PRO4824 CNC 4' x 2'
Assembly Instructions

v2018Q4.1, 16.1 Model Revision

Archived instructions for machines purchased Jan 2016 - Dec 2018.

Current machine assembly instructions are available at
https://www.avidcnc.com/support/instructions/pro

Contents

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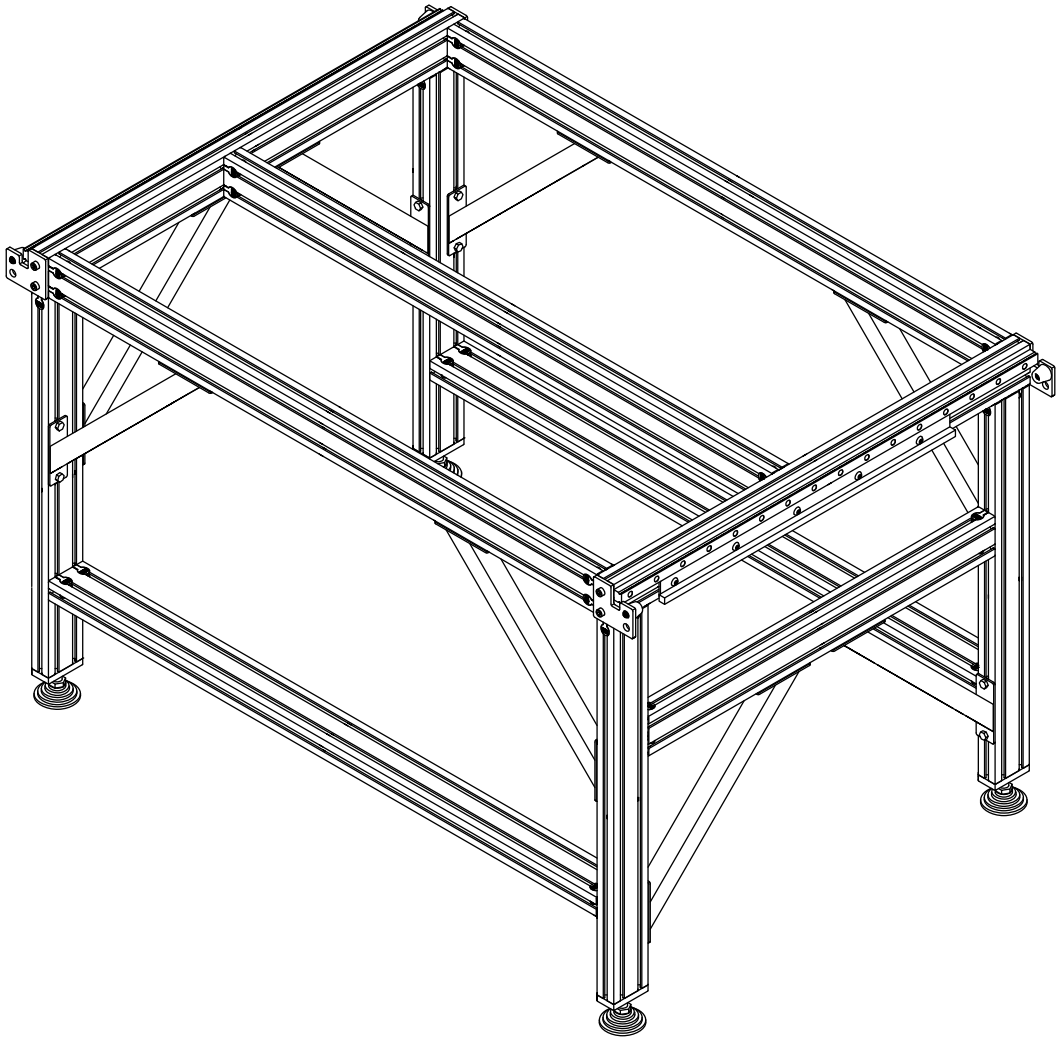
Base Assembly



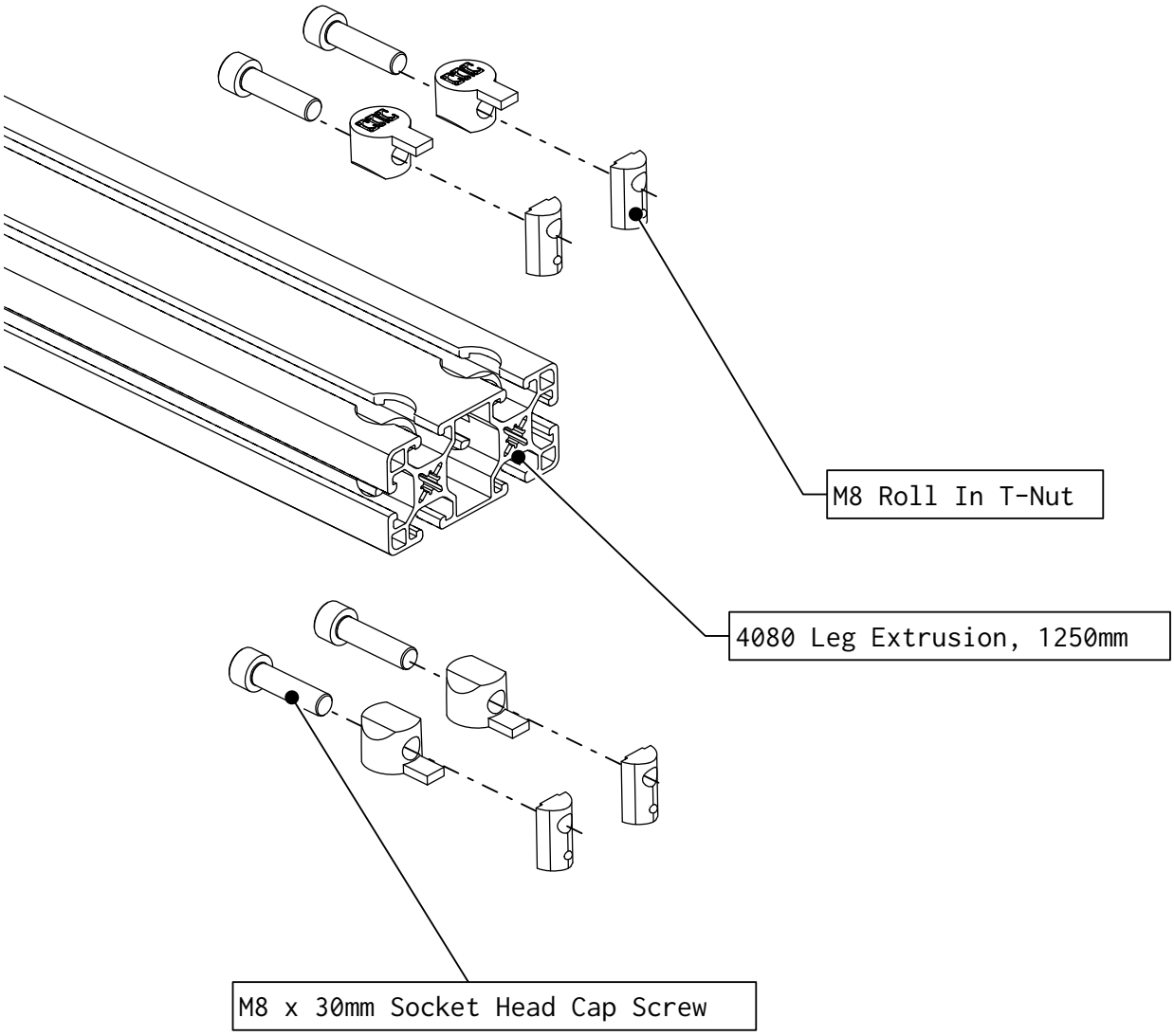
1.1 Table Leg Assembly

Note: Skip this section if you did not purchase a Leg Kit.

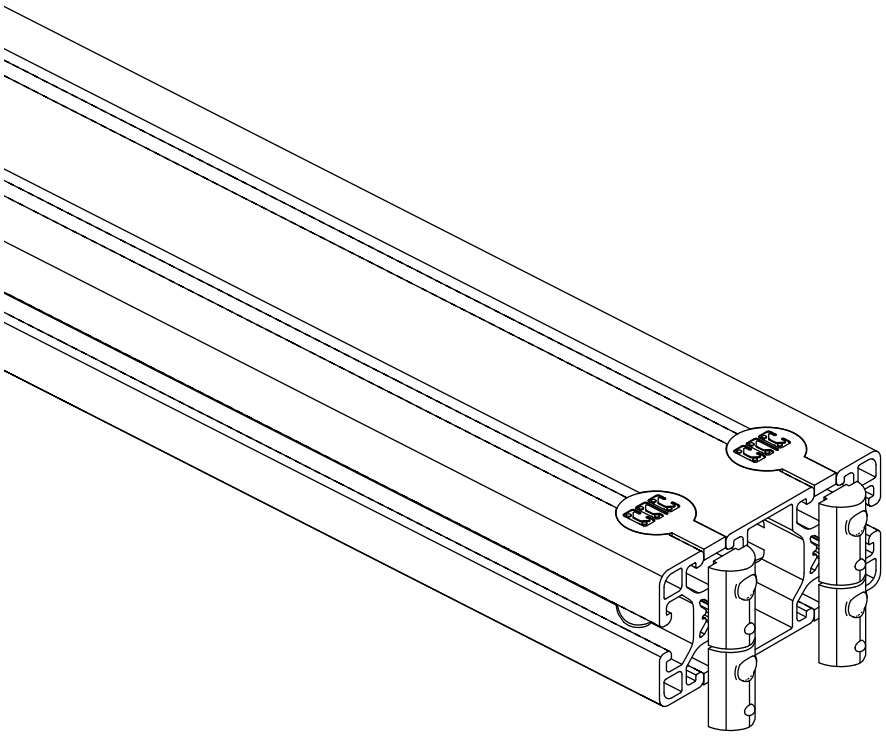
Note: The Electronics Mounting Bar was added with the 2016Q4.1 revision of our leg kit. If you purchased the previous revision, please contact us if you wish to upgrade your leg kit. To assemble without the electronics mounting bar, please refer to the Leg Kit revision 2016Q3.1 Assembly Diagram at http://www.cncrouterparts.com/leg-kit-assembly-instructions-p-295.html

The following parts and bags will be used in this section:

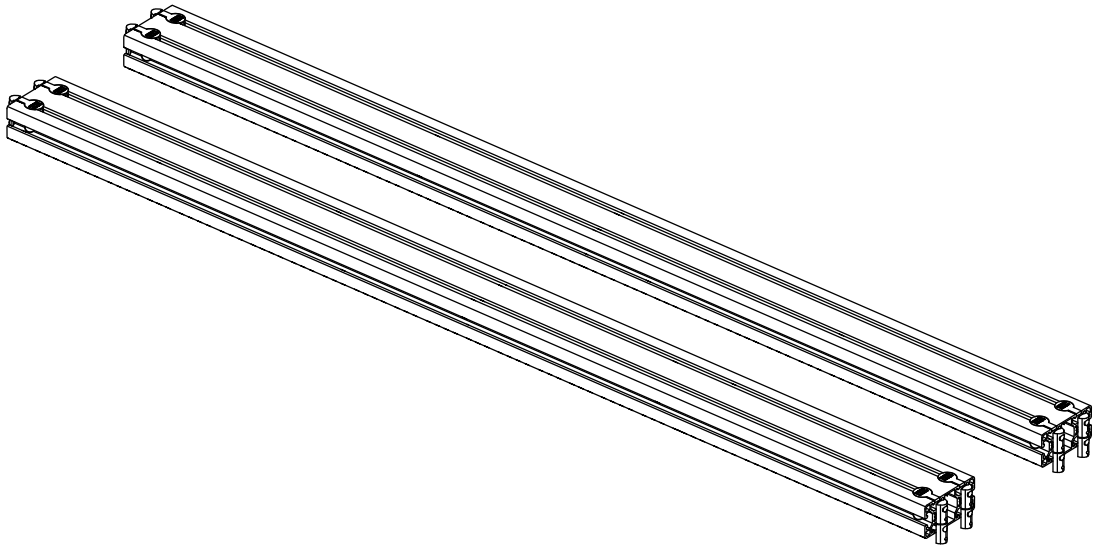
- (4) 4080 Leg Extrusion, 750 mm
- (2) 4080 Leg Extrusion, 1250 mm
- (1) 4080 Leg Extrusion, 790 mm
- (28) 40 Series Anchor Fastener
- (36) M8 x 30mm Socket Head Cap Screw
- (60) M8 Roll in T-Nut
- (4) 7111 Foot Plate
- (4) H172 Leveling Foot
- (8) CRP813-01 Leg Kit Gusset
- (32) M8 x 14mm Hex Cap Bolt



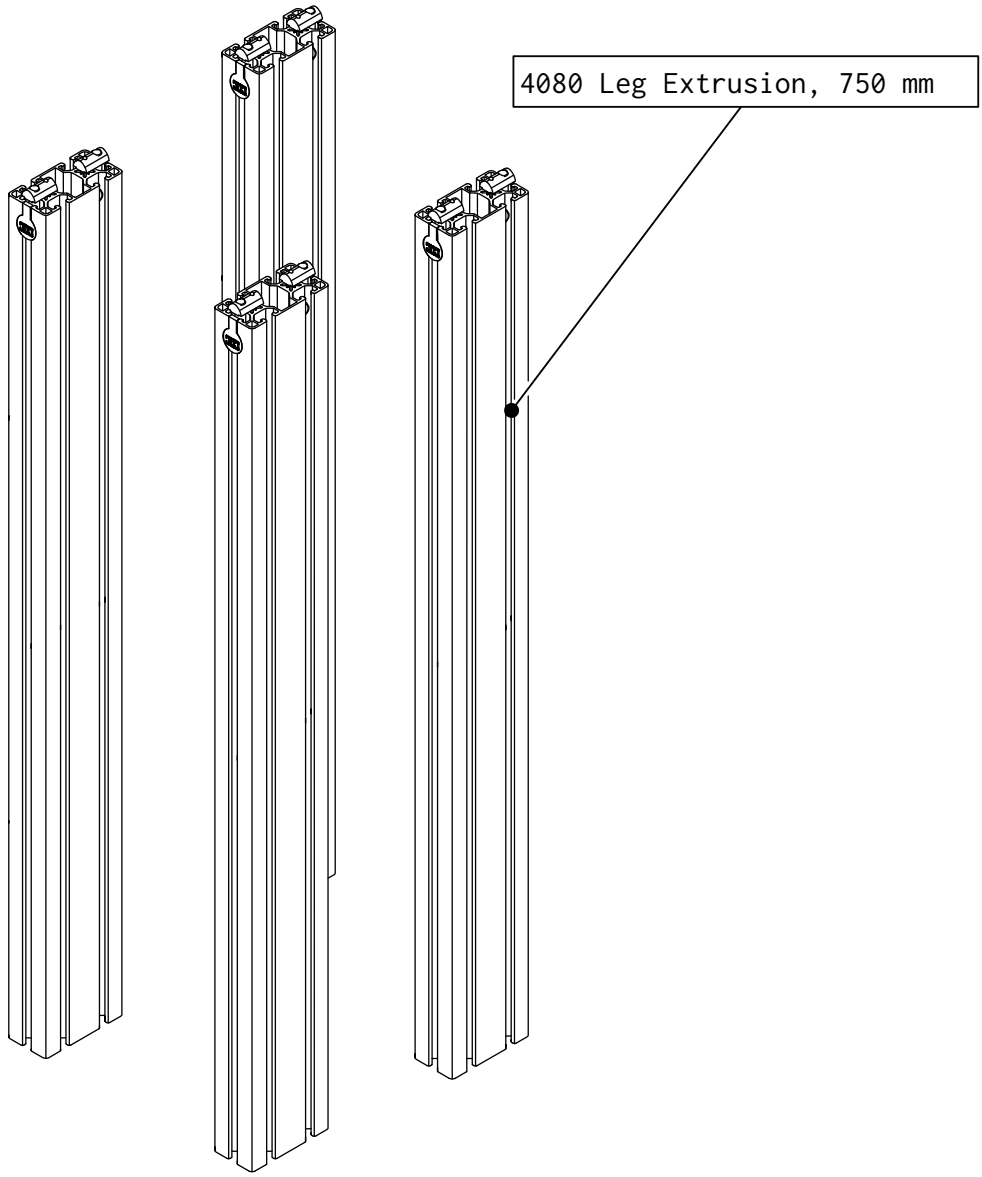
- Thread the socket head cap screws into the t-nuts through the anchor fasteners as indicated.



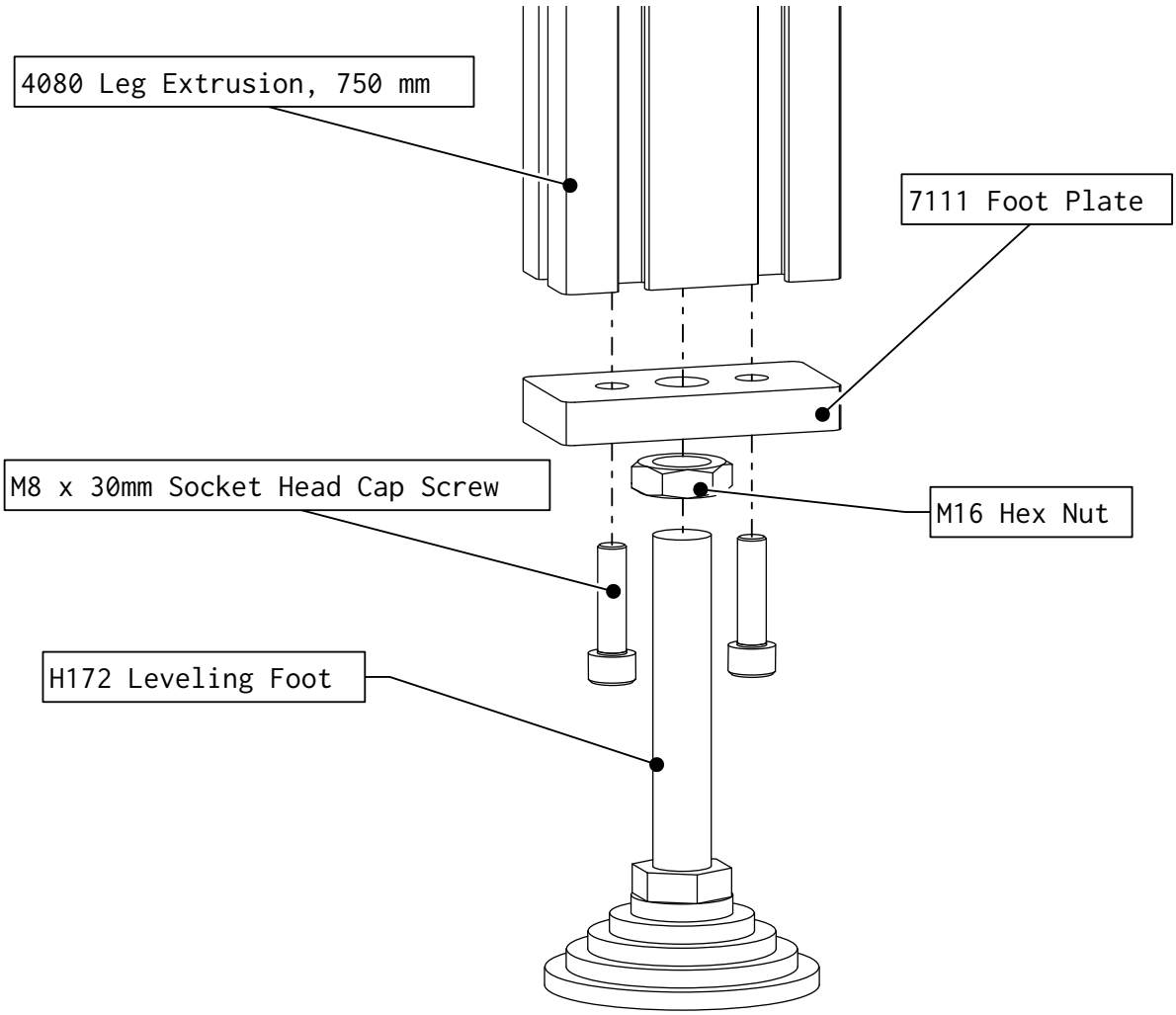
- Slide the anchor assembly into the extrusion.



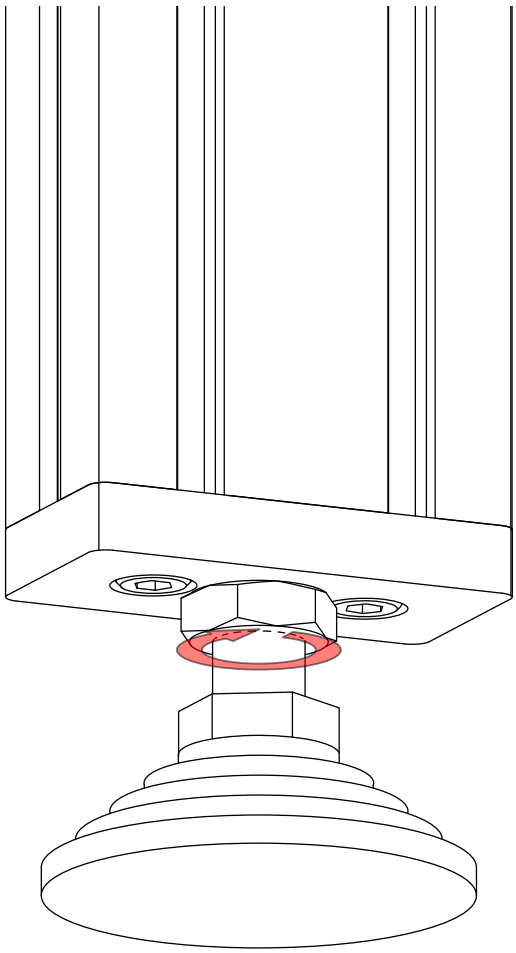
- Repeat the previous steps on both sides for each of the 1250mm Leg extrusion sections.



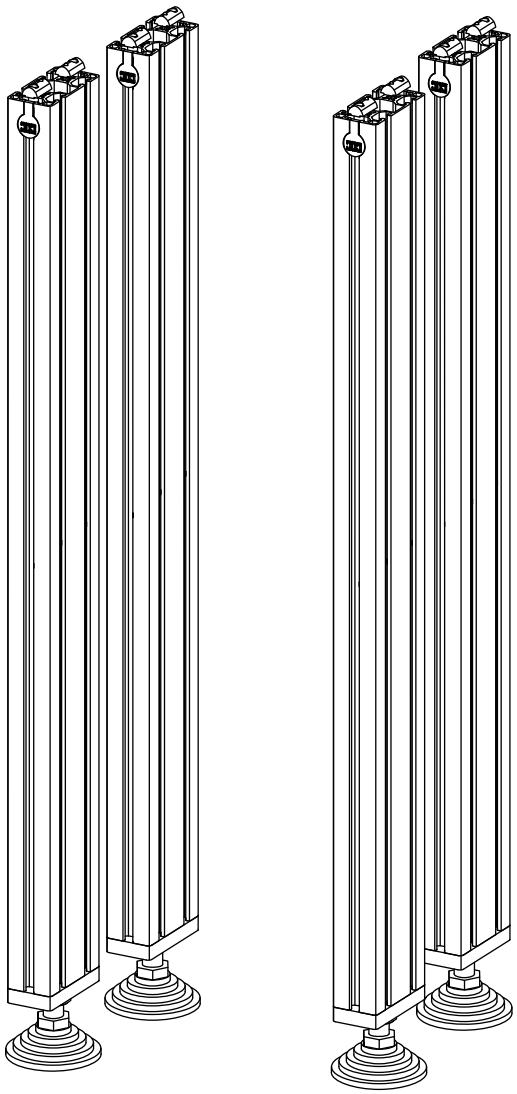
- Repeat the previous steps one side for each of the 750mm Leg extrusion sections.



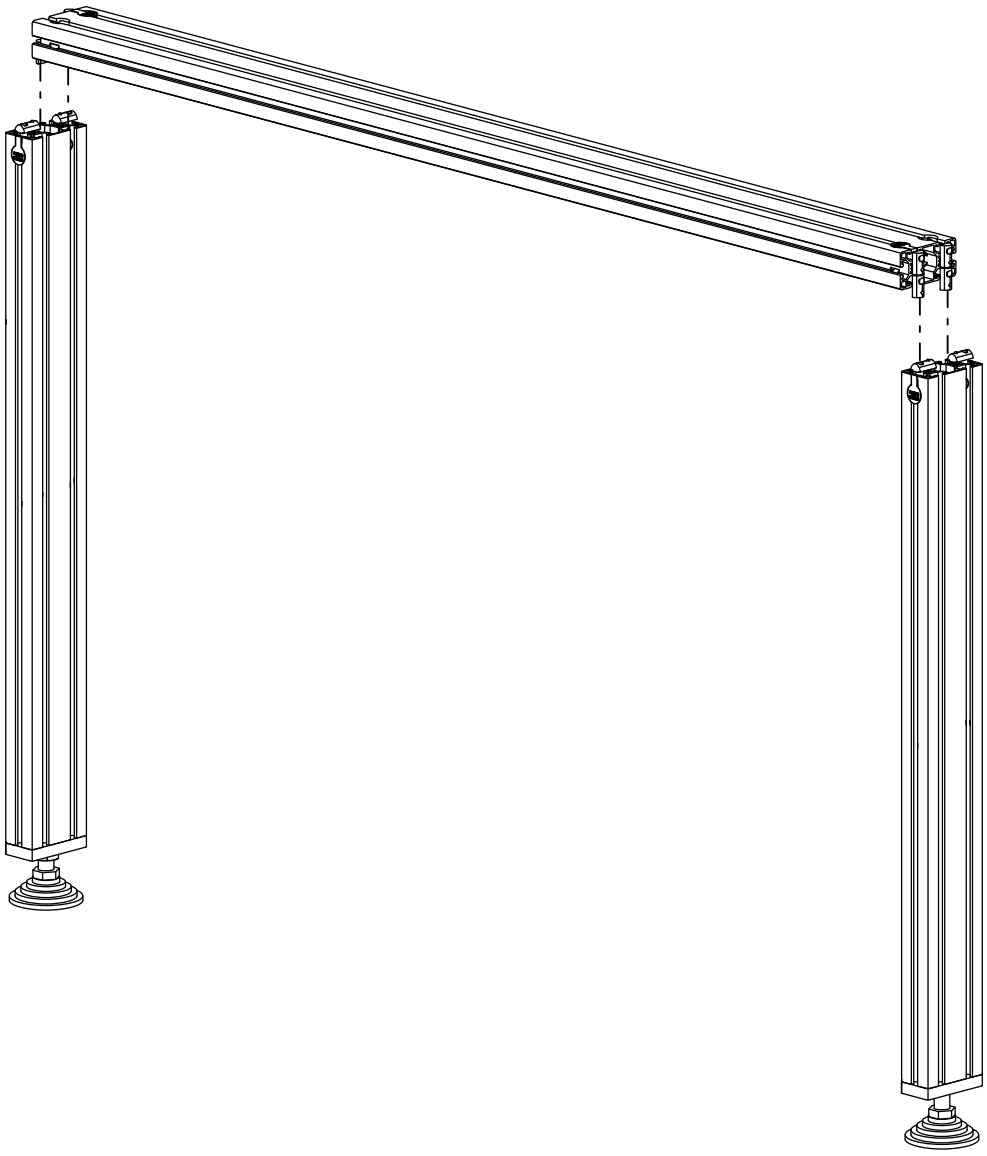
- Install a foot assembly onto a piece of 750mm Leg extrusion as indicated.



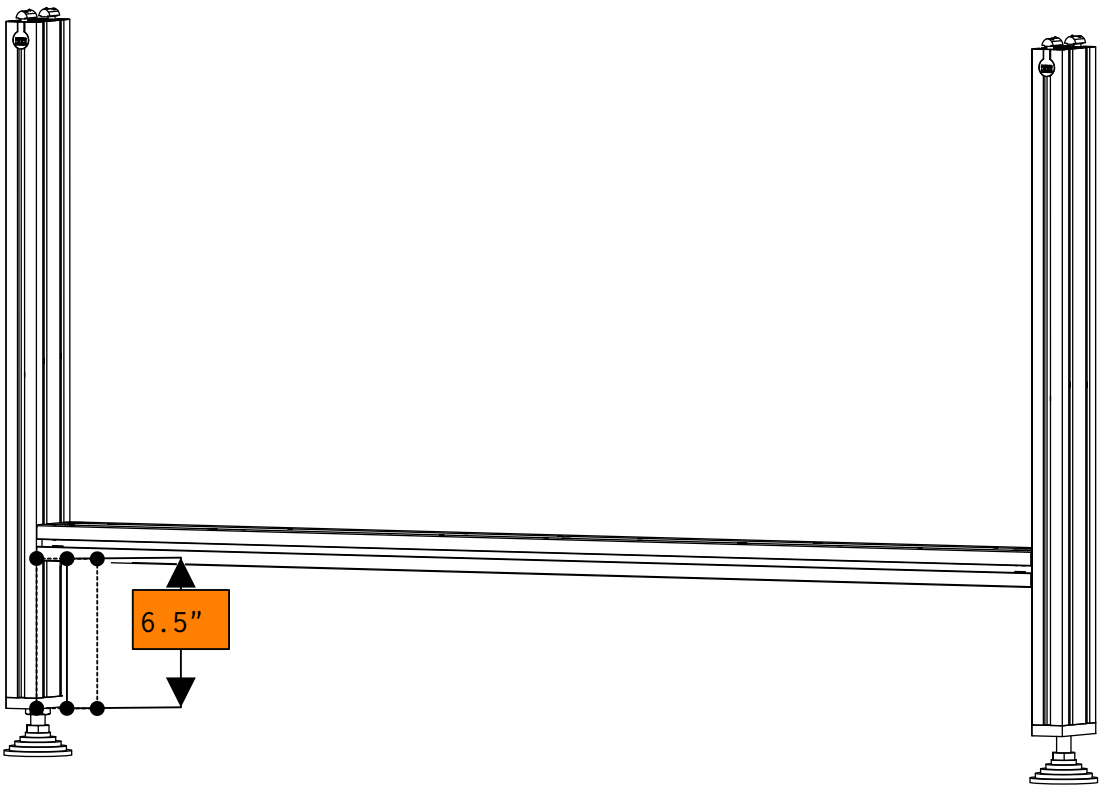
- Fully tighten the highlighted fasteners.



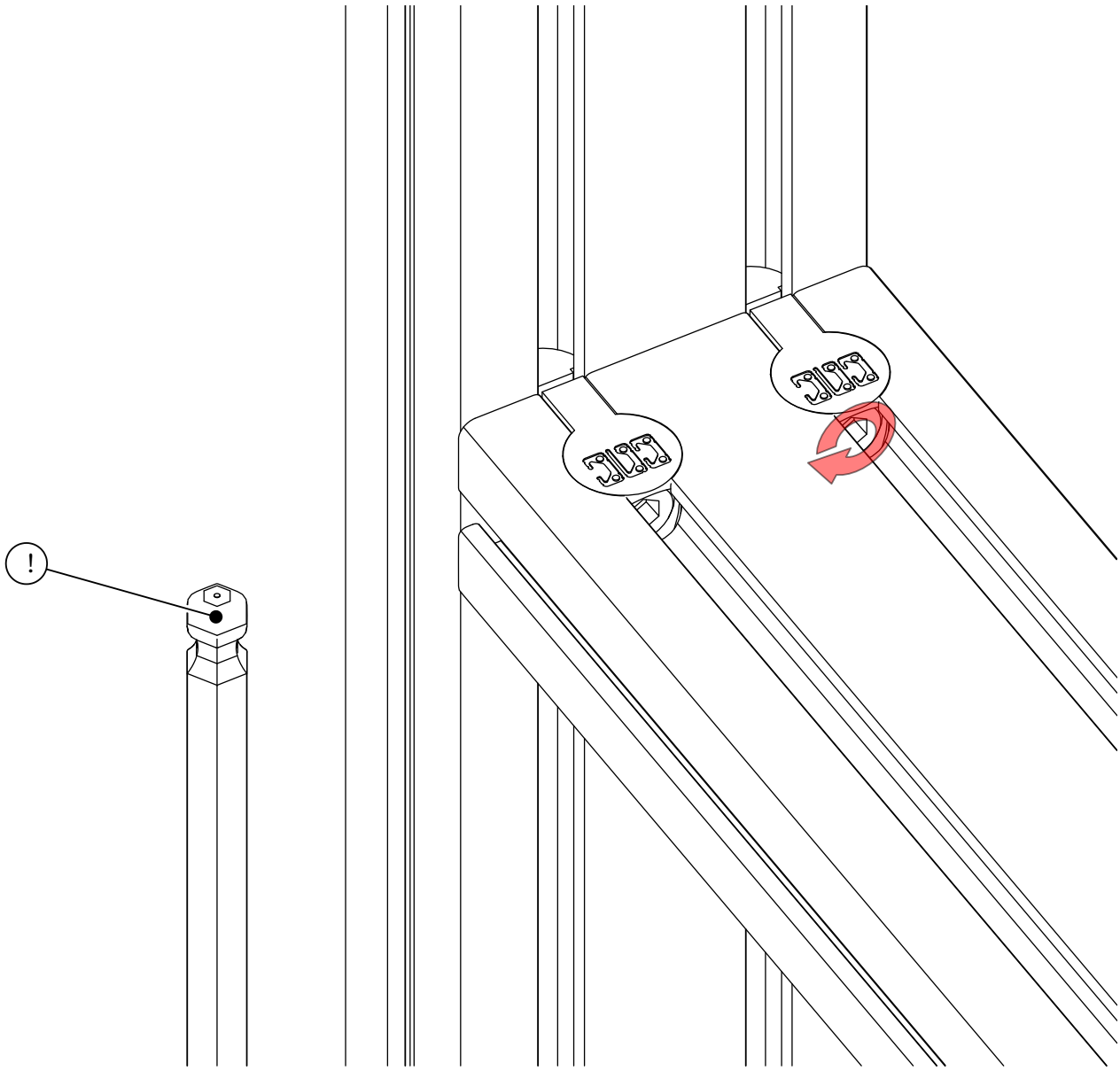
- Repeat the previous steps for each of the 750mm Leg extrusion as indicated.



- Use a section of 1250mm Leg Extrusion to join two of the 750 mm Extrusion sections.

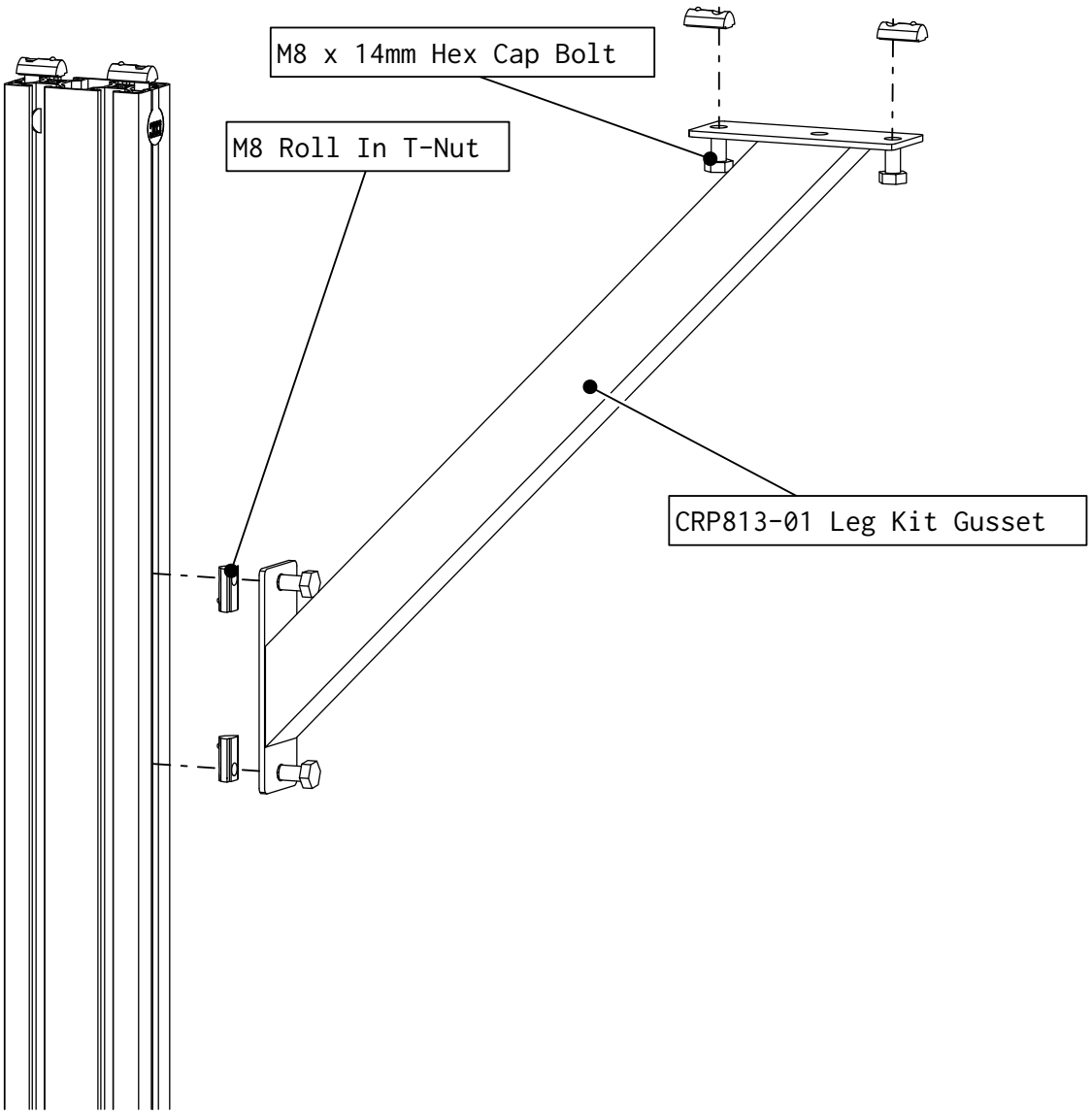


- Position the crossmember 6.5" (160mm) from the bottom of the leg.

