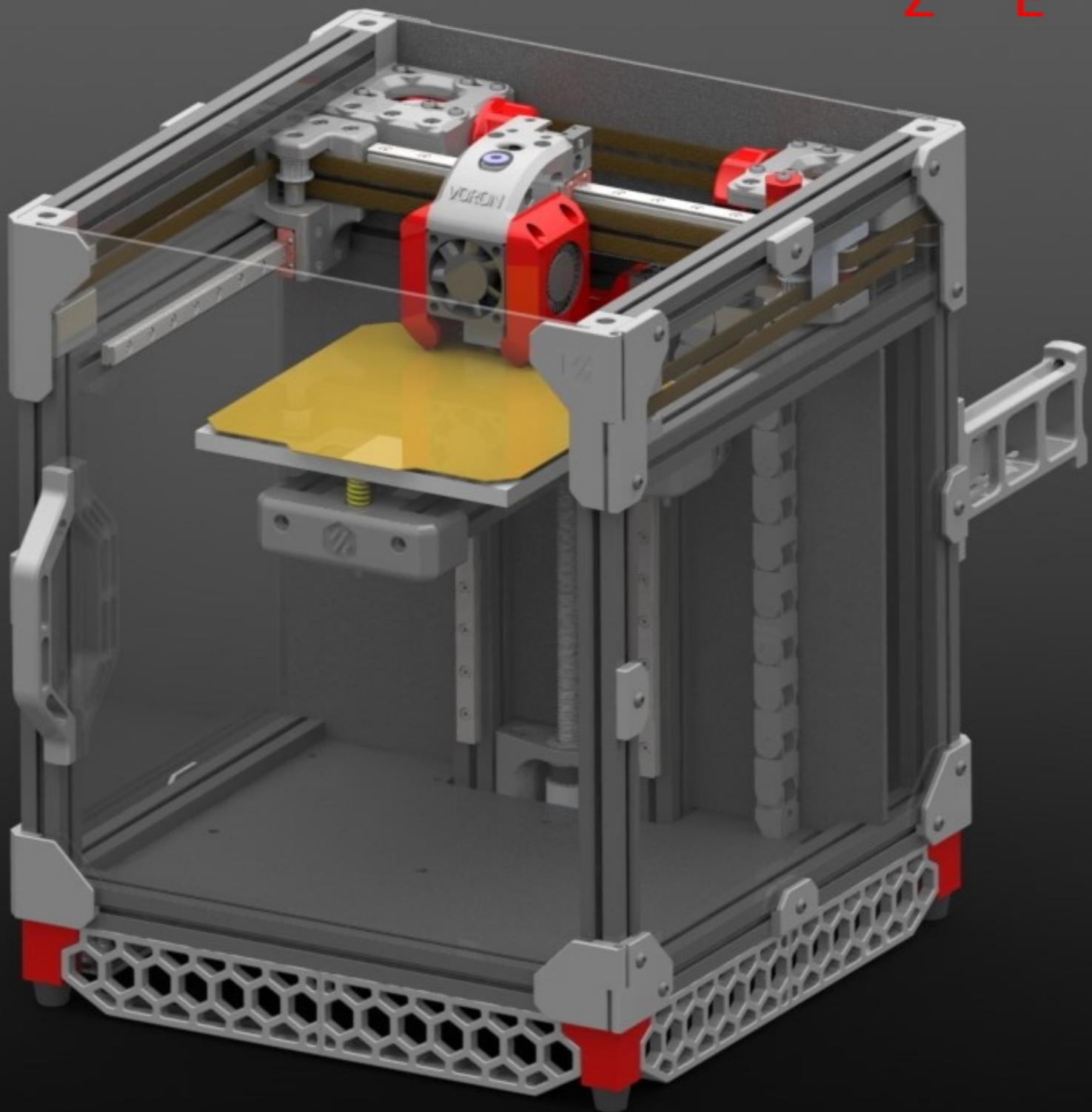


VORON
Z E R O



Assembly Manual



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 channel (#voron_v0_questions) for any tips and questions that may halt your progress.

Most of all, good luck!

- The VORON Development Team

File Key / Part Printing Guidelines and Standards

File Key	
Primary Color	nothing at start of file name
Accent Color	[a]_ at start of file name
Quantity Required	_x# near end of file name

Part Printing Guidelines and Standards	
Approved FDM Materials	ABS or ABS+ Only
Layer Height	0.2mm
Extrusion Width	Forced 0.4mm
Infill Percentage	40% minimum
Infill Type	Grid, Gyroid, Honeycomb, Triangle or Cubic
Wall Count	4 minimum
Solid Top/Bottom Layers	5 minimum

Very Important Steps

Fastener Size/Type Part

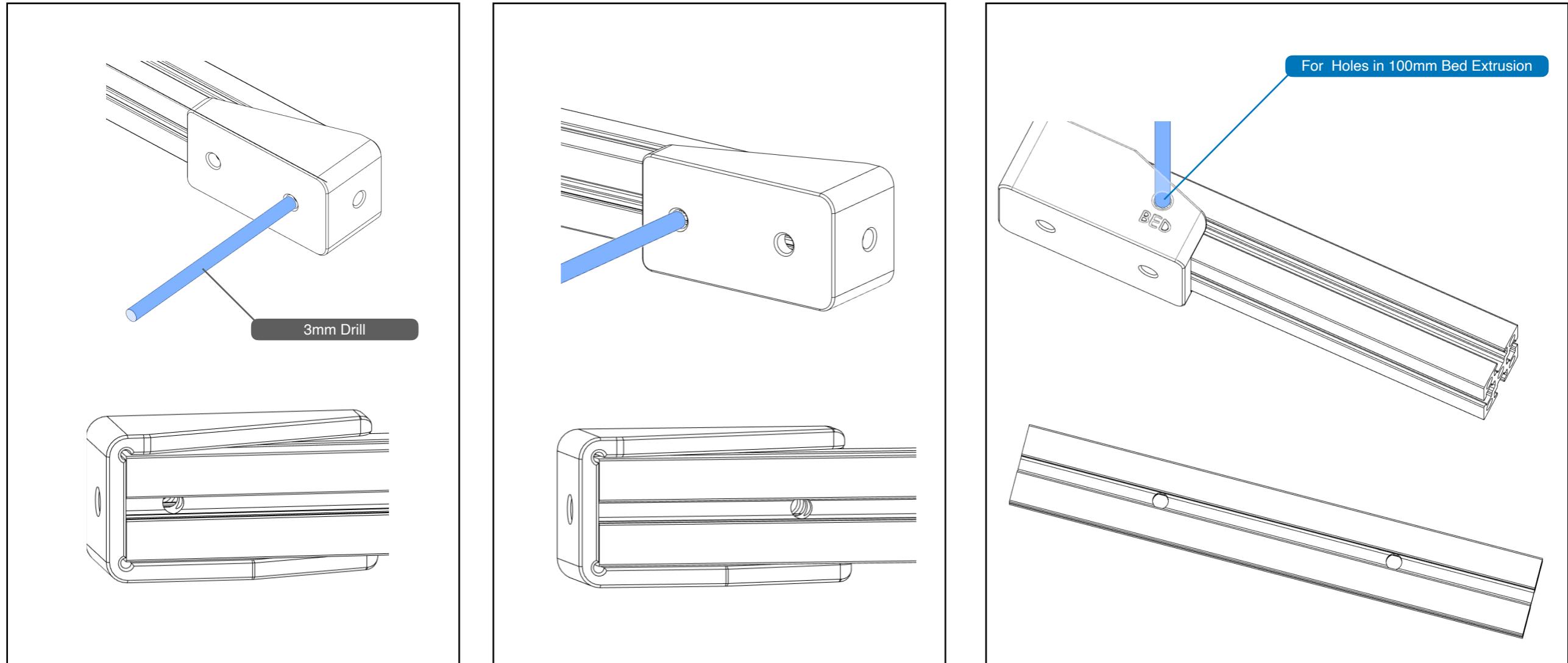
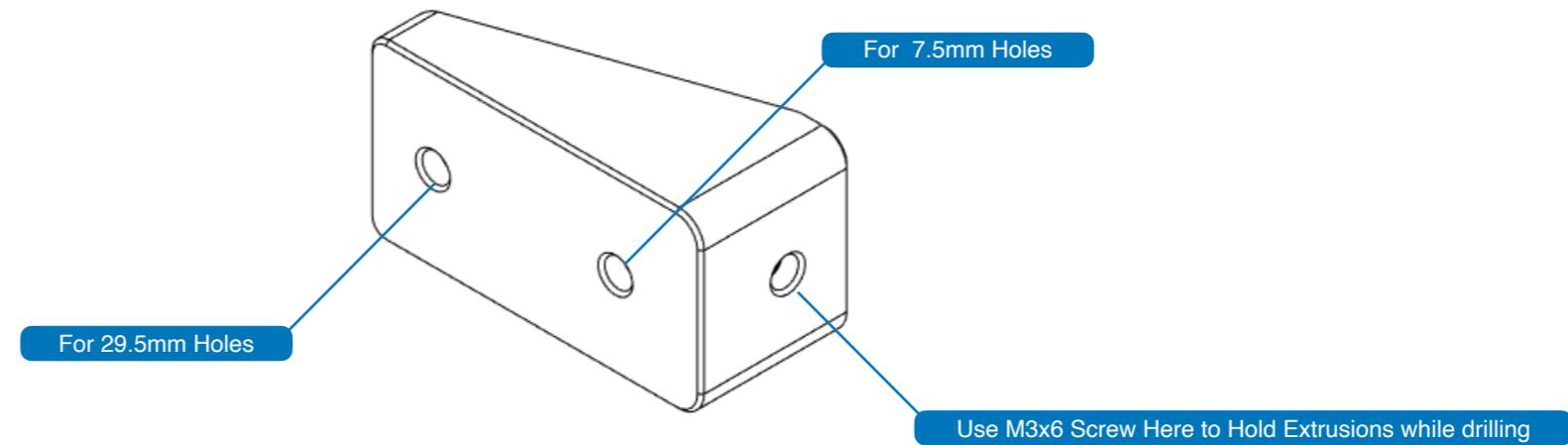
Notes and Tips

Preloaded M3 Nuts

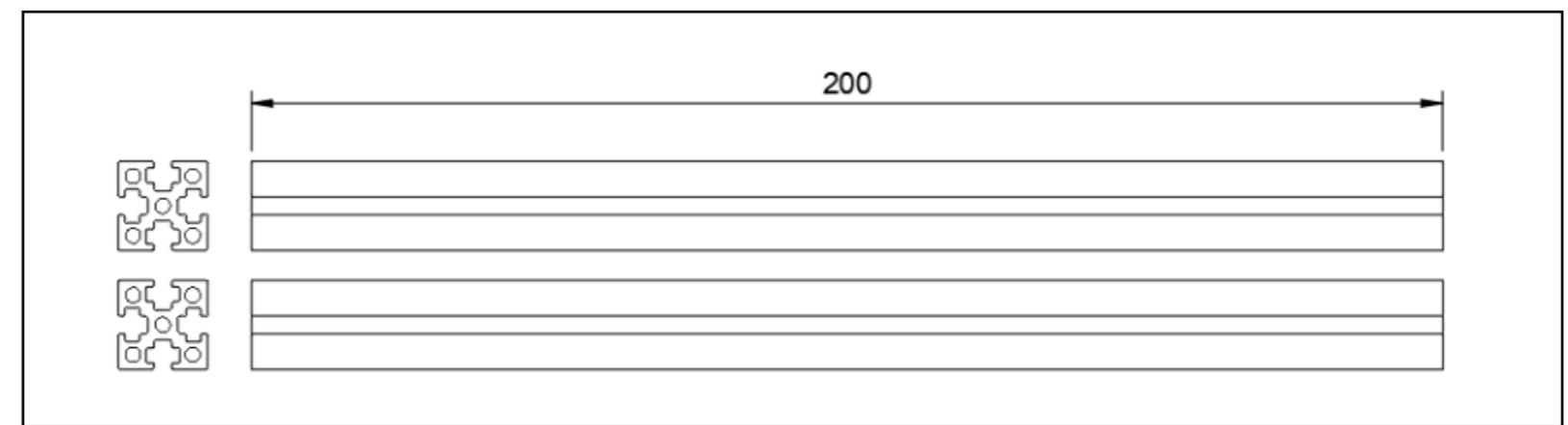
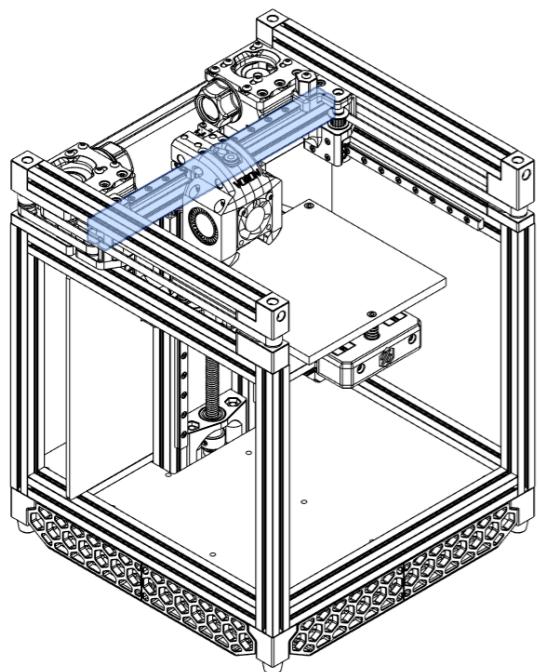
Important Definitions and Adhesives List

Callout	Definition
BHCS	Button Head Cap Screw (ISO 7380-1)
SHCS	Socket Head Cap Screw (ISO 4762/DIN 912)
Shim	Shim Ring (DIN 988)
Nut	DIN934 or equivalent
Thumb Nut	DIN 467 or equivalent
Low Strength Thread Locker	Loctite 222 (aka "Purple")
#X	This callout means you need to add the specified number of M3 nuts into the indicated slot at this step to be used by a fastener later in the assembly at which point adding a nut in will not be possible

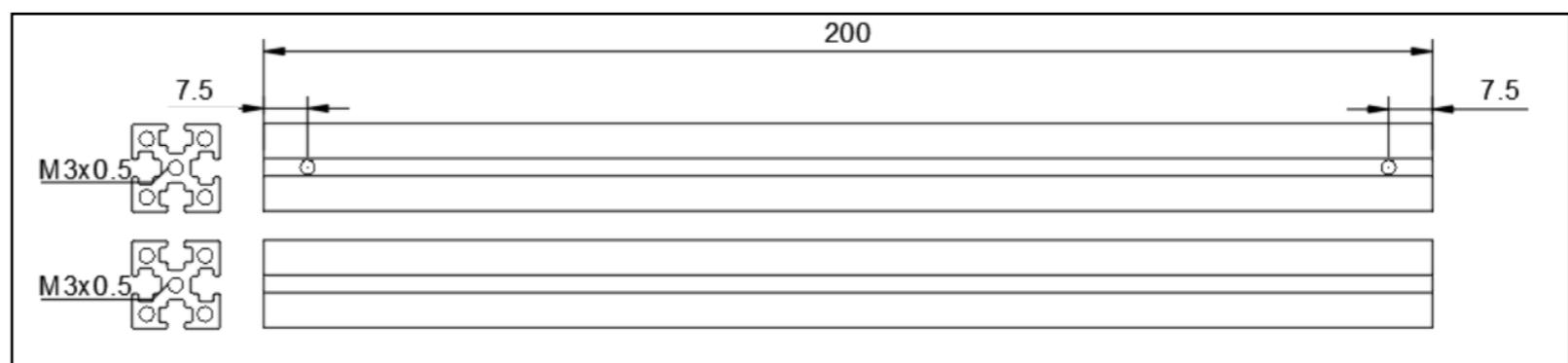
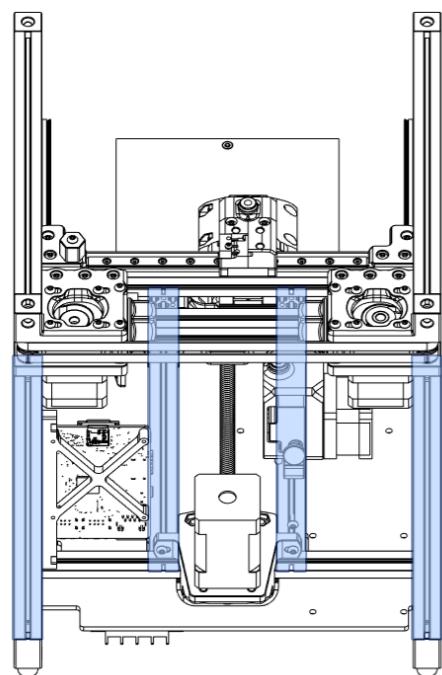
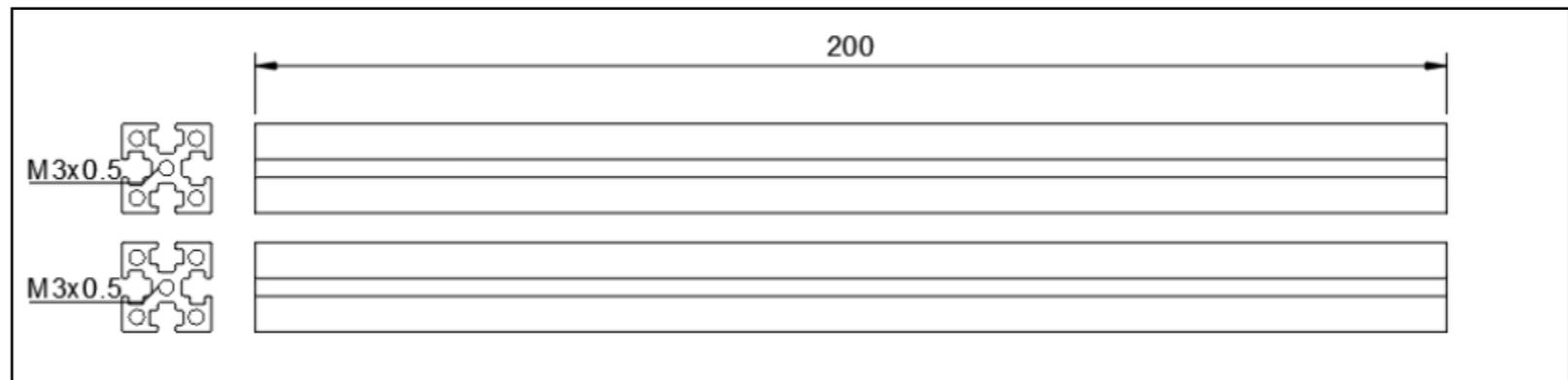
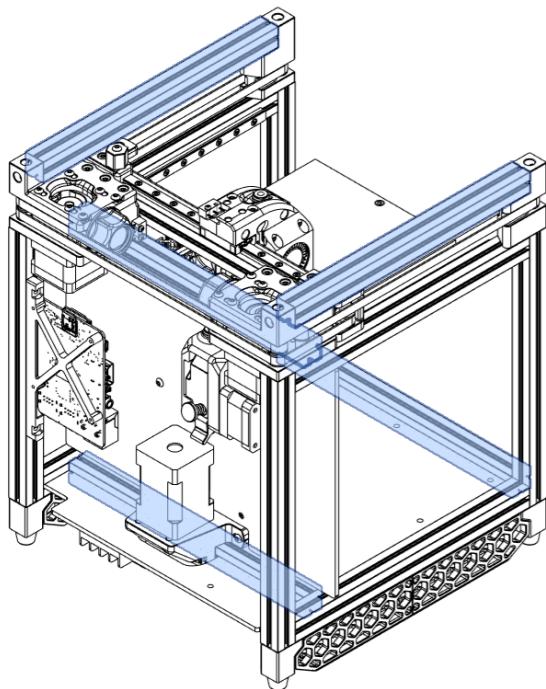
Frame Drilling Guide



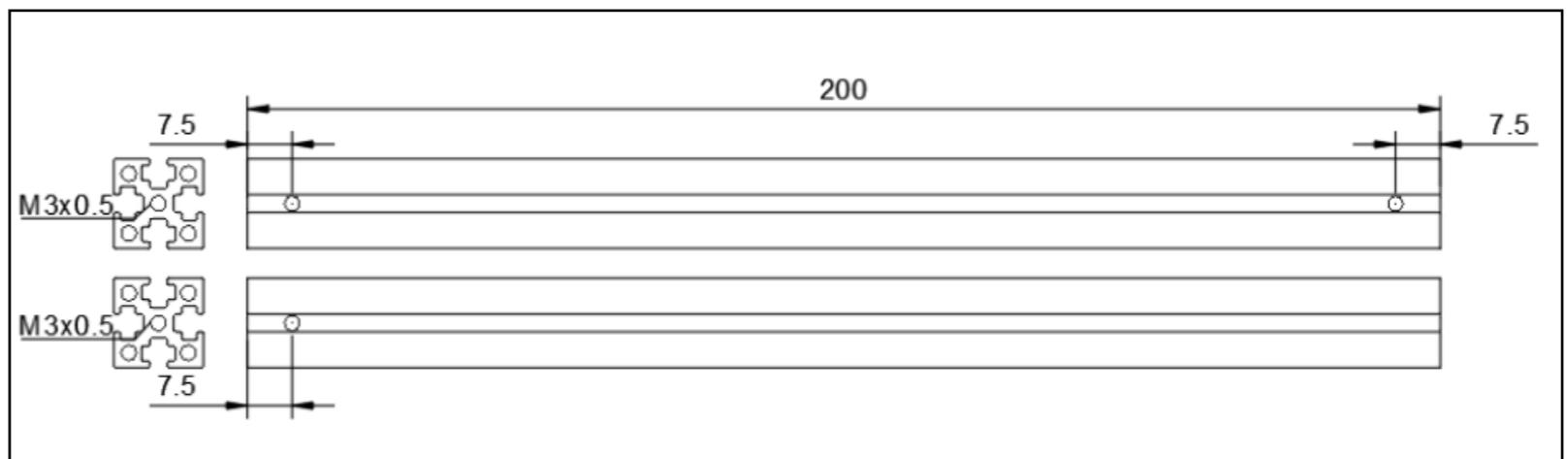
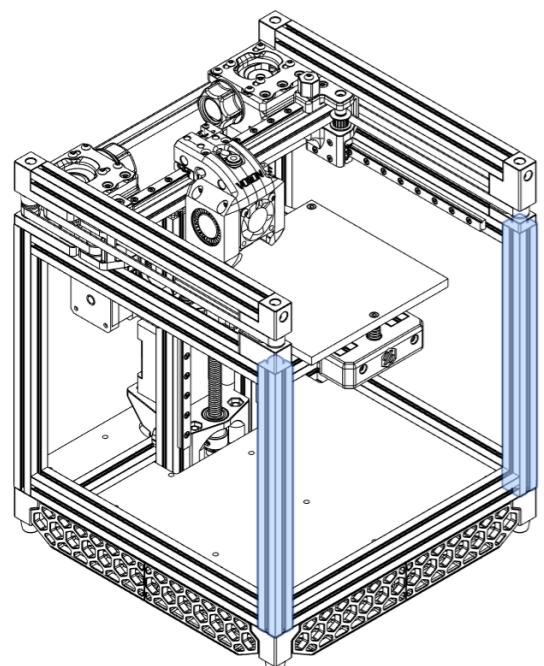
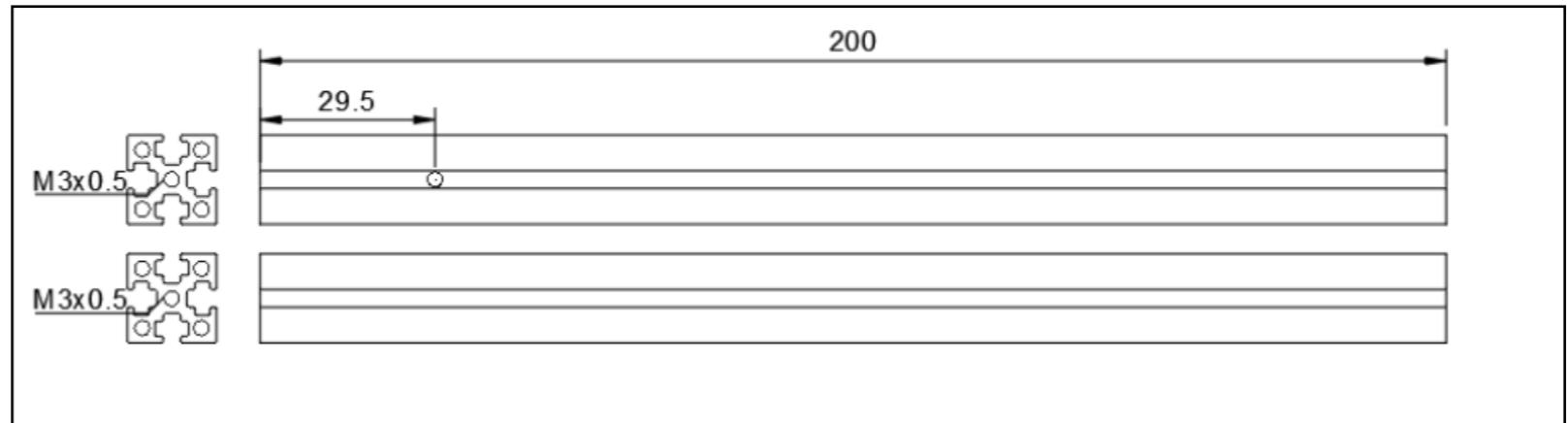
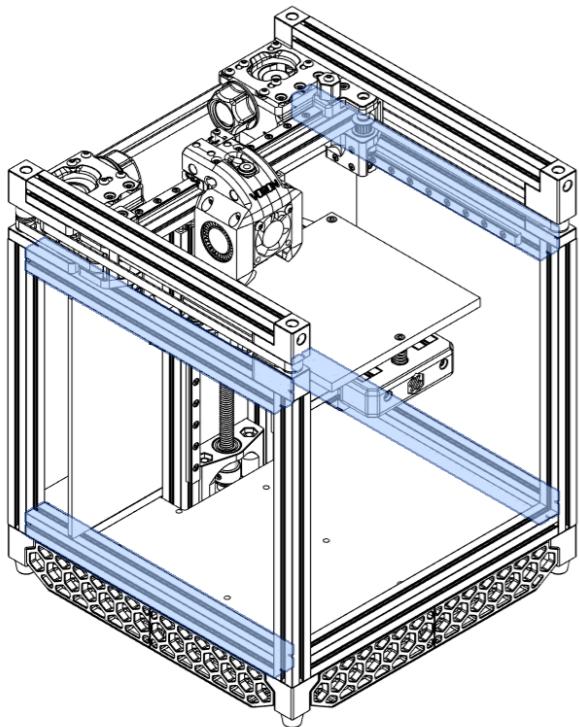
Drilled holes are for hex wrench access only they are not required to be precision holes. top view and side view of each extrusion type are boxed below



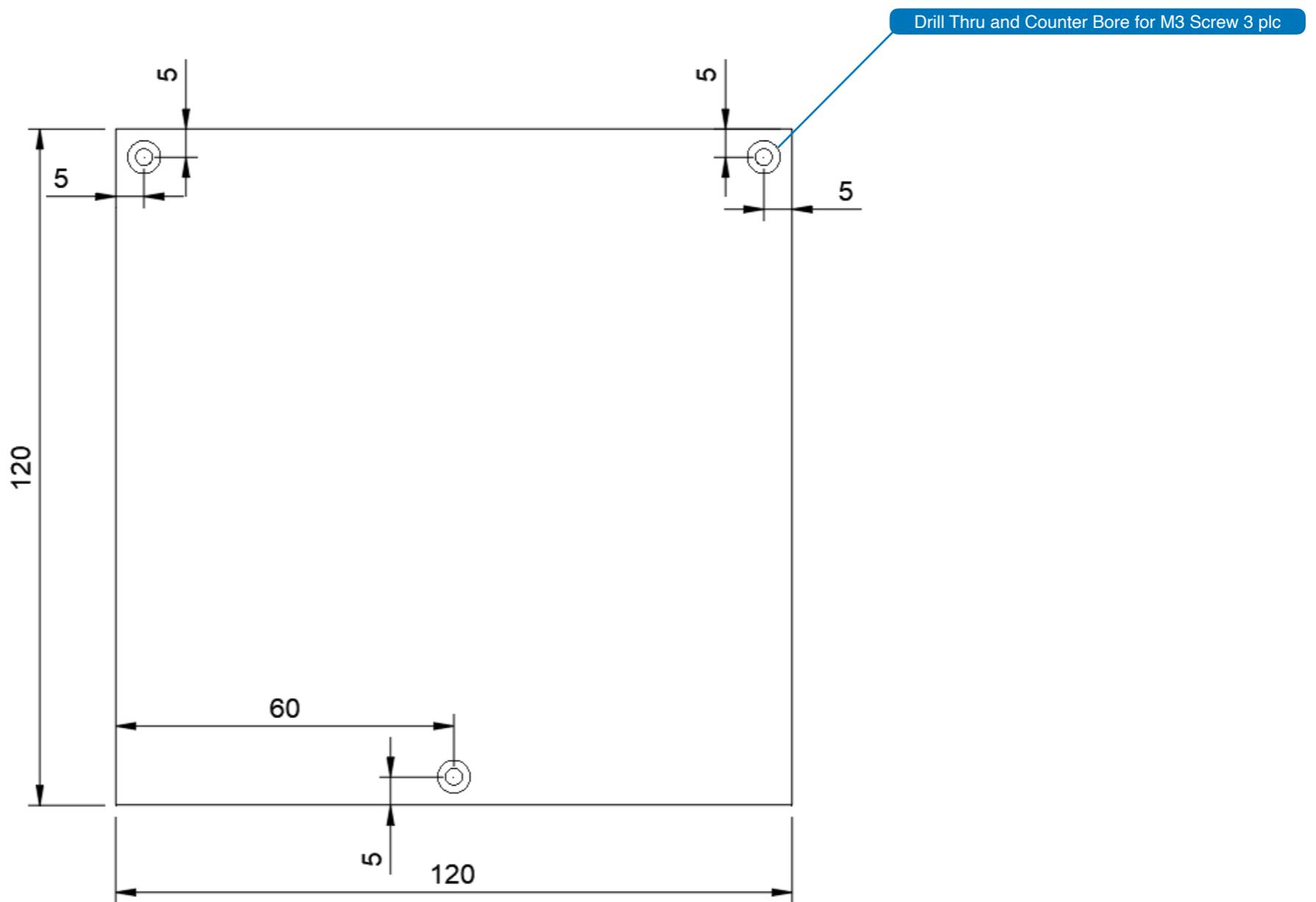
Frame Drilling

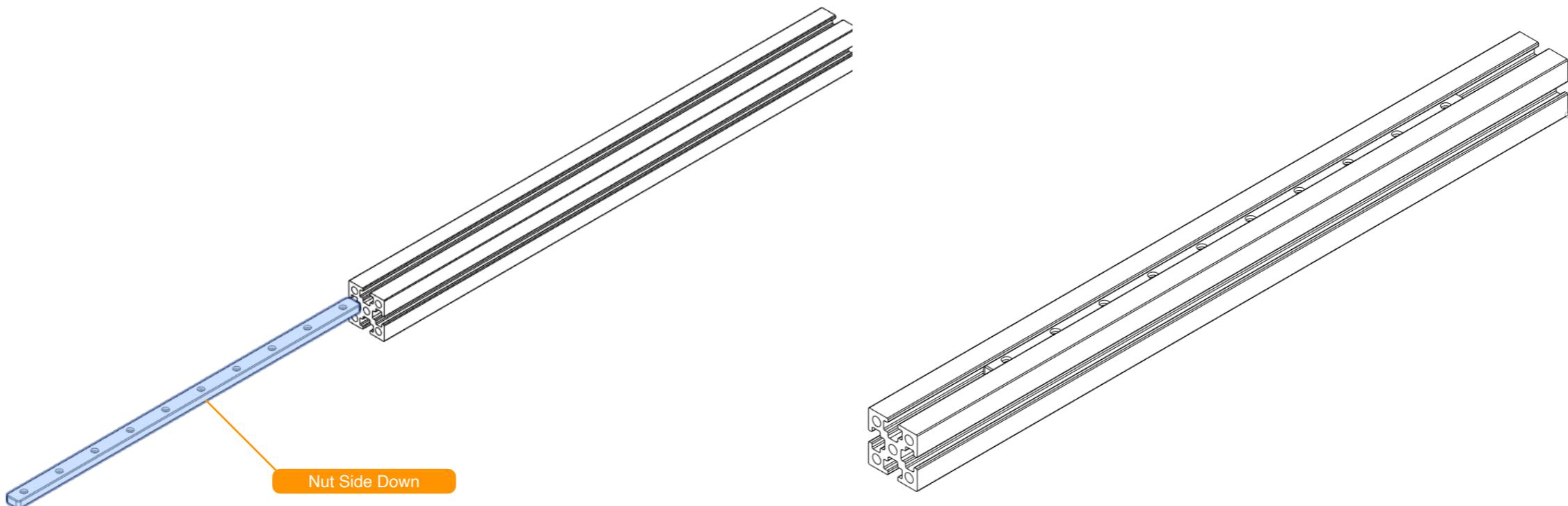
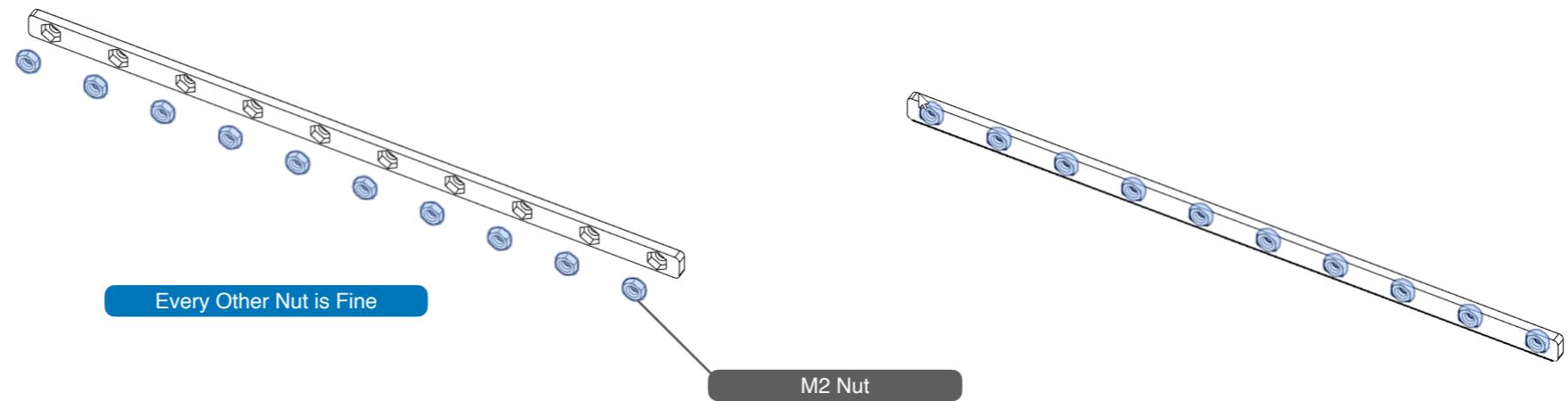
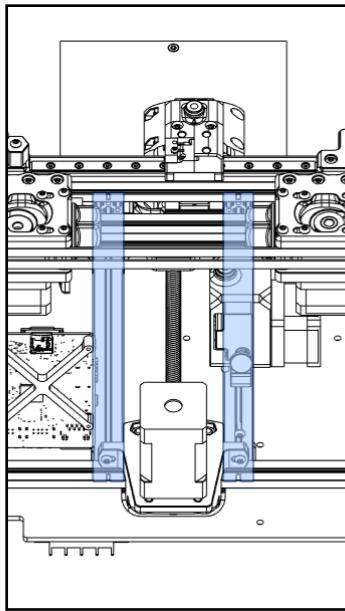


Frame Drilling



Bed Assembly

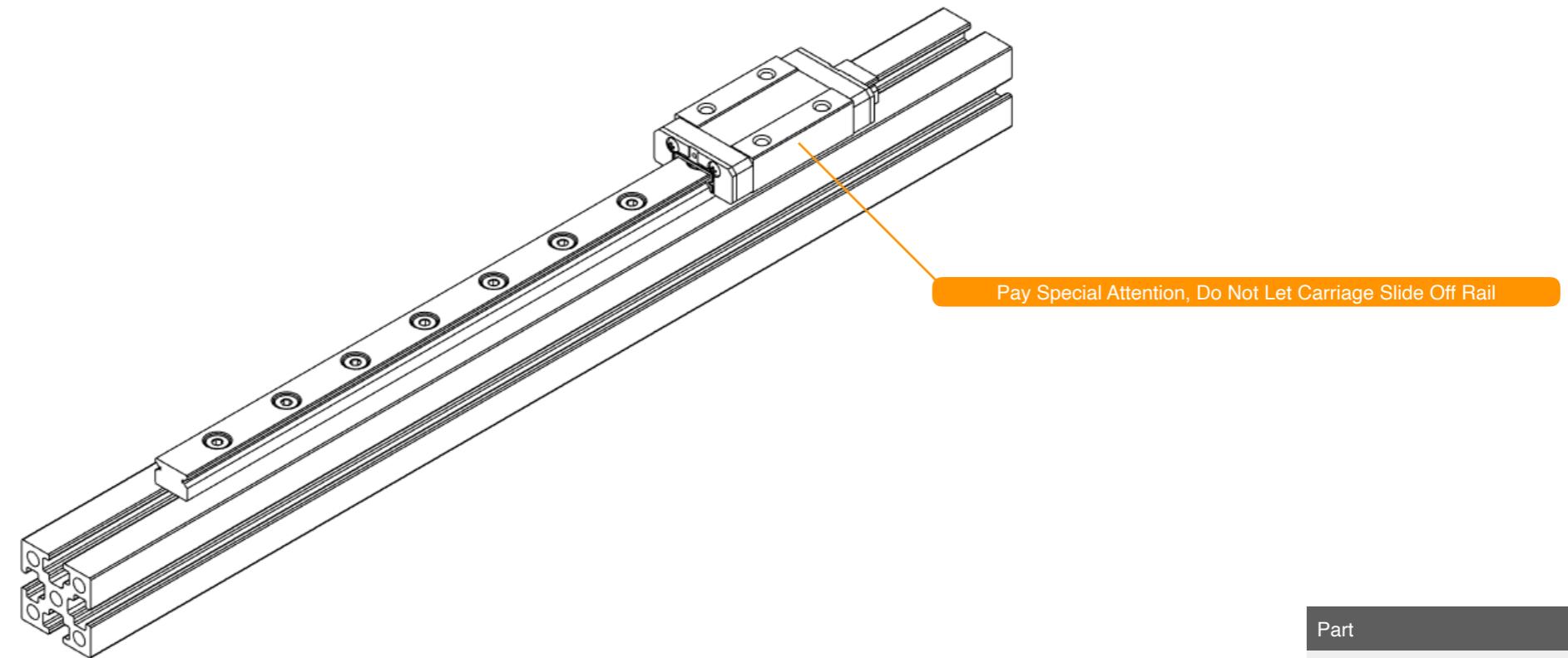
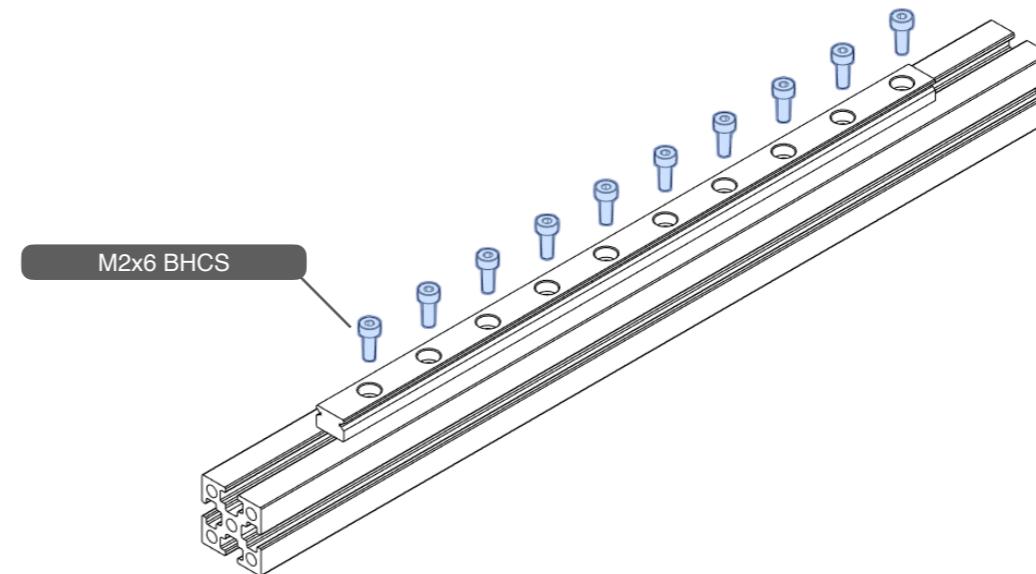
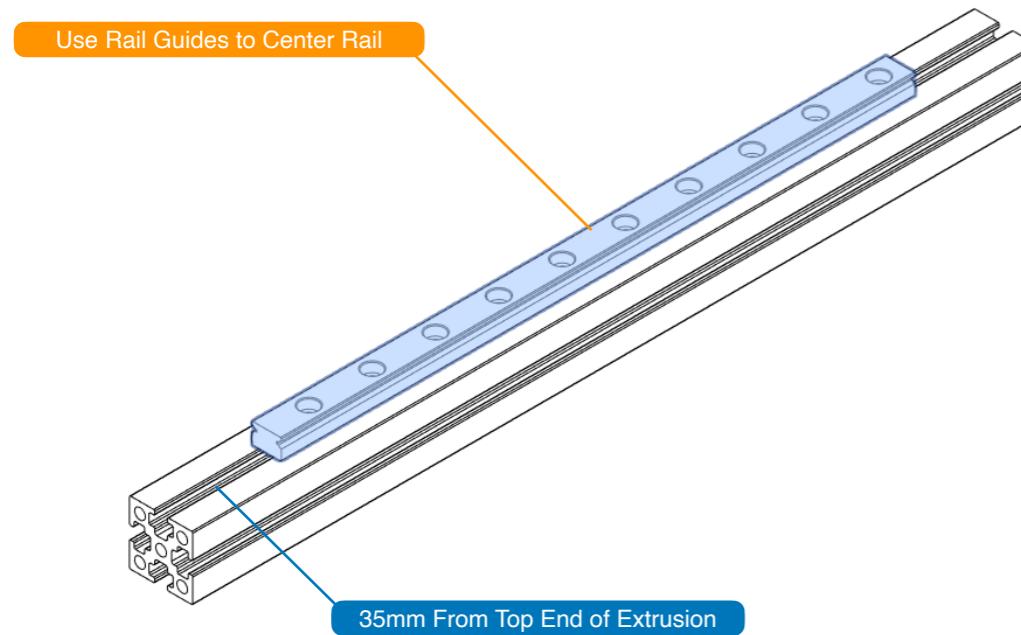




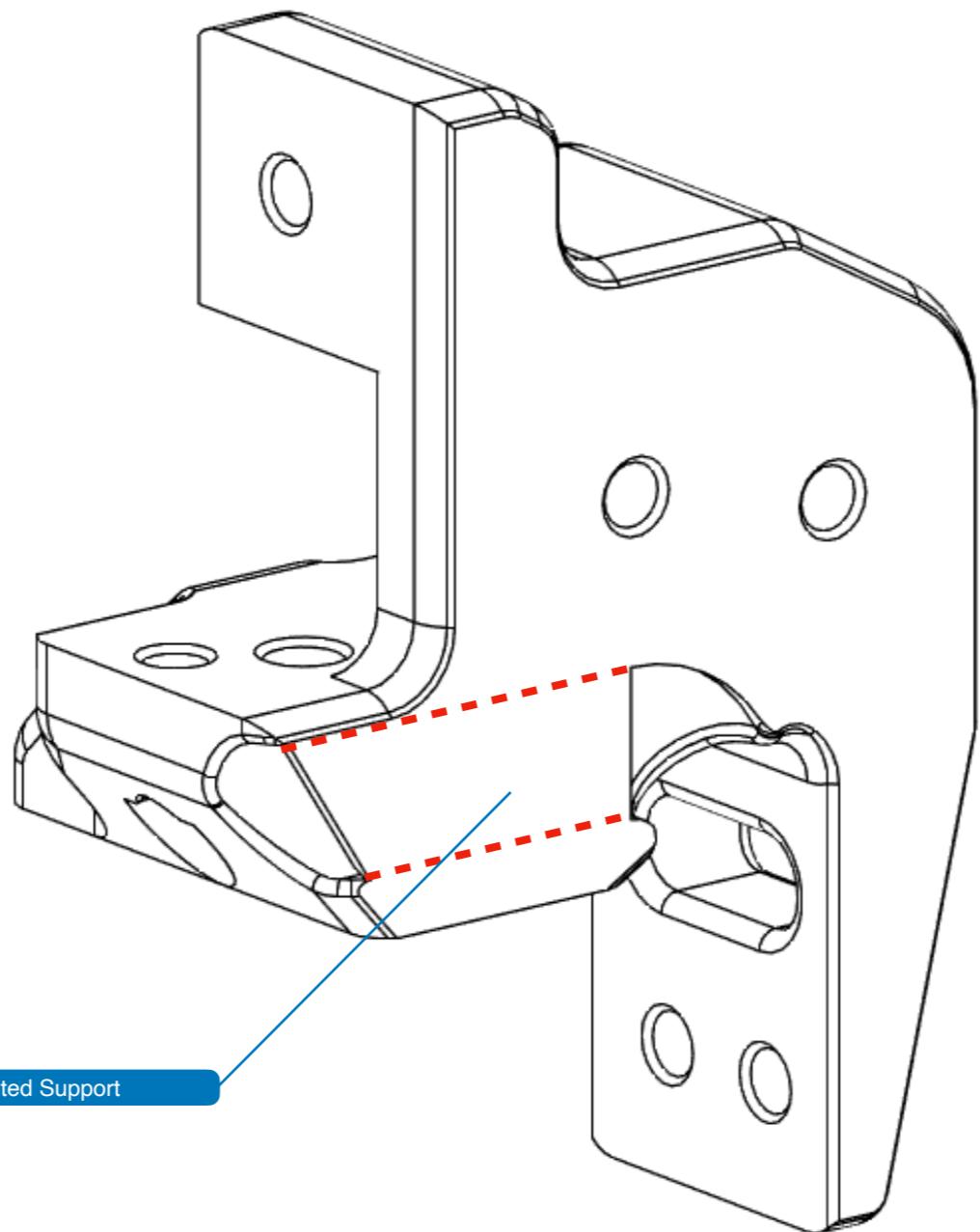
Part	Qty
M2 Nut	5-10
15x15x200 Extrusion	2

Z Rail Installation

2x

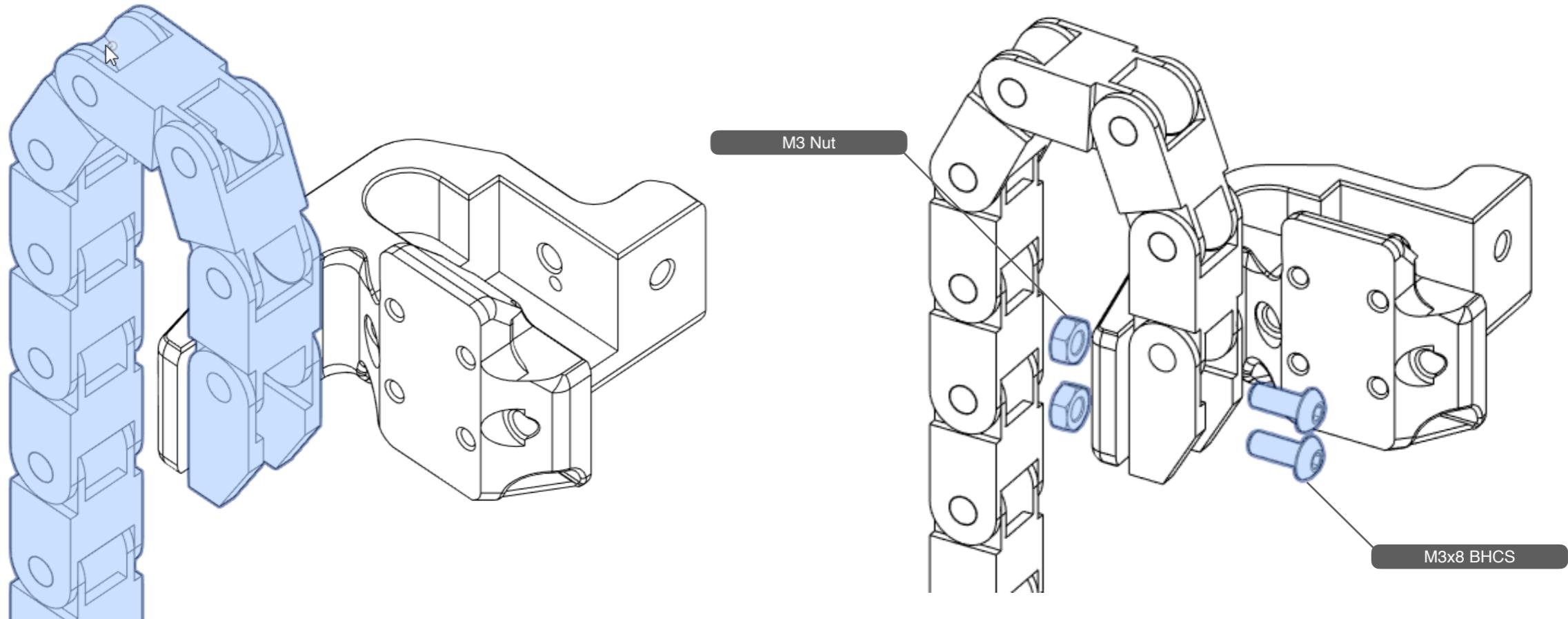


Part	Qty
M2x6	5-10
MGN7R	2



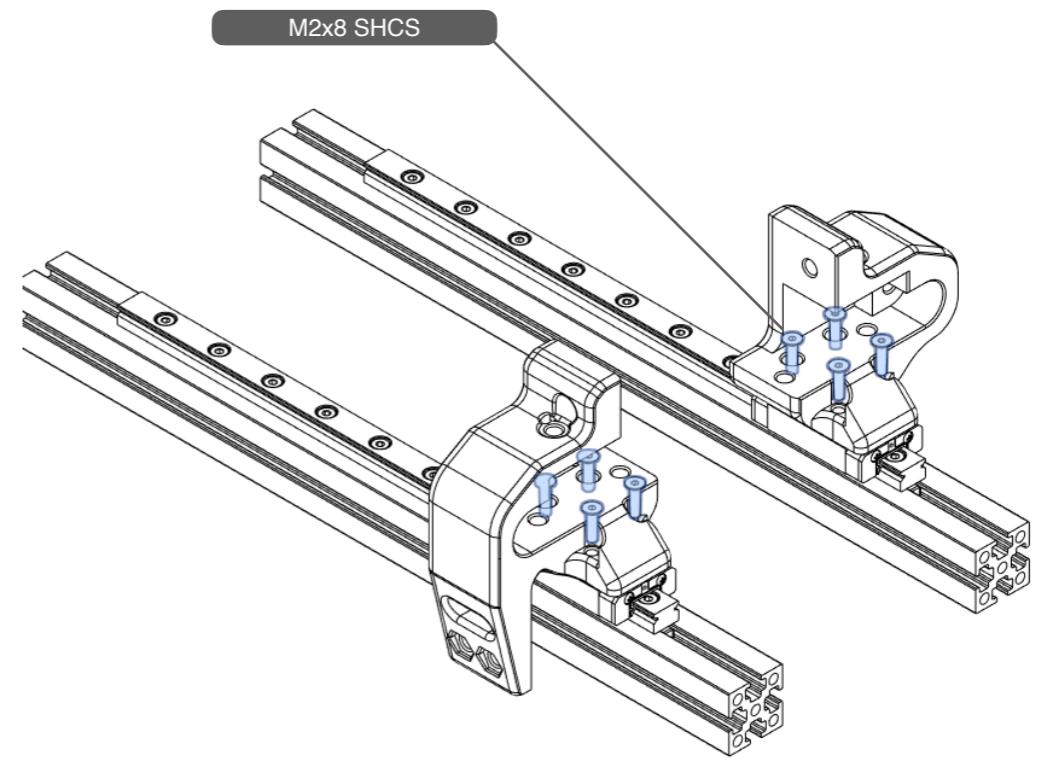
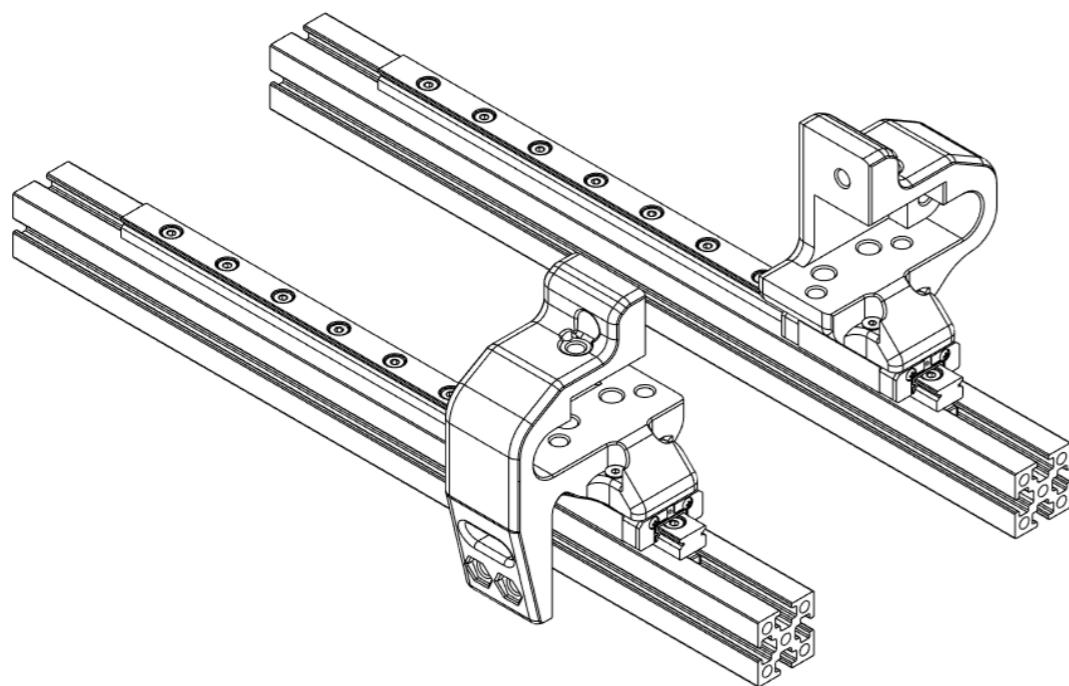
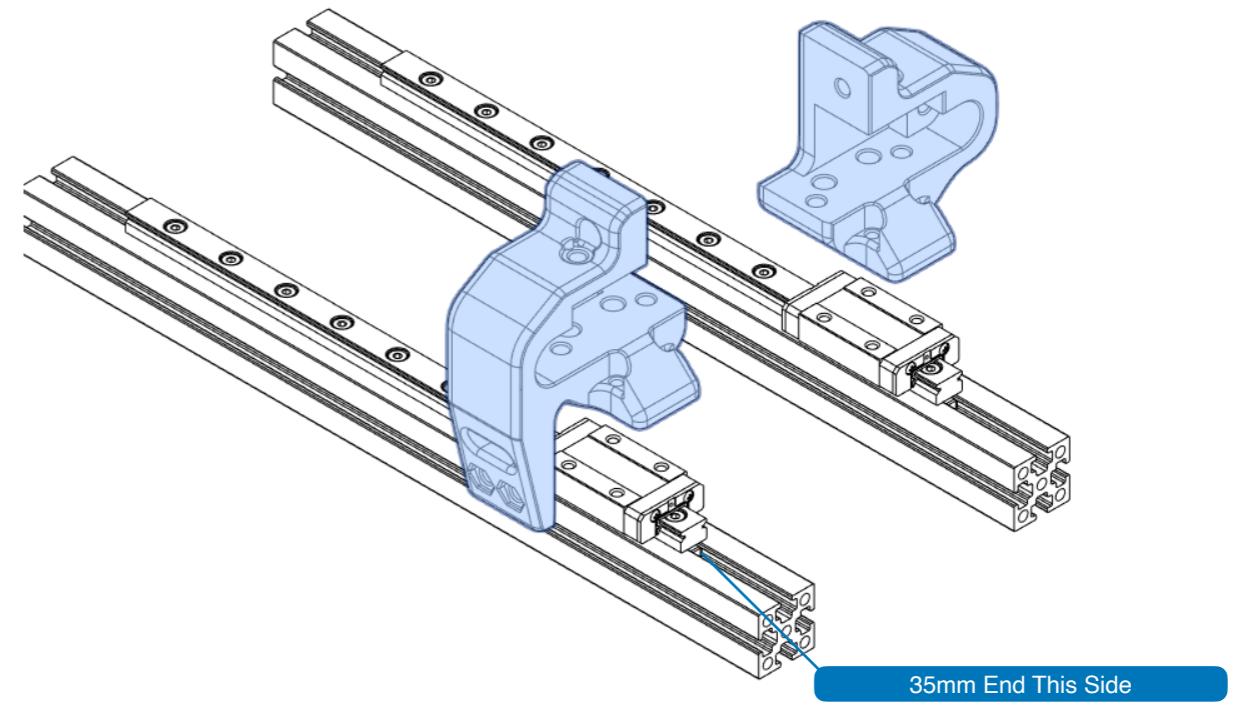
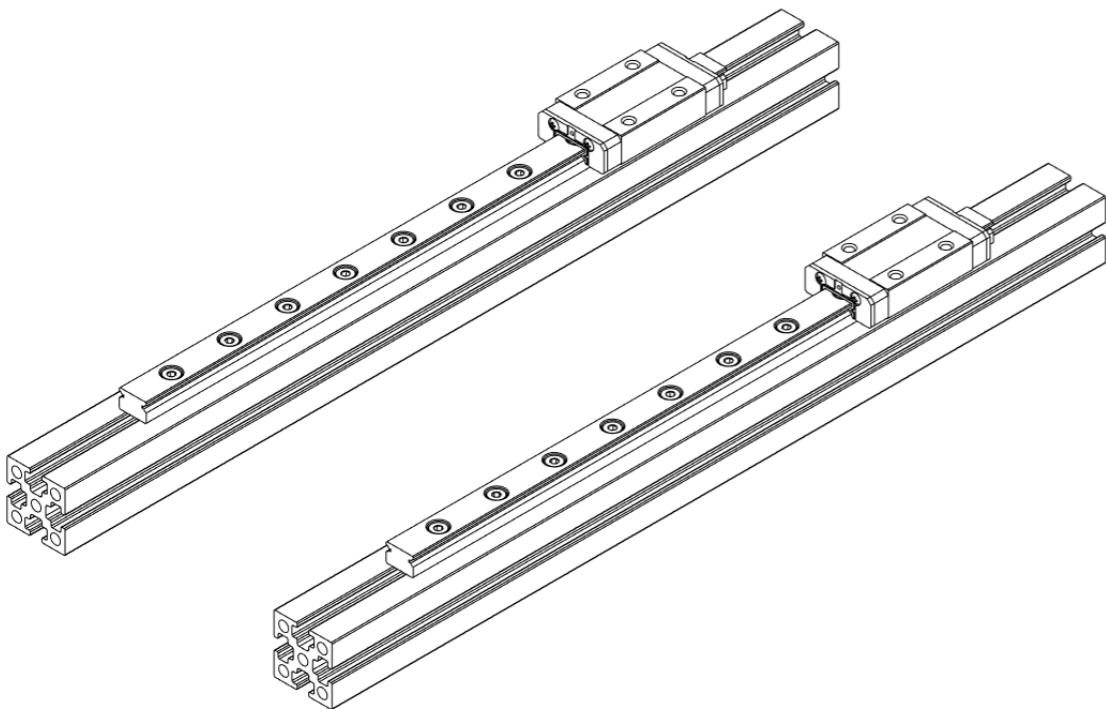
Bed Frame Assembly

Chain Purposely Not Shown In Later Images

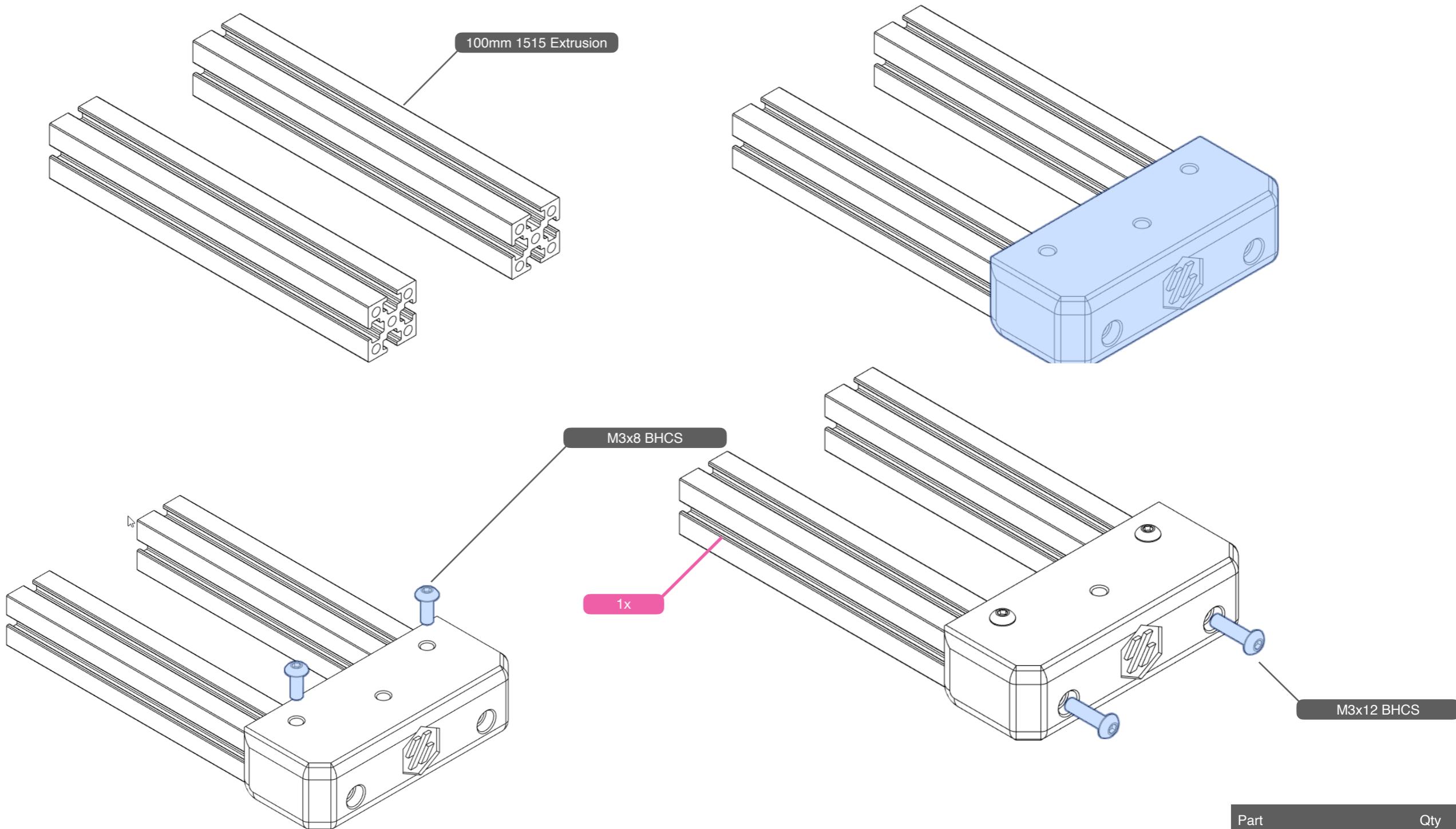


Part	Qty
M3x8 BHCS	2
M3 Nut	2

Bed Frame Assembly

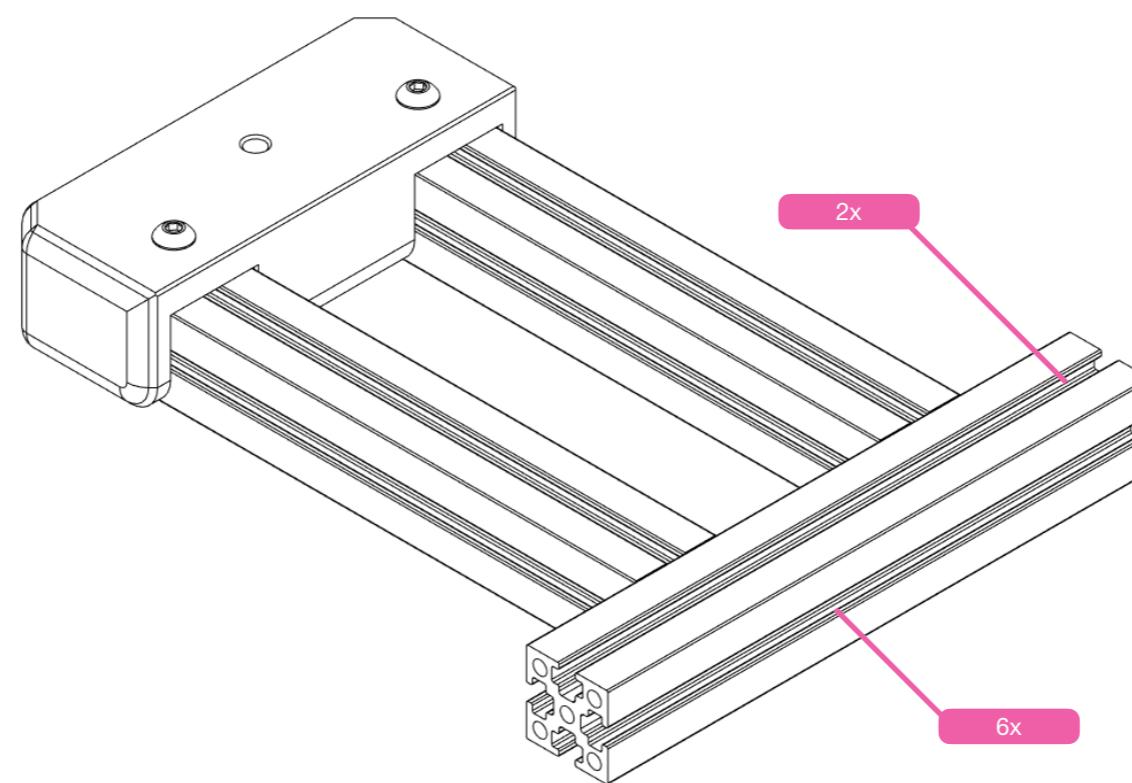
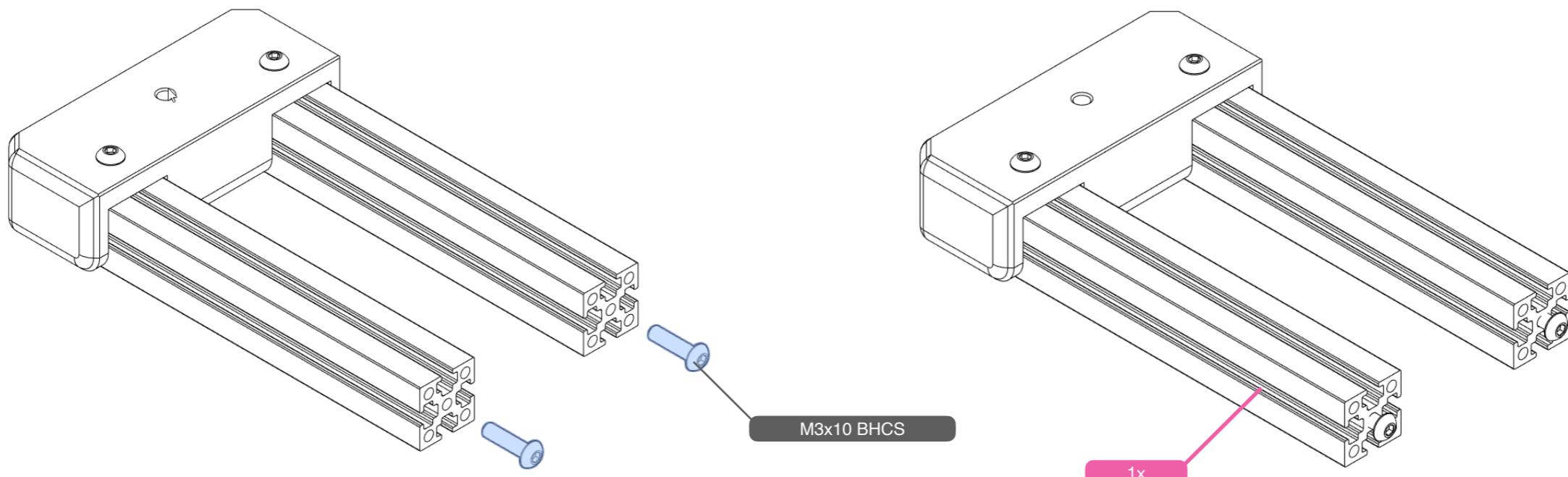


Bed Frame Assembly



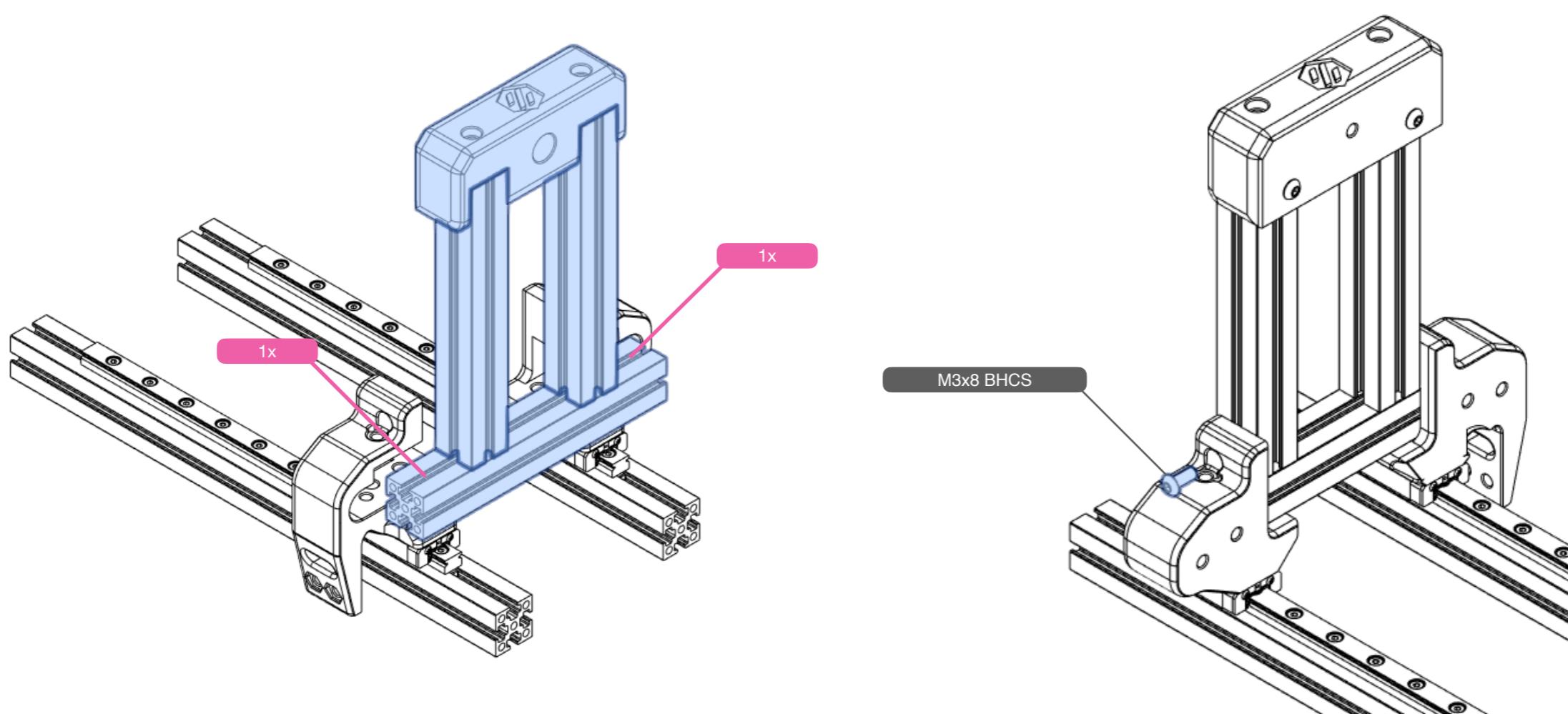
Part	Qty
100mm Extrusion	2
M3x8 BHCS	2
M3x12 BHCS	2
M3 Nut	3

Bed Frame Assembly



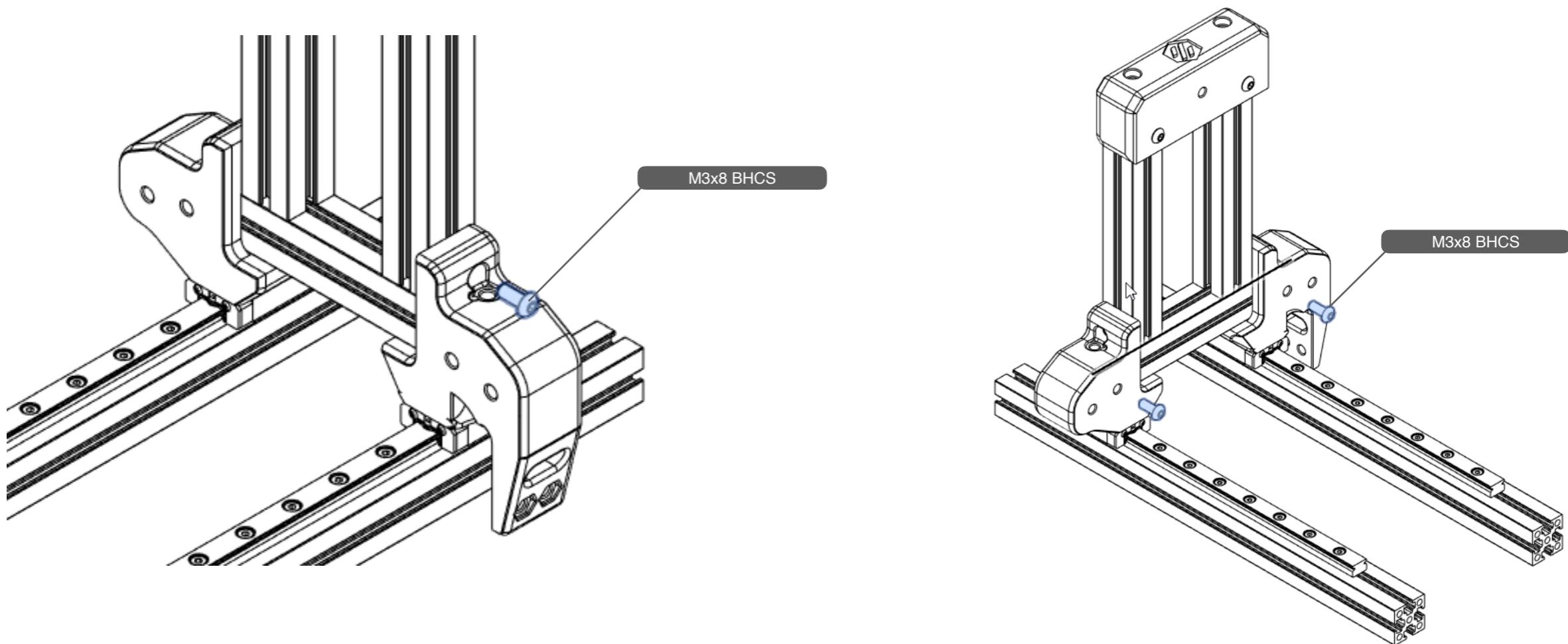
Part	Qty
100mm Extrusion	1
M3x10 BHCS	2
M3 Nut	9

Bed Frame Assembly



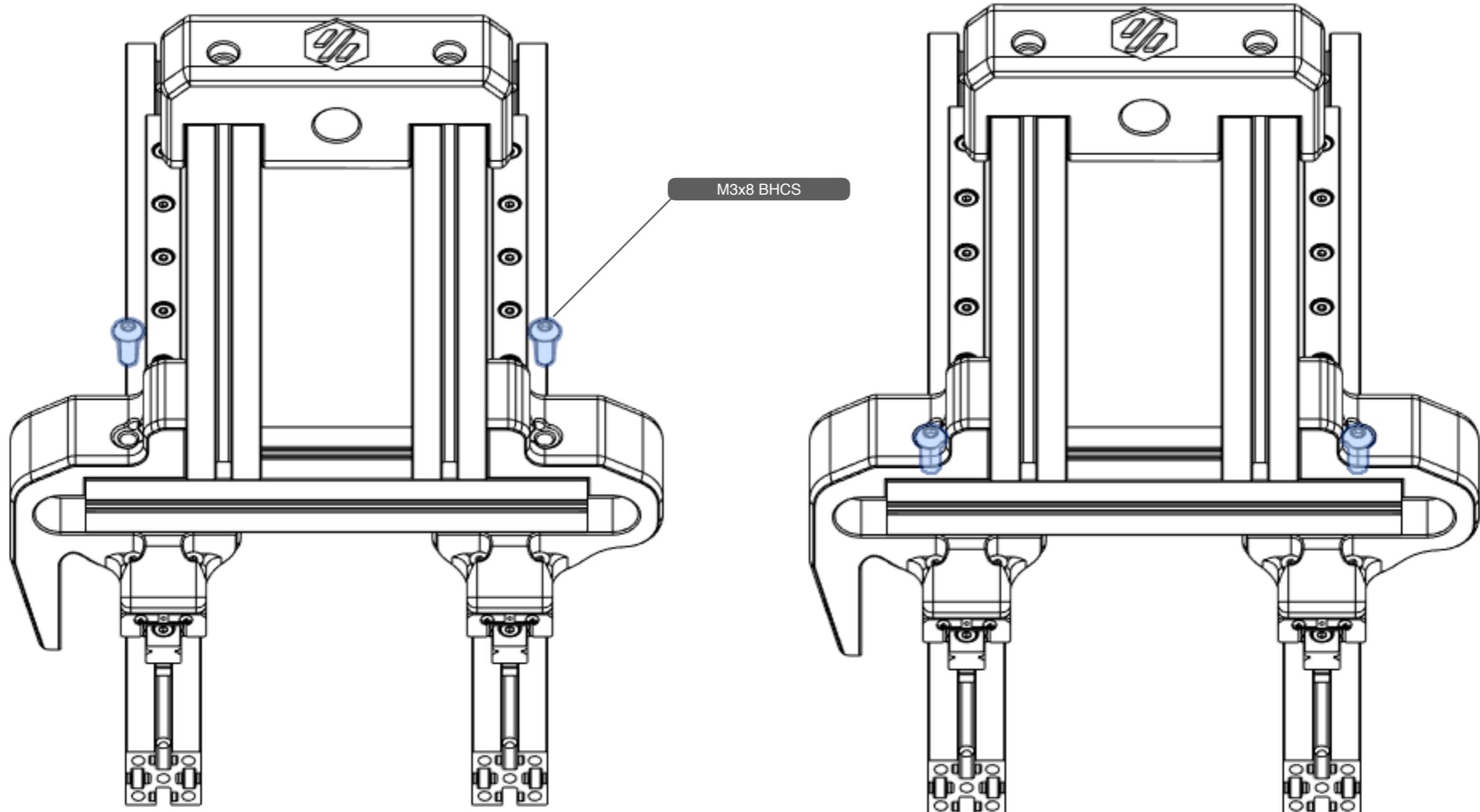
Part	Qty
M3x8 BHCS	2
M3 Nut	2

Bed Frame Assembly

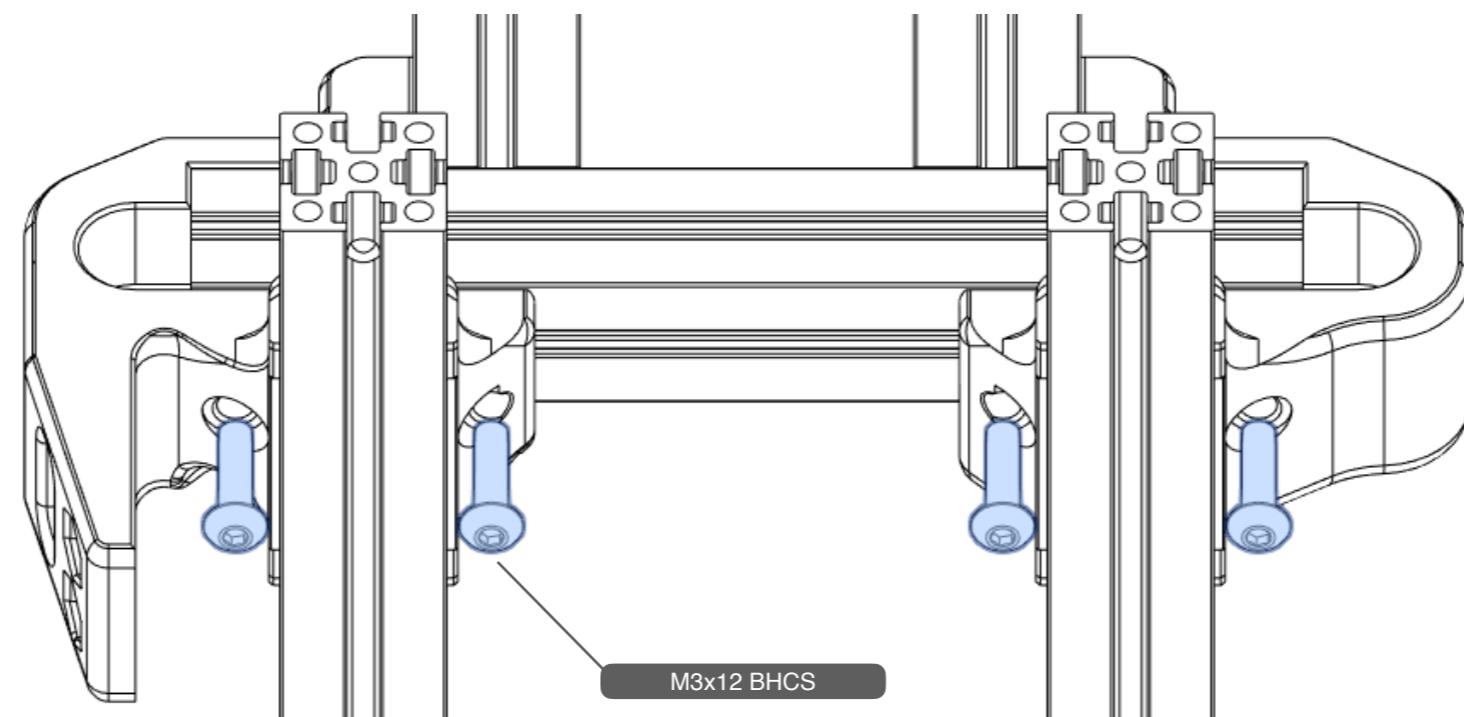


Part	Qty
M3x8 BHCS	3

Bed Frame Assembly

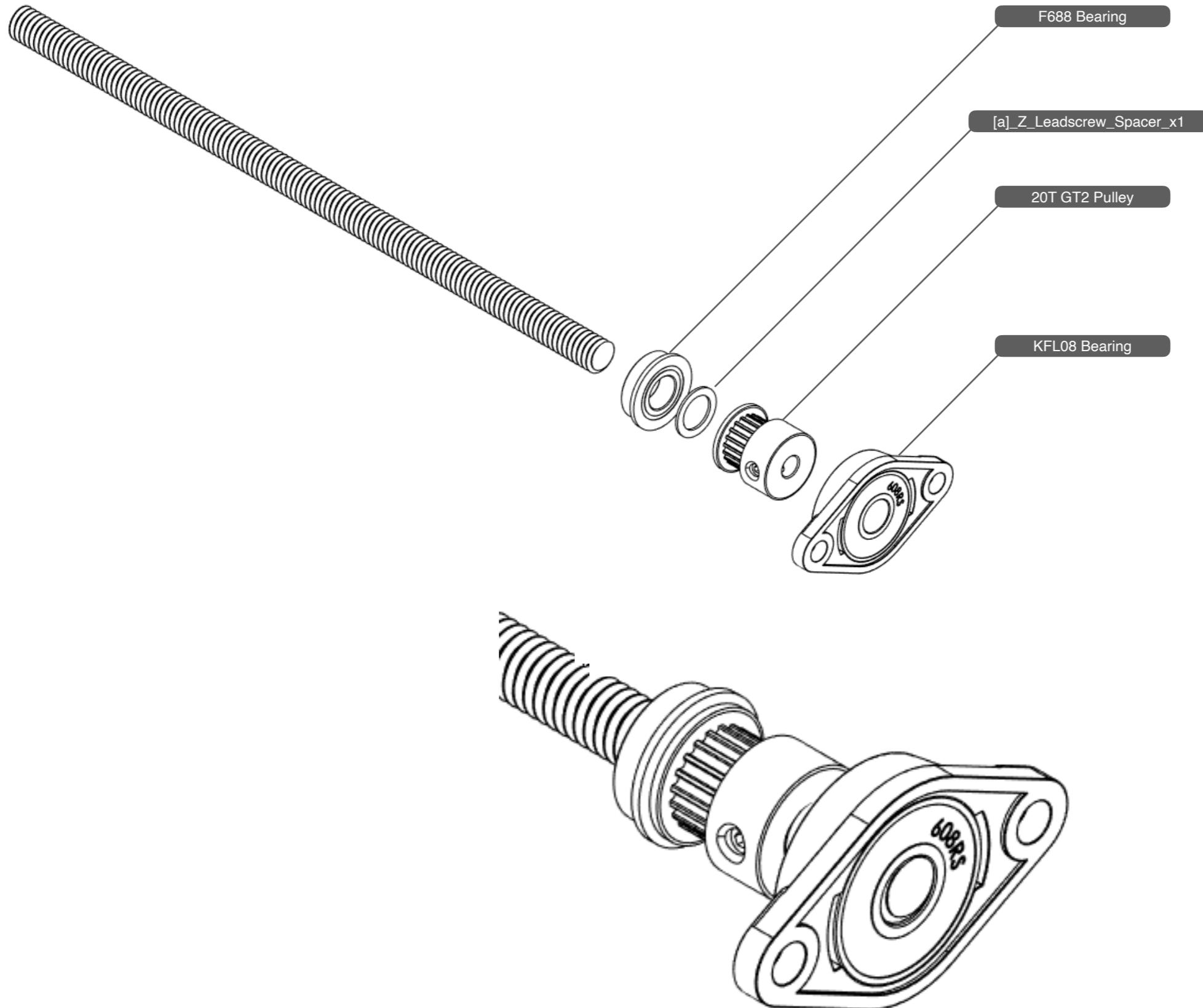


Bed Frame Assembly



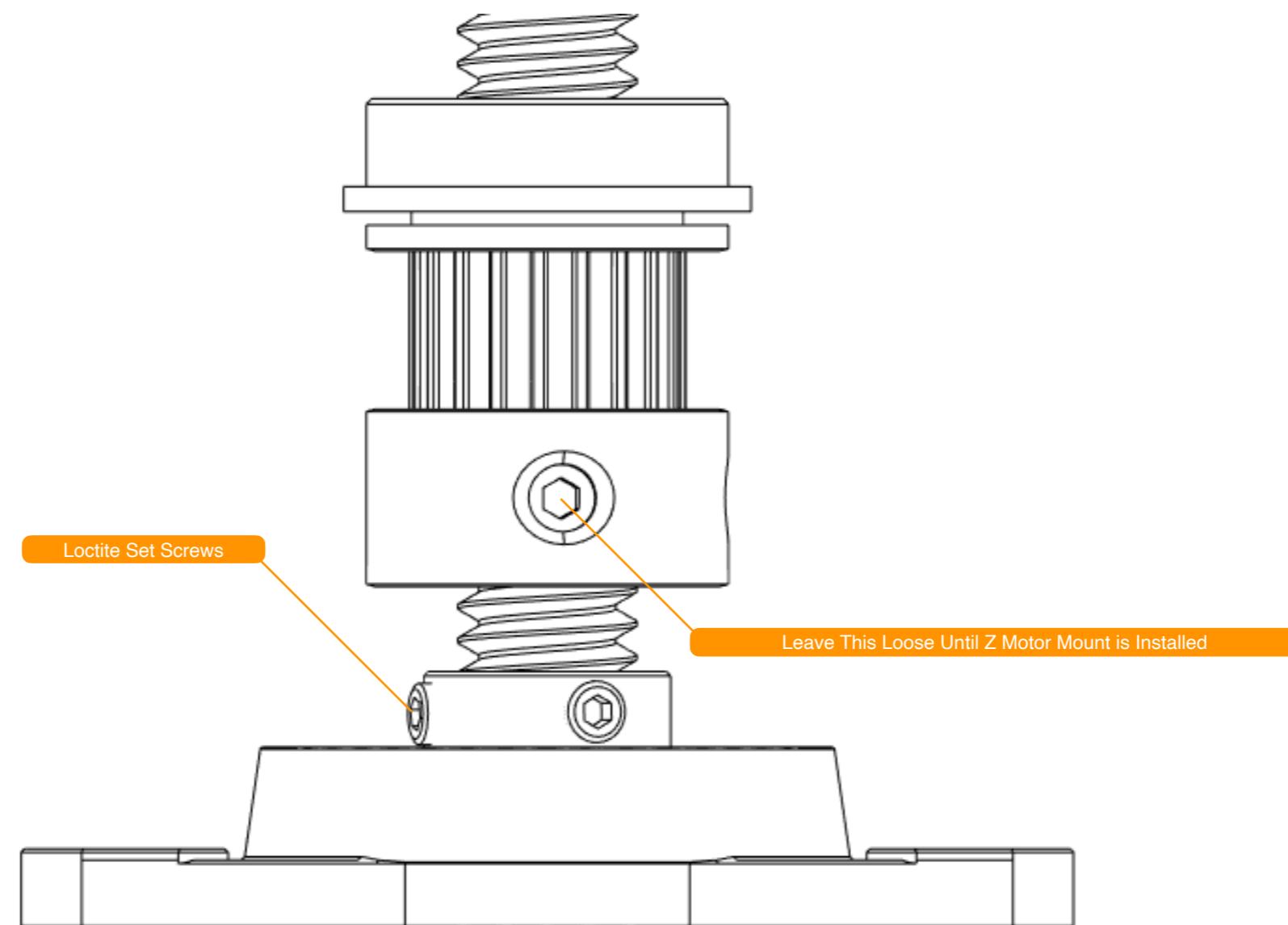
Part	Qty
M3x12 BHCS	4

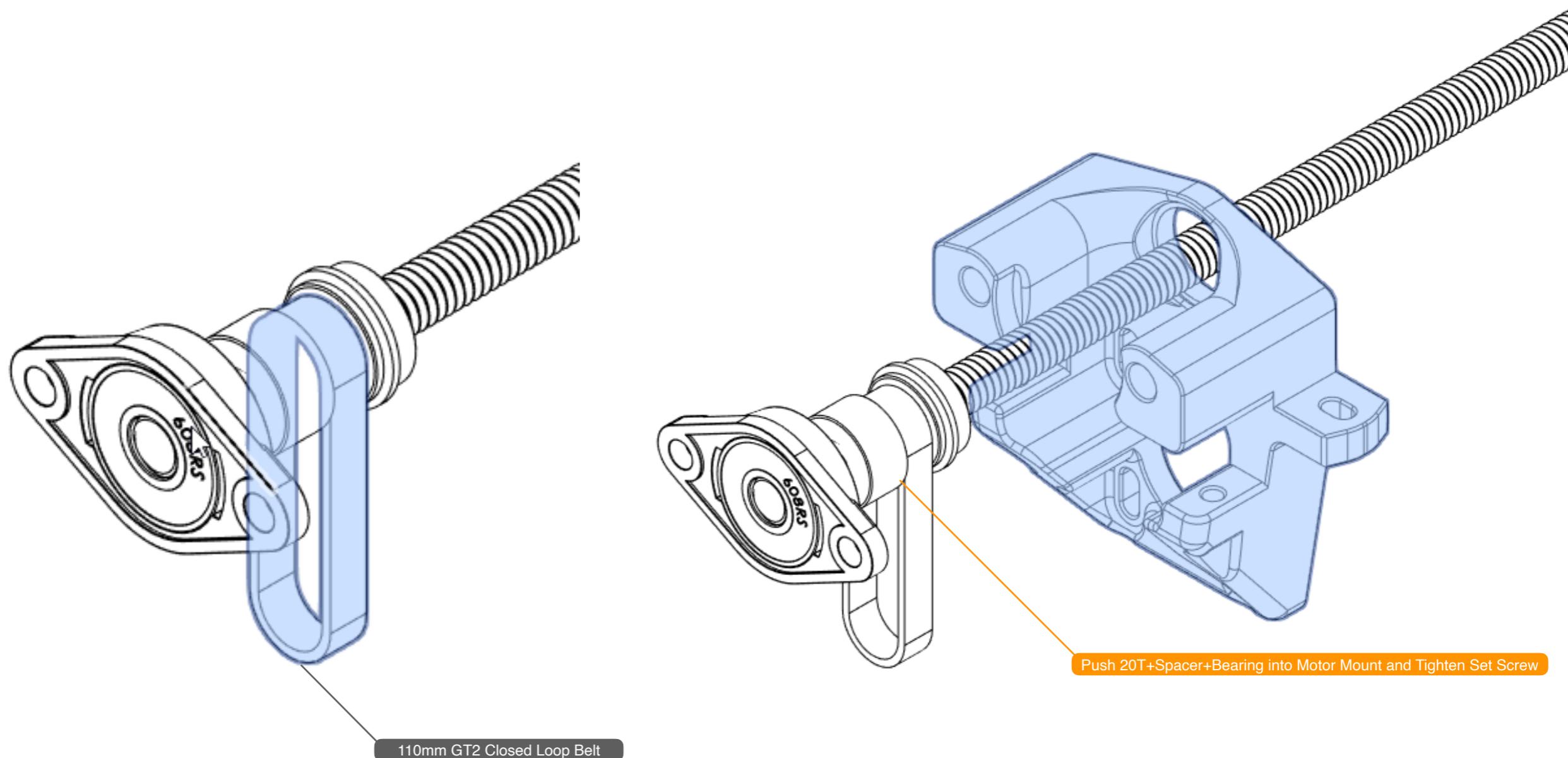
Z Motor Assembly



Part	Qty
20T GT2 Pulley	1
F688	1
KFL08	1
T8x2 ACME	1

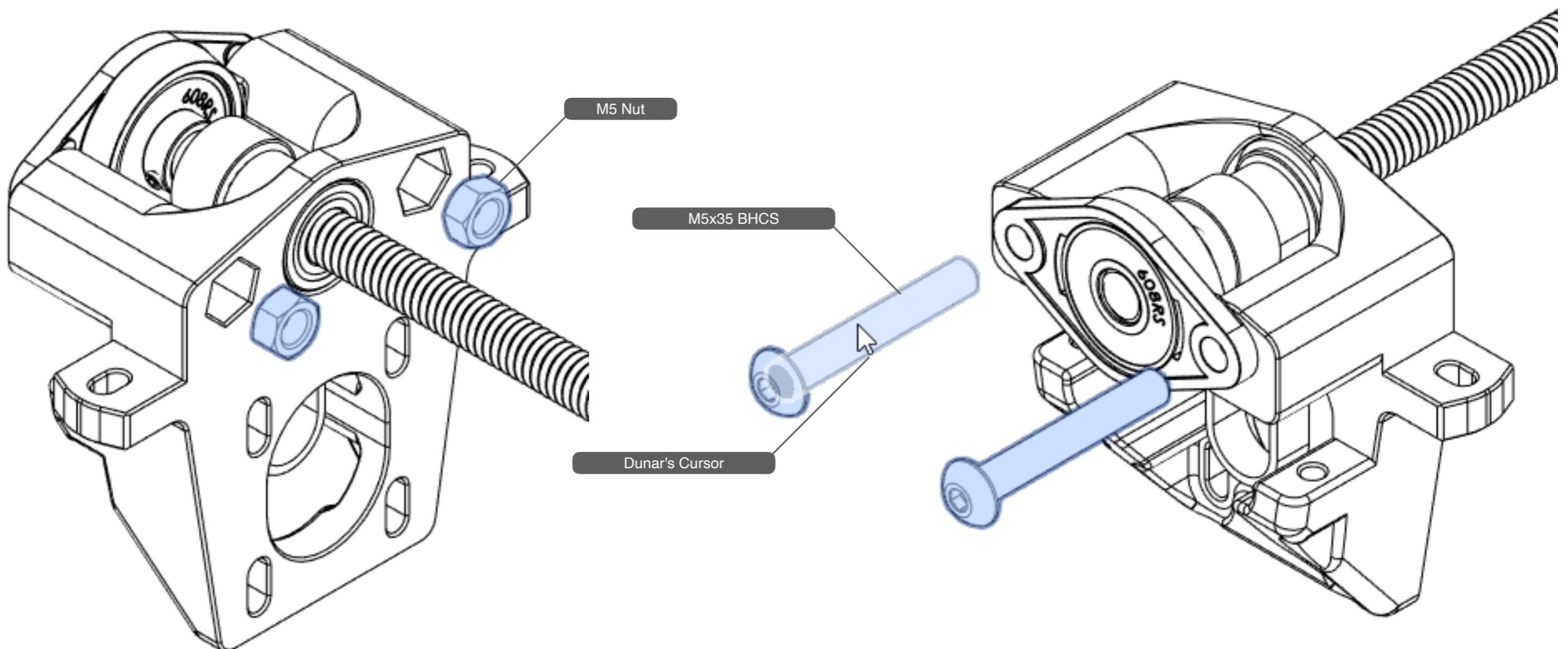
Z Motor Assembly





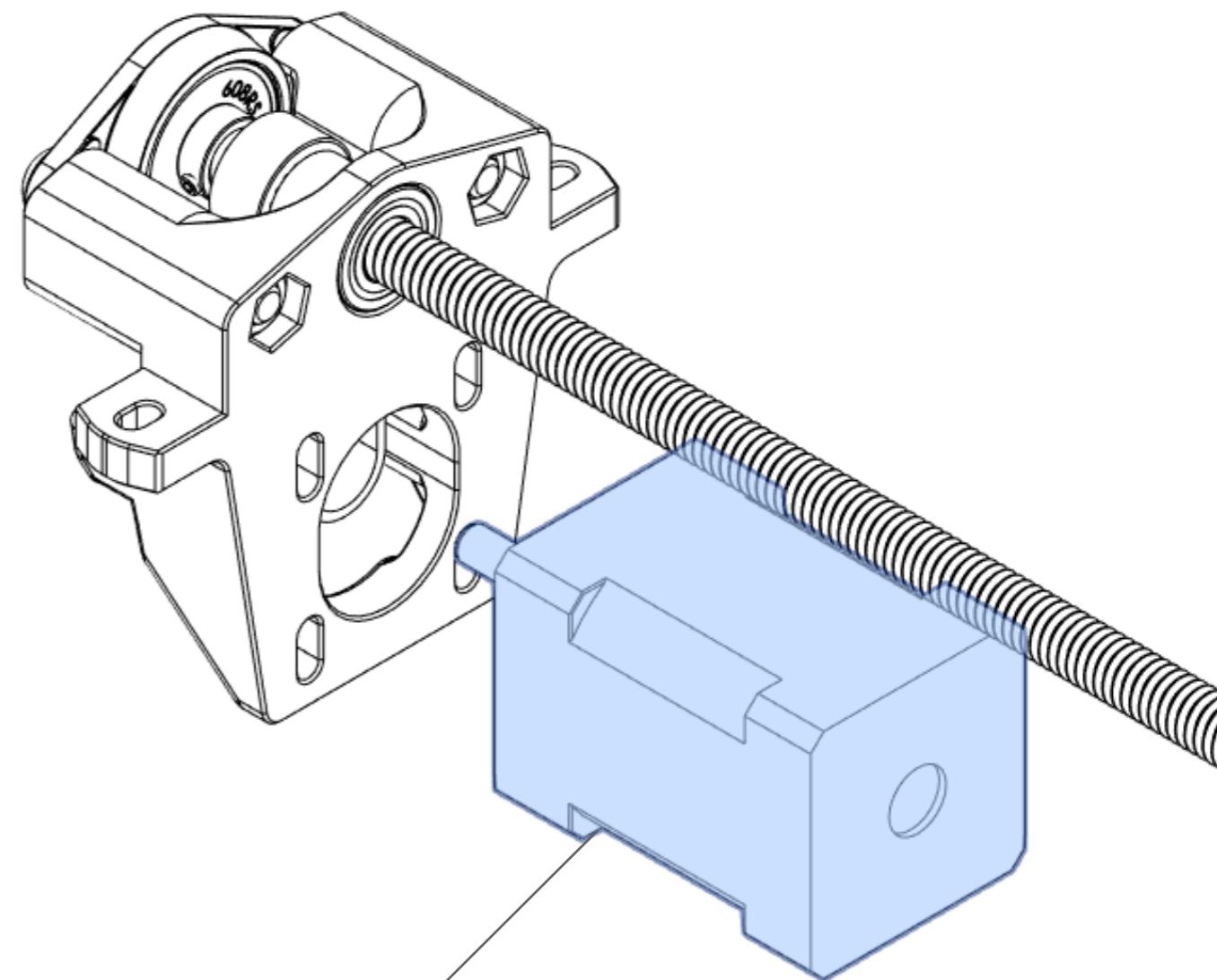
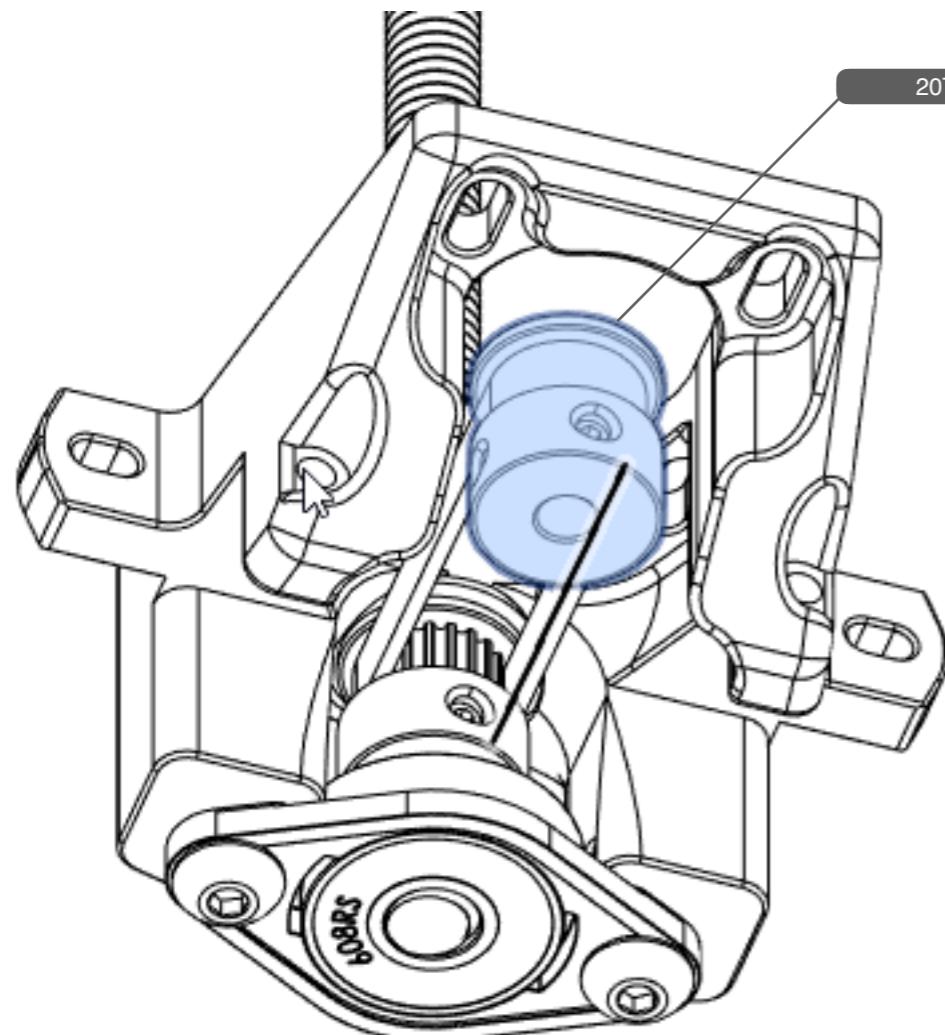
Part	Qty
110mm GT2 Loop	1

