



PRO4848 CNC 4' x 4' **Assembly Instructions**

v2019Q1.3, 19.1 Model Revision

READ THE FOLLOWING BEFORE ASSEMBLING YOUR PRO 4' X 4' CNC MACHINE KIT

1. The machine assembly is broken down into 8 main sections, visible in the PDF bookmarks tab.
2. It is helpful to look through each section prior to beginning its assembly.
3. Each section begins with an image of the fully assembled component. If needed, refer to this as a reference while completing individual assembly steps.
4. Each section will identify the parts and tools needed for those assembly steps, as well as which box contains those parts. Identification of fasteners is easier if they are kept in their respective fastener bags.
5. Assembling the larger components, such as the base and optional leg kit, is made easier with two people. Though not required, this can make the process more efficient.
6. Listed below are three types of notes you will see throughout the assembly instructions:

Section Note

Section Notes can be used to denote when the section is configuration specific.
(ex: NEMA 23 vs NEMA 34 electronics)

Assembly Note

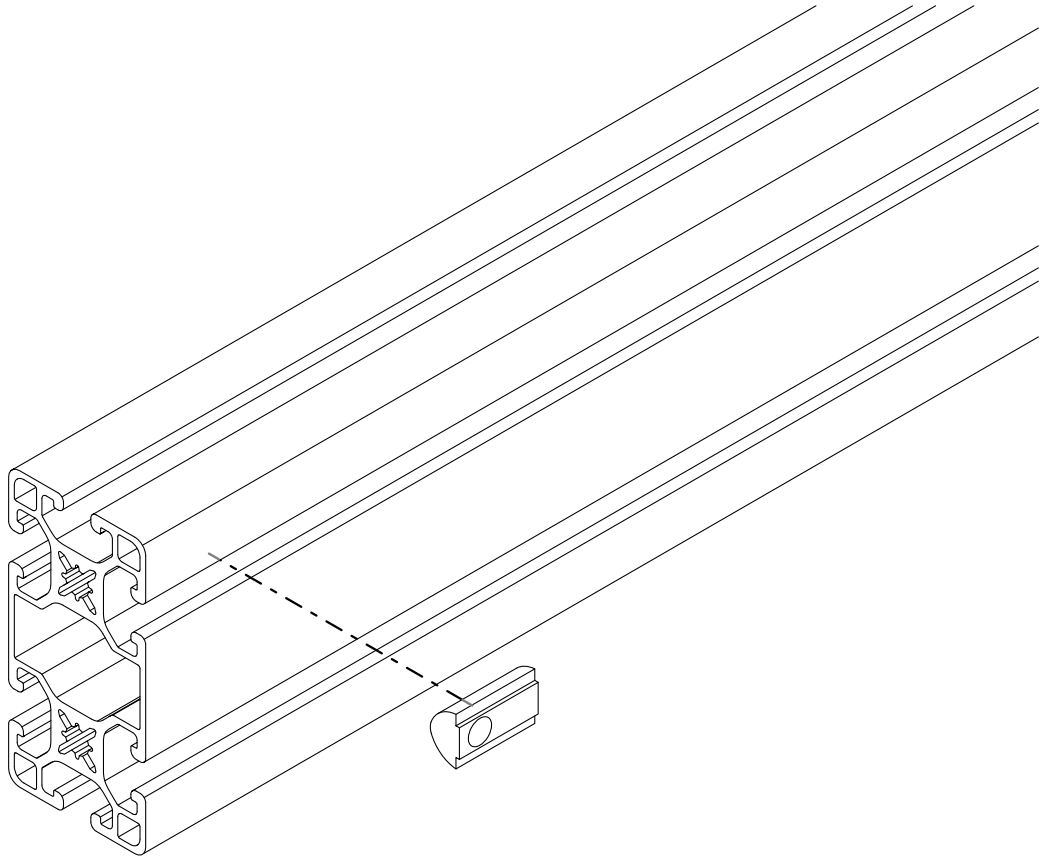
Assembly Notes are used to call attention to certain parts of the assembly step. Pay attention to these as they provide important information for a successful machine build.

Machine Configuration Options

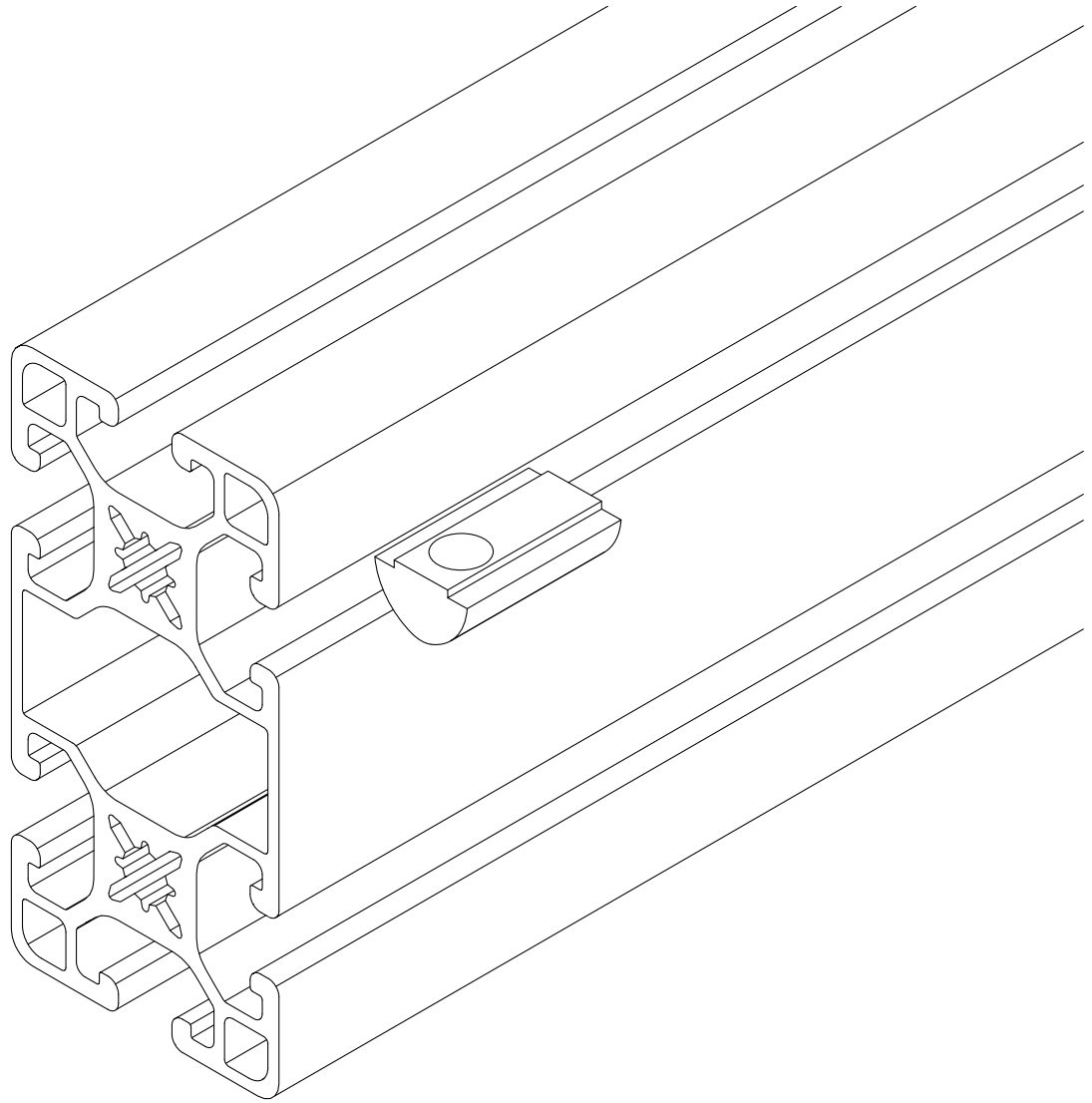
These will denote specific steps to follow if you purchased the optional Extended Gantry, Custom Gantry Height, or Extended Z-Axis Travel.

7. Throughout the assembly of your machine, you will use Roll-in T-Nuts. Review the instructions on the following pages for proper use of this component.

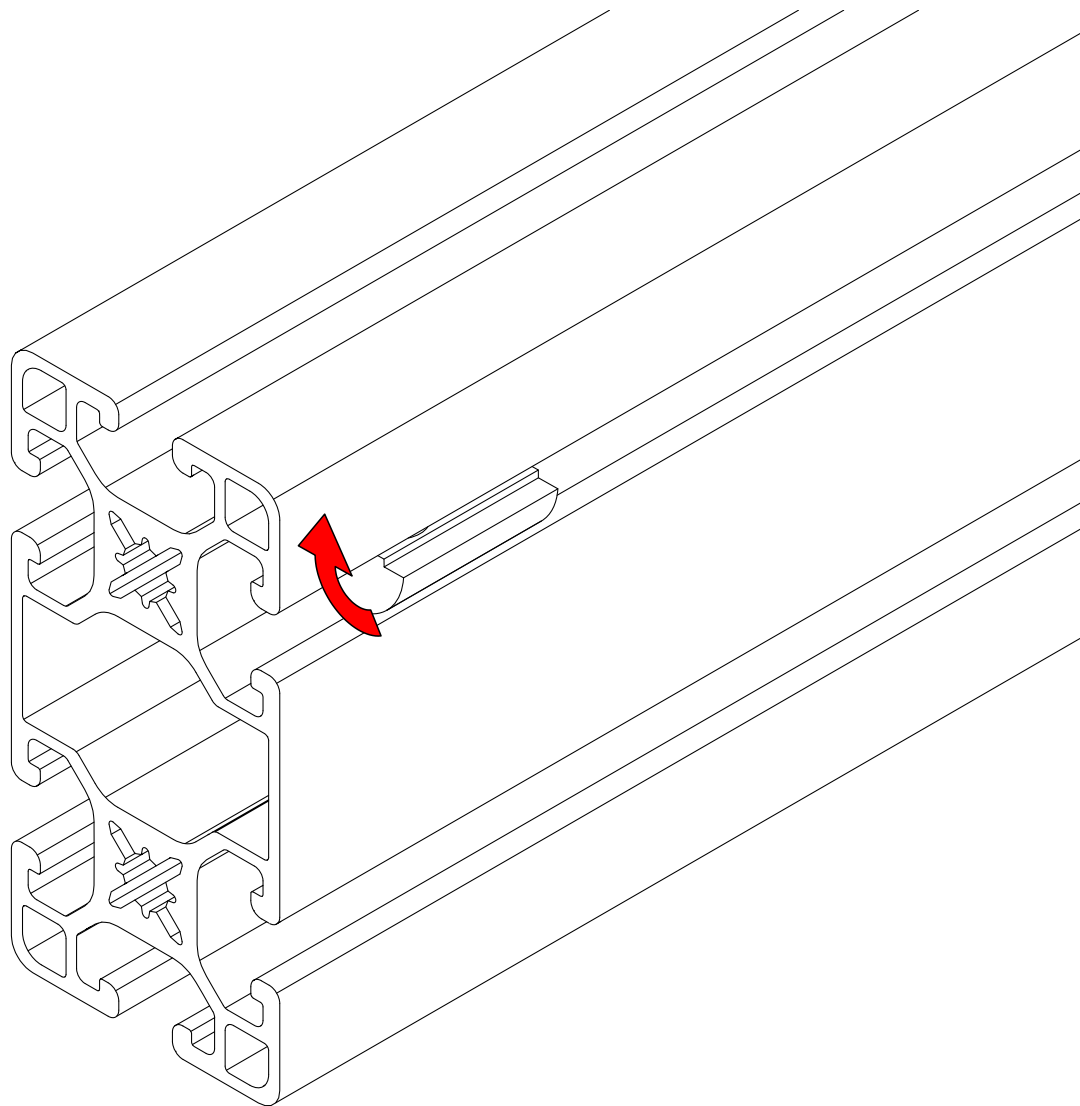
Roll-in T-Nuts



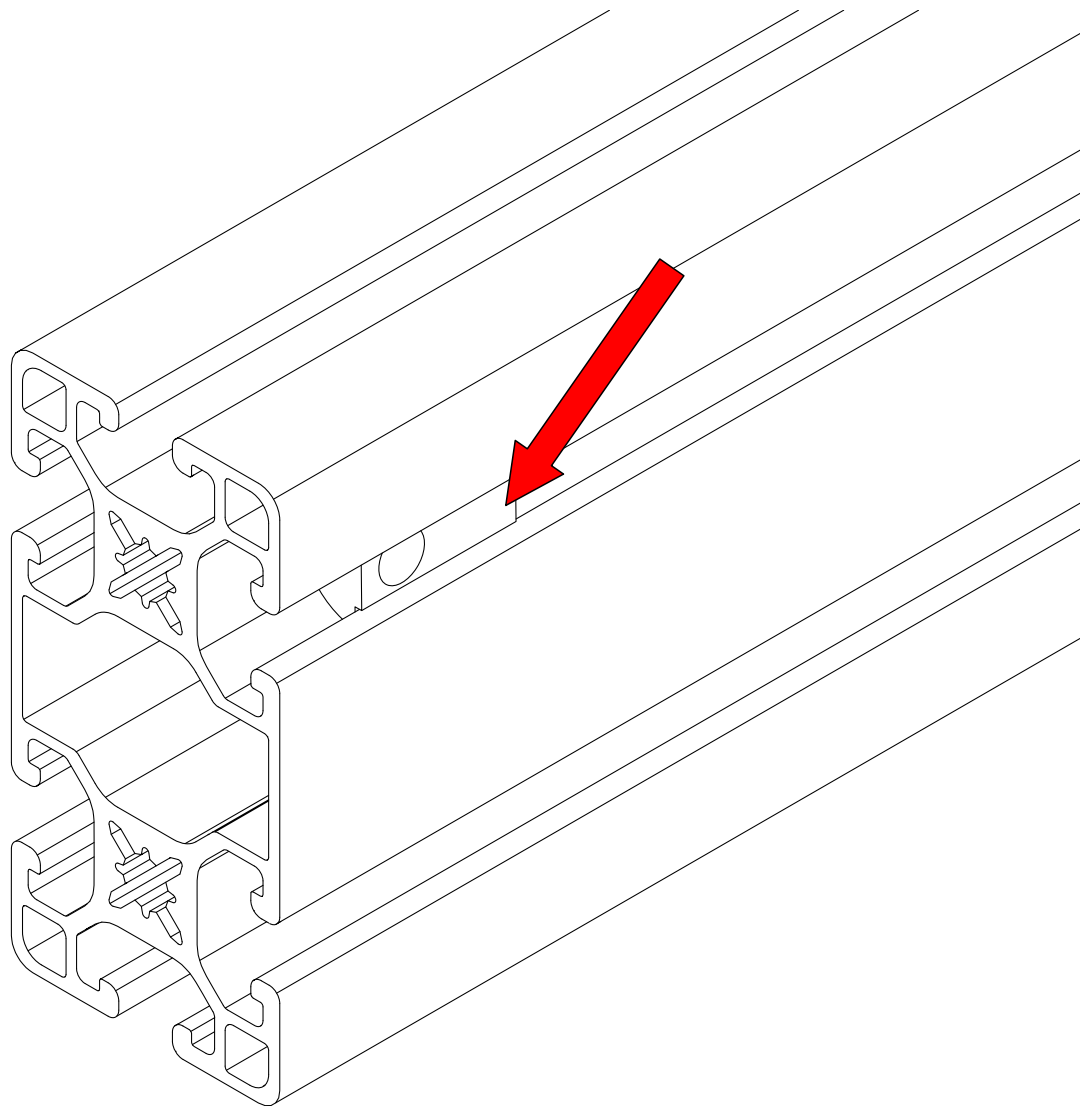
- Assembly steps will depict Roll-in T-Nut installation as shown above.



- To install in the appropriate extrusion slot, position the T-Nut as indicated.



- Insert the T-Nut into the extrusion slot and rotate 90°.



- When properly installed, the indicated face of the T-Nut will be parallel with the face of the extrusion.

Assembly Note

A small allen wrench can be inserted into the hole of the T-Nut and subsequently used to rotate it the full 90°.

Tools List

Required tools for assembly of your machine:

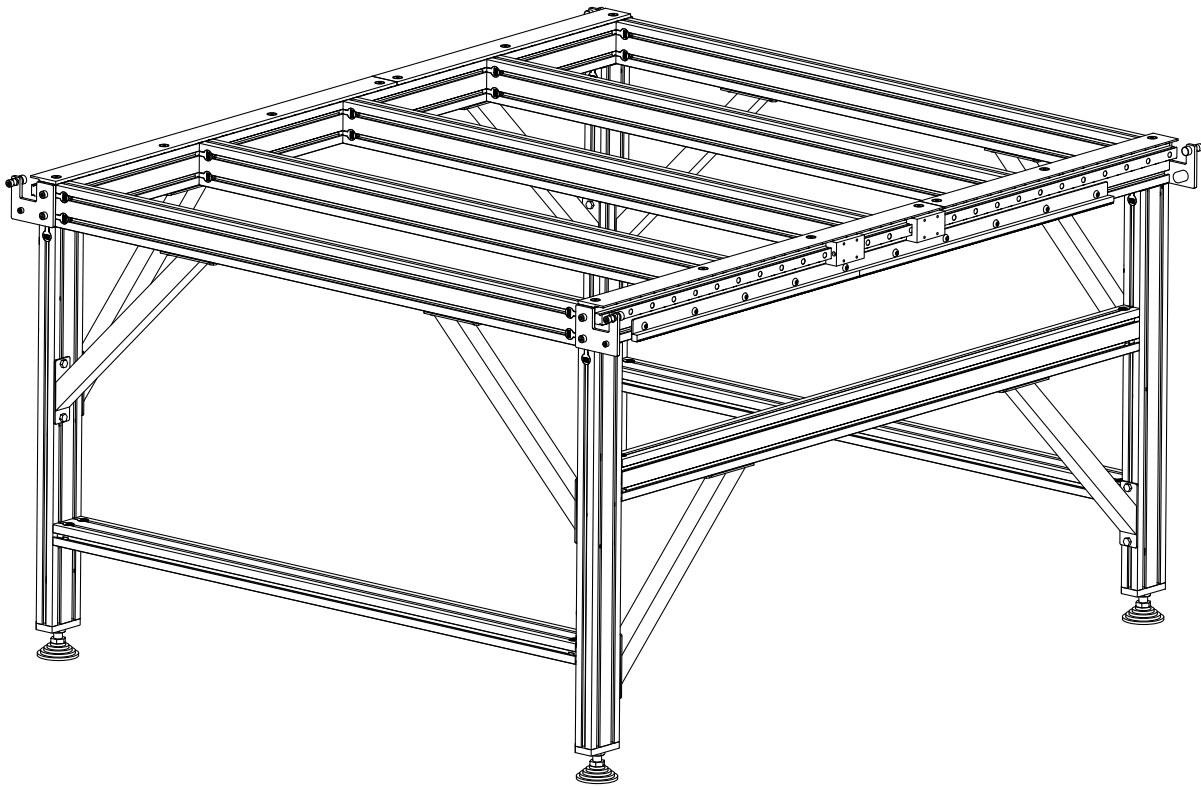
- Metric Ball-End Allen Wrenches:
 - 2.5mm, 3mm, 4mm, 5mm, 6mm
- Imperial Allen Wrenches:
 - 3/32", 1/4"
- Adjustable Wrench
- Standard (Flat Tip) Screwdriver
- (2) Clamps
 - 6" C-Clamps recommended
- Tape Measure

Additional recommended tools and supplies:

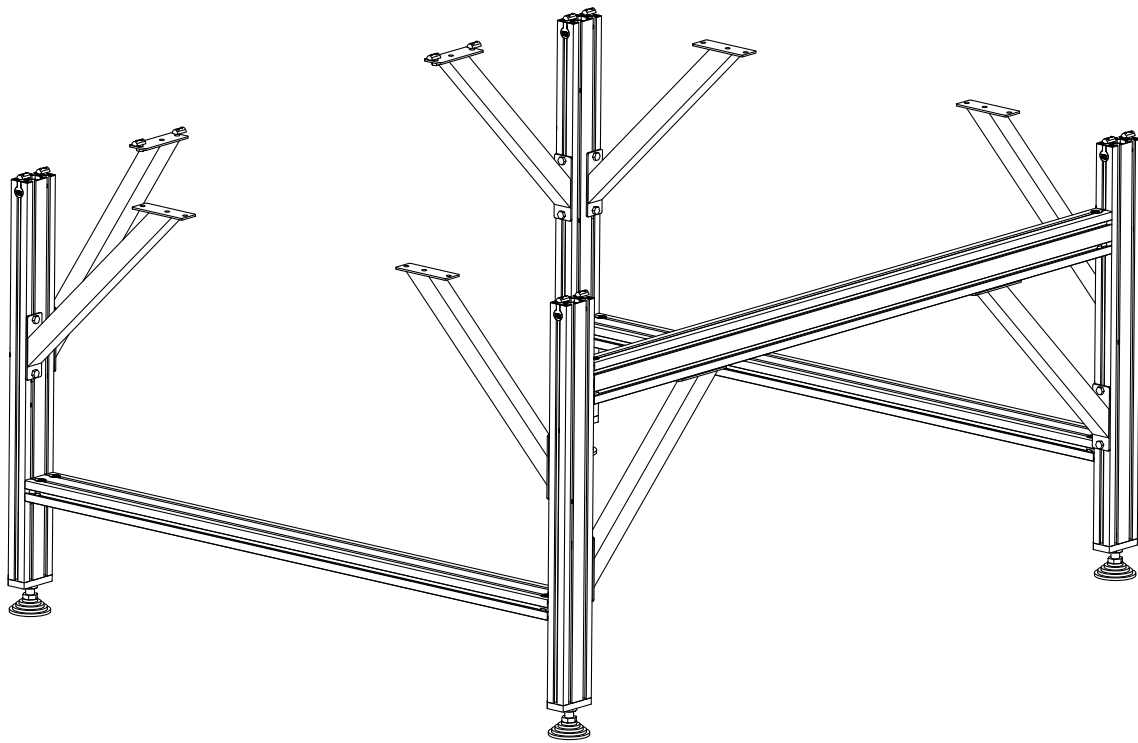
- 6mm Hex Ball-end Power Bit and Drill/Impact Driver
- Metric Combination Wrenches:
 - 8mm, 10mm, 13mm, 16mm, 17mm
- Metric Tape Measure
- Threadlocker (Loctite Blue 242)
- Dimensional Lumber (refer to Step 1.2.3.4)
- (2) 24" Hand Trigger Clamp
- Cable Ties



Section 1: Base Assembly



1.1 Table Leg Assembly



Section Note

Skip to Section 1.3 if you are not using a CNC Router Parts leg kit

Parts and Tools Required

The following parts and tools will be used Section 1.1

QTY	Part/Description	Packaged In
2	4080 Leg Crossmember Extrusion, 1250mm (49-1/4")	Leg Extrusion
4	4080 Leg Extrusion, 750mm (29-1/2")	Leg Extrusion
1	4080 Electronics Bar Extrusion, 1440mm (56-11/16")	Leg Extrusion
8	CRP813-01 Leg Gusset Kit	Leg Gussets
2	CRP813-00-LEGSET-HW-BAG: - (12) 40 Series Anchor Fastener (Total QTY: 24) - (16) M8 x 30mm Socket Head Cap Screw (Total QTY: 32) - (24) M8 Roll-in T-Nut (Total QTY: 48) - (2) 7111 Foot Plate (Total QTY: 4) - (2) H172 Leveling Foot (Total QTY: 4) - (12) M8 x 14mm Hex Cap Screw (Total QTY: 24) <i>Remaining parts from this kit used in future sections</i>	CRP810 Base Kit
1	CRP813-00-ELCBAR-HW-BAG: - (4) 40 Series Anchor Fastener - (4) M8 x 30mm Socket Head Cap Screw - (4) M8 Roll-in T-Nut <i>Remaining parts from this kit used in future sections</i>	CRP810 Base Kit

Required Tools:

- 6mm Ball-End Allen Wrench
- Adjustable Wrench
- Tape Measure

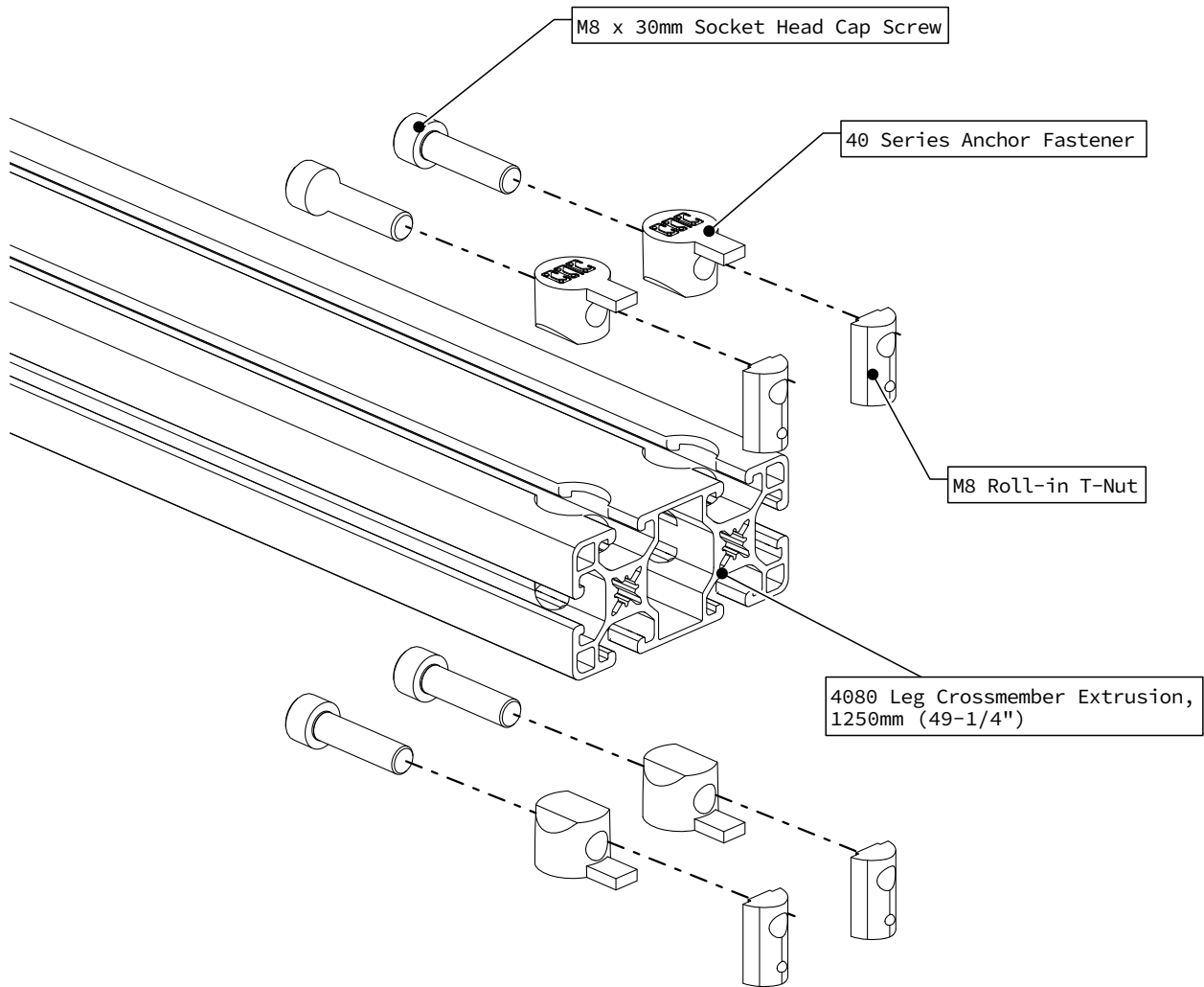
Recommended Additional Tools:

- 6mm Hex Ball-End Power Bit
- 13mm Combination Wrench



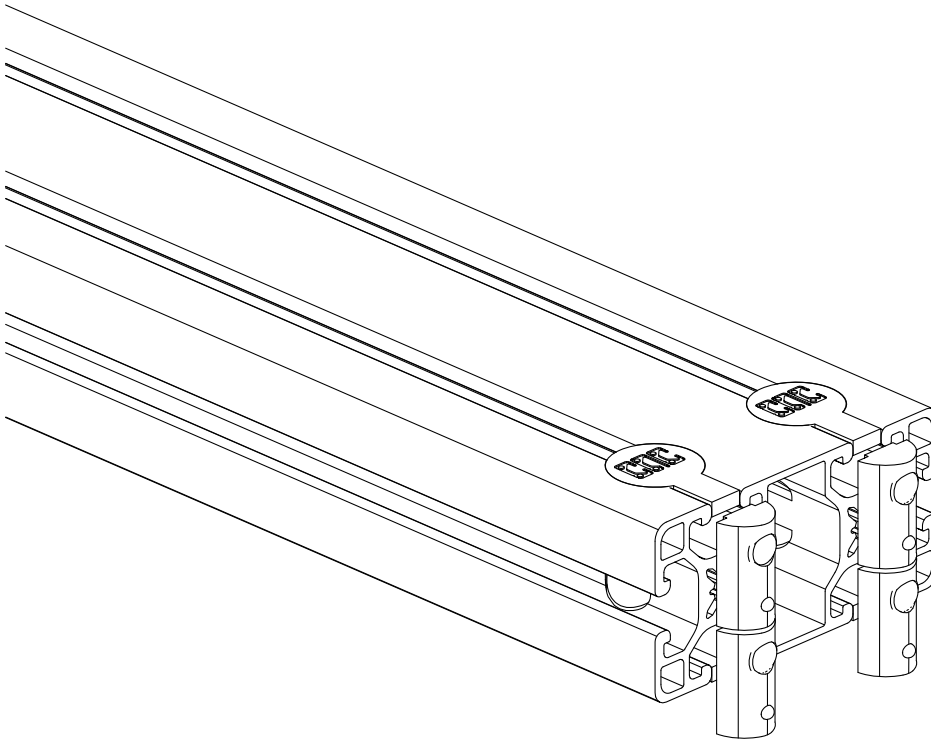
1.1.1 Anchor Fastener Assembly

1.1.1.1



- Thread the socket head cap screws into the T-Nuts through the anchor fasteners as indicated.

1.1.1.2

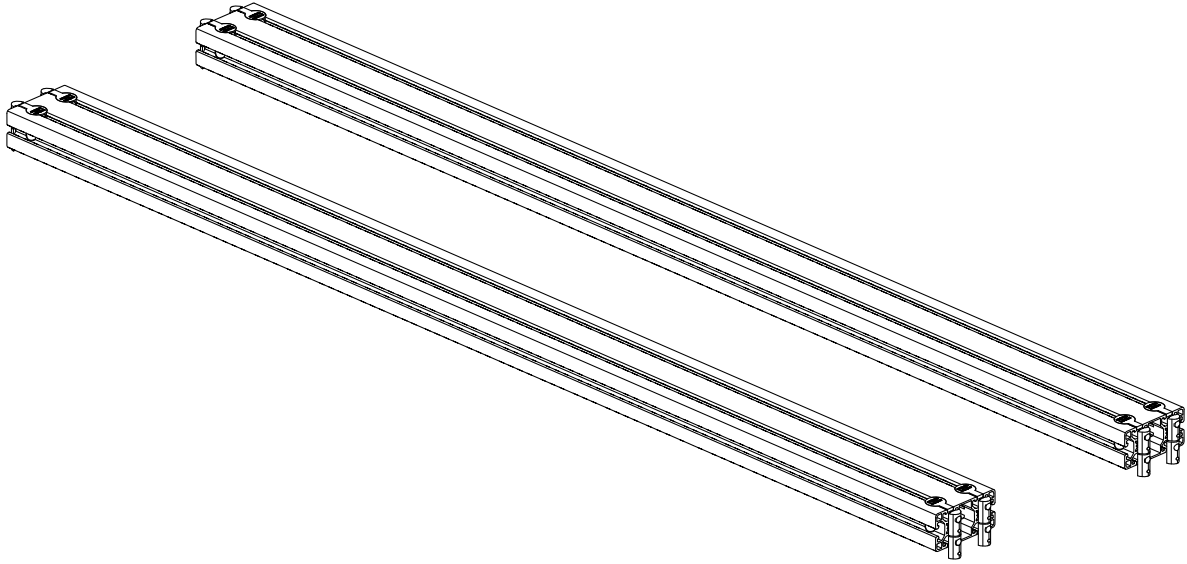


- Slide the anchor assemblies into the 1250mm (49-1/4") 4080 Leg Crossmember Extrusion.

Assembly Note

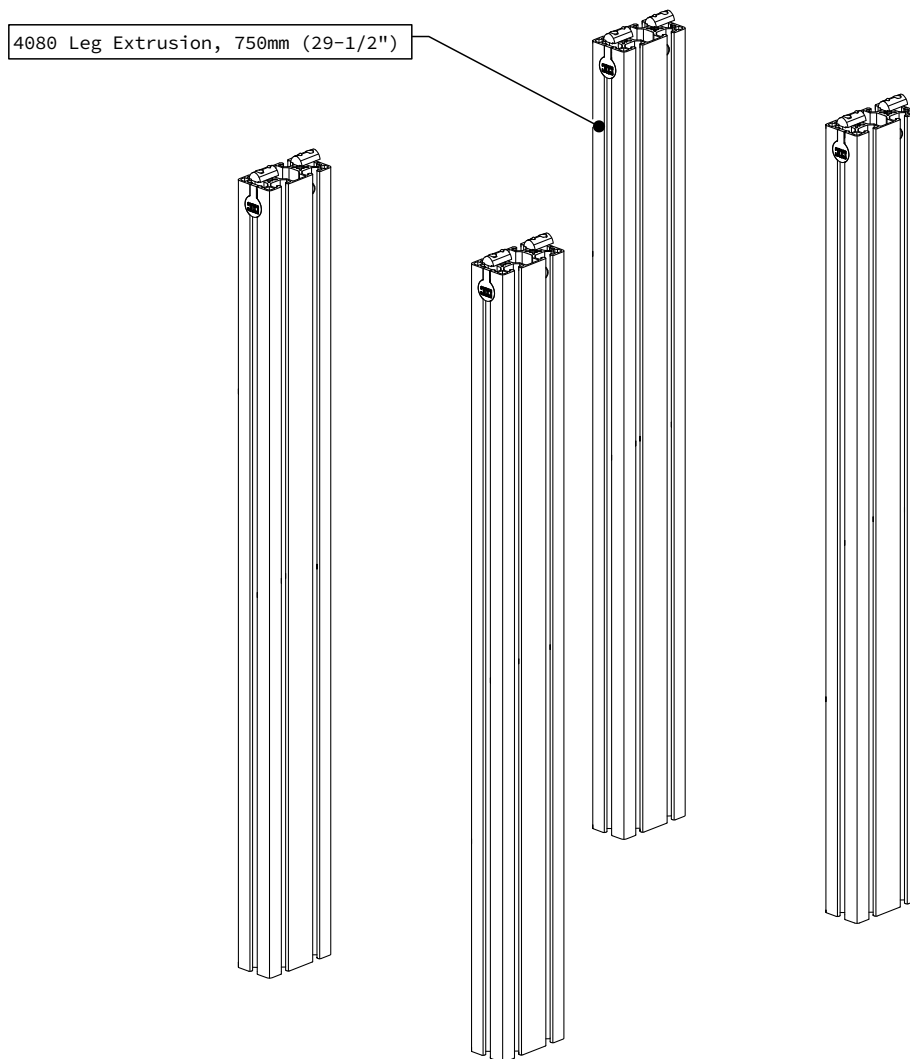
It can be helpful to use a small piece of masking tape to hold the anchor assemblies in the extrusion during leg assembly.

1.1.1.3



- Repeat the previous steps to install anchor fasteners on both sides of the 1250mm (49-1/4") Leg Crossmember Extrusions.

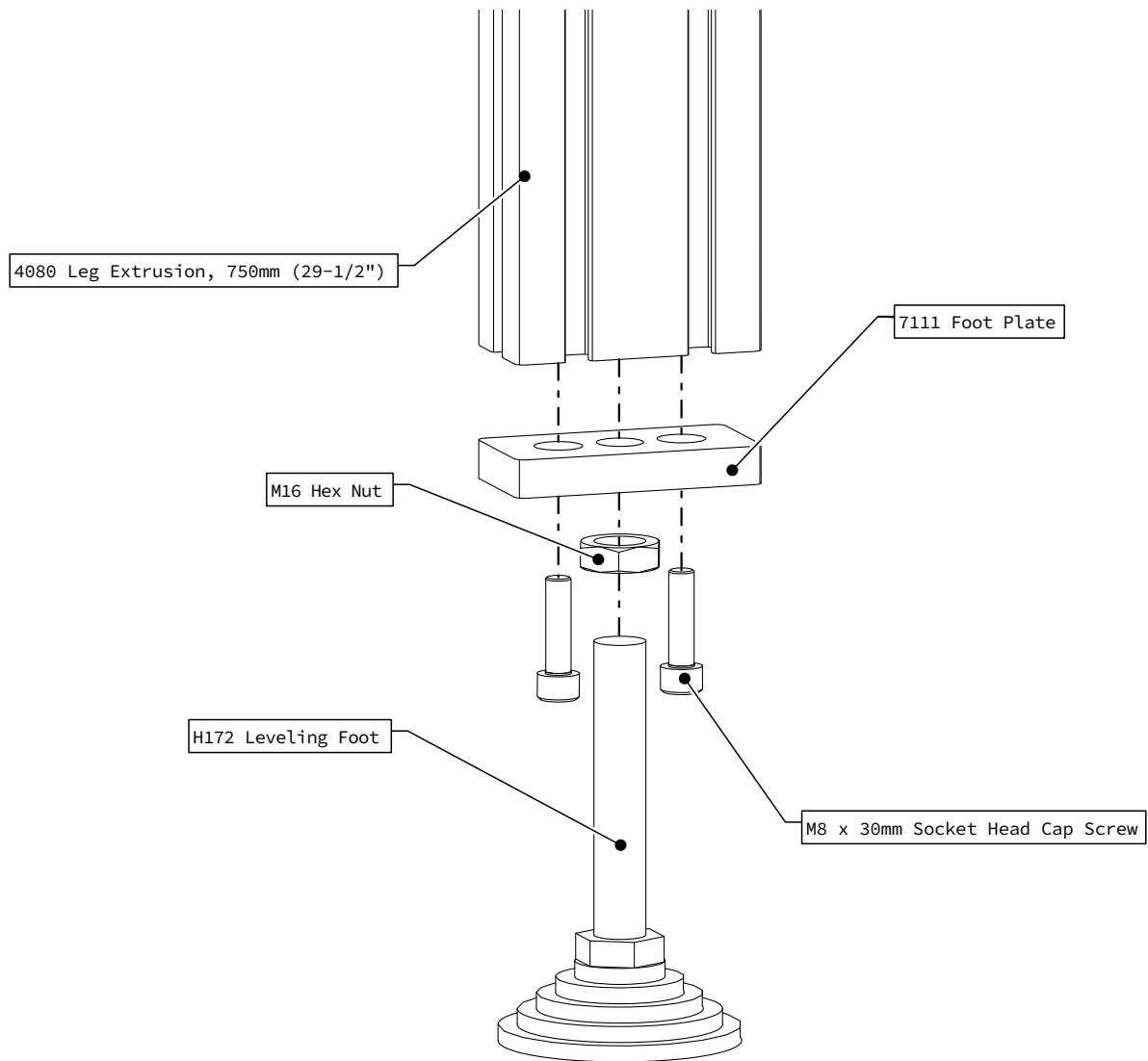
1.1.1.4



- Repeat the previous steps to install anchor fasteners on one side of each 750mm (29-1/2") Leg Extrusion.

1.1.2 Leveling Feet Installation

1.1.2.1

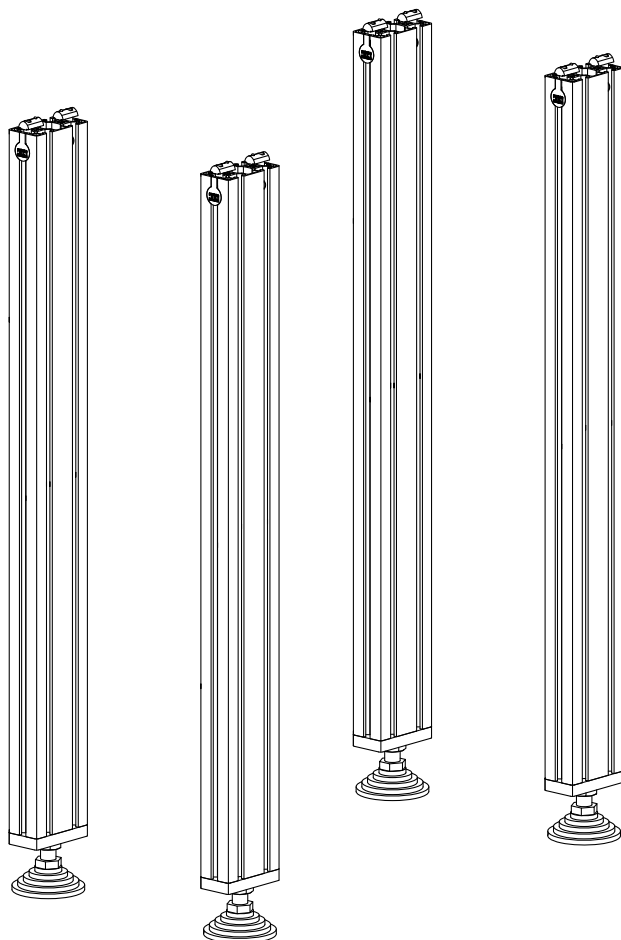


- Install a foot assembly onto each 750mm (29-1/2") Leg Extrusion as indicated.

Assembly Note

It is recommended to first install the Foot Plate onto the extrusion before threading in the Leveling Foot.

1.1.2.2



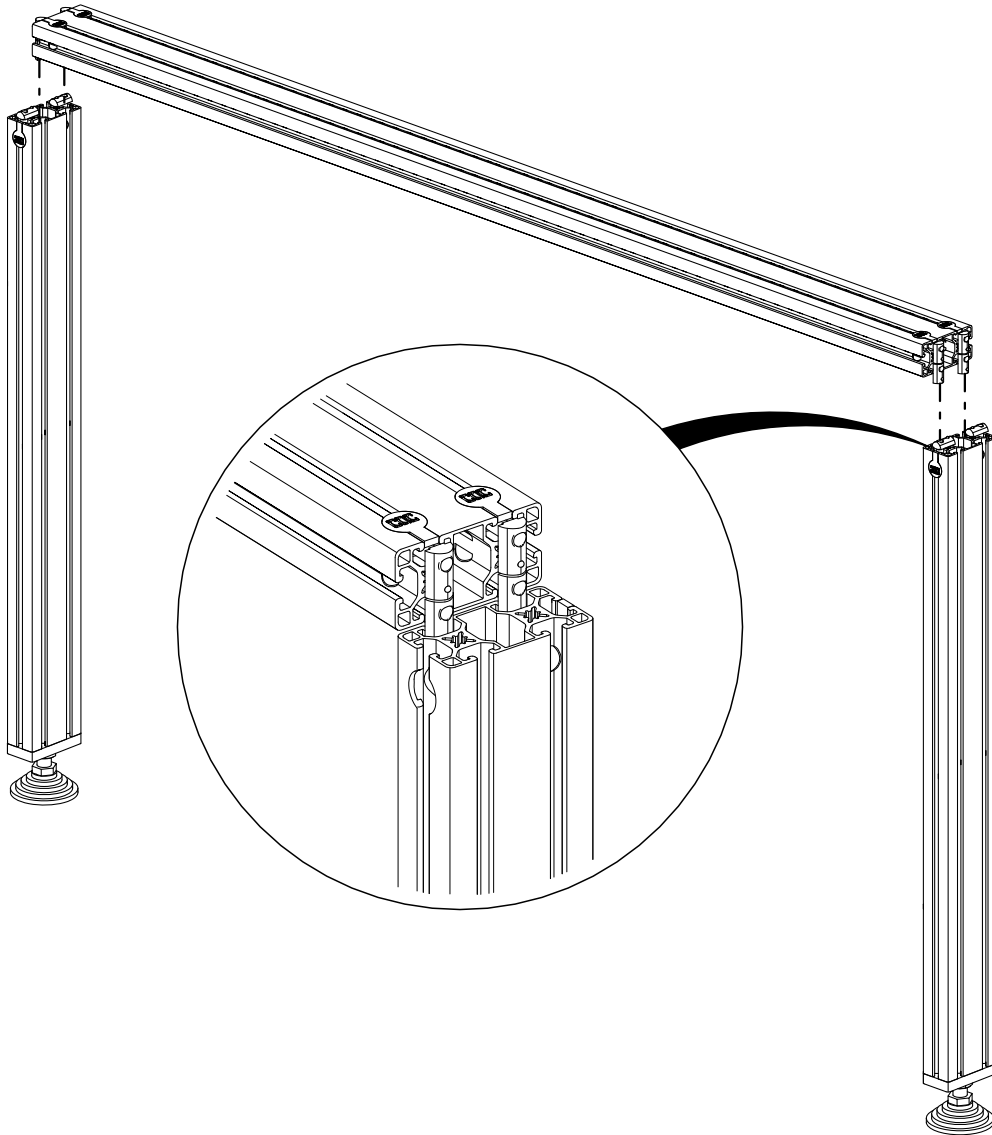
- Repeat the previous steps for each of the 750mm (29-1/2") Leg Extrusions as indicated.

Assembly Note

Initially thread the Leveling Feet all of the way into the Foot Plate. After machine assembly, final adjustments will be made in the **table leveling procedure**. (www.cncrouterparts.com/leveling-squaring-and-tramming-your-cnc-machine-p-438.html)

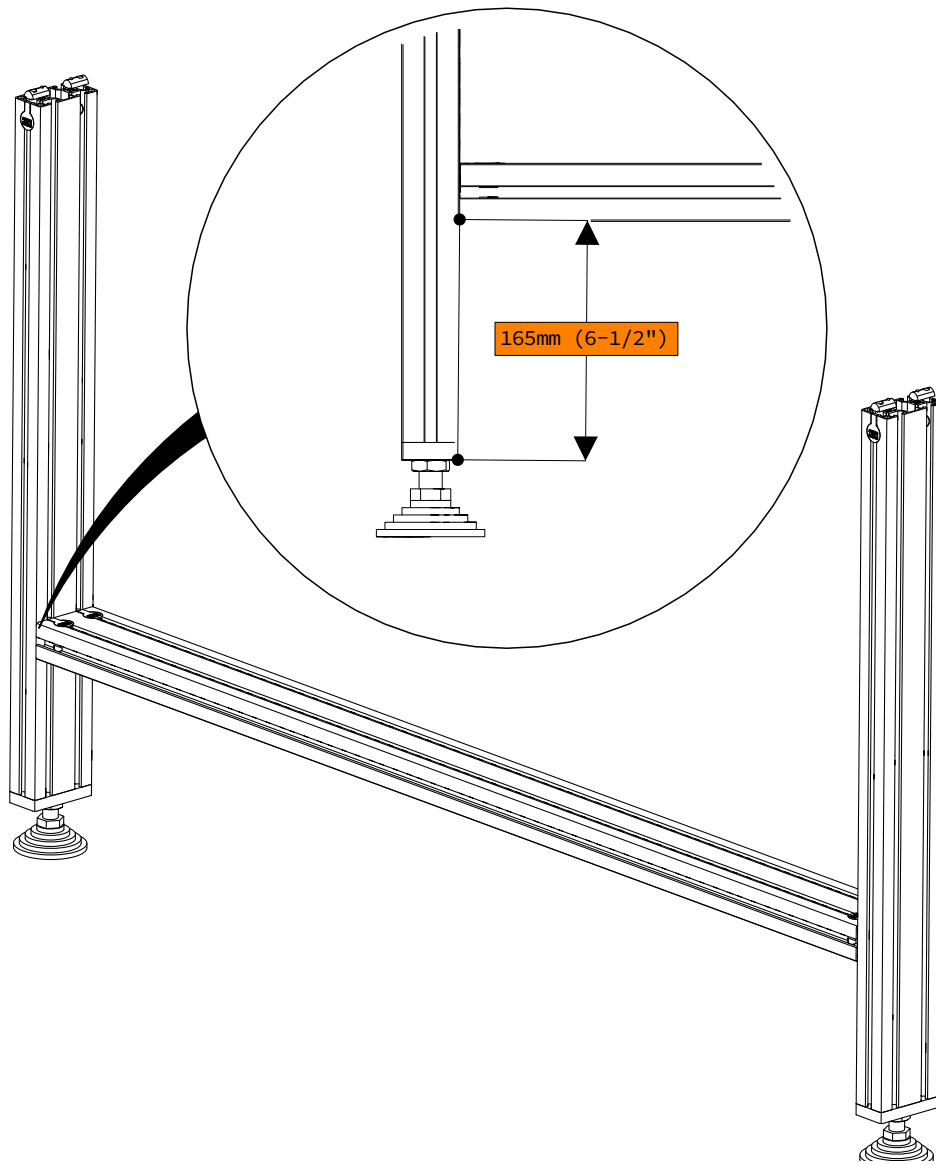
1.1.3 Leg Crossmember Assembly

1.1.3.1



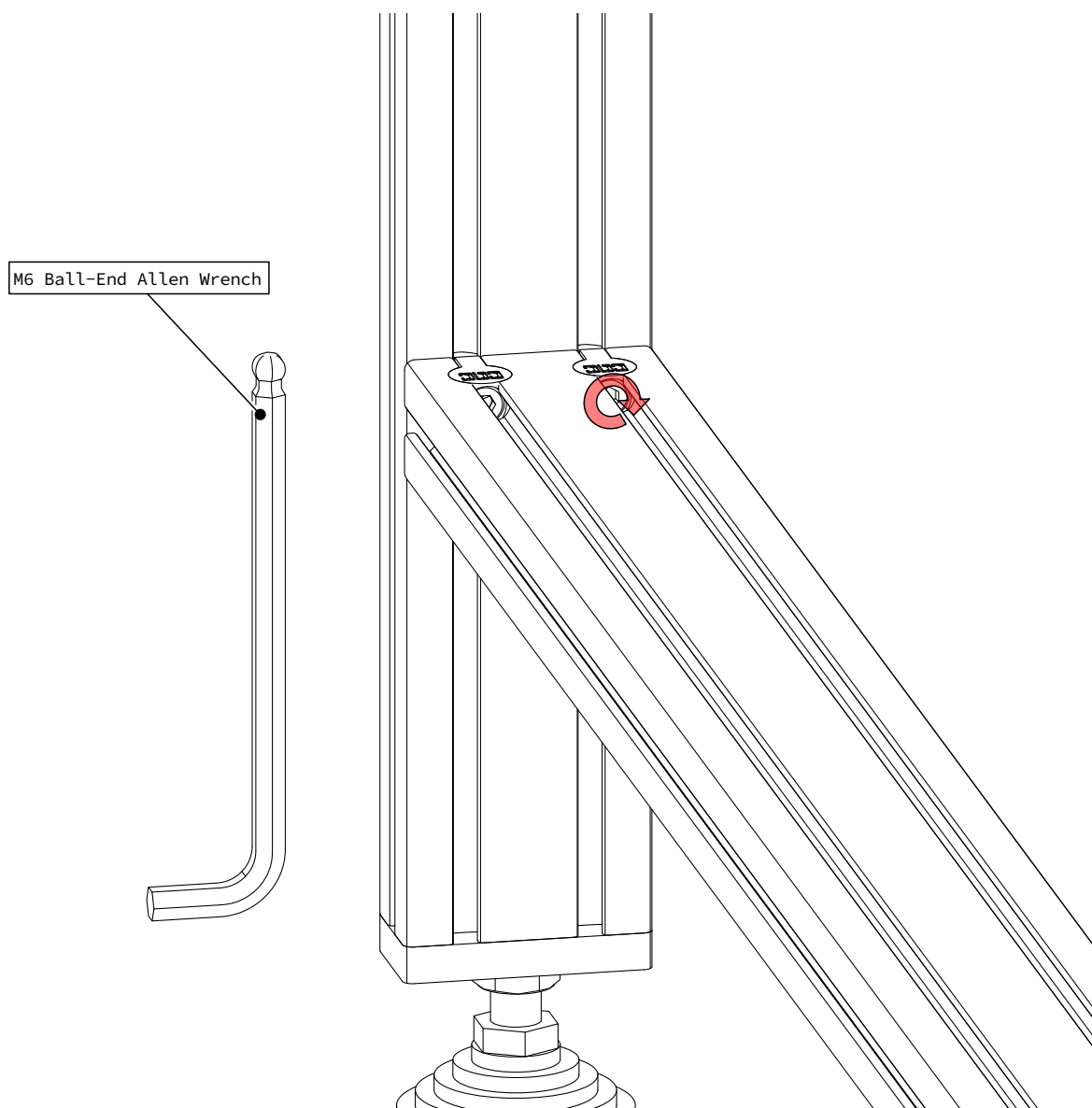
- Use a section of 1250mm (49-1/4") Leg Crossmember Extrusion to join two of the 750mm (29-1/2") Leg Extrusion sections.

1.1.3.2



- Position the leg crossmember 165mm (6-1/2") from the bottom of the leg as indicated.

1.1.3.3



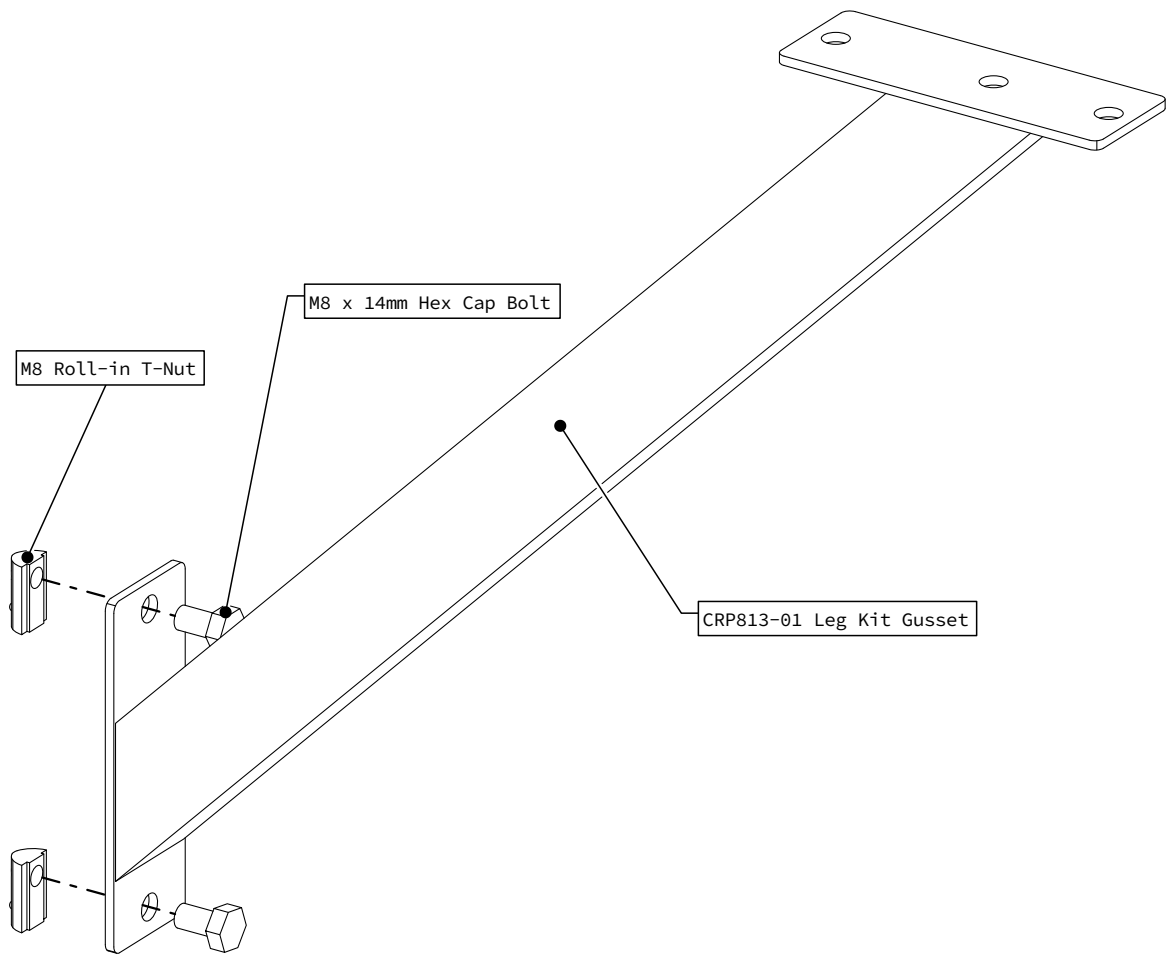
- On each side of the leg crossmember tighten the anchor fasteners incrementally, alternating between fasteners.

Assembly Note

For tightening the anchor fasteners, an M6 ball-end allen wrench is required. An M6 ball-end driver attachment for a drill or impact driver can make assembly more efficient.

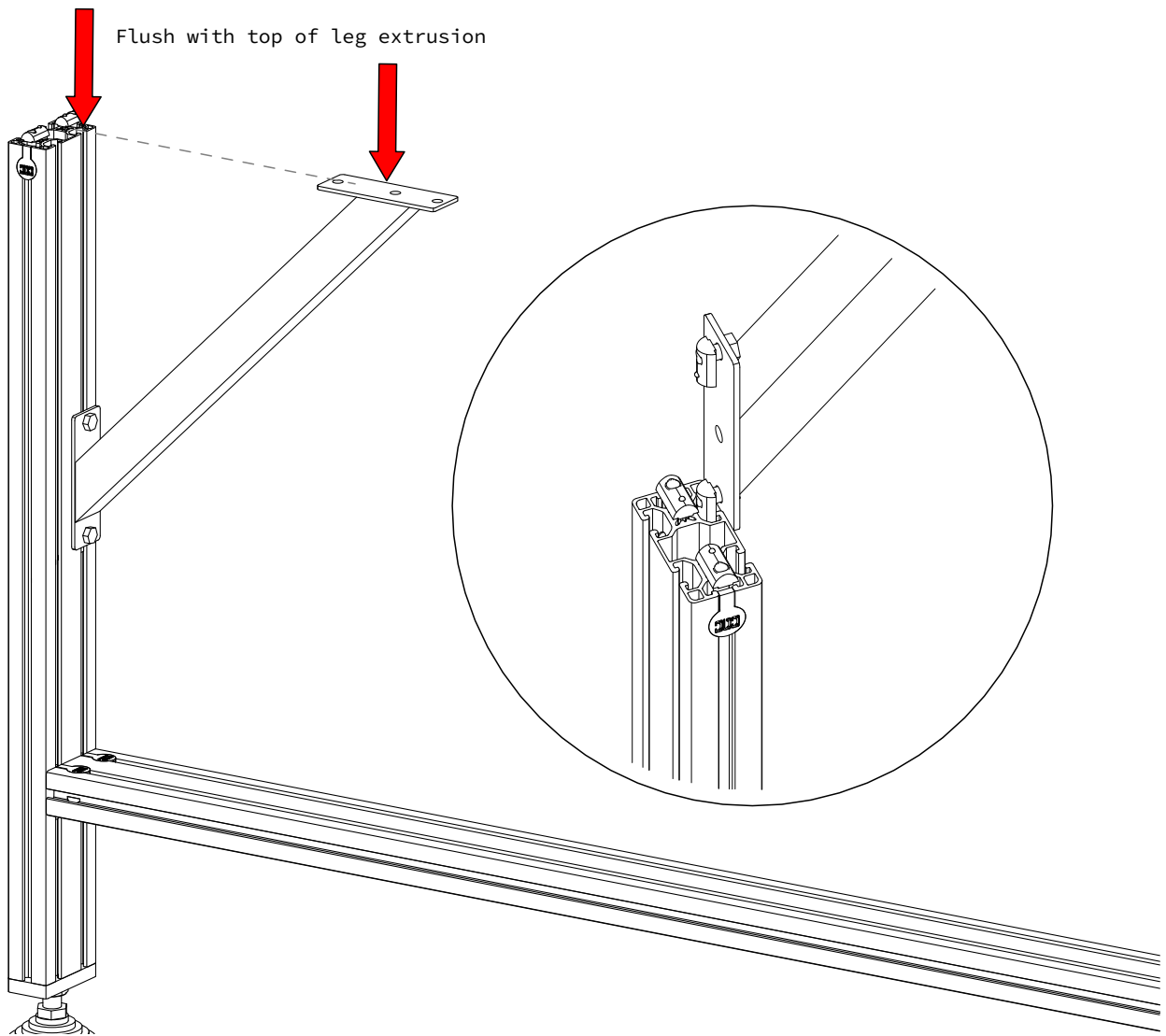
1.1.4 Leg Gussets Installation

1.1.4.1



- Install M8 bolts through the gusset as indicated, partially threading on the T-Nuts.

1.1.4.2

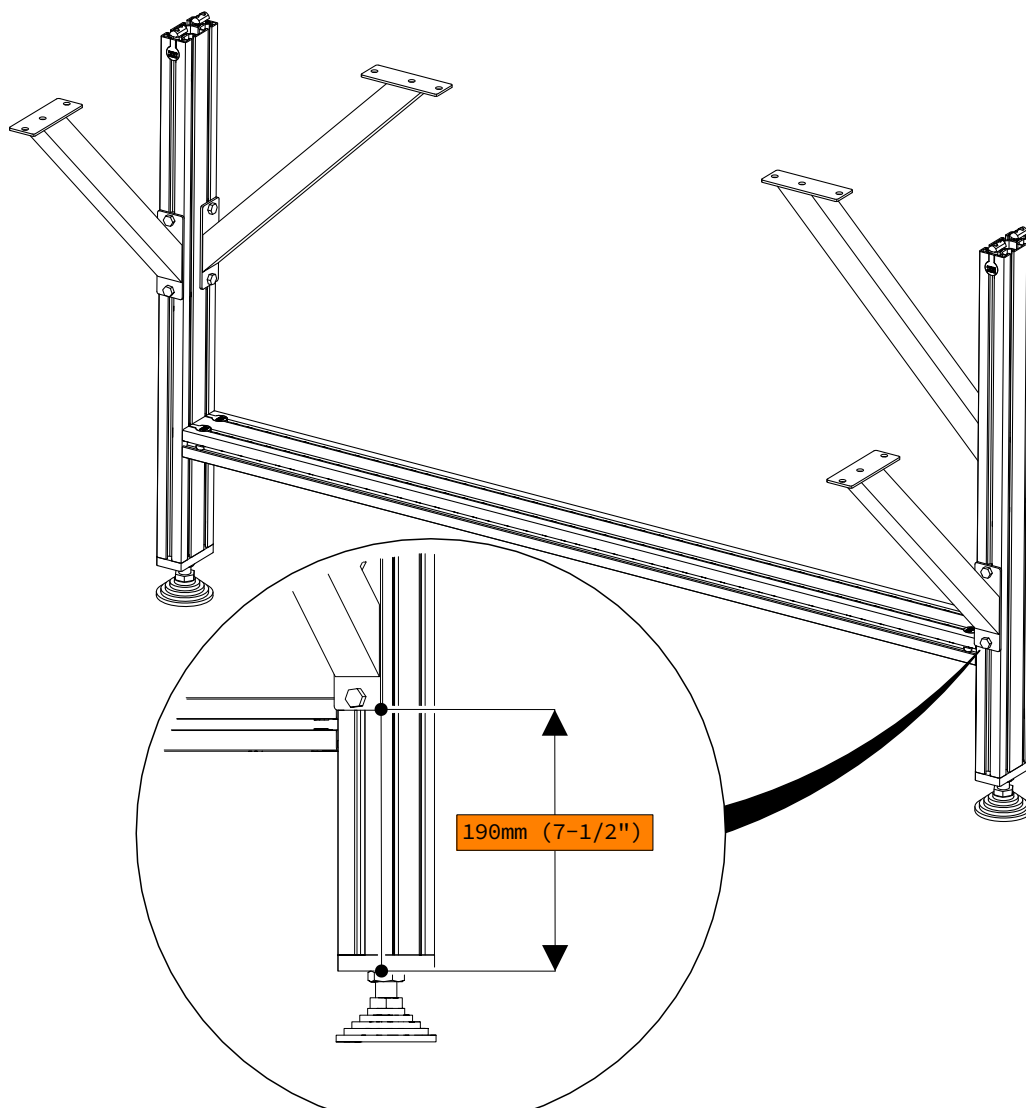


- Slide the gusset into the extrusion as indicated and partially tighten the M8 bolts.

Assembly Note

The top of the gusset should be roughly flush with the top of the extrusion.

1.1.4.3

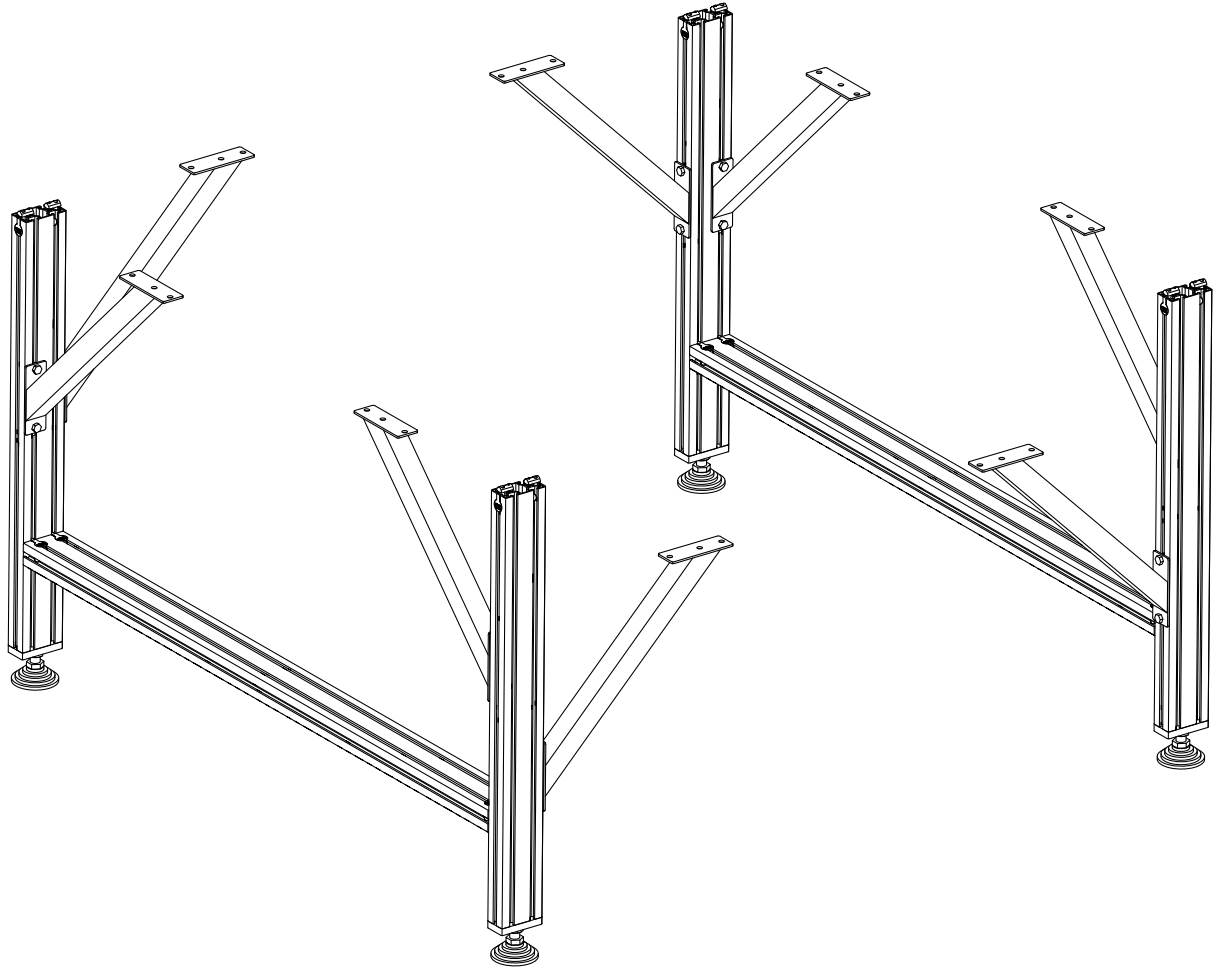


- Install 3 additional gussets to the leg assembly as indicated.

Assembly Note

One gusset should be lowered to the dimension shown to accommodate the electronics mounting bar. The dimension is measured from the bottom of the foot plate to the bottom of the gusset.

1.1.4.4



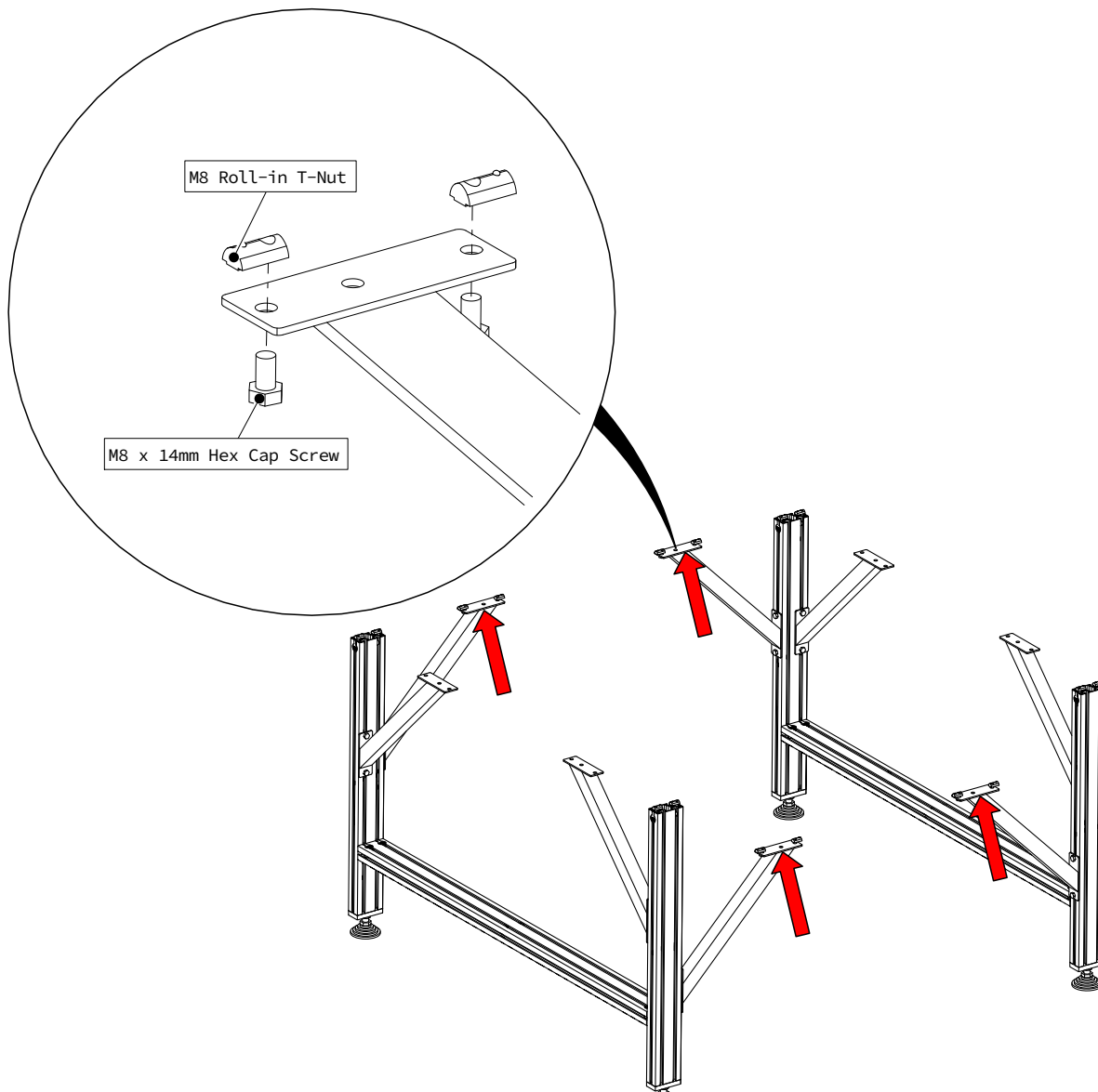
- Repeat the previous steps to assemble the remaining gussets and extrusion sections in the indicated configuration.

Assembly Note

The lowered gussets should be on the same side as indicated.

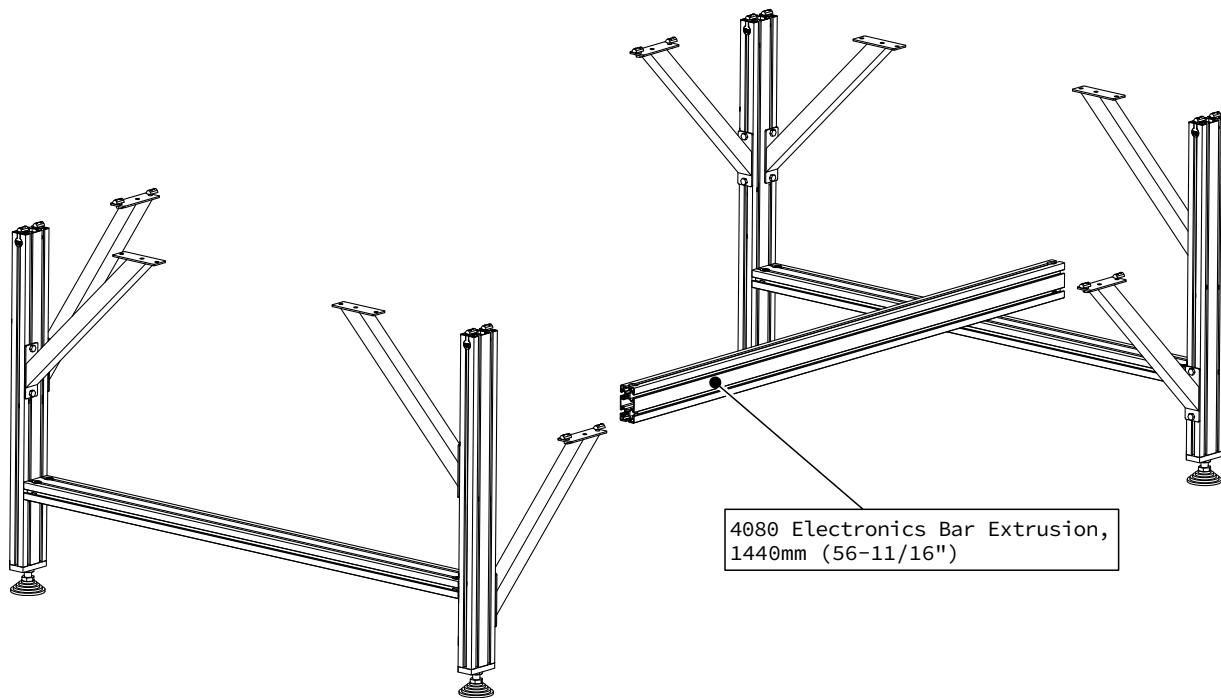
1.1.5 Electronics Mounting Bar Installation

1.1.5.1



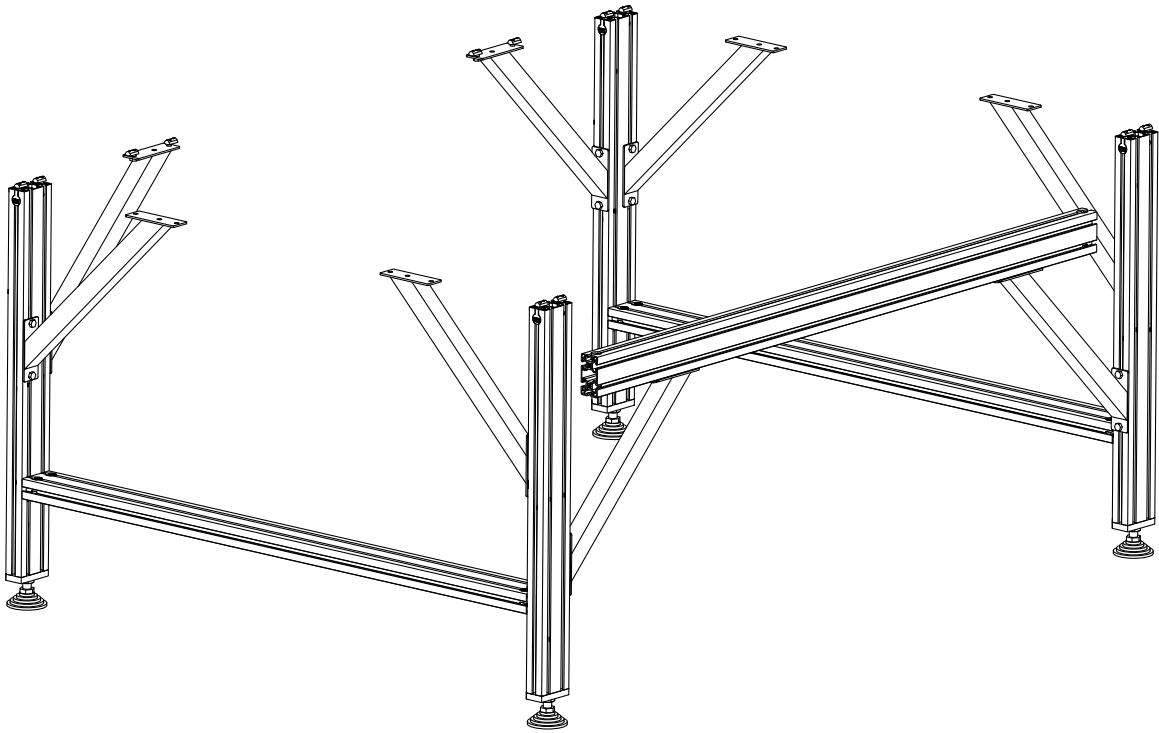
- On the indicated gussets, install M8 bolts and partially thread on the T-Nuts.

1.1.5.2



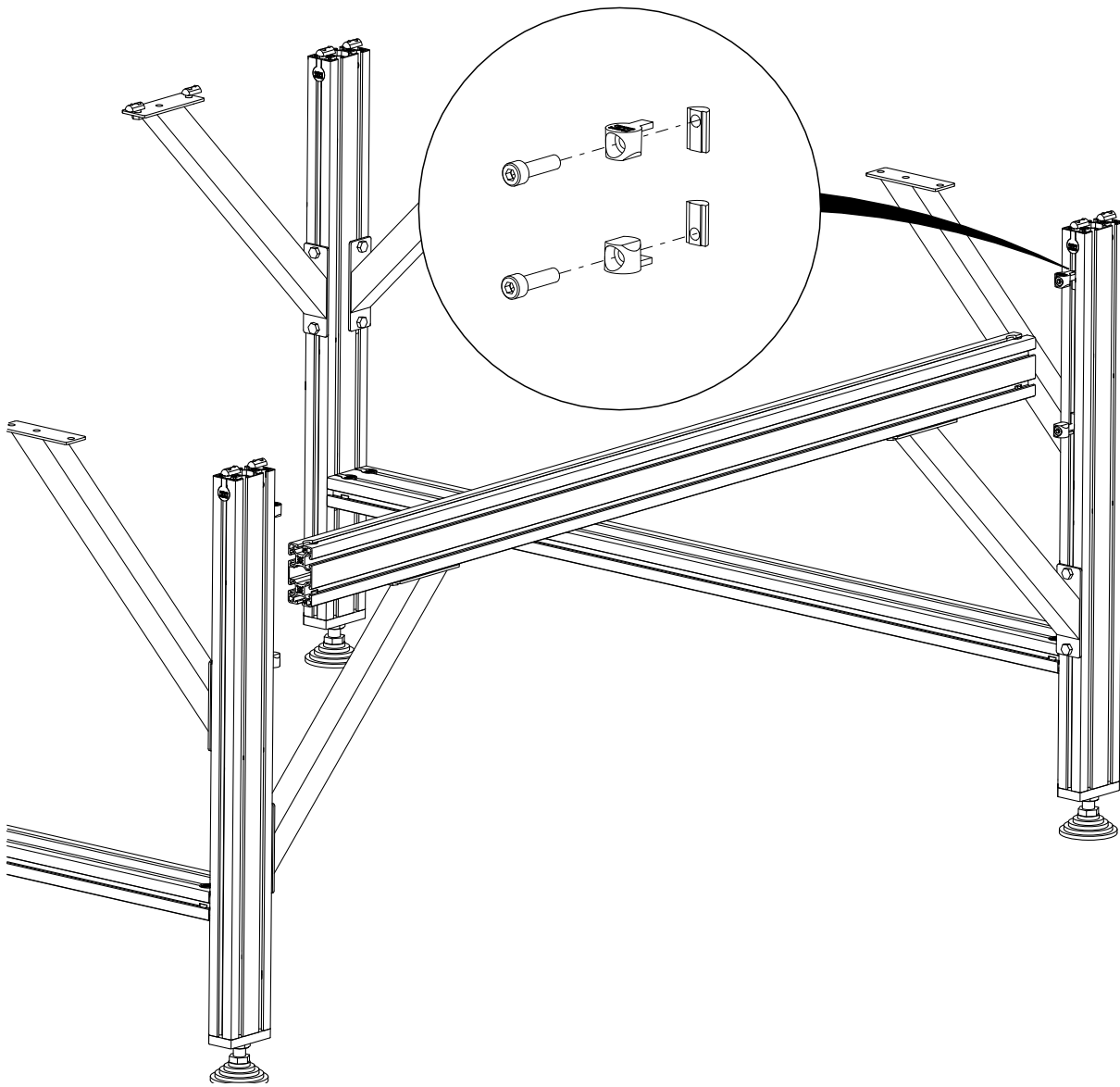
- Separate the leg assemblies to allow room for the 1440mm (56-11/16") Electronics Bar Extrusion to slide on the lower gussets.

1.1.5.3



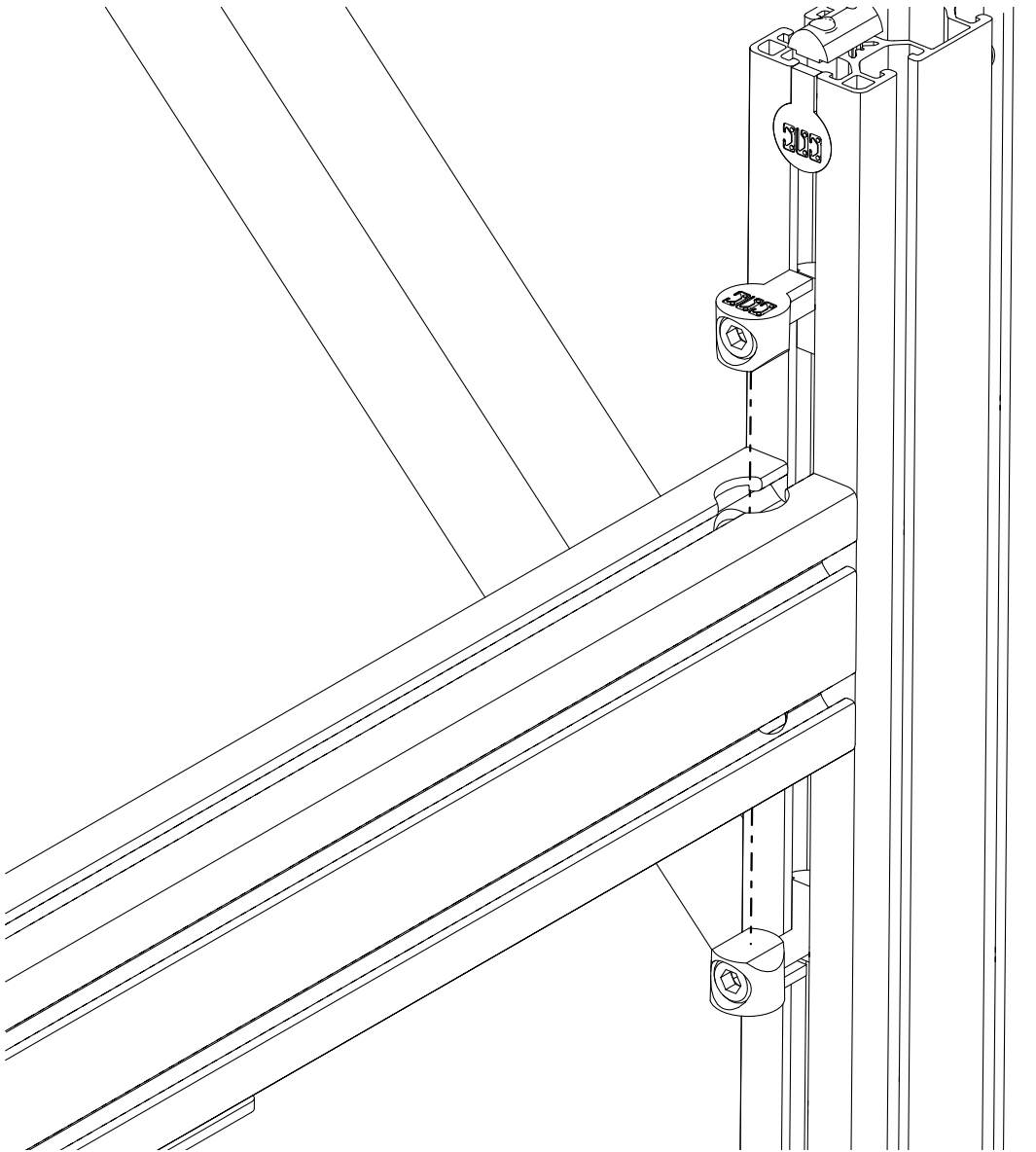
- Slide the electronics bar onto the gussets, leaving space between it and the leg extrusions as indicated.

1.1.5.4



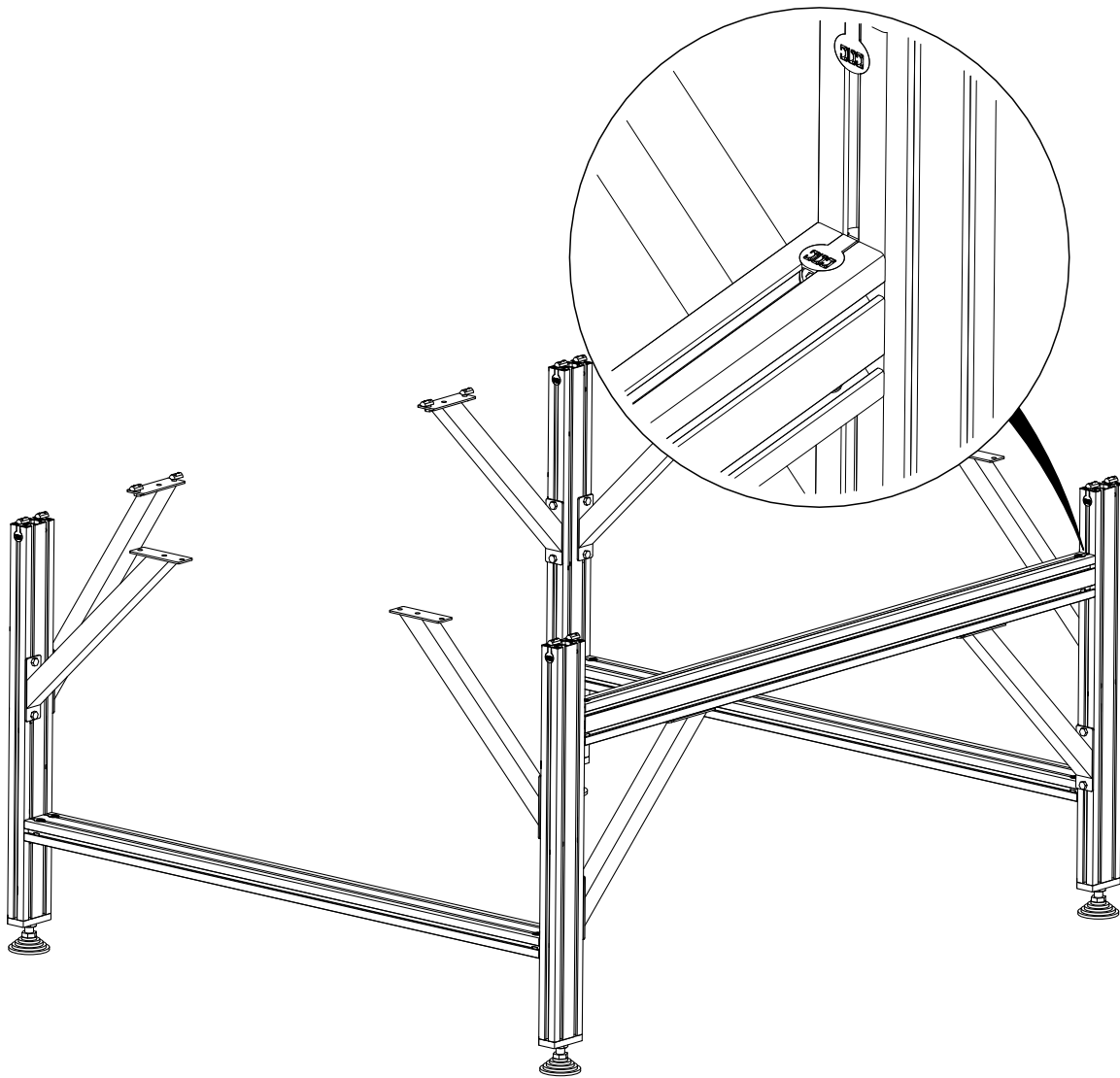
- Slide assembled anchor fasteners into the leg extrusions, positioning them above and below the electronics bar as indicated.

1.1.5.5



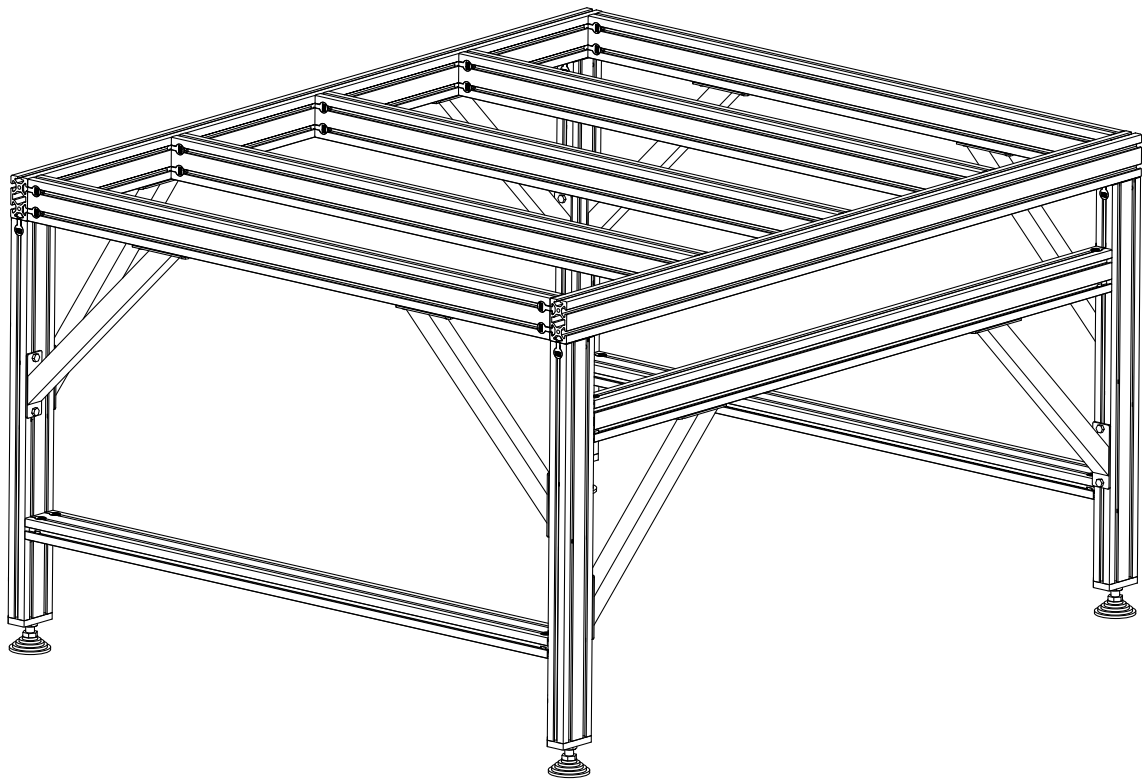
- With the electronics bar flush against the leg extrusion, insert the anchor fasteners.

1.1.5.6



- Complete this process on both sides of the electronics bar.
- Tighten all electronics bar anchor fasteners.

1.2 Table Frame Assembly (with Leg Kit)



Parts and Tools Required

The following parts and tools will be used in Section 1.2

QTY	Part/Description	Packaged In
2	4080 Frame Extrusion, 1600mm (63")	Machine Kit Extrusion
5	4080 Crossmember Extrusion, 1250mm (49-1/4")	Machine Kit Extrusion
1	40-3100-00 - 40 Series Short Double Anchor Assembly: - (40) 40 Series Anchor Fastener - (40) M8 x 30mm Socket Head Cap Screw - (20) M8 Double Anchor Slide-in T-Nut	CRP810 Base Kit
2	CRP813-00-LEGSET-HW-BAG: - (4) M8 x 14mm Hex Cap Screw (Total QTY: 8) - (4) M8 Roll-in T-Nut (Total QTY: 8)	CRP810 Base Kit

Required Tools:

- 6mm Ball-End Allen Wrench
- Tape Measure

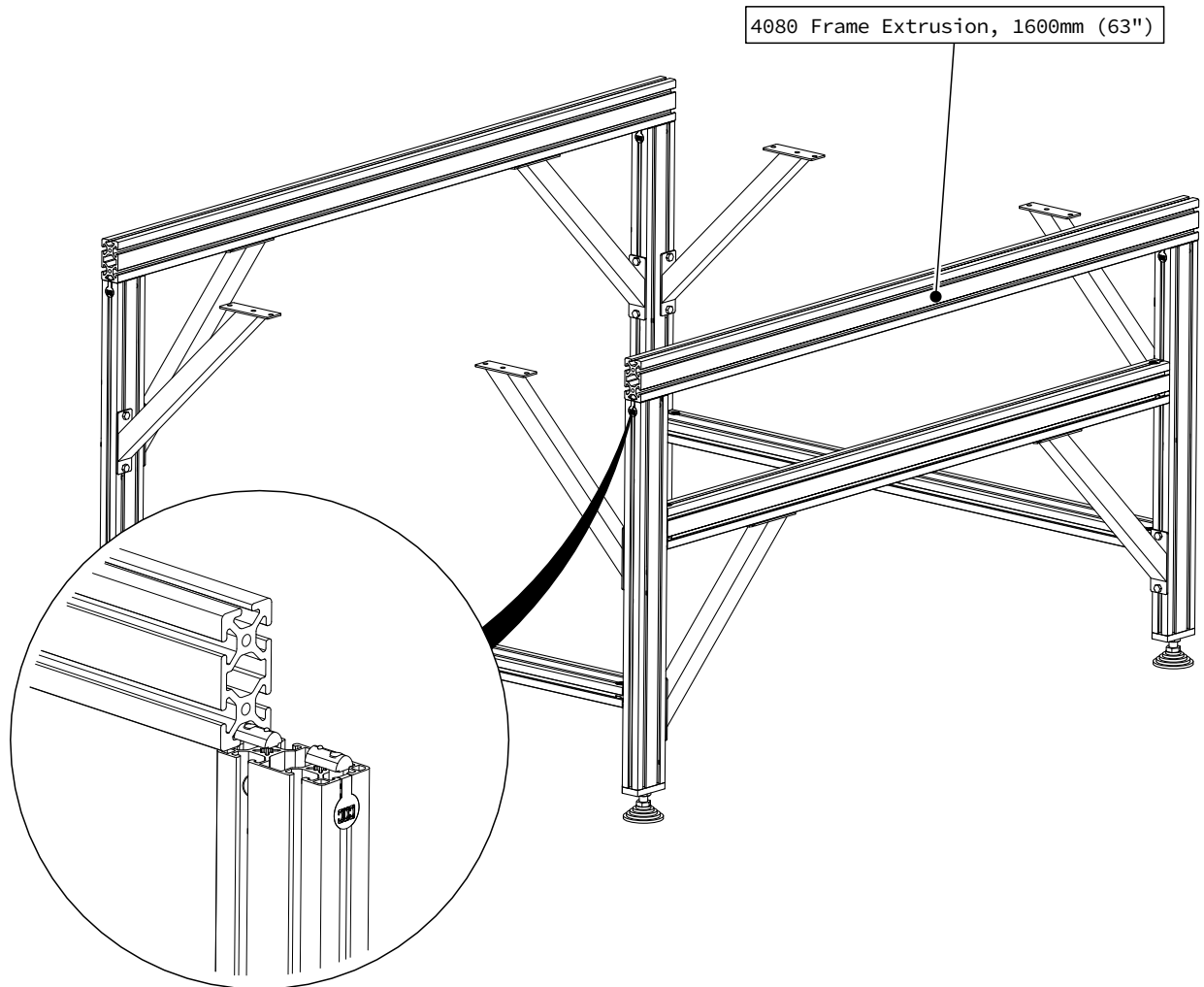
Recommended Additional Tools:

- 6mm Hex Ball-End Power Bit
- 13mm Combination Wrench
- Dimensional Lumber (refer to Step 1.2.3.4)
- (2) 24" Hand Trigger Clamp



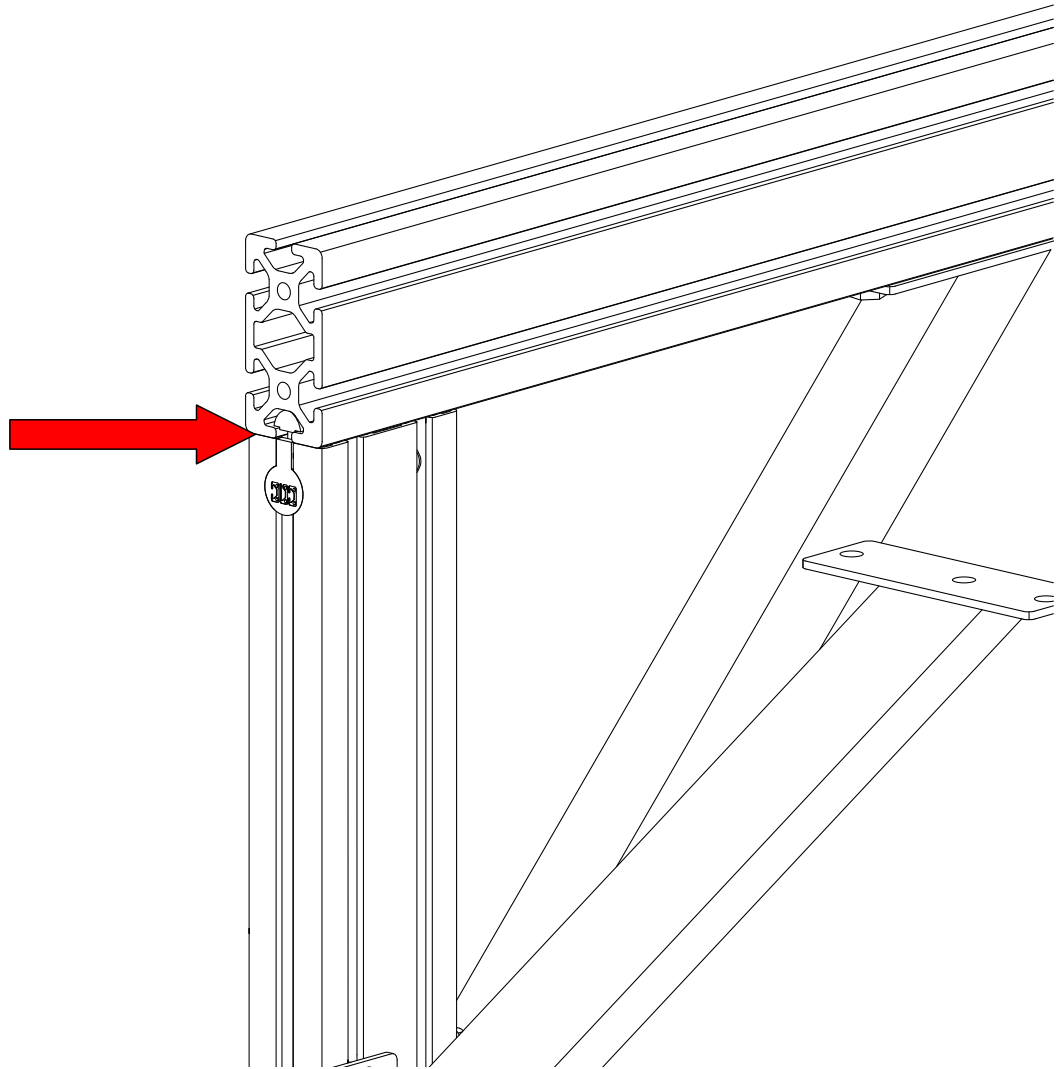
1.2.1 Frame Extrusions Installation

1.2.1.1



- Slide the two 1600mm (63") 4080 Frame Extrusions on to the leg assemblies as indicated.

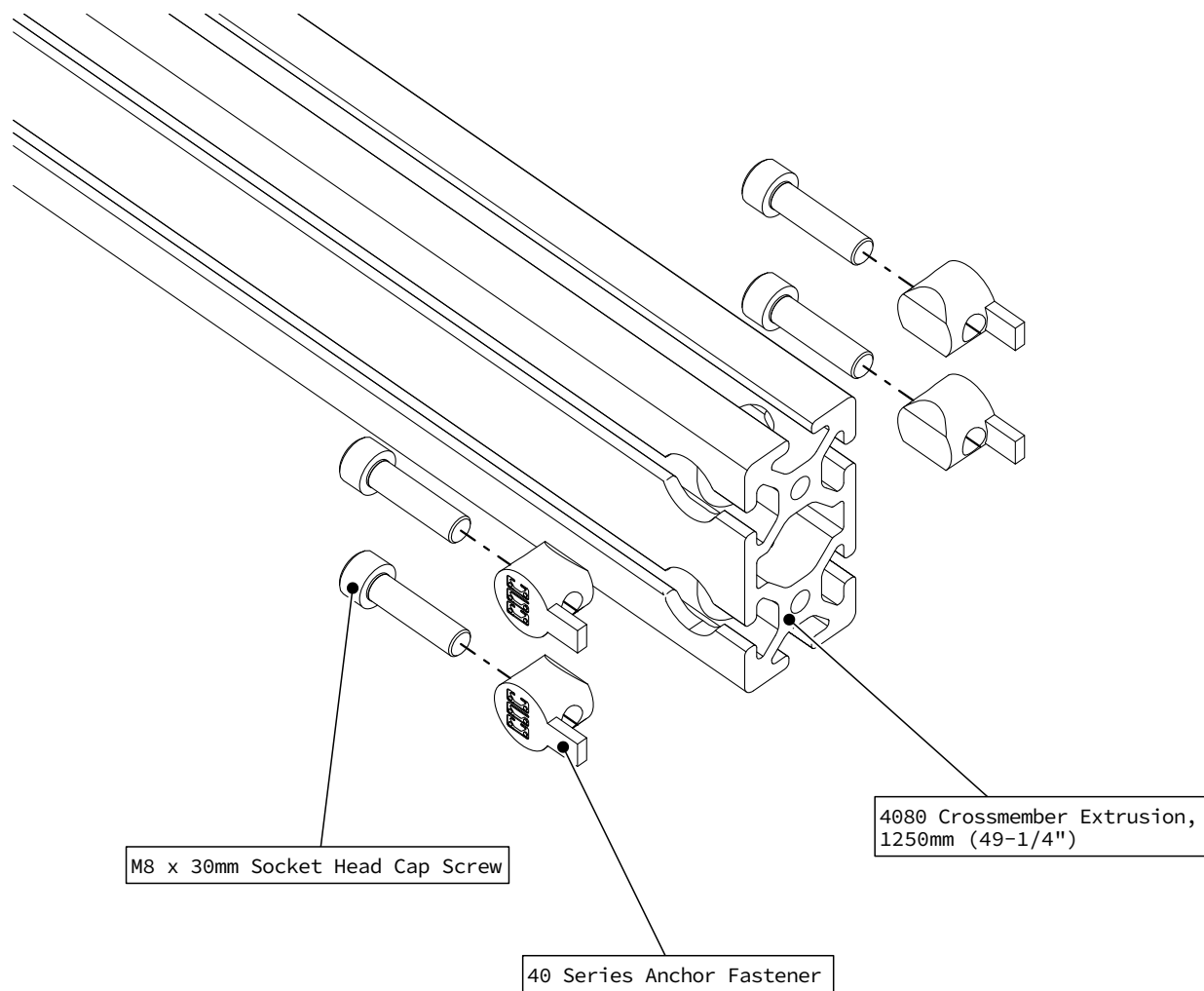
1.2.1.2



- Bring the ends of the frame extrusion flush with the legs as indicated.
- Fully tighten the anchor fasteners attaching the frame extrusions to the legs.

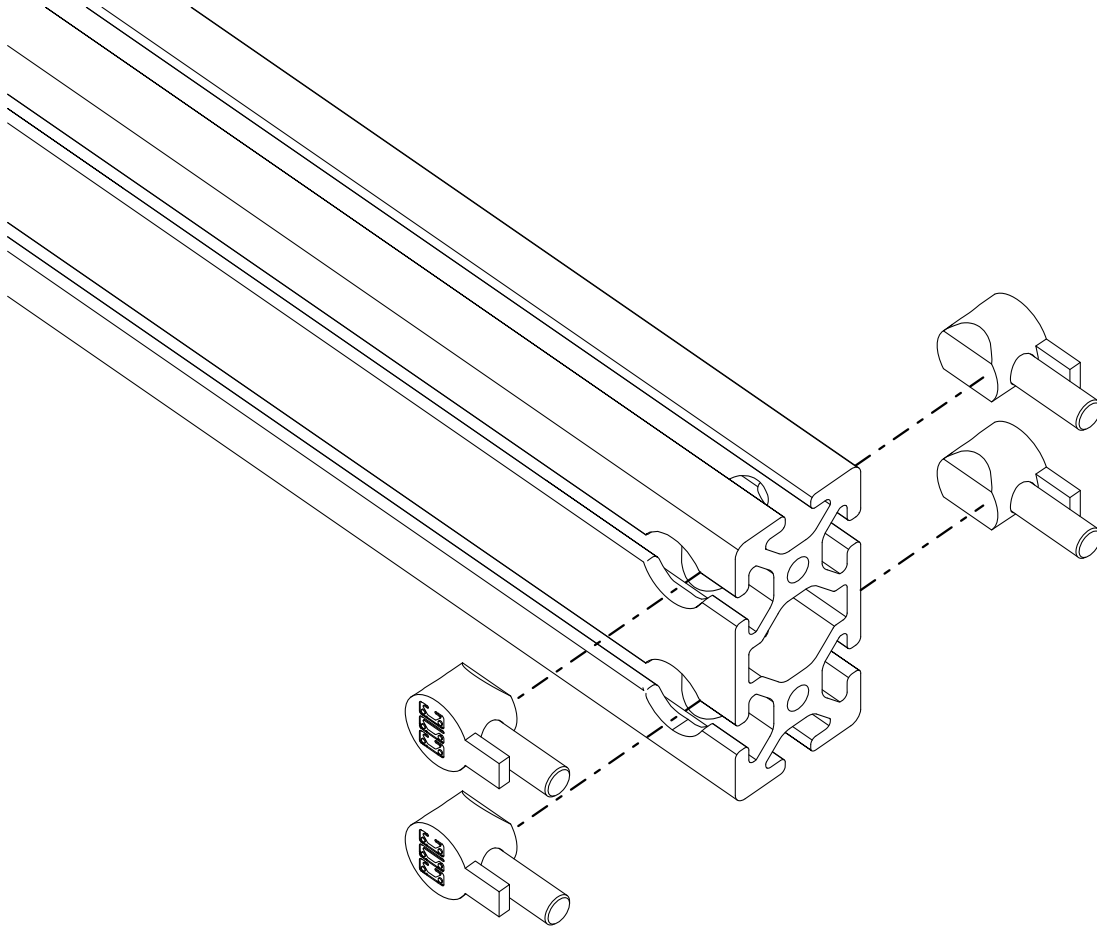
1.2.2 Table Crossmember Assembly

1.2.2.1



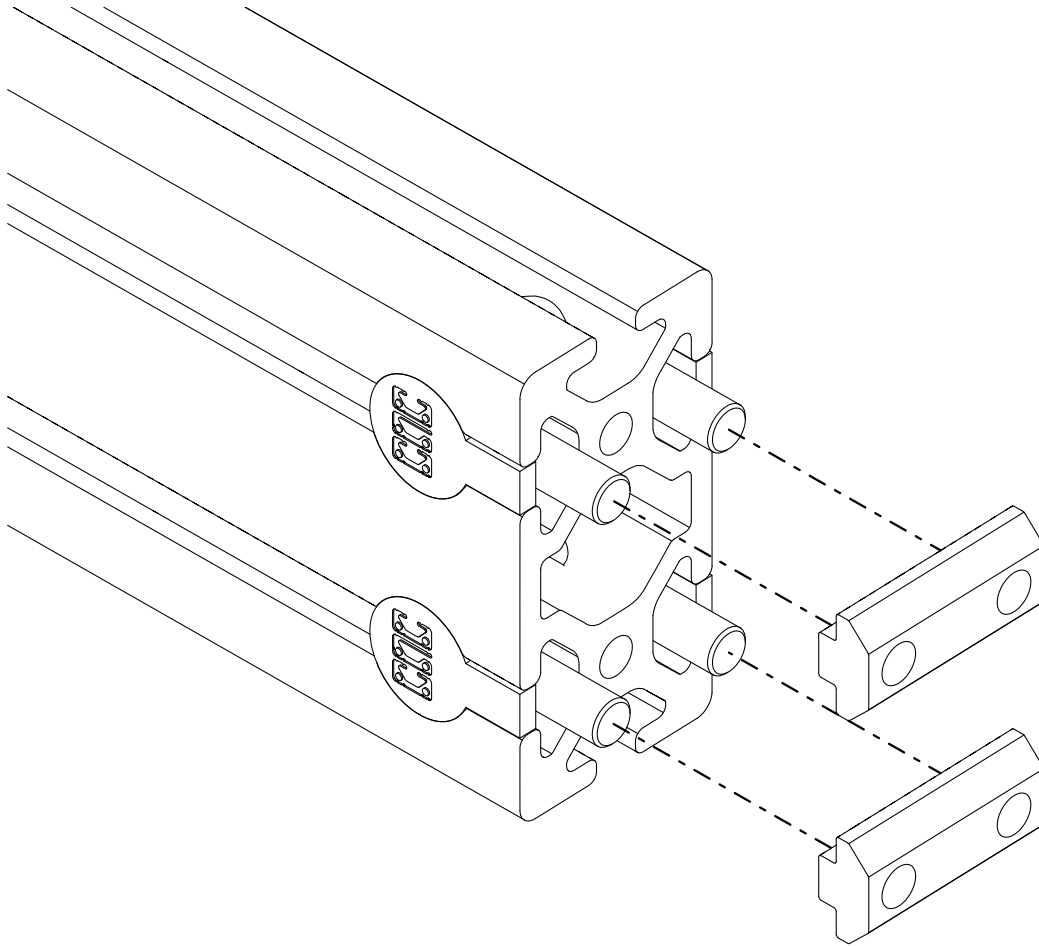
- Thread the socket head cap screws into the anchor fasteners as indicated.

1.2.2.2



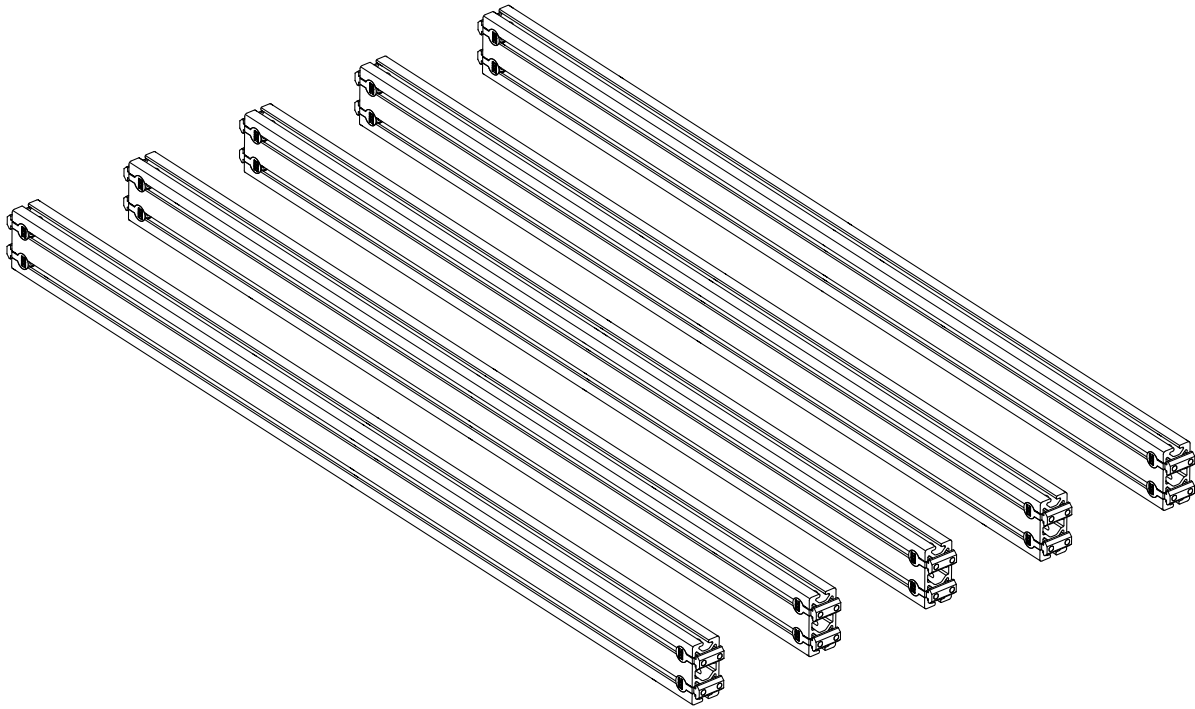
- Slide the anchor assembly into the extrusion.

1.2.2.3



- Loosely thread the double t-nuts onto the socket head cap screws as indicated.

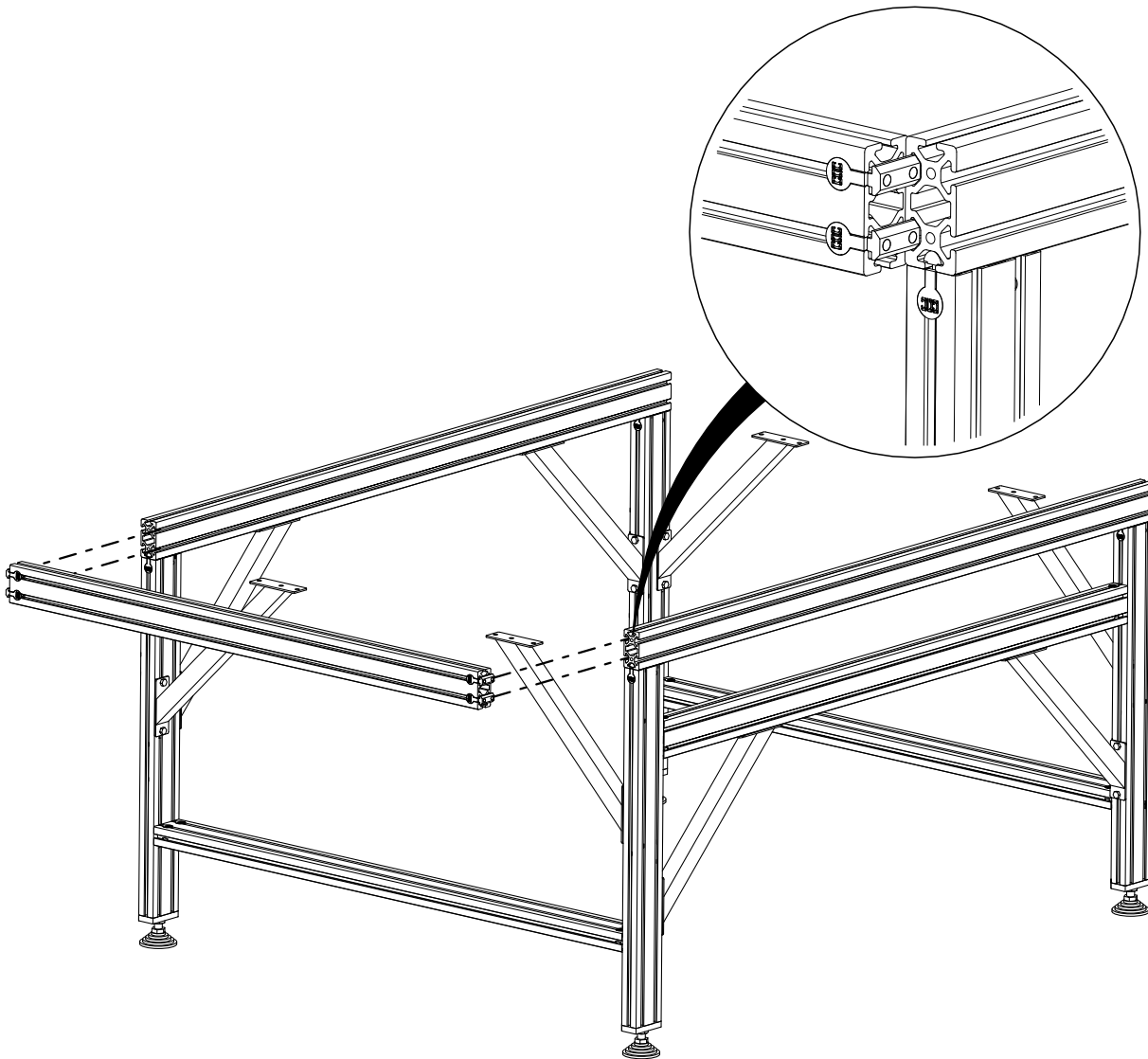
1.2.2.4



- Repeat the previous steps on both sides for all of the crossmember extrusion pieces.

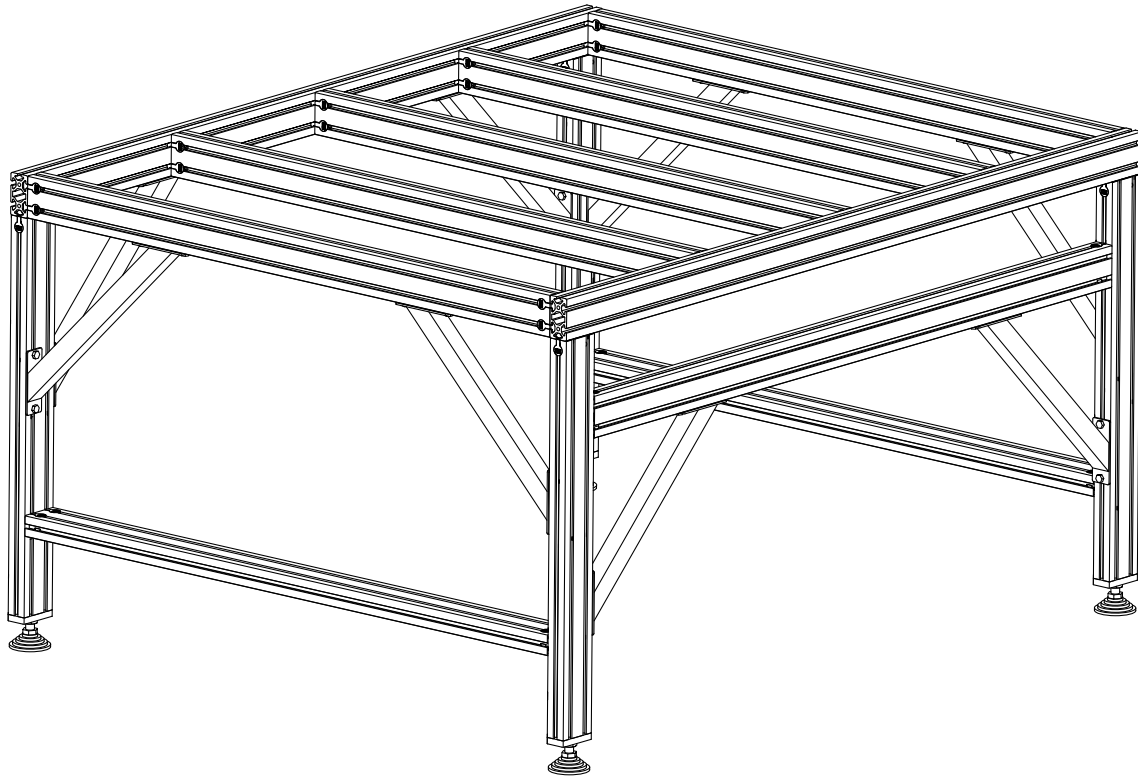
1.2.3 Table Crossmembers Installation

1.2.3.1



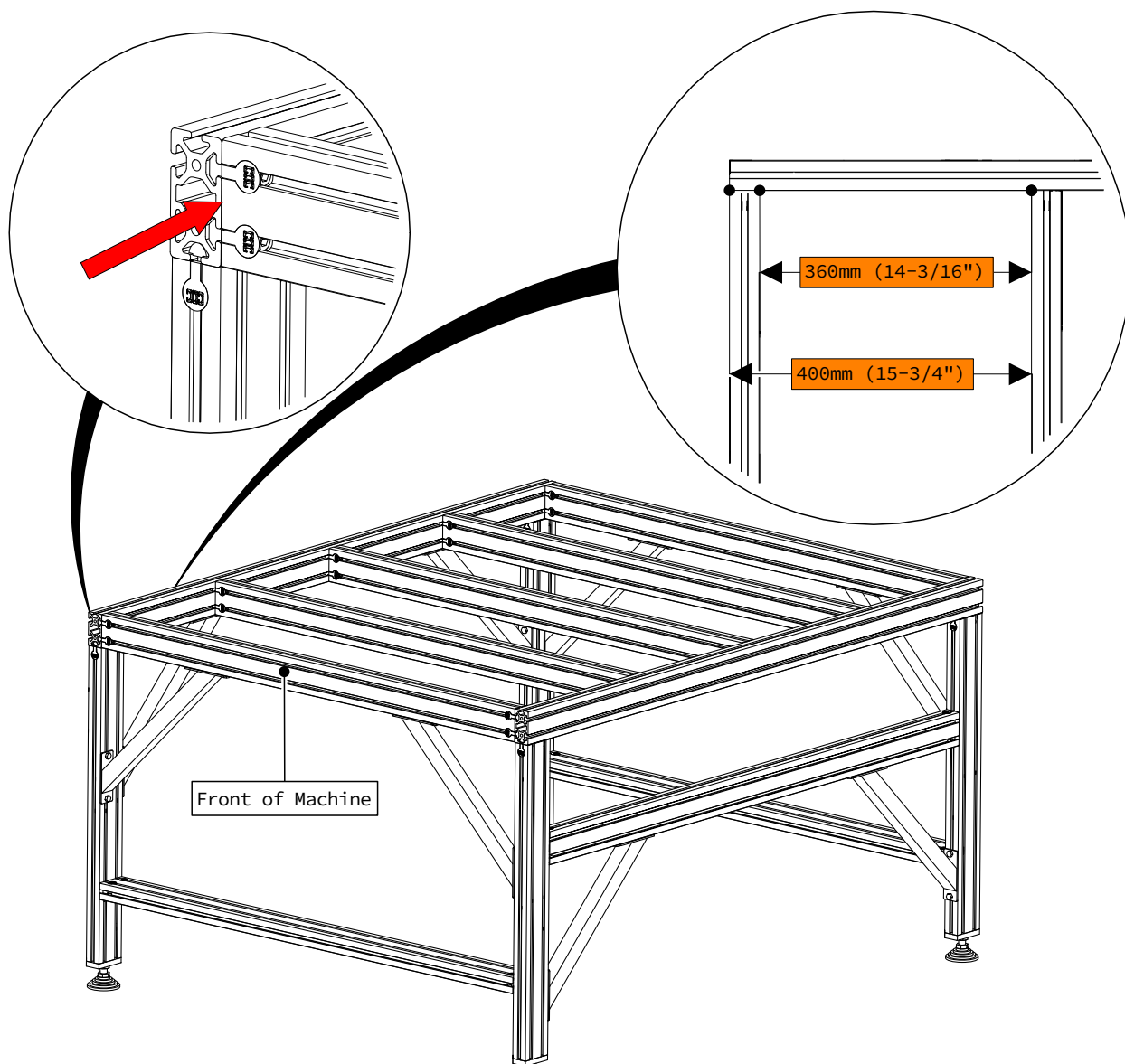
- Slide the t-nuts into the frame extrusion as indicated.