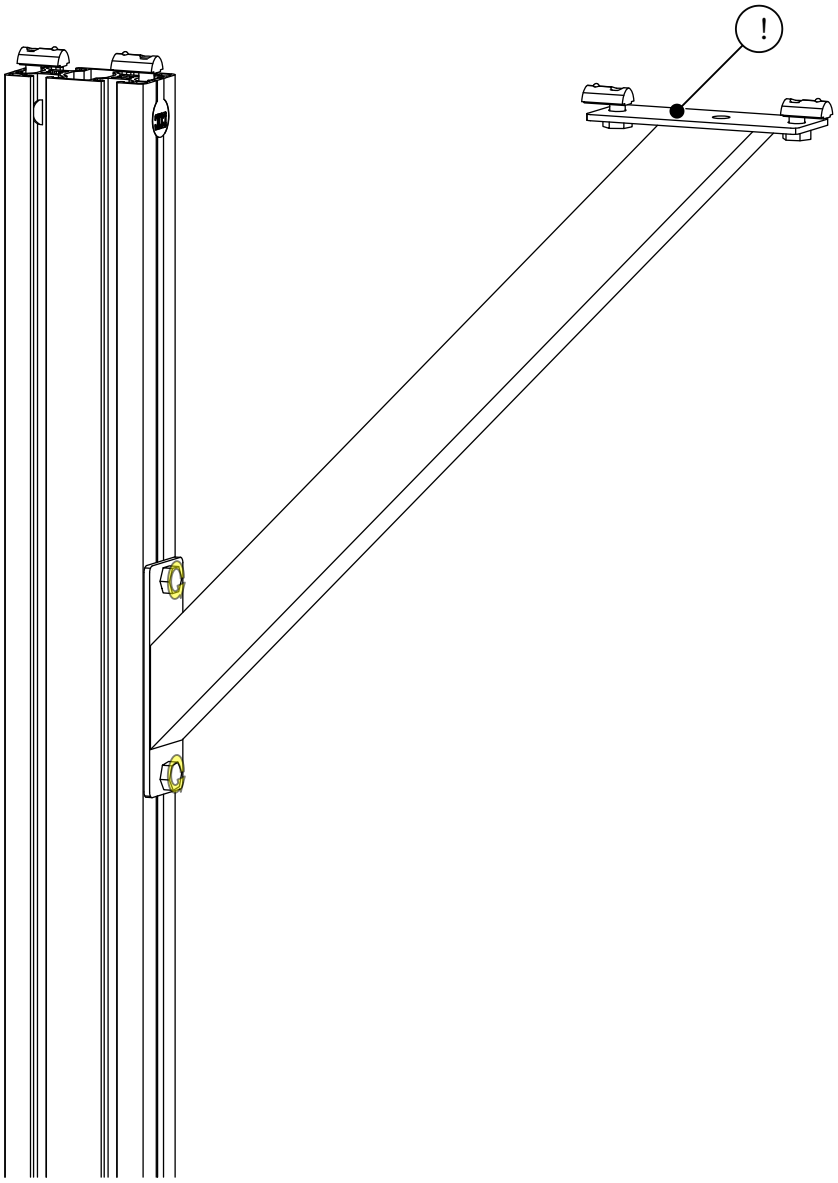


- Tighten all 8 of the anchor fasteners in the crossmember.

  Note: For assembling anchor fastener connections, 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.

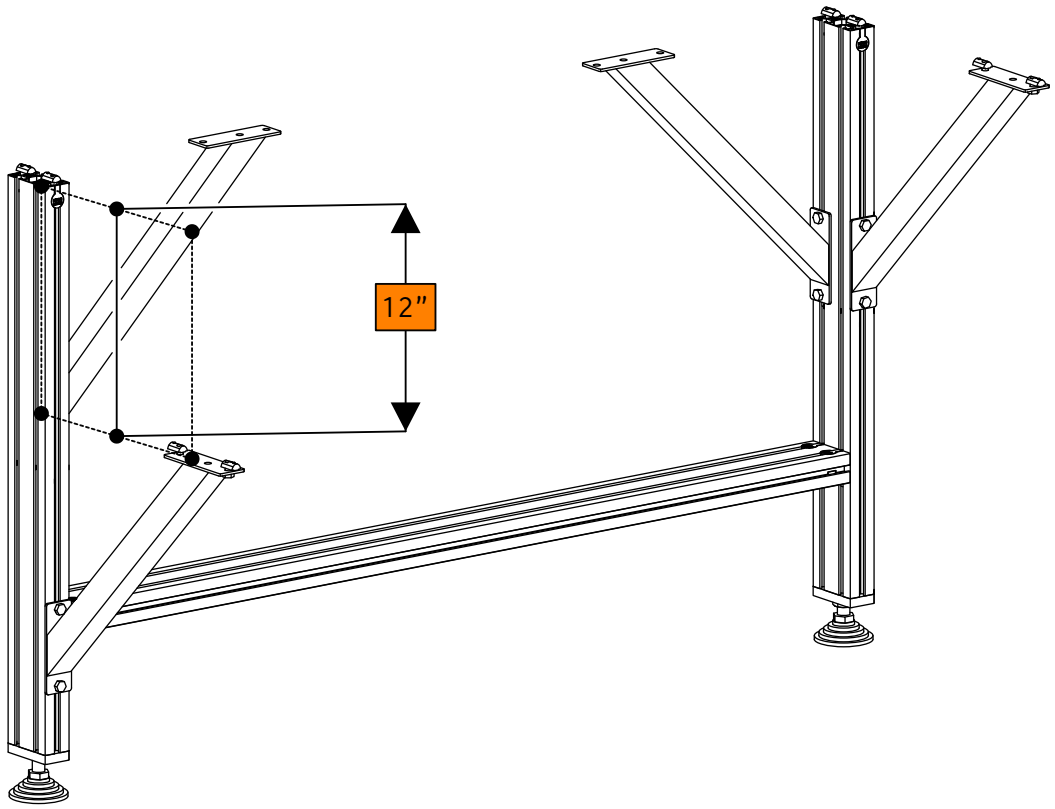


- Attach a leg gusset to a leg as indicated.



- Partially tighten the highlighted fasteners.

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

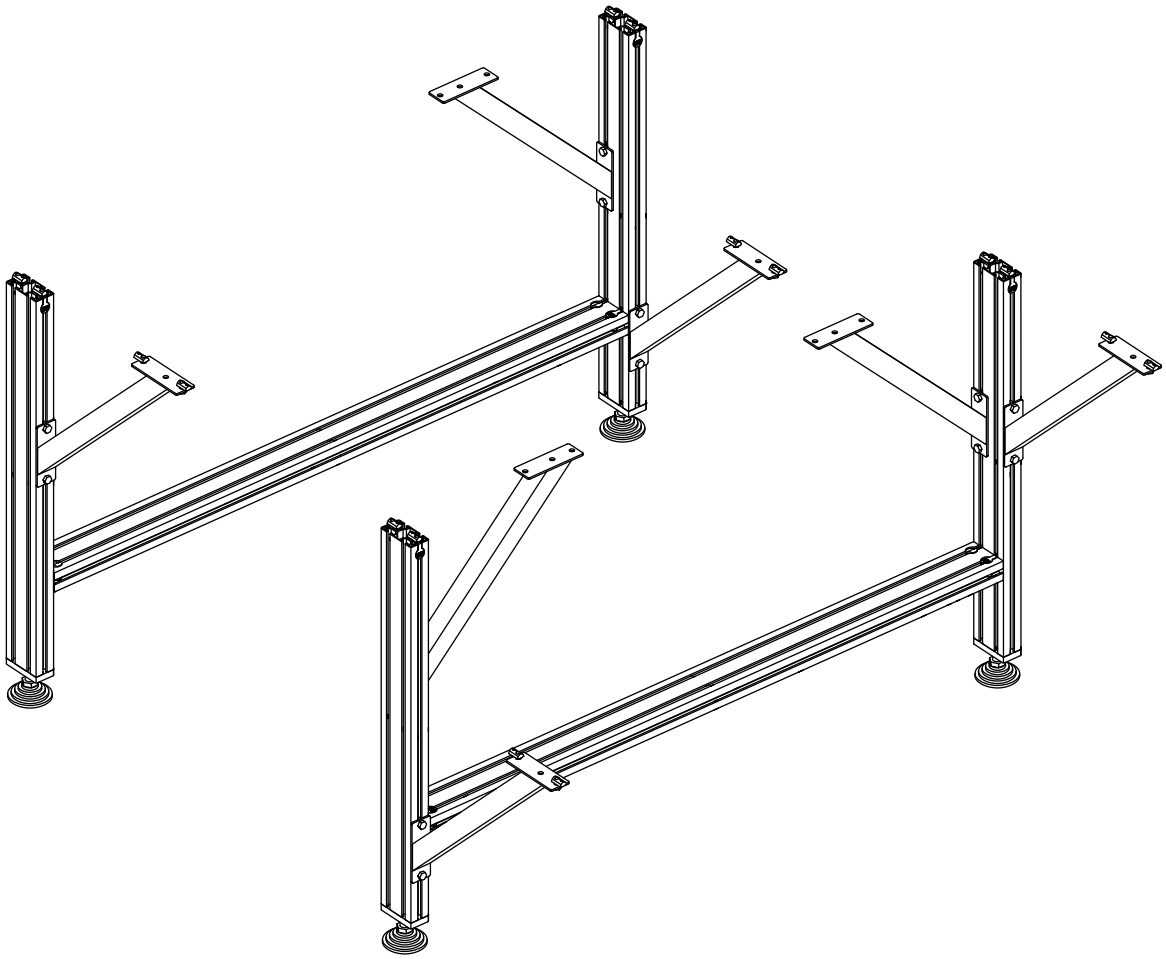


- Install 3 additional gussets to the leg assembly as indicated.

  Note: Do not prethread t-nuts into the inside gussets at this time.

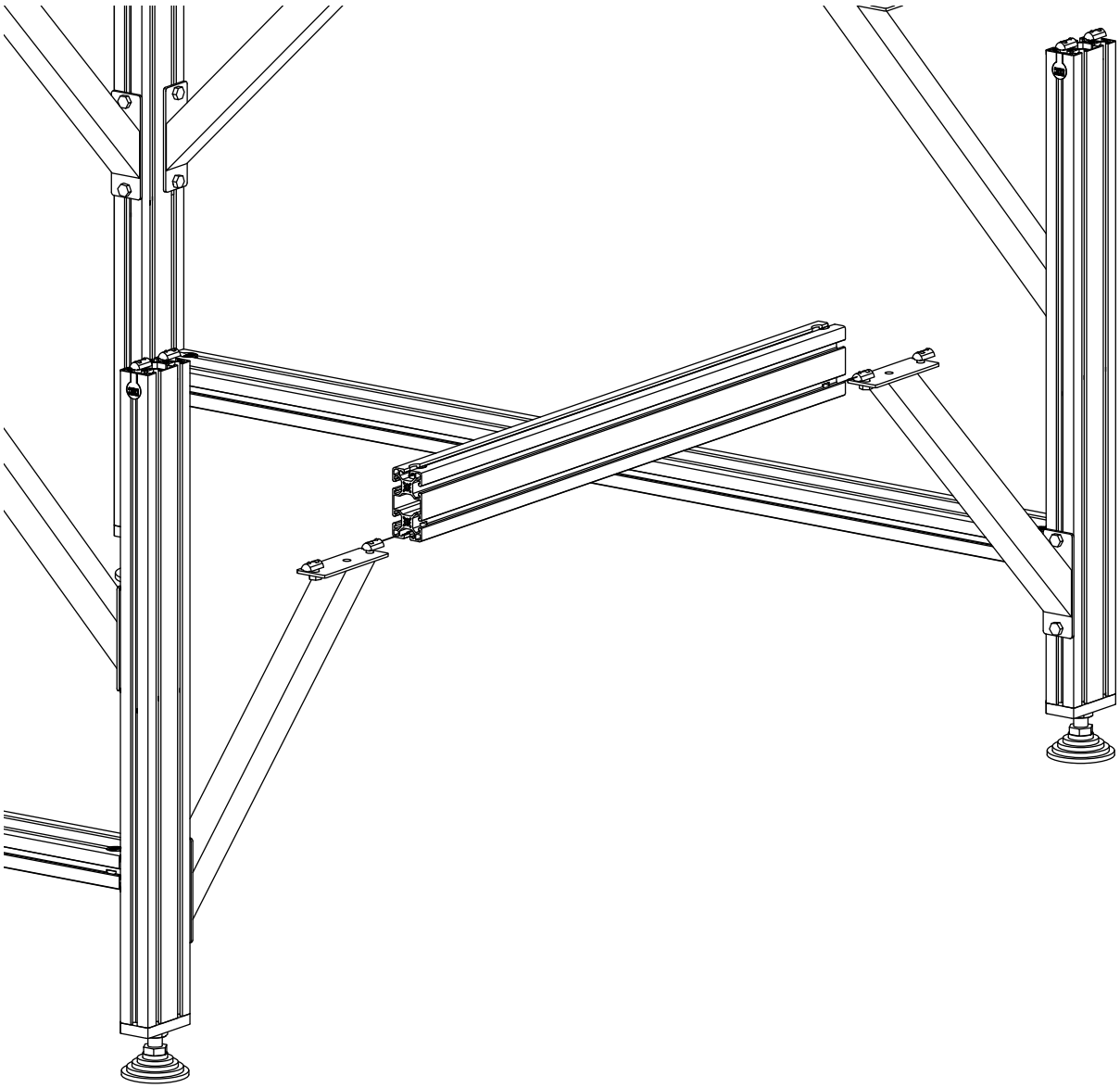
  Note: One gusset should be lowered by about 12" (300mm) to accomidate the electronics mounting bar.

  Note: Do not prethread t-nuts into the inside gussets at this time.

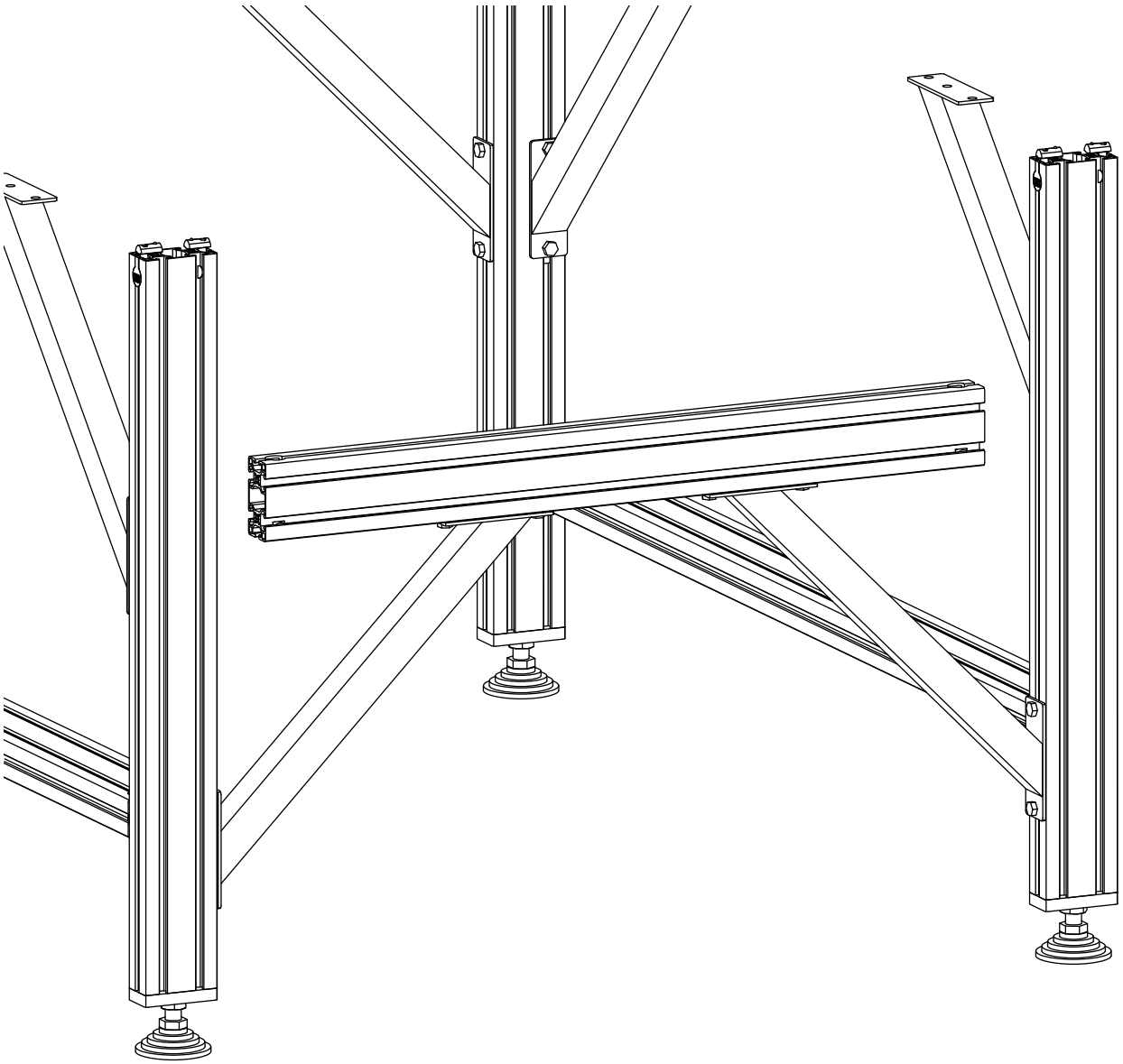


- Repeat the previous steps with the remaining gussets and extrusion sections.

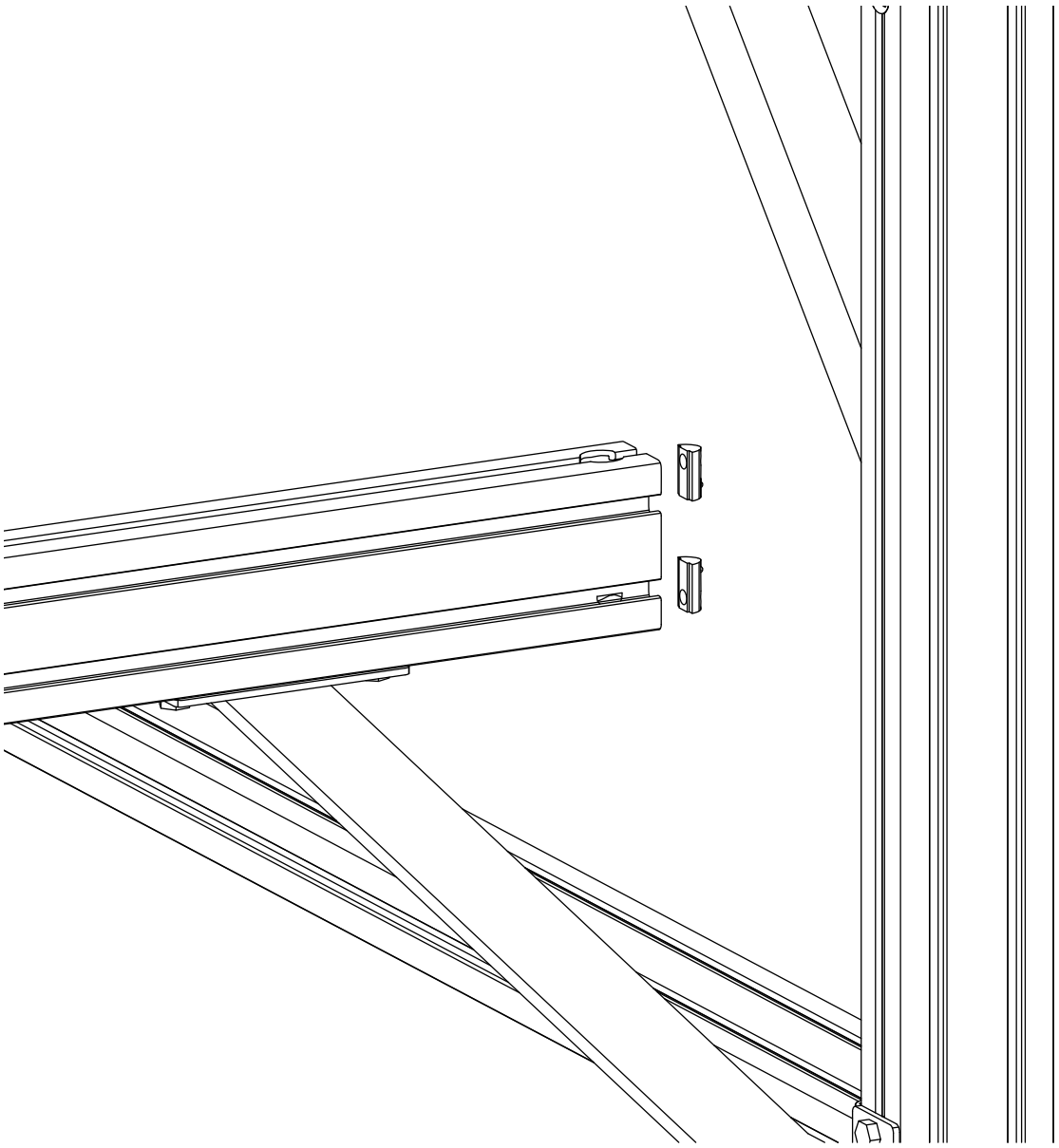
  Note: Only two of the three leg sets should have a lowered gusset. The lowered gussets should be on opposite legs as indicated.



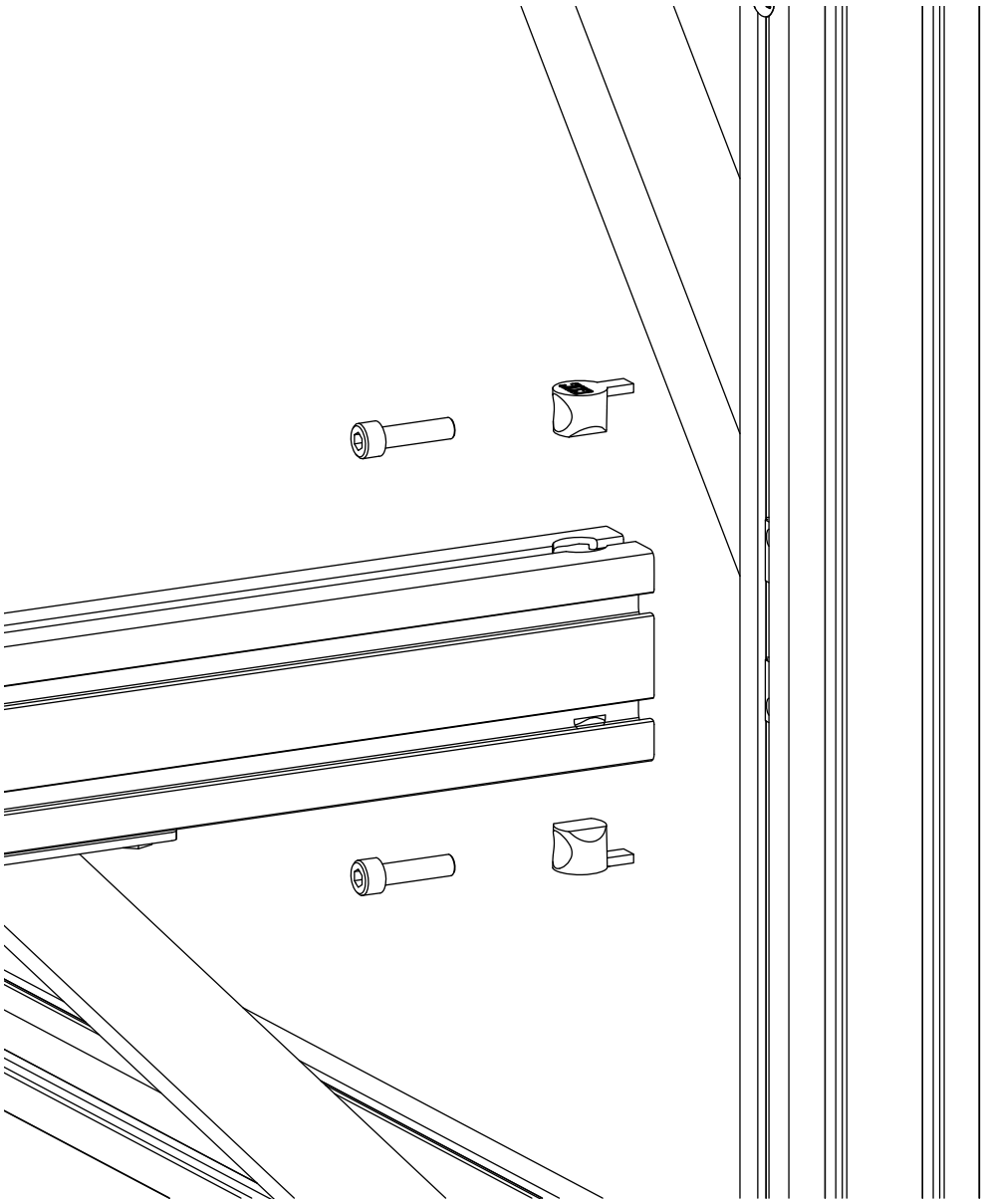
- Slide the 790mm length of leg extrusion onto the lowered gussets as indicated.



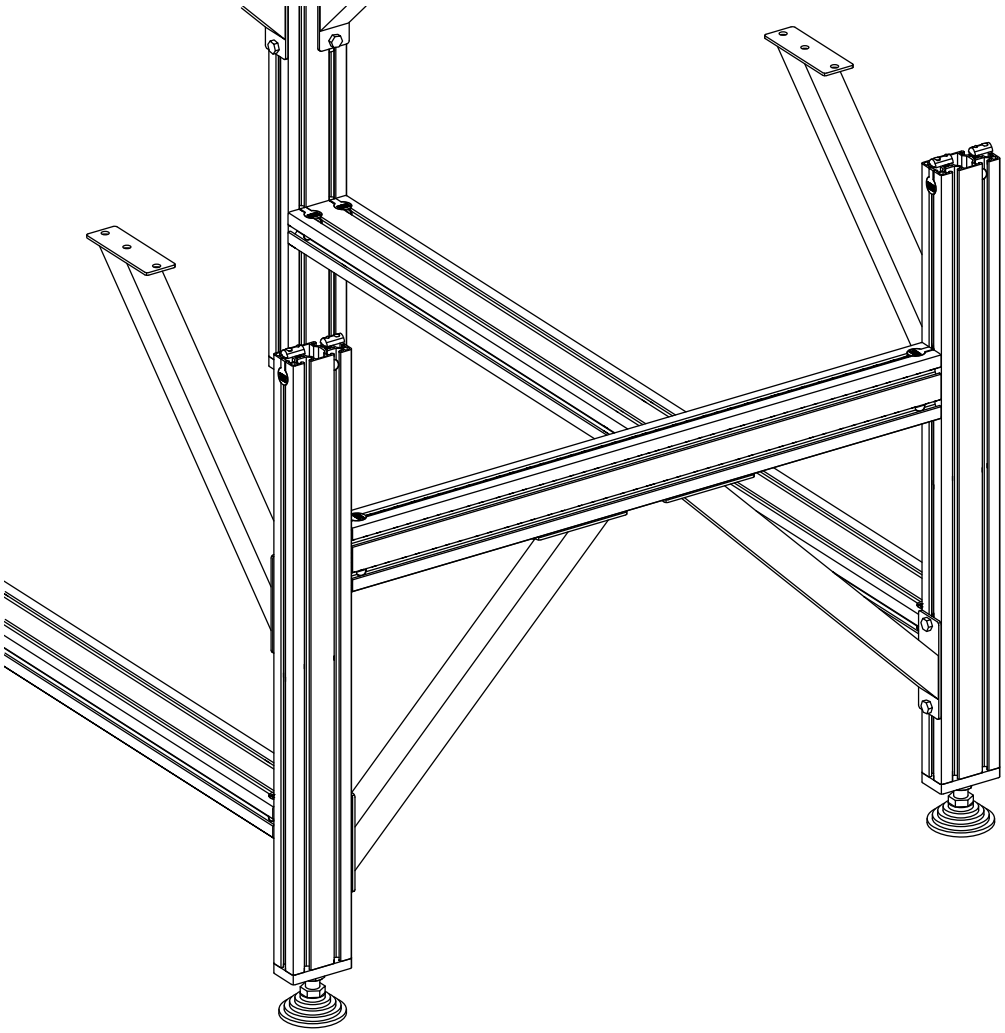
- Leave some space between the electronics mounting bar and the legs.



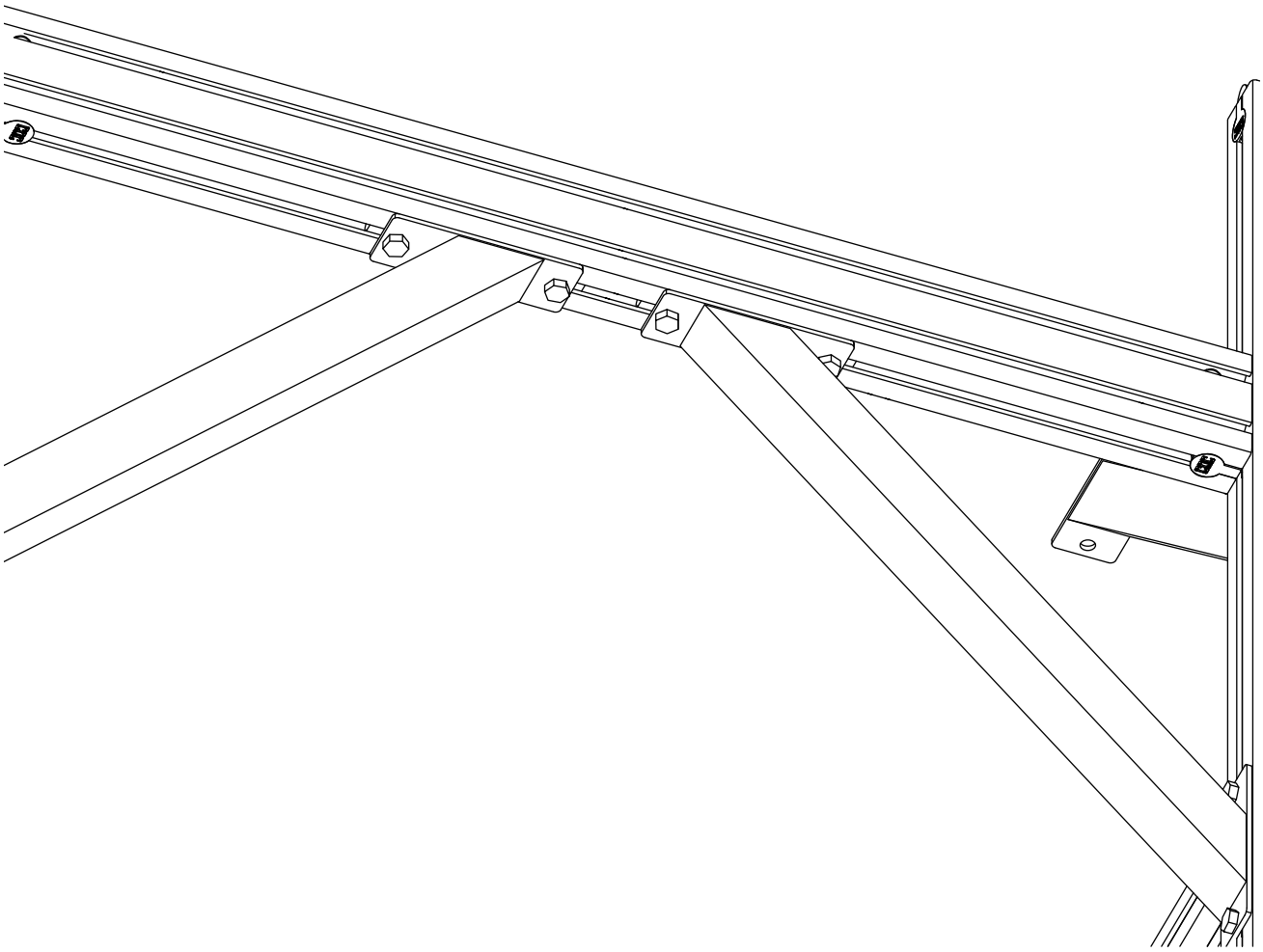
- Roll two t-nuts into the indicated t-slot.



- Install anchor fasteners as indicated.



- Repeat this step on the other side of the electronics mounting bar .
- Bring the ends of the electronics mounting bar flush with the legs.
- Tighten the anchor fasteners installed in the previous step.



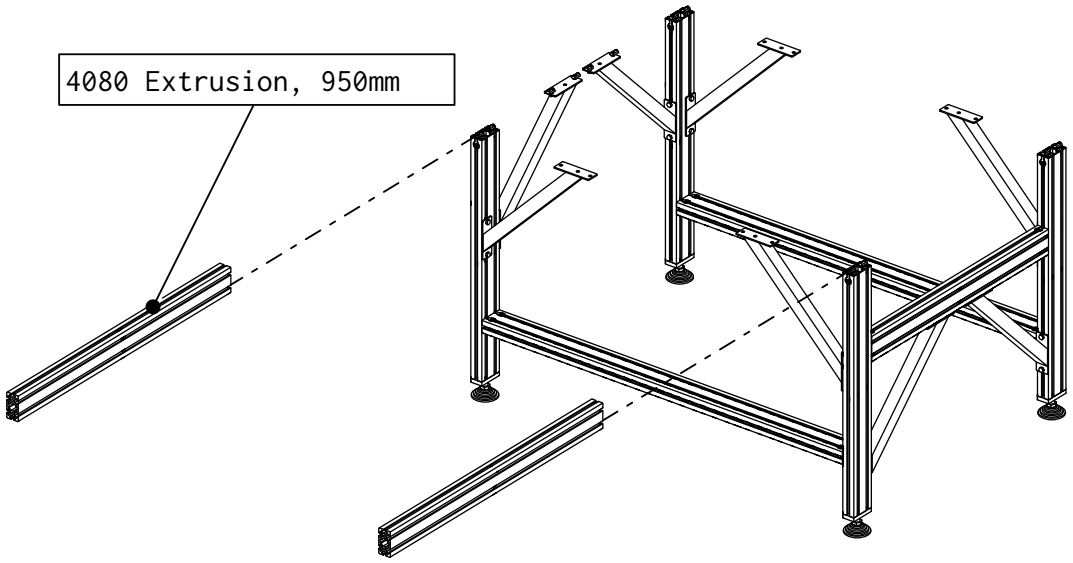
- Tighten the highlighted fasteners.