Z Motor Assembly



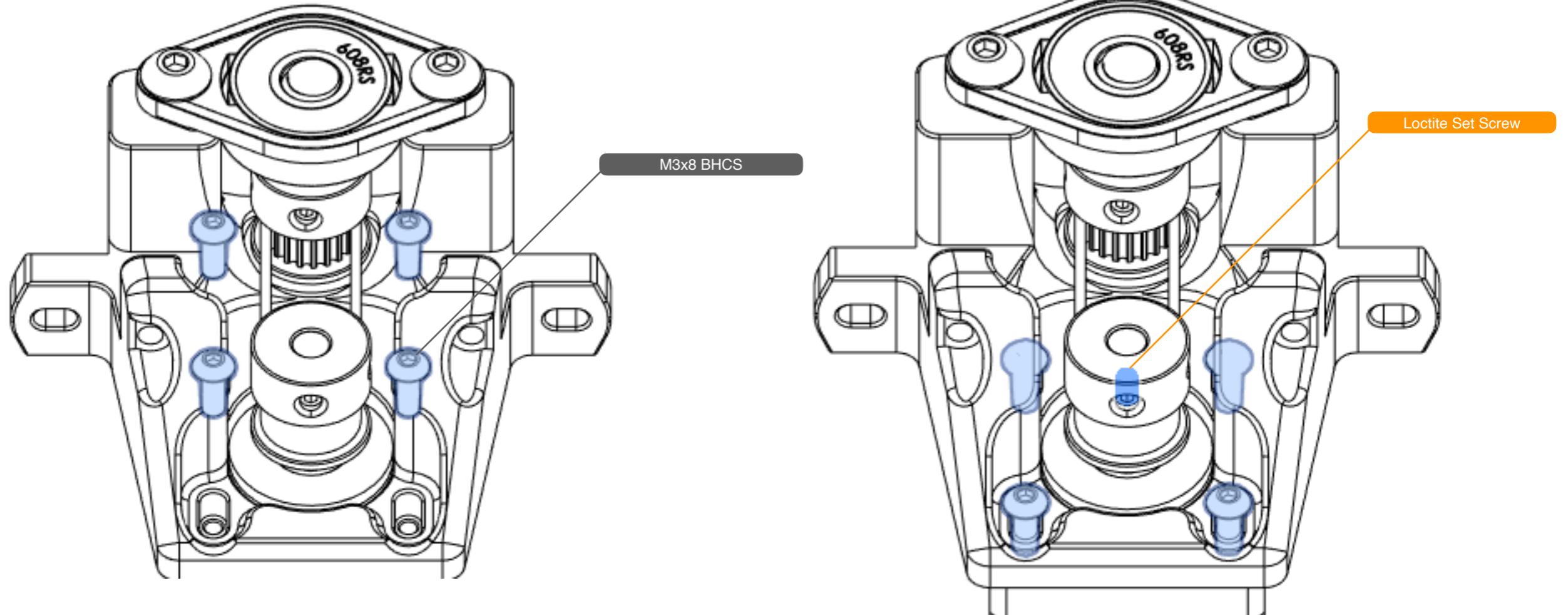
Part	Qty
M5x35 BHCS	2
M5 Nut	2

Z Motor Assembly

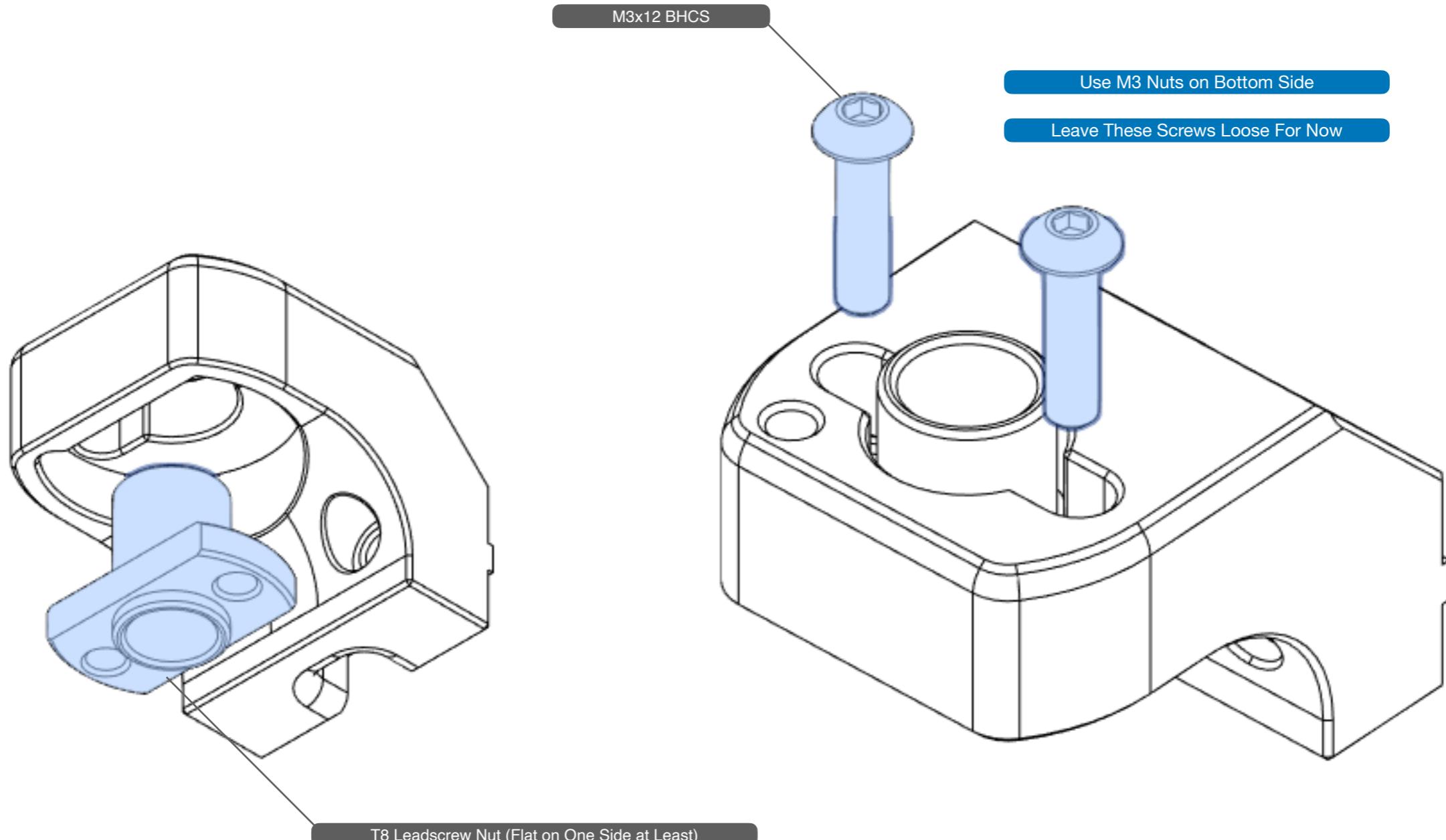


Part	Qty
20T GT2 Pulley	1
NEMA14	1

Z Motor Assembly

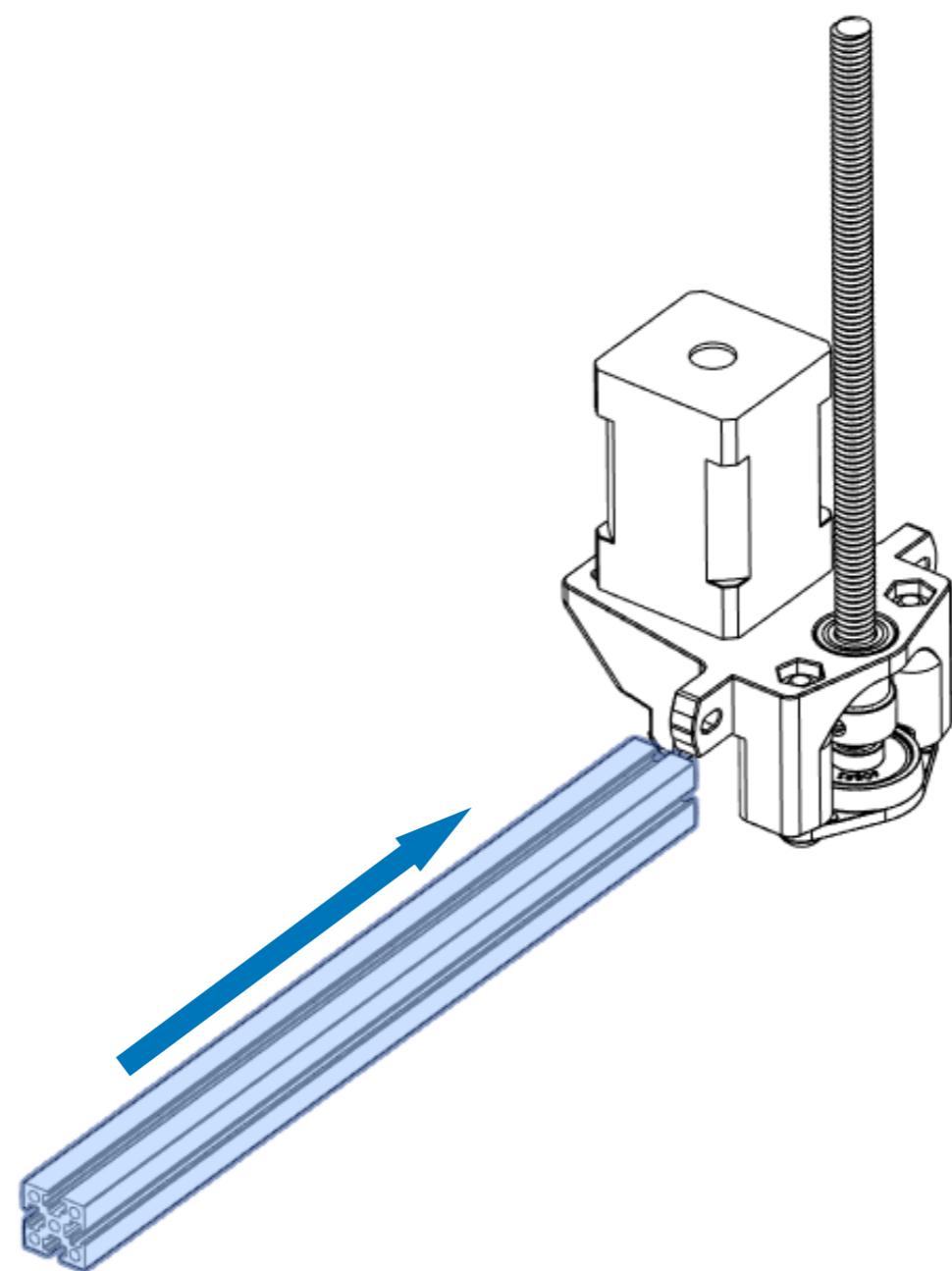


Z Motor Assembly

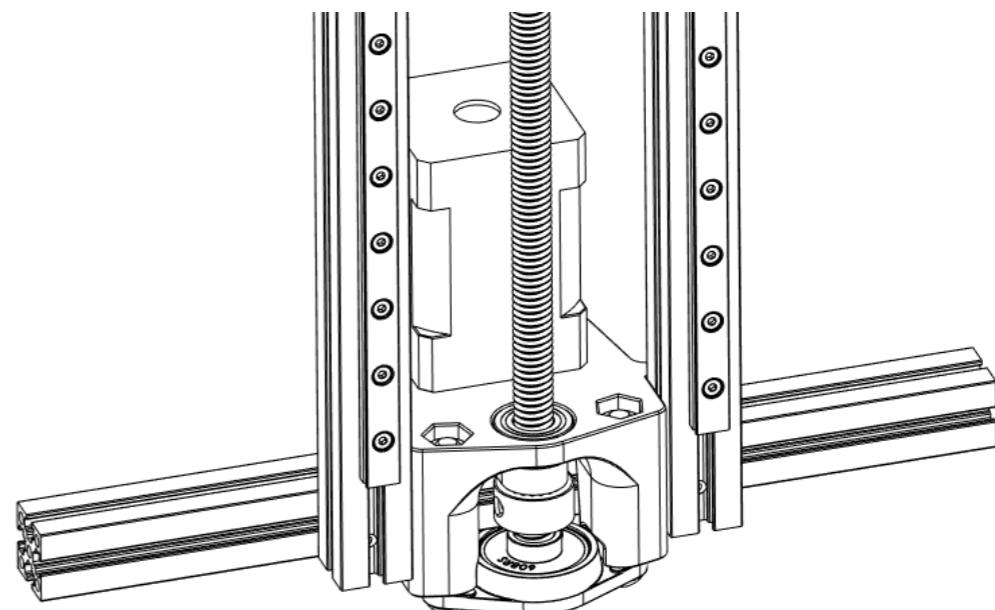
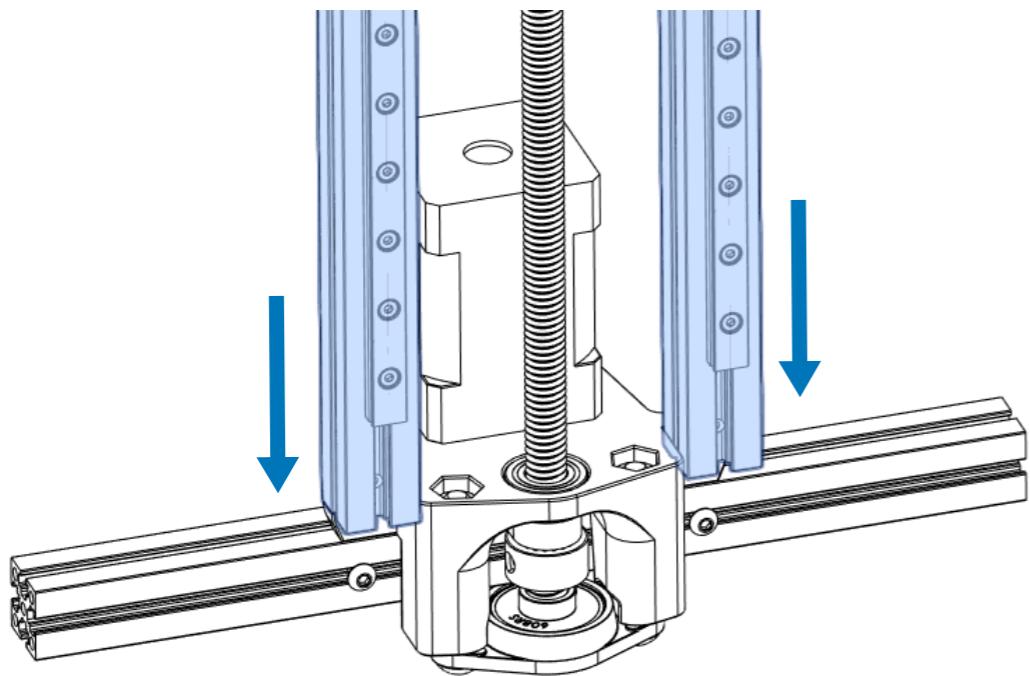
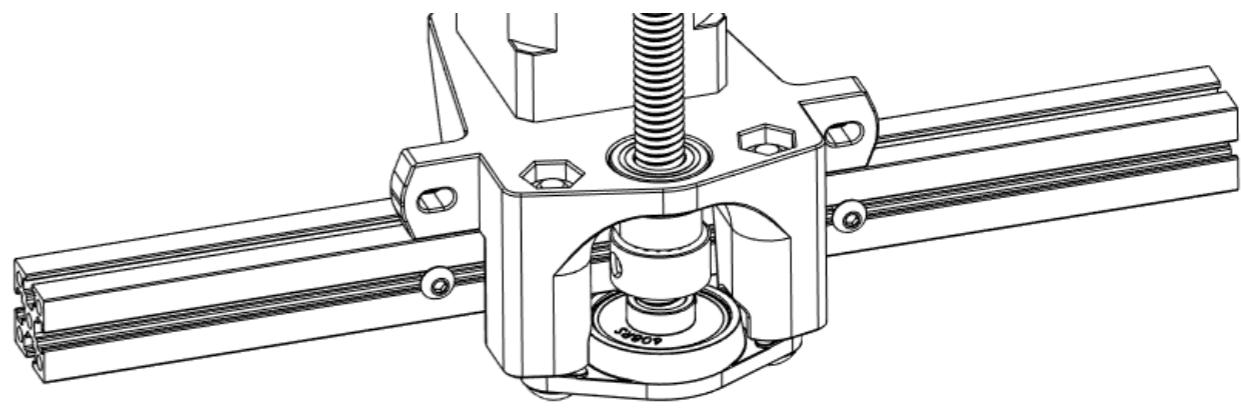
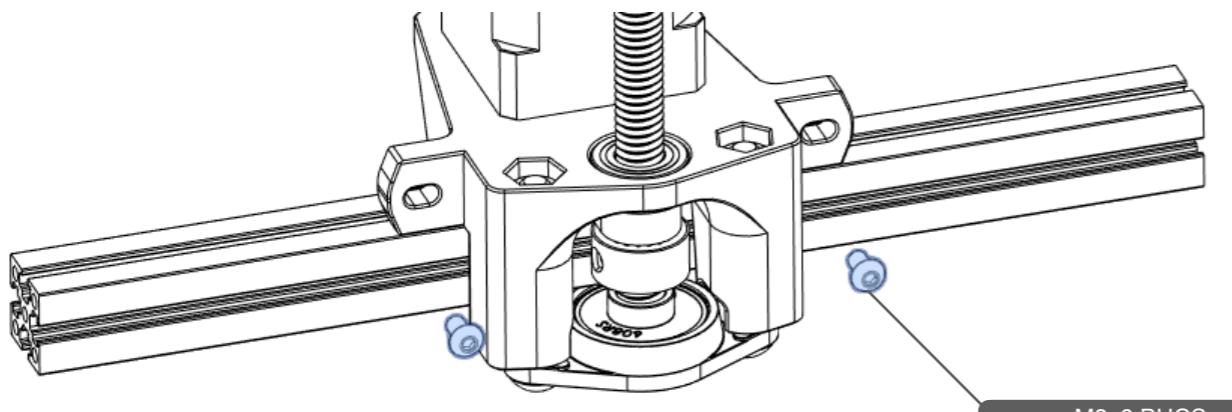


Part	Qty
M3x12 BHCS	2
T8x2 Nut	1

Z Motor Assembly

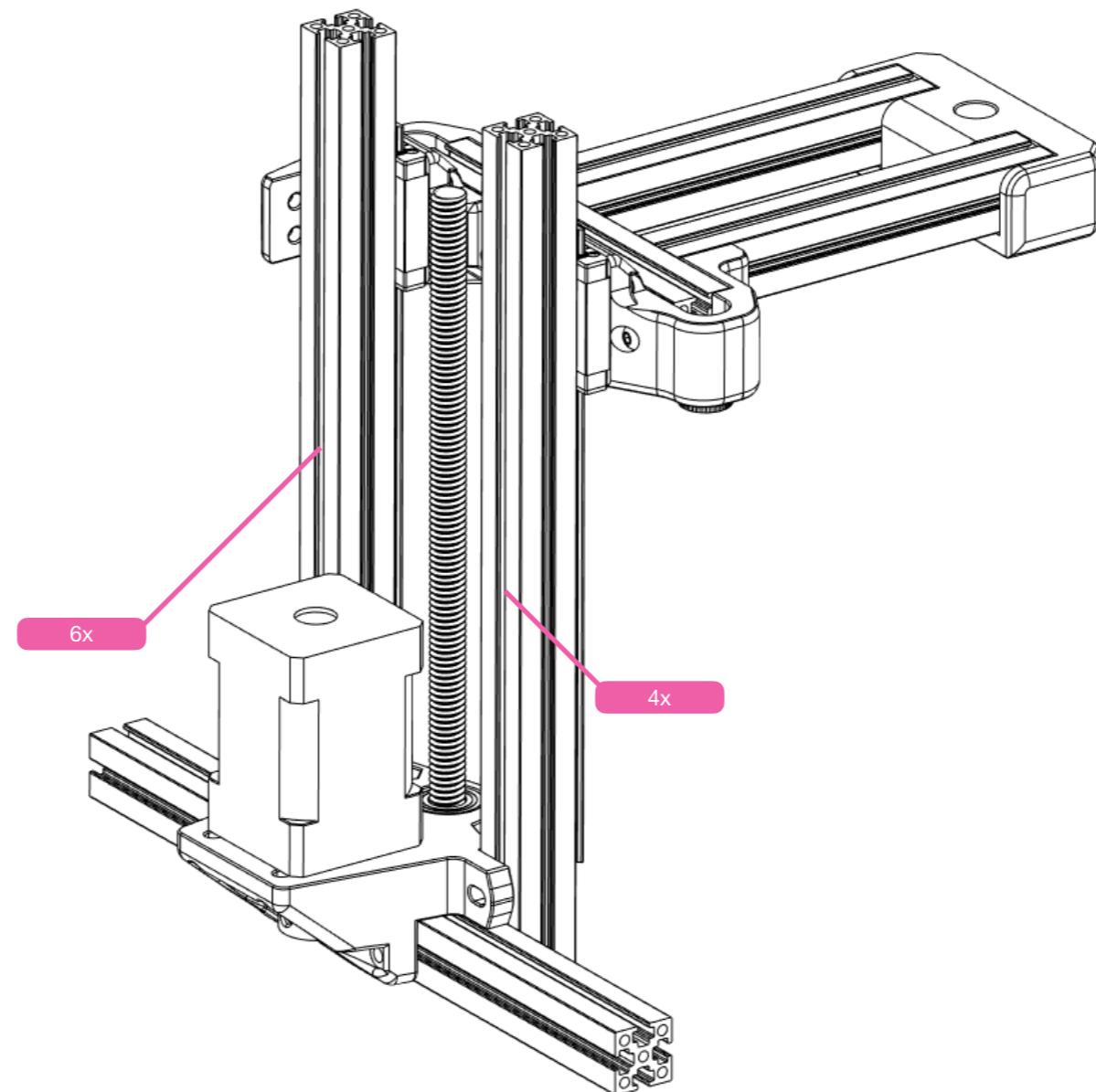


Z Motor Assembly



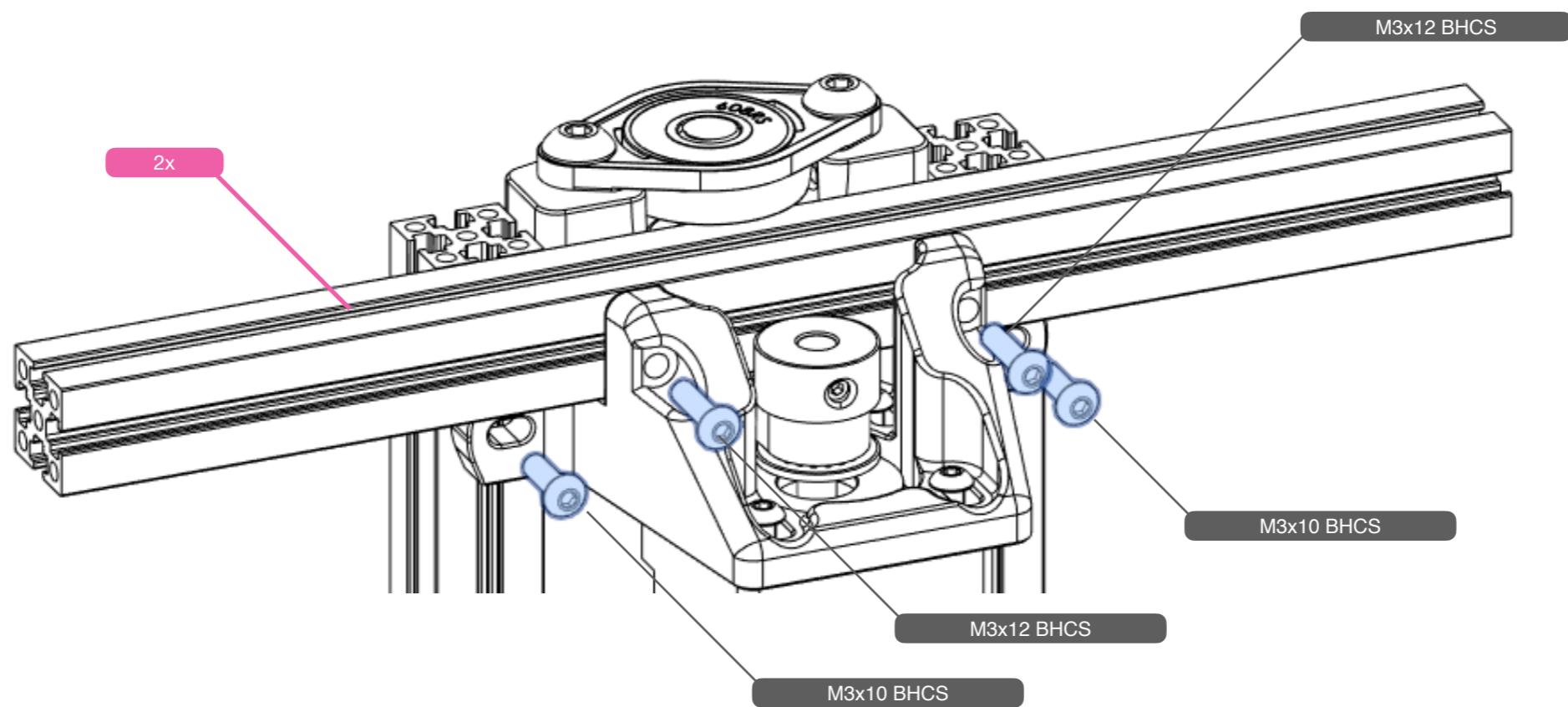
Part	Qty
M3x6 BHCS	2
M3 Nut	2

Z Motor Assembly



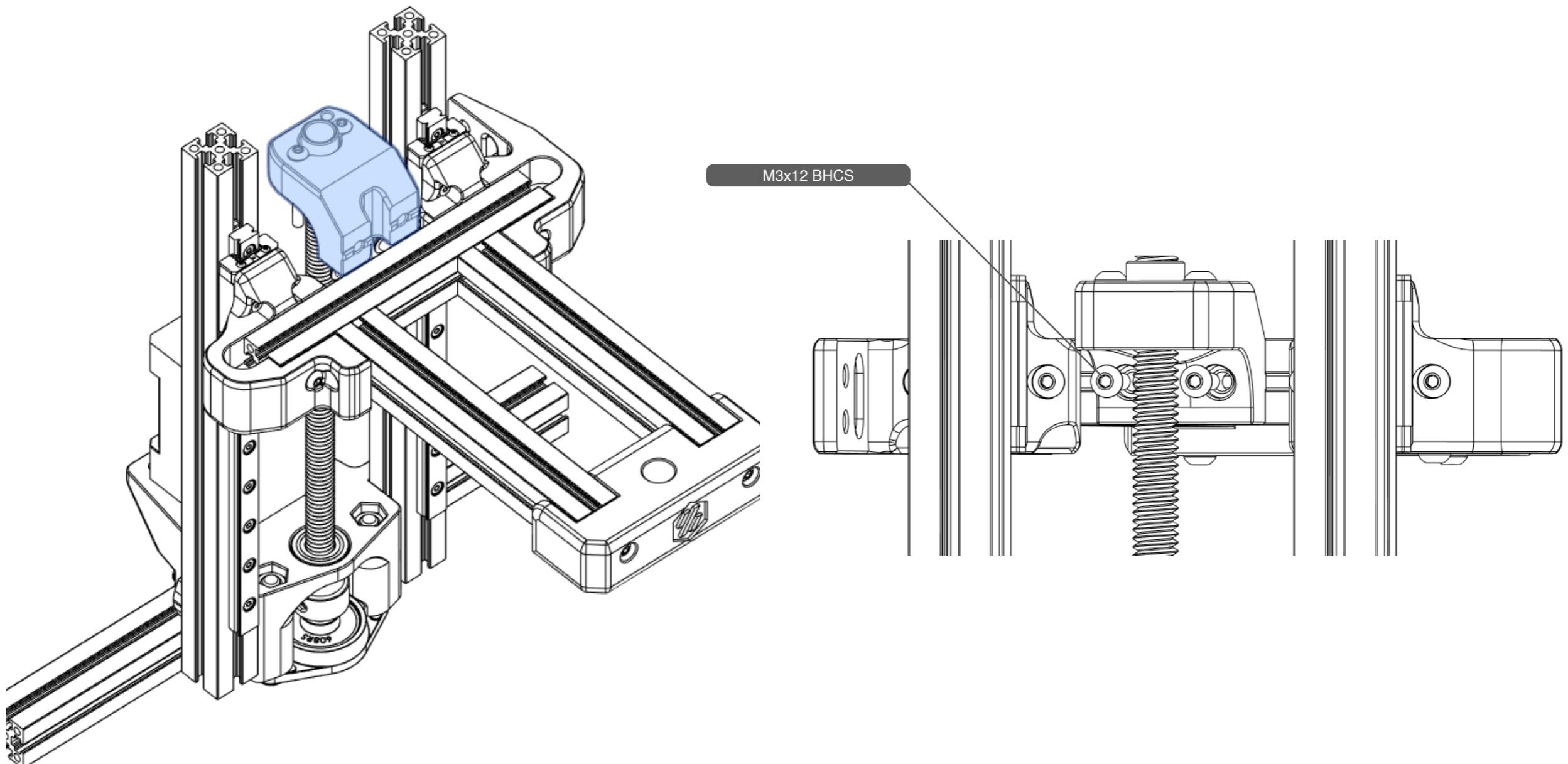
Part	Qty
M3 Nut	10

Z Motor Assembly



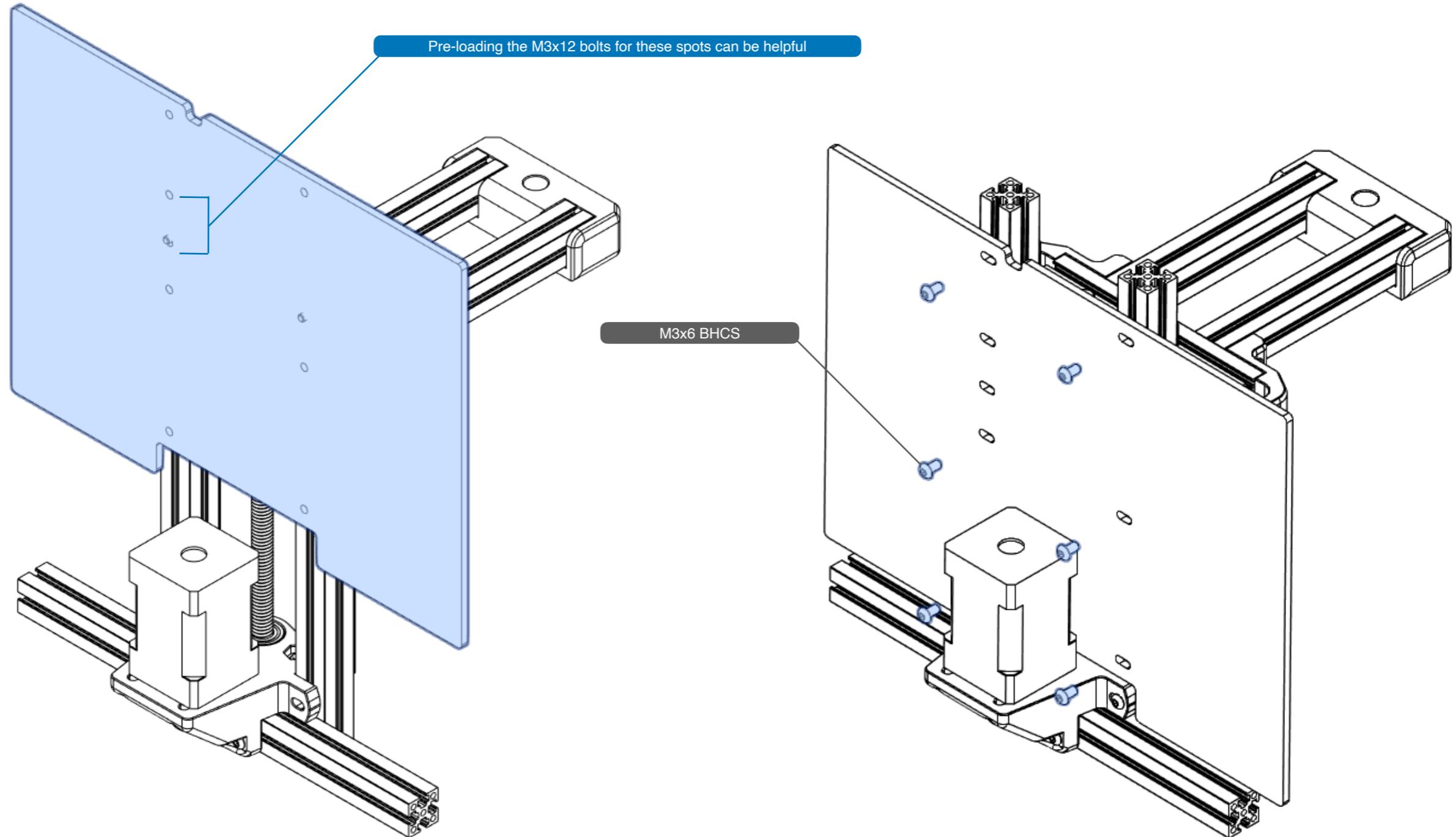
Part	Qty
M3x10 BHCS	2
M3x12 BHCS	2
M3 Nut	6

T8 Nut Block

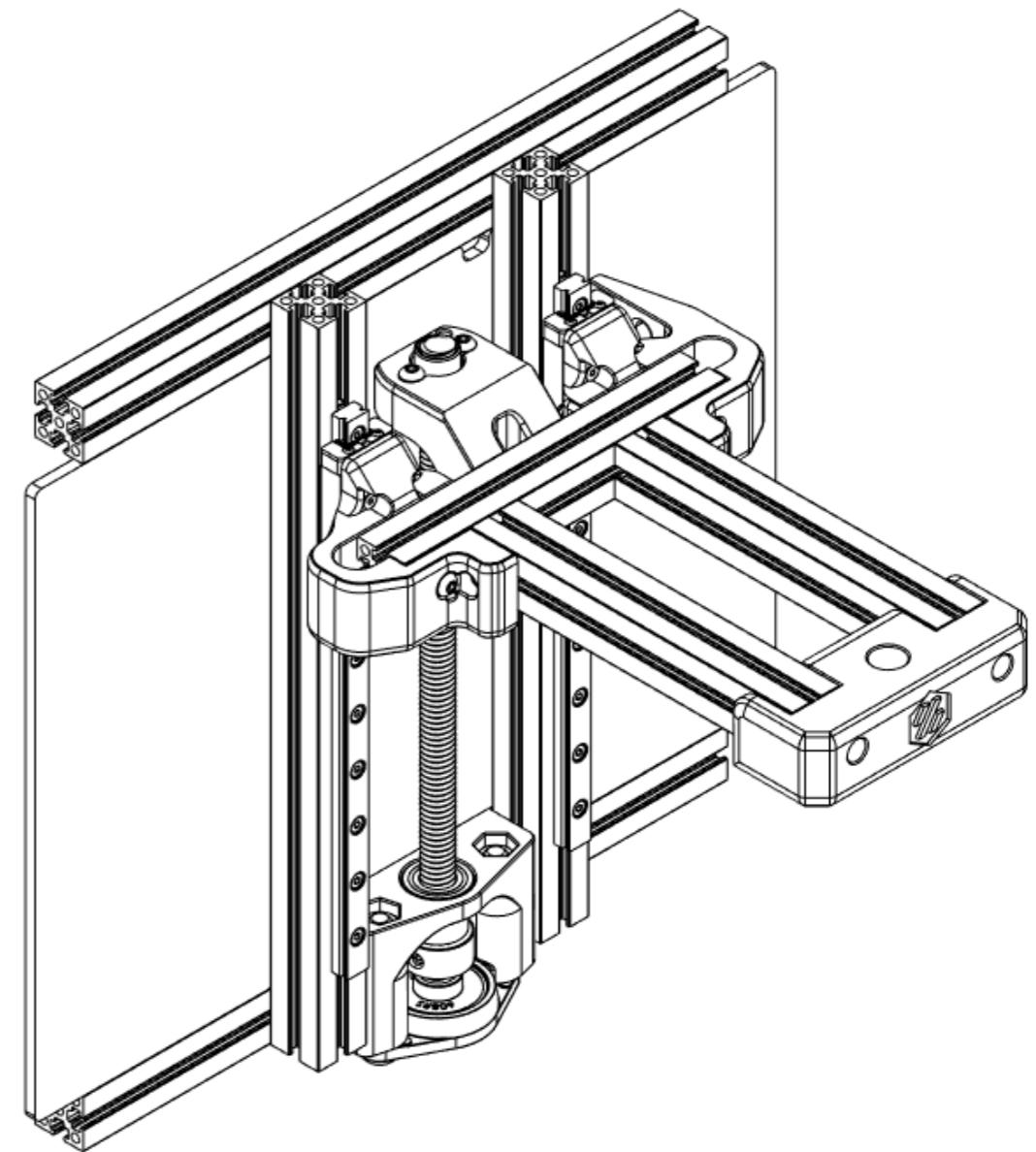
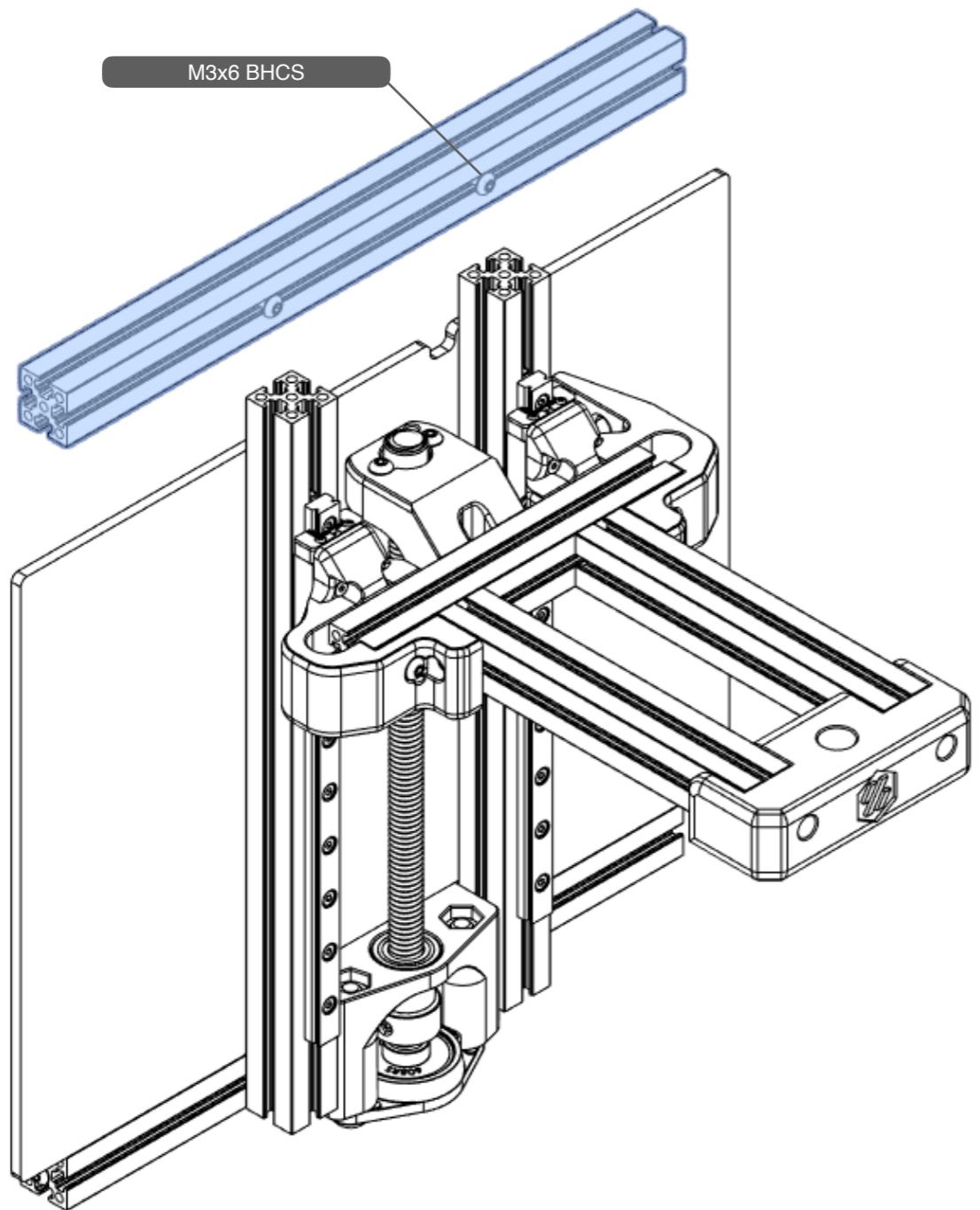


Part	Qty
M3x12 BHCS	2

Mid Panel Installation

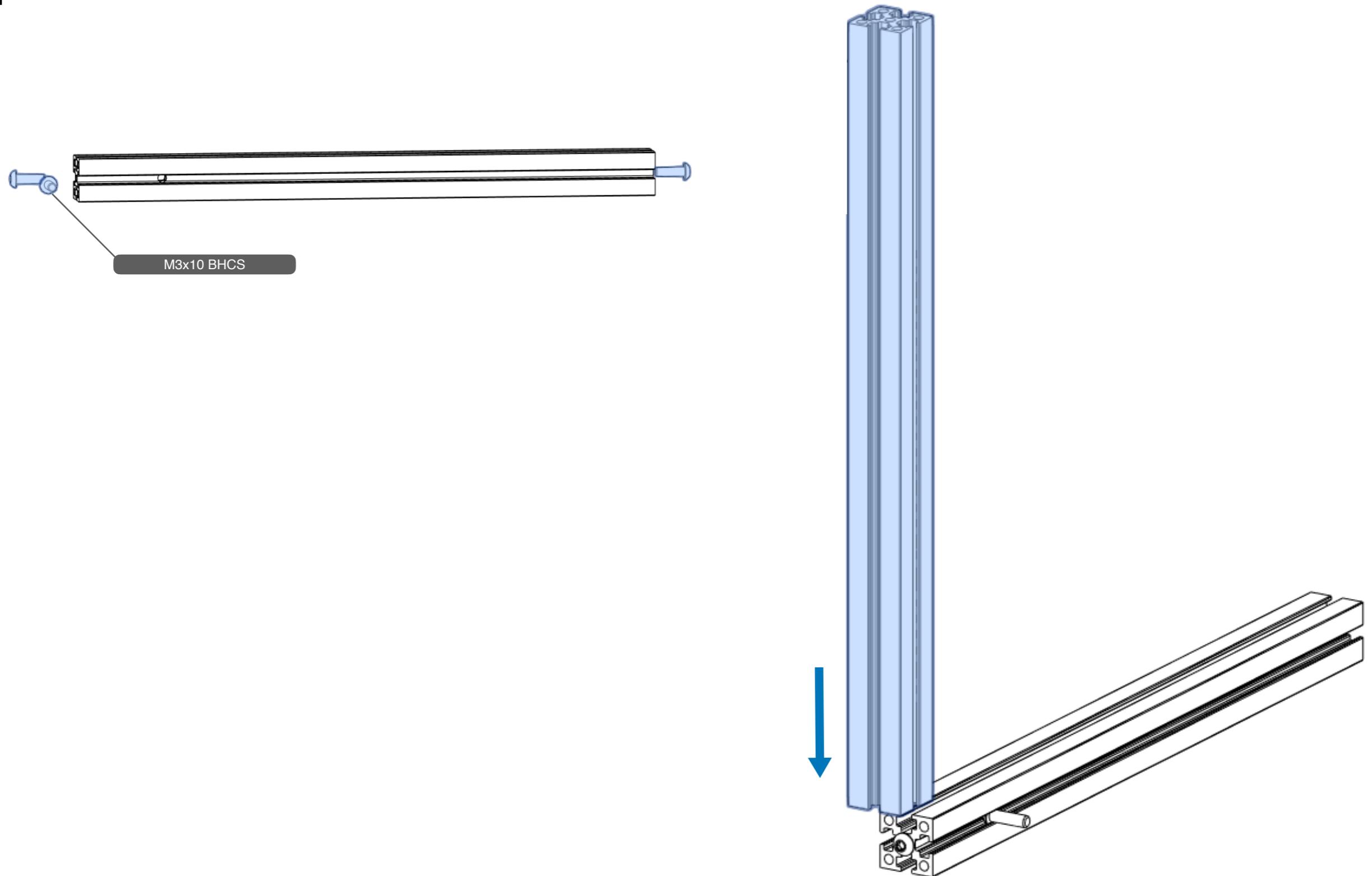


Frame Assembly

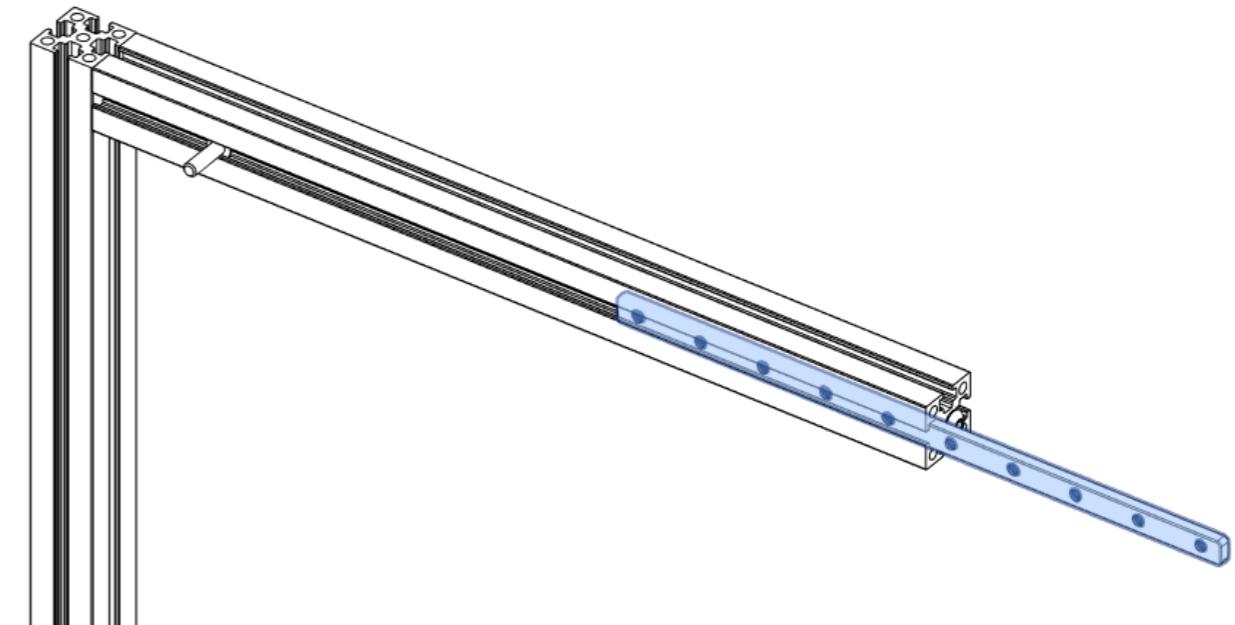
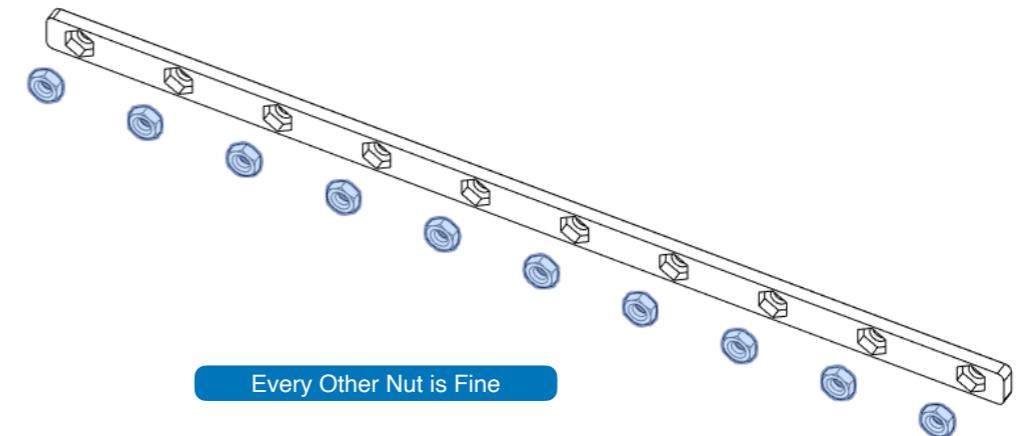
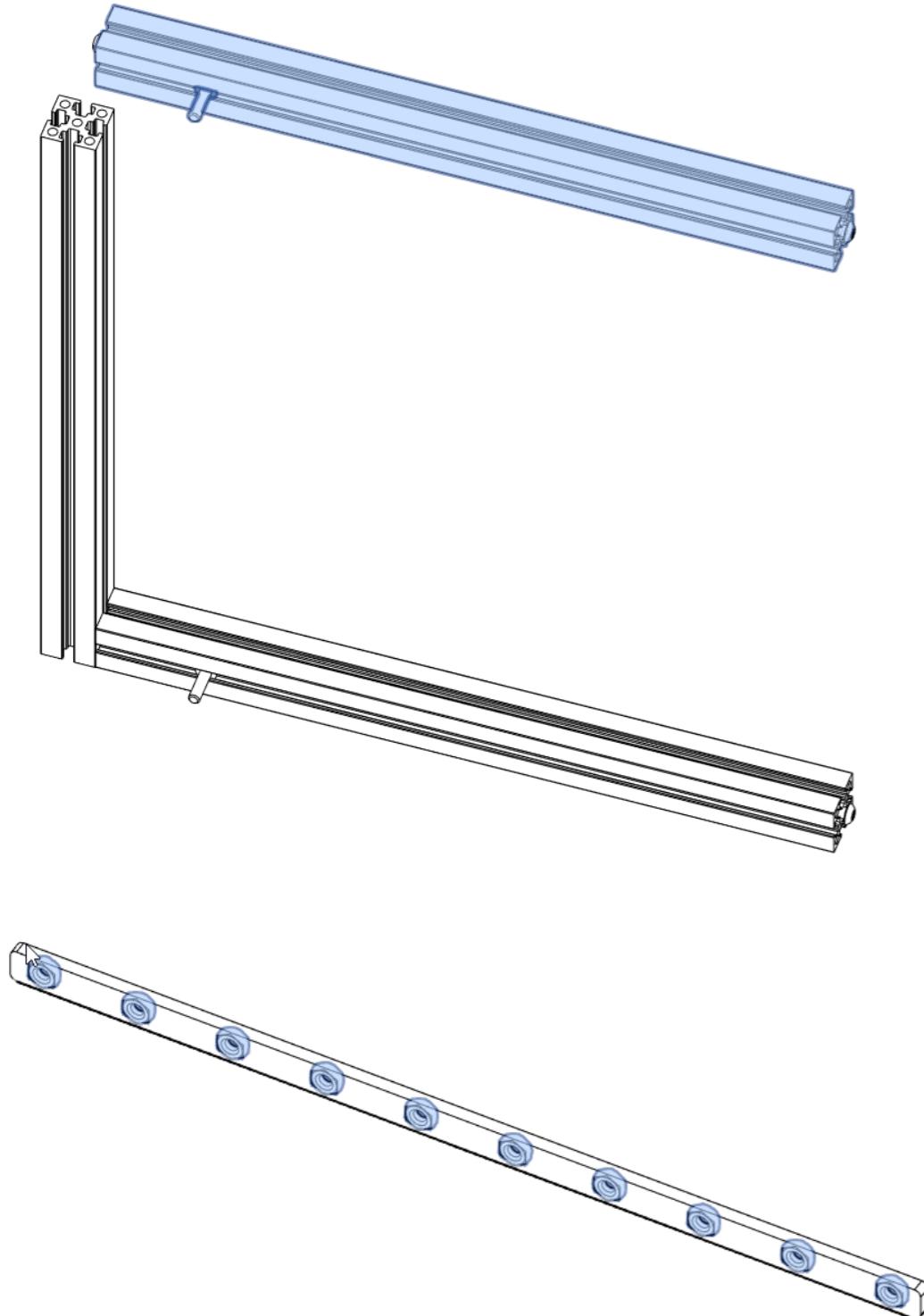


Part	Qty
M3x6 BHCS	2
M3 Nut	2

Repeat for mirror side

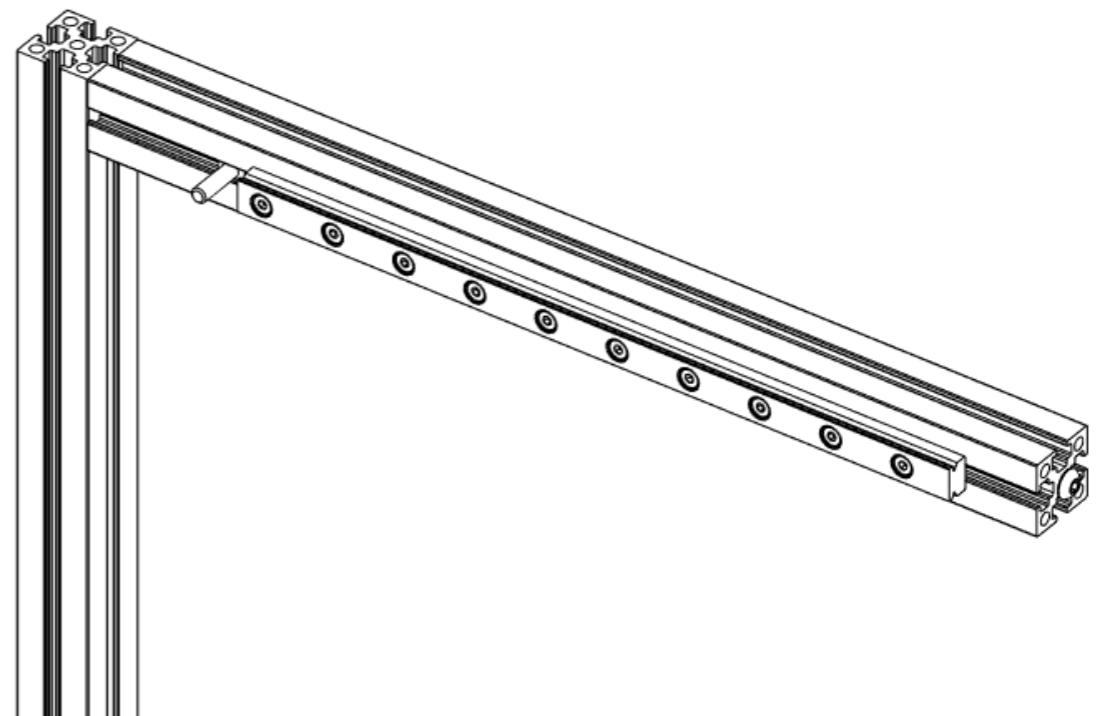
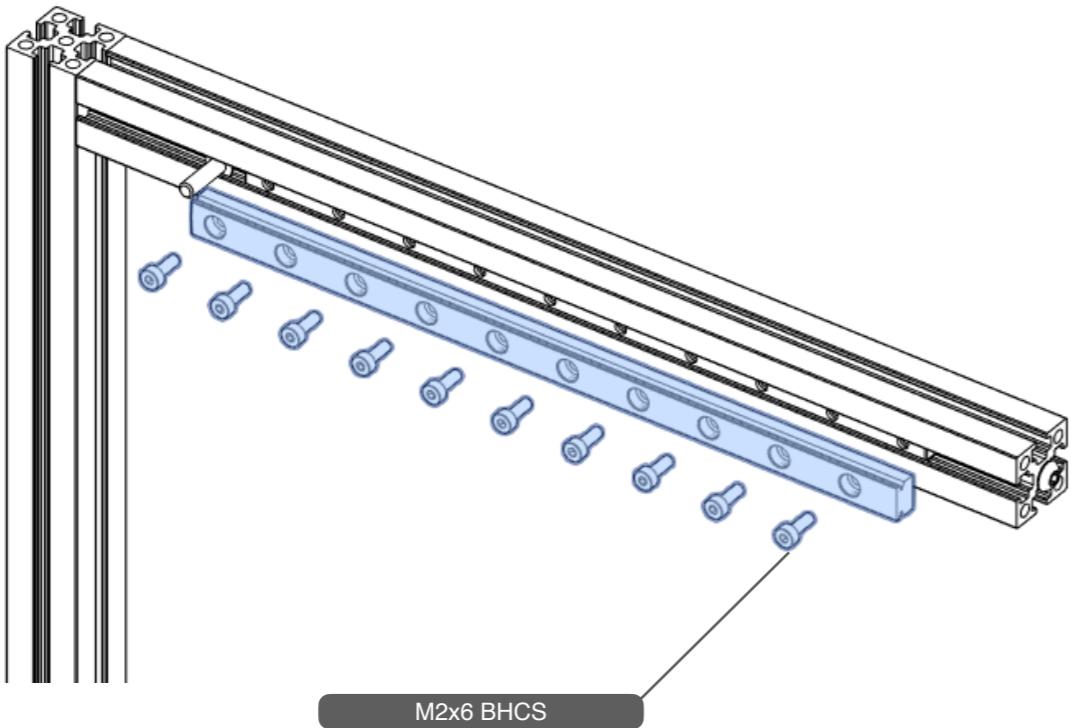


Repeat for mirror side



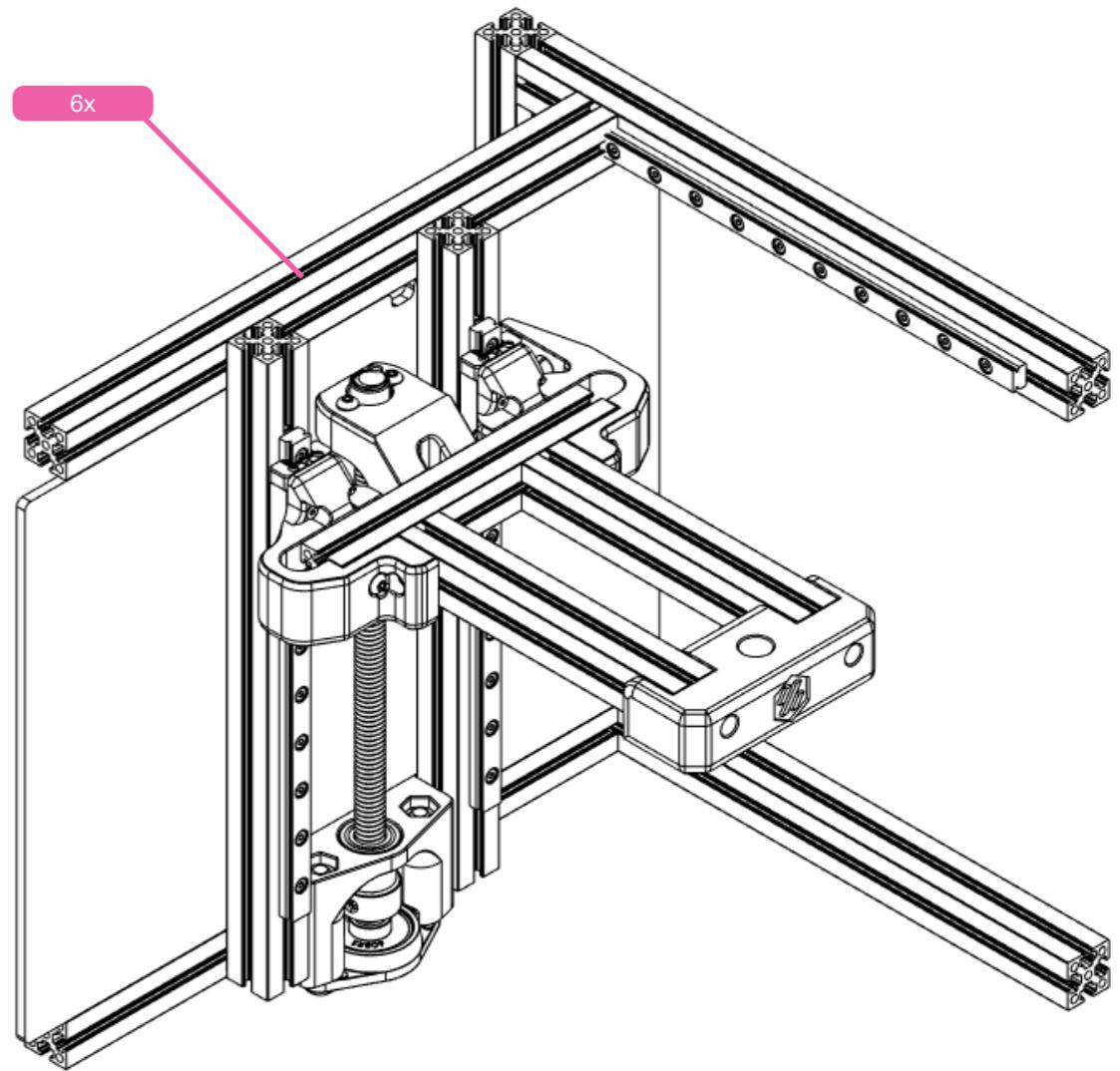
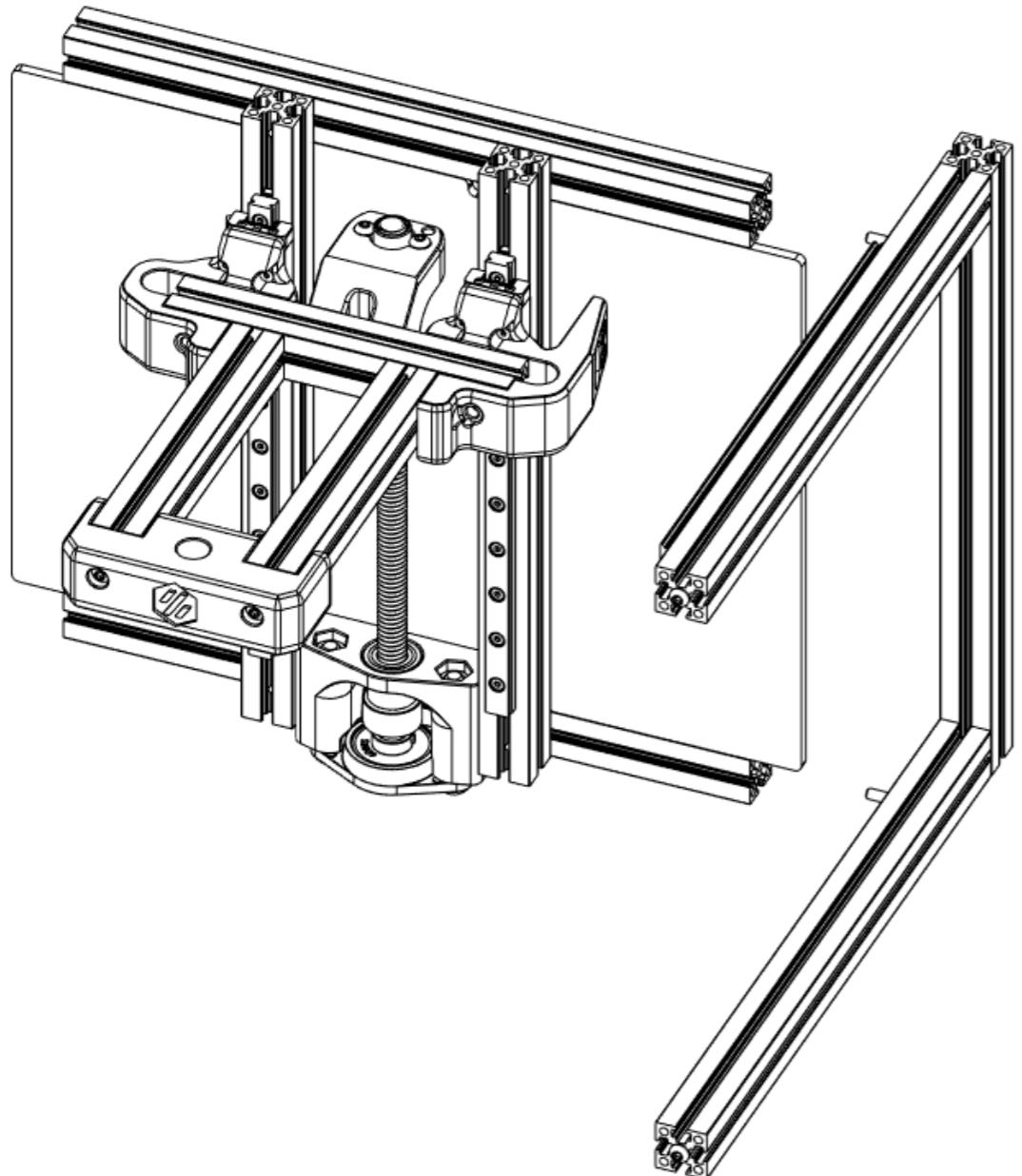
Part	Qty
M2 Nut	5-10
M3x10 BHCS	6

Repeat for mirror side

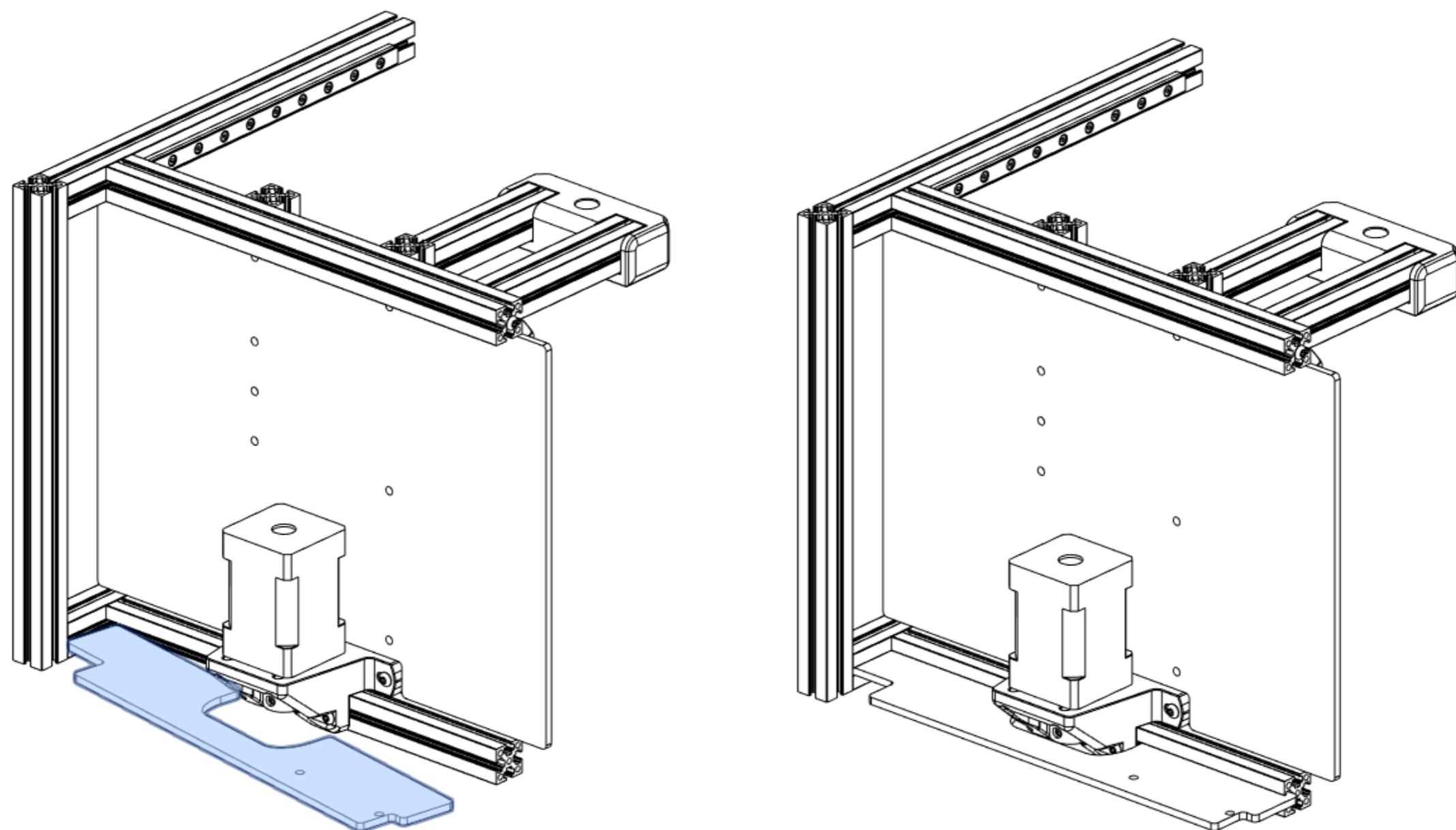


Part	Qty
M2x6	5-10
MGN7R	2

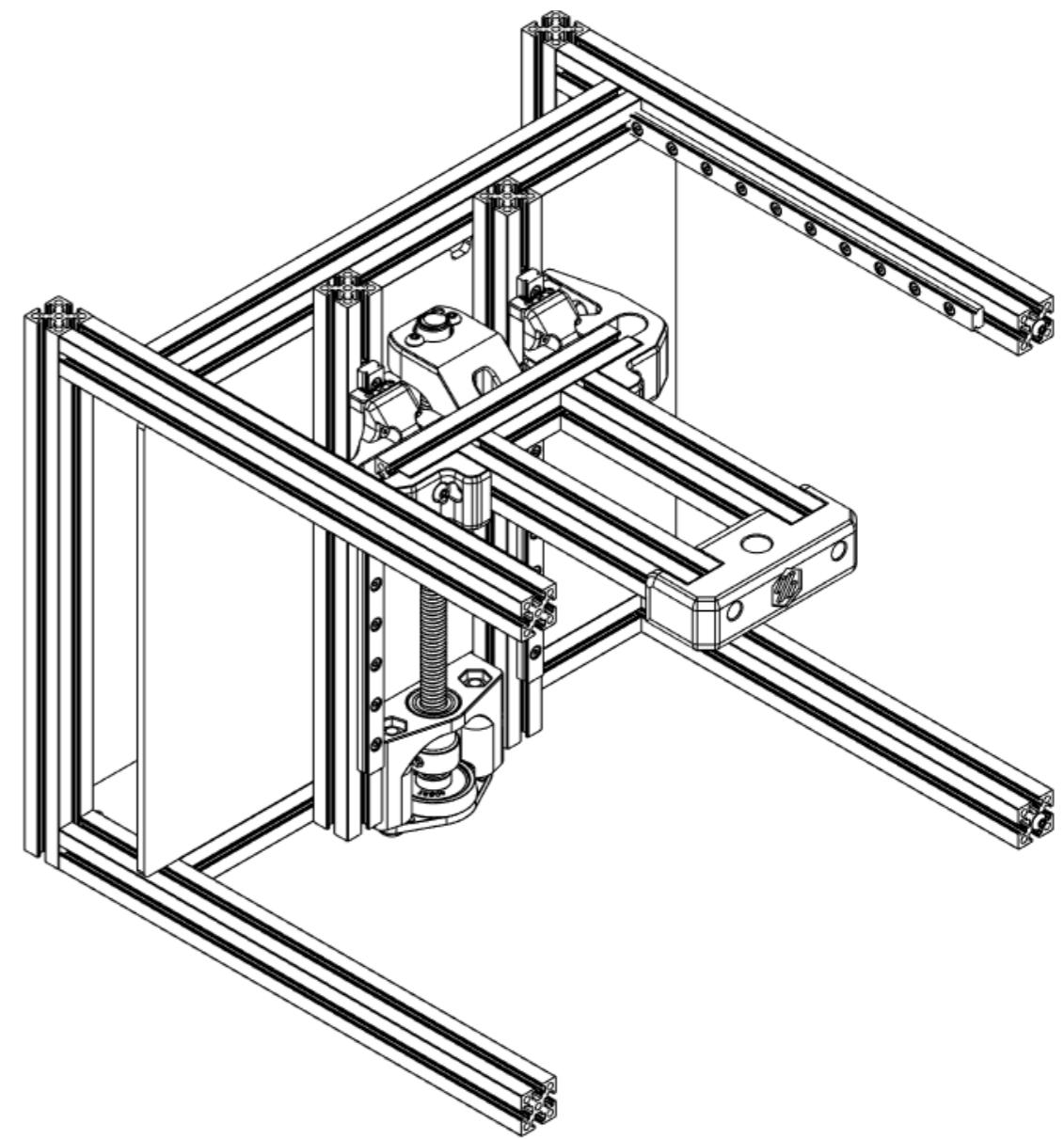
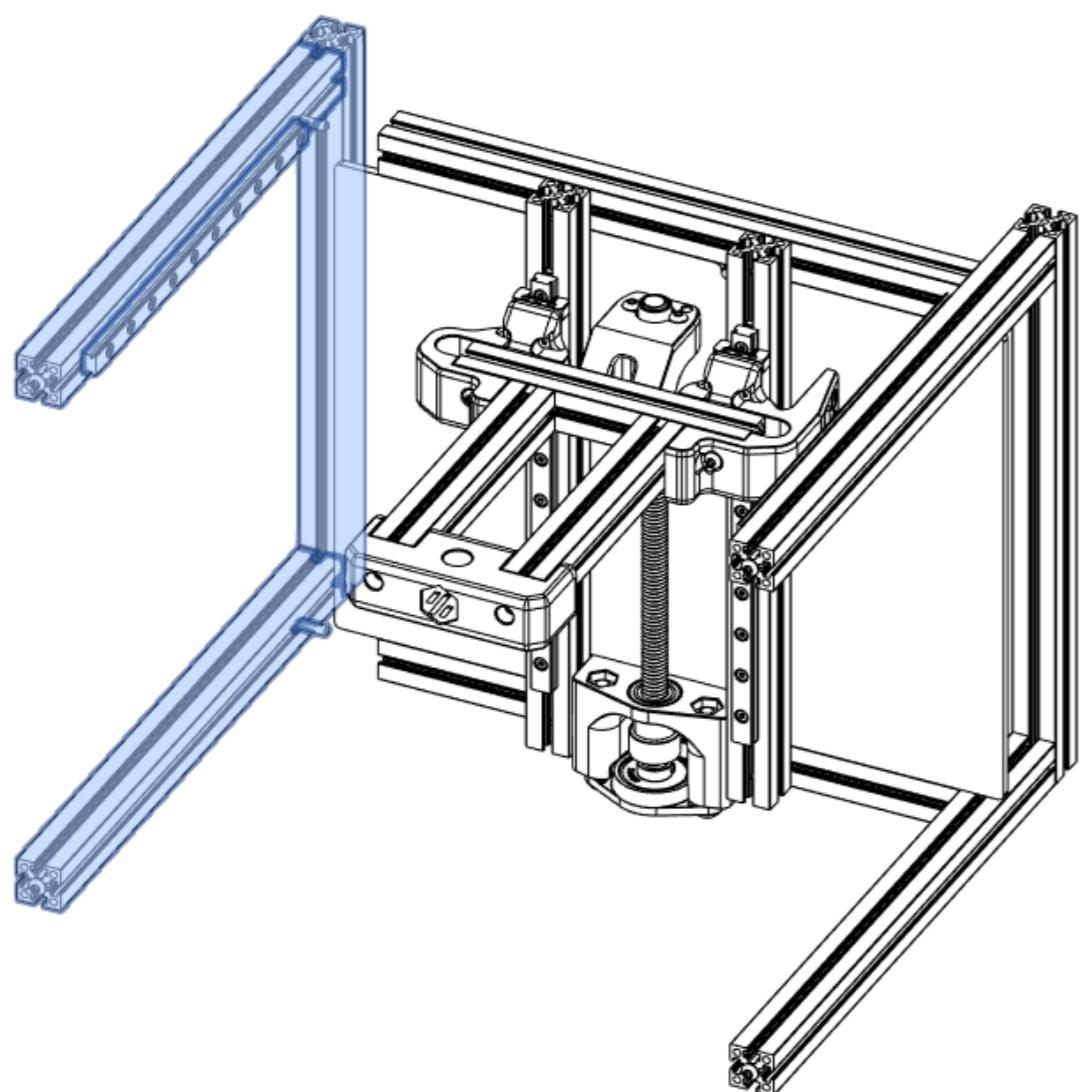
Frame Assembly



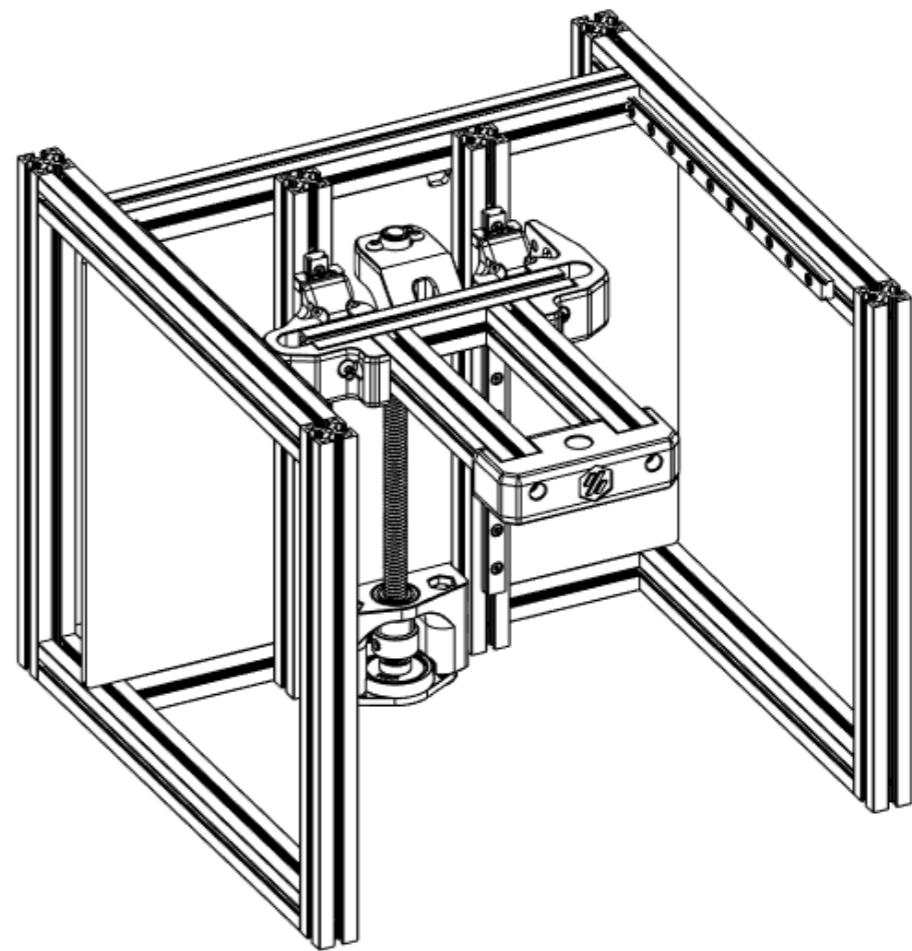
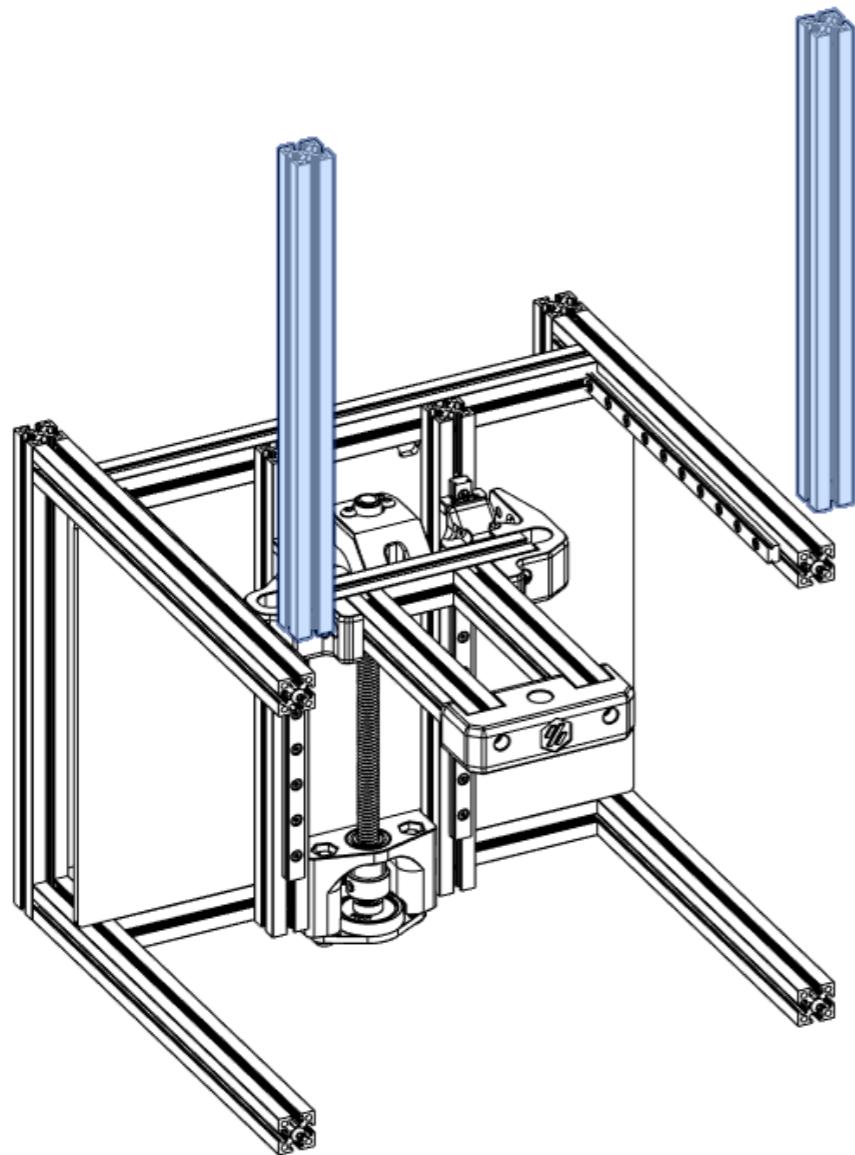
Rear Deck Installation



