



SWITCHWIRE ASSEMBLY MANUAL

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

VERSION 2021-11-26

INTRODUCTION WWW.VORONDESIGN.COM



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

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

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

Most of all, good luck!

THE VORON TEAM

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PART PRINTING GUIDELINES

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

3D PRINTING PROCESS

Fused Deposition Modeling (FDM)

MATERIAL

ABS

LAYER HEIGHT

Recommended: 0.2mm

EXTRUSION WIDTH

Recommended: Forced 0.4mm

INFILL TYPE

Grid, Gyroid, Honeycomb, Triangle or Cubic

INFILL PERCENTAGE

Recommended: 40%

WALL COUNT

Recommended: 4

SOLID TOP/BOTTOM LAYERS

Recommended: 5

PRINT IT FORWARD (PIF)

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

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

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HOW TO GET HELP

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



https://discord.gg/voron

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 be sometimes be easier to follow along when you have the whole assembly in front of you.

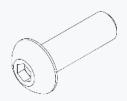


https://github.com/vorondesign



https://docs.vorondesign.com/

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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



FLAT HEAD COUNTERSUNK SCREW (FHCS)

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

ISO 10642



SOCKET HEAD CAP SCREW (SHCS)

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

ISO 4762



PULLEY

GT2 pulley used on the motion system of the Voron.



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



SHIM

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

DIN 988

HARDWARE WWW.VORONDESIGN.COM



F695 BEARING

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



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

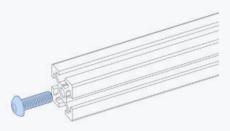
Nut that can be inserted into the slot of an aluminium profile. Used in both M3 and M5 variants throughout this guide.

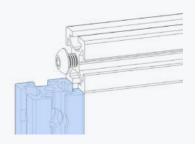


SELF TAPPING SCREW

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

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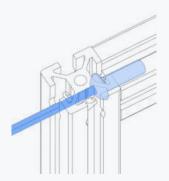
BLIND JOINT BASICS

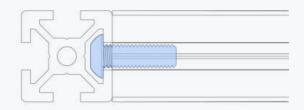
Blind Joints provide a cost effective and rigid assembly method.

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



https://voron.link/onjwmcd

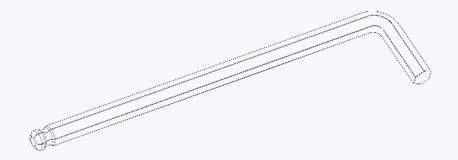




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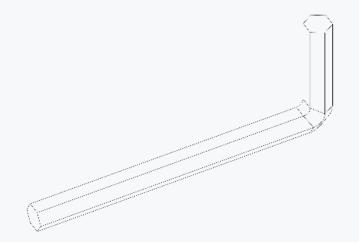
BALL-END DRIVER

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



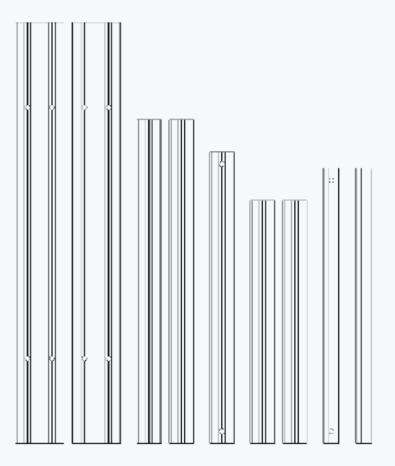
2.5MM HEX DRIVER

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.



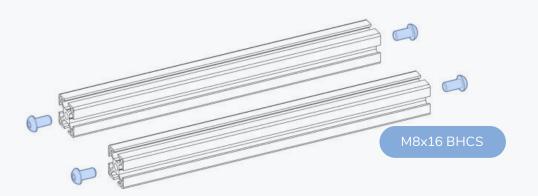


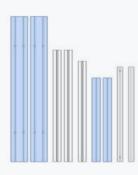
EXTRUSIONS WWW.VORONDESIGN.COM



GETTING EXTRUSIONS TOGETHER

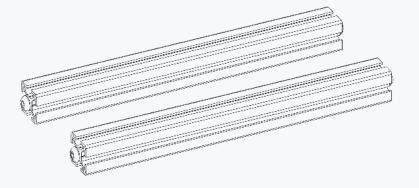
Separate the extrusions you're going to need for this section of the build. We've laid out all the parts you should have and highlighted the ones that will be used in the following sections.

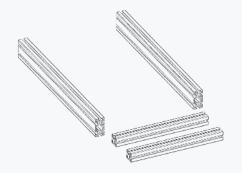




BLIND JOINT BASICS

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 other extrusion.





FIRST BLIND JOINT

This design relies on blind joints to assemble the frame. We outlined the basics of blind joints on page 8.

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



https://voron.link/onjwmcd

UPSIDE DOWN ASSEMBLY

For ease of assembly we often recommend to assemble components upside down.

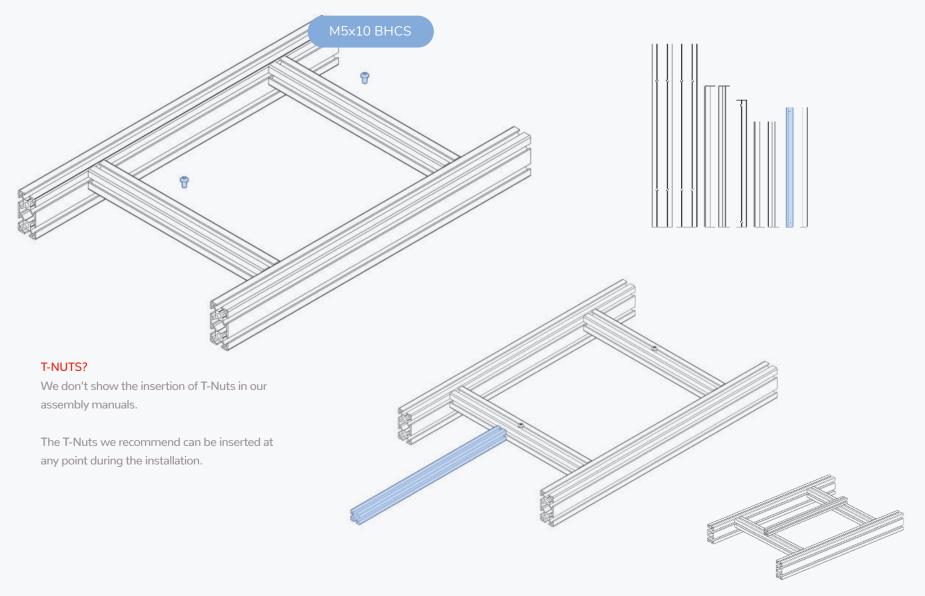
Assemble on a flat surface to ensure that the base is square.

BUILD ON A FLAT SURFACE

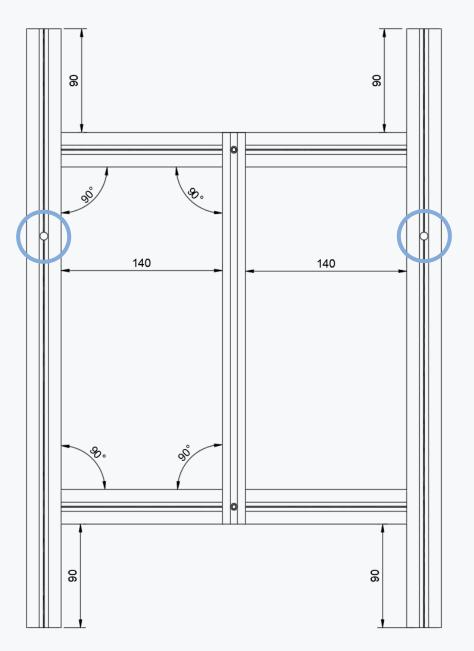
Build the frame on a glass or granite surface to ensure you can get it as square as possible.

BLIND JOINT ACCESS HOLES

Use the access holes to fasten the bolts.



FRAME



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VERIFY DIMENSIONS

Make sure the frame is square and that all positions are set correctly before moving on.

Check the 90° angles with a machinist square.

MIND ACCESS HOLE POSITION

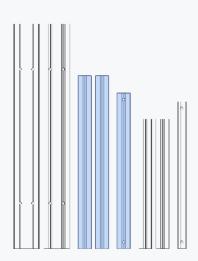
We do our best to call out things that may bite you later in the assembly process but may skip things that seem obvious to us. If in doubt please refer to the CAD model, it might save you some considerable time down the road.

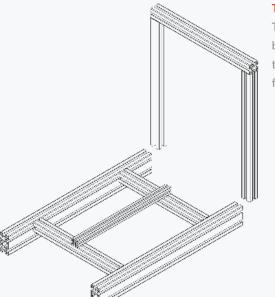




BUILD ON A FLAT SURFACE

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





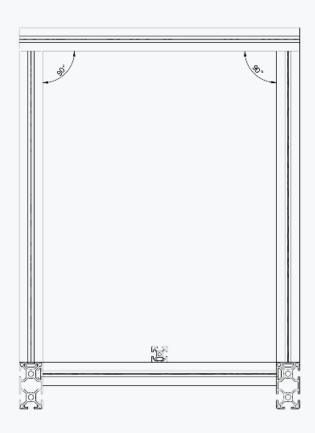
TILT FRAME 90°

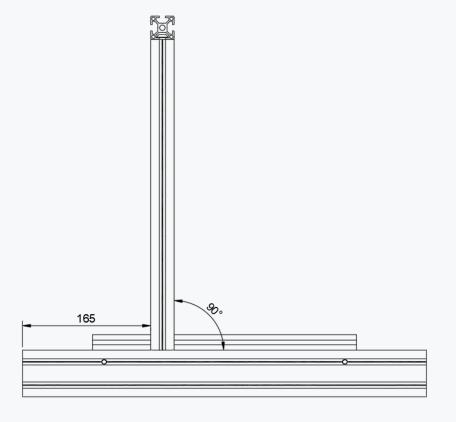
The access holes for the Blind Joints are at the bottom. Lay the frame flat on it's side to access them. This also helps in mounting the uprights flush to the base.

VERIFY DIMENSIONS

Check the corners and make sure that they are at 90° angles. Use a small machinist square. If you have the measuring equipment verify that both uprights are dead on parallel.

Correct the angle is required. Failure in doing so may result in a sticky Z Axis.

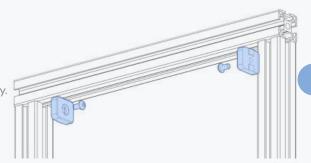




MIND THE CARRIAGE

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.



M5x10 BHCS

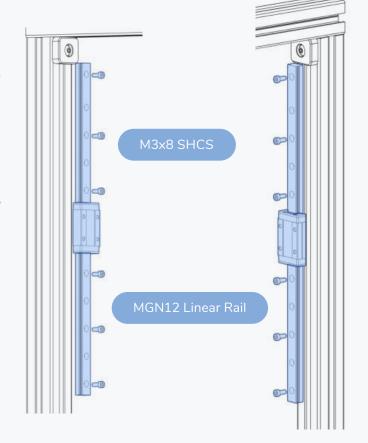
NO STOPPER ON LEFT RAIL

The left rail does not have a stopper in place to prevent the carriage from sliding off the rail. Some rails come with little plastic stop pins, you can leave the bottom one in place.

If your rail does not have these stop pins leave the last bolt slightly loose to act as a stopper.

Tip: Mark the location with some tape to draw your attention to it later.

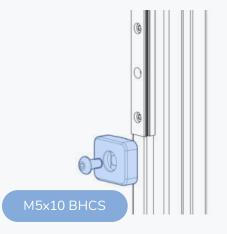






CENTERED RAIL INSTALLATION GUIDE

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



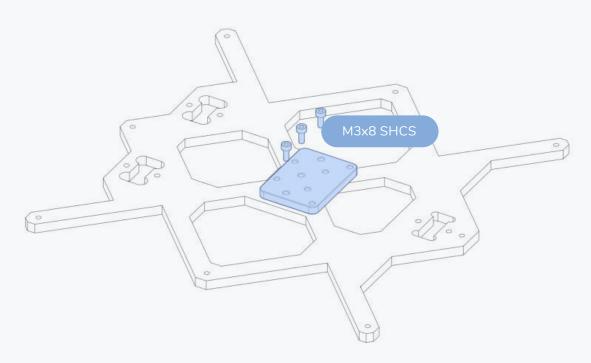
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Y AXIS WWW.VORONDESIGN.COM



BED CARRIAGE WWW.VORONDESIGN.COM



CARRIAGE MODIFICATION

If you sourced an unmodified carriage (e.g. a Prusa replacement part) you'll need to modify the hole pattern.

Temporarily mount the drill jig to the carriage.

Drill the 6 holes marked on the right with a 3mm or 3.2mm drill bit.

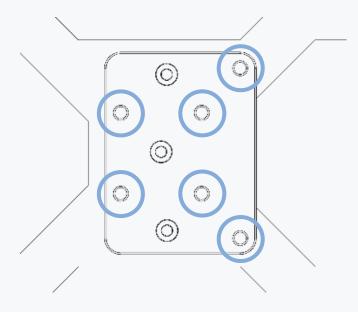
Remove the jig after you have drilled the holes.

FINISHED CARRIAGE

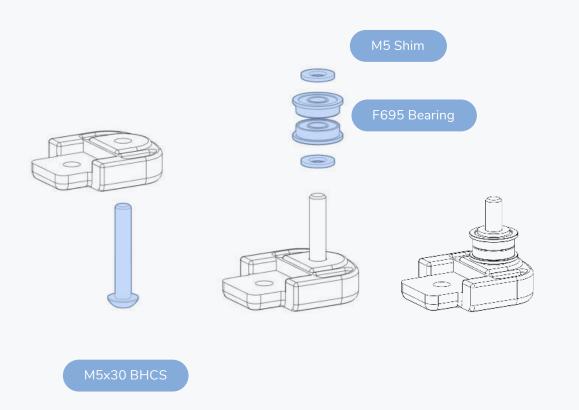


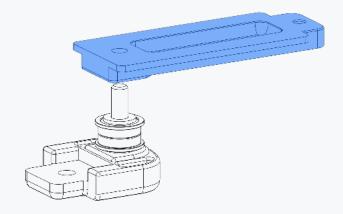
Some vendors offer carriages with the bolt pattern required for the Voron Switchwire.

If you sourced a premachined carriage you can skip this step.



Y IDLER WWW.VORONDESIGN.COM





DON'T OVER TIGHTEN

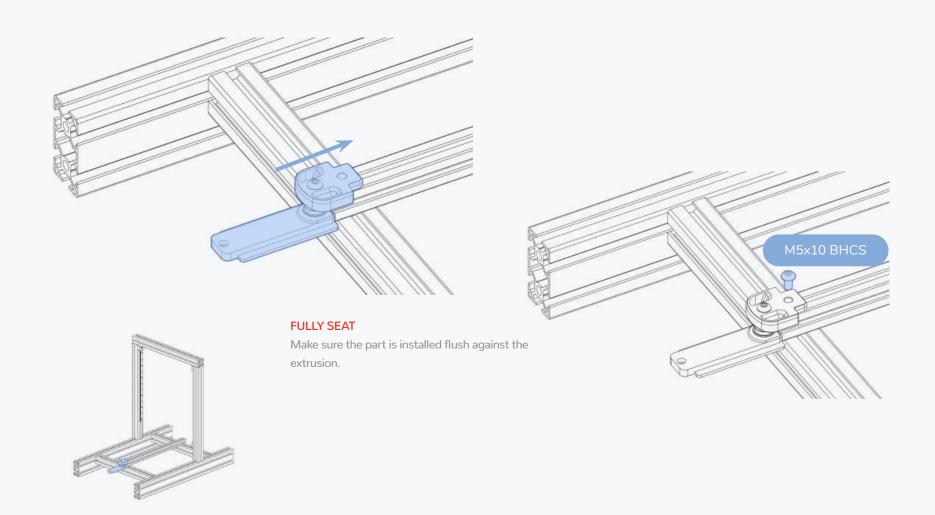
The M5 screws are threaded directly into plastic.

The plastic part has threads modeled into it.

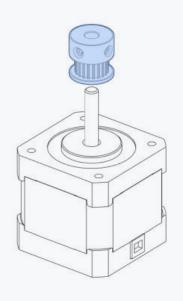
UPSIDE DOWN ASSEMBLY

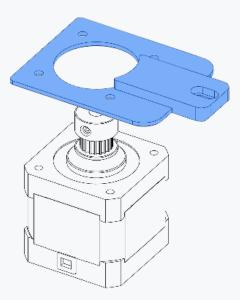
Why fight gravity if it can work for us.