1.2 Table Frame Assembly

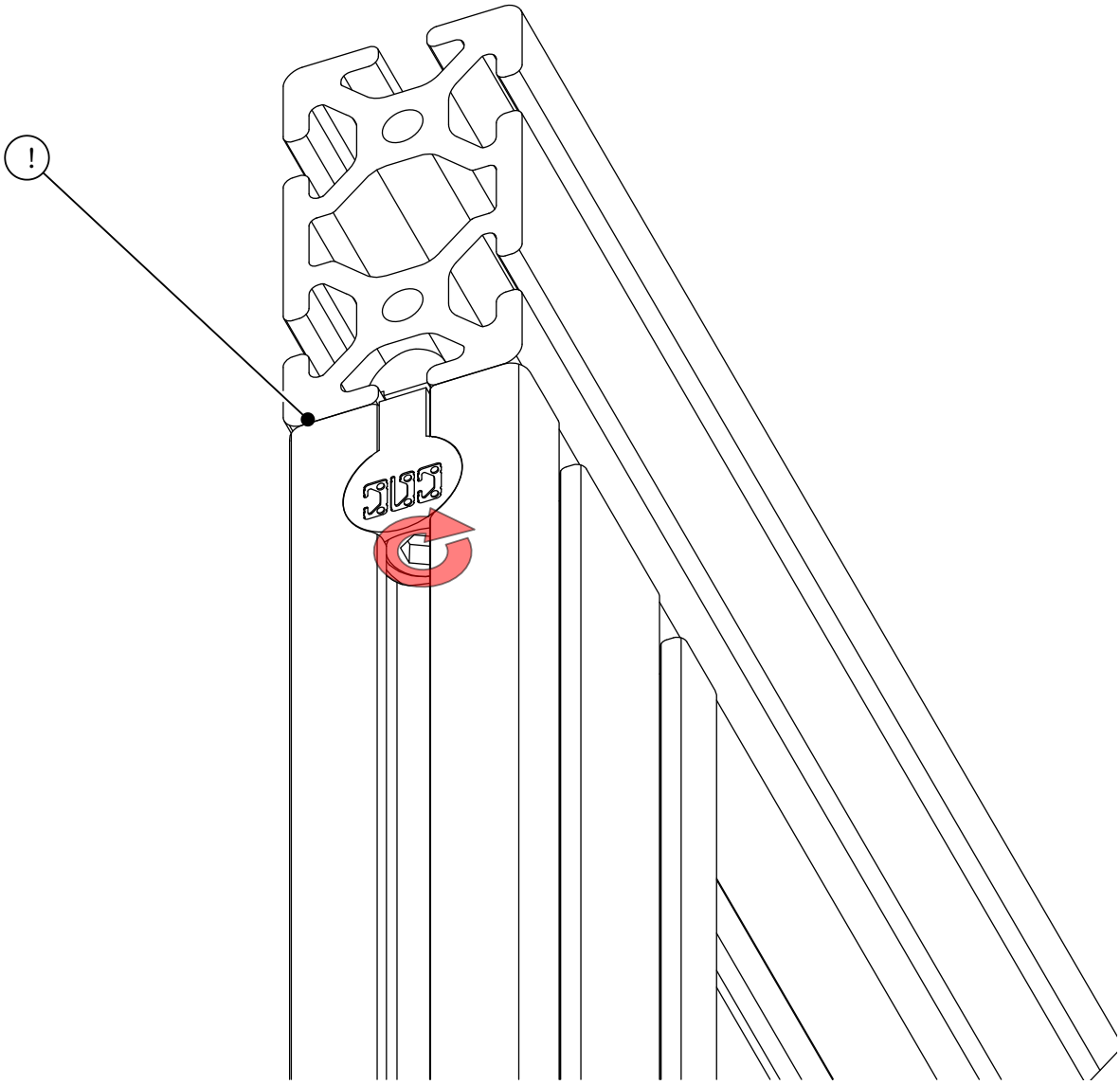
Note: Skip this section if you did not purchase a Leg Kit.

The following parts and bags will be used in this section:

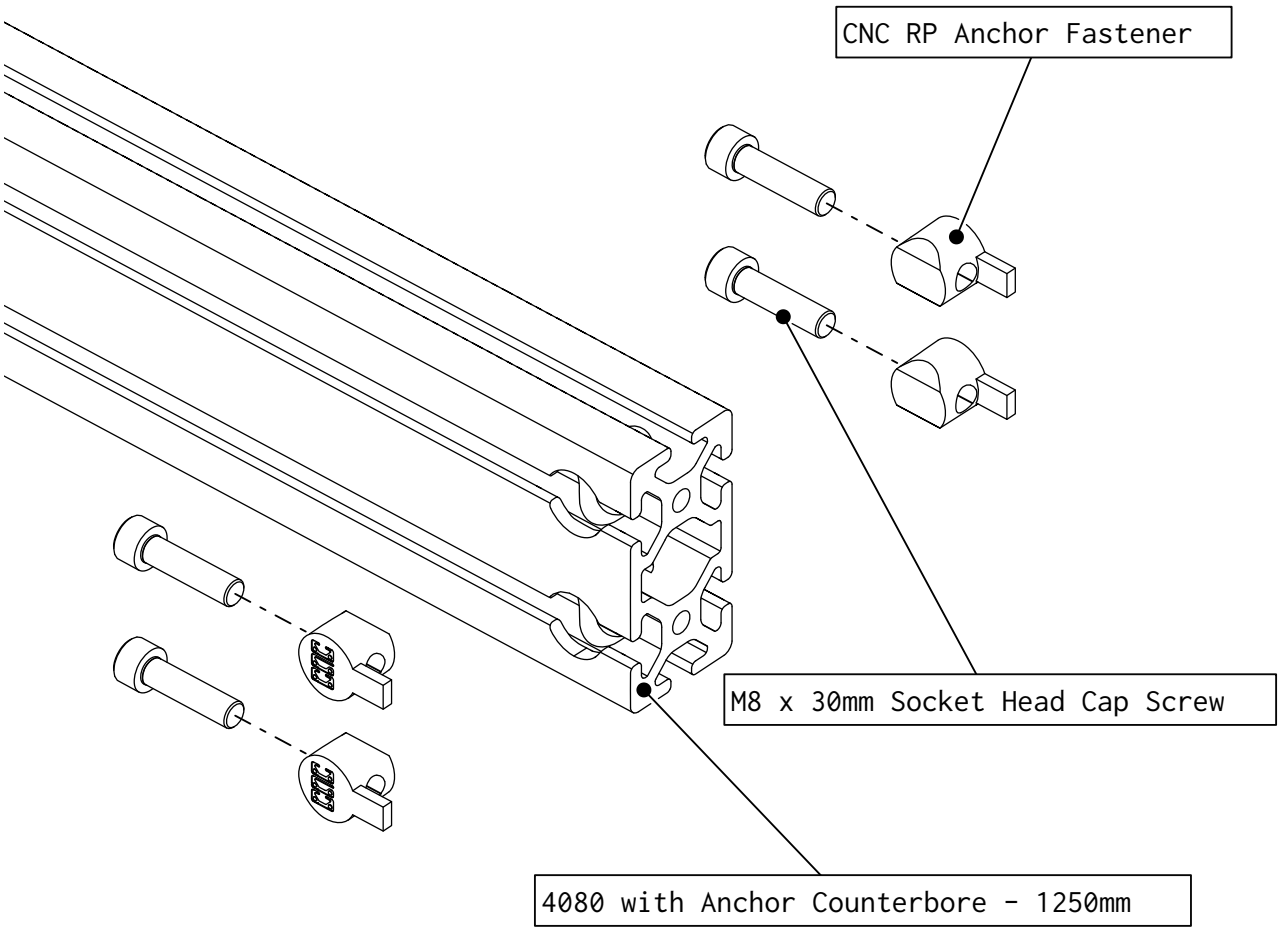
- (12) (40-3100-00) 40 Series Short Double Anchor Assembly
  - (1) Double Anchor M8 Slide-In T-Nut
  - (2) 40 Series Anchor Fastener
  - (2) M8 x 30mm Socket Head Cap Screw
- (3) 4080 with Anchor Counterbore, 1250mm
- (2) 4080 Extrusion, 950mm



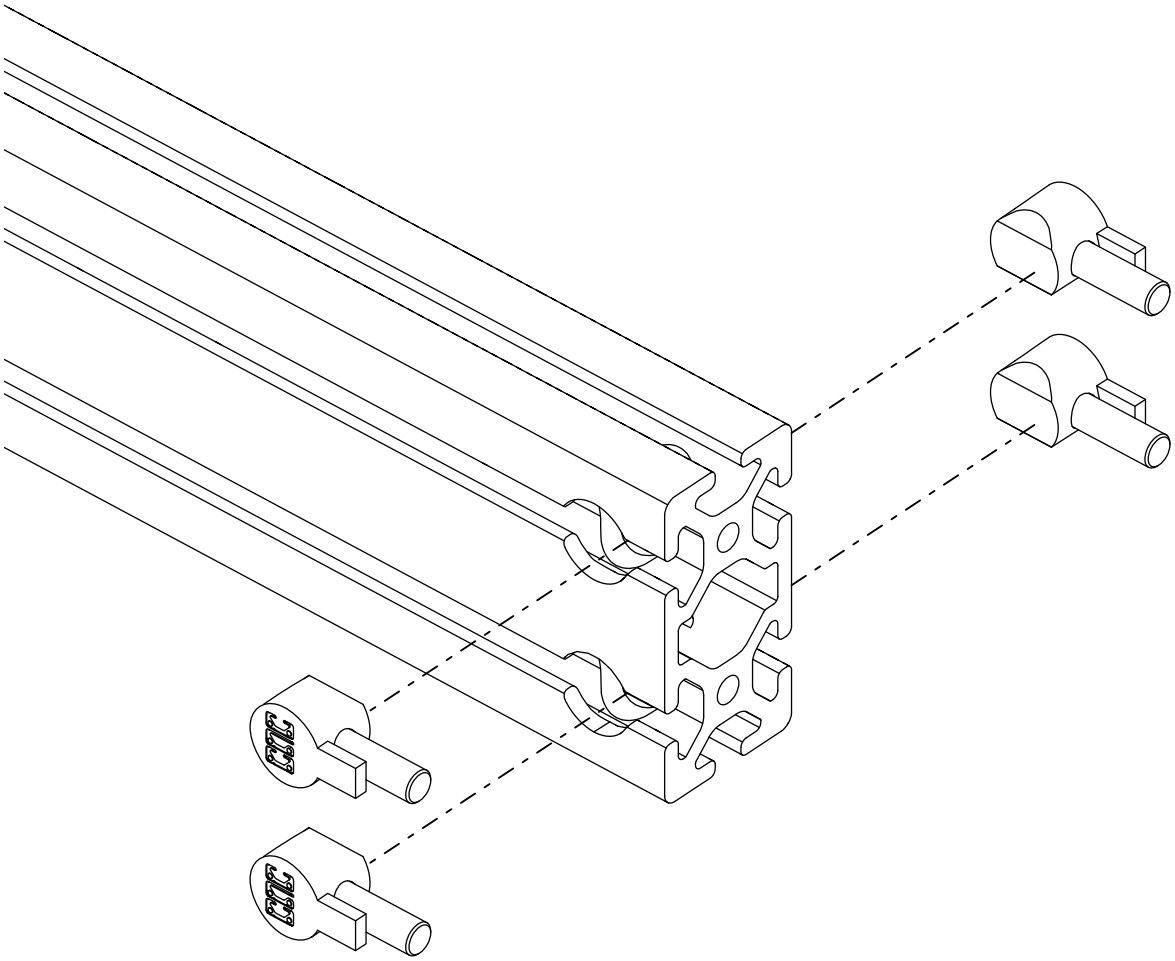
- Attach the leg assemblies to two 950mm lengths of 4080 extrusion as indicated.



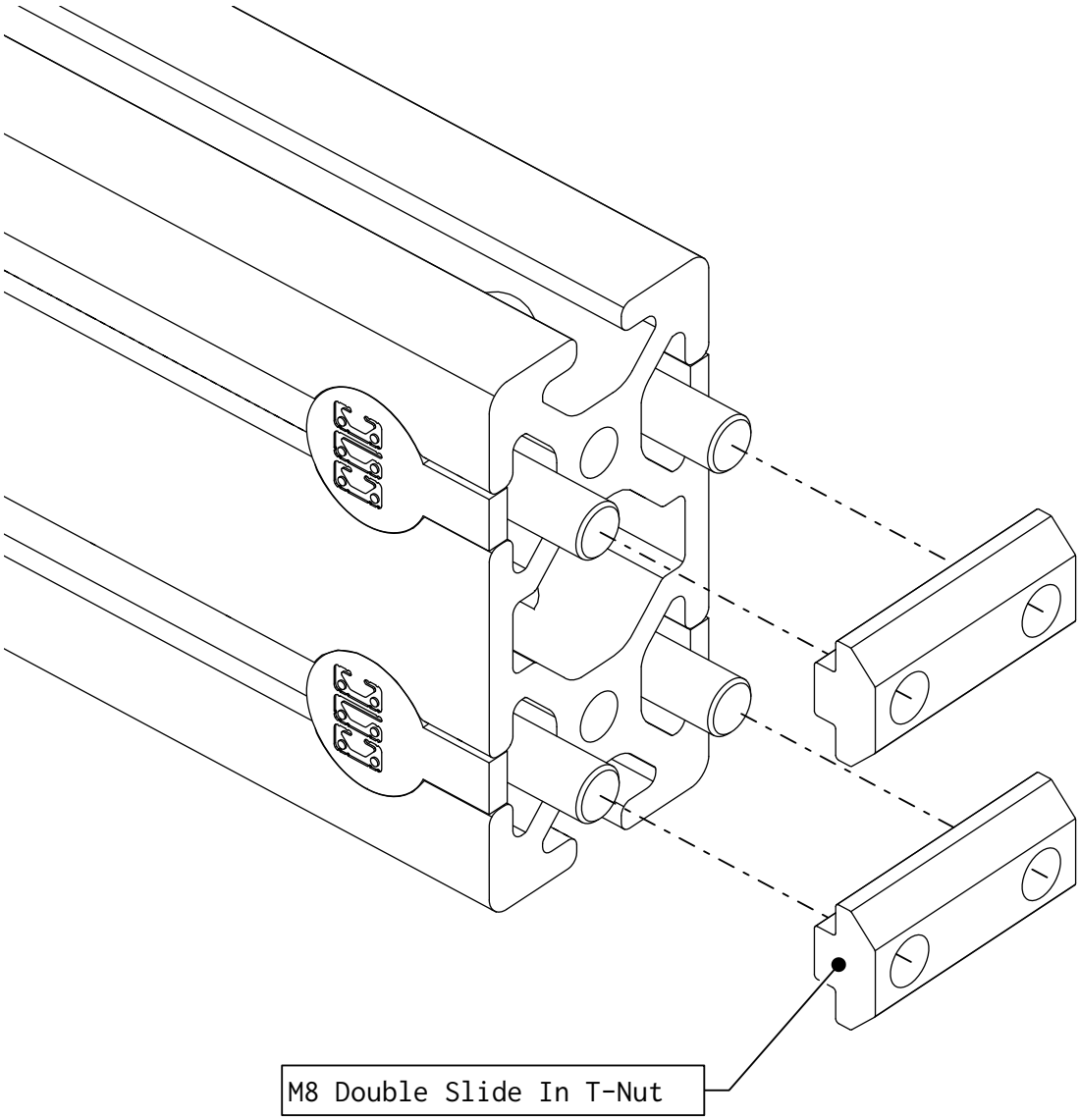
- Bring the ends of the frame extrusion flush with the legs.
- Fully tighten the anchor fasteners of all four legs.



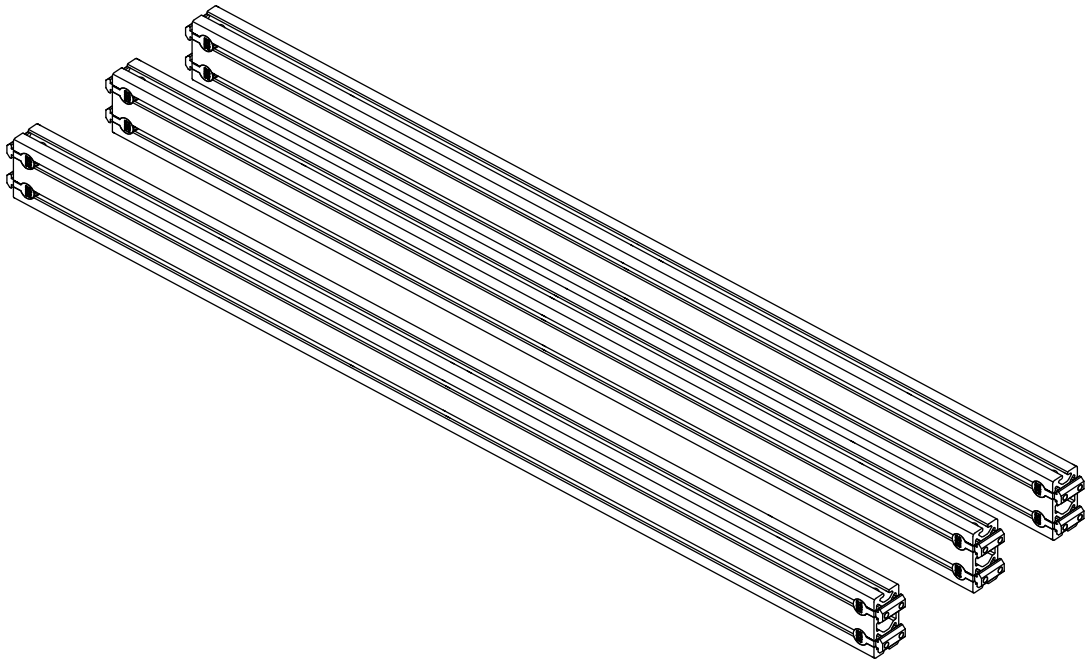
- Thread the socket head cap screws into the anchor fasteners as indicated.



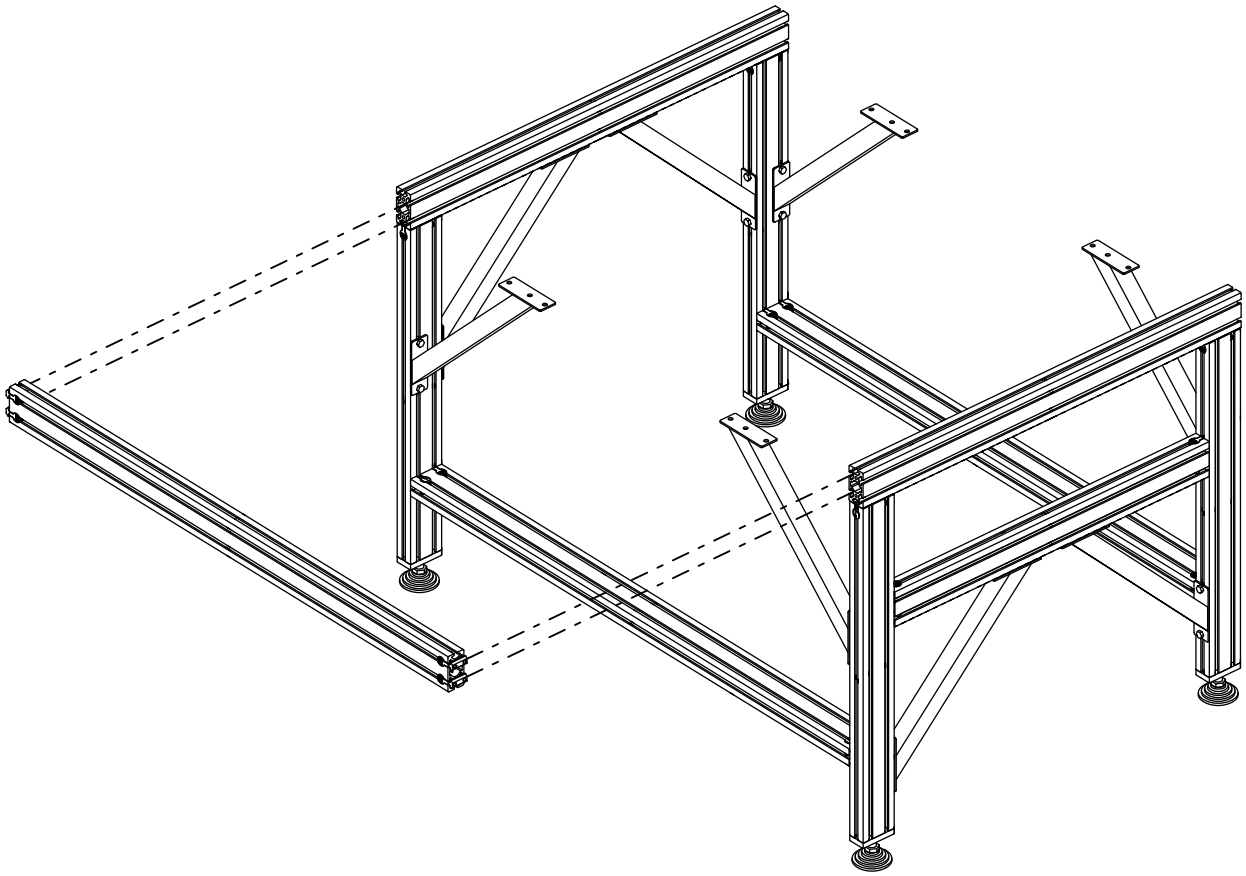
- Slide the anchor assembly into the extrusion.



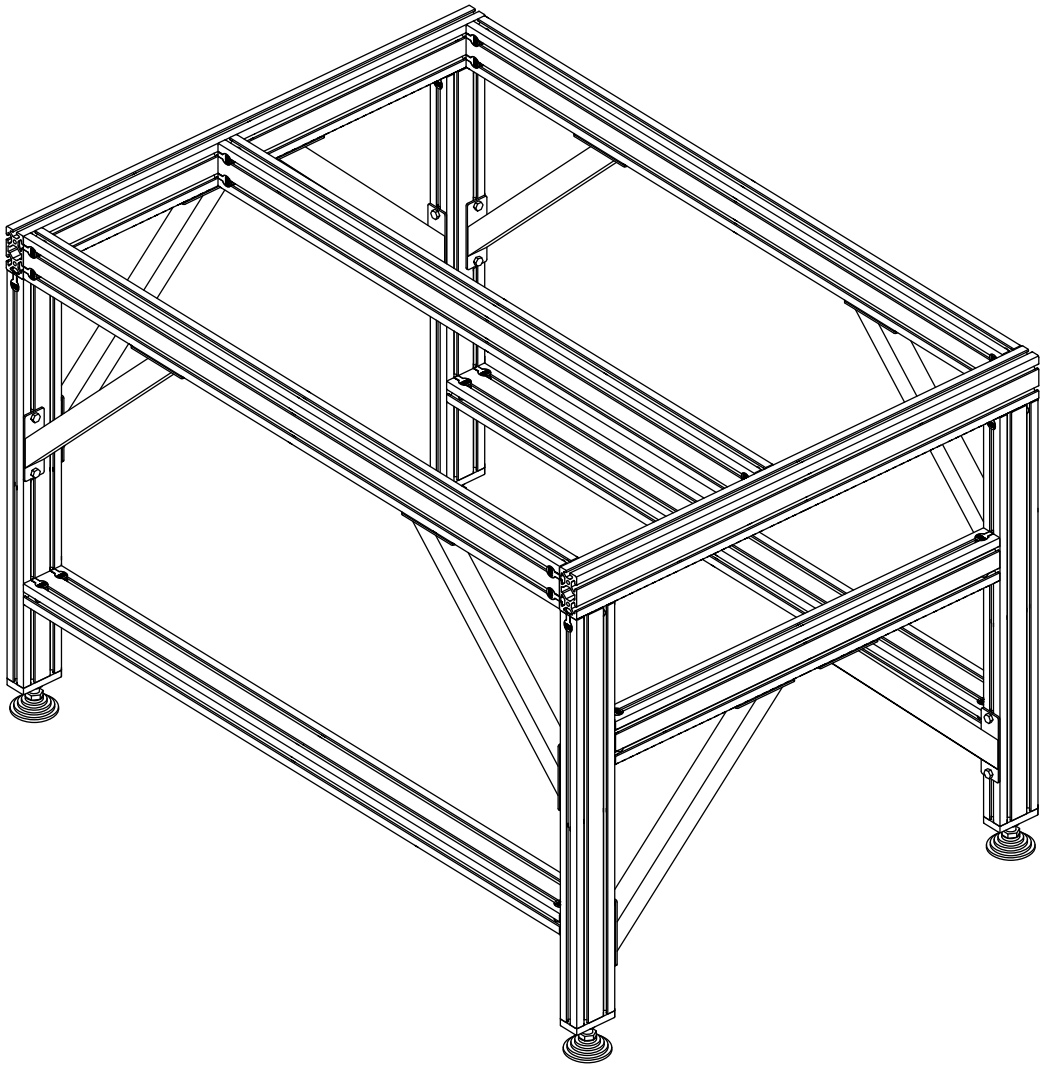
- Loosely thread the double t-nuts onto the socket head cap screws as indicated.



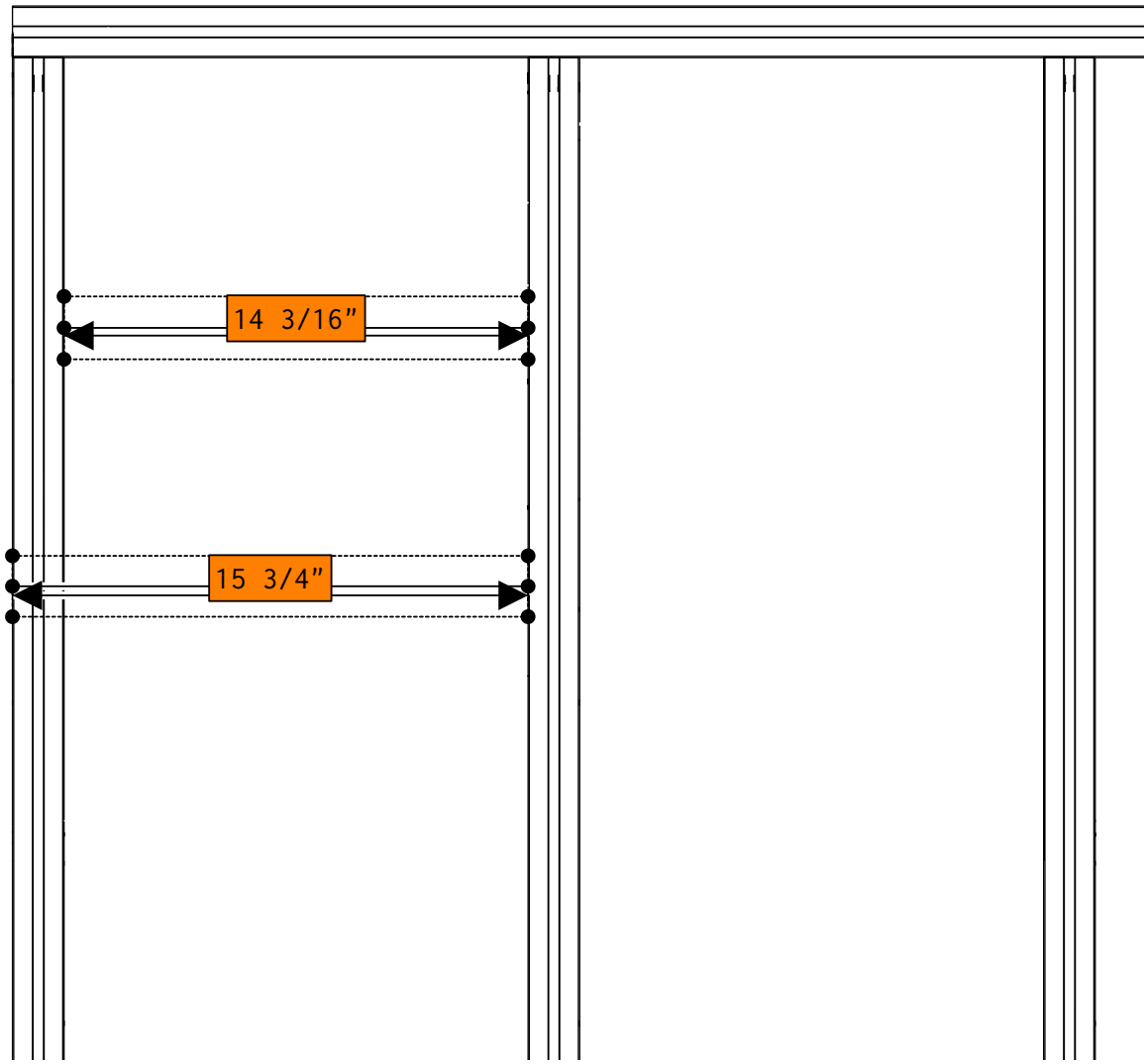
- Repeat the previous steps on both sides for all of the crossmember extrusion pieces.



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



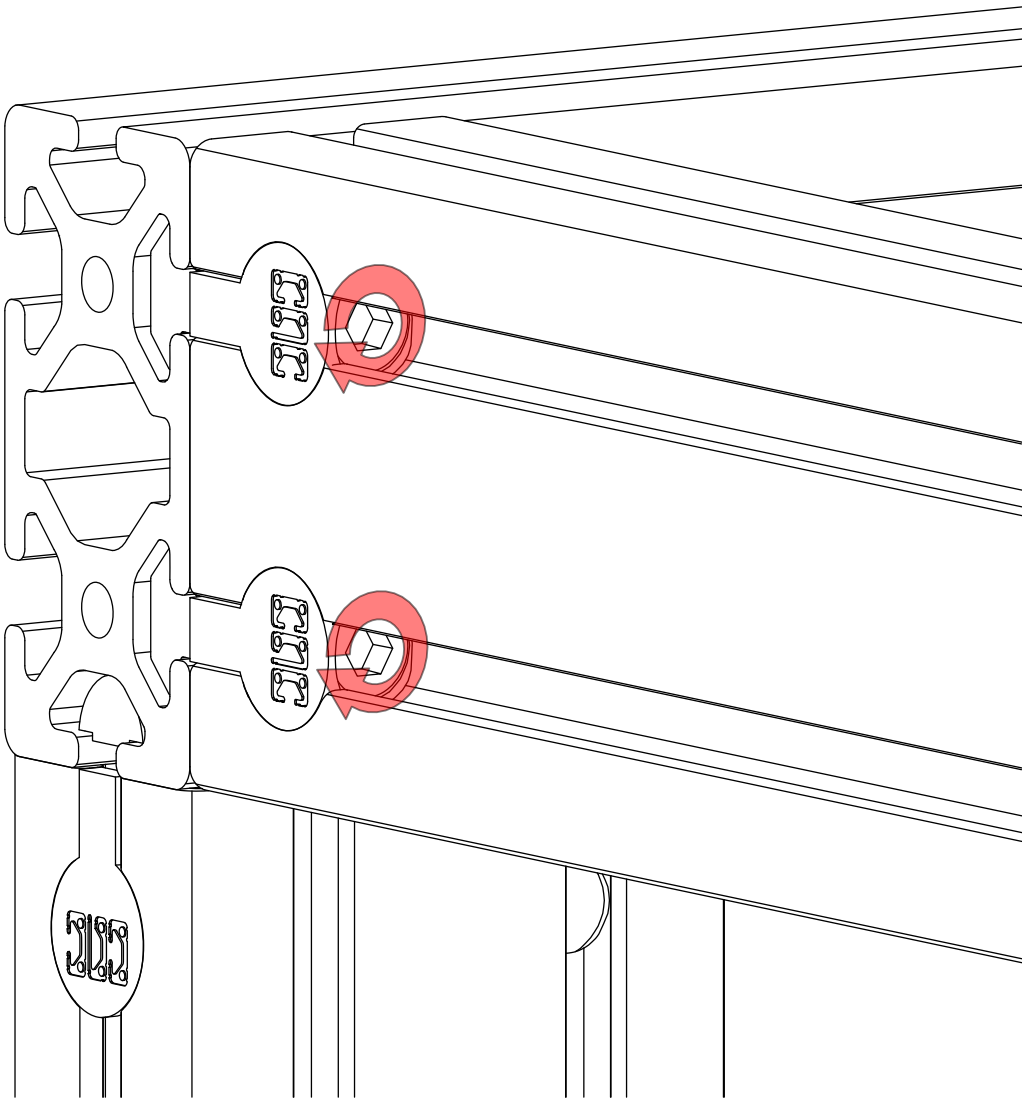
- Repeat the previous step for all crossmembers.



- Space each crossmember 14 3/16" (360mm) apart (15 3/4" (400mm) center to center) as indicated.

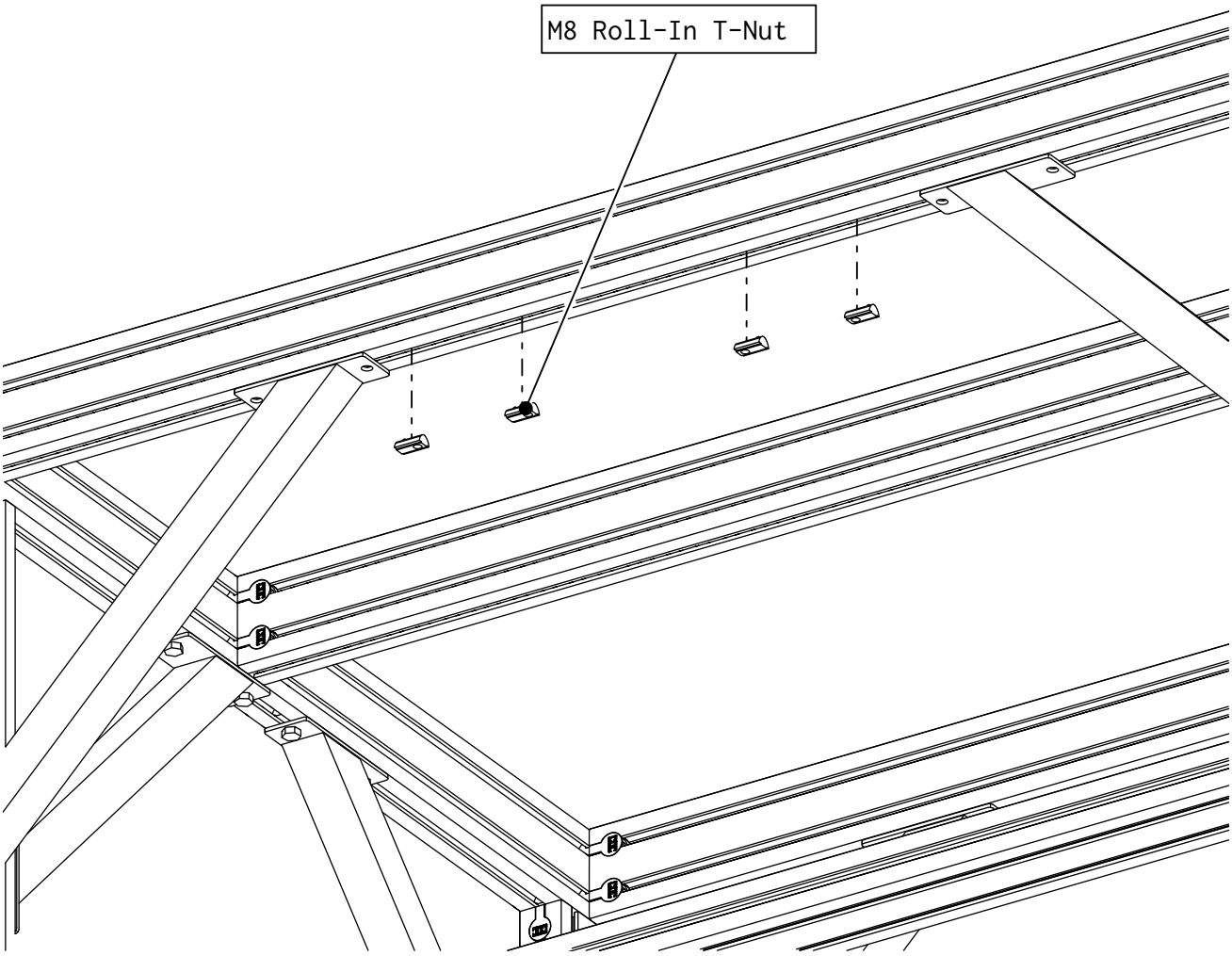
Note: The back crossmember will have a different spacing due to the size of the machine.

