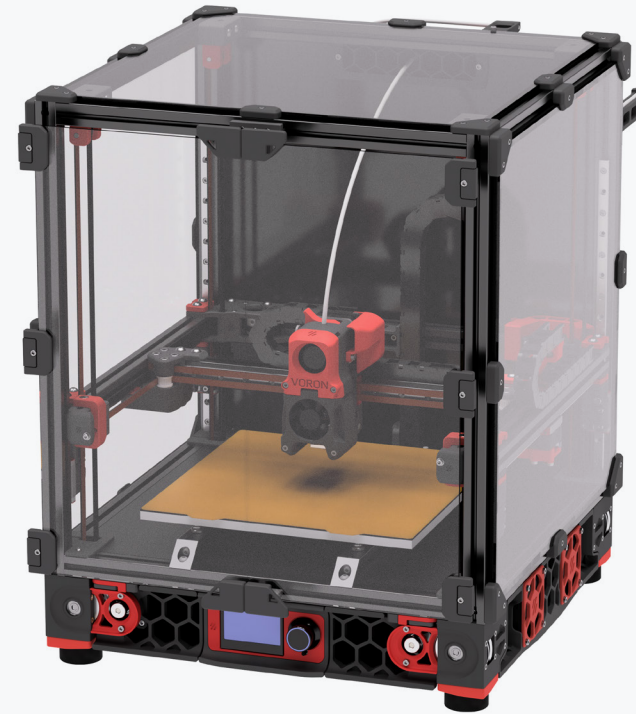




VORON2 2.4R2 BUILD GUIDE

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

Based on VERSION 2022-07-04, For Lecktor.com Kit



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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REPORTING ISSUES

Should you have any issues or have any ideas for improvements, please let Lecktor.com know about in Discord or Email. This manual is based on Voron V.2.4R2 but has been modified to streamline assembly of the kit we sell.

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.

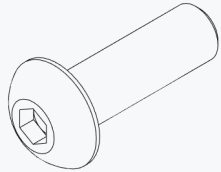


<https://github.com/vorondesign>
<https://github.com/lecktor/Voron-V2.4>

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

HARDWARE REFERENCE

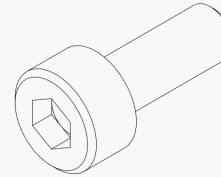
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BUTTON HEAD CAP SCREW (BHCS)

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 SCREW (SHCS)

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

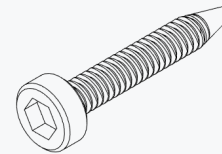
ISO 4762



FLAT HEAD COUNTERSUNK SCREW (FHCS)

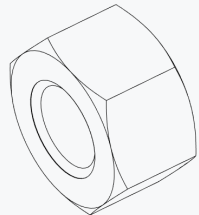
Metric fastener with a cone shaped head and a flat top.

ISO 10642



SELF TAPPING SCREW

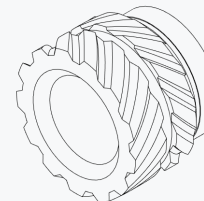
Fastener with a pronounced thread profile that is screwed directly into plastic.



HEX NUT

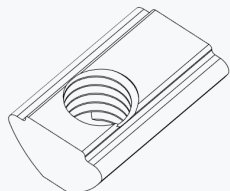
Hex nuts couple with bolts to create a tight, secure joint. You'll see these used in both M3 and M5 variants throughout this guide.

ISO 4032



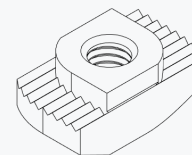
HEAT SET INSERT

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".

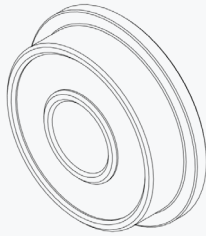


HAMMERHEAD NUT

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

WWW.VORONDESIGN.COM



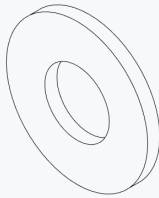
F695 BEARING

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



625 BEARING

A ball bearing used on the Voron Z drives.



SHIM

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

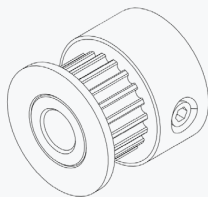
DIN 988



WASHER

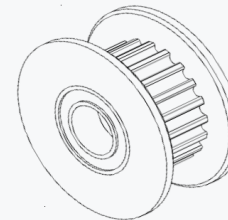
Usually stamped from sheet metal this type of spacer is not as consistent in thickness as the shims are. Only used in M3 size.

DIN 125



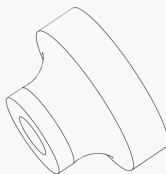
PULLEY

GT2 pulley used on the motion system of the Voron.



IDLER

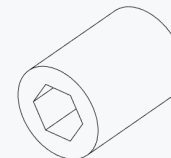
GT2 idler used in the motion system of the Voron.



THUMB NUT

Used in the print bed as a spacer.

DIN 466-B



SET SCREW

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

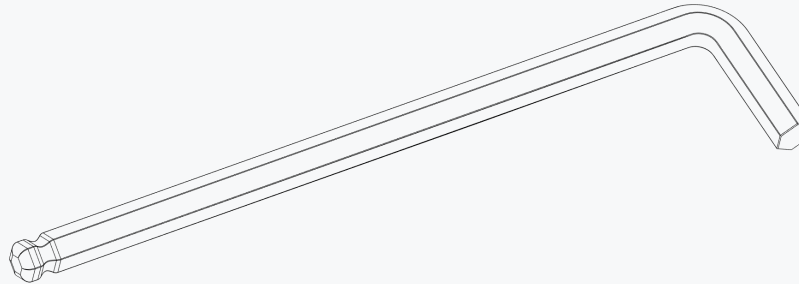
ISO 4026

INTRODUCTION

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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.



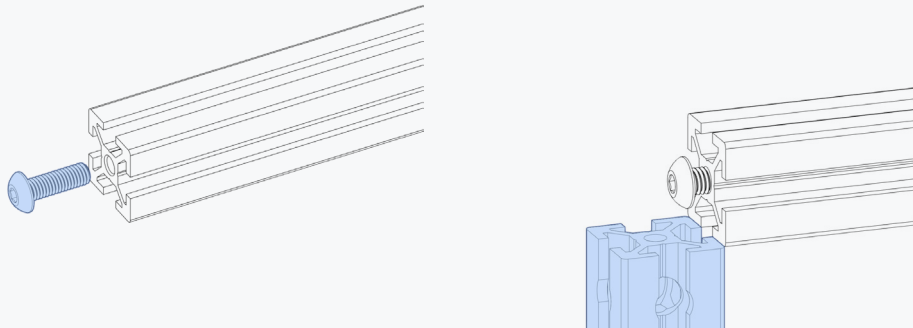
2.5MM HEX DRIVER

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 and switch to the "Voron Tools" tab at the bottom of the page.

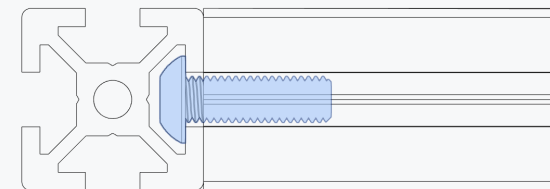
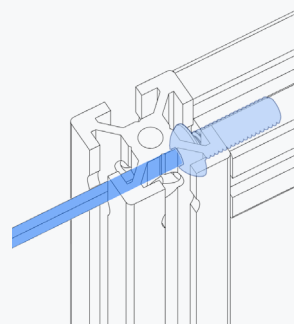


BLIND JOINT BASICS

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.

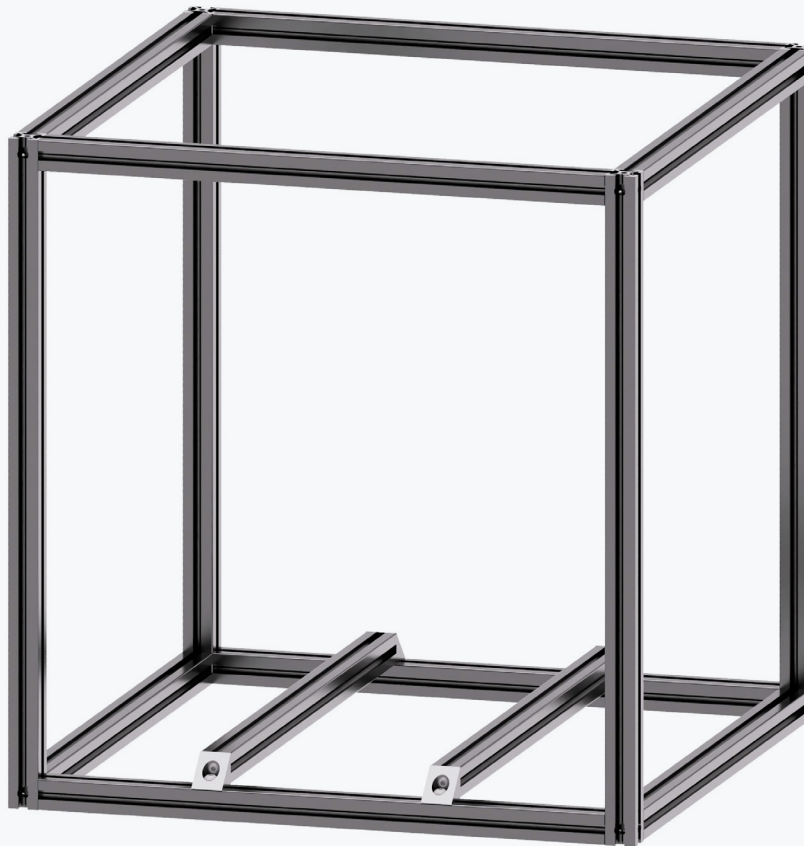


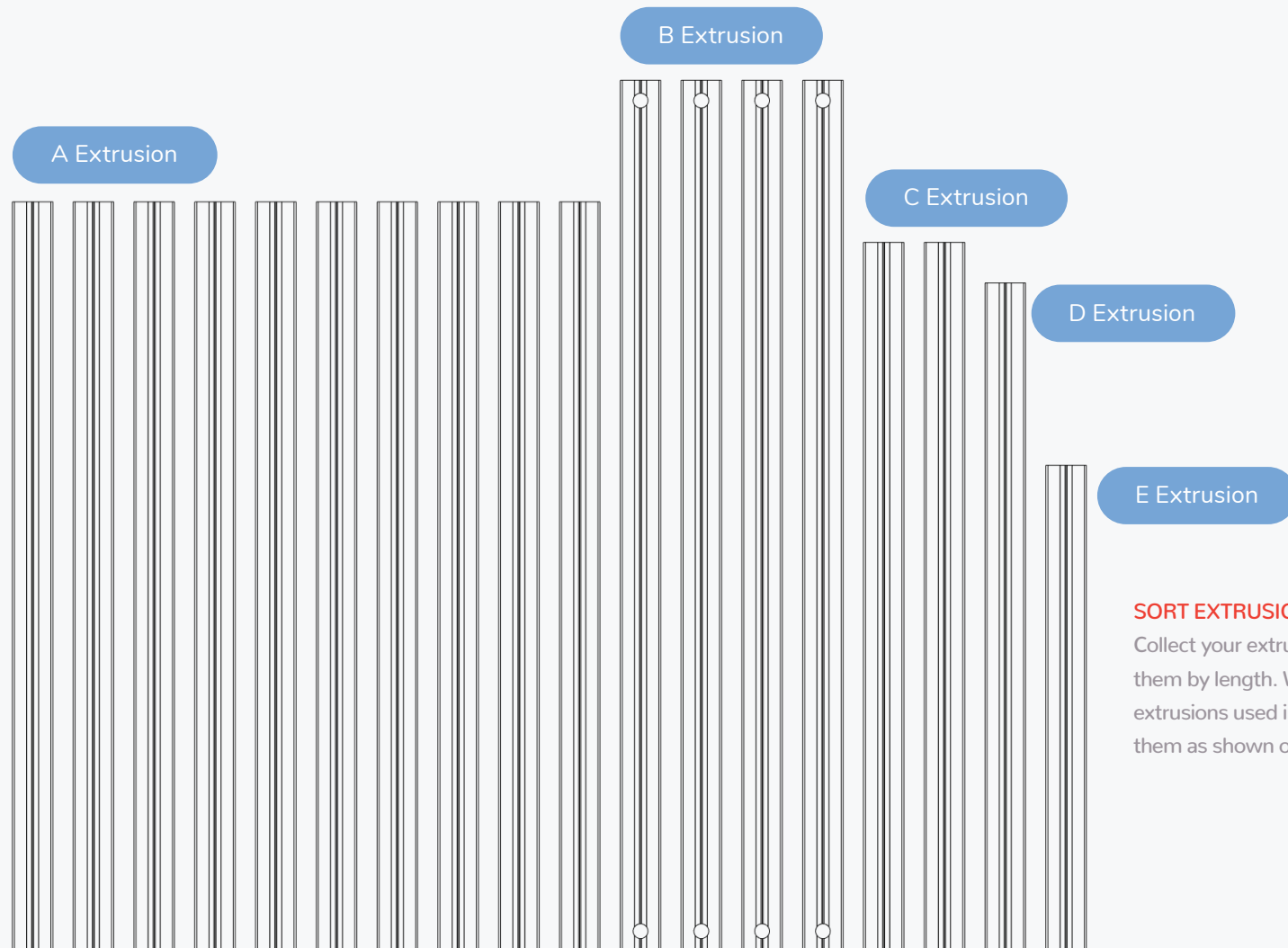
<https://voron.link/onjwmc>

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

FRAME

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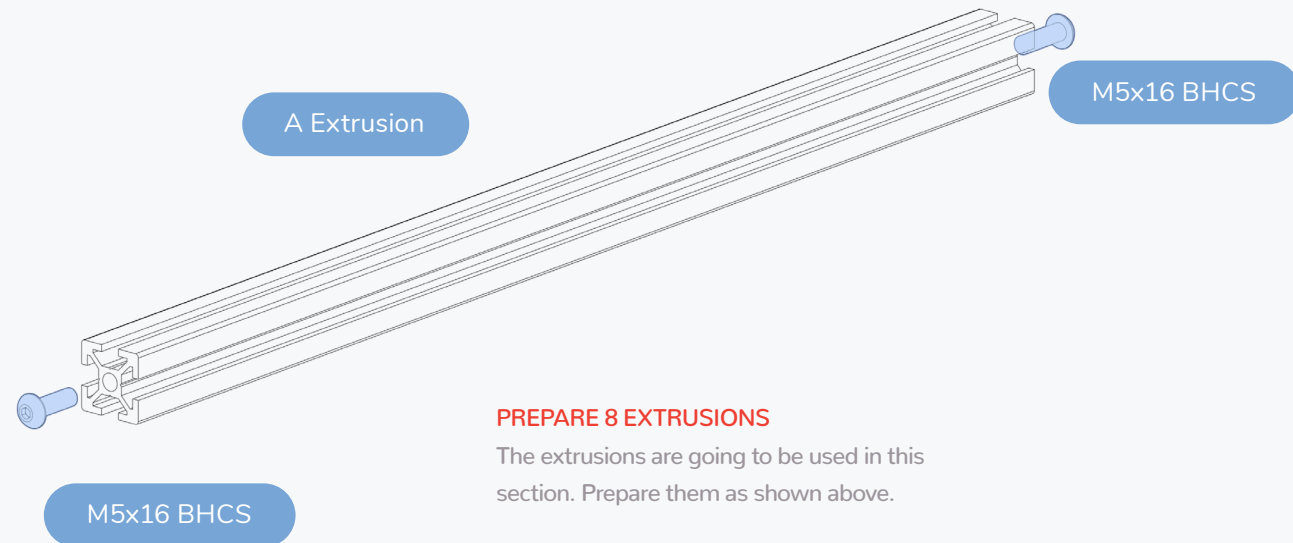
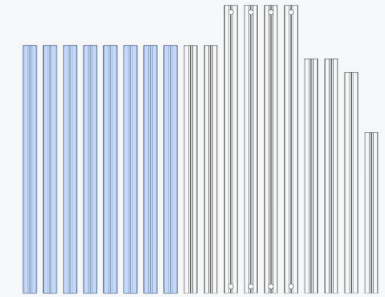


SORT EXTRUSIONS

Collect your extrusions and sort them by length. We will highlight the extrusions used in each step and label them as shown on this page.

FRAME

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PREPARE 8 EXTRUSIONS

The extrusions are going to be used in this section. Prepare them as shown above.

FRAME

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FRAME ASSEMBLY

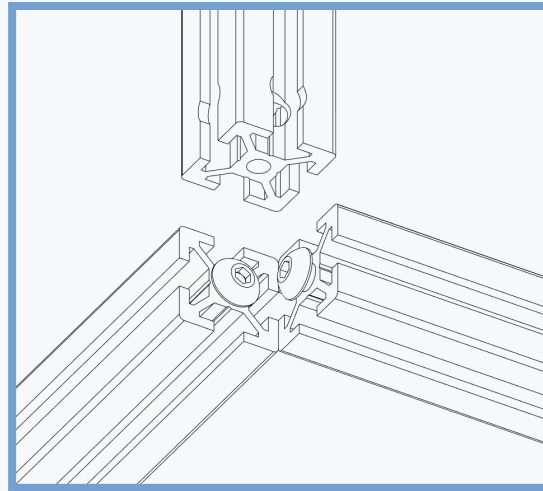
This design relies on blind joints to assemble the frame. We outlined the basics of blind joints on page 10.

More tips on how to assemble a frame are linked below.

B Extrusion



<https://voron.link/kdtpzam>

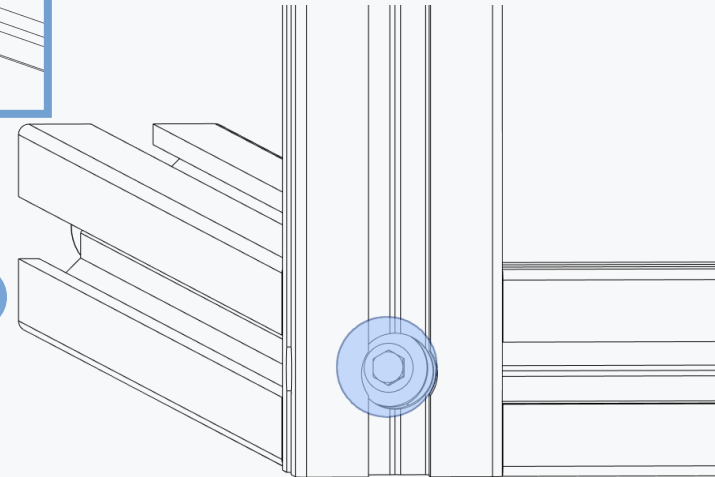
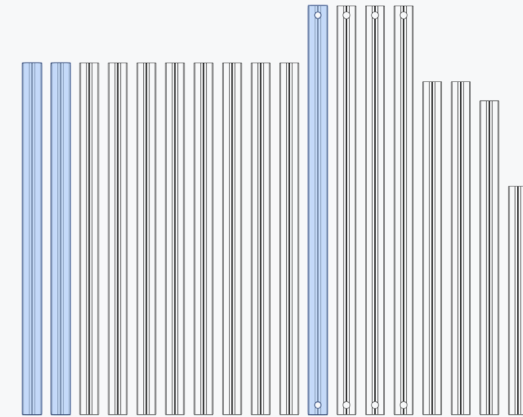


A Extrusion

A Extrusion

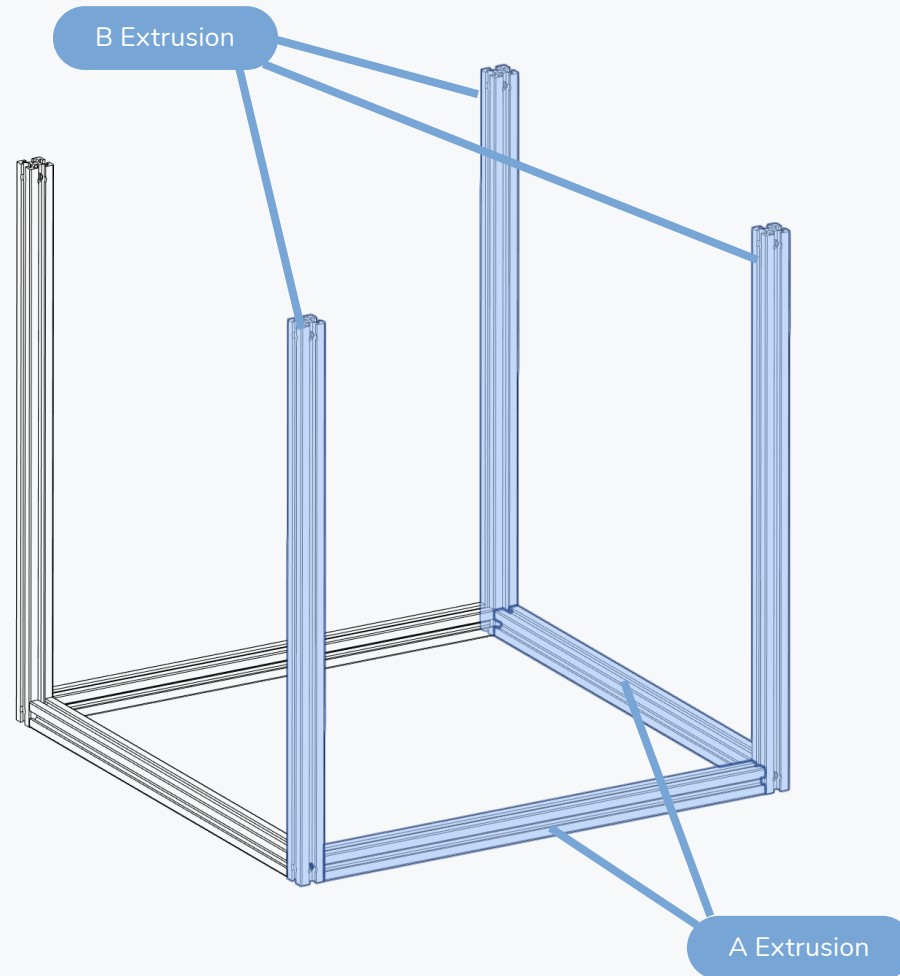
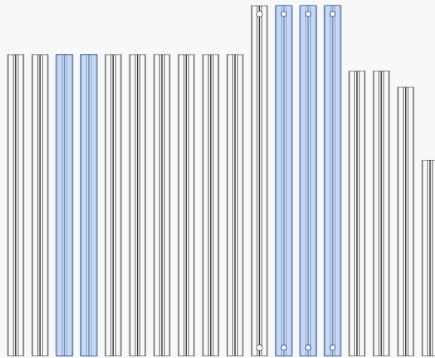
BUILD ON A FLAT SURFACE

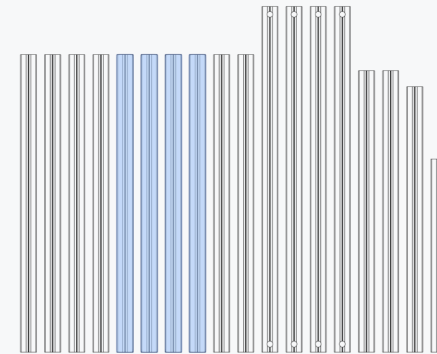
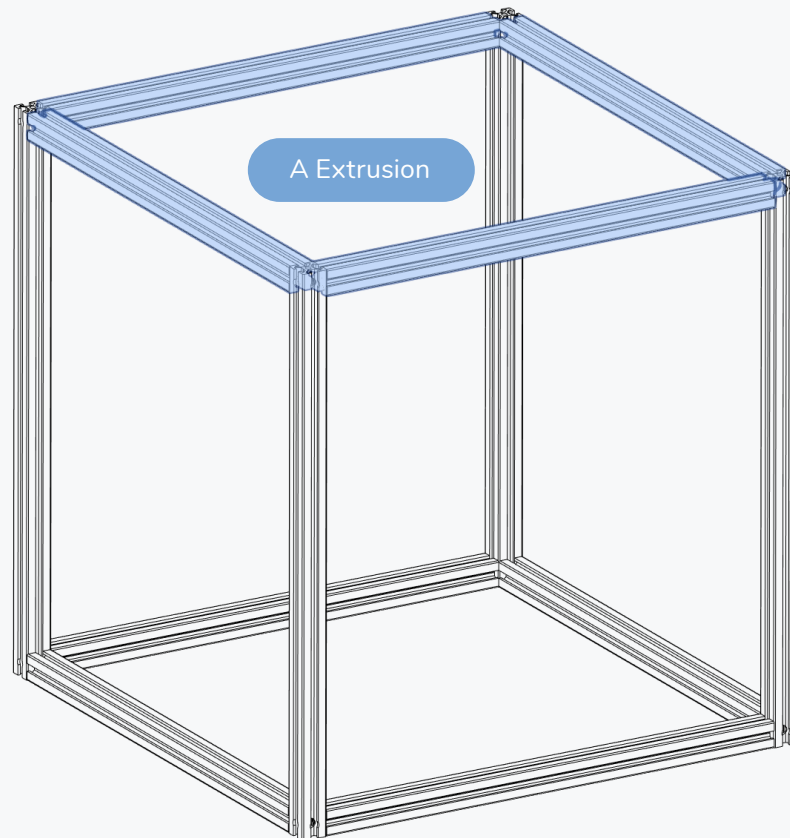
Build the frame on a glass or granite surface to ensure you can get it as square as possible.

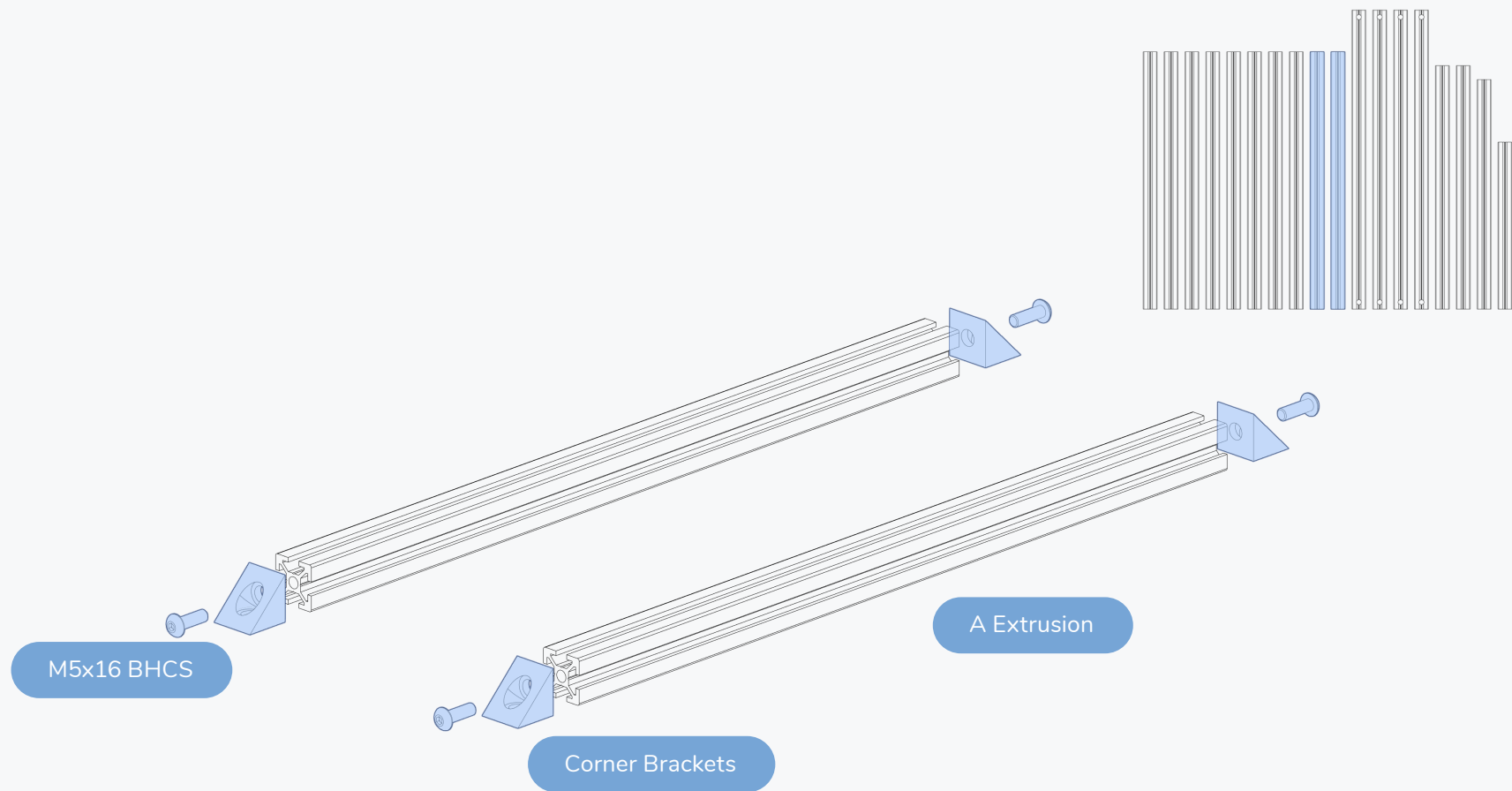


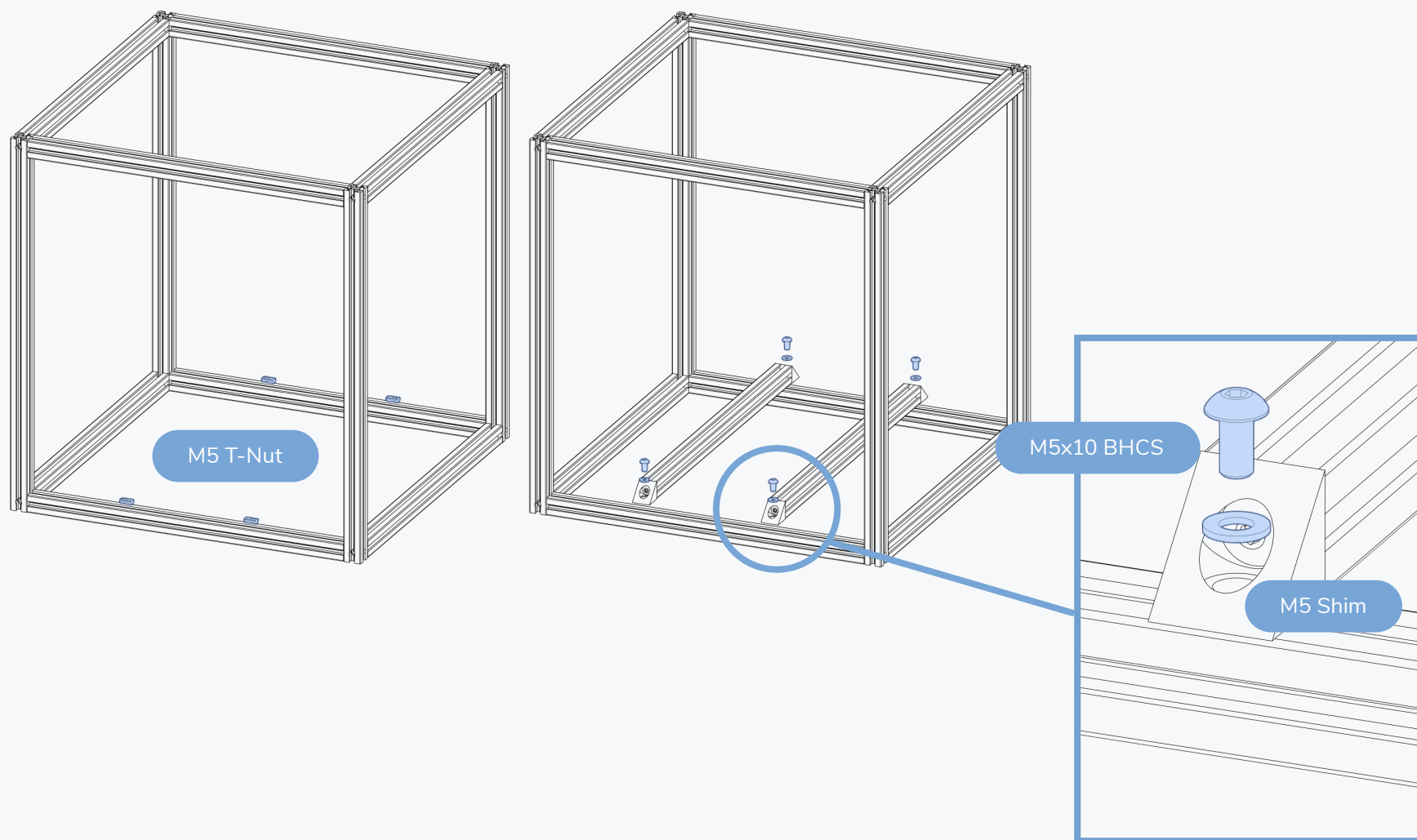
FRAME

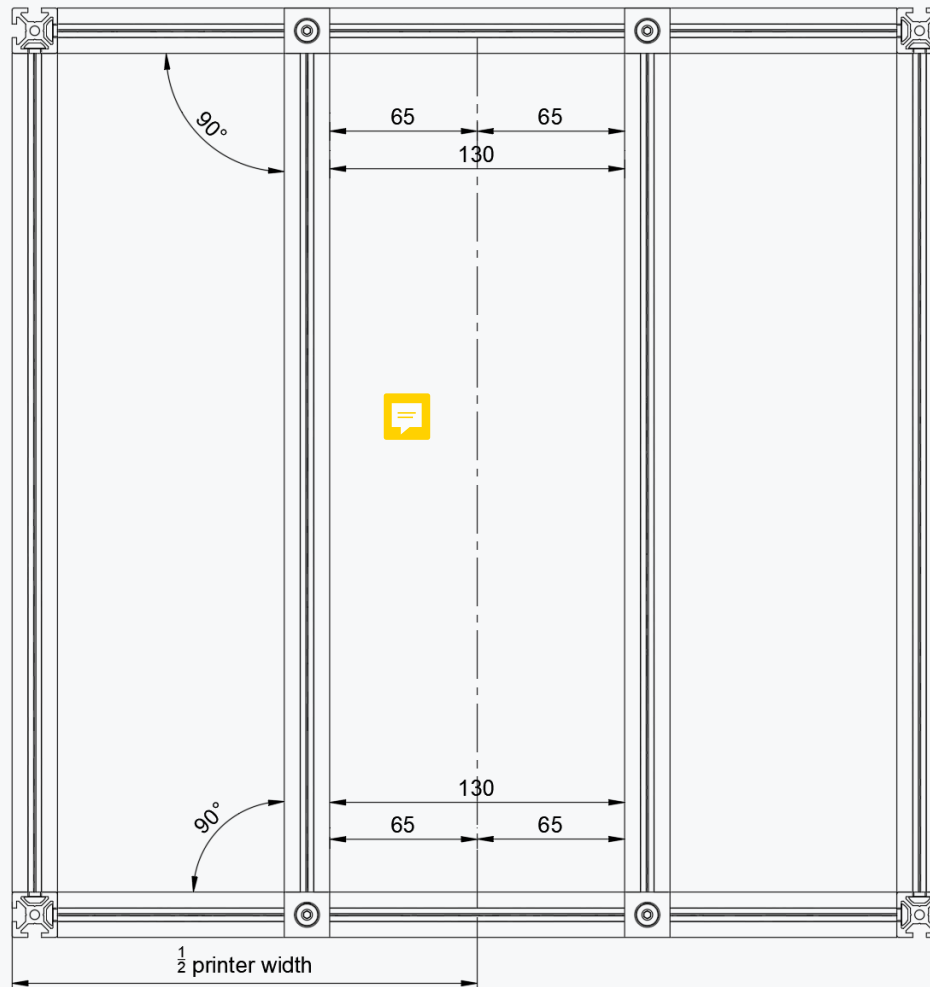
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**POSITION BED EXTRUSIONS**

Find the centreline of the printer and position the bed extrusions as shown in the diagram to the left. The distance between the extrusions is 130mm centred on the centreline of the printer.

1/2 printer width for standard sizes:

250 spec 205mm

300 spec 230mm

350 spec 255mm

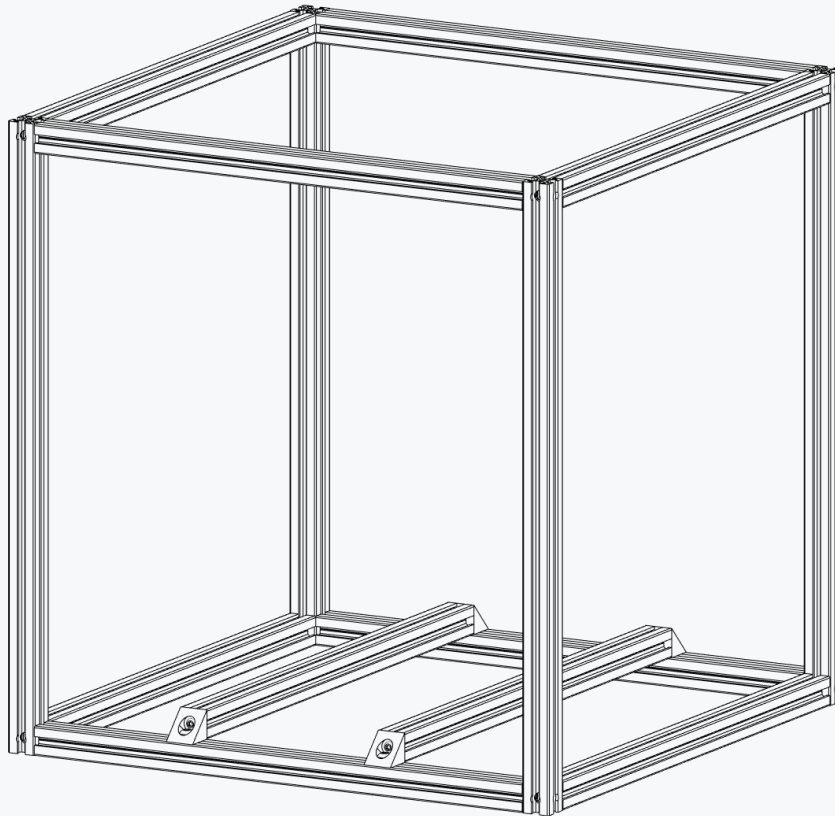
ALL UNITS ARE METRIC

If a unit is not specified
assume it's metric.

All distances are called out in
millimeters.

FRAME

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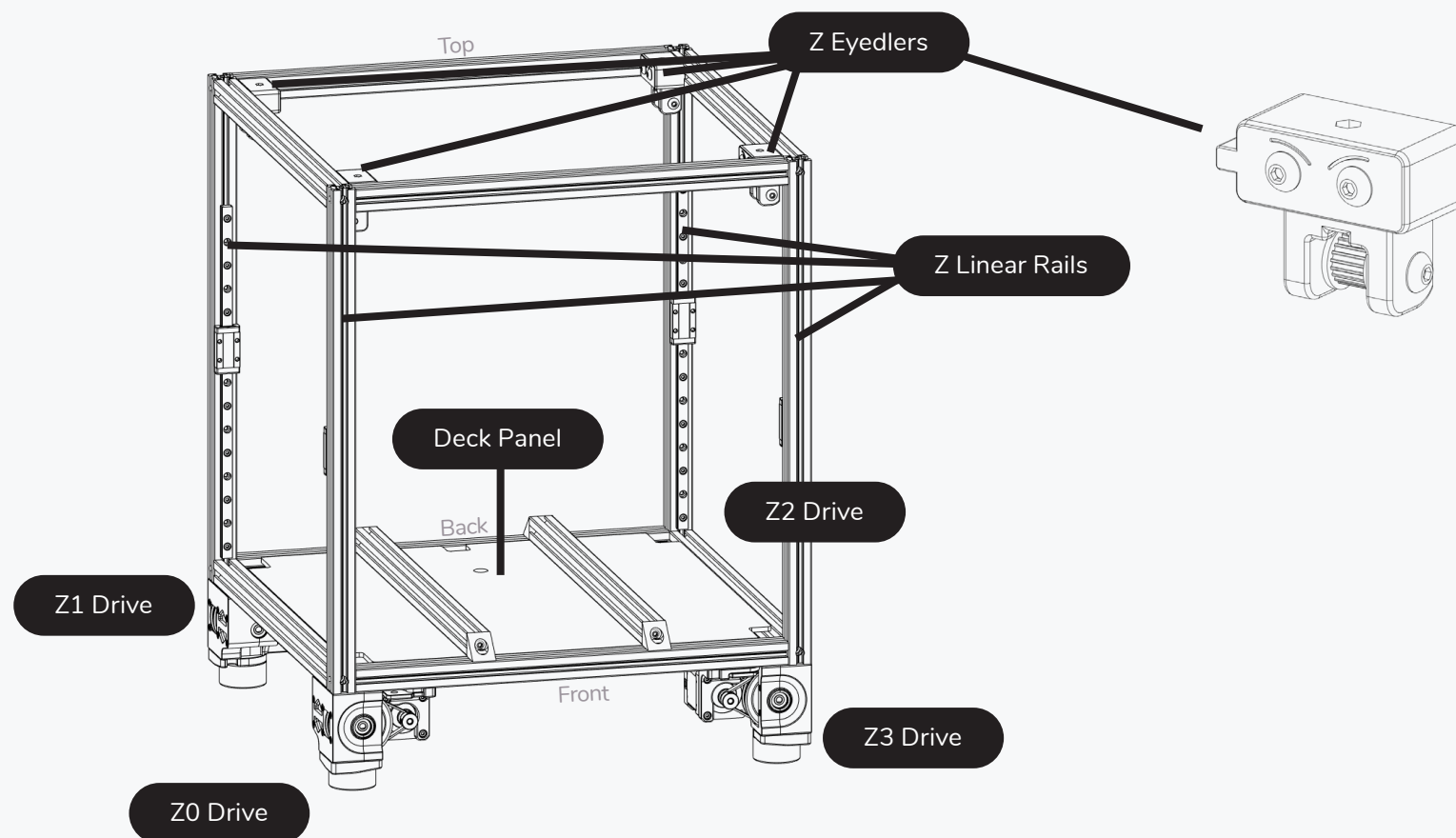
CHECK FOR SQUARENESS

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>

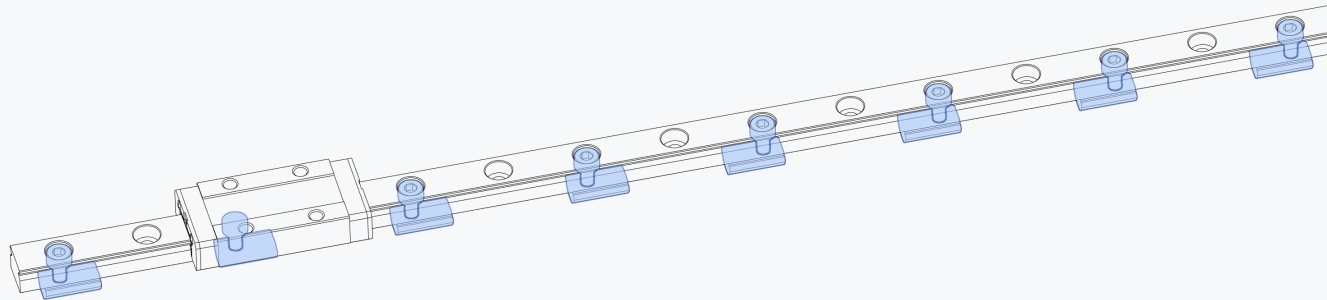


**OVERVIEW**

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

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.

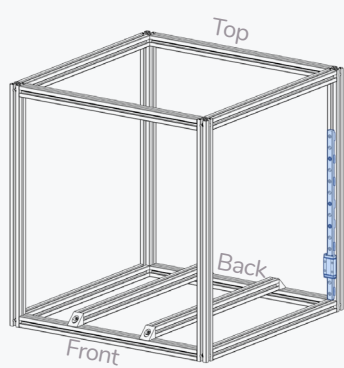
When tightening the bolts tighten them from the center outward to ensure that the rail sits flush on the extrusion.



<https://voron.link/agu0nes>

Z RAILS

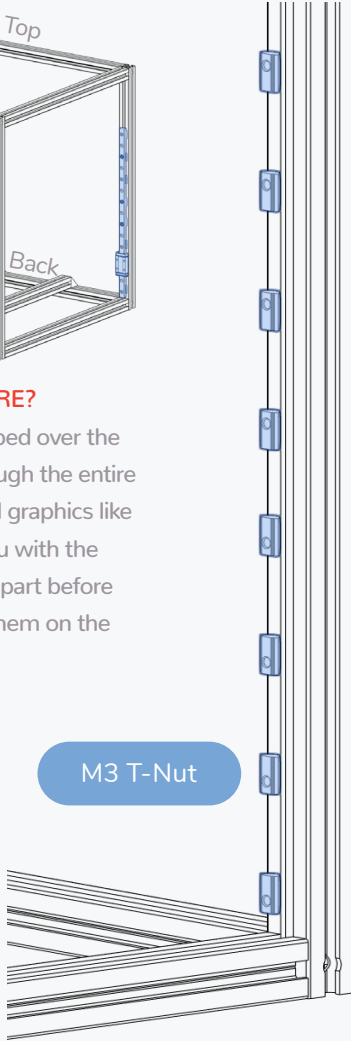
WWW.VORONDESIGN.COM



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.

M3 T-Nut



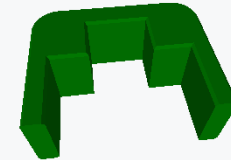
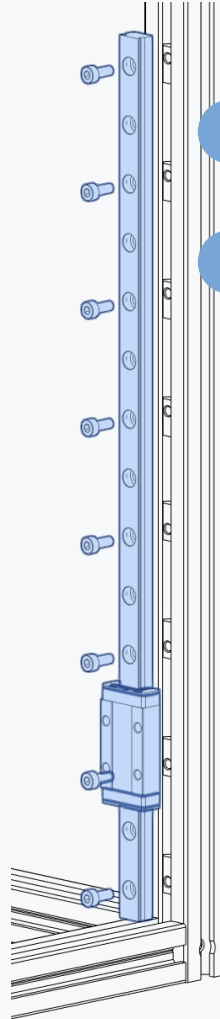
MGN9 Rail

M3x8 SHCS

MIND THE CARRIAGE

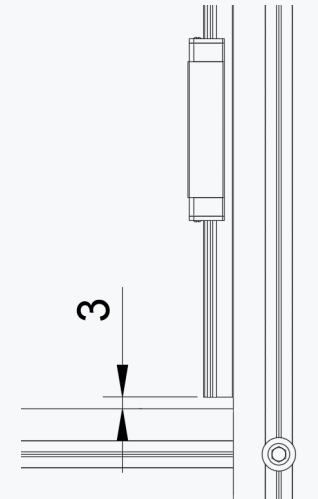
The carriages are designed to slide along the rail easily. This unfortunately also includes sliding off the rails.

Dropping the carriage will likely damage it.



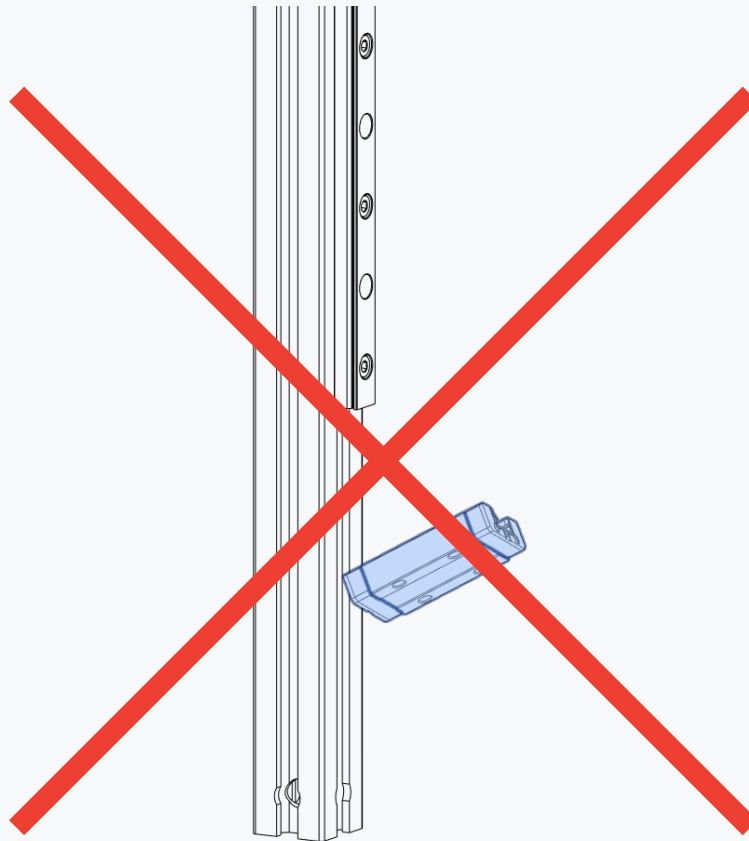
CENTRED RAIL INSTALLATION GUIDE

Use the MGN9 guides to position the rail in the center of the extrusion prior to fastening the screws.



BOTTOM GAP

Leave a gap between the printer frame and the rail. ~3mm is fine.

**RAIL SAFETY**

As we will turn the printer upside down during further assembly make sure to fix each carriage in position with a piece of sticky tape.

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..

For illustration purposes only. Do not attempt to replicate.

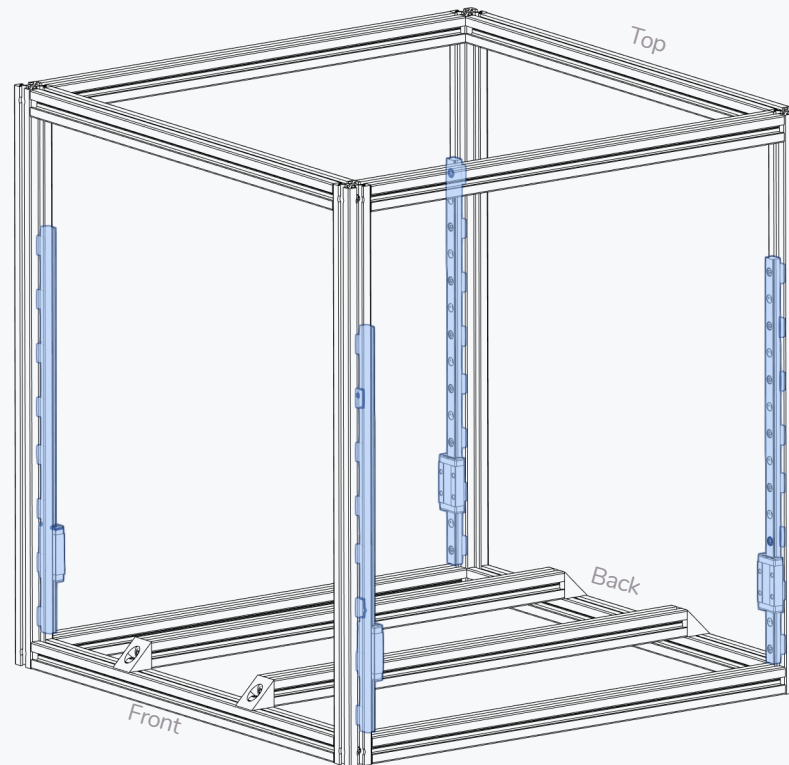
Z RAILS

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INSTALL REMAINING Z RAILS

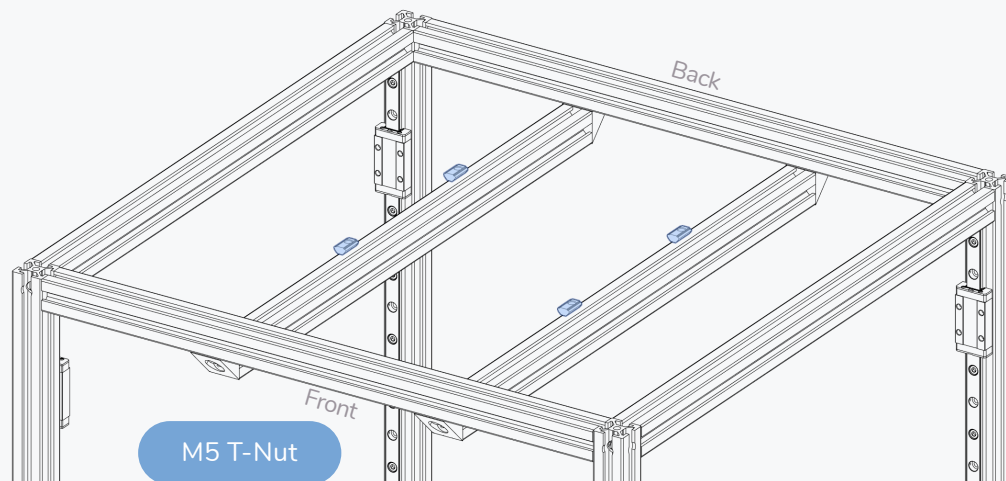
Add the remaining Z rails following the same instructions.

Make sure the rails face each other as shown in the graphic.



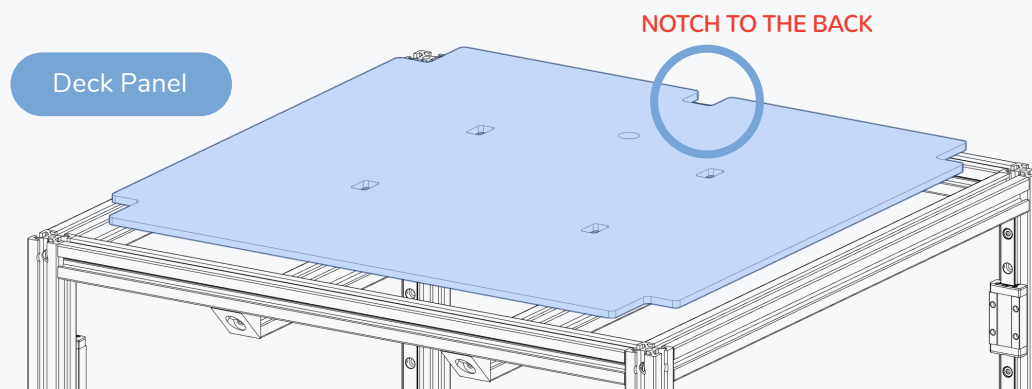
DECK PANEL

WWW.VORONDESIGN.COM



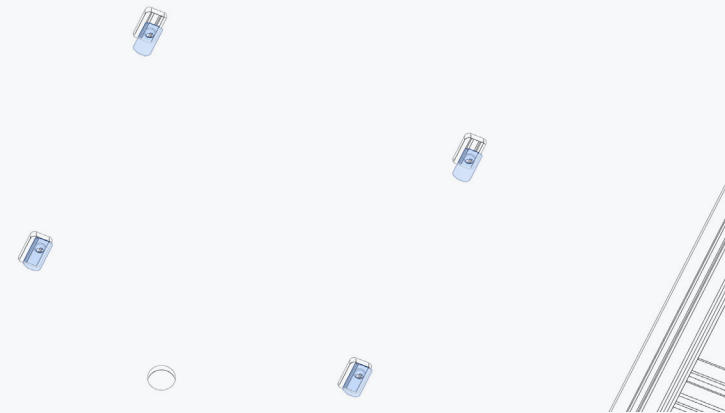
FLIP PRINTER UPSIDE DOWN

It's easier working with gravity than against it. But make sure the rail carriages are secure before doing so.



DECK PANEL

WWW.VORONDESIGN.COM

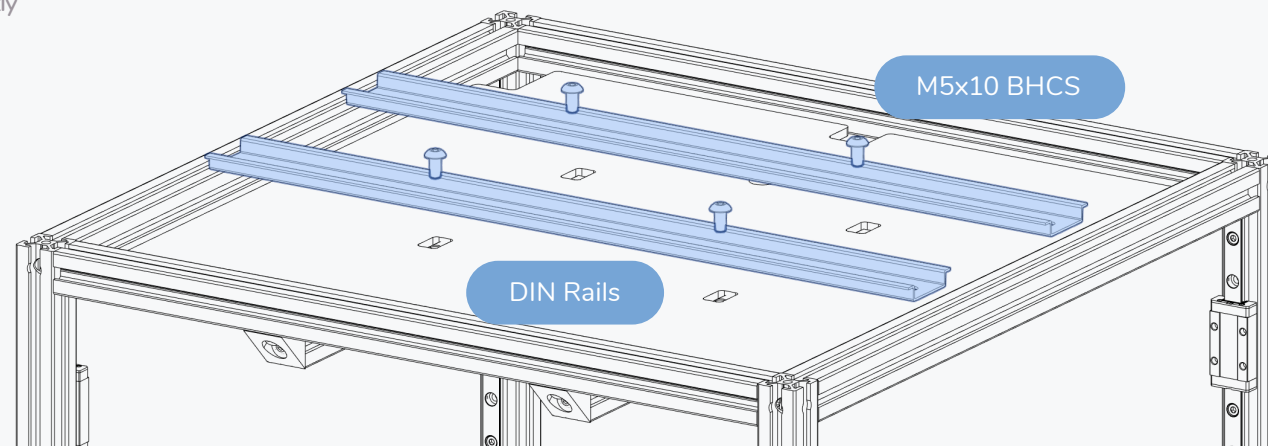


ALIGN T-NUTS WITH HOLES

Position the 4 T-nuts so they are directly below the 4 holes in the deck panel.

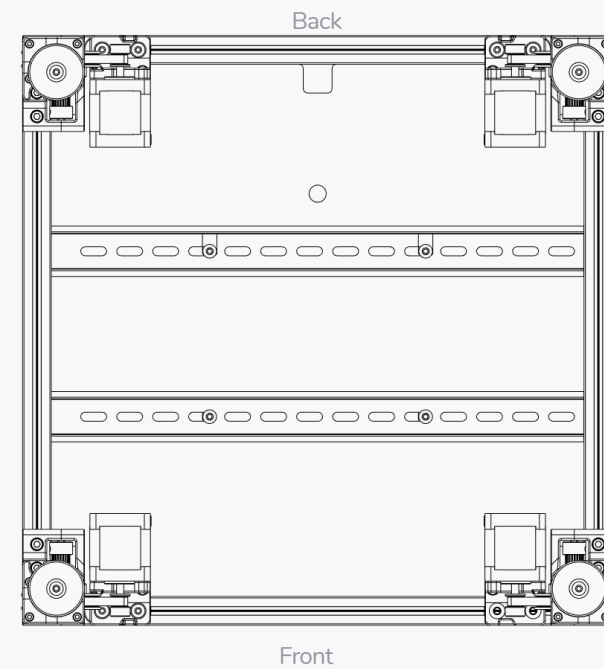
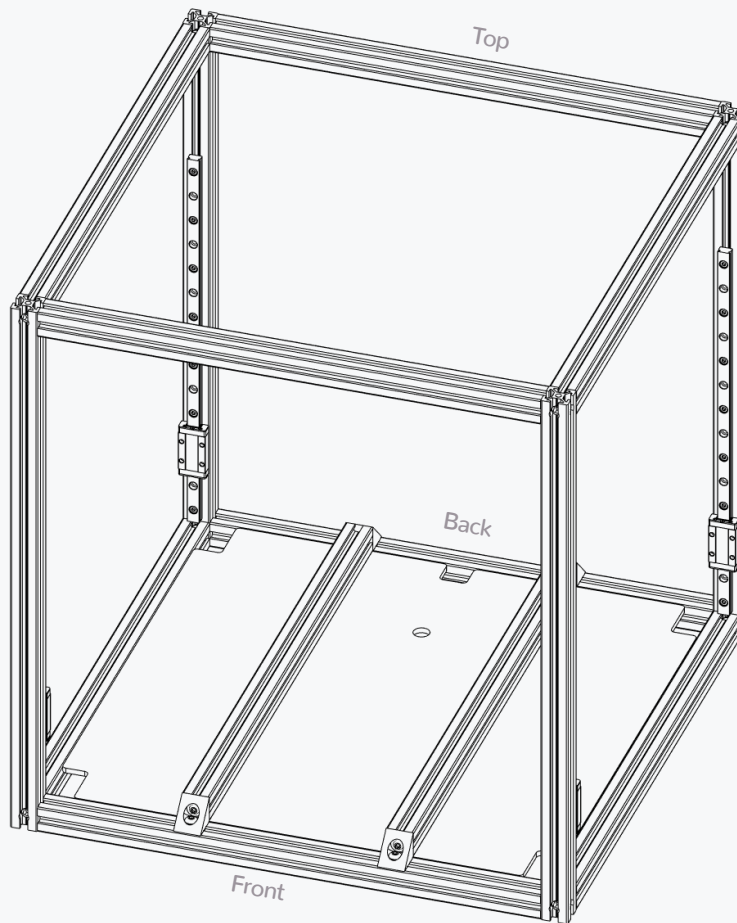
DIN RAIL SLOTS

If the slots in the rails do not line up with the t-nut you can shorten the DIN rails by a few mm.



ORIENTATION

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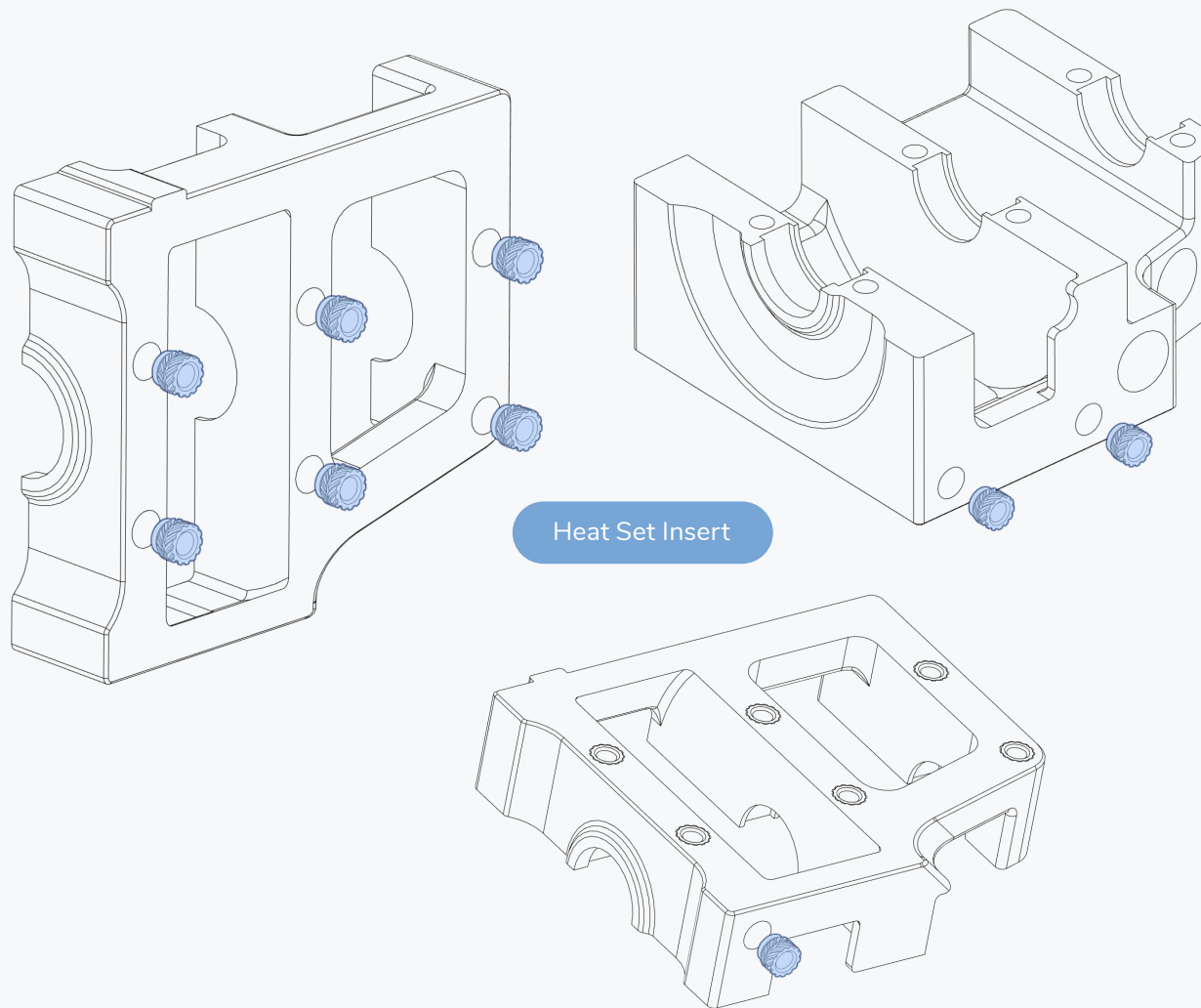


PRINTER ORIENTATION

We regularly insert graphics like the ones above to help you along the build process. The sides are labeled to make it easier to keep track.

PREPARATION

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HEAT SET INSERTS

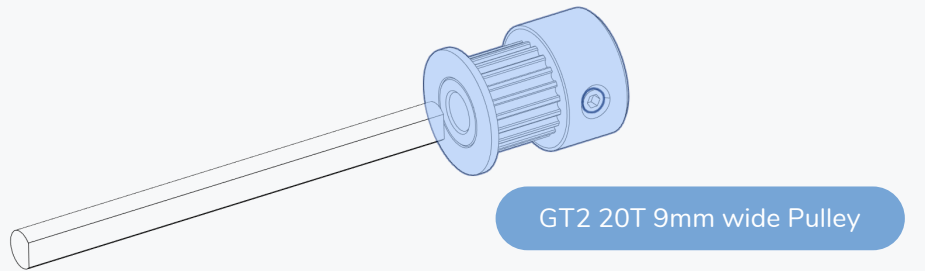
This design relies heavily on heat set inserts. Make sure you have the proper inserts (check the hardware reference for a close up picture and the BOM for dimensions).

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



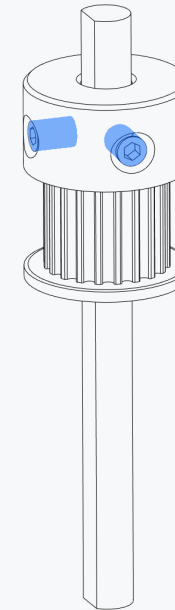
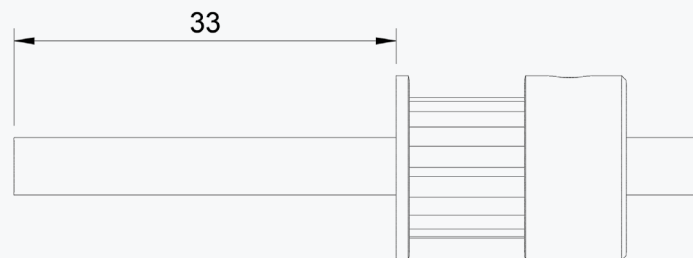
<https://voron.link/m5ybt4d>

COMPLETED



POSITION AS SHOWN

Make sure one of the set screws is oriented with the D cut, as shown in the image.



SET SCREWS

AKA THE ROOT OF ALL ISSUES

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

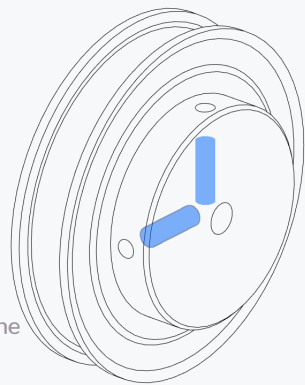
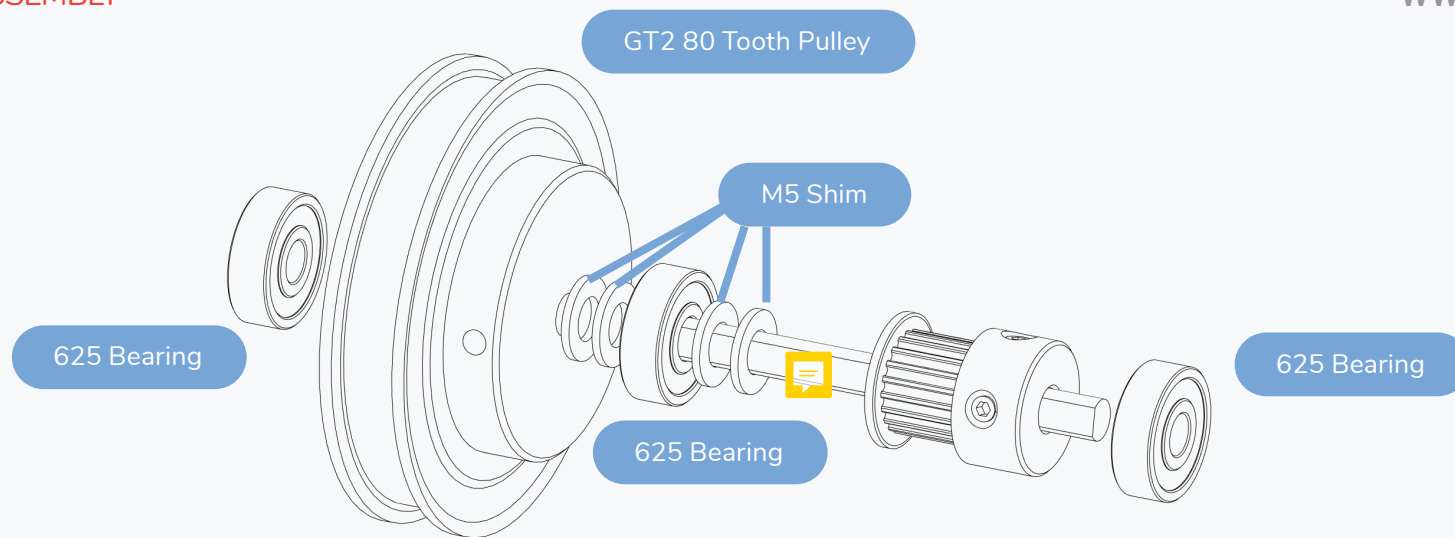
Use a high quality hex driver to prevent the hex profile from stripping. Ball-end drivers are not recommended.

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.

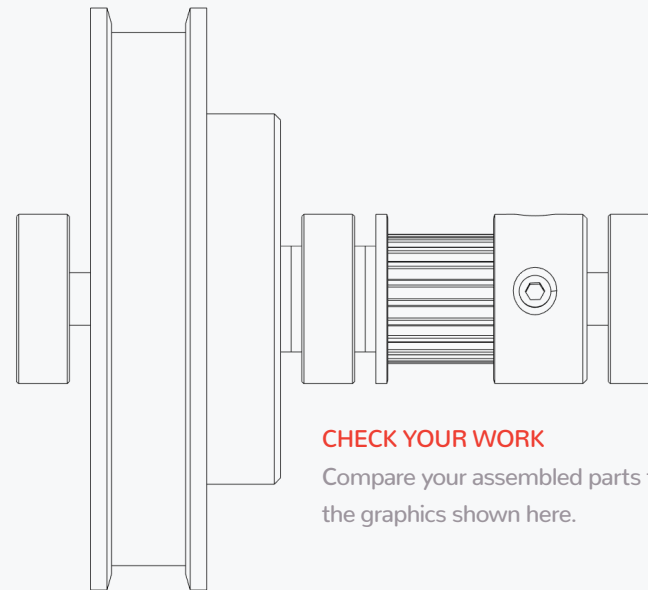
BELT DRIVE ASSEMBLY

WWW.VORONDESIGN.COM



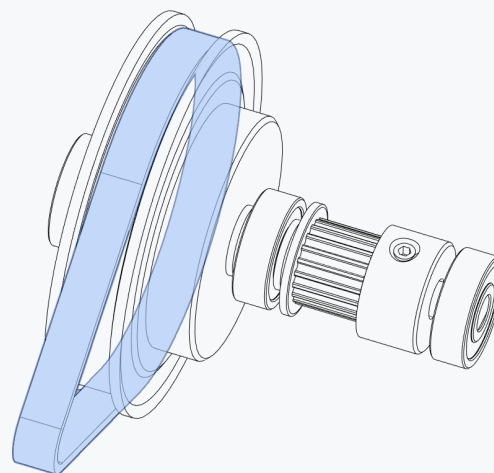
APPLY THREAD LOCKER

Make sure to use thread locker on the set screws.

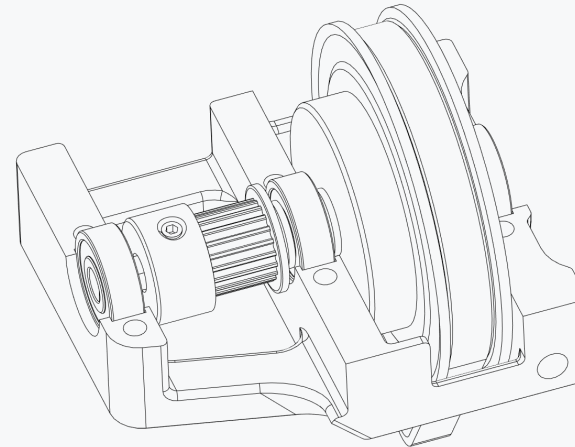
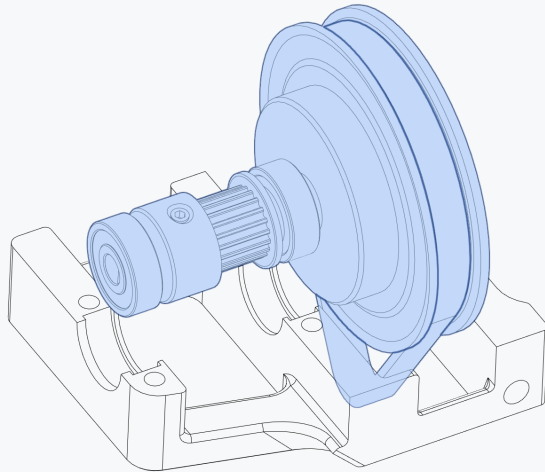


CHECK YOUR WORK

Compare your assembled parts to the graphics shown here.

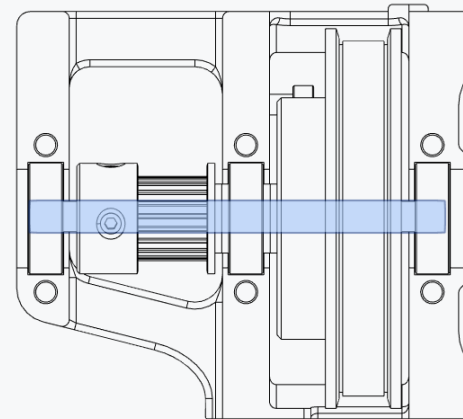


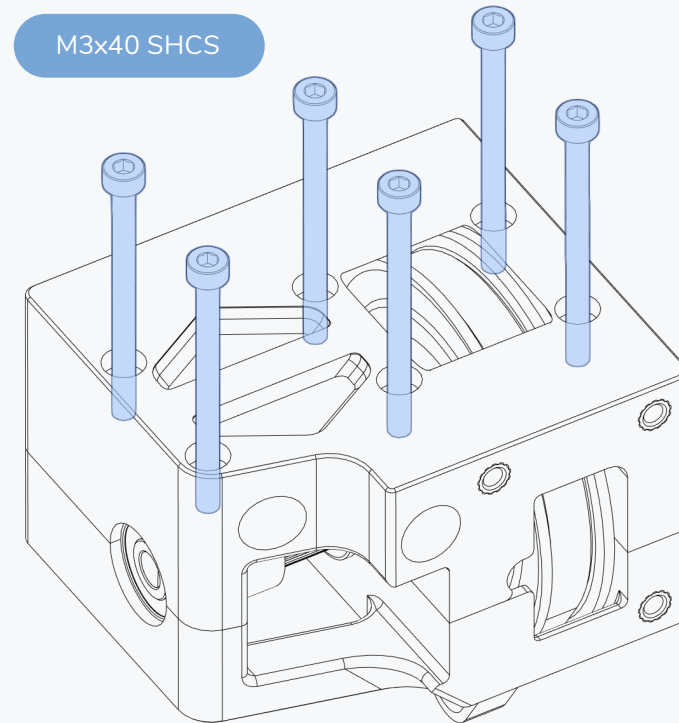
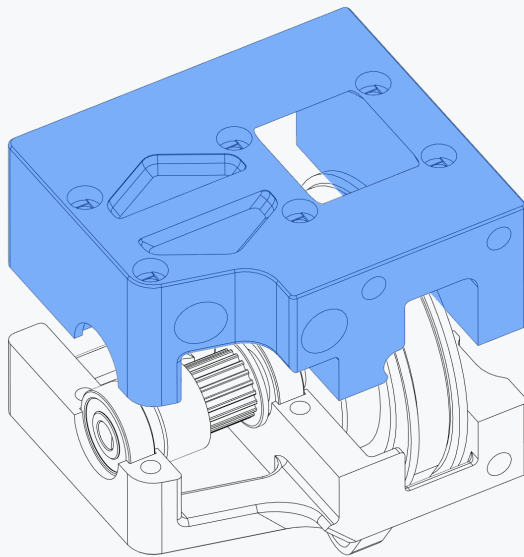
GT2 188mm Belt Loop

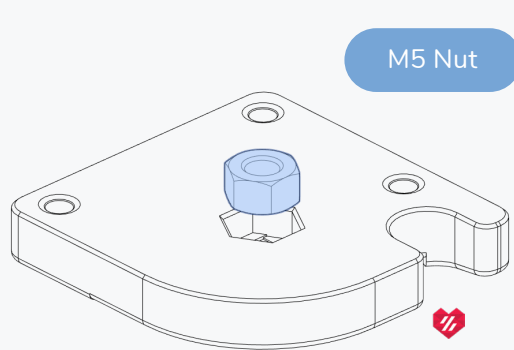


CHECK SHAFT POSITION

Compare your assembled parts to the graphics shown here.



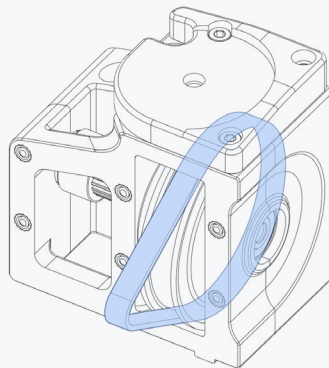




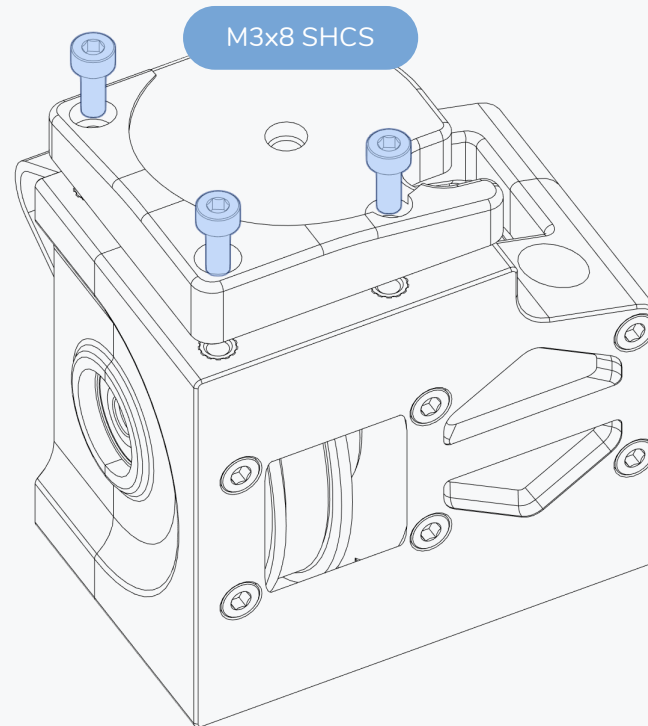
M5 Nut

ACCENT PART?

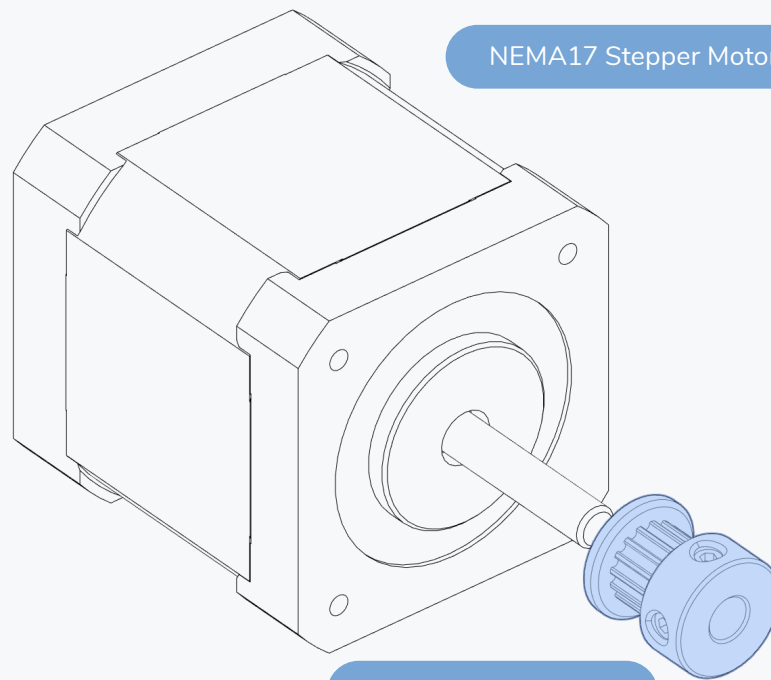
Look for Voron heart next to the part.
It indicates that this is an accent part.

**CHECK FOR BELT**

Make sure the closed belt loop is in
the part.

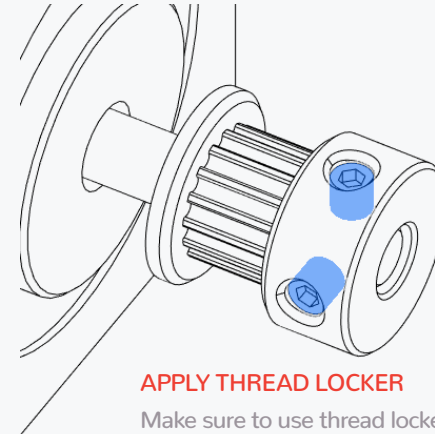


M3x8 SHCS

**16 TOOTH PULLEYS**

The Z drive motors are the only place in the printer that use 16 tooth pulleys!

Remove the pulleys from your work surface after you finish this chapter.



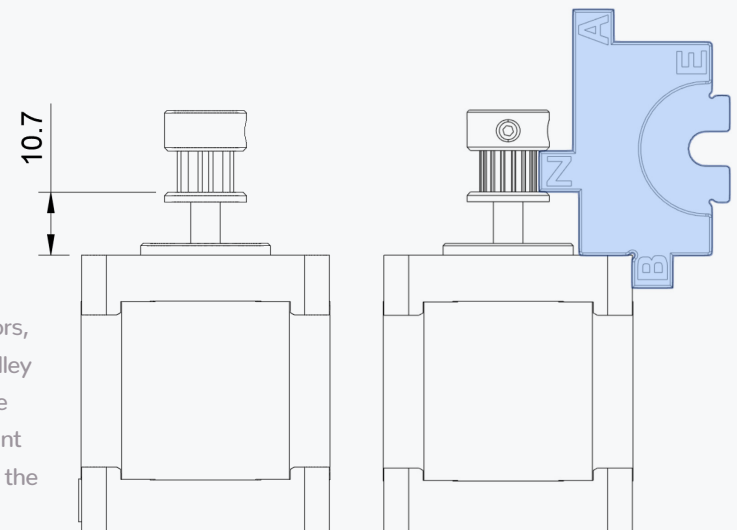
Make sure to use thread locker on the set screws.

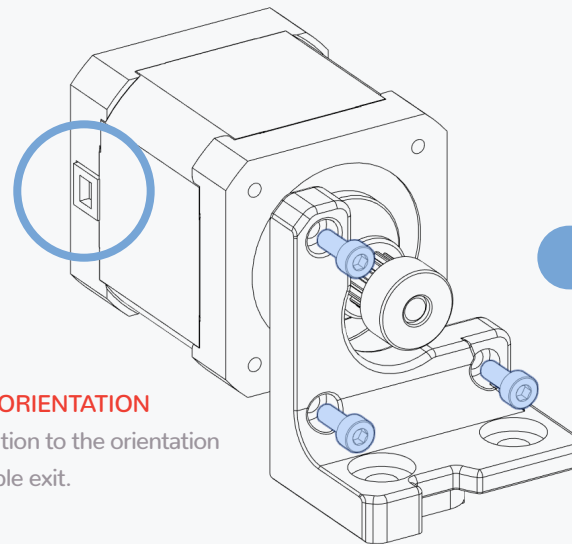
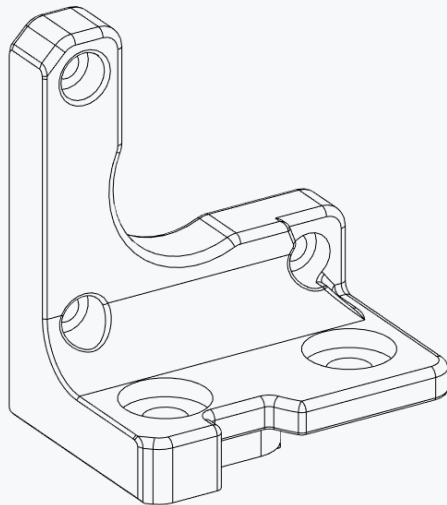


<https://voron.link/fx10m8e>

PULLEY POSITION

Depending on your motors, you may find that the pulley sits better in the opposite orientation. The important thing is the placement of the actual teeth.





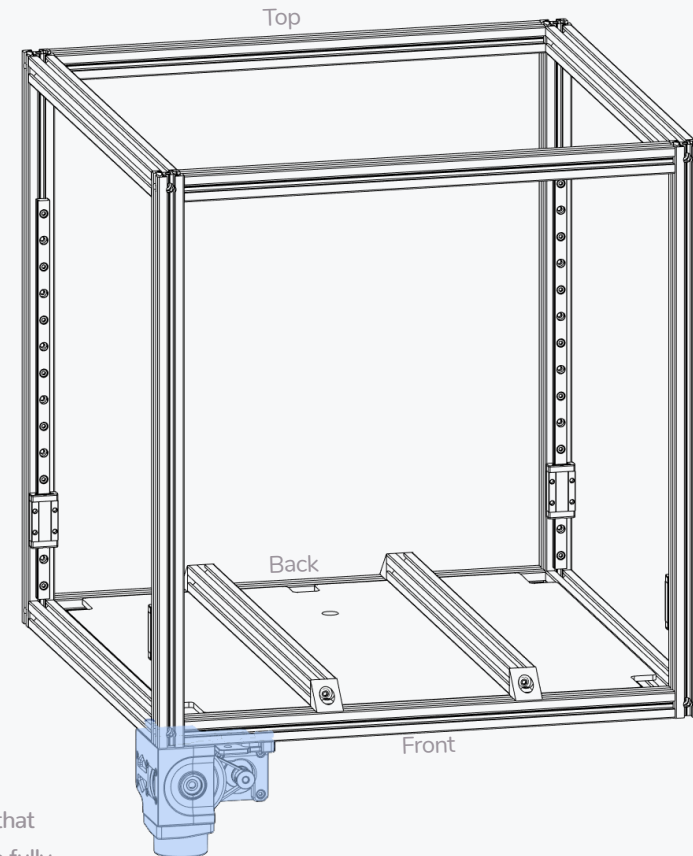
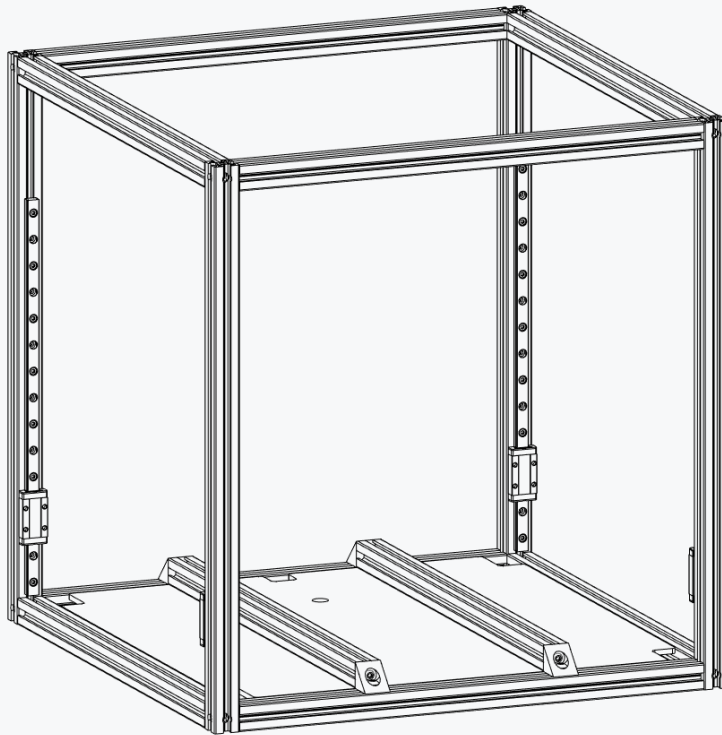
MOTOR ORIENTATION

Pay attention to the orientation
of the cable exit.

M3x8 SHCS

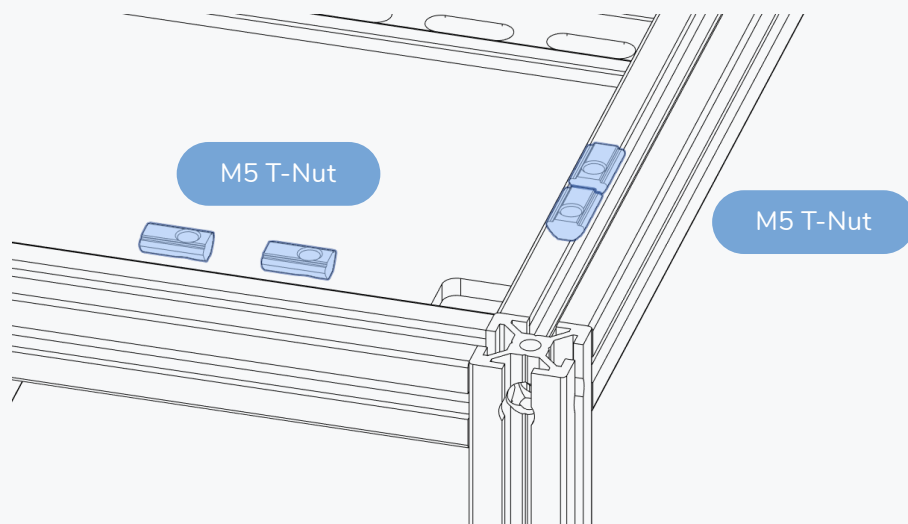
ORIENTATION

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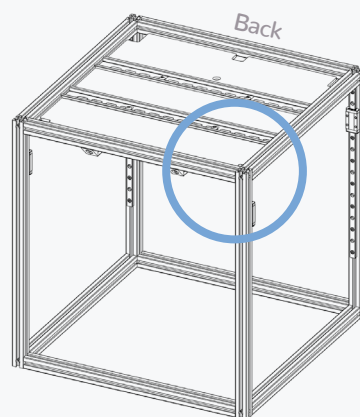


PICTURE FOR ORIENTATION

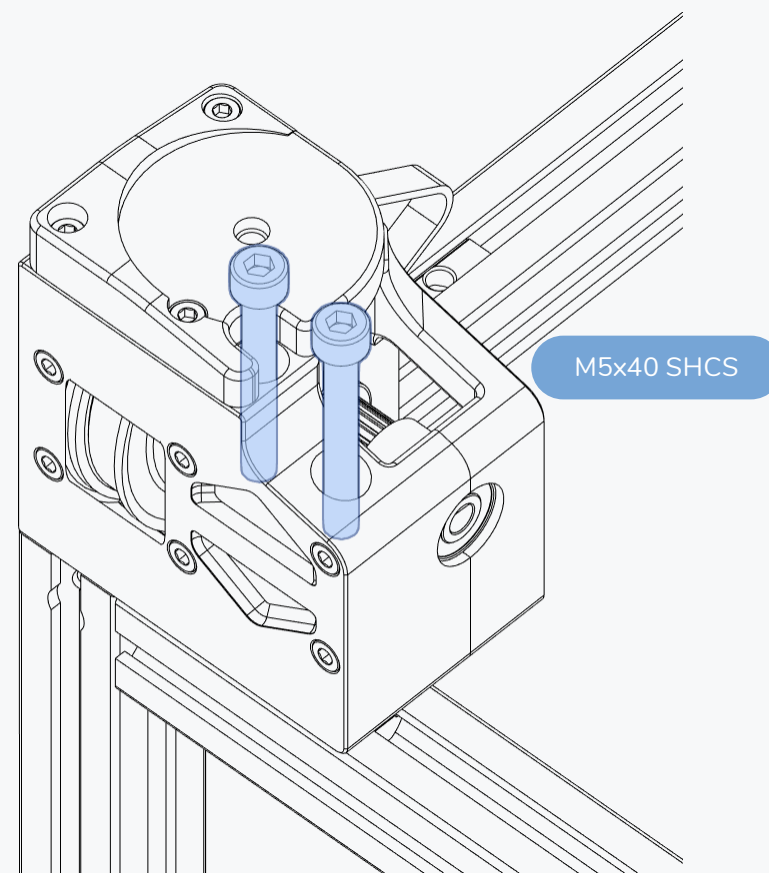
The Z0 drive is the first Z drive that will be added to the printer. The fully assembled Z Drive is highlighted in blue.

