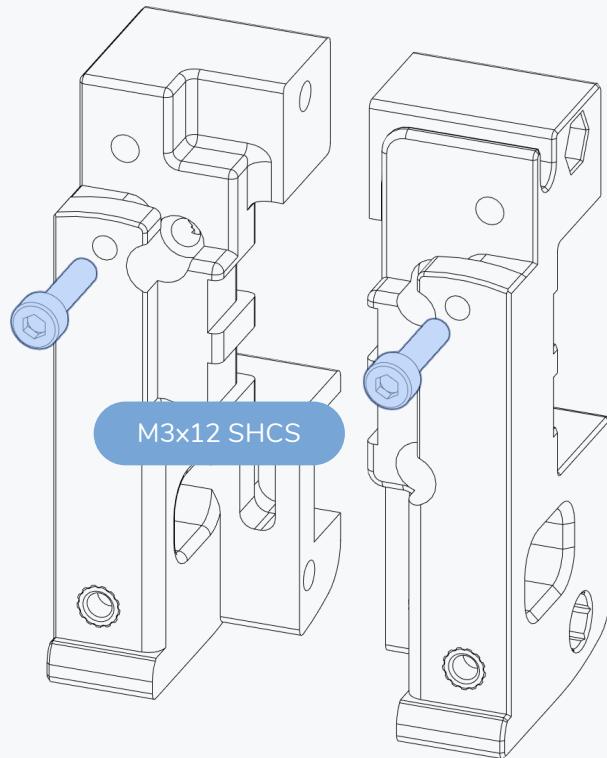
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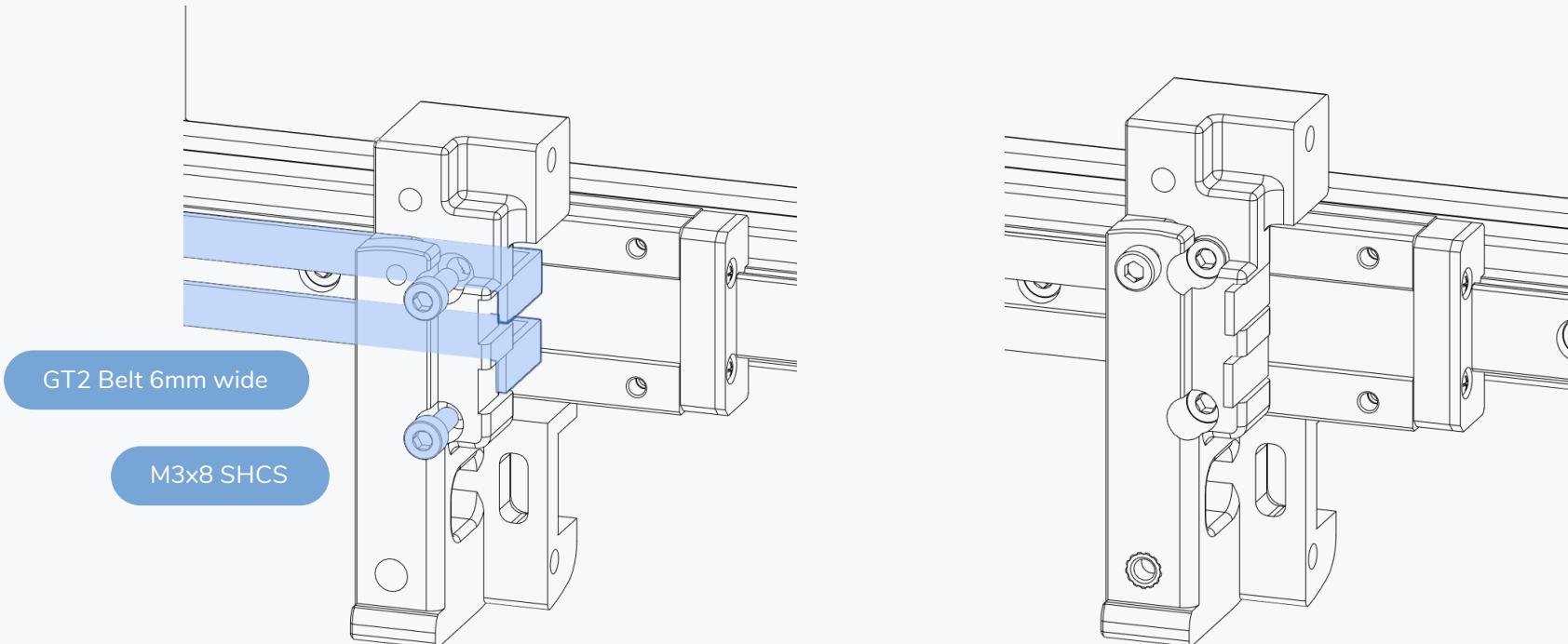


BELTS

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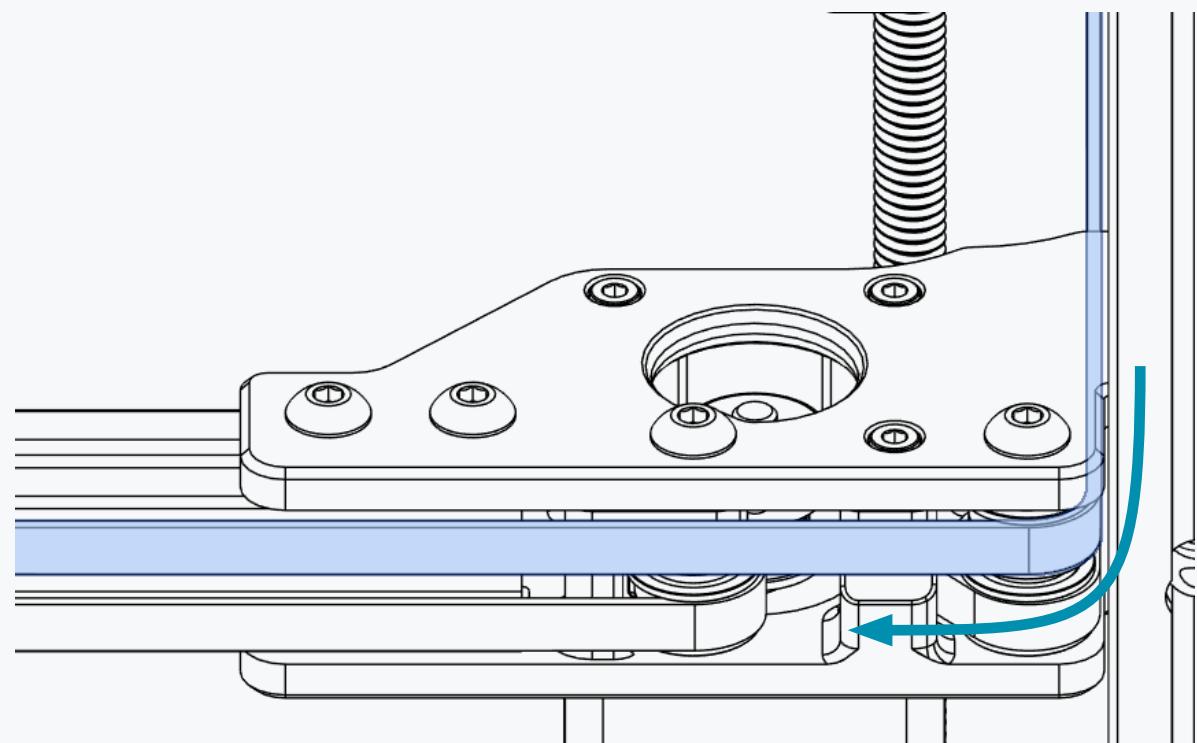
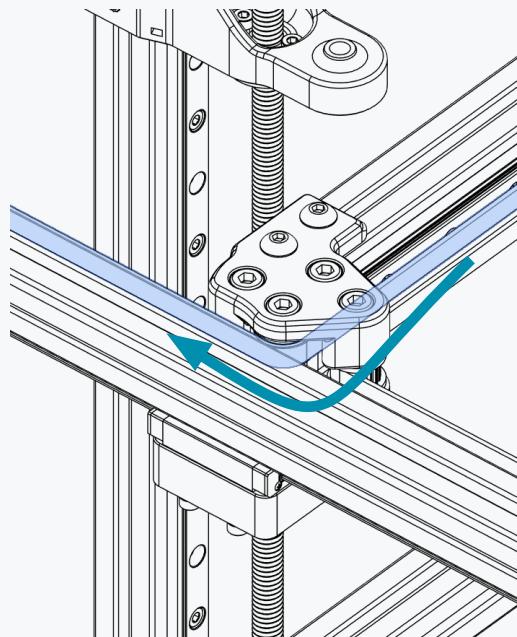




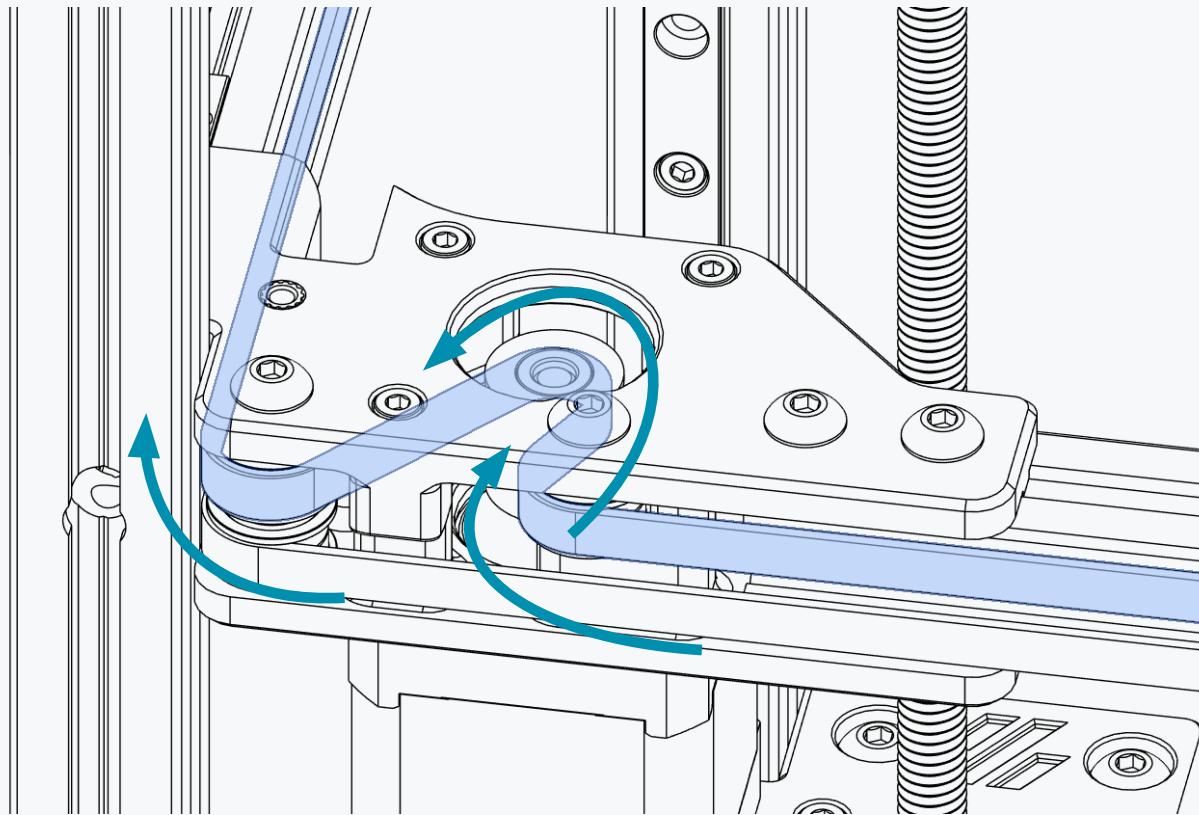
#### CLAMP BELTS

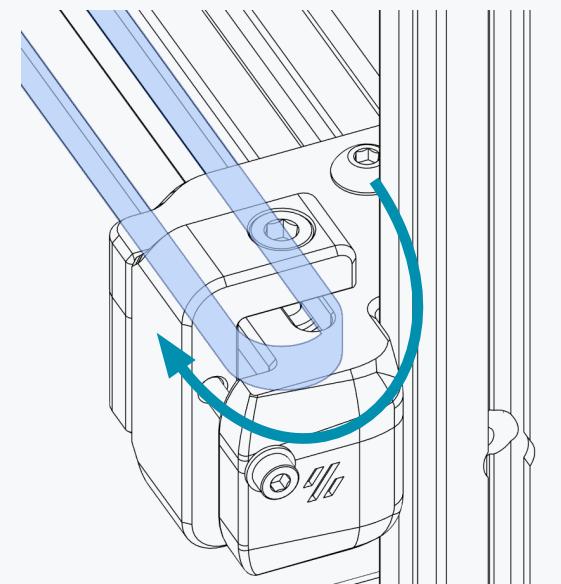
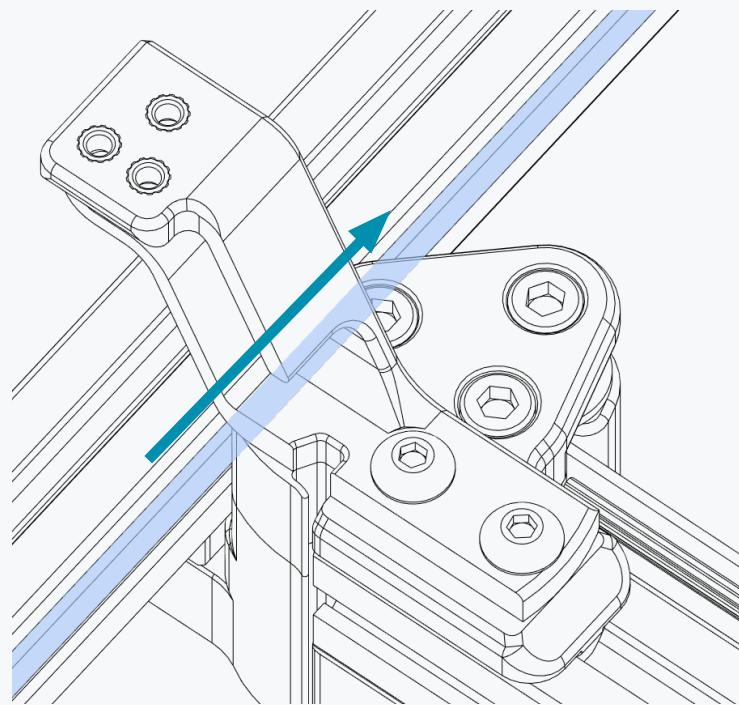
Clamp both A and B belts in place by installing the left X carriage part.

The belt teeth face away from the extrusion.

**A BELT ROUTING**

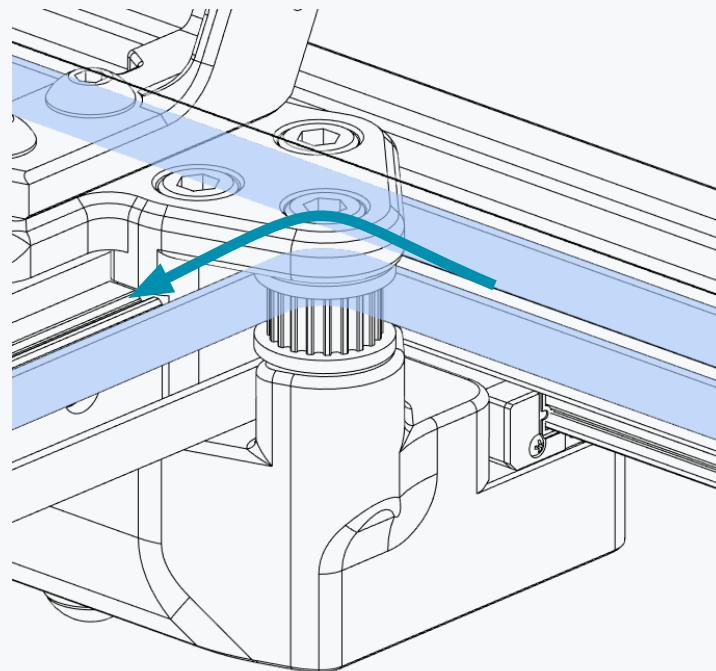
Follow the path pointed out by the arrows.  
Needle nose pliers, tweezers or similar tools  
can help in this step.

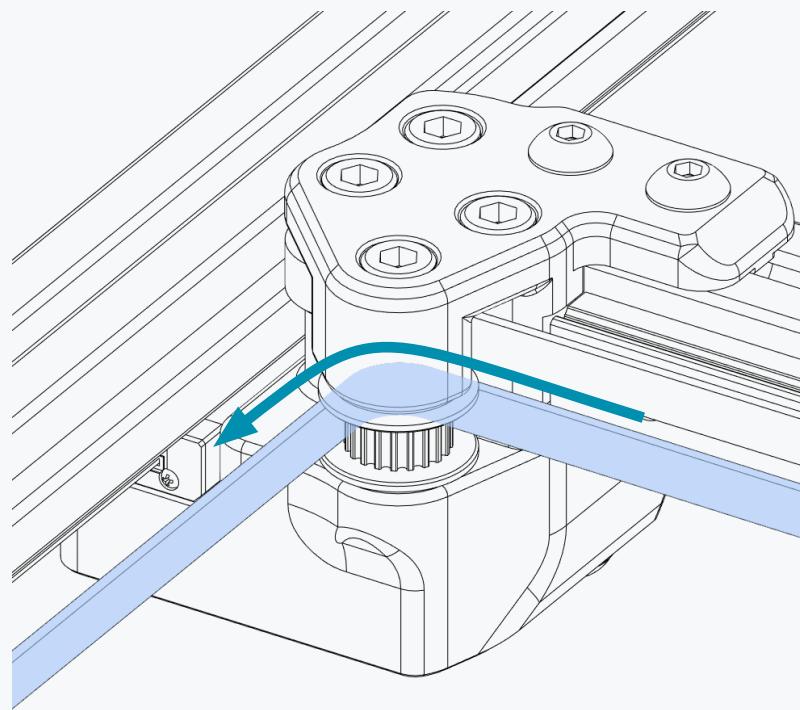




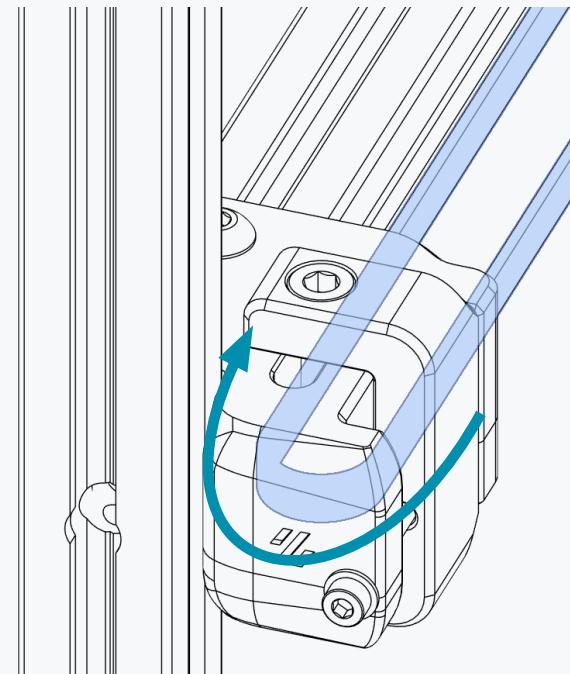
#### BELTING IDLERS

If you're having trouble guiding the belts around the bearing stack temporarily remove the M3x40 SHCS to get better access.



**B BELT ROUTING**

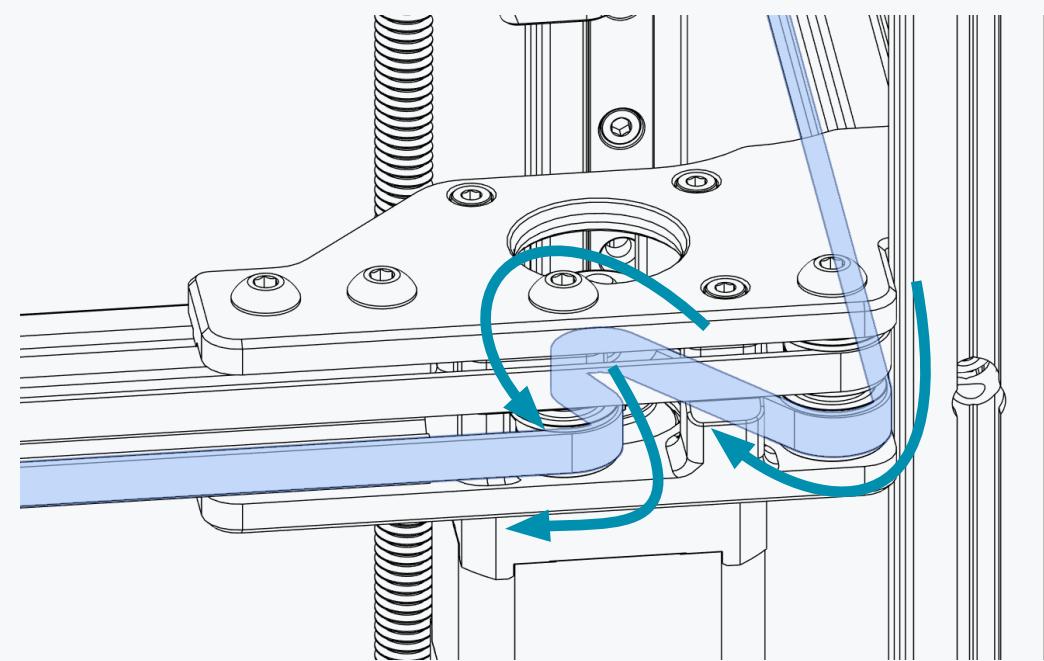
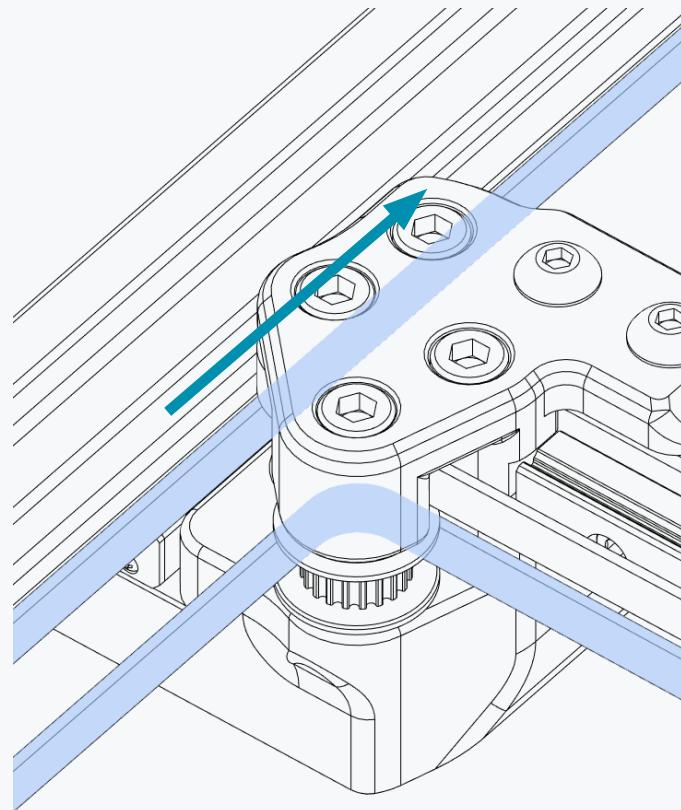
Follow the path pointed out by the arrows.  
Needle nose pliers, tweezers or similar tools  
can help in this step.

**BELTING IDLERS**

If you're having trouble guiding the belts around  
the bearing stack temporarily remove the M3x40  
SHCS to get better access.

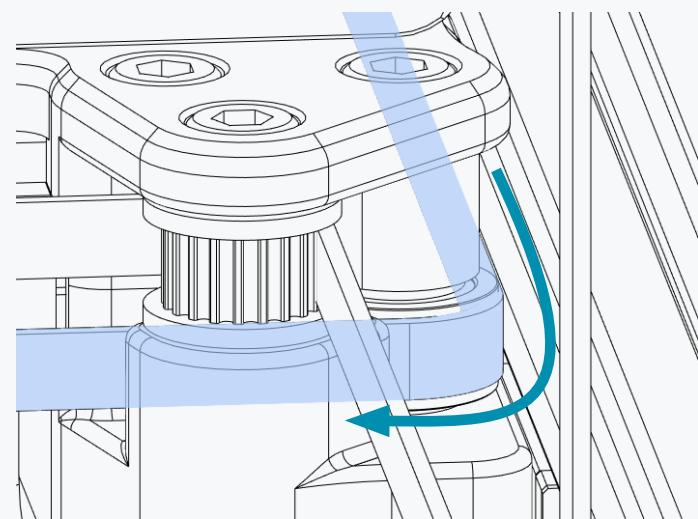
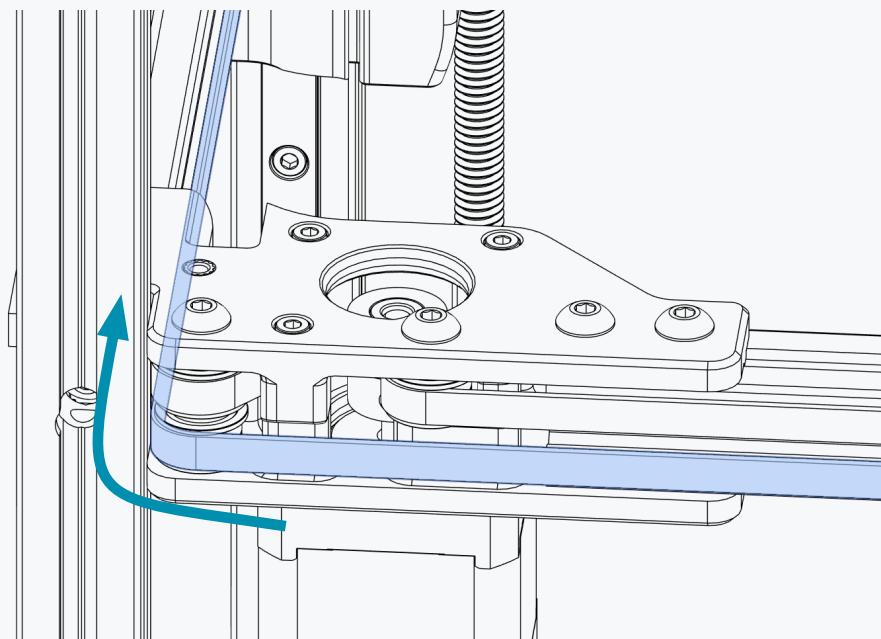
B BELT

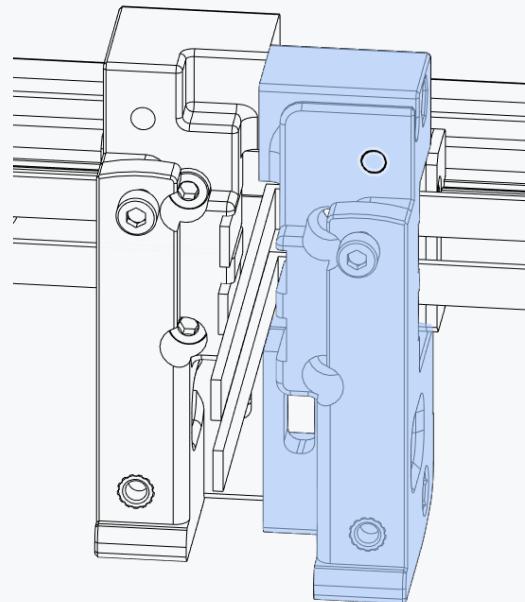
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B BELT

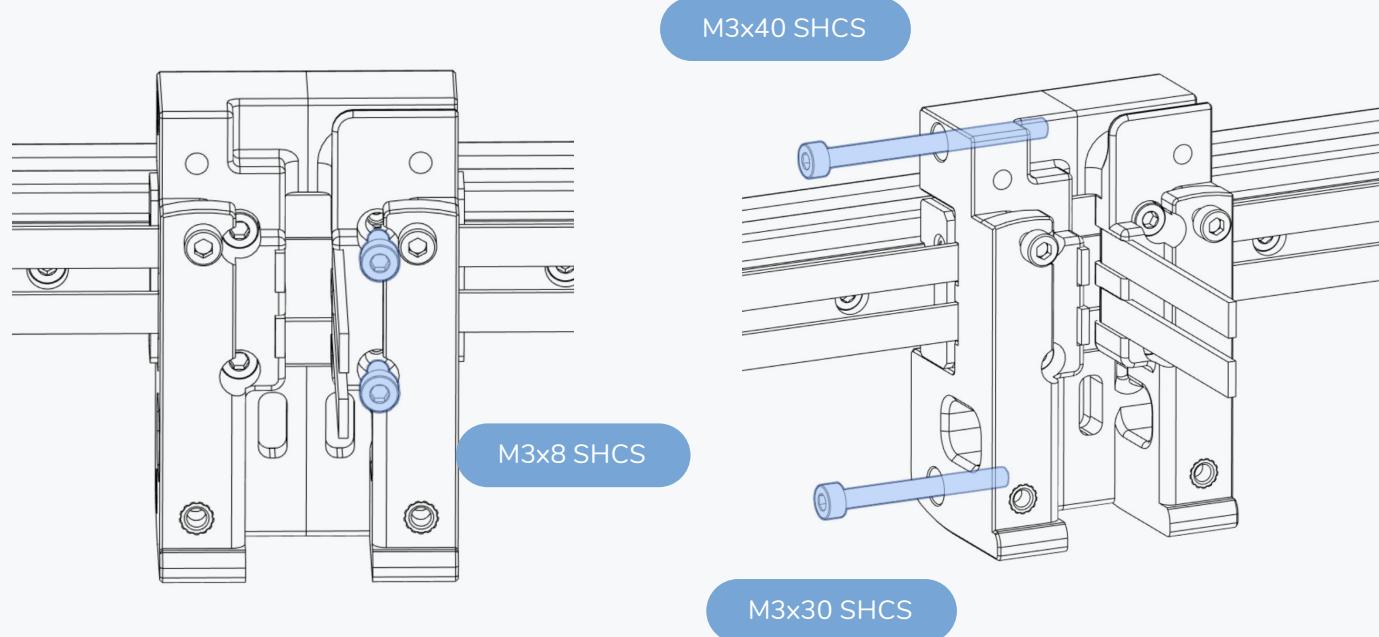
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**X CARRIAGE**

Use the second part of the X carriage to capture the belt ends.

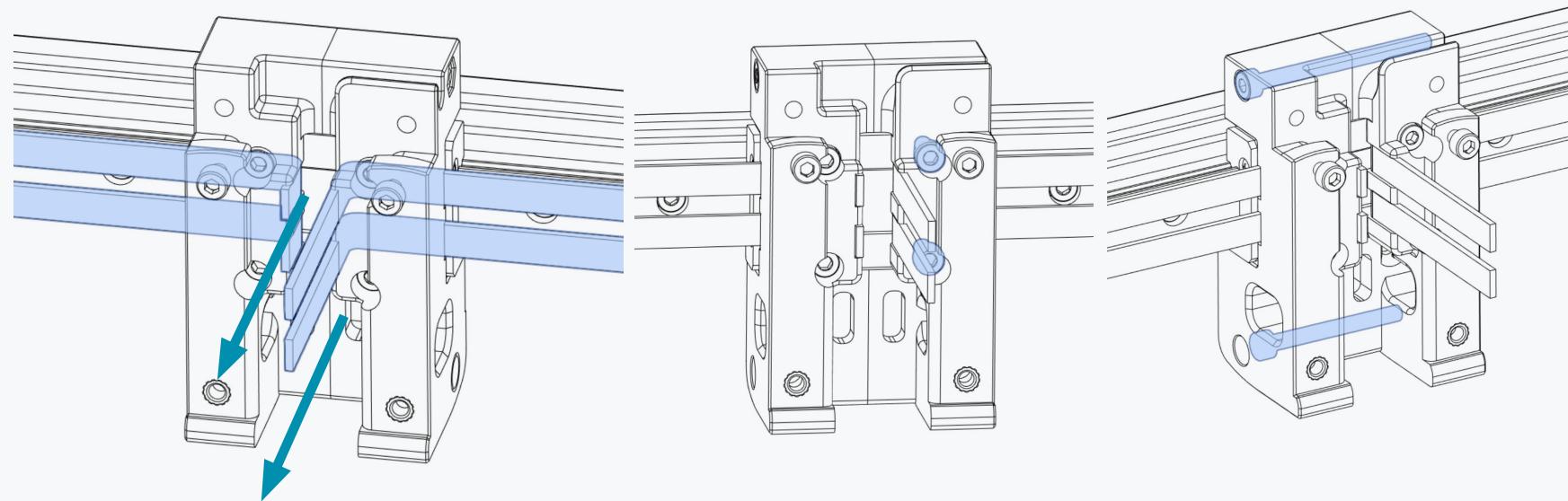
**FIX BELTS**

Lightly tighten the screws.

The belt must still be able to move.

**LEAVE LOOSE**

Lightly tighten the bolts.

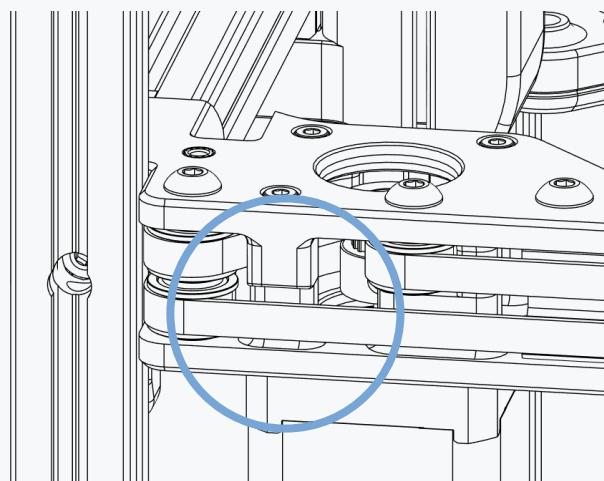
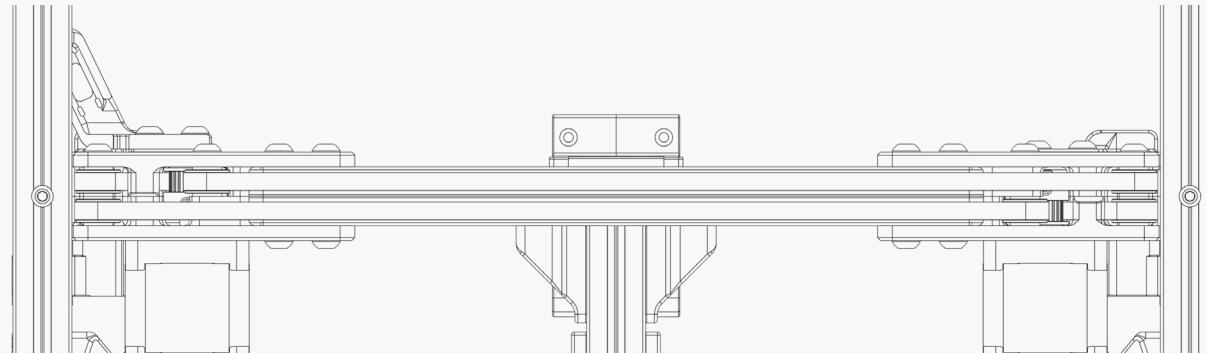
**PULL TIGHT**

Grab both belt ends with a pair of pliers and pull the belt tight.

As both belts are cut to the exact same total length and the belt paths are equal length in this design make sure the same length of belt protrudes from the carriage.

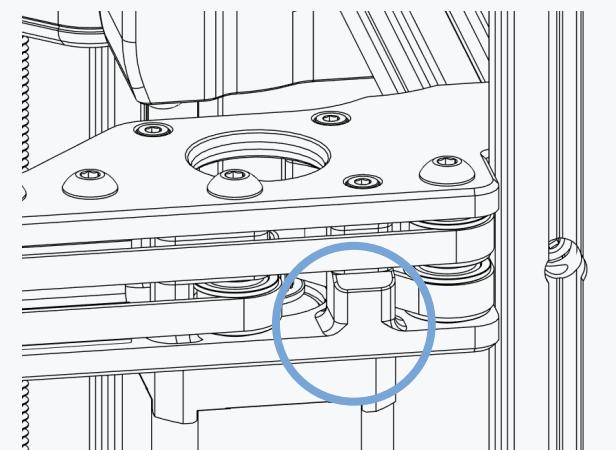
**TIGHTEN BOLTS**

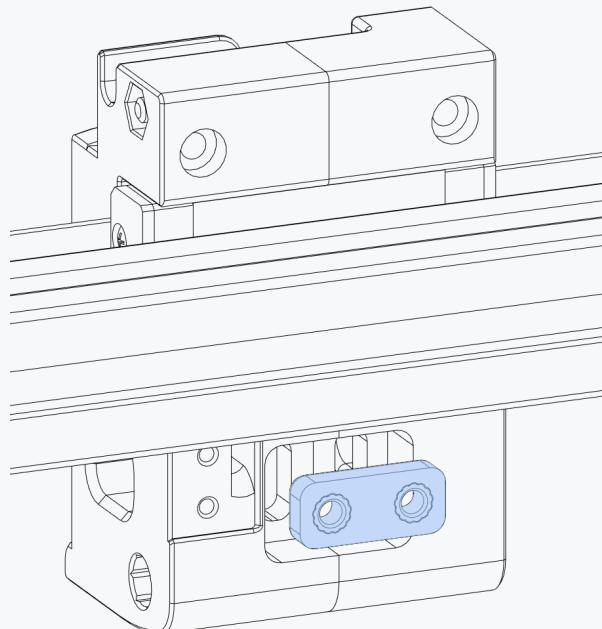
Fully tighten the carriage bolts.



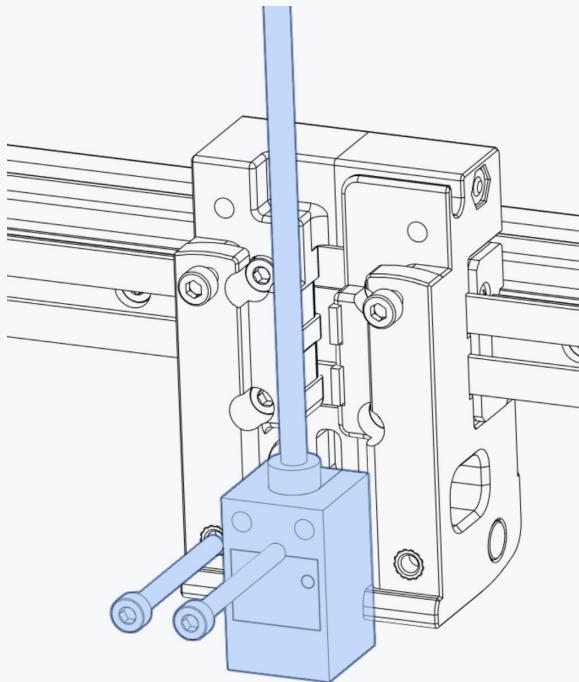
**CHECK YOUR WORK**

Make sure that the belt is not riding on the plastic parts.





M3x30 SHCS



Inductive Probe

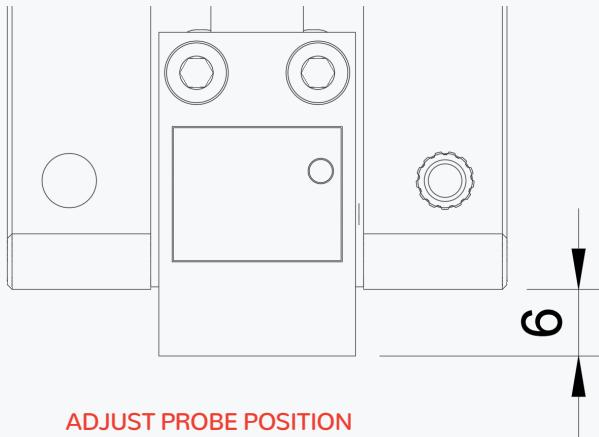
#### PROBE WIRES

Cut the probe wires to about 150mm.

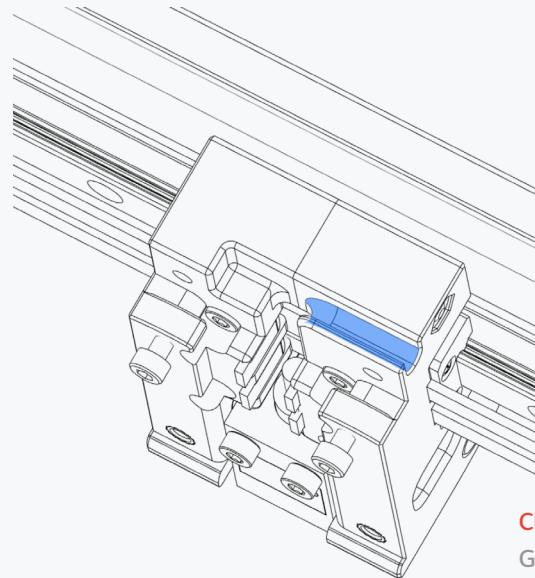
#### OTHER PROBE TYPES

The picture shows the recommended Omron TL-Q5MC probe.

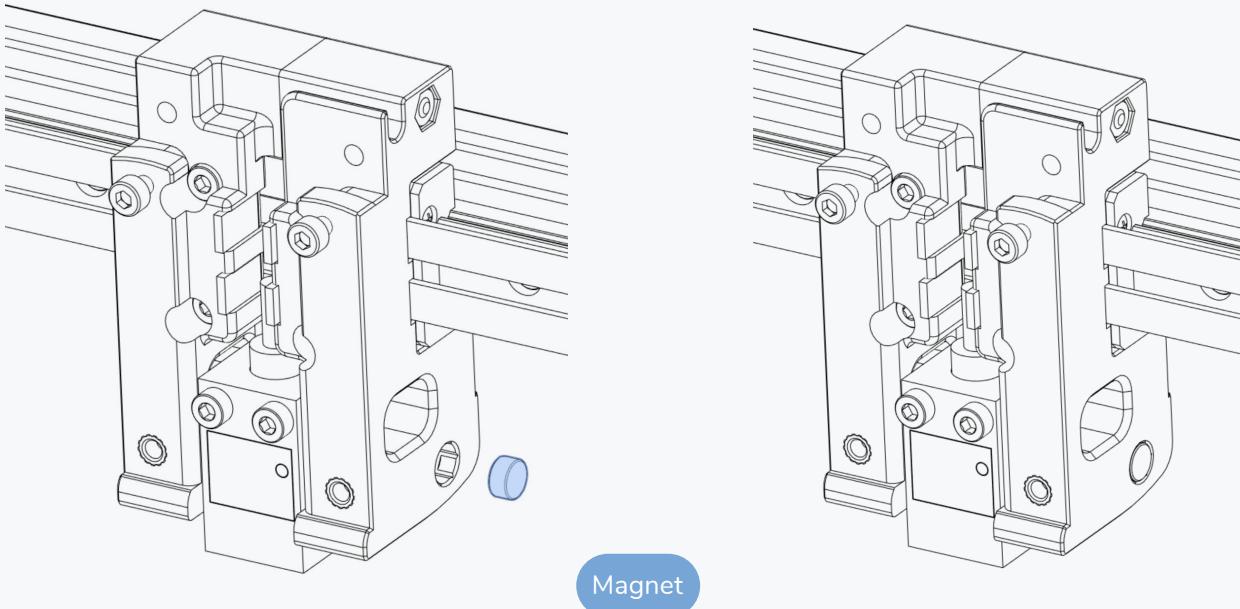
Other probes with a similar form factor and characteristics might work as well. A design for a PINDA probe adapter is included in the released files.

**ADJUST PROBE POSITION**

The position can be fine-tuned later. Set an initial position of about 6mm below the plastic part.

**CHANNEL FOR PROBE CABLE**

Guide the probe cable into the highlighted slot.

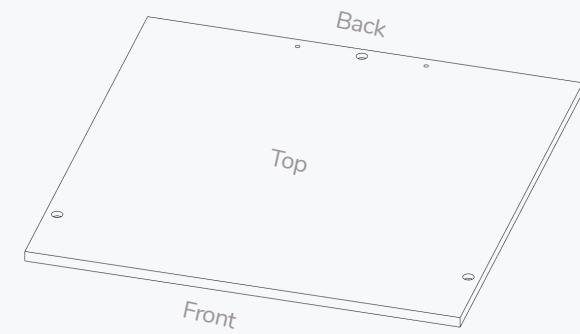
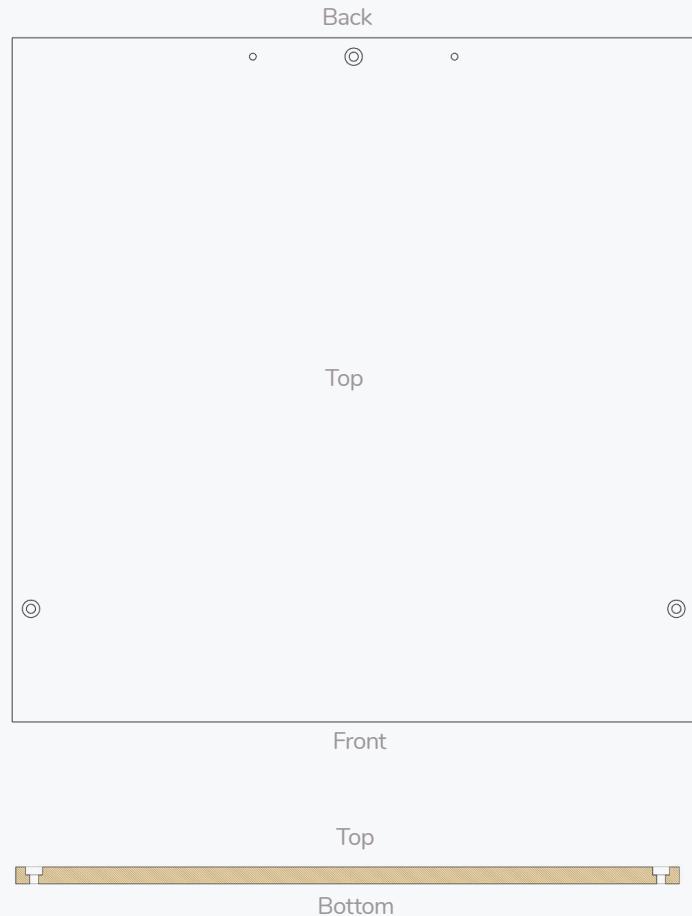
**OPTION: HALL EFFECT ENDSTOP**

If you are using a Hall Effect Endstop  
insert a 3x6 magnet into the highlighted  
position during calibration. See: <https://voron.link/hxd3cv0>

PRINT BED

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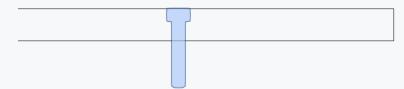


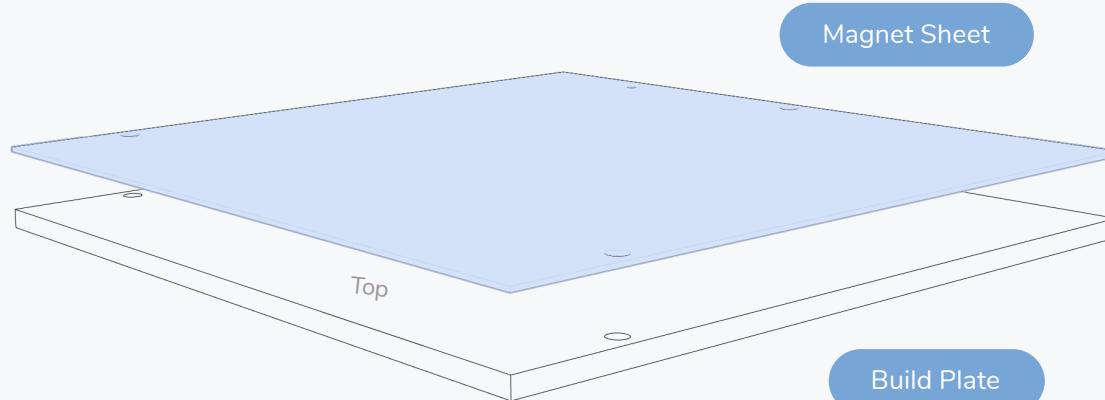


#### WHICH SIDE IS WHICH?

The top of the plate has mounting holes with bores that allow boltheads to sit flush/below the surface.

The plate has additional tapped holes to secure the PE connection and a thermal fuse, those are on the back side of the plate.





#### MAGNET APPLICATION

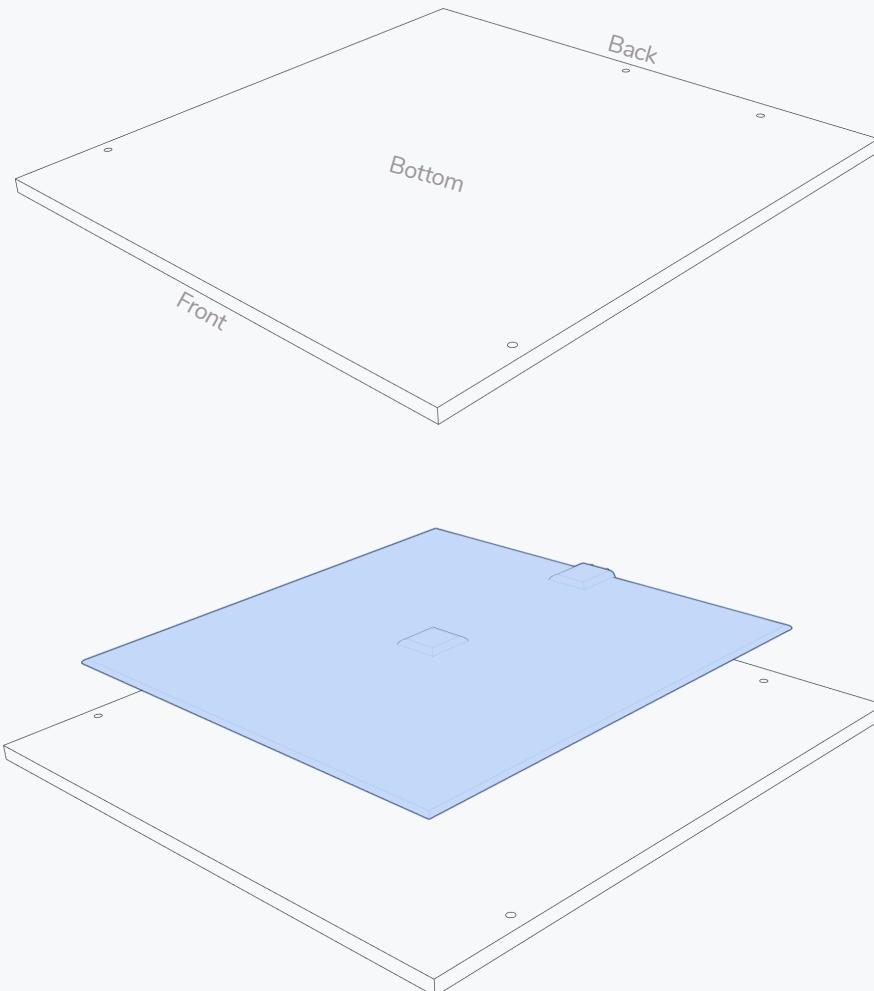
Clean the plate with isopropyl alcohol or similar cleaner prior to applying the magnet.

Use the edge of a plastic object or a small roller to firmly press the magnet on the plate to get a good bond.

If you have never done this before we recommend you watch the linked guide.



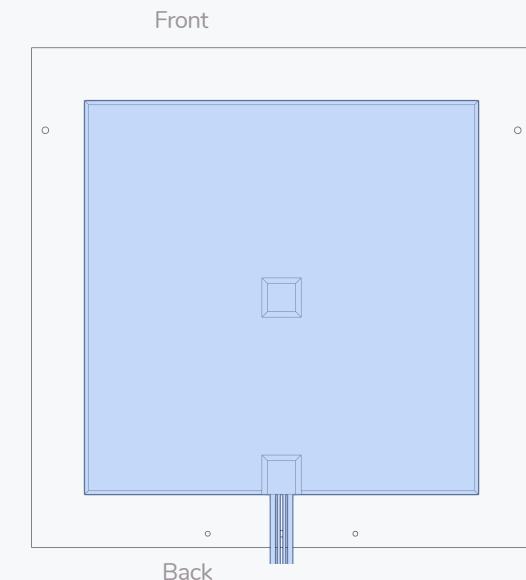
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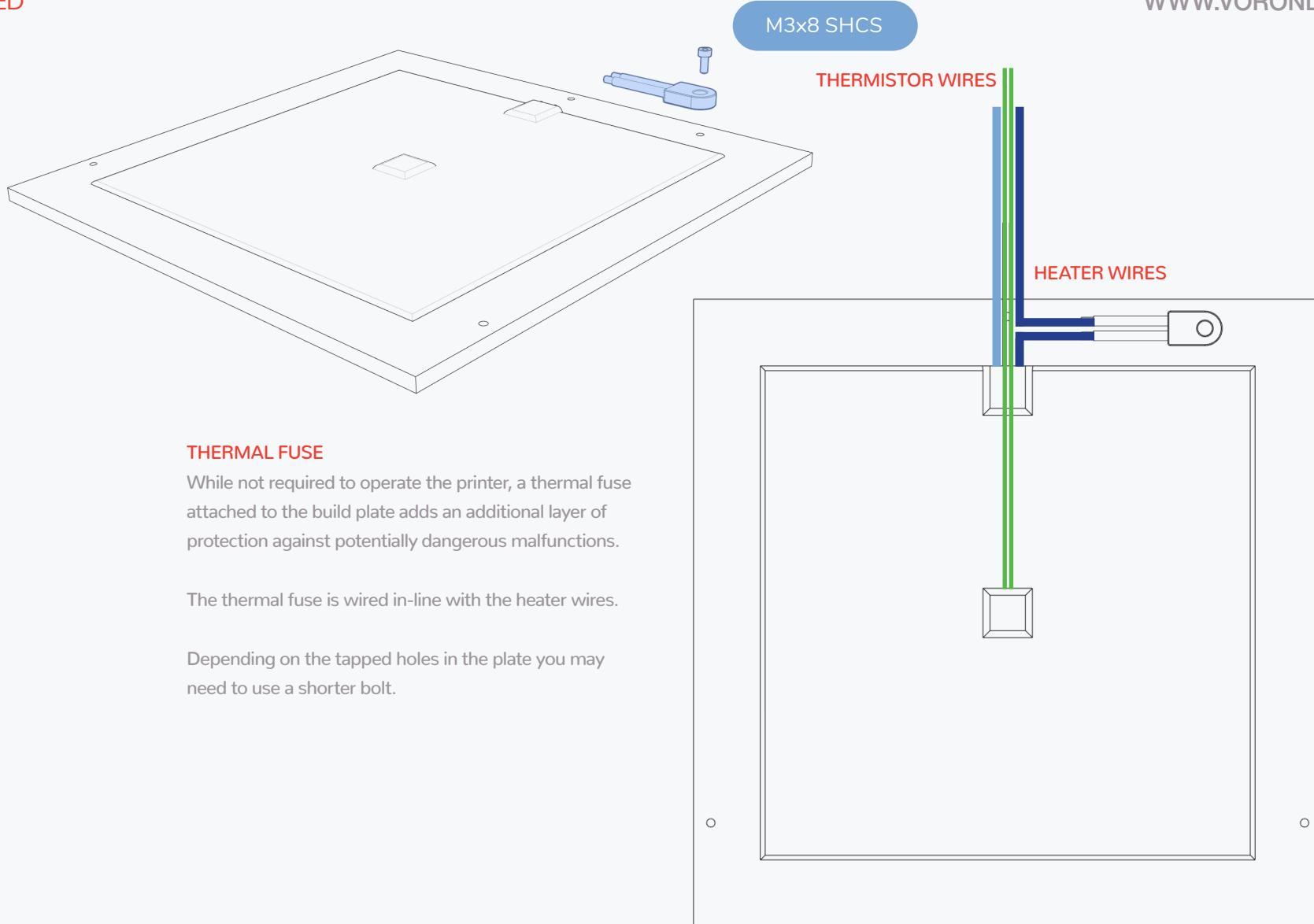


#### HEATER APPLICATION

The heater is installed in the same fashion as the magnet.

Centre it on the underside of the build plate and make sure to firmly press it on the build plate.



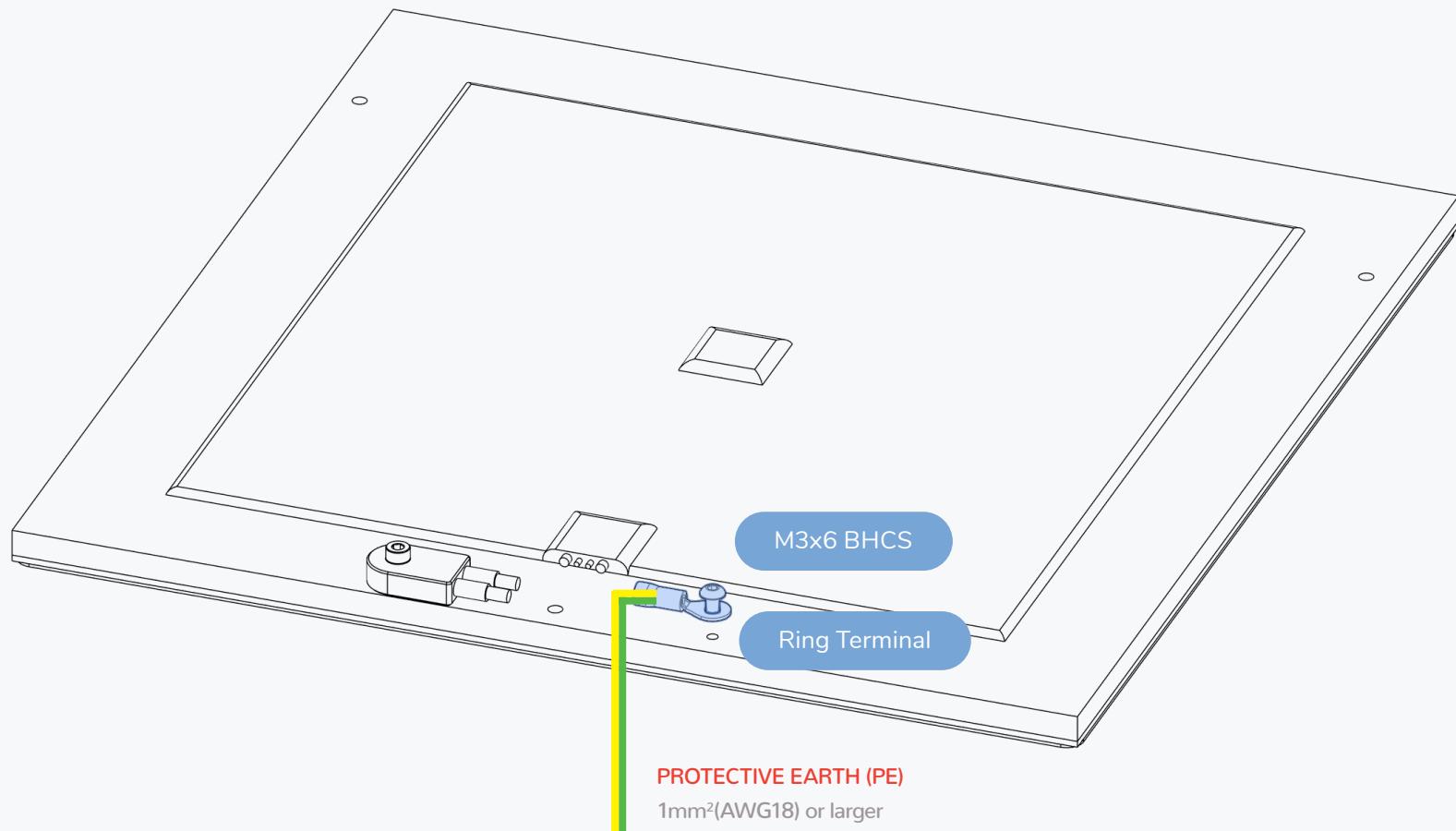


#### THERMAL FUSE

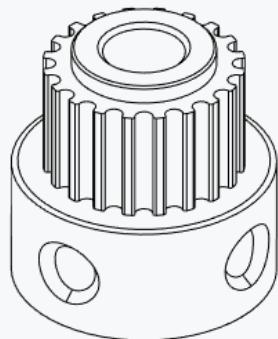
While not required to operate the printer, a thermal fuse attached to the build plate adds an additional layer of protection against potentially dangerous malfunctions.

The thermal fuse is wired in-line with the heater wires.

Depending on the tapped holes in the plate you may need to use a shorter bolt.



GT2 20 Tooth Pulley

**REMOVE FLANGE & SET SCREWS**

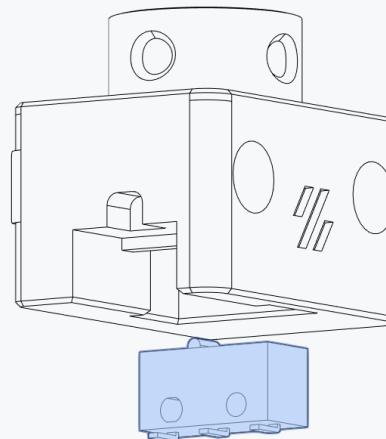
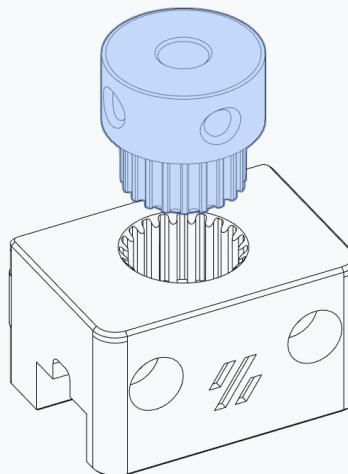
Use a bottle opener or some pliers to remove the top flange.



<https://voron.link/ict0j6x>

**PRESS FIT**

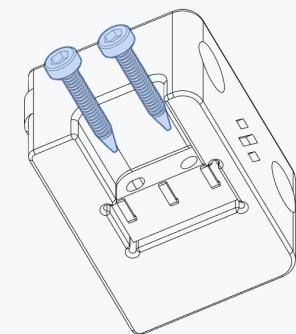
Apply the required force to fully seat the pulley in the printed part.



Microswitch

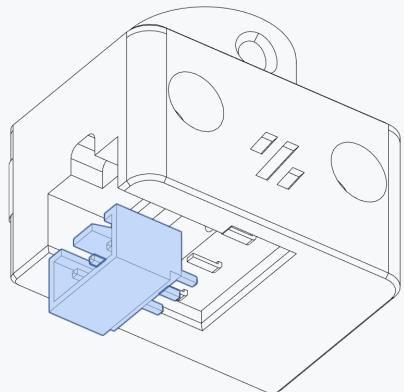


M2x10 Self Tapping

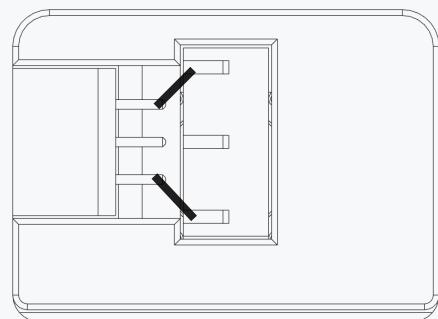
**SWITCH W/OUT LEVER**

This part requires a switch without lever to be installed in the shown orientation.

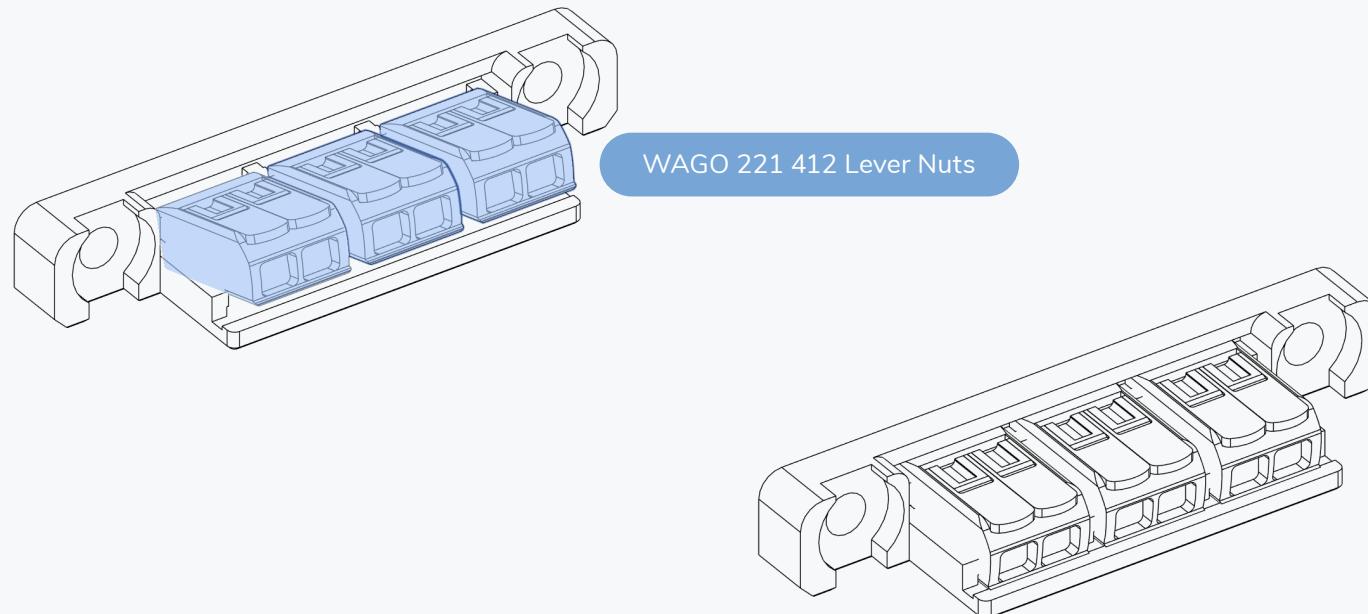
You can remove the lever from microswitches by gently pressing on the lever's hinge point.

**PREVENTING MISHAPS**

You can add a notch to the Z endstop point and capture it with a set screw to prevent it from falling out.