Note: Measure from multiple points along the crossmembers to ensure squareness.

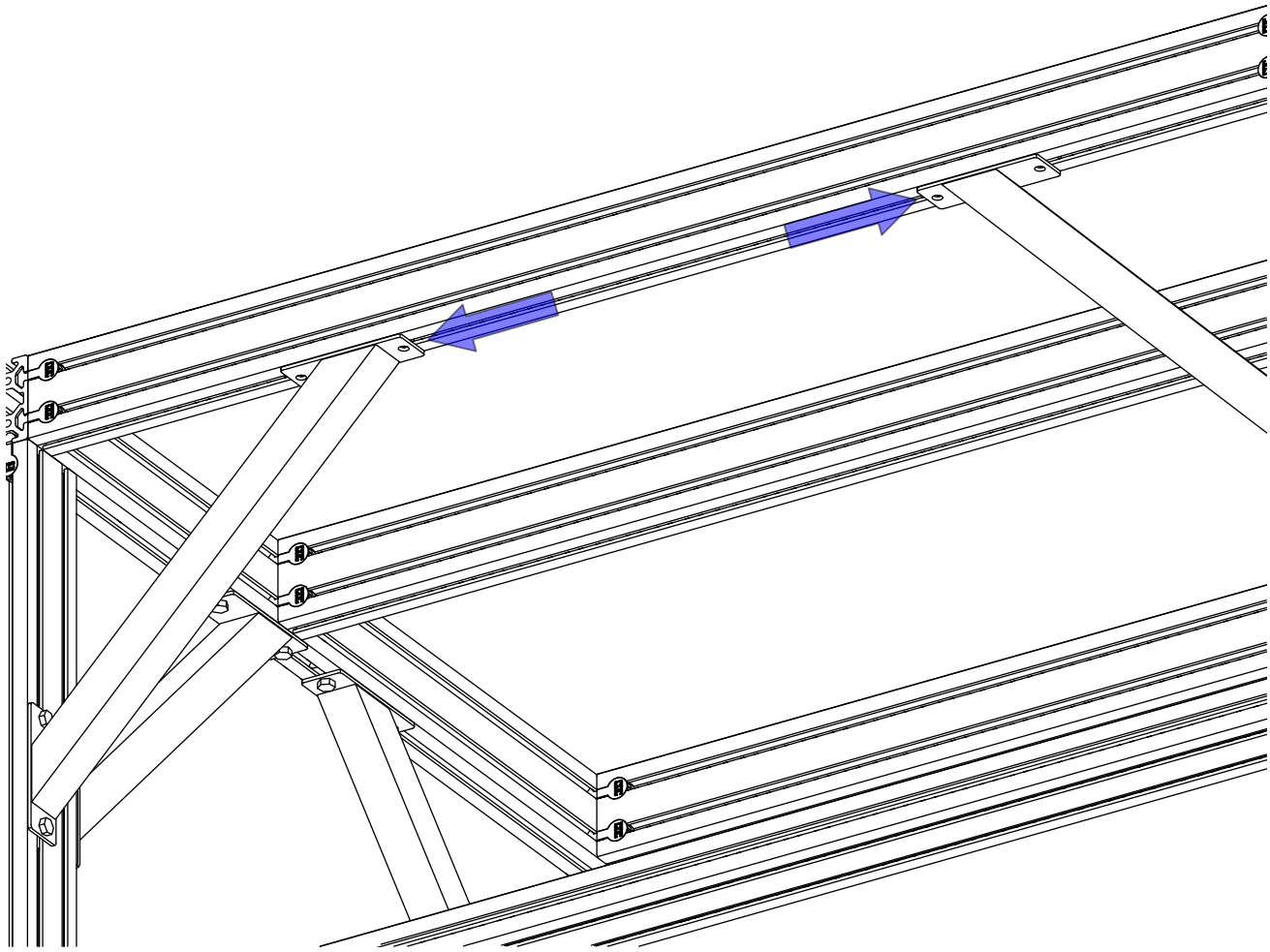


- Tighten the socket heads in each of the anchor assemblies to secure the frame.

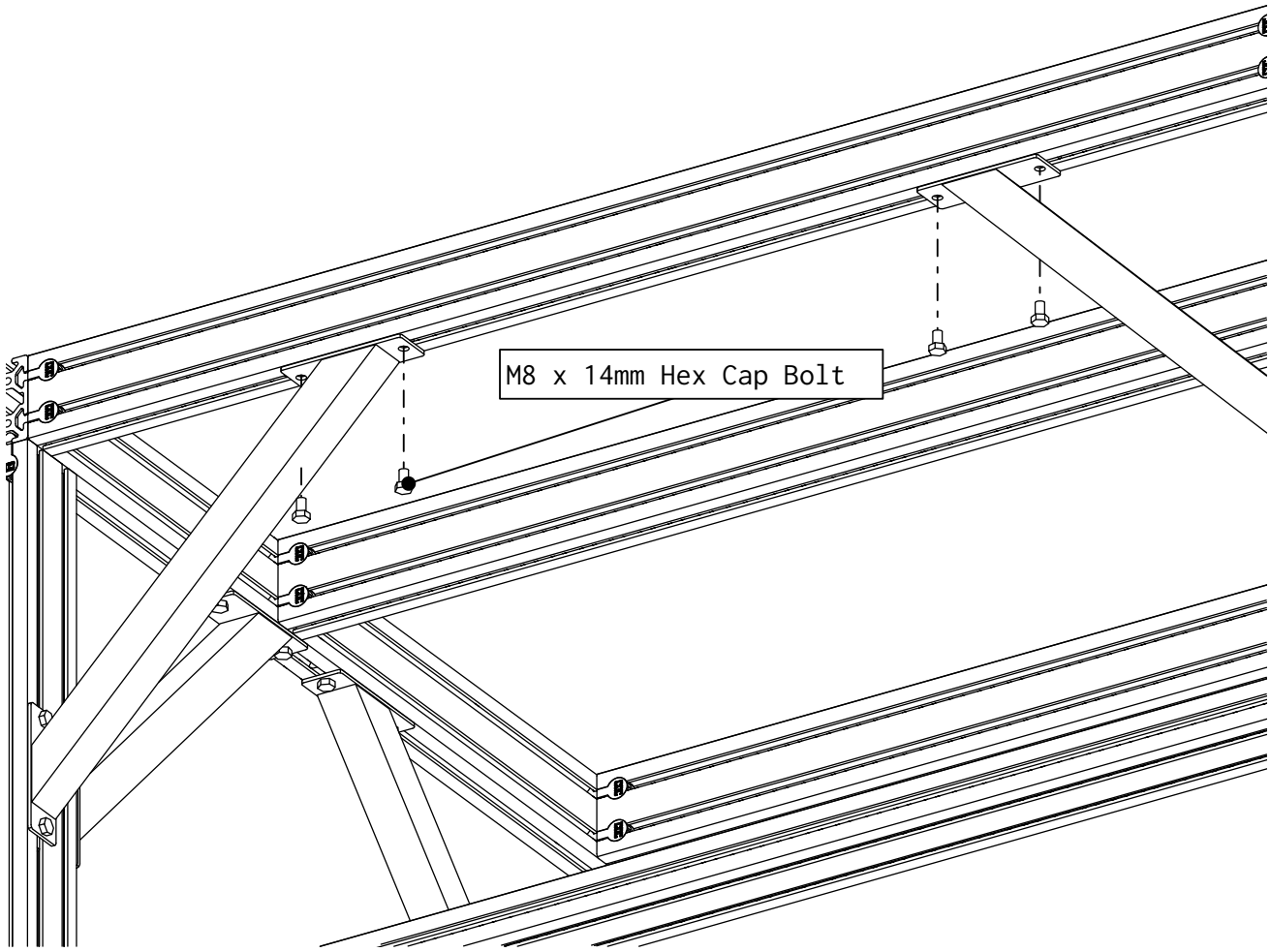
Note: Repeat this step for all 8 screws in each of the crossmembers.



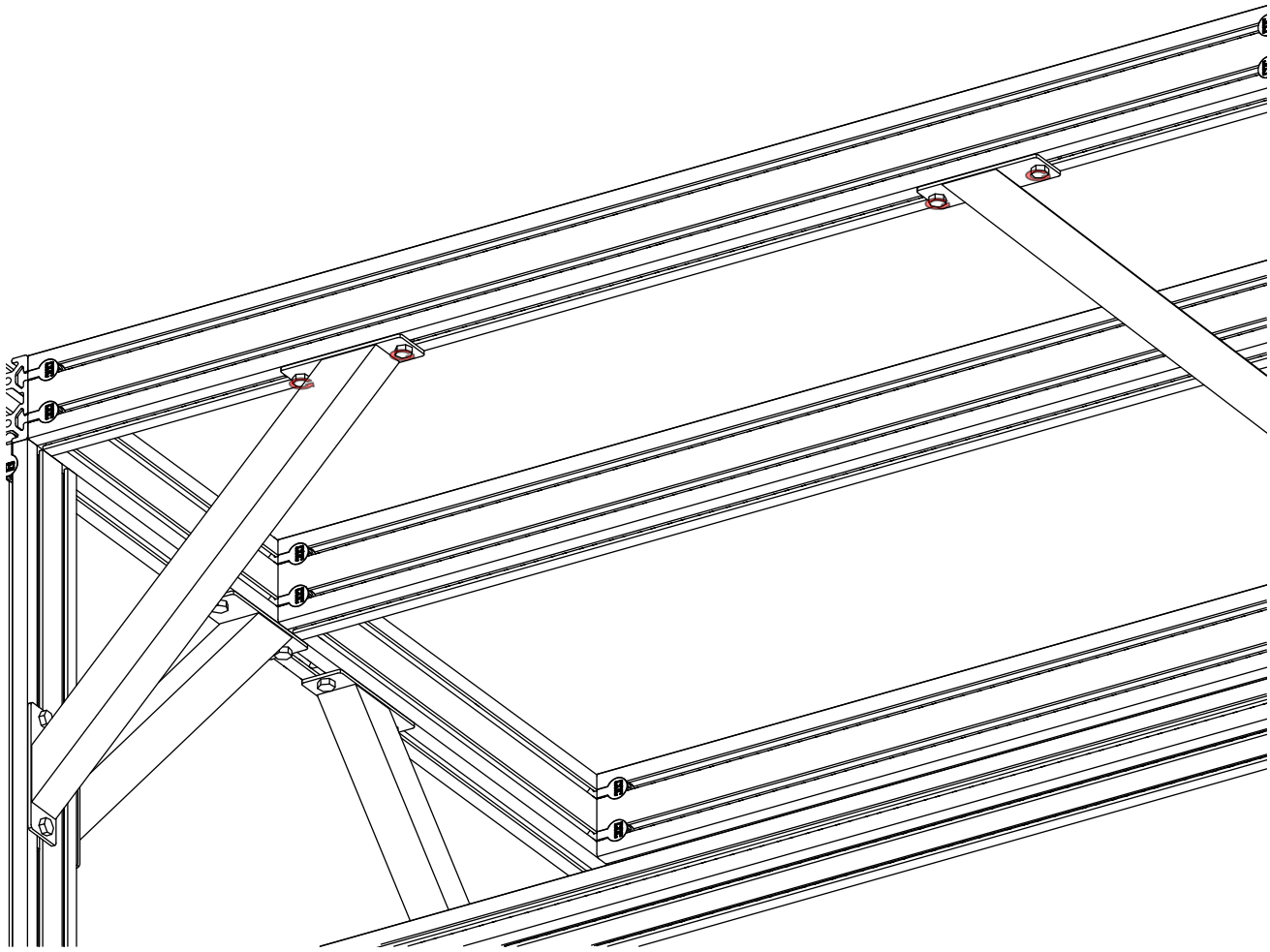
- Roll t-nuts into the crossmember extrusion as indicated.



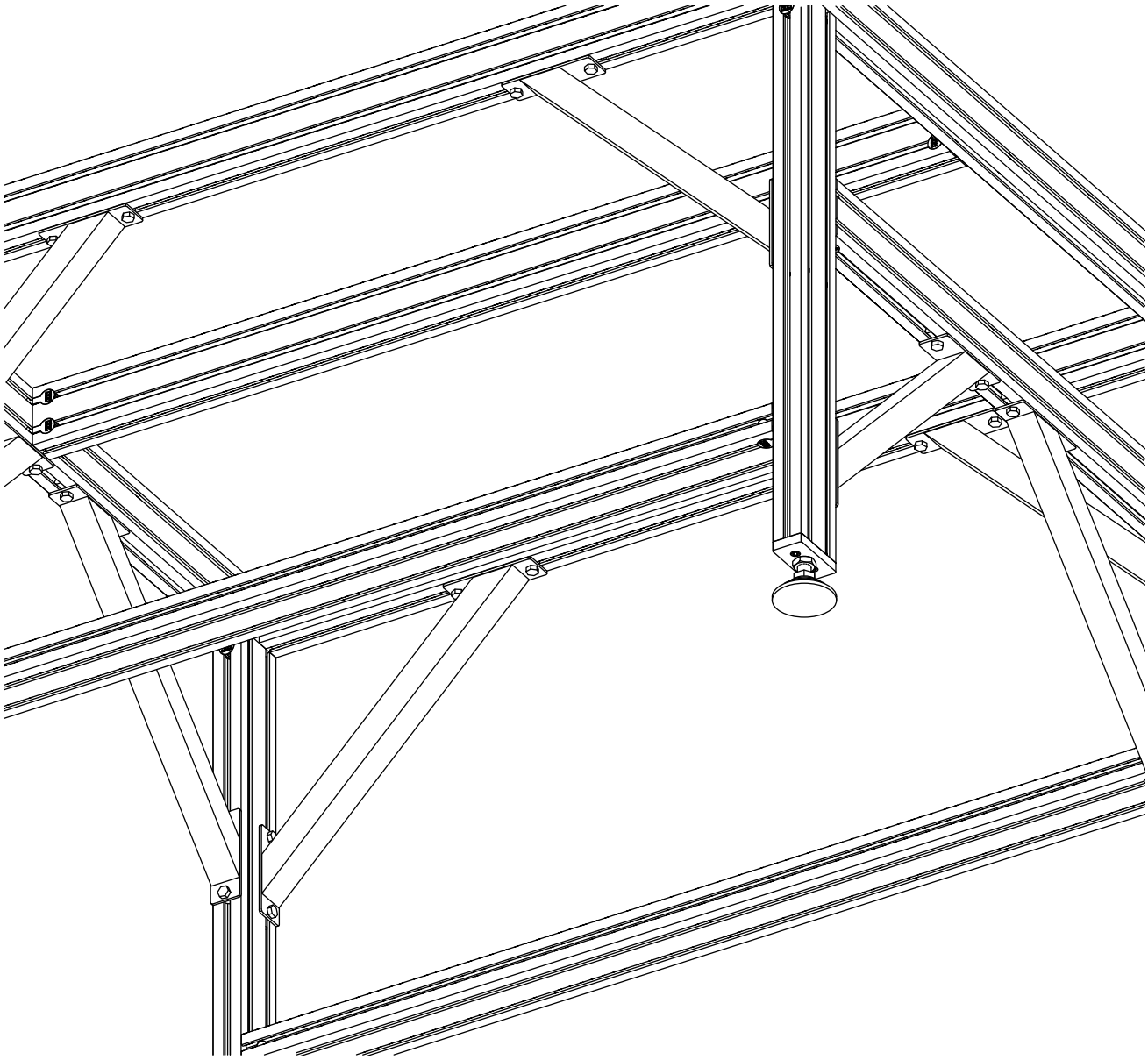
- Slide the t-nuts under the holes of the gusset.



- Fasten the gusset to the extrusion as indicated.



- Tighten the highlighted fasteners.



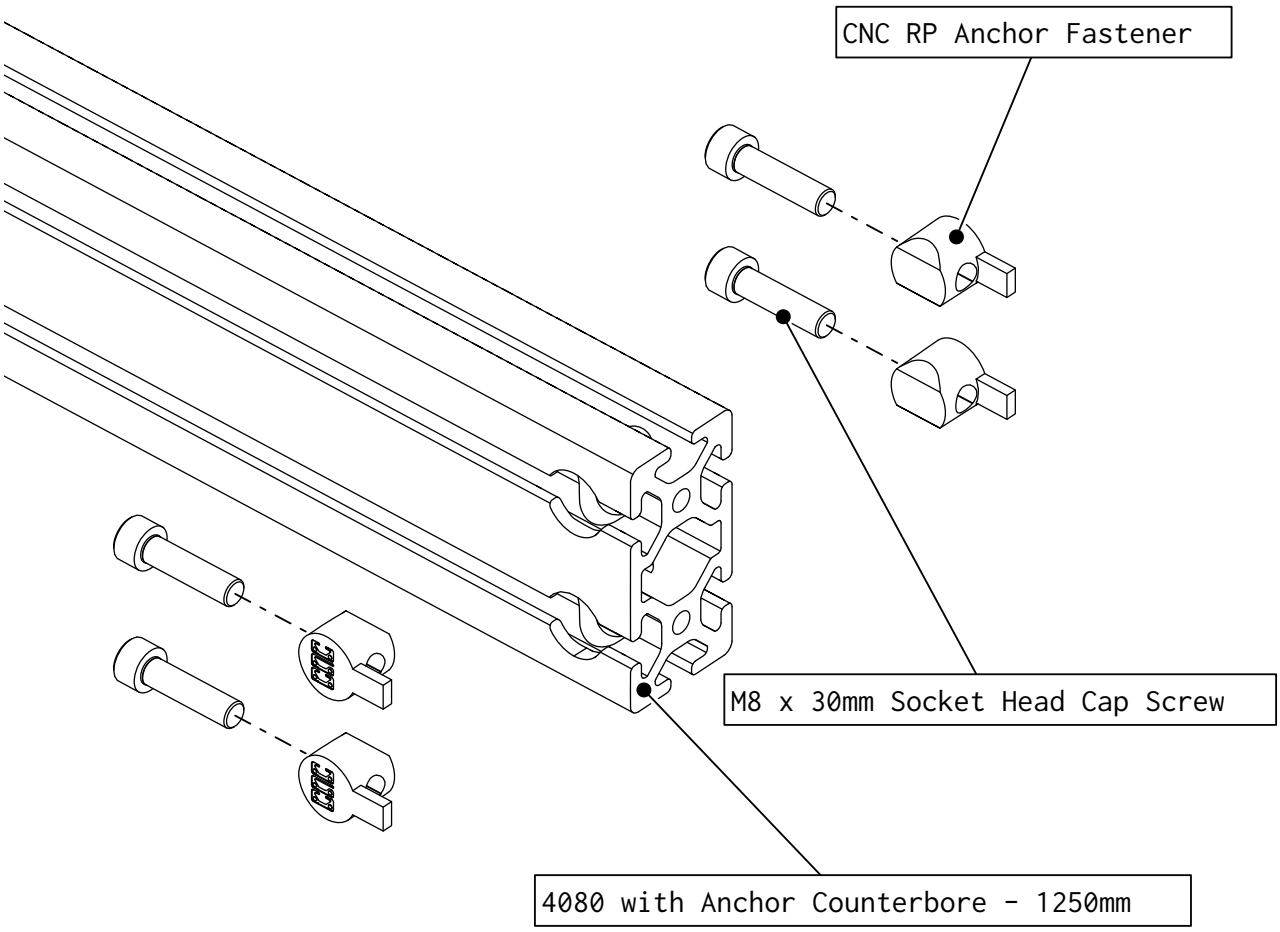
- Repeat the previous steps for the remaining gussets.
- Fully tighten any remaining fasteners.

1.3 Crossmember Installation

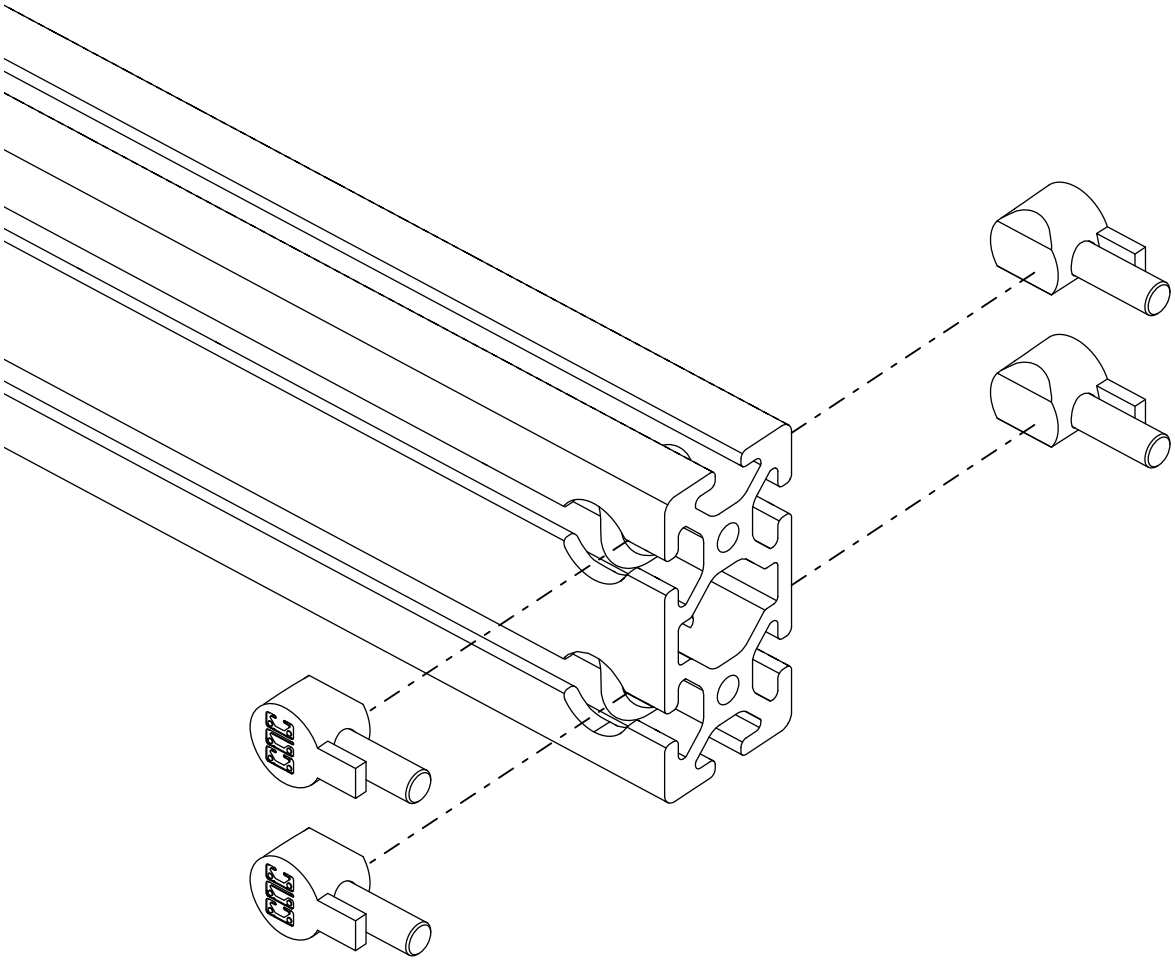
Note: Skip this section if you purchased a Leg Kit.

The following parts and bags will be used in this section:

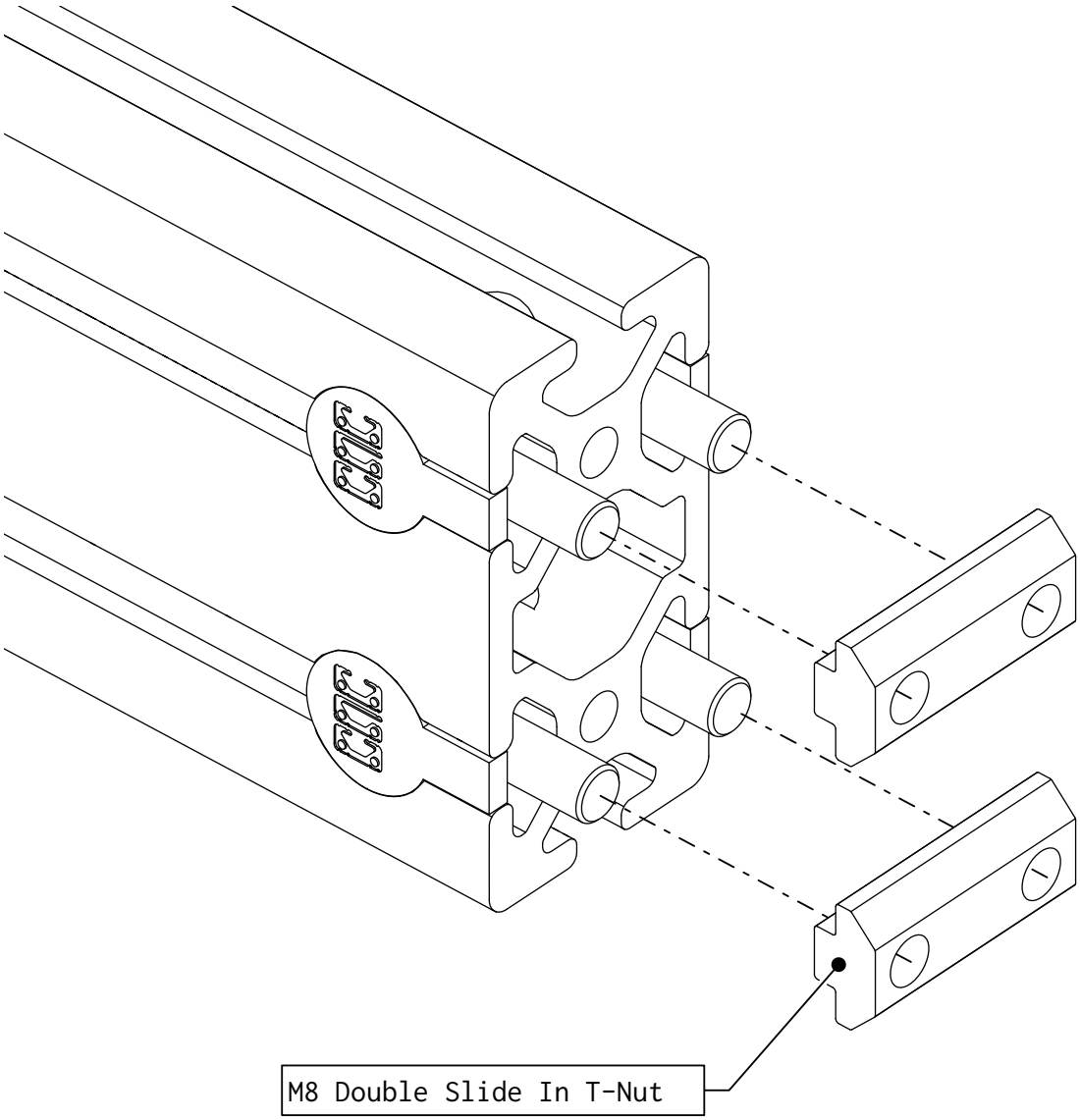
- (12) (40-3100-00) 40 Series Short Double Anchor Assembly
  - (1) Double Anchor M8 Slide-In T-Nut
  - (2) 40 Series Anchor Fastener
  - (2) M8 x 30mm Socket Head Cap Screw
- (3) 4080 with Anchor Counterbore, 1250mm
- (2) 4080 Extrusion, 950mm



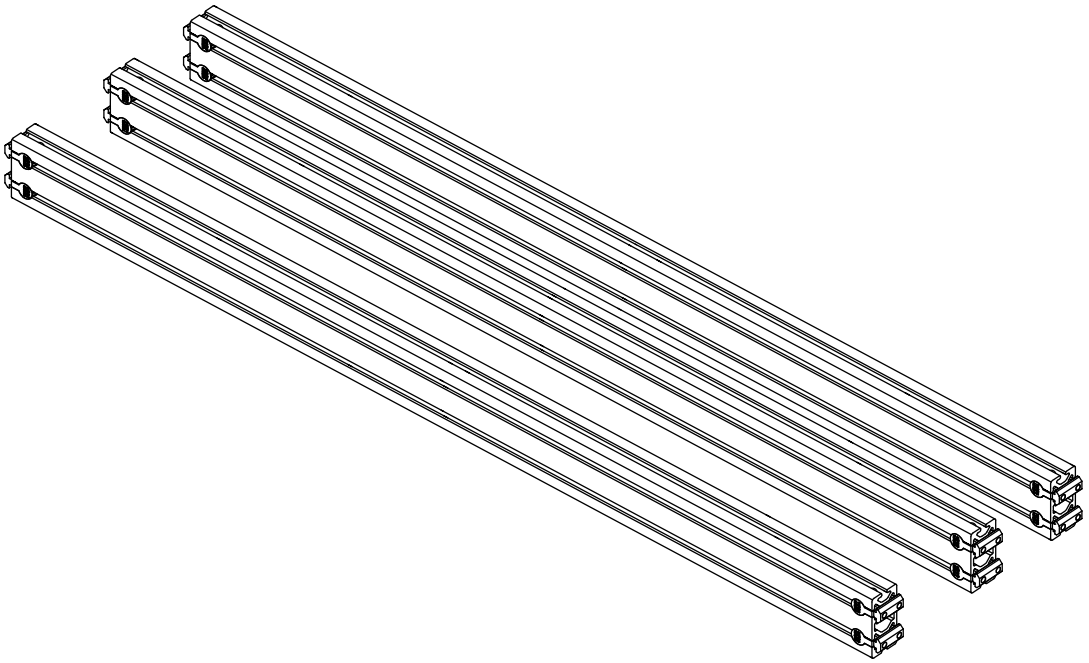
- Thread the socket head cap screws into the anchor fasteners as indicated.



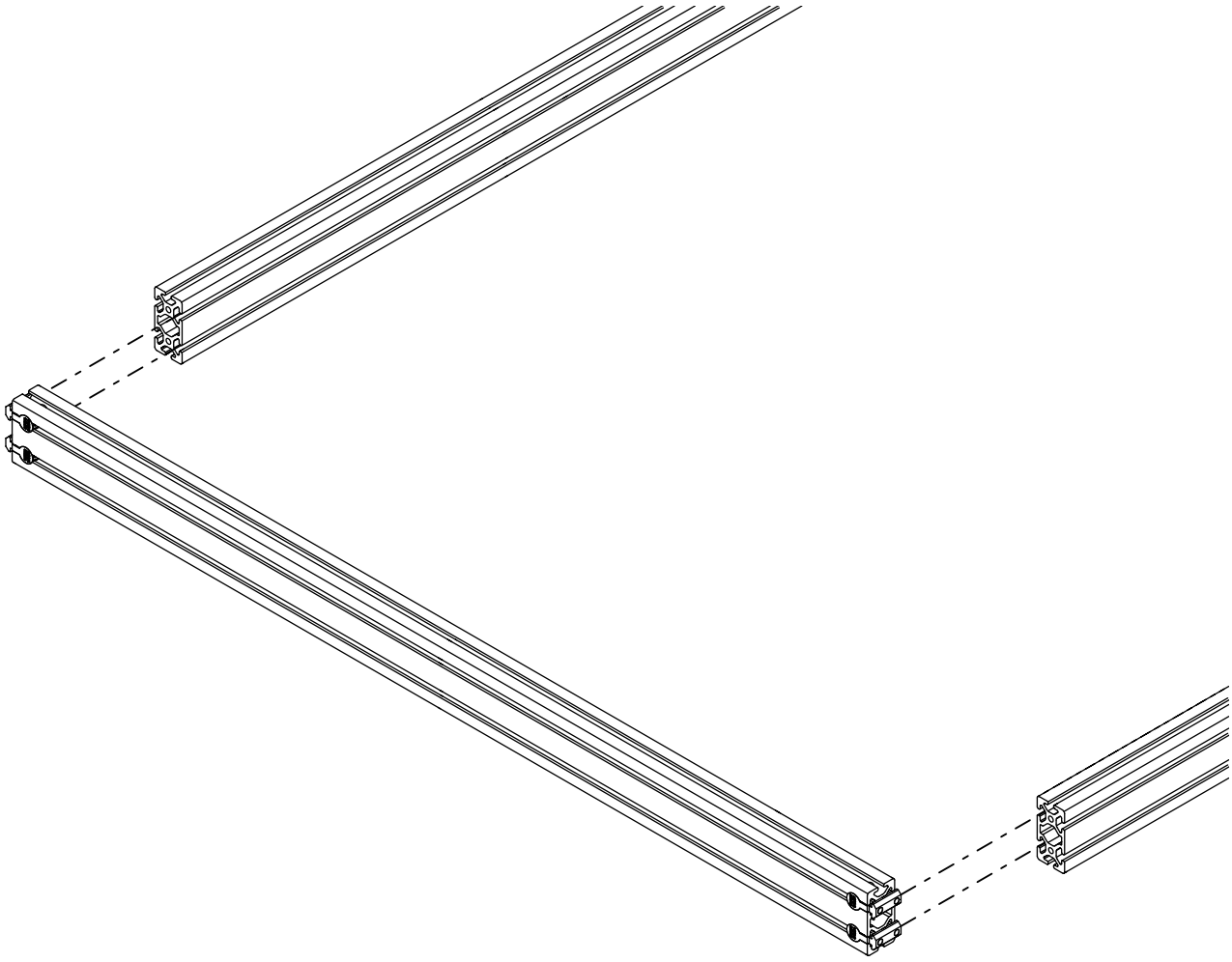
- Slide the anchor assembly into the extrusion.



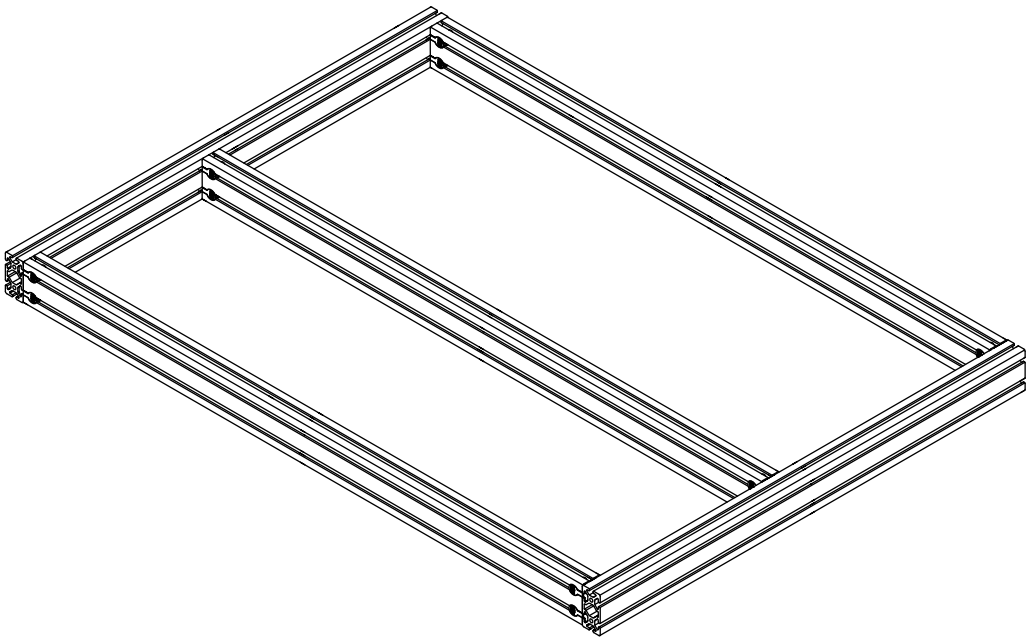
- Loosely thread the double t-nuts onto the socket head cap screws as indicated.