1.2.3.2



- Repeat the previous step for all crossmembers.

1.2.3.3

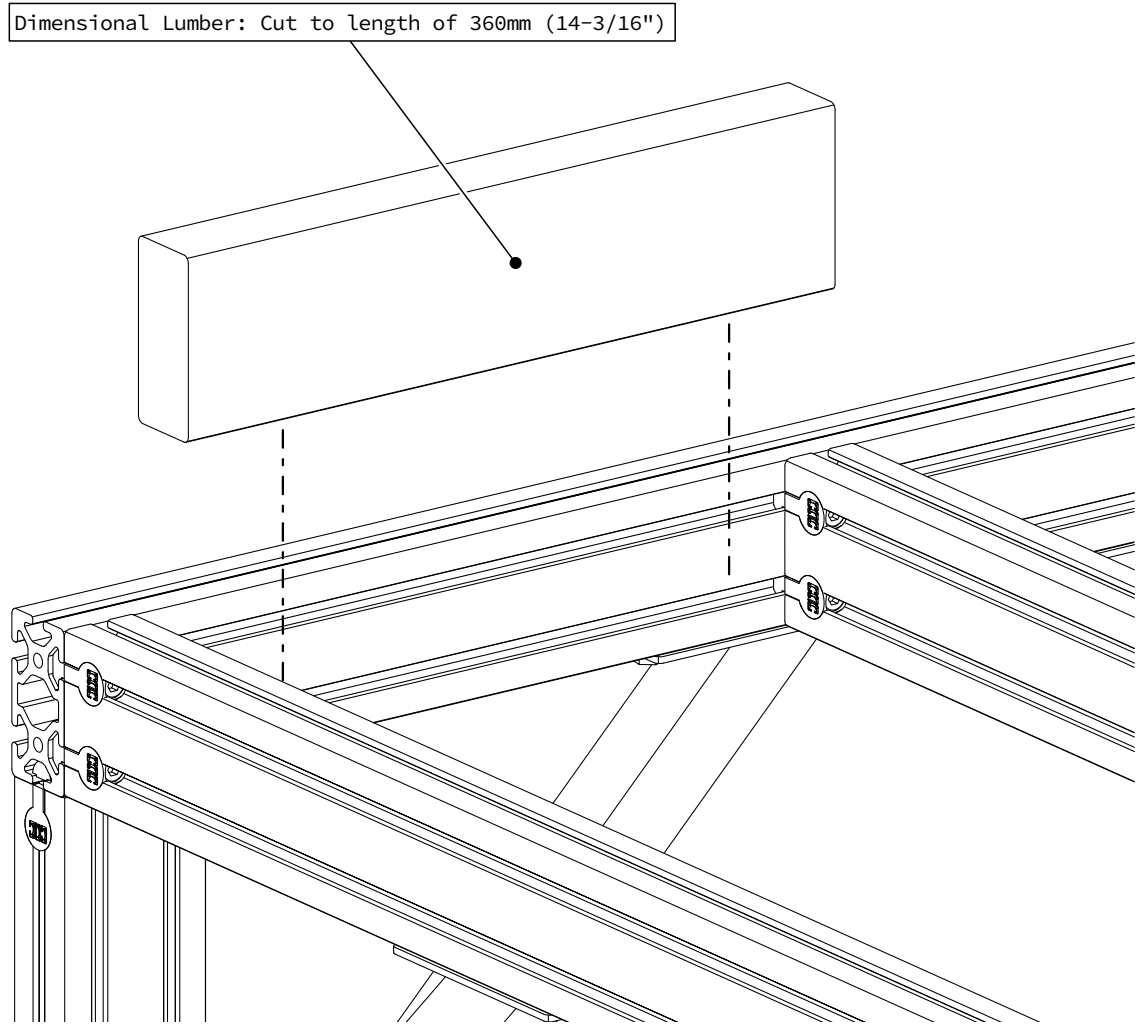


- Position the the outer crossmembers flush with the ends of the frame extrusion.
- Space the crossmembers 360mm (14-3/16\"), or 400mm (15-3/4\") center to center, apart as indicated.

Assembly Note

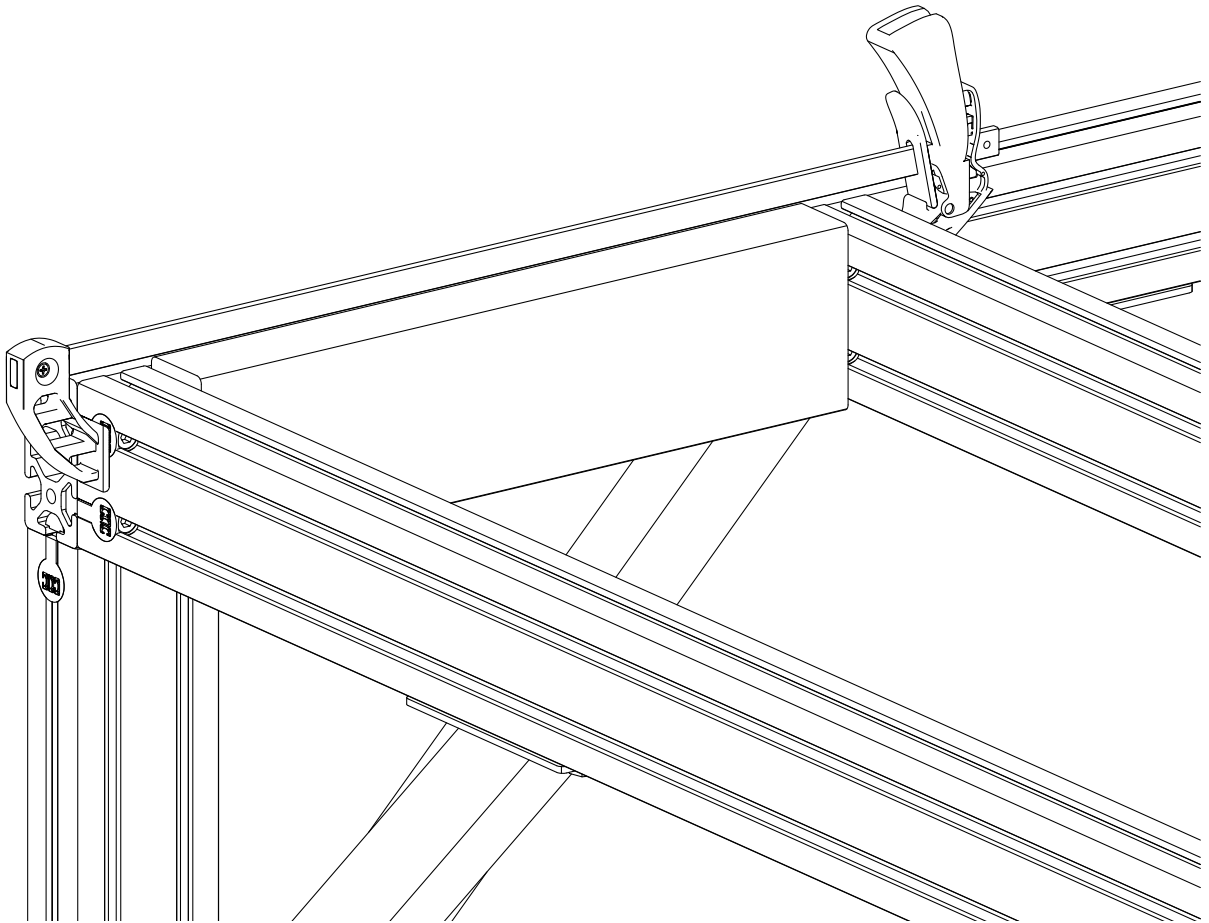
Use dimensional lumber to help position the crossmembers, as shown in the following steps.

1.2.3.4



- Cut two pieces of dimensional lumber (a 2x4 is recommended) to a length of 360mm (14-3/16").
- Position this piece between the crossmembers as indicated.

1.2.3.5

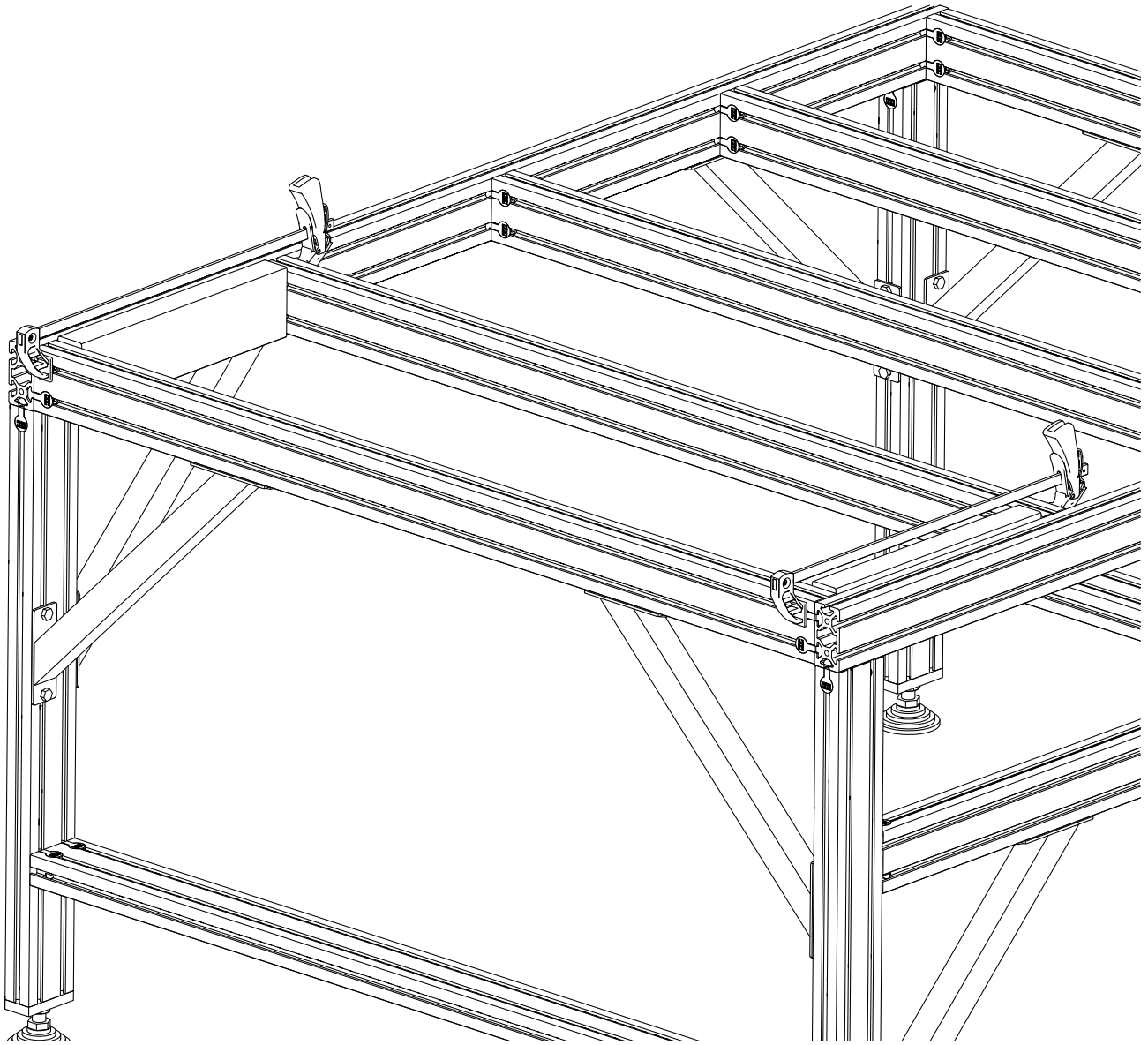


- With the cut piece of lumber flush against the frame extrusion, clamp the crossmembers together.

Assembly Note

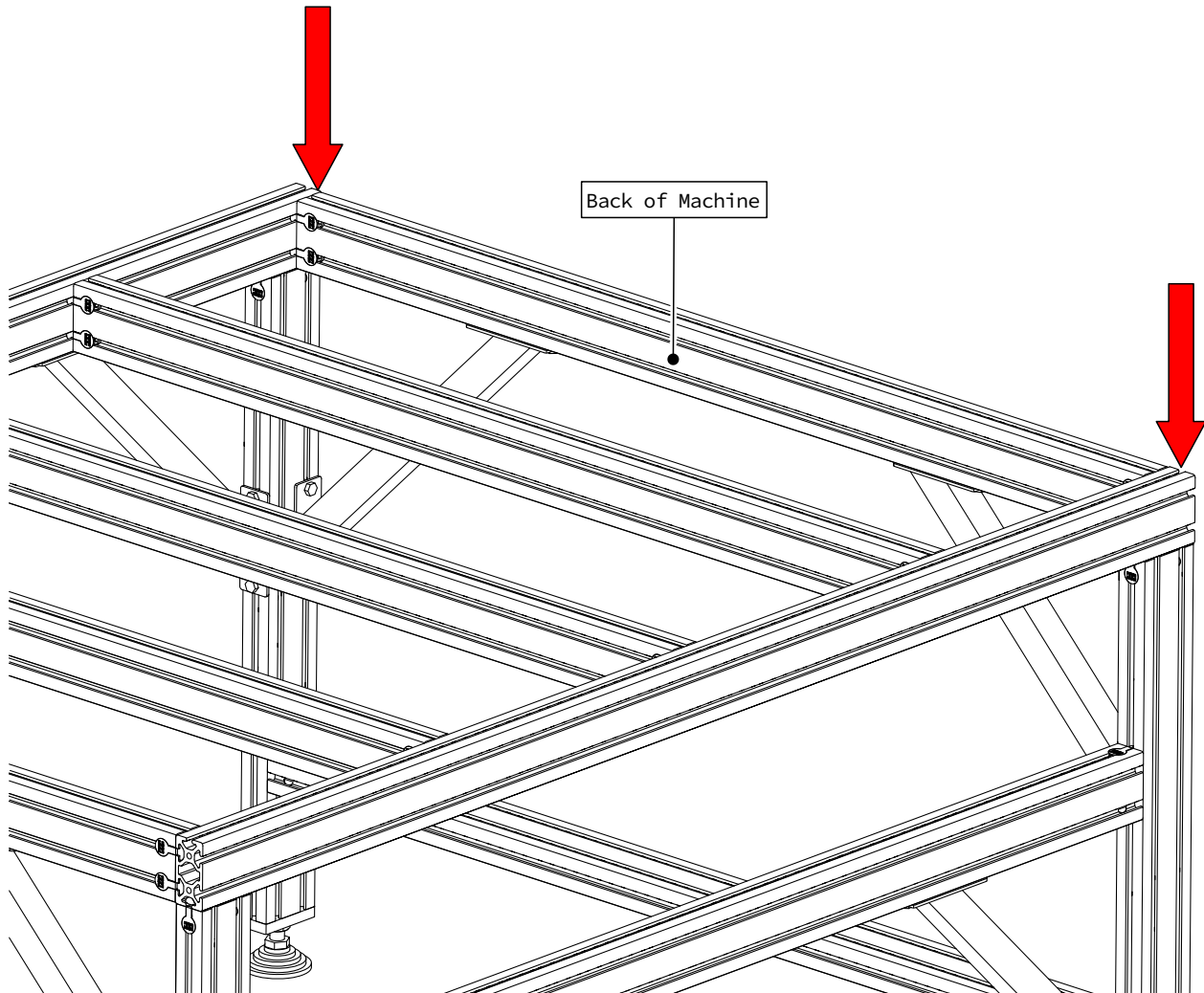
Recommended clamps are 24" Hand Trigger Clamps available at your local hardware store.

1.2.3.6



- Repeat this process to clamp the other side of the crossmember.
- While clamped, tighten the crossmember anchor fasteners.

1.2.3.7

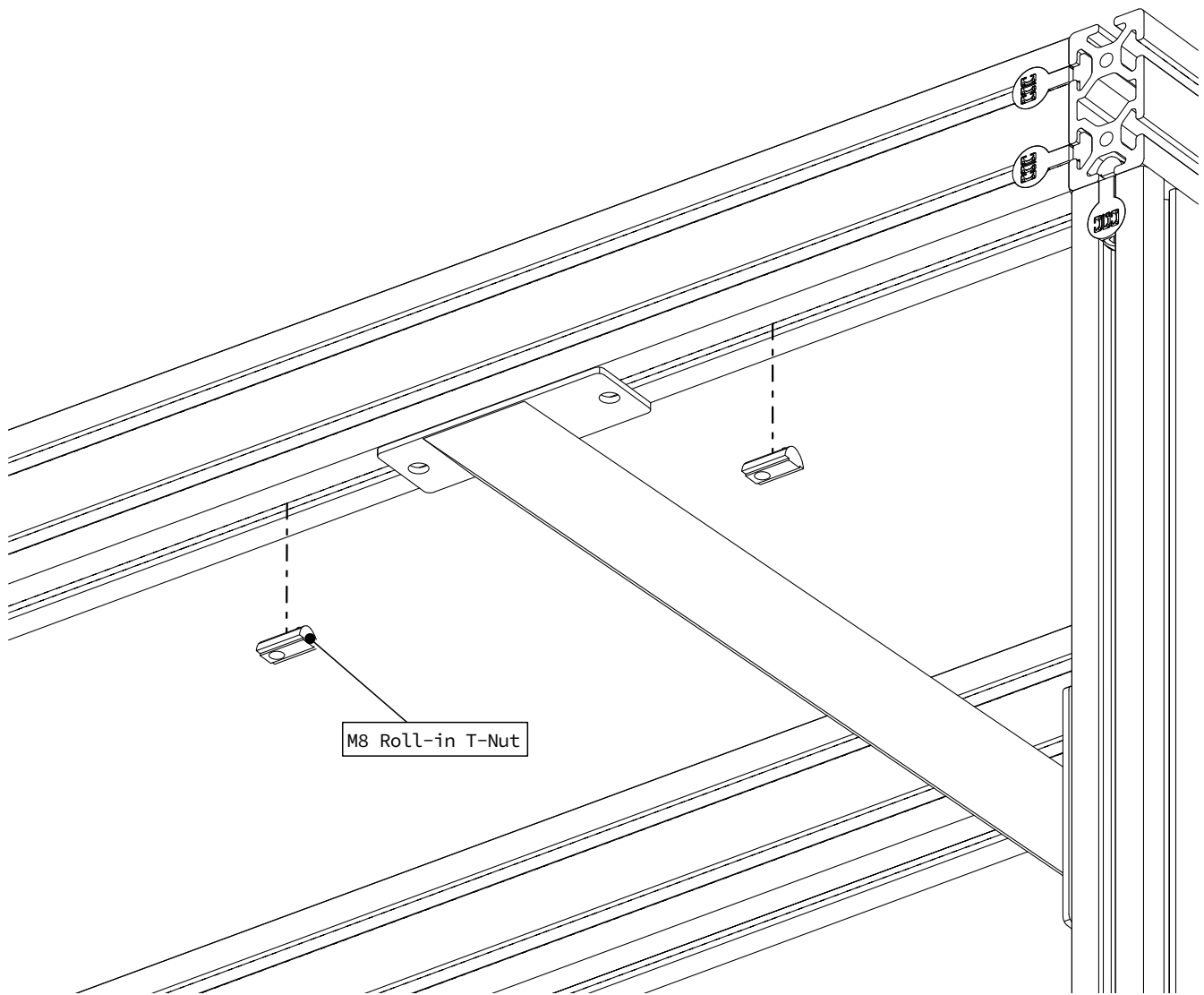


- Repeat this process with the next two crossmembers.
- The rear crossmember will be positioned flush against the end of the frame extrusion.

Assembly Note

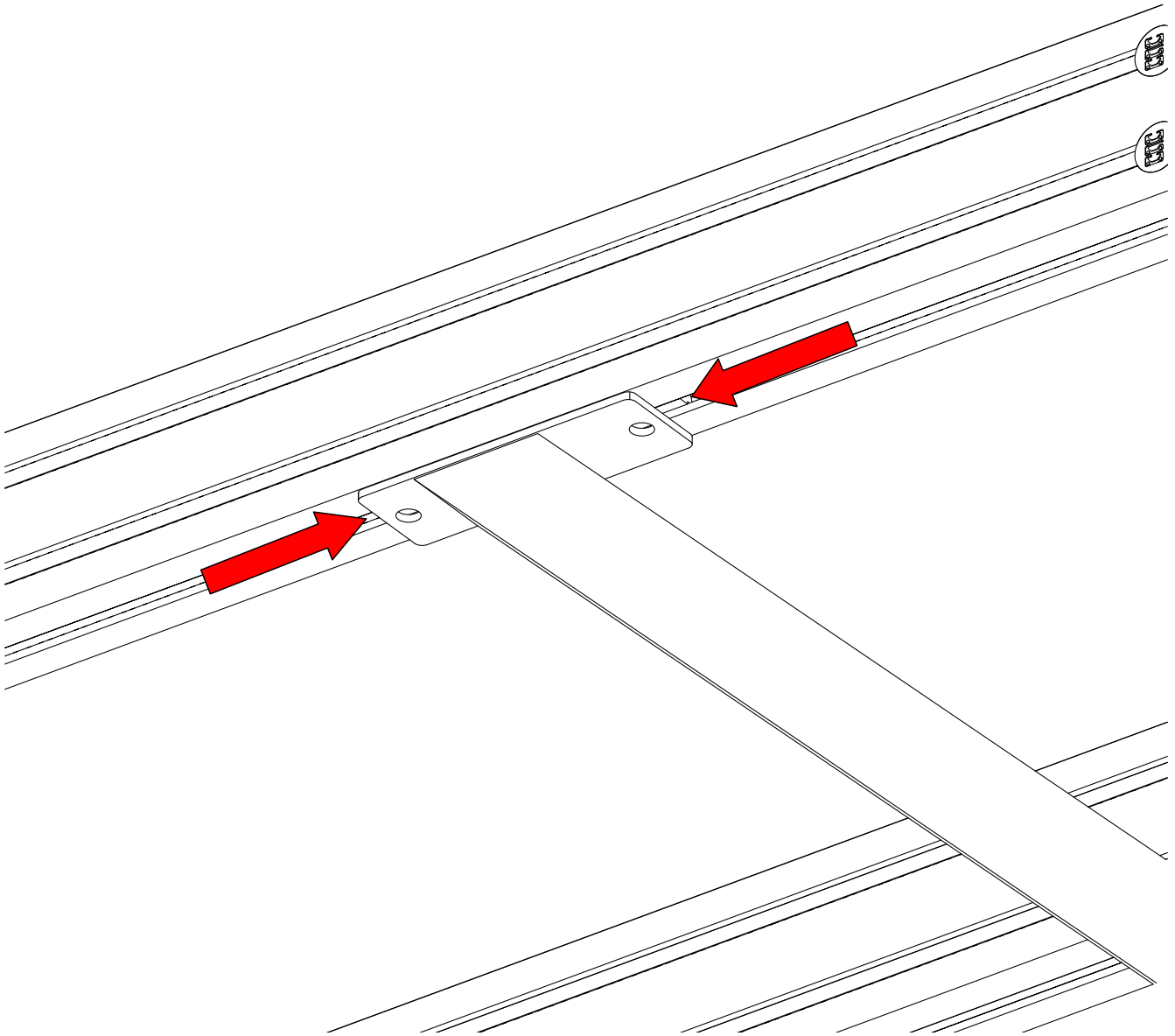
The rear crossmember will have a different spacing due to the length of the machine.

1.2.3.8



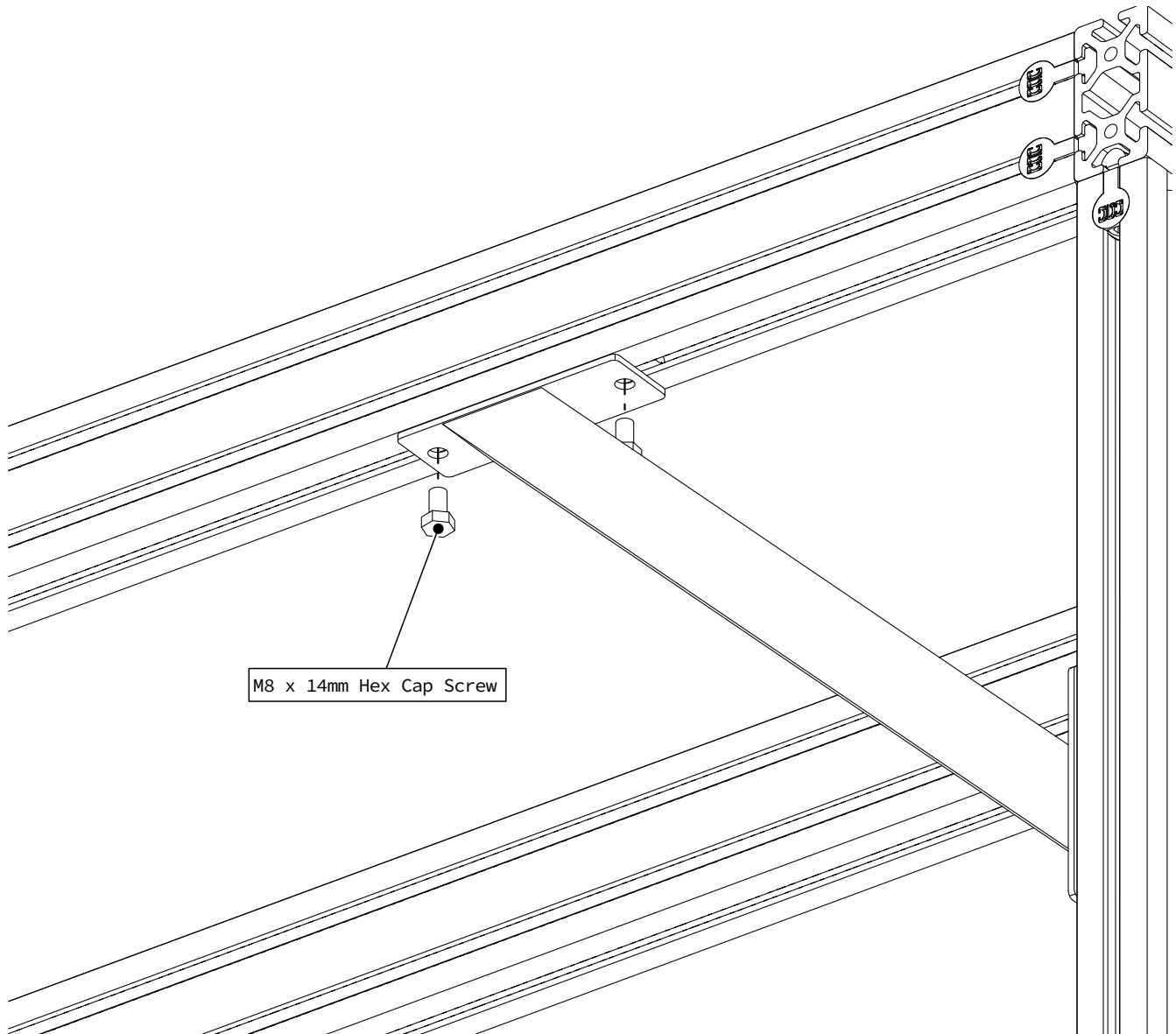
- For each of the four gussets that attach to the outer crossmembers, install two Roll-in T-Nuts to the bottom of the crossmember extrusion as indicated.

1.2.3.9



- Slide the T-Nuts in the extrusion to align them with the gusset holes.

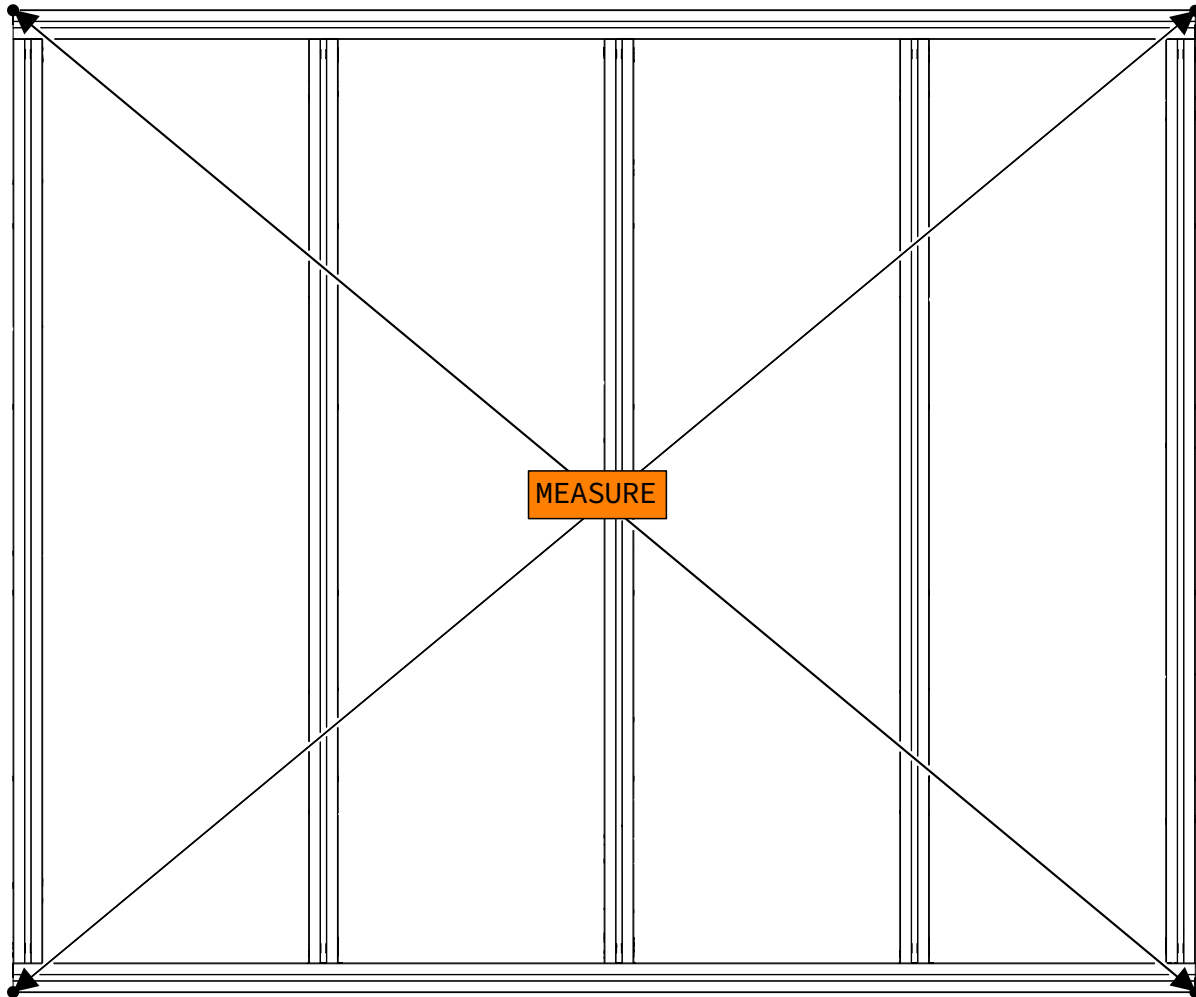
1.2.3.10



- Insert the fasteners as indicated and partially tighten.

1.2.4 Table Squaring

1.2.4.1

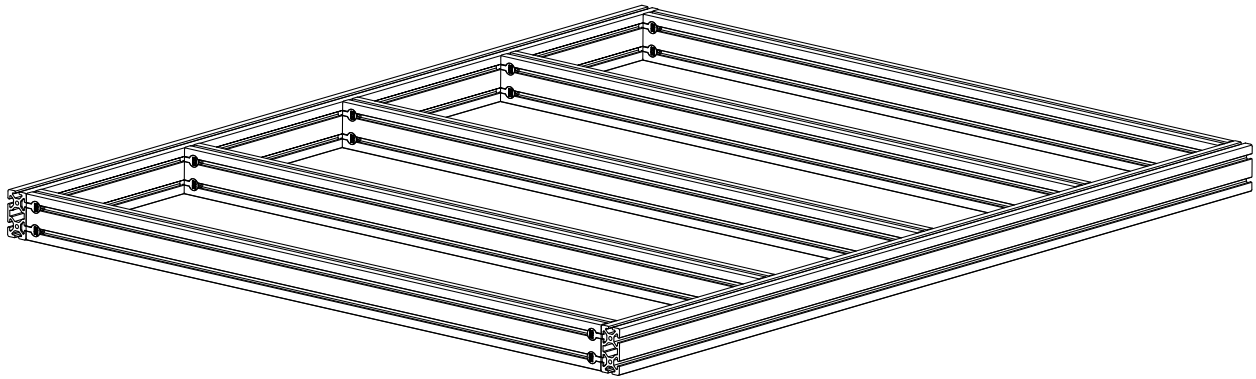


- Measure diagonal across the table in each direction as indicated.
- Make adjustments until the two measurements are within 1/8" or less of each other.
- After squaring the table, tighten all anchor fasteners and leg gusset fasteners.

Assembly Note

Position of the leg gussets may need to be adjusted in the table squaring process.

1.3 Table Frame Assembly (without Leg Kit)



Section Note

Skip this section if you are using a CNC Router Parts leg kit

Parts and Tools Required

The following parts and tools will be used in Section 1.3

QTY	Part/Description	Packaged In
2	4080 Frame Extrusion, 1600mm (63")	Machine Kit Extrusion
5	4080 Crossmember Extrusion, 1250mm (49-1/4")	Machine Kit Extrusion
1	40-3100-00 - 40 Series Short Double Anchor Assembly: - (40) 40 Series Anchor Fastener - (40) M8 x 30mm Socket Head Cap Screw - (20) M8 Double Anchor Slide-in T-Nut	CRP810 Base Kit

Required Tools:

- 6mm Ball-End Allen Wrench
- Tape Measure

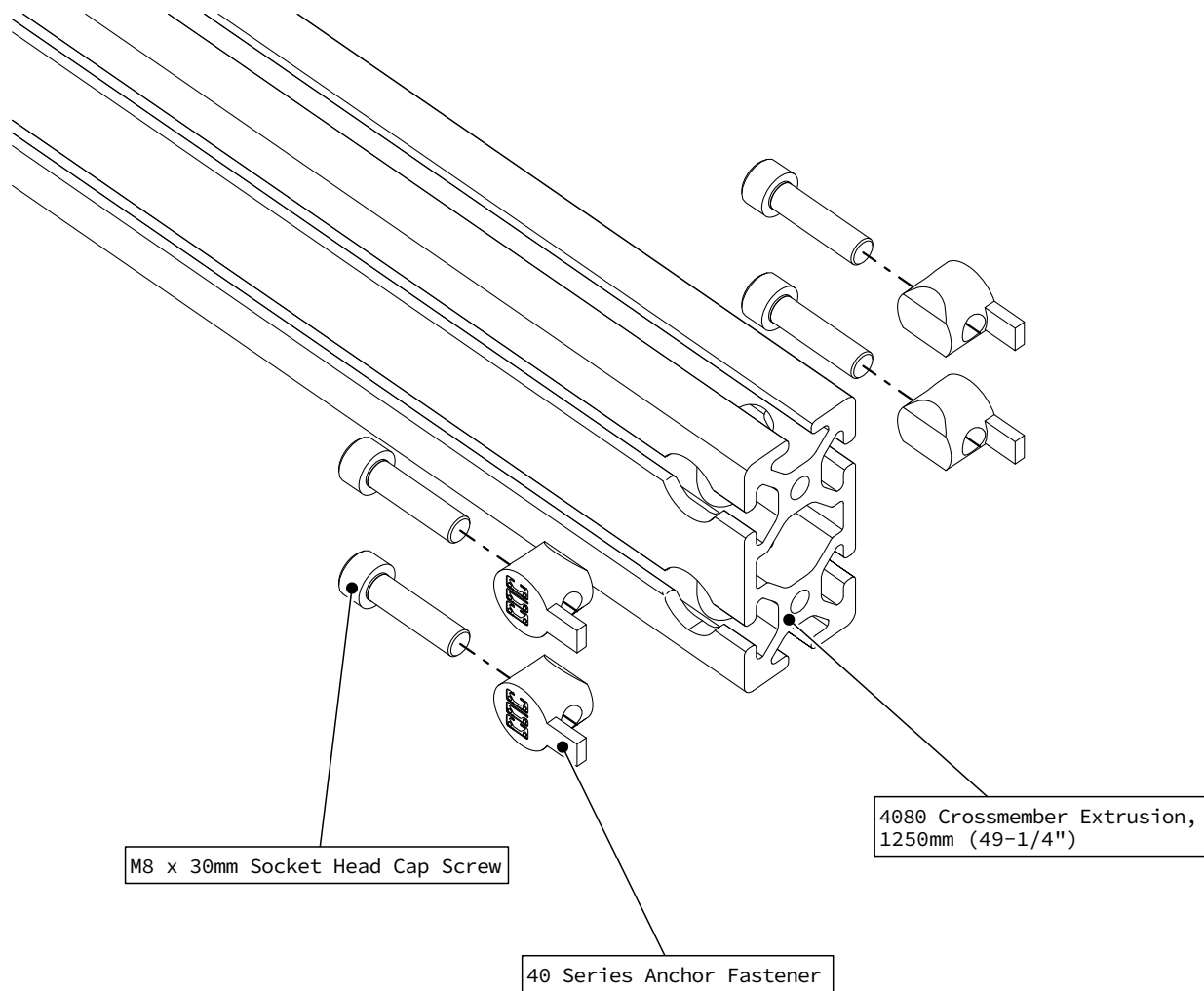
Recommended Additional Tools:

- 6mm Hex Ball-End Power Bit
- Dimensional Lumber (refer to Step 1.3.2.4)
- (2) 24" Hand Trigger Clamp



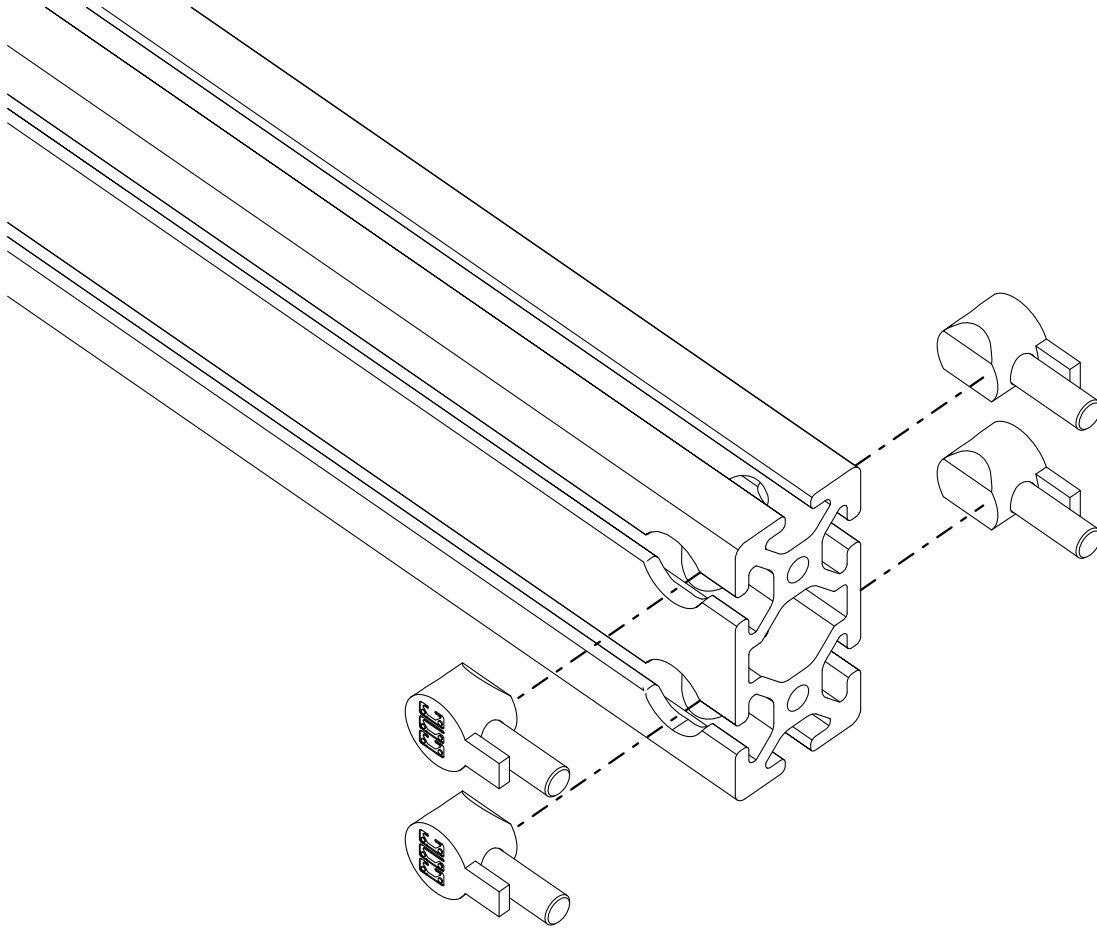
1.3.1 Table Crossmember Assembly

1.3.1.1



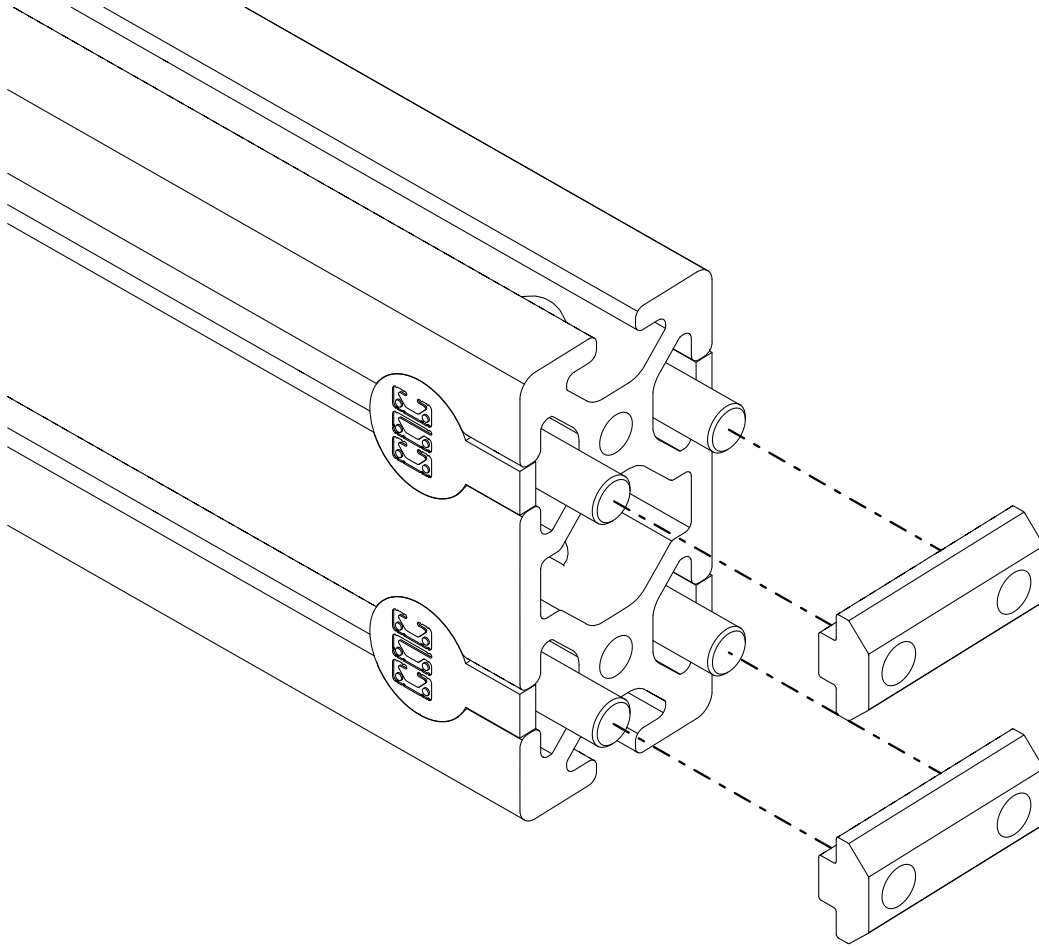
- Thread the socket head cap screws into the anchor fasteners as indicated.

1.3.1.2



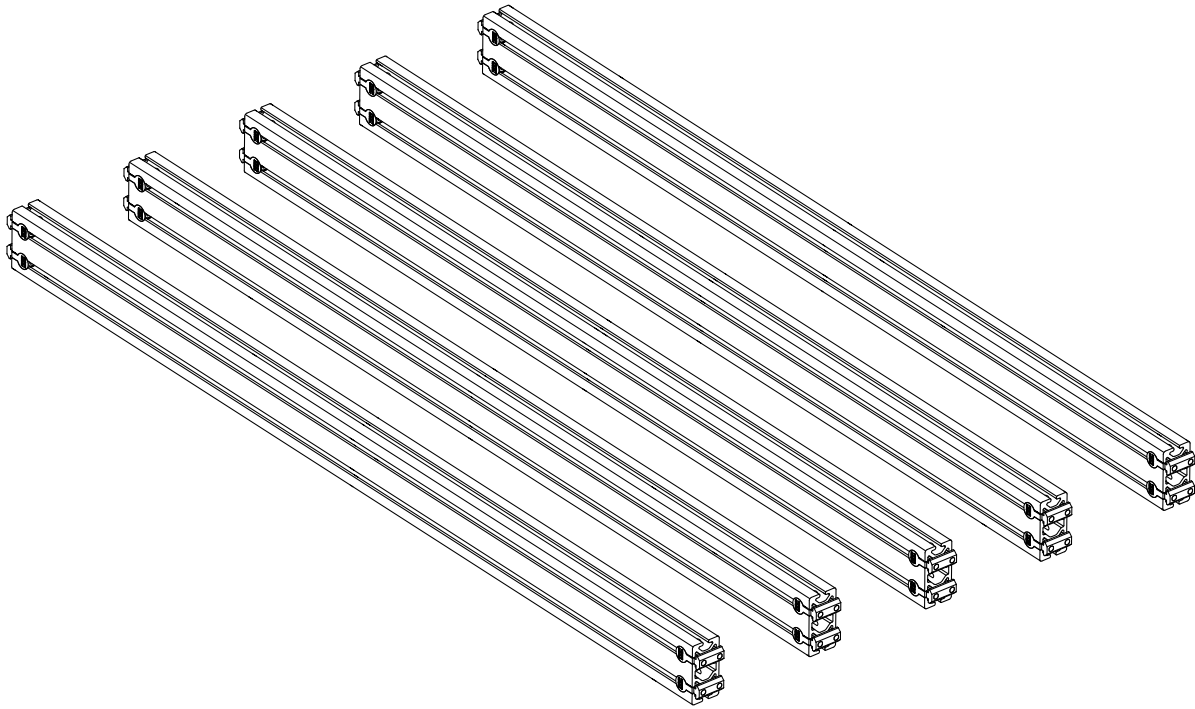
- Slide the anchor assembly into the extrusion.

1.3.1.3



- Loosely thread the double t-nuts onto the socket head cap screws as indicated.

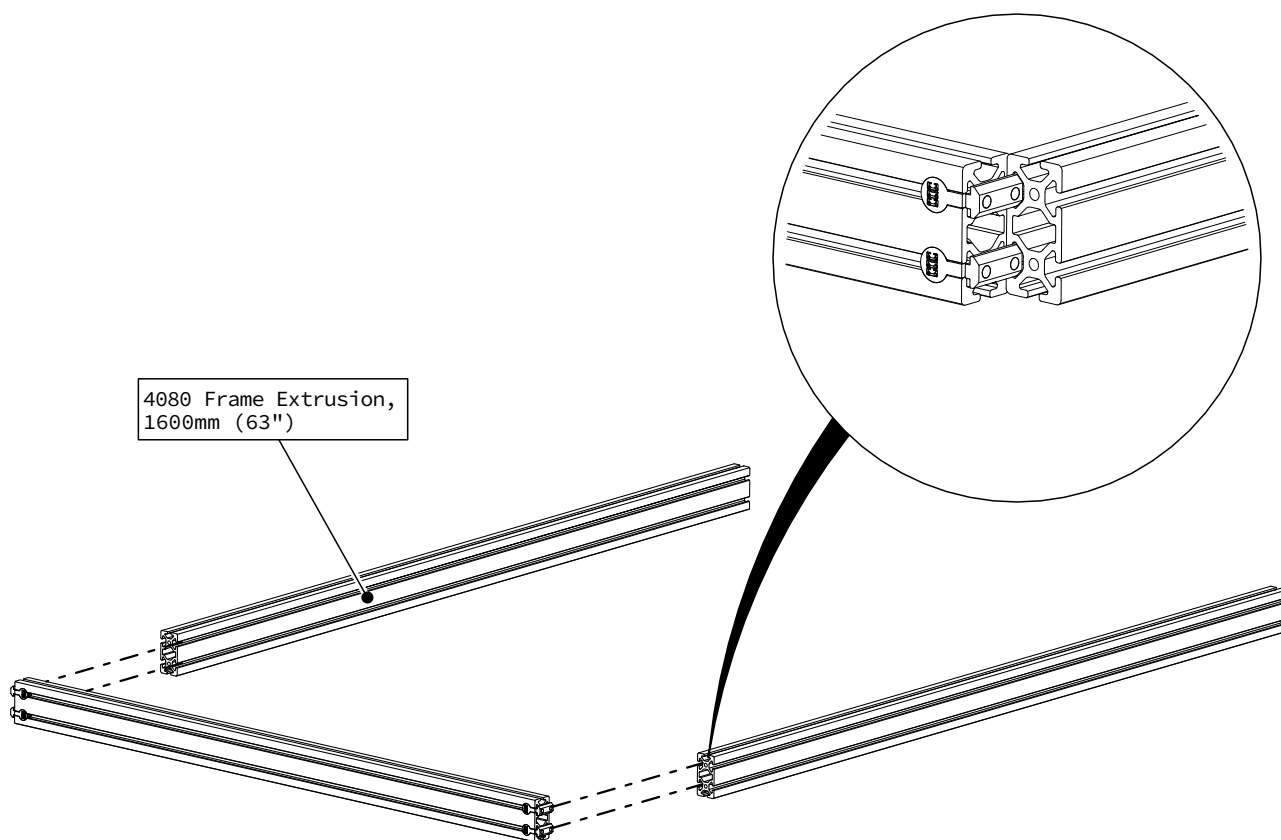
1.3.1.4



- Repeat the previous steps on both sides for all of the crossmember extrusion pieces.

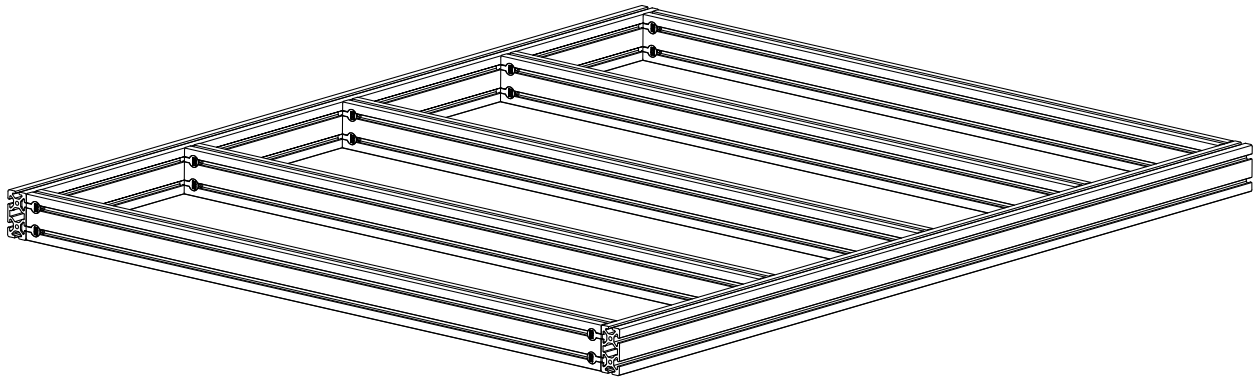
1.3.2 Table Crossmember Installation

1.3.2.1



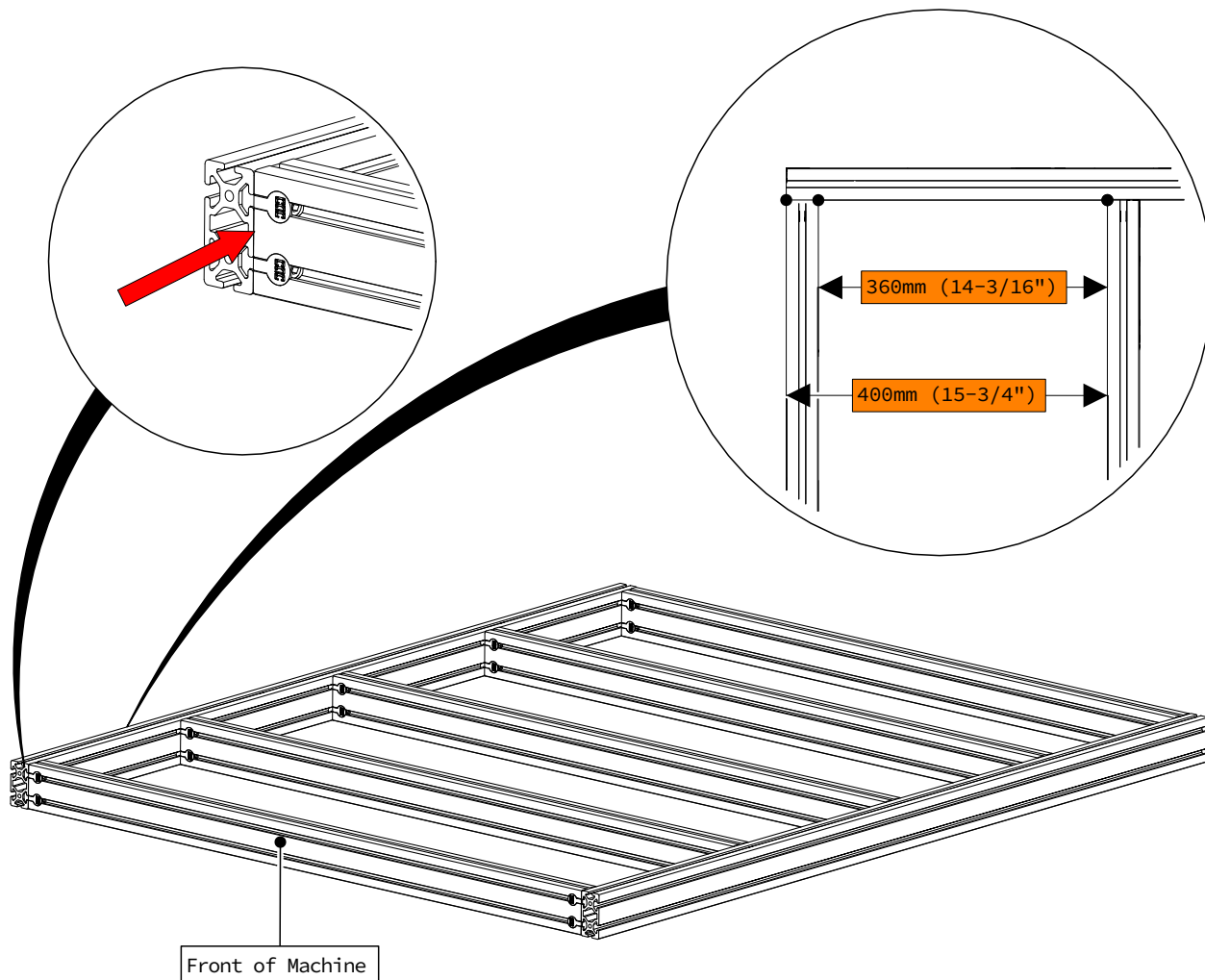
- Slide the t-nuts into the 1600mm (63") frame extrusion as indicated.

1.3.2.2



- Repeat the previous step for all crossmembers.

1.3.2.3

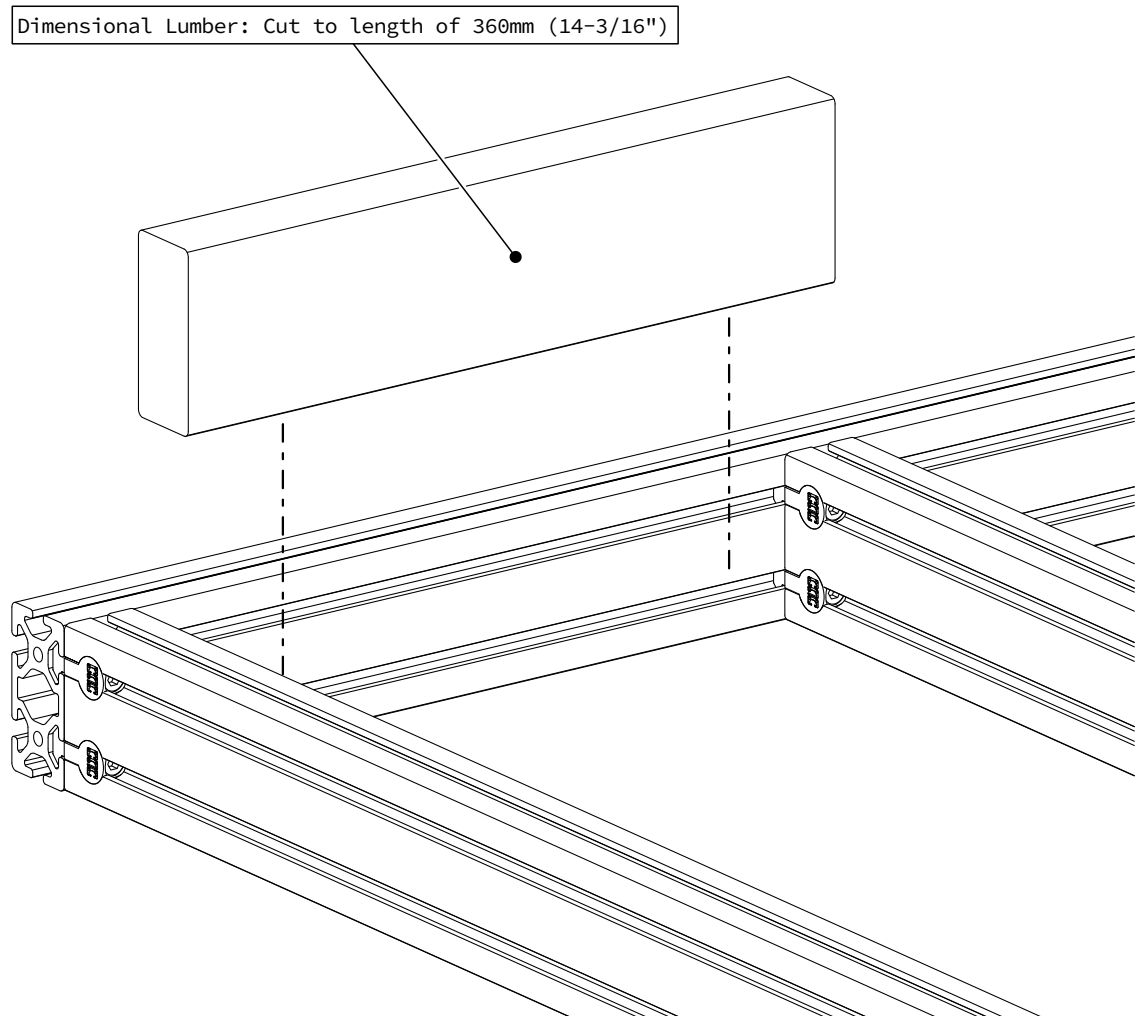


- Position the the outer crossmembers flush with the ends of the frame extrusion.
- Space the crossmembers 360mm (14-3/16"), or 400mm (15-3/4") center to center, apart as indicated.

Assembly Note

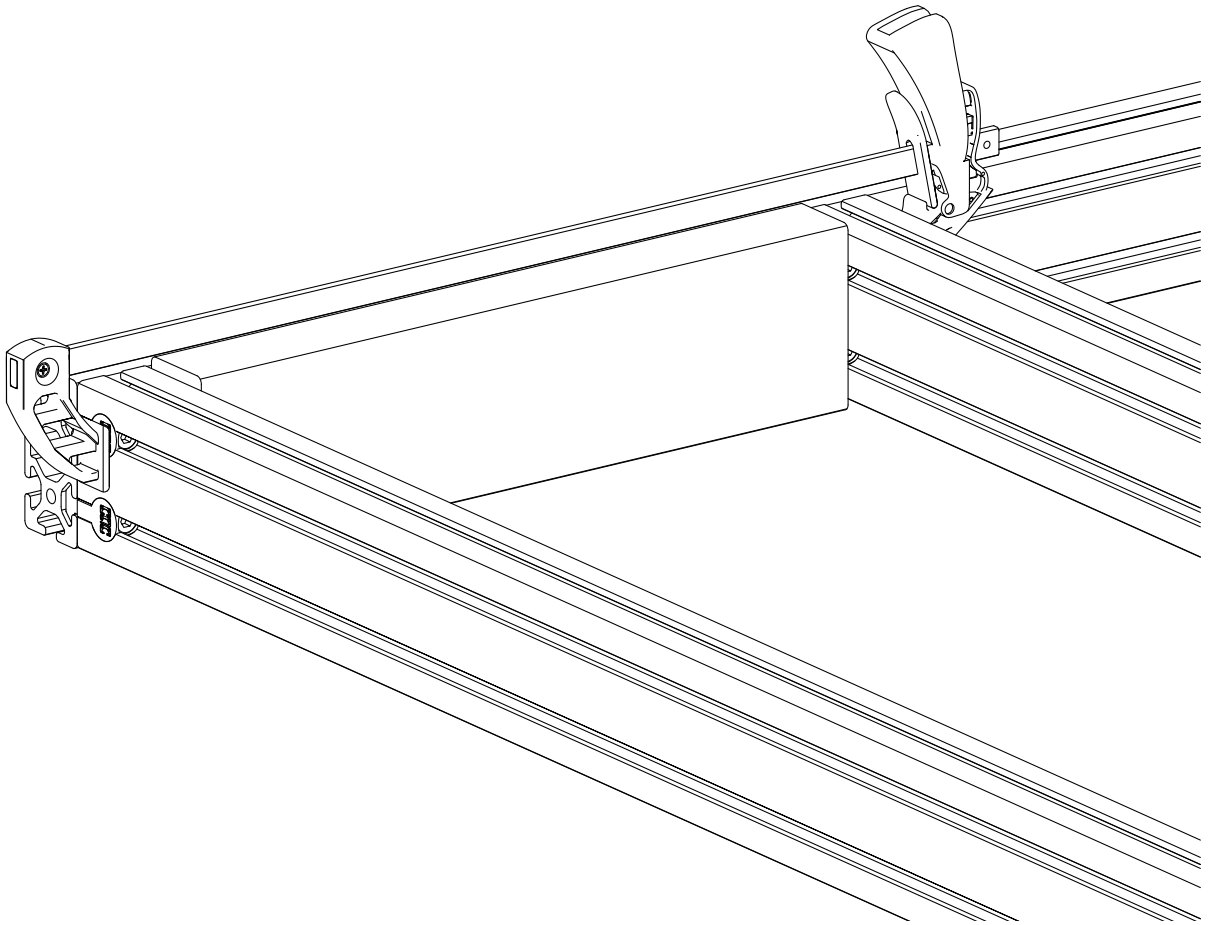
Use dimensional lumber to help position the crossmembers, as shown in the following steps.

1.3.2.4



- Cut two pieces of dimensional lumber (a 2x4 is recommended) to a length of 360mm (14-3/16").
- Position this piece between the crossmembers as indicated.

1.3.2.5

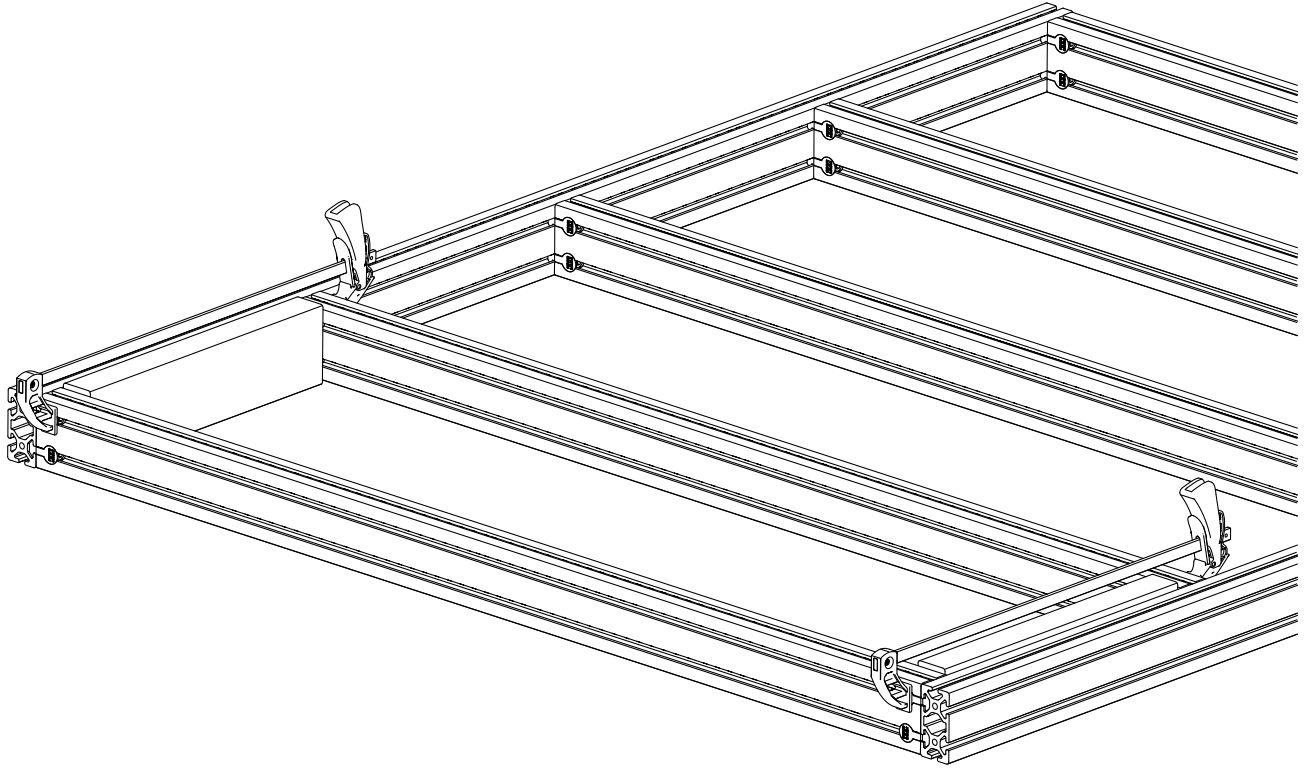


- With the cut piece of lumber flush against the frame extrusion, clamp the crossmembers together.

Assembly Note

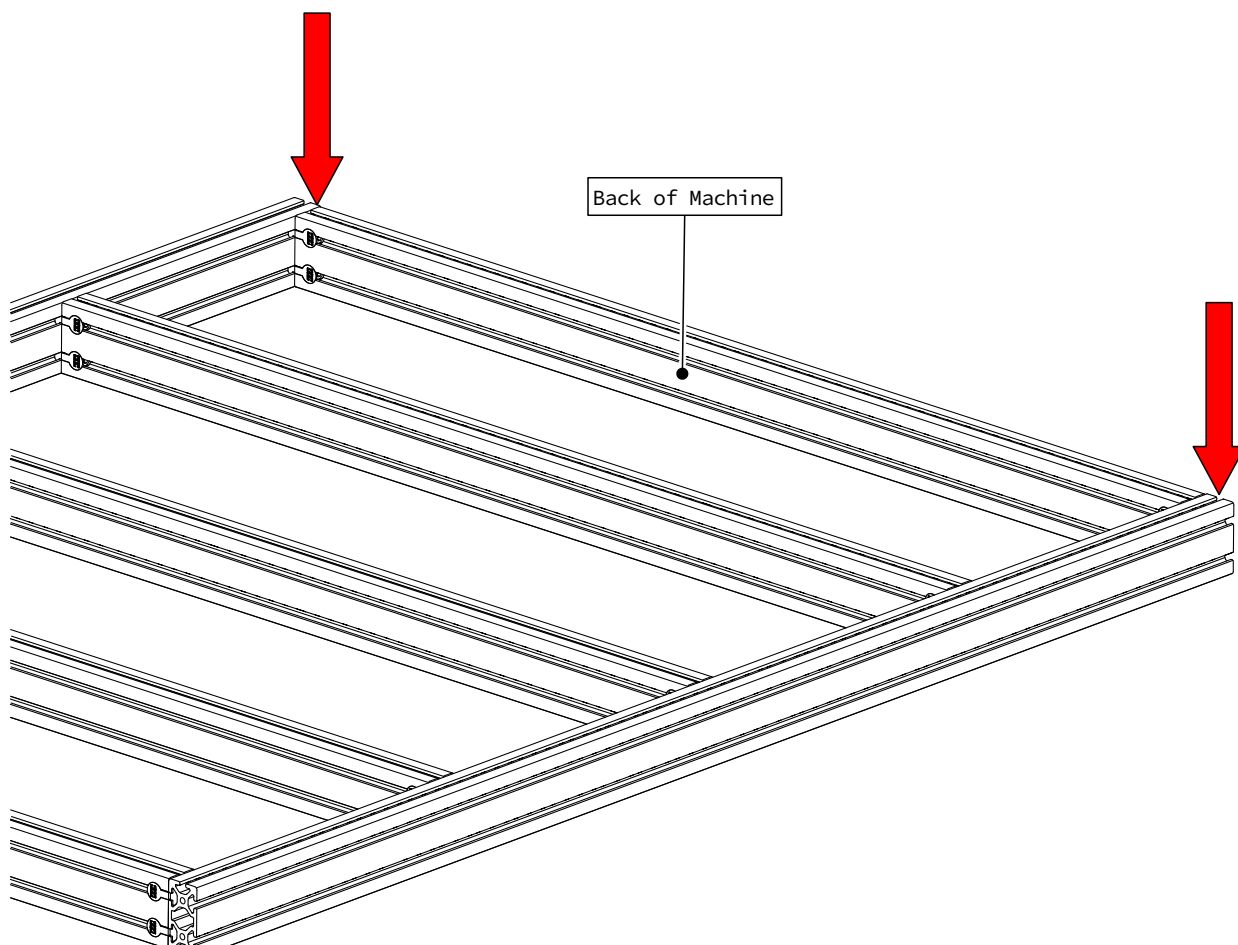
Recommended clamps are 24" Hand Trigger Clamps available at your local hardware store.

1.3.2.6



- Repeat this process to clamp the other side of the crossmember.
- While clamped, tighten the crossmember anchor fasteners.

1.3.2.7



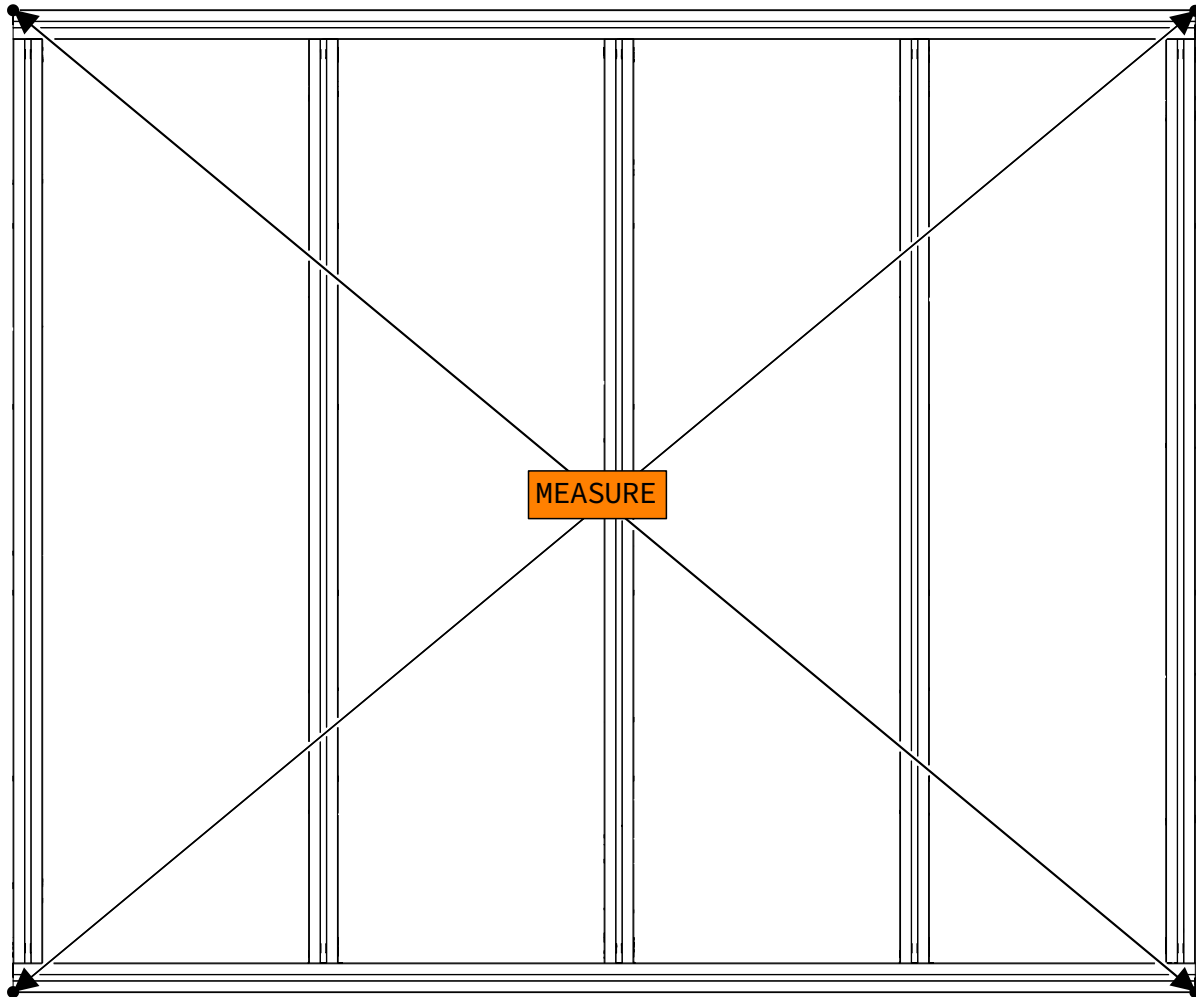
- Repeat this process with the next two crossmembers.
- The rear crossmember will be positioned flush against the end of the frame extrusion.

Assembly Note

The rear crossmember will have a different spacing due to the length of the machine.

1.3.3 Table Squaring

1.3.3.1

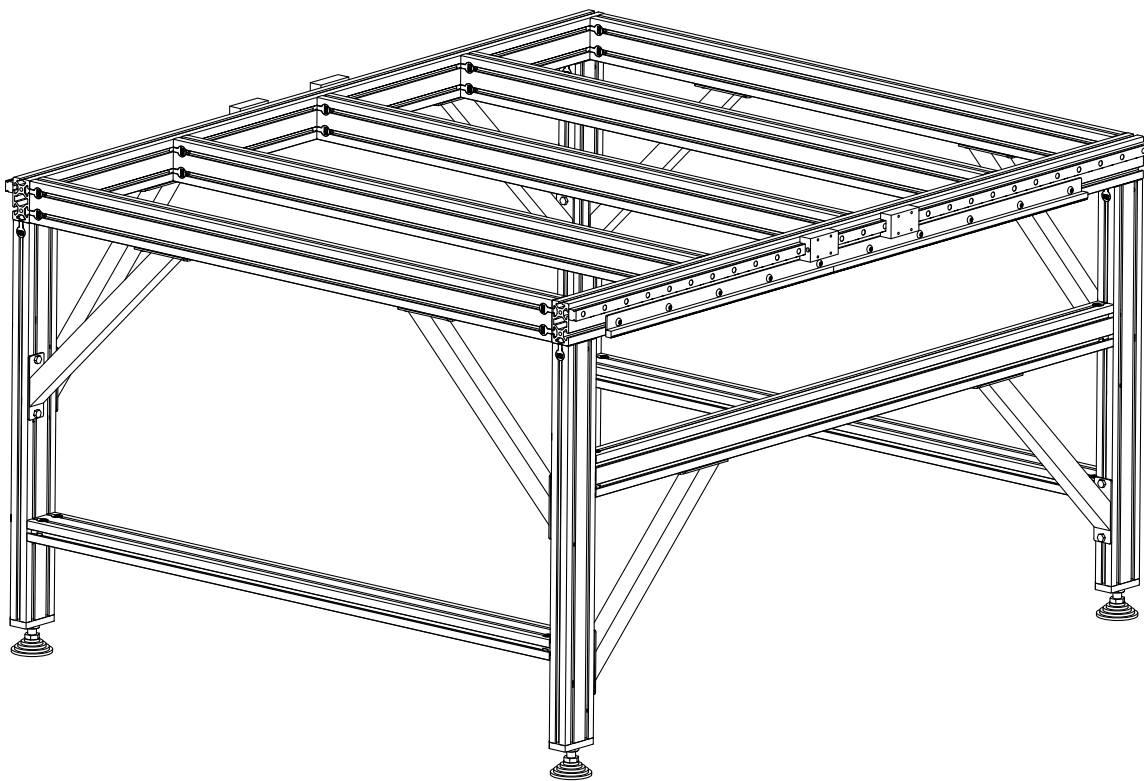


- Measure diagonal across the table in each direction as indicated.
- Make adjustments until the two measurements are within 1/8" or less of each other.
- After squaring the table, tighten all anchor fasteners and leg gusset fasteners.

Assembly Note

Position of the leg gussets may need to be adjusted in the table squaring process.

1.4 Linear Rail & Gear Rack Installation



i Section Note

The remaining sections are applicable both with or without a CNC Router Parts leg kit. Some figures are shown without a leg kit for illustrative purposes.

Parts and Tools Required

The following parts and tools will be used in Section 1.4

QTY	Part/Description	Packaged In
2	Linear Rail, 1600mm (63)	Table-48 Steel Tube
2	Gear Rack, 1320mm (52")	Table-48 Steel Tube
4	GHH20CA - Linear Bearing Block	CRP820 Riser Kit
4	Grease Fitting for Linear Bearing Block	CRP820 Riser Kit
2	GH20-1600-FAST: - (27) M5 x 20mm Socket Head Cap Screw (Total QTY: 54) - (27) M5 Slide-in T-Nut (Total QTY: 54)	CRP810 Base Kit
1	Linear Rail Setting Jig Kit: - (2) Rail Alignment Jig - (4) M8 x 25mm Socket Head Cap Screw - (4) M8 Roll-in T-Nut	CRP810 Base Kit
2	MGM-52-FAST-40: - (10) M8 x 12mm Button Head Cap Screw (Total QTY: 20) - (10) M8 Slide-in T-Nut (Total QTY: 20)	CRP810 Base Kit
1	LPRO-GREASE-KIT-19.1: - (1) Grease Gun - (1) Tube of Grease - (1) Needle Tip Adapter	CRP810 Base Kit

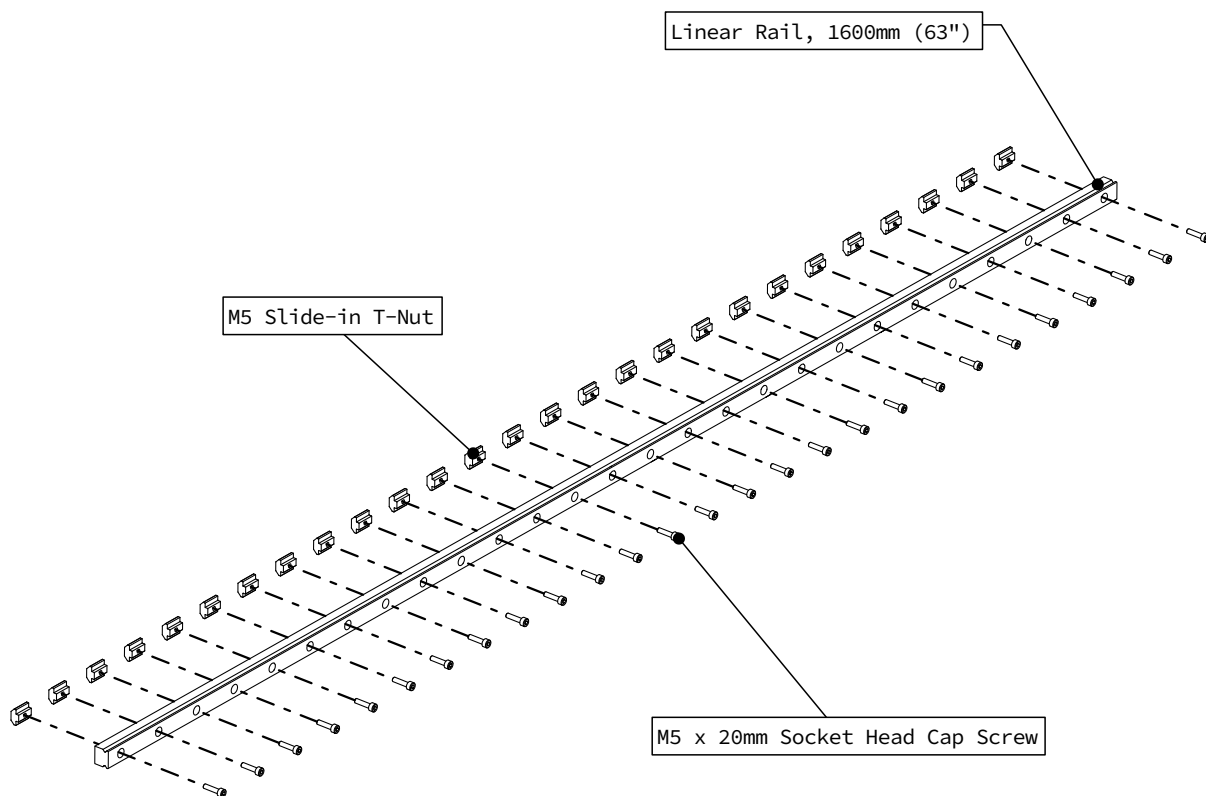
Required Tools:

- 4mm Allen Wrench
- 5mm Allen Wrench
- 6mm Allen Wrench
- (2) Clamps
- Tape Measure



1.4.1 Linear Rail Installation

1.4.1.1



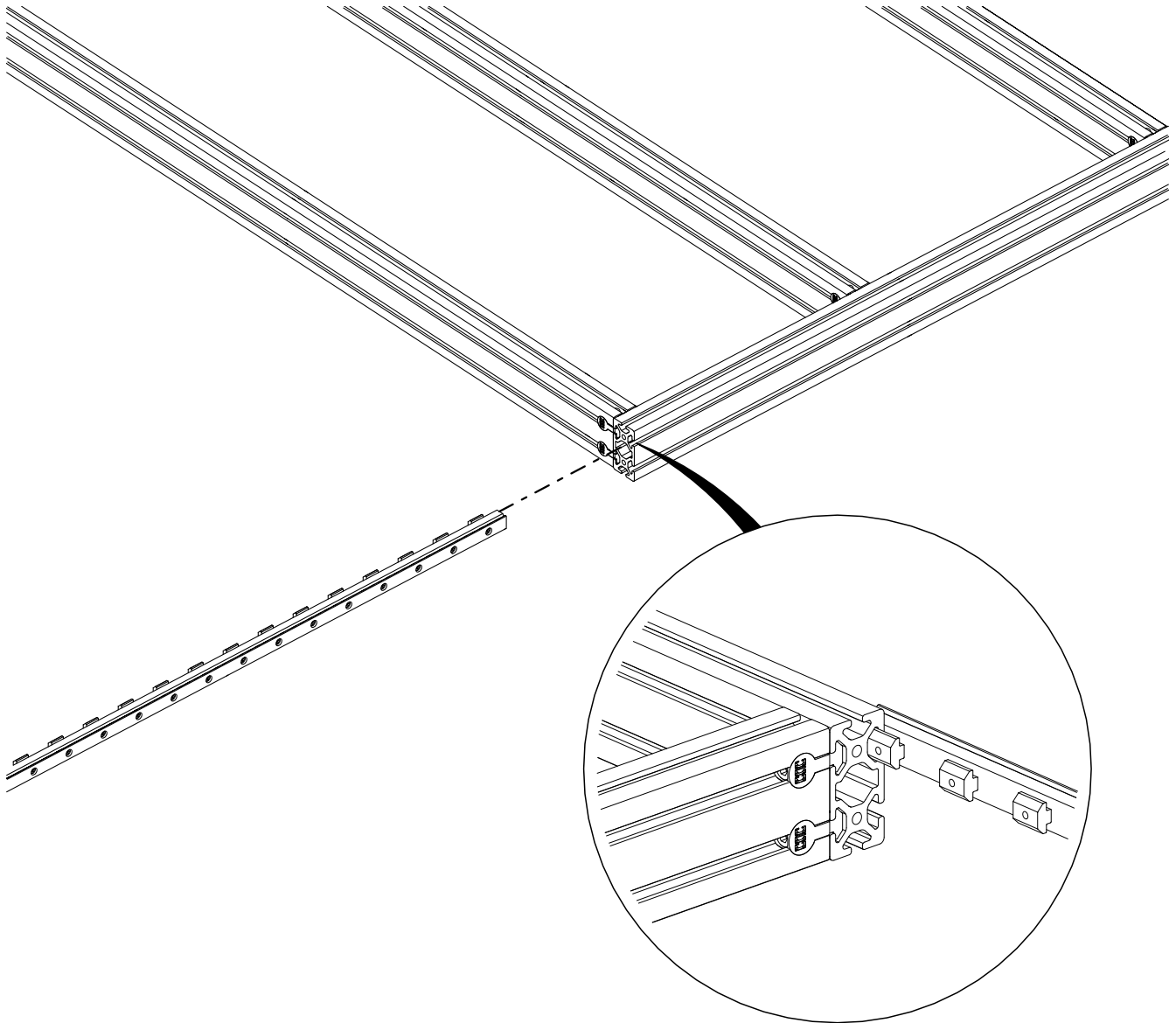
- Thread fasteners into the linear rail as indicated.

1.4.1.2



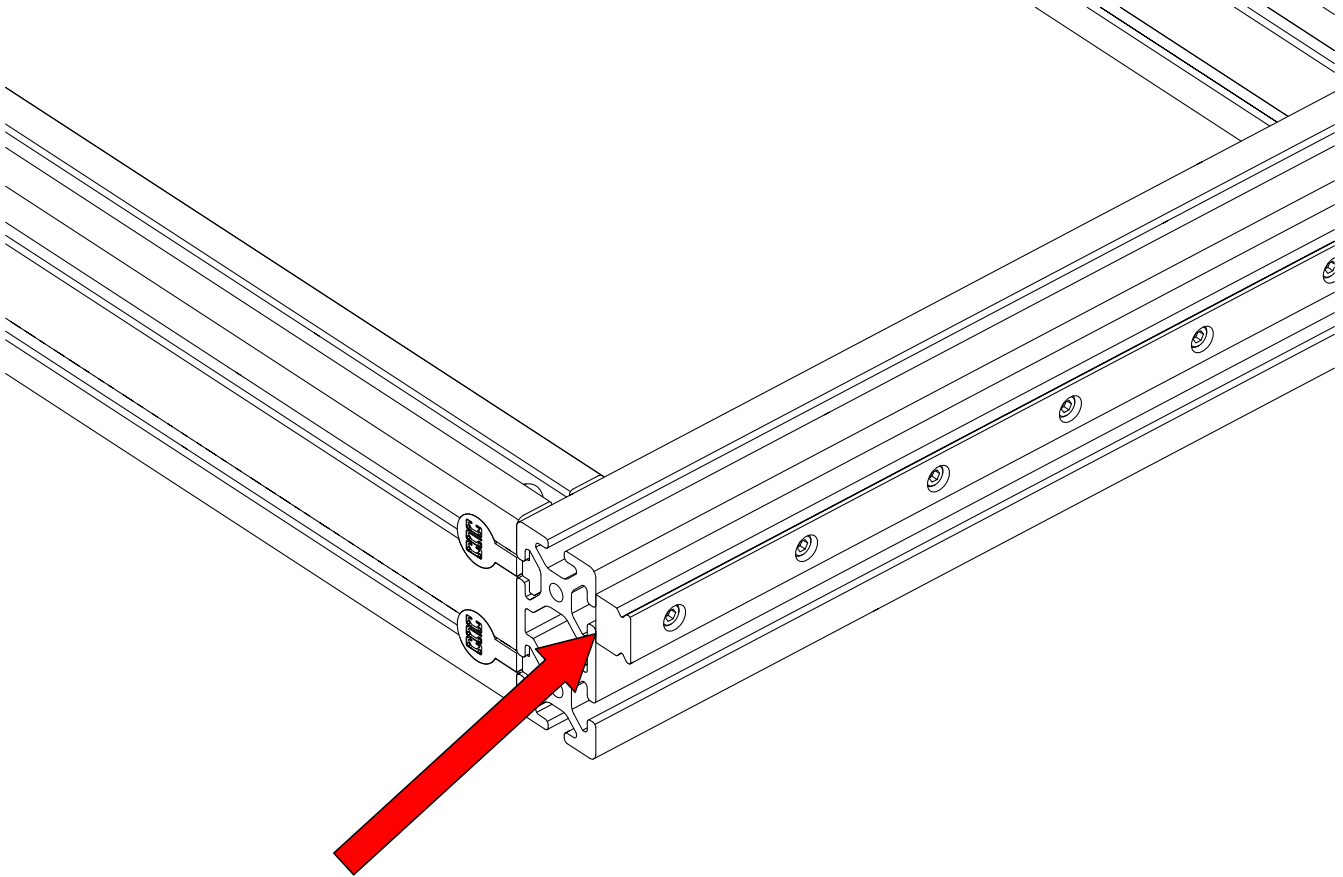
- Repeat this step for each of the linear rails.

1.4.1.3



- Slide one of the rails into the upper extrusion t-slot as indicated.

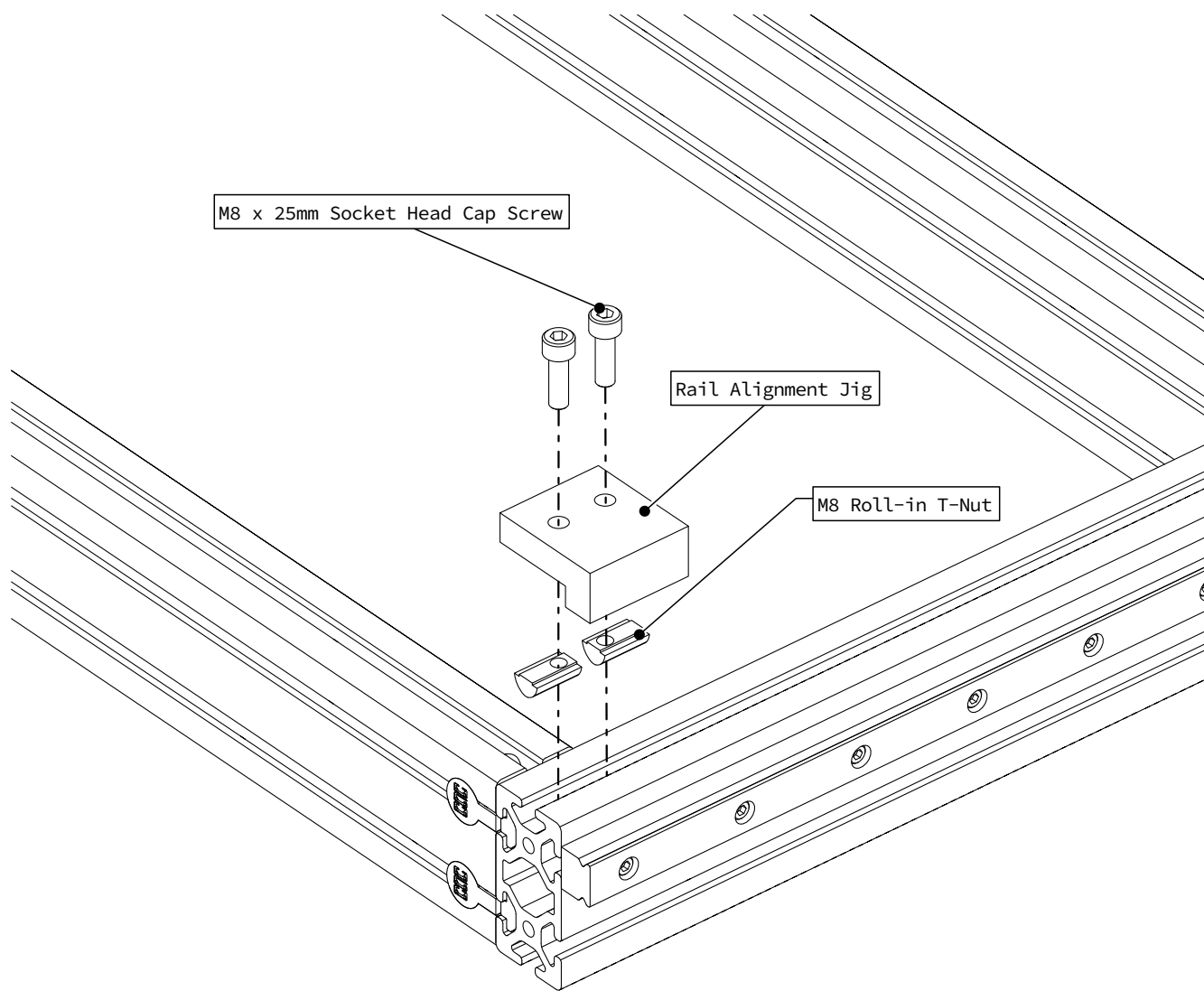
1.4.1.4



- The linear rail should be roughly flush with the end of the extrusion.

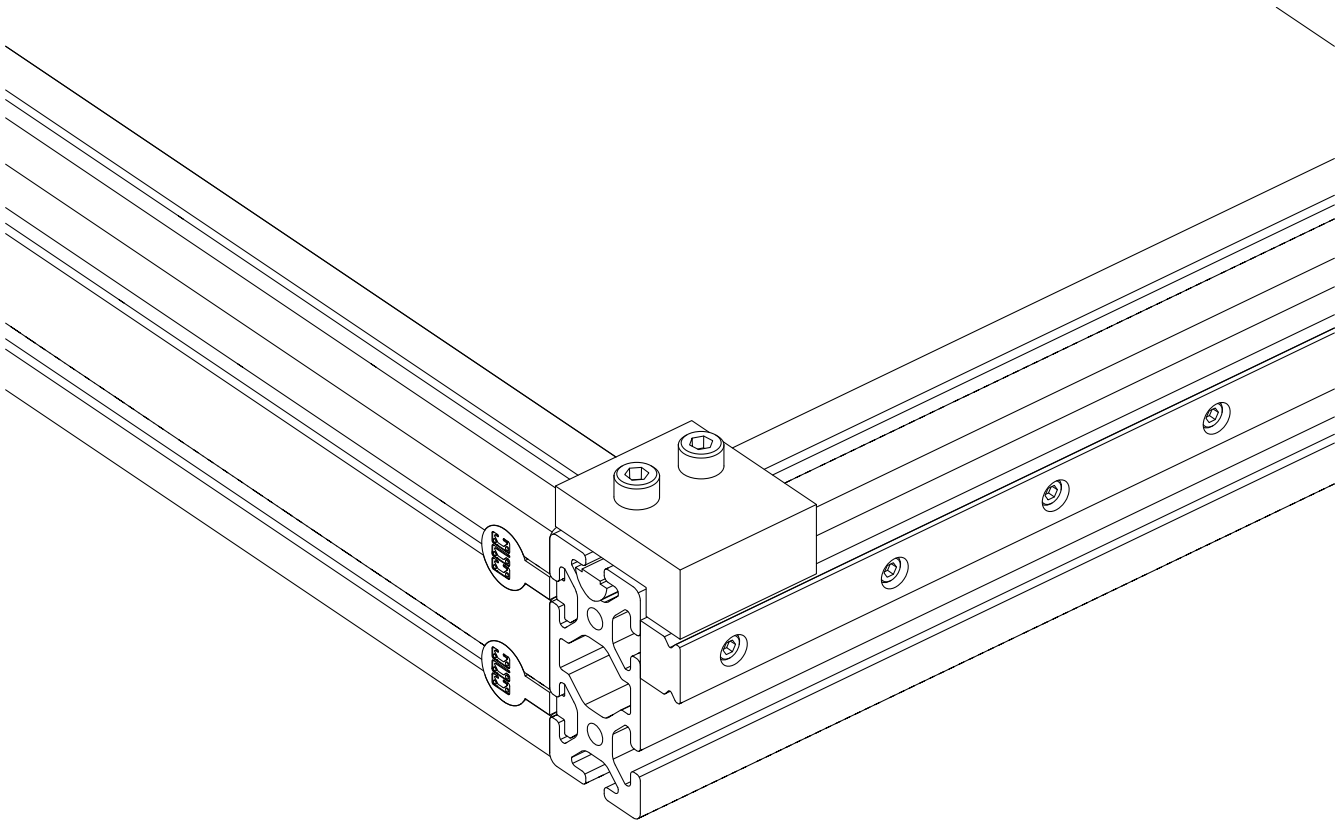
1.4.2 Linear Rail Alignment

1.4.2.1



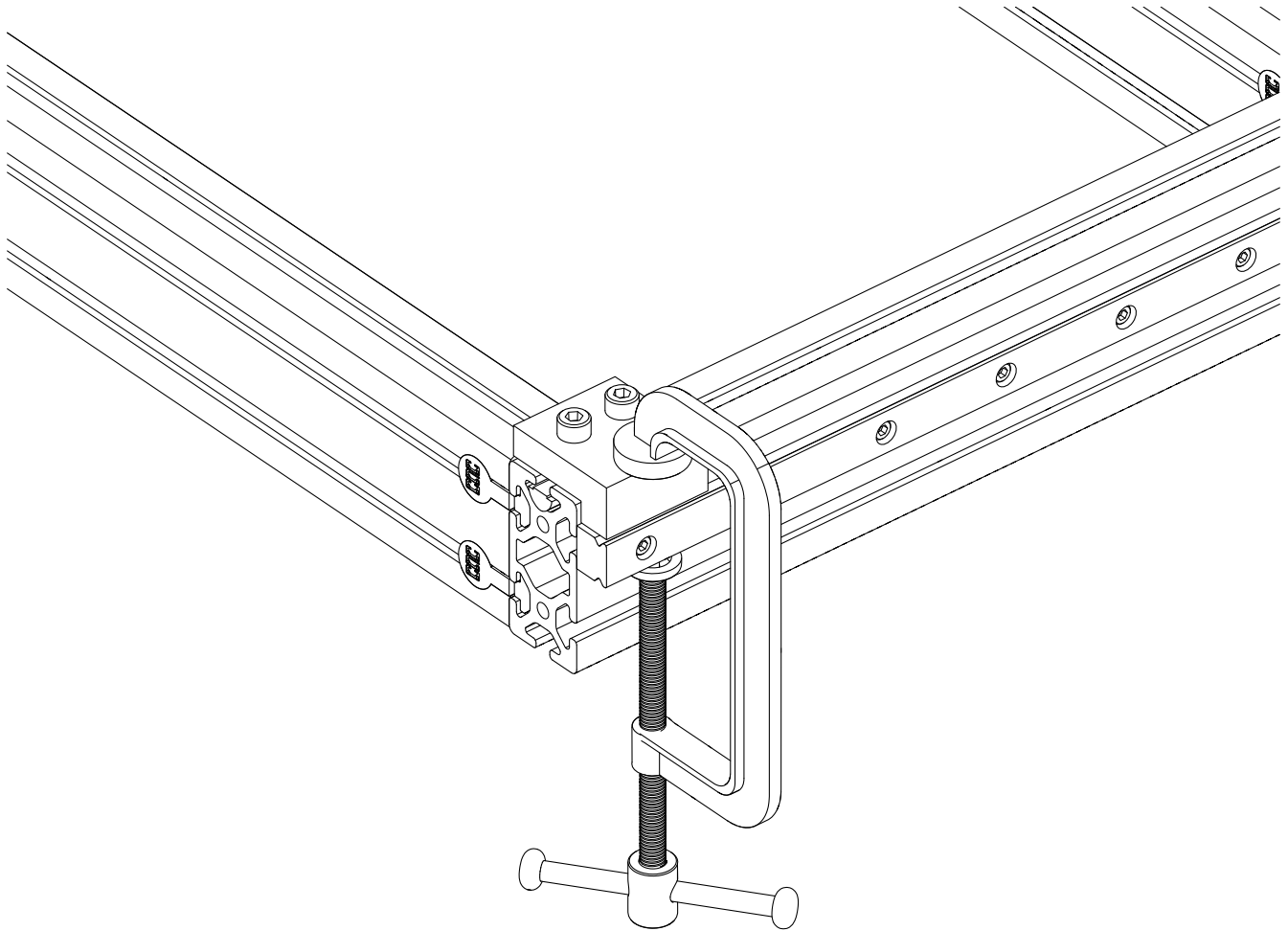
- Attach the rail alignment jig to the extrusion as indicated.

1.4.2.2



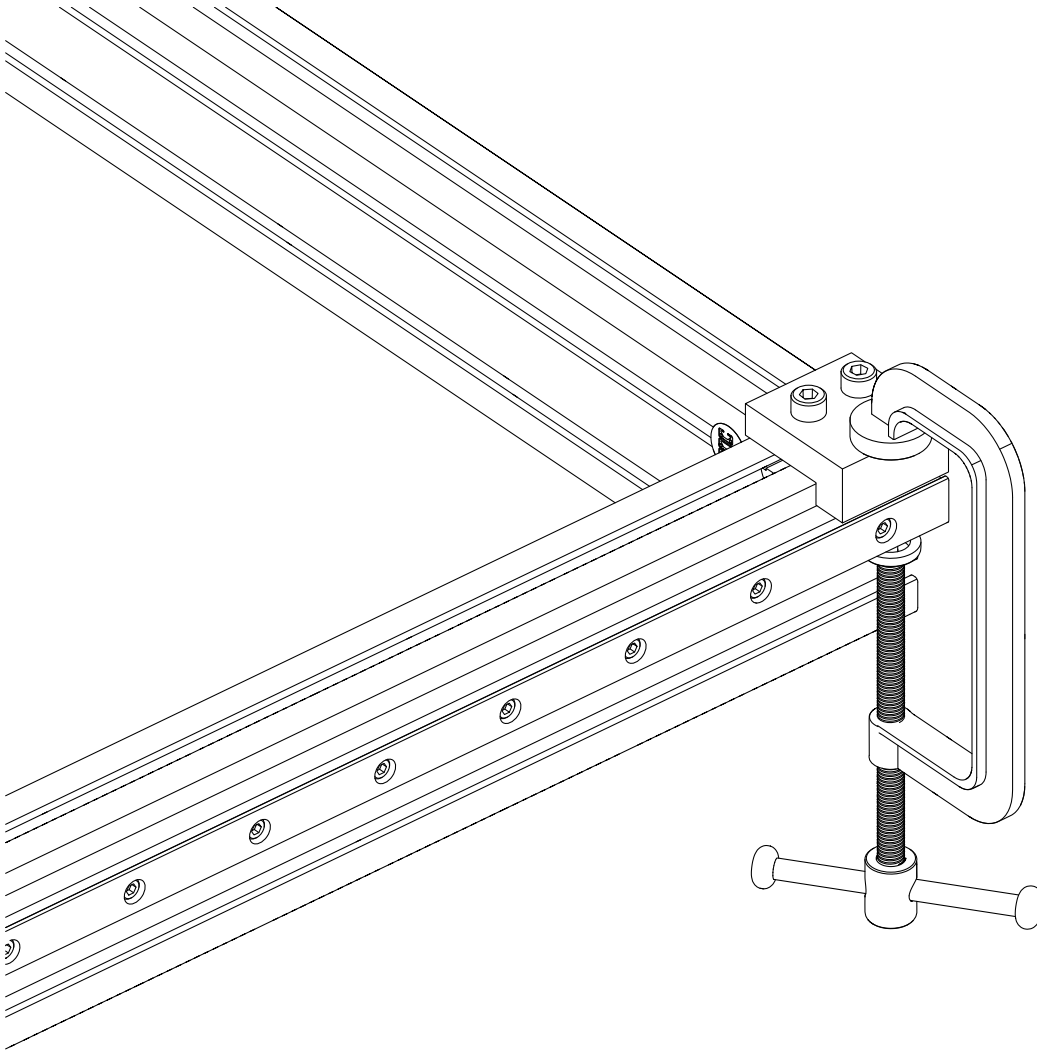
- Fully tighten the alignment jig fasteners.

1.4.2.3



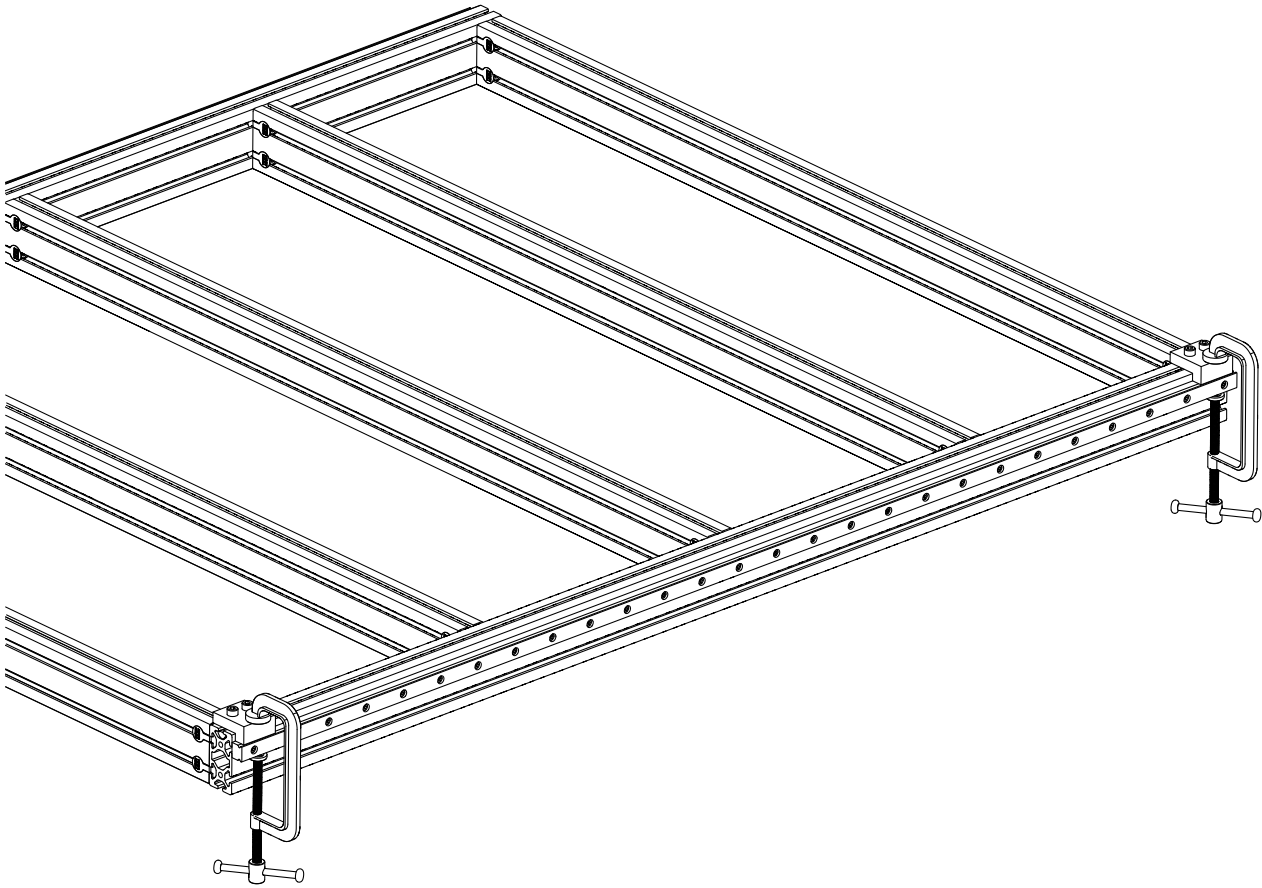
- Clamp the end of the linear rail to the jig as indicated.

1.4.2.4



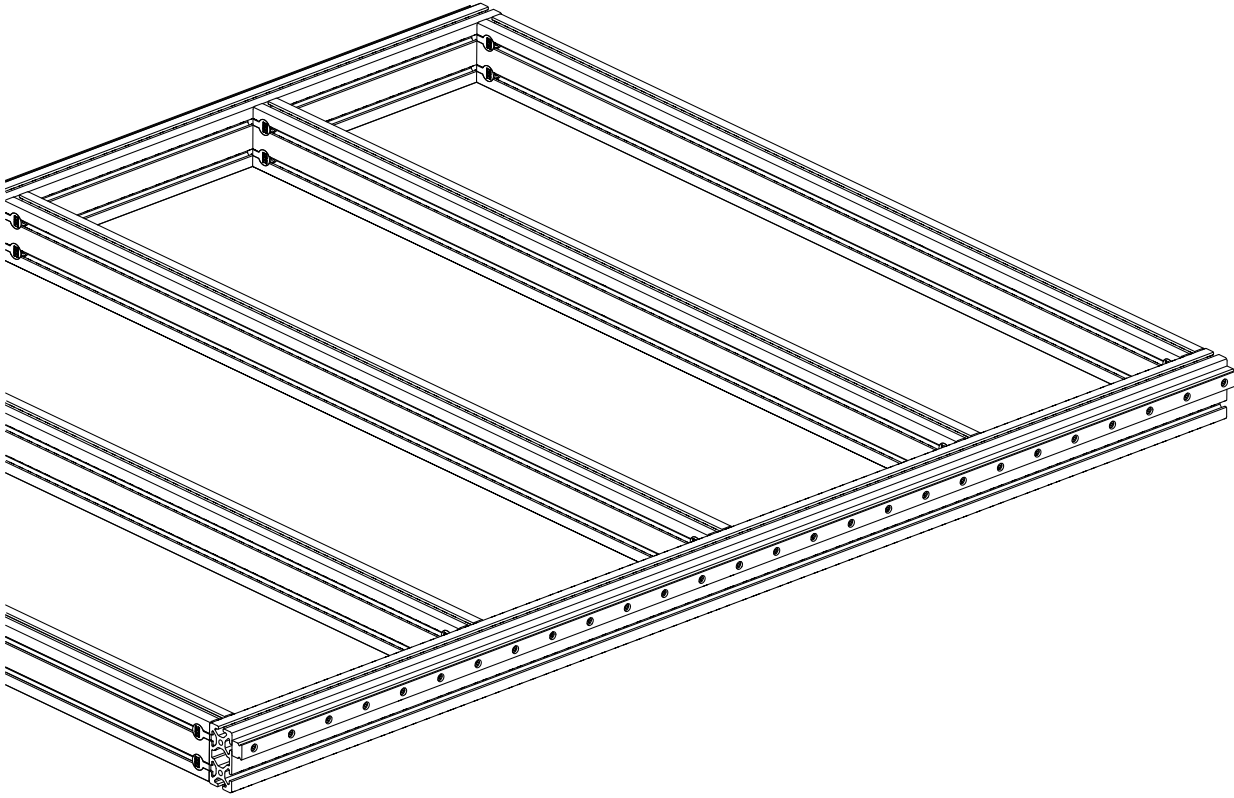
- Repeat the previous step to clamp the other end of the rail.

1.4.2.5



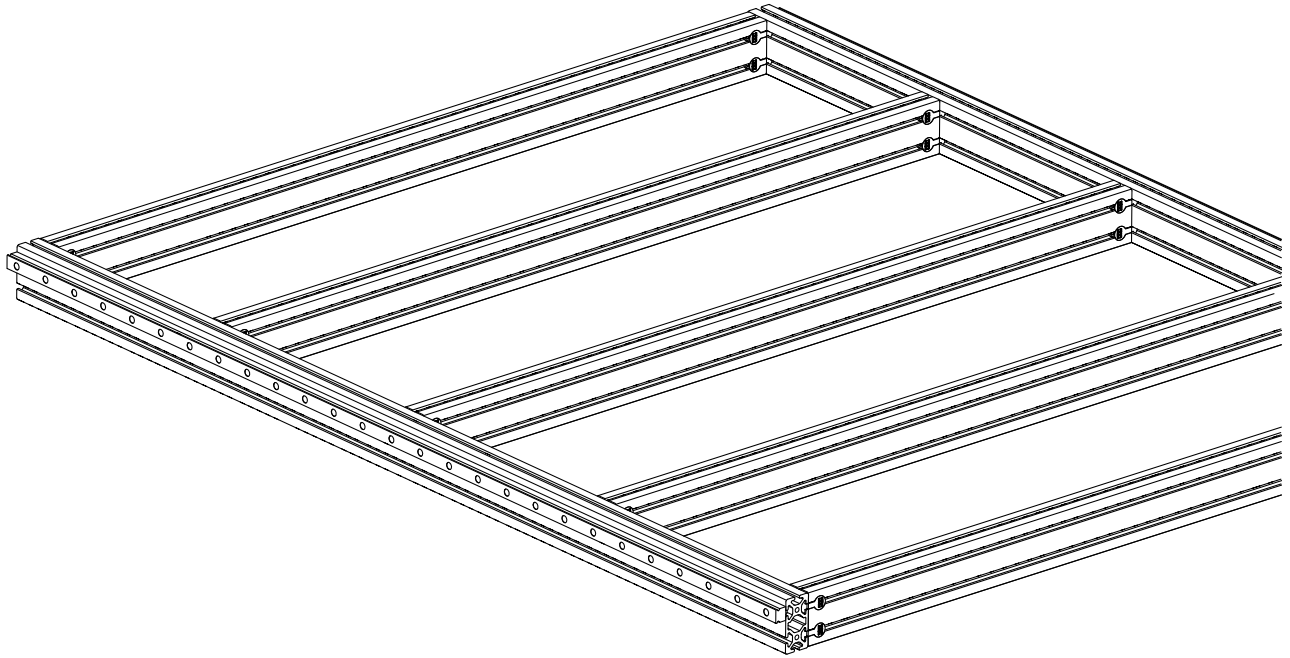
- With the rail clamped to the alignment jigs, fully tighten all of the rail fasteners.

1.4.2.6



- Remove the clamps and alignment jigs.

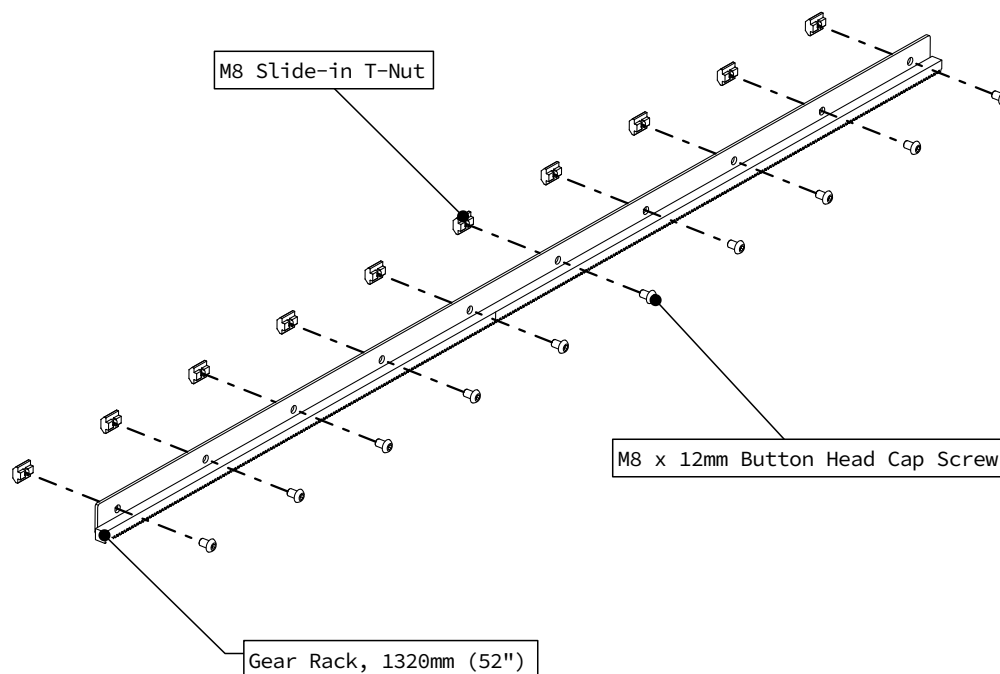
1.4.2.7



- Repeat the previous steps to install the linear rail on the other side of the machine.

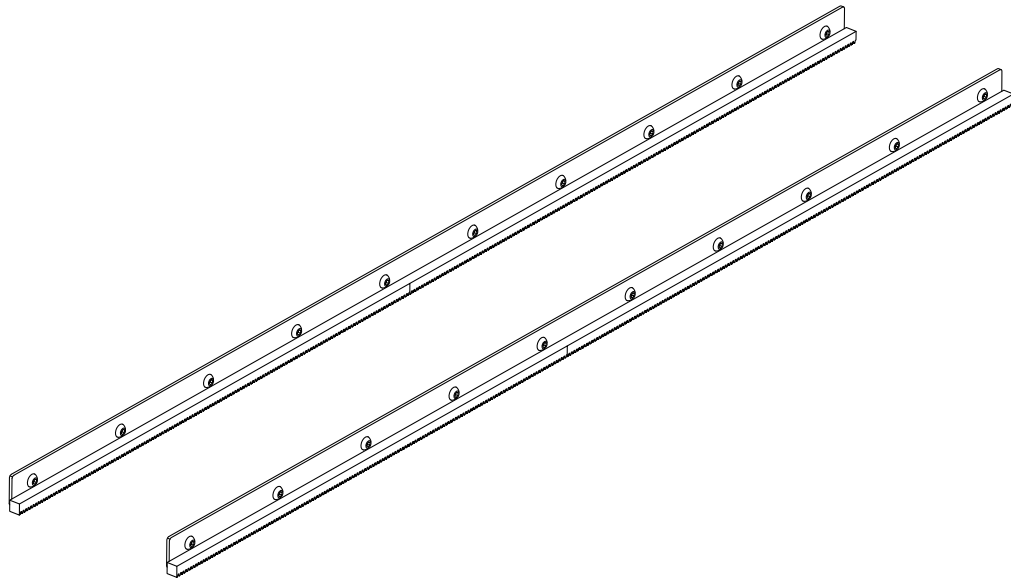
1.4.3 Gear Rack Installation

1.4.3.1



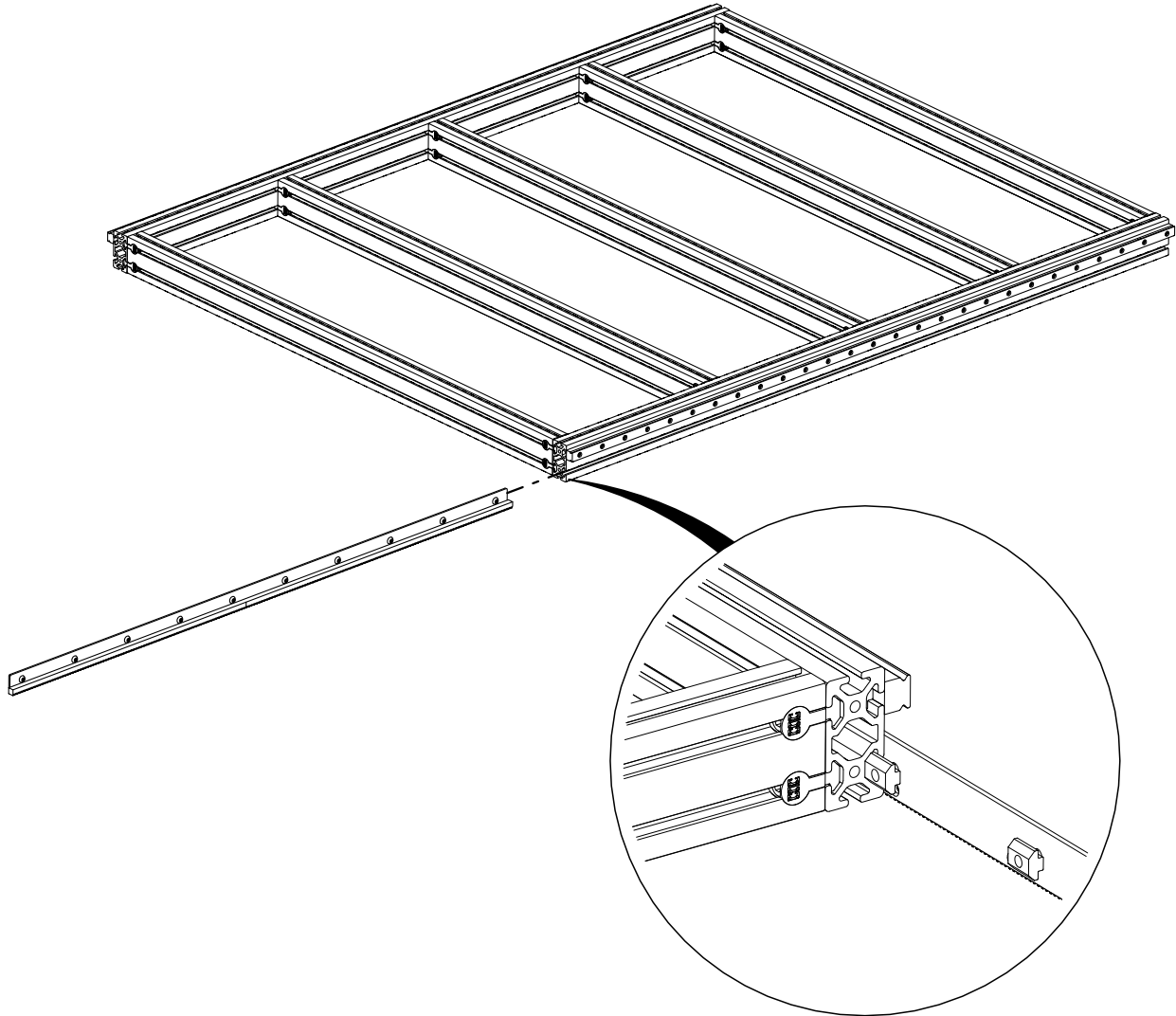
- Thread fasteners into the gear rack as indicated.

1.4.3.2



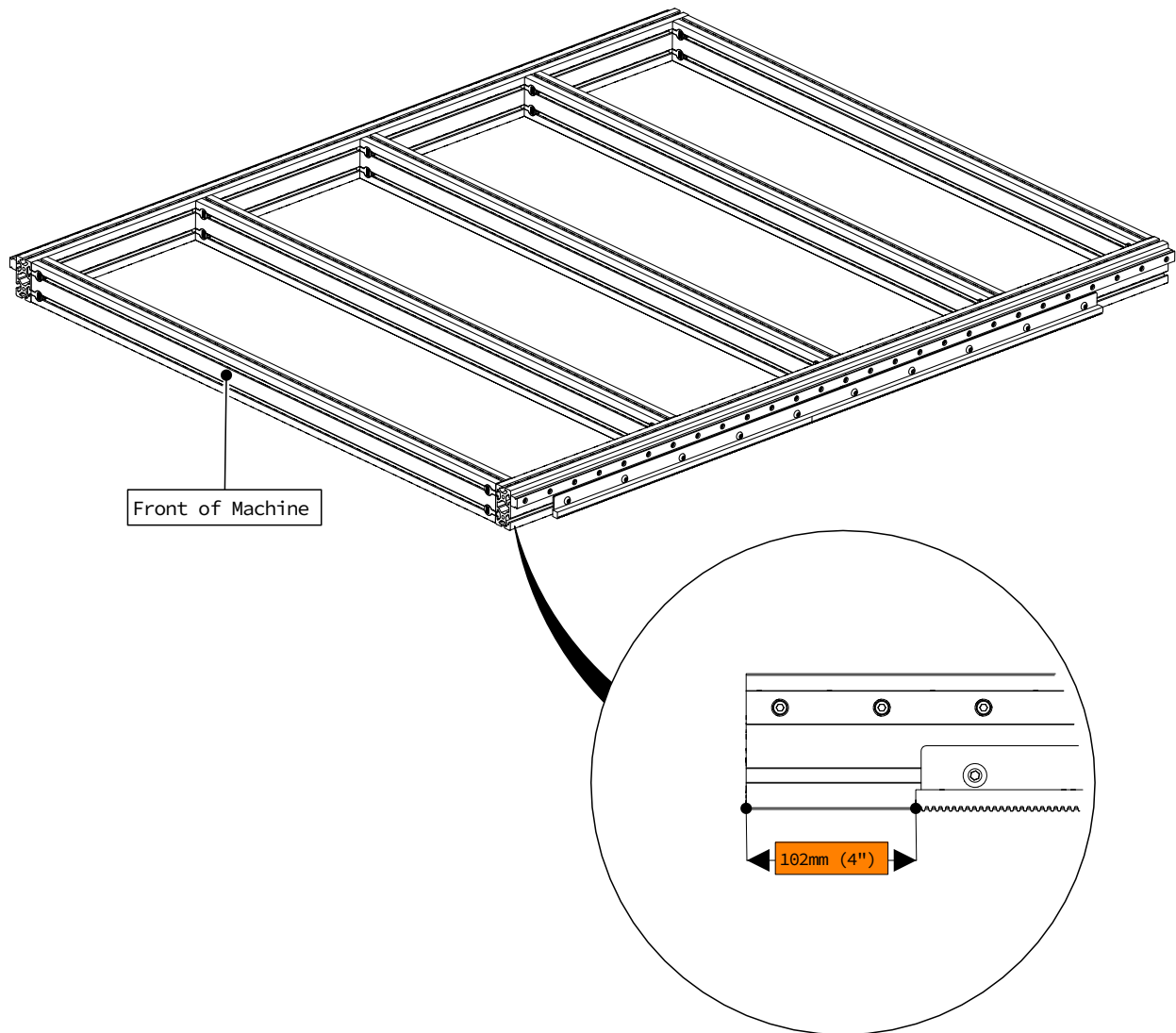
- Repeat the previous step for each of the gear rack sections.