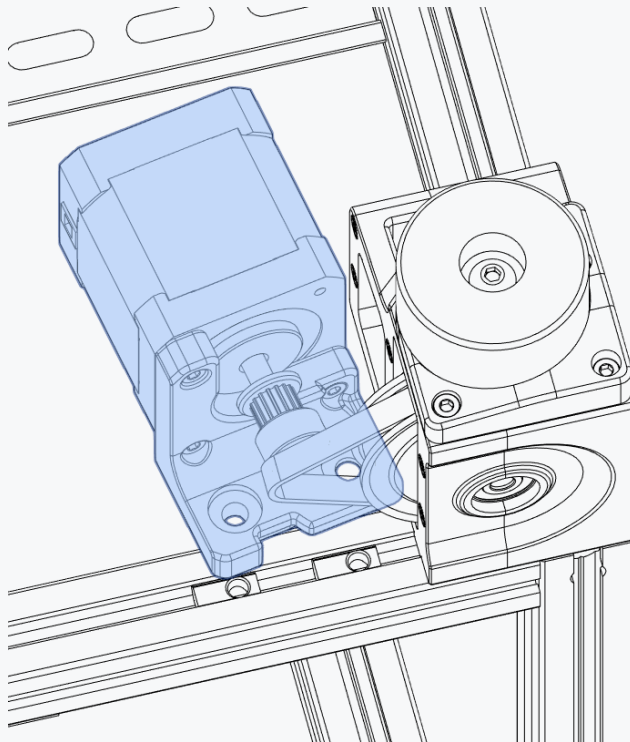
**WHICH CORNER IS THIS?**

We highlighted the corner with a circle.

**UPSIDE DOWN ASSEMBLY**

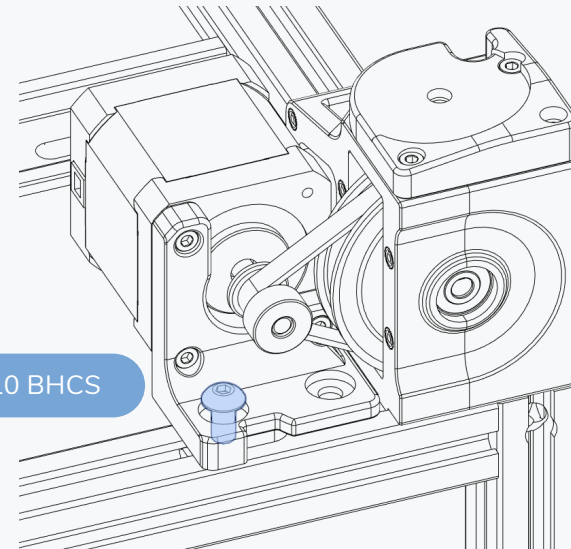
For ease of assembly we recommend flipping the printer on its head for the next steps.





SLIDE INTO PLACE

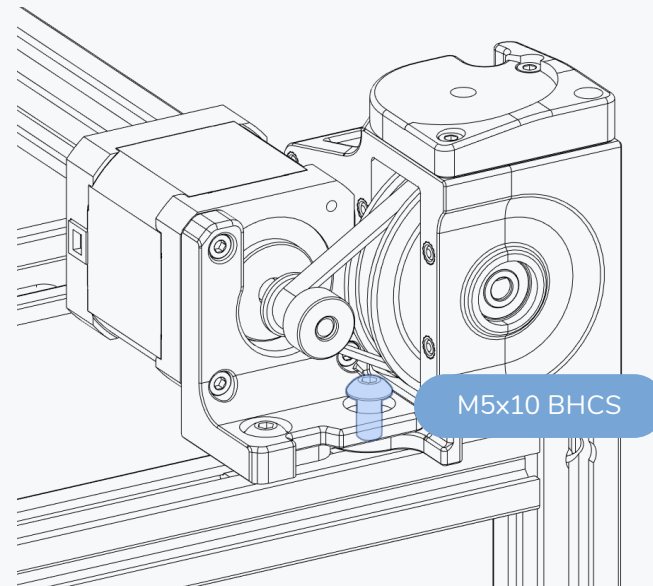
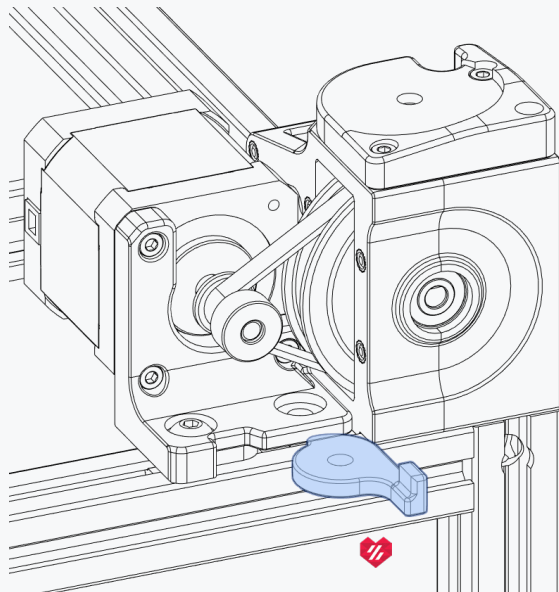
Insert at an angle and slide into place.



M5x10 BHCS

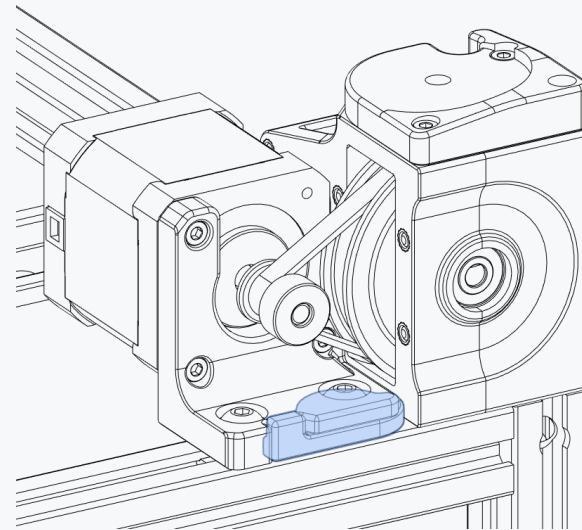
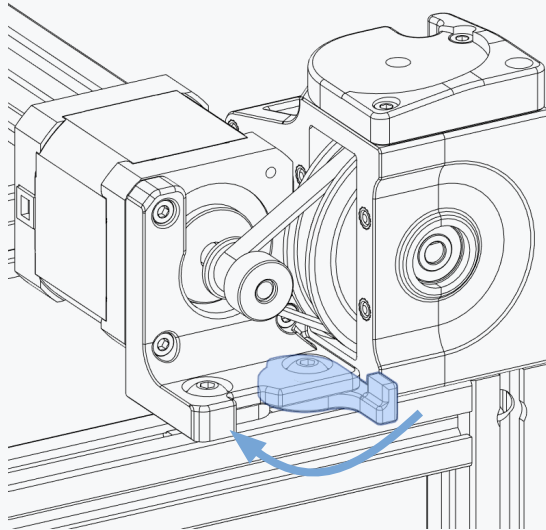
DON'T TIGHTEN

Leave the bolt loose for the next step.



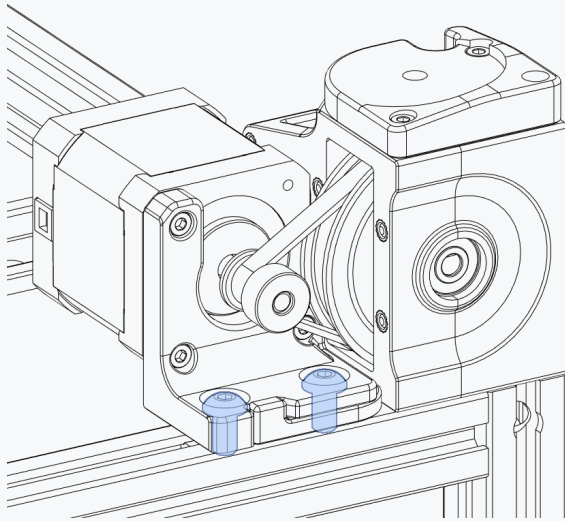
DON'T TIGHTEN

Leave the bolt loose for the next step.

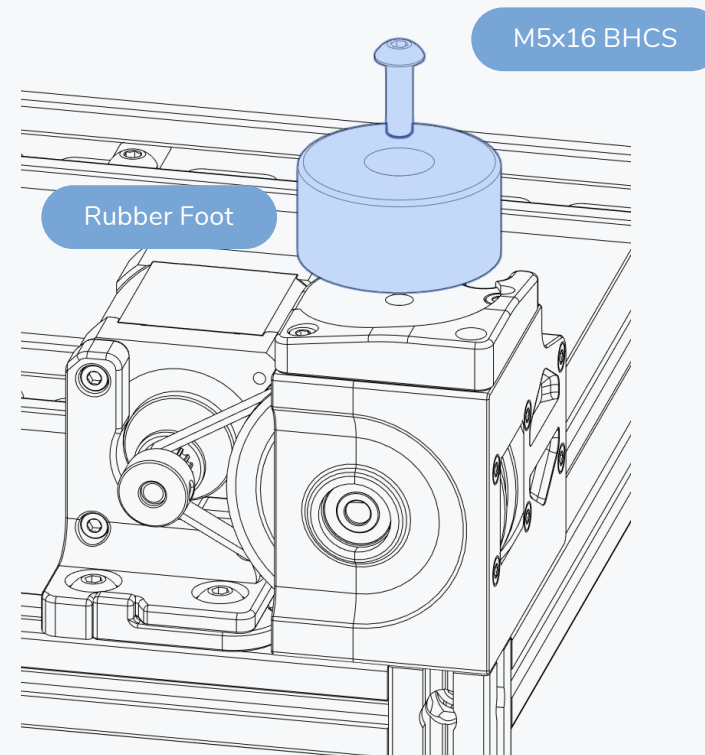


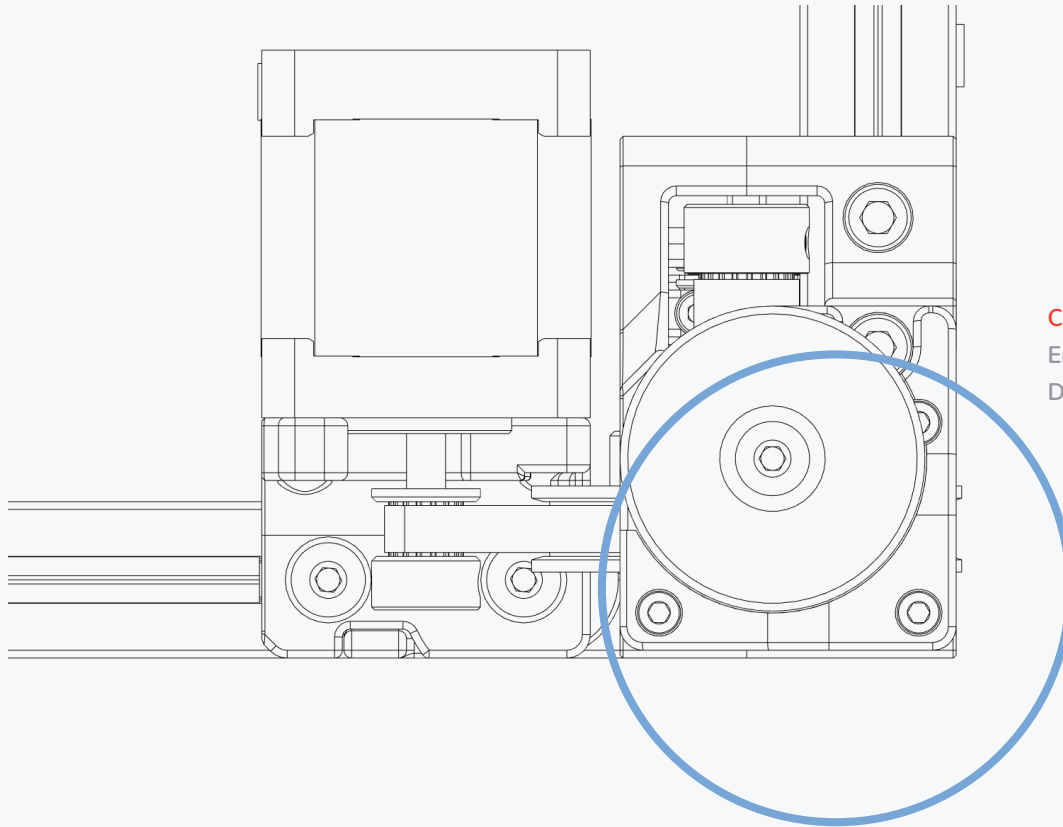
CLOSE THE BELT TENSIONER

Flip the belt tensioner latch closed.

**TIGHTEN BOLTS**

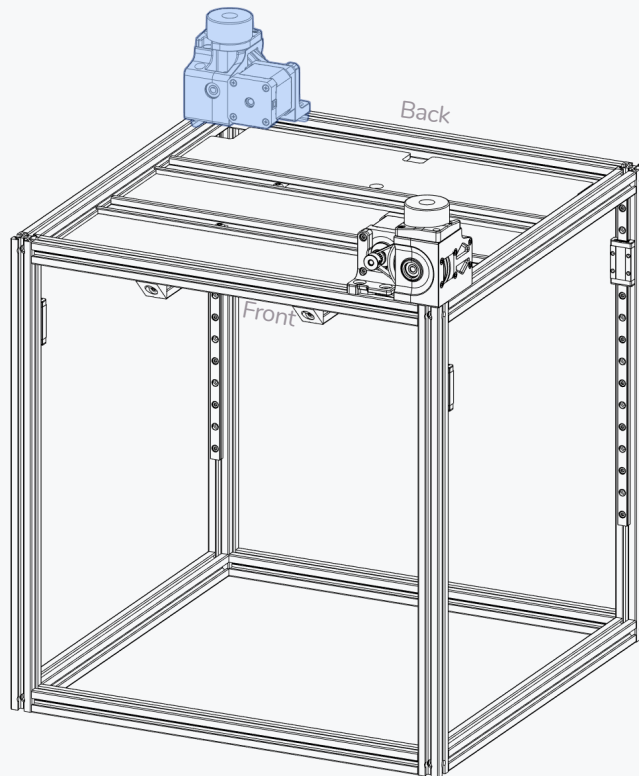
After closing the tensioner the M5 bolts can be properly fastened.





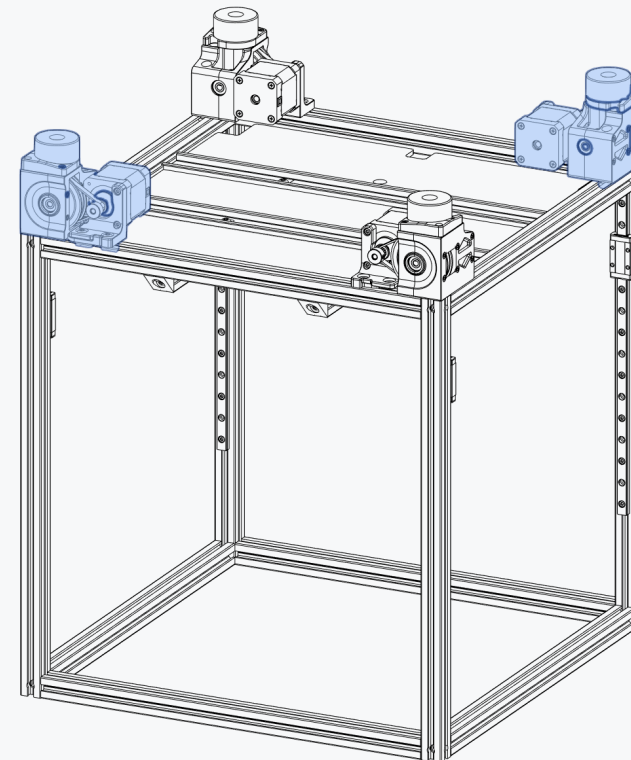
CHECK POSITION

Ensure that closing the belt tensioner did not cause the Z Drive to move/shift. If it did undo the bolts and realign.



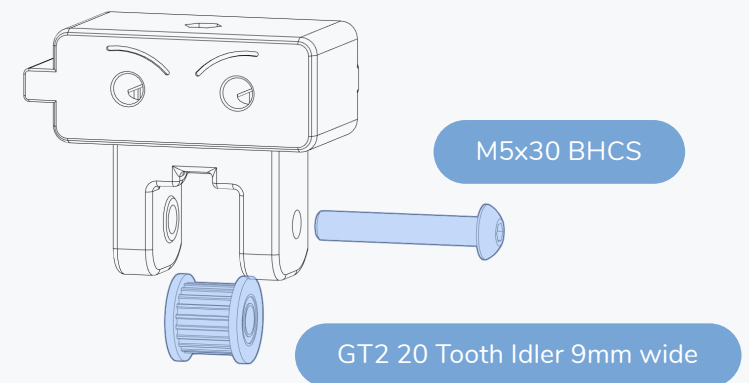
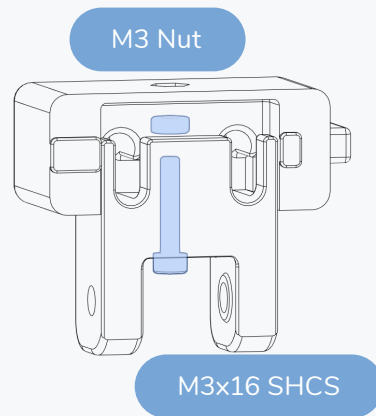
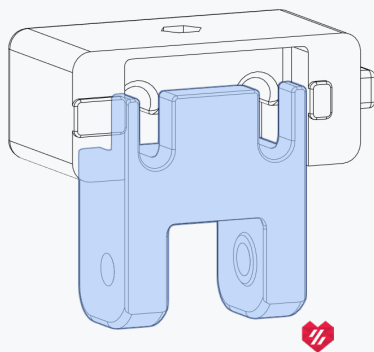
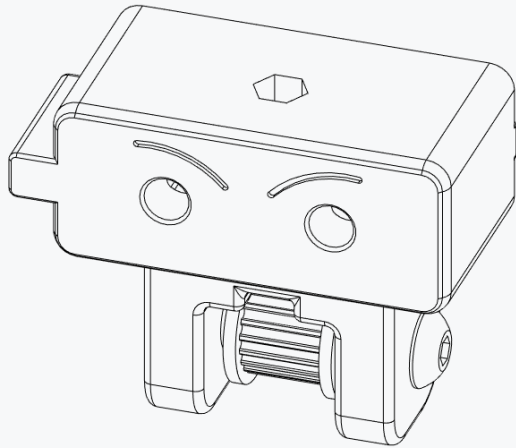
REPEAT INSTRUCTIONS FOR OPPOSING CORNER

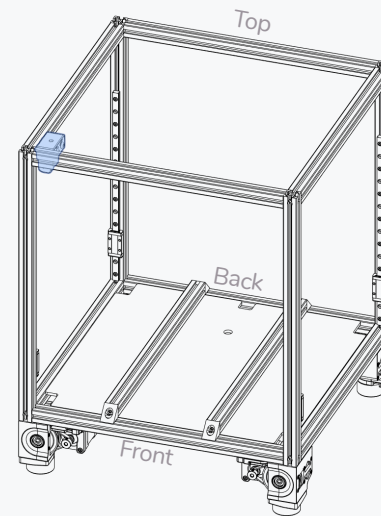
Build another Z drive, following the same instructions.



REPEAT INSTRUCTIONS FOR THE MIRRORED DRIVES

Build two more Z drives following the instructions that came before. The printed parts are mirrored.

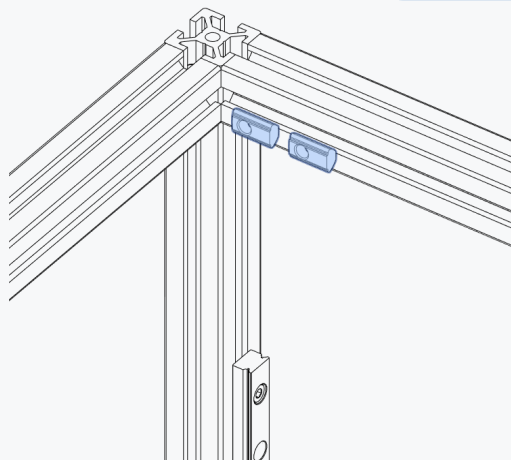




IDLER ORIENTATION

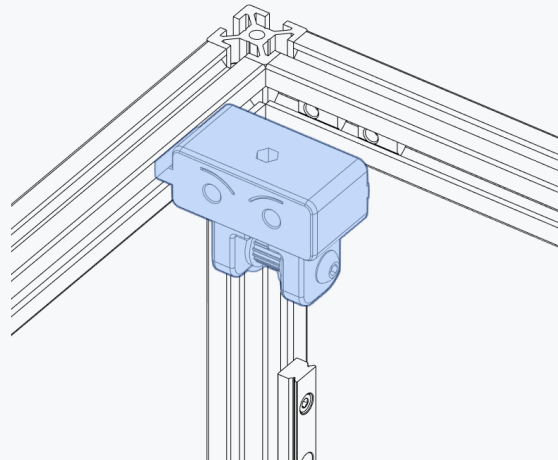
Mind the idler orientation. The idler must face in the same orientation as the pulley in the drive below it.

M5 T-Nut

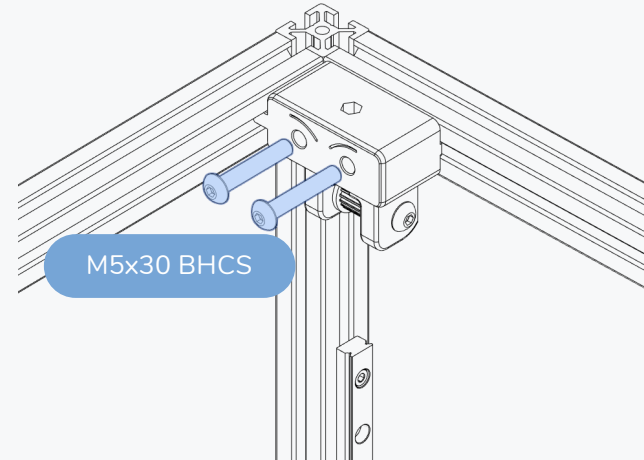


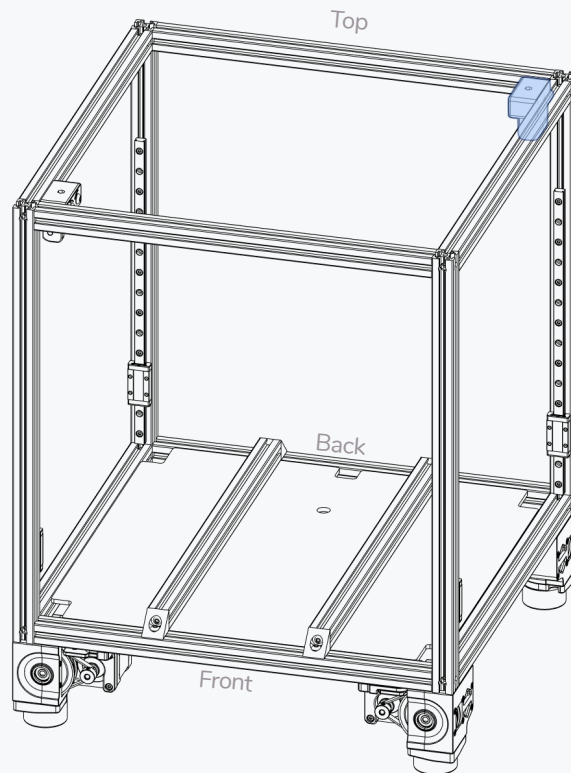
SEAT IN CORNER

Ensure idler is pressed firmly into corner before tightening.



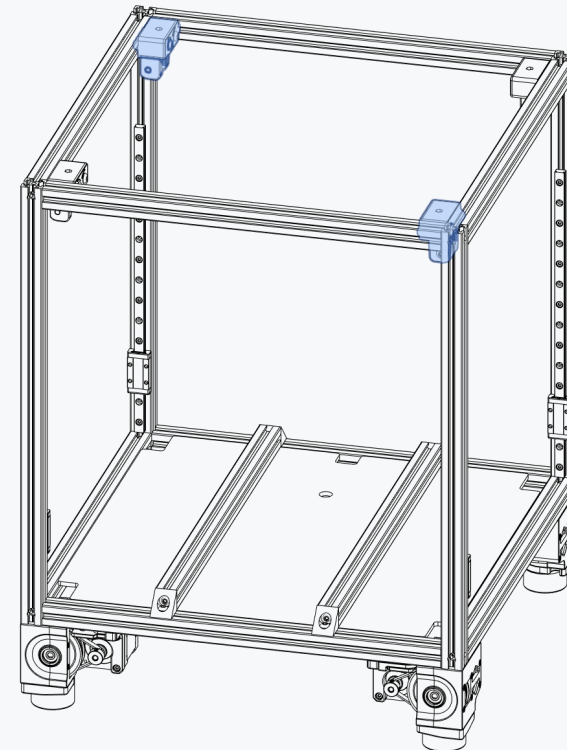
M5x30 BHCS





REPEAT INSTRUCTIONS FOR OPPOSING CORNER

Build another Z idler following the same instructions.



REPEAT INSTRUCTIONS FOR THE MIRRORED DRIVES

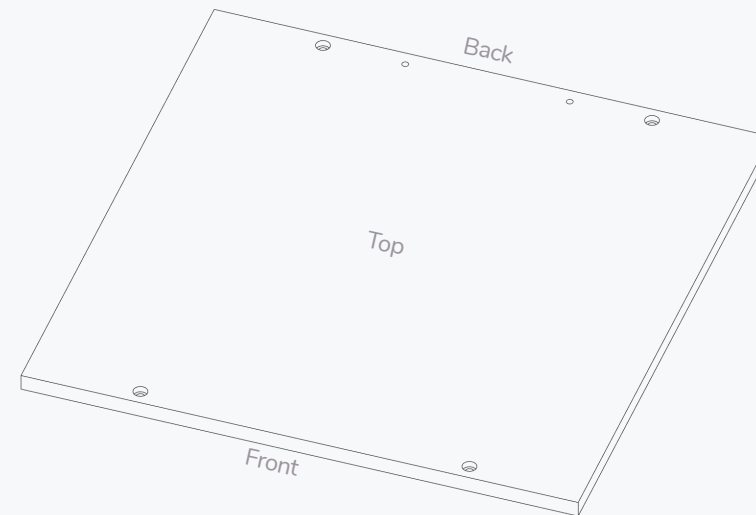
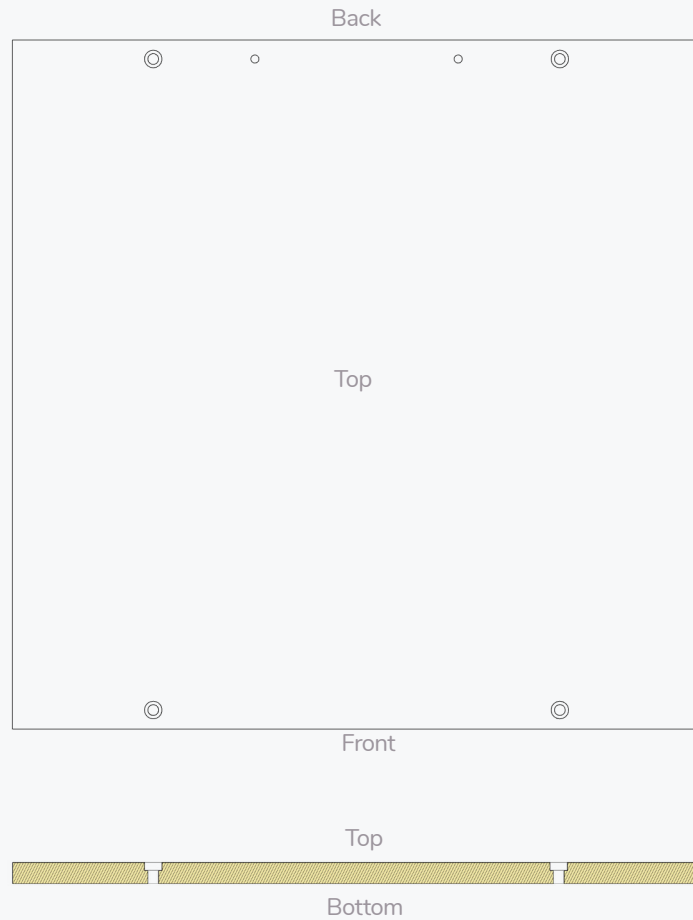
Build two more Z idlers following the instructions that came before. The printed parts are mirrored.

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

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 Protective Earth (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 from the adhesive backing.

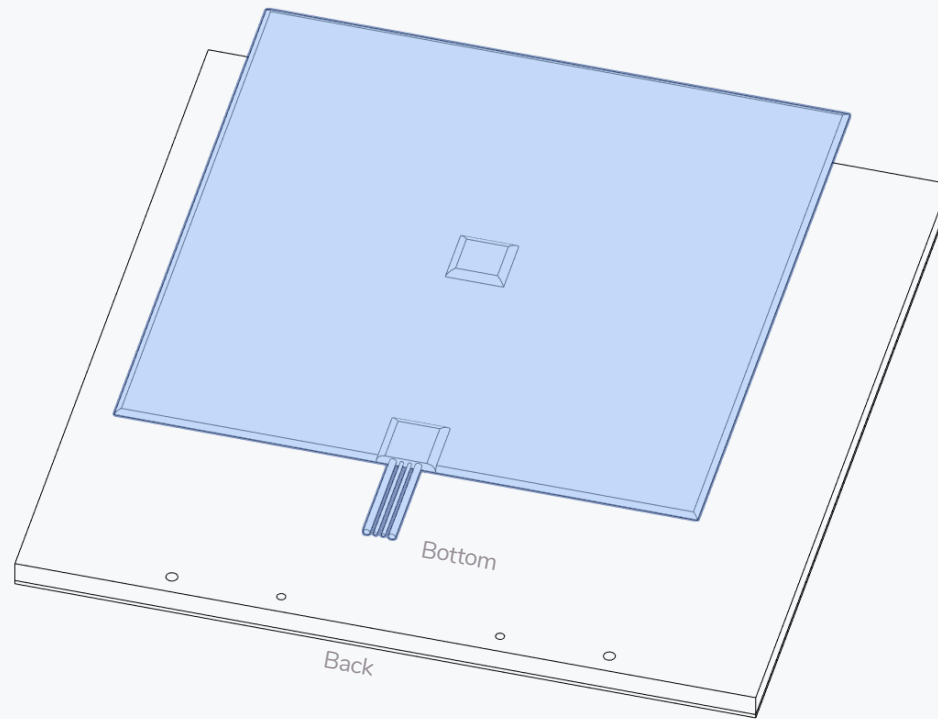
If you have never done this before we recommend you watch the linked guide.



<https://voron.link/rm6tpld>

HEATED BED

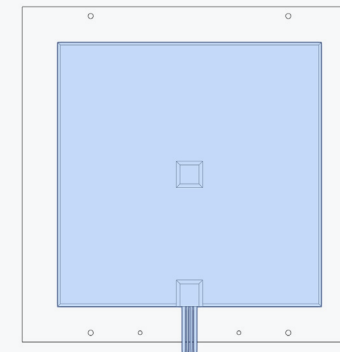
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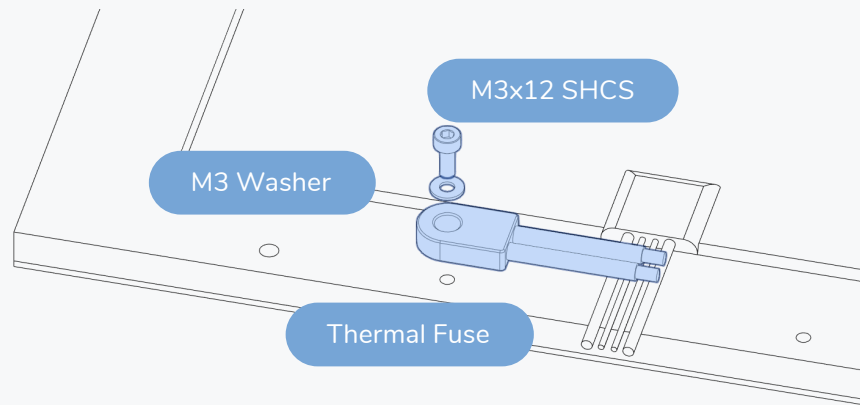


HEATER APPLICATION

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

Centre it on the bottom side of the build plate and make sure to firmly press it onto the build plate.

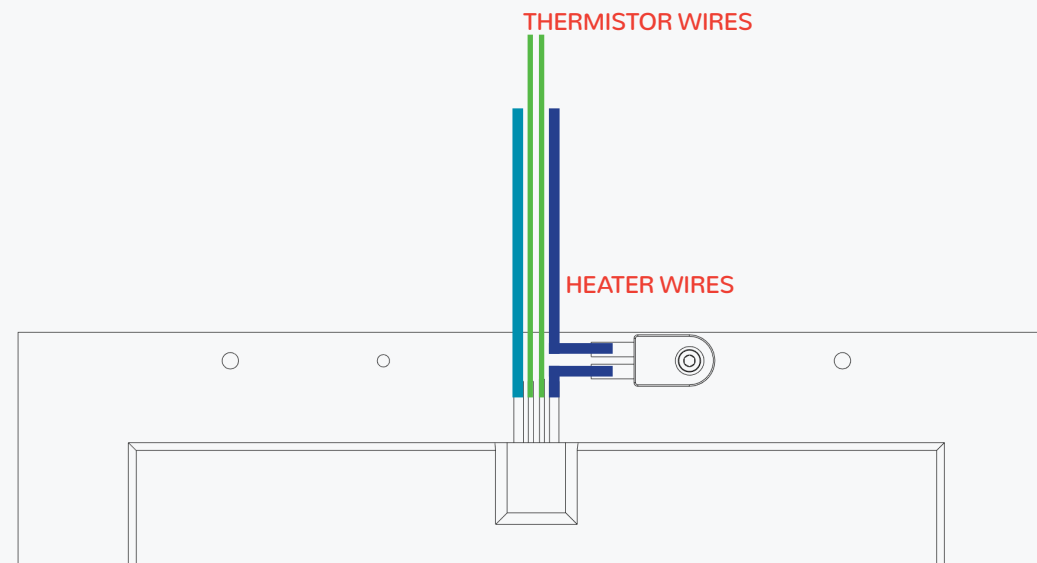


**THERMAL FUSE**

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.

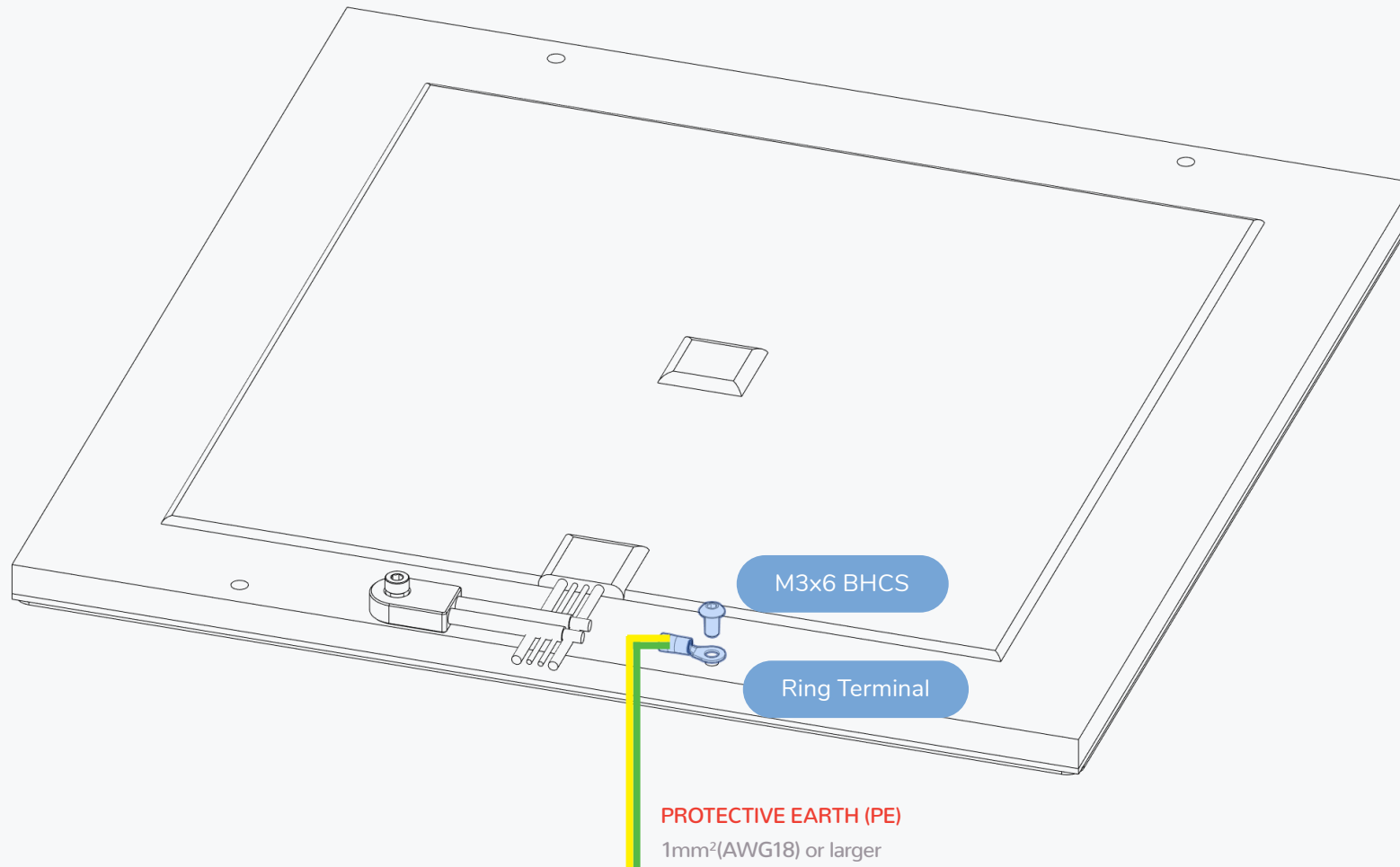
The thermal fuse is wired in-line with the heater wires.

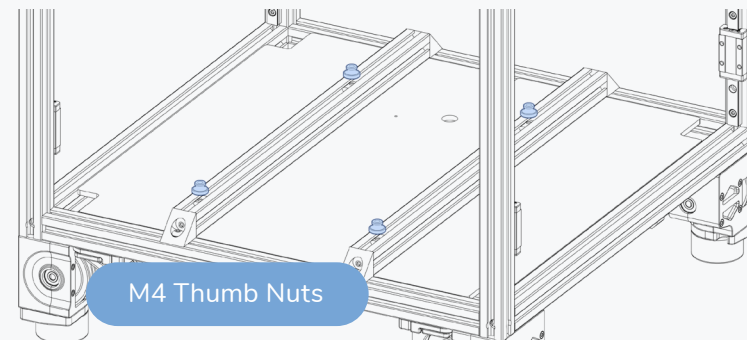
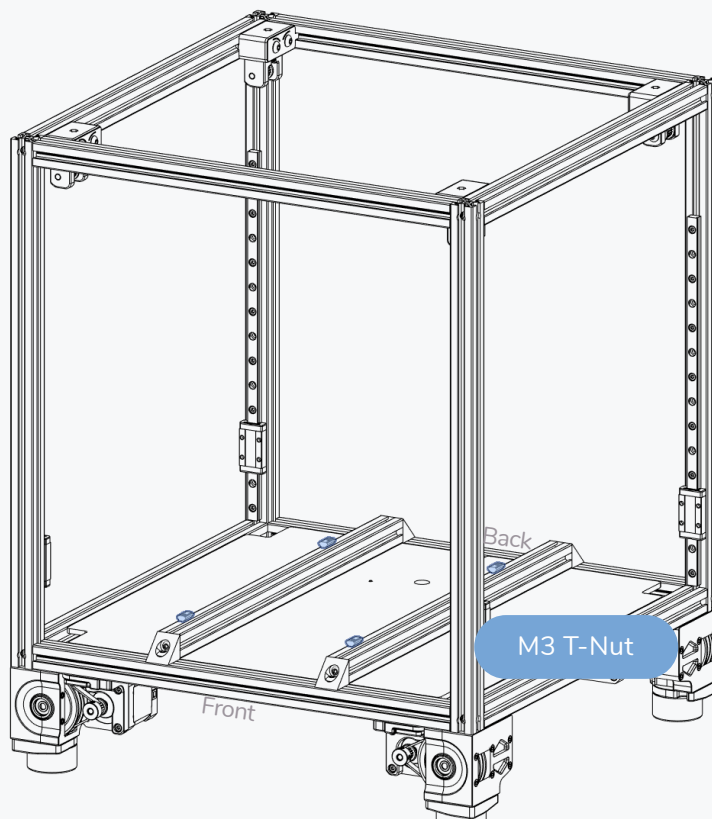
Depending on the tapped holes in the plate you may need to use a shorter bolt.



HEATED BED

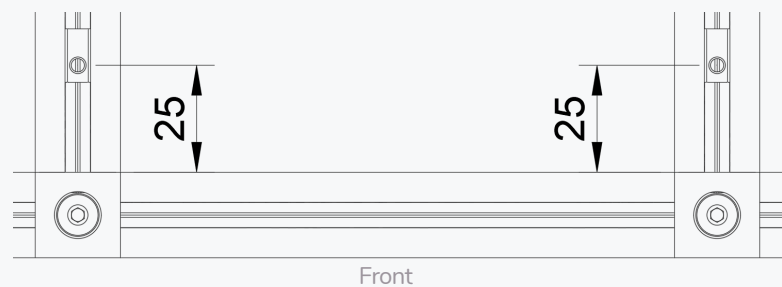
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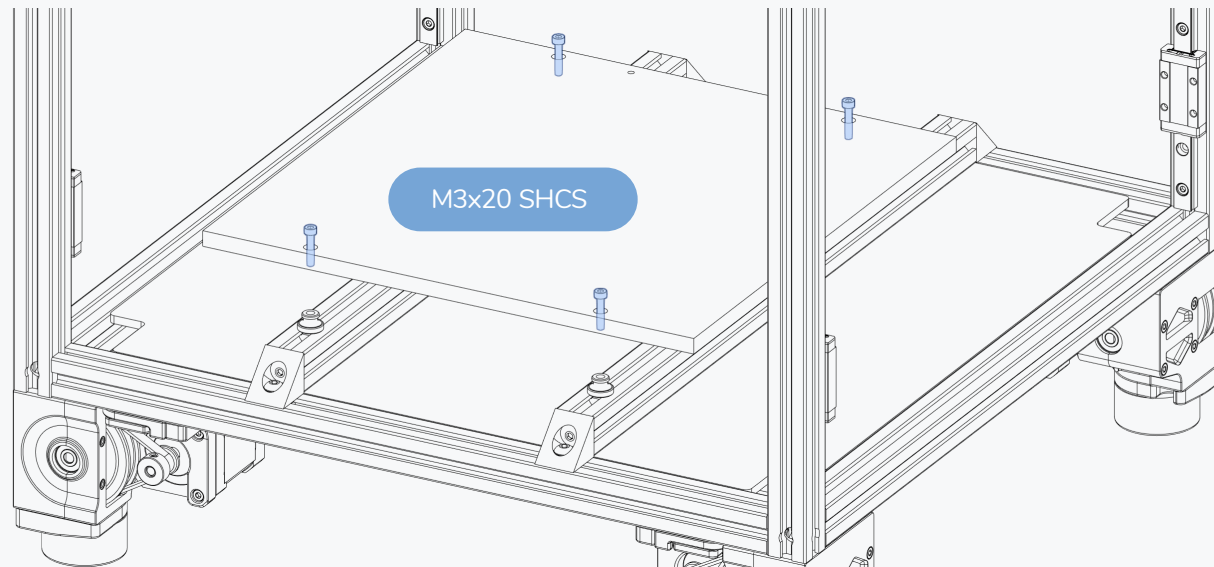
M4 NUT FOR A M3 BOLT?

We use the thumb nuts as spacers. You can replace them with different heat resistant spacers of the same length.



HEATED BED

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BED AND SPACER THICKNESS

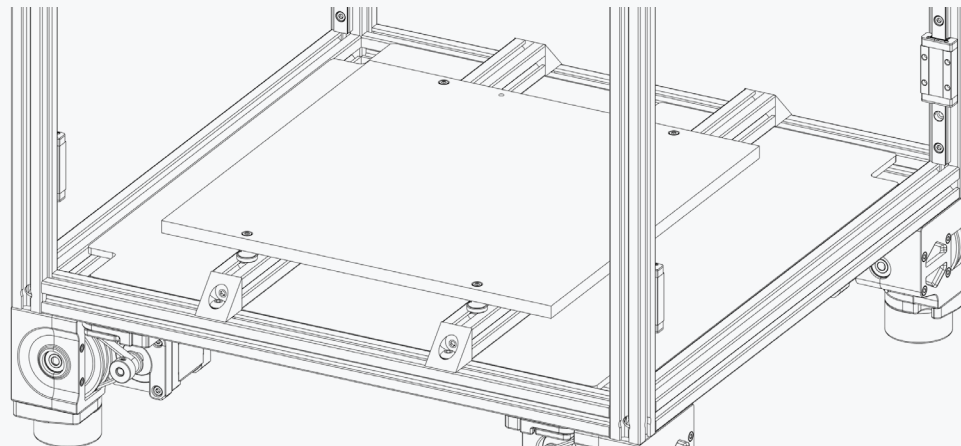
Depending on the combination of bed and spacer thickness you may need to use longer bolts to secure the bed.

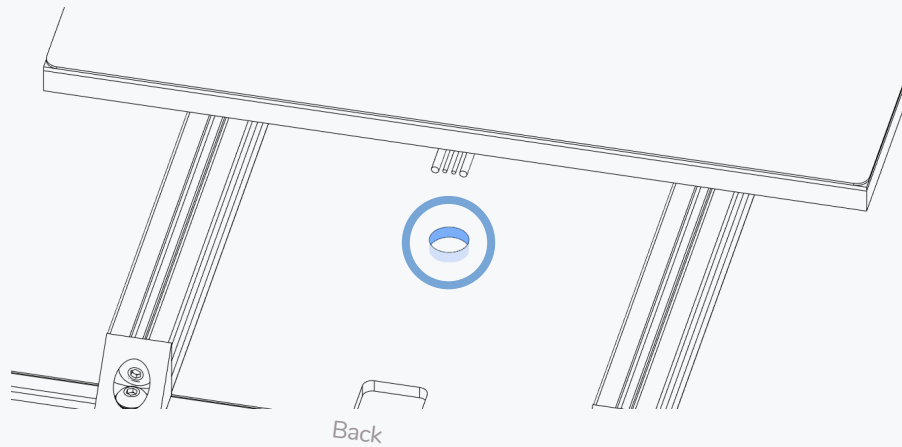
DON'T TIGHTEN

Only tighten one bolt fully.

Leave the remaining bolts slightly loose.

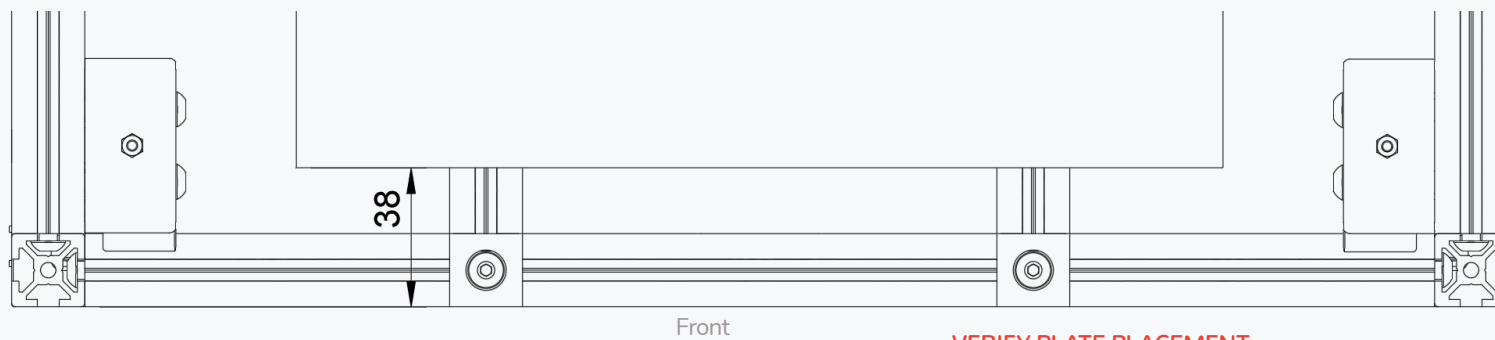
This will allow for thermal expansion without putting additional stress on the plate.





WIRE PASSTHROUGH

Feed the bed related wires through the opening in the deck plate.

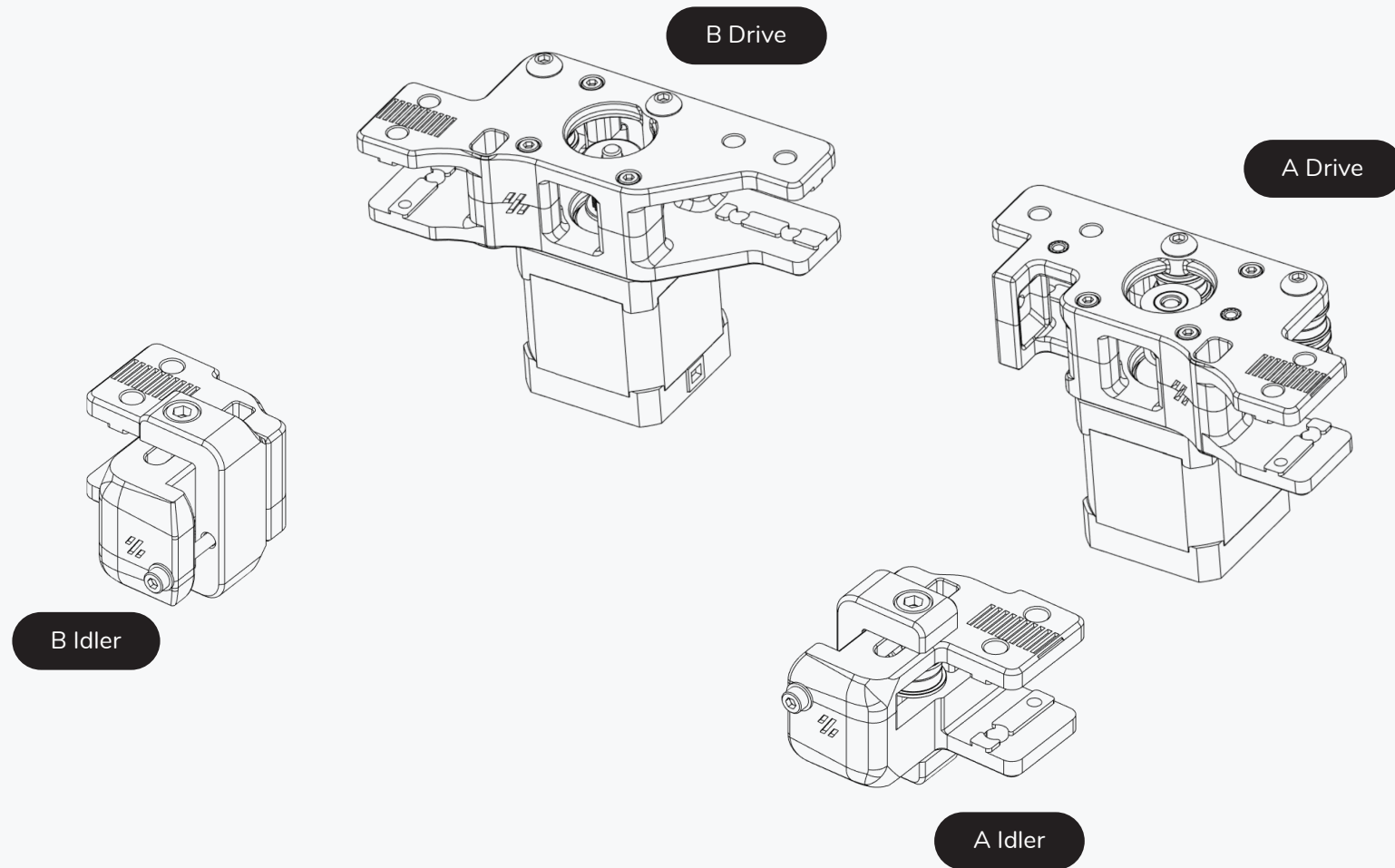


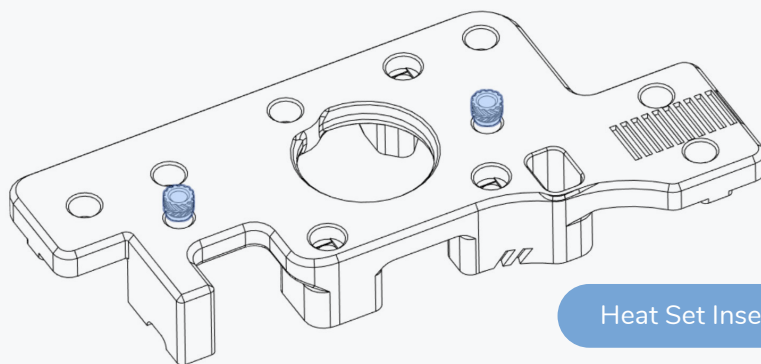
VERIFY PLATE PLACEMENT

The front edge of the print plate should sit 38mm behind the front edge of the frame.

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

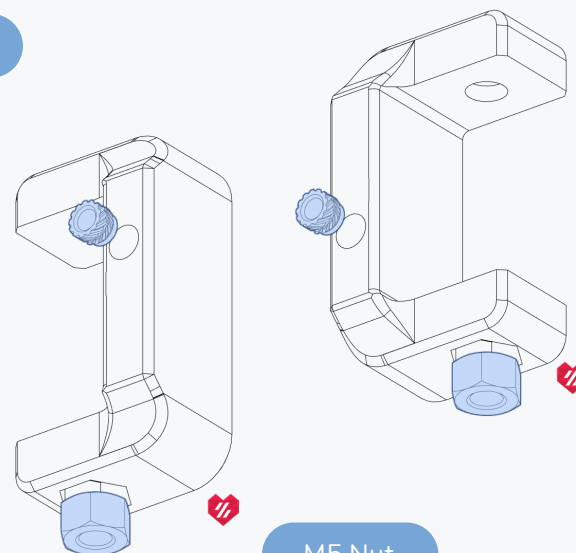






Heat Set Insert

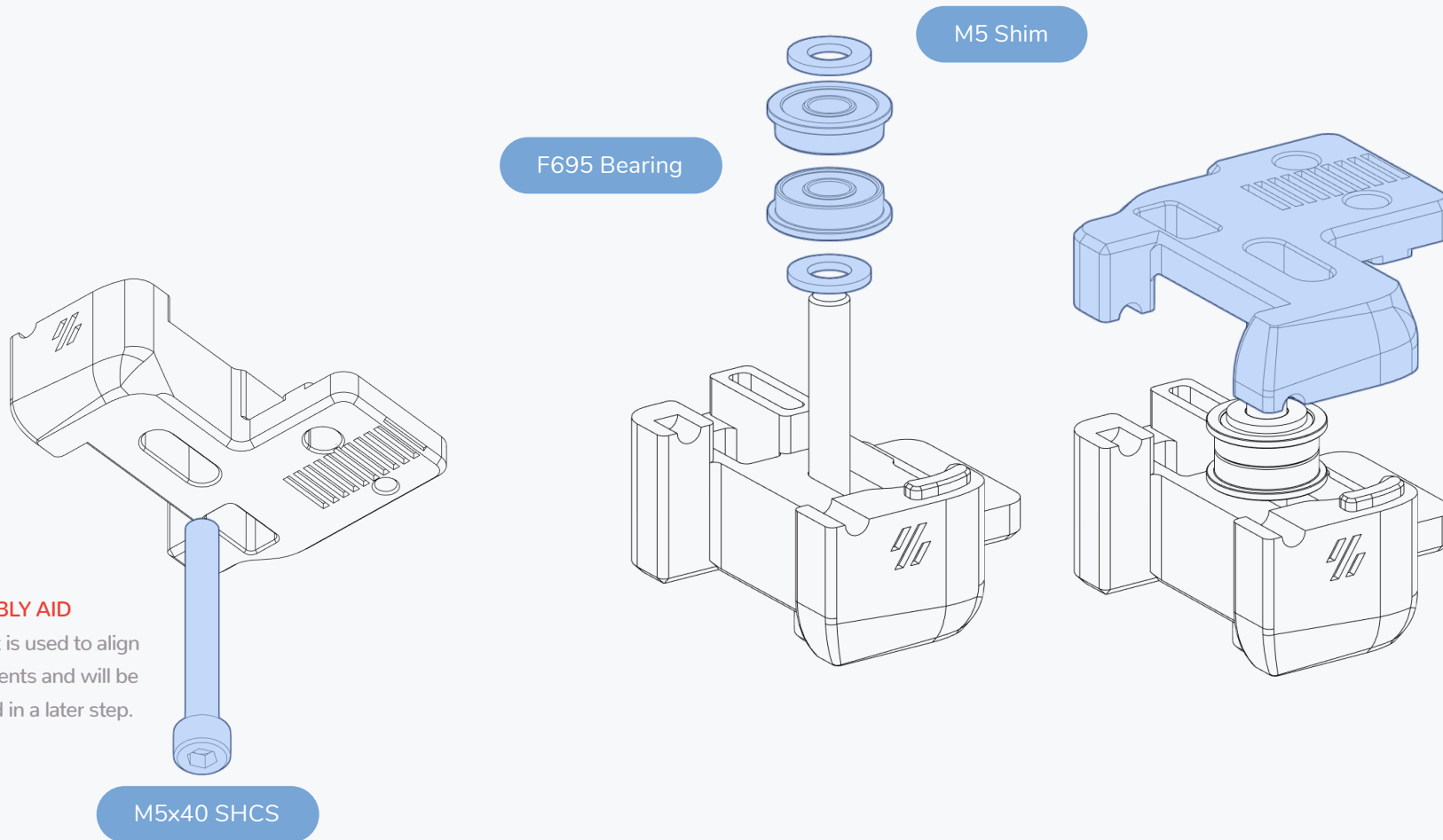
COMPLETED

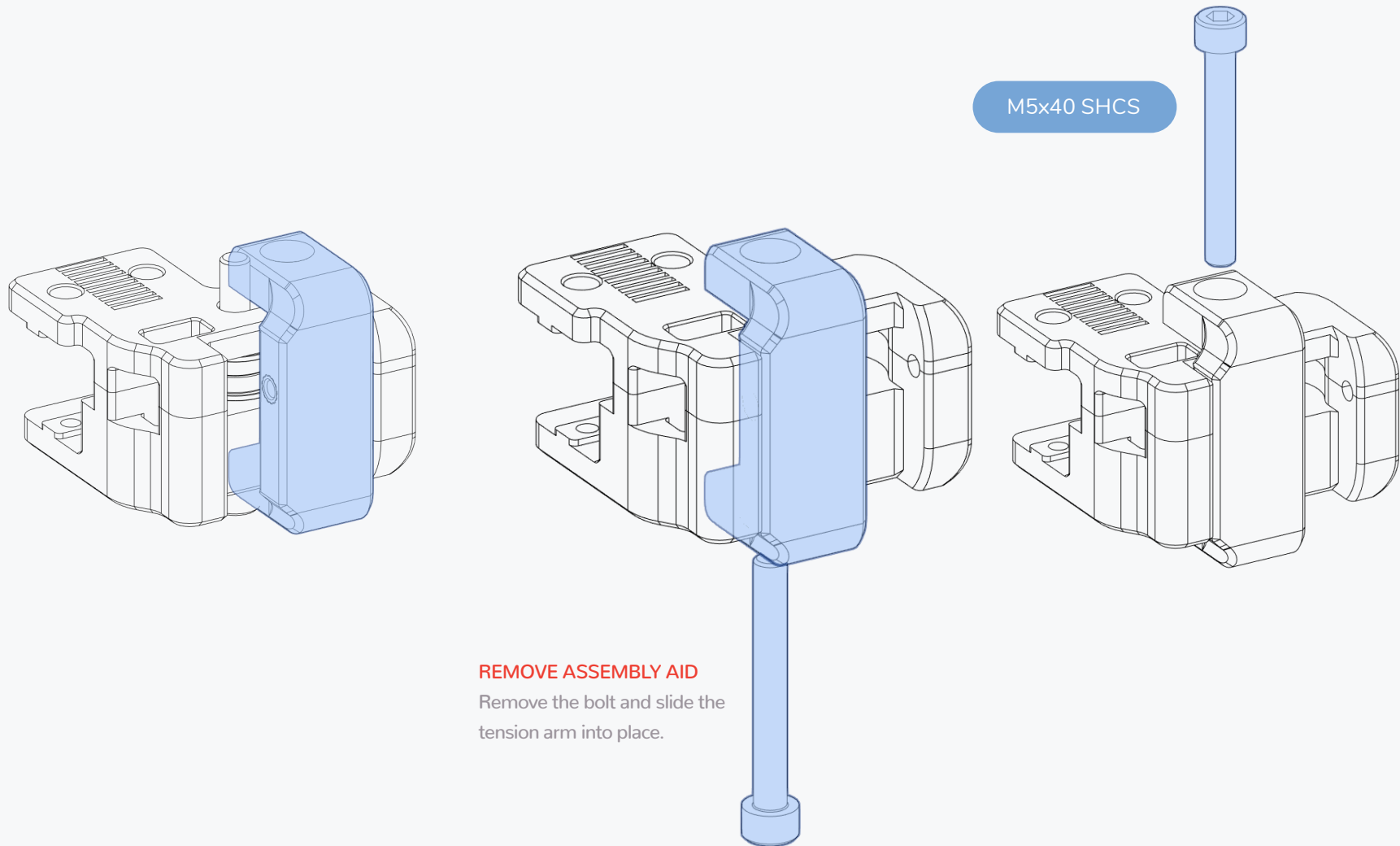


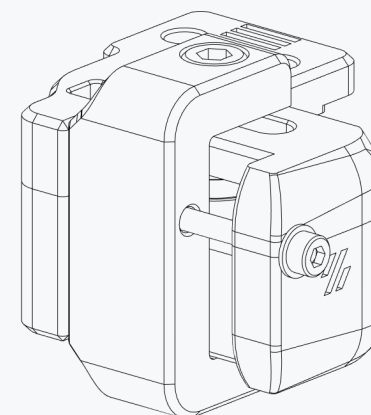
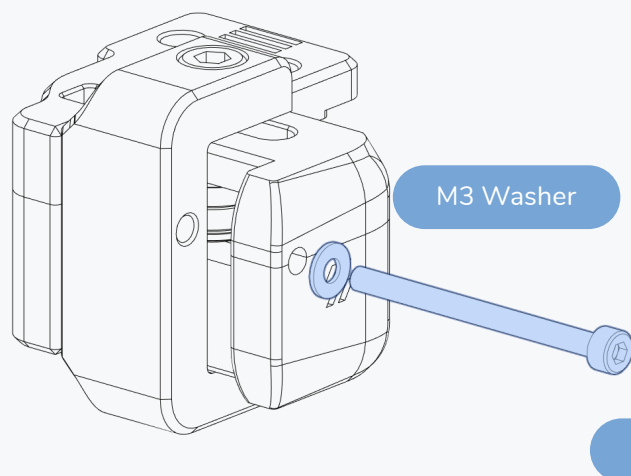
M5 Nut

ASSEMBLY AID

This bolt is used to align components and will be removed in a later step.

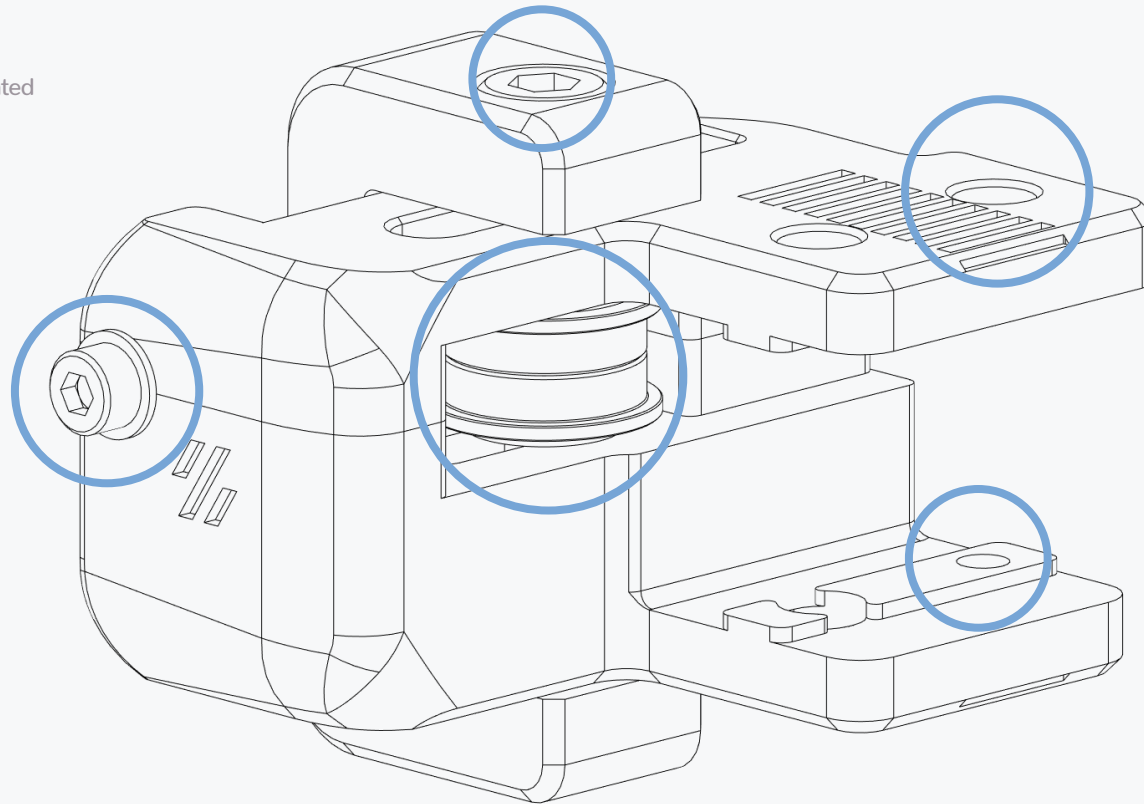


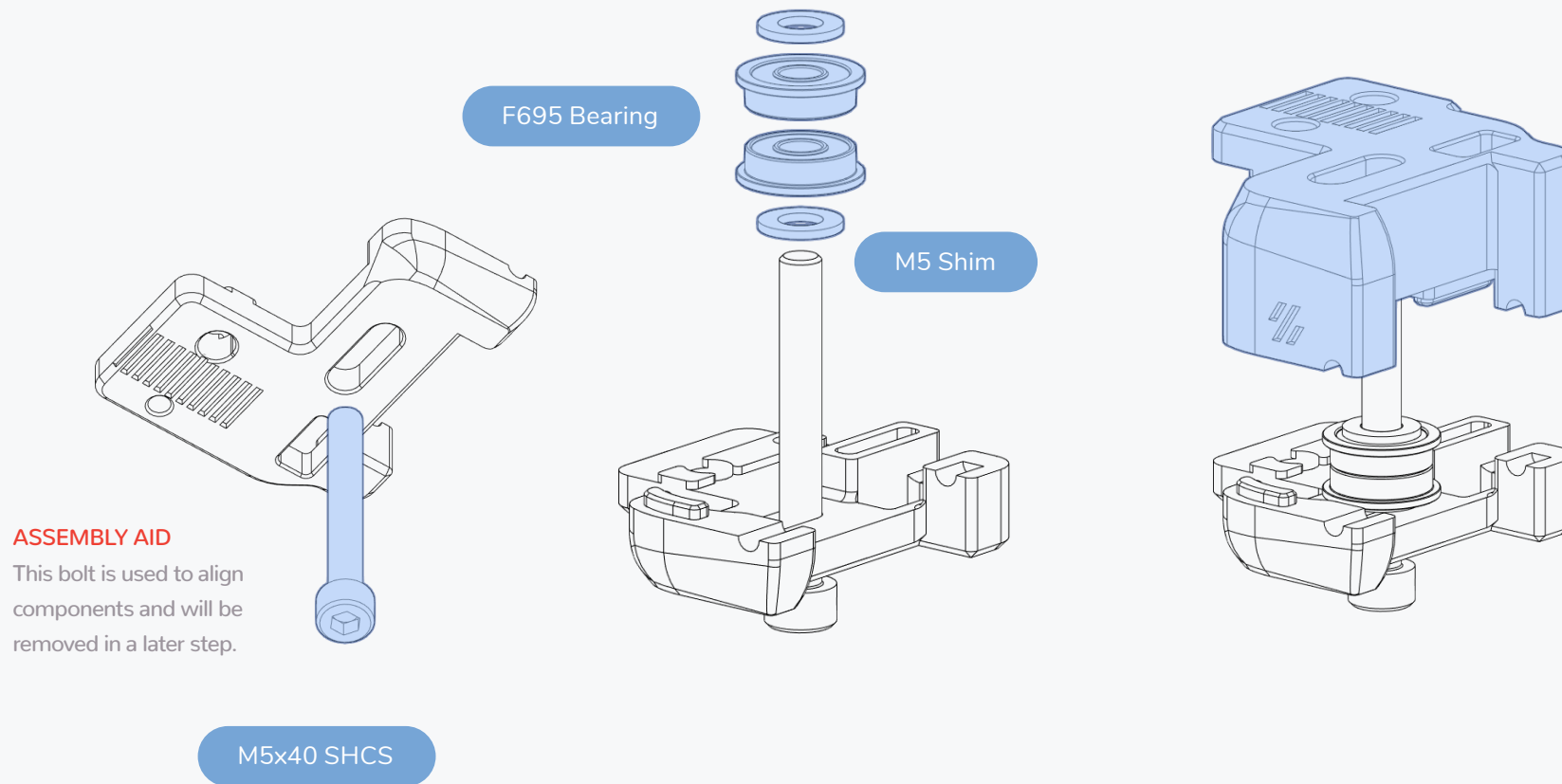


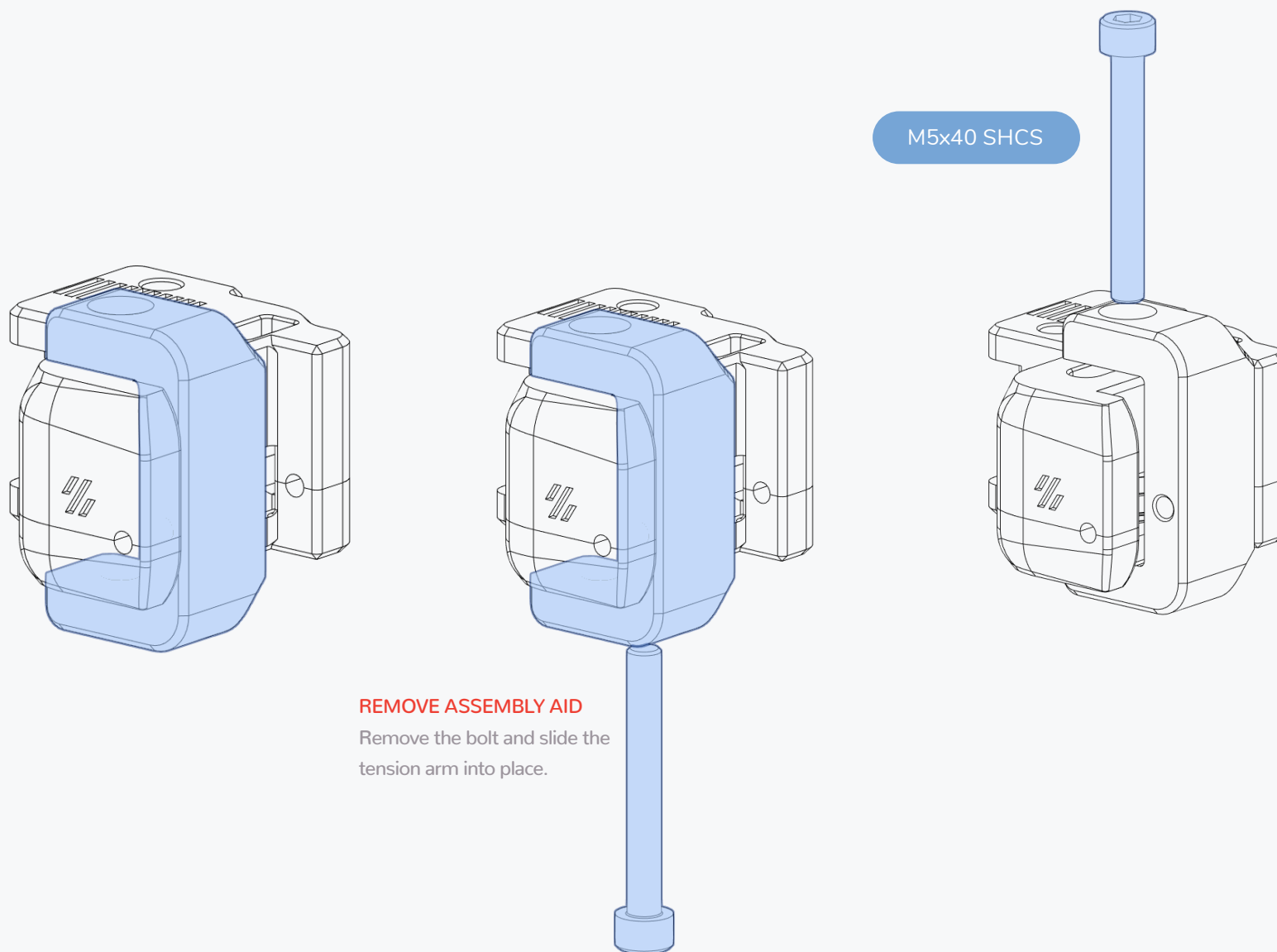


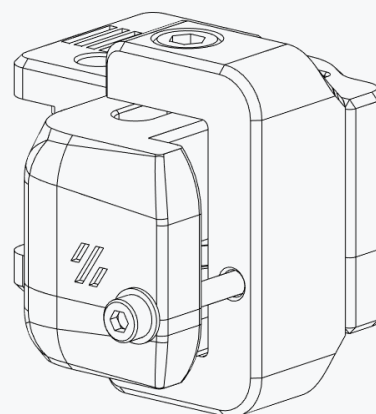
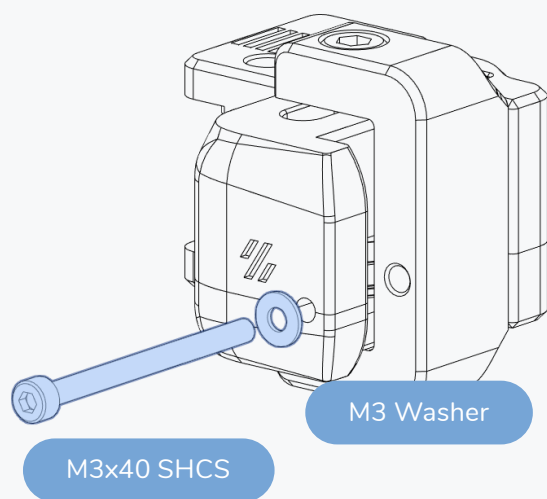
CHECK YOUR WORK

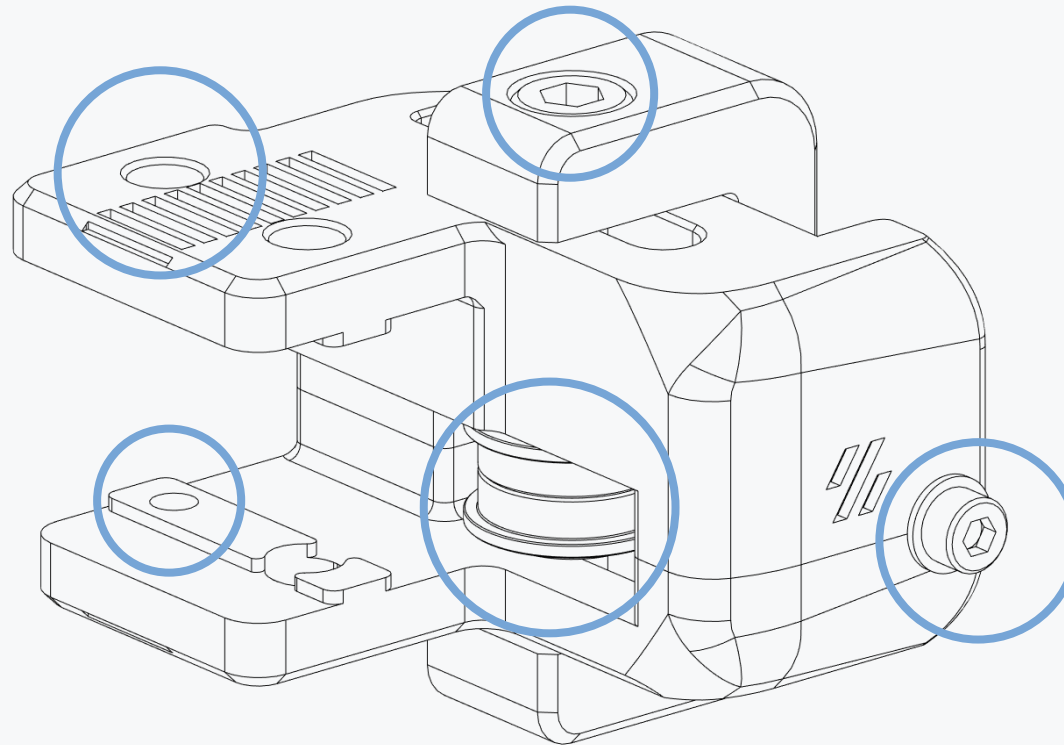
Compare your assembled parts to the graphics shown here. Pay attention to the features highlighted by the circles.



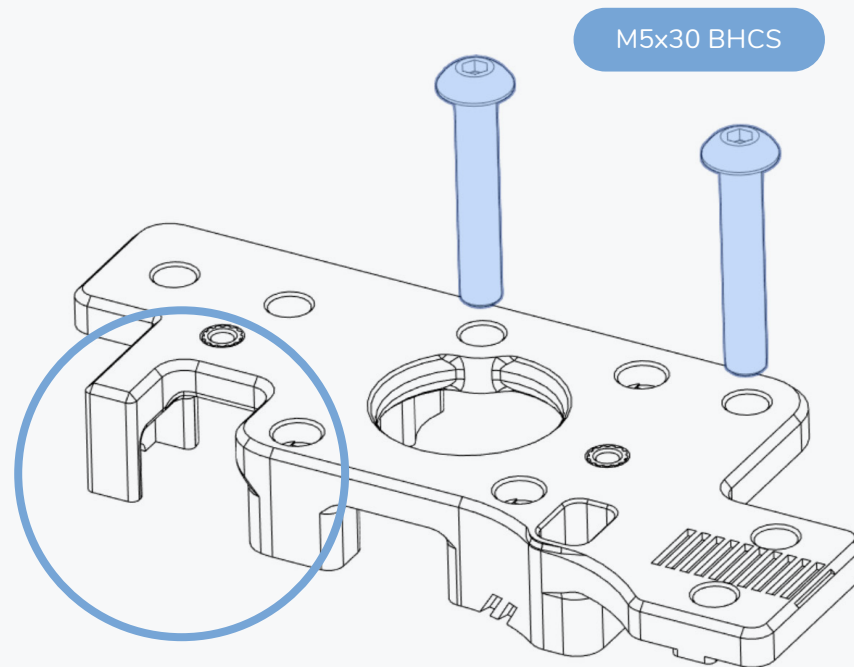






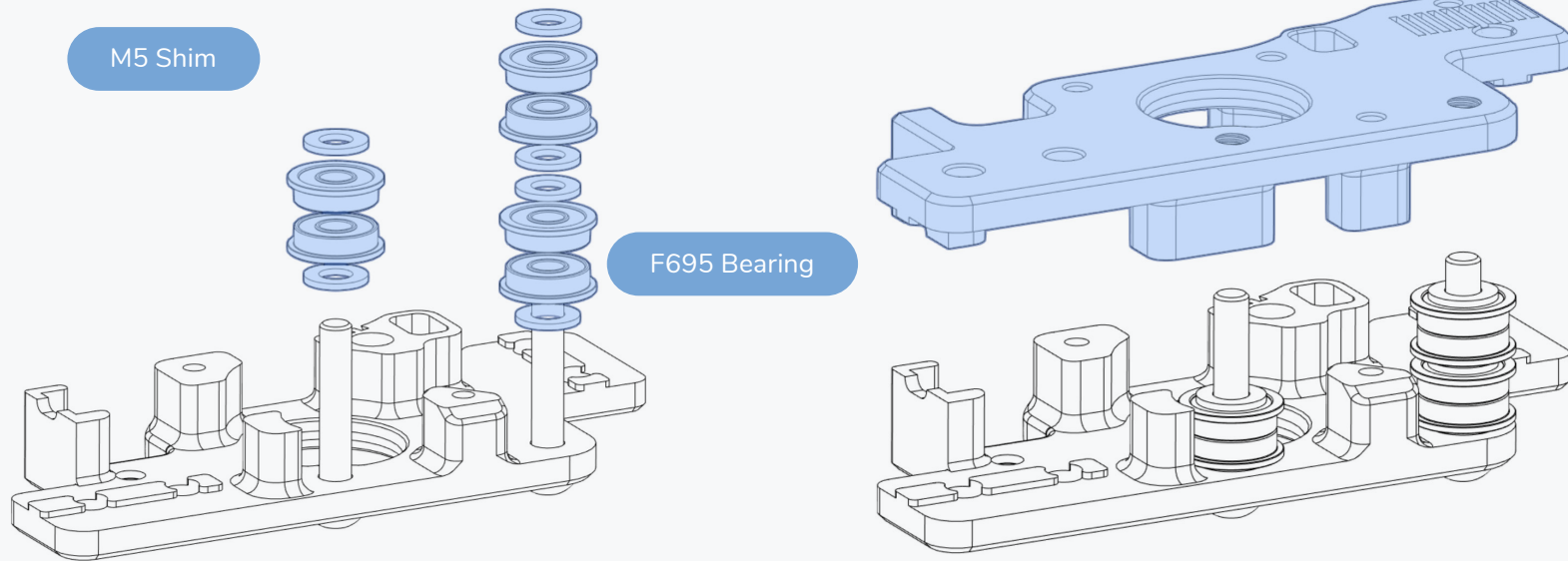
**CHECK YOUR WORK**

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



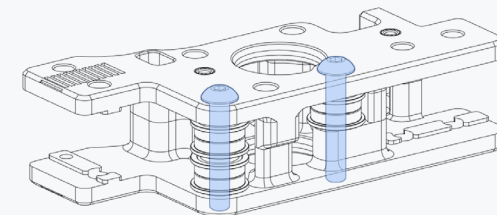
CUTOUT

The printed parts for the A drive have a cutout.



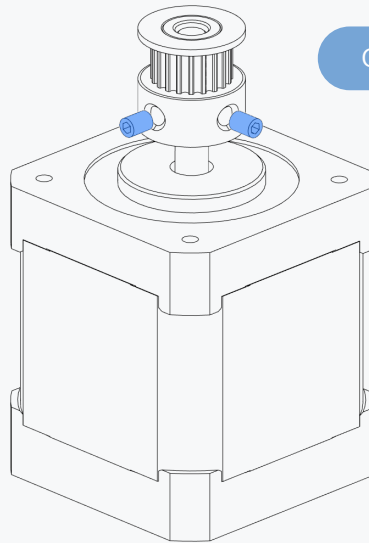
UPSIDE DOWN ASSEMBLY

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



DON'T OVER TIGHTEN

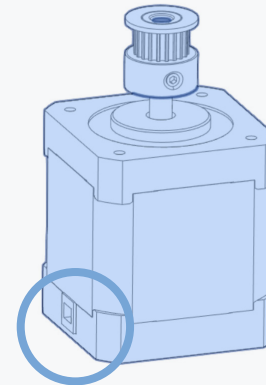
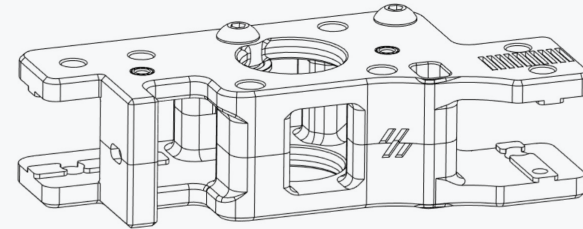
The M5 bolts are threaded directly into plastic.



GT2 20 Tooth Pulley

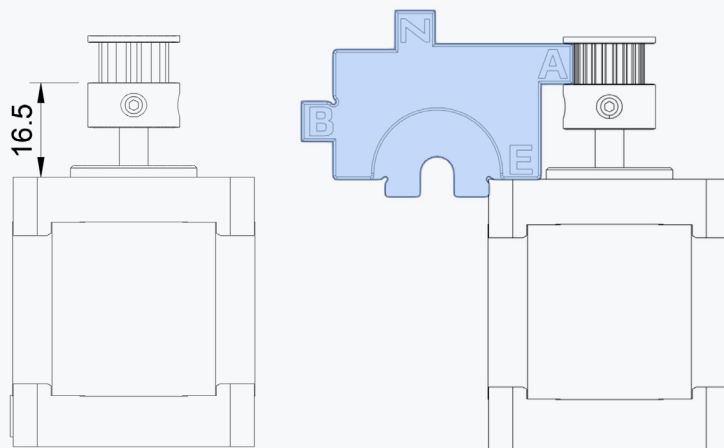
APPLY THREAD LOCKER

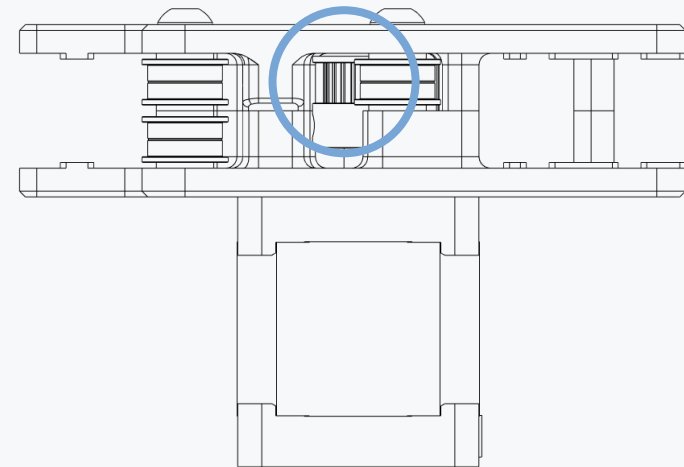
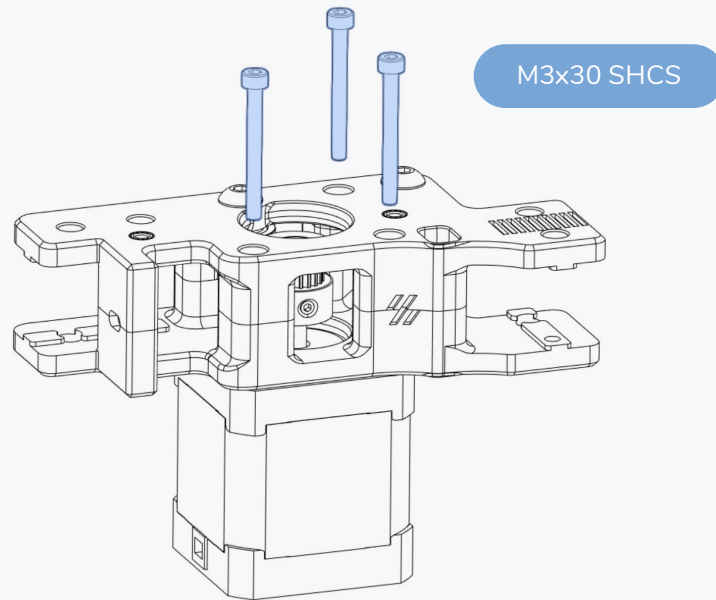
Make sure to use thread locker on the set screws.



MOTOR ORIENTATION

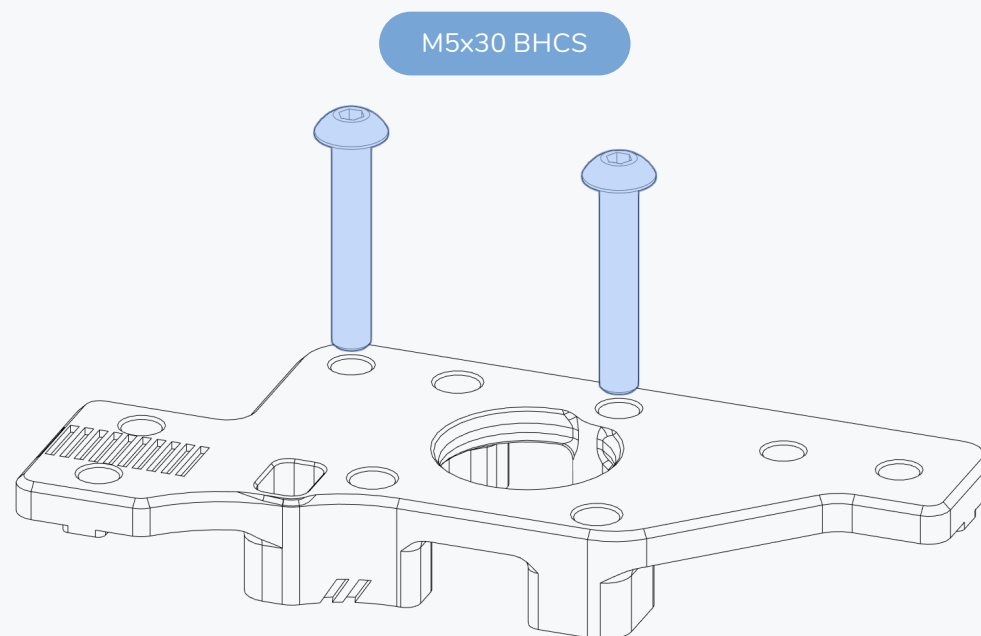
Pay attention to the orientation of the cable exit. The wires from the motors will be pointing towards each other once fully assembled.

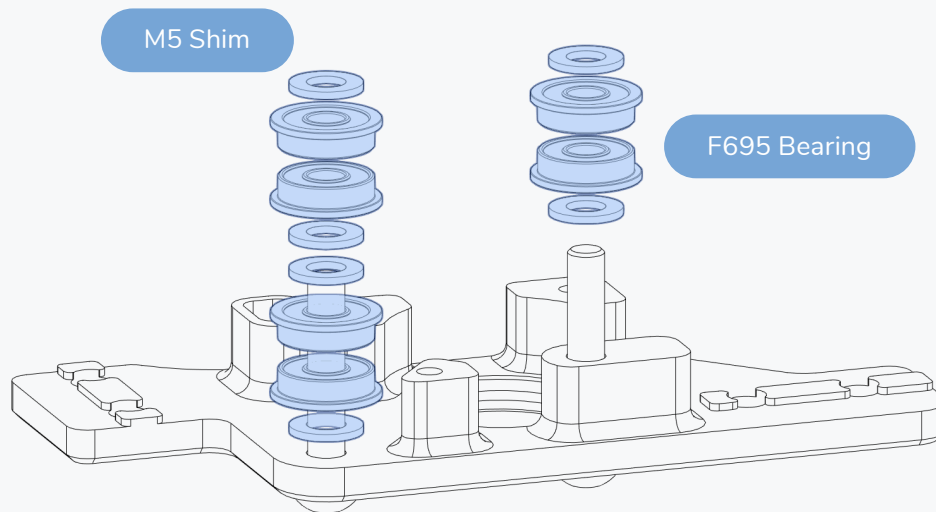


**CHECK YOUR WORK**

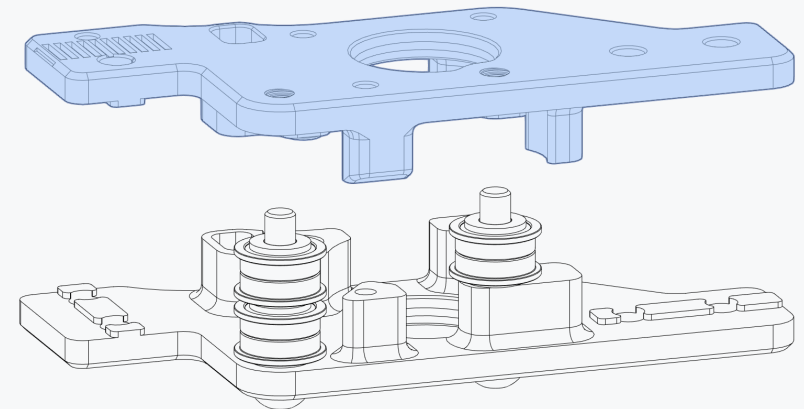
Compare your assembled part to the graphic shown here.

Pay attention to the pulley orientation and alignment with the bearing stack ups.