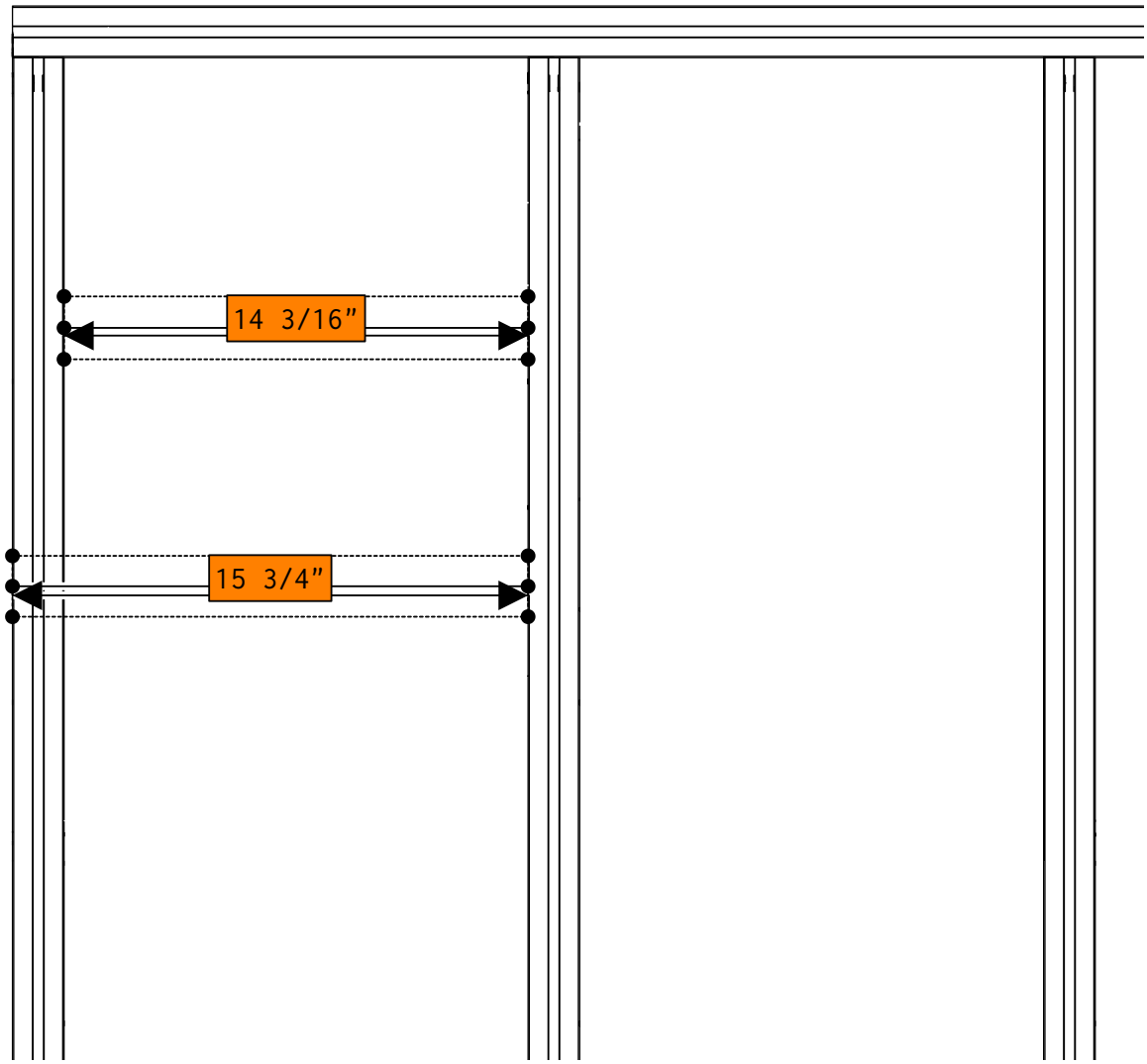
- Repeat the previous steps on both sides for all of the crossmember extrusion pieces.



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

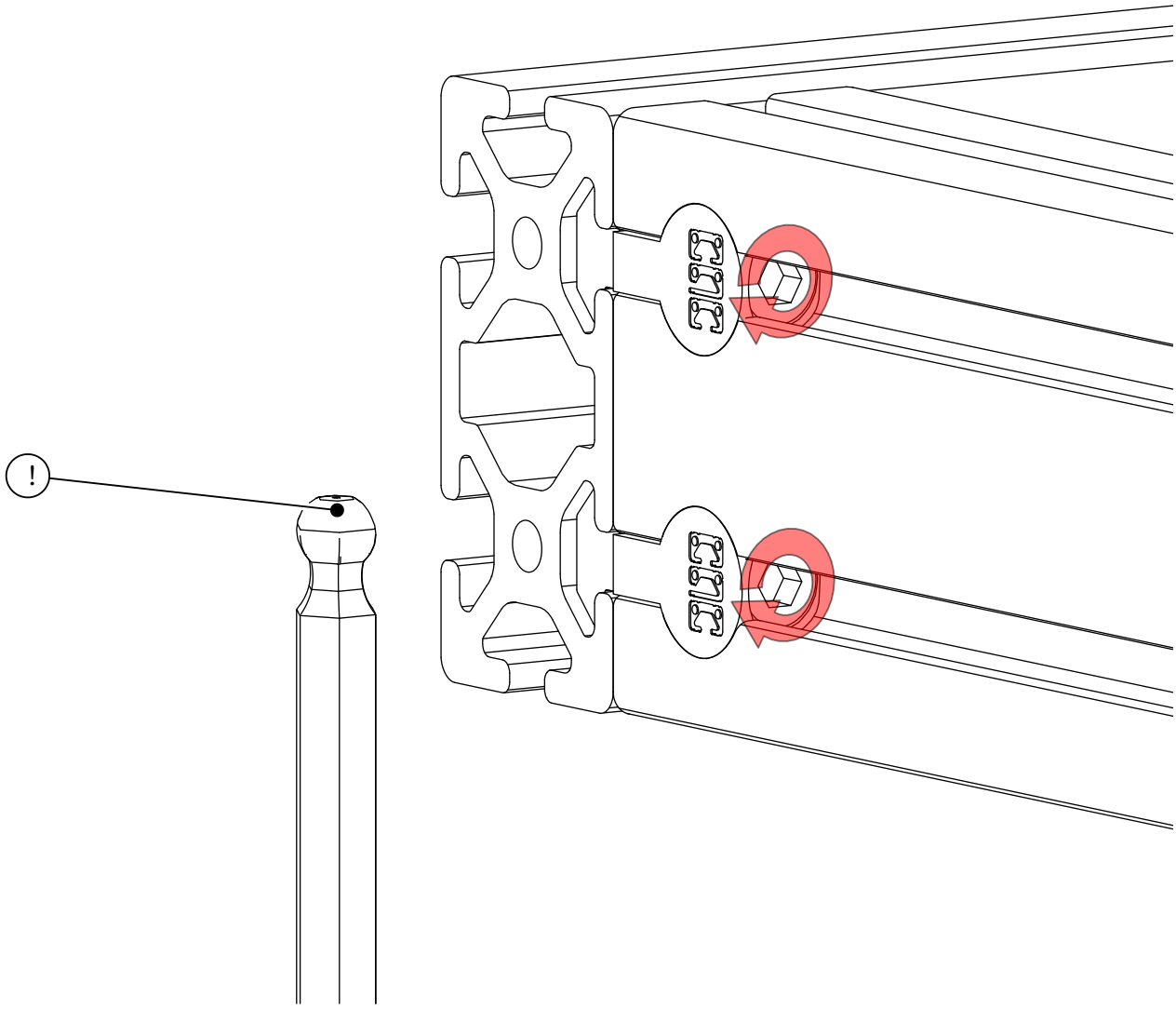


- Repeat the previous step for all crossmembers.



- Space the center crossmember 15 3/4" (400mm) from the front crossmember (so there is 14 3/16" (360mm) between the front and center crossmembers) as indicated.

  Note: Measure from multiple points along the crossmembers to ensure squareness.



- Tighten the socket heads in each of the anchor assemblies to secure the frame.

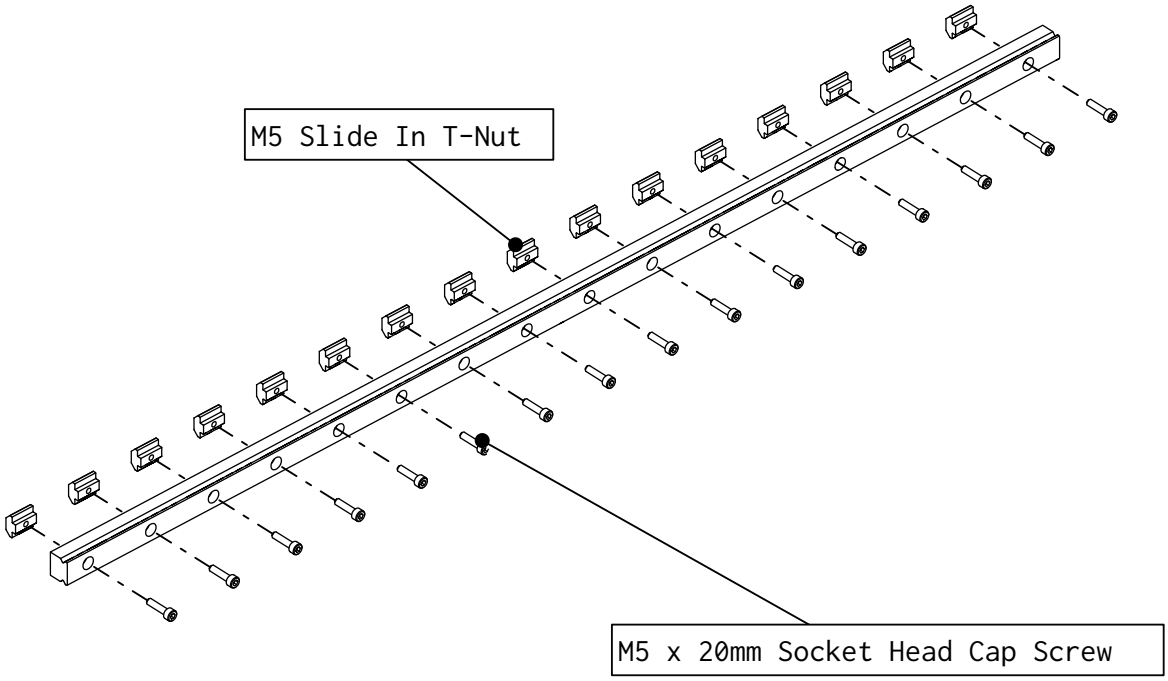
Note: Repeat this step for all 8 screws in each of the crossmembers.

Note: For assembling anchor fastener connections, 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.

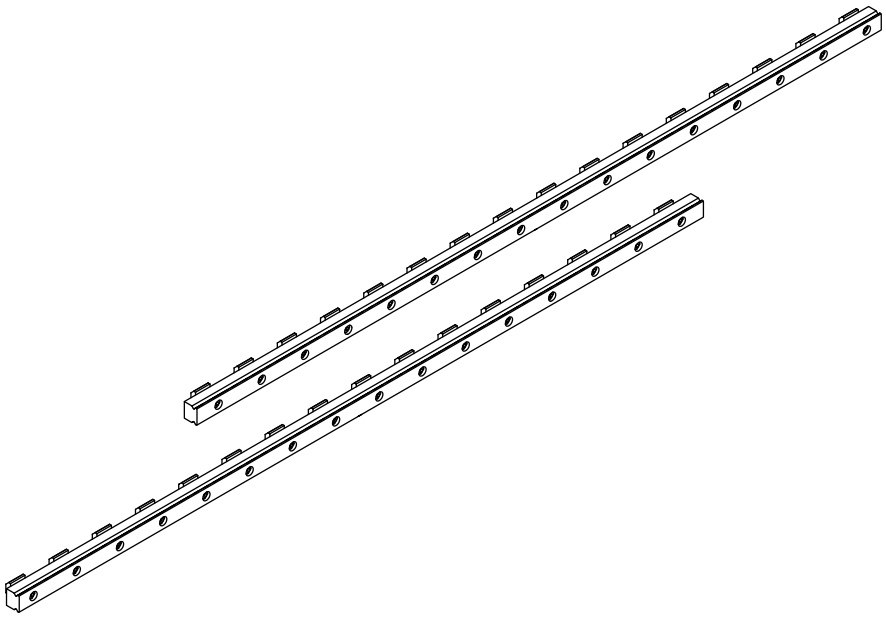
1.4 Linear Rail Installation

The following parts and bags will be used in this section:

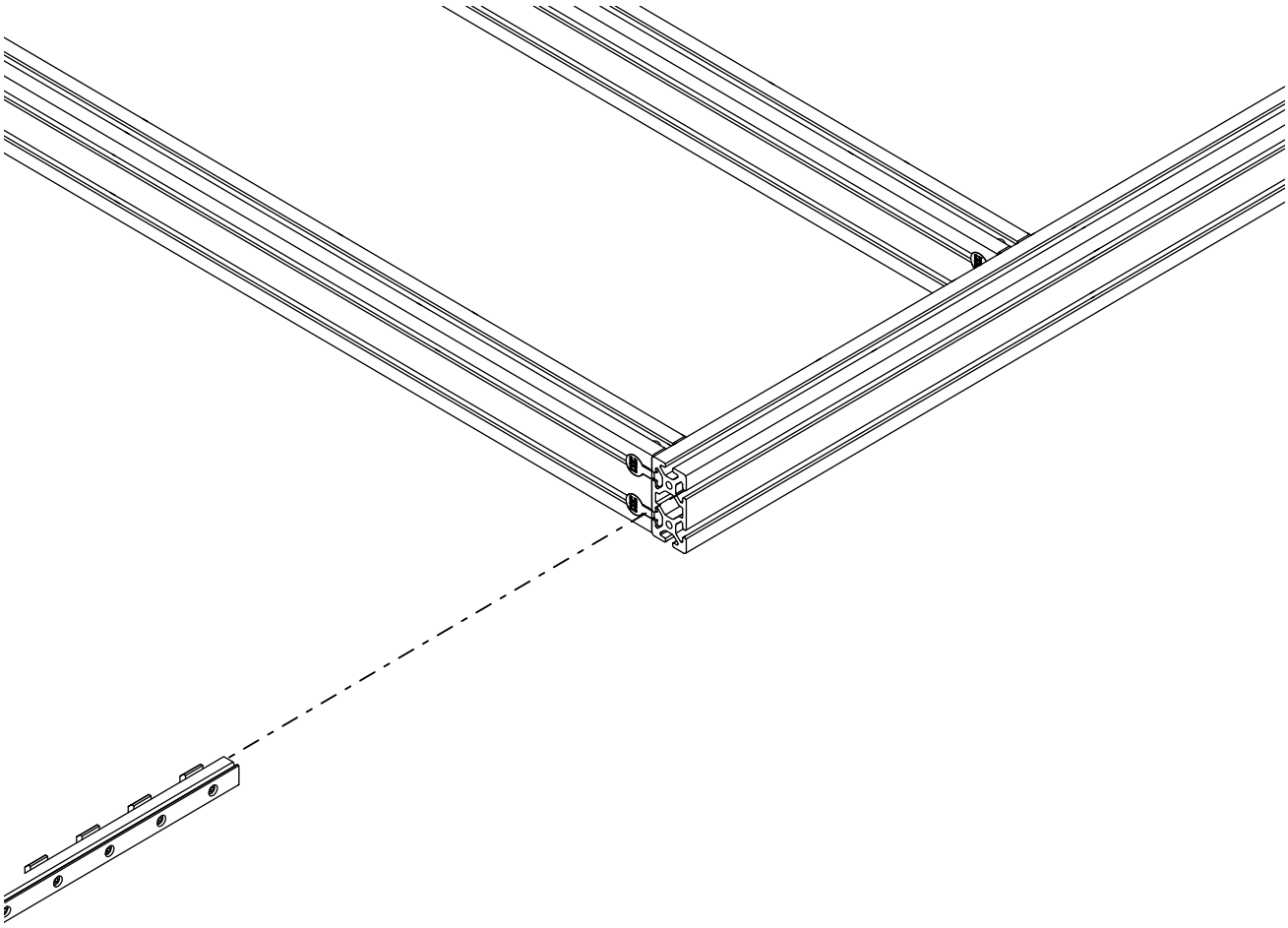
- (2) Linear Rail - 950mm
- (2) (GH20-950-FAST) Linear Rail Fasteners, 950mm Length
  - (16) M5 Slide-in T-nut
  - (16) M5 x 20mm Socket Head Cap Screw
  - (16) Linear Rails Hole Covers
- (1) (GHH20-JIG-00) Linear Rail Setting Kit
  - (2) (GHH20-JIG) Linear Rail Setting Jig
  - (4) M8 x 25mm Socket Head Cap Screw
  - (4) M8 Roll-in T-nut



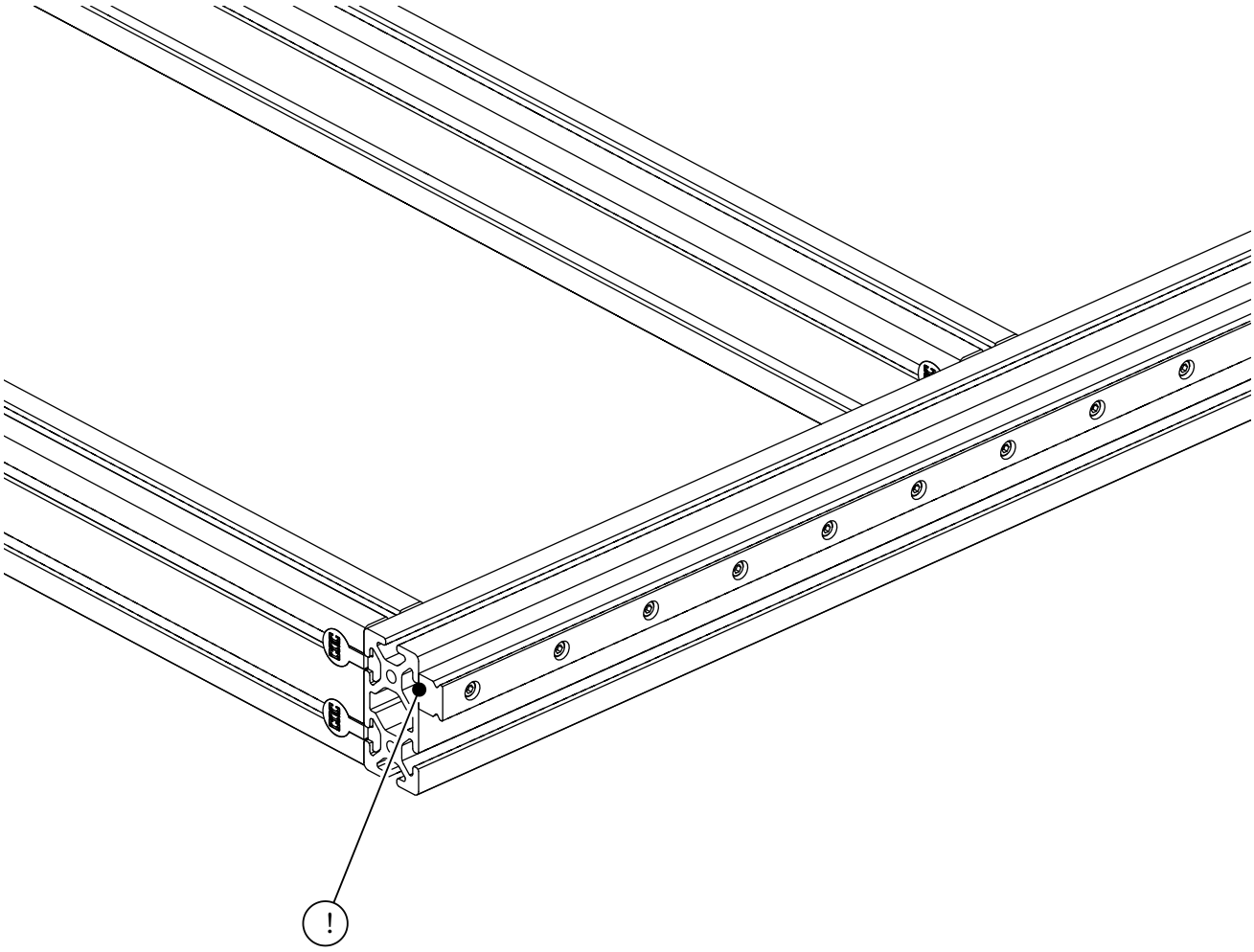
- Thread fasteners into the linear rail as indicated.



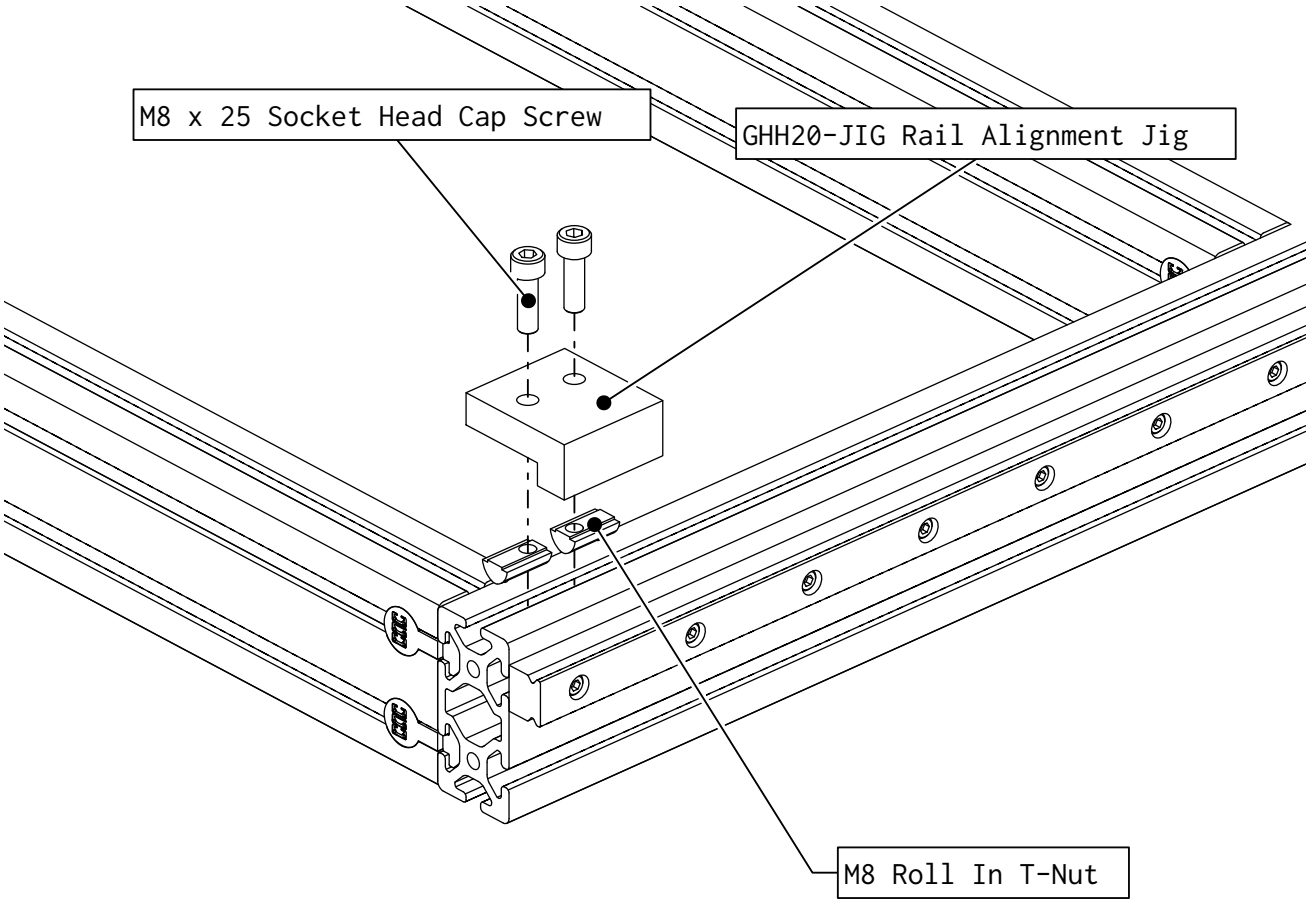
- Repeat this step for each of the linear rails.



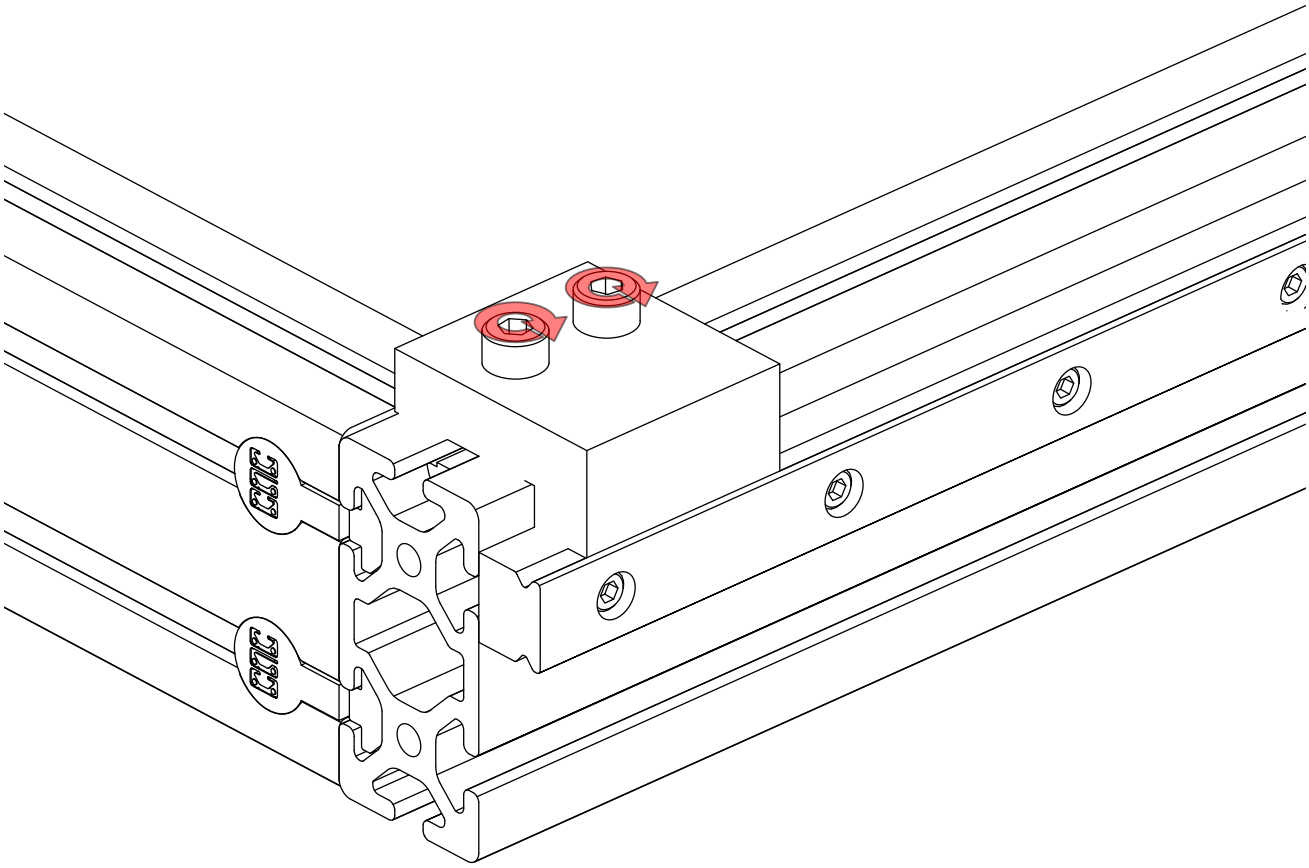
- Slide one of the rails into the extrusion t-slot as indicated.



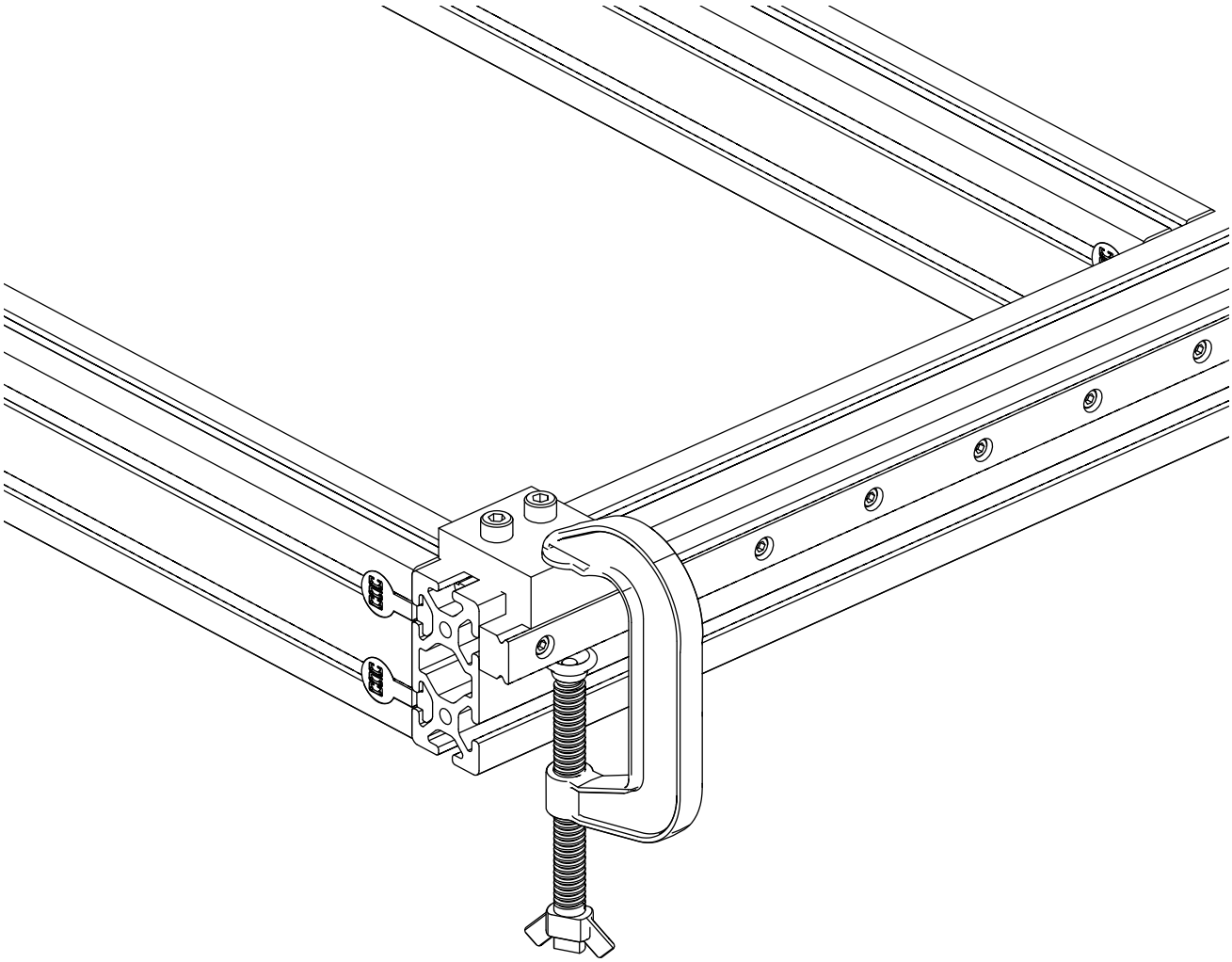
Note: The rail should be roughly flush with the end of the extrusion.



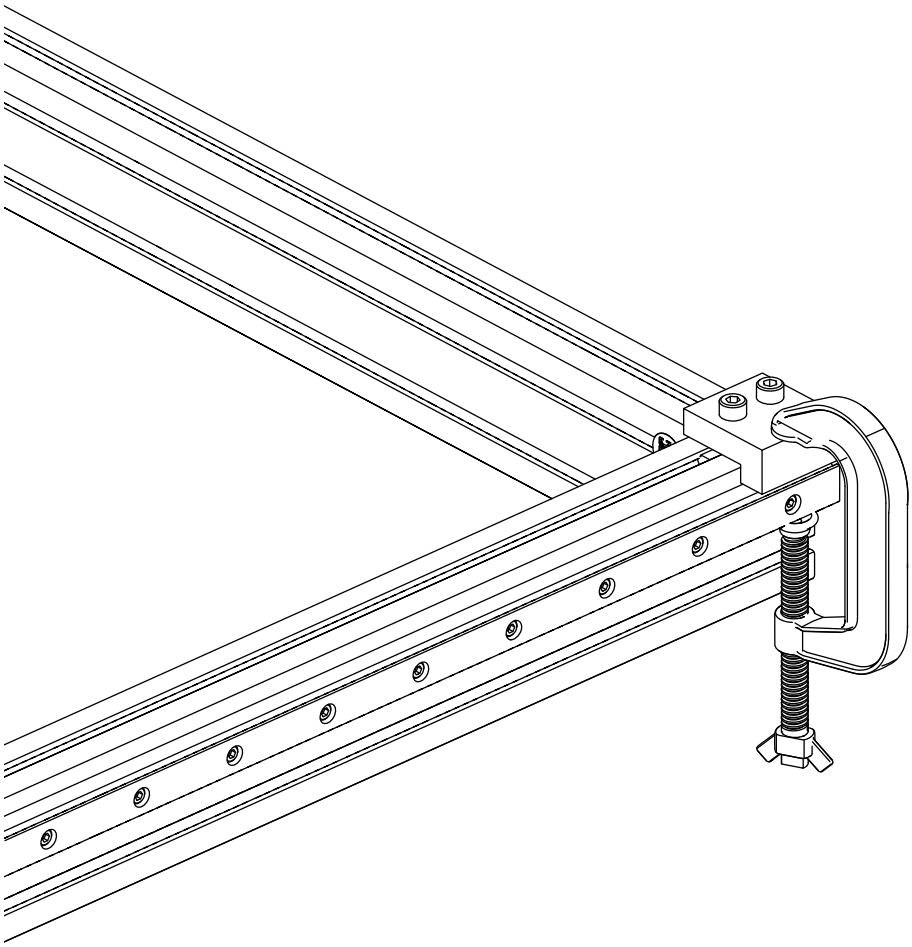
- Attach the rail alignment jig to the extrusion as indicated.



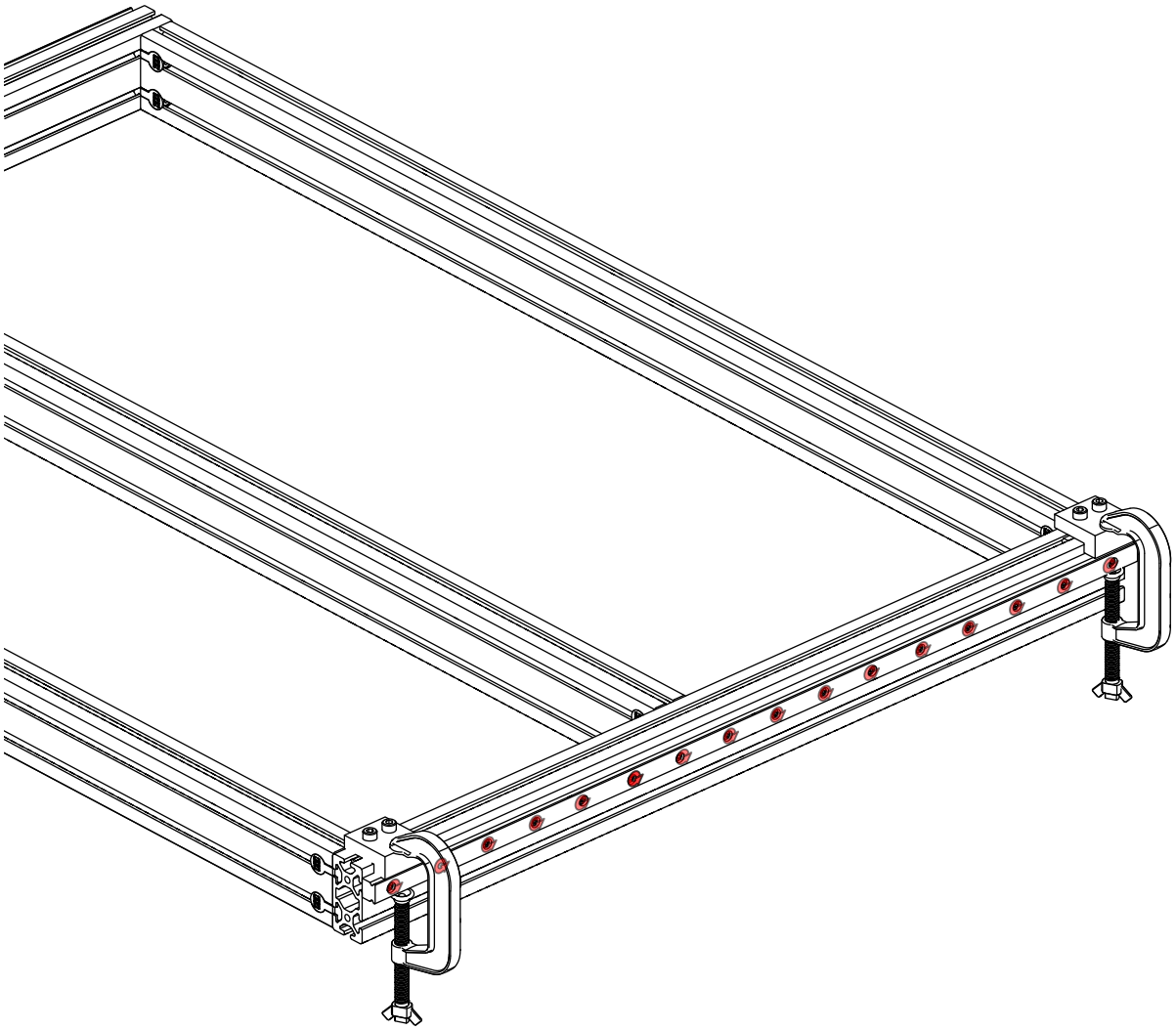
- Tighten the highlighted fasteners.