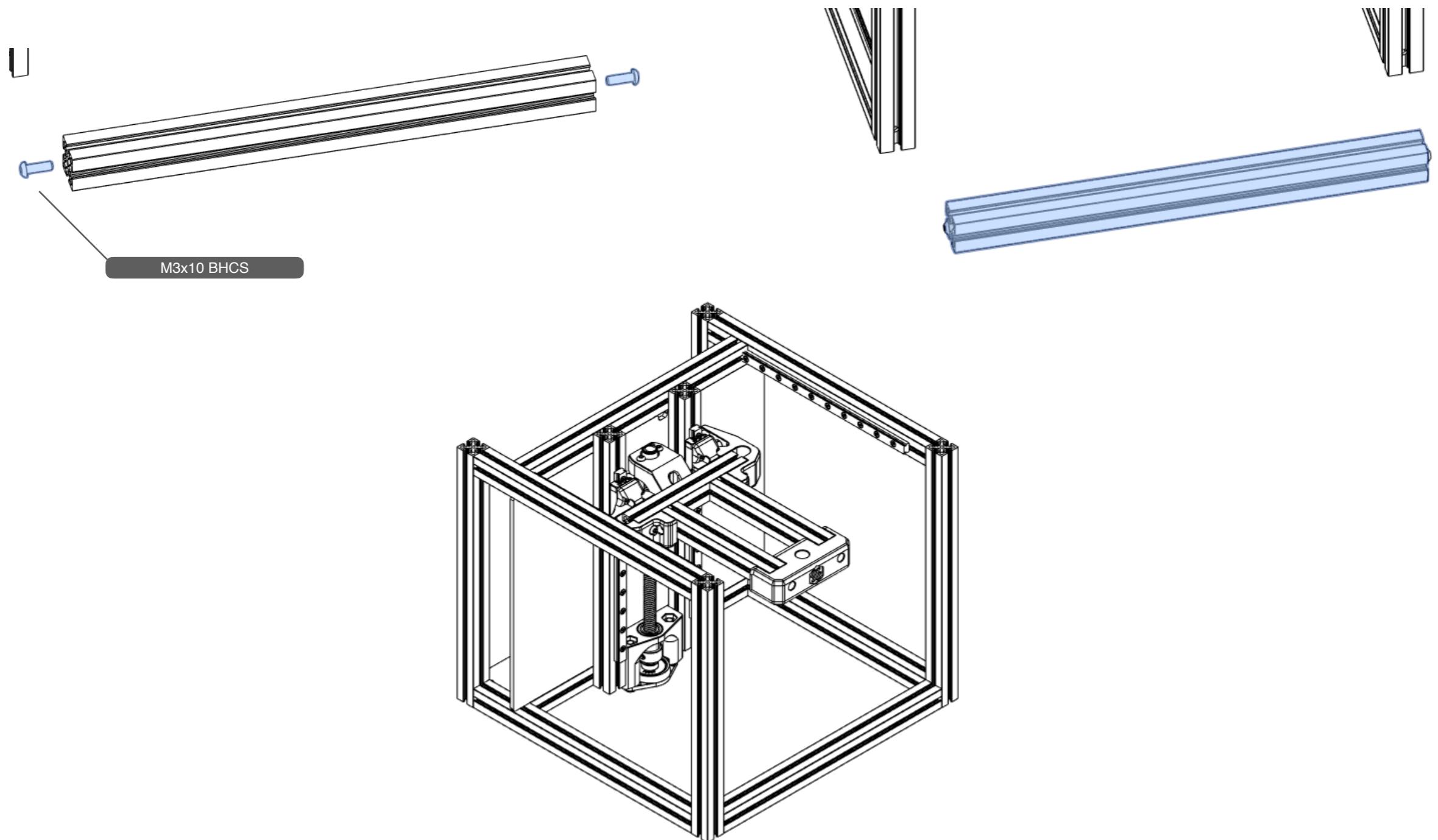
Y Rail Installation



Front Beams

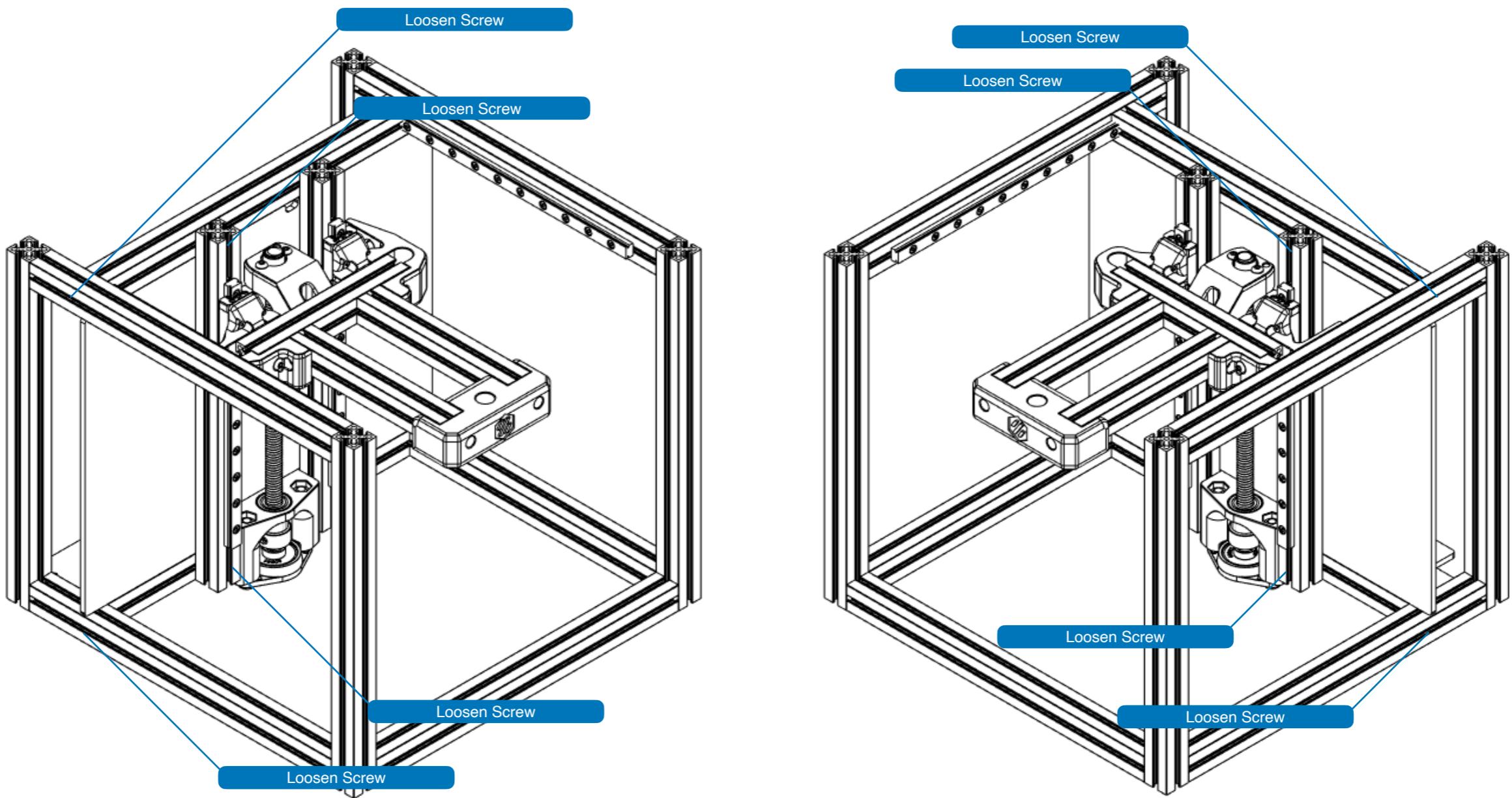


Front Beams

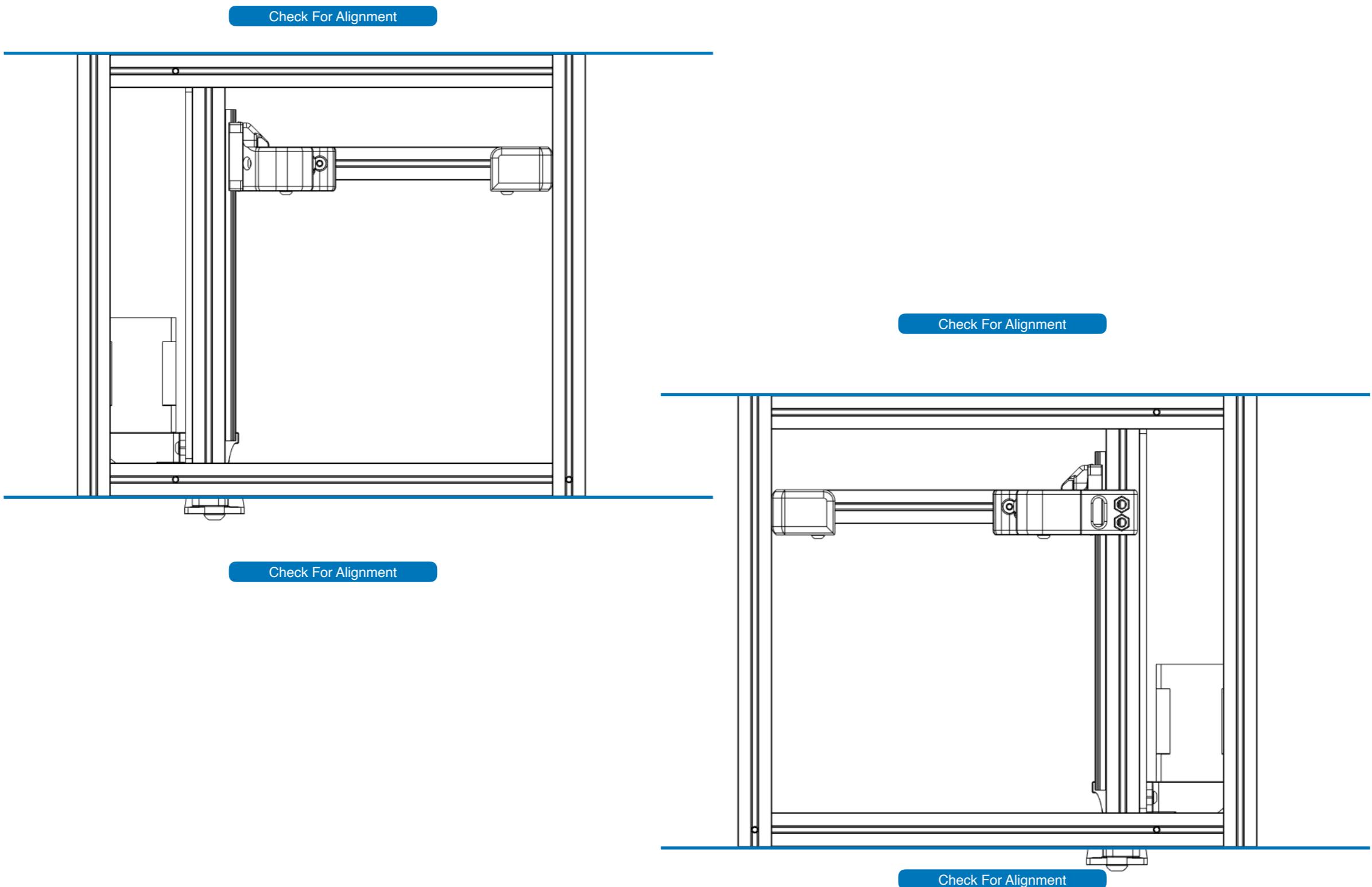


Part	Qty
M3x10 BHCS	2

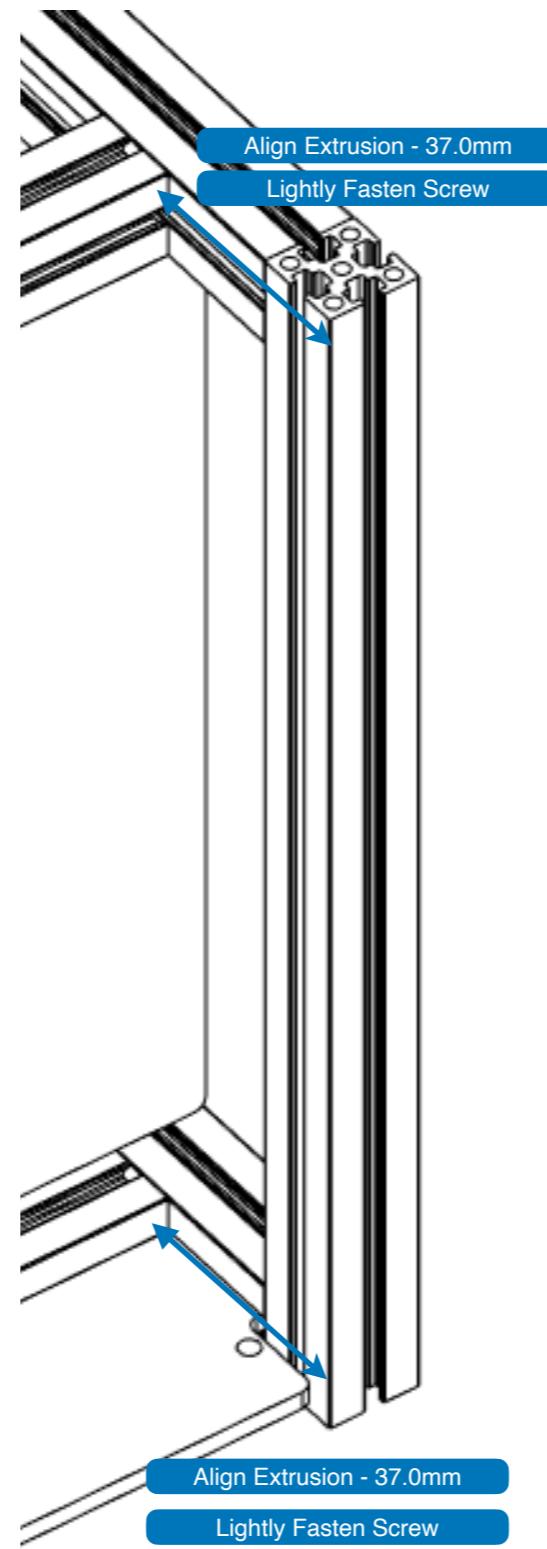
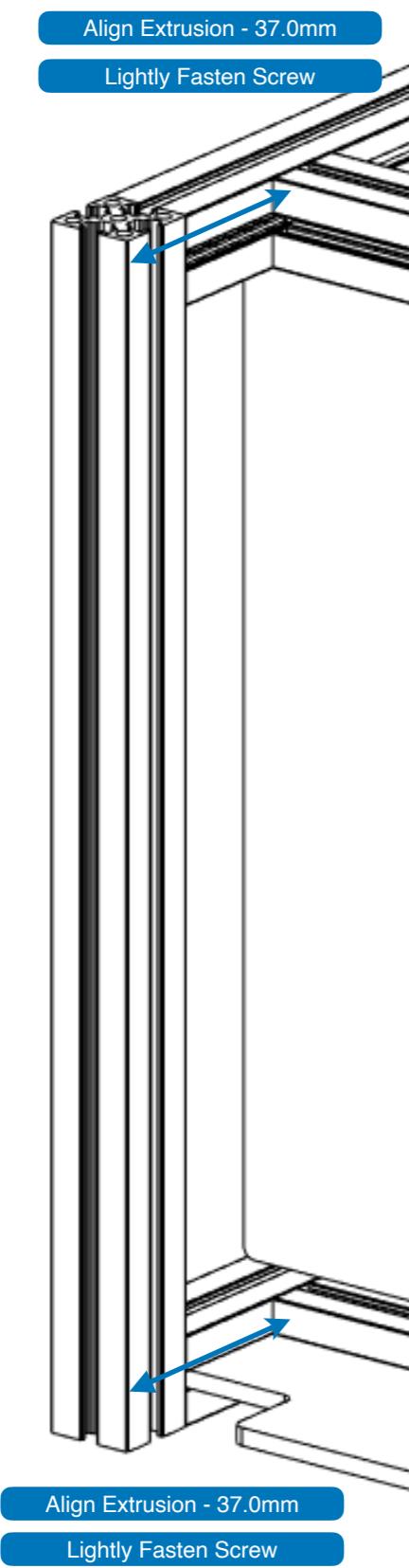
Frame Alignment



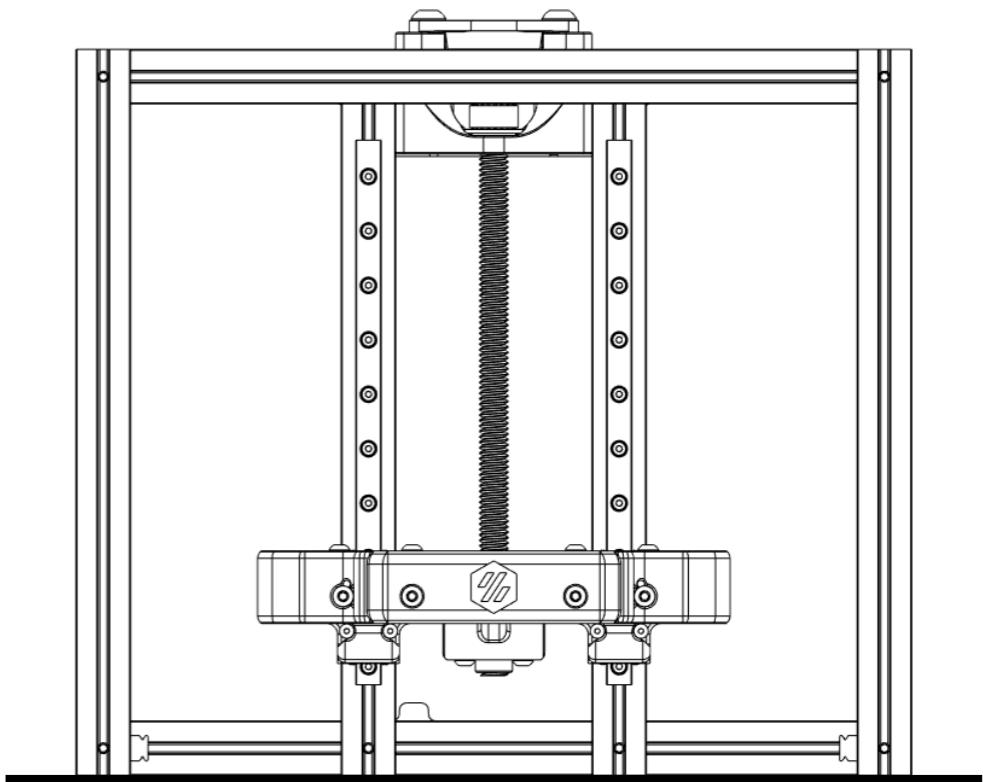
Frame Alignment



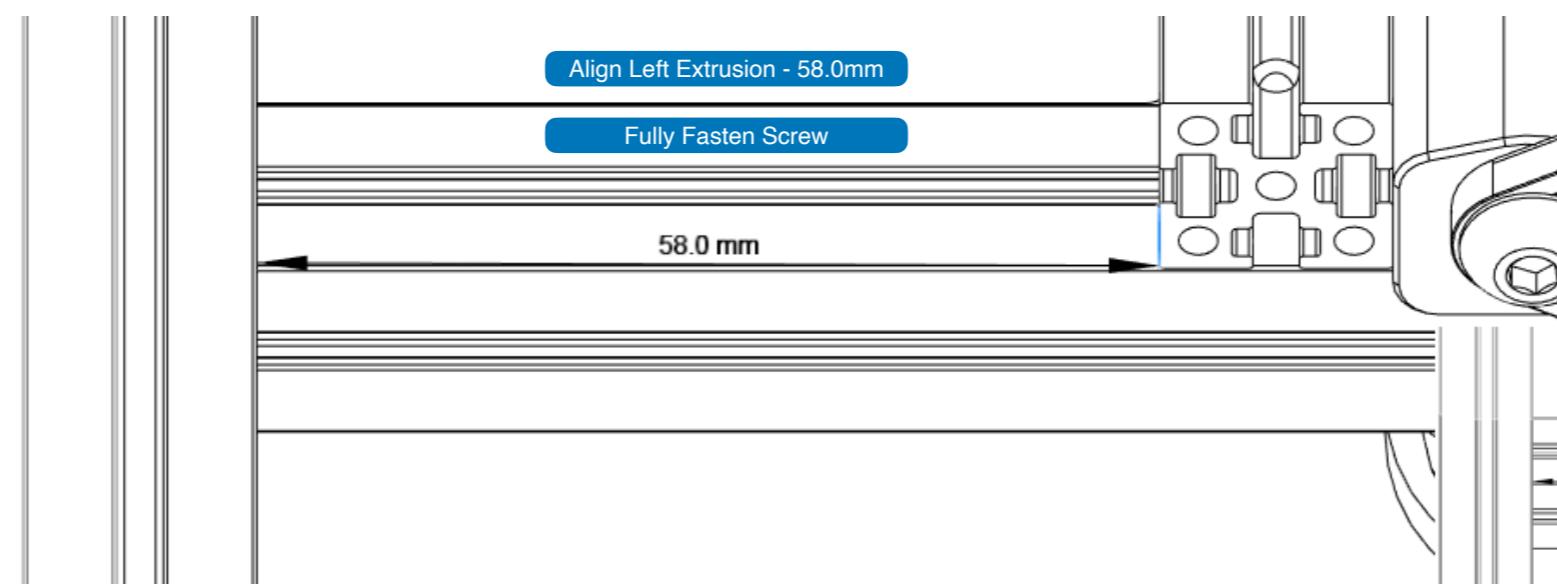
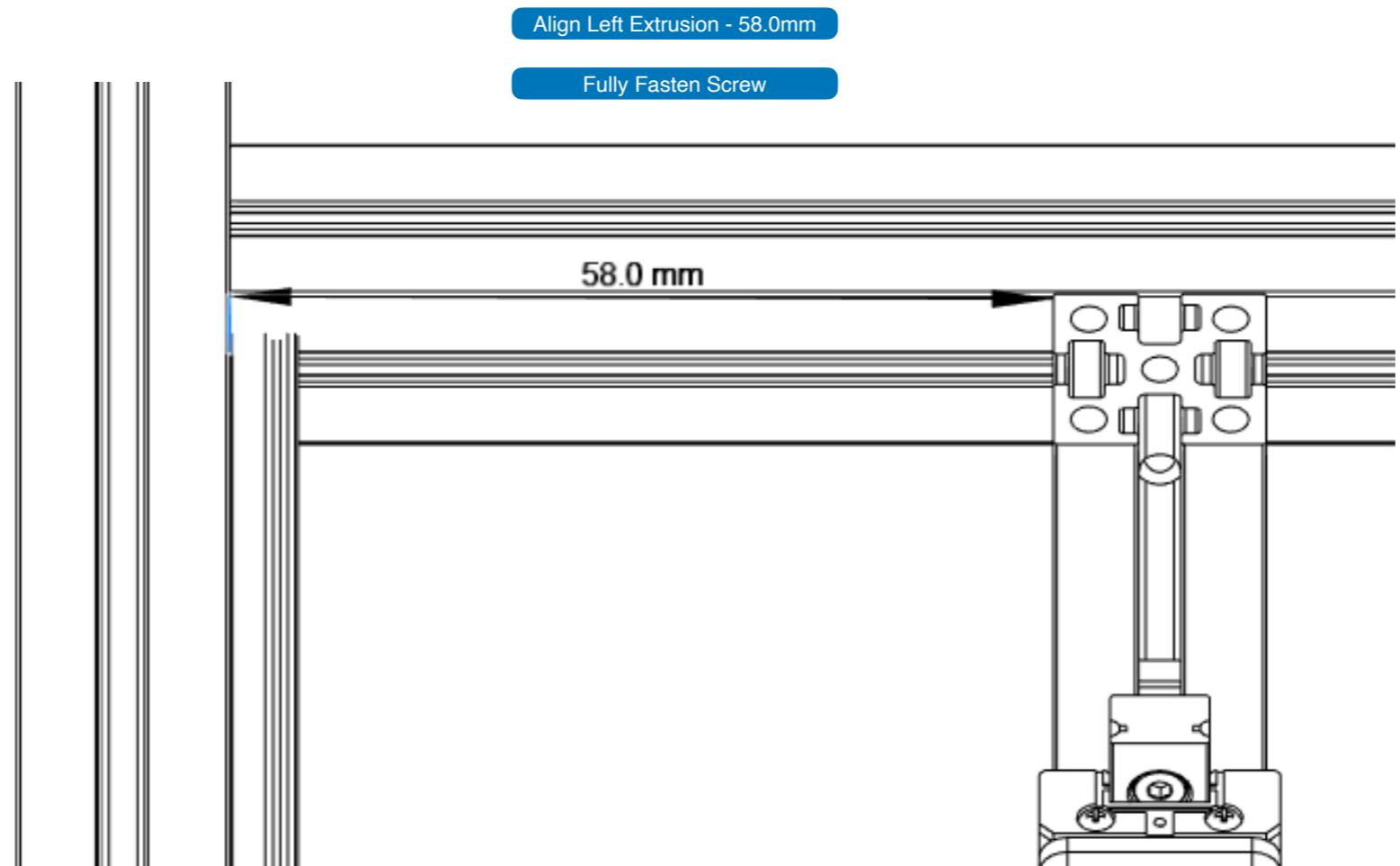
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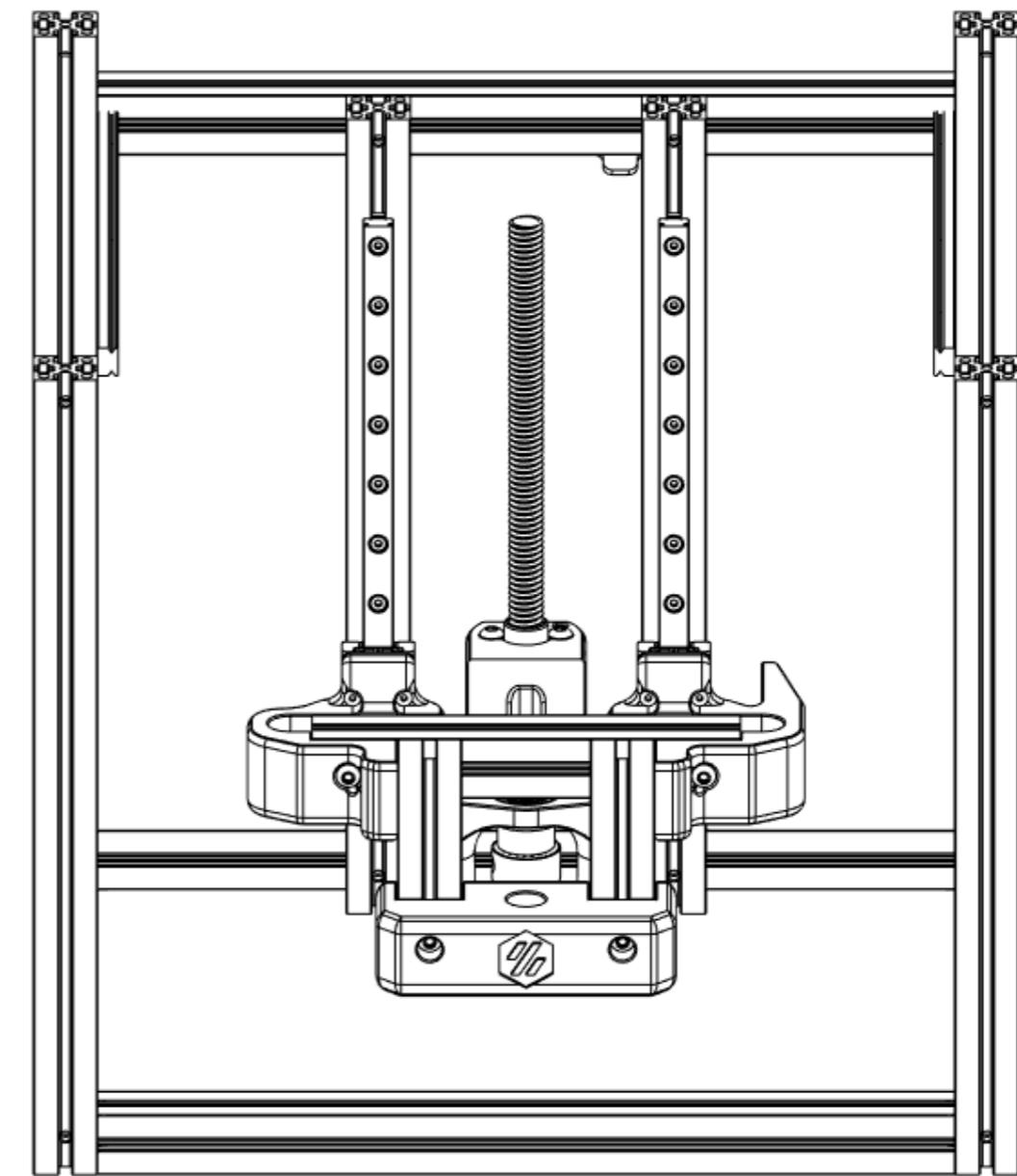
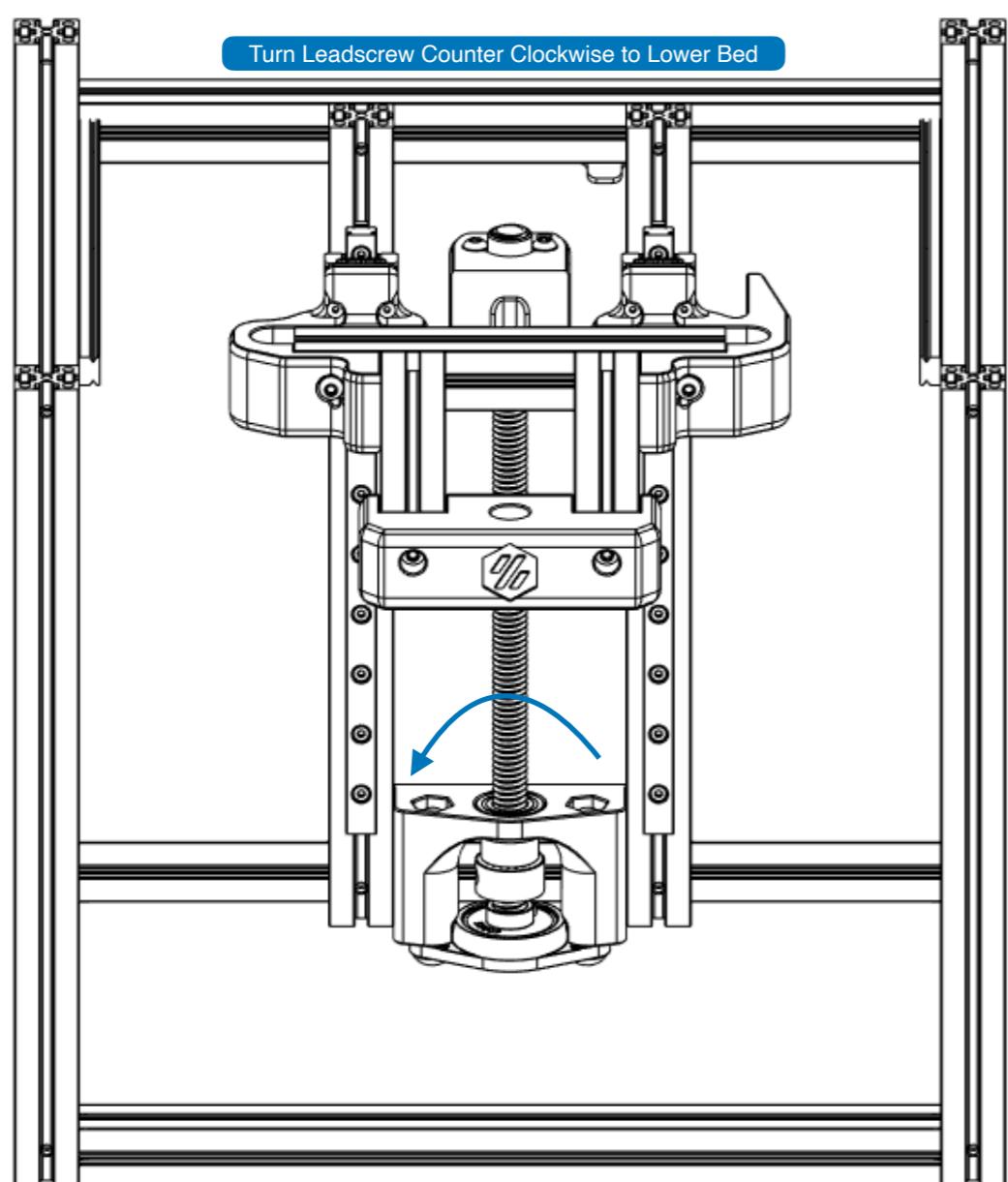


Carefully Flip Printer Upside Down
Place On Flat Surface And Fully Fasten Screws

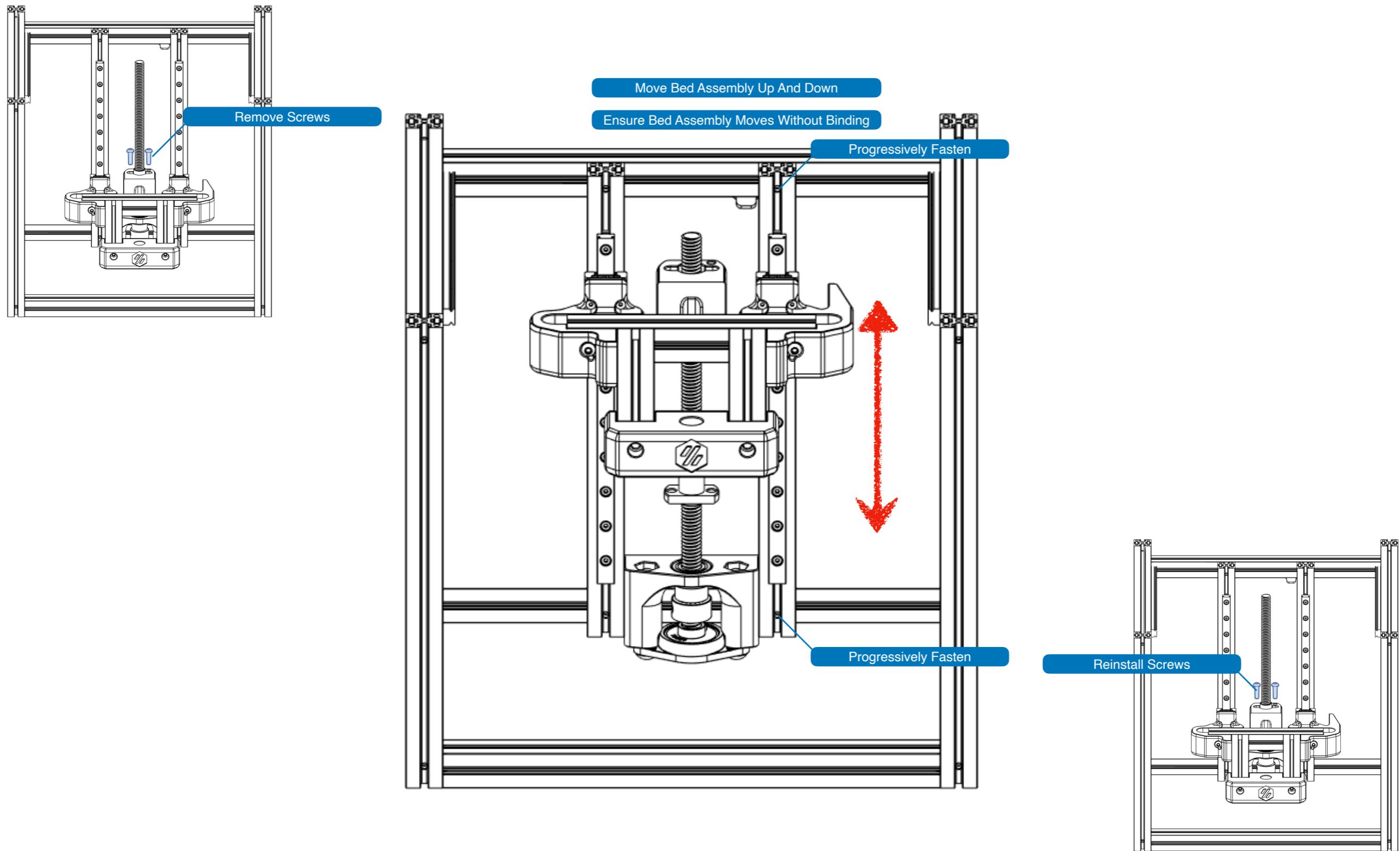


Frame Alignment

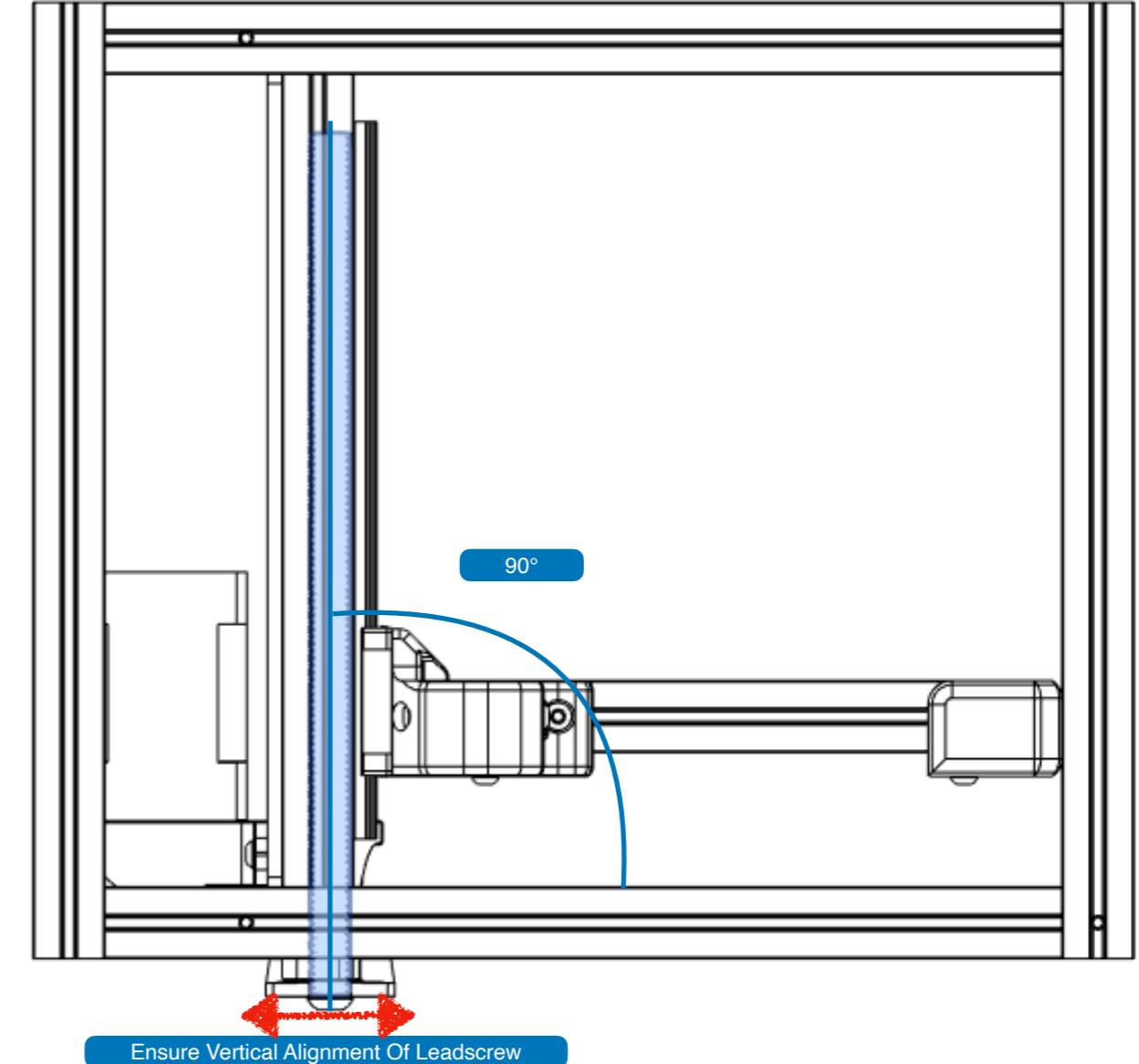
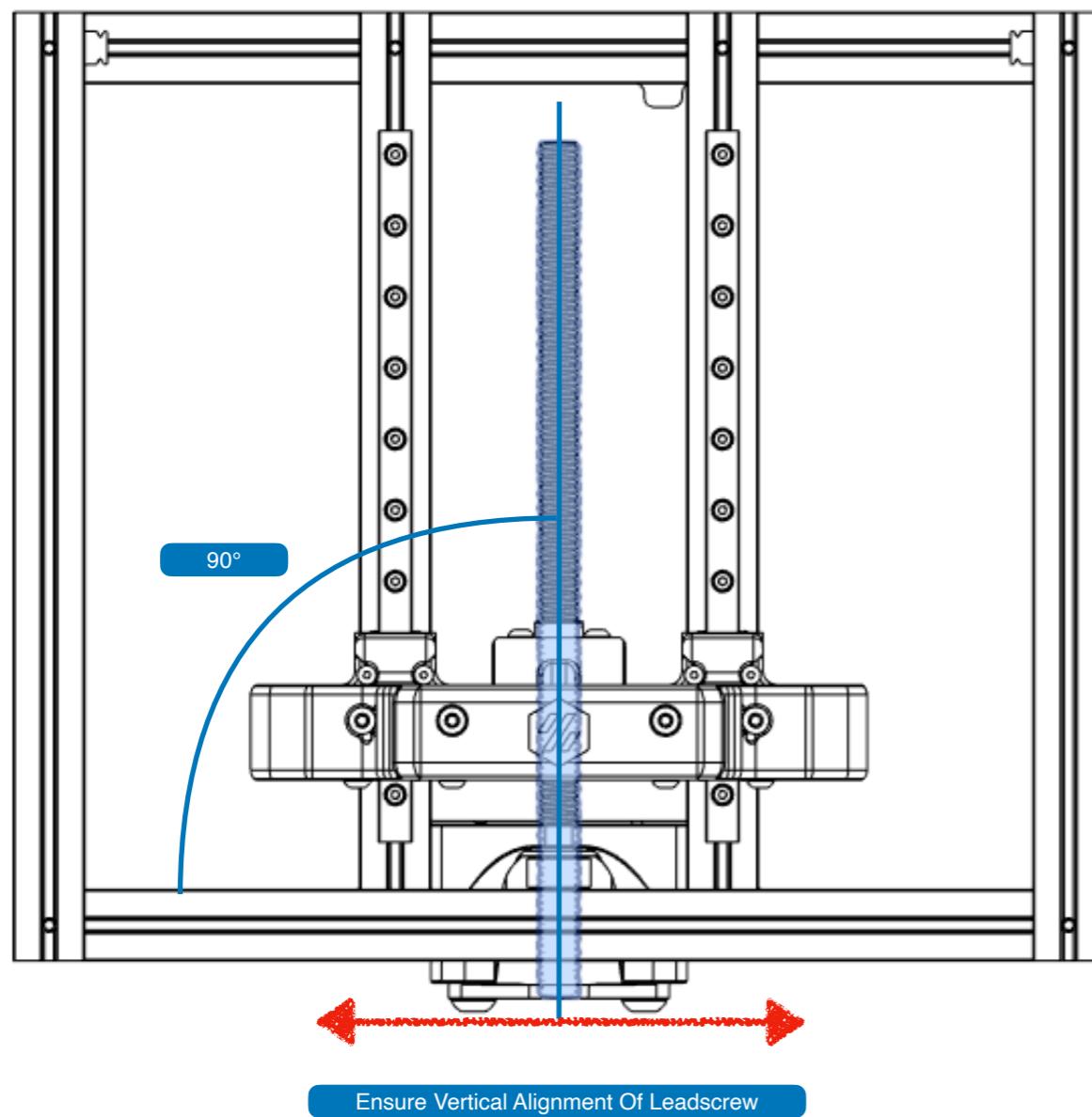
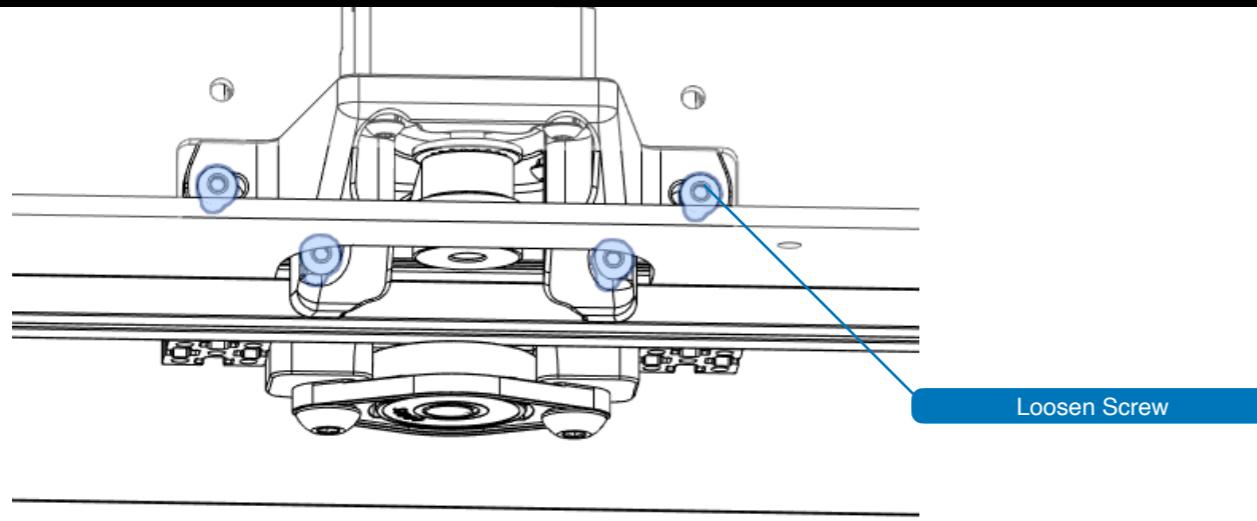


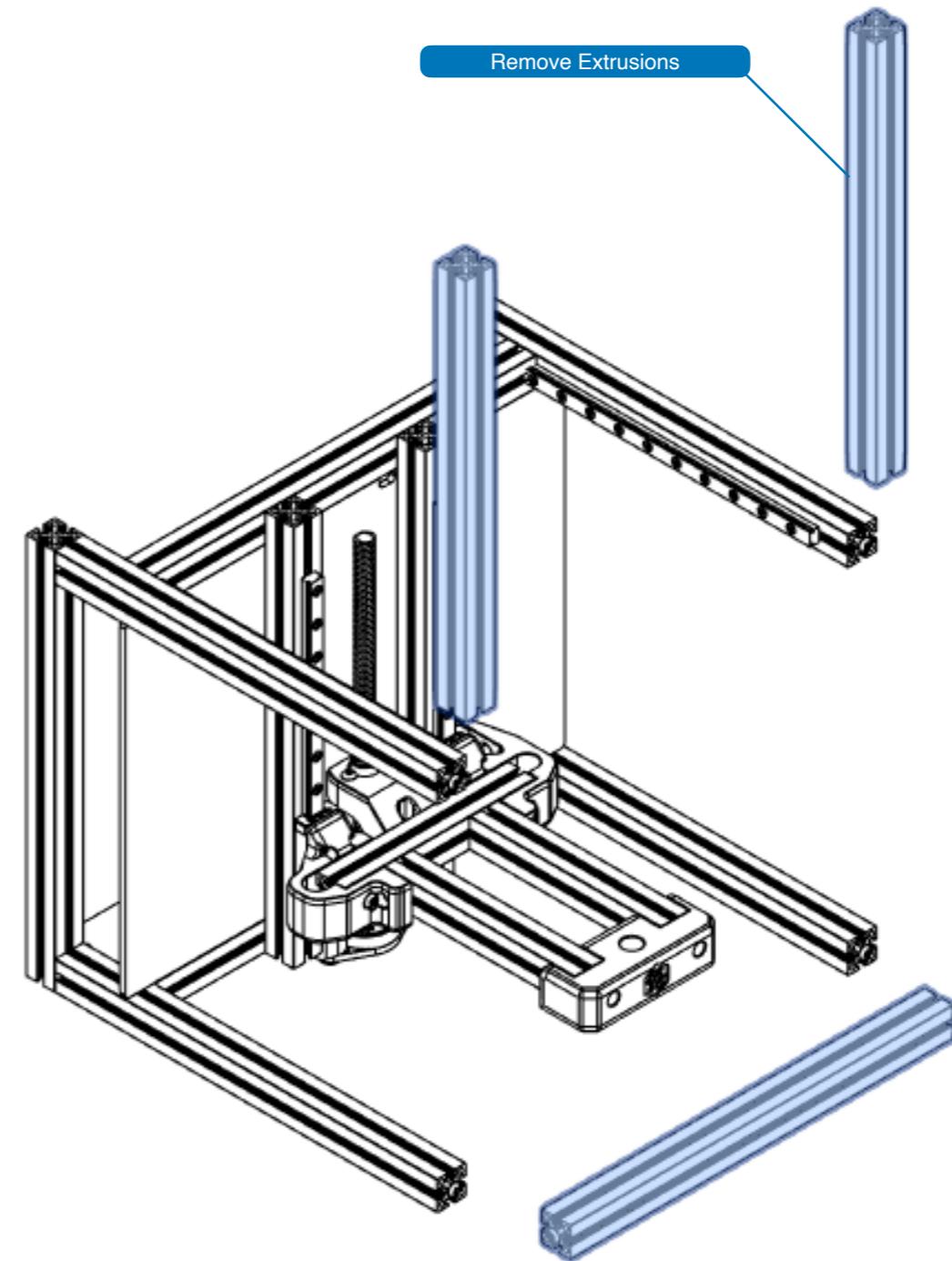
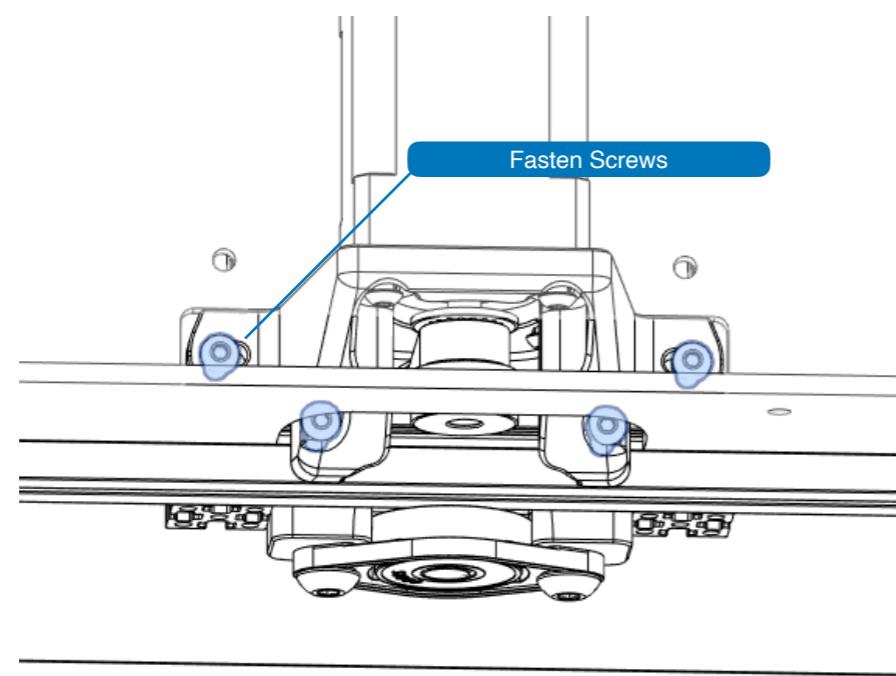


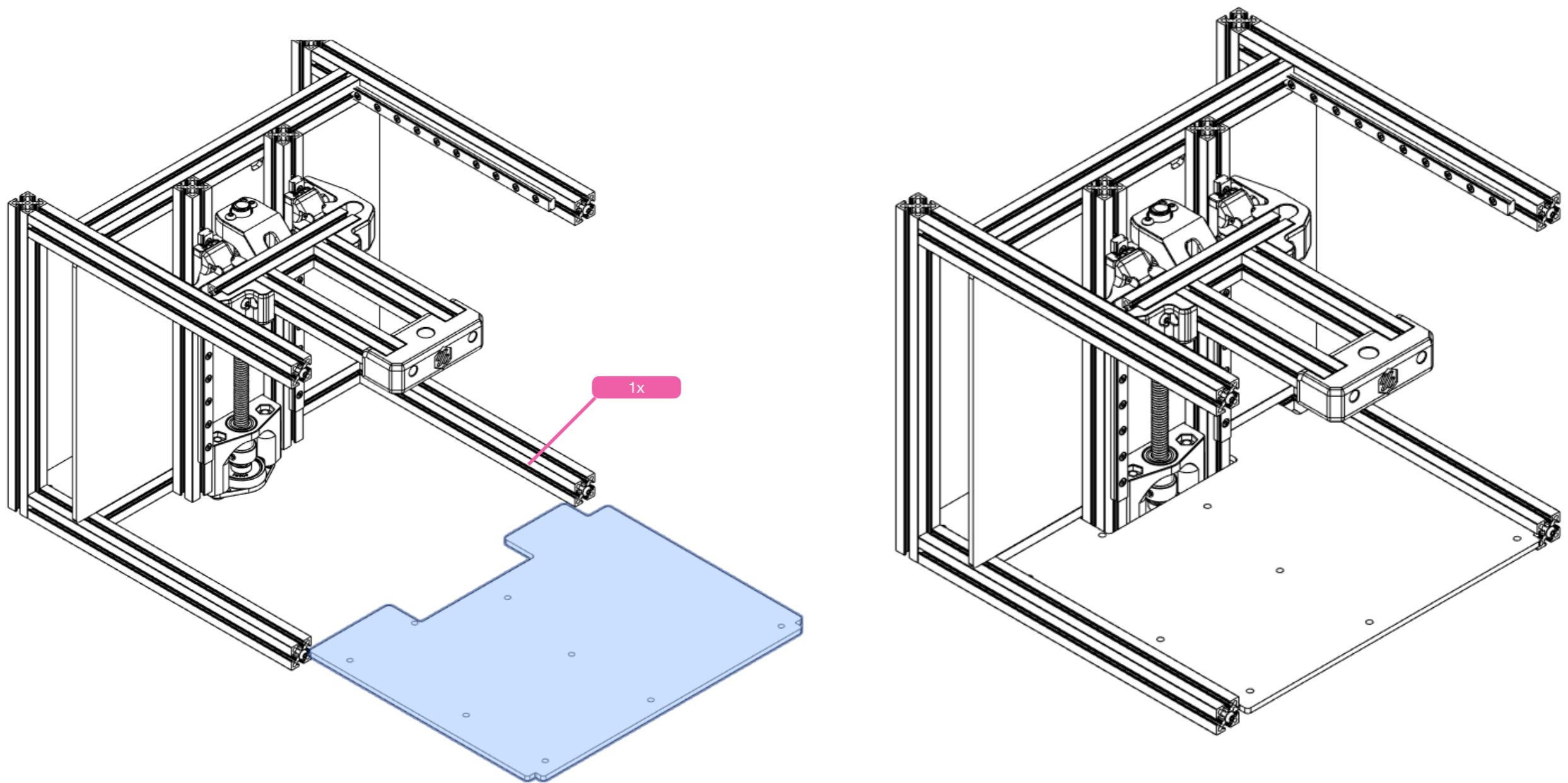
Bed Assembly Tramming



Leadscrew Alignment

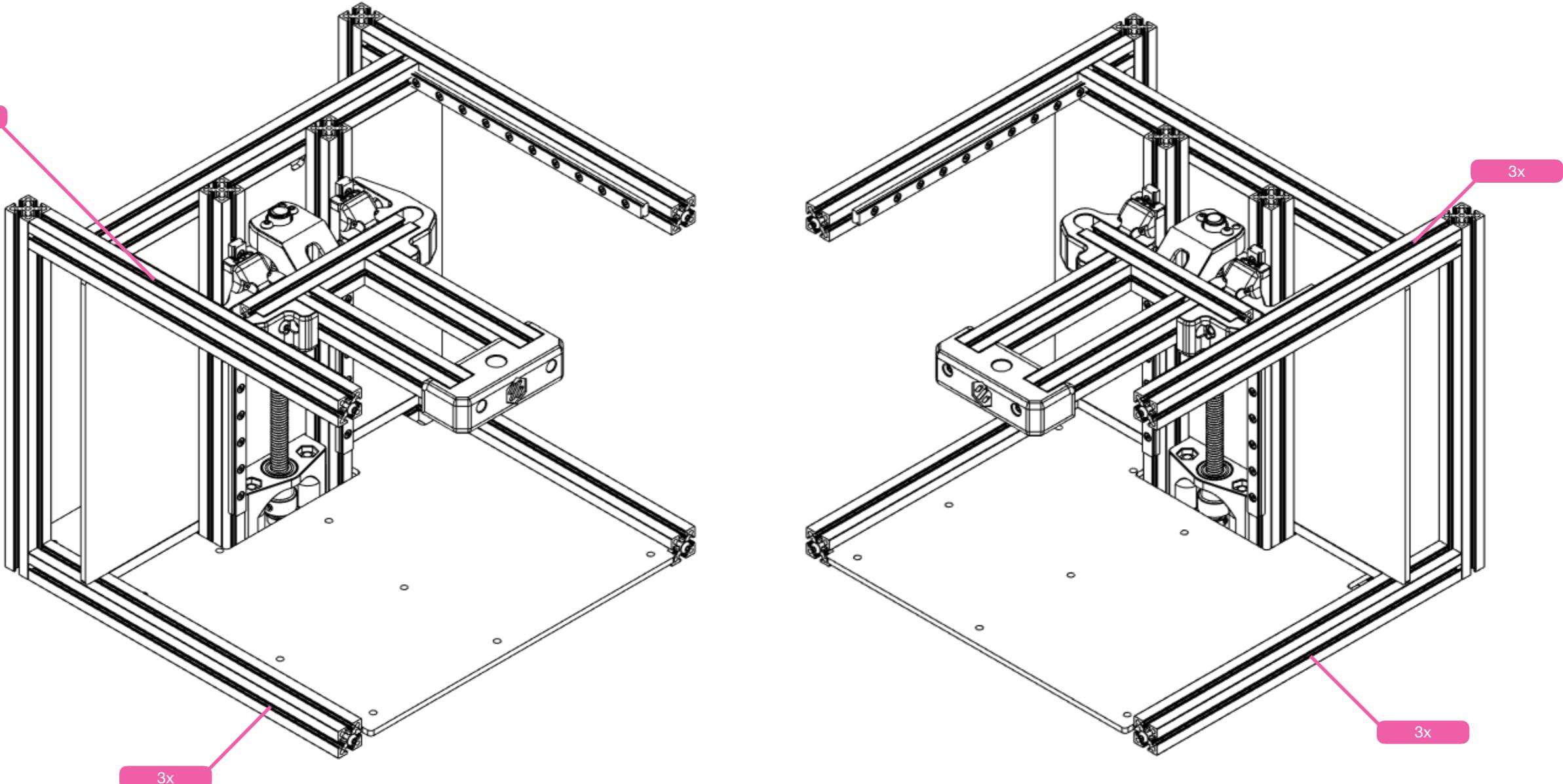




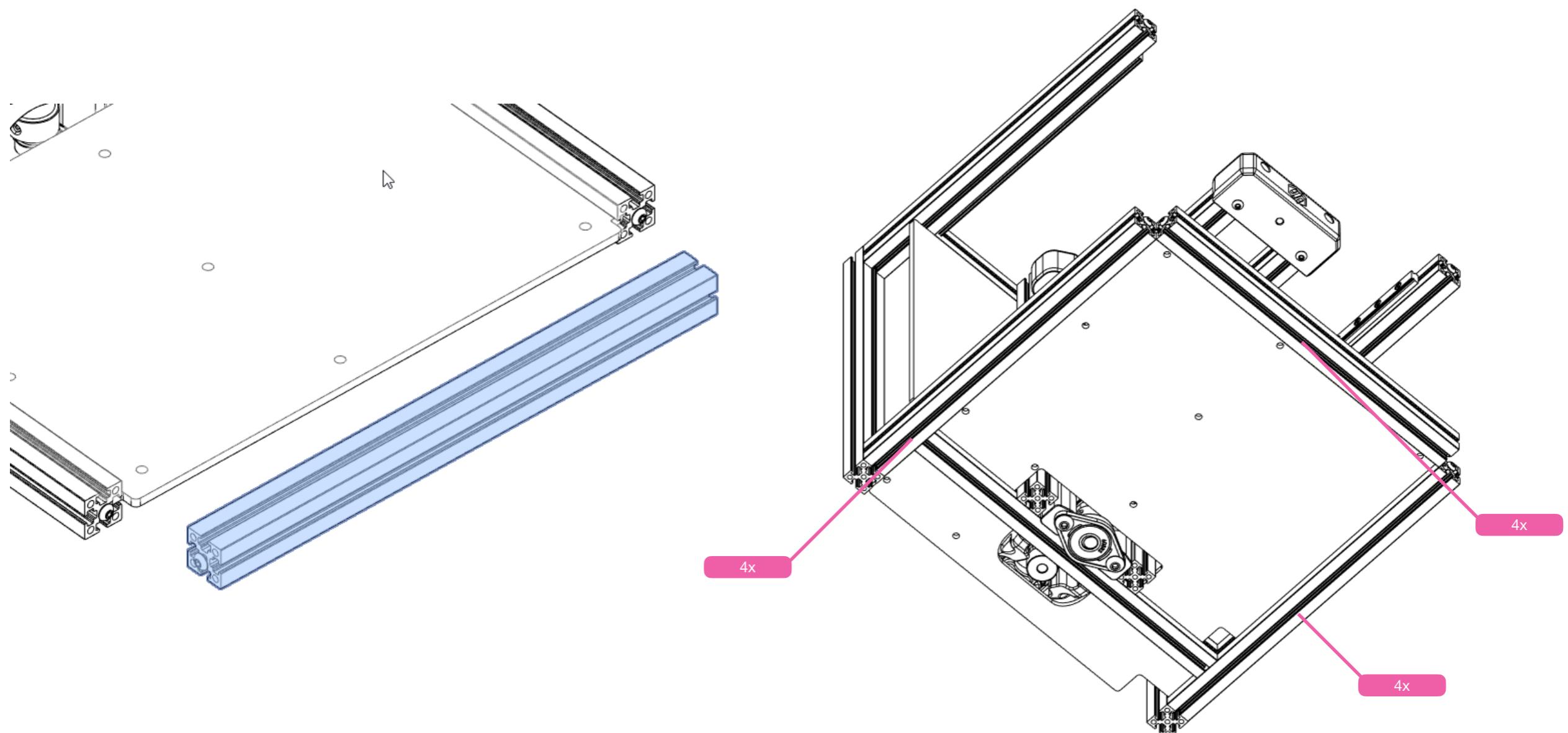


Part	Qty
M3 Nut	1

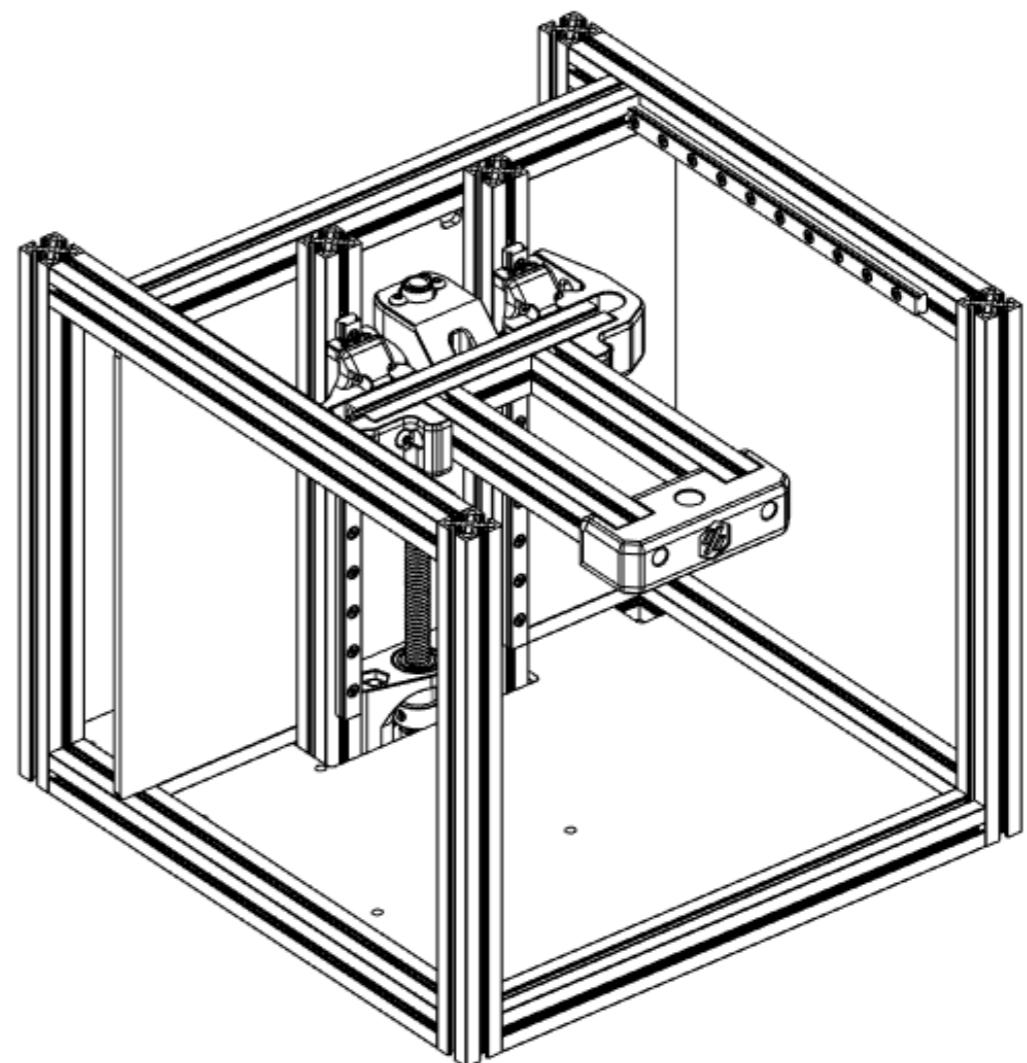
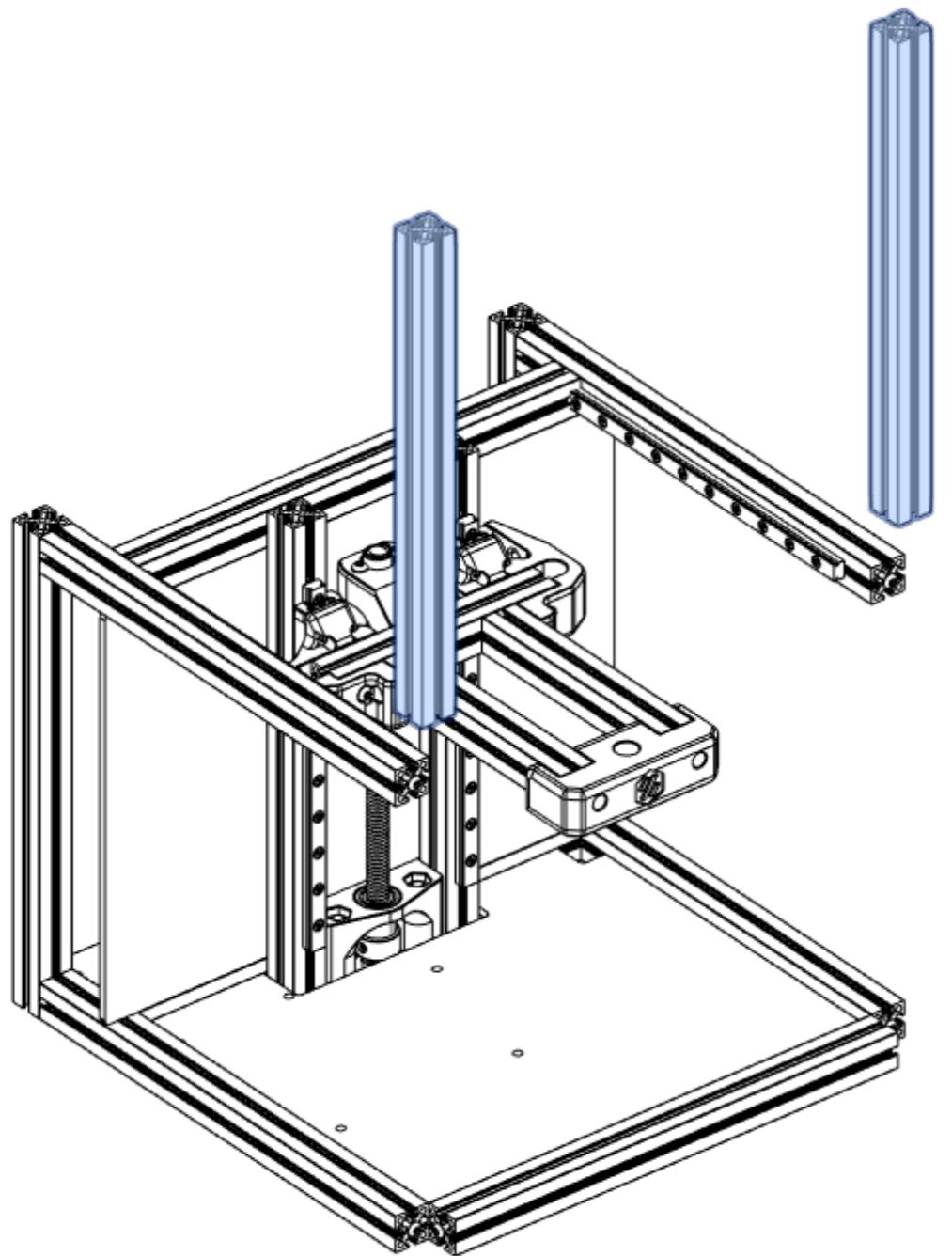
Frame Assembly



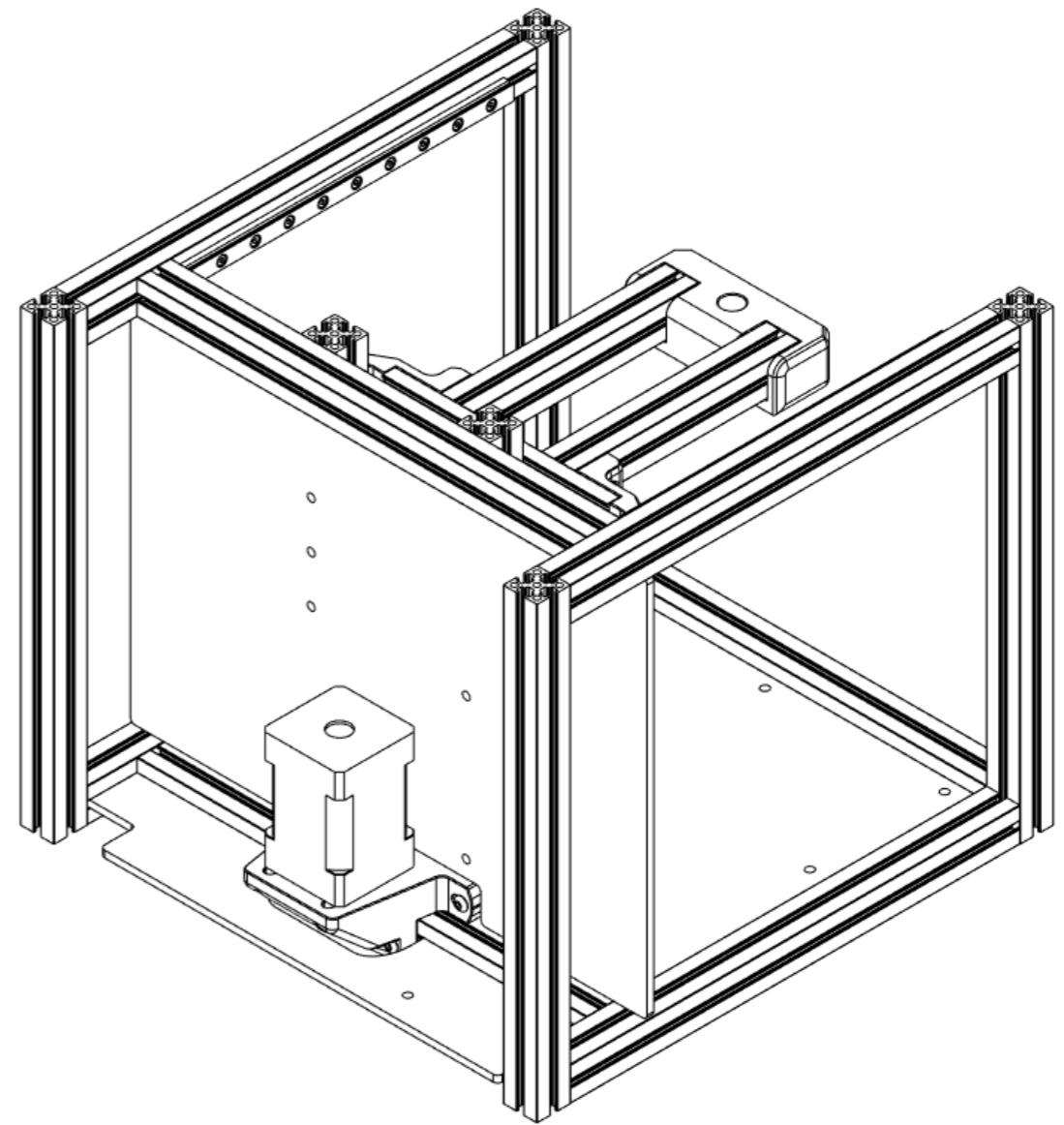
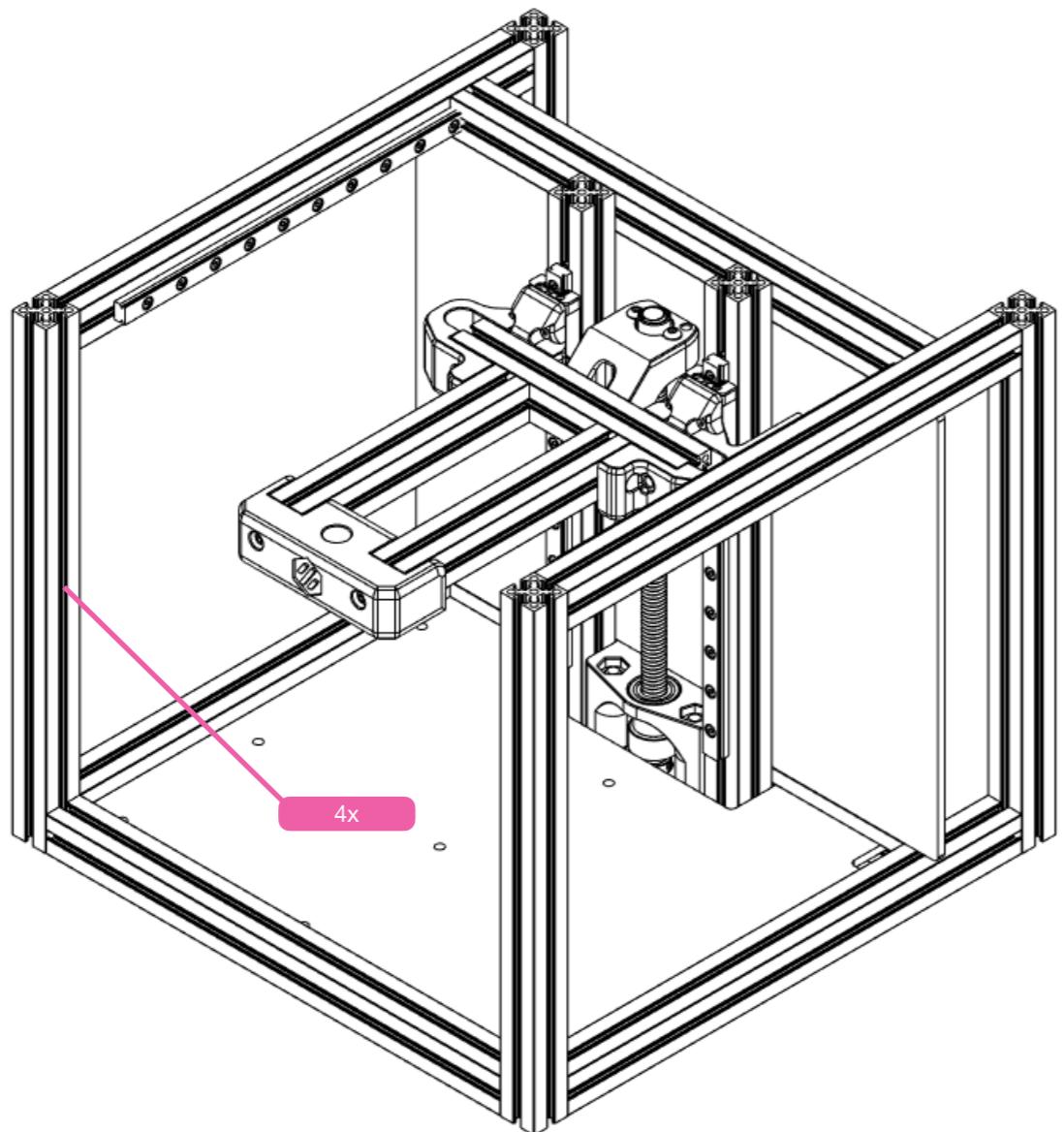
Frame Assembly



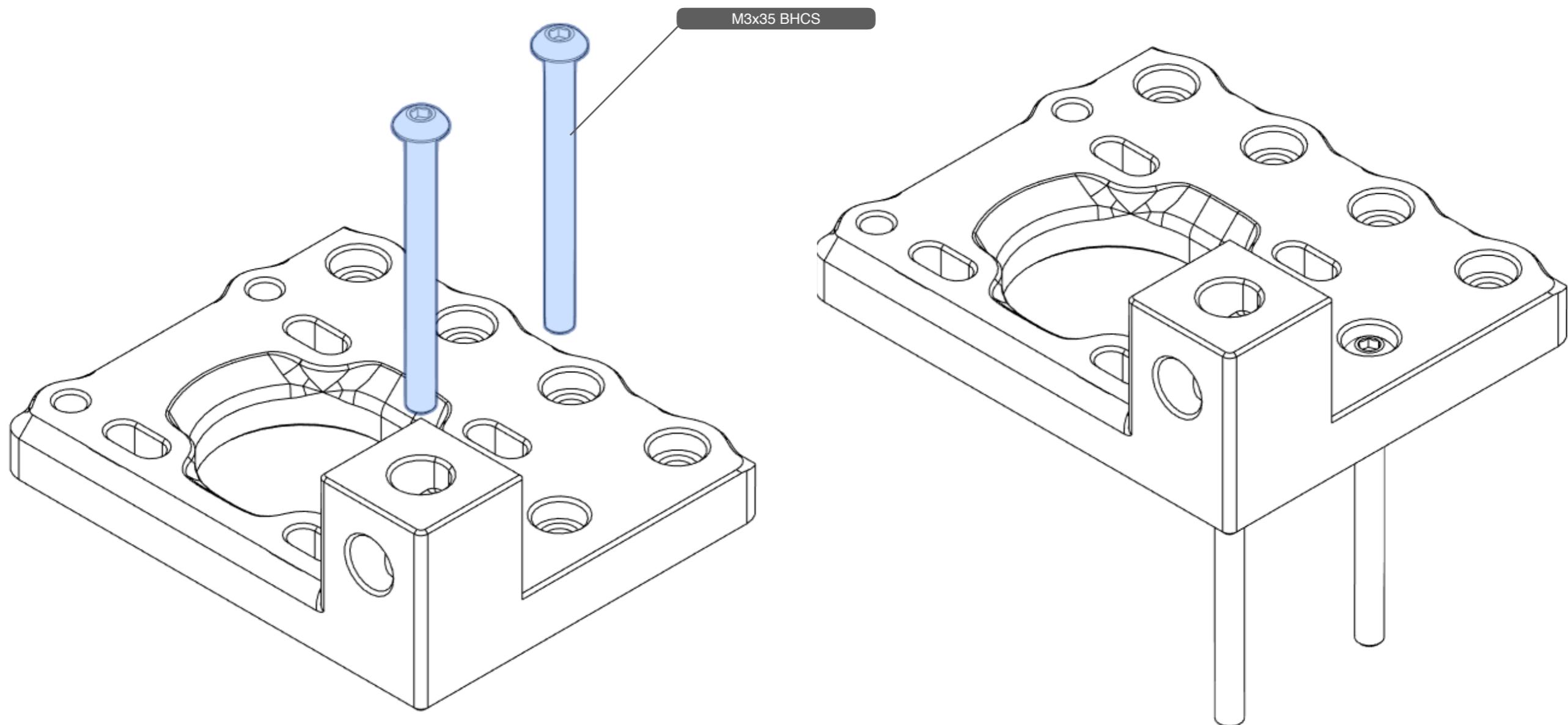
Frame Assembly



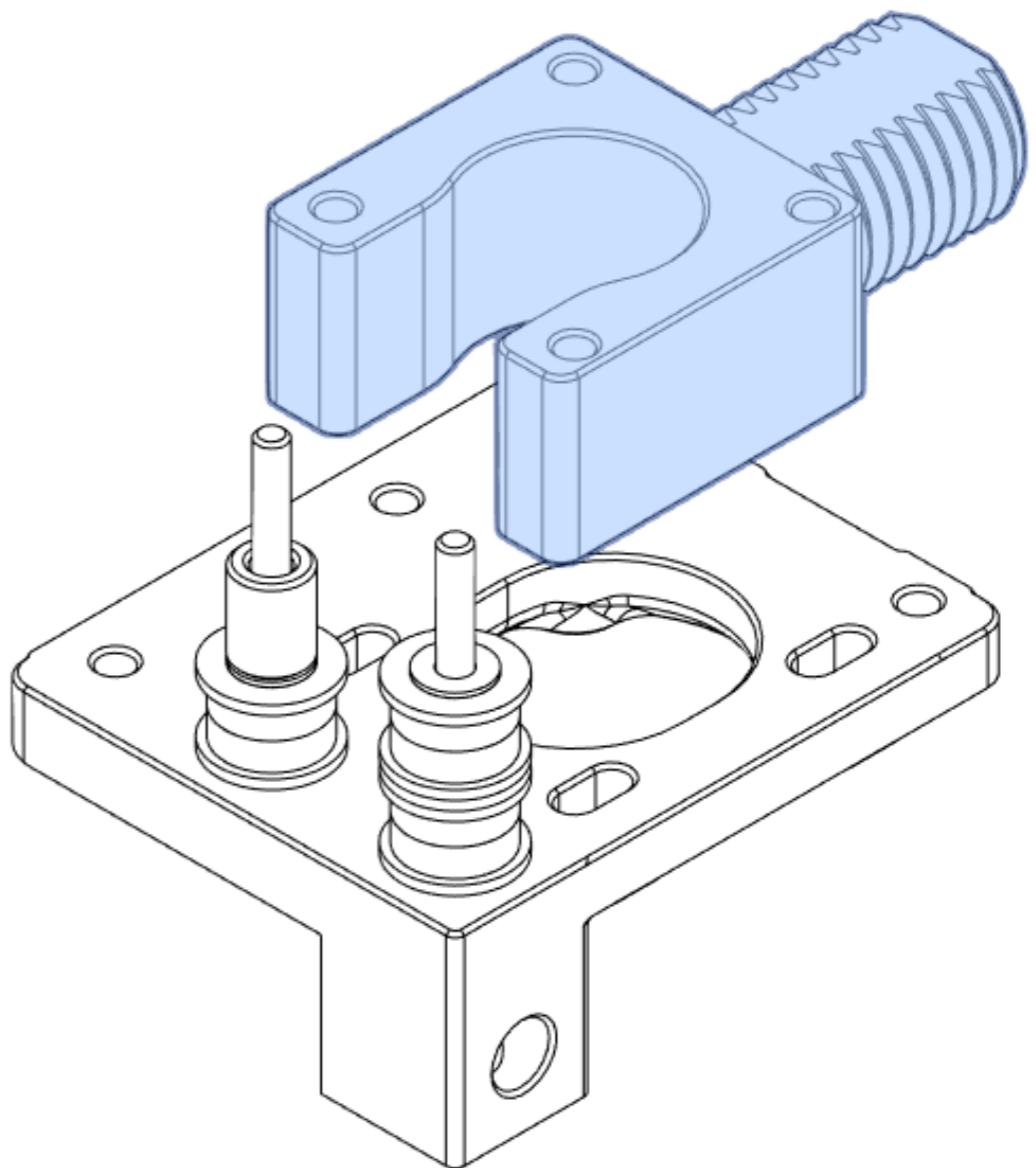
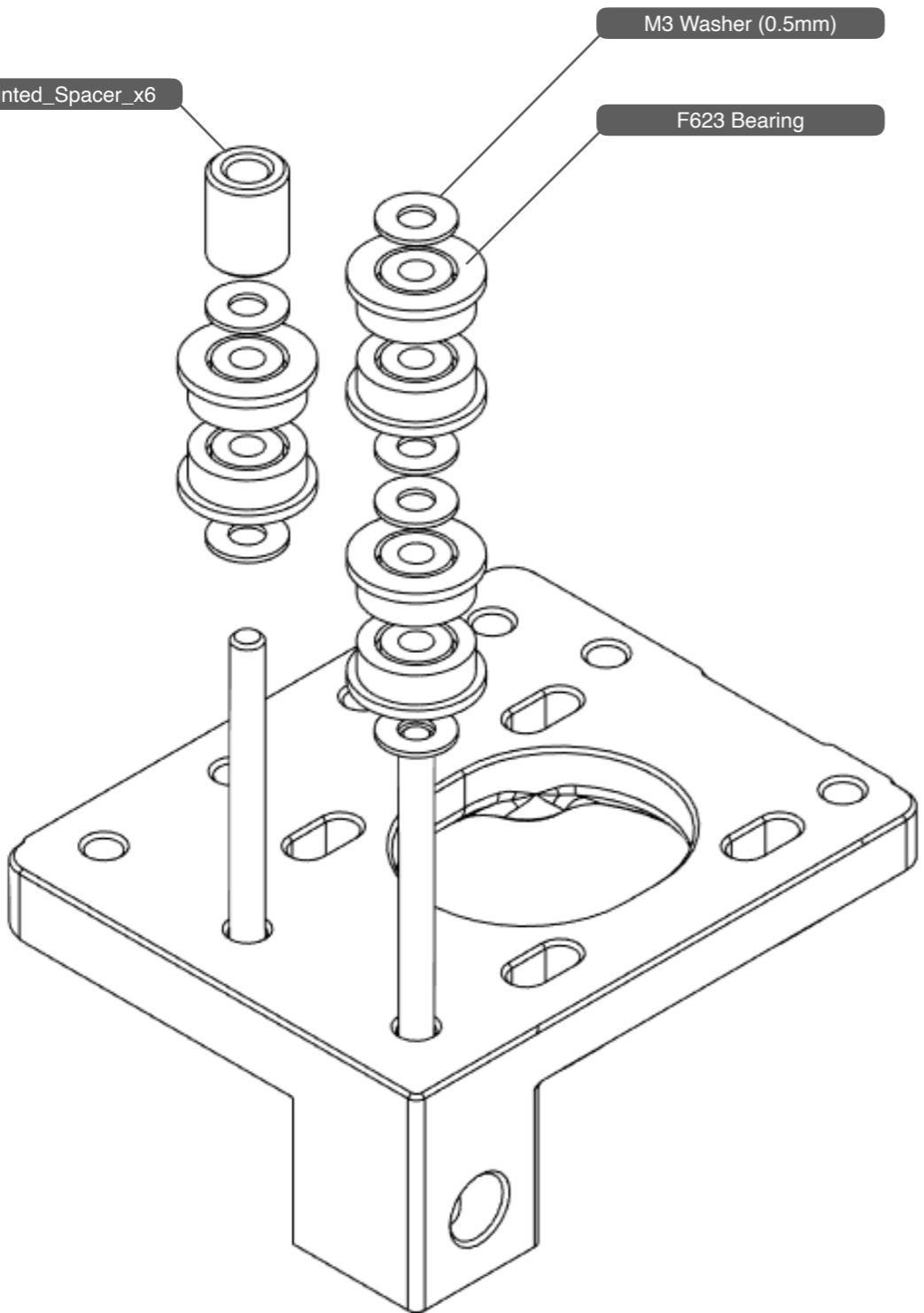
Frame Assembly



Part	Qty
M3 Nut	4

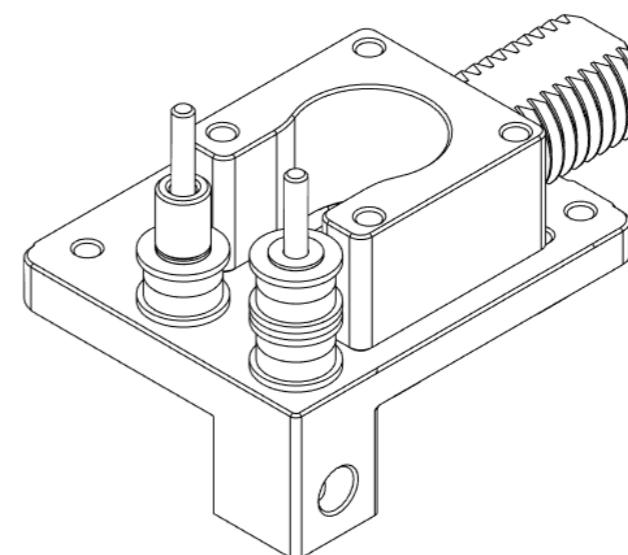
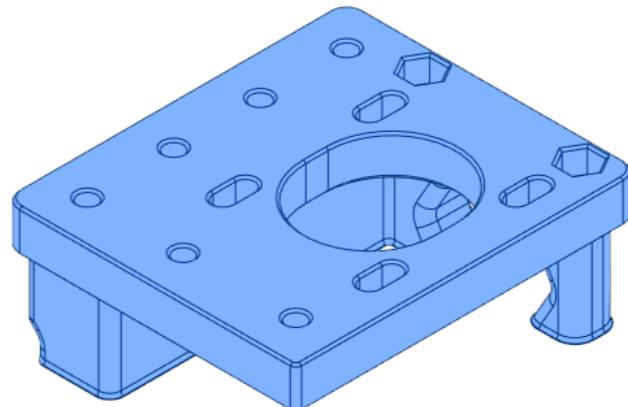
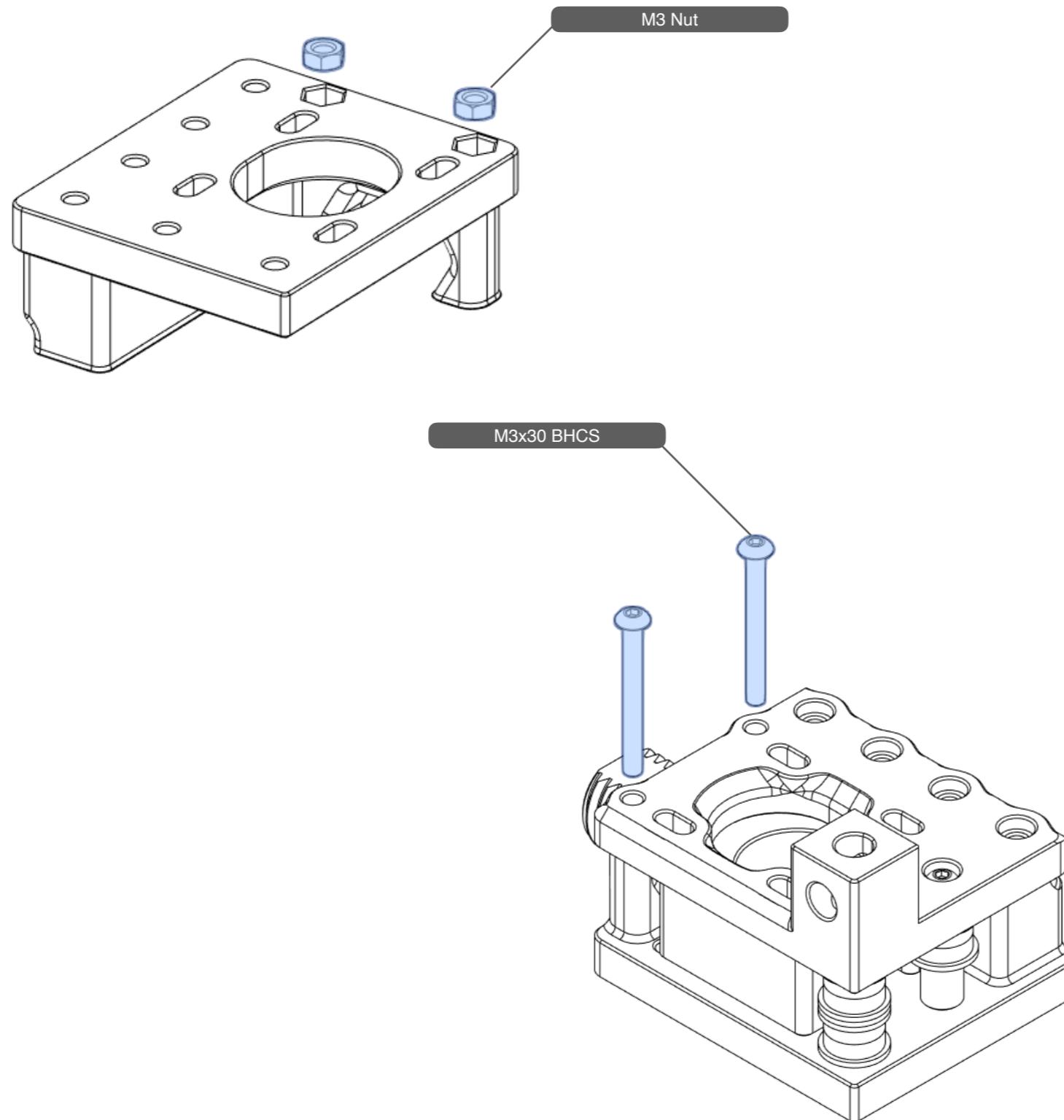