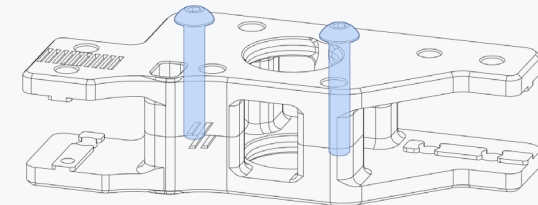


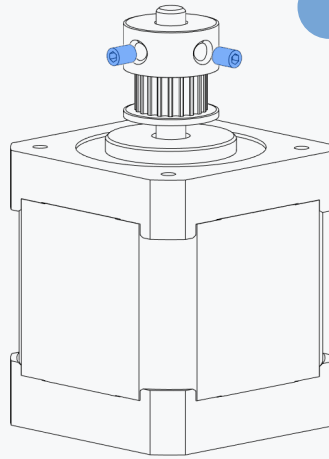
**UPSIDE DOWN ASSEMBLY**

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.

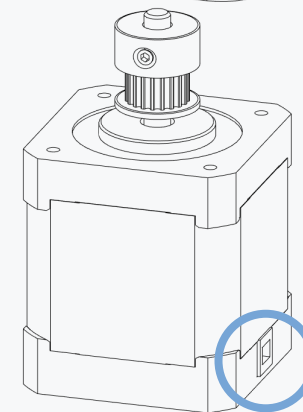
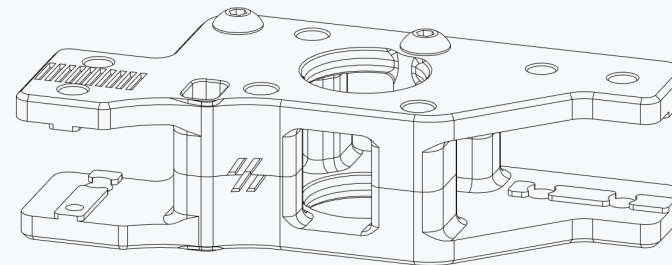
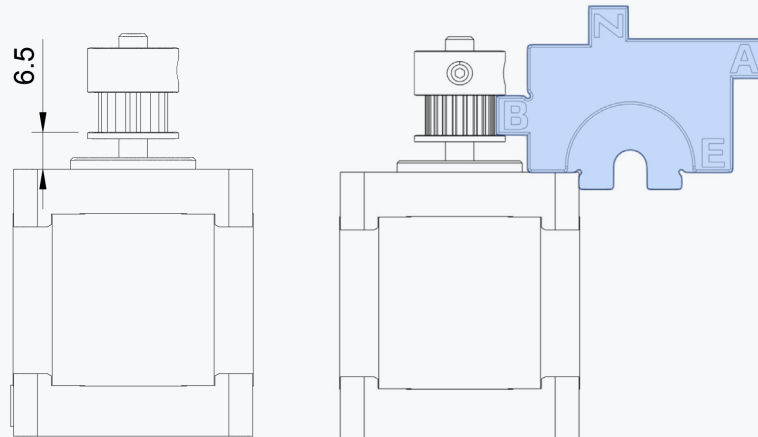




GT2 20 Tooth Pulley

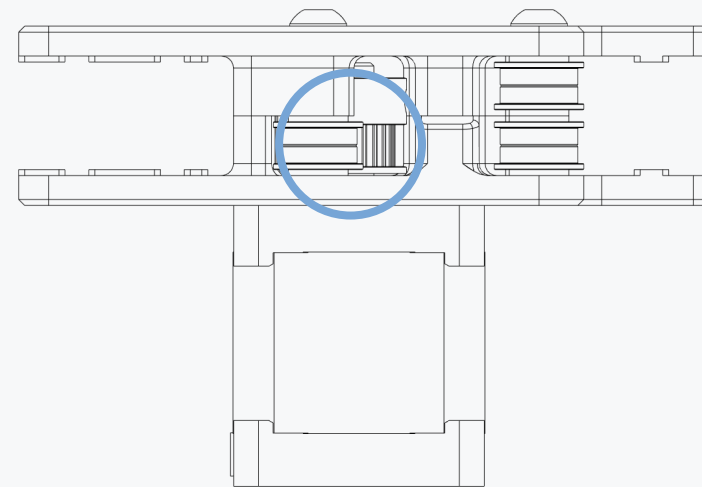
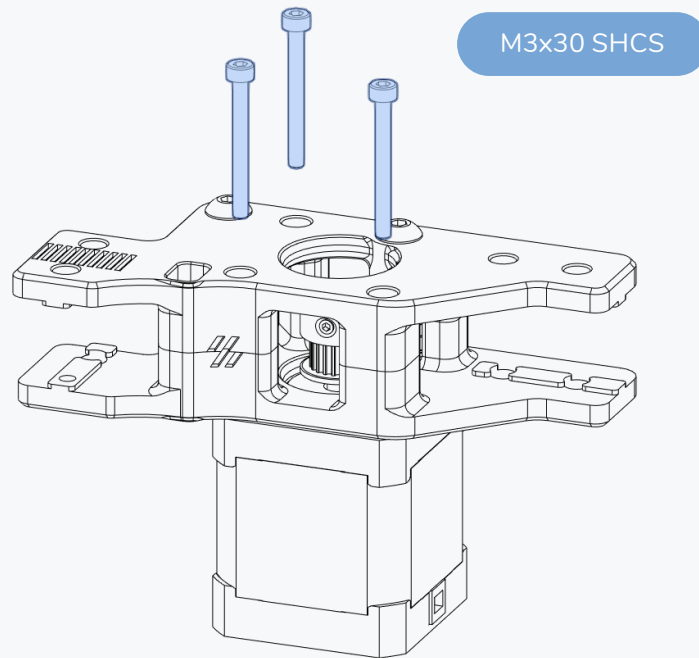
APPLY THREAD LOCKER

Make sure to use thread locker on the set screws.



MOTOR ORIENTATION

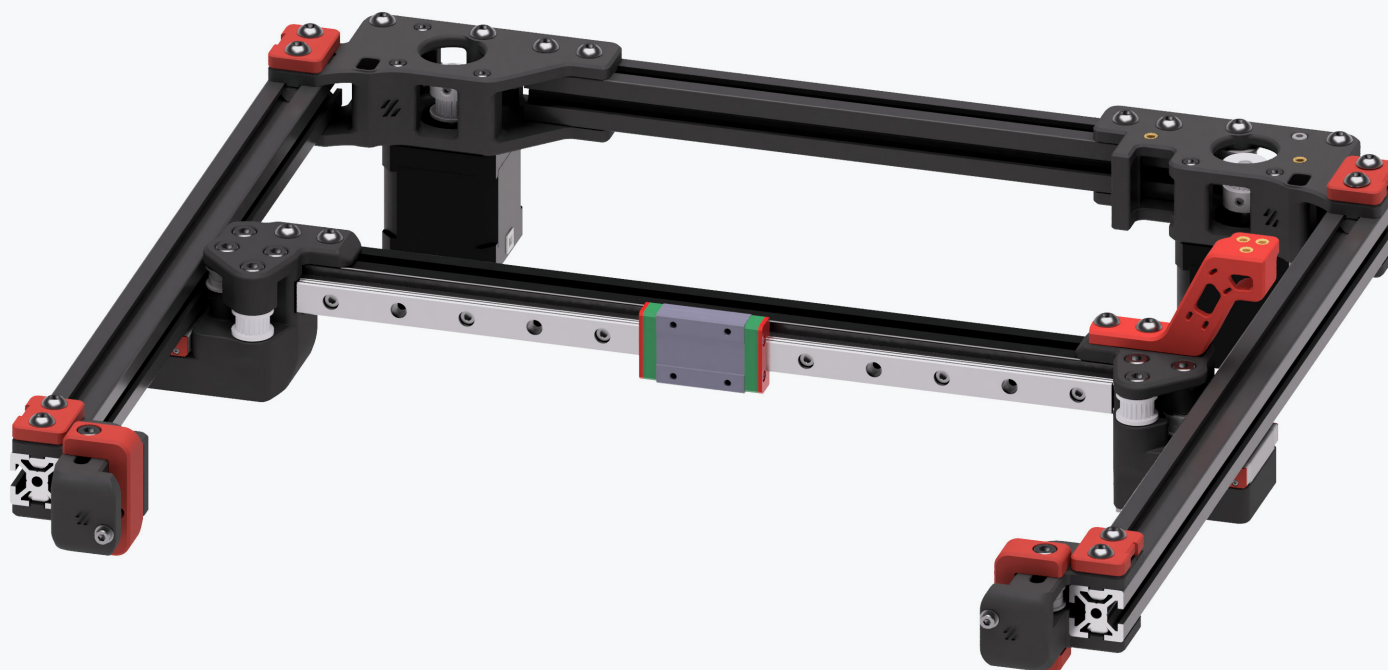
Pay attention to the orientation of the cable exit.

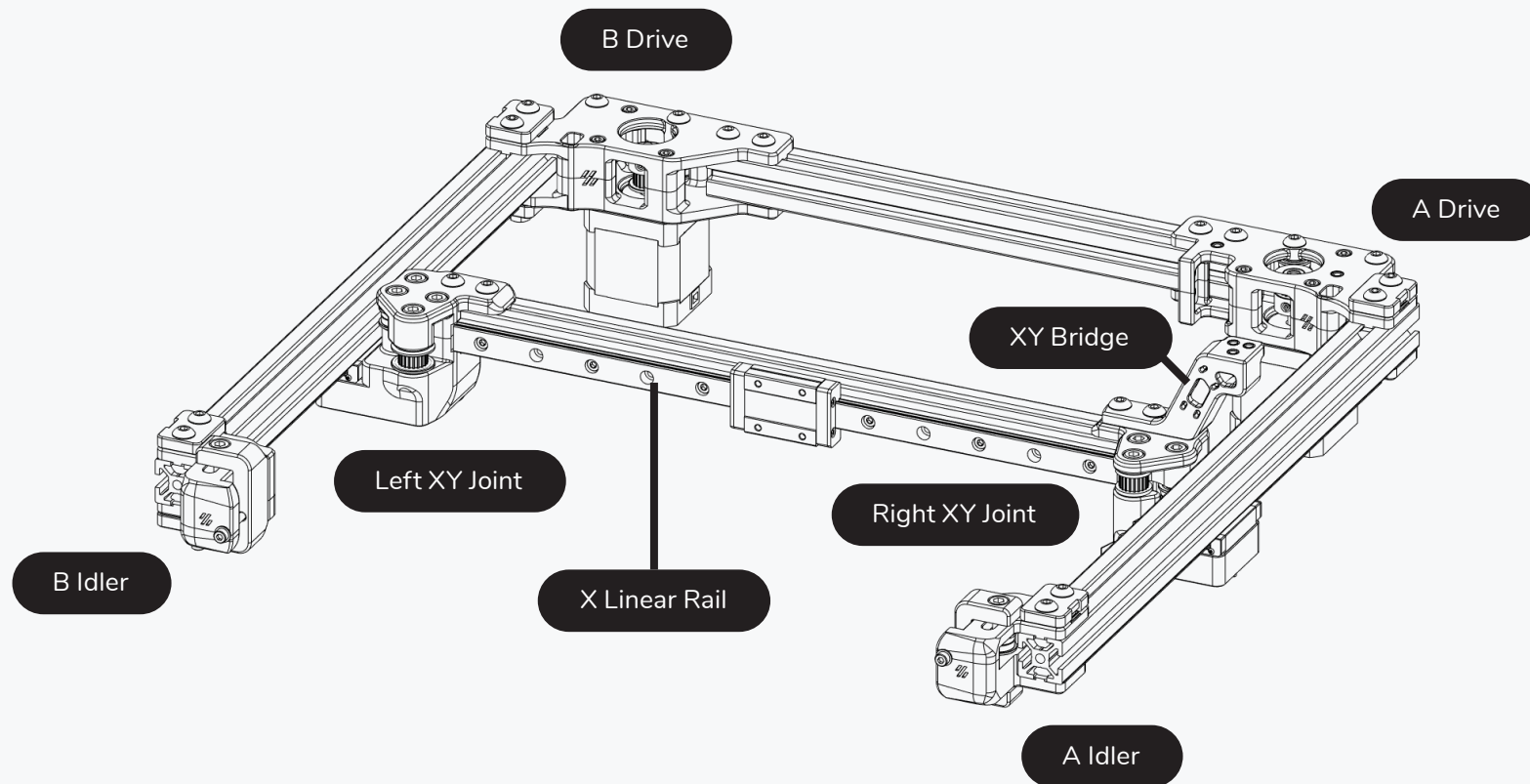
**CHECK YOUR WORK**

Compare your assembled part to the graphic shown here.

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

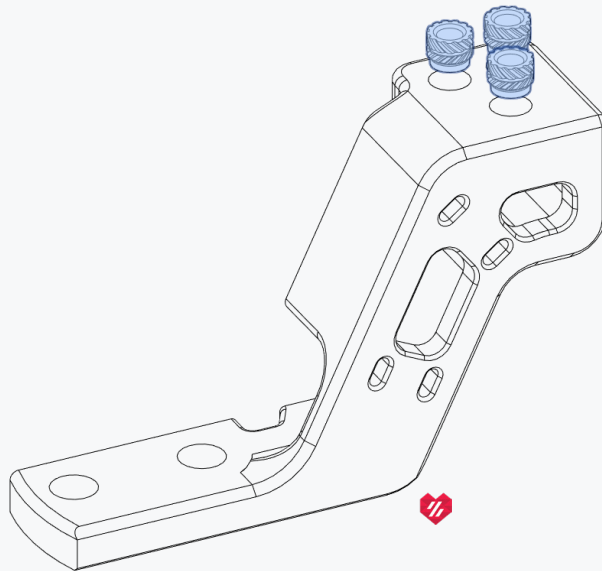
V24 (not V2.4) was an experimental design, only 2 have ever been built. It's design became the basis for the Voron2.





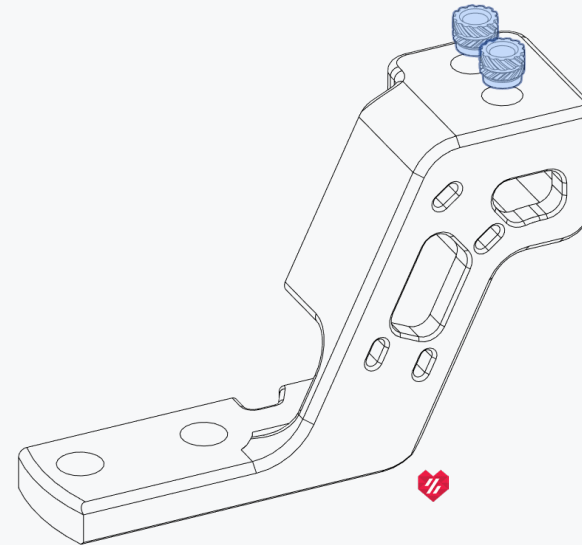
GENERIC CABLE CHAINS

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



IGUS CABLE CHAINS

IGUS chains have 2 mounting holes.



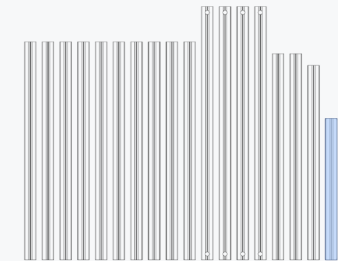
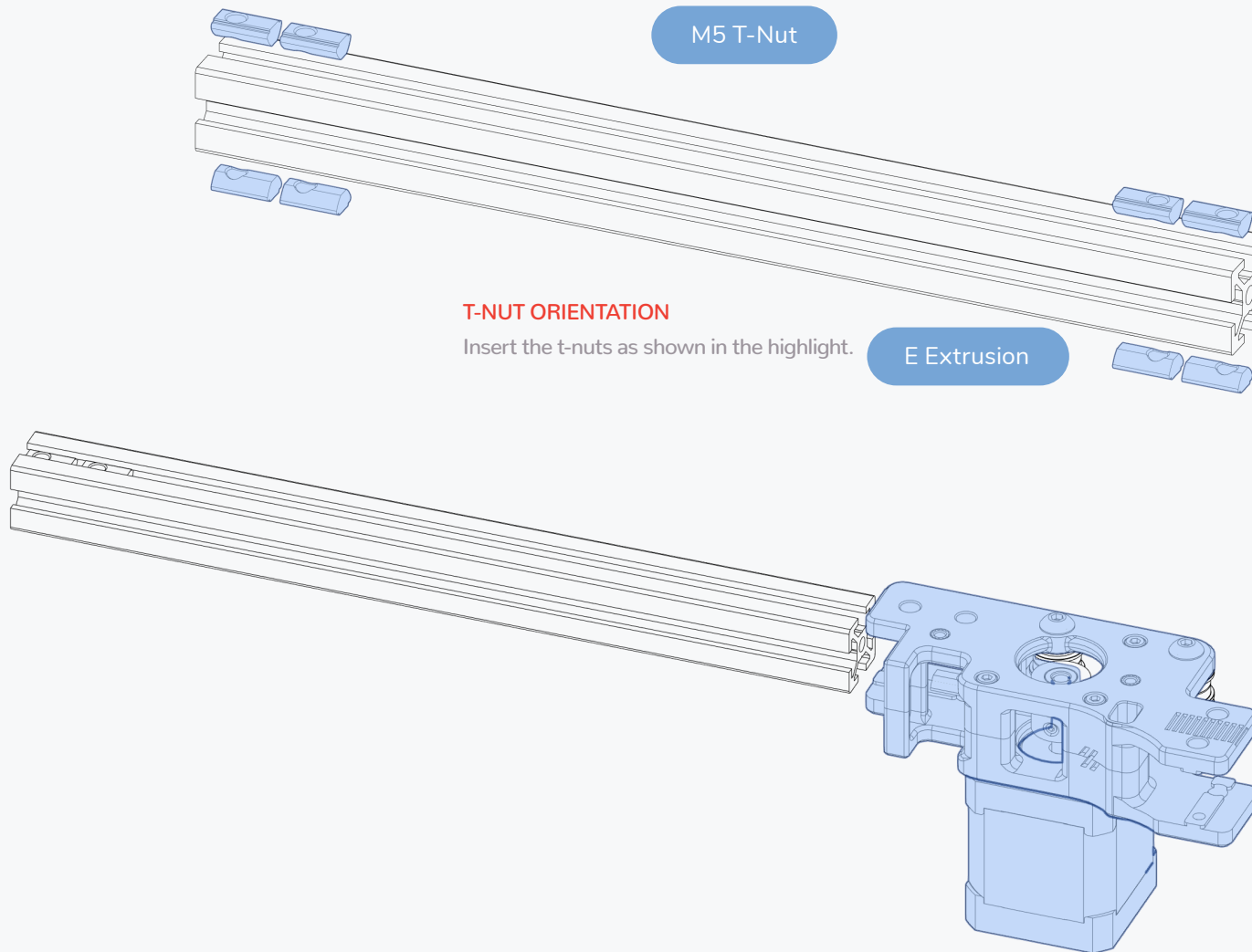
WHICH TO CHOOSE?

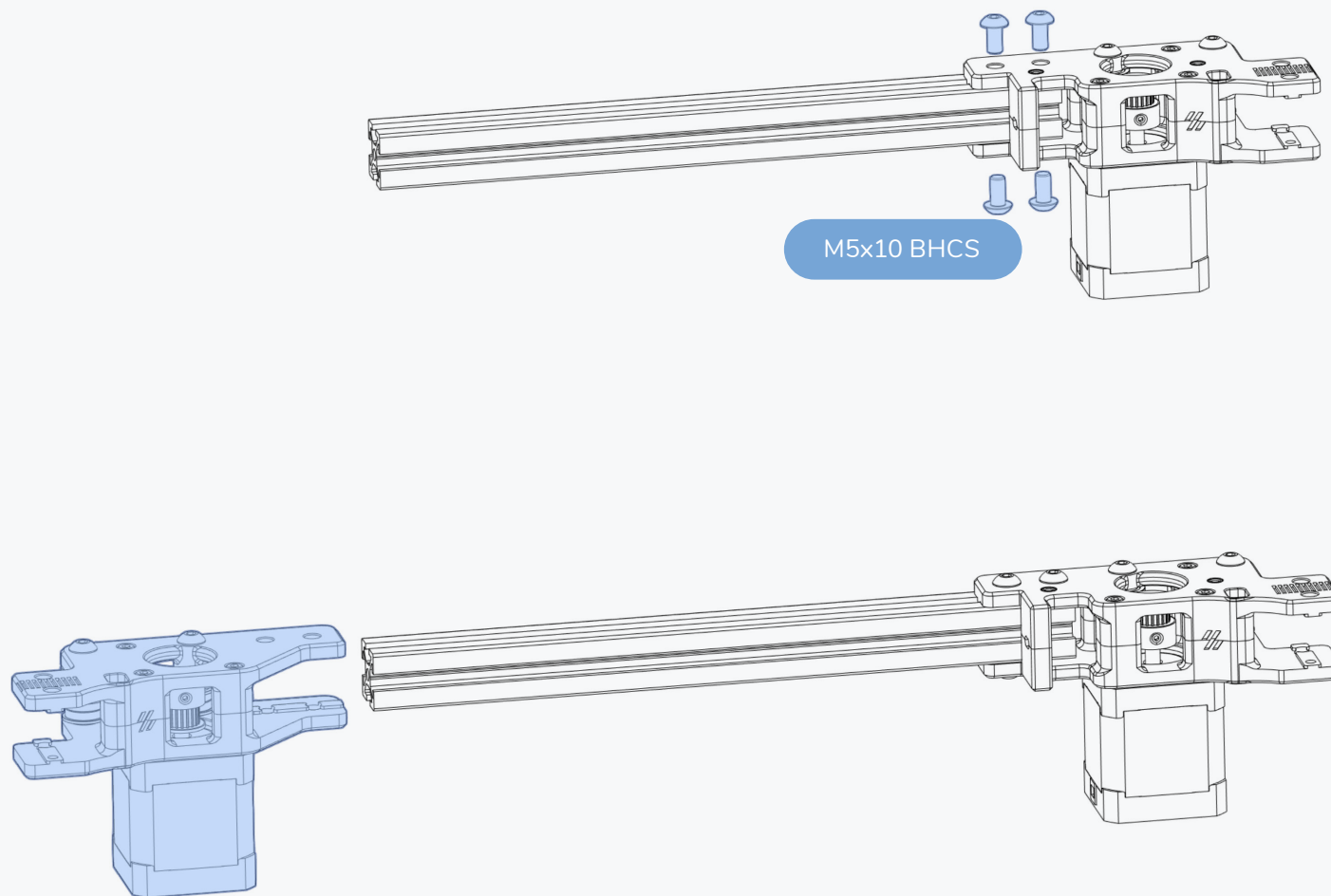
Pick the style that matches the mounting pattern of your cable chains.

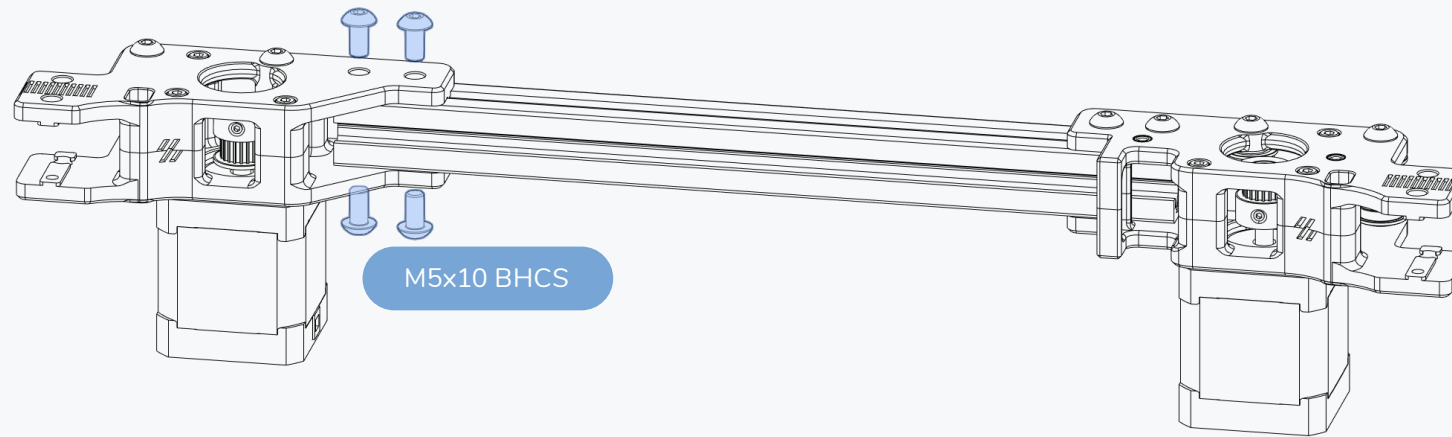


GANTRY

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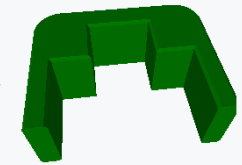






CENTRED RAIL INSTALLATION GUIDE

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



MGN9 Rail

T-NUT ORIENTATION

Insert the t-nuts as shown in the highlight.

M3 T-Nut

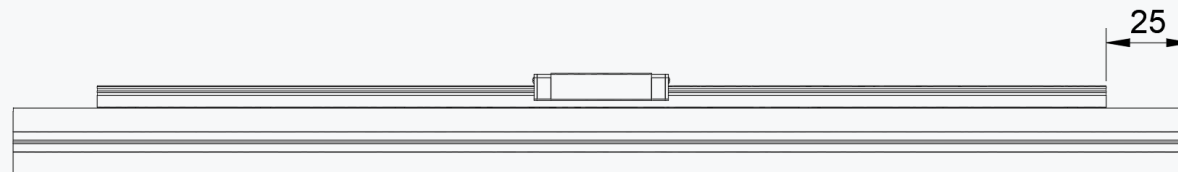
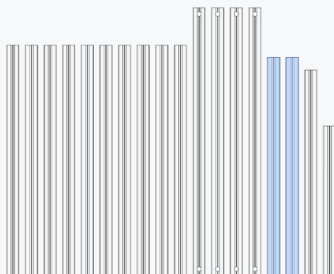
C Extrusion

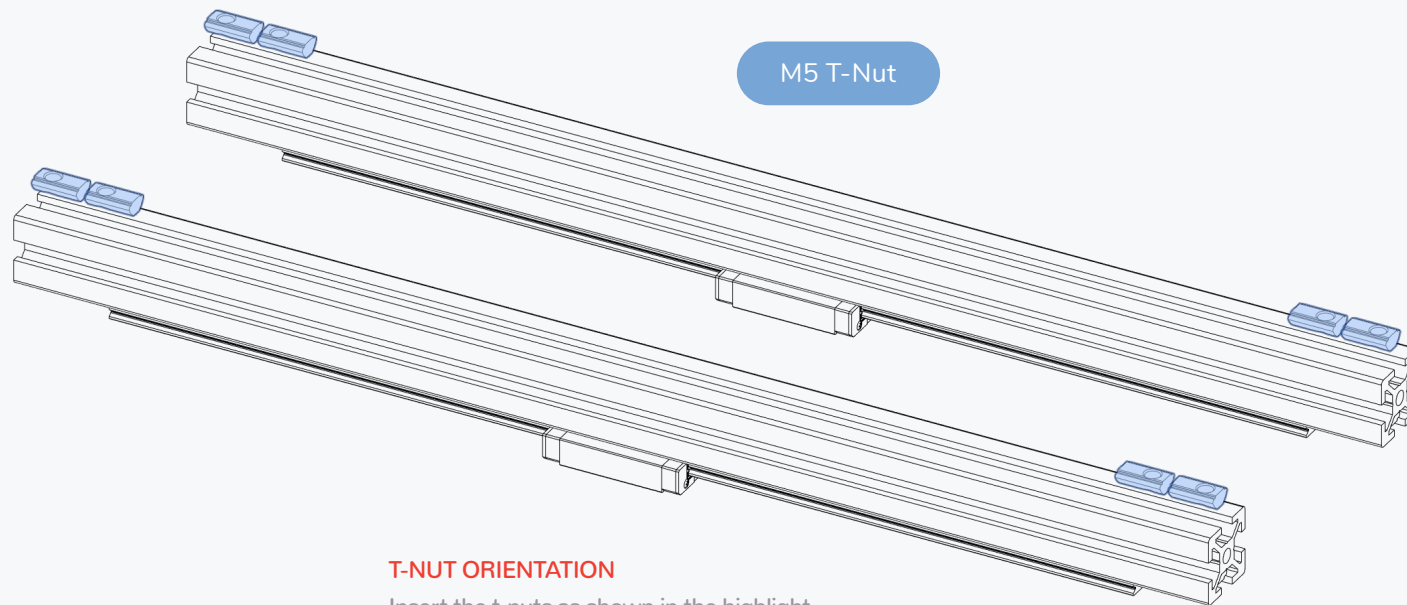
M3x8 SHCS

MIND THE CARRIAGE

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

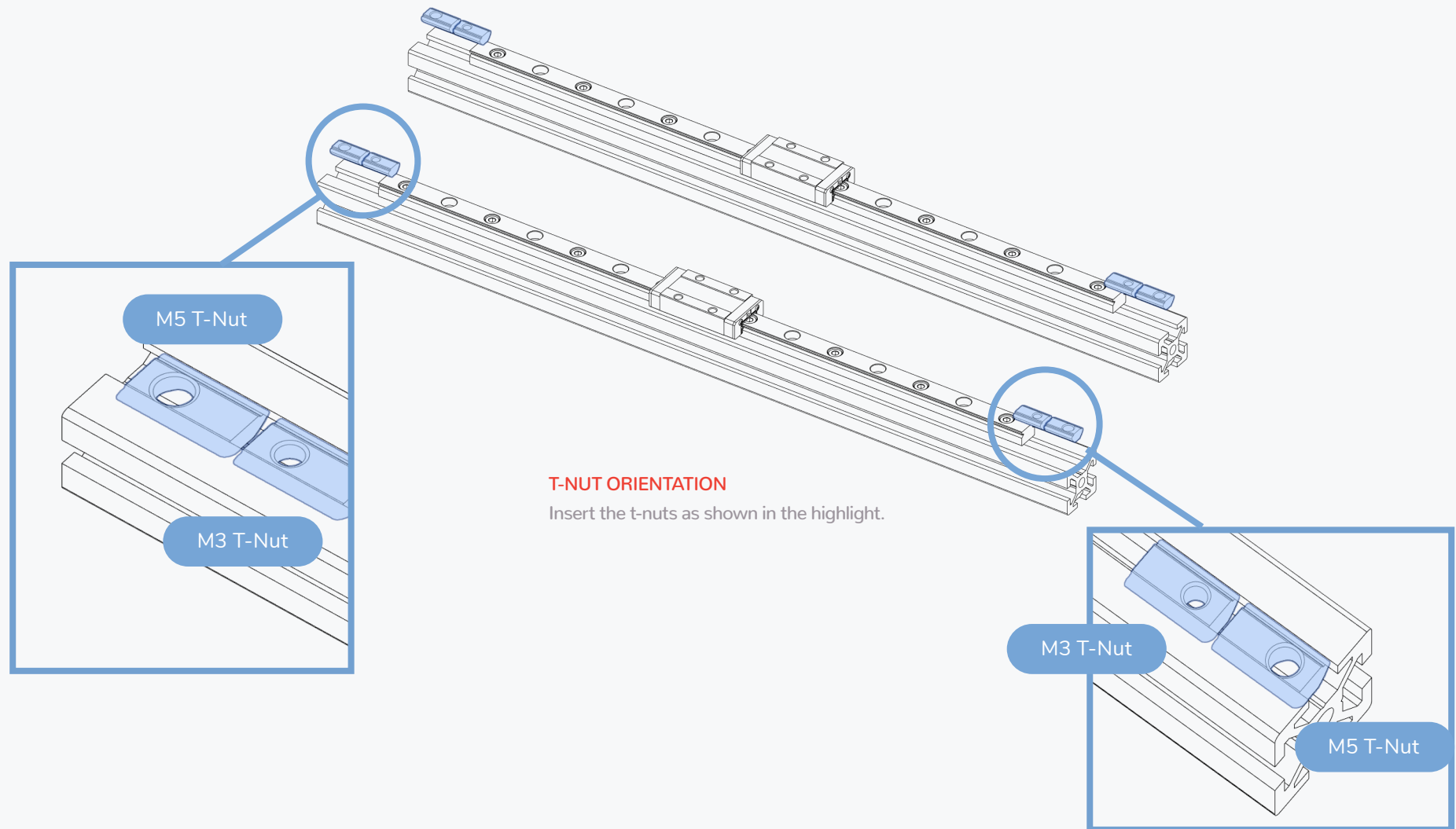
Dropping the carriage likely irreparably damages it.





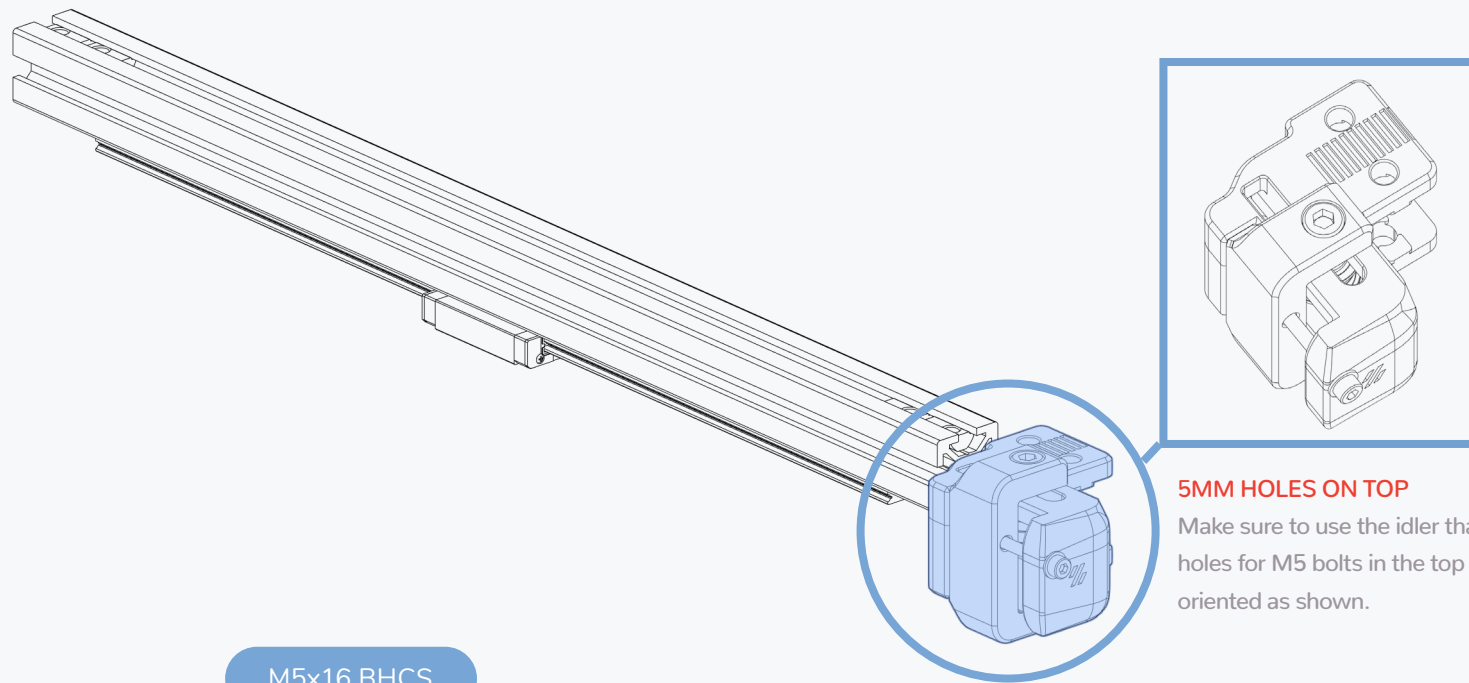
T-NUT ORIENTATION

Insert the t-nuts as shown in the highlight.

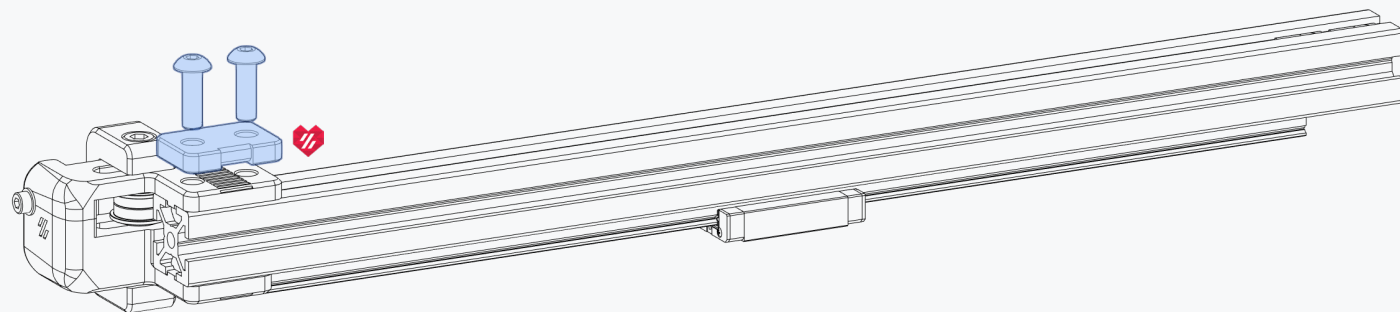


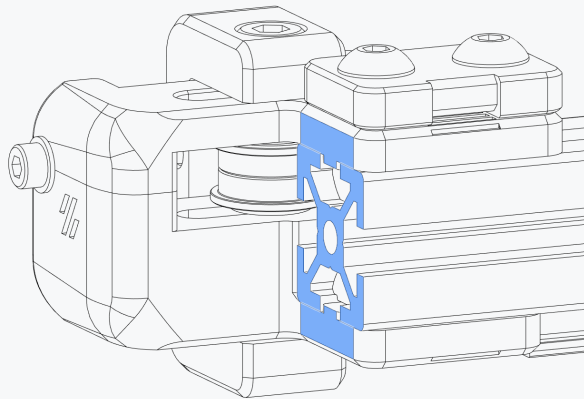
Y AXIS

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Make sure to use the idler that has 2 holes for M5 bolts in the top when oriented as shown.

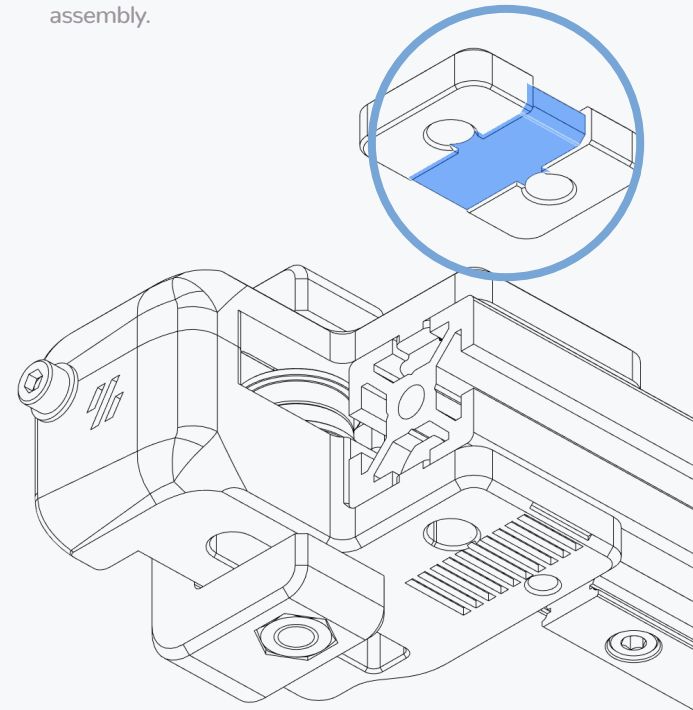


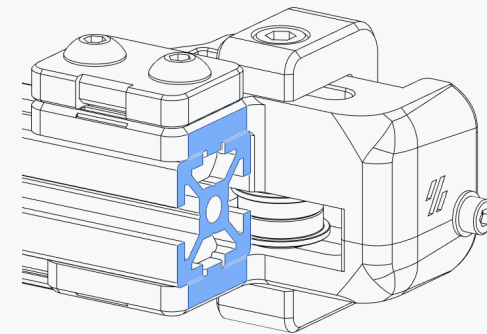
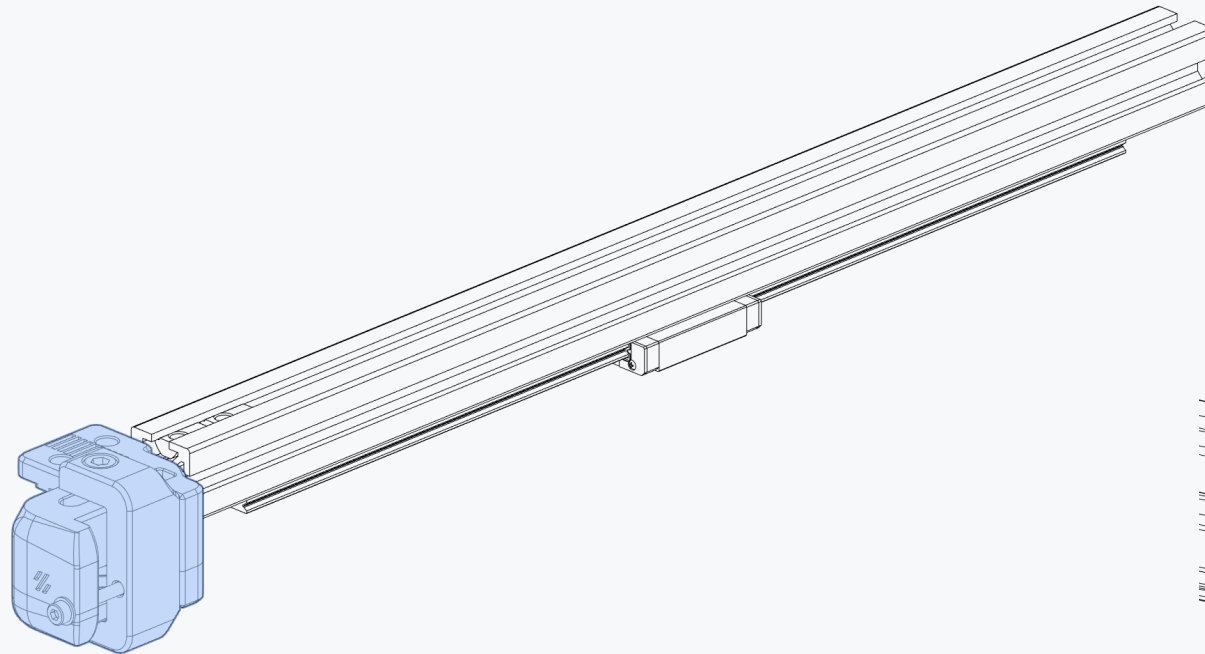
**FLUSH INSTALL**

Make sure the plastic part sits flush with the end of the extrusion. If not flush check if you installed the correct idler.

NOTCH ORIENTATION

The indentation along the part is designed to clamp on the belt. The notch points away from the idler assembly.

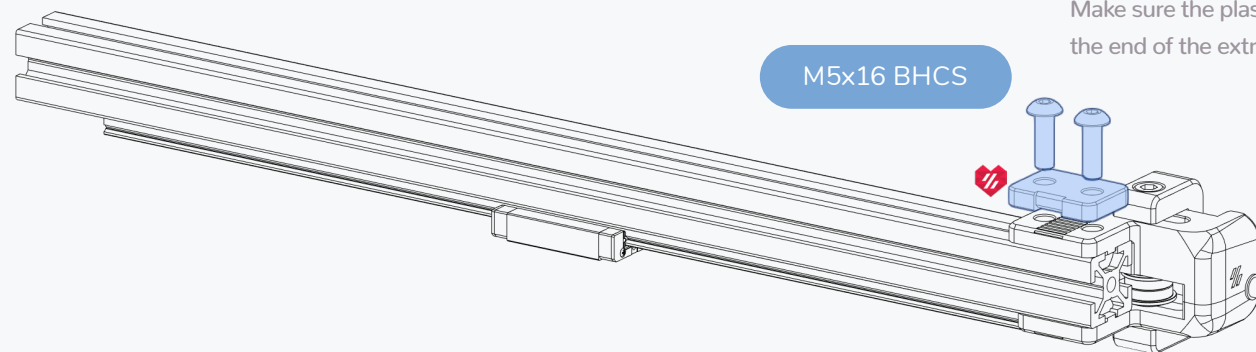


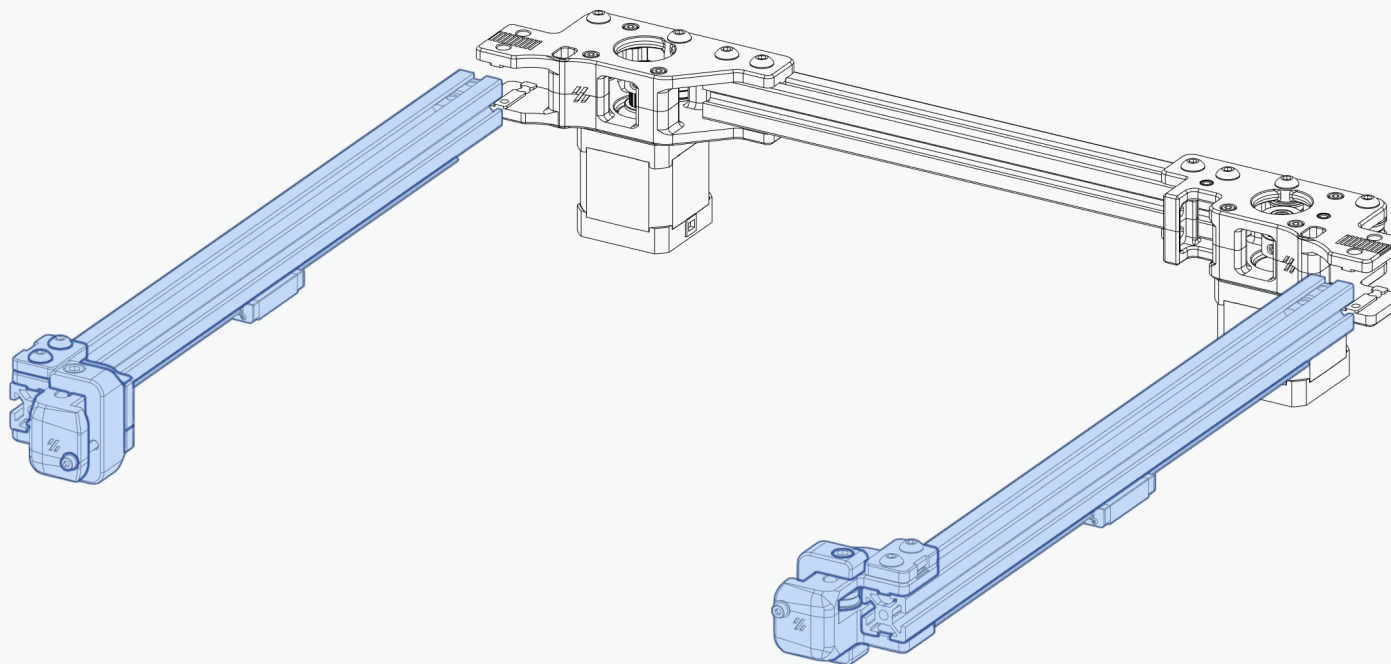


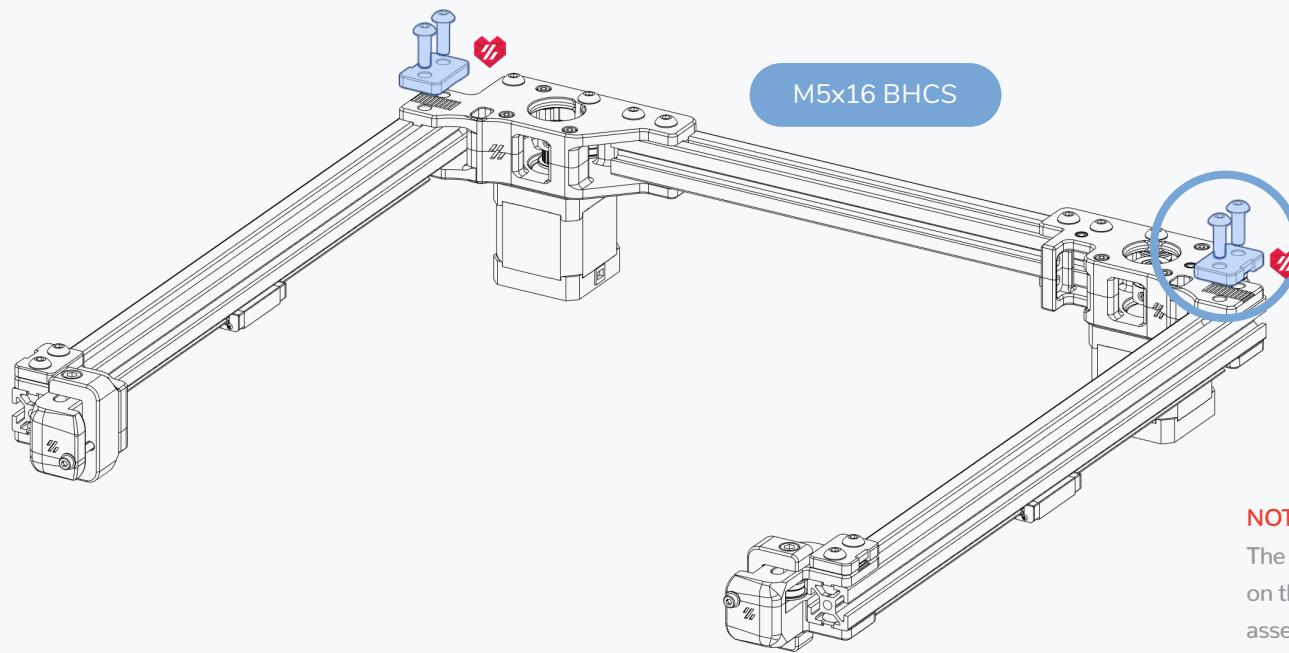
FLUSH INSTALL

Make sure the plastic part sits flush with the end of the extrusion.

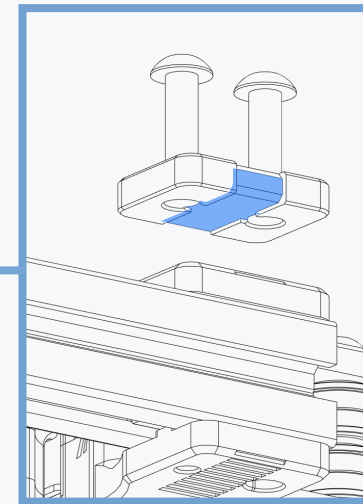
M5x16 BHCS







M5x16 BHCS

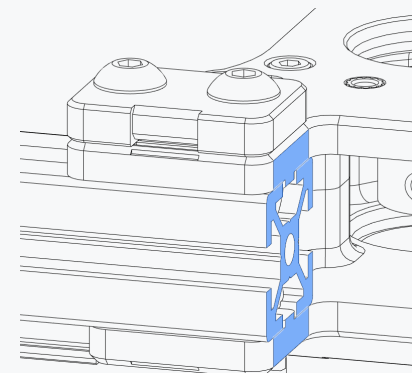


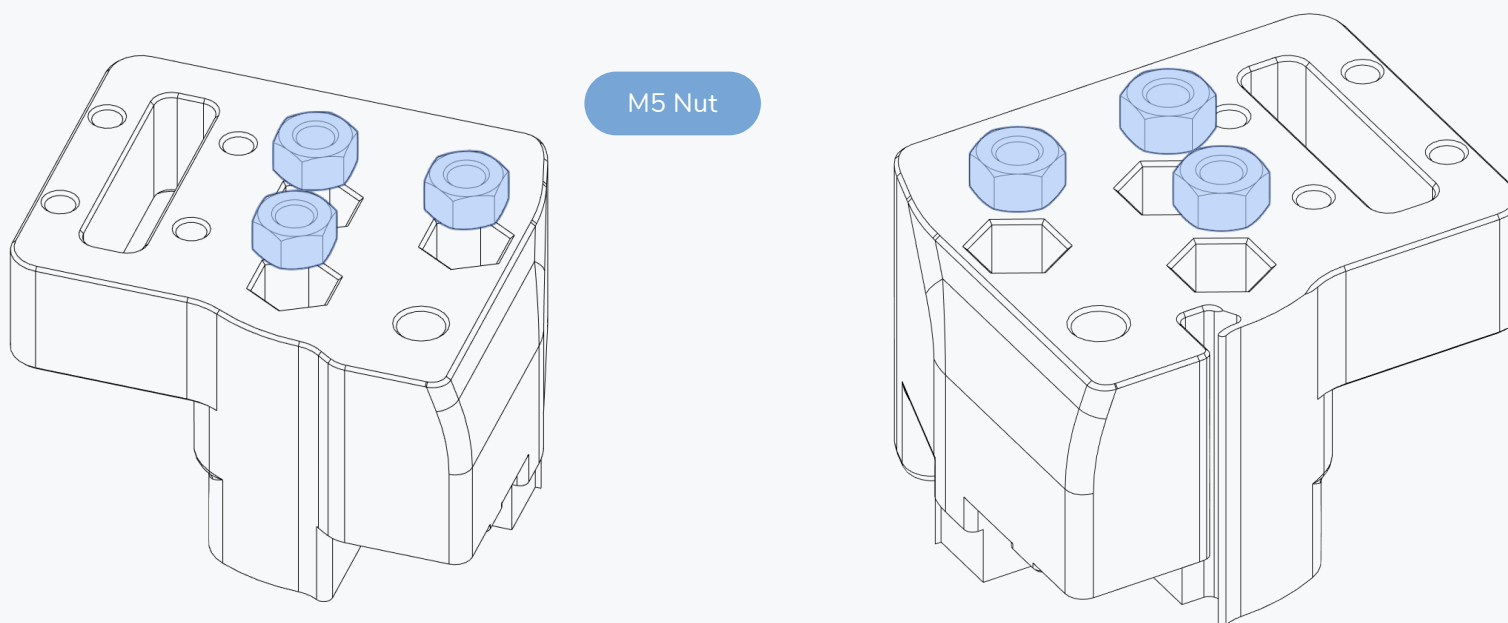
NOTCH ORIENTATION

The indentation along the part is designed to clamp on the belt. The notch points away from the drive assembly.

FLUSH INSTALL

Make sure the plastic part sits flush with the end of the extrusion.



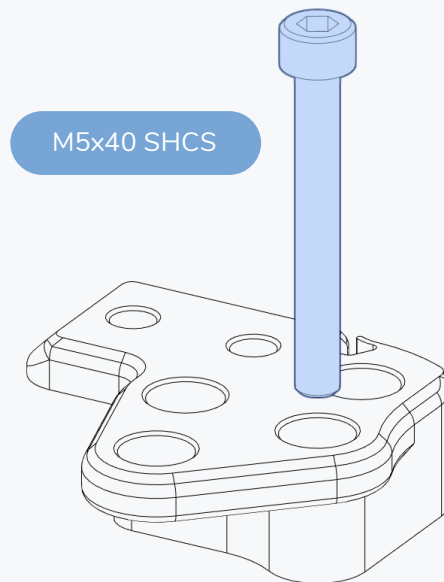
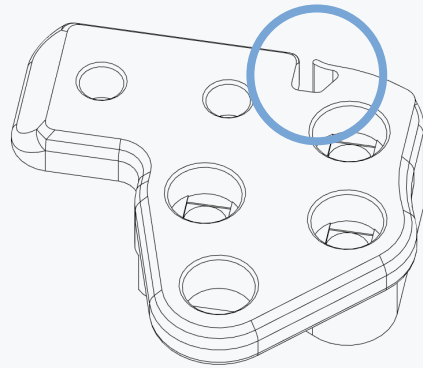


RIGHT XY JOINT

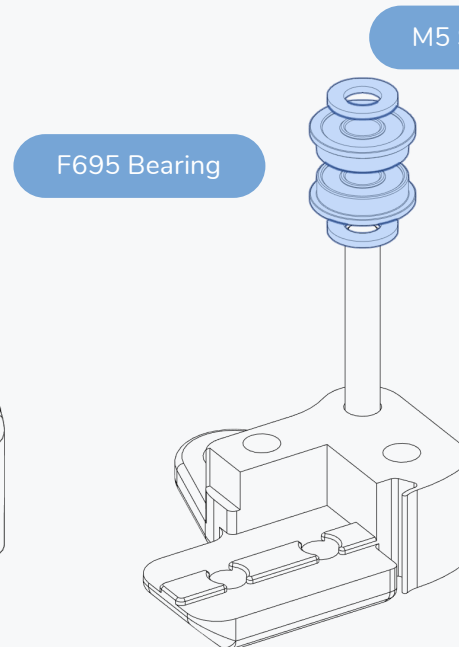
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CABLE PATH

The printed parts for the right XY joint have a small channel to guide the end stop wires..

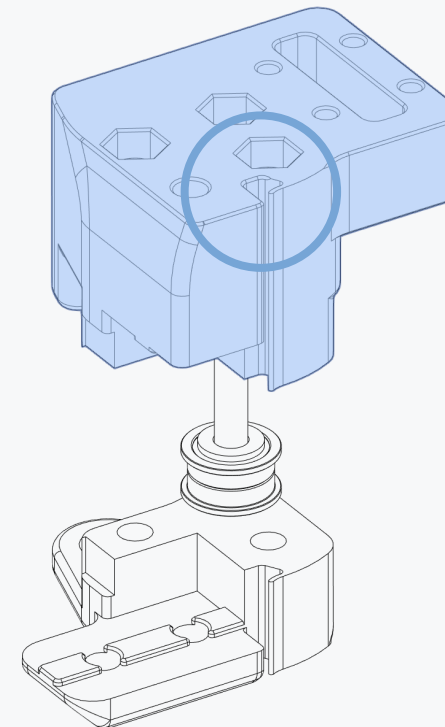


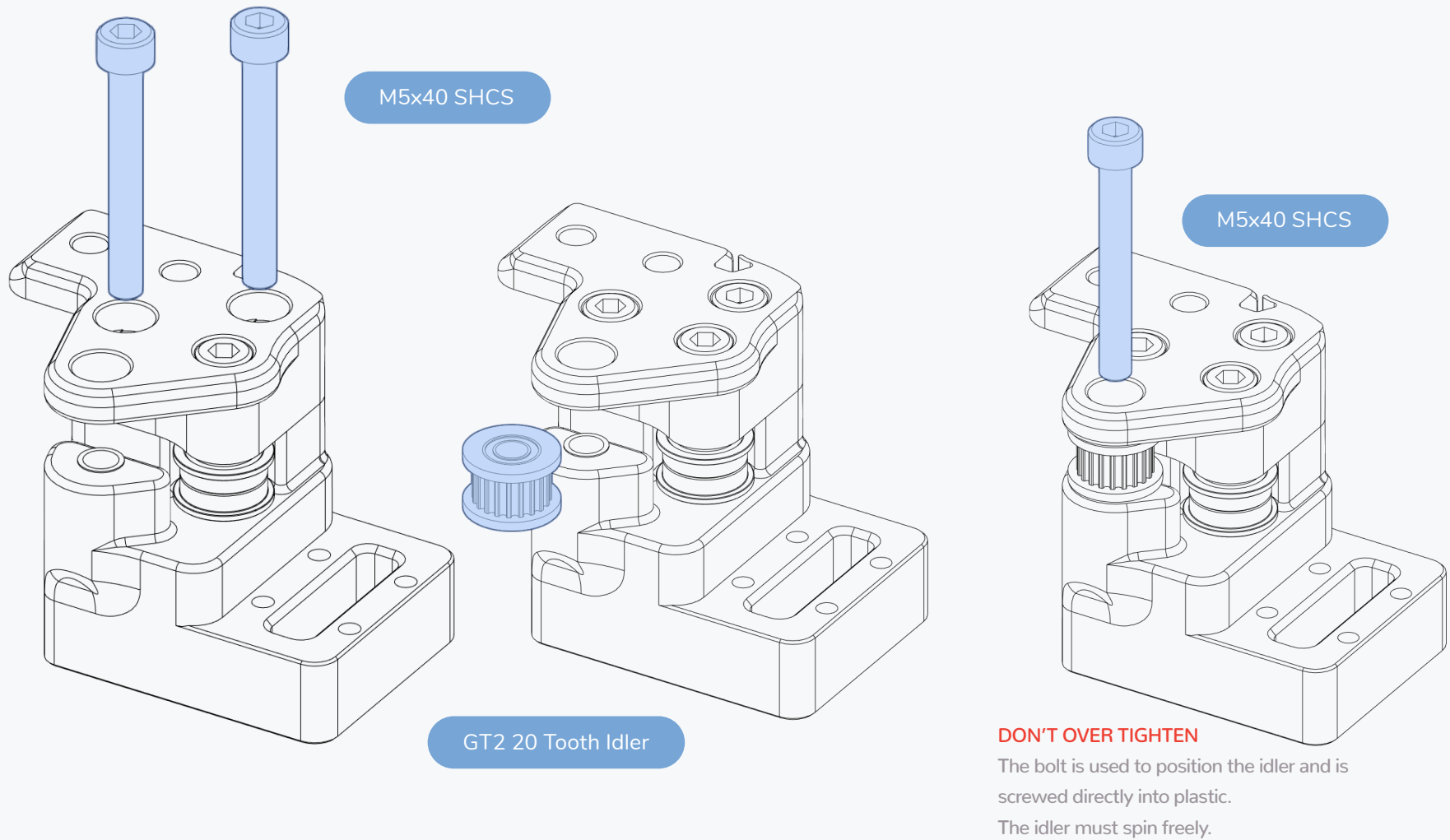
M5x40 SHCS



F695 Bearing

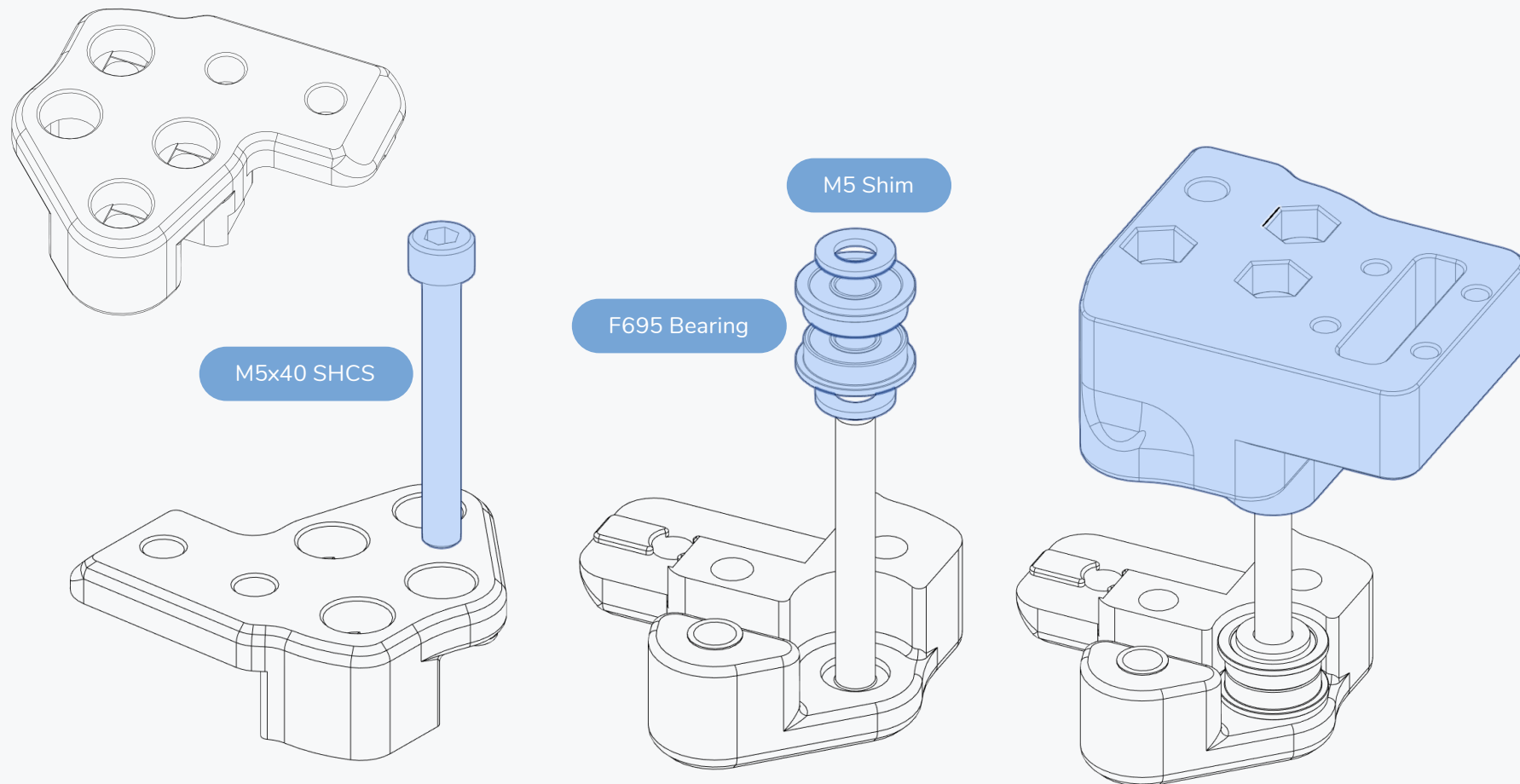
M5 Shim

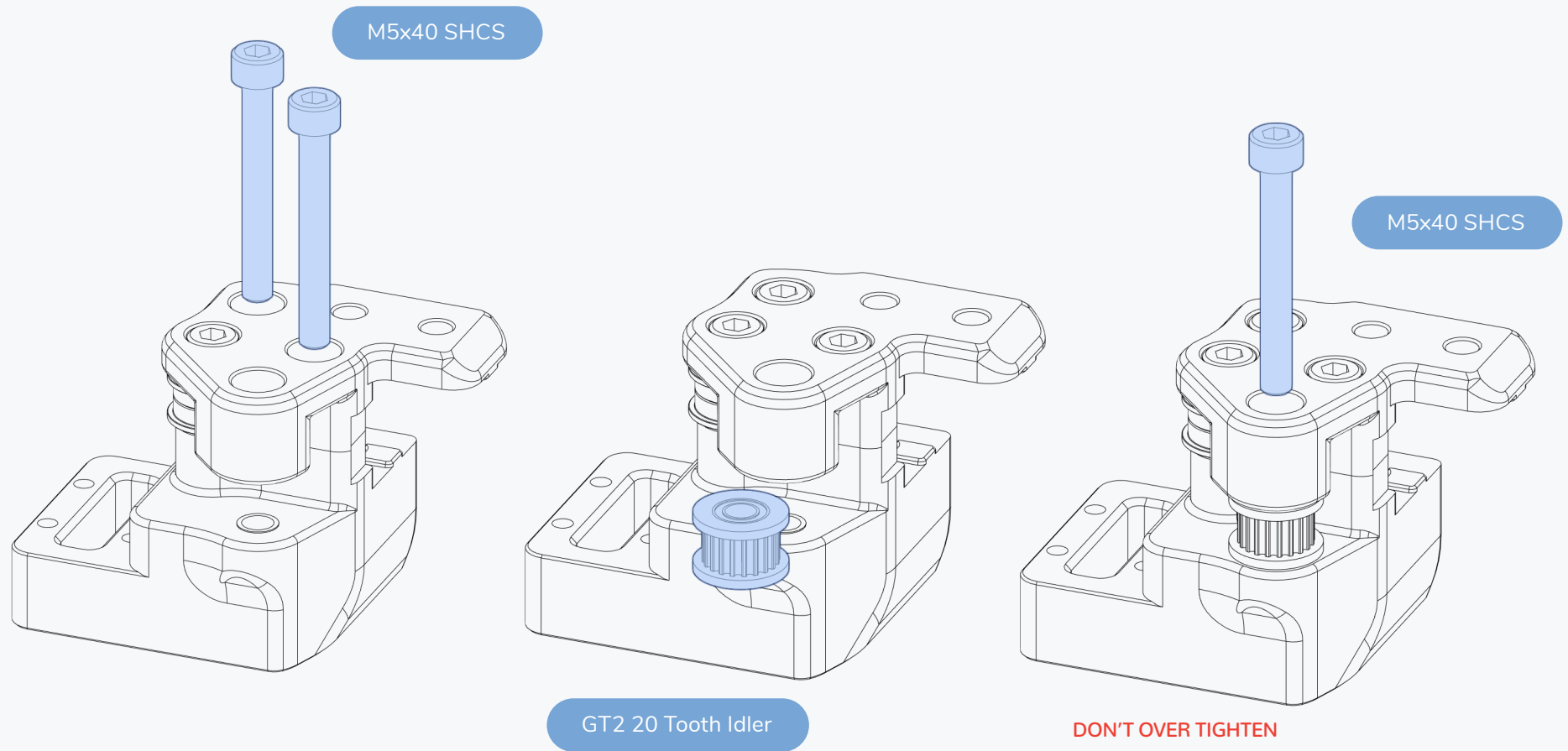


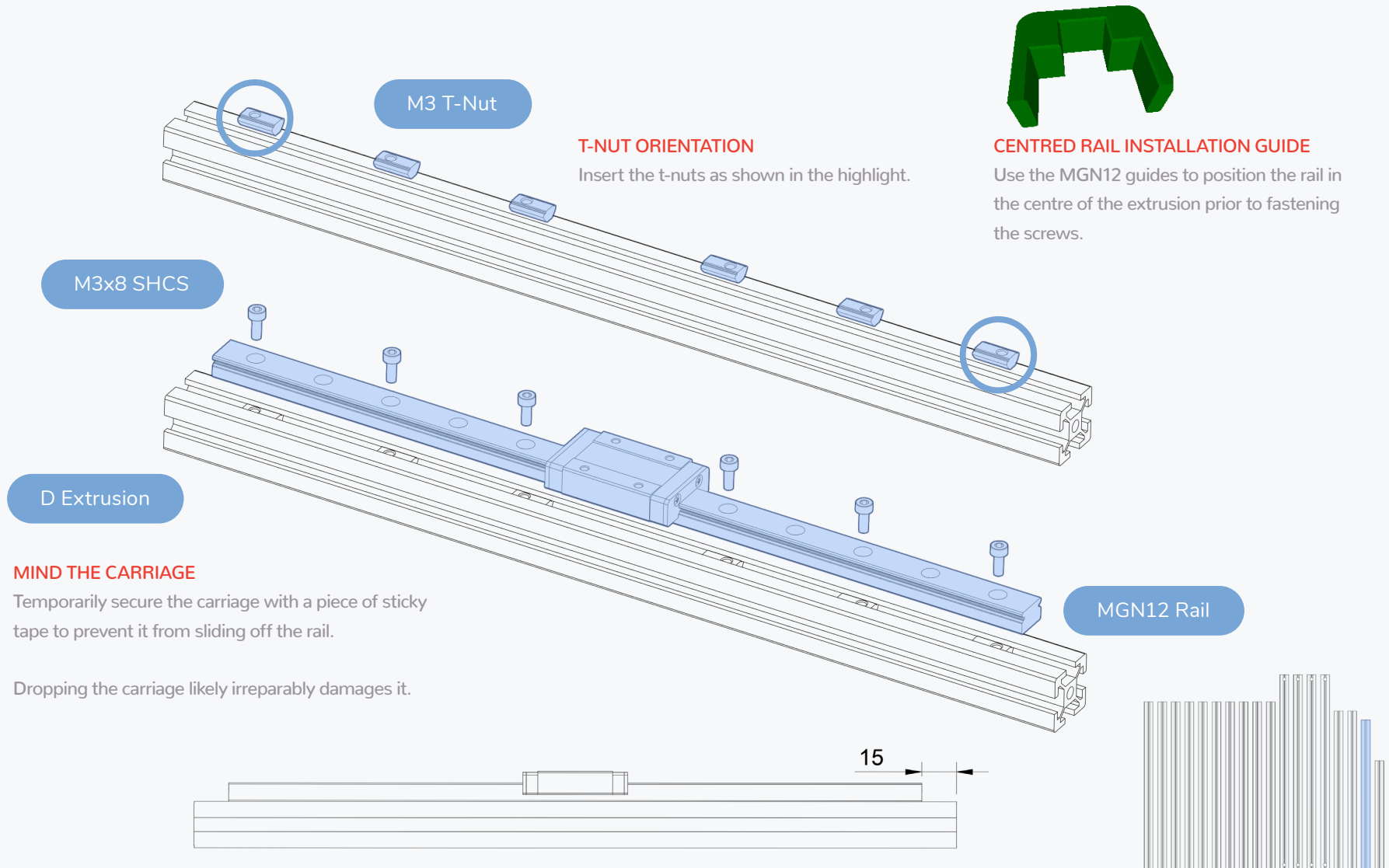


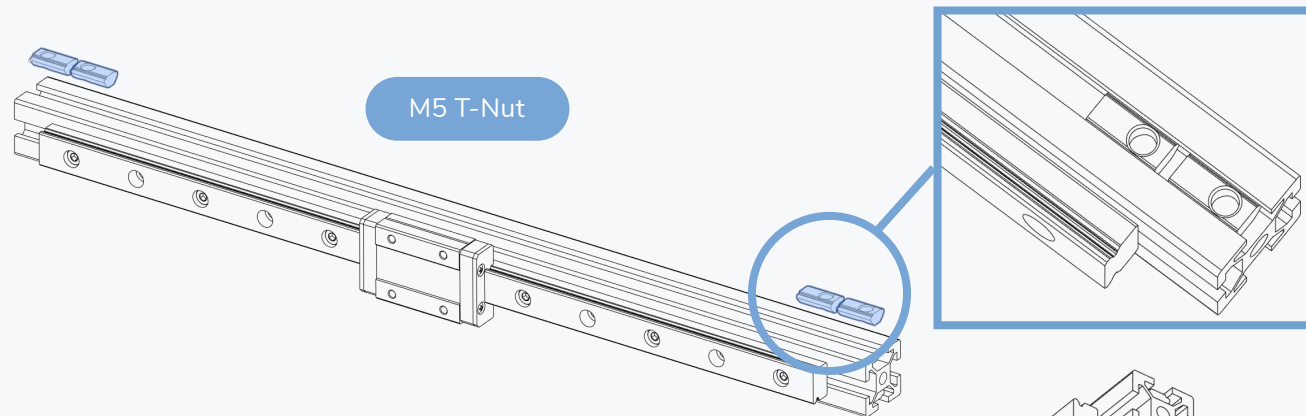
LEFT XY JOINT

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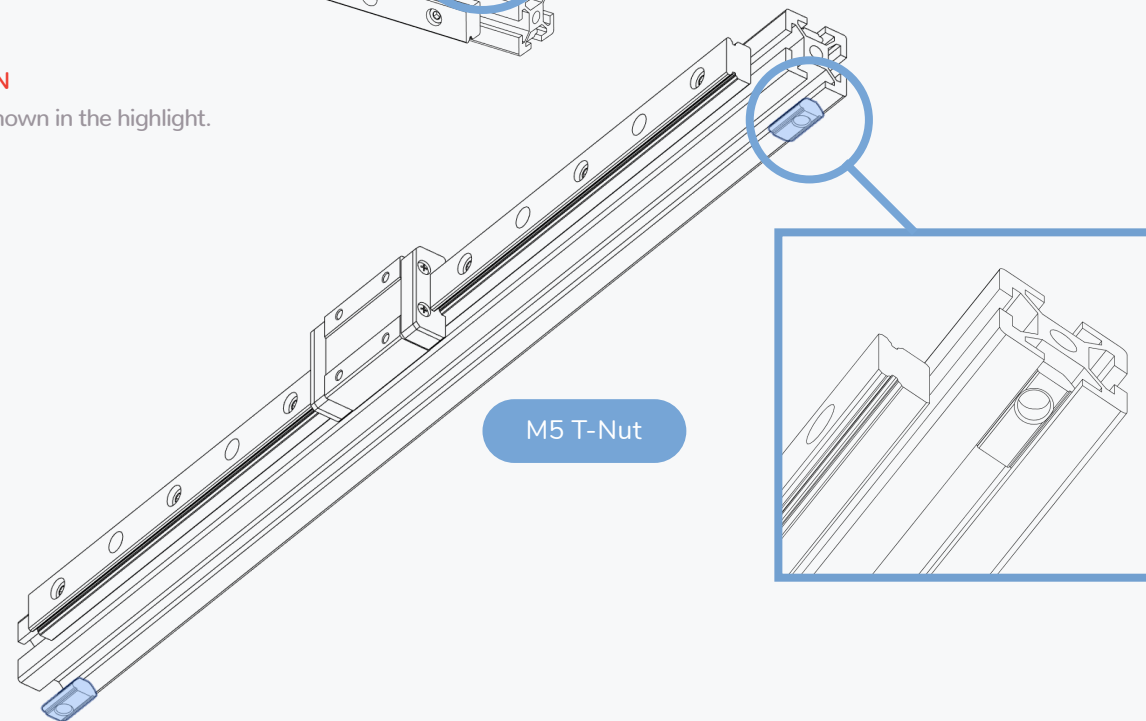


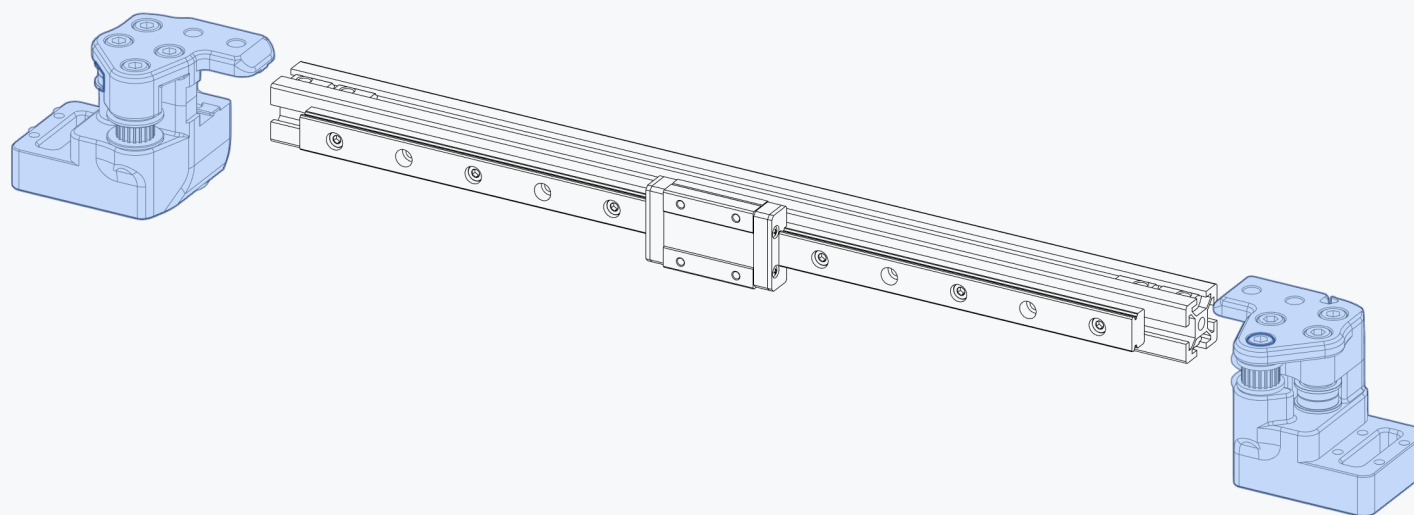




T-NUT ORIENTATION

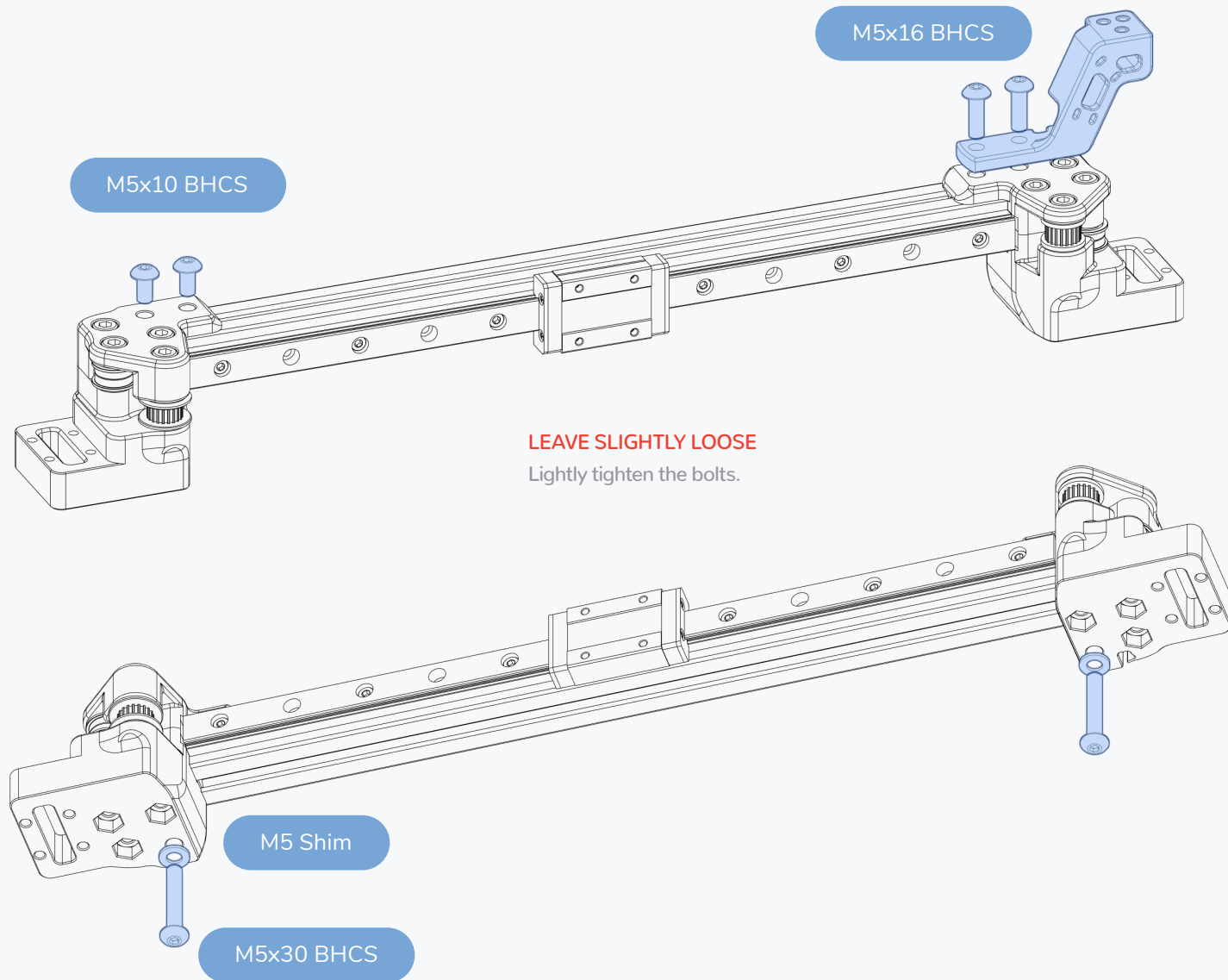
Insert the t-nuts as shown in the highlight.

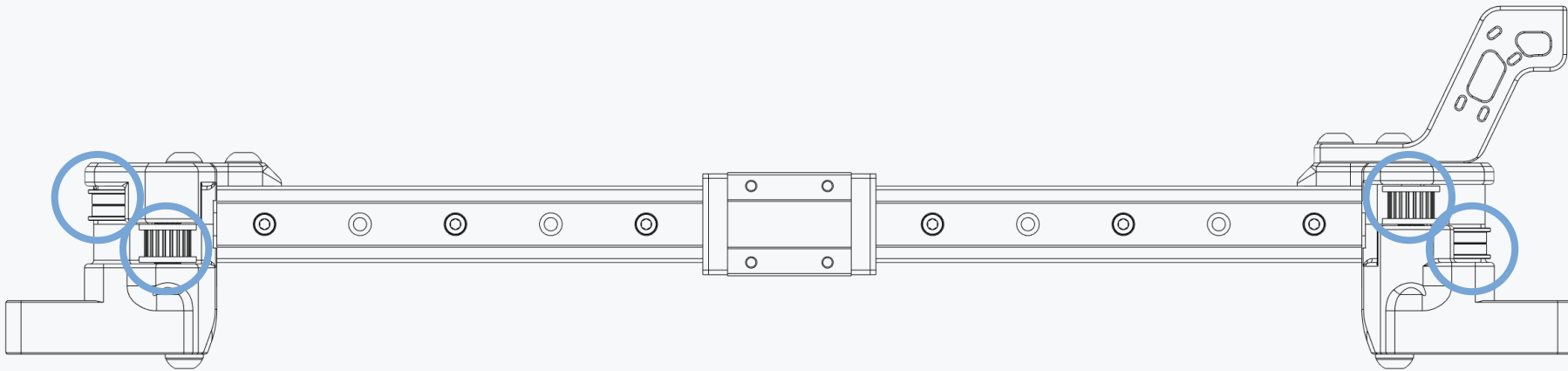




X AXIS

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**CHECK YOUR WORK**

Compare your assembled part to the graphic shown here.

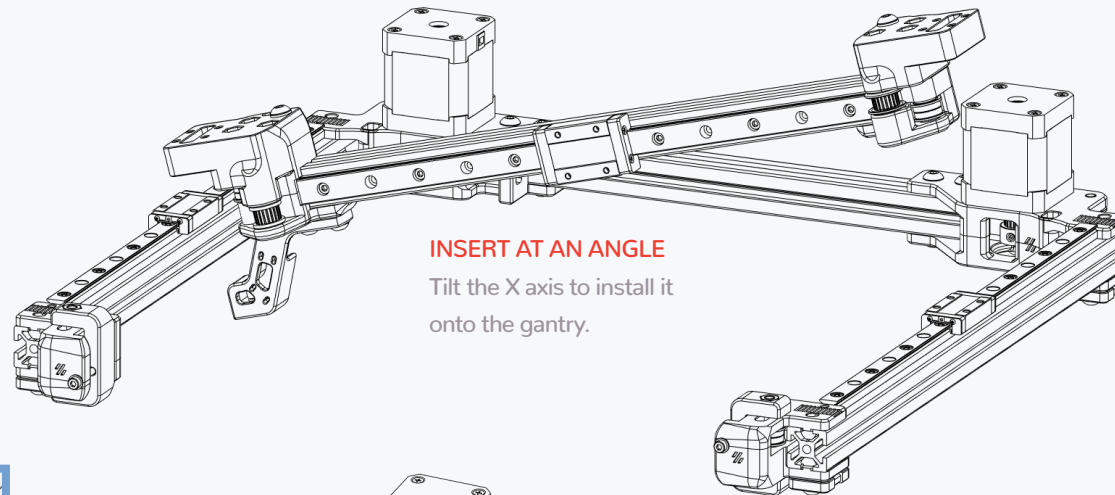
Pay attention to the pulley orientation and alignment with the bearing stack ups.

GANTRY

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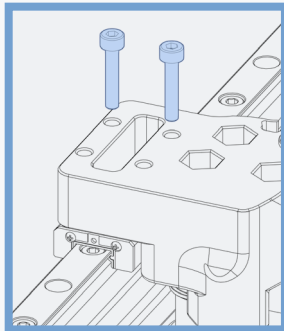
FLIP GANTRY

Turn the gantry around for the next step.



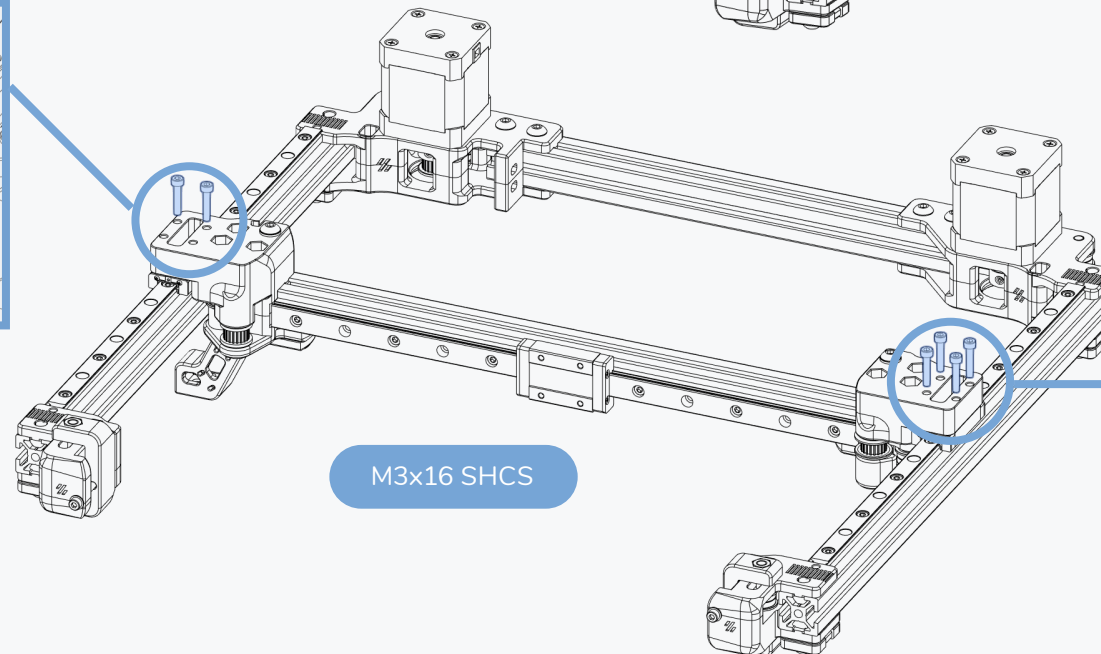
INSERT AT AN ANGLE

Tilt the X axis to install it onto the gantry.

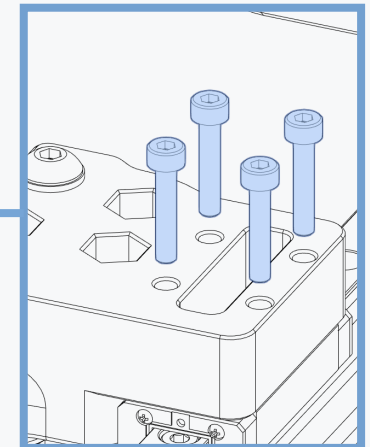


2X BOLT ONLY

The remaining bolts will be installed during the end-stop installation.



M3x16 SHCS

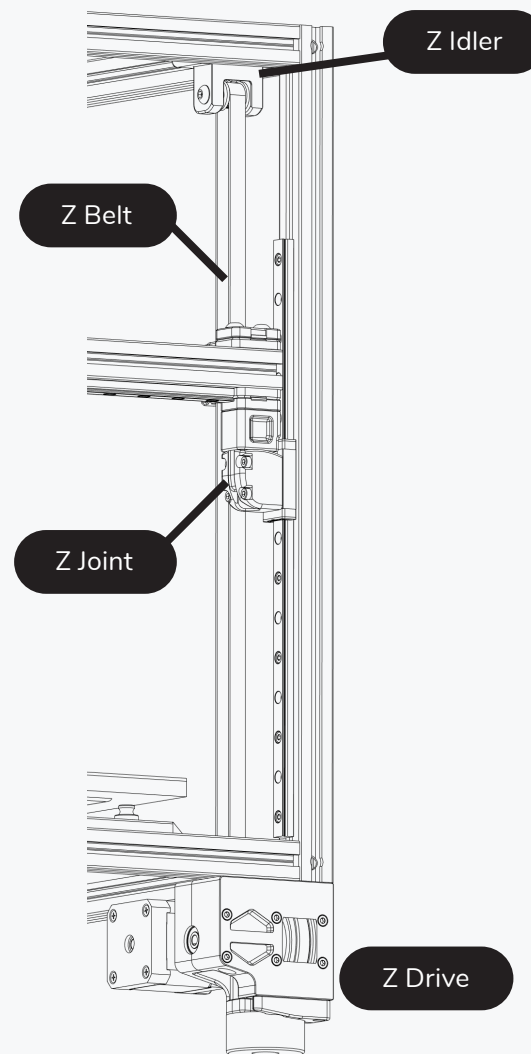


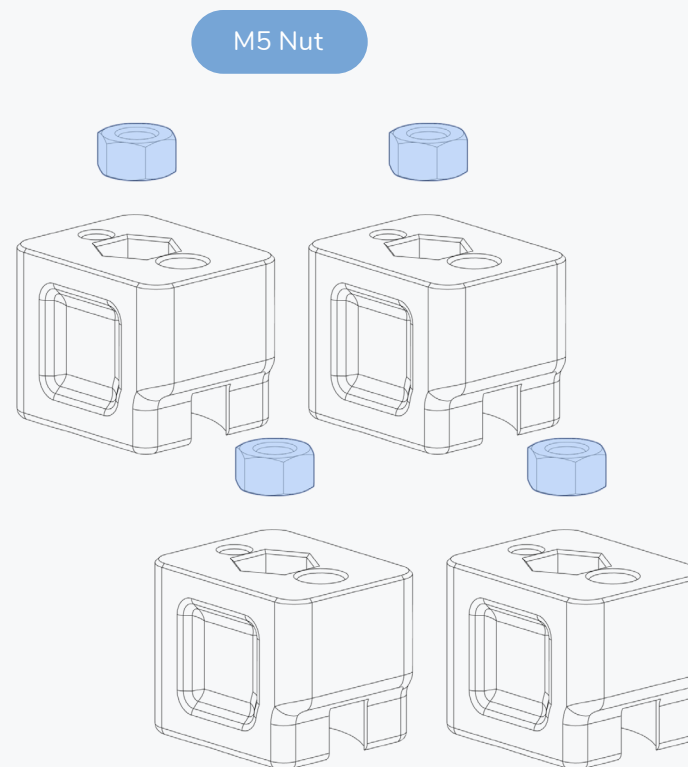
V1 and V2 are not version numbers but the printer models/lines. We renamed the V1 to Voron Trident to address the confusion this caused.