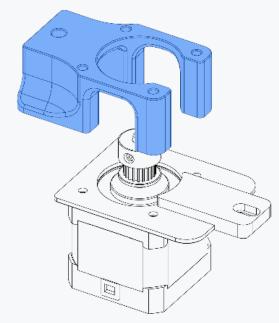
Y IDLER WWW.VORONDESIGN.COM

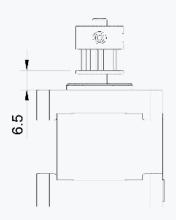


GT2 20T Pulley









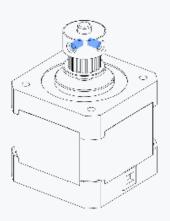
GRUB SCREWS

AKA THE ROOT OF ALL ISSUES

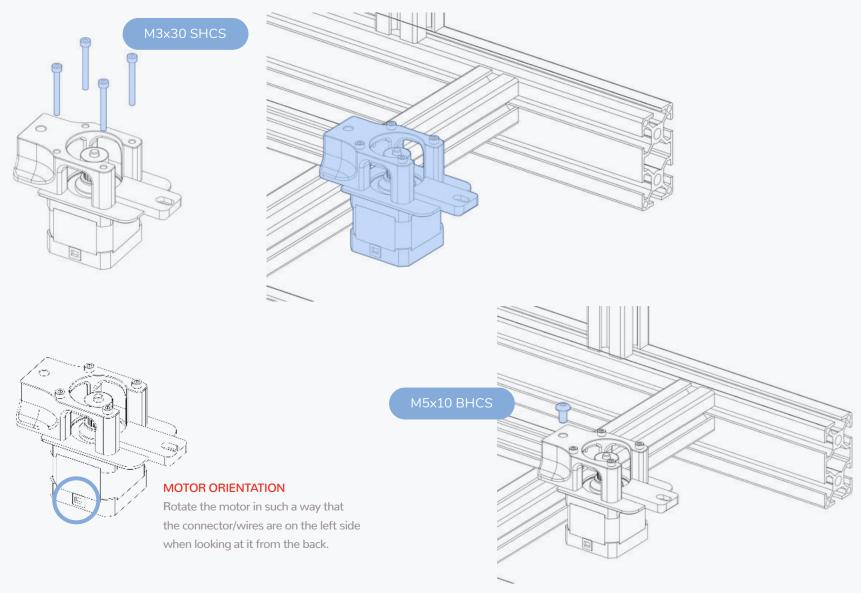
Use thread locker on all grub screws after you set their position.

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

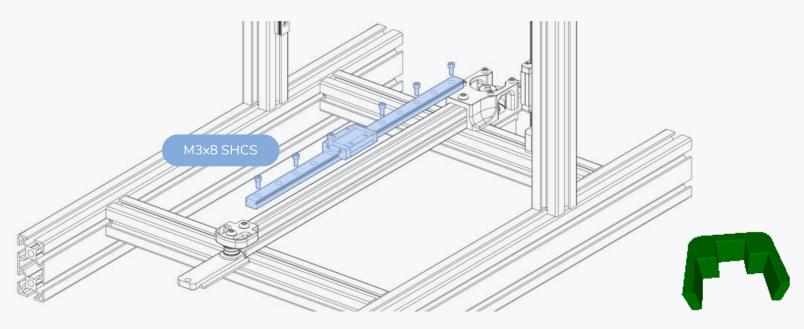
See the products application notes for instructions.



Y MOTOR WWW.VORONDESIGN.COM



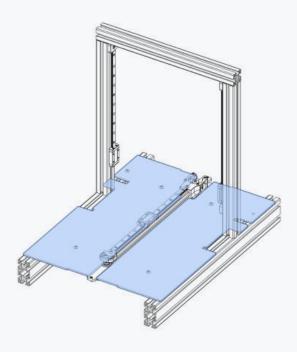
Y AXIS WWW.VORONDESIGN.COM



CENTERED RAIL INSTALLATION GUIDE

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

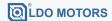
DECK PANELS WWW.VORONDESIGN.COM



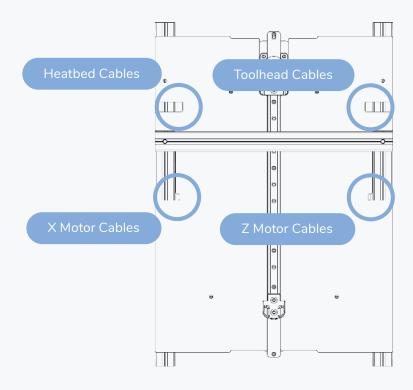
DECK PANELS?!

You can install the deck panels at this point if you like. We didn't show them to make some captures easier.

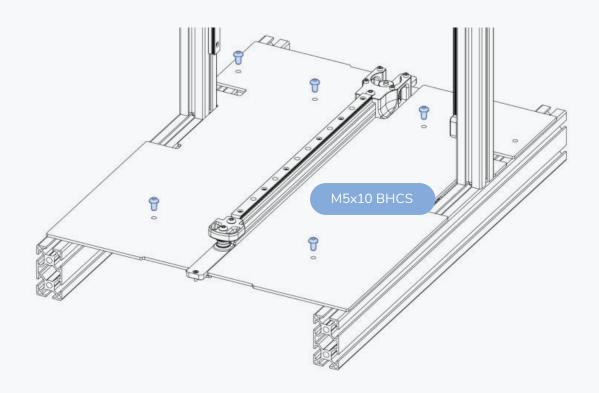
PREMADE WIRE HARNESS



If you sourced a premade wire harness add the cables that pass through the deck panels now.



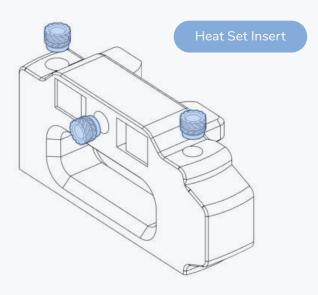
DECK PANELS WWW.VORONDESIGN.COM



SENSORLESS HOMING FOR Y



Should you desire to use a microswitch as an endstop follow the instructions on the next page instead.



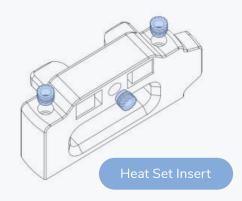
HEAT SET INSERTS

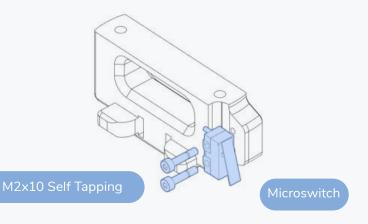
This design relies heavily on heat set inserts. Make sure you have the proper inserts (check the hardware reference for a close up picture).

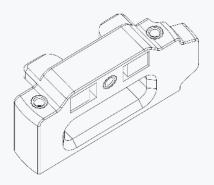
If you've never worked with heat set inserts before we recommend you watch the linked guide.



https://voron.link/m5ybt4d

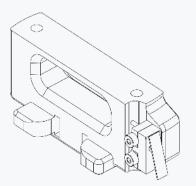




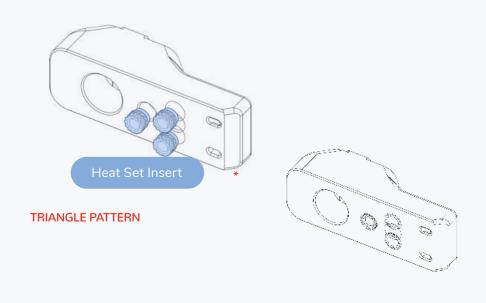


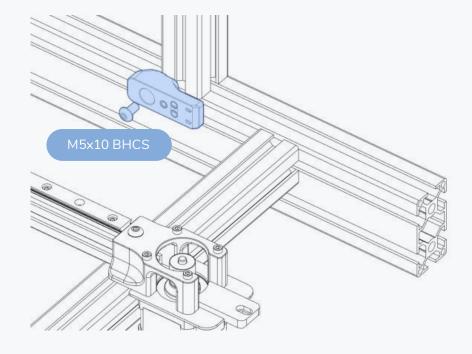
SOLDER WIRES

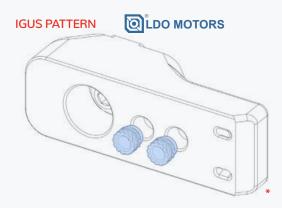
Solder approx. 100mm of wire to the mircoswitch before installing it.
See setup guide for details.



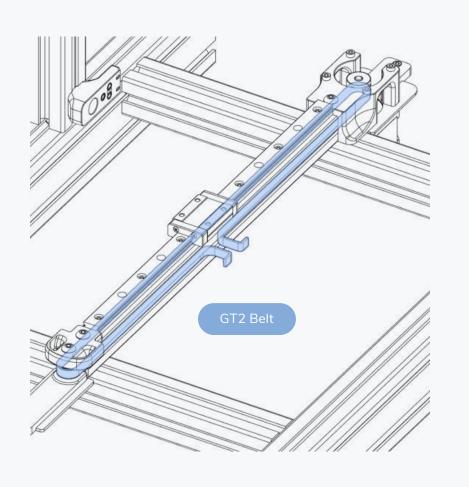
Y CABLE CHAIN MOUNT WWW.VORONDESIGN.COM

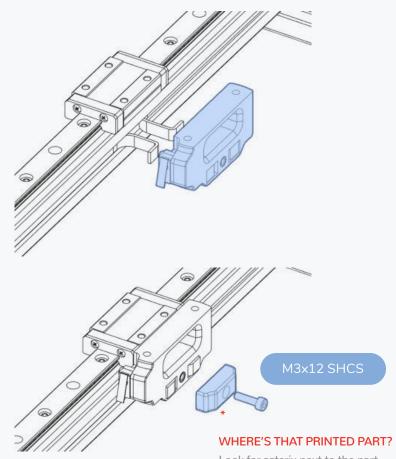






Y BELT PATH WWW.VORONDESIGN.COM

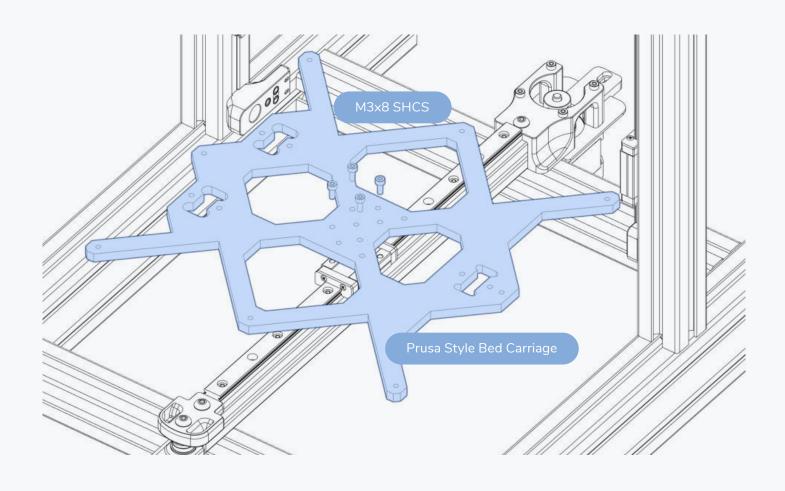




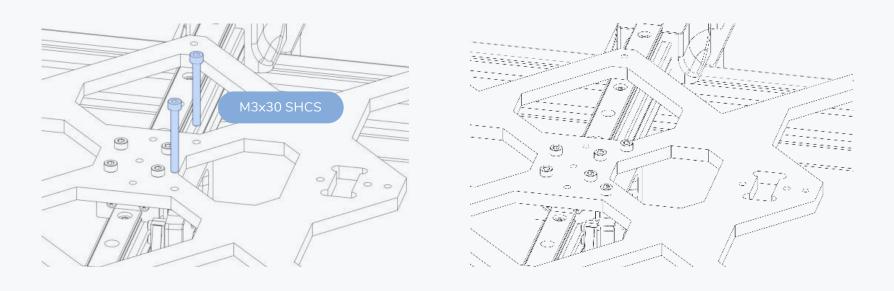
Look for asterix next to the part.

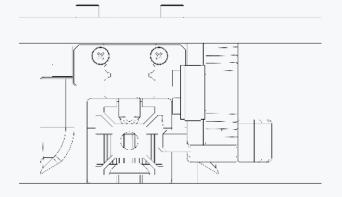
It indicates that this is an accent part.

BED CARRIAGE INSTALLATION WWW.VORONDESIGN.COM



Y BELT HOLDER WWW.VORONDESIGN.COM

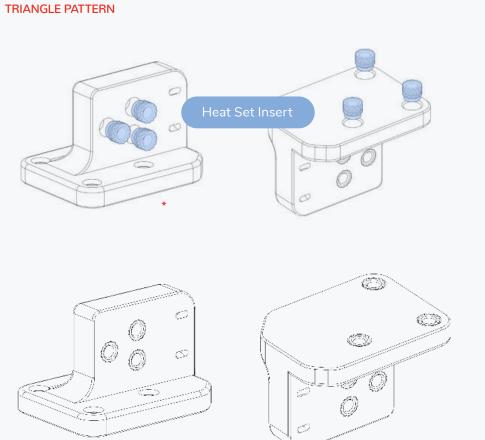




Y CABLE CHAIN WWW.VORONDESIGN.COM

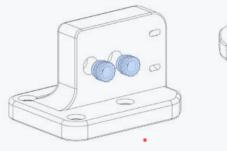
CABLE CHAIN HOLE PATTERN

Cable chains ends have a couple of different hole patterns. We offer mounts for both the inline pattern used on IGUS chains, and the triangle pattern present on budget chains.

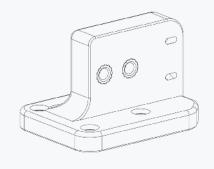


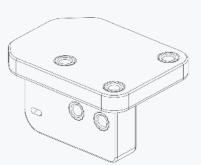




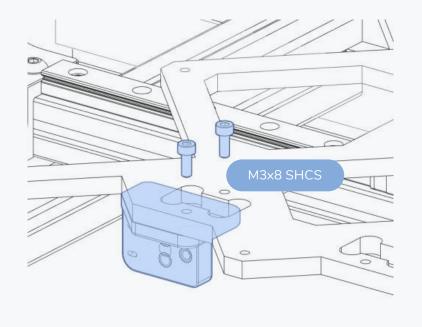


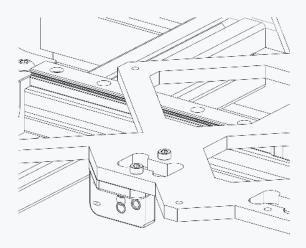






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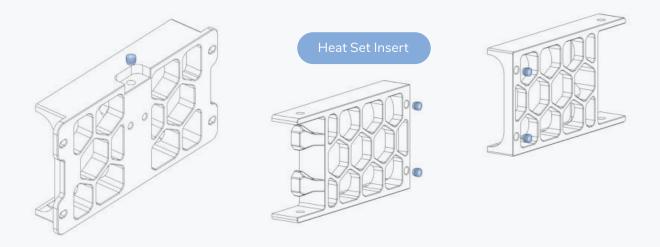
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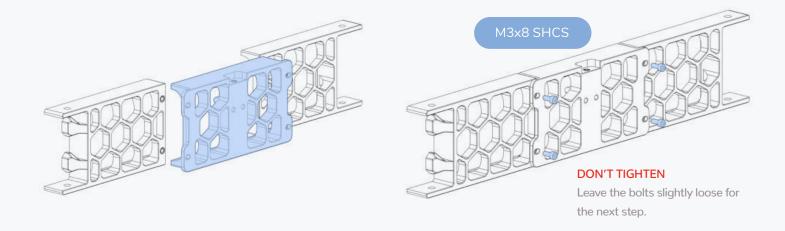
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SKIRTS WWW.VORONDESIGN.COM

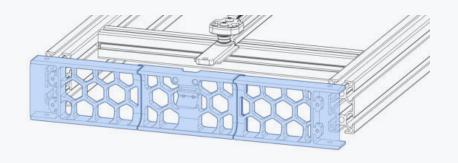


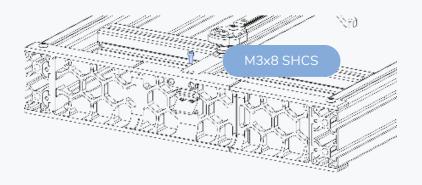
FRONT SKIRTS WWW.VORONDESIGN.COM

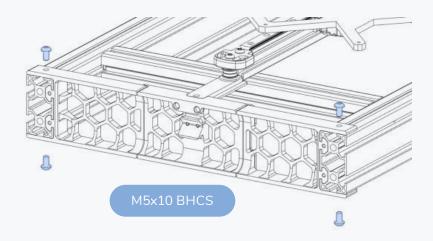


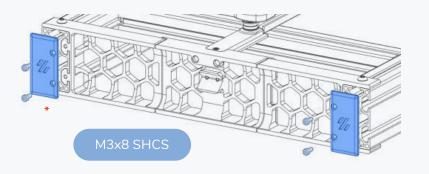


FRONT SKIRT WWW.VORONDESIGN.COM





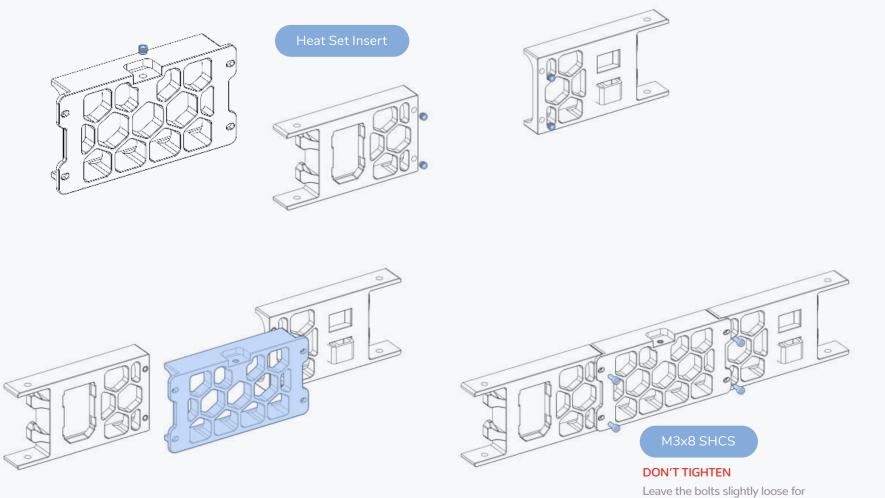




TIGHTEN BOLTS

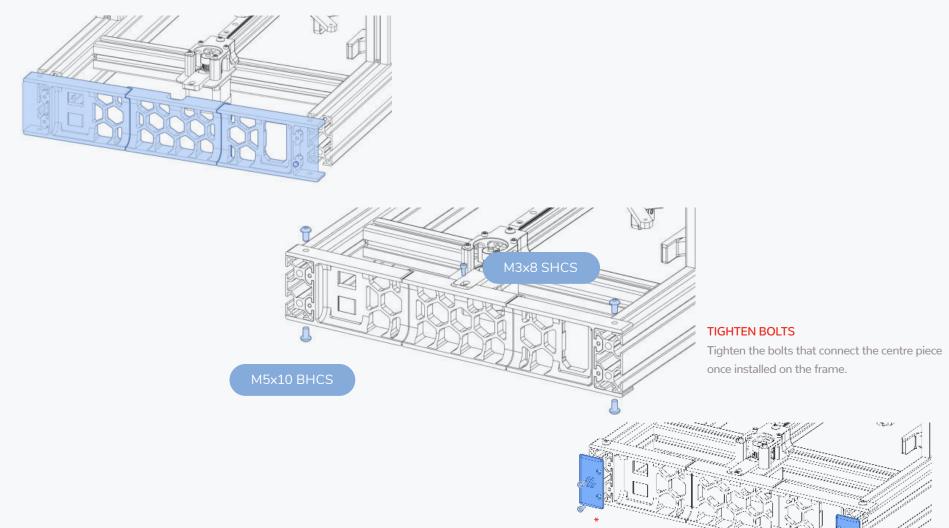
Tighten the bolts that connect the centre piece once installed on the frame.