1.4.3.3



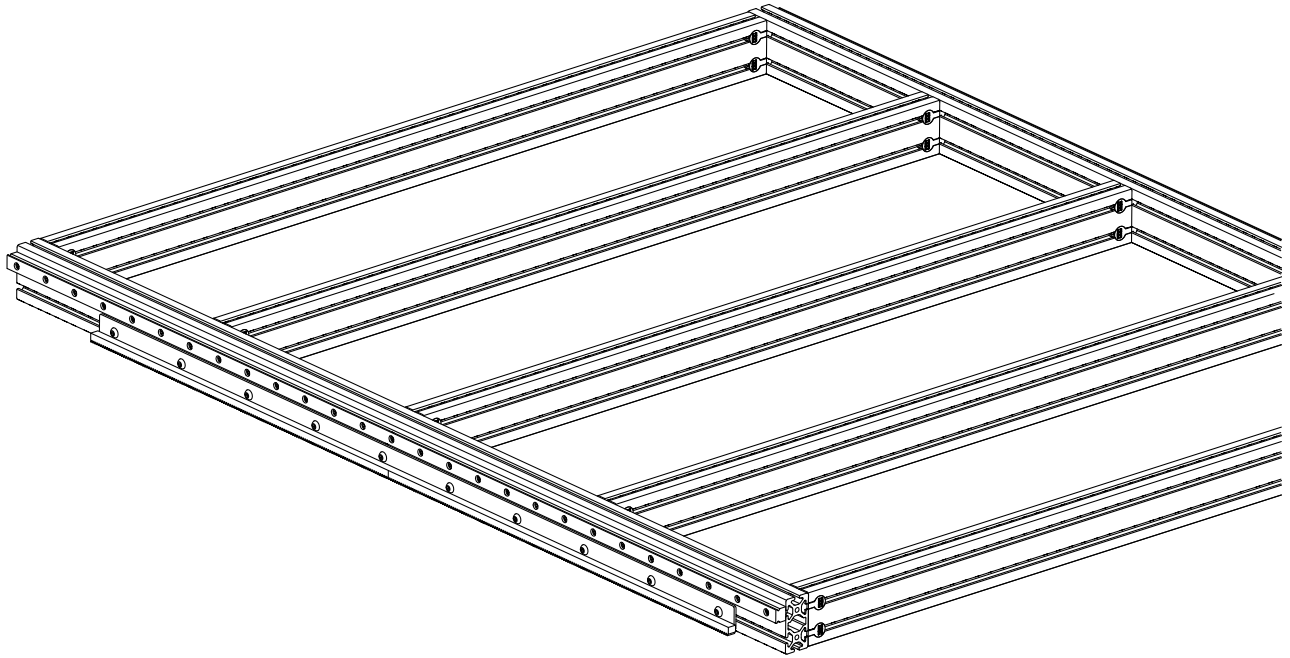
- Slide one of the sections of gear rack into the extrusion.

1.4.3.4



- Position the Gear rack 102mm (4") from the front of the machine as indicated.
- Tighten all gear rack fasteners.

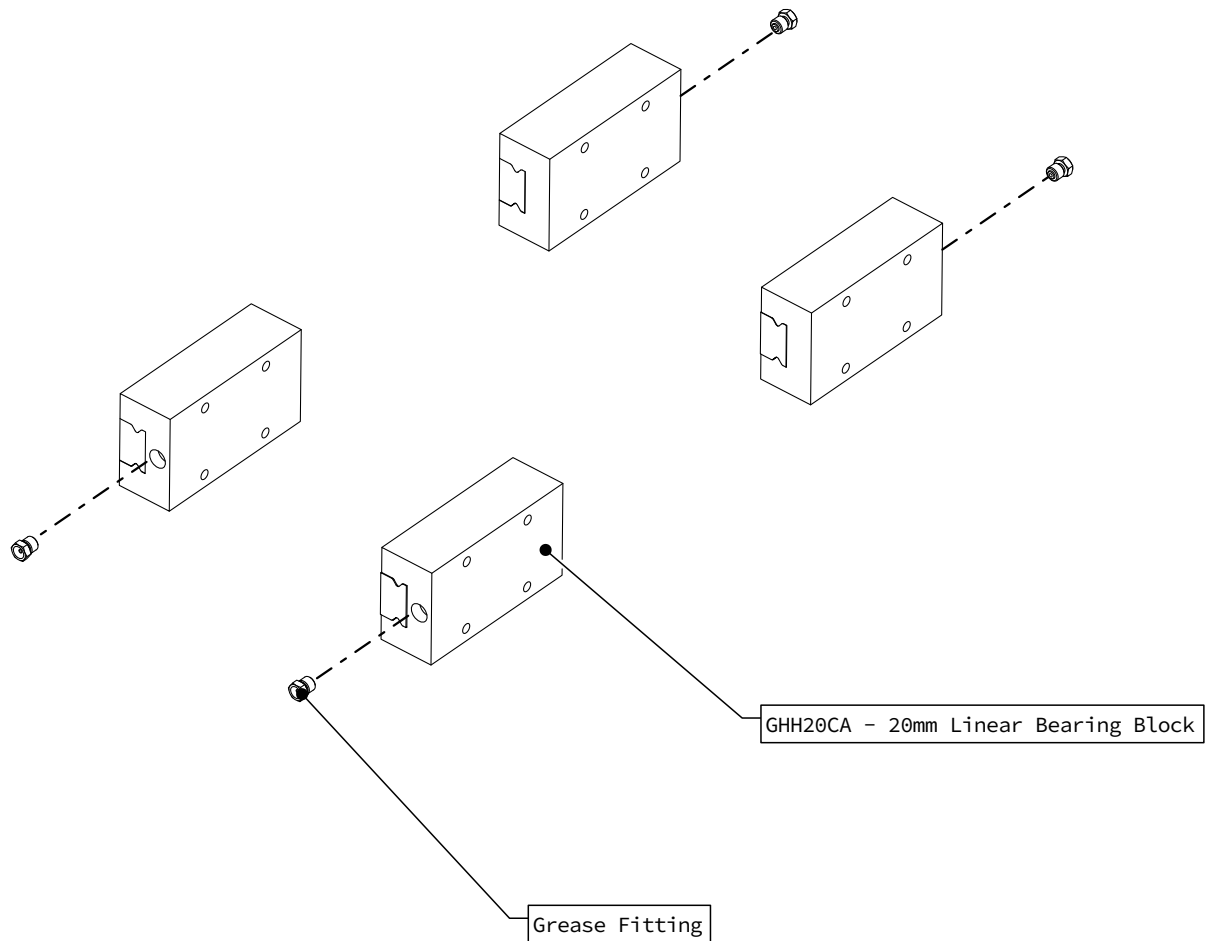
1.4.3.5



- Repeat this procedure to install the gear rack on the other side of the machine.

1.4.4 Linear Bearing Block Installation

1.4.4.1

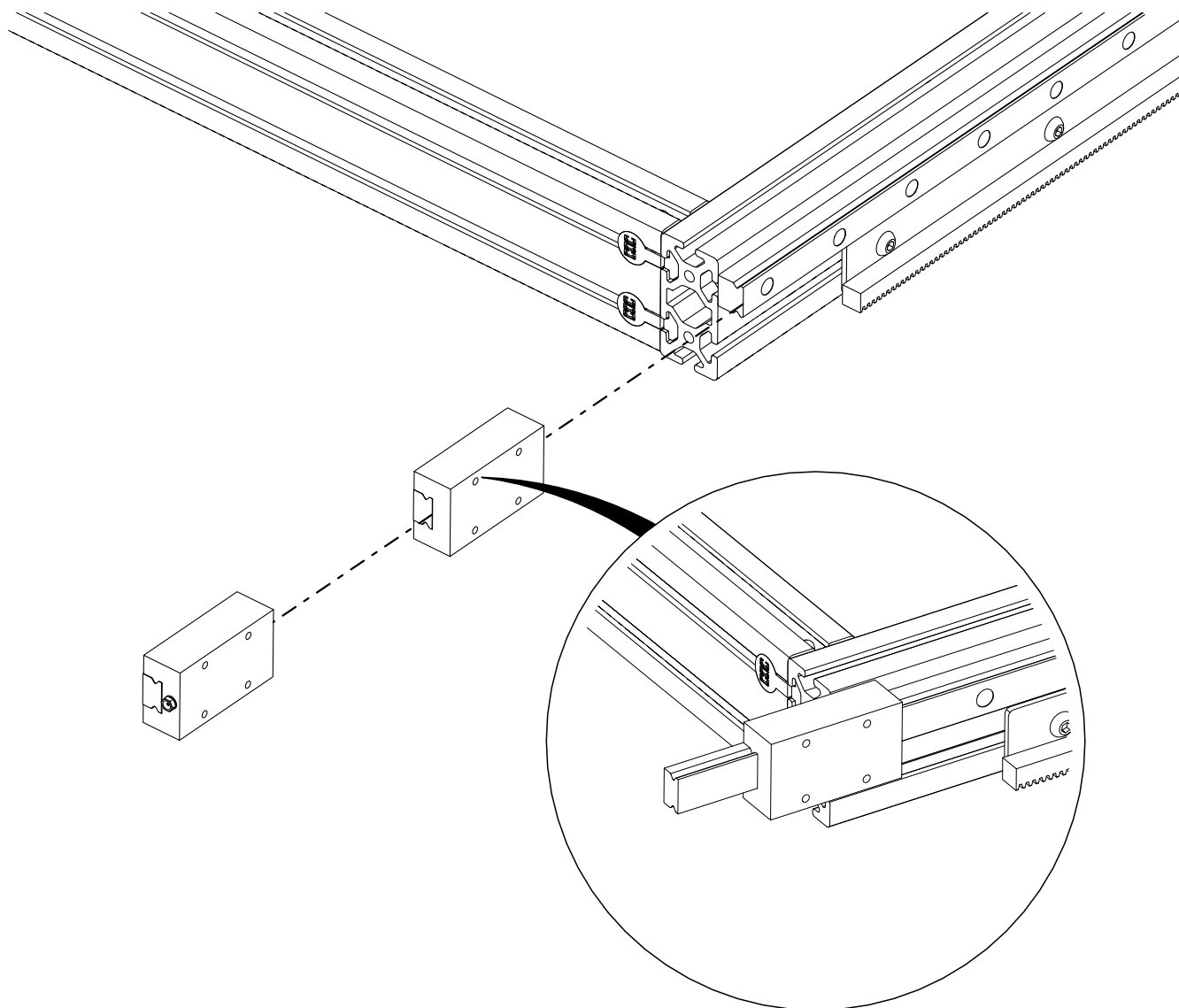


- Thread grease fittings into the linear bearing blocks as indicated.
- Hand tighten the grease fittings.

Assembly Note

DO NOT remove the plastic bearing retainers at this time.

1.4.4.2

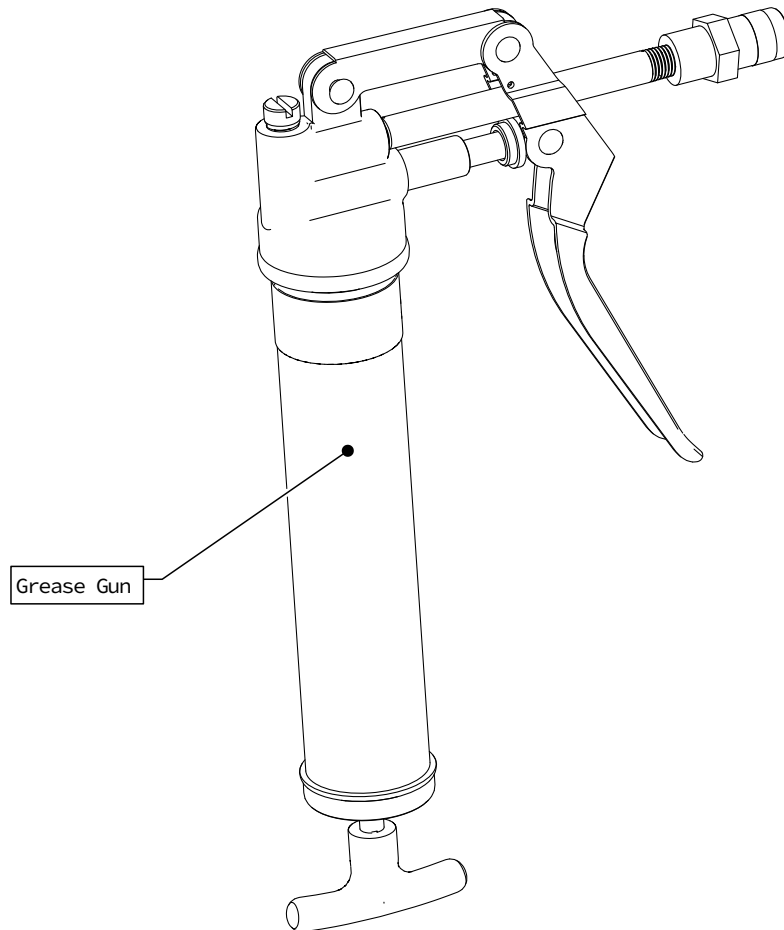


- Slide two linear bearing blocks onto a rail.
- Use the rail to push the plastic bearing retainer out of the block as indicated.

Assembly Note

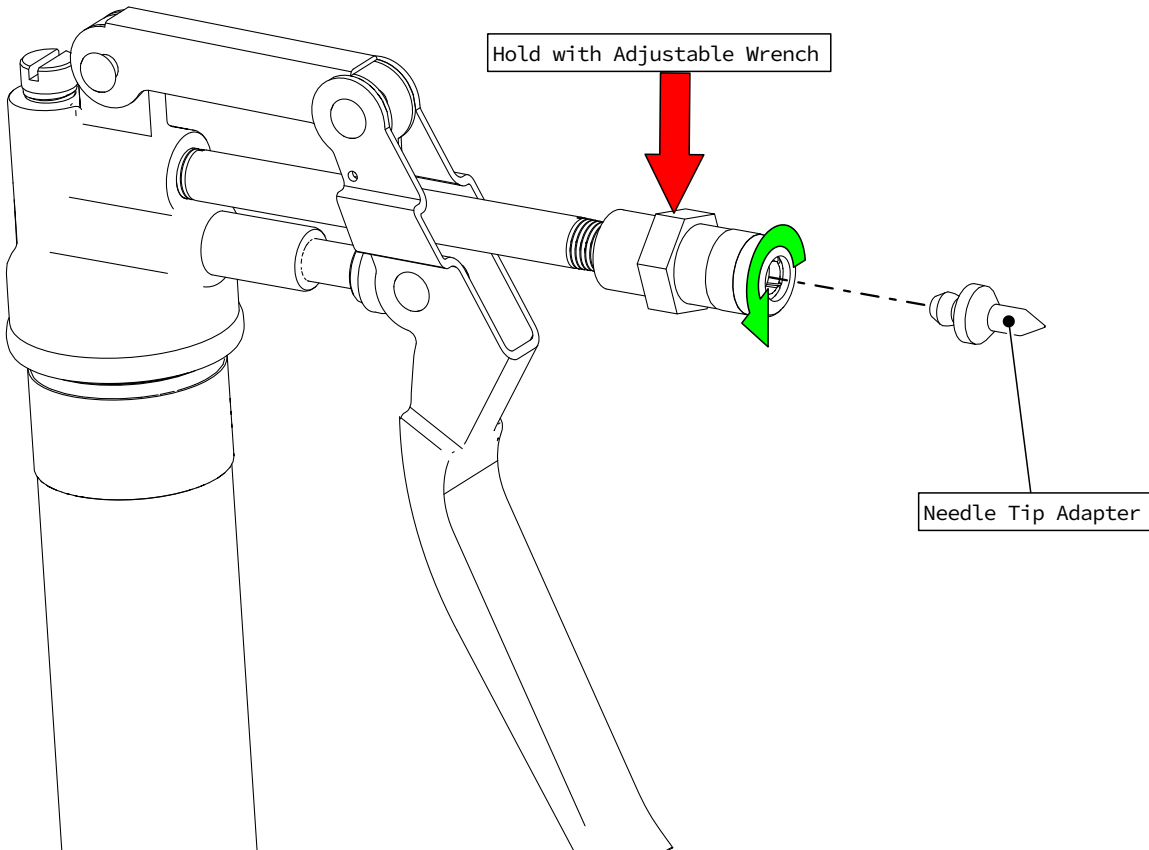
Ensure the linear bearing blocks are oriented in the correct directions, with the grease fittings facing away from each other.

1.4.4.3



- Assemble the grease gun and tube of grease, following the manufacturer's instructions.

1.4.4.4

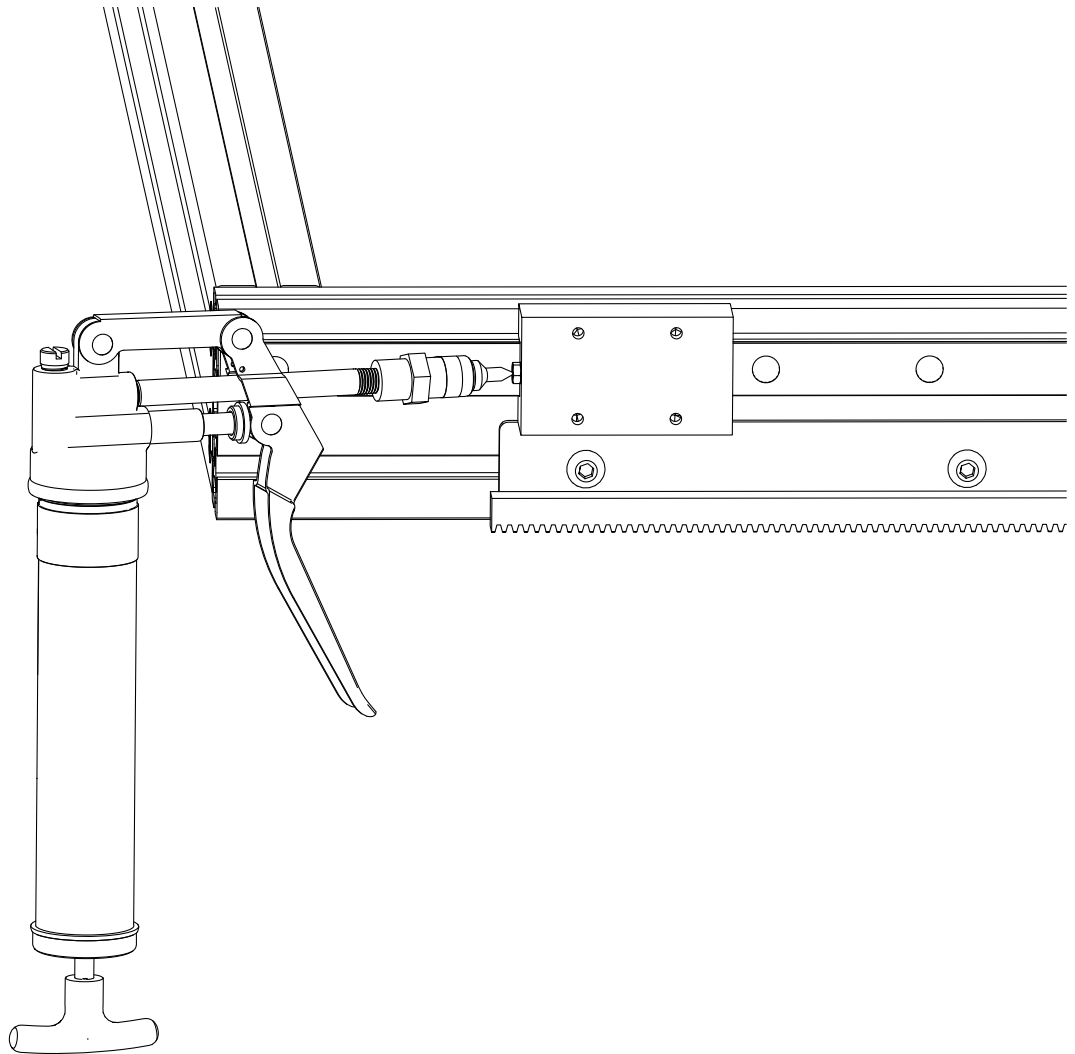


- Loosen the end cap and install the needle tip adapter as indicated.

Assembly Note

Be sure to tighten the end cap after installing the needle tip adapter.

1.4.4.5

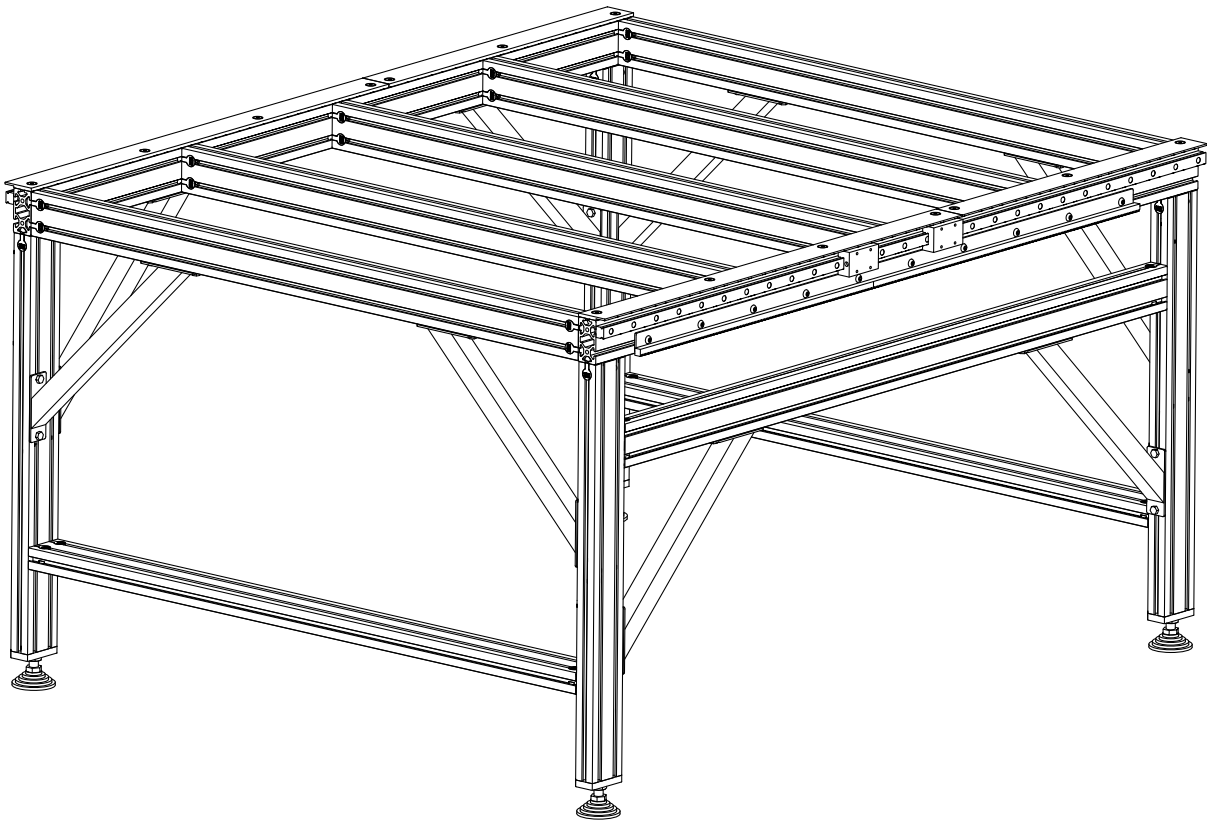


- Ensure the grease gun is primed before use.
- Lubricate the linear bearing blocks with three pumps per block.

Maintenance Note

The blocks will need to be lubricated periodically. The required interval will depend upon machine use, loads, and ambient conditions. We suggest evaluating each month by cleaning the linear rails, moving the blocks along them, and checking for a lubricant film. If a film is not present, then add one additional pump of grease to your blocks.

1.5 Linear Rail Dust Covers



Parts and Tools Required

The following parts and tools will be used in Section 1.5

QTY	Part/Description	Packaged In
2	Linear Rail Dust Cover, 950mm (37-3/8")	Dust Cover Kit
2	Linear Rail Dust Cover, 650mm (25-5/8")	Dust Cover Kit
1	CRP814-00-48-FAST: - (14) M8 x 16mm Flat Head Screw - (14) M8 Roll-in T-Nut	Dust Cover Kit

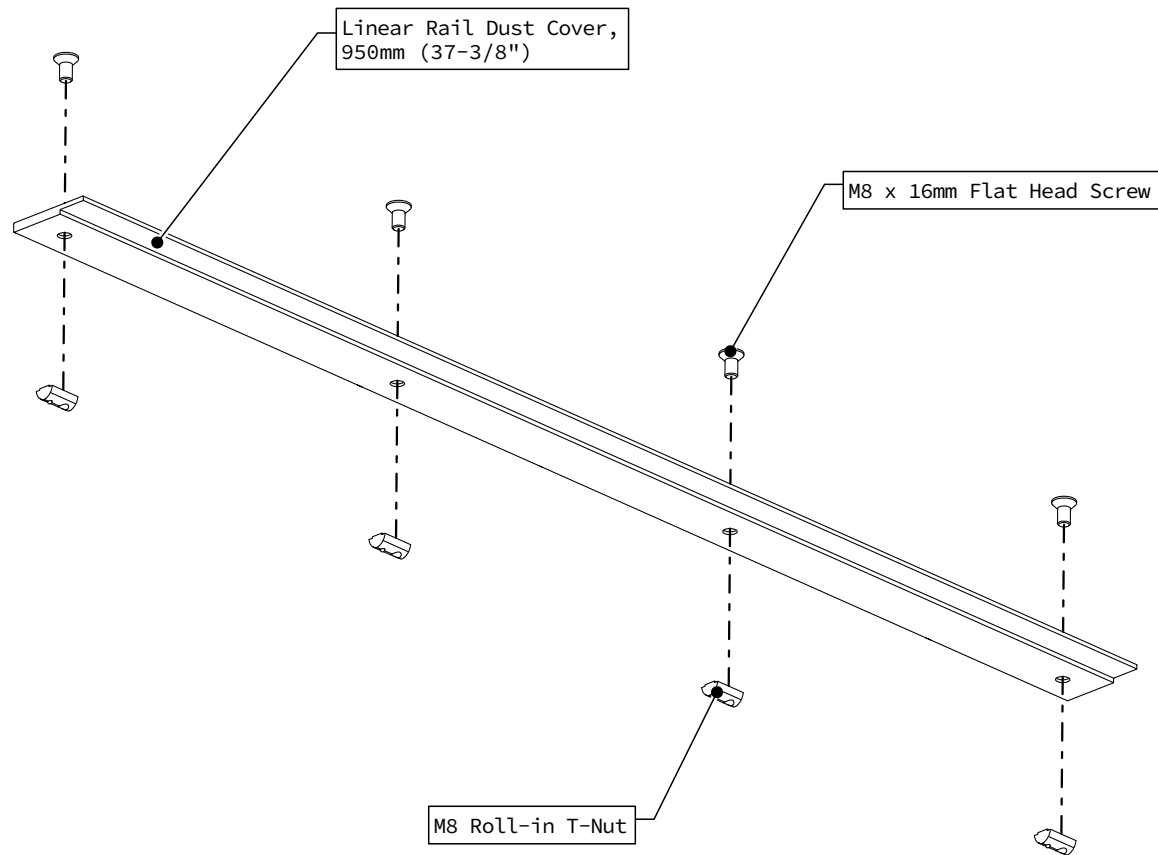
Required Tools:

- 5mm Allen Wrench



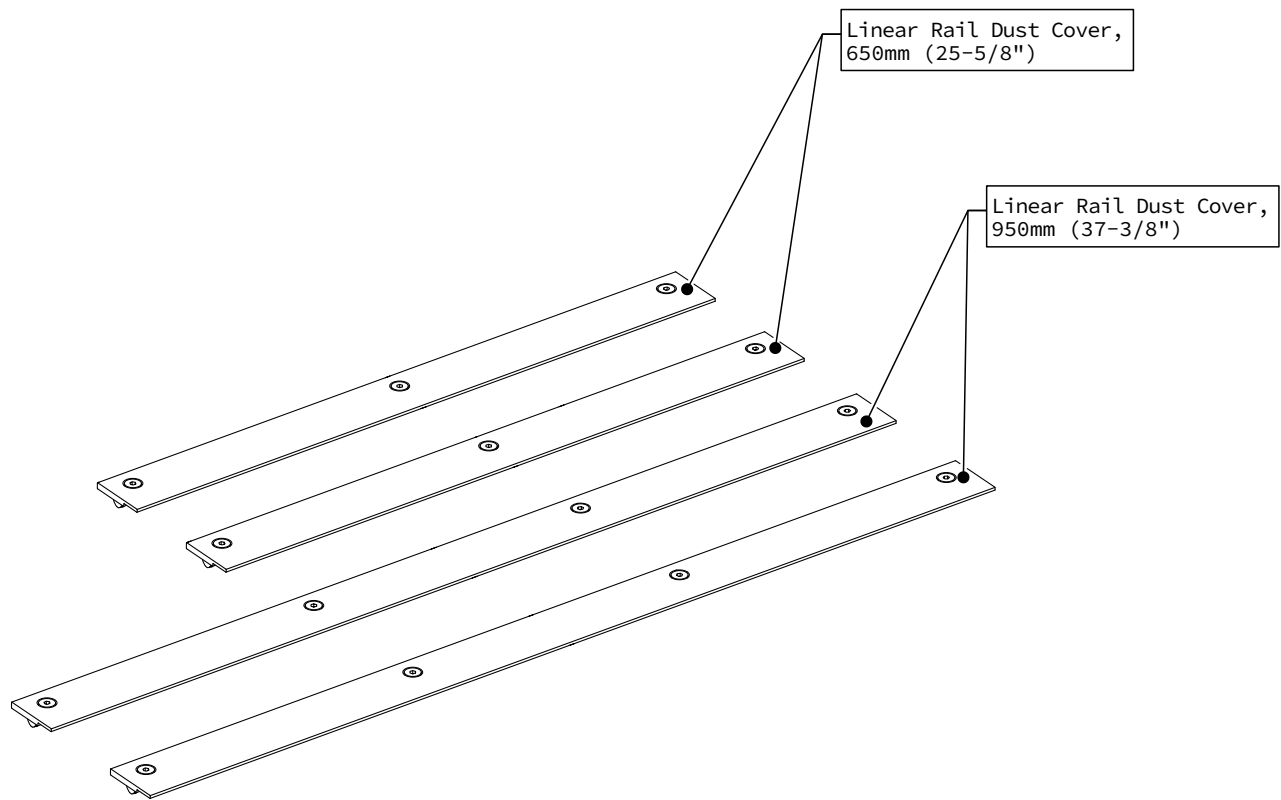
1.5.1 Dust Cover Assembly

1.5.1.1



- Partially thread fasteners onto the Linear Rail Dust Cover as indicated.

1.5.1.2



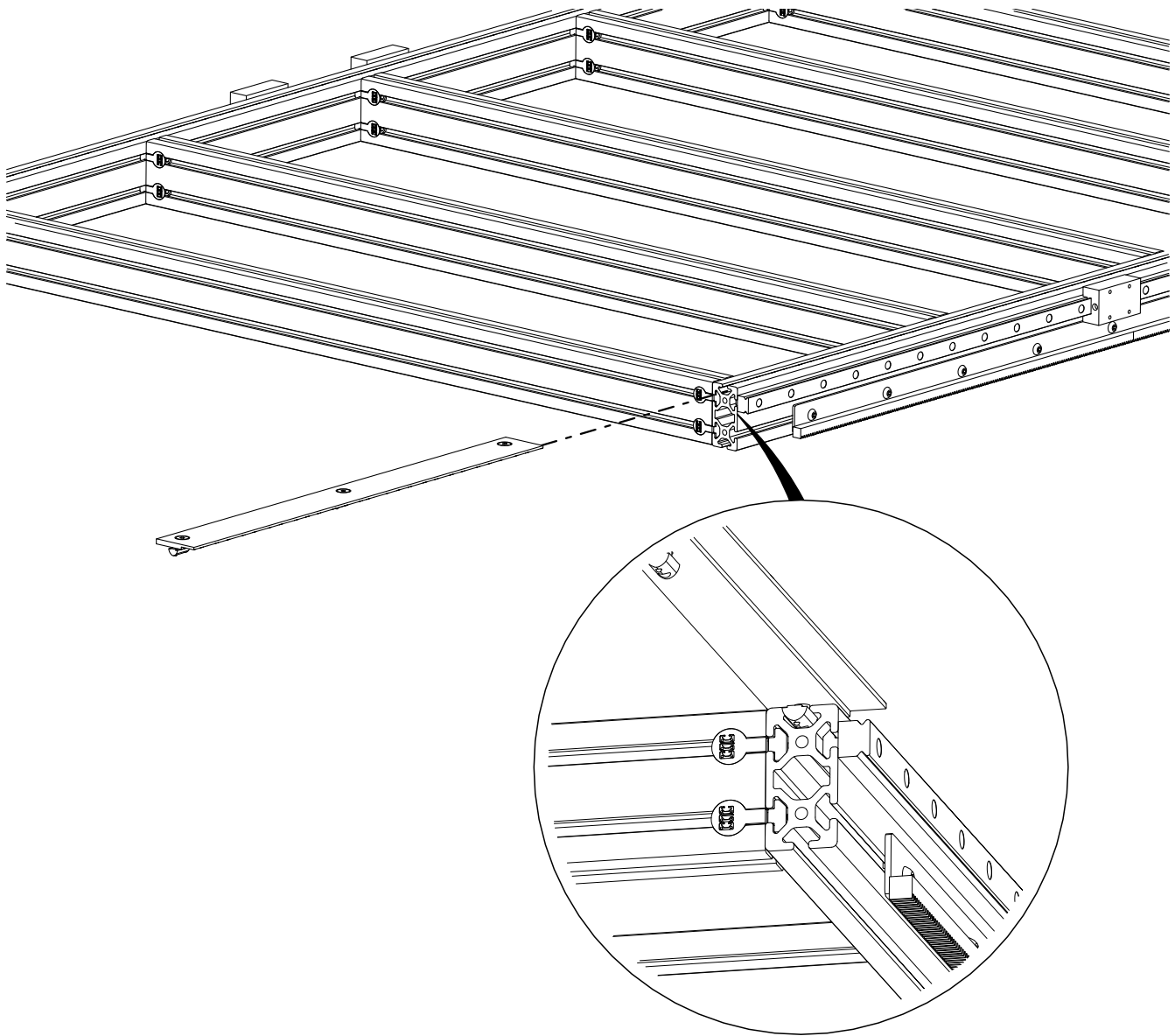
- Repeat the previous step to assemble four Linear Rail Dust Covers.

Assembly Note

There are four total dust covers, two of each length as indicated.

1.5.1 Dust Cover Installation

1.5.2.1

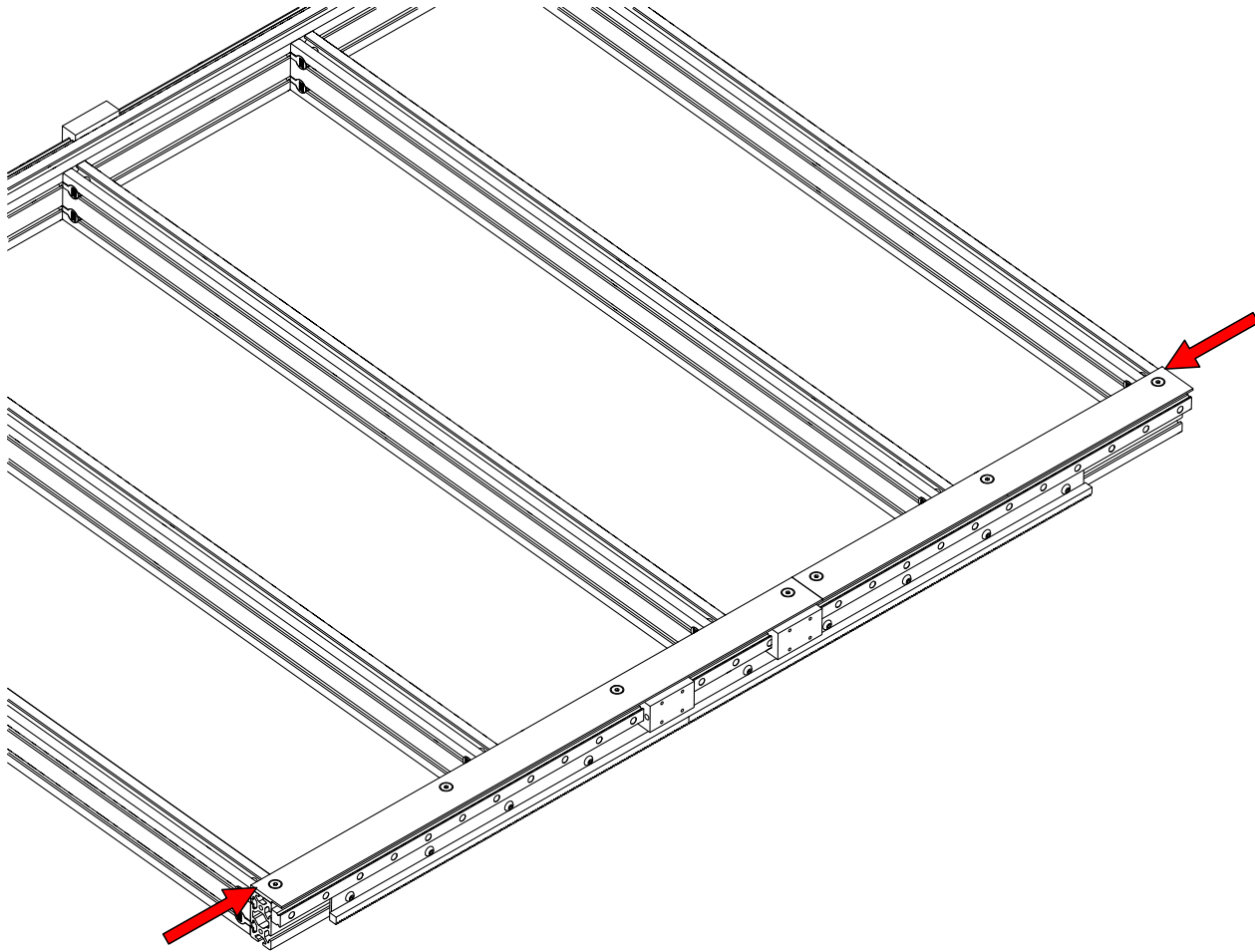


- Slide an assembled 650mm (25-5/8") Linear Rail Dust Cover into the top t-slot as indicated.

Assembly Note

Ensure the Linear Rail Dust Cover is oriented so it overhangs the linear rail.

1.5.2.2

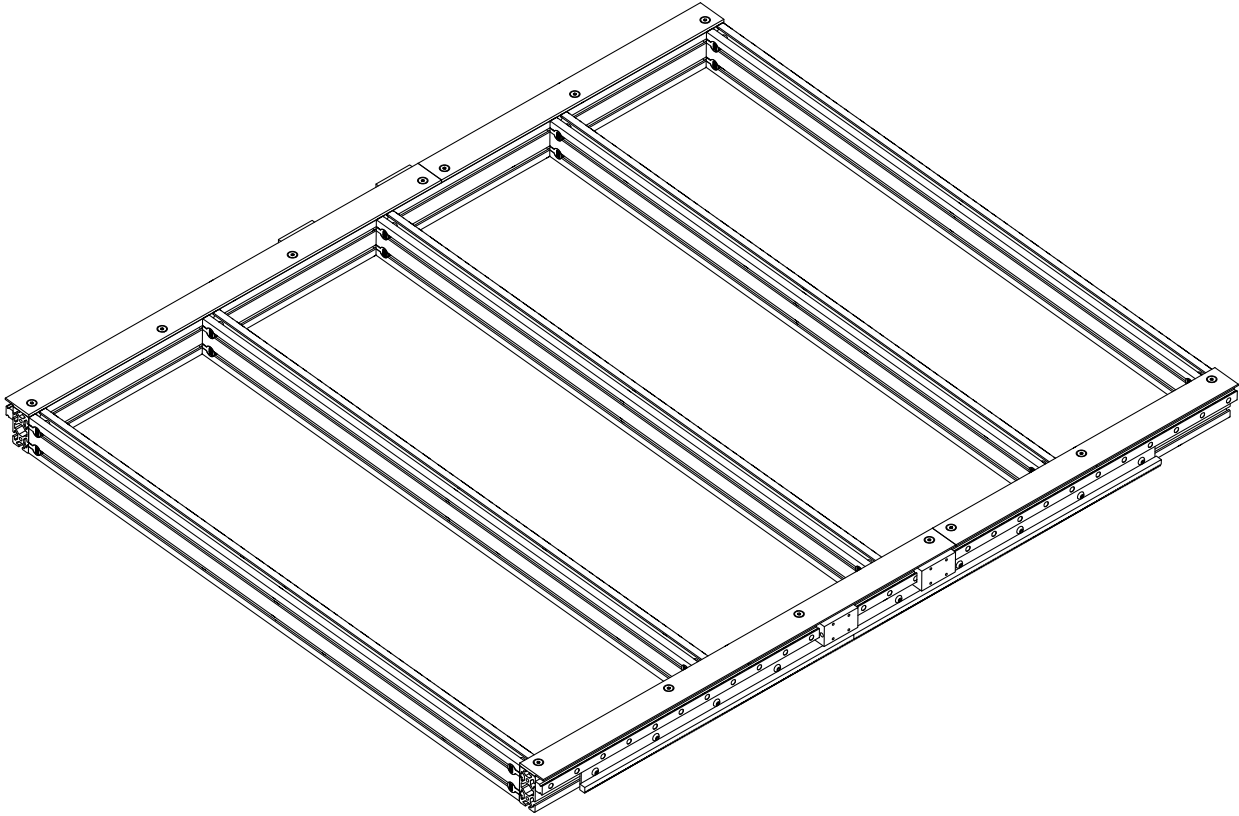


- Repeat this process with the 950mm (37-3/8") Linear Rail Dust Cover.
- Fully tighten the fasteners on both Linear Rail Dust Covers.

Assembly Note

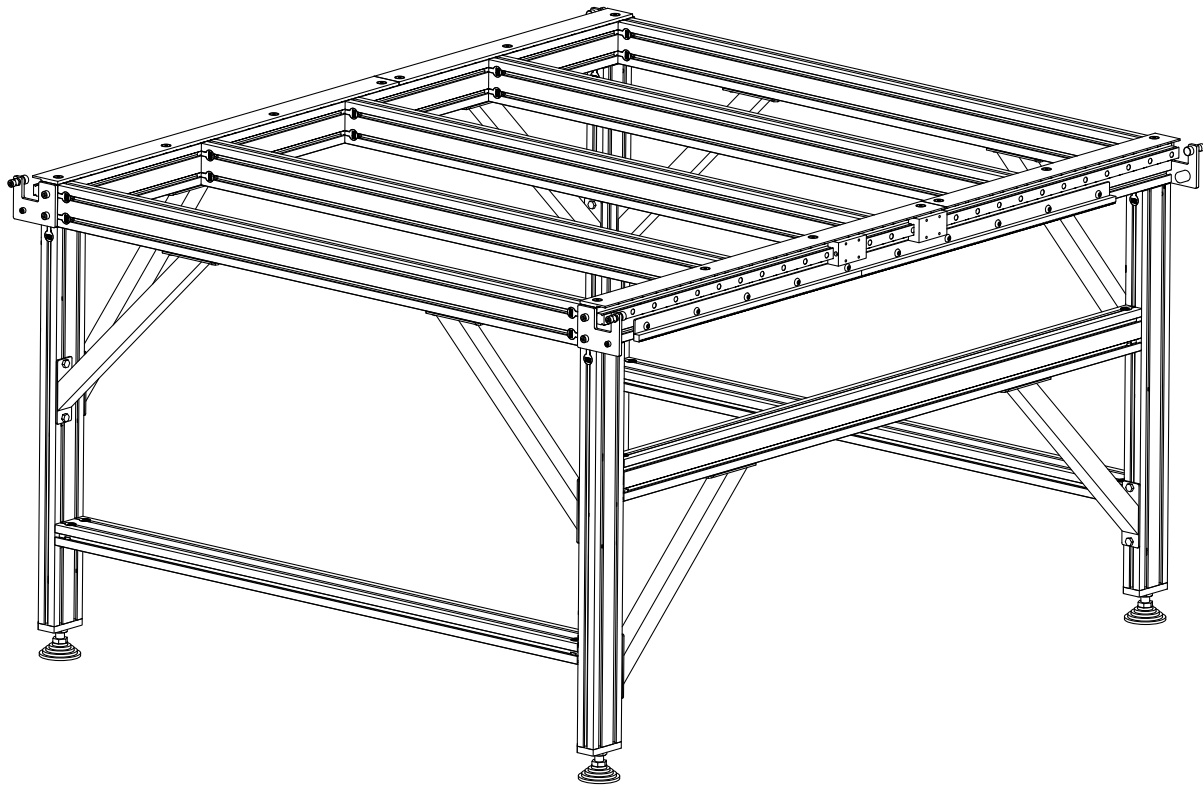
The ends of the Linear Rail Dust Covers should be flush with the ends of the extrusion as indicated.

1.5.2.3



- Repeat this process on the other side of the table.

1.6 Table Bumper Installation



Parts and Tools Required

The following parts and tools will be used in Section 1.6

QTY	Part/Description	Packaged In
1	CRP812-00-01-19.1 PRO Table Axis Bumper Kit: - (4) CRP812-05 Bumper Plate - (4) Rubber Bumper - (4) M6 x 20mm Socket Head Cap Screw - (8) M8 x 20mm Socket Head Cap Screw - (3) M8 x 30mm Fine Pitch Socket Head Cap Screw - (3) M8 Fine Pitch Hex Jam Nut - (3) CRP812-02 Sensor Flag	CRP810 Base Kit

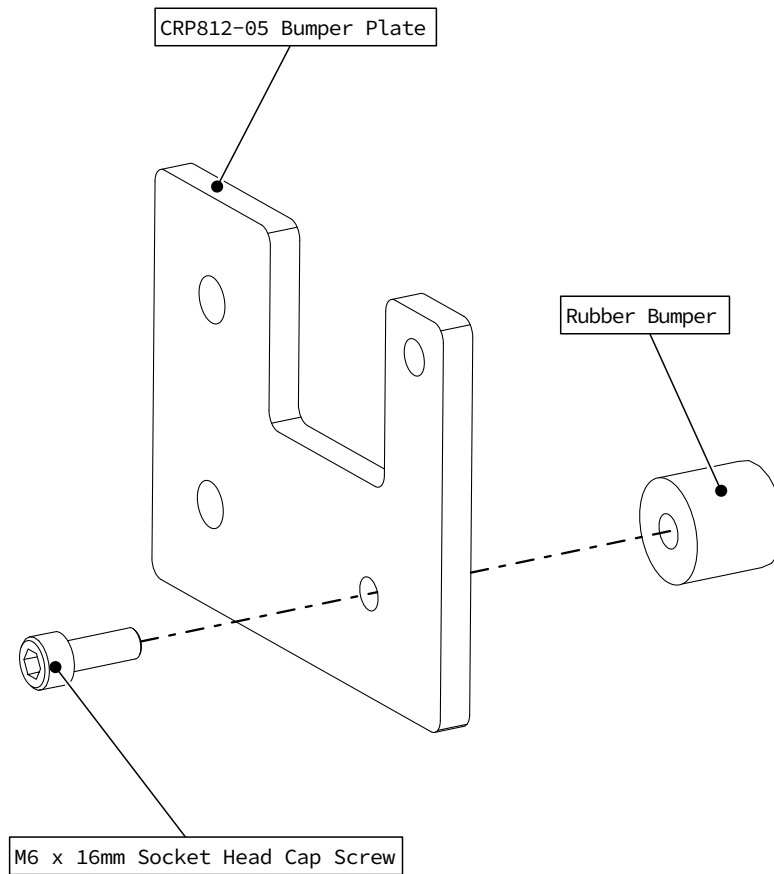
Required Tools:

- 5mm Allen Wrench
- 6mm Allen Wrench
- Adjustable Wrench



1.6.1 Bumper Assembly

1.6.1.1

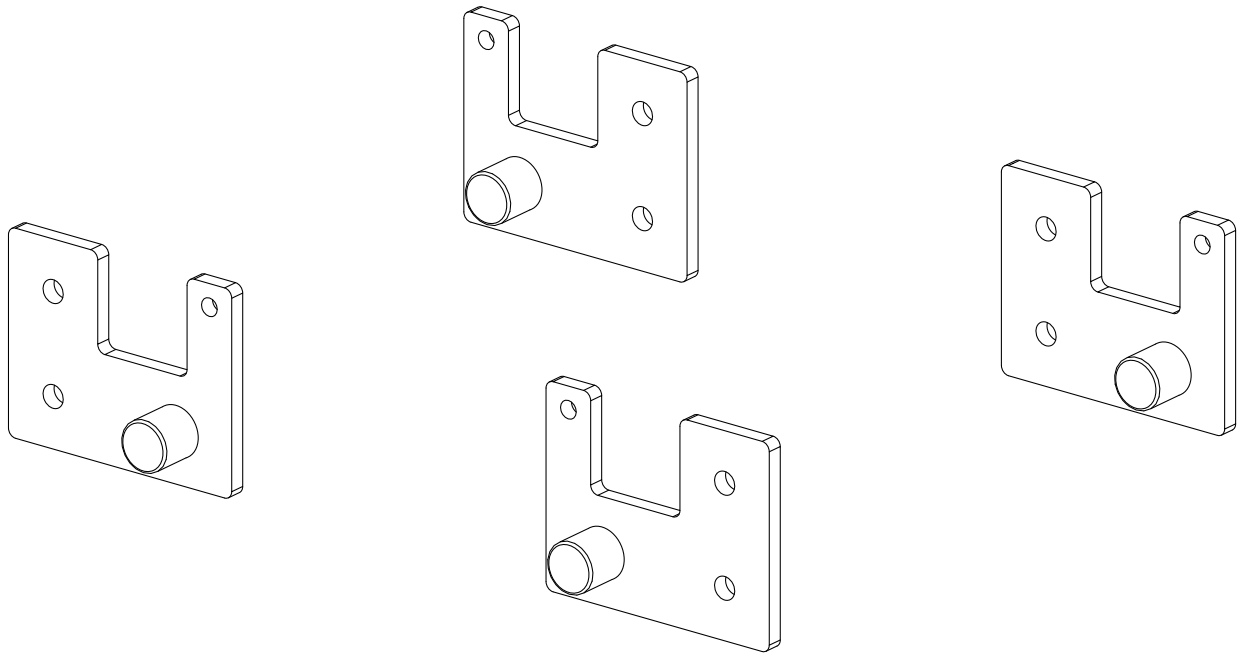


- Assemble one table bumper as indicated.

Assembly Note

Fully tighten the bumper until it is seated against the bumper plate.

1.6.1.2



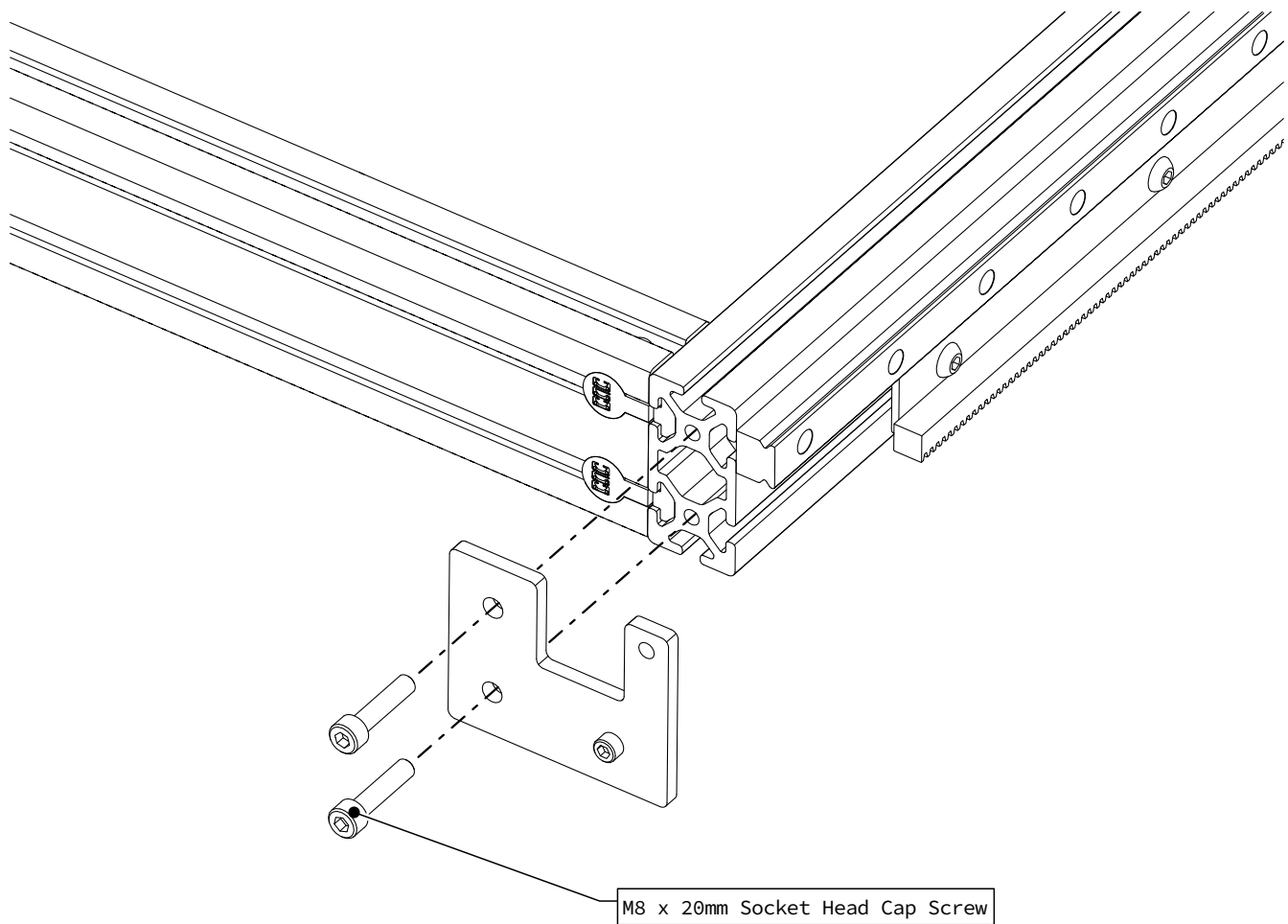
- Repeat the previous step to assemble four table bumpers as indicated.

Assembly Note

Two of the bumpers will be assembled in a mirrored configuration as shown above.

1.6.2 Bumper Installation

1.6.2.1

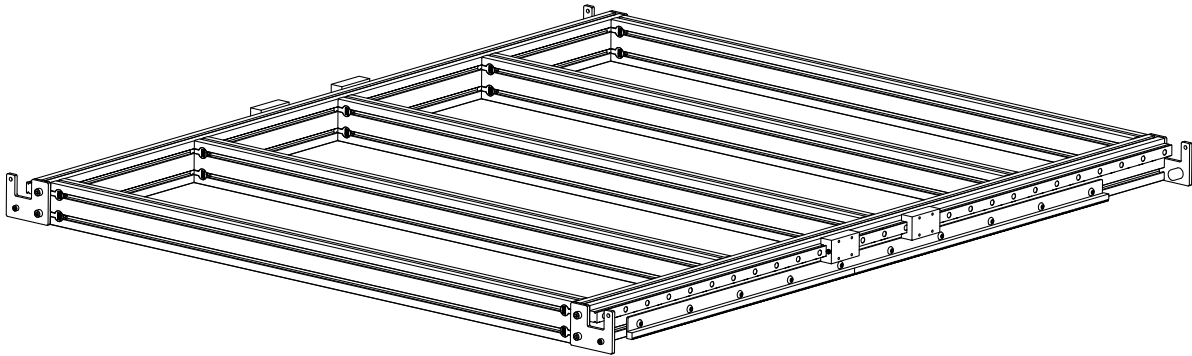


- Install an assembled bumper into the extrusion as indicated.

Assembly Note

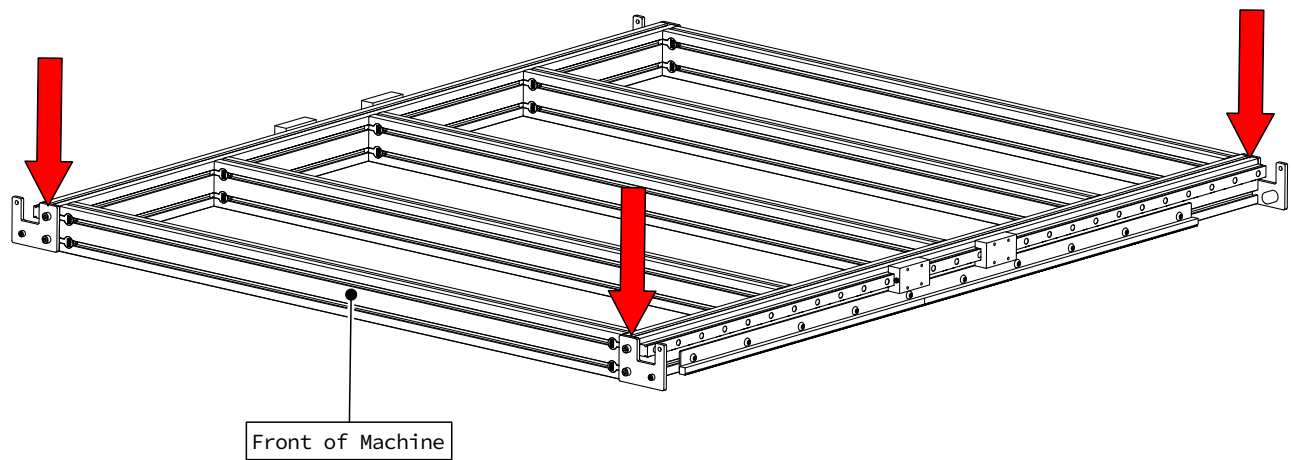
Ensure the bumper assembly is oriented correctly, with the bumper plate cutout facing up.

1.6.2.2



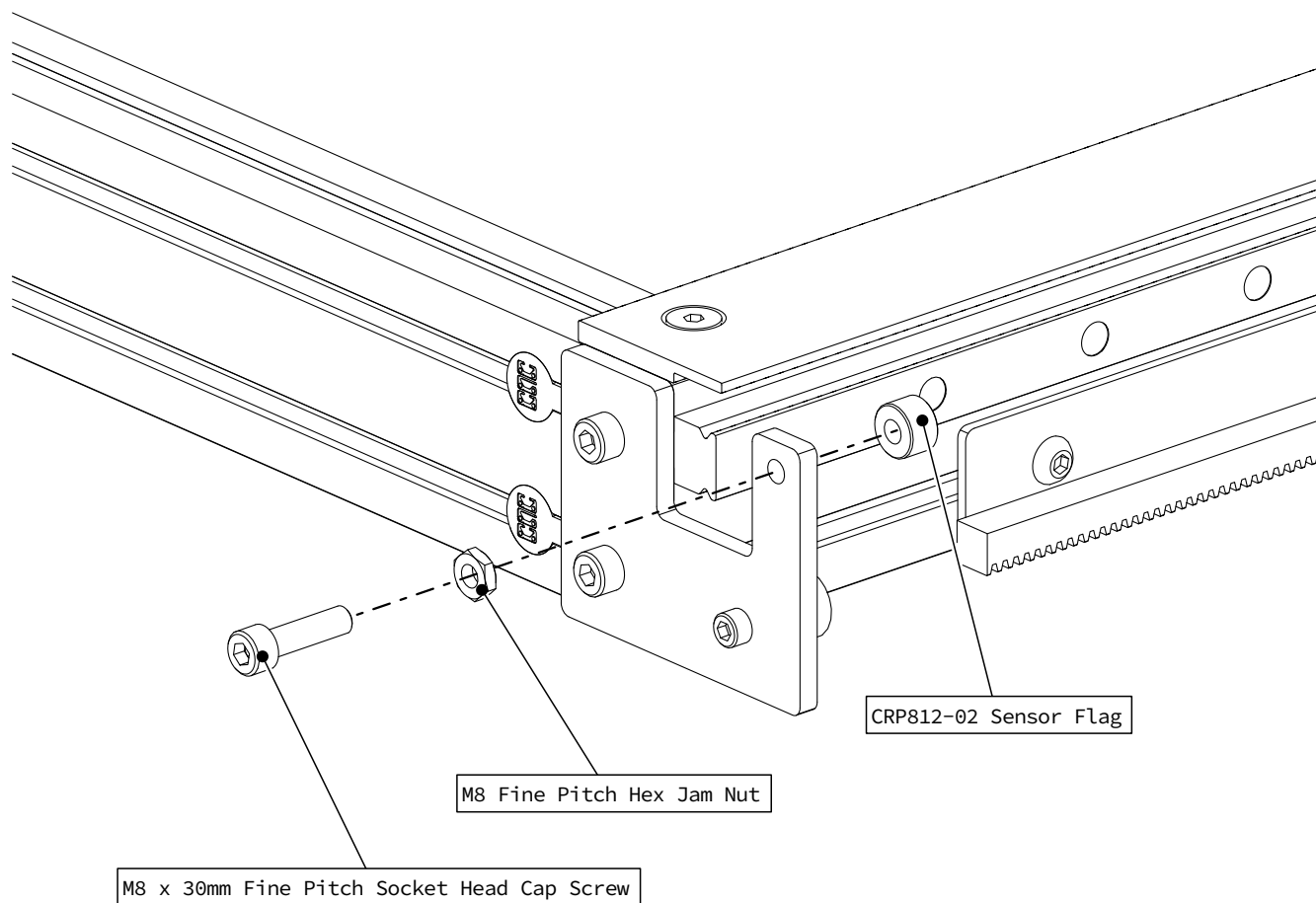
- Repeat this procedure to install the remaining three bumper assemblies at each corner of the machine.

1.6.2.3



- At the specified locations, install a sensor flag as indicated in the following steps.

1.6.2.4

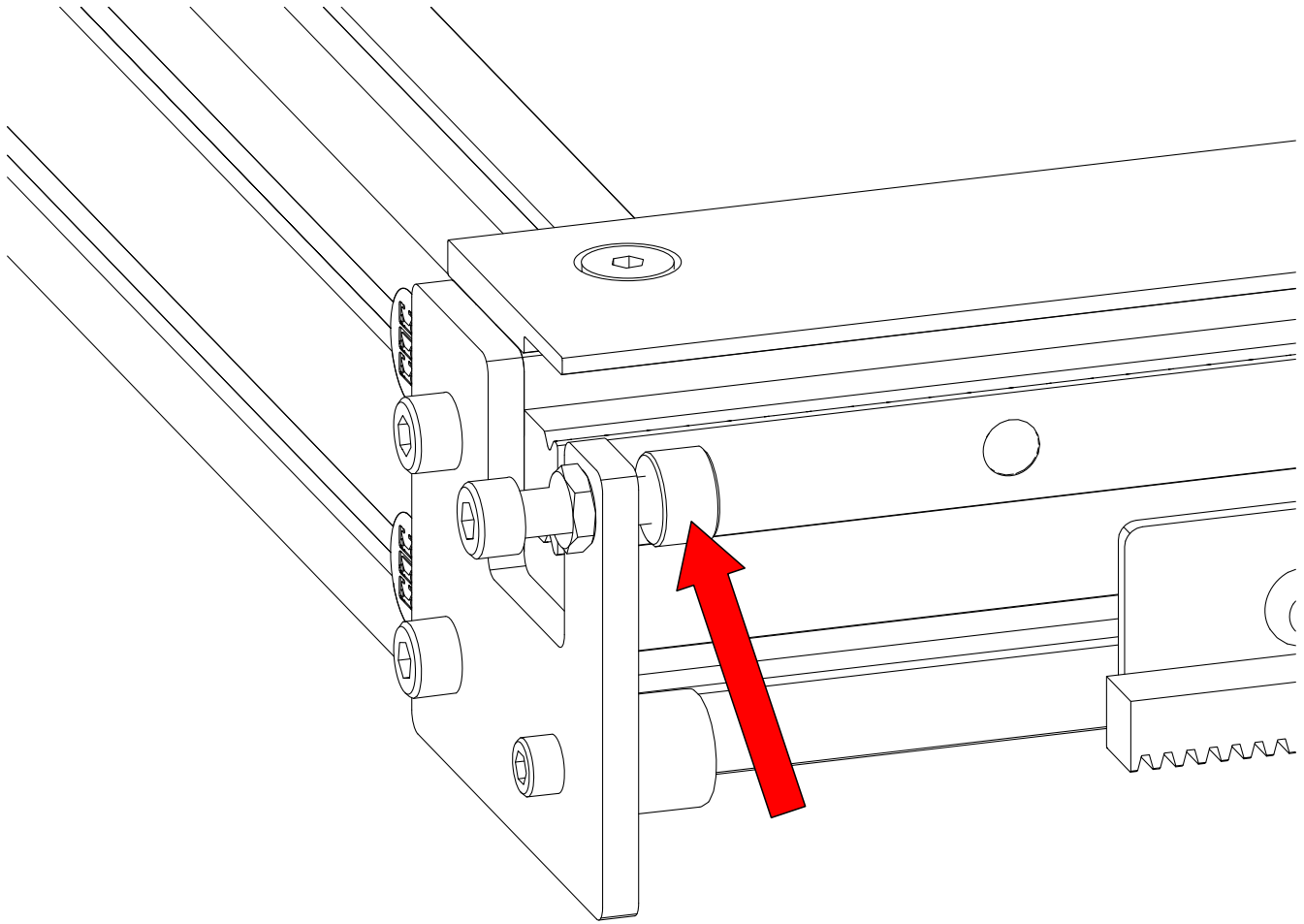


- Assemble a sensor flag on the table bumper as indicated.

Assembly Note

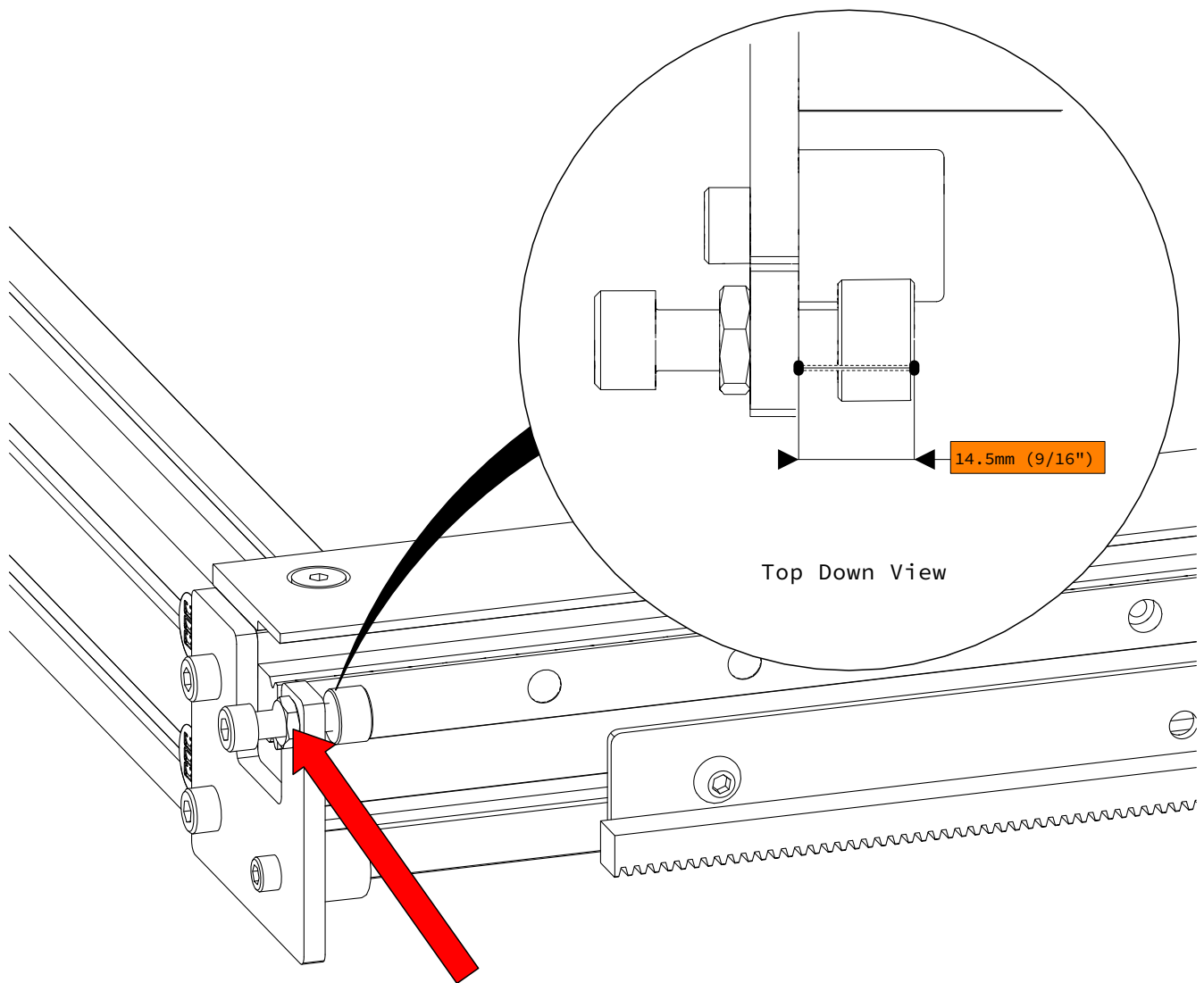
Use Blue Loctite on the threads of the CRP812-02 Sensor Flag.

1.6.2.5



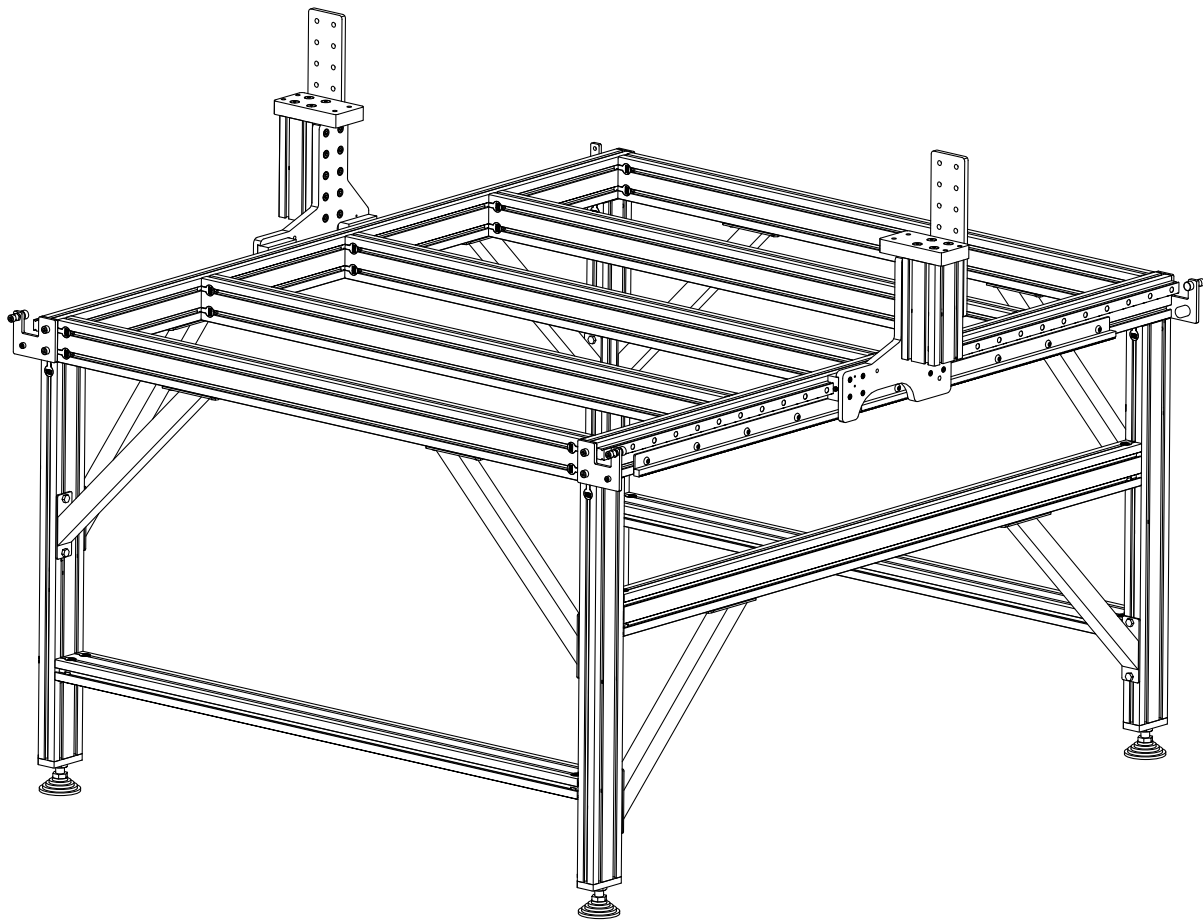
- Tighten the CRP812-02 Sensor Flag on the M8 screw.

1.6.2.6



- Adjust the M8 screw until the end of the Sensor Flag is 14.5mm (9/16") from the bumper plate as indicated.
- Tighten the jam nut against the bumper plate.

Section 2: Riser Assembly



Section Note

Some figures are shown without a leg kit for illustrative purposes.

2.1 Riser Installation

Parts and Tools Required

The following parts and tools will be used in Section 2.1

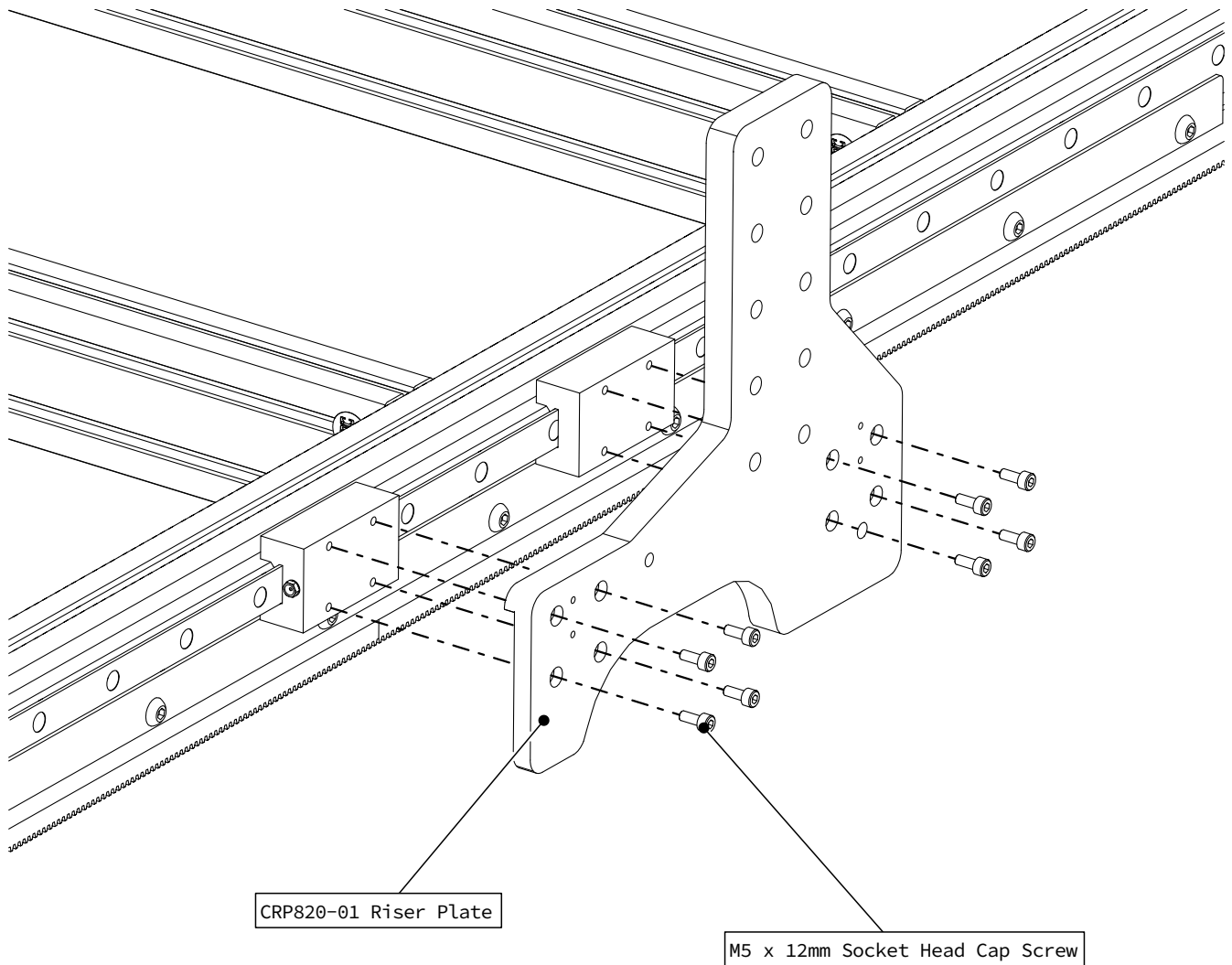
QTY	Part/Description	Packaged In
2	CRP820-01 Riser Plate	CRP820 Riser Kit
2	8080 Riser Extrusion, 190mm (7-1/2")	CRP820 Riser Kit
2	CRP820-02 Gantry Interface Plate	CRP820 Riser Kit
2	CRP820-10 Joining Plate	CRP820 Riser Kit
1	CRP820-00-FAST: - (16) M5 x 12mm Socket Head Cap Screw - (32) M8 x 20mm Socket Head Cap Screw - (32) M8 Roll-in T-Nut - (8) M8 x 35mm Flat Head Screw <i>Remaining parts from this kit used in future sections</i>	CRP820 Riser Kit

Required Tools:

- 4mm Allen Wrench
- 5mm Allen Wrench
- 6mm Allen Wrench
- Tape Measure

2.1.1 Riser Plate

2.1.1.1

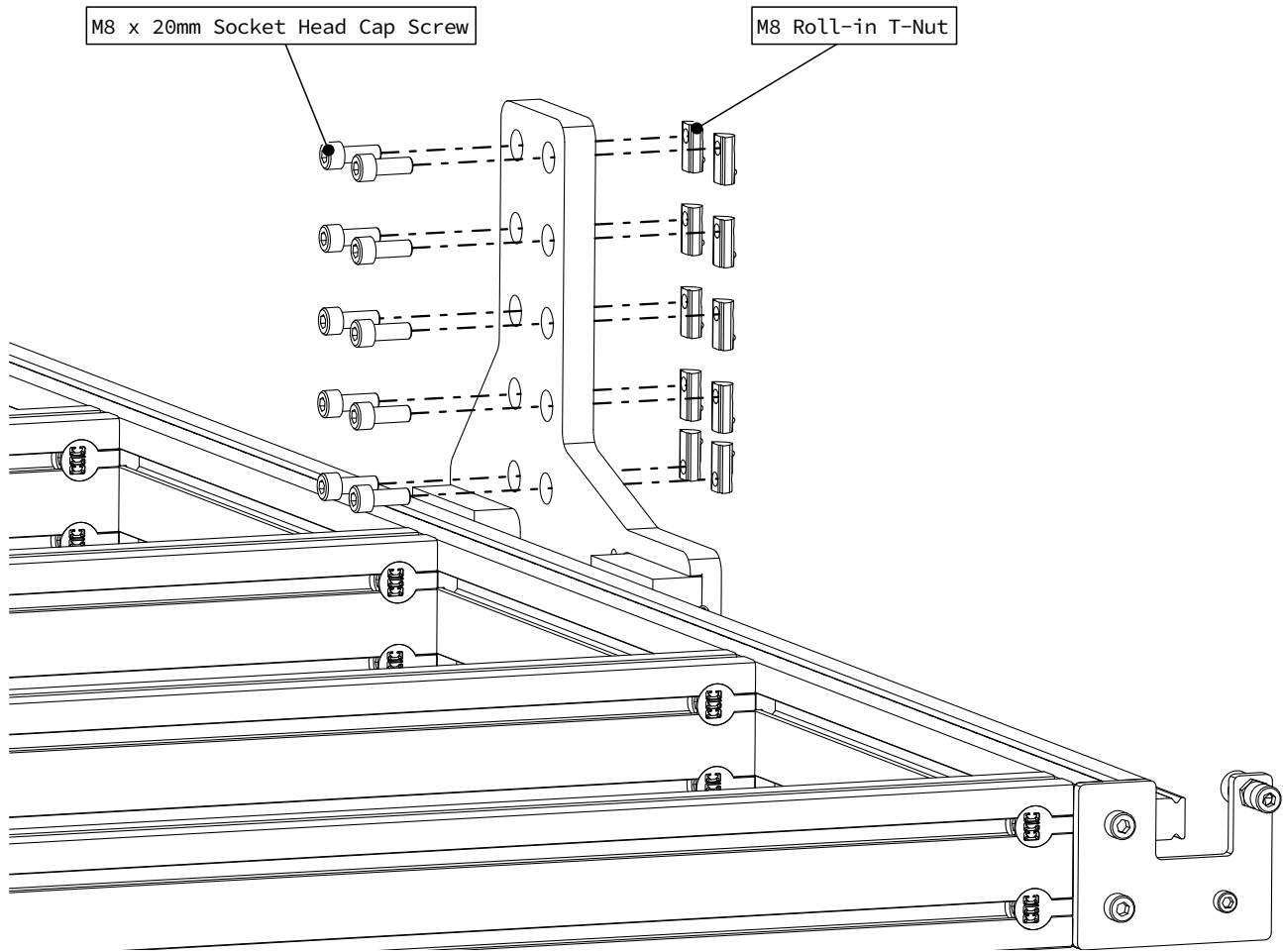


- Install a Riser Plate onto the linear carriage blocks as indicated, fully tightening the fasteners.

Assembly Note

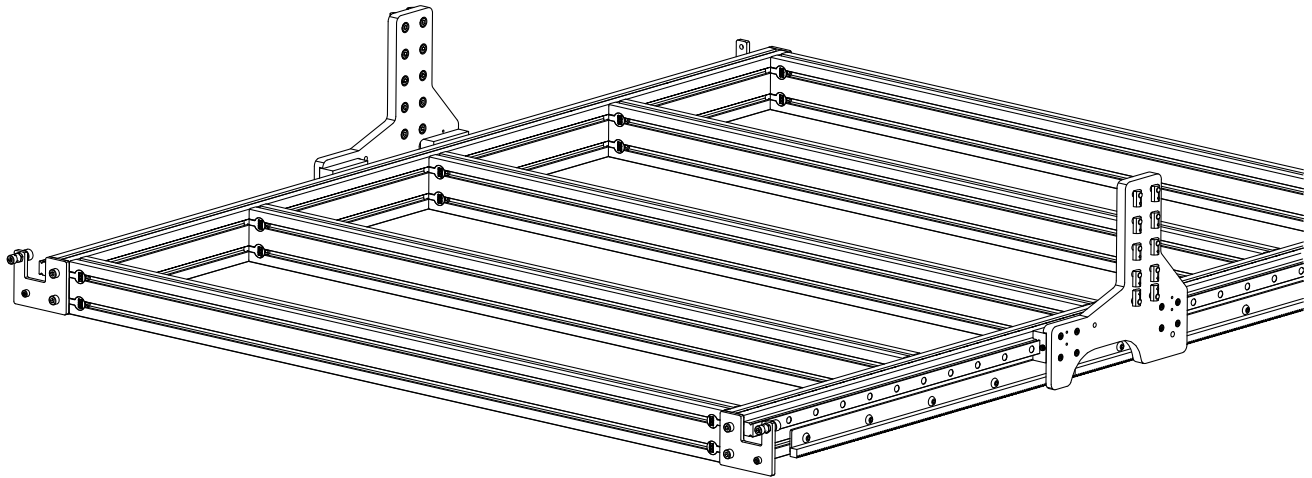
The Riser Plates come as a pair, with a left and right configuration. Refer to the images to ensure the correct one is used.

2.1.1.2



- Partially thread M8 Roll-in T-Nuts onto the fasteners as indicated.

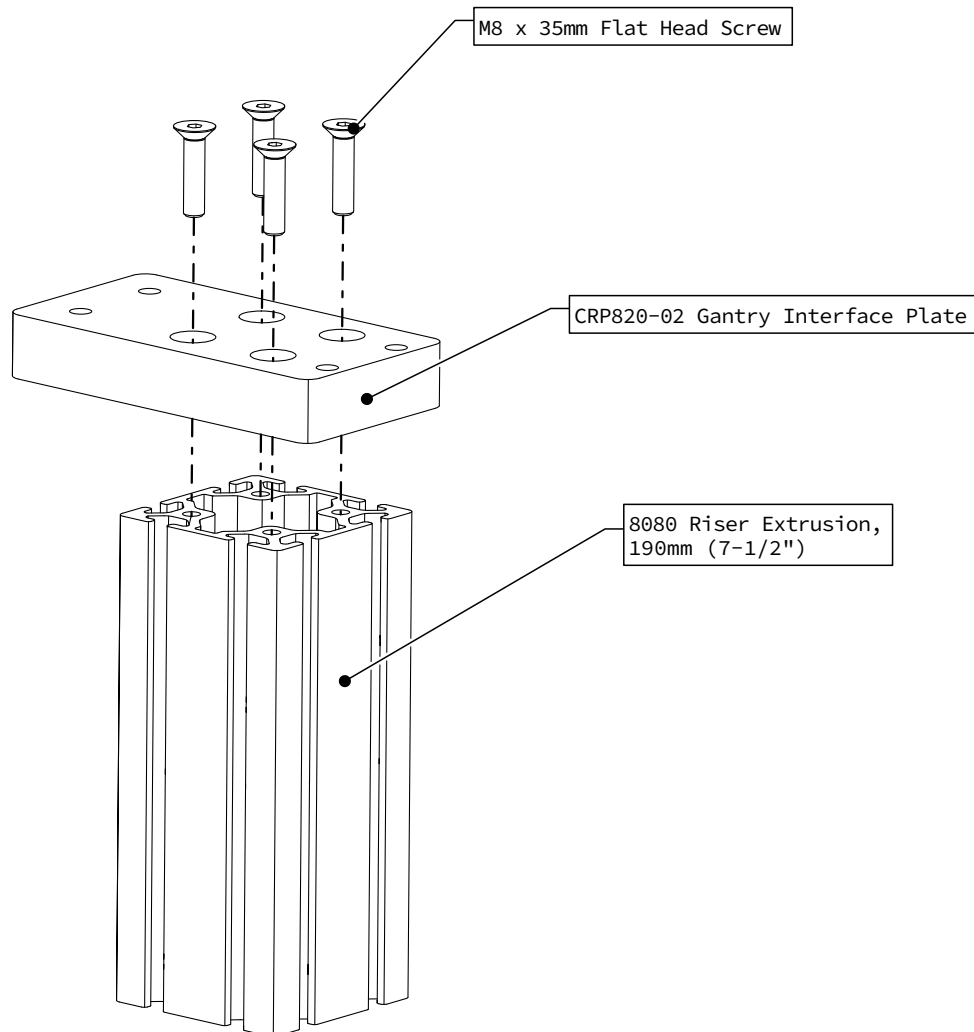
2.1.1.3



- Repeat this process to install a riser plate on the other side of the machine.

2.1.2 Riser Extrusion

2.1.2.1

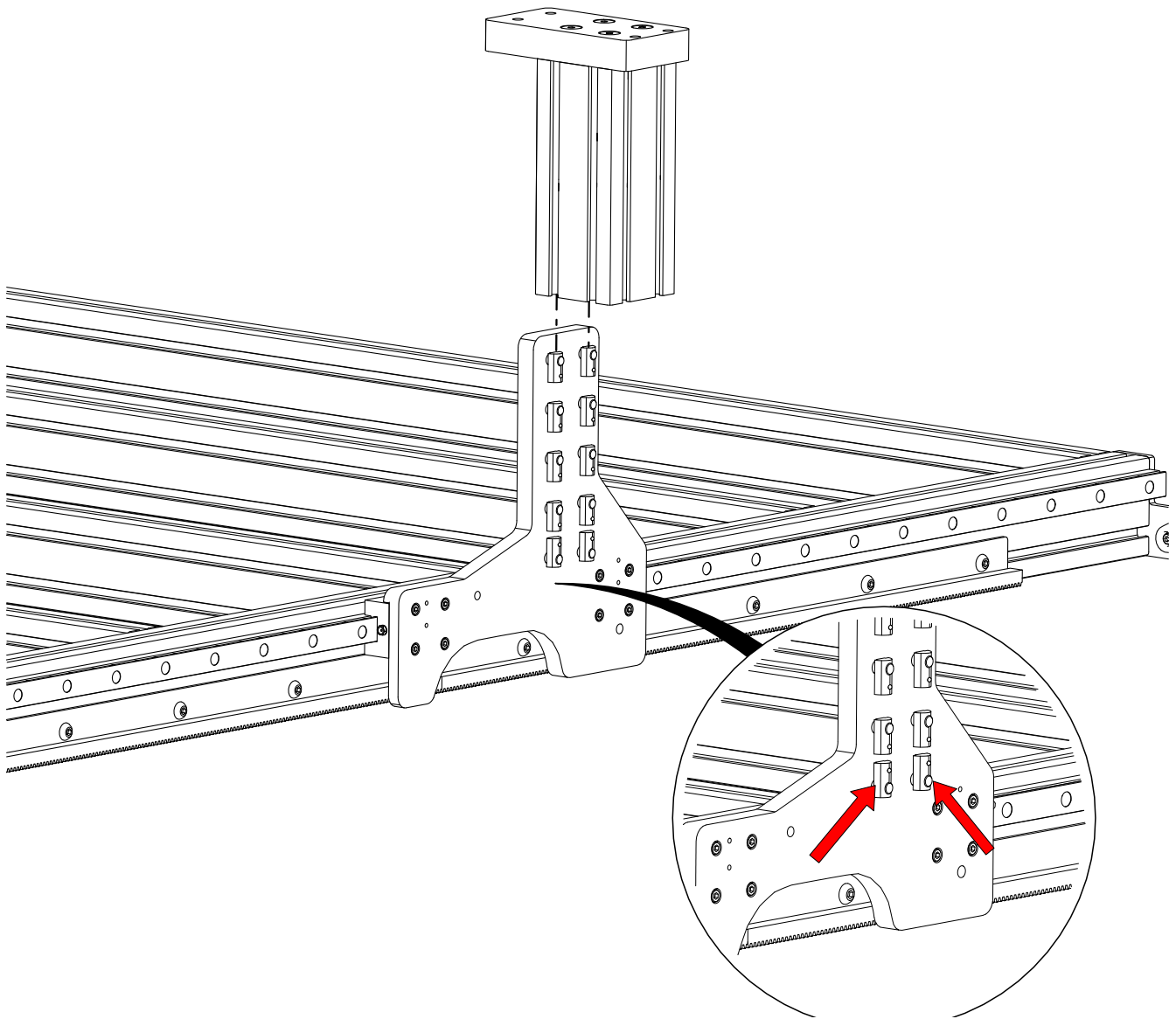


- Install a Gantry Interface Plate onto a piece of 8080 Riser Extrusion as indicated.
- Fully tighten the fasteners.

Custom Gantry Height Option

If you purchased a custom gantry height, your 8080 Riser Extrusion will be a different length than shown above.

2.1.2.2

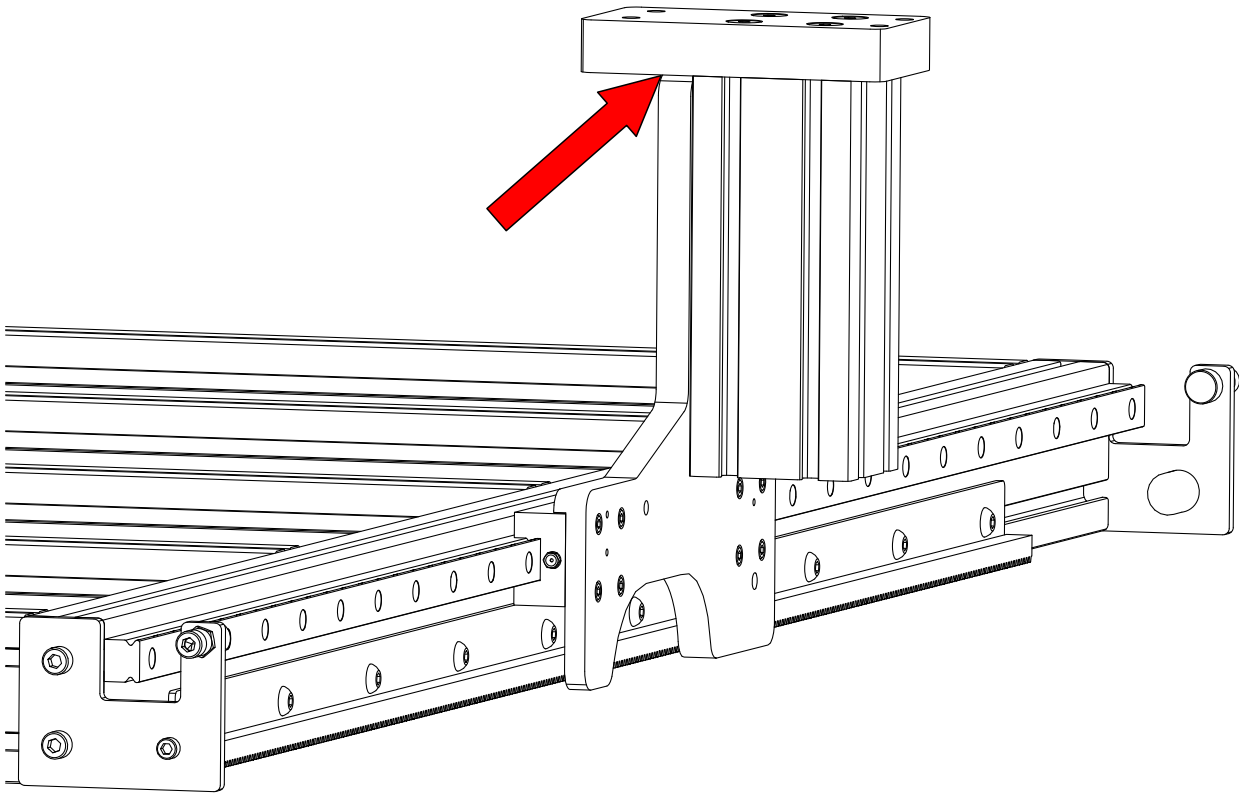


- Slide the extrusion assembly from the previous step onto the riser plate T-Nuts.

Assembly Note

Ensure the bottom two T-Nuts on the riser plate are facing up, as indicated, and the long side of the gantry interface plate is facing towards the inside of the machine.

2.1.2.3

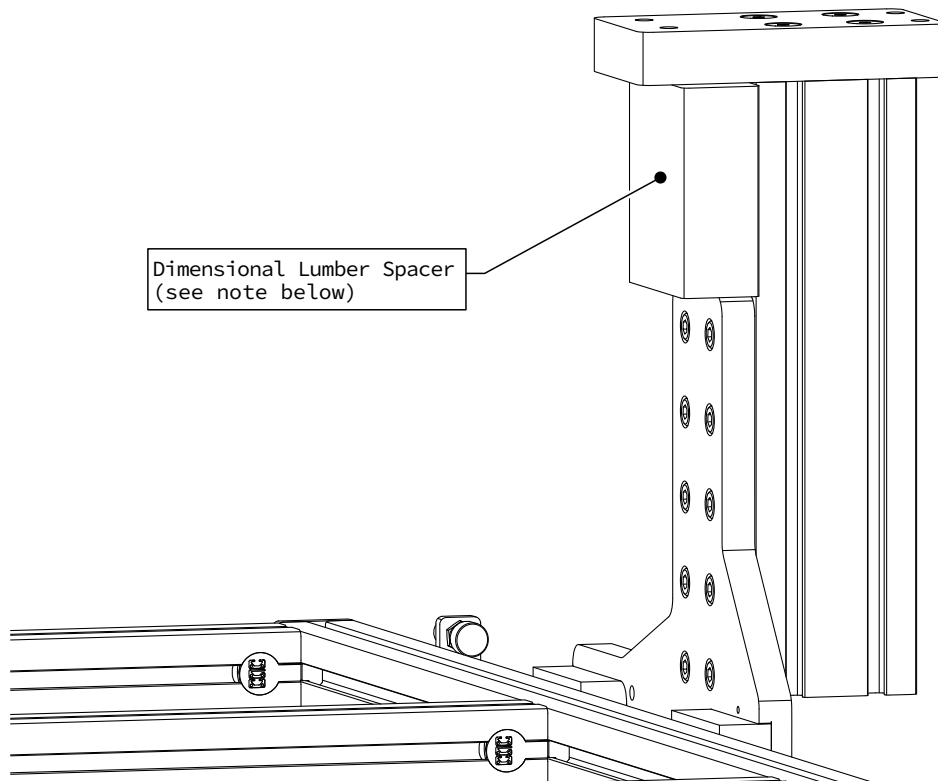


- Bring the Gantry Interface Plate flush with the top of the riser plate as indicated.

2.1.2.4

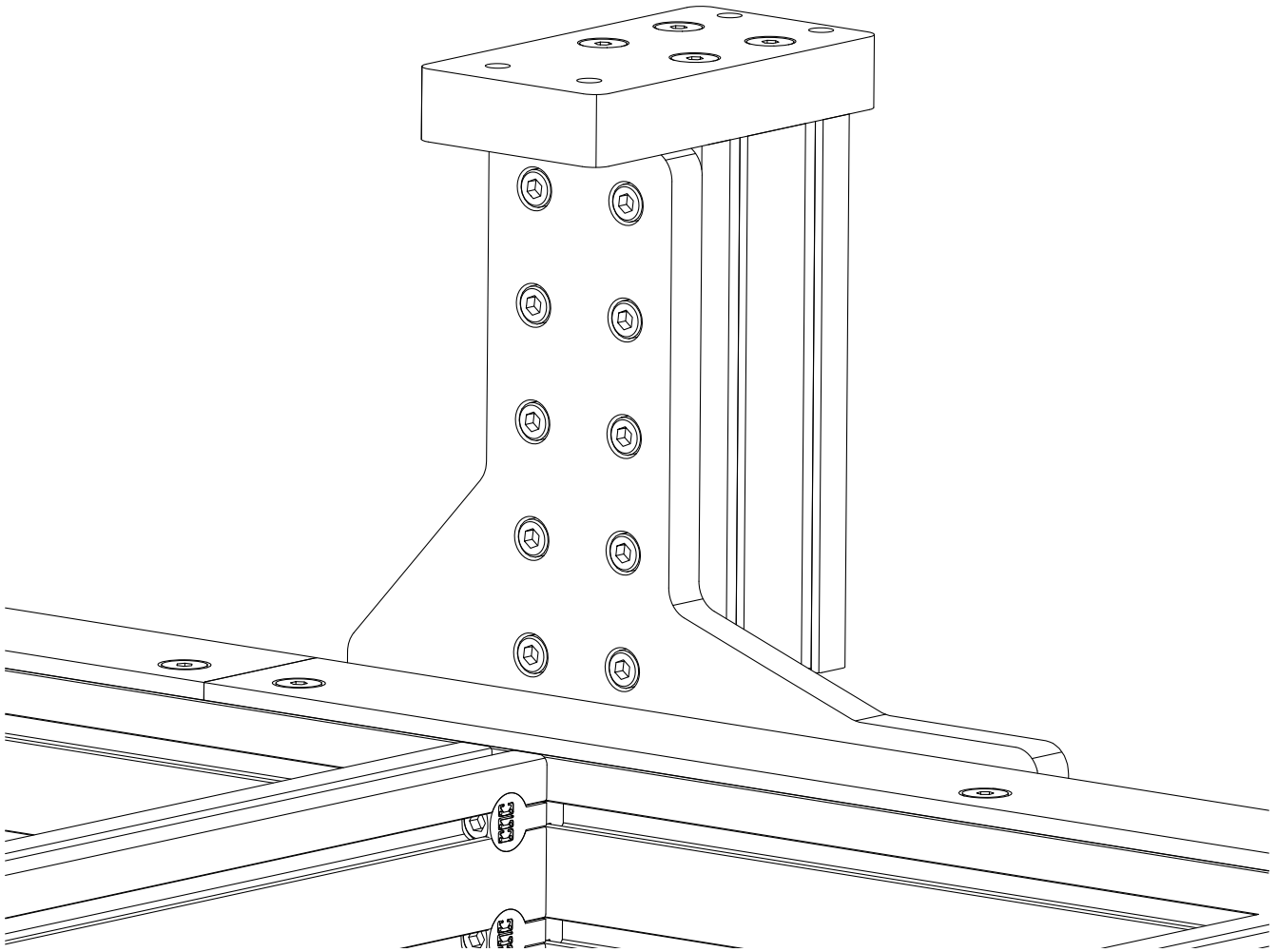
Custom Gantry Height Option

The step is applicable only for those who purchased a custom gantry height.



- Use a piece of dimensional lumber to position the riser extrusion. Determine the length of this spacer by subtracting 200mm (8") from your gantry height (this can be found in the description of your invoice or packing list). For example, the optional 12" gantry risers would need a 100mm (4") spacer.
- After tightening the riser plate fasteners in the next step, remove the spacer.

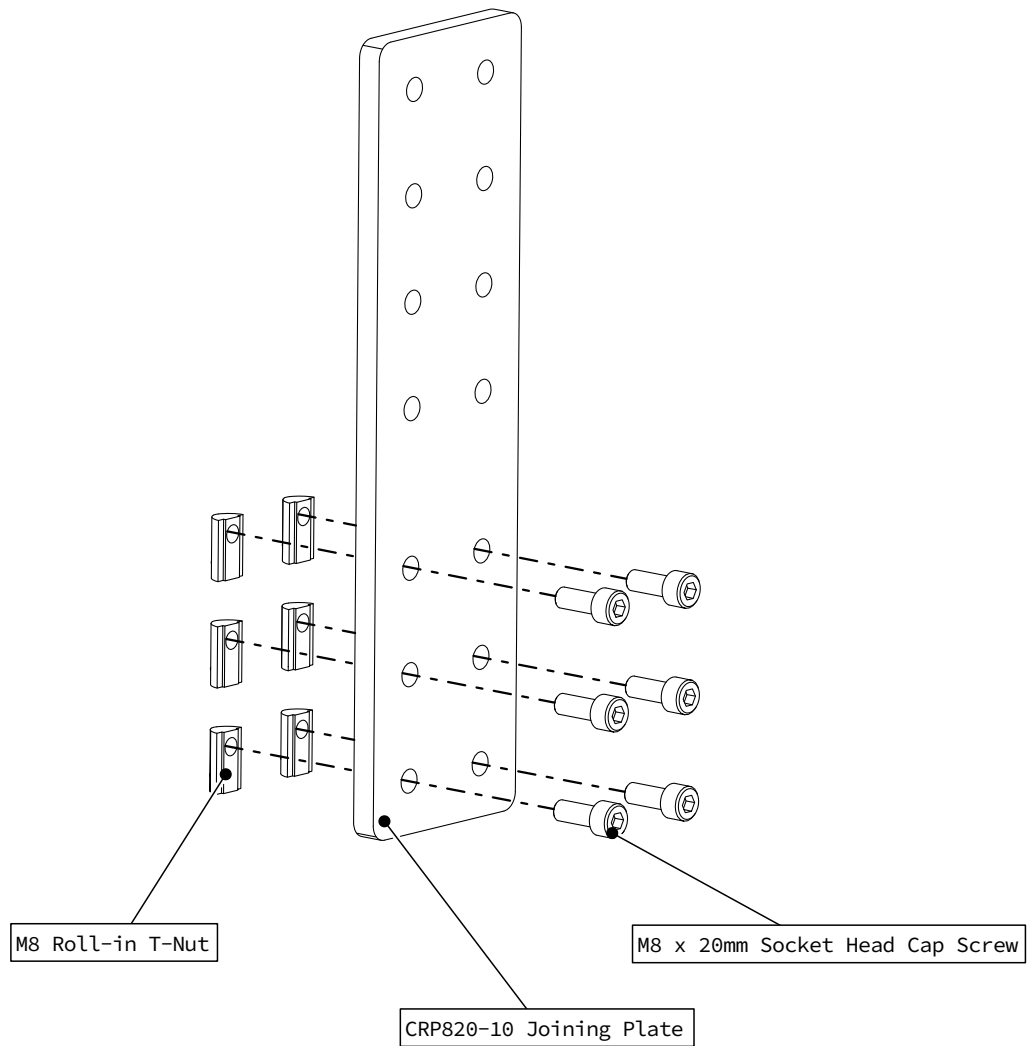
2.1.2.5



- Fully tighten the riser plate fasteners.

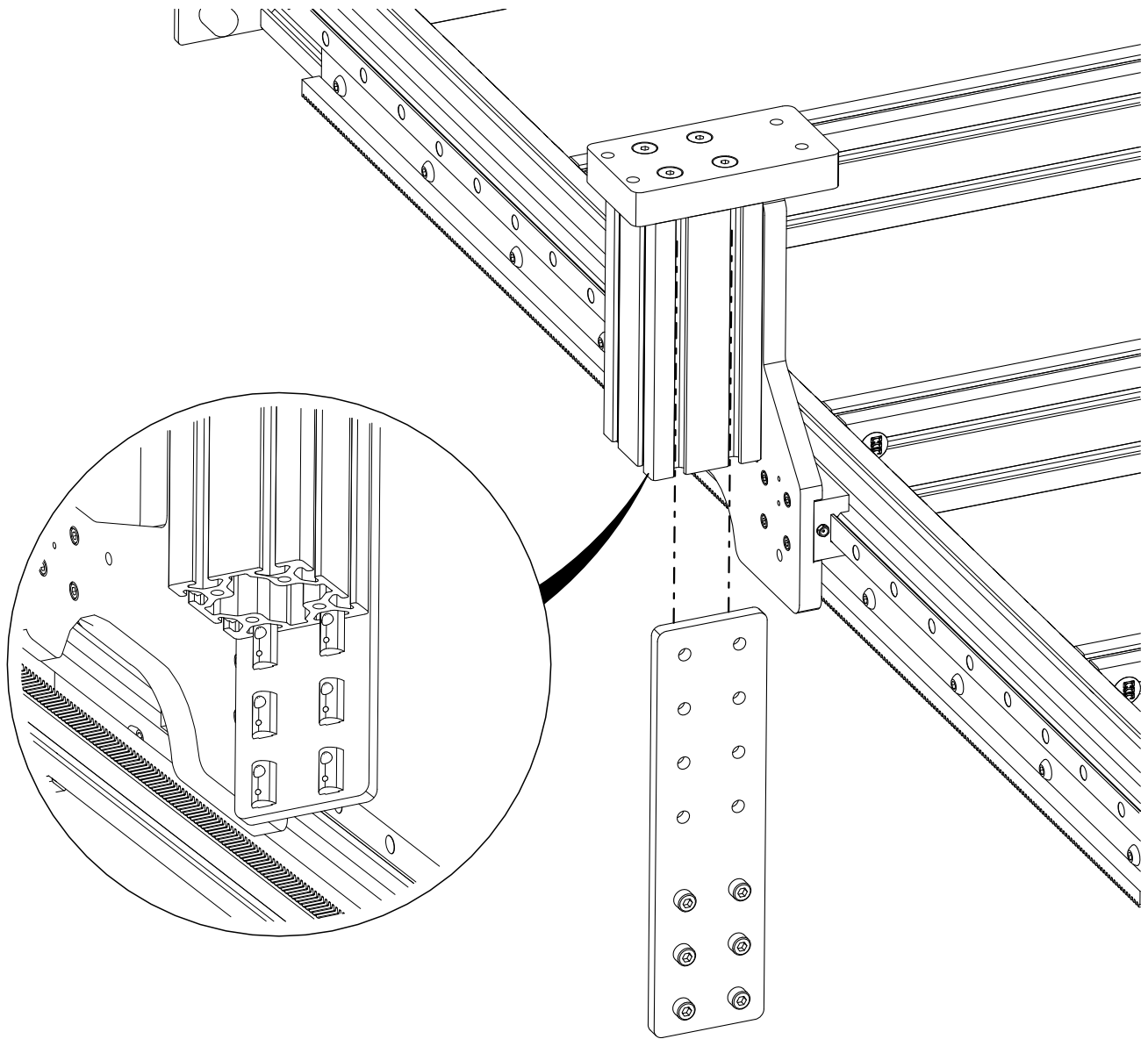
2.1.3 Riser Joining Plate

2.1.3.1



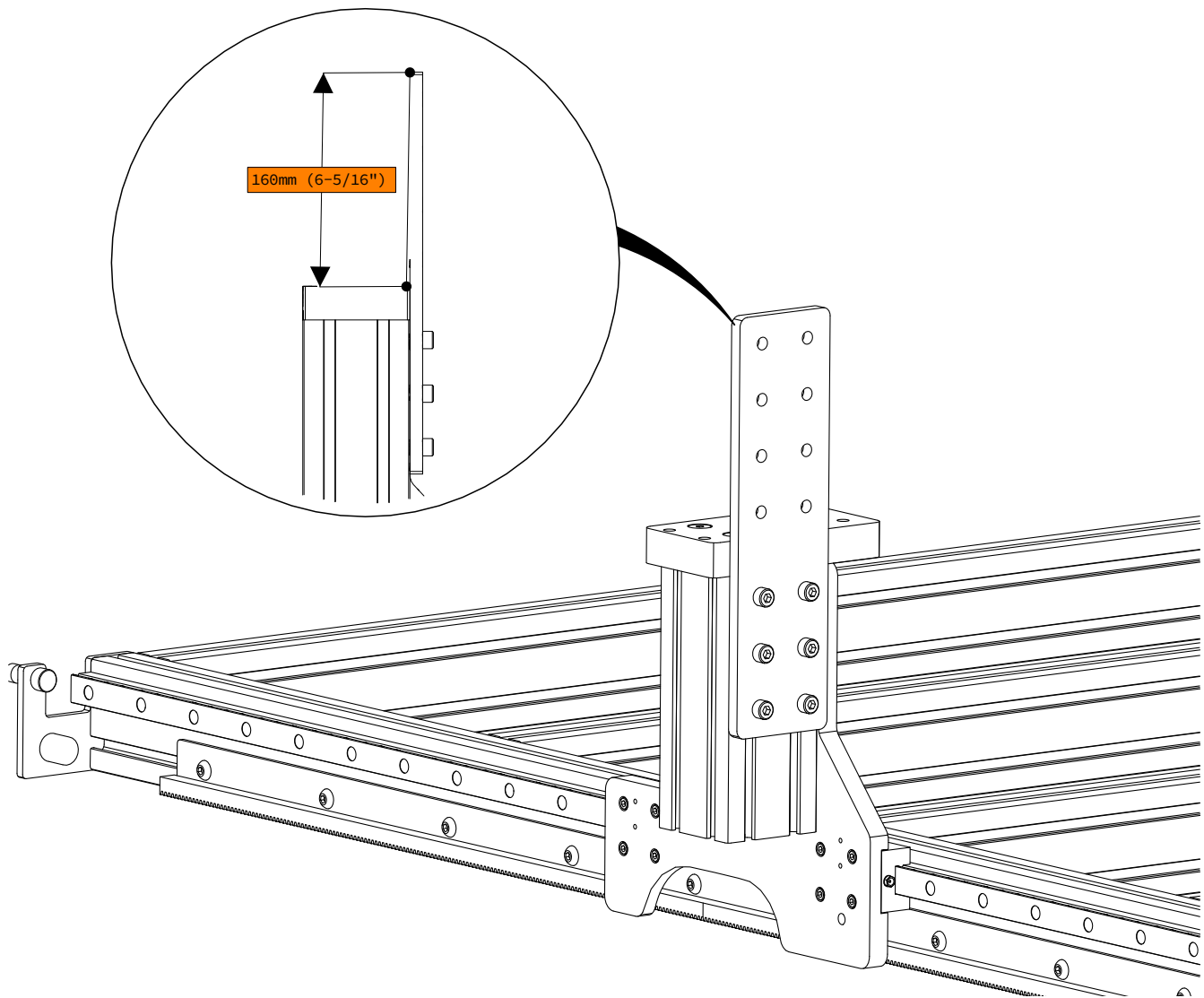
- Partially thread M8 Roll-in T-Nuts onto the fasteners as indicated.

2.1.3.2



- Slide the Joining Plate into the Riser Extrusion as indicated.

2.1.3.3

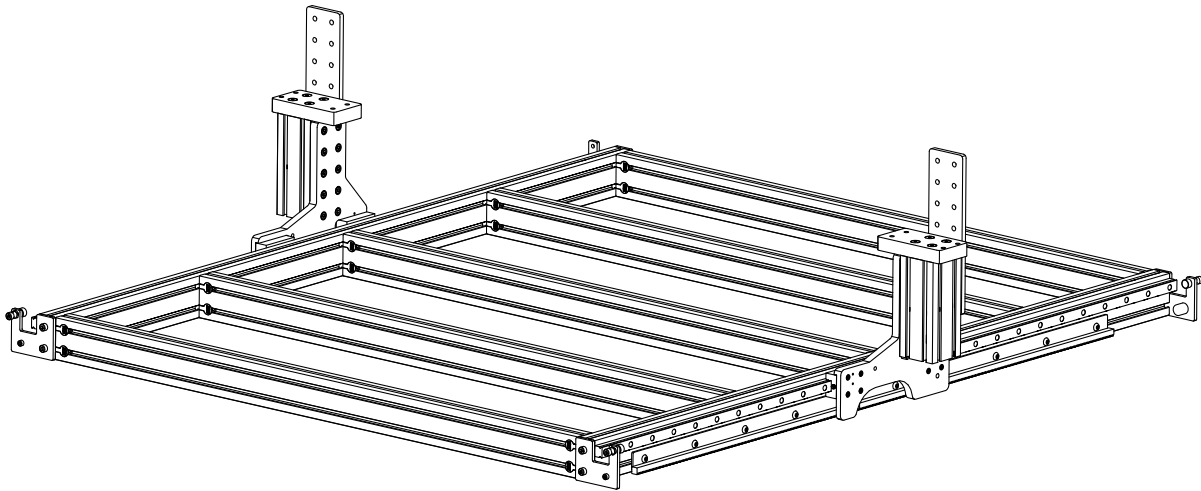


- Position the top of the Joining Plate 160mm (6-5/16") above the Gantry Interface Plate as indicated.
- Partially tighten the Joining Plate fasteners.

Assembly Note

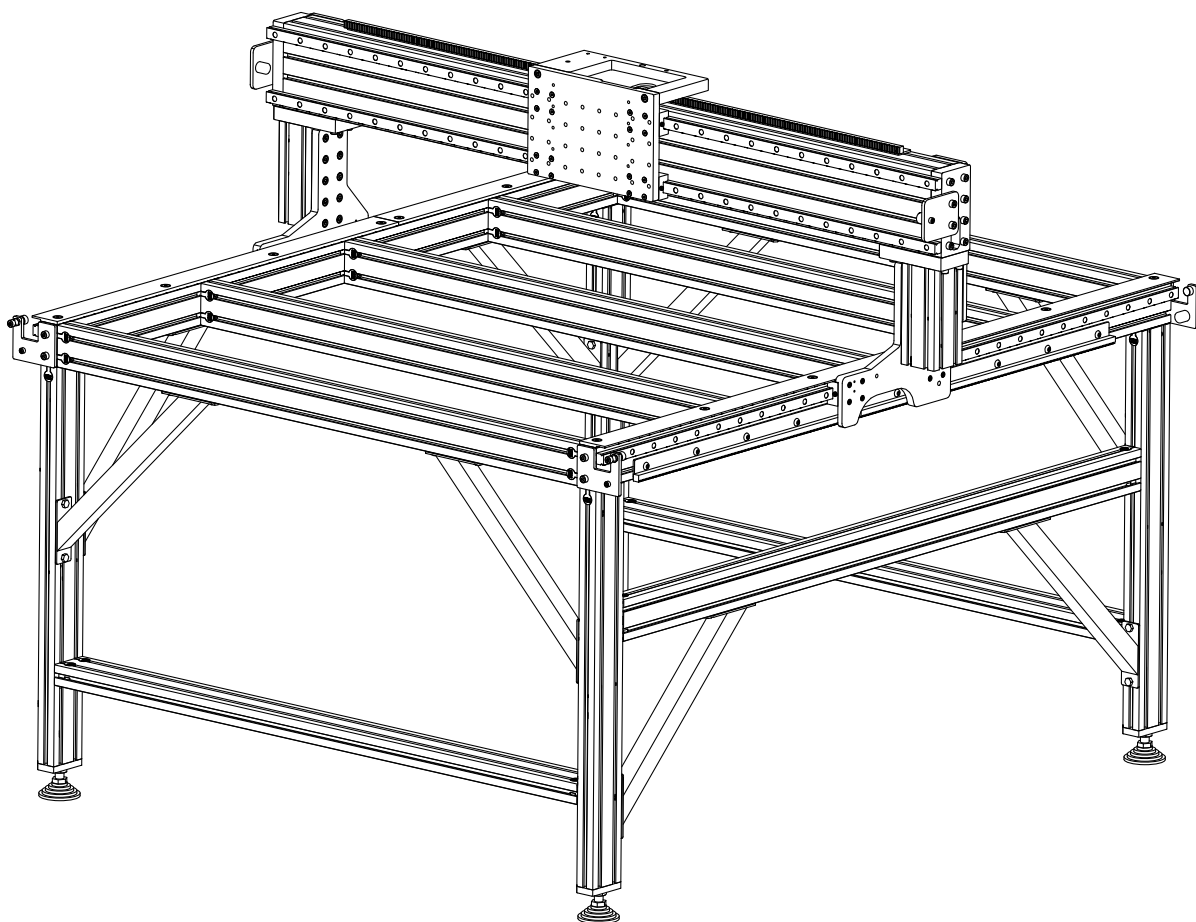
The final positioning of the Joining Plate will occur while installing the gantry extrusion.

2.1.3.4



- Repeat this procedure to assemble the riser on the other side of the machine.

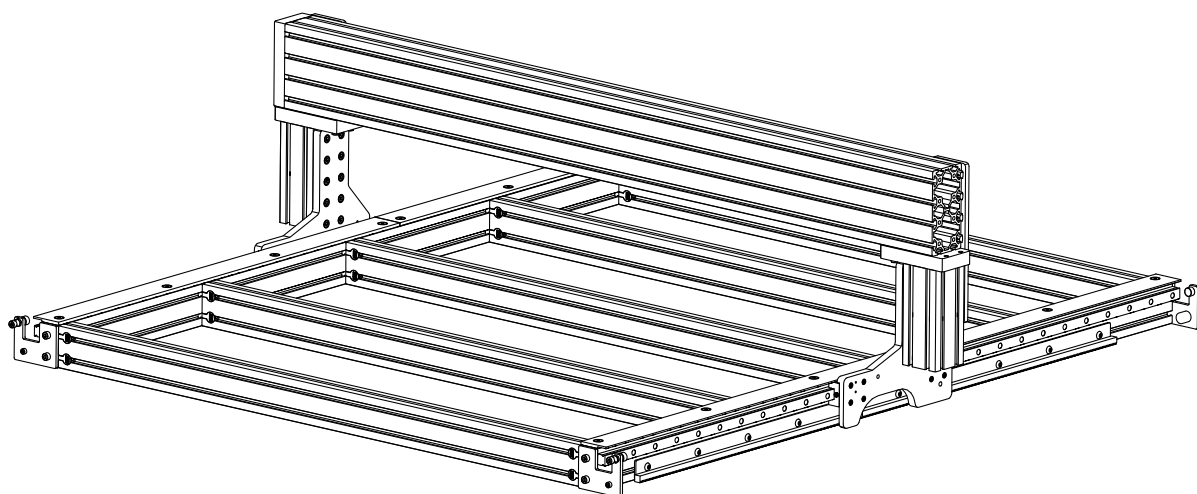
Section 3: Gantry Assembly



Section Note

Some figures are shown without a leg kit for illustrative purposes.

3.1 Gantry Extrusion



Parts and Tools Required

The following parts and tools will be used in Section 3.1

QTY	Part/Description	Packaged In
1	8016 Gantry Extrusion, 1550mm (61")	Machine Kit Extrusion
1	CRP833-00 Gantry End Cap Kit: - (1) CRP830-03 Gantry End Cap - (6) M8 x 35mm Socket Head Cap Screw <i>Remaining parts from this kit used in future sections</i>	CRP830 Gantry Kit
1	CRP820-00-FAST: - (20) M8 Roll-in T-Nut - (4) M8 x 35mm Socket Head Screw - (8) M8 x 20mm Socket Head Cap Screw <i>Remaining parts from this kit used in future sections</i>	CRP820 Riser Kit

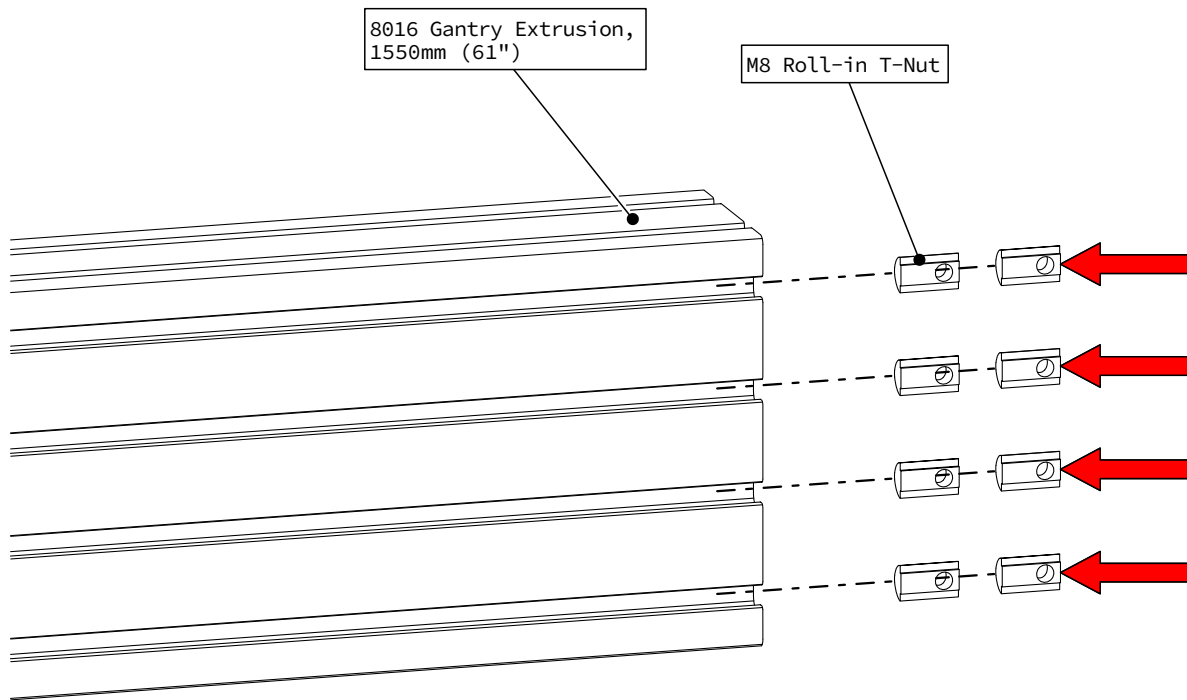
Required Tools:

- 6mm Allen Wrench



3.1.1 Extrusion Assembly

3.1.1.1



- Slide T-Nuts into the indicated gantry extrusion t-slots.