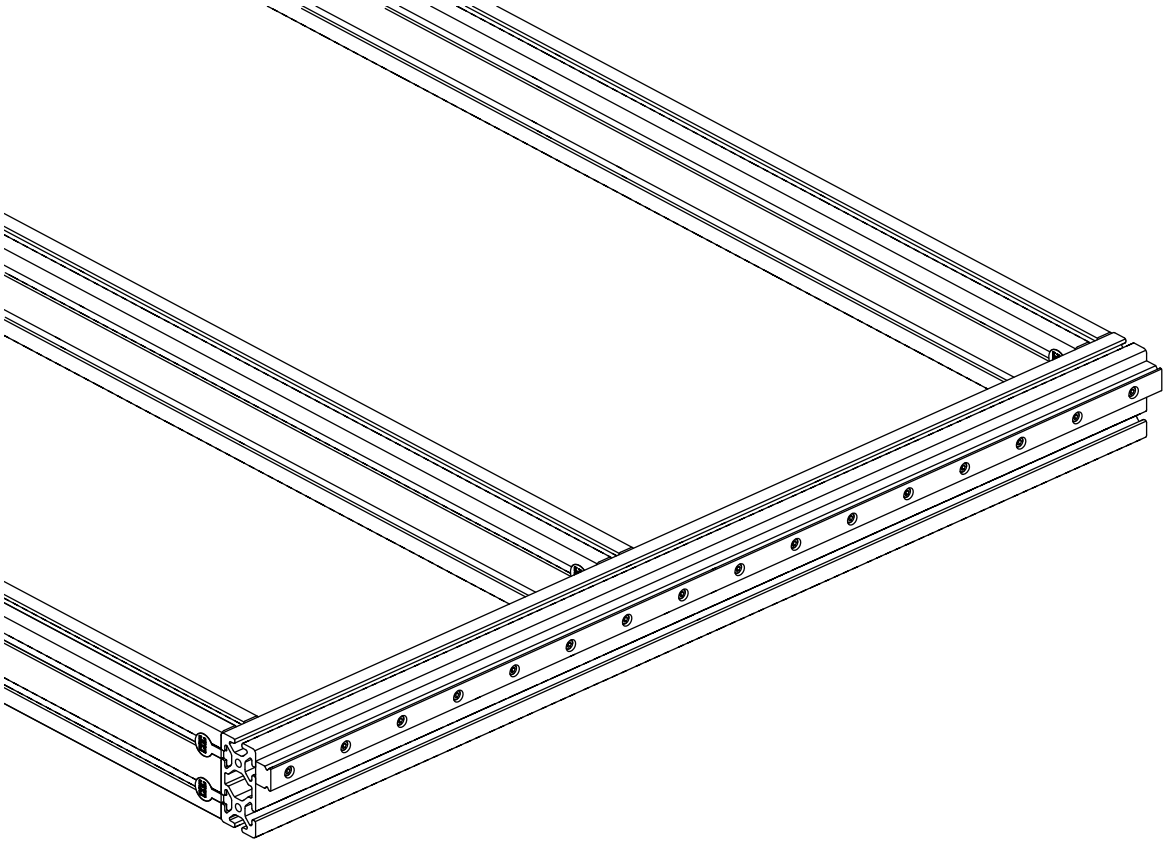
- Clamp the end of the linear rail to the jig.



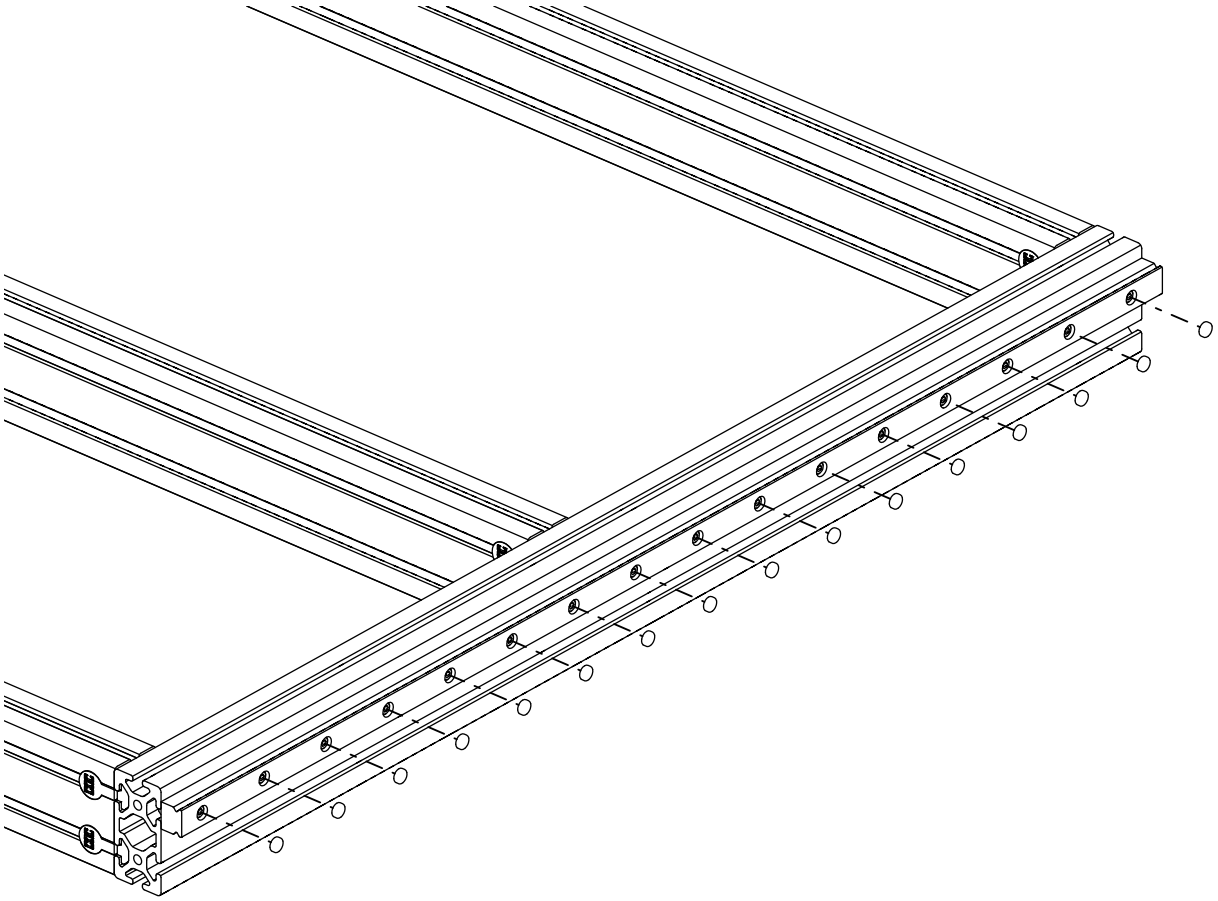
- Repeat the previous steps on the other side of the rail.



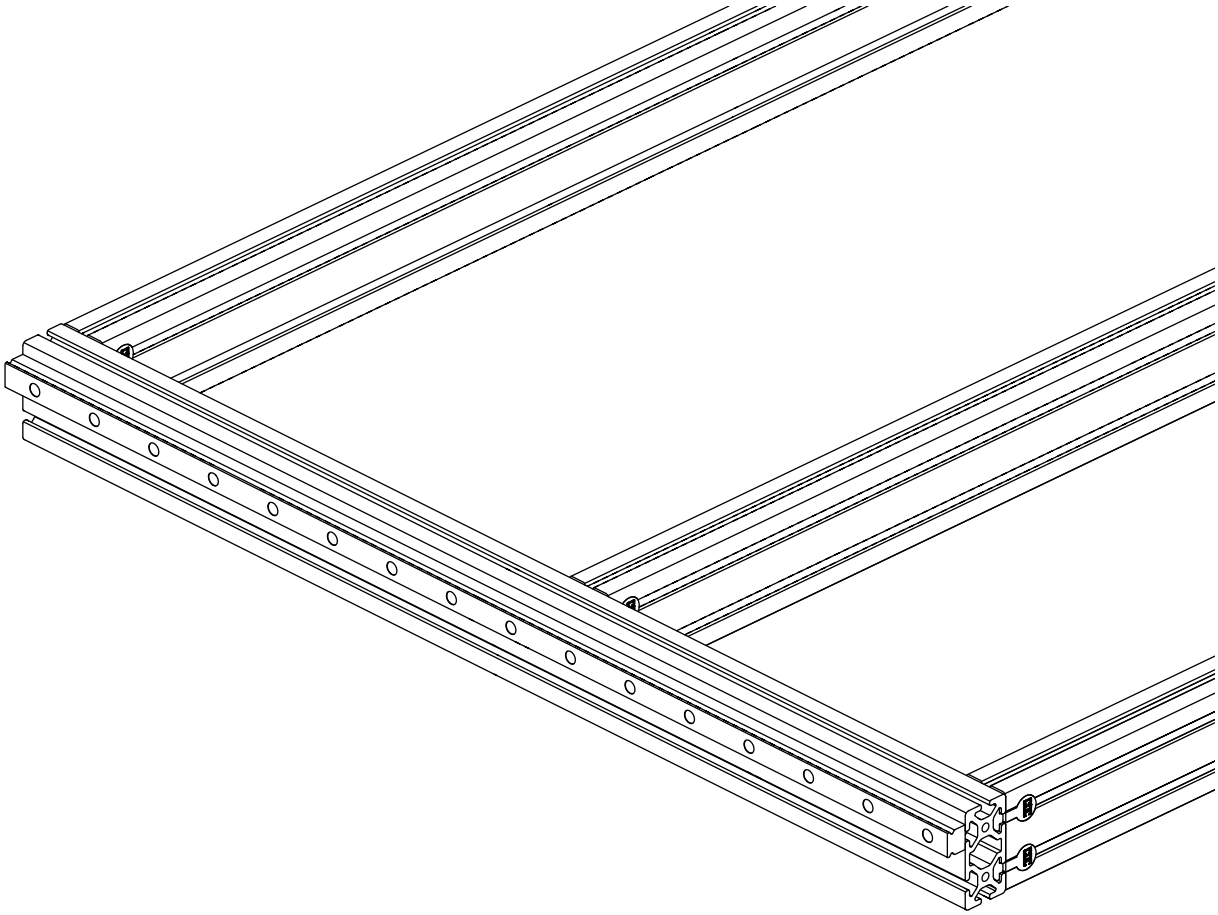
- Fully tighten fasteners of the clamped rail.



- Remove the clamps and adjustment jigs.



- Place plastic covers in each of the rail counterbores as indicated.

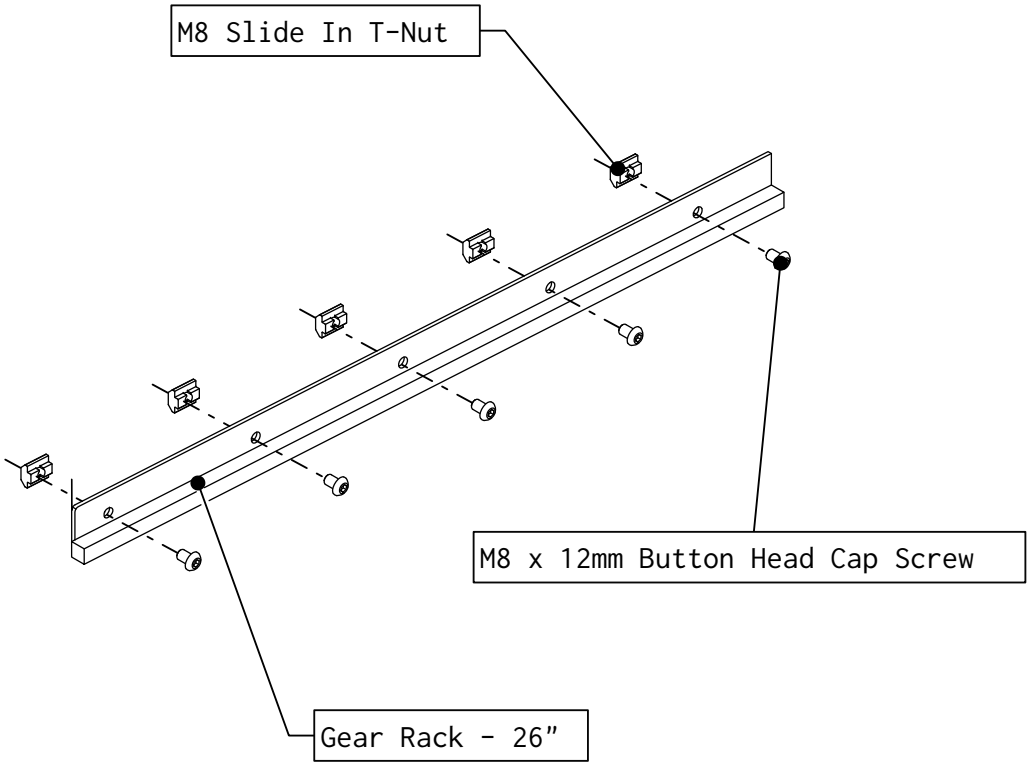


- Repeat the previous steps on the other side of the machine.

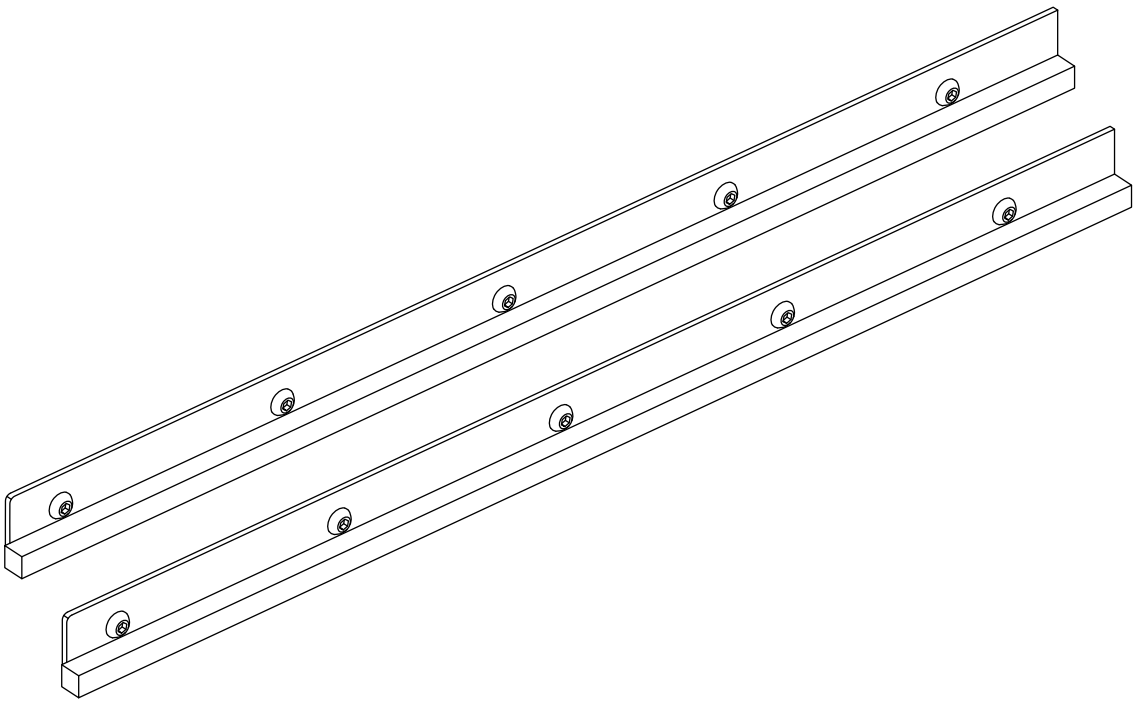
1.5 Gear Rack Installation

The following parts and bags will be used in this section:

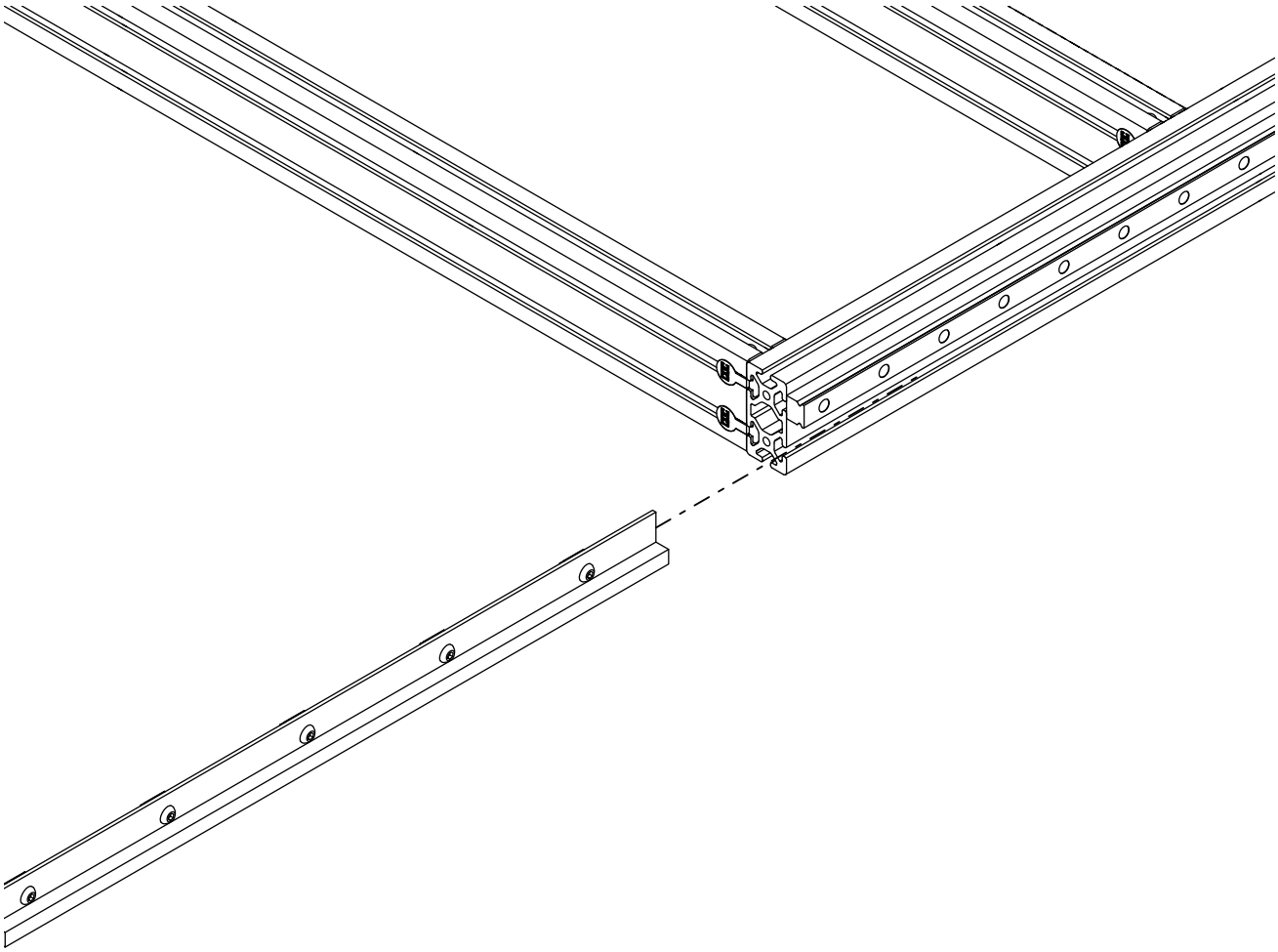
- (2) (MGM-26-FAST-40) 26" Gear Rack Fastener Kit
  - (5) M8 Slide-in T-nut
  - (5) M8 x 12mm Button Head Cap Screw
- (2) 26" Gear Rack



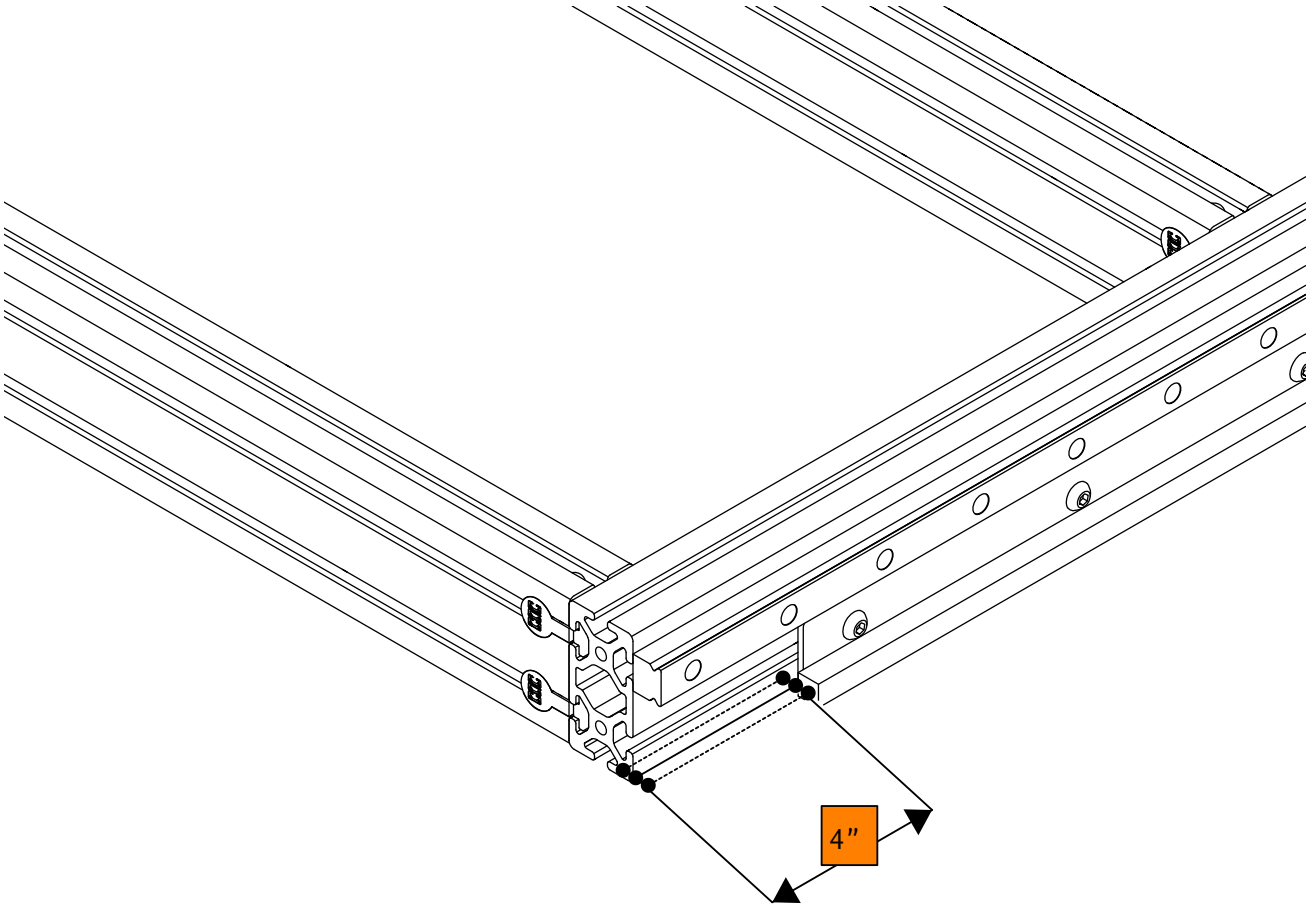
- Thread fasteners into the gear rack as indicated.



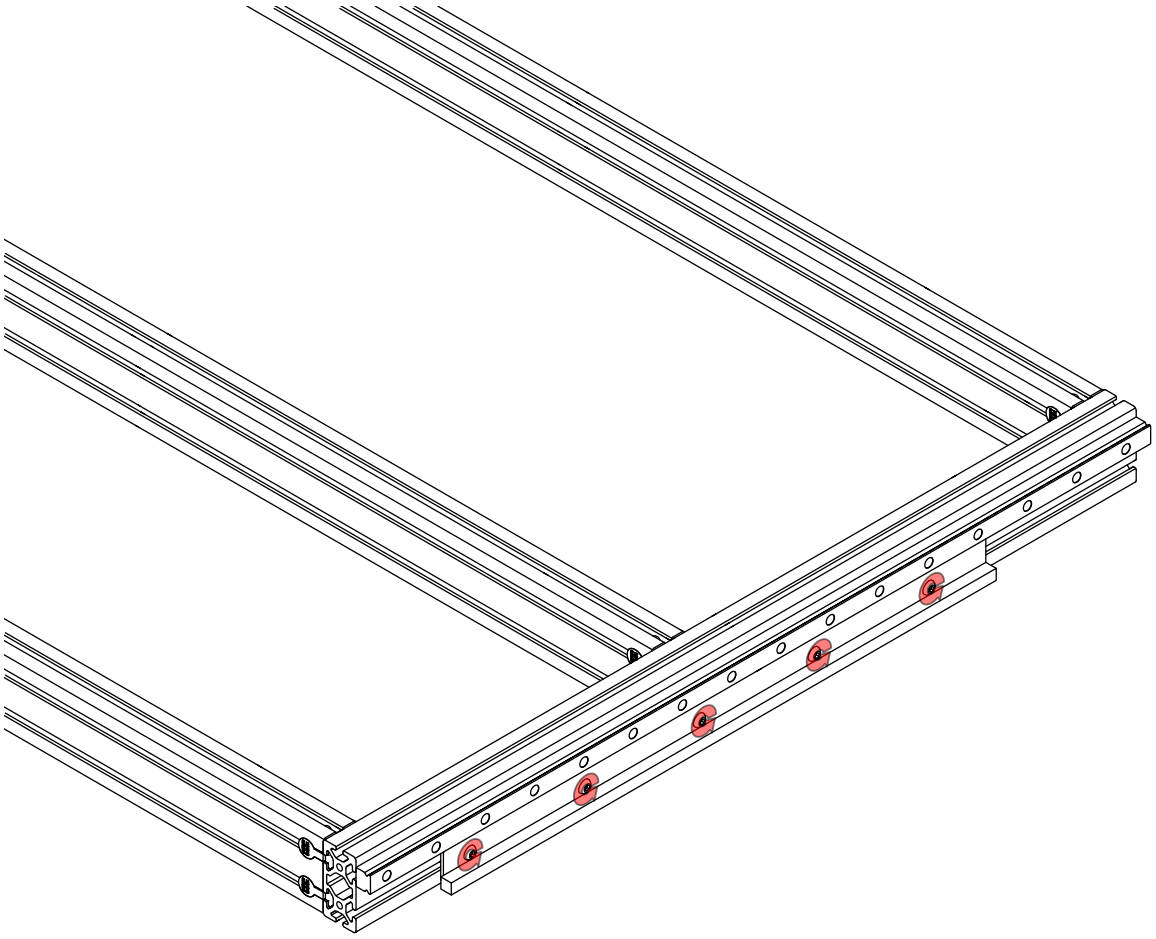
- Repeat this step for each of the gear rack sections.



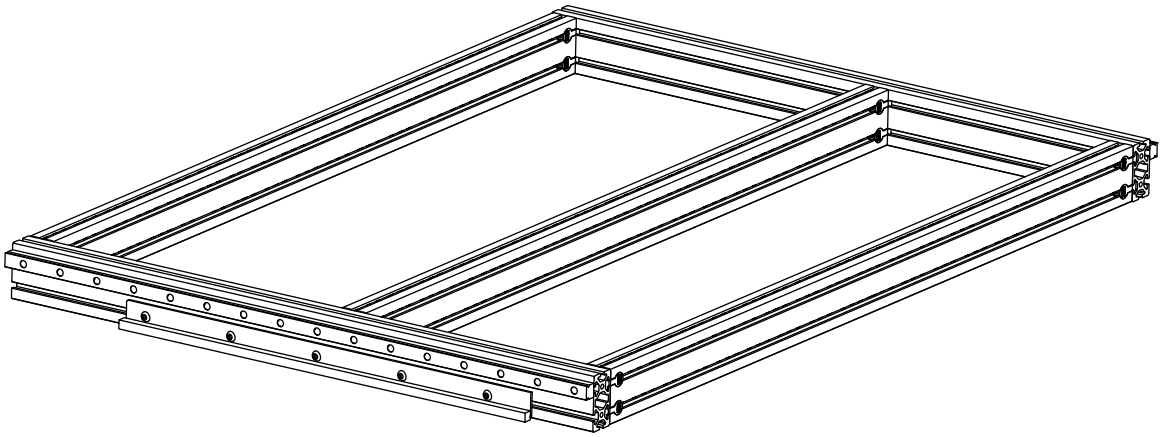
- Slide one of the sections of gear rack into the extrusion.



- Ensure the gear rack is spaced 4" from the end of the extrusion as pictured.



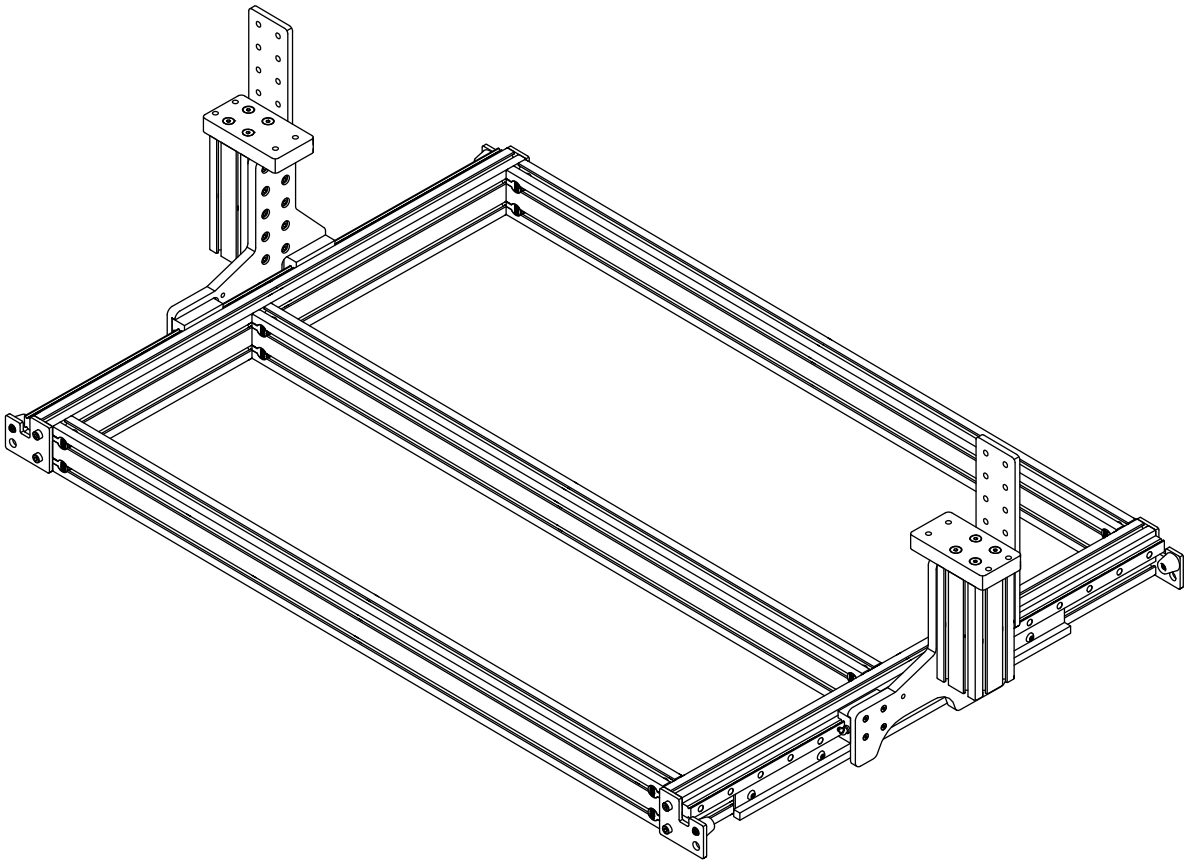
- Tighten the indicated fasteners.



- Repeat these steps on the other side of the machine.