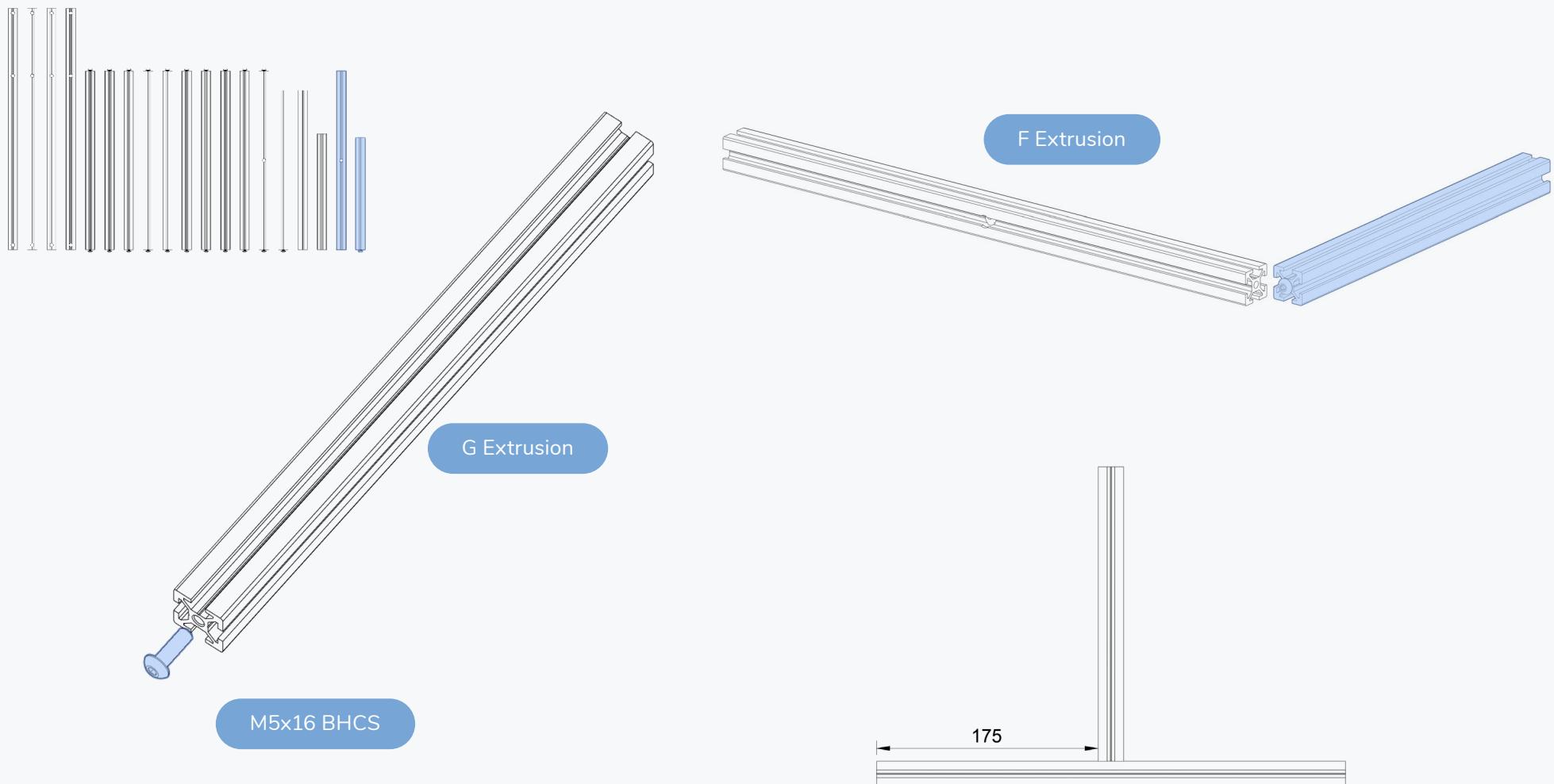
**SOLDER CONNECTOR**

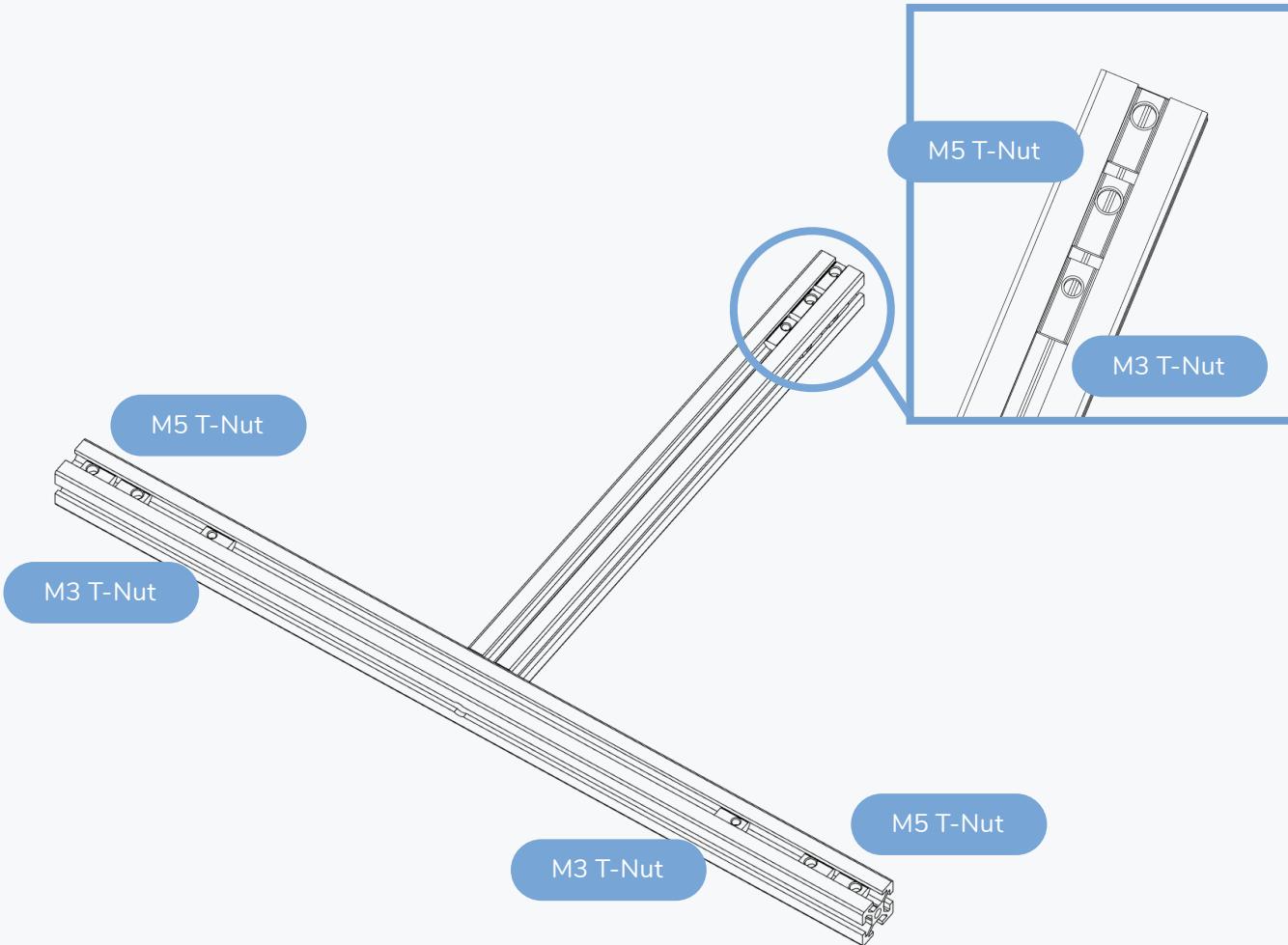
Solder a connection from the outer two terminals of the microswitch to the connector.

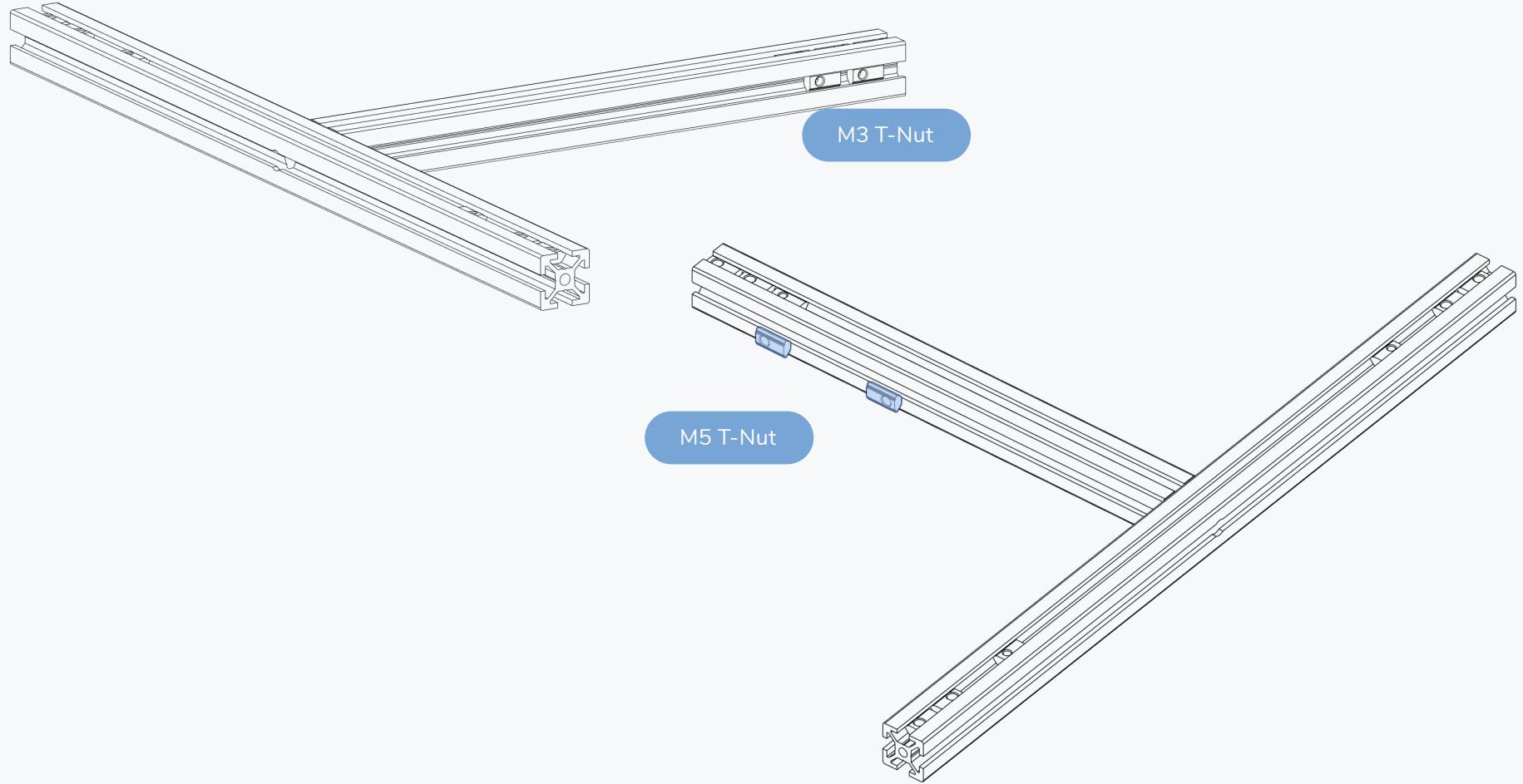


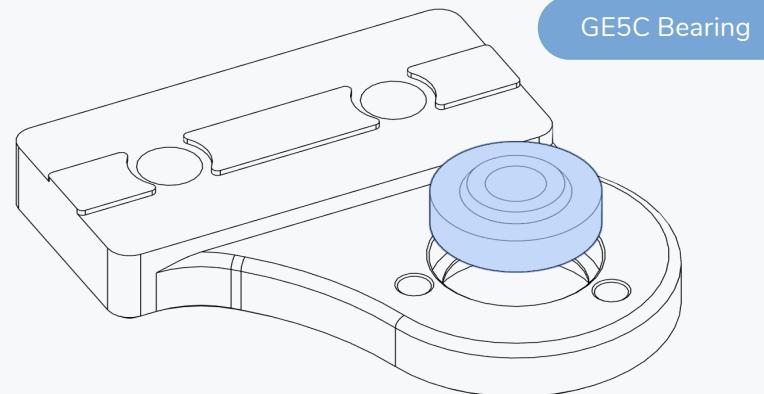
## BED FRAME

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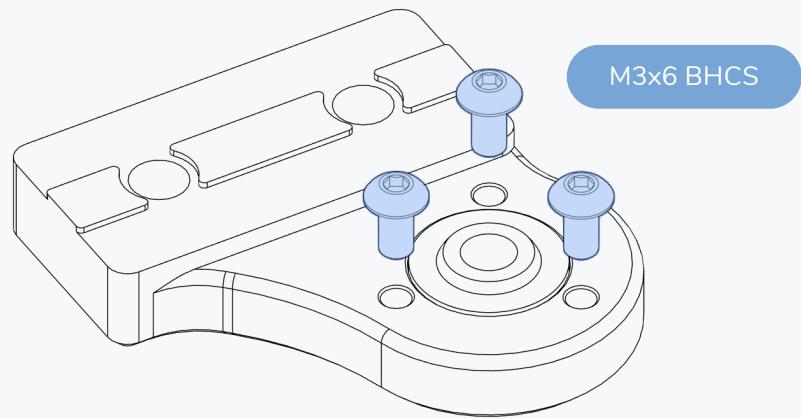








GE5C Bearing

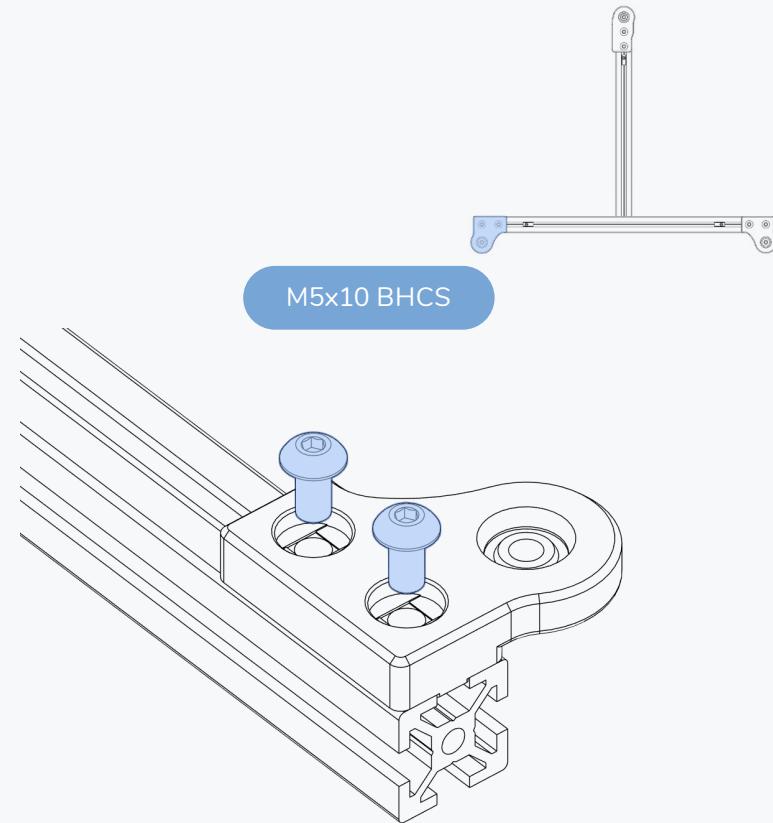
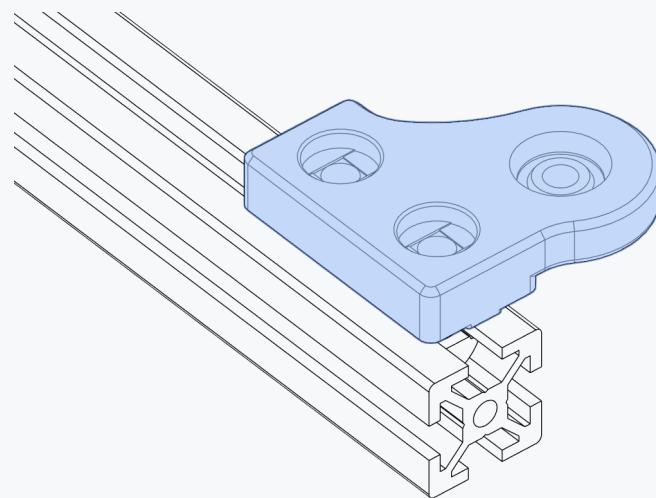


M3x6 BHCS

**DON'T OVER TIGHTEN**

The bolts are used to position the bearing and are bolted directly into plastic.

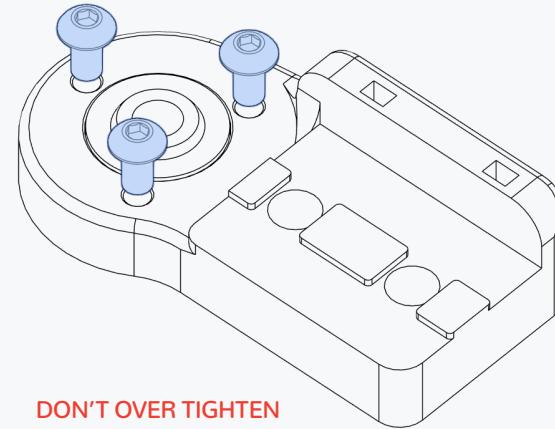
BED FRAME



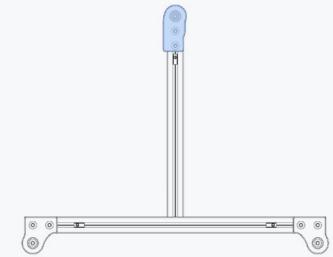


GE5C Bearing

M3x6 BHCS

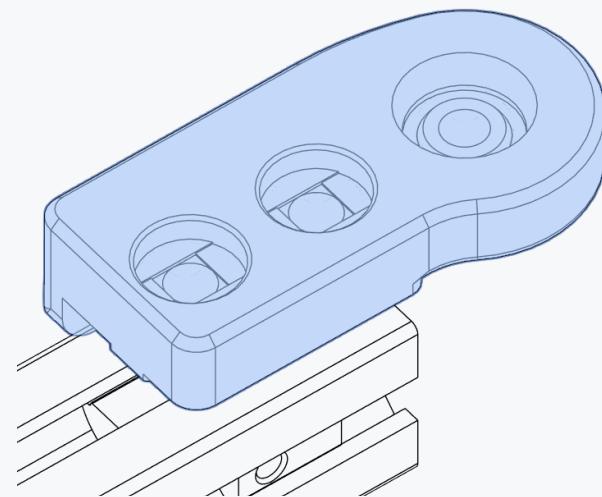
**DON'T OVER TIGHTEN**

The bolts are used to position the bearing and are bolted directly into plastic.

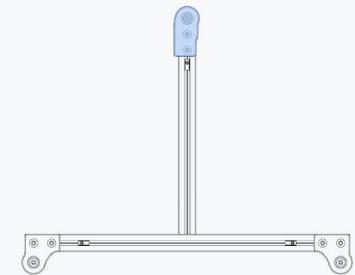
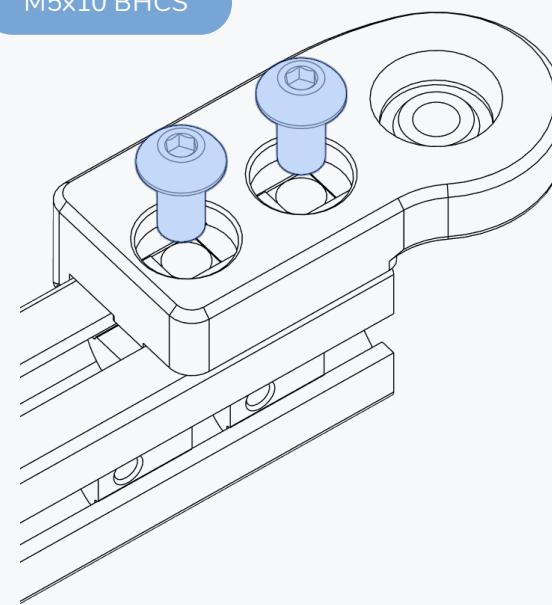


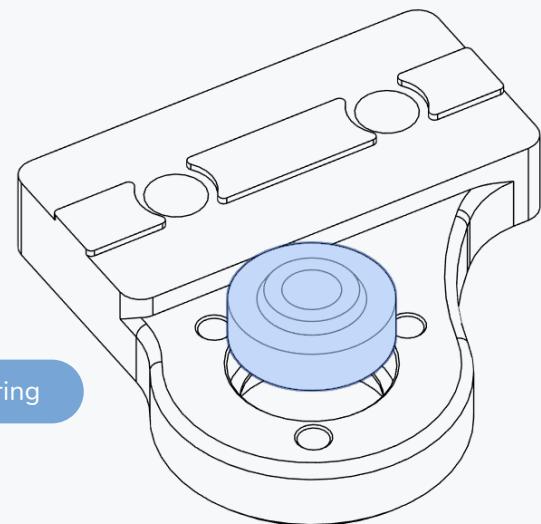
BED FRAME

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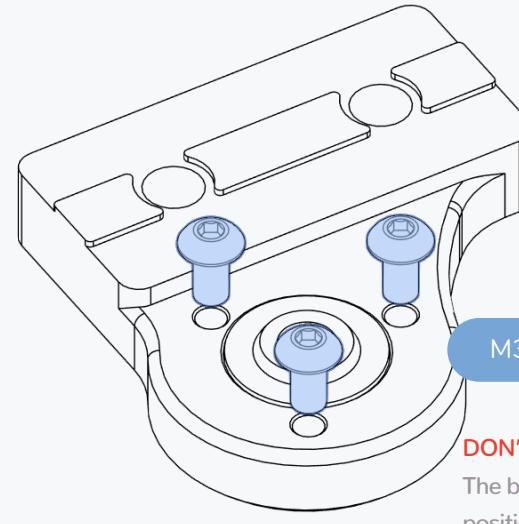


M5x10 BHCS





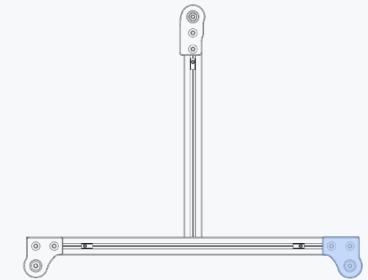
GE5C Bearing



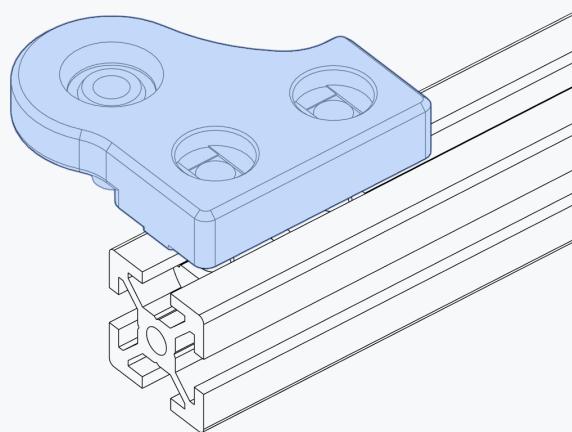
M3x6 BHCS

**DON'T OVER TIGHTEN**

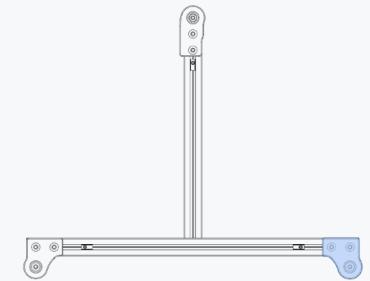
The bolts are used to position the bearing and are bolted directly into plastic.



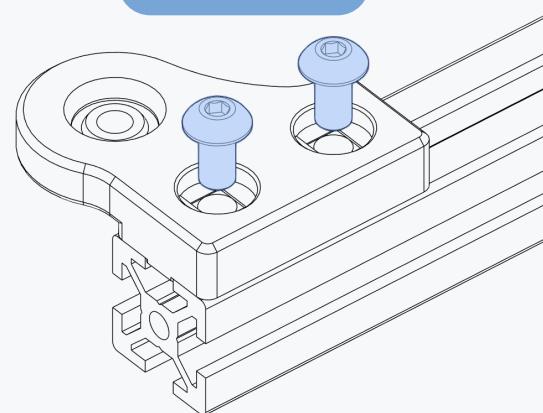
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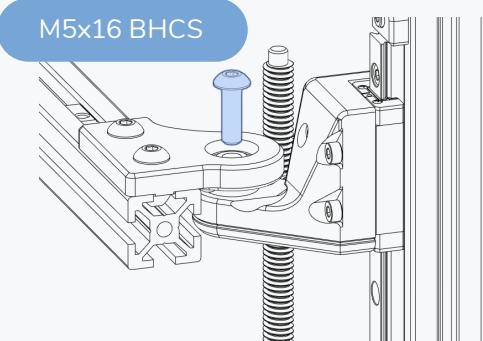
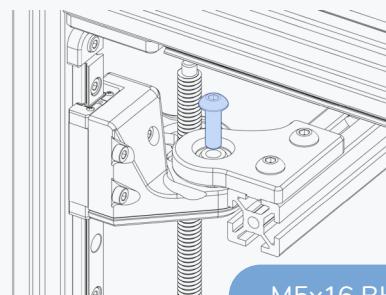
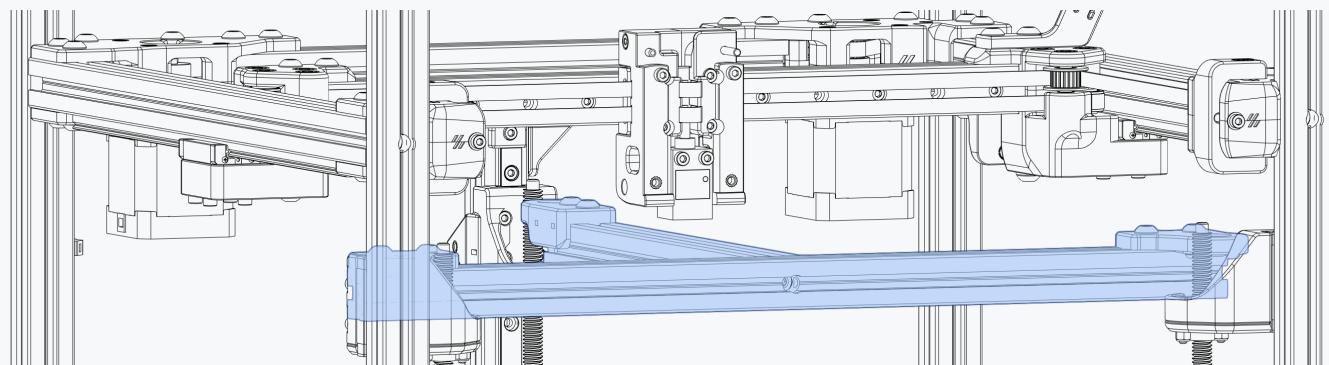
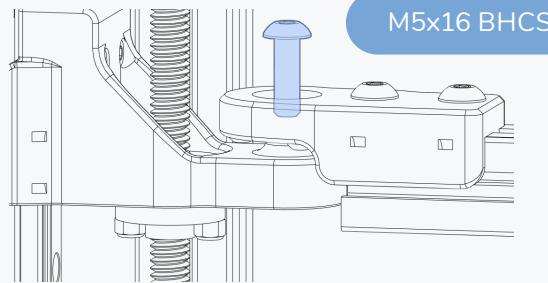


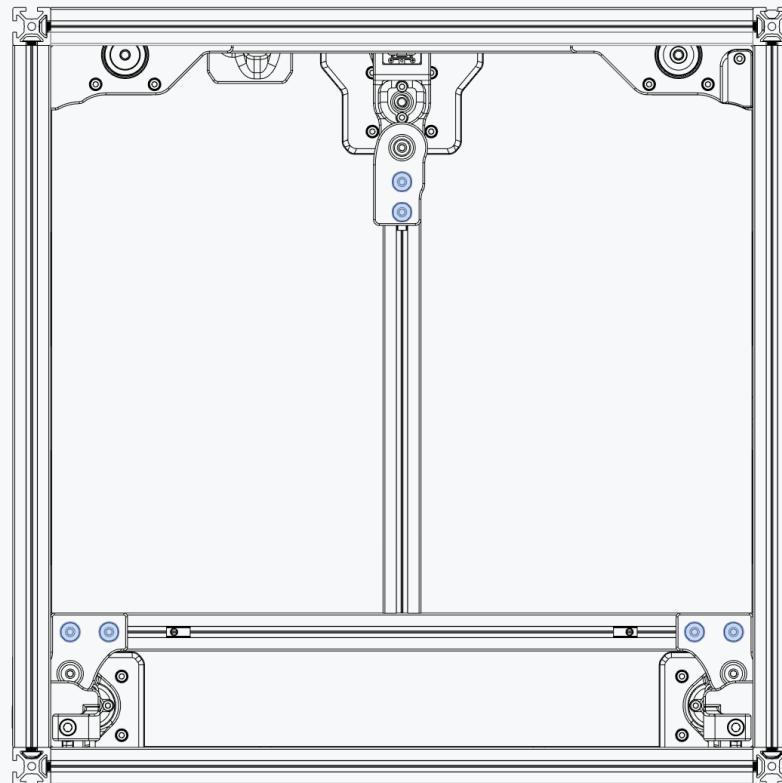
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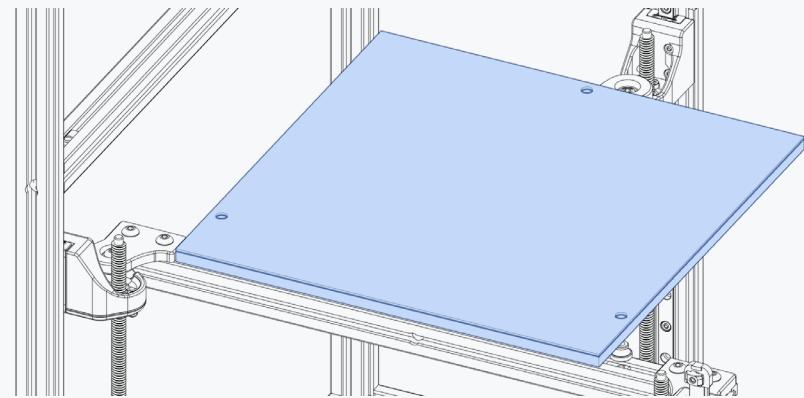
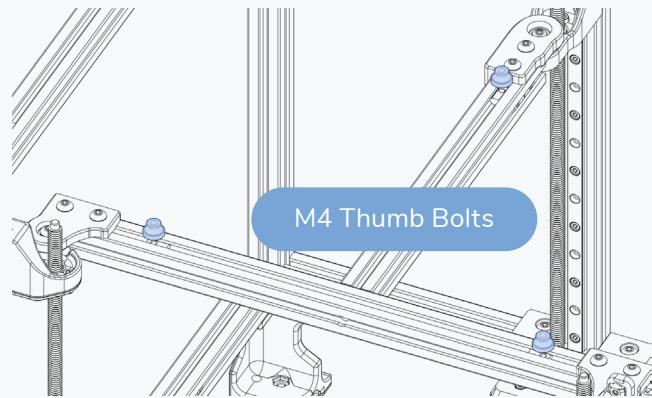
M5x10 BHCS





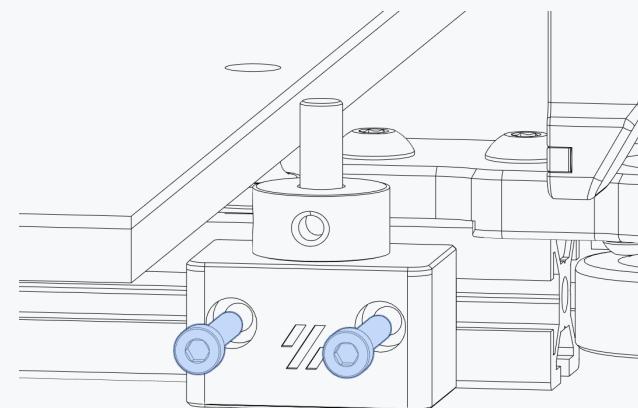
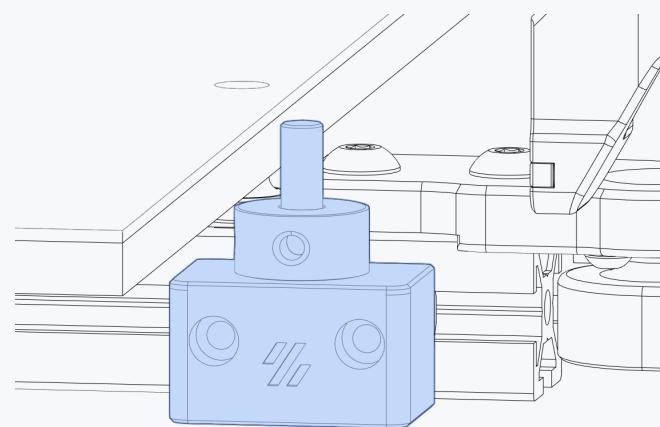
**LOOSEN AND RETIGHTEN**

Slightly loosen the bolts that hold the bed frame to the printed parts and gently shake the bed frame before retightening them.



## BED FRAME

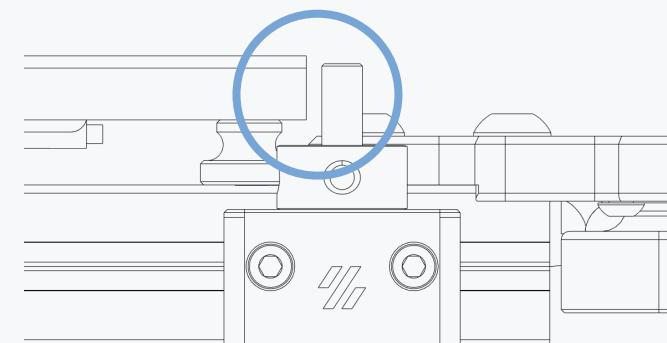
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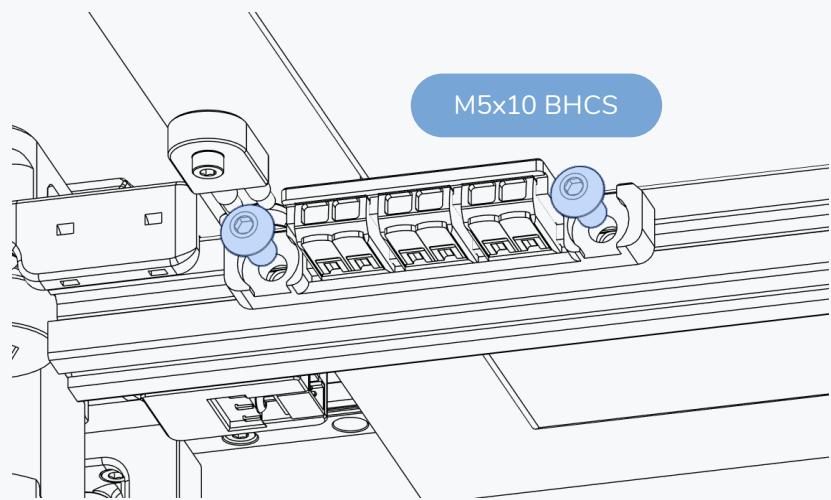
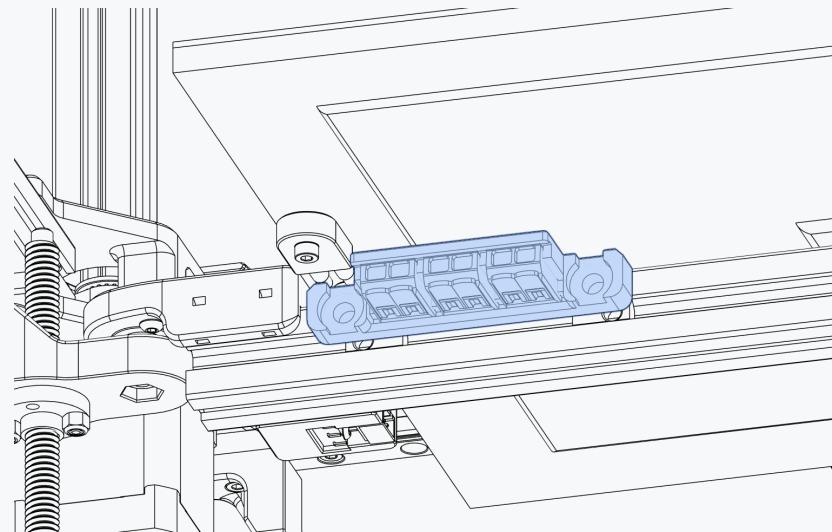


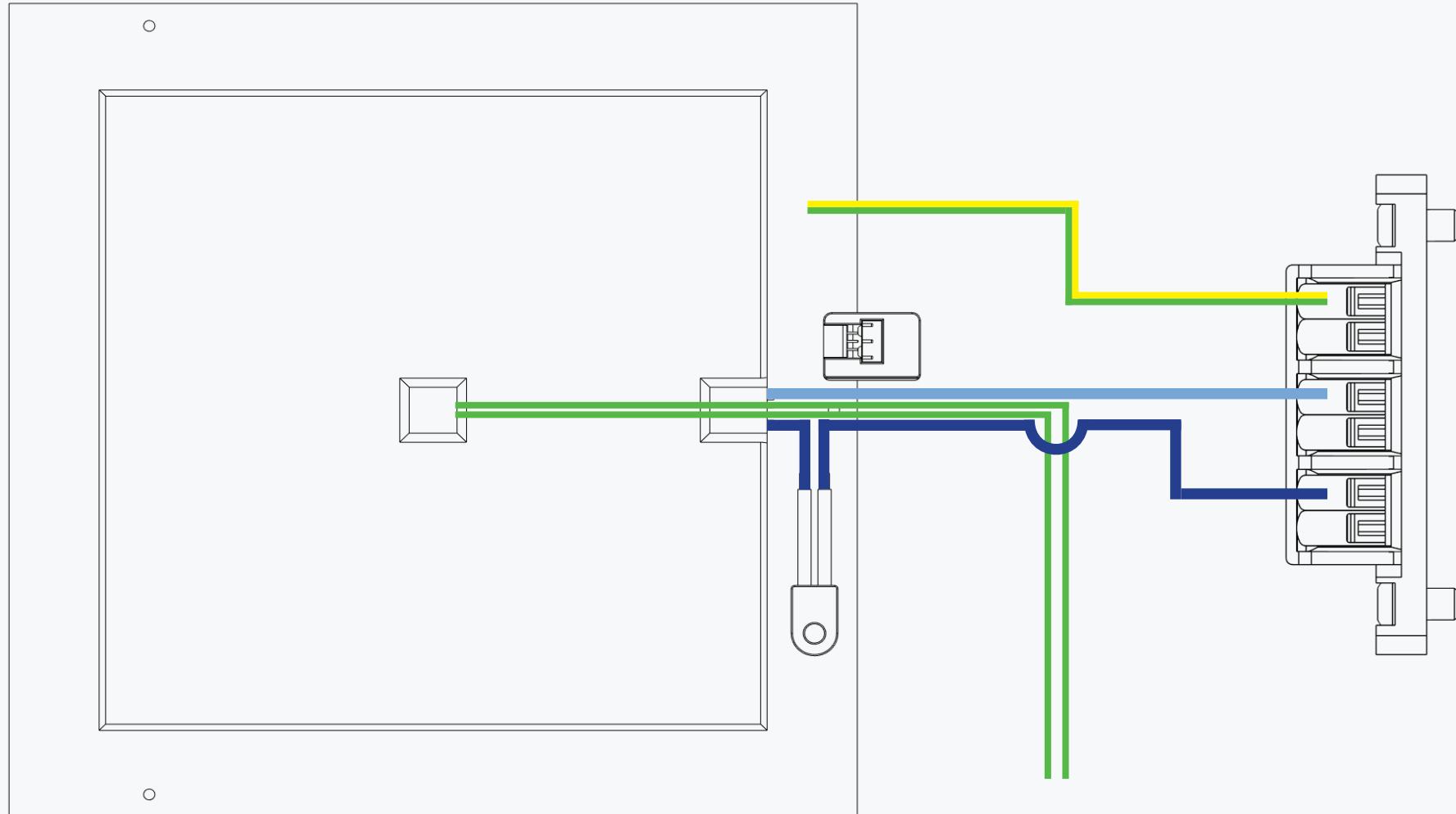
M3x20 SHCS

### ADJUST Z ENDSTOP POSITION

The shaft of the Z Endstop must not touch the print bed.  
Adjust the position if required.



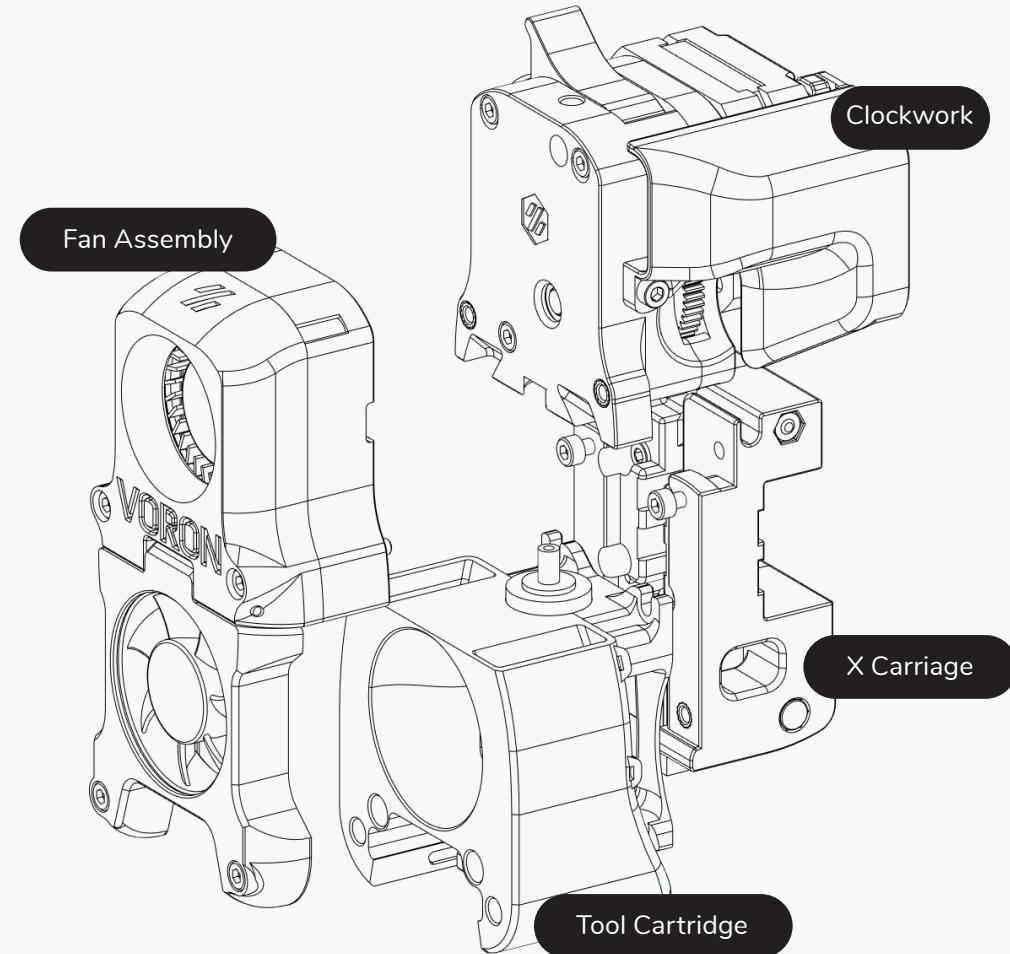
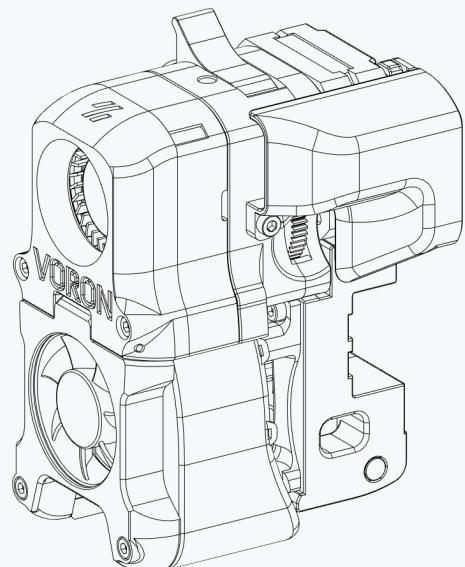


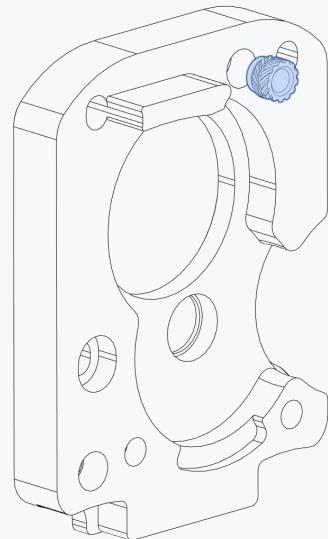
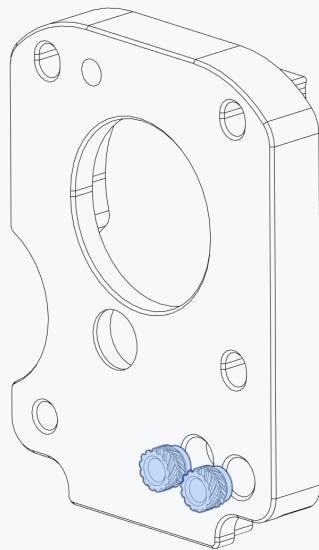


AFTERRUNNER

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Heat Set Insert

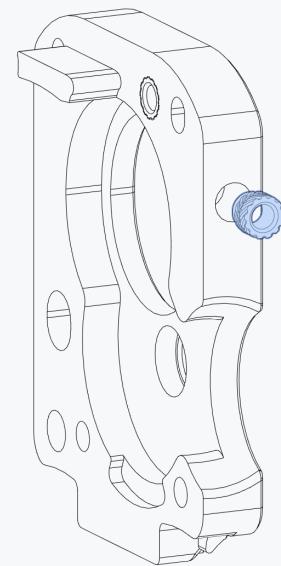
### HEAT SET INSERTS

You will need to install heat set inserts into various plastic parts.

If you need help on the correct procedure, ask in Discord.

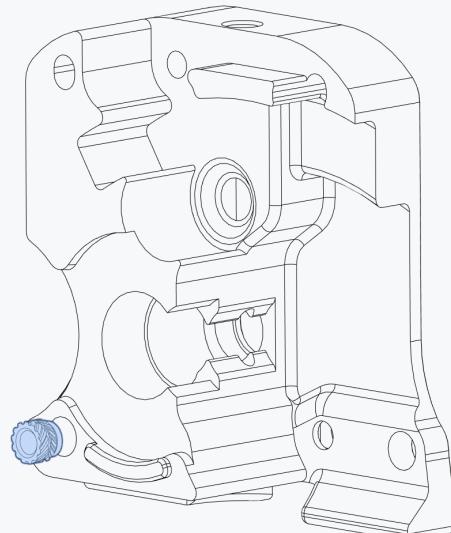
### OPTION: TOOLHEAD PCB

If you opt to use a toolhead PCB, add an additional heat set insert into the alternate part.

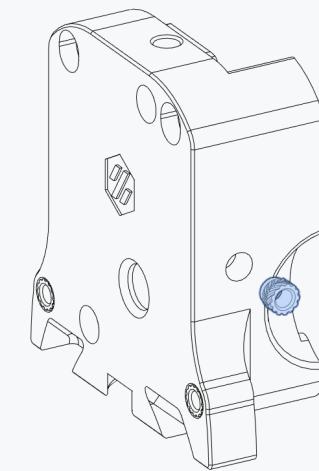
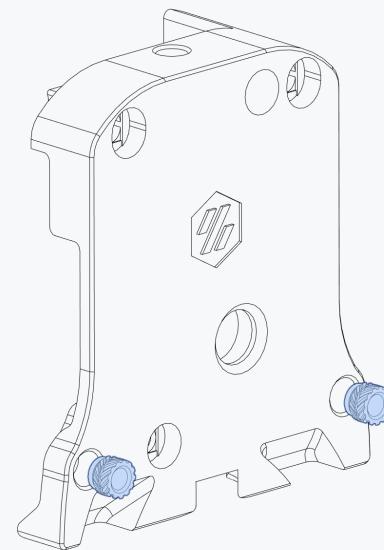


## HEAT SET INSERTS

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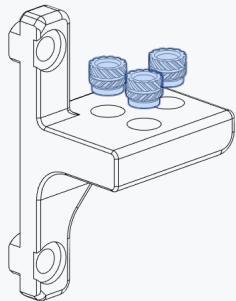


Heat Set Insert



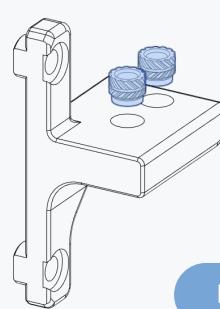
**GENERIC CABLE CHAINS**

The 3 hole pattern is usually found on generic cable chains.

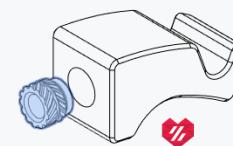


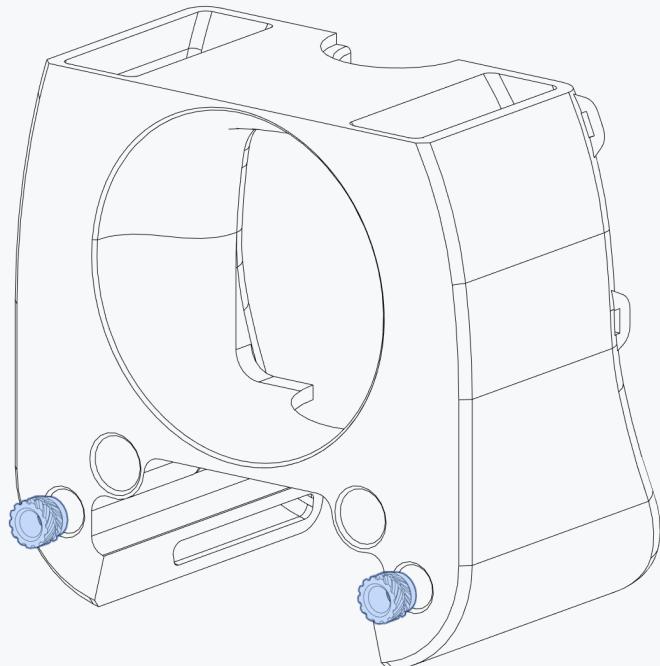
**IGUS CABLE CHAINS**

IGUS chains have 2 mounting holes.

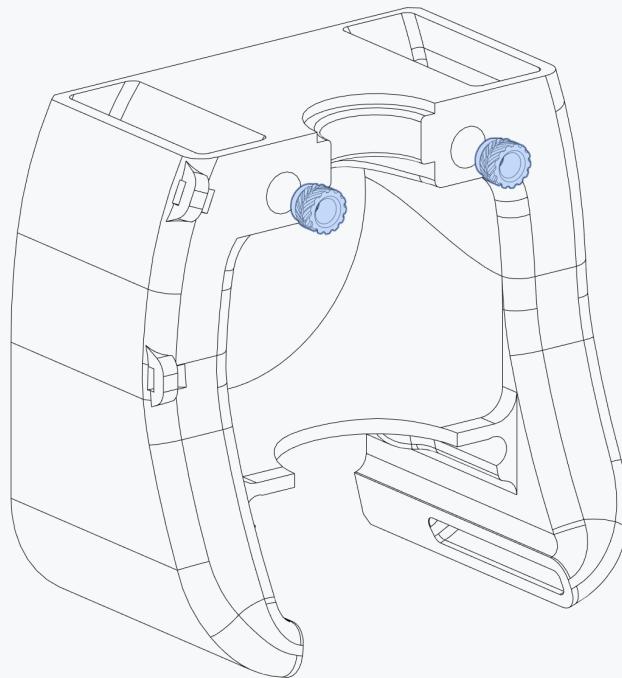


Heat Set Insert





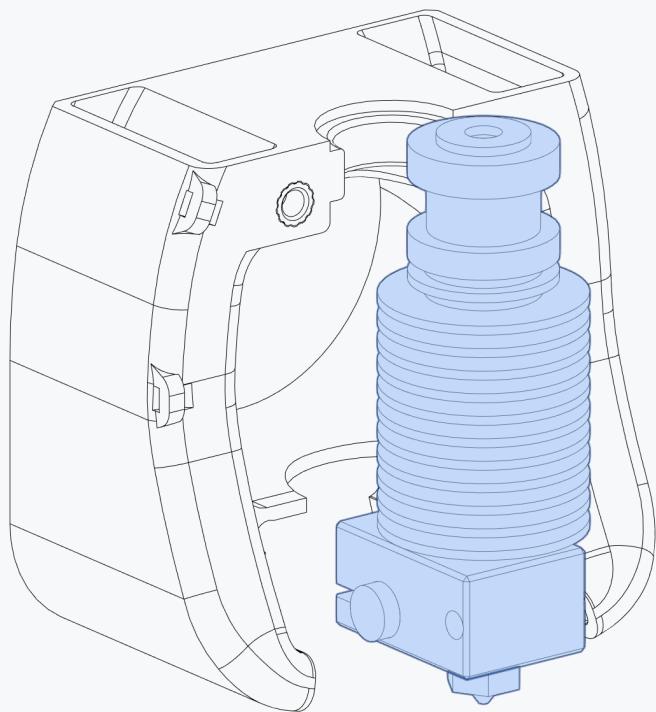
Heat Set Insert



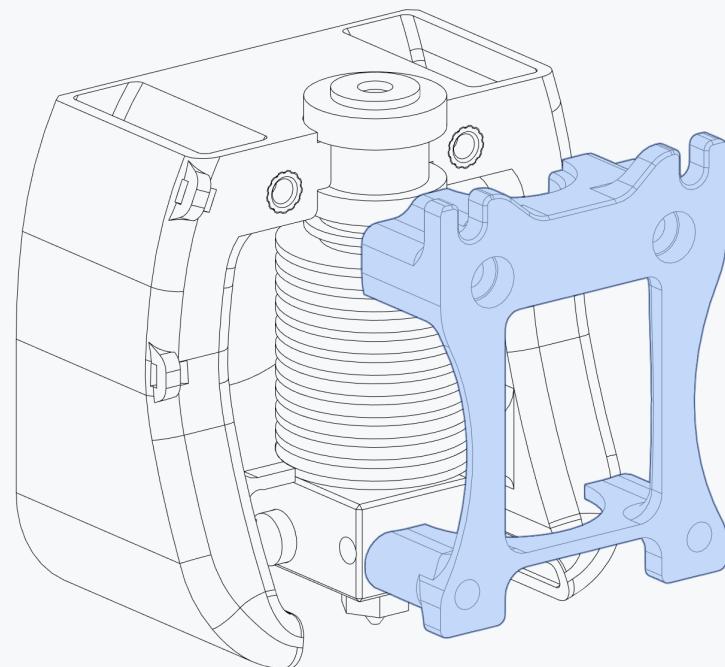
**AVAILABLE MOUNTS**

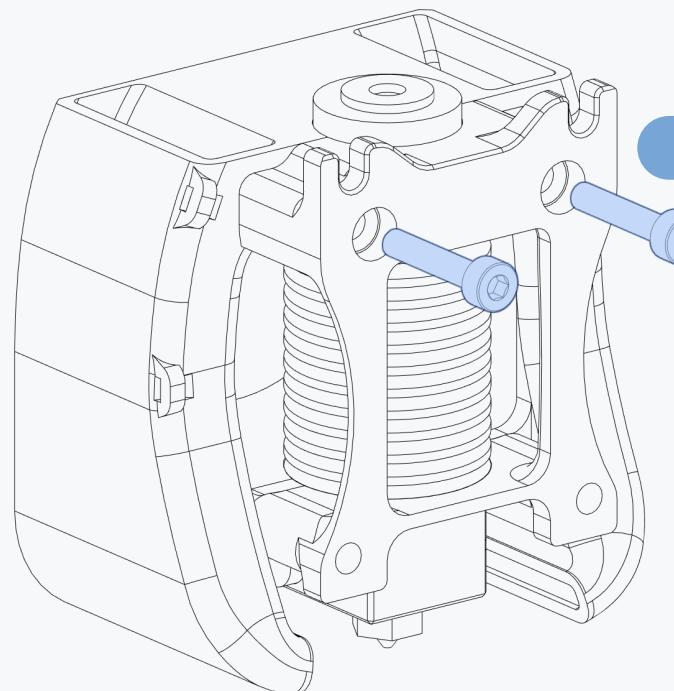
We also provide mounts for other hotends.

They are assembled in a similar manner.

**HEATER AND SENSOR**

We do not show the heater and temperature sensor cartridge in the drawing. Install them prior to assembling the toolhead.

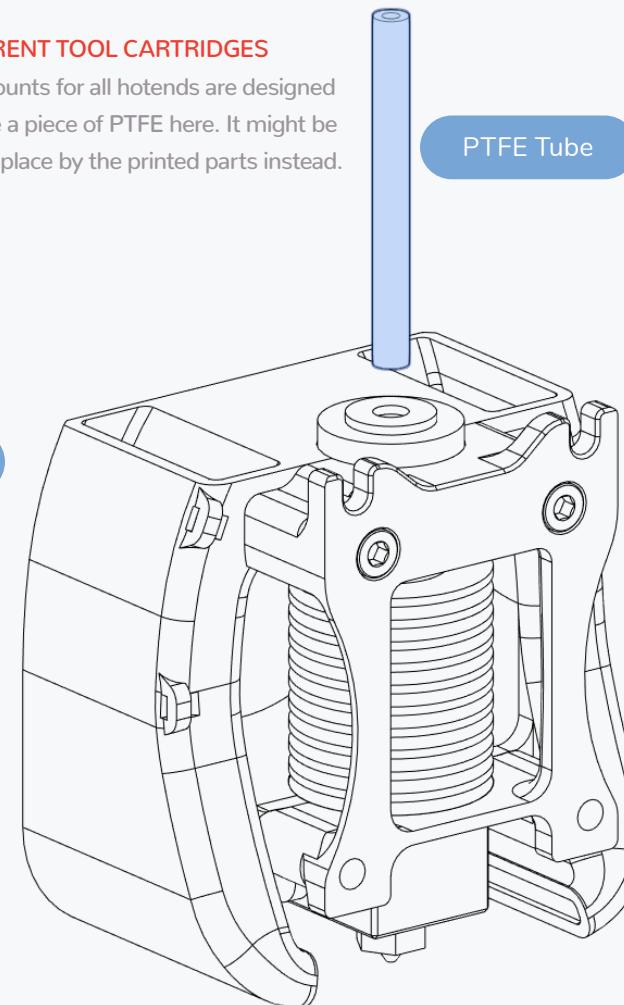
**E3D V6 Hot End**



M3x16 SHCS

## DIFFERENT TOOL CARTRIDGES

The mounts for all hotends are designed to have a piece of PTFE here. It might be held in place by the printed parts instead.

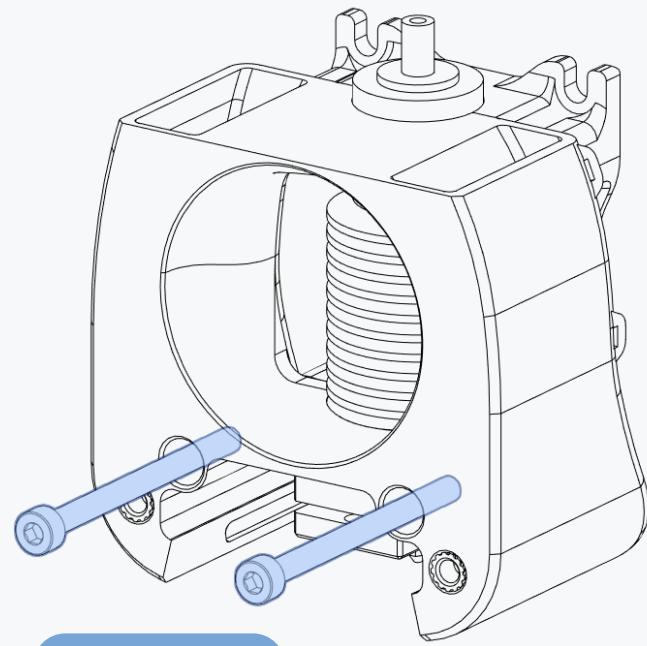
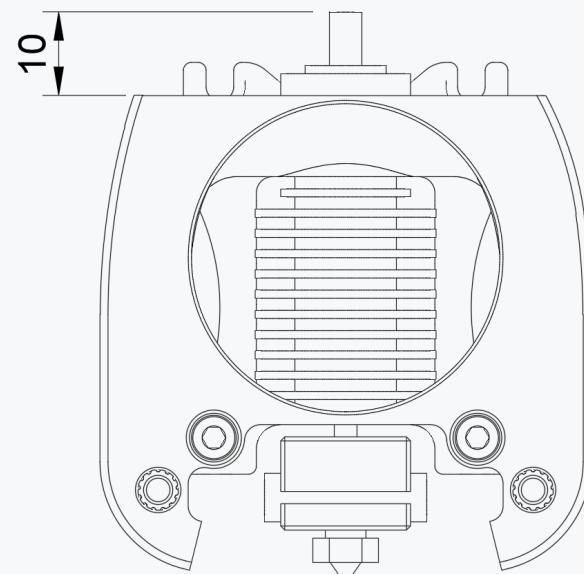


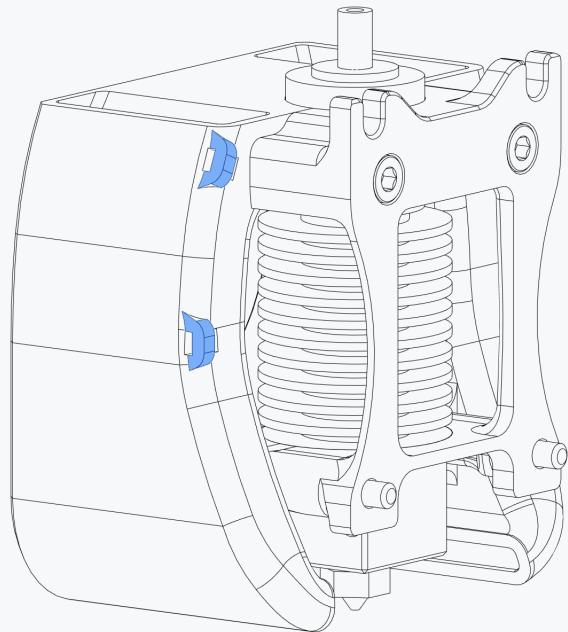
PTFE Tube

**PTFE STICKOUT**

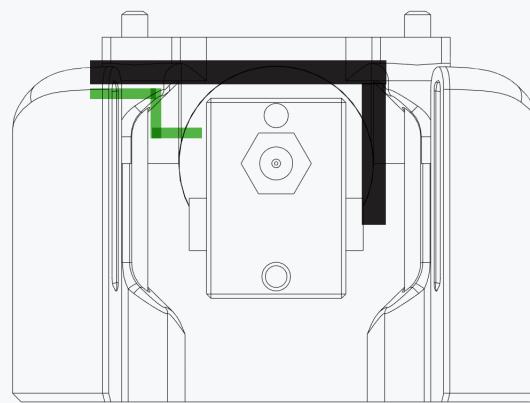
The PTFE tube should end 10mm above the surface of the printed part.

The stick out length might vary if you use an extruder other than the Clockwork.



**WIRING PATH**

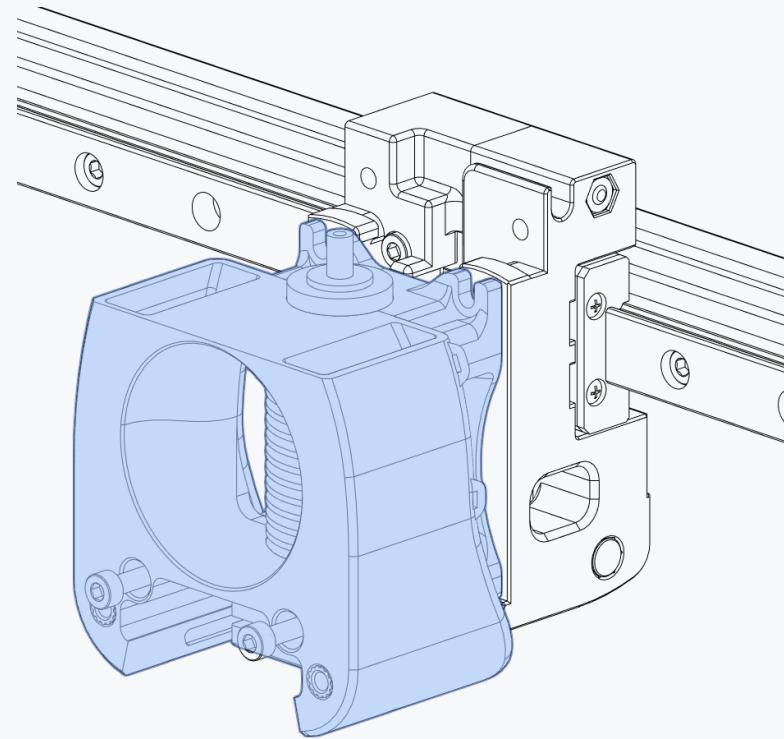
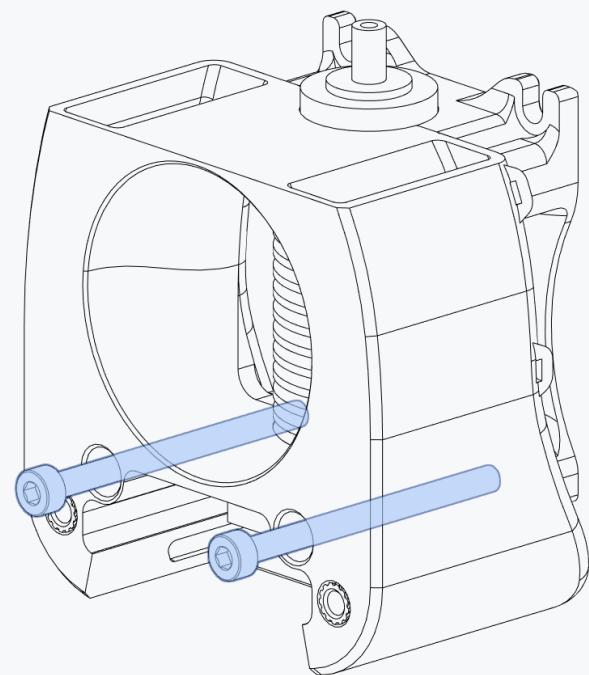
Guide the wires in the highlighted path.

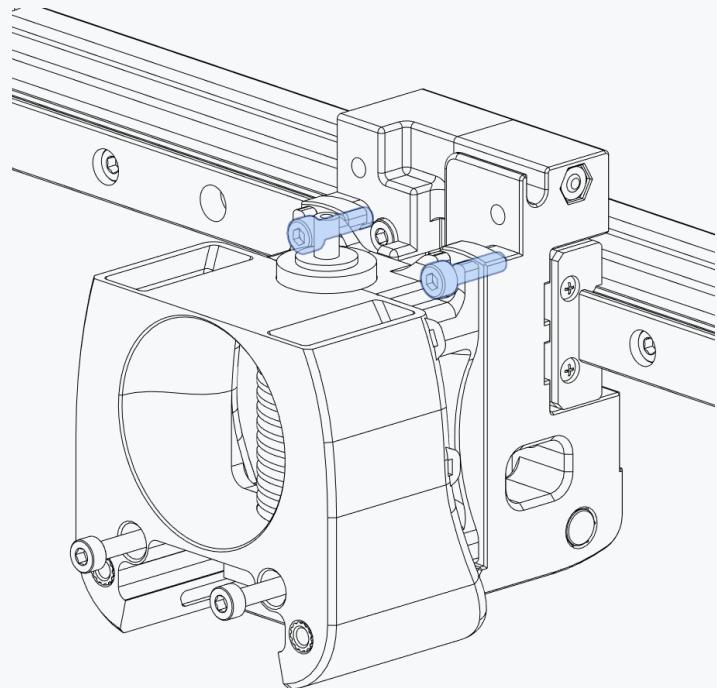
**CHECK ORIENTATION**

The heater block must point forwards.

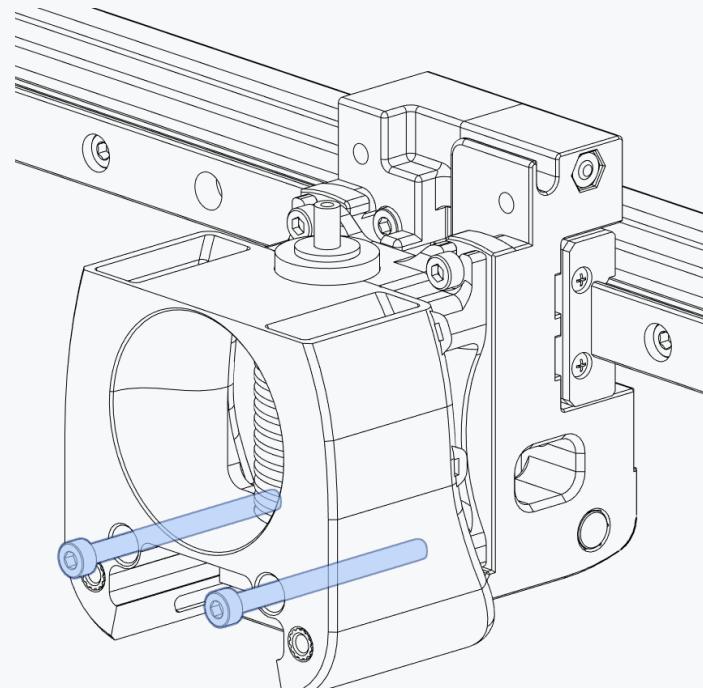
TOOL CARTRIDGE

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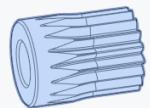
**INDEXING BOLTS**

The bolts are used to index the tool cartridge. Leave them slightly loose so that the cartridge can be slid out.

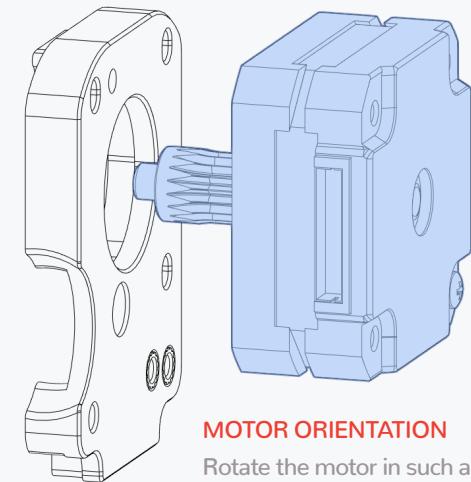
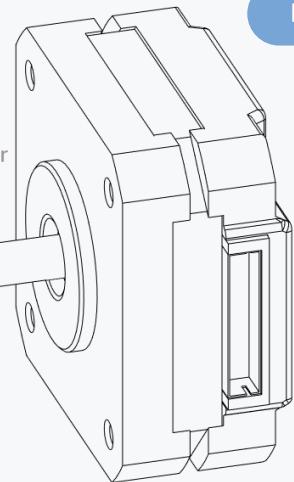


**DRIVE PINION**

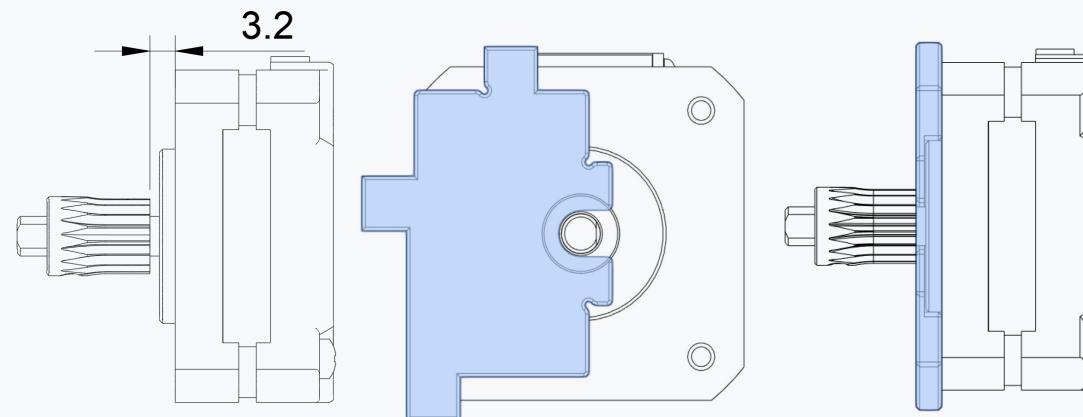
Make sure the set screw in the drive pinion is seated on the flat of the motor shaft. Use thread locker.