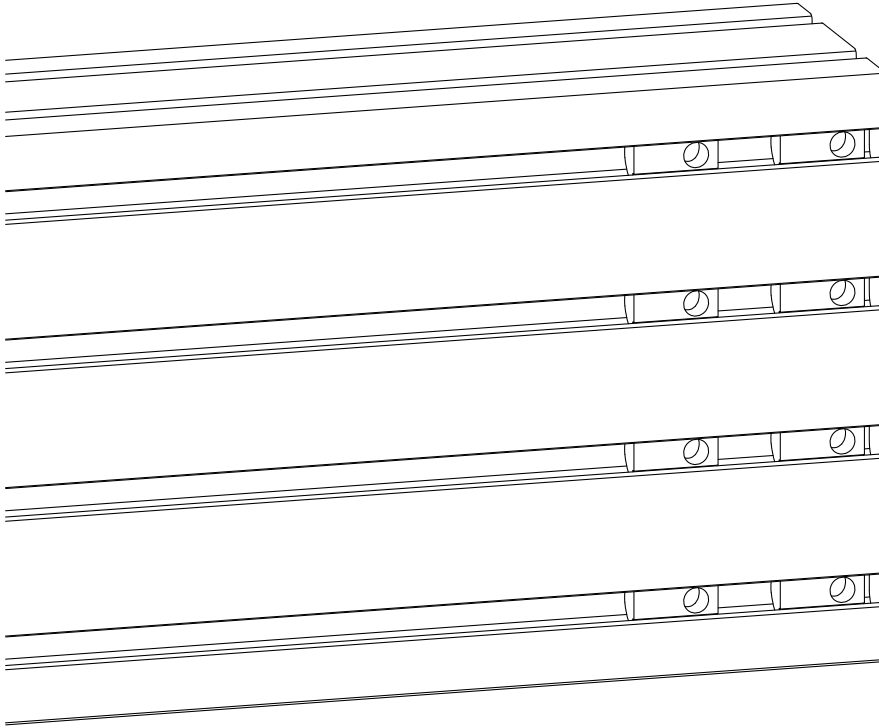
Assembly Note

Ensure the indicated T-Nuts are in the correct orientation.

Extended Gantry Option

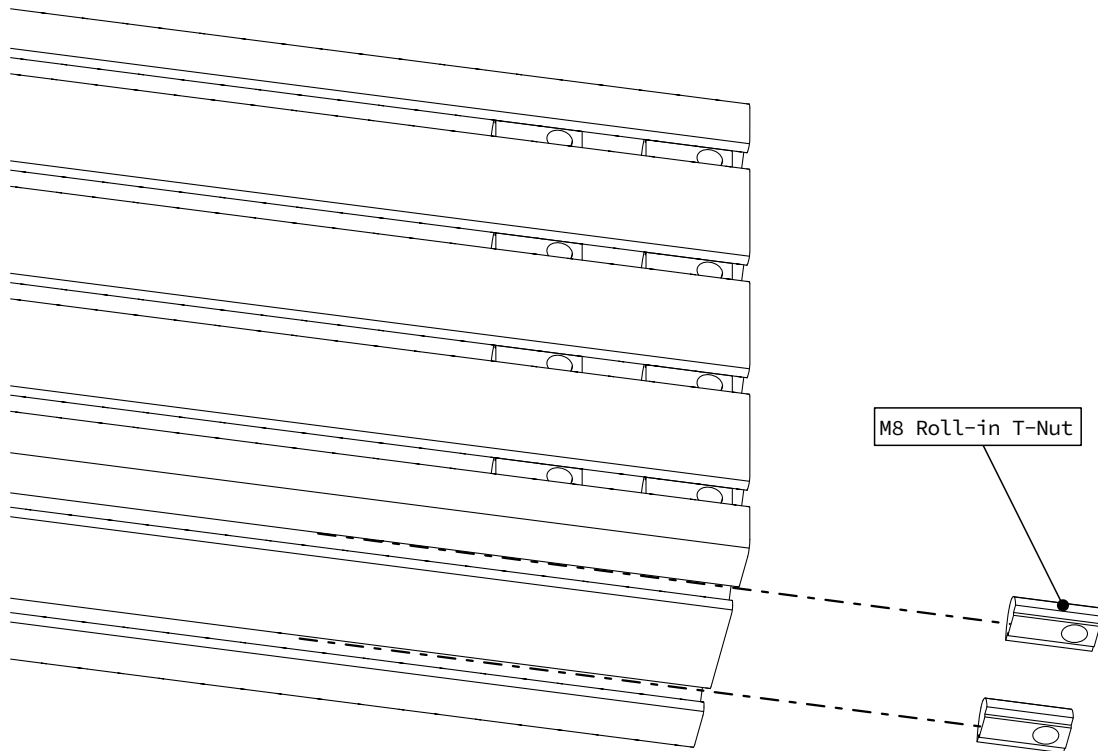
If you purchased an extended gantry, your extrusion will be 1850mm (72-13/16").

3.1.1.2



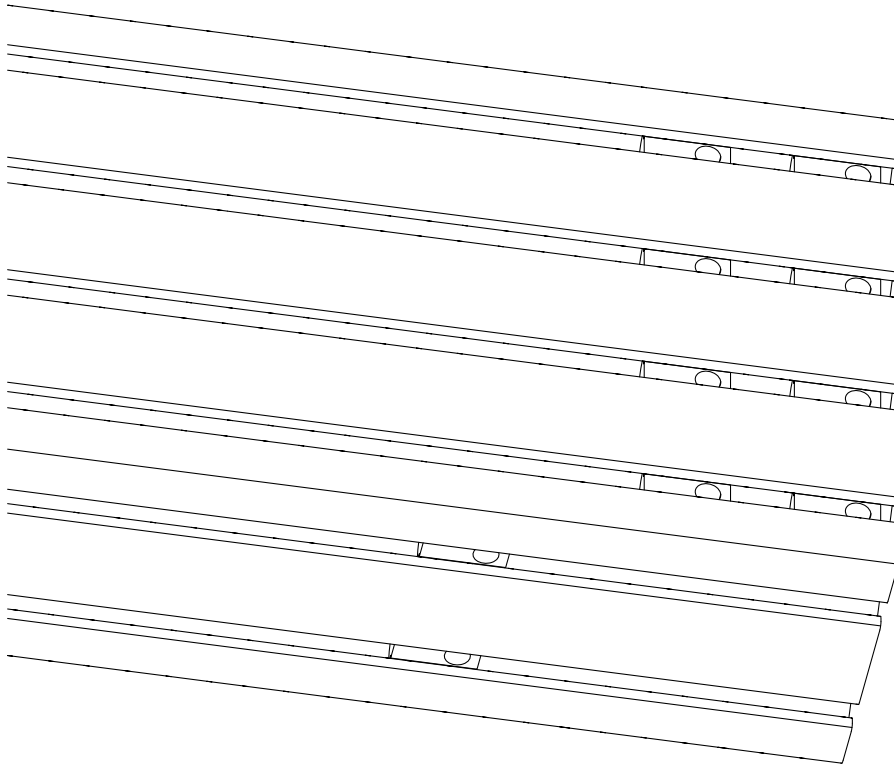
- Position the T-Nuts as indicated.

3.1.1.3



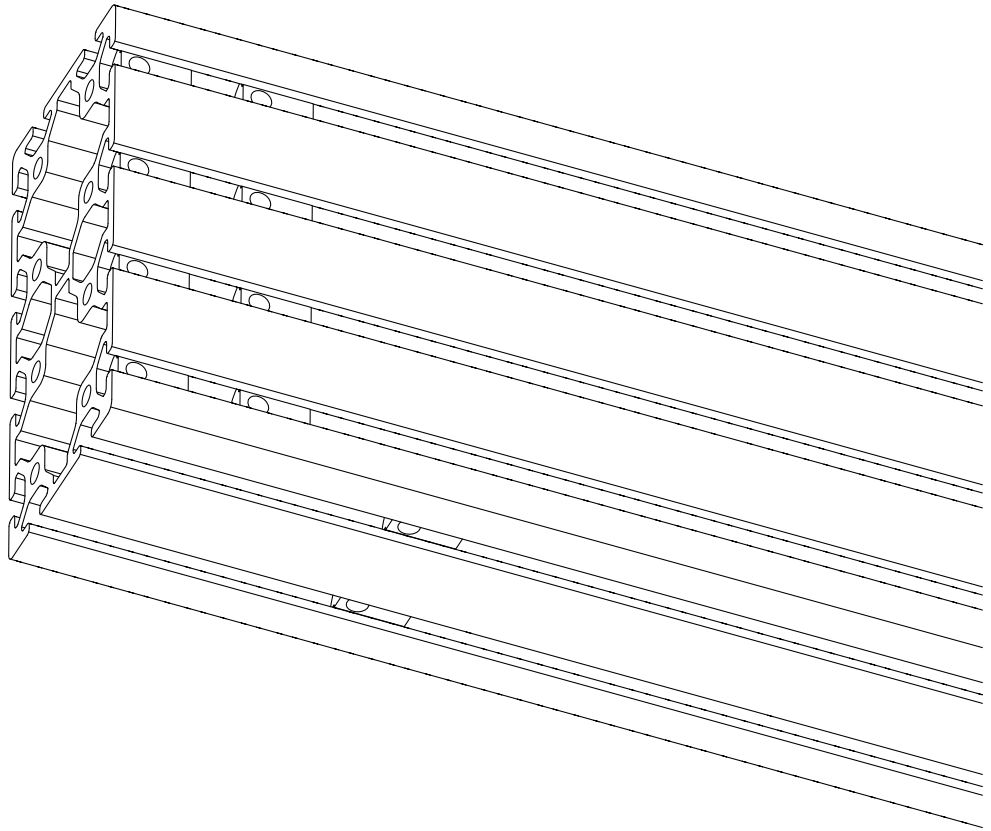
- Slide T-Nuts into the bottom gantry extrusion t-slots.

3.1.1.4



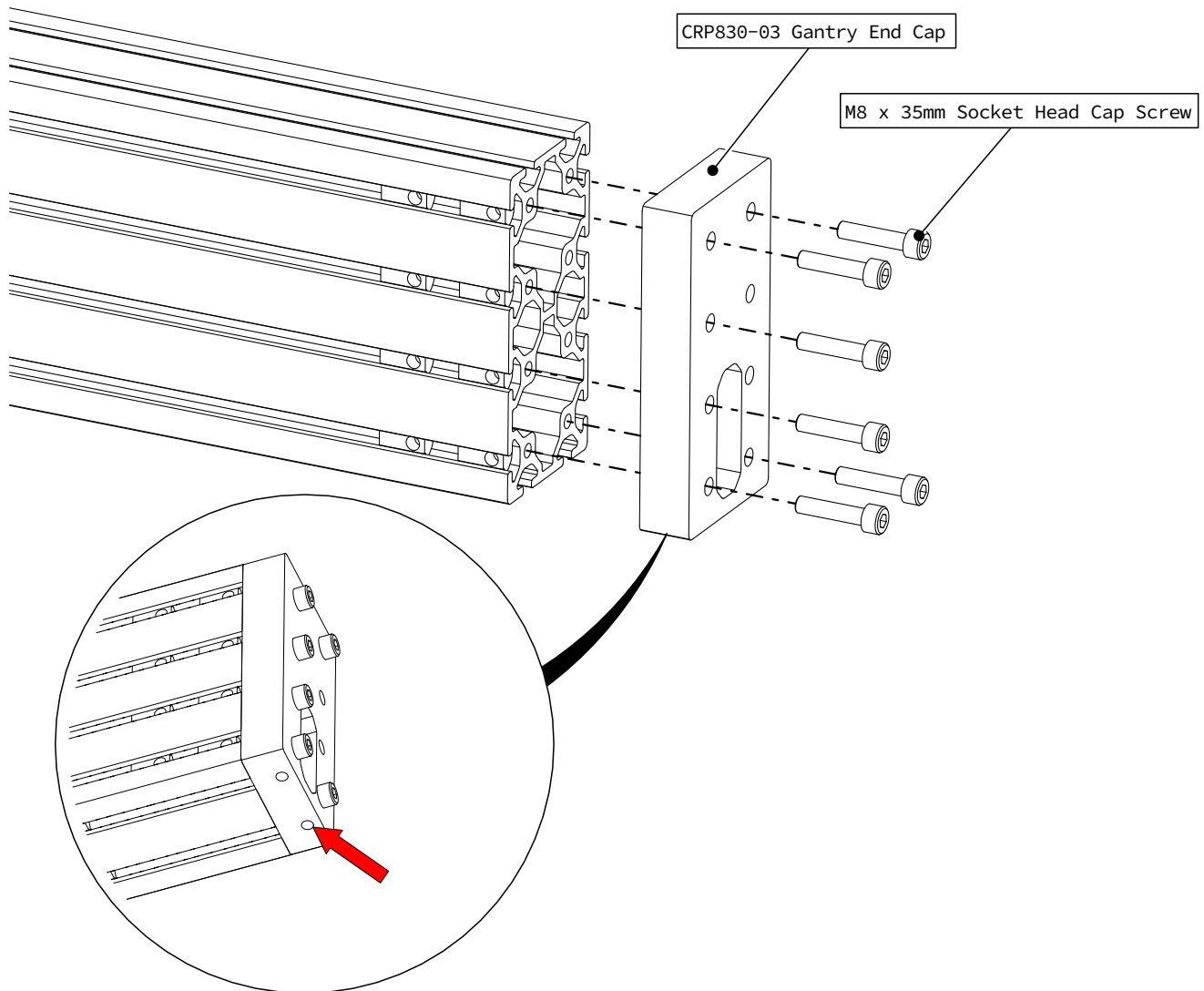
- Orient the T-Nuts as indicated.

3.1.1.5



- Repeat these steps to install T-Nuts on the other side of the gantry extrusion.

3.1.1.6



- Install a Gantry End Cap on one end of the extrusion.

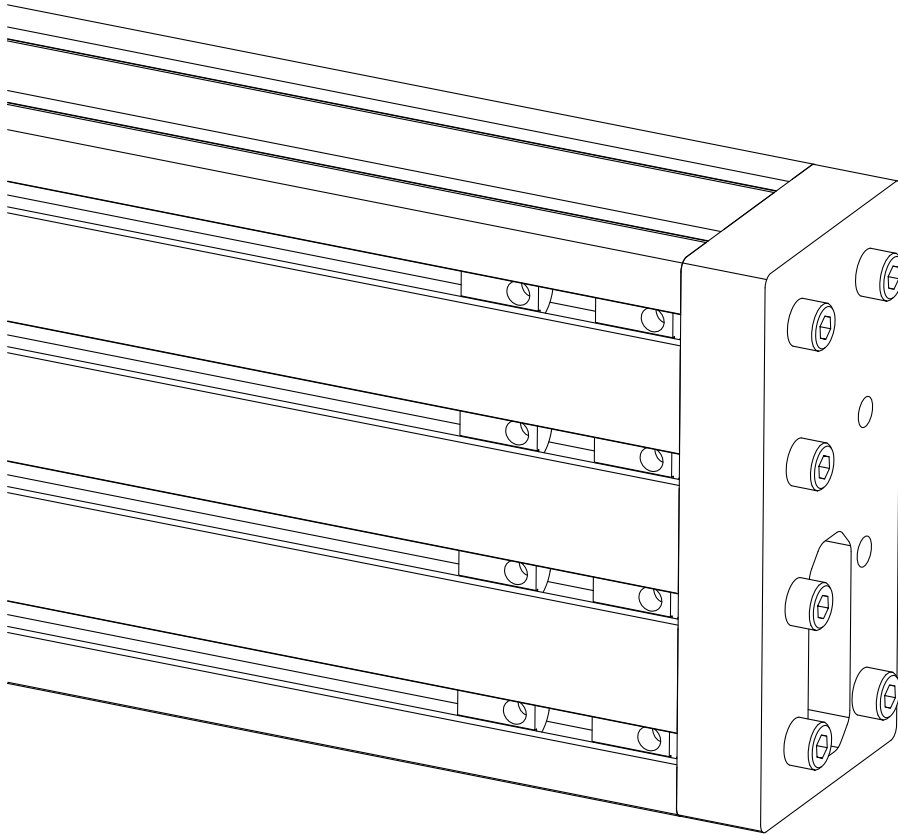
Assembly Note

Orient the Gantry End Cap with the tapped holes on the bottom biased toward the outside of the machine.

Assembly Note

Do not install fasteners in the remaining two holes of the Gantry End Cap, these will be used when mounting the gantry bumpers.

3.1.1.7



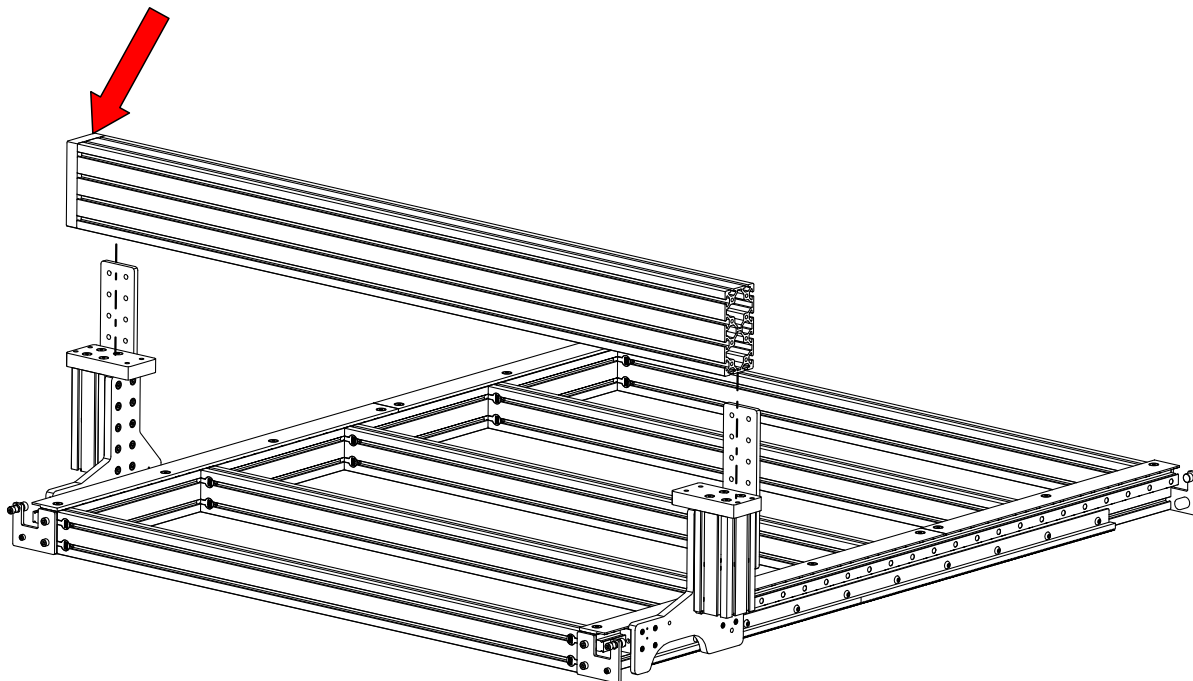
- Fully tighten the Gantry End Cap fasteners.

Assembly Note

Do not install the Gantry End Cap on the other side of the extrusion. You will need access to the extrusion t-slots in future steps.

3.1.2 Gantry Extrusion Installation

3.1.2.1

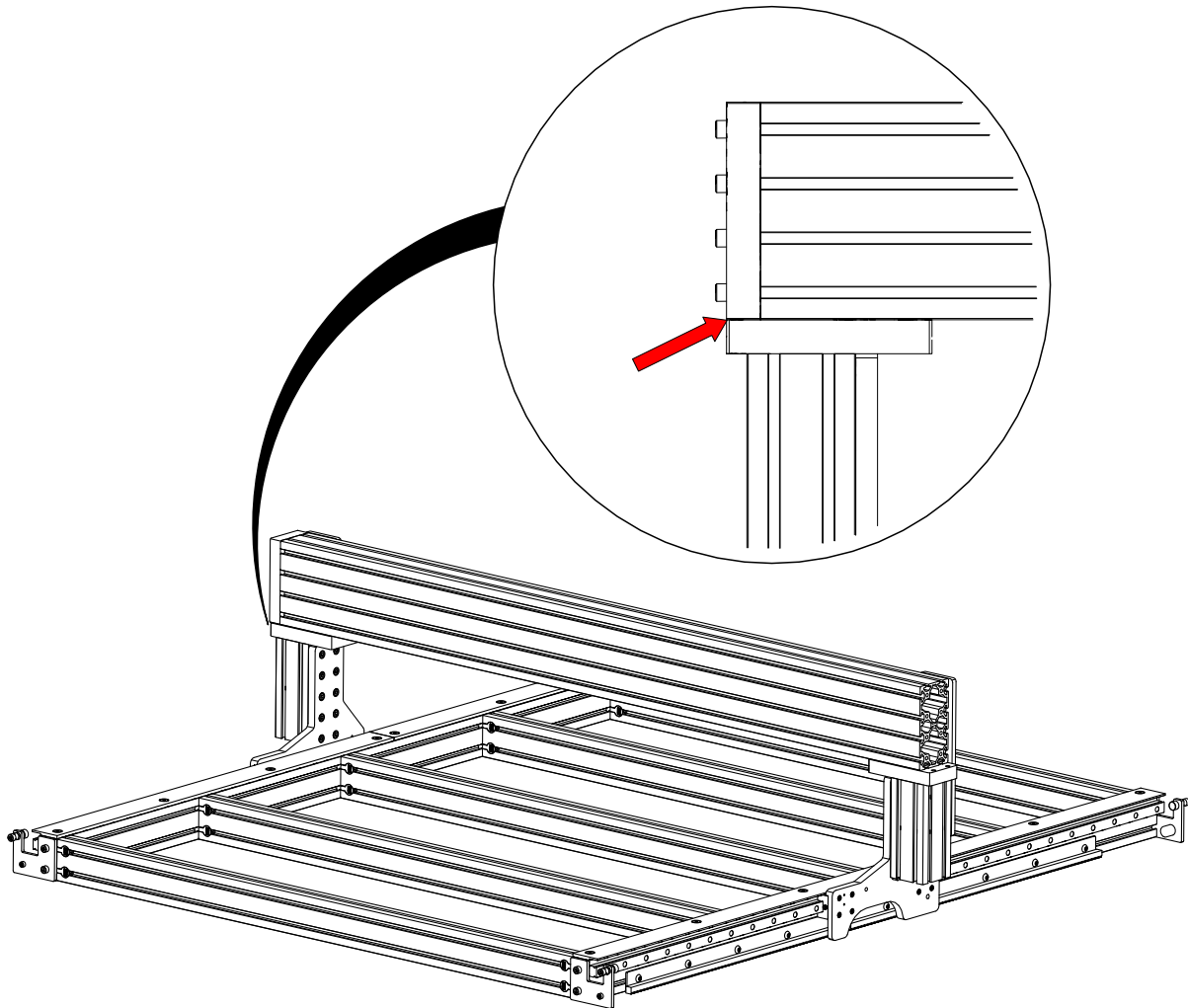


- Carefully lower the gantry extrusion onto the risers.
- Note the orientation of the extrusion, with the end cap on the indicated side.

Assembly Note

This step is made easier by sliding the risers to the front of the machine.

3.1.2.2

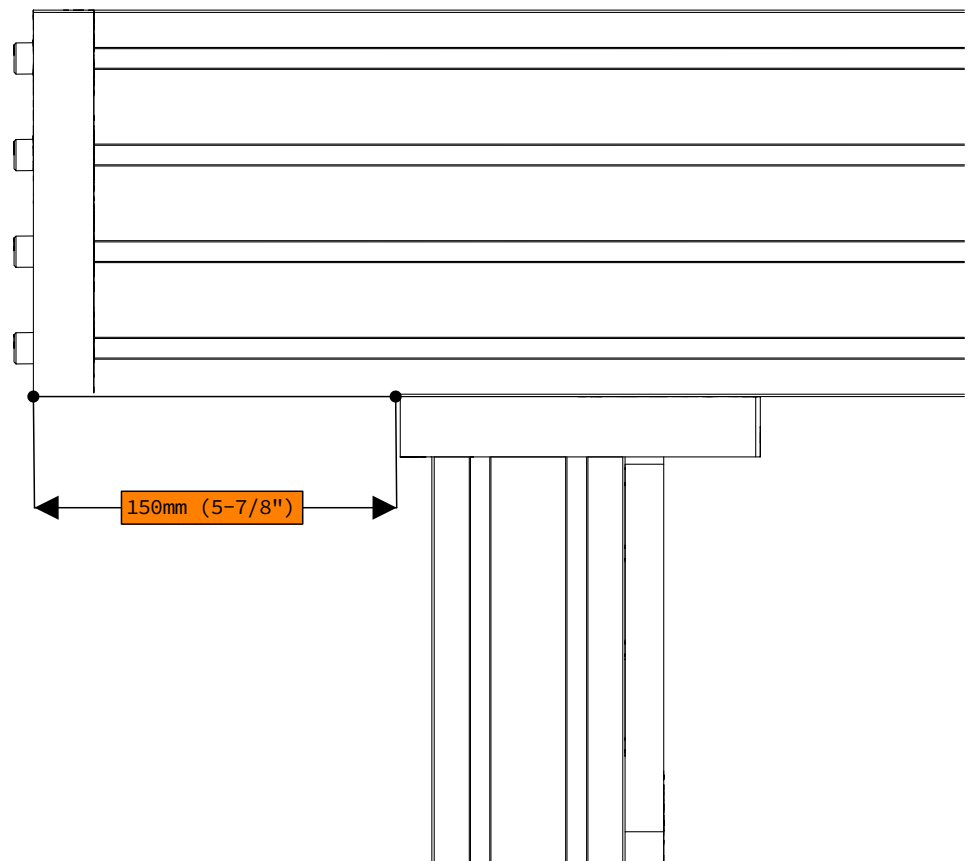


- Bring the End Cap flush with the Interface Plate as indicated.

3.1.2.3

Extended Gantry Option

This step is applicable only for those who purchased an extended gantry.

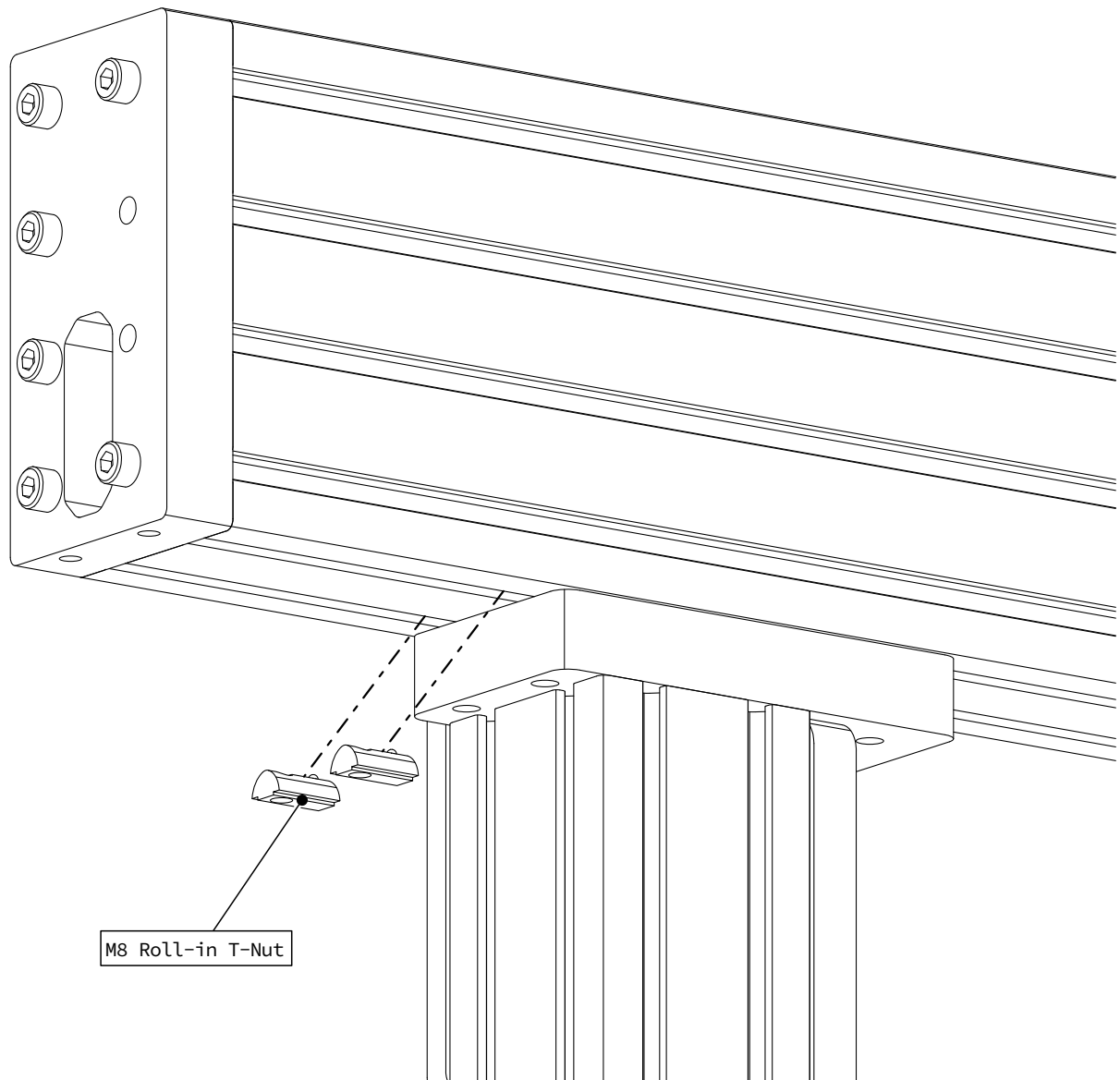


- Position the gantry 150mm (5-7/8") from the end of the Gantry Interface Plate as indicated.

3.1.2.4

Extended Gantry Option

This step is applicable only for those who purchased an extended gantry.

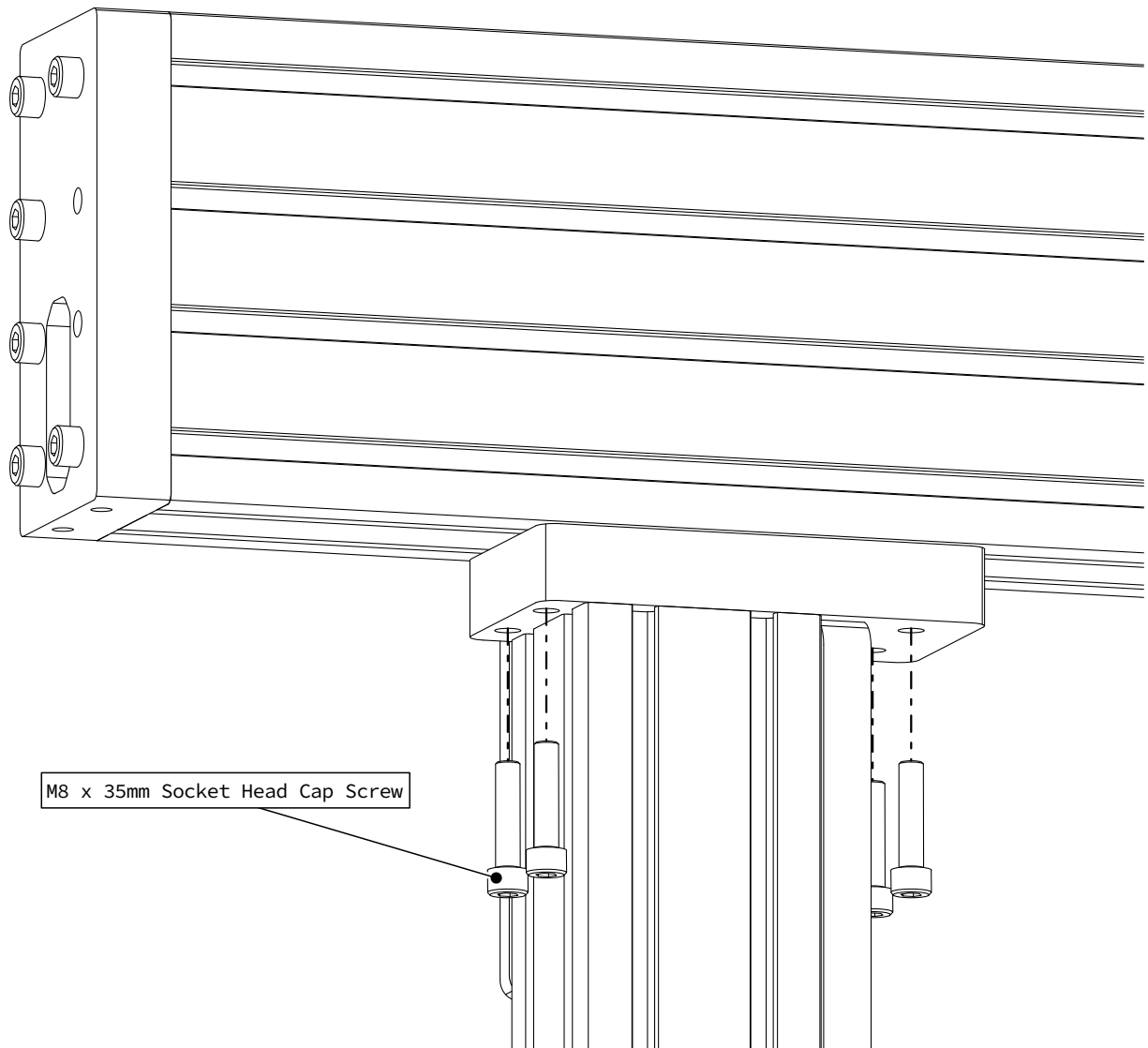


- Install an additional two M8 Roll-in T-Nuts into the bottom of the extrusion as indicated.
- These parts will be located in the CRP830-00-FAST-XTD fastener bag.

3.1.2.5

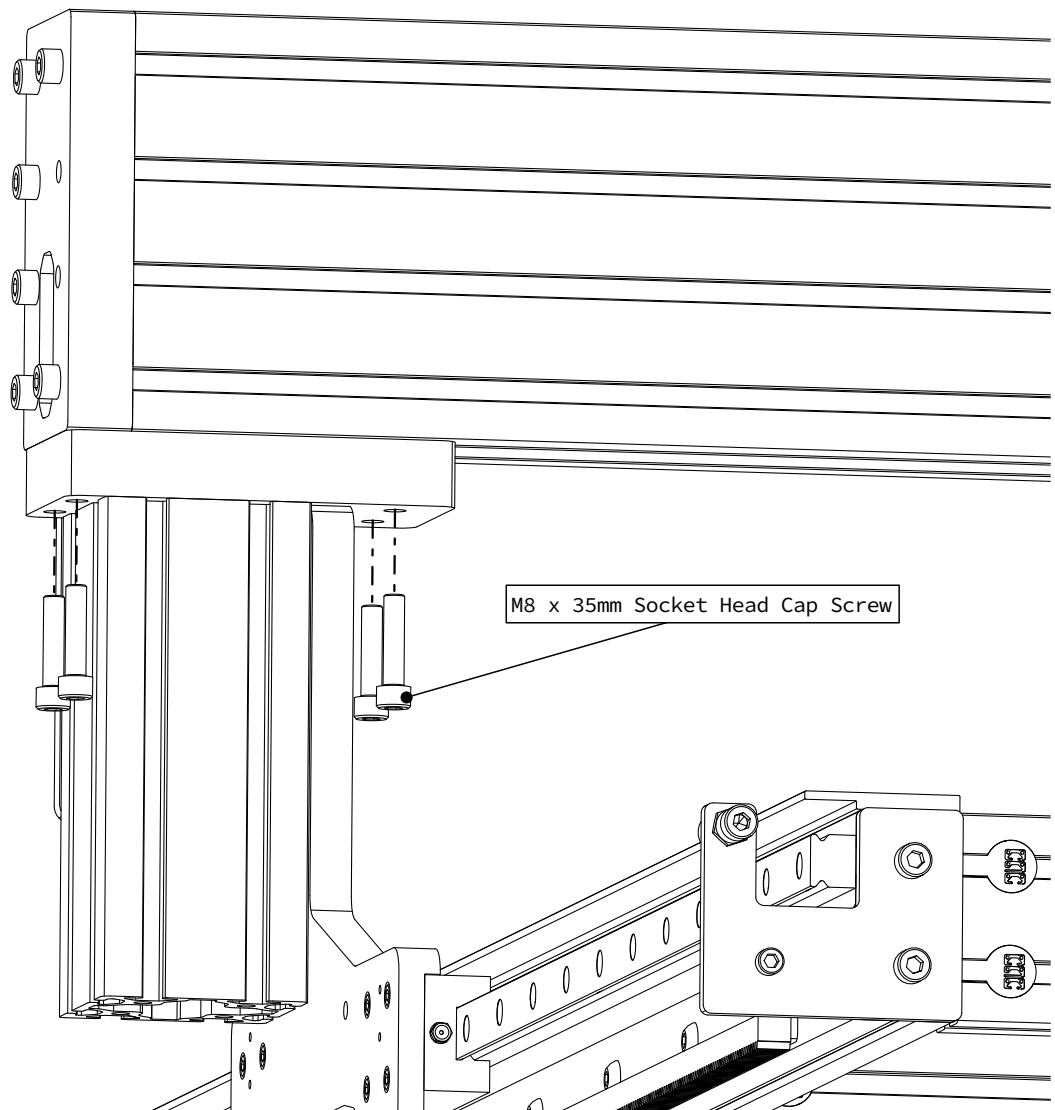
Extended Gantry Option

This step is applicable only for those who purchased an extended gantry.



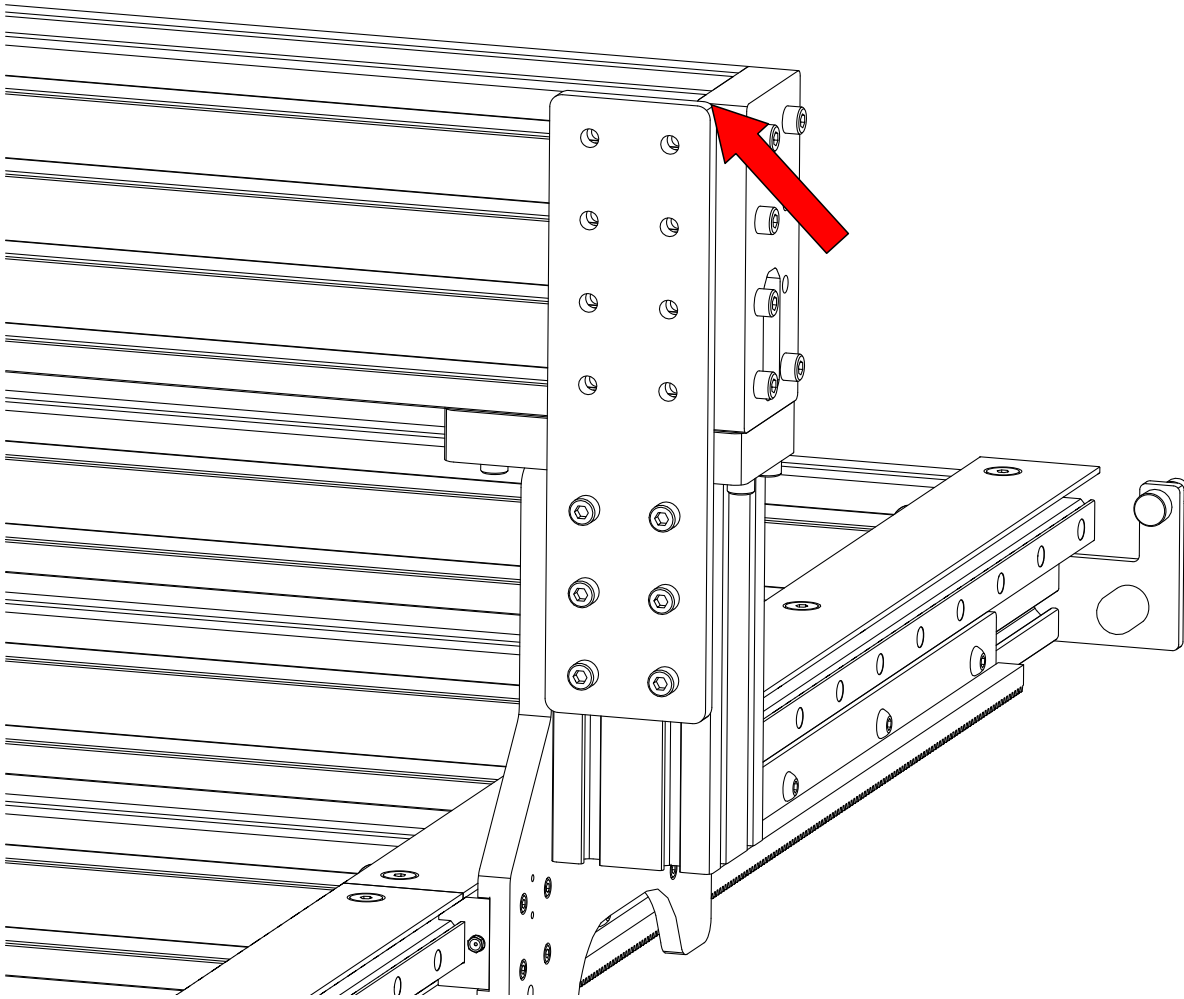
- Fasten the gantry extrusion to the gantry interface plate as indicated.

3.1.2.6



- On the side with the End Cap, attach the gantry to the Interface Plate as indicated.
- Partially tighten these fasteners.

3.1.2.7

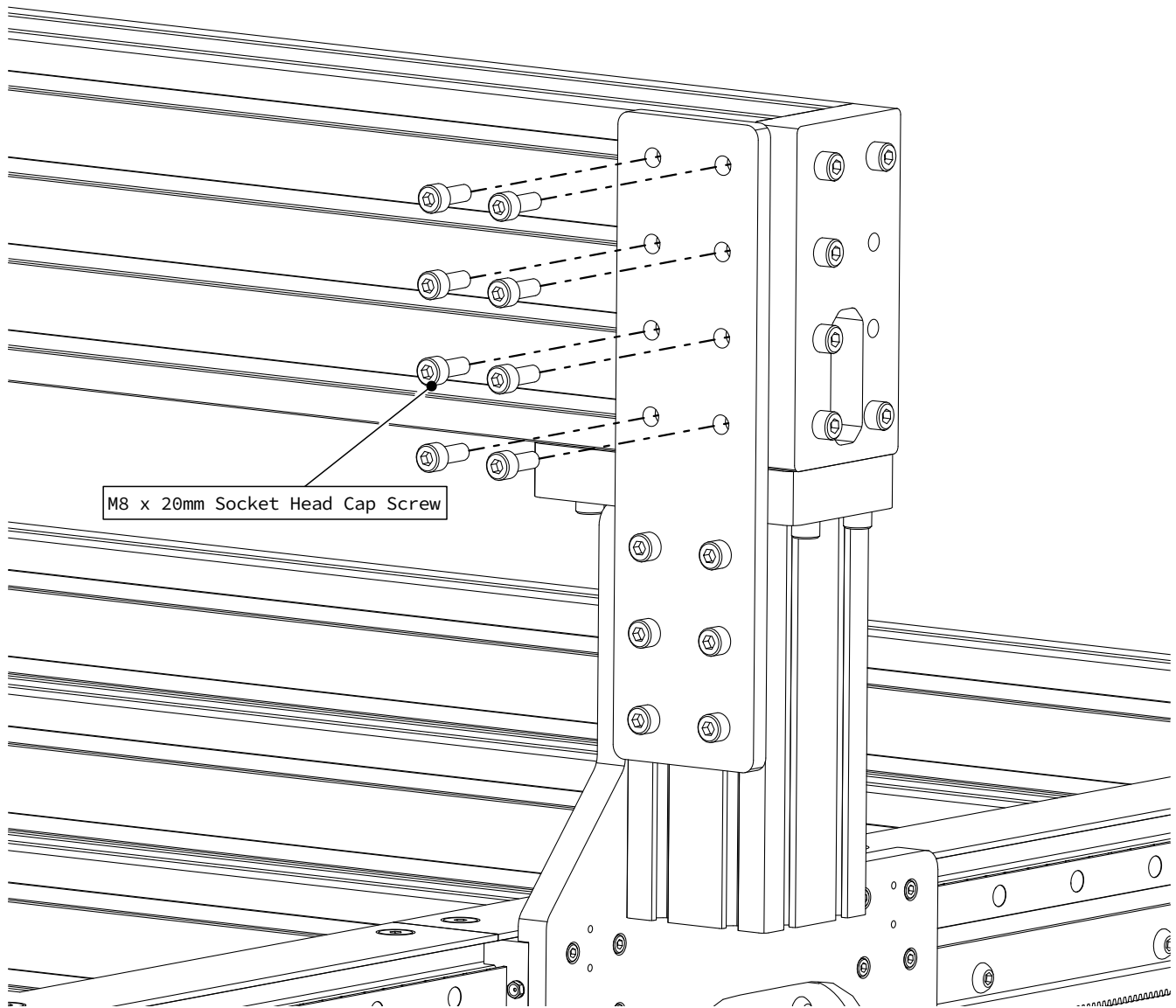


- Align the T-Nuts in the gantry extrusion with the holes in the Joining Plate.

Assembly Note

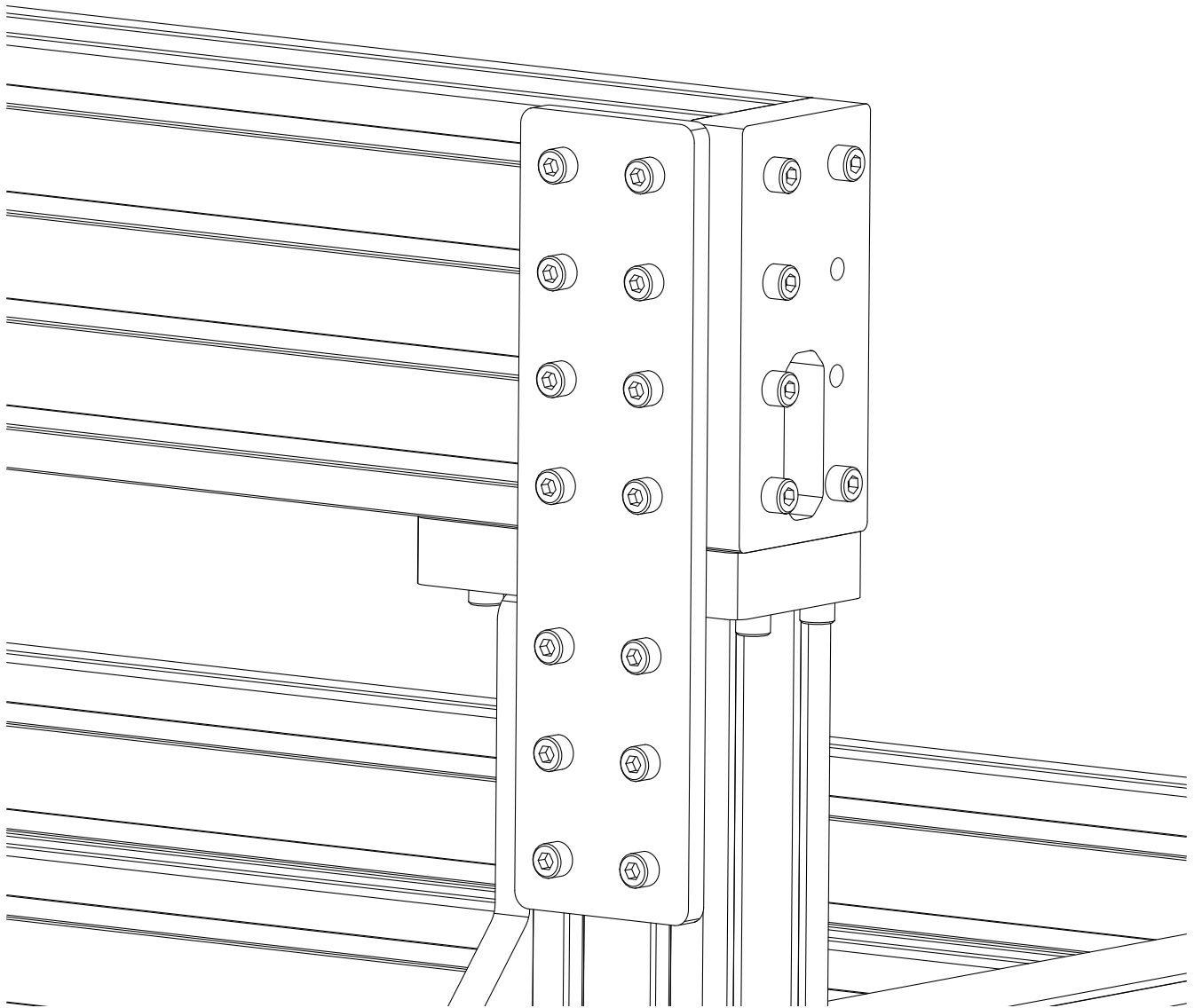
Ensure the top of the Joining Plate is flush with the top of the gantry extrusion.

3.1.2.8



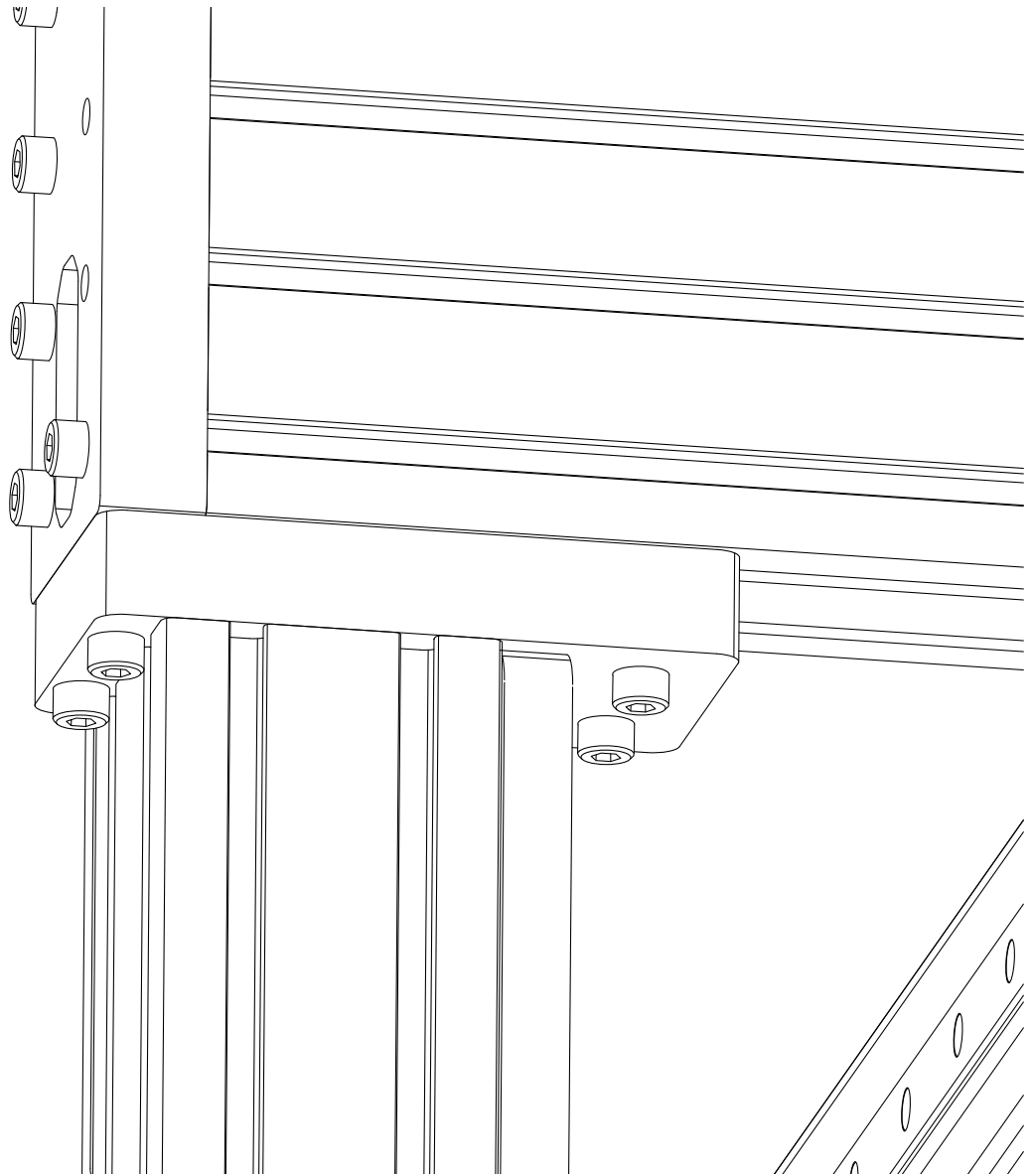
- Thread the socket head cap screws into the T-Nuts as indicated.

3.1.2.9



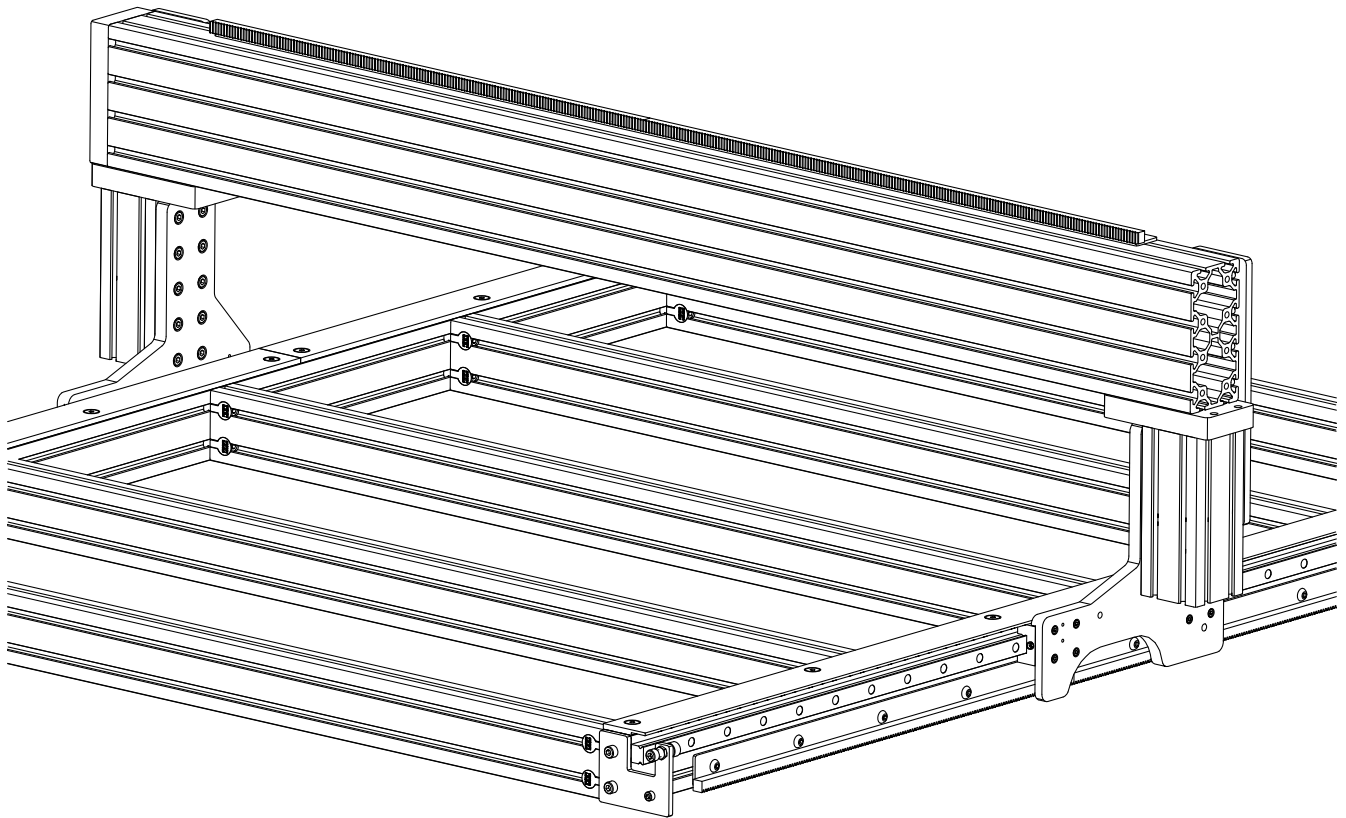
- Fully tighten all 14 of the Joining Plate fasteners.

3.1.2.10



- Fully tighten the all the Gantry Interface Plate fasteners.

3.2 Gear Rack



Parts and Tools Required

The following parts and tools will be used in Section 3.2

QTY	Part/Description	Packaged In
1	Gear Rack, 1320mm (52")	Gantry-48 Steel Tube
1	MGM-52-FAST-40: - (10) M8 x 12mm Button Head Cap Screw - (10) M8 Slide-in T-Nut	CRP830 Gantry Kit

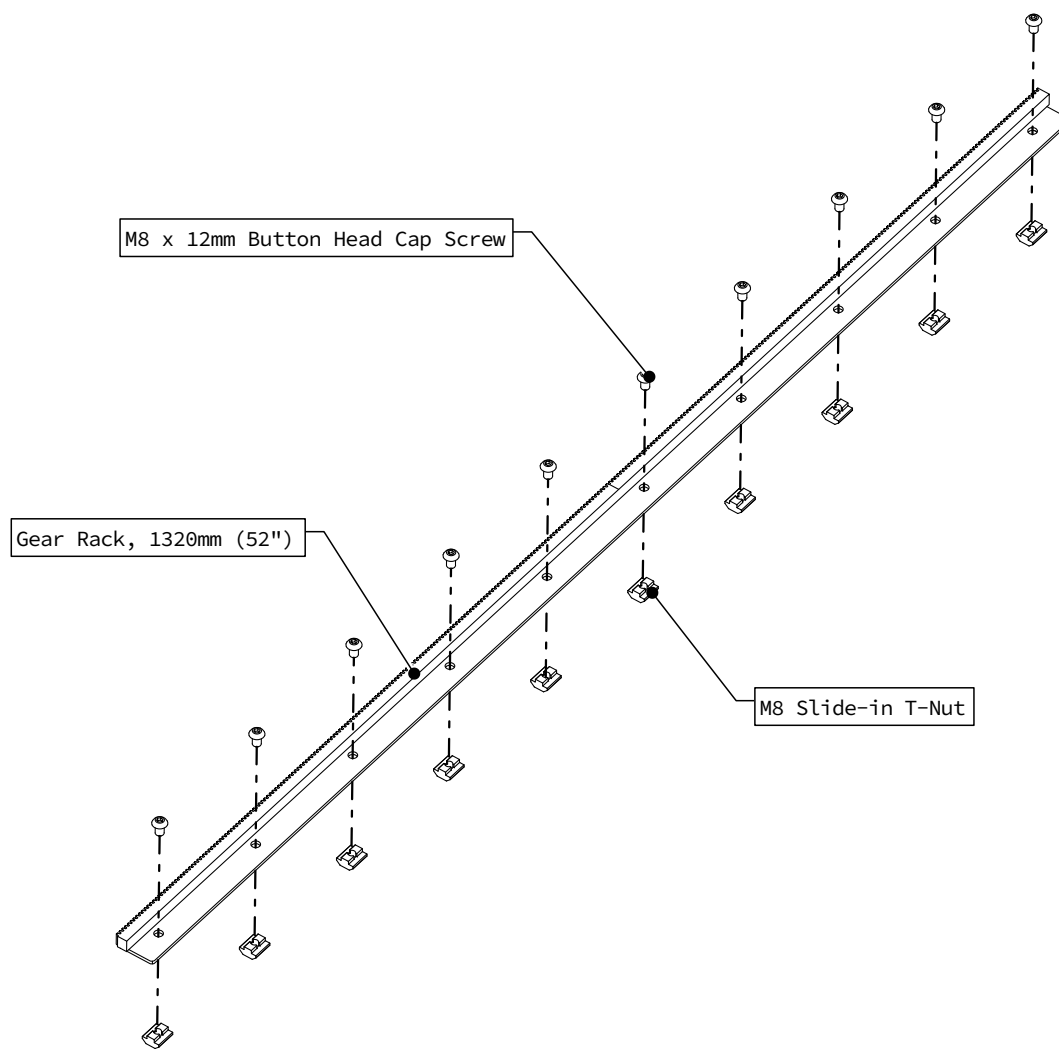
Required Tools:

- 5mm Allen Wrench
- Tape Measure



3.2.1 Gear Rack Assembly

3.2.1.1



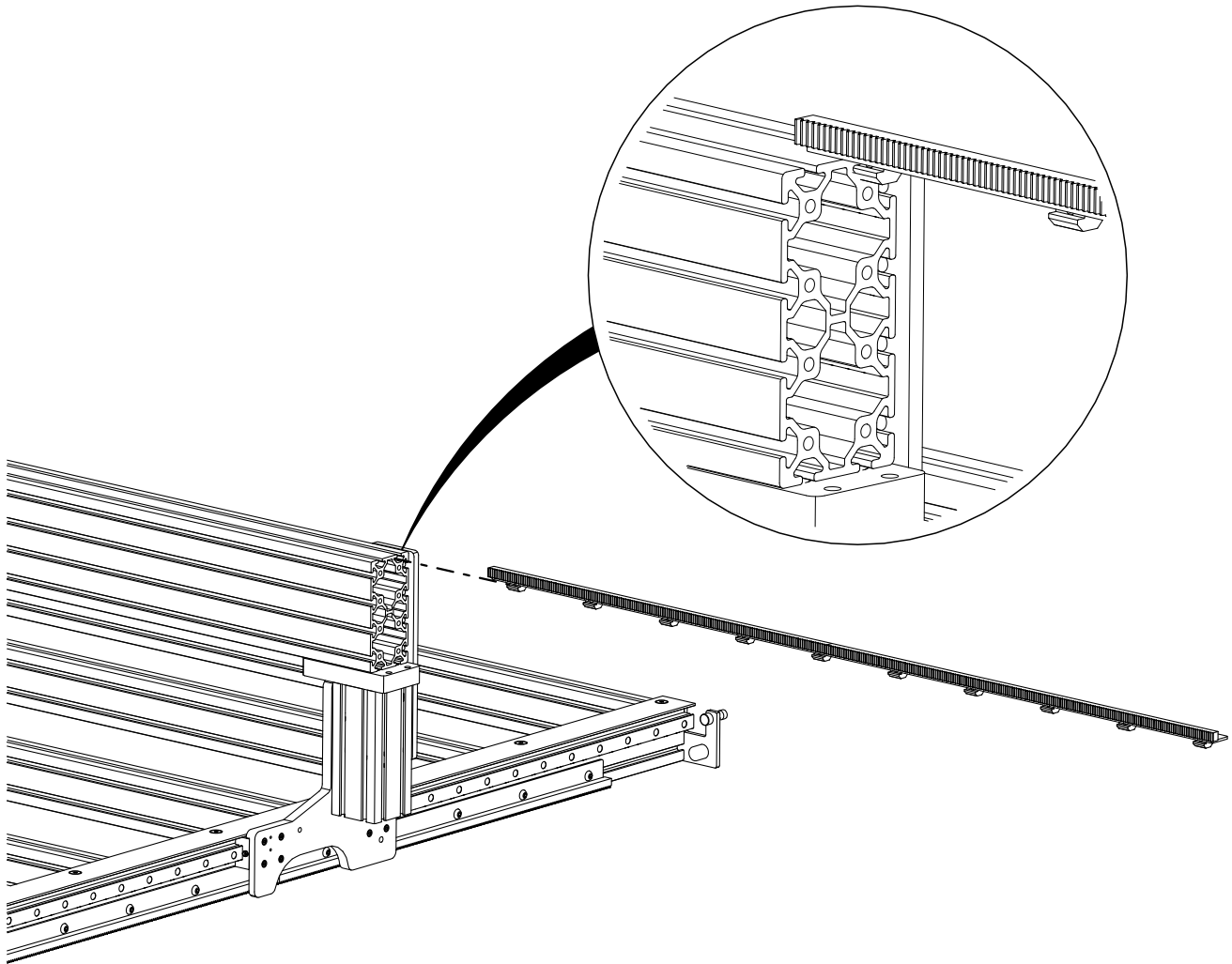
- Partially thread the indicated fasteners into the gear rack.

Extended Gantry Option

If you purchased an extended gantry, you will use a 660mm (26") and 990mm (39") gear rack piece.

3.2.2 Gear Rack Installation

3.2.2.1

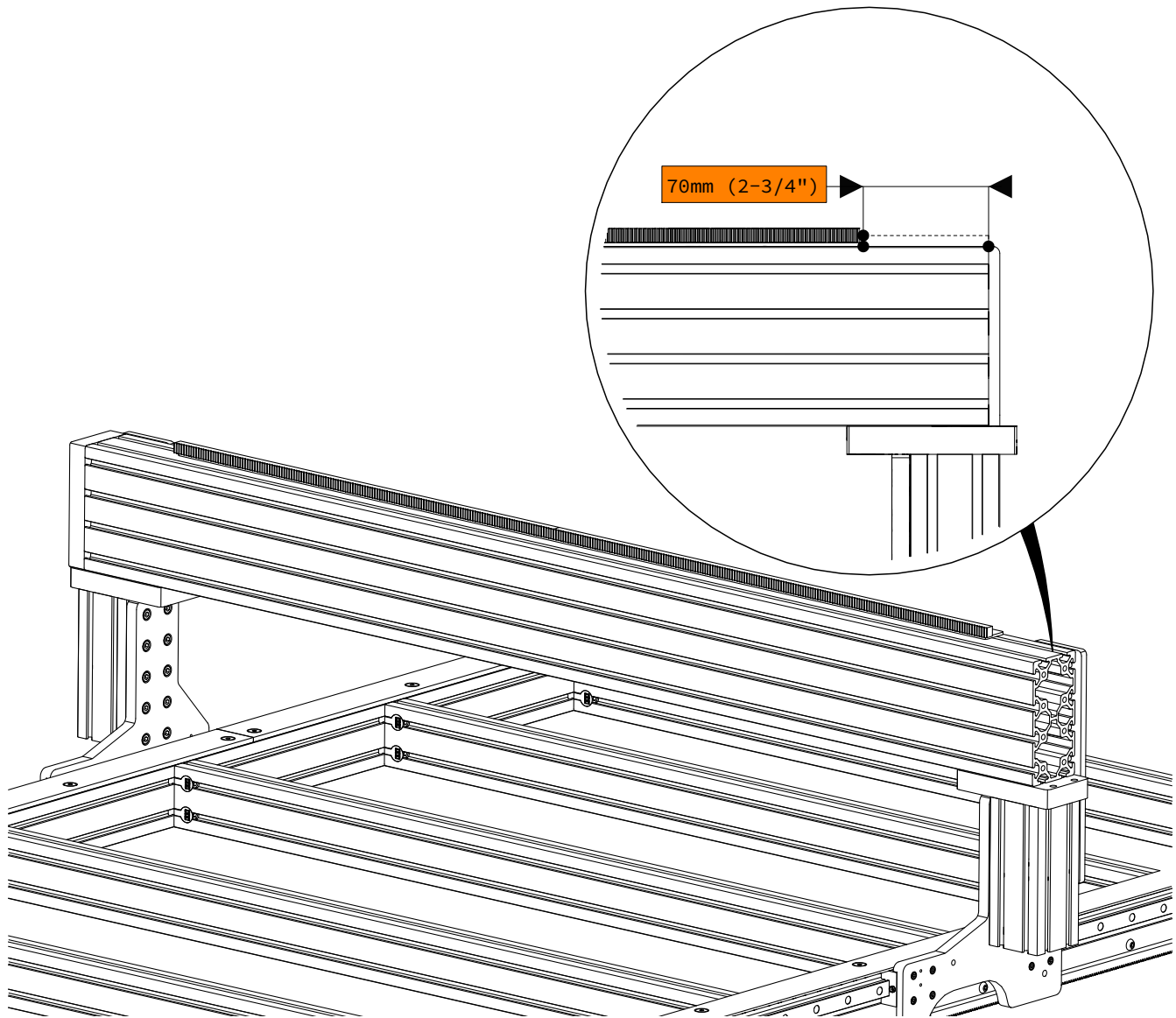


- Slide the gear rack into the indicated t-slot on top of the gantry extrusion.

Assembly Note

Ensure the gear rack teeth are facing the correct direction as shown.

3.2.2.2



- Position the gear rack 70mm (2-3/4") from the right end of the gantry extrusion as indicated.
- Fully tighten the gear rack fasteners.

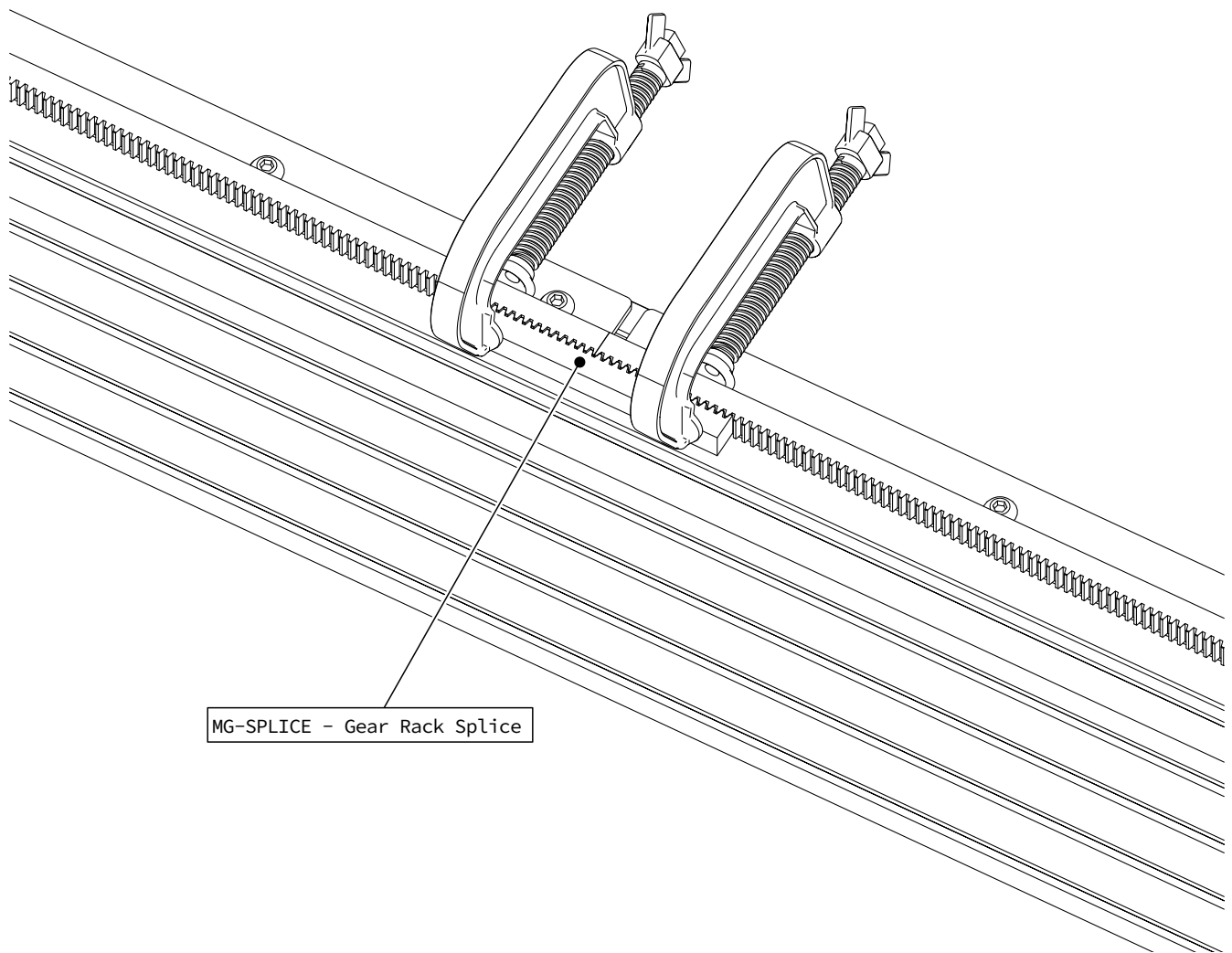
Assembly Note

Looking from the front of the machine, the measurement shown is from the right end of the gantry.

3.2.2.3

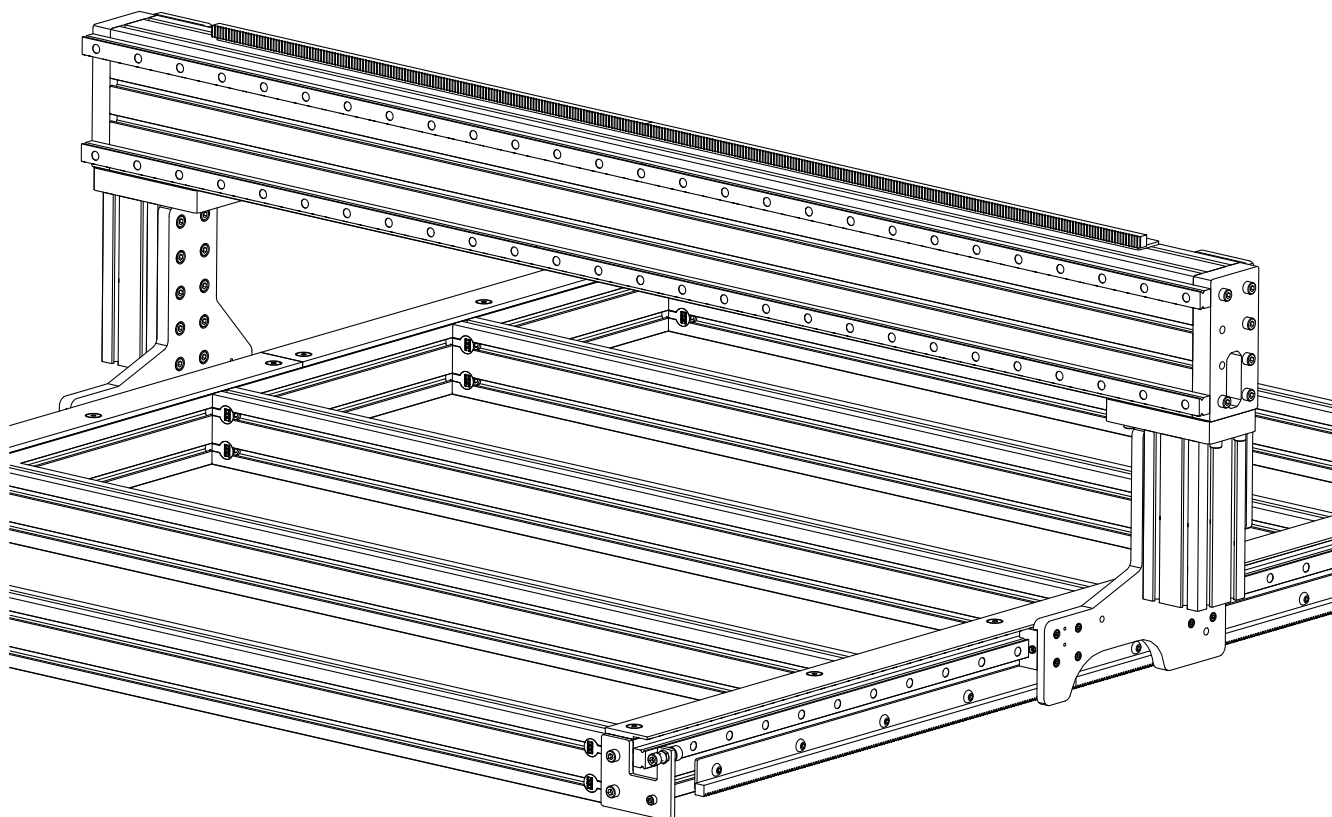
Extended Gantry Option

This step is applicable only for those with gantry travel longer than 4'.



- Using the Gear Rack Splice, clamp the two sections of gear rack together to align the teeth.
- Fully tighten the gear rack fasteners before removing the clamps.

3.3 Linear Rails



Parts and Tools Required

The following parts and tools will be used in Section 3.3

QTY	Part/Description	Packaged In
2	Linear Rail, 1600mm (63")	Gantry-48 Steel Tube
2	GH20-1600-FAST: - (25) M5 x 20mm Socket Head Cap Screw (Total QTY: 50) - (25) M5 Slide-in T-Nut (Total QTY: 50)	CRP830 Gantry Kit
1	CRP833-00 Gantry End Cap Kit: - (1) CRP830-03 Gantry End Cap - (6) M8 x 35mm Socket Head Cap Screw	CRP830 Gantry Kit
1	CRP820-00-FAST: - (4) M8 x 35mm Socket Head Screw - (8) M8 x 20mm Socket Head Cap Screw	CRP820 Riser Kit
1	Linear Rail Setting Jig Kit (Same kit used in Base Assembly): - (2) Rail Alignment Jig - (4) M8 x 25mm Socket Head Cap Screw - (4) M8 Roll-in T-Nut	CRP810 Base Kit
4	GHH20CA - Linear Bearing Block	CRP830 Gantry Kit
4	Grease Fitting for Linear Bearing Block	CRP830 Gantry Kit

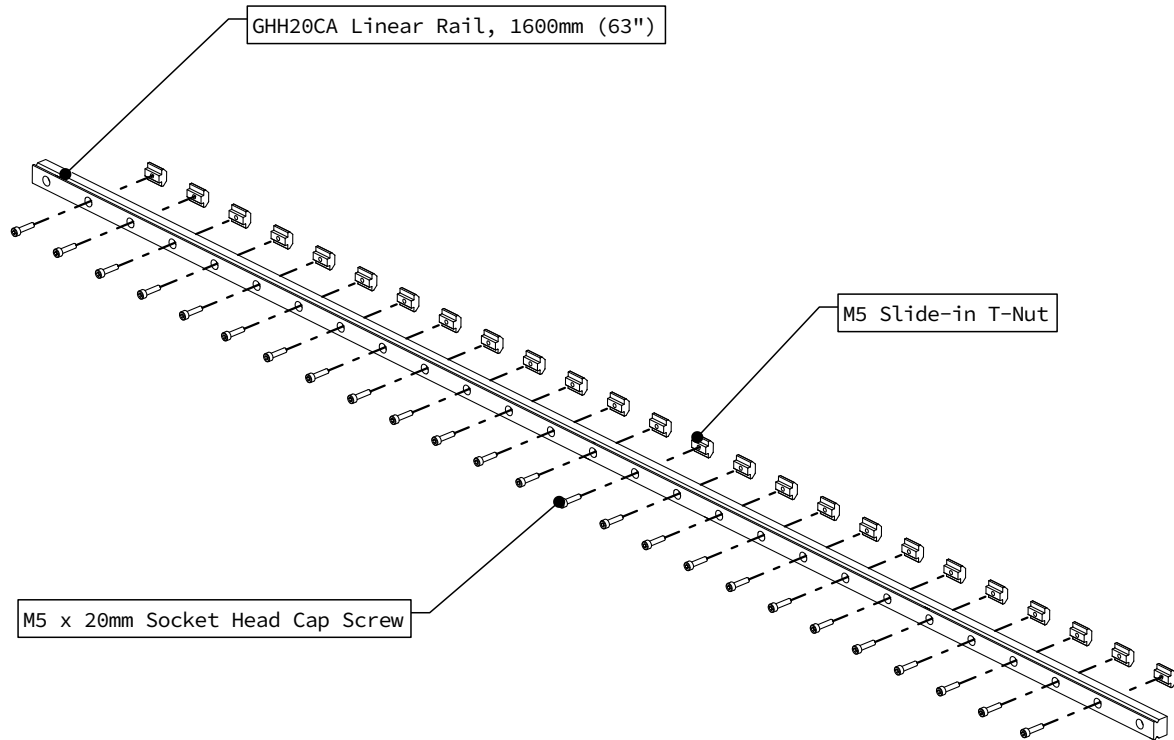
Required Tools:

- 4mm Allen Wrench
- 6mm Allen Wrench
- (2) Clamps



3.3.1 Linear Rail Assembly

3.3.1.1



- Partially thread fasteners into the linear rail as indicated.

Assembly Note

The outermost hole on each side of the linear rail will not use a fastener.

Extended Gantry Option

If you purchased an extended gantry, your linear rails will be 1900mm (74-3/4").

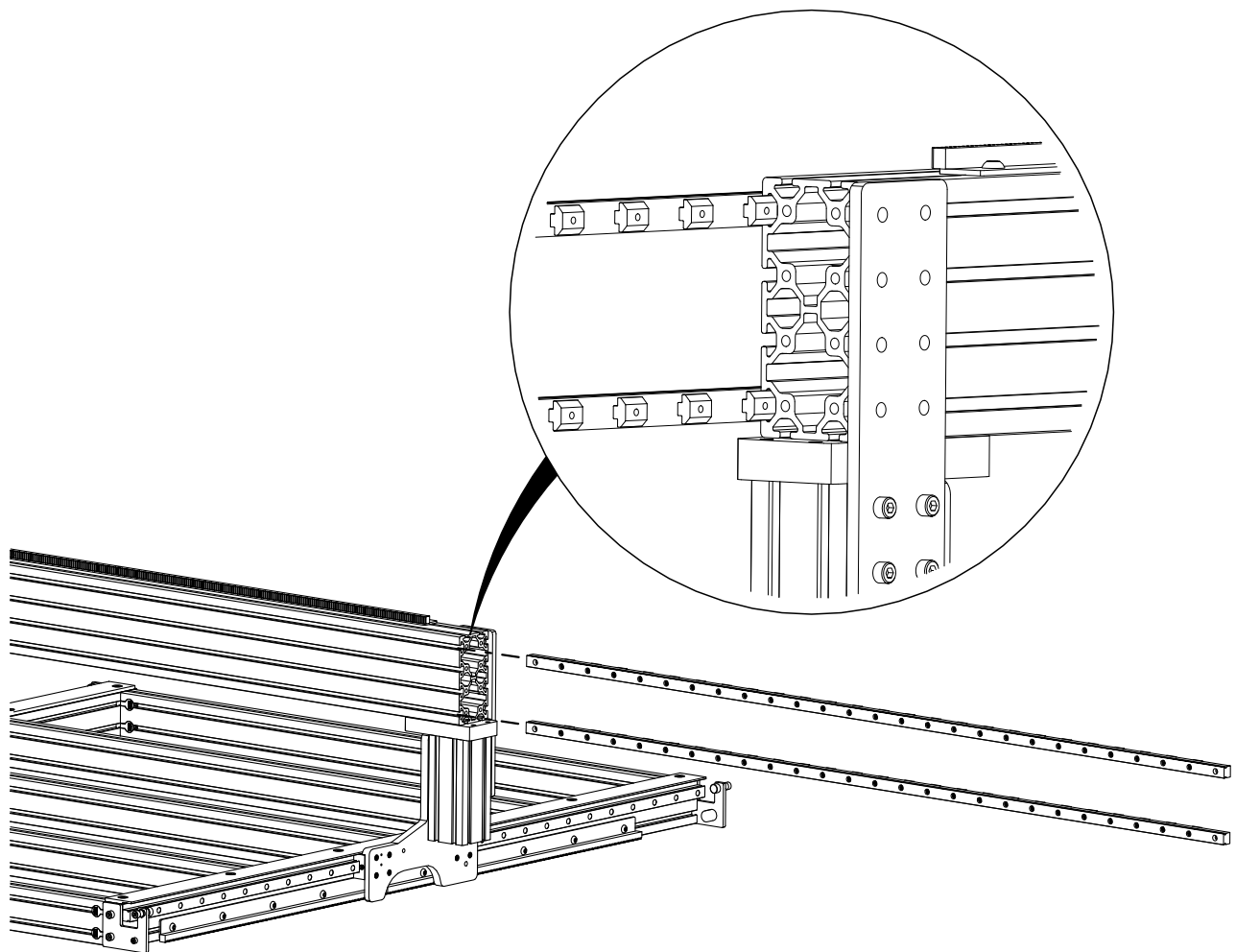
3.3.1.2



- Repeat the previous step to assemble the other linear rail.

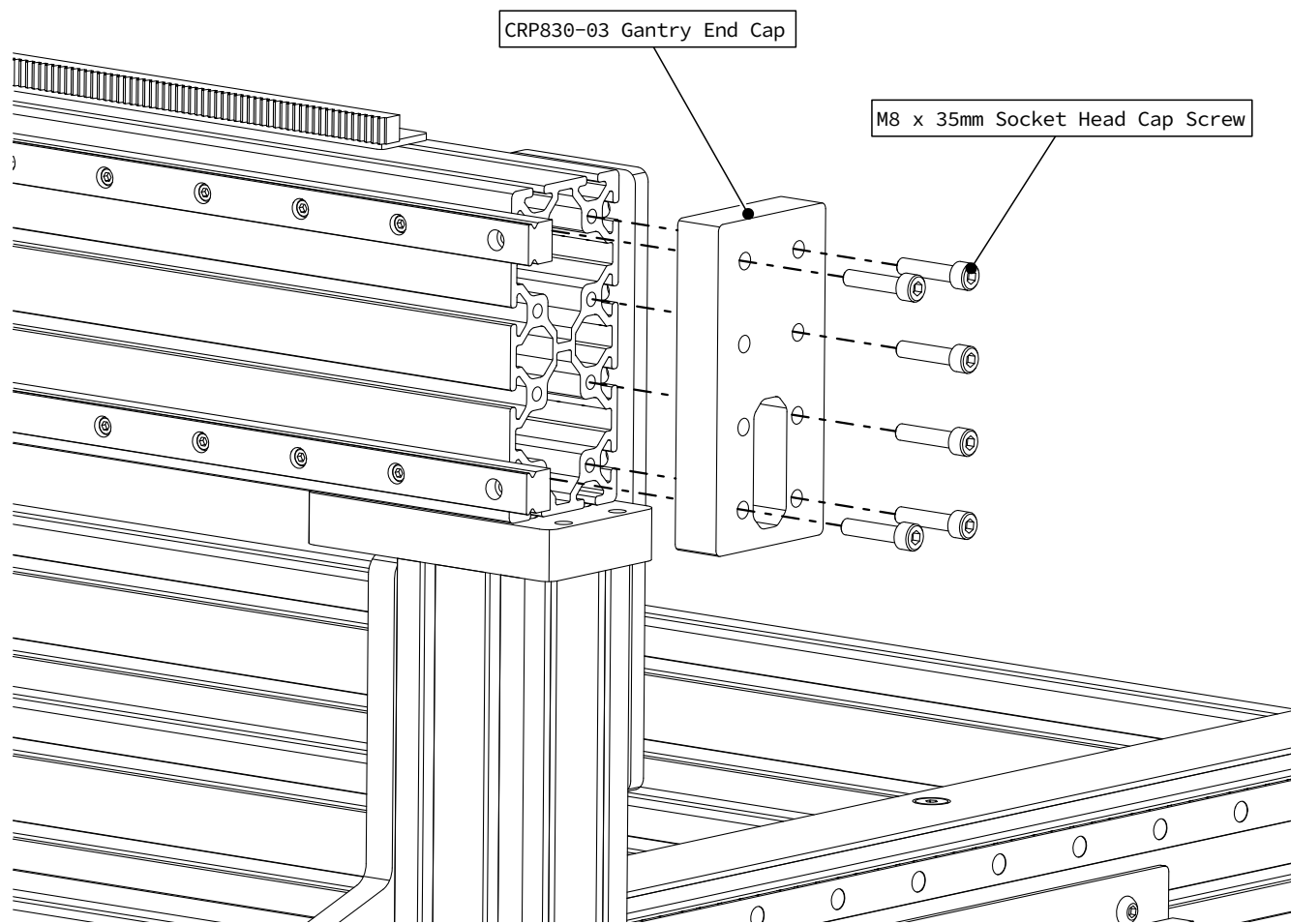
3.3.2 Linear Rail Installation

3.3.2.1



- Slide the assembled linear rails into the indicated gantry extrusion t-slots.

3.3.2.2



- Install the other Gantry End Cap as indicated.

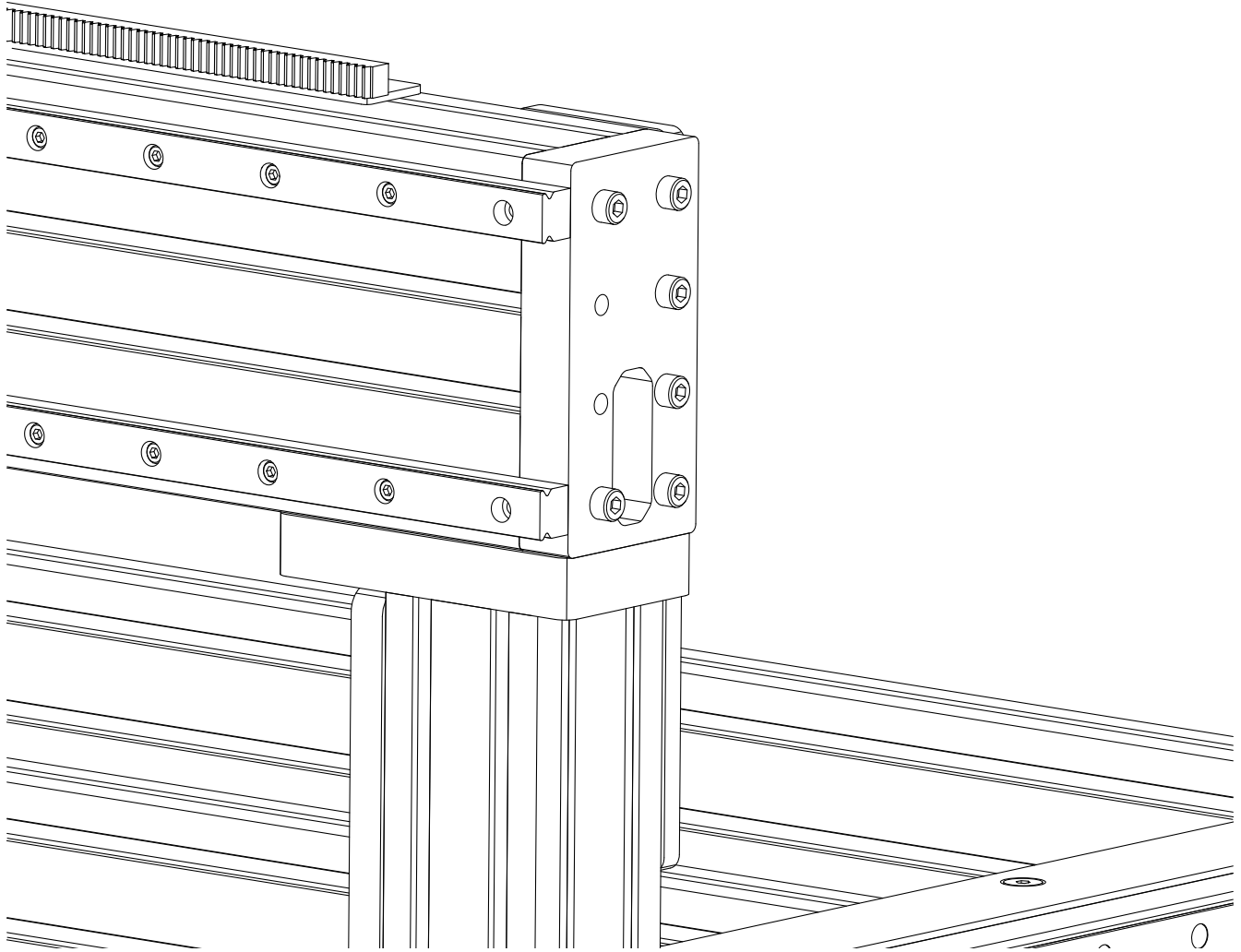
Assembly Note

Orient the Gantry End Cap with the tapered holes on the bottom biased towards the outside of the machine.

Assembly Note

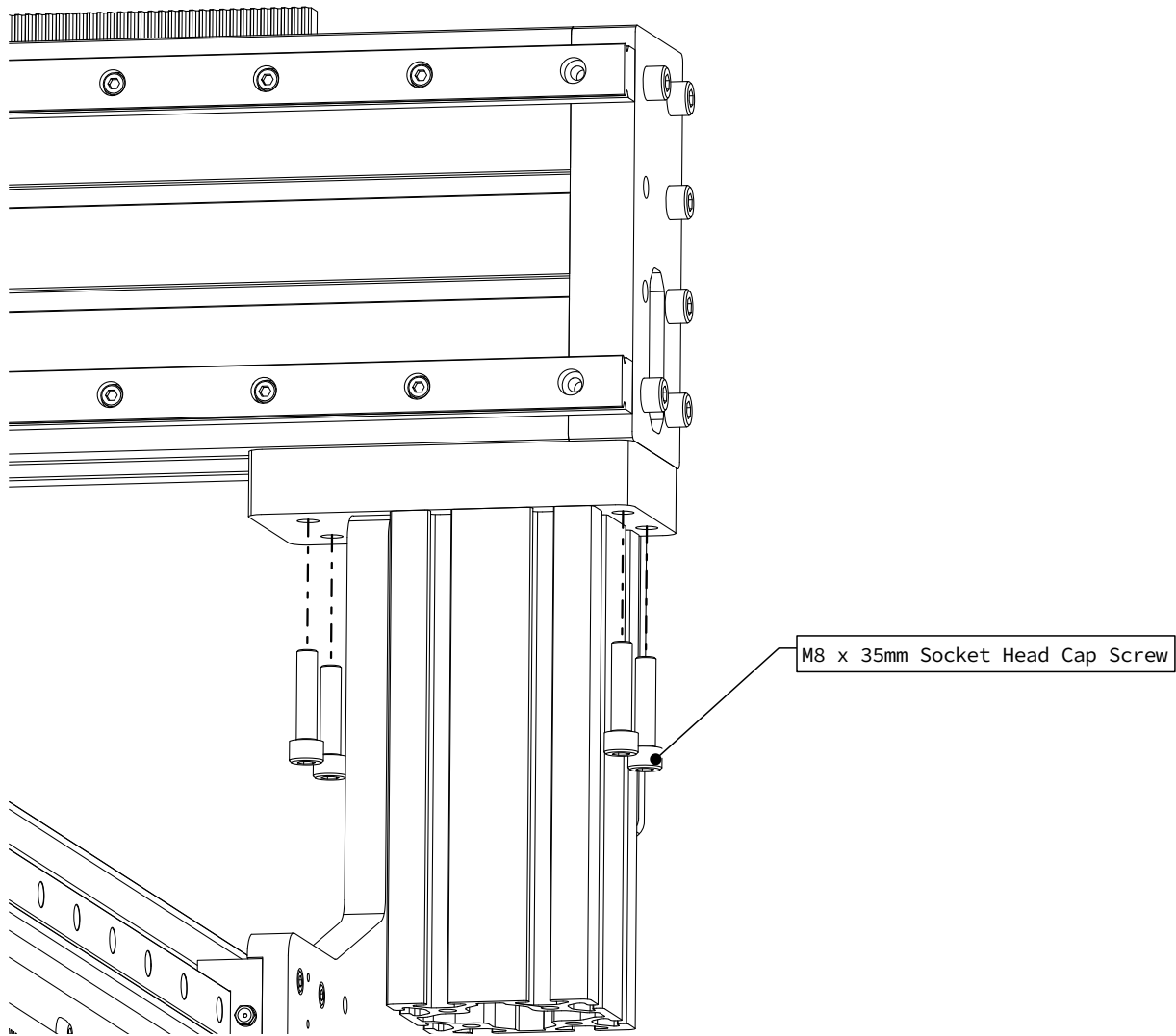
Do not install fasteners in the remaining two holes of the Gantry End Cap, these will be used when mounting the gantry bumpers.

3.3.2.3



- Fully tighten the Gantry End Cap fasteners.

3.3.2.4

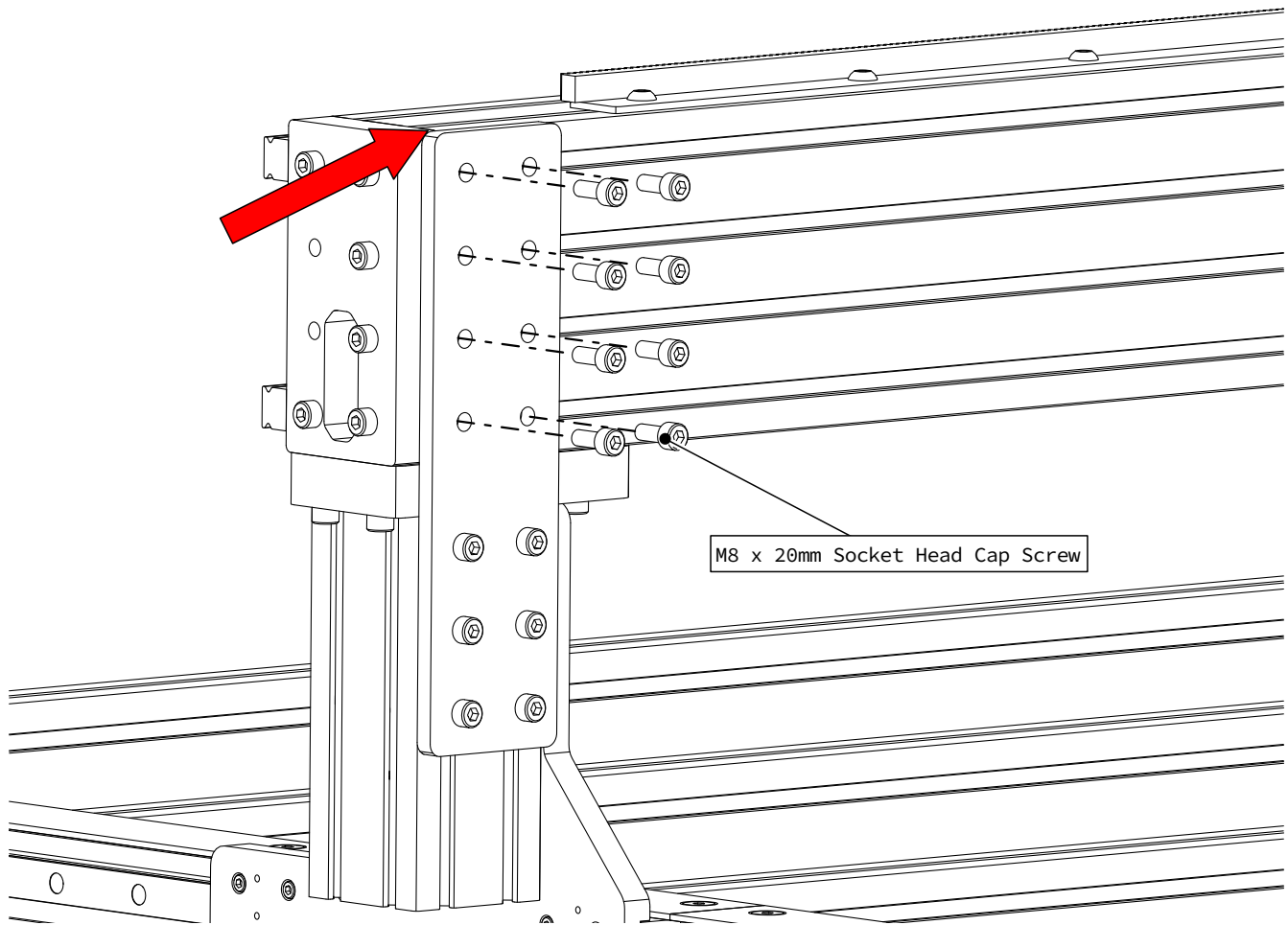


- Install and partially tighten the M8 x 35mm fasteners.

Extended Gantry Option

If you purchased an extended gantry, repeat the process from Step 3.1.2.4 to install additional T-Nuts in the gantry extrusion.

3.3.2.5

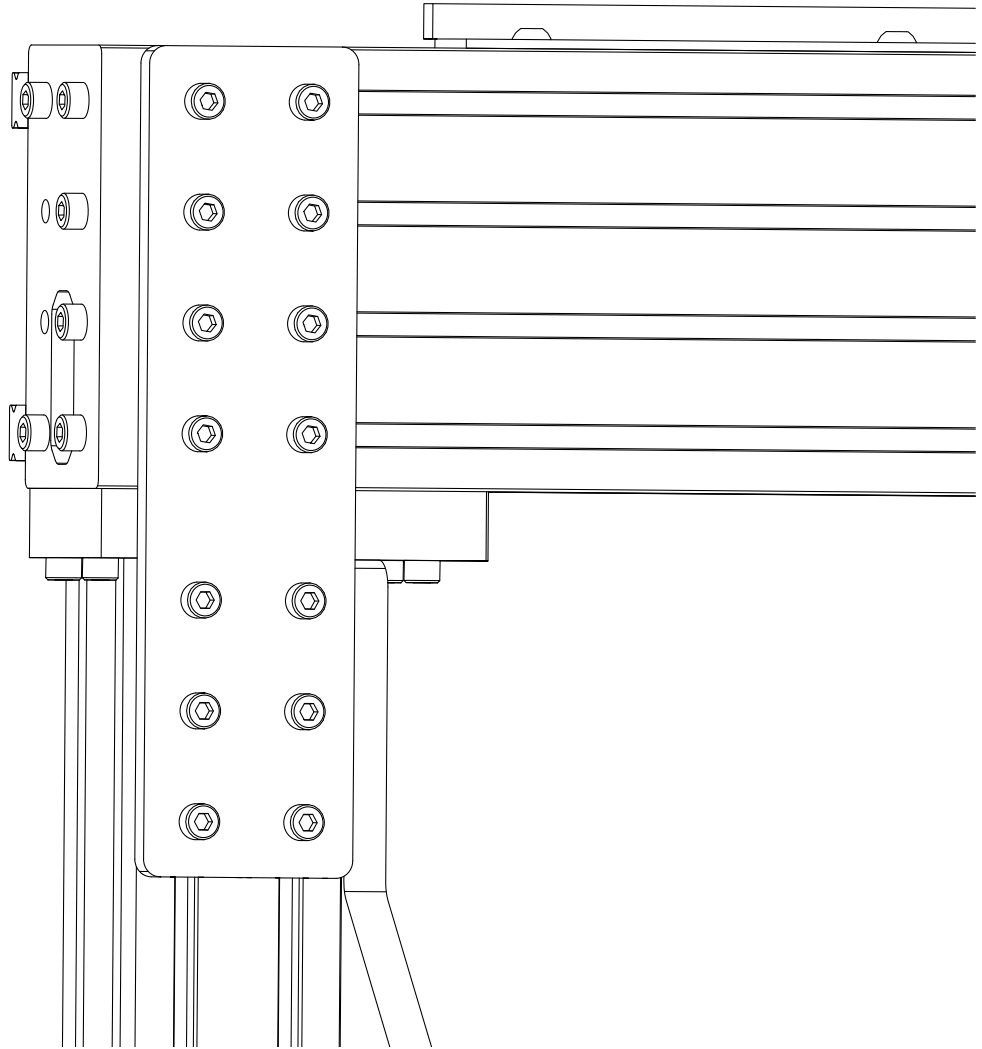


- Install the remaining Joining Plate fasteners as indicated.

Assembly Note

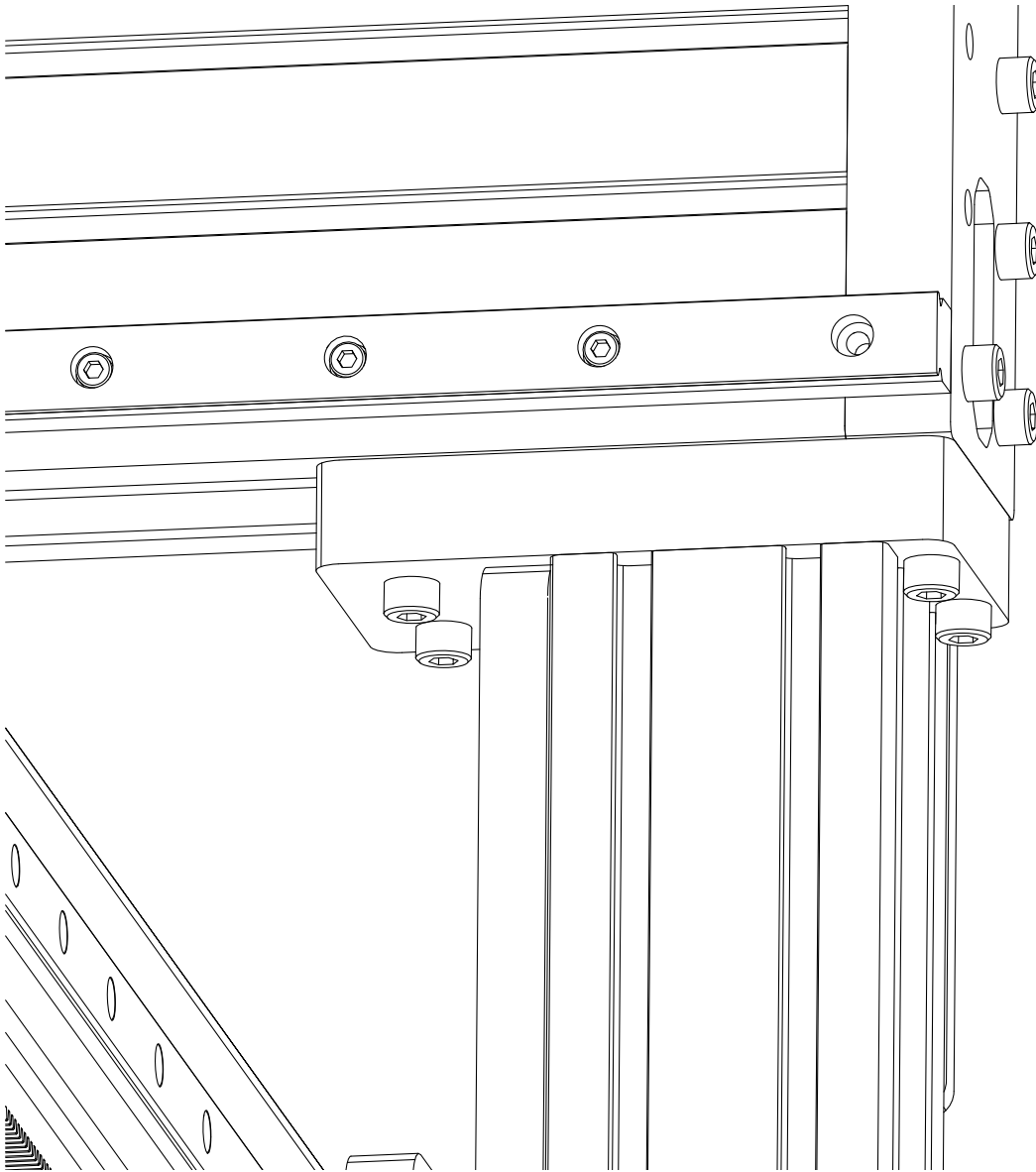
Ensure the top of the Joining Plate is flush with the top of the gantry extrusion.

3.3.2.6



- Fully tighten all 14 of the Joining Plate fasteners.

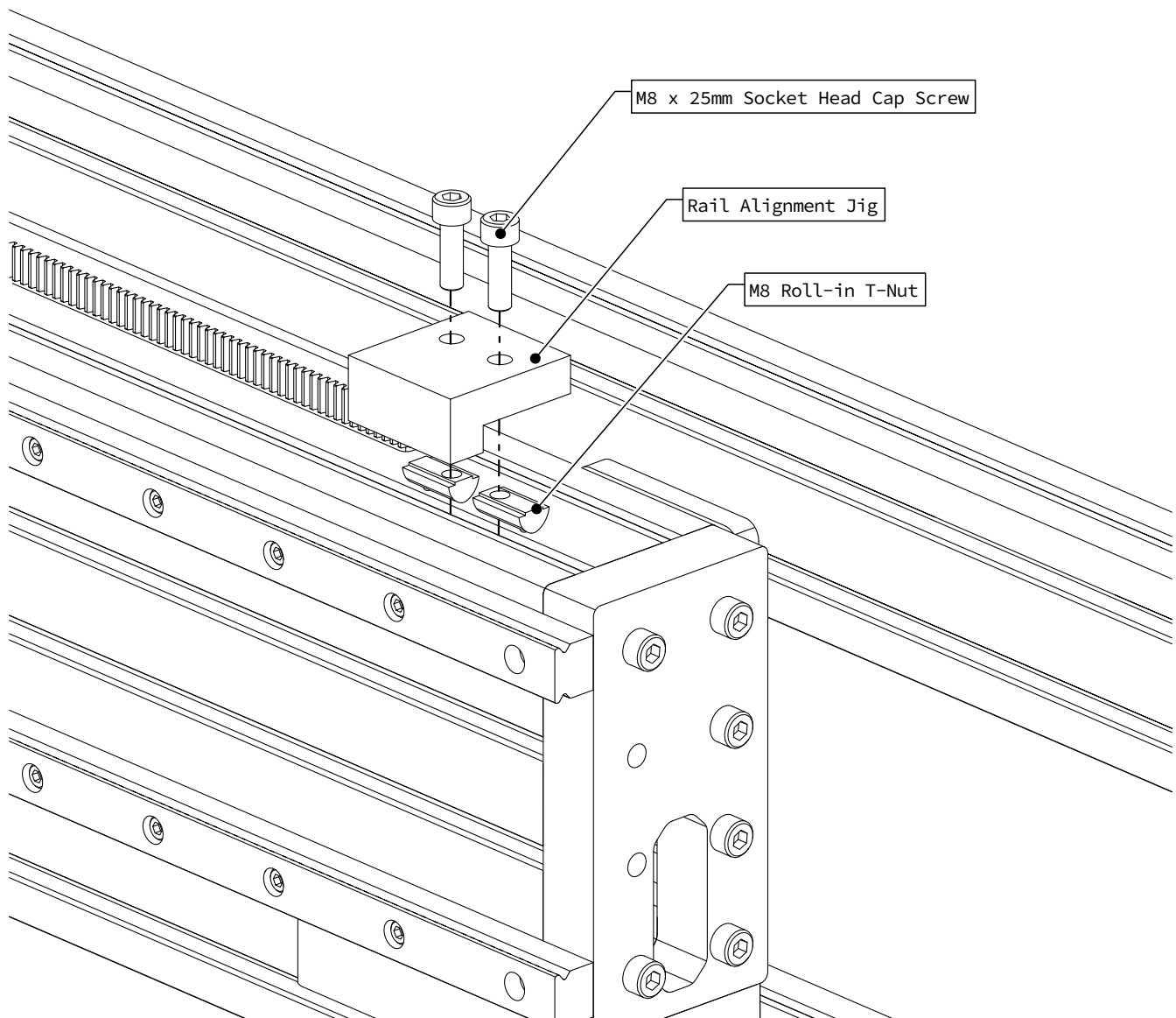
3.3.2.7



- Fully tighten all Interface Plate fasteners.

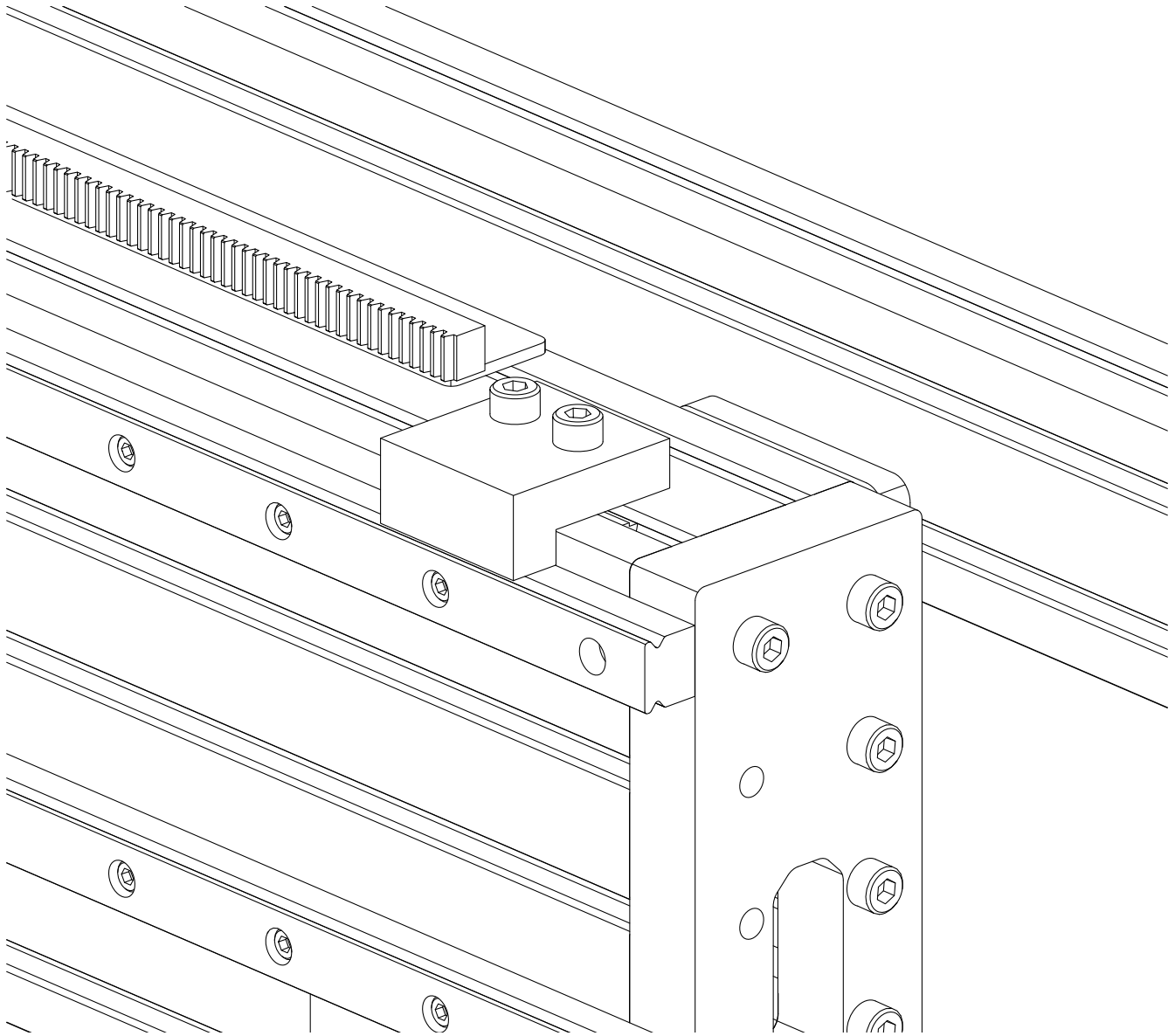
3.3.3 Linear Rail Alignment

3.3.3.1



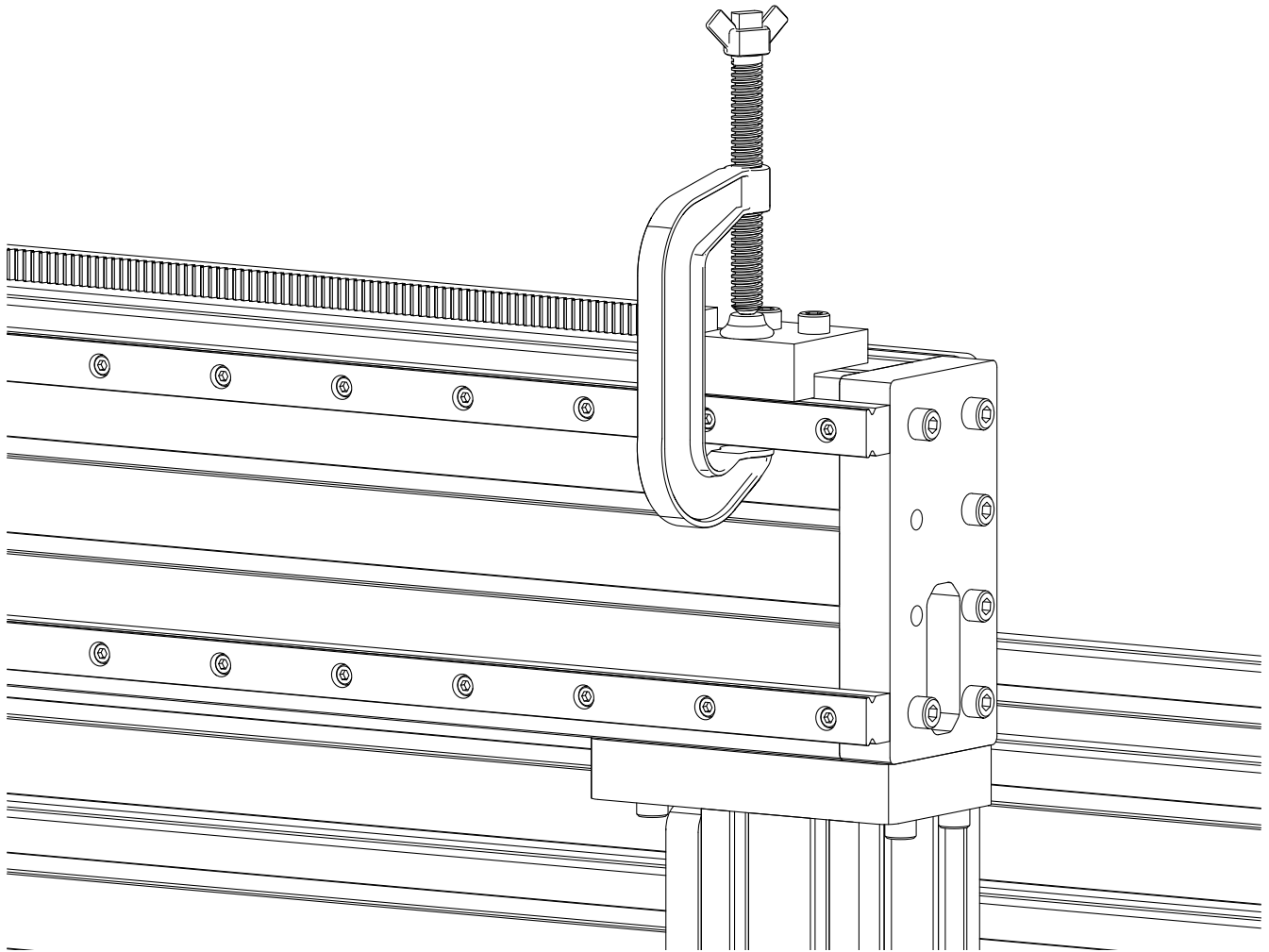
- Attach a Rail Alignment Jig at one end of the gantry as indicated.

3.3.3.2



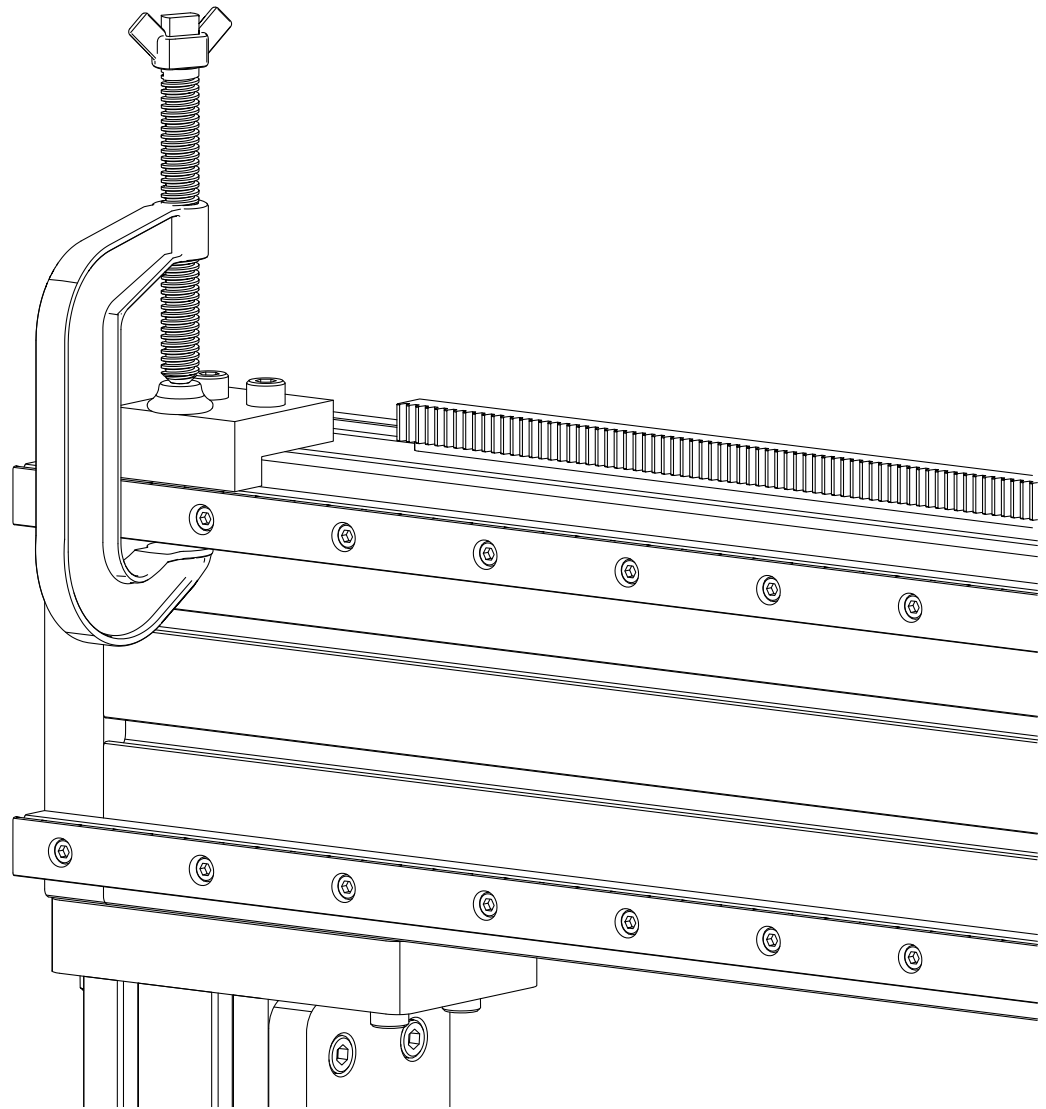
- Fully tighten the Rail Alignment Jig fasteners.

3.3.3.3



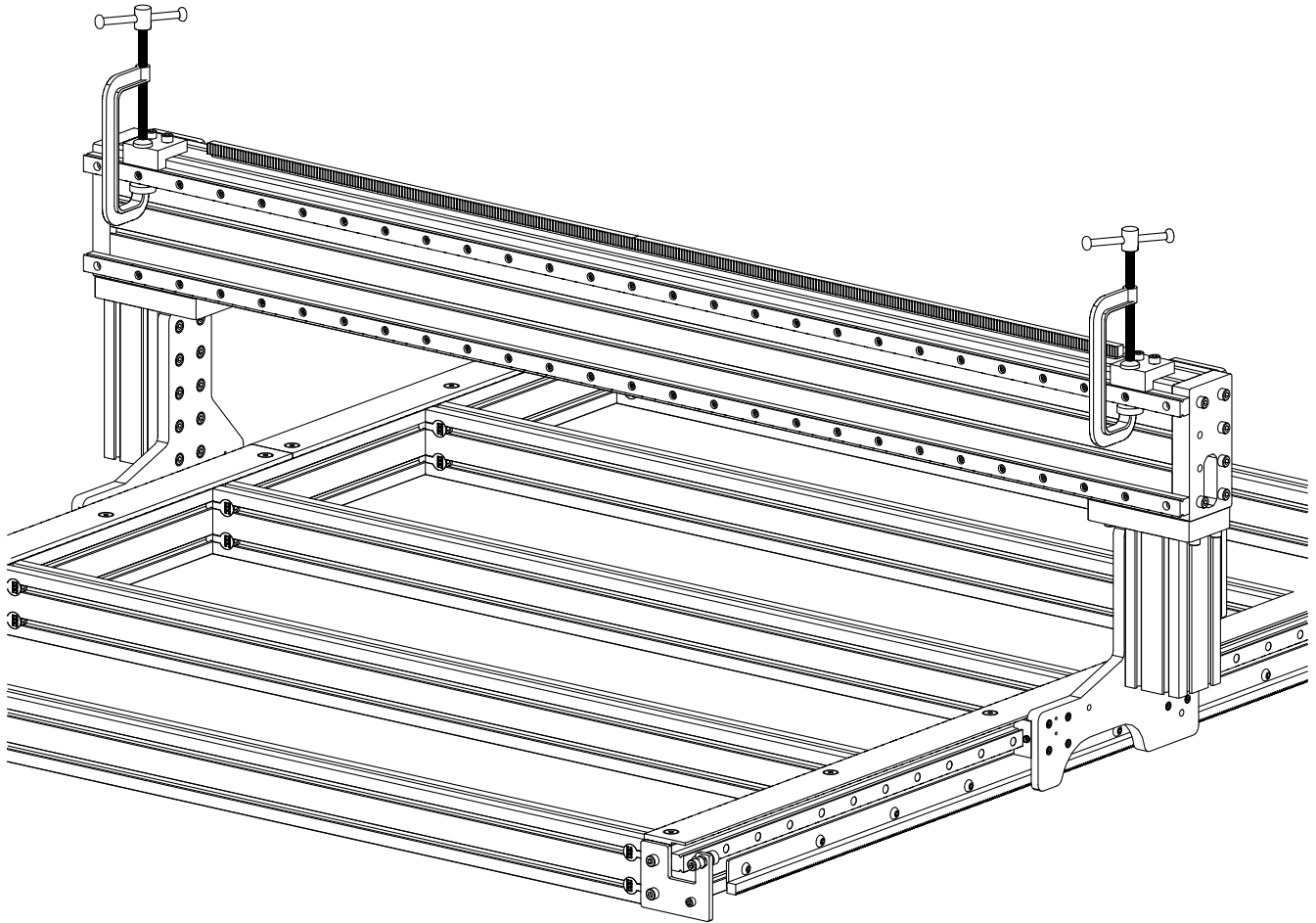
- Clamp the end of the rail to the Rail Alignment Jig as indicated.