2

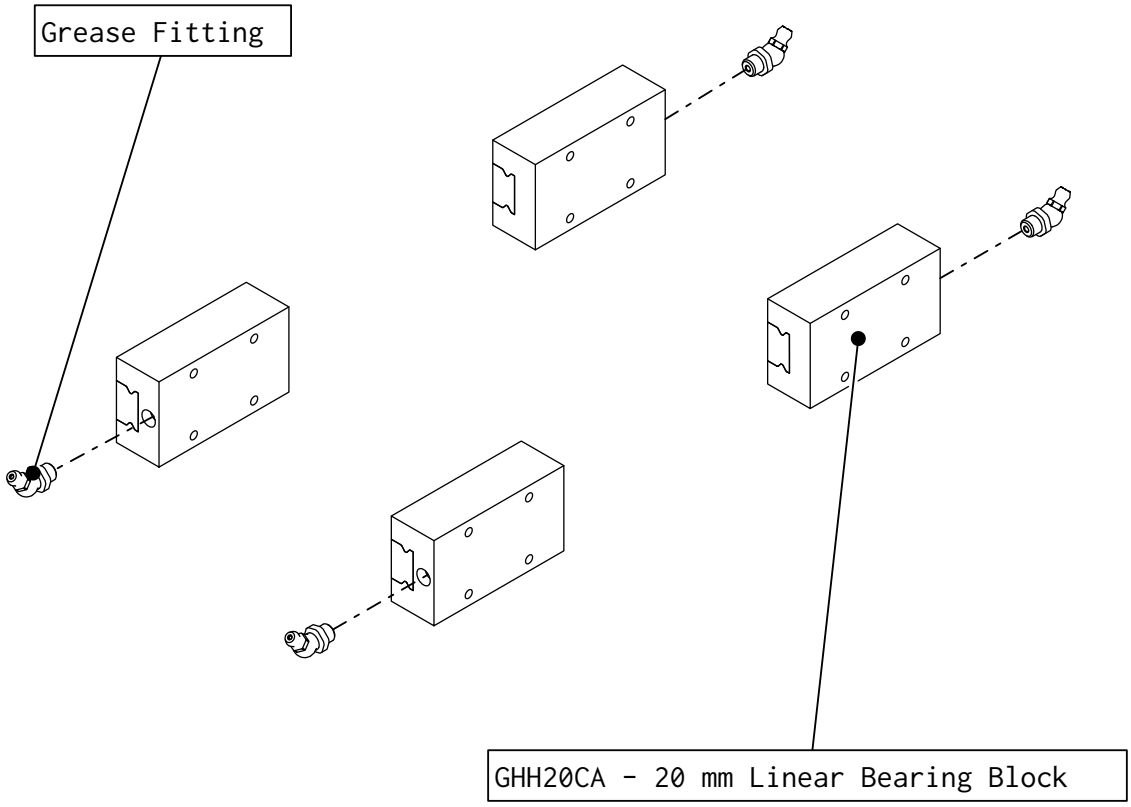
Riser Assembly



2.1 Linear Bearing Block Installation

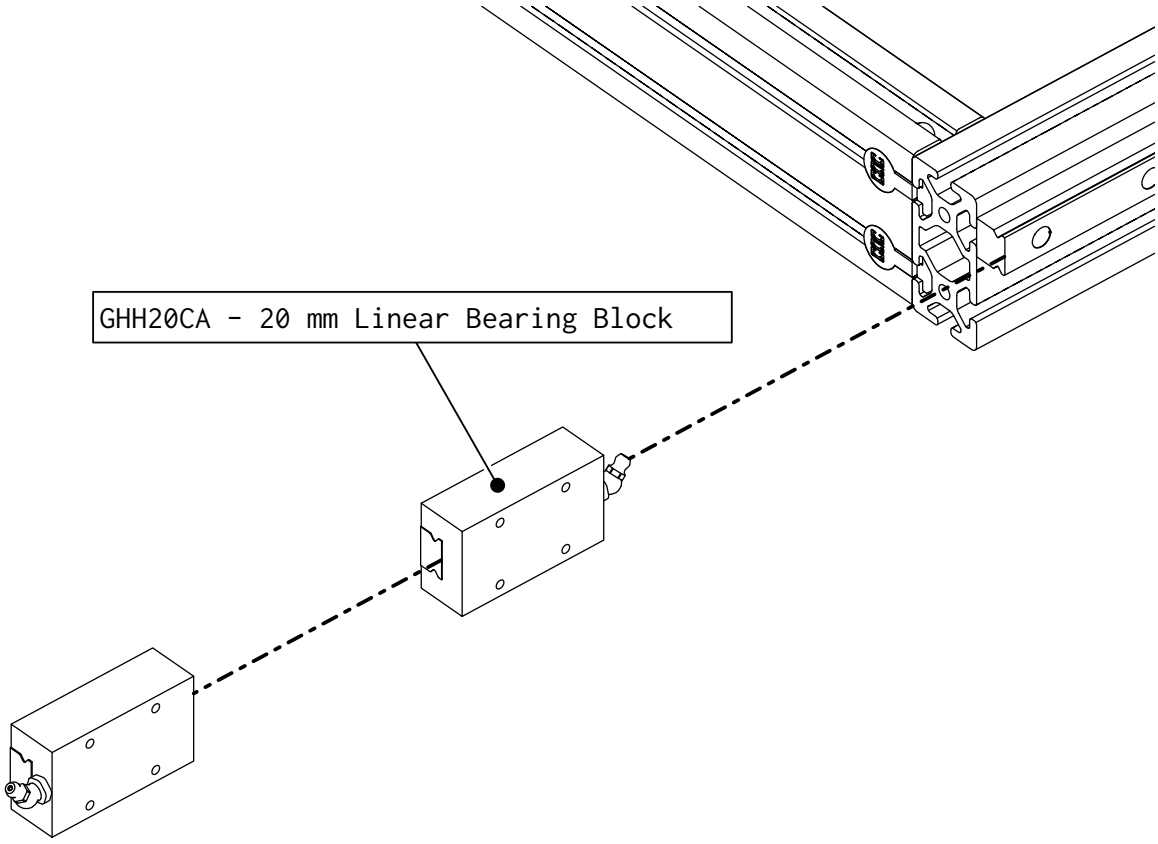
The following parts and bags will be used in this section:

- (4) Linear Bearing Block
- (1) Grease Gun



- Thread grease fittings into linear bearing blocks as indicated.
- Use a wrench to fully tighten the grease fittings.

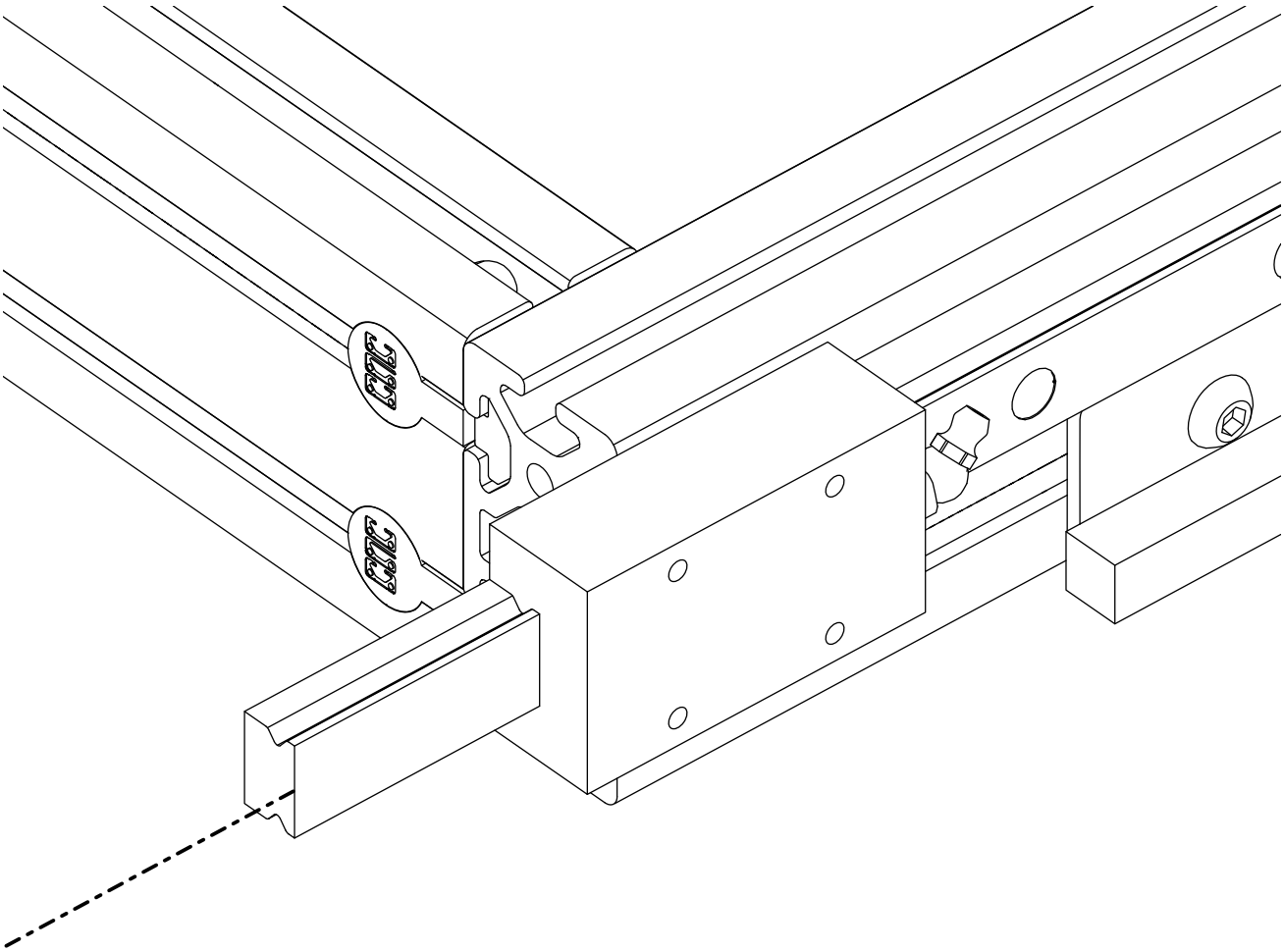
Note: Do not remove the plastic bearing retainers at this time.



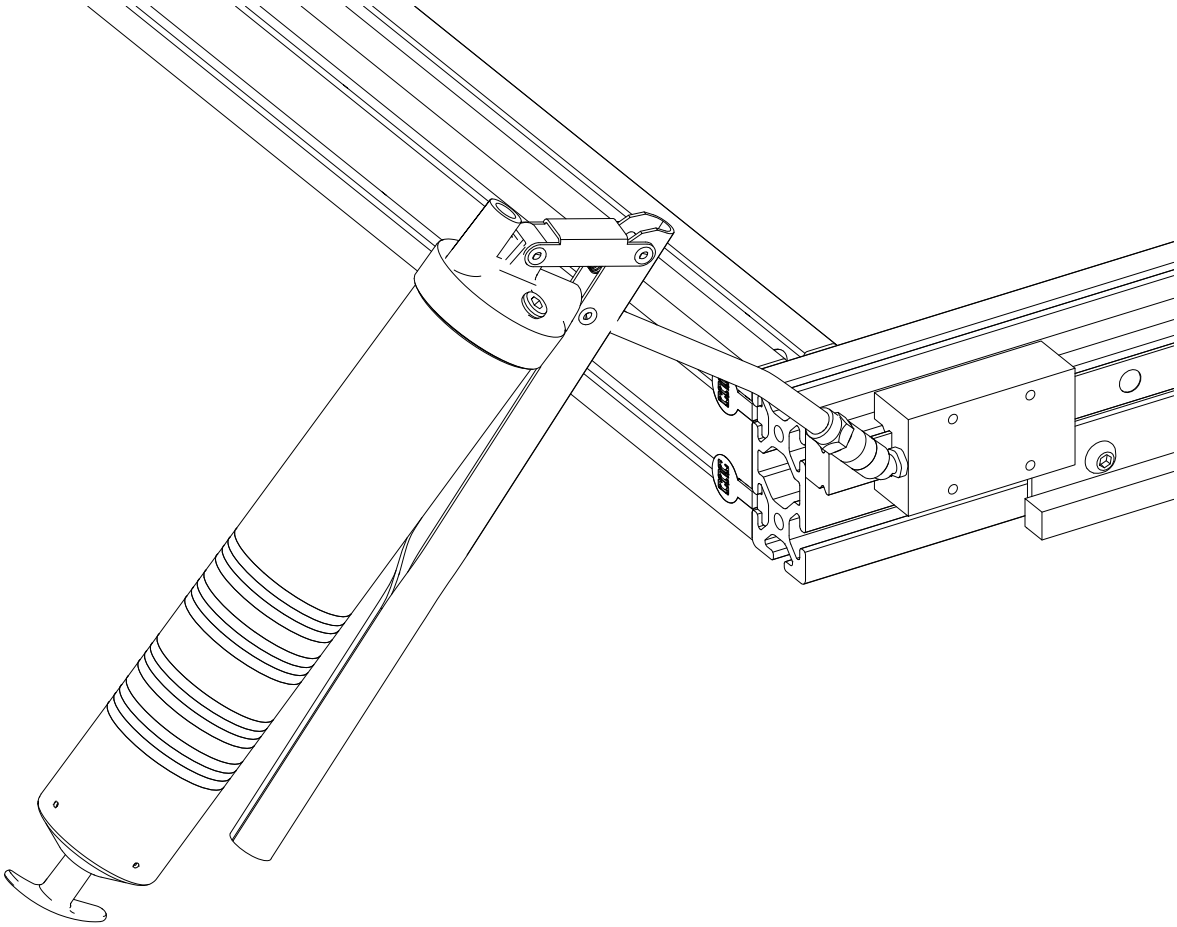
- Slide two linear bearing blocks onto a rail as pictured.

  Note: Ensure the grease fittings are oriented as pictured.

  Note: The blocks contain a plastic bearing retainer that should not be removed before installation. (See next page.)



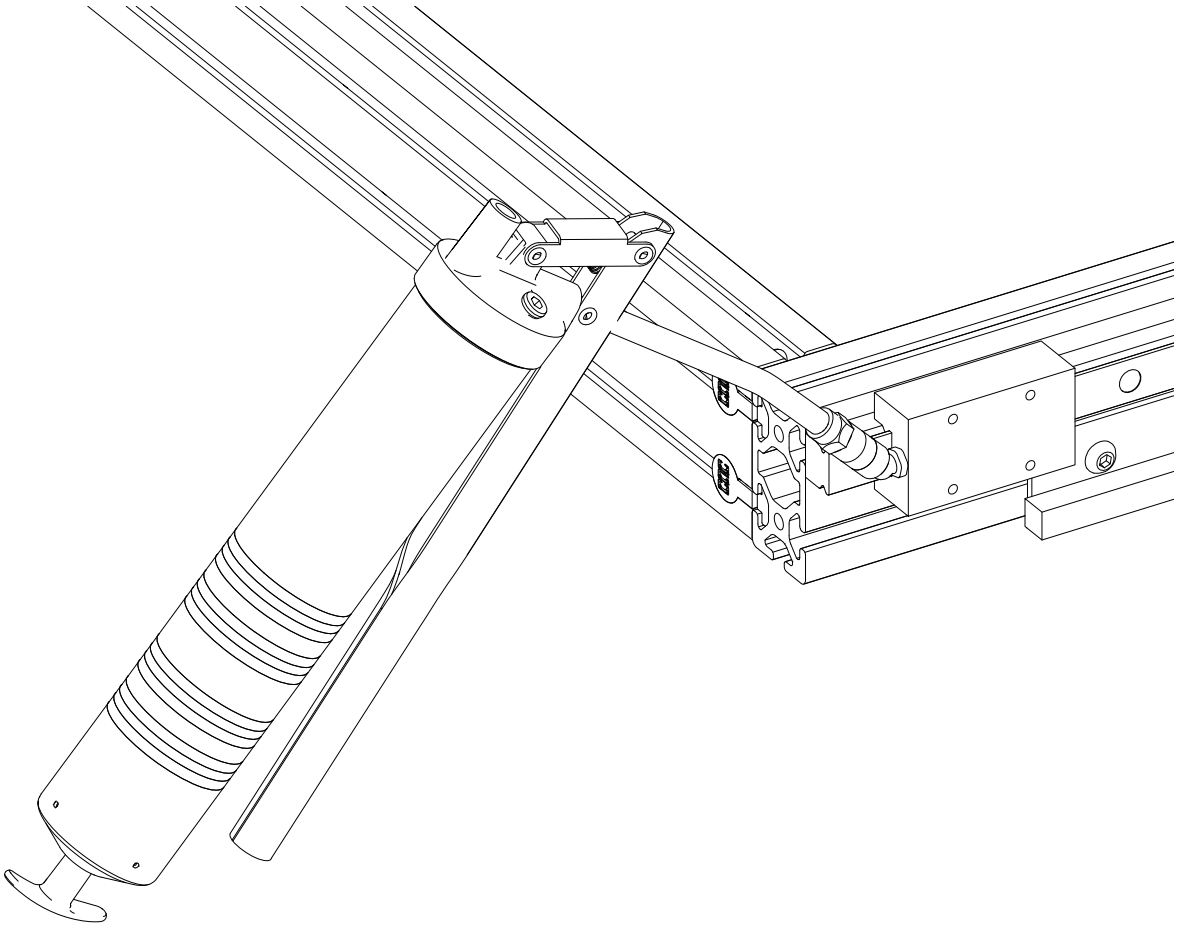
- Use the rail to push the plastic bearing retainer out of the block as indicated.



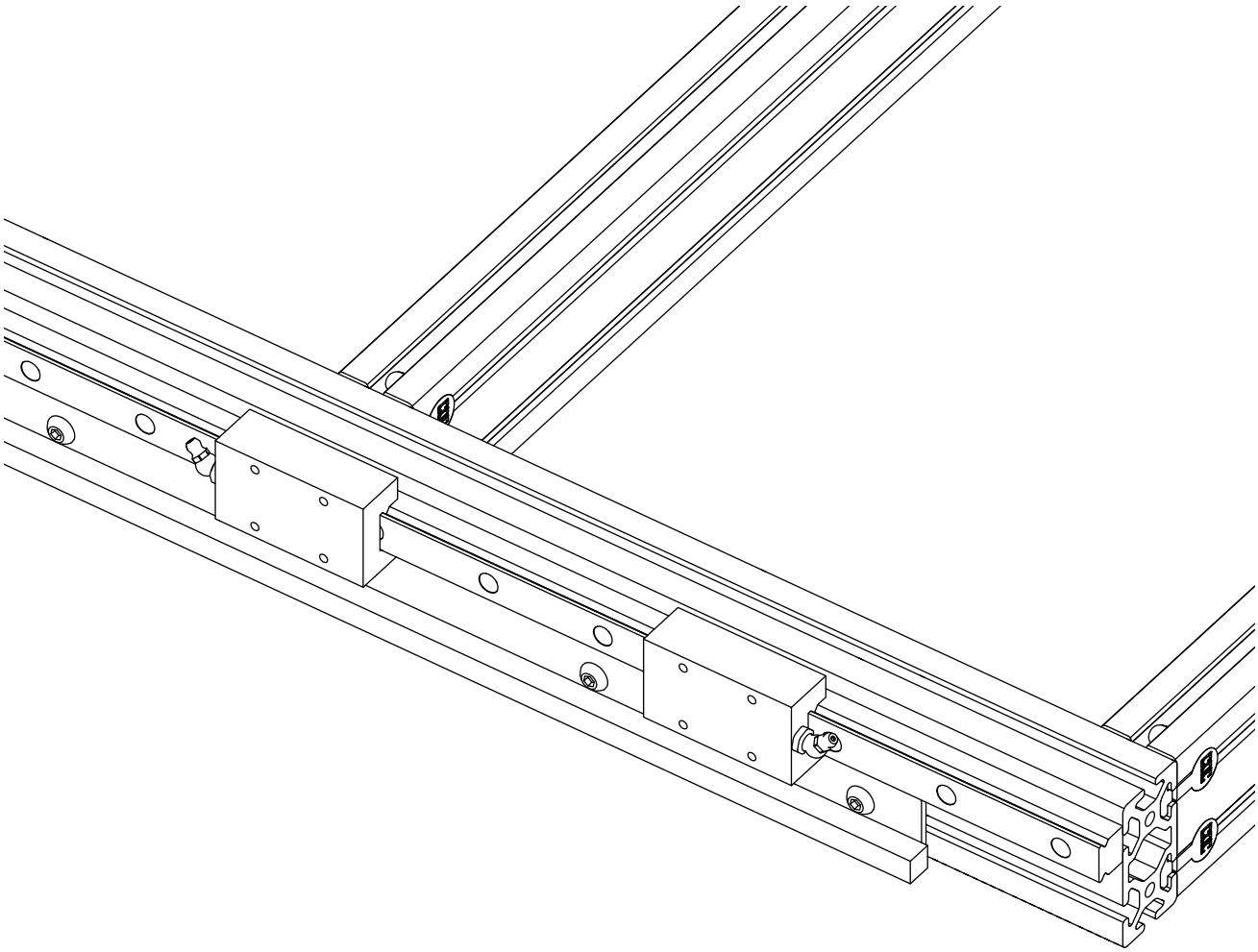
- Use the supplied grease gun to lubricate the bearing blocks with three pumps per block.
- Remove the gun from the fitting with a "tilt and twist" motion. A video demonstration is available at our website.

Note: Ensure the gun is primed before first use.

Note: Do not remove the grease gun from the grease fitting by pulling directly backwards.



Note: The blocks will need to be relubricated periodically. The required interval will depend on machine use, loads, and ambient conditions. We suggest evaluating each month by cleaning your 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.

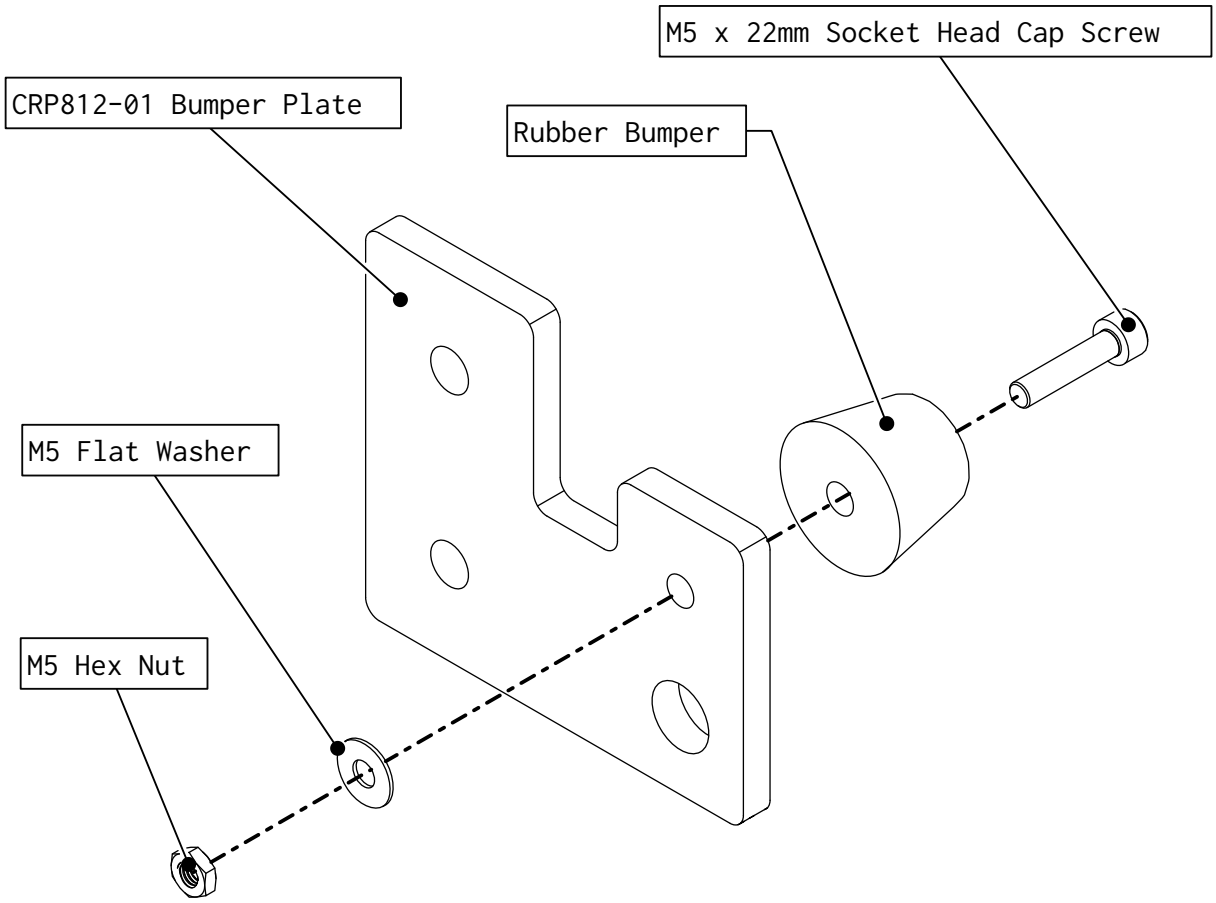


- Repeat this step on the other side of the machine.

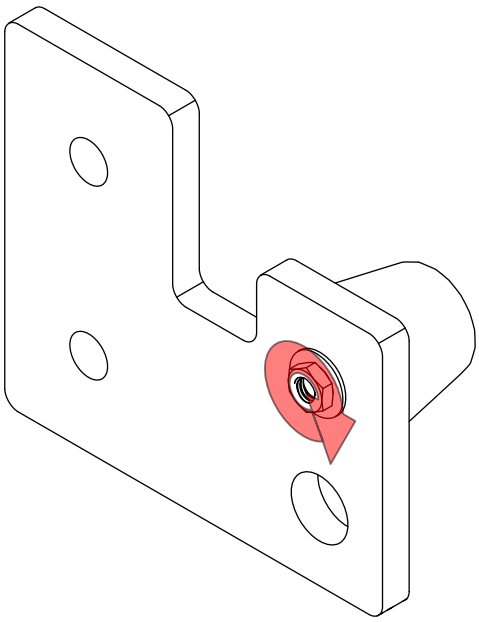
2.2 Table Bumpers

The following parts and bags will be used in this section:

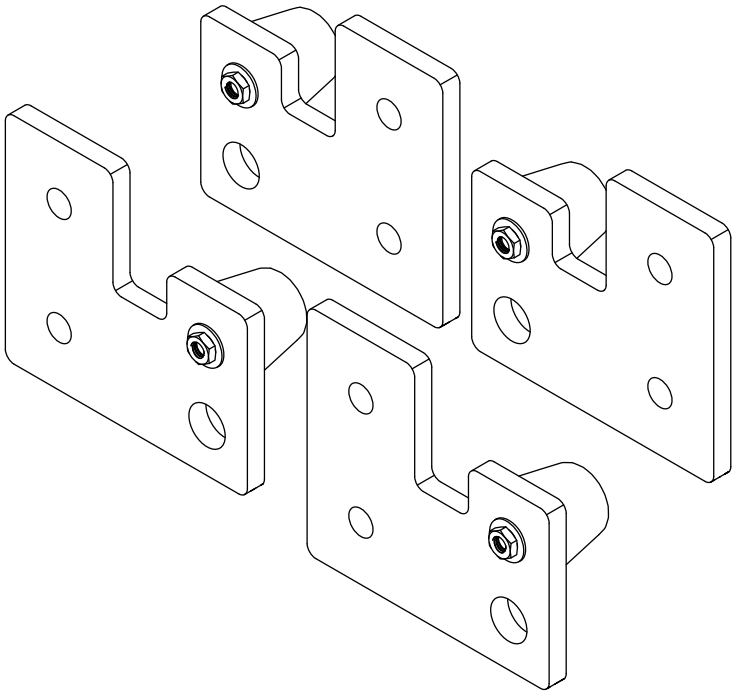
- (4) (CRP812-00) Pro Linear Table Axis Bumper Kit
  - (1) (CRP812-01) Pro Linear Table Axis Bumper Plate
  - (1) M5 x 22mm Socket Head Cap Screw
  - (1) 10-32 Flat Washer
  - (1) M5 Hex Nut
  - (1) Rubber Bumper
  - (2) M8 x 20mm Socket Head Cap Screw



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

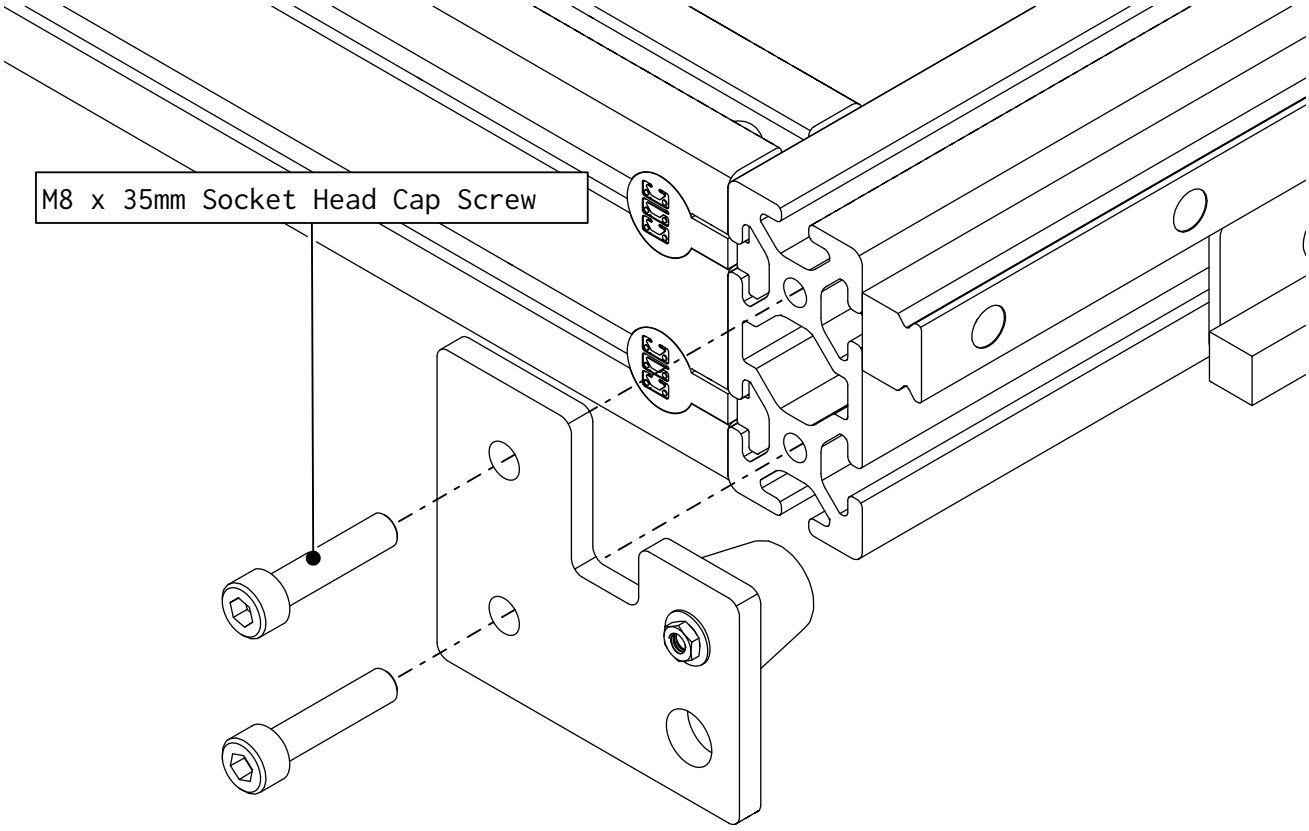


- Tighten the indicated fastener.

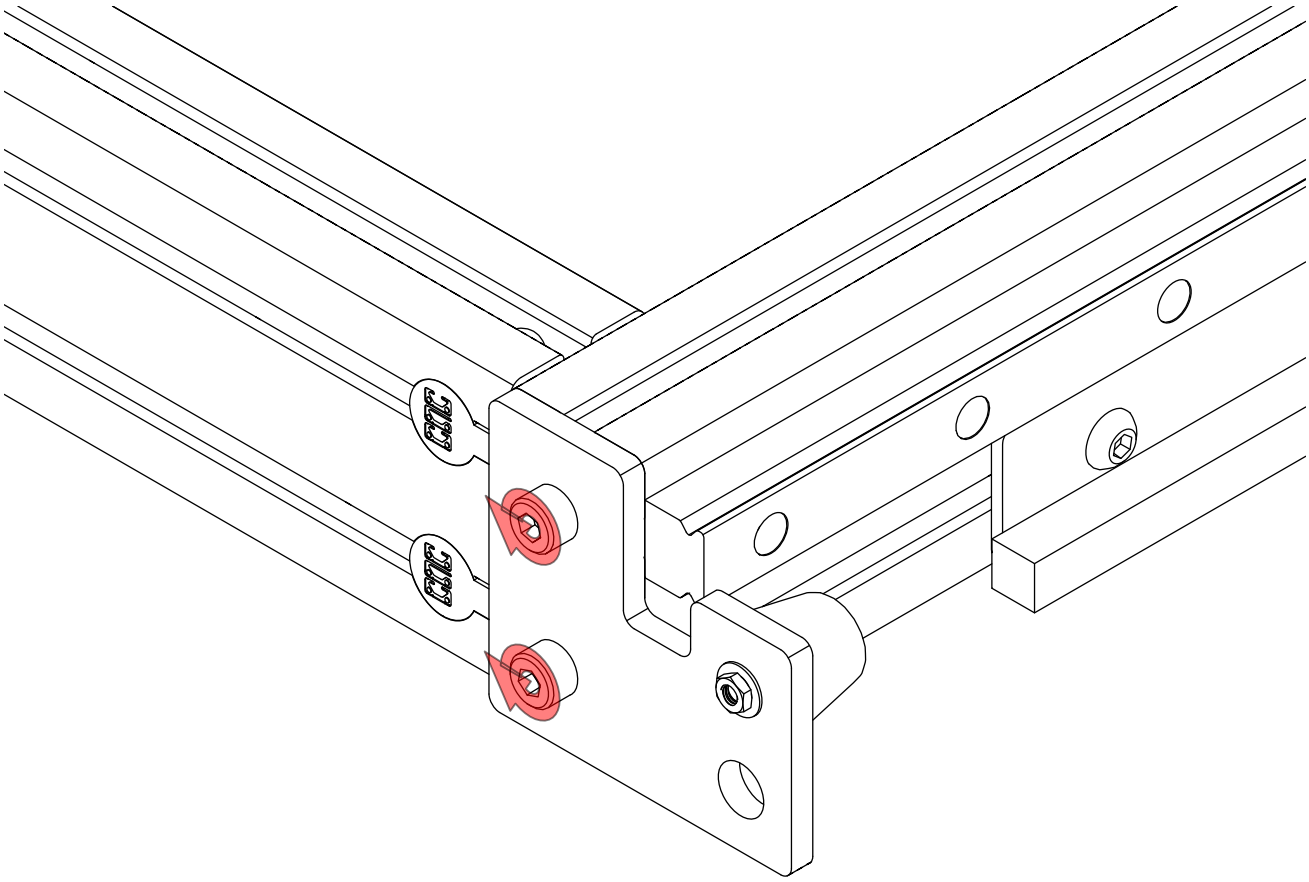


- Repeat the previous steps for the remaining bumpers.

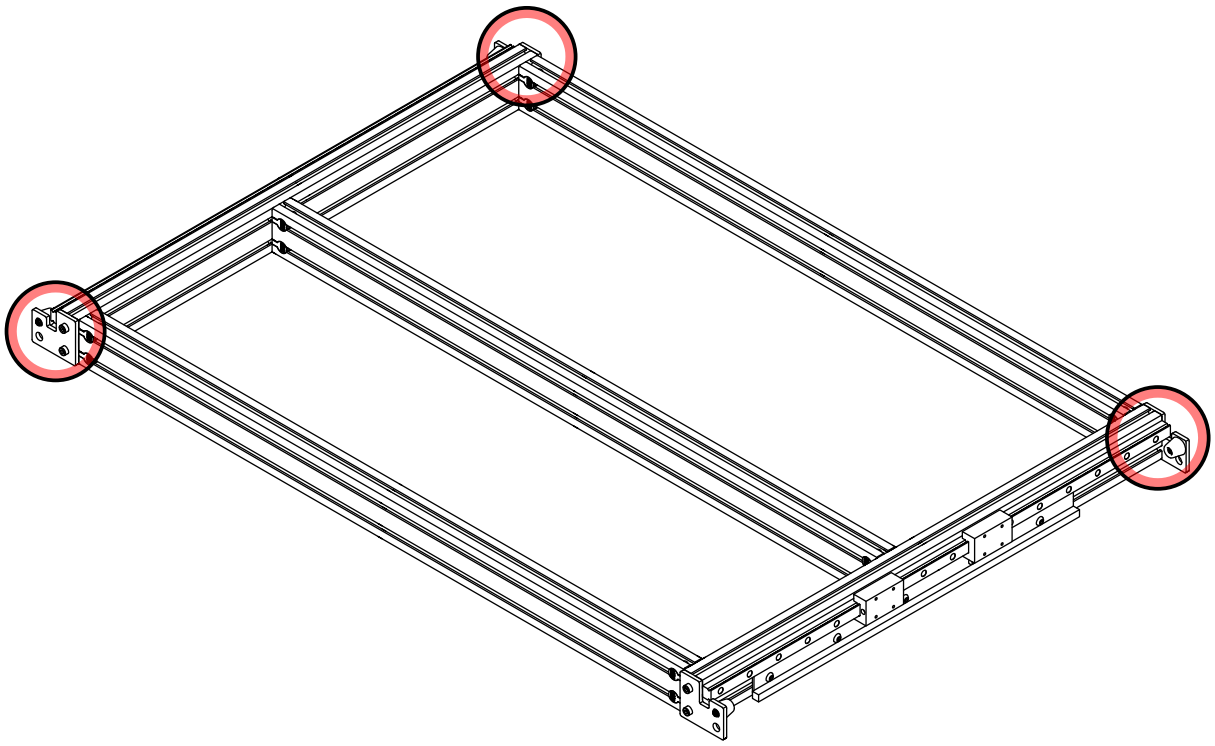
  Note: Two of the bumpers are assembled in a mirrored configuration.



- Install a bumper to the extrusion as indicated.



- Tighten the highlighted fasteners.