Z AXIS

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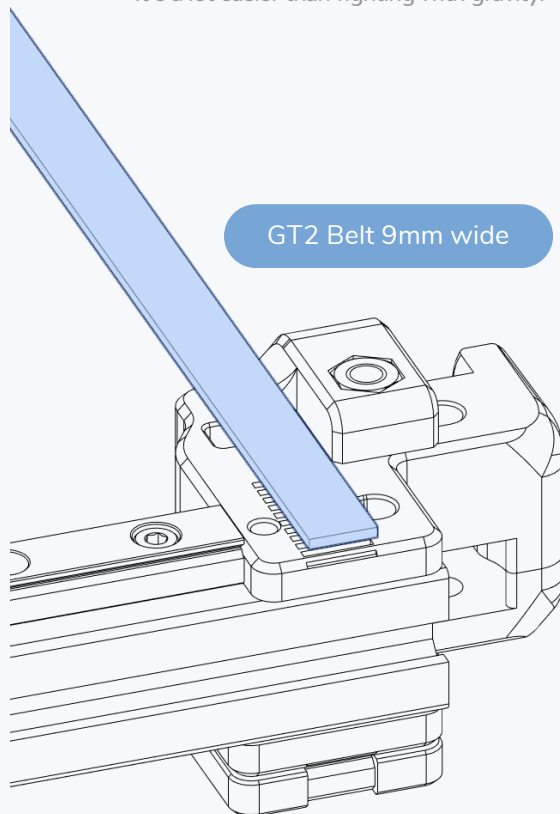




Z BEARING BLOCKS

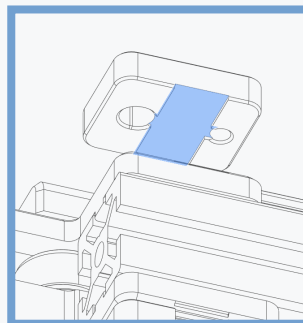
GANTRY IS STILL UPSIDE DOWN

It's a lot easier than fighting with gravity.



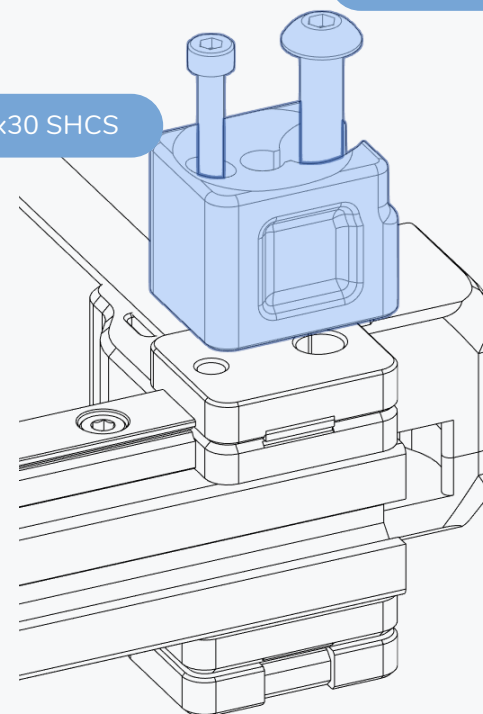
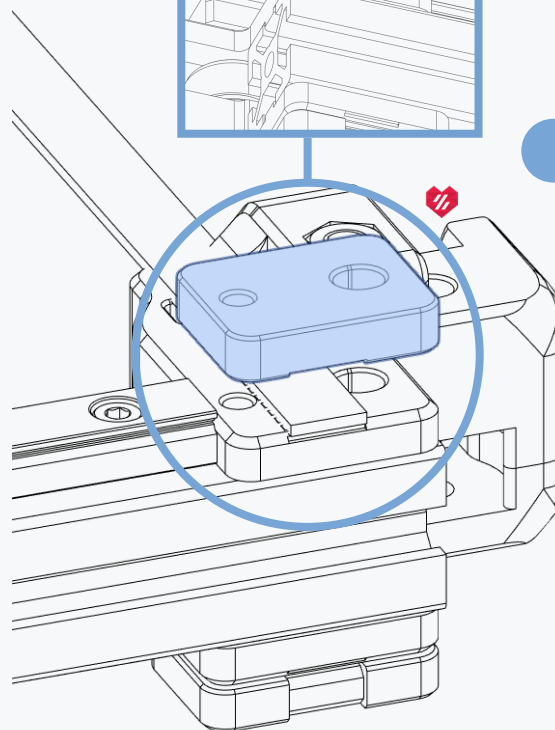
TEETH DOWN

The teeth of the belts are facing down into the serrations in the printed part.



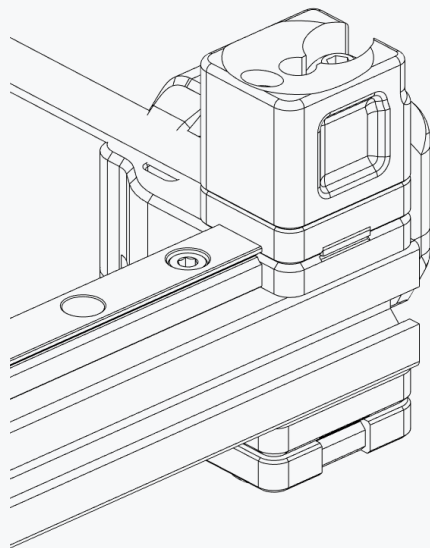
NOTCH ORIENTATION

The indentation along the part is designed to clamp on the belt.



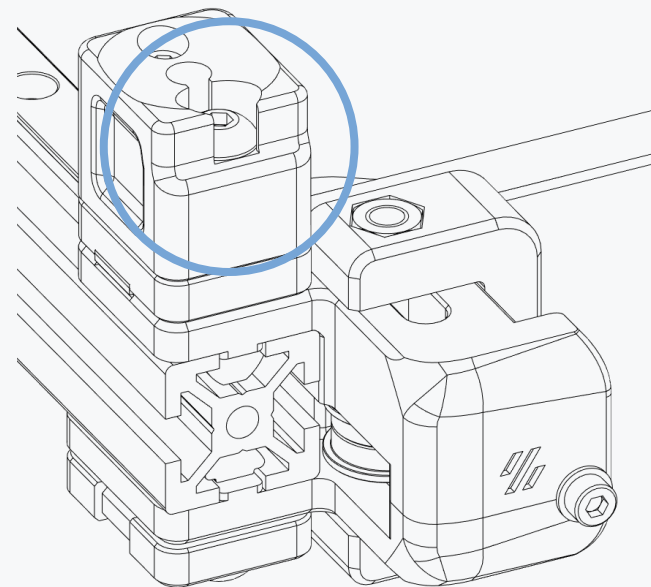
MINIMUM RECOMMENDED BELT CUT LENGTH

250 spec 1000mm
300 spec 1100mm
350 spec 1200mm



MIND THE PART ORIENTATION

The cutout goes towards the outside.

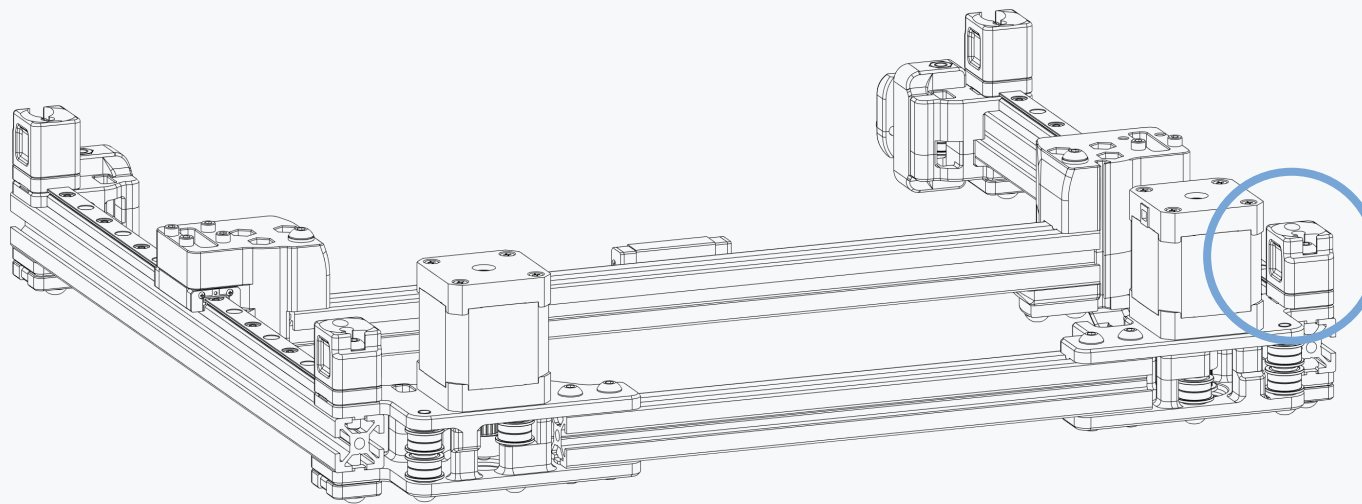
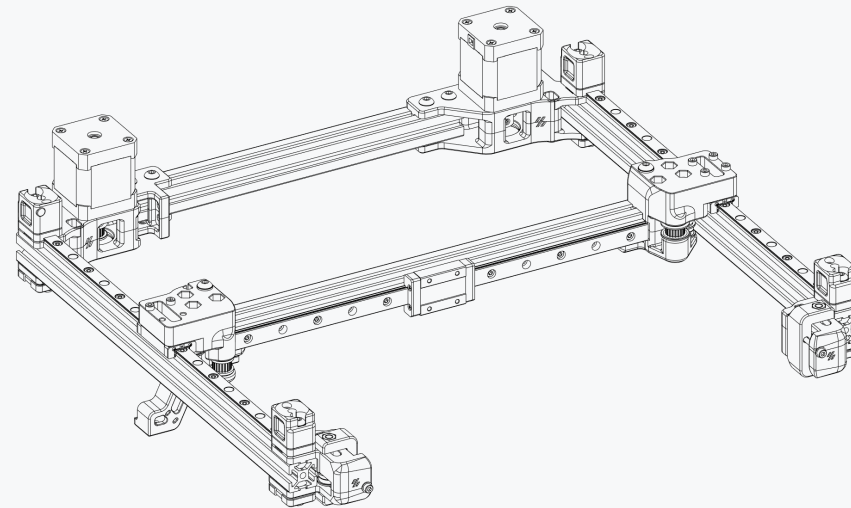


Z BEARING BLOCKS

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REPEAT BELT INSTALL FOR ALL 4 BLOCKS

We are not showing the belts in the pictures on this page.

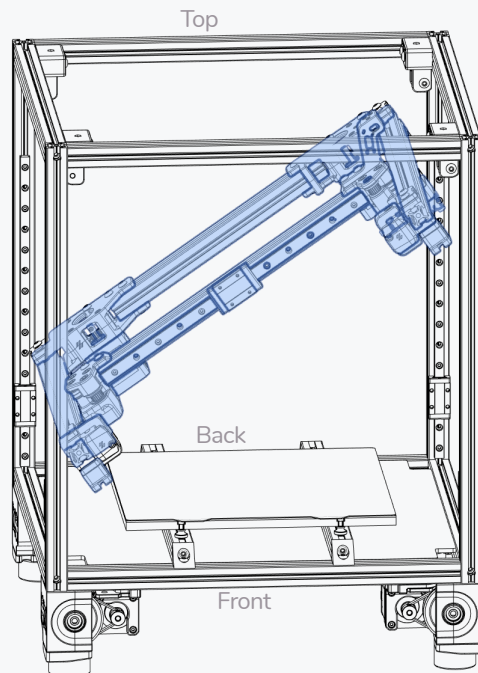


OPTION: HALL ENDSTOP

Install the block with the magnet in this position. The magnet faces the XY joint.

GANTRY INSTALL

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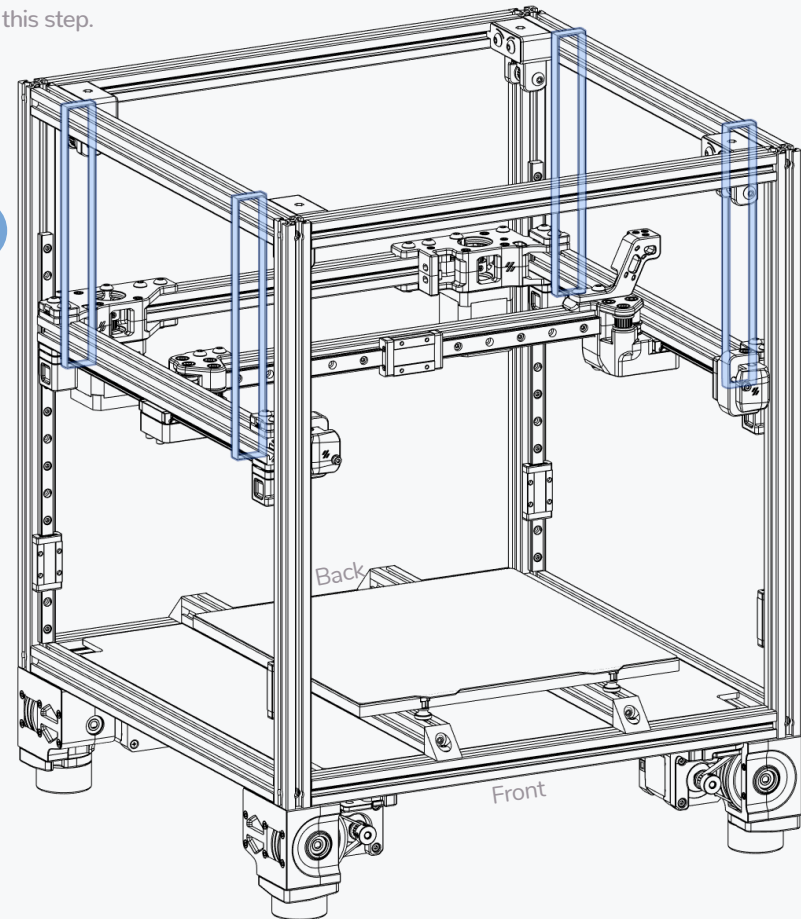
INSERT AT AN ANGLE

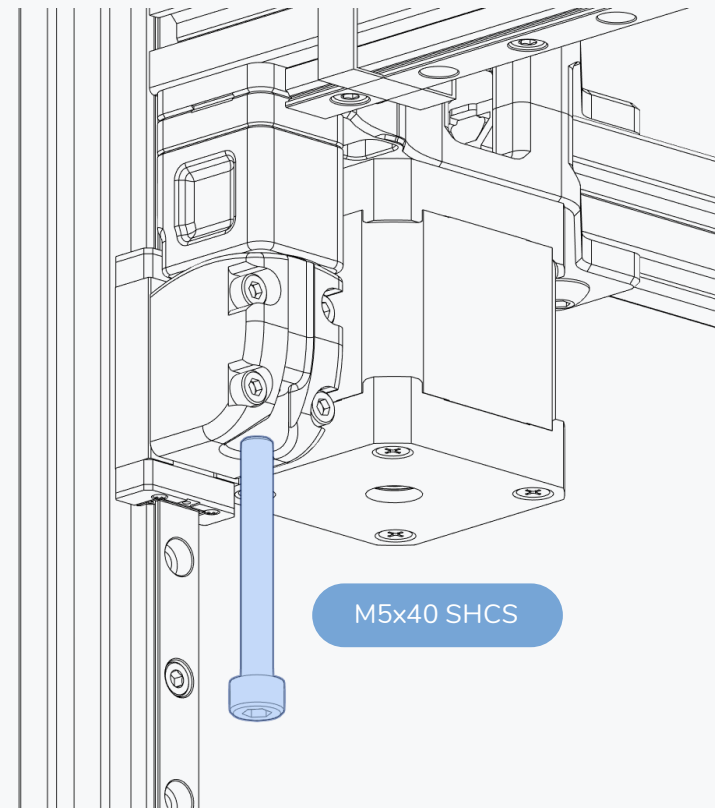
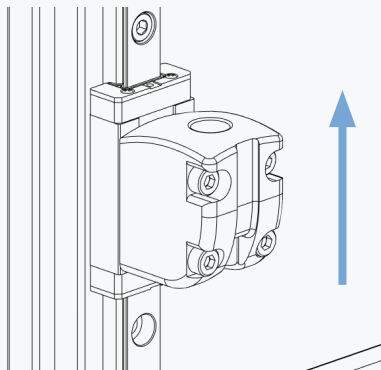
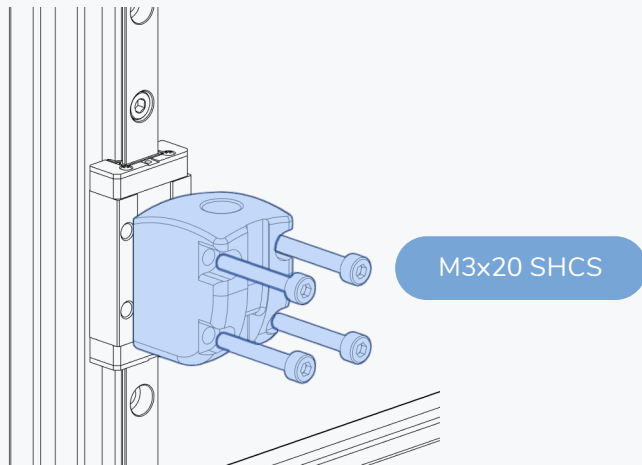
Tilt the gantry to move it past the uprights.

Long Zipties

A HELPING HAND

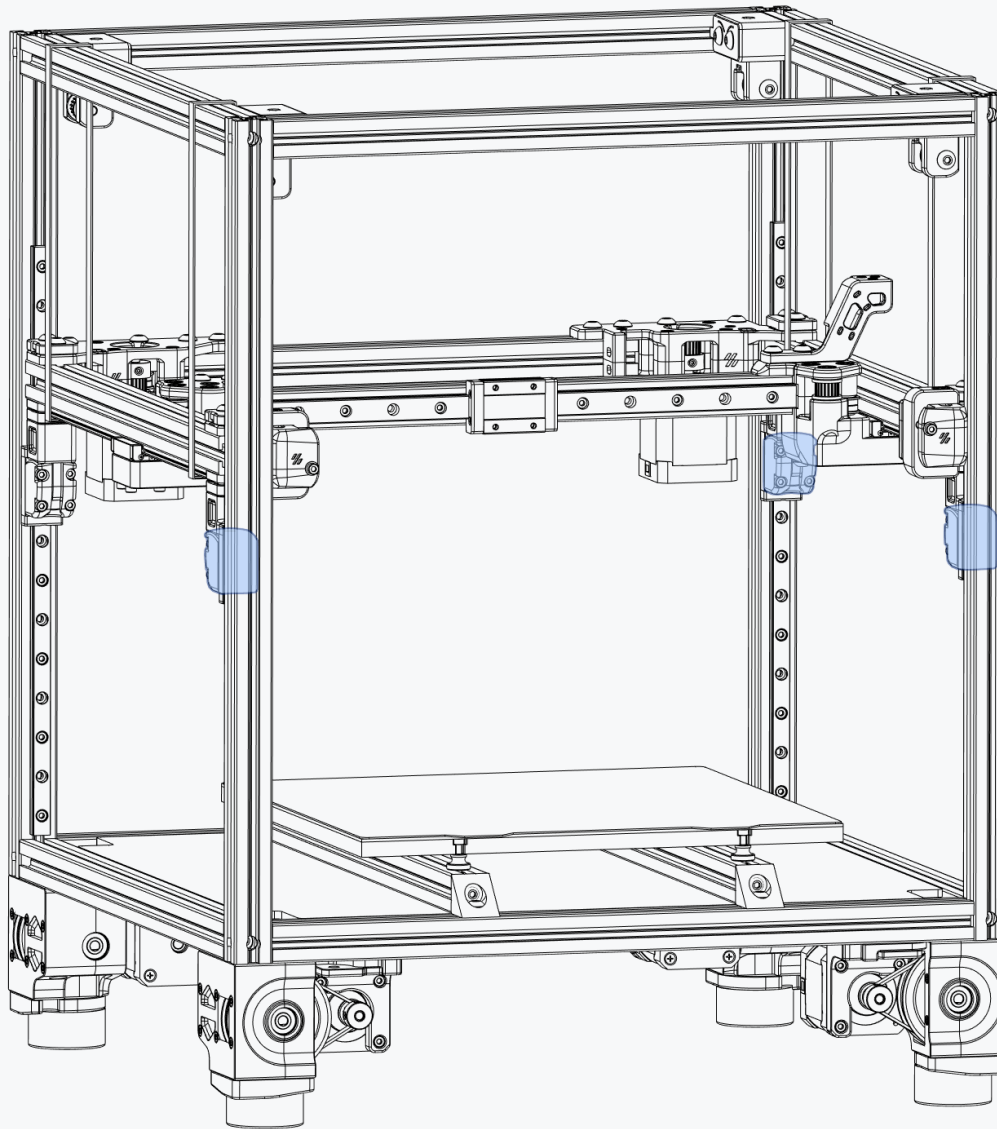
Secure the gantry with long zipties or similar while the gantry is being installed. An extra pair of hands helps with this step.





Z JOINTS

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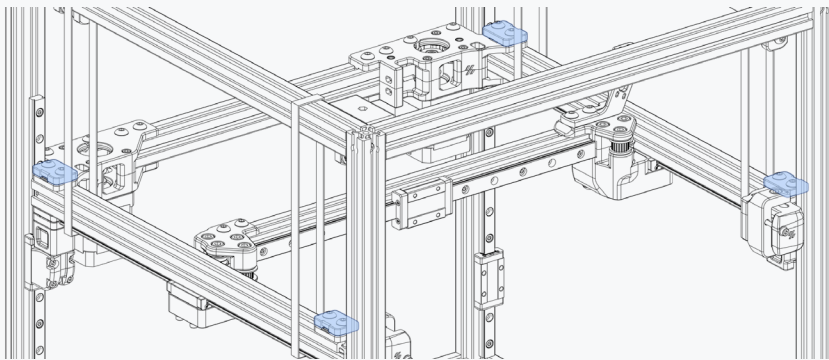


INSTALL REMAINING JOINTS

Add the other 3 joints repeating the same steps.

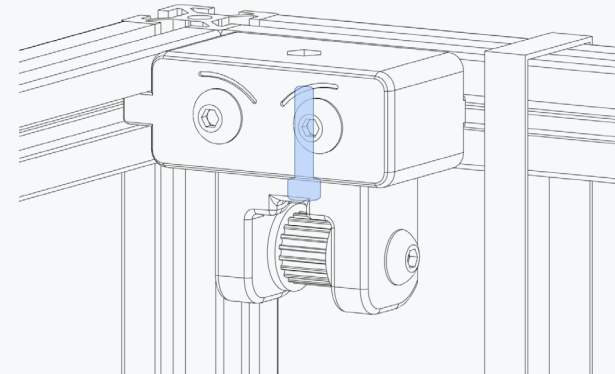
PREPARATION

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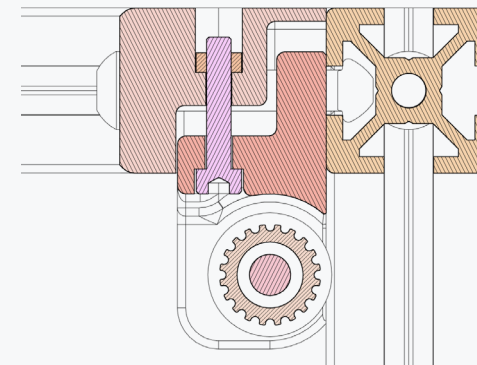
LOOSEN TOP BELT CLAMPS

Undo the top belt clamps, we'll be installing the belts in the next steps.



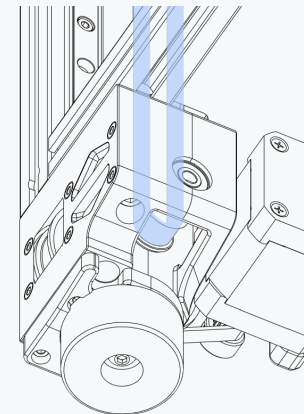
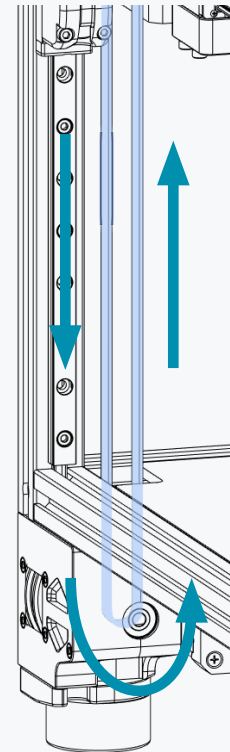
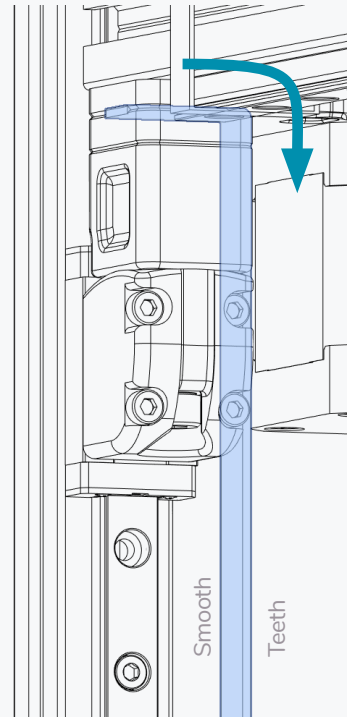
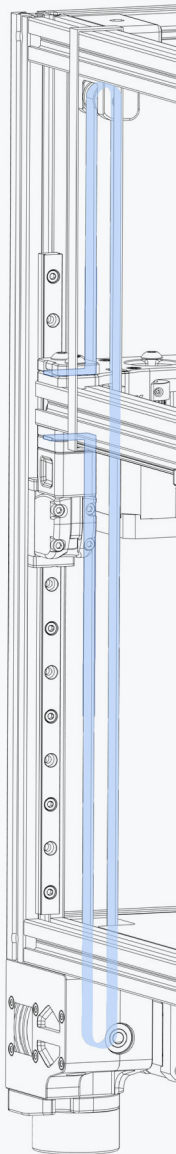
EXTEND IDLER

Loosen the idler bolt to extend the idler.
Once extended to the maximum before becoming undone tighten 4 turns.
Repeat for all 4 idlers.



Z BELT

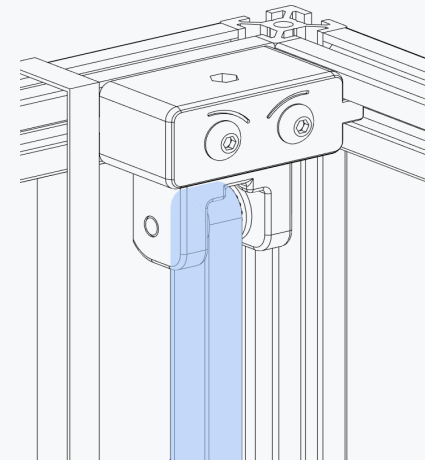
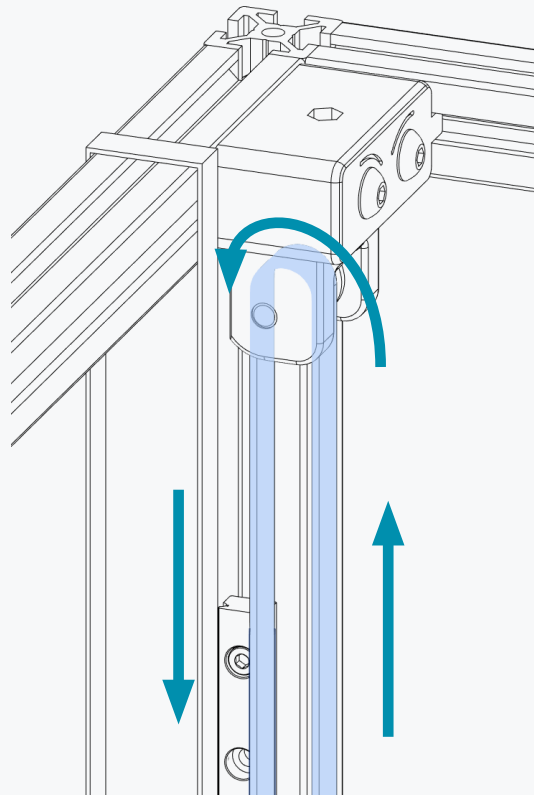
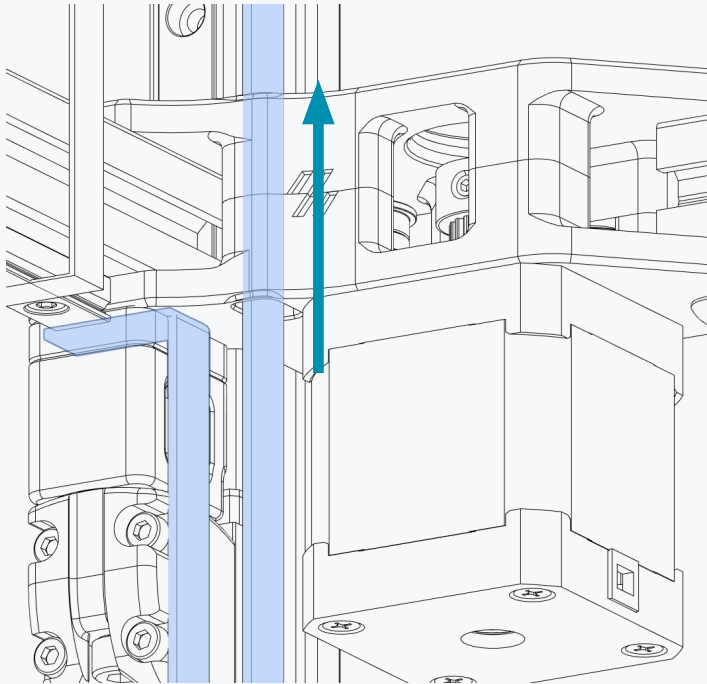
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Z BELT ROUTING

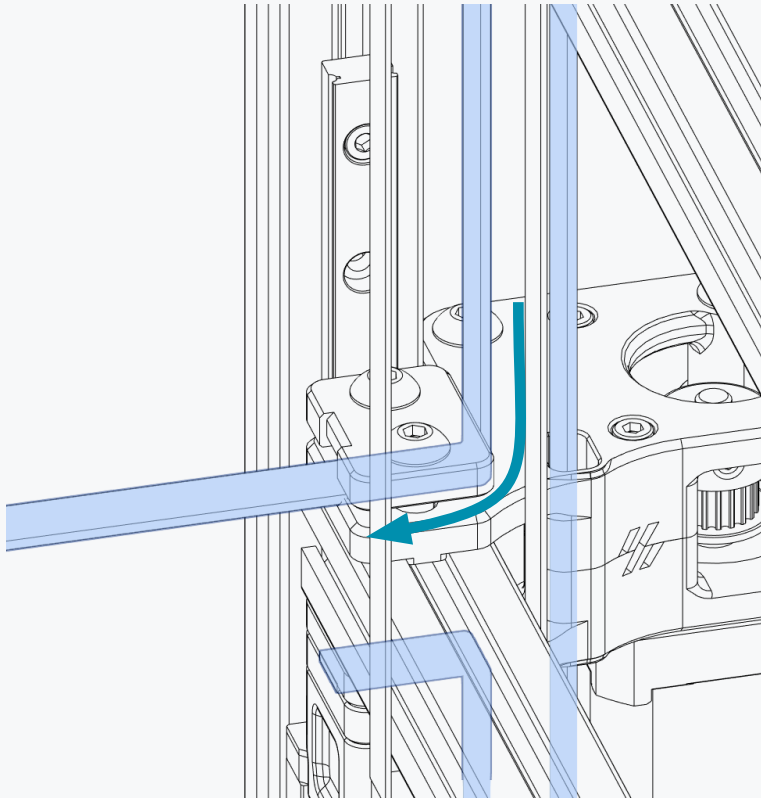
Follow the path pointed out by the arrows.
Needle nose pliers, tweezers or similar tools
can help in this step.

The belt teeth are on the inside of the loop.



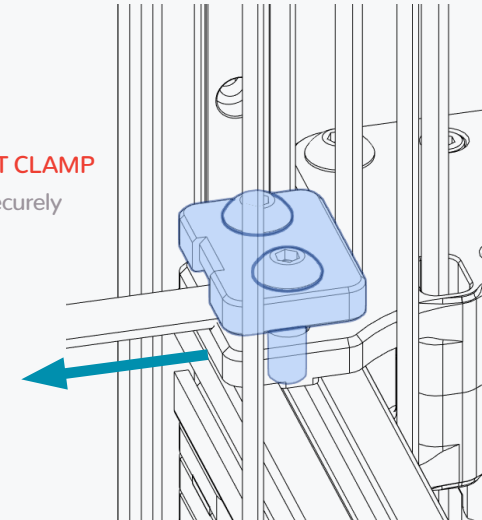
Z BELT

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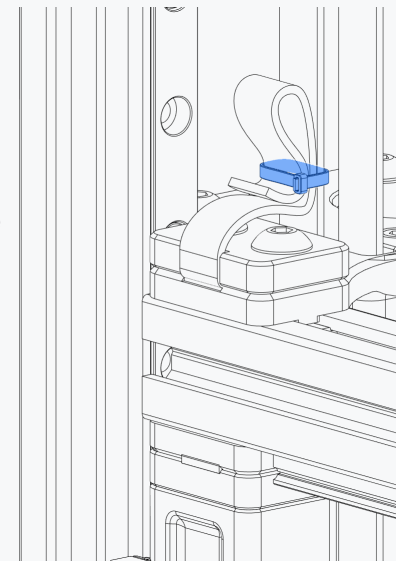
PULL TIGHT AND SECURE BELT CLAMP

Pull on the end of the belt and securely fasten the top belt clamp.



EXCESS BELT

Fold the excess belt over and use a small zip tie to secure the end.

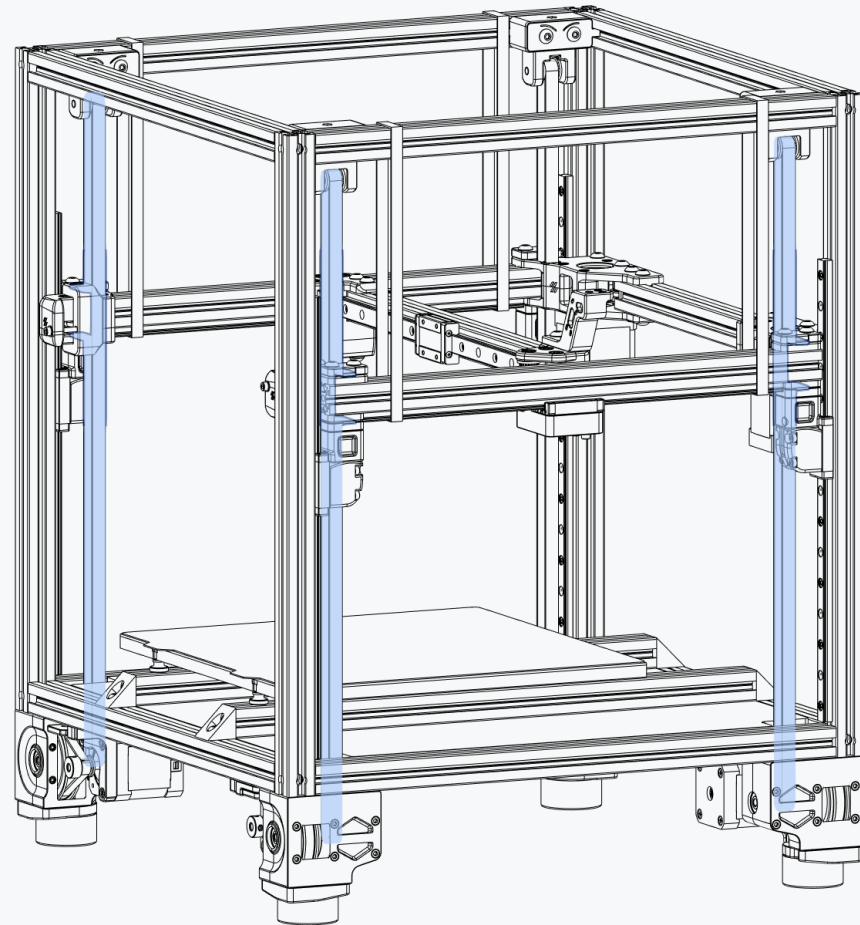


Z BELT

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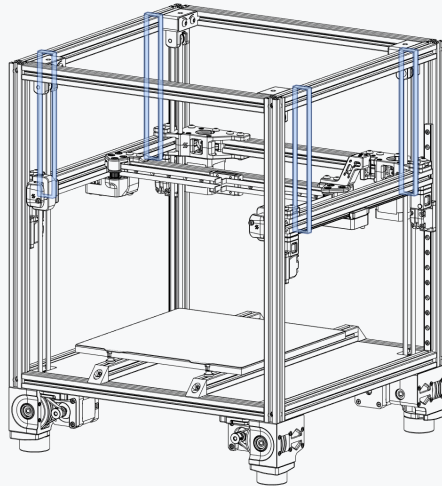
INSTALL REMAINING Z BELTS

Repeat the install instructions for the other 3 Z belts.



GANTRY ALIGNMENT

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REMOVE ZIPTIES

With the belts installed the gantry will stay in position.

SQUARING THE GANTRY

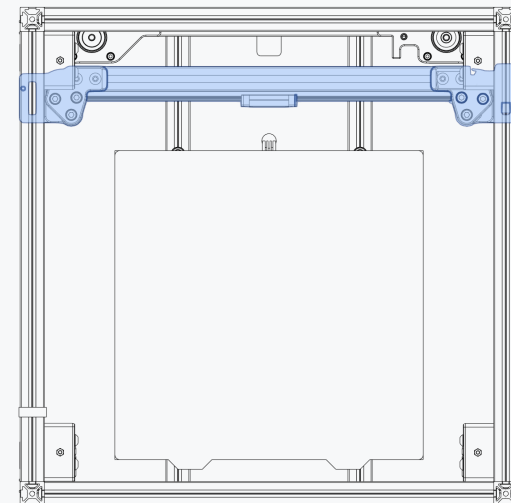
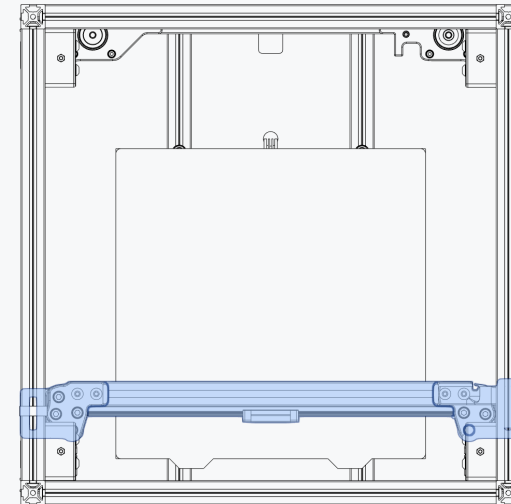
Move the gantry all the way back until it hits the A and B drive on both sides.

Fully tighten all screws on the X axis.

You may need to adjust the distance between the A and B drive to square the gantry. To do this loosen the bolts that secures the B drive to the rear gantry extrusion. Repeat the steps above and secure the fasteners again.



<https://voron.link/cekh81l>



Voron2.0 was never officially released.



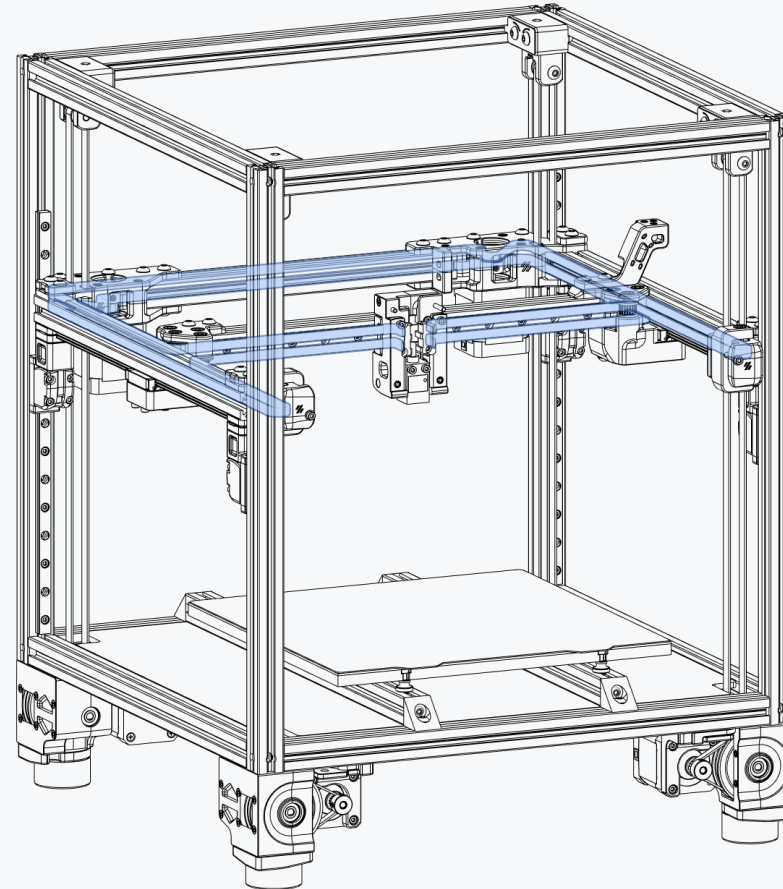
THE VORON BELT PATH

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>

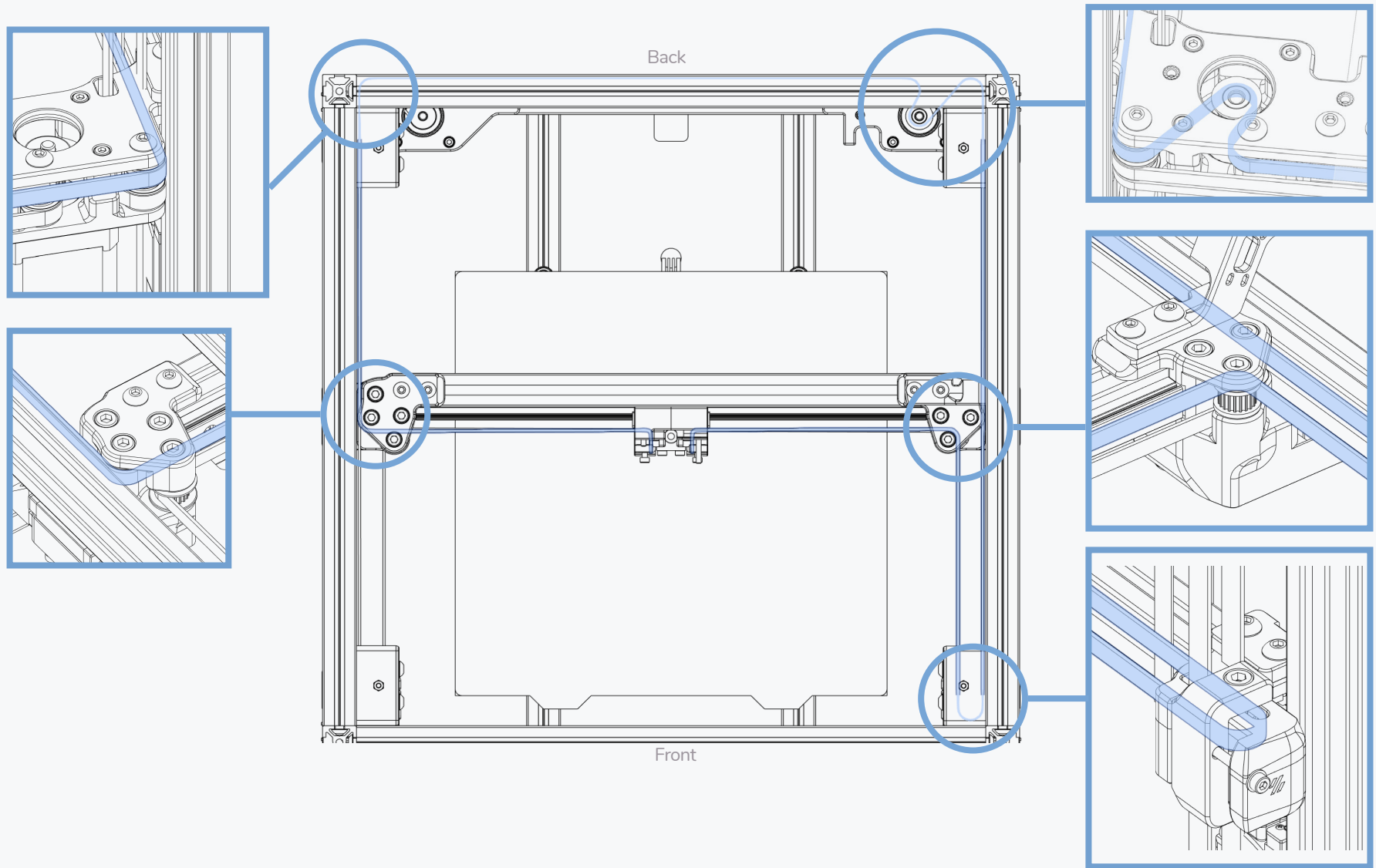
Equal belt tension is important to the proper function of a CoreXY motion system.

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.



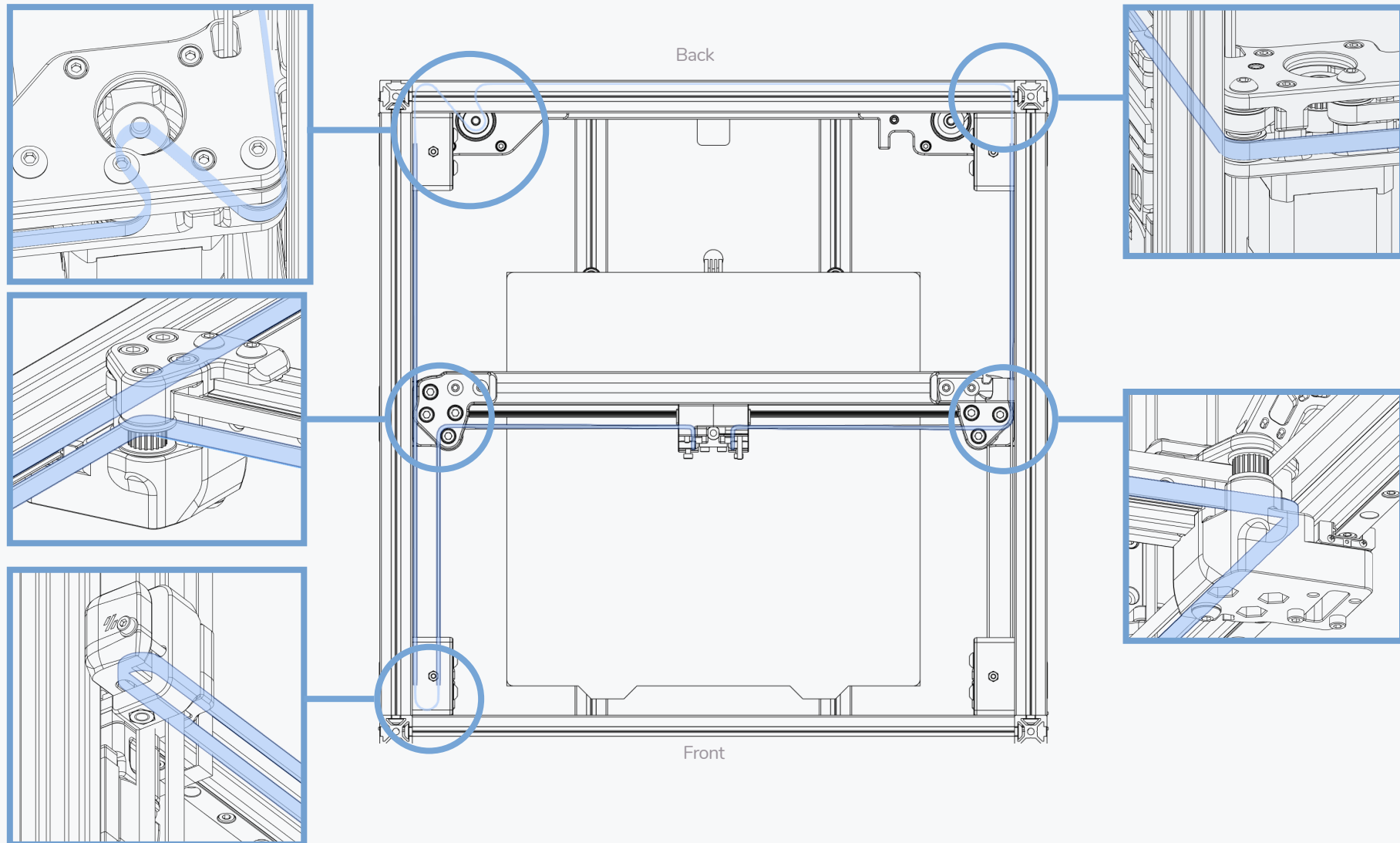
OVERVIEW - A BELT

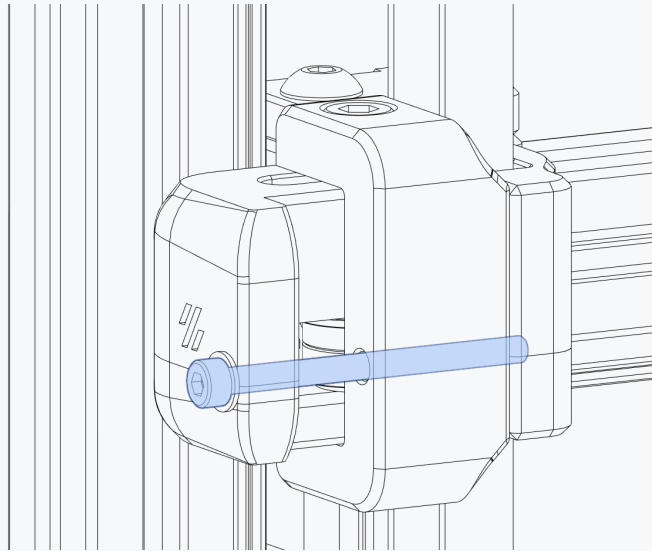
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OVERVIEW - B BELT

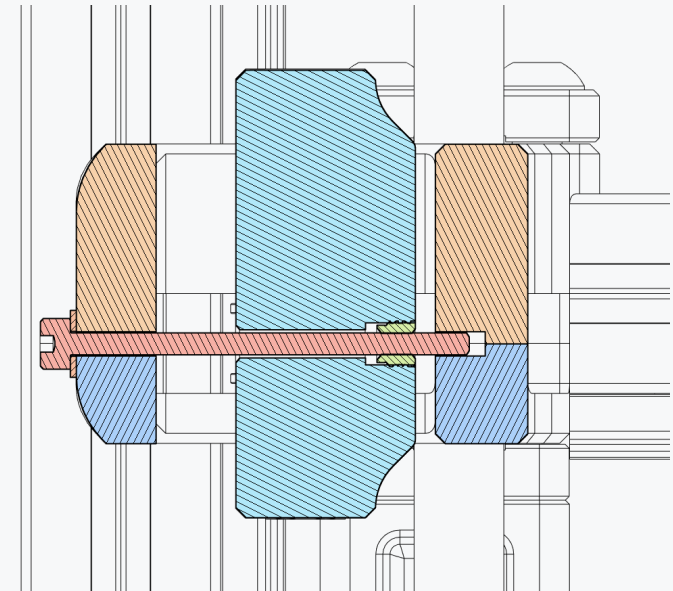
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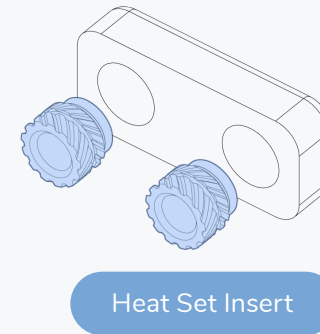
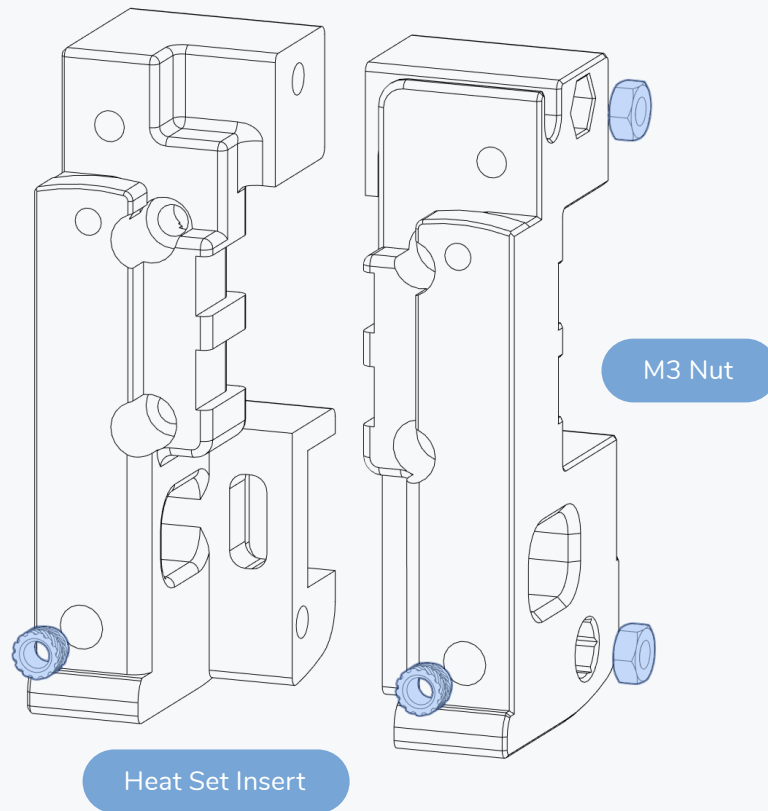




EXTEND IDLER

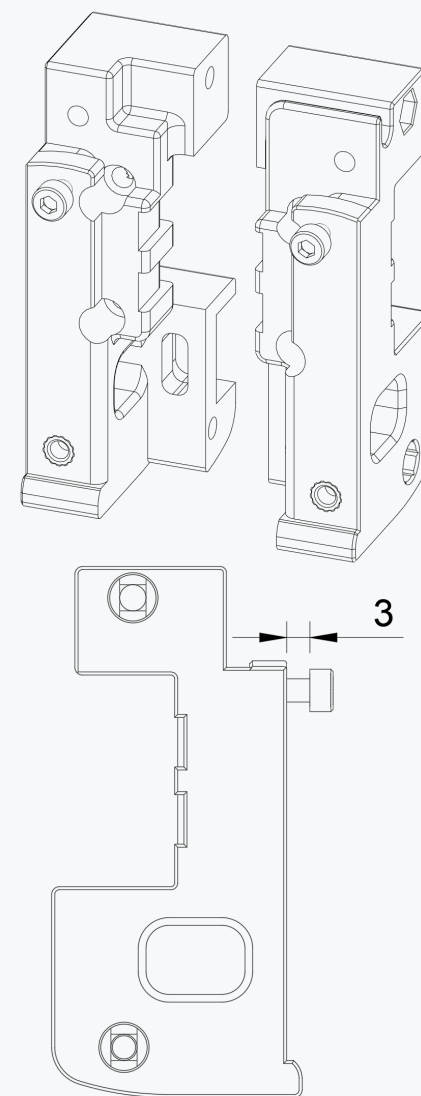
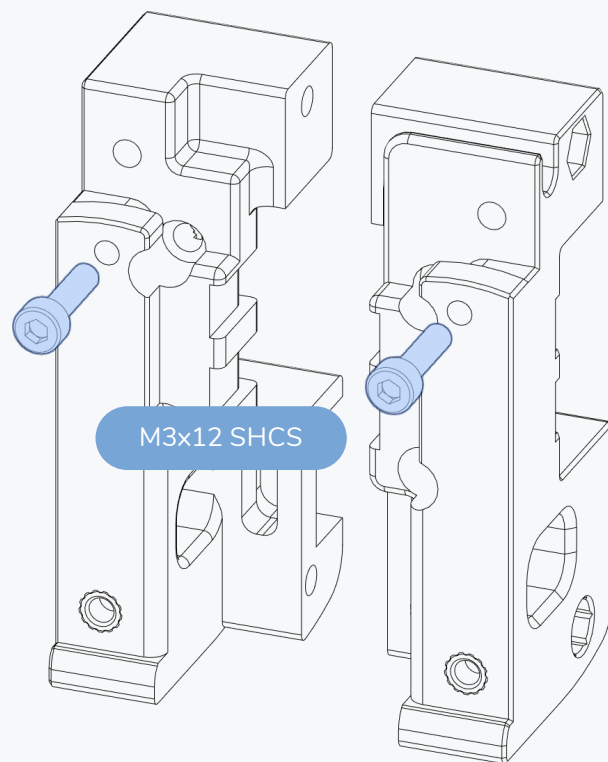
Loosen the idler bolt to extend the idler.
Once extended to the maximum tighten 4 turns.
Repeat for the second idler.

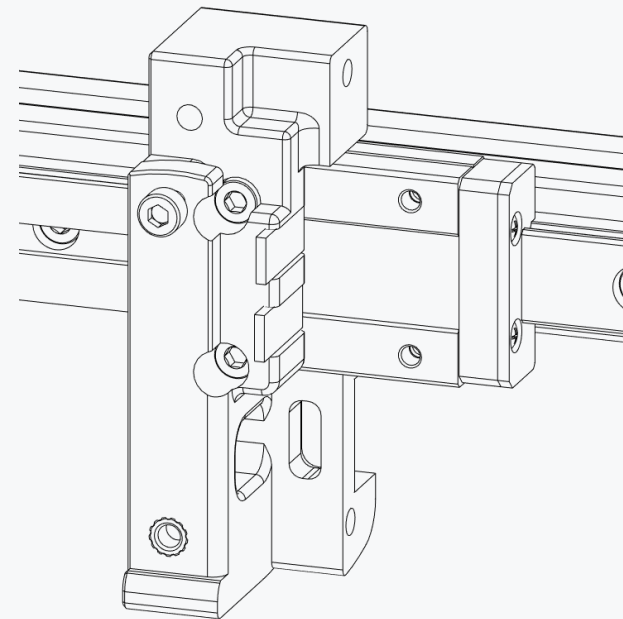
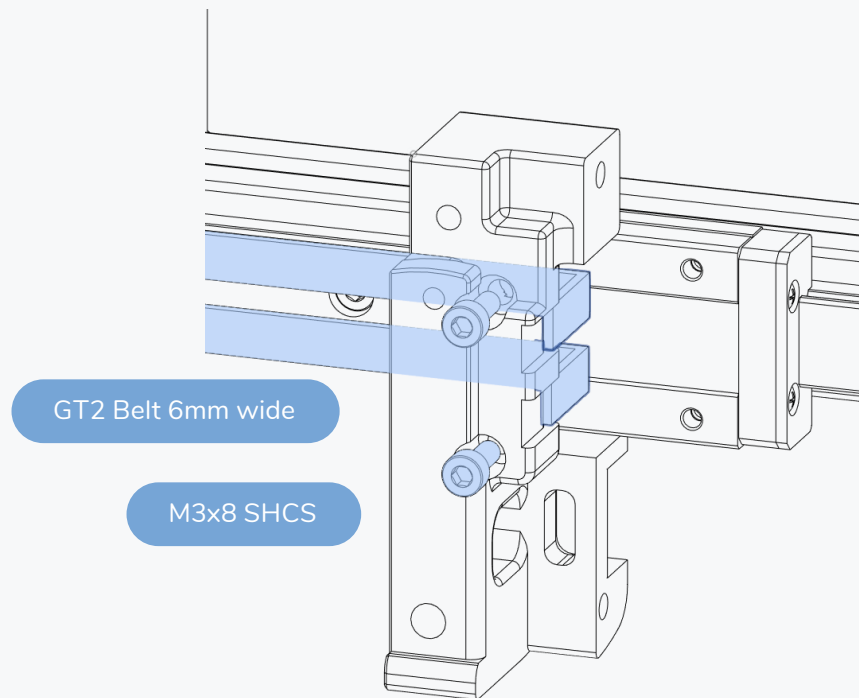




X CARRIAGE

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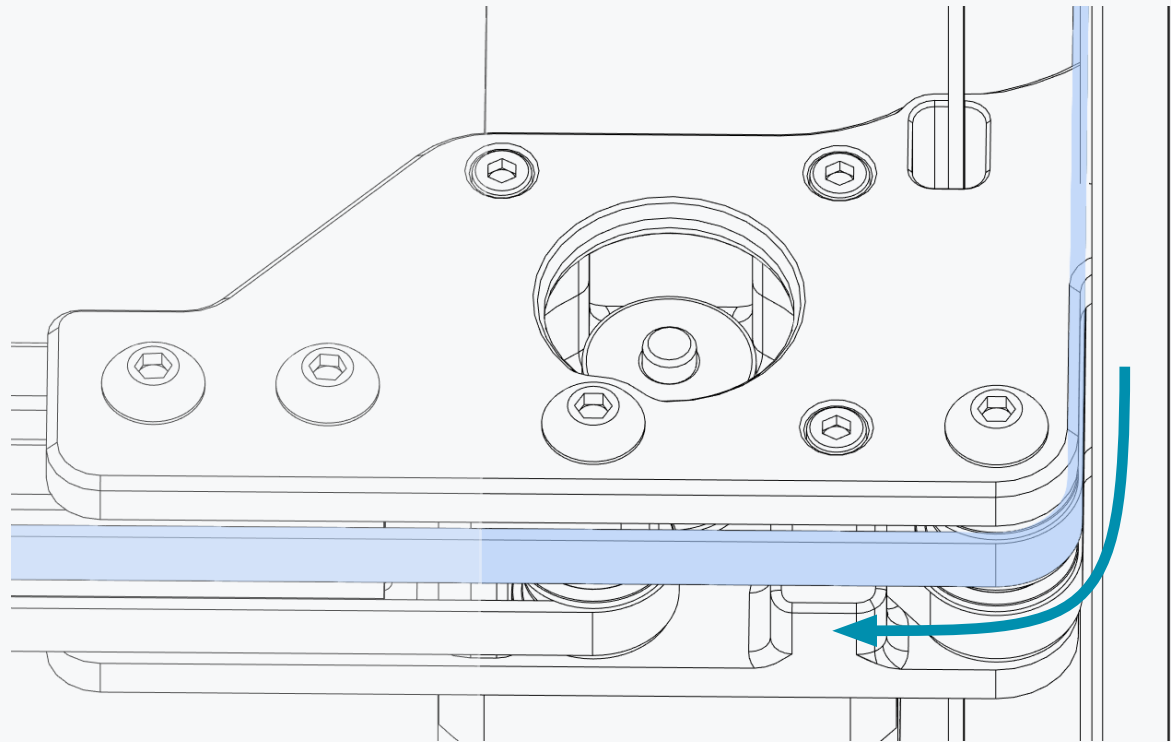
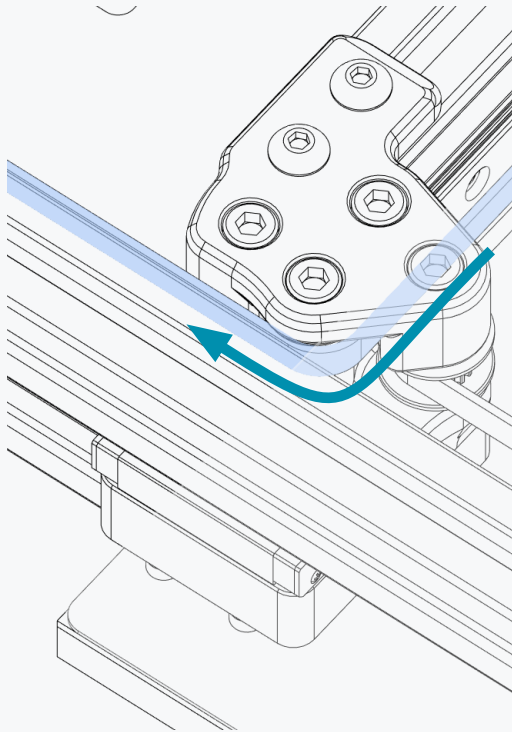
CLAMP BELTS

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

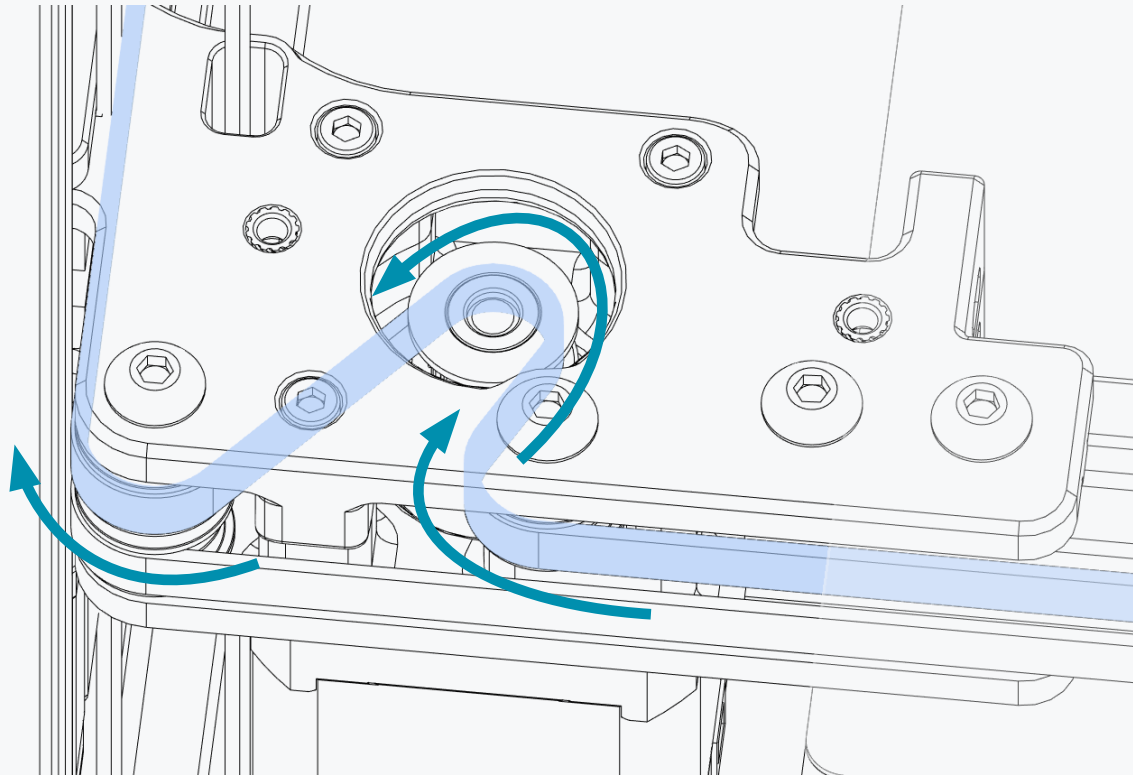
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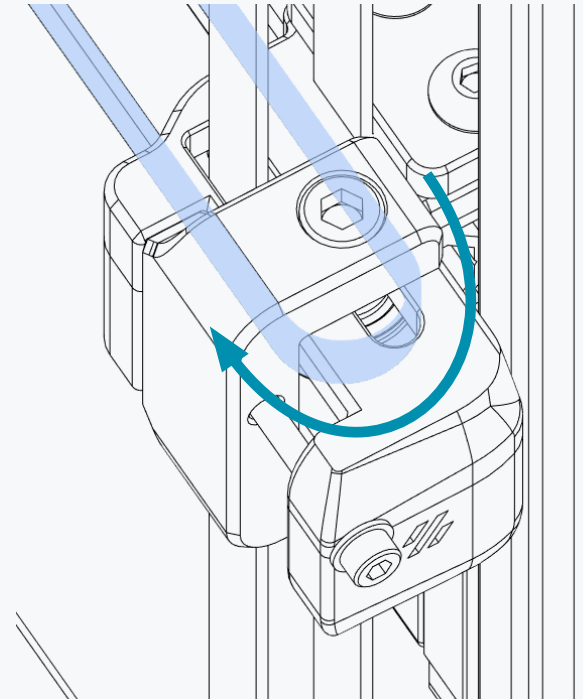
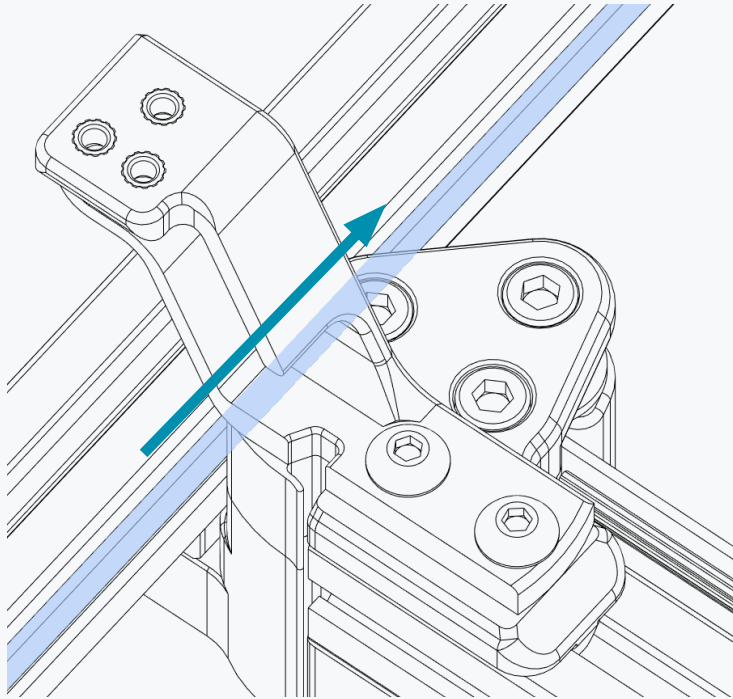


A BELT ROUTING

Follow the path pointed out by the arrows.

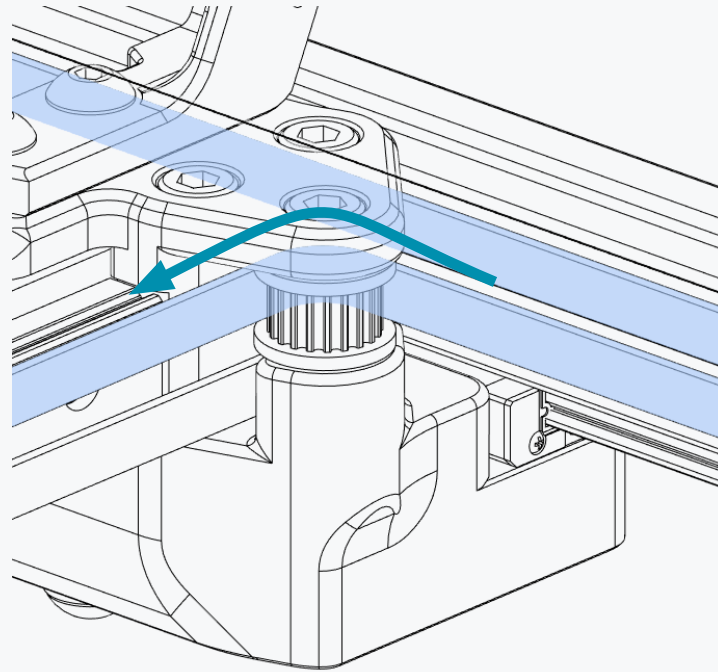
Needle nose pliers, tweezers or similar tools
can help in this step.

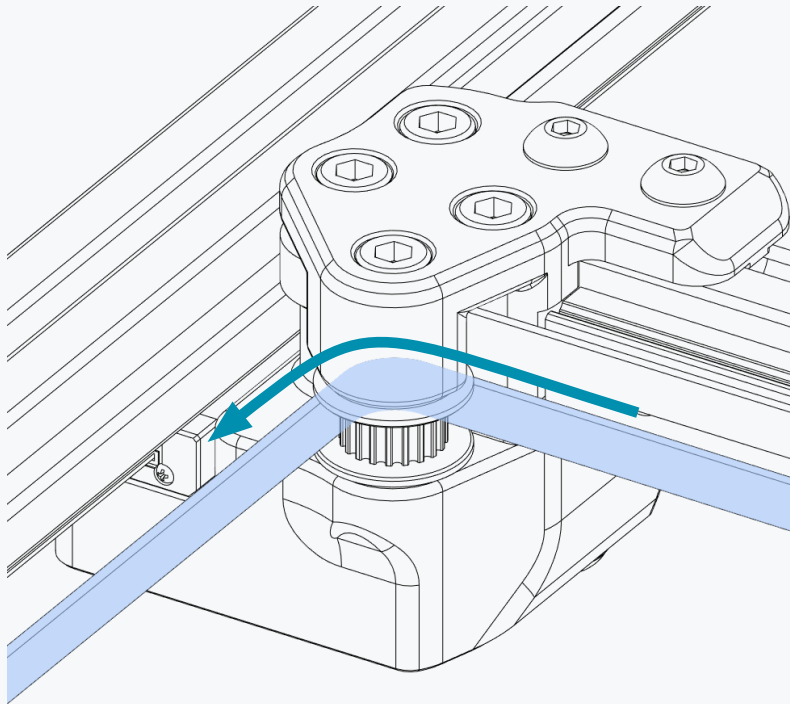




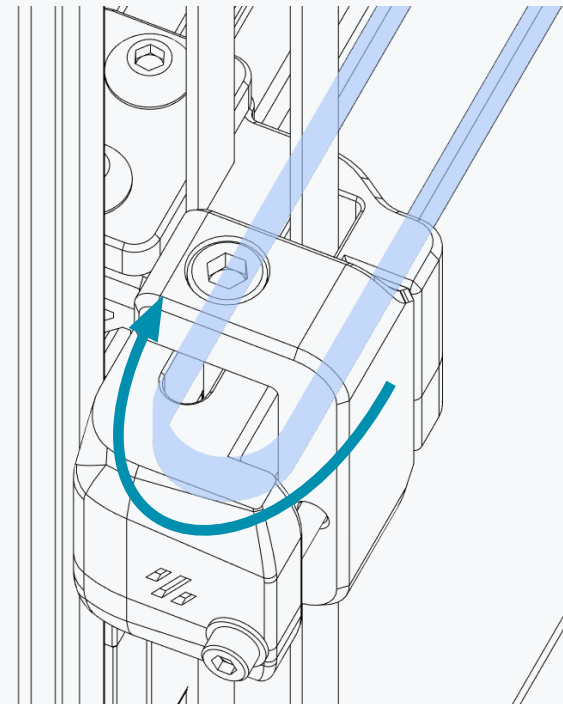
BELTING IDLERS

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

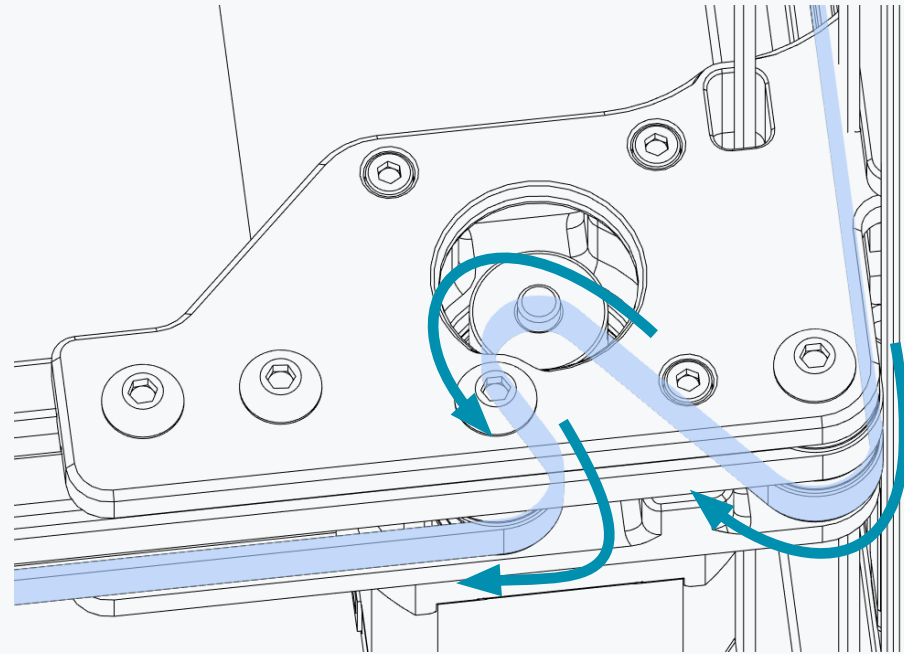
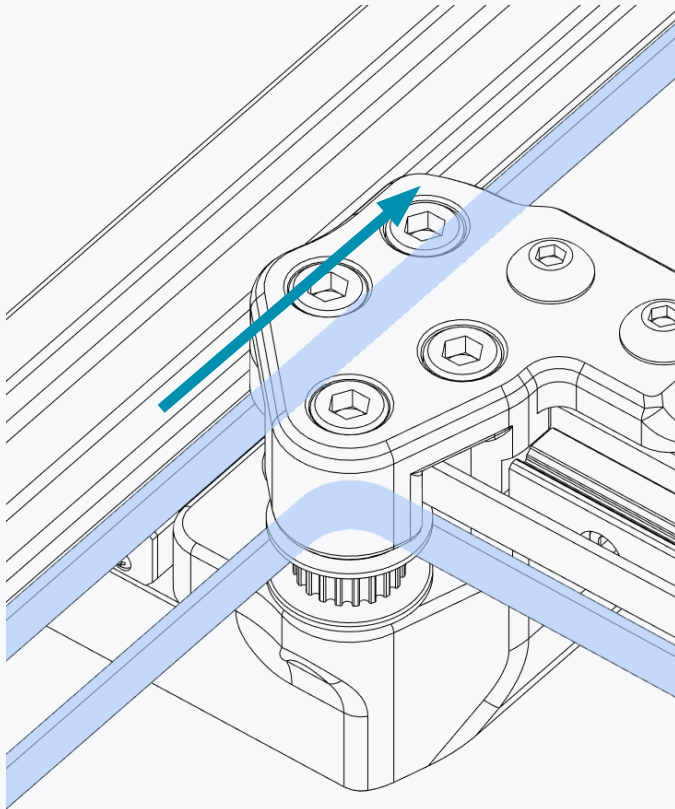


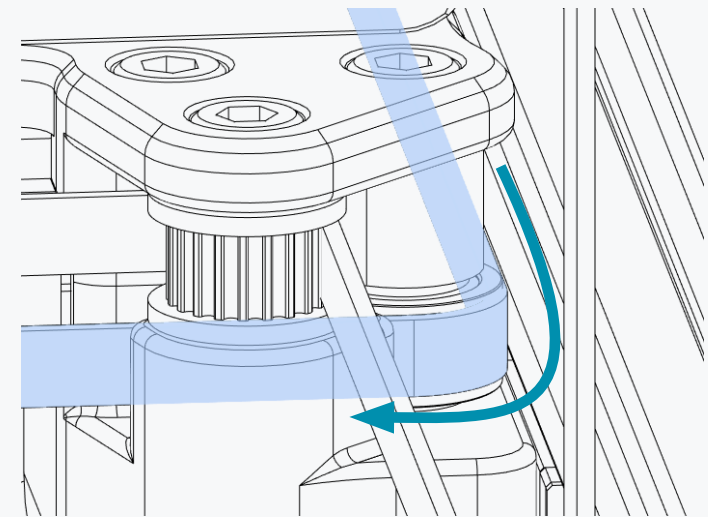
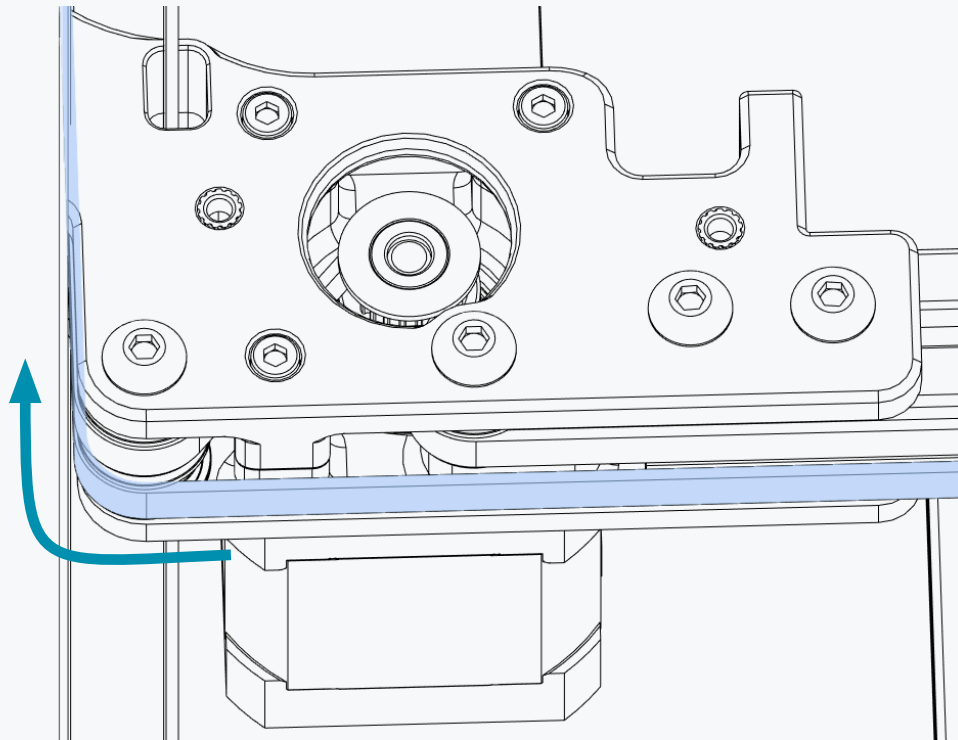
**B BELT ROUTING**

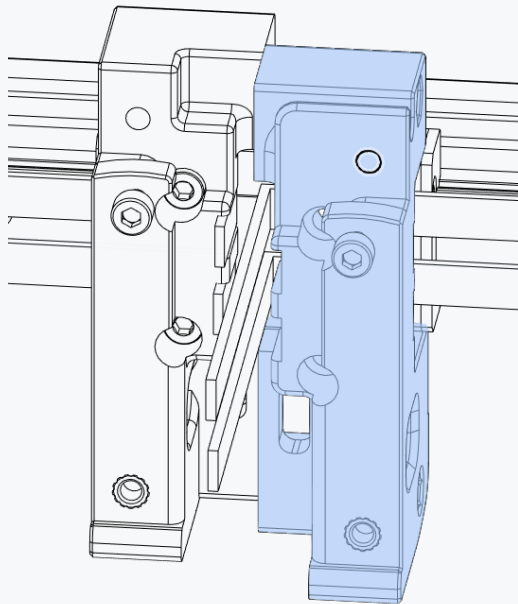
Follow the path pointed out by the arrows.
Needle nose pliers, tweezers or similar tools
can help in this step.

**BELTING IDLERS**

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





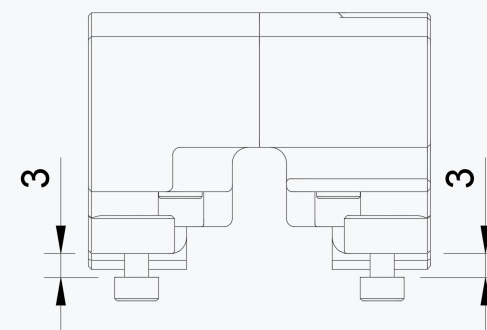
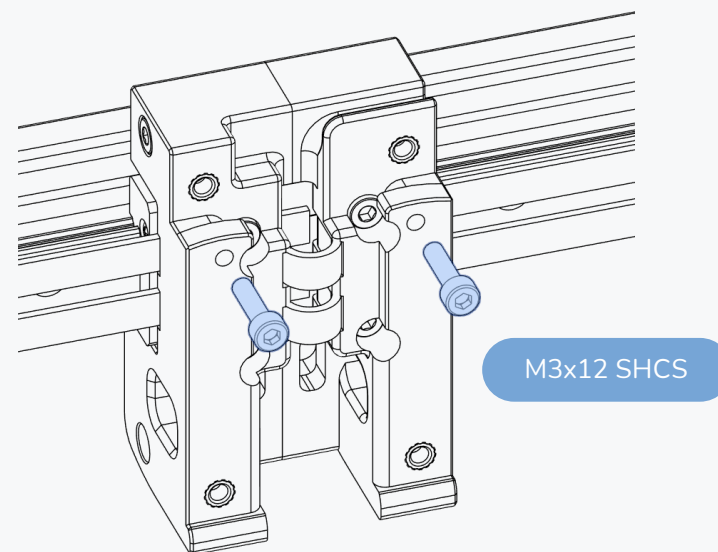
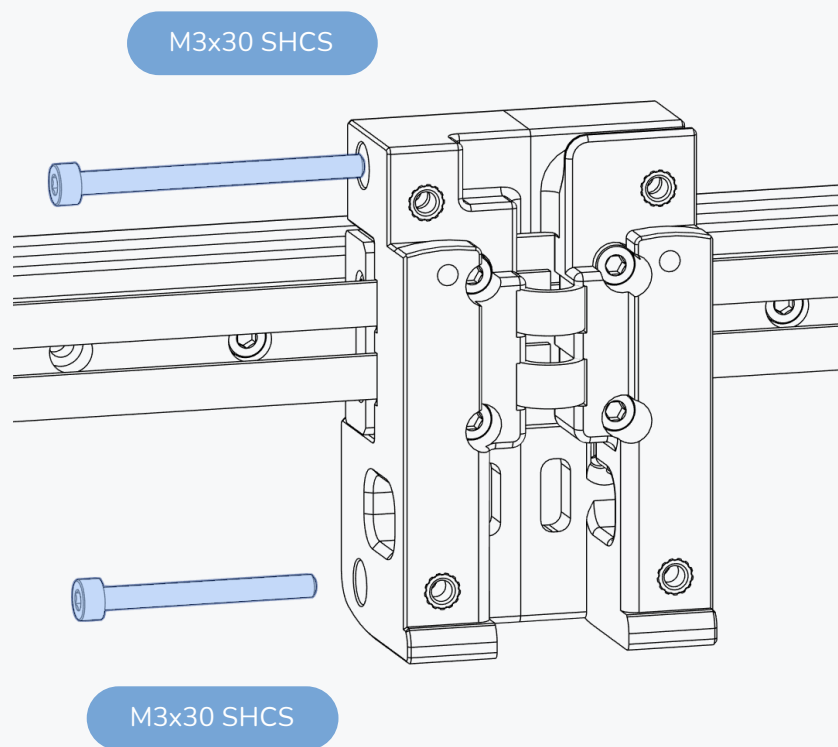


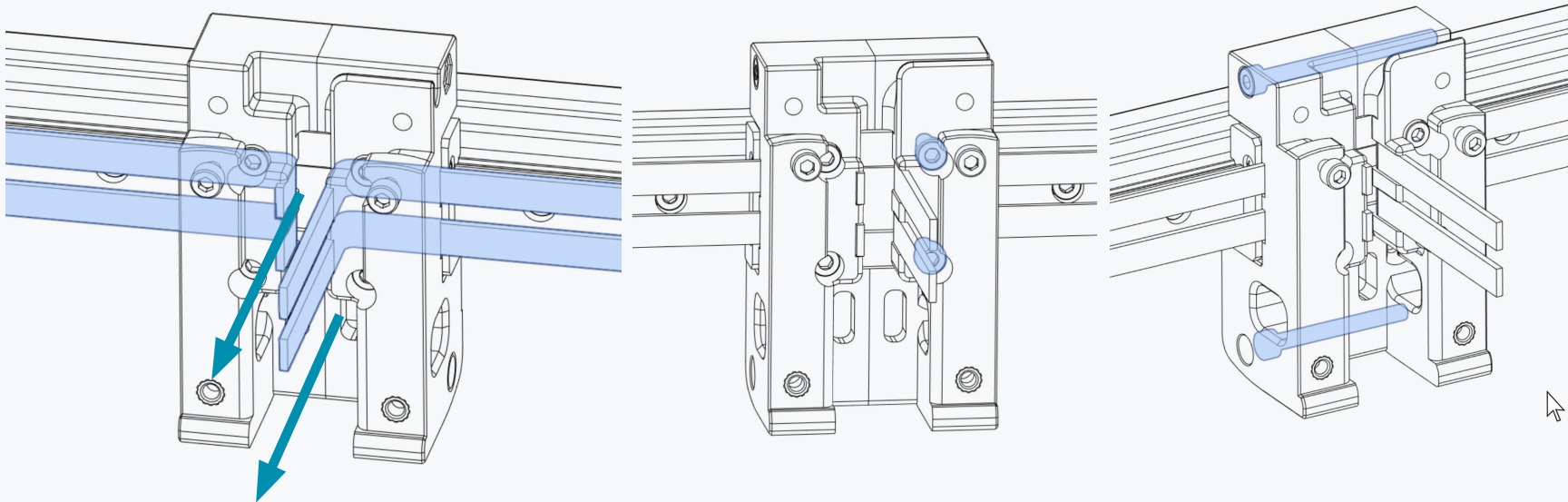
X CARRIAGE

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

X CARRIAGE

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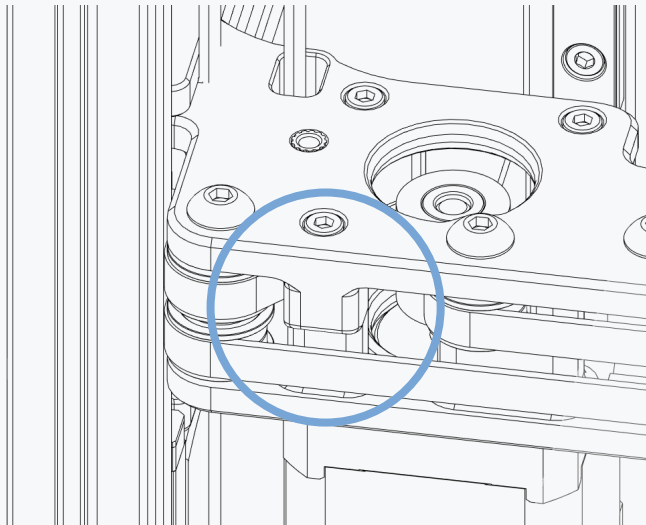
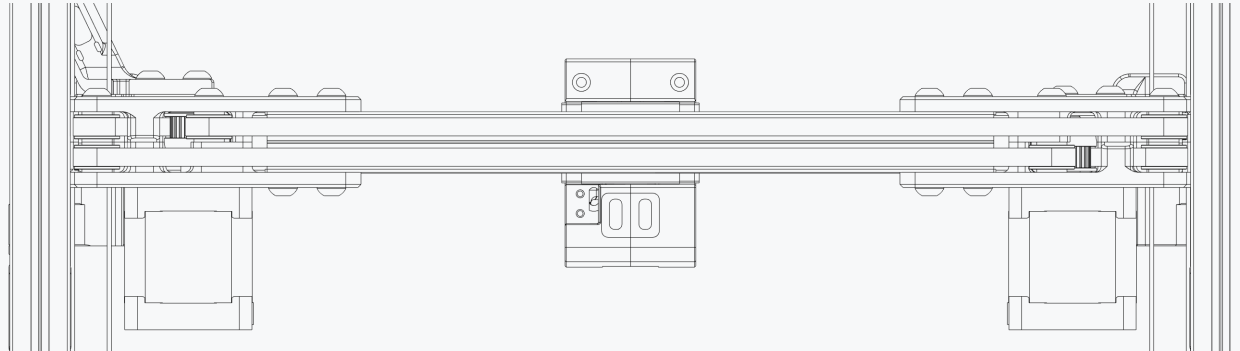
PULL TIGHT

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.

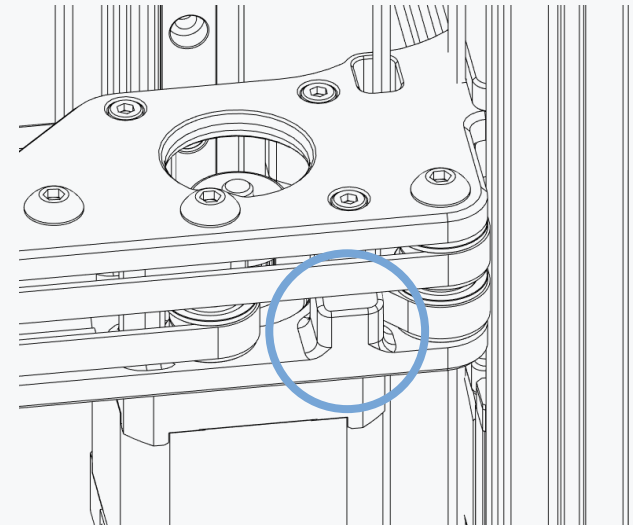
TIGHTEN BOLTS

Fully tighten the carriage bolts.