Part	Qty
M3x35 BHCS	2



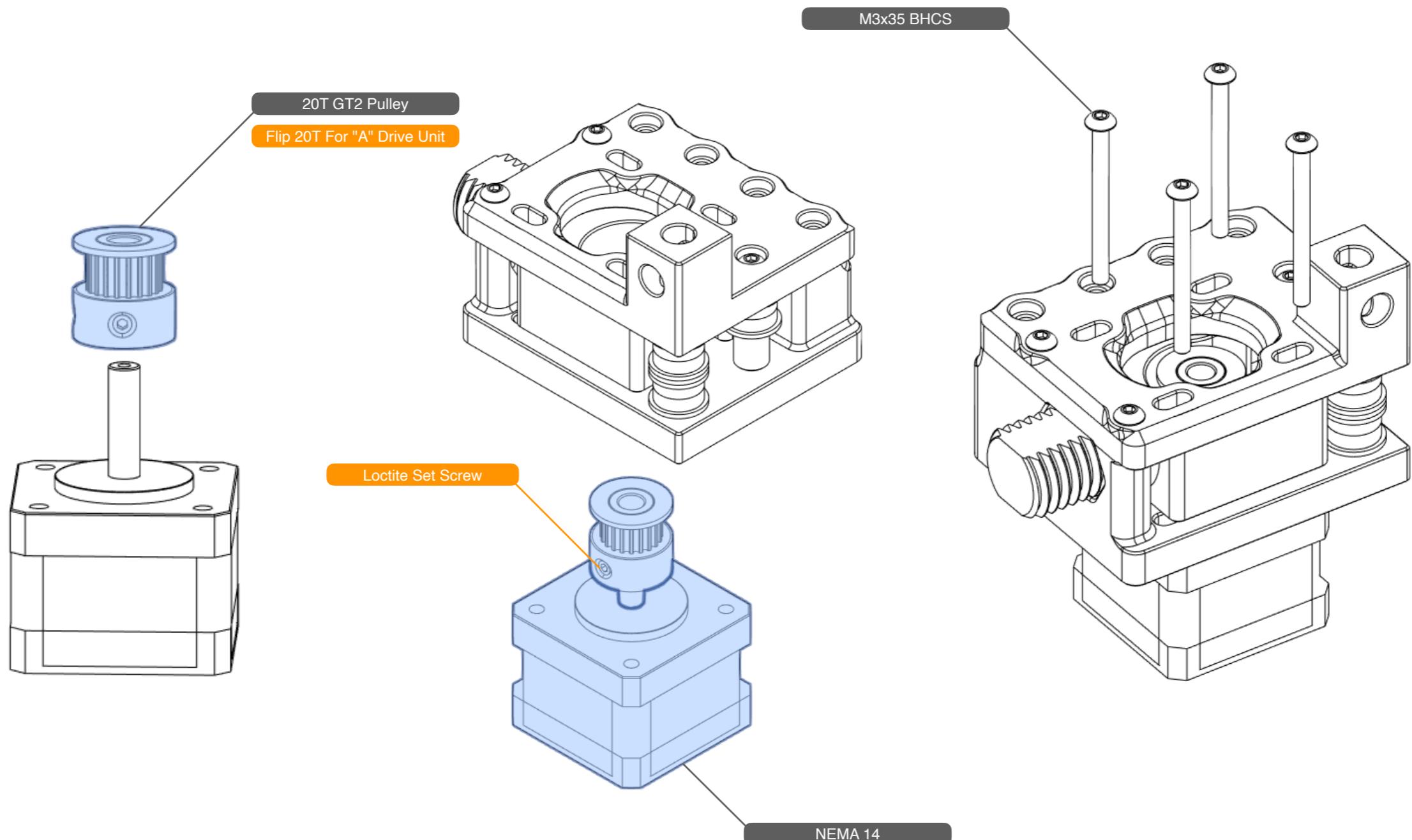
Part	Qty
F623	12
M3 Washer	12

A/B Drive Units

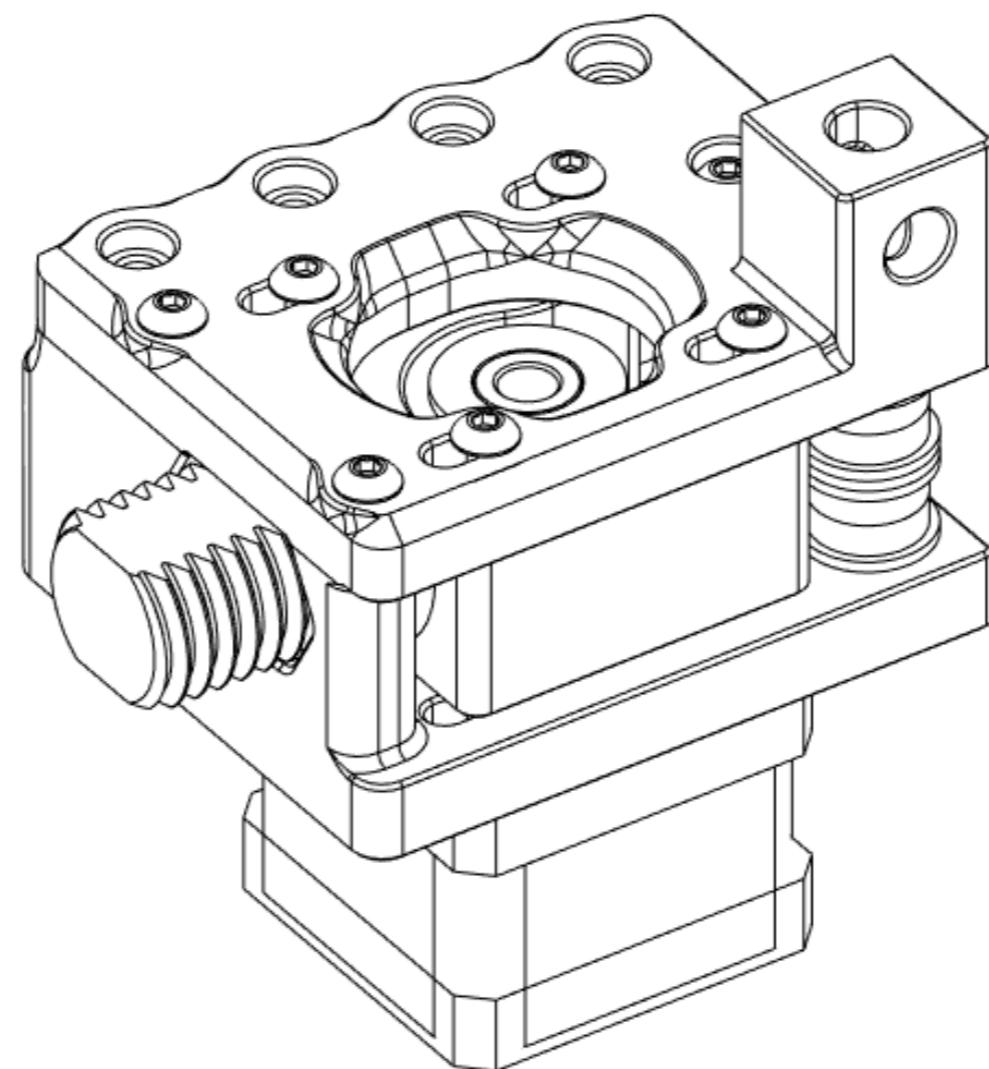


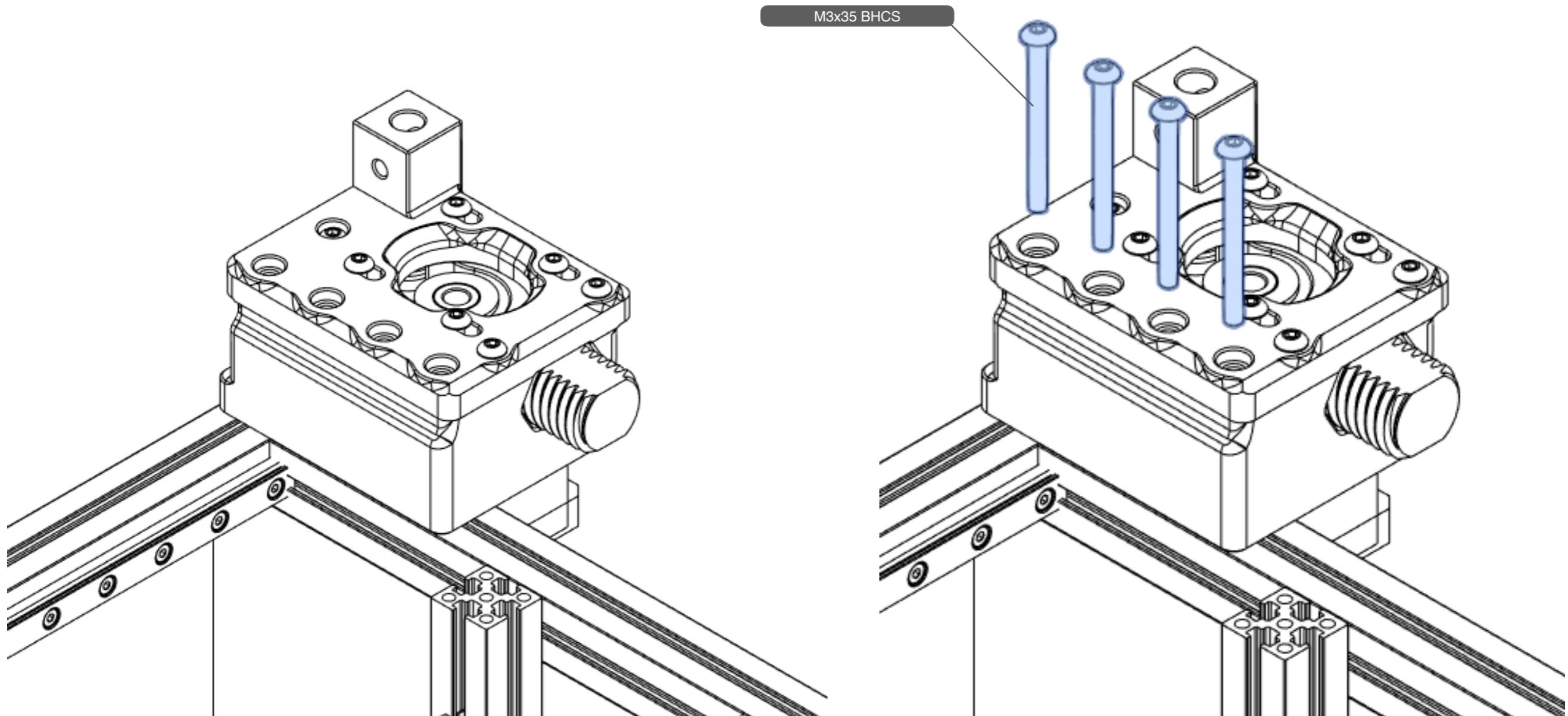
Part	Qty
M3x30 BHCS	4
M3 Nut	4

A/B Drive Units

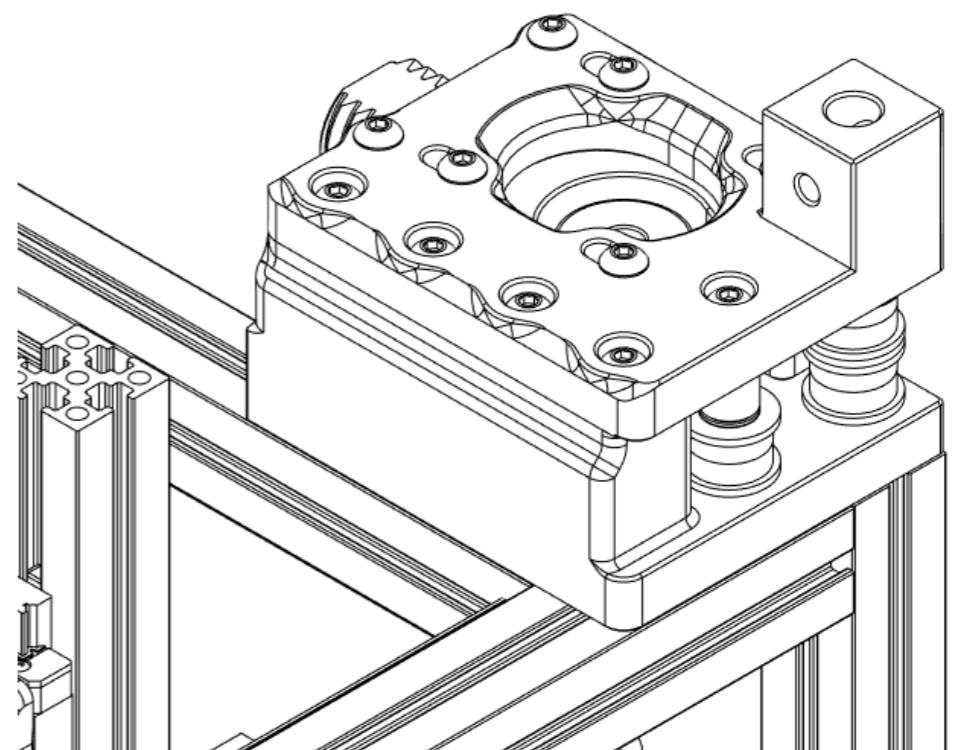
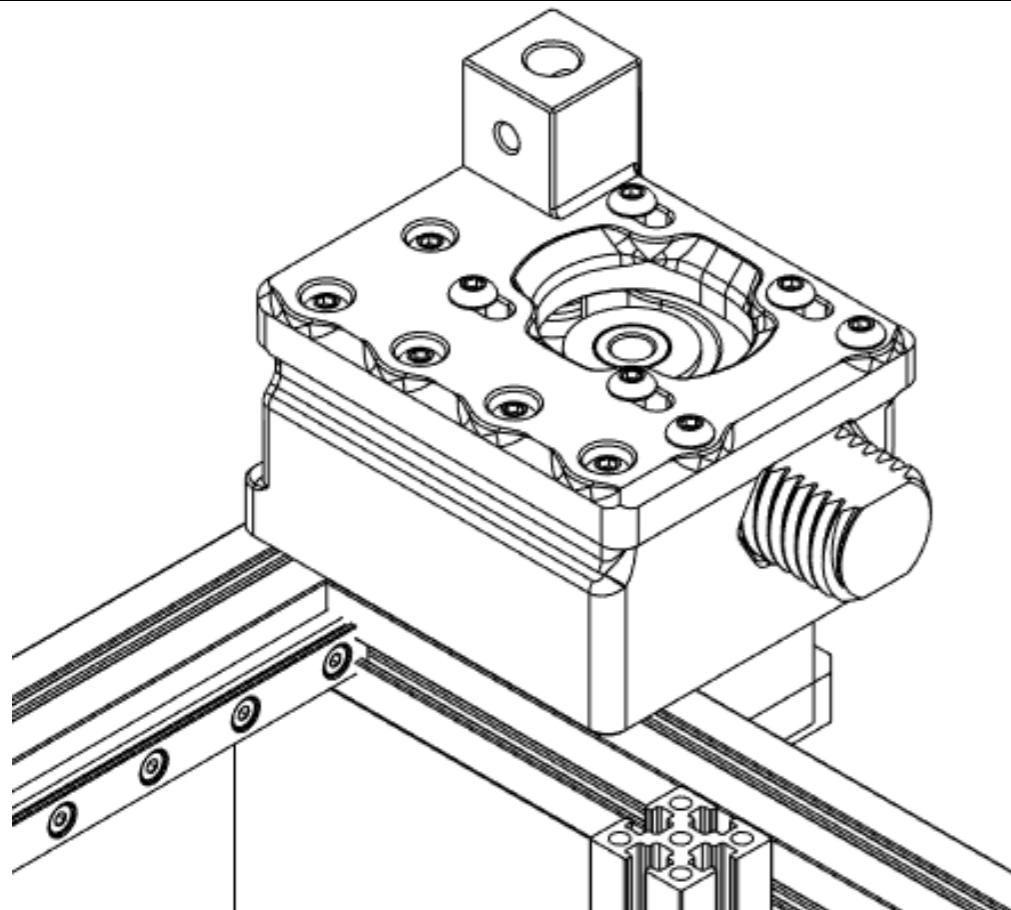


Part	Qty
20T GT2 Pulley	2
M3x35 BHCS	8
NEMA 14	2



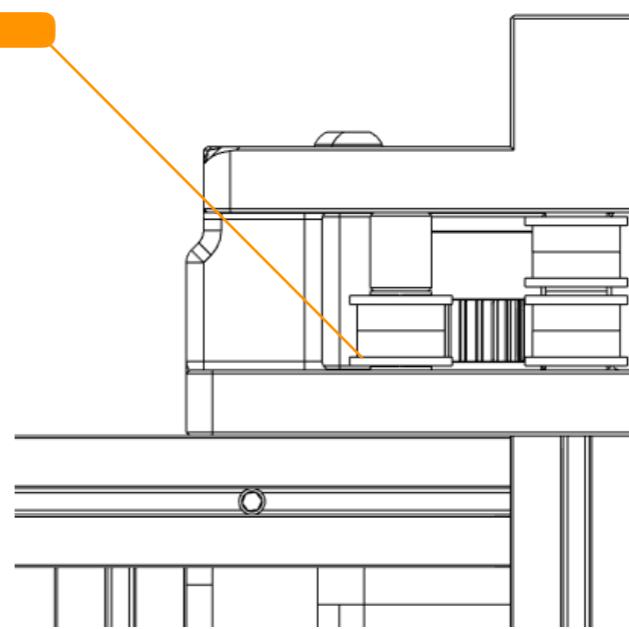
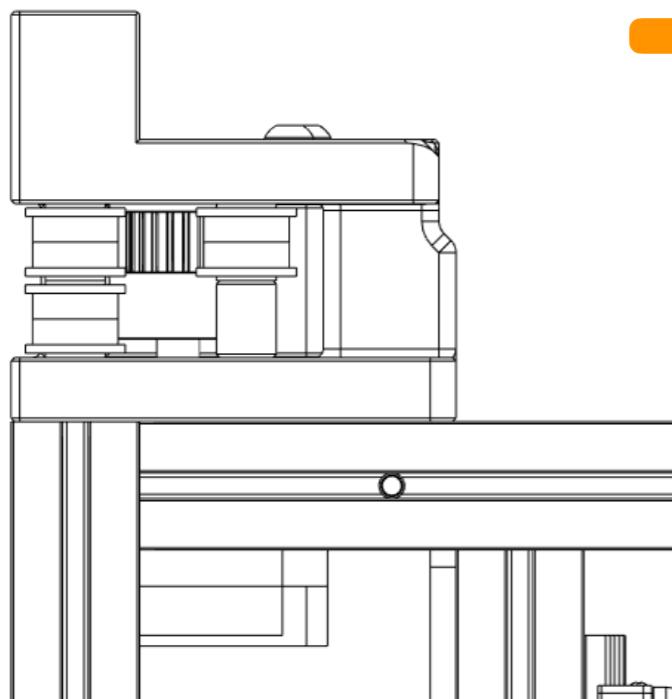


Part	Qty
M3x35 BHCS	8

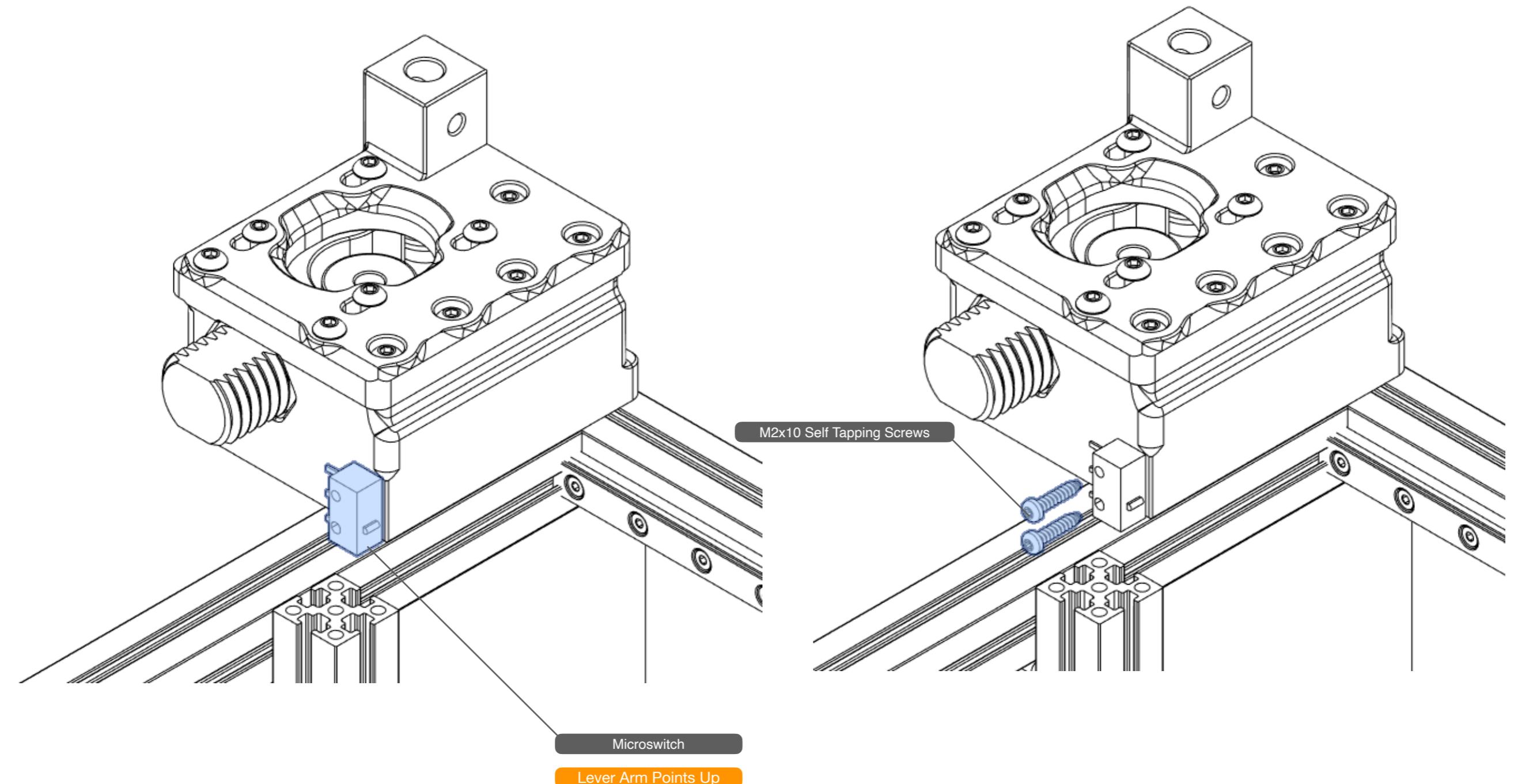


Repeat Drive Assembly Instructions For A Drive Unit

Note Bearing and Spacer Stackup Order For A drive

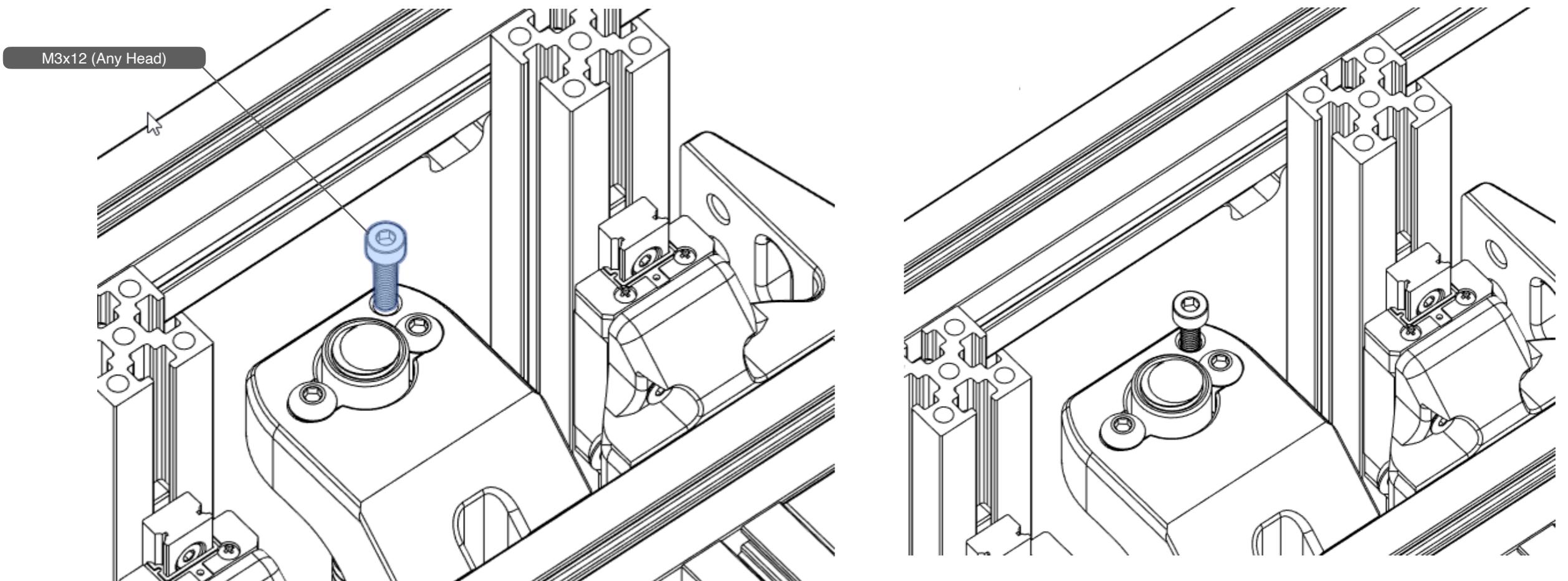


Y Endstop

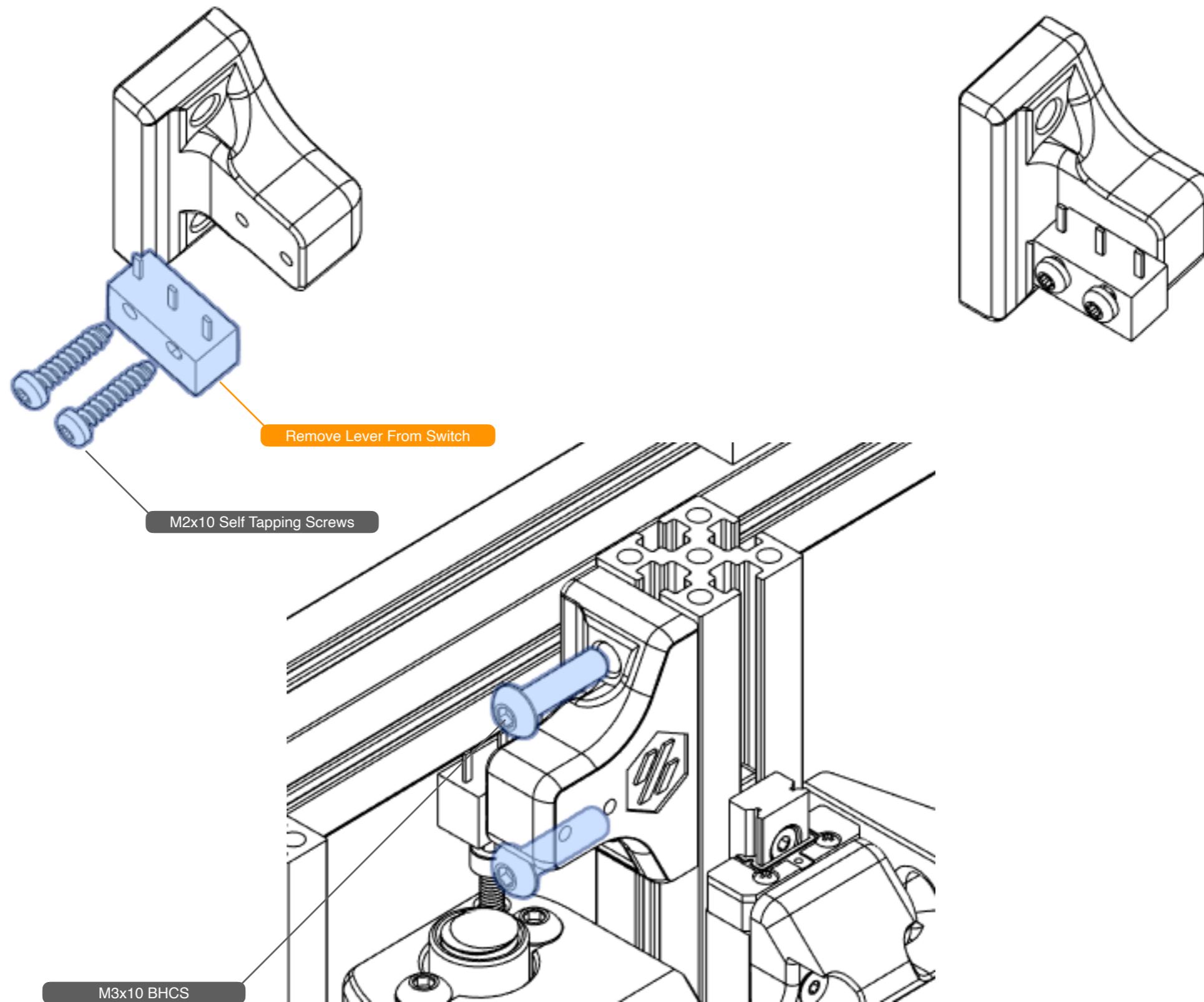


Part	Qty
M2x10 Self Tapping	2
Microswitch w/lever	1

Z Endstop

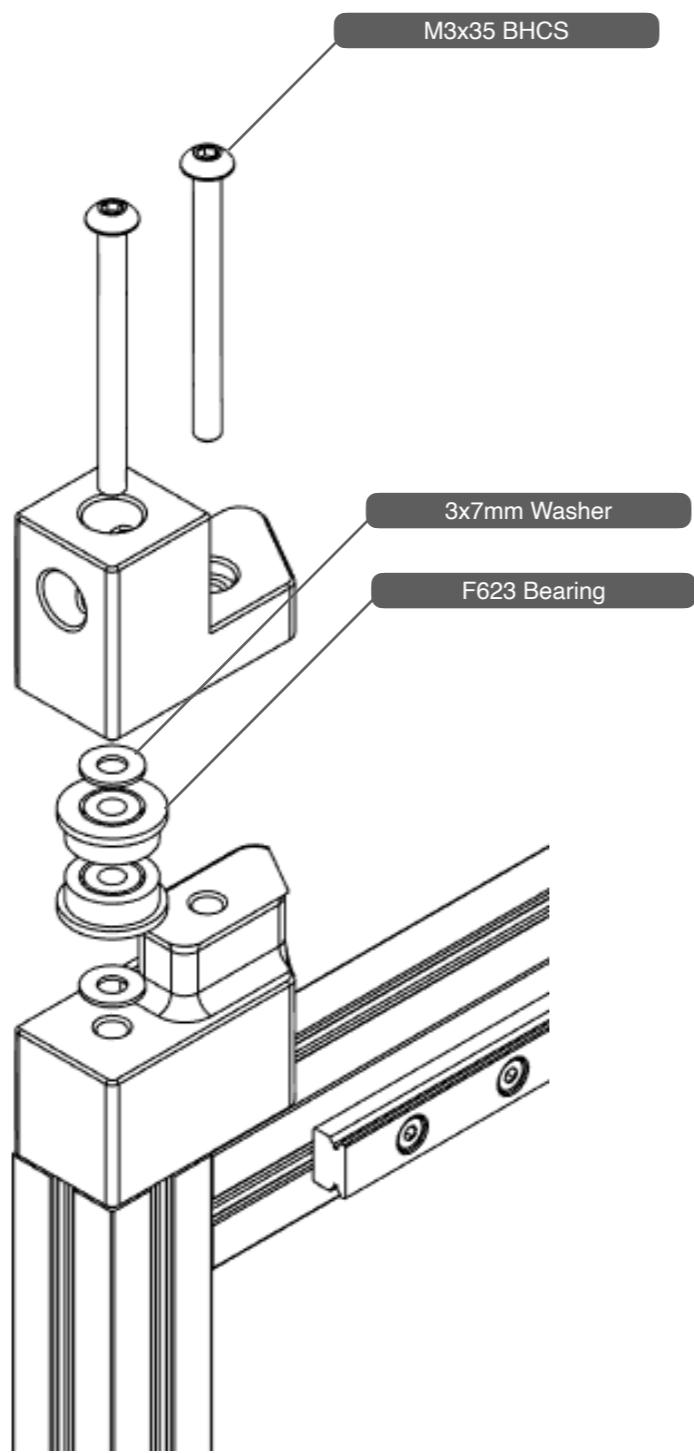


Z Endstop

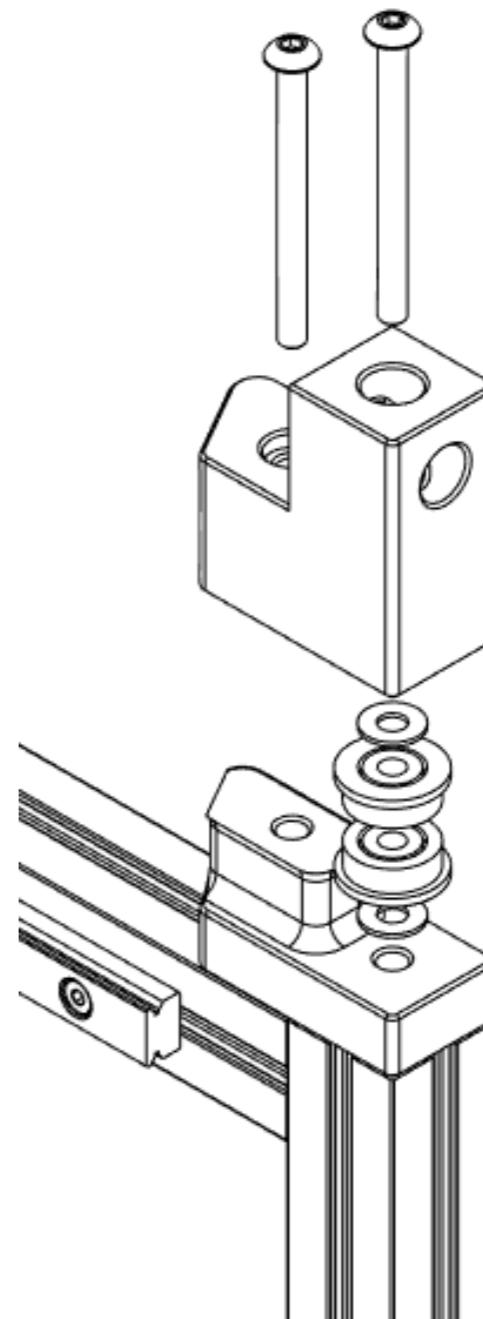


Part	Qty
M2x10 Self Tapping	2
M3x10 BHCS	2
Microswitch	1

Idlers

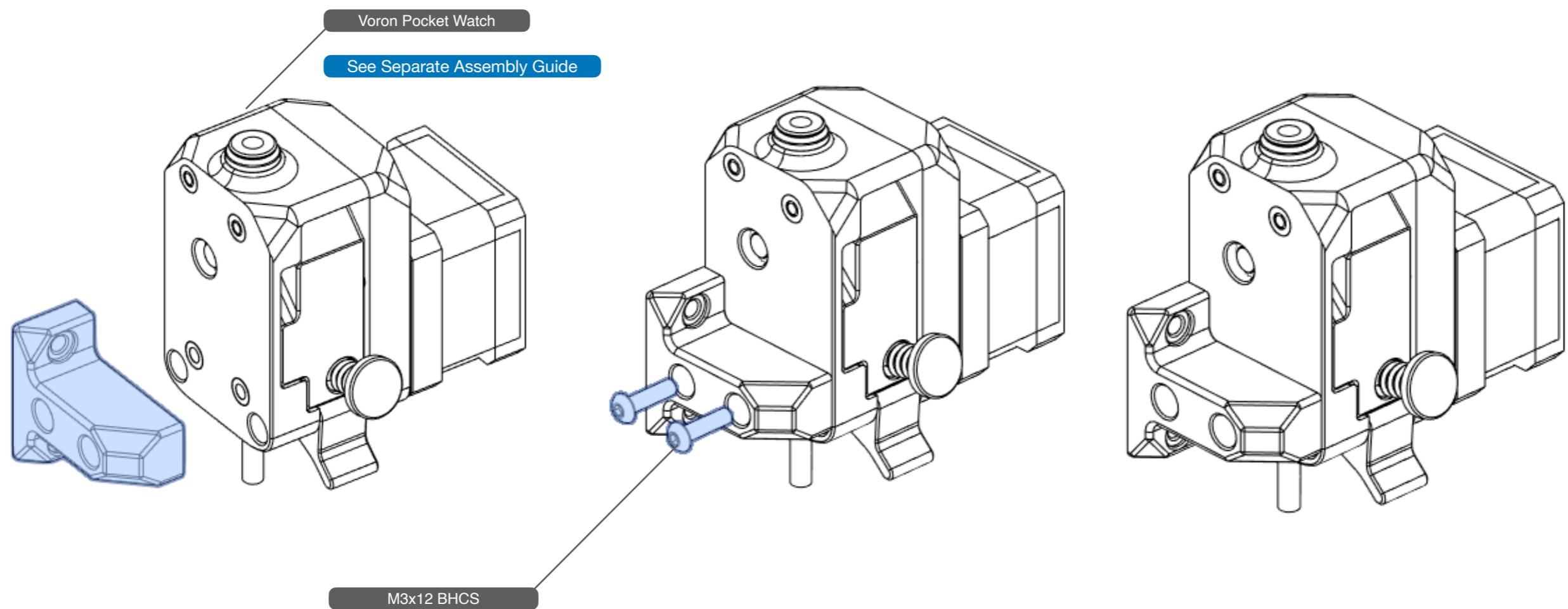


B Idler



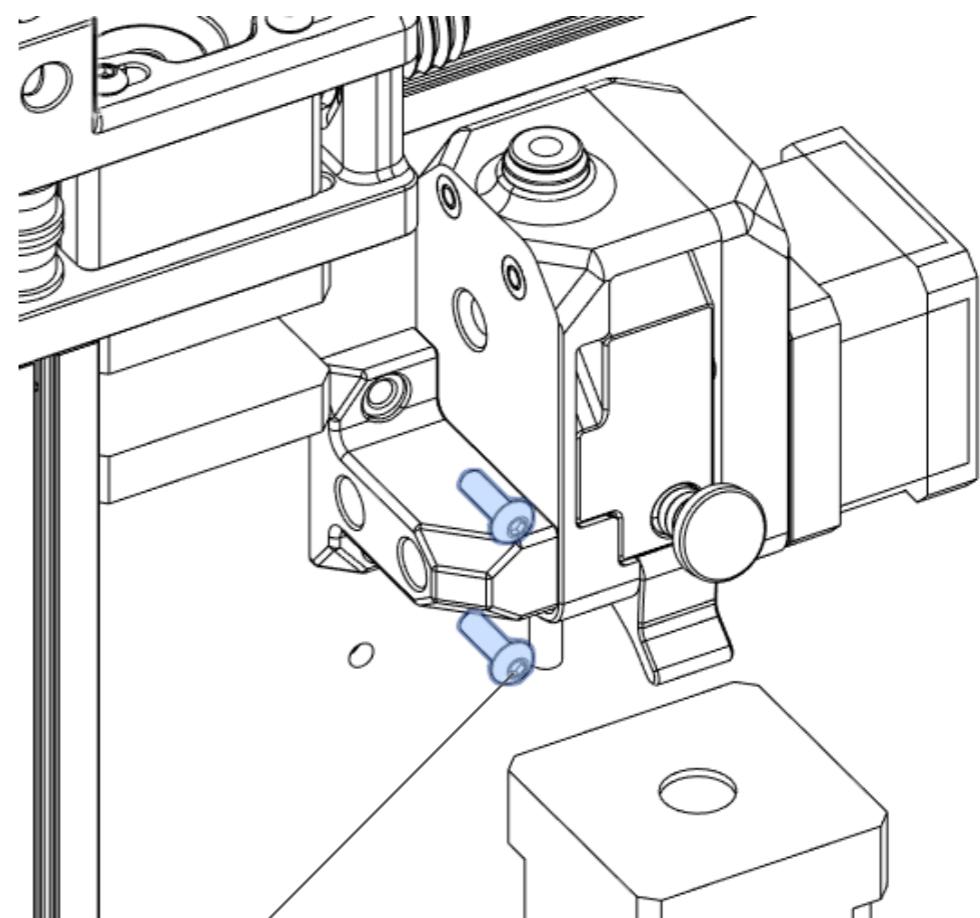
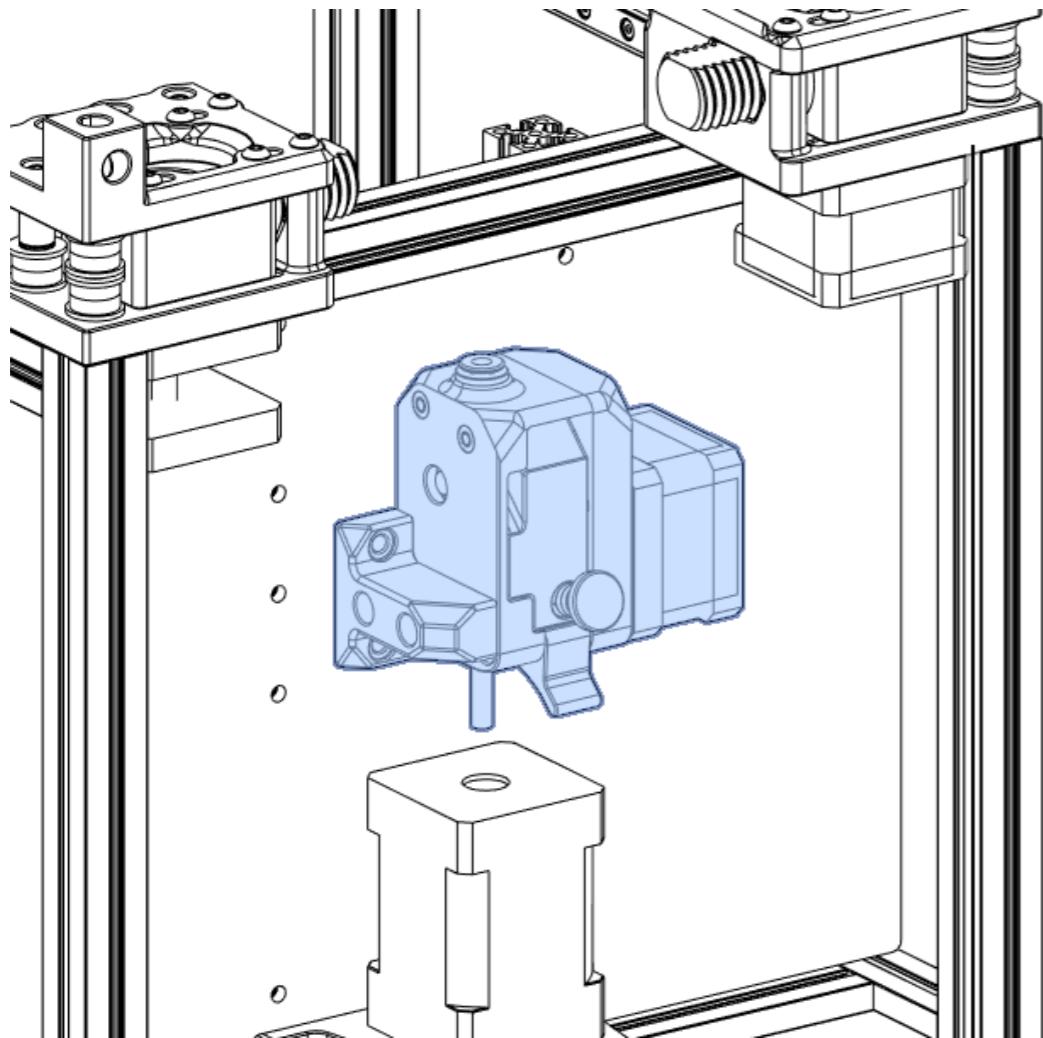
A Idler

Part	Qty
M3x35 BHCS	4
M3 Washer	4
F623	4



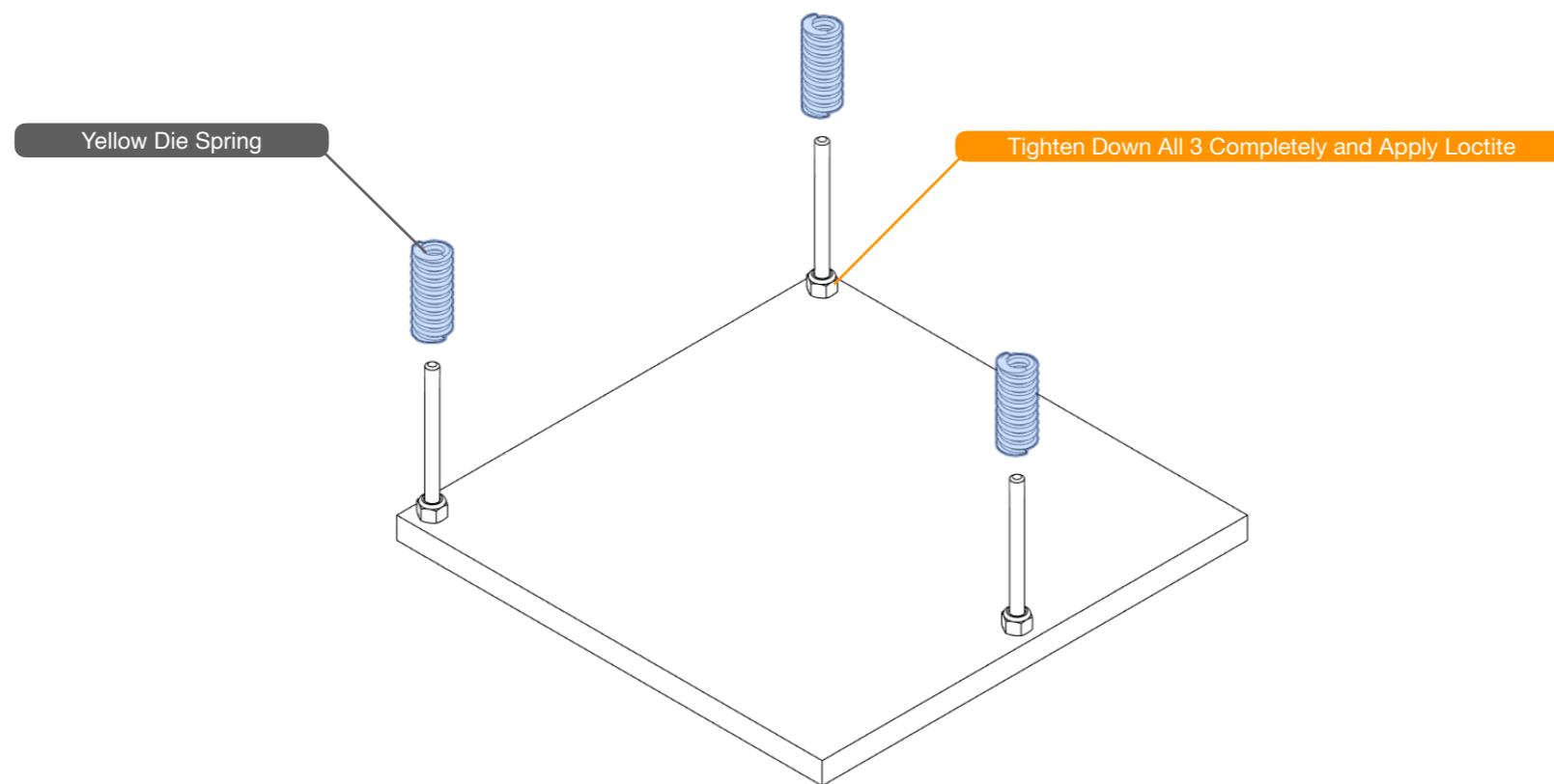
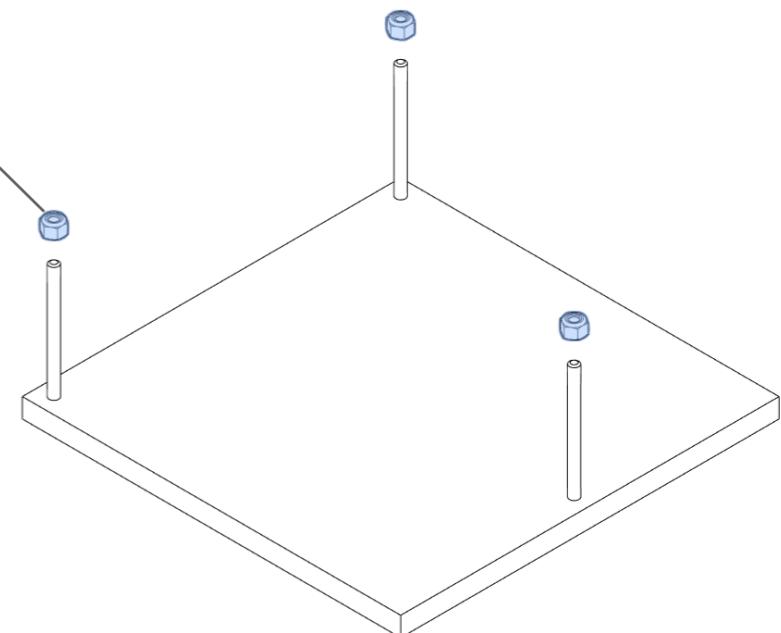
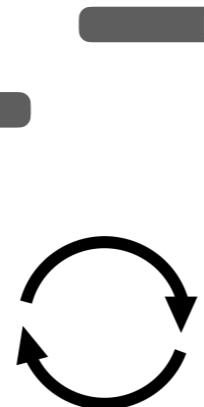
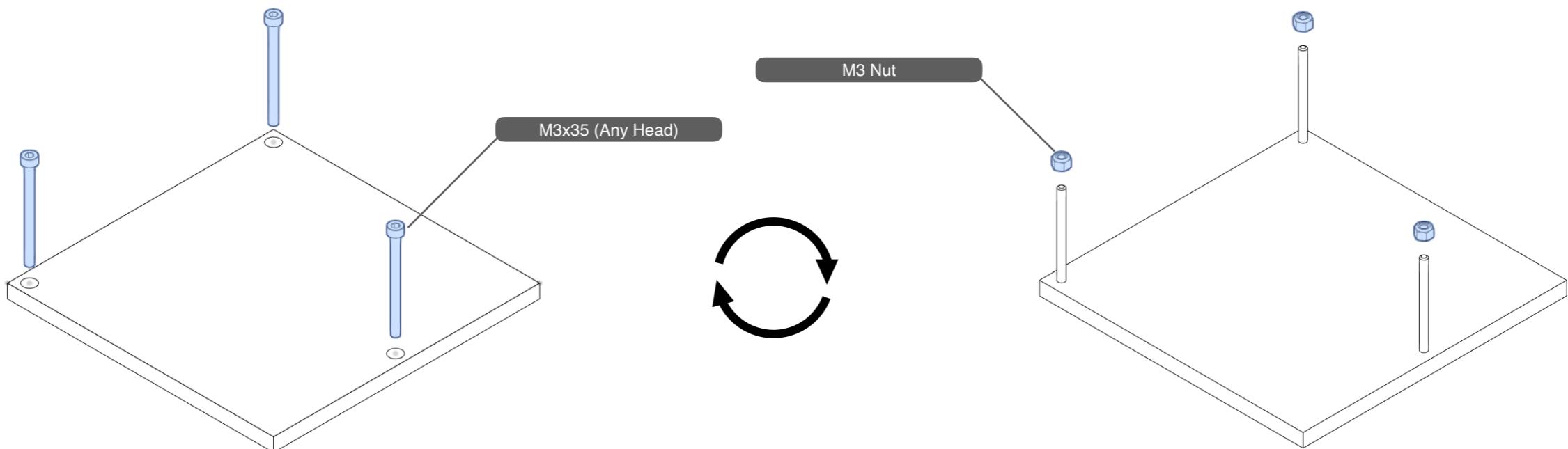
Part	Qty
M3x12 BCHCS	2

Extruder



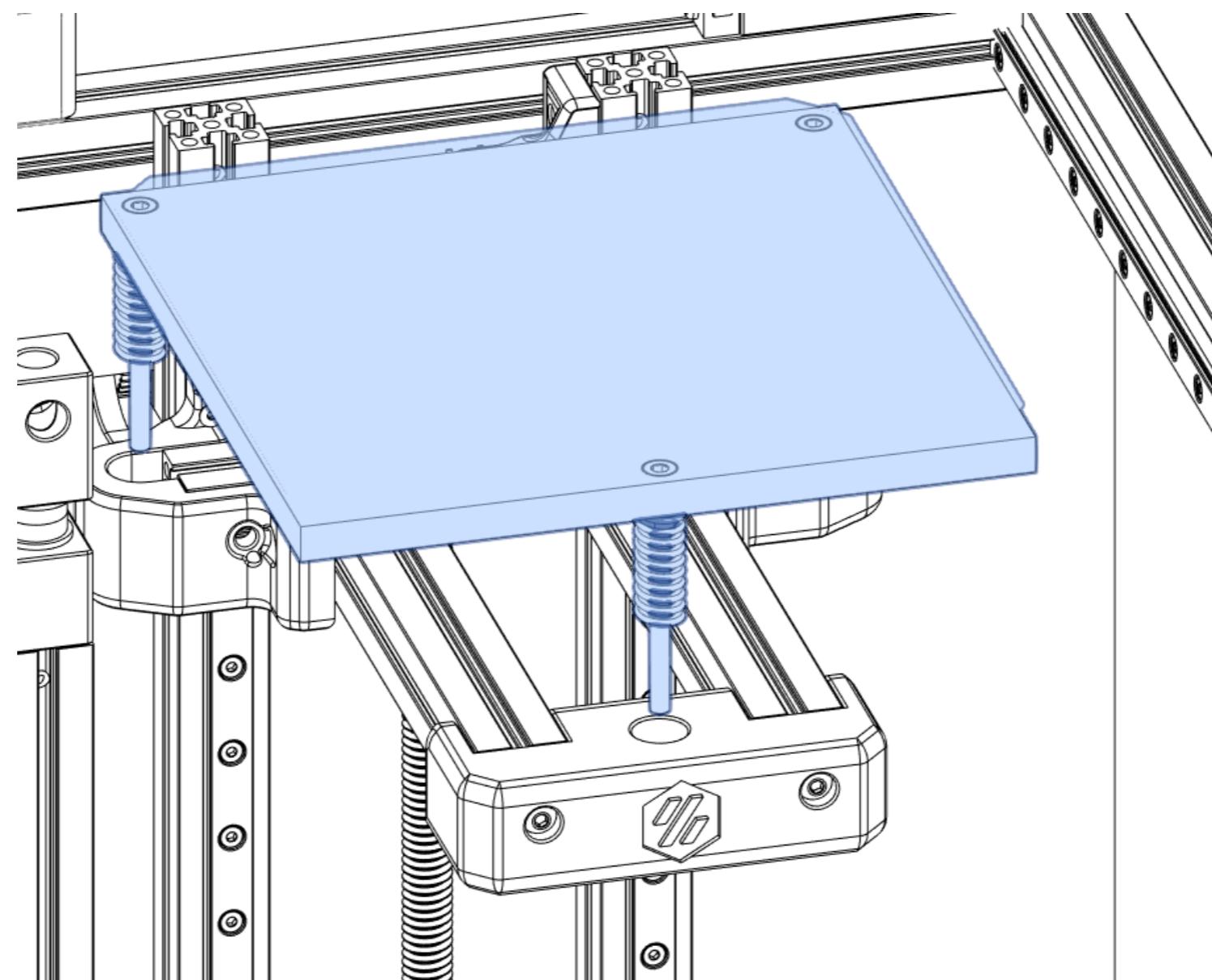
M3x12 BHCS

Bed Assembly

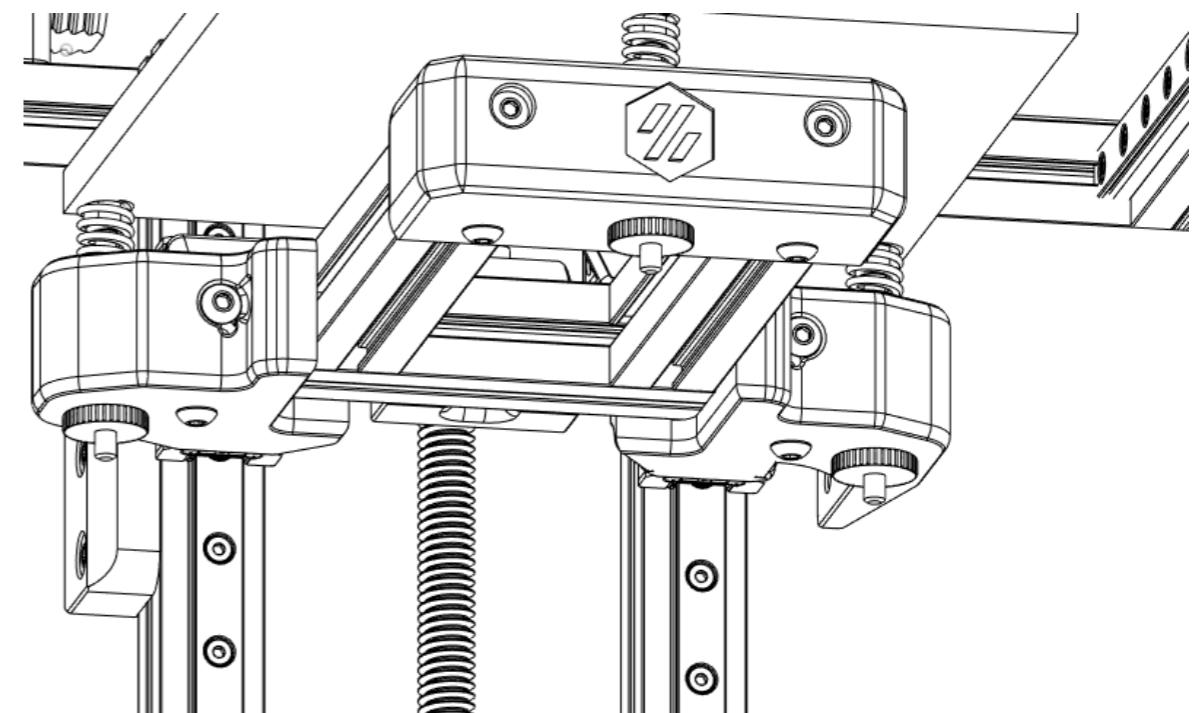
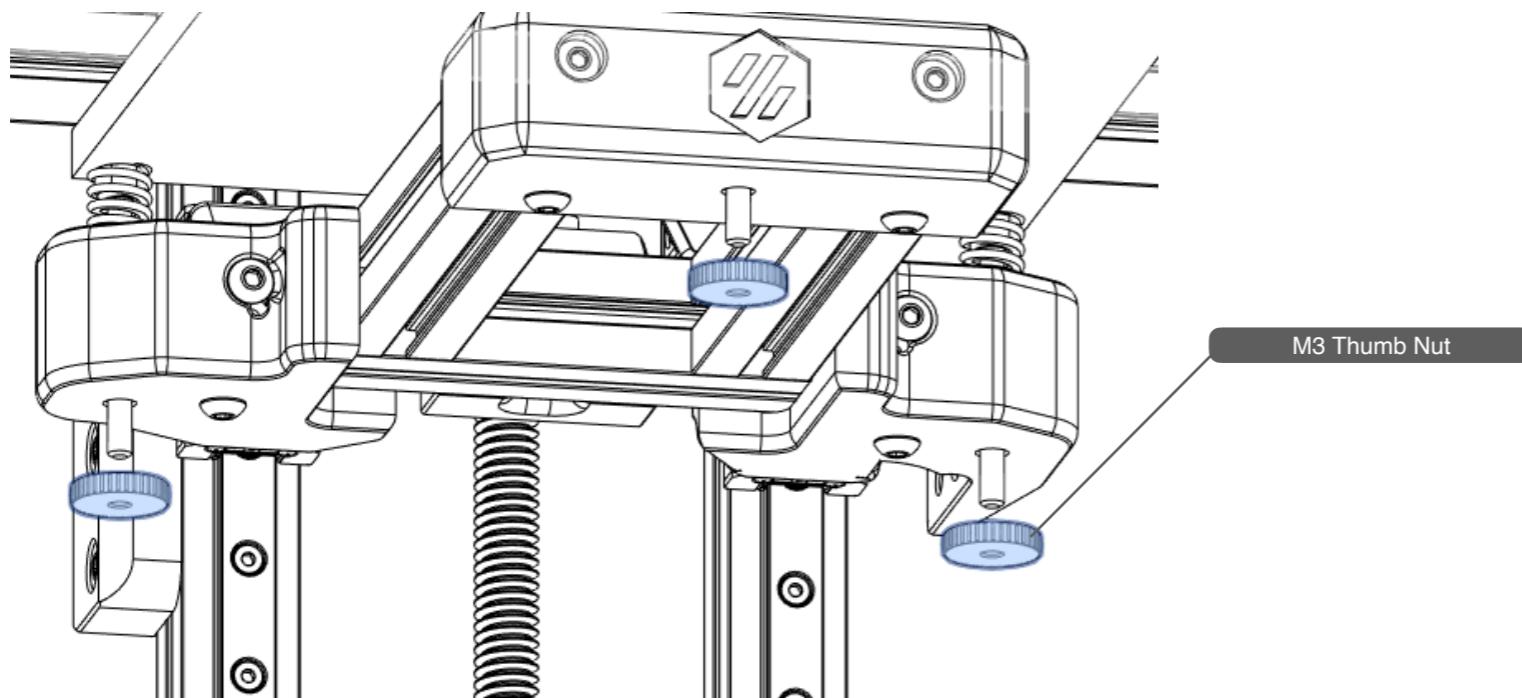


Part	Qty
M3x35 BHCS	3
M3 Nut	3
Yellow Die Spring	3

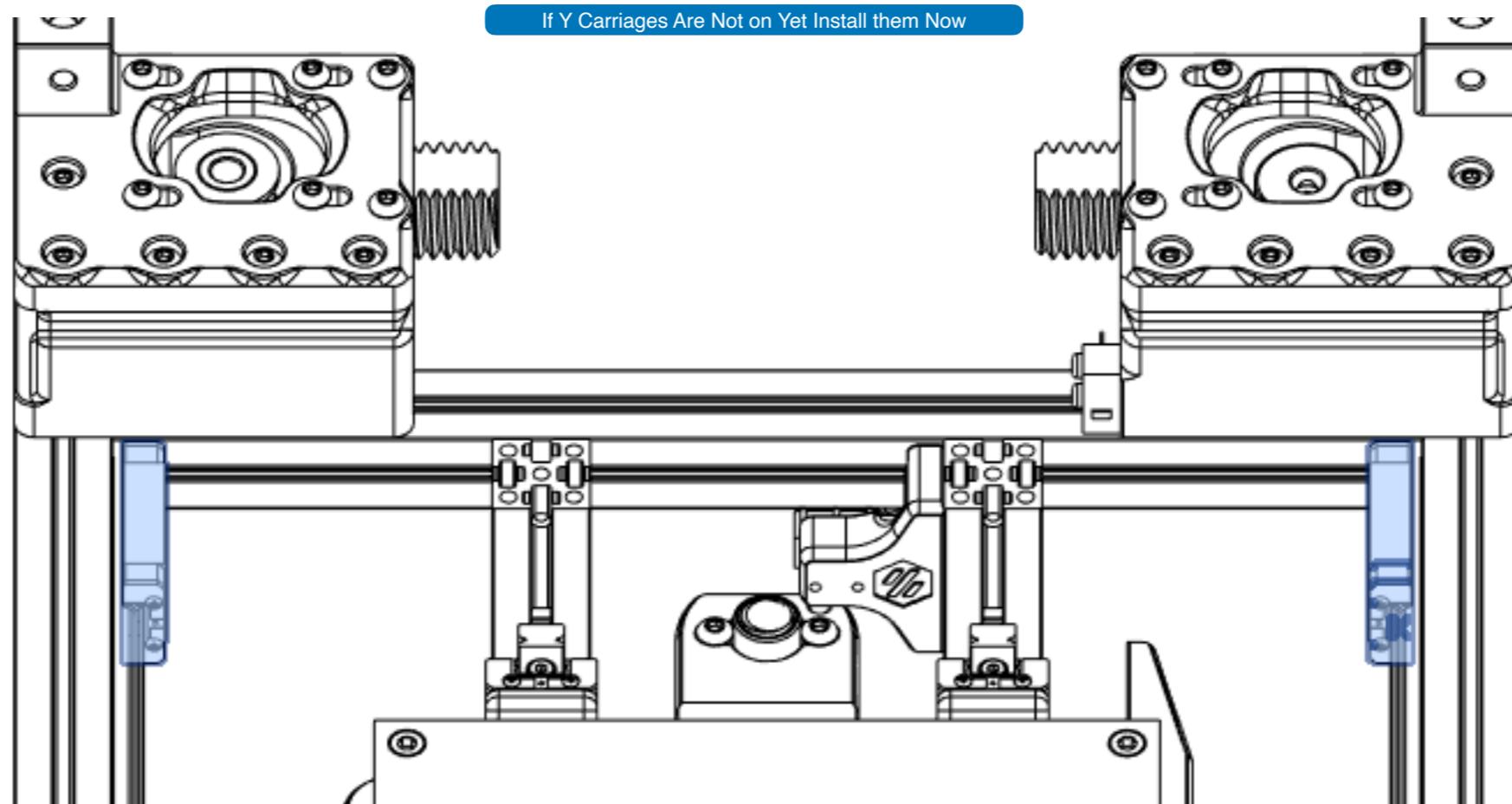
Bed Assembly



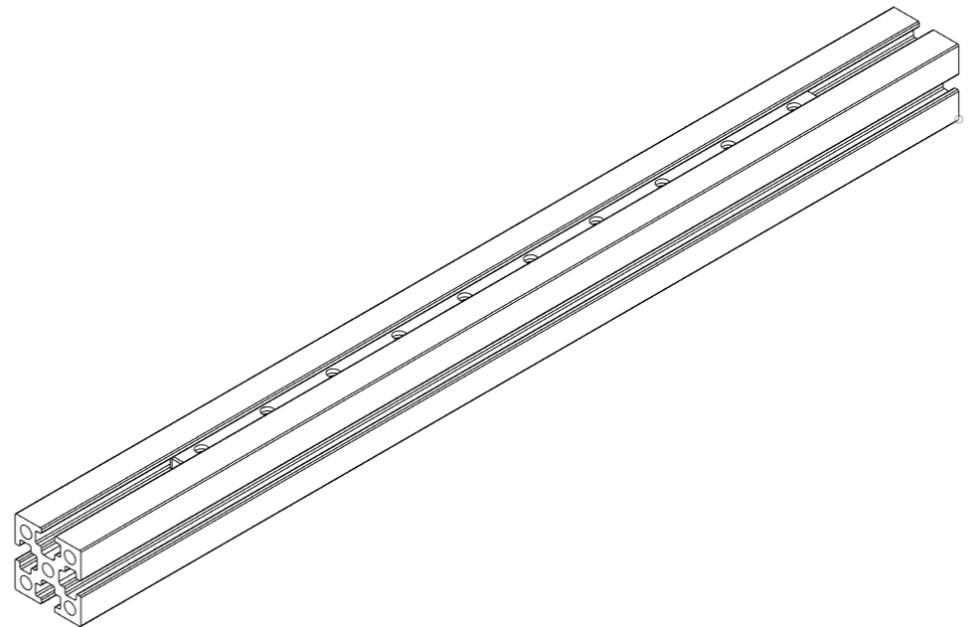
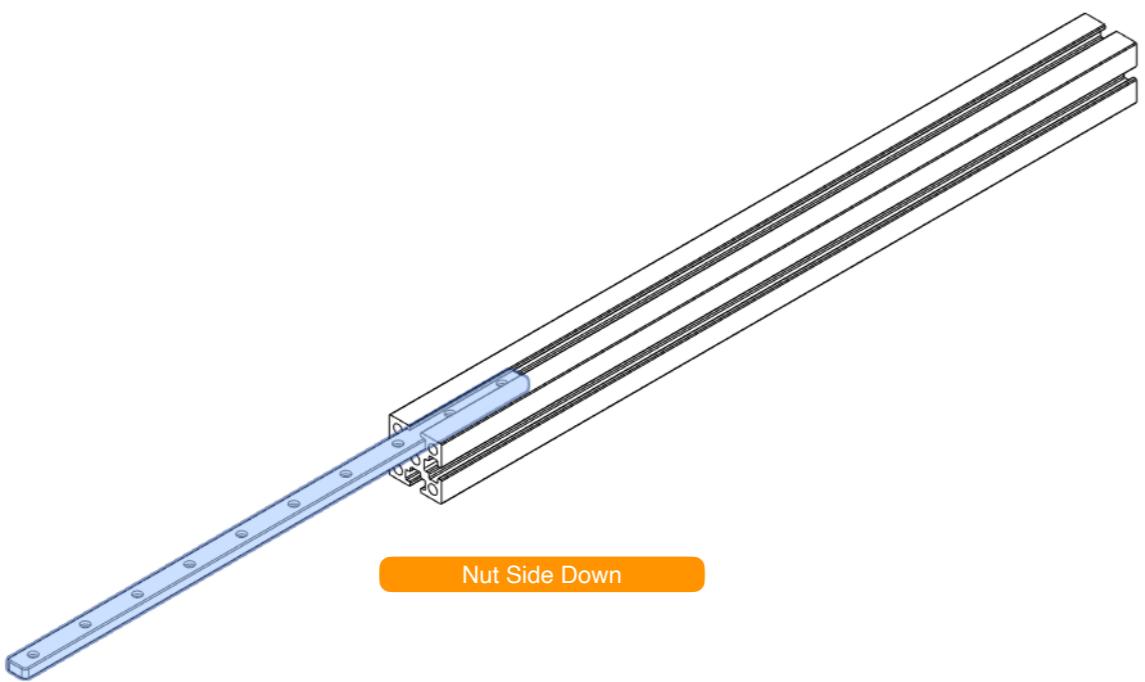
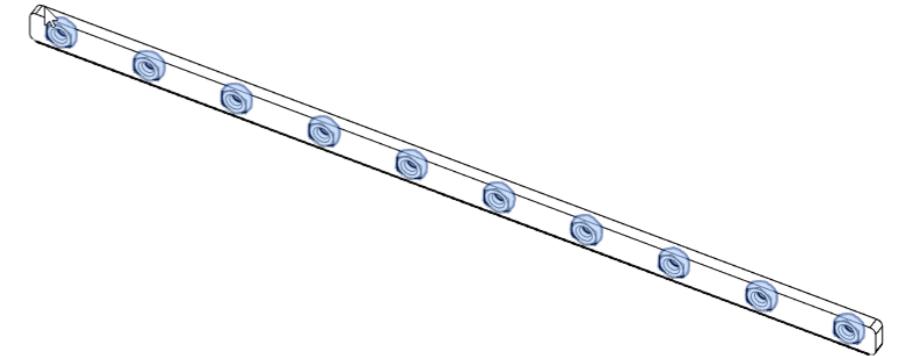
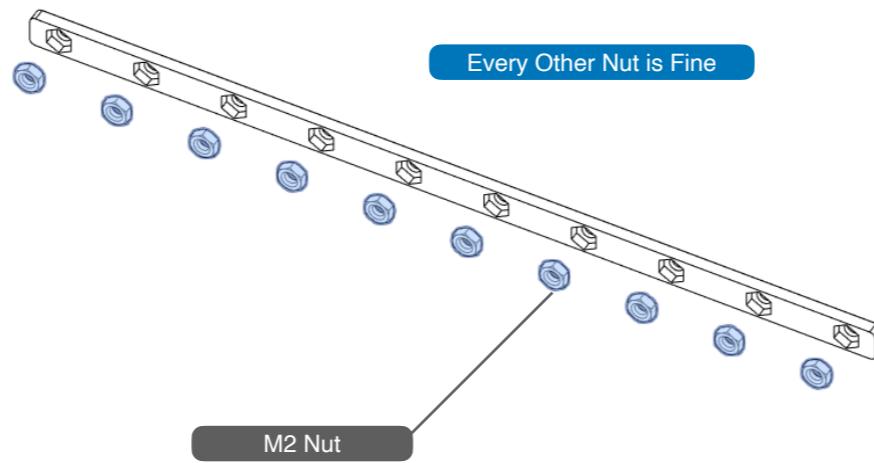
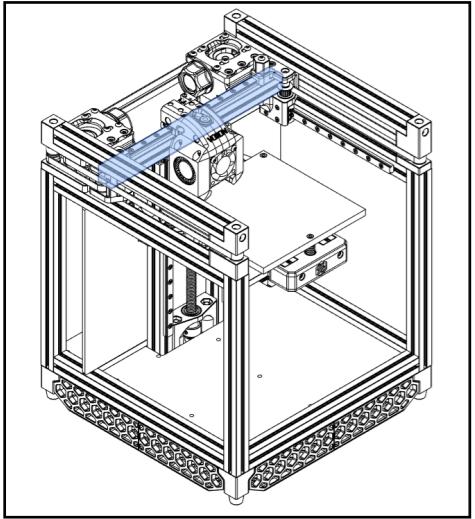
Bed Assembly



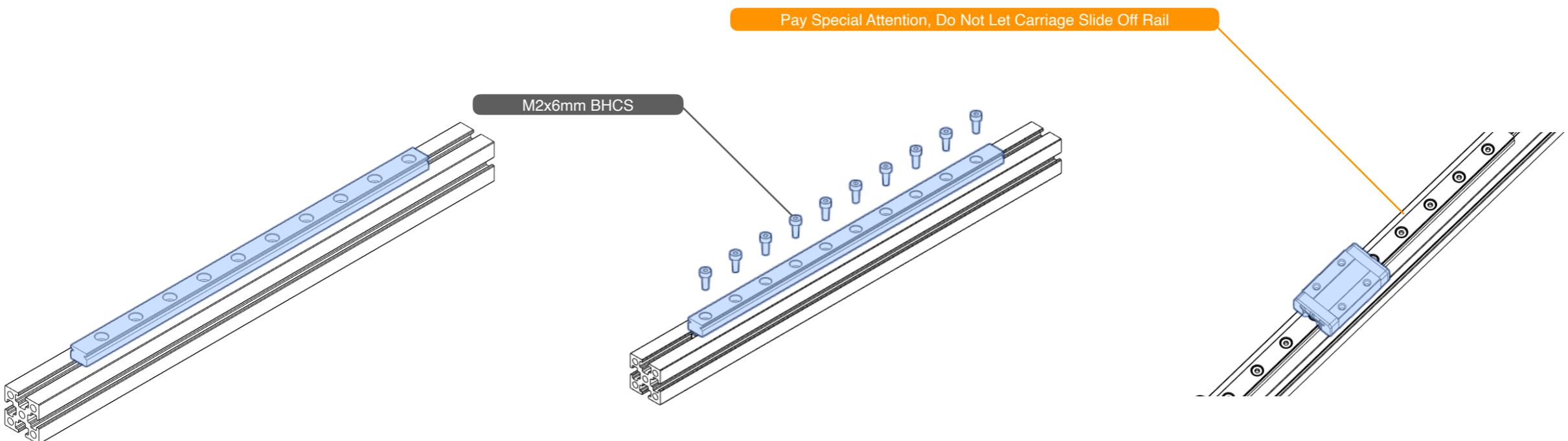
Gantry Assembly



Gantry Assembly

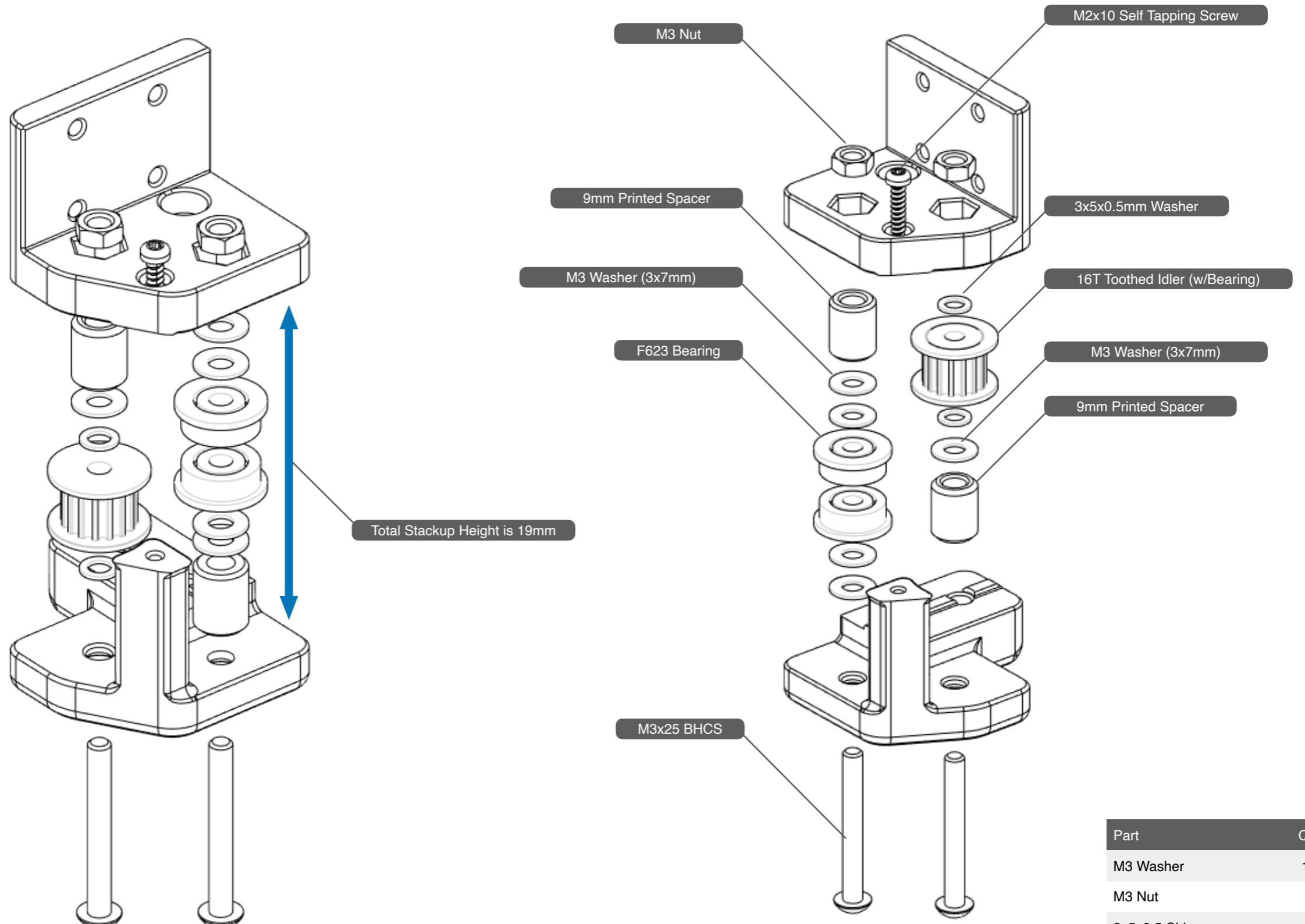


Gantry Assembly



Part	Qty
M2x6	5-10
MGN7R	1

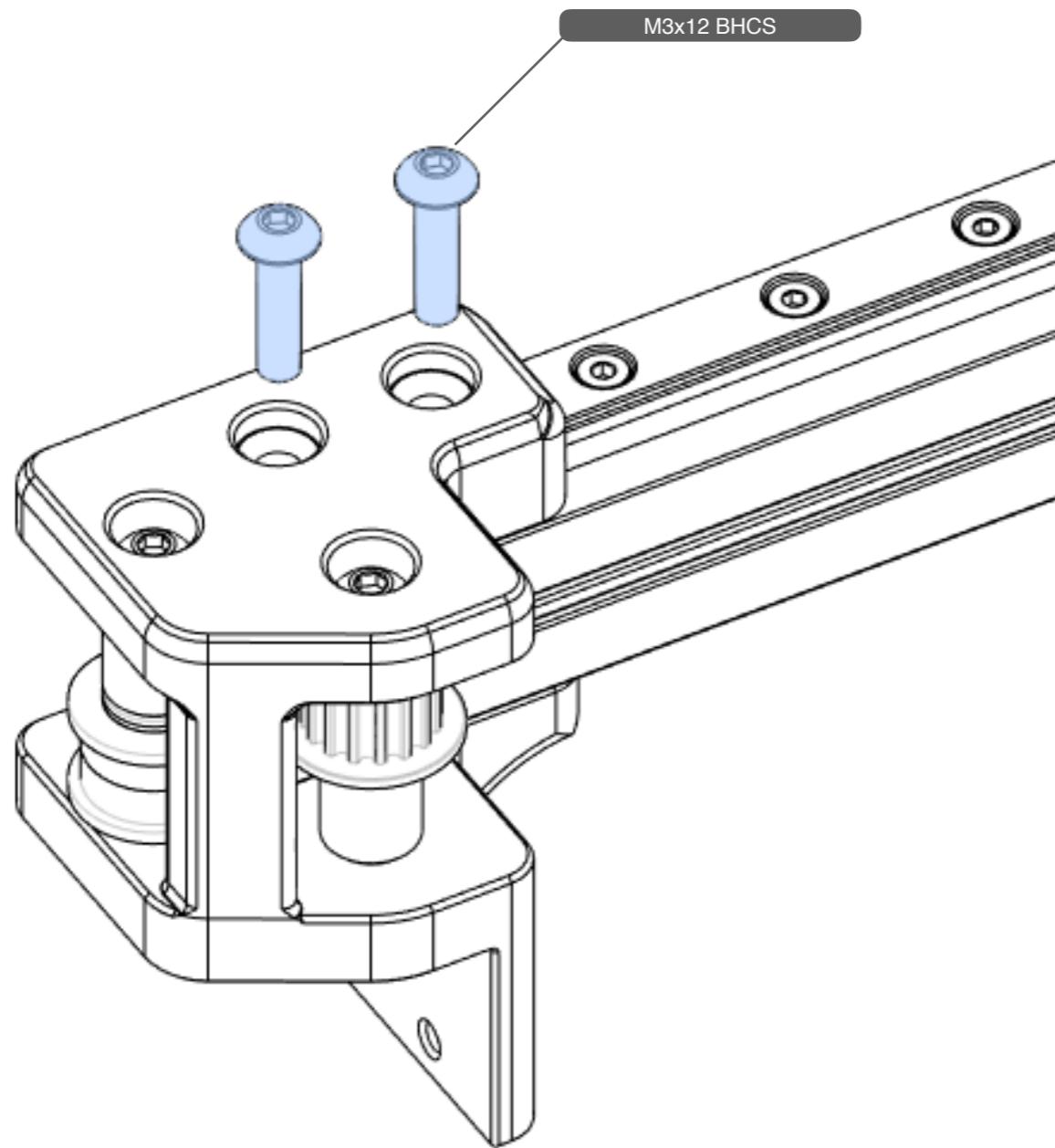
XY Joint Assembly



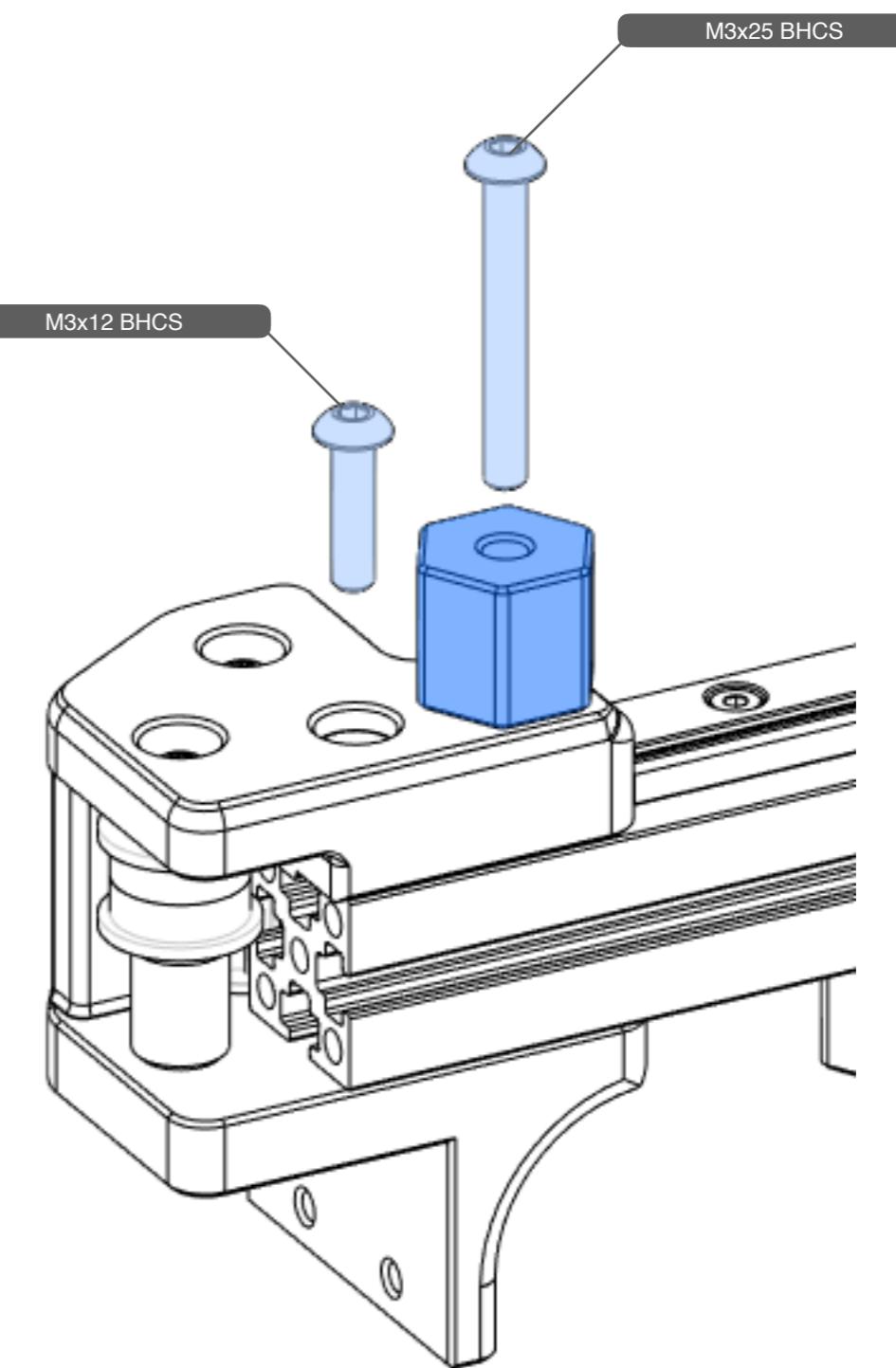
Part	Qty
M3 Washer	10
M3 Nut	4
3x5x0.5 Shim	4
F623	4
M3x25 BHCS	4
16T Toothed Idler	2
M2x10 Self Trapping	2

Gantry Assembly

Leave all Gantry Bolts Loose For Now



Left XY Joint

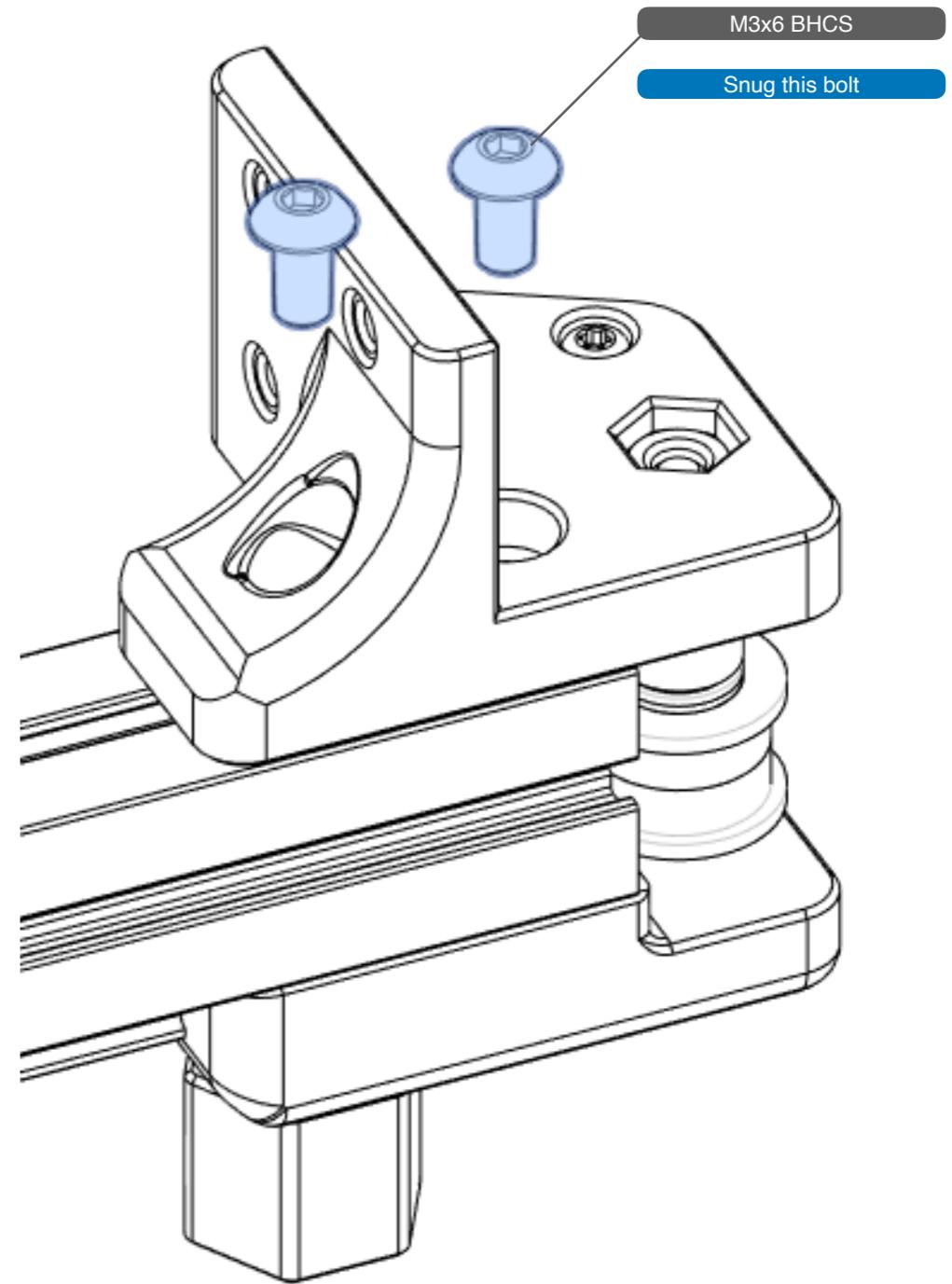
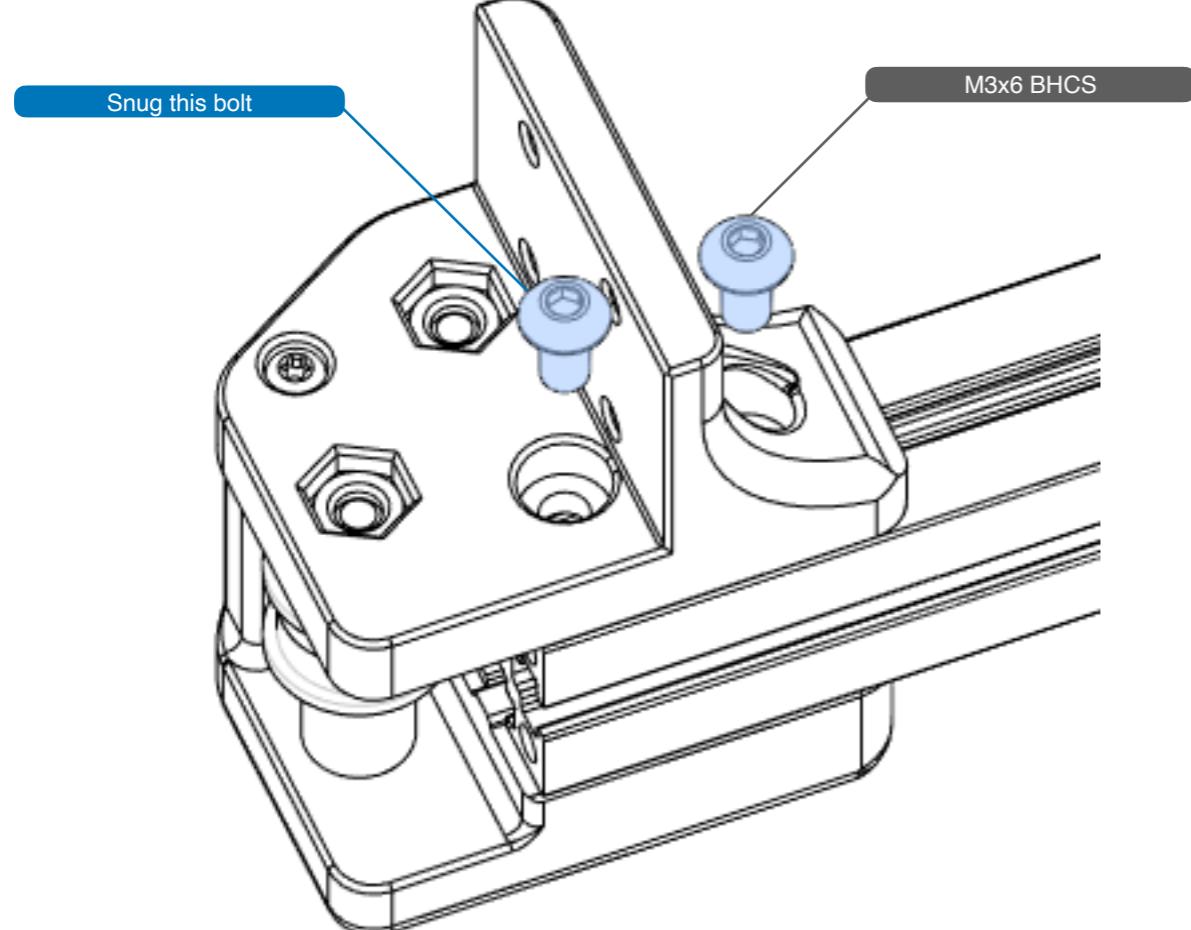