3.3.3.4



- Repeat the previous step to clamp the other side of the rail.

3.3.3.5



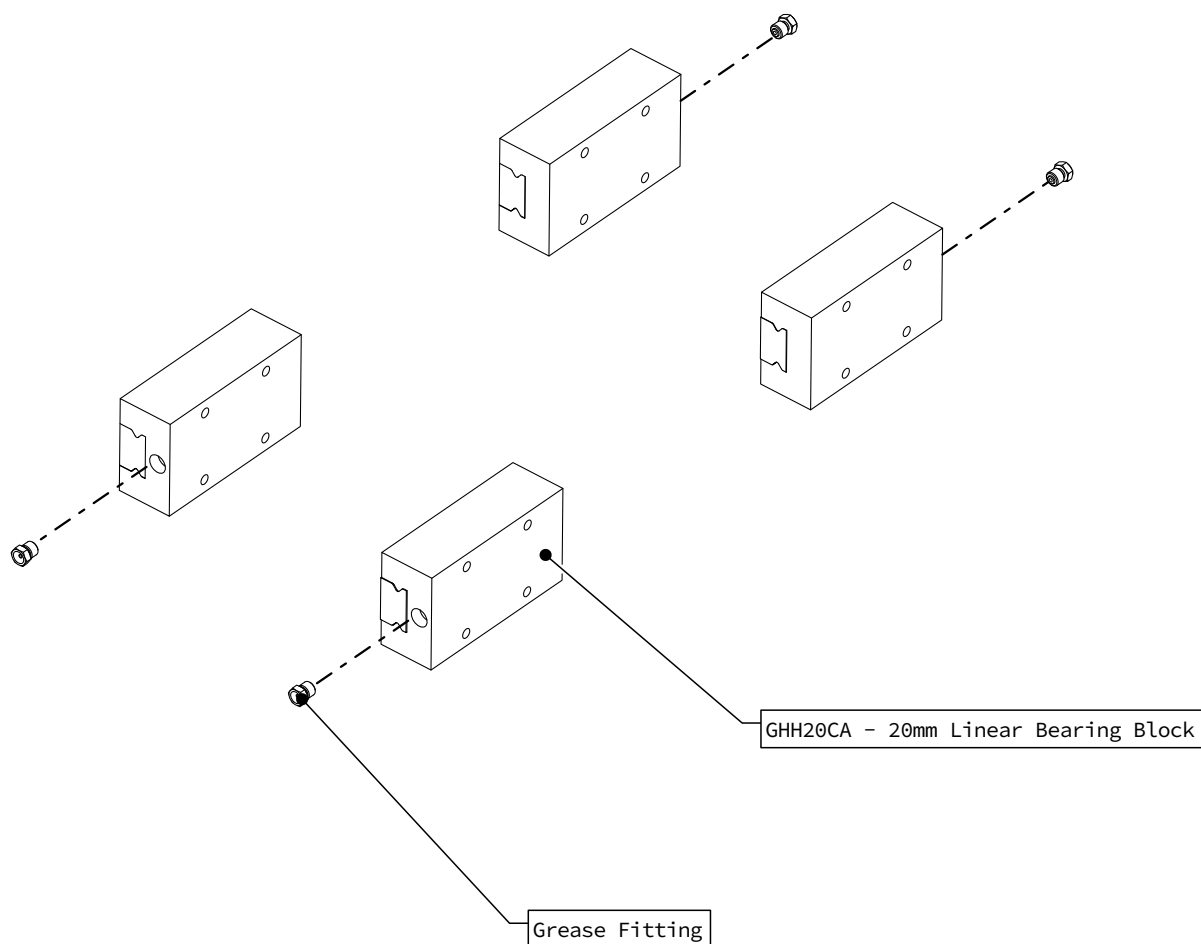
- Fully tighten the fasteners of the clamped linear rail only.
- After tightening the fasteners, remove the clamps and Rail Alignment Jigs.

Assembly Note

Partially tighten the lower linear rail fasteners. These will be fully tightened after the gantry carriage assembly is installed.

3.3.4 Linear Bearing Block Installation

3.3.4.1

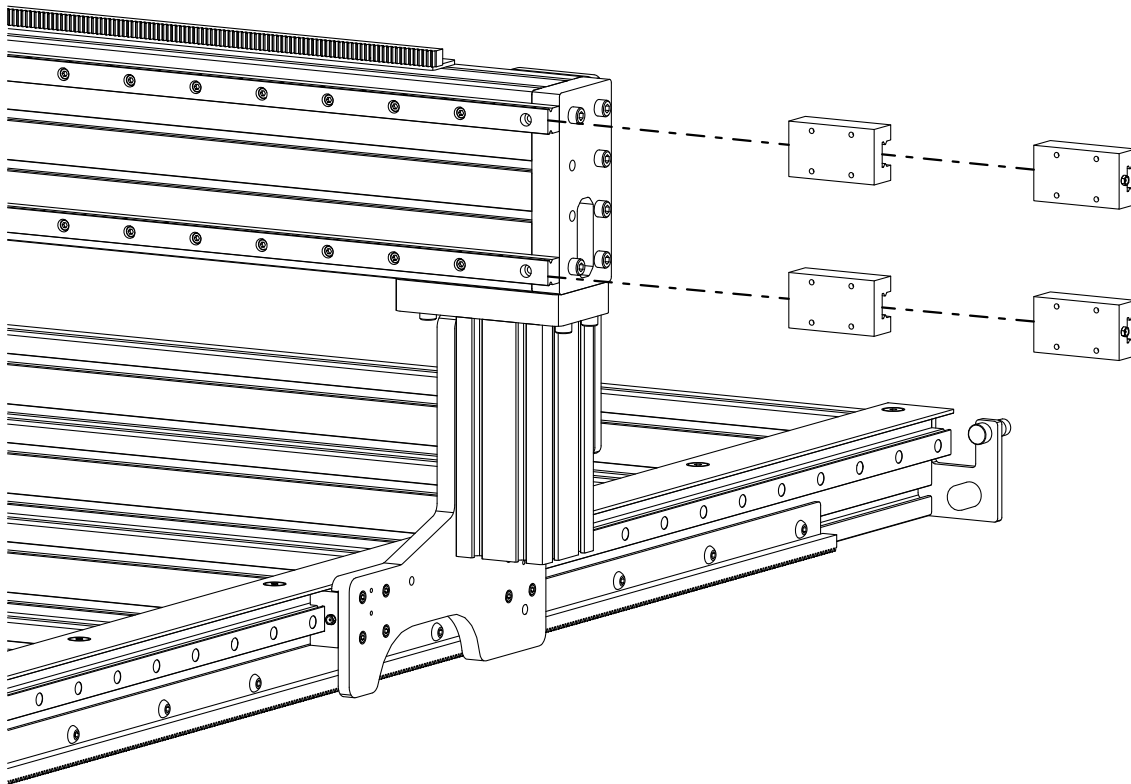


- Thread grease fittings into the linear blocks as indicated.
- Hand tighten the grease fittings.

Assembly Note

DO NOT remove the plastic bearing retainers at this time.

3.3.4.2



- Slide the linear blocks onto the rails as indicated.

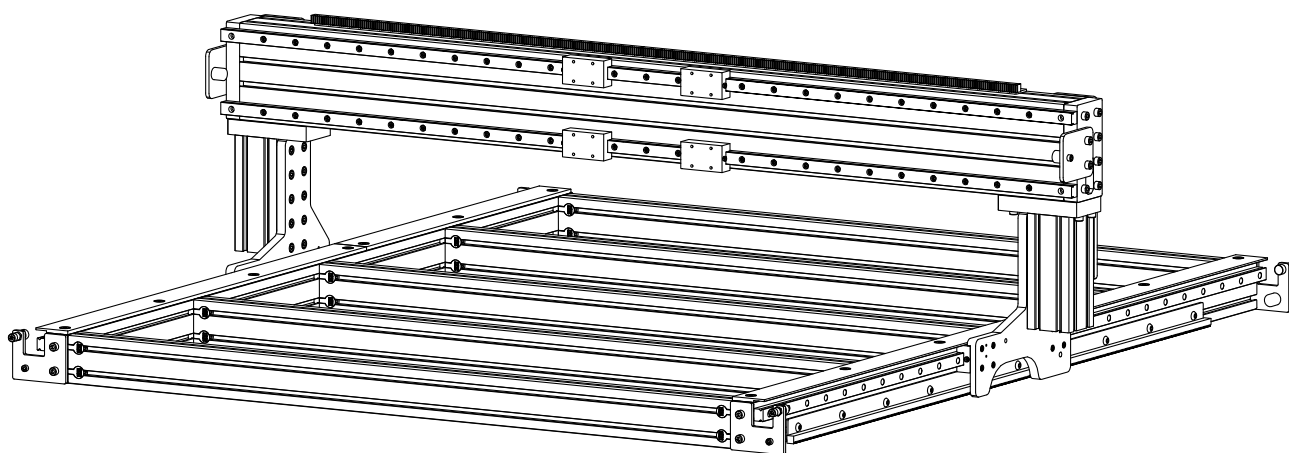
Assembly Note

Refer to Step 1.4.4.2 for the correct procedure to remove the plastic bearing retainers.

Assembly Note

Follow the same procedure as in Step 1.4.4.3 to grease the linear blocks.

3.4 Gantry Bumpers & Sensor Flags



Parts and Tools Required

The following parts and tools will be used in Section 3.4

QTY	Part/Description	Packaged In
1	CRP831-00-19.1 Gantry Axis Bumper Kit: - (2) CRP831-01 Bumper Plate - (2) Rubber Bumper - (2) M6 x 20mm Socket Head Cap Screw - (4) M8 x 50mm Socket Head Cap Screw	CRP830 Gantry Kit
1	CRP831-02-00 Gantry Sensor Flag Kit: - (4) M8 Roll-in T-Nut - (4) M8 x 25mm Socket Head Cap Screw - (2) CRP831-02 Sensor Flag	CRP830 Gantry Kit

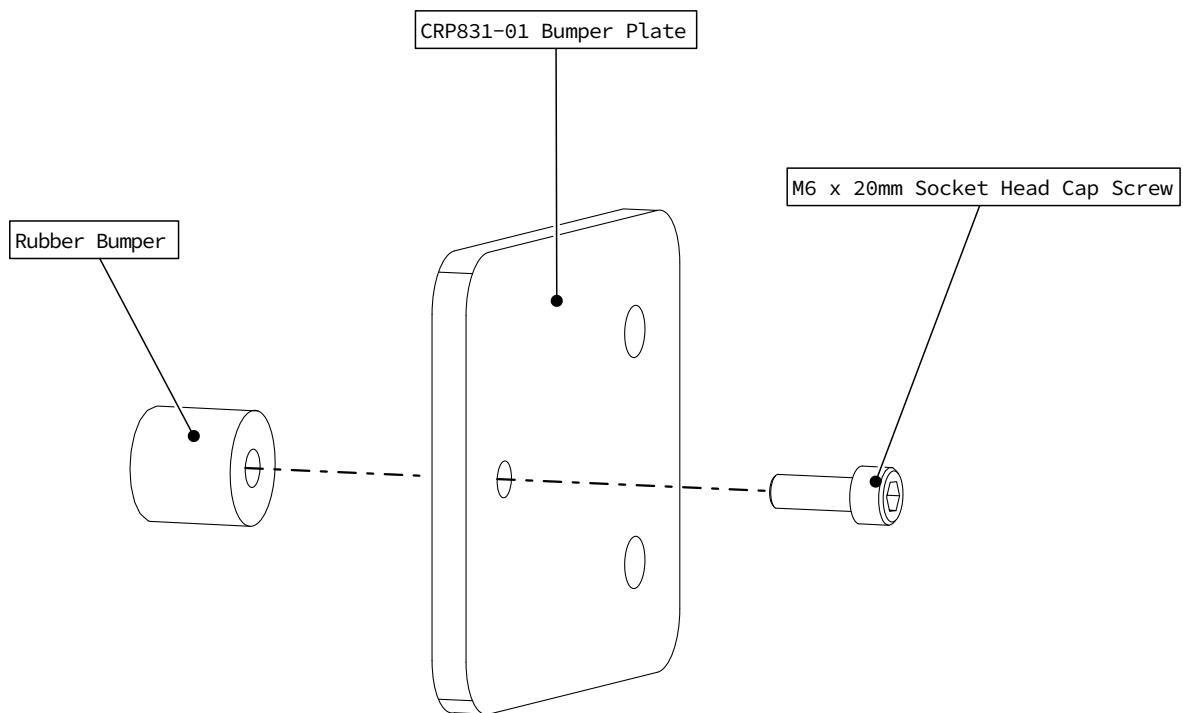
Required Tools:

- 5mm Allen Wrench
- 6mm Allen Wrench
- Adjustable Wrench



3.4.1 Bumper Assembly

3.4.1.1



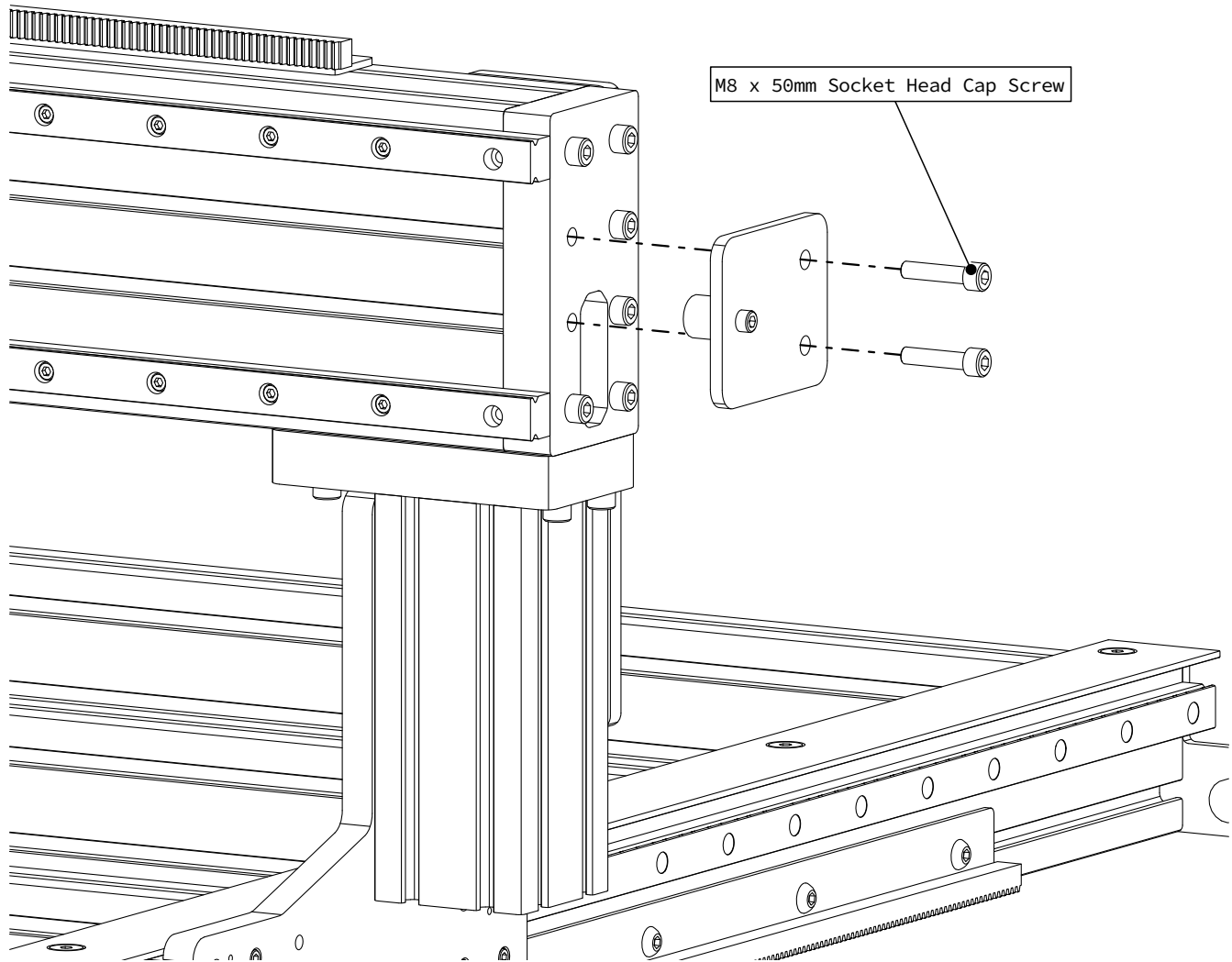
- Attach the rubber bumper to the bumper plate as indicated.

Assembly Note

Fully tighten the bumper until it is seated against the bumper plate.

3.4.2 Bumper Installation

3.4.2.1

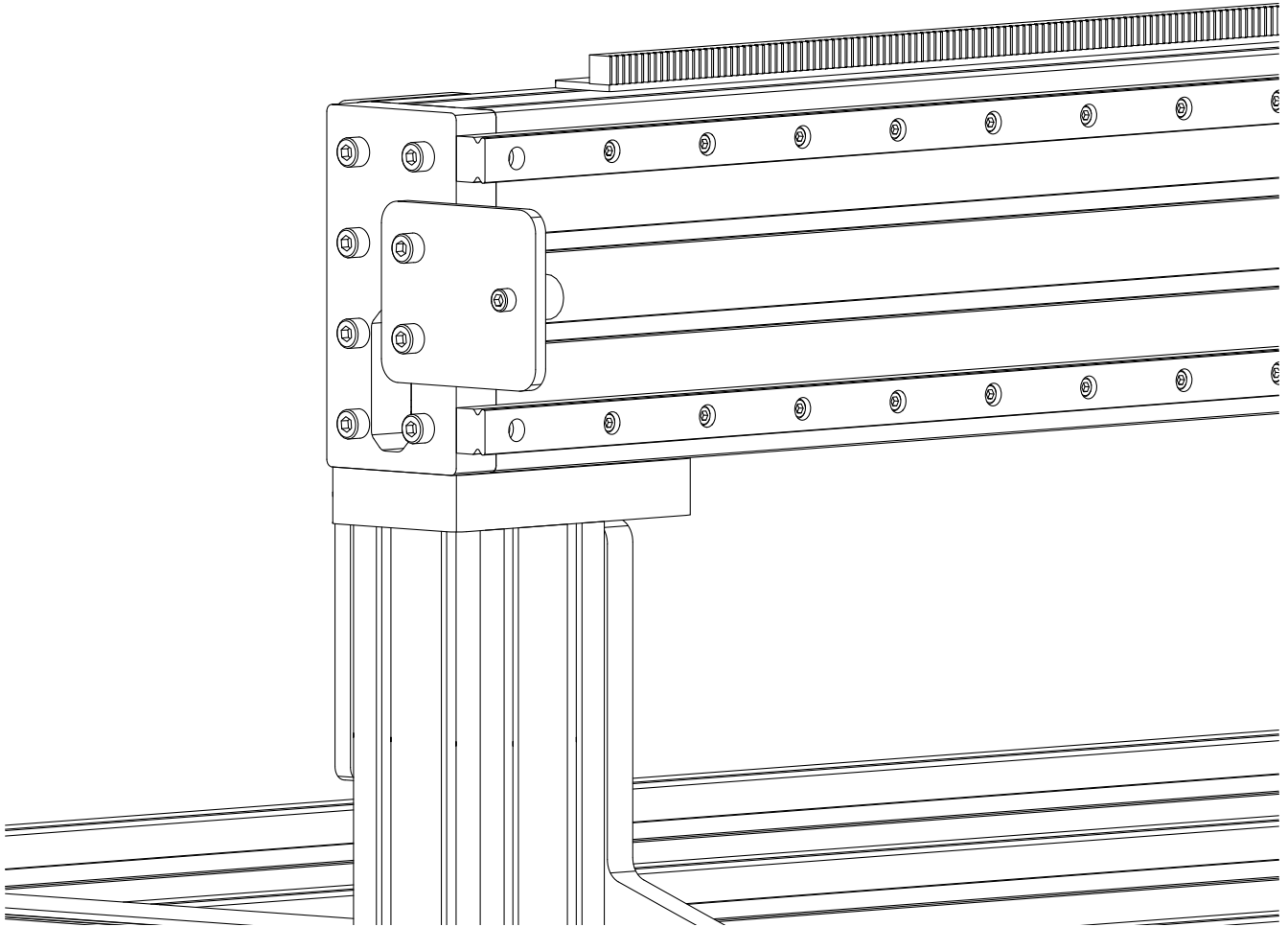


- Attach the assembled bumper plate to the gantry end cap as indicated.

Assembly Note

Ensure the rubber bumper is facing inwards.

3.4.2.2



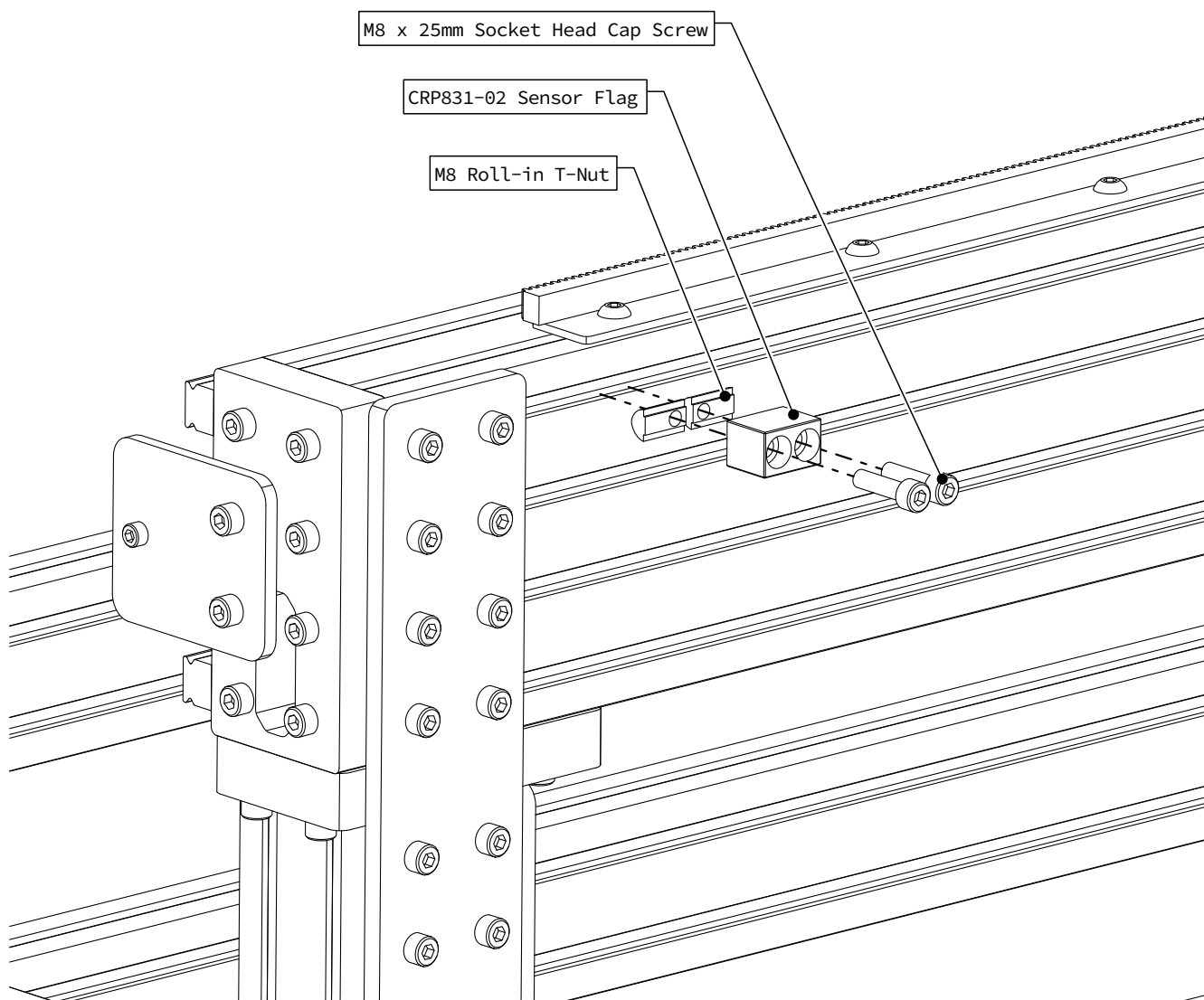
- Repeat this process to assemble and install a bumper on the other side of the gantry.

3.4.3 Gantry Sensor Flags

Extended Gantry Option

If you purchased an extended gantry, use Steps 3.4.3.5 through 3.4.3.8 to install the gantry sensor flags.

3.4.3.1

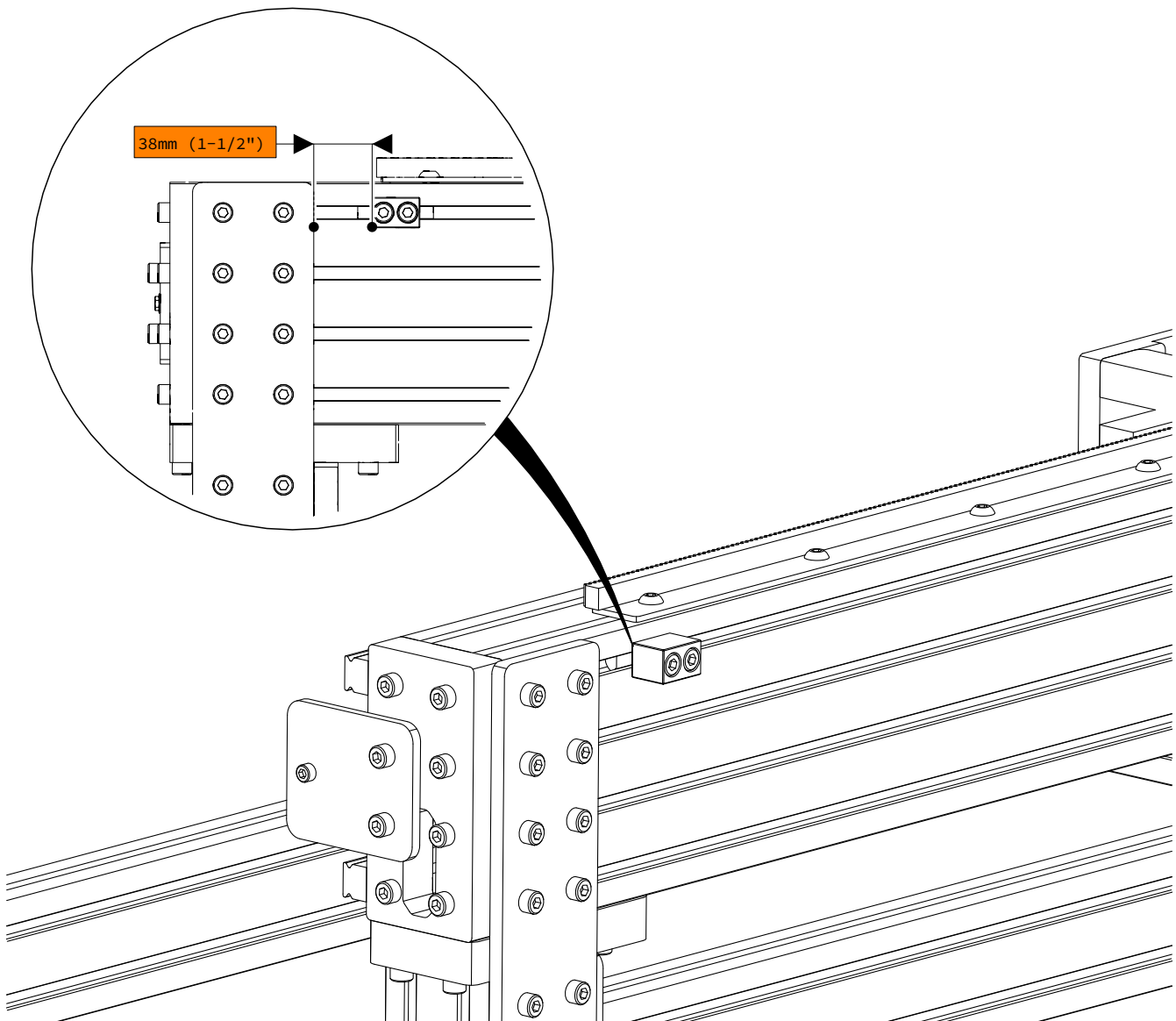


- Attach a sensor flag to the gantry extrusion as indicated, partially tightening the fasteners.

Assembly Note

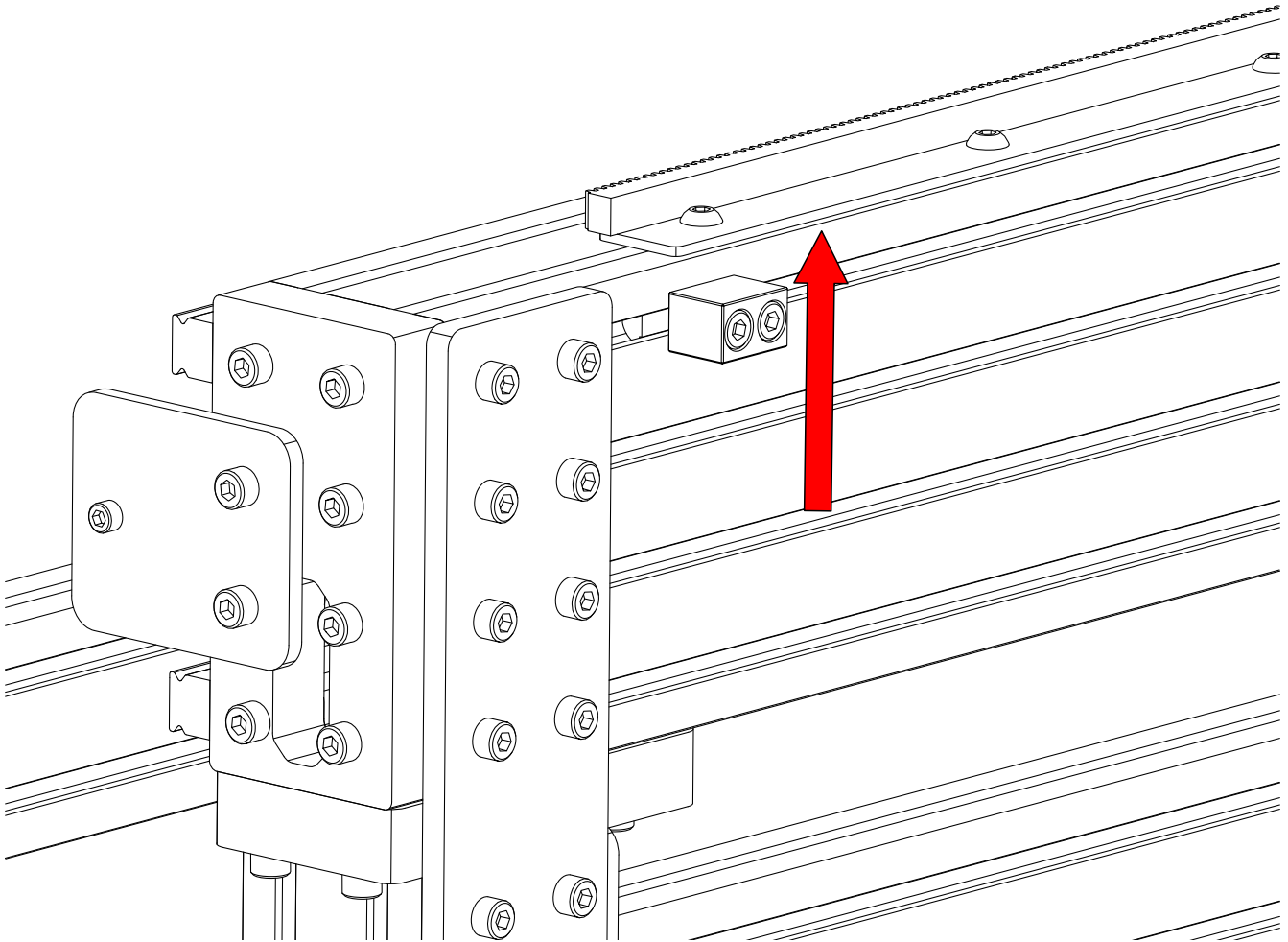
Use the upper t-slot on the back of the gantry extrusion.

3.4.3.2



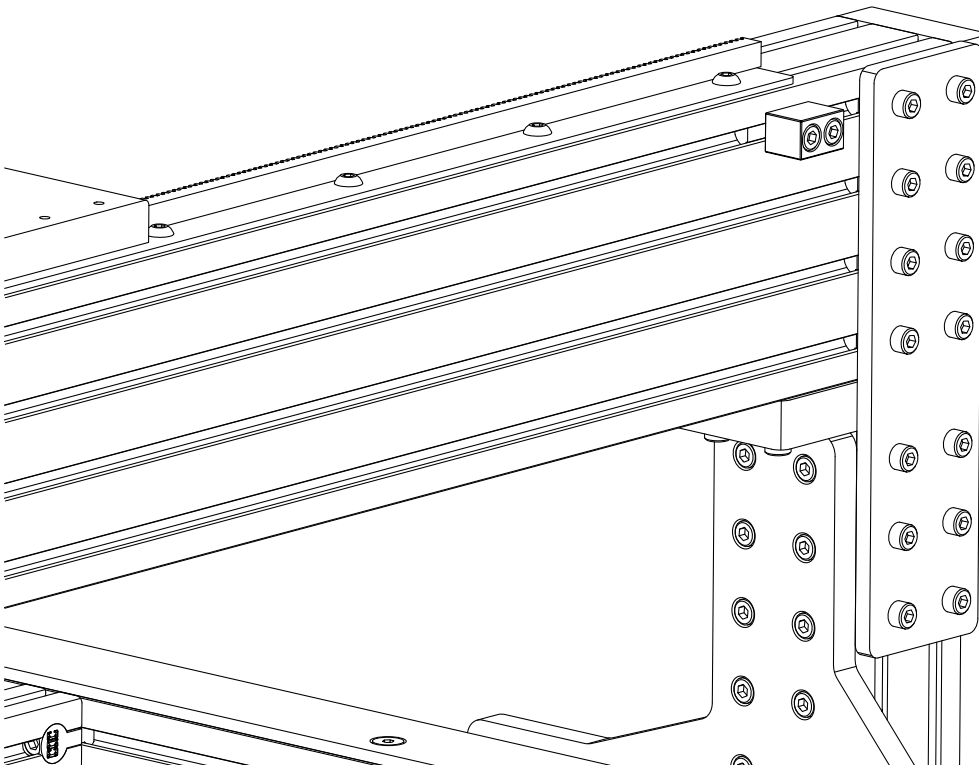
- Position the sensor flag 38mm (1-1/2") from the joining plate as indicated.

3.4.3.3



- Bias the sensor flag towards the top of the gantry extrusion as indicated.
- Fully tighten the fasteners.

3.4.3.4

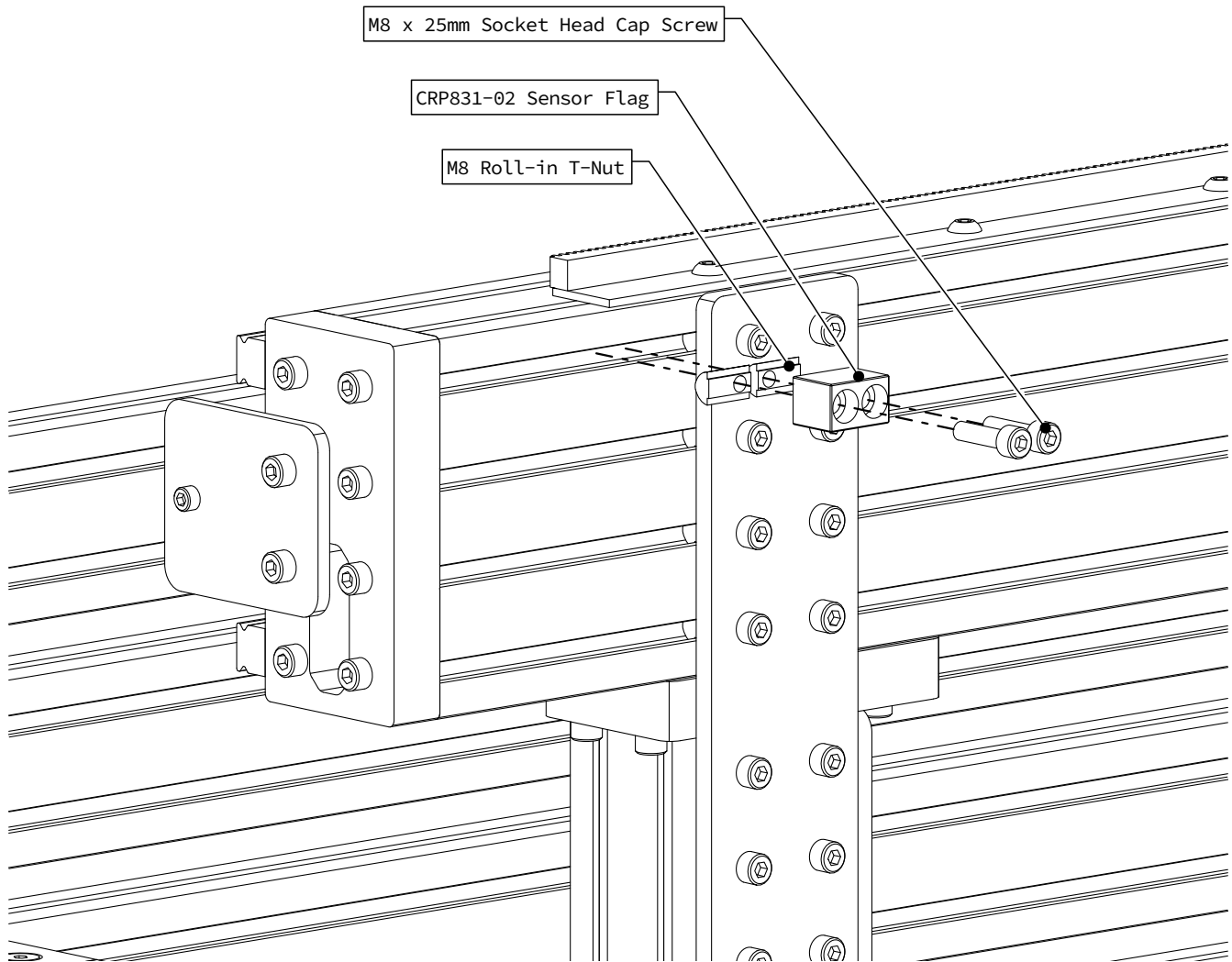


- Repeat this process on the other side of the gantry.

3.4.3.5

Extended Gantry Option

This step is applicable only for those who purchased an extended gantry.



- Attach a sensor flag to the gantry extrusion as indicated.
- Partially tighten the fasteners.

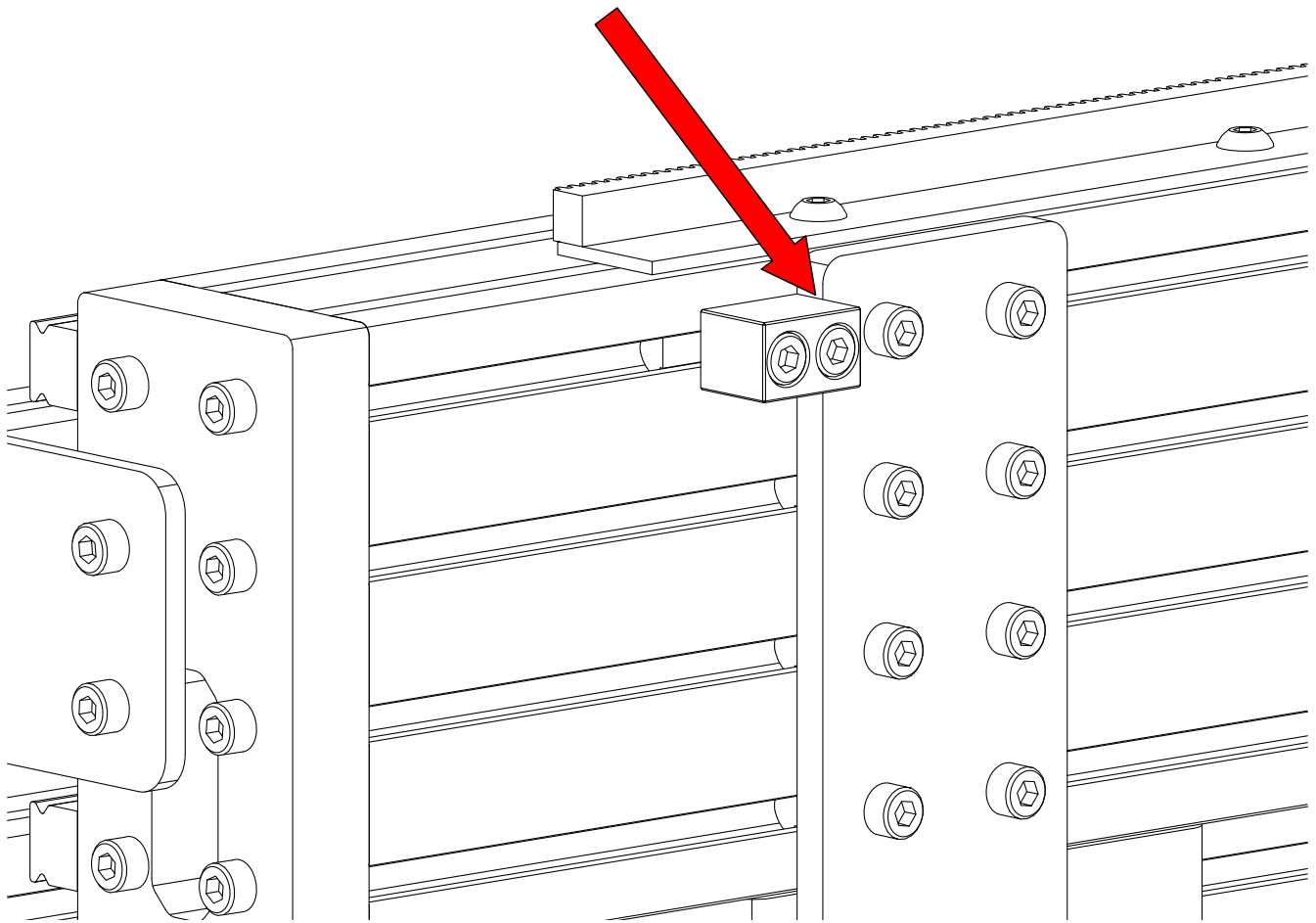
Assembly Note

Use the upper t-slot on the back of the gantry extrusion.

3.4.3.6

Extended Gantry Option

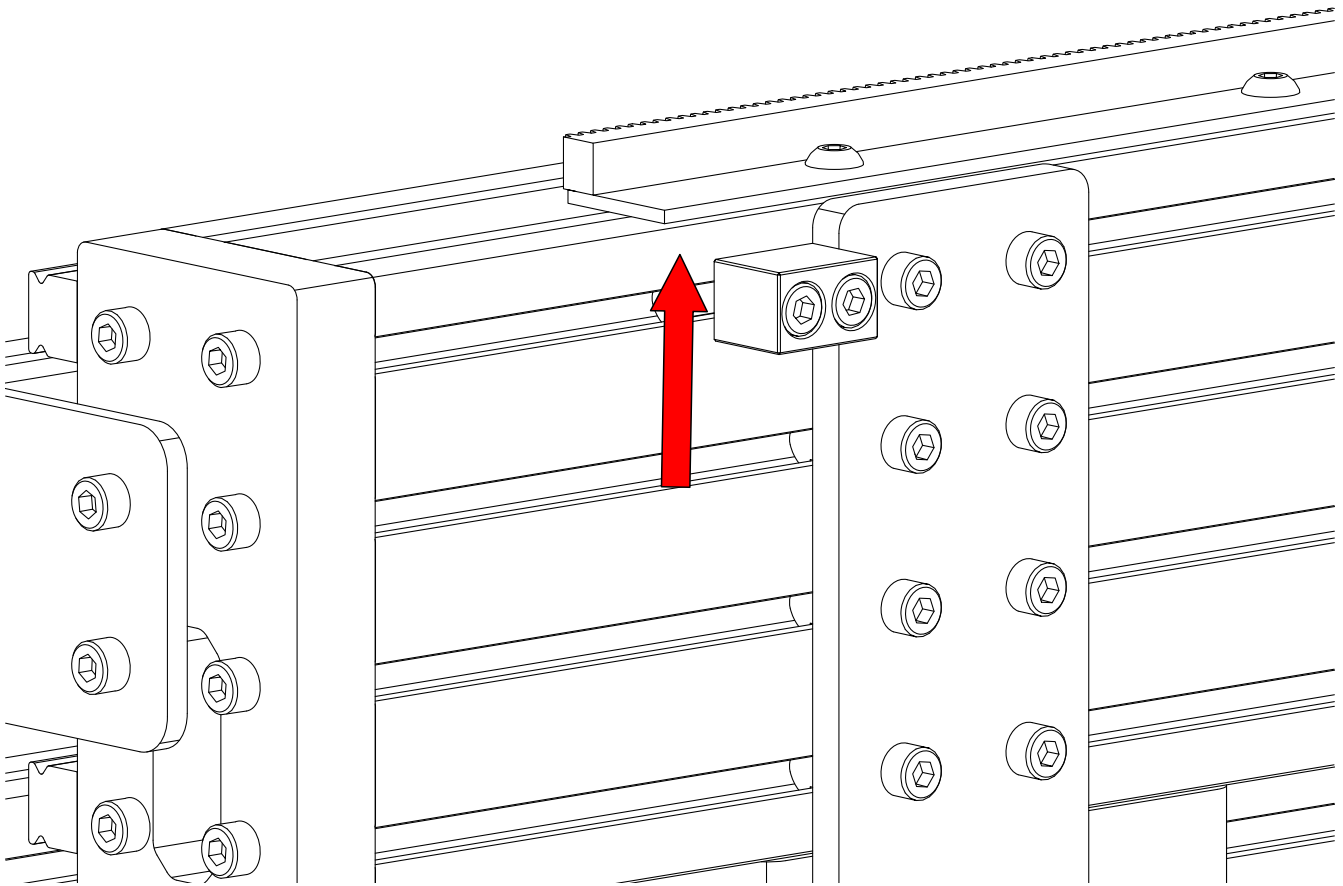
This step is applicable only for those who purchased an extended gantry.



- Position the sensor flag flush against the joining plate as indicated.

Extended Gantry Option

This step is applicable only for those who purchased an extended gantry.

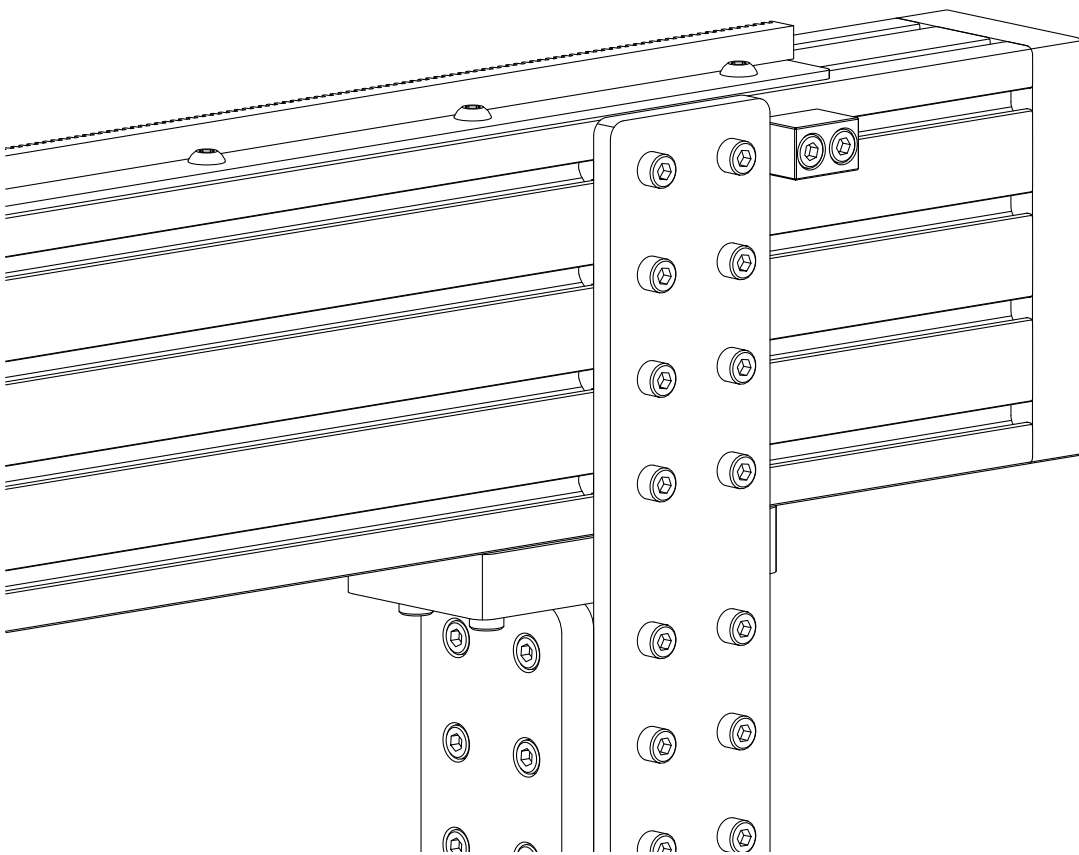


- Bias the sensor flag towards the top of the gantry extrusion as indicated.
- Fully tighten the fasteners.

3.4.3.8

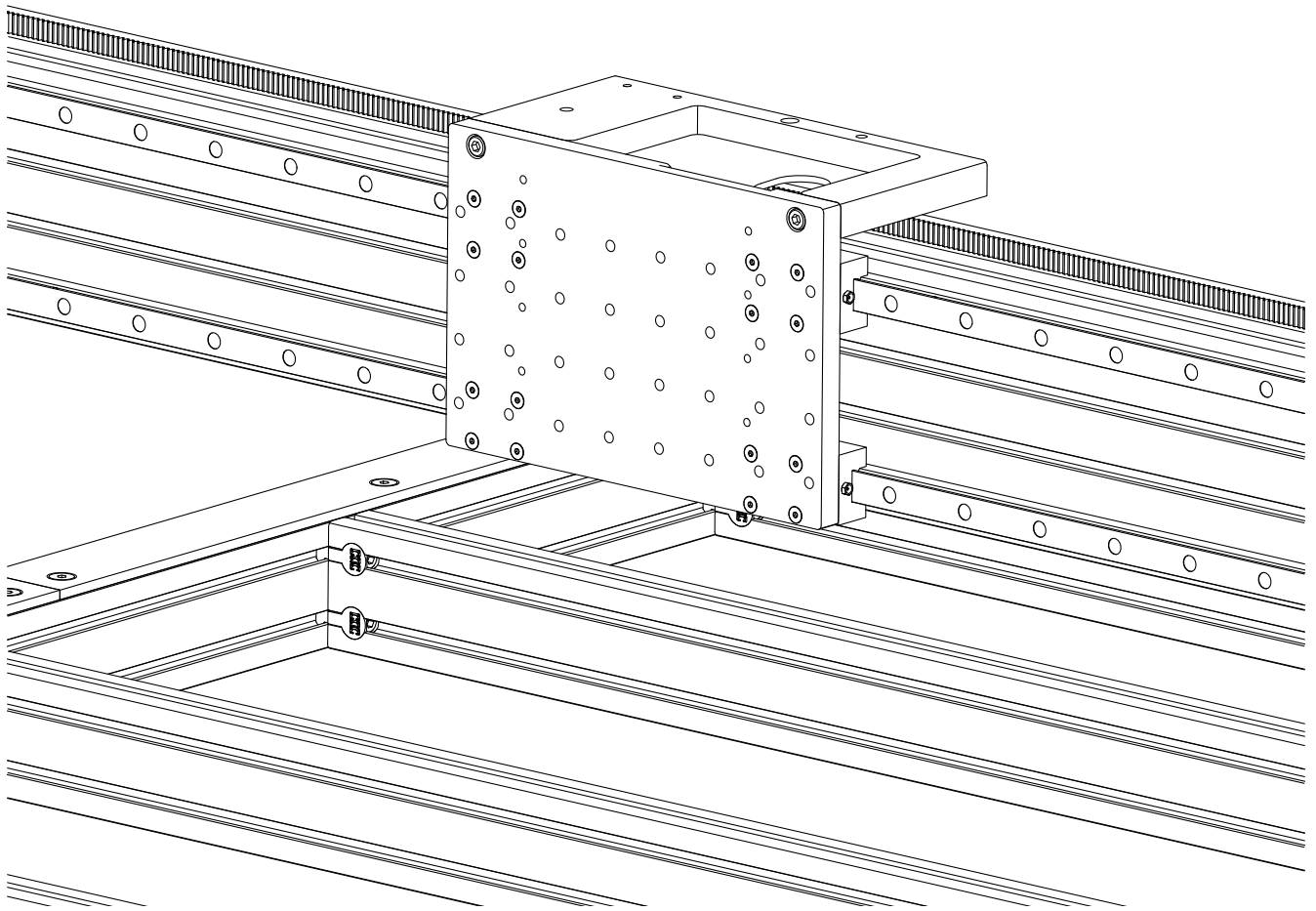
Extended Gantry Option

This step is applicable only for those who purchased an extended gantry.



- Repeat this process on the other side of the gantry.

3.5 Gantry Carriage



Parts and Tools Required

The following parts and tools will be used in Section 3.5

QTY	Part/Description	Packaged In
1	CRP830-01 Gantry Plate	CRP830 Gantry Kit
1	CRP830-02 Gantry R&P Plate	CRP830 Gantry Kit
1	CRP832-00-FAST: - (16) M5 x 22mm Flat Head Screw - (2) M8 x 20mm Dowel Pin - (2) M8 x 20mm Socket Head Cap Screw	CRP830 Gantry Kit

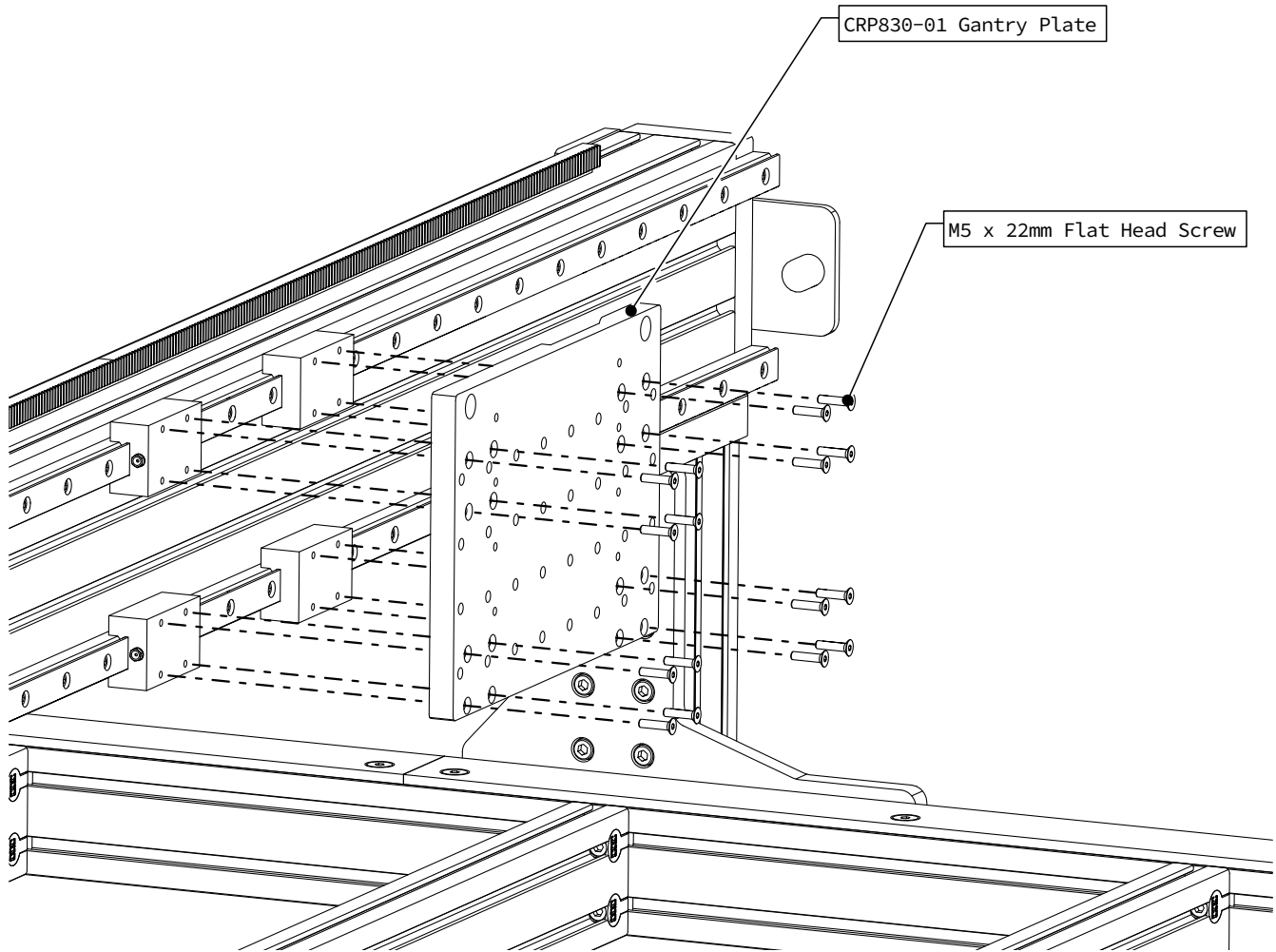
Required Tools:

- 4mm Allen Wrench
- 6mm Allen Wrench



3.5.1 Gantry Carriage Installation

3.5.1.1

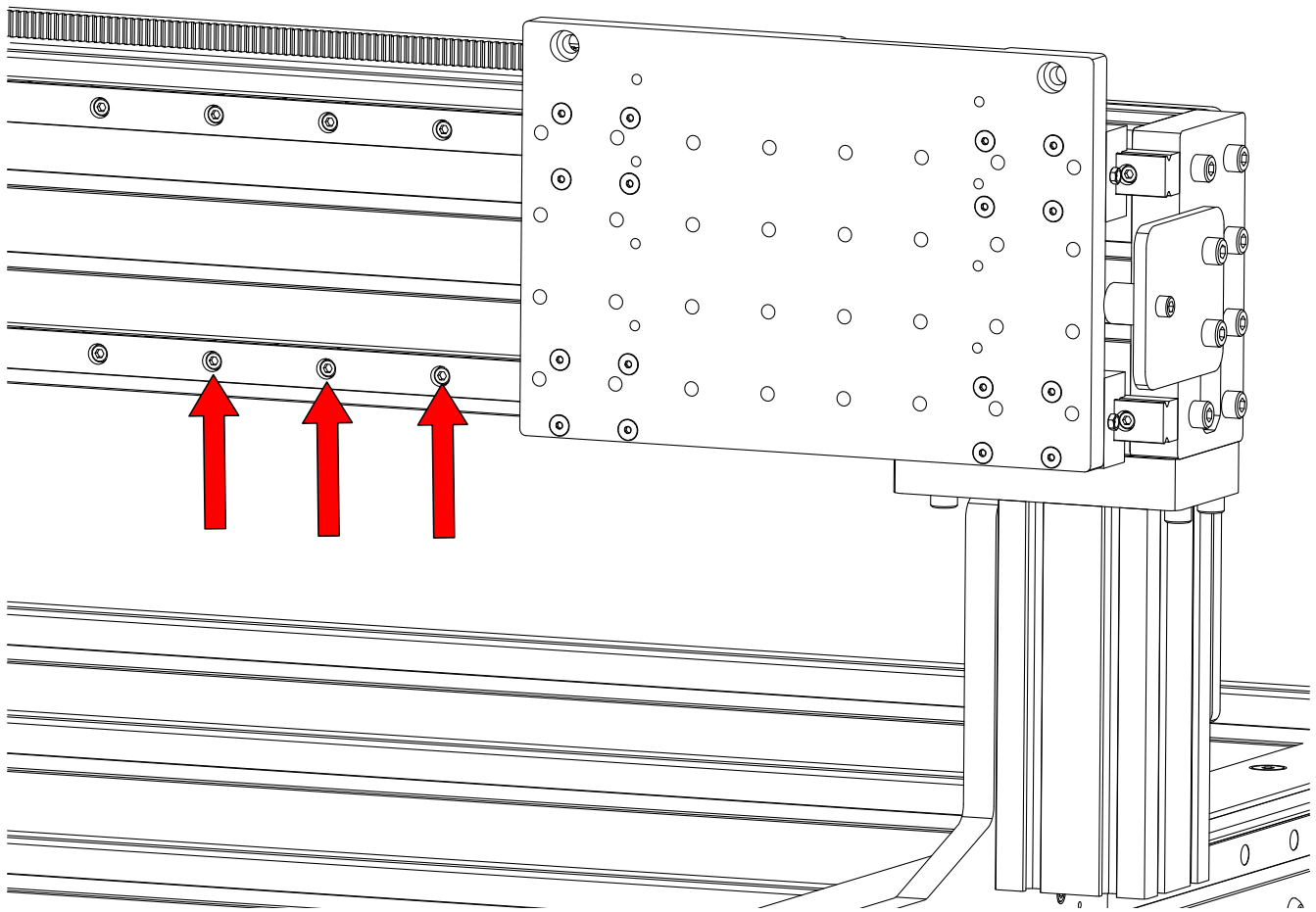


- Attach the Gantry Plate to the bearing blocks as indicated.
- Fully tighten all fasteners.

Assembly Note

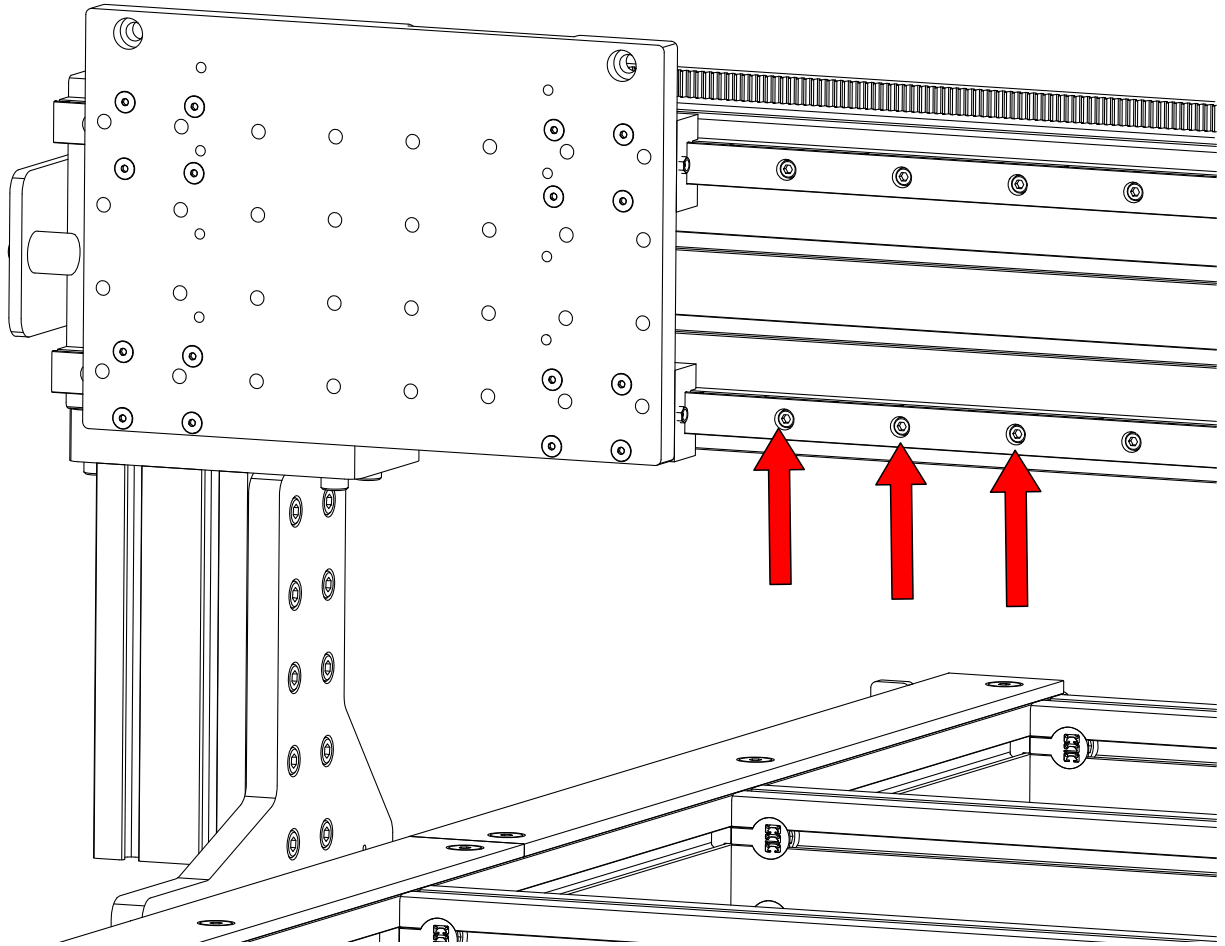
Ensure correct orientation of the Gantry Plate. The cutout on the back of the plate will be on the top and facing towards the gantry.

3.5.1.2



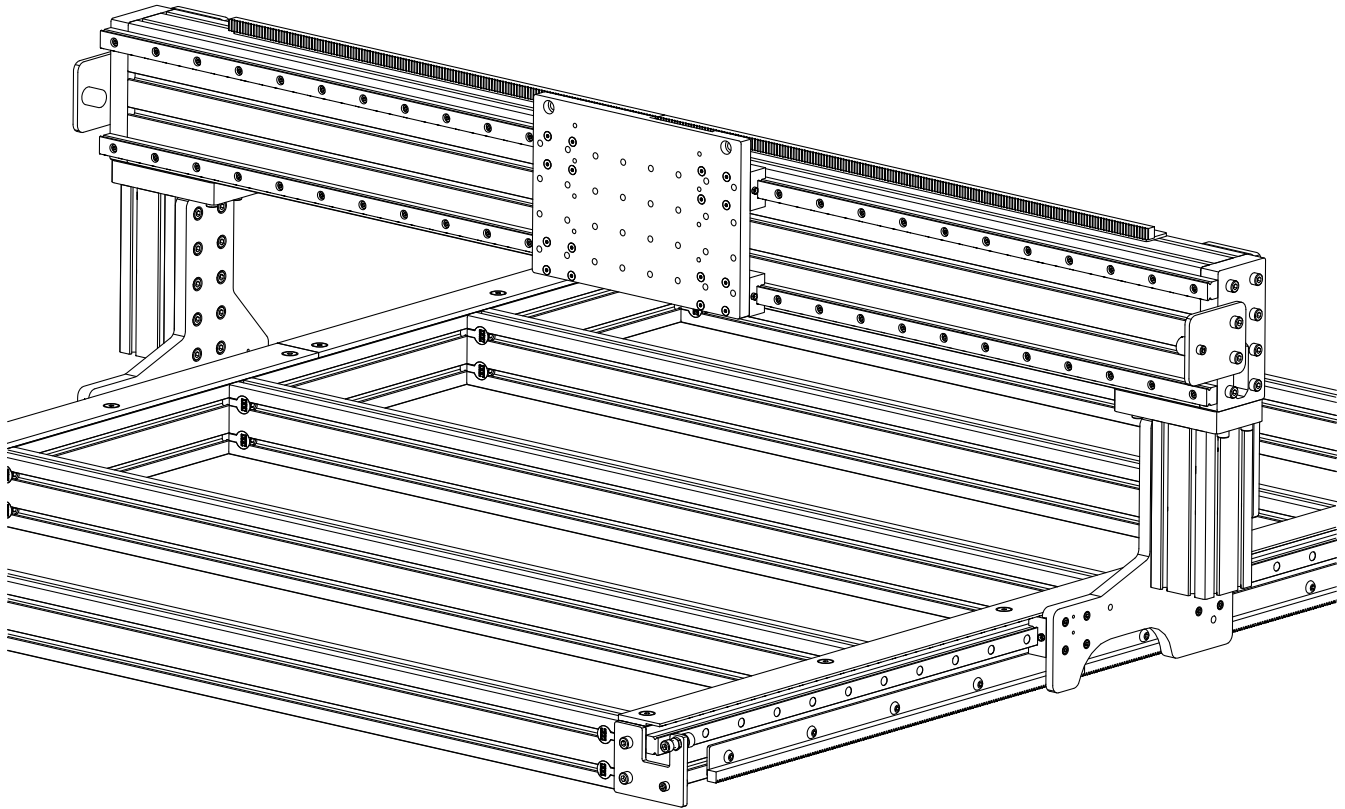
- Slide the Gantry Plate to one end of the gantry.
- Tighten the three indicated linear rail fasteners near the Gantry Plate.

3.5.1.3



- Slide the Gantry Plate to the other end of the gantry.
- Tighten the three indicated linear rail fasteners near the Gantry Plate.

3.5.1.4

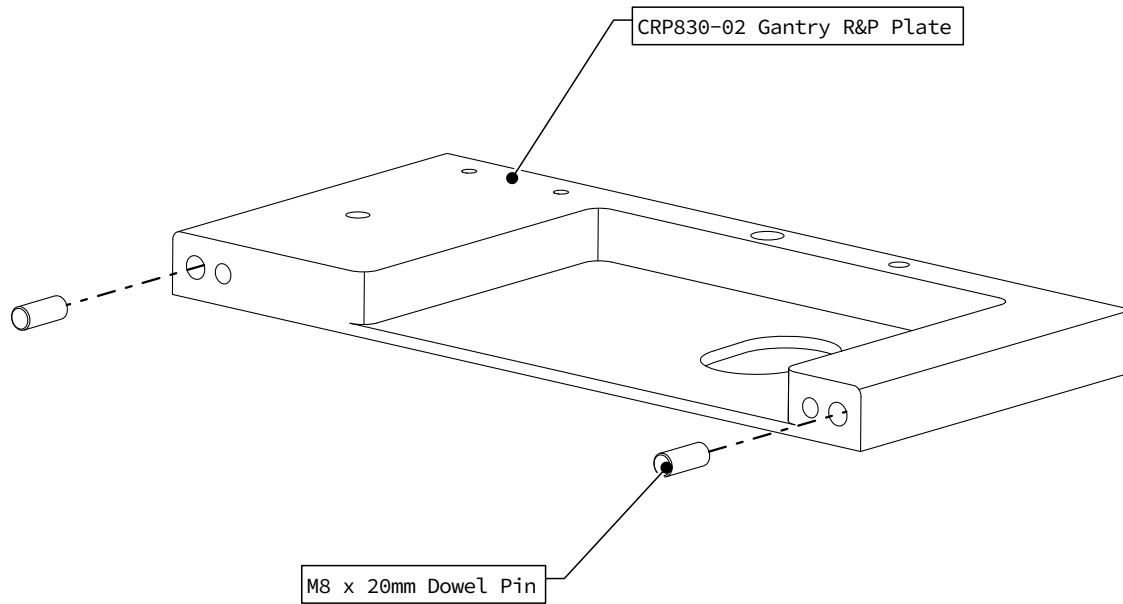


- Fully tighten the remaining lower linear rail fasteners.

Assembly Note

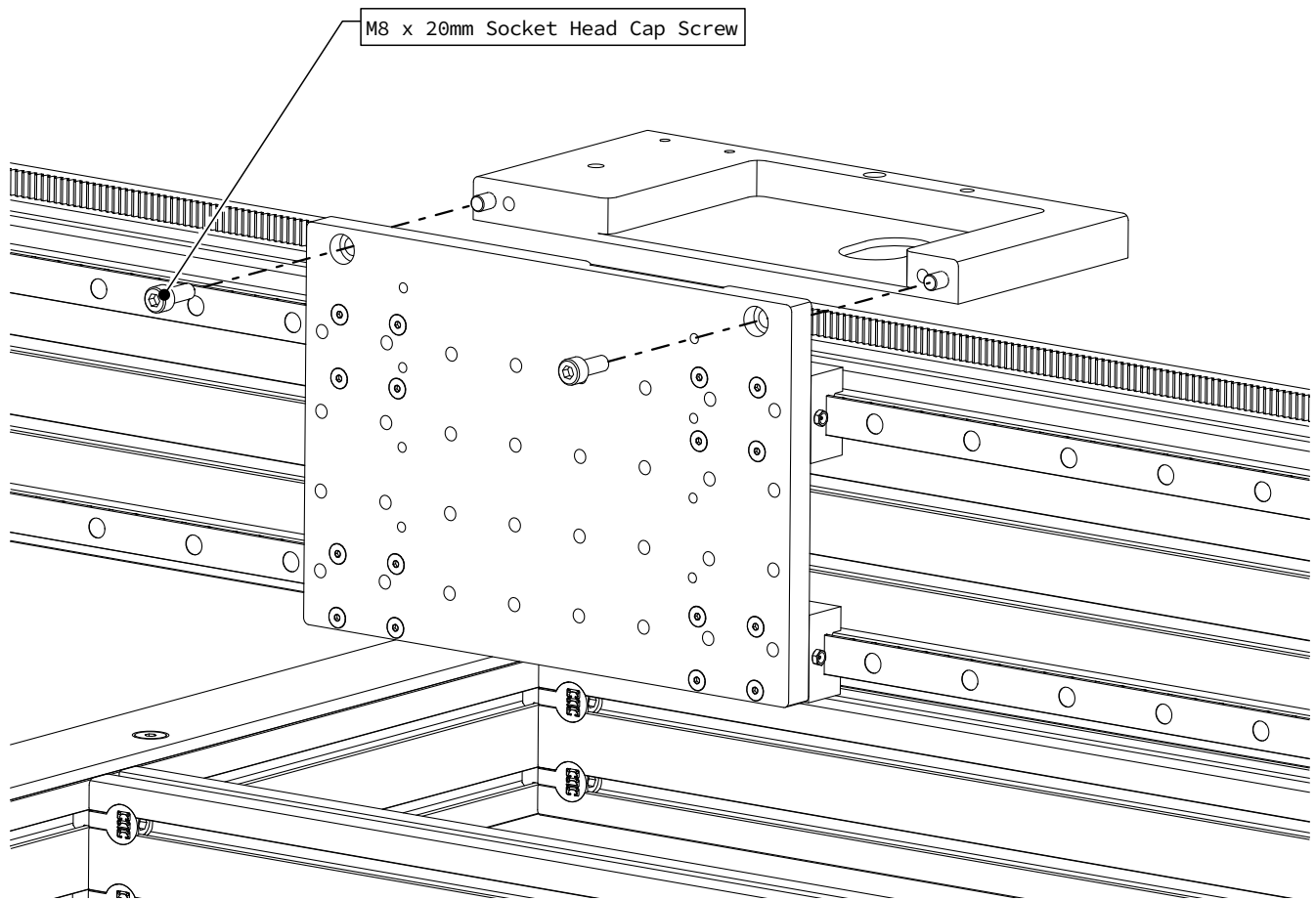
You will need to move the Gantry Plate along the gantry to access all of the fasteners. During this operation it will be normal to feel some resistance.

3.5.1.5



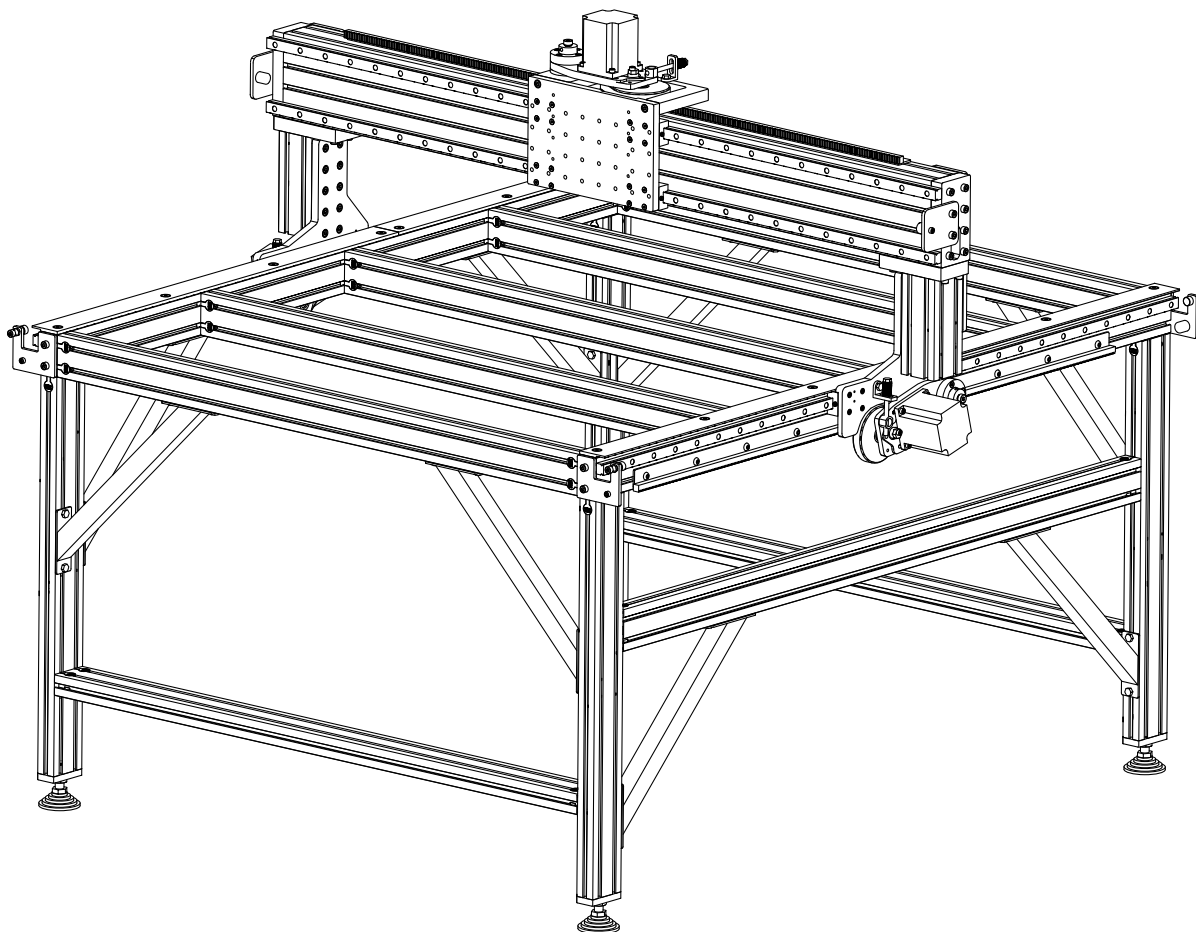
- Install dowel pins into the Gantry R&P Plate as indicated.

3.5.1.6

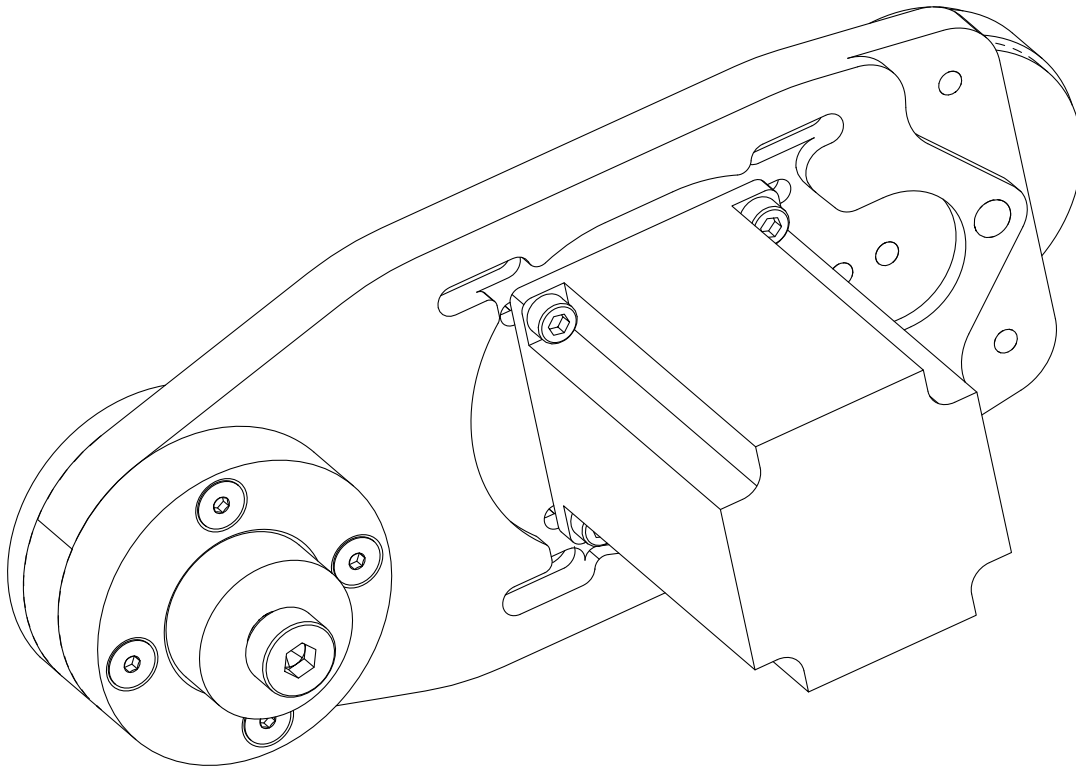


- Attach the Gantry R&P Plate to the Gantry Plate as indicated.
- Fully tighten the fasteners.

Section 4: Rack and Pinion Drive



4.1 NEMA 23 Drive Assembly



i Section Note

Skip to **Section 4.2** if you are using a NEMA 34 electronics package.

i Section Note

Simplified models will not depict gear teeth on the motor pulleys or drive spindles

Parts and Tools Required

The following parts and tools will be used in Section 4.1

QTY	Part/Description	Packaged In
3	NEMA 23 Motor	Electronics
3	CRP201-09 - NEMA 23 Motor Pulley	CRP320-00-S375-19.1
3	R&P Drive Plate	CRP320-00-S375-19.1
3	CRP325-00 - PRO NEMA 23 Spindle Assembly	CRP320-00-S375-19.1
3	CRP320-00-FAST-375-19.1: - (4) M5 x 14mm Socket Head Cap Screw (Total QTY: 12) - (4) M5 Hex Nut (Total QTY: 12) - (1) NEMA 23 R&P Drive Belt (Total QTY: 3) - (1) 5/16" Flat Washer (Total QTY: 3) - (1) M6 x 22mm Socket Head Cap Screw (Total QTY: 3) - (1) Cam Tensioner (Total QTY: 3) <i>Remaining parts from this kit used in Section 4.3</i>	CRP320-00-S375-19.1

Note: The fastener kit part number listed above is applicable for NEMA 23's with the default 3/8" shaft. If you purchased the 1/4" shaft version, your fastener kit part number will be CRP320-00-FAST-250-19.1 and your Rack & Pinion Drive parts will be located in the box labeled CRP320-00-S250-19.1.

Required Tools:

- 3/32" Allen Wrench
- 1/4" Allen Wrench
- 4mm Allen Wrench
- 5mm Allen Wrench
- Adjustable Wrench
- Tape Measure

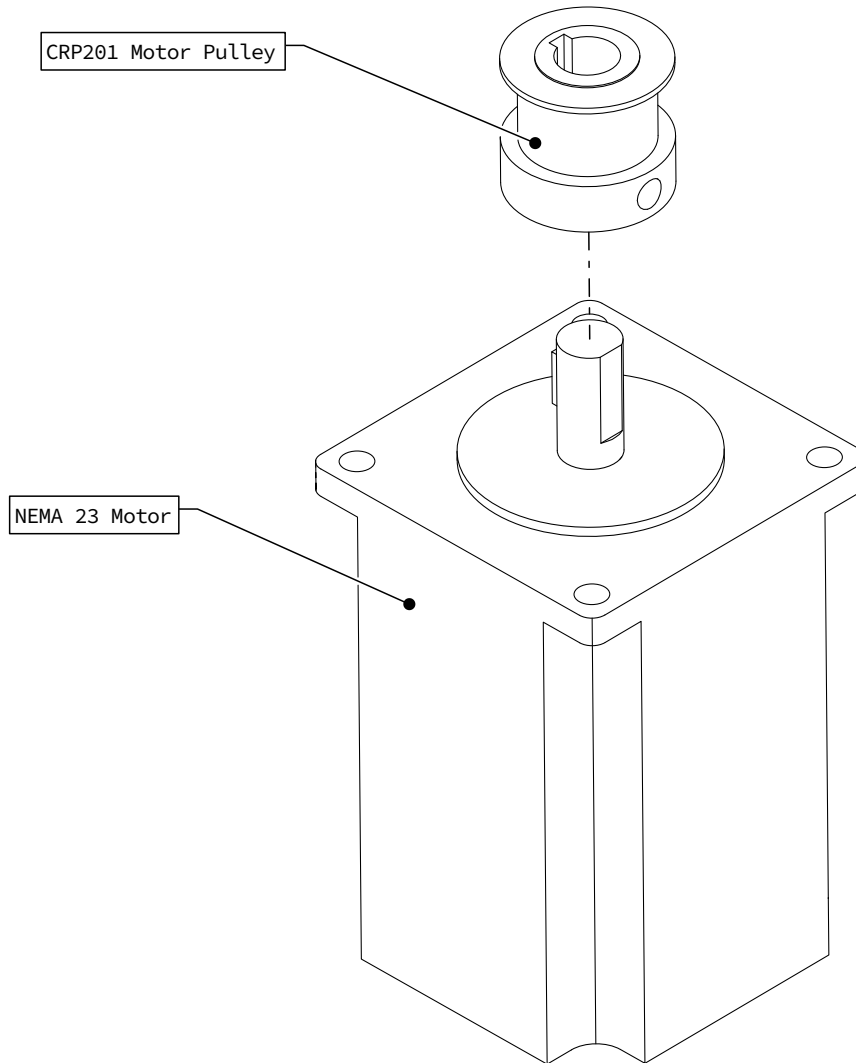
Recommended Additional Tools:

- 16mm Combination Wrench



4.1.1 Motor Assembly

4.1.1.1

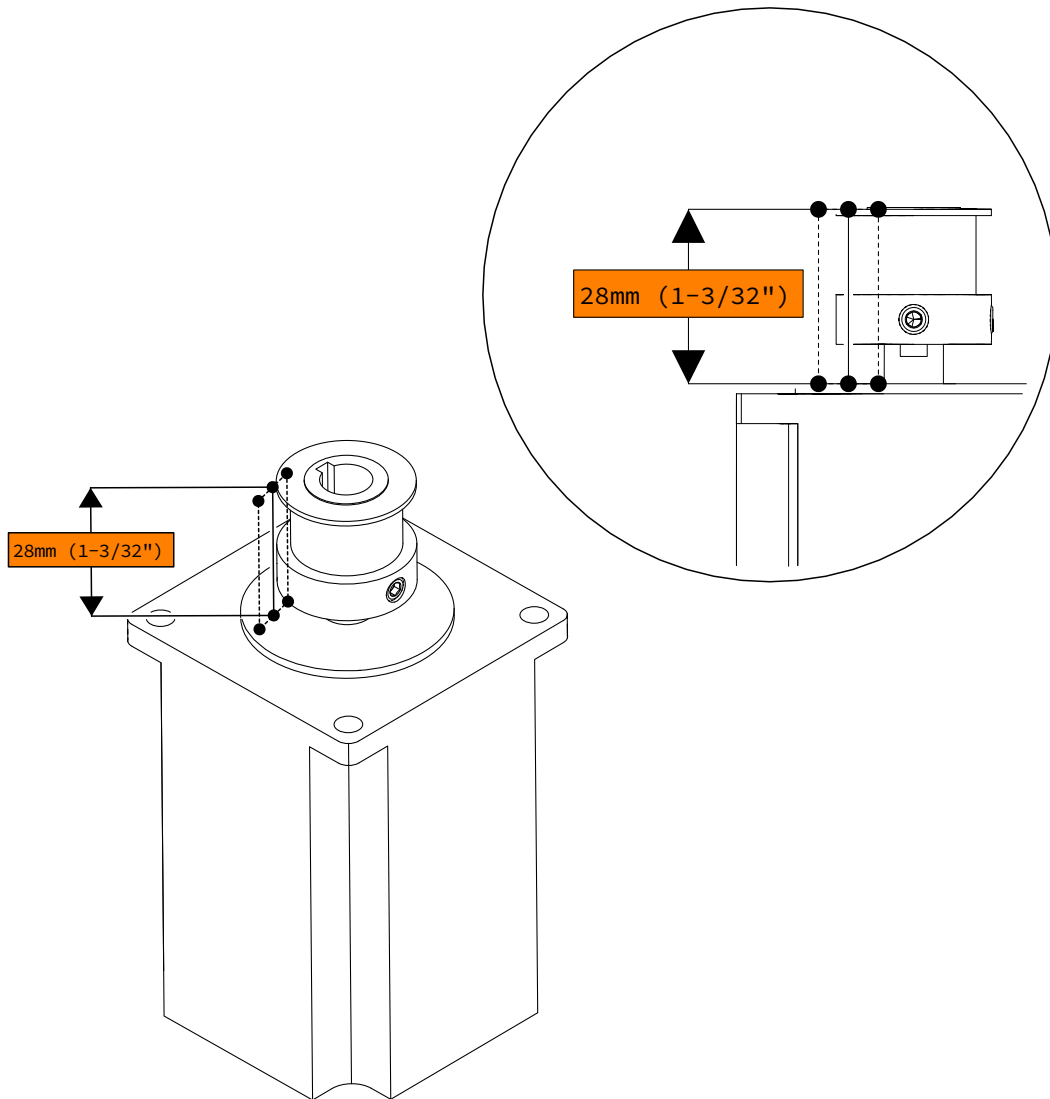


- Slide the motor pulley onto the motor shaft as indicated.

Assembly Note

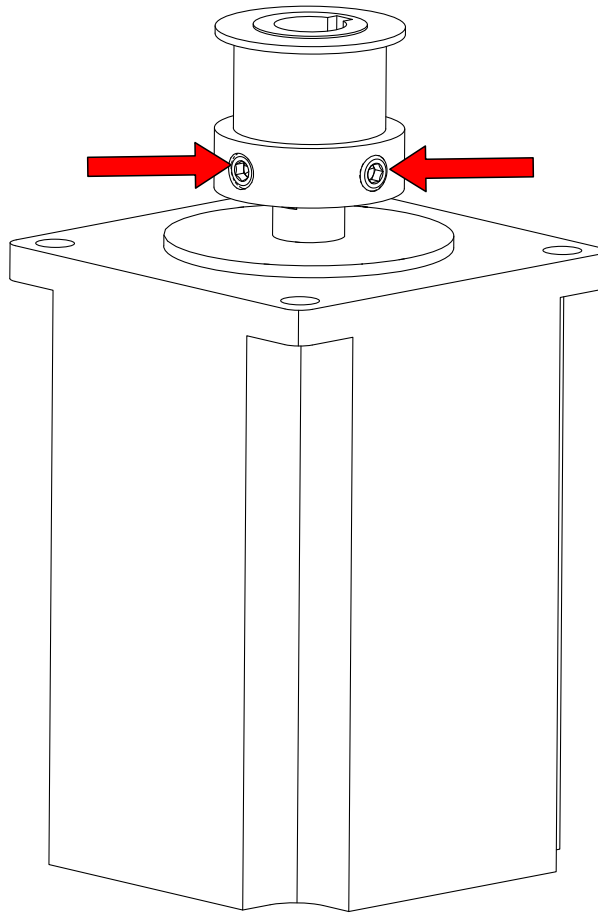
Ensure the motor keys are installed into the shaft prior to installing the pulley. Motor keys will either be pre-installed or included in a small bag.

4.1.1.2



- Adjust the motor pulley such that the top of the pulley is 28mm (1-3/32") from the motor flat.

4.1.1.3



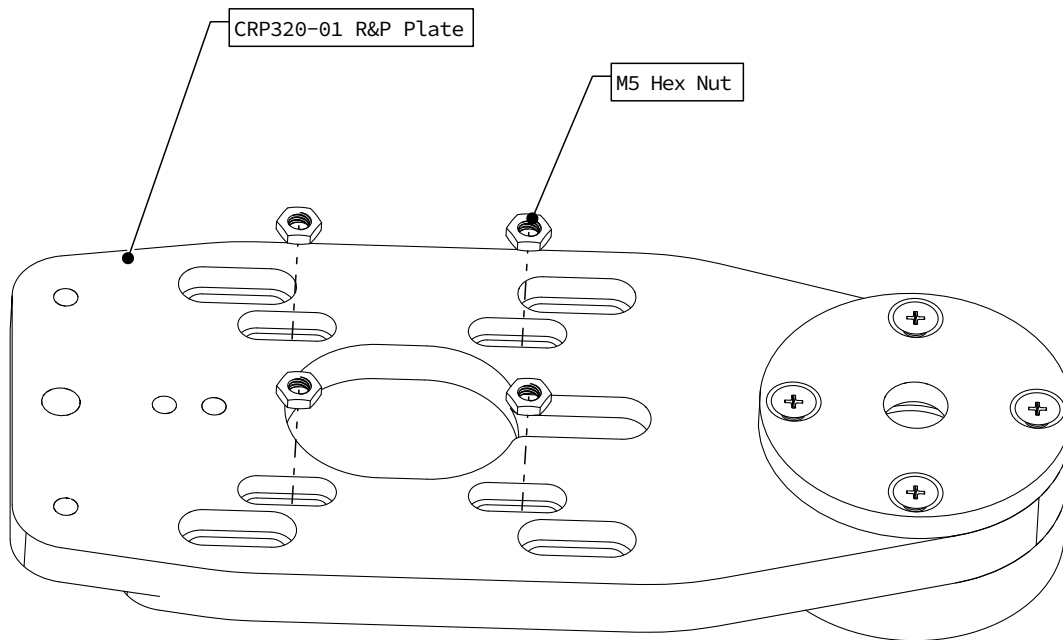
- Apply blue thread locker to the set screws. (Not Included)
- Fully tighten the set screws.

Assembly Note

Do not over tighten, but ensure fasteners are completely seated.

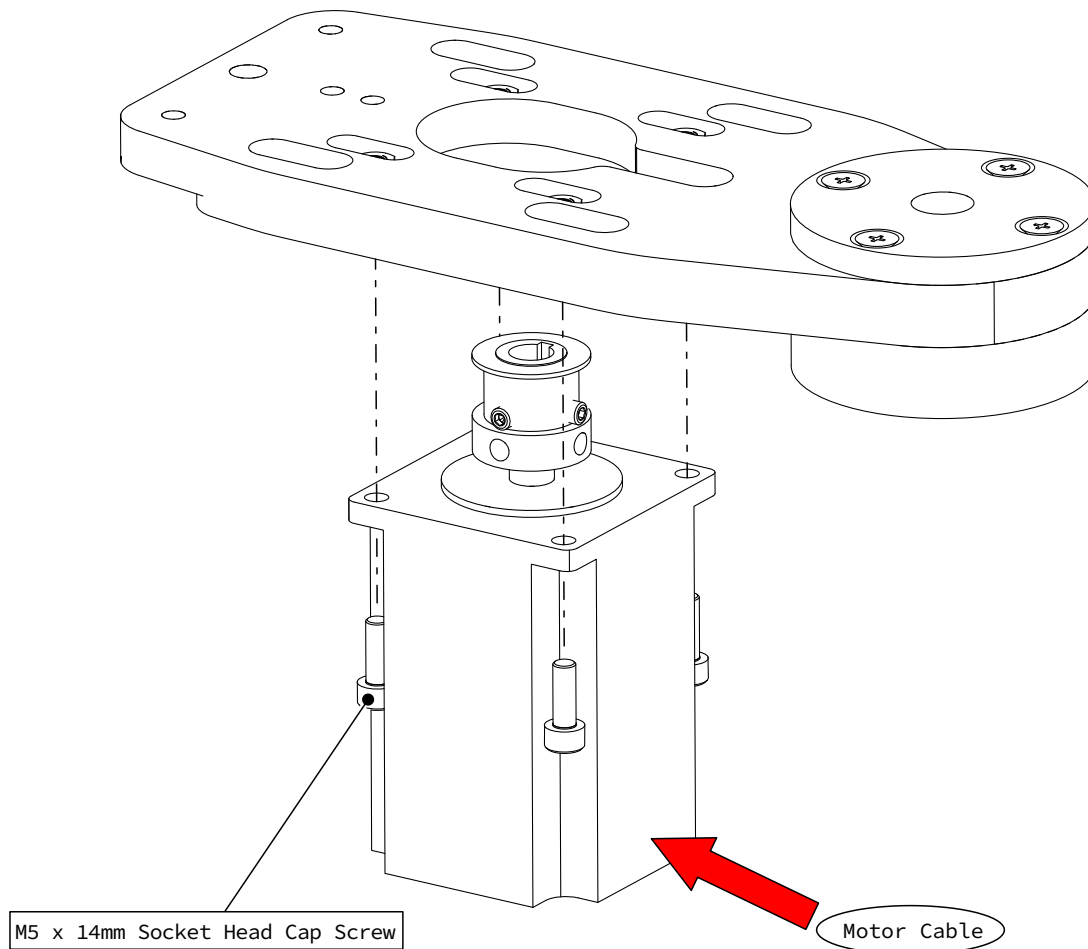
4.1.2 Drive Plate Assembly

4.1.2.1



- Carefully set hex nuts in the indicated slots.

4.1.2.2

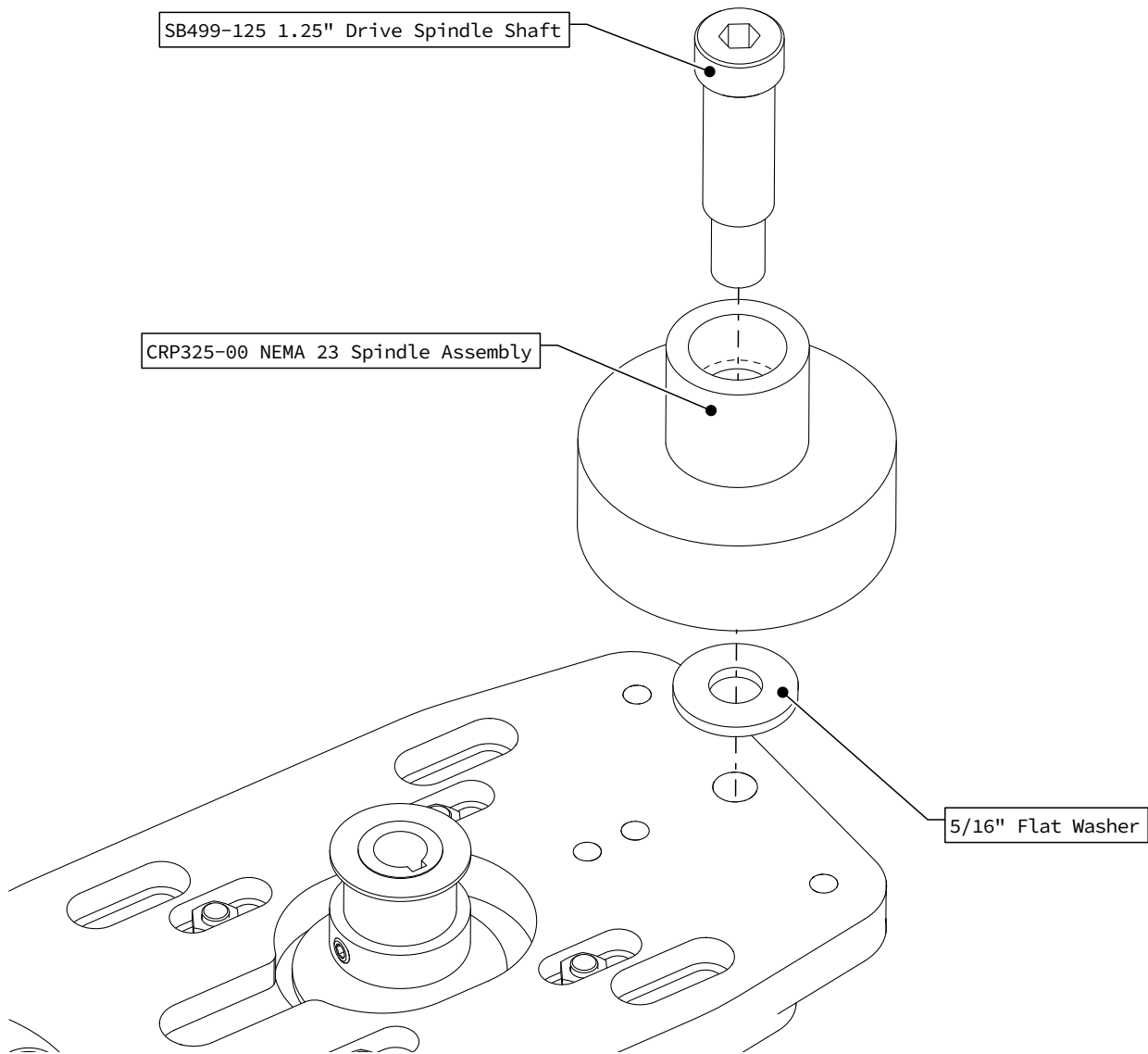


- Attach the motor to the R&P Plate as indicated.
- Partially tighten the fasteners.

Assembly Note

Orient the motor with the cable pointing towards the R&P Drive Plate bearing cup.

4.1.2.3

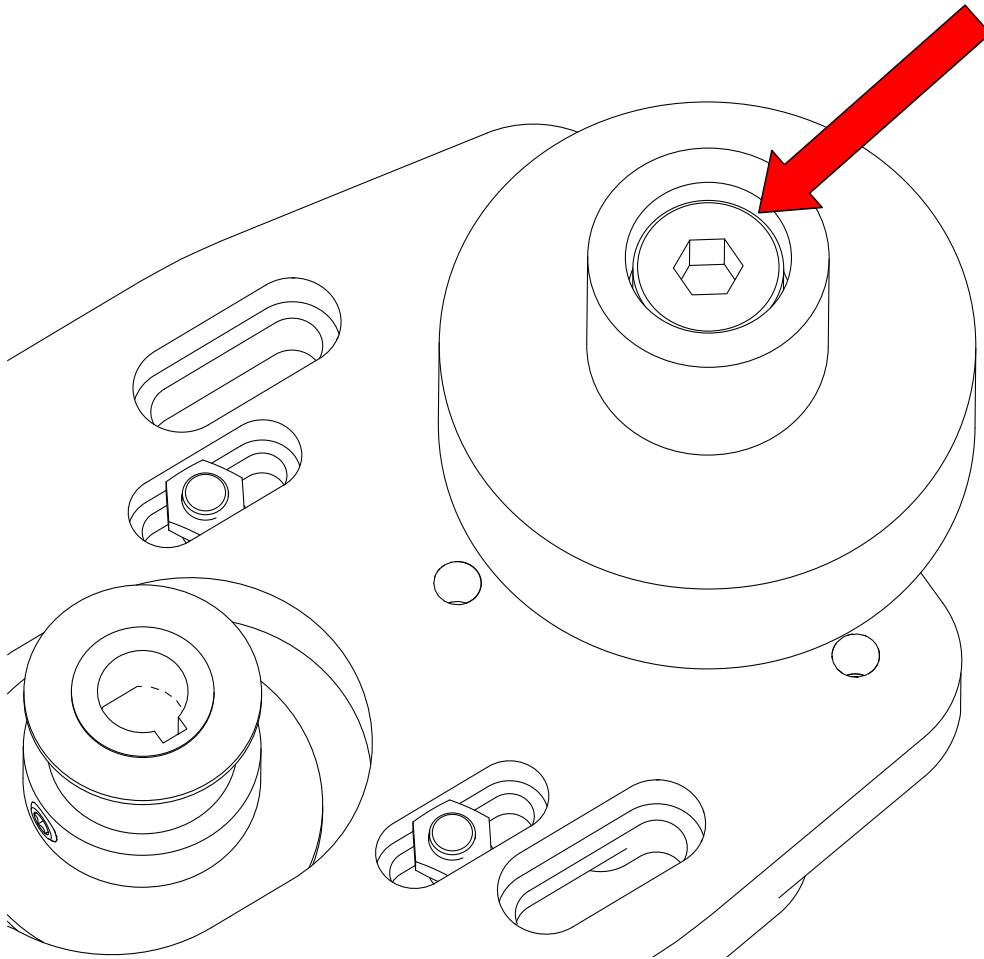


- Attach the drive spindle to the R&P Plate as indicated.

Assembly Note

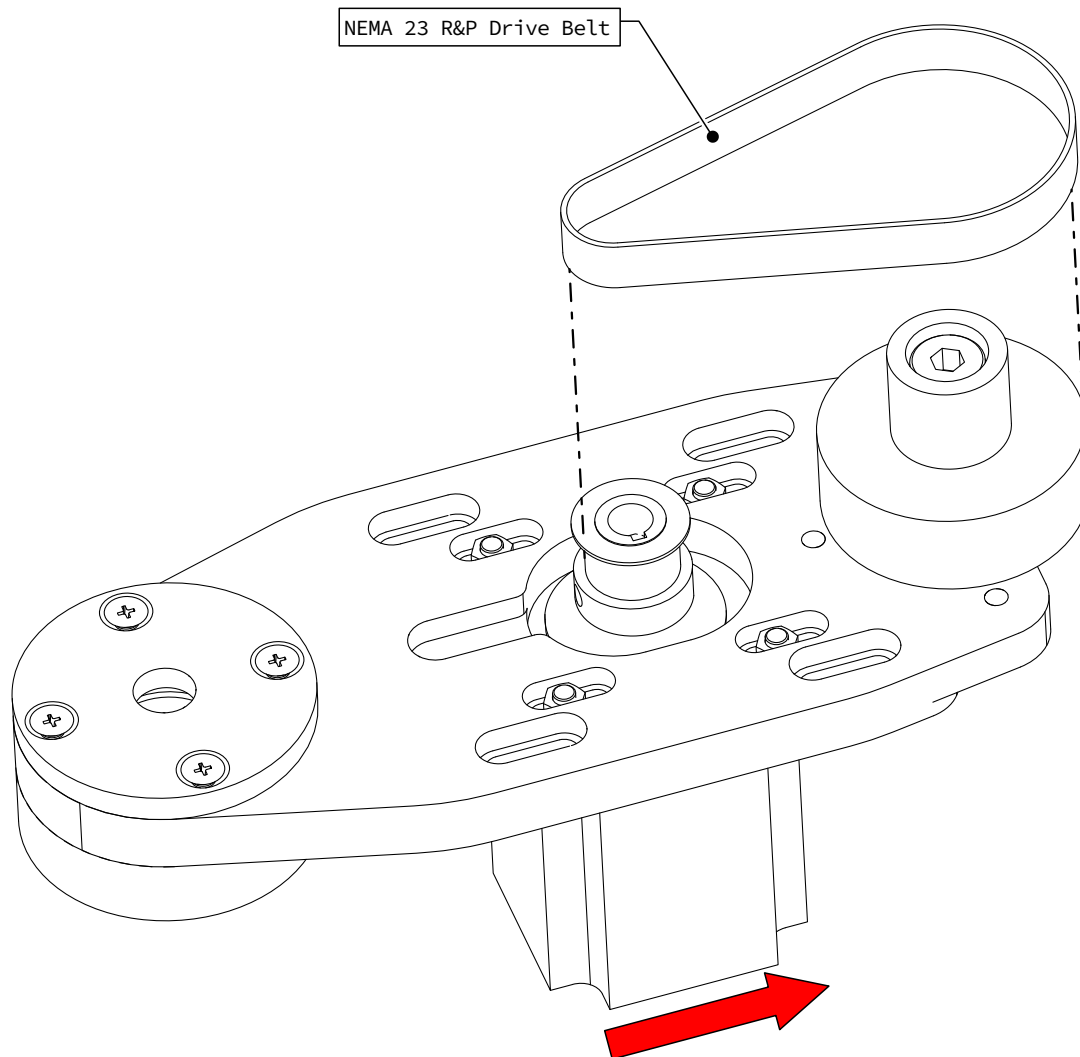
Your spindle may have the shaft installed in the spindle already, held in place with a plastic hex nut for protection during shipping. The plastic hex nut needs to be removed prior to installing the spindle.

4.1.2.4



- Tighten the Drive Spindle Shaft.

4.1.2.5

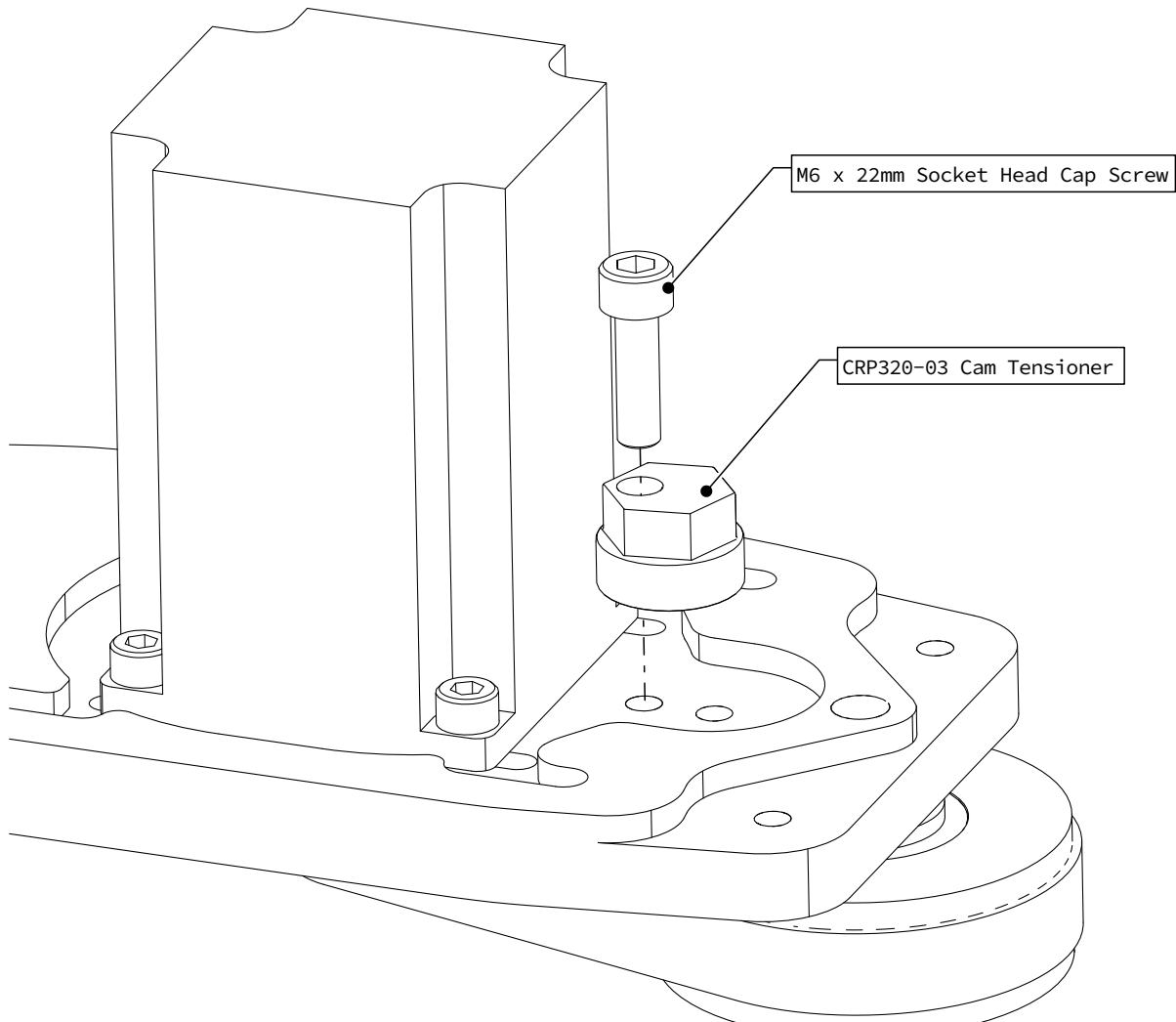


- Slide the drive belt around the motor pulley and drive spindle.

Assembly Note

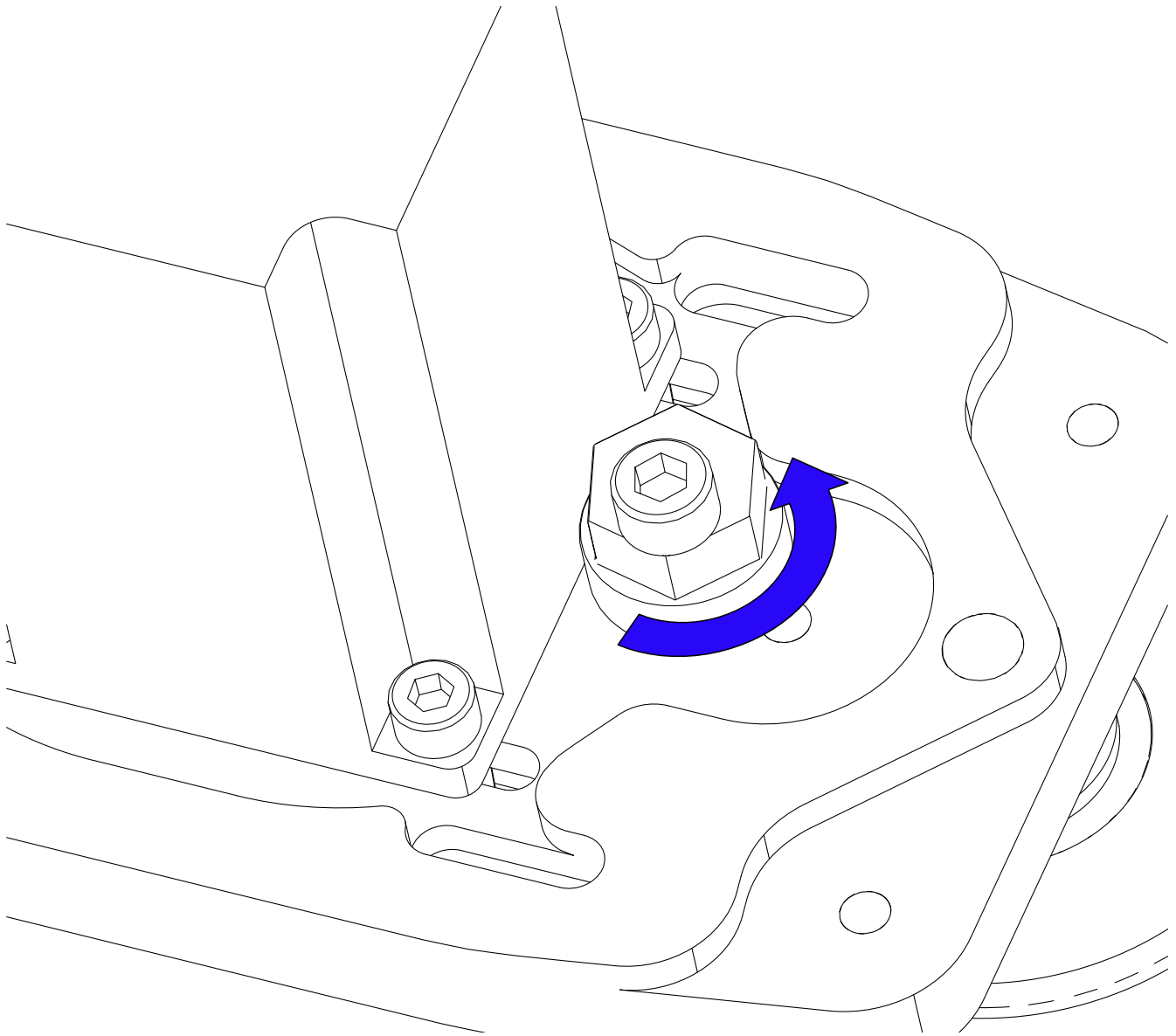
It may be necessary to slide the motor closer to the drive spindle as indicated.

4.1.2.6



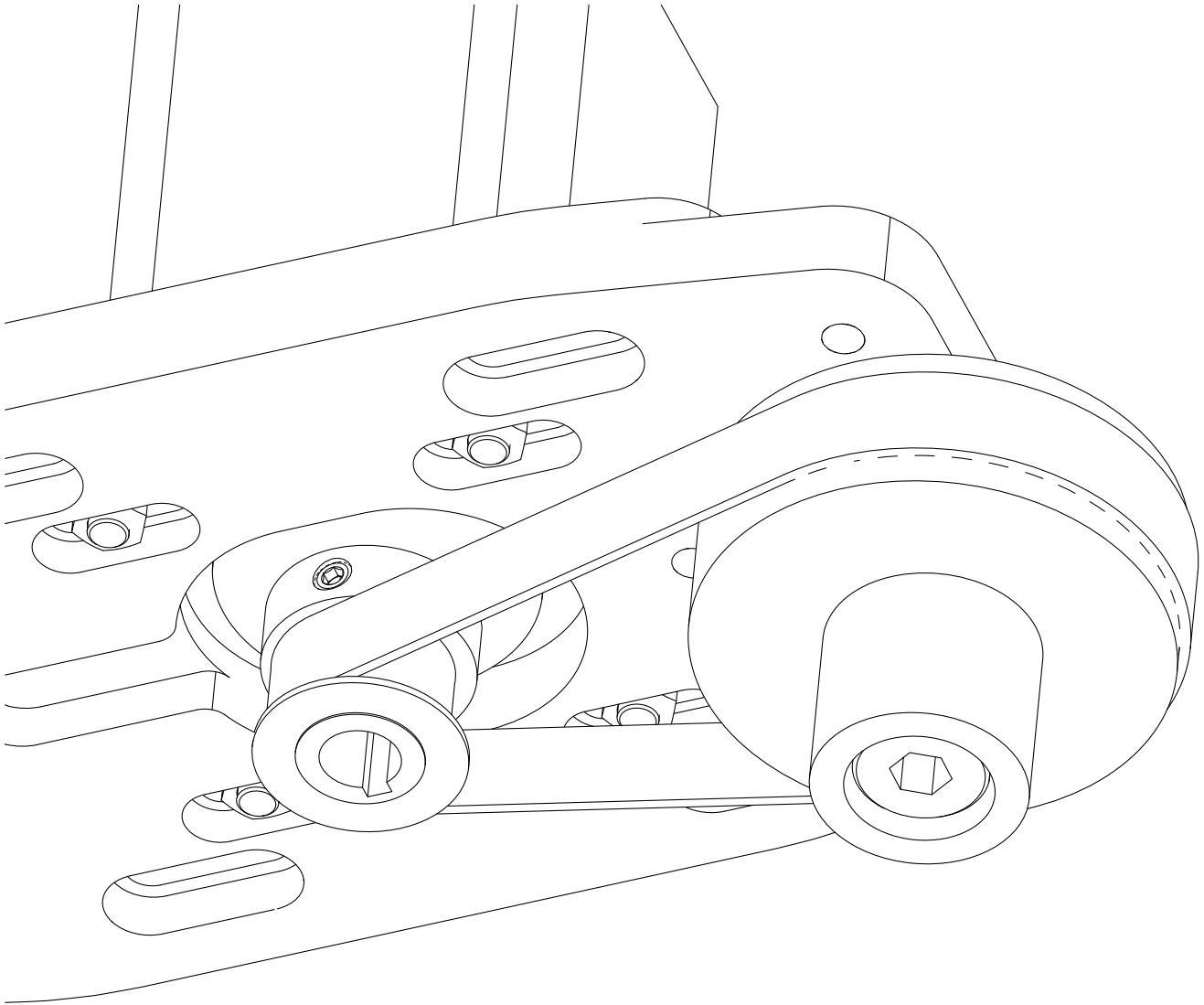
- Attach the Tensioner Cam to the R&P Drive Plate as indicated.

4.1.2.7



- Use a 16mm wrench to turn the Tensioner Cam against the motor.

4.1.2.8

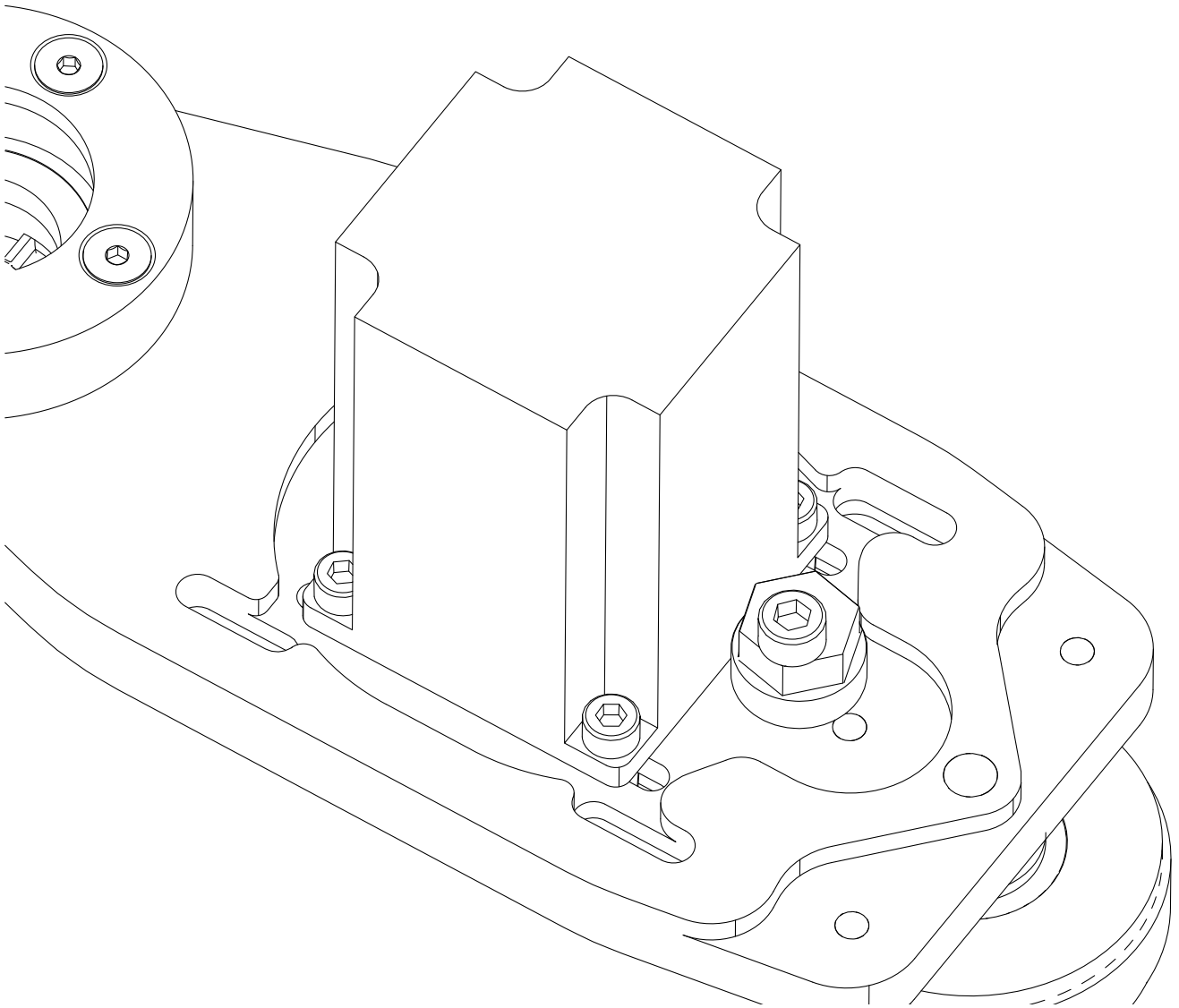


- Hold the Tensioner Cam against the motor to generate belt tension.