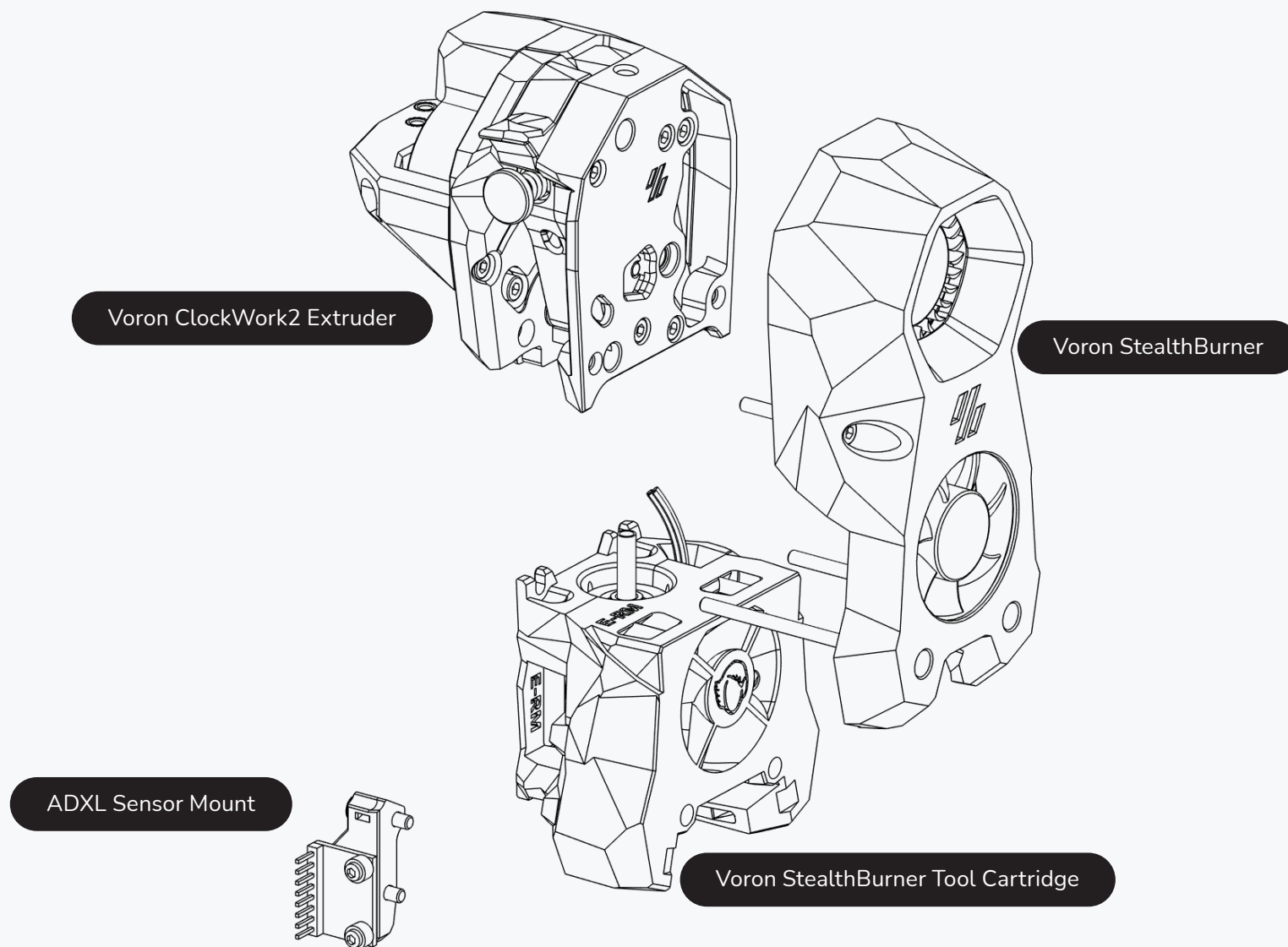
CHECK YOUR WORK

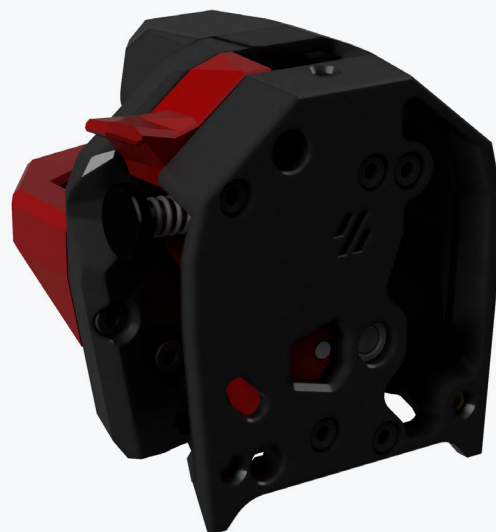
Make sure that the belt is not riding on the plastic parts.



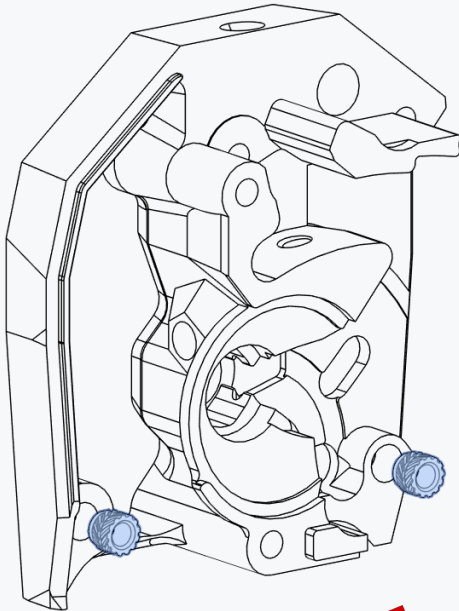
Voron2.1 was released on November 5 2018.







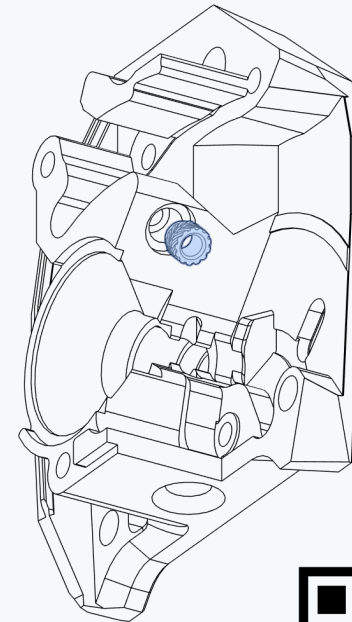
HEAT SET INSERTS



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 [Sourcing Guide](#) for dimensions).

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



Heat Set Insert

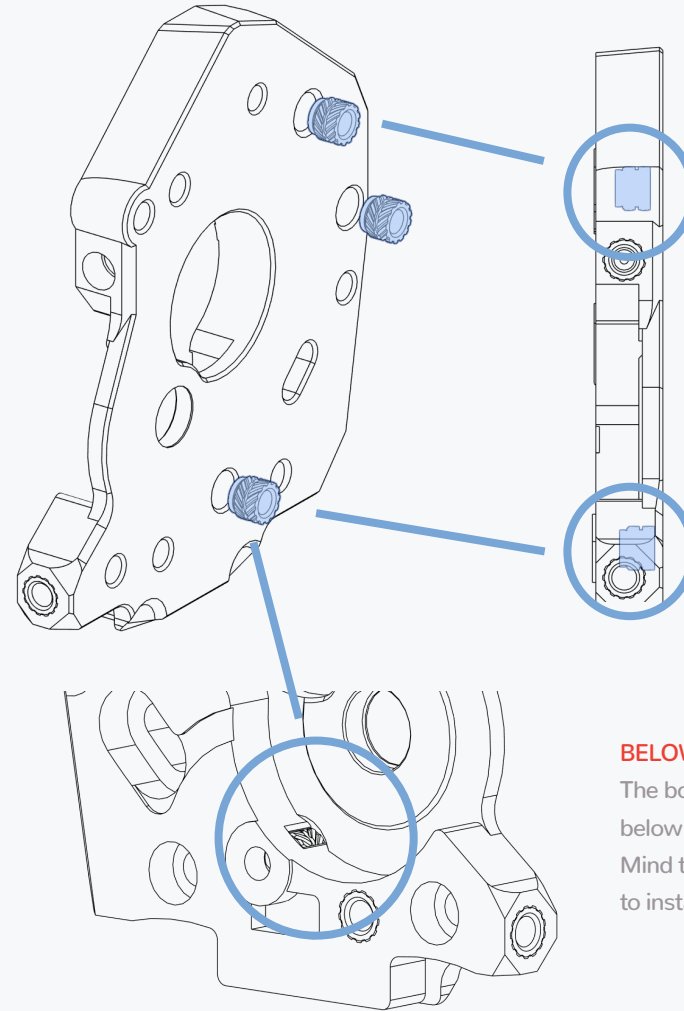
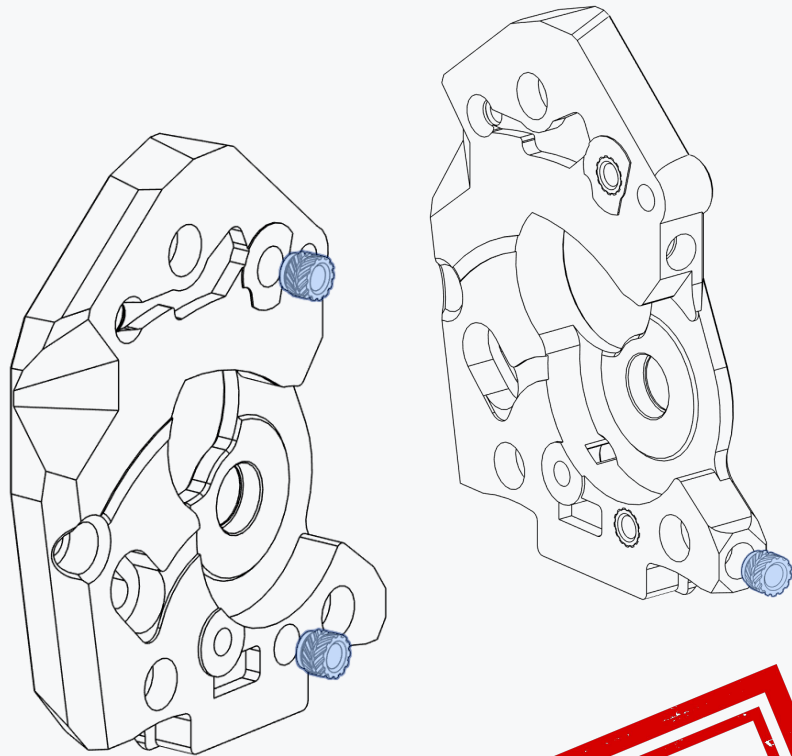


<https://voron.link/m5ybt4d>



HEAT SET INSERTS

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BELOW SURFACE

The top heatset insert needs to sit below the surface of the printed part.

BELOW SURFACE

The bottom heatset insert needs to sit below the surface of the printed part. Mind the cutout in the part and make sure to install it straight.

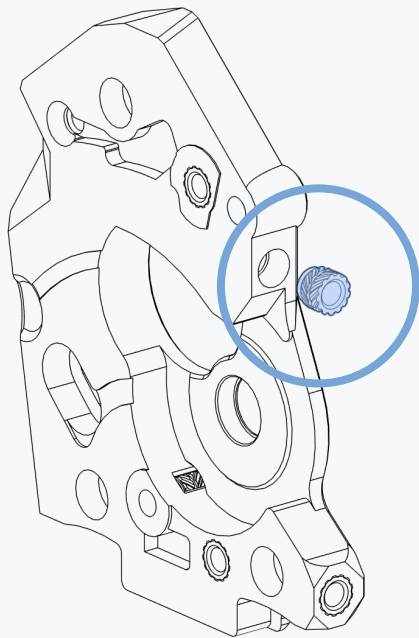
COMPLETED

HEAT SET INSERTS

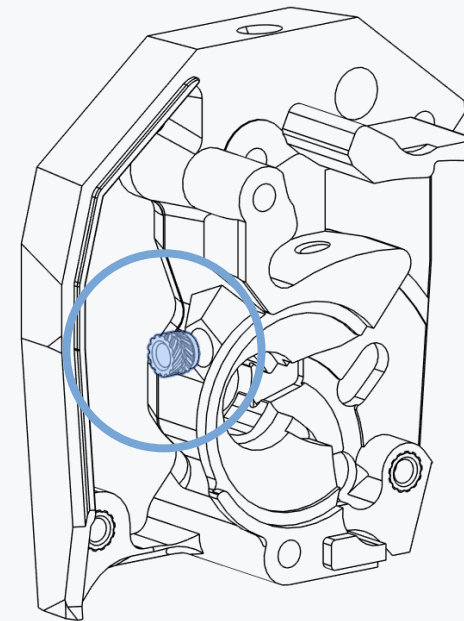
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OPTION: TOOLHEAD PCB

If you opt to use a toolhead PCB, add additional heat set inserts into locations highlighted below.



Heat Set Insert



HEAT SET INSERT

Be careful when inserting this heat set insert. It's easy to accidentally touch the left side of the part with the soldering iron.

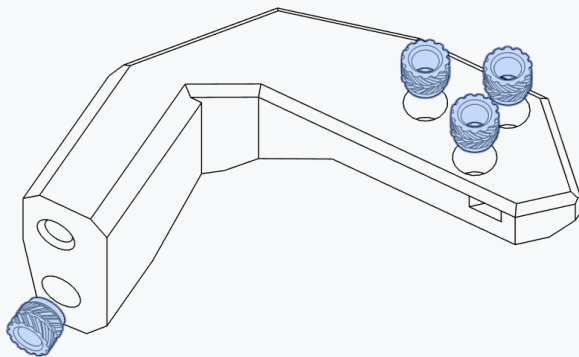
COMPLETED

HEAT SET INSERTS

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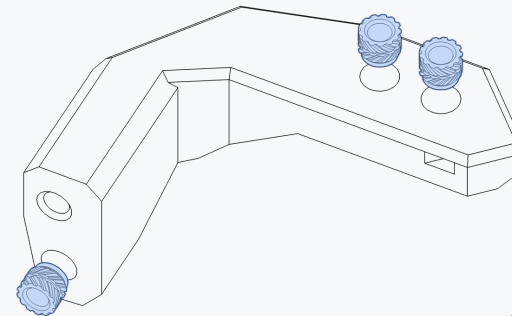
GENERIC CABLE CHAINS

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



IGUS CABLE CHAINS

IGUS chains have 2 mounting holes.



Heat Set Insert

PRINTER SPECIFIC MOUNTS

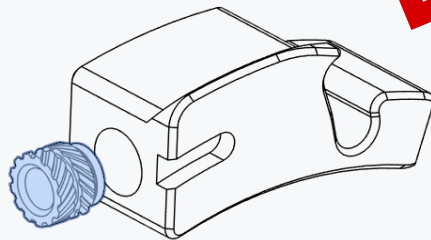
V2, Trident and Legacy use the same printed parts. Extra parts are included for SwitchWire.

COMPLETED

HEAT SET INSERTS

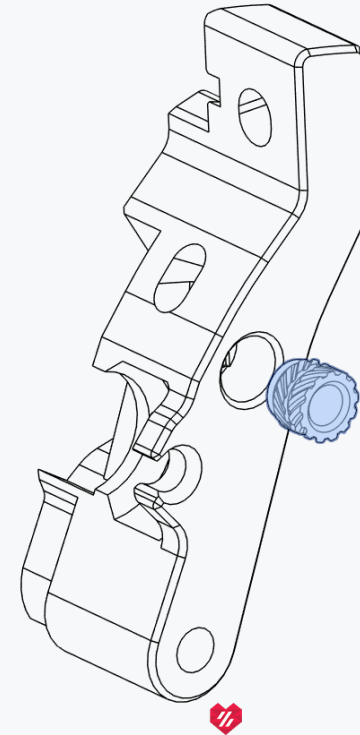
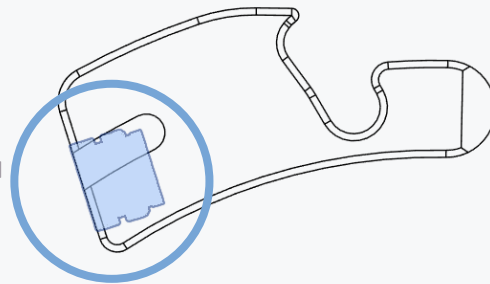
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COMPLETED



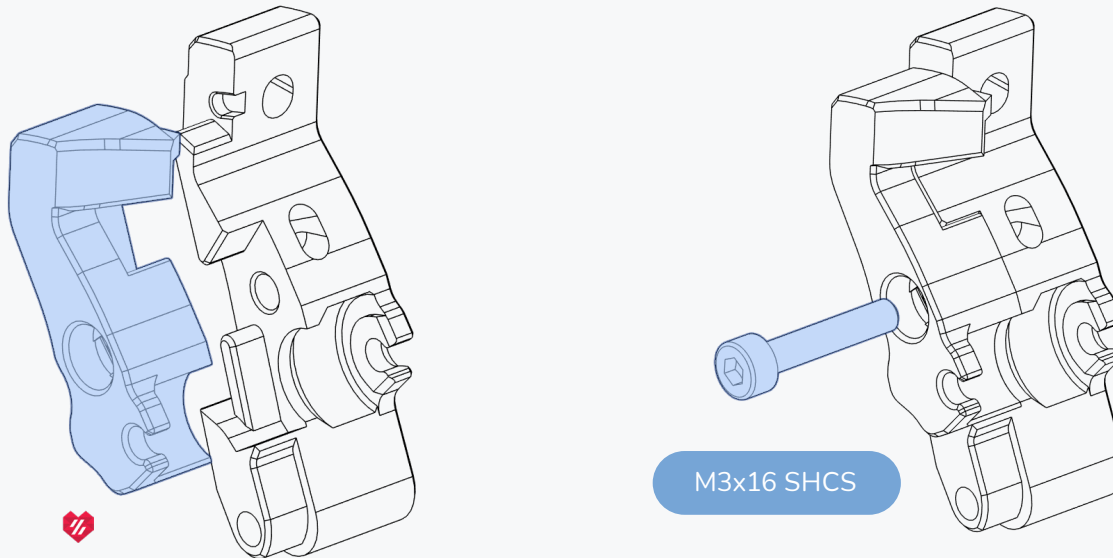
FLUSH WITH SURFACE

The heatset insert needs to sit flush or slightly below the surface of the printed part.



ACCENT PART?

Look for Voron heart next to the part. It indicates that this is a part that is usually printed in the accent color.

**TOLERANCES, EXTRUSION MULTIPLIERS AND YOU**

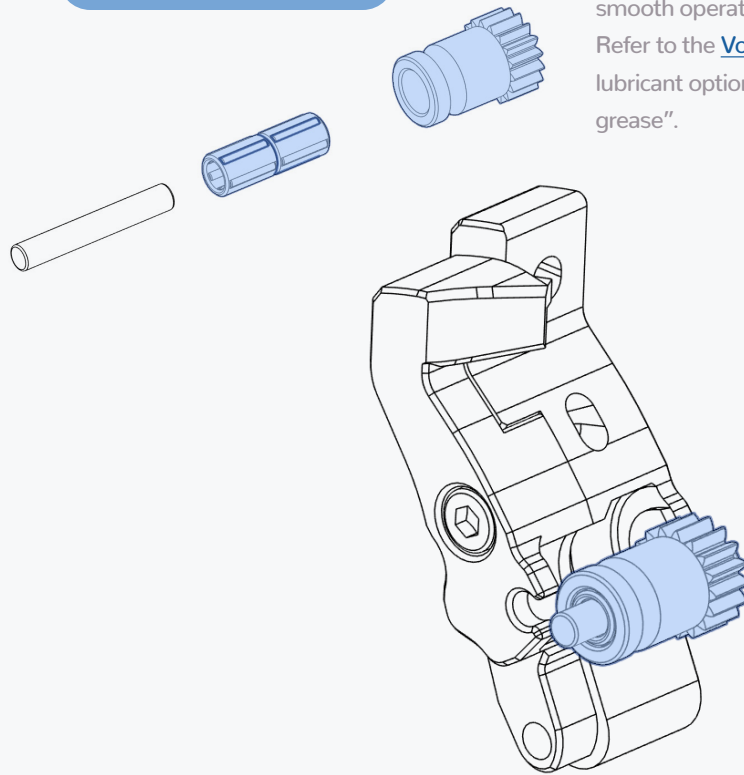
The part has tight tolerances. If it doesn't fit together well the printed parts are likely over-extruded.

GUIDLER ARM

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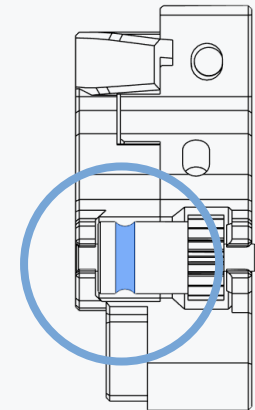
BMG Idler Assembly



LUBRICATE BEARINGS

A lubrication film is required to ensure smooth operation and longevity.

Refer to the [Voron sourcing guide](#) for lubricant options - look for a "light grease".

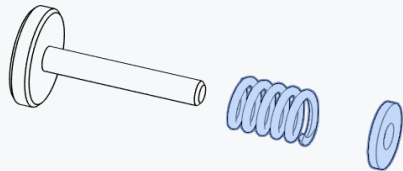


MIND ORIENTATION

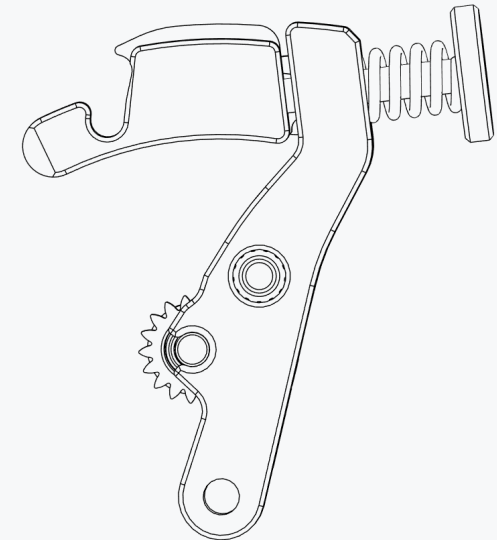
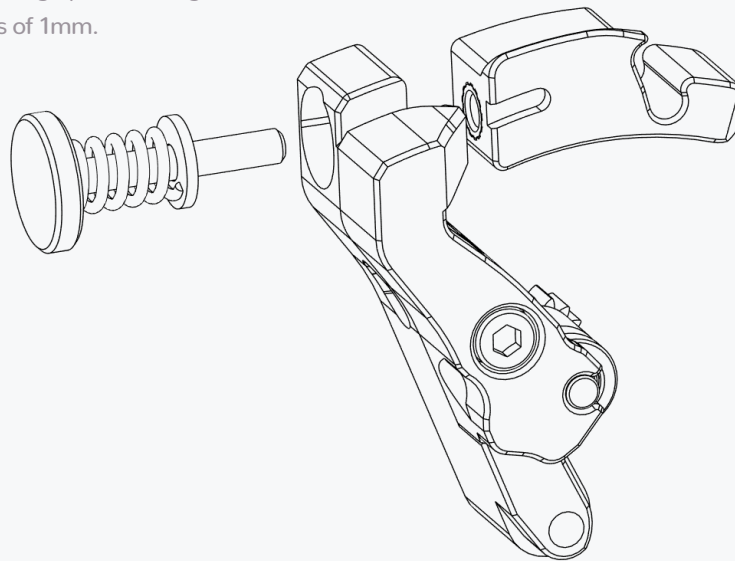
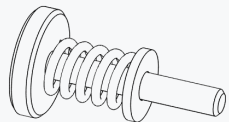
Make sure to orient the idler assembly as shown above.

A NOTE ON SPRINGS

Longer/shorter/stiffer springs will change the tension characteristics and have an impact on how well the tension mechanism works. Consider buying the [original Bondtech part](#) as those are known to work well. If sourced from a different vendor check if it's roughly 12mm long with an outer diameter of 6mm and a wire thickness of 1mm.



BMG Thumbscrew Assembly



MOTOR PLATE

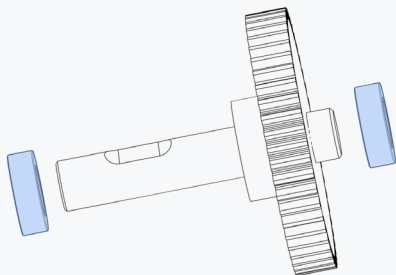
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CHECK BEARING FIT

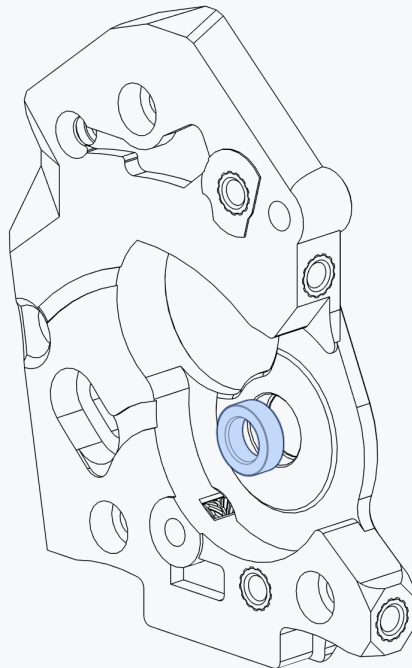
The bearings must slip on and off the shaft easily to allow the gear to self-centre.

Pressing the bearings on the shaft will damage them.

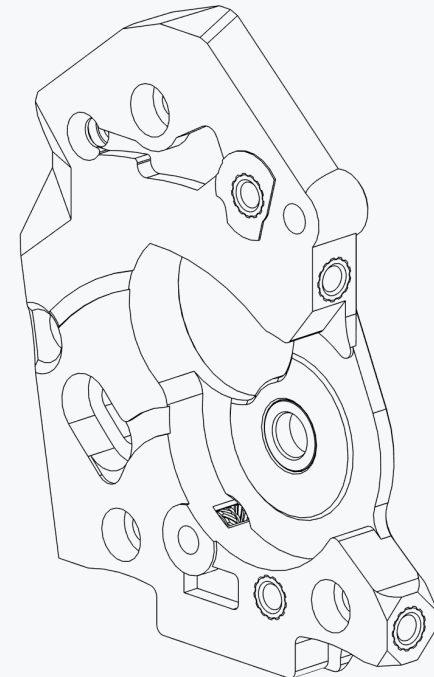
Lightly sand the shaft if required.



MR85 Bearing



MR85 Bearing

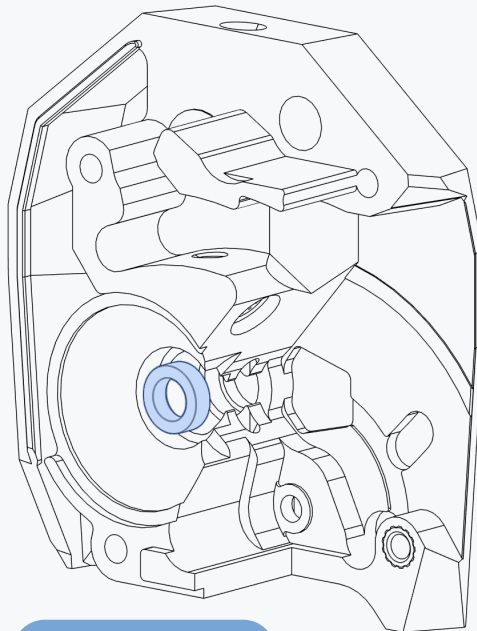


BEARING FIT

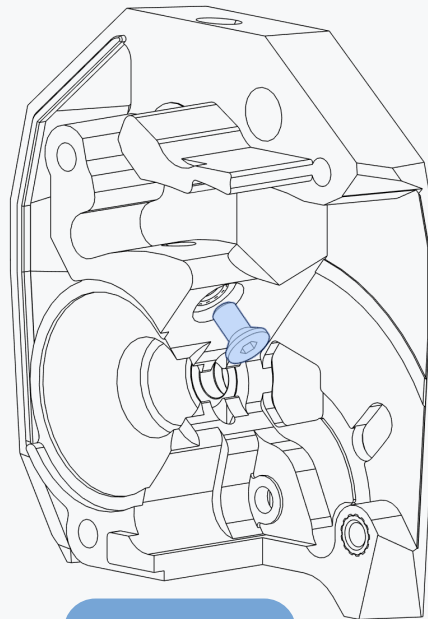
Fully seat the bearing into the plastic pocket.

Apply even pressure to insert them. Avoid pressing on the inner ring of the bearing.

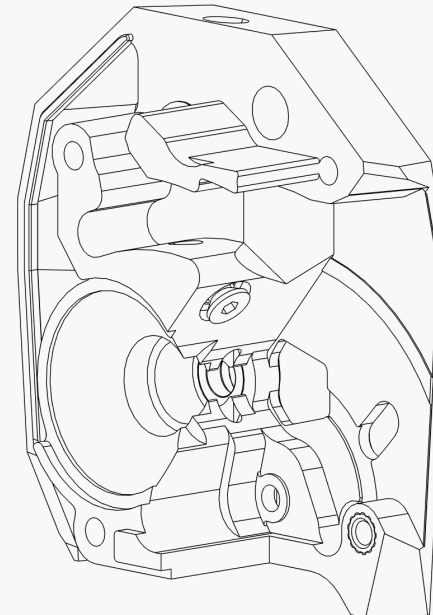
If the fit is too tight the printed parts are likely over-extruded.



MR85 Bearing



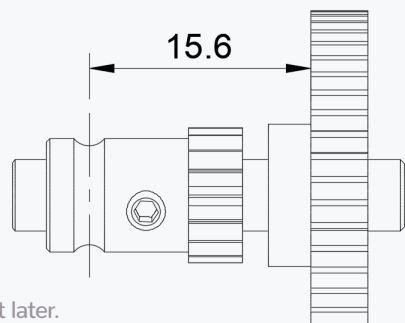
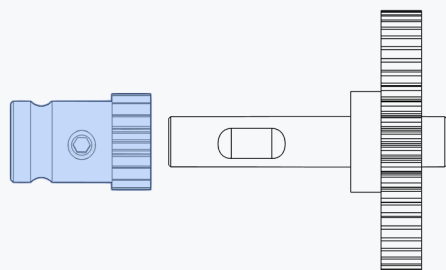
M3x6 FHCS

**BEARING FIT**

Fully seat the bearing into the plastic pocket.
Apply even pressure to insert them. Avoid
pressing on the inner ring of the bearing.

A NOTE ON GEARS

Poorly made gears often cause print quality issues. For best performance consider sourcing the [original Bondtech parts](#).

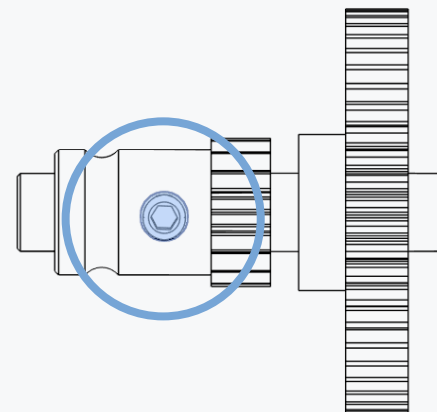


INITIAL POSITION

The final position is set later.

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.

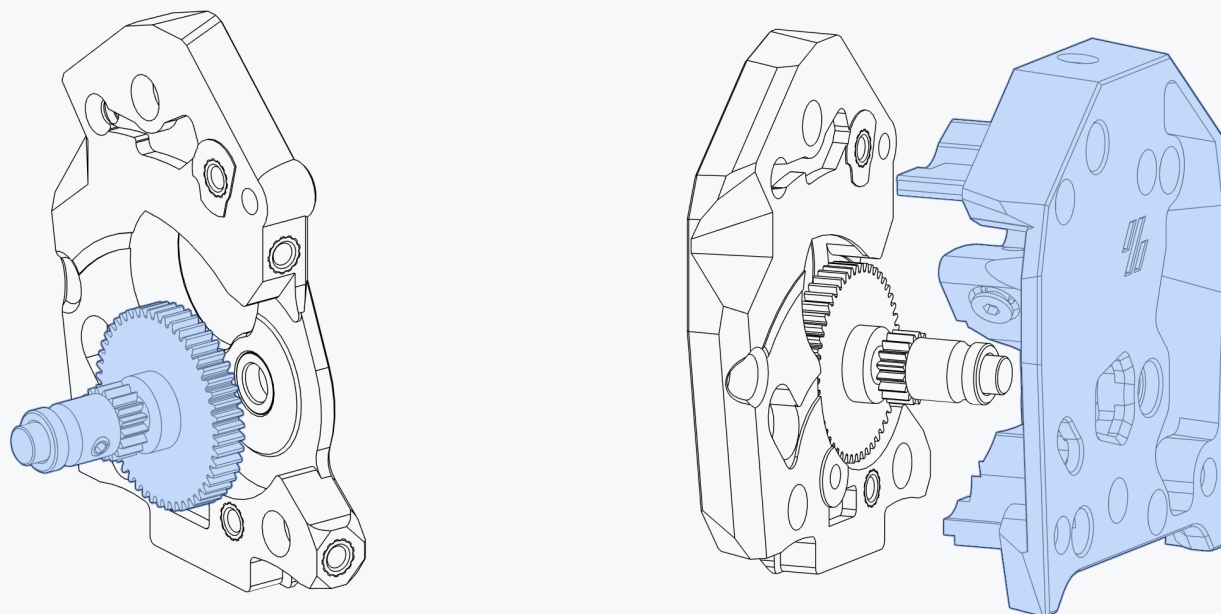


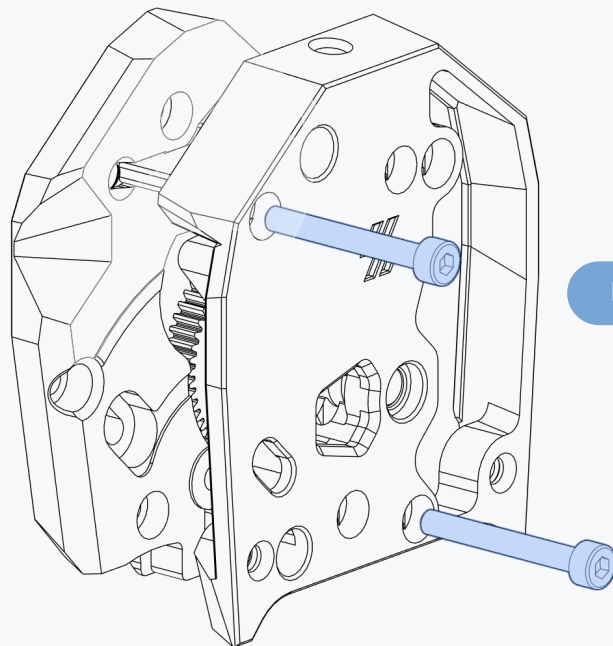
THREAD LOCKER

The final position of the drive gear is set in a later step. Common thread lockers have a long enough working time to complete the steps without issues.

Familiarize yourself with the steps on the next 3 pages before you apply thread locker.

Complete the steps on the next 3 pages after applying the thread locker.

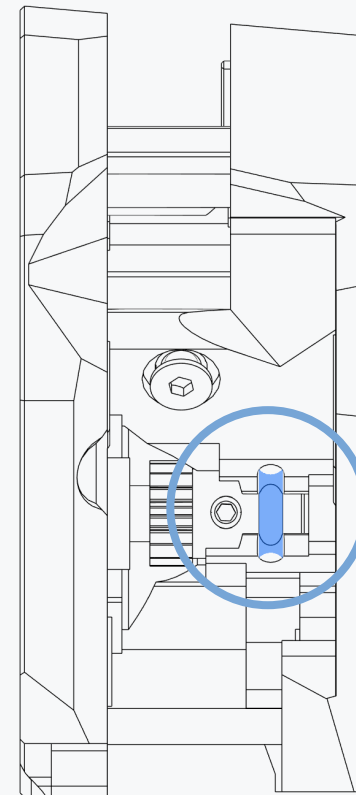




M3x25 SHCS

DON'T OVERTIGHTEN

Tighten until the plastic bends and cracks.
Back up 2 turns, discard parts, reprint and try again.



INITIAL ALIGNMENT CHECK

Check if the filament path aligns with the toothed section of the drive gear.

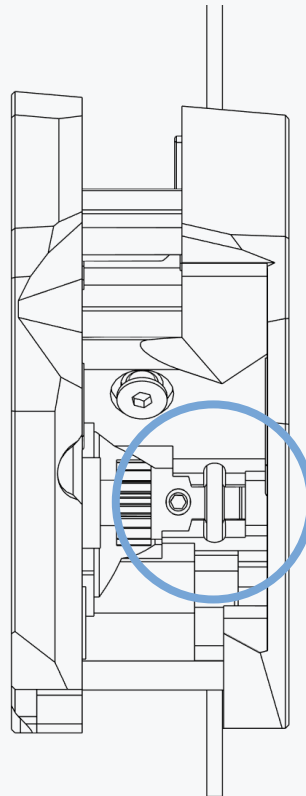
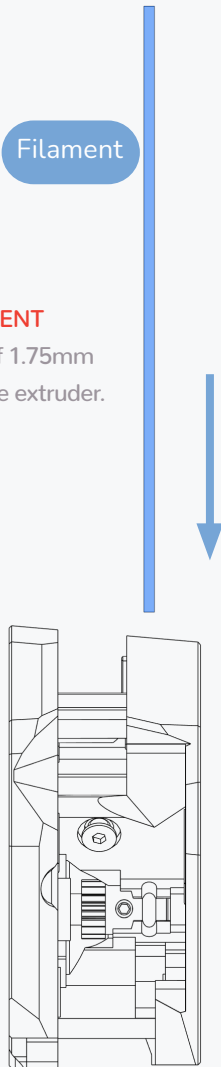
DRIVE ALIGNMENT

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Filament

INSERT FILAMENT

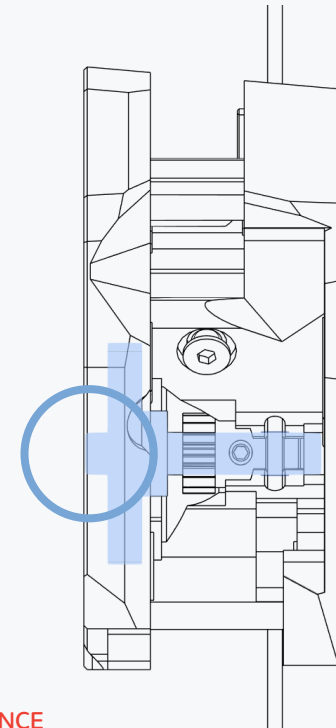
Insert a piece of 1.75mm filament into the extruder.



CHECK ALIGNMENT

With the filament inserted, verify if the filament path and drive gear are aligned.

Loosen the set screw and adjust the position of the drive gear if required.



CHECK FOR CLEARANCE

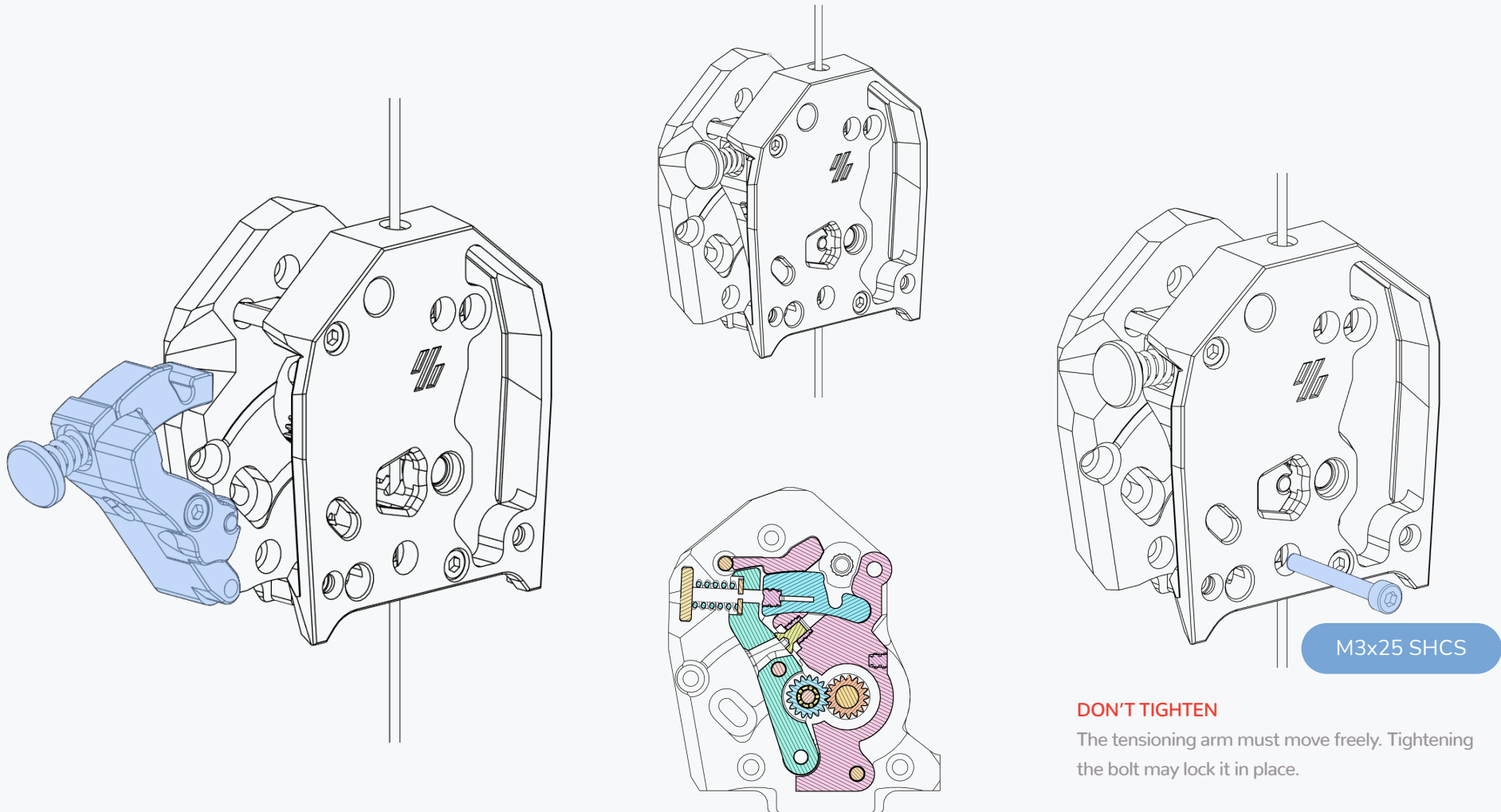
The drive shaft must not touch the motor housing. Make sure it does not sit above the surface of the printed part.

Check if the shaft has sufficient clearance when fully seated.

Depending on the shafts tolerances you may need to adjust the position of the drive gear or sand the face of shaft.

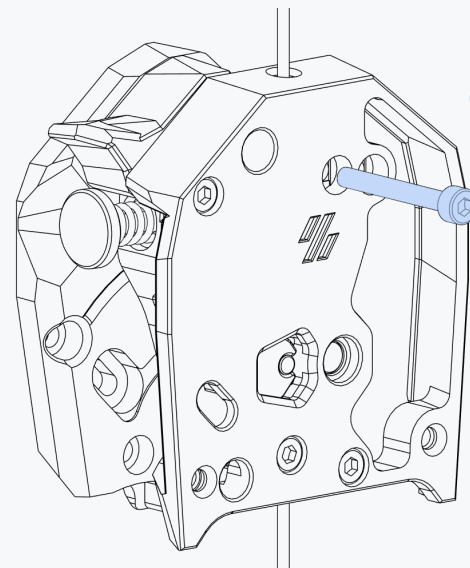
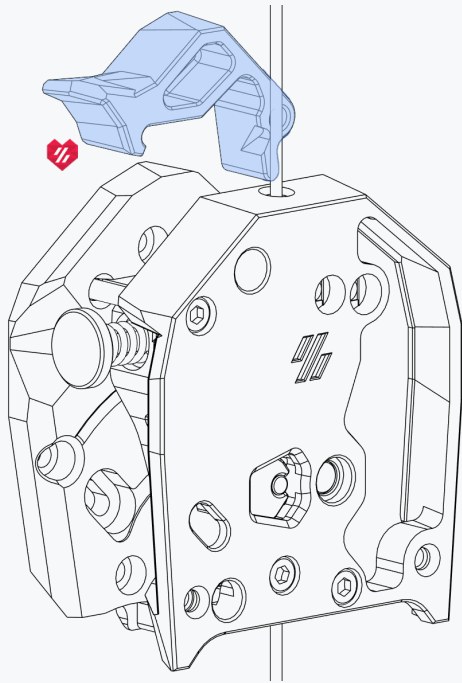
TENSION ARM

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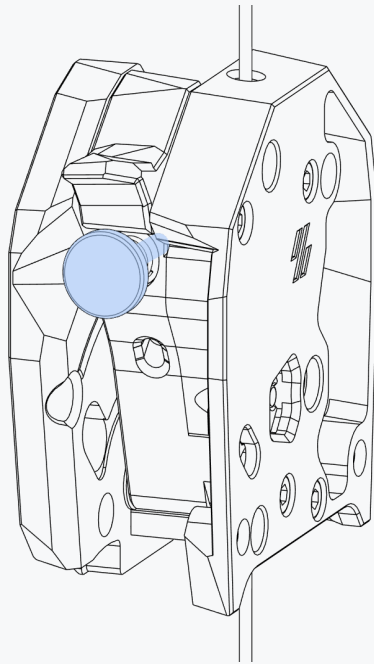


LATCH

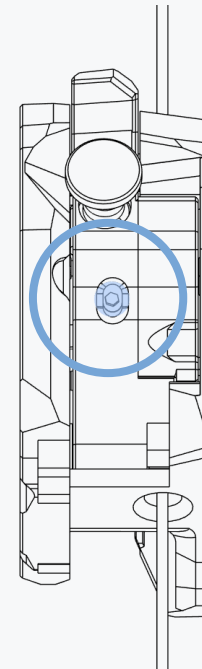
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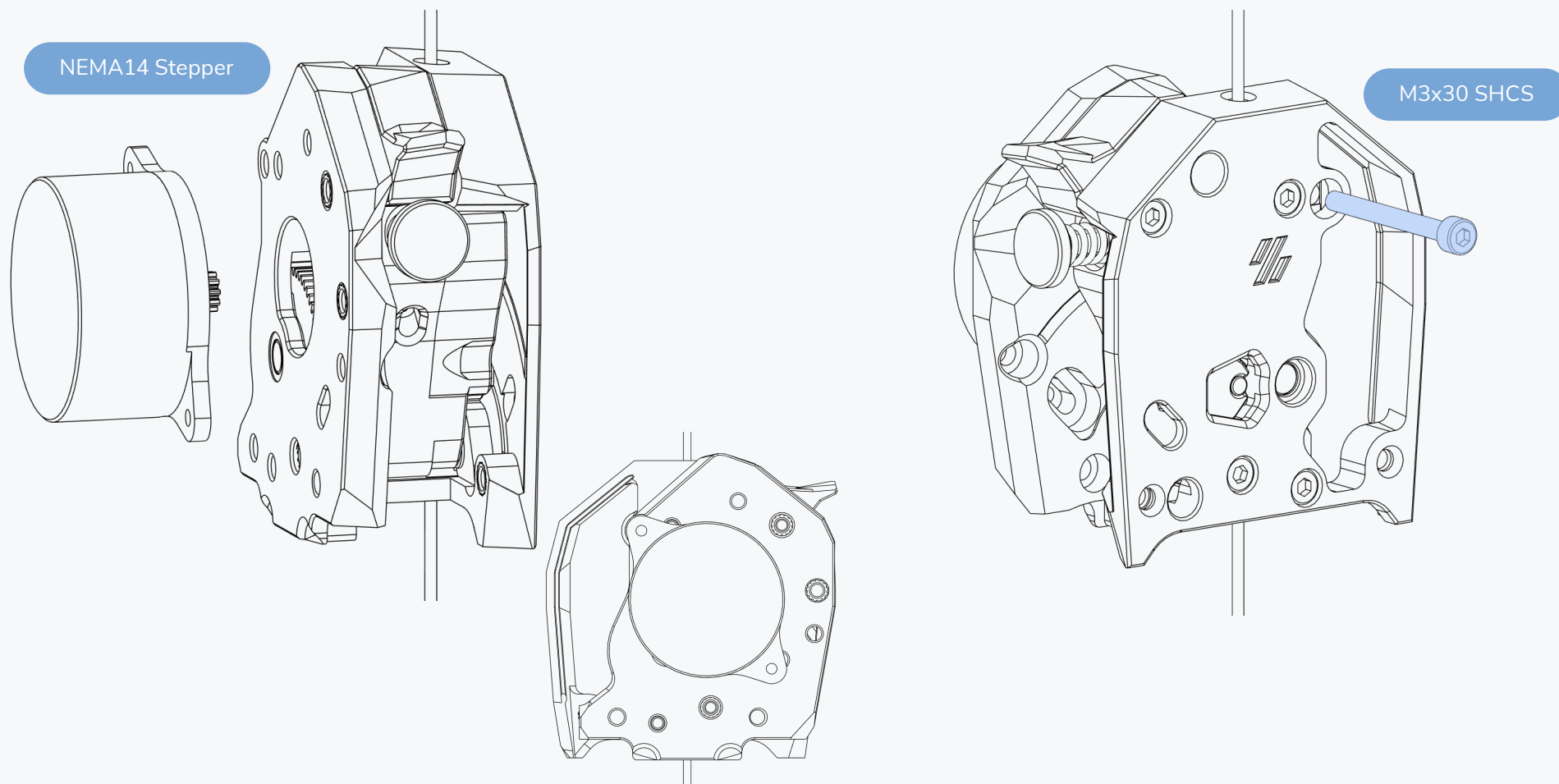
M3x25 SHCS

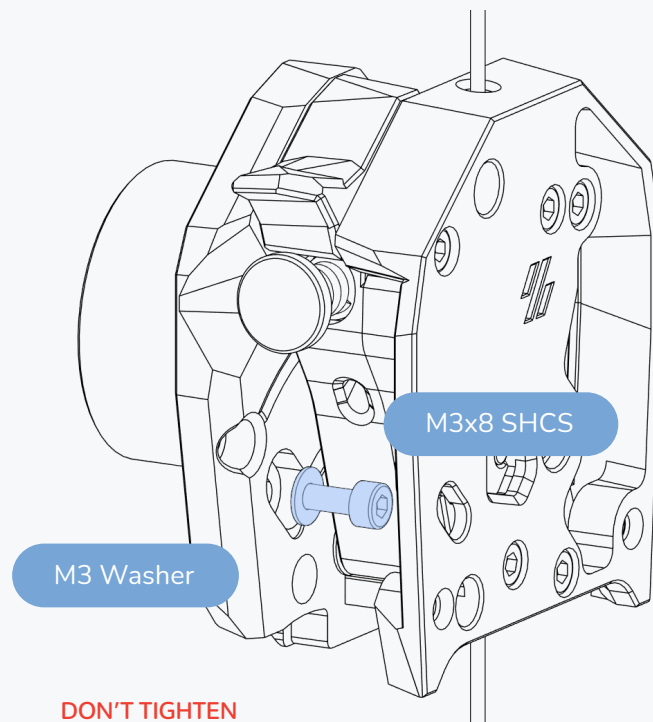
**TENSION KNOB**

Turning the thumb screw clockwise will increase the tension and grip on the filament. Too much tension will result in print issues.

**ANTI SQUISH THINGYMAJIG**

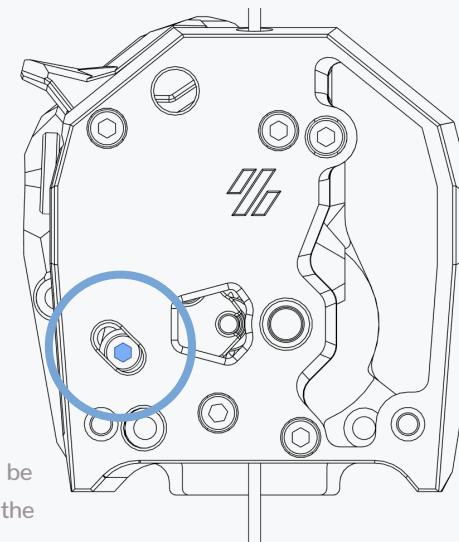
Softer and flexible materials will deform and extrude poorly under too much tension. ClockWork2 adds an adjustment feature to set the minimum distance between the drive gear and the idler, limiting the squish on the filament, and to prevent the gears from meshing too tightly or binding up the extruder.





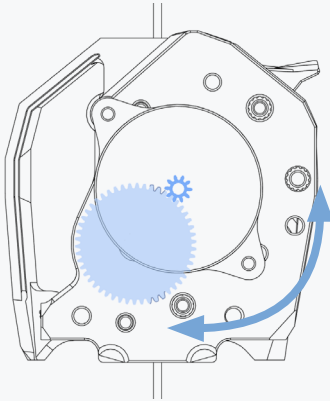
DON'T TIGHTEN

The motor position will be adjusted in the next steps. Don't fully tighten just yet.



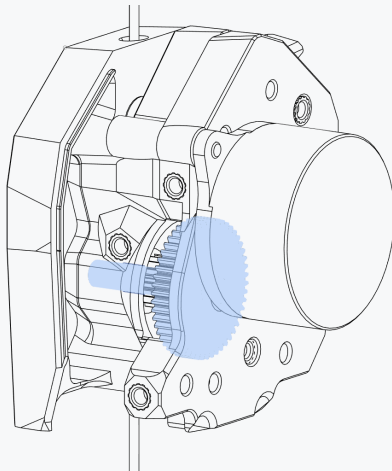
ACCESS HOLE

The second motor bolt can be accessed from the front of the extruder.



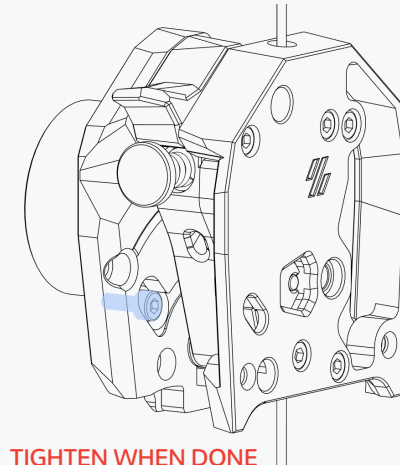
SET GEAR MESHING

Adjust the stepper motor position so that the motor and extruder gear teeth fully mesh /overlap with each other. There should be a very small gap between the faces of the gear teeth; the gears must not press tightly against each other.



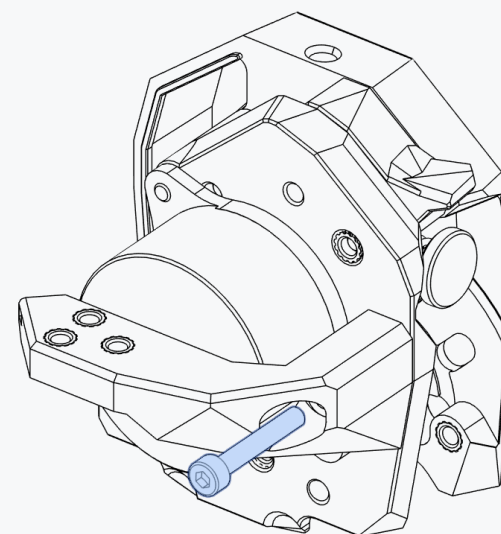
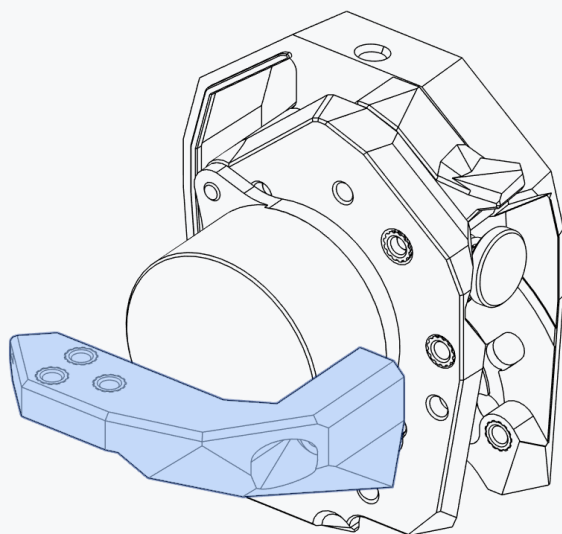
CHECK GEAR PLAY

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.

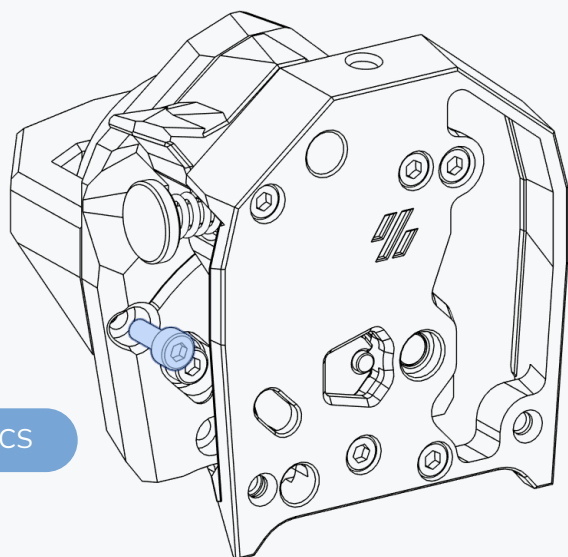


TIGHTEN WHEN DONE

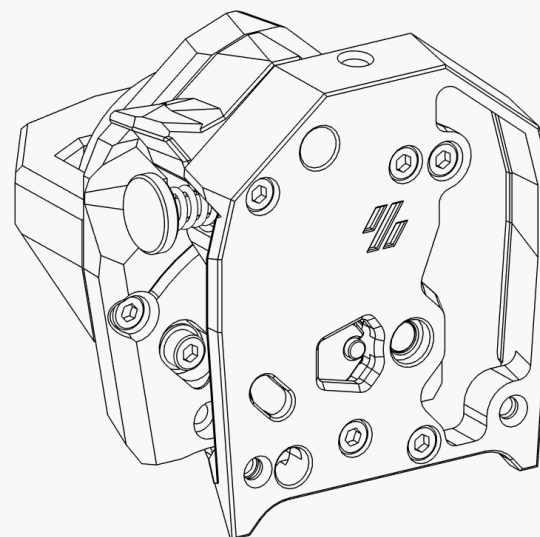
Don't forget to tighten the second motor bolt after adjusting.



M3x20 SHCS

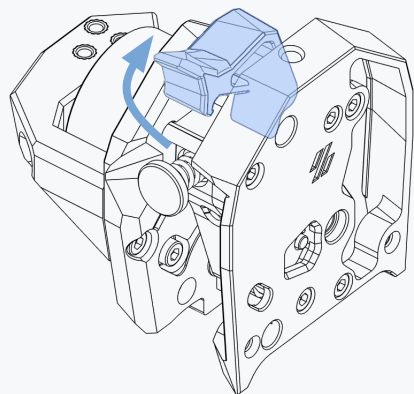


M3x8 SHCS



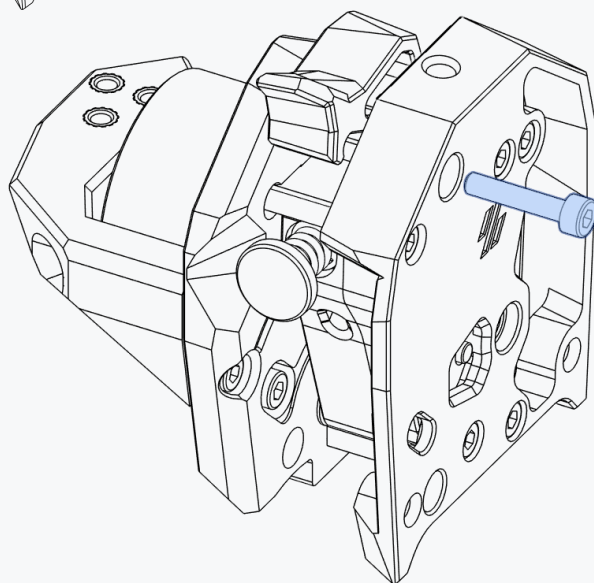
CABLE COVER

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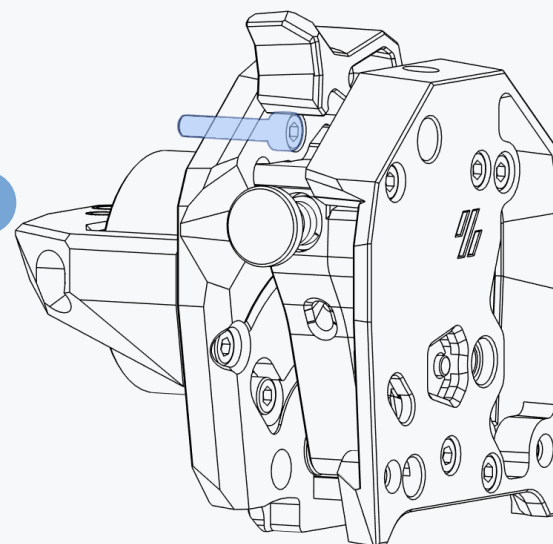


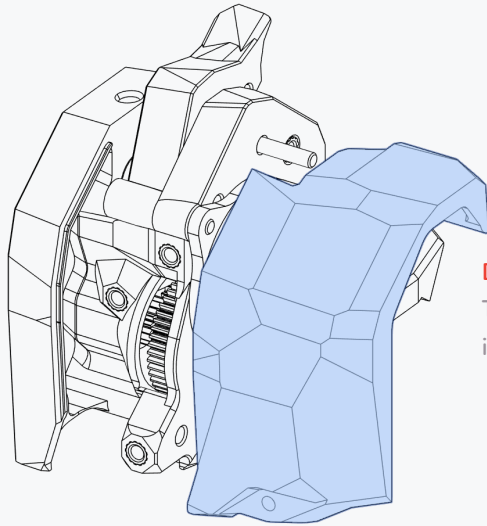
OPEN LATCH

Undo the filament latch to expose the bolt pocket for the cable cover.

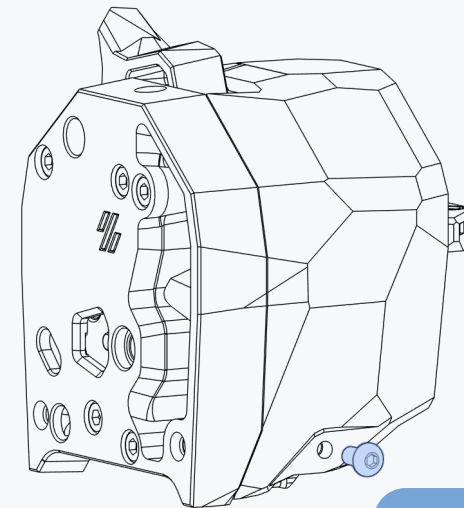


M3x16 SHCS





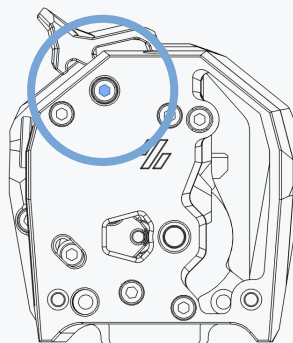
DON'T OVER-TIGHTEN
The bolt is threaded directly into plastic.



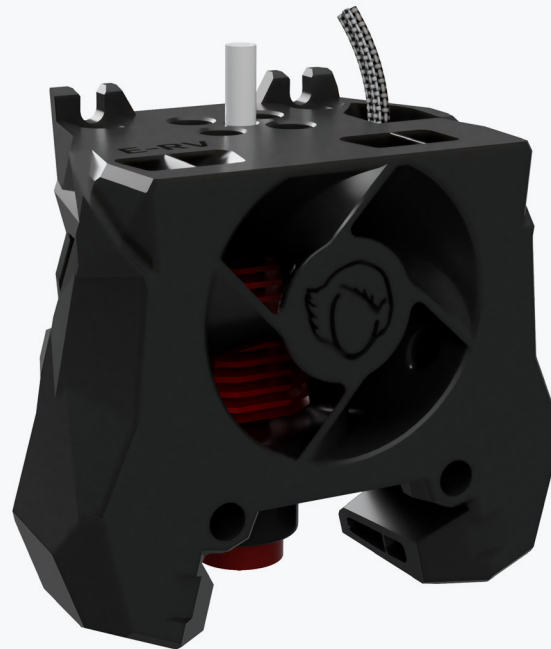
M3x6 BHCS

ACCESS HOLE

The bolt drive can be accessed from the front of the extruder.



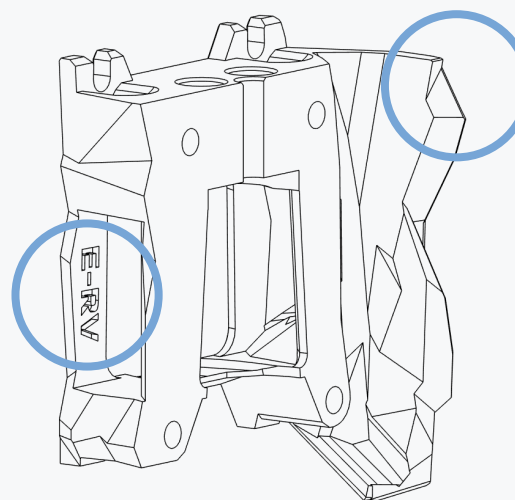
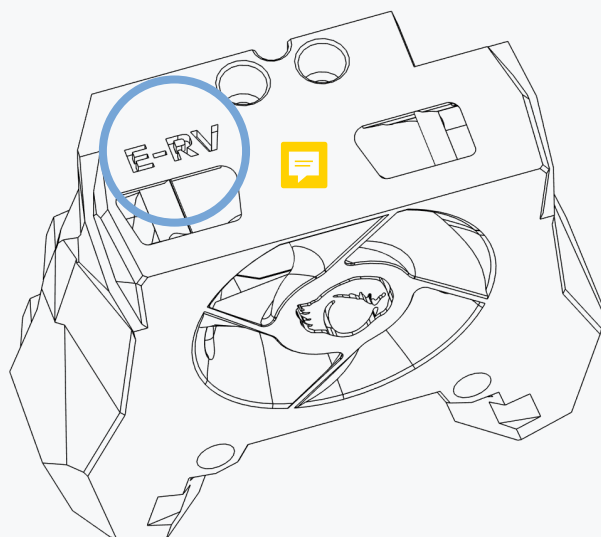
StealthBurner development started on 2021-04-13 with a simple: "I'm going to regret saying this but, 'How hard could it be?'"



IDENTIFYING PRINTED PARTS

The hotend type is embossed on the printed parts.

Make sure they match your hotend.



MISSING CORNER? CW1? CW2?

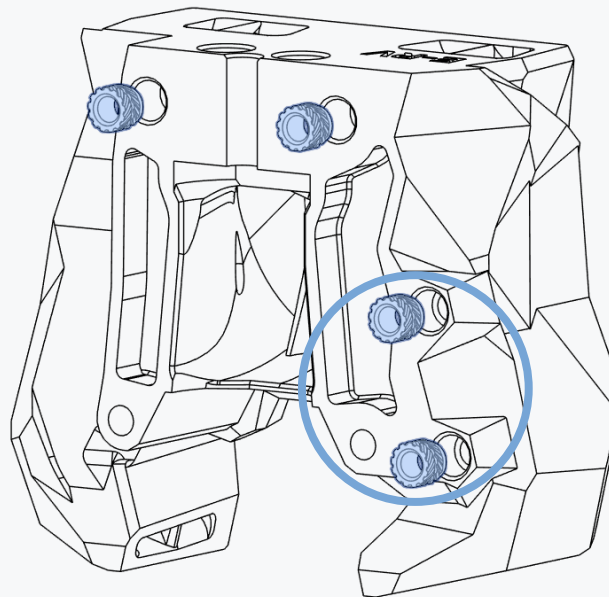
We also provide tool cartridge parts for ClockWork1, and other extruders designed as an alternative to CW1. They are identical except for an opening in the highlighted corner to help with wire routing for those designs.

AVAILABLE MOUNTS

We also provide mounts for other hotends. They are assembled in a similar manner.

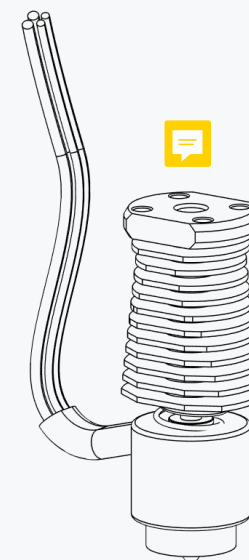
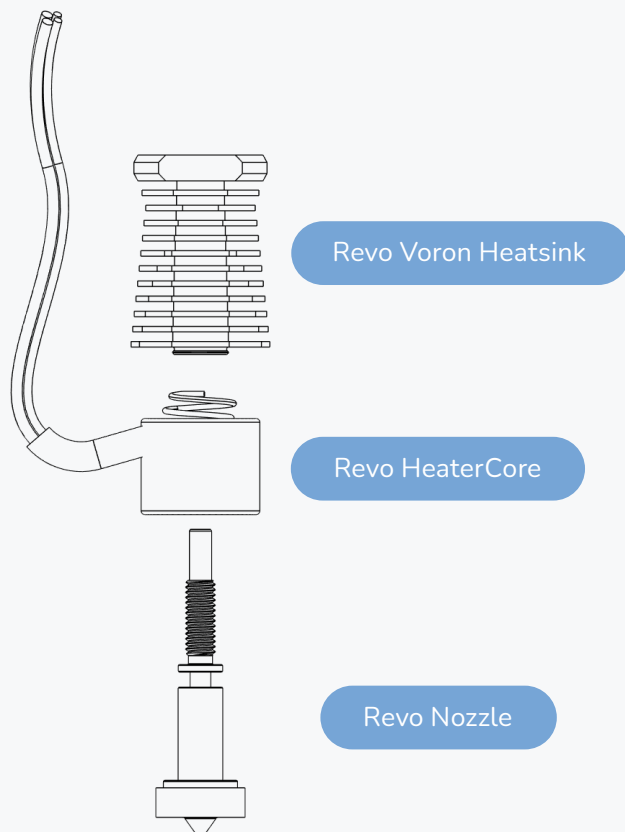
For a full list of available mounts and their identification code, see the readme file included in the toolheads folder.

Heat Set Insert



OPTION: ADXL PCB MOUNT

To use the optional ADXL PCB for Klipper's Input Shaper calibration, add additional heat set inserts into the holes in highlighted location.



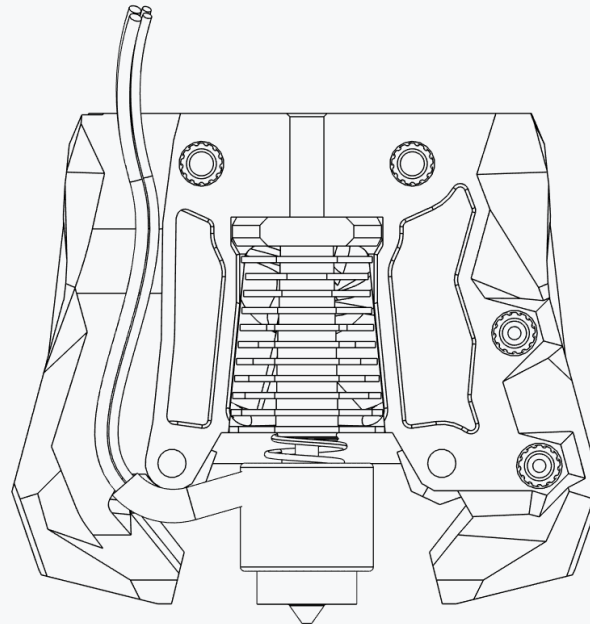
HOTEND WIRE ROUTING

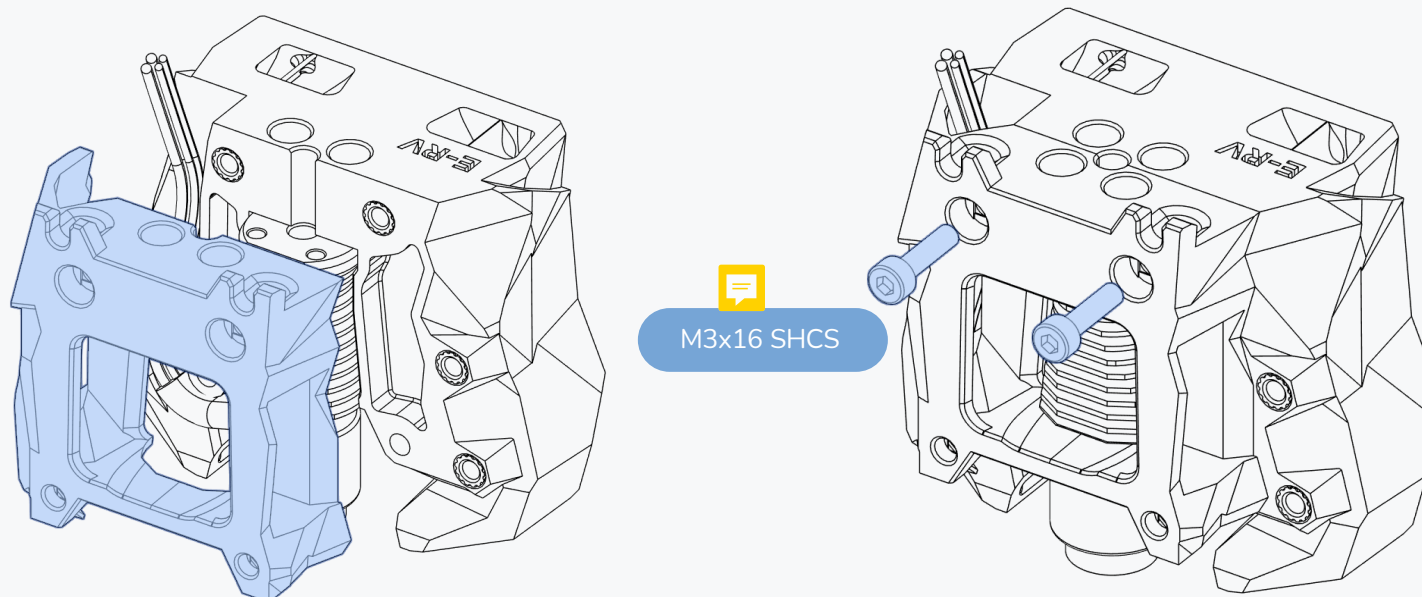
Route the wires as shown to the right. This is universal to all hotend types.

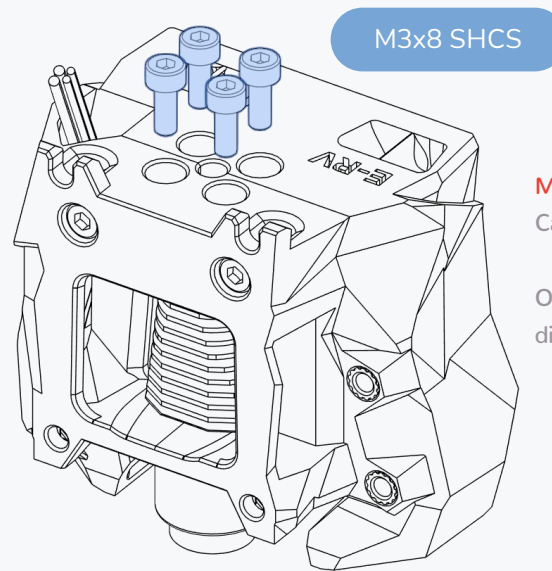
BEND STRAIN RELIEF

Carefully bend the strain relief to clear the printed part. Firmly hold the HeaterCore to prevent bending the Revo Nozzle.

It is critical that the Revo Nozzle is fully hand tightened into the heatsink. You **MUST** bend the strain relief to achieve this.



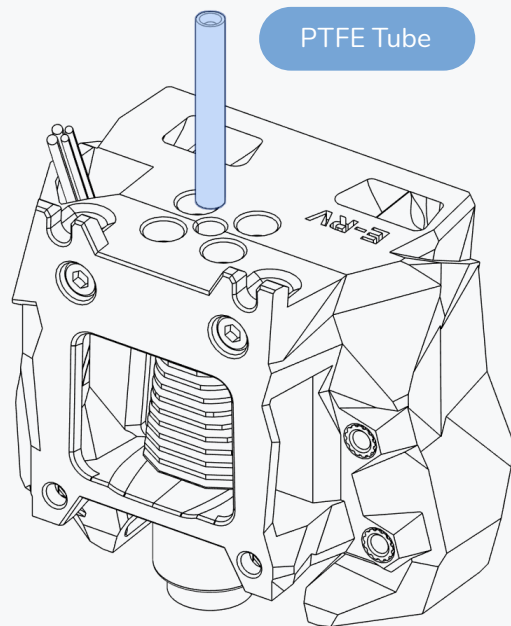




M3 MOUNTING BOLTS?

Cause we can, that's why.

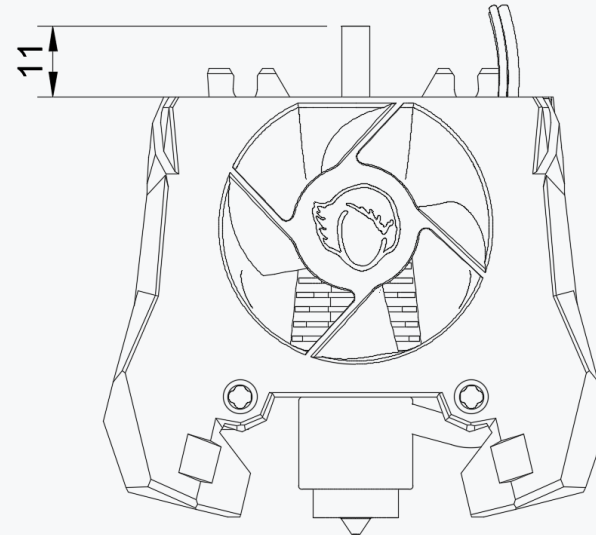
Other hotend designs may use different mounting hardware.

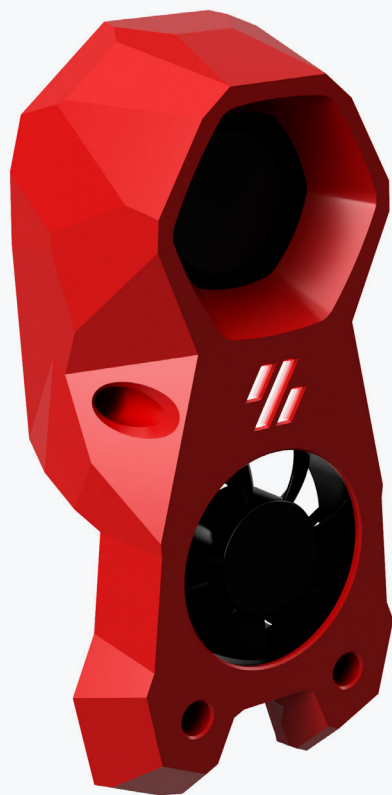


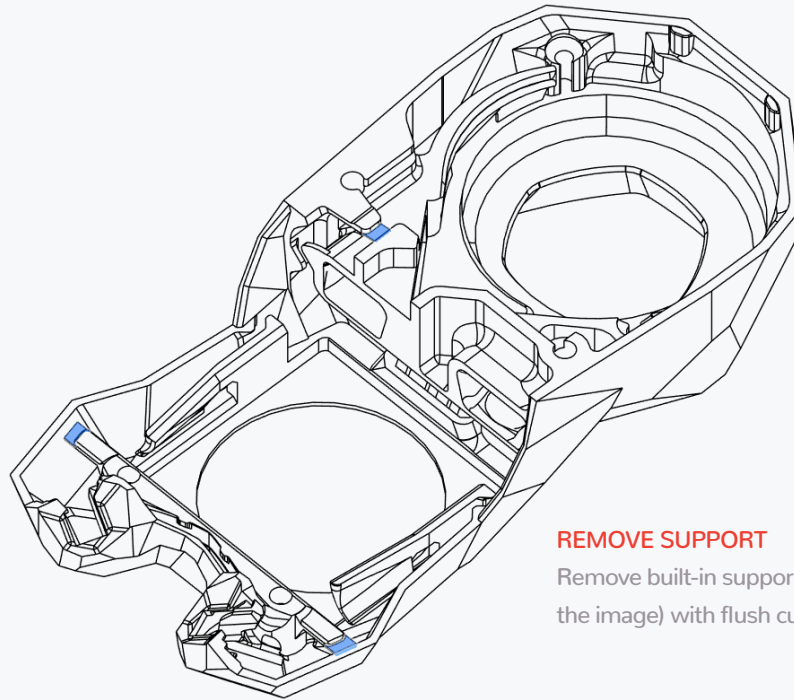
PTFE STICKOUT

The PTFE tube should stick out 11mm above the surface of the printed part.

The stick out length might vary if you use an extruder other than the ClockWork2.





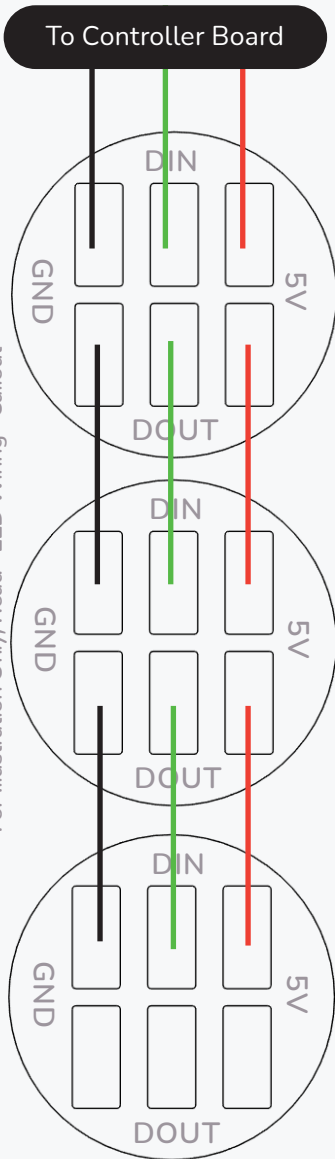


REMOVE SUPPORT

Remove built-in supports (highlighted in the image) with flush cutters.



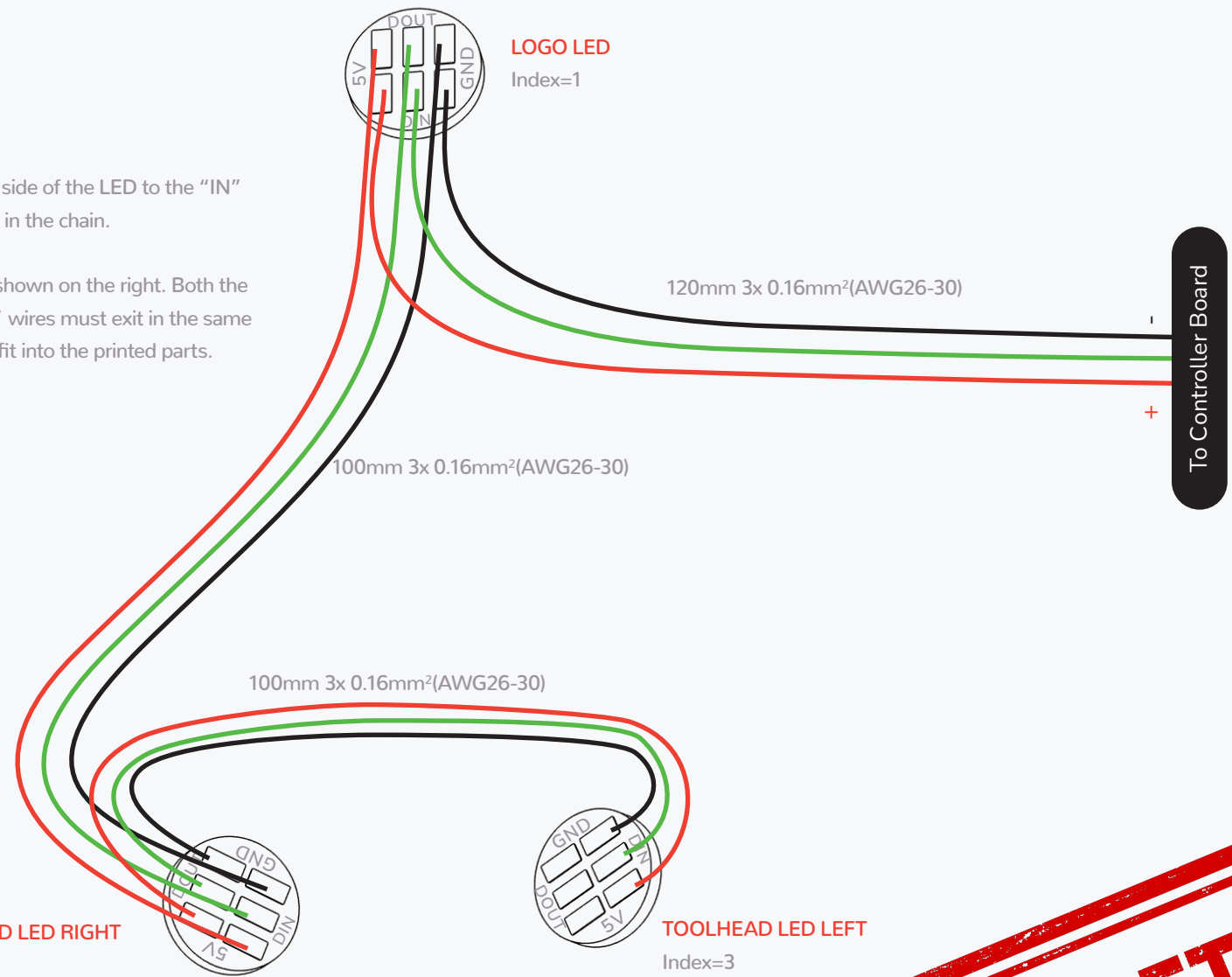
For Illustration Only, Read "LED Wiring" Callout



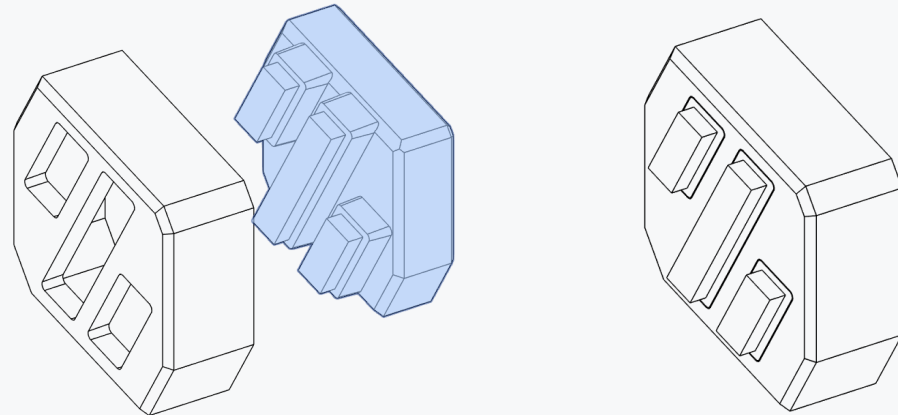
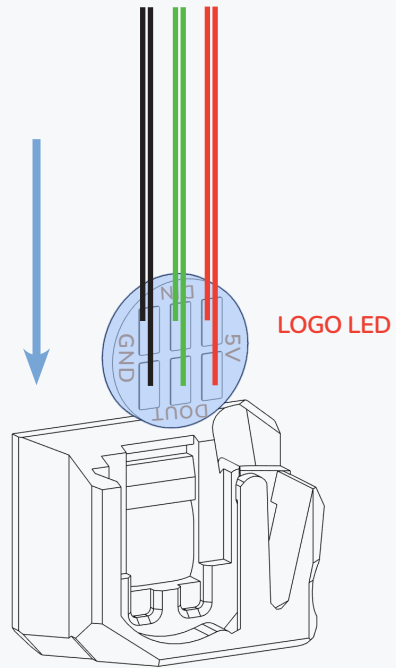
LED WIRING

Connect the "OUT" side of the LED to the "IN" side of the next LED in the chain.

Solder the wires as shown on the right. Both the "IN" and the "OUT" wires must exit in the same direction in order to fit into the printed parts.



COMPLETED



LED DIFFUSER AND MASK

The diffuser (highlighted part) is printed in a translucent filament to evenly spread the light.

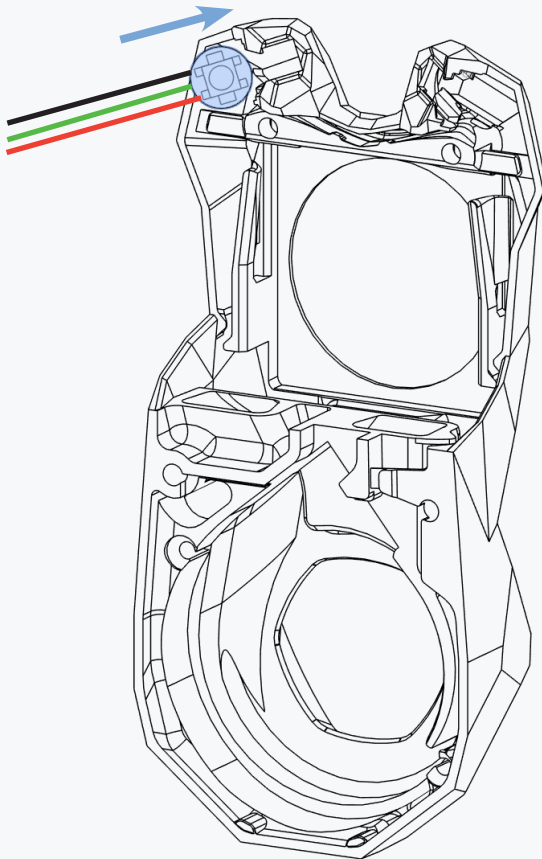
The mask (part to the left) is printed in an opaque filament to prevent the light from leaking, resulting in a crisp logo.