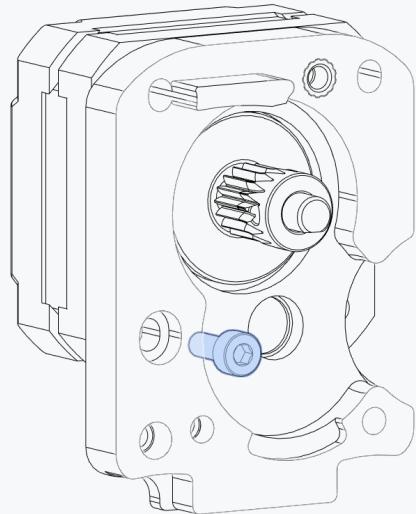
BMG Drive Pinion

**NEMA 17 Stepper****MOTOR ORIENTATION**

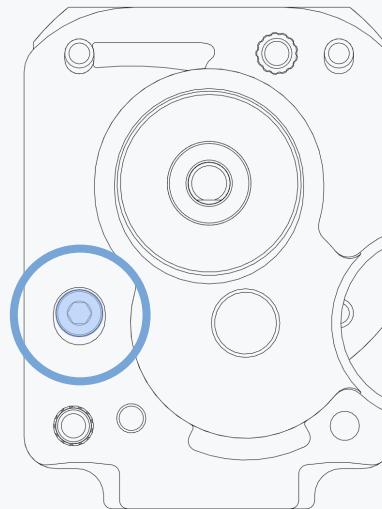
Rotate the motor in such a way that the connector/wires are on the left side when looking at it from the back.



This side will be covered by the cable cover later.

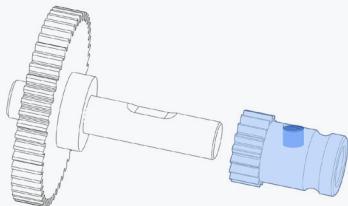


M3x8 SHCS

**ADJUSTABLE MOTOR POSITION**

The motor position is adjustable to allow for a proper meshing of the drive gears.

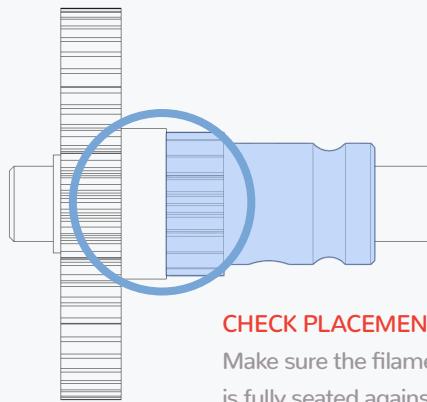
Start in the topmost position of the slot.



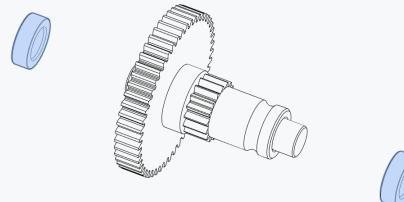
BMG Drive Gear

**DRIVE GEAR**

Make sure the set screw in the filament drive gear is seated against the notch in the shaft. Carefully tighten the set screw, the head is easy to strip.

**CHECK PLACEMENT**

Make sure the filament drive gear is fully seated against the drive shaft gear.



MR85 Bearing

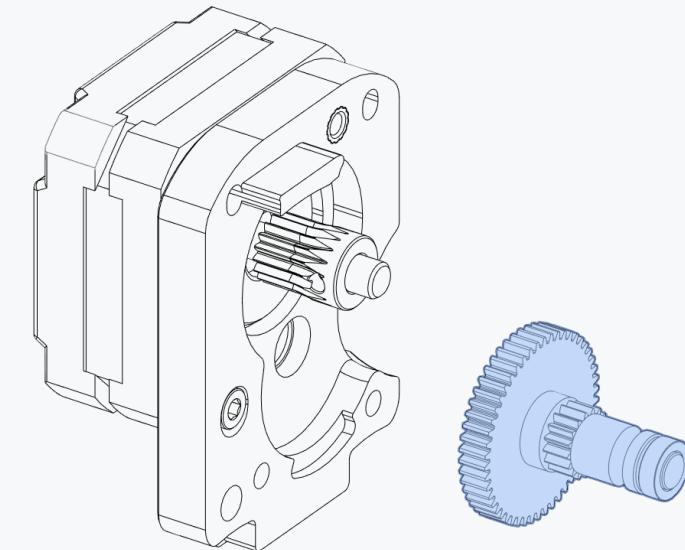
**CHECK BEARING FIT**

The bearings must slip on and off the shaft easily to allow the gear to self-centre. Do not shim into position.

Pressing the bearings on the shaft will damage them.  
Lightly sand the shaft if required.

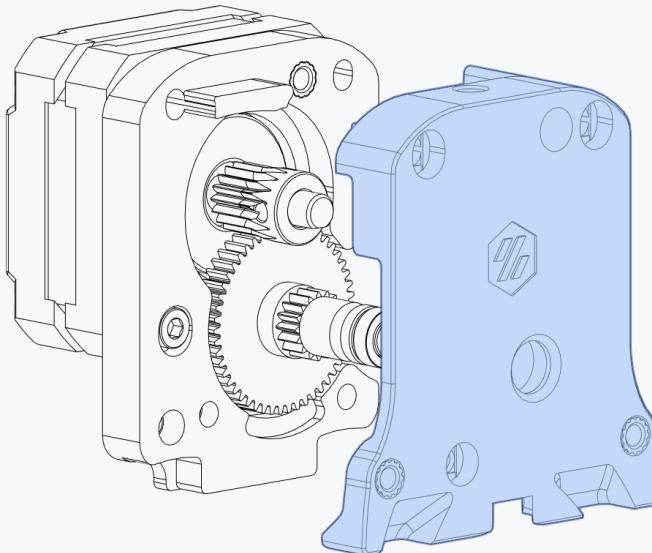
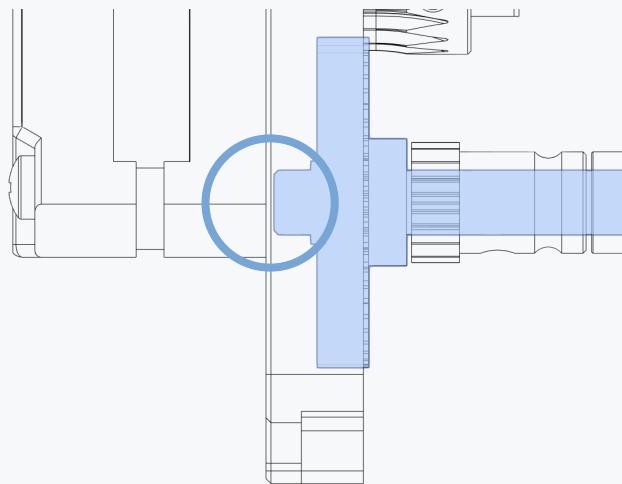


<https://voron.link/p0xac5e>



## MAIN BODY

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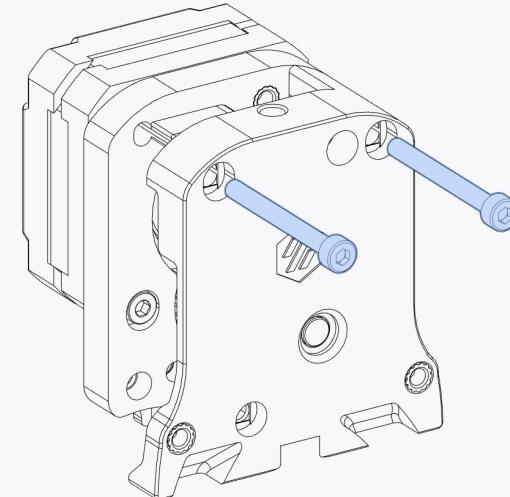


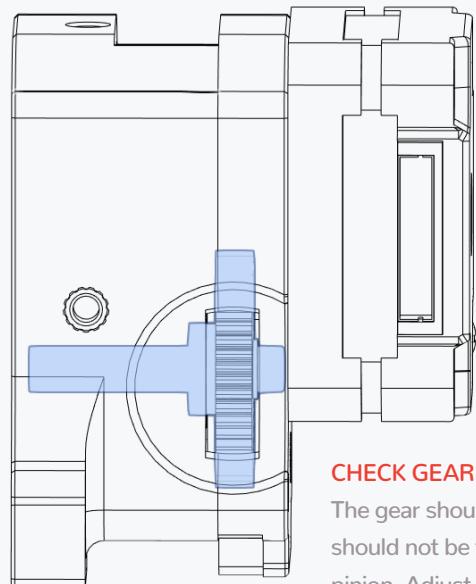
### CHECK FOR CLEARANCE

The drive shaft must not touch the motor housing.

Check if the shaft has sufficient clearance when fully seated.

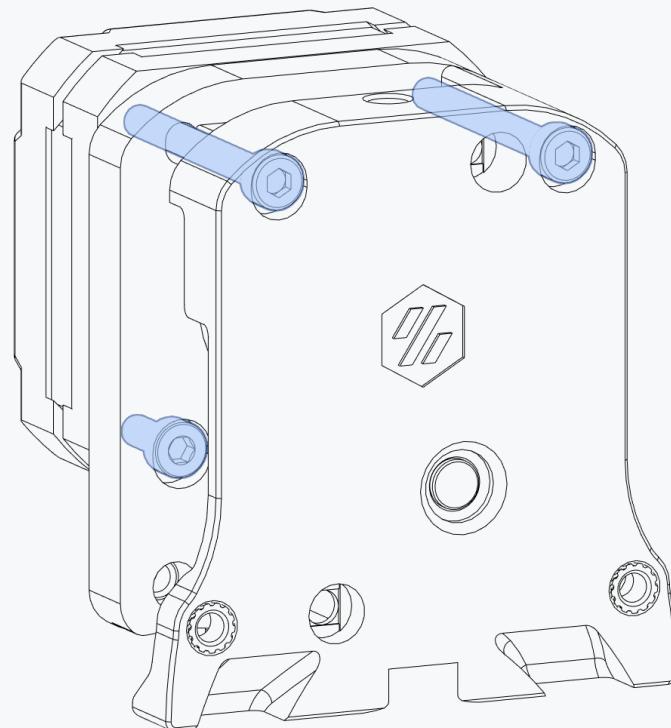
Sand the face of shaft if required.





**CHECK GEAR PLAY**

The gear should have a slight play and should not be fully tight against the pinion. Adjust the position of the motor until you have a faint play.



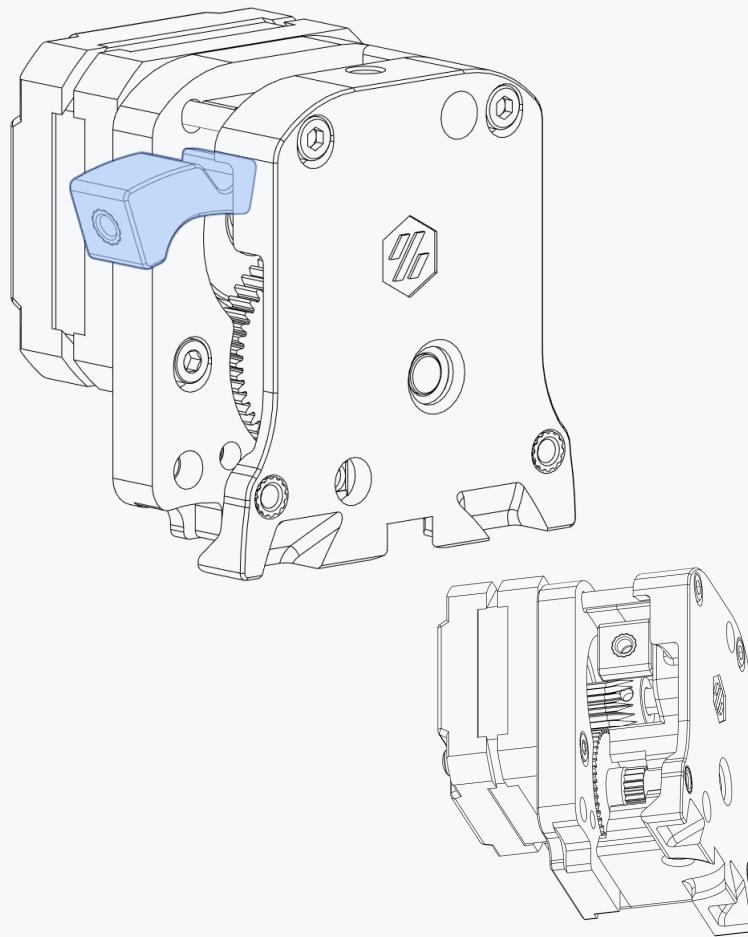
GUIDLER

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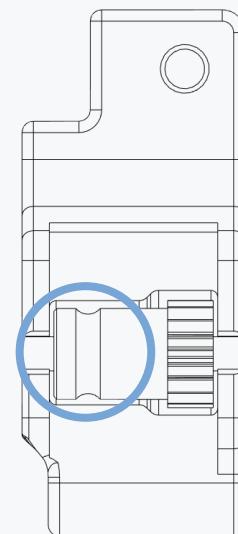
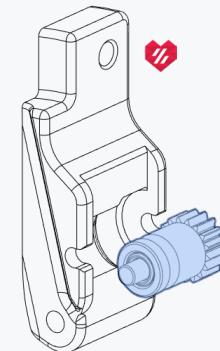
LUBRICATE BEARINGS

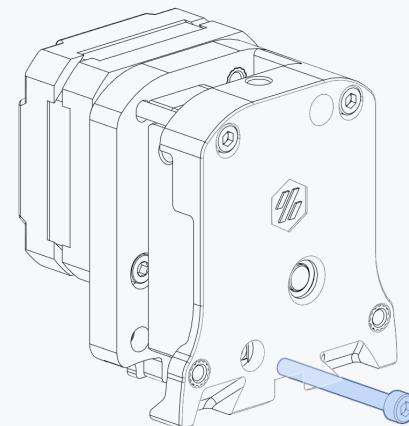
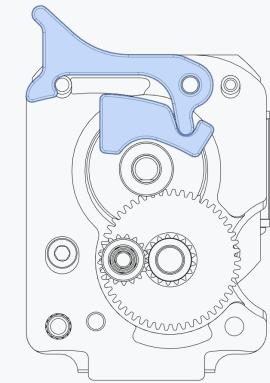
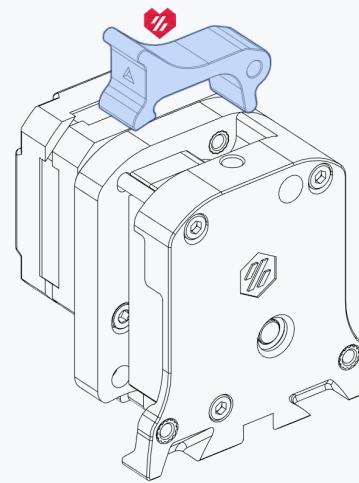
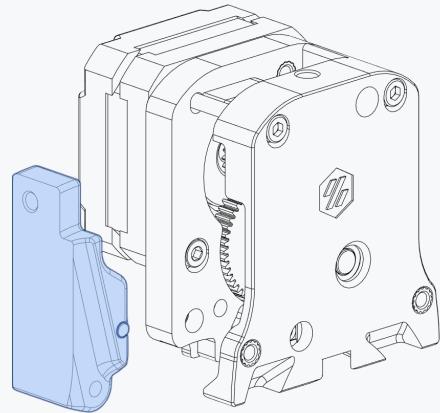
A lubrication film is required to ensure smooth operation and longevity.  
Refer to the BOM for lubricant options - look for a "light grease".

BMG Idler Assembly

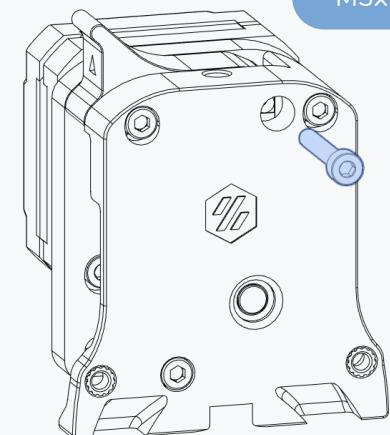


<https://voron.link/dncvwdm>



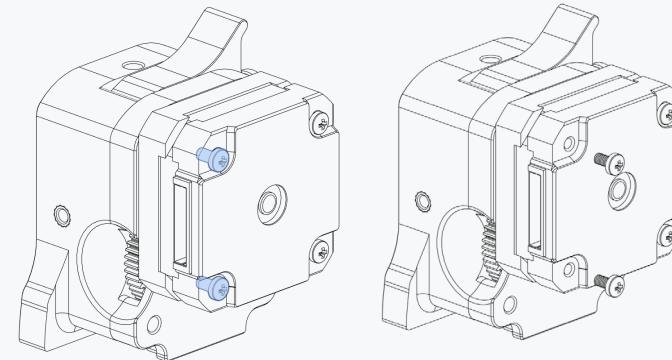


M3x30 SHCS

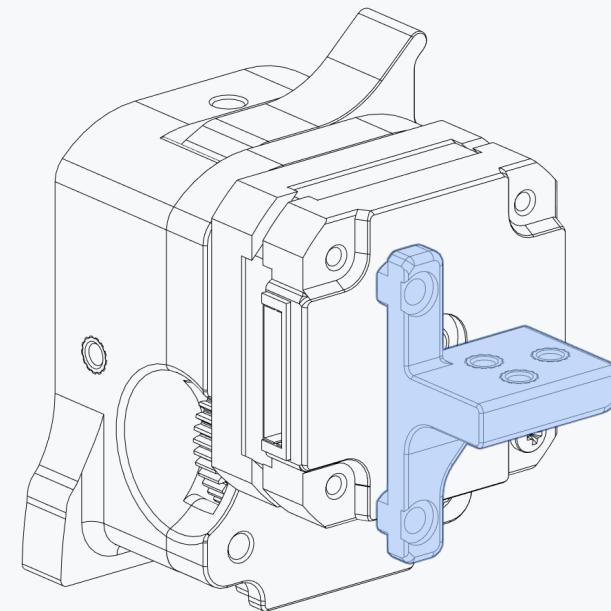
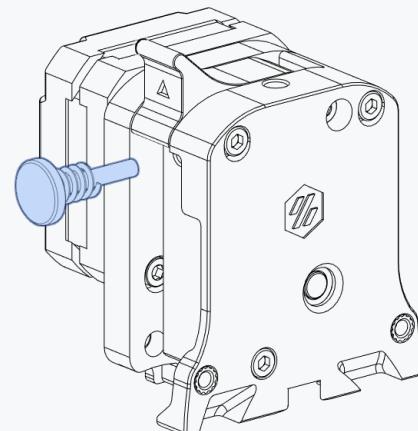


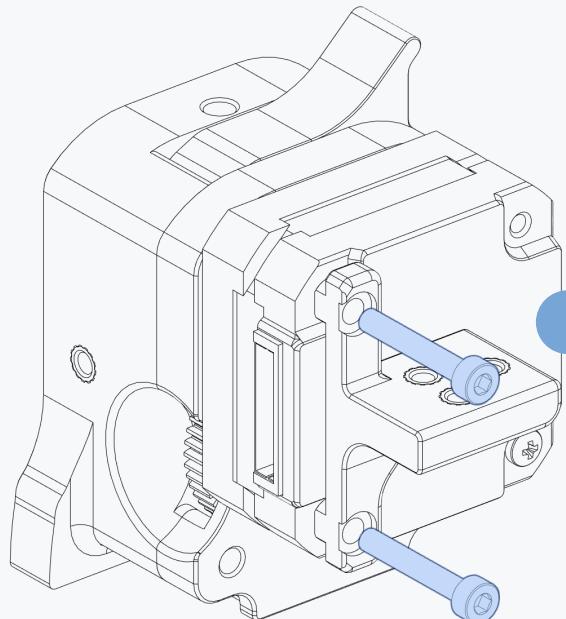
M3x20 SHCS

BMG Thumb Screw

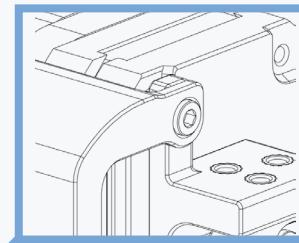
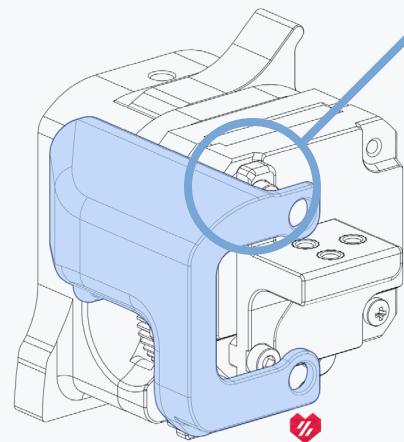
**REMOVE SCREWS**

Carefully remove the screws from the left side of the motor. They will be replaced with new bolts in the next step.

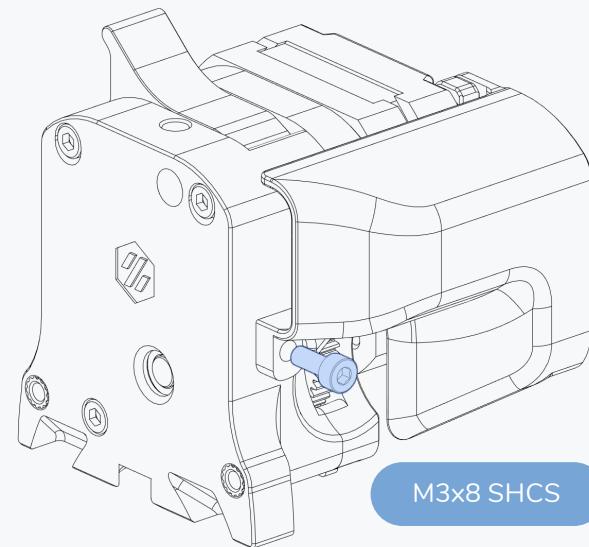




M3x20 SHCS

**OPTION: TOOLHEAD PCB**

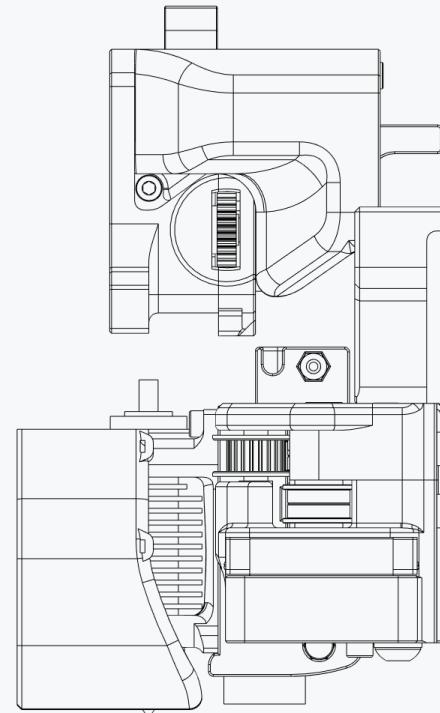
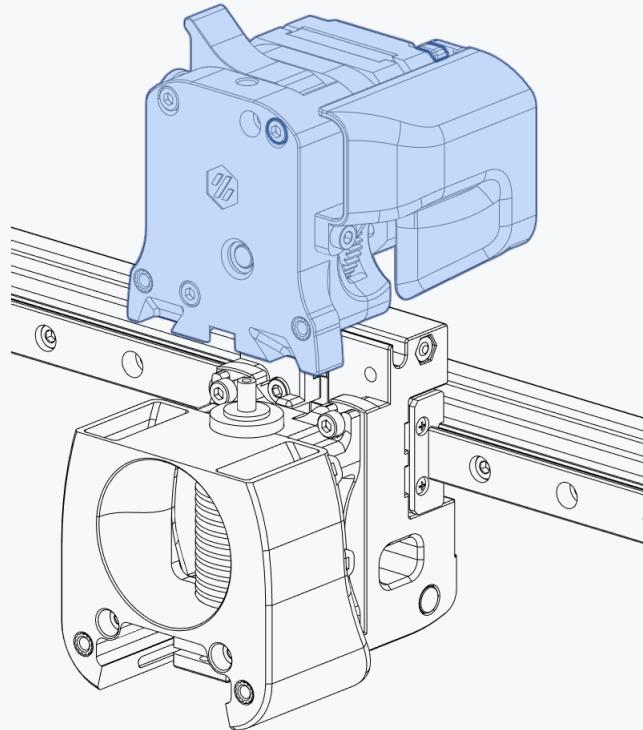
If you opted to use a toolhead PCB, skip the wire cover and follow the instructions on page 174.

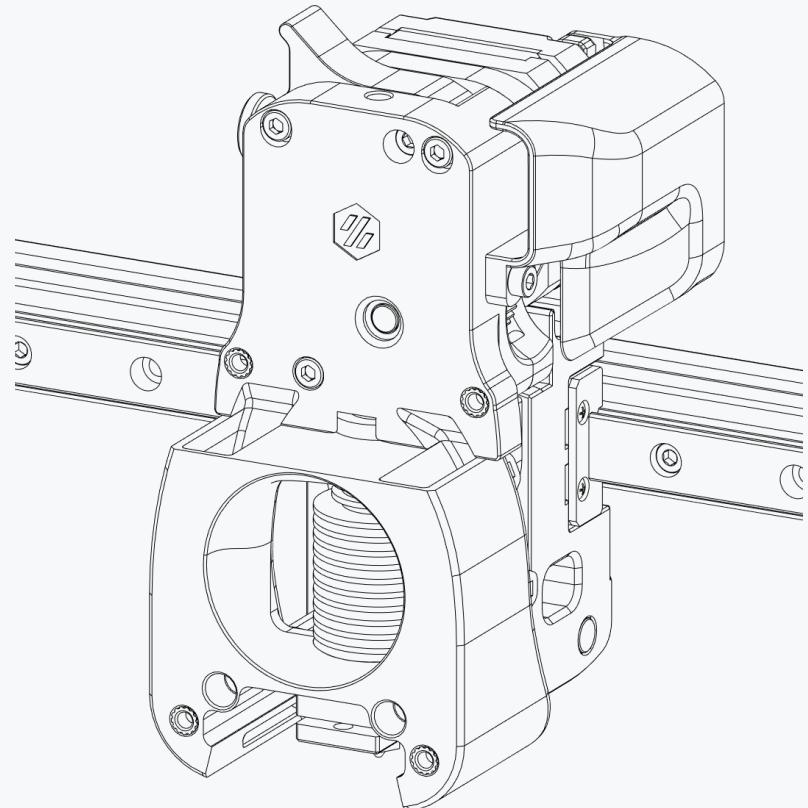
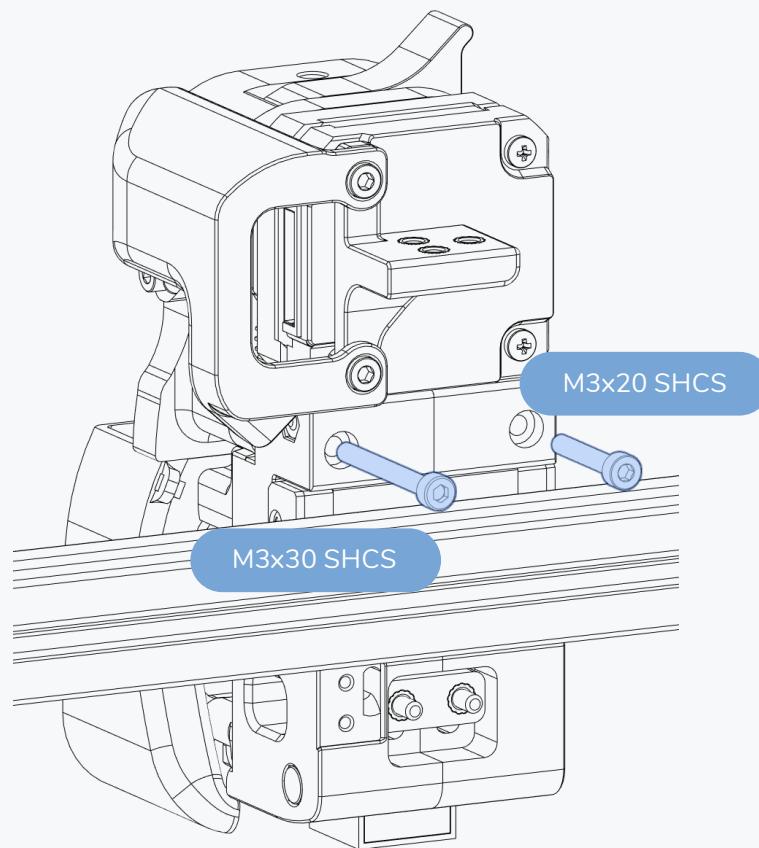


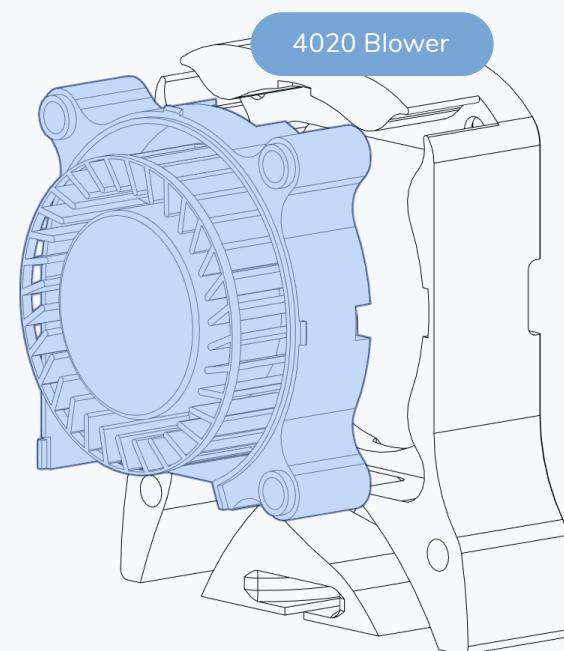
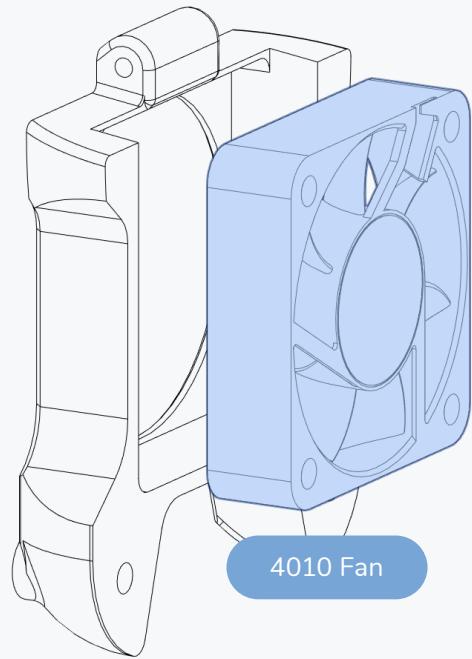
M3x8 SHCS

CLOCKWORK

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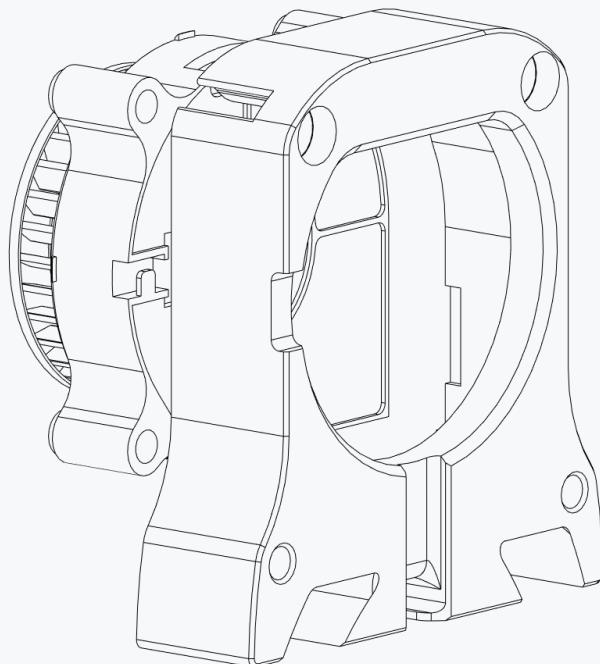


**REMOVE TOP COVER**

Split the fan open by  
bending the tabs on the  
side.

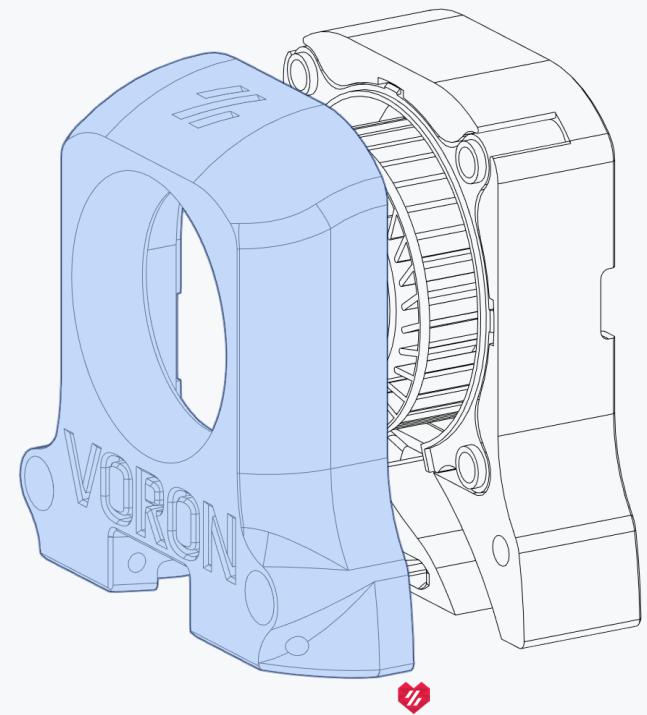


<https://voron.link/vyvtcpa>



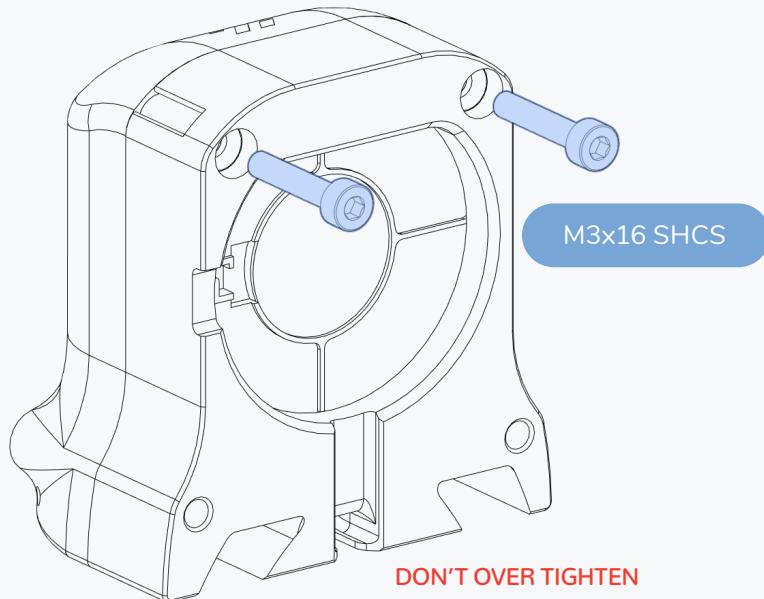
**WIRING PATH**

Route the wires through the large opening in the back.



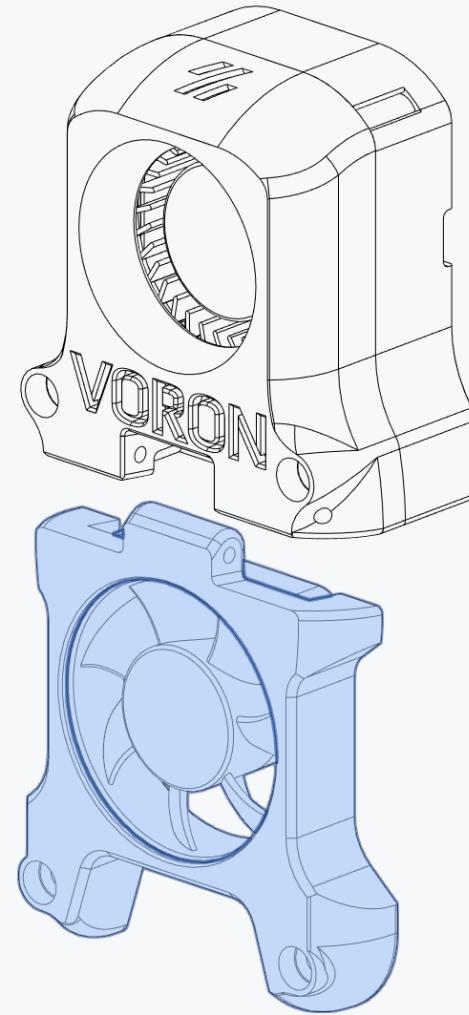
## FAN ASSEMBLY

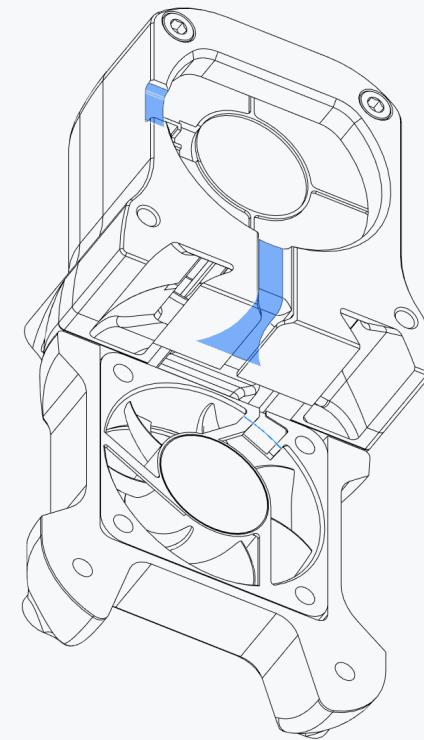
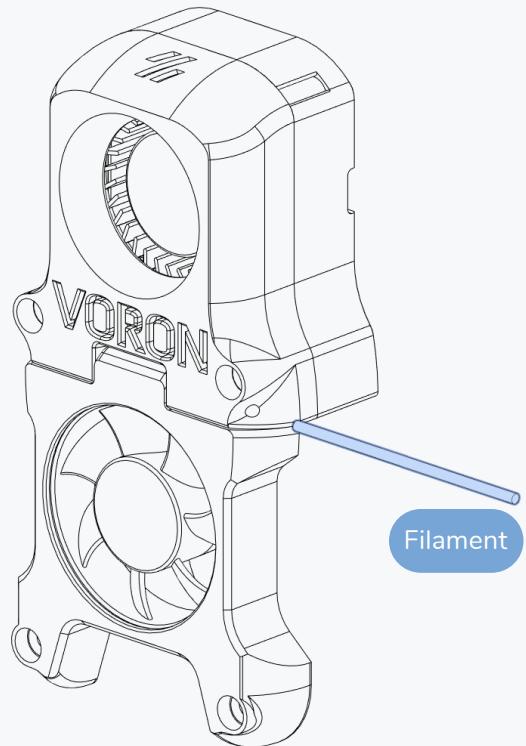
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**DON'T OVER TIGHTEN**

The bolts are threaded  
directly into plastic.



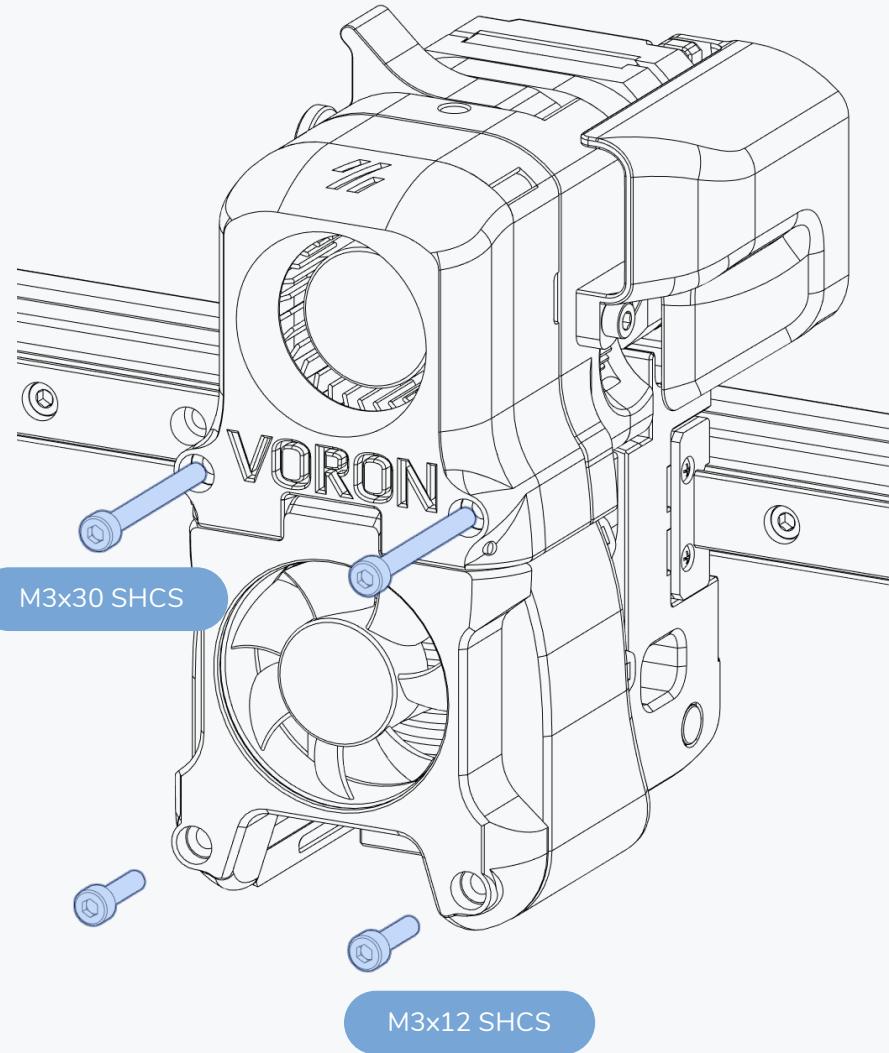
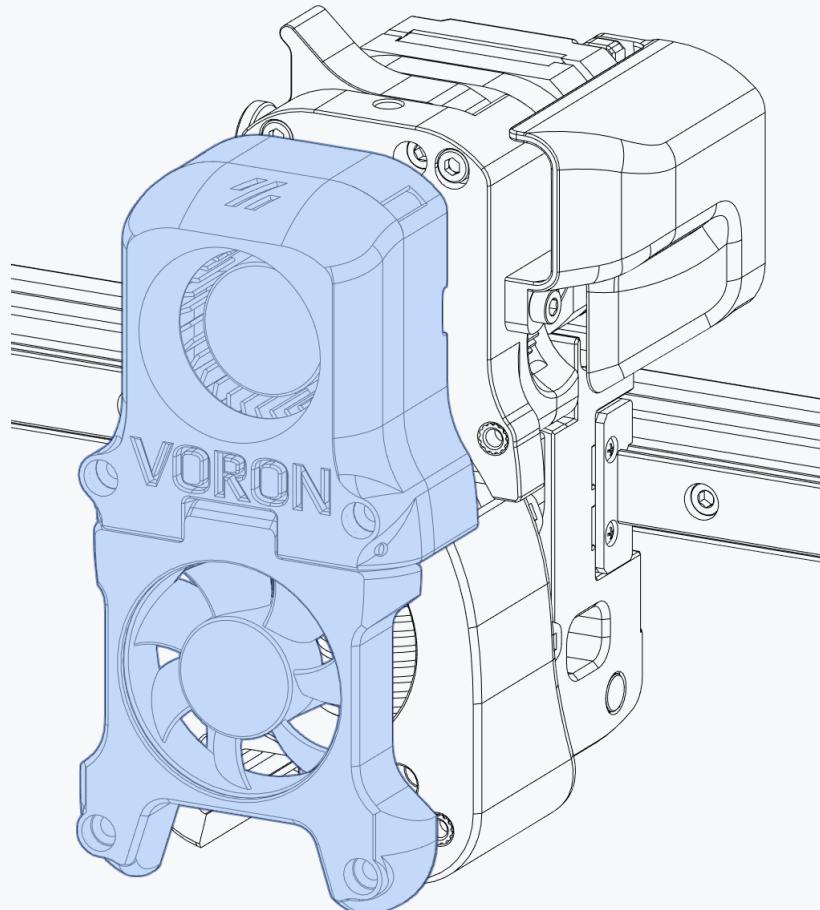


**WIRING PATH**

Guide the wires in the highlighted path.

FAN ASSEMBLY

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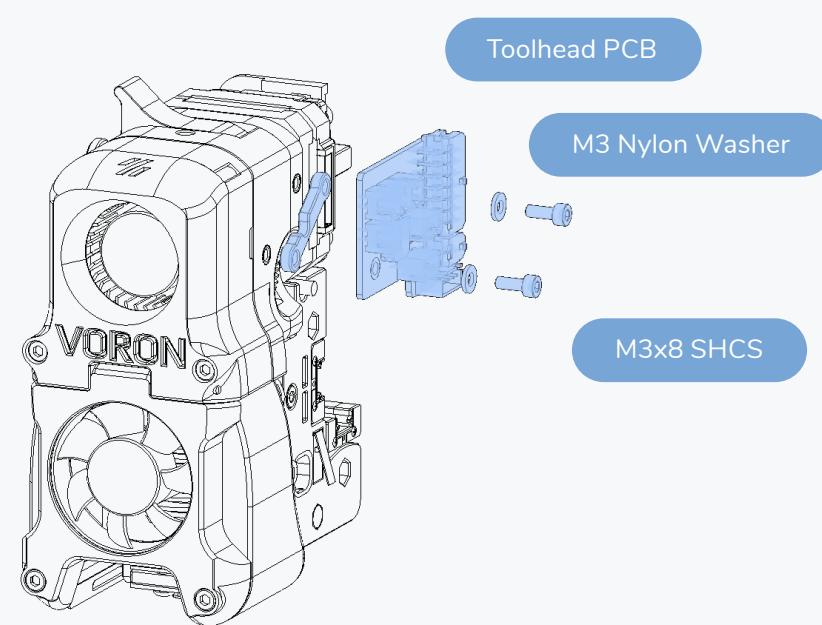


M3x12 SHCS

**OPTION: TOOLHEAD PCB**

If you opted to use a toolhead PCB, install it instead of the cable cover.

While not strictly required the use of plastic (e.g. nylon) washers is recommended.

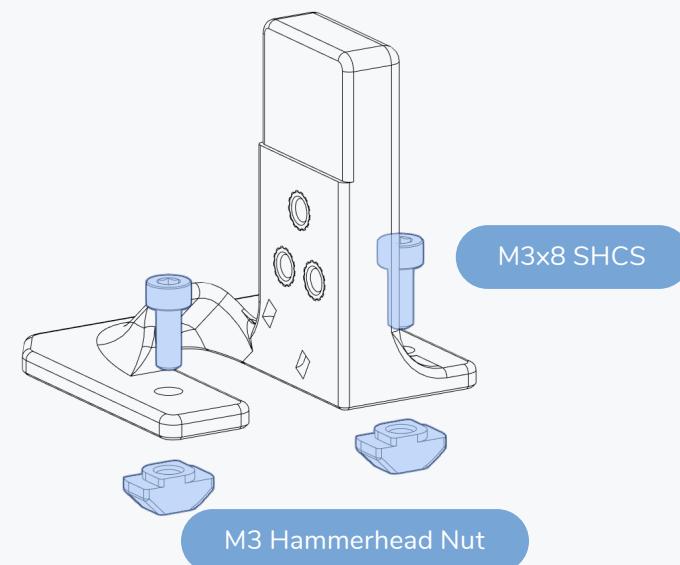
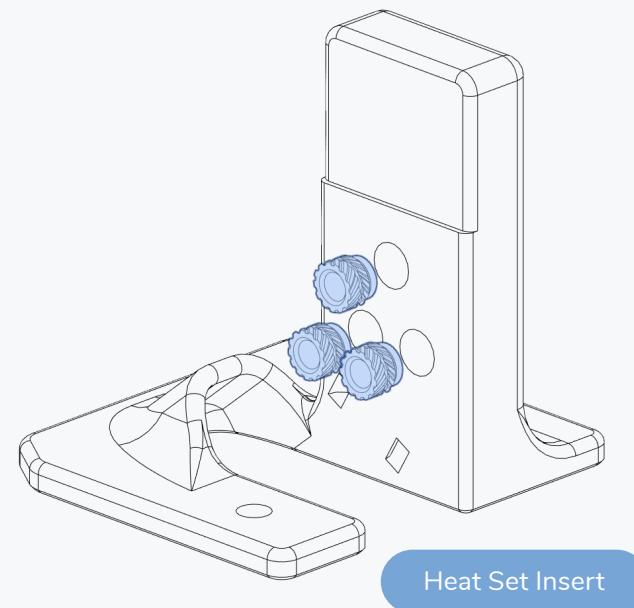


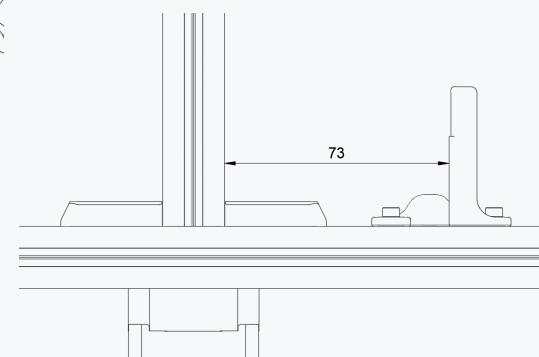
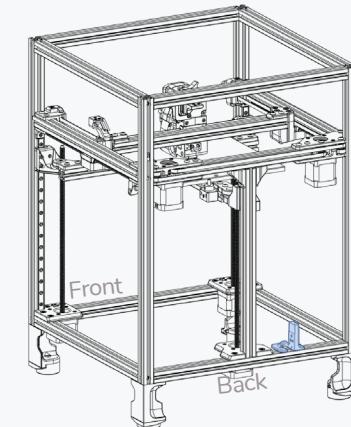
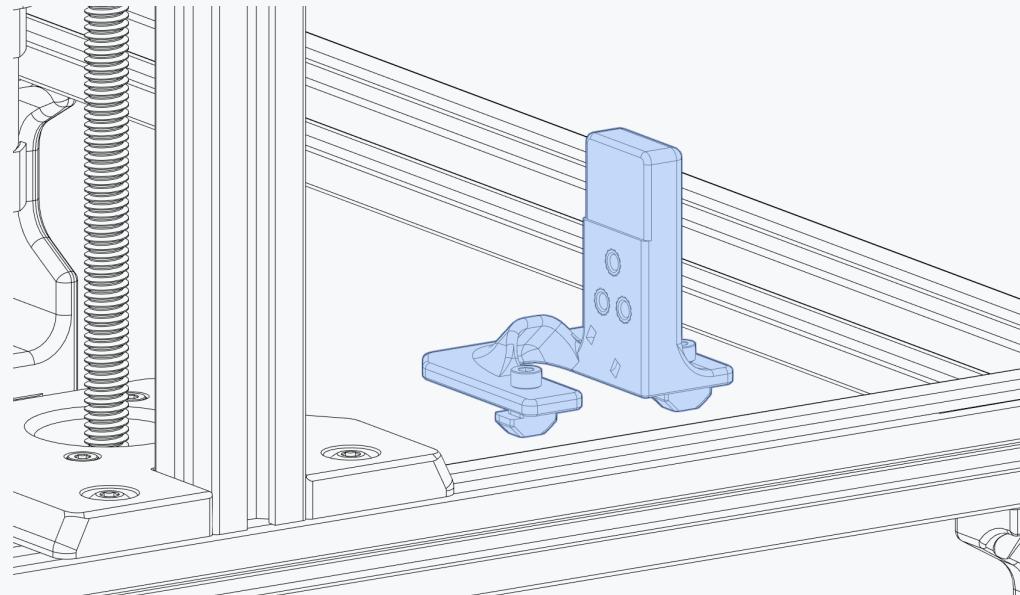
V1 and V2 are not version numbers but the printer models/lines. We renamed the V1 to Voron Trident to address the confusion this caused.

WIRING PREP

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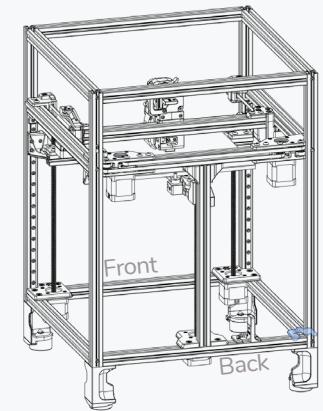
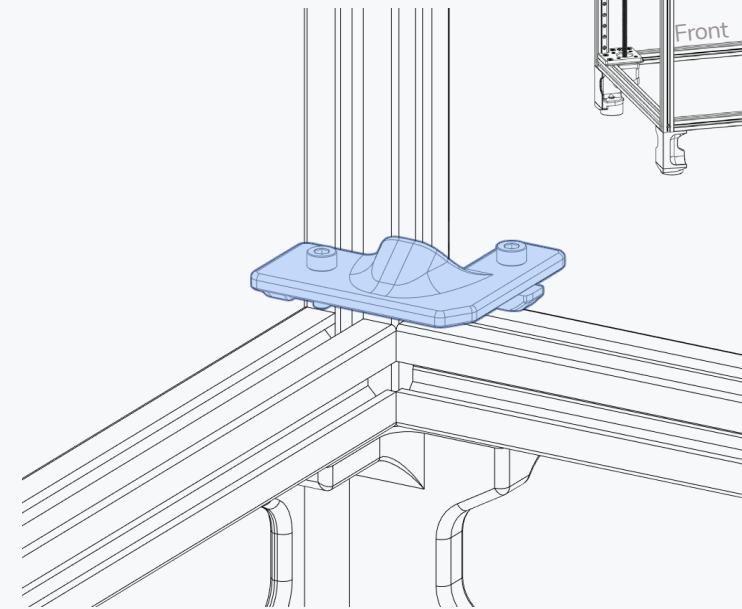
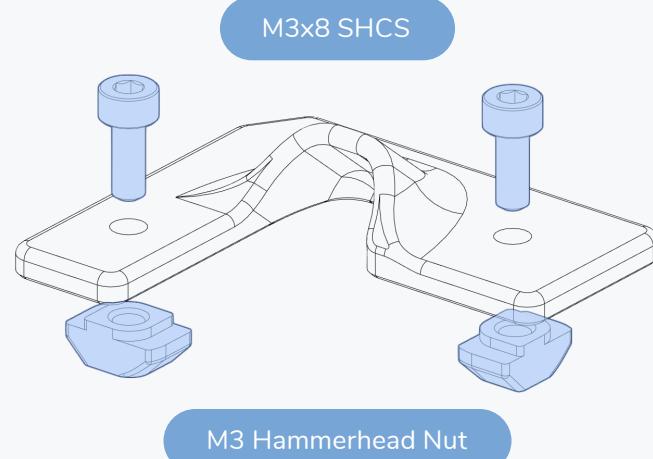


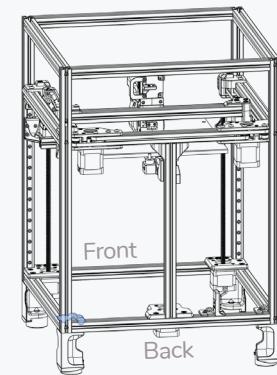
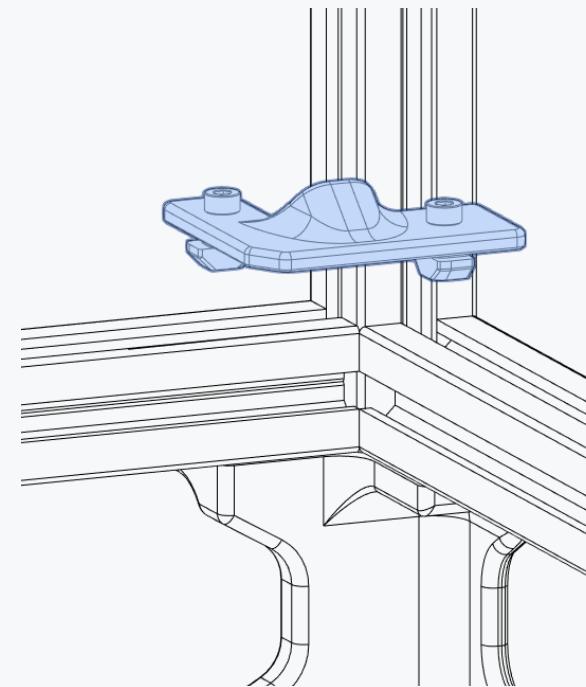
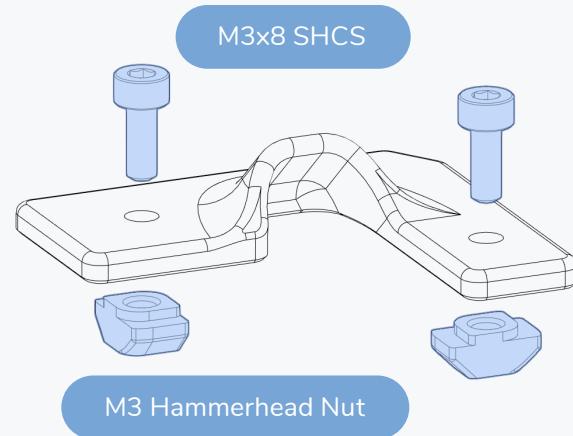


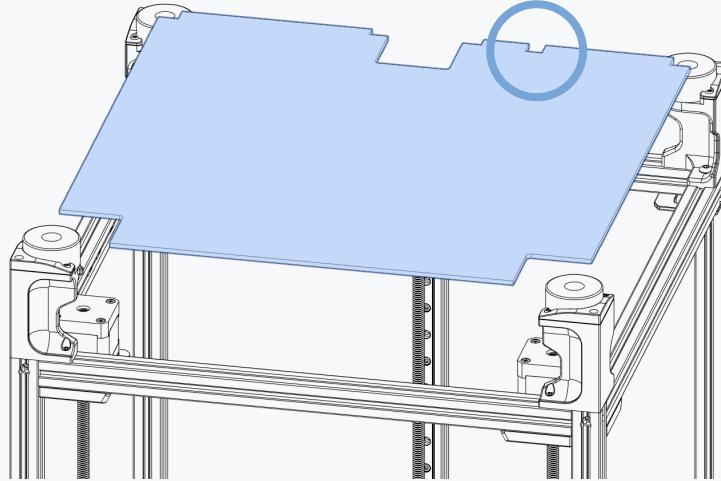


## CABLE COVER

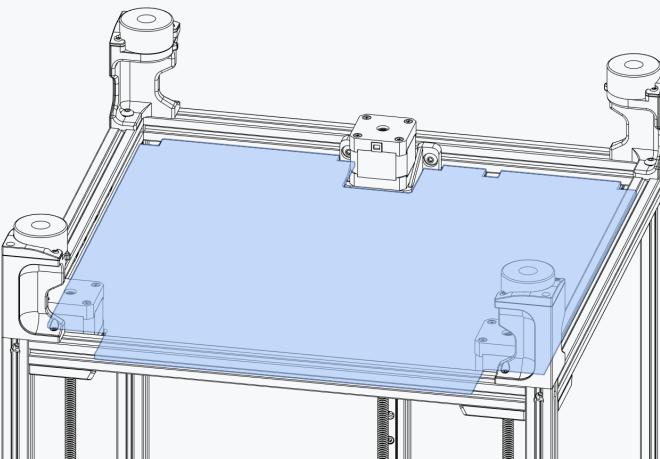
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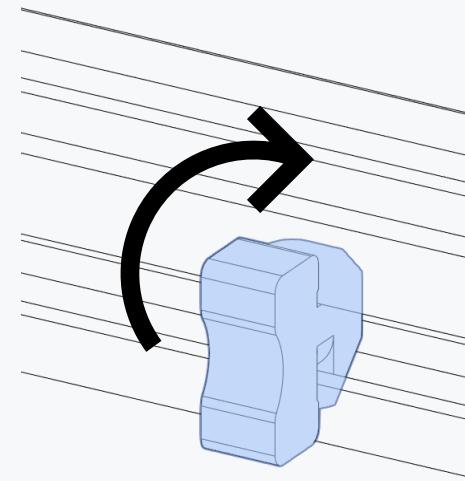
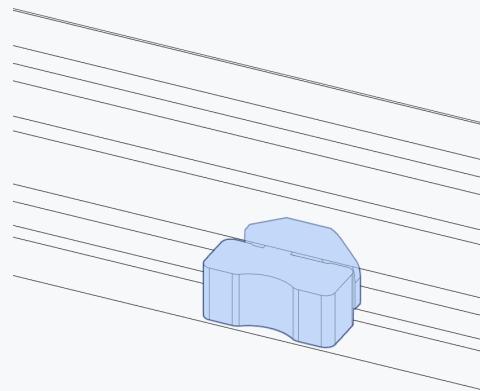
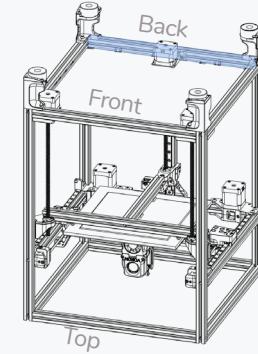
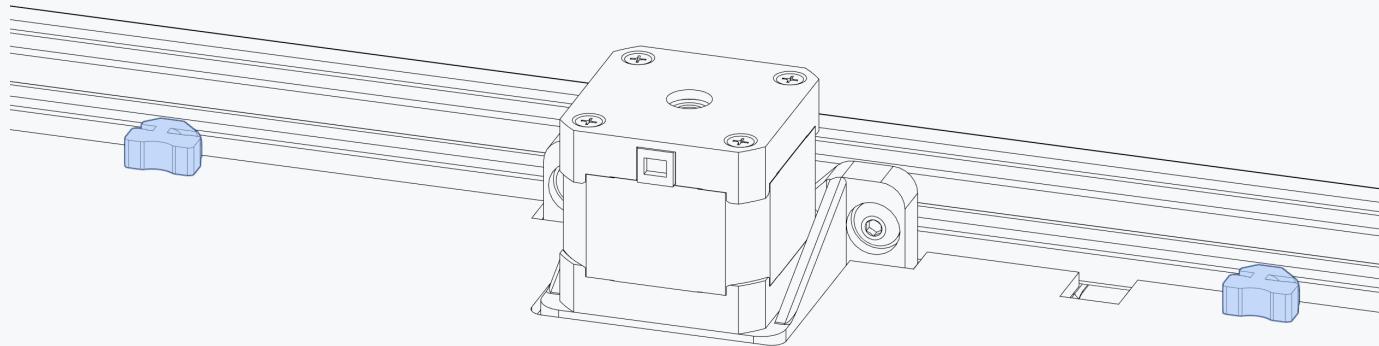




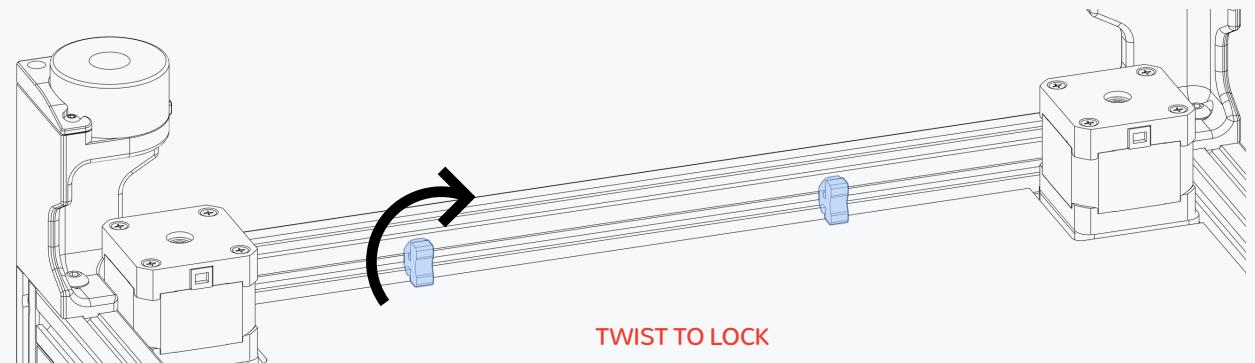
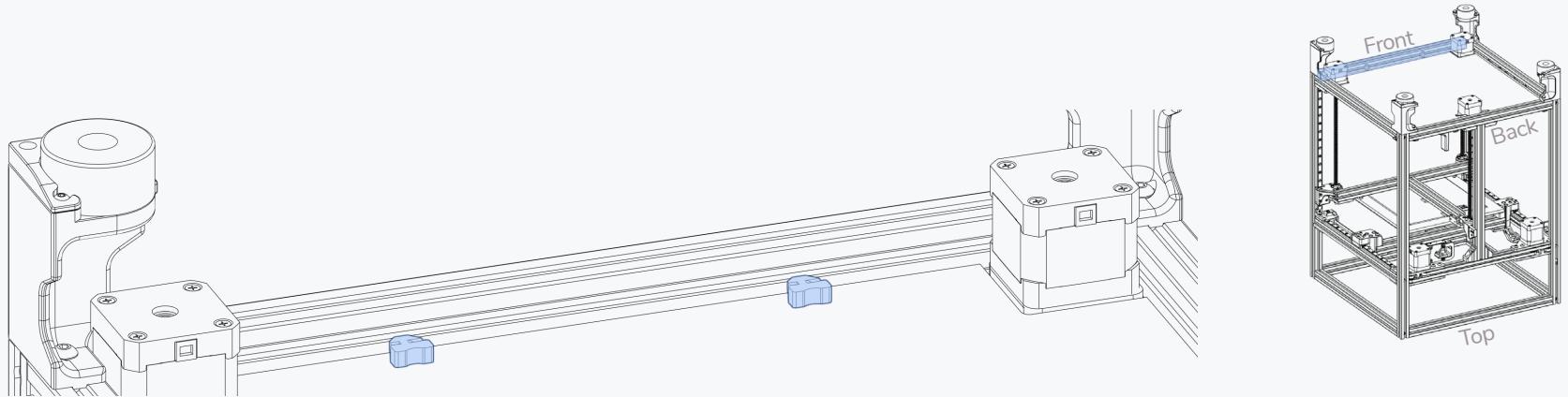
**PANEL ORIENTATION**

Align the notch to the back and in line with the Z chain anchor.

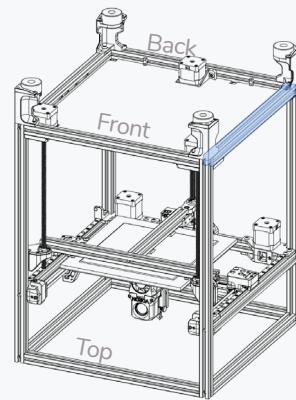
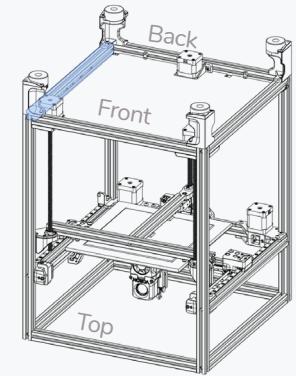
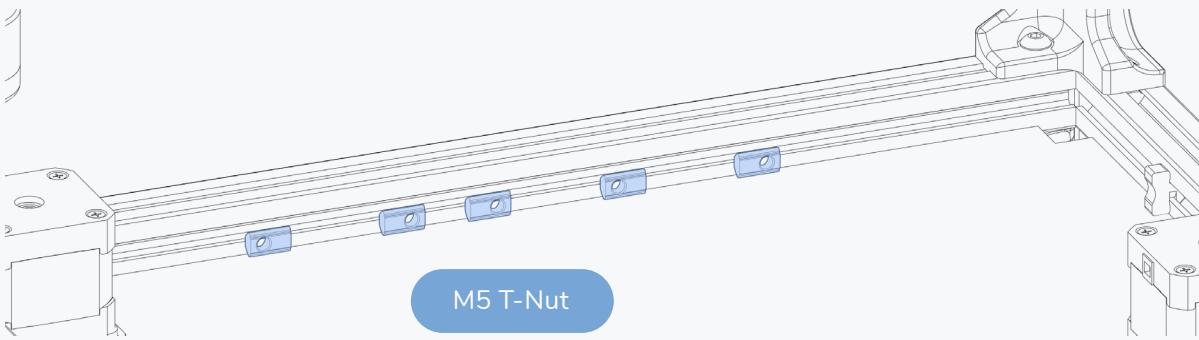


**TWIST TO LOCK**

Rotate the deck supports by 90° to lock them in place.

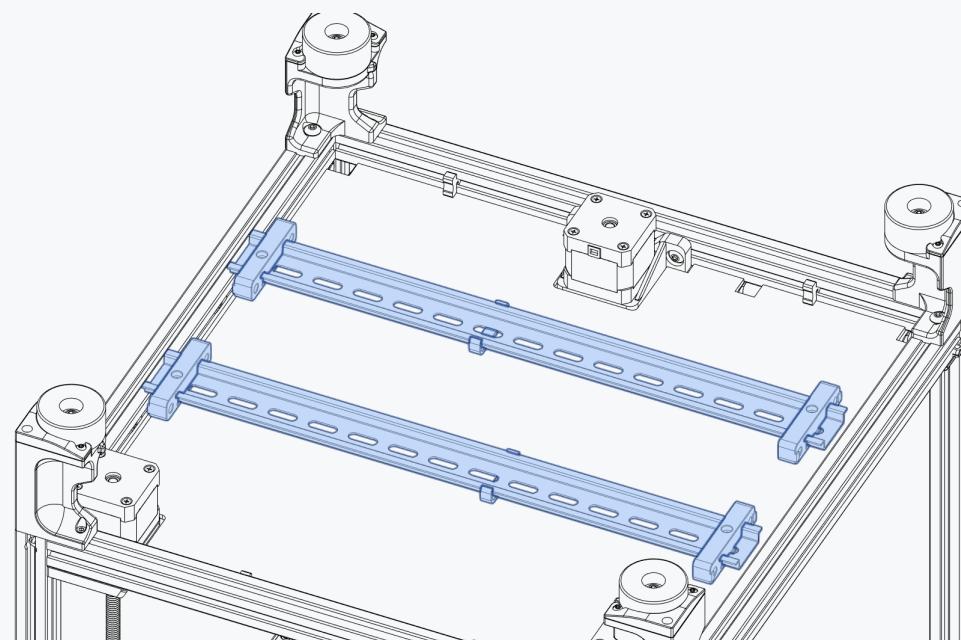
**TWIST TO LOCK**

Rotate the deck supports  
by 90° to lock them in  
place.