Assembly Note

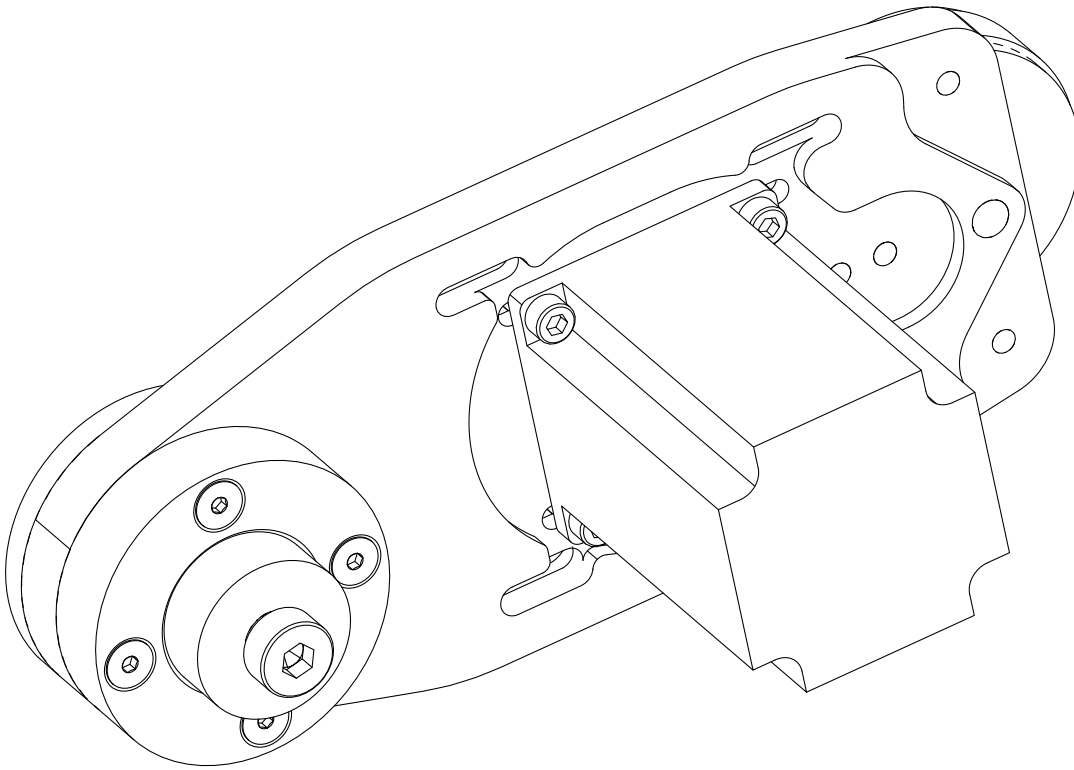
The belt should be tight enough such that the belt cannot be squeezed more than 3mm (1/8") with your fingers.

4.1.2.9



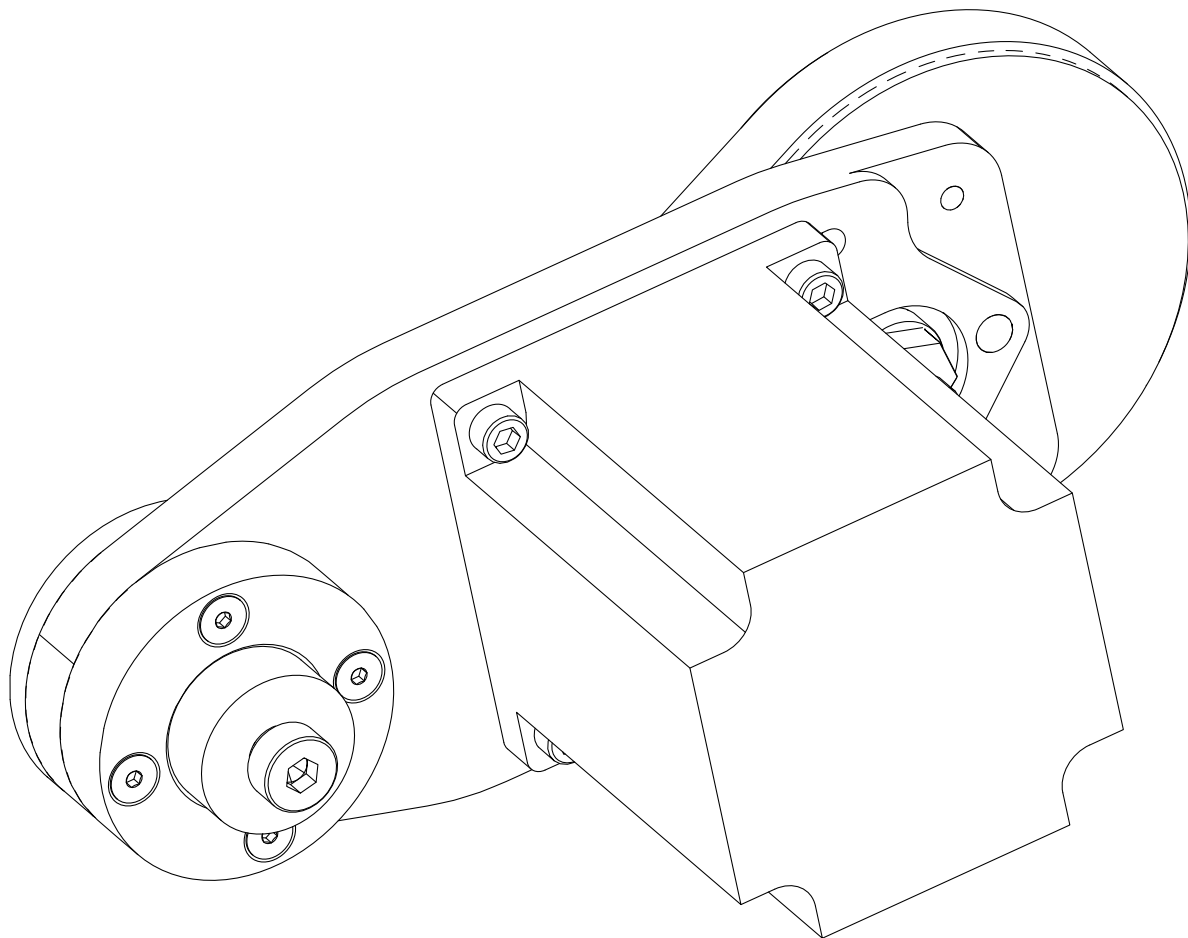
- With the belt tensioned, fully tighten the Cam Tensioner and motor fasteners.

4.1.2.10



- Repeat this process to assemble three R&P Drive assemblies.

4.2 NEMA 34 Drive Assembly



i Section Note

Skip to **Section 4.3** if you are using a NEMA 23 electronics package.

i Section Note

Simplified models will not depict gear teeth on the motor pulleys or drive spindles

Parts and Tools Required

The following parts and tools will be used in Section 4.2

QTY	Part/Description	Packaged In
3	NEMA 34 Motor	Motors
3	CRP301-03 - NEMA 34 Motor Pulley	CRP320-00-S500-19.1
3	R&P Drive Plate	CRP320-00-S500-19.1
3	CRP324-00 - PRO NEMA 34 Spindle Assembly	CRP320-00-S500-19.1
3	CRP320-00-FAST-500: - (4) M6 Hex Nut (Total QTY: 12) - (1) NEMA 34 R&P Drive Belt (Total QTY: 3) - (1) 5/16" Flat Washer (Total QTY: 3) - (5) M6 x 22mm Socket Head Cap Screw (Total QTY: 15) - (1) Cam Tensioner (Total QTY: 3) <i>Remaining parts from this kit used in Section 4.3</i>	CRP320-00-S500-19.1

Required Tools:

- 3/32" Allen Wrench
- 1/4" Allen Wrench
- 5mm Allen Wrench
- Adjustable Wrench
- Tape Measure

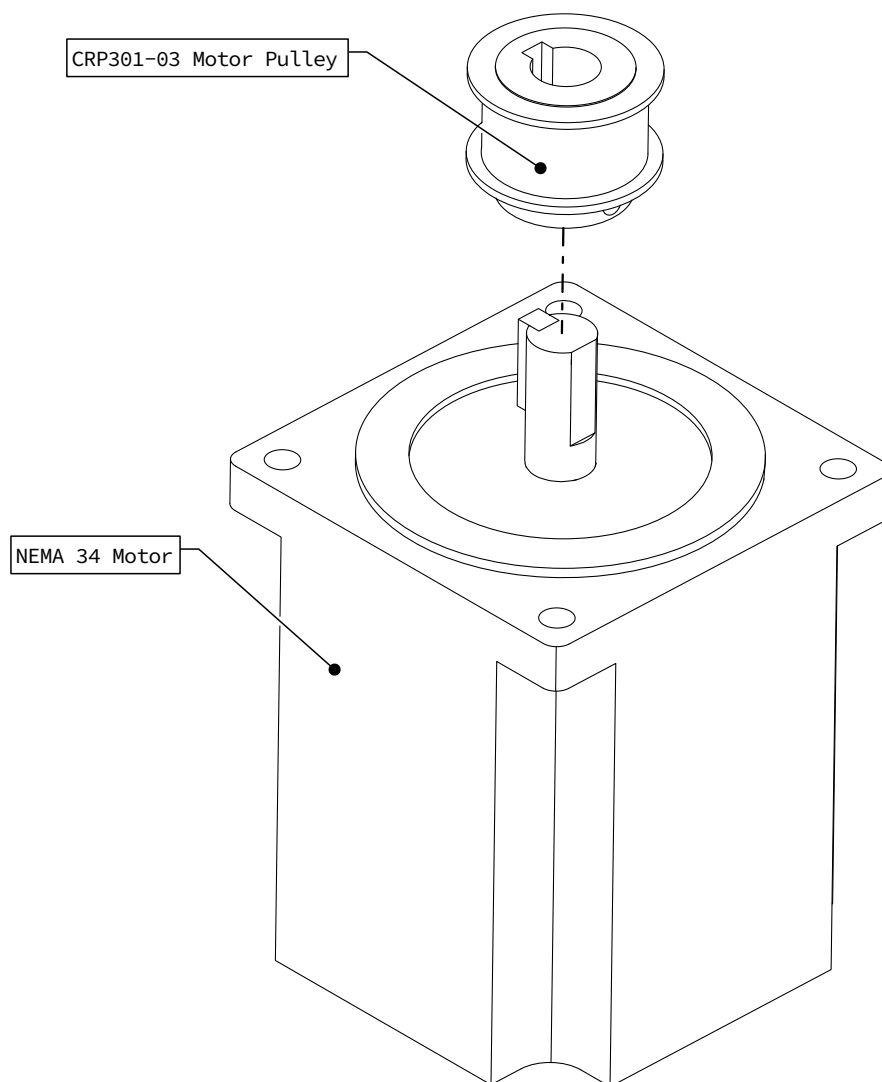
Recommended Additional Tools:

- 16mm Combination Wrench



4.2.1 Motor Assembly

4.2.1.1

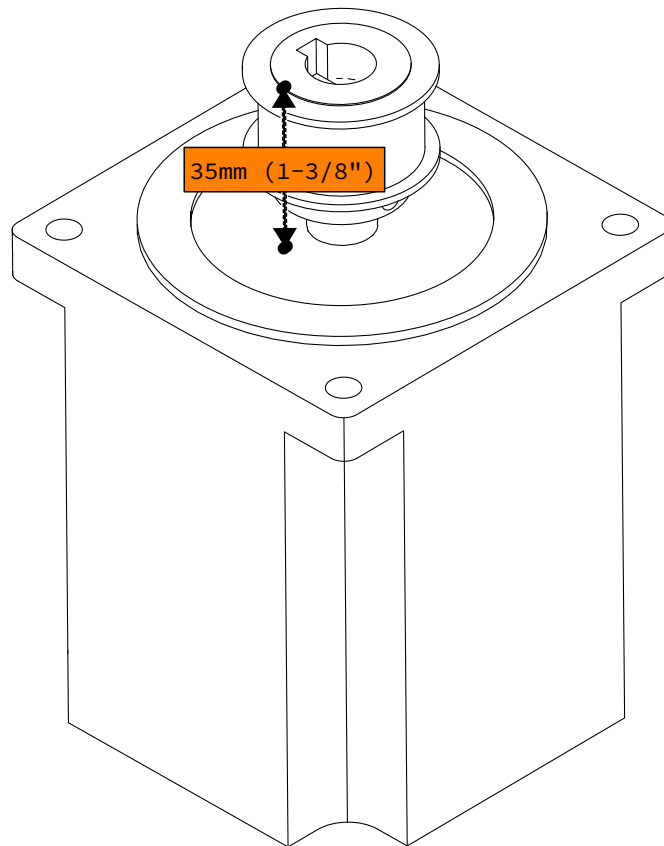


- Slide the motor pulley onto the motor shaft as indicated.

Assembly Note

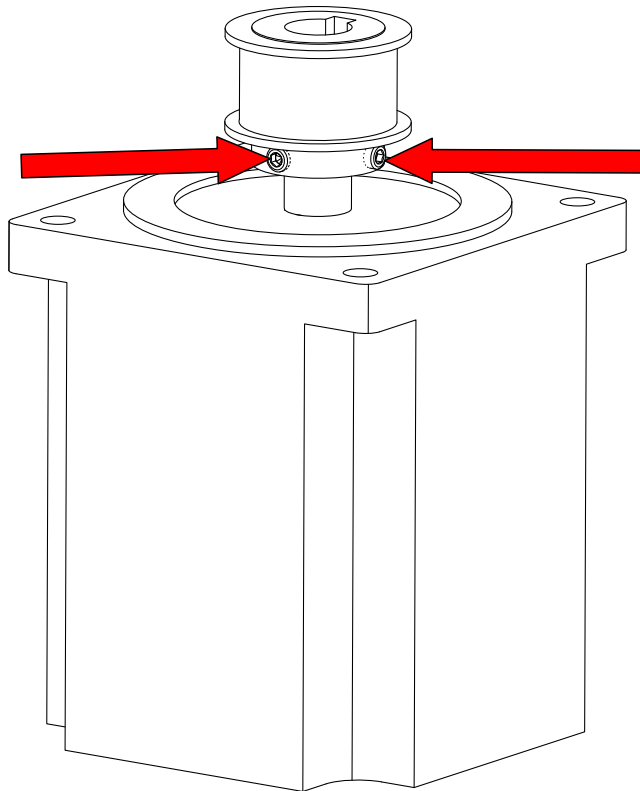
Ensure the motor keys are installed into the shaft prior to installing the pulley. Motor keys will either be pre-installed or included in a small bag.

4.2.1.2



- Adjust the motor pulley such that the top of the pulley is 35mm (1-3/8") from the bottom of the motor flat.

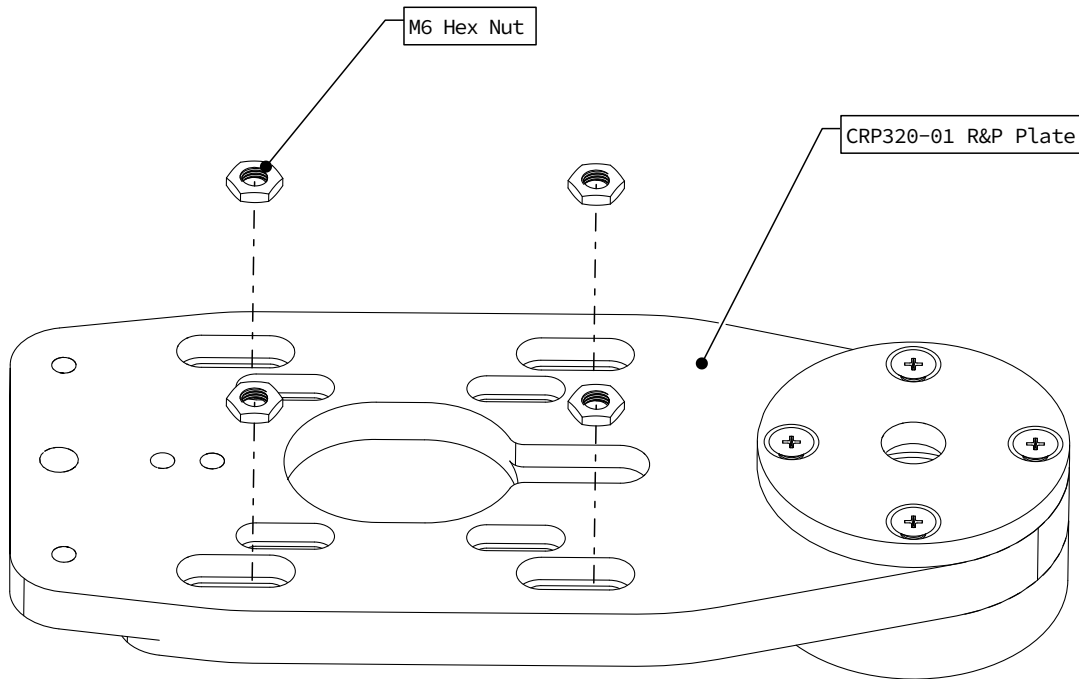
4.2.1.3



- Apply blue thread locker to the set screws. (Not included)
- Fully tighten the set screws.

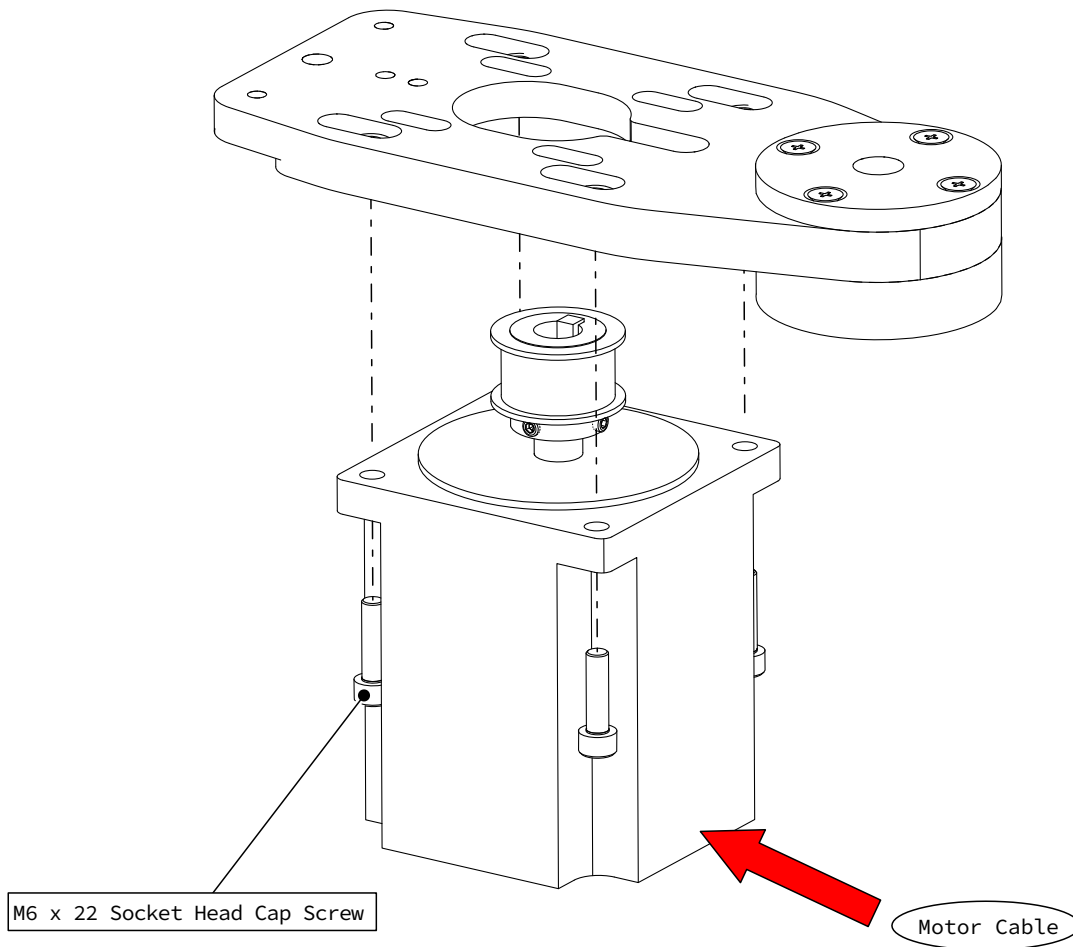
4.2.2 Drive Plate Assembly

4.2.2.1



- Carefully set hex nuts in the indicated slots.

4.2.2.2

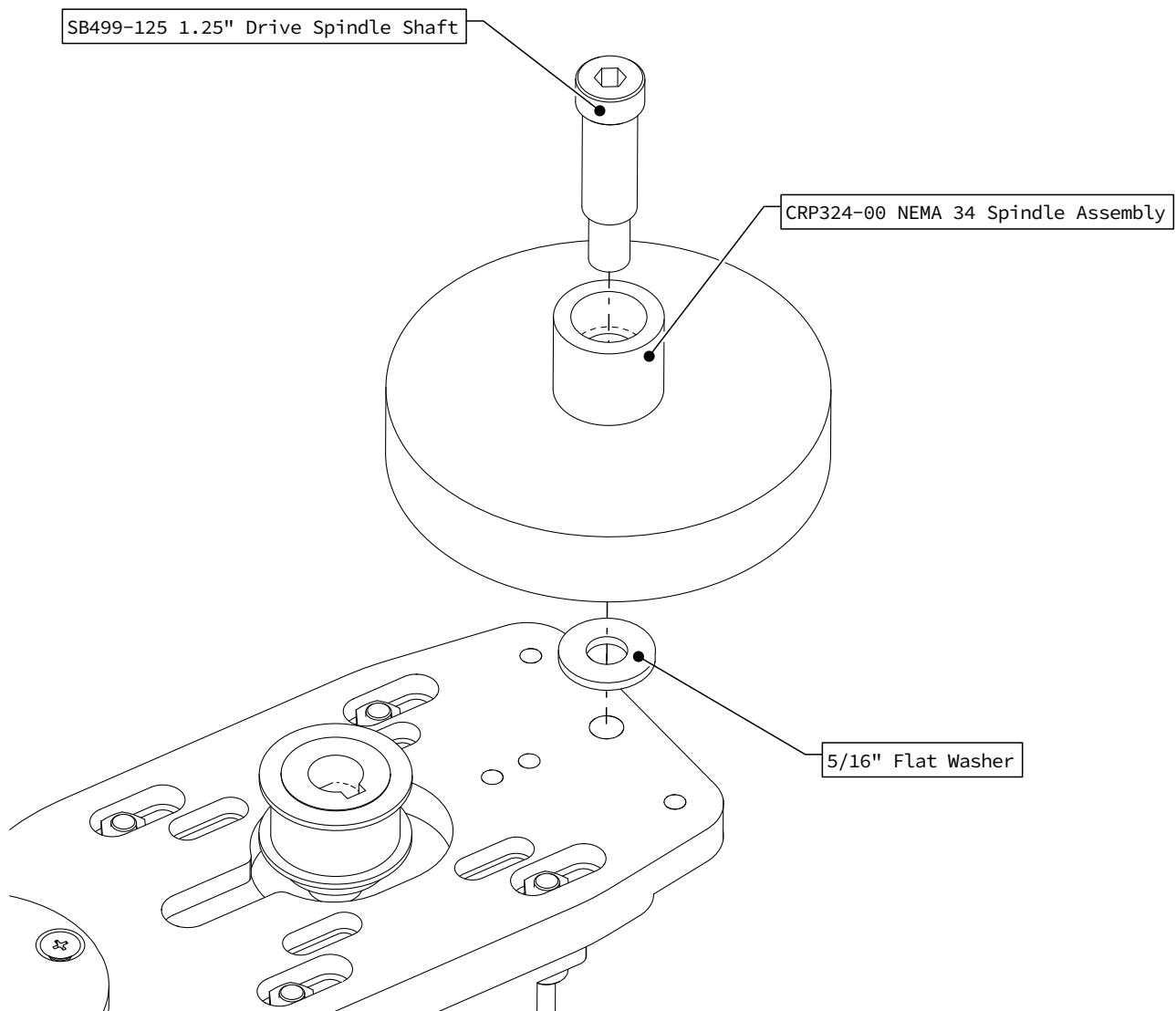


- Attach the motor to the R&P Plate as indicated.
- Partially tighten the fasteners.

Assembly Note

Orient the motor with the cable pointing towards the R&P Drive Plate bearing cup.

4.2.2.3

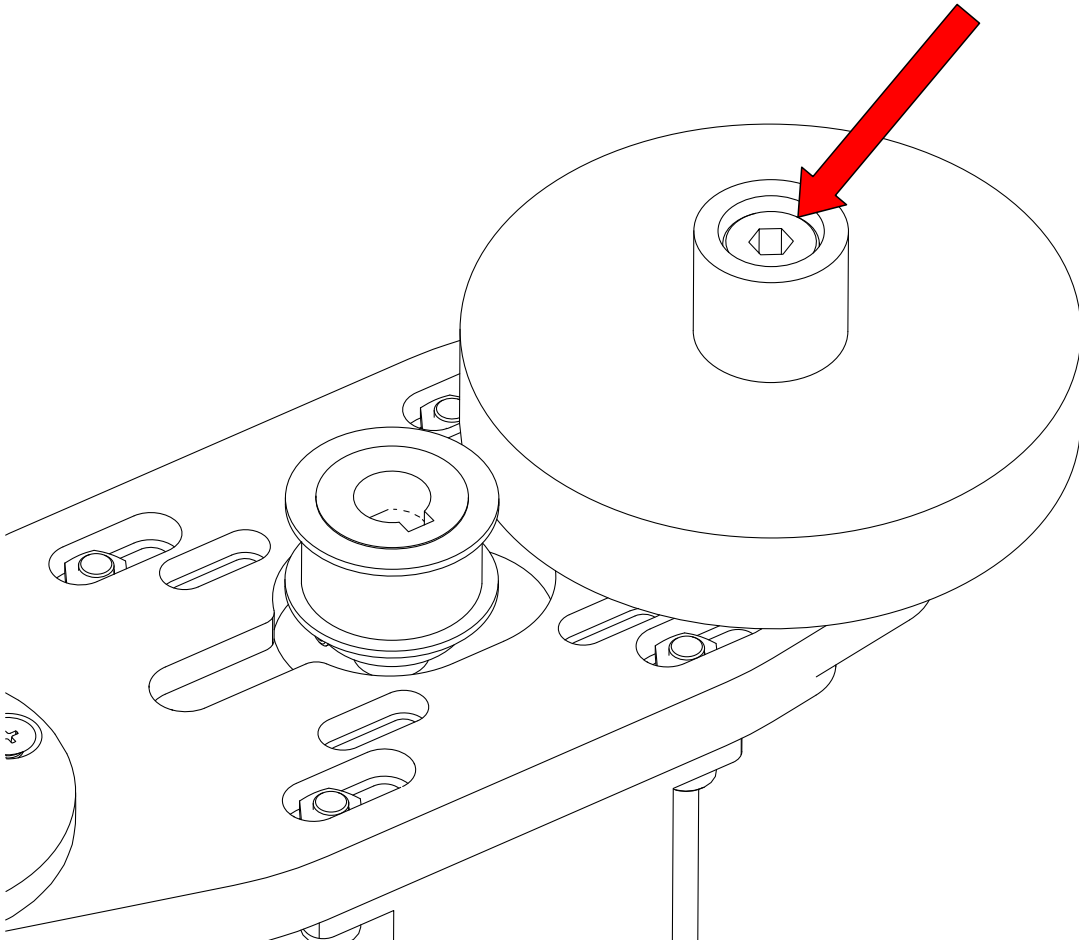


- Attach the drive spindle to the R&P Plate as indicated.

Assembly Note

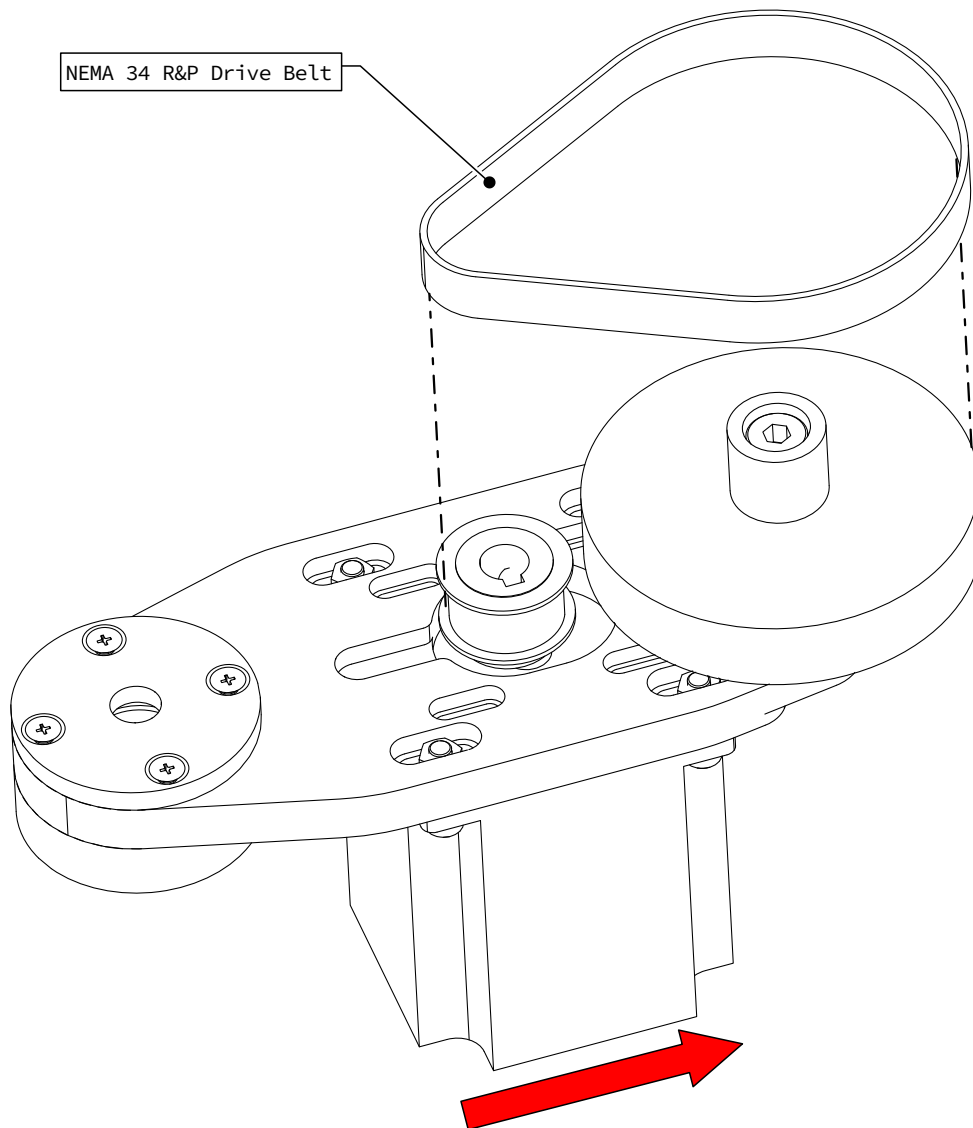
Your spindle may have the shaft installed in the spindle already, held in place with a plastic hex nut for protection during shipping. The plastic hex nut needs to be removed prior to installing the spindle.

4.2.2.4



- Tighten the Drive Spindle Shaft.

4.2.2.5

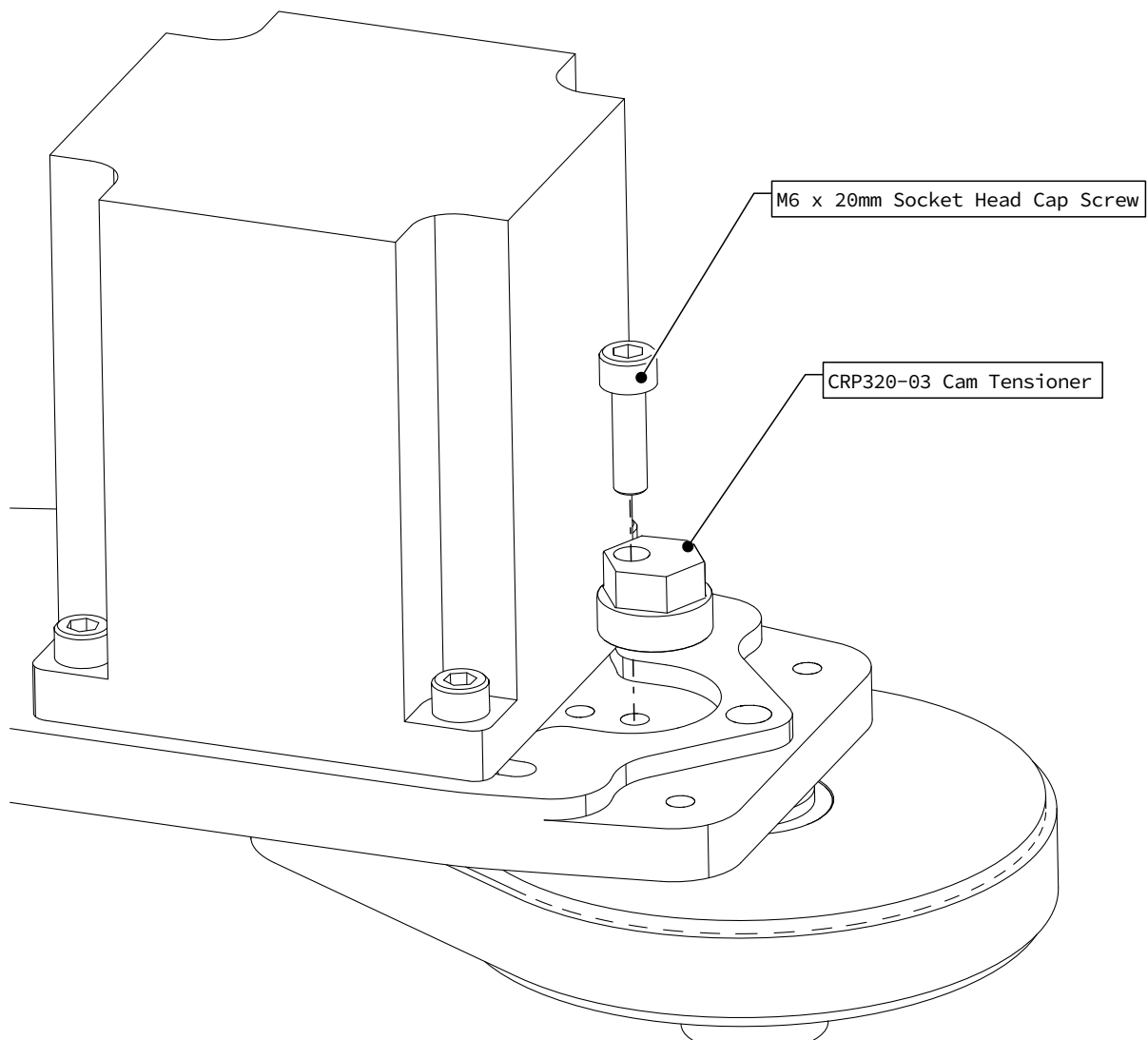


- Slide the drive belt around the motor pulley and drive spindle.

Assembly Note

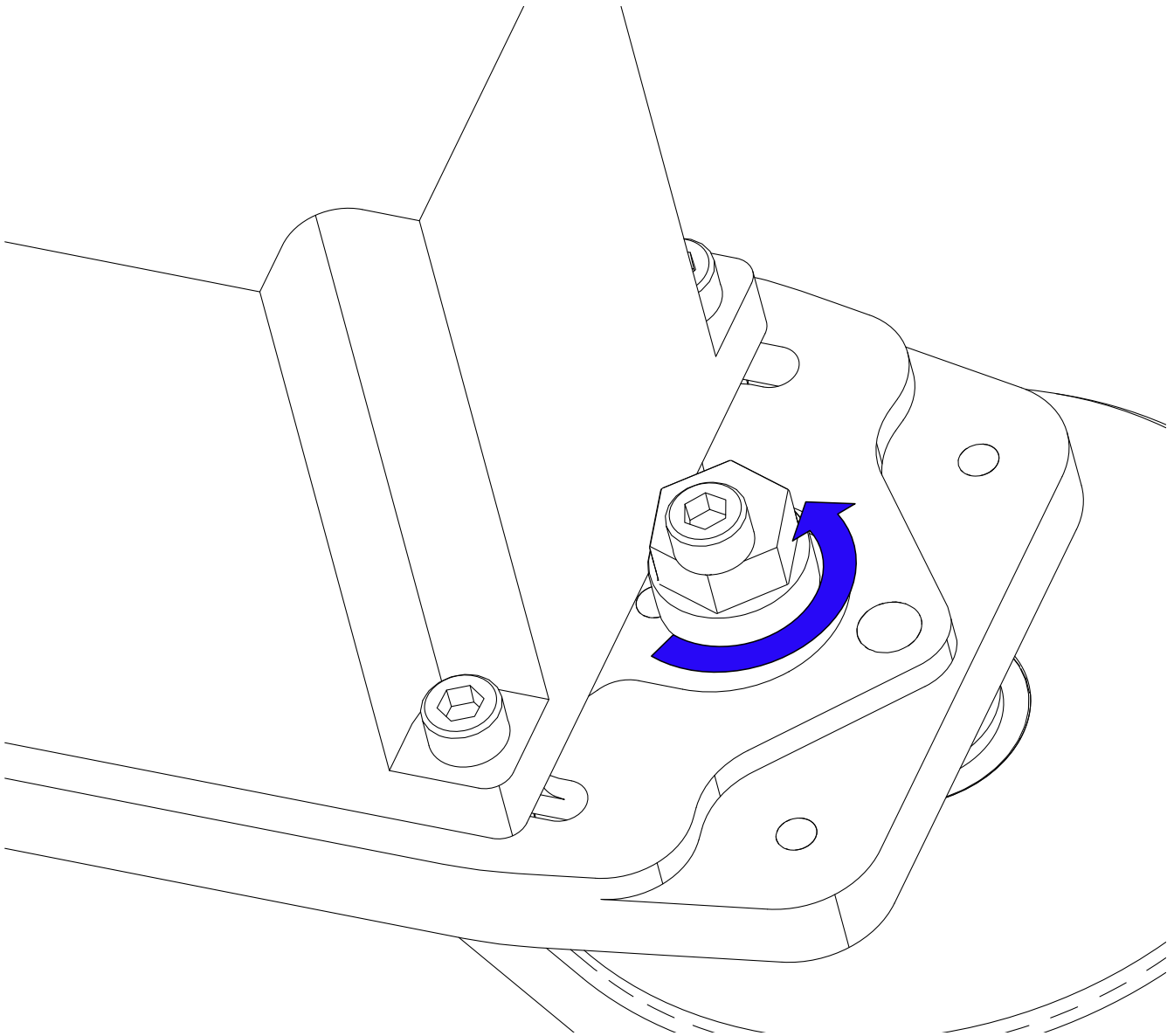
It may be necessary to slide the motor closer to the drive spindle as indicated.

4.2.2.6



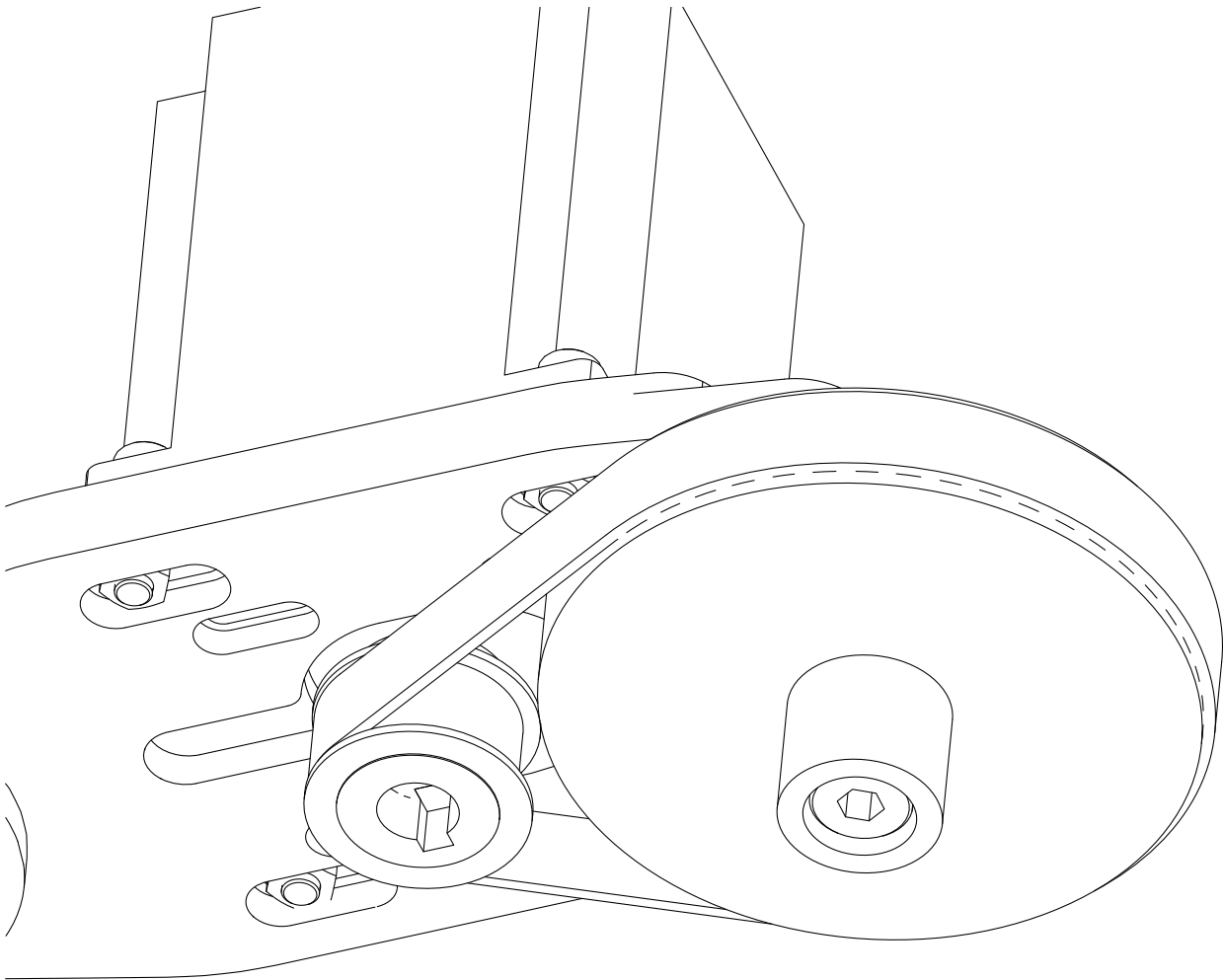
- Attach the Tensioner Cam to the R&P Drive Plate as indicated.

4.2.2.7



- Use a 16mm wrench to turn the Tensioner Cam against the motor.

4.2.2.8

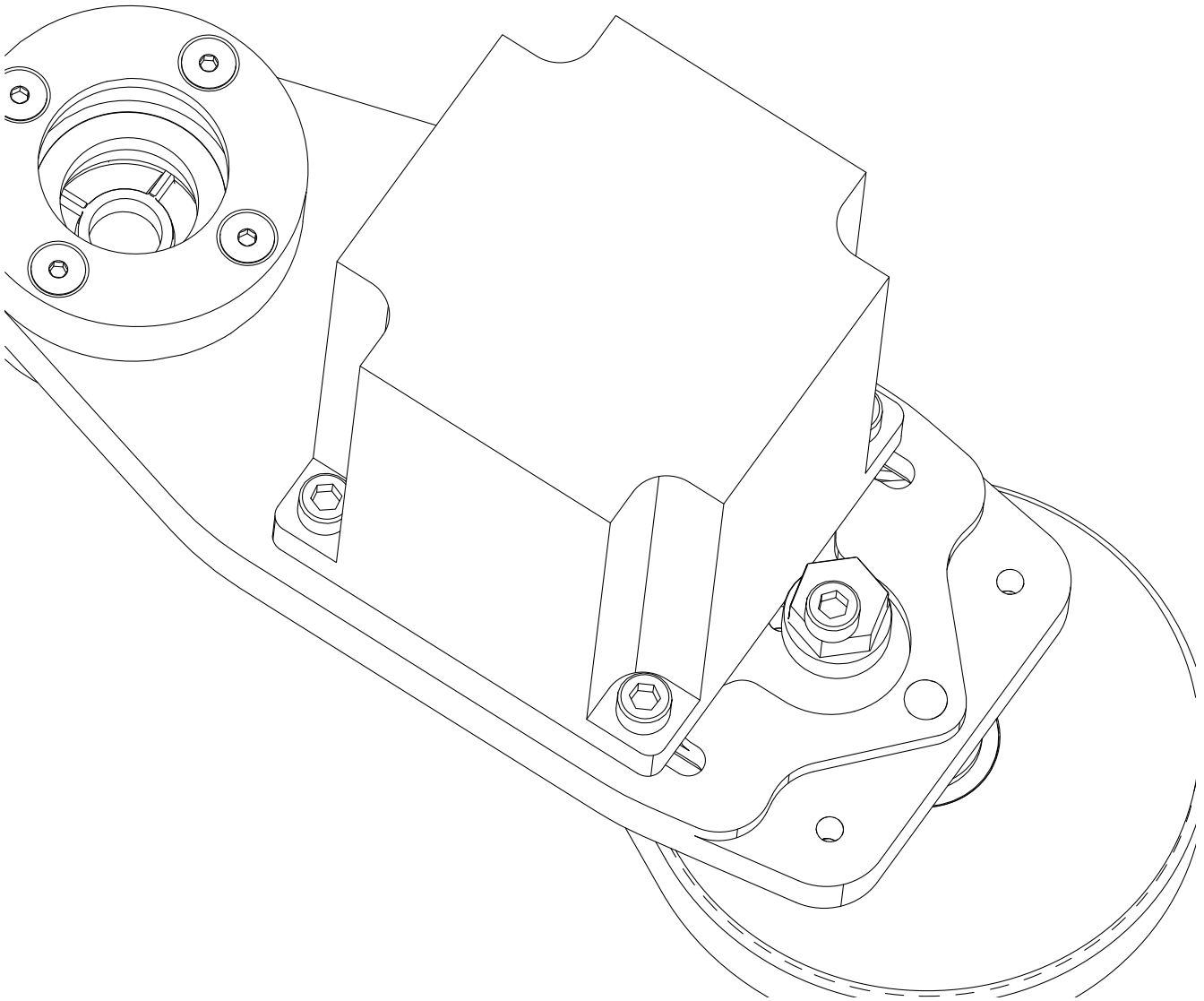


- Hold the Tensioner Cam against the motor to generate belt tension.

Assembly Note

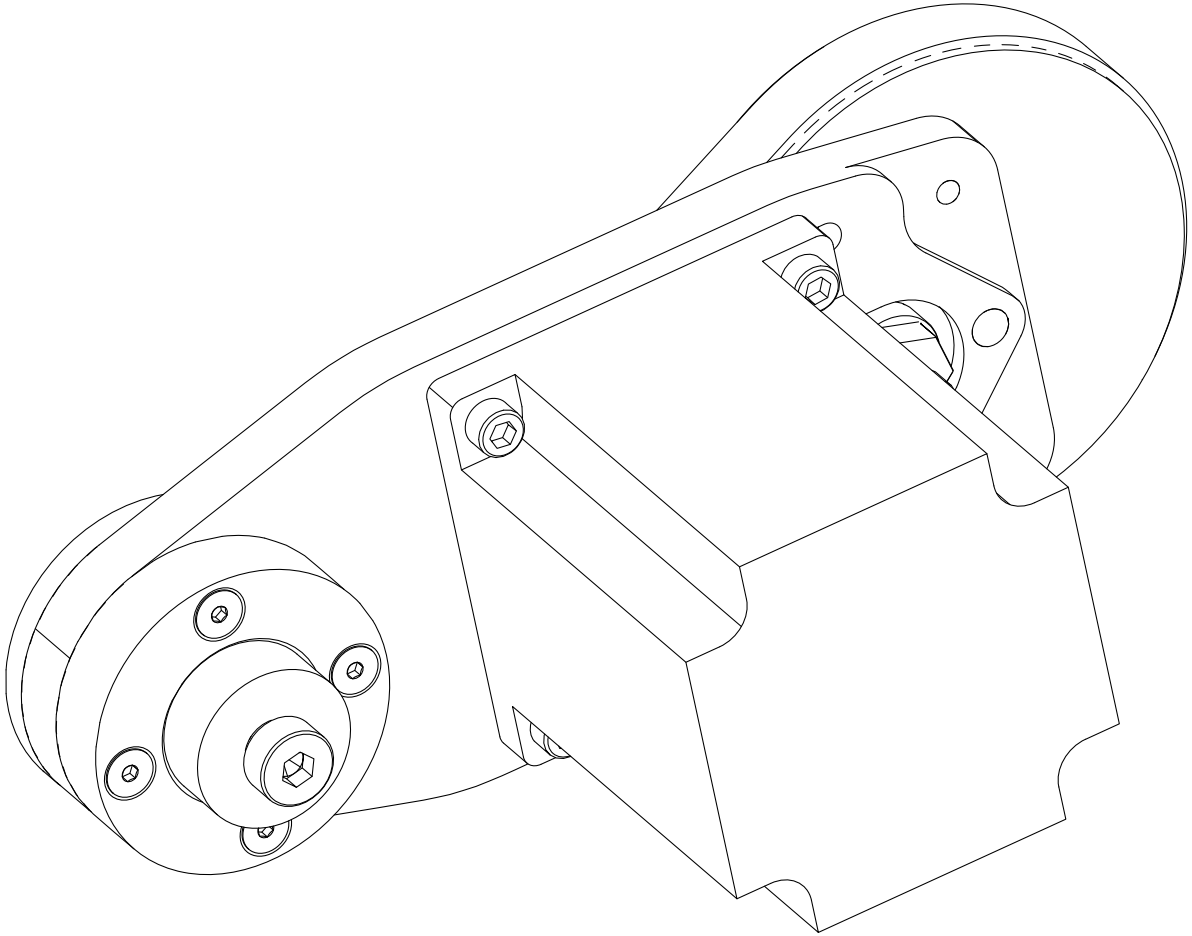
The belt should be tight enough such that the belt cannot be squeezed more than 3mm (1/8") with your fingers.

4.2.2.9



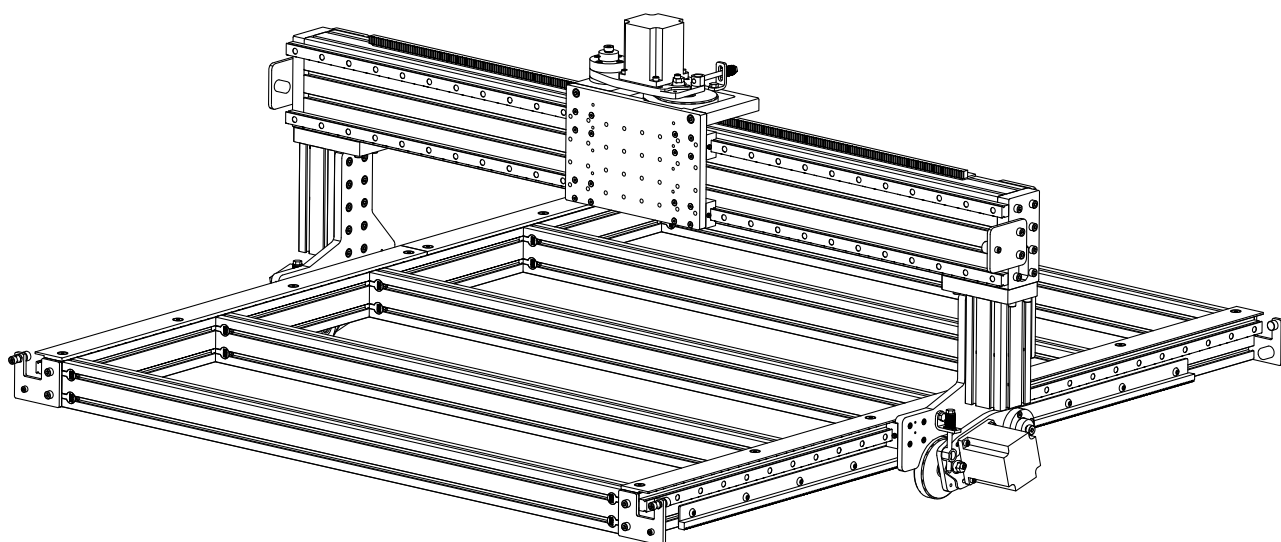
- With the belt tensioned, fully tighten the Cam Tensioner and motor fasteners.

4.2.2.10



- Repeat this process to assemble three R&P Drive assemblies.

4.3 R&P Drive Installation



Section Note

Section applicable for NEMA 23 and 34 applications.

Parts and Tools Required

The following parts and tools will be used in Section 4.3

QTY	Part/Description	Packaged In
3	CRP320-00-TEN-19.1: - (1) R&P Tension Post (Total QTY: 3) - (1) R&P Tension Bracket (Total QTY: 3) - (1) M6 x 12mm Flat Head Screw (Total QTY: 3) - (1) M8 x 14mm Hex Cap Screw (Total QTY: 3) - (1) M8 x 90mm Hex Cap Screw (Total QTY: 3) - (2) M8 Flat Washer (Total QTY: 6) - (1) Die Spring (Total QTY: 3)	CRP320-00-SXXX-19.1
3	CRP320-00-FAST-XXX: - (1) Eccentric Collar Bearing Cap (Total QTY: 3) - (1) Pivot Shaft (Total QTY: 3)	CRP320-00-SXXX-19.1

Required Tools:

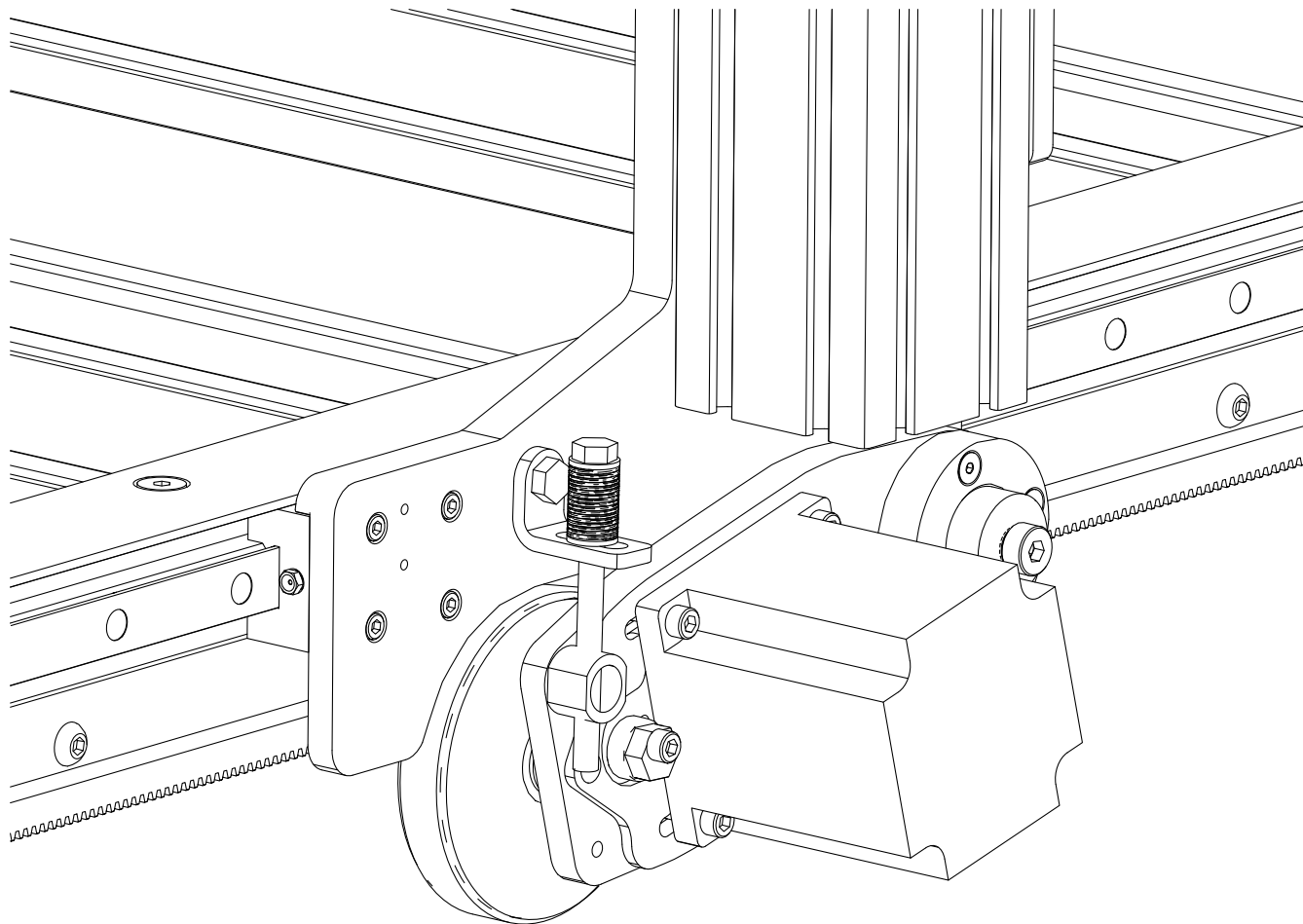
- 1/4" Allen Wrench
- 3mm Allen Wrench
- 4mm Allen Wrench
- 6mm Allen Wrench
- Adjustable Wrench
- Tape Measure

Recommended Additional Tools:

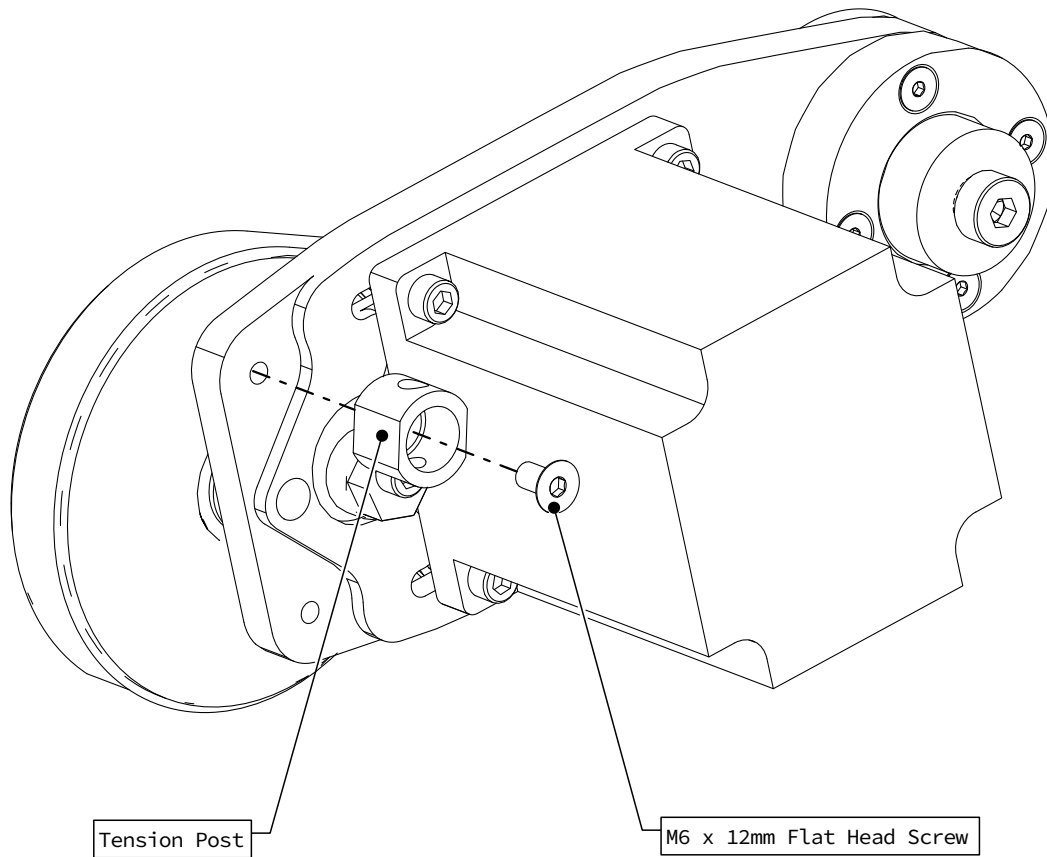
- 13mm Combination Wrench



4.3.1 Table R&P Drive

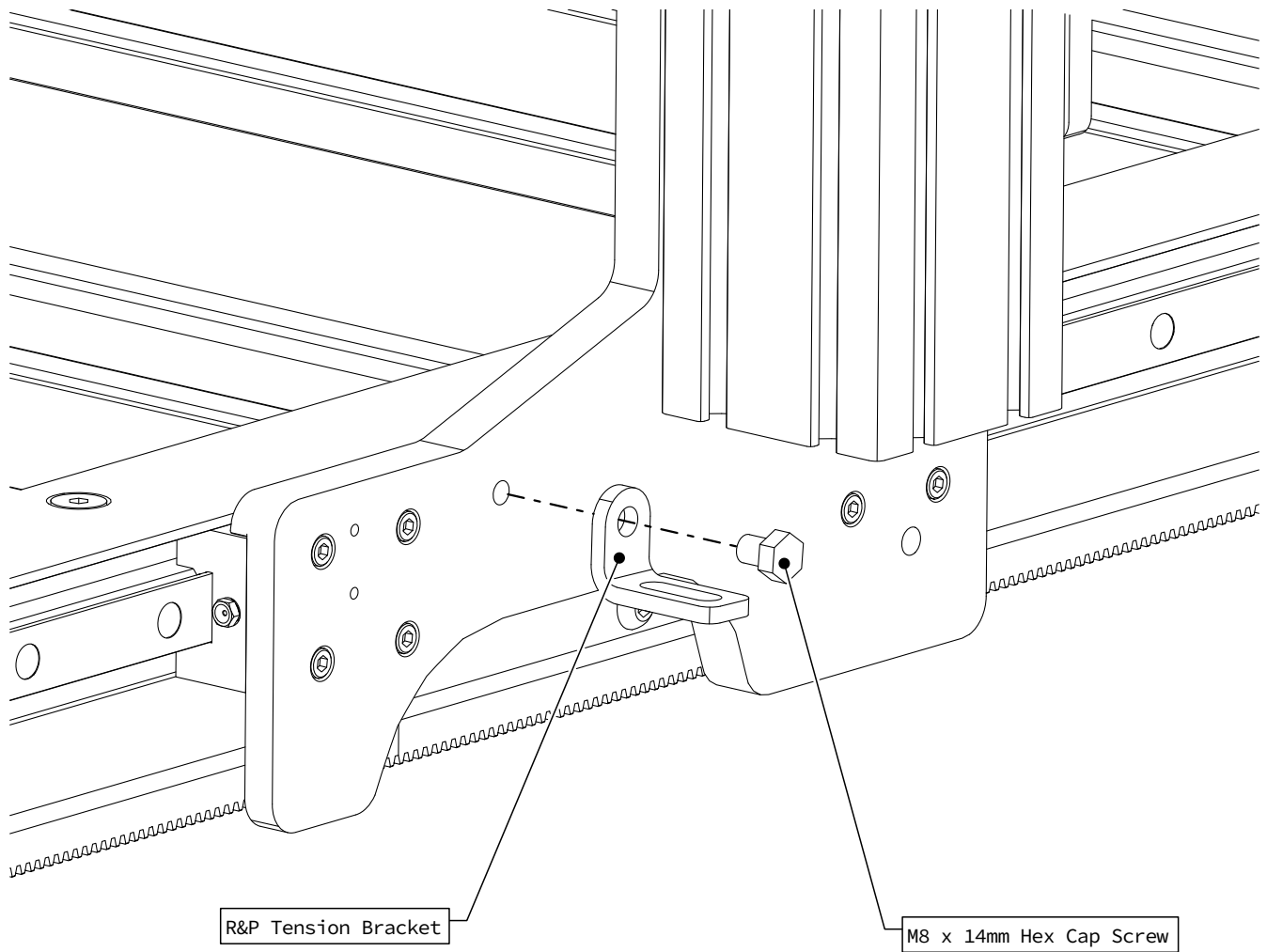


4.3.1.1



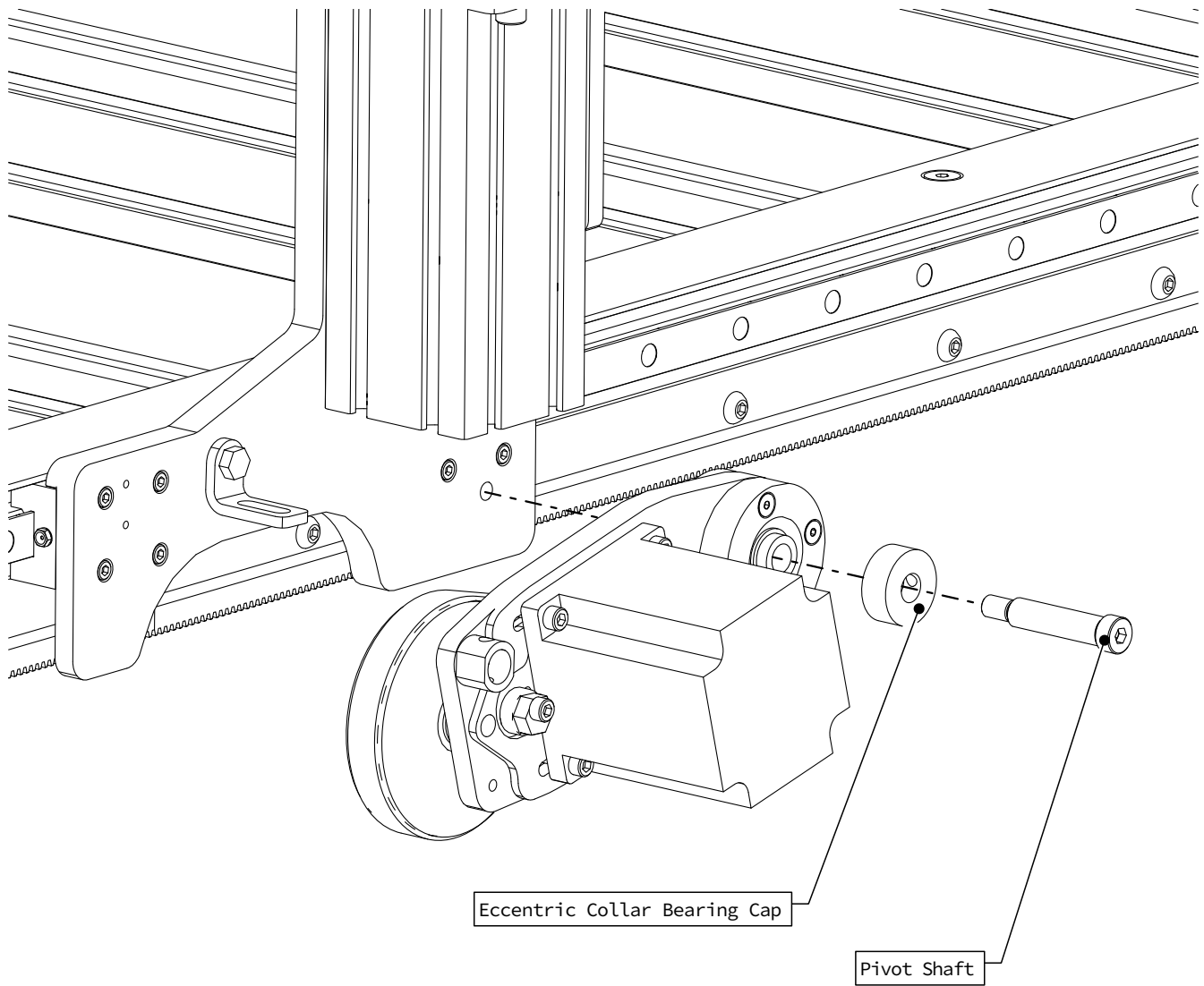
- Attach the Tension Post to the R&P Plate as indicated.
- Partially tighten the fastener.

4.3.1.2



- Attach the Tension Bracket to the Riser Plate as indicated.
- Partially tighten the fastener.

4.3.1.3

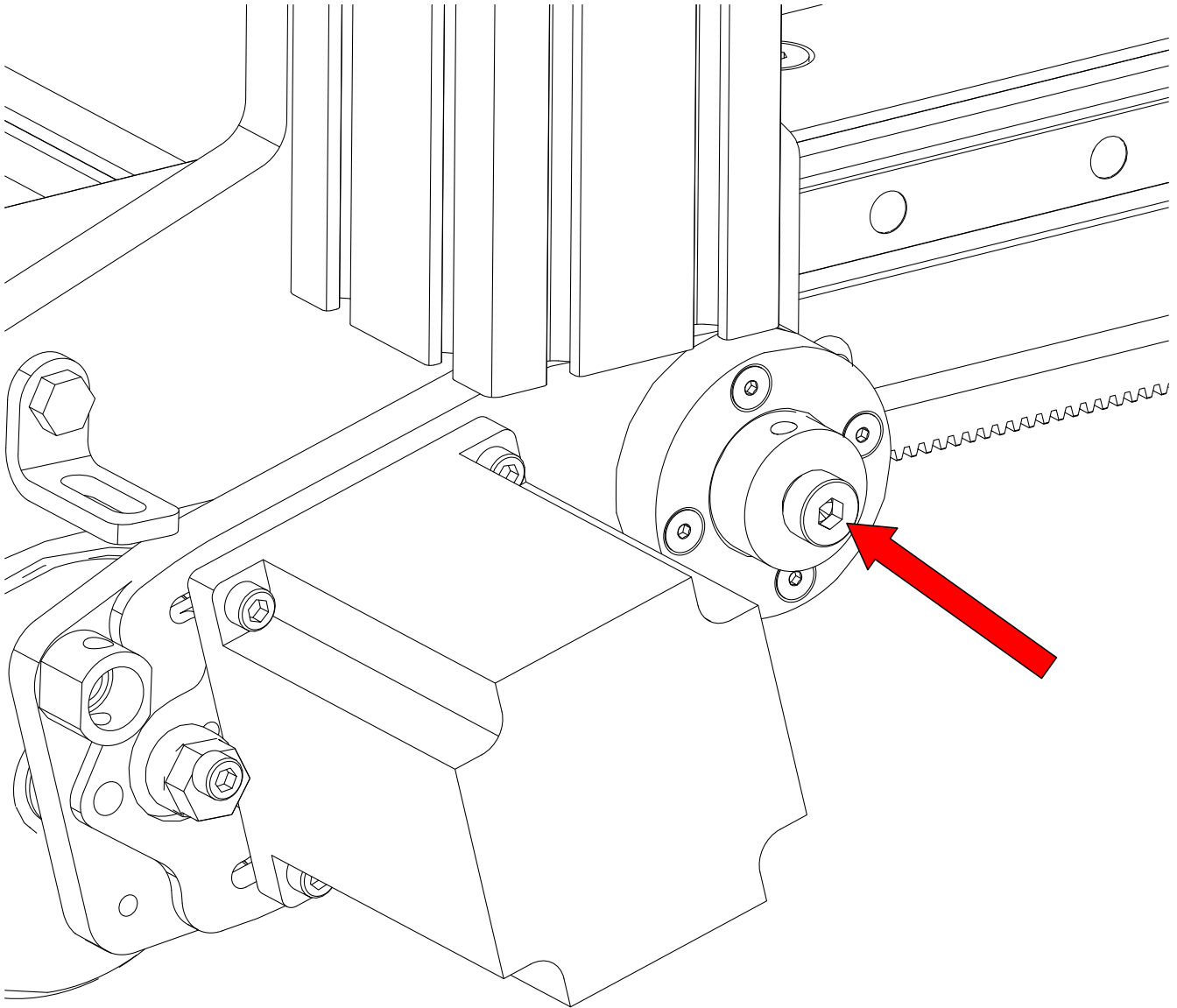


- Attach the R&P Assembly to the Riser Plate as indicated.

Assembly Note

Ensure the Eccentric Collar Bearing Cap is oriented correctly. It will fit over the Eccentric Collar Bearing pre-installed in the R&P Drive Plate.

4.3.1.4

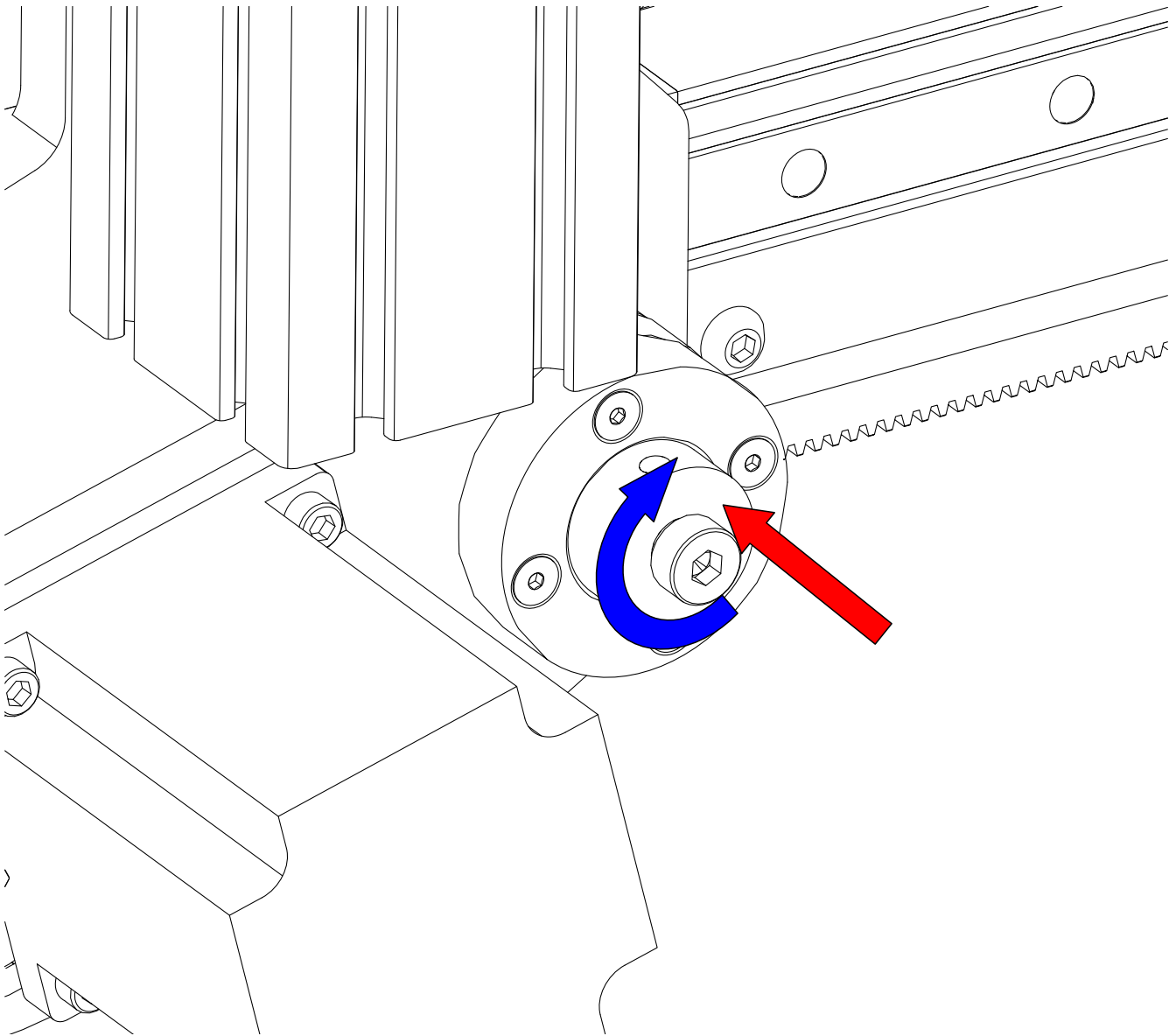


- Fully tighten the Pivot Shaft.

Assembly Note

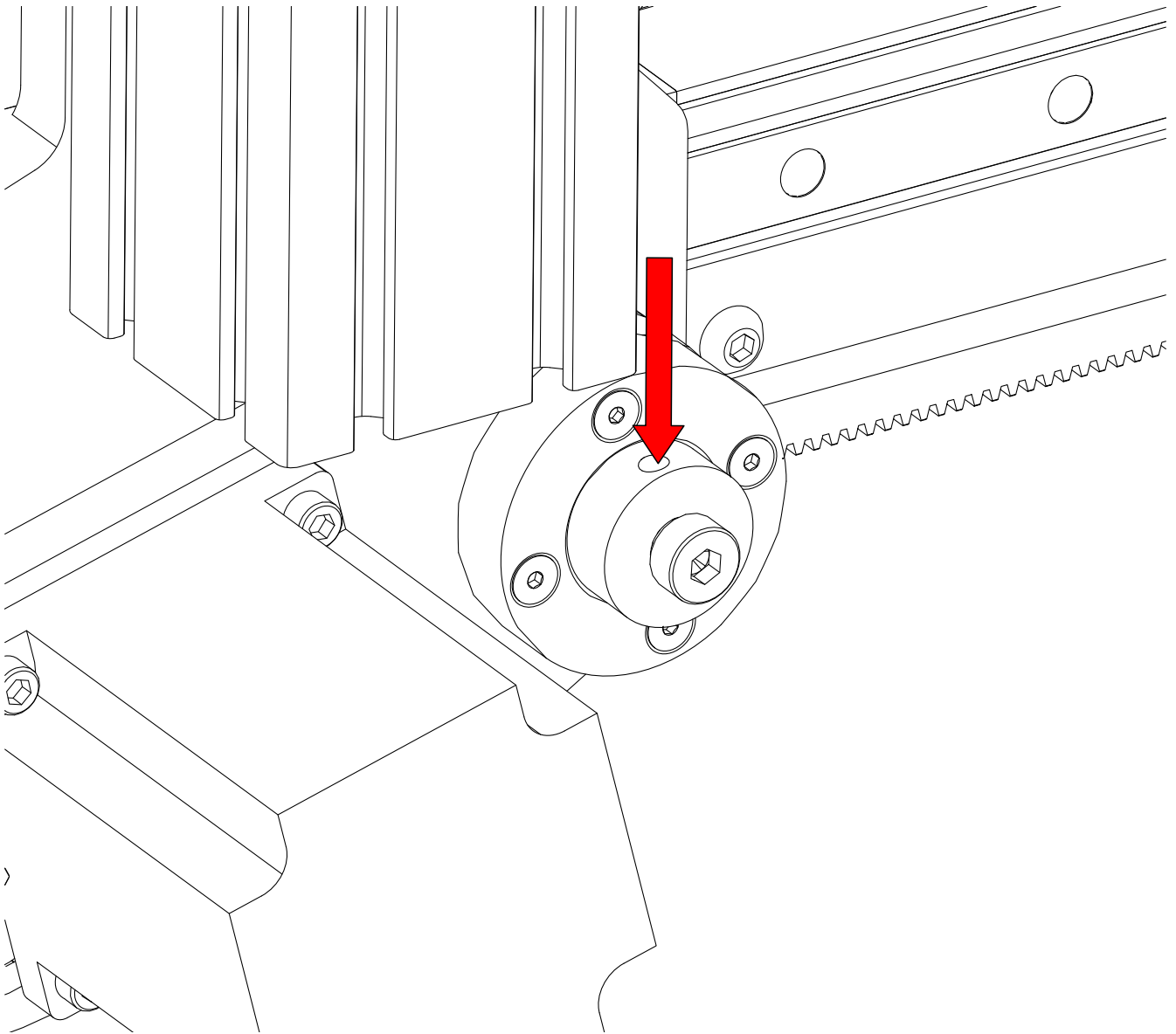
There will be a gap between the head of the Pivot Shaft and the Eccentric Collar Bearing.

4.3.1.5



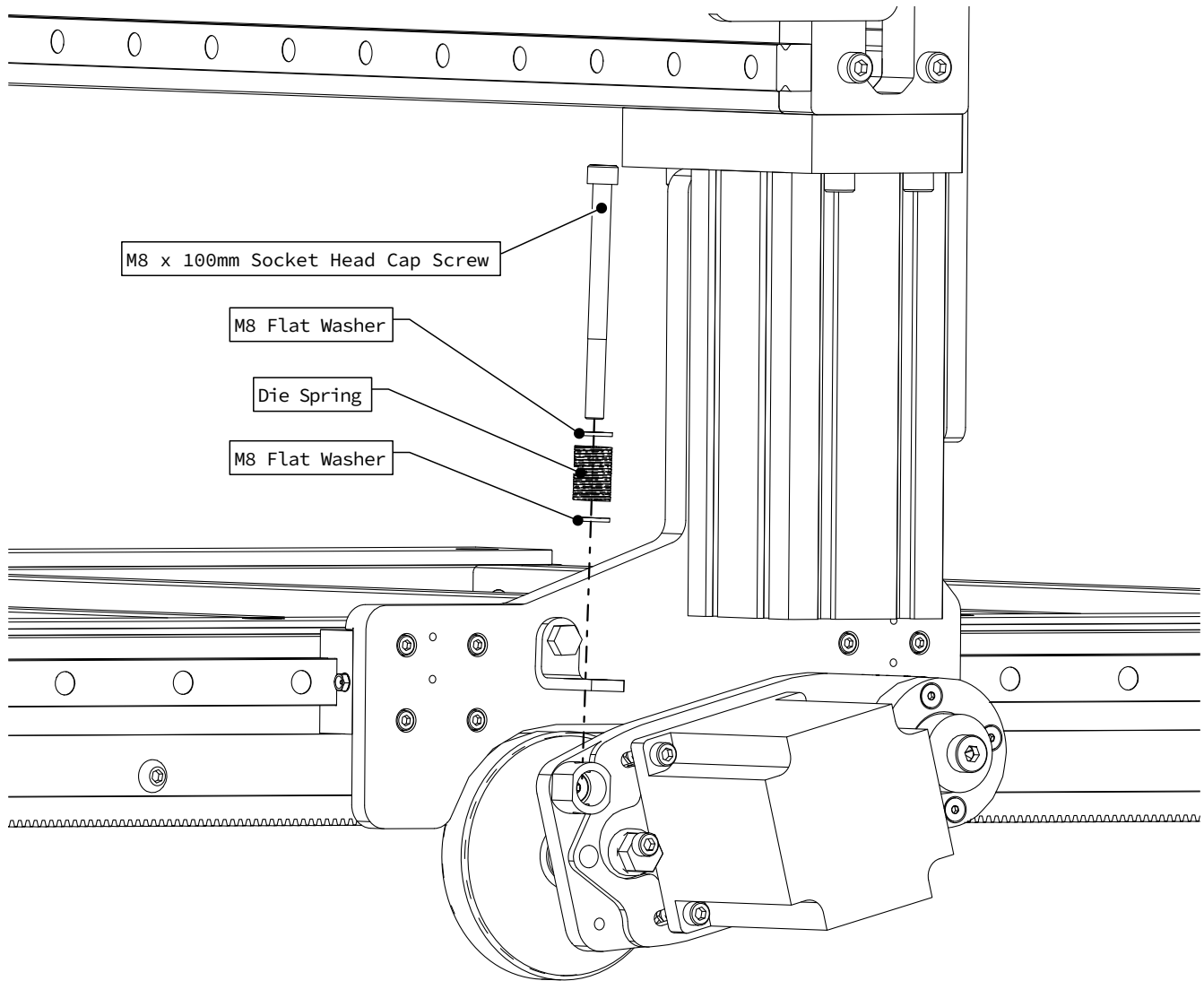
- While pushing in on the Eccentric Collar Bearing, rotate it in the clockwise direction until it starts rotating inside the R&P Plate.
- Hold the Eccentric Collar Bearing in this position while proceeding to the next step.

4.3.1.6



- Tighten the set screw on the side of the Eccentric Collar Bearing.

4.3.1.7

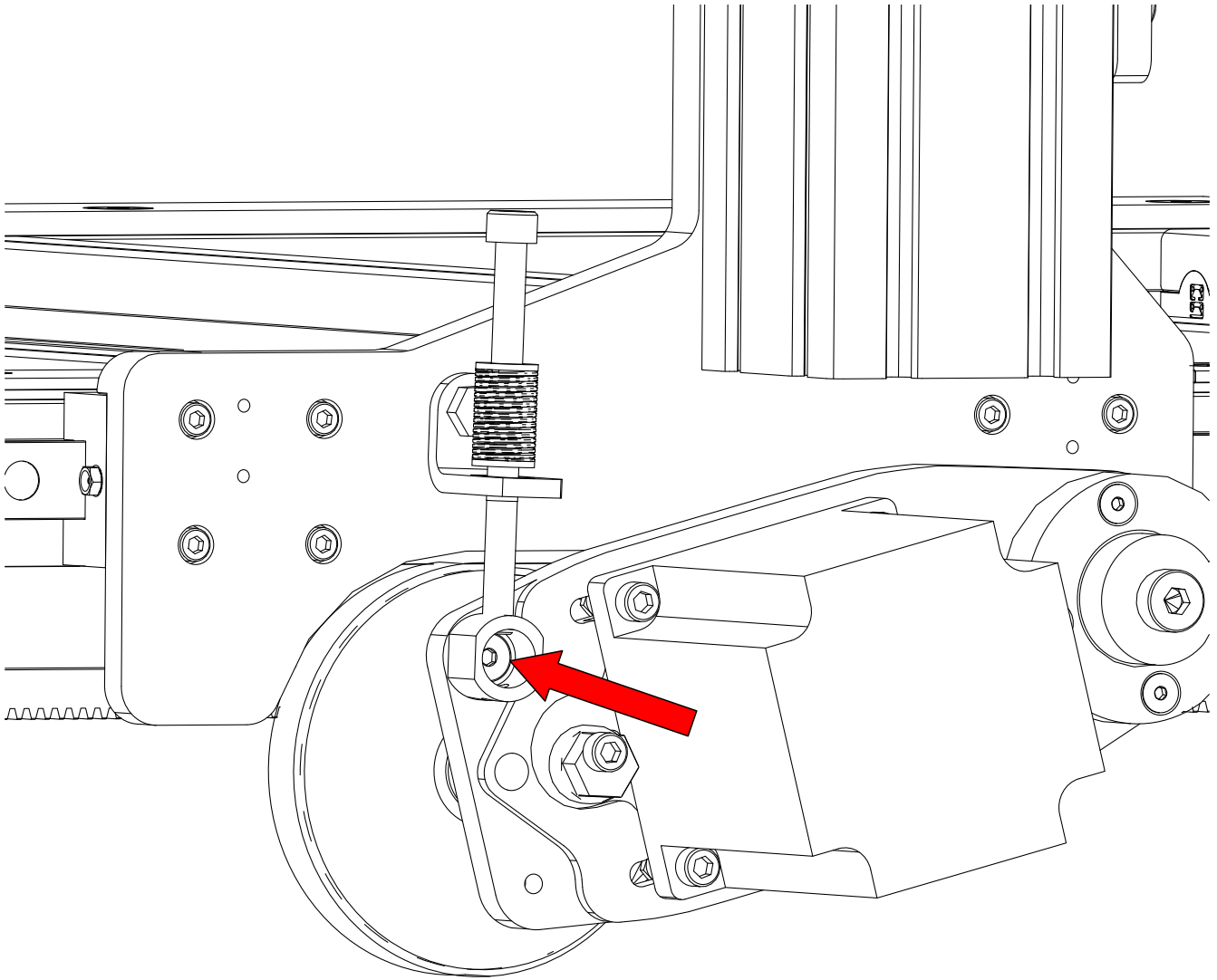


- Install the tension bolt, washers, and spring as indicated.

Assembly Note

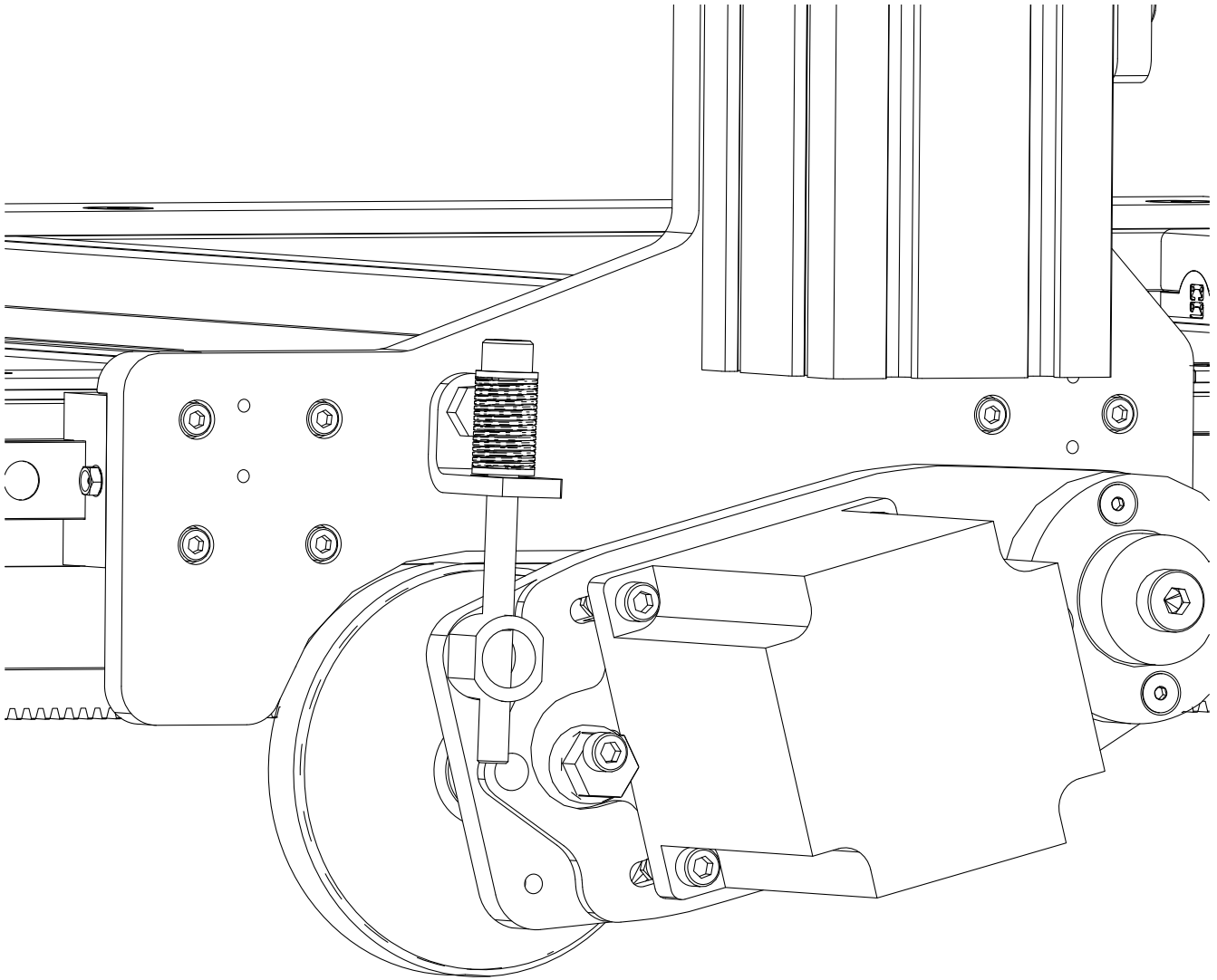
Only thread the bolt through the first hole of the tension post.

4.3.1.8



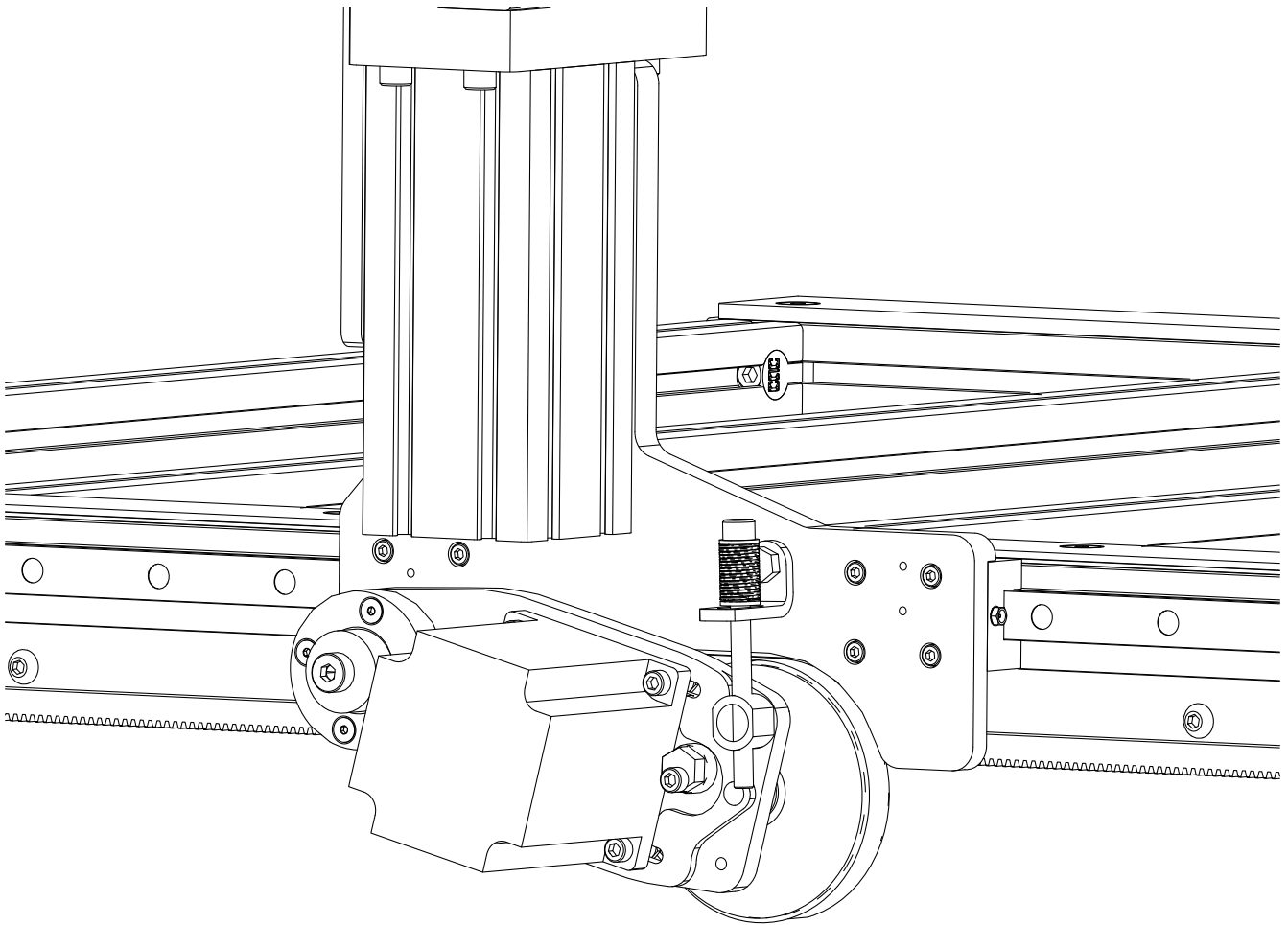
- Tighten the tension post fastener

4.3.1.9



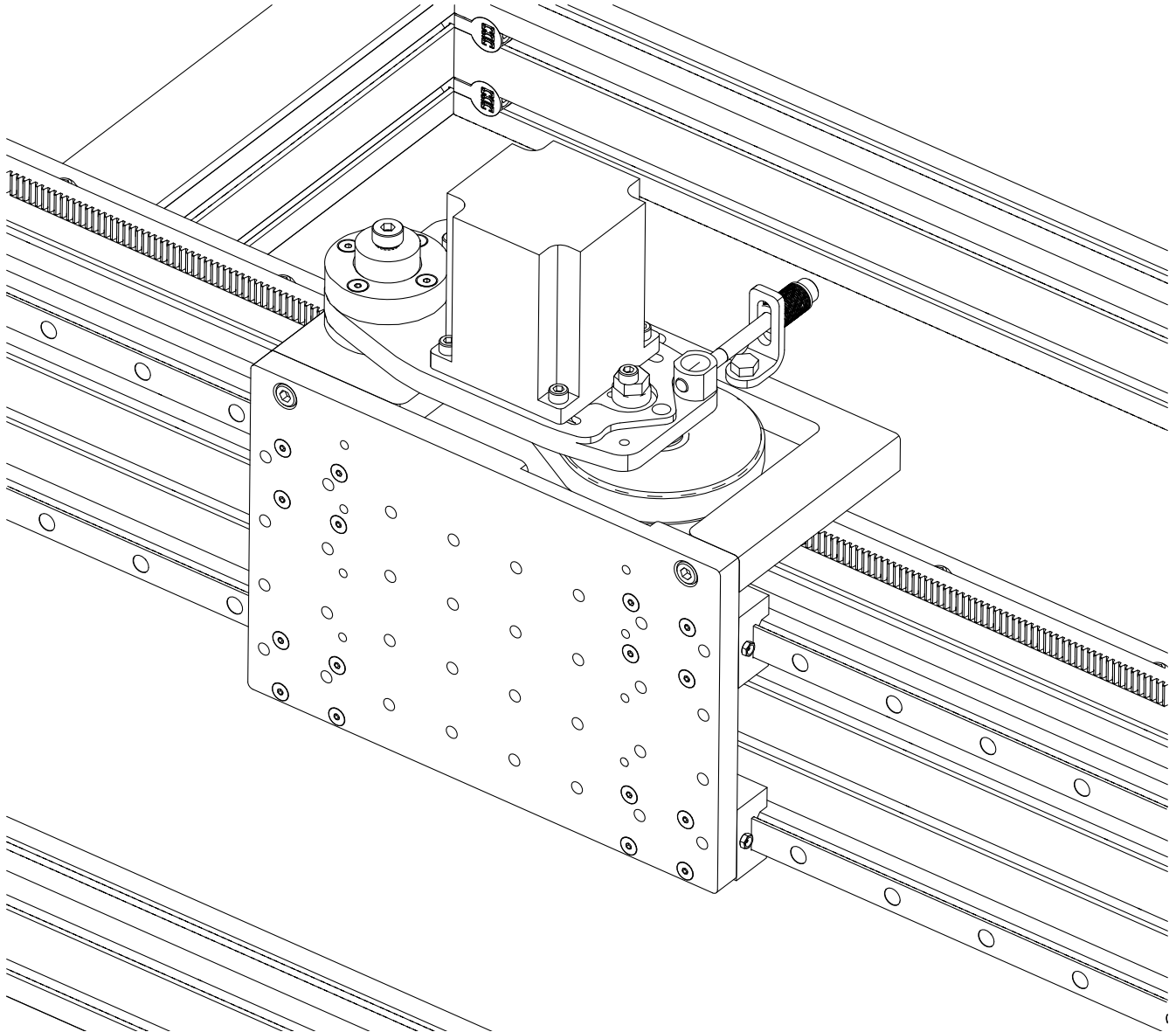
- Continue threading in the tension bolt until the spring is seated, but not compressed.
- Then tighten 3 revolutions to tension the R&P Assembly.

4.3.1.10

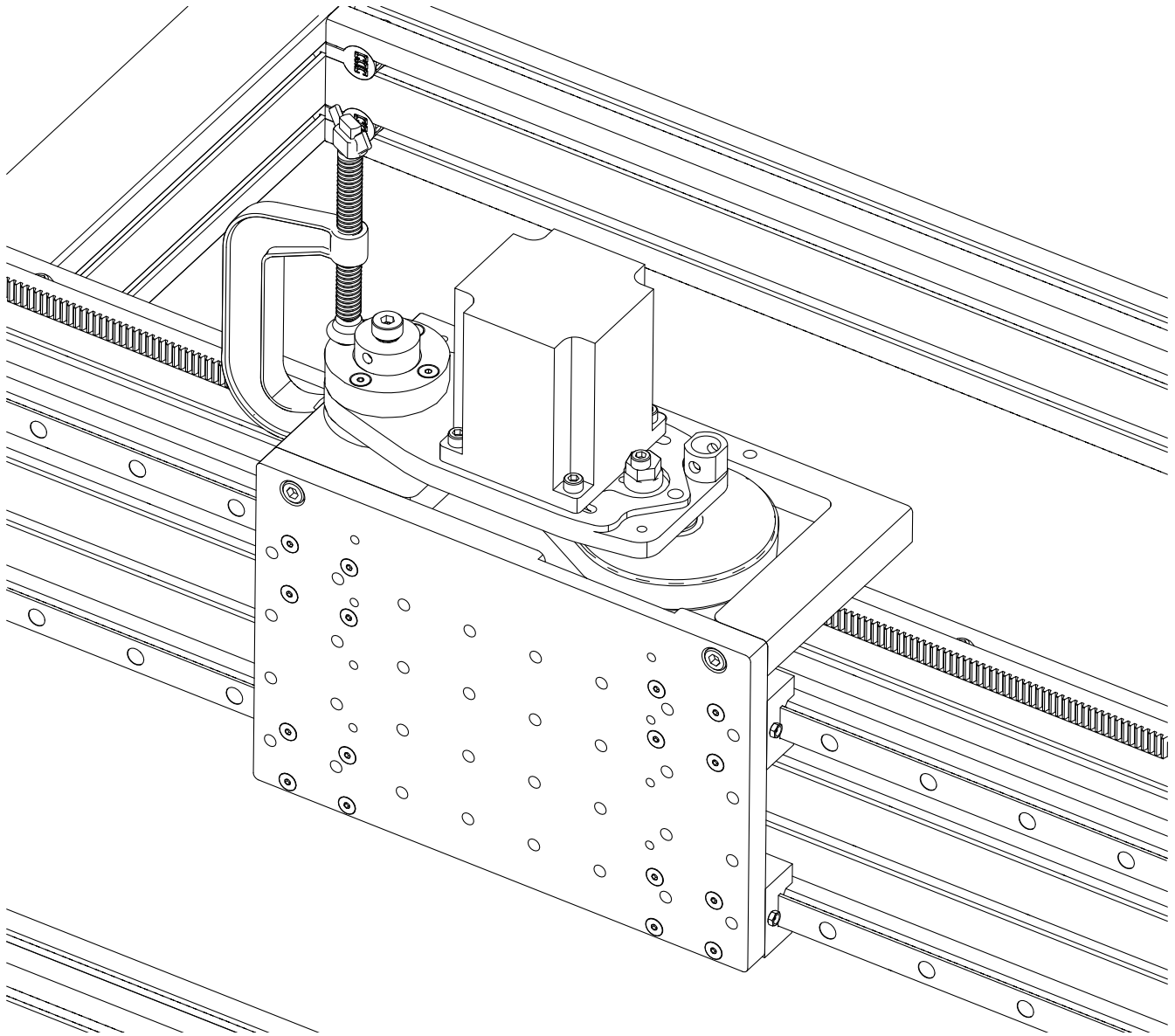


- Repeat this process on the other side of the machine.

4.3.2 Gantry R&P Drive



4.3.2.1

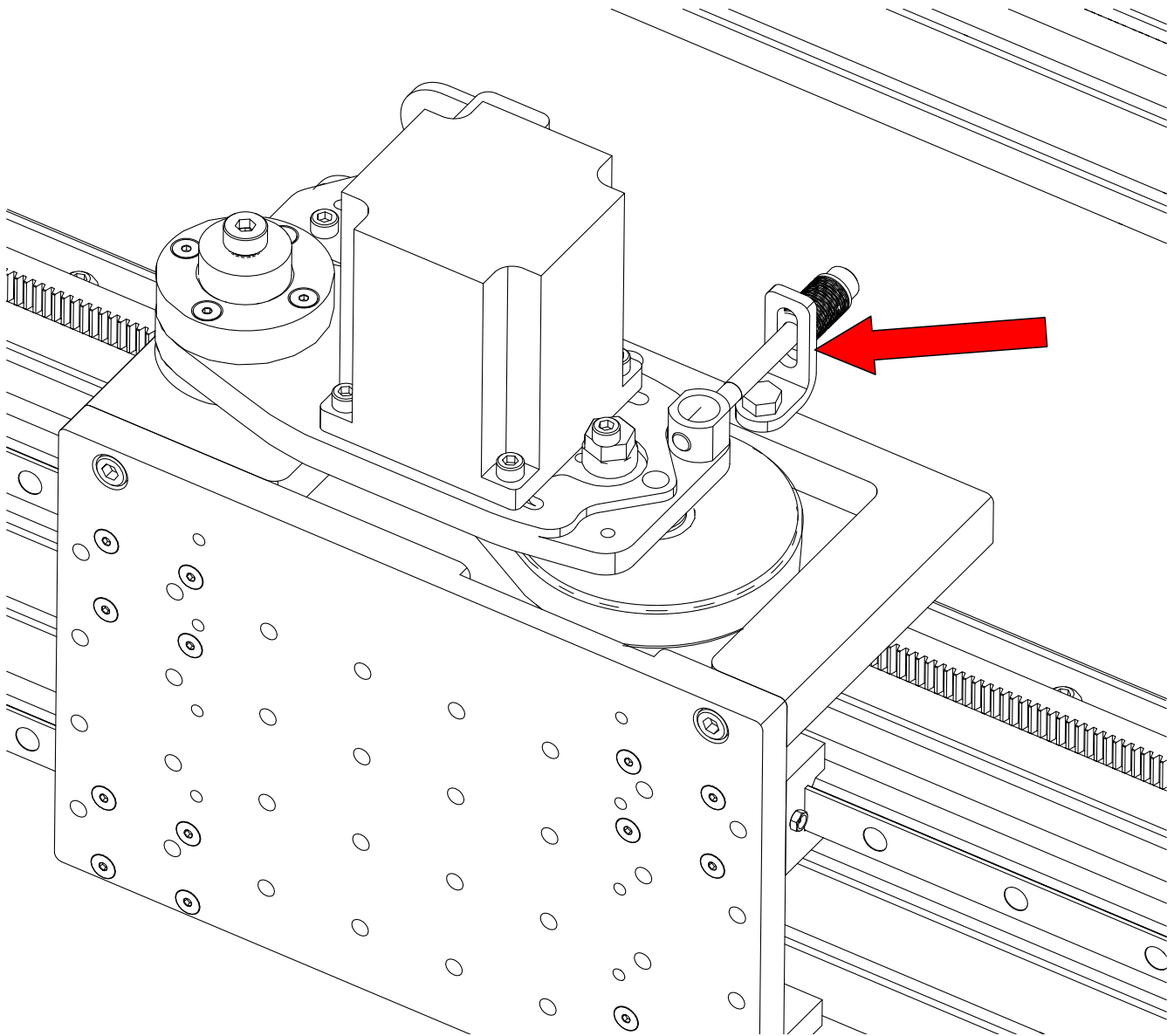


- Repeat the previous steps to install an R&P Drive Assembly on the gantry.

Assembly Note

You can use a clamp to hold the R&P Assembly level while adjusting the Eccentric Collar Bearing.

4.3.2.2

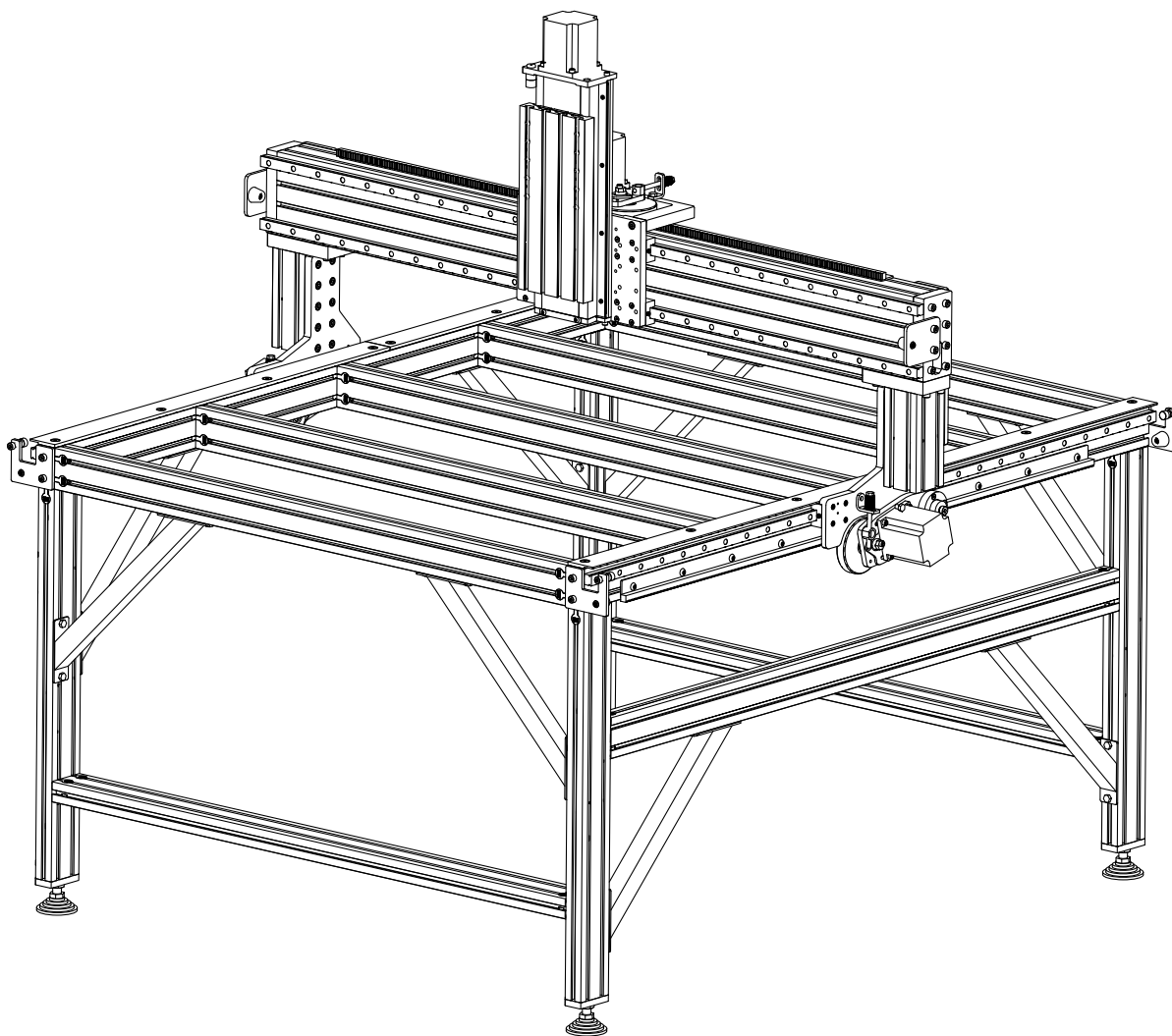


- Follow the same procedure as the table R&P Drive to install the R&P Tensioner on the gantry.

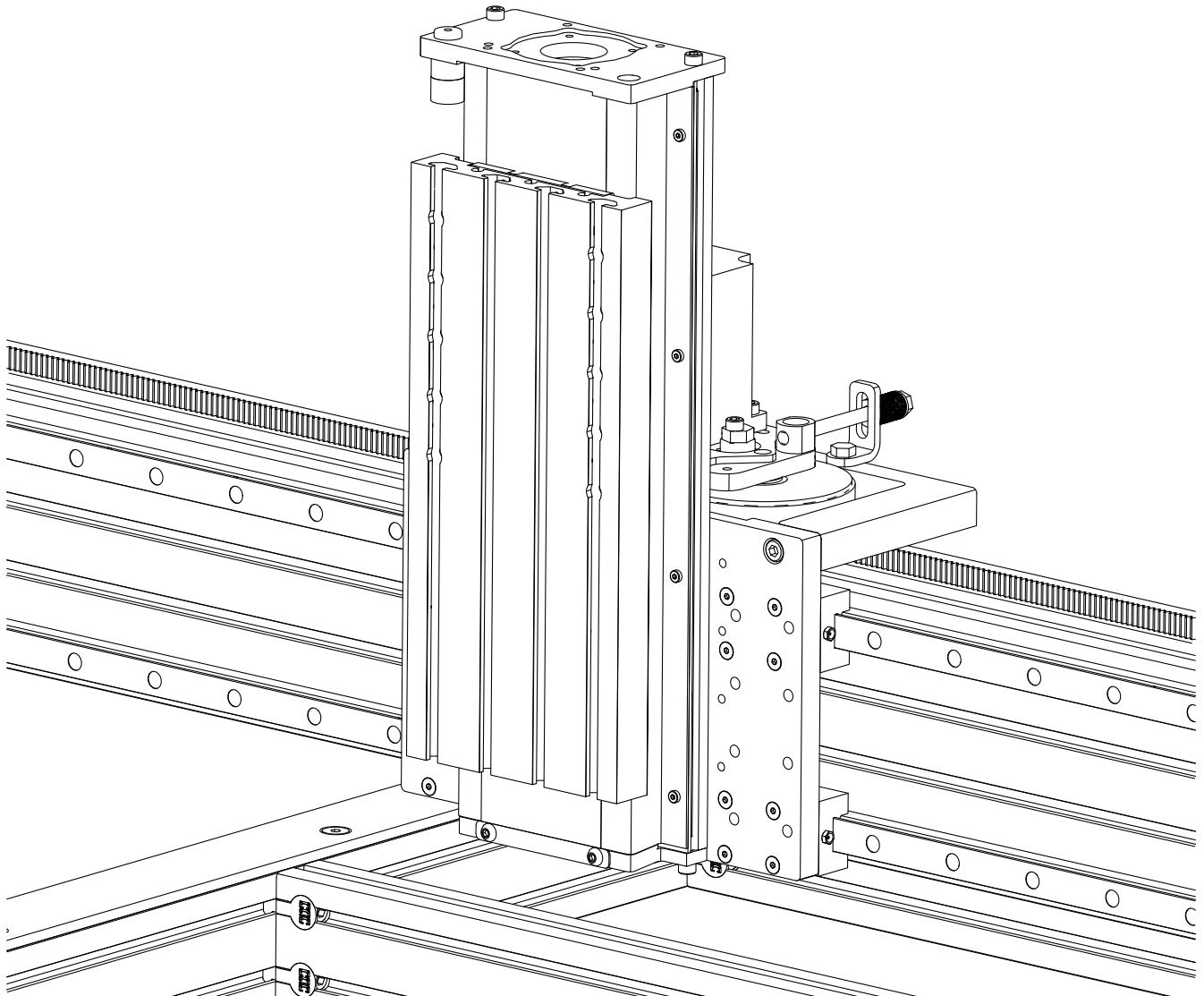
Assembly Note

Ensure the tensioner bracket is in the correct orientation, as depicted above.

Section 5: Z-Axis



5.1 Z-Axis Installation



Parts and Tools Required

The following parts and tools will be used in Section 5.1

QTY	Part/Description	Packaged In
1	CRP840-00 Ballscrew Z-Axis	Z-Axis
1	CRP840-00-FAST-18.3: - (8) M8 x 25mm Flat Head Screw <i>Remaining parts from this kit used in future sections</i>	Z-Axis

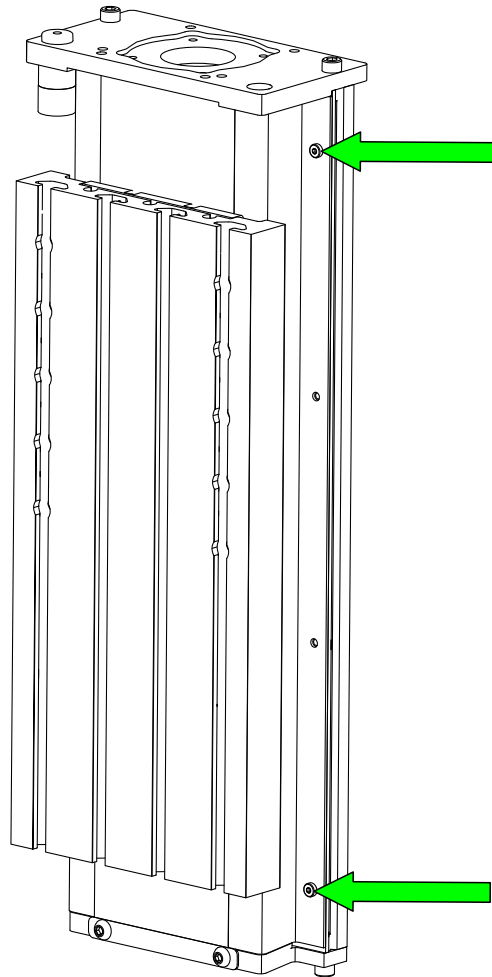
Required Tools:

- 2.5mm Allen Wrench
- 5mm Ball-End Allen Wrench



5.1.1 Attach Z-Axis

5.1.1.1

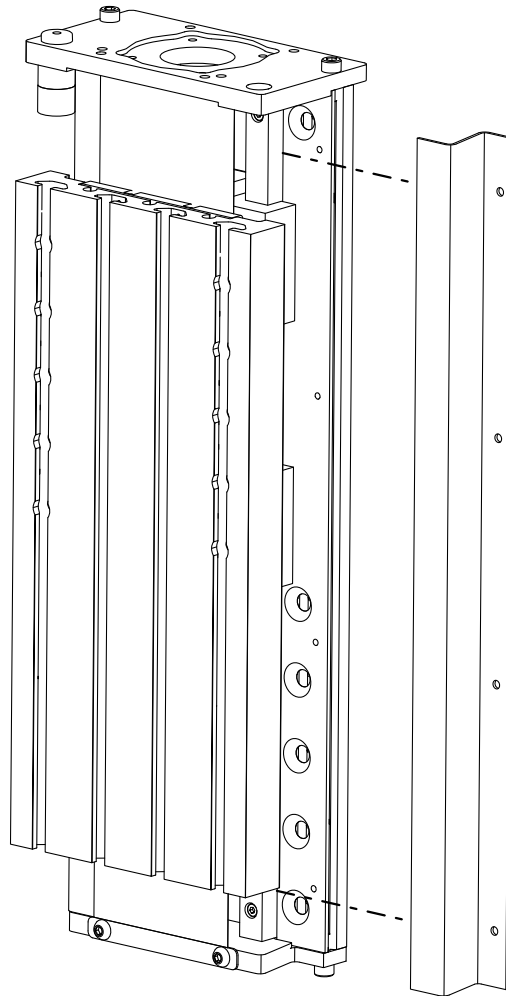


- Remove the screws holding the metal dust covers to the Z-Axis.

Assembly Note

The remaining screws for the dust covers are included in a bag with the Z-Axis.

5.1.1.2

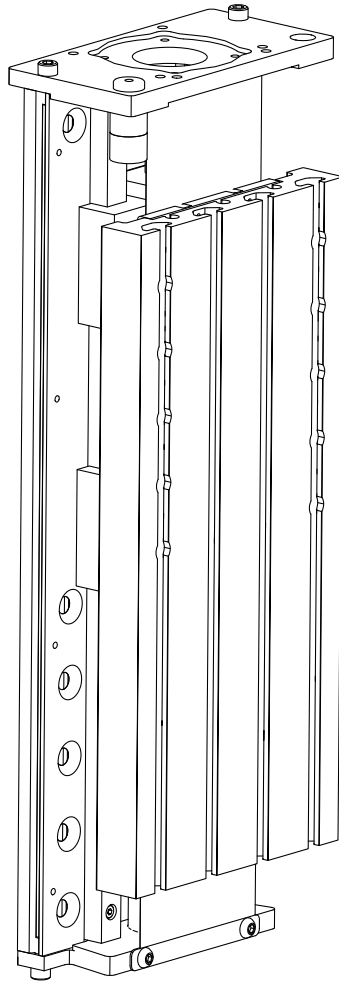


- Remove the dust cover.

Assembly Note

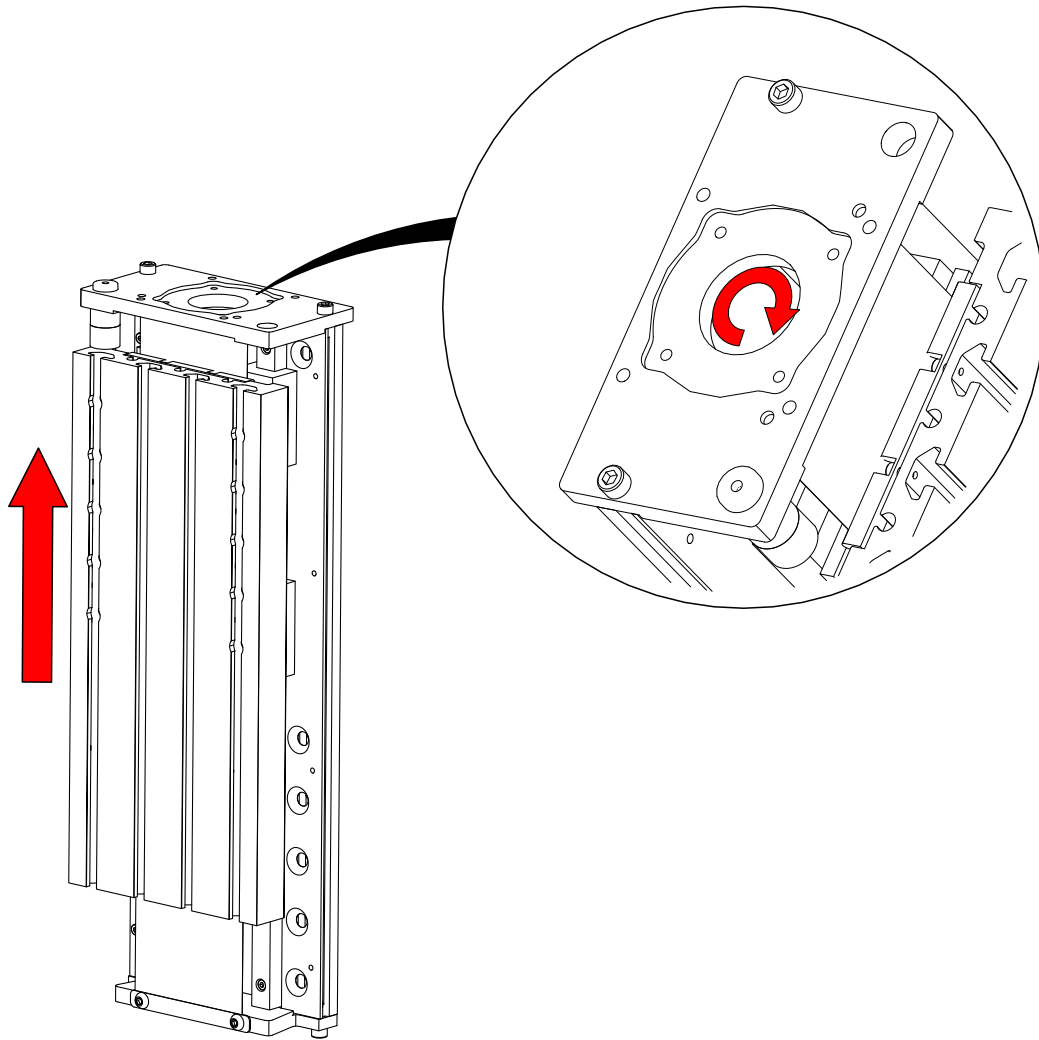
Set aside the dust cover and screws that were removed, these will be reinstalled after mounting the Z-Axis.

5.1.1.3



- Repeat these steps to remove the dust cover on the other side.