BACK SKIRT WWW.VORONDESIGN.COM



the next step.

BACK SKIRT WWW.VORONDESIGN.COM



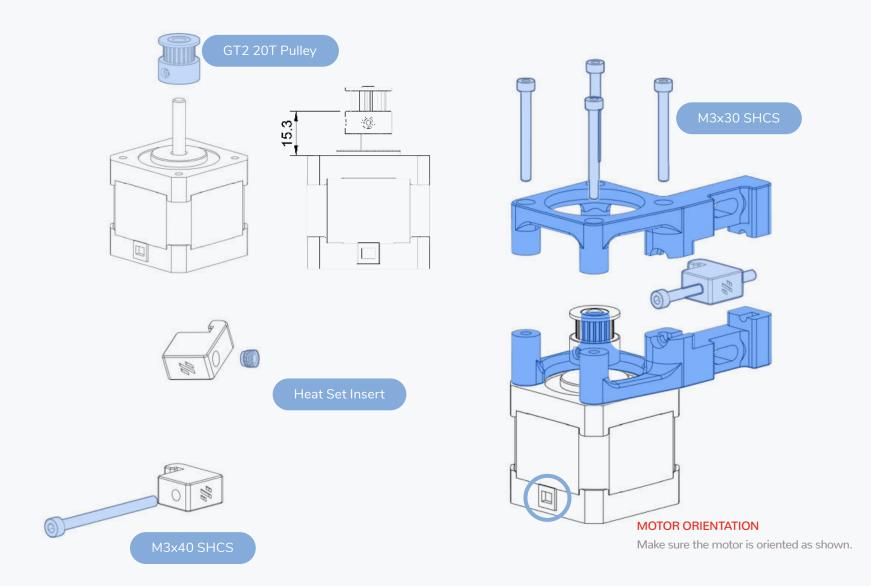
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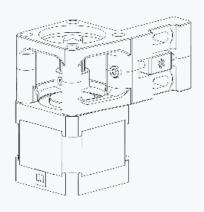
X&Z AXIS WWW.VORONDESIGN.COM

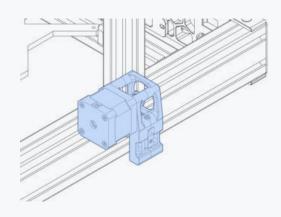


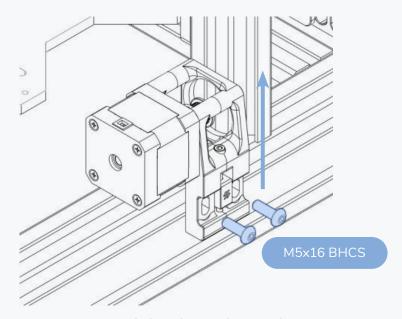
"Z" MOTOR MOUNT WWW.VORONDESIGN.COM



"Z" MOTOR MOUNT WWW.VORONDESIGN.COM



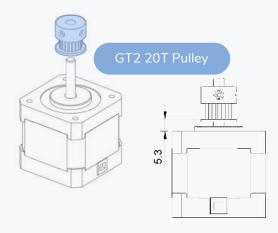




MOTOR MOUNT INSTALLATION

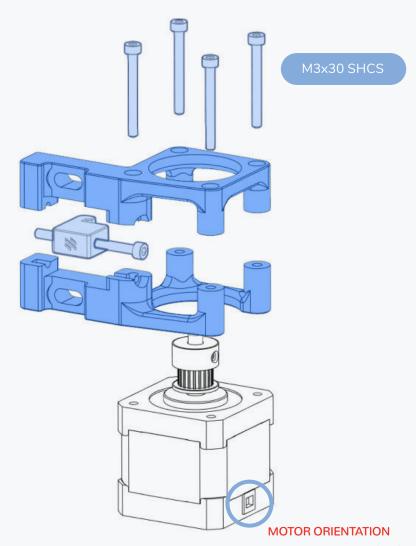
Push the motor mount as far up as the slots in the parts allow you to before fastening the bolts. You may need to turn the M3x40 counter clock wise to fully bottom out in the slot.

"X" MOTOR MOUNT WWW.VORONDESIGN.COM



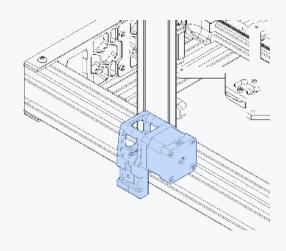


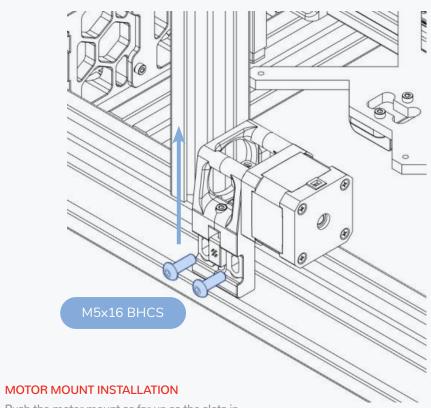




Make sure the motor is oriented as shown.

"X" MOTOR MOUNT WWW.VORONDESIGN.COM

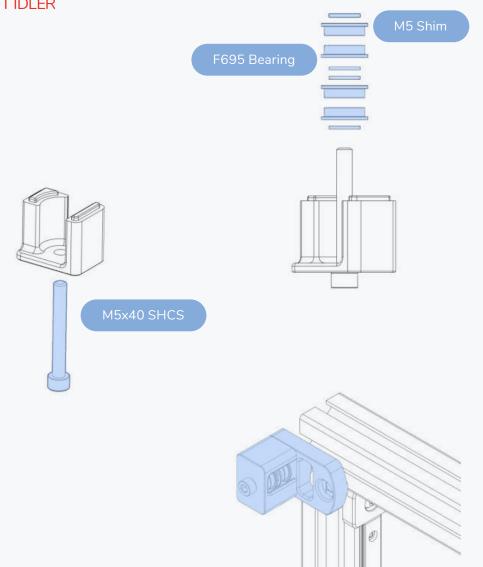


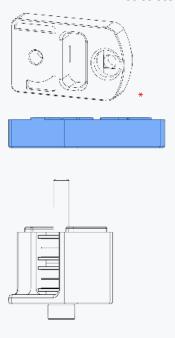


Push the motor mount as far up as the slots in the parts allow you to before fastening the bolts. You may need to turn the M3x40 counter clock wise to fully bottom out in the slot.

LEFT IDLER

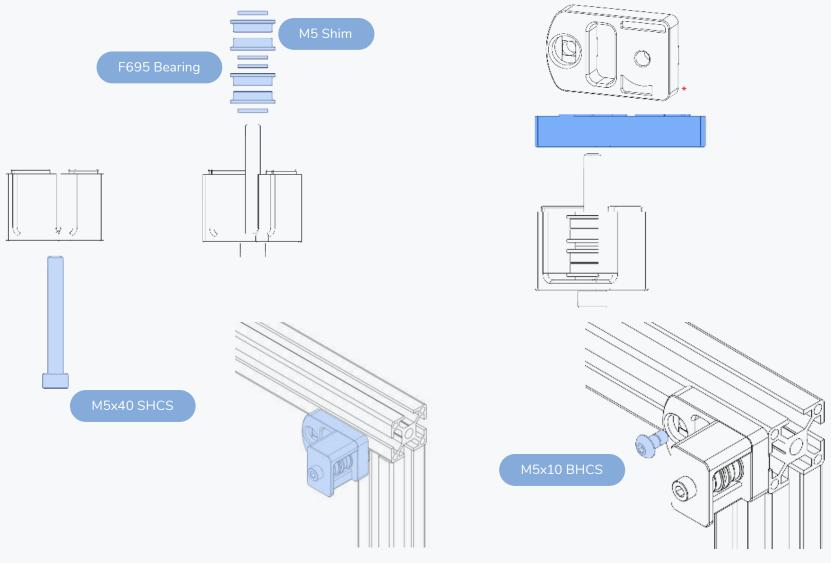
WWW.VORONDESIGN.COM







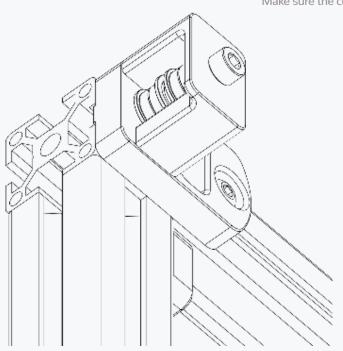
RIGHT IDLER WWW.VORONDESIGN.COM

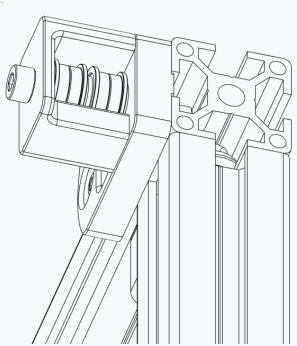


TOP IDLERS WWW.VORONDESIGN.COM

CHECK ORIENTATION

Make sure the cut-out is facing down.

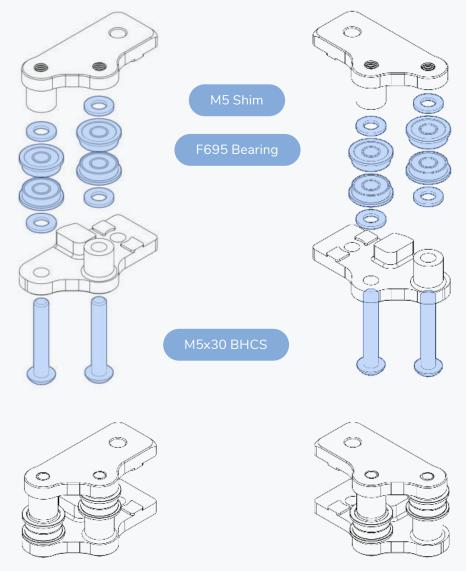




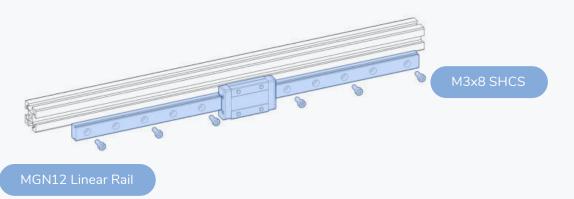
XZ BLOCKS WWW.VORONDESIGN.COM

UPSIDE DOWN ASSEMBLY

We'll flip these components a few times. Pay attention to their final orientation



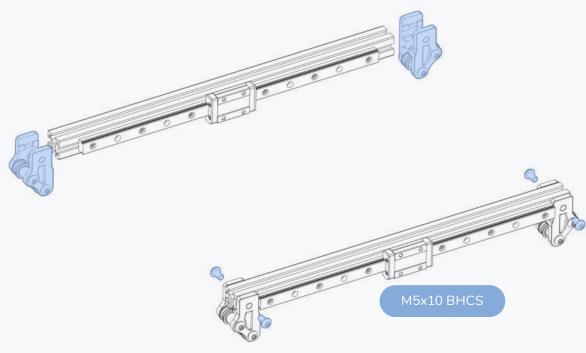
X AXIS WWW.VORONDESIGN.COM



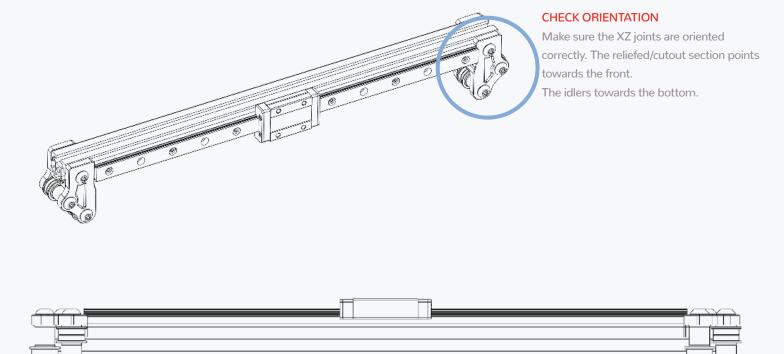


CENTERED RAIL INSTALLATION GUIDE

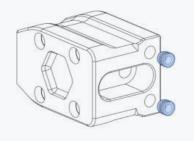
Use the guides to position the rail in the center of the extrusion prior to fastening the bolts.



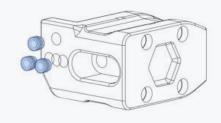
X AXIS WWW.VORONDESIGN.COM

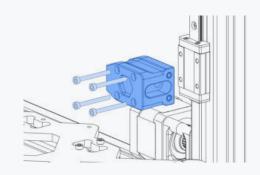


Z BEARING BLOCK WWW.VORONDESIGN.COM

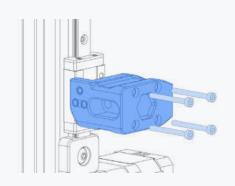


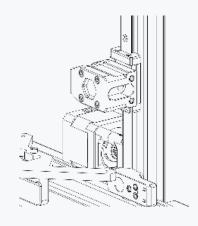
Heat Set Insert

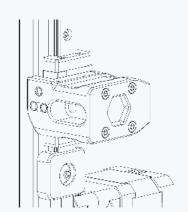




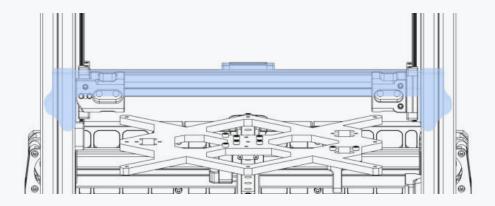
M3x30 SHCS







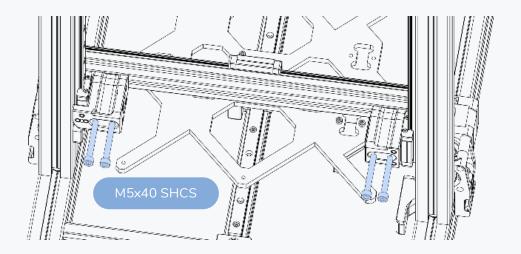
X AXIS WWW.VORONDESIGN.COM



X AXIS INSTALLATION

Lightly tighten the M5x40 bolts and align the X axis horizontally by moving it all the way to the top. Make sure it is centered across the front.

Hold the X axis against the stoppers and fully tighten the bolts. Move the axis up and down and check for binding.



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X CARRIAGE WWW.VORONDESIGN.COM



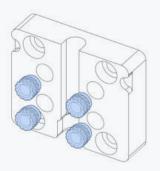
HEAT SETS WWW.VORONDESIGN.COM

Heat Set Insert





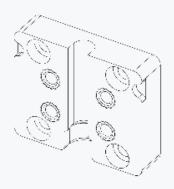




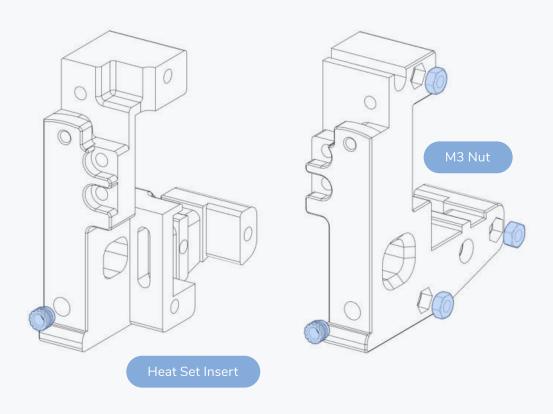




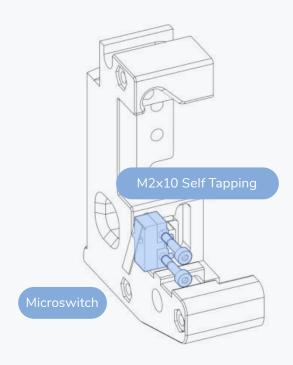




X CARRIAGE WWW.VORONDESIGN.COM



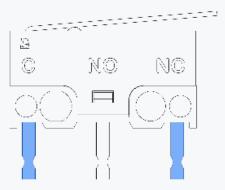
WWW.VORONDESIGN.COM



PRESOLDERED WIRES



Route the wires through the slot to the front of the carriage. Only attach the connector on the crimps after you routed them to the front.