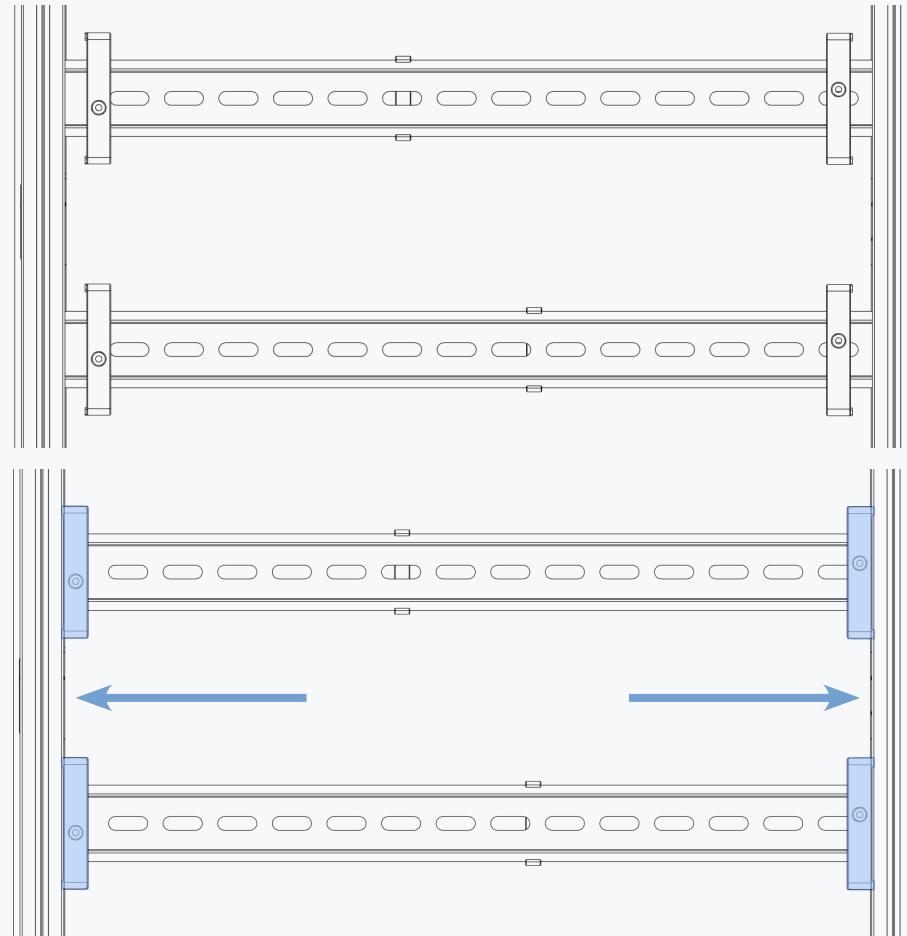
DIN RAILS

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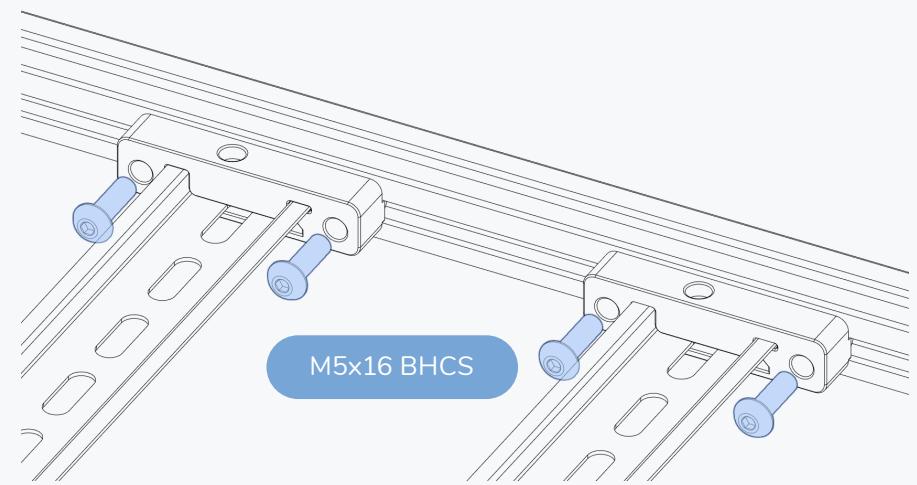
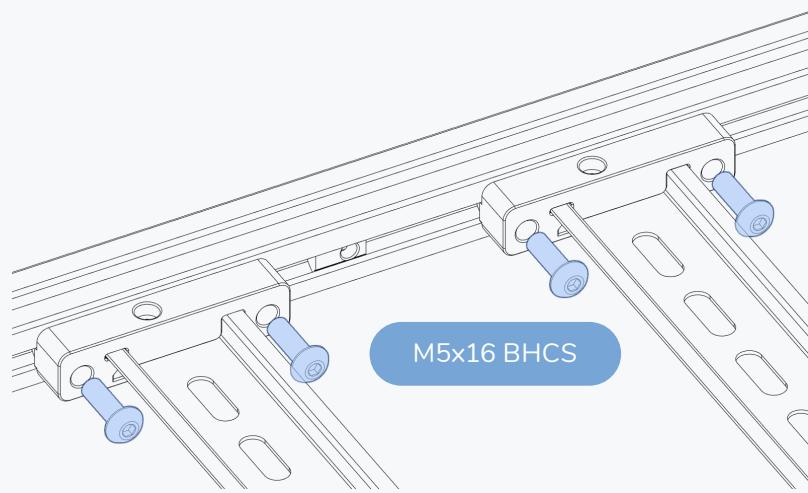


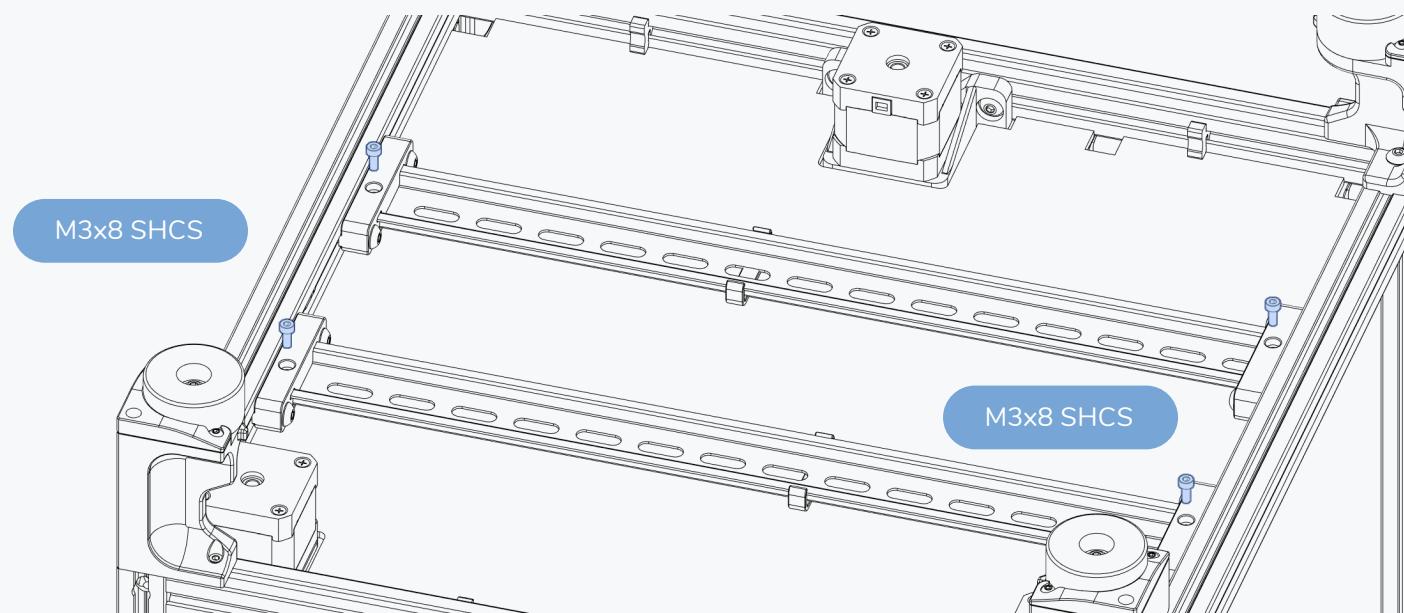
**SPACING**

Roughly centre the DIN rails and space them about 80mm apart.

**SLIDE INTO POSITION**

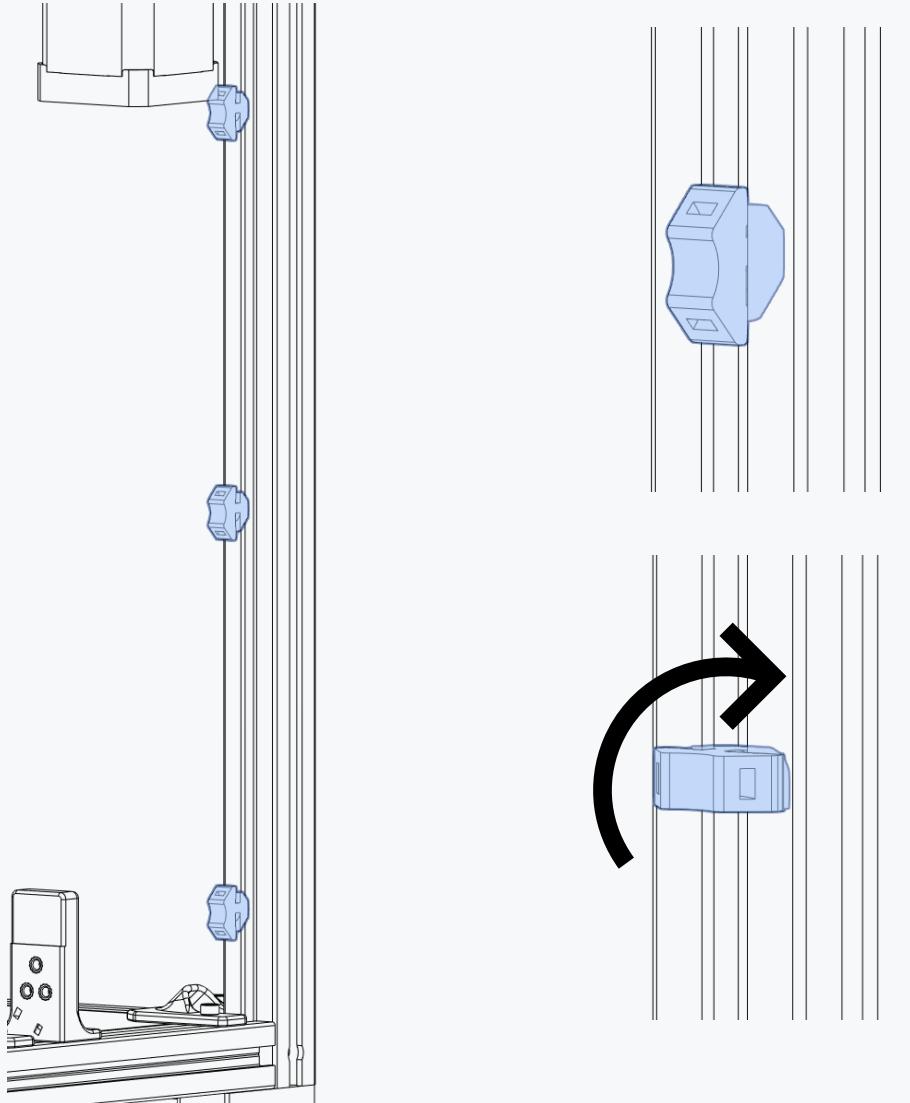
Slide the mounts all the way to the extrusions.



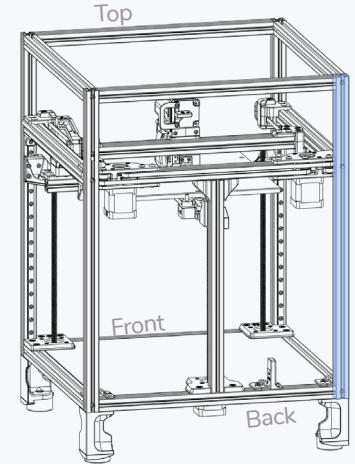
**DON'T OVER TIGHTEN**

The bolts are used to keep the DIN rails from sliding and are bolted directly into plastic.

## ZIP TIE LOOPS



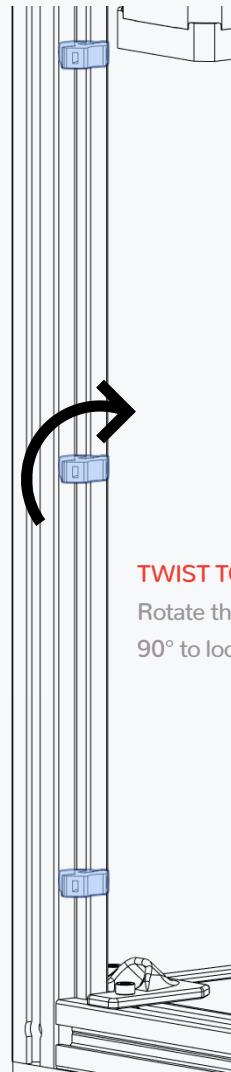
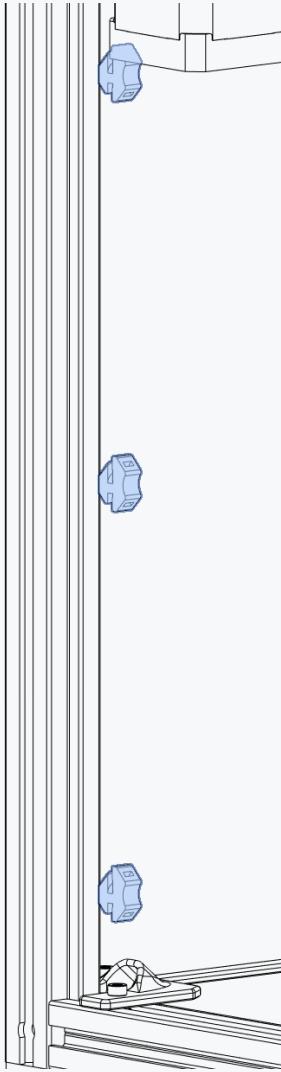
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## TWIST TO LOCK

Rotate the zip tie loops by  
90° to lock them in place.

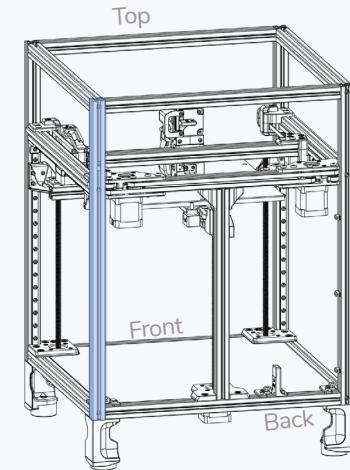
## ZIP TIE LOOPS



### TWIST TO LOCK

Rotate the zip tie loops by 90° to lock them in place.

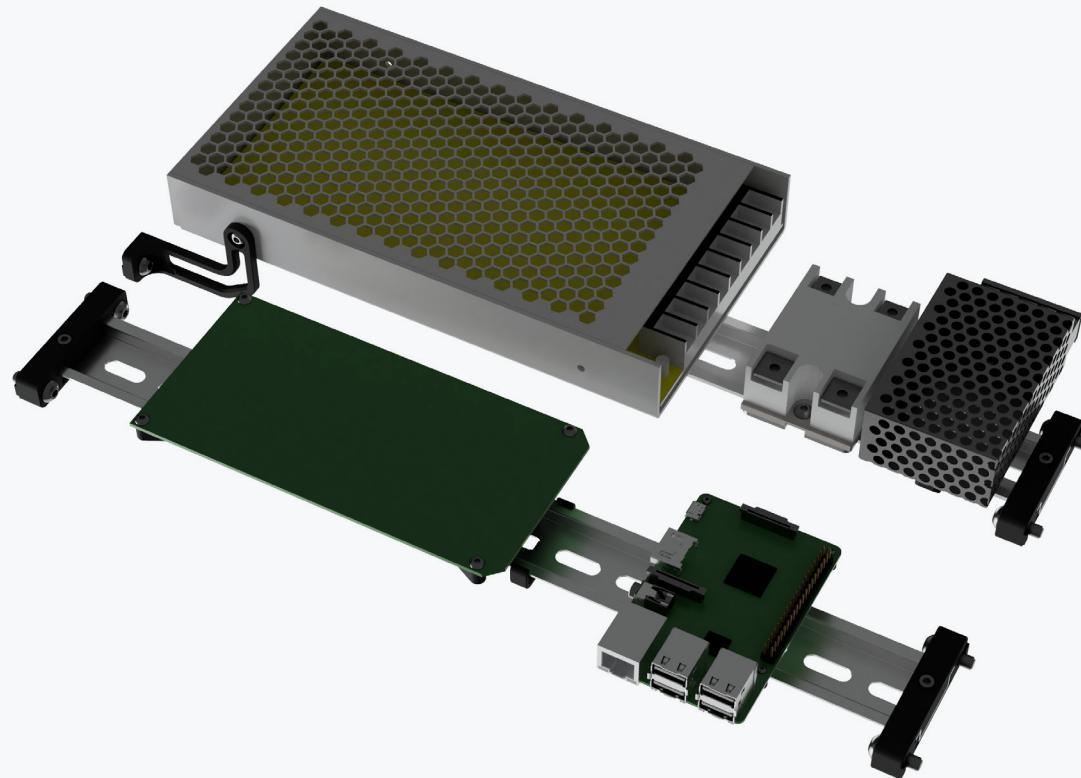
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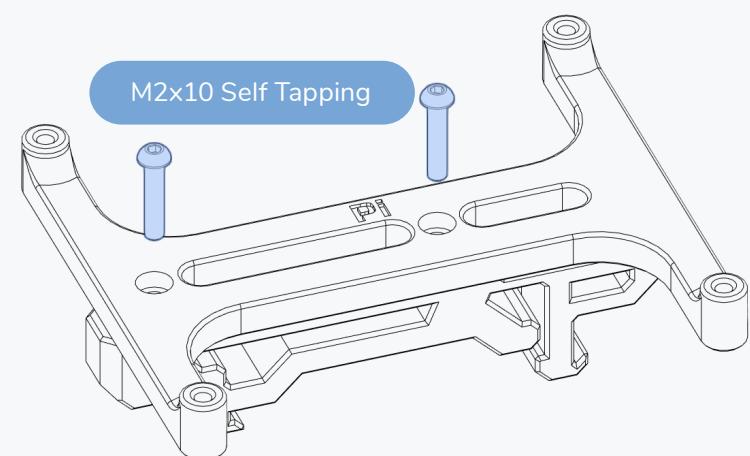
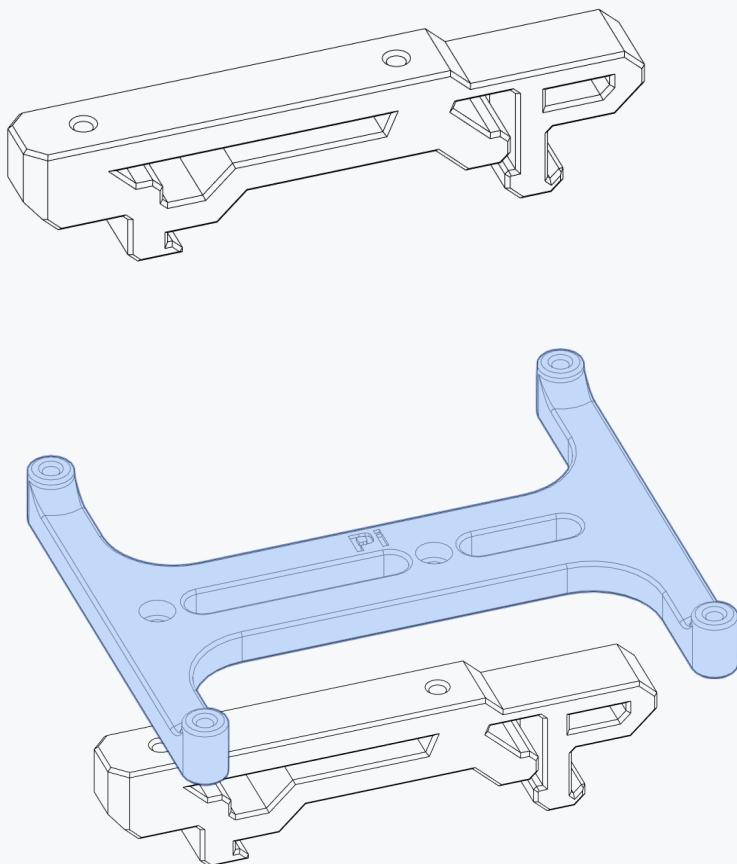


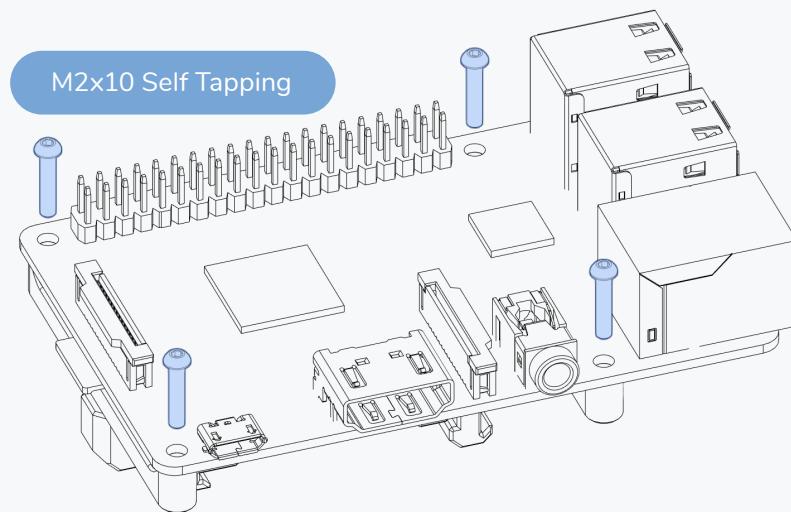
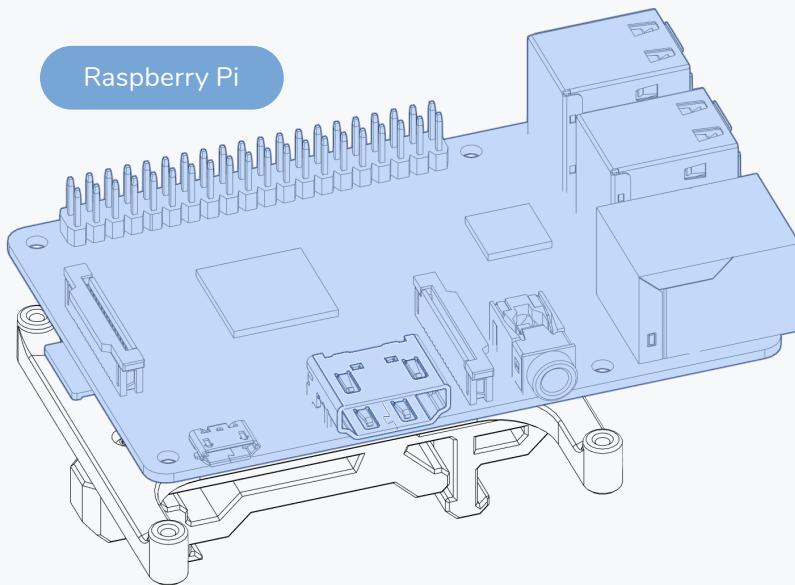
Voron Trident was released on the 16th of August 2021.

ELECTRONICS

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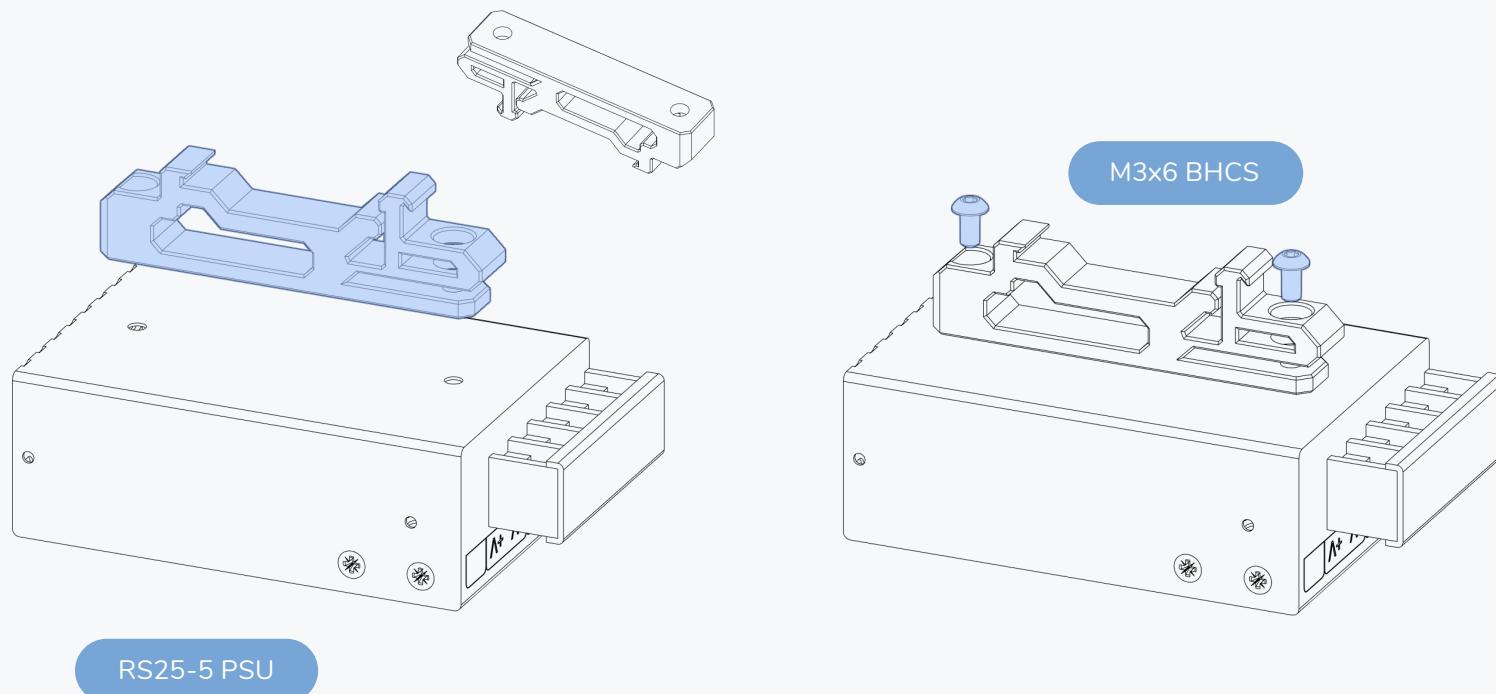


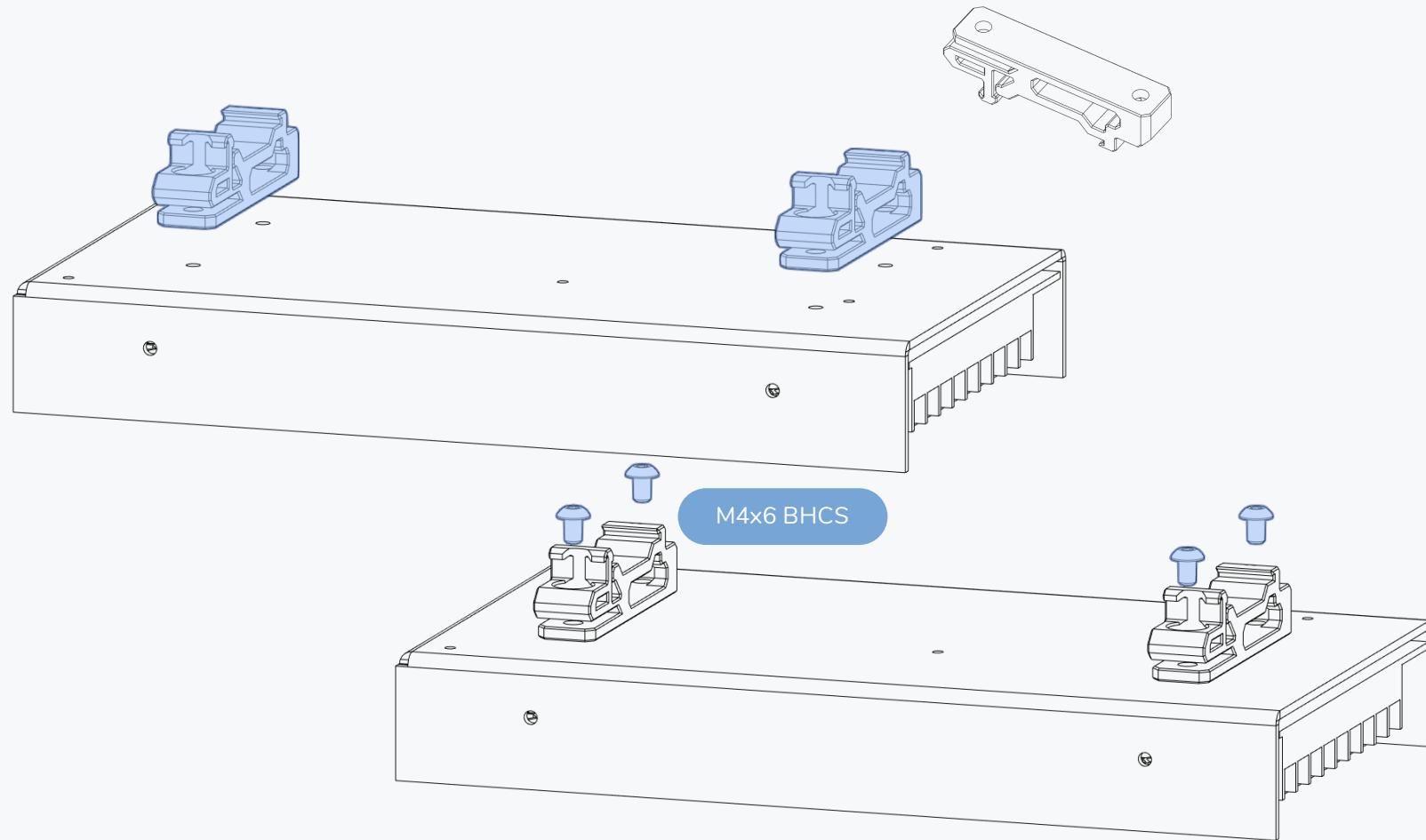


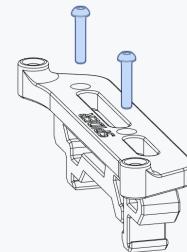
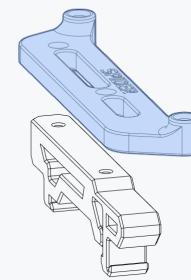
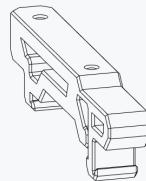
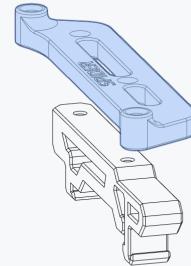
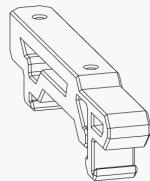


5V PSU

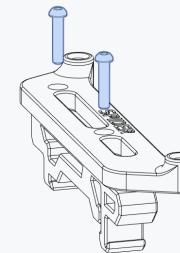
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M2x10 Self Tapping



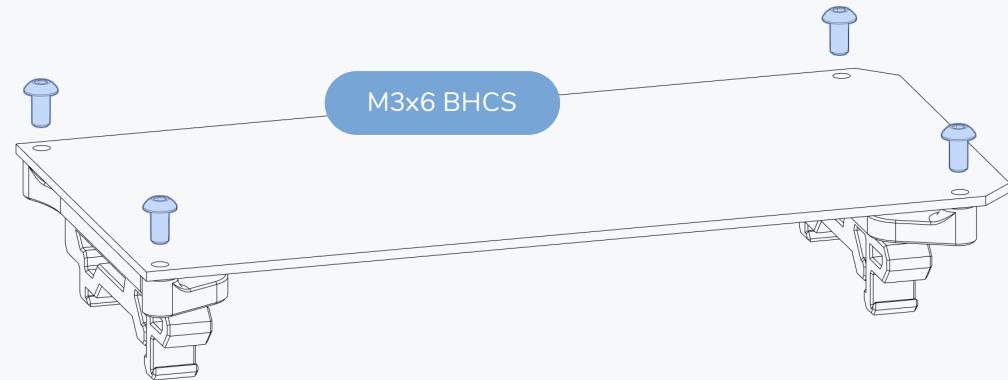
#### AVAILABLE MOUNTS

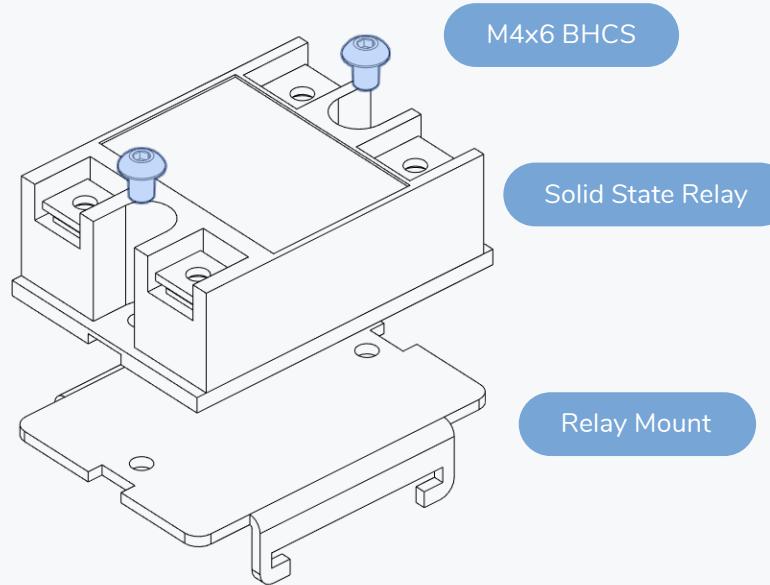
We also provide mounts for other controller boards.

They are assembled in a similar manner.

**WHY DOES IT LOOK THAT WAY?**

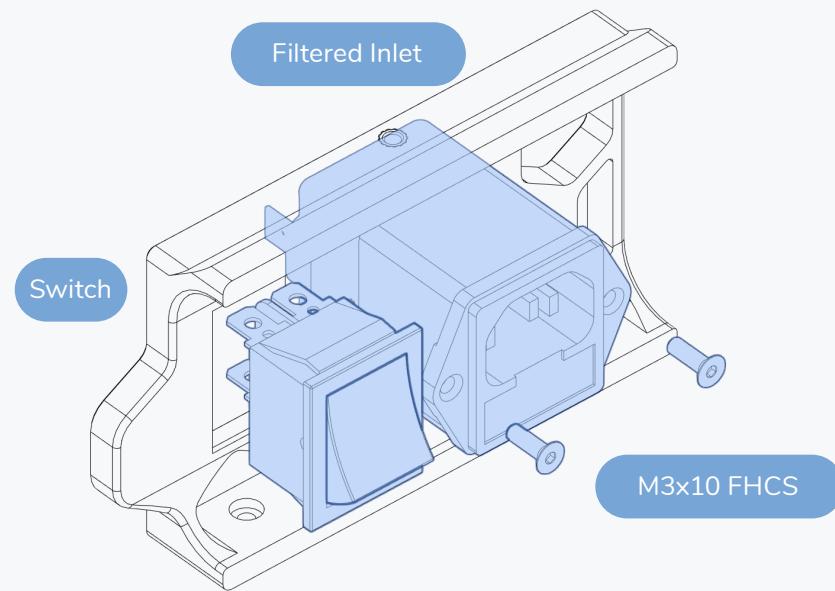
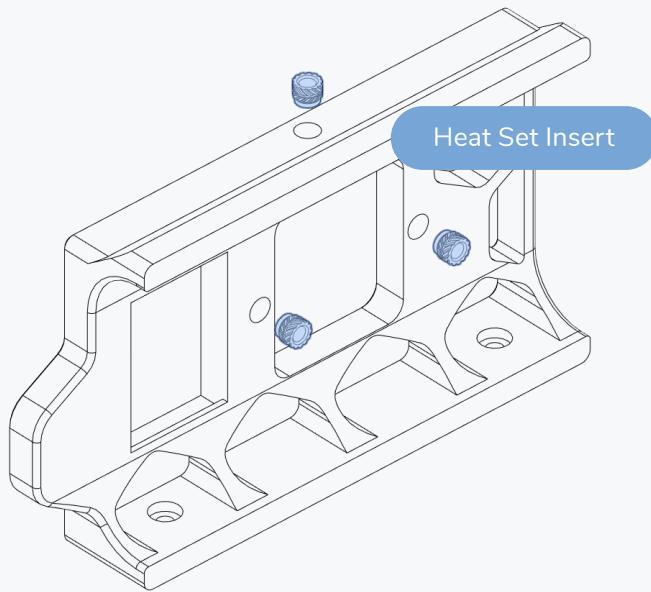
We used a dummy to keep the file size of the printers CAD manageable. The wiring section will have a fully featured image.

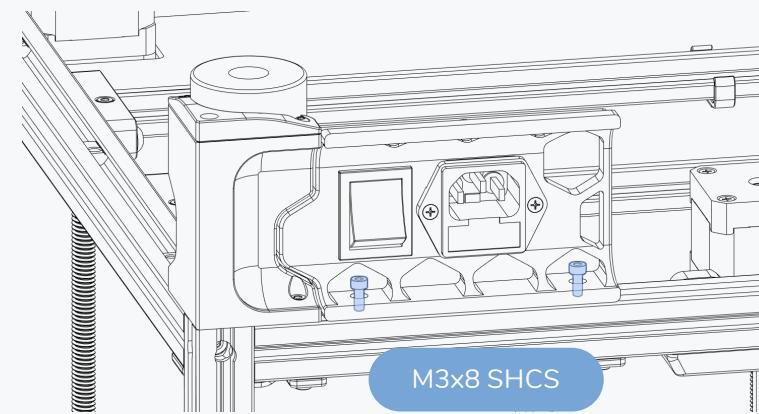
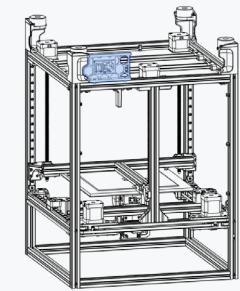
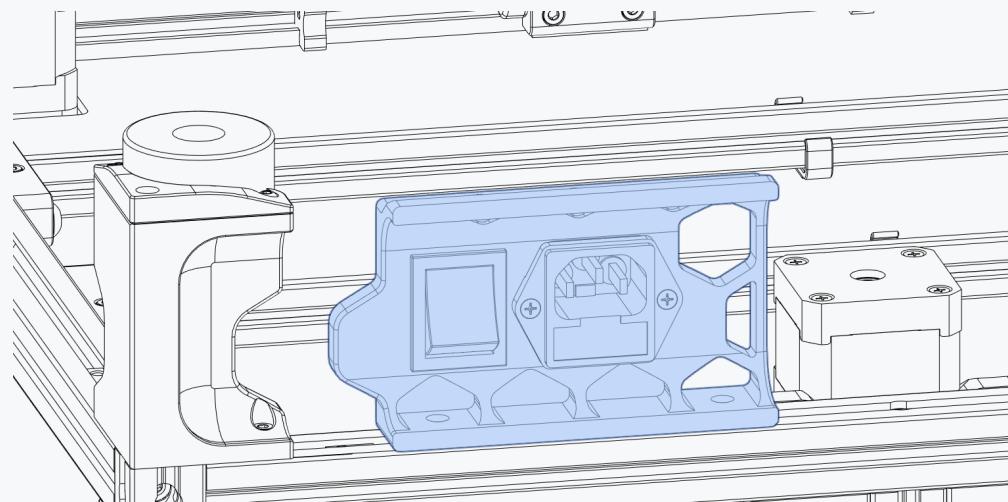


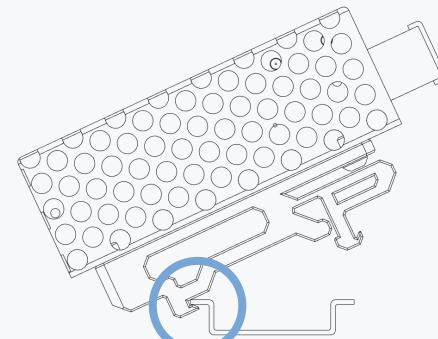
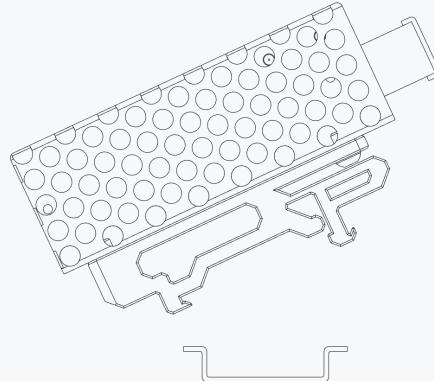


#### WHERE CAN I FIND THE RELAY MOUNT?

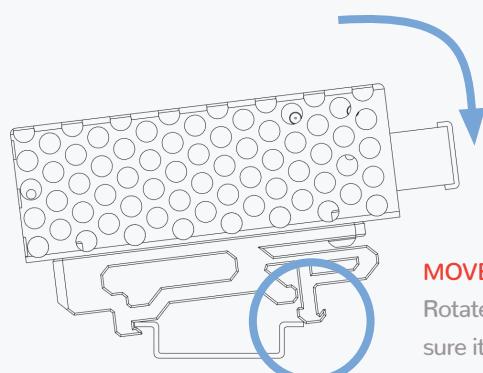
The SSR mount is an off the shelf part. Look for a metal bracket in your pile of parts.  
There is no printed mount.



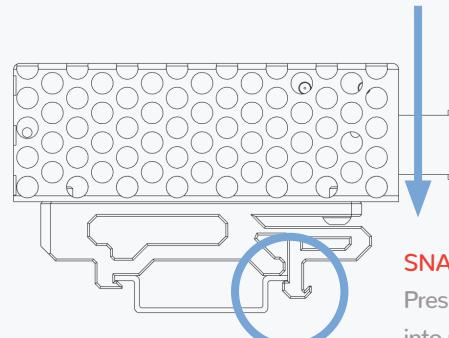


**HOOK FIXED SIDE**

Hook the fixed side of the printed mount on side of DIN rail.

**MOVE INTO POSITION**

Rotate the part into place, make sure it does not unhook from the fixed side.

**SNAP INTO PLACE**

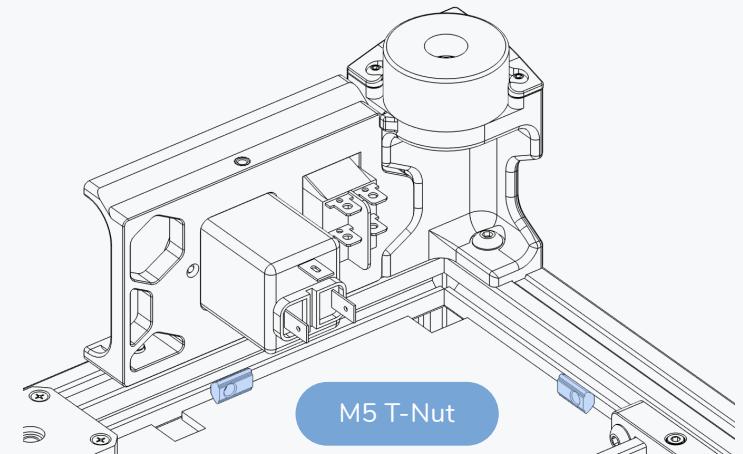
Press to snap the free side into place. The part should now sit securely on the DIN rail.

## MAINS DISTRIBUTION - WAGO

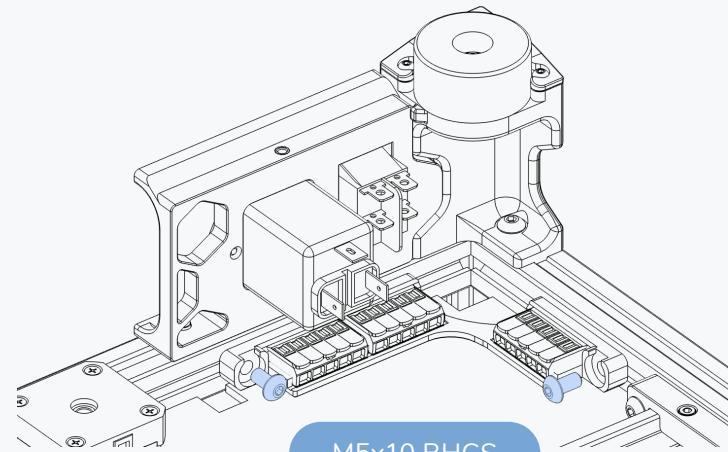
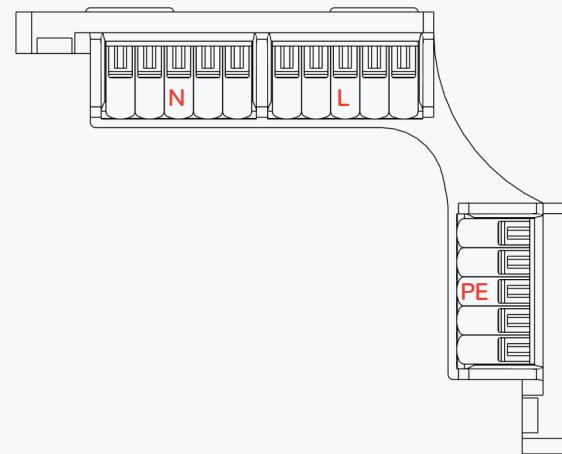
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WAGO 221 415 Lever Nuts



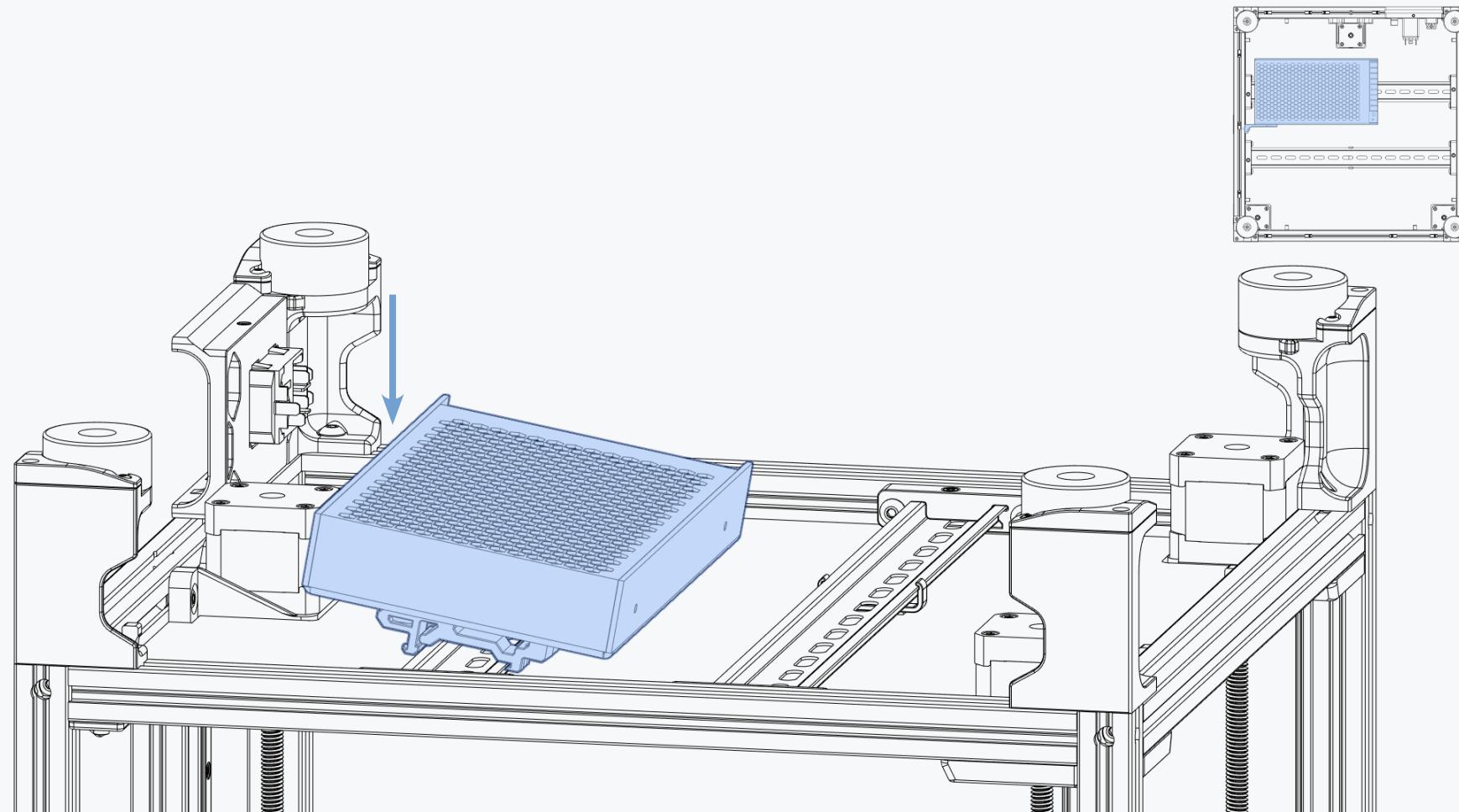
M5 T-Nut



M5x10 BHCS

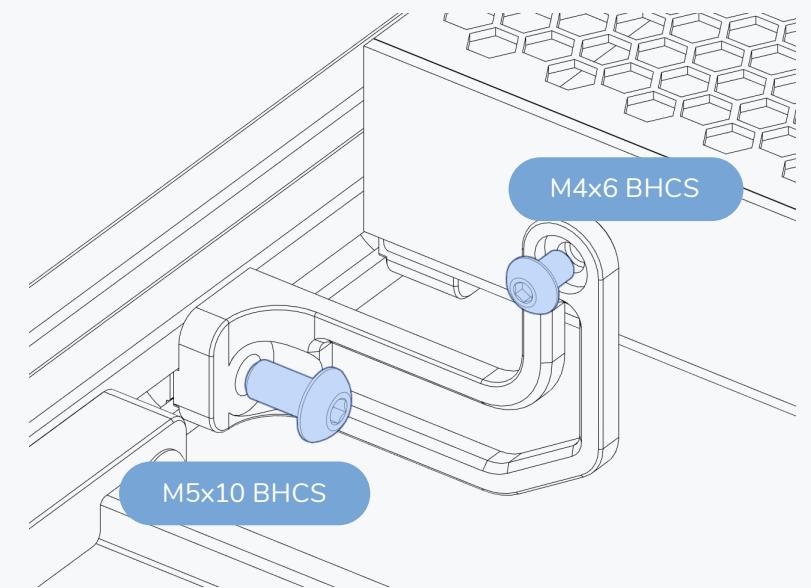
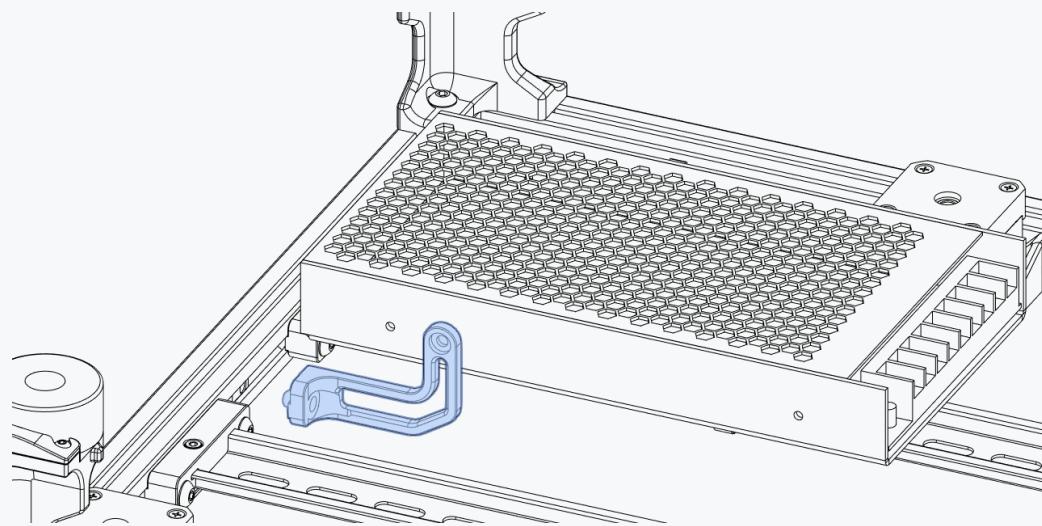
PSU MOUNTING

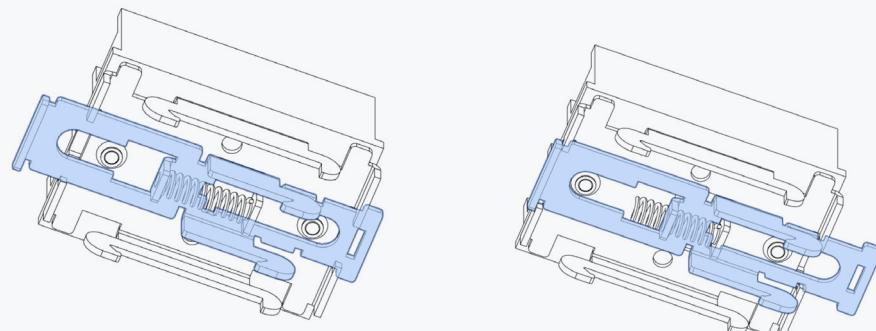
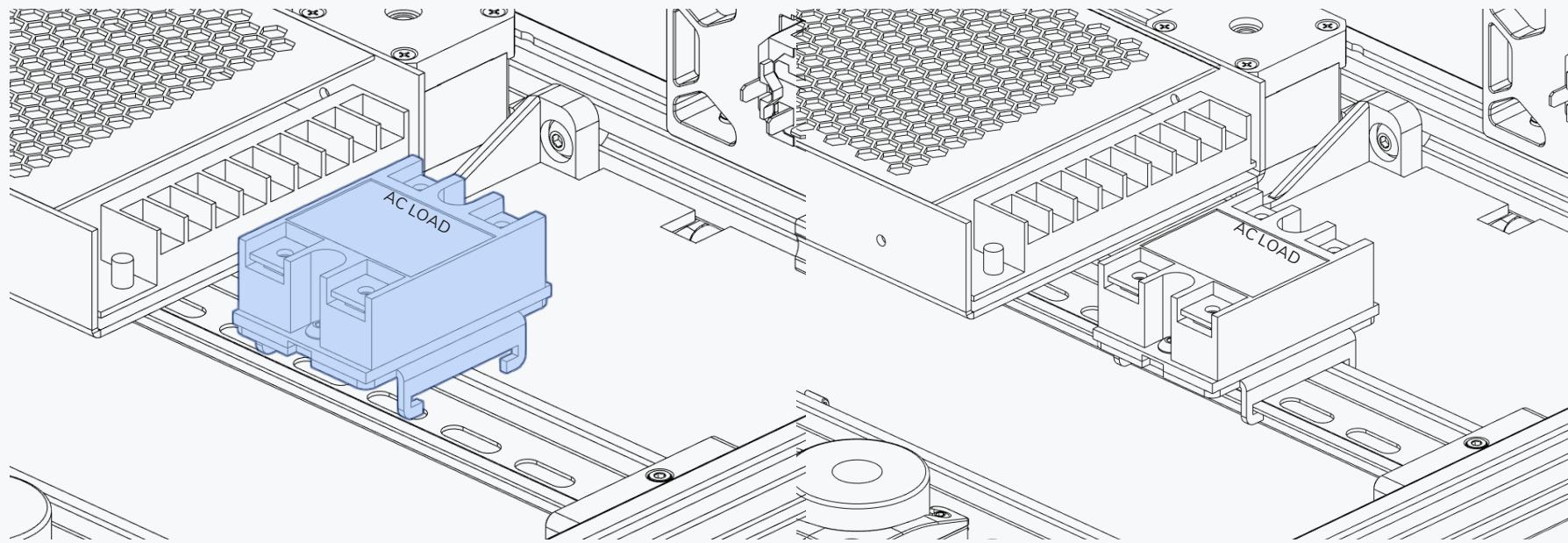
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## PSU MOUNTING

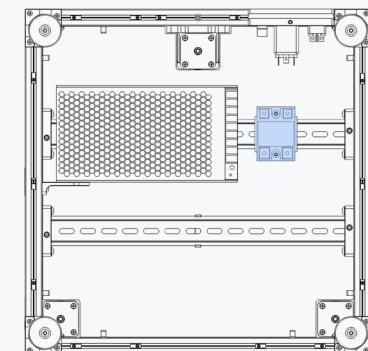
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**SPRING LOADED**

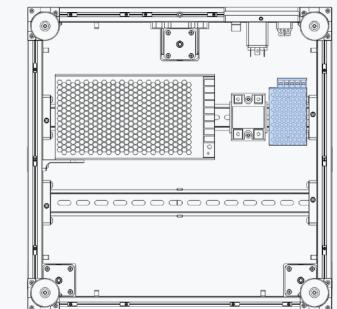
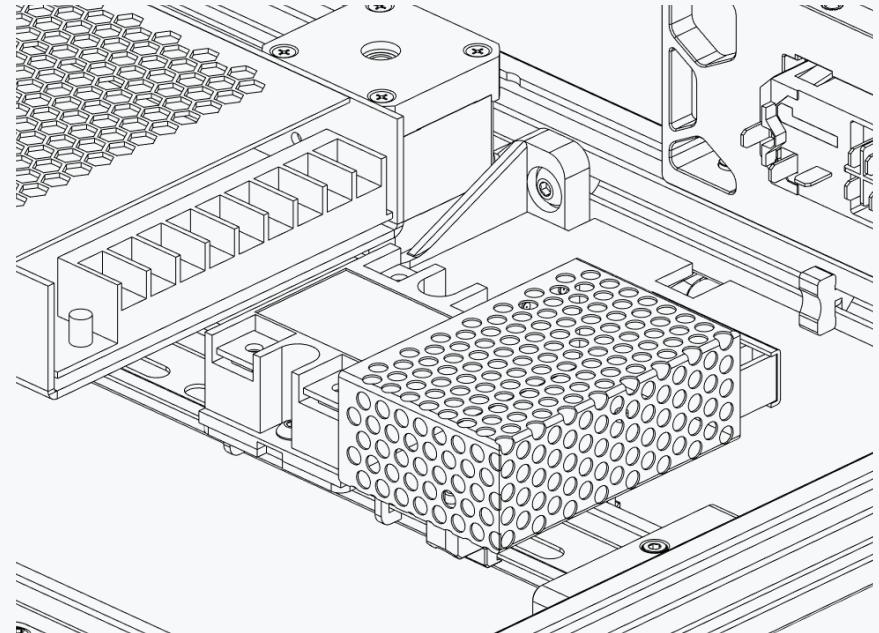
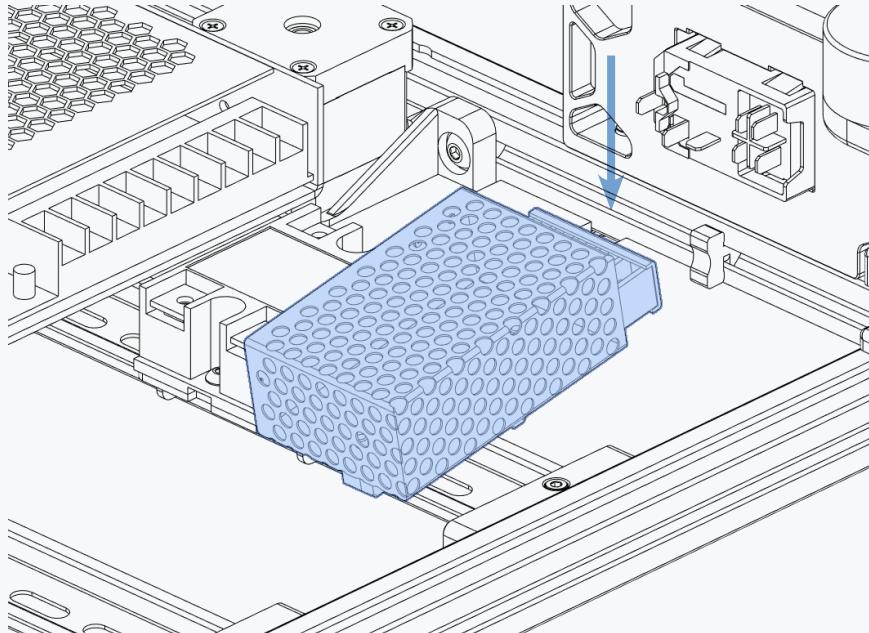
Use a flat head bolt driver to pull the latch open. It will lock open.

Be careful when releasing the latch, it will snap back into place. Mind your fingers.



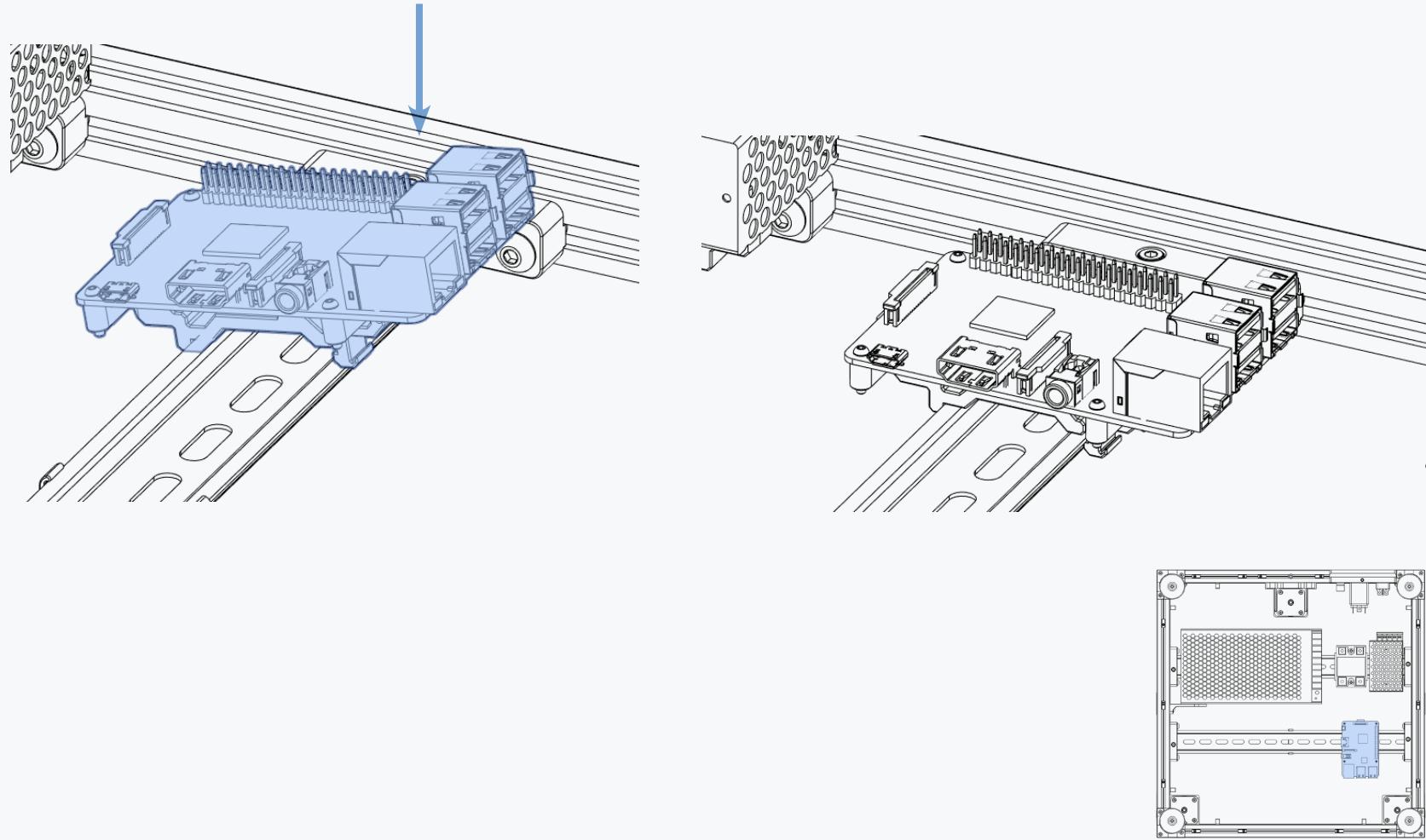
## PSU MOUNTING

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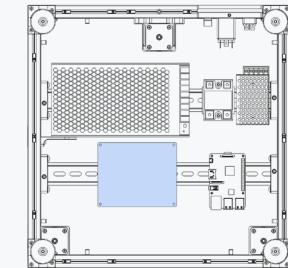
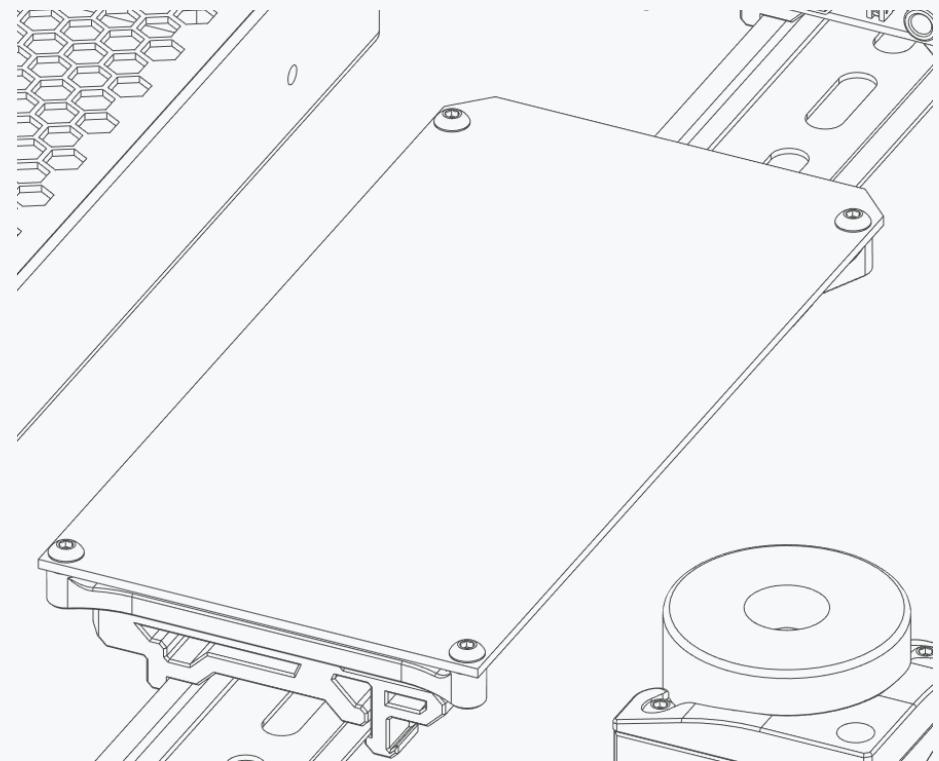
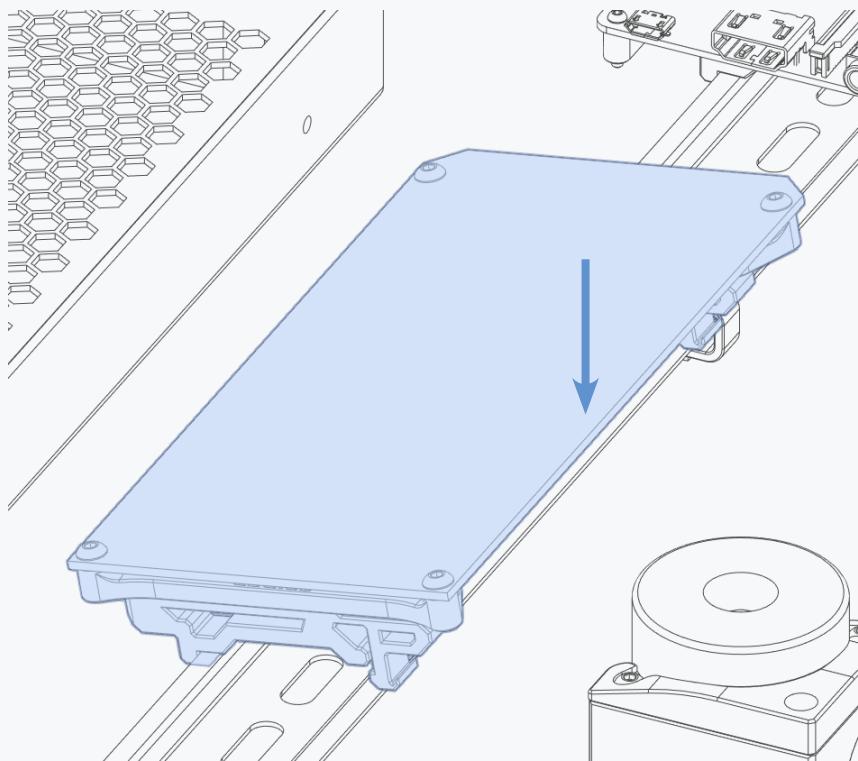
## RASPBERRY PI MOUNTING

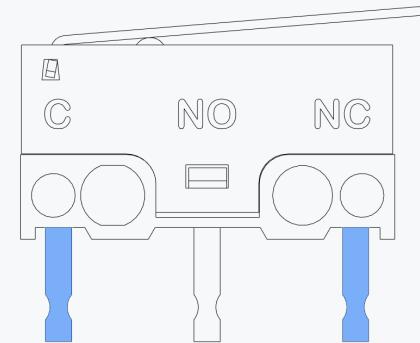
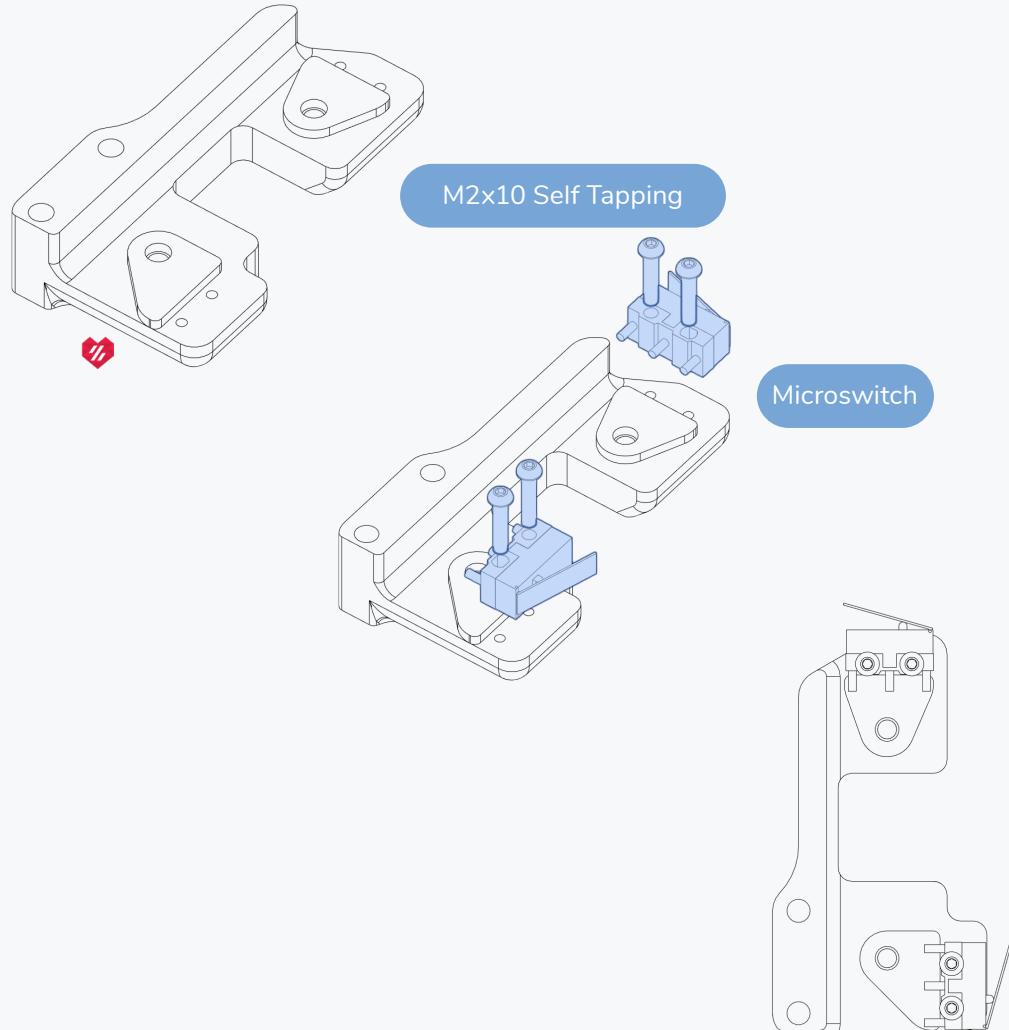
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## CONTROLLER BOARD MOUNTING

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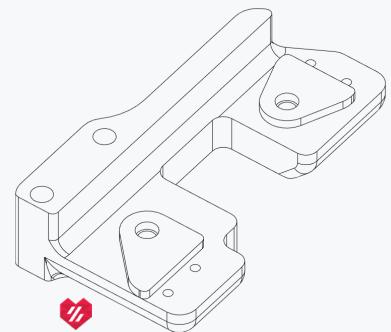


#### END-STOP SWITCHES FOR X AND Y

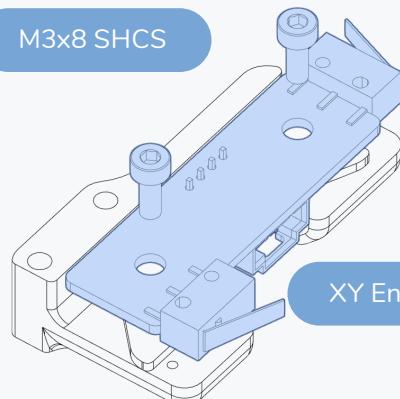
End-stops are wired in a “Normally Closed” configuration. On microswitches those are the 2 outer terminals indicated by C and NC.