COMPLETED

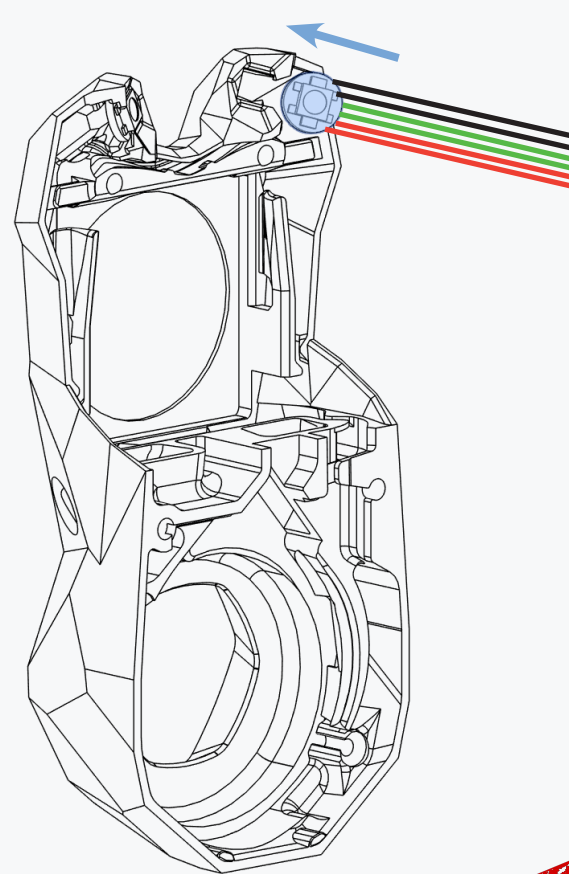
LEDS

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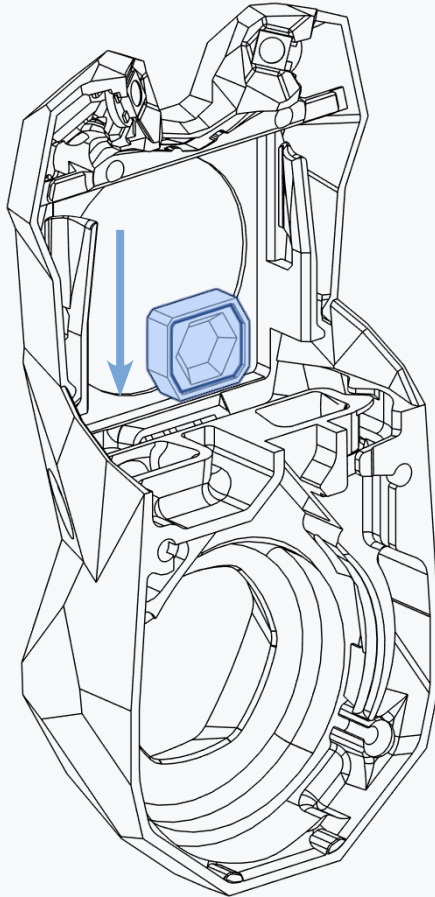
TOOLHEAD LED LEFT



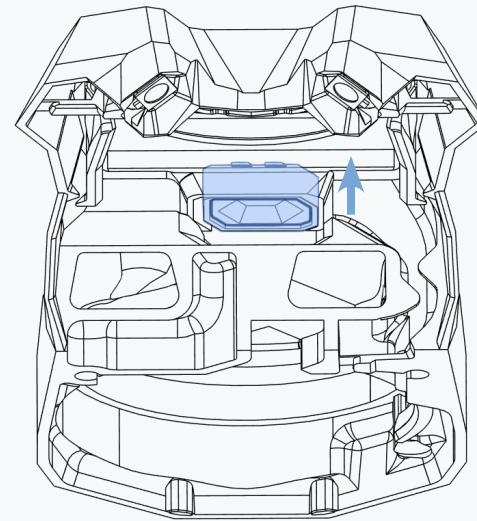
TOOLHEAD LED RIGHT



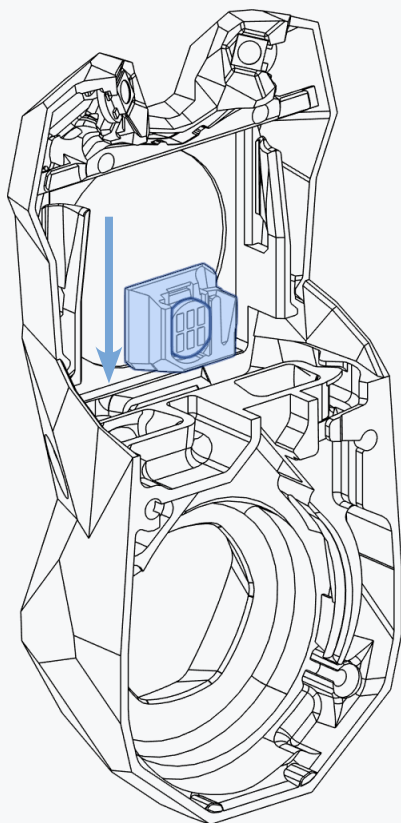
COMPLETED

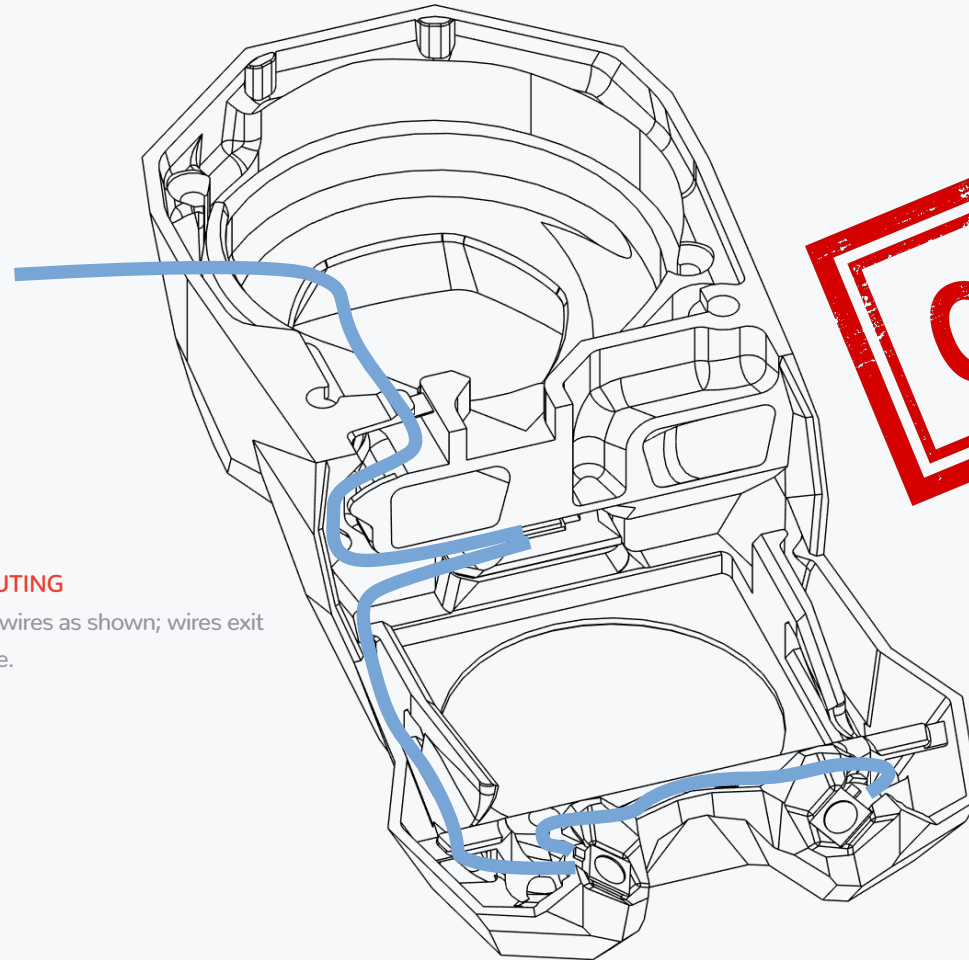
**DIFFUSER INSERTION**

Insert the printed parts and push them towards the front.



COMPLETED

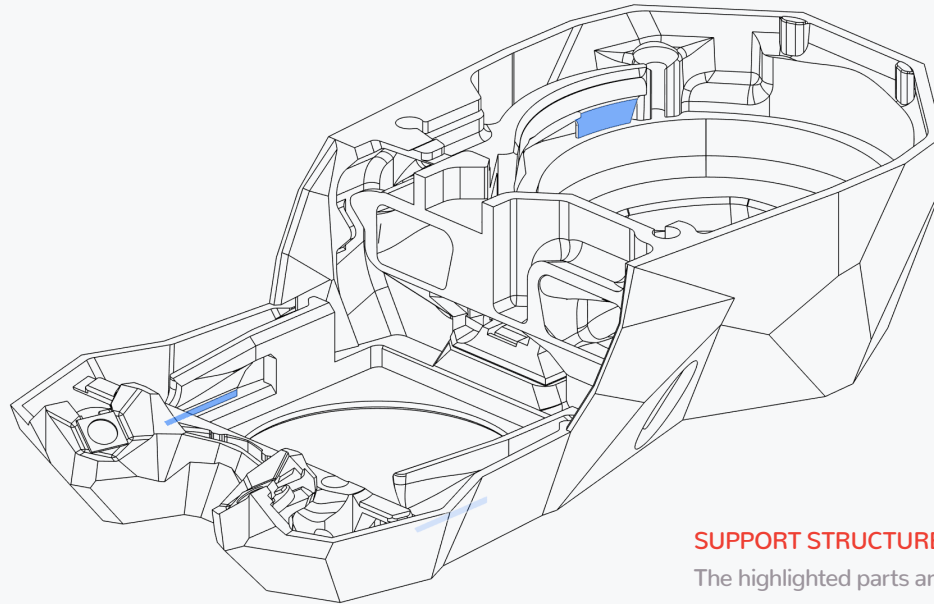




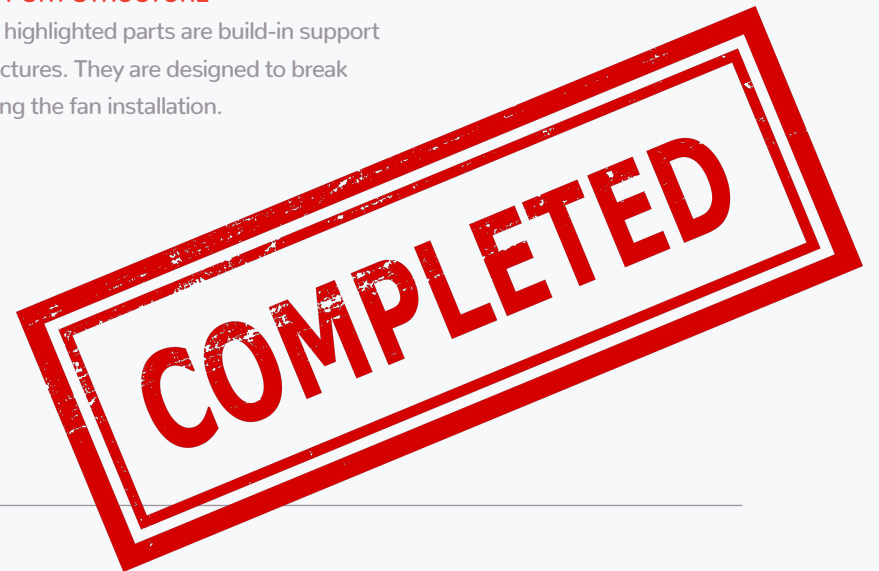
LED WIRE ROUTING

Route the LED wires as shown; wires exit on the right side.

COMPLETED

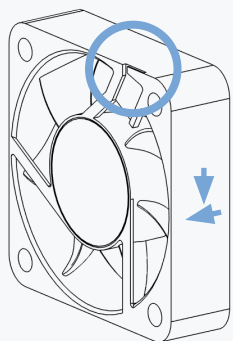
**SUPPORT STRUCTURE**

The highlighted parts are build-in support structures. They are designed to break during the fan installation.



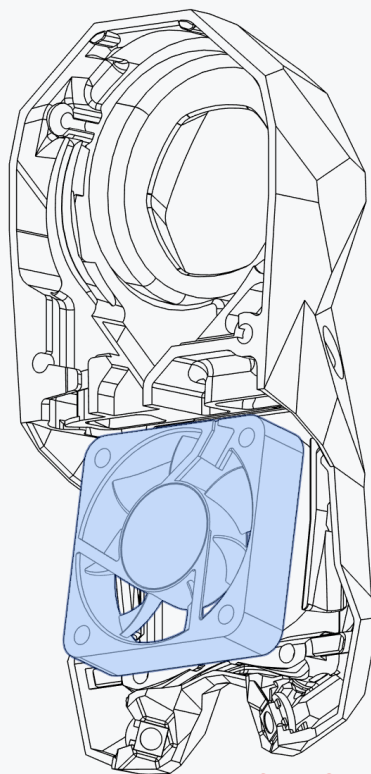
HOTEND FAN

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FAN ORIENTATION

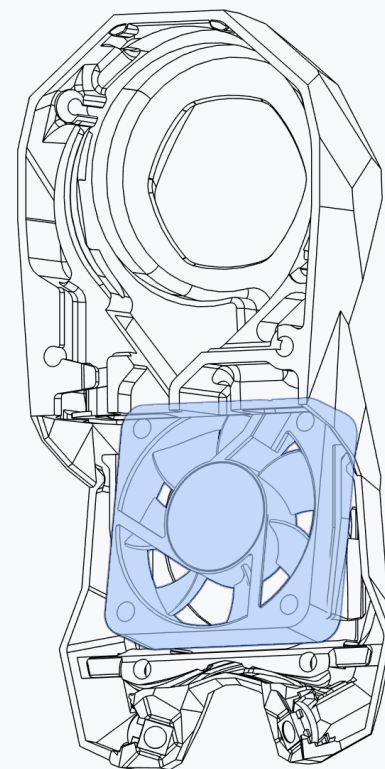
Rotate the fan so that the wires exit on the top and the air is pushed "inwards".



FAN INSERTION

Insert the fan at a slight angle and clip it into place.

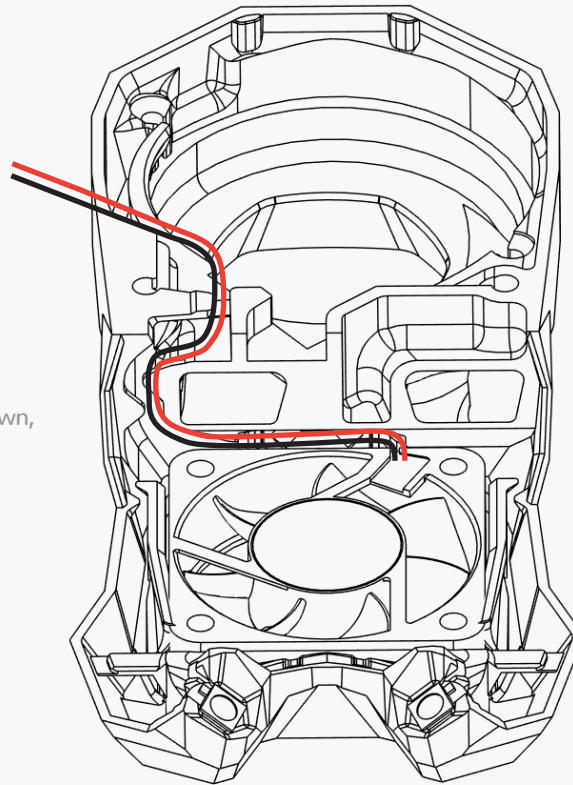
Mind the fan orientation.

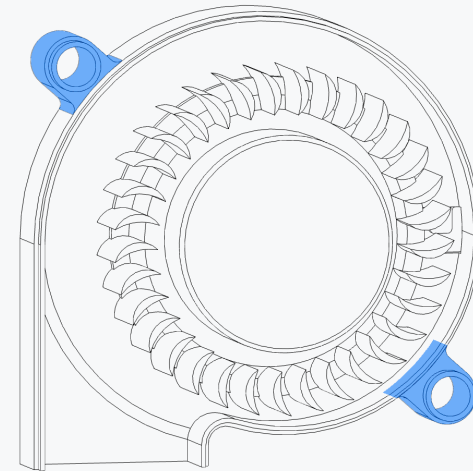
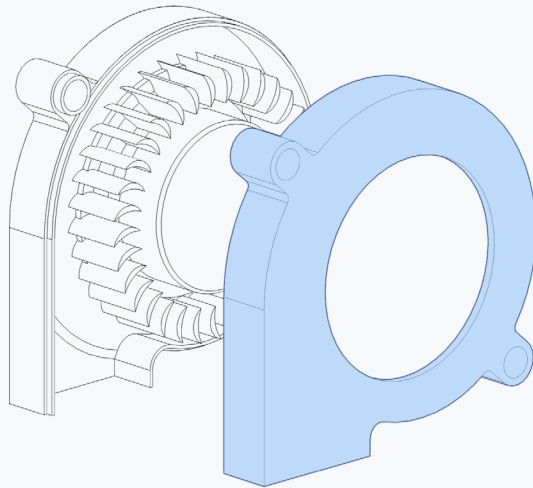


COMPLETED

FAN WIRE ROUTING

Route the fan wires as shown,
exiting on the right side



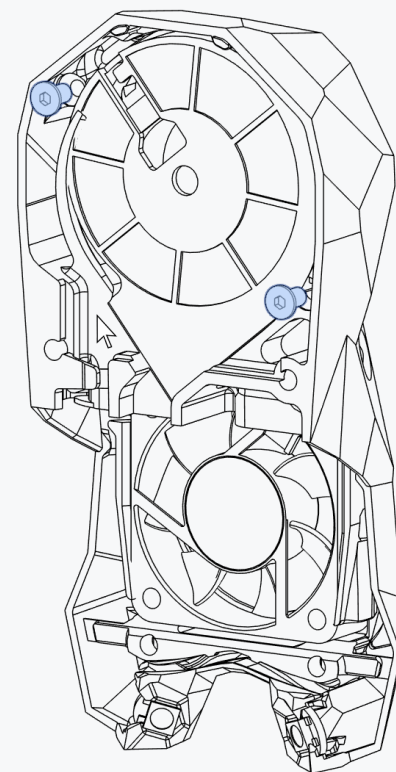
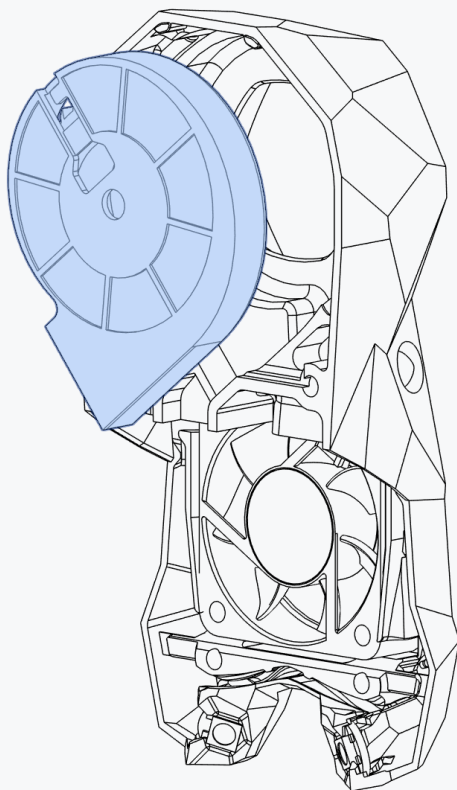


FAN PREPARATION

Remove the front of the 5015 fan. Clip off and file down the stock mounting ears.

There's a trimming jig STL included in the release to make this task easier.



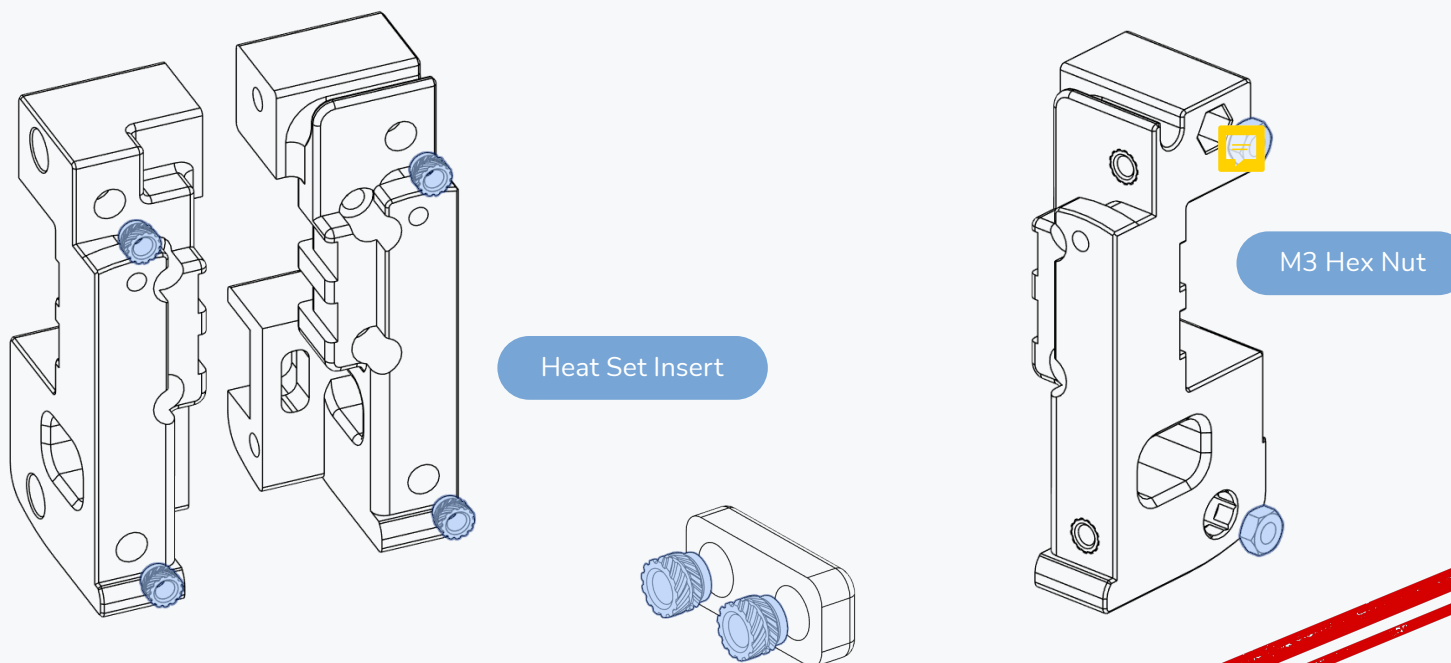


M3x6 FHCS



Yeah, it went about as expected.



**PRINTER SPECIFIC PARTS**

We provide different versions of the carriage to fit our different printer designs. Be sure to pick the right one for your printer.

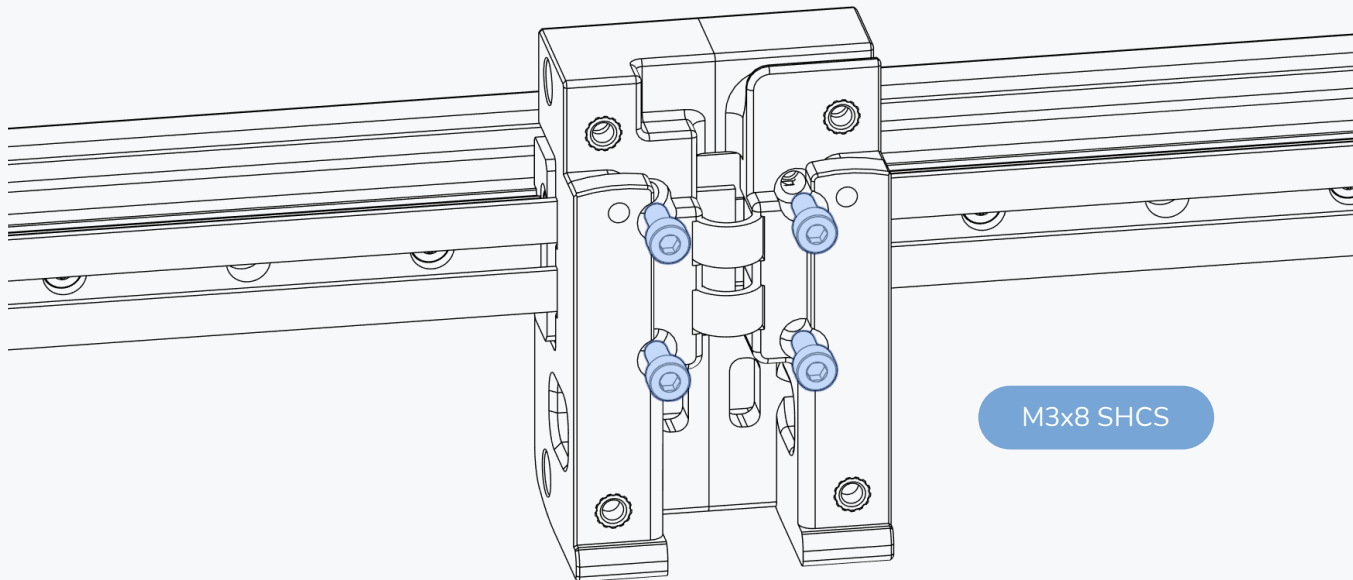


X CARRIAGE

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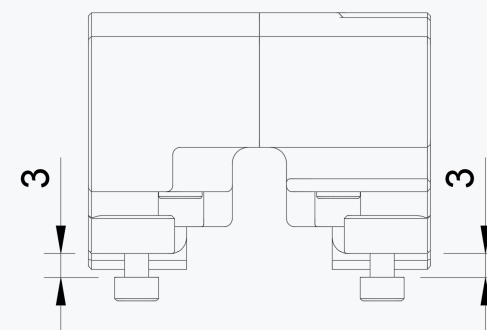
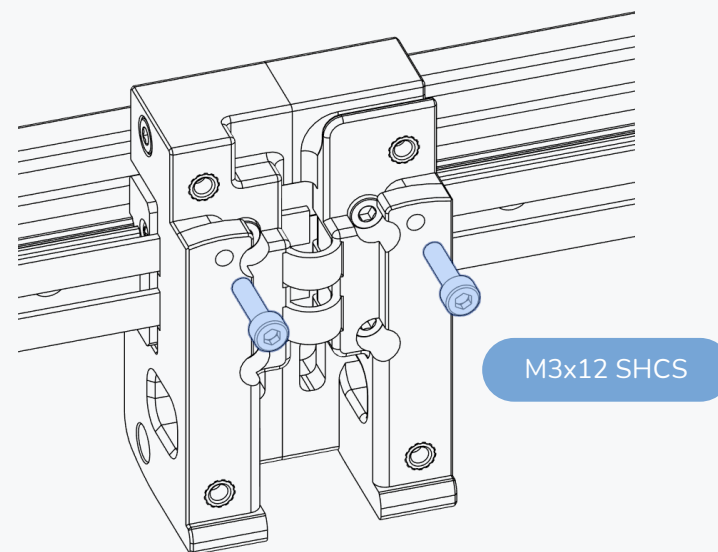
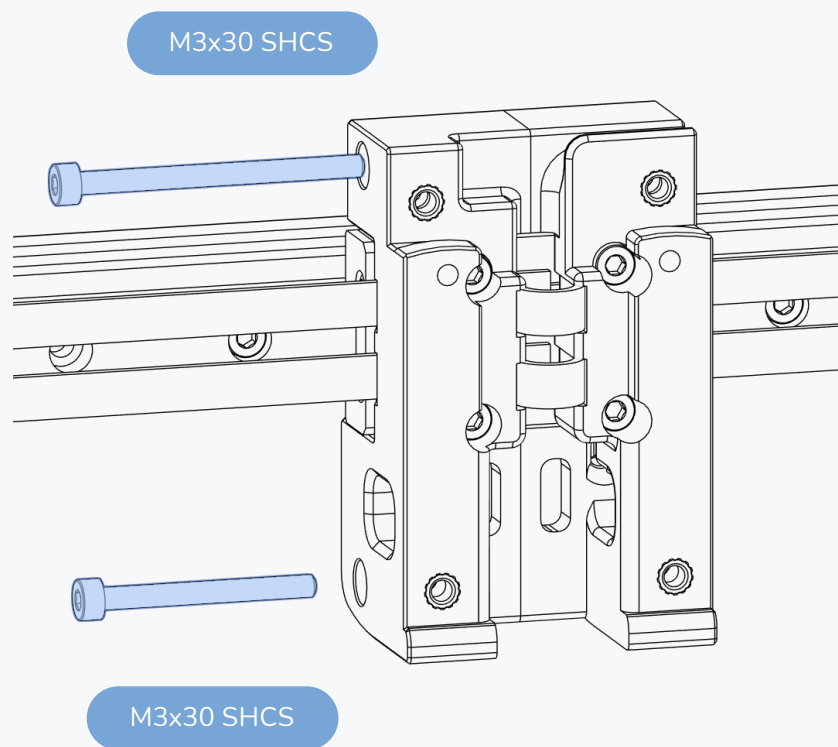
FOLLOW BELTING AND X CARRIAGE INSTALLATION OUTLINED IN PRINTER MANUAL

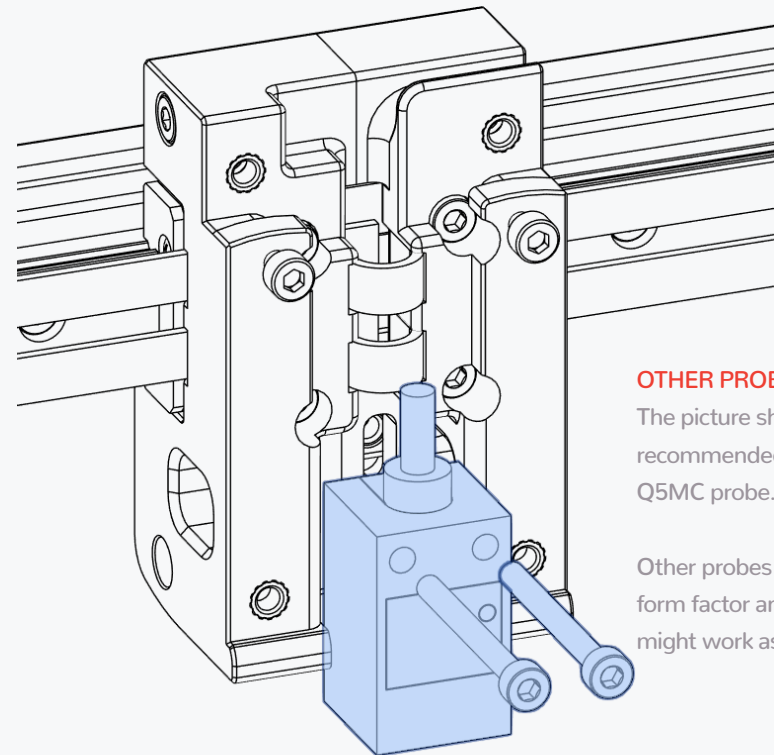
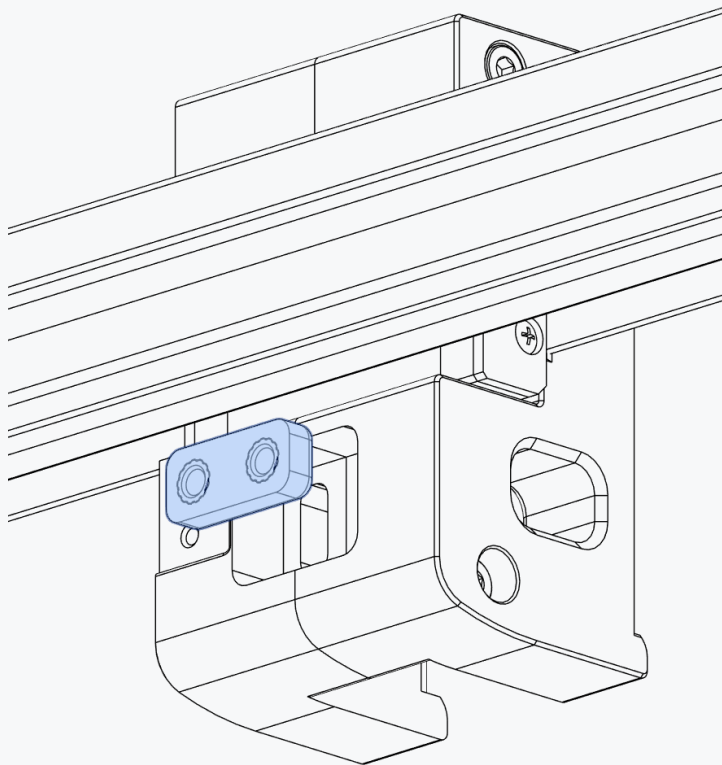
Consult the printer's manual for instructions on how to run the belts and details on carriage mounting.



X CARRIAGE

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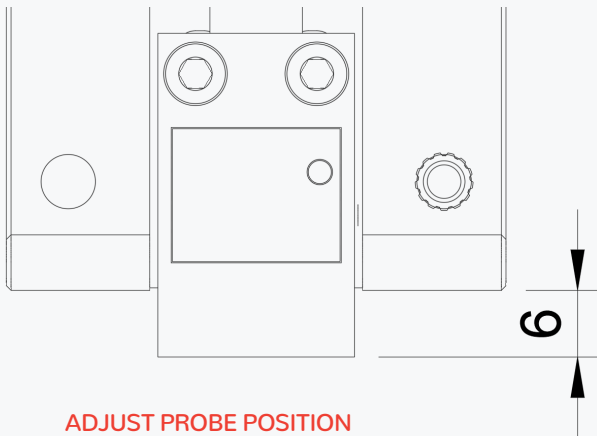
OTHER PROBE TYPES

The picture shows the recommended Omron TL-Q5MC probe.

Other probes with a similar form factor and characteristics might work as well.

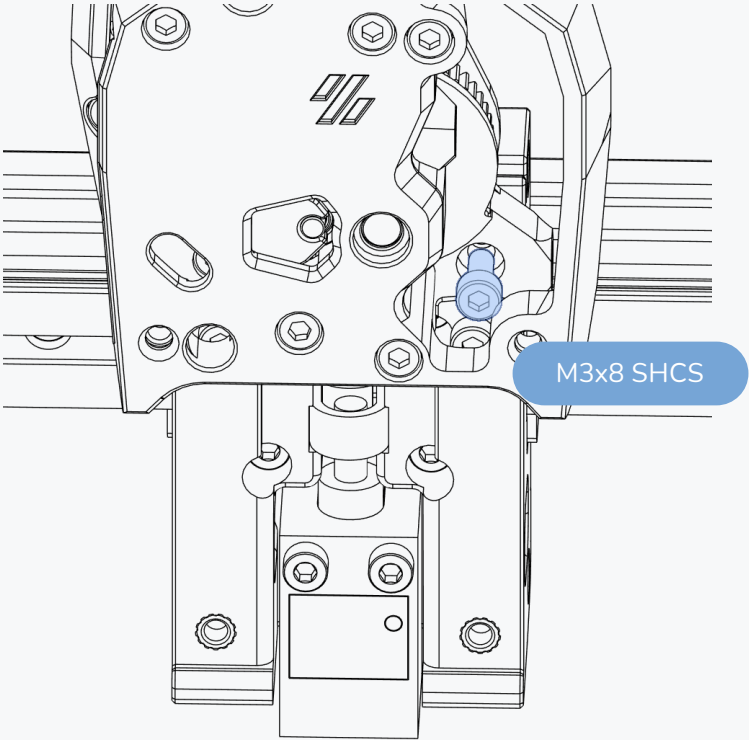
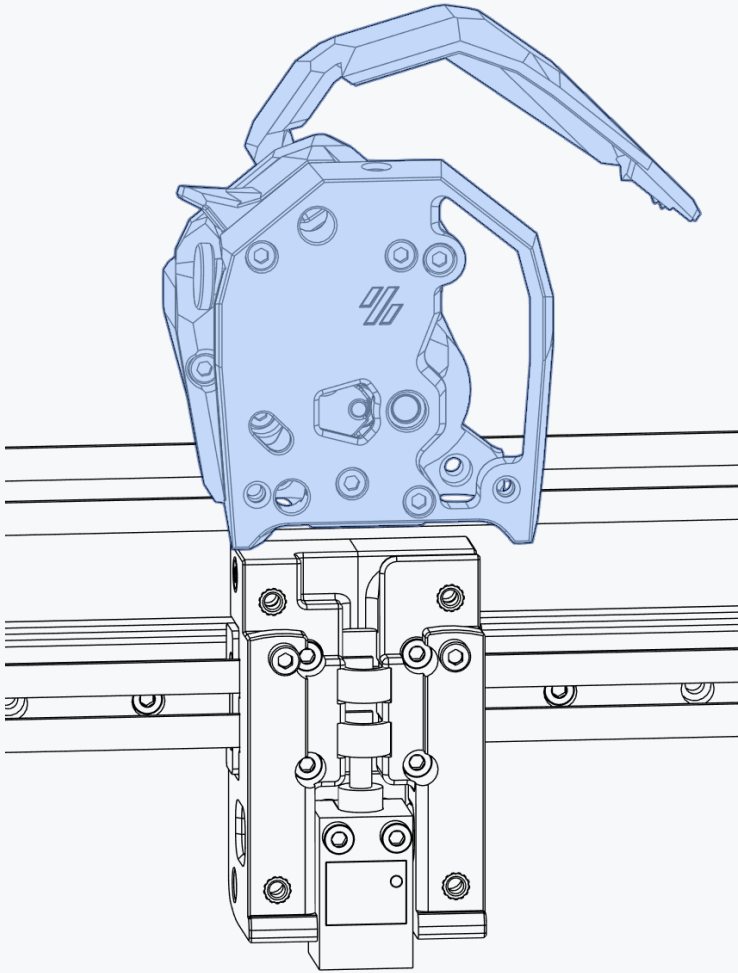
Omron Style Probe

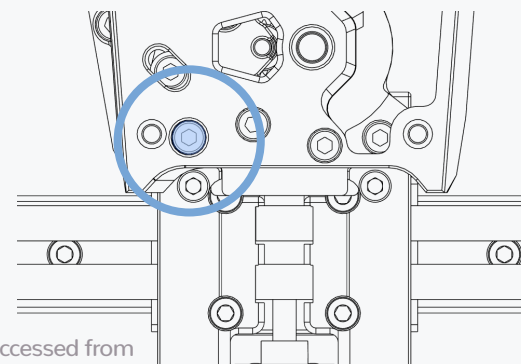
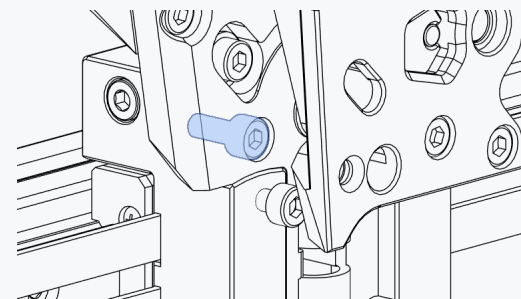
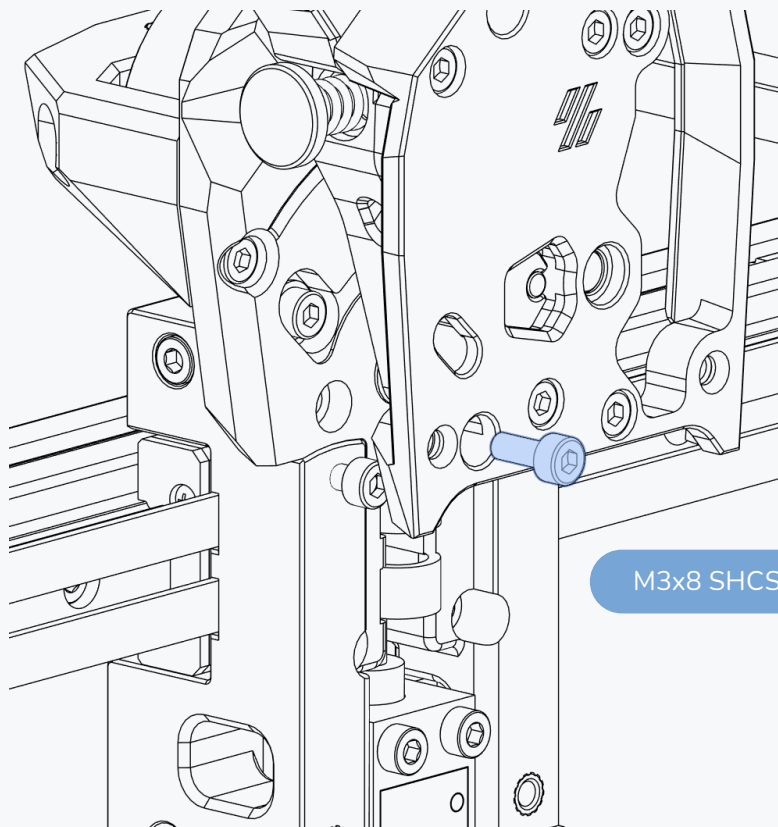
M3x30 SHCS



ADJUST PROBE POSITION

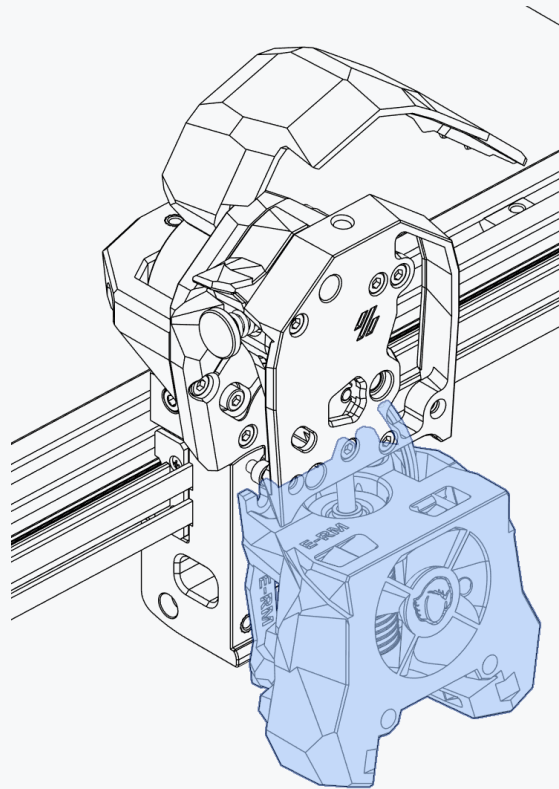
The position can be fine-tuned later. Set an initial position of about 6mm below the plastic part.

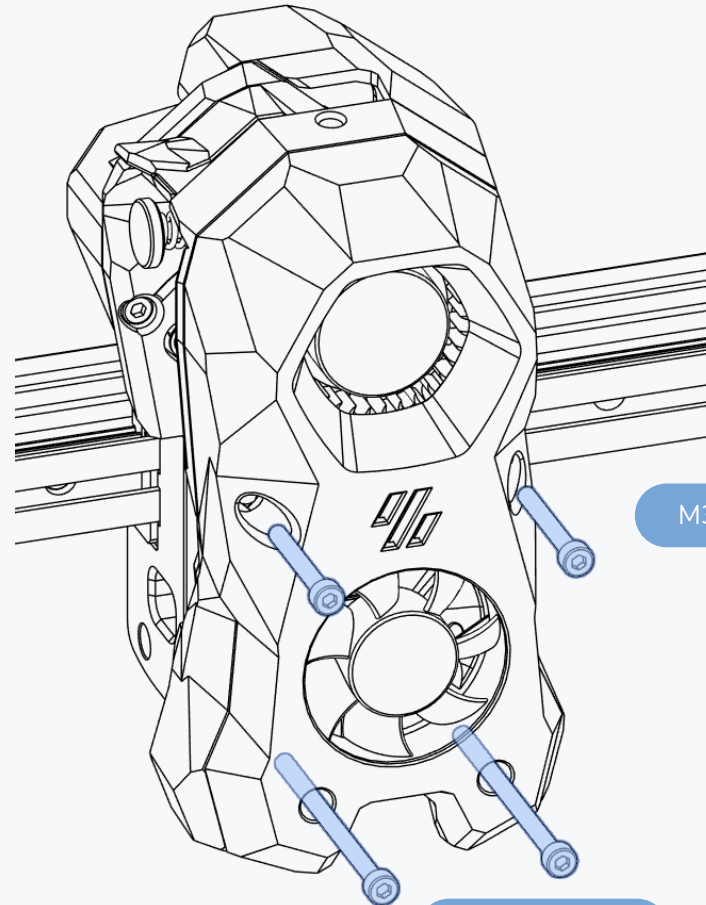
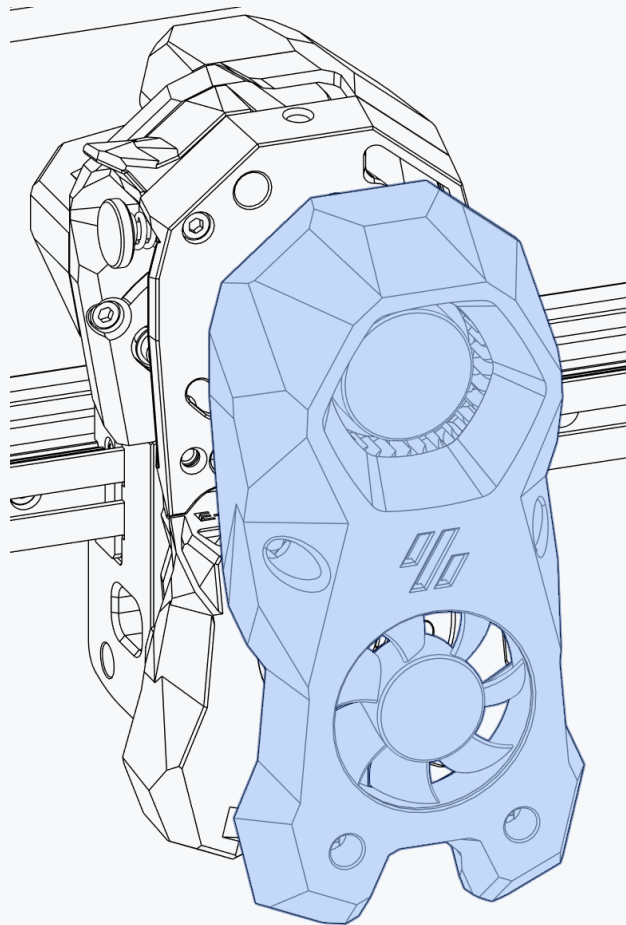




ACCESS HOLE

The bolt can be accessed from the front of the extruder.





25MM BOLTS?

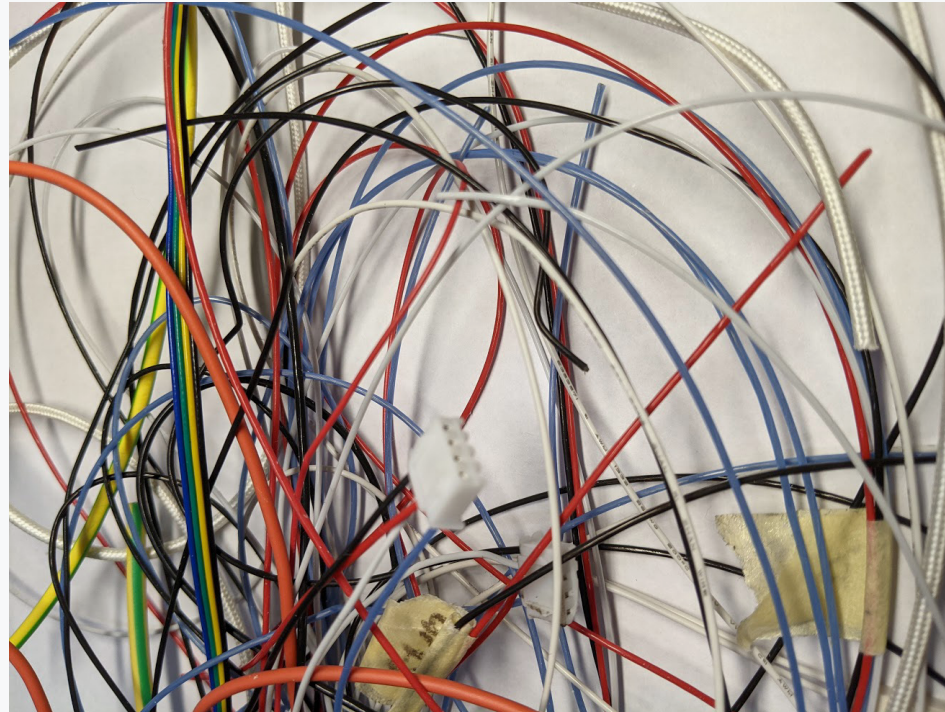
The bolts are slightly longer than necessary. This is on purpose and a QOL feature.

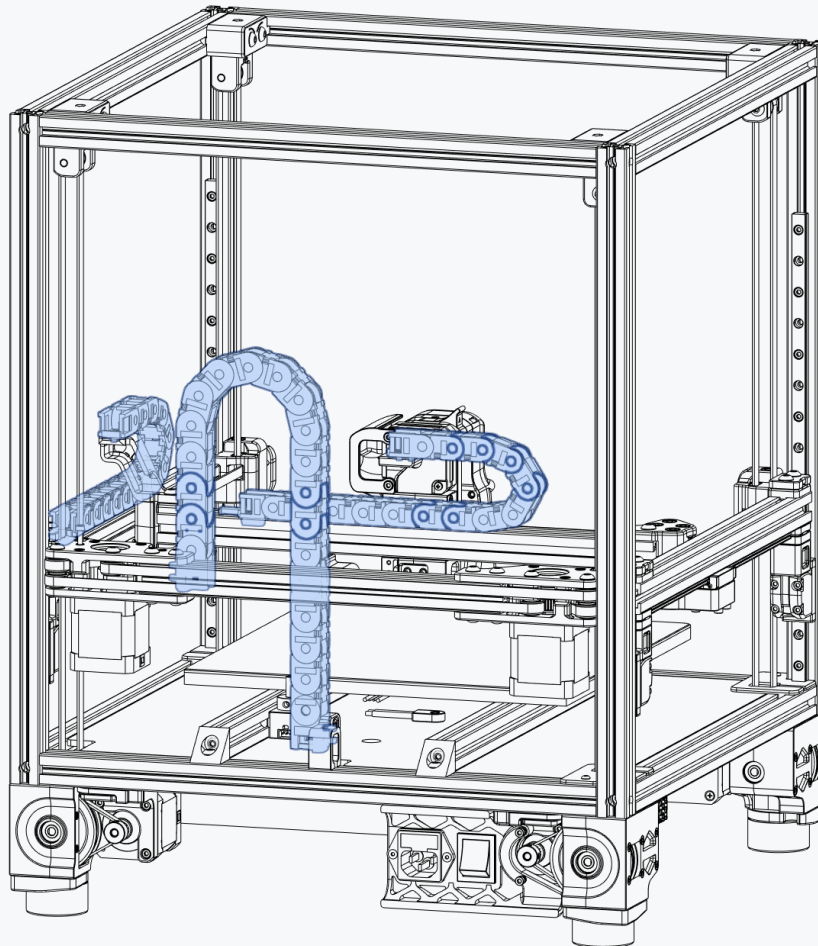
The longer bolts prevents the front from falling off.

M3x25 SHCS

M3x50 SHCS

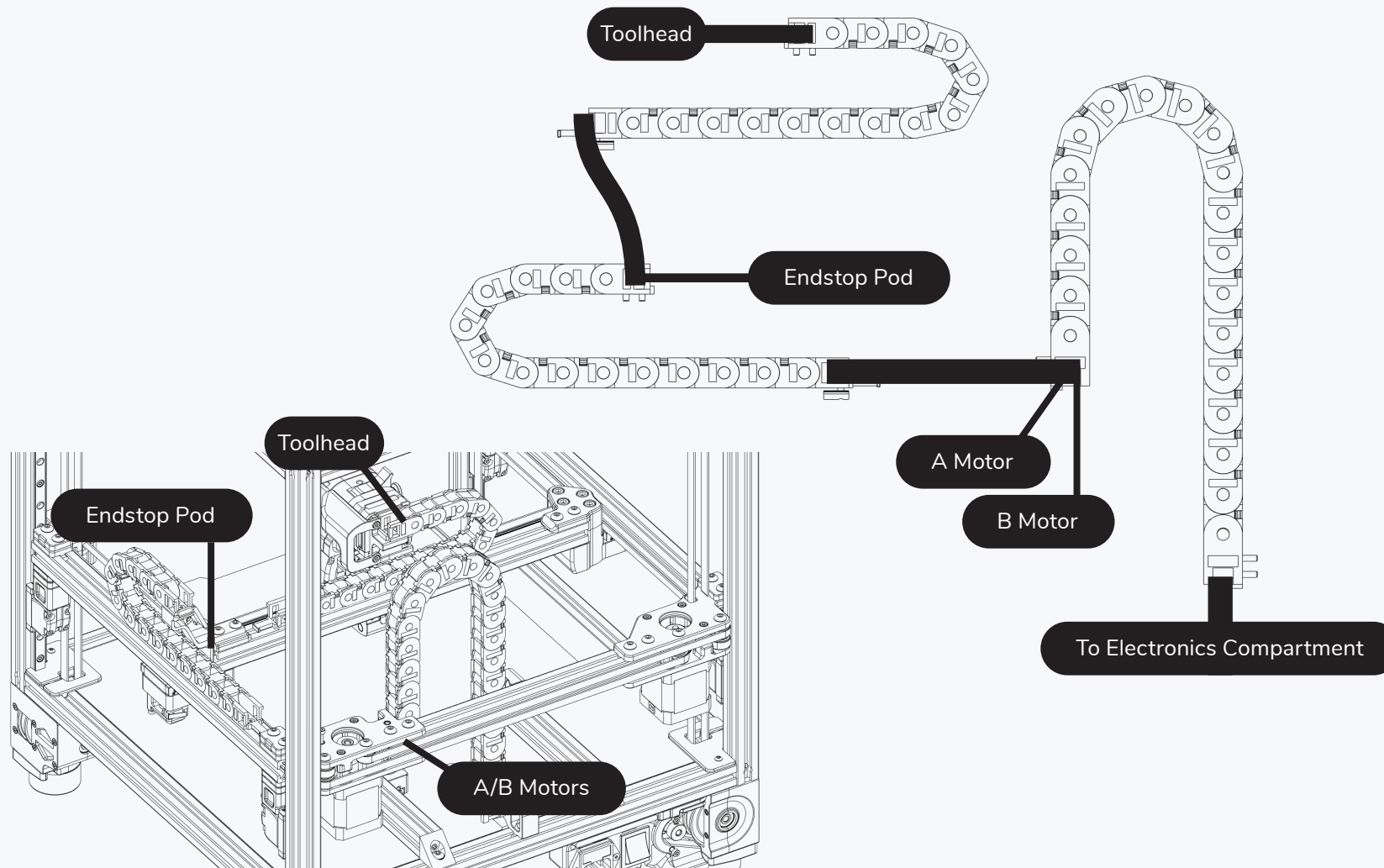






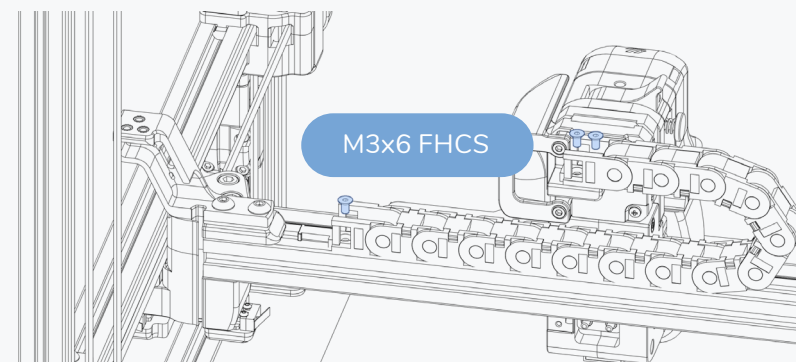
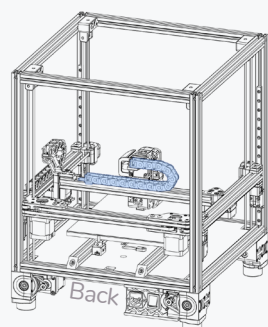
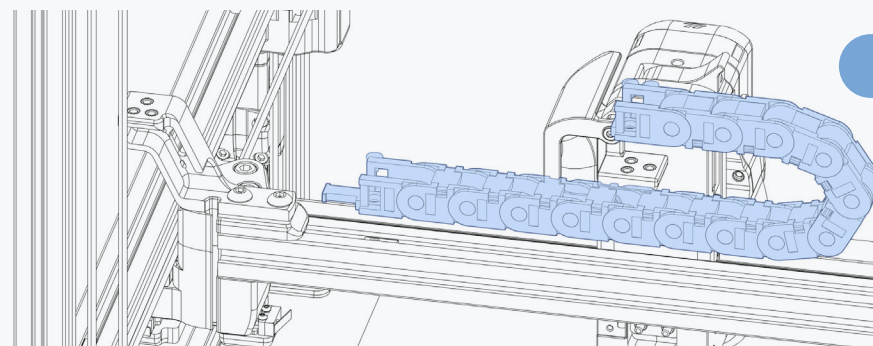
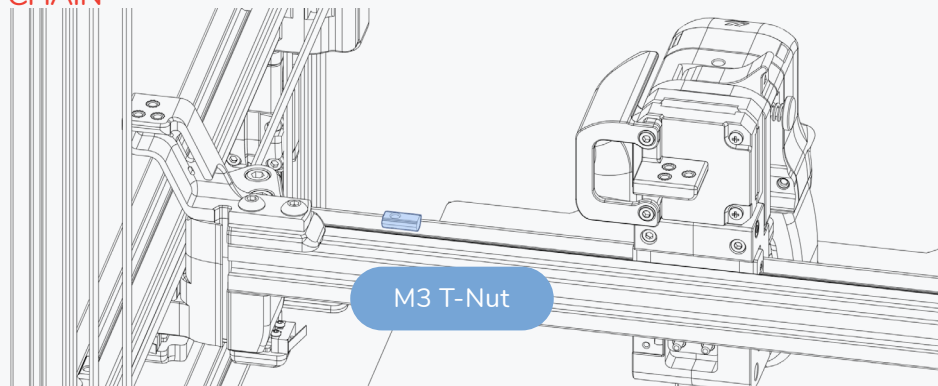
CABLE CHAINS INSTALL

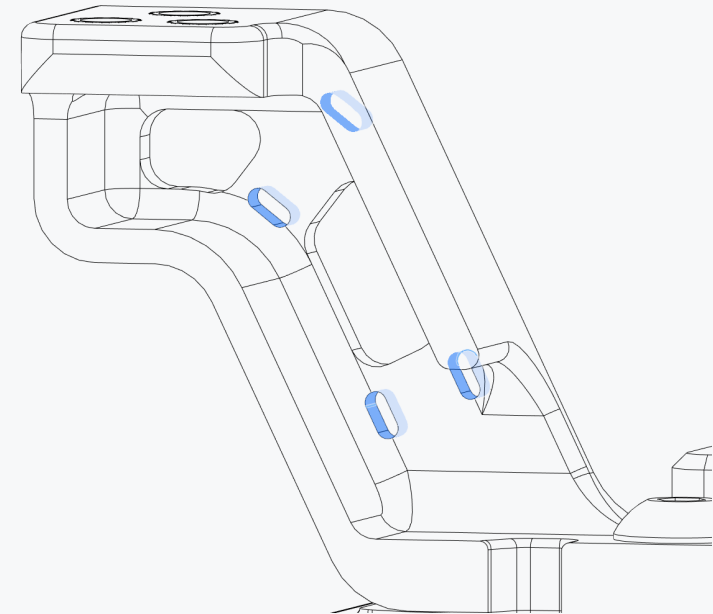
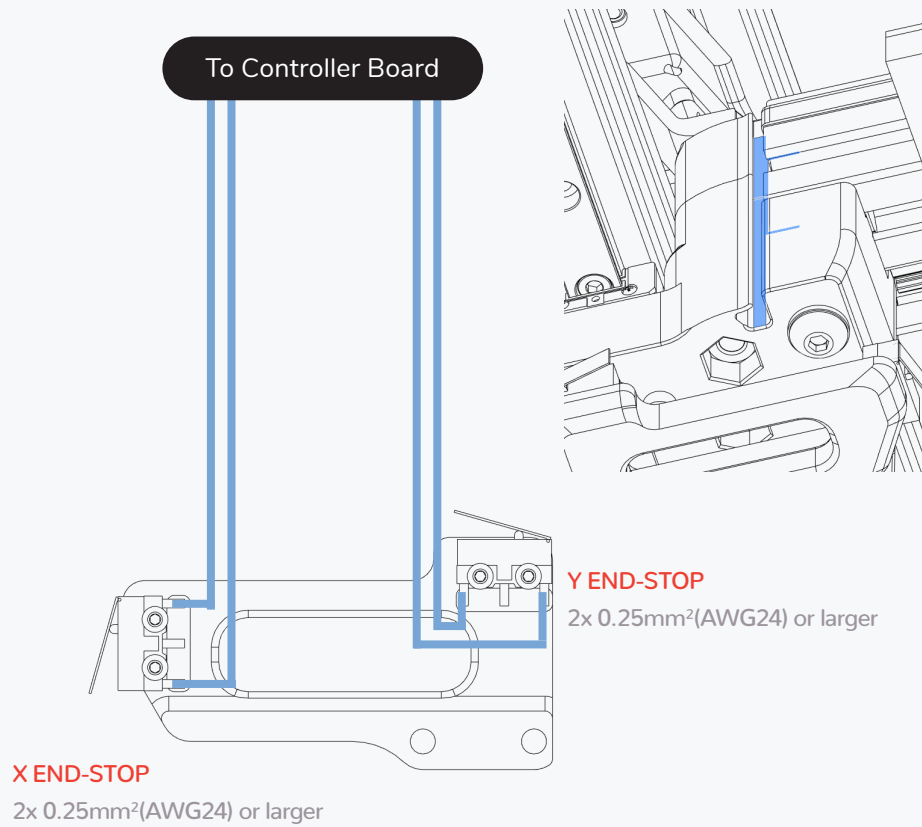
Install the chains now. Completing the harness outside of the printer is recommended.



X CABLE CHAIN

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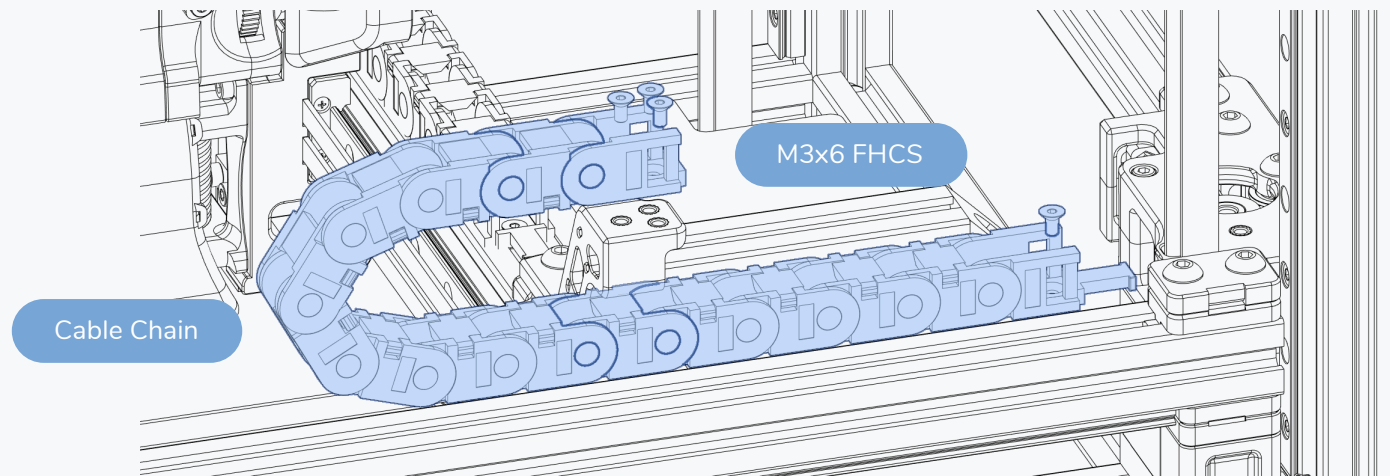
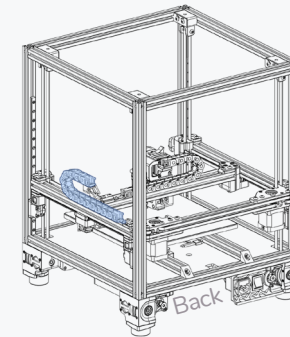
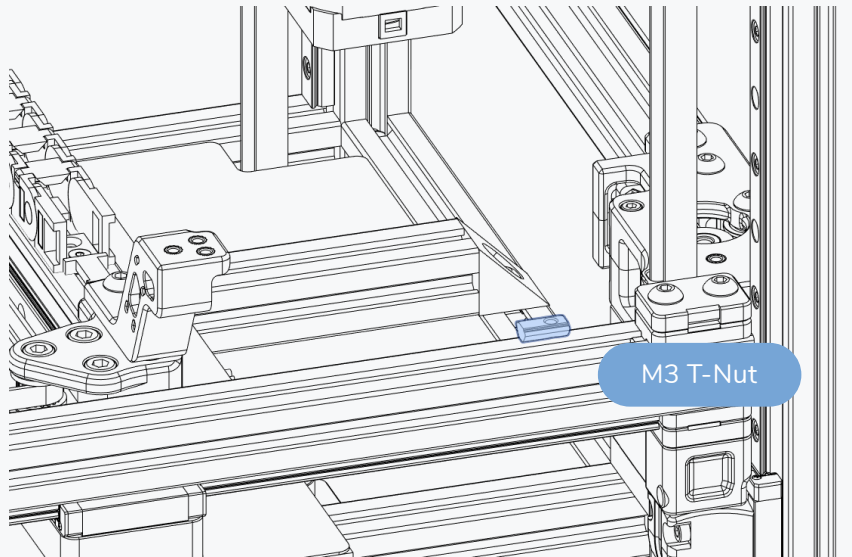


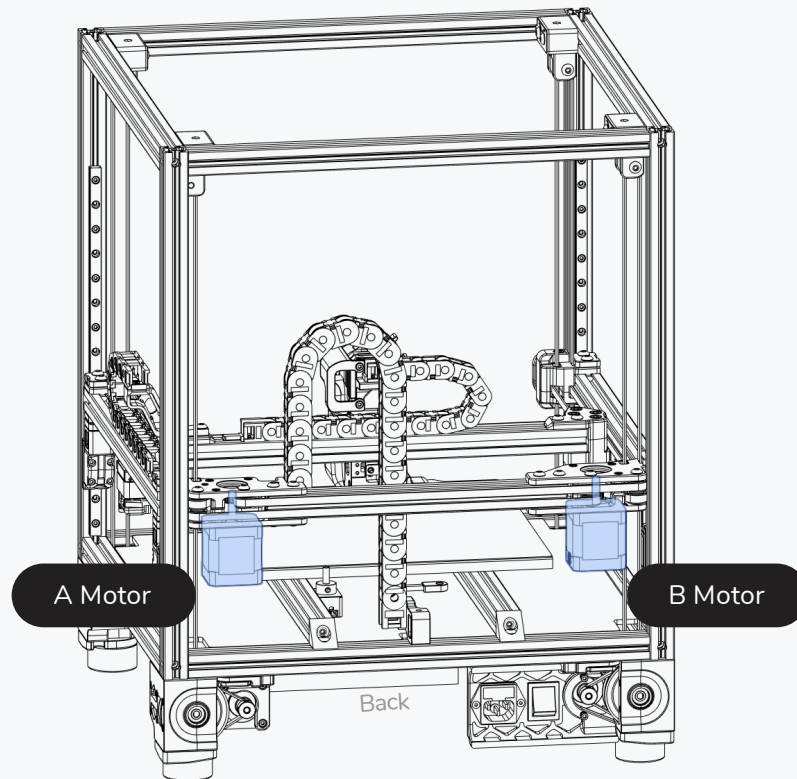
ZIP TIE LOOPS

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

Y CABLE CHAIN

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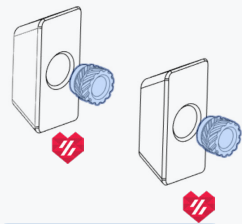


SECURING MOTOR CABLES

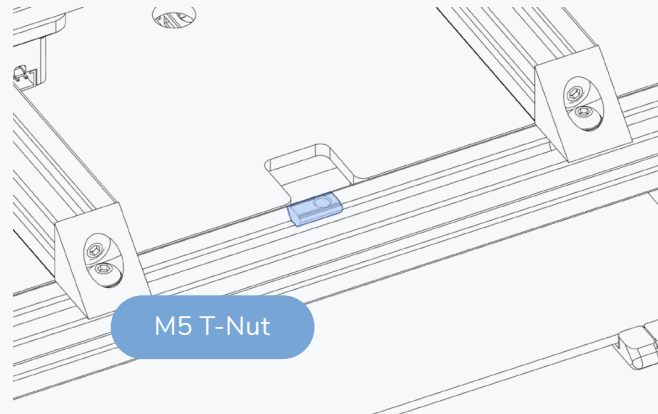
Secure the wire bundles along the small extrusion that sits between the drives with small zip ties.

Z CABLE CHAIN

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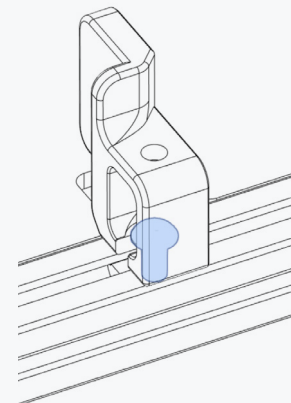
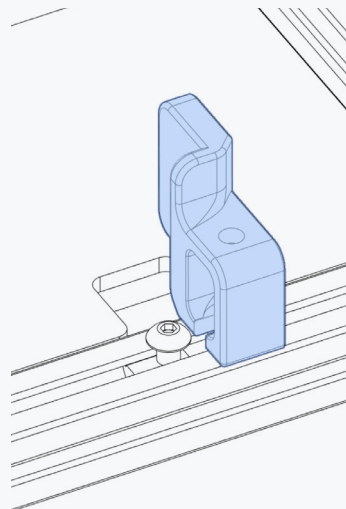
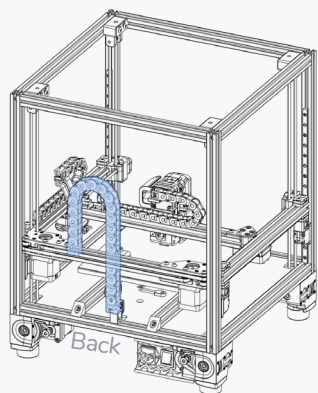
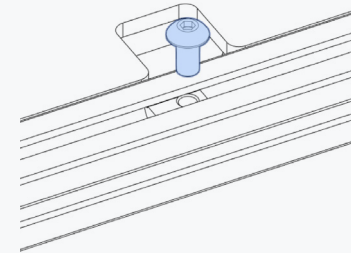


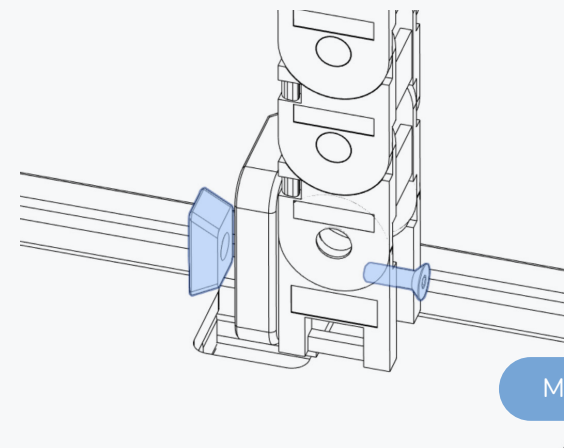
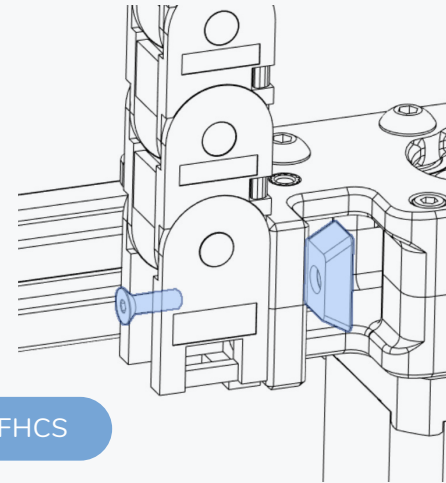
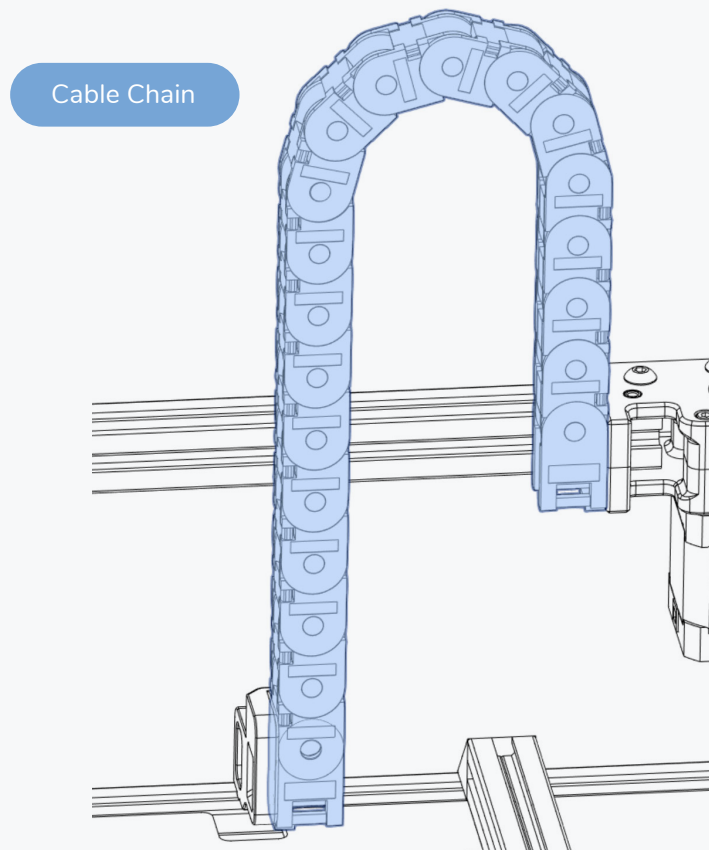
Heat Set Insert



M5 T-Nut

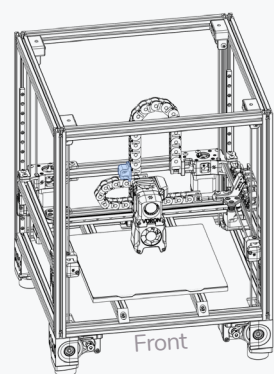
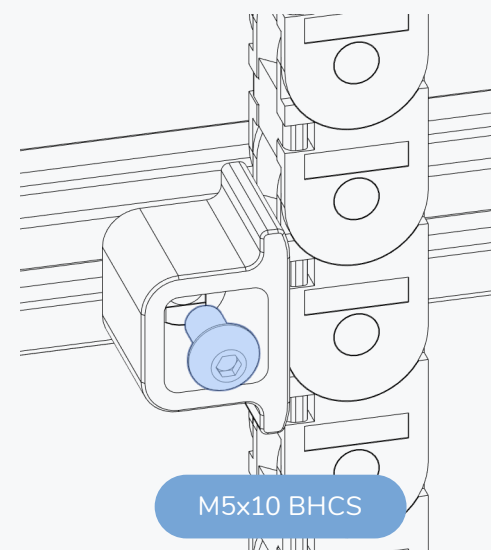
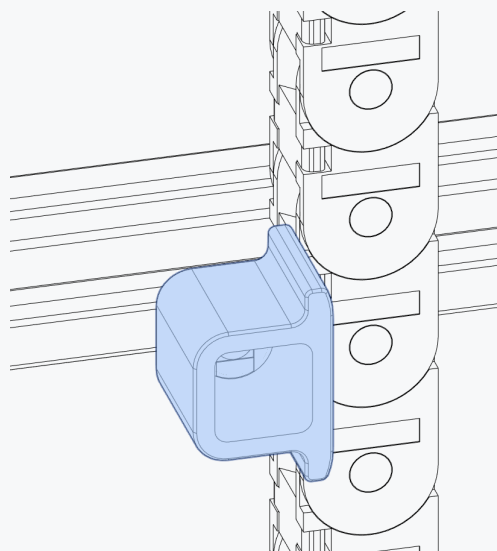
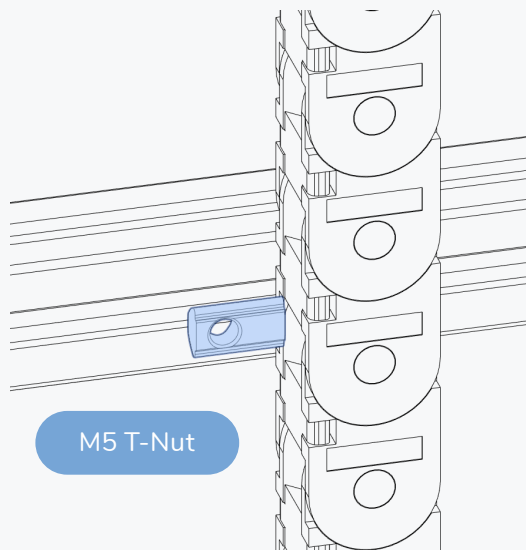
M5x10 BHCS





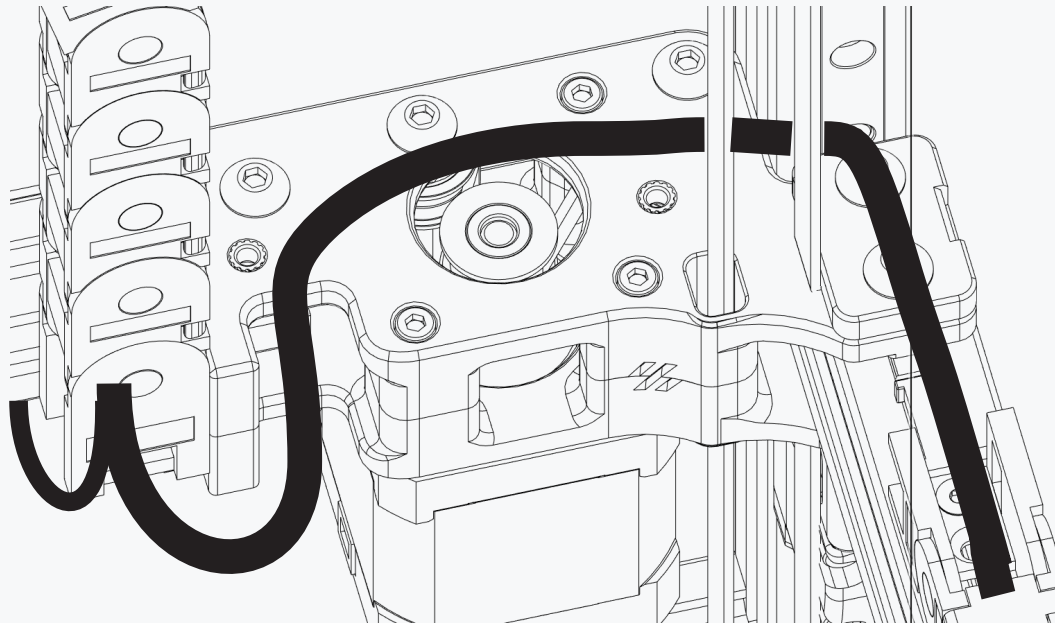
Z CABLE CHAIN

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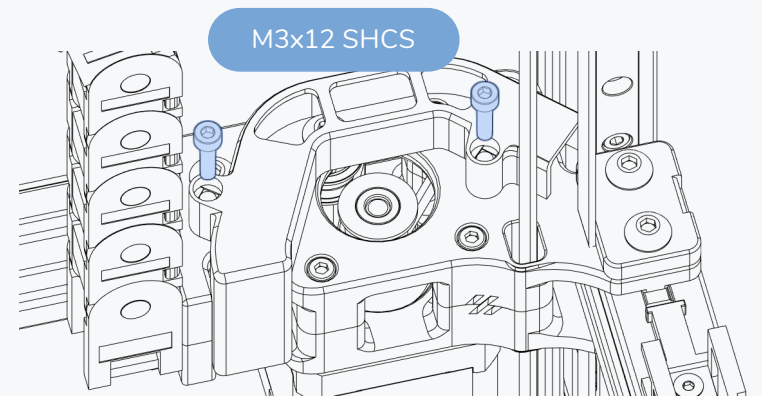
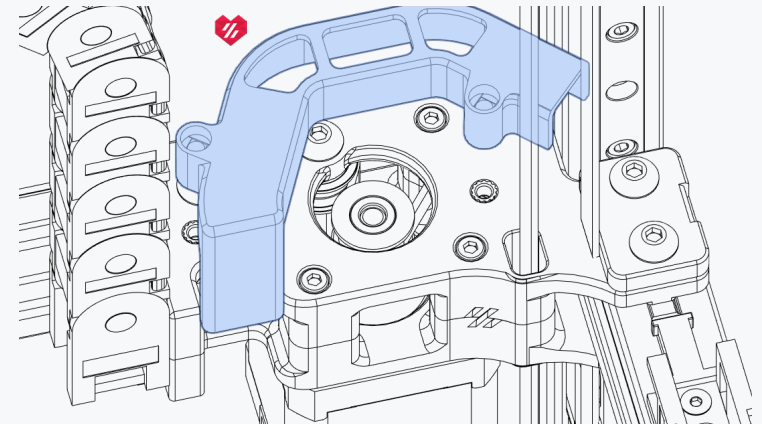
Z CABLE CHAIN

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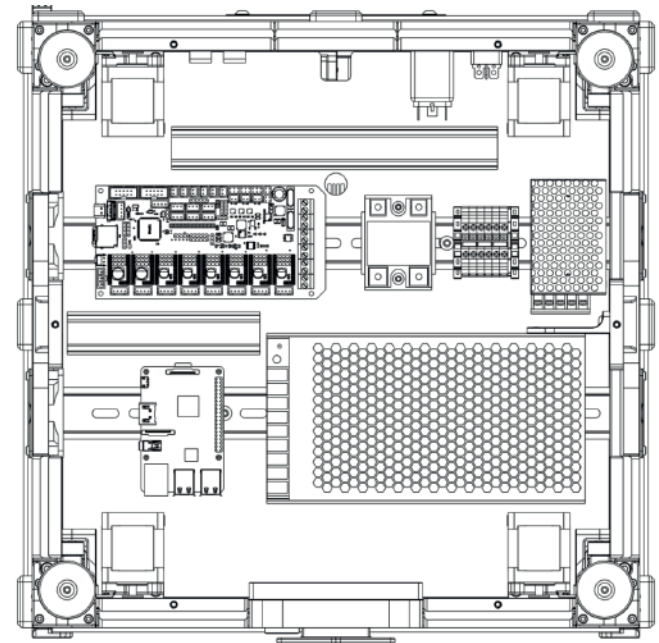
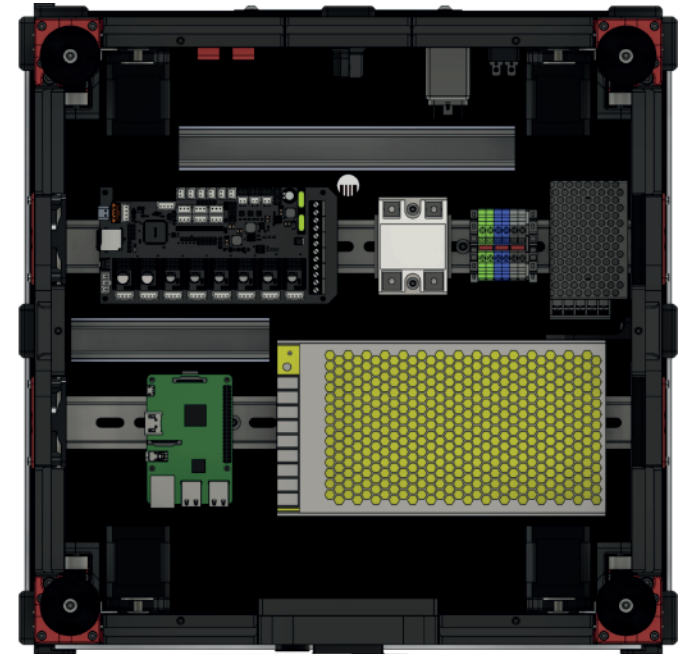
WIRE PATH

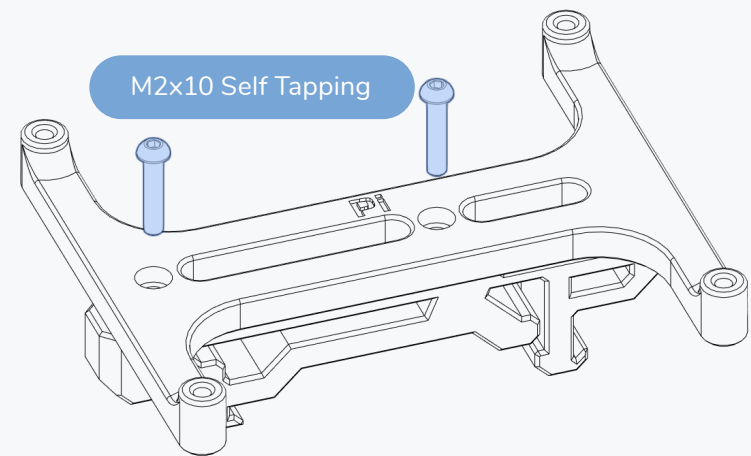
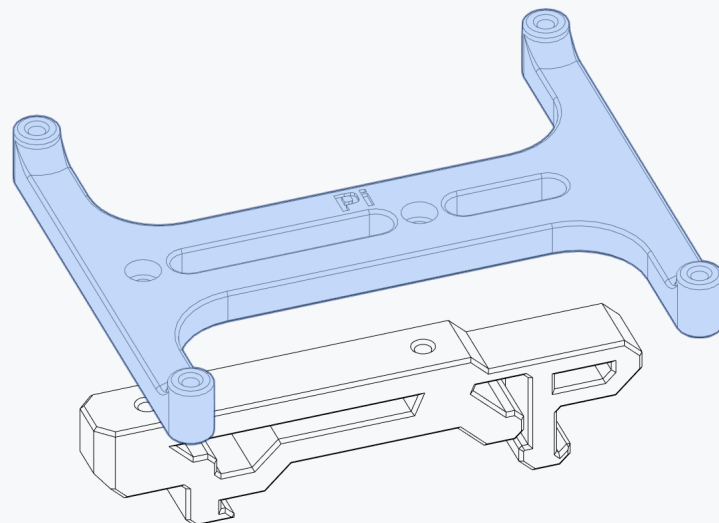
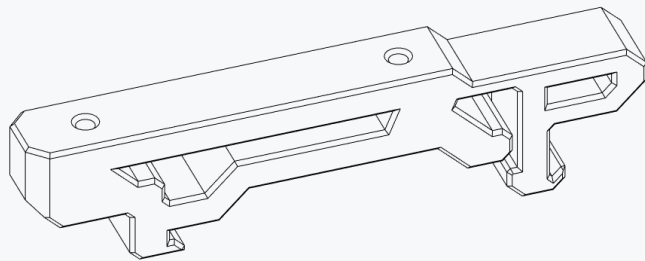
Guide the wire bundle behind the Z belt and over the A drive as shown above. Secure it with zip ties on the strain relief of the cable chains.

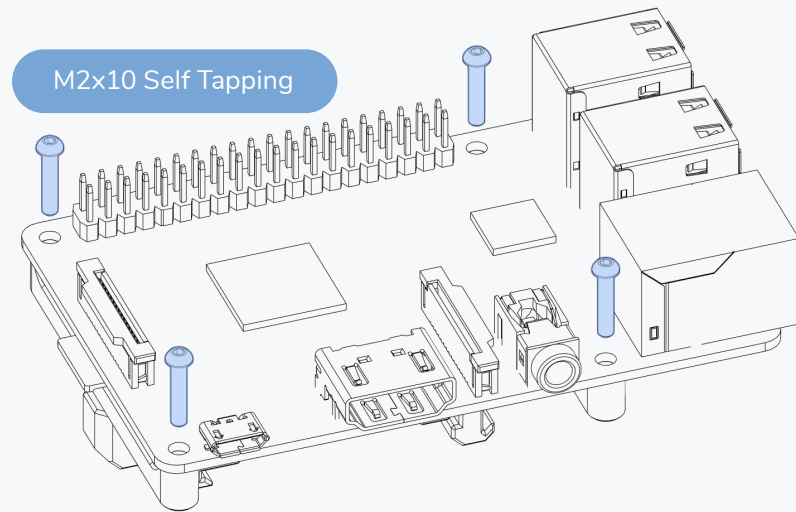
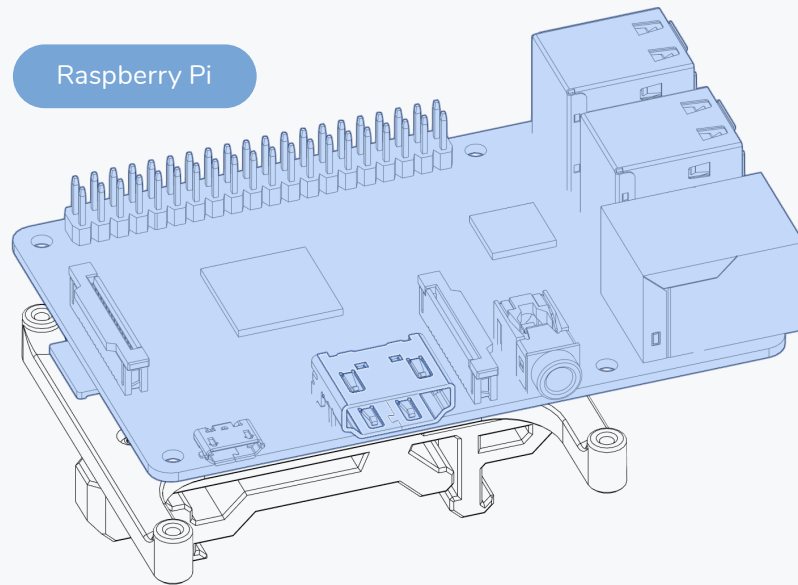


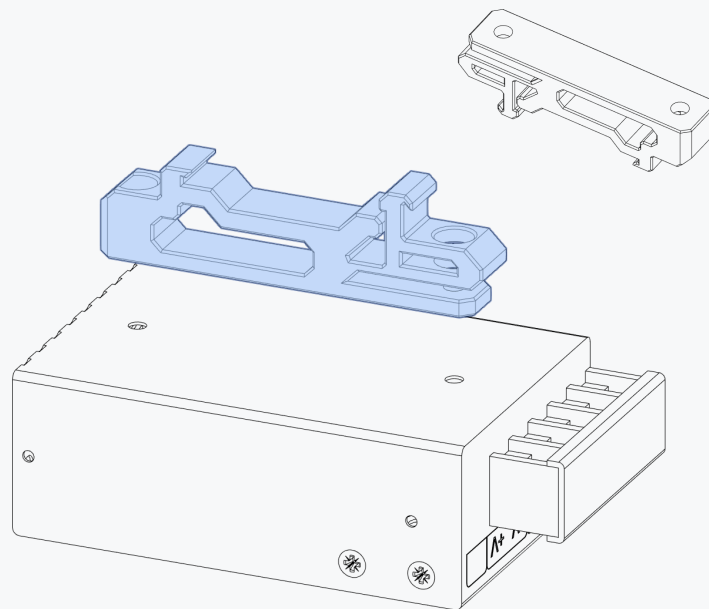
Suggested layout

This layout is slightly different from the standard one because of cooling priority when using fans from only one side. Better for RPI and motor drivers.

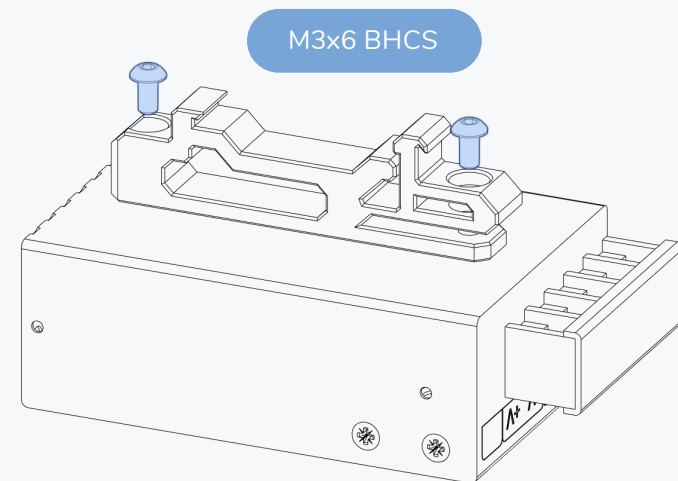




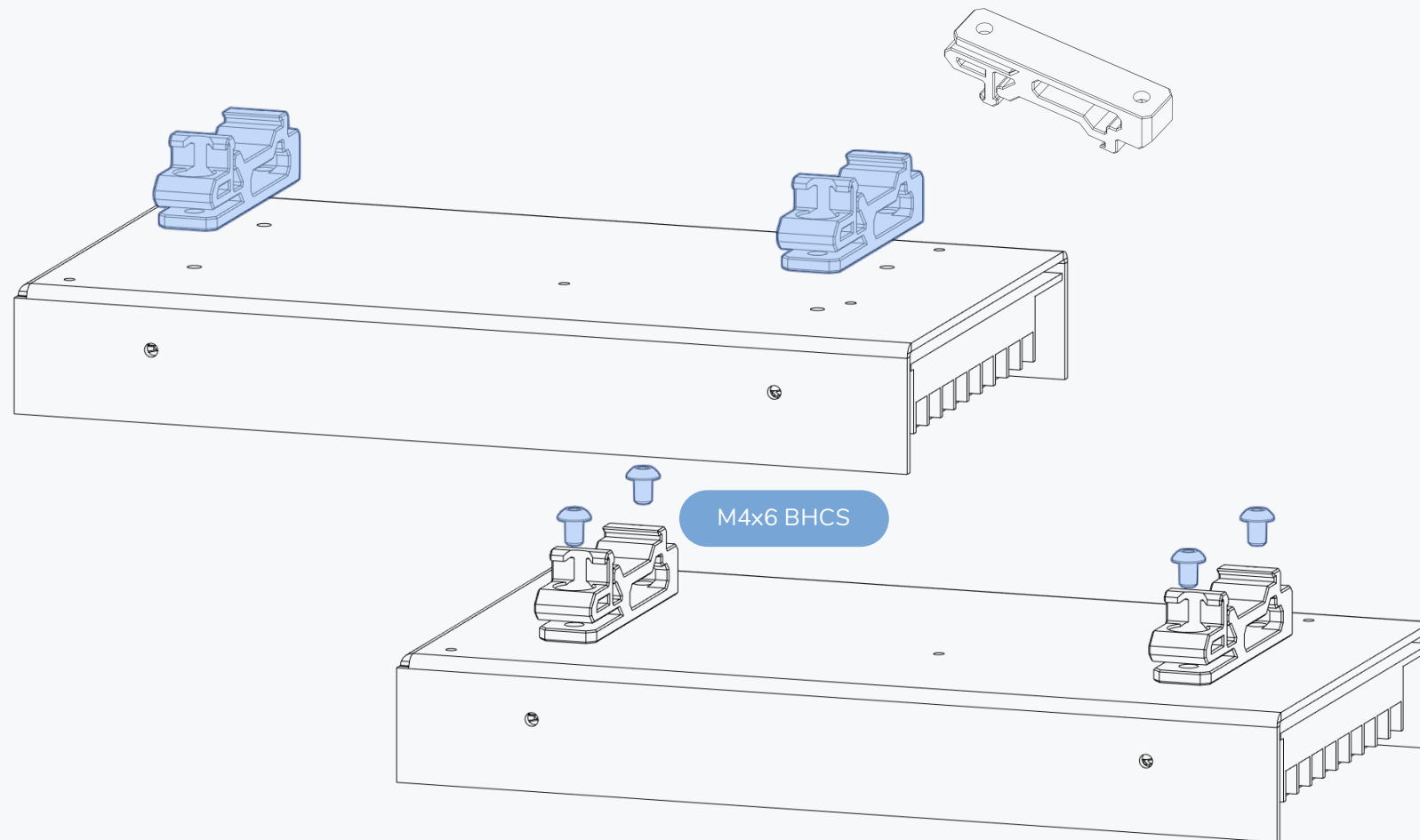


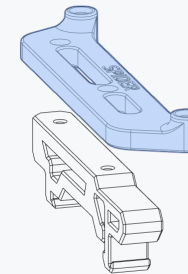
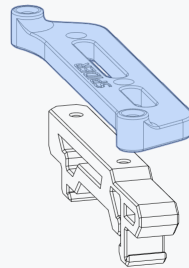
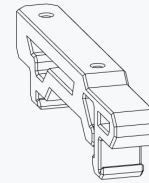
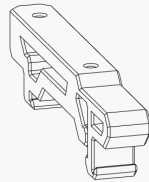


RS25-5 PSU



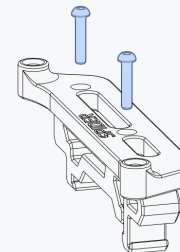
M3x6 BHCS



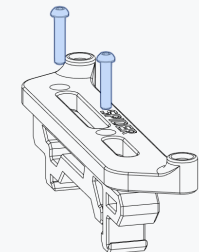


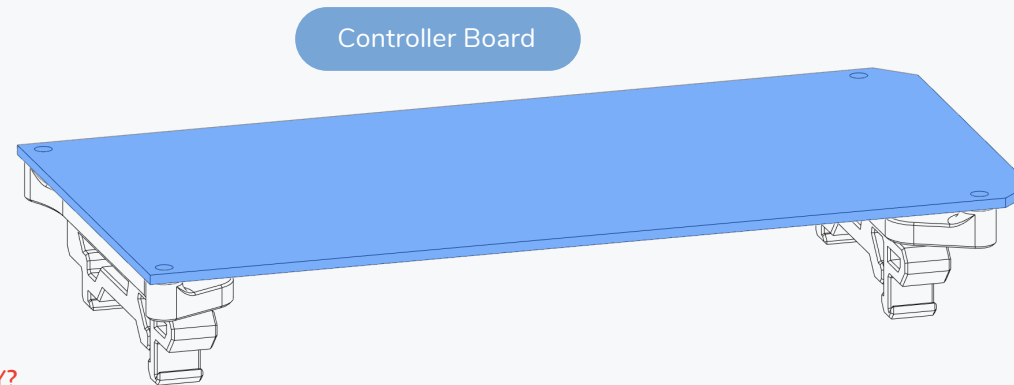
AVAILABLE MOUNTS

We also provide mounts for other controller boards. They are assembled in a similar manner.