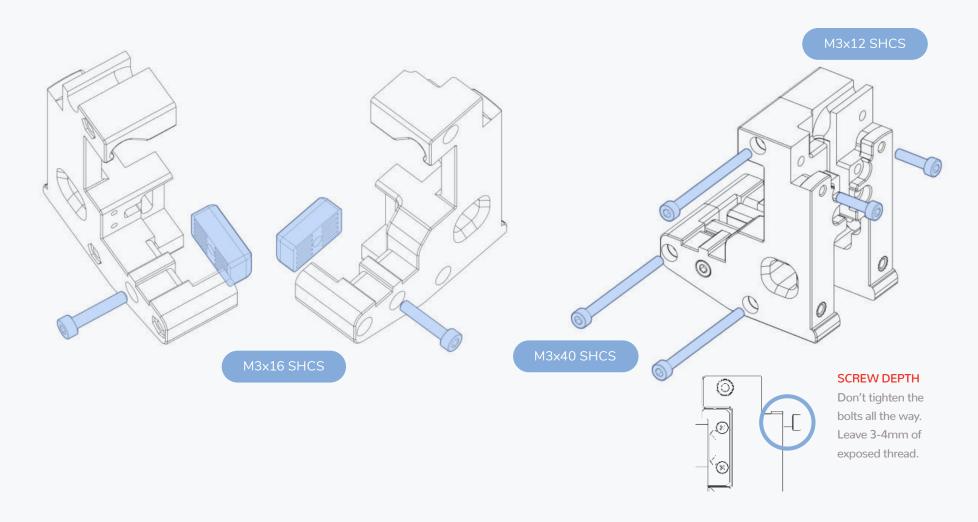
END-STOP SWITCHES FOR X AND Y

End-stops are wired in a "Normally Closed" configuration.

On microswitches those are the 2 outer terminals indicated by C and NC.

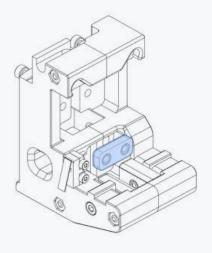
Prepare the switches for X by soldering 150mm of wire to each of the outer terminals.

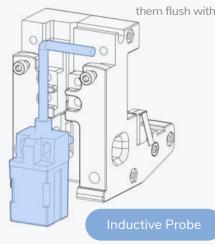
X CARRIAGE WWW.VORONDESIGN.COM



PROBE WIRES

Unless your probe comes preterminated cut the probes wires to about 15cm. Don't cut them flush with the carriage frame.



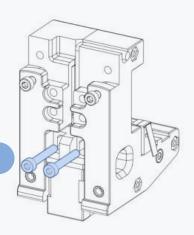


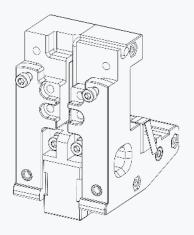
OTHER PROBE TYPES DLDO MOTORS

The picture shows a PL-08 probe. The recommended Omron TL-Q5MC probe will fit in the same space but requires M3x25 SHCS.

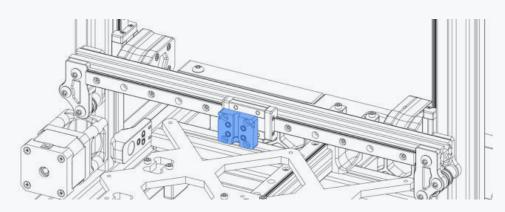
M3x20 SHCS

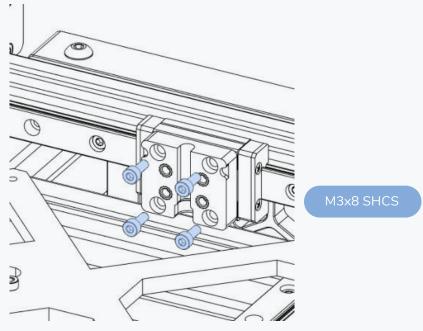
Other probes with a similar form factor and characteristics might work as well.



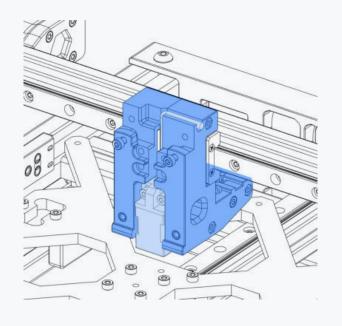


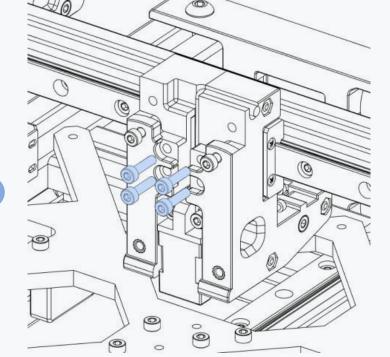
X CARRIAGE PLATE WWW.VORONDESIGN.COM





X CARRIAGE WWW.VORONDESIGN.COM



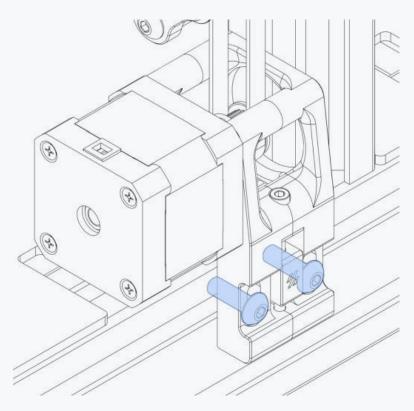


M3x12 SHCS

BELT TENTIONER WWW.VORONDESIGN.COM

BELT TENTIONER FOR "X" AND "Z"

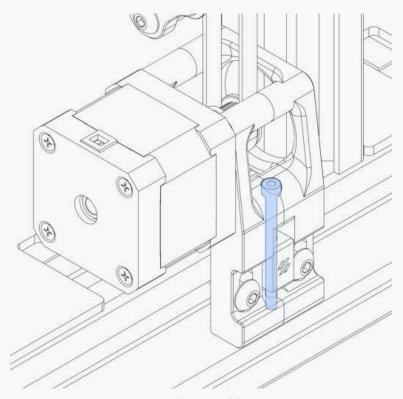
The motor mounts for the "X" and the "Z" motors have build in tentioners.



LOCK SCREWS

Slightly loosen these screws before adjusting the belt tension.

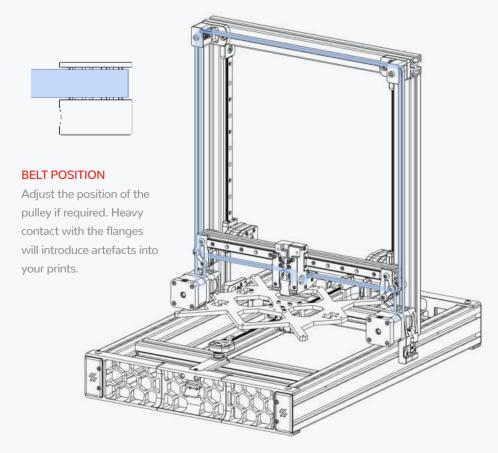
Fasten them again after adjusting the tension.

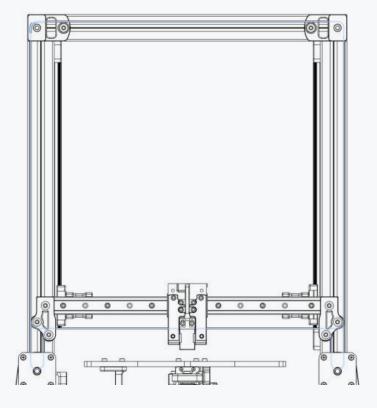


ADJUSTMENT SCREW

Turn the screw clockwise to pull a higher tension on the belt.

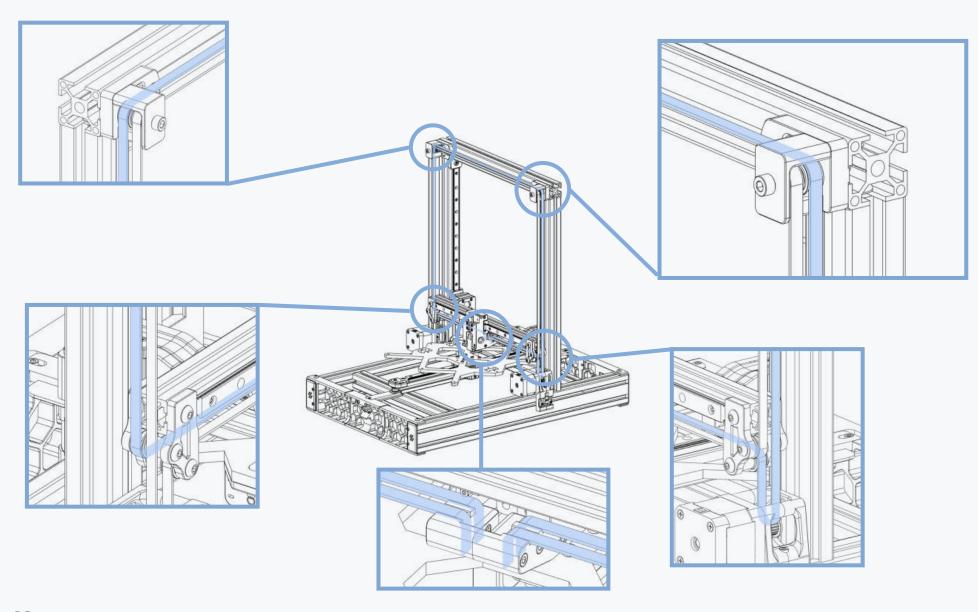
BELT PATH WWW.VORONDESIGN.COM



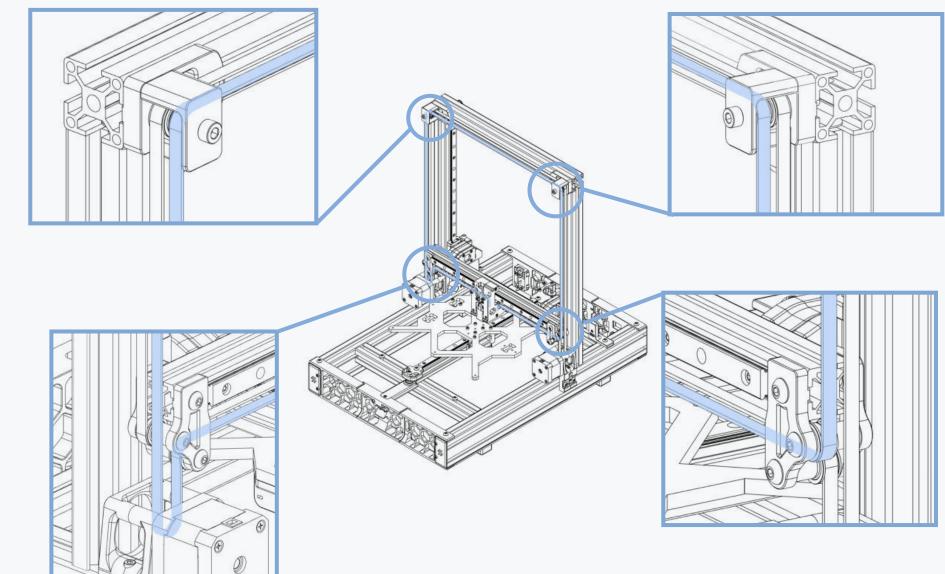


BELT PATH

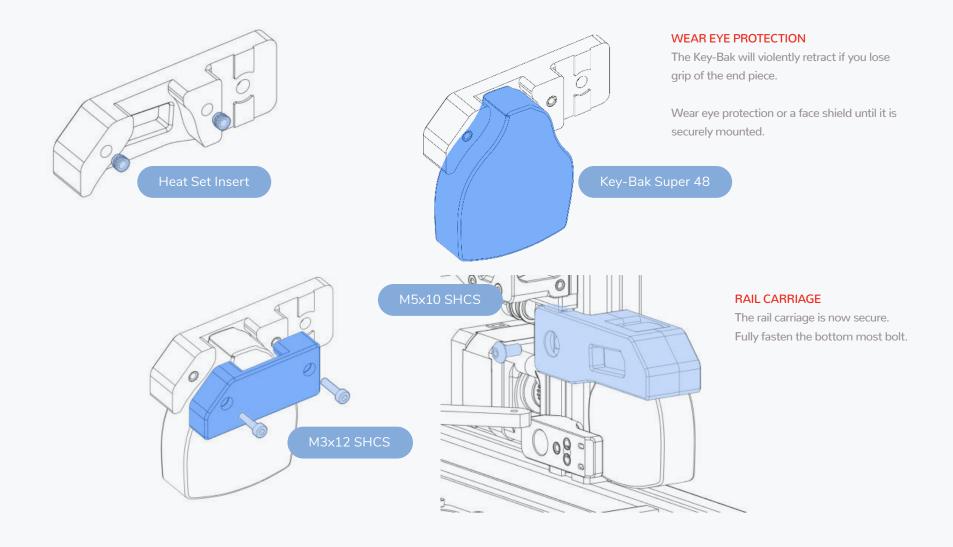
Take your time and make sure your belt routing is as intended. Belts should never rub on plastic parts. "Z" BELT WWW.VORONDESIGN.COM



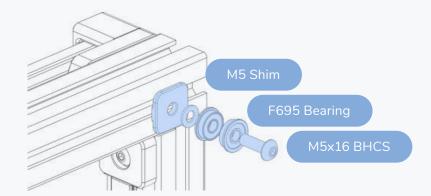
"X" BELT WWW.VORONDESIGN.COM



COUNTERWEIGHT MOUNT WWW.VORONDESIGN.COM



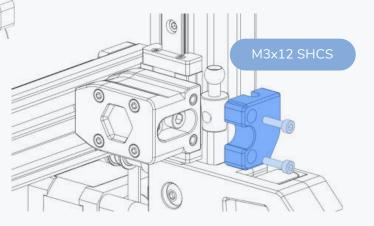
COUNTERWEIGHT IDLER WWW.VORONDESIGN.COM



MOUNTING THE KEYBACK END PIECE

Pull the end piece of the Key-Bak and mount it as shown.

Extend more of the cord and hook it in the idler mounted above.



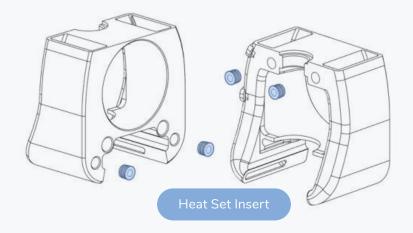
AFTERBURNER WWW.VORONDESIGN.COM

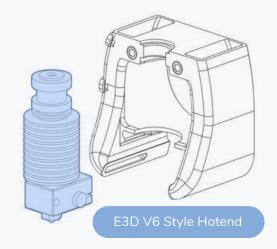


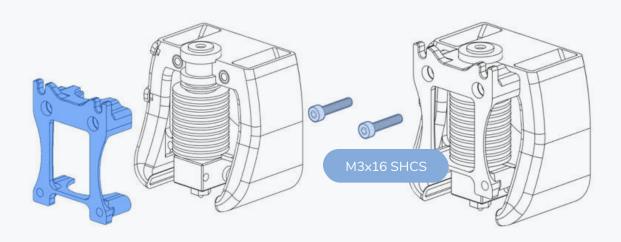
AVAILABLE MOUNTS

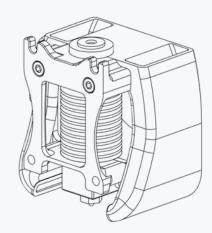
We also provide mounts for the Slice Engineering Mosquito and TriangleLab/Phaetus Dragon Hotend.

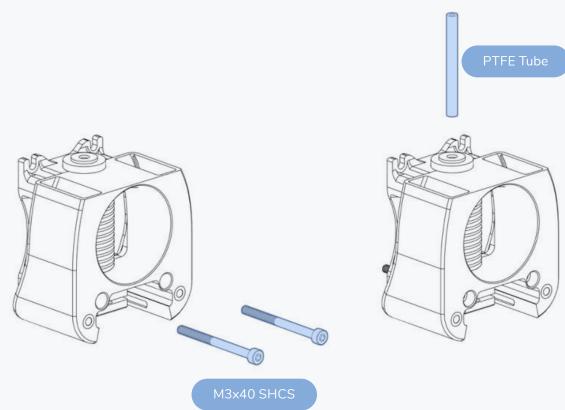
They are assembled in a similar manner.