Prepare the switches for X and Y by soldering 150mm of wire to each of the outer terminals.

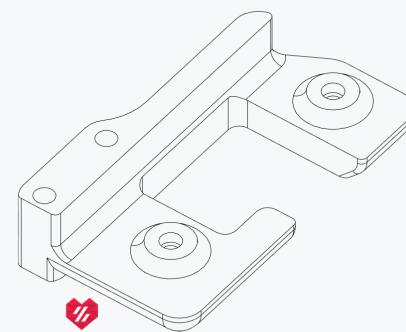
OPTION: XY ENDSTOP BOARD



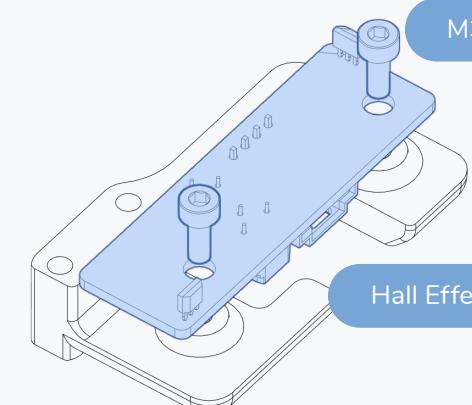
M3x8 SHCS



OPTION: HALL EFFECT ENDSTOP BOARD

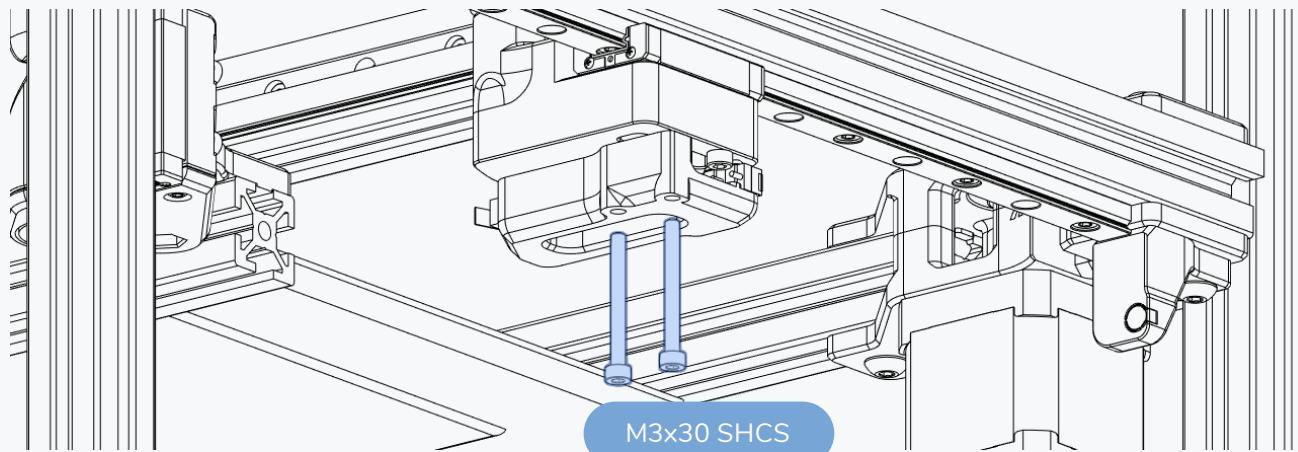
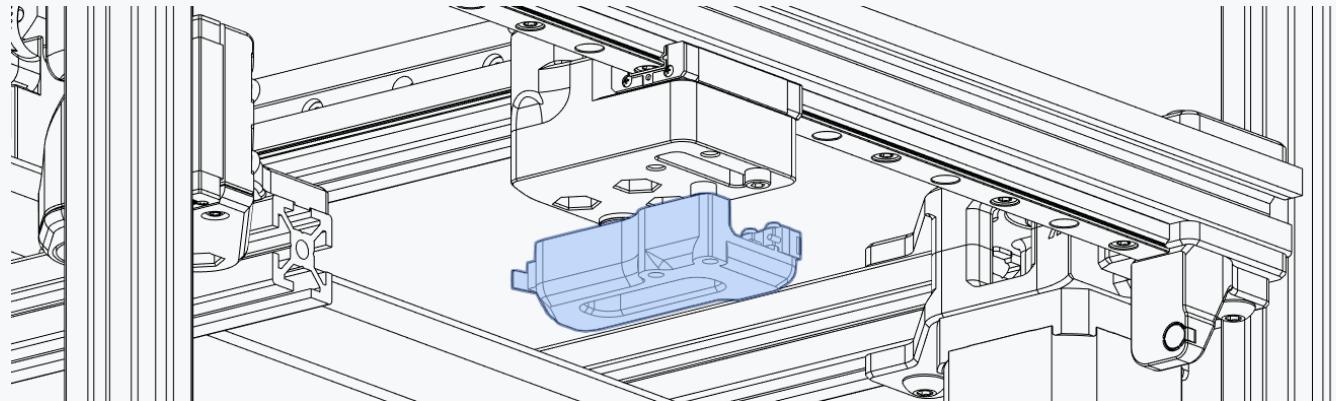


M3x8 SHCS

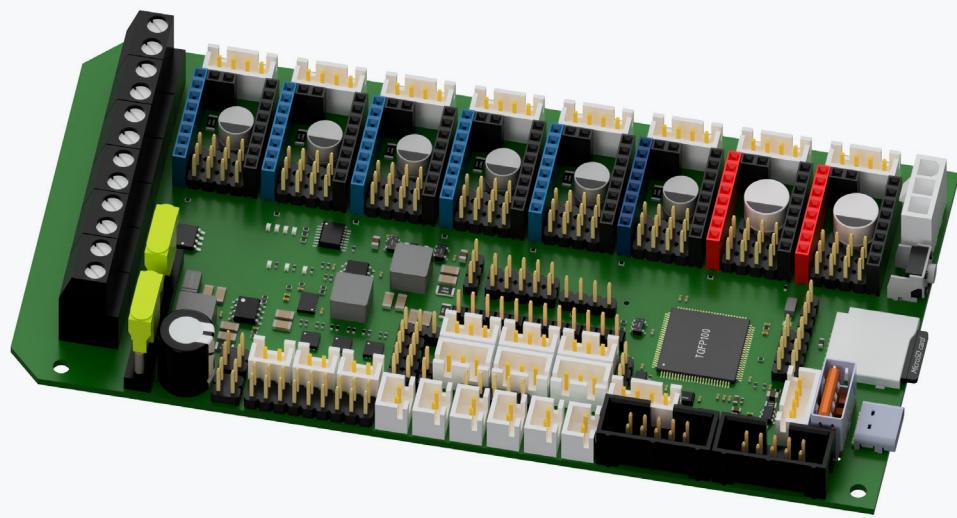


XY END-STOP POD

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Around 1100 images have been created for use in this manual. Slightly below 700 made it into the final document.



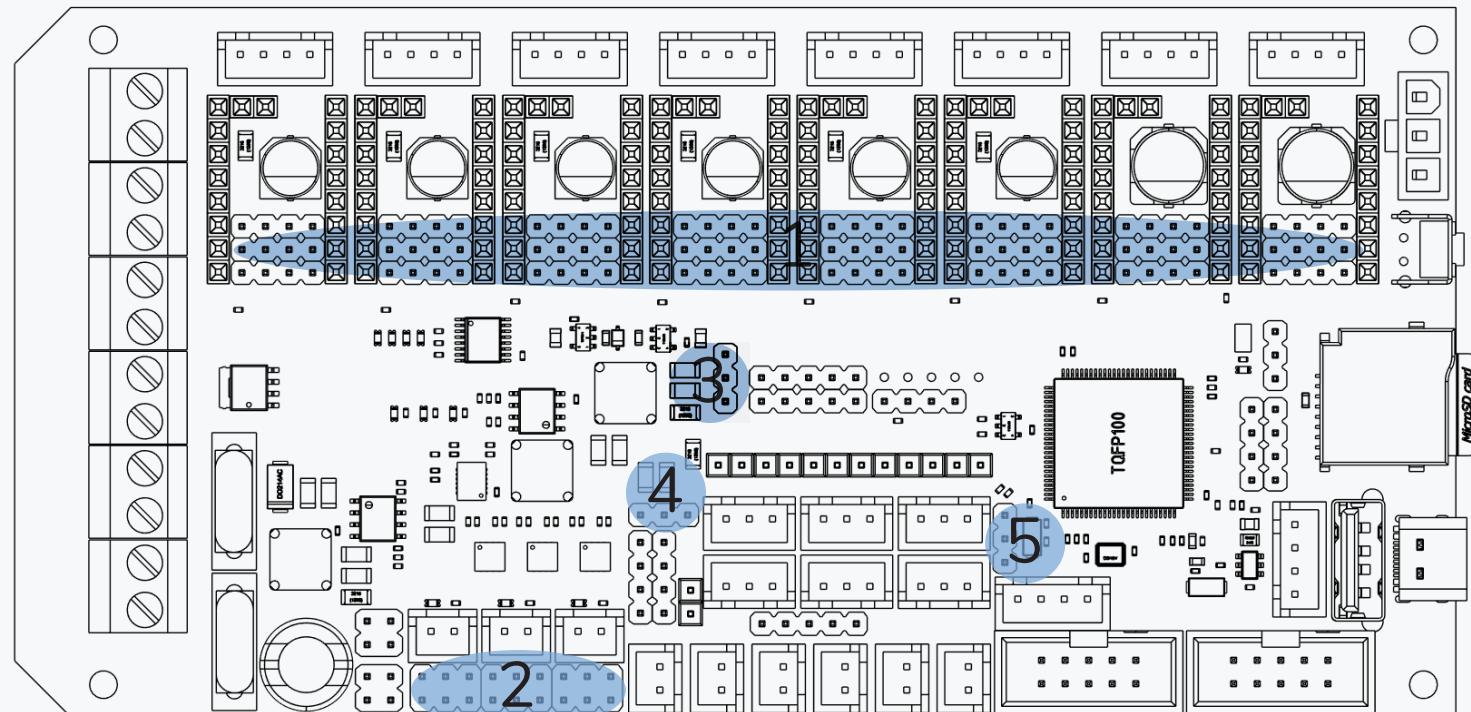
**CONTROLLER BOARD**

The assembly manual will outline the wiring for a Fyetc Spider V2.2 board. You can find additional documentation and alternative configurations on [docs.vorondesign.com](https://docs.vorondesign.com)

**JUMPERS**

Several jumpers need to be configured on the controller board. Begin by **removing all the JUMPERS** from the controller board (MCU).

- 1) Remove the jumpers in the "driver sockets".
- 2) Remove all the jumpers on the "Fan Voltage Selection"
- 3) Remove the "USB 5V power supply" jumper
- 4) Remove the "LED Voltage Selection" jumper
- 4) Remove the "Probe Voltage Selection" jumper

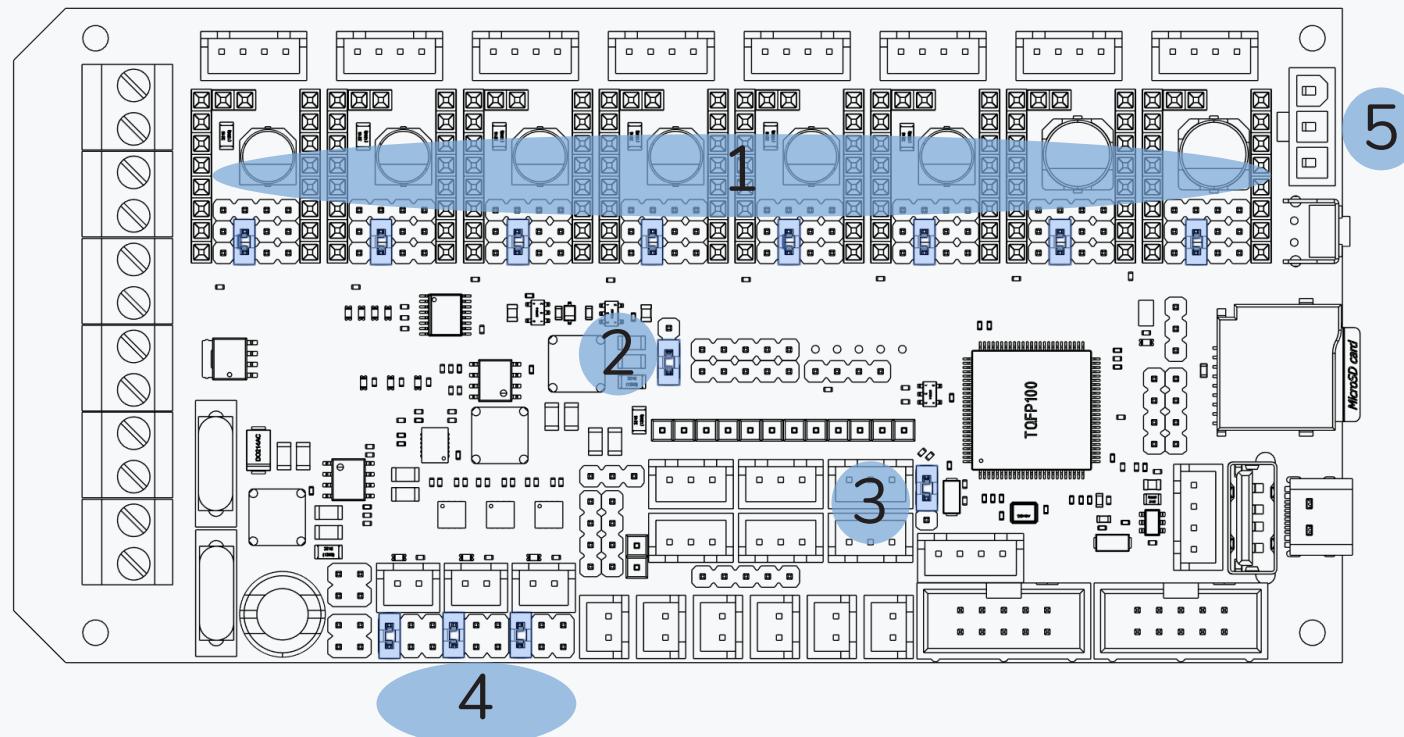


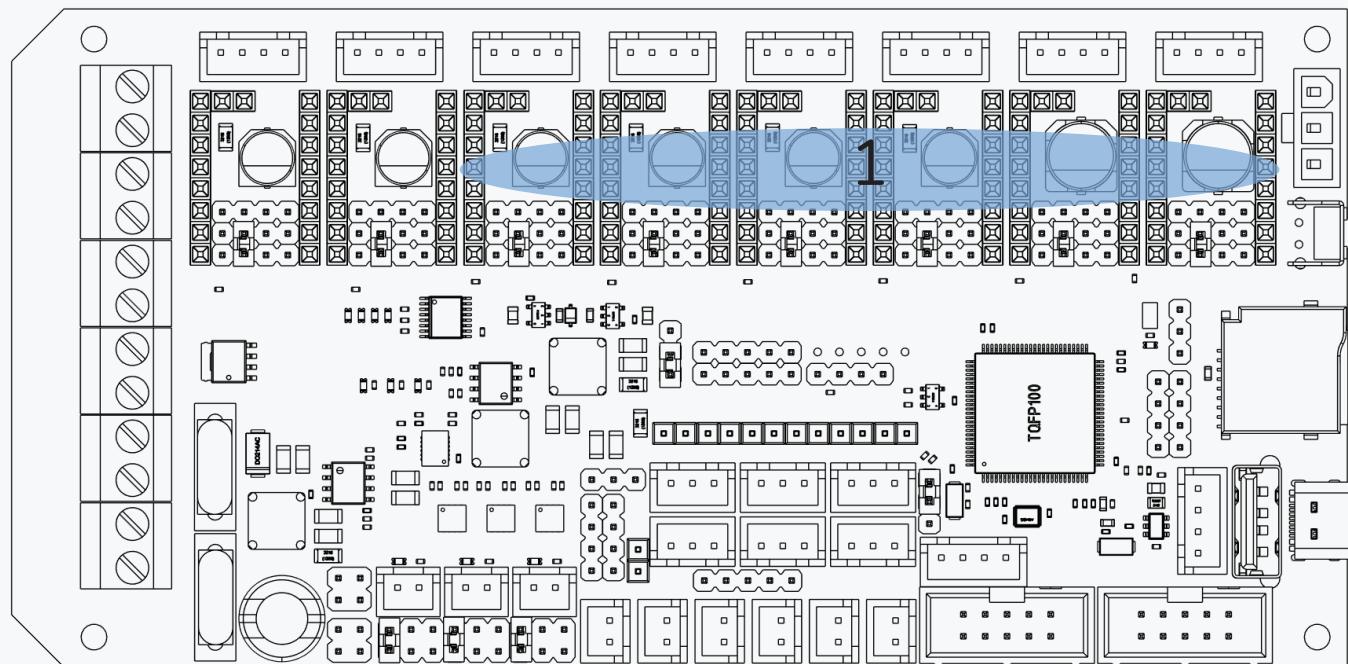
## JUMPERS

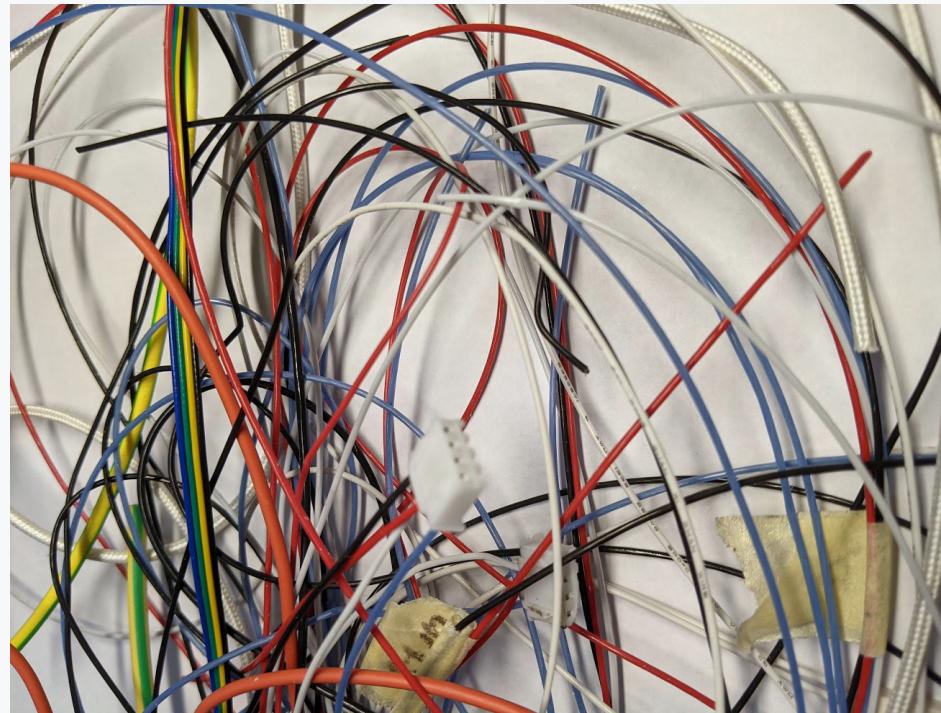
Several jumpers need to be set on the MCU.

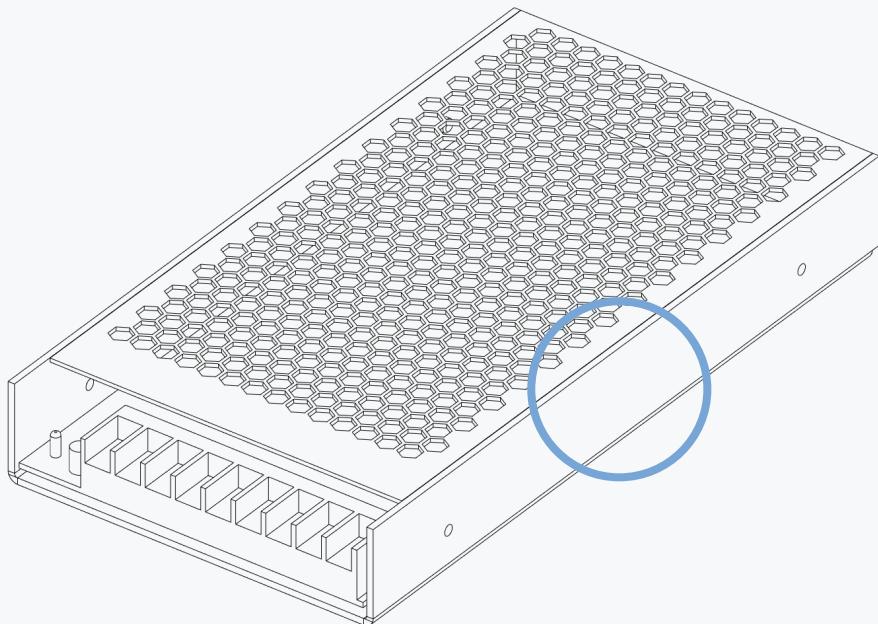
Add the following JUMPERS to the controller board (MCU).

- 1) Set the jumpers in the "driver sockets" as shown to set TMC2209 UART mode.
- 2) Ensure the Power Selection header is set to the lower position (DC5V).
- 3) Set the Jumpers for the "Fan Voltage Selection" header so they match your fan's voltage. Shown here are the settings for 24VDC.
- 4) Set the jumper in "Probe Voltage Selection" header to 24VDC.
- 5) Set the included wirejumper to the 24VDC position.









#### INPUT VOLTAGE SWITCH

Check the input voltage switch of the power supply. It is located in the highlighted area behind the metal mesh.

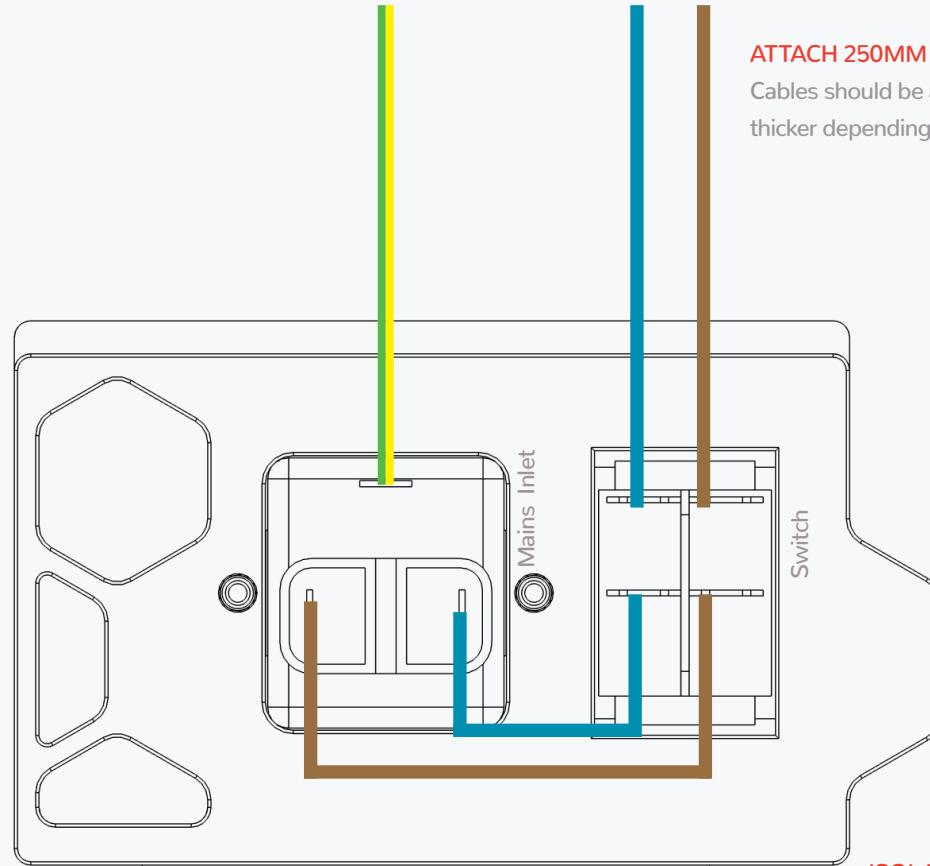
Make sure the selection matches your local mains voltage. Refer to the Mean Well LRS-200 datasheet for possible settings (<https://voron.link/e0szdyh>).

**MAINS INLET WIRING**

We show the wiring in the IEC colour scheme. Depending on your region the colour scheme and wiring standards will differ.

Mains wiring should only be done by qualified personnel trained in local regulations and safety standards. Depending on your local regulations you may be forbidden from wiring the mains side and/or putting the printer into operation; seek professional assistance.

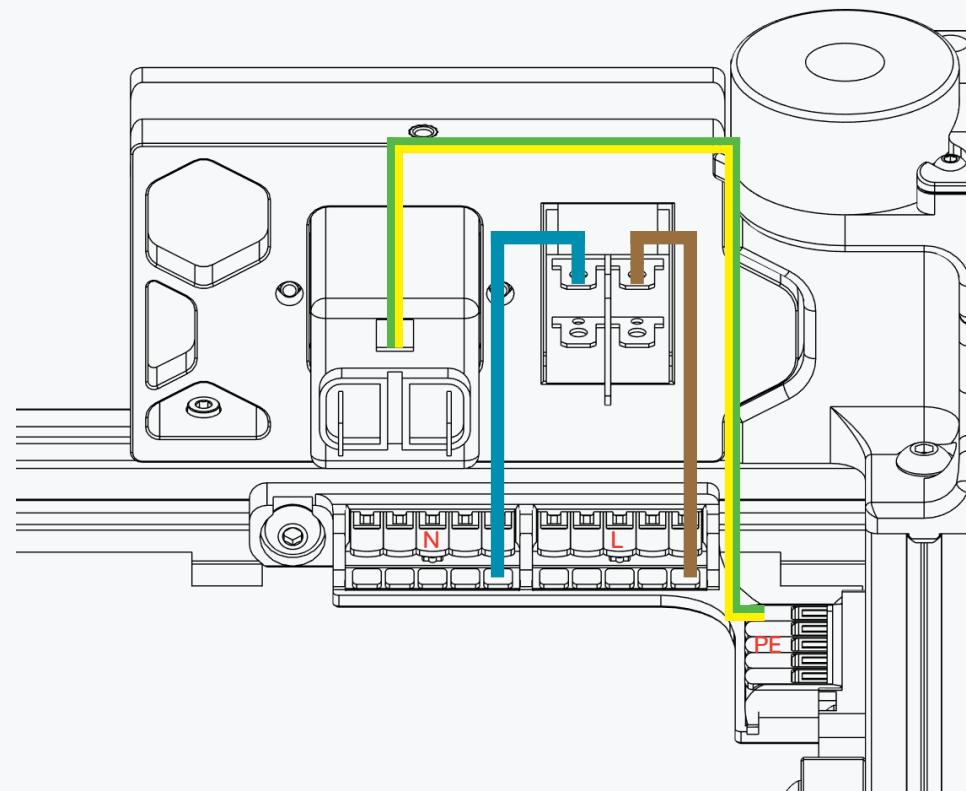
Failure to observe those could result in bodily harm.

**ATTACH 250MM OF WIRE**

Cables should be at least  $0.75\text{mm}^2$  (AWG18) or thicker depending on local regulations.

**ISOLATED CONNECTORS ONLY**

Make sure that all mains connectors are properly isolated and meet the applicable safety standards.

**ISOLATED CONNECTORS ONLY**

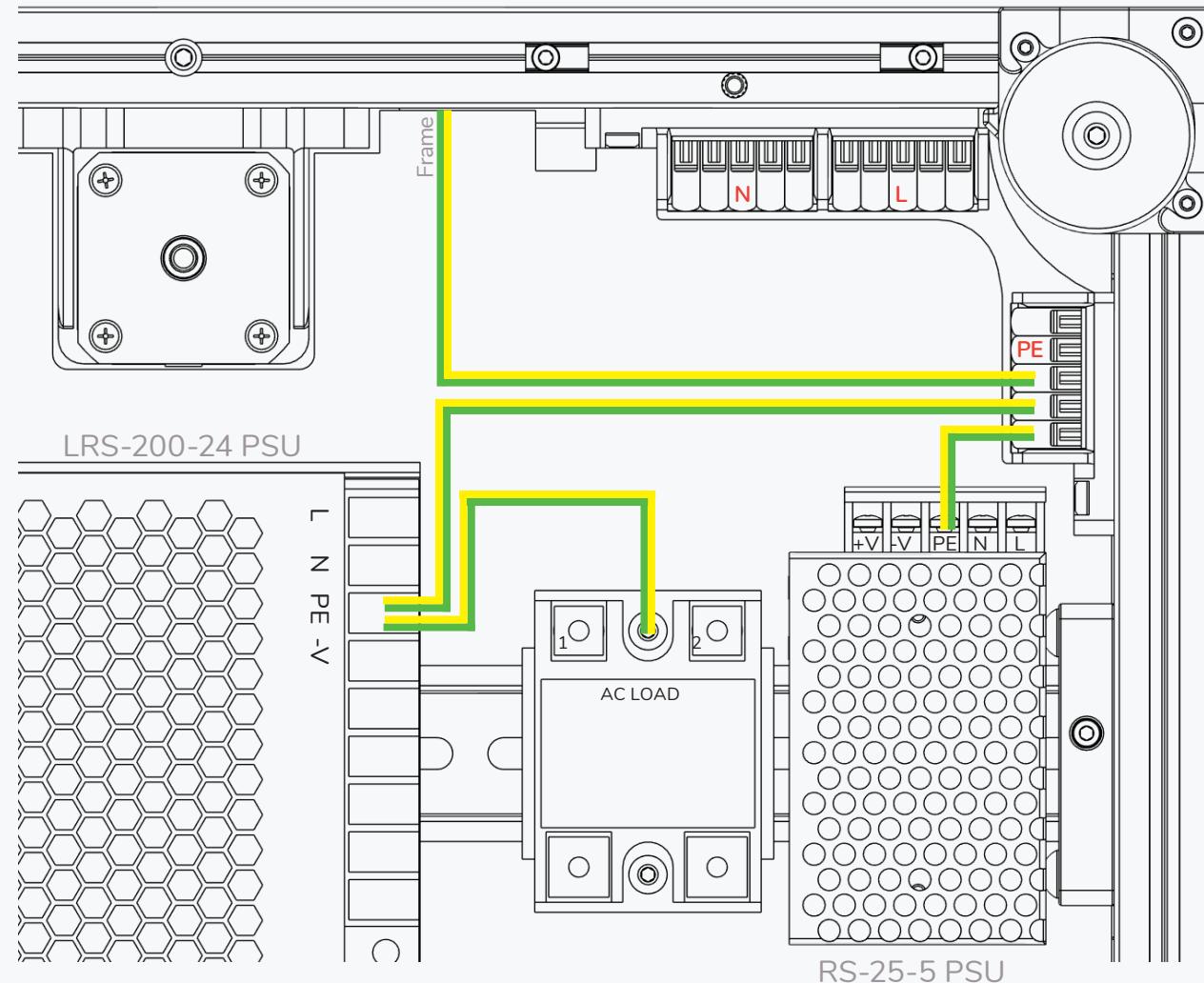
Make sure that all mains connectors are properly isolated and meet the applicable safety standards.

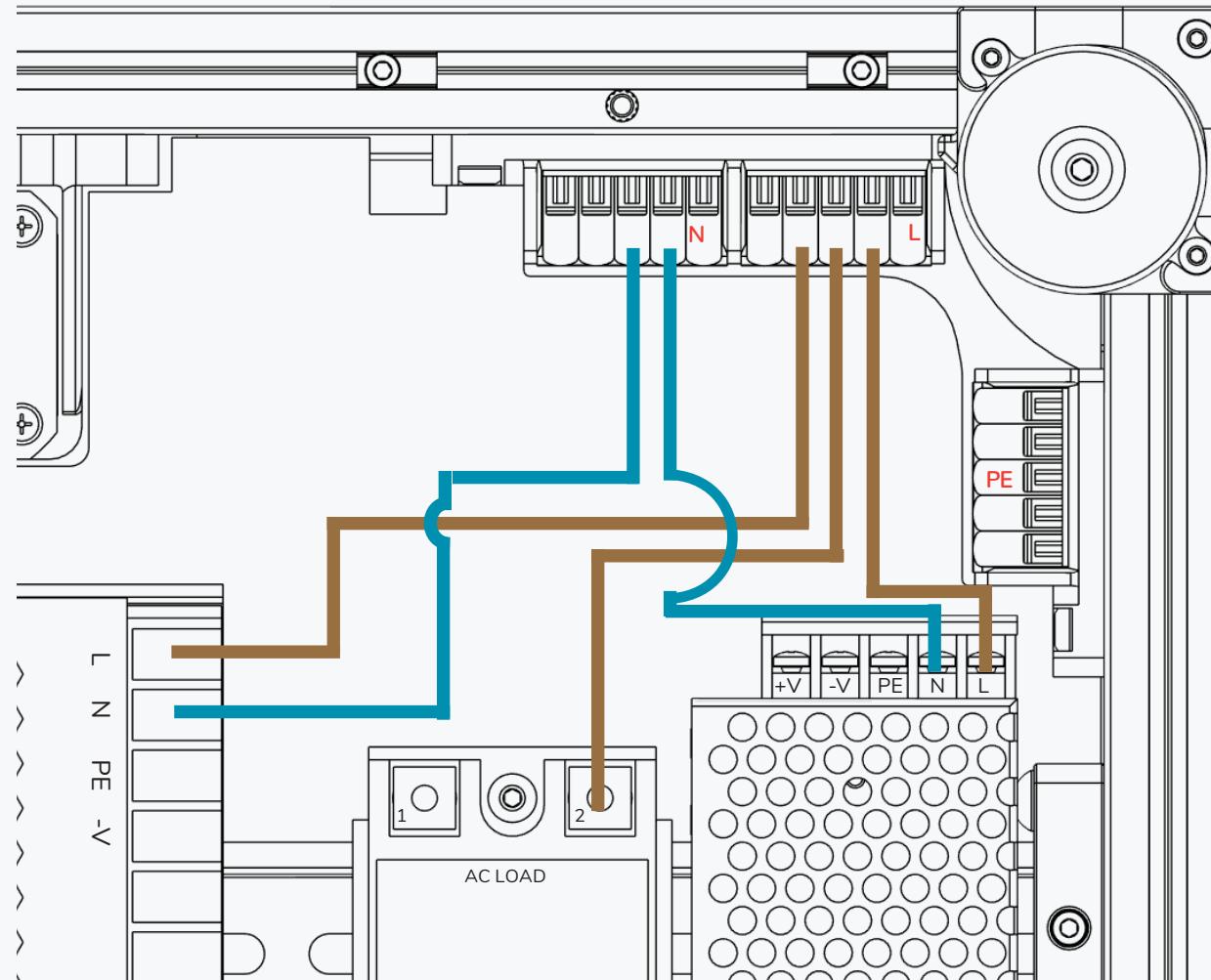
## MAINS WIRING CONTINUED

Secure the wires with cable clips / cable tie anchors.

The bed heater is powered by AC voltage and receives its PE in a later step.

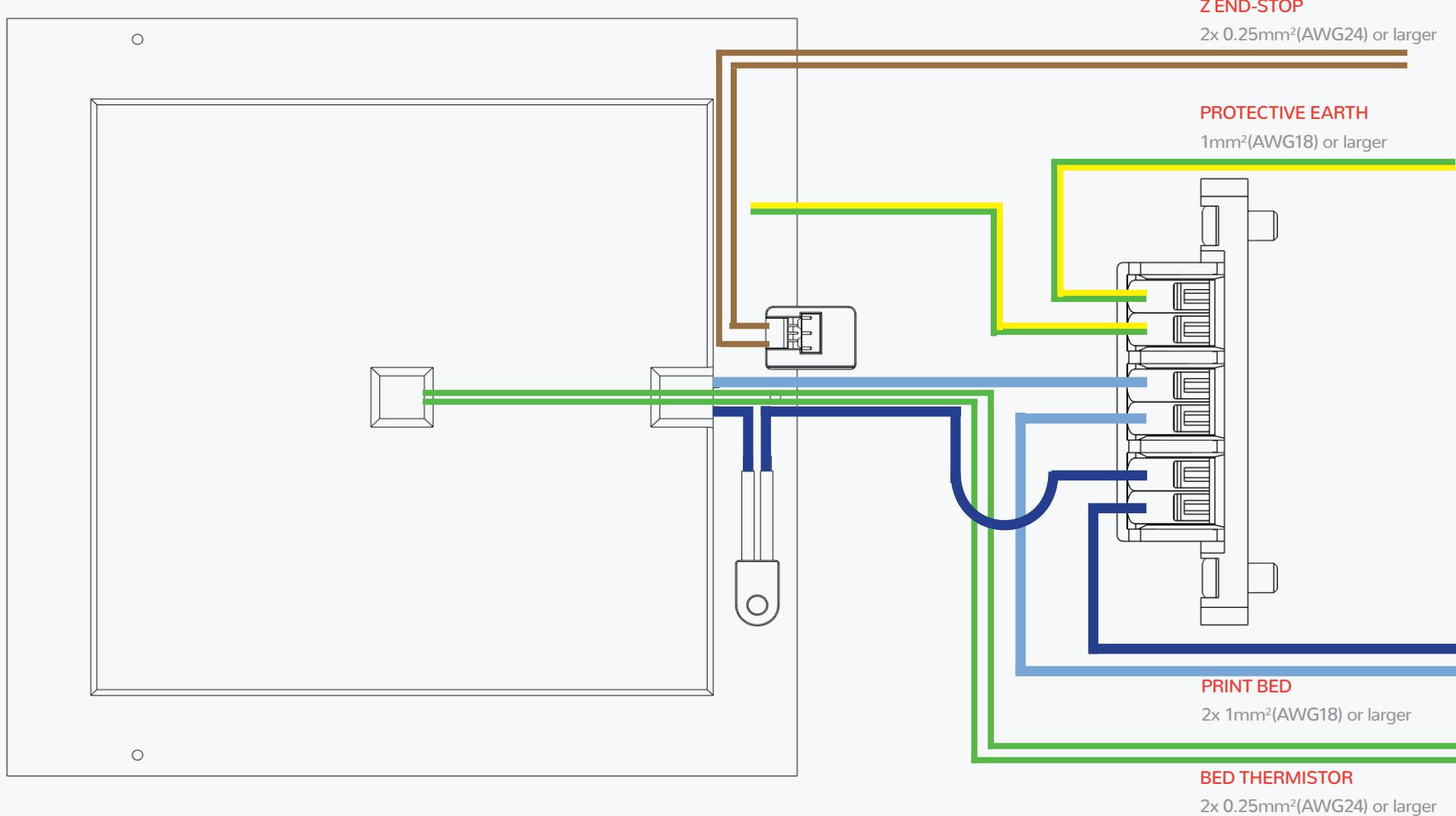
Observe your local regulations in regards to the Protective Earth connections for the frame/other components.





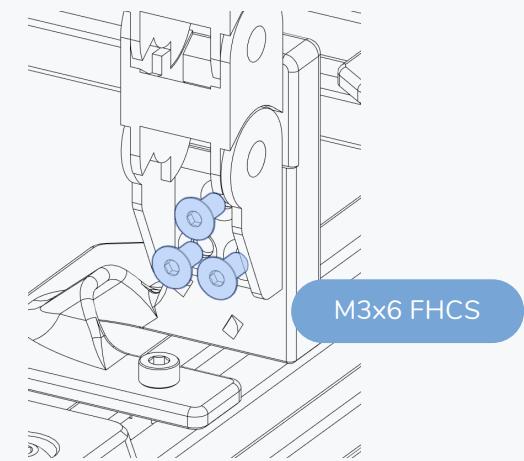
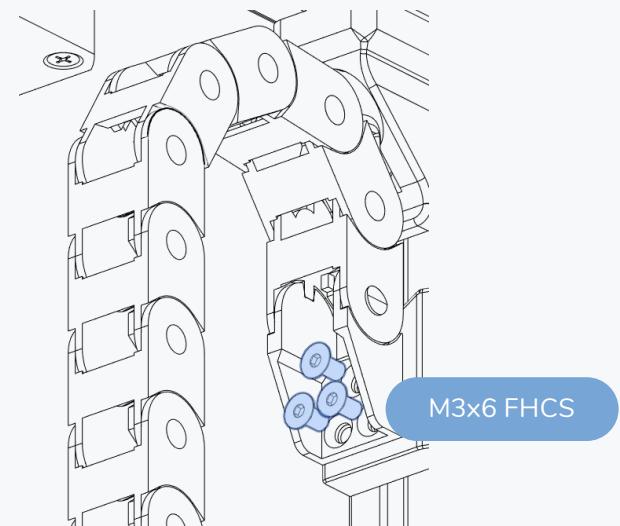
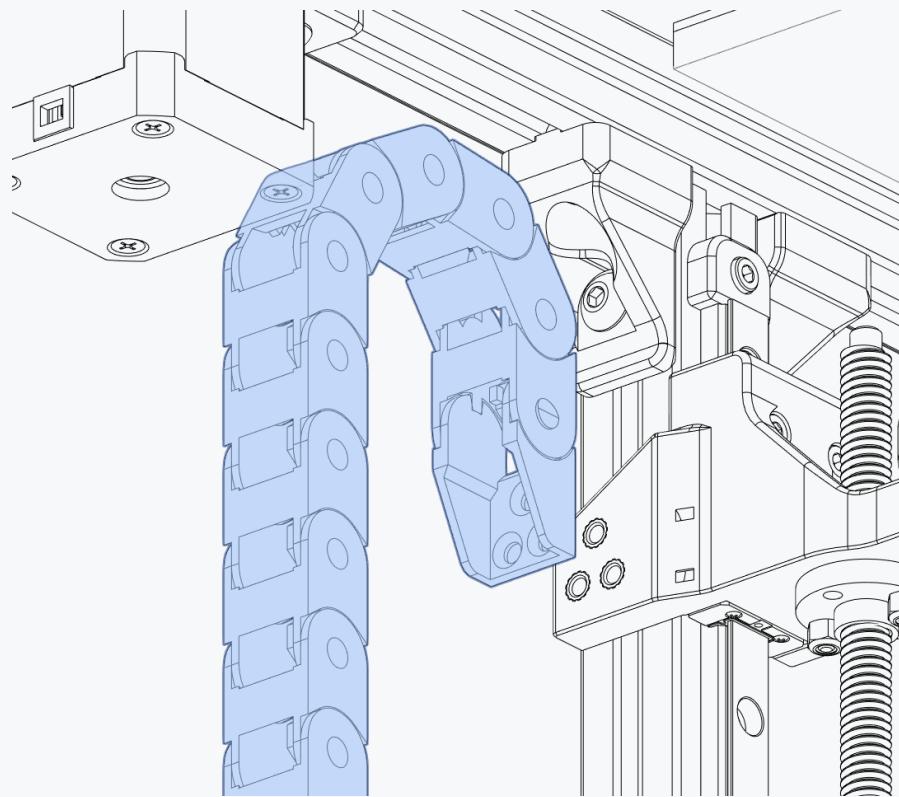
BED WIRING

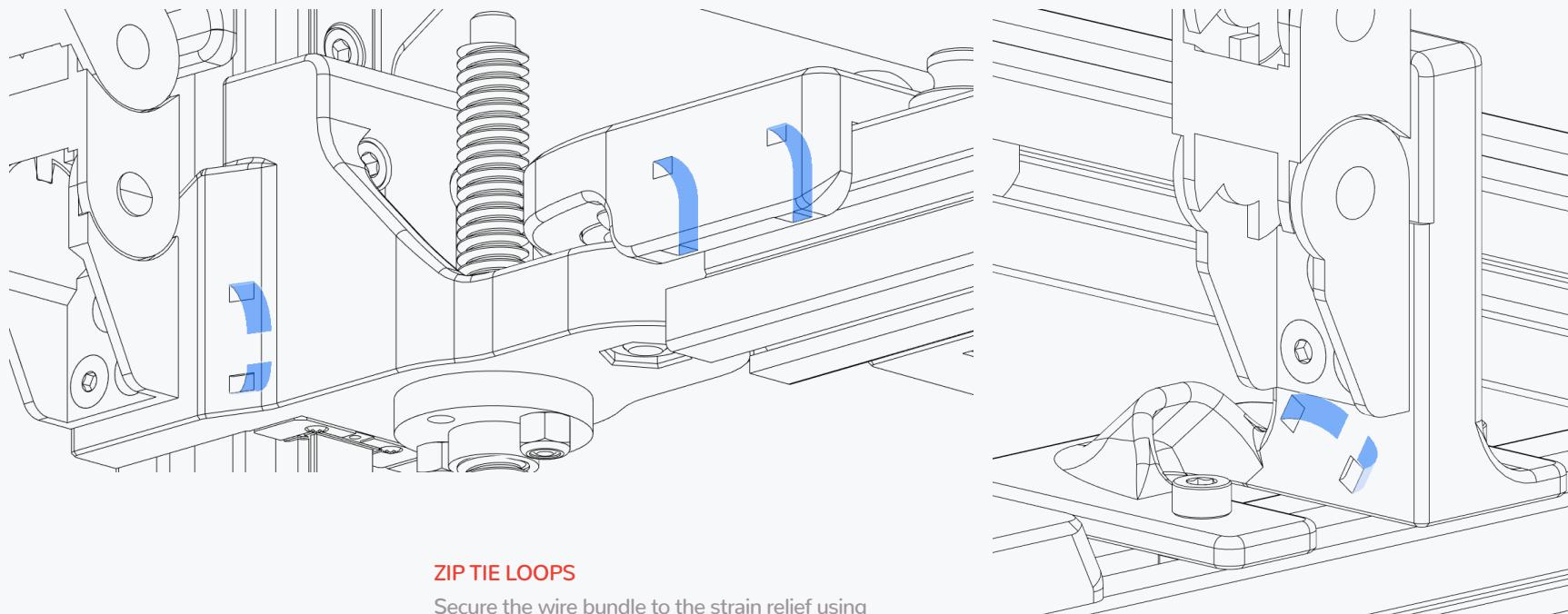
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## BED CABLE ROUTING

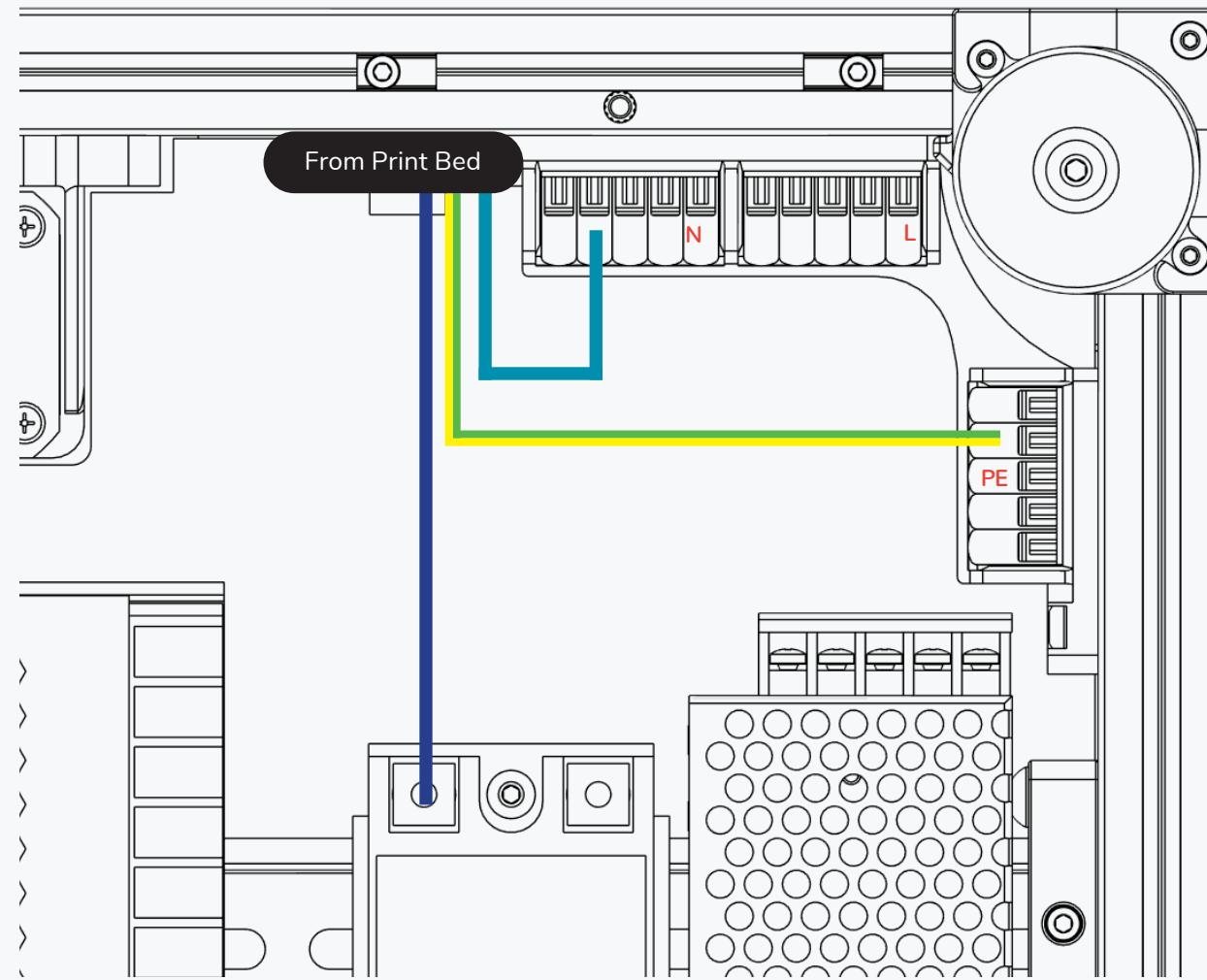
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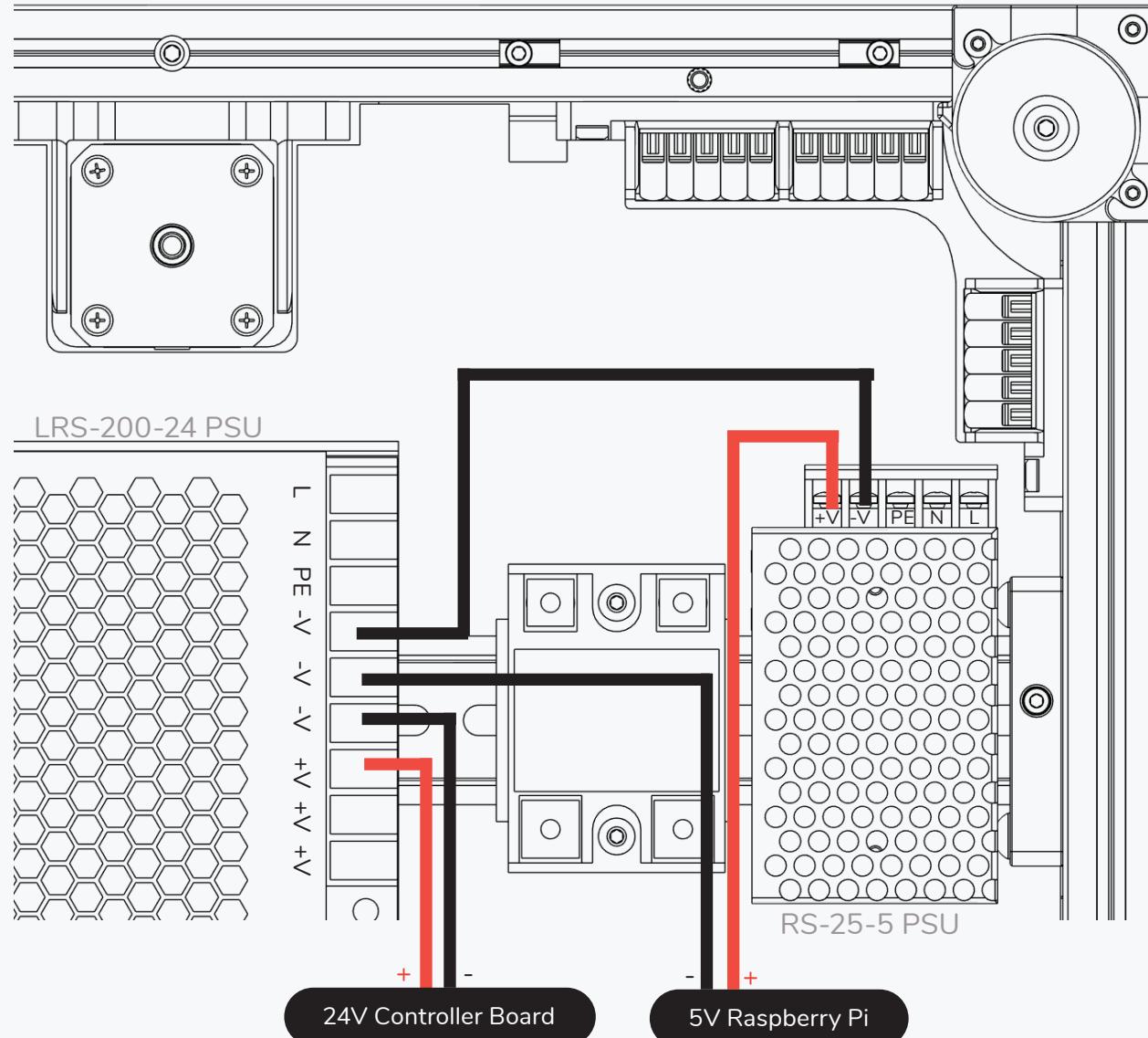




**ZIP TIE LOOPS**

Secure the wire bundle to the strain relief using small zip ties.





#### CABLE CROSS SECTION

Cables to the controller board should be  $1\text{mm}^2$  (AWG18) or larger.

$0.5\text{mm}^2$  (AWG20) is sufficient for the connection to the Raspberry Pi.

#### TERMINAL COVER

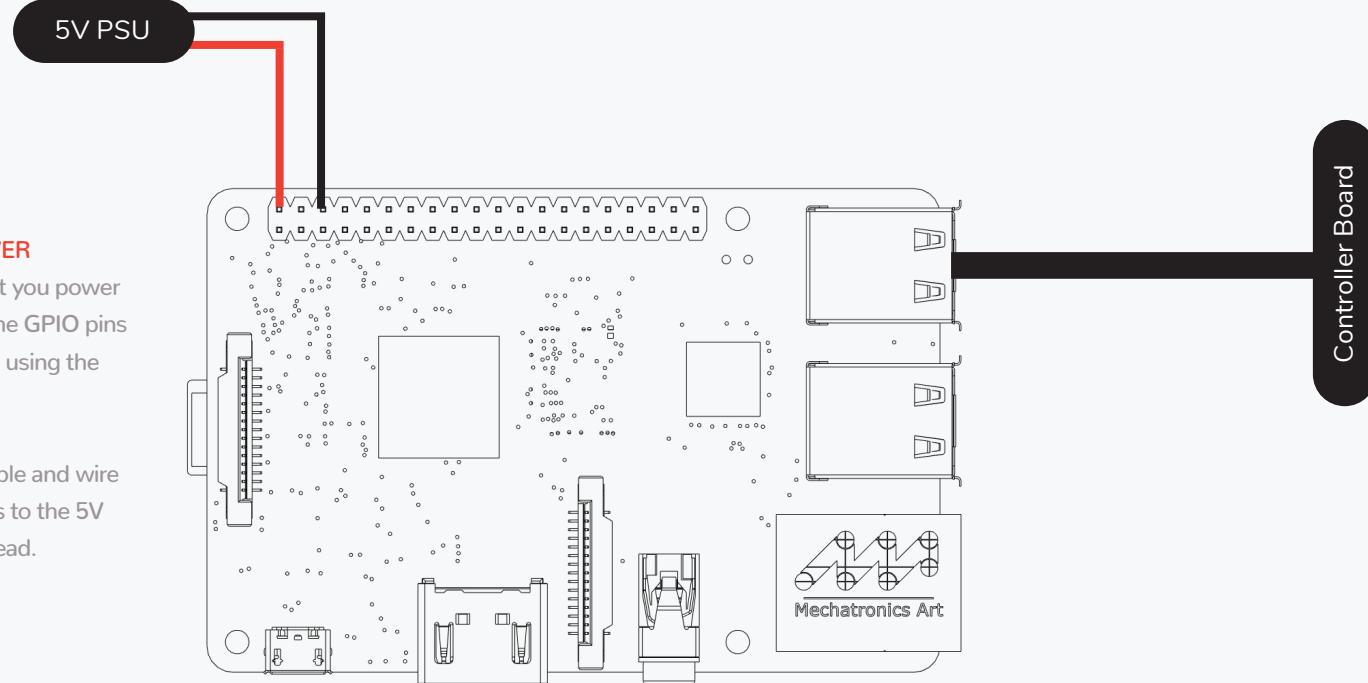
After installing all cables install the Meanwell TBC-09 Terminal Cover included in the BOM on the PSU.

It clips onto the the terminal block.

**RASPBERRY PI POWER**

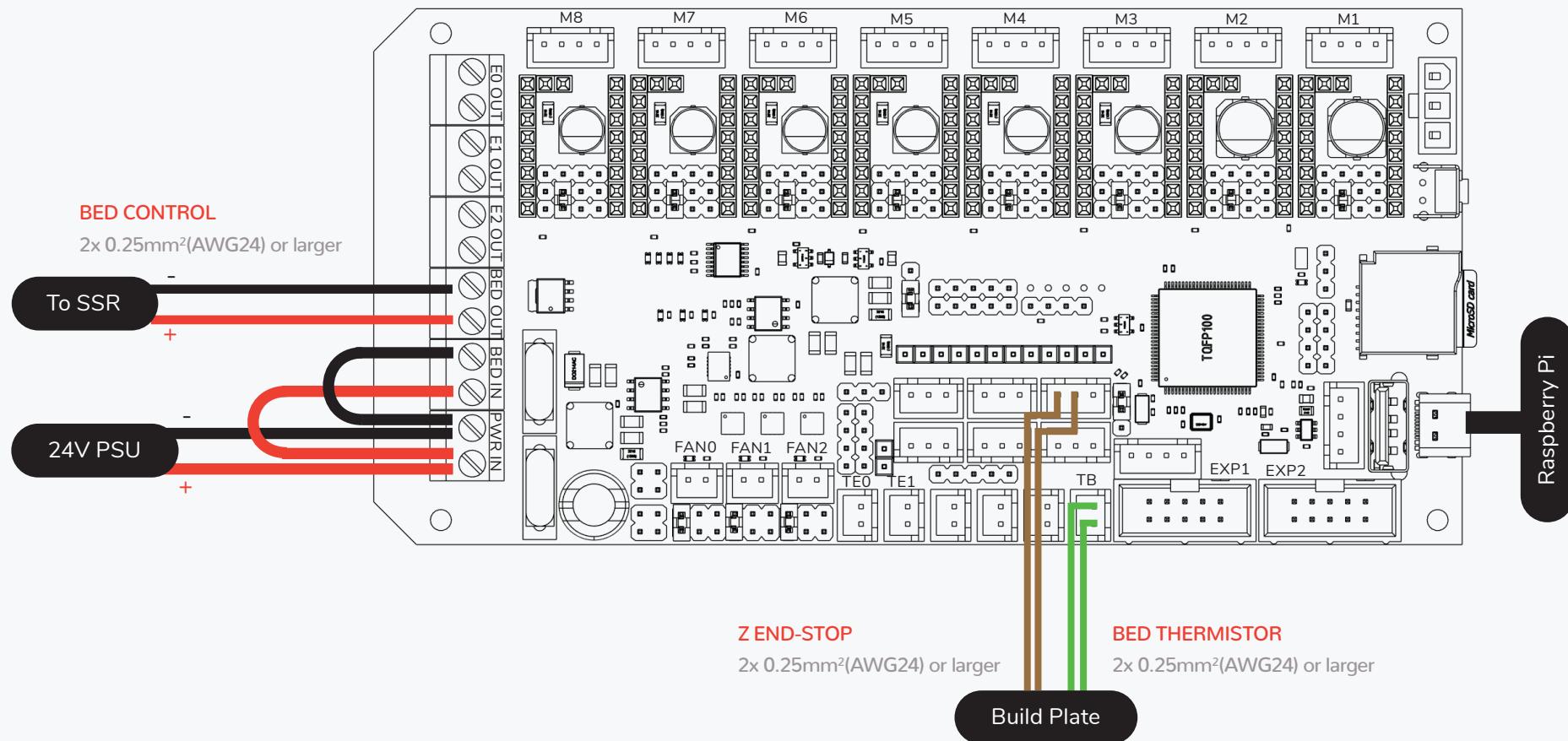
While we suggest that you power the Raspberry Pi via the GPIO pins you may also power it using the "Power-In" USB port.

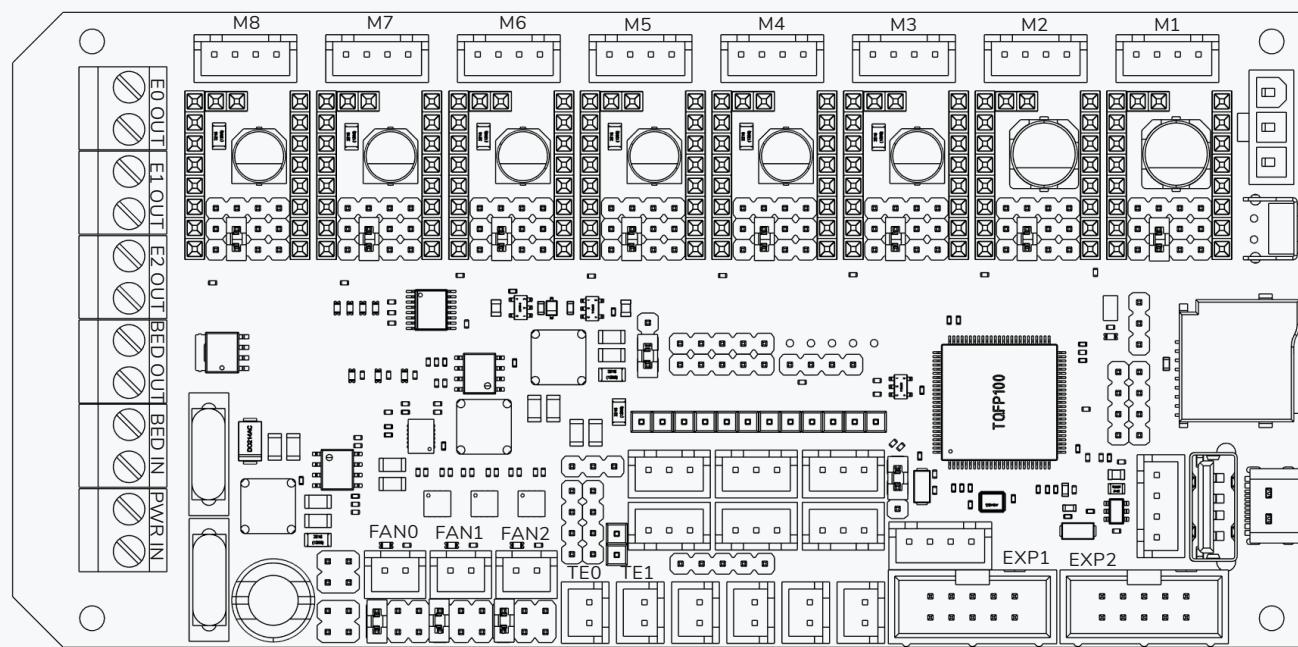
Cut a suitable USB cable and wire the + and ground lines to the 5V DC/DC converter instead.