Right XY Joint

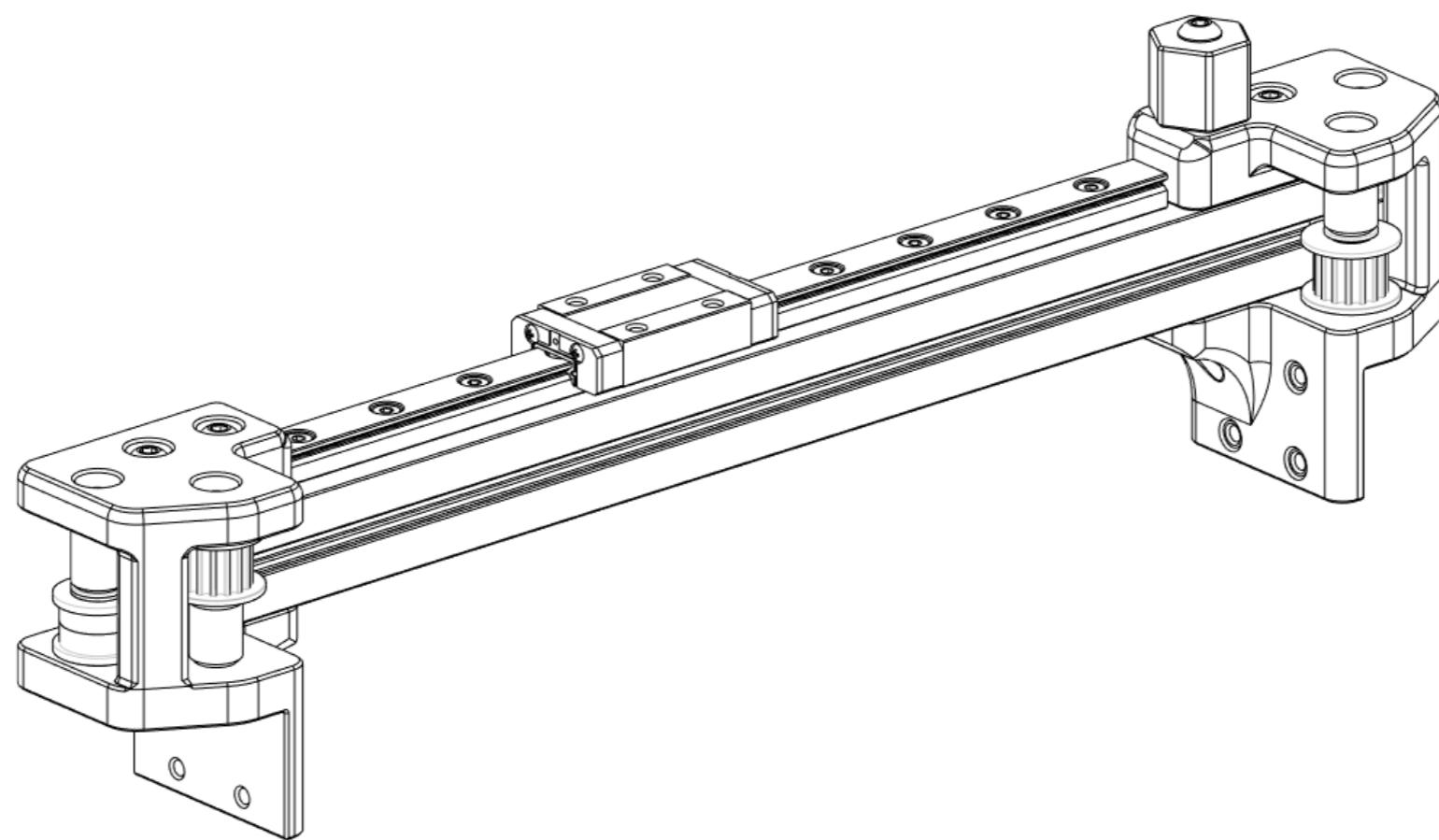
Part	Qty
M3x12 BHCS	3
M3x25 BHCS	1

Gantry Assembly

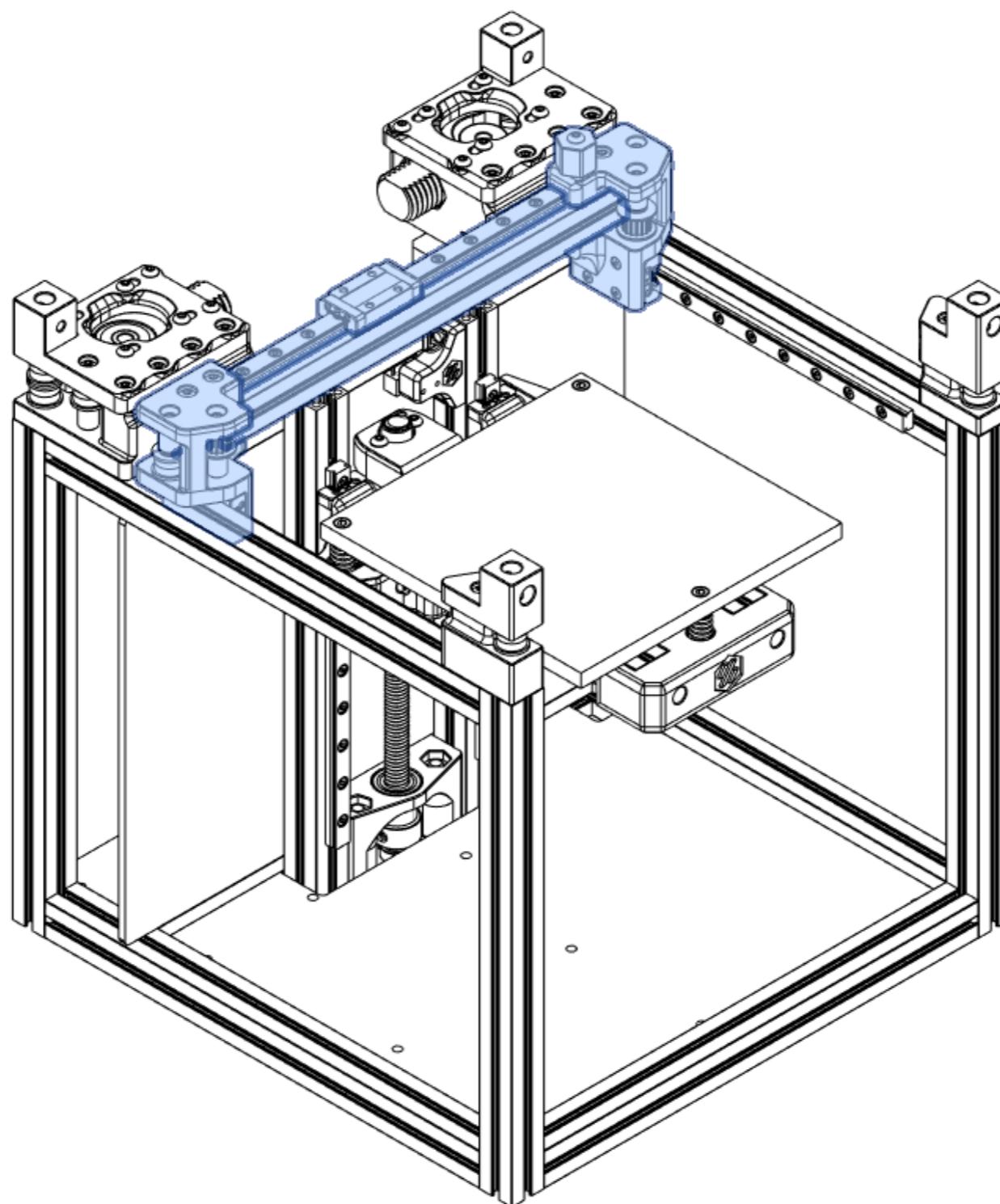
Leave all Gantry Bolts Loose For Now



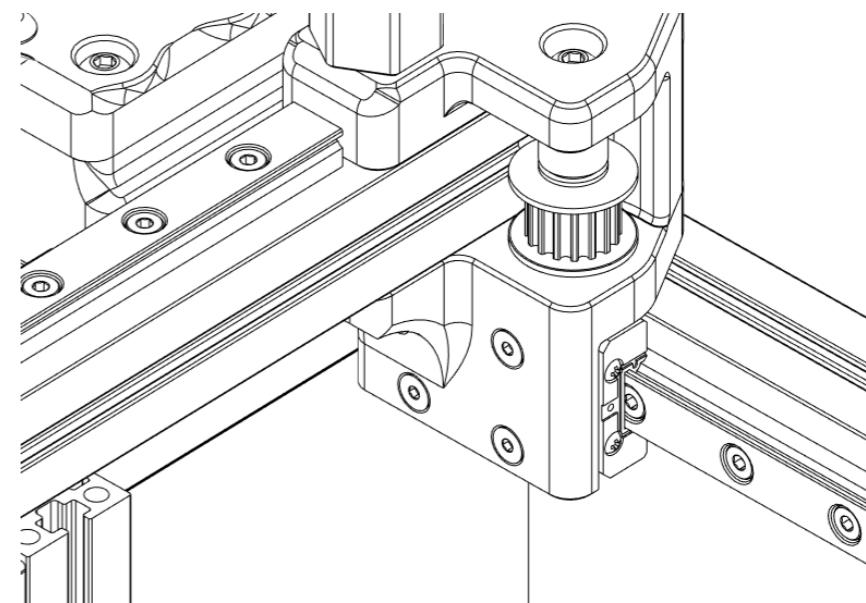
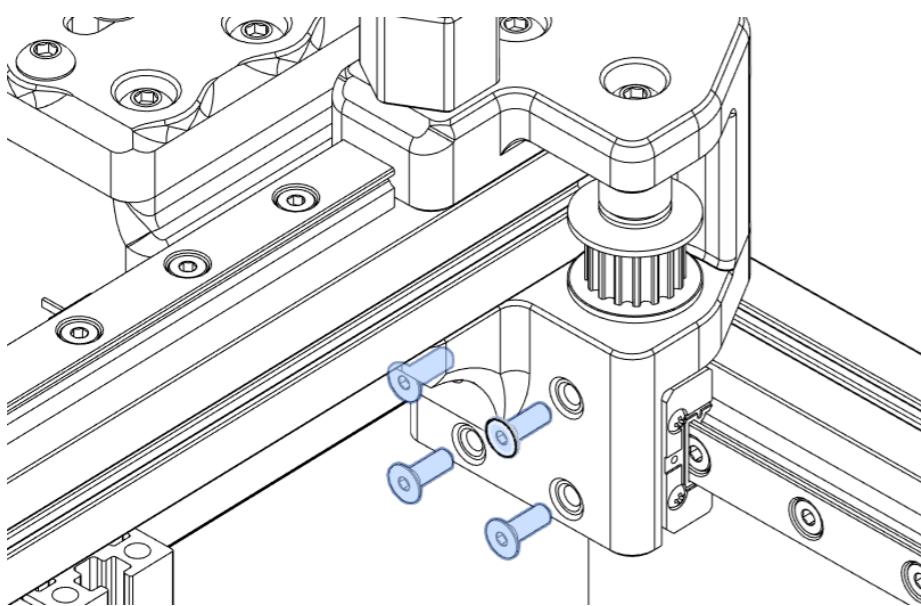
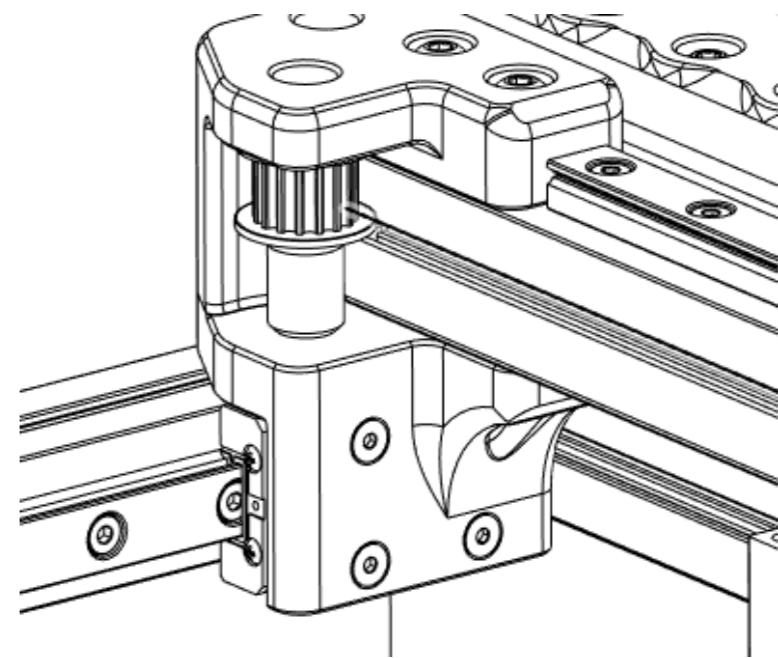
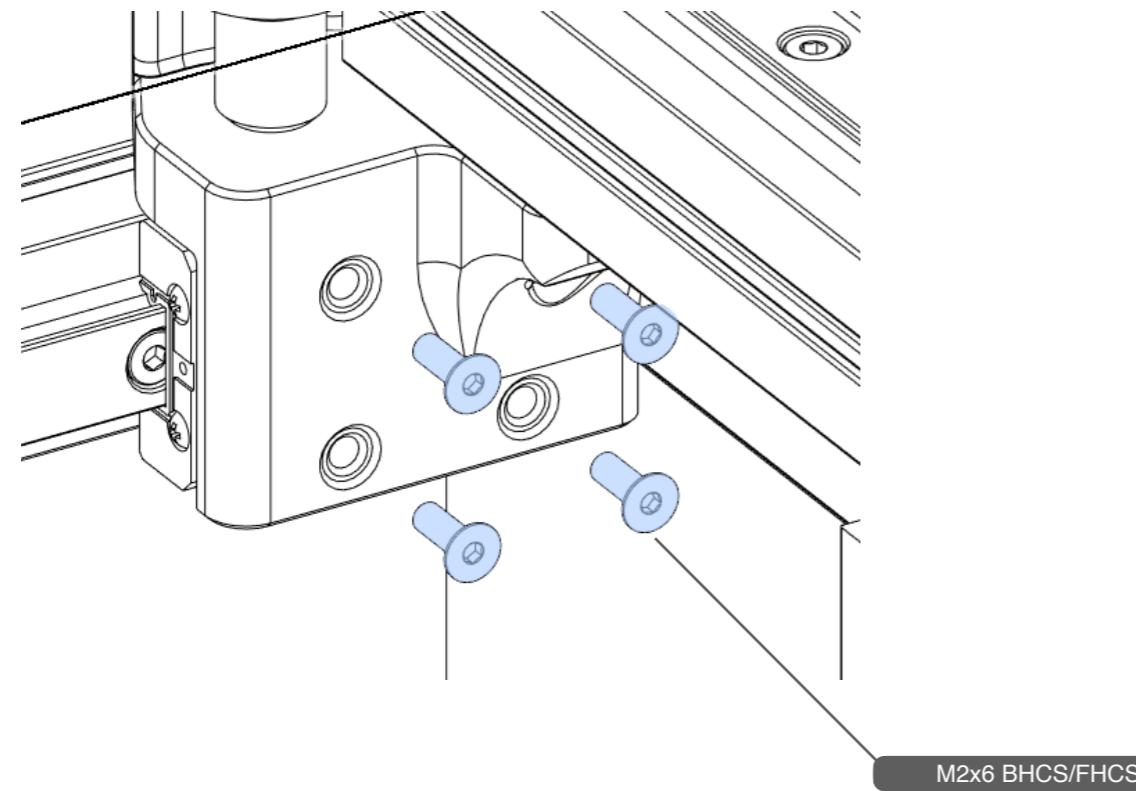
Gantry Assembly



Gantry Assembly



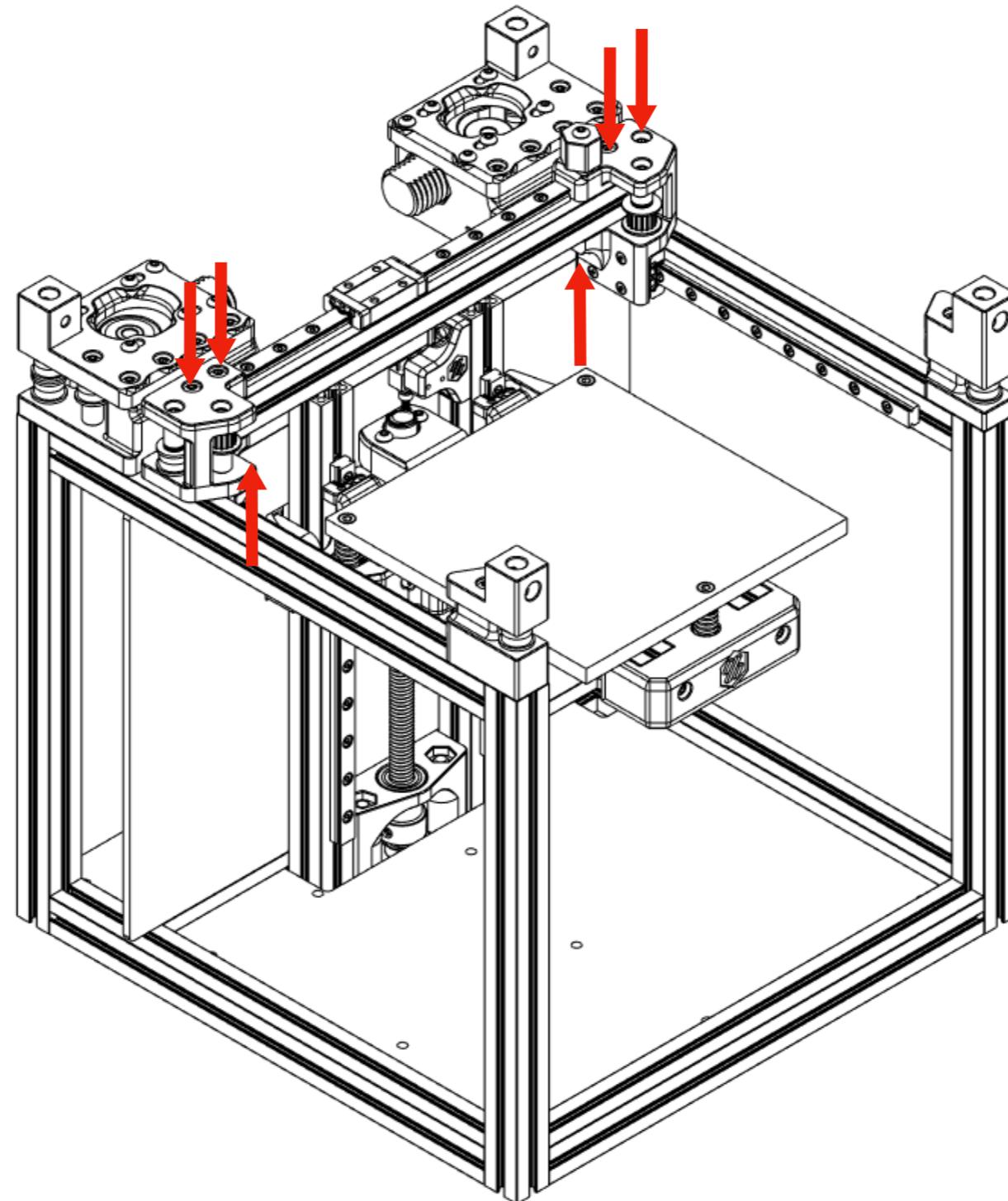
Gantry Assembly



Part	Qty
M2x6 BHCS	8

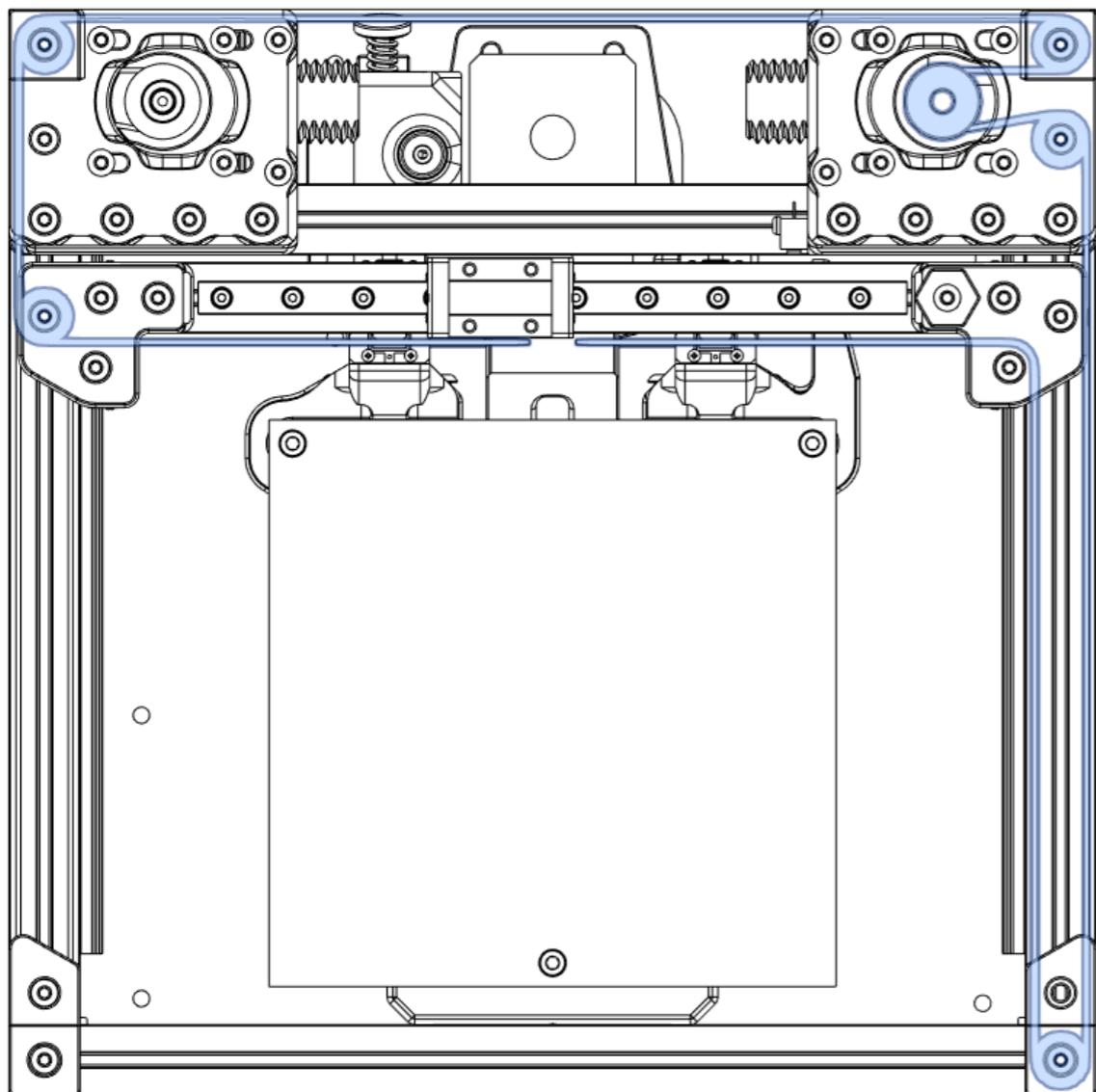
Gantry Assembly

Tighten Loose Gantry Bolts Now

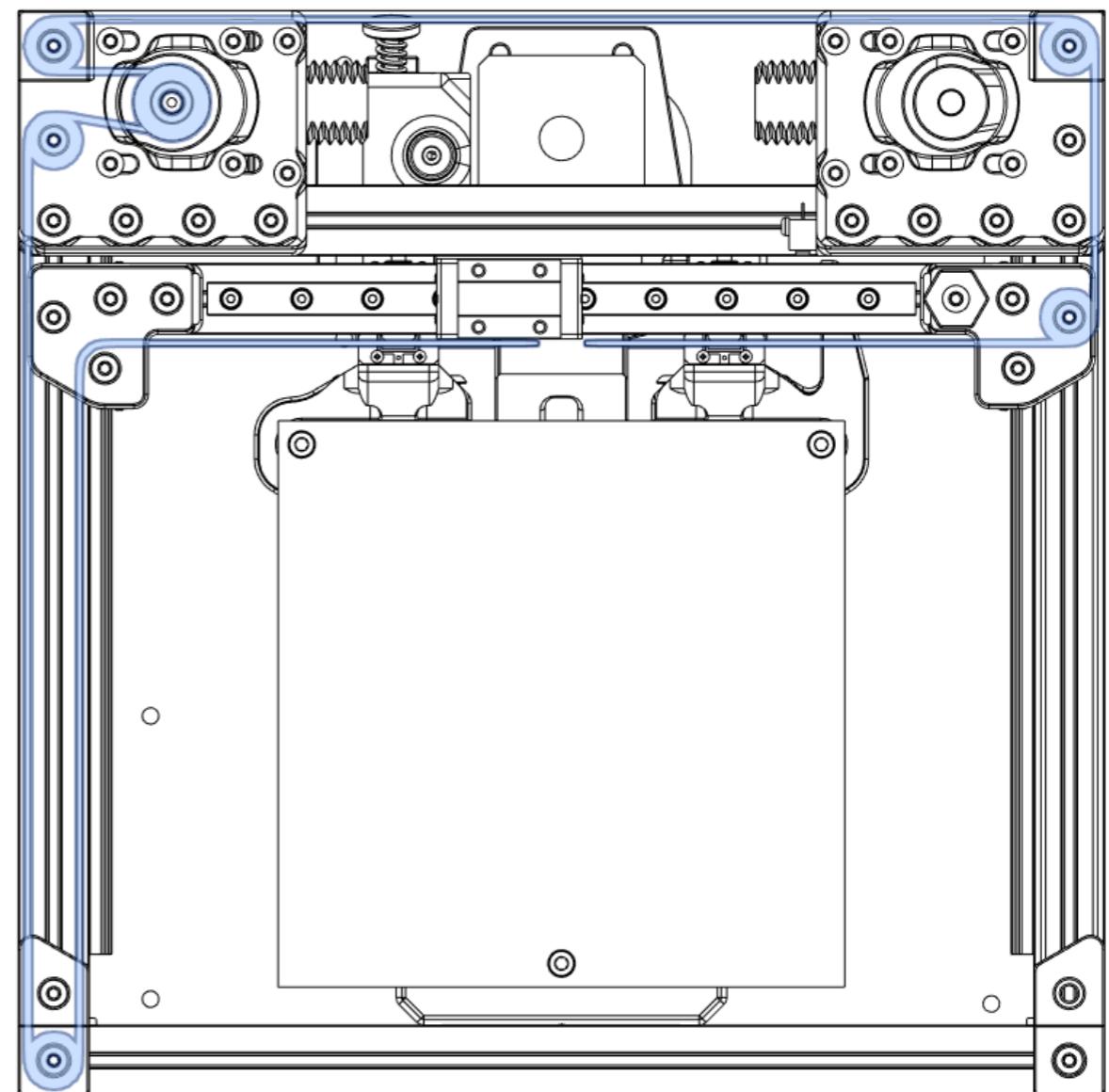


Belt Paths

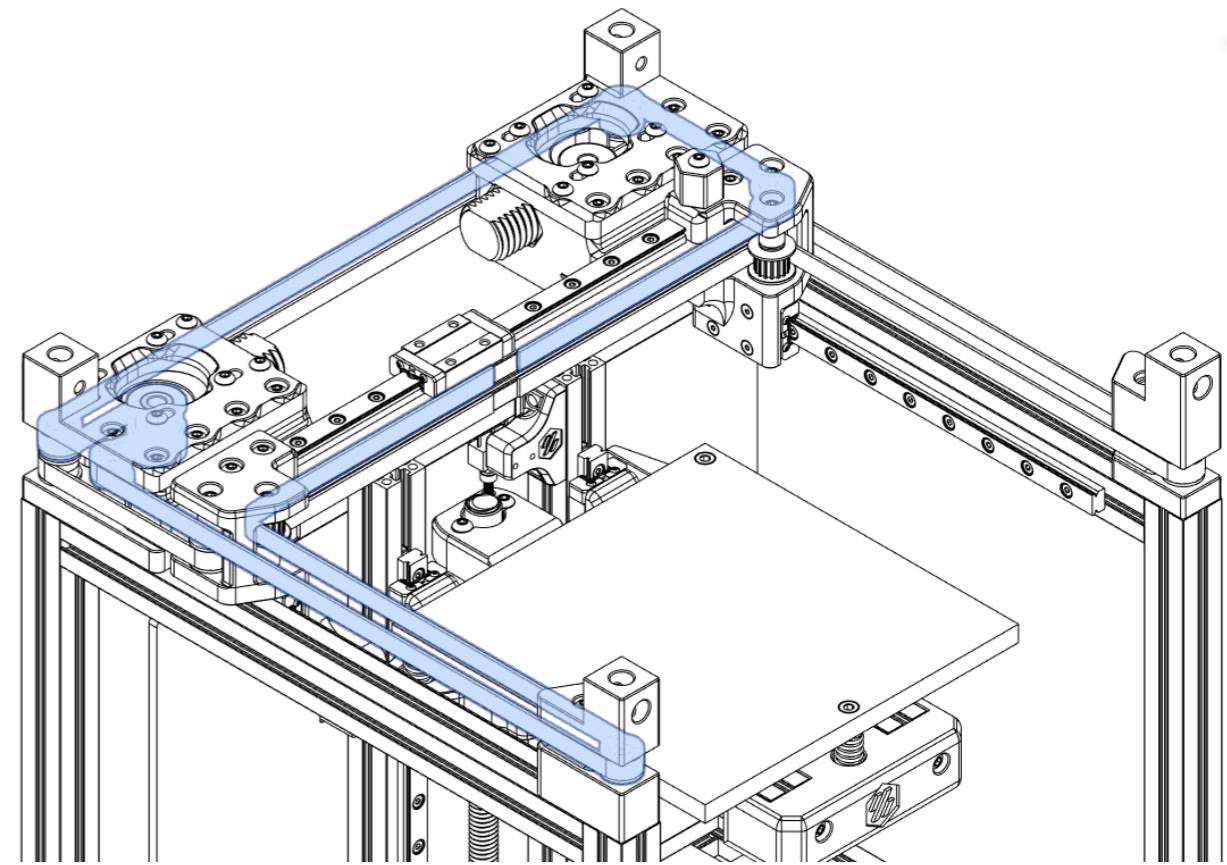
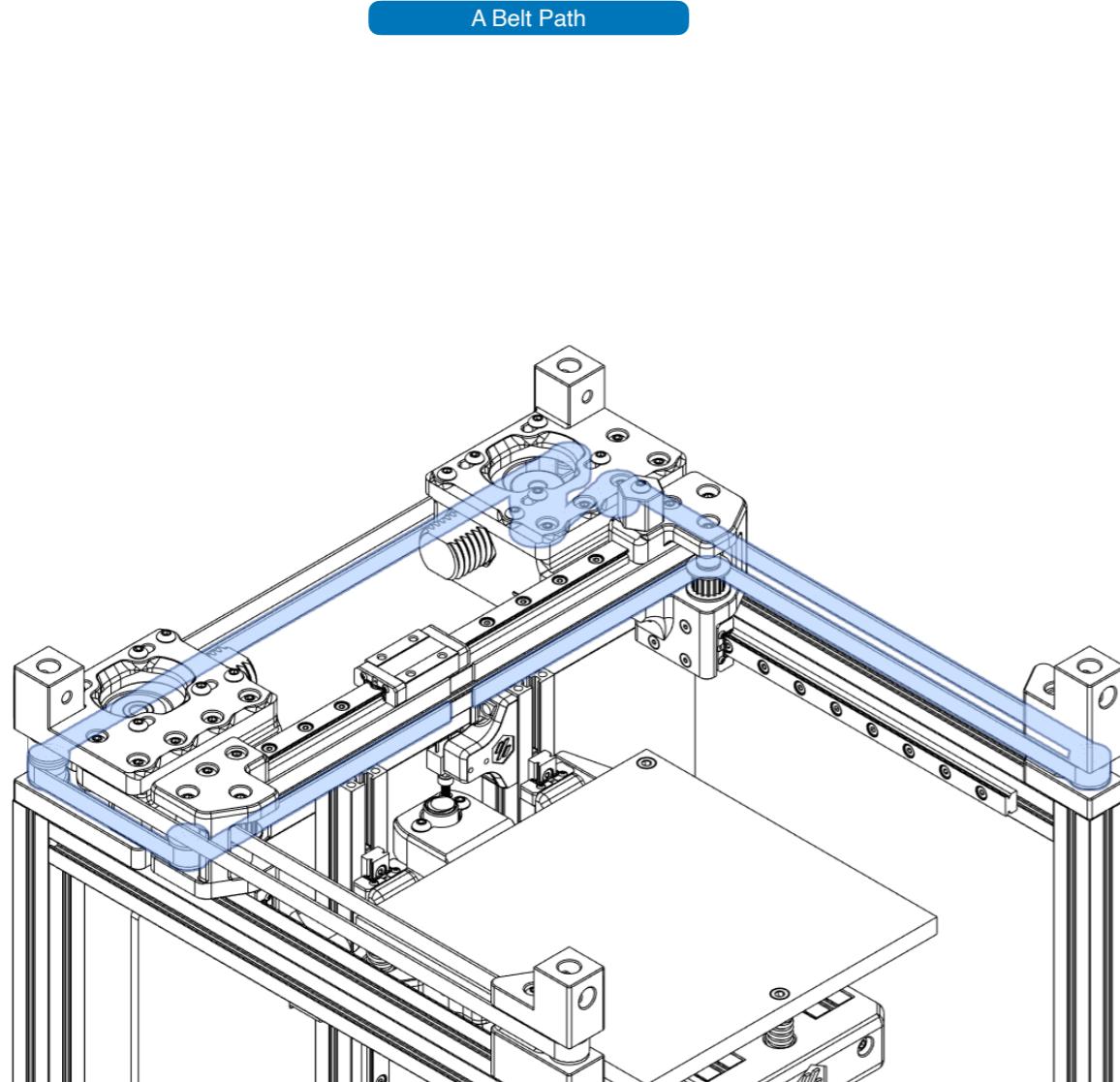
A Belt Path



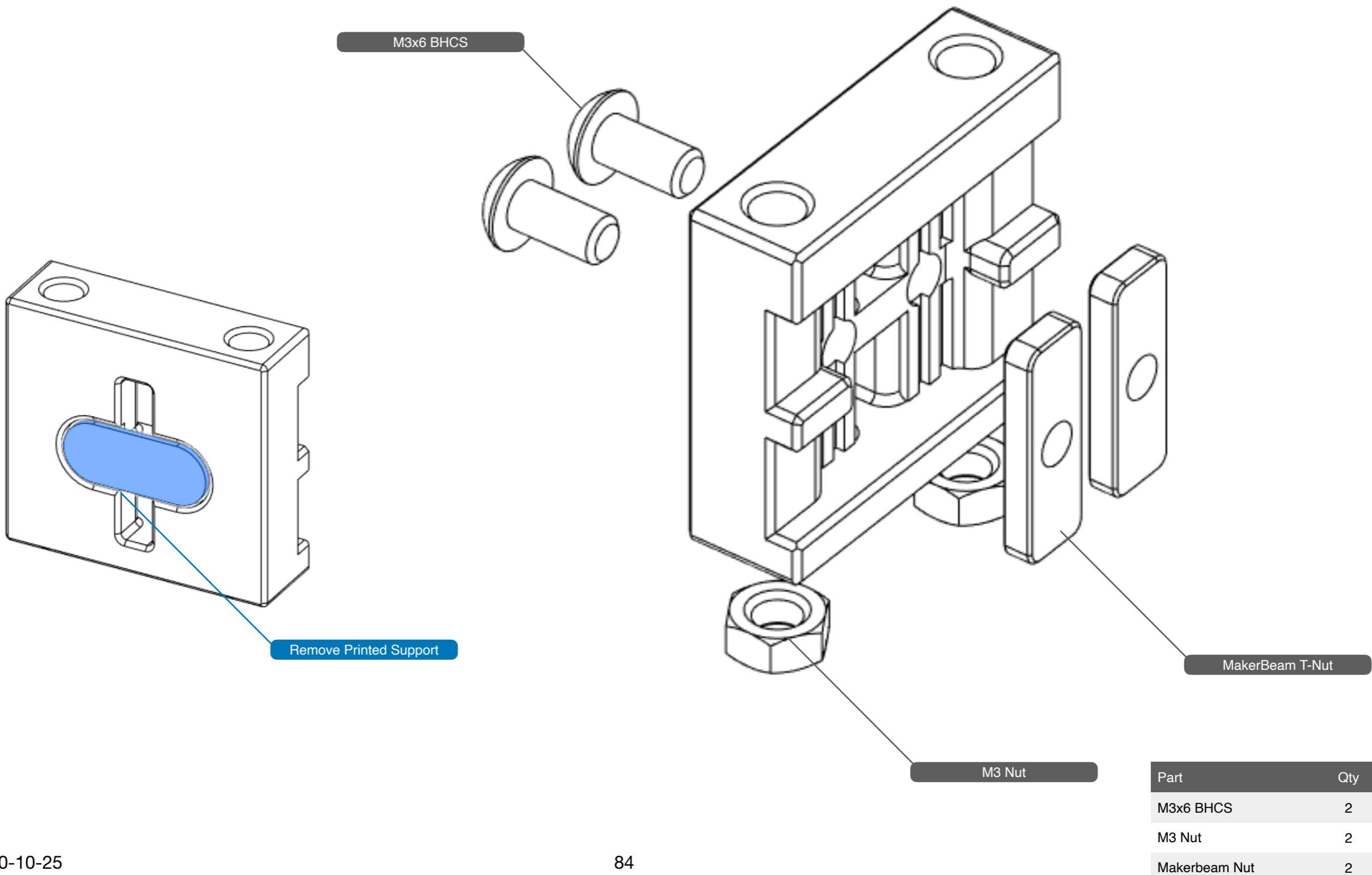
B Belt Path

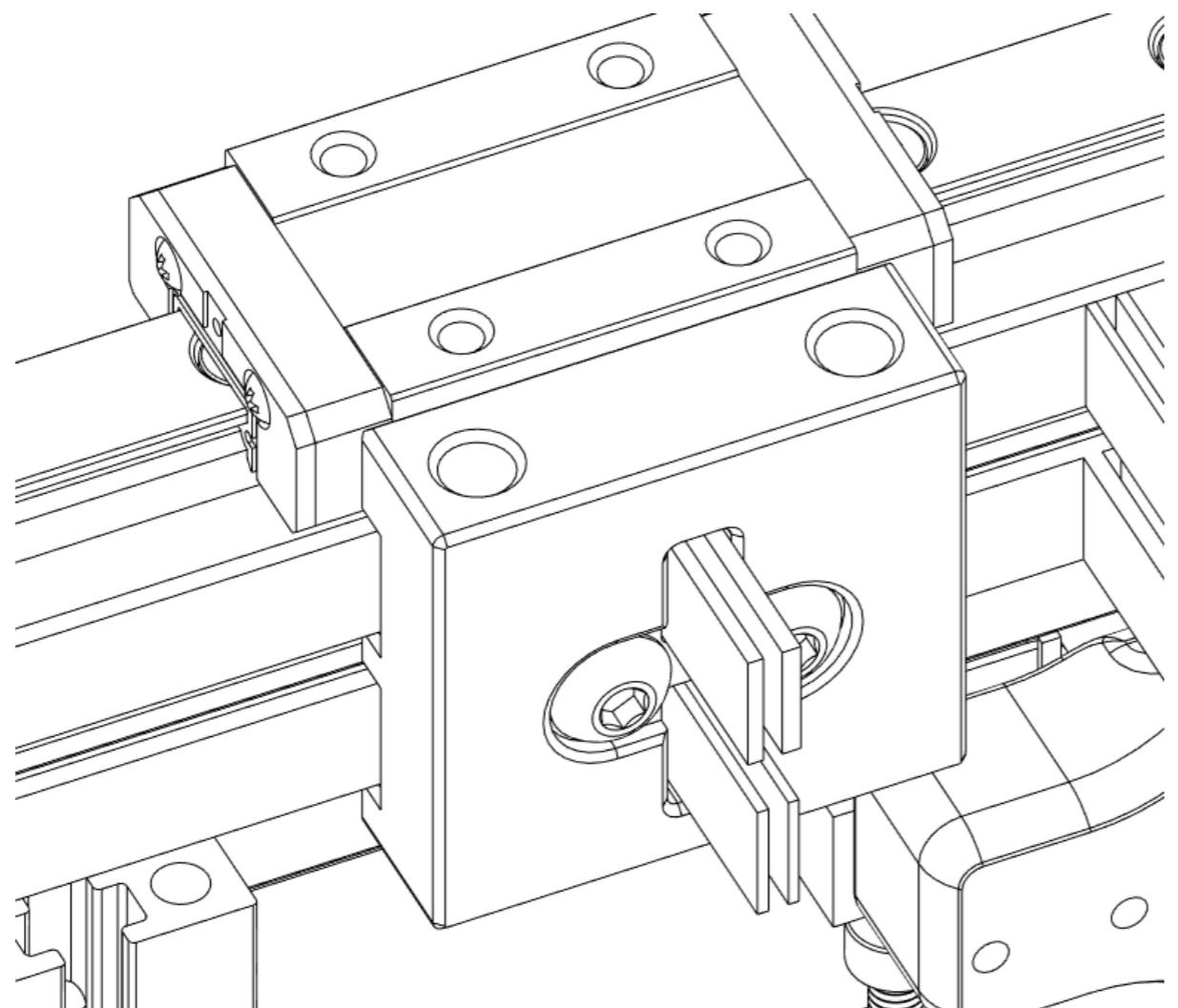


Belt Paths



Belt Retention

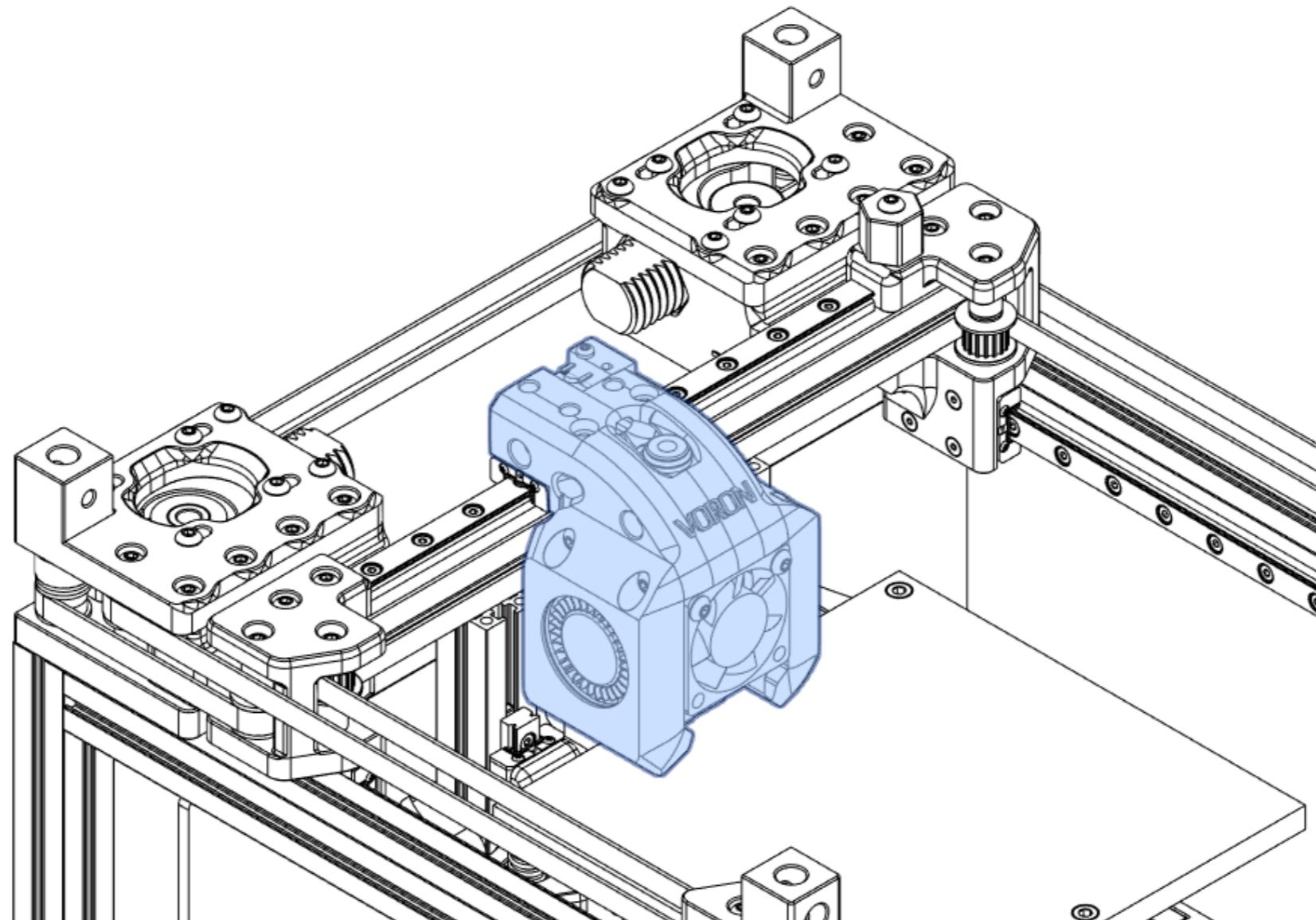




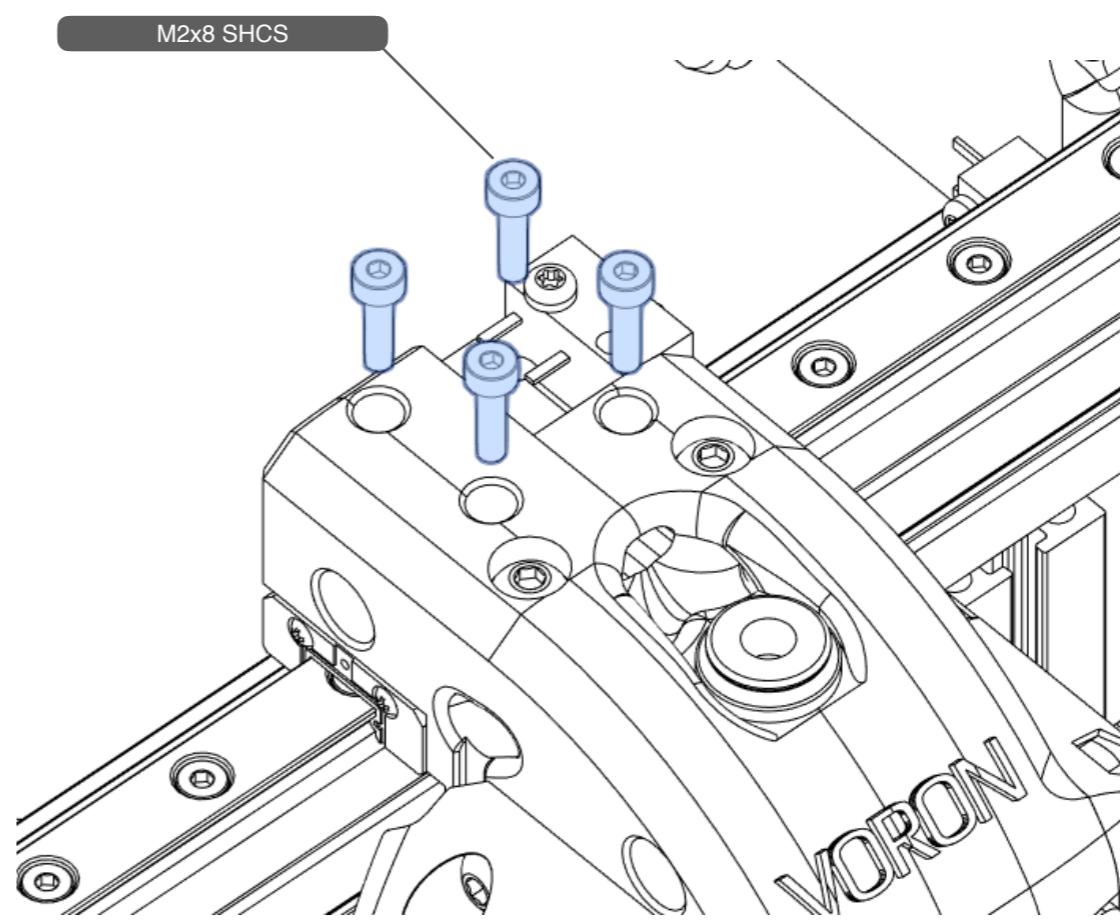
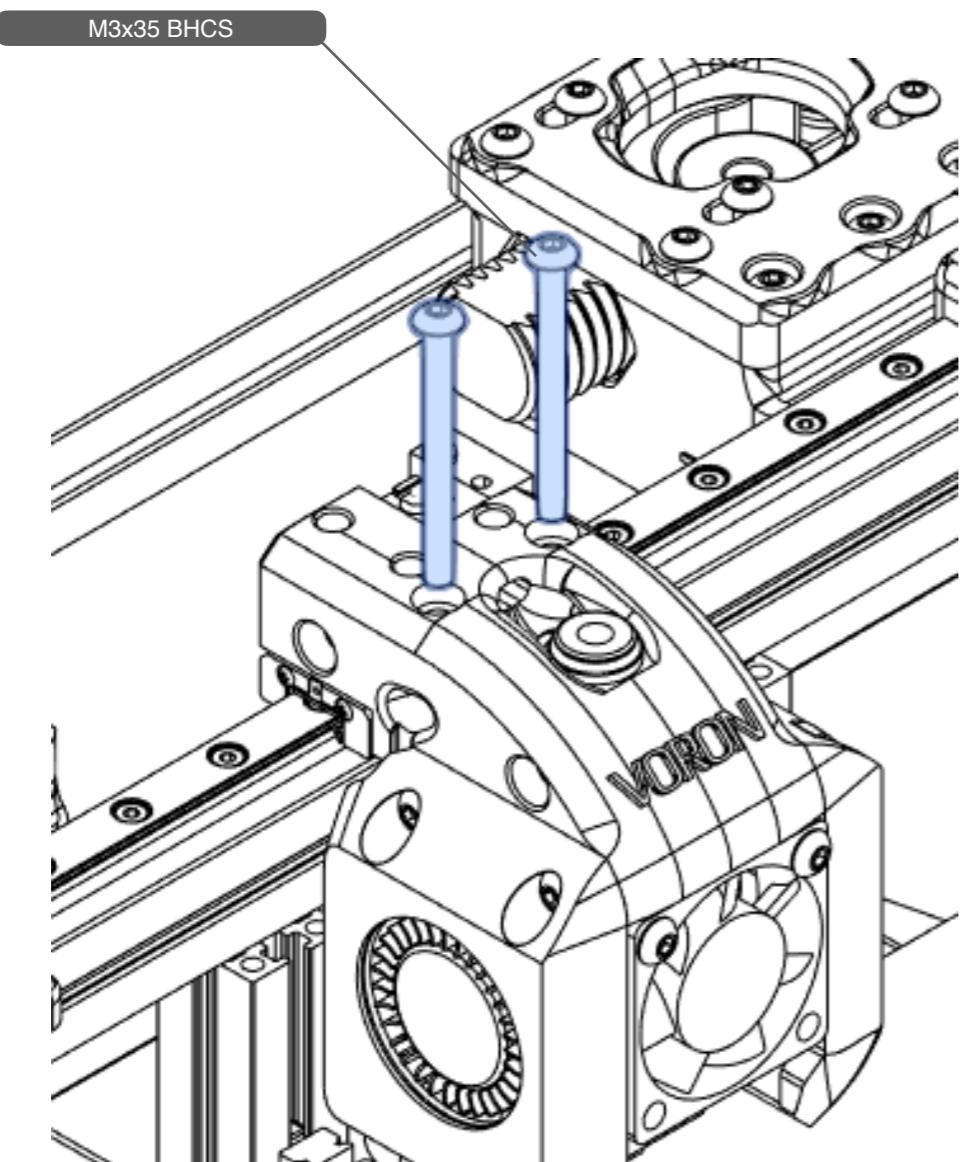
Instructions for belt tightening:
belts MUST be tight, like
not kinda tight, fully tight
use a pliers to pull the
belt ends while the t-nuts
are semi tight so you can
feel the teeth clicking
through the retention
block. pull them as tight
as you can without
tearing the belts only
then should you move to
tensioning with the knobs
on the drives. if you dont
you're going to run out of
travel on the drive
tensioners. after tension
is set then you can trim
the belts flush, theres no
going back after that
step, re-tensioning after
cutting the belts is almost
impossible. take your
time and get it right

Toolhead

See Appendix for Toolhead Assembly

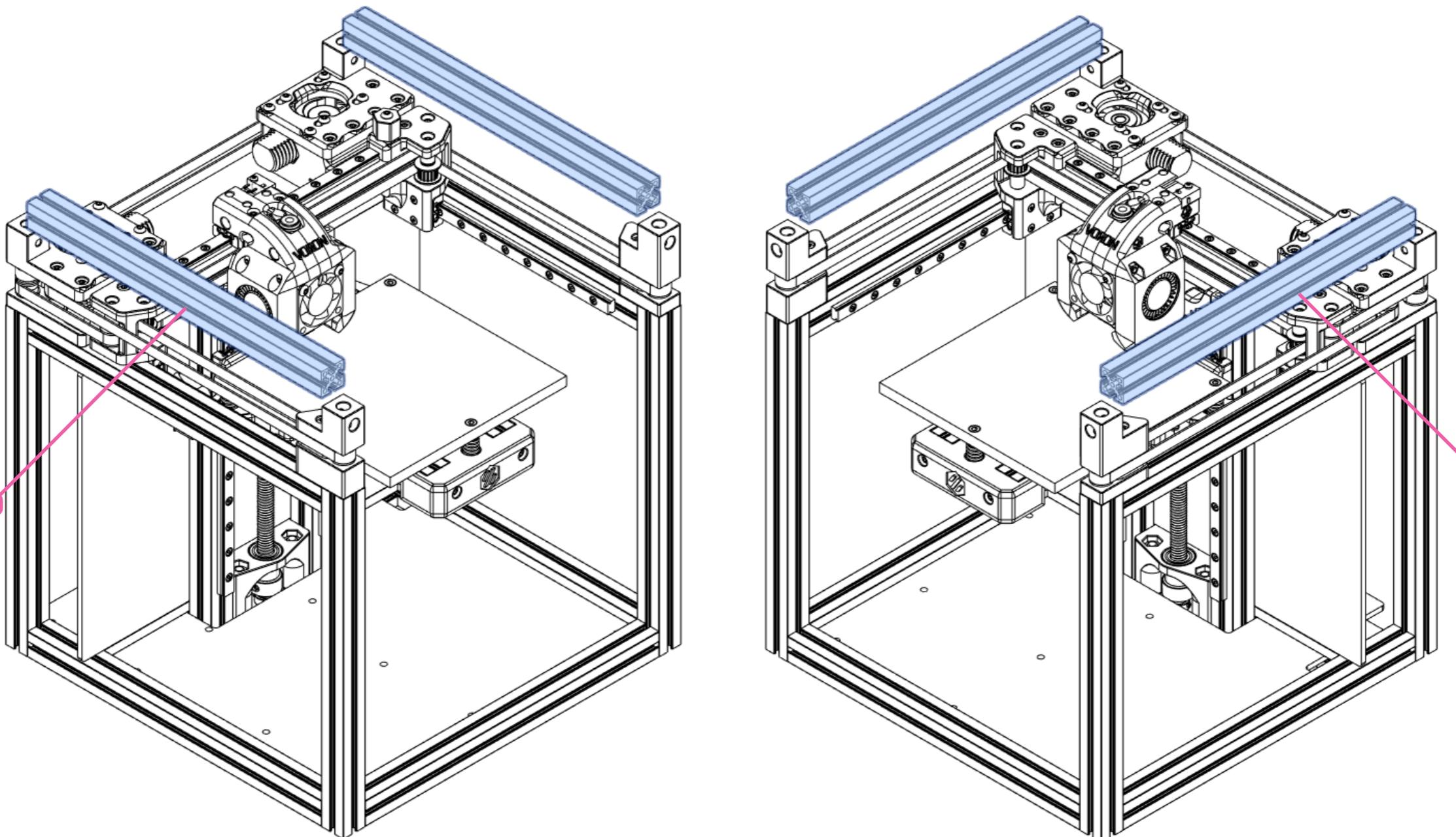


Toolhead



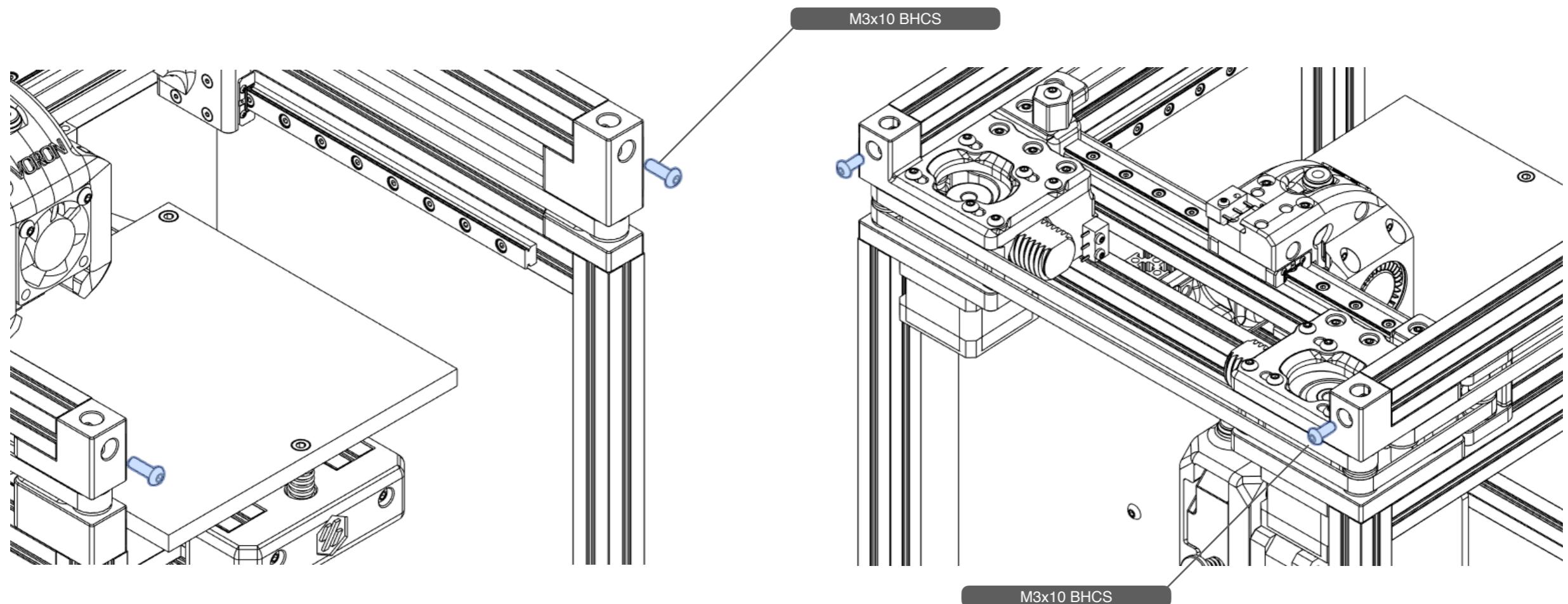
Part	Qty
M2x8 SHCS	4
M3x25 BHCS	2

Frame Assembly

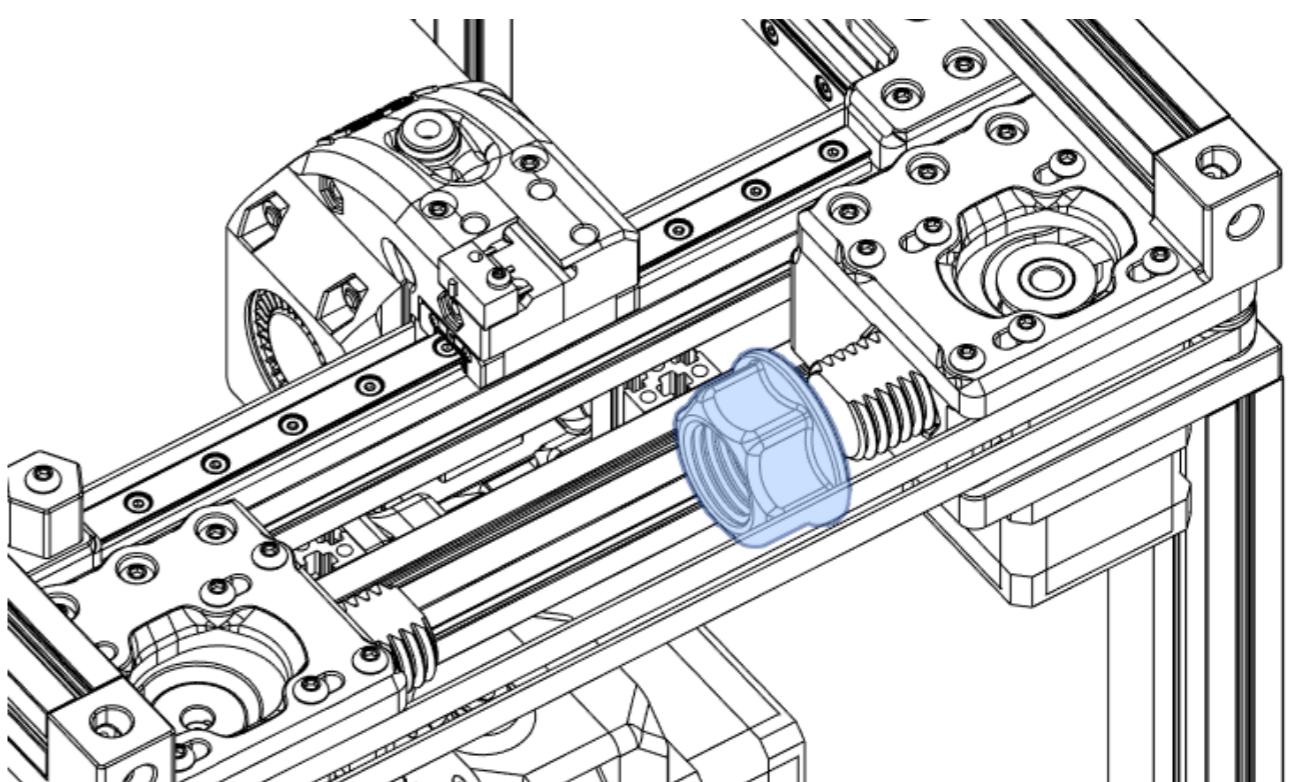
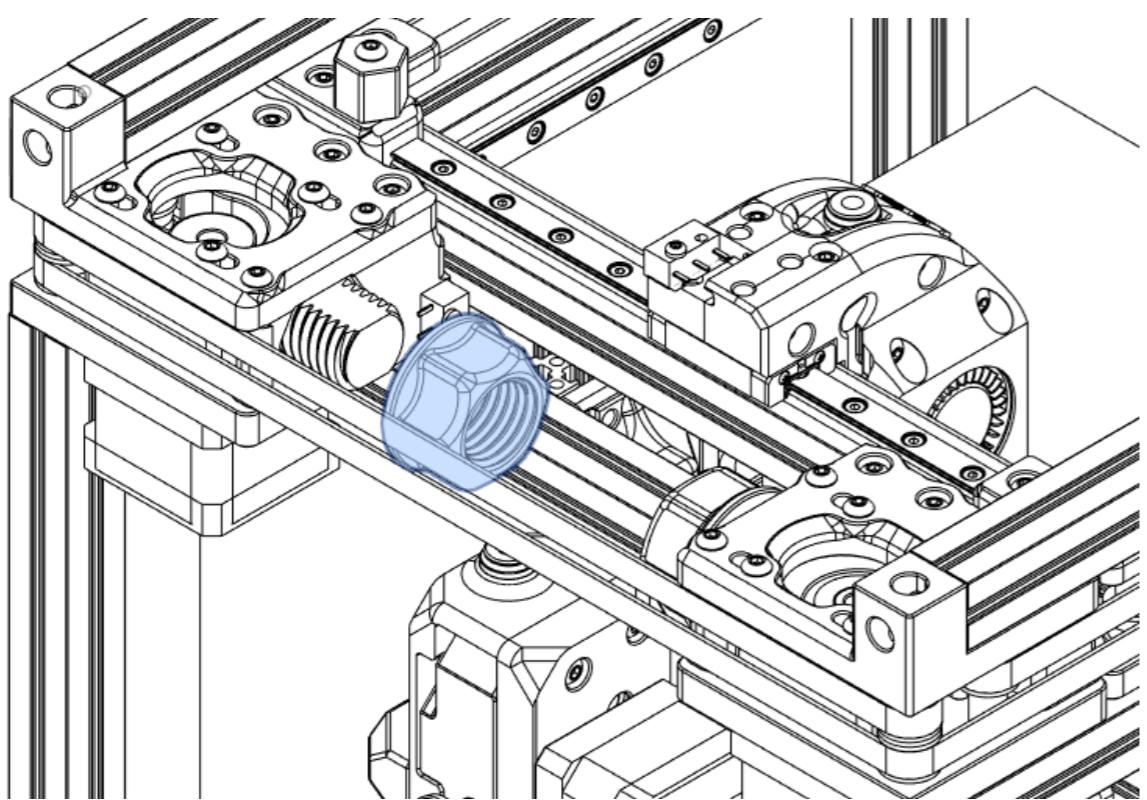


Part	Qty
M3 Nut	6

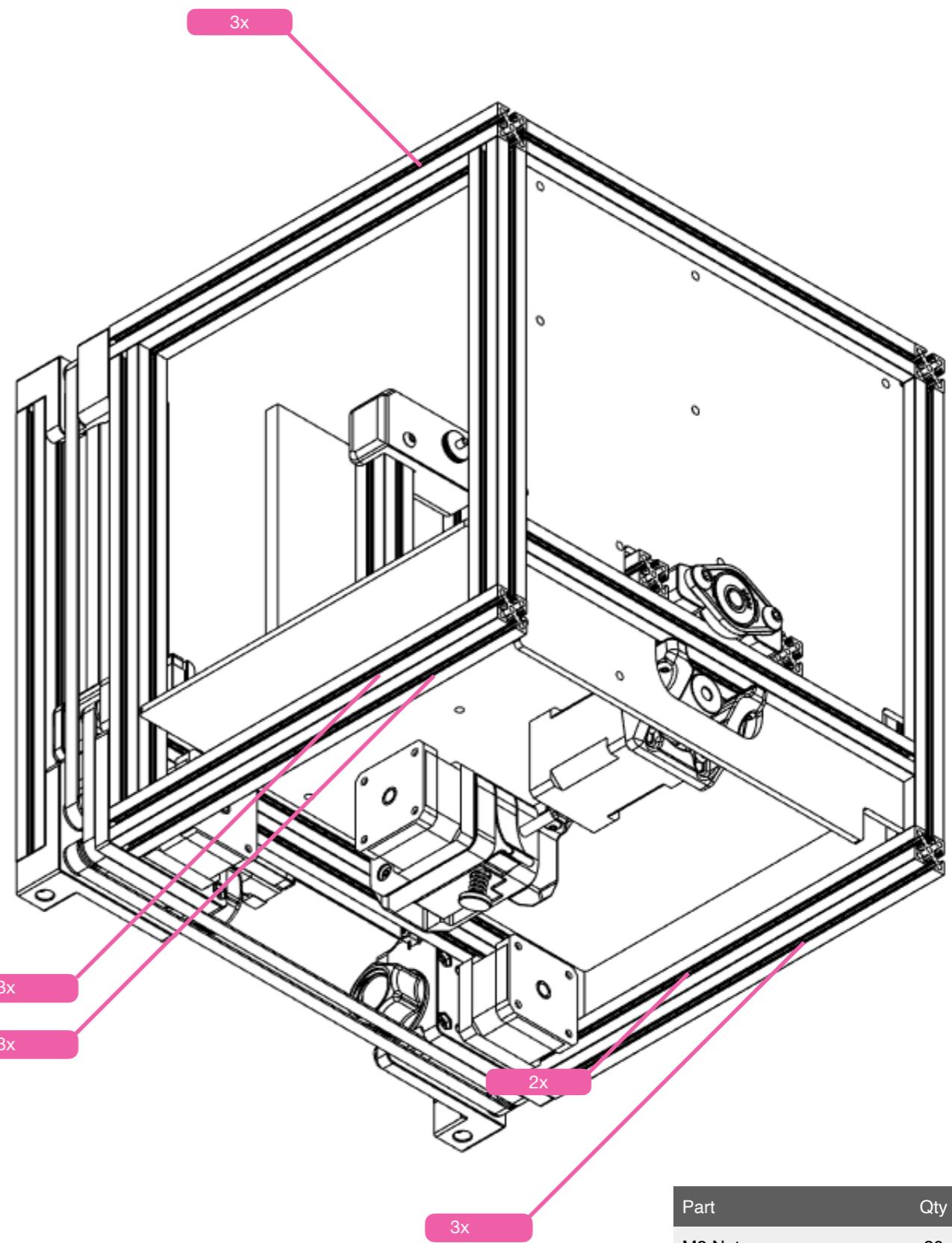
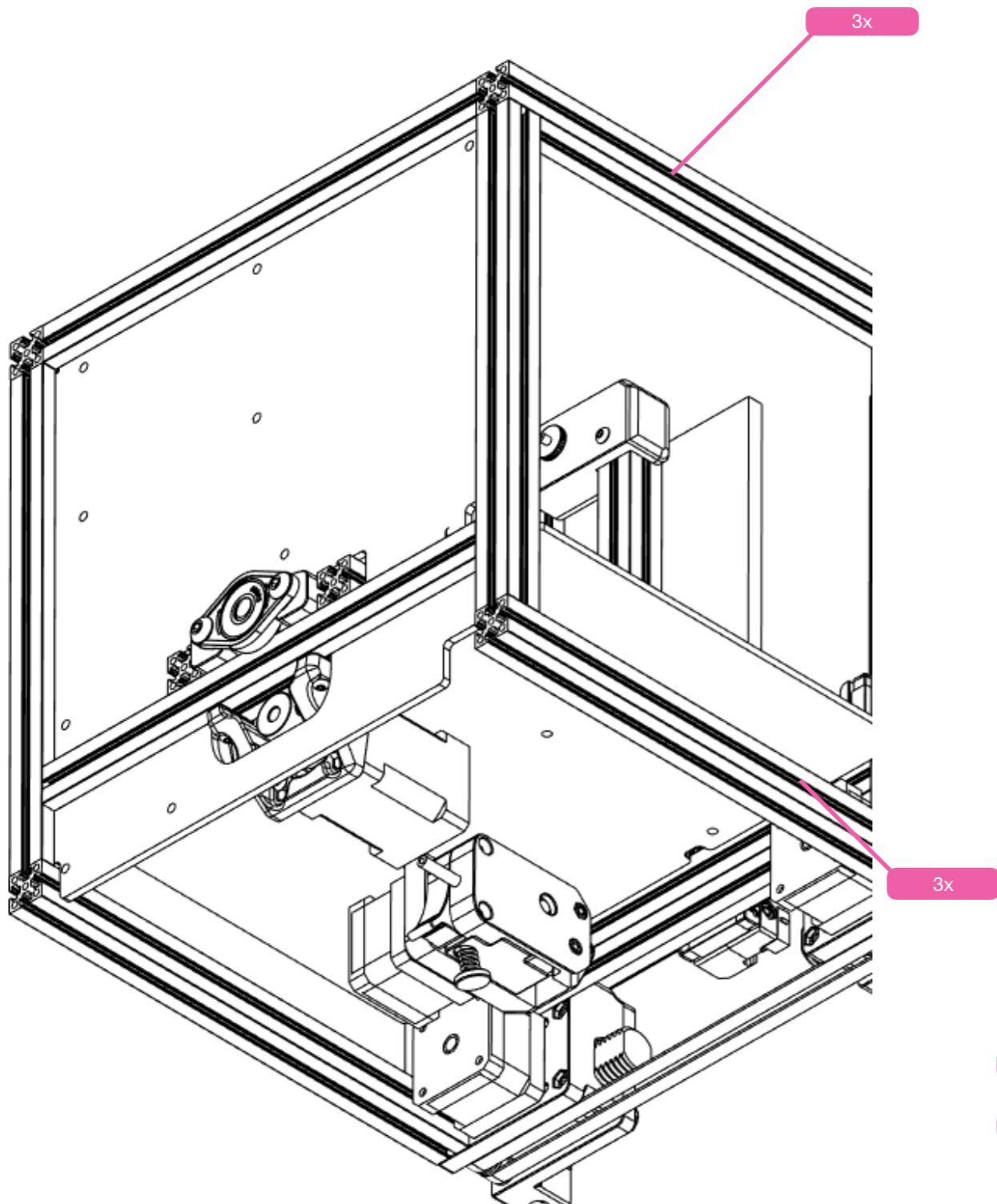
Frame Assembly



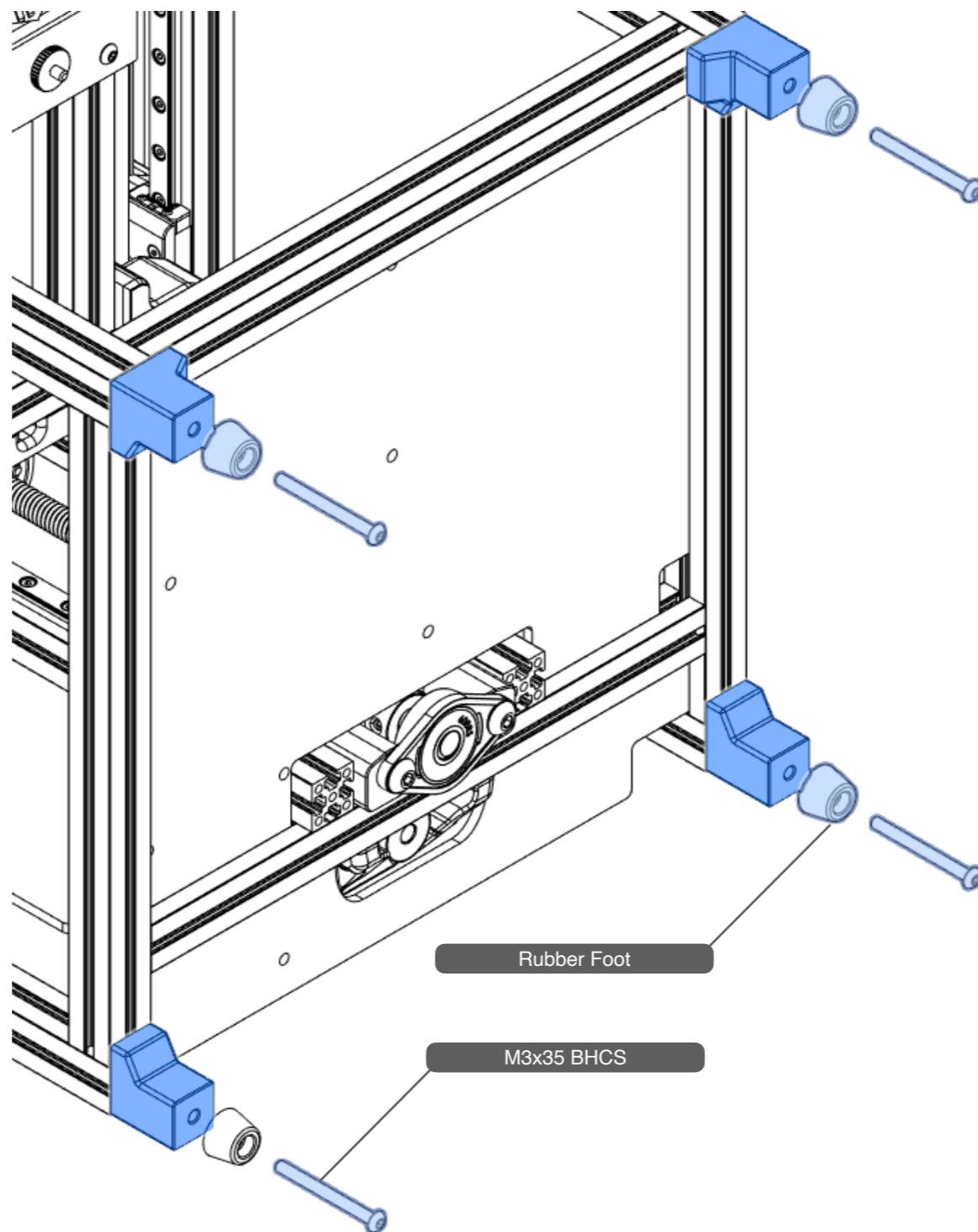
Tension Knobs



Pre-Load Nuts

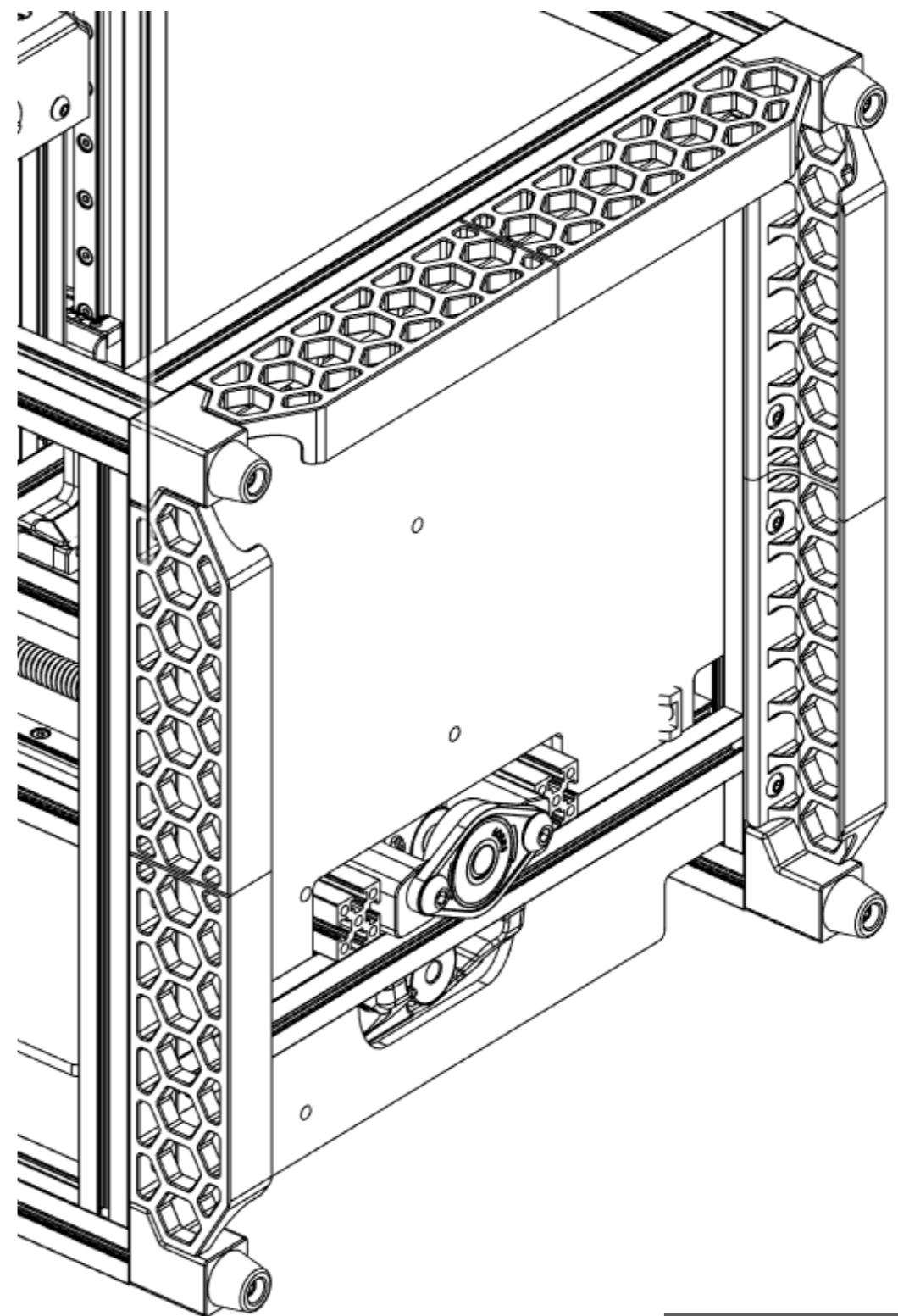
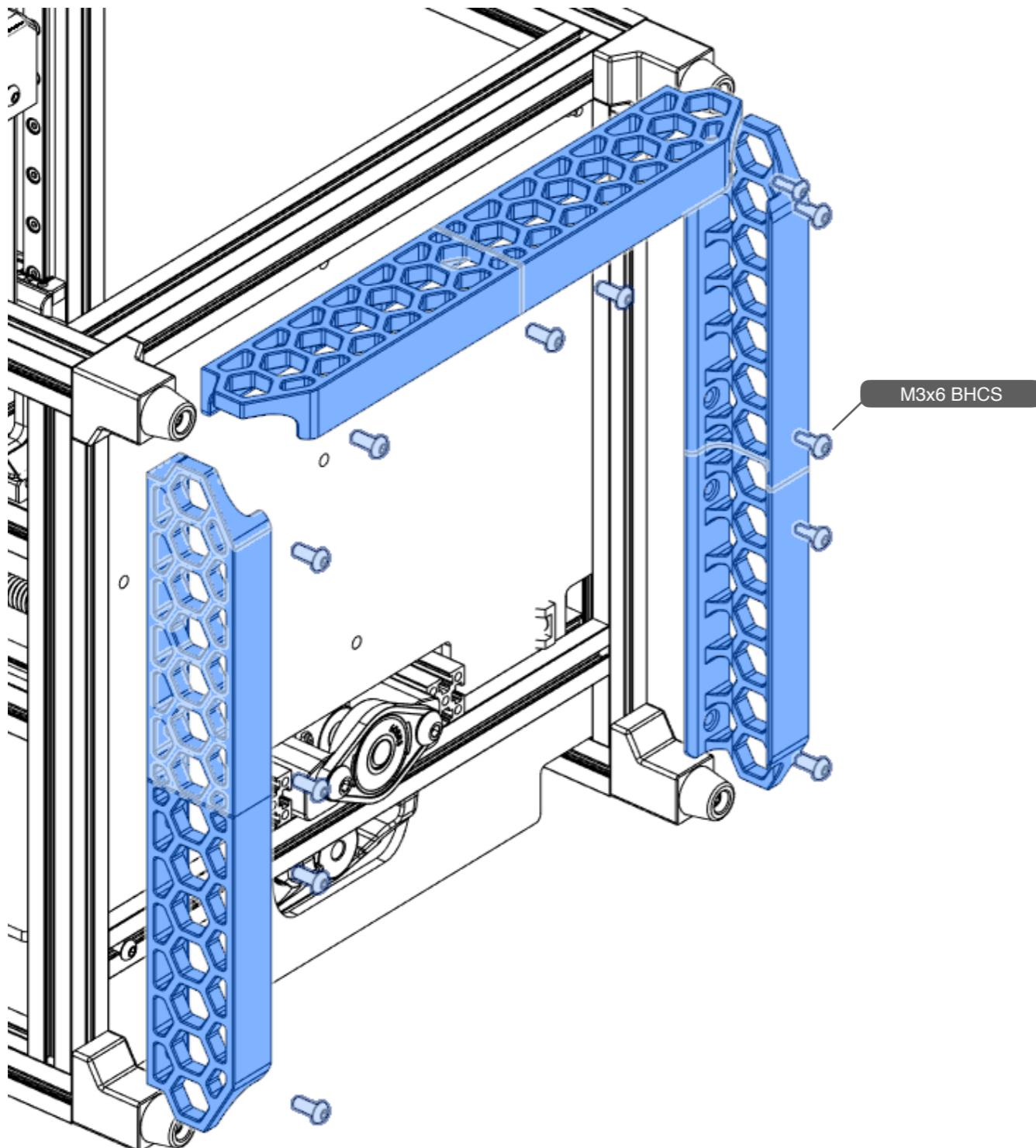


Feet/Skirts

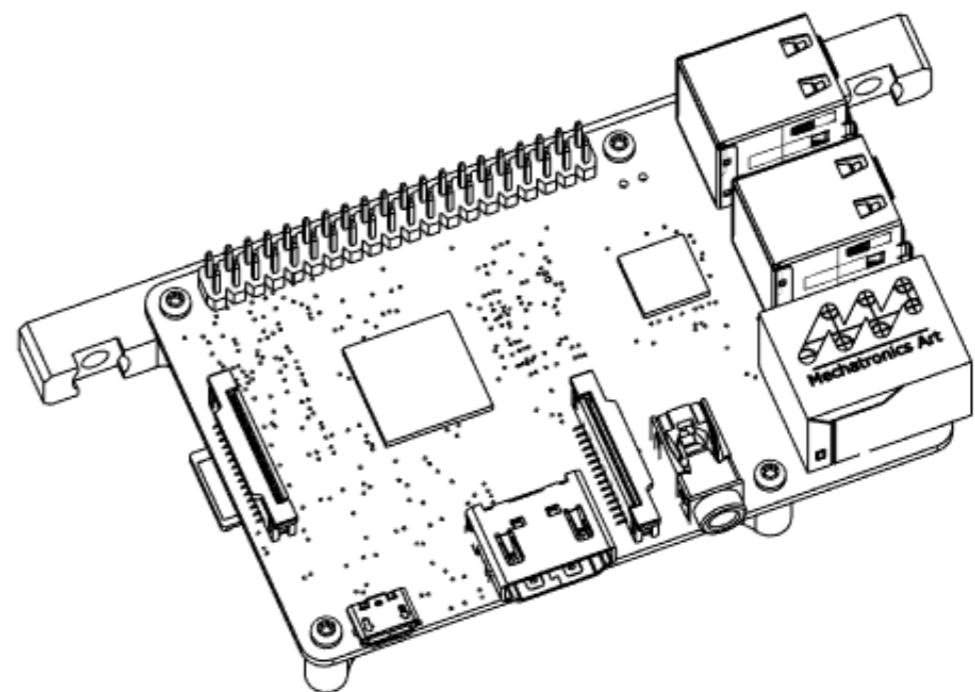
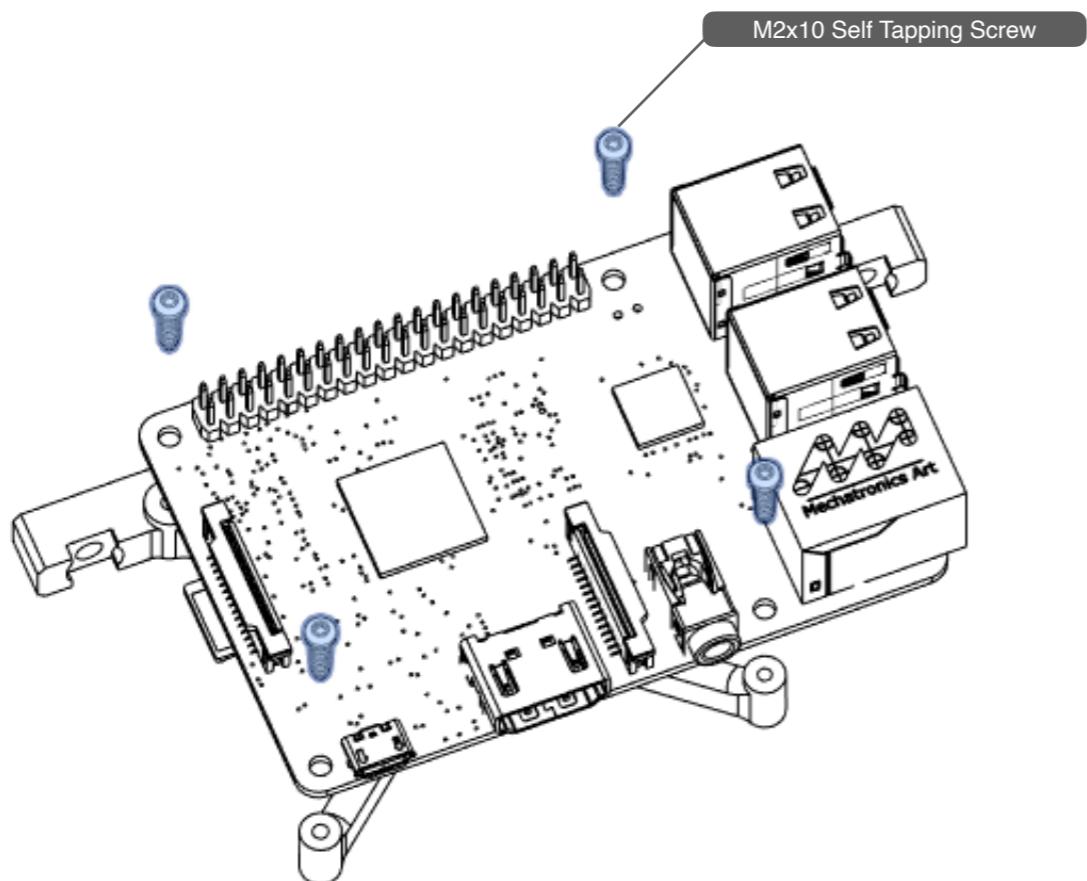


Part	Qty
M3x35 BHCS	4
Rubber Foot	4

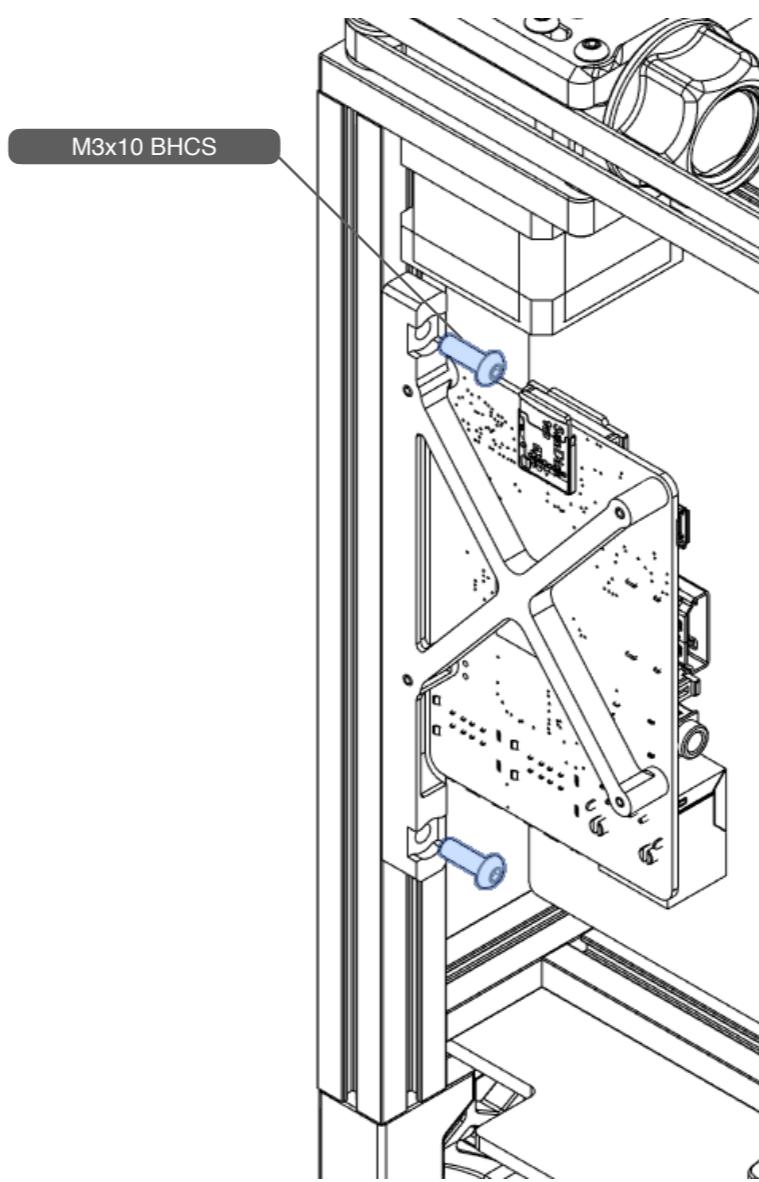
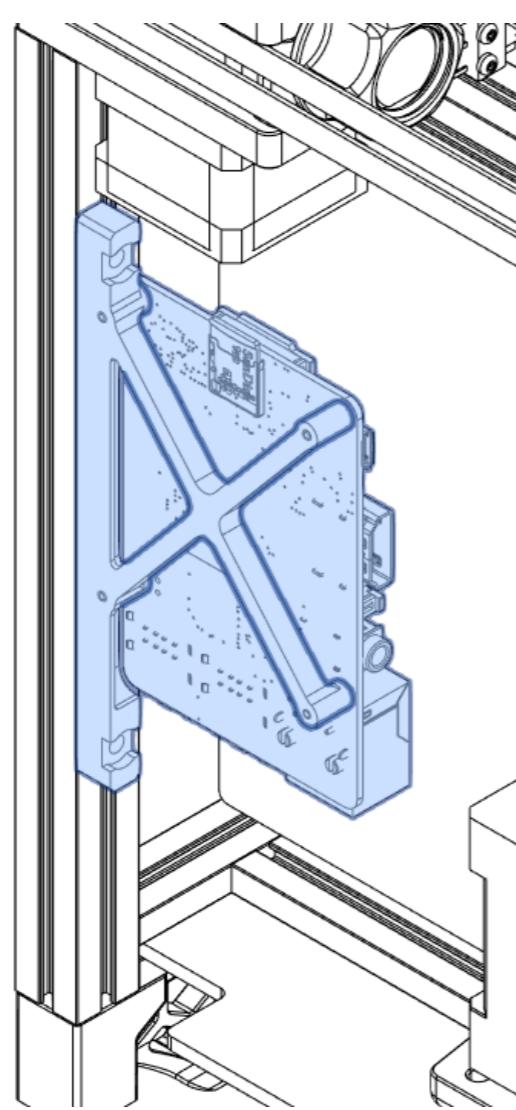
Feet/Skirts