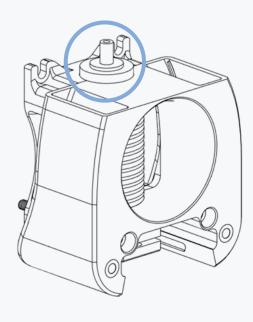






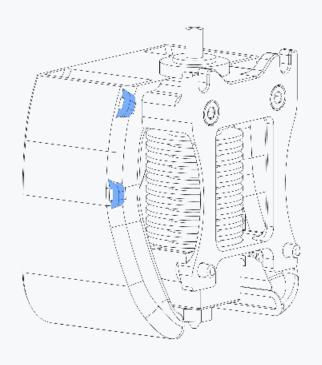






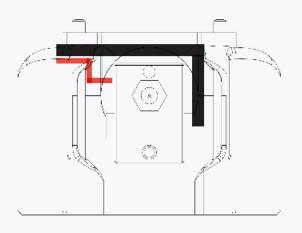
PTFE STICKOUT

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



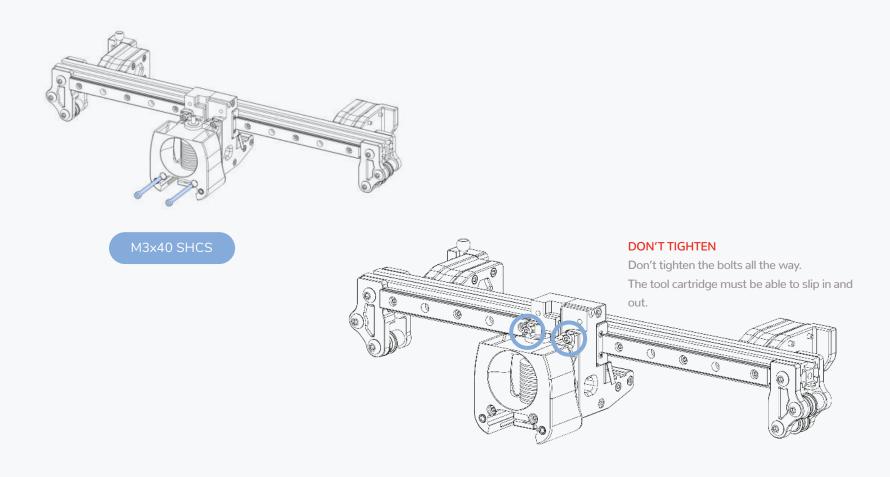
WIRING PATH

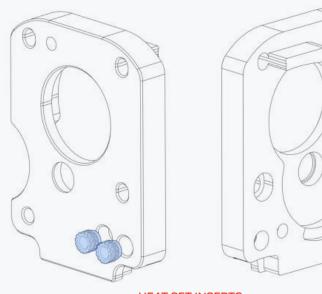
Guide the wires in the highlighted path.



CHECK ORIENTATION

The heater block must point forwards.





HEAT SET INSERTS

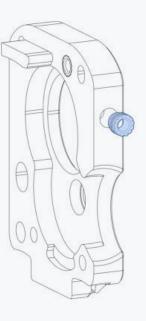
You will need to install heat set inserts into various plastic parts.

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

OPTION: TOOLHEAD PCB



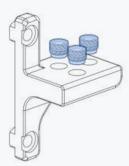
If you opt to use a toolhead pcb add an aditional heat set insert into the alternate part.





GENERIC CABLE CHAIN

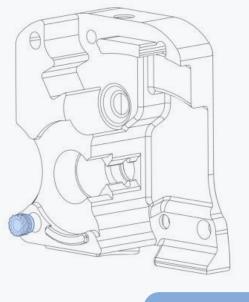
The 3 hole pattern is usually found on generic cable chains.

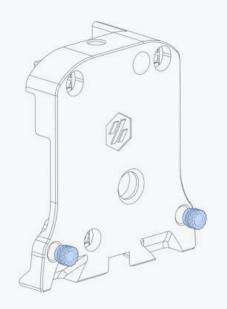


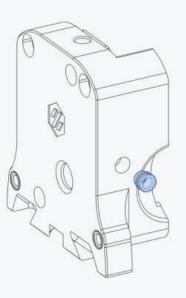


IGUS chain have 2 mounting holes.

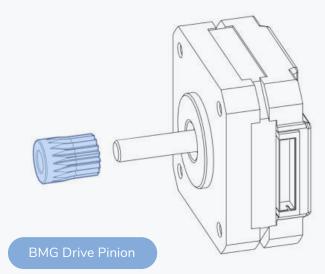


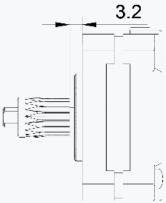






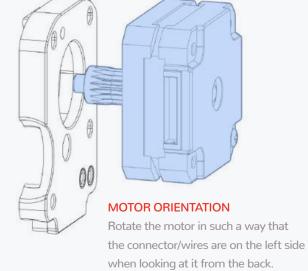
Het Set Insert



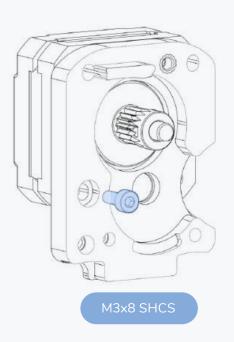


ALL UNITS ARE METRIC

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



This side will be covered by the cable cover later.



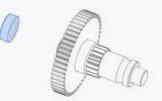


ADJUSTABLE MOTOR POSITION

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

Start in the top most position of the slot.





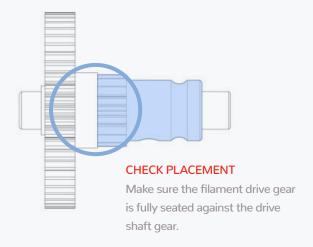
MR85 Bearing

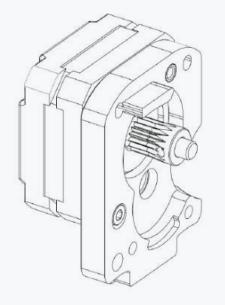
CHECK BEARING FIT

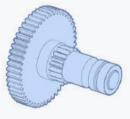
The bearings must slip on and off the shaft easily to allow the gear to self centre. Do $\underline{\text{not}}$ shim into position.

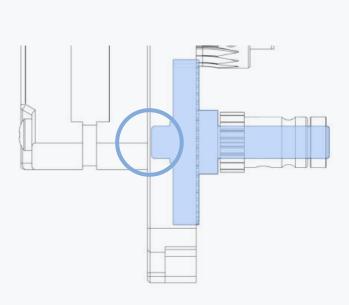
Pressing the bearings on the shaft will damage them.

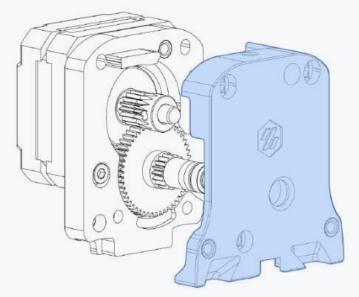
Lightly sand the shaft if required.









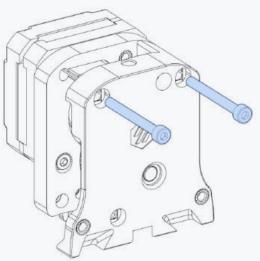


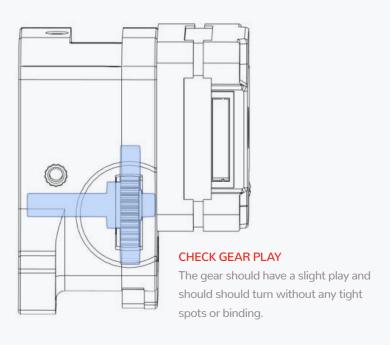
M3x30 SHCS

CHECK CLEARANCE

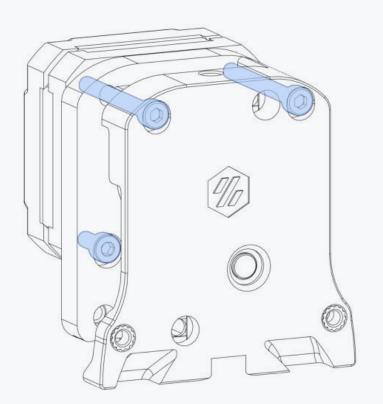
The drive shaft must not touch the motor housing.

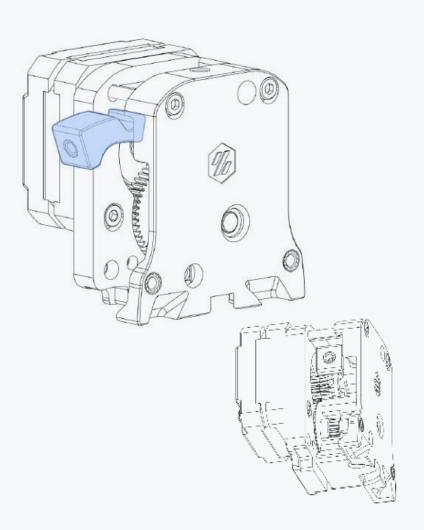
You can sand the face of shaft if required.









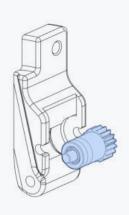






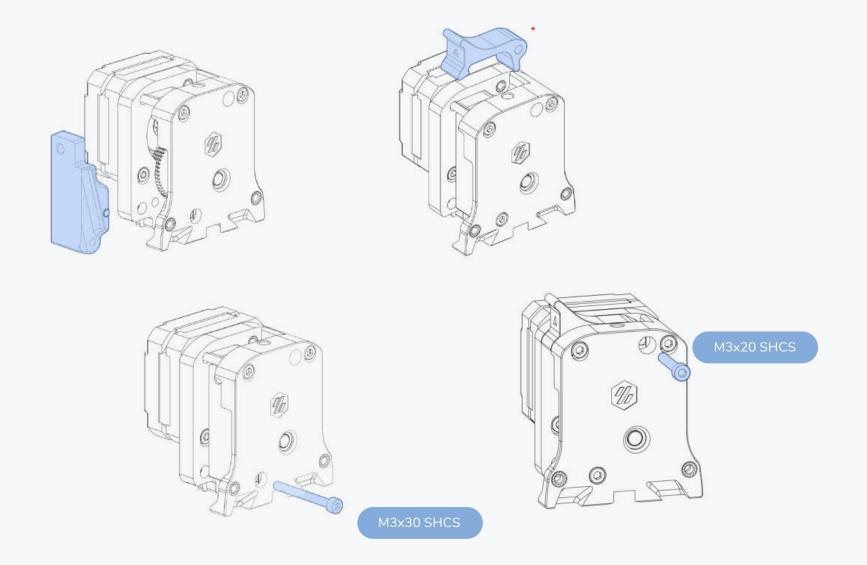
LUBRICATE BEARINGS

A lubrication film is required to ensure smooth operation and longevity. Refer to the BOM for lubricant options.



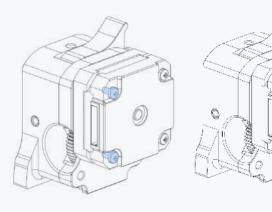


GUIDLER & LATCH WWW.VORONDESIGN.COM



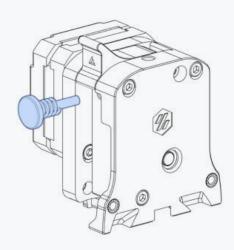
BMG Thumb Screw

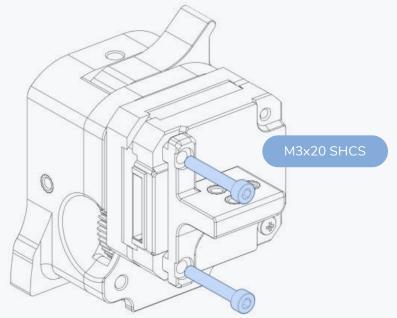


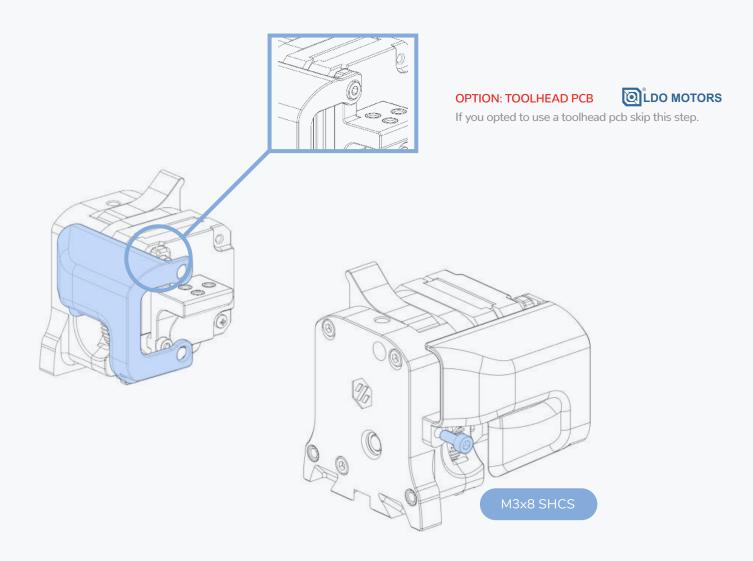


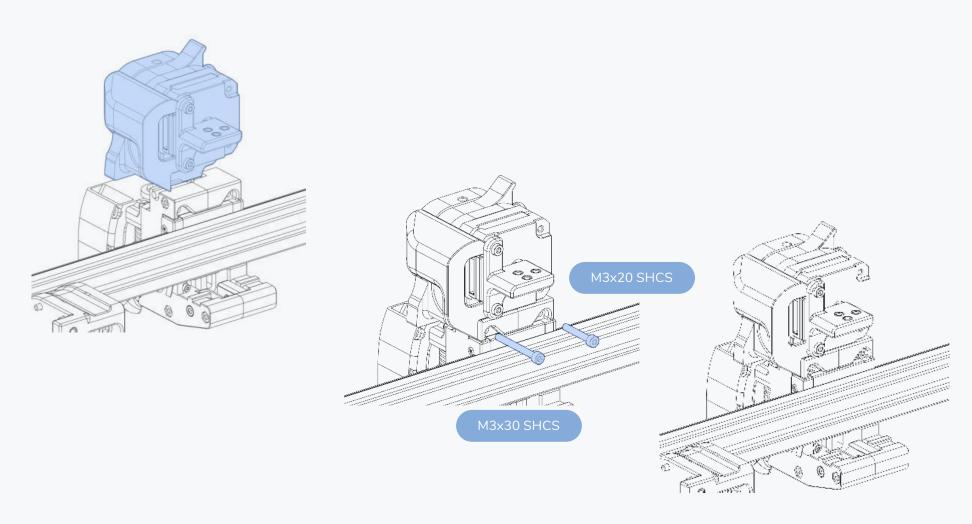
REMOVE BOLTS

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

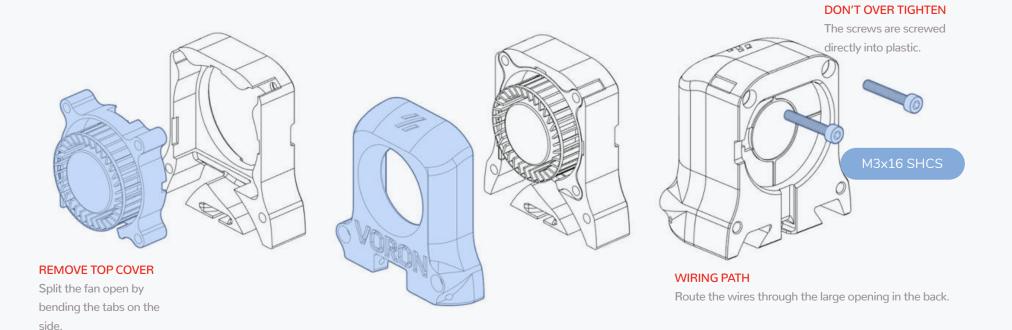




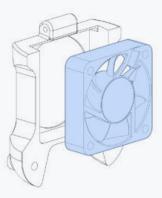




FAN ASSEMBLY WWW.VORONDESIGN.COM



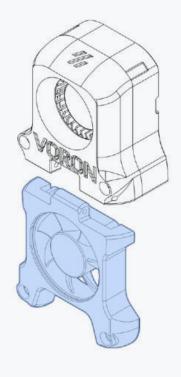
FAN ASSEMBLY WWW.VORONDESIGN.COM

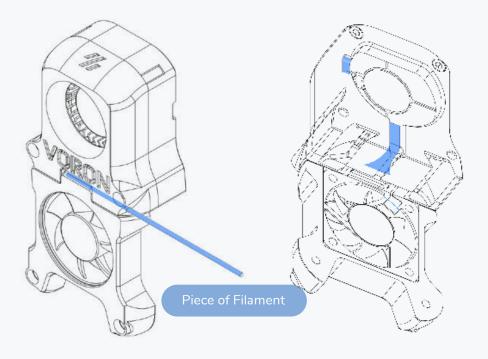


AIRFLOW DIRECTION

Make sure the fan blows air towards the hotend.

Look for a small arrow on the fan housing.

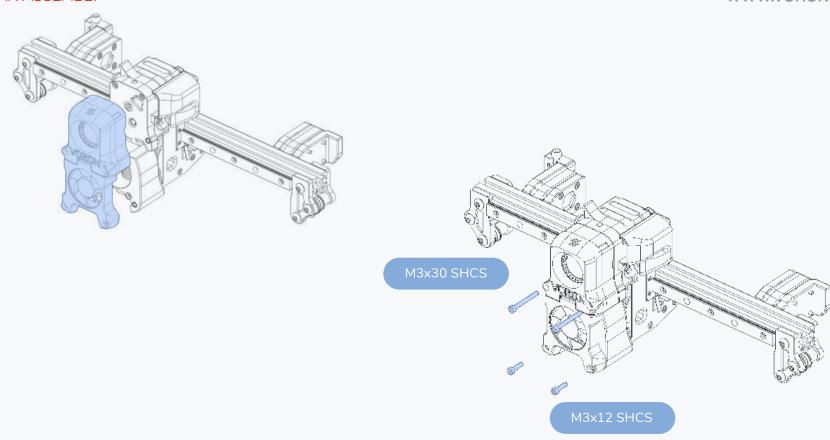




WIRING PATH

Guide the wires in the highlighted path.