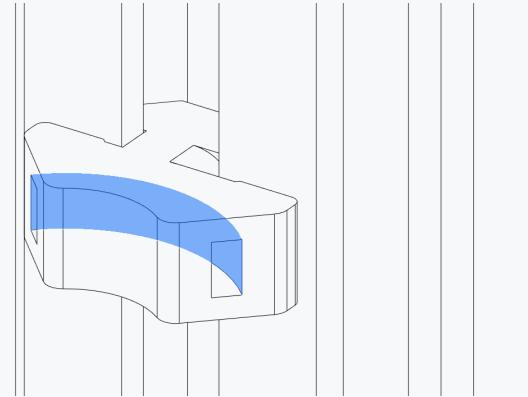
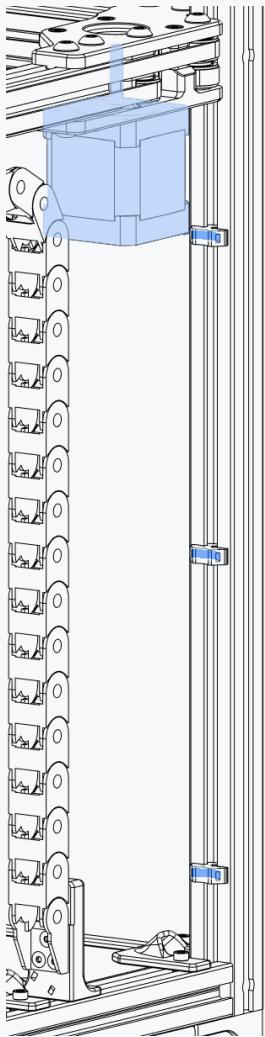


**CONTROLLER BOARD**

The assembly manual will outline the wiring for a Fysetc Spider 2.2. You can find additional documentation and alternative configurations on [docs.vorondesign.com](https://docs.vorondesign.com)

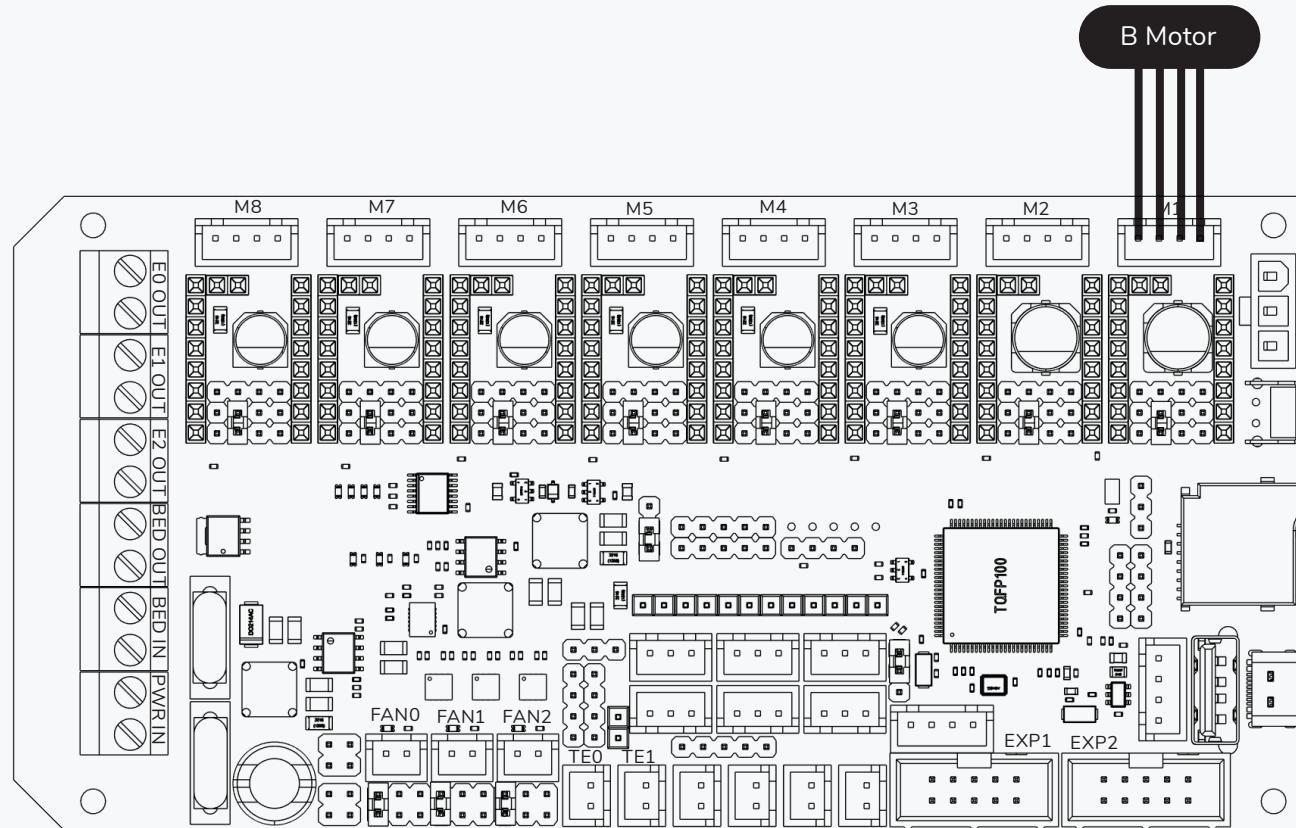


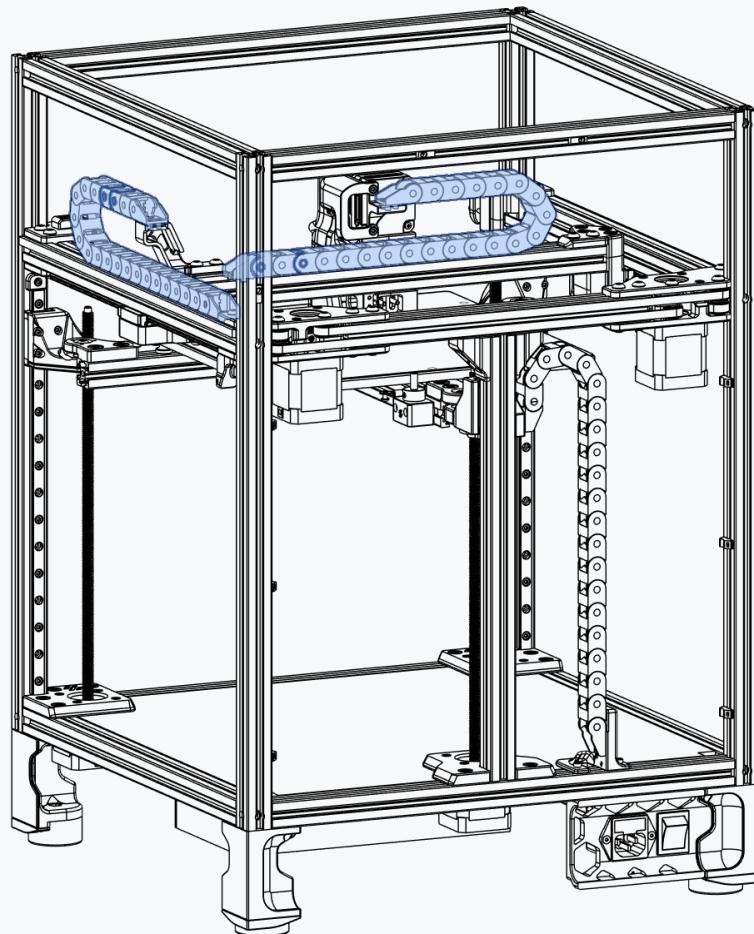




#### ZIP TIE LOOPS

Secure the wire bundle to the strain relief using small zip ties.

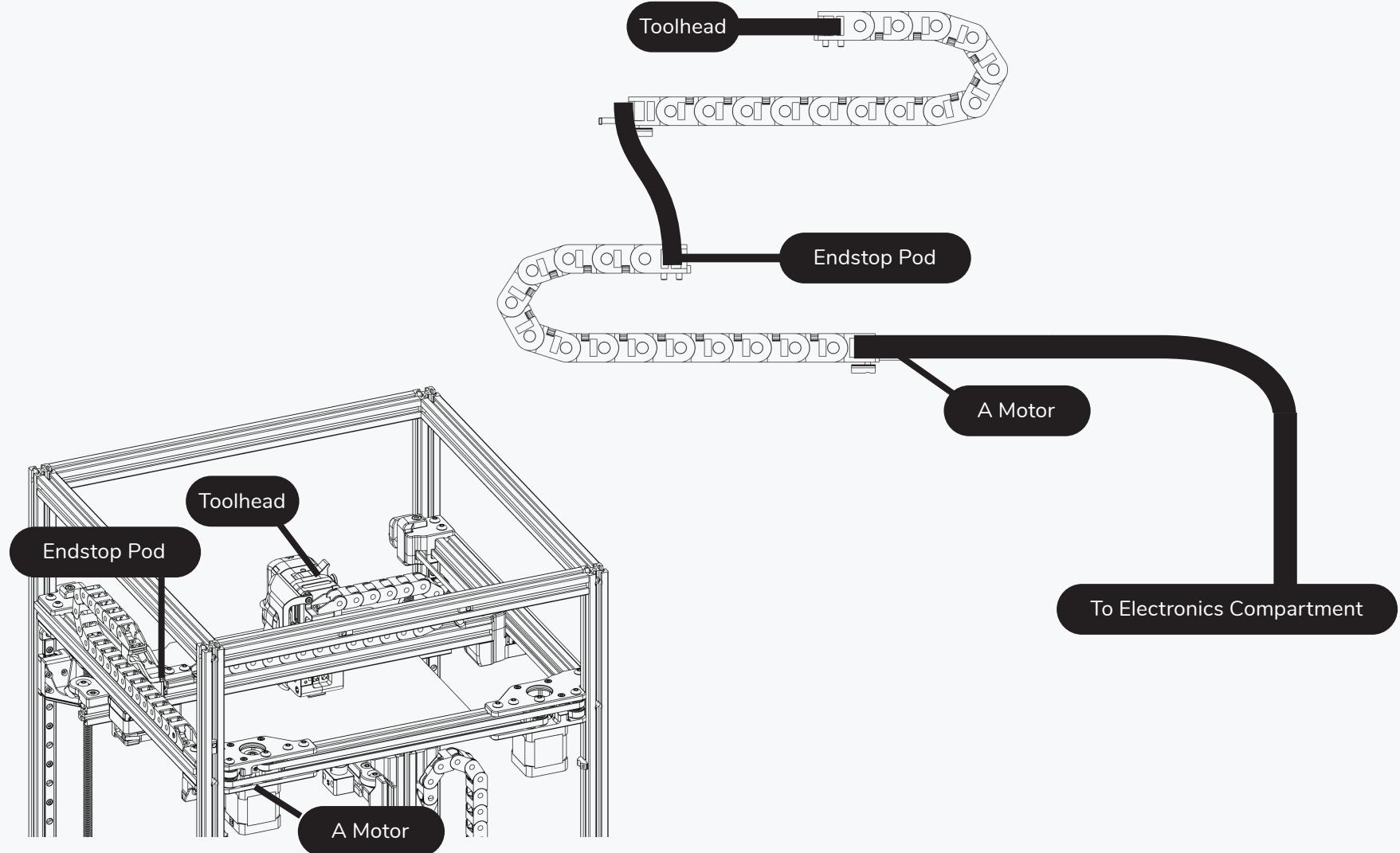


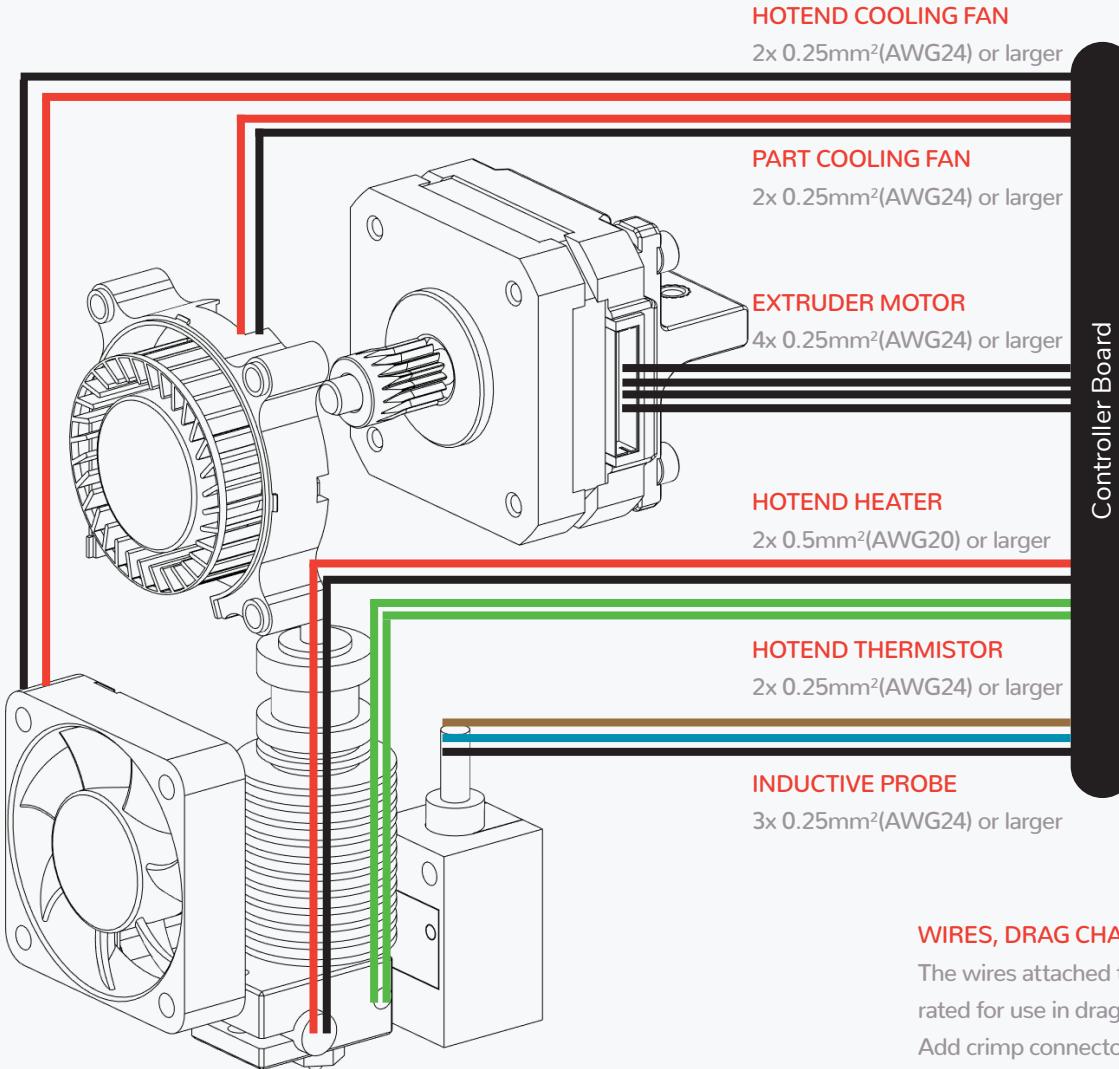


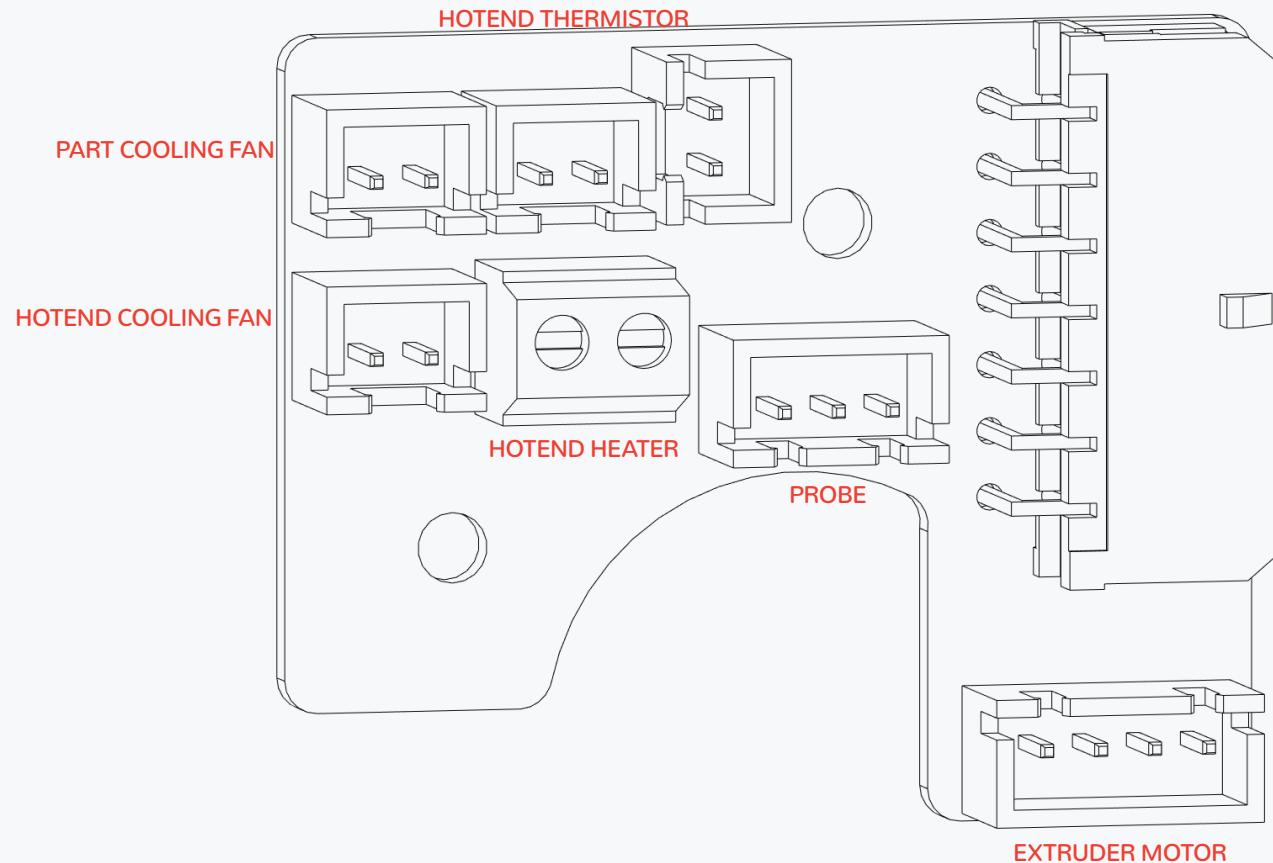
#### CABLE CHAINS INSTALL

You can opt to install the chains now and fish the wires through the chains or build the complete harness outside of the printer and install it in one go. Either approach does work.

If you sourced a pre-built wire harness completing the harness outside of the printer is recommended.



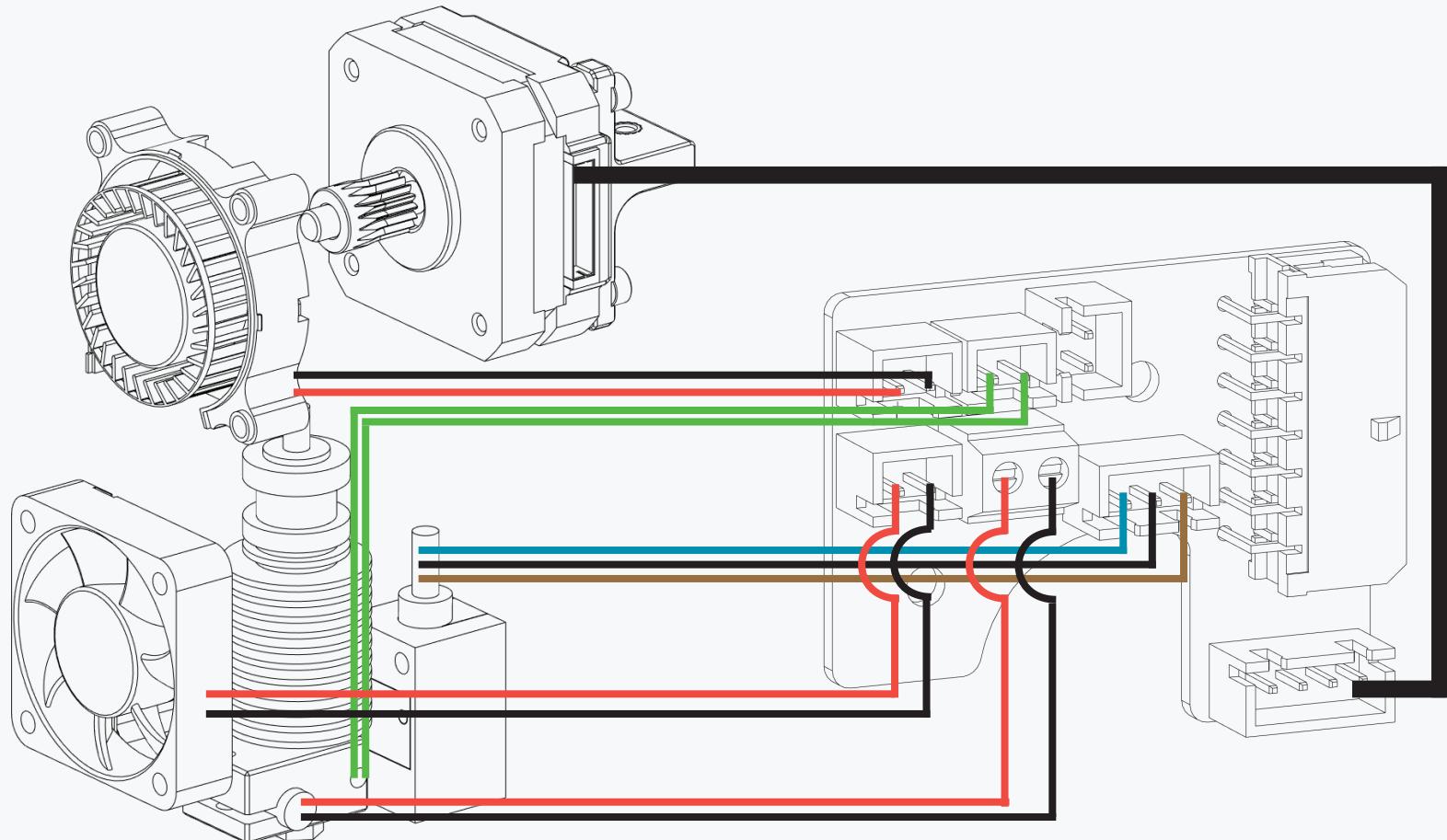


**OPTION: TOOLHEAD PCB**

The layout of the toolhead pcb changed over the versions. For a full breakdown visit the link below.

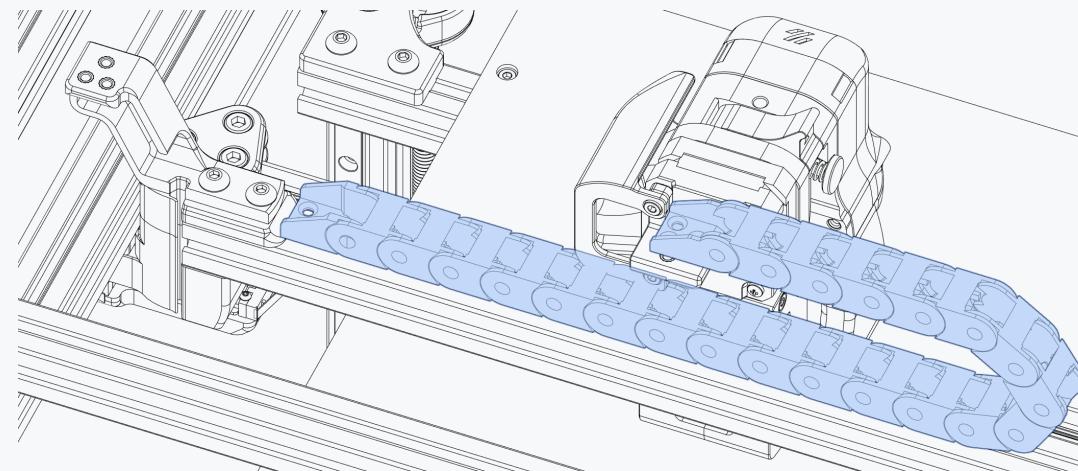
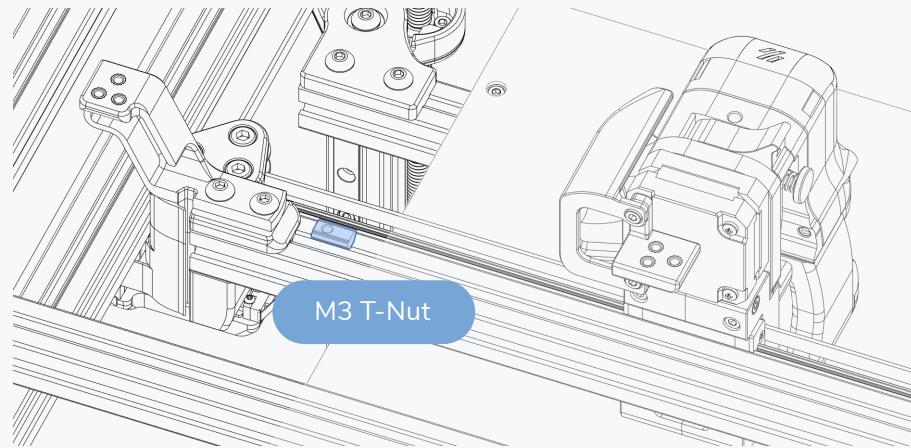


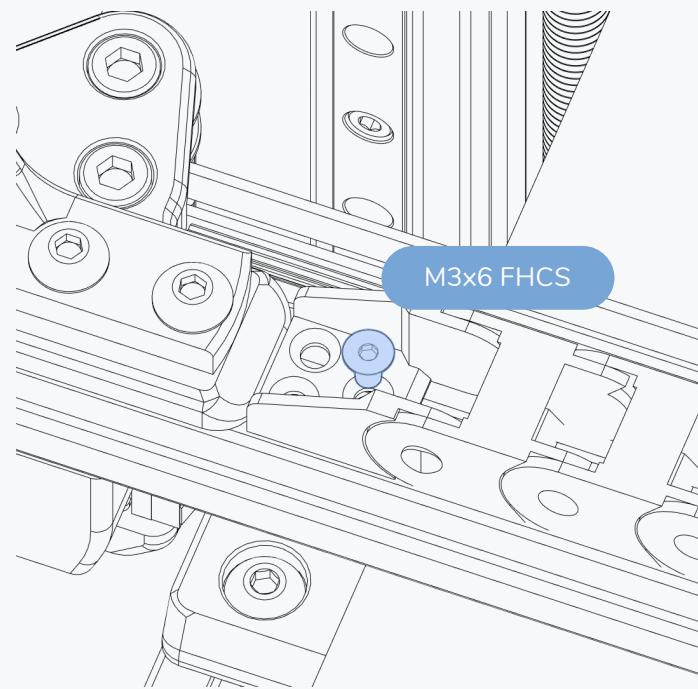
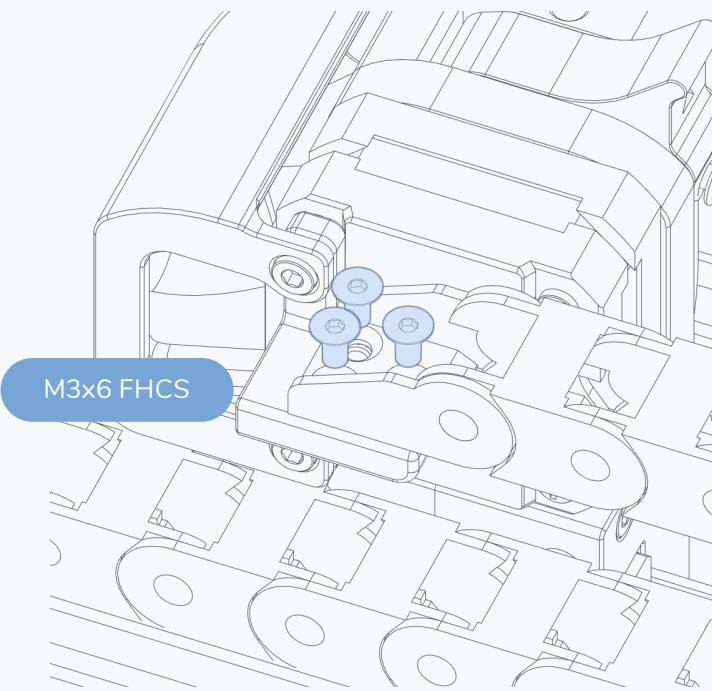
<https://voron.link/zopduze>

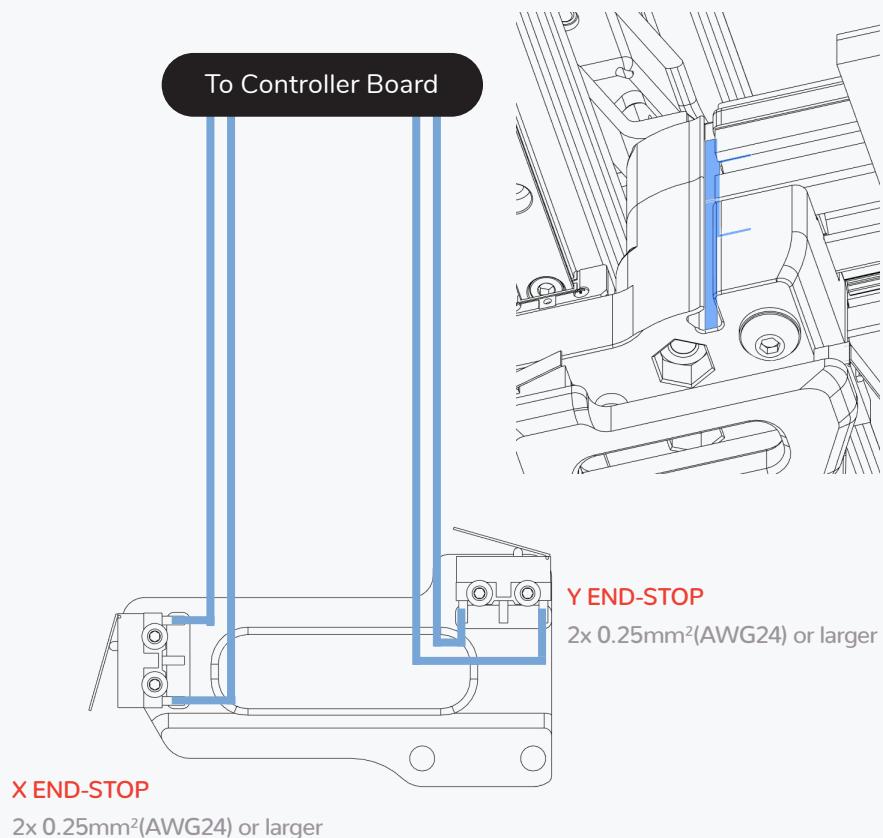


## TOOLHEAD CABLE ROUTING

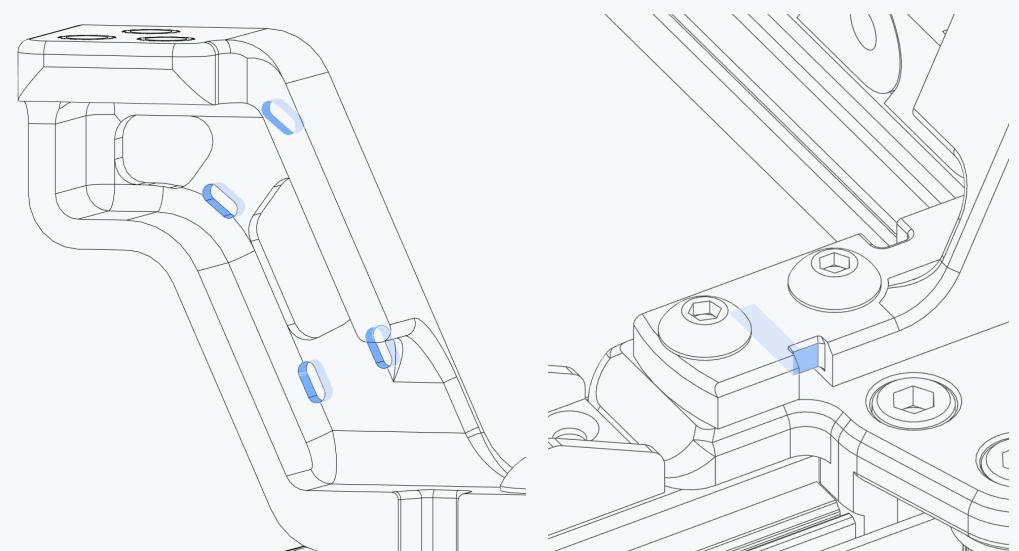
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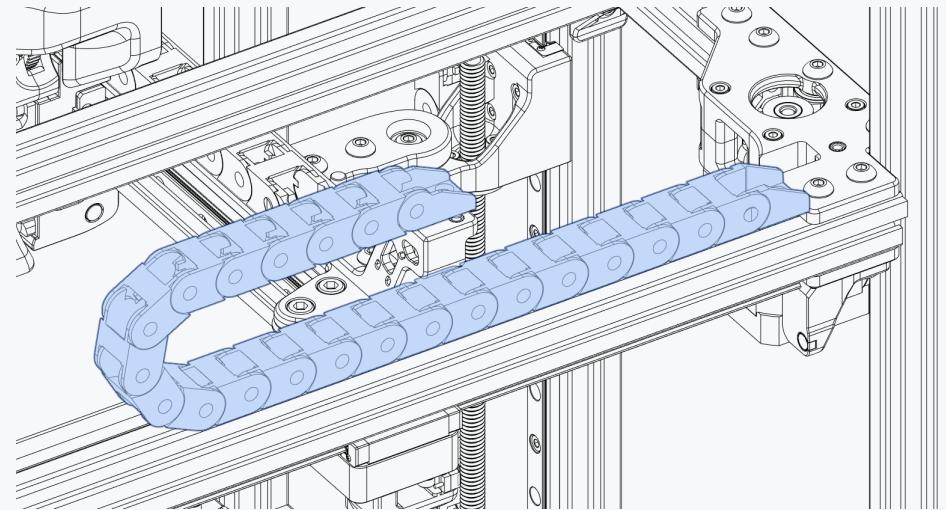
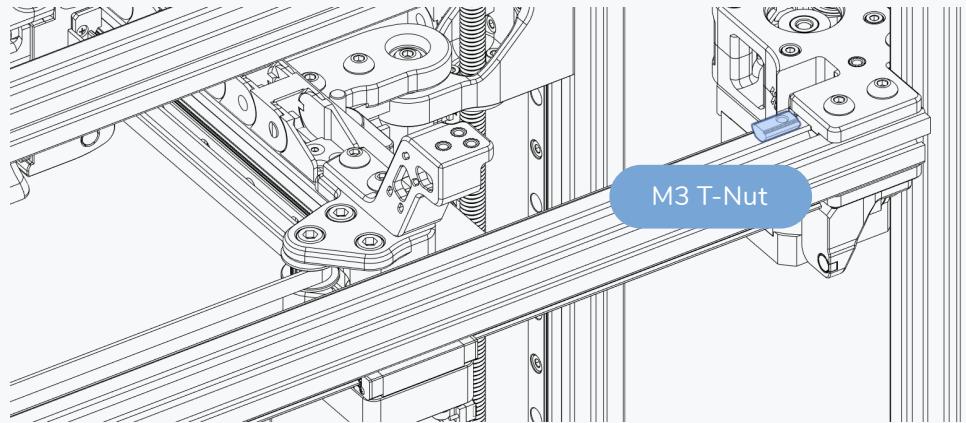
**OPTION: ENDSTOP BOARD/HALL EFFECT BOARD**

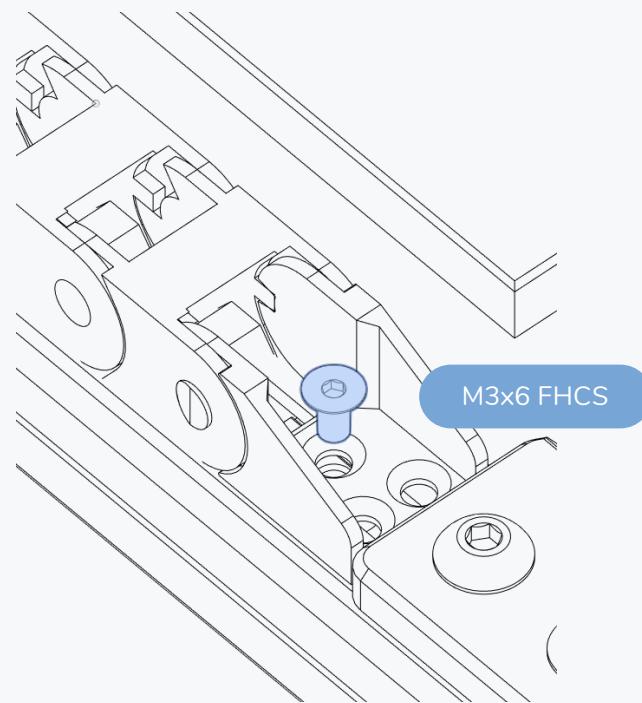
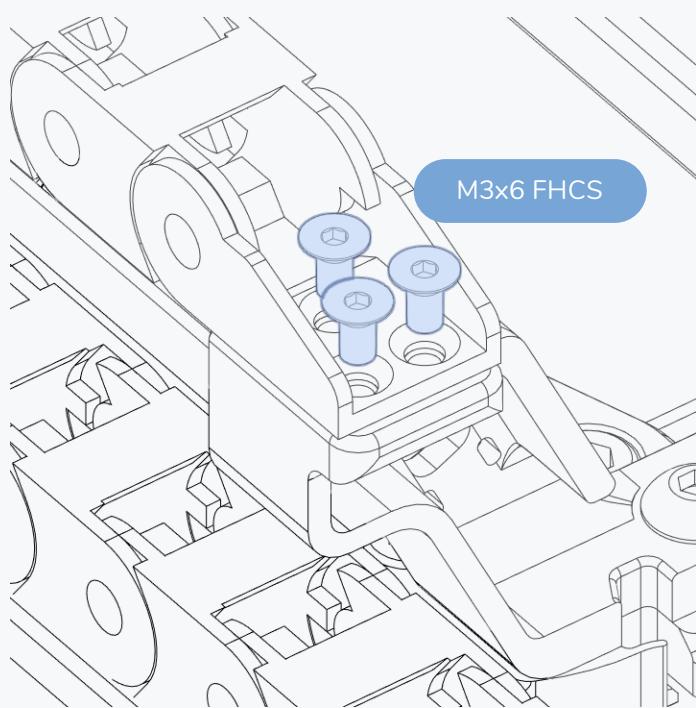
Those boards utilize a 4 pin connector instead. Please refer to <https://voron.link/djhyygu> and <https://voron.link/d6qb7o6> for details.

**ZIP TIE LOOPS**

Secure the wire bundle to the strain relief using small zip ties.

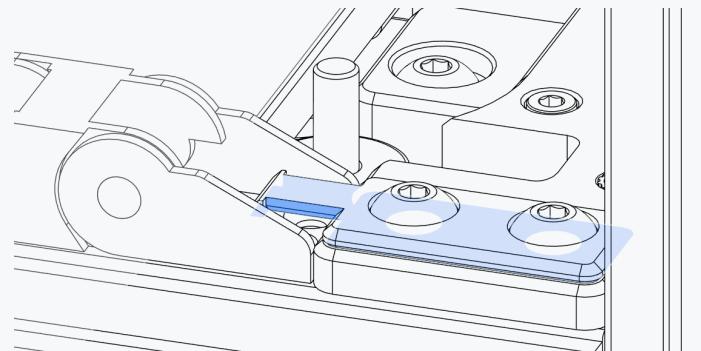
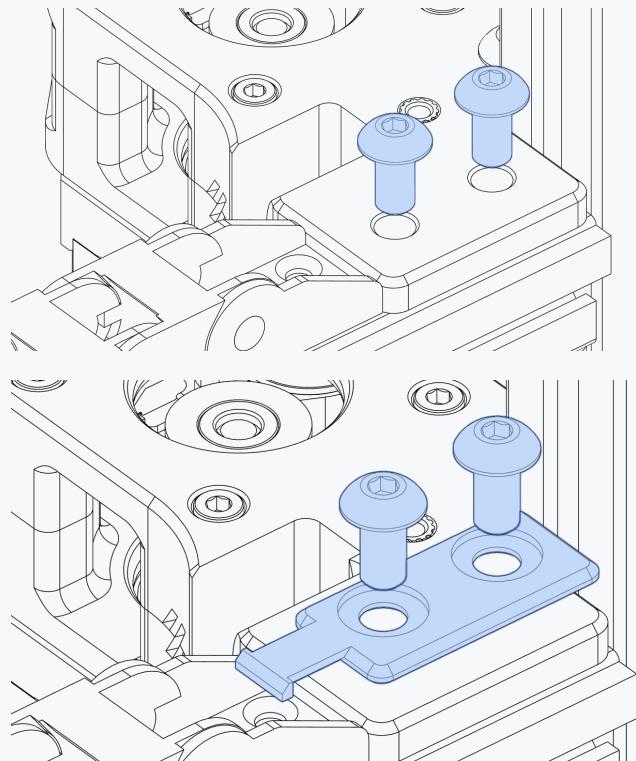
IGUS cable chains have a build-in strain relief. We omitted the loop on the part.





**GENERIC CABLE CHAINS**

The chains generally don't include a strain relief. Undo the bolts on the A drive and add the printed strain relief.

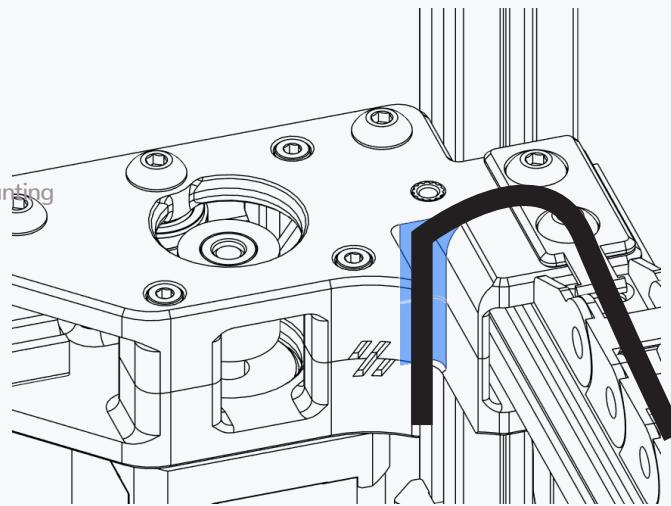
**ZIP TIE LOOP**

Secure the wire bundle to the strain relief using small zip ties.

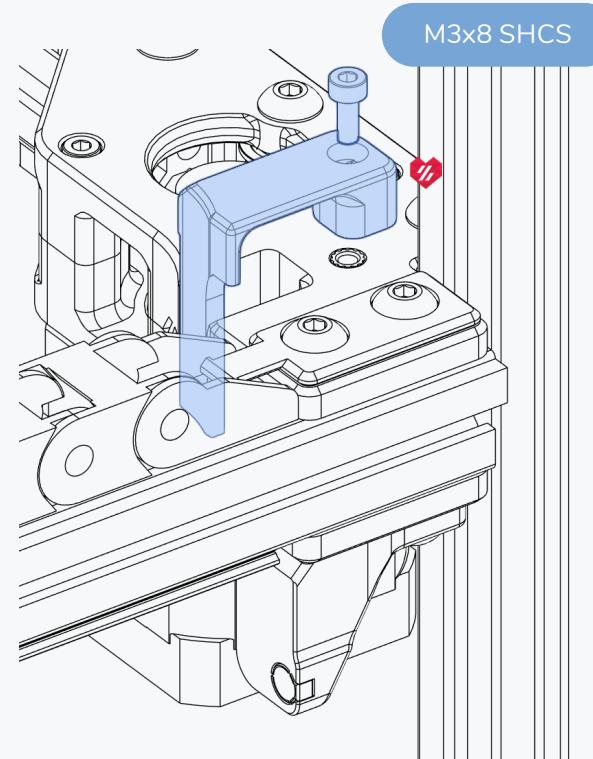
IGUS cable chains have a build-in strain relief. Don't install the additional part.

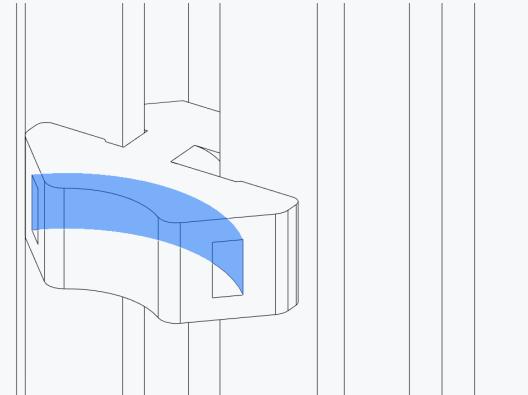
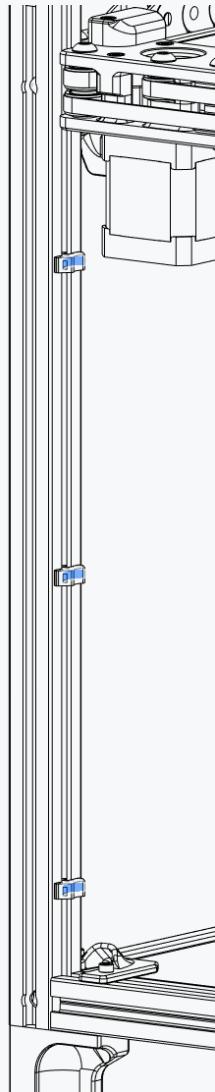
**IGUS CABLE CHAINS**

IGUS chains have 2 mounting holes.

**WIRING PATH**

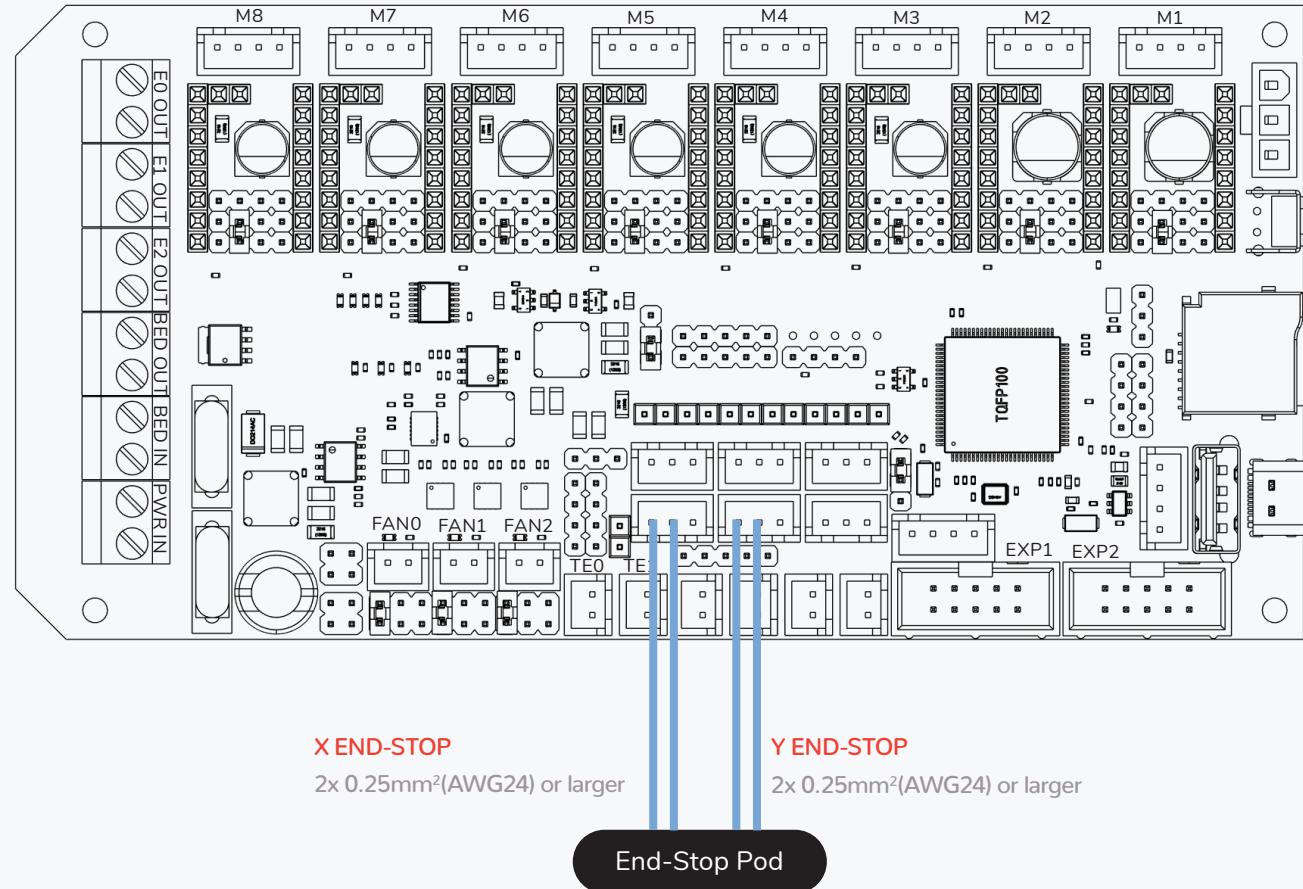
Guide the wires in the highlighted path.

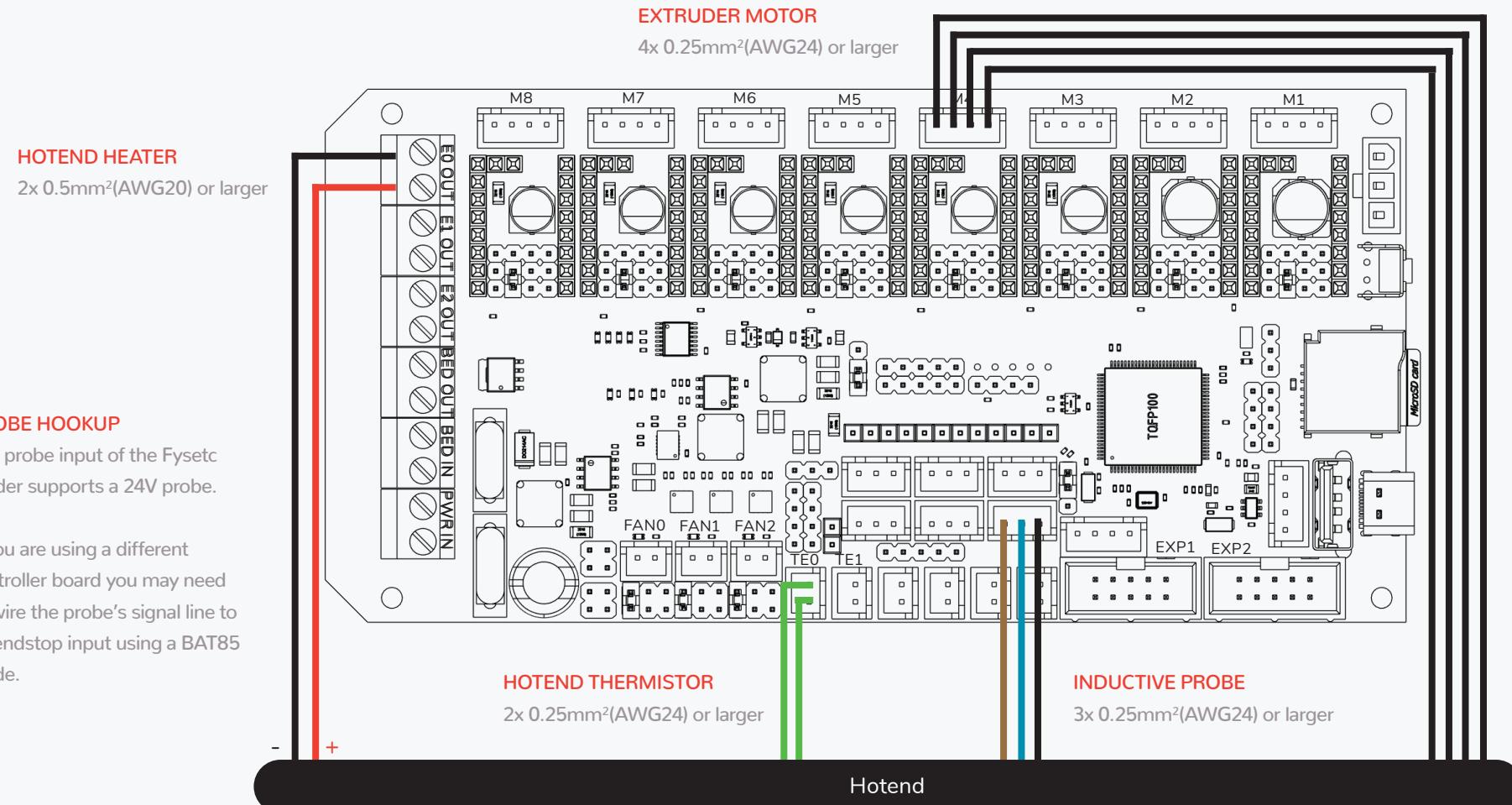


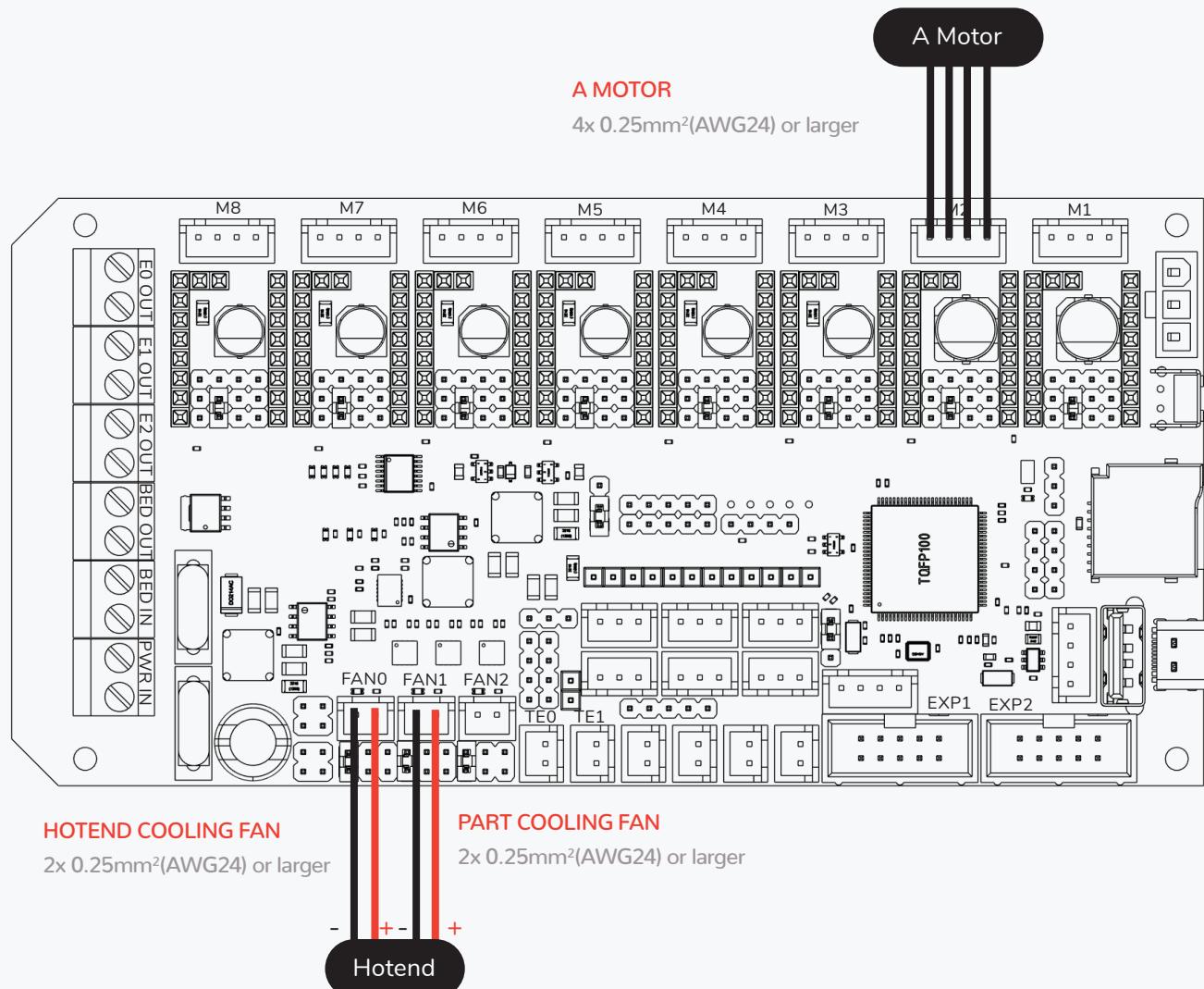


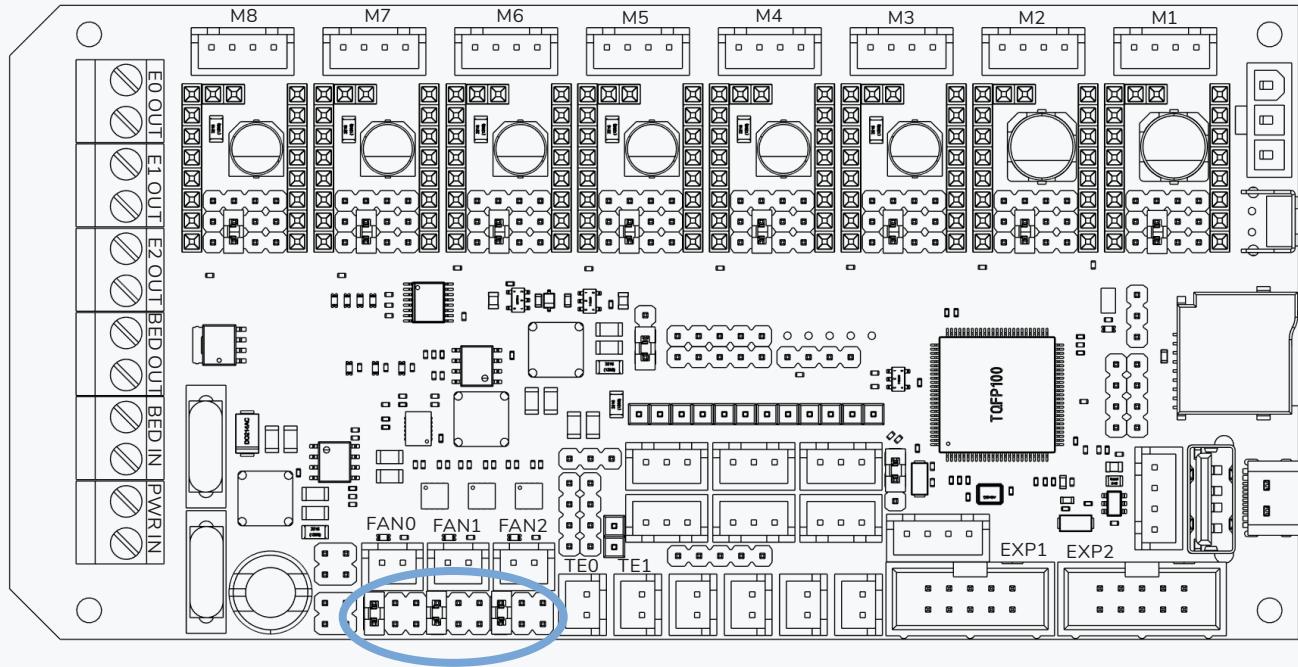
**ZIP TIE LOOPS**

Secure the wire bundle to the strain relief using small zip ties.









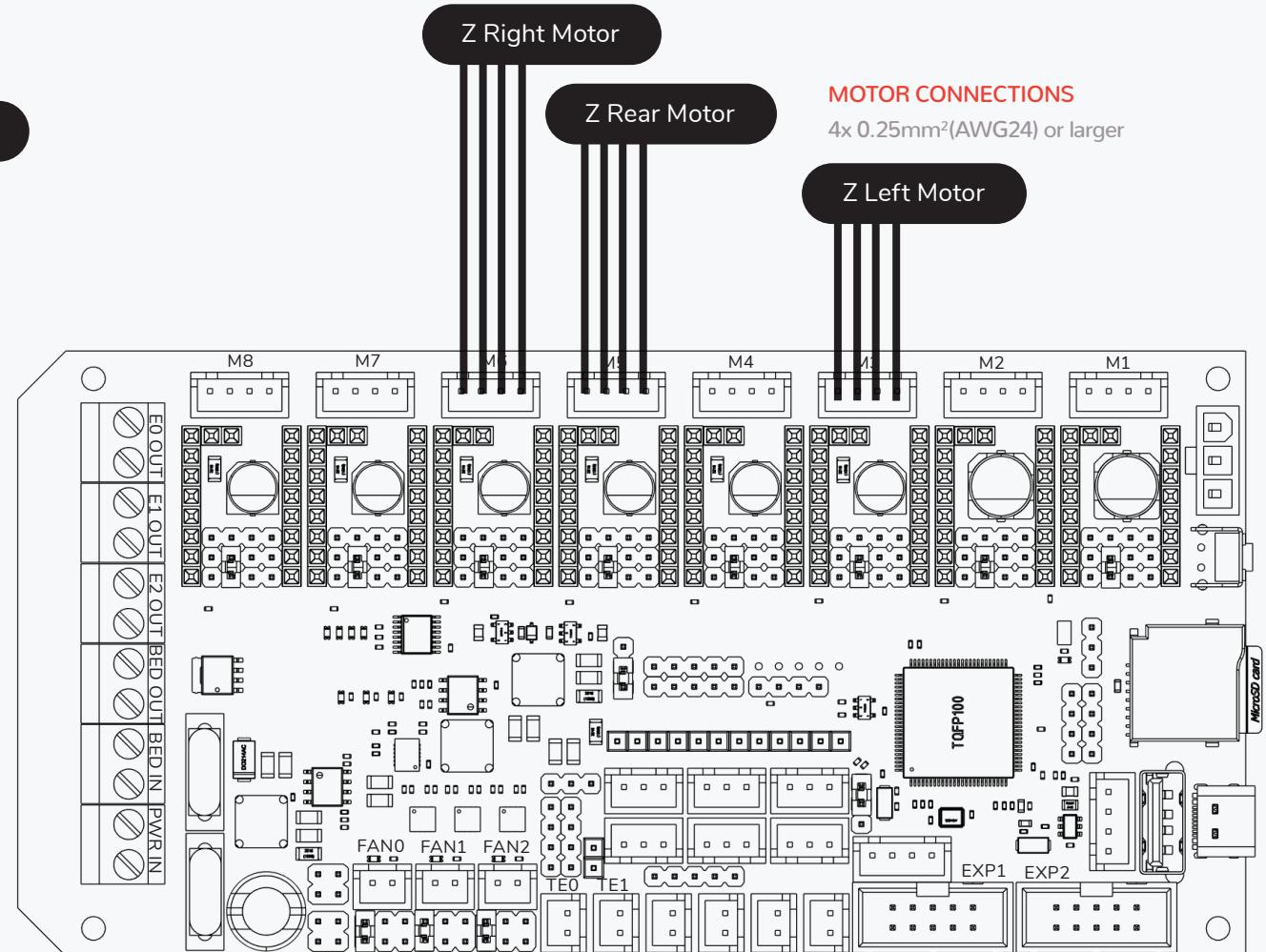
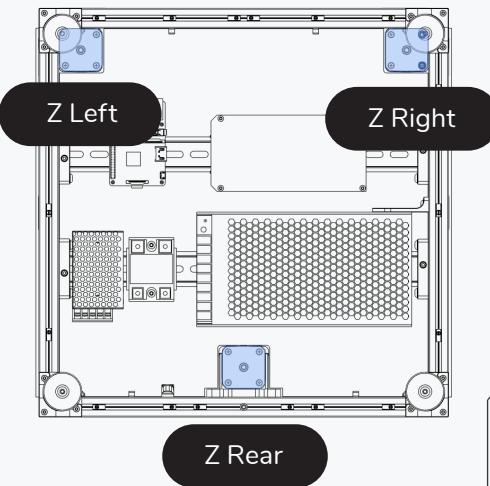
#### FAN VOLTAGE

The fans recommended in the sourcing guide are 24V fans.

Please check your hotend cooling (40x40x10 axial), part cooling (40x40x20 blower) and exhaust/electronics (60x60x20 axial) fans for their voltage rating and jumper the voltage selection accordingly. Refer to the Fysetc Spider manual for possible settings.

Z AXIS

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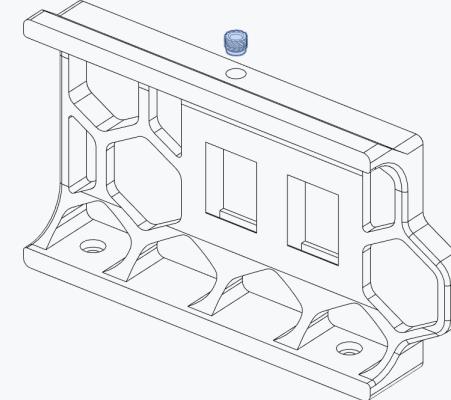
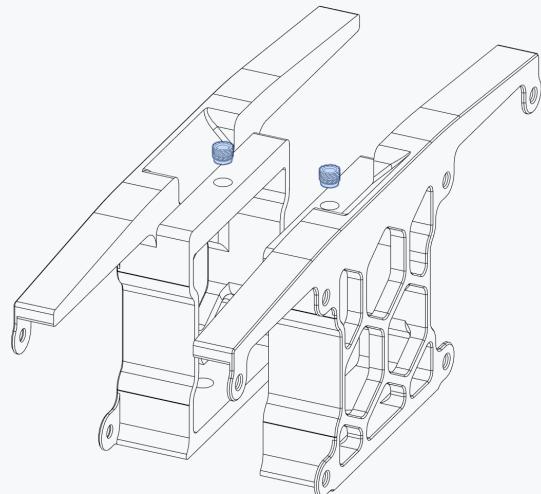
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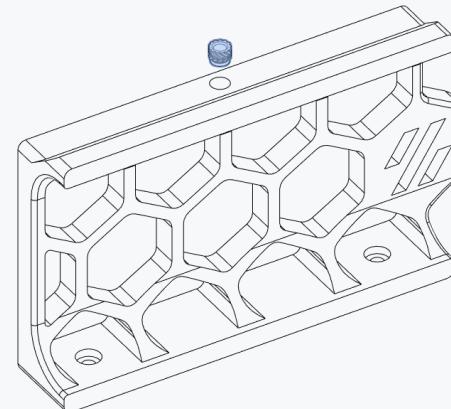
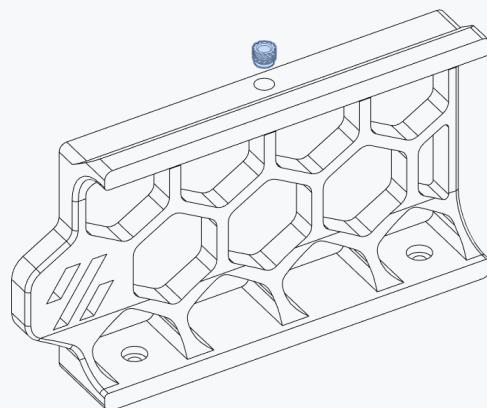


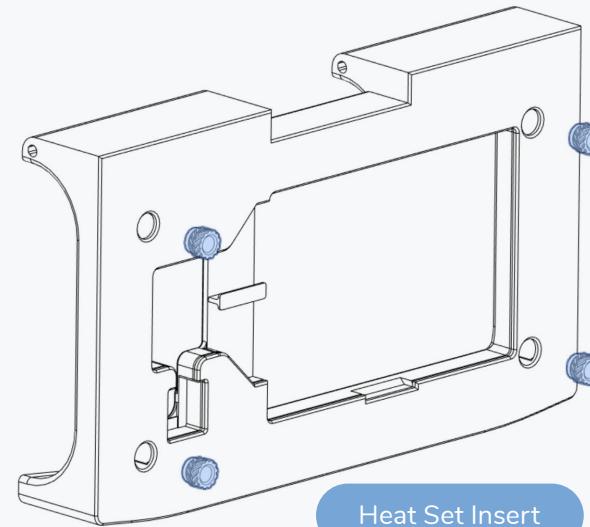
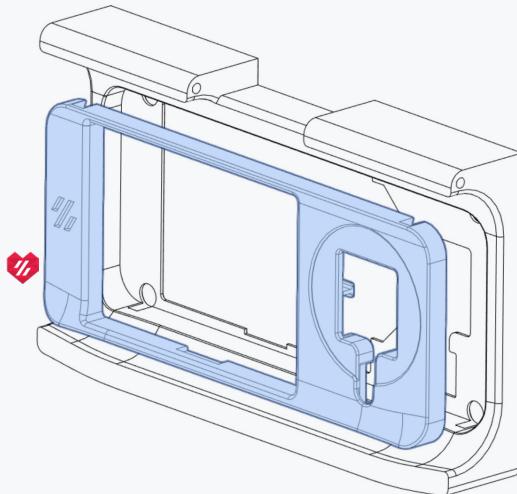
## HEAT SET INSERT

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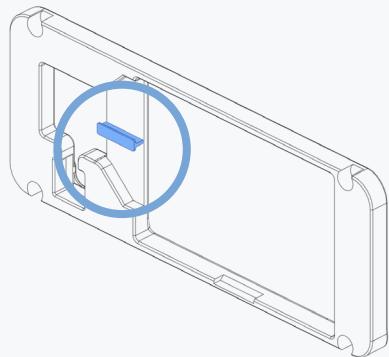
Heat Set Insert





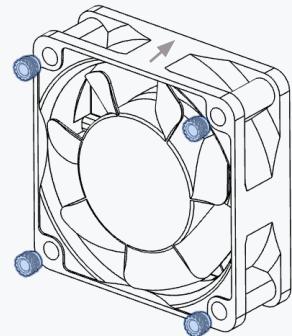
#### FRONT COVER

The front cover is held in place by the heat set inserts. Hold the front face firmly in place while inserting the heat set inserts.

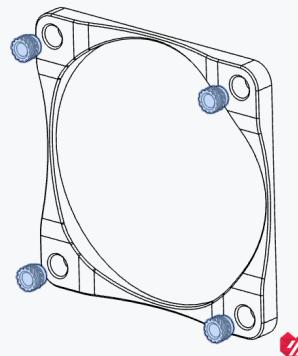


#### BUILT-IN SUPPORT

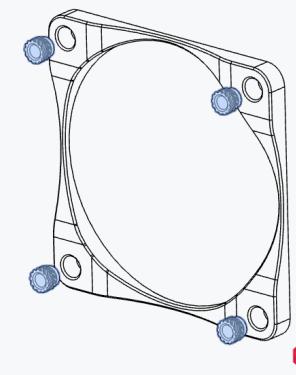
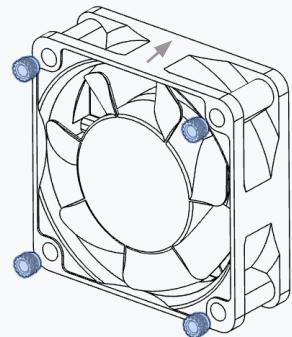
Remove the highlighted section. It's a built-in support for printability.