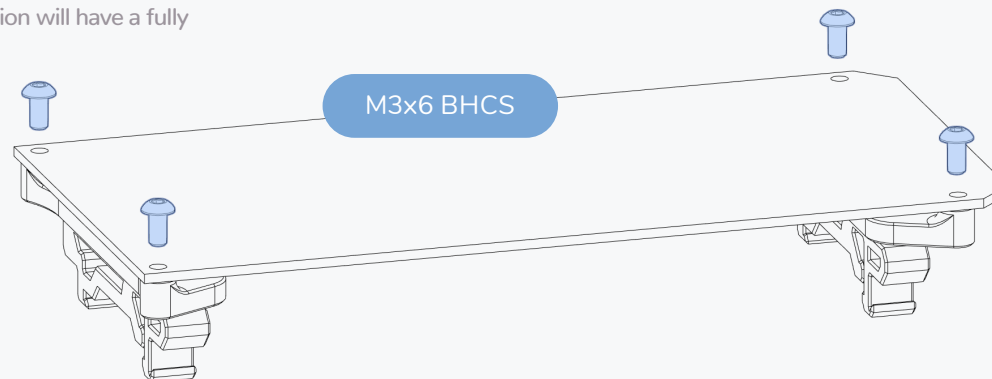
M2x10 Self Tapping

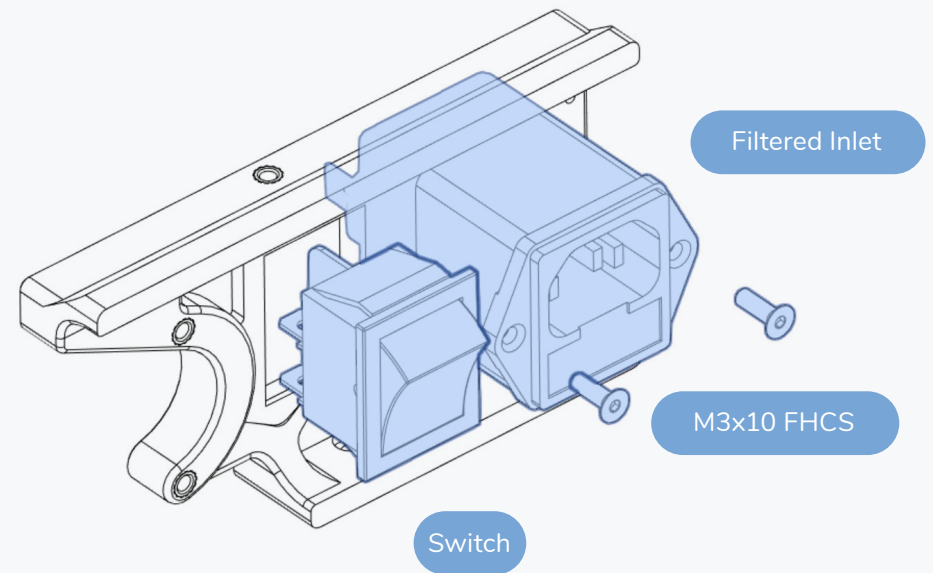
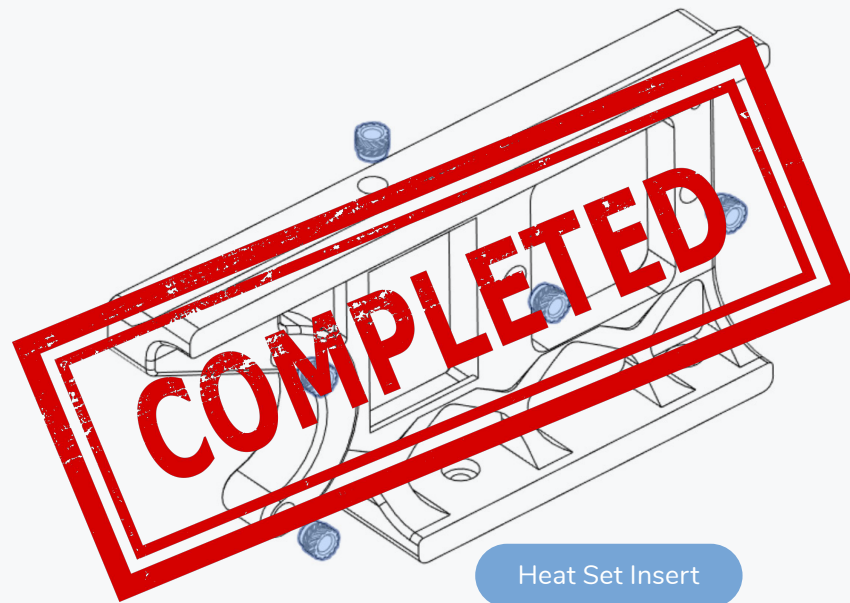


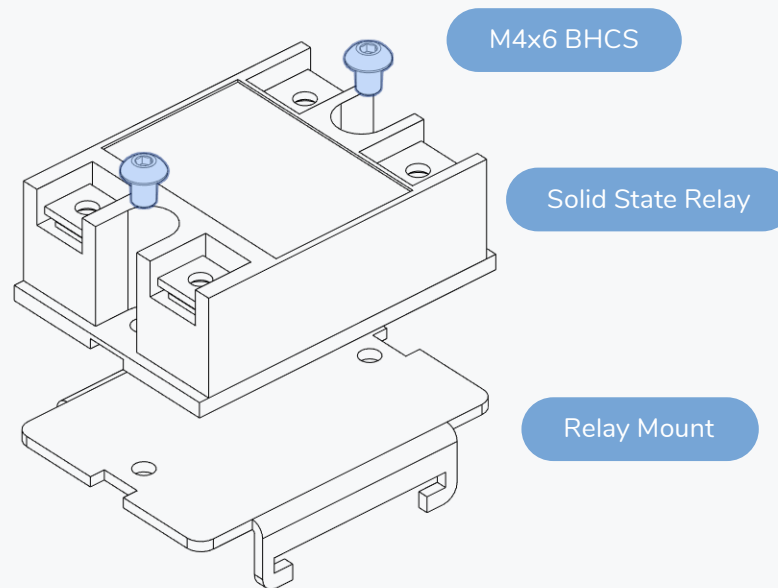


WHY DOES IT LOOK THAT WAY?

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.

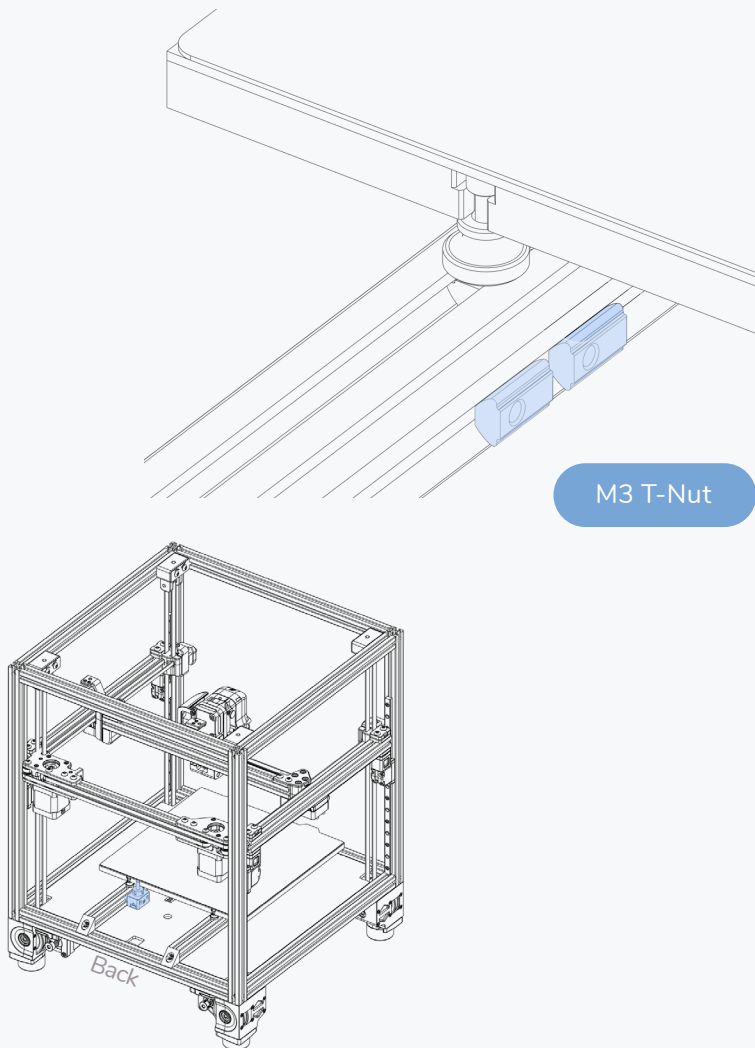
Z ENDSTOP BOARD

**ADDITIONAL INFORMATION**

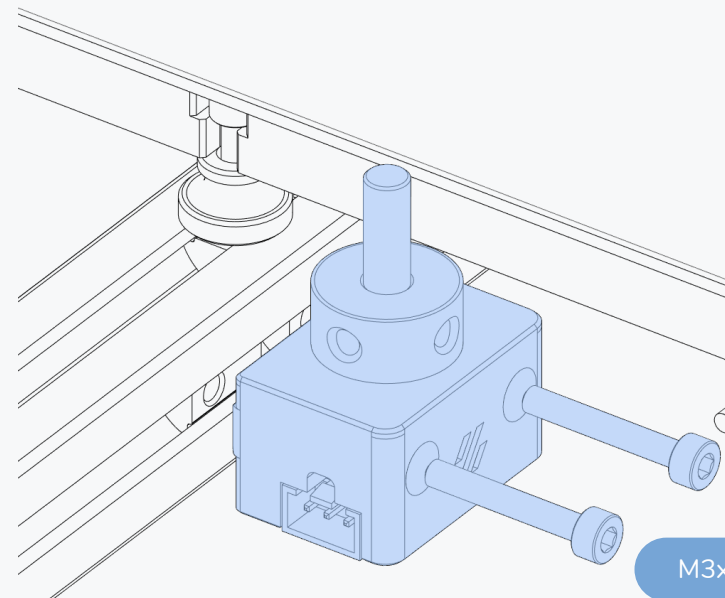
Visit voron.link/3bwwnqy for design files and BOM.

Z ENDSTOP

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M3 T-Nut

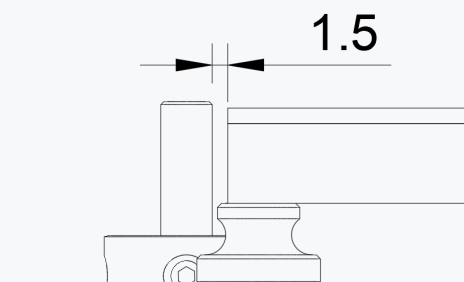


M3x20 SHCS

ADJUST Z ENDSTOP POSITION

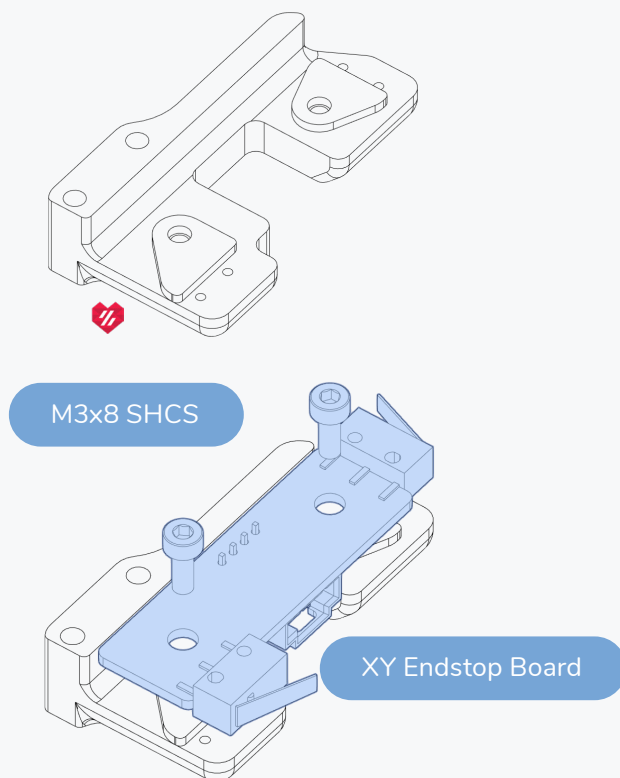
The shaft of the Z Endstop must not touch the print bed.

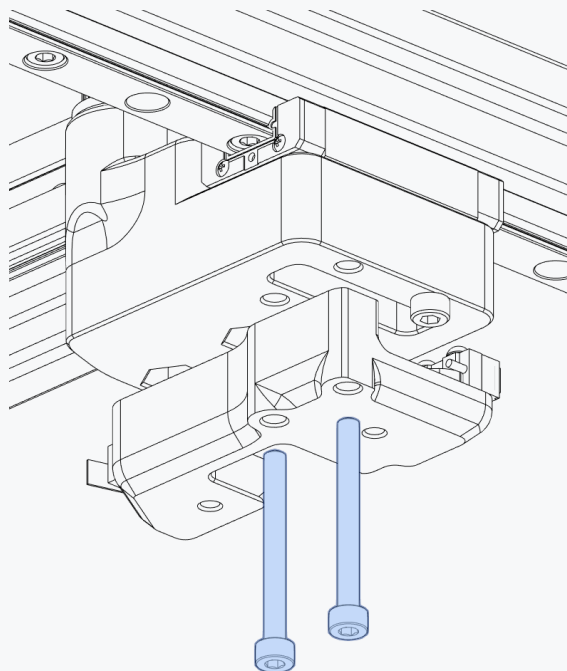
Adjust the position if required.



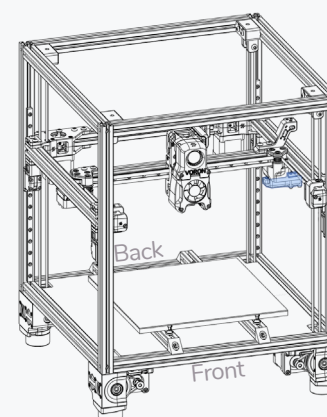
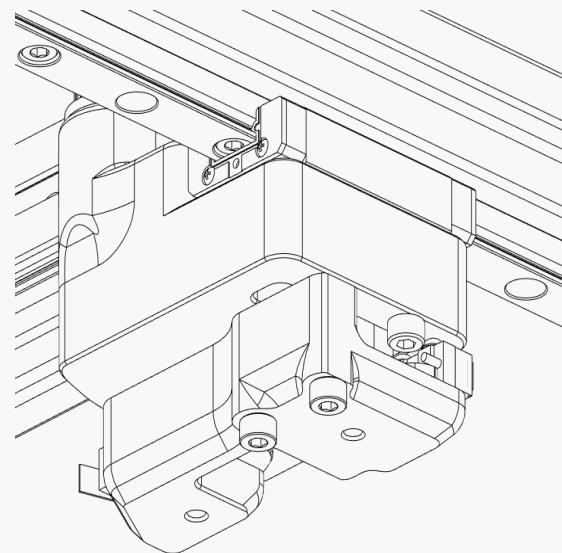
XY ENDSTOP

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M3x30 SHCS

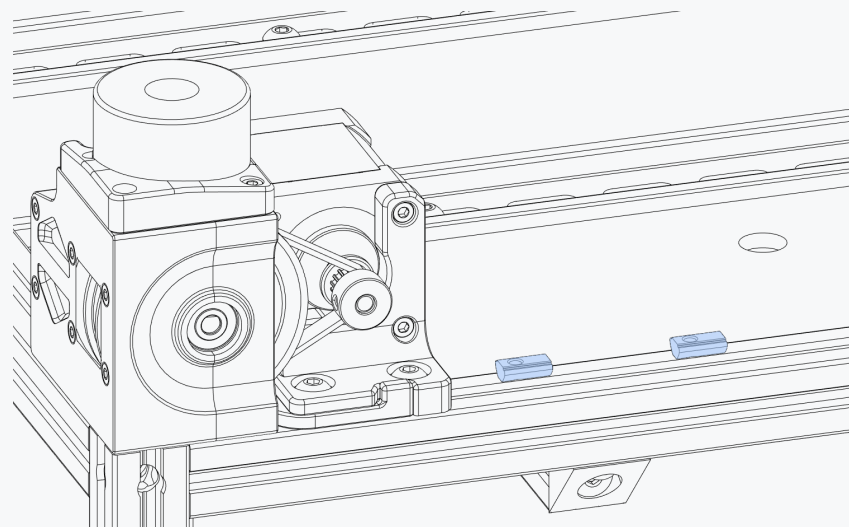
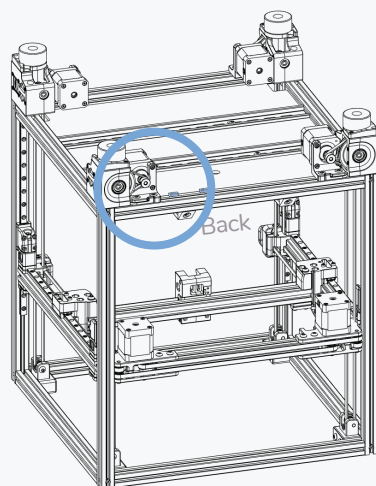


POWER INLET

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UPSIDE DOWN ASSEMBLY

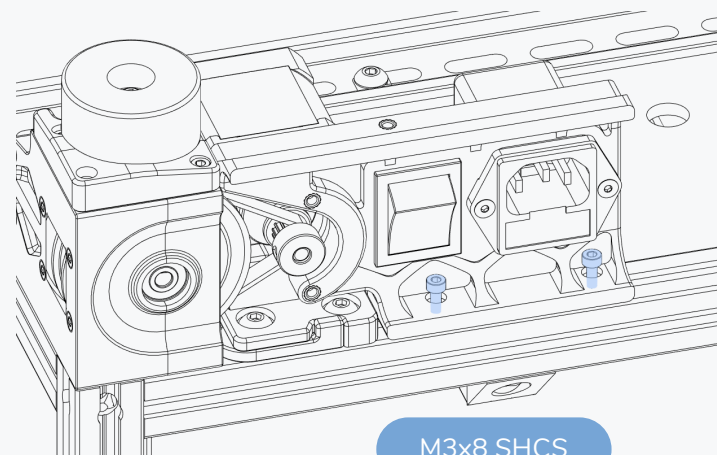
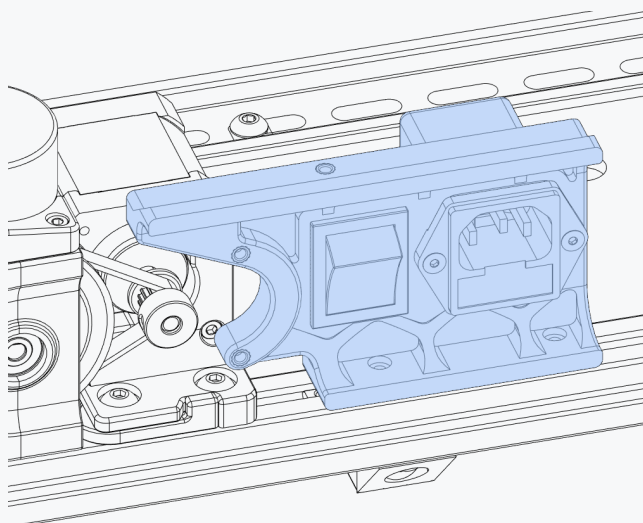
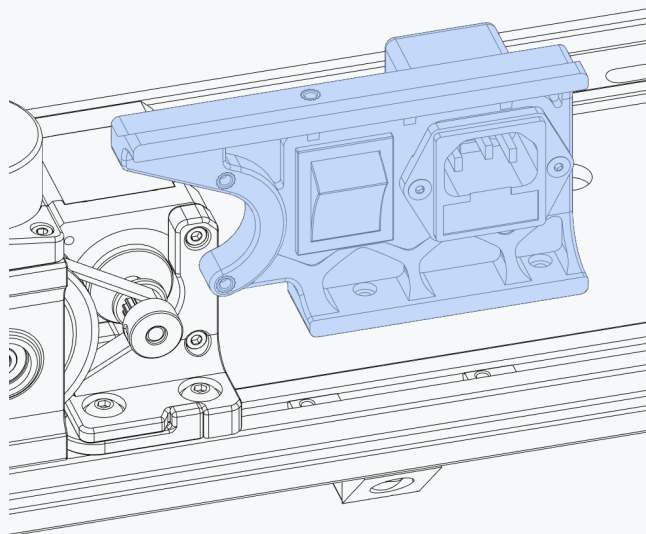
For ease of assembly we recommend to flip the printer on its head for the next steps. Hope you don't regret building a 350.



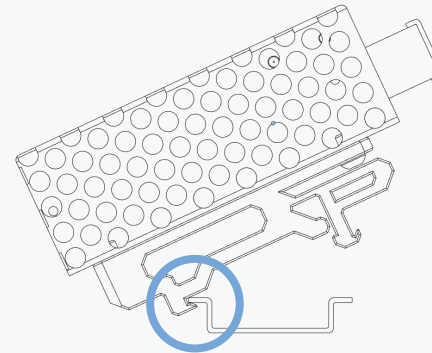
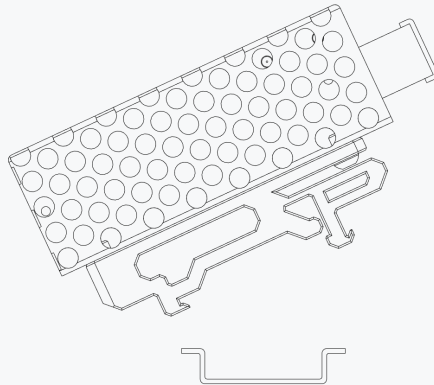
M3 T-Nut

POWER INLET

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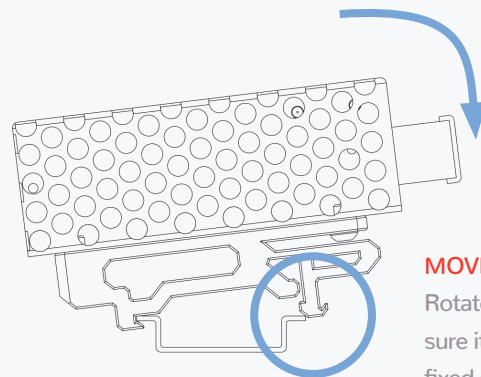


M3x8 SHCS



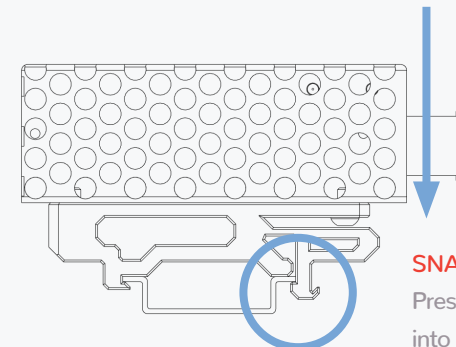
HOOK FIXED SIDE

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



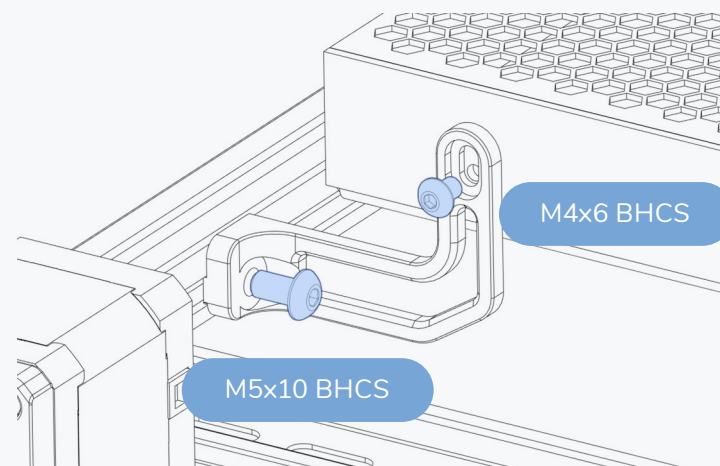
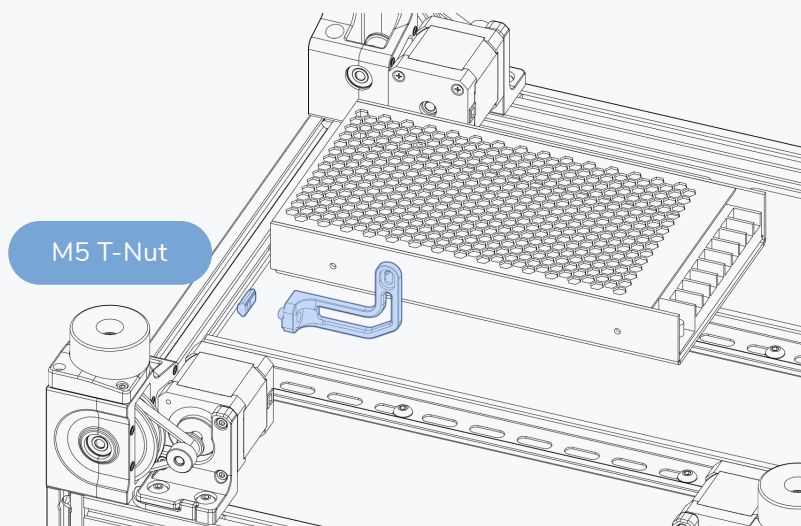
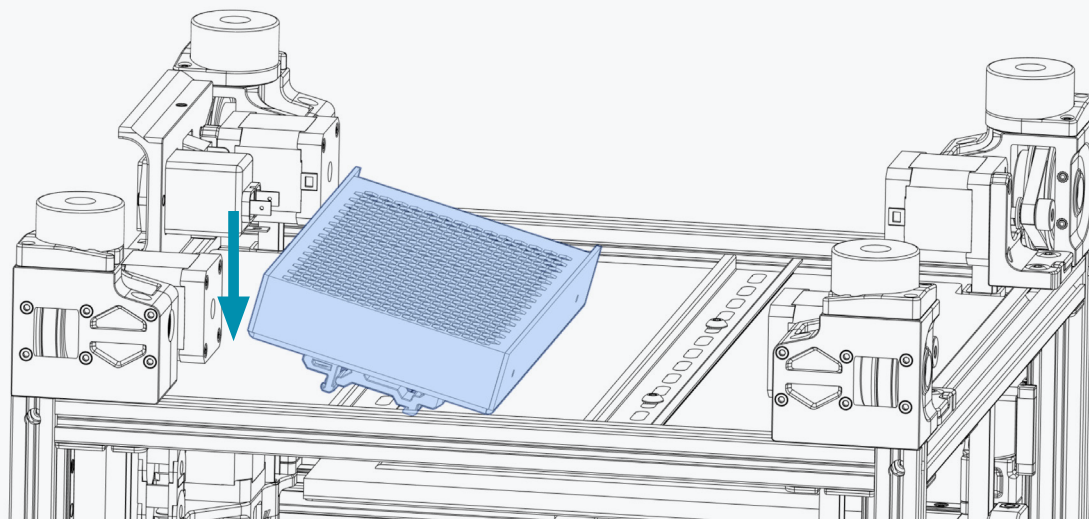
MOVE INTO POSITION

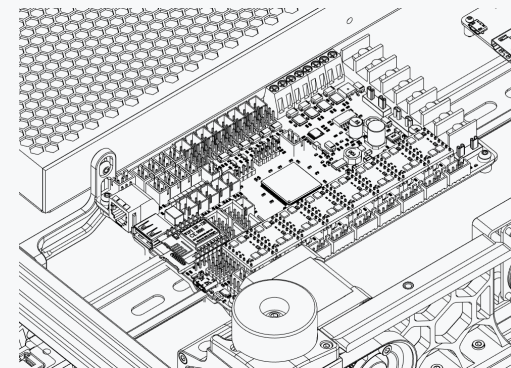
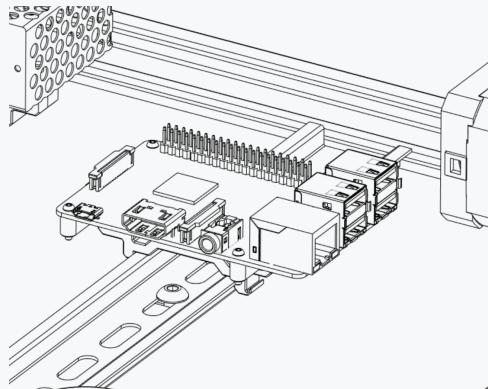
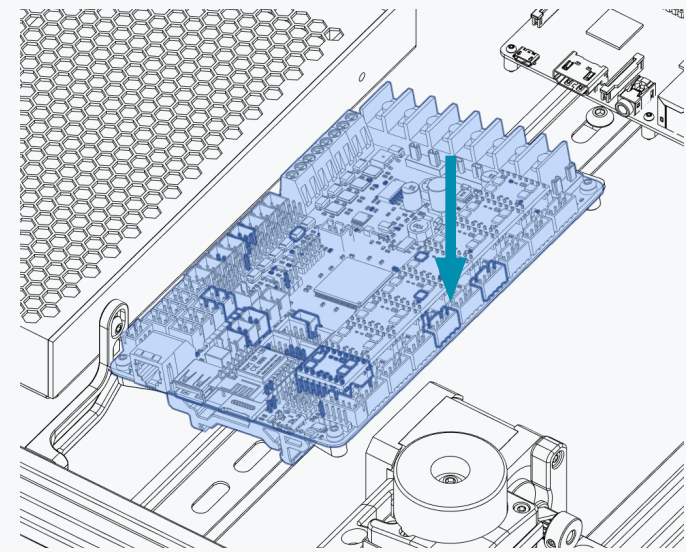
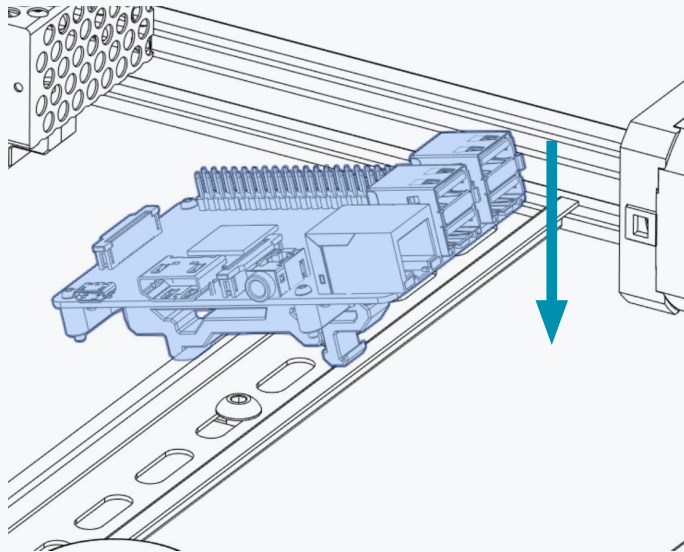
Rotate the part into place, make sure it does not unhook from the fixed side.



SNAP INTO PLACE

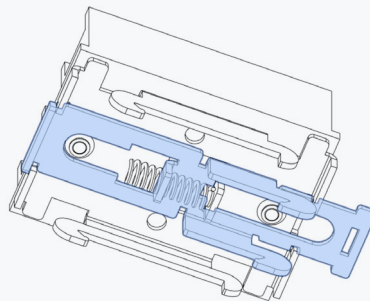
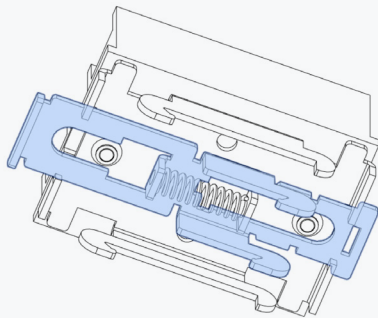
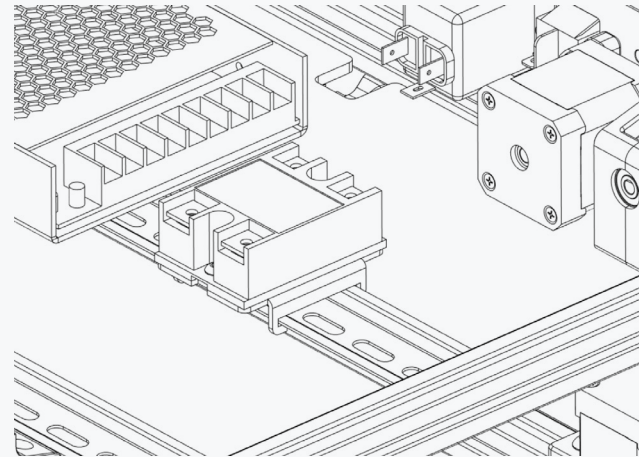
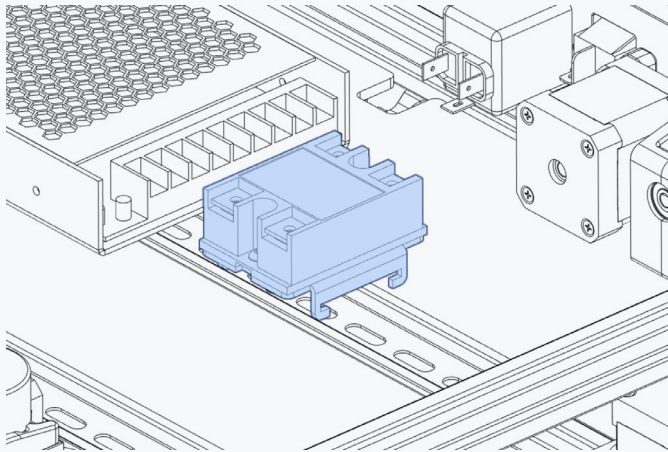
Press to snap the free side into place. The part should now sit securely on the DIN rail.





SOLID STATE RELAY

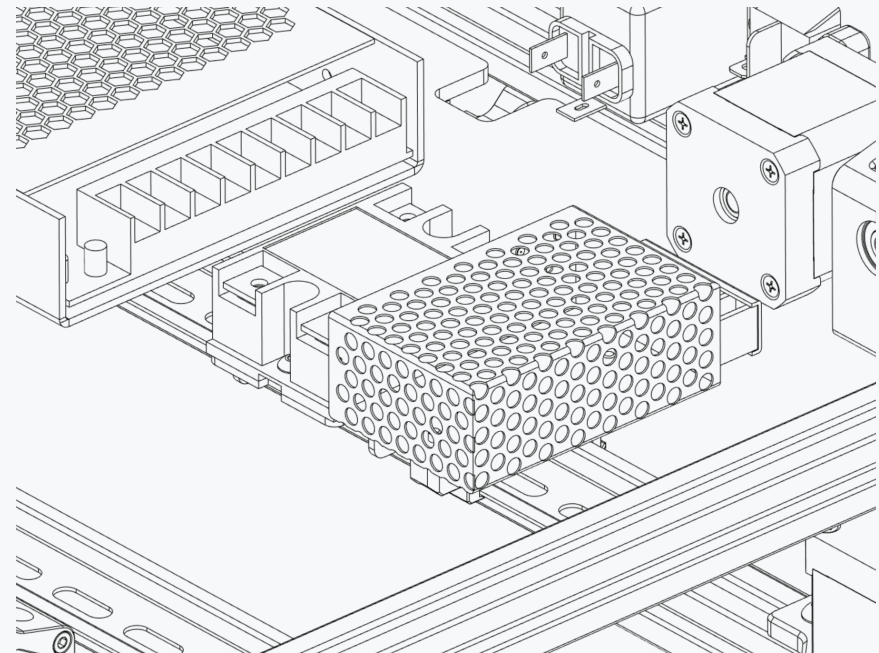
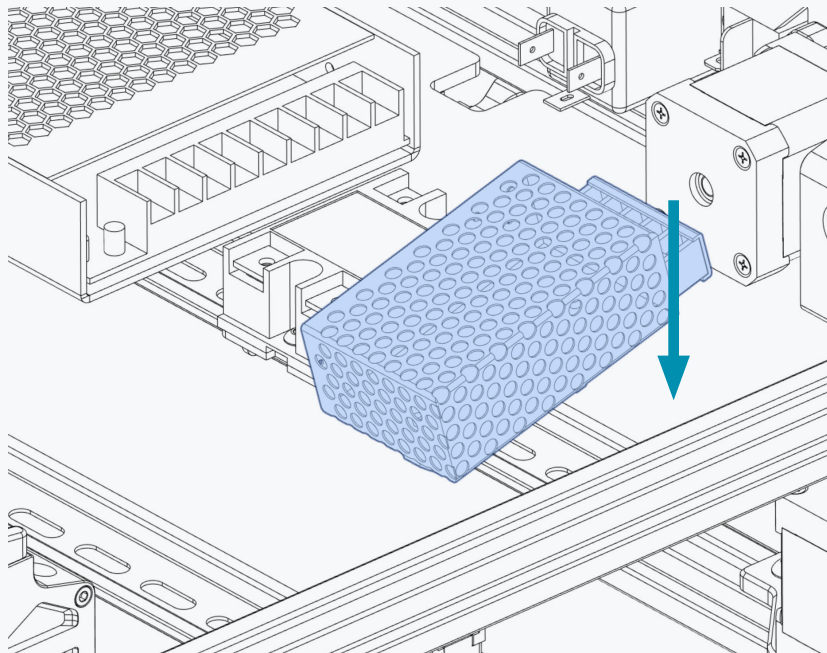
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SPRING-LOADED

Use a flat head screw 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.

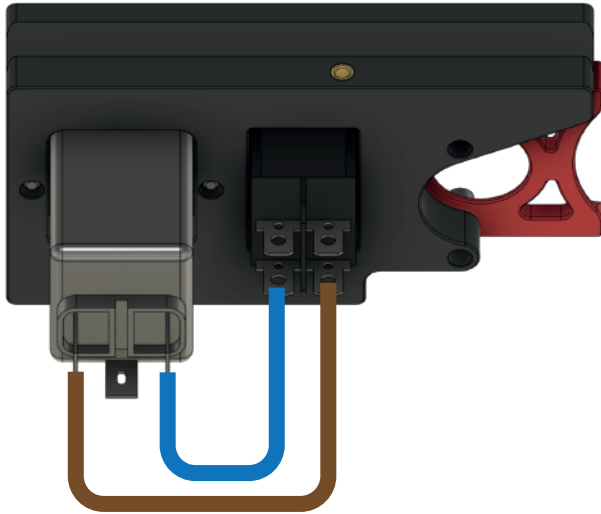


By February 2019 over 100 Voron2 printers had been built and serialized.

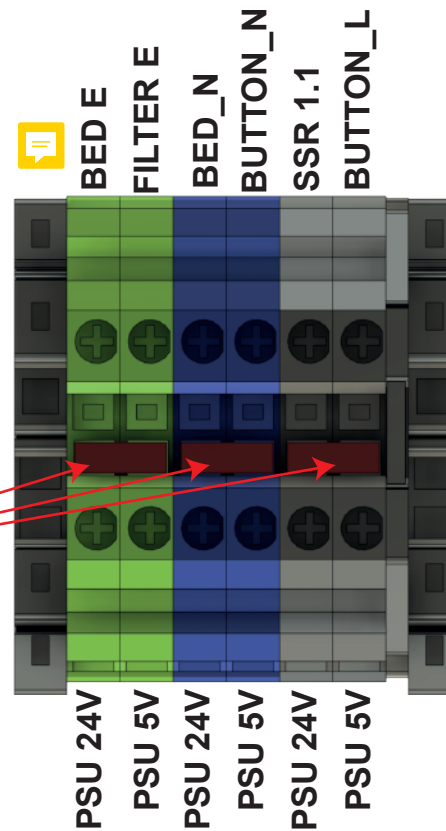
A year later this figure grew to 350 Voron2 printers.

Power distribution

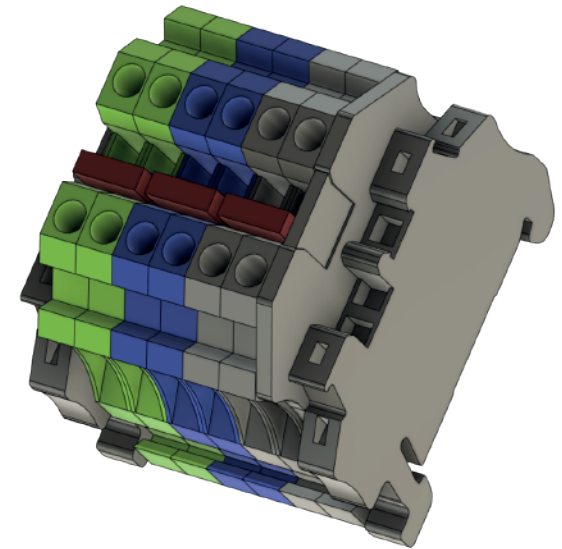
1. Connect filter and button with two short wires



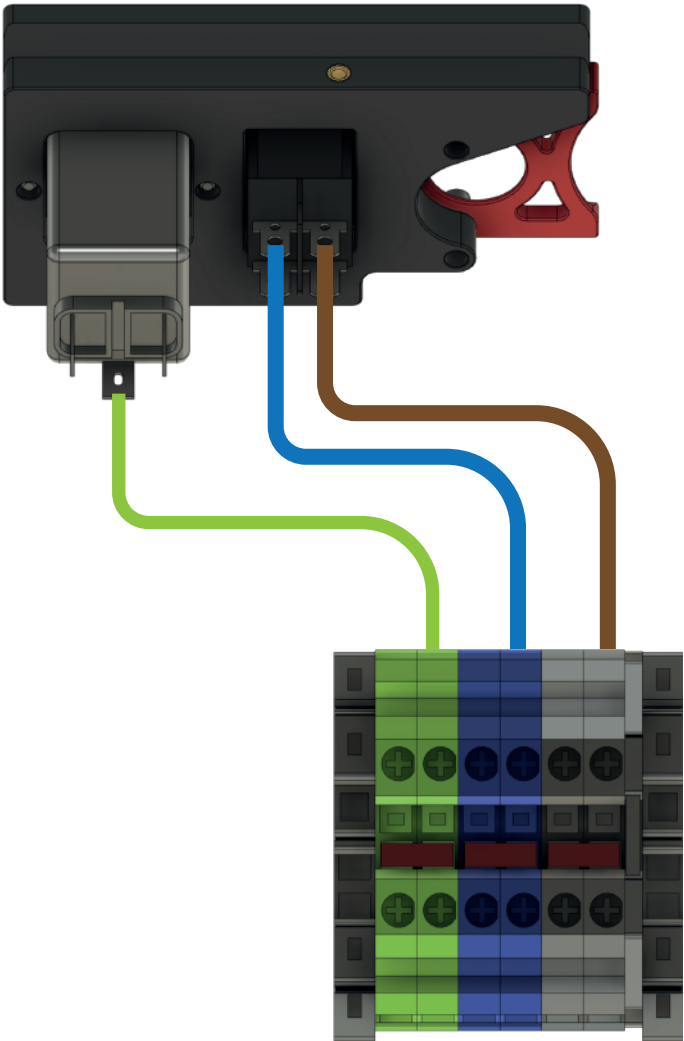
2. Assemble the distribution block on a din rail



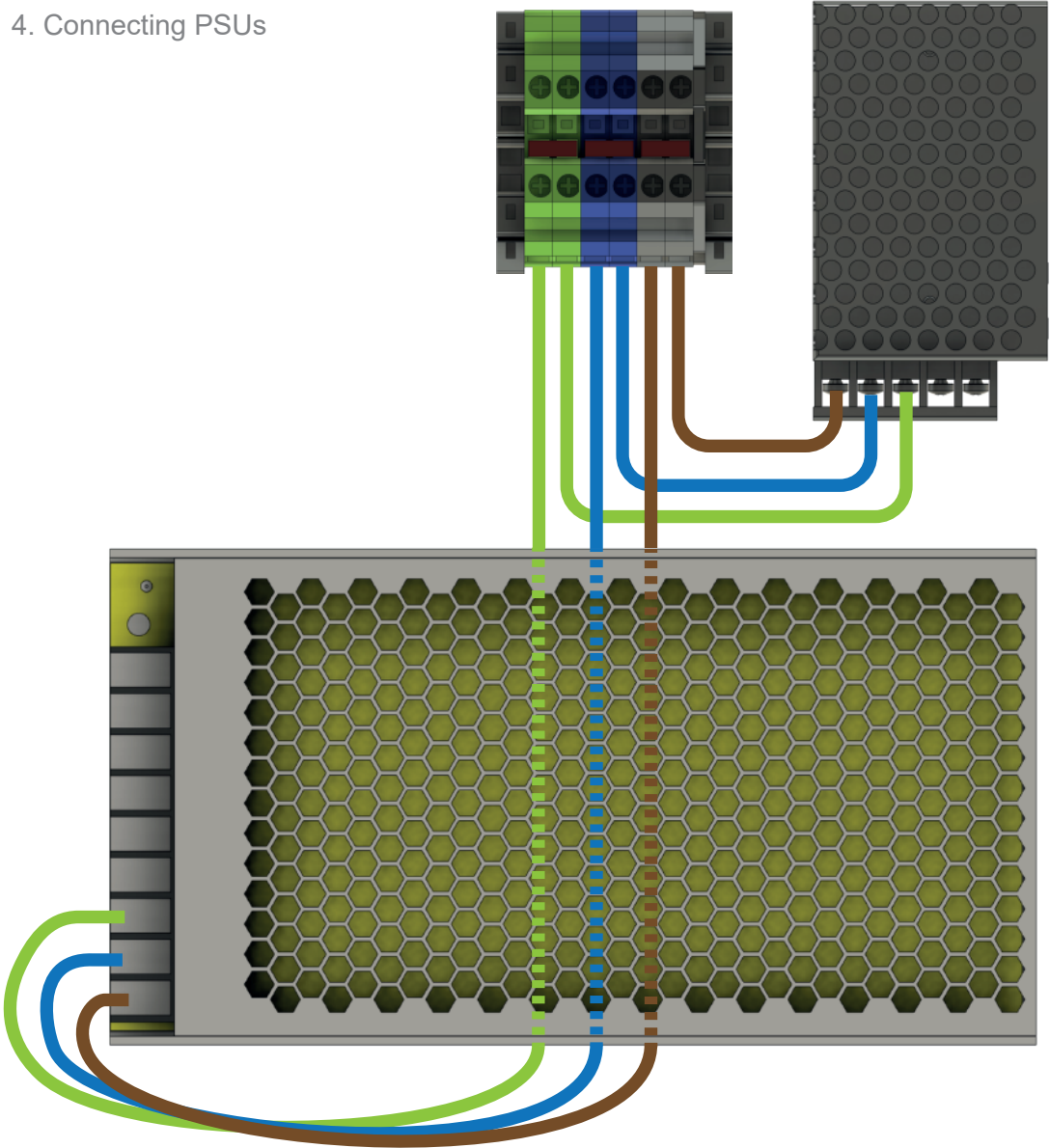
Do not forget to install jumpers

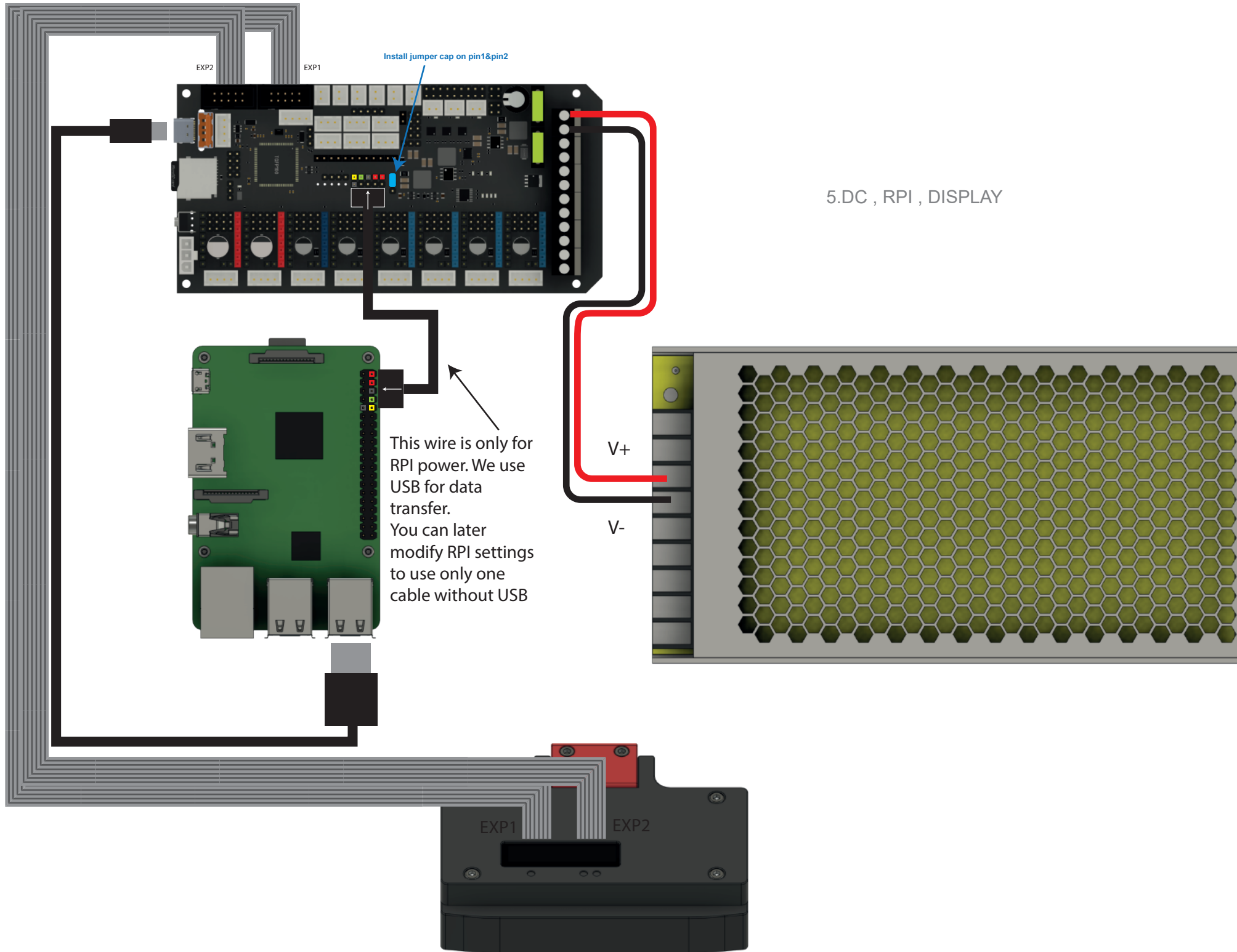


3.



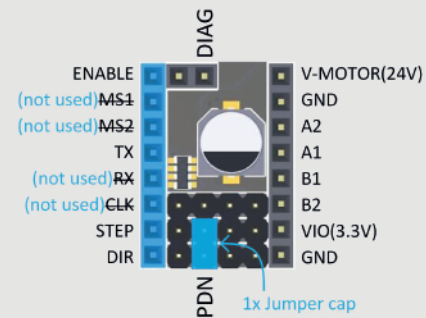
4. Connecting PSUs





6. Motors

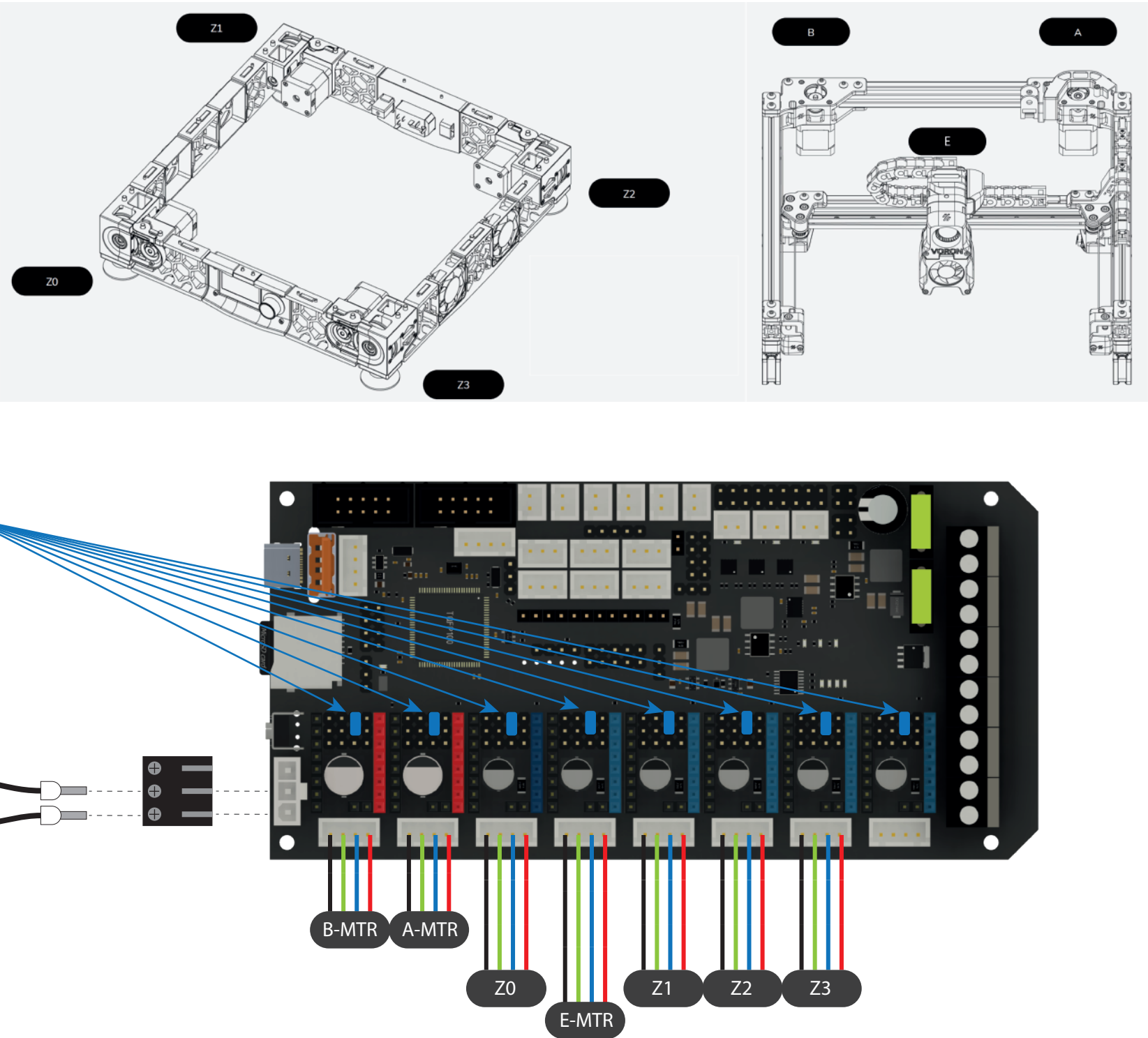
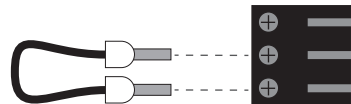
USE FYSETC TMC 2209 V3.1



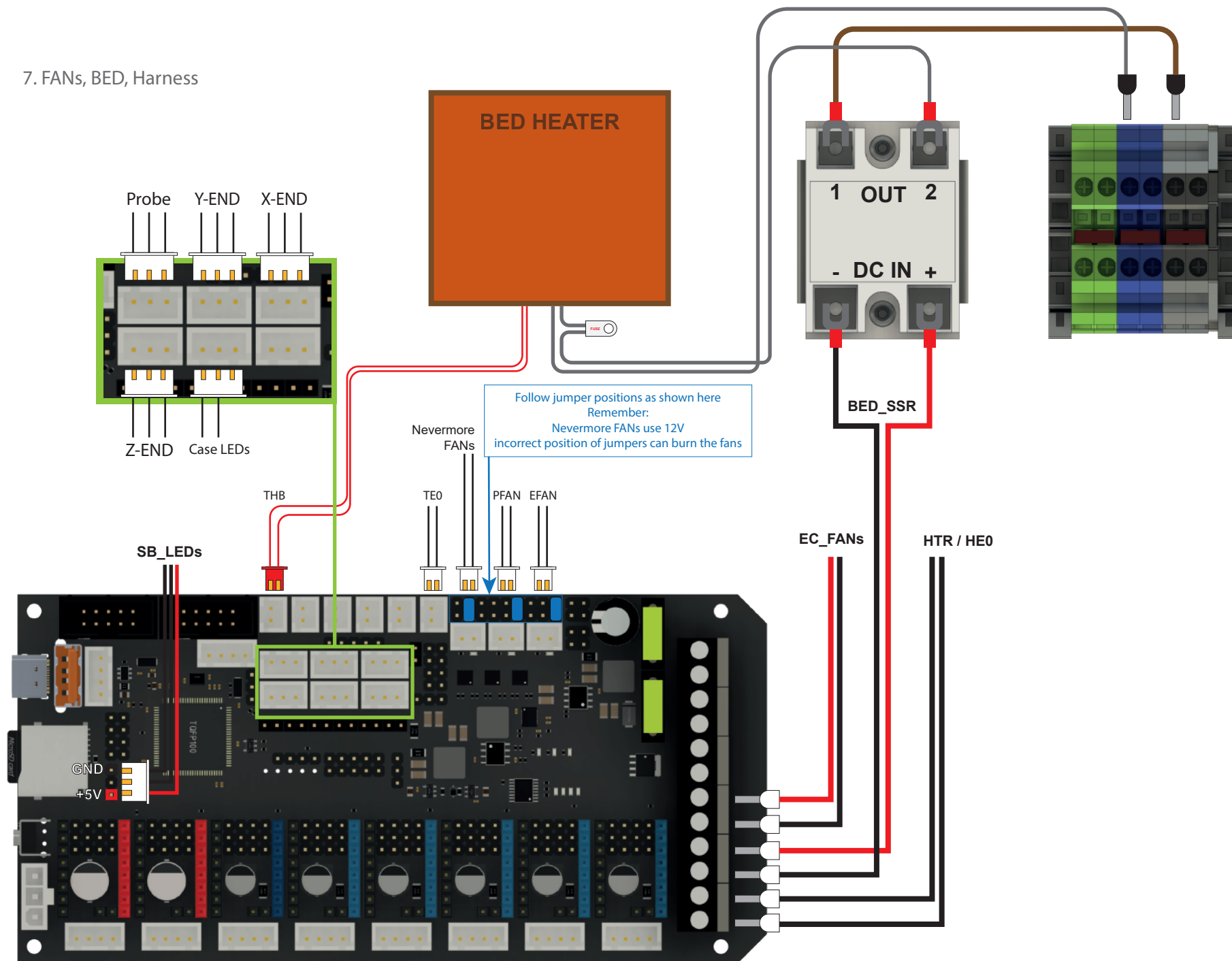
PDN: It is connected to TX for communication between TMC and MCU, using single wire. The jumper cap shown in the figure must be setted before the drive module install.

DIAG: It is used to go home without sensing, while ensuring that the jumper corresponding to the limit is in the closed state.

Install this jumper wire for using 24V on A & B Motors

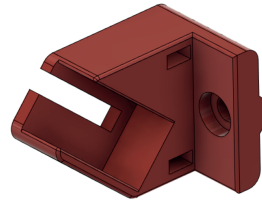


7. FANs, BED, Harness

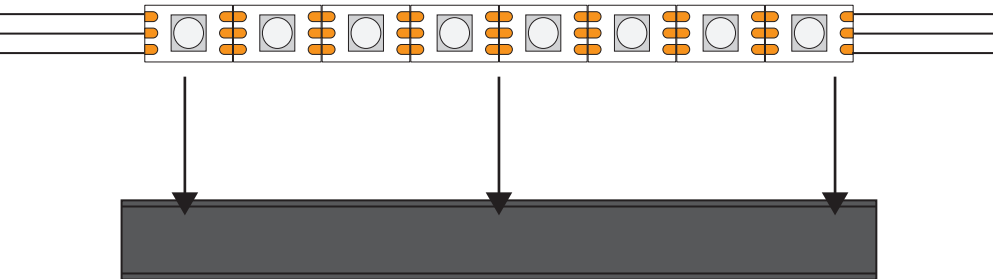


Case LEDs Installation

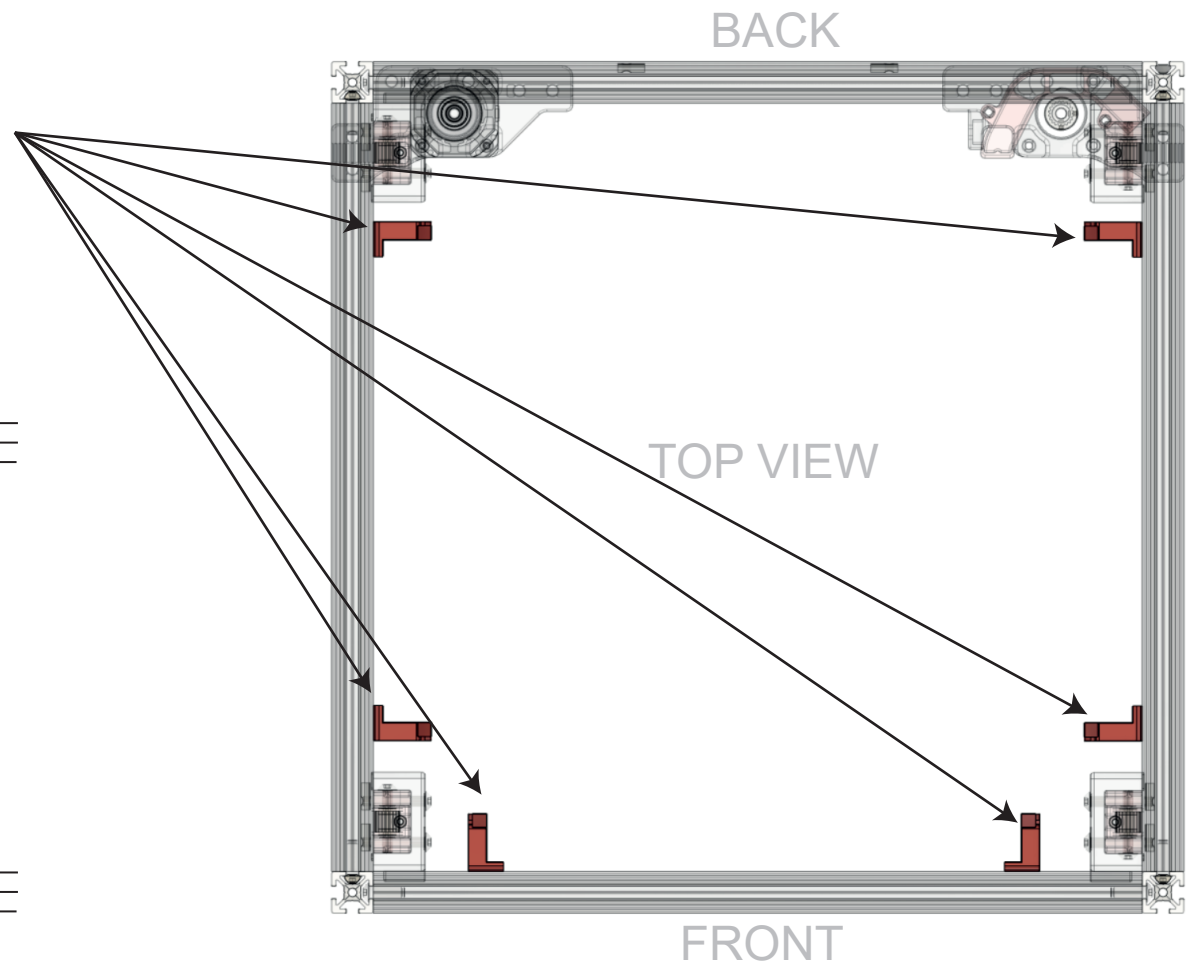
1. Install profile mounts using m3x8 screws and T-Nuts



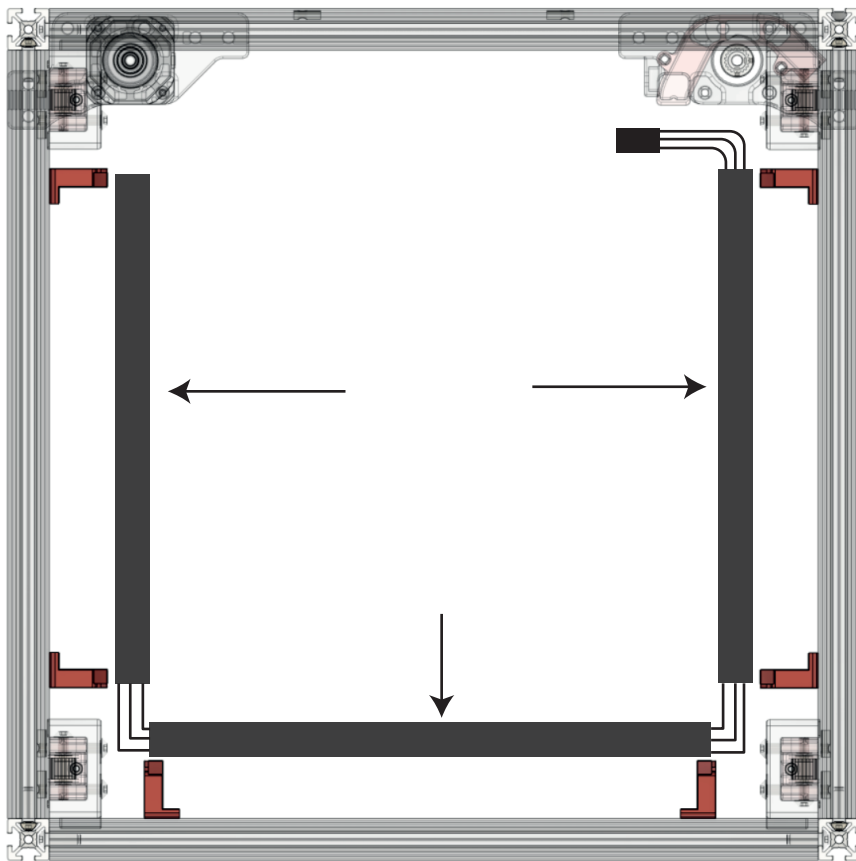
2. Glue all parts of the strip tape to the aluminum profiles



3. Cover up profiles with PC covers

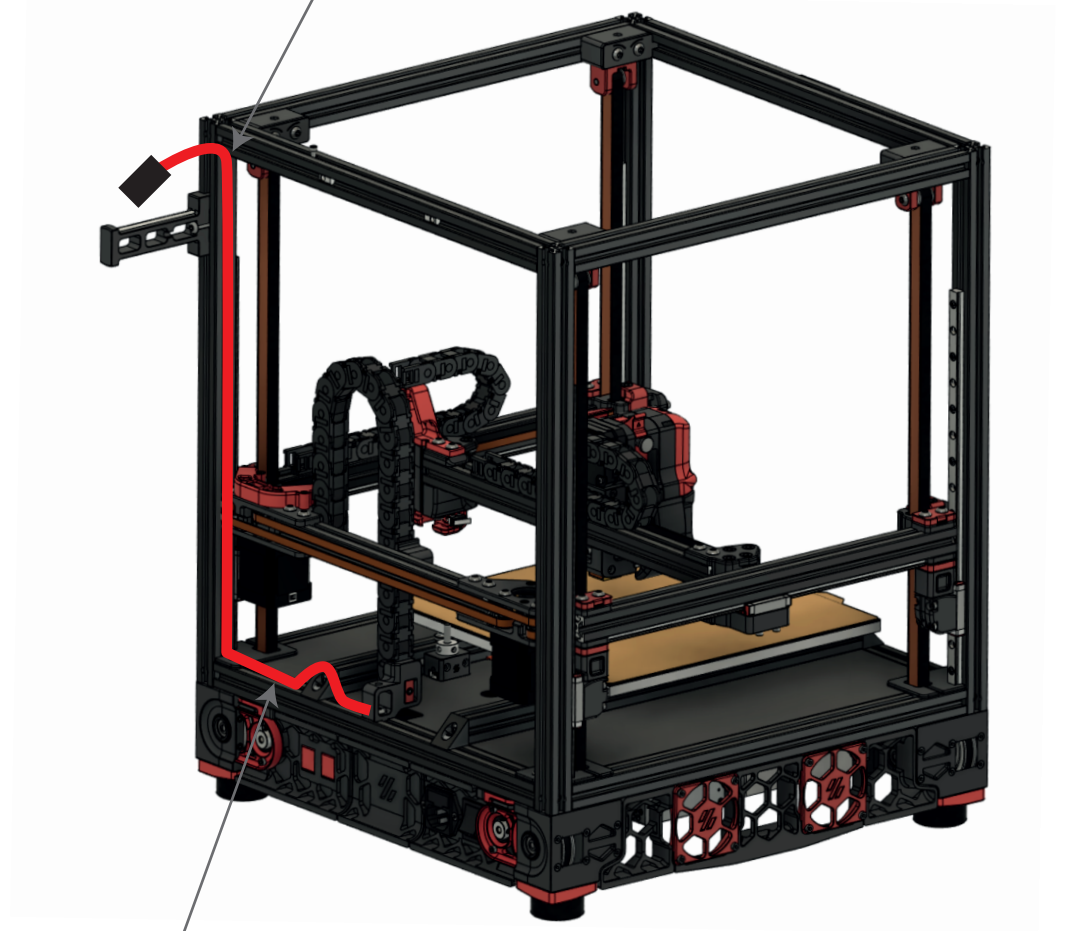


4. Insert profiles with led strips into holders



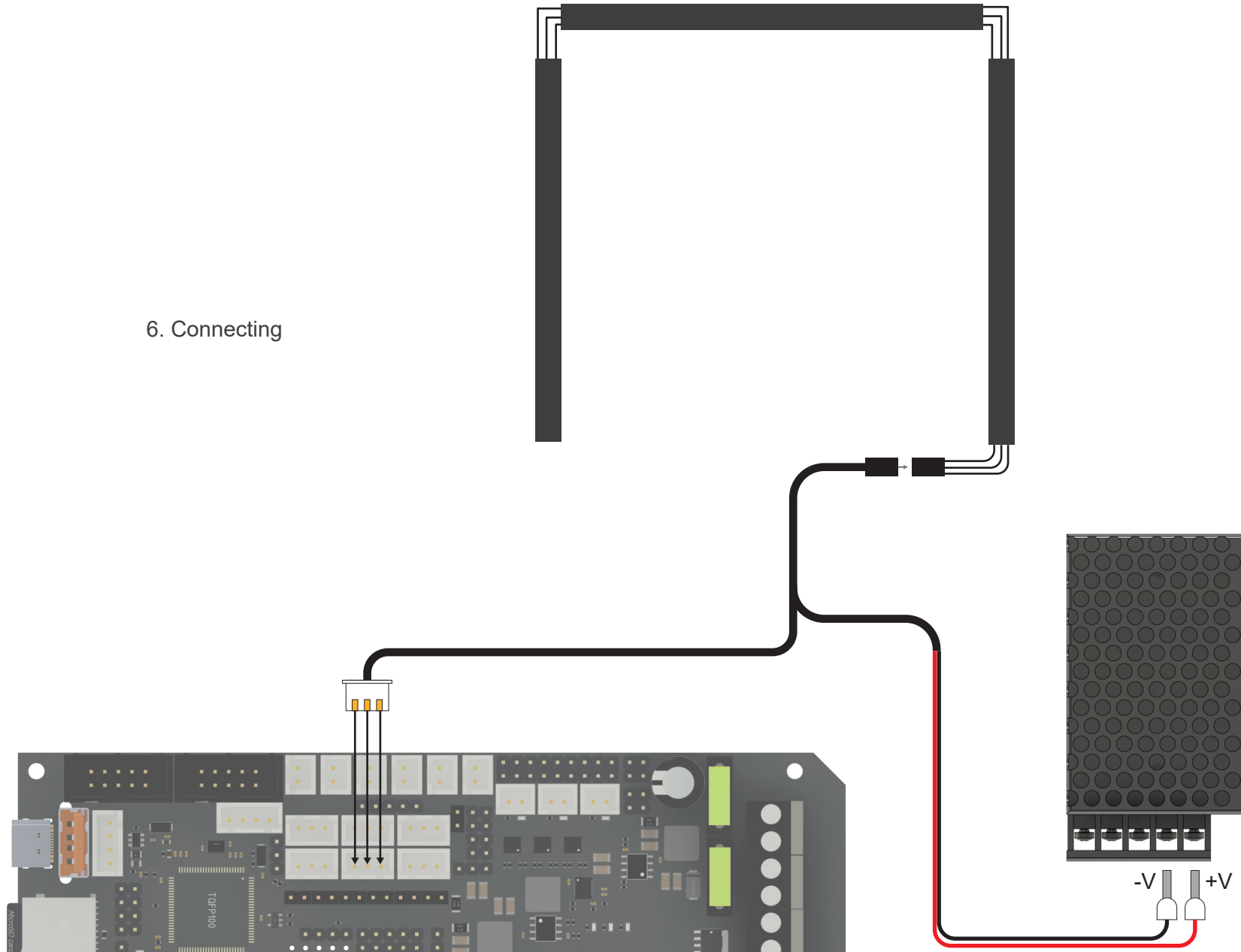
5. Install another cable along this path.

Inside of vertical extrusion secure cable with plastic cover.



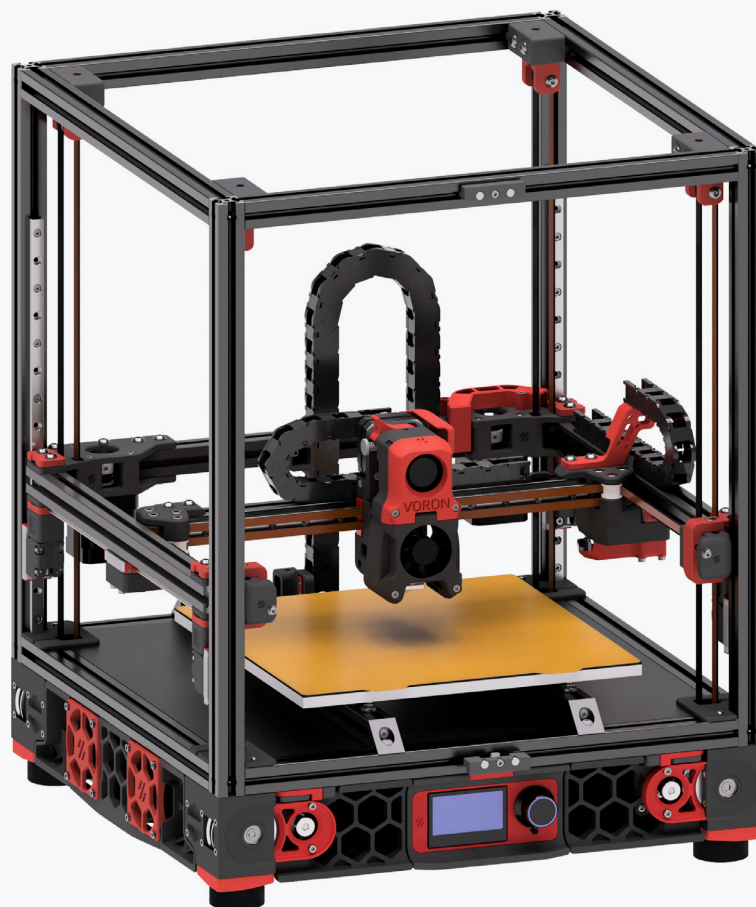
Cable here can be closed with small cable sleeve.

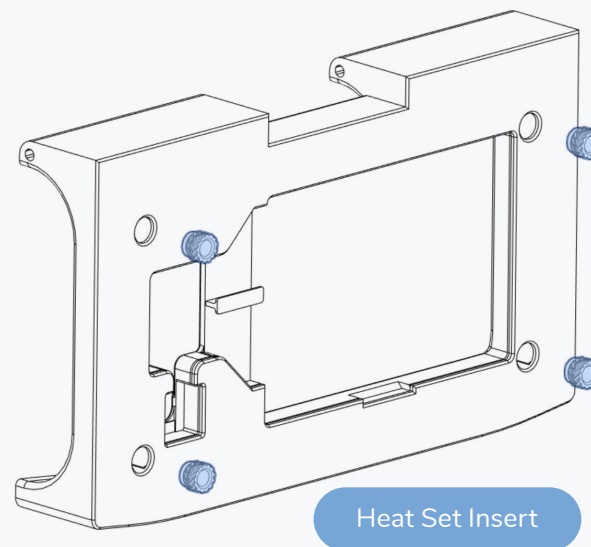
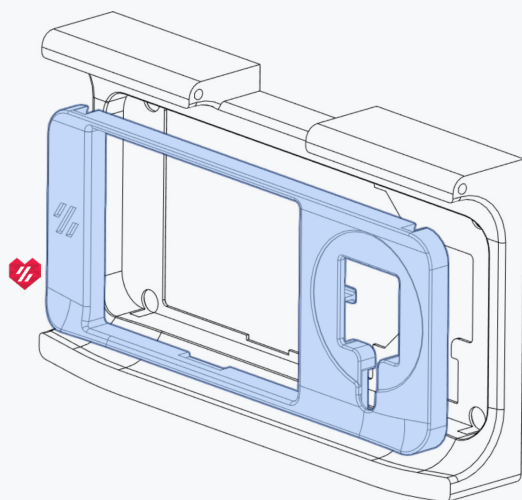
6. Connecting



SKIRTS

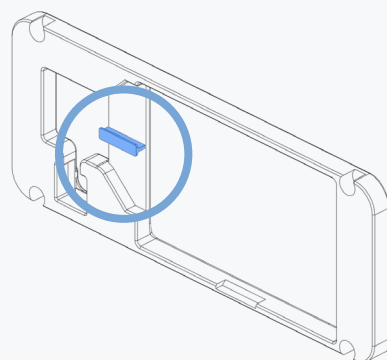
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FRONT COVER

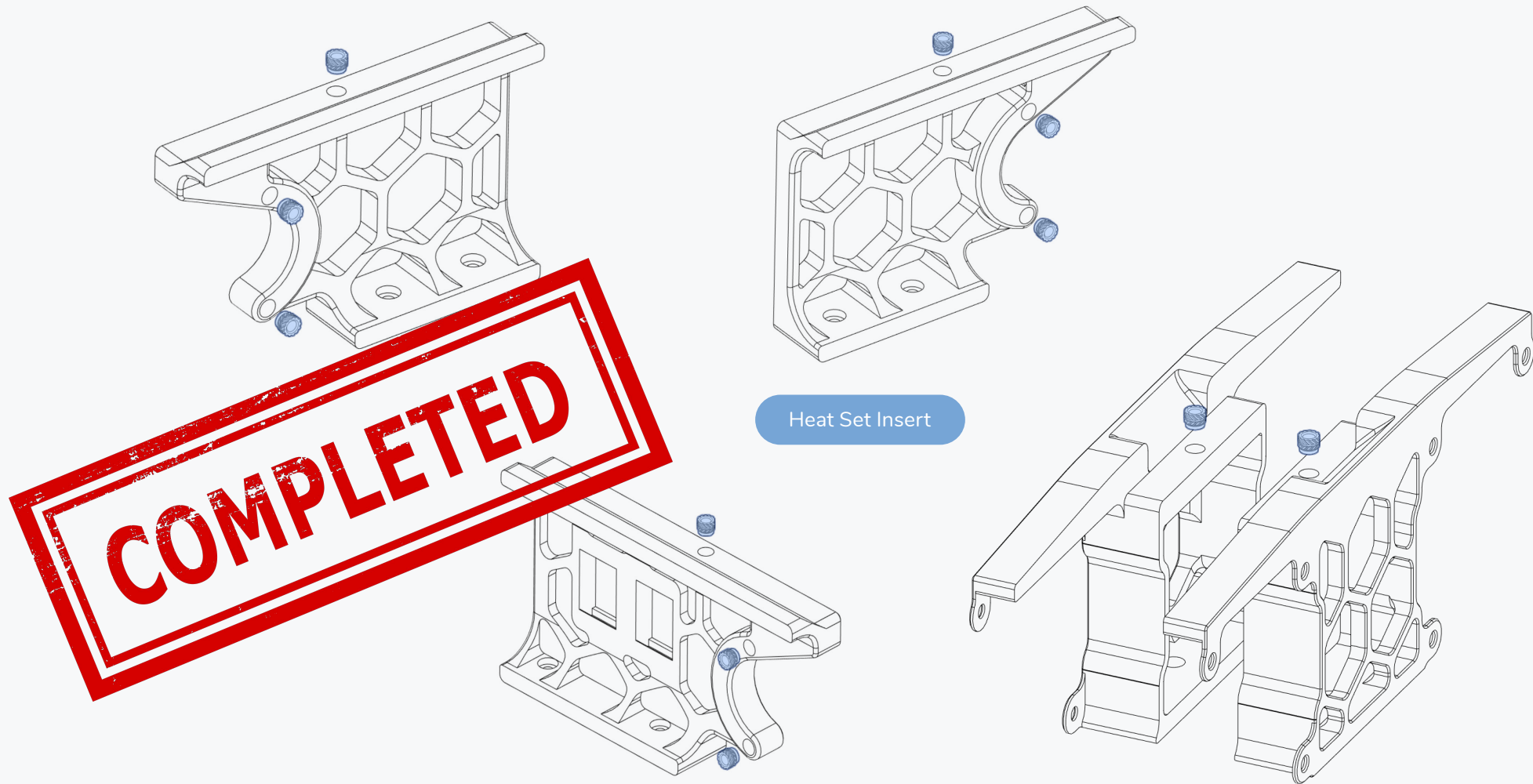
The front cover is held in place by the heat set inserts. Hold the front face firmly in place while inserting the heat set inserts.

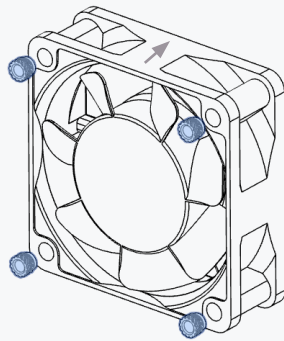


BUILT-IN SUPPORT

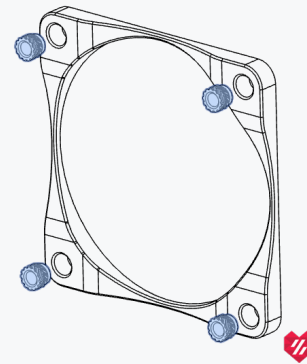
Remove the highlighted section. It's a built-in support for printability.