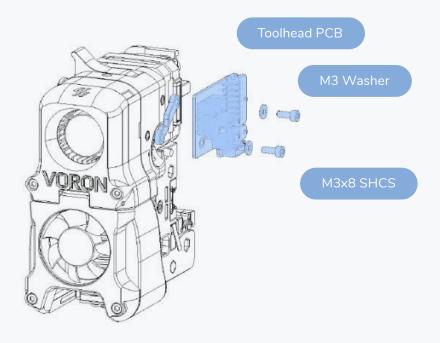
FAN ASSEMBLY WWW.VORONDESIGN.COM



OPTION: TOOLHEAD PCB



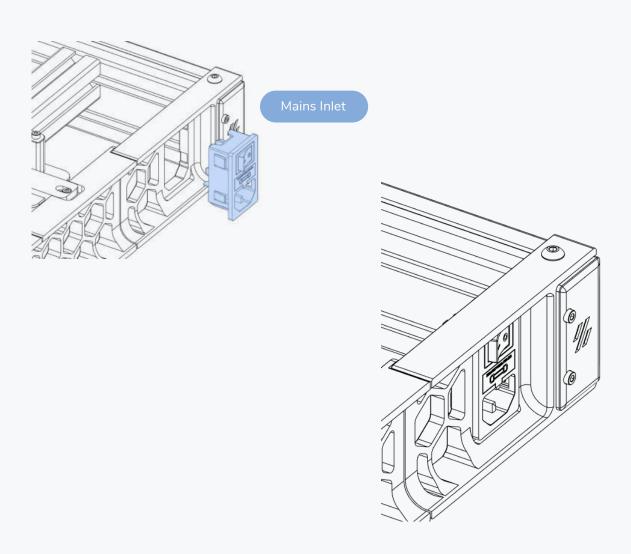
If you opted to use a toolhead pcb install it instead of the cable cover.



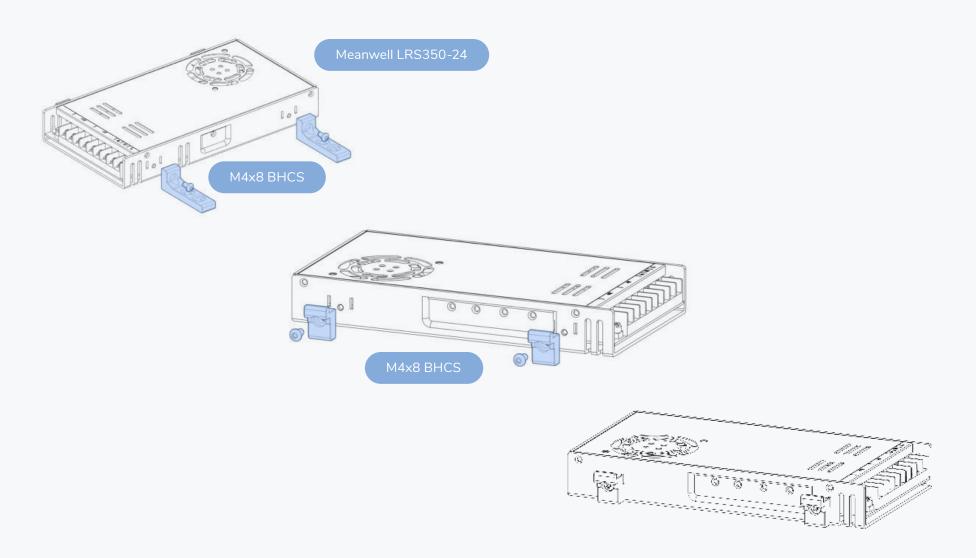
ELECTRONICS AND PANELS WWW.VORONDESIGN.COM

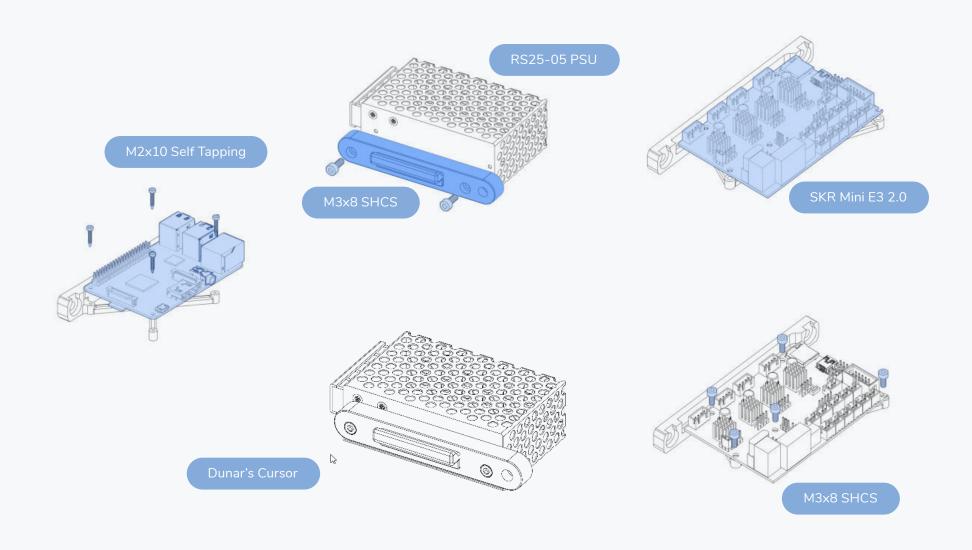


MAINS INLET WWW.VORONDESIGN.COM

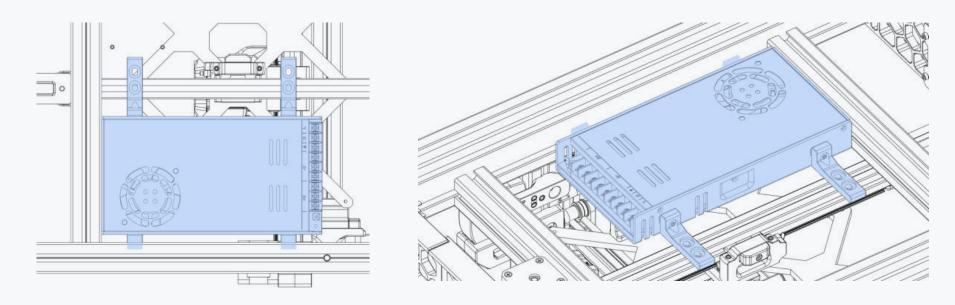


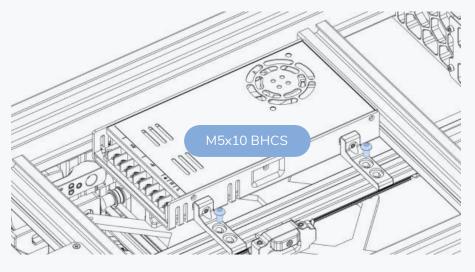
MAIN PSU WWW.VORONDESIGN.COM



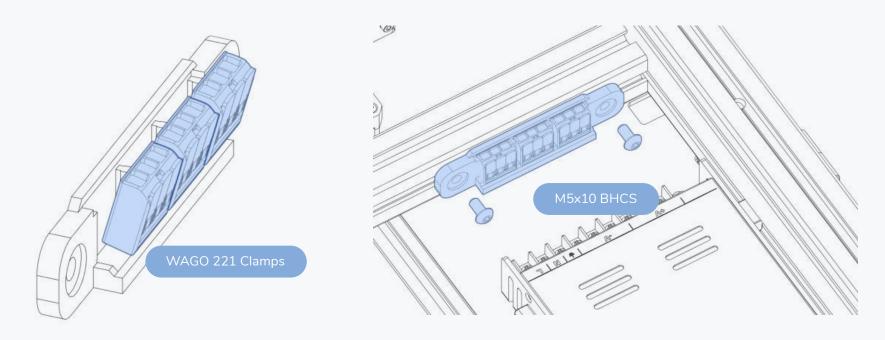


PSU INSTALLATION WWW.VORONDESIGN.COM





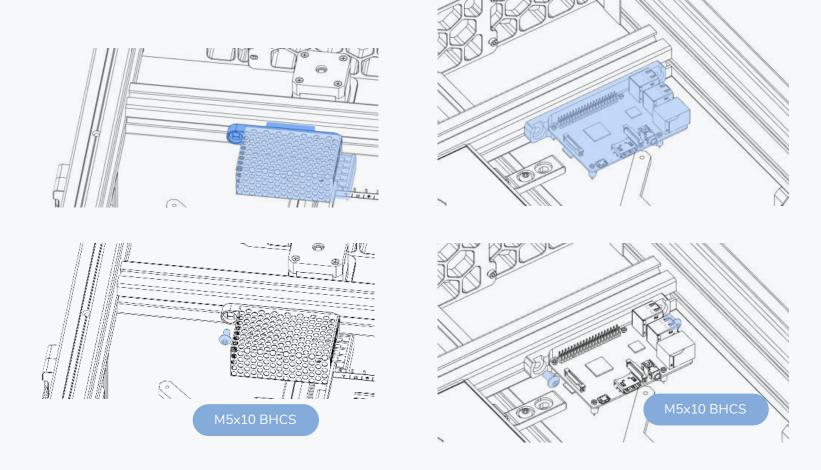
WAGO TERMINALS WWW.VORONDESIGN.COM

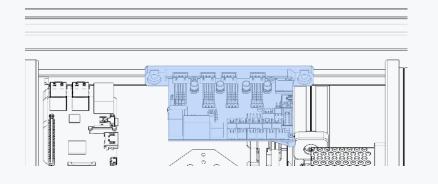


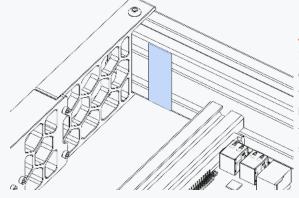
OPTION: WAGO TERMINAL STRIP



WAGO 221 series clamps can be used to simplify the mains wiring.

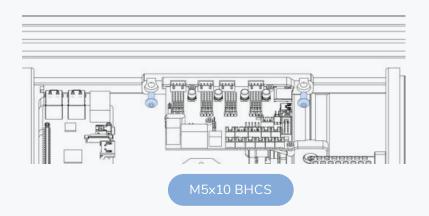


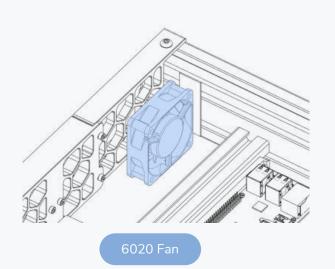




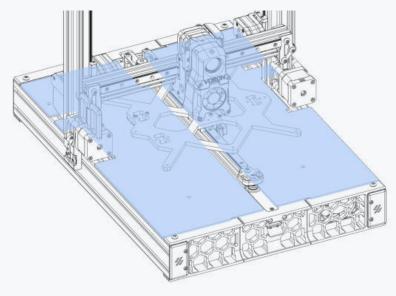
APPLY VHB TAPE

3M VHB tape is a double sided adhesive tape. Other vendors have similar products that you can use as a substitute.



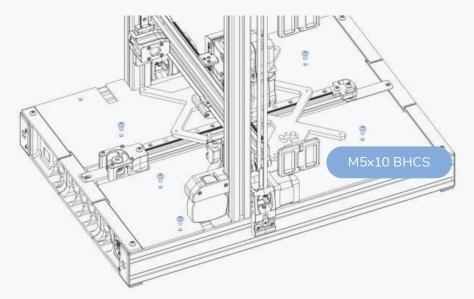


DECK PANEL WWW.VORONDESIGN.COM



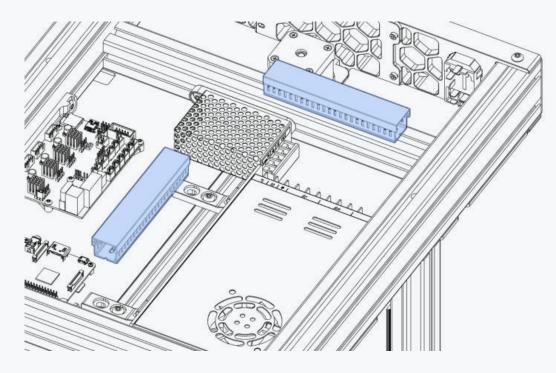
DECK PANELS

Unless you installed the panels earlier undo the 6 bolts on the bed carriage and remove the bed carriage to install the panels.



CABLE RACEWAYS WWW.VORONDESIGN.COM



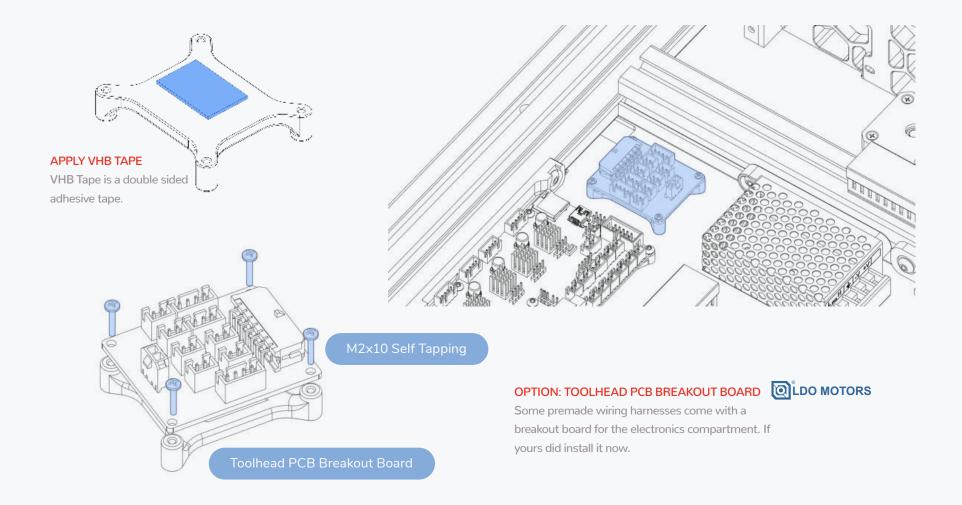


OPTION: CABLE RACEWAYS

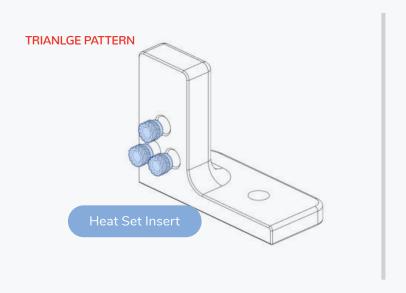


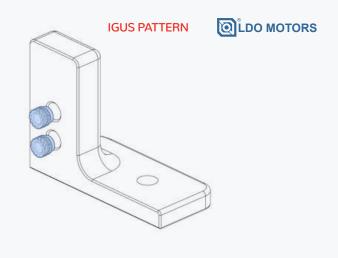
Raceways help in keeping the electronics compartment organized and clutter free.