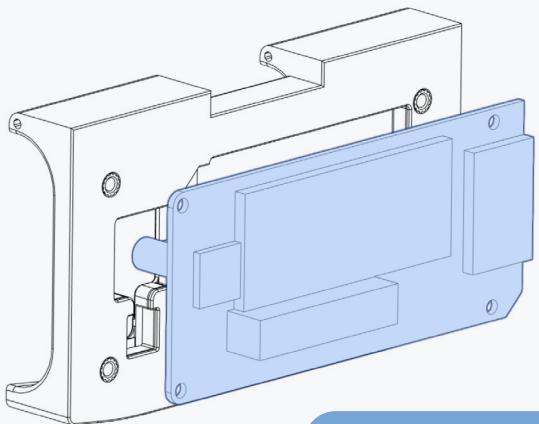


60x20 Fan

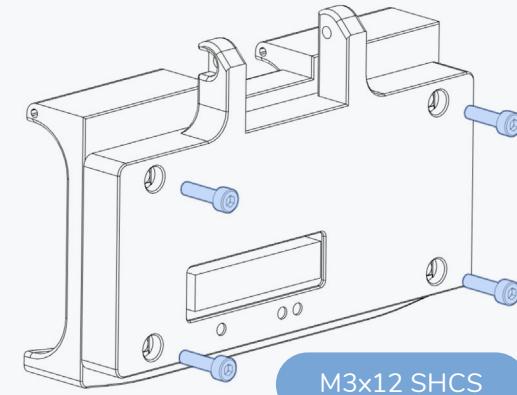
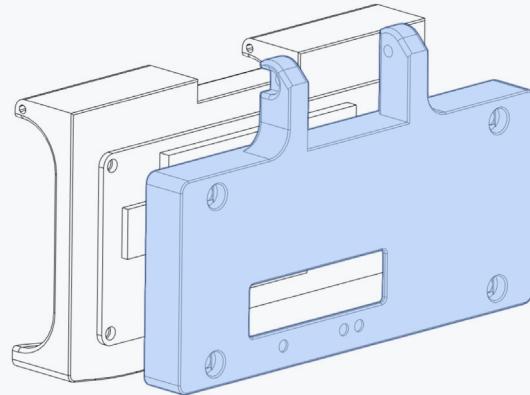


Heat Set Insert

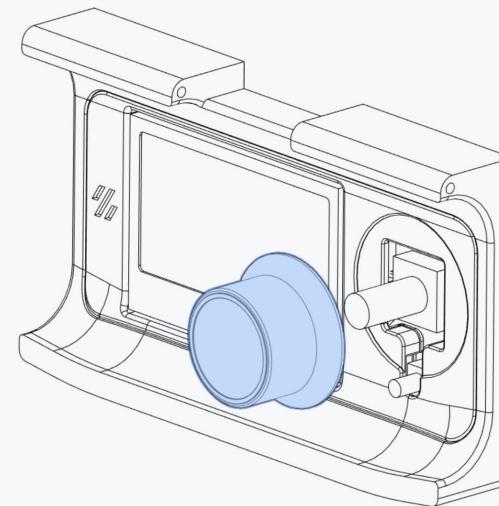
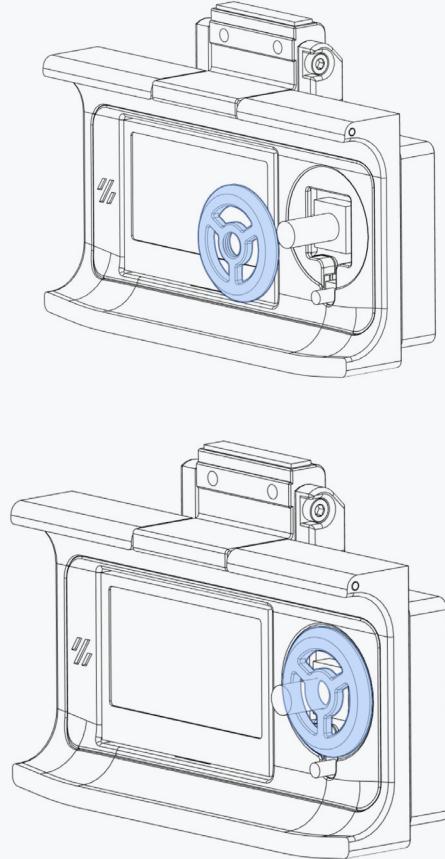




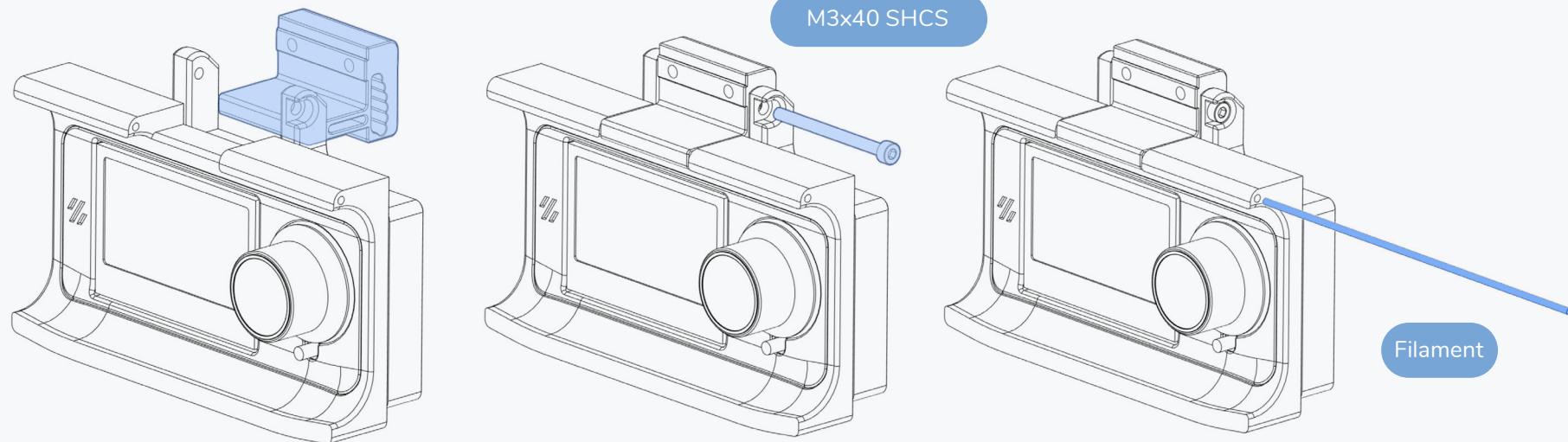
Mini 12864 Screen

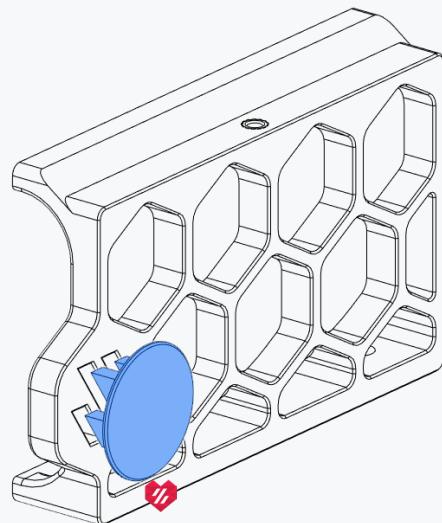


M3x12 SHCS

**OPTION: LIGHT BLOCKER**

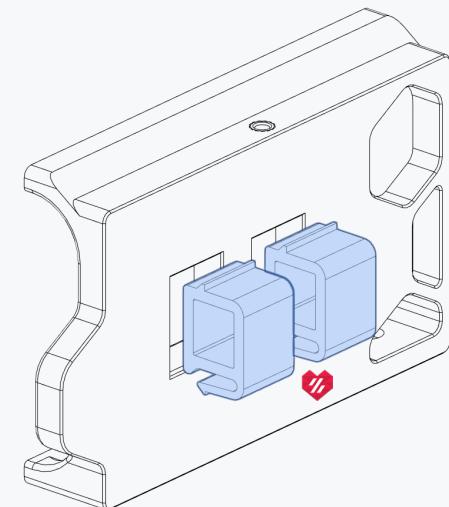
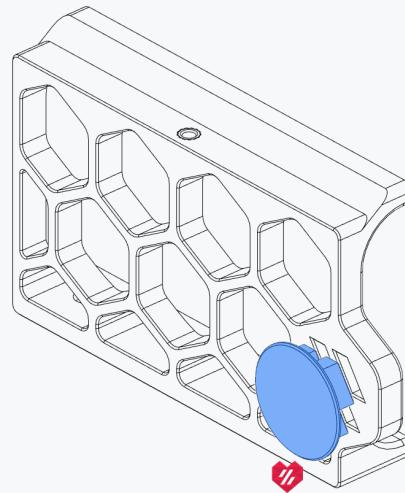
Some LCDs come with a smaller encoder knob. This extra piece prevents excess light bleed. Threads onto the encoder before the knob is pressed on.



**LOGO INSERTS**

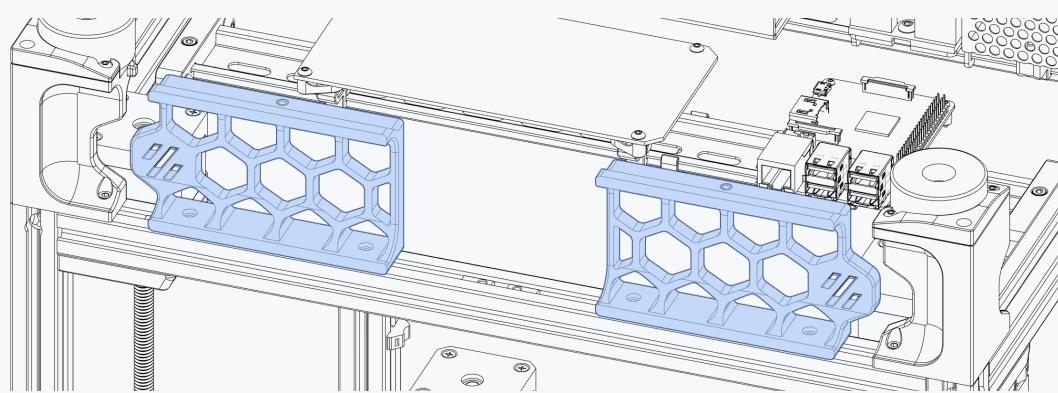
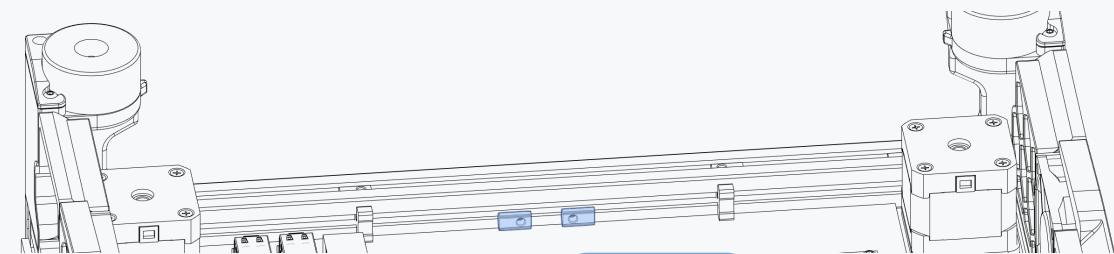
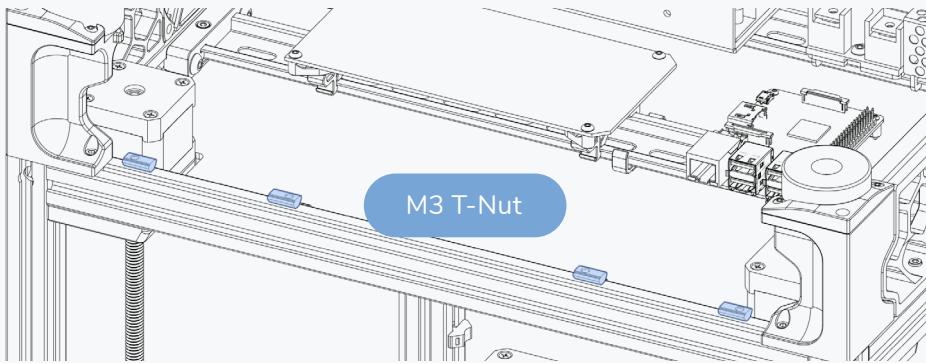
These will stay in place without any adhesive.

Alternatively they can be glued in place.



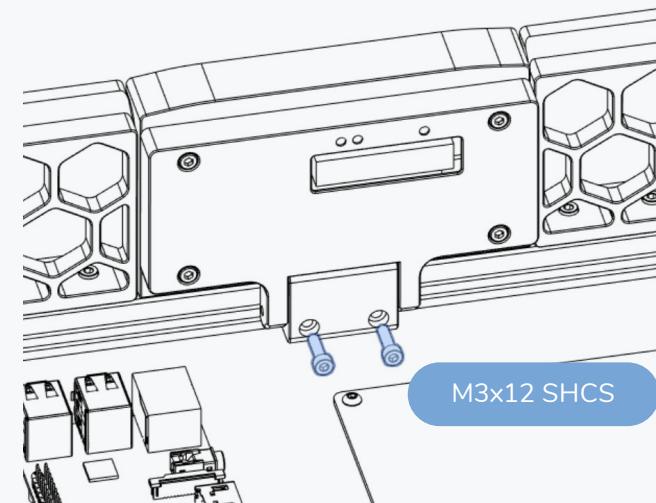
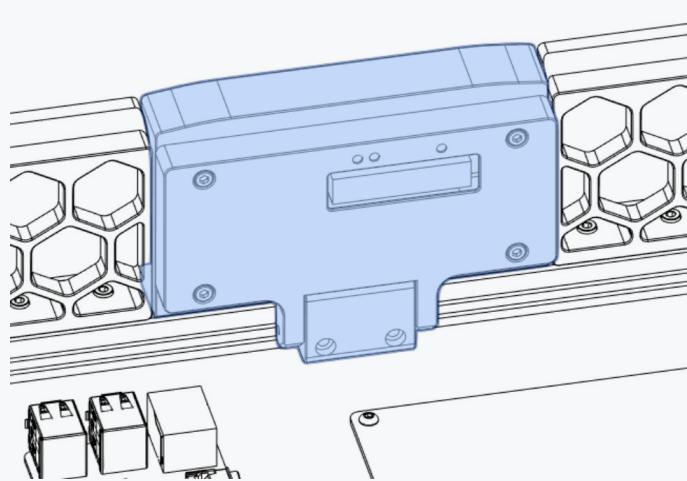
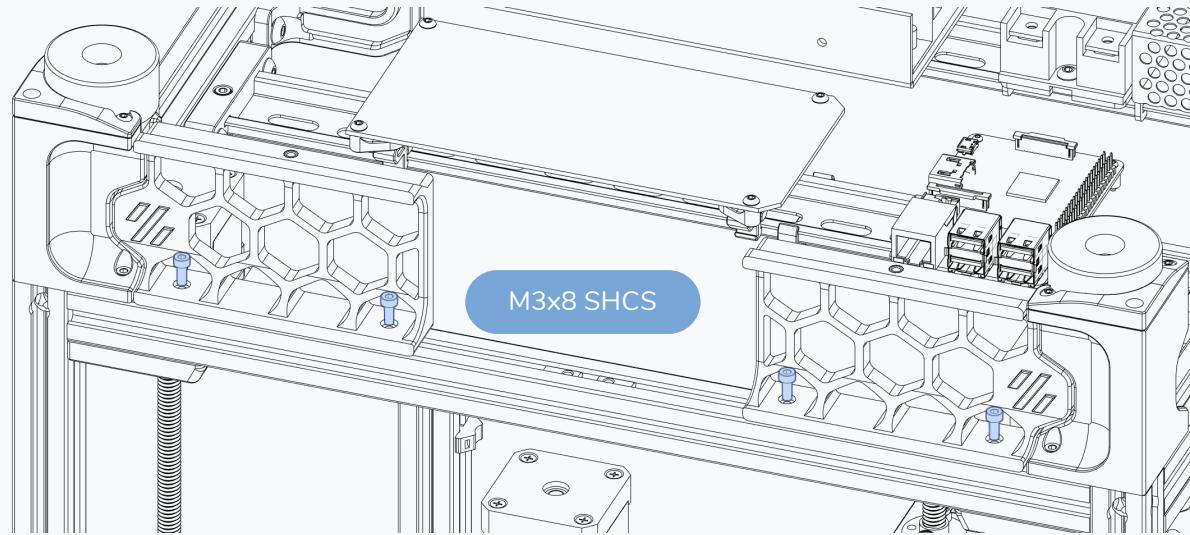
SKIRTS

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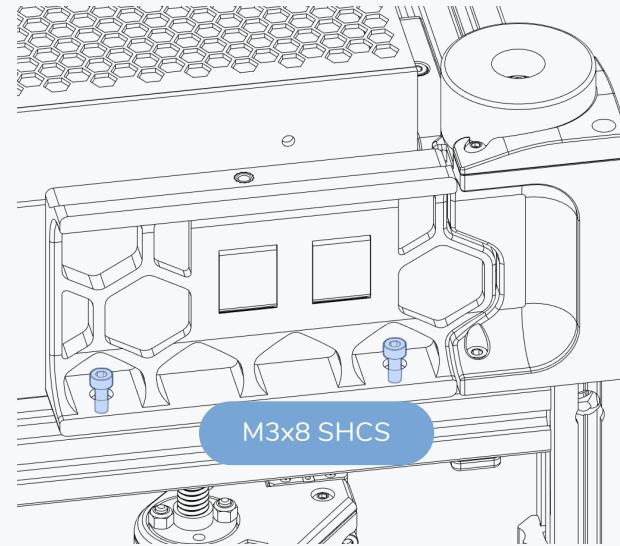
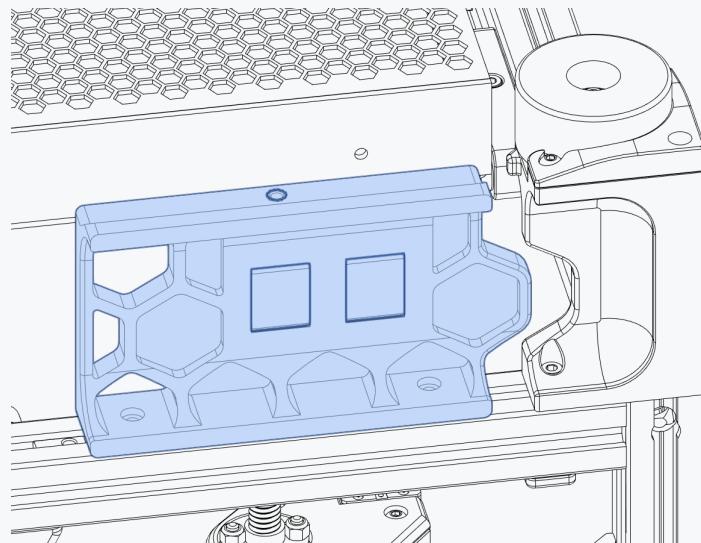
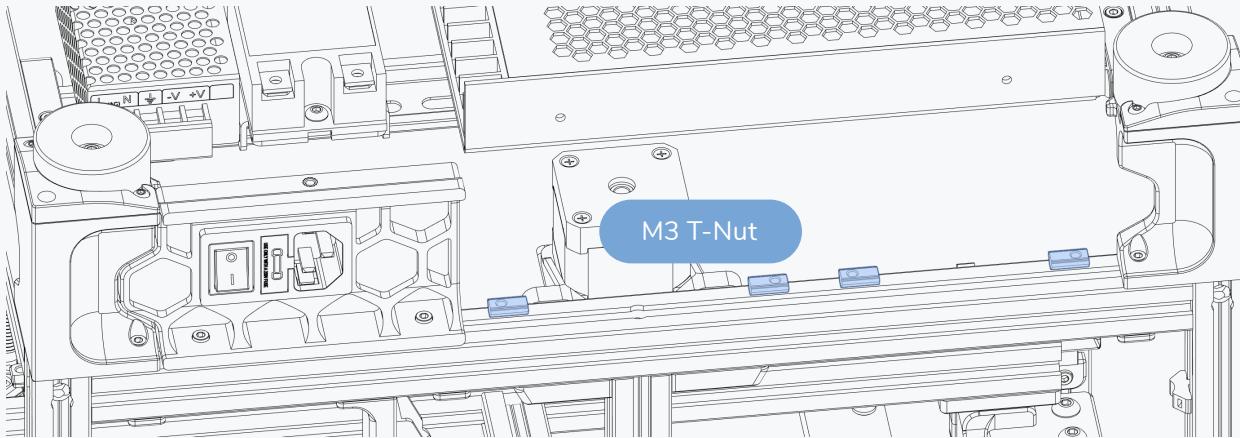


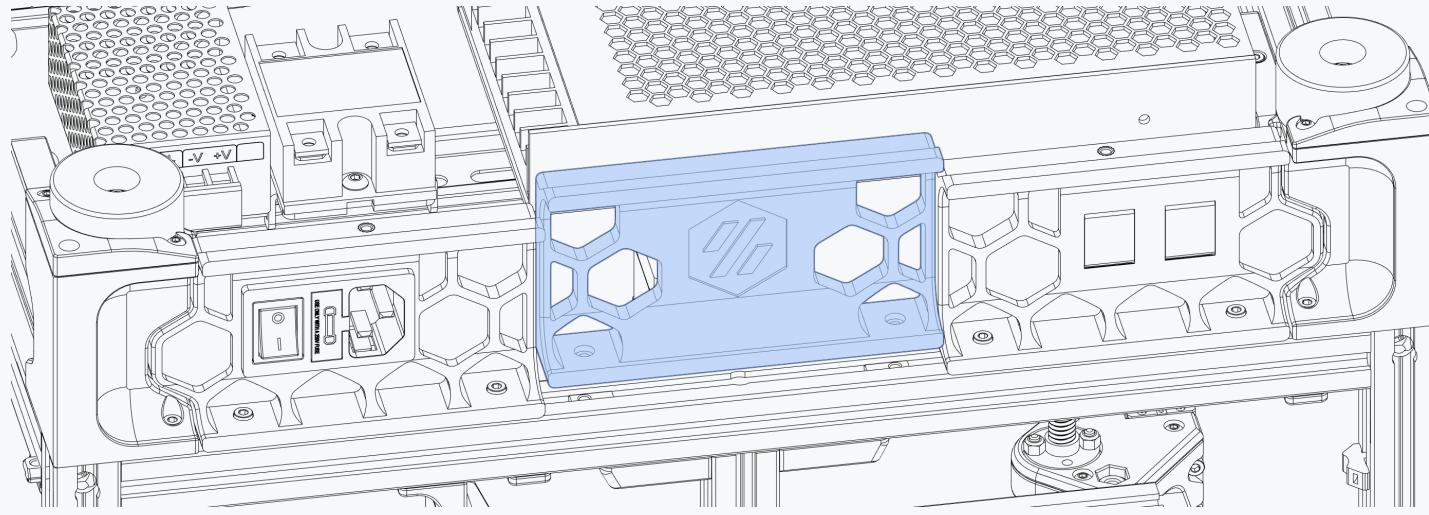
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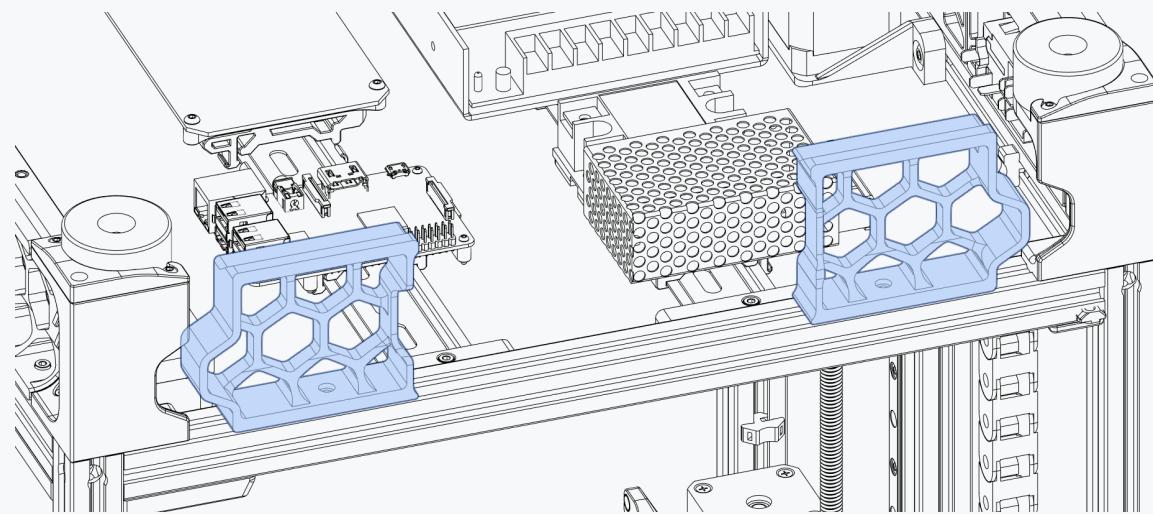
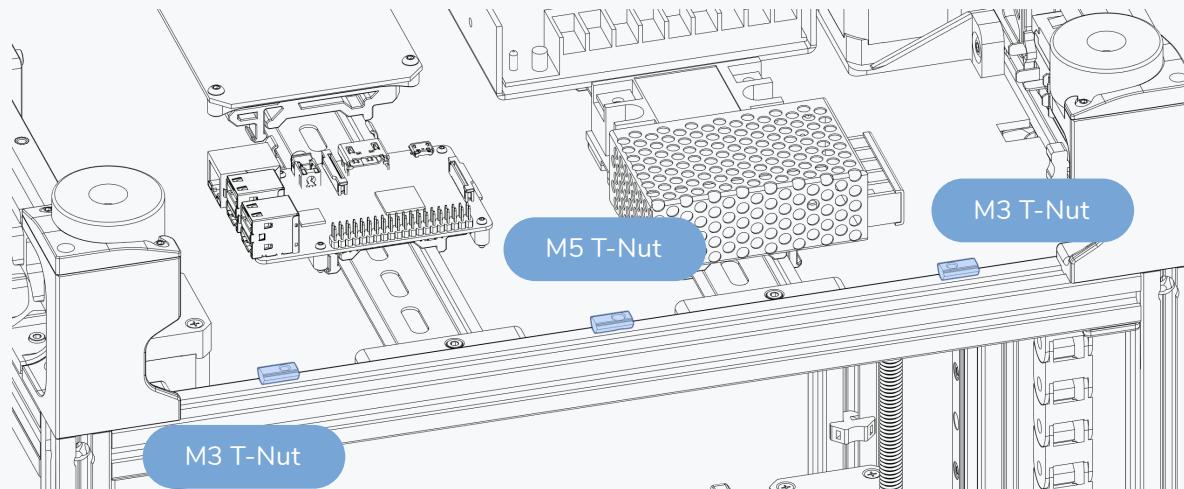
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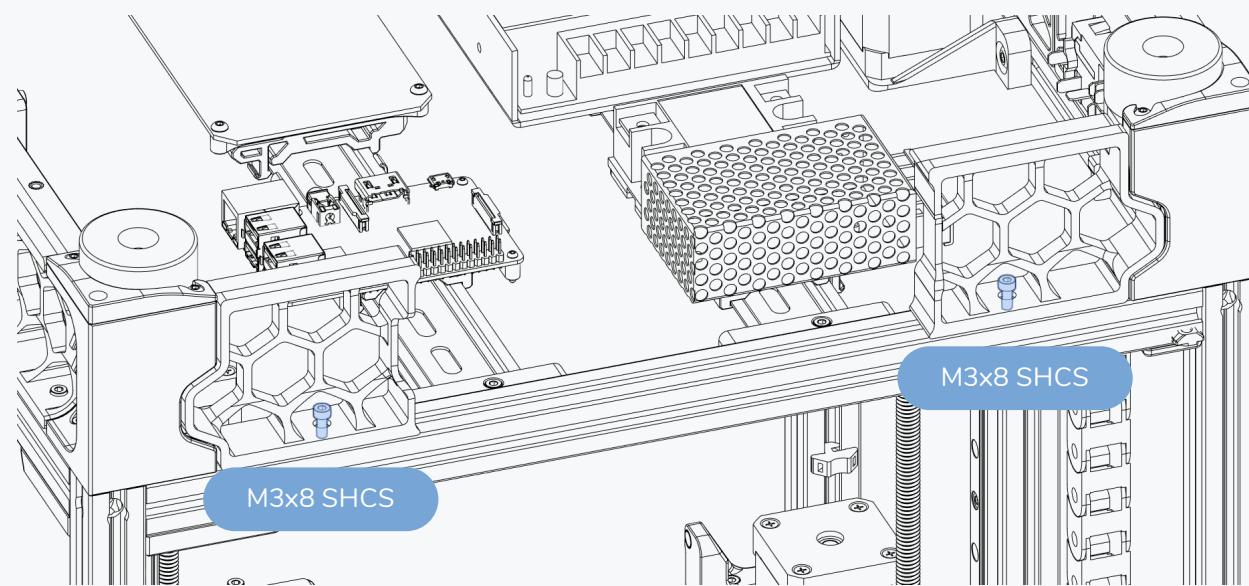


M3x12 SHCS



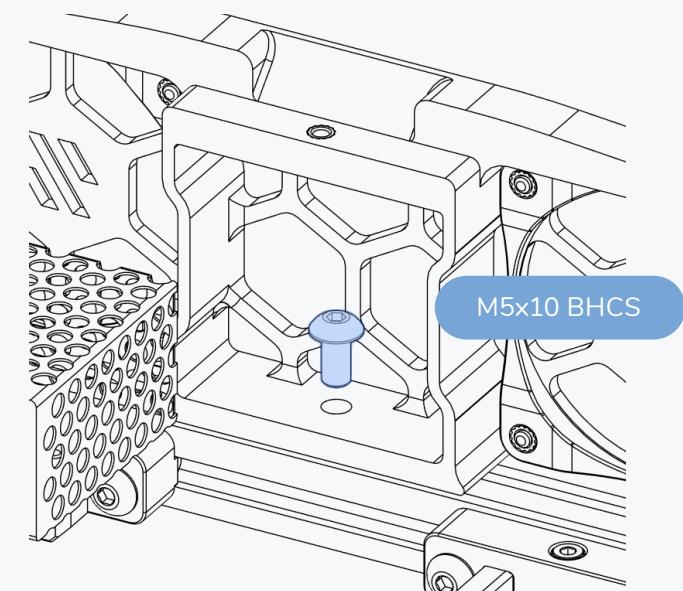
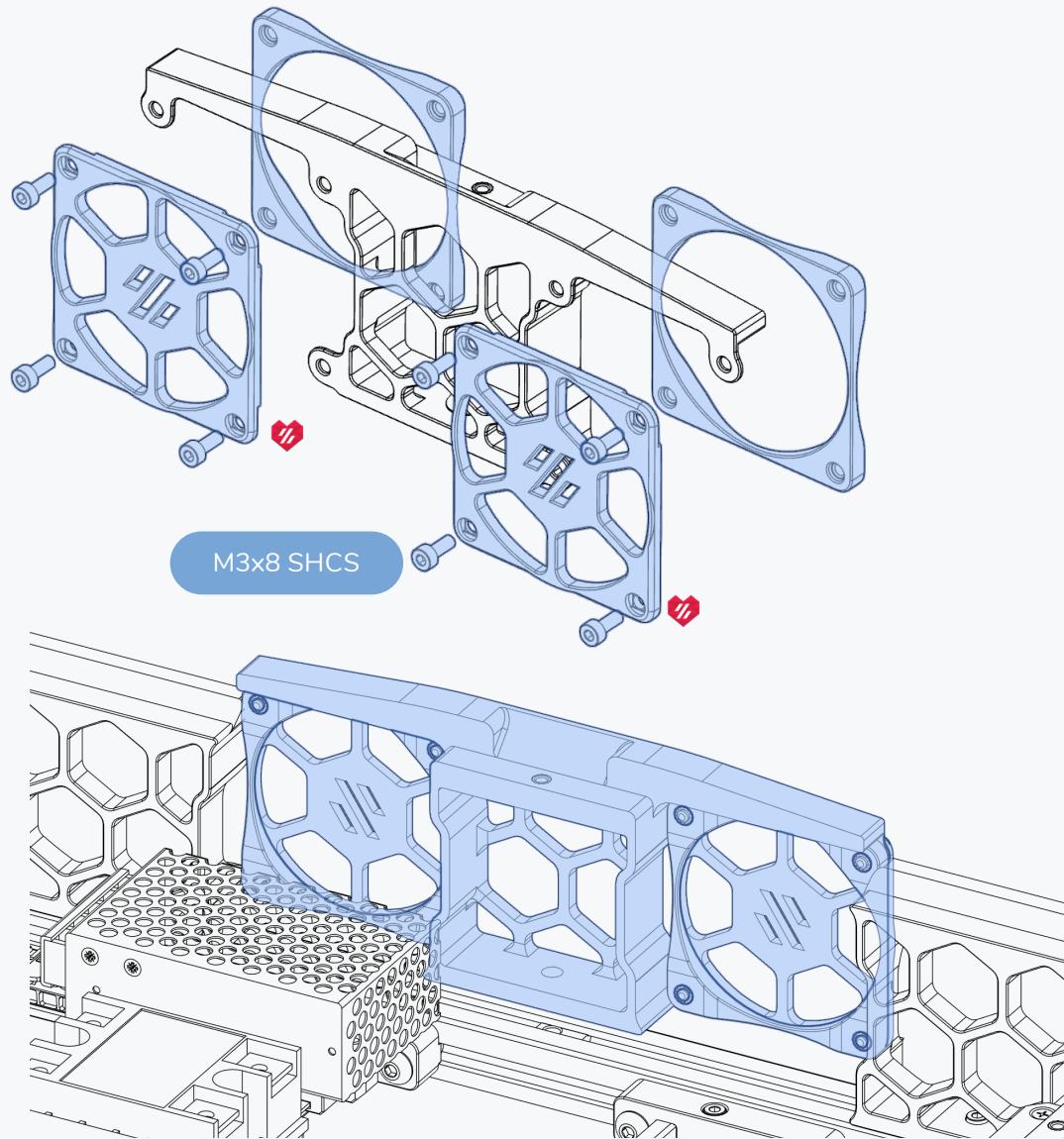






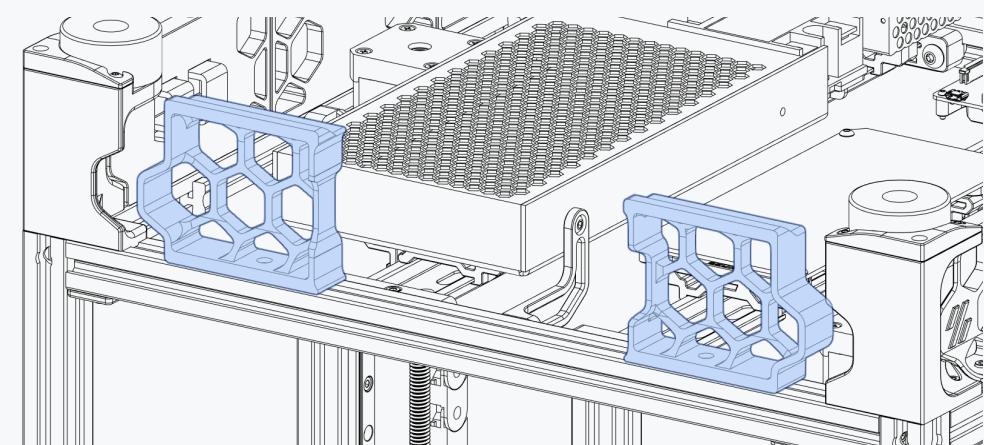
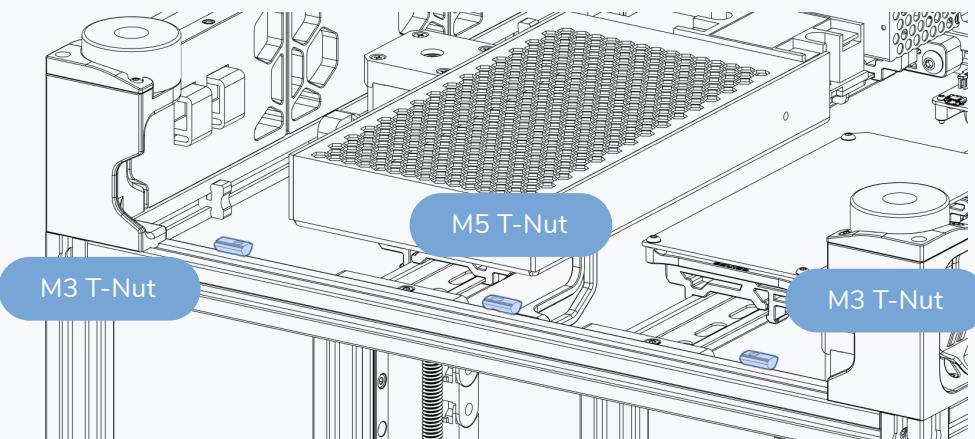
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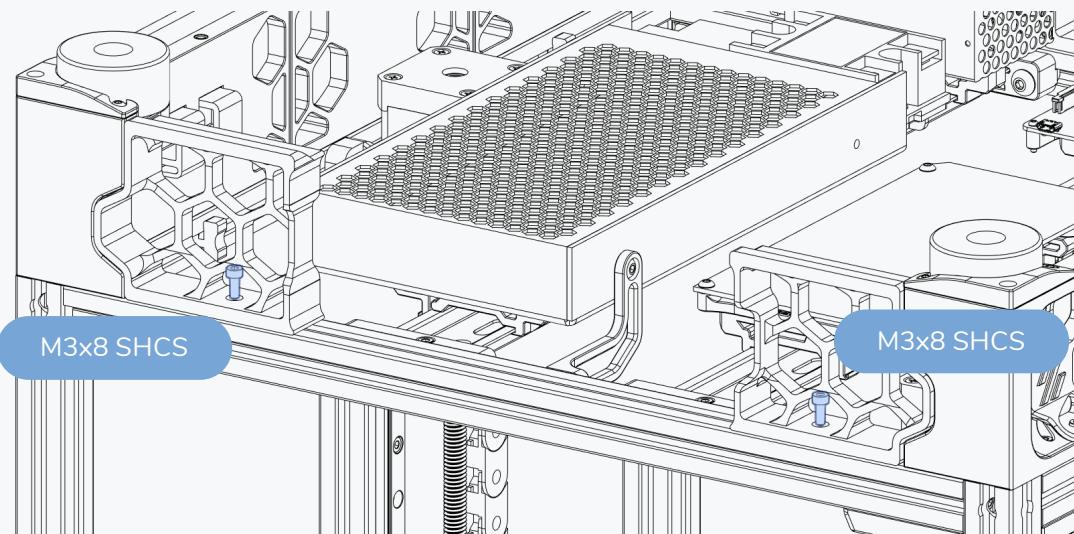
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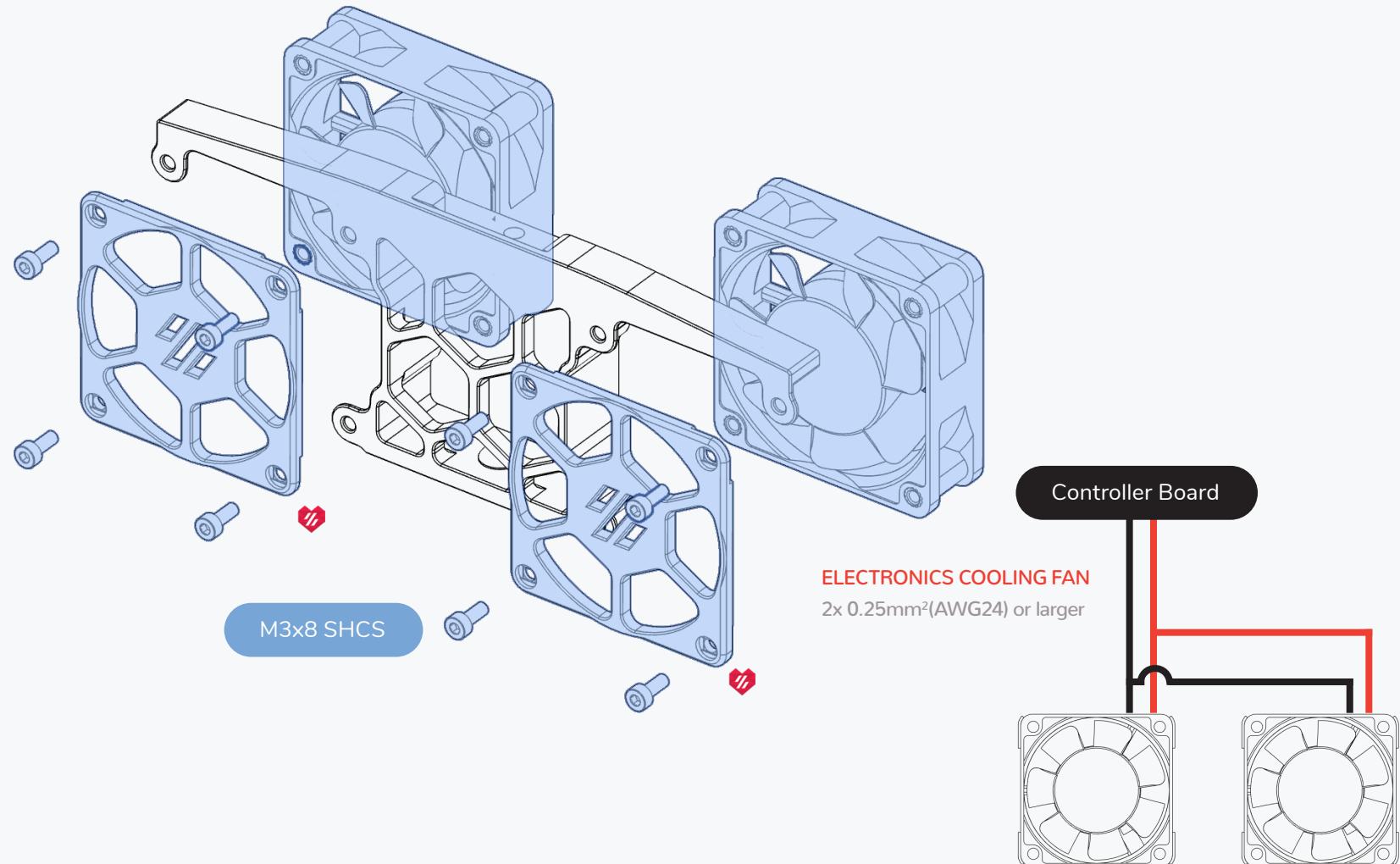


SKIRTS

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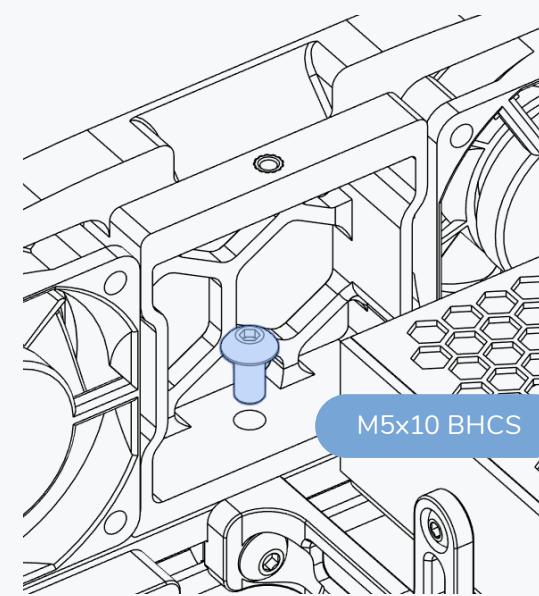
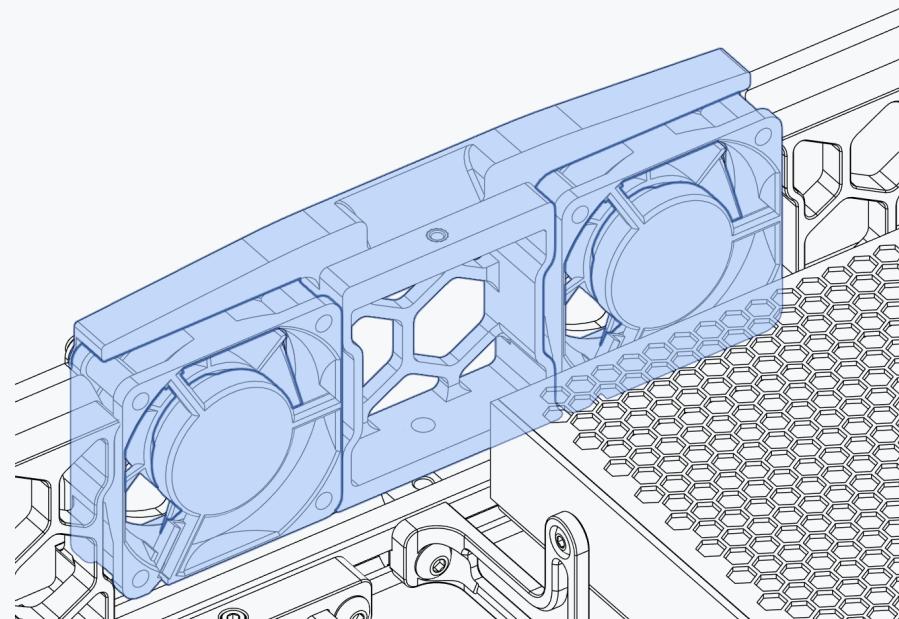






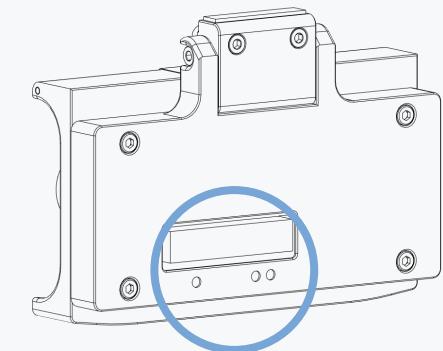
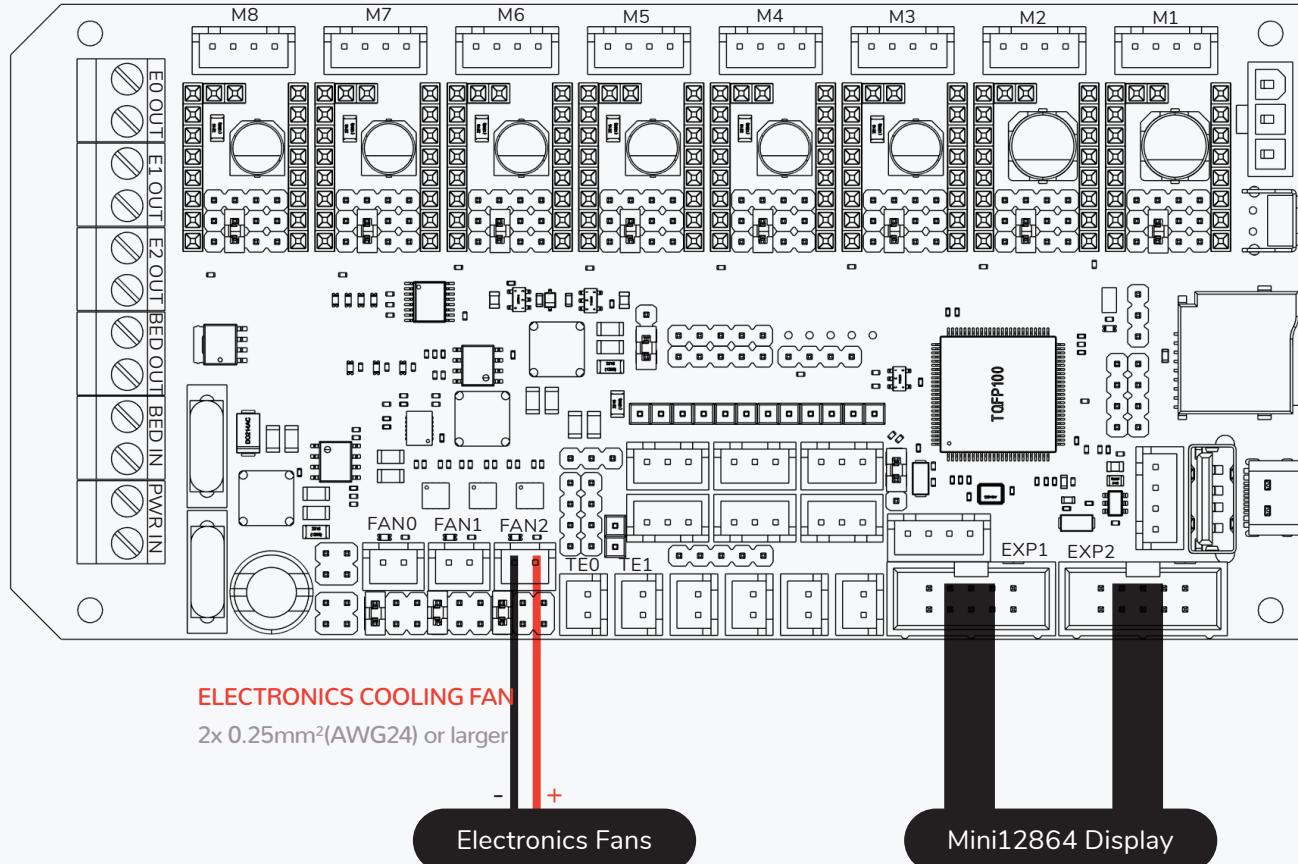
SKIRTS

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## WIRING

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### WHICH IS WHICH?

The socket with 1 dot below it is EXP1 and the socket with 2 dots below it is EXP2.

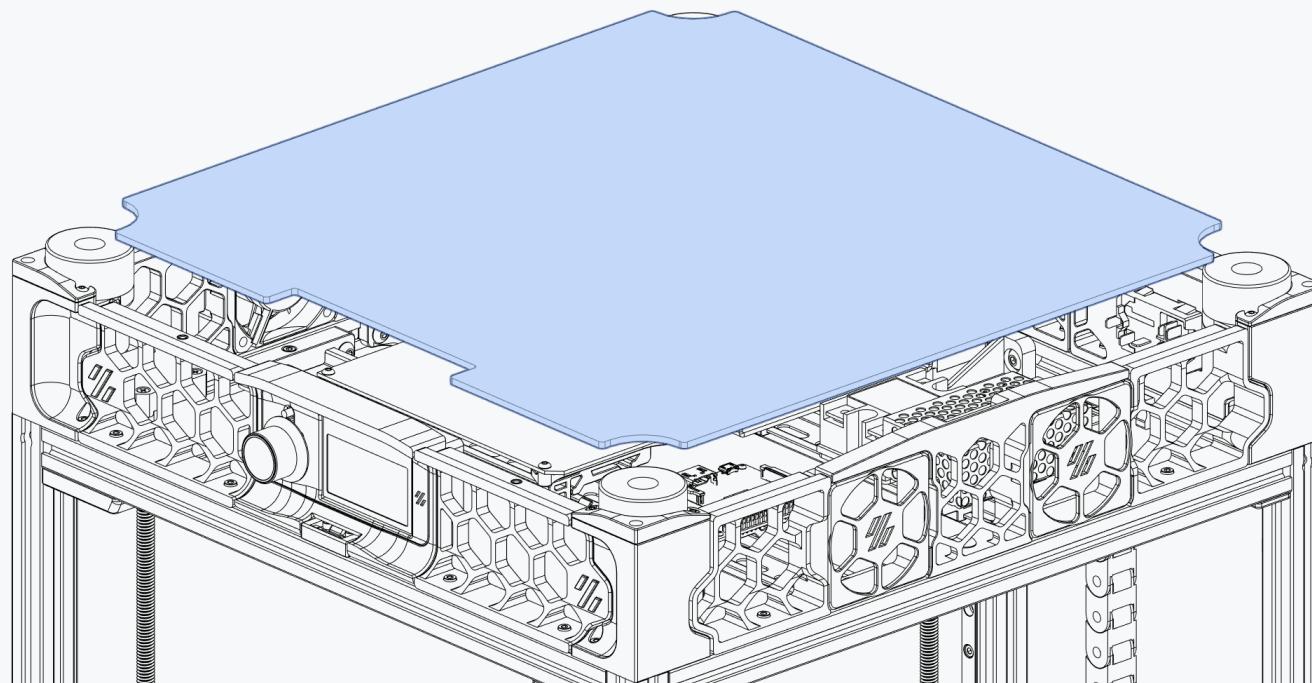
### WARNING: DISPLAY HOOKUP

Before connecting the display make sure to review the documentation on the Voron documentation site (<https://voron.link/ypdmcb2>).

If you are using a "FYSETC mini12864" please review section 3.3 of the FYSETC Spider documentation (<https://voron.link/m6wtwnl>).

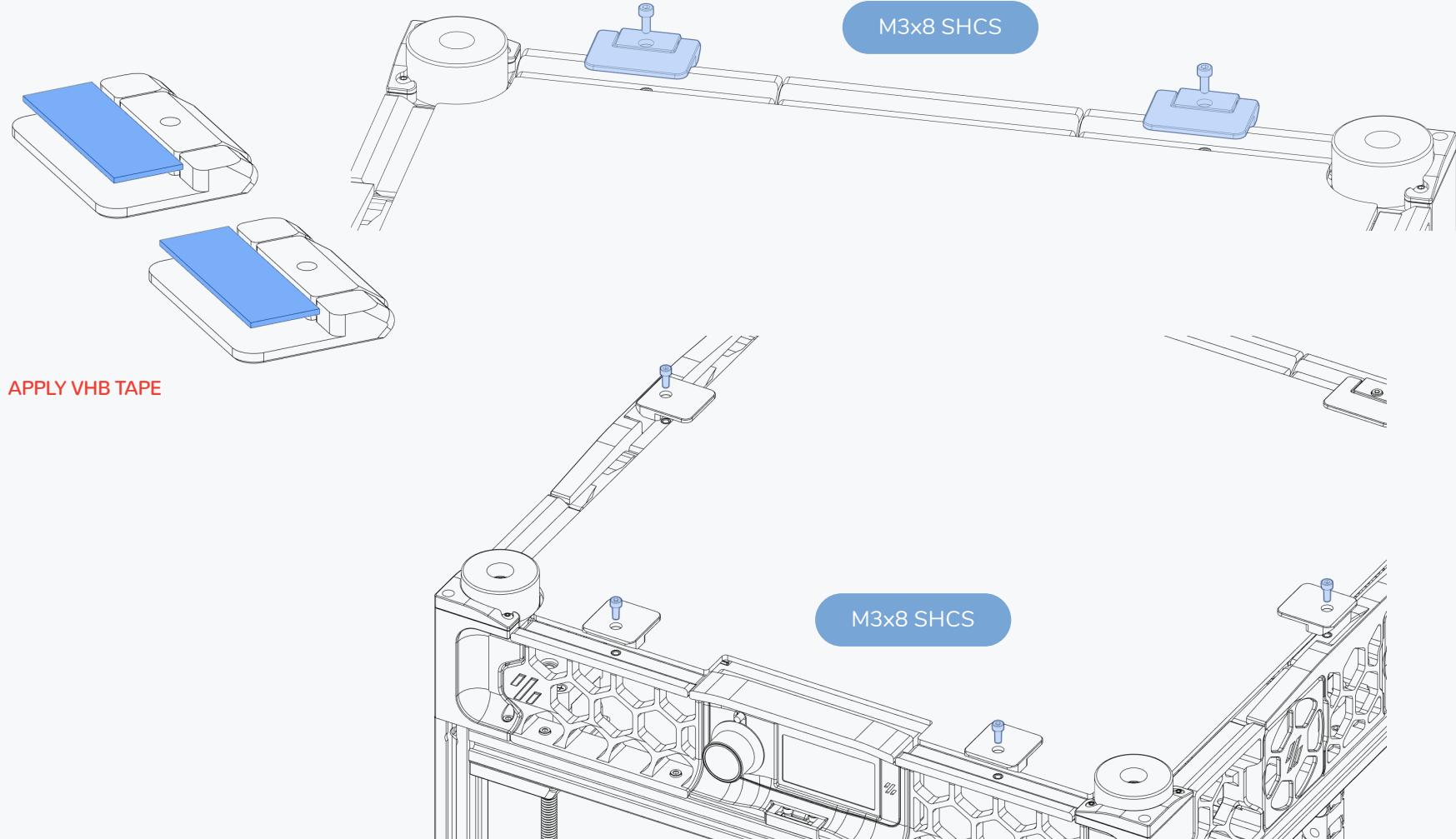
BOTTOM PANEL

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BOTTOM PANEL

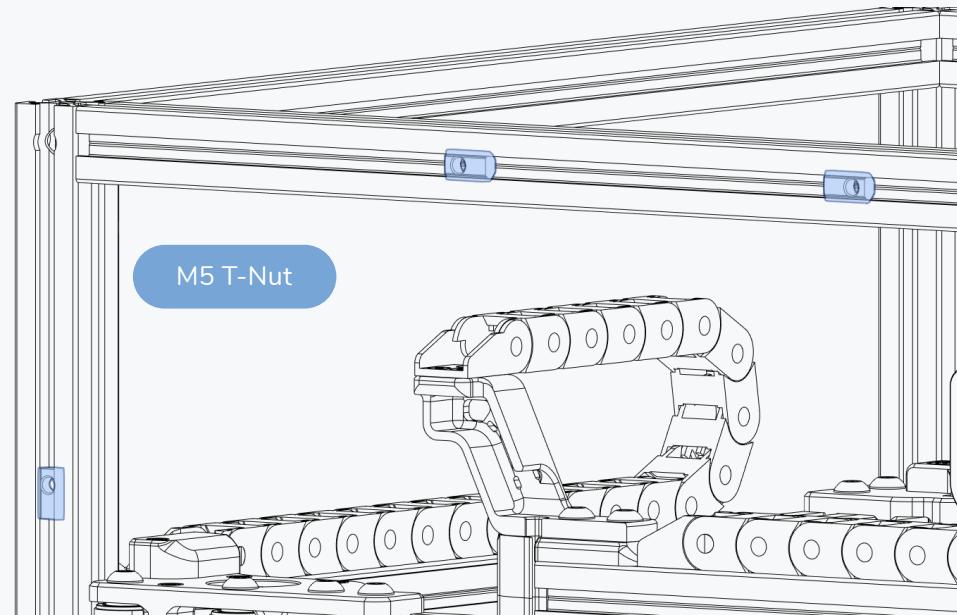
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PANELS & FINISHING TOUCHES

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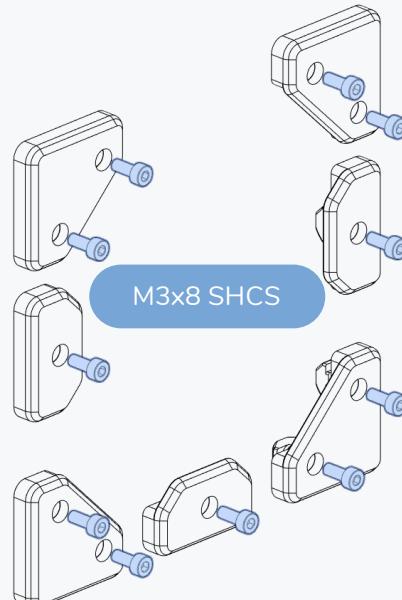






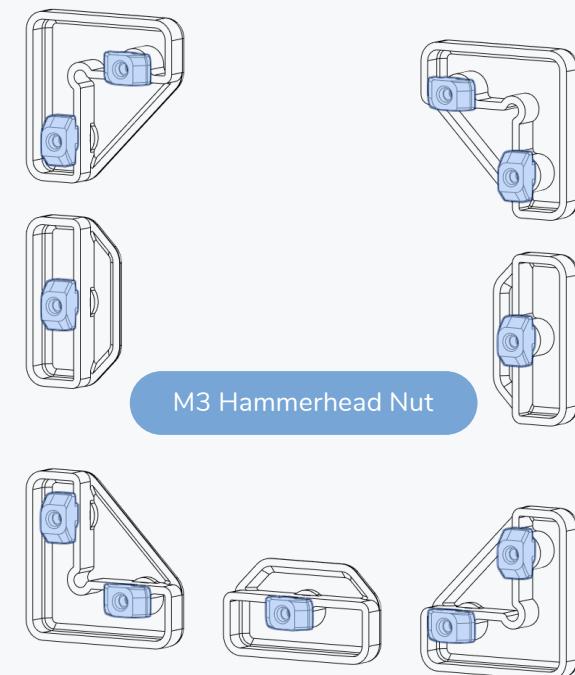
#### APPLY FOAM TAPE

Use foam tape on the contact areas between the panels and the frame to mitigate noise from vibrations.



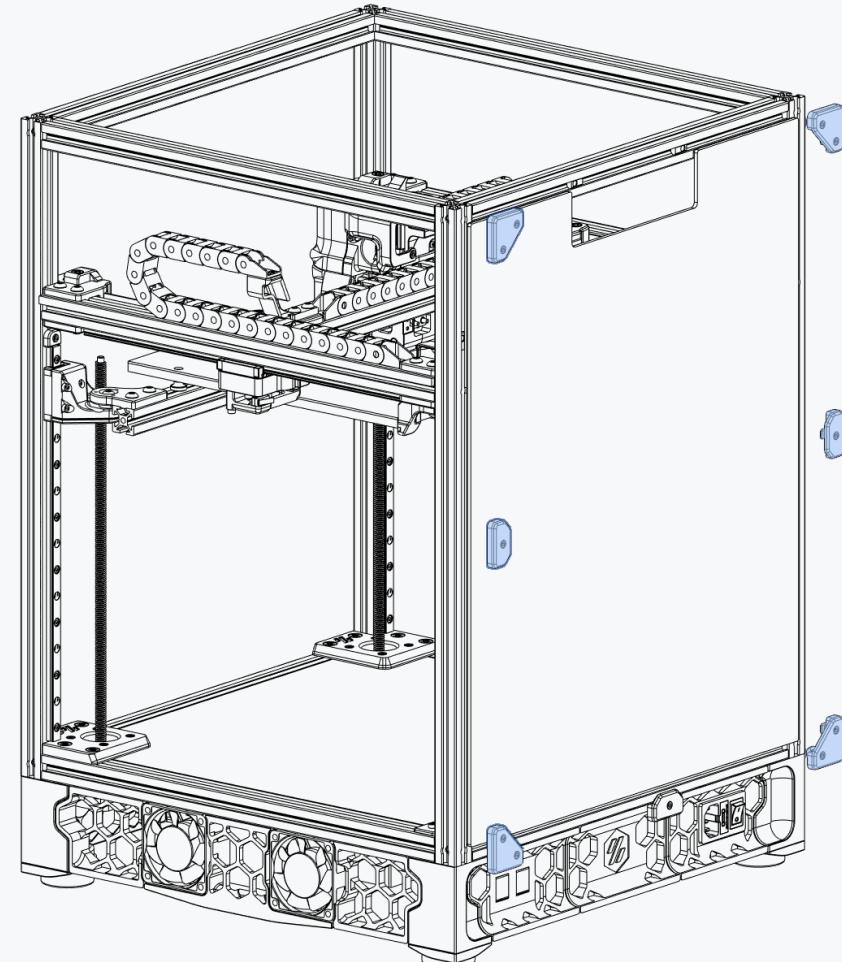
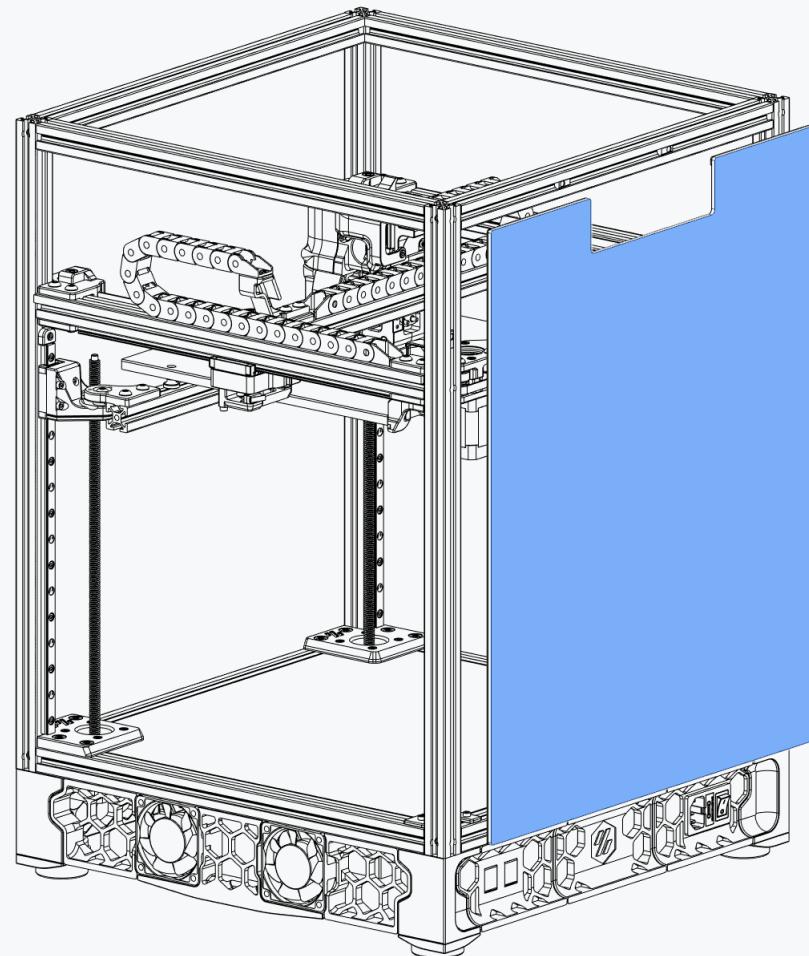
#### HAMMERHEAD NUTS?

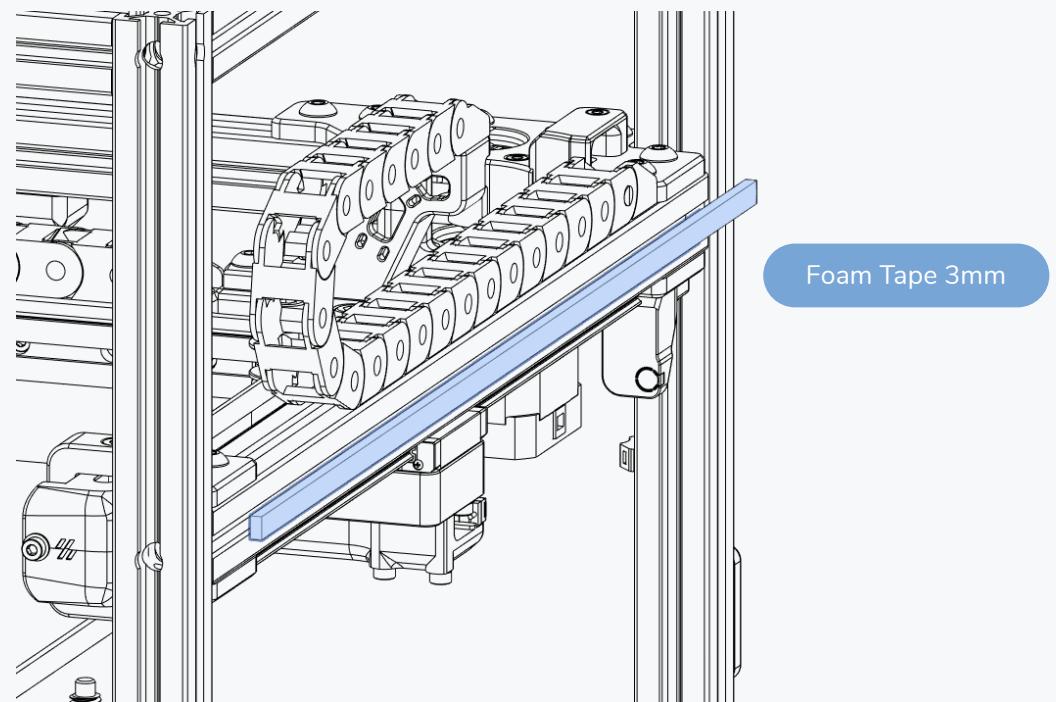
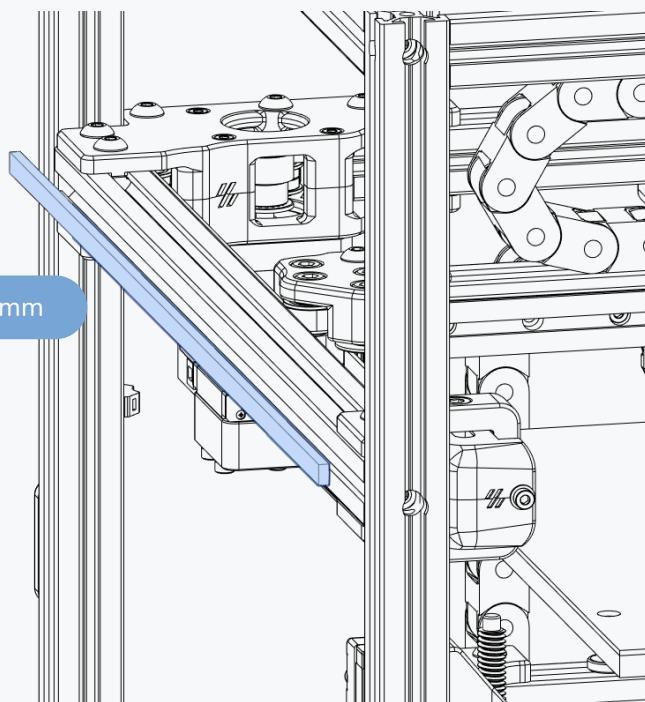
A drop of thread locker will turn the hammerhead nuts into a 1/4 turn quick release for the panels. Best done once the assembly is finished.