5.1.1.4

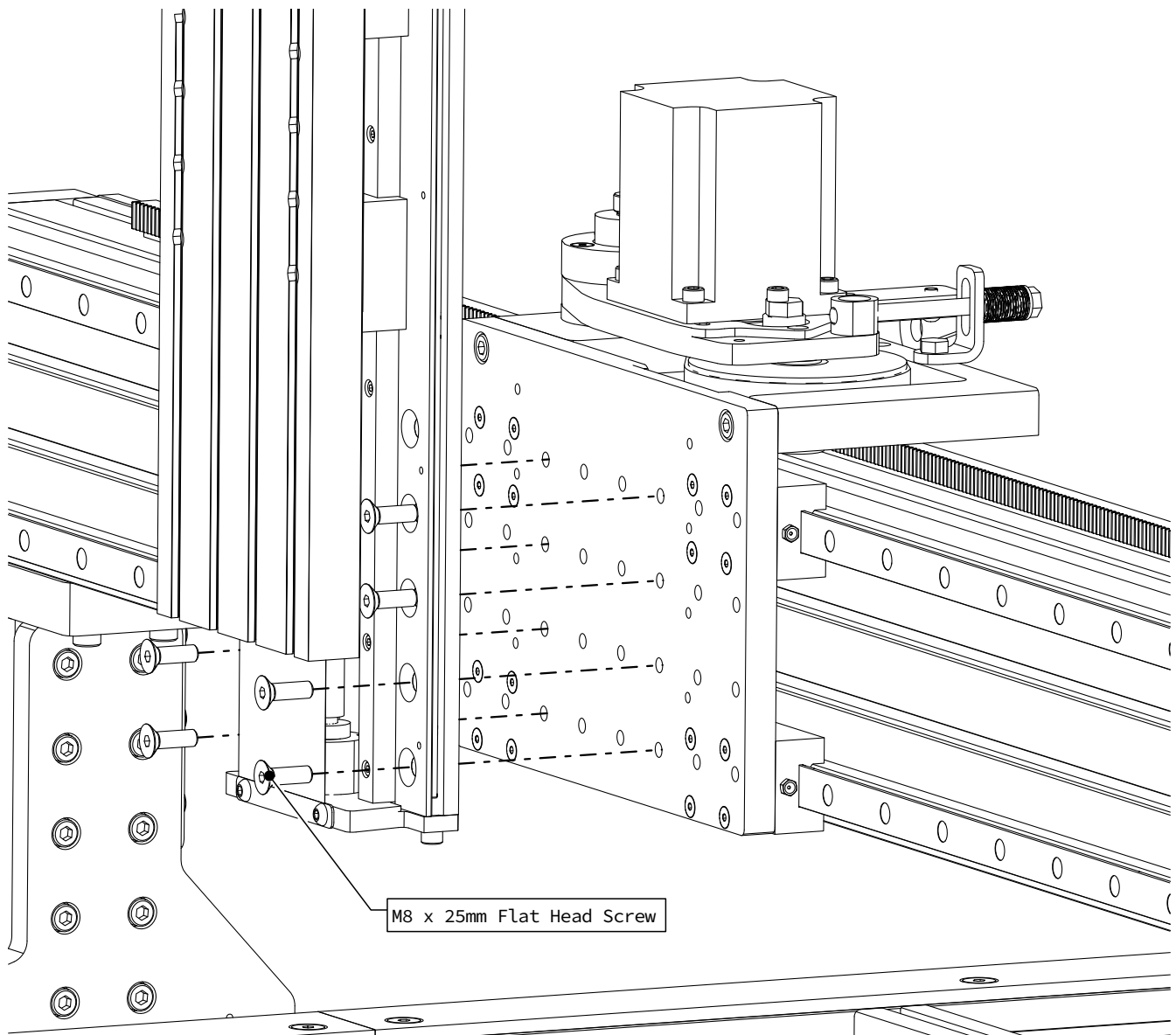


- Rotate the Z-Axis coupler to position the Z-Axis Drop Plate at the top of the Z-Axis.

Assembly Note

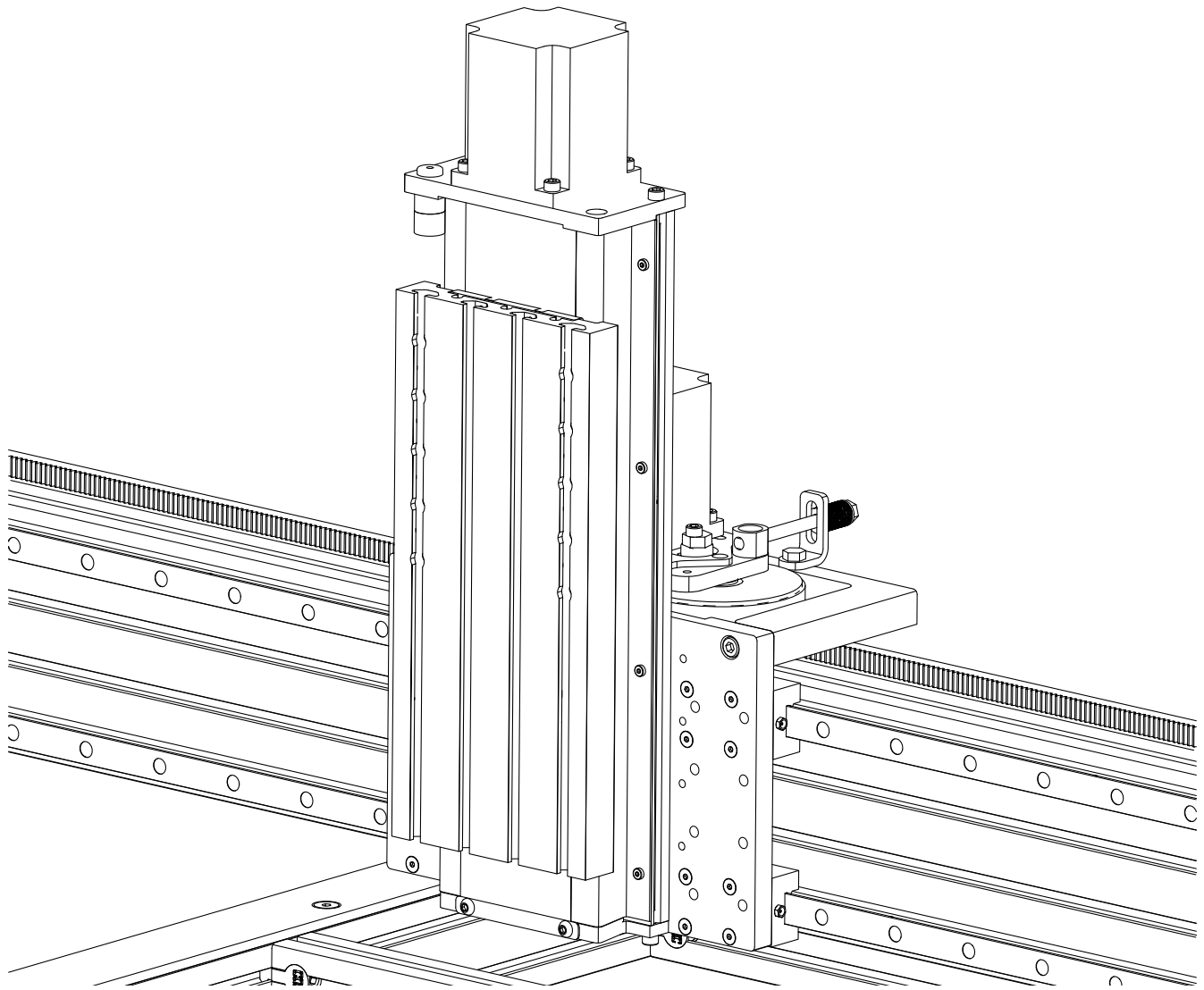
The Z-Axis Drop Plate should be touching the bumper when in the highest position.

5.1.1.5



- Attach the Z-Axis to the gantry carriage as indicated.
- Fully tighten all 8 fasteners.

5.2 Z-Axis Motor Installation



Parts and Tools Required

The following parts and tools will be used in Section 5.2

QTY	Part/Description	Packaged In
1	NEMA 23 or 34 Motor	Electronics or Motors Box
1	Oldham Assembly	Z-Axis
1	CRP840-00-FAST-18.3: - (4) M5 x 10mm Socket Head Cap Screw (NEMA 23 Applications) - (4) M6 x 16mm Socket Head Cap Screw (NEMA 34 Applications)	Z-Axis

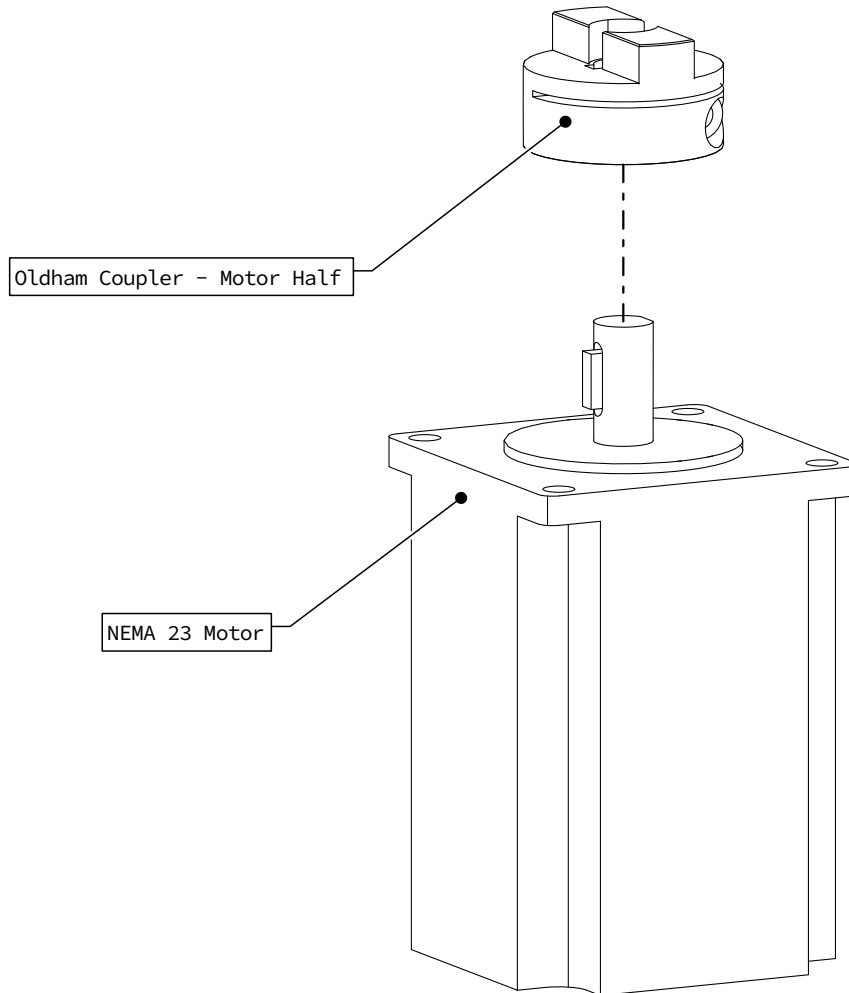
Required Tools:

- 3mm Allen Wrench
- 4mm Allen Wrench (NEMA 23 Applications)
- 5mm Allen Wrench (NEMA 34 Applications)
- Tape Measure



5.2.1 NEMA 23

5.2.1.1

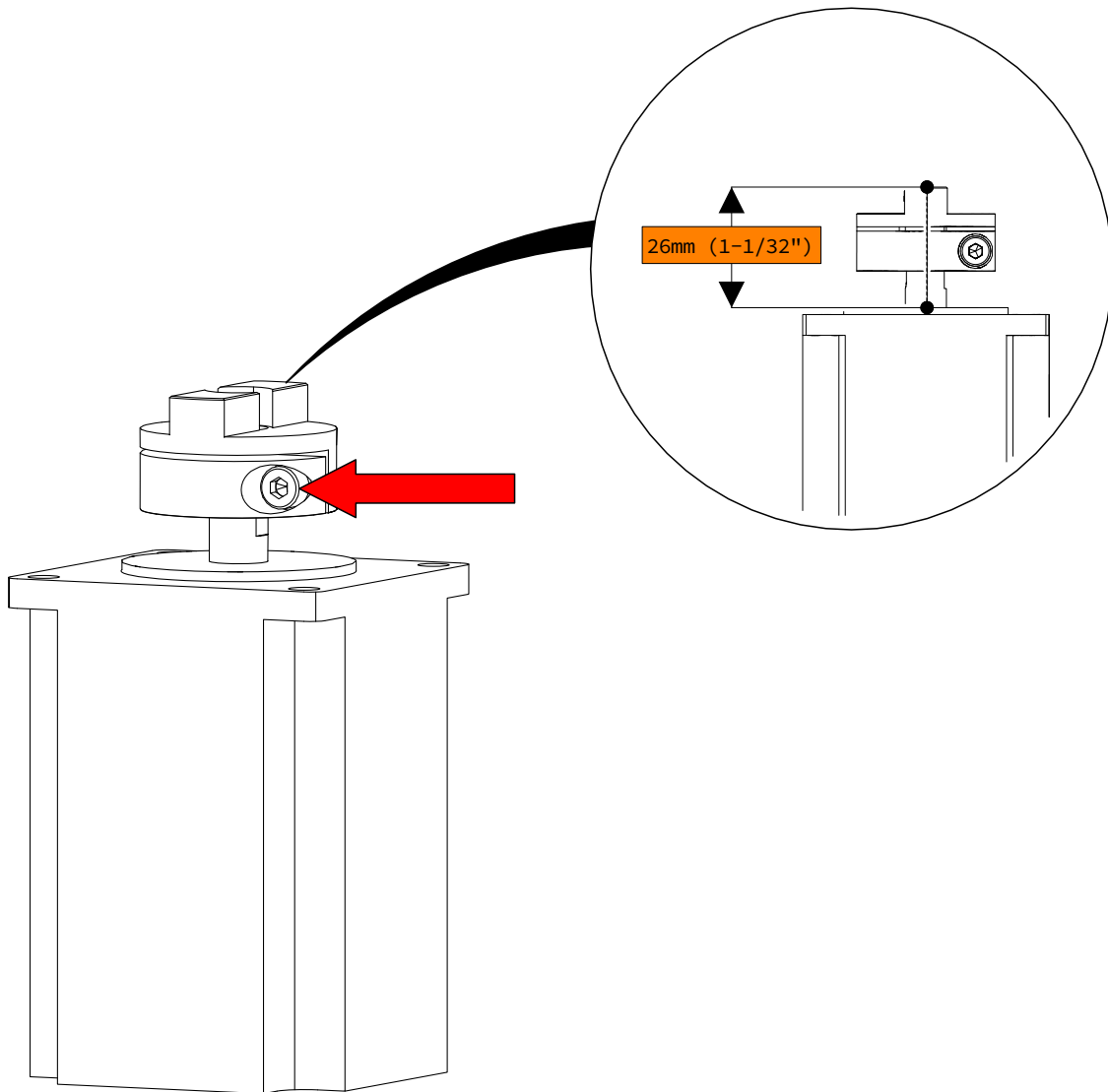


- Slide the motor half of the Oldham Coupler onto the motor as indicated.

Assembly Note

Align the key in the motor shaft with the slot in the Oldham Coupler.

5.2.1.2

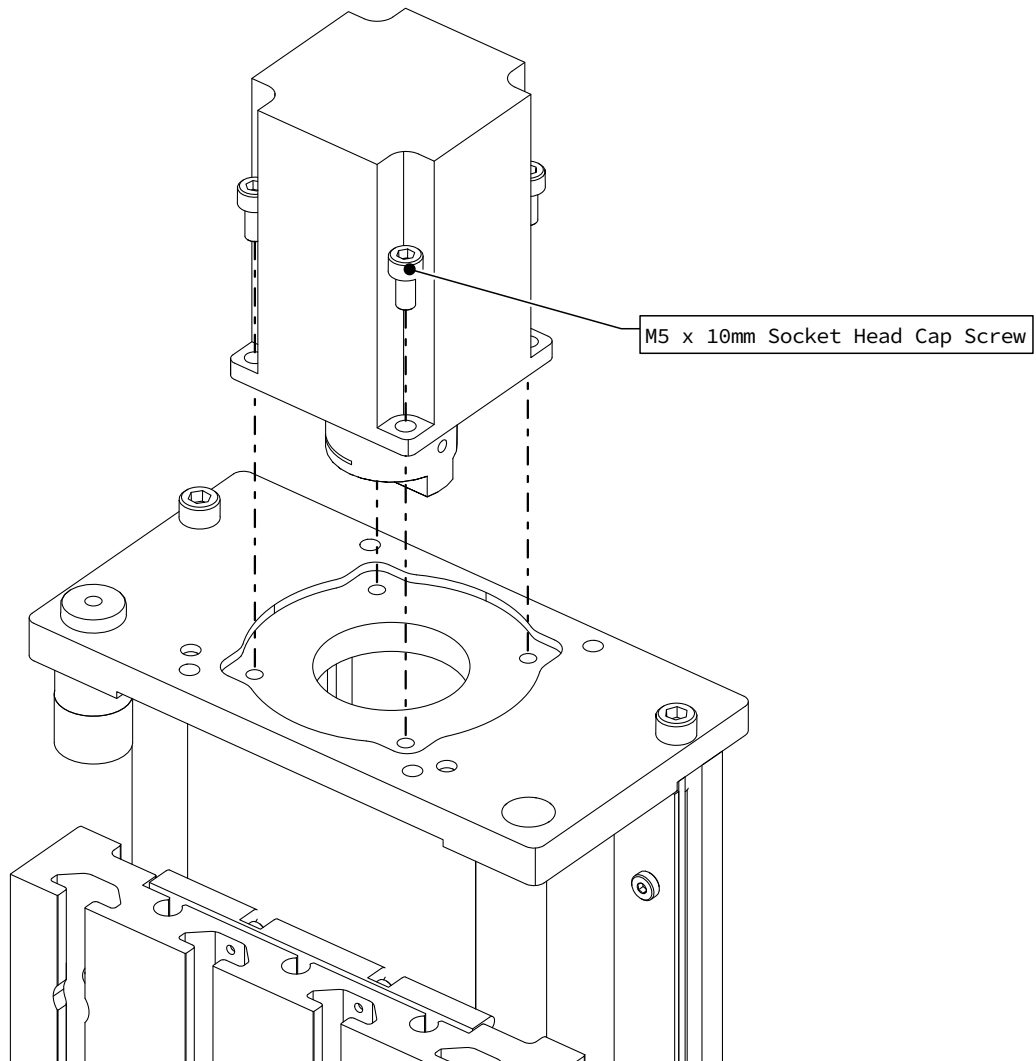


- Position the Oldham Coupler to the dimension shown.
- Then tighten the clamping screw on the Oldham Coupler.

Assembly Note

The dimension shown is measured from the bottom of the motor boss to the top of the Oldham Coupler.

5.2.1.3



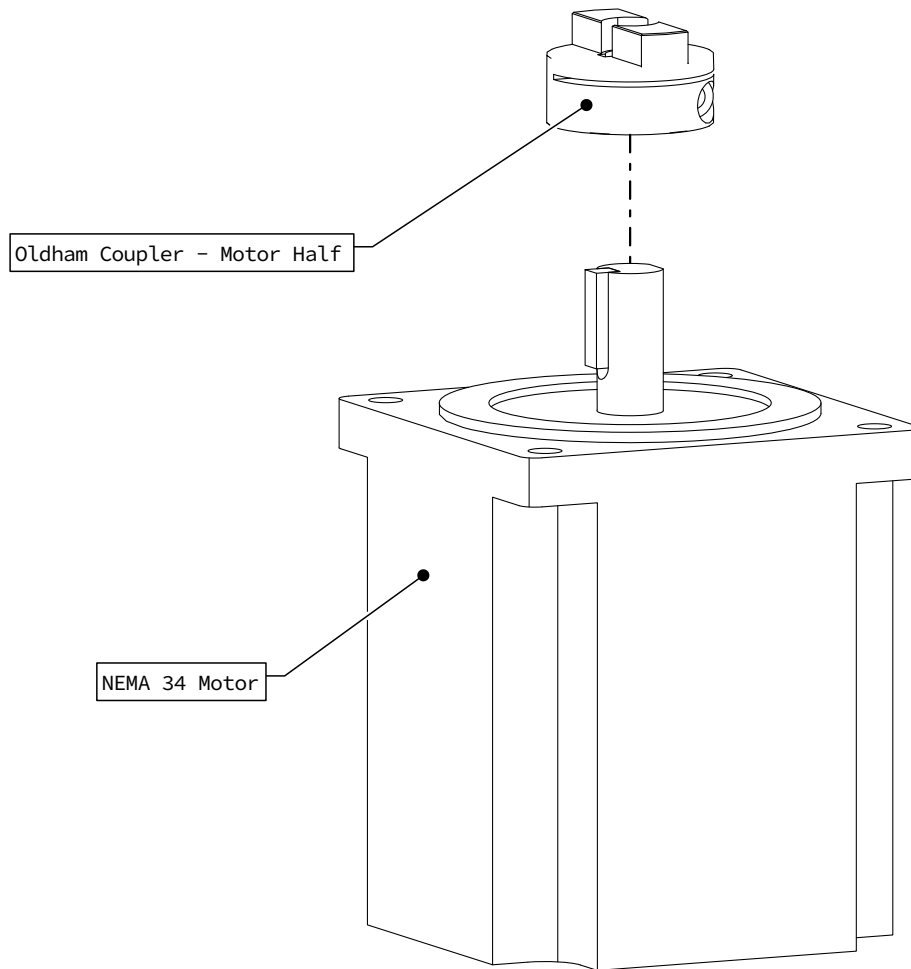
- Install the assembled motor on the Z-Axis as indicated.

Assembly Note

Align the motor half of the Oldham Coupler with the Oldham Coupler on the Z-Axis.

5.3.1 NEMA 34

5.3.1.1

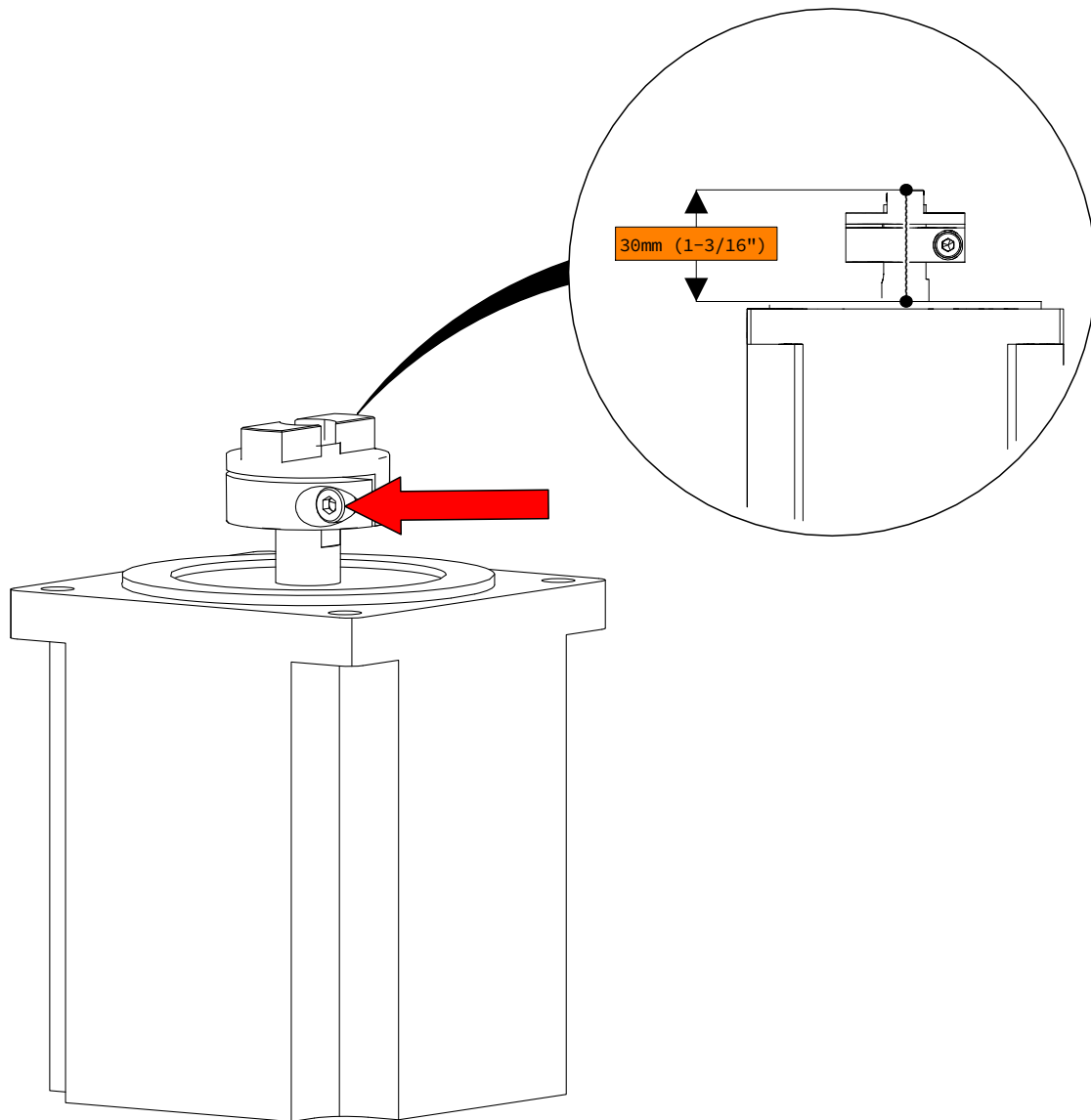


- Slide the motor half of the Oldham Coupler onto the motor as indicated.

Assembly Note

Align the key in the motor shaft with the slot in the Oldham Coupler.

5.3.1.2

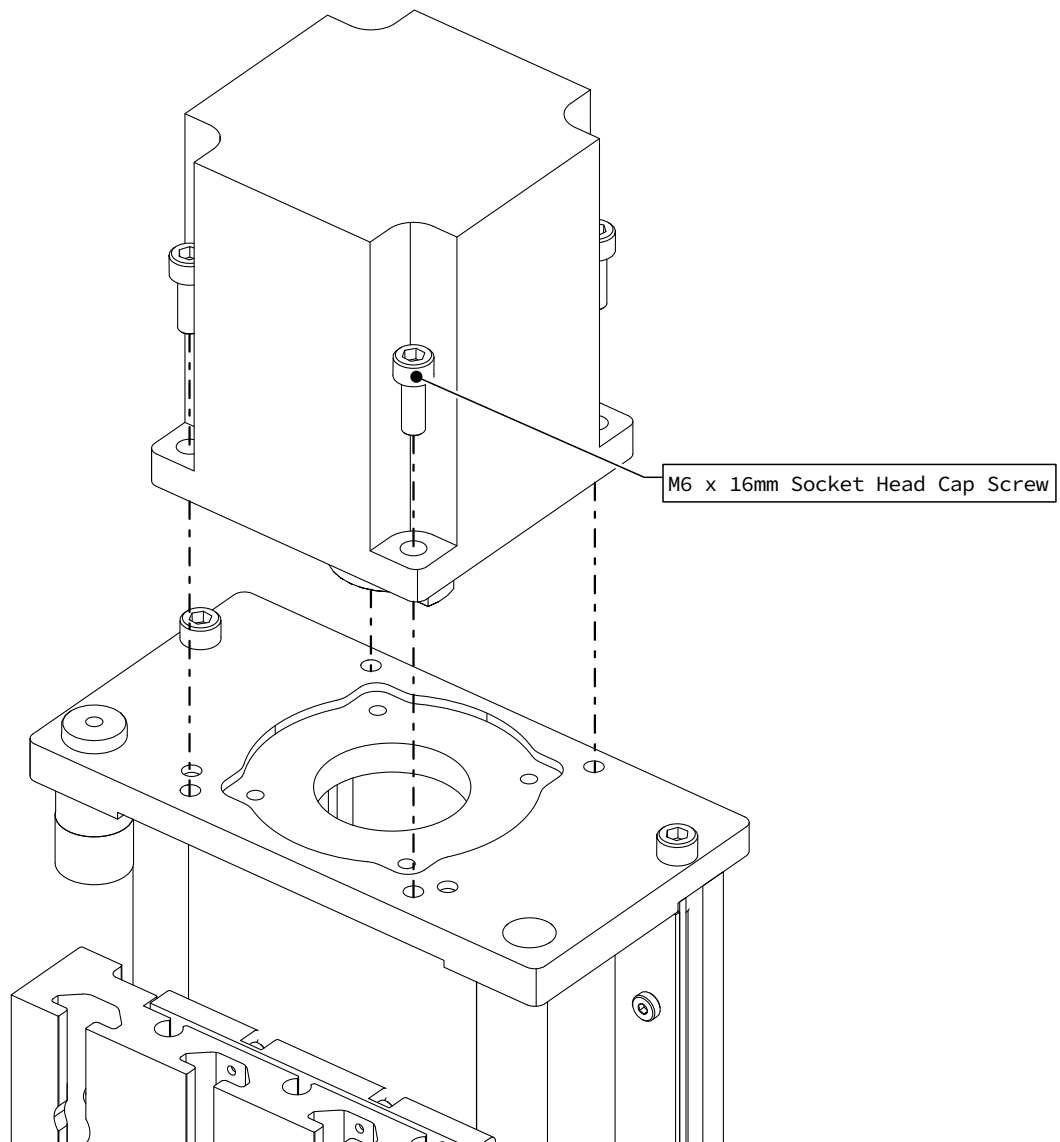


- Position the Oldham Coupler to the dimension shown.
- Then tighten the clamping screw on the Oldham Coupler.

Assembly Note

The dimension shown is measured from the boss on the motor to the top of the Oldham Coupler.

5.3.1.3

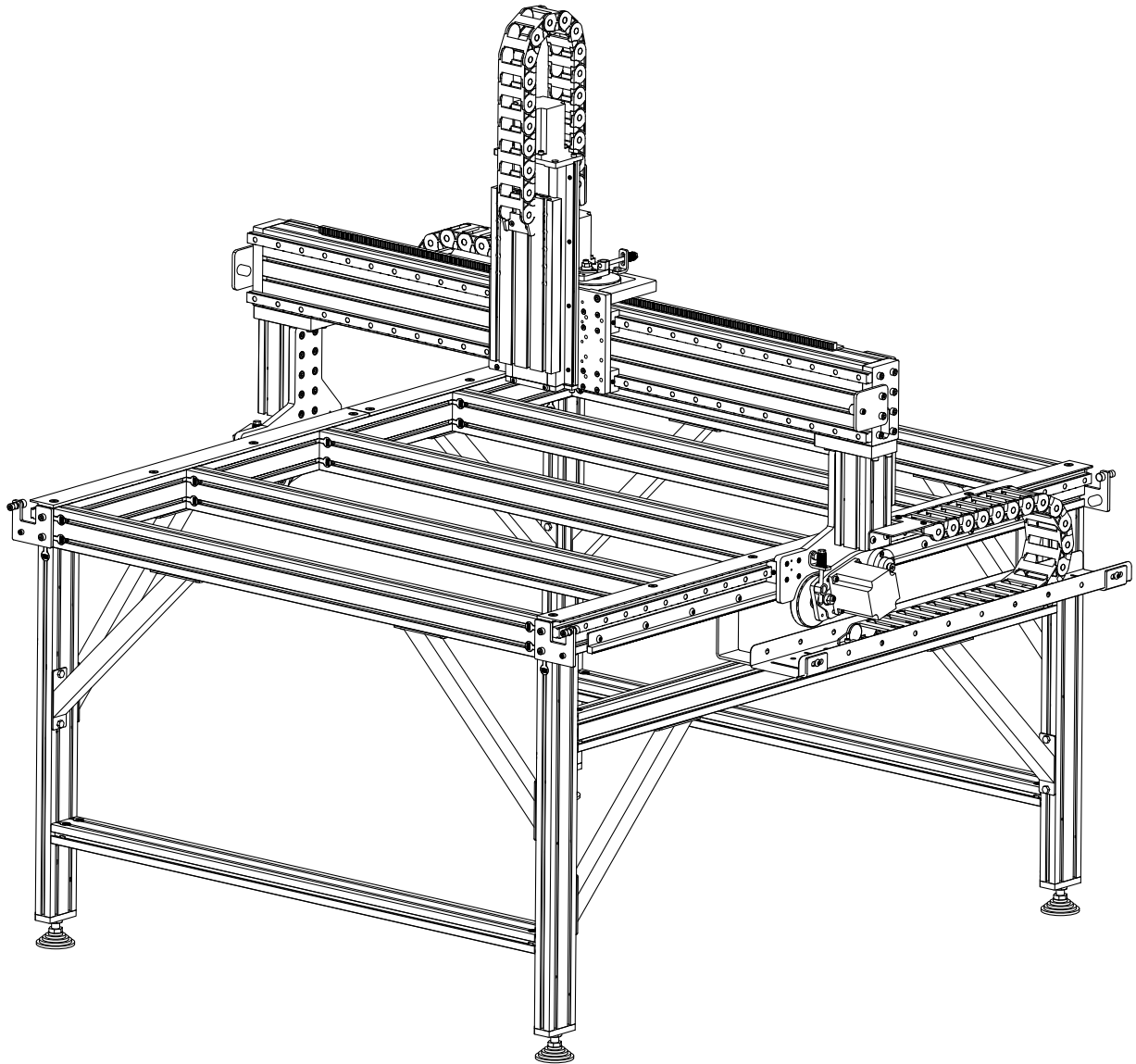


- Install the assembled motor on the Z-Axis as indicated.

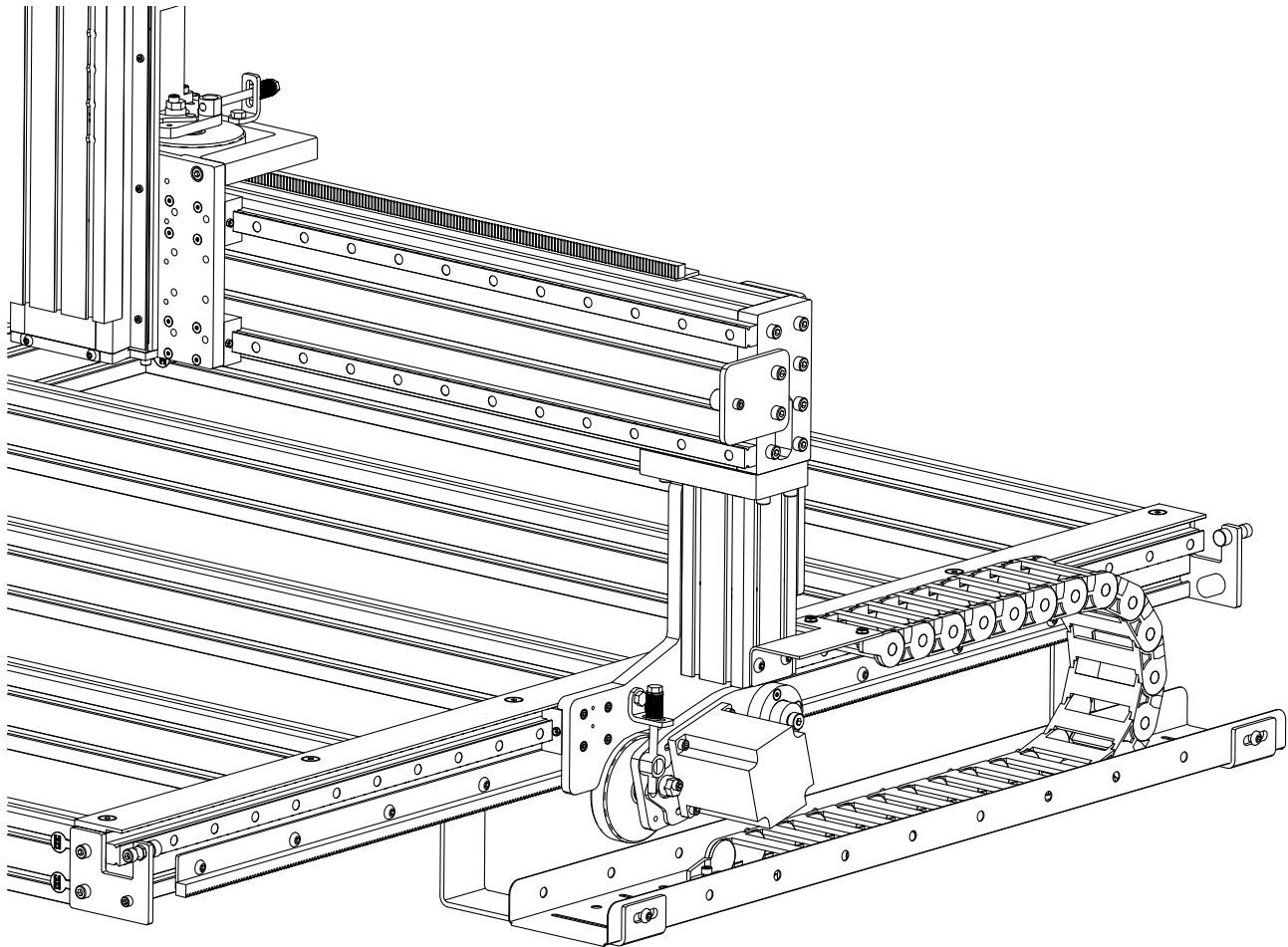
Assembly Note

Align the motor half of the Oldham Coupler with the Oldham Coupler on the Z-Axis.

Section 6: Cable Track



6.1 Table Cable Track



Parts and Tools Required

The following parts and tools will be used in Section 6.1

QTY	Part/Description	Packaged In
2	CRP150-03 Cable Tray Bracket	Cable Track
1	CRP150-08 Riser Cable Track Bracket	Cable Track
1	QT40x125B Cable Track Tray	Cable Track
1	75mm Cable Track Section	Cable Track
1	CT-TRAY-TABLE-PRO-FAST: - (4) M8 x 12mm Button Head Cap Screw - (4) M8 x 16mm Button Head Cap Screw - (4) M8 Roll-in T-Nut - (2) M8 Hex Flange Nut	Cable Track
1	CT-FAST-PRO-19.1: - (2) M8 Roll-in T-Nut - (4) M6 x 12mm Socket Head Cap Screw - (4) M6 Flat Washer - (4) M6 Hex Jam Nut <i>Remaining parts from this kit used in future sections</i>	Cable Track

Required Tools:

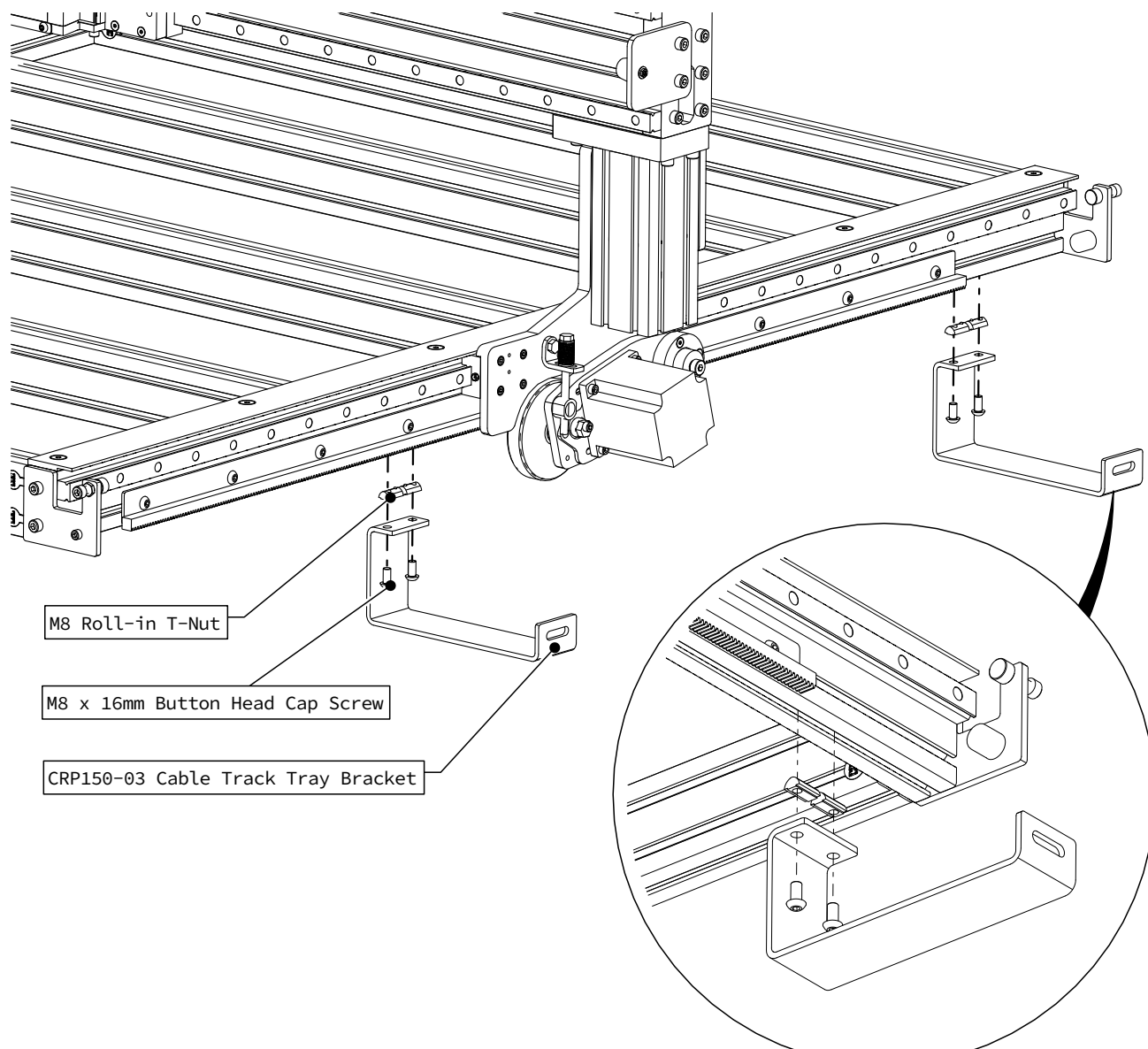
- 5mm Allen Wrench
- Adjustable Wrench
- Tape Measure

Recommended Additional Tools:

- 10mm Combination Wrench
- 13mm Combination Wrench

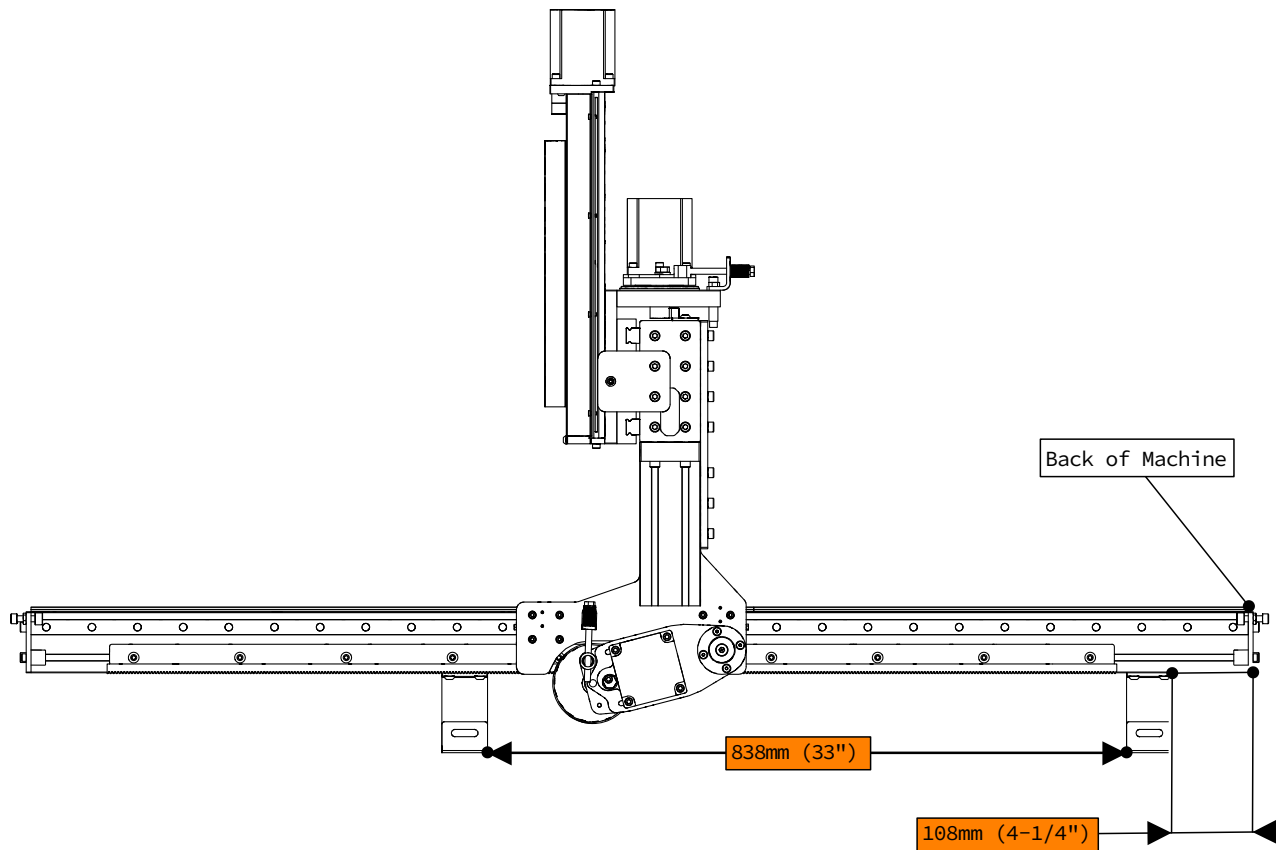
6.1.1 Cable Track Tray

6.1.1.1



- Attach the Cable Track Tray Brackets to the base extrusion as indicated.
- Partially tighten the fasteners to allow positioning in the next step.

6.1.1.2

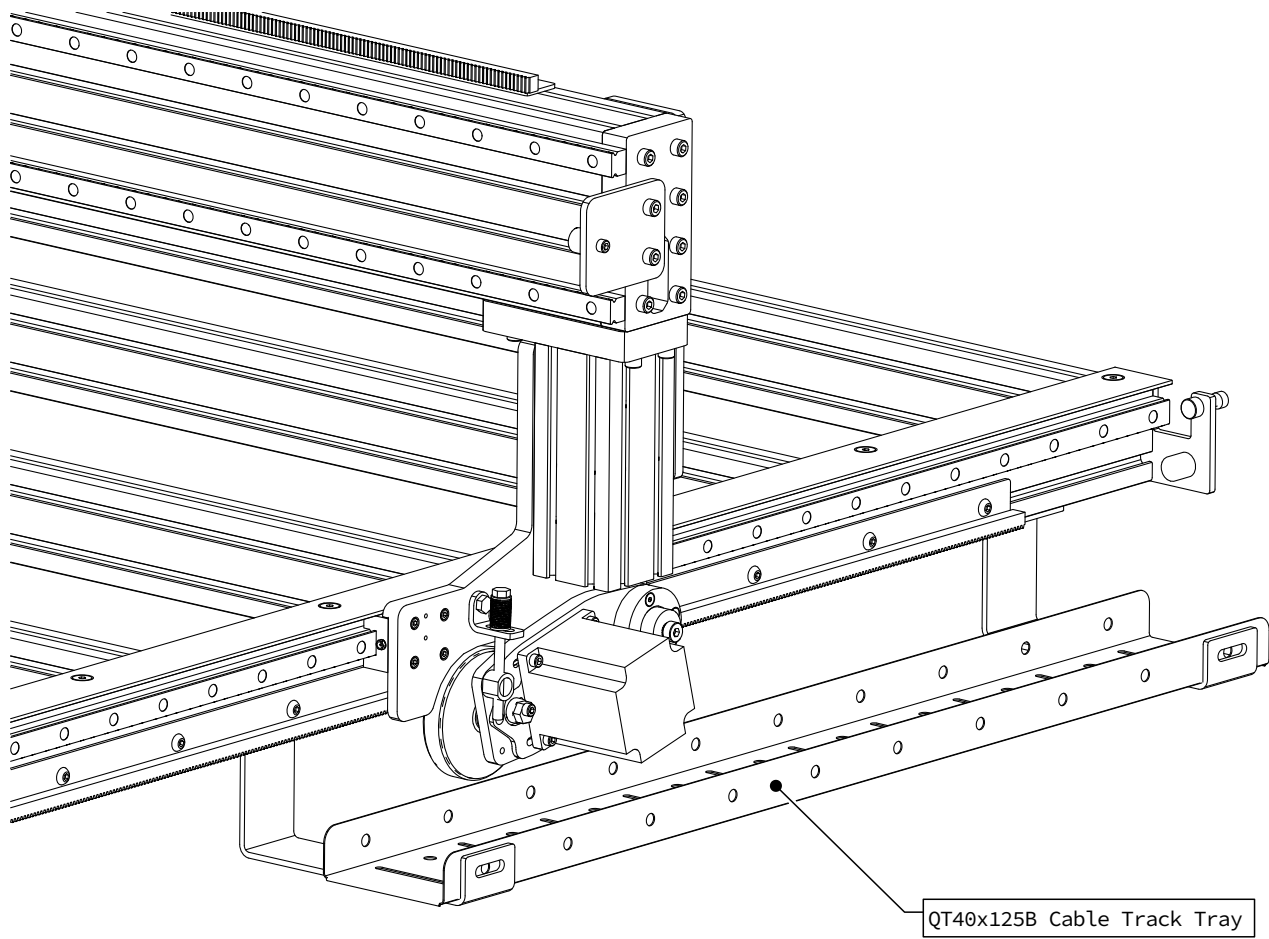


- Position the brackets as indicated.
- Fully tighten the fasteners.

Assembly Note

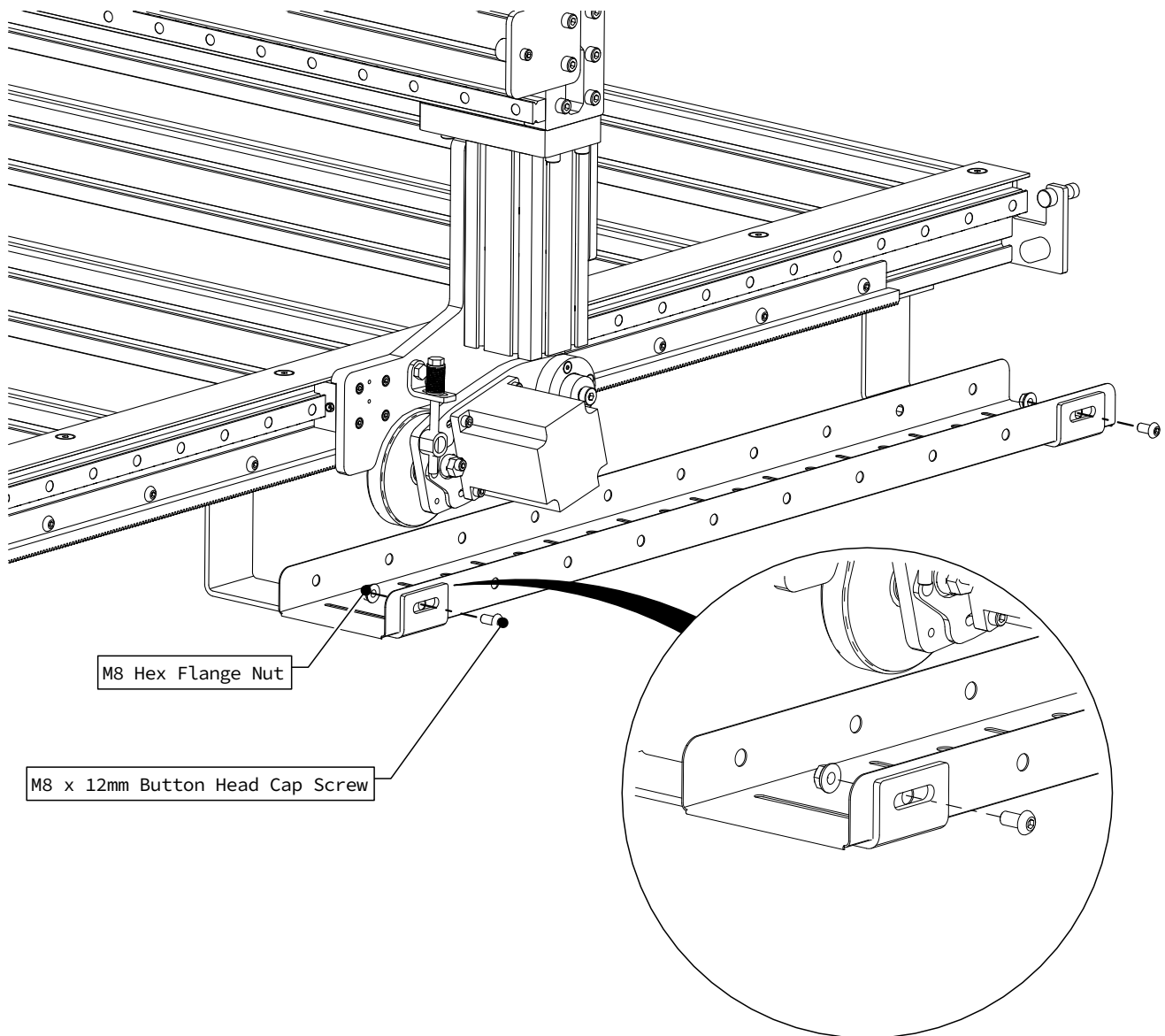
Dimensions shown are from the back of the machine.

6.1.1.3



- Set a Cable Track Tray on the brackets.

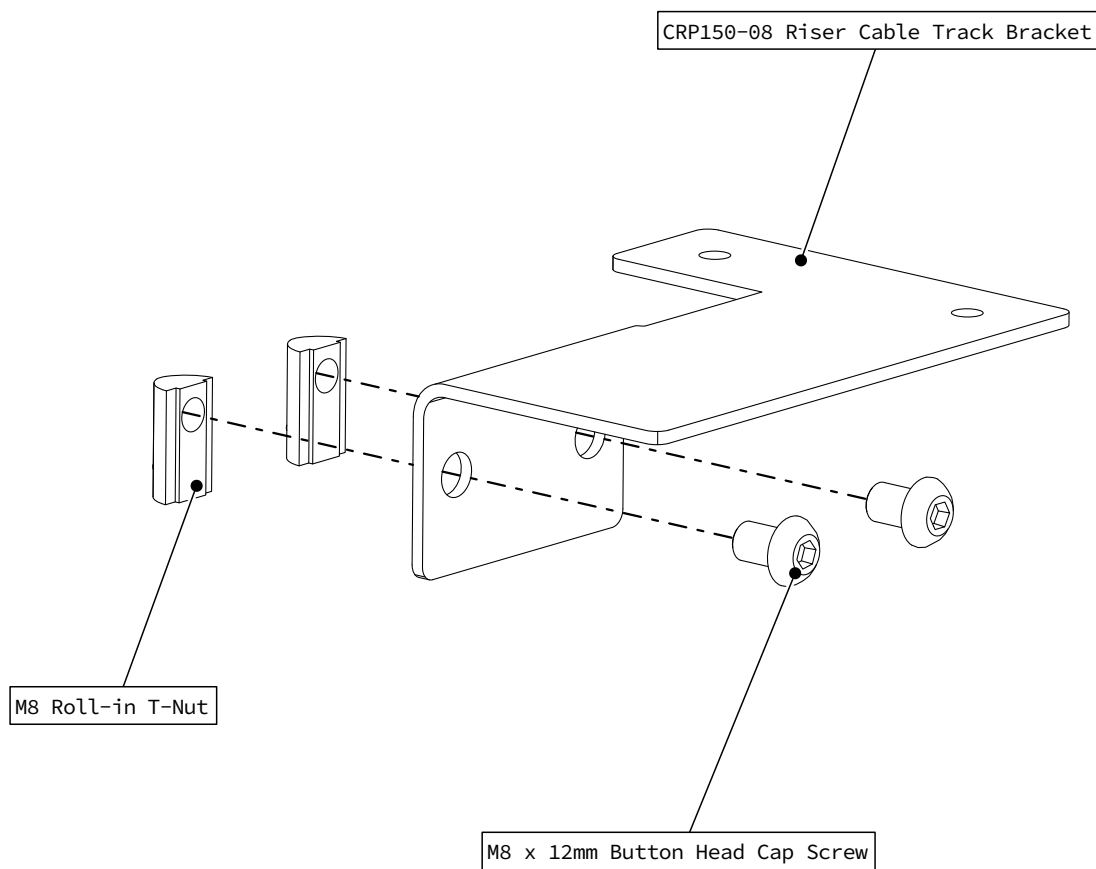
6.1.1.4



- Fasten the Cable Track Tray to the brackets as indicated.

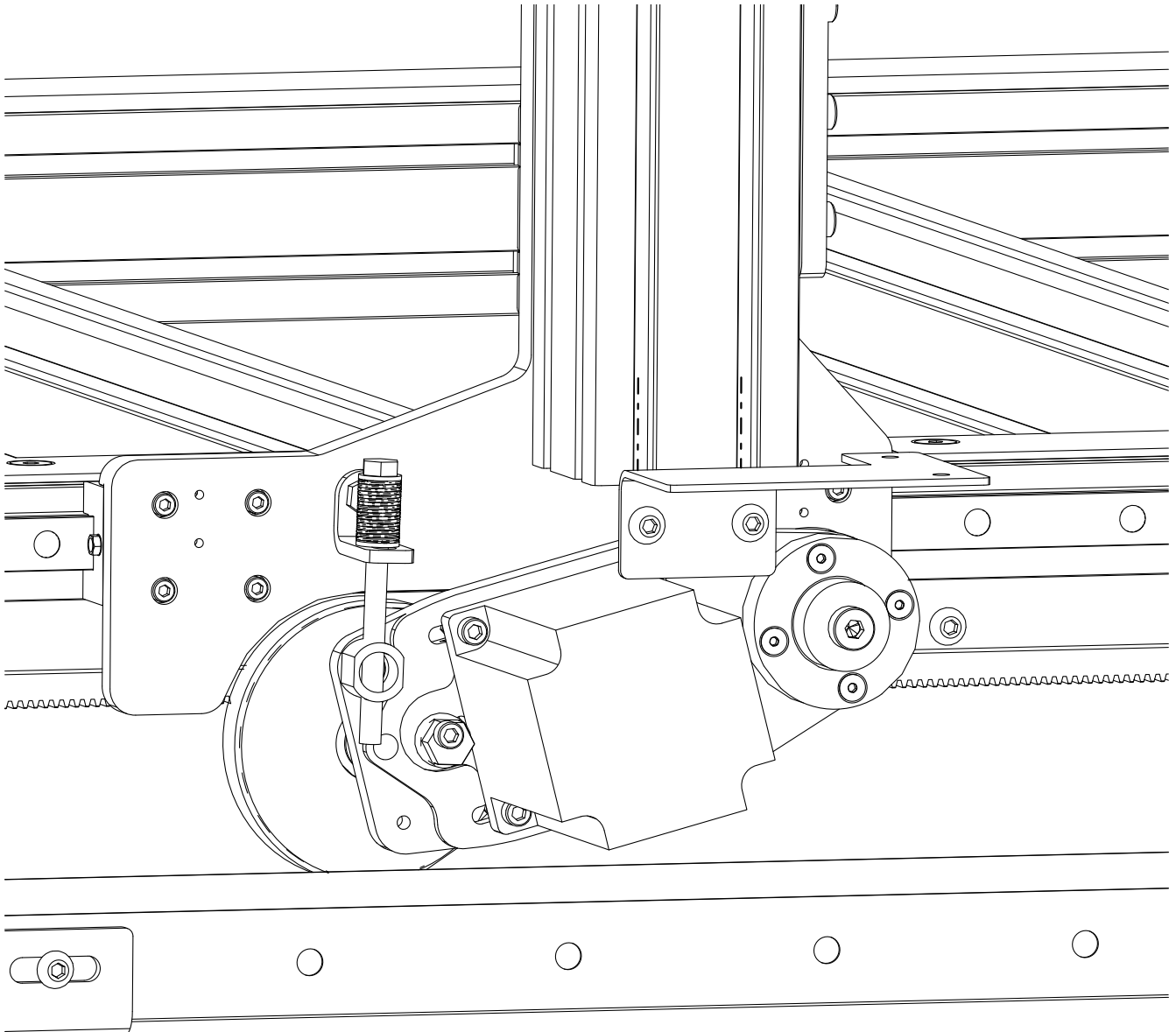
6.1.2 Cable Track Installation

6.1.2.1



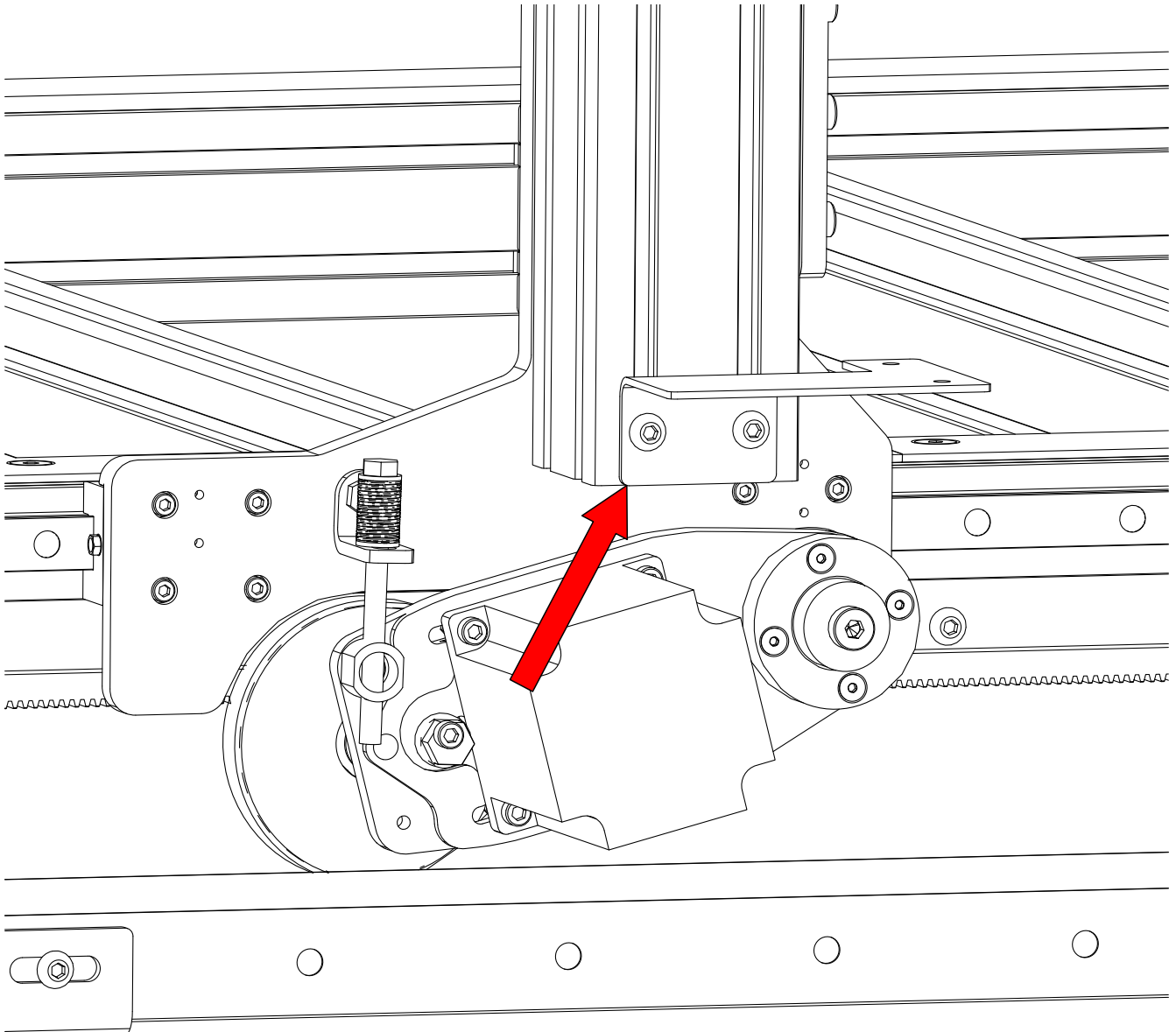
- Partially thread fasteners into the Riser Cable Track Bracket as indicated.

6.1.2.2



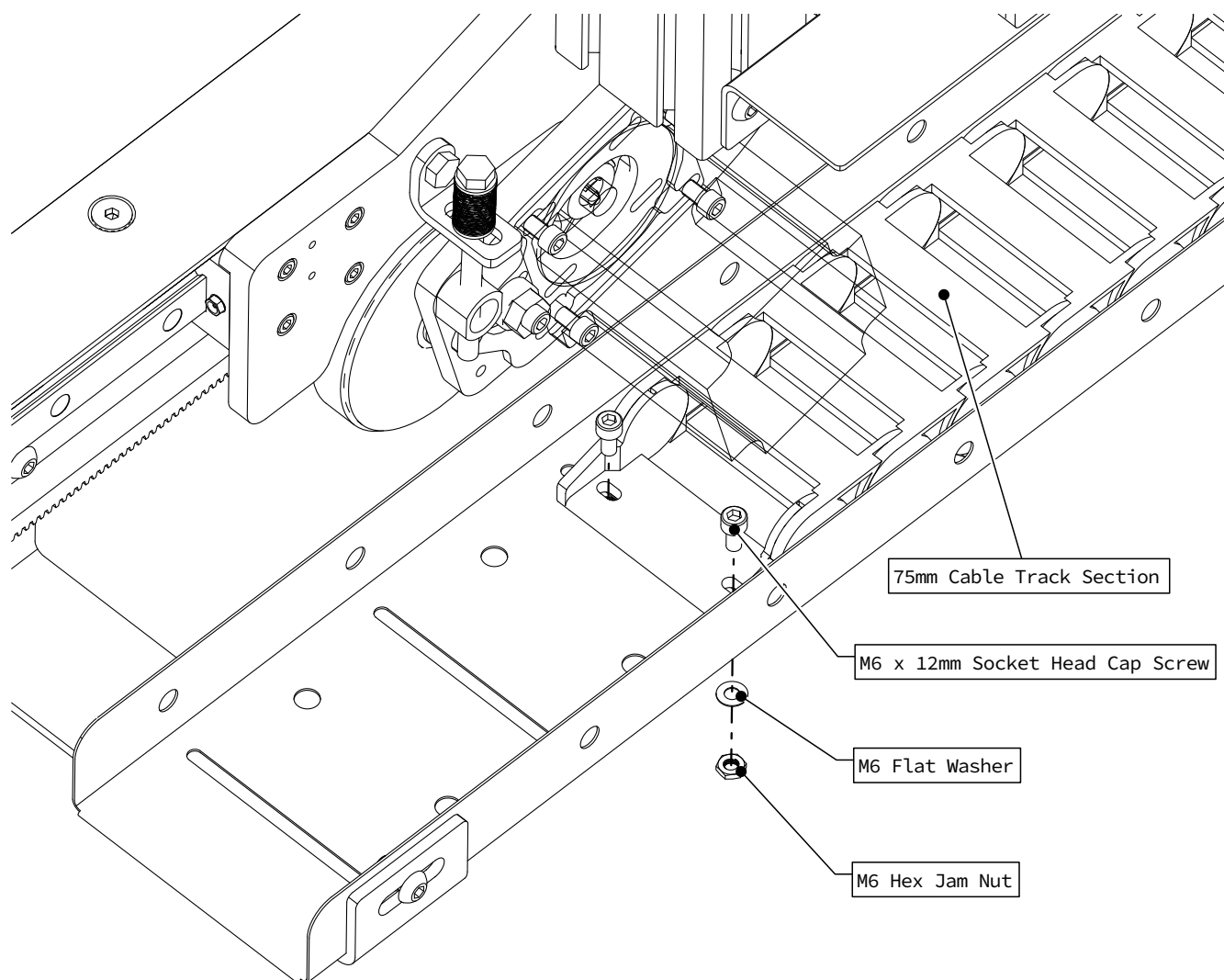
- Slide the assembled Riser Cable Track Bracket into the riser extrusion as indicated.

6.1.2.3



- Position the Riser Cable Track Bracket flush with the bottom of the riser extrusion.
- Fully tighten the fasteners.

6.1.2.4



- Attach the fixed end of the 75mm Cable Track Section to the tray, 3 slots back from the front of the tray as indicated.

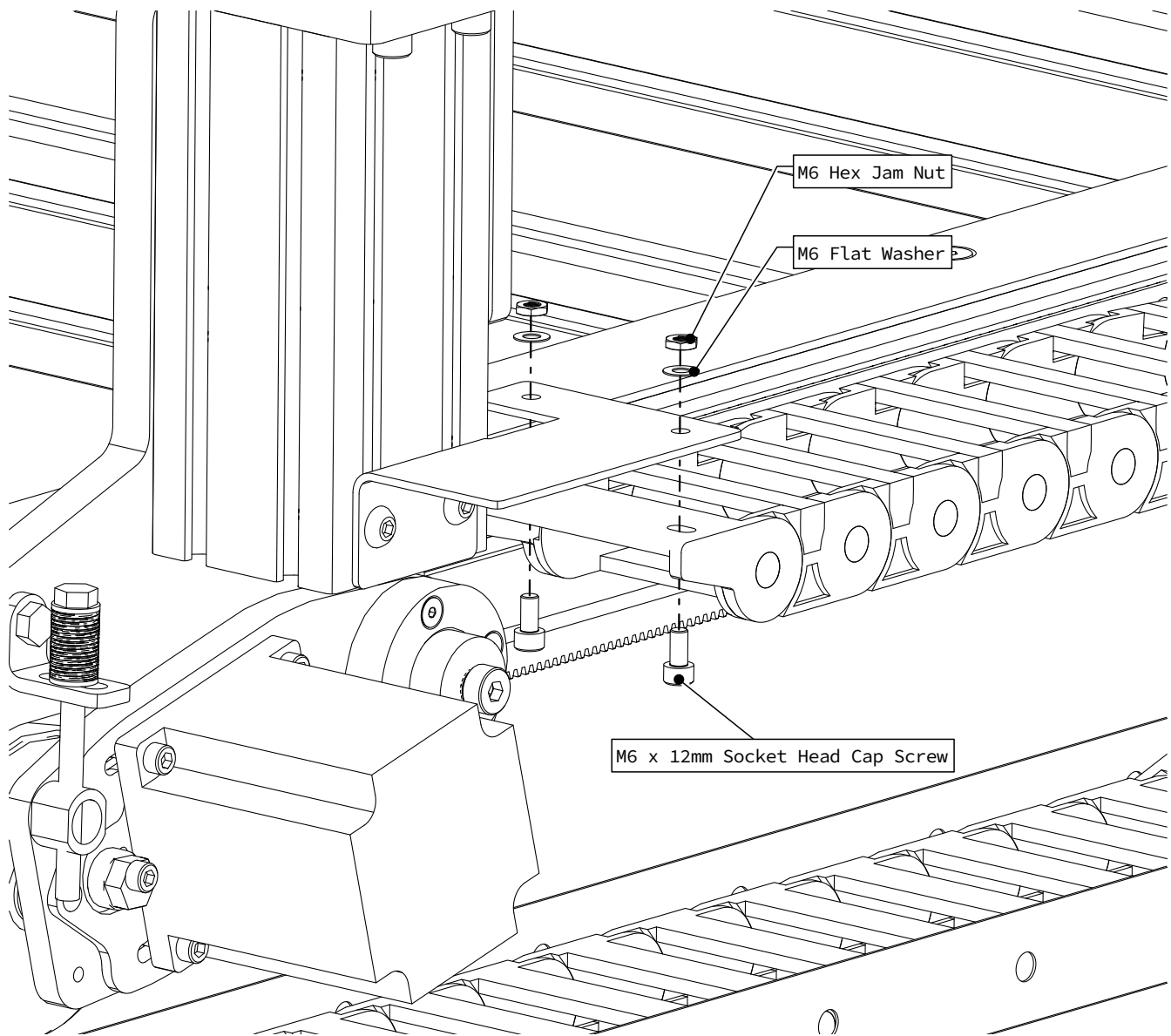
Assembly Note

The fixed end of the cable track section is the one that does not rotate independently.

Assembly Note

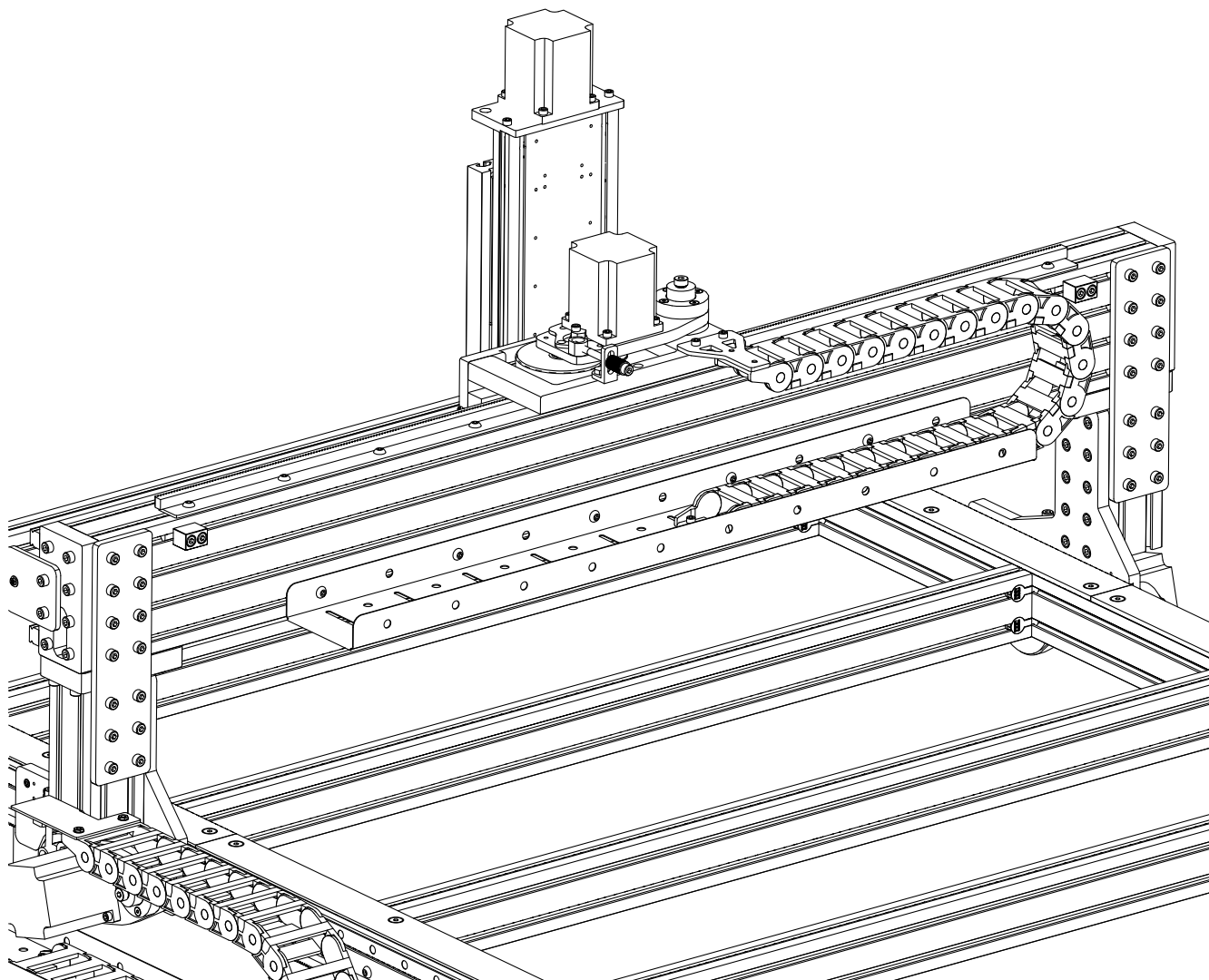
The R&P motor is hidden for illustrative purposes.

6.1.2.5



- Attach the other end of the 75mm Cable Track Section to the Riser Cable Track Bracket as indicated.
- Fully tighten the 75mm Cable Track Section fasteners.

6.2 Gantry Cable Track



Parts and Tools Required

The following parts and tools will be used in Section 6.2

QTY	Part/Description	Packaged In
1	CRP150-09 Gantry Cable Track Bracket	Cable Track
1	QT40x125B Cable Track Tray	Cable Track
1	50mm Cable Track Section (23 Links)	Cable Track
1	CT-FAST-PRO-19.1: - (6) M6 x 12mm Socket Head Cap Screw - (2) M6 Flat Washer - (2) M6 Hex Jam Nut <i>Remaining parts from this kit used in the Motors and Sensors Connections section</i>	Cable Track
1	CT-TRAY-GANTRY-PRO-FAST: - (5) M8 x 12mm Button Head Cap Screw - (5) M8 Roll-in T-Nut	Cable Track

Required Tools:

- 5mm Allen Wrench
- Adjustable Wrench
- Tape Measure

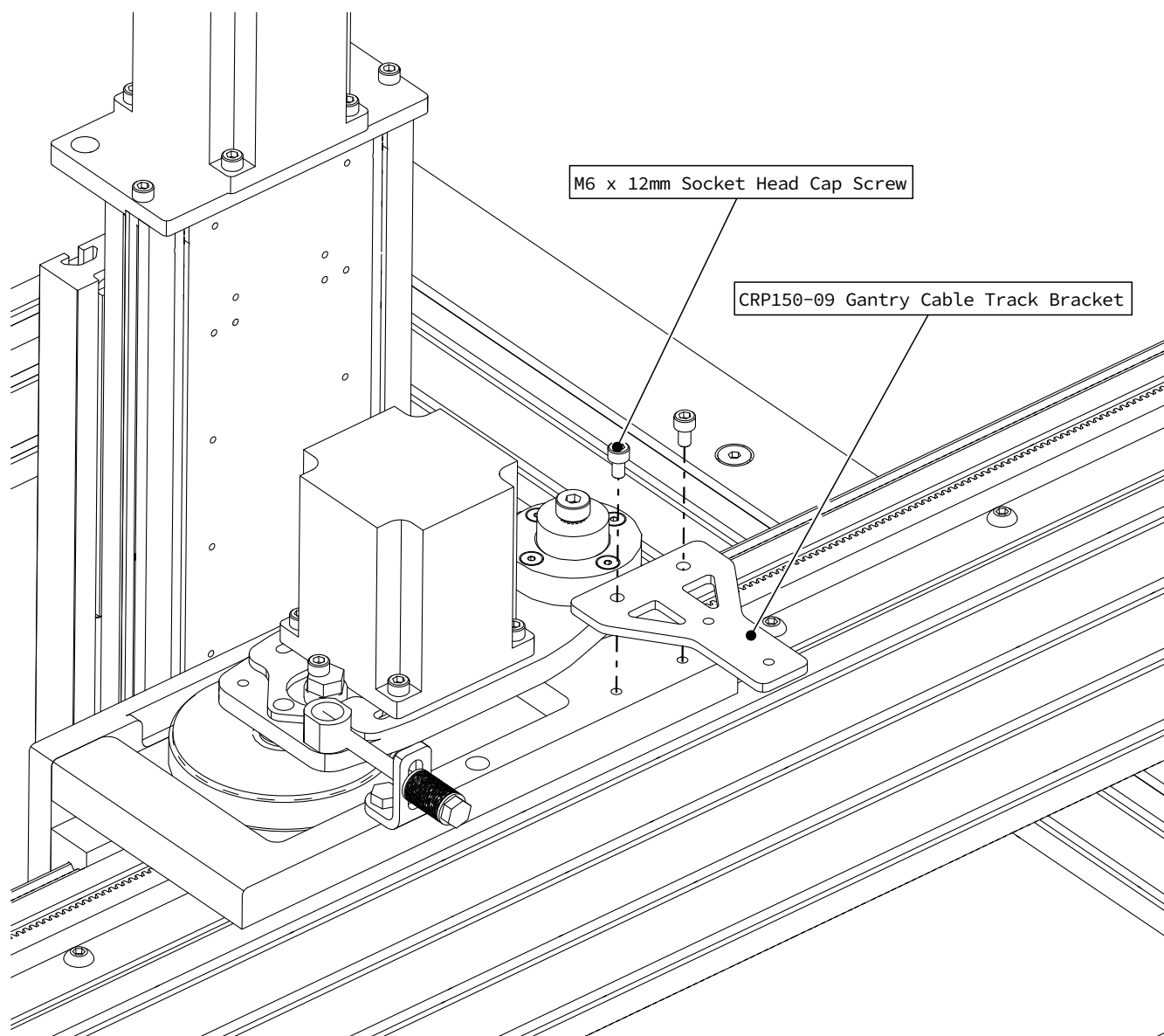
Recommended Additional Tools:

- 10mm Combination Wrench



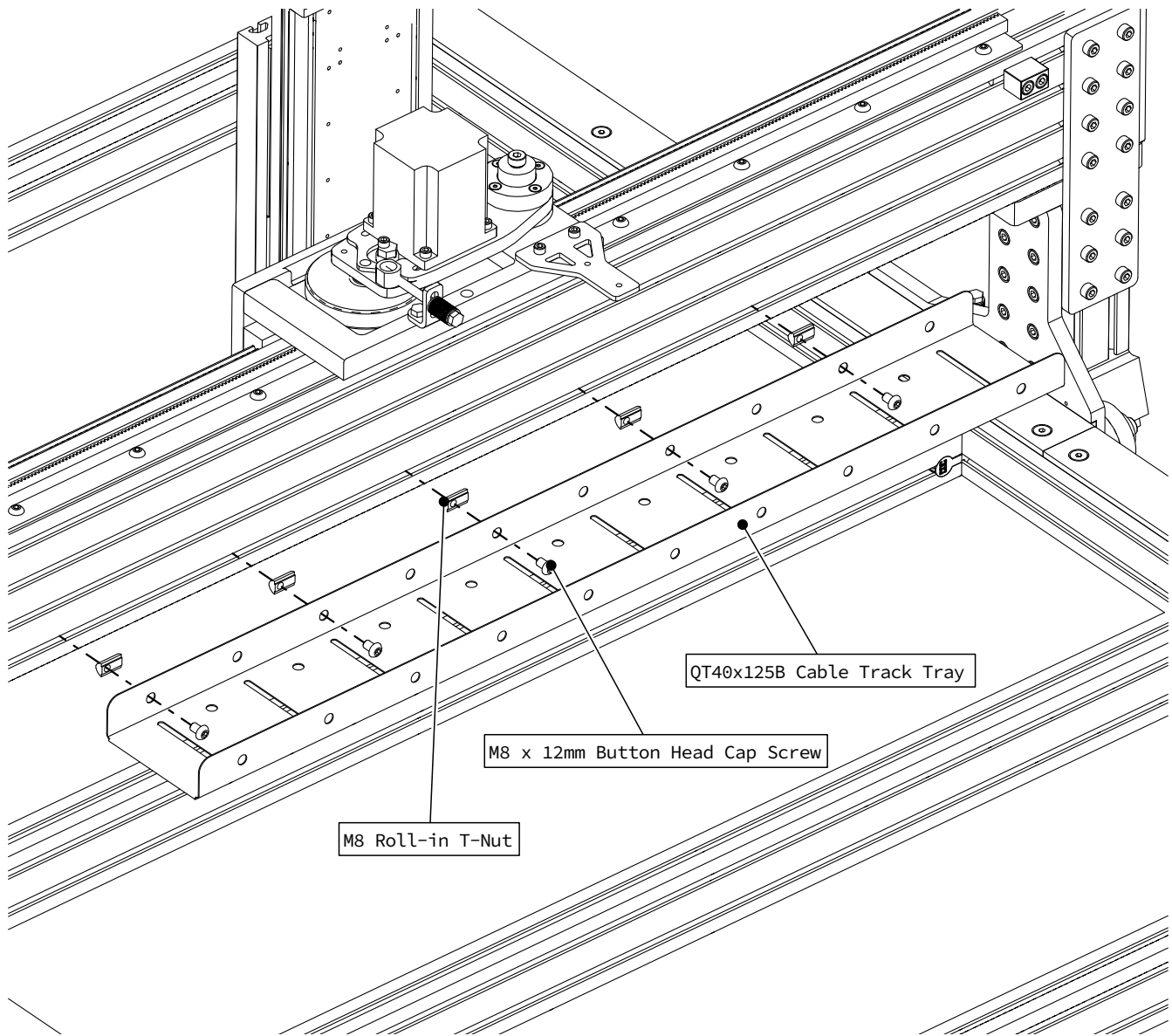
6.2.1 Cable Track Tray

6.2.1.1



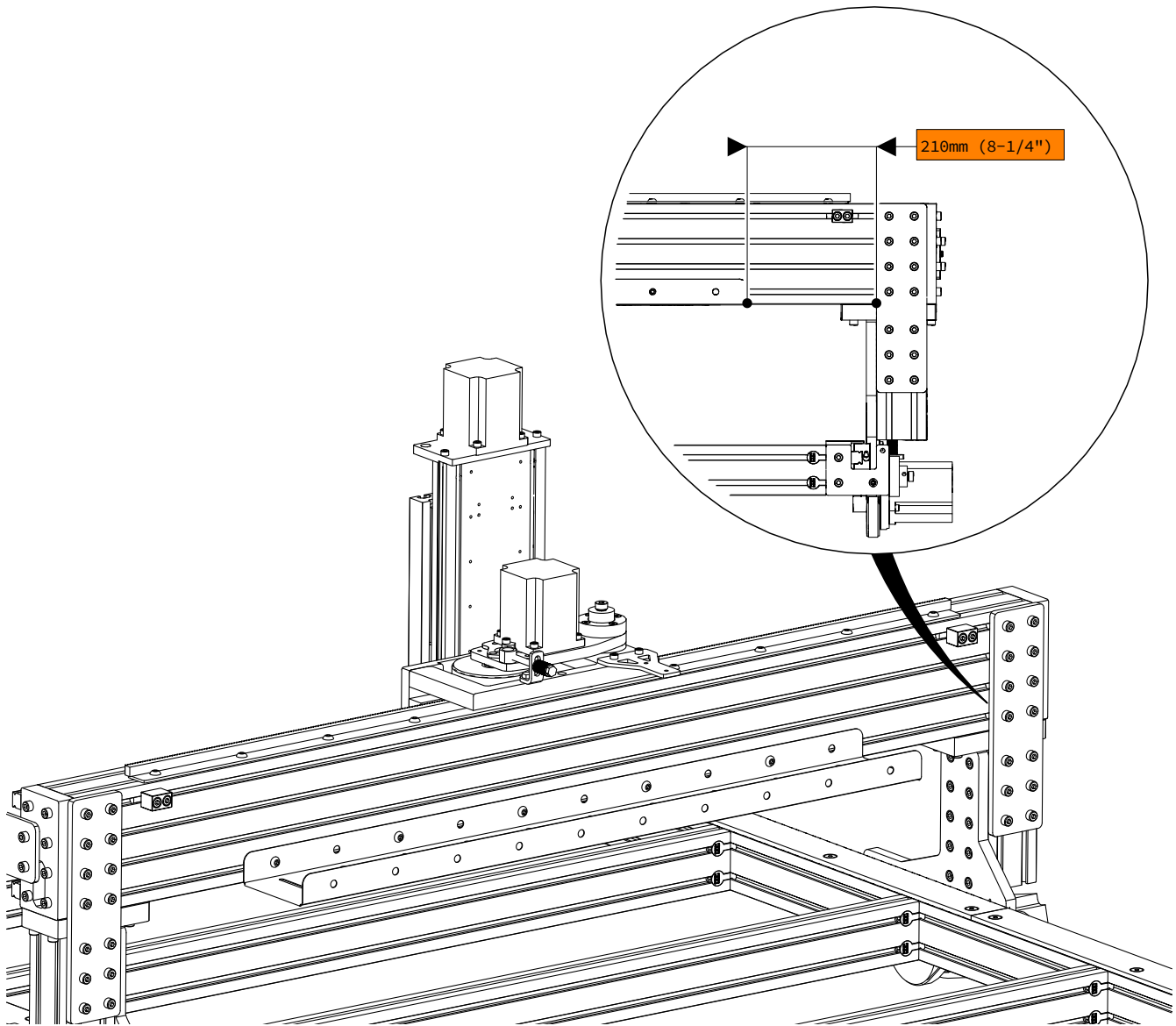
- Attach the Gantry Cable Track Bracket to the Gantry R&P Plate as indicated.
- Fully tighten the fasteners.

6.2.1.2



- Attach a Cable Track Tray to the bottom t-slot on the gantry extrusion as indicated.
- Partially tighten the fasteners.

6.2.1.3



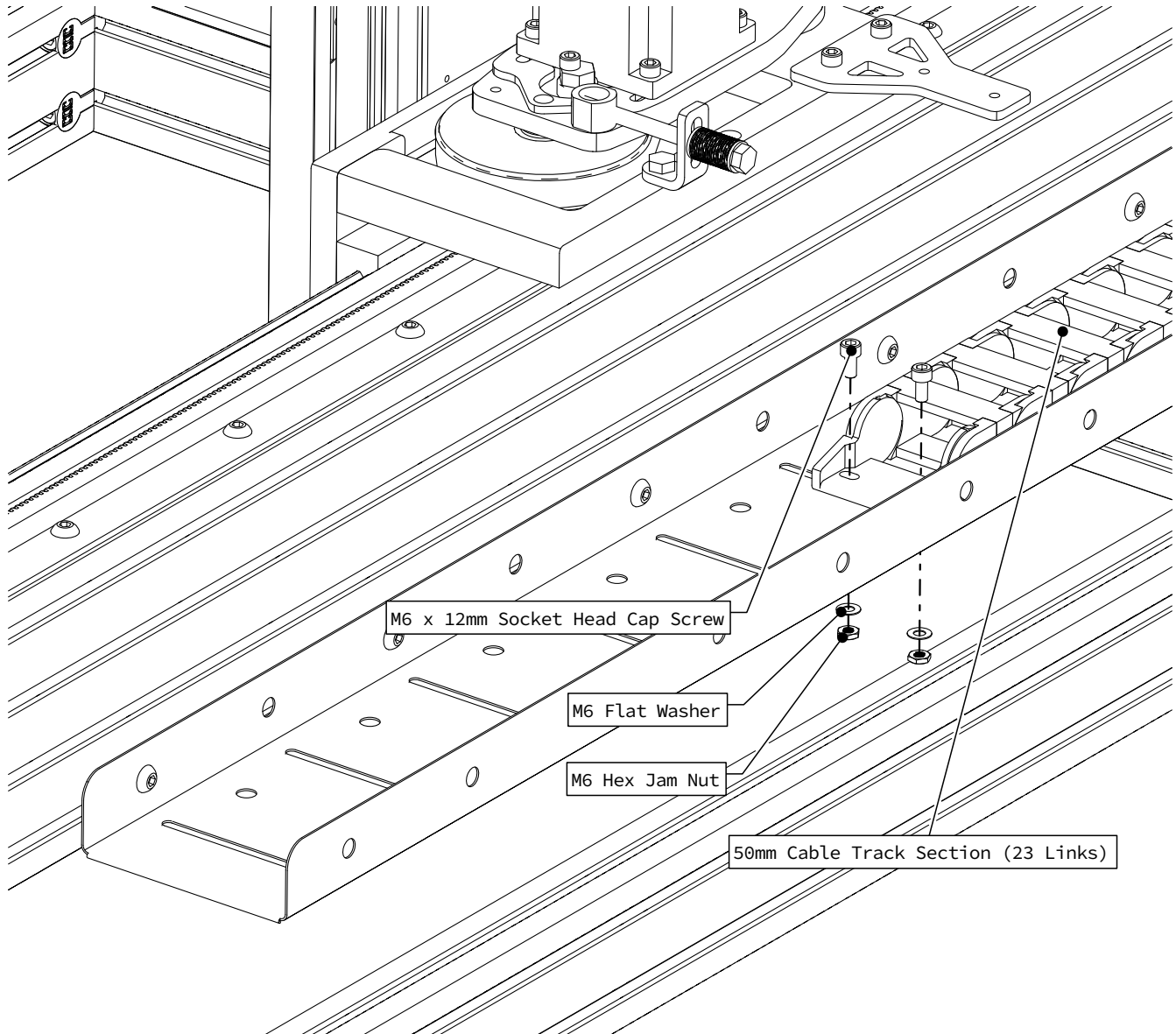
- Position the Cable Track Tray as indicated.
- Fully tighten the fasteners.

Assembly Note

The measurement shown is from the inside of the Riser Joining Plate.

6.2.2 Cable Track Section

6.2.2.1

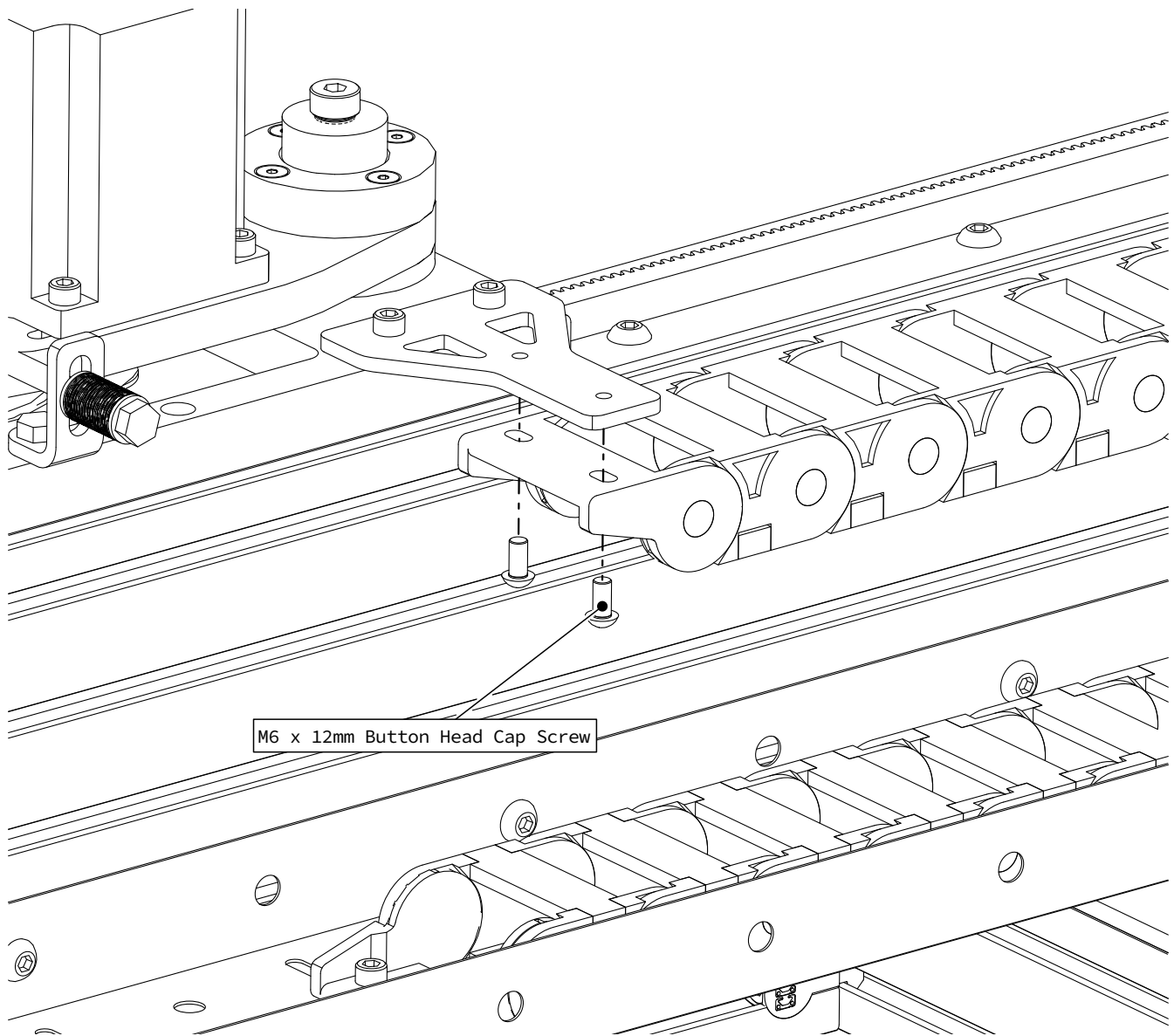


- Attach the fixed end of the 50mm Cable Track Section to the tray, 6 slots from the end as indicated.

Assembly Note

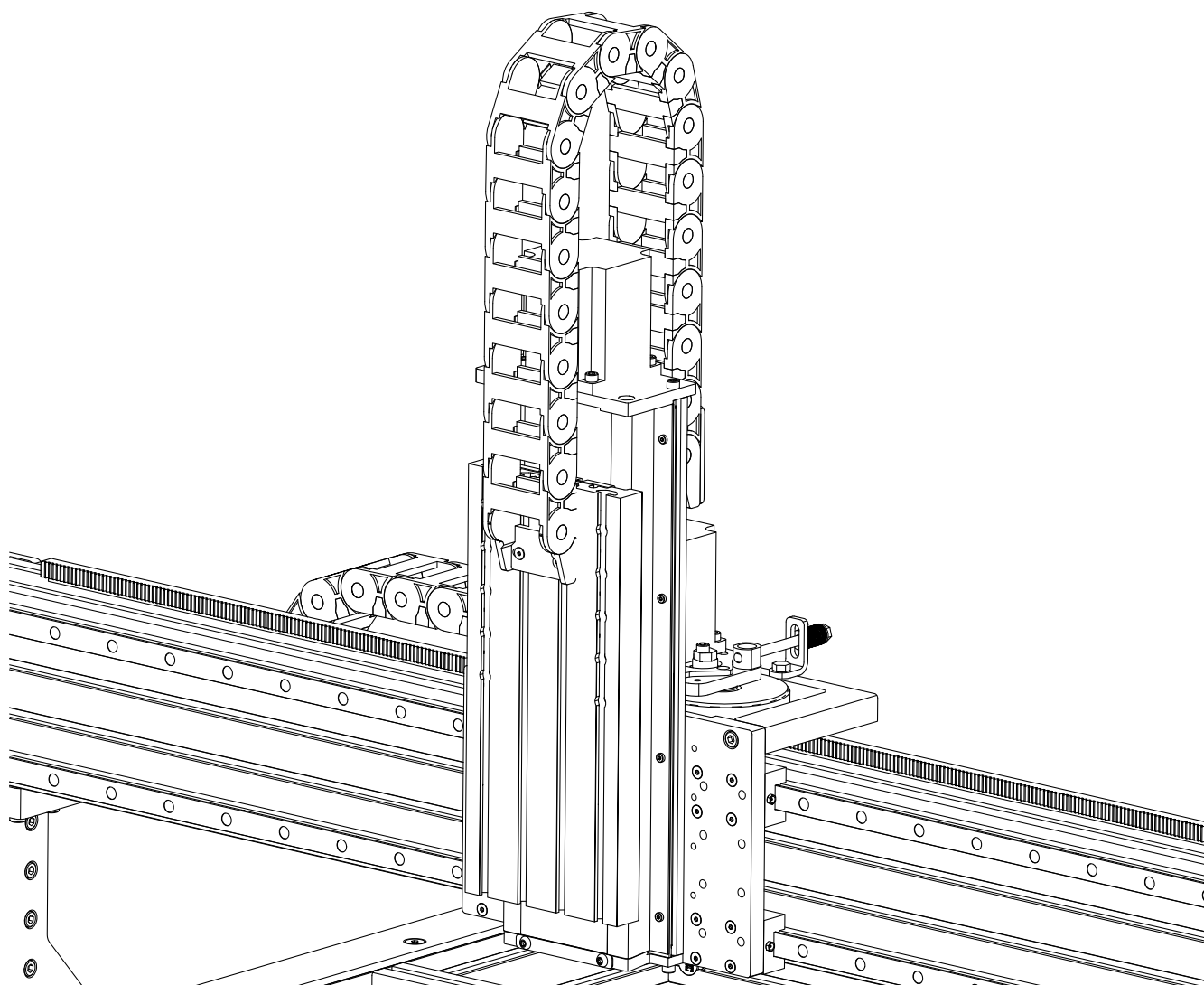
The fixed end of the cable track section is the one that does not rotate independently.

6.2.2.2



- Attach the other end of the 50mm Cable Track Section to the Gantry Cable Track Bracket as indicated.
- Fully tighten the 50mm Cable Track Section fasteners.

6.3 Z-Axis Cable Track



Parts and Tools Required

The following parts and tools will be used in Section 6.3

QTY	Part/Description	Packaged In
1	CRP150-10 Z-Axis Cable Track Bracket	Cable Track
1	50mm Cable Track Section (18 Links)	Cable Track
1	CT-Z-PRO-FAST: - (2) M5 x 12mm Flat Head Screw - (2) M6 x 12mm Flat Head Screw - (2) M8 x 16mm Socket Head Cap Screw - (2) M5 Slide-in T-Nut - (2) M8 Roll-in T-Nut	Cable Track

Required Tools:

- 3mm Allen Wrench
- 4mm Allen Wrench
- 6mm Allen Wrench
- Tape Measure

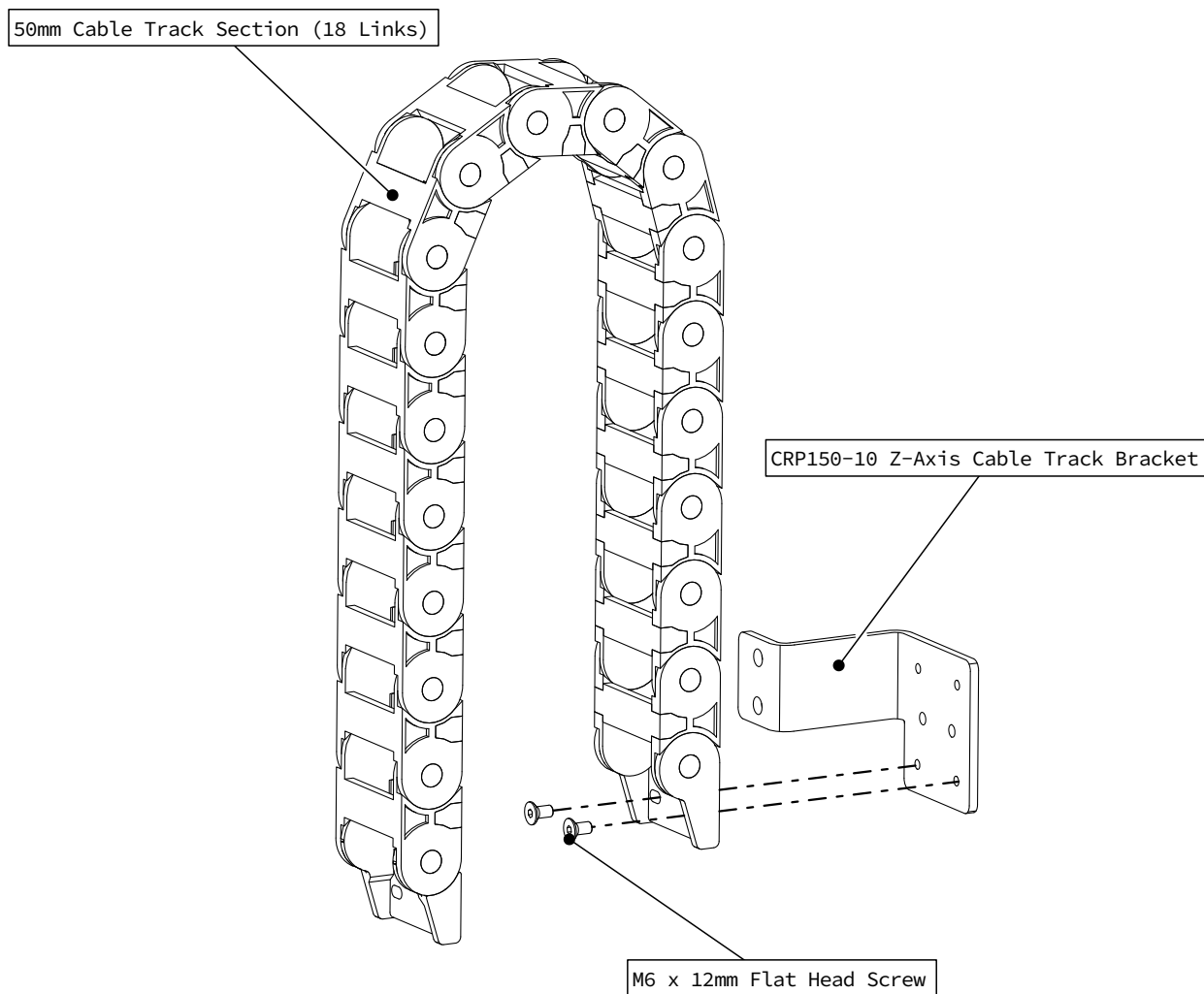


6.3.1 Cable Track Assembly

6.3.1.1

12" Z-Axis Option

Skip this step if you purchased the optional 12" travel Z-Axis.



- Attach the Z-Axis Cable Track Bracket to the free end of the 50mm Cable Track Section as indicated.

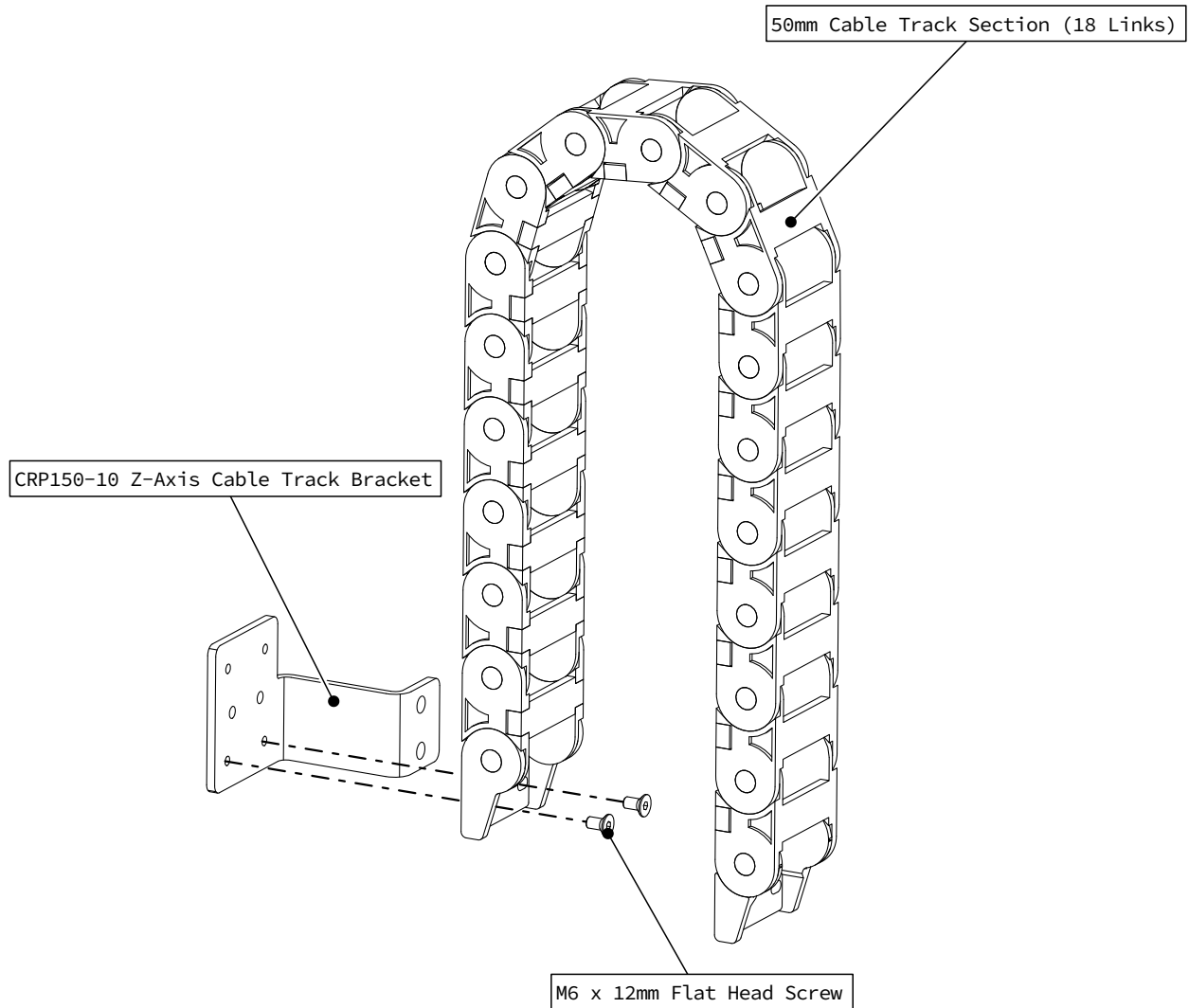
Assembly Note

The free end of the cable track is the one that can rotate independently.

6.3.1.2

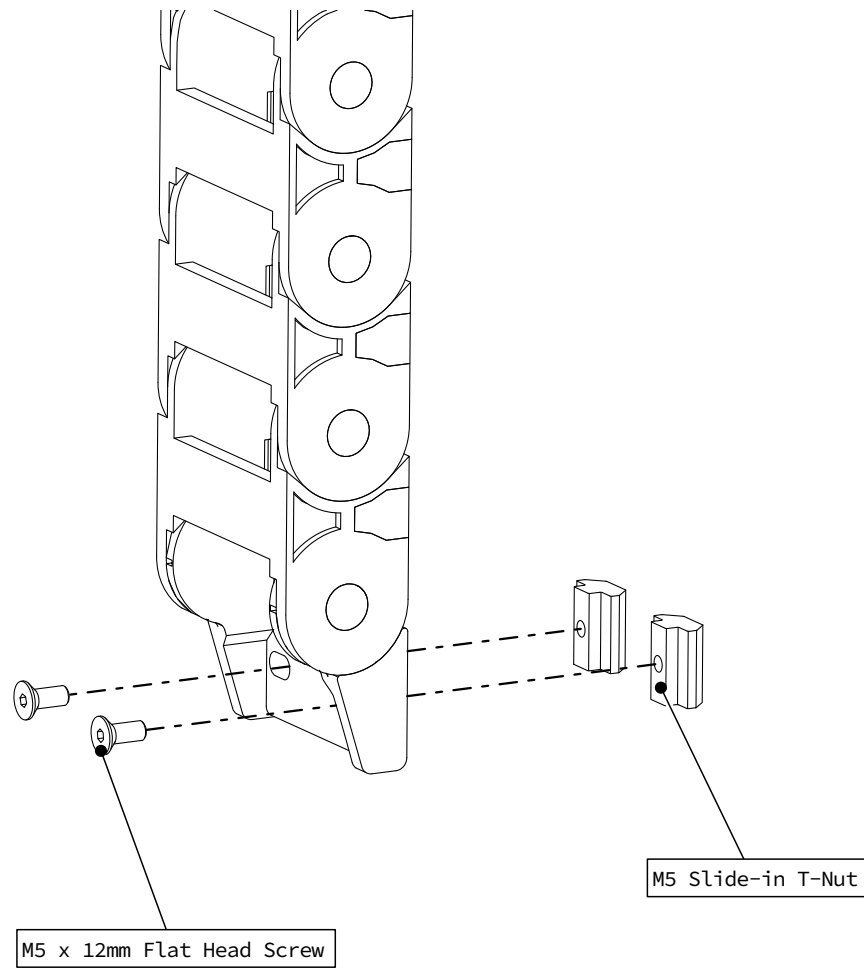
12" Z-Axis Option

This step is applicable only for those who purchased the optional 12" travel Z-Axis.



- Attach the Z-Axis Cable Track Bracket to the free end of the 50mm Cable Track Section as indicated.

6.3.1.3



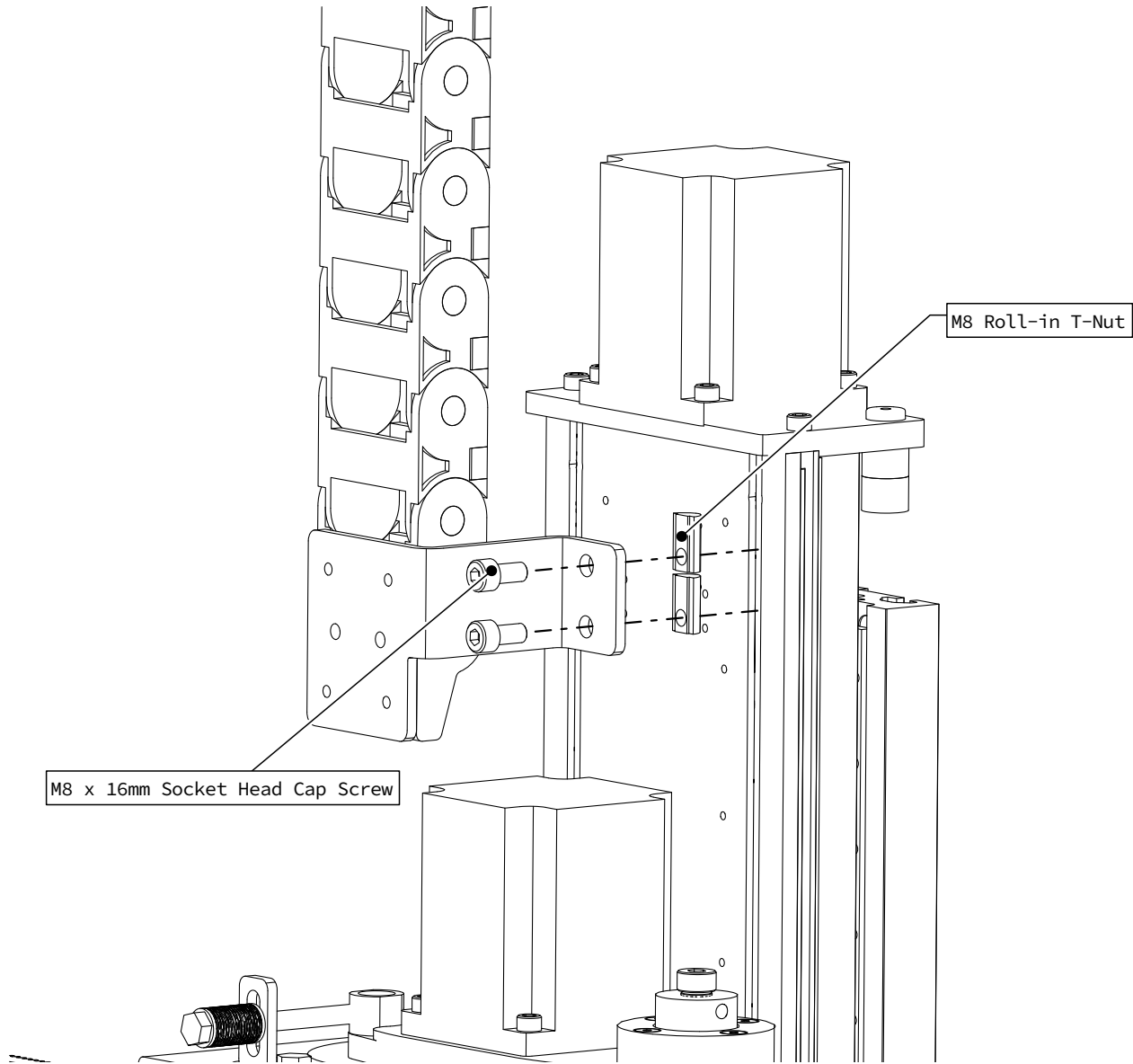
- Partially thread fasteners onto the other end of the cable track section as indicated.

6.3.2 Cable Track Installation

6.3.2.1

12" Z-Axis Option

Skip to Step 6.3.2.5 if you purchased the optional 12" travel Z-Axis.

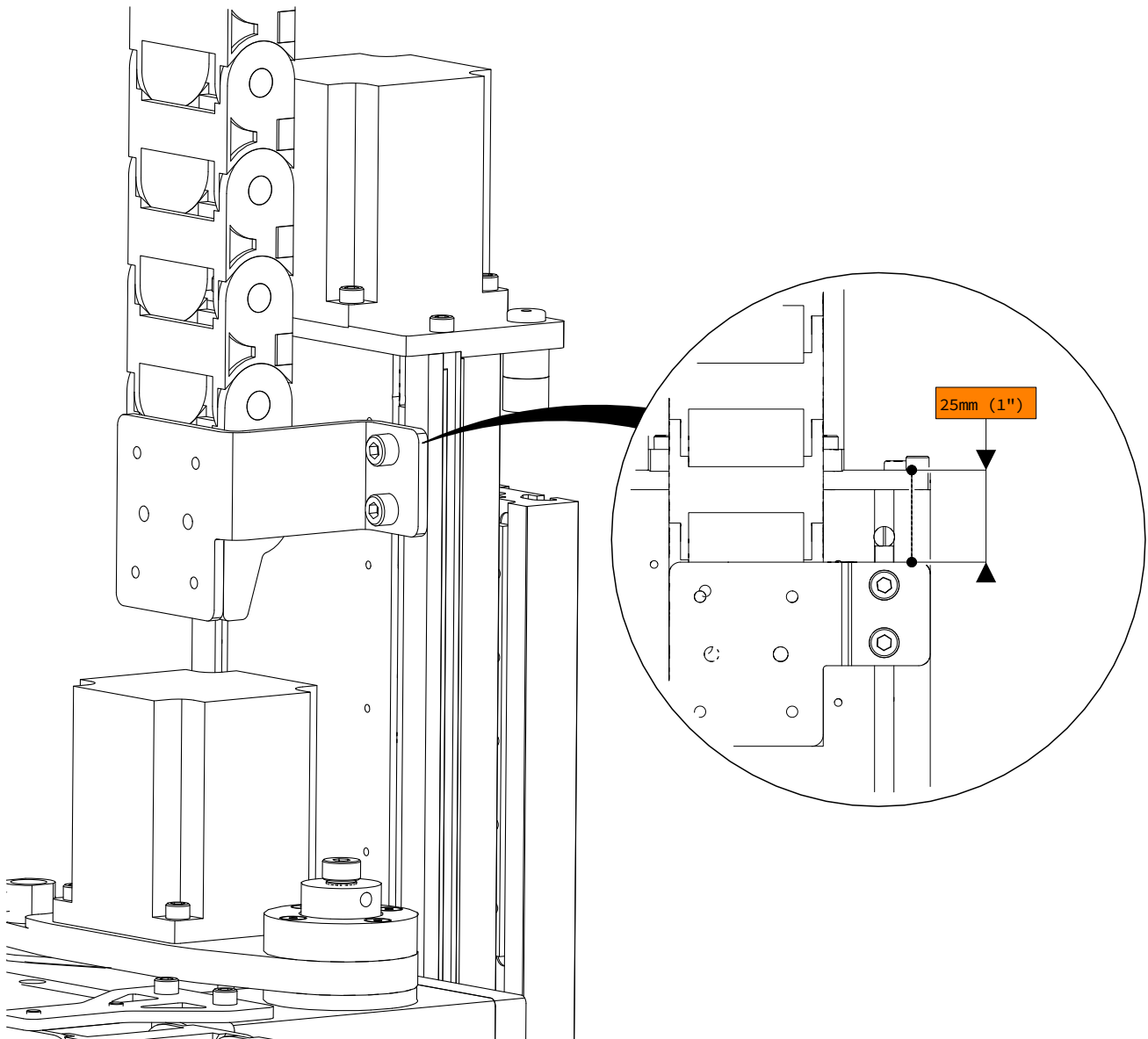


- Attach the Z-Axis Cable Track Bracket to the back of the Z-Axis as indicated, partially tightening the fasteners.

Assembly Note

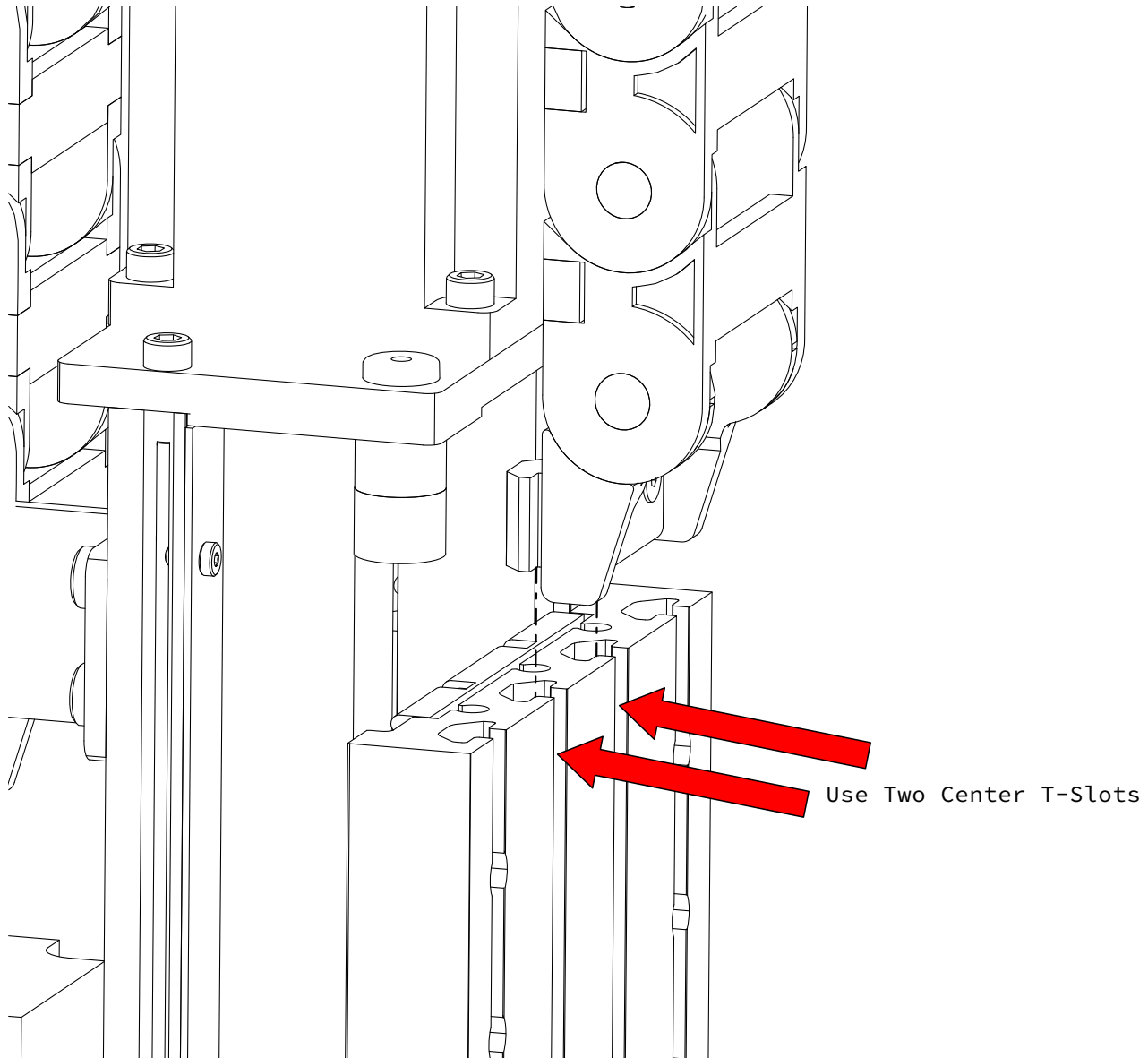
While installing the Roll-in T-Nuts, take care to prevent them from sliding down the t-slot.