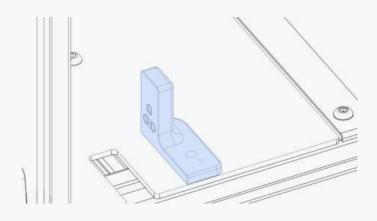
TOOLHEAD PCB BREAKOUT WWW.VORONDESIGN.COM

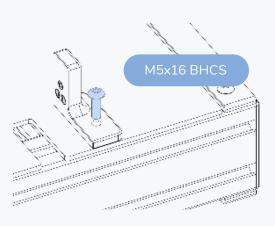


Z CHAIN MOUNT WWW.VORONDESIGN.COM

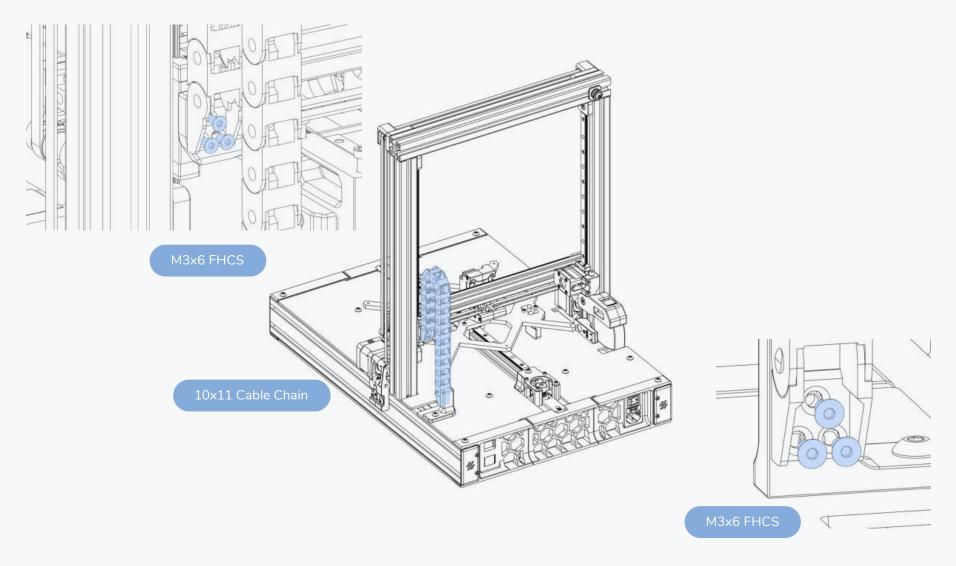




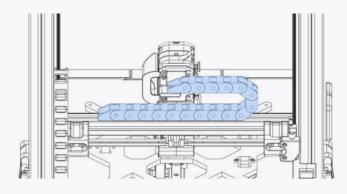




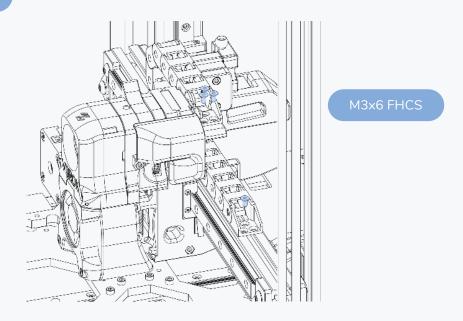
Z CABLE CHAIN WWW.VORONDESIGN.COM

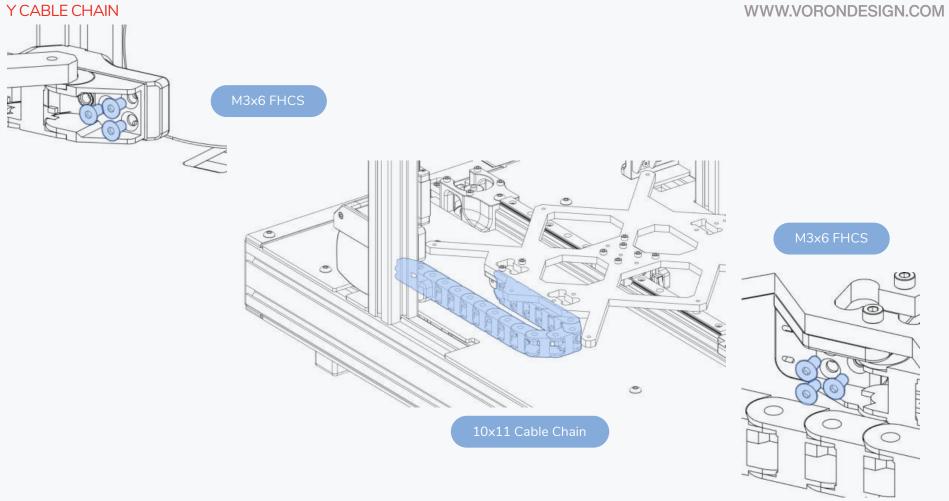


X CABLE CHAIN WWW.VORONDESIGN.COM



10x11 Cable Chain

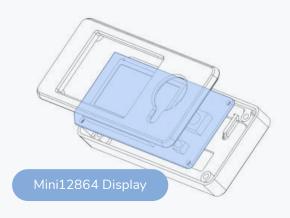


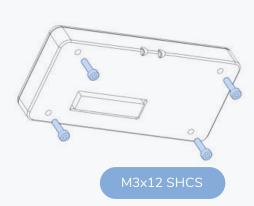


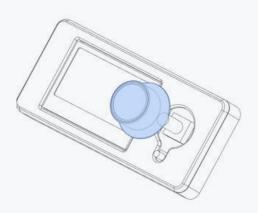
LCD THING WWW.VORONDESIGN.COM

Heat Set Insert

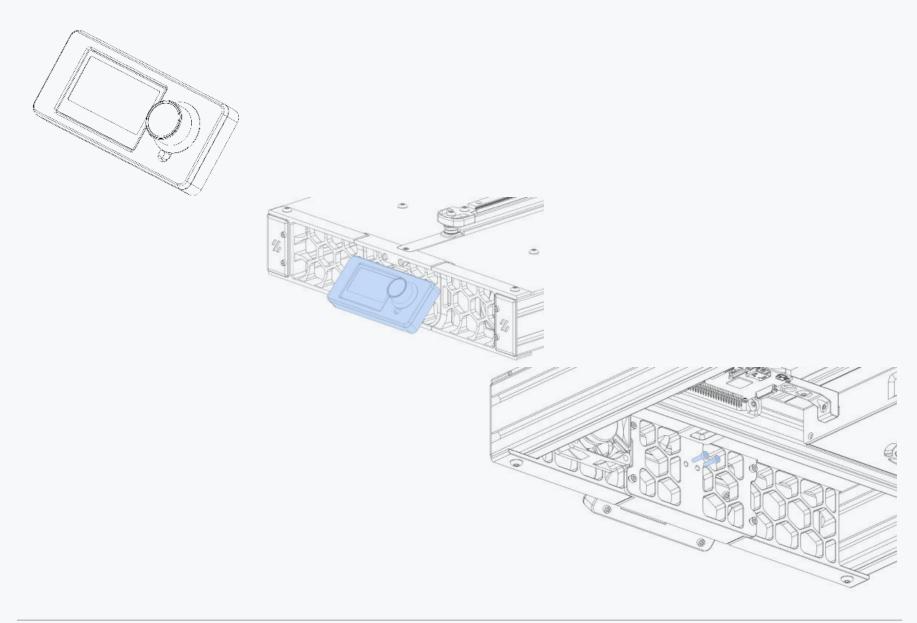






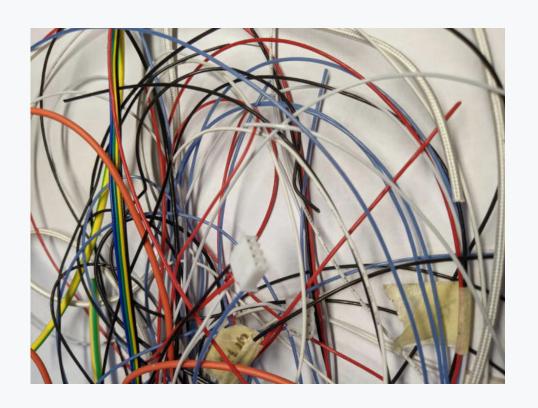


LCD THING WWW.VORONDESIGN.COM

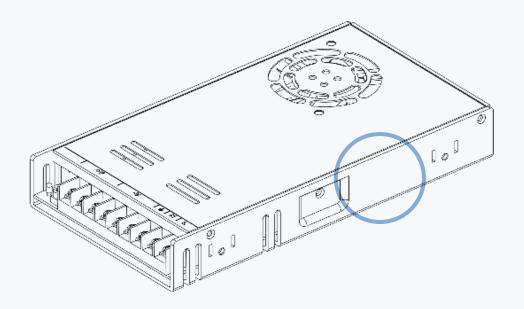


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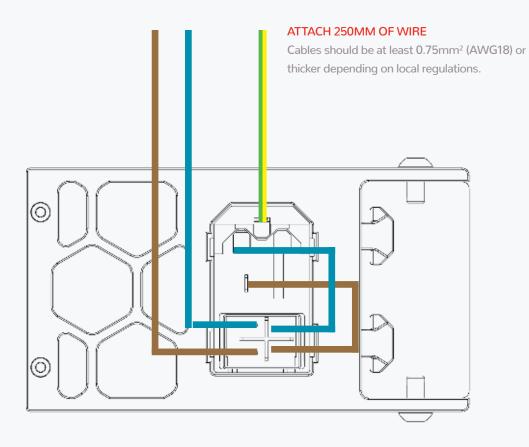
WWW.VORONDESIGN.COM



INPUT VOLTAGE SWITCH

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

Make sure the selection matches your local mains voltage. Refer to the Mean Well LRS-350 datasheet for possible settings.



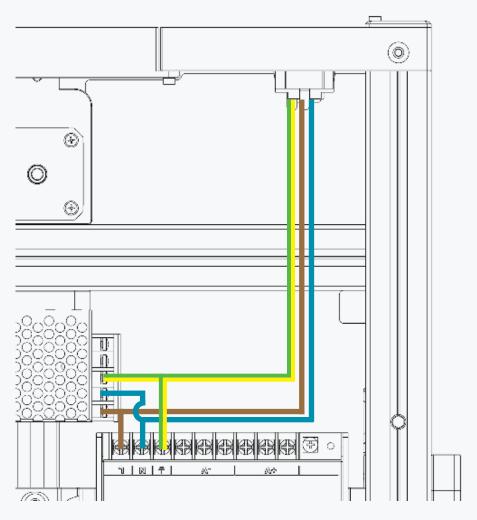
MAINS INLET WIRING

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

Mains wiring should only be done by qualified personnel trained in local regulations and safety standards.

Failure to observe those could result in bodily harm.

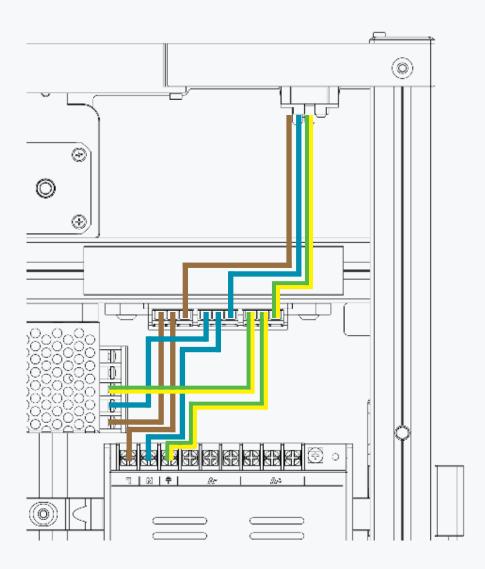
MAINS WIRING WWW.VORONDESIGN.COM



MAINS WIRING CONTINUED

Secure the wires with cable clips / cable tie anchors.

Observe your local regulations in regards to grounding the frame/other components.



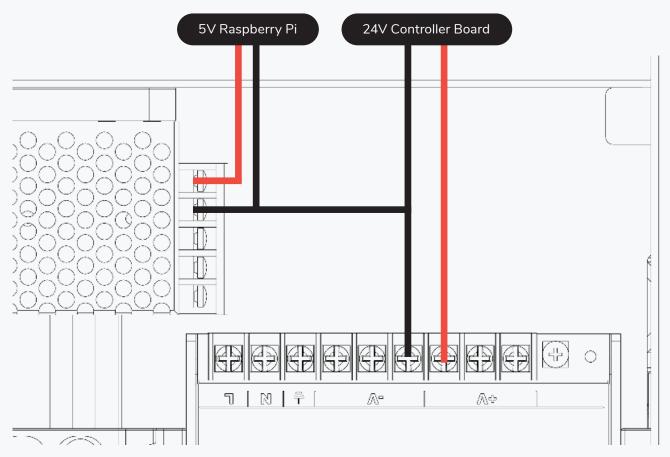
MAINS WIRING CONTINUED



Some vendors provide preprovisioned mains wiring components along.

Observe your local regulations in regards to grounding the frame/other components.

DC POWER WWW.VORONDESIGN.COM

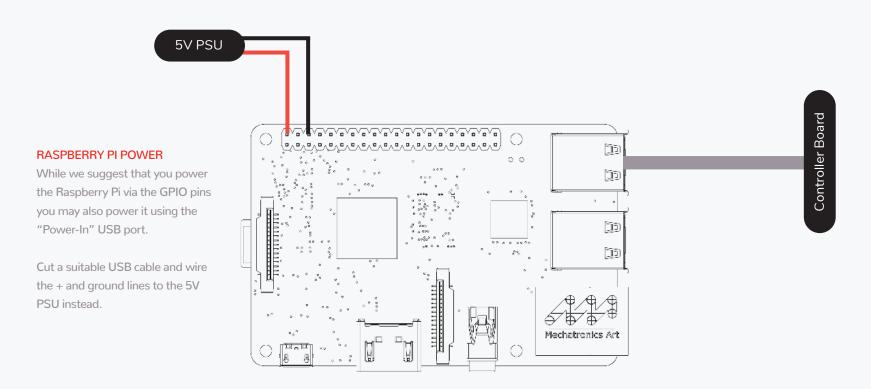


CABLE CROSS SECTION

Cables to the controller board should be 2.5mm² (AWG14) or larger.

0.5mm² (AWG20) is sufficient for the connection to the Raspberry Pi.

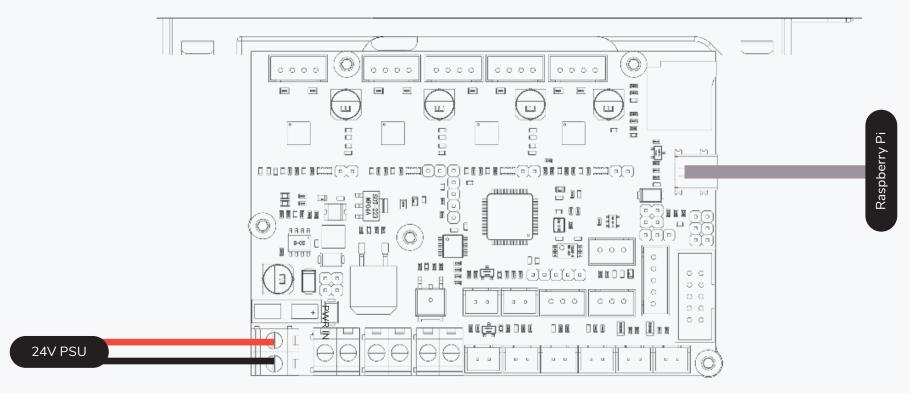
DC POWER WWW.VORONDESIGN.COM



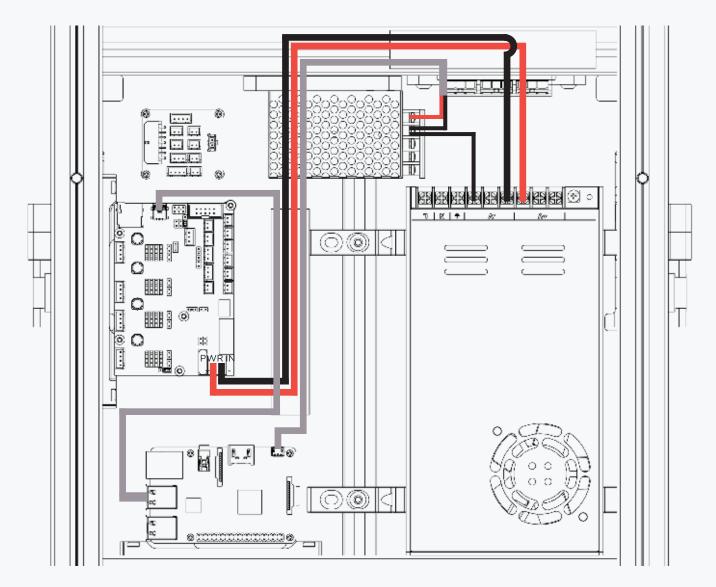
DC POWER WWW.VORONDESIGN.COM

CONTROLLER BOARD

The assembly manual will outline the wiring for a BTT SKR Mini E3 2.0. You can find additional documentation and alternative configurations on docs.vorondesign.com



DC POWER - PREMADE CABLES WWW.VORONDESIGN.COM

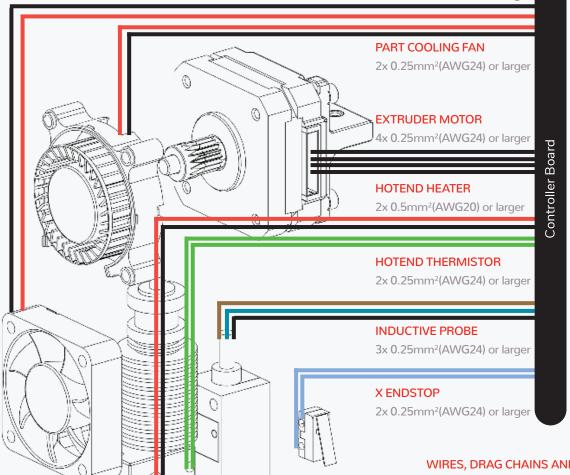


© LDO MOTORS PREMADE CABLES

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TOOLHEAD WIRING

WWW.VORONDESIGN.COM



DLDO MOTORS **OPTION: TOOLHEAD PCB**

If you are planing to use a toolhead PCB skip forward to the toolhead PCB section.

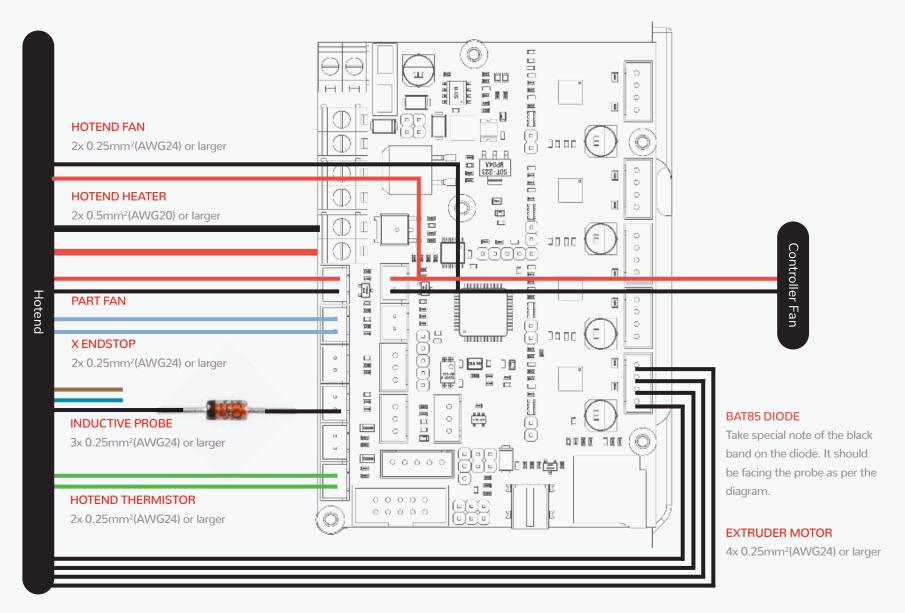
WIRES, DRAG CHAINS AND CRIMPS

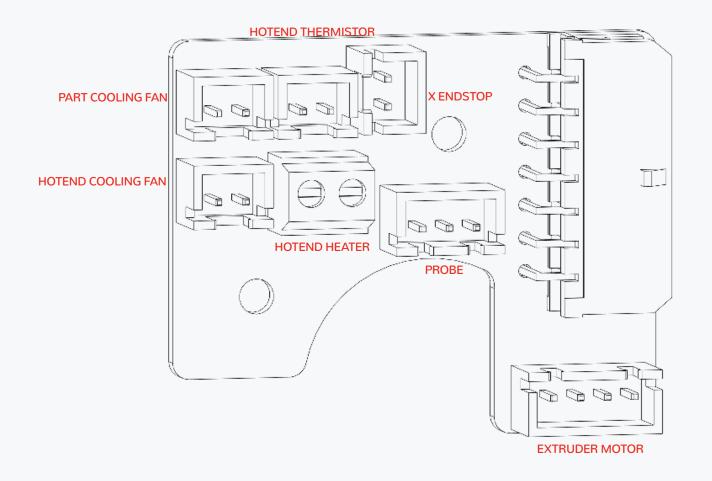
HOTEND COOLING FAN 2x 0.25mm²(AWG24) or larger

> The wires attached to the probe, fans, heater, etc. are usually not rated for use in drag chains.