PANELS

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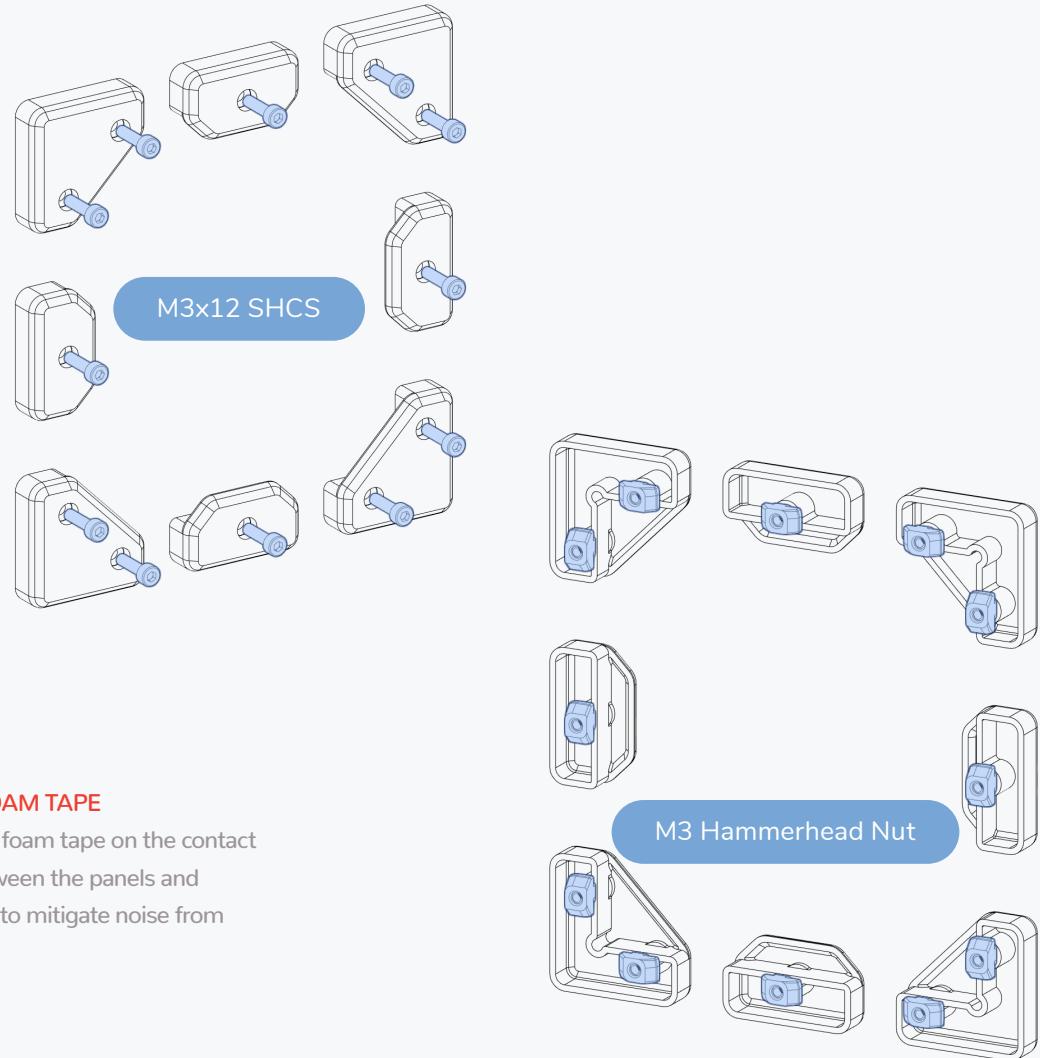


#### APPLY FOAM TAPE

Use 3mm foam tape on the contact areas between the panels and the frame to mitigate noise from vibrations.

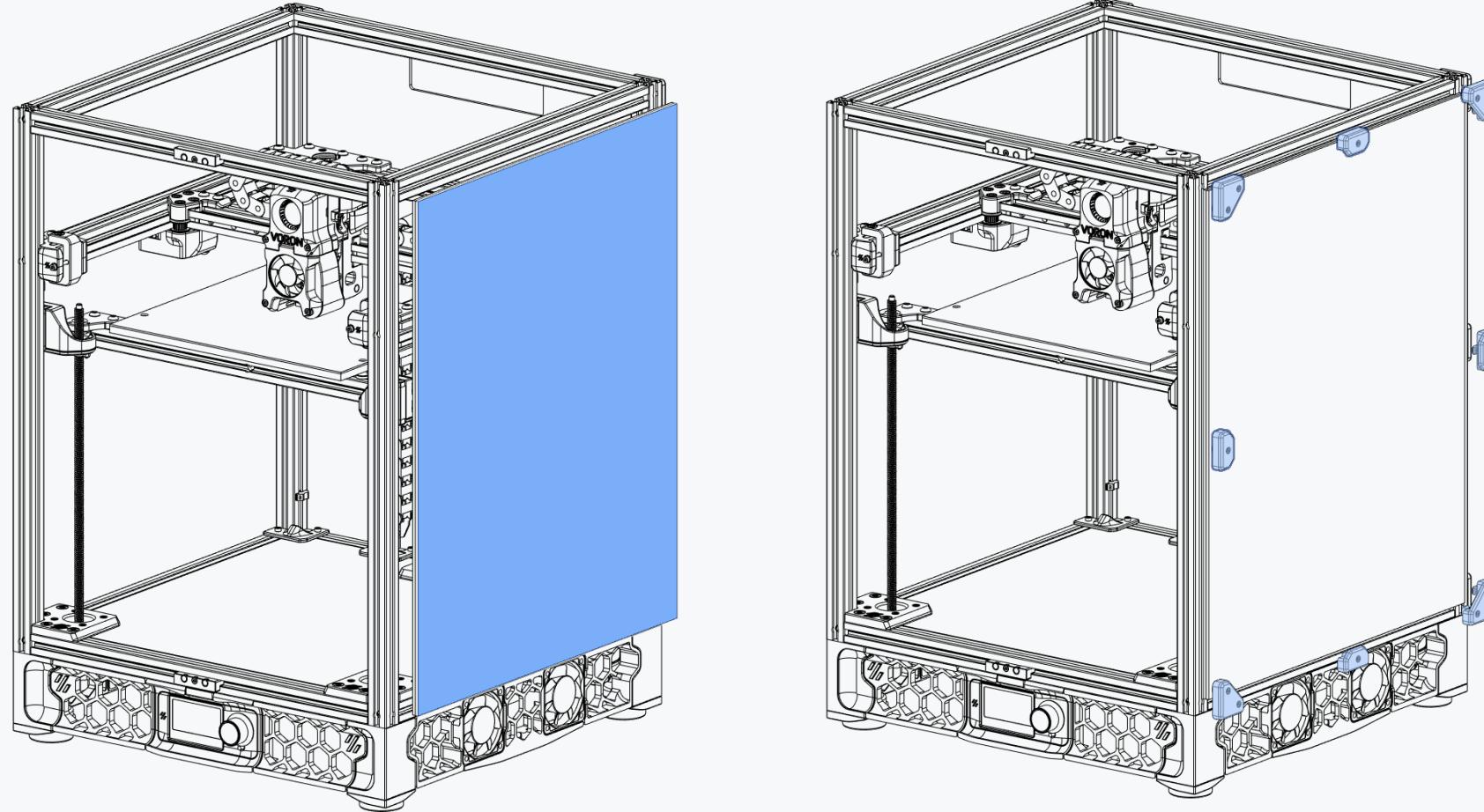
**APPLY FOAM TAPE**

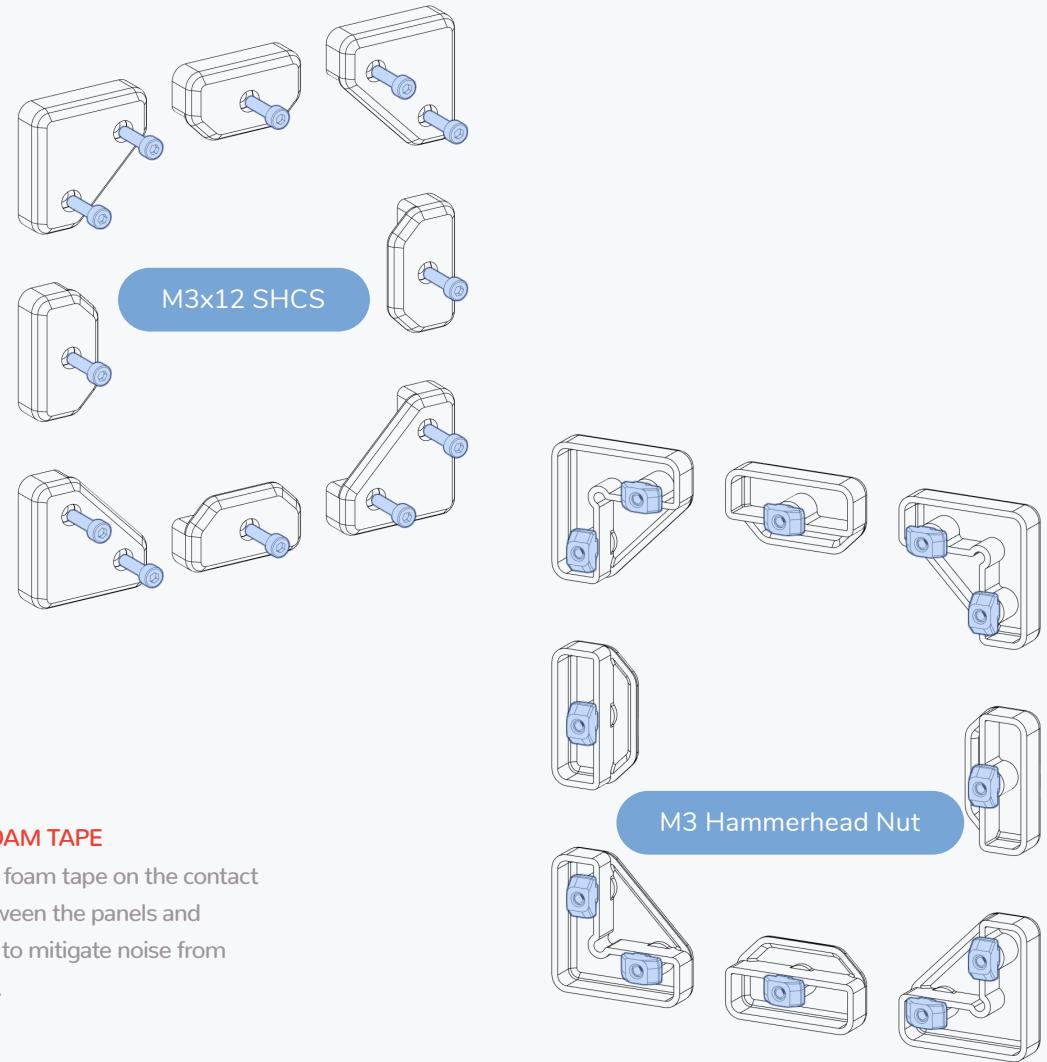
Use 3mm foam tape on the contact areas between the panels and the frame to mitigate noise from vibrations.



PANELS

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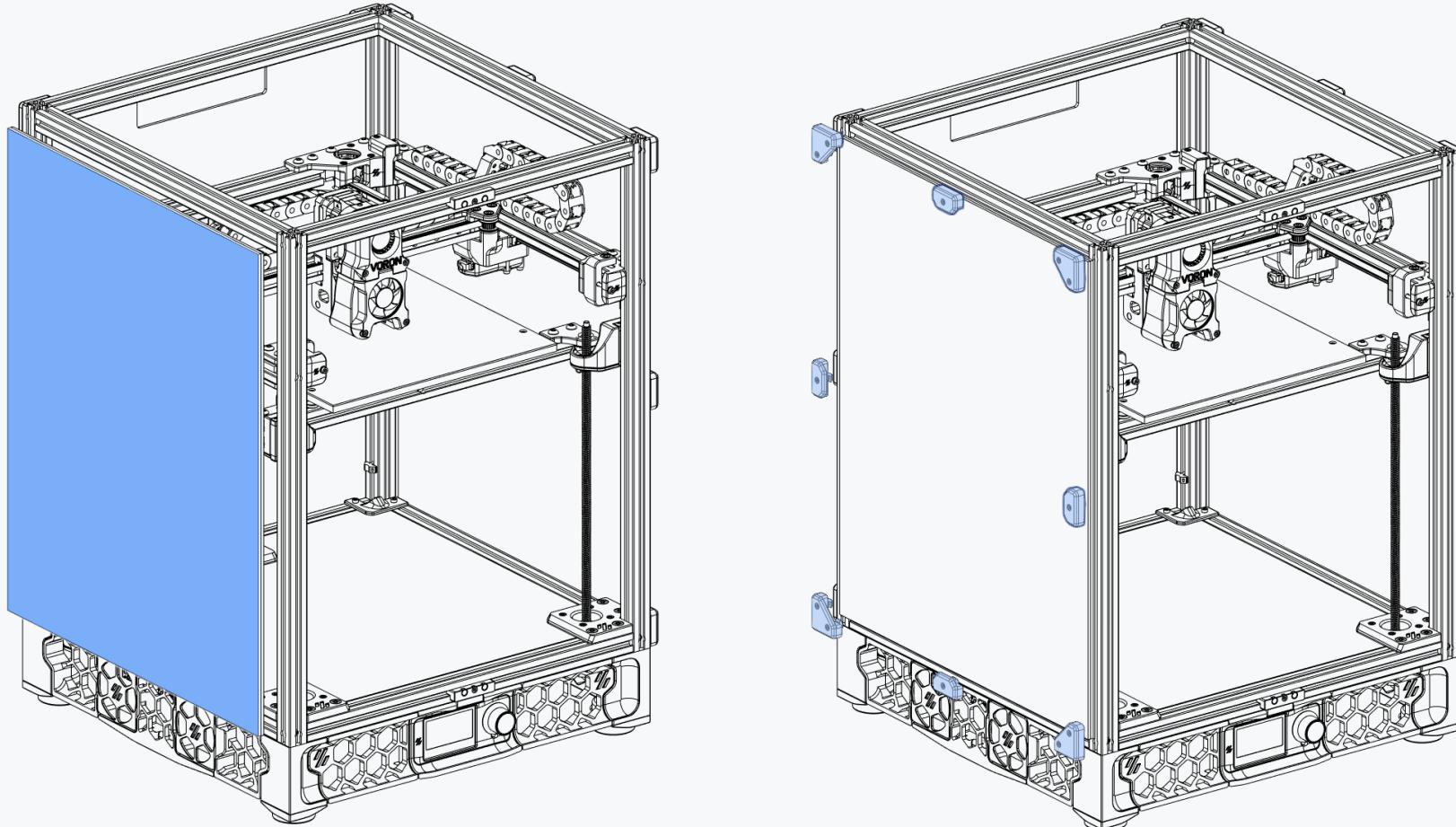


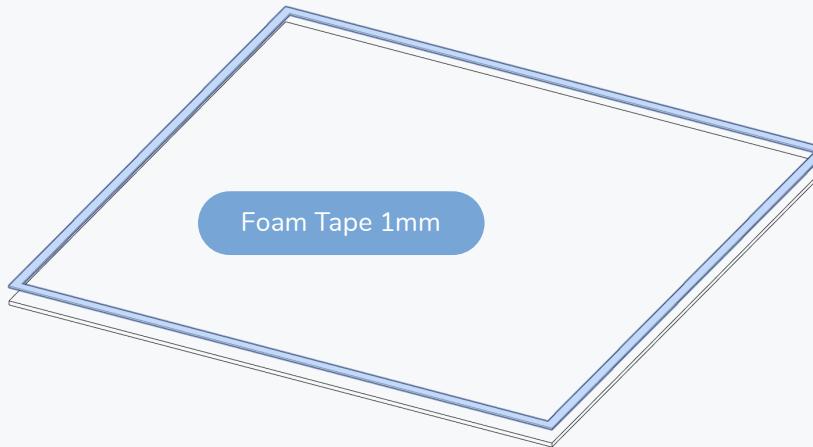
#### APPLY FOAM TAPE

Use 3mm foam tape on the contact areas between the panels and the frame to mitigate noise from vibrations.

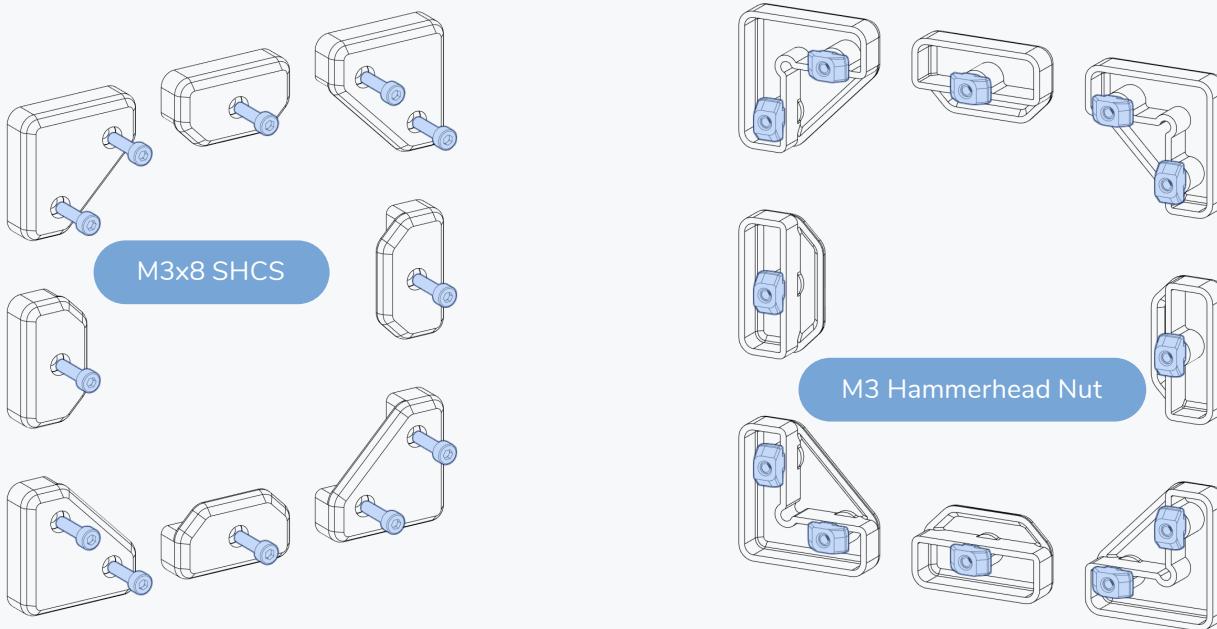
PANELS

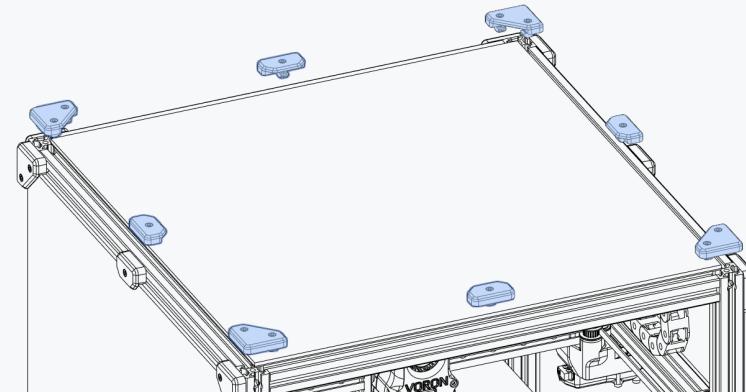
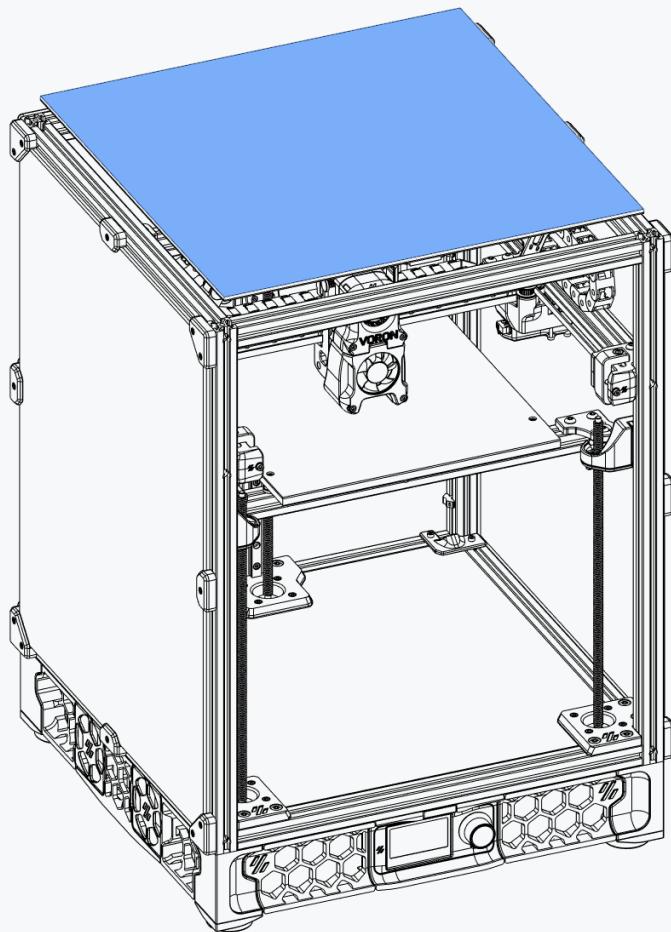
WWW.VORONDESIGN.COM

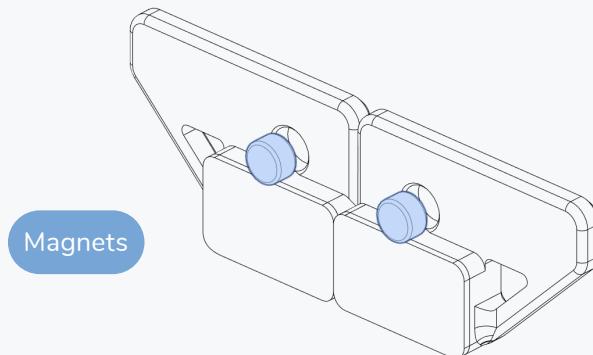
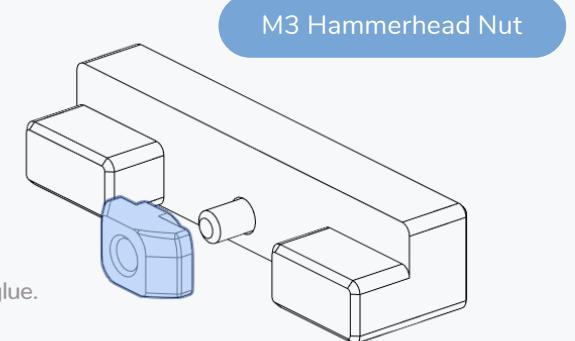
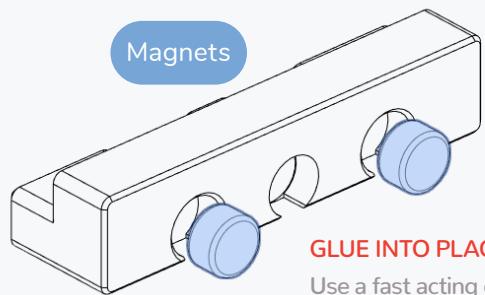
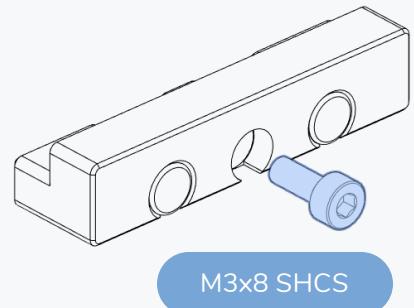


**APPLY FOAM TAPE**

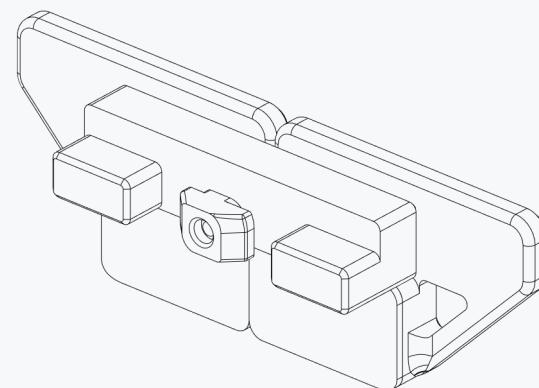
Use 1mm foam tape on the contact areas between the panels and the frame to mitigate noise from vibrations.

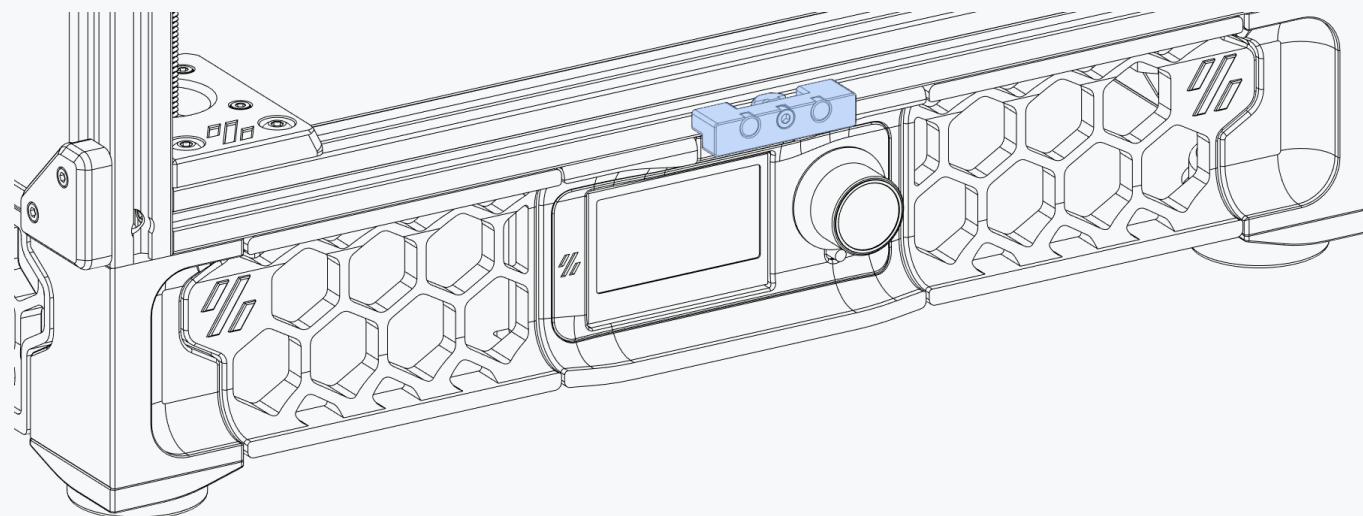
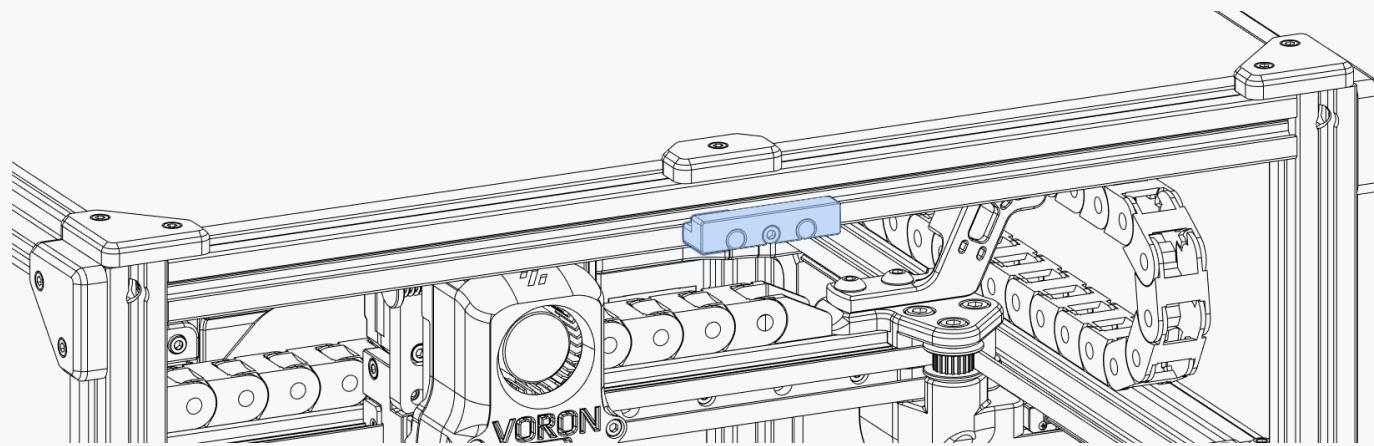


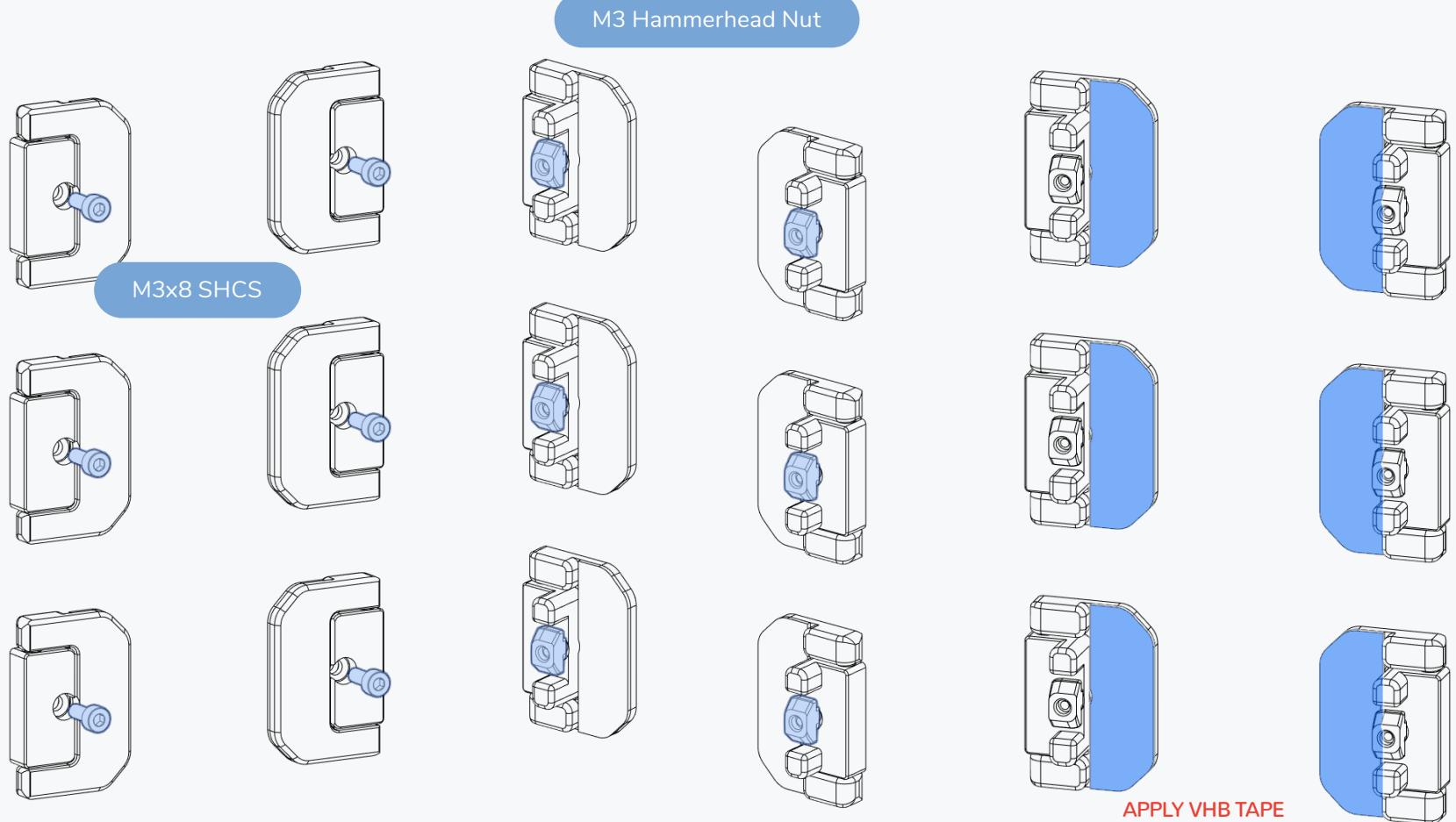




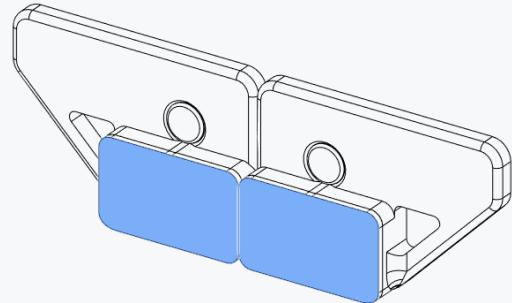
MIND THE MAGNET POLARITY  
Ensure that the magnets are facing in the right direction prior to glueing them into place.



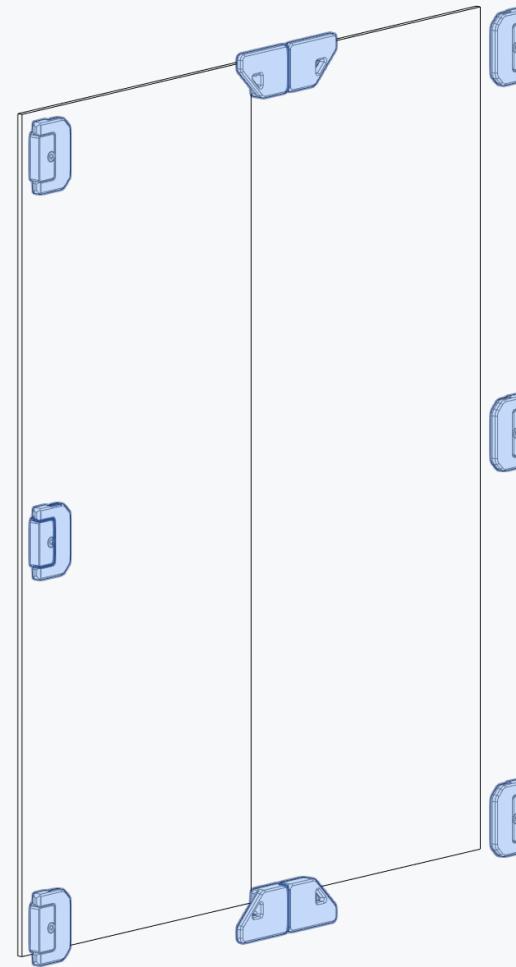
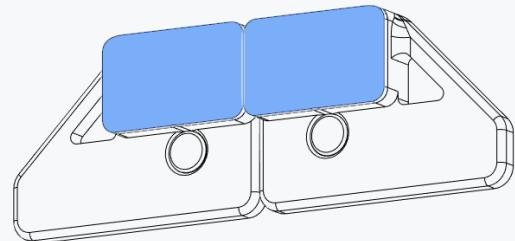


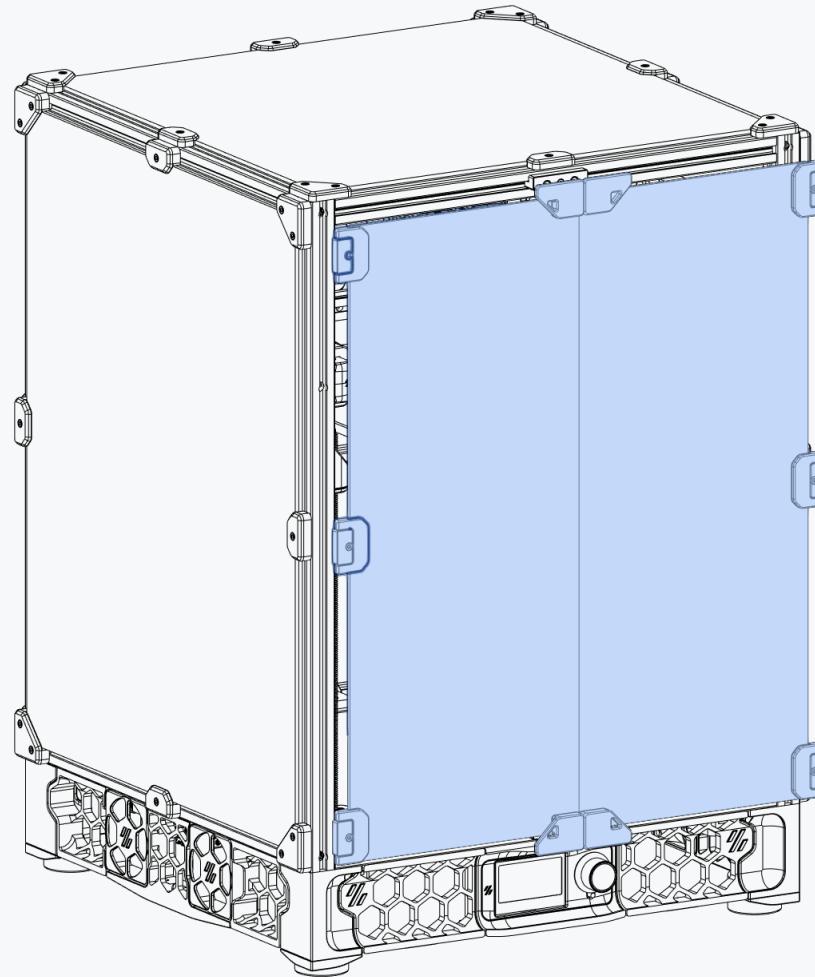


VHB Tape is a double sided adhesive tape.

**APPLY VHB TAPE**

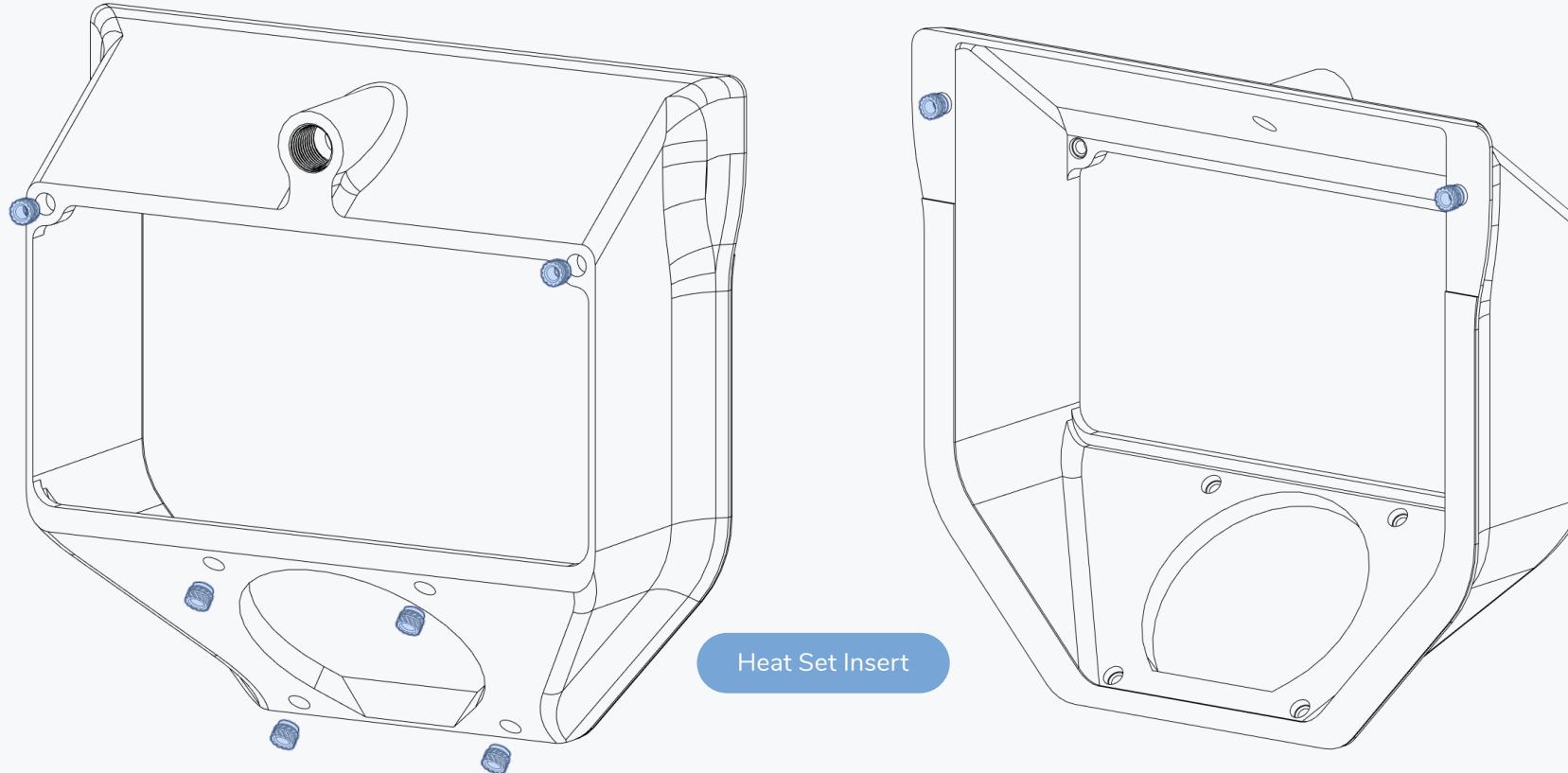
VHB Tape is a double sided adhesive tape.

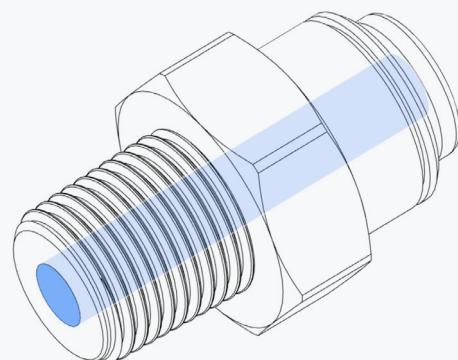




EXHAUST

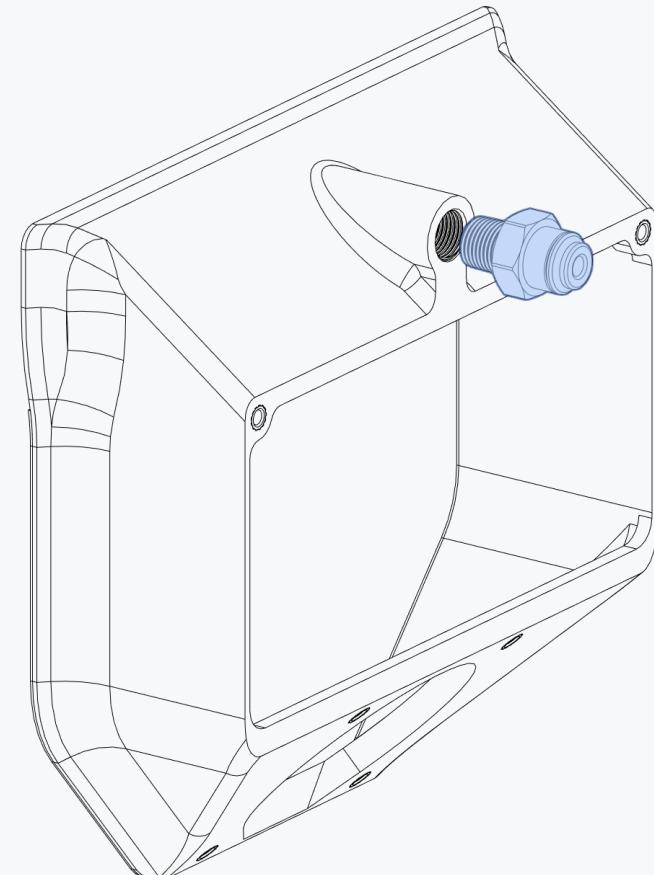
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**BSPP ADAPTER**

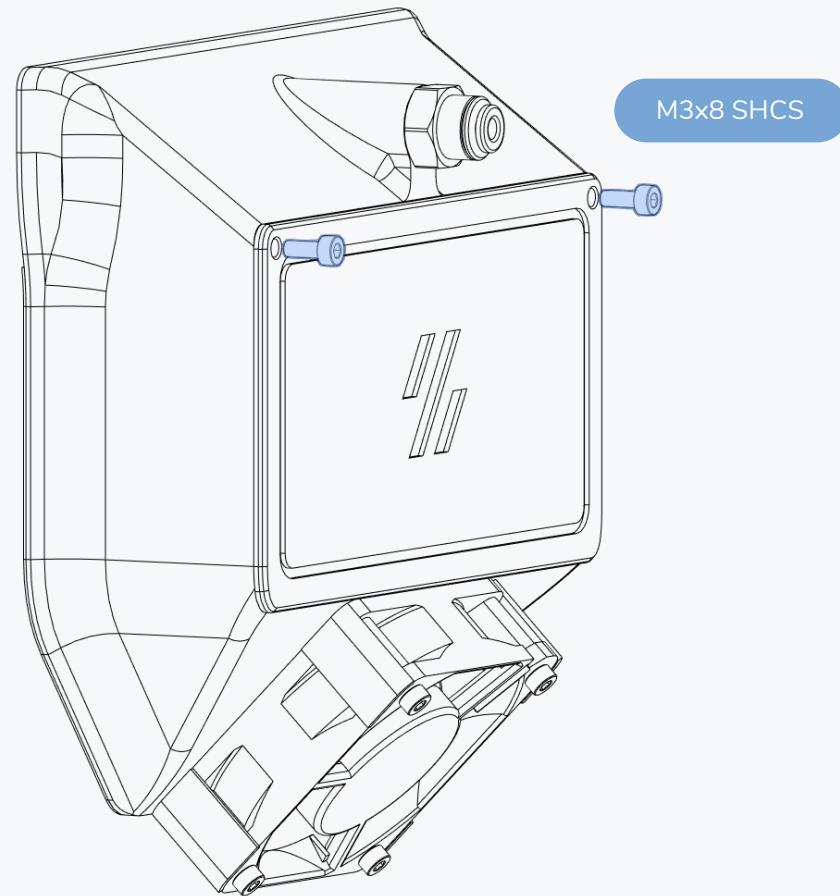
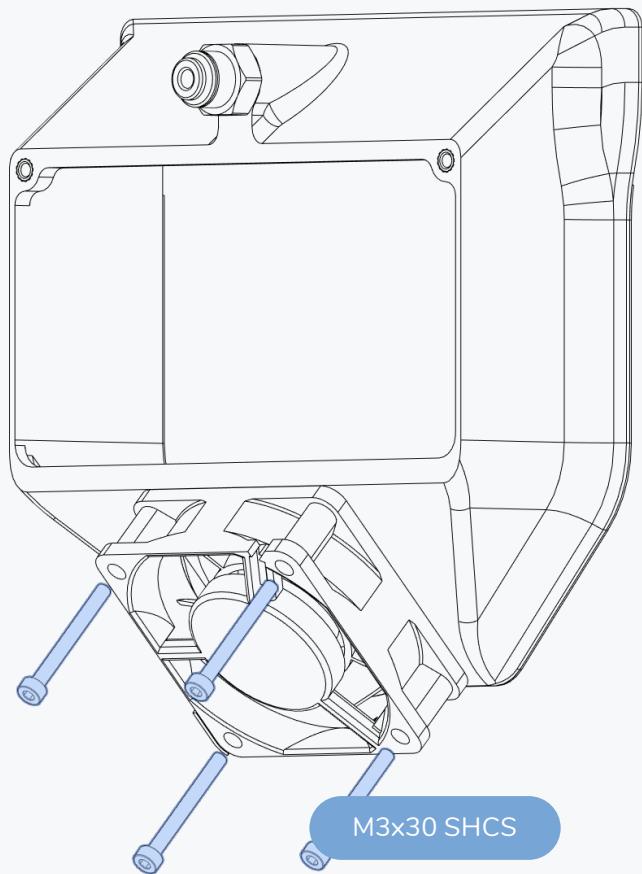
Some adapters have a small lip that prevents the PTFE tube from passing through.

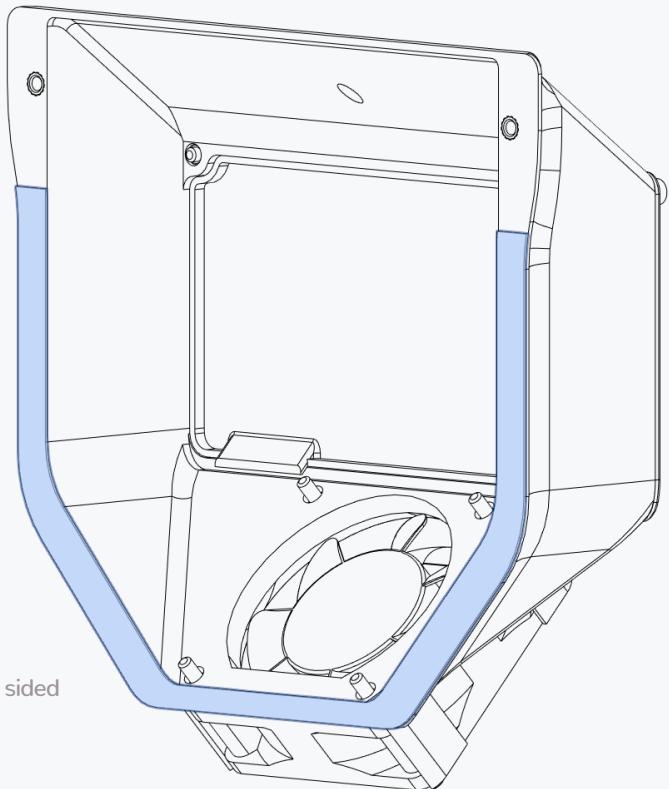
Inspect the adapter and if necessary use a drill to carefully remove the lip.



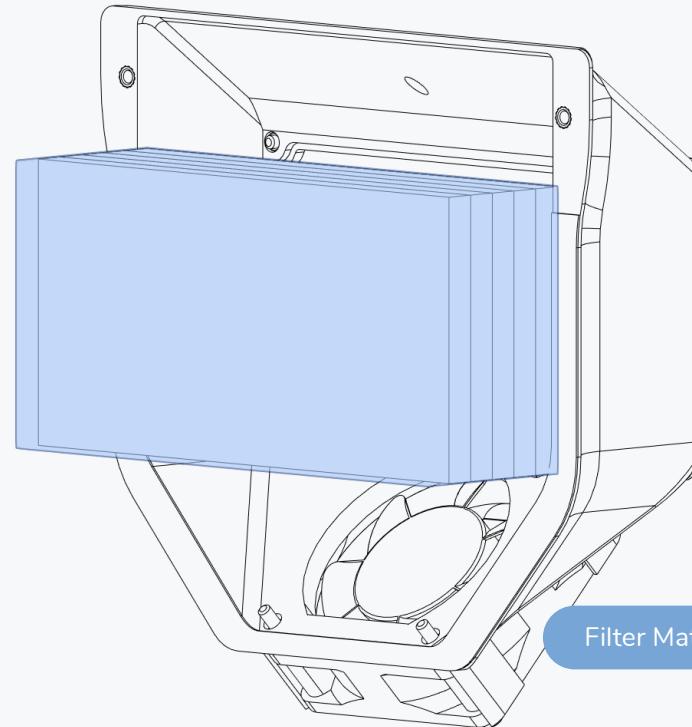
EXHAUST

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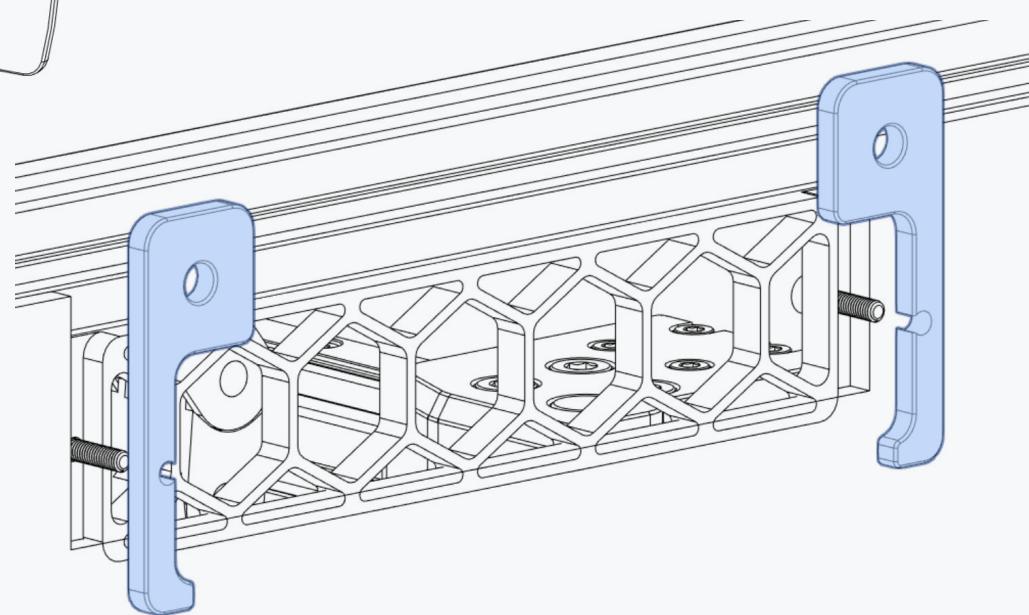
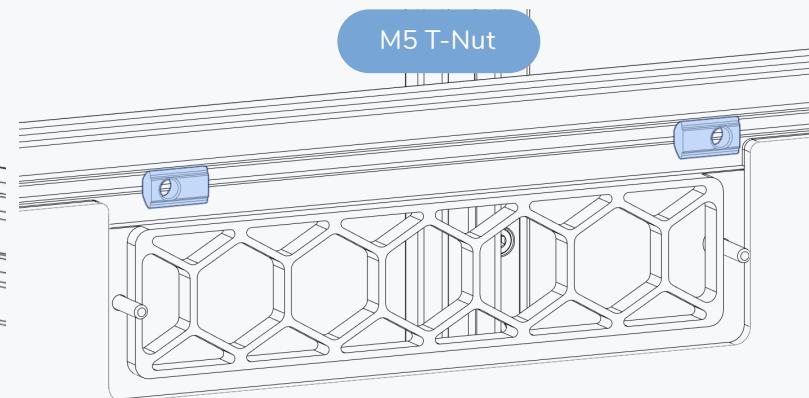
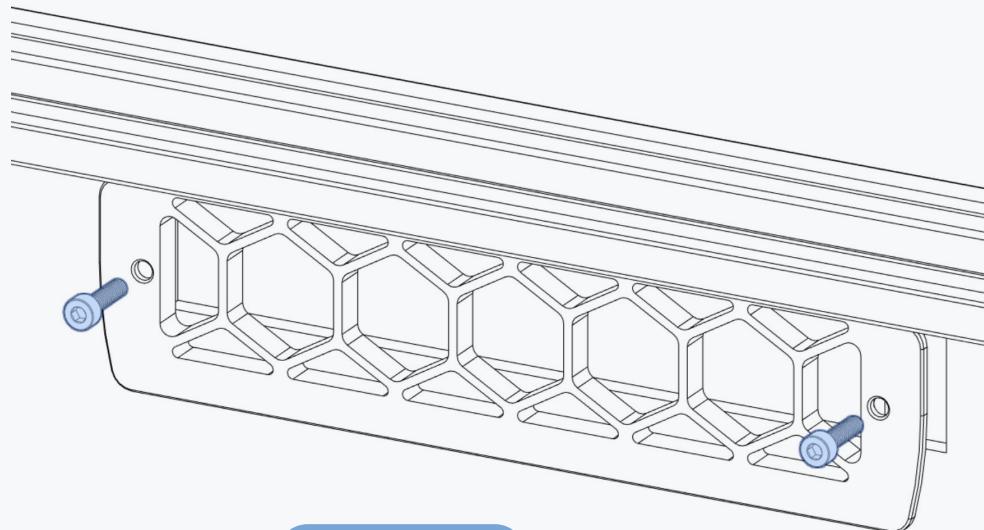
**APPLY VHB TAPE**

VHB Tape is a double sided adhesive tape.

**Filter Material**

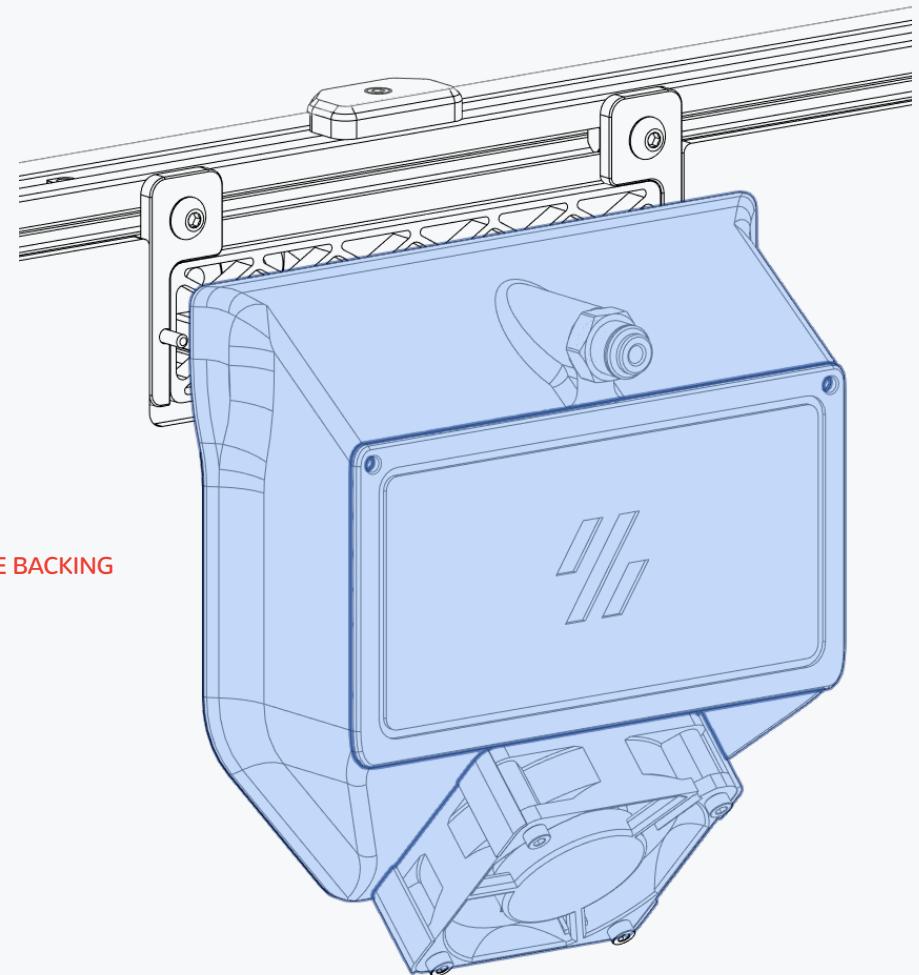
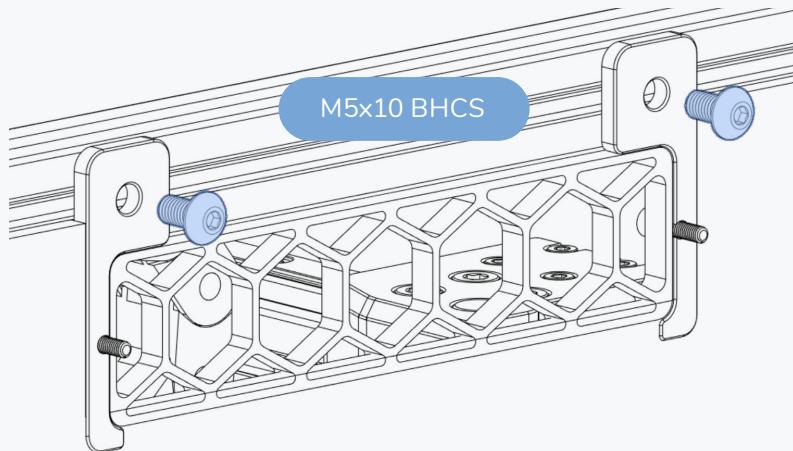
EXHAUST

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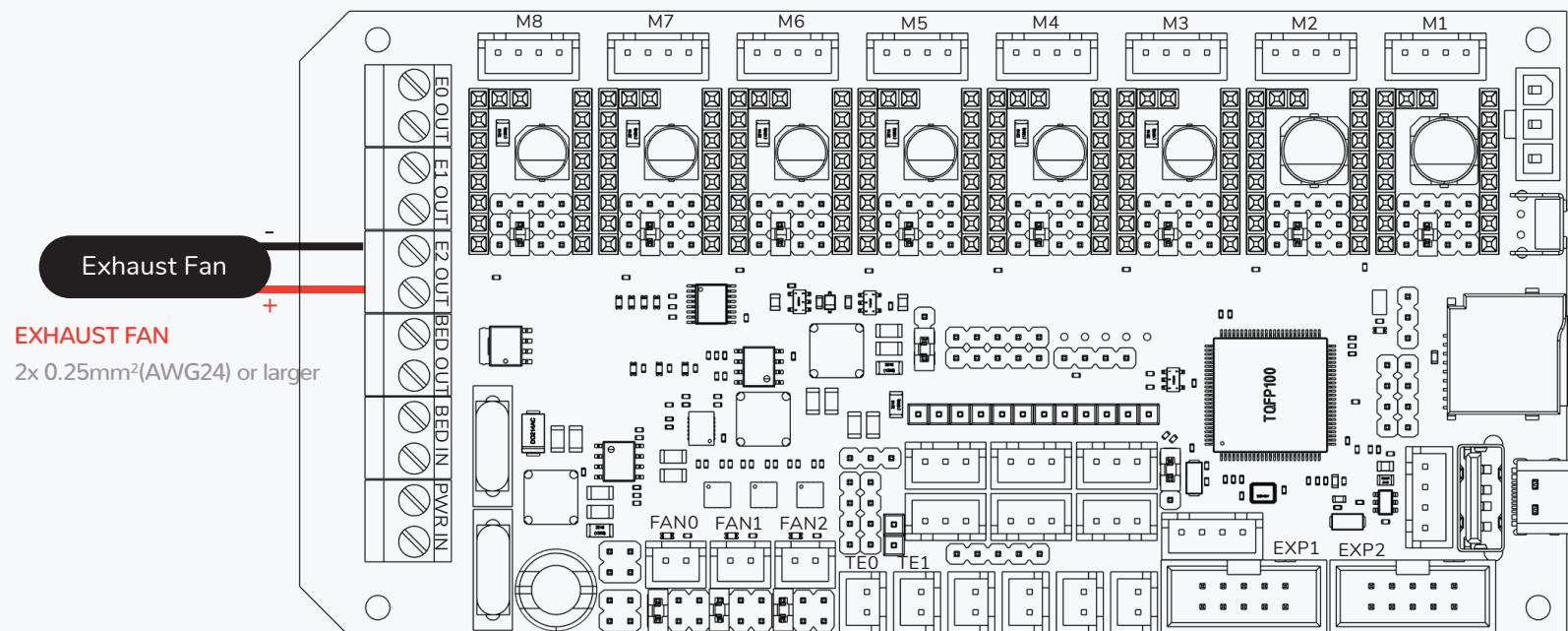


EXHAUST

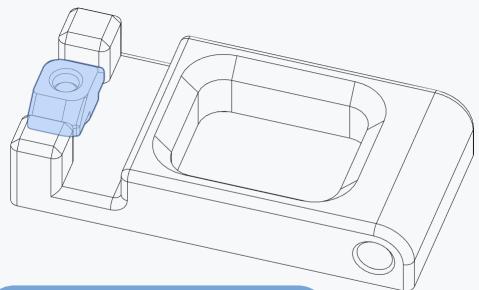
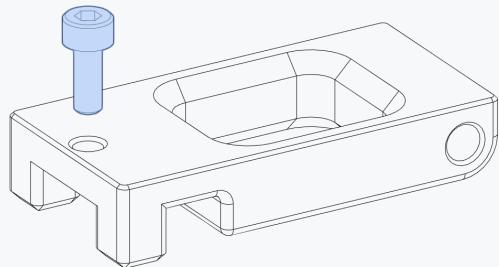
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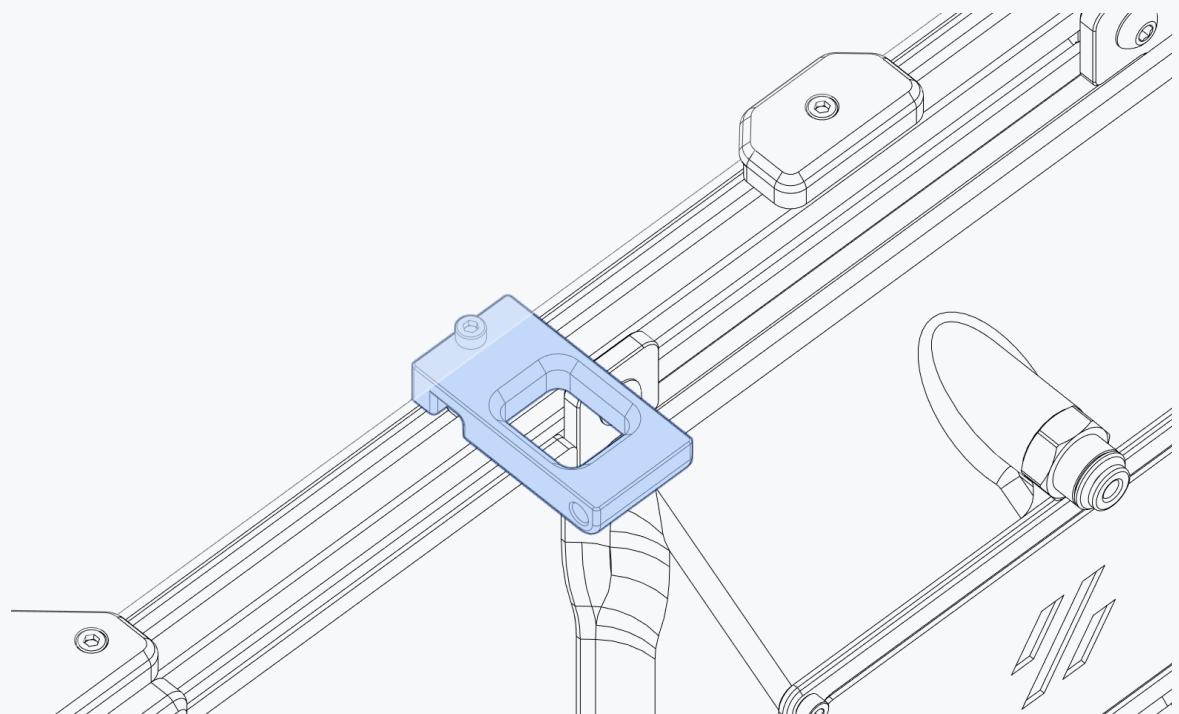
REMOVE TAPE BACKING



M3x8 SHCS

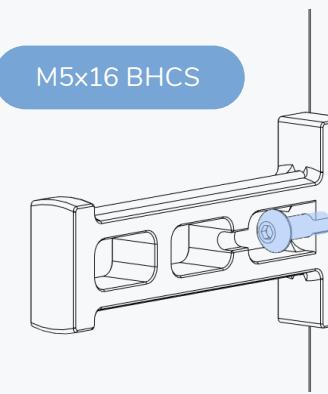
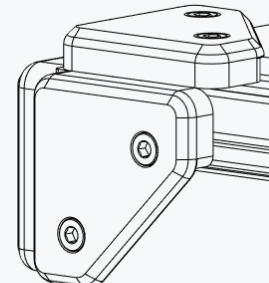
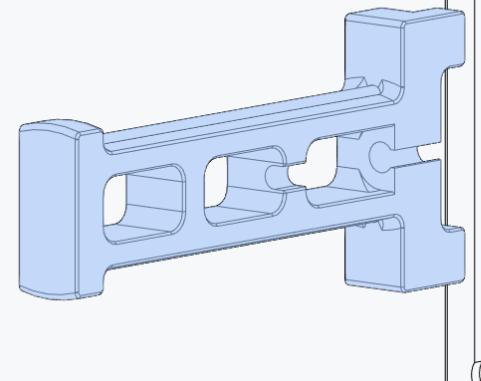
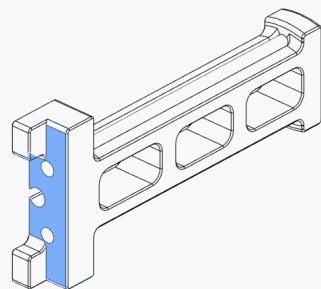
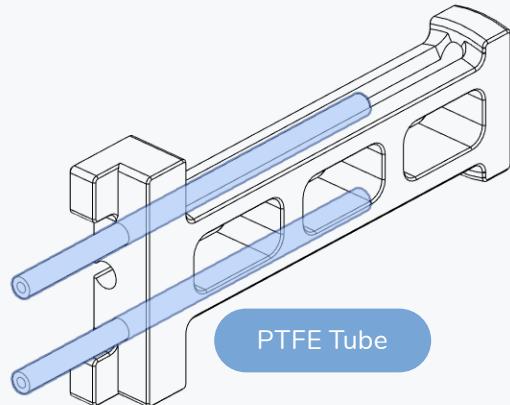


M3 Hammerhead Nut



SPOOL HOLDER

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**ASSEMBLY COMPLETED! ... NEXT STEP: SETUP & CALIBRATION**

This manual is designed to be a reference manual for the build process of a Voron2 printer. Additional details about the build and background on advanced topics can be found on our documentation page linked below.

The software setup and other initial setup steps with your new printer can also be found on our documentation page. We recommend starting [here](#).



<https://docs.vorondesign.com/>



<https://github.com/VoronDesign/Voron-Trident>

#### HOW TO GET HELP

If you need assistance with your build, we're here to help. Head on over to our Discord group and post your questions. This is our primary medium to help VORON Users and we have a great community that can help you out if you get stuck. Alternatively, you can use our subreddit.



<https://discord.gg/voron>



<https://www.reddit.com/r/VORONDesign>

#### REPORTING ISSUES

Should you find an issue in this document or have a suggestion for an improvement please consider opening an issue on GitHub (<https://github.com/VoronDesign/Voron-Trident/issues>).

When raising an issue please include the relevant page numbers and a short description; annotated screenshots are also very welcome.

We periodically update the manual based on the feedback we get.

There are some easter eggs hidding in this document. You might not spot them on a cursory glance.



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**Website**  
[www.vorondesign.com](http://www.vorondesign.com)

**Github**  
[github.com/vorondesign](https://github.com/vorondesign)

**Docs**  
[docs.vorondesign.com](https://docs.vorondesign.com)

**Discord**  
[discord.gg/voron](https://discord.gg/voron)

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