Part	Qty
M3x35 BHCS	4
Rubber Foot	4

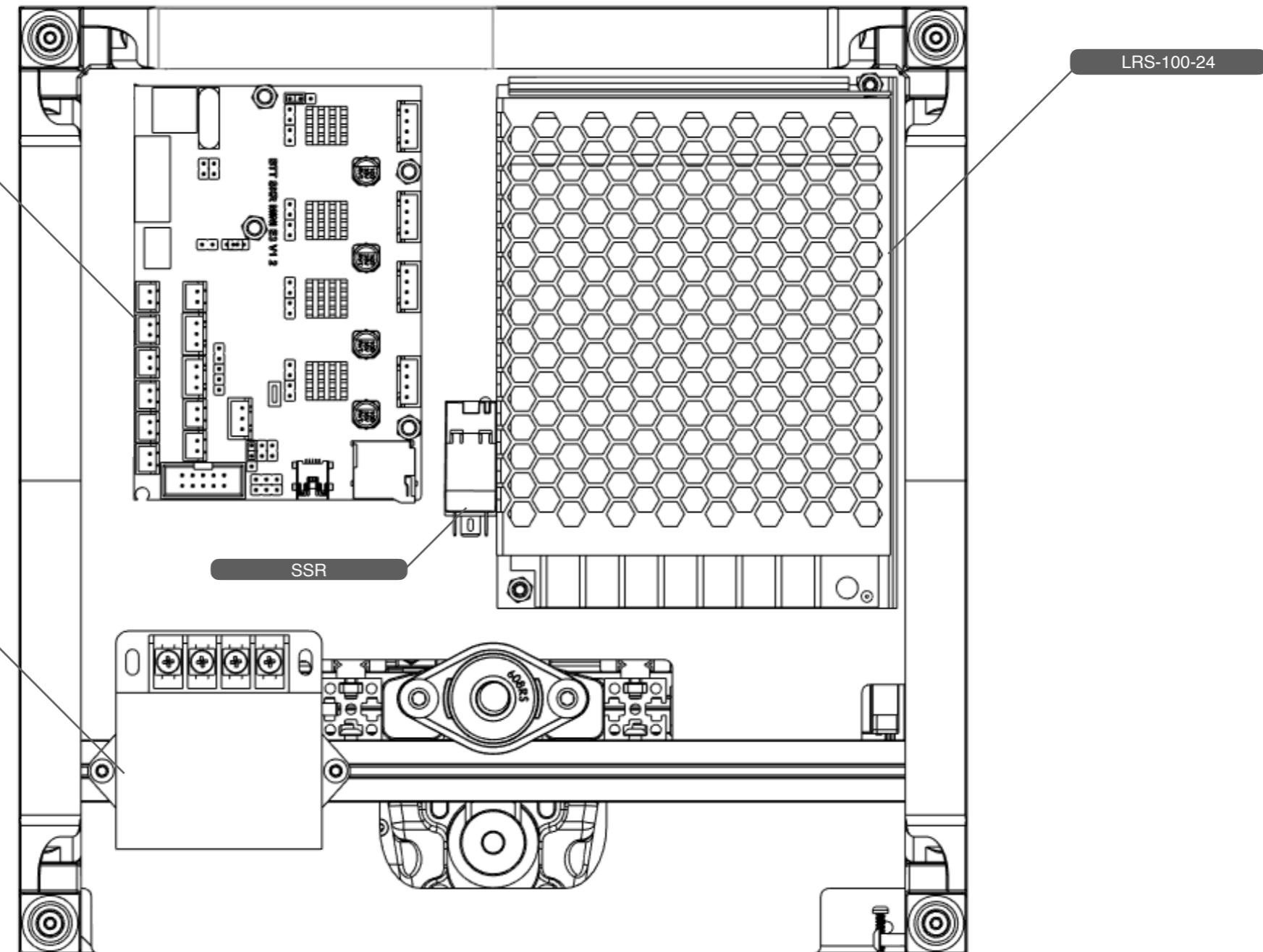


Part	Qty
M2x10 Self Tapping	4
Raspberry Pi	1

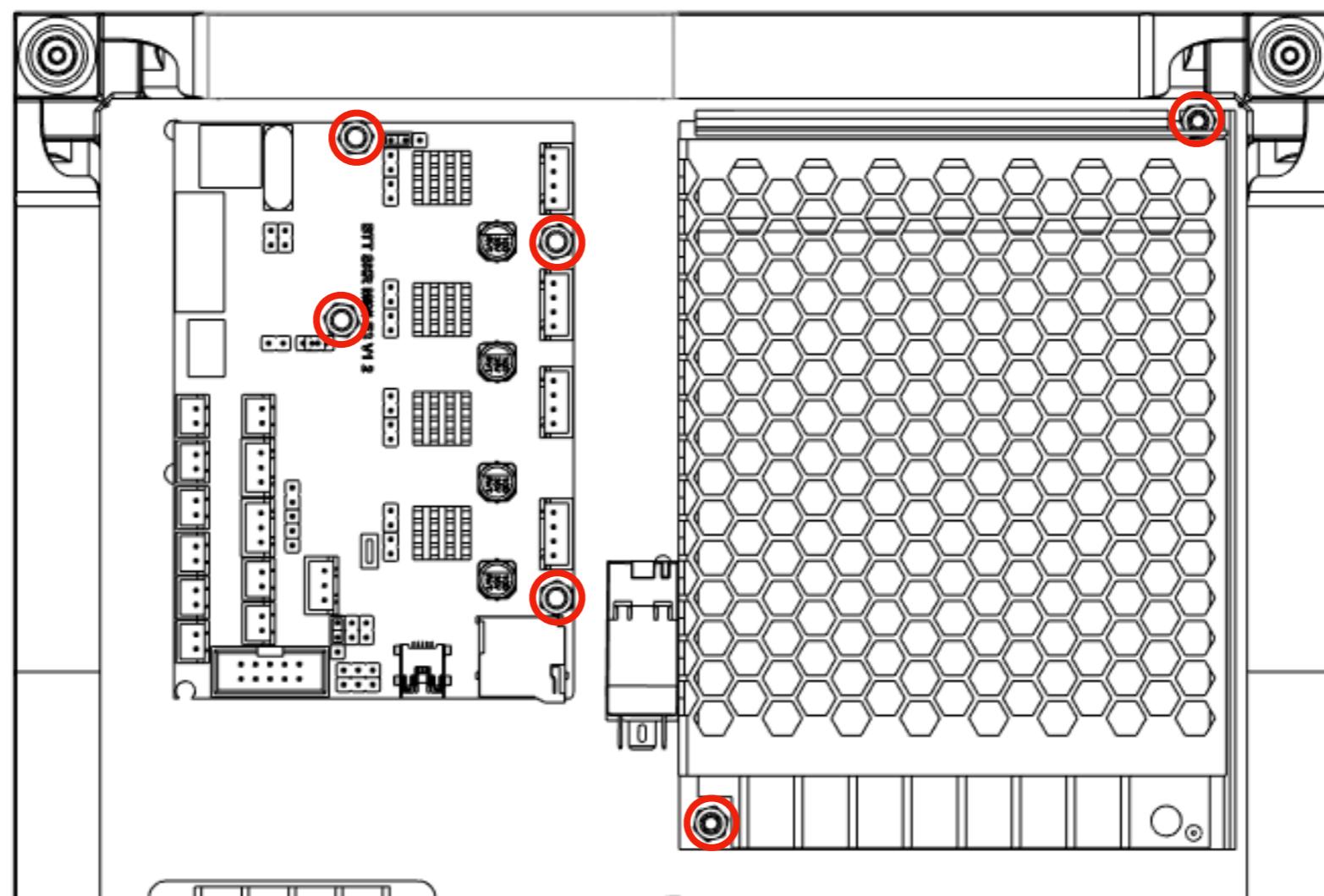


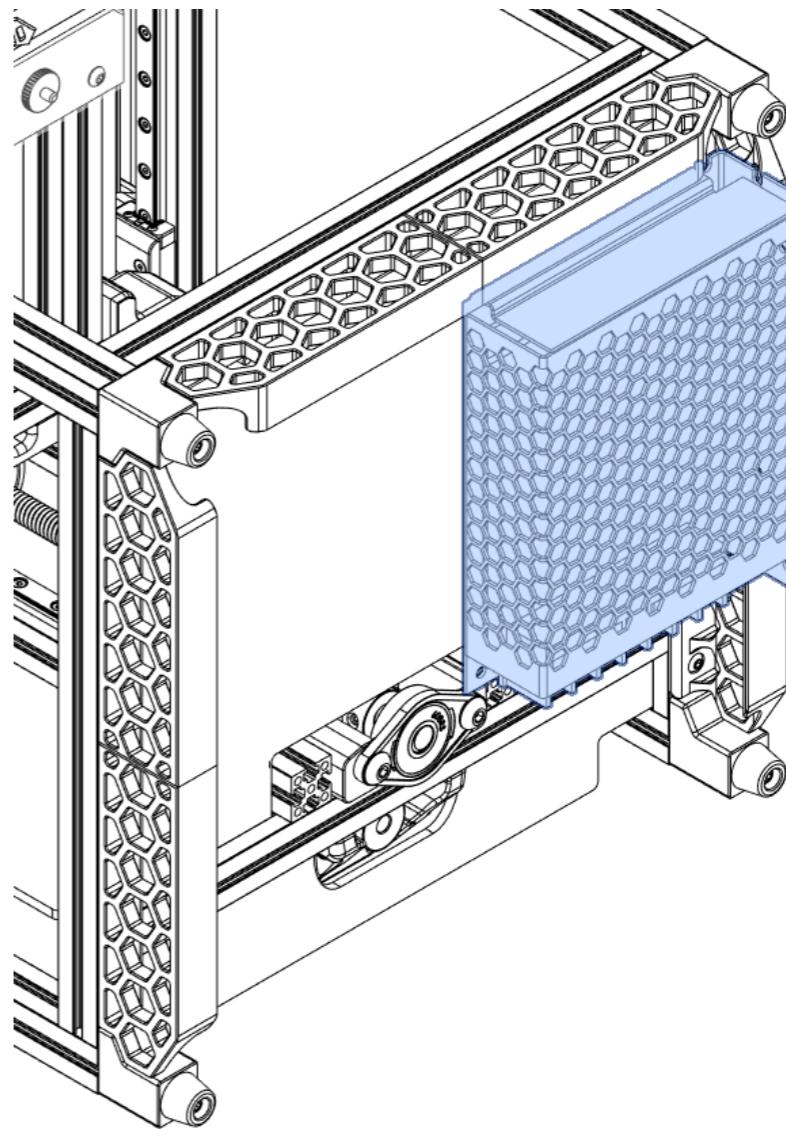
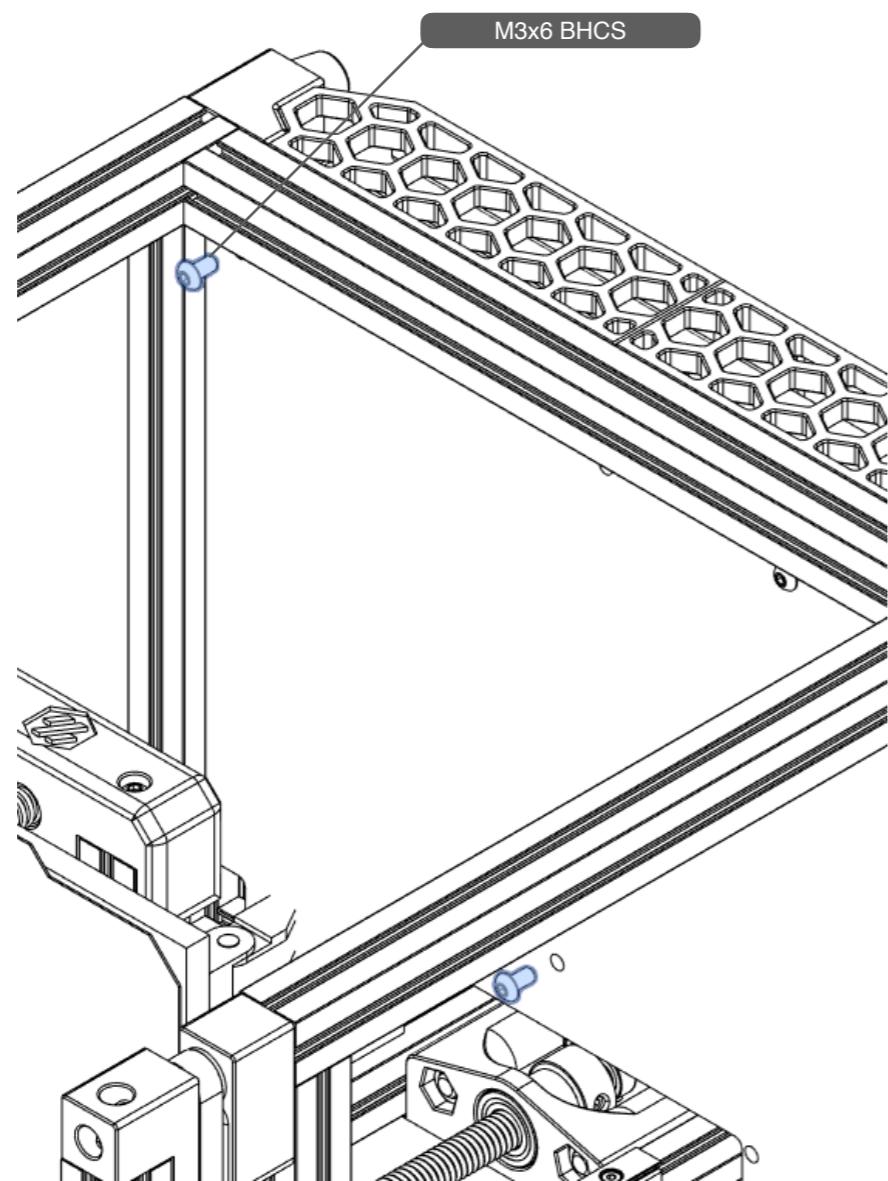
Part	Qty
M3x10 BHCS	2

Overview of Electronics Layout

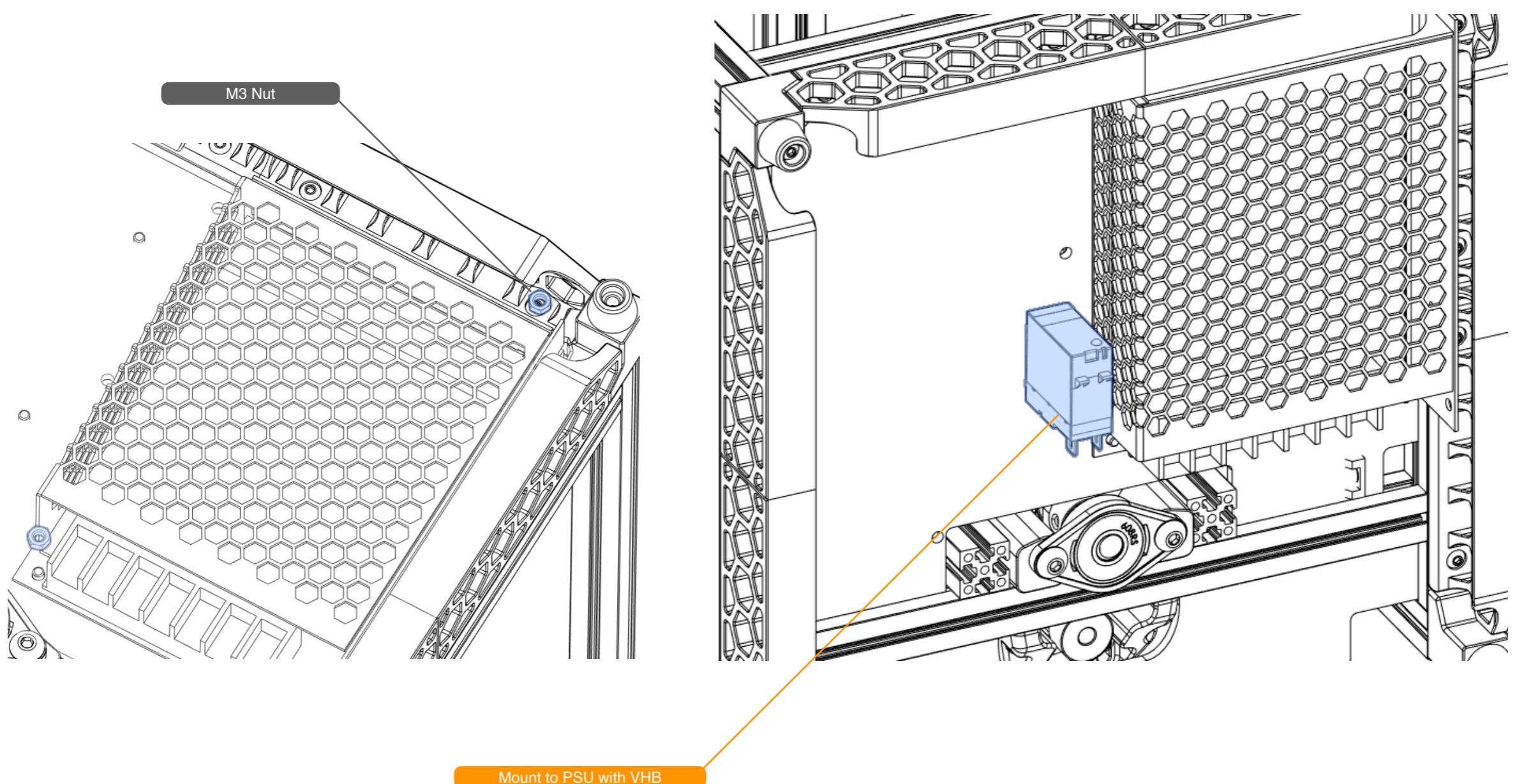


Layout, Mark, and Drill 3mm holes for PSU and MCU in Deck Panel

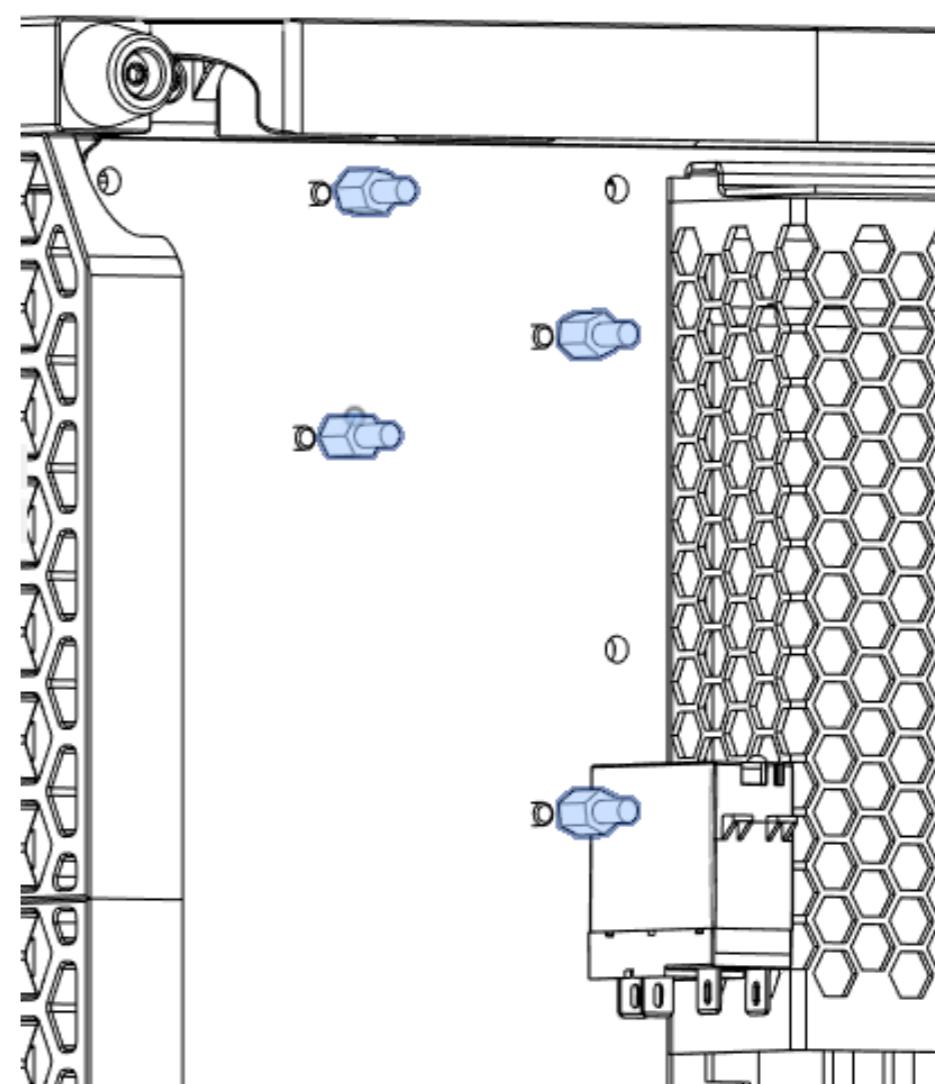
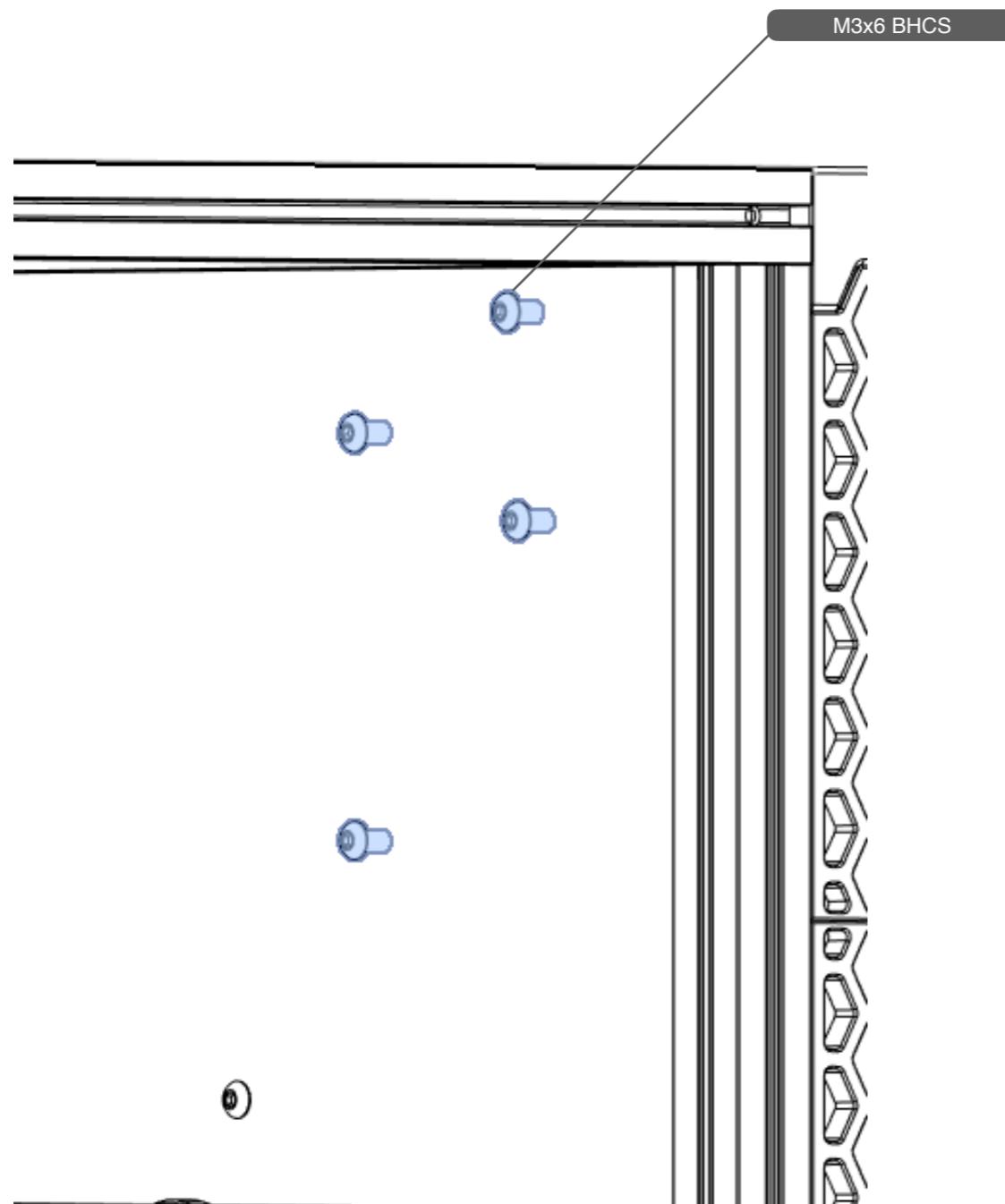




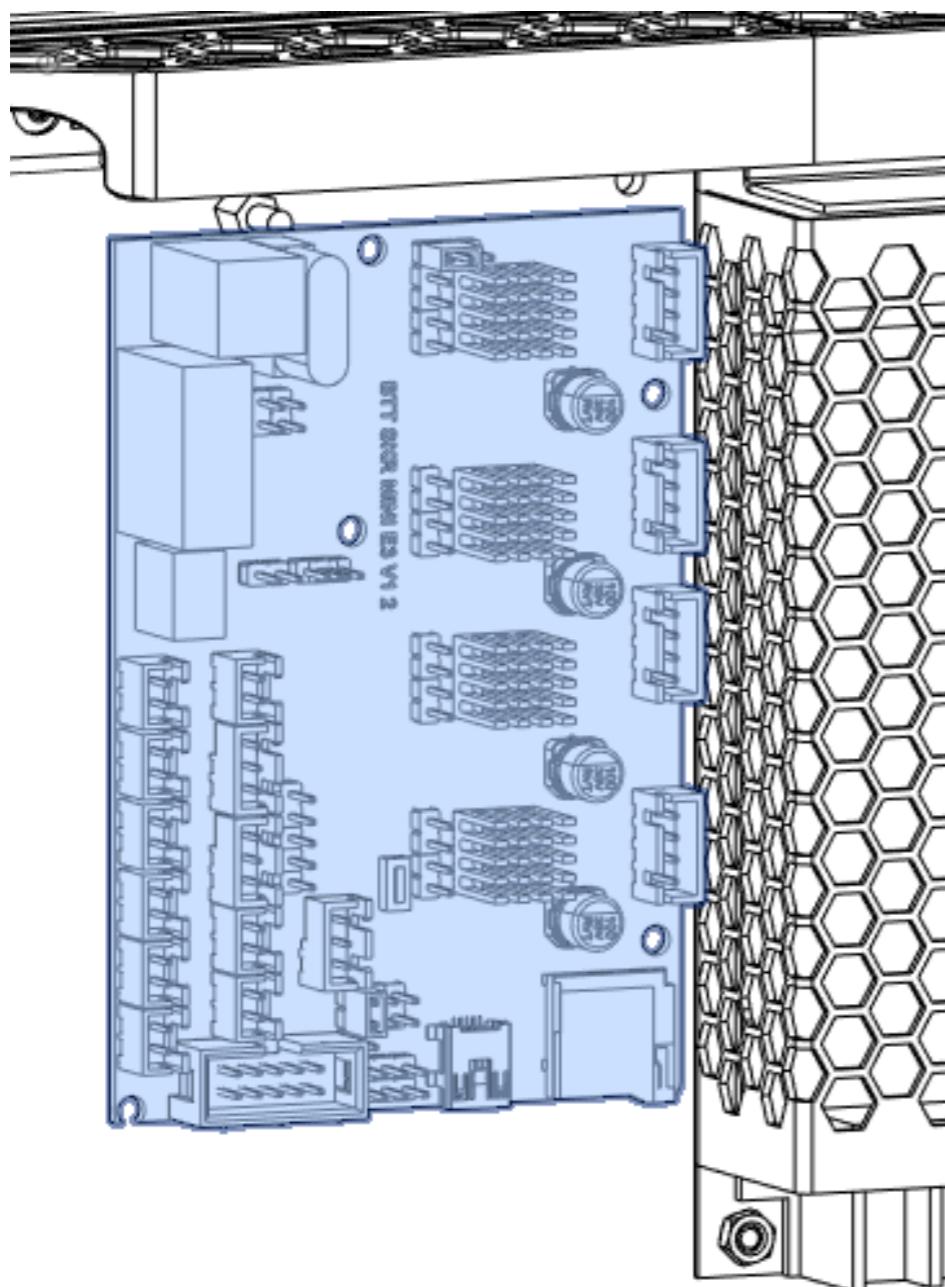
Part	Qty
M3x6 BHCS	2
LRS-100 PSU	1



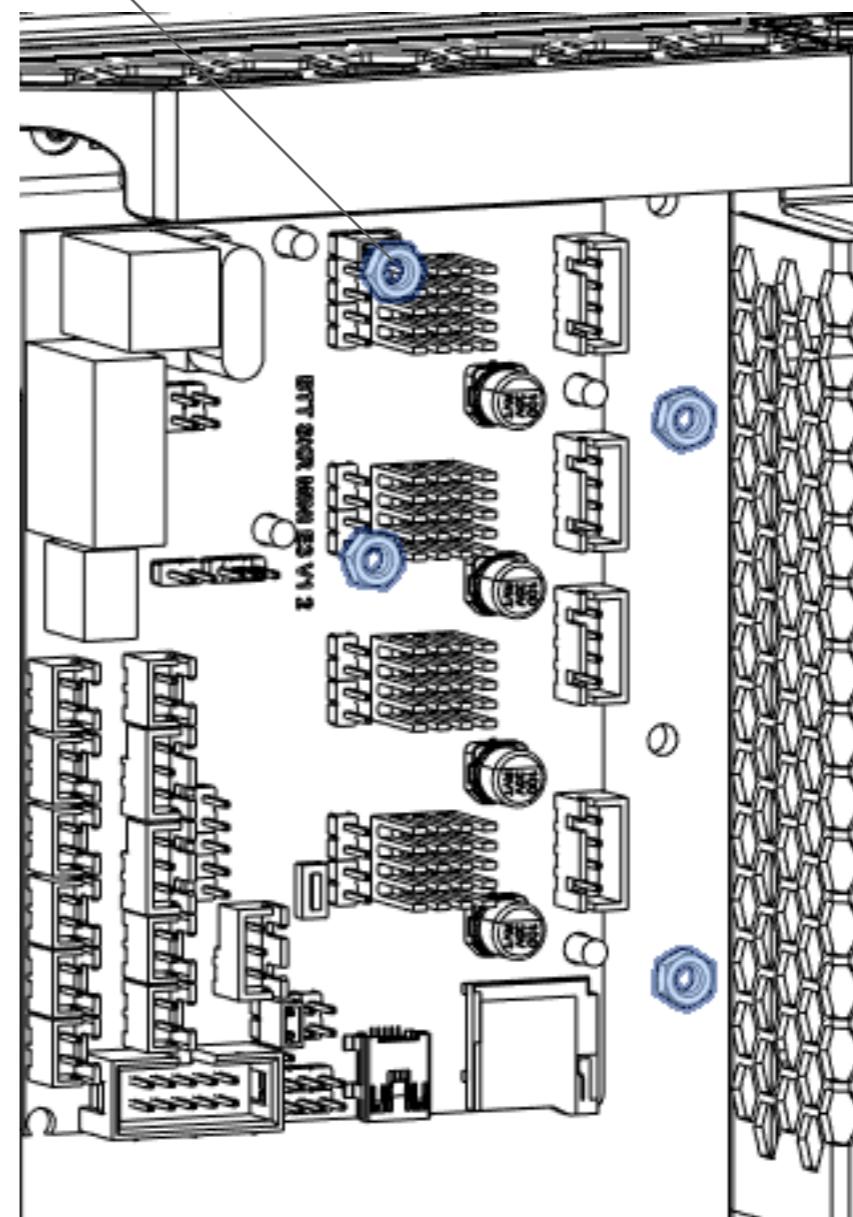
Part	Qty
M3 Nut	2
Crydom SSR	1



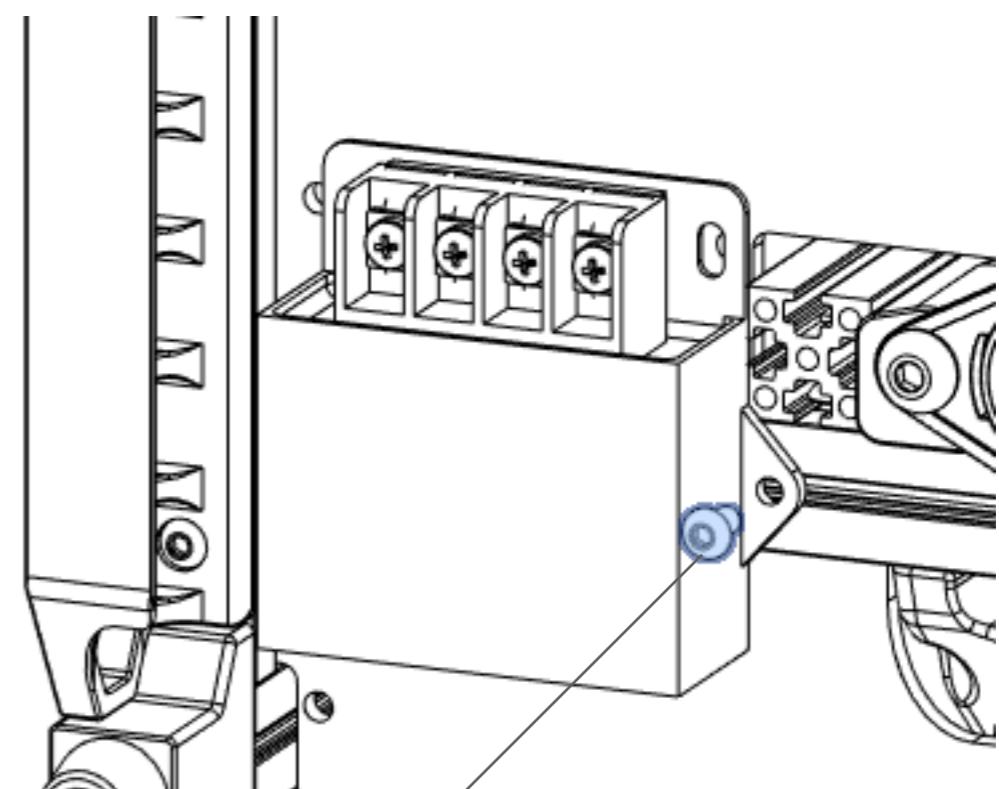
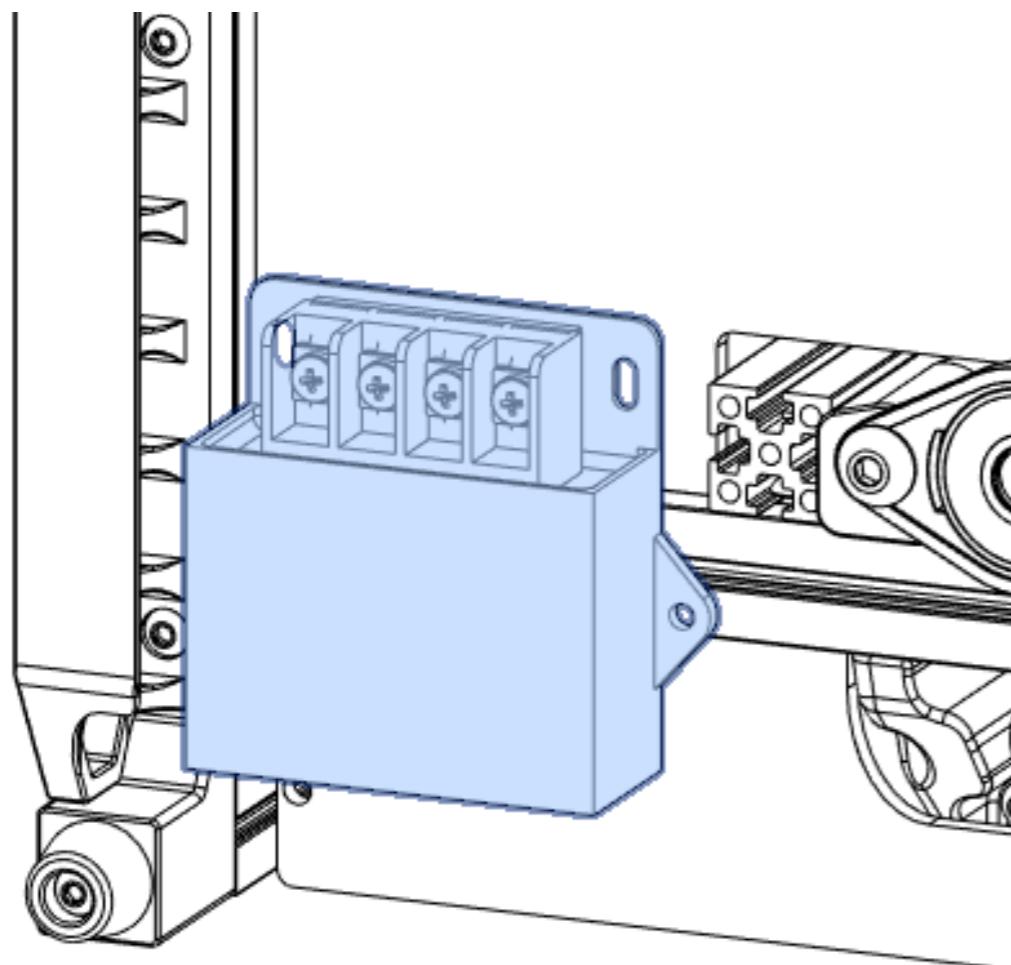
Part	Qty
M3x6 BHCS	4
M3 Nylon Standoffs	4



M3 Nut



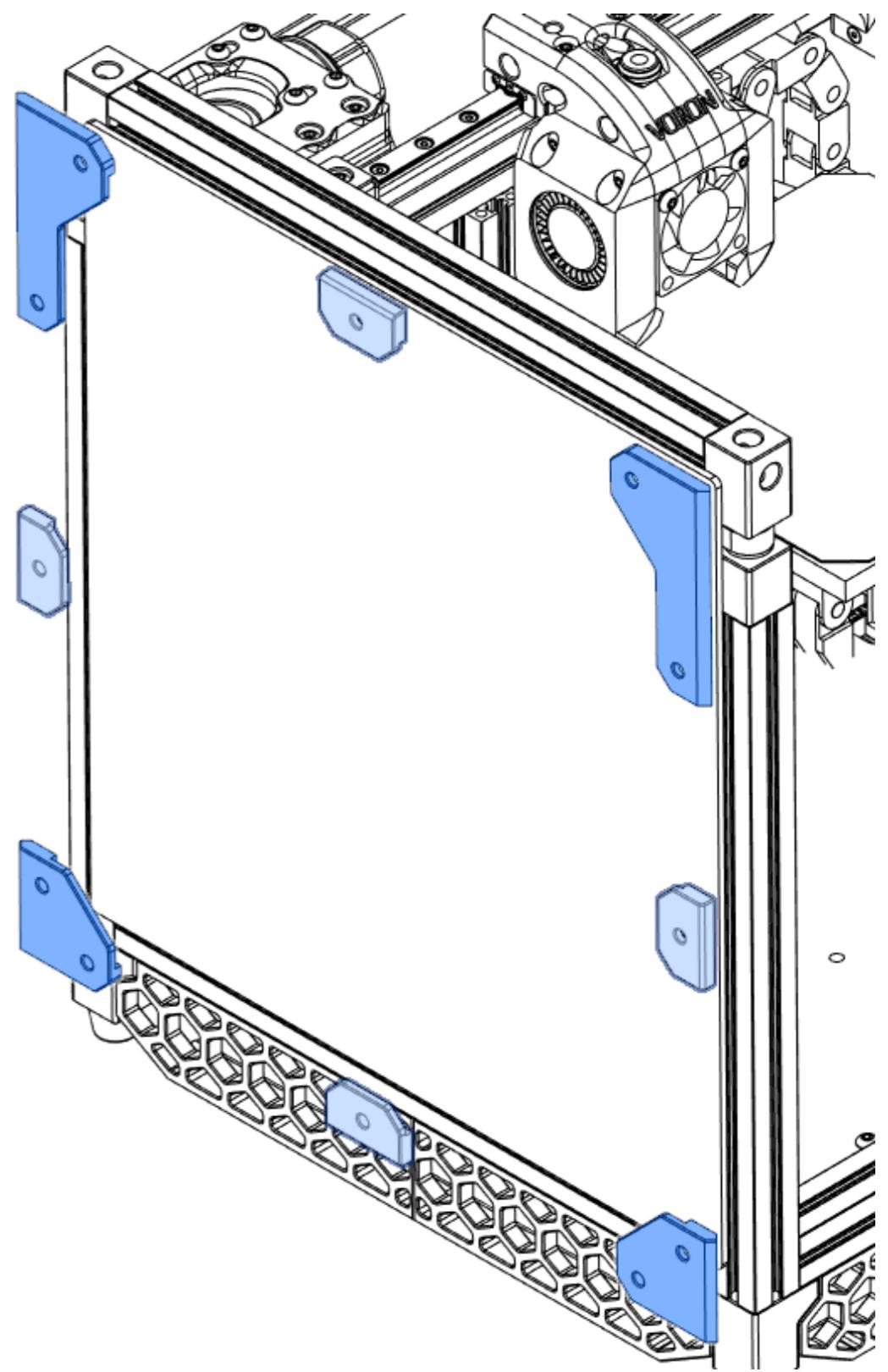
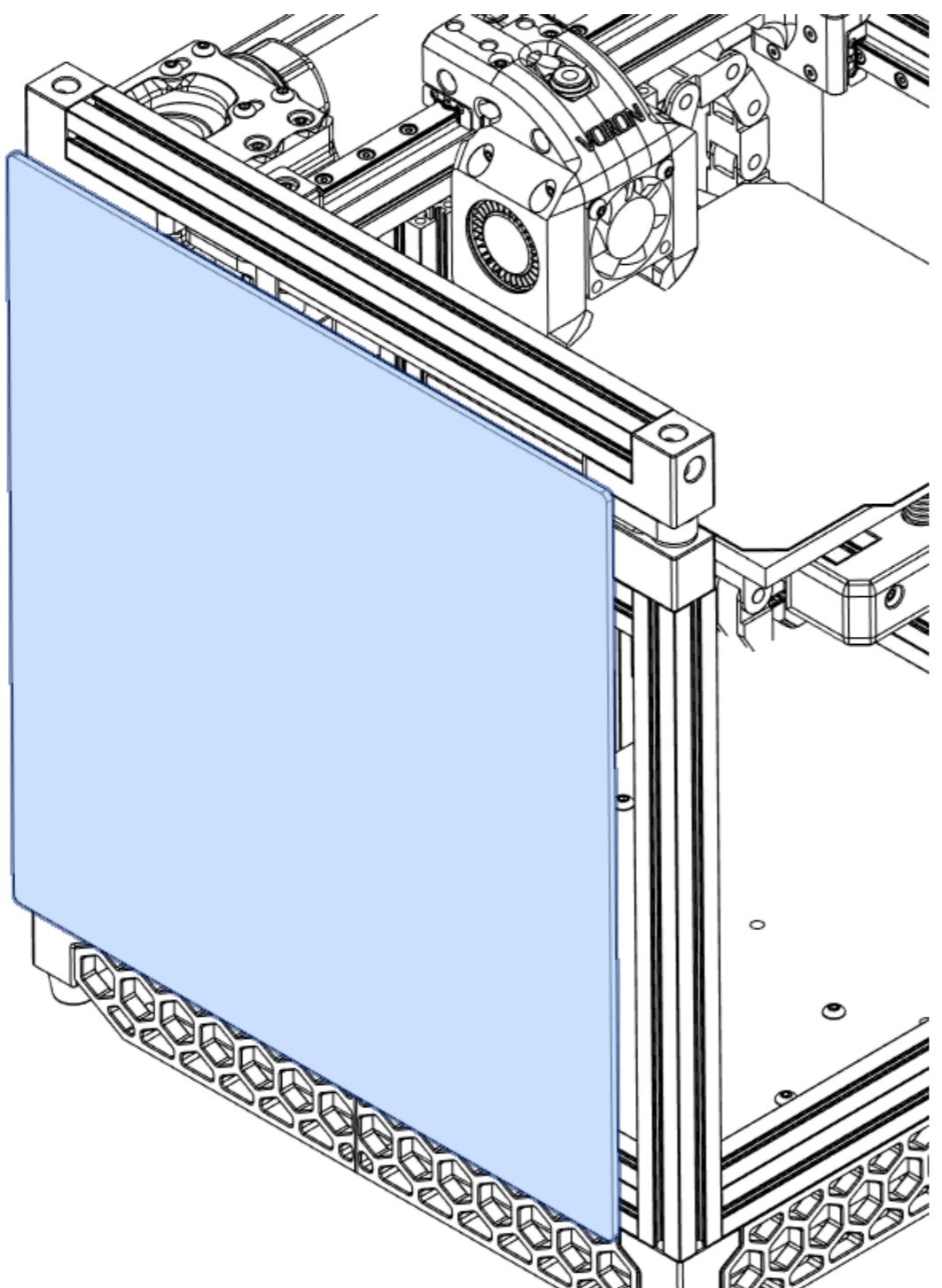
Part	Qty
M3 Nut (opt Nylon)	4

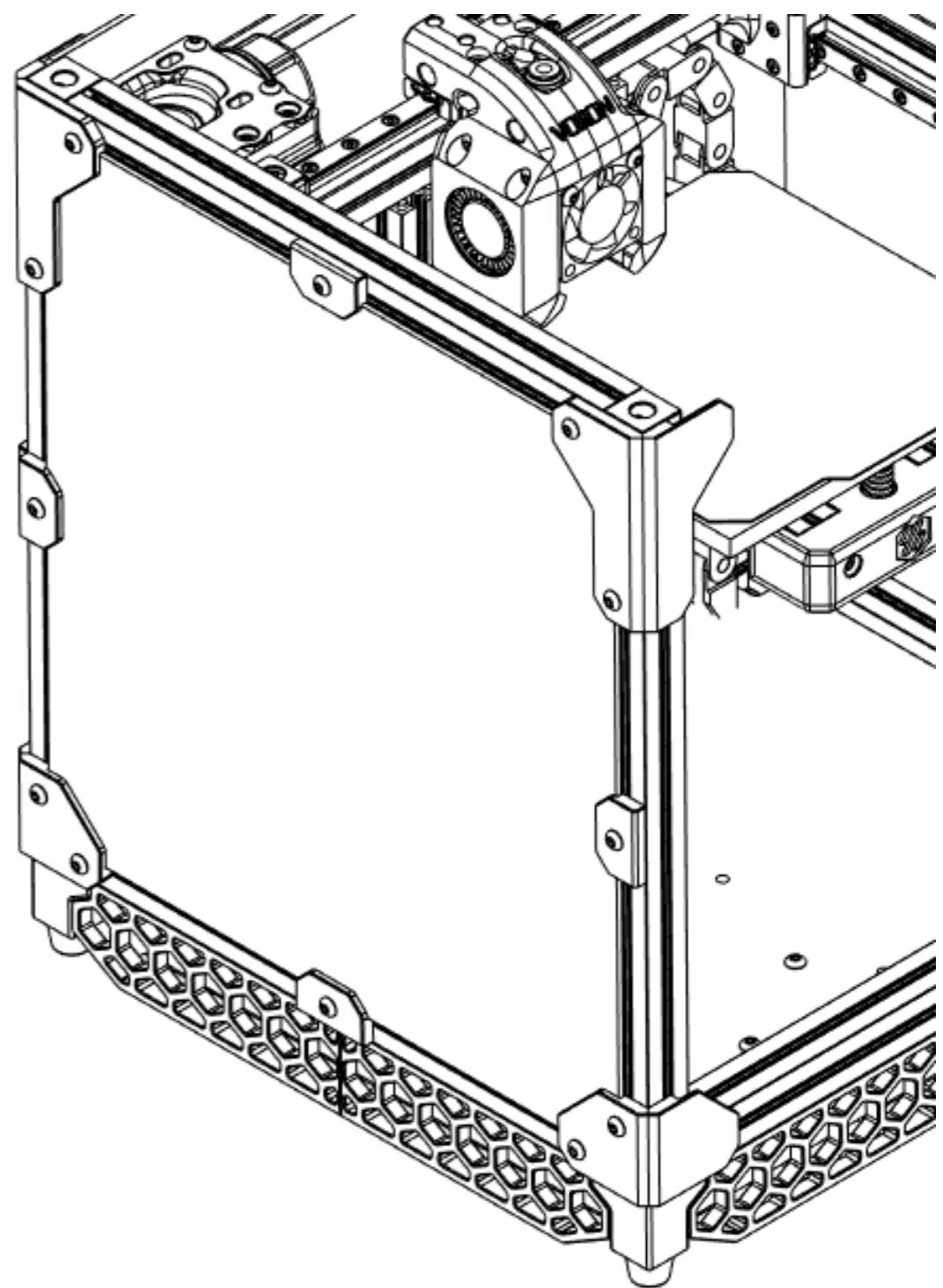
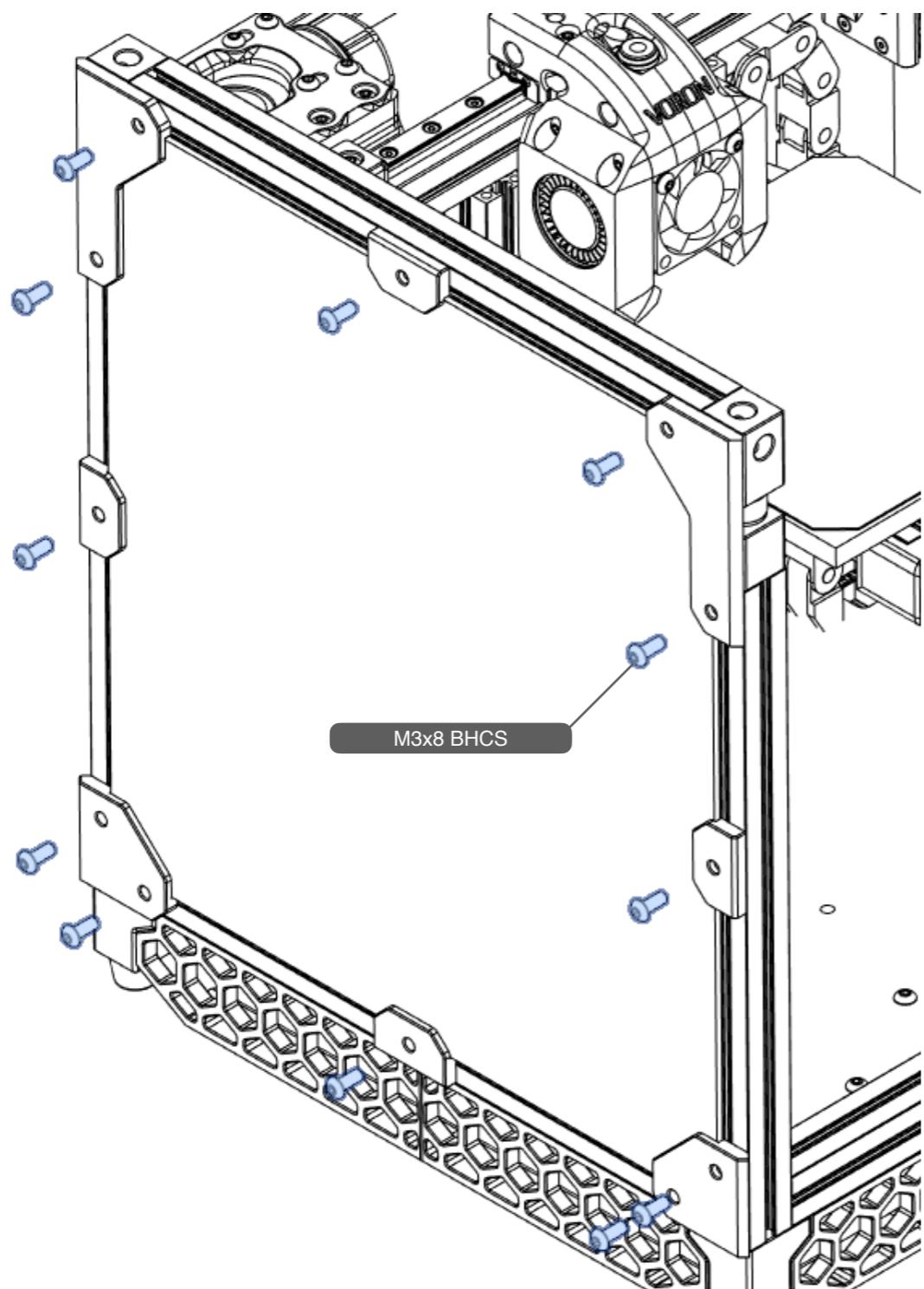


M3x6 BHCS

Part	Qty
DCDC Converter	1
M3x6 BHCS	2

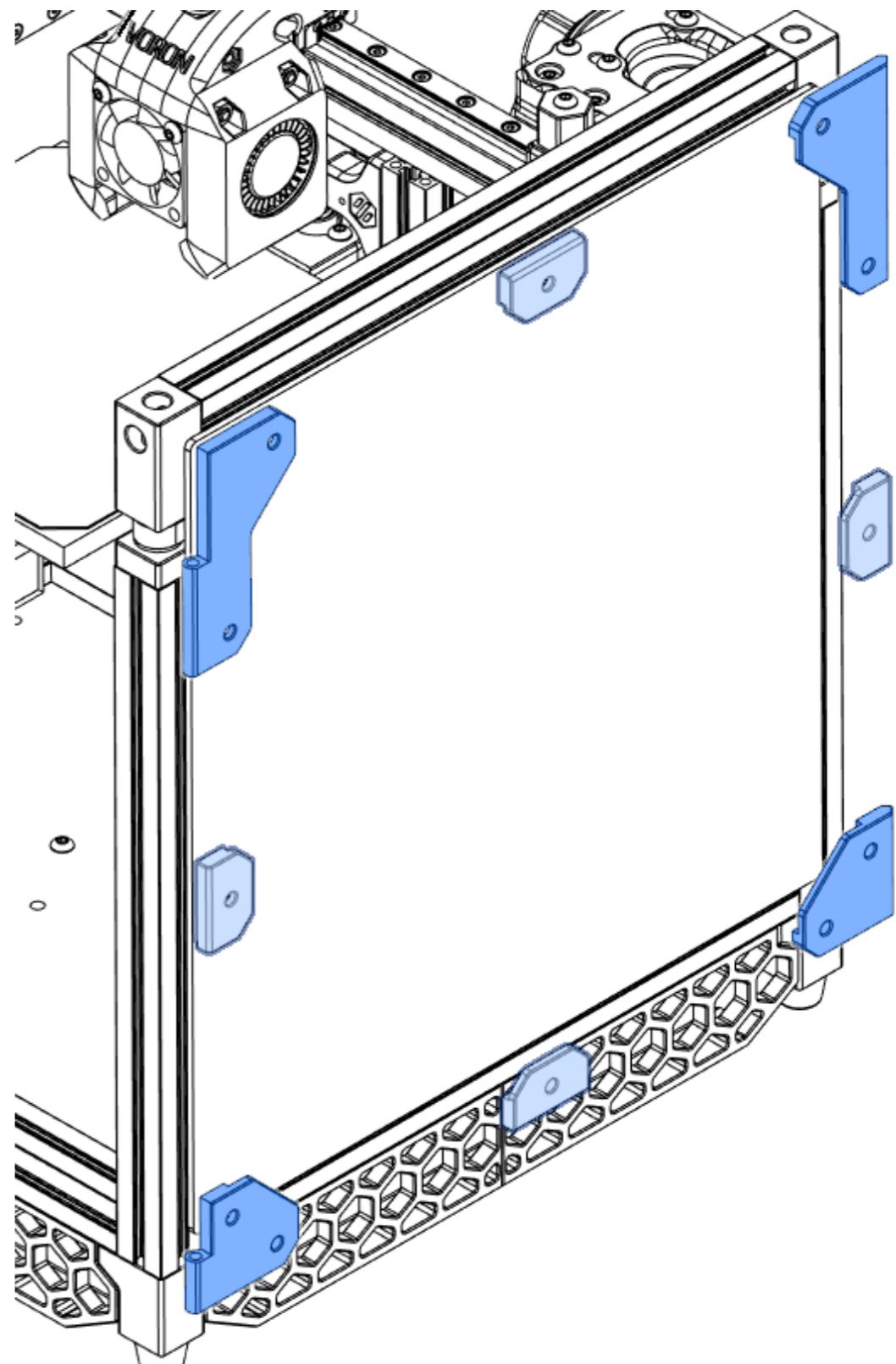
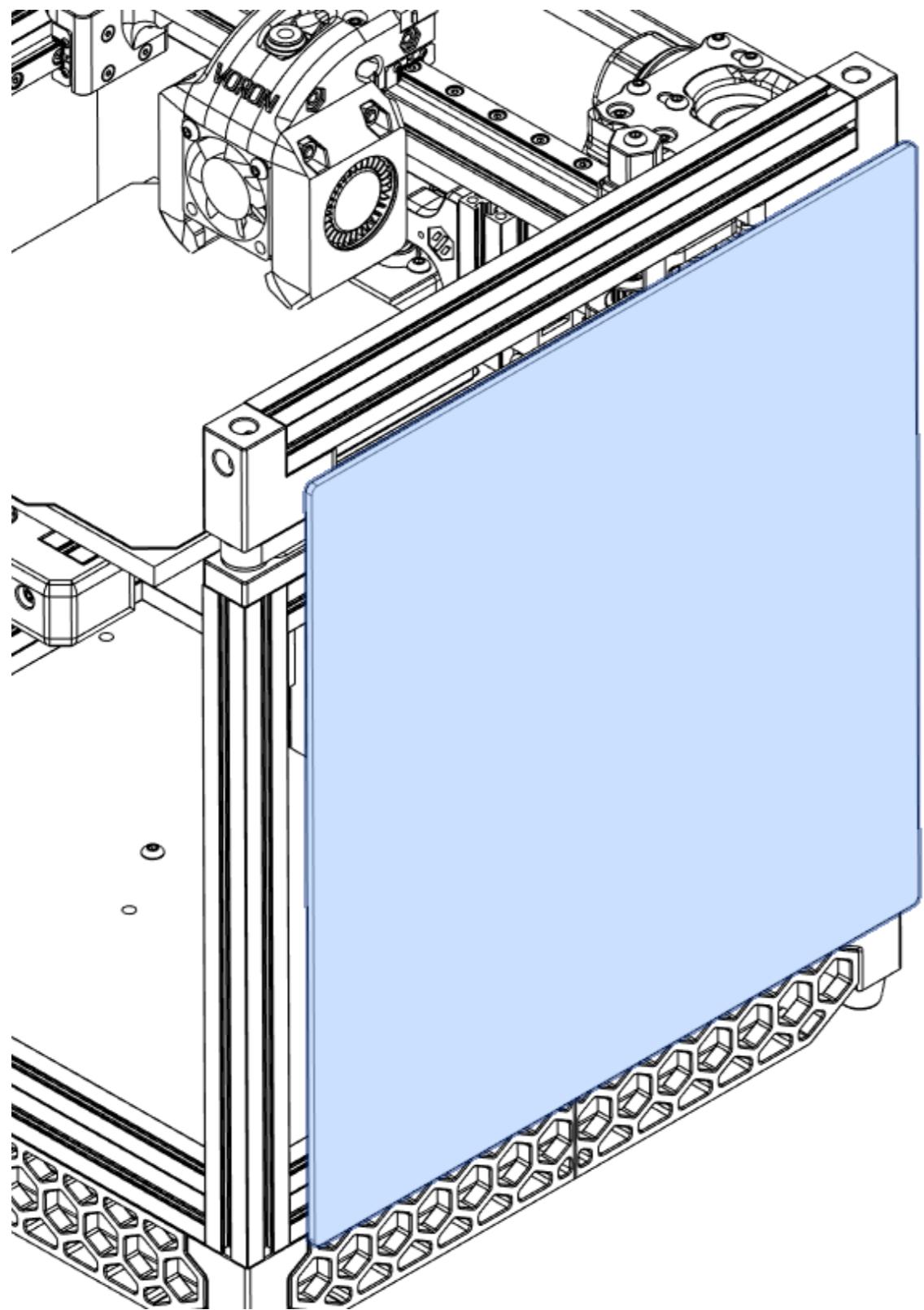
Panels

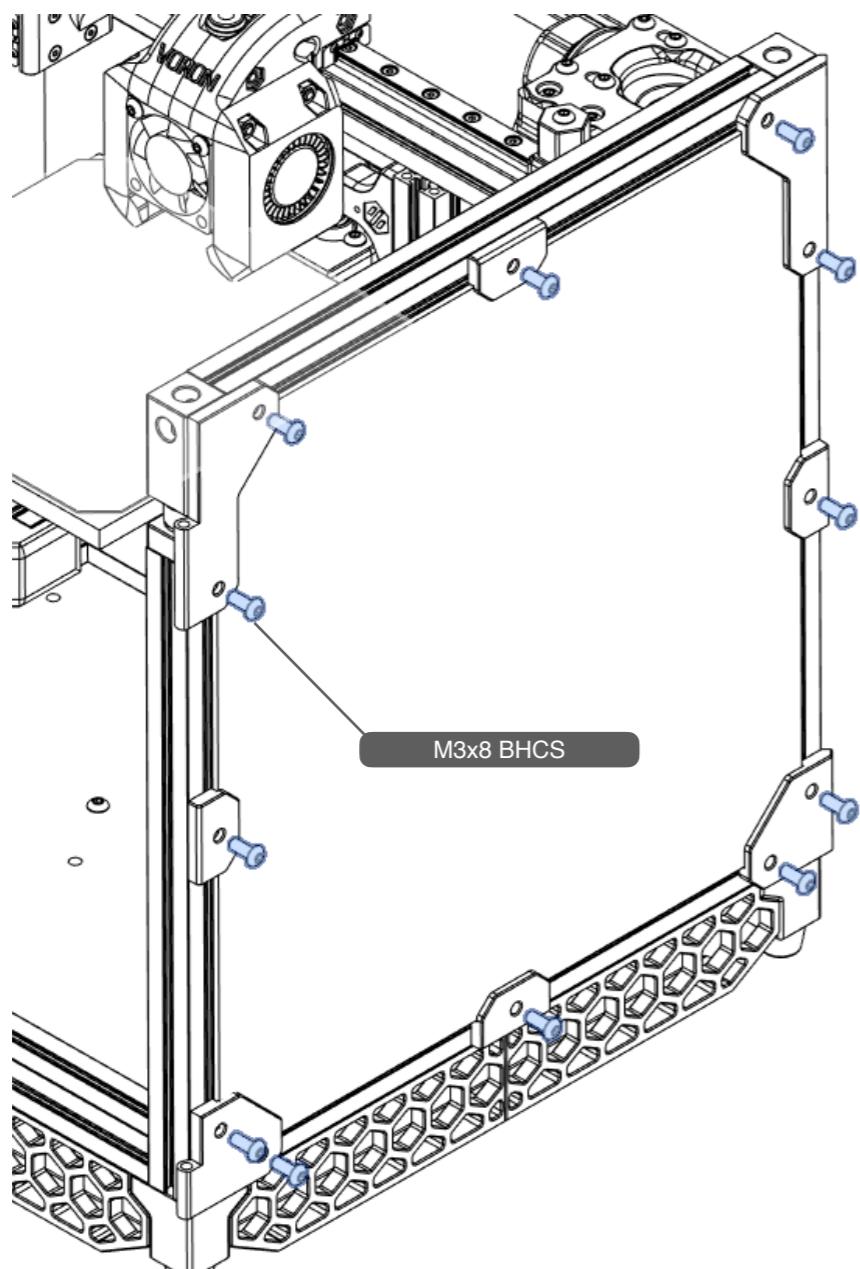




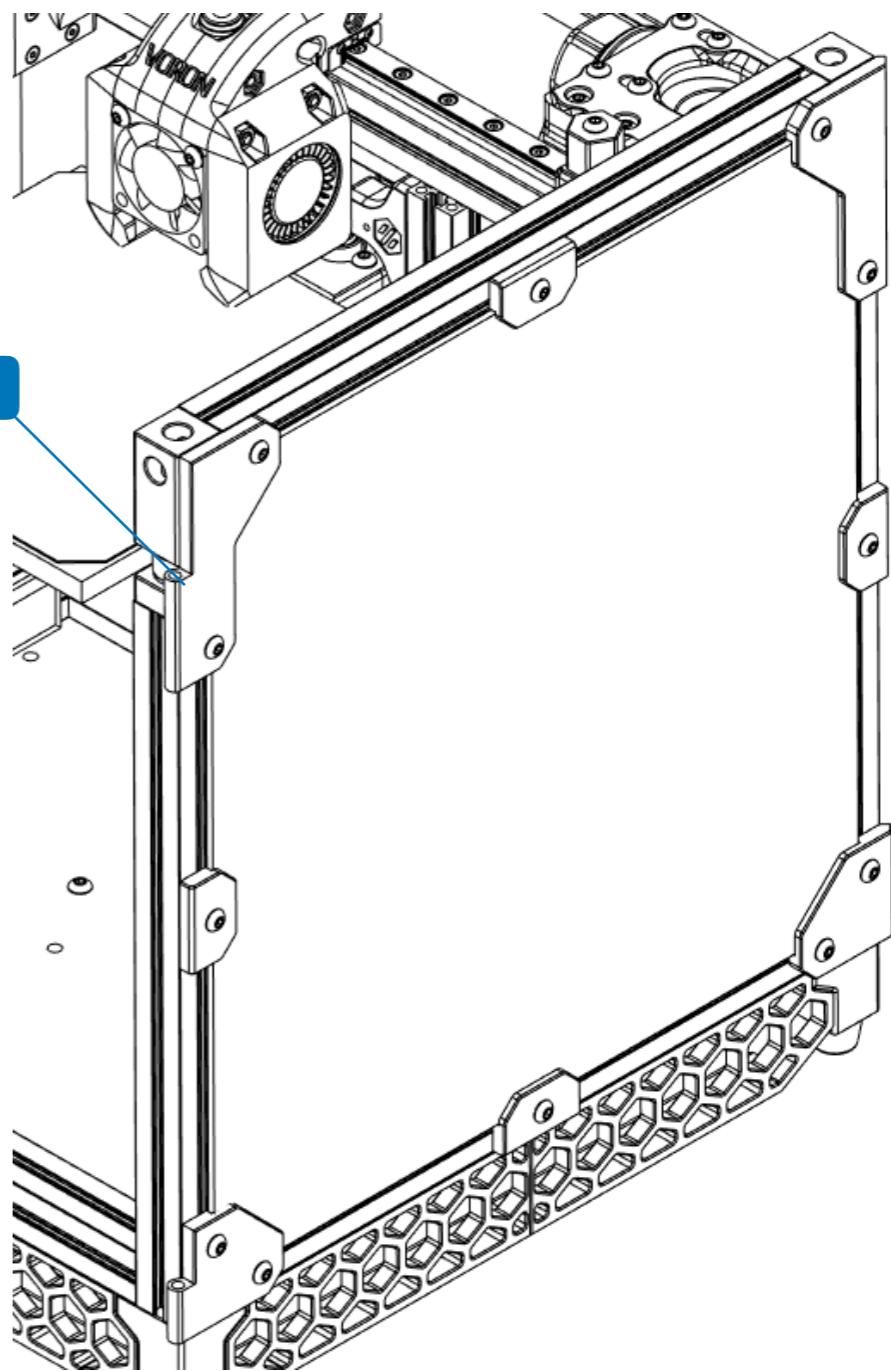
Part	Qty
M3x8 BHCS	12

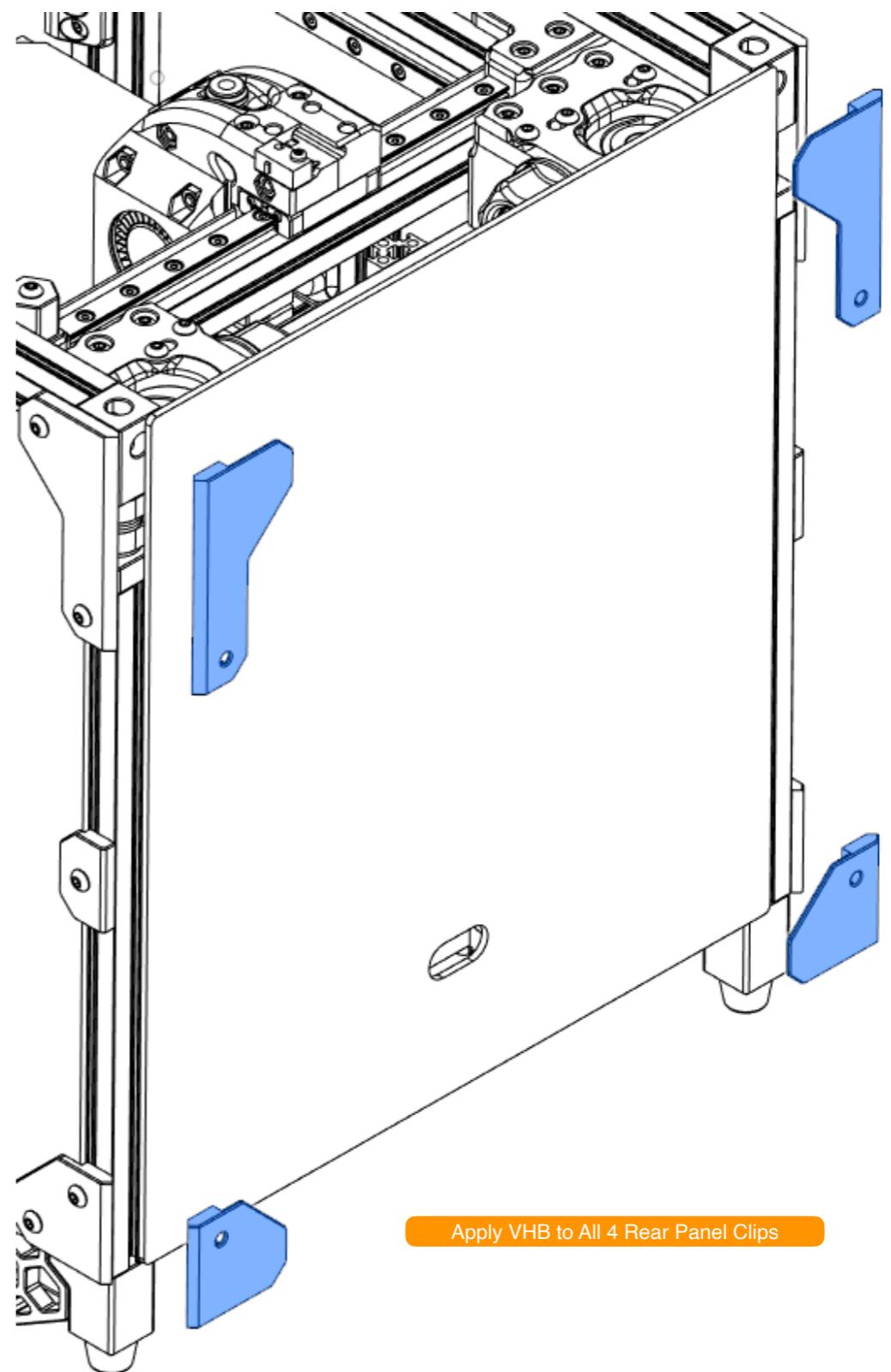
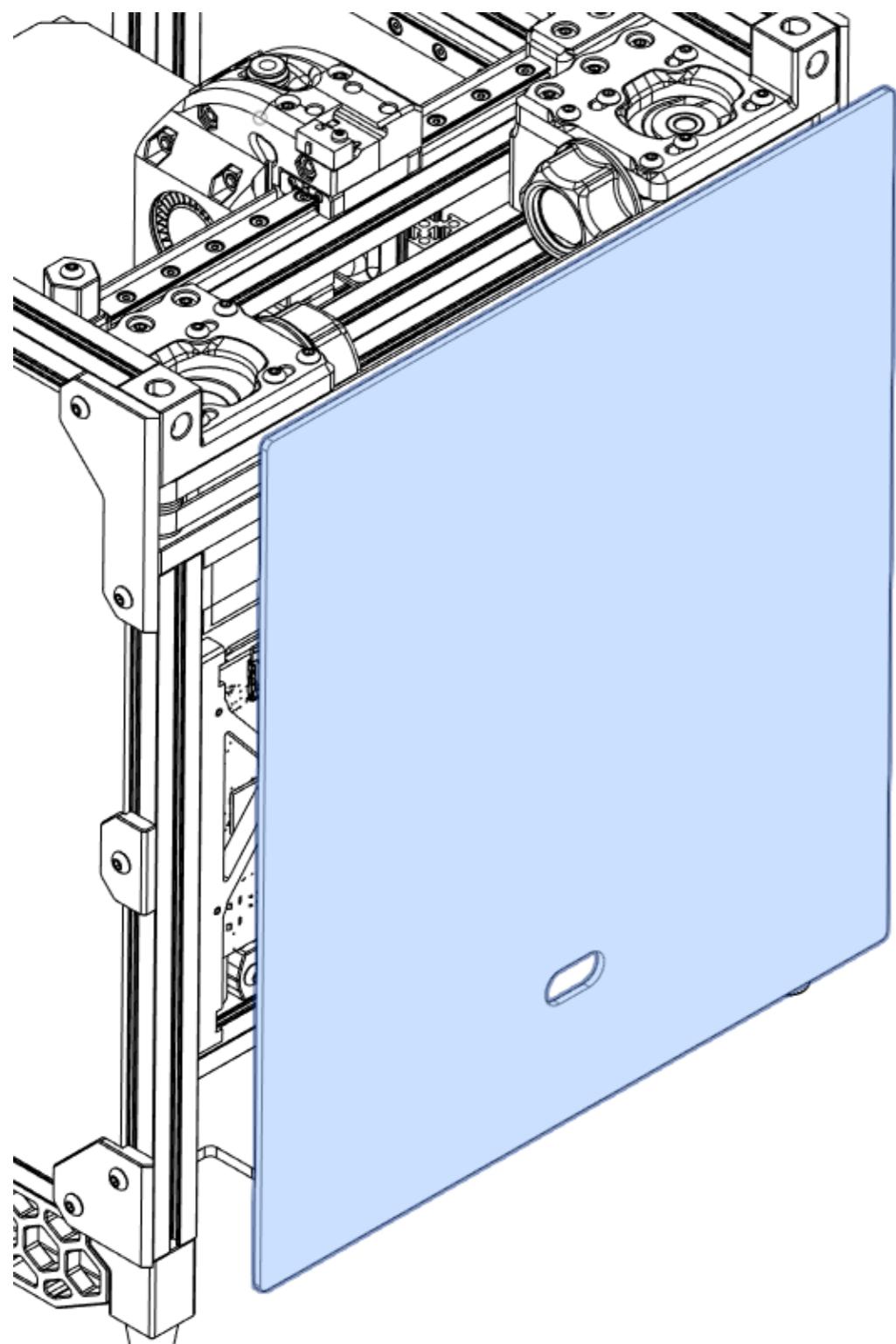
Panels



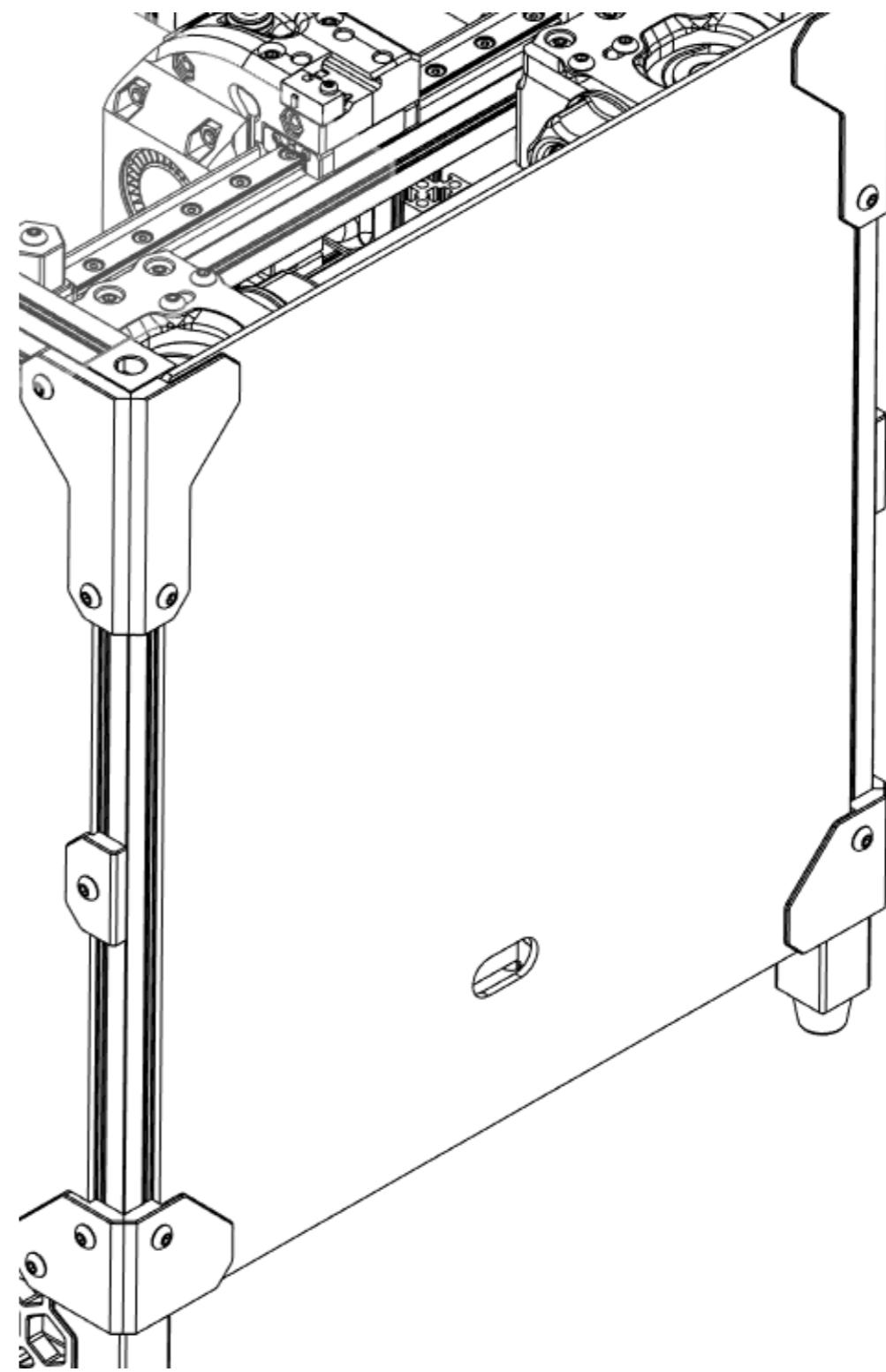
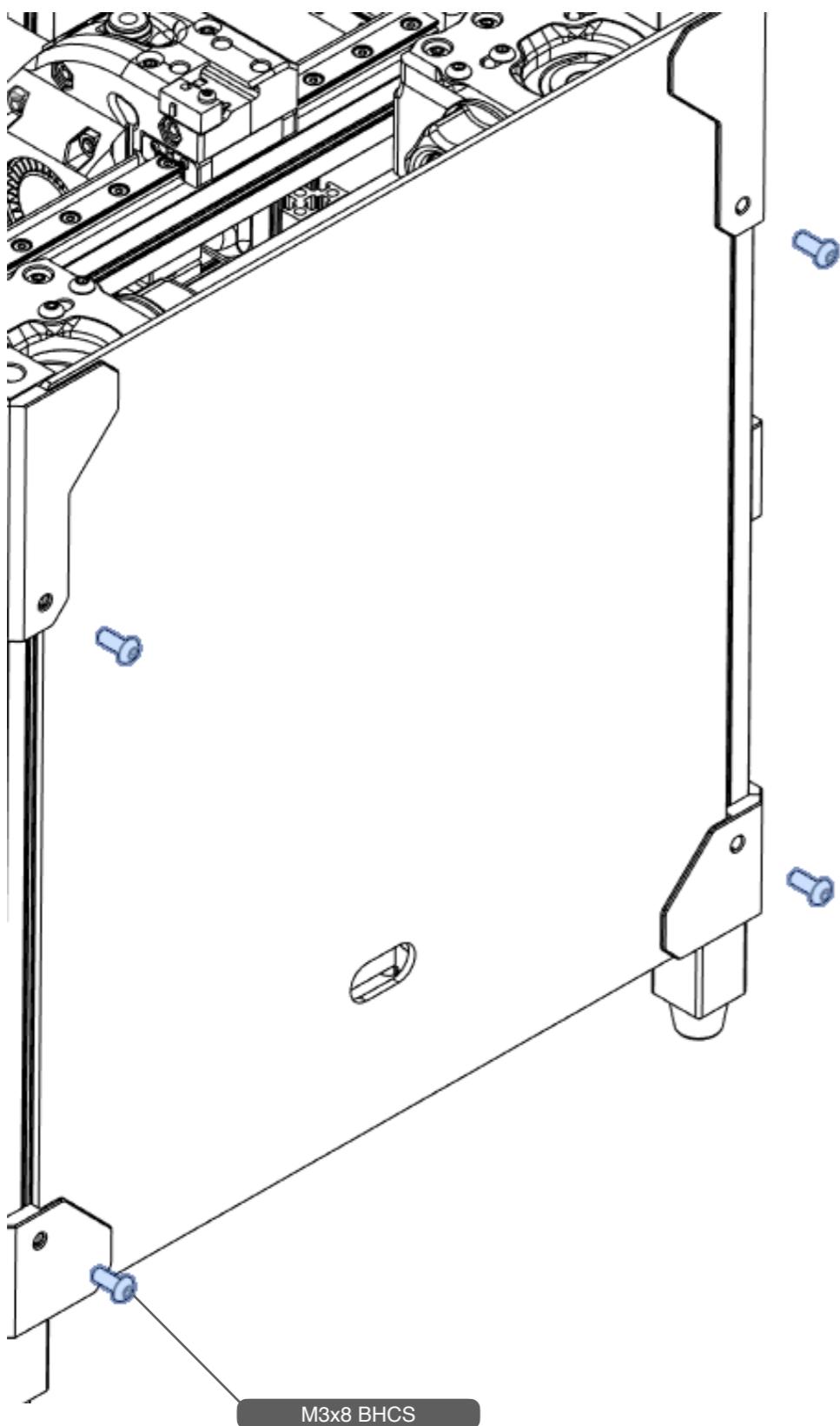


Use M3x40 BHCS as Hinge Pin
(screw down from top and then cut off bolt head)

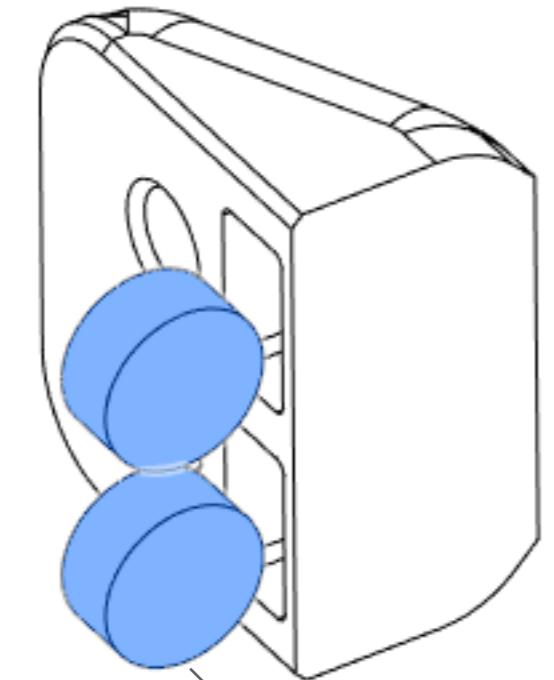




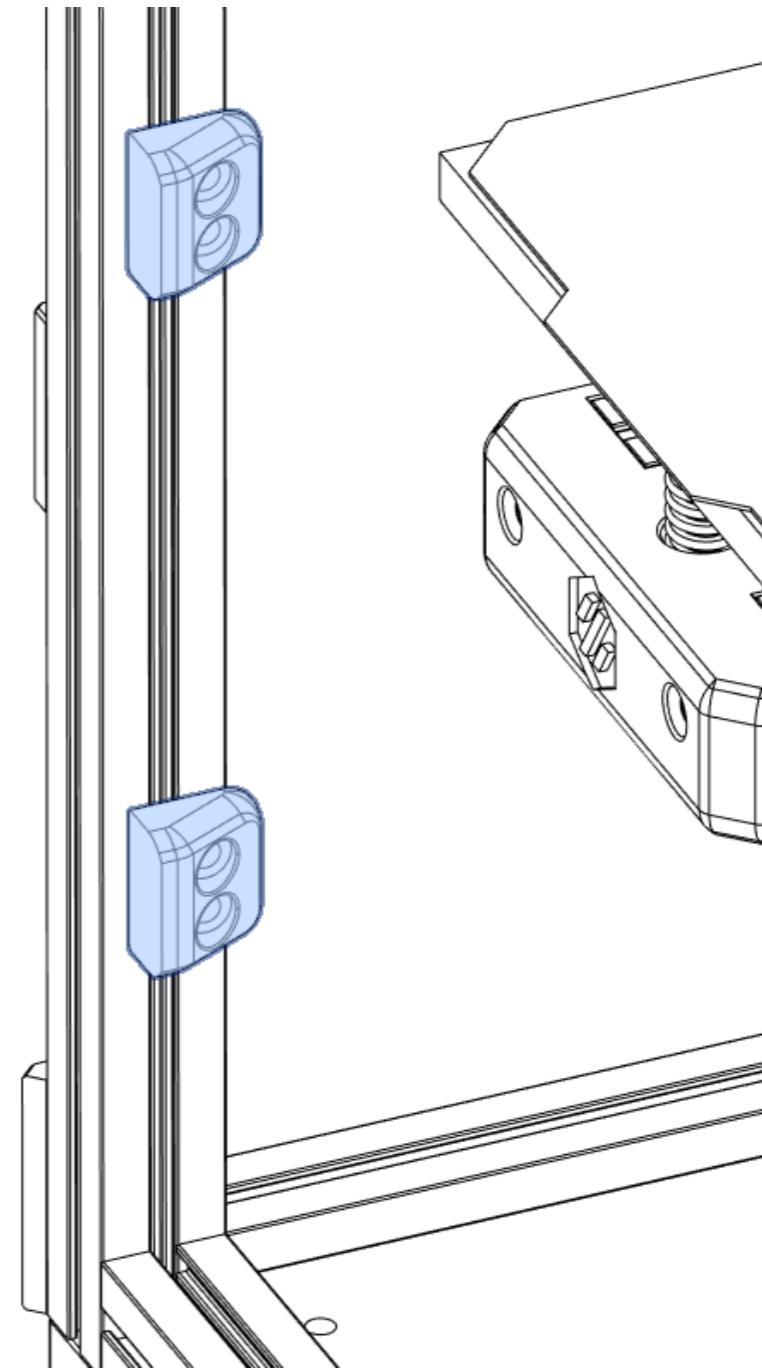
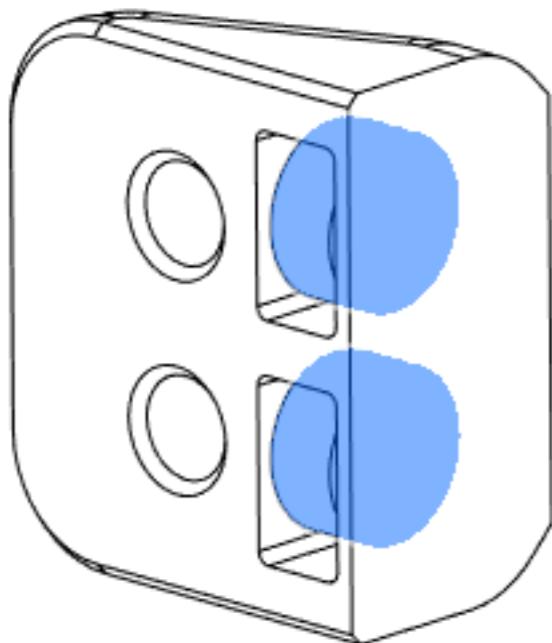
Panels



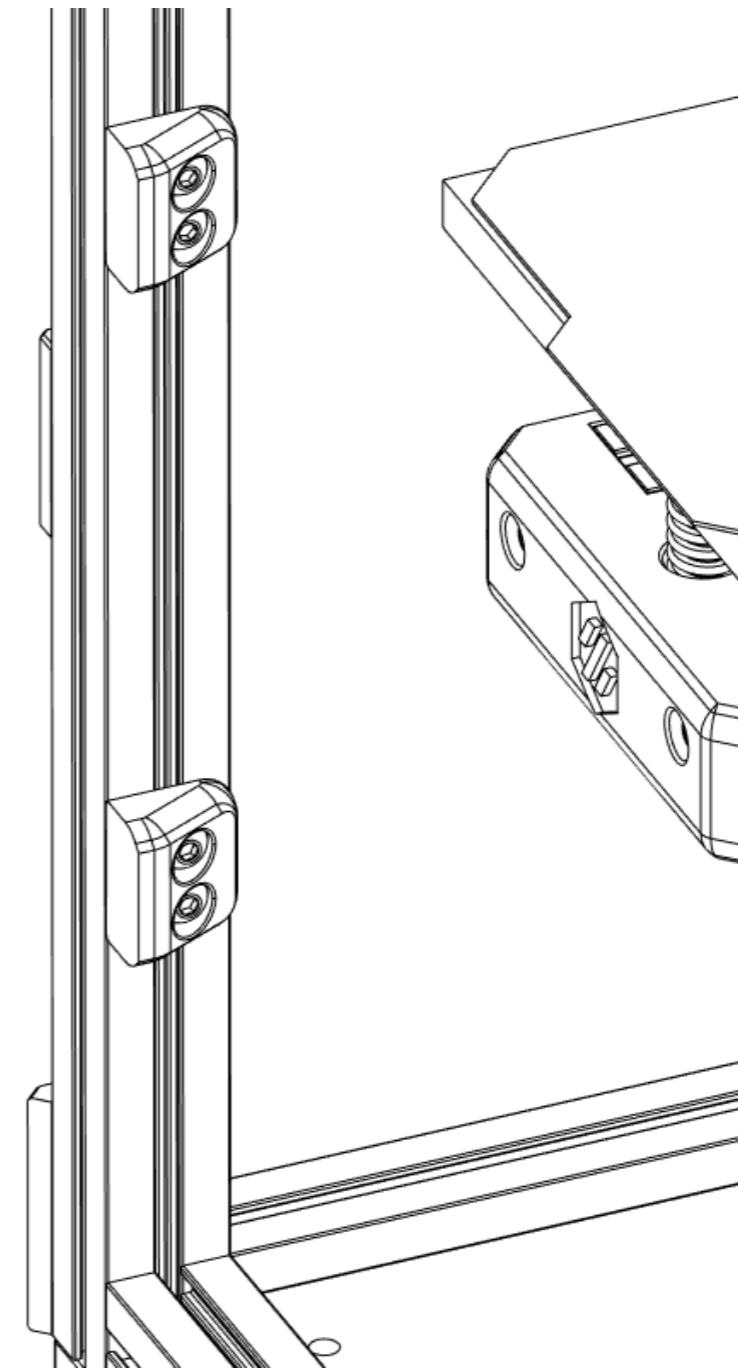
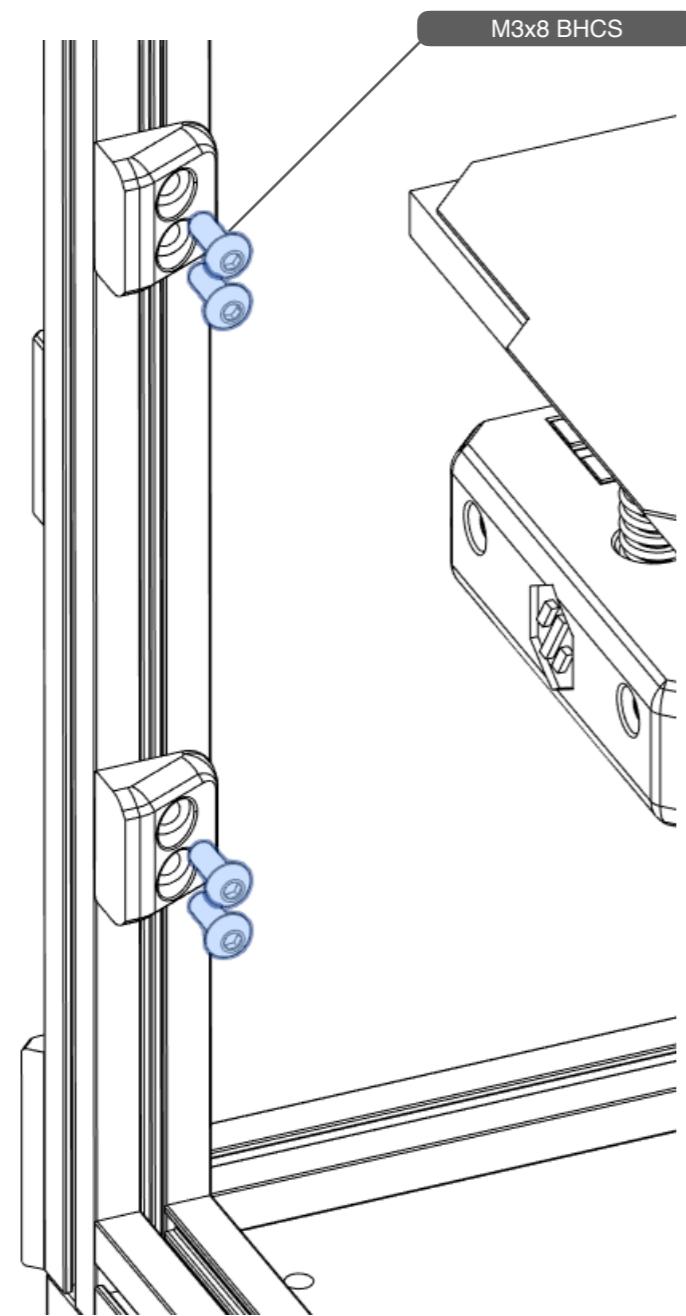
Front Door



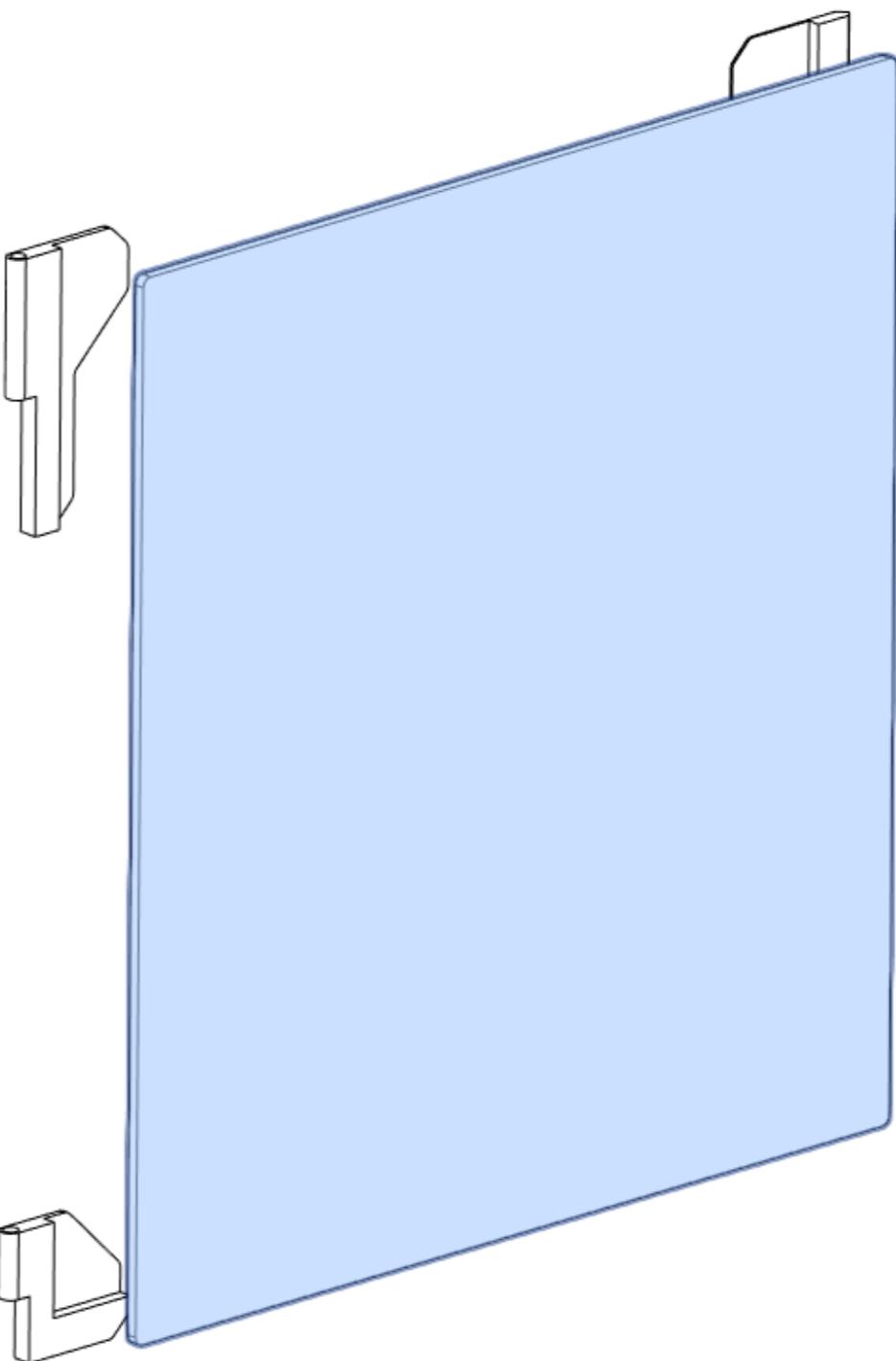
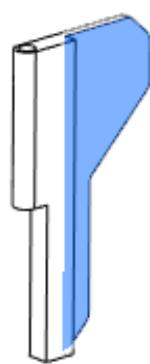
6x3mm Neodymium Magnets



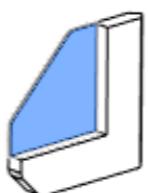
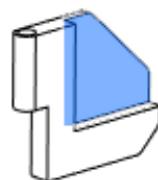
Front Door