6.3.2.2



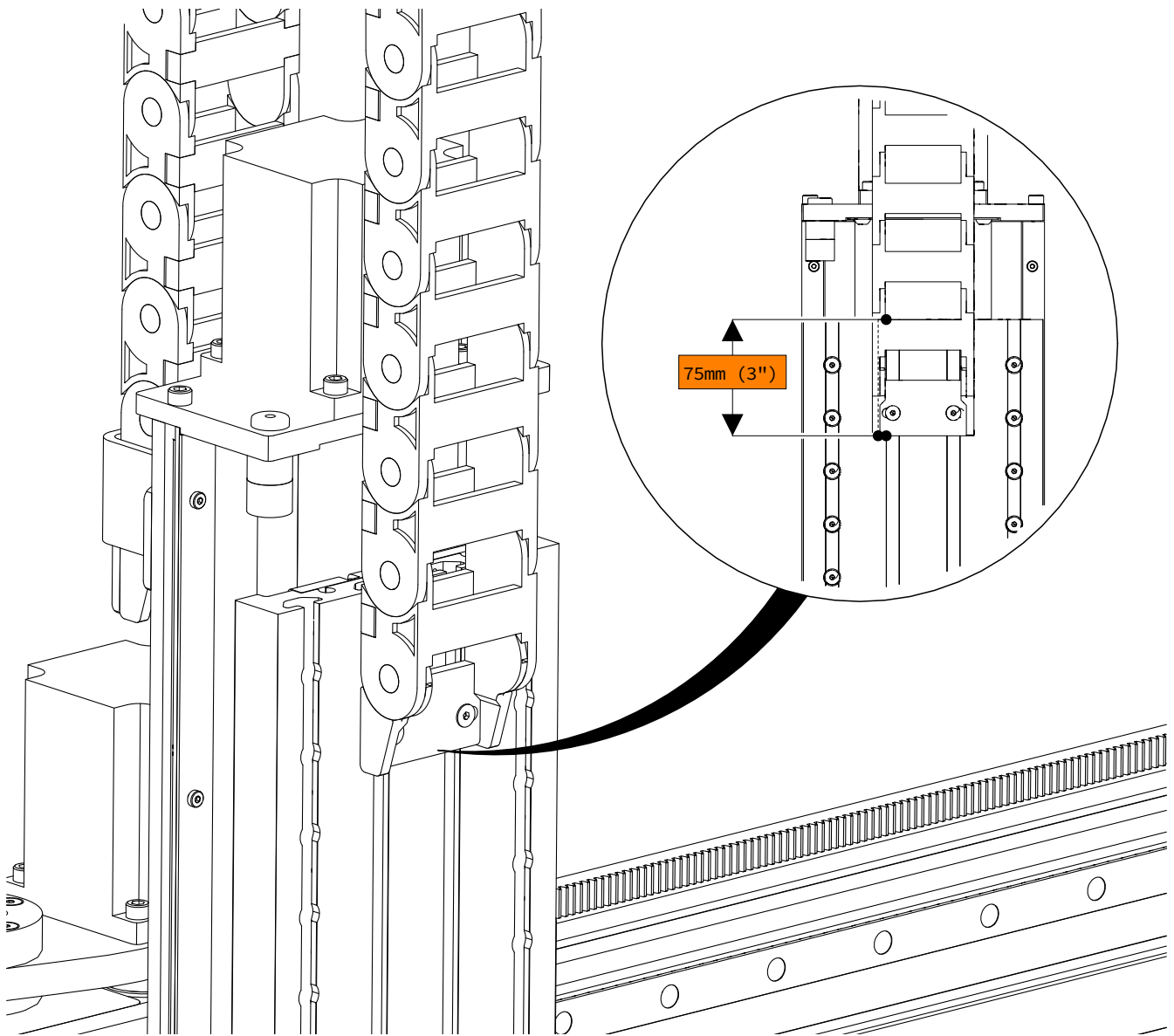
- Position the bracket 1" from the top of the Z-Axis as indicated.
- Fully tighten the fasteners.

6.3.2.3



- Slide the other end of the cable track into the extrusion as indicated.
- Partially tighten the fasteners.

6.3.2.4

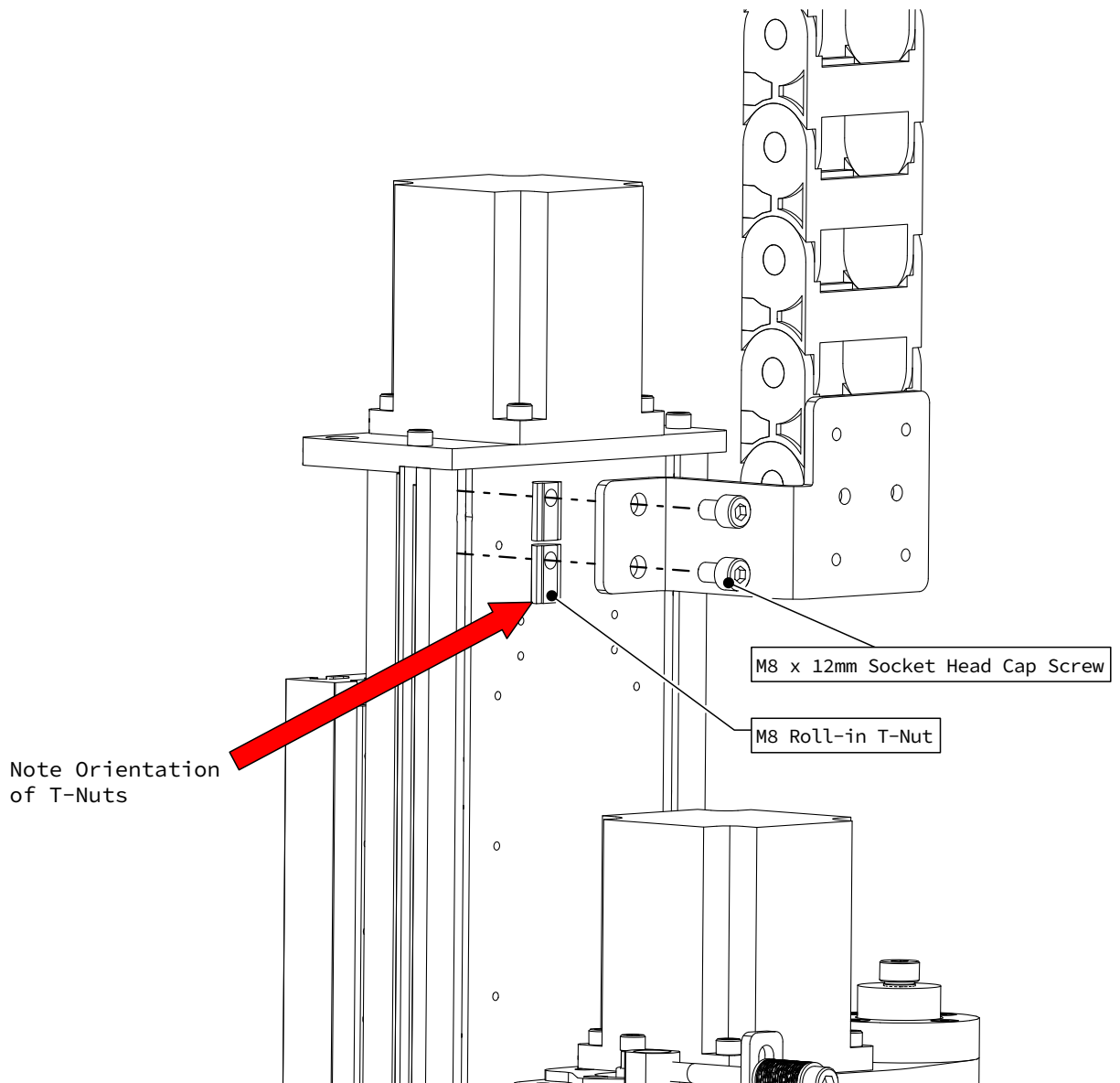


- Position the cable track as indicated.
- Fully tighten the fasteners.

6.3.2.5

12" Z-Axis Option

The remaining steps in Section 6.2.3 are applicable only for those who purchased the optional 12" travel Z-Axis.

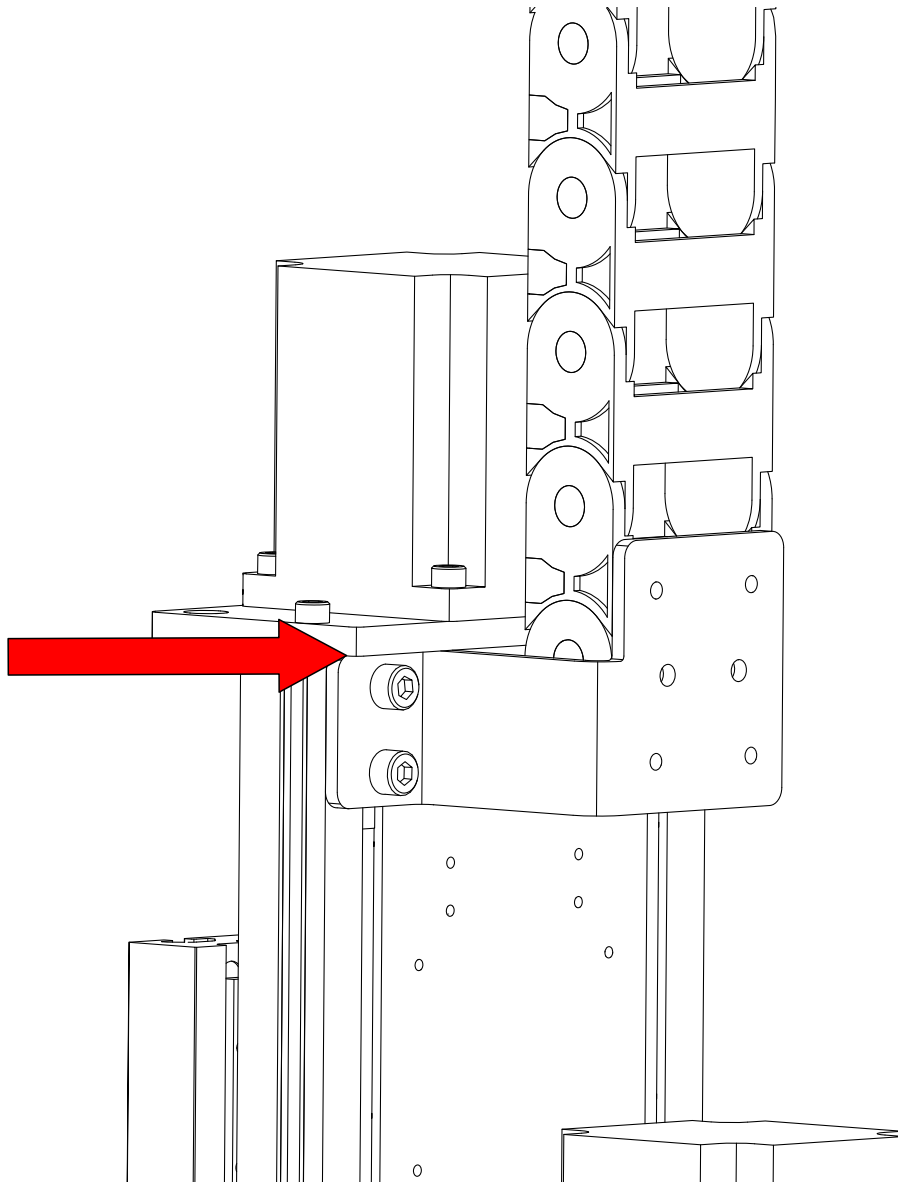


- Attach the Z-Axis Cable Track Bracket to the back of the Z-Axis as indicated, partially tightening the fasteners.

Assembly Note

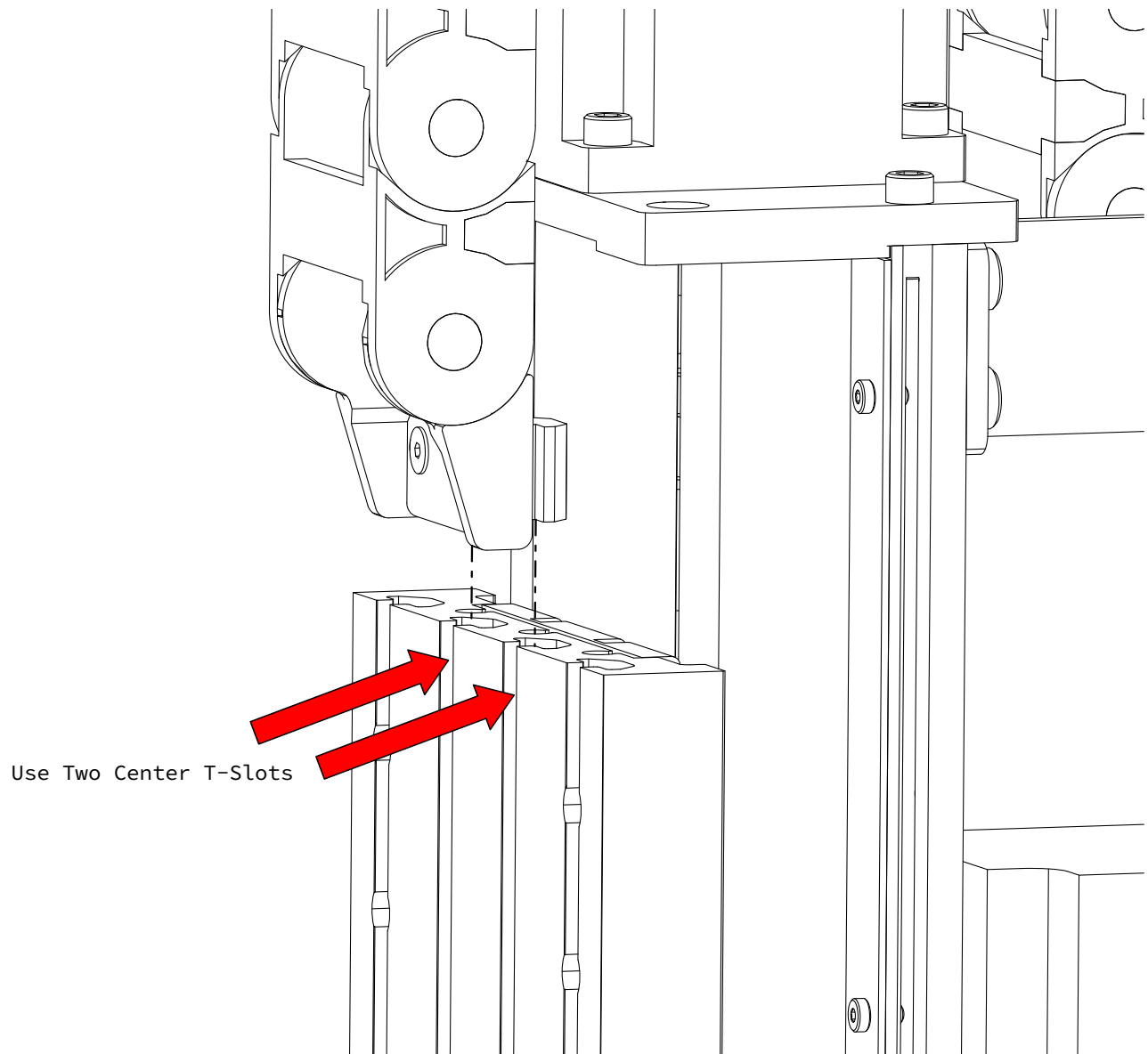
While installing the Roll-in T-Nuts, take care to prevent them from sliding down the t-slot.

6.3.2.6



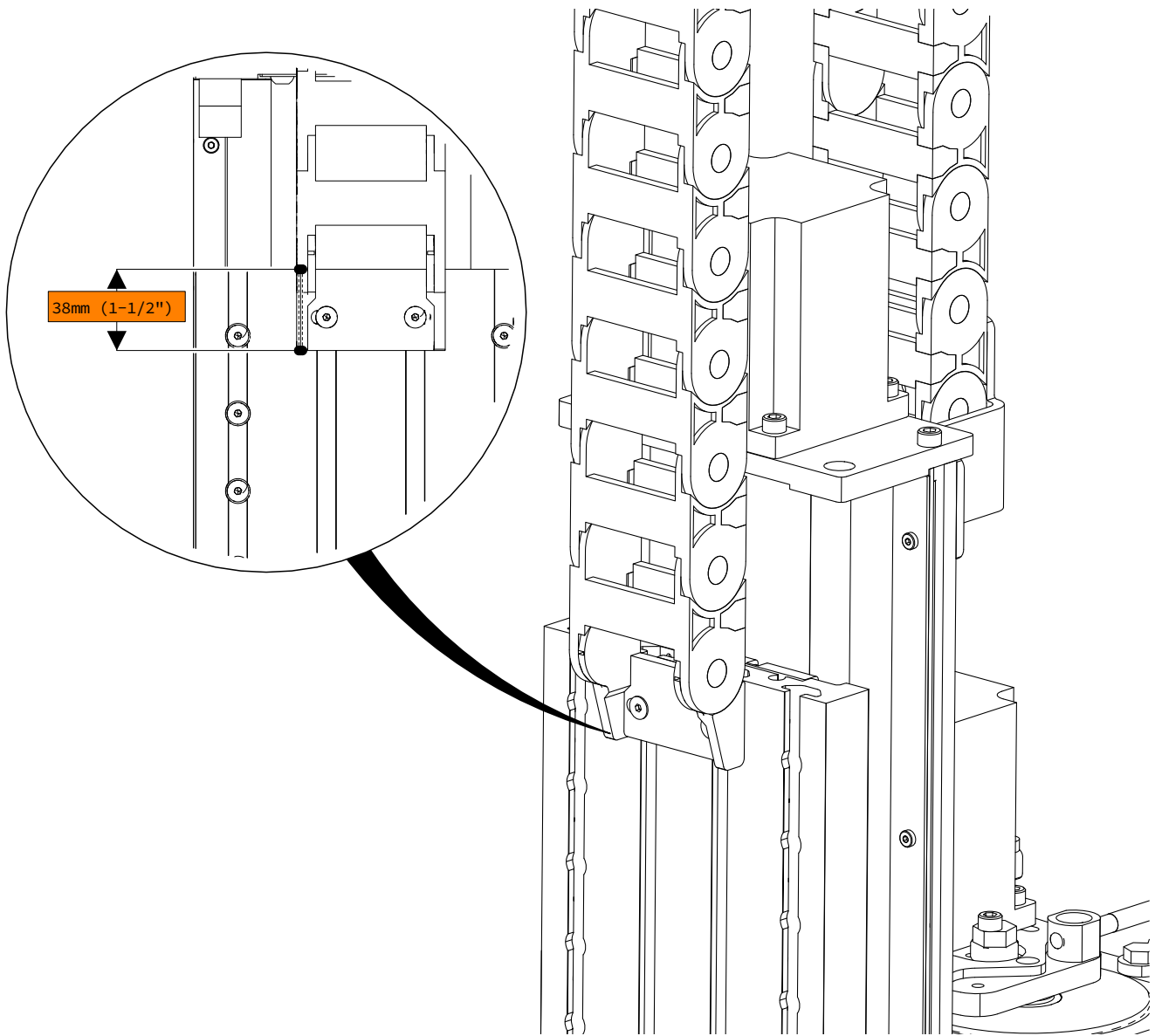
- Position the bracket flush with the top of the Z-Axis as indicated.
- Fully tighten the fasteners.

6.3.2.7



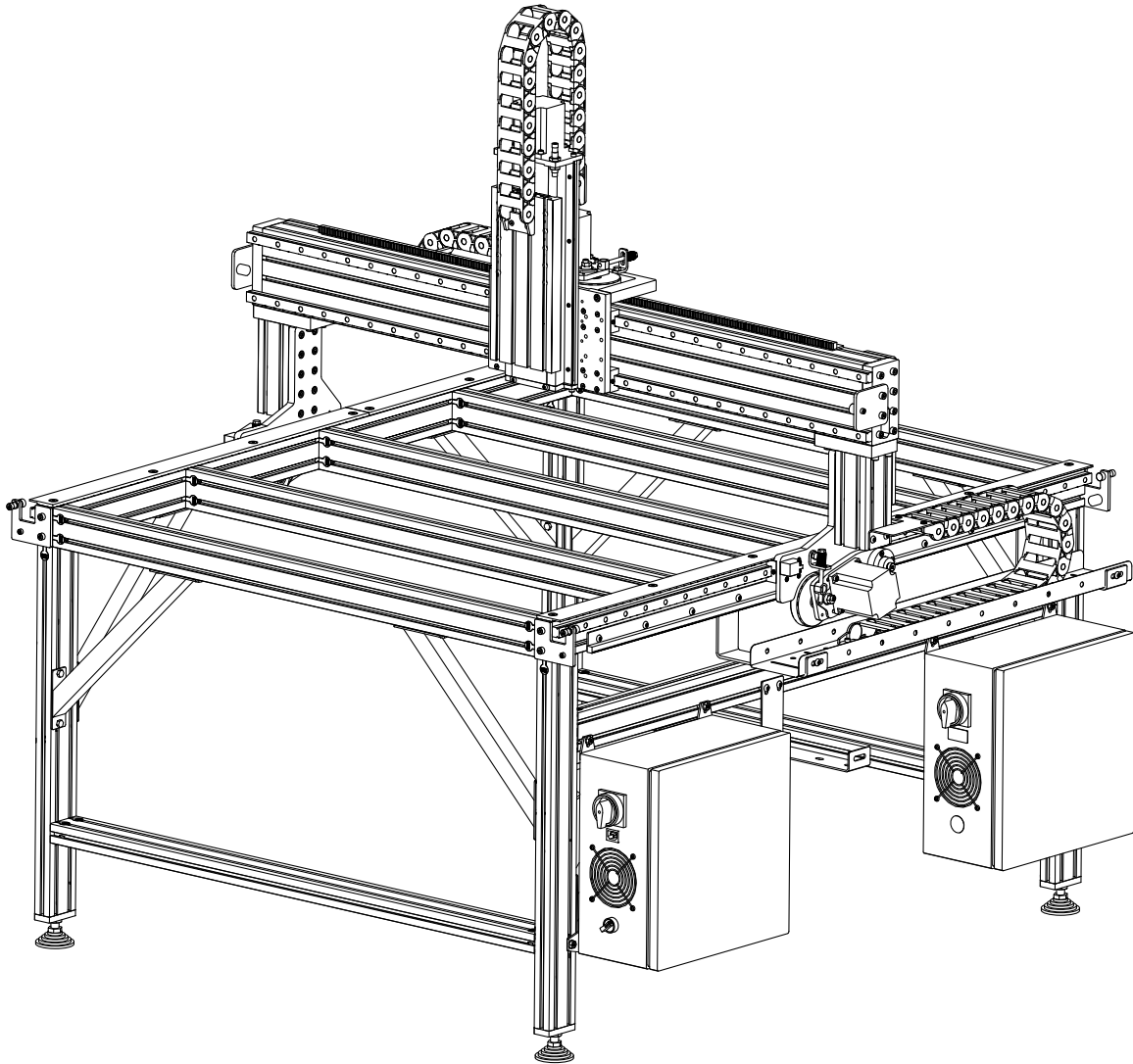
- Slide the other end of the cable track into the extrusion as indicated.
- Partially tighten the fasteners.

6.3.2.4



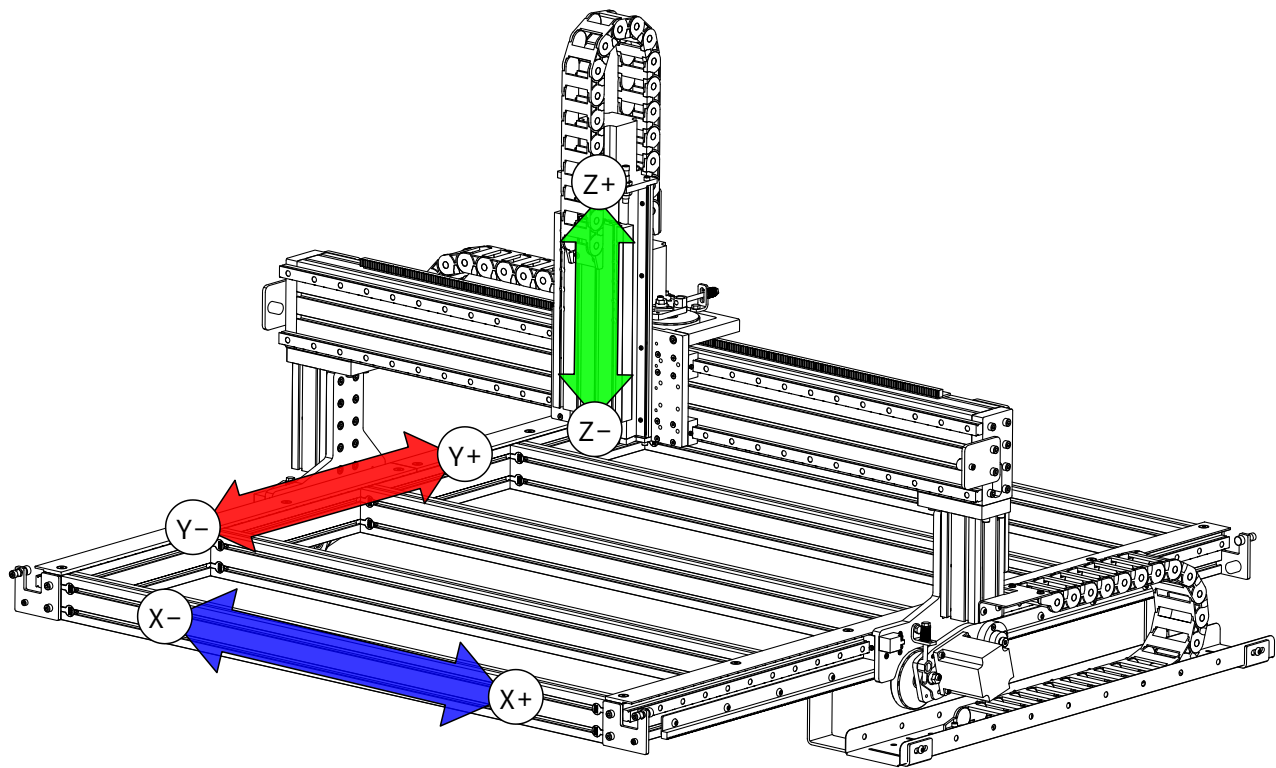
- Position the cable track as indicated.
- Fully tighten the fasteners.

Section 7: Motor and Sensor Connections



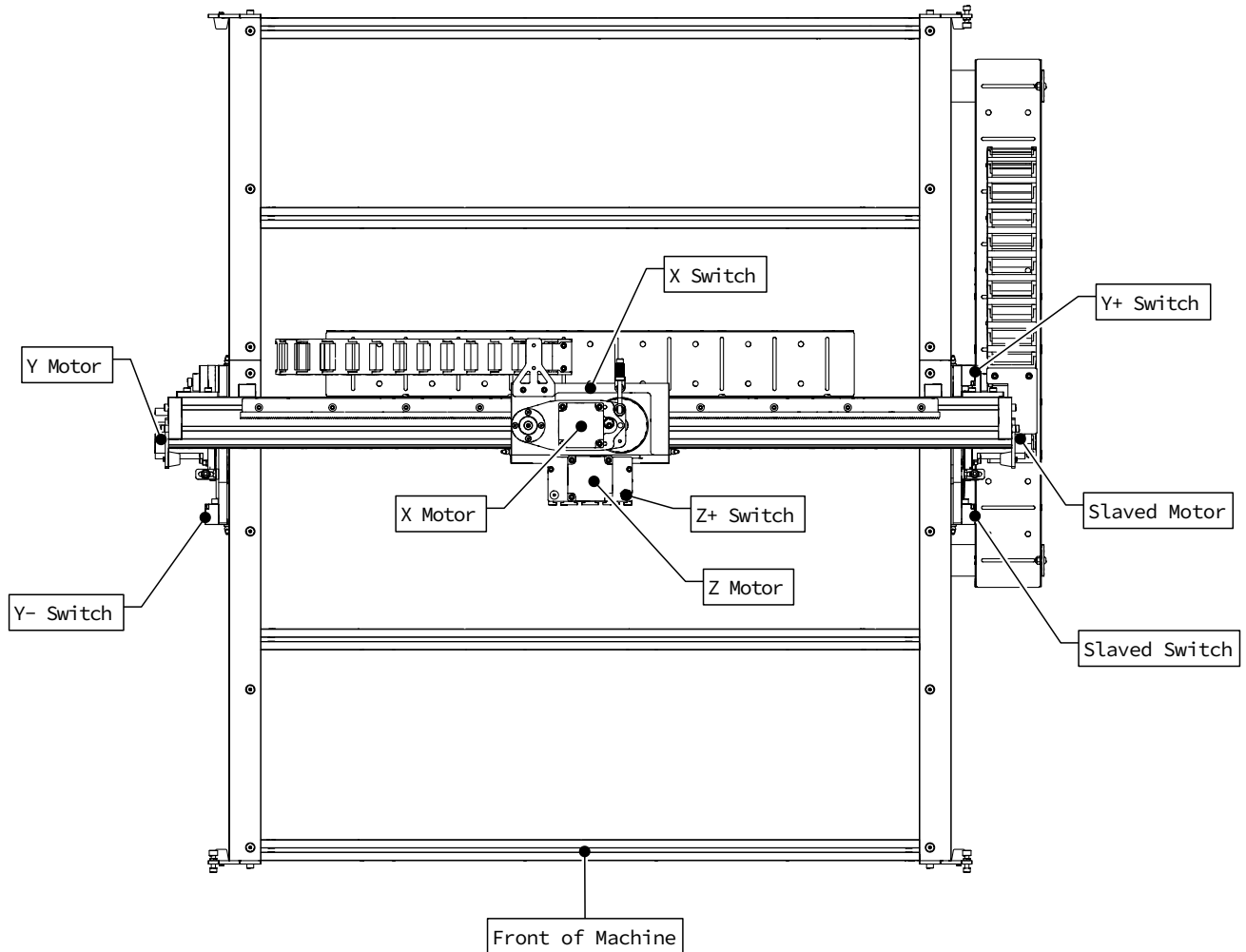
7.1 Motor and Sensor Locations

7.1.1.1



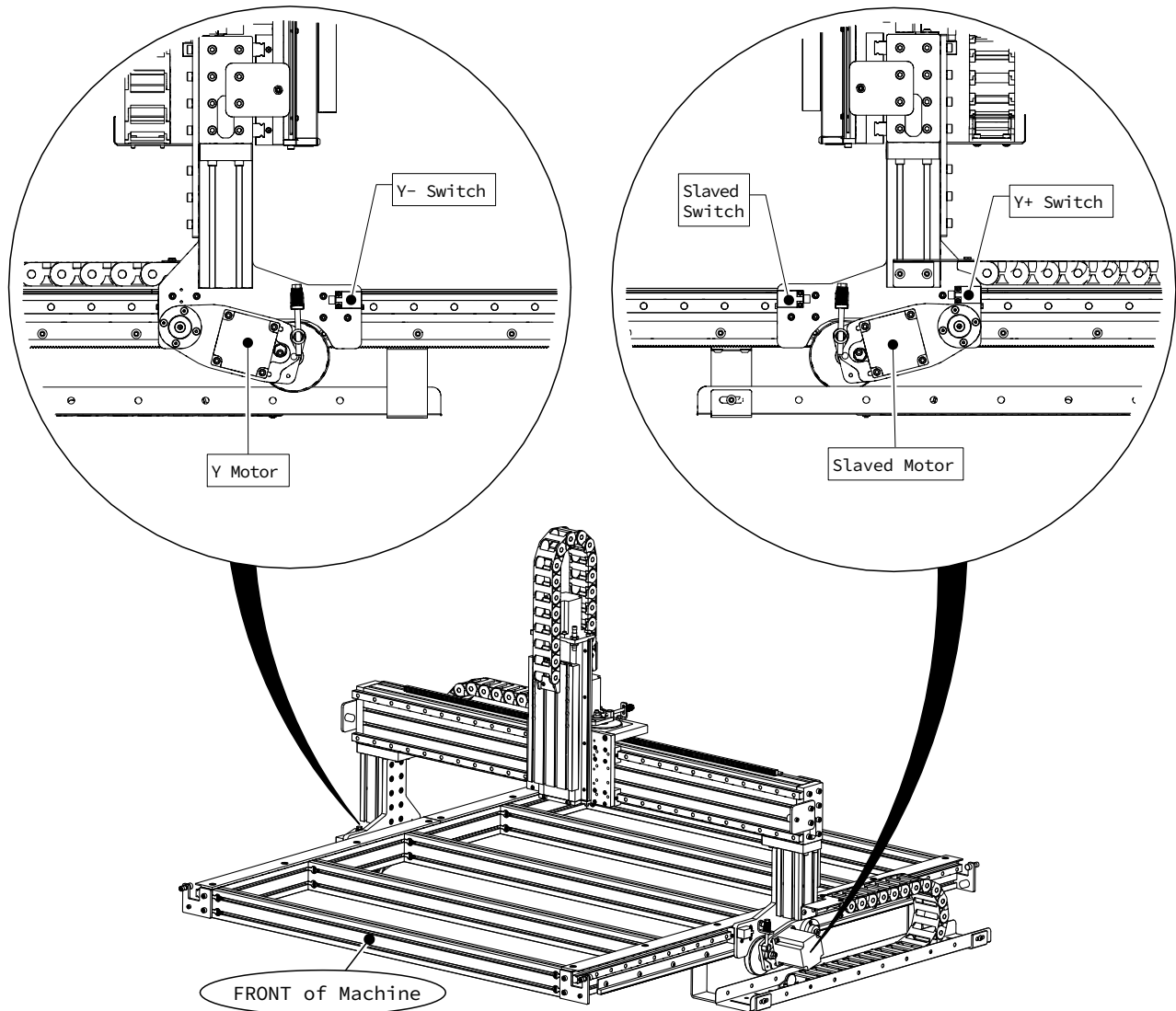
- The depicted axes and sign conventions correspond to CNC Router Parts' XML files.

7.1.1.2



- Top down view of motor and sensor(switch) locations.

7.1.1.3



- Motor and sensor locations for Y and Slaved axes.

7.2 Cable Routing

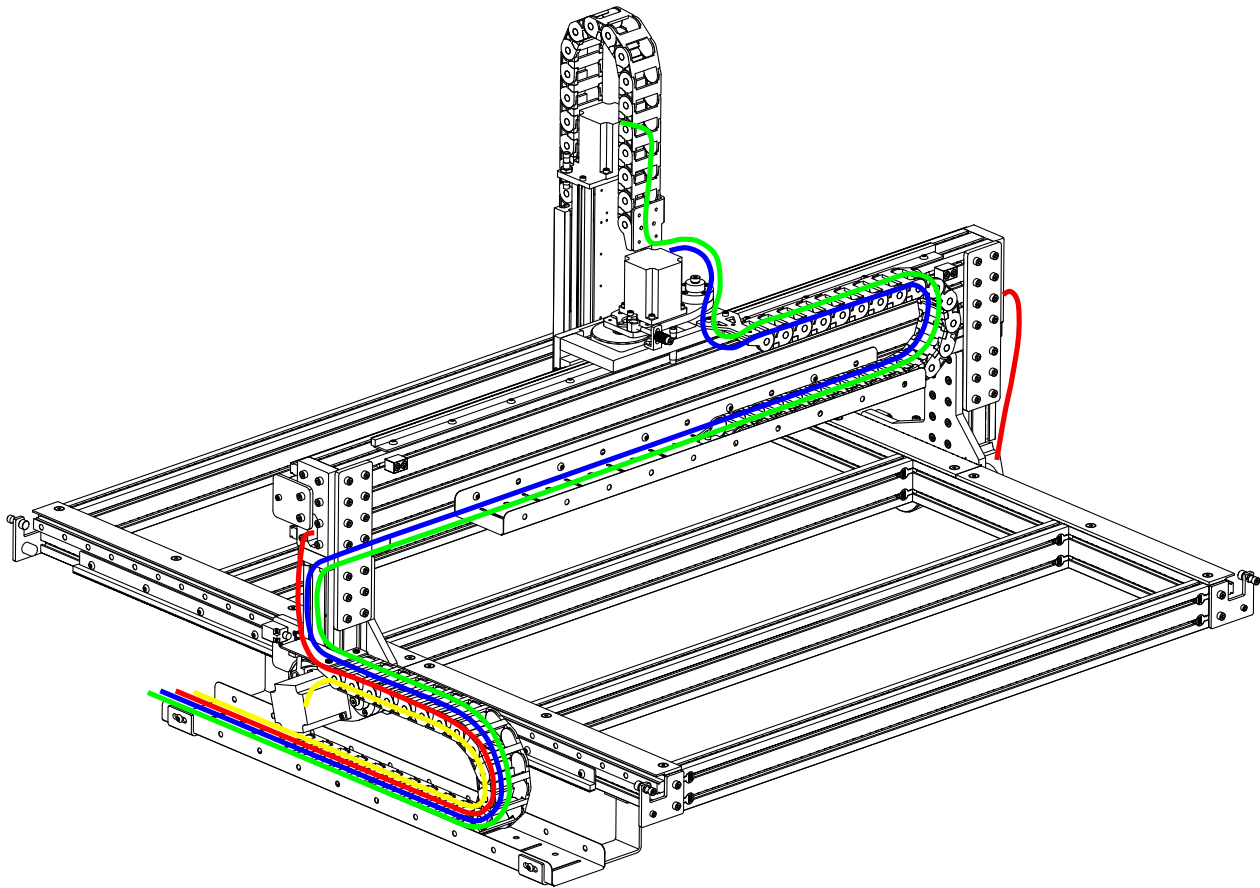
7.2.1.1

Cable Routing Paths

Motor/Sensor	Cable Routing Path
Y- Switch	Through Gantry Extrusion and Table Cable Track
Y+ Switch	Through Table Cable Track
Slaved Switch	Through Table Cable Track
Y Motor	Through Gantry Extrusion and Table Cable Track
X- Switch	Through Gantry Cable Track and Table Cable Track
X Motor	Through Gantry Cable Track and Table Cable Track
Z Motor	Through Gantry Cable Track and Table Cable Track
Z+ Switch	Through Gantry Cable Track and Table Cable Track
Slaved Motor	Through Table Cable Track



7.2.1.2

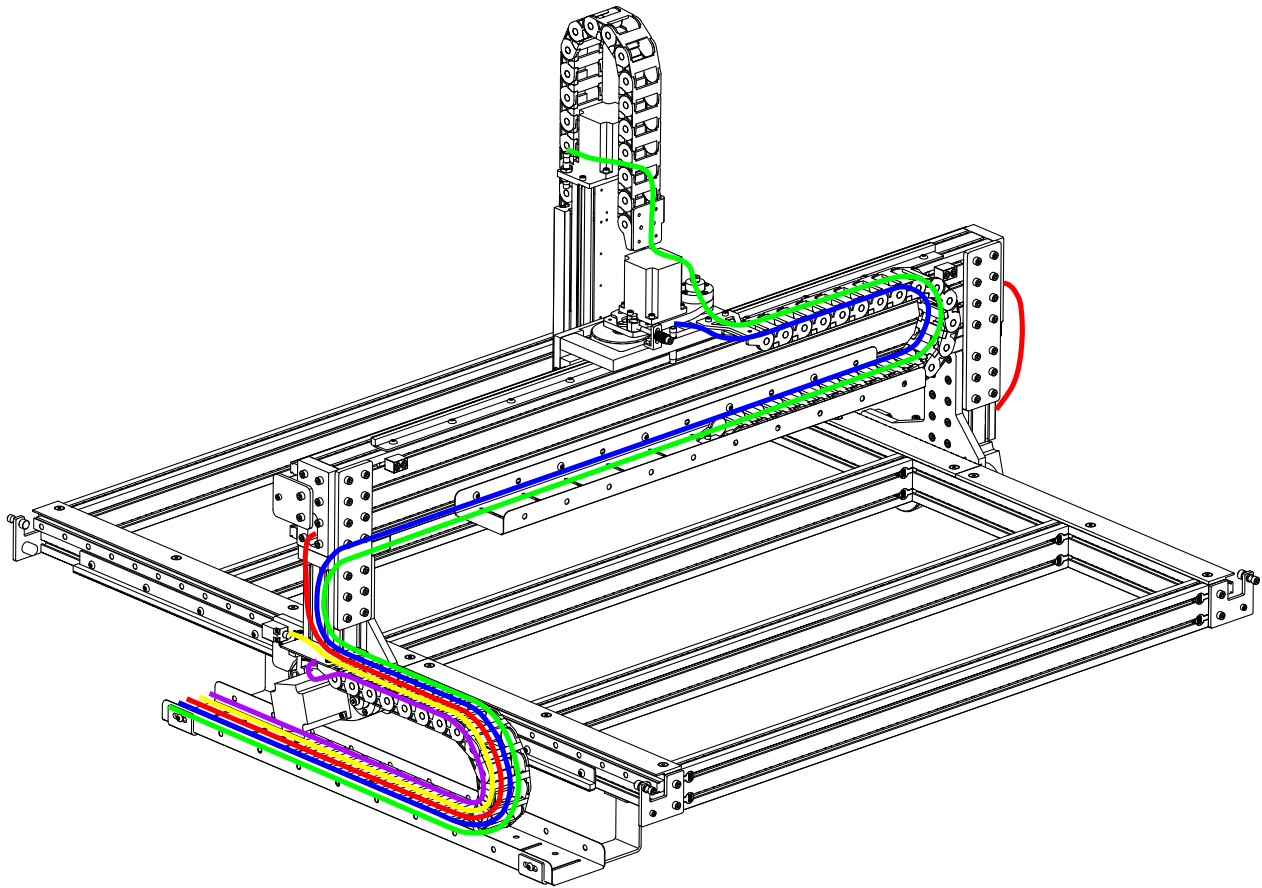


- Motor cable routing viewed from the back of the machine.

Motor Cables

Axis	Color	Cable
X	Blue	20'
Y	Red	20'
Z	Green	20'
Slaved	Yellow	12'

7.2.1.3



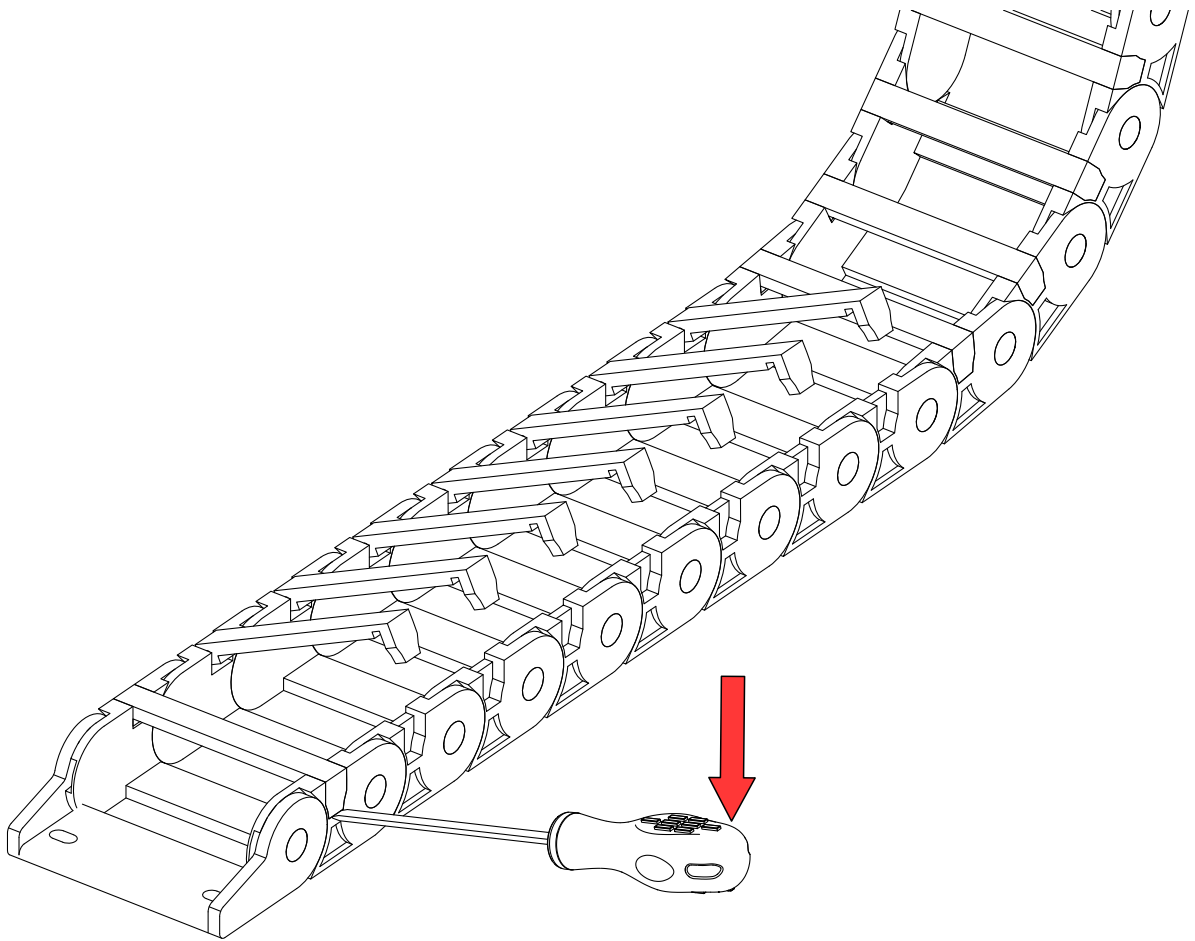
- Sensor cable routing viewed from the back of the machine.

Sensor Cables

Axis	Color	Cable
Y- Switch	Red	20' with Straight Connector
Z+ Switch	Green	20' with 90° Connector
X- Switch	Blue	20' with 90° Connector
Slaved Switch	Yellow	12' with Straight Connector
Y+ Switch	Purple	12' with Straight Connector



7.2.1.4



- To route cables through the cable track, use a screwdriver to lift open the individual cable track sections as indicated.

7.3 Proximity Sensors

Parts and Tools Required

The following parts and tools will be used in Section 7.3

QTY	Part/Description	Packaged In
1	Proximity Sensor Kit: - (2) Cylindrical Proximity Sensors - (3) Cube Proximity Sensors - (4) M4 x 25mm Socket Head Cap Screw - Proximity Cables (See table in Step 7.2.1.3 for lengths)	Electronics

Required Tools:

- 3mm Allen Wrench
- Adjustable Wrench
- Tape Measure

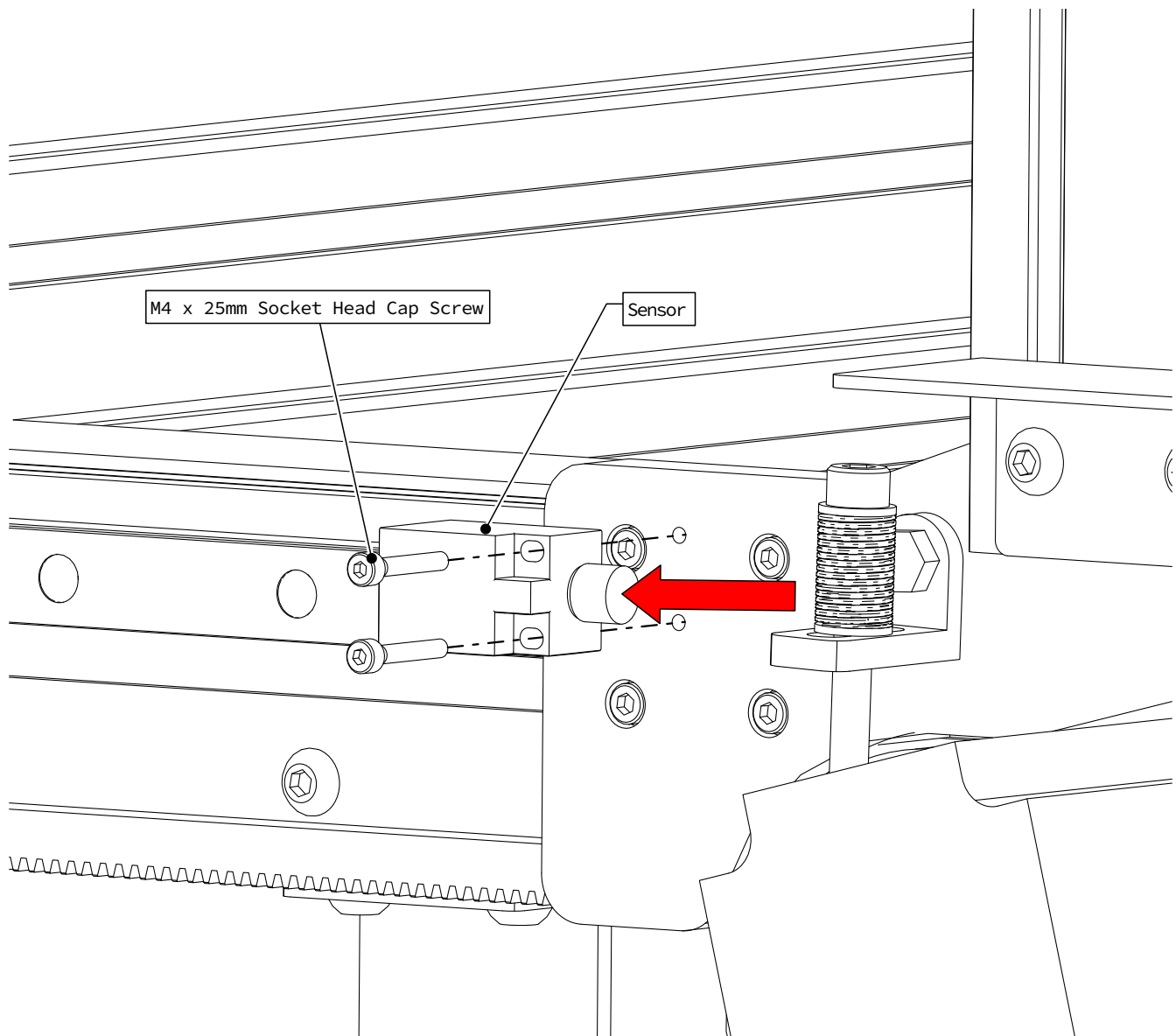
Recommended Additional Tools:

- 17mm Combination Wrench



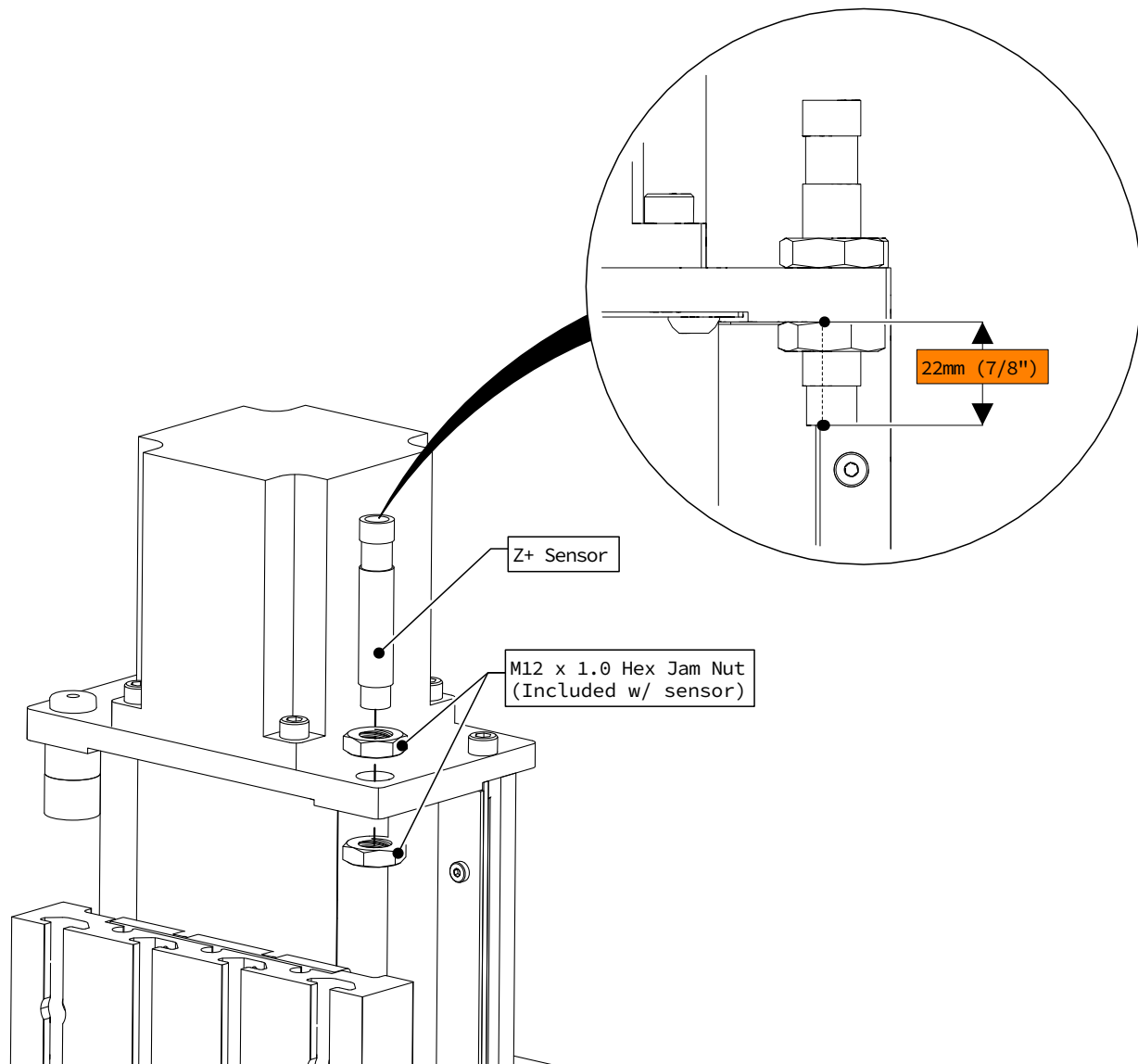
7.3.1 Sensor Installation

7.3.1.1



- Prior to installing sensor, attach a straight connector sensor cable.
- Install the sensor as indicated.
- Use this procedure to install the Y-, Y+, and Slaved Switch sensors.

7.3.1.2

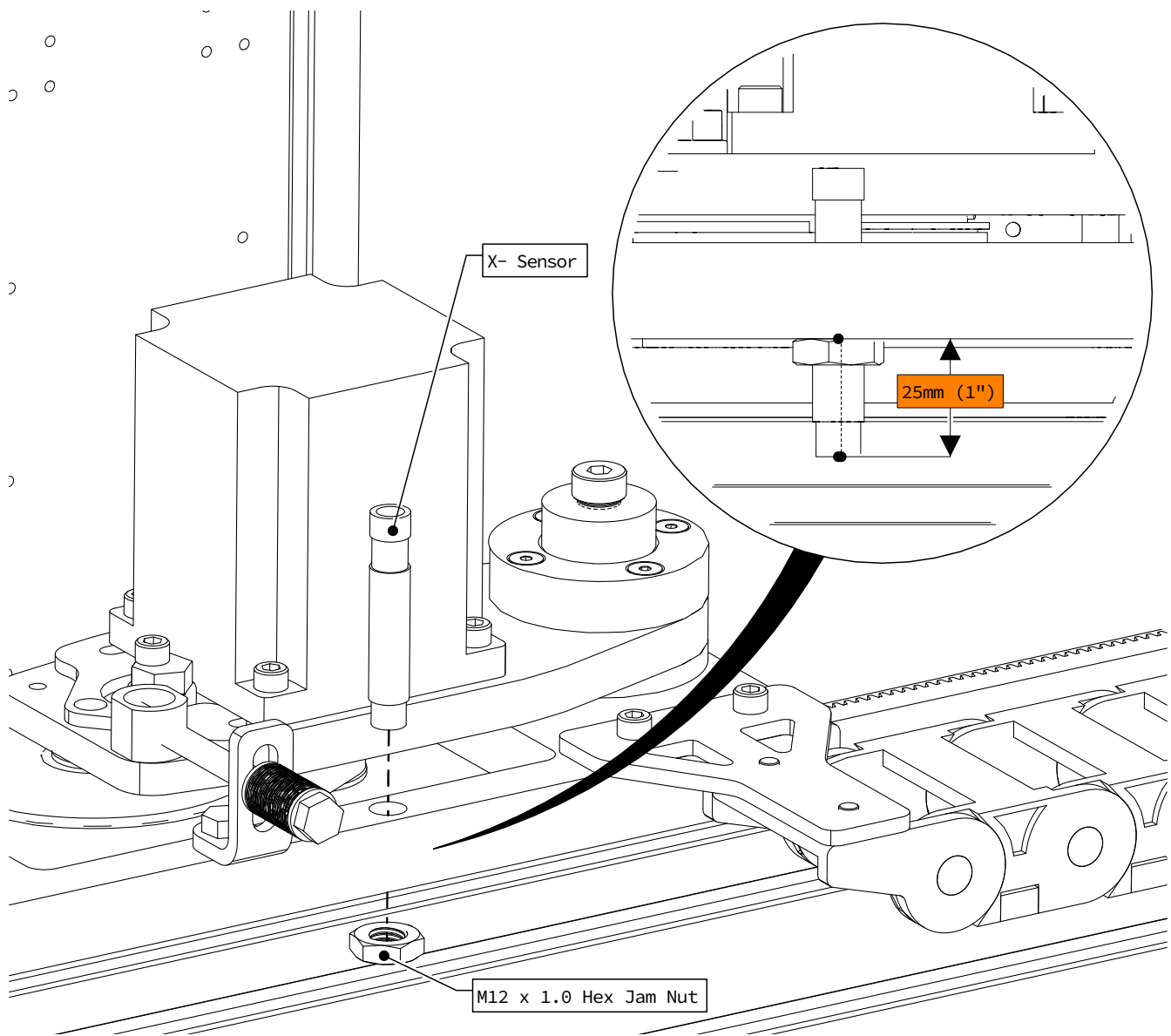


- Install the Z+ sensor as indicated.

Assembly Note

We recommend positioning the sensor 22mm (7/8") from the bottom of the Z-Axis Motor Mount Plate as indicated.

7.3.1.3

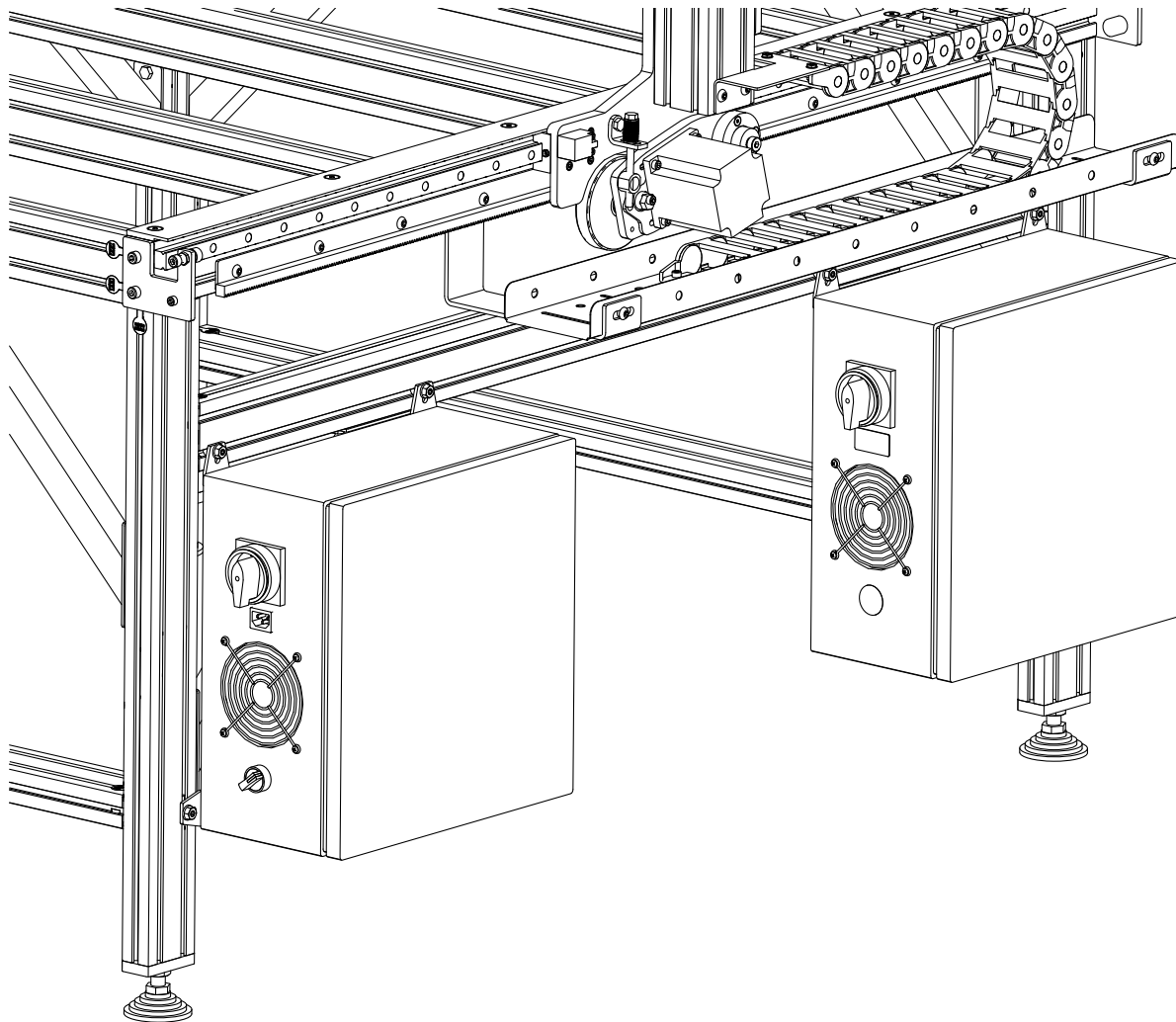


- Thread the X- sensor into the Gantry R&P Plate as indicated.

Assembly Note

We recommend positioning the sensor 25mm (1") from the bottom of the Gantry R&P Plate as indicated.

7.4 Electronics Enclosure Installation



i Section Note

Continue with this section if you purchased a Plug-and-Play Electronics Kit and/or a VFD.

Parts and Tools Required

The following parts and tools will be used in Section 7.4

QTY	Part/Description	Packaged In
1	CRP800-00E Plug-and-Play Control System	Electronics
1	CRP450-00E Plug-and-Play Spindle/VFD System	Electronics
1	Electronics Enclosure Mounting Hardware: - (6) M8 x 20mm Hex Cap Screw - (6) M8 Hex Nut - (6) Mounting Bracket	Electronics
1	CRP813-00-ELCBAR-HW-BAG: - (6) M8 Roll In T-Nut - (6) M8 x 25mm Set Screw - (6) M8 Hex Flange Nut	CRP810 Base Kit

Required Tools:

- 4mm Allen Wrench
- Adjustable Wrench
- Standard (Flat Head) Screwdriver

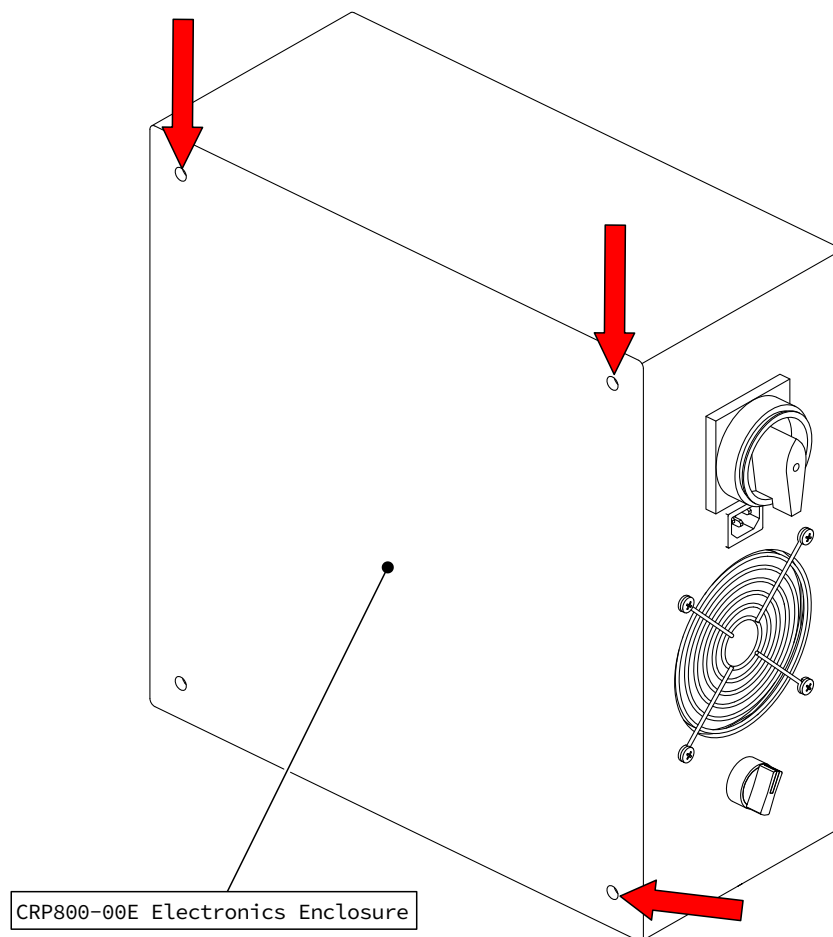
Recommended Additional Tools:

- 13mm Combination Wrench



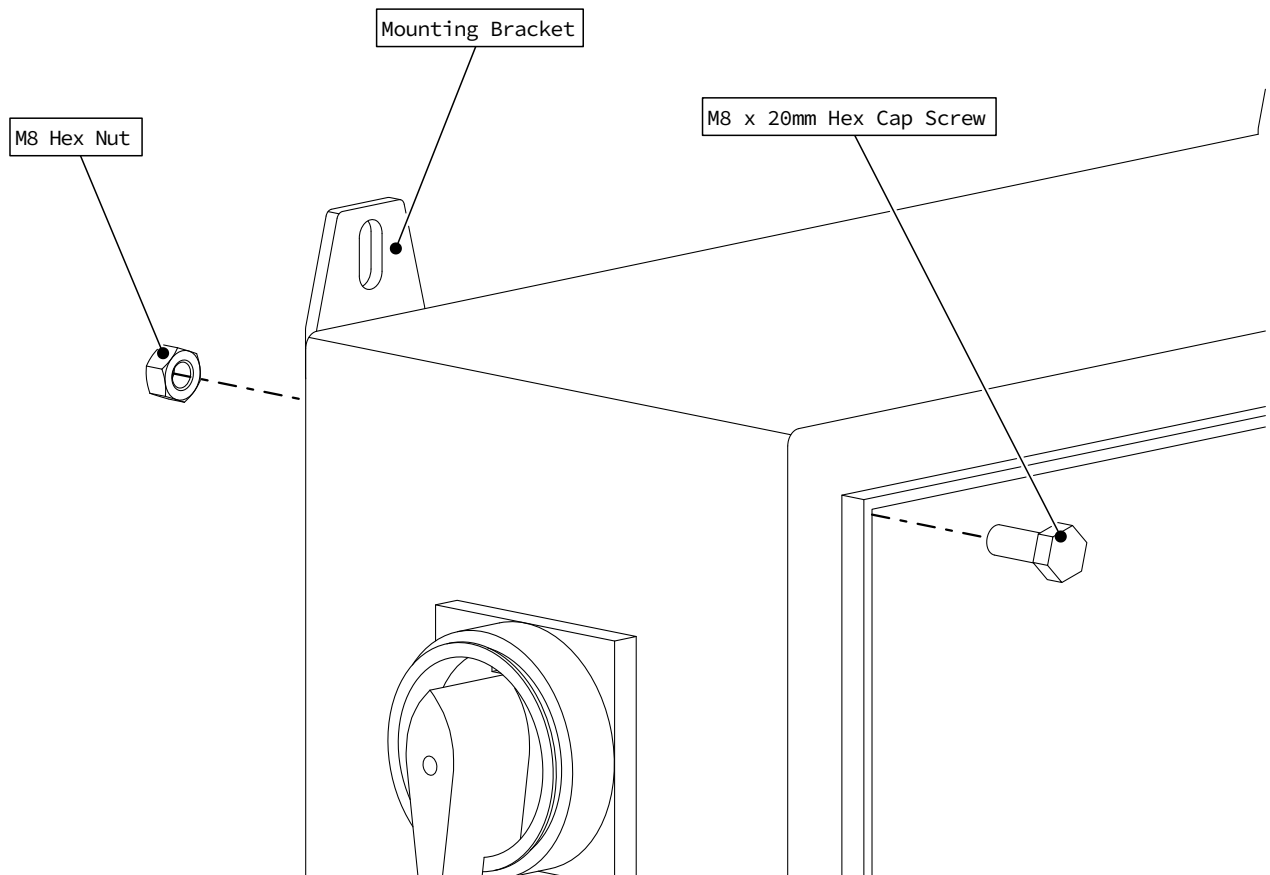
7.4.1 CRP800 Control Unit

7.4.1.1



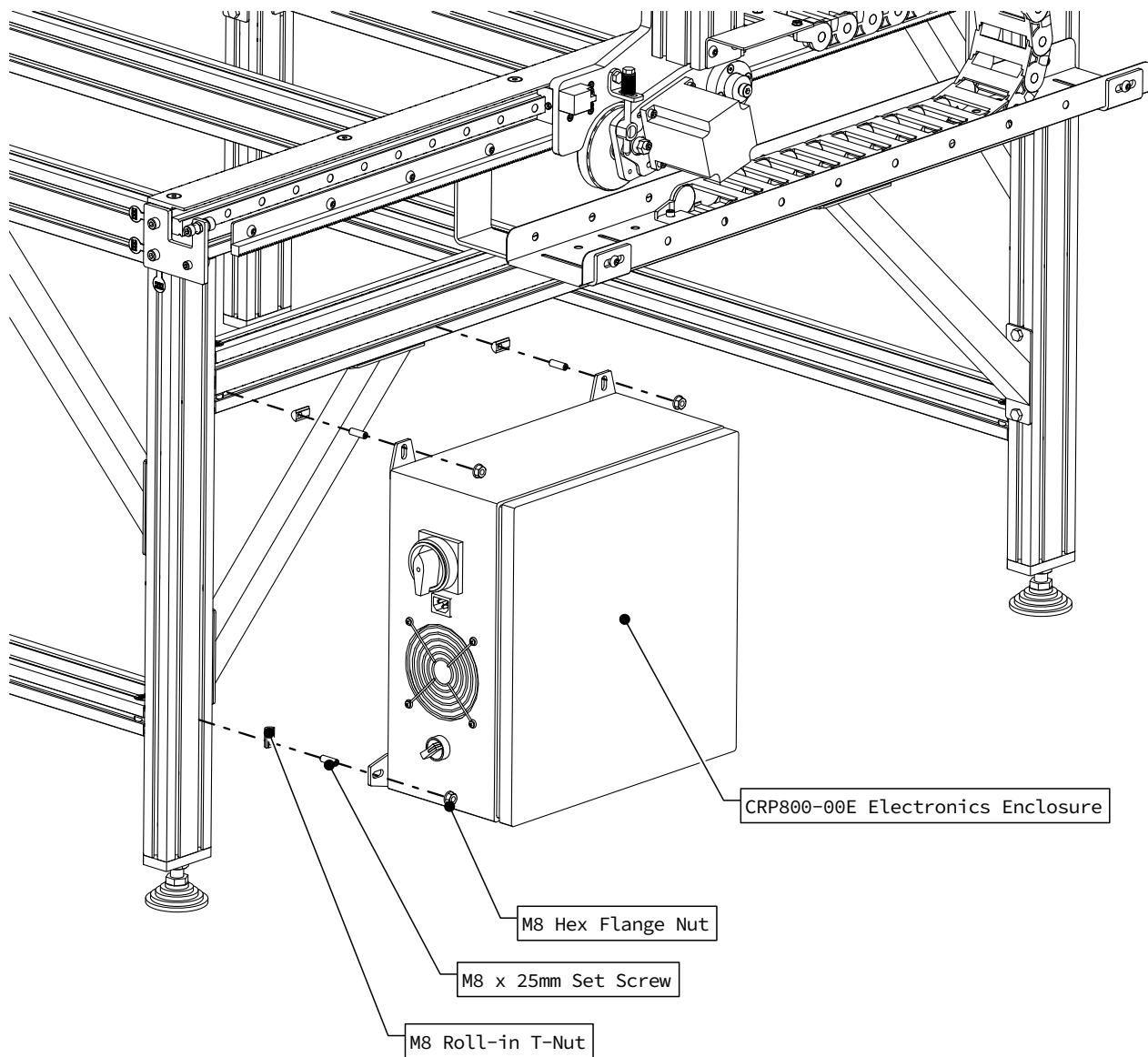
- At the indicated locations, remove the plastic plugs from the CRP800-00E Plug-and-Play Electronics Enclosure.

7.4.1.2



- At the locations with the removed plugs, attach a mounting bracket as indicated.

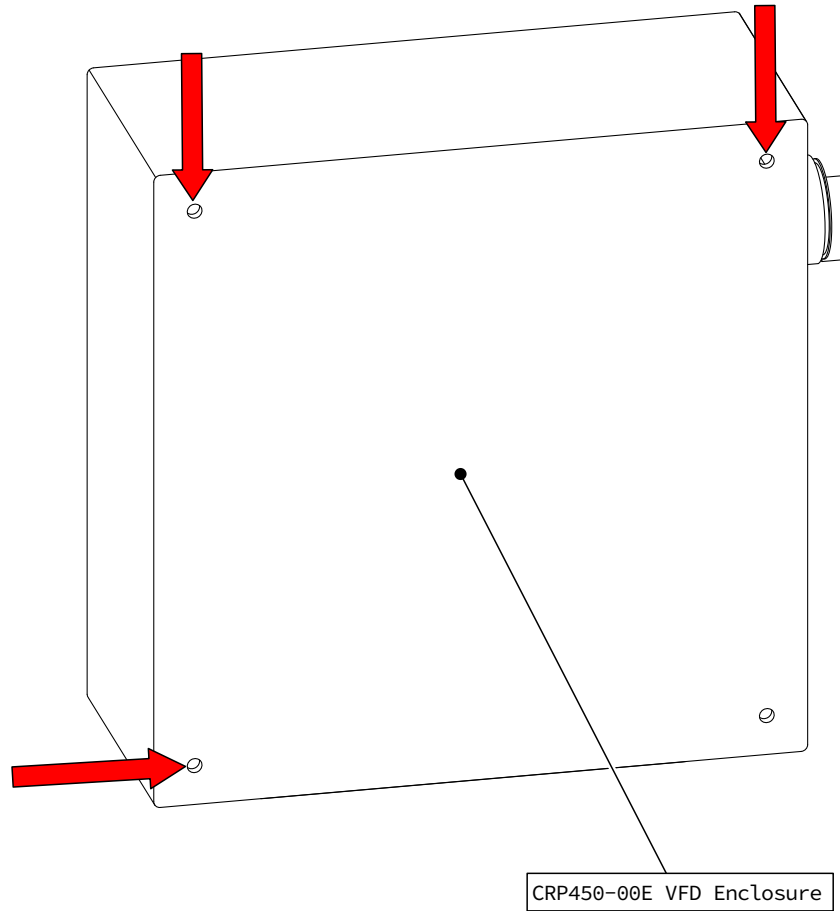
7.4.1.3



- Attach the CRP800-00E Plug-and-Play Electronics Enclosure to the leg kit as indicated.

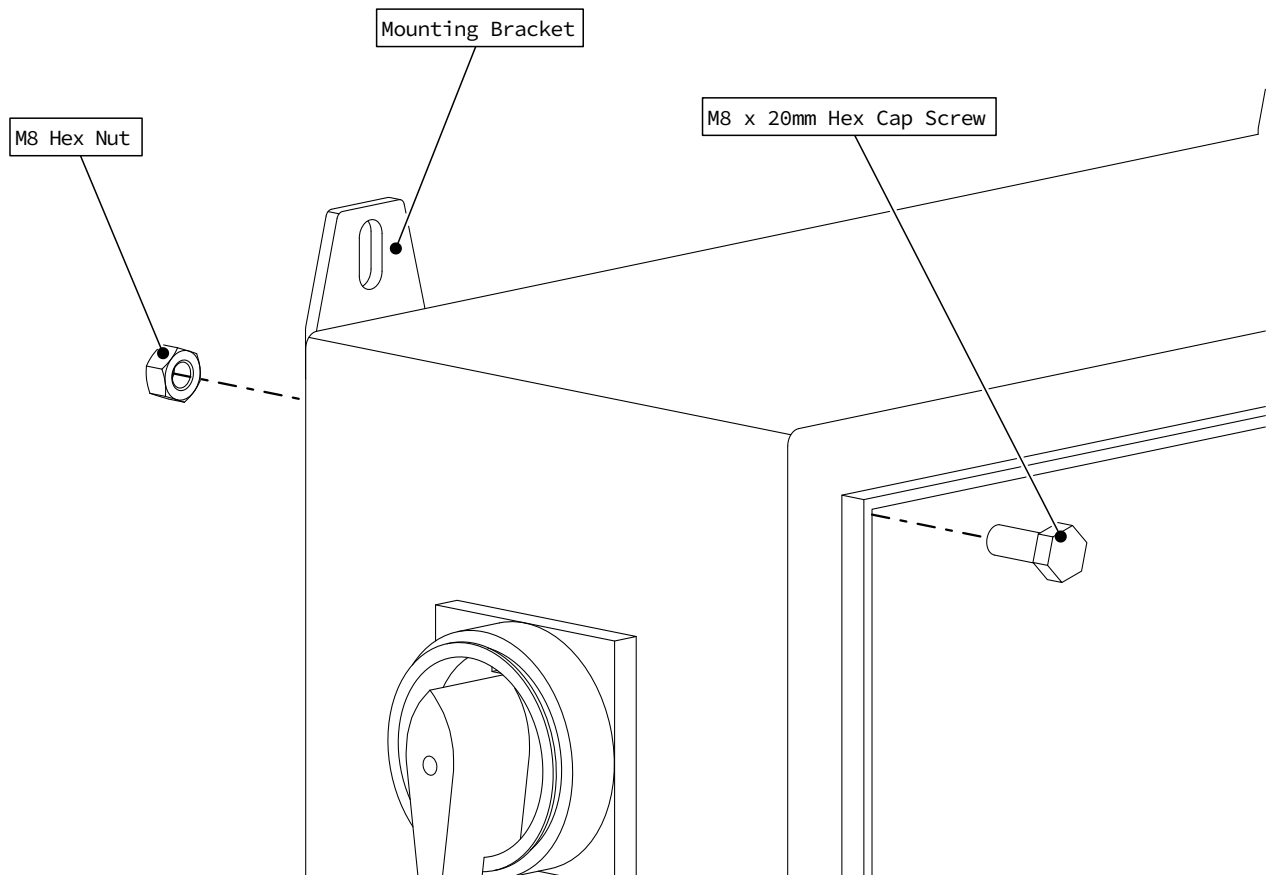
7.4.2 CRP450 VFD System

7.4.2.1



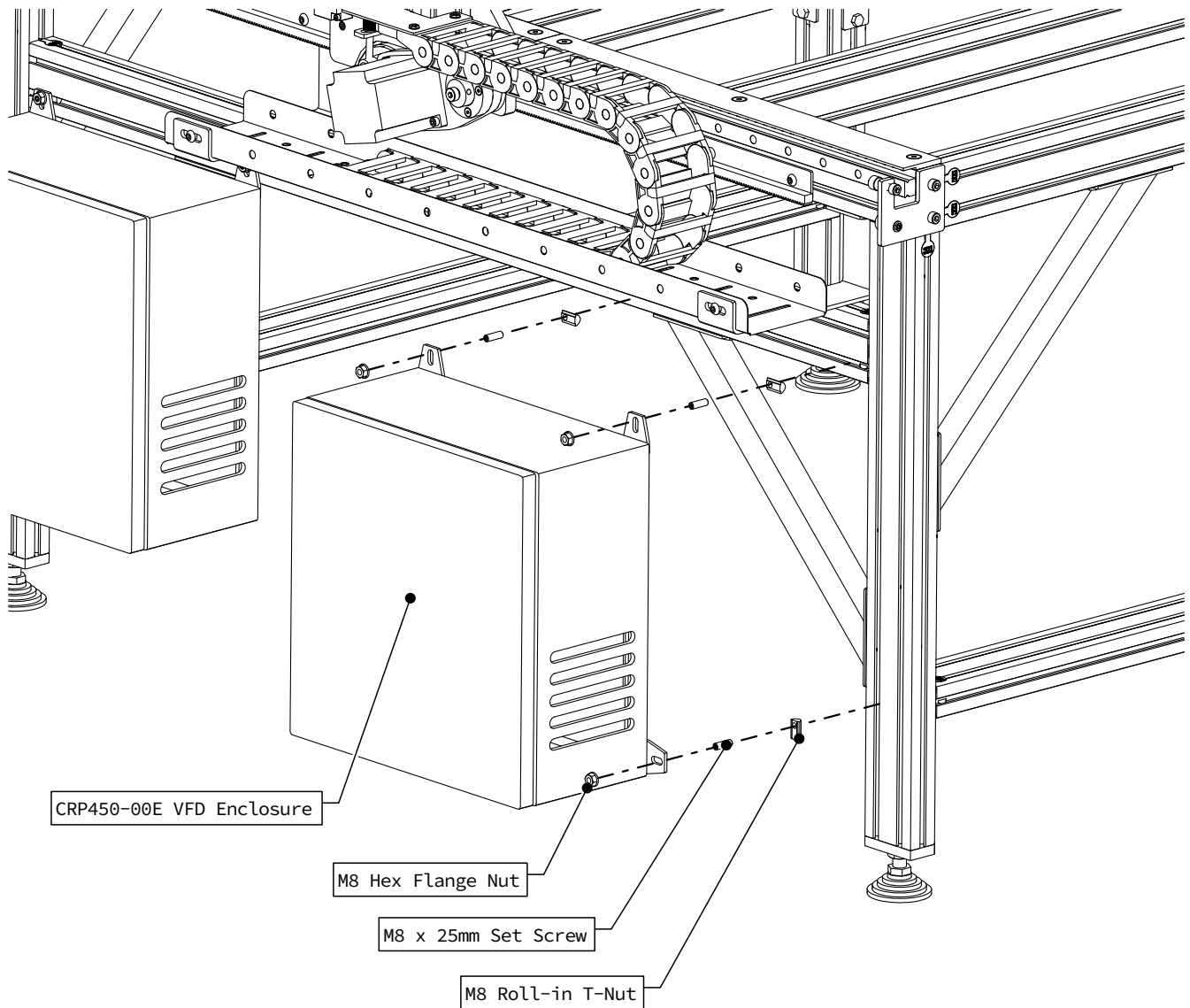
- At the indicated locations, remove the plastic plugs from the CRP450-00E VFD Electronics Enclosure.

7.4.2.2



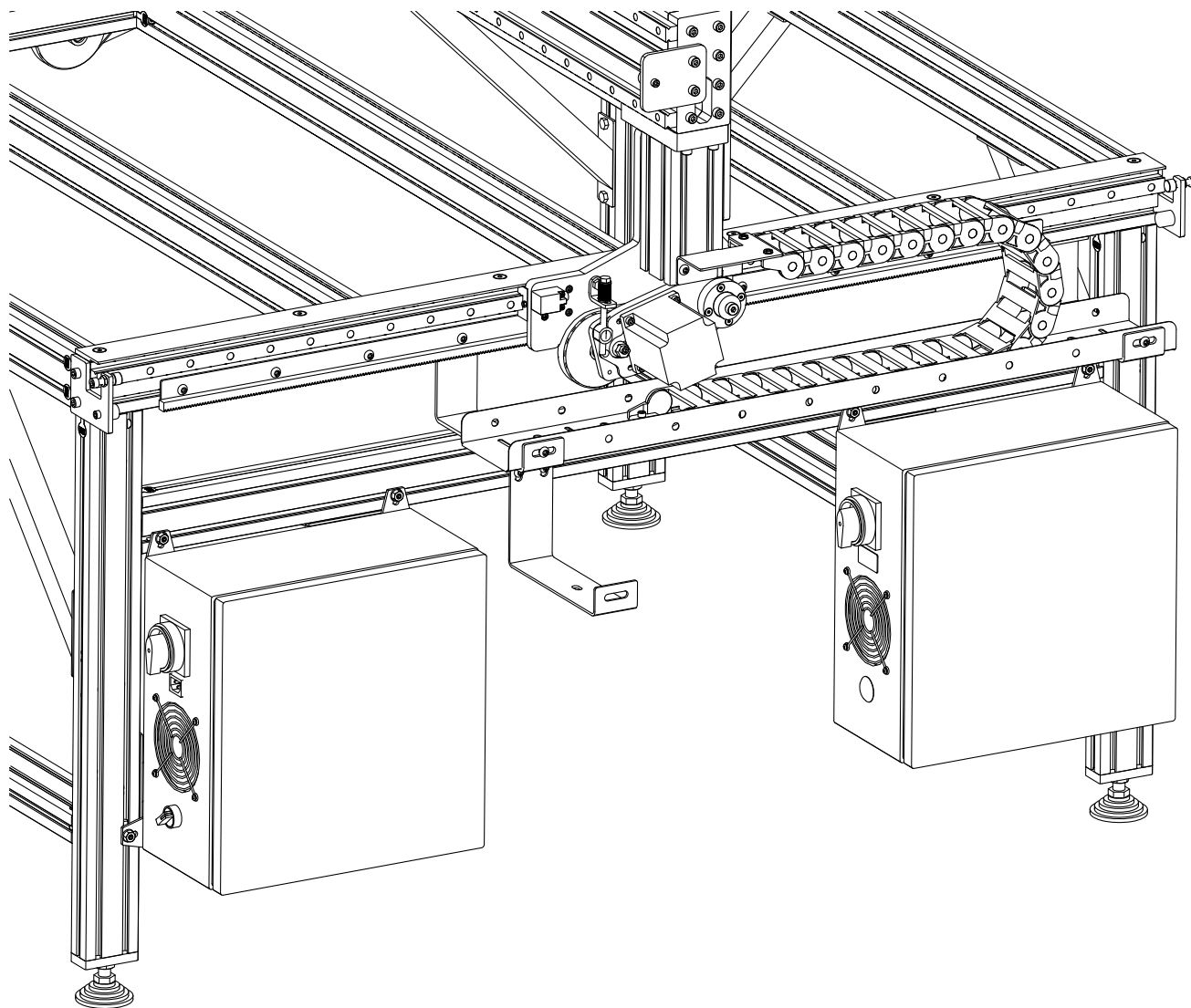
- At the locations with the removed plugs, attach a mounting bracket as indicated.

7.4.2.3



- Attach the CRP450-00E VFD Electronics Enclosure to the leg kit as indicated.

7.5 Cable Management



Parts and Tools Required

The following parts and tools will be used in Section 7.5

QTY	Part/Description	Packaged In
1	CRP150-07 Cable Bracket	Cable Track
1	CT-FAST-PRO-19.1: - (3) Cable Tie Mounts - (3) M6 x 10mm Button Head Cap Screw - (3) M6 Roll-in T-Nut - (2) M8 x 12mm Button Head Cap Screw - (2) M8 Roll-in T-Nut	Cable Track

Required Tools:

- 3mm Allen Wrench
- 5mm Allen Wrench

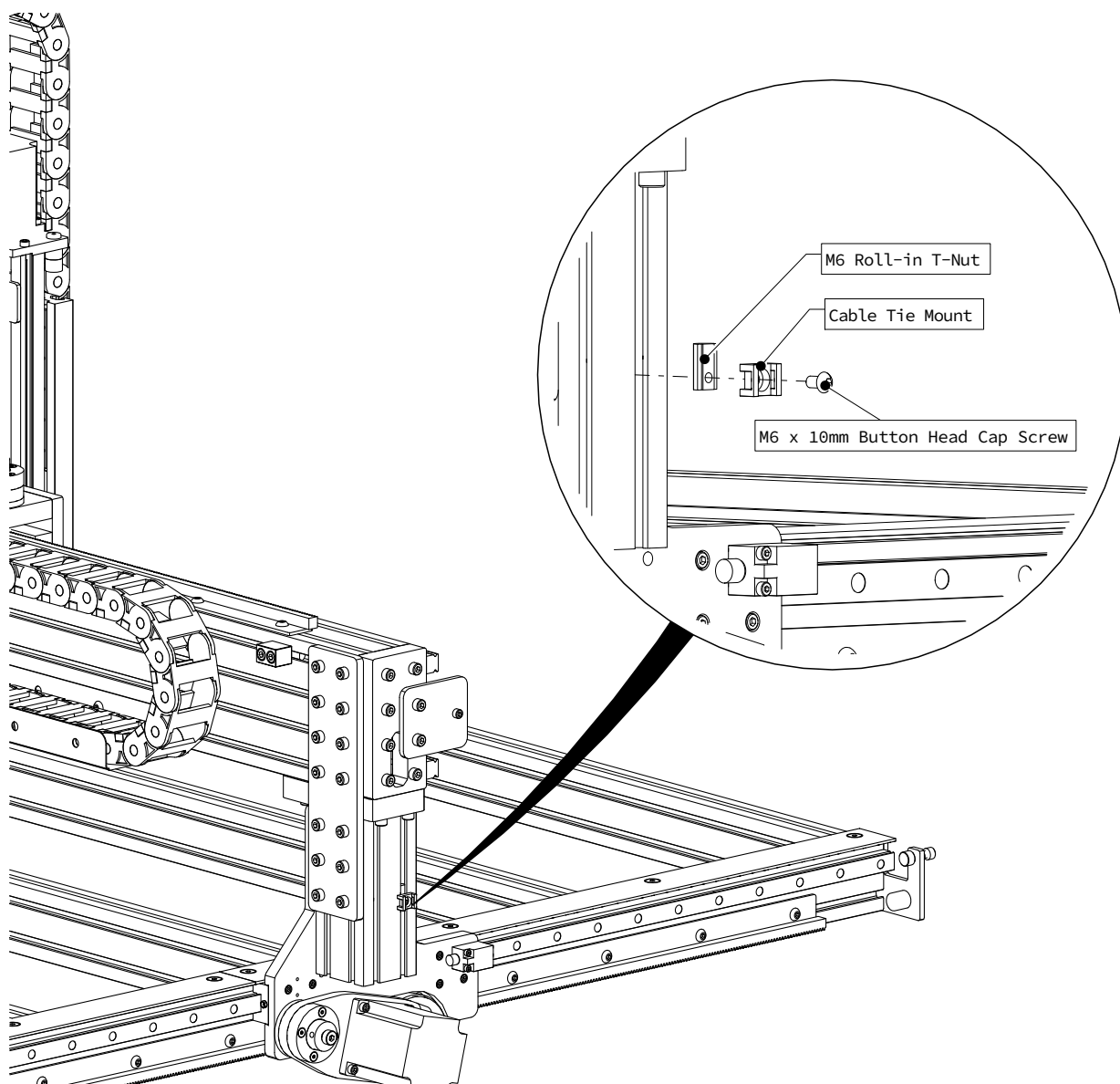
Recommended Additional Supplies:

- Cable Ties



7.5.1 Cable Tie Mounts

7.5.1.1

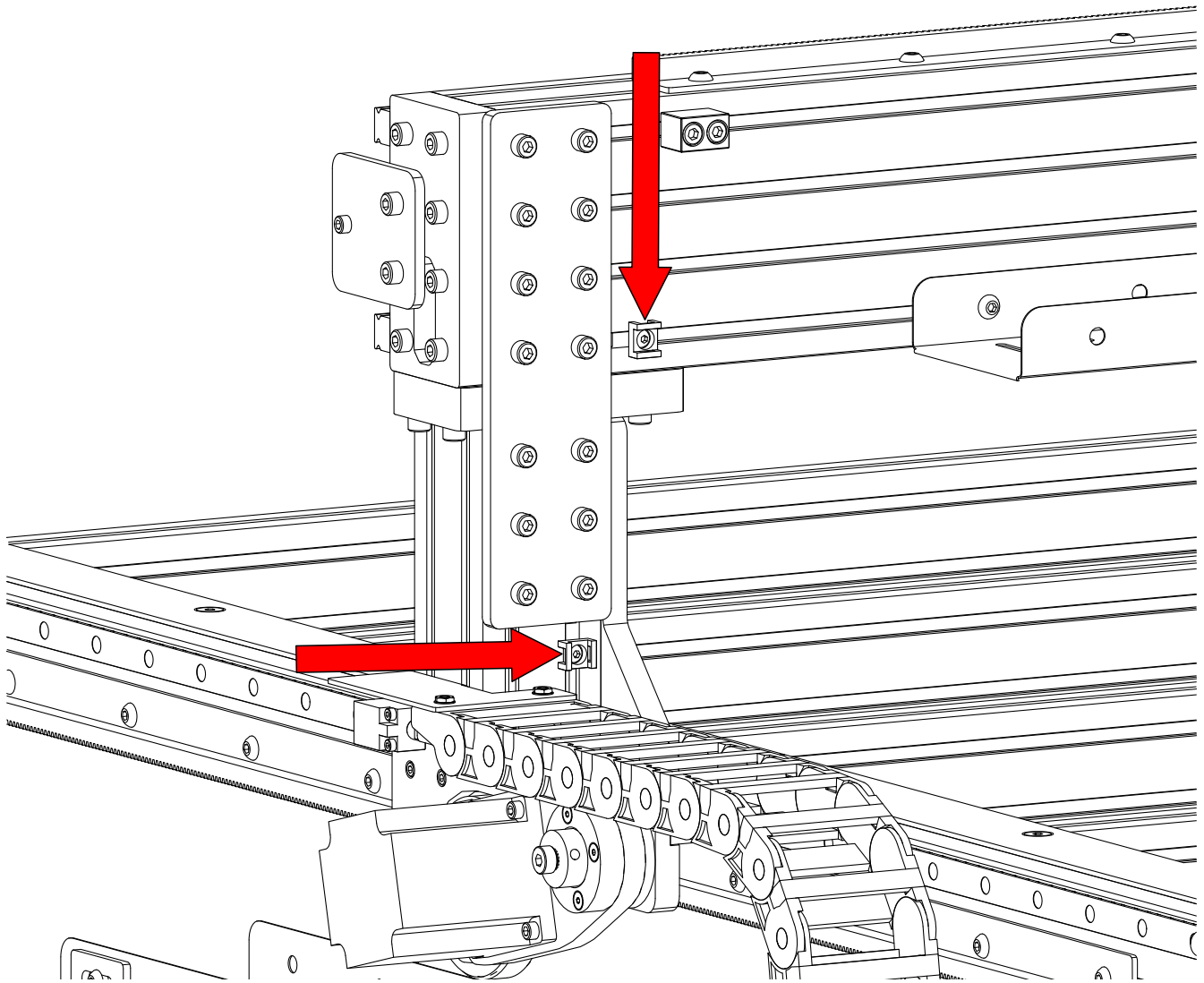


- Attach a cable tie mount to the riser extrusion as indicated.

Assembly Note

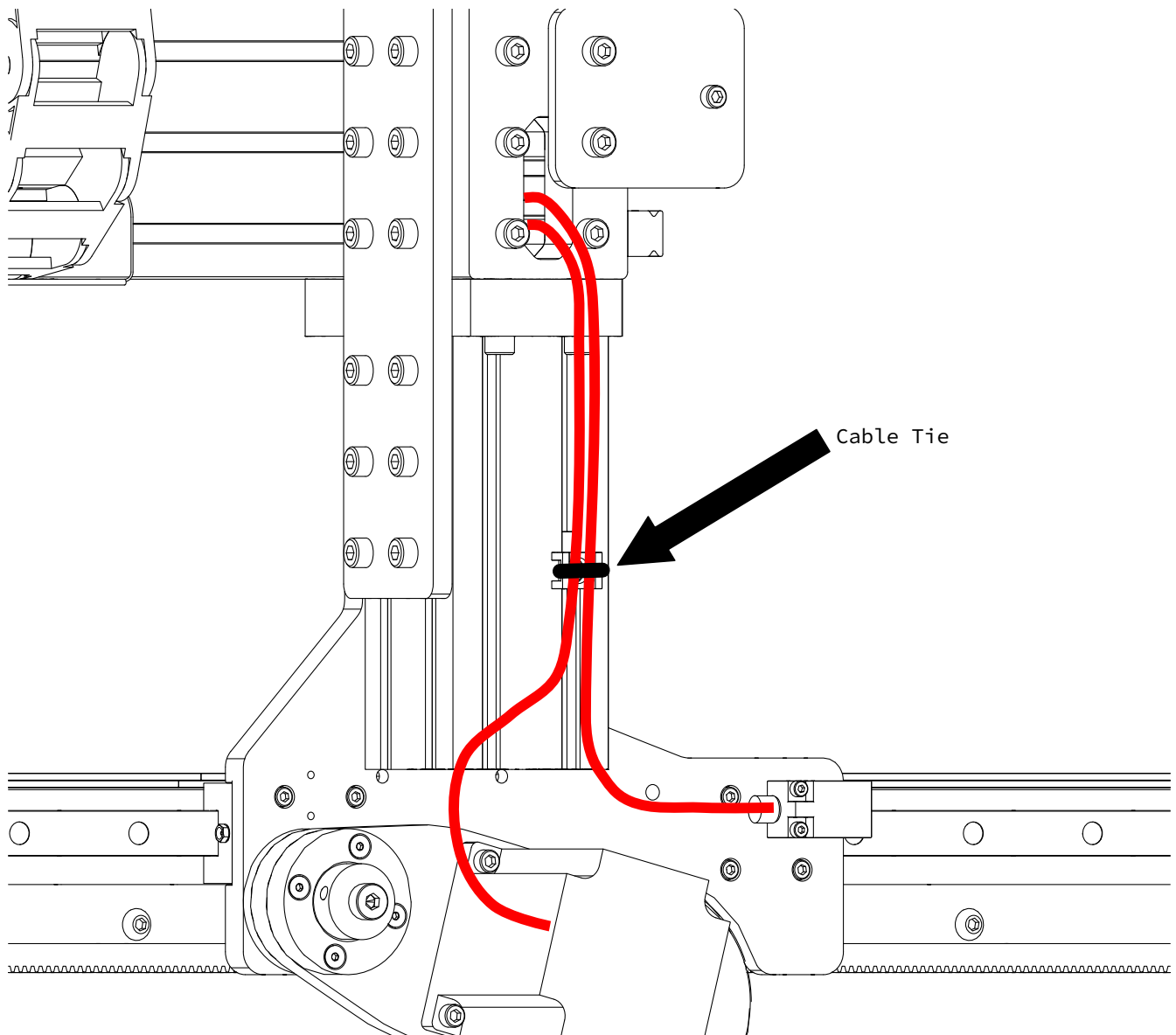
The riser shown is on the side of the machine without table cable track.

7.5.1.2



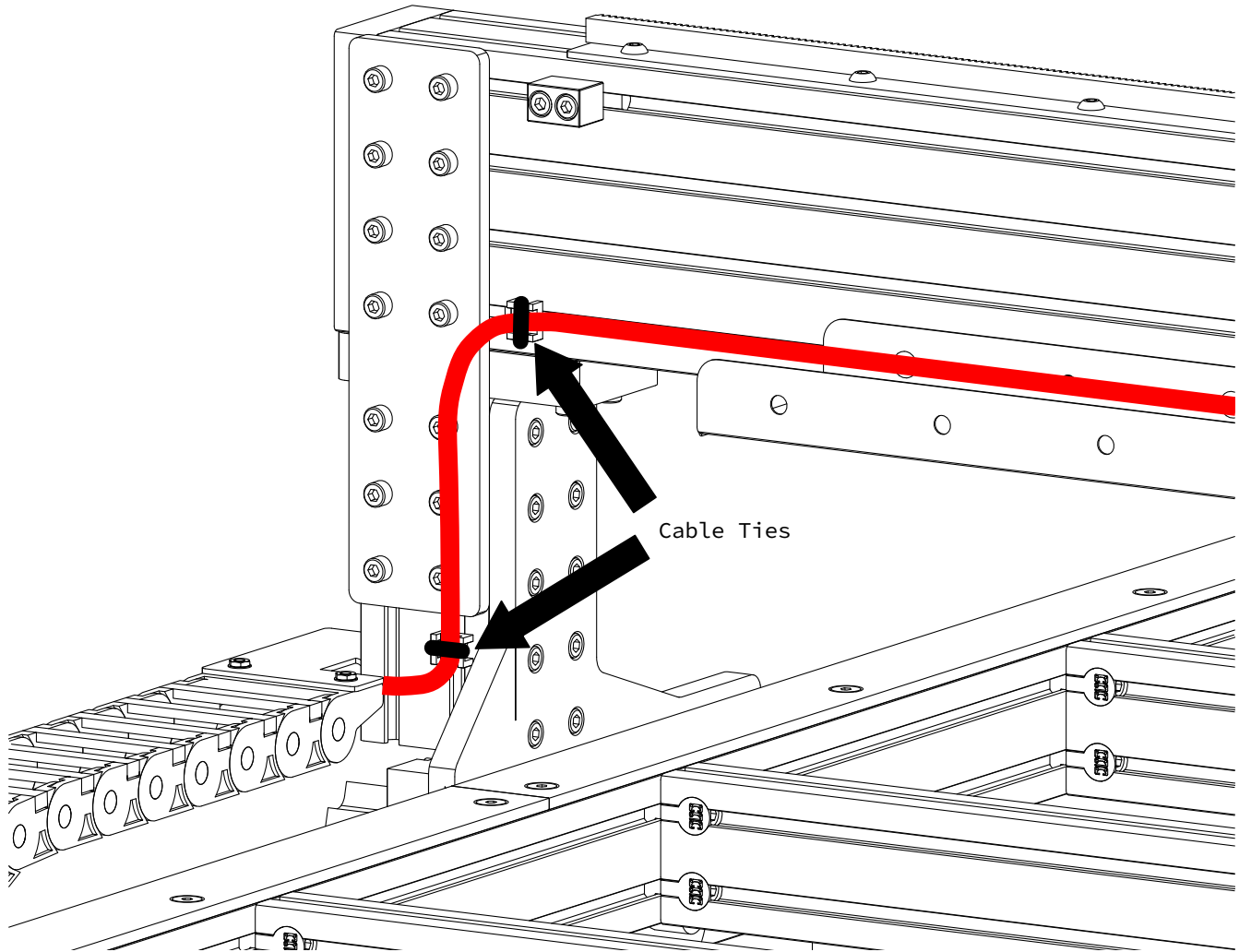
- Repeat this process to attach two additional cable tie mounts at the indicated locations.

7.5.1.3



- Use a cable tie to secure the Y- sensor cable and Y motor cable to the cable tie mount.

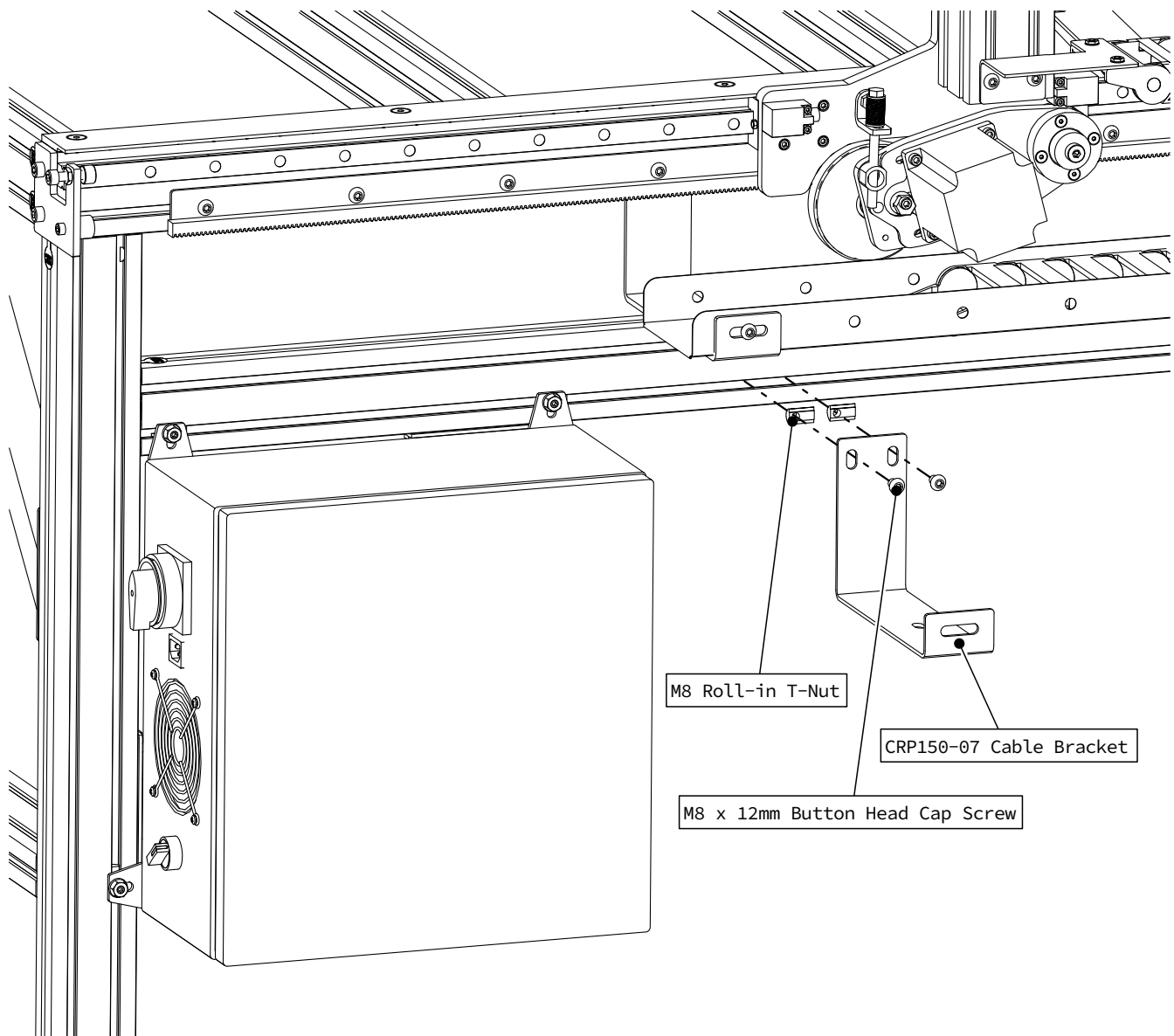
7.5.1.4



- Use cable ties to secure the cables routed from the gantry cable track to the table cable track.

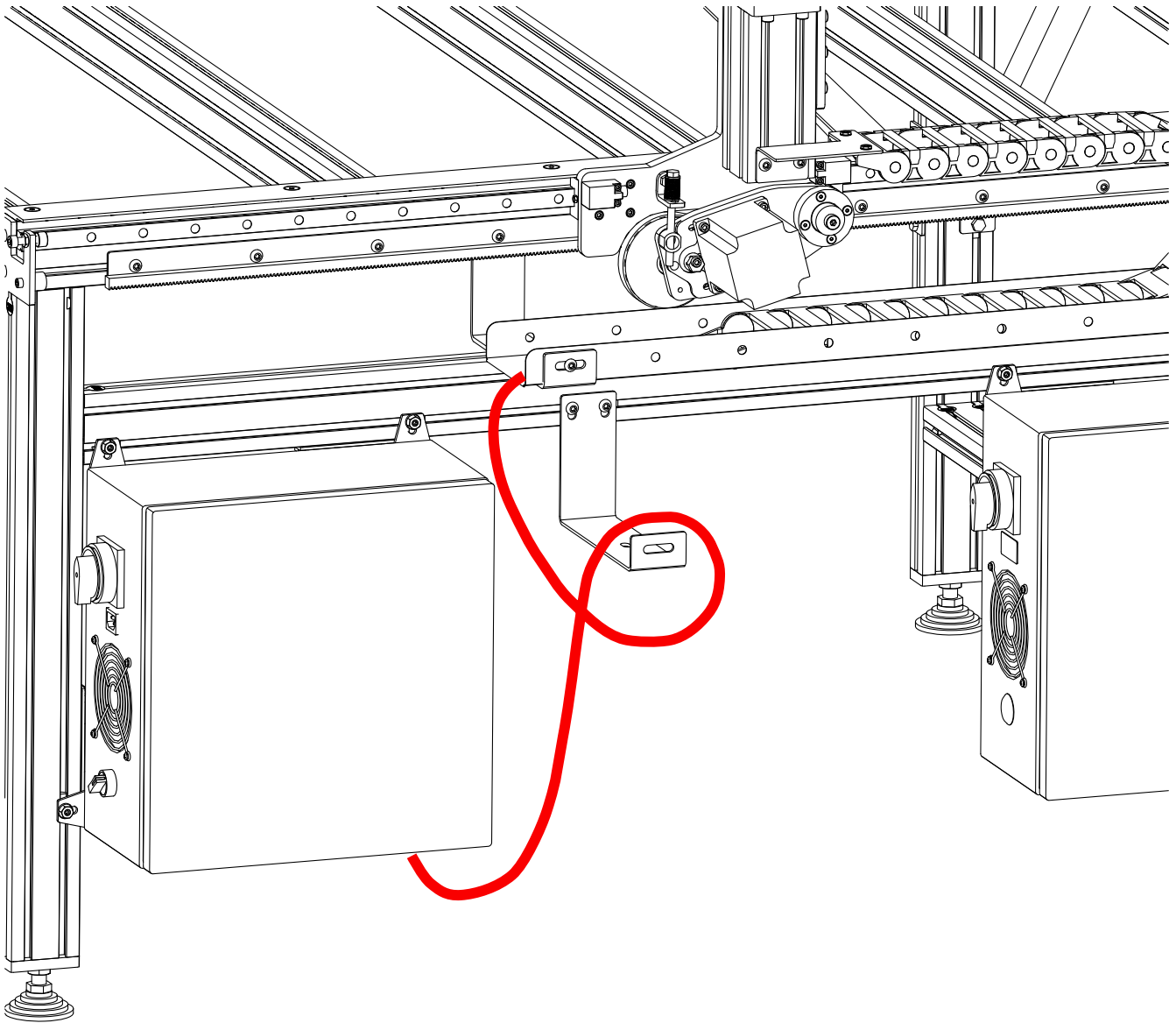
7.5.2 Cable Bracket

7.5.2.1



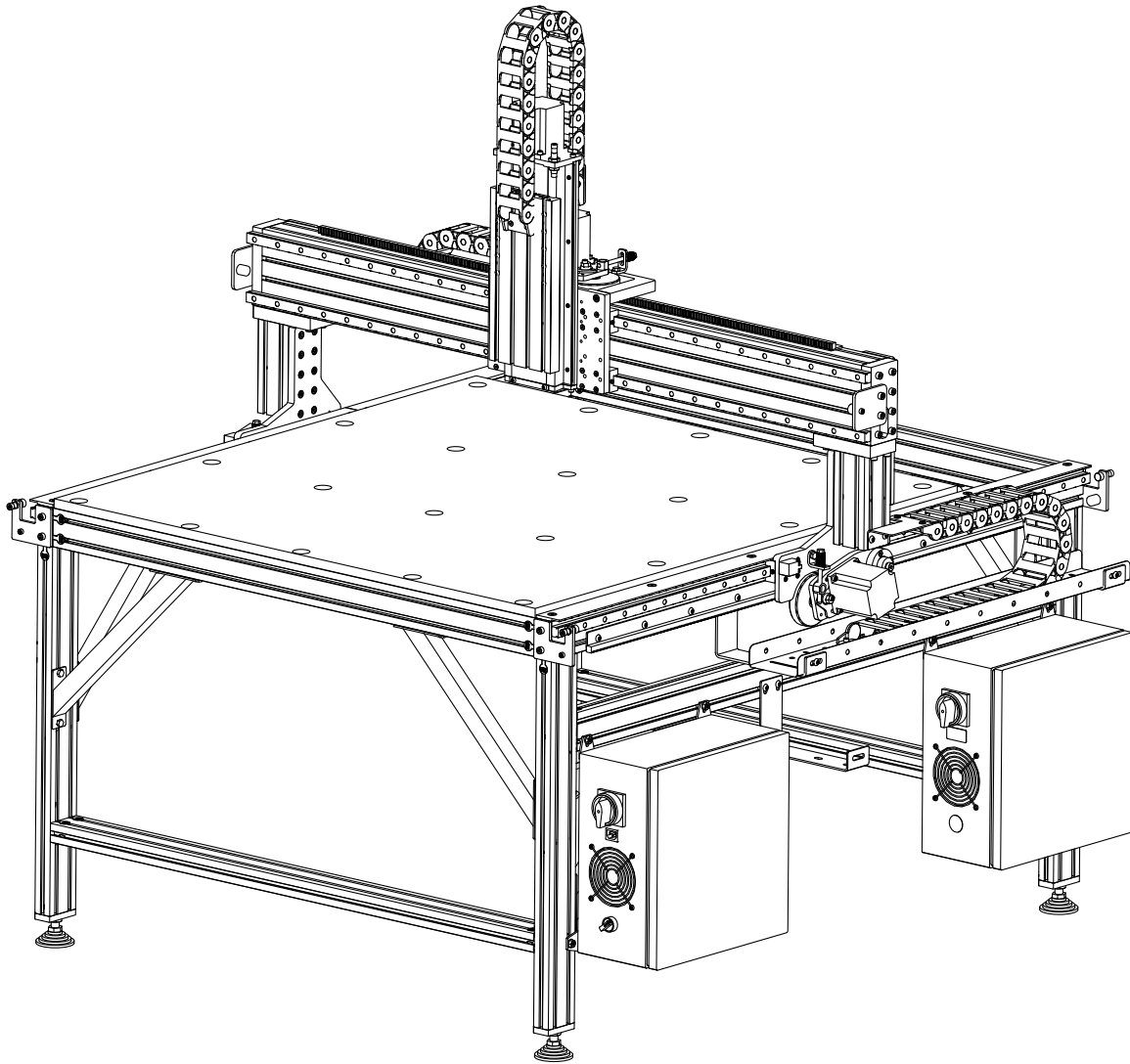
- Attach the cable bracket to the electronics mounting bar as indicated.
- Fully tighten the fasteners.

7.5.2.2



- Coil any excess length of cables and hang on the cable bracket.

Section 8: Machine Setup



8.1 Software Setup and Calibration

The next step to get your machine up and running will be to setup your CNC software. Our CNC Software Setup Guide (www.cncrouterparts.com/cnc-software-setup-guide-p-286.html) provides step-by-step instructions.

Once your CNC machine is up and running, you can use our Leveling, Squaring, and Tramming Instructions (www.cncrouterparts.com/leveling-squaring-and-tramming-your-cnc-machine-p-438.html) to calibrate your machine for consistent and reliable results.

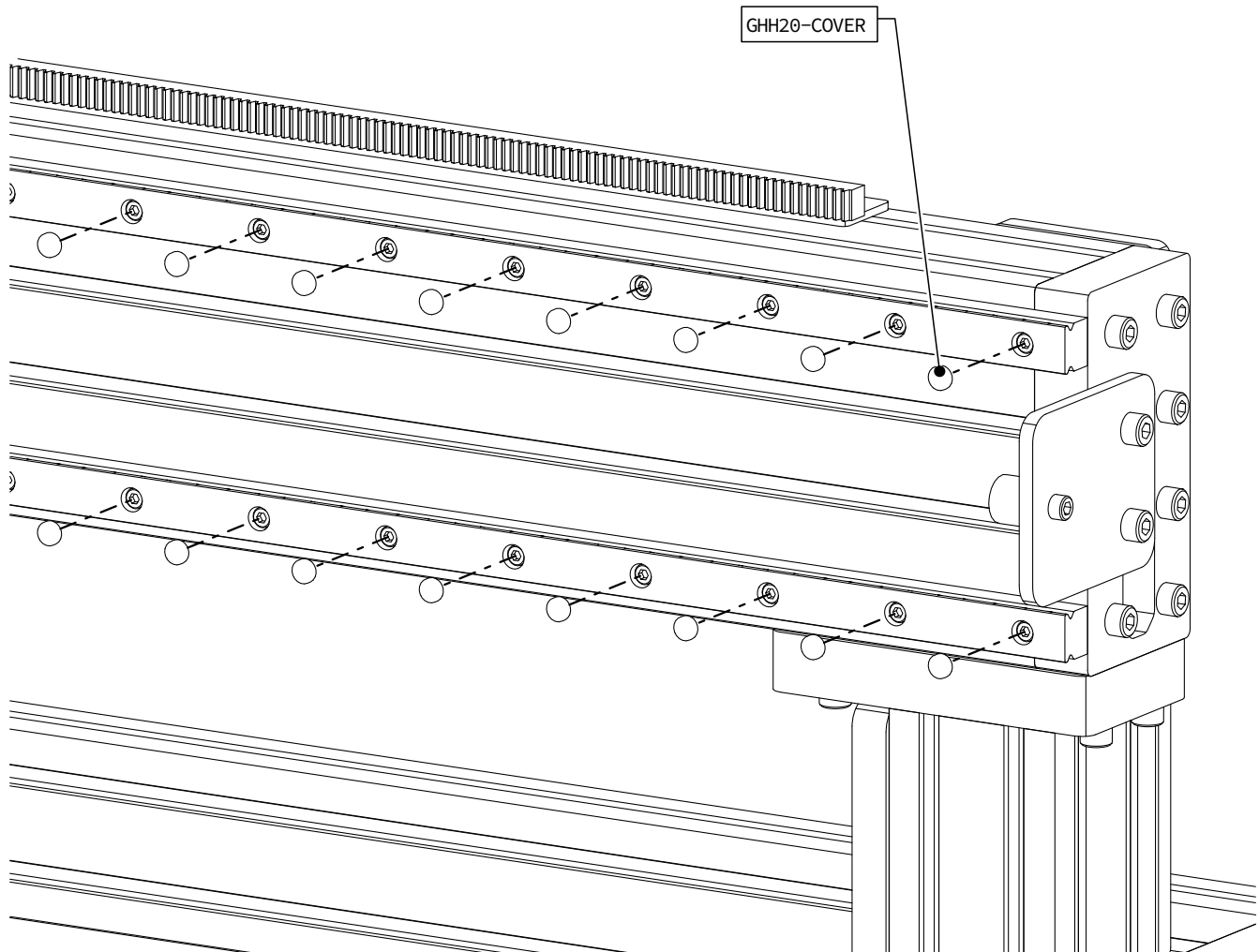


8.2 Linear Rail Hole Covers

We recommend installing the Linear Rail Hole Covers after you have your machine assembled and running.

The following parts and tools will be used in Section 8.2

QTY	Part/Description	Packaged In
108	GHH20-COVERS	CRP810 Base Kit

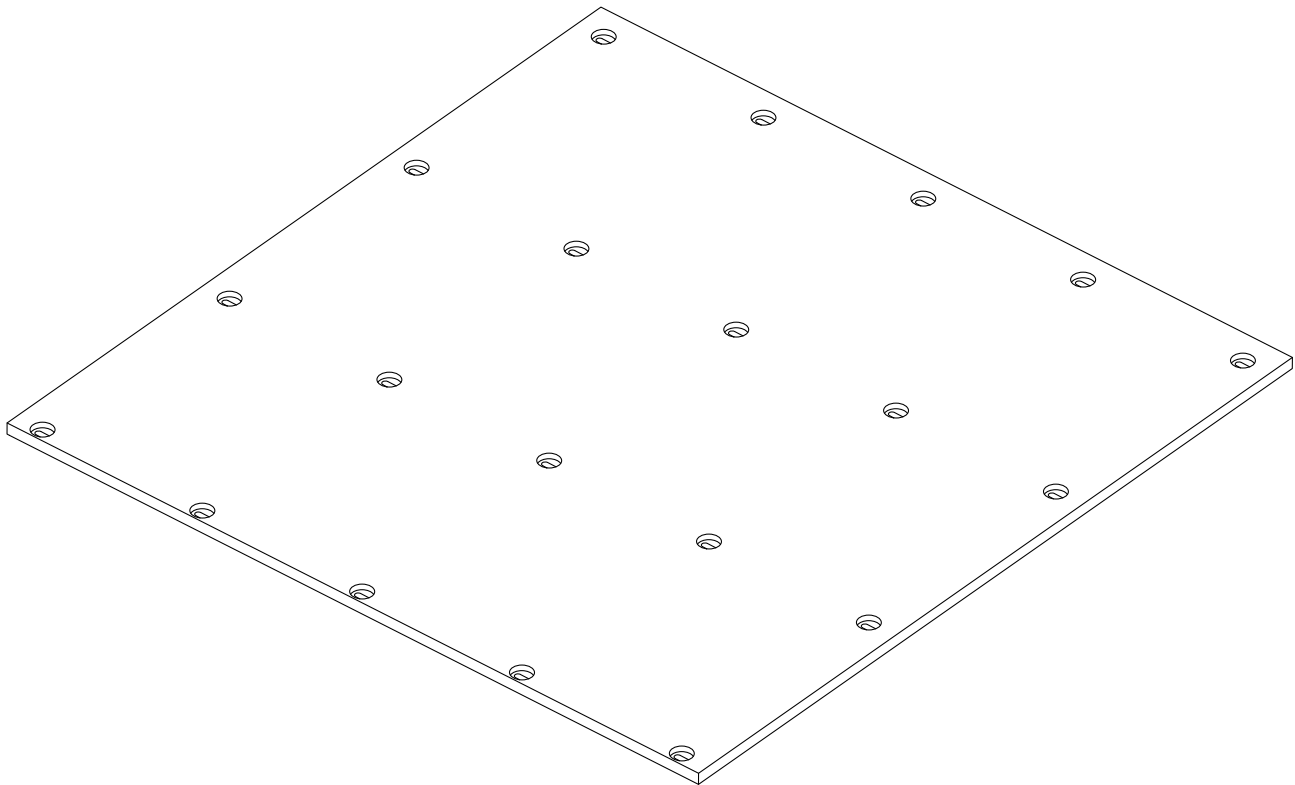


- Install a GHH20 cover in each hole of the linear rails as indicated.
- Repeat this process for both the table and gantry linear rails.

8.3 Spoil Board Installation

Our Spoil Board Project includes plans and instructions to help you make a spoil board specific for your size of CNC machine. Included with your machine kit are the necessary fasteners to attach the spoil board.

Spoil Board Project Link: www.cncrouterparts.com/cnc-spoilboard-p-425.html

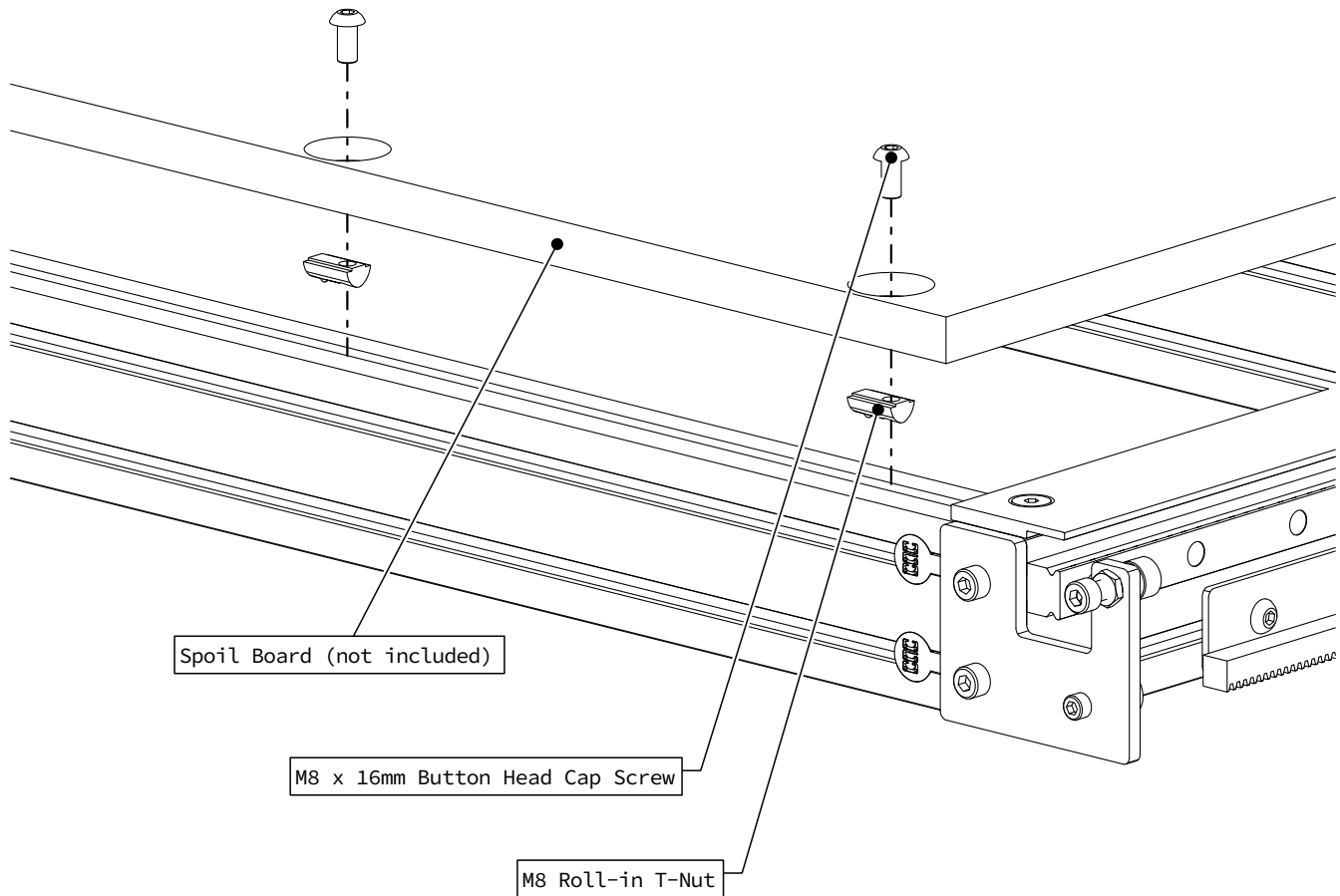


The following parts and tools will be used in Section 8.3

QTY	Part/Description	Packaged In
1	CRP816-00-4848 - Spoil Board Fastener Kit: - (20) M8 x 16mm Button Head Cap Screw - (20) M8 Roll-in T-Nut	CRP810 Base Kit

Required Tools:

- 5mm Allen Wrench



- Attach the spoil board to the table crossmembers as indicated.