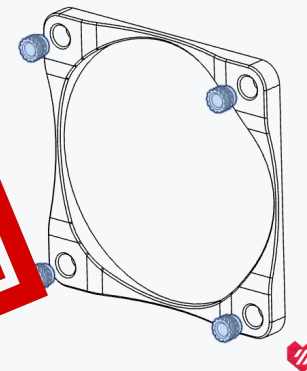
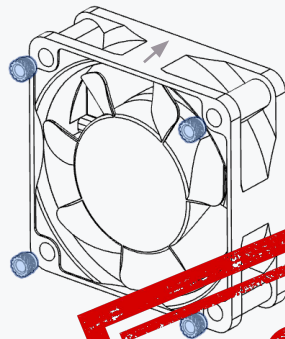




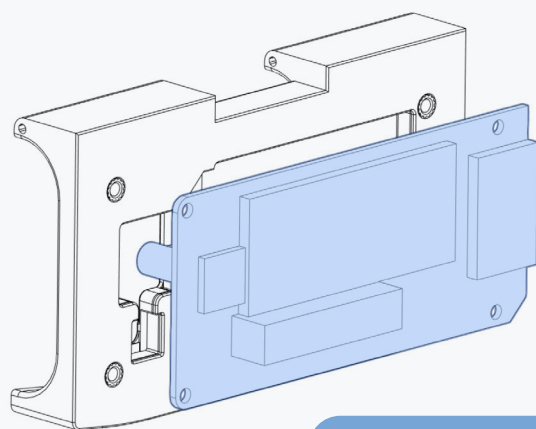
60x20 Fan



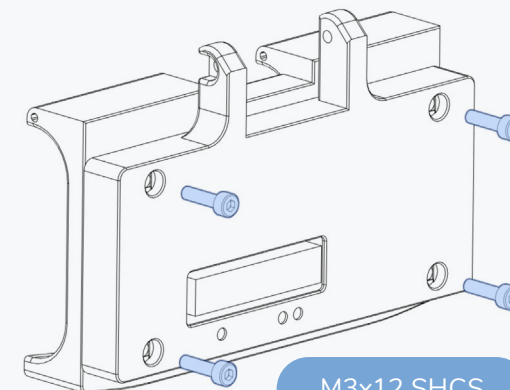
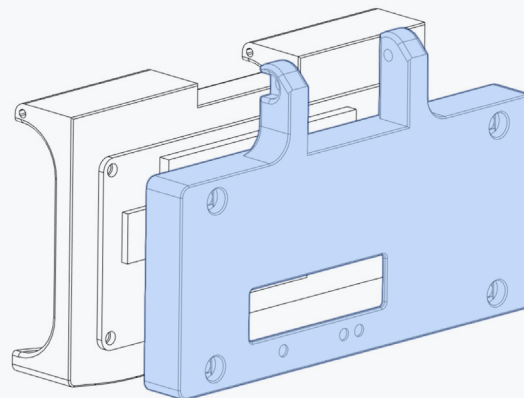
Heat Set Insert



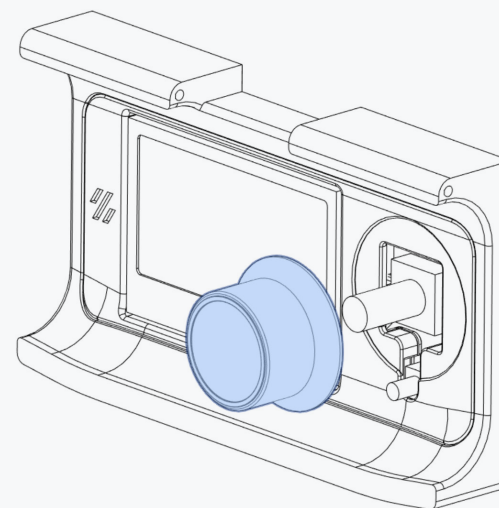
COMPLETED

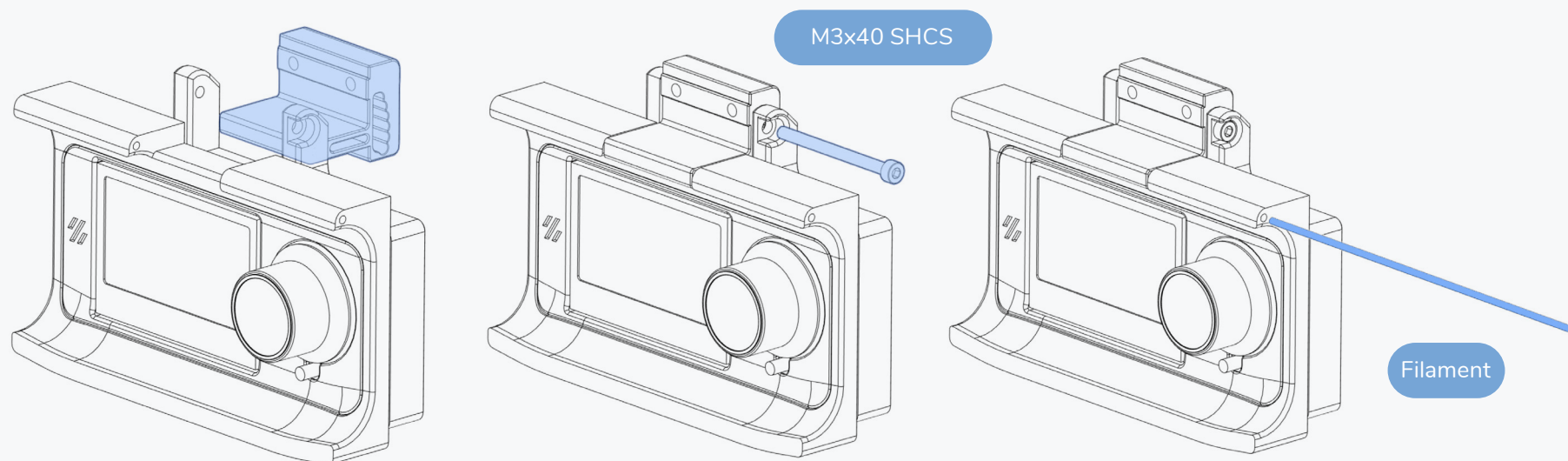


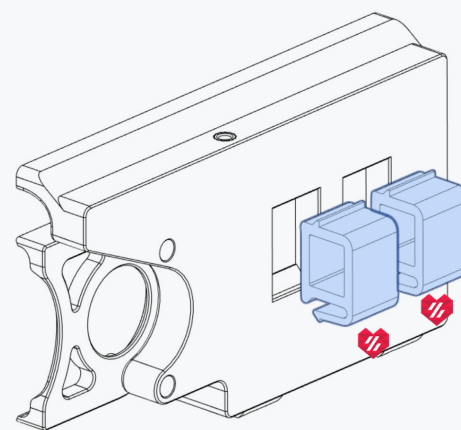
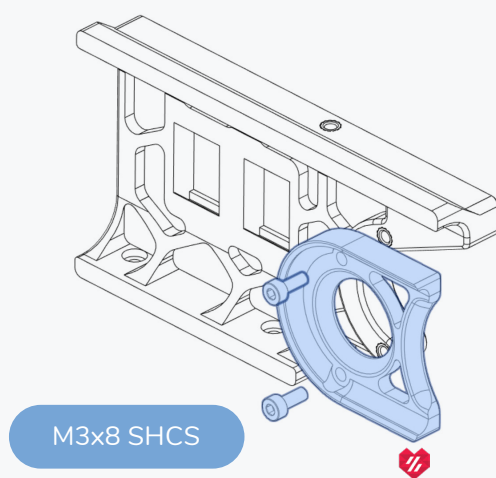
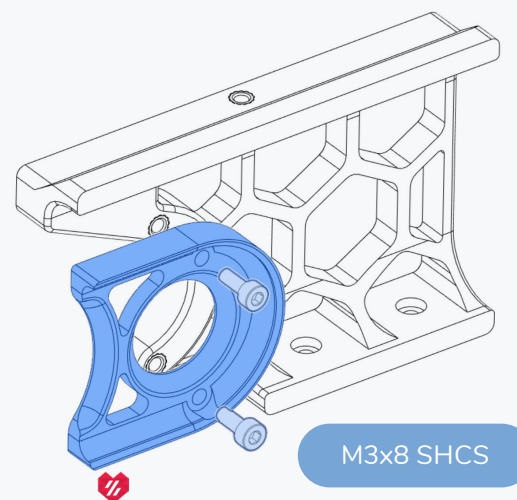
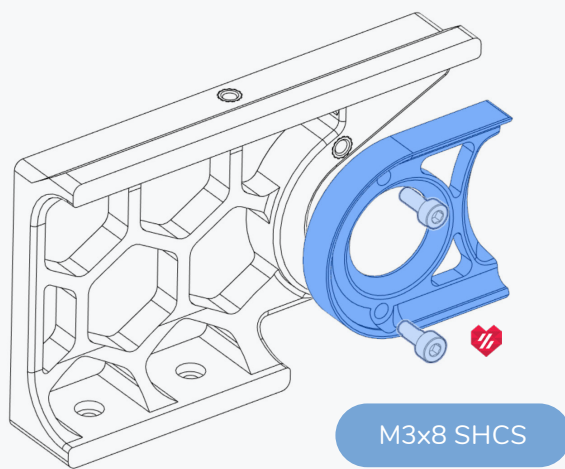
Mini 12864 Screen



M3x12 SHCS



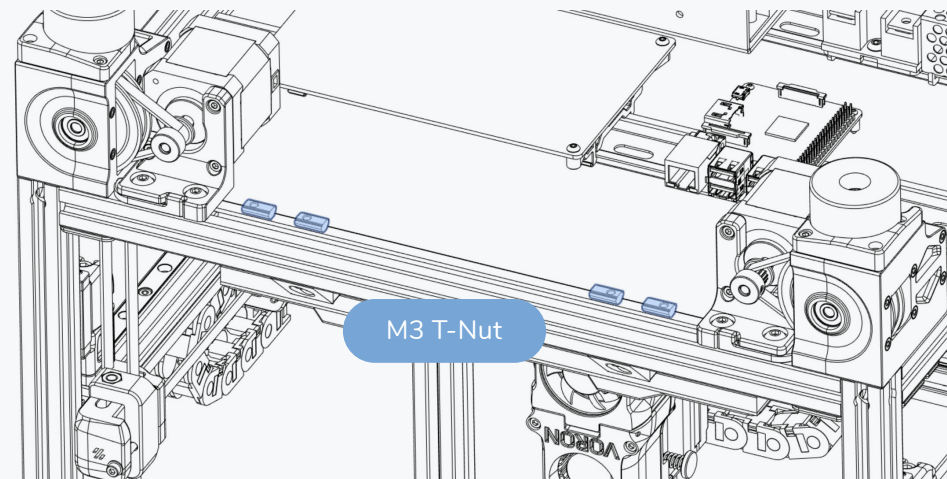
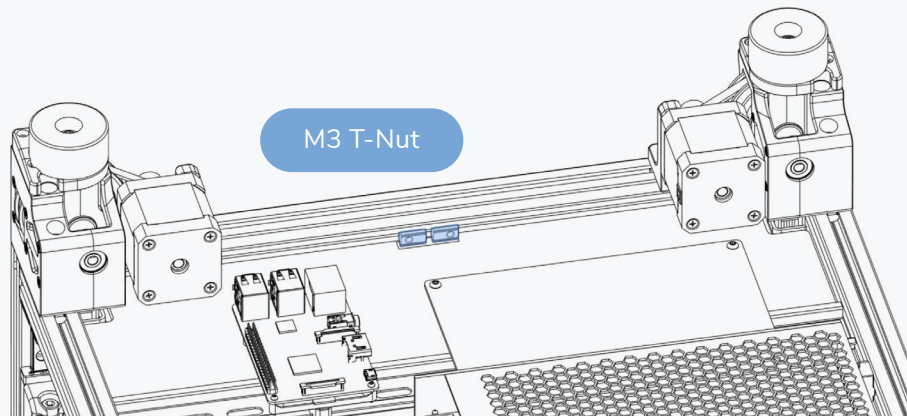


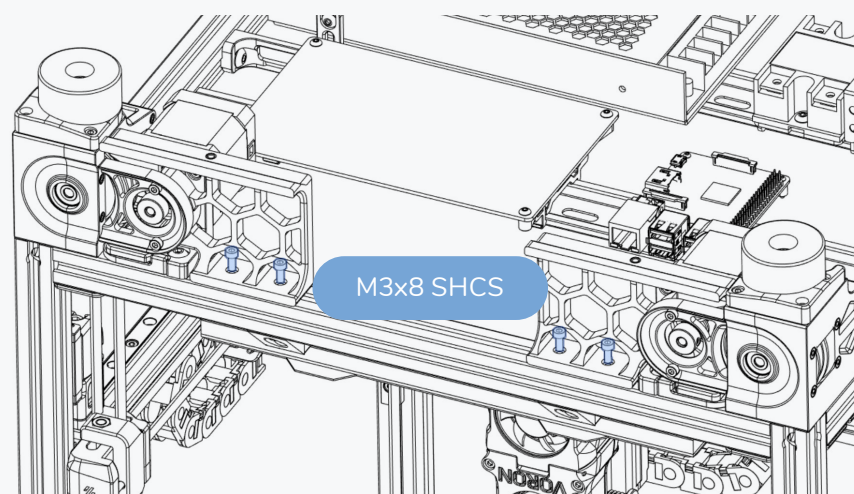
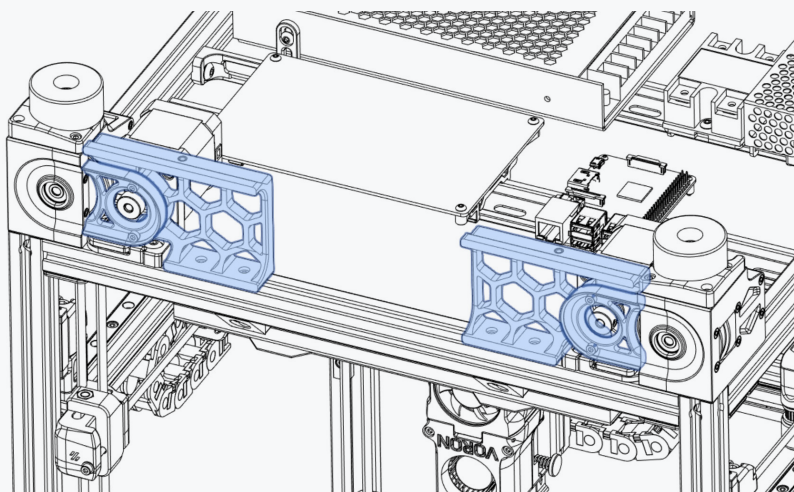


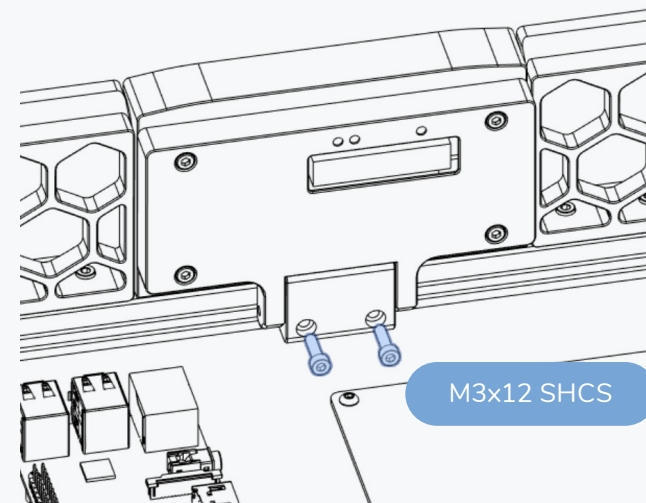
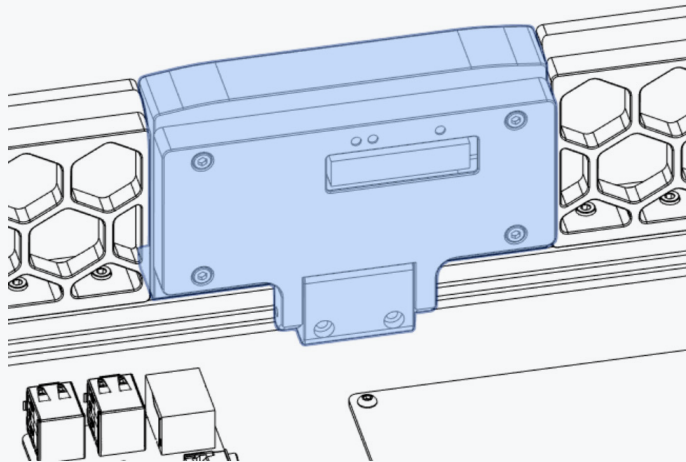
OPTION: KEYSTONE INSERTS

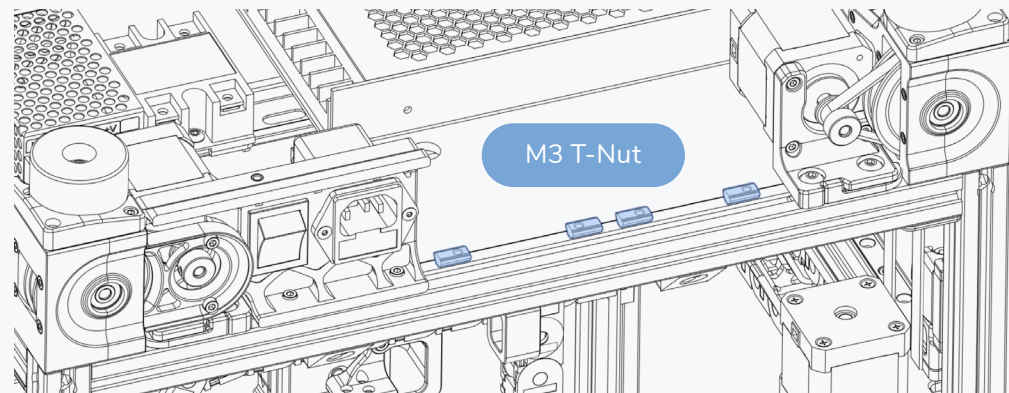
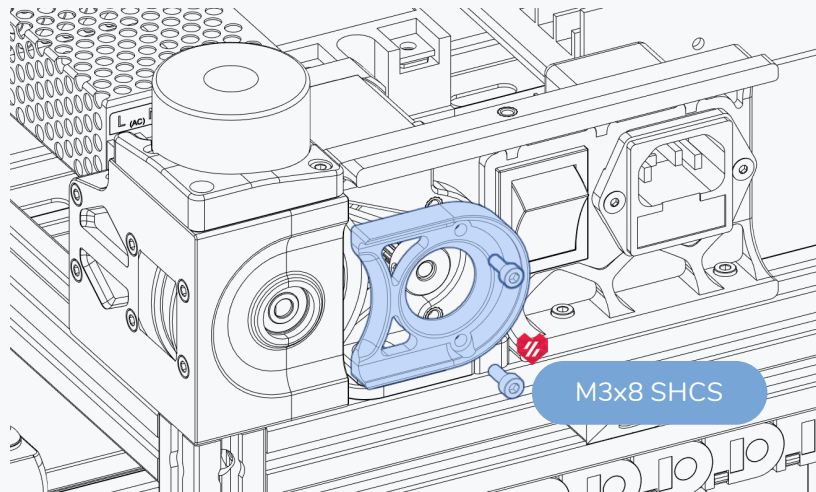
The picture is showing blanks for the keystone slots.

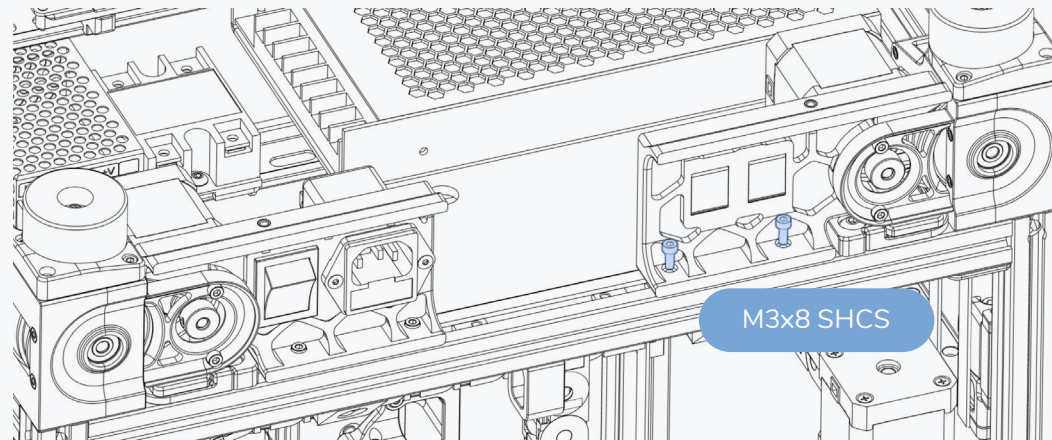
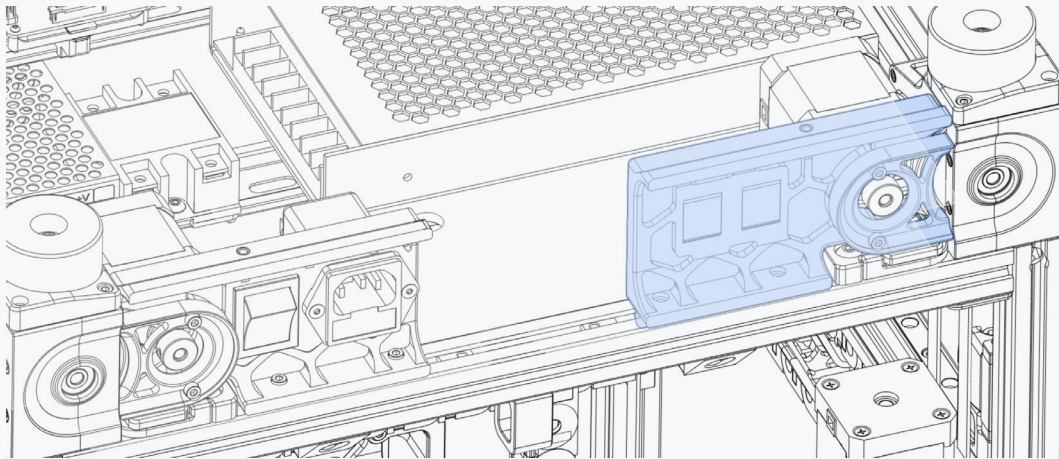
Alternatively you can add modules for USB or ethernet and expose ports of the Raspberry PI on the back of the printer.

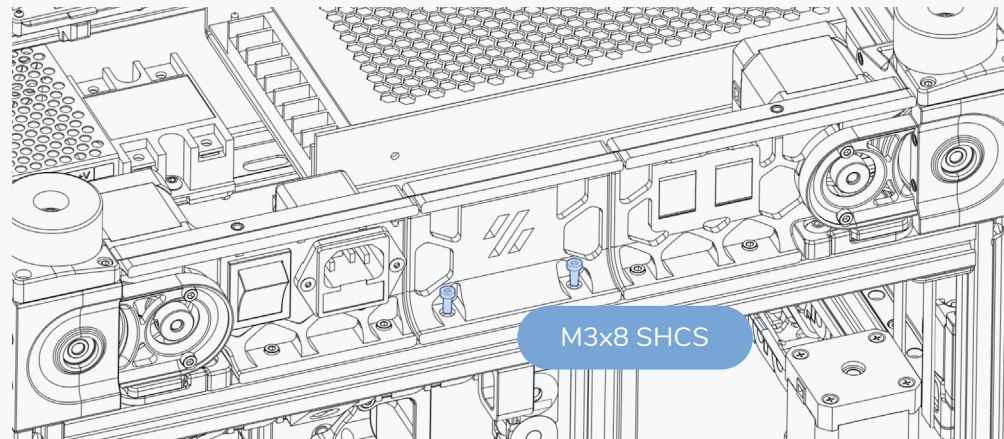
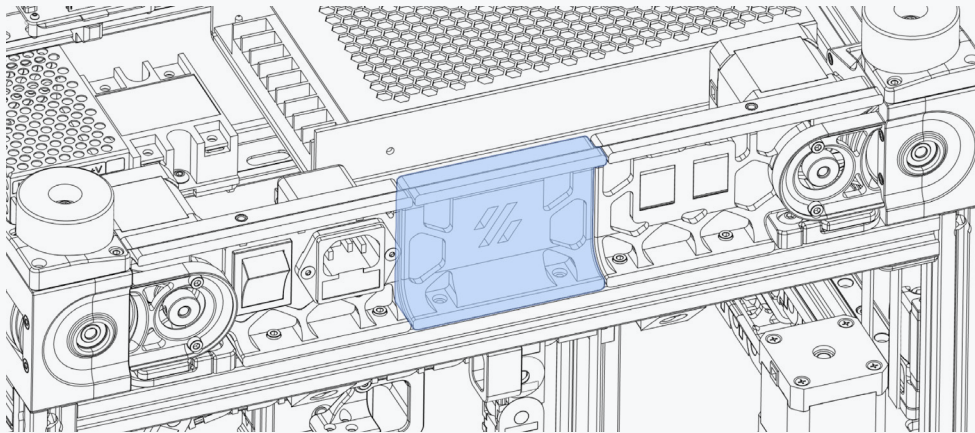


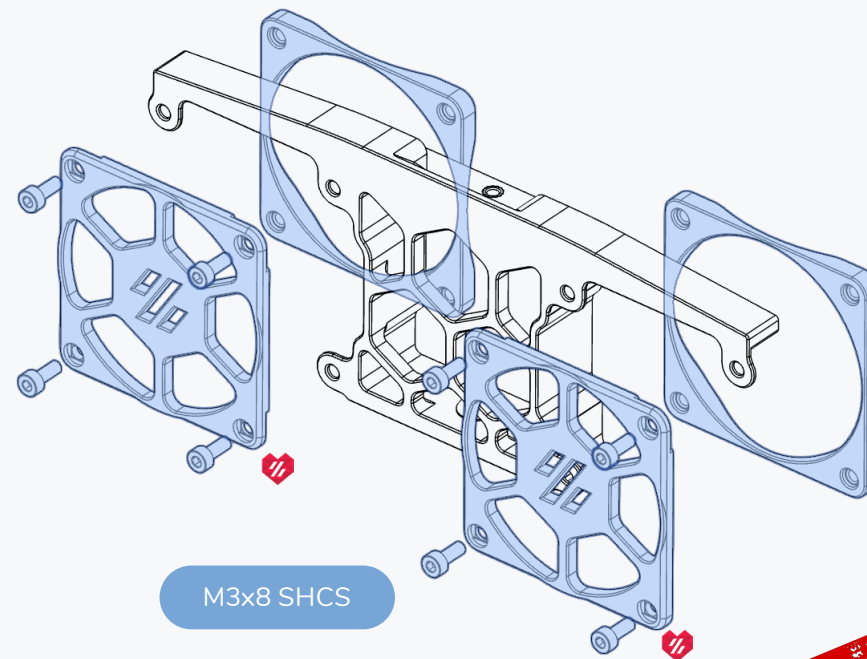




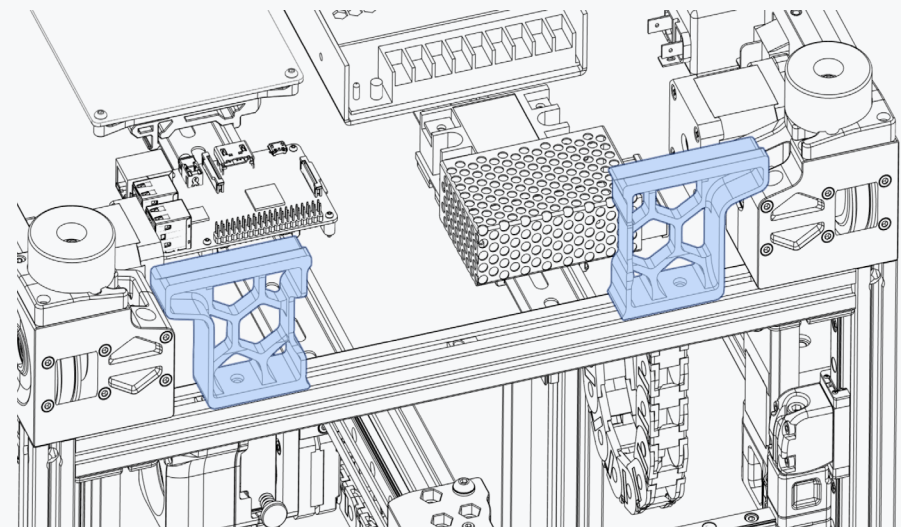
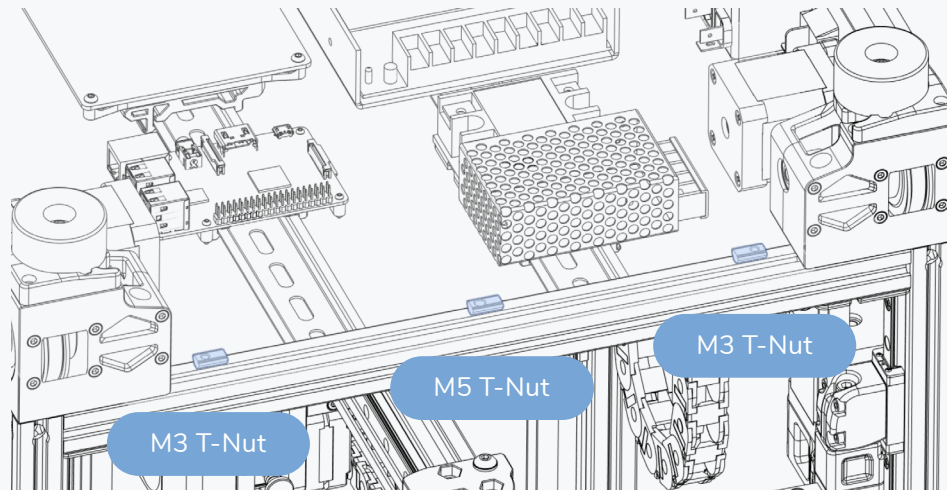






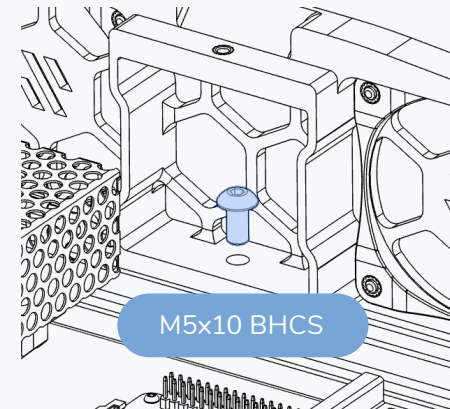
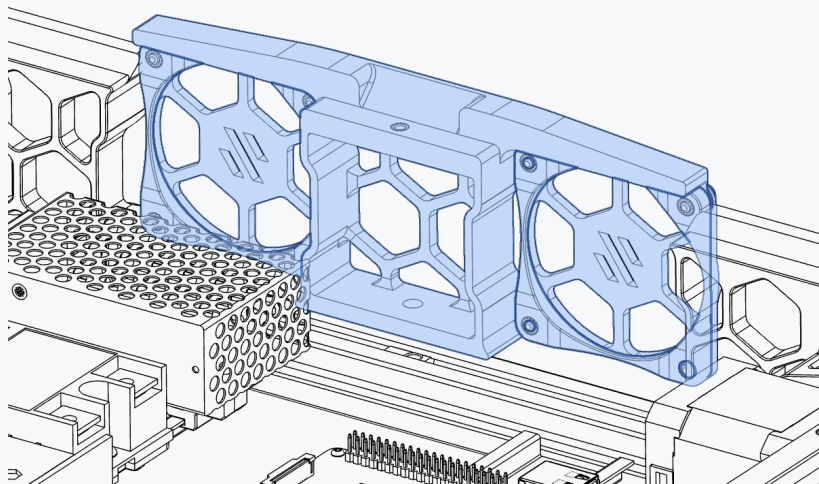
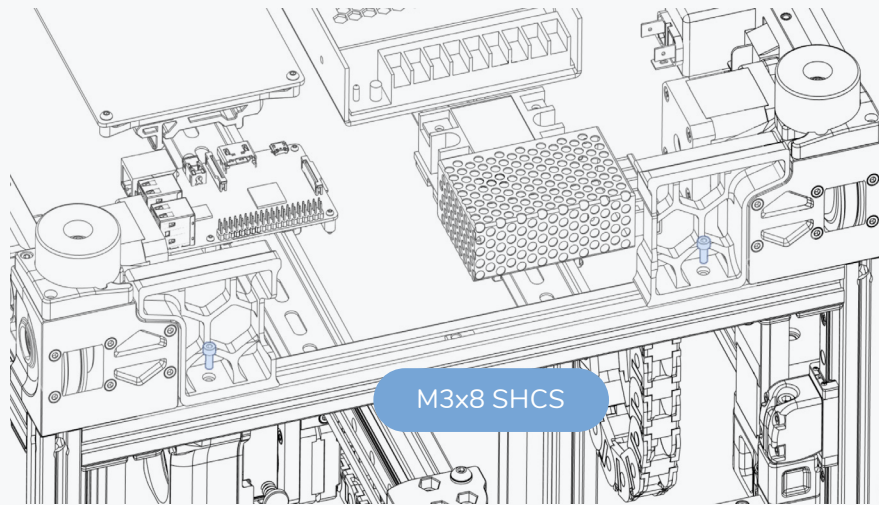


COMPLETED



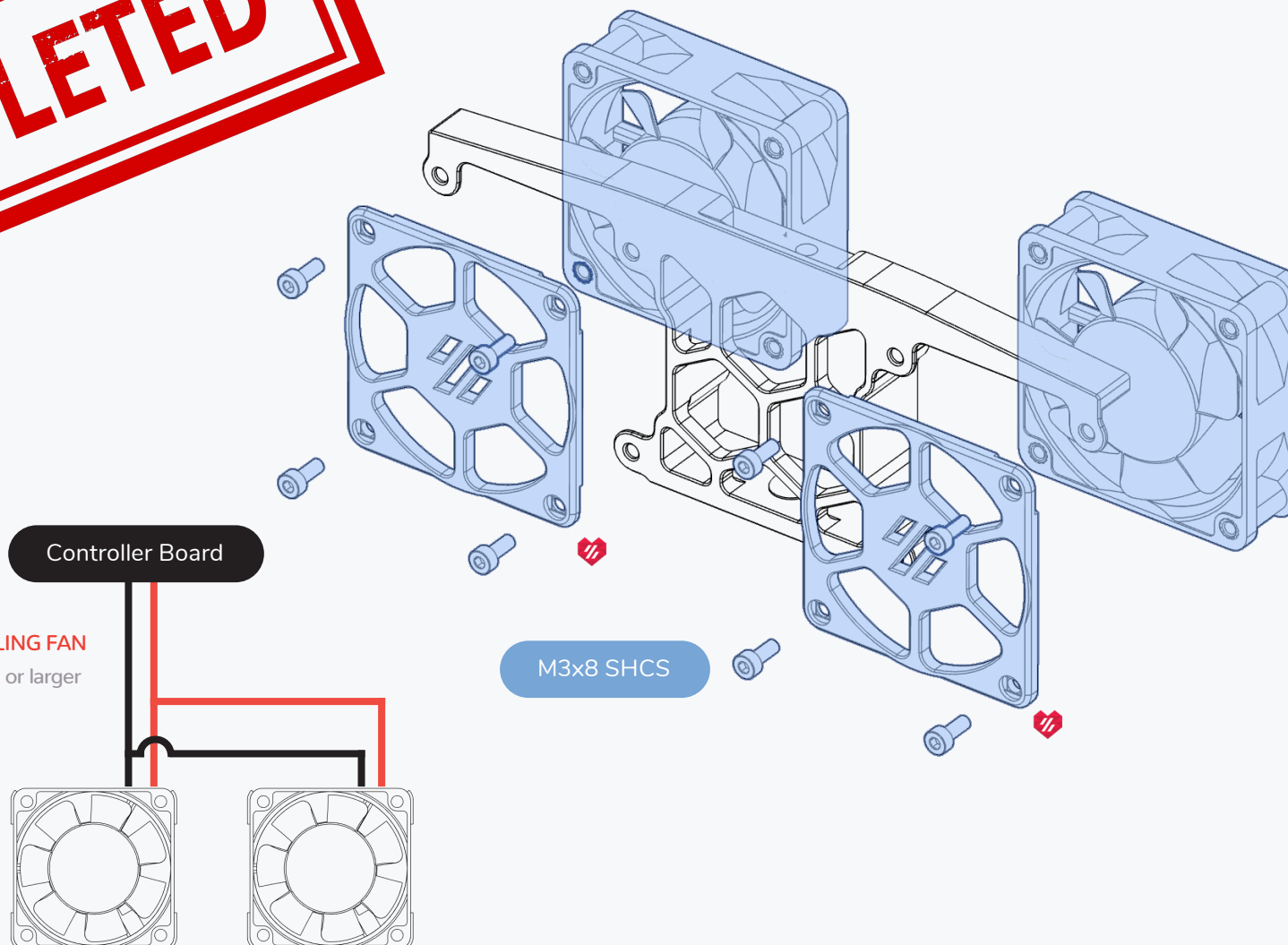
SKIRTS

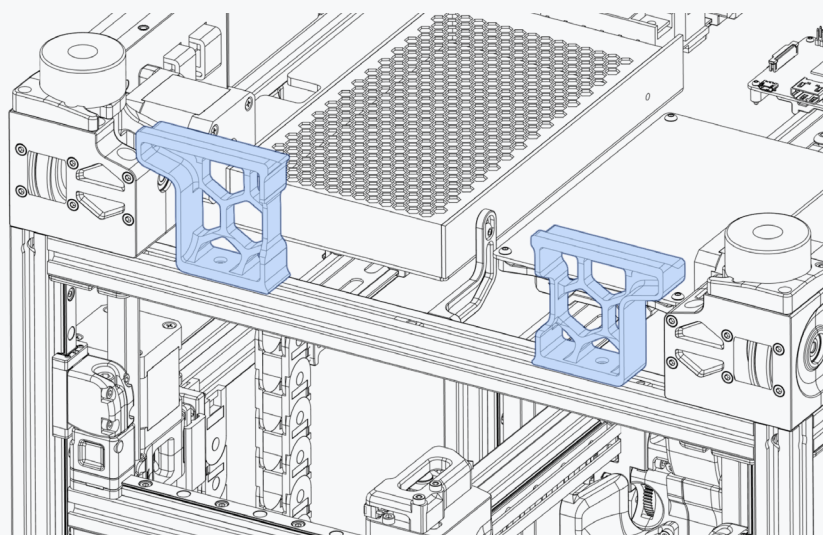
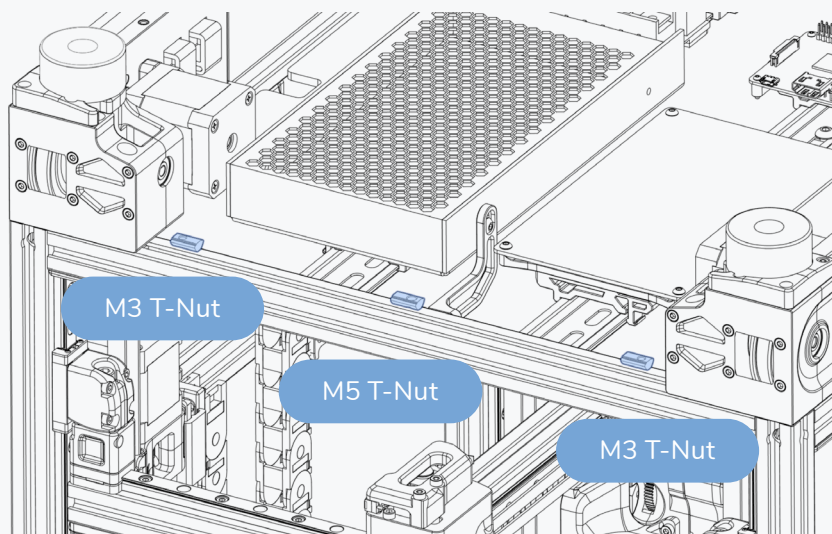
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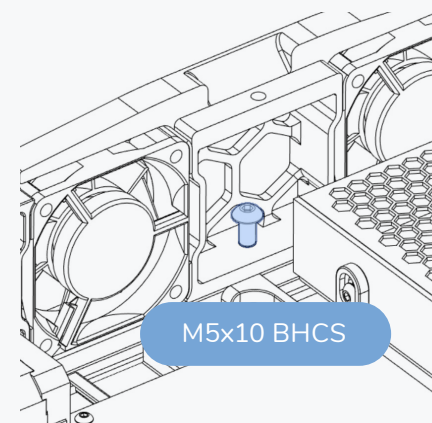
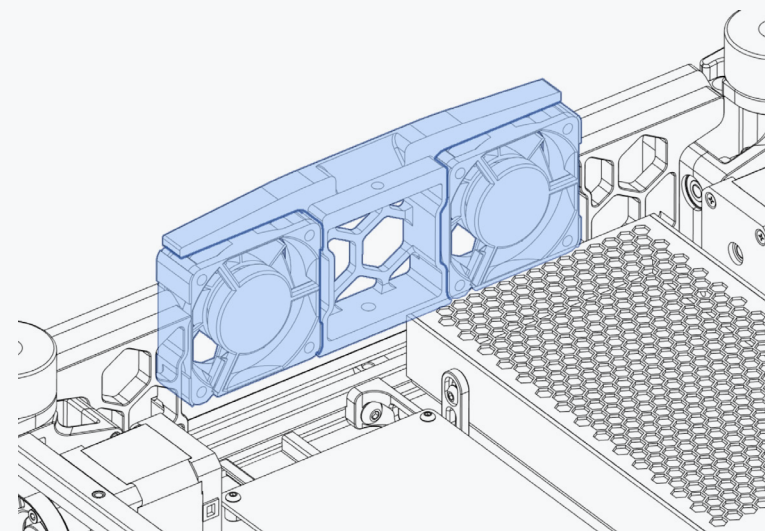
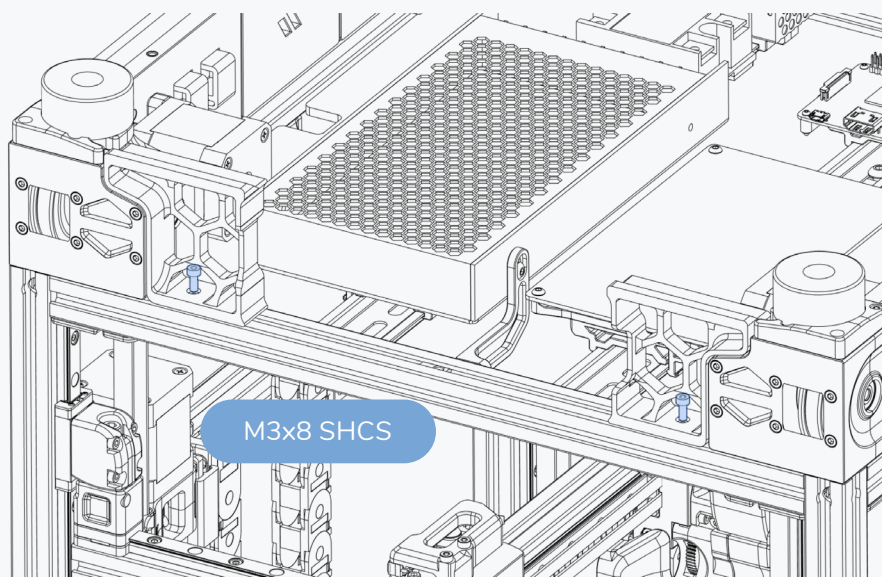
ELECTRONICS COOLING FAN
2x 0.25mm²(AWG24) or larger





SKIRTS

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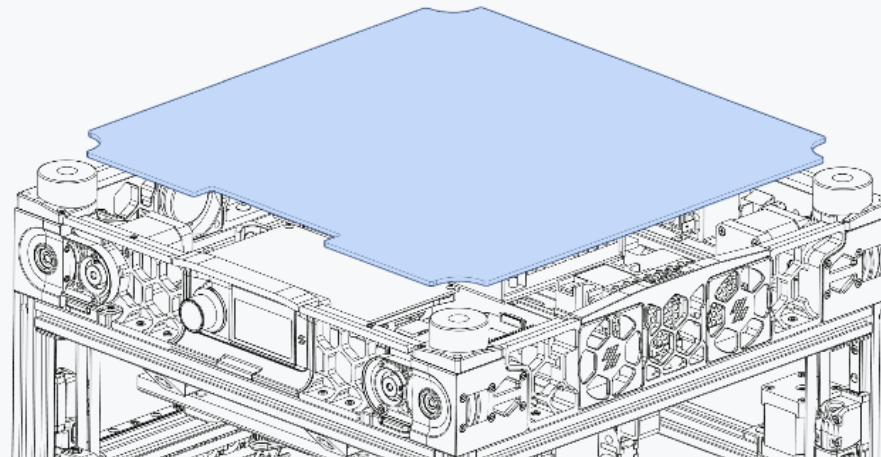
BOTTOM PANEL

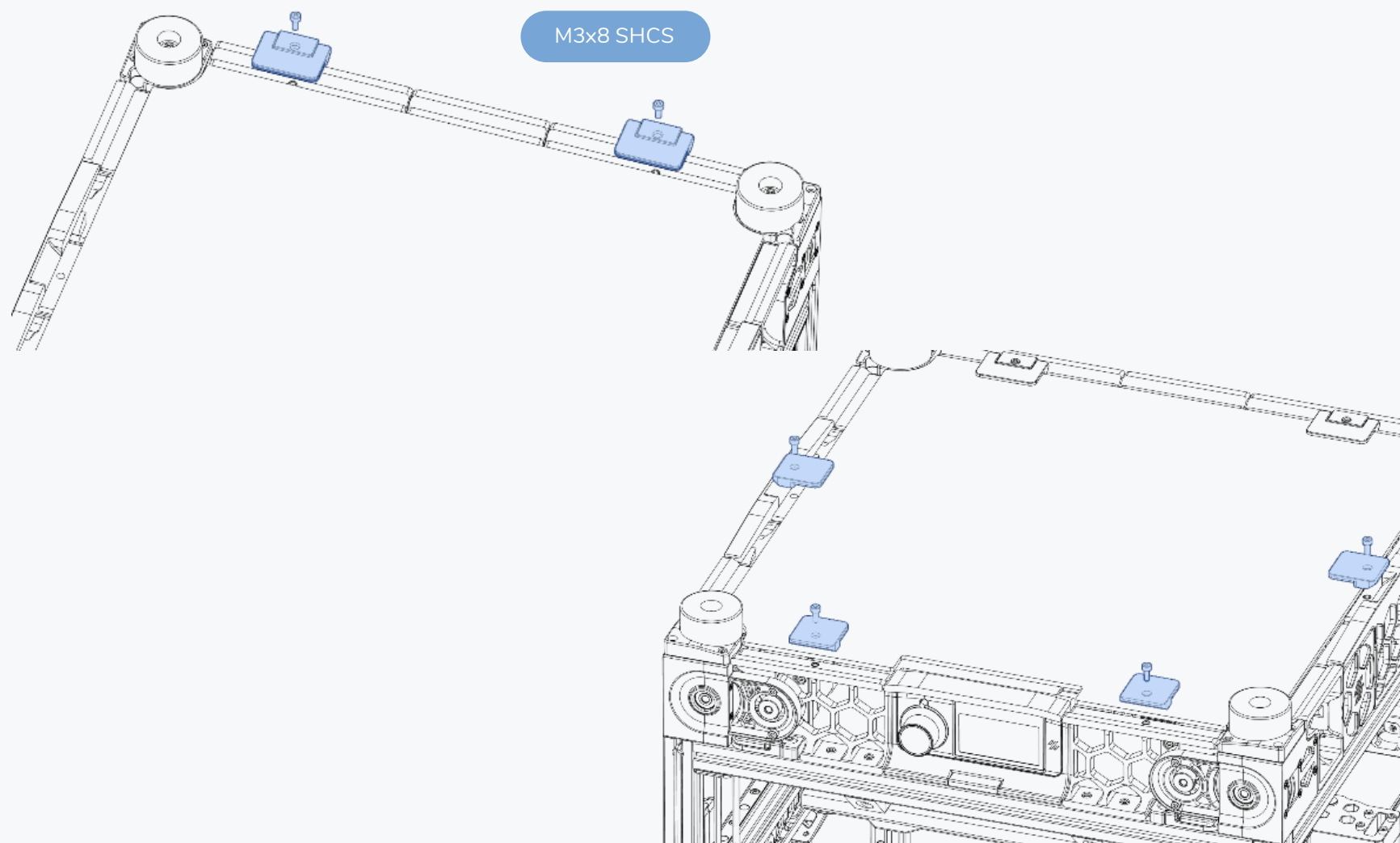
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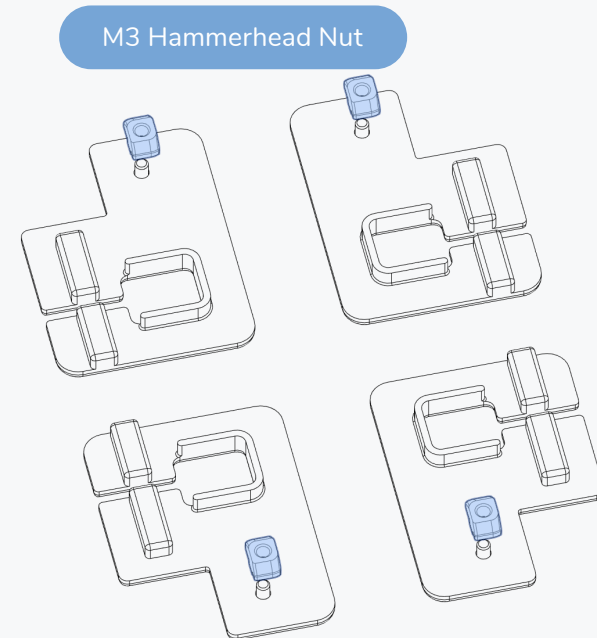
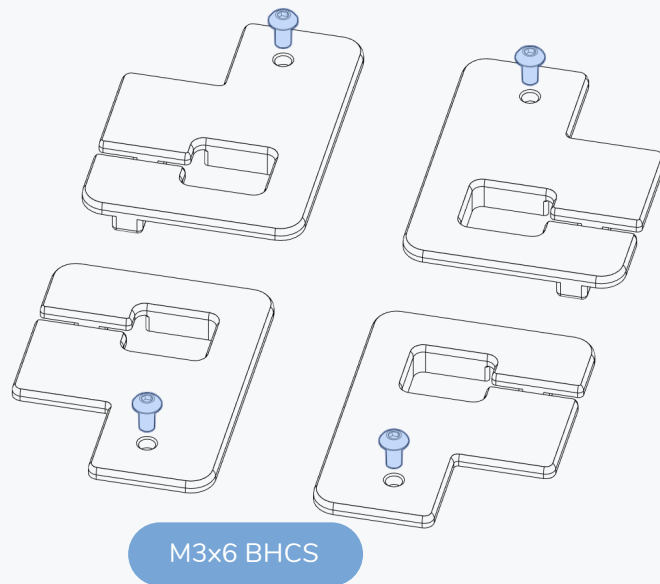


APPLY VHB TAPE

VHB Tape is a double sided adhesive tape.

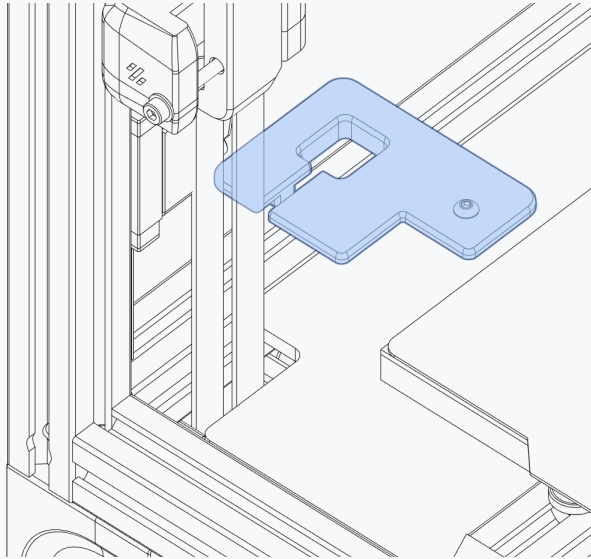






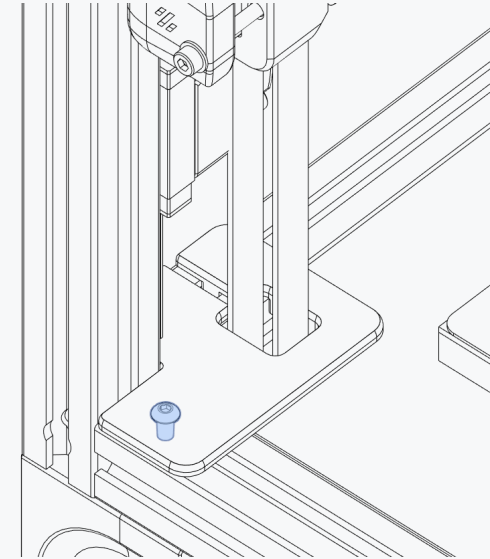
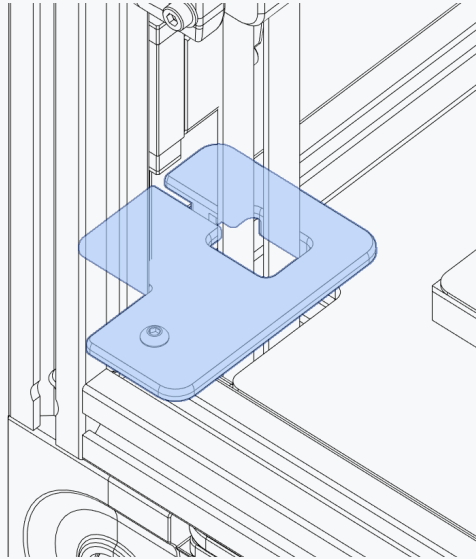
Z BELT COVERS

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PINCH BELT

Pinch the Z belt loop flat and slide the cover in place.

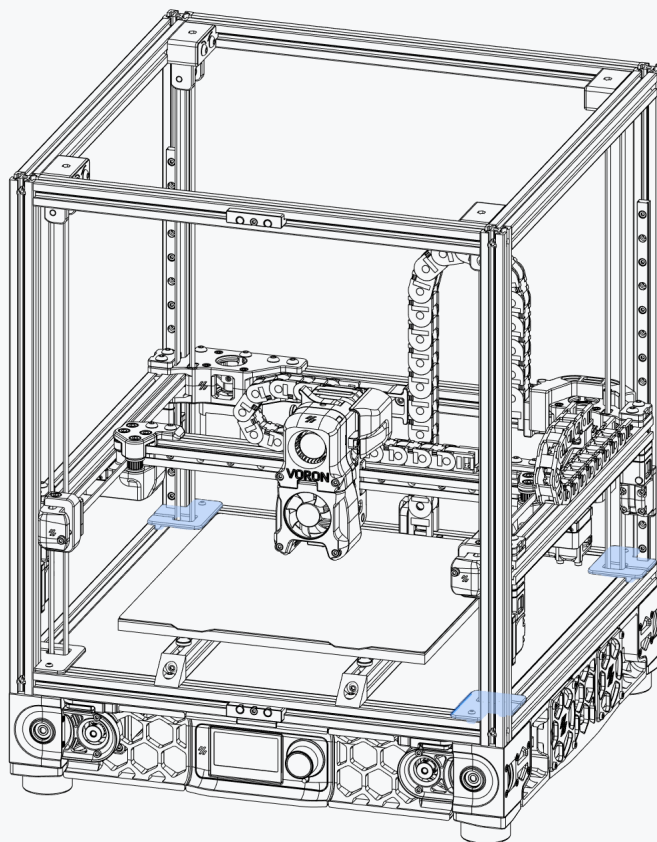


TURN TO FASTEN

The hammerhead nut will rotate and lock into place when you fasten the screw. At least that's the theory.

Z BELT COVERS

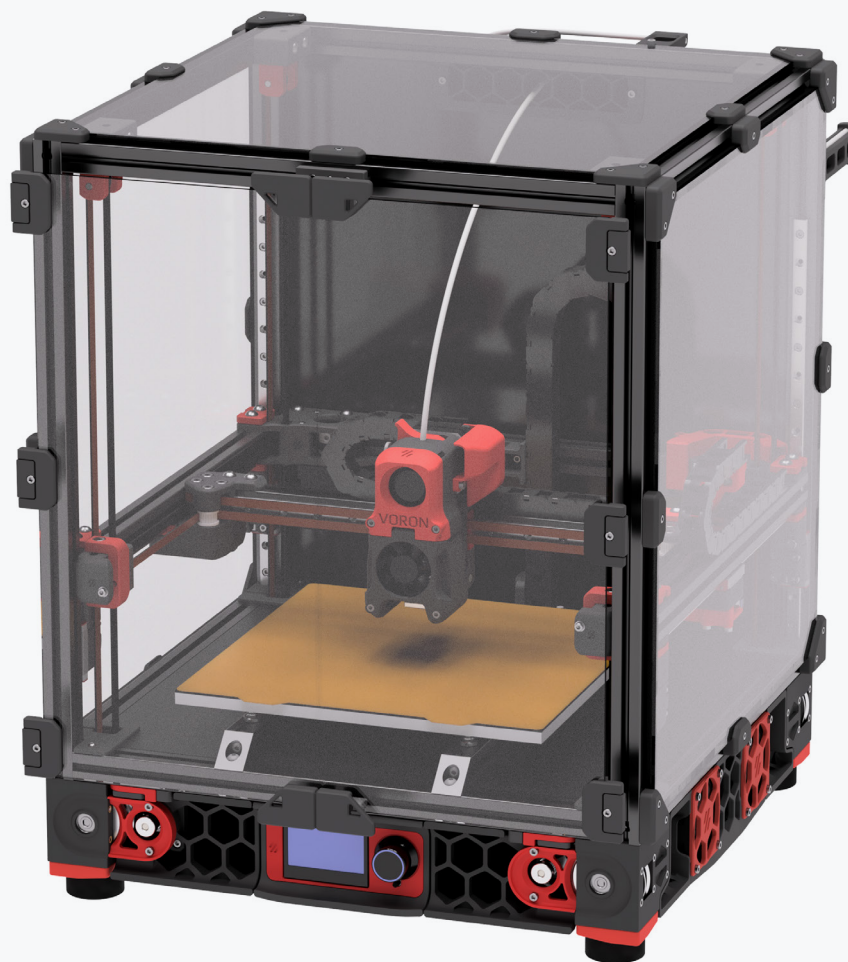
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REPEAT FOR REMAINING COVERS

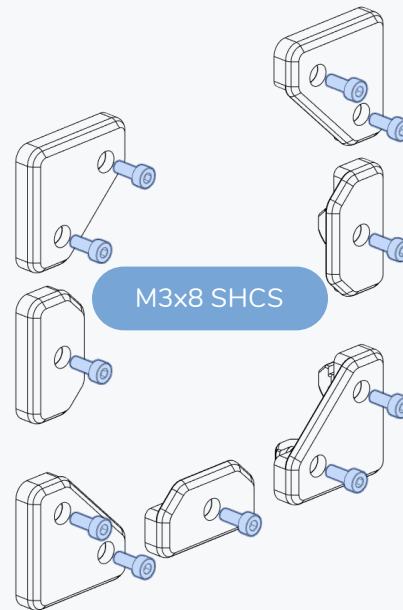
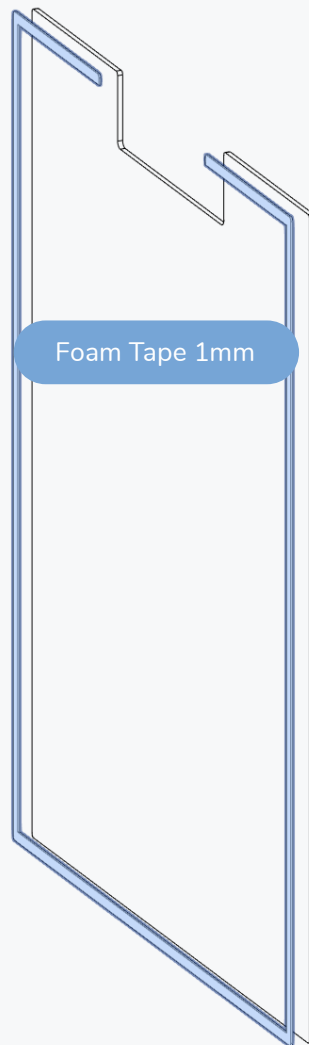
Repeat the assembly steps and install the remaining 3 covers.

Voron2.4 was released on May 13 2020. Between the releases of 2.4 and 2.4R2 over 2500 Voron2 printers have been build and serialized.



BACK PANEL

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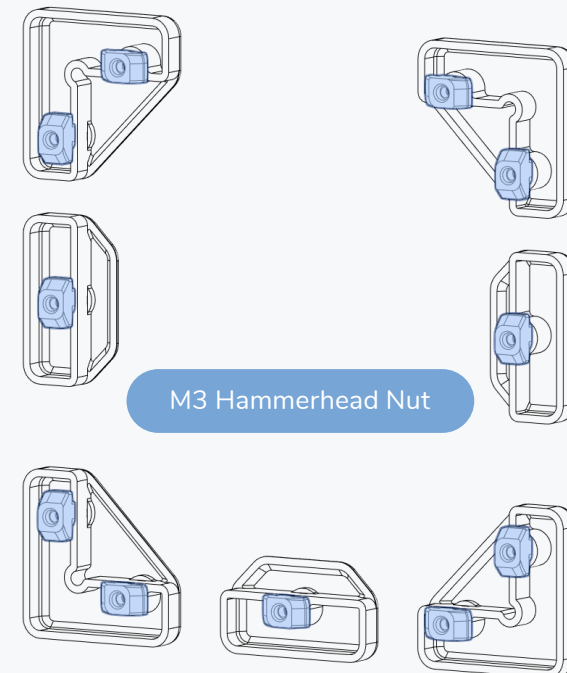


APPLY FOAM TAPE

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

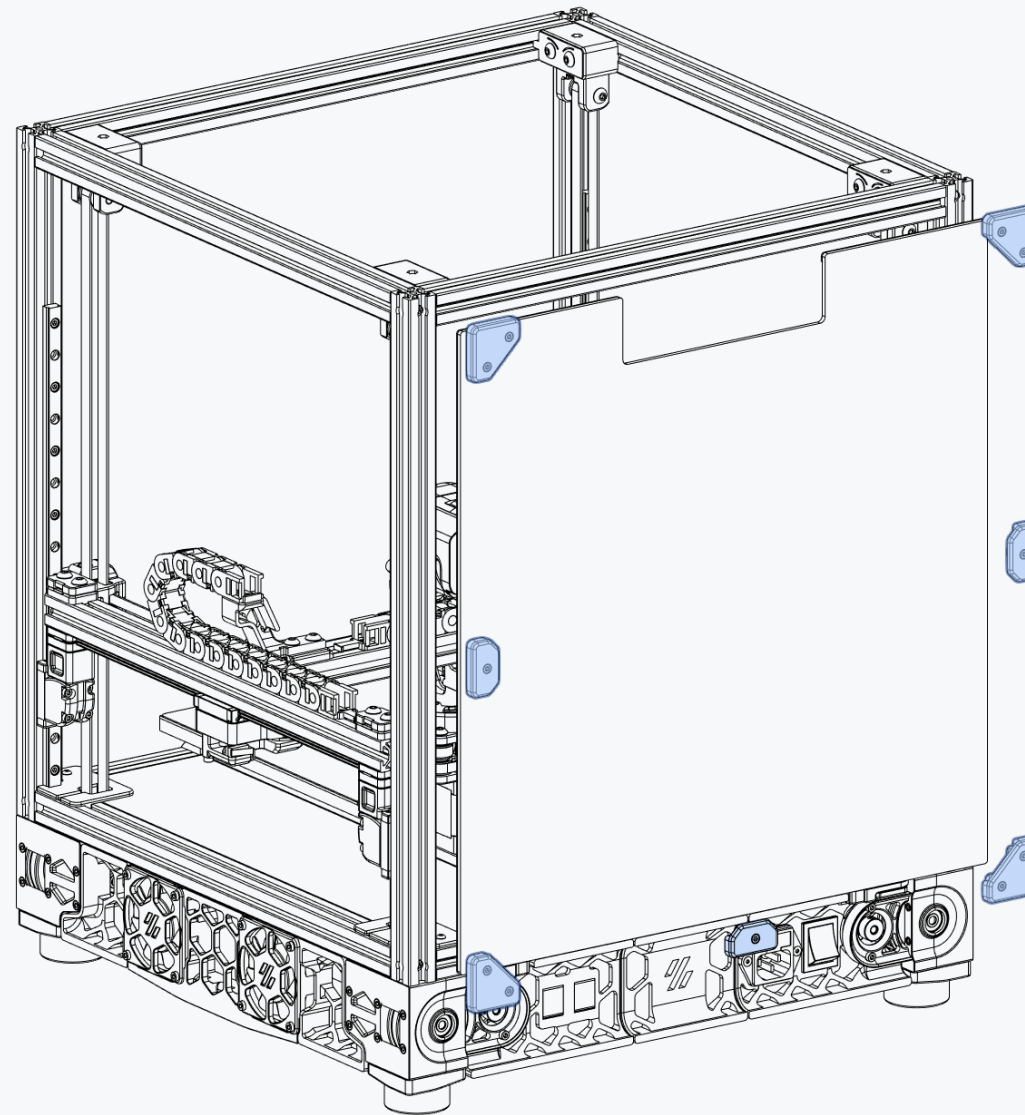
HAMMERHEAD NUTS?

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.



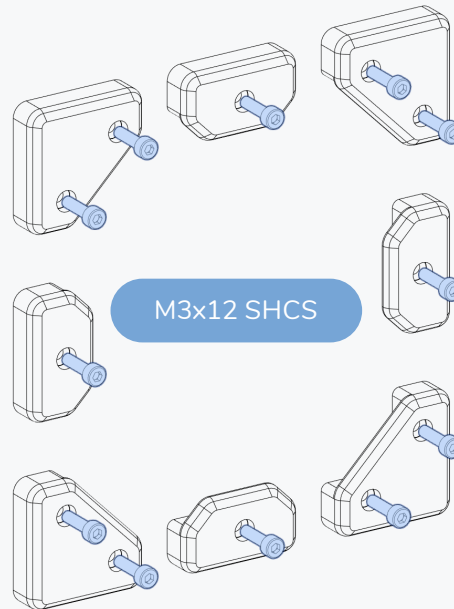
BACK PANEL

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SIDE PANELS

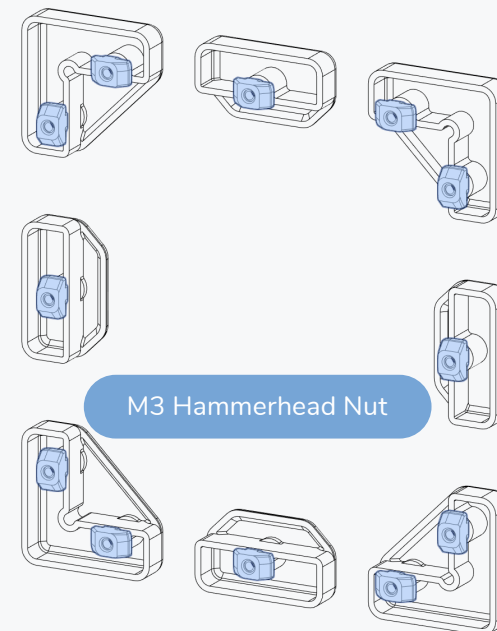
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APPLY 3MM FOAM TAPE

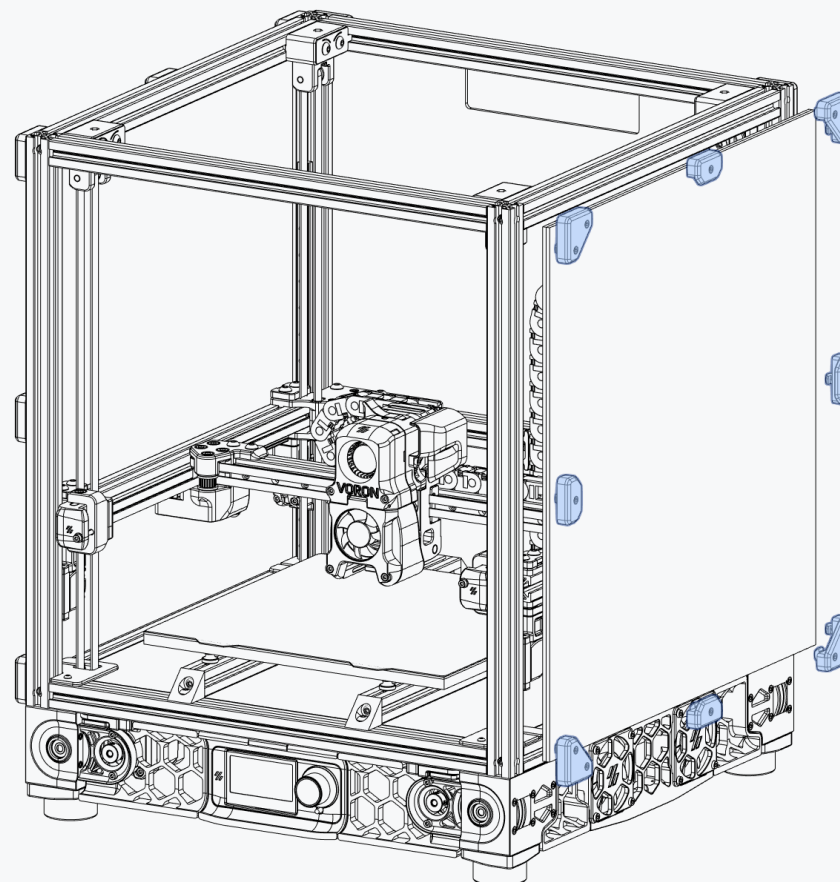
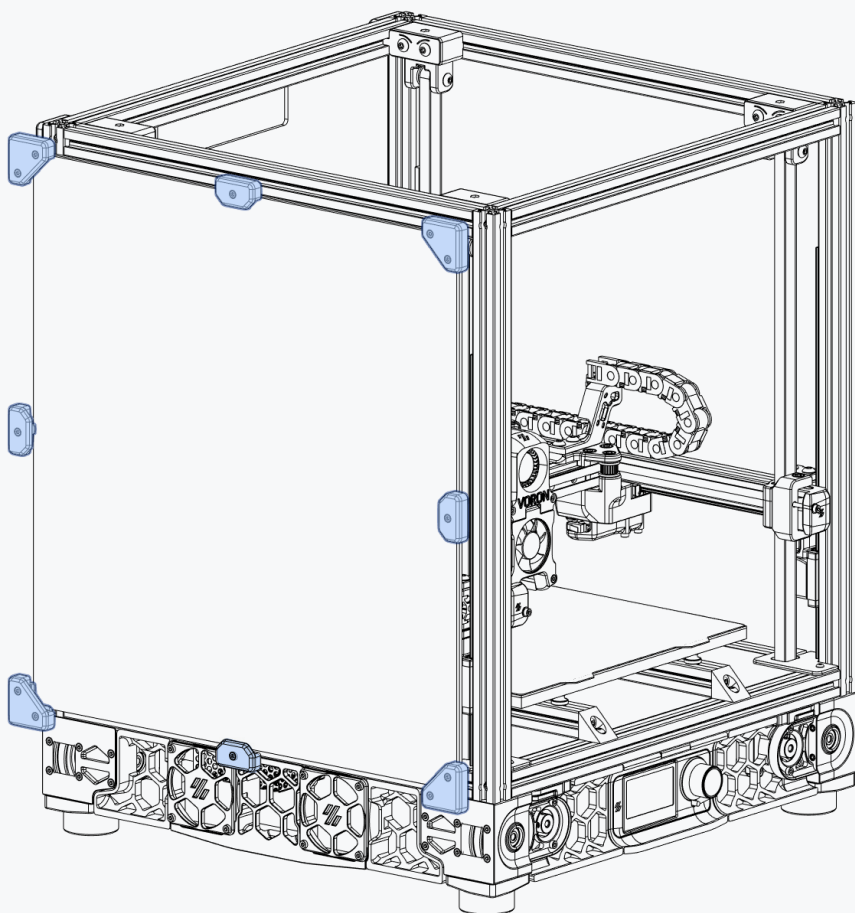
Use foam tape on the contact areas between the panels and the frame to mitigate noise from vibrations.

The 3mm foam tape is used on the side panels to prevent the gantry from rubbing on the panels.



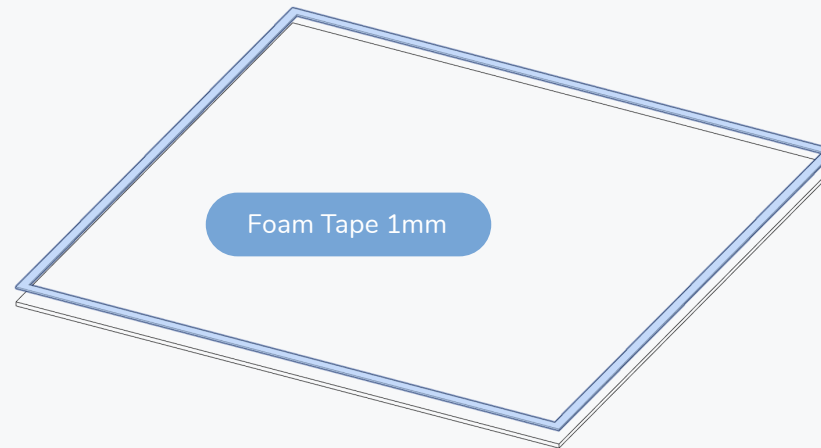
SIDE PANELS

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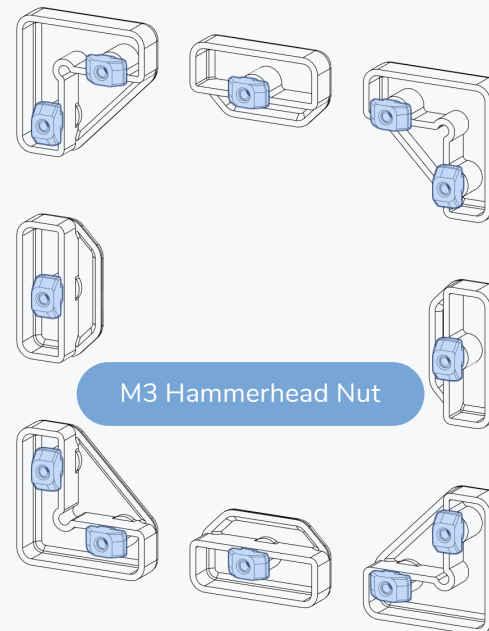
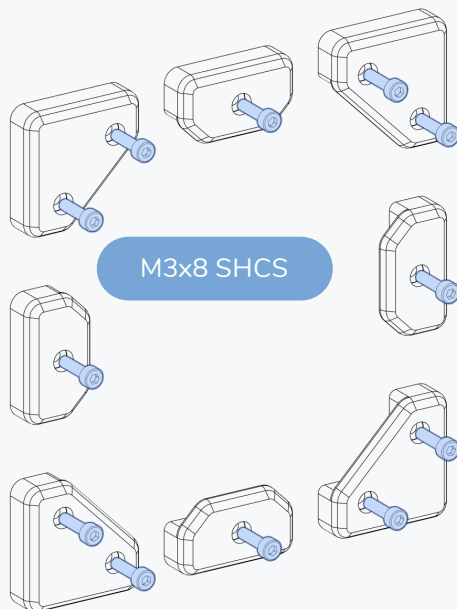
TOP PANEL

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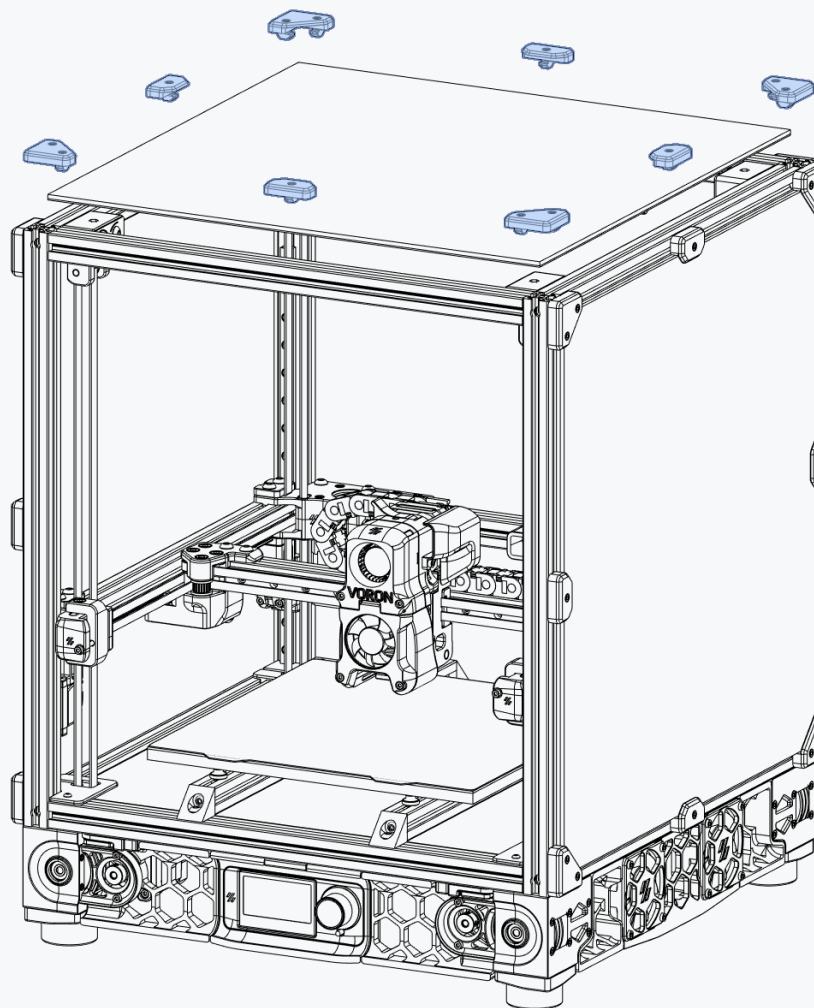
APPLY FOAM TAPE

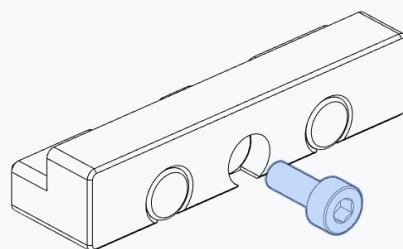
Use foam tape on the contact areas between the panels and the frame to mitigate noise from vibrations.



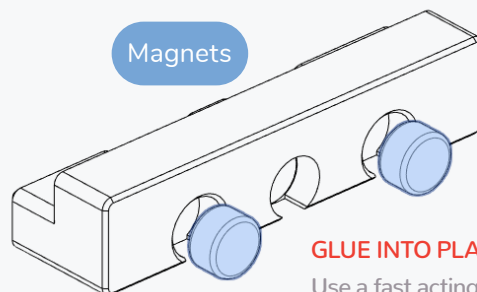
TOP PANEL

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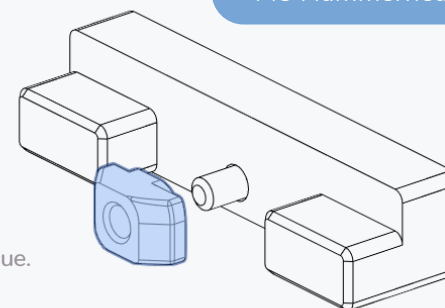
M3x8 SHCS



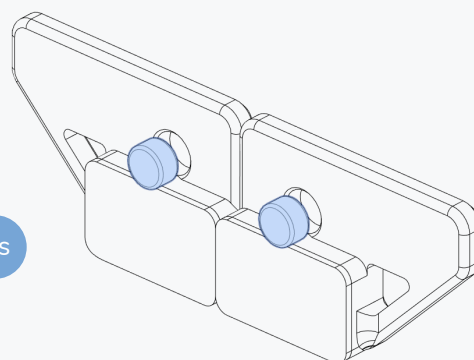
Magnets

GLUE INTO PLACE

Use a fast acting glue like super-glue.



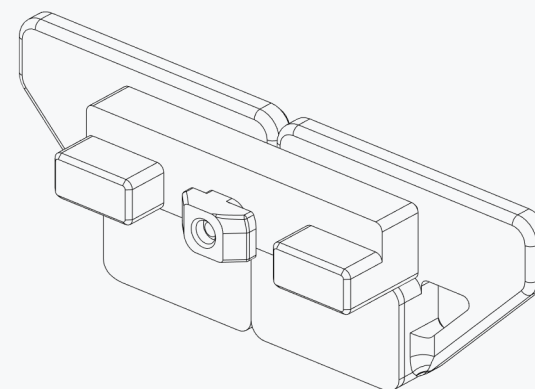
M3 Hammerhead Nut

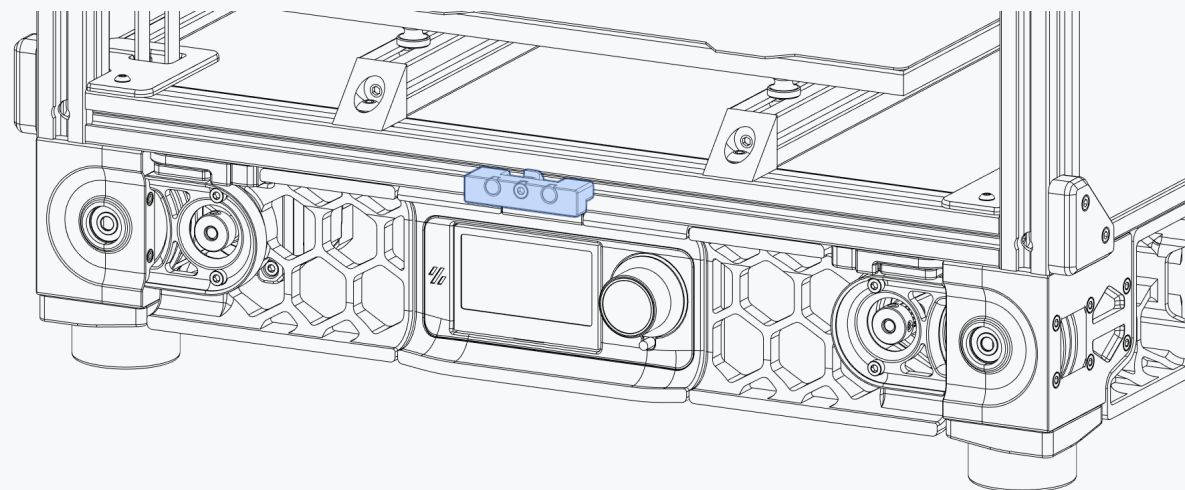
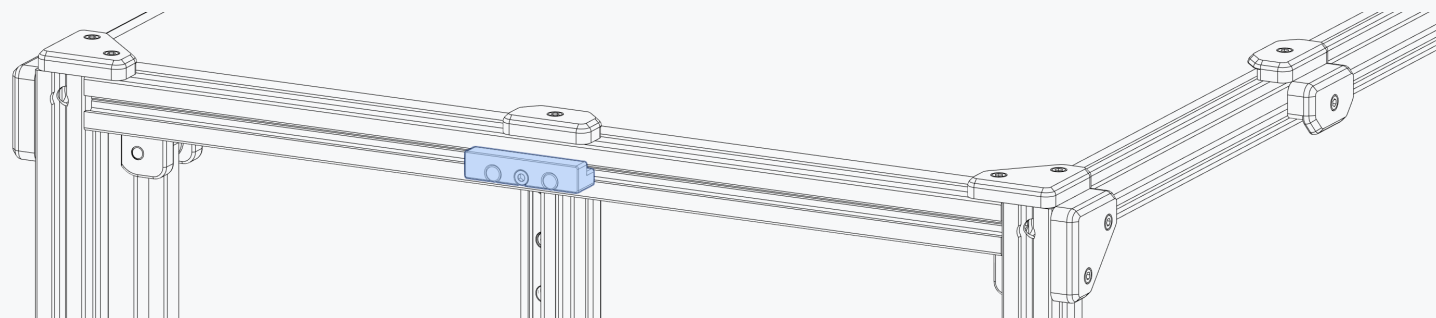


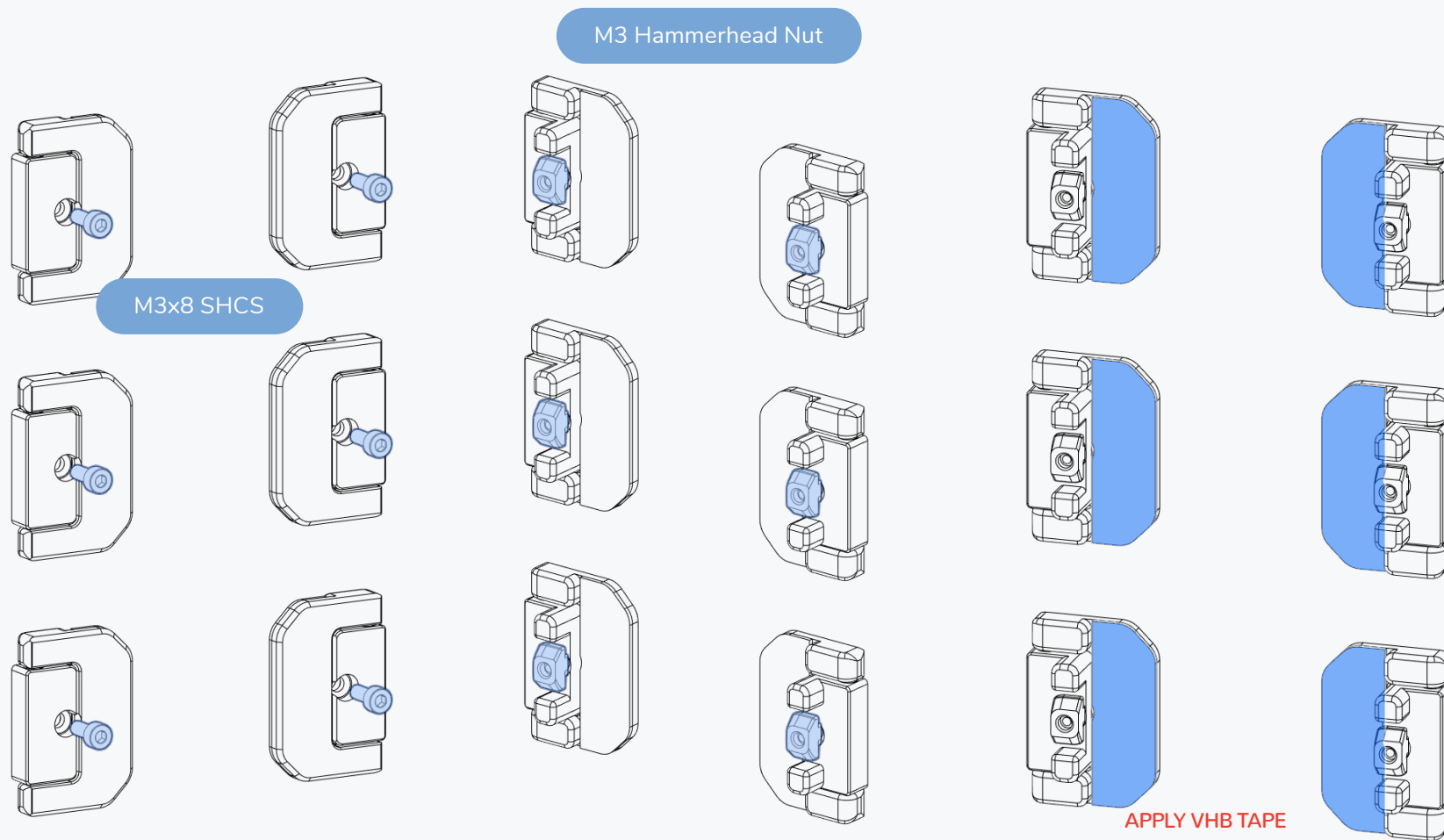
Magnets

MIND THE MAGNET POLARITY

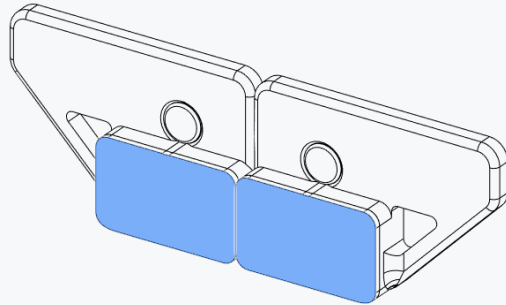
Ensure that the magnets are facing in the right direction prior to gluing them into place.



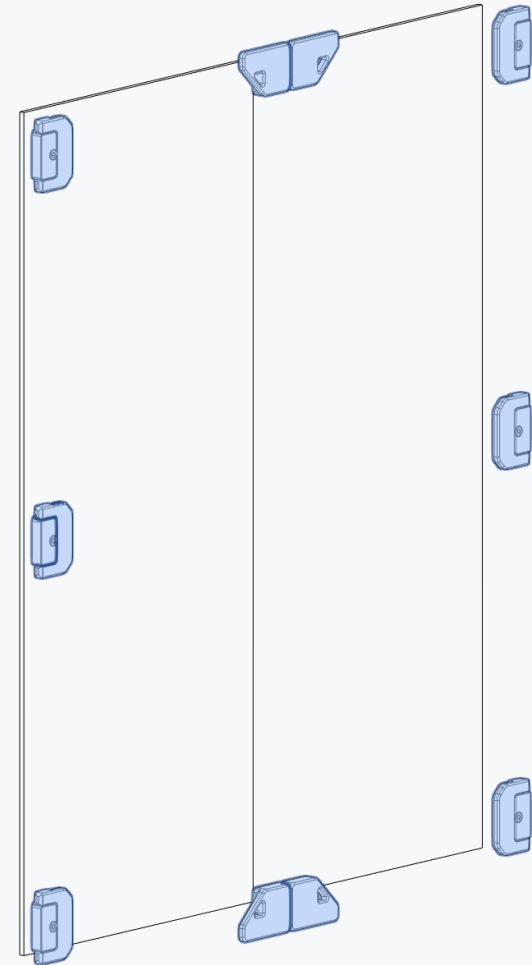
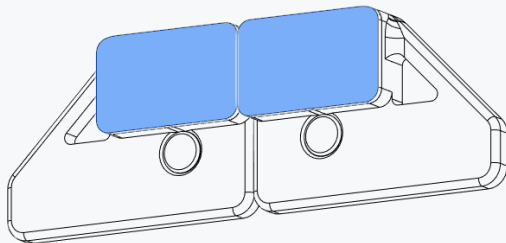


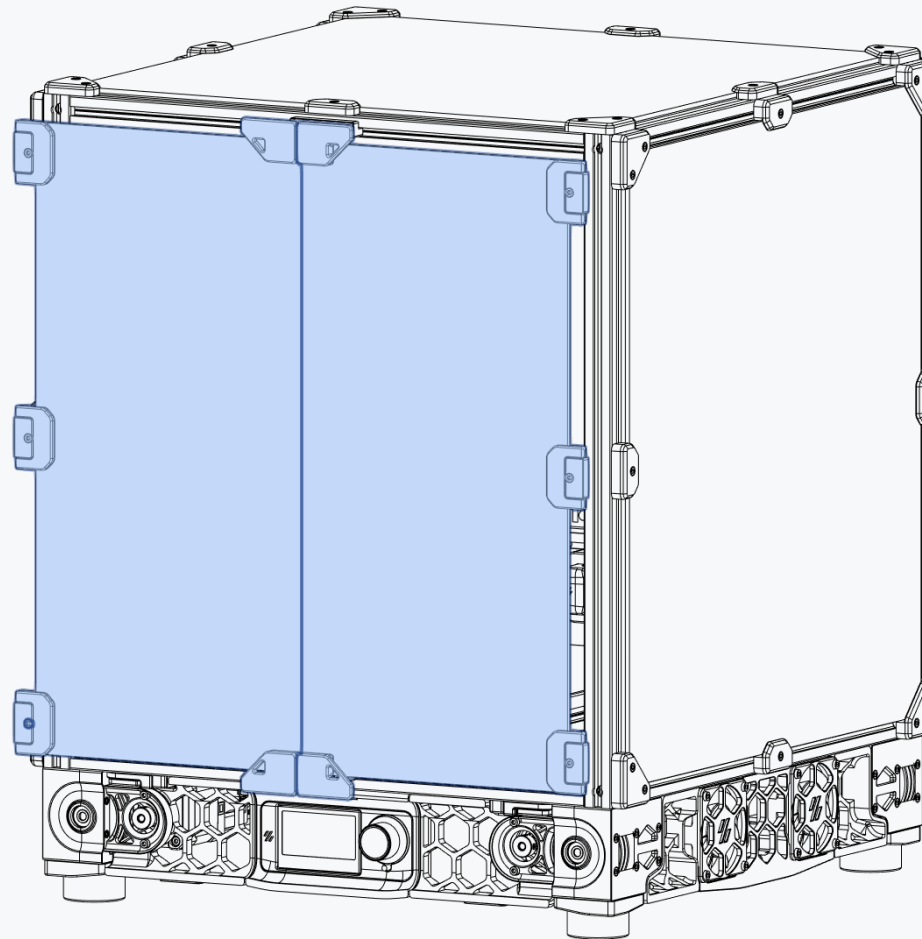


VHB Tape is a double sided adhesive tape .

**APPLY VHB TAPE**

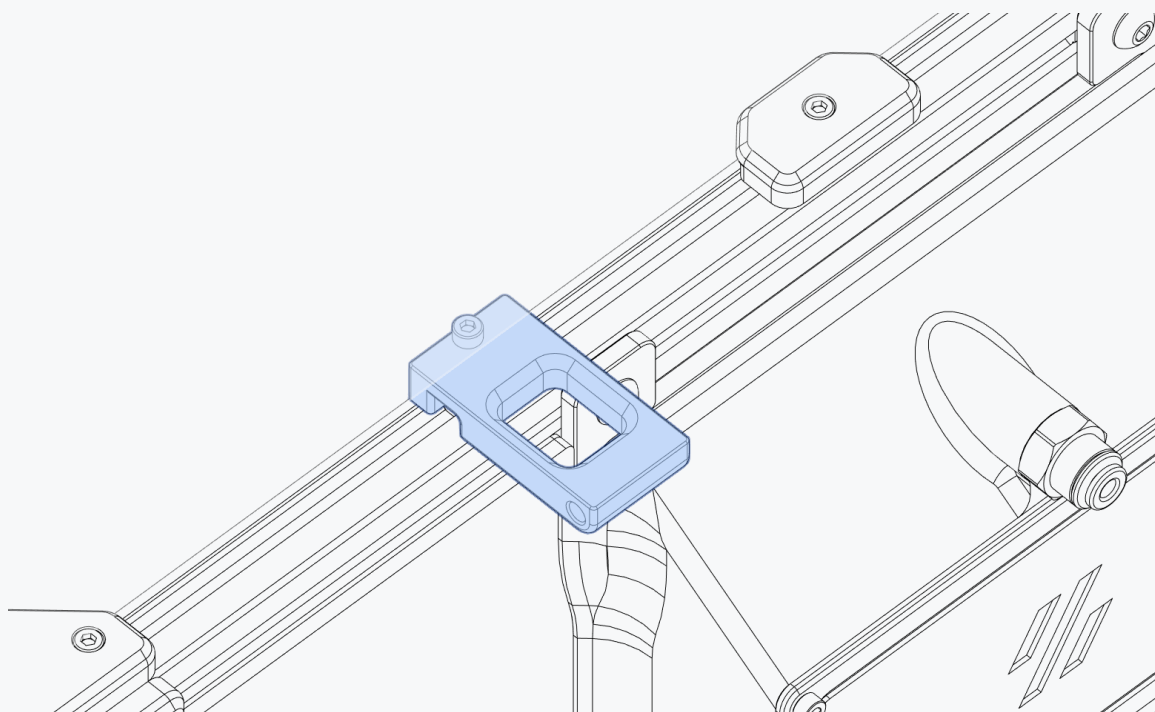
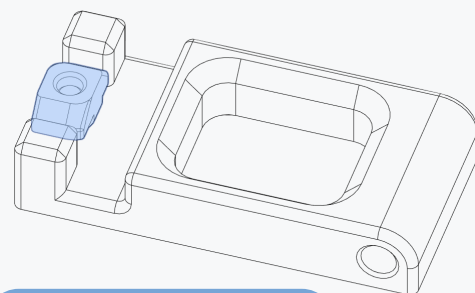
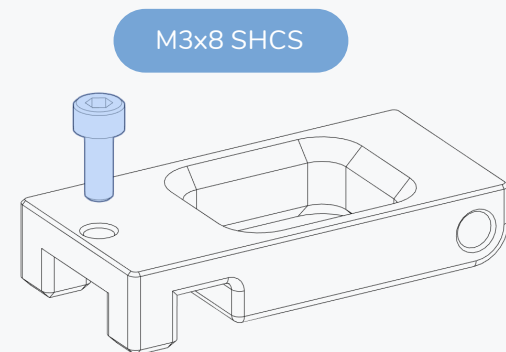
VHB Tape is a double sided adhesive tape.





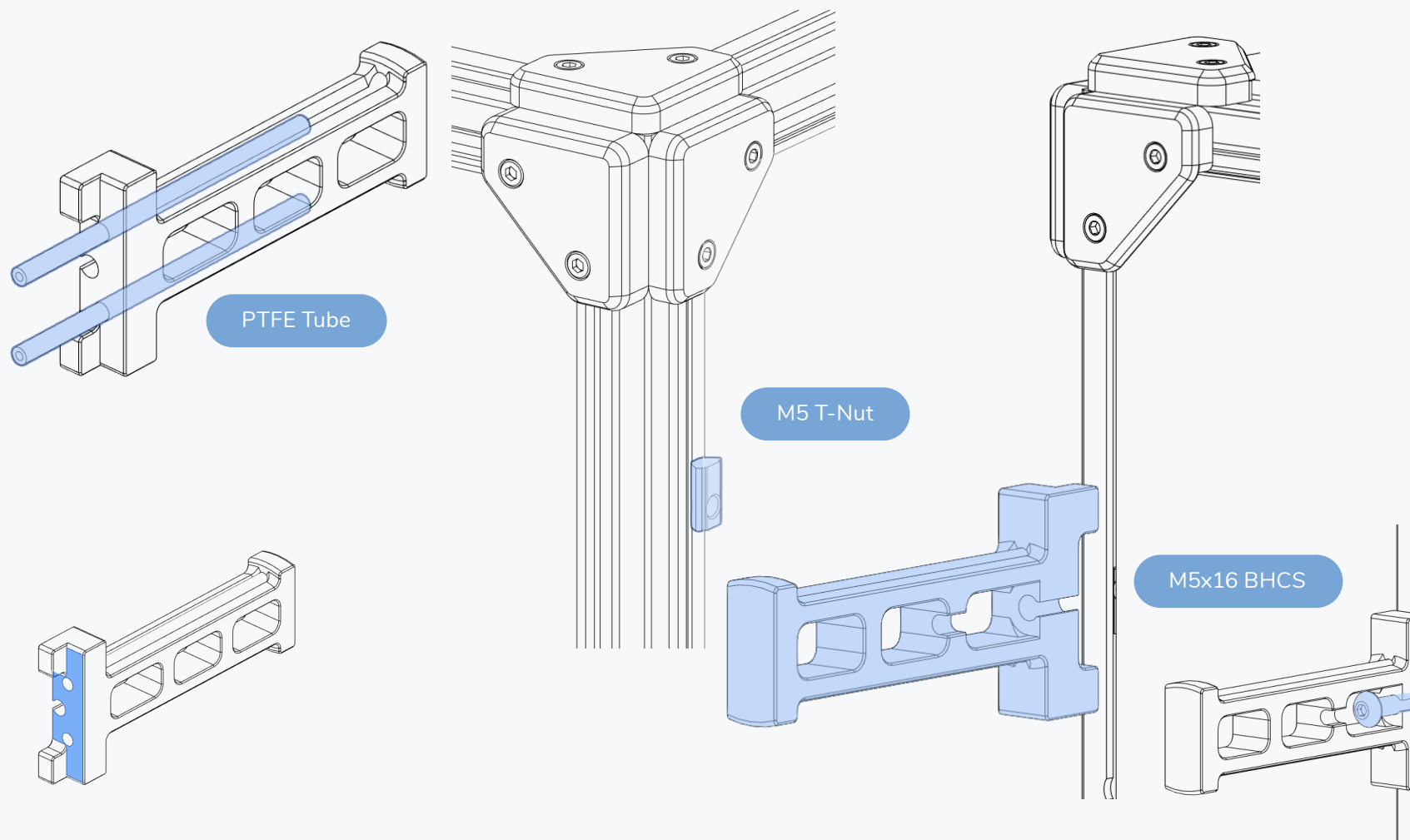
SPOOL HOLDER

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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-2>
<https://github.com/leктор/Voron-V2.4>

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://discord.gg/guZ7prmEN8>



<https://www.reddit.com/r/VORONDesign> <- for help
<https://www.reddit.com/r/voroncorexy> <- for serial requests

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-2/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.

Enjoy your printer.
With Love, From Lecktor



Website
www.vorondesign.com

Github
github.com/vorondesign

Docs
docs.vorondesign.com

Discord
discord.gg/voron