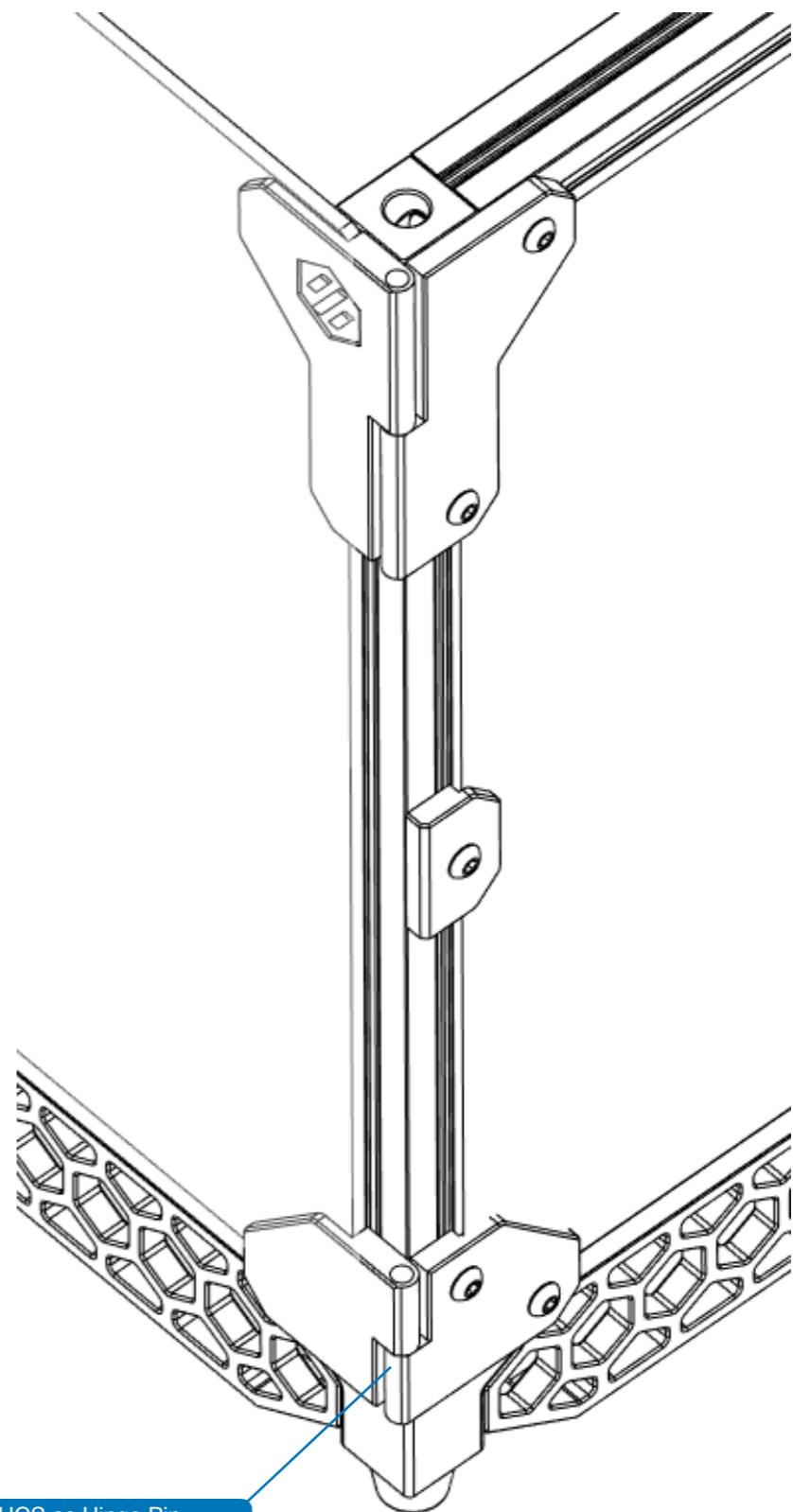
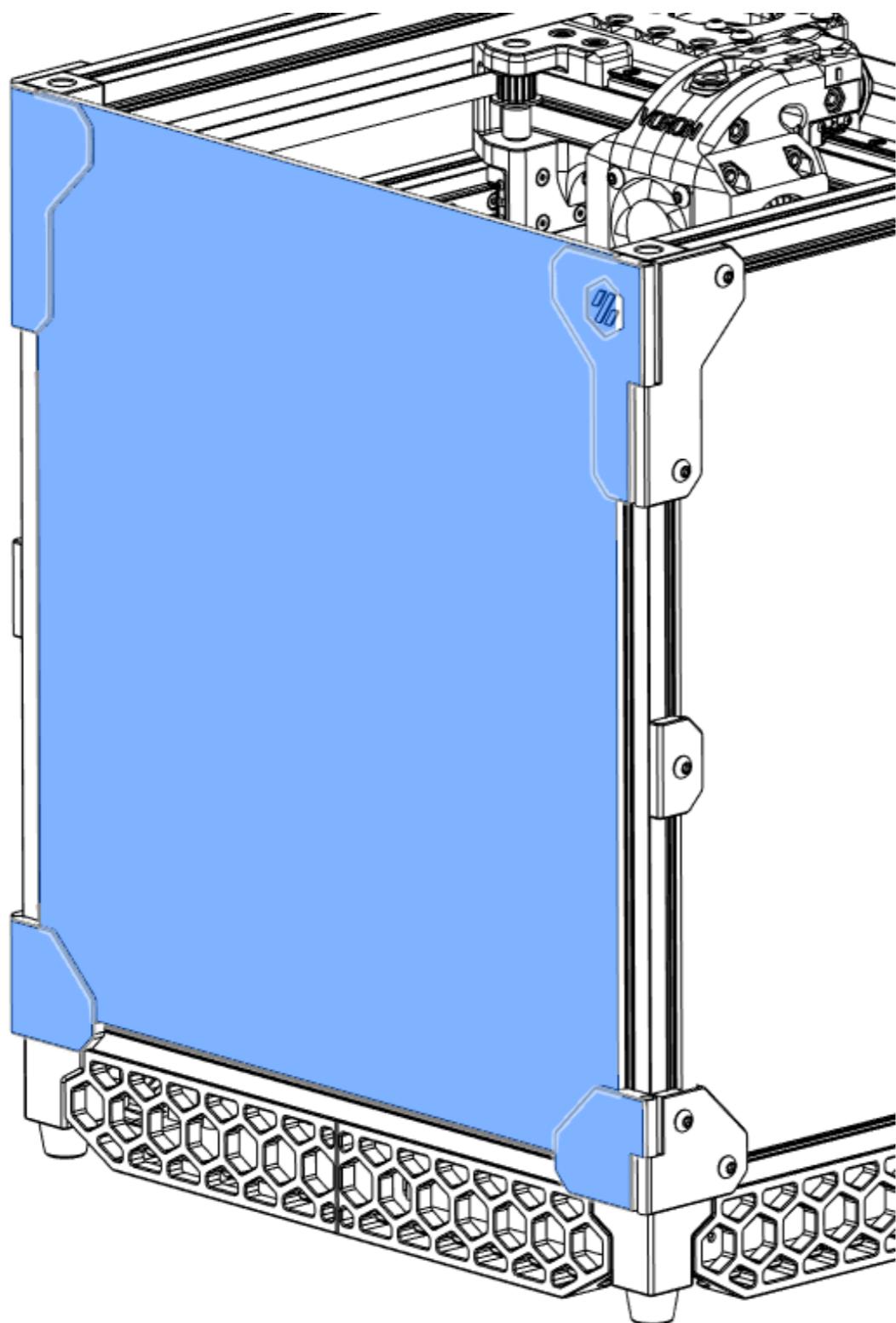
Front Door



Apply VHB to All 4 Door Panel Clips



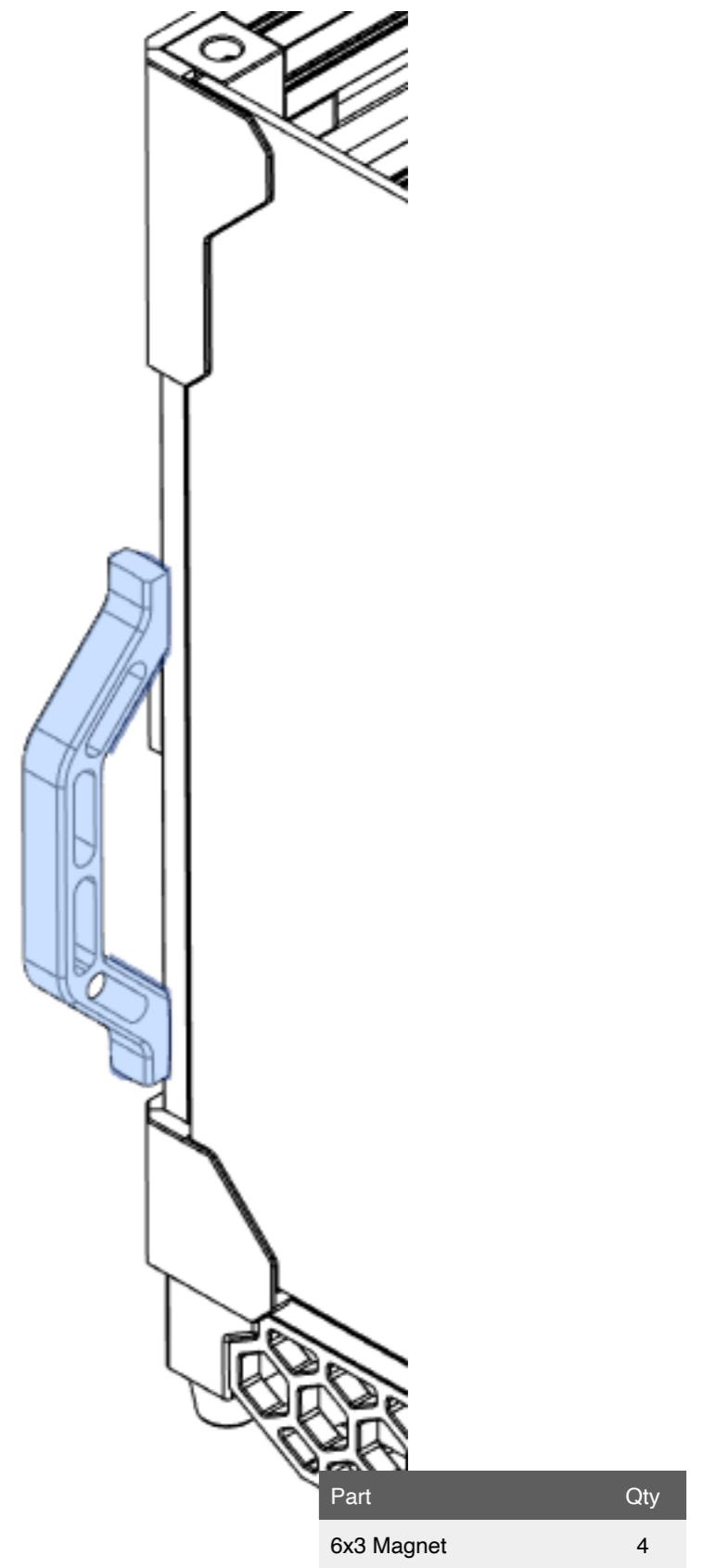
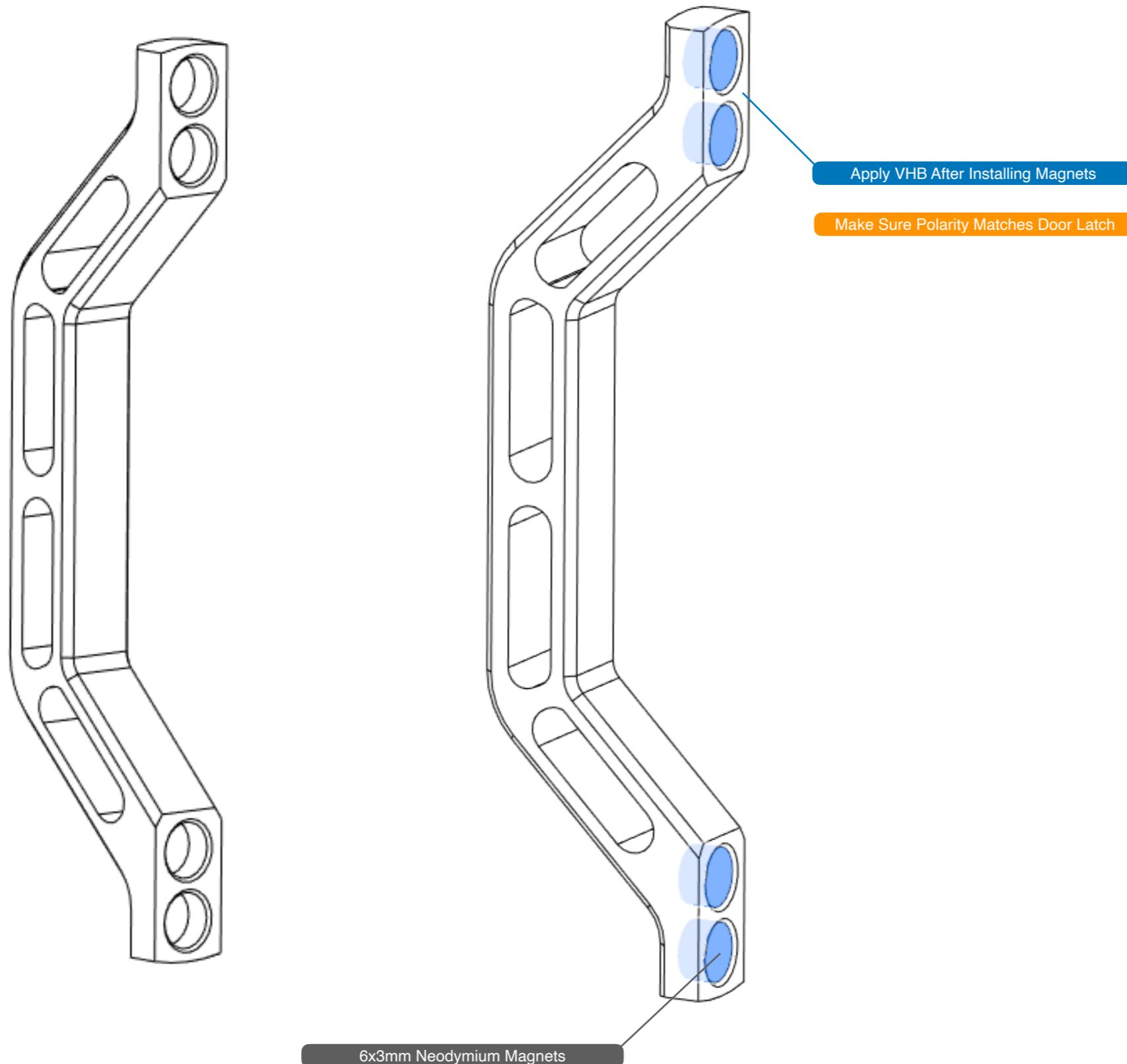
Front Door



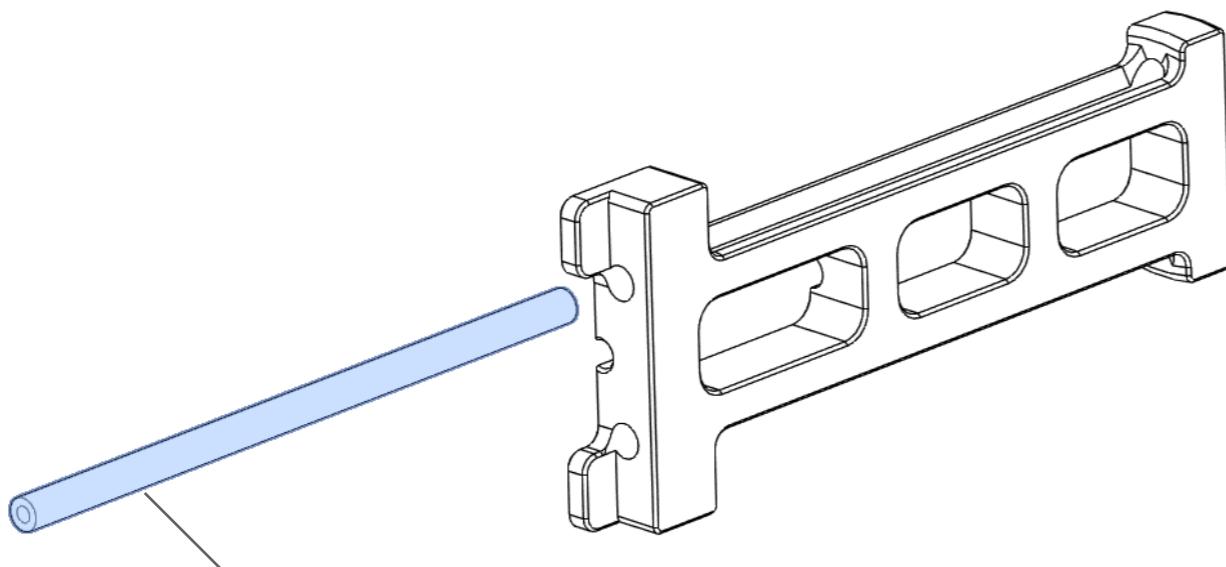
Use M3x30 BHCS as Hinge Pin

Part	Qty
M3x30 BHCS	1

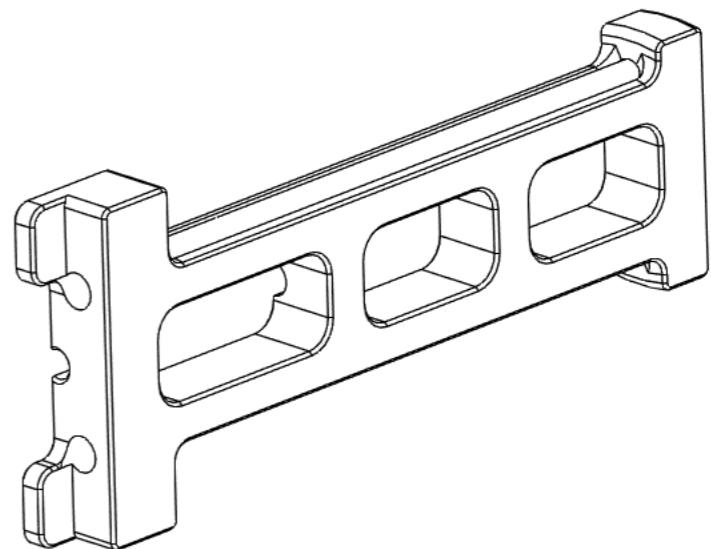
Front Door



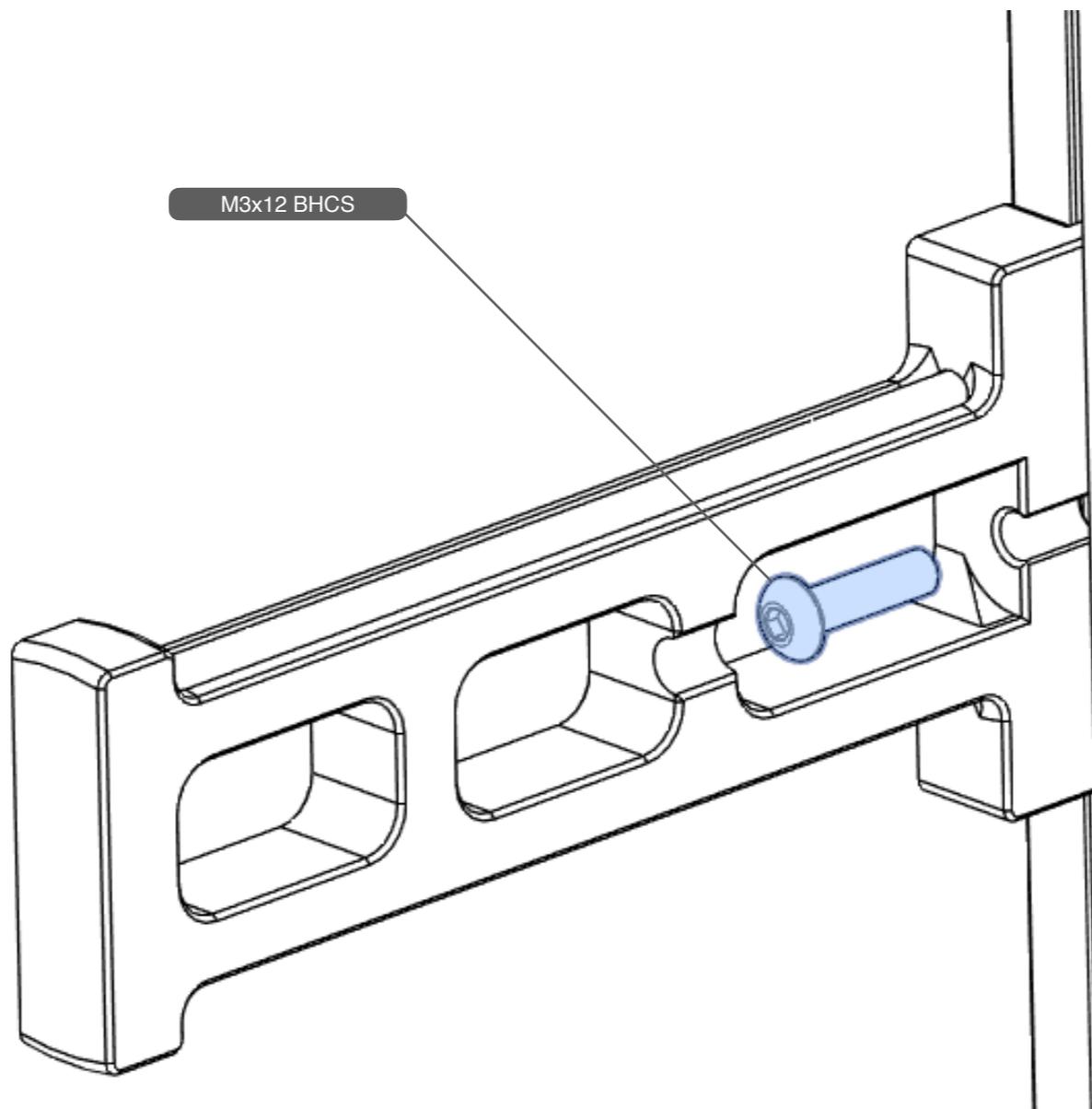
Spool Holder



90mm Piece of Bowden Tube

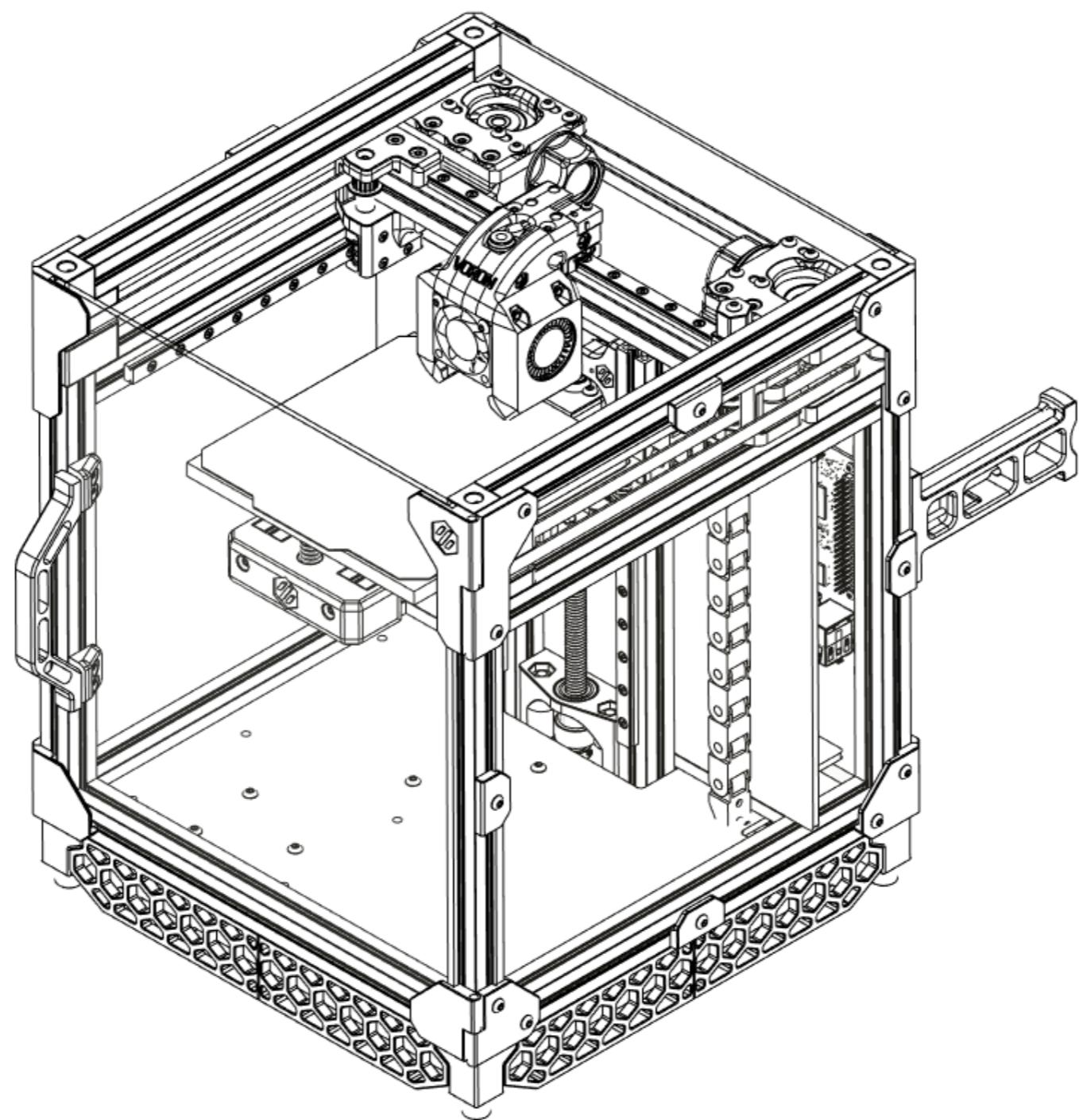


Spool Holder

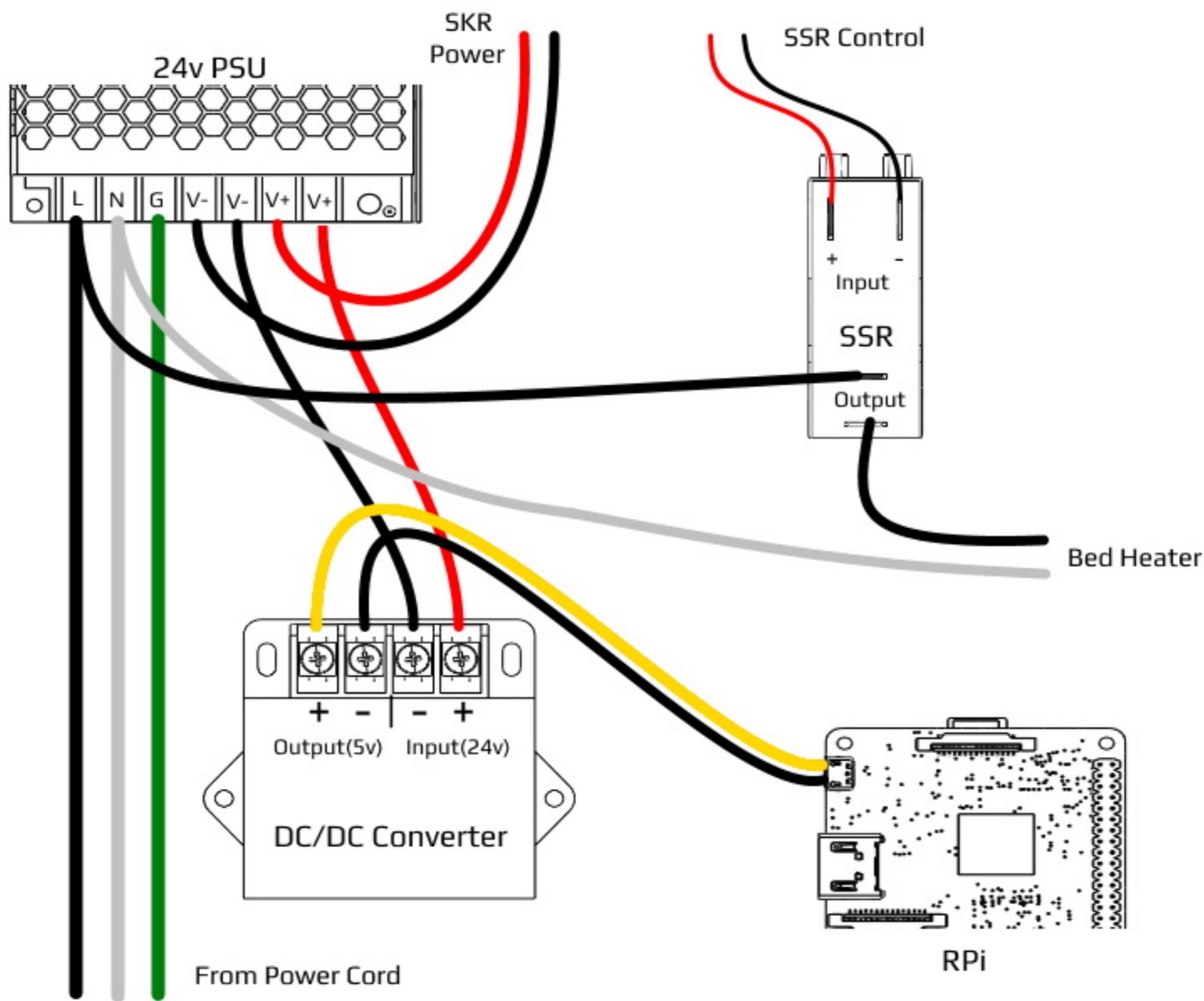


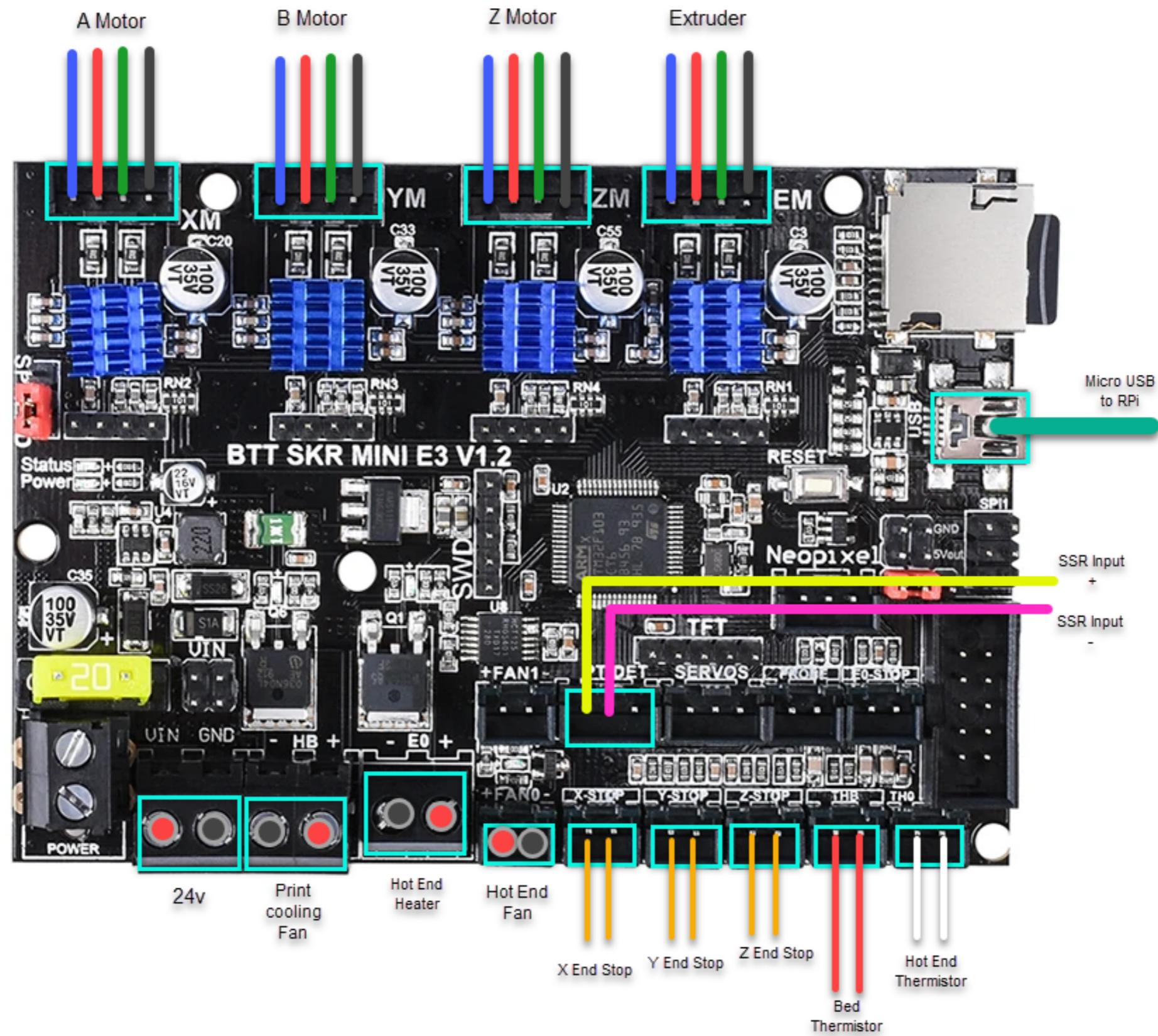
Part	Qty
M3x12 BHCS	1

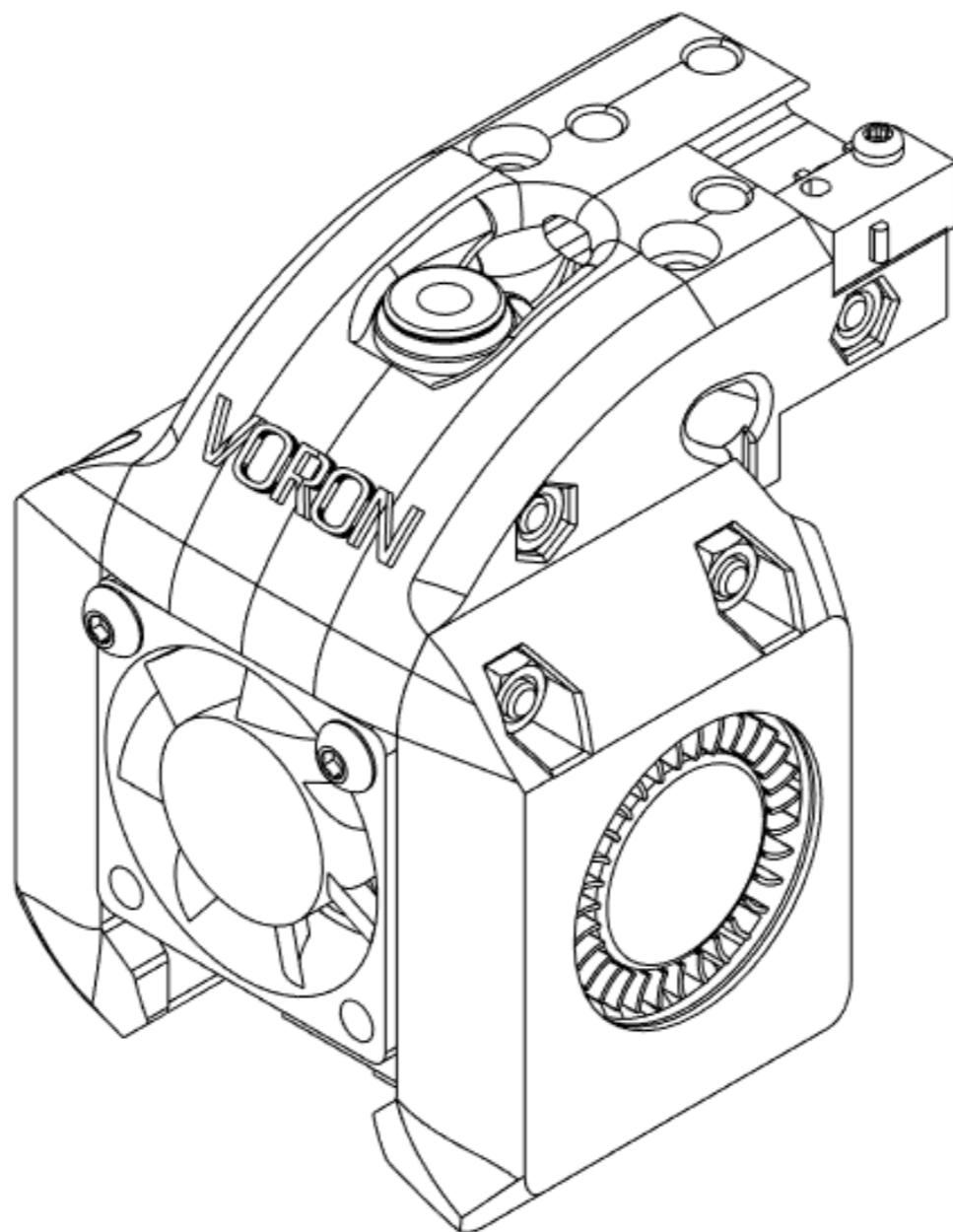
YAY!

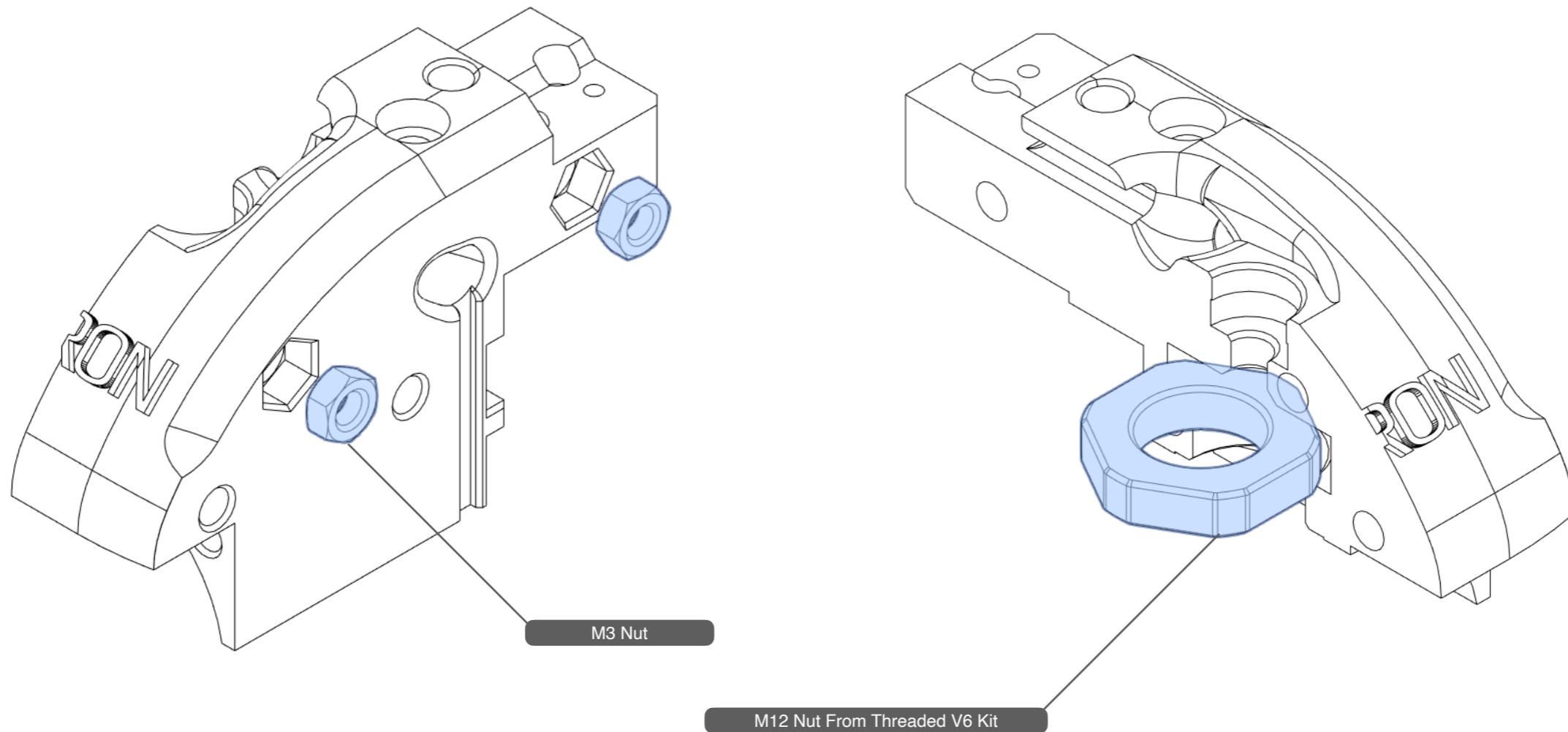


Mains Wiring

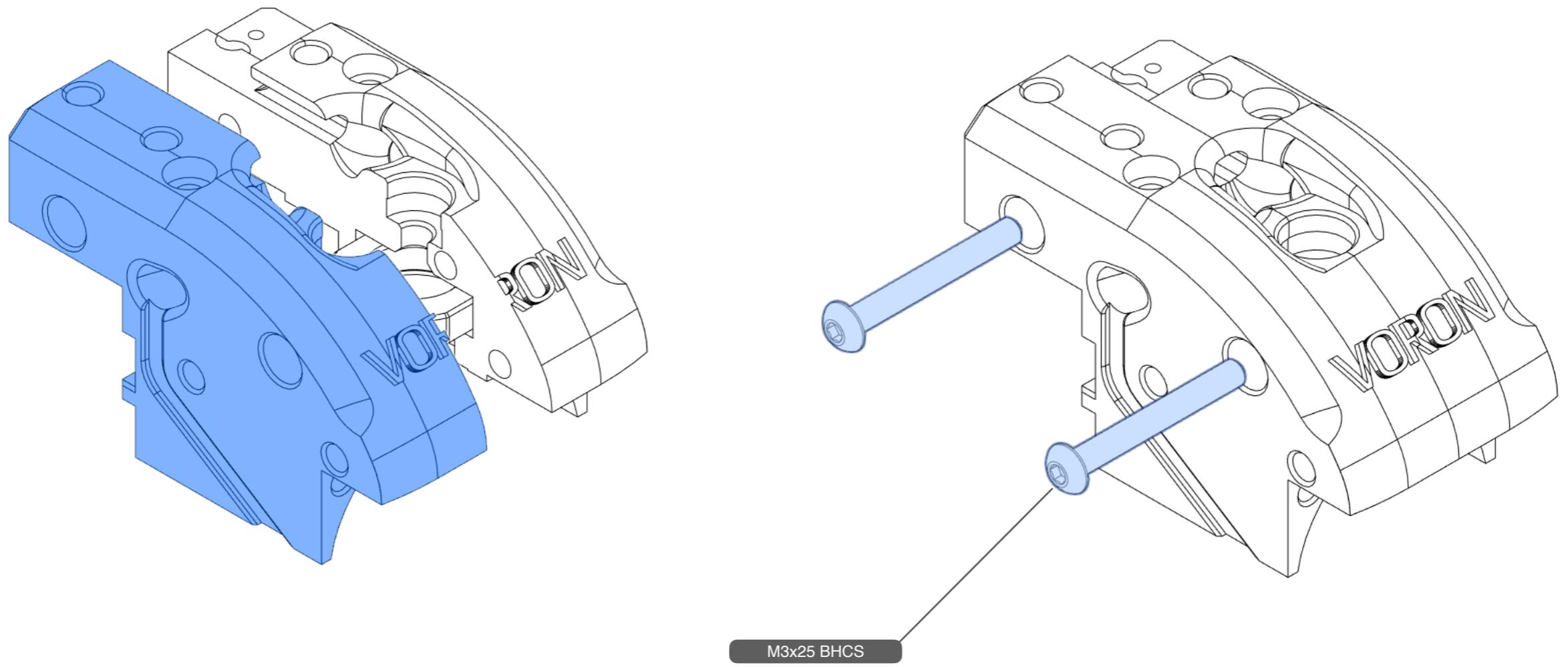




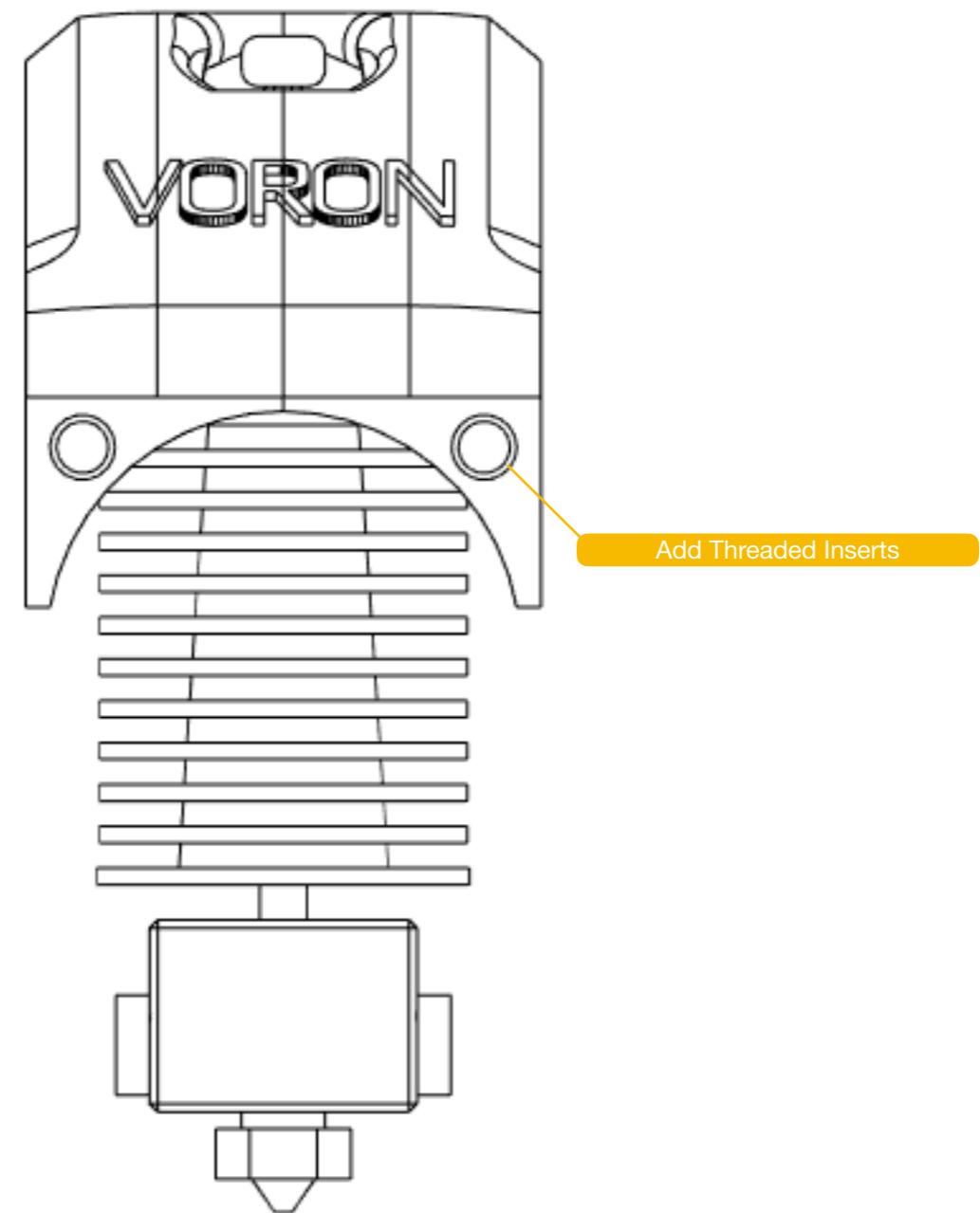
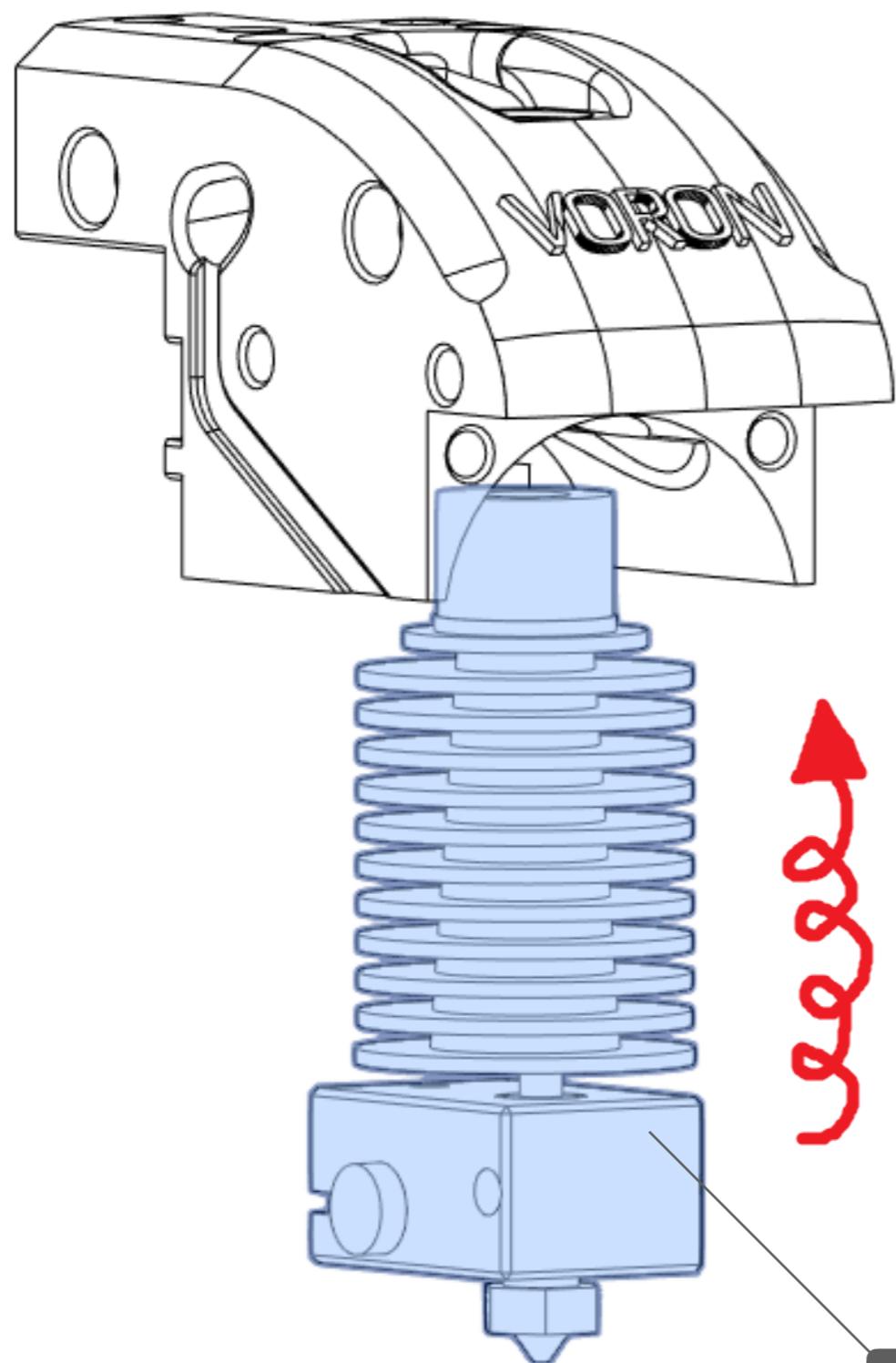




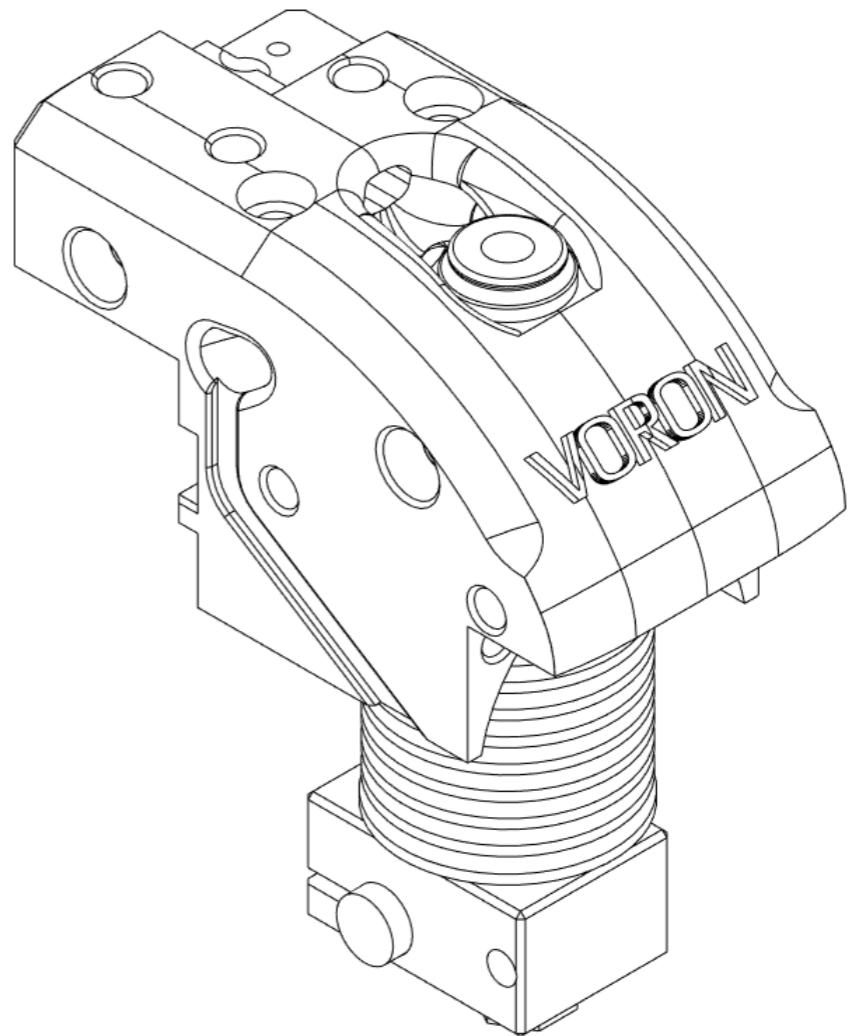
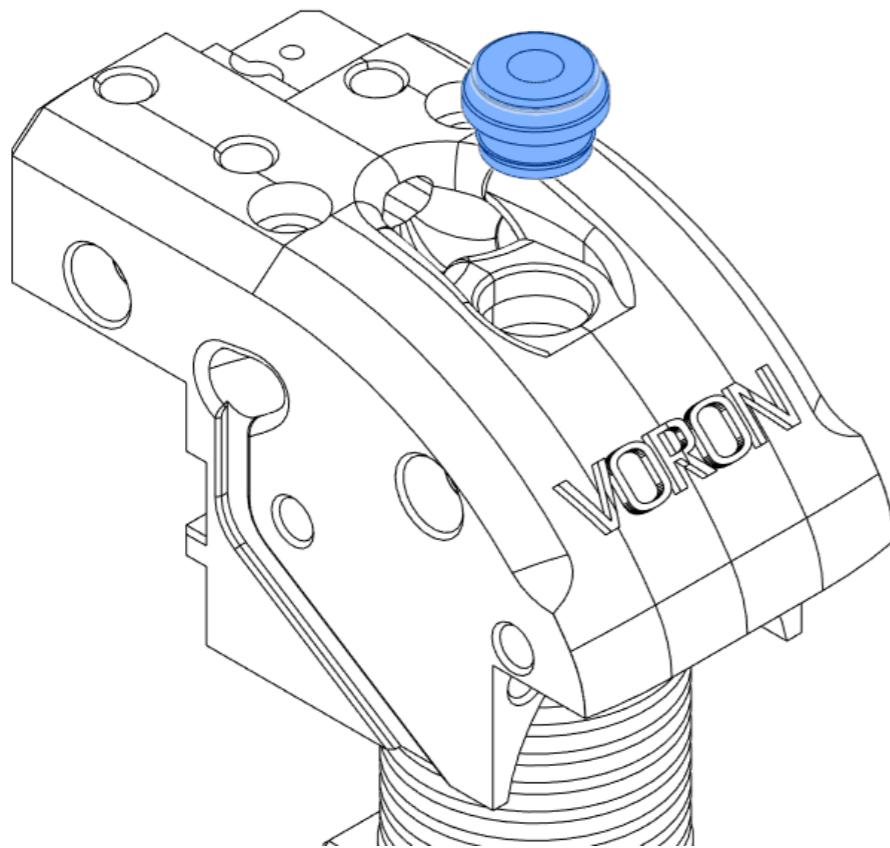
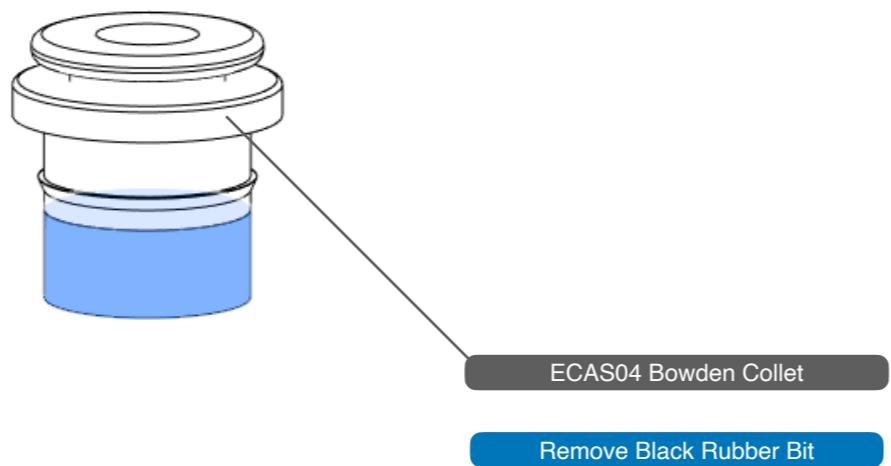
Part	Qty
M3 Nut	2
M12 Nut	1



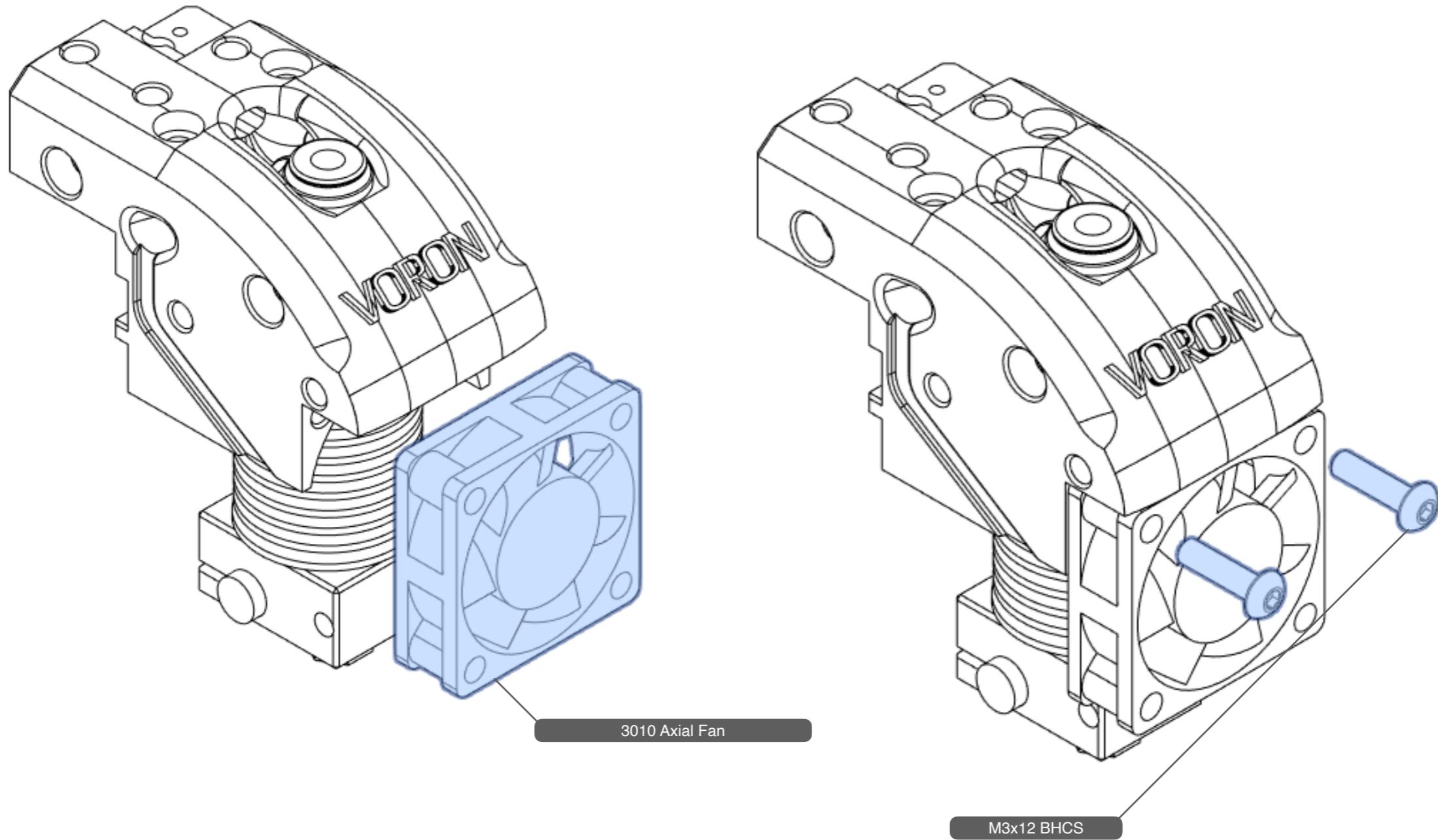
Part	Qty
M3x25 BHCS	2



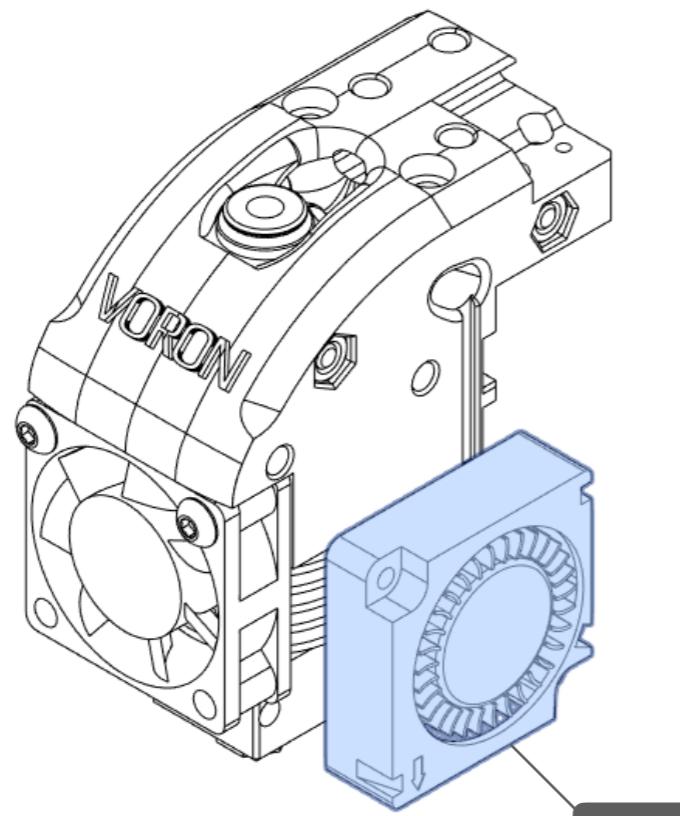
Part	Qty
E3D V6	1
M3 Threaded Insert	2



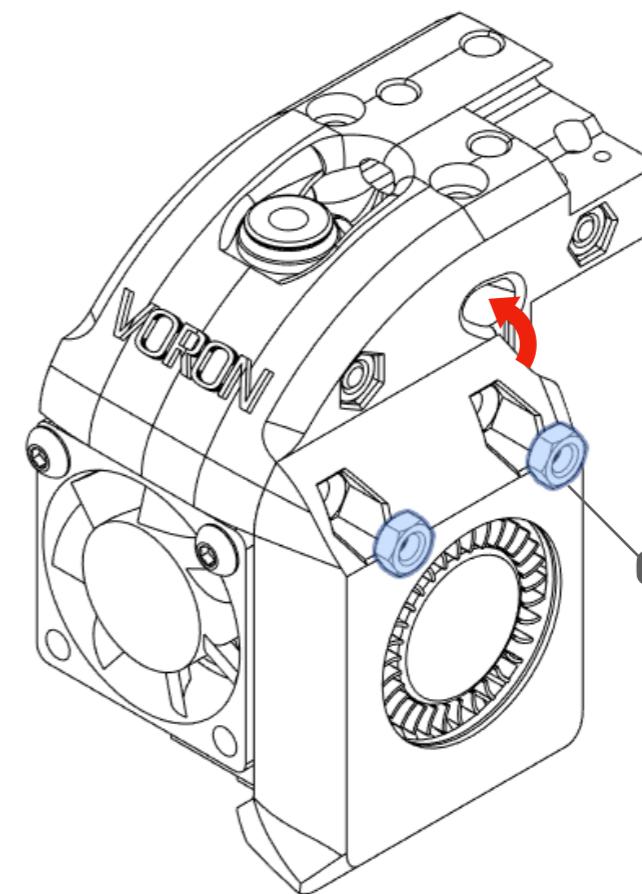
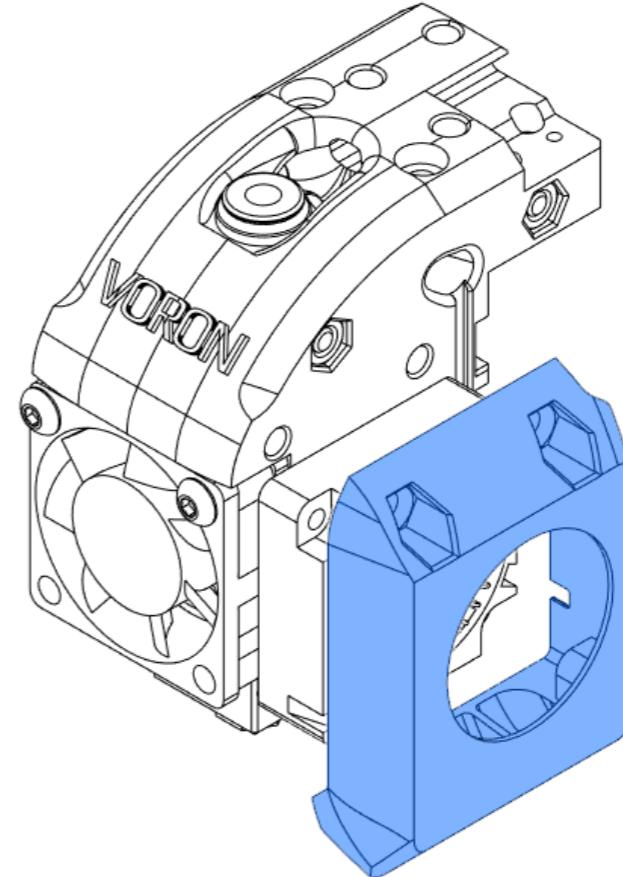
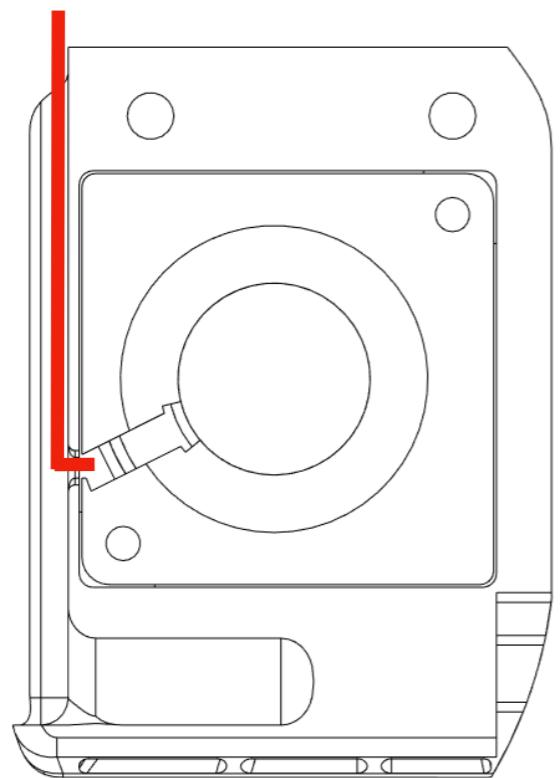
Part	Qty
ECAS04 Collet	1



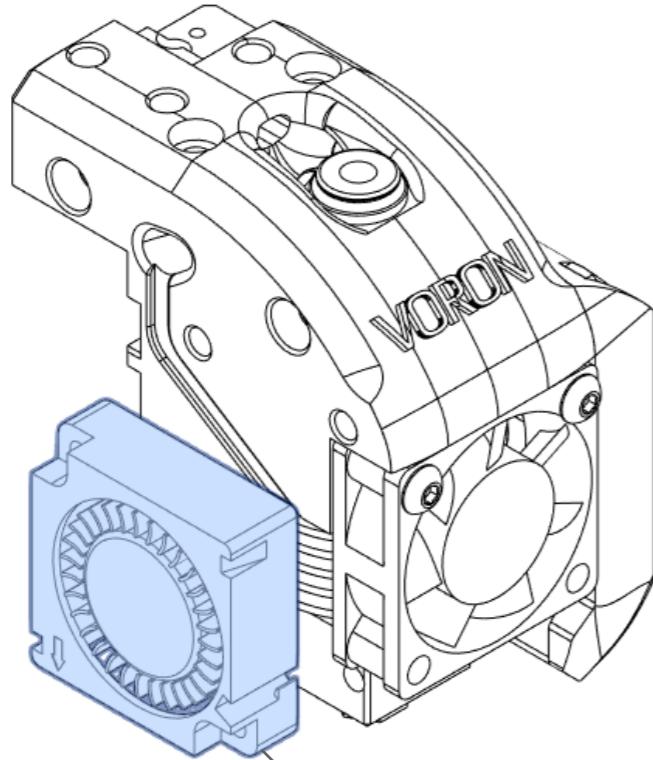
Part	Qty
M3x12 BHCS	2
3010 Axial Fan	1



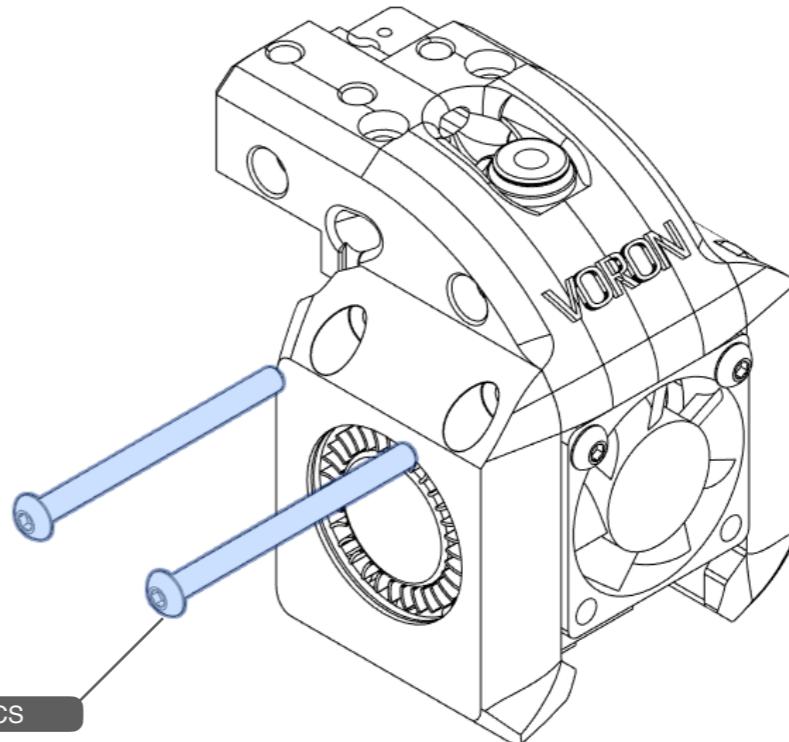
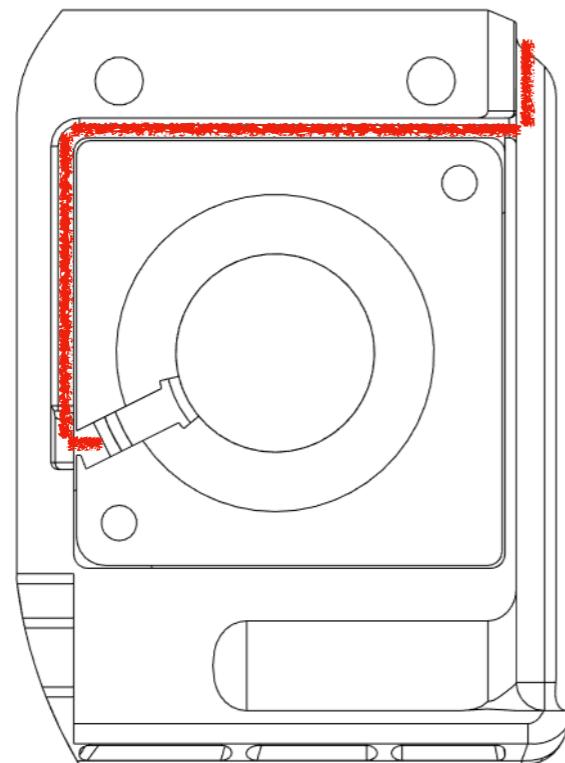
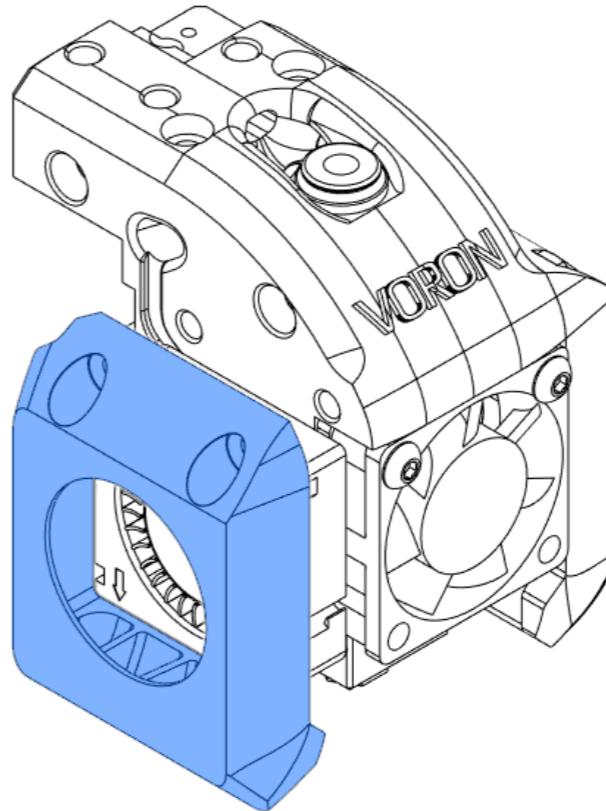
3010 Blower Fan



Part	Qty
M3 Nut	2
3010 Radial Fan	1

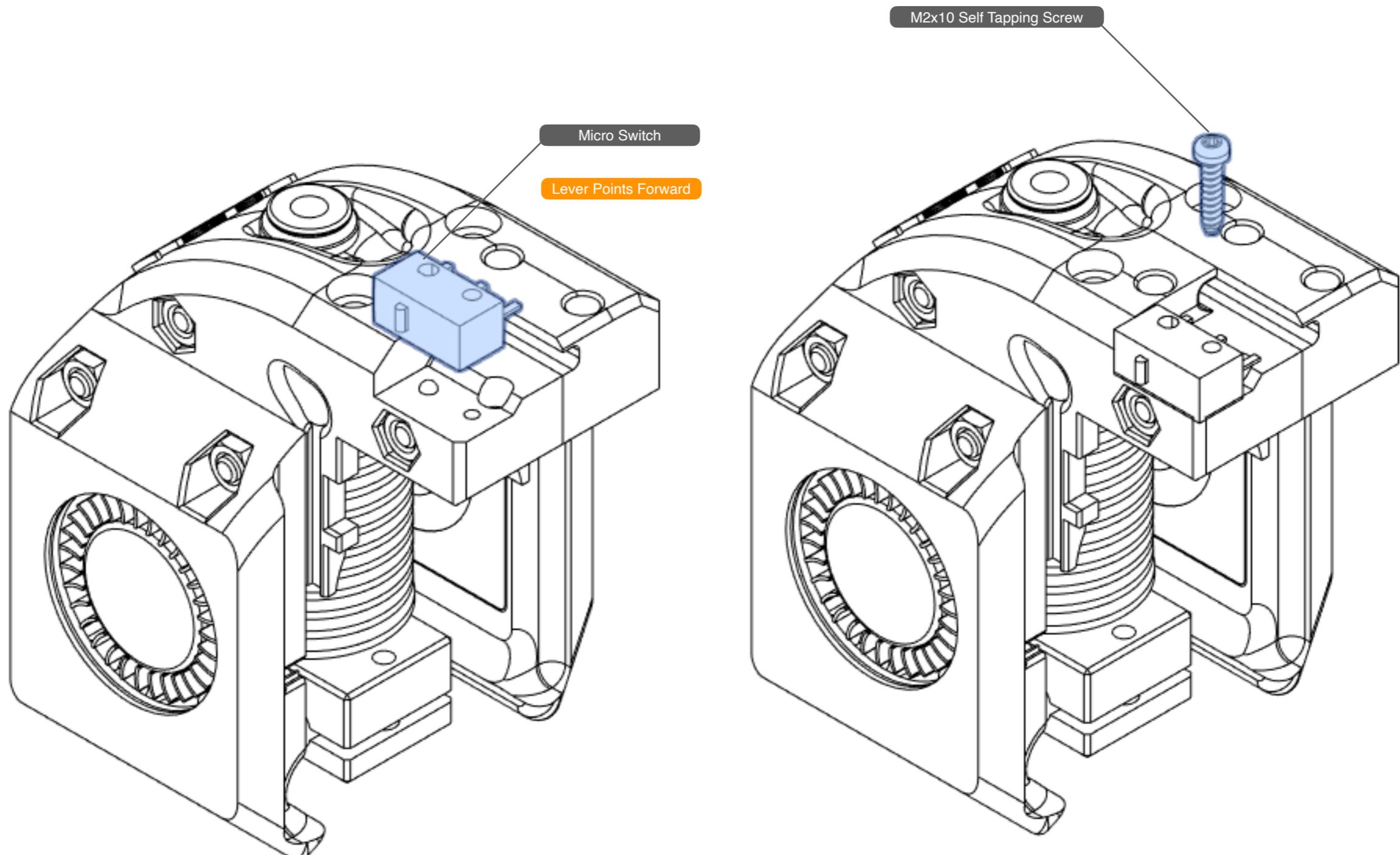


3010 Blower Fan

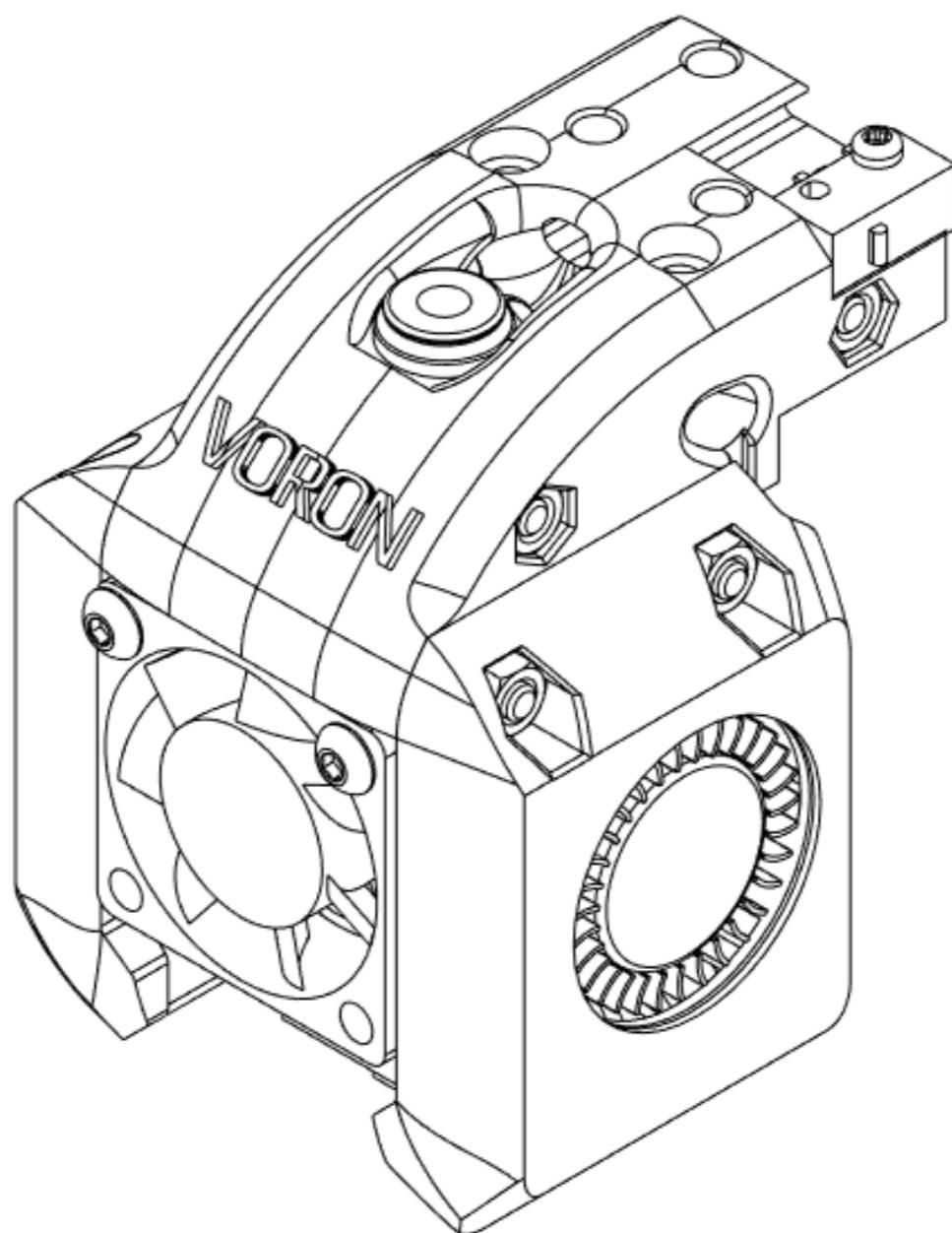


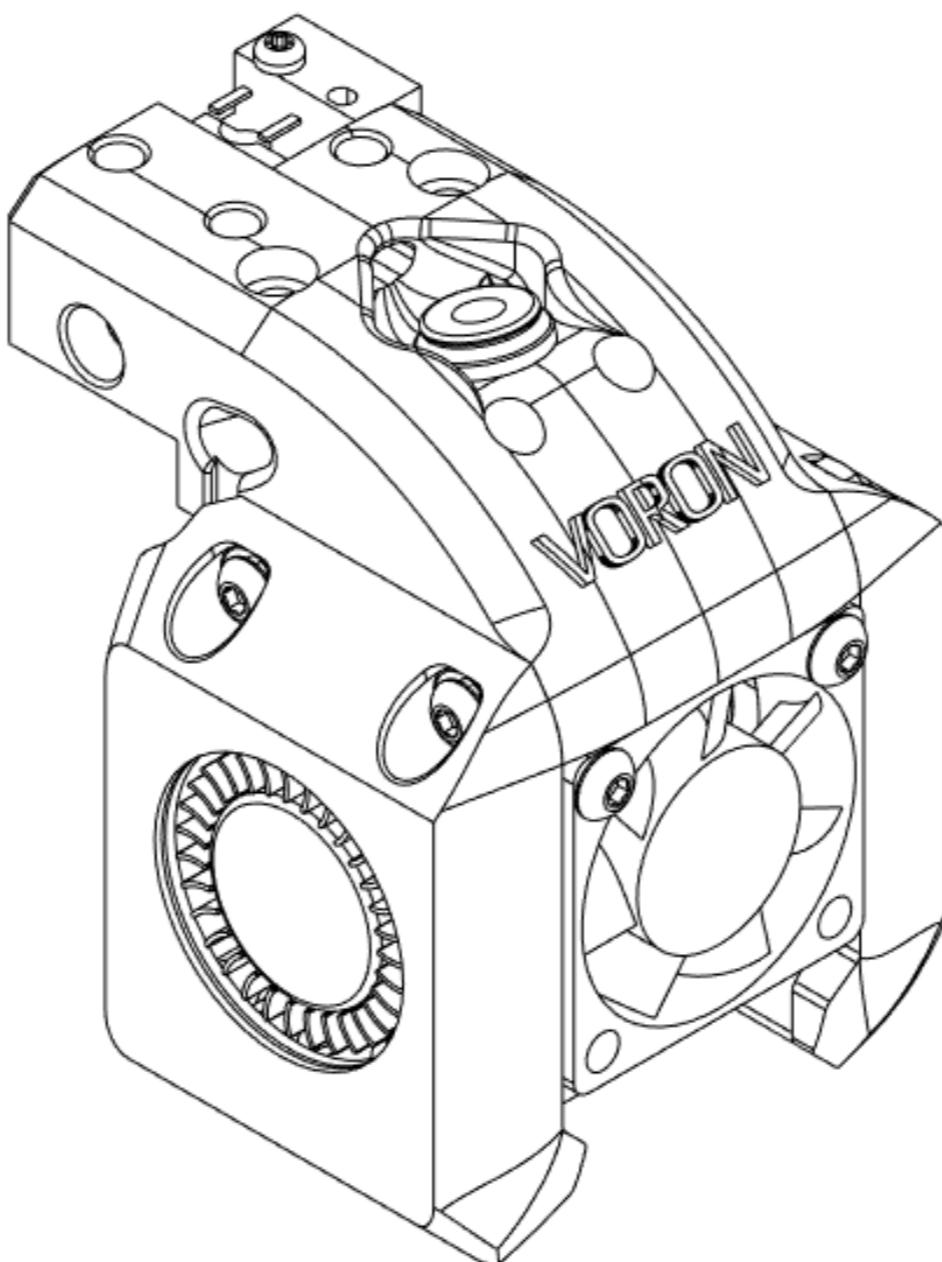
M3x40 BHCS

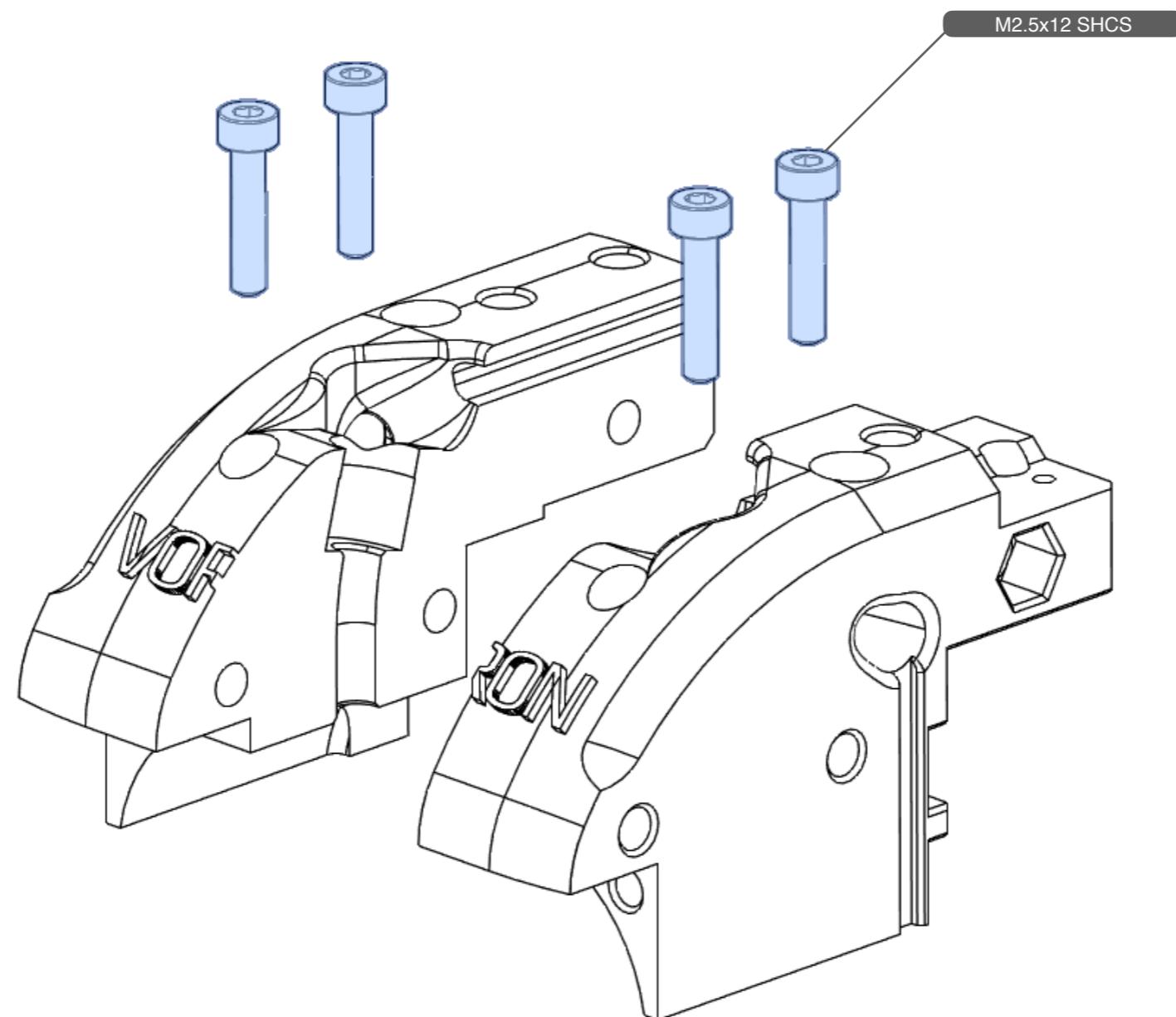
Part	Qty
M3x40 BHCS	2
3010 Radial Fan	1



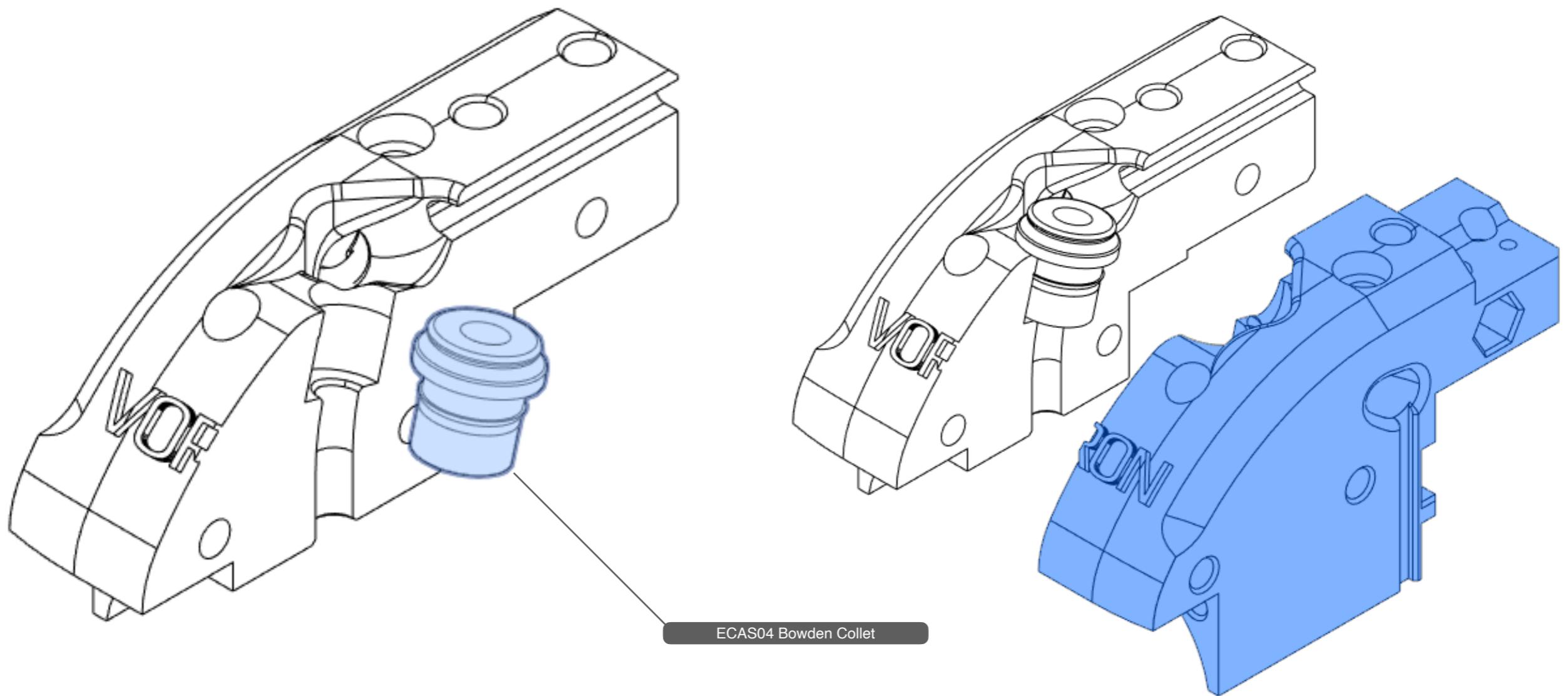
Part	Qty
M2x10 Self Tapping	1
Microswitch	1