Add crimp connectors at the toolhead and run suitable wire down the drag chains. Refer to the sourcing guide for options.

CONTROLLER WIRING WWW.VORONDESIGN.COM





OPTION: TOOLHEAD PCB LDO MOTORS

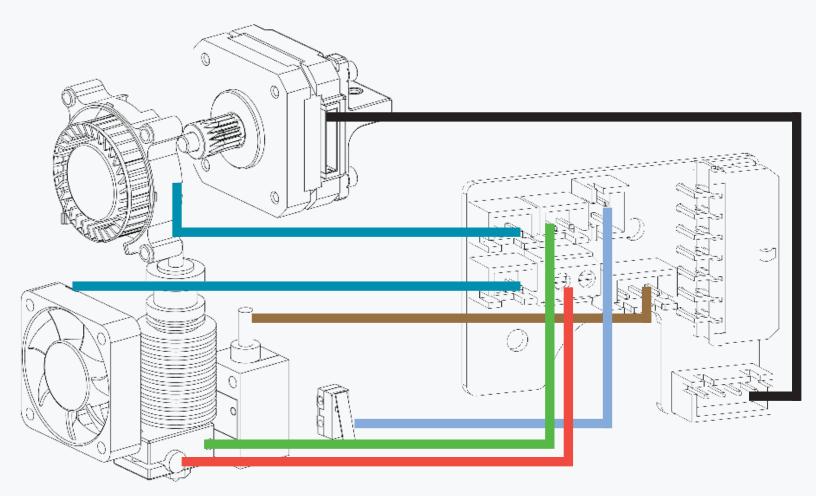
The layout of the toolhead pcb changed over the versions. For a full breakdown visit the link below.

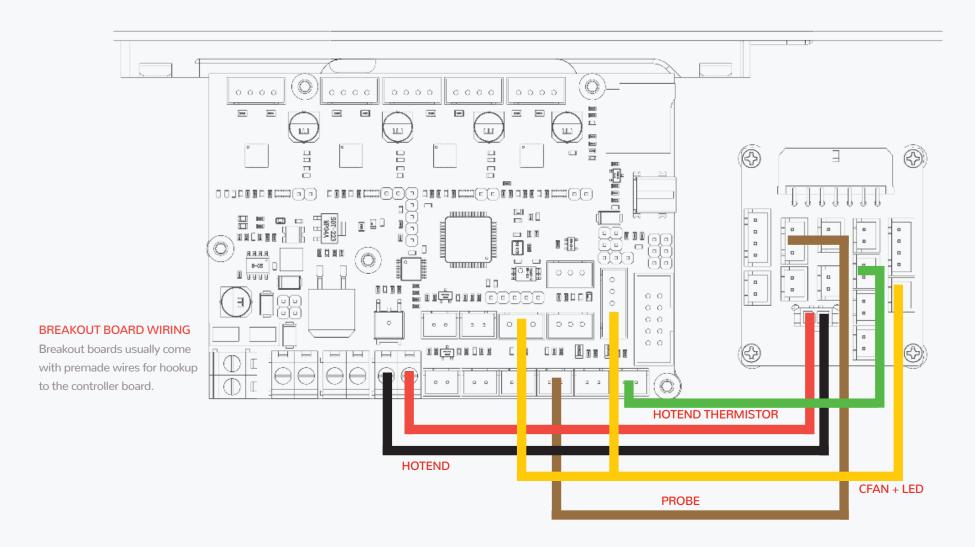


https://voron.link/zopduze

TOOLHEAD WIRING - TOOLHEAD PCB LDO MOTORS

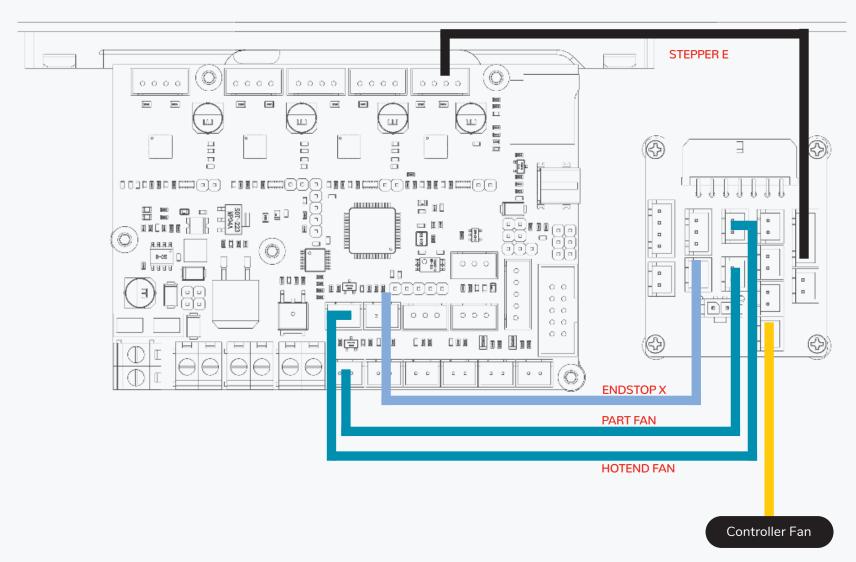




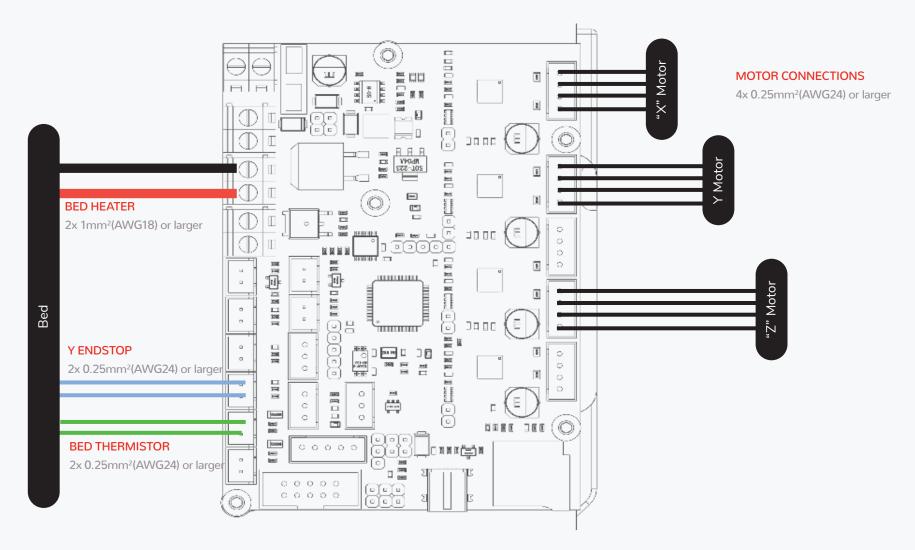


CONTROLLER WIRING - TOOLHEAD PCB

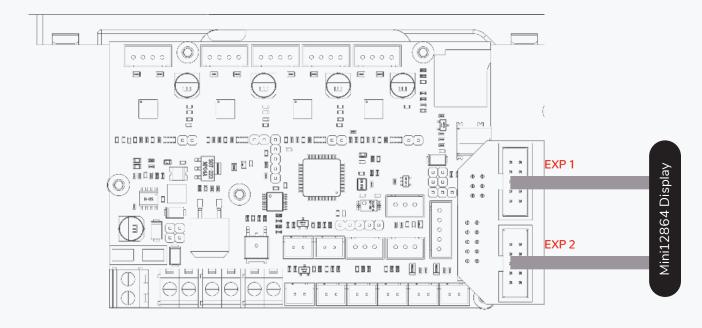




CONTROLLER WIRING WWW.VORONDESIGN.COM

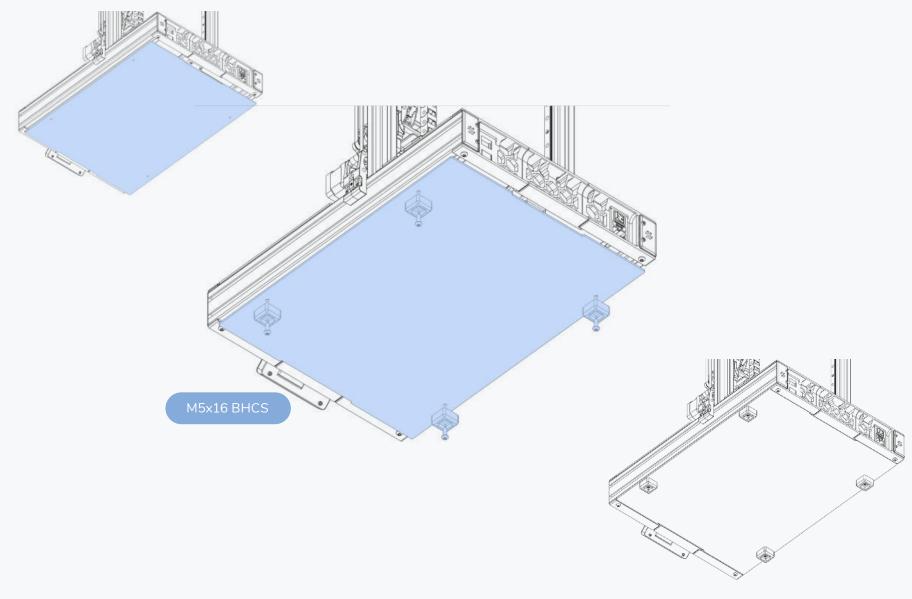






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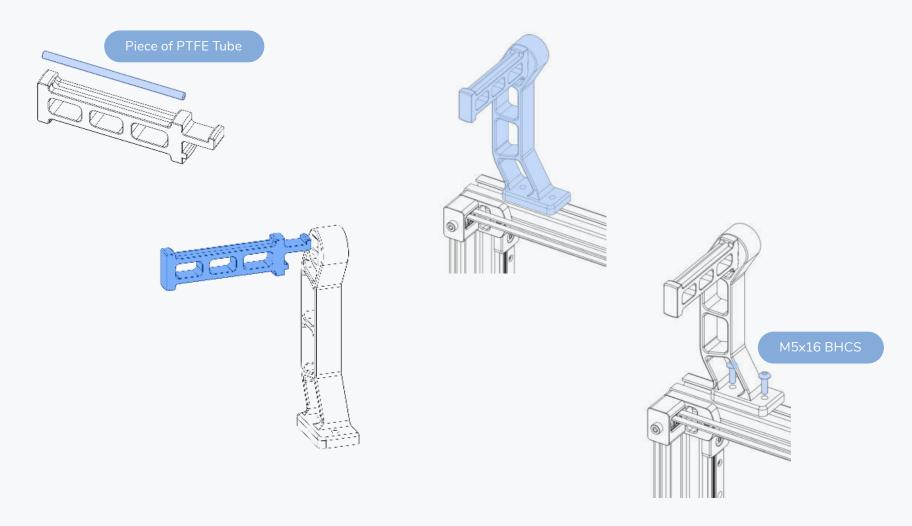
BOTTOM PANEL WWW.VORONDESIGN.COM

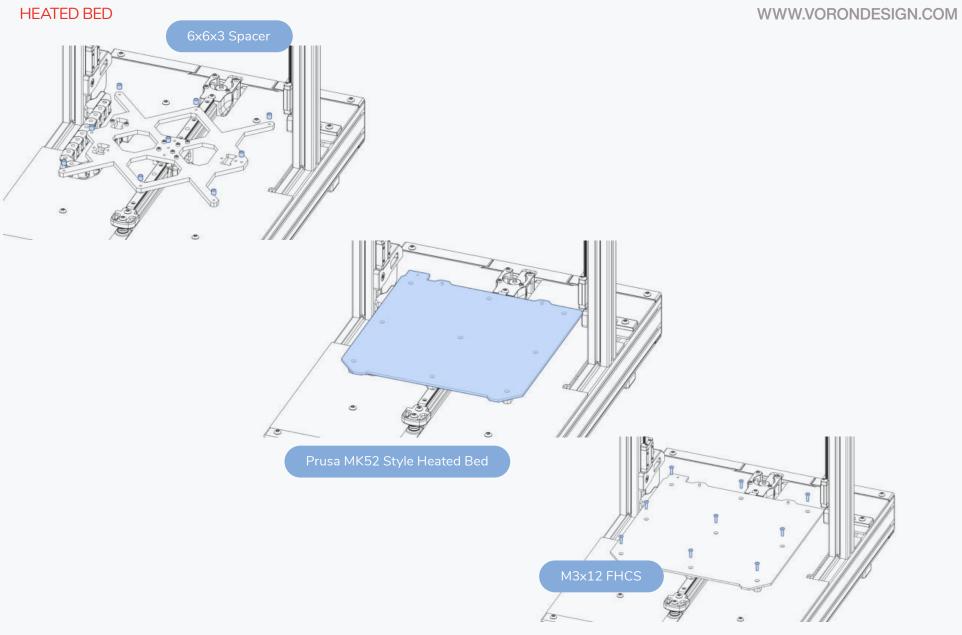


FINAL TOUCHES WWW.VORONDESIGN.COM

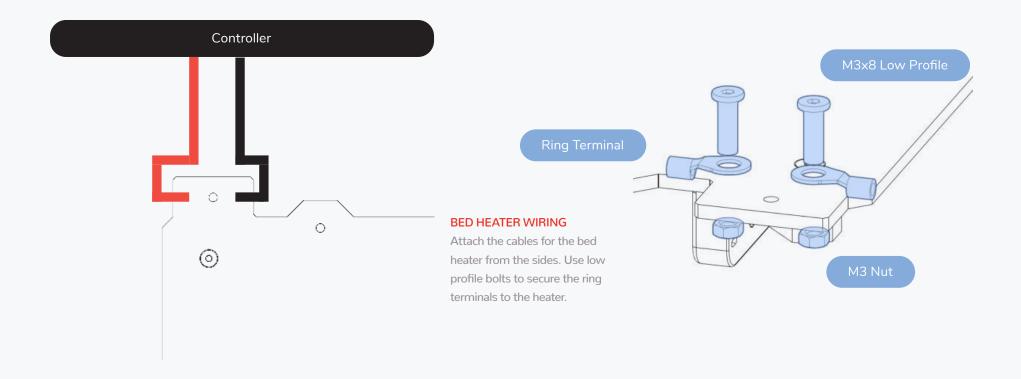


SPOOL HOLDER WWW.VORONDESIGN.COM

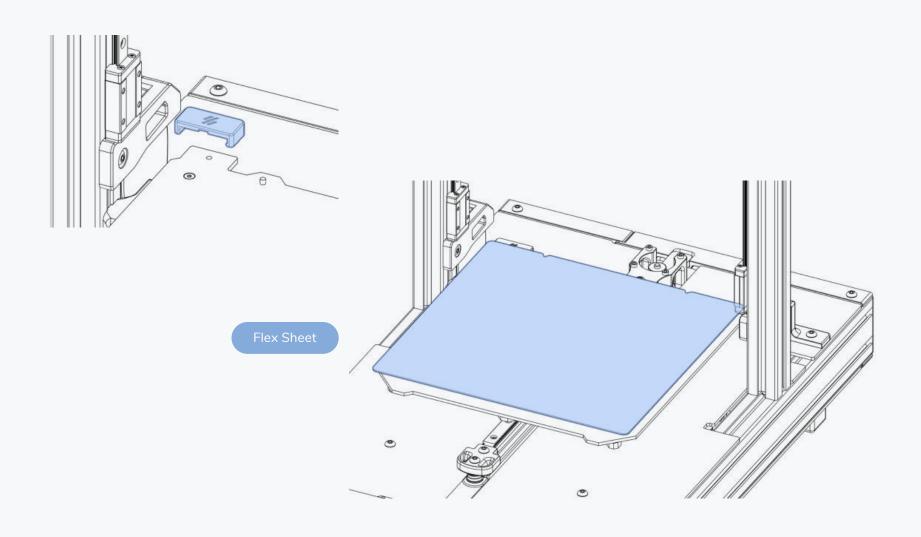




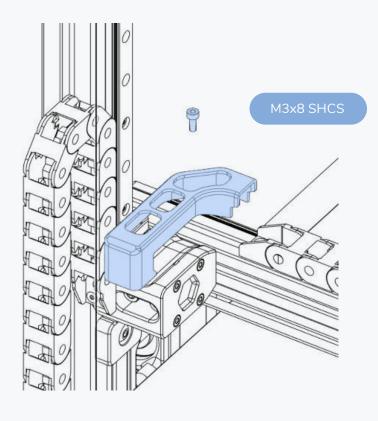
HEATED BED WWW.VORONDESIGN.COM



HEATED BED WWW.VORONDESIGN.COM



CABLE COVER WWW.VORONDESIGN.COM



NEXT STEPS WWW.VORONDESIGN.COM

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

This manual is designed to be a simple reference manual for the build process.

For details on the setup of the electronics and other initial steps of your new printer please visit our documentation available on github and docs.vorondesign.com.



https://docs.vorondesign.com/



https://github.com/VoronDesign/Voron-Switchwire

HOW TO GET HELP

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



https://discord.gg/voron





Website

www.vorondesign.com

Github

https://github.com/vorondesign

Discord

https://discord.gg/voron