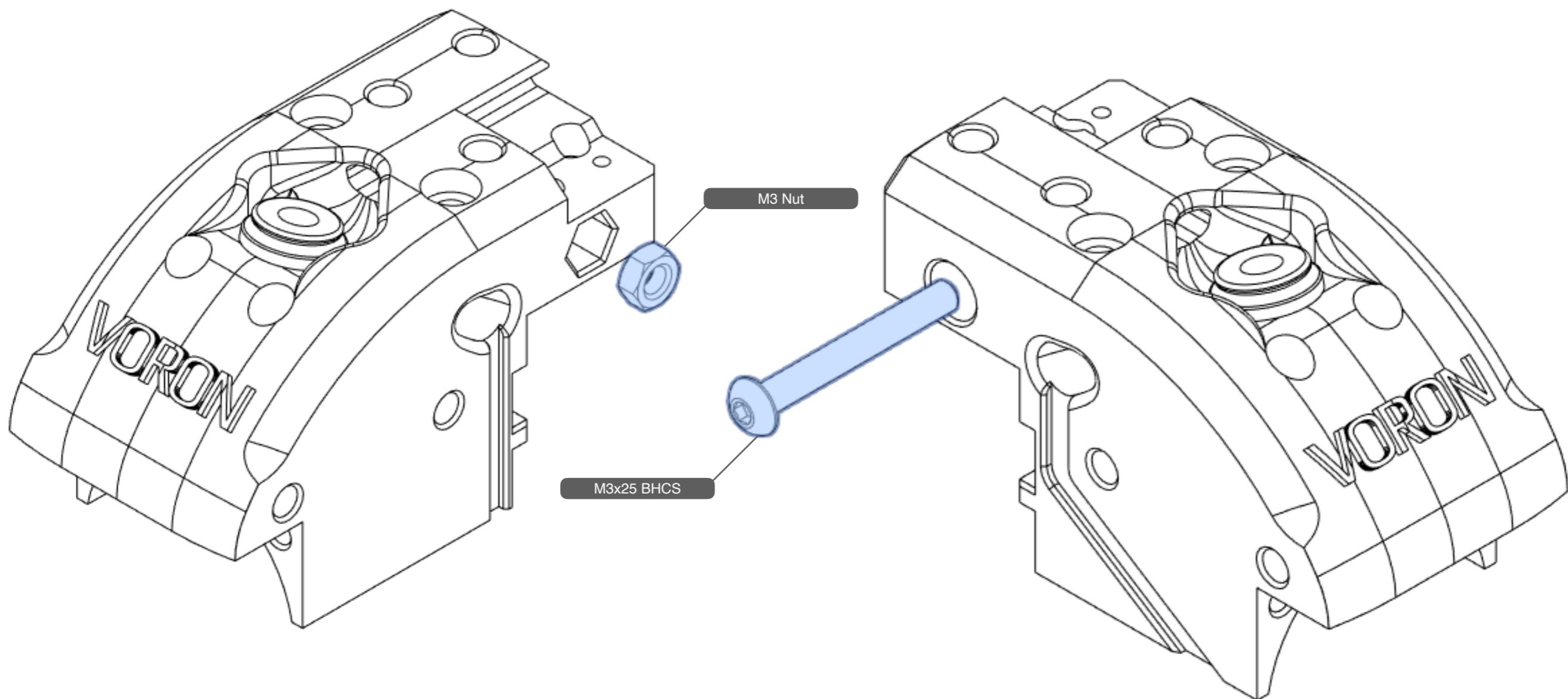




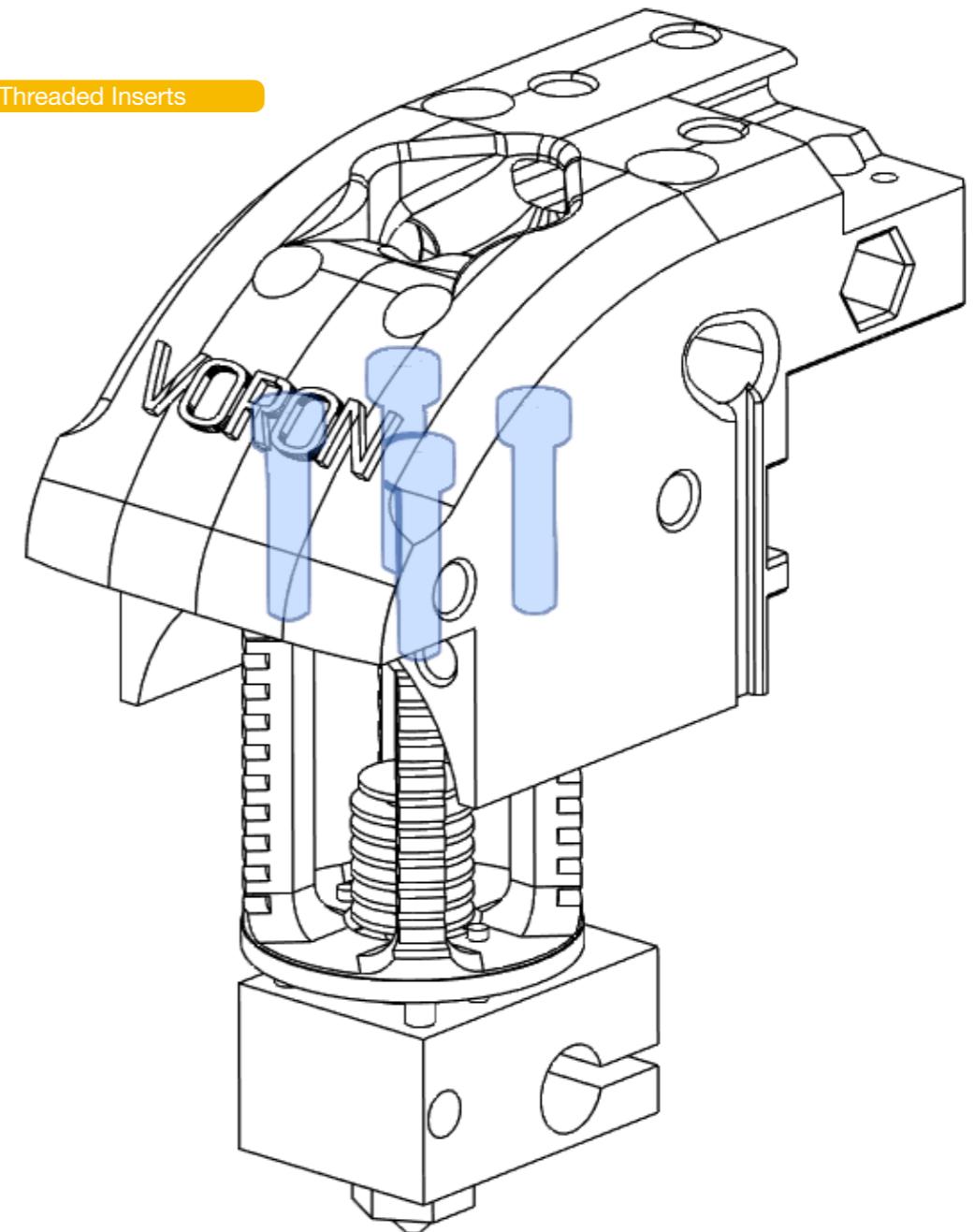
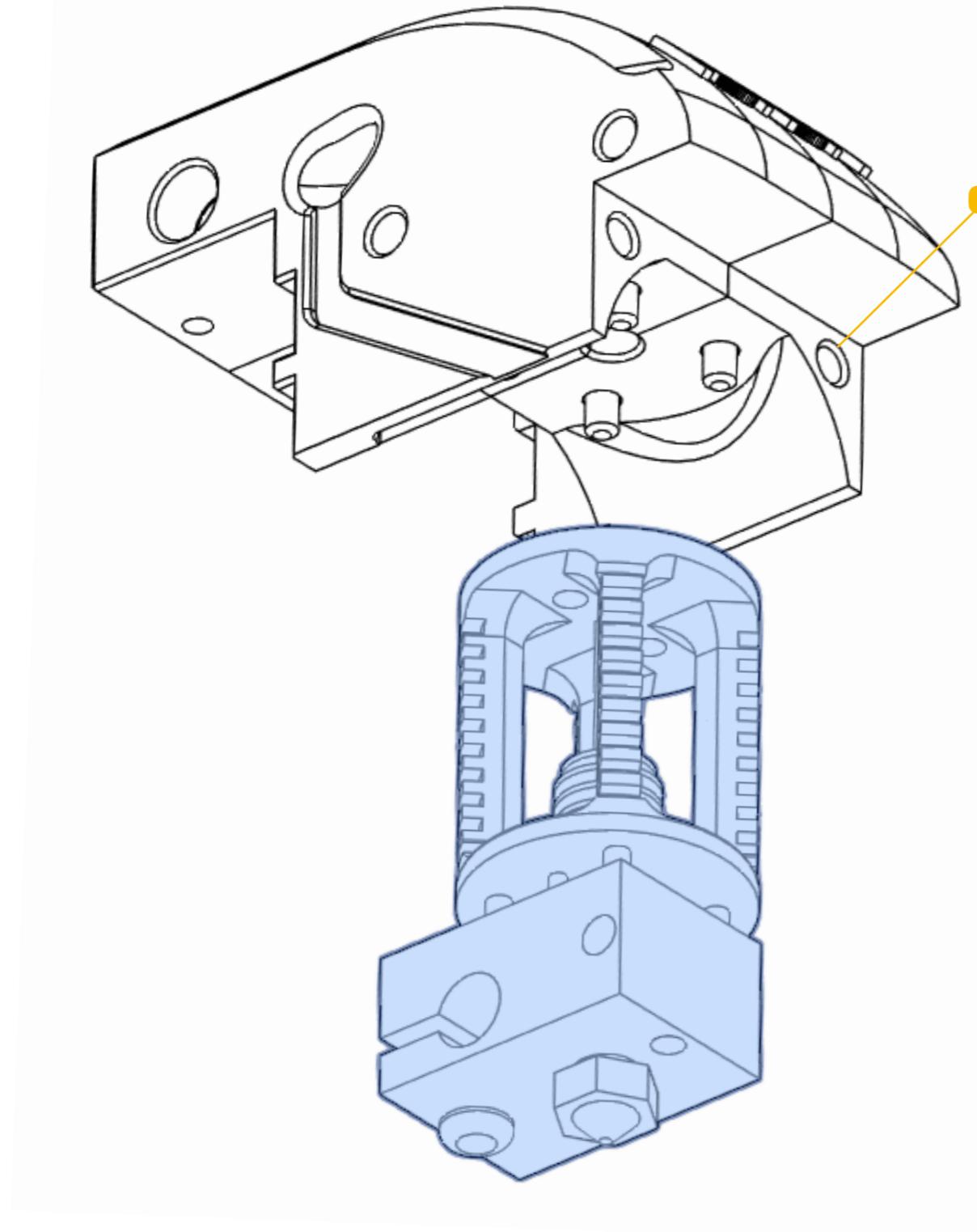
Part	Qty
M2.5x12 SHCS	4



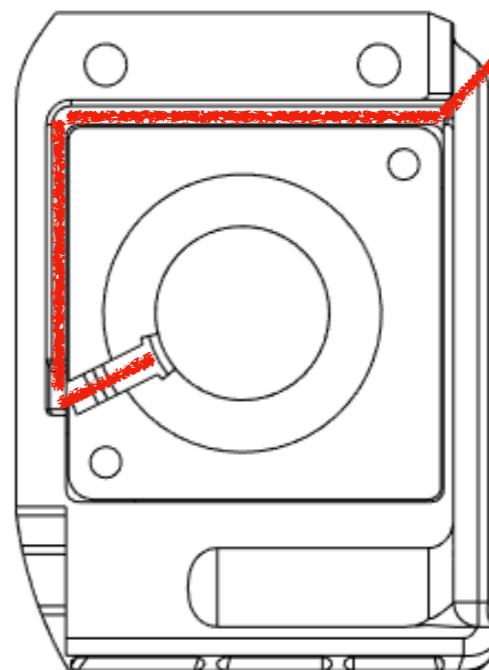
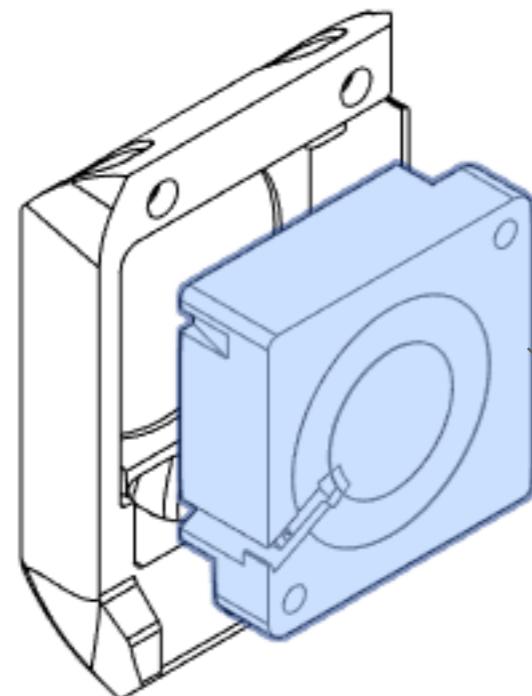
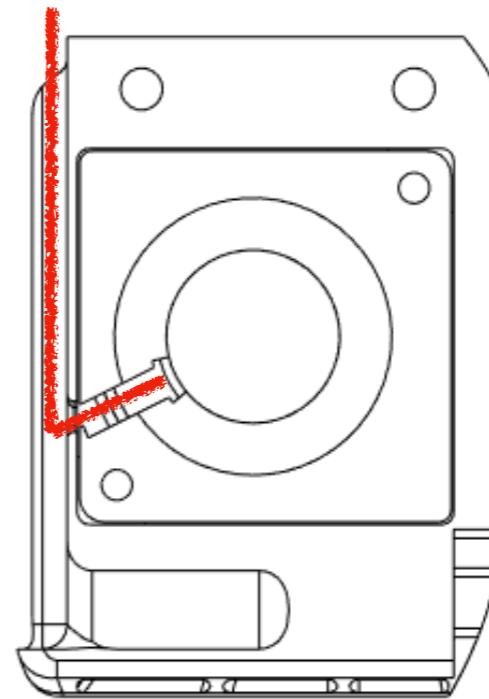
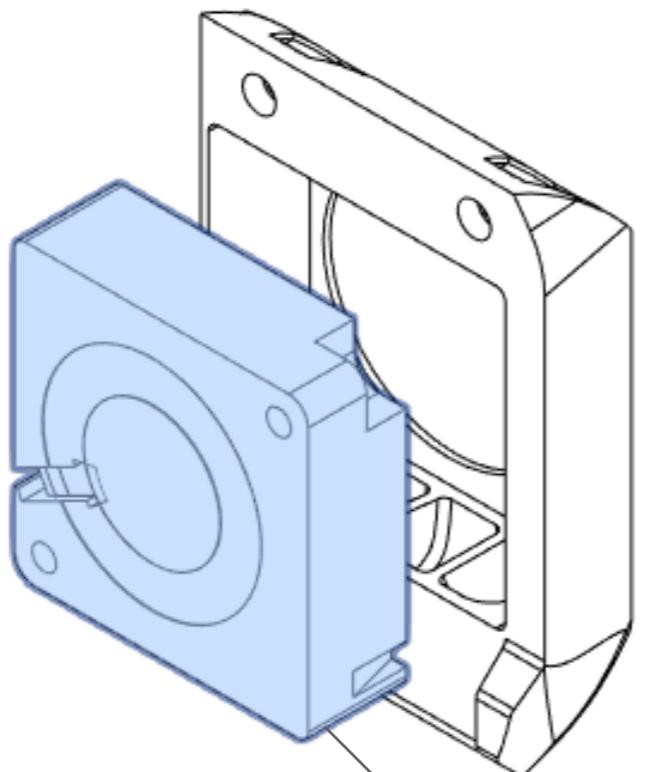
Part	Qty
ECAS04 Collet	1



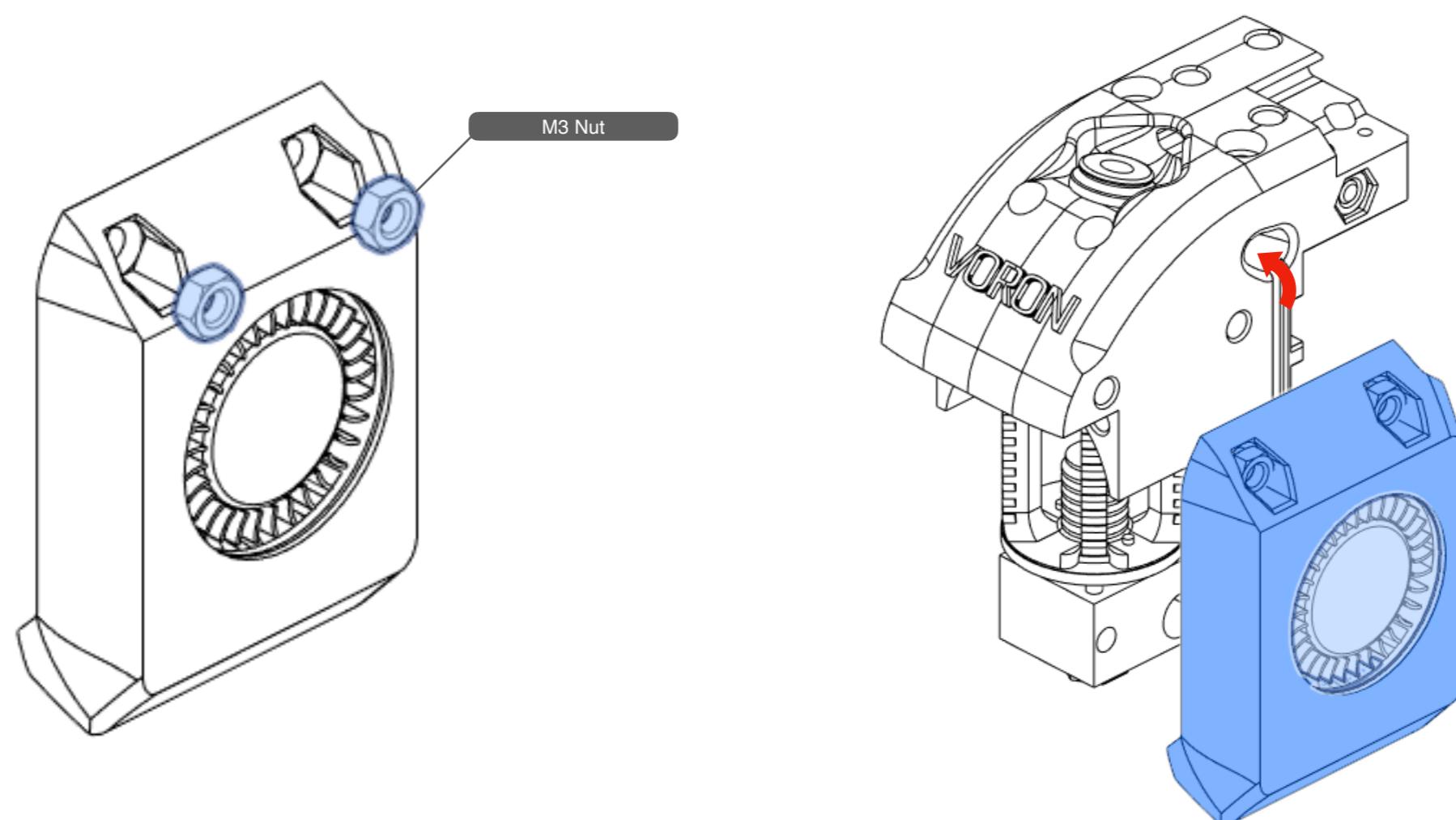
Part	Qty
M3x25 BHCS	1
M3 Nut	1



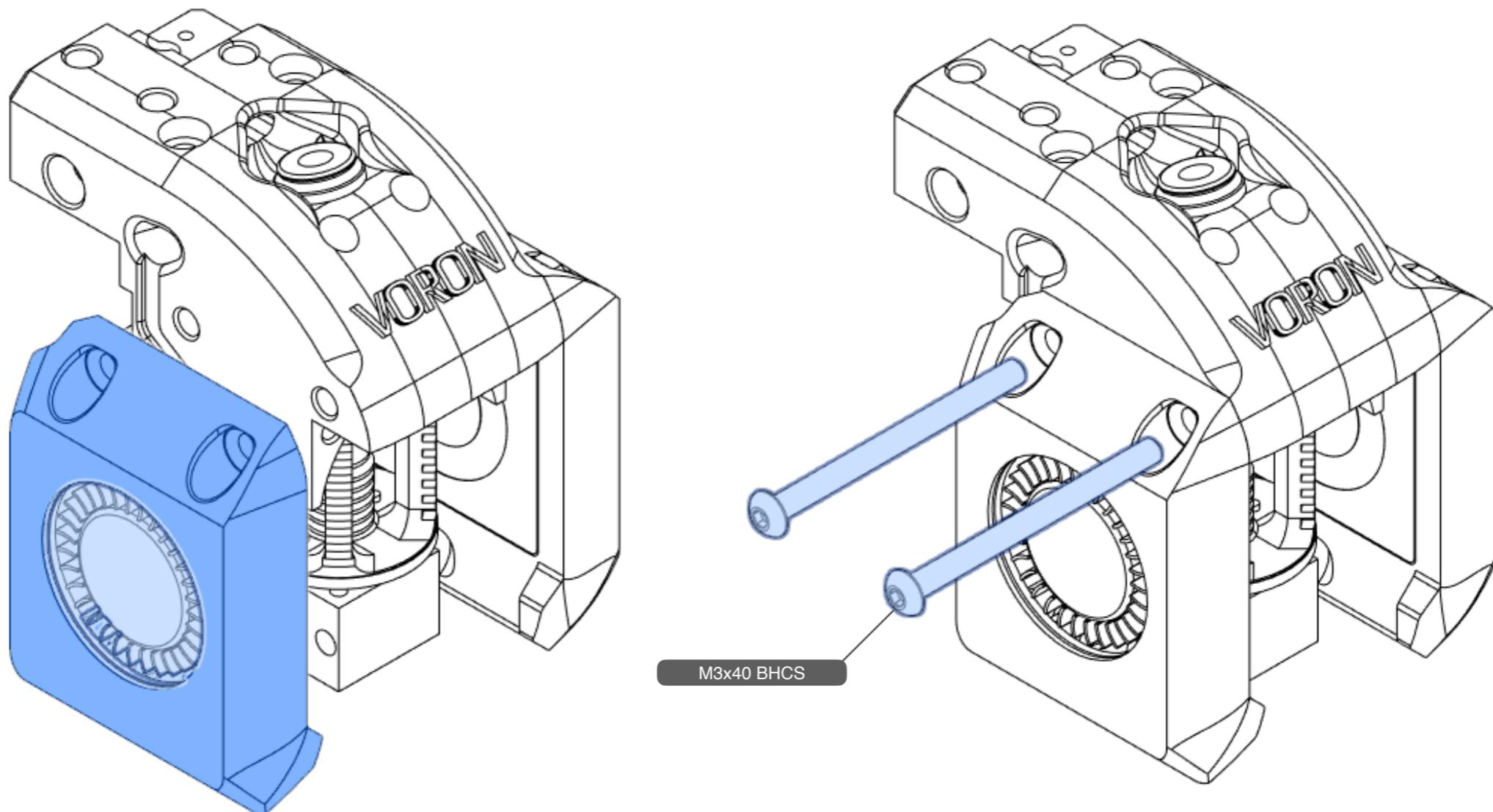
Part	Qty
Dragon Hotend	1
M3 Threaded Insert	2

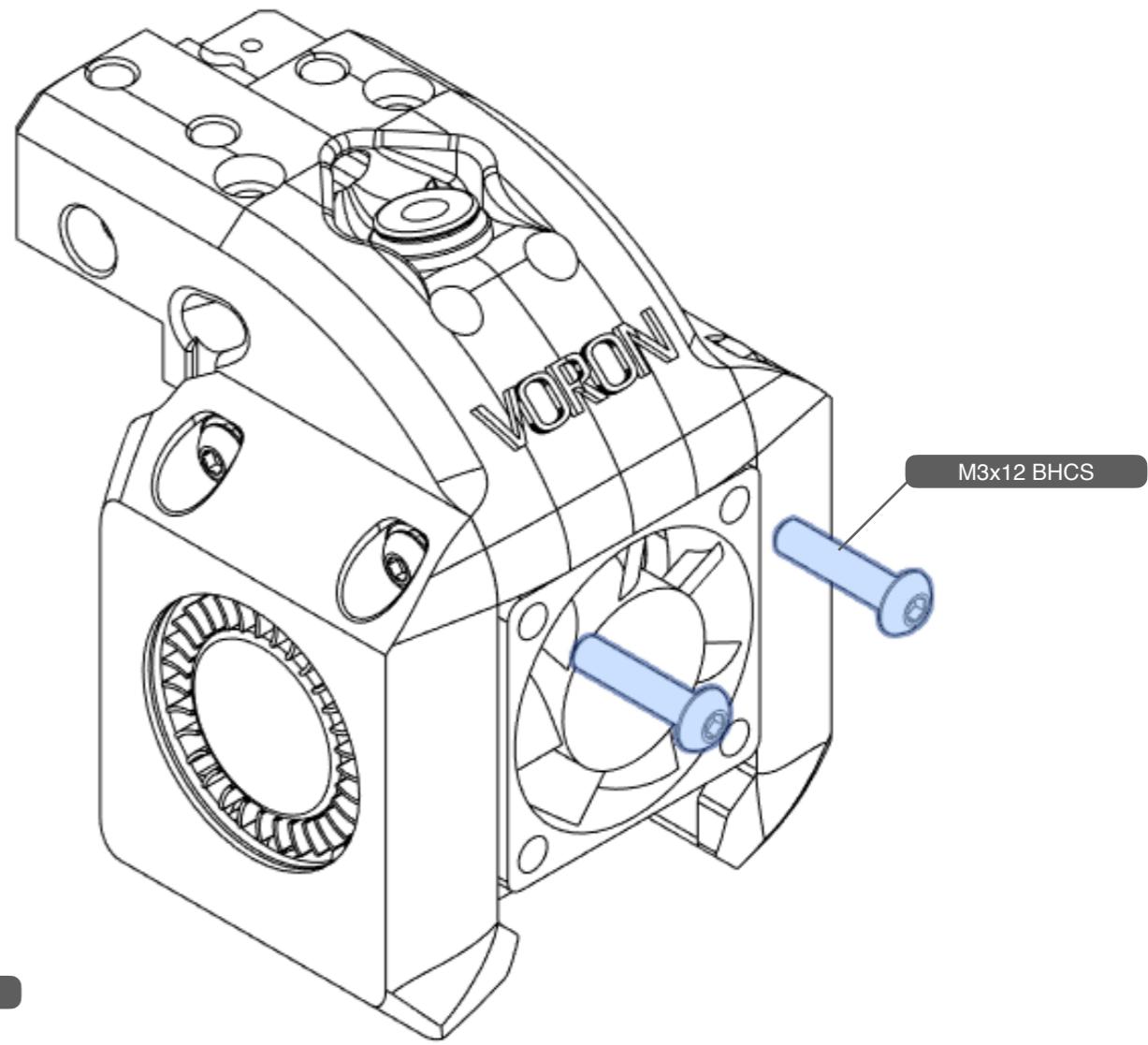
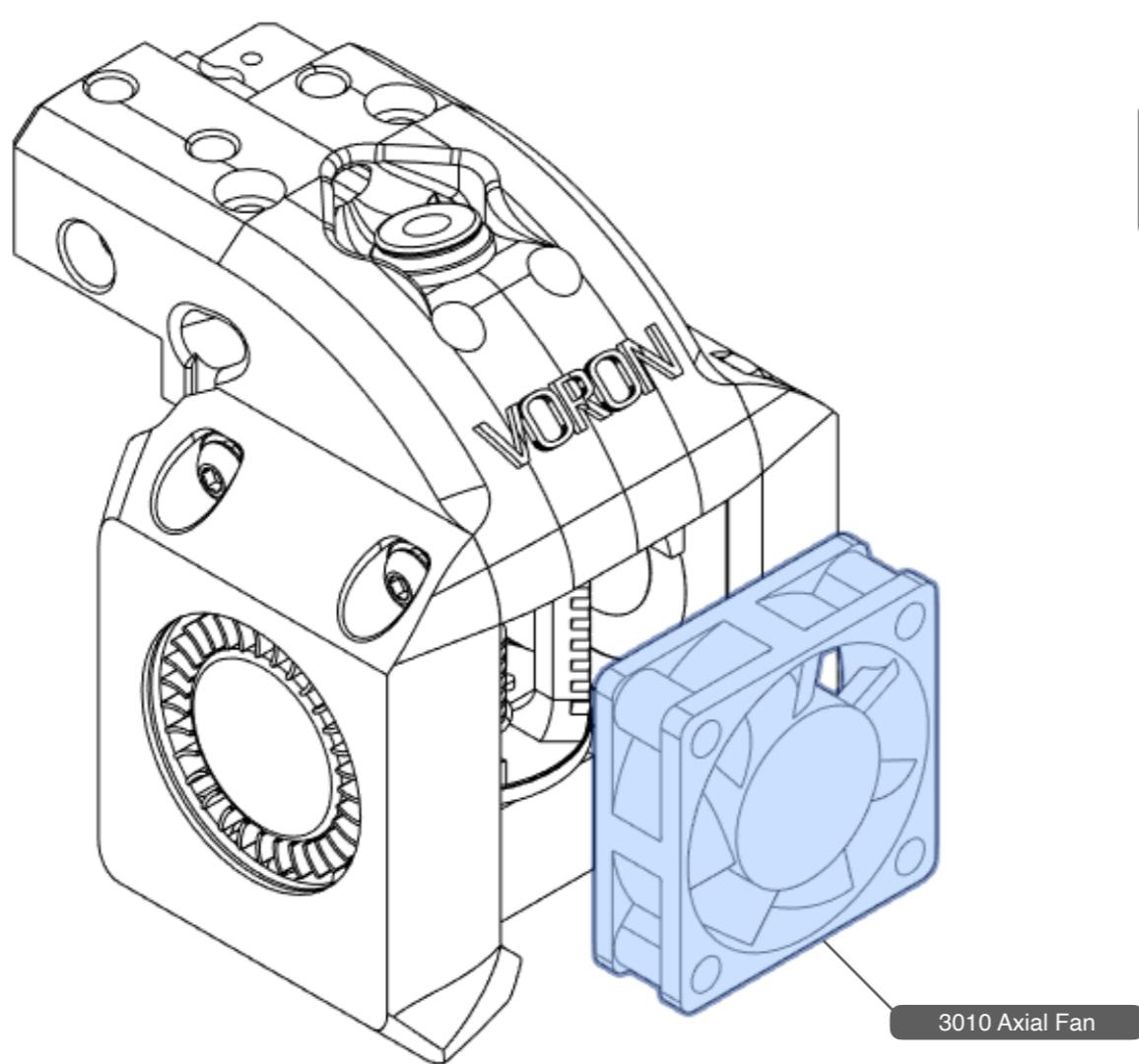


Part	Qty
3010 Radial Fan	2

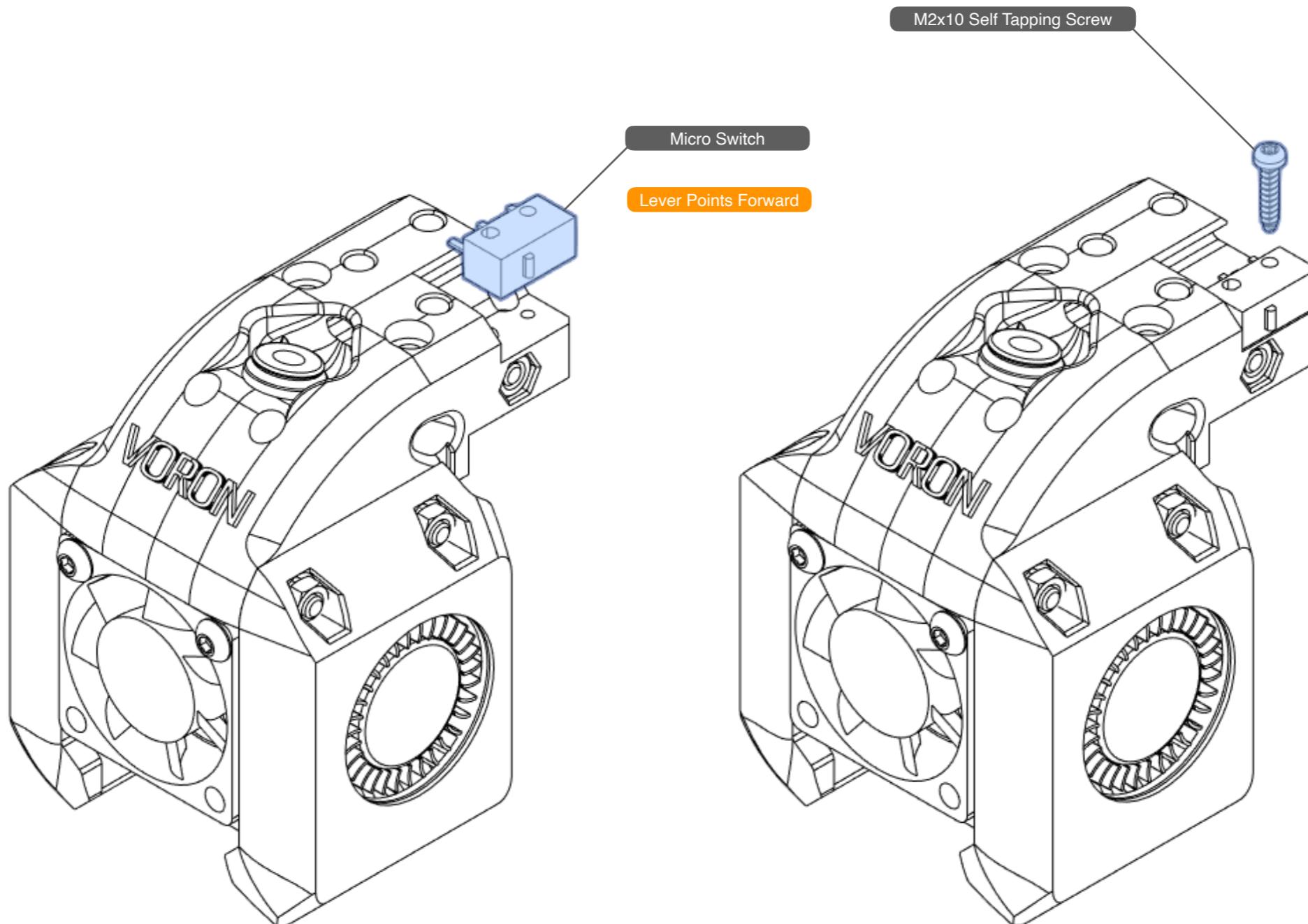


Part	Qty
M3 Nut	2

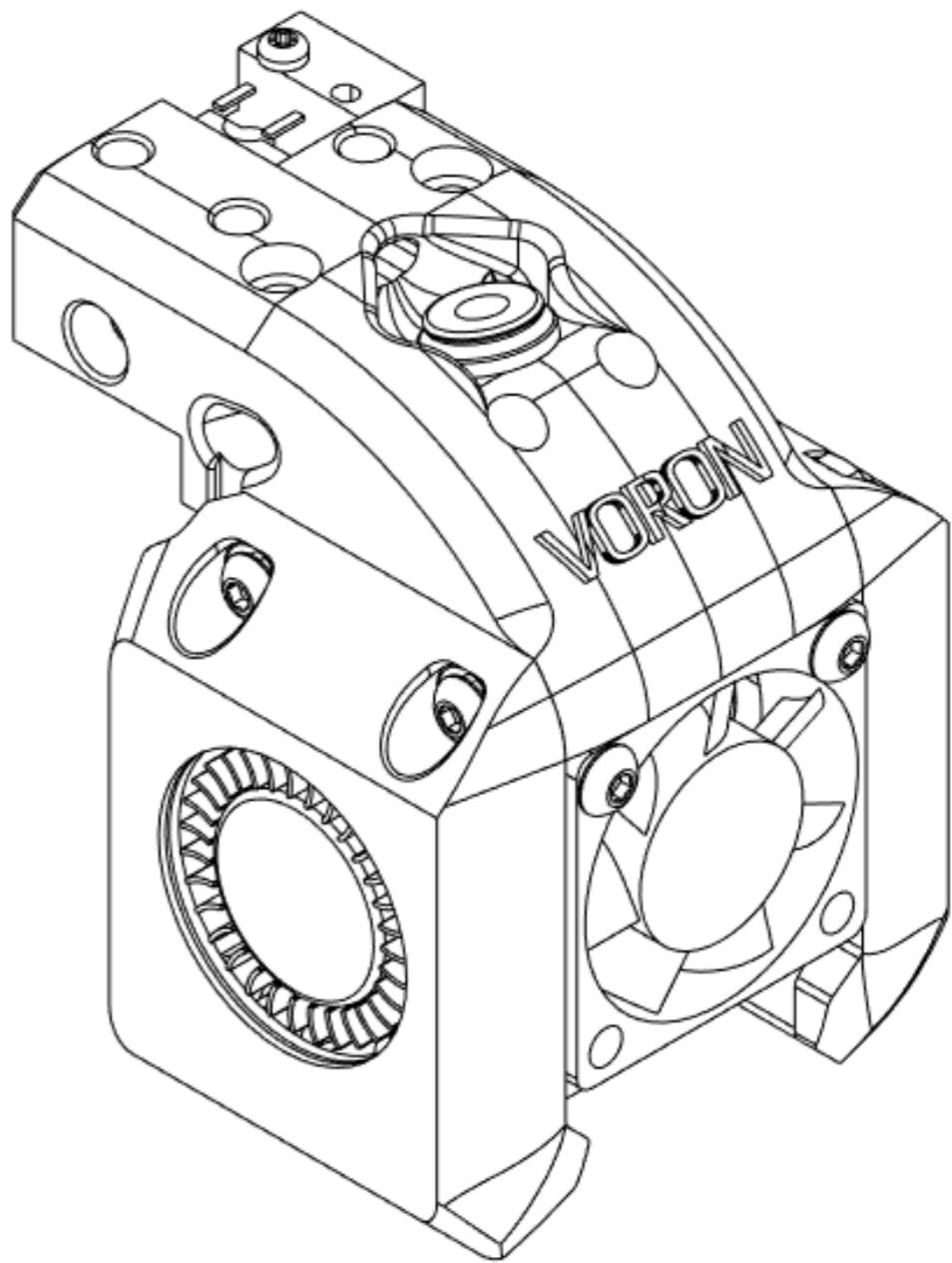
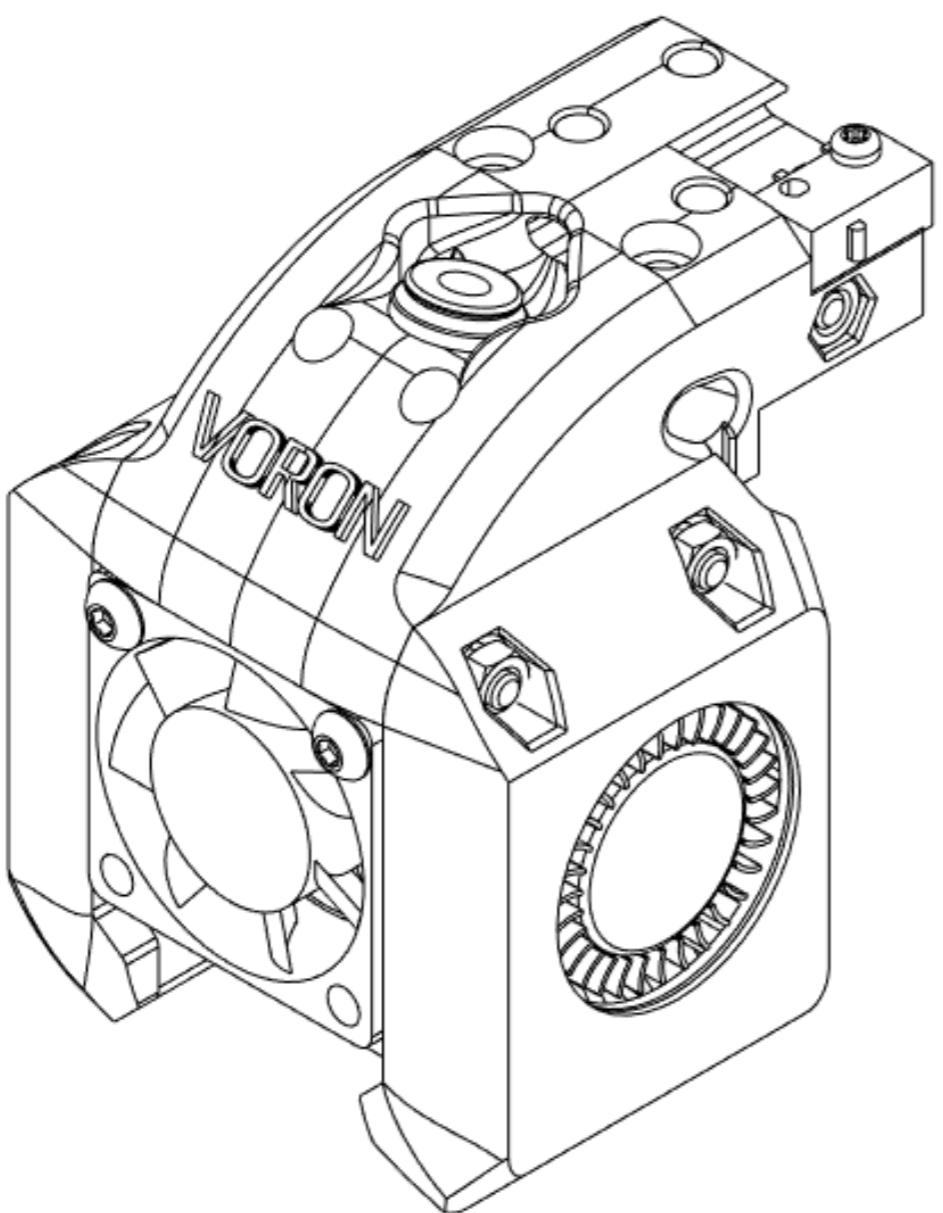


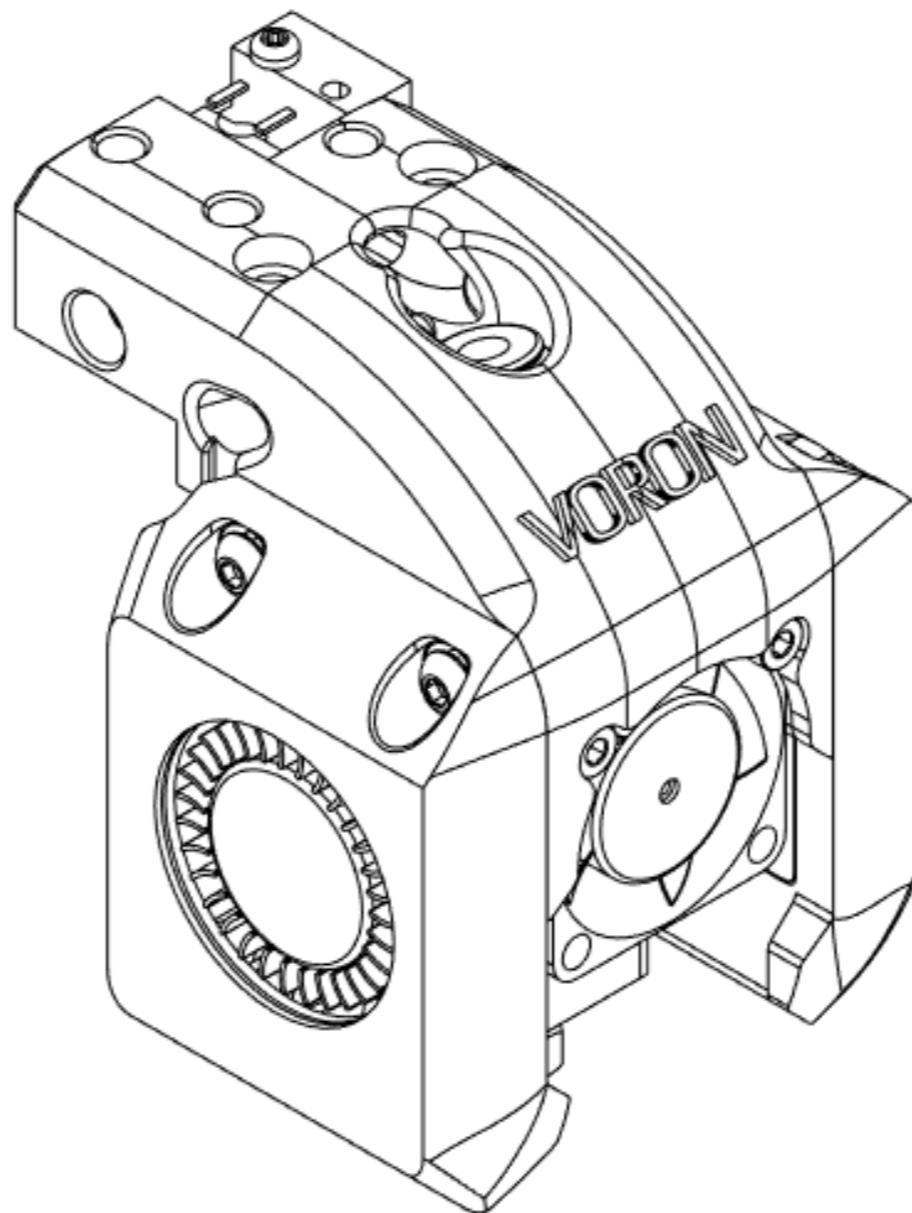


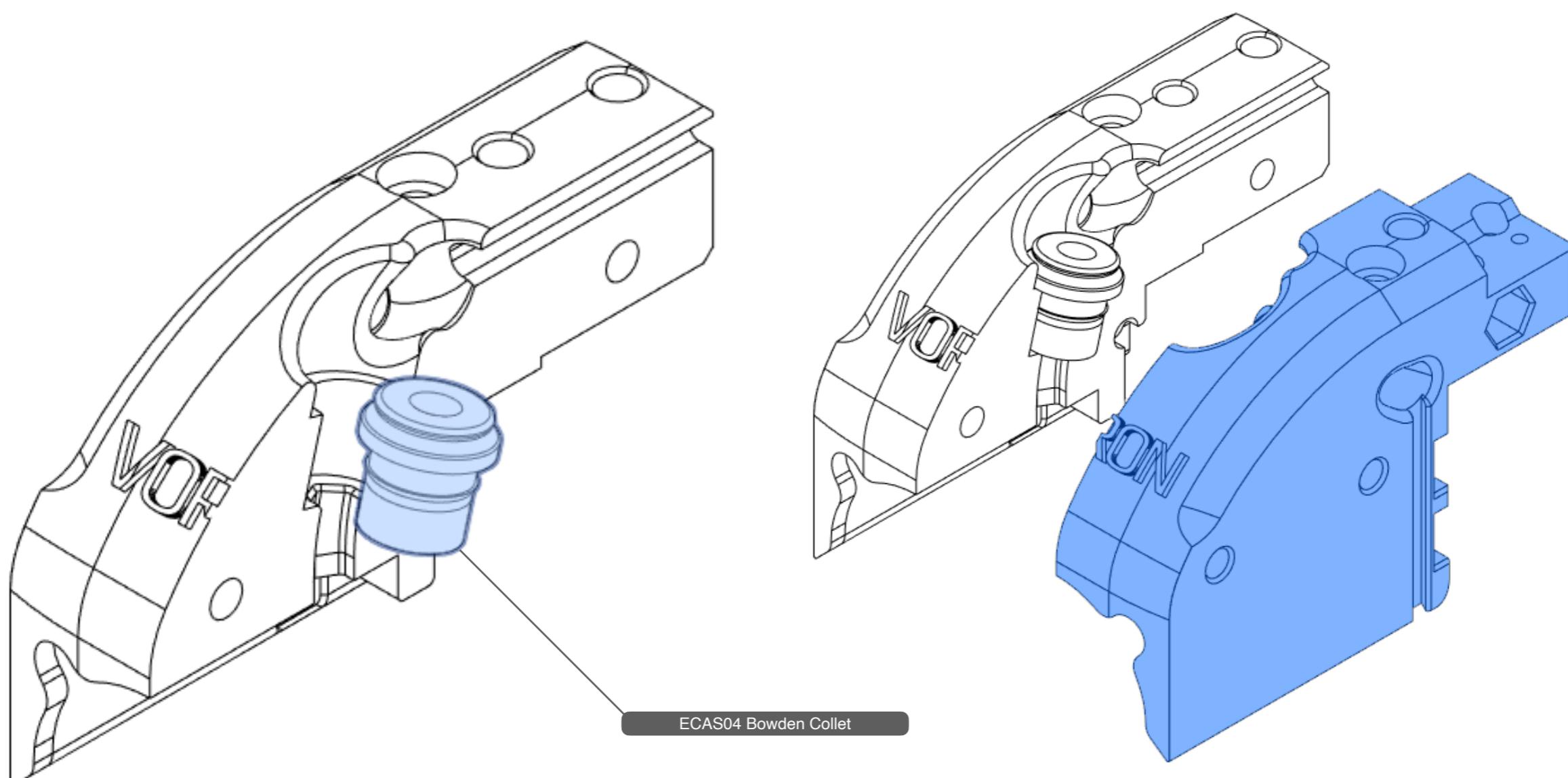
Part	Qty
M3x12 BHCS	2
3010 Axial Fan	1



Part	Qty
Micro Switch	1
M2x10 Self Tapping	1

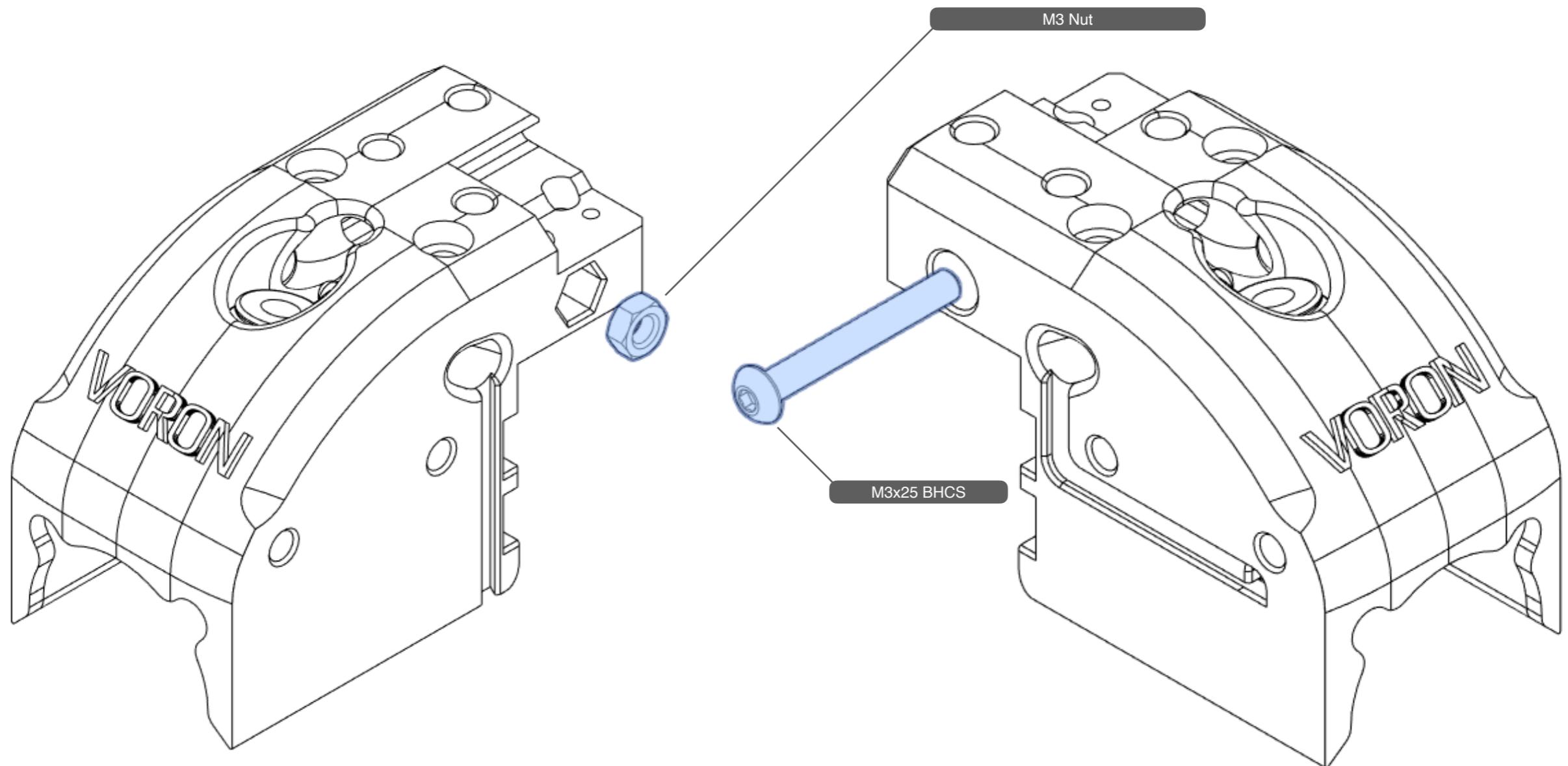




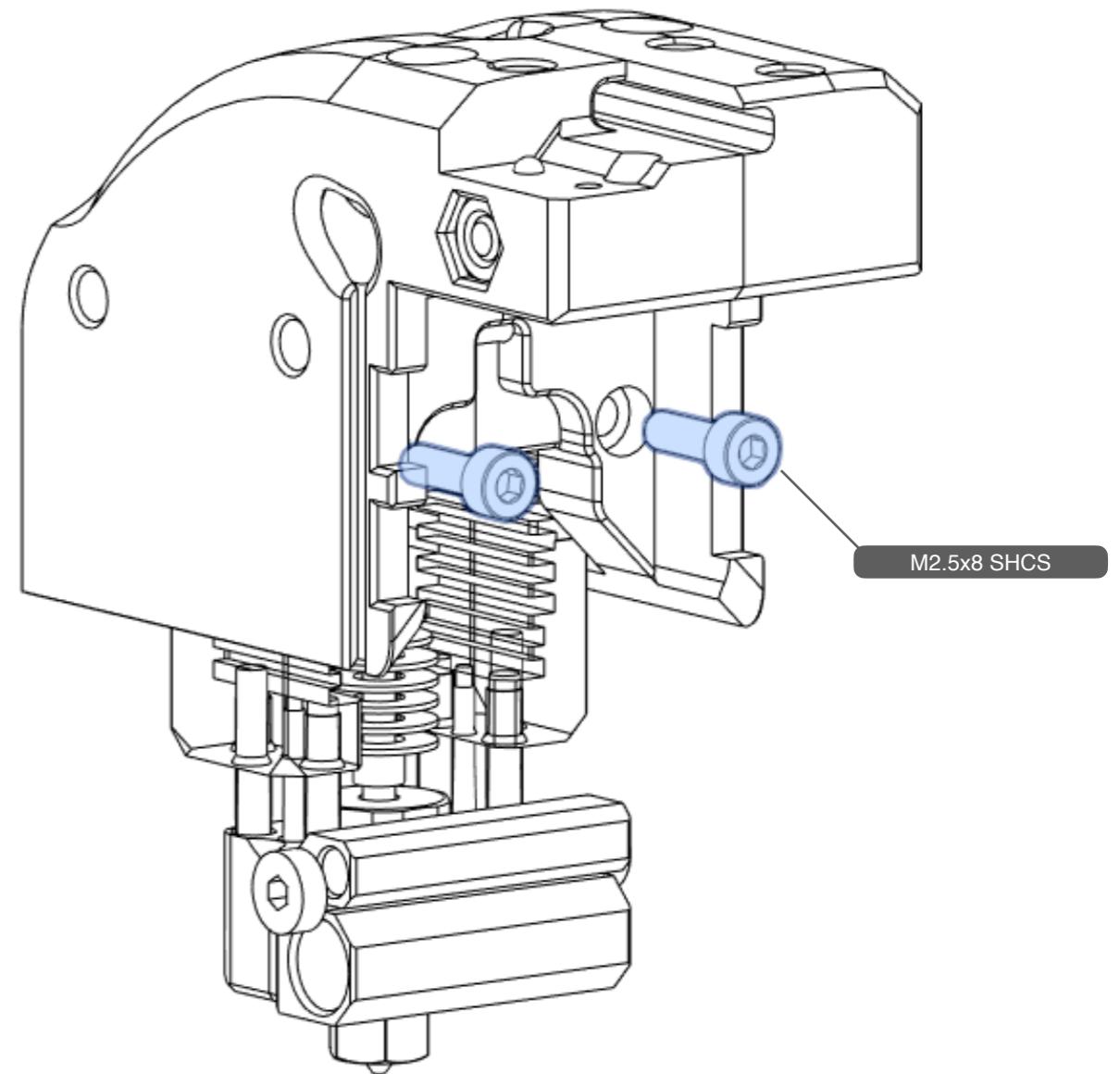
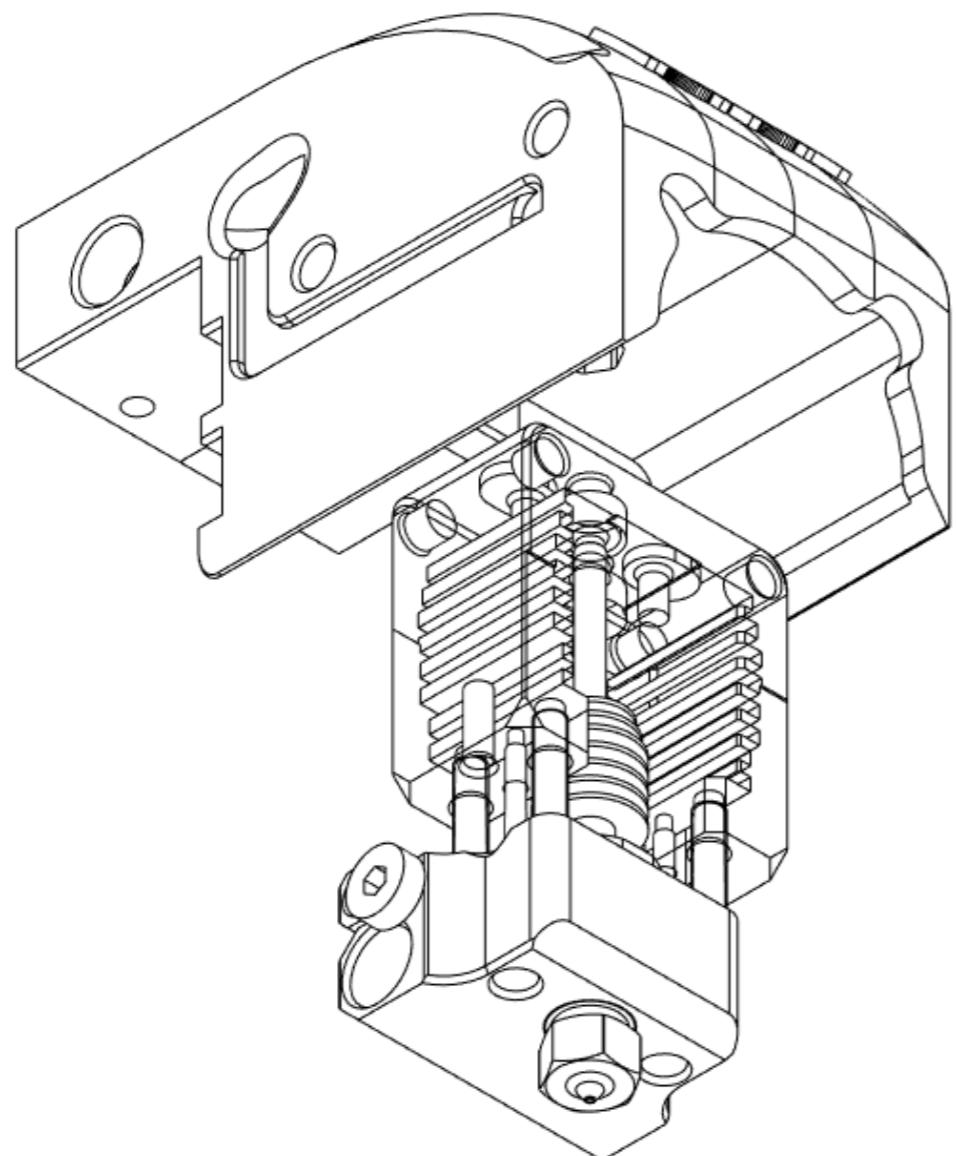


ECAS04 Bowden Collet

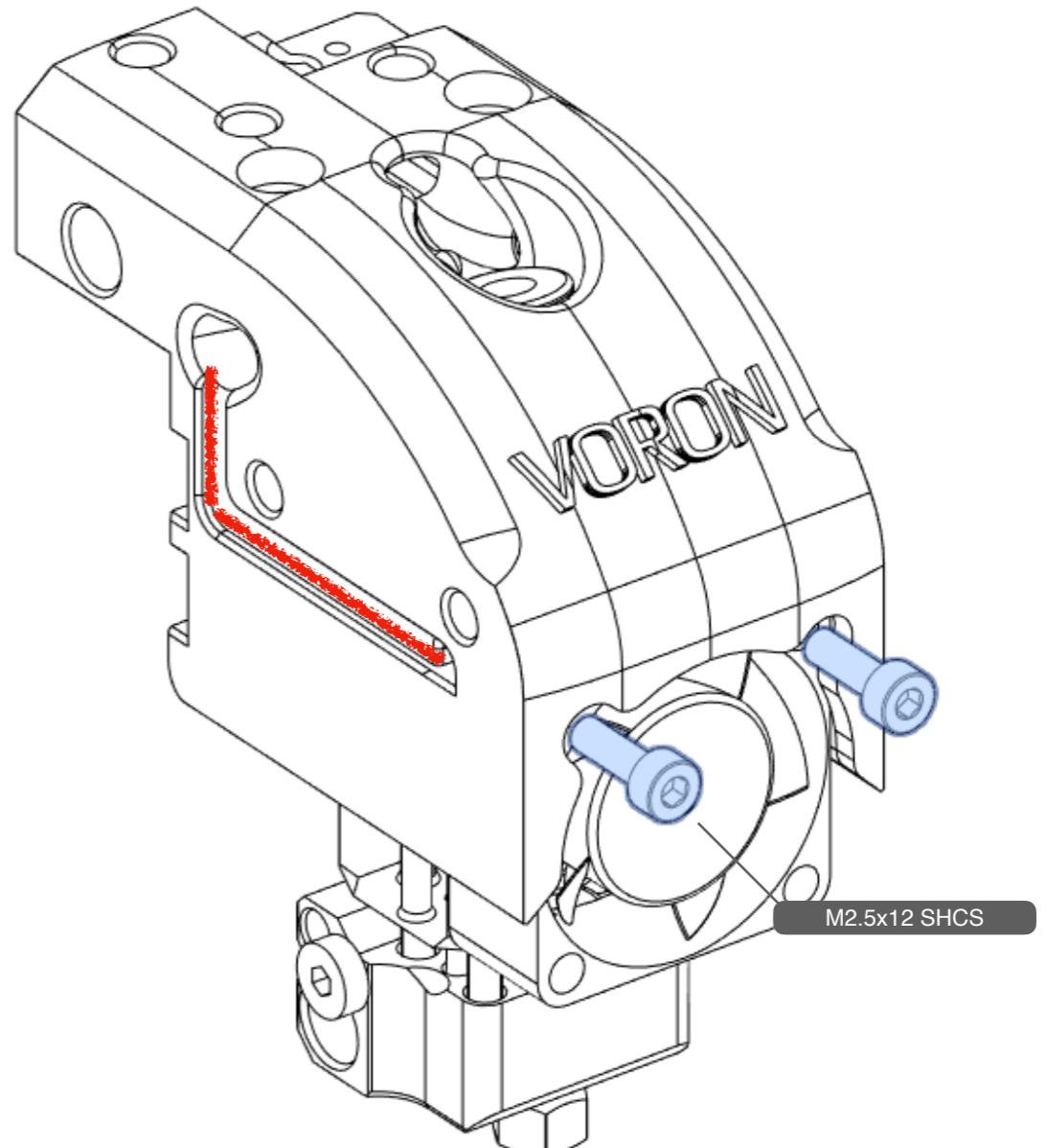
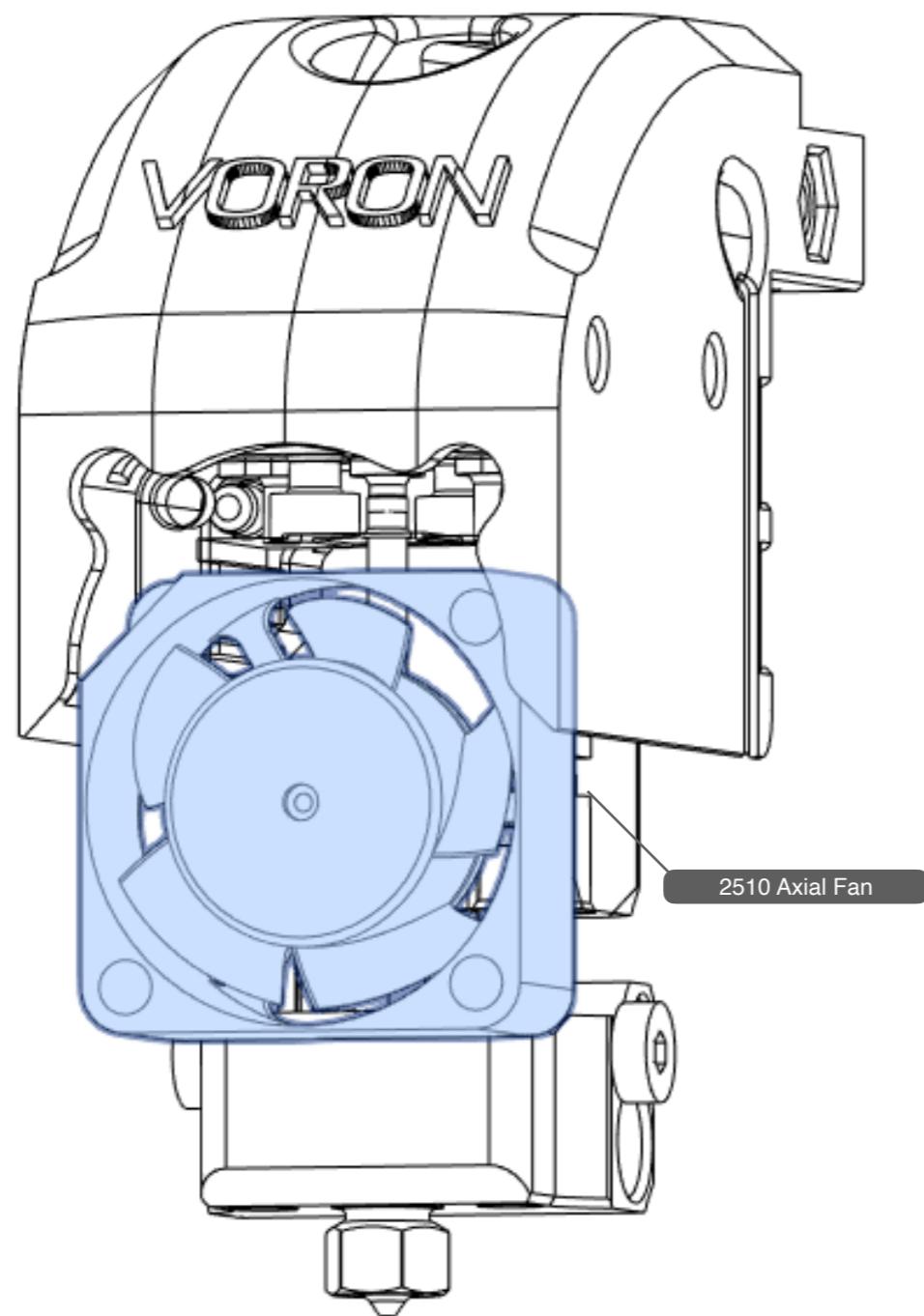
Part	Qty
ECAS04 Collet	1



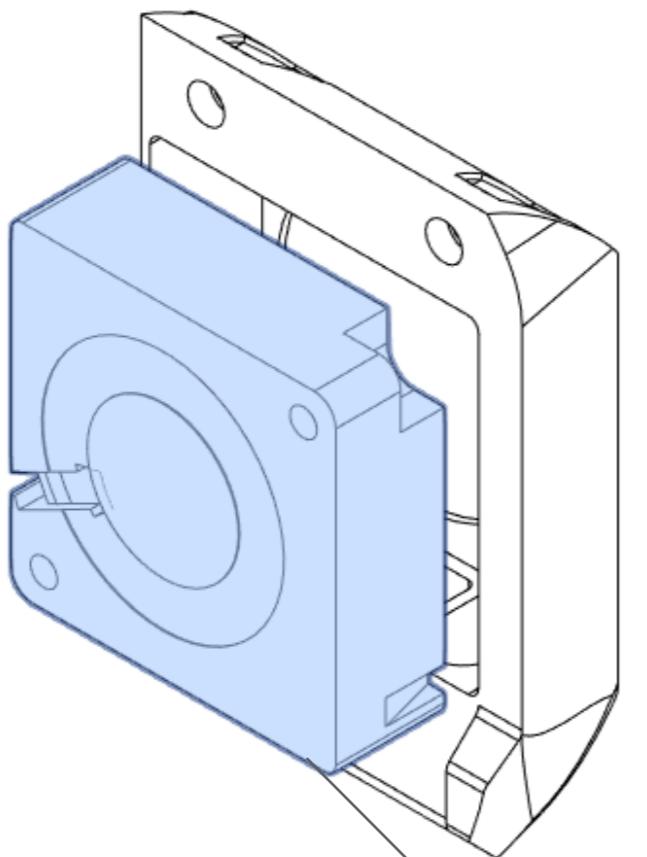
Part	Qty
M3x25 BHCS	1
M3 Nut	1



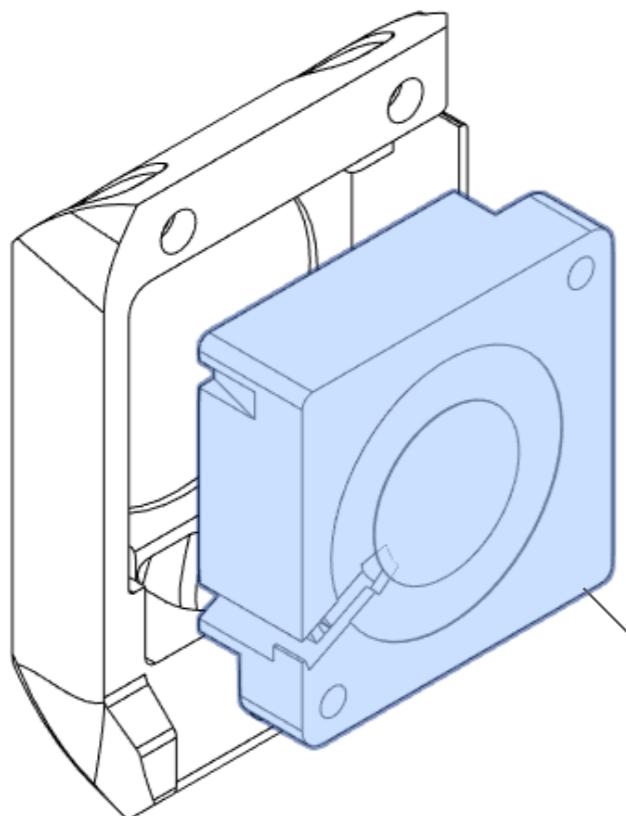
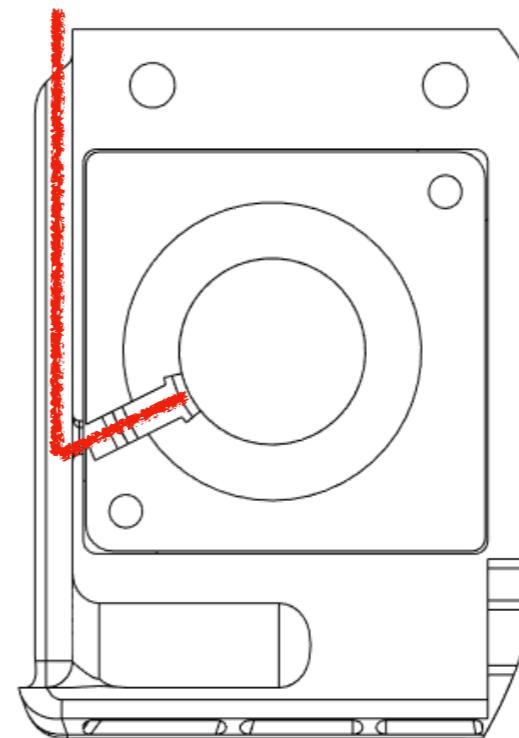
Part	Qty
M2.5x8 SHCS	2
Mosquito Hotend	1



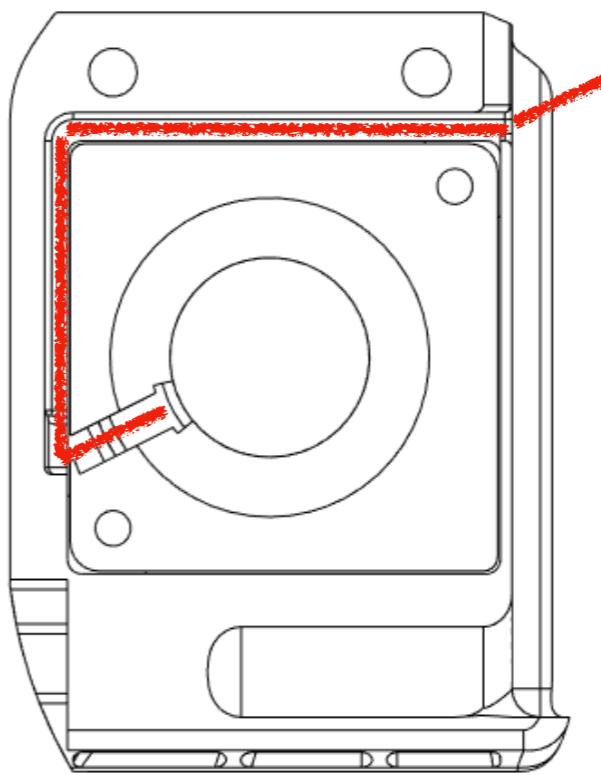
Part	Qty
M2.5x12 SHCS	2
2510 Axial Fan	1



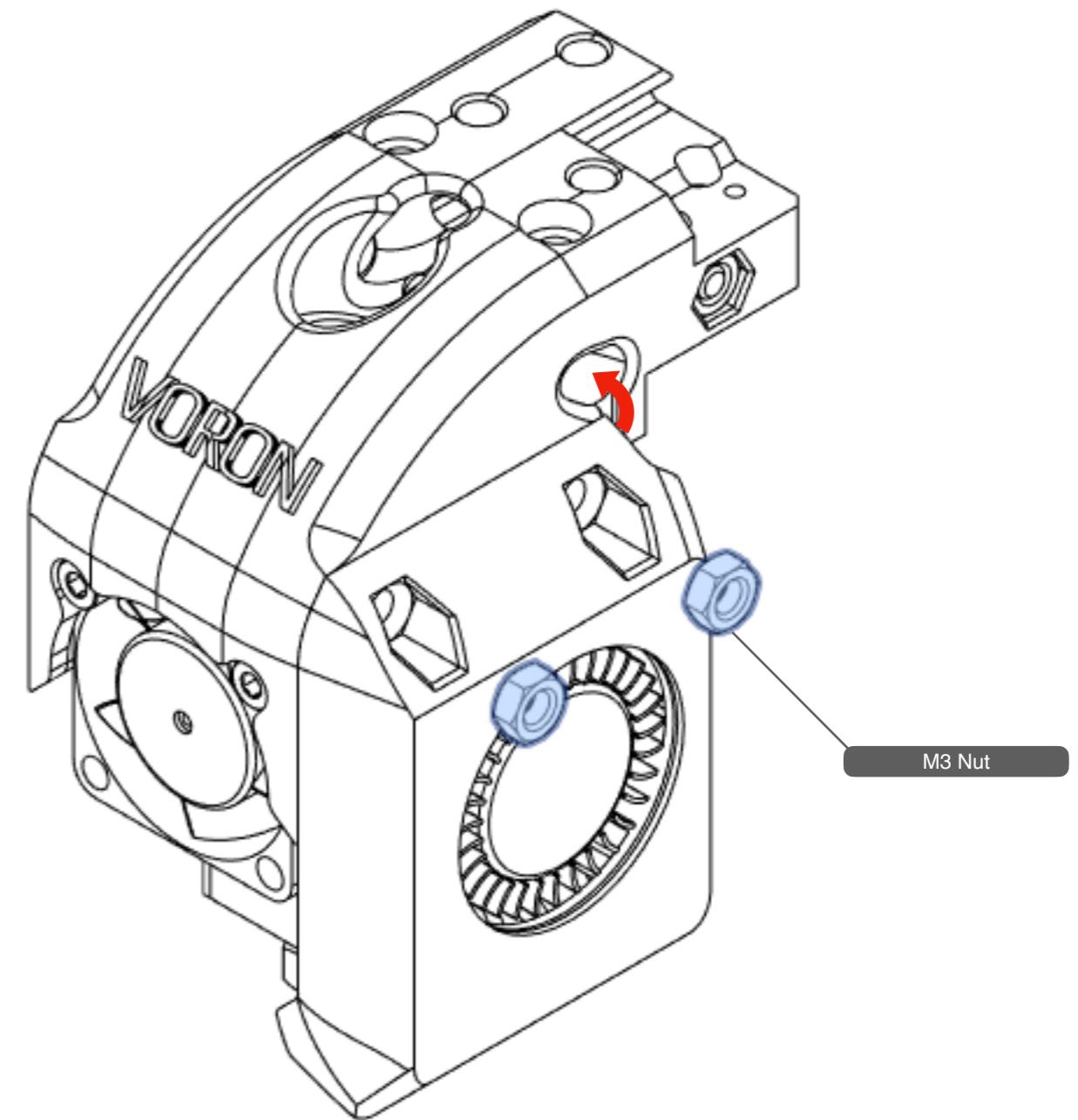
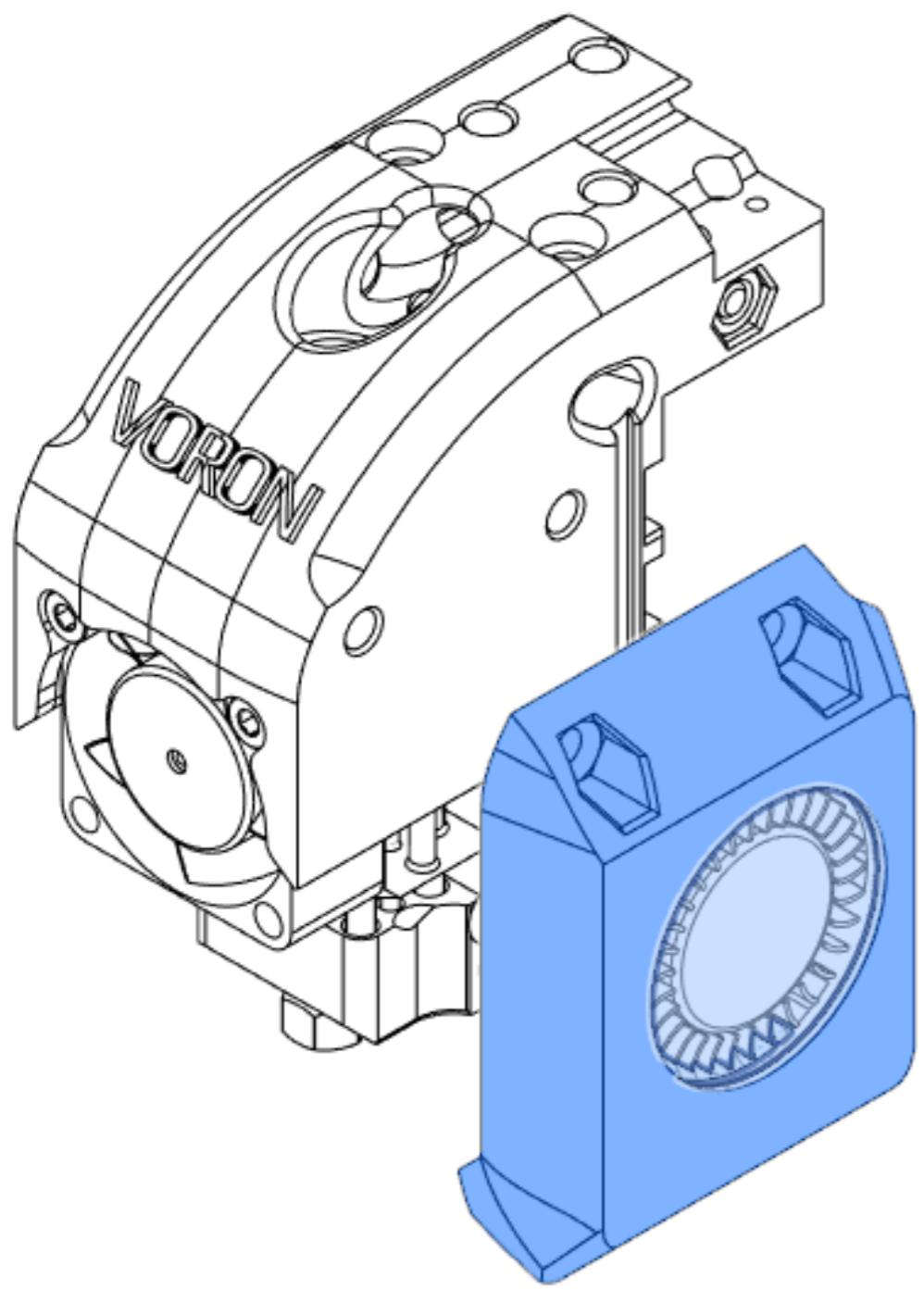
3010 Blower Fan

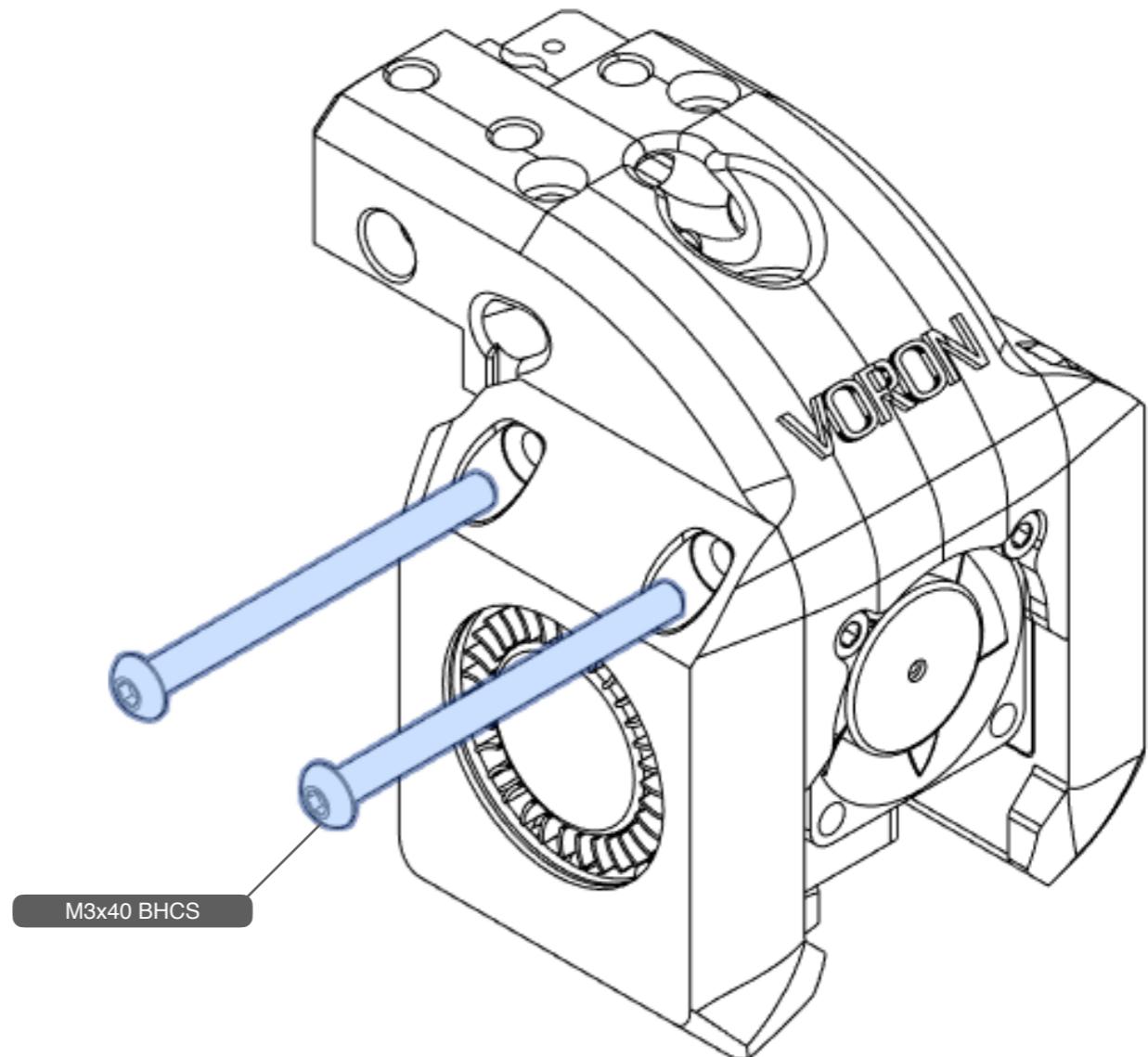
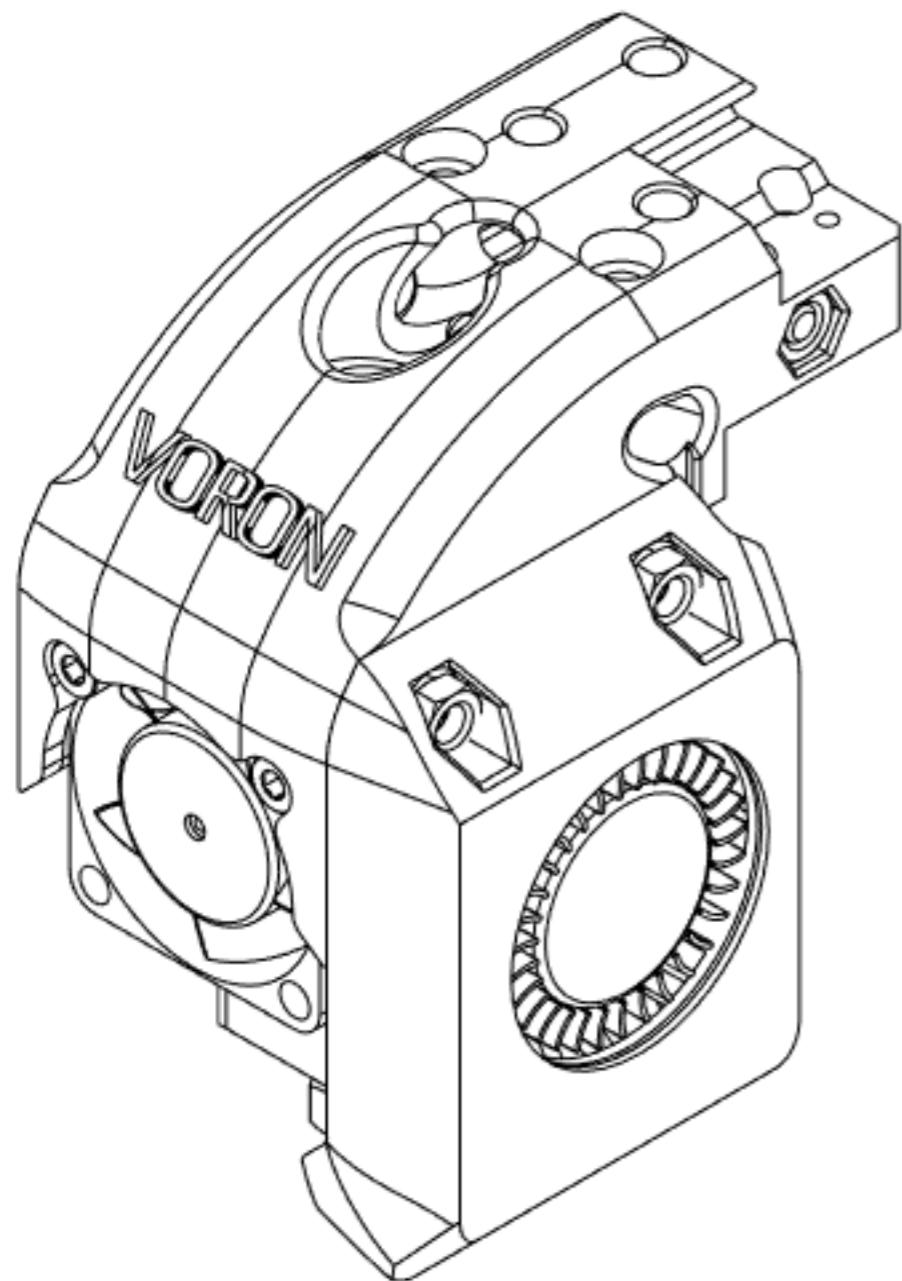


3010 Blower Fan

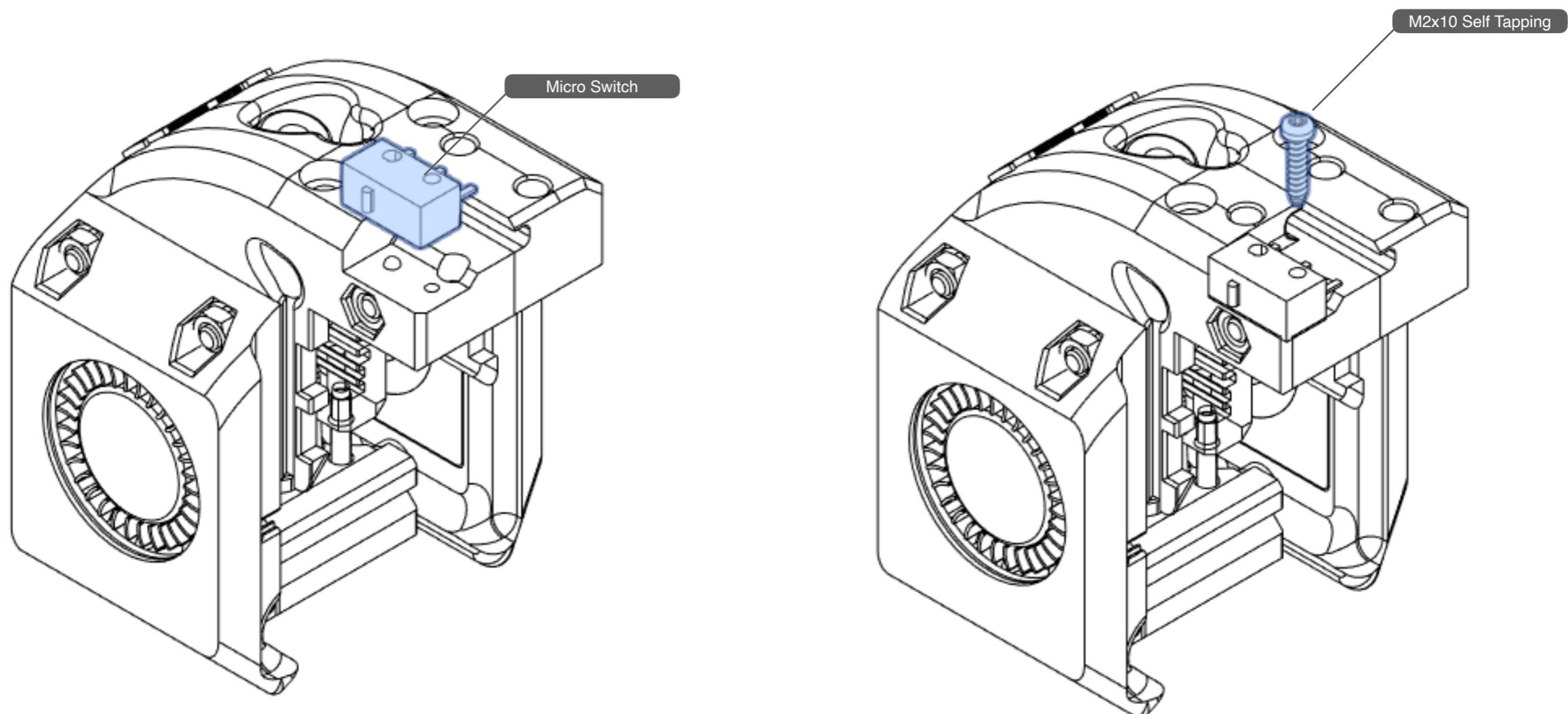


Part	Qty
3010 Radial Fan	2

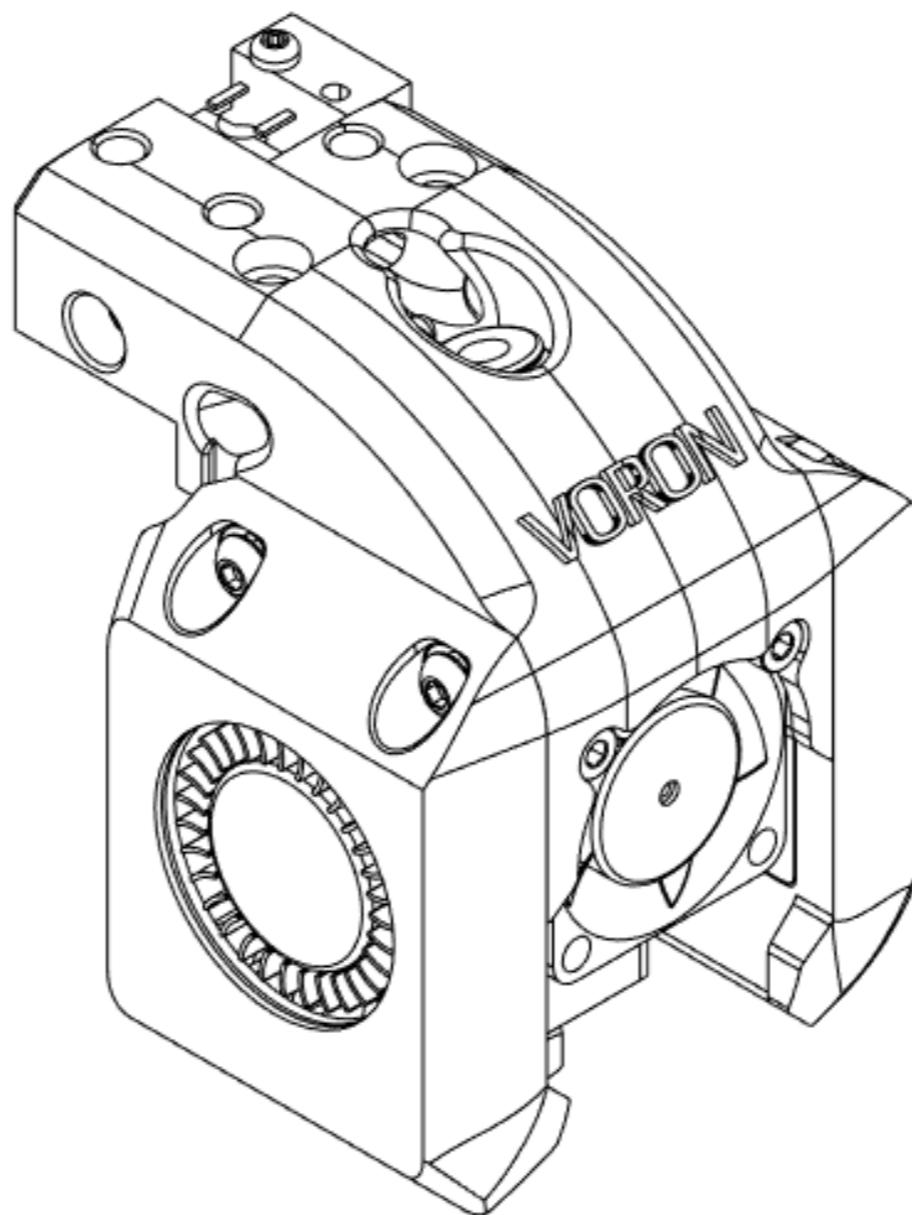




Part	Qty
M3x40 BHCS	2



Part	Qty
Microswitch	1
M2x10 Self Tapping	1



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andylsun	dgcaste	fujimonster	Minasokoni	Timmit99	insurgus
Arksine	DocJeeves	Fulg	Nemgrea	tinpec	johnprime
ArmyAg08	doowrednu	Hackdoggo	pnewb	Trunkmonky	resam
bahahah	Drbpgh	lakabos	pnokel	Ubernero	Stephan
Boff	dunar	Immutef	railgunner13f	_unregistered	wile.e.coyote
<i>our husbands/wives/children/pets/significant others: for putting up with our shit, and dealing with our aliexpress packages</i>					

VORON ZERO

Development Graveyard