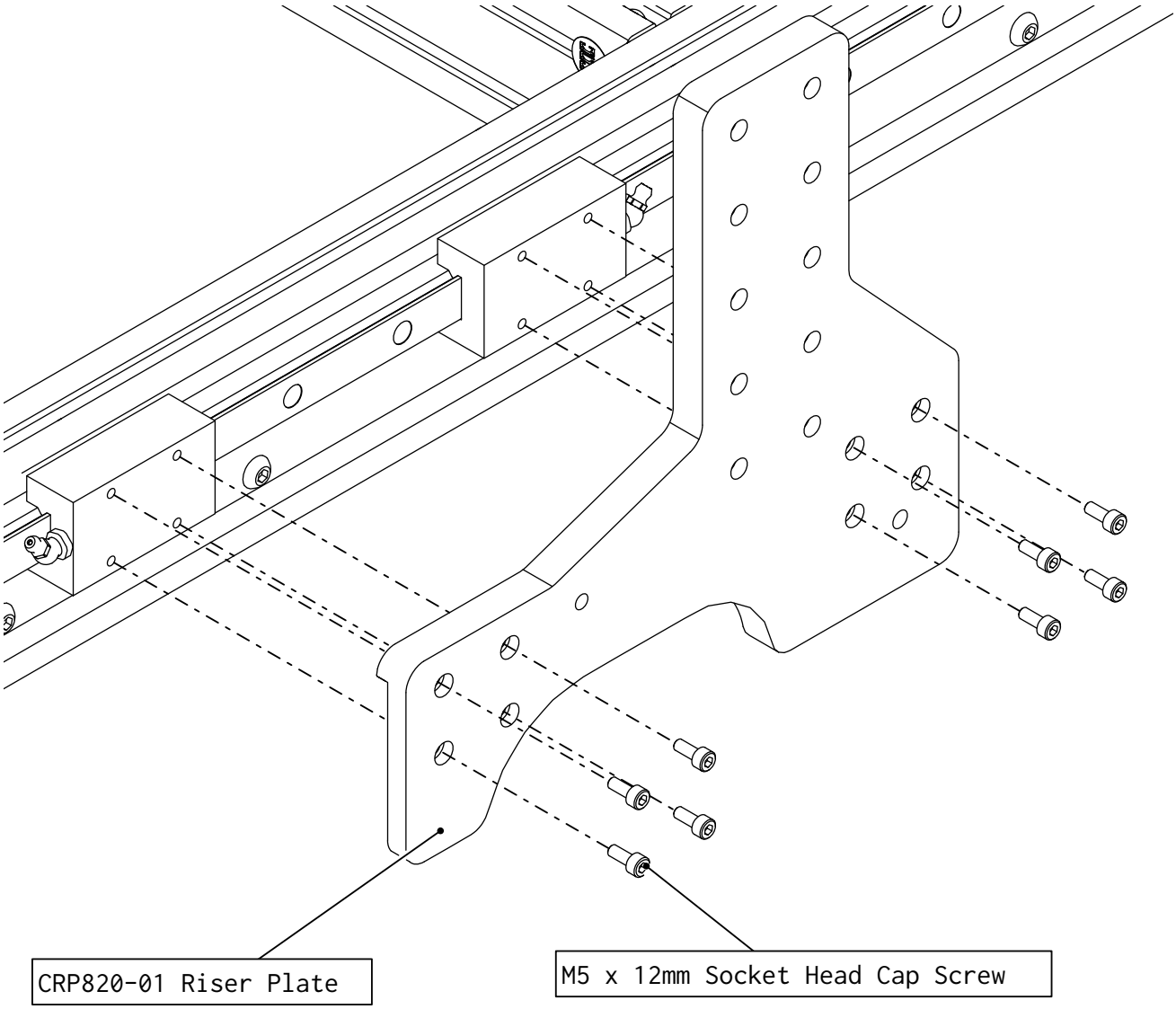


- Install bumpers at the remaining the locations.

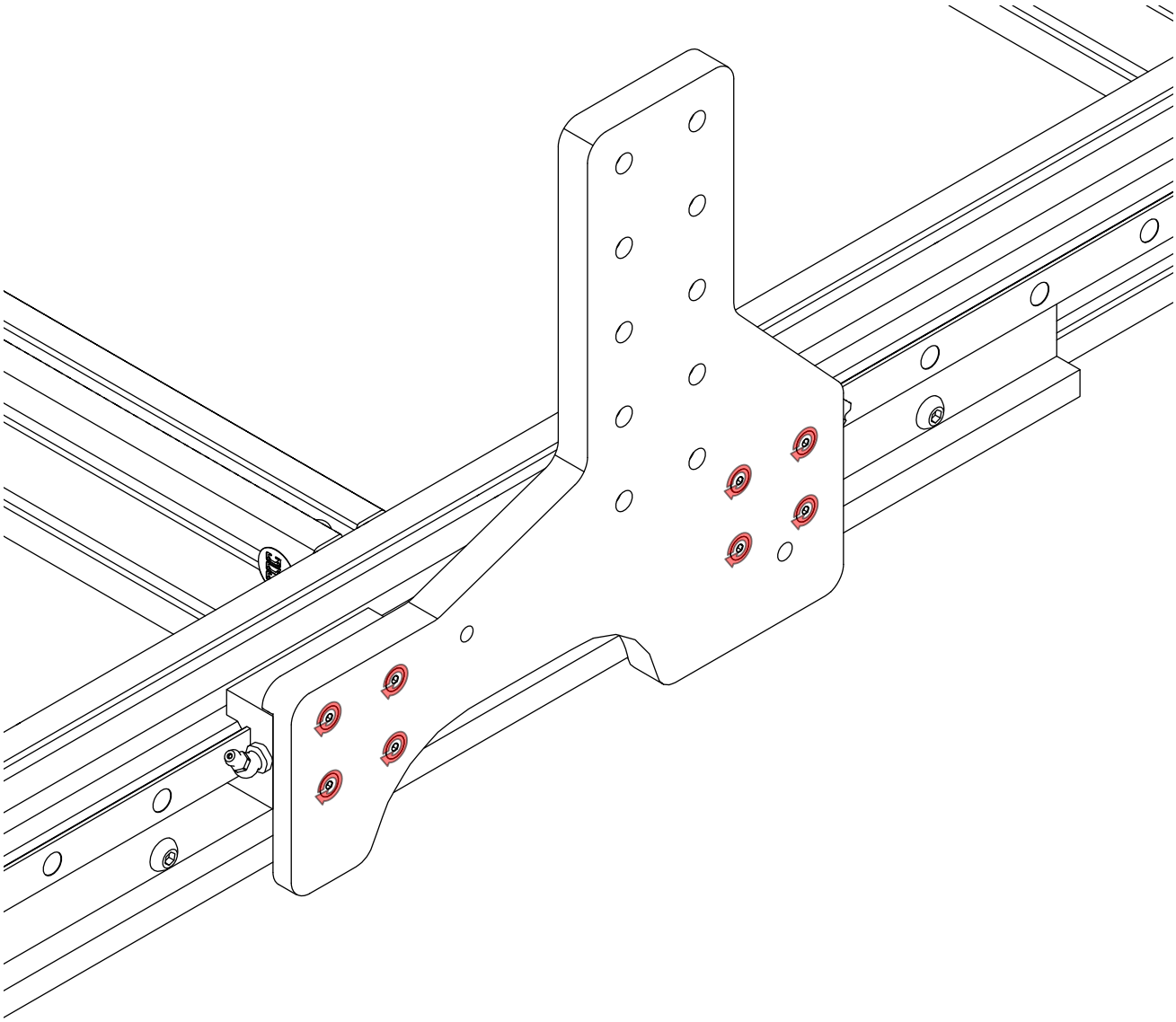
2.3 Risers

The following parts and bags will be used in this section:

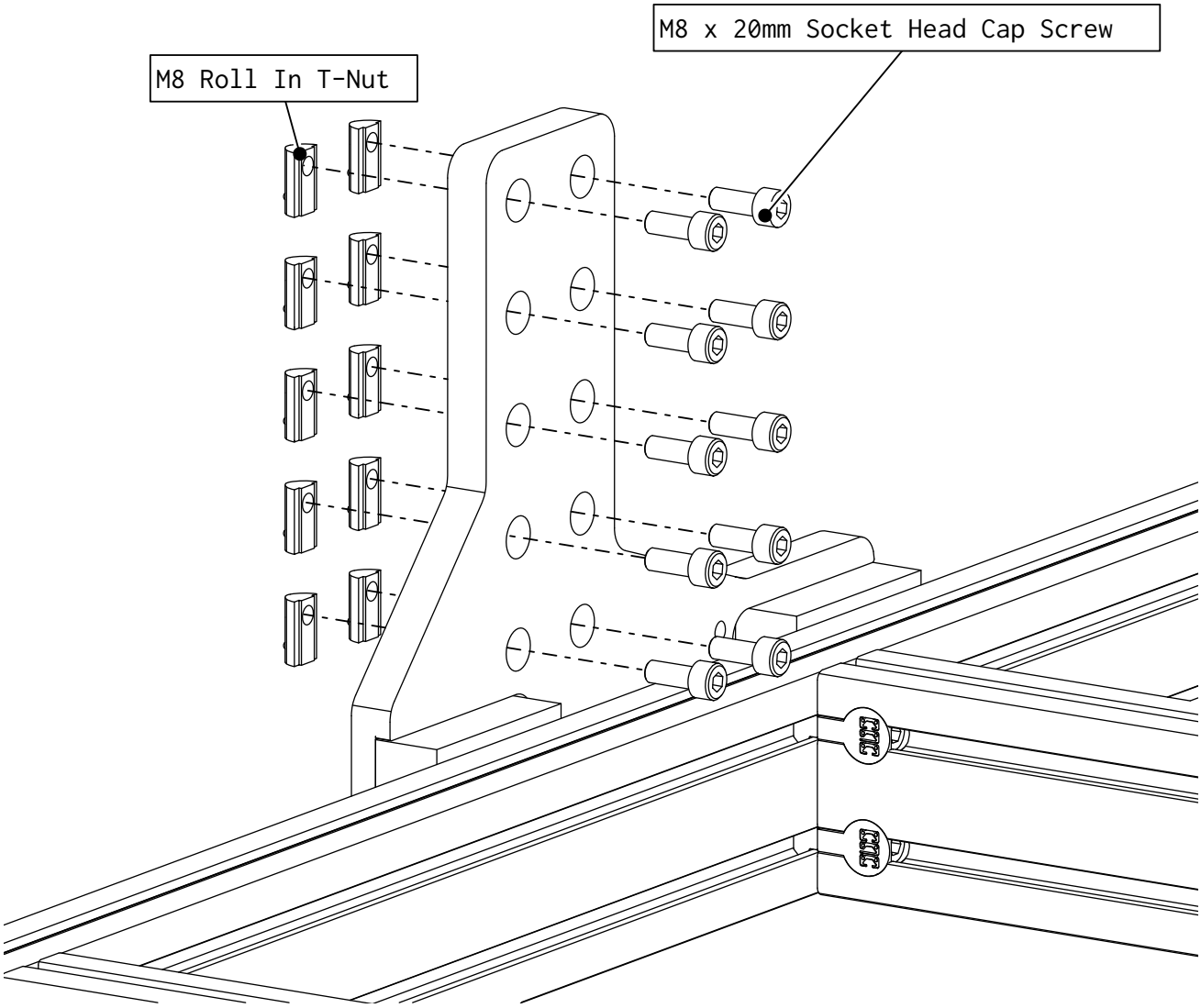
- (1) (CRP820-00-FAST) PRO Linear Riser Assembly Fasteners
  - (8) M8 x 35mm Flat Head Screw
  - (16) M5 x 12mm Socket Head Cap Screw
  - (32) M8 x 20mm Socket Head Cap Screw
  - (32) M8 Roll-in T-nut
- (2) (CRP820-02) Riser to Gantry Interface Plate
- (1) (CRP820-01L) Linear Riser Plate, Left
- (1) (CRP820-01R) Linear Riser Plate, Right
- (2) 8080 Extrusion, 200mm
- (2) (CRP820-10) Riser Joining Plate



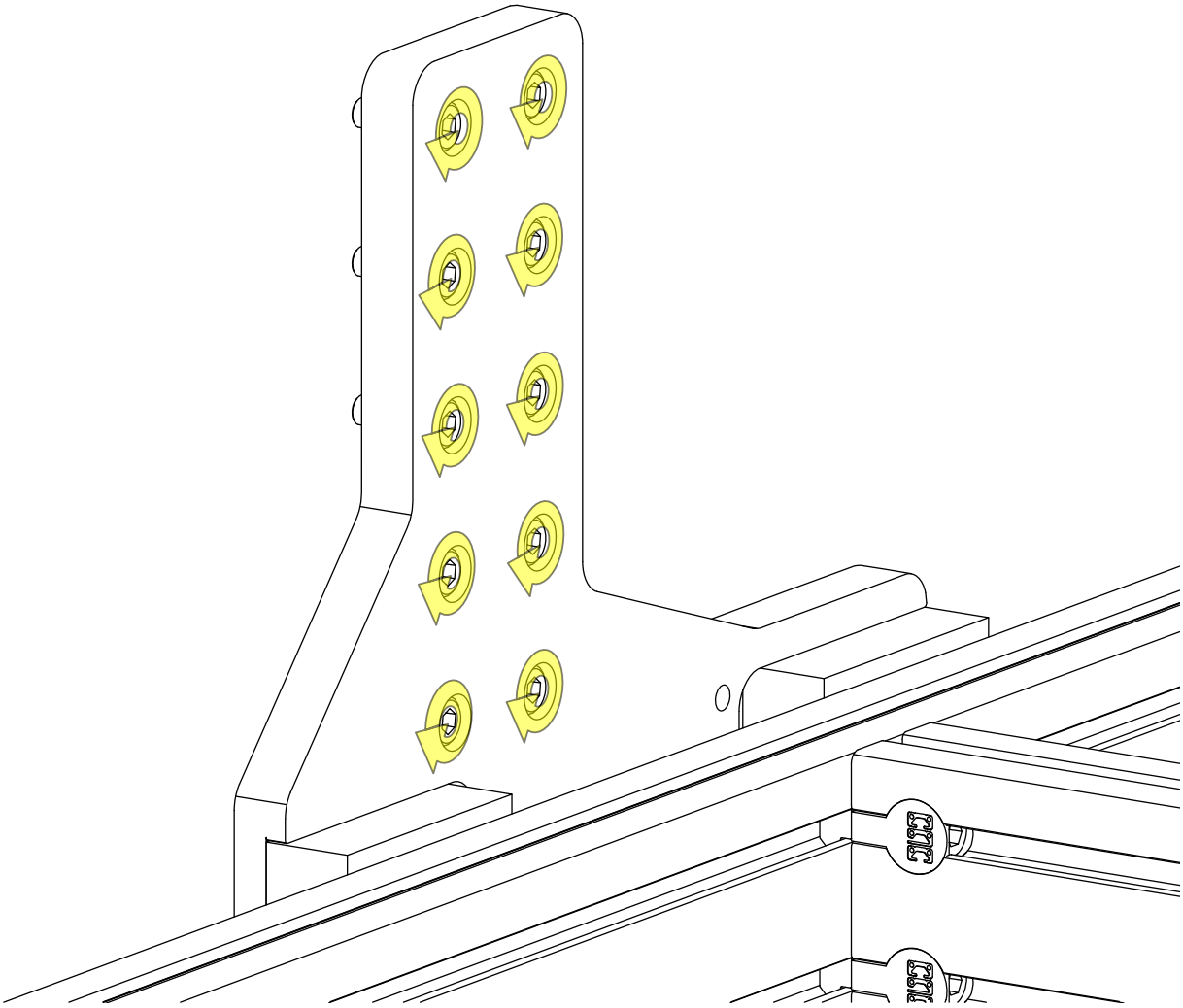
- Install a riser onto the linear bearing blocks as indicated.



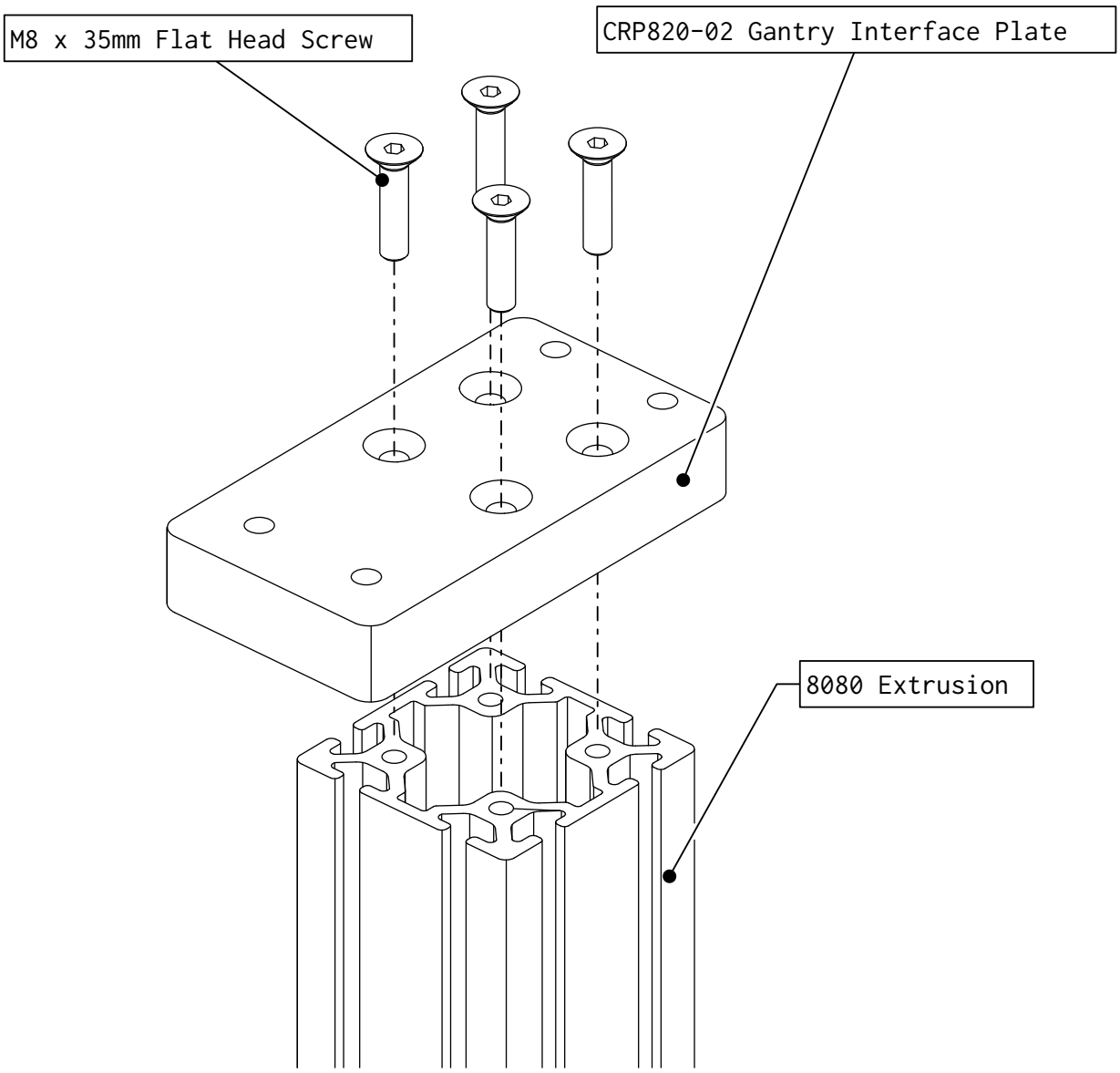
- Tighten the highlighted fasteners.



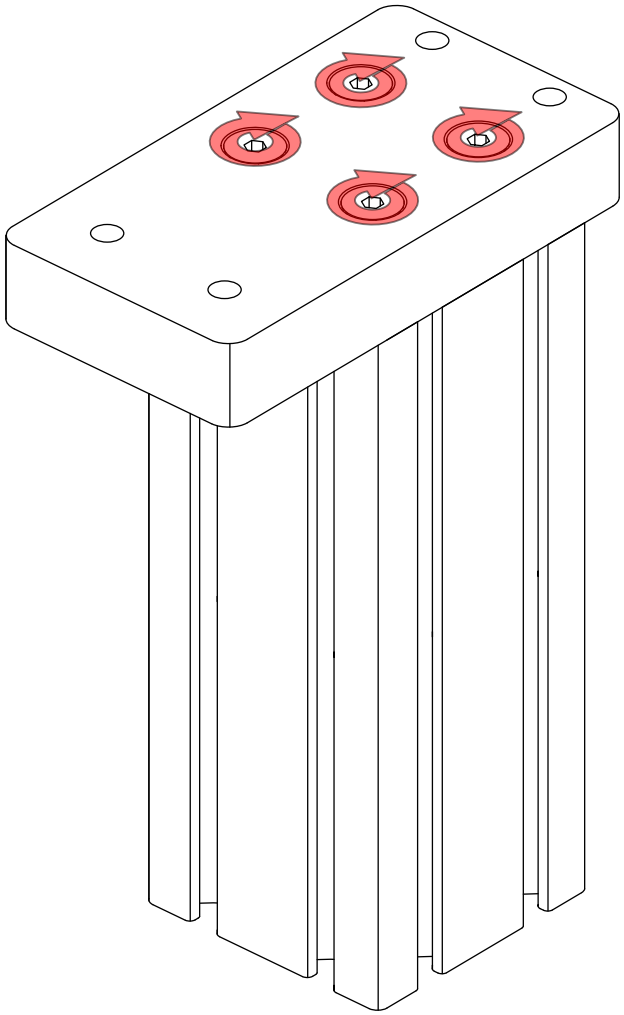
- Thread fasteners through the holes in the riser plate as indicated.



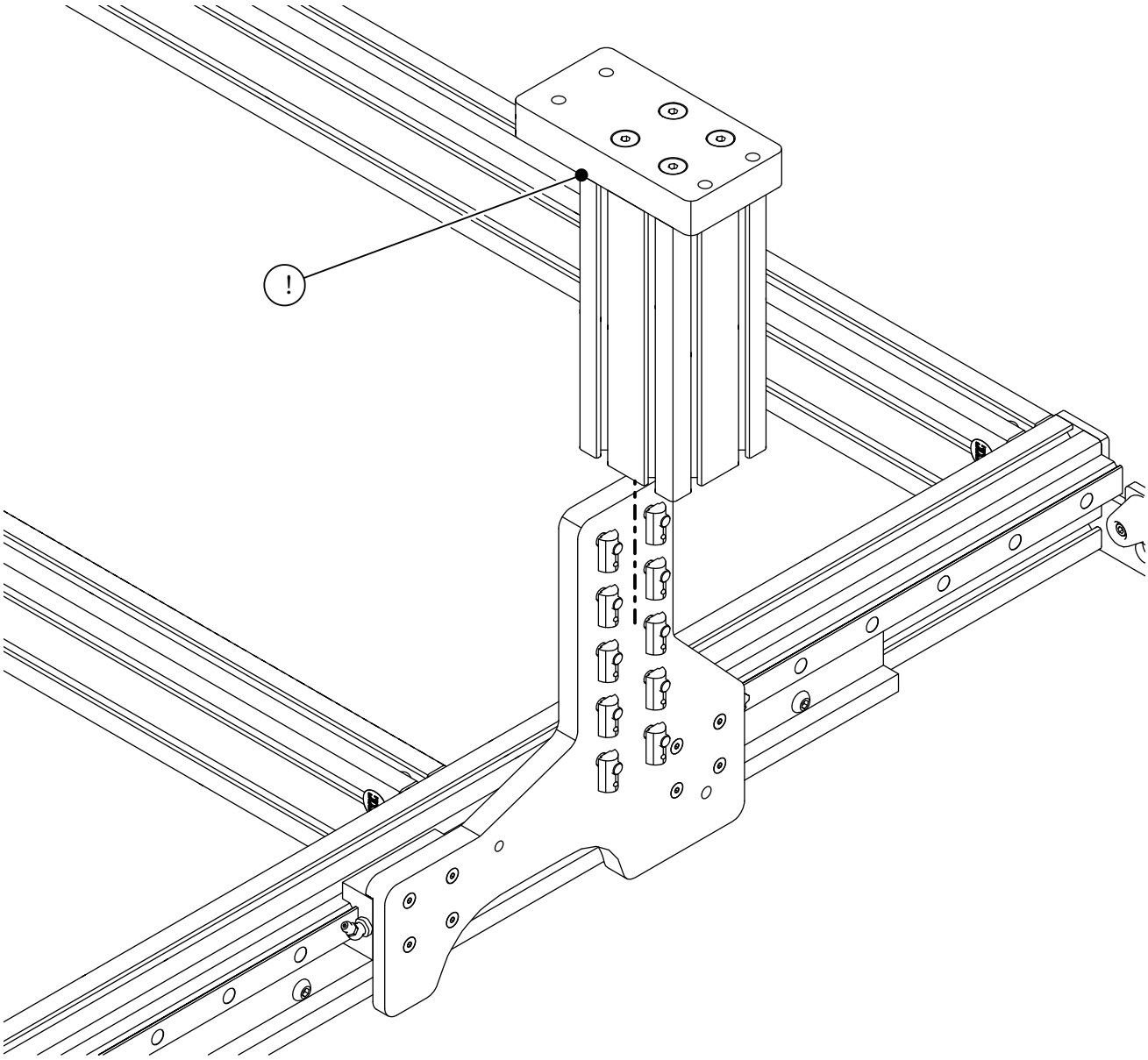
- Partially tighten the highlighted fasteners.



- Install a CRP820-02 Gantry Interface Plate to a piece of 8080 extrusion as indicated.

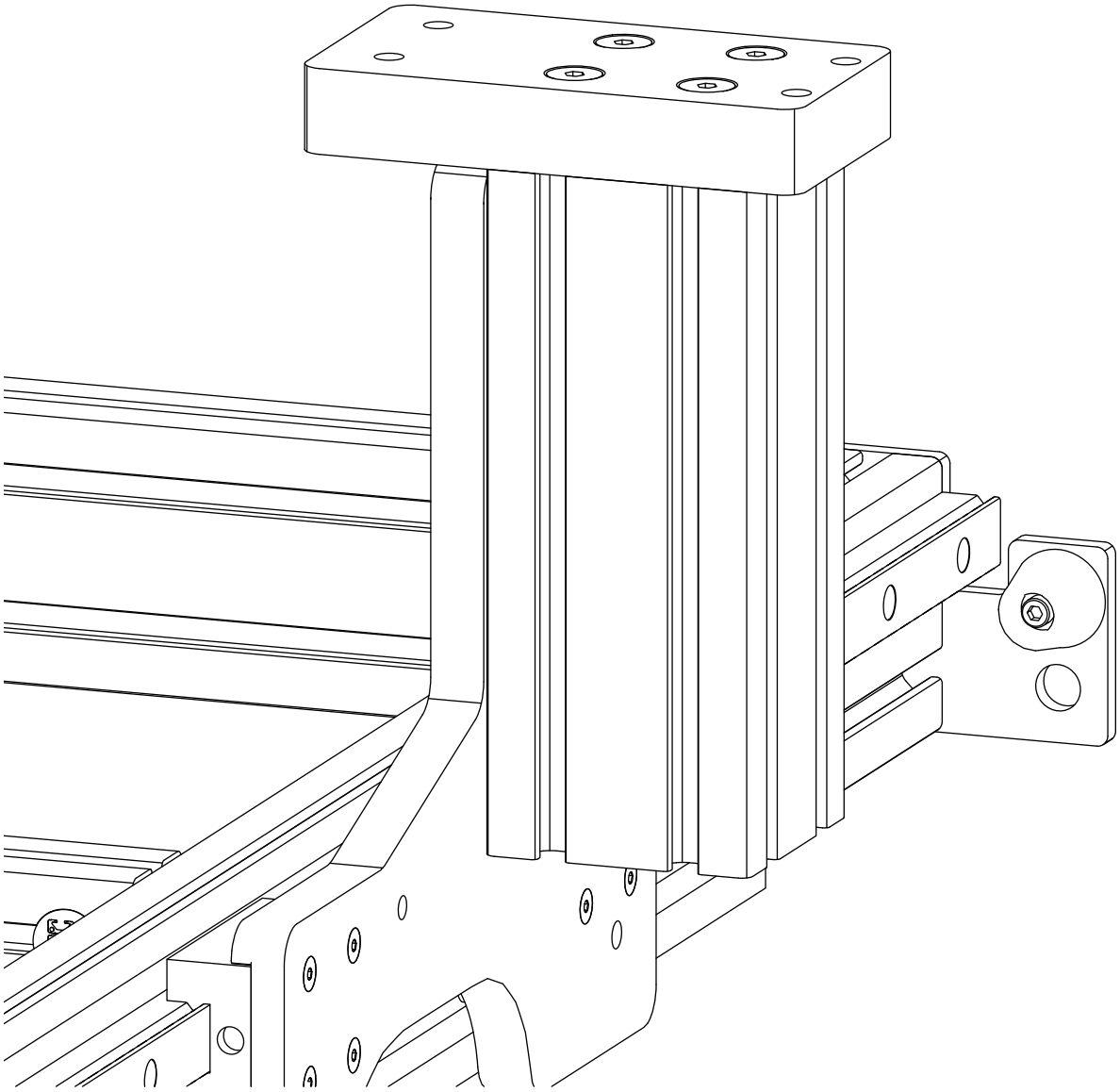


- Tighten the highlighted fasteners.

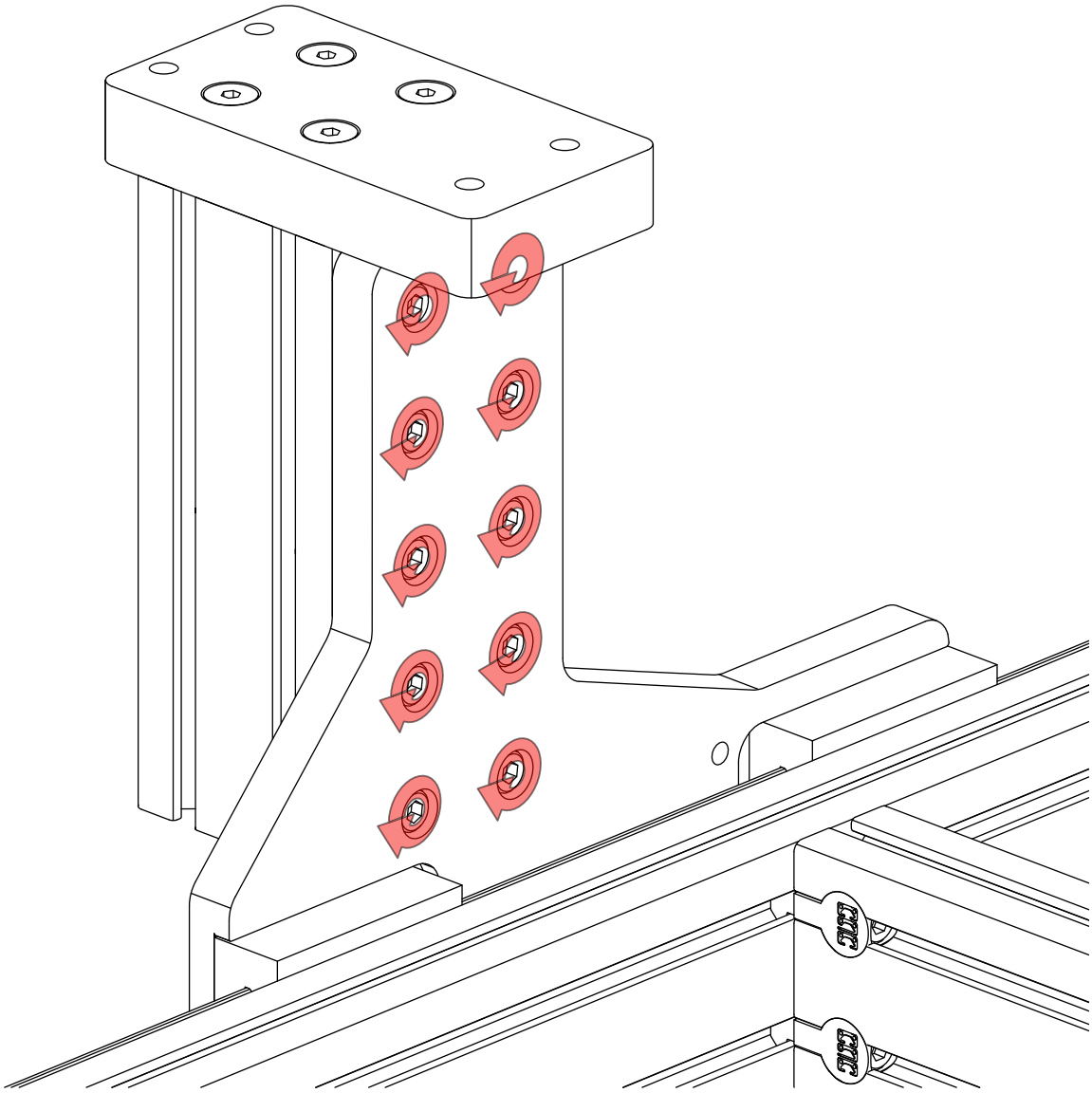


- Slide the extrusion assembly from the previous step onto the t-nuts on the riser plate.

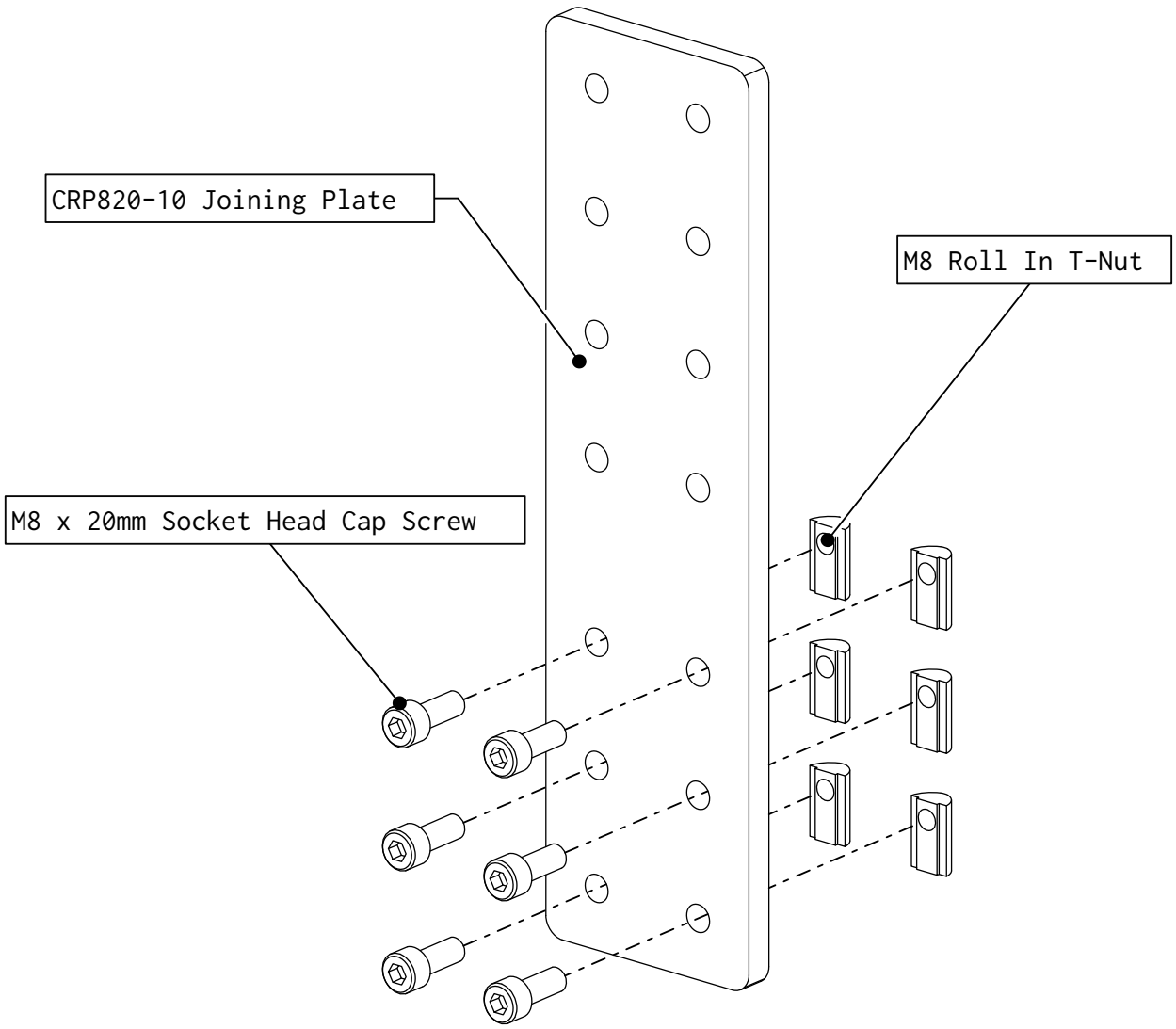
  Note: The long side of the Gantry Interface Plate should face the inside of the machine as indicated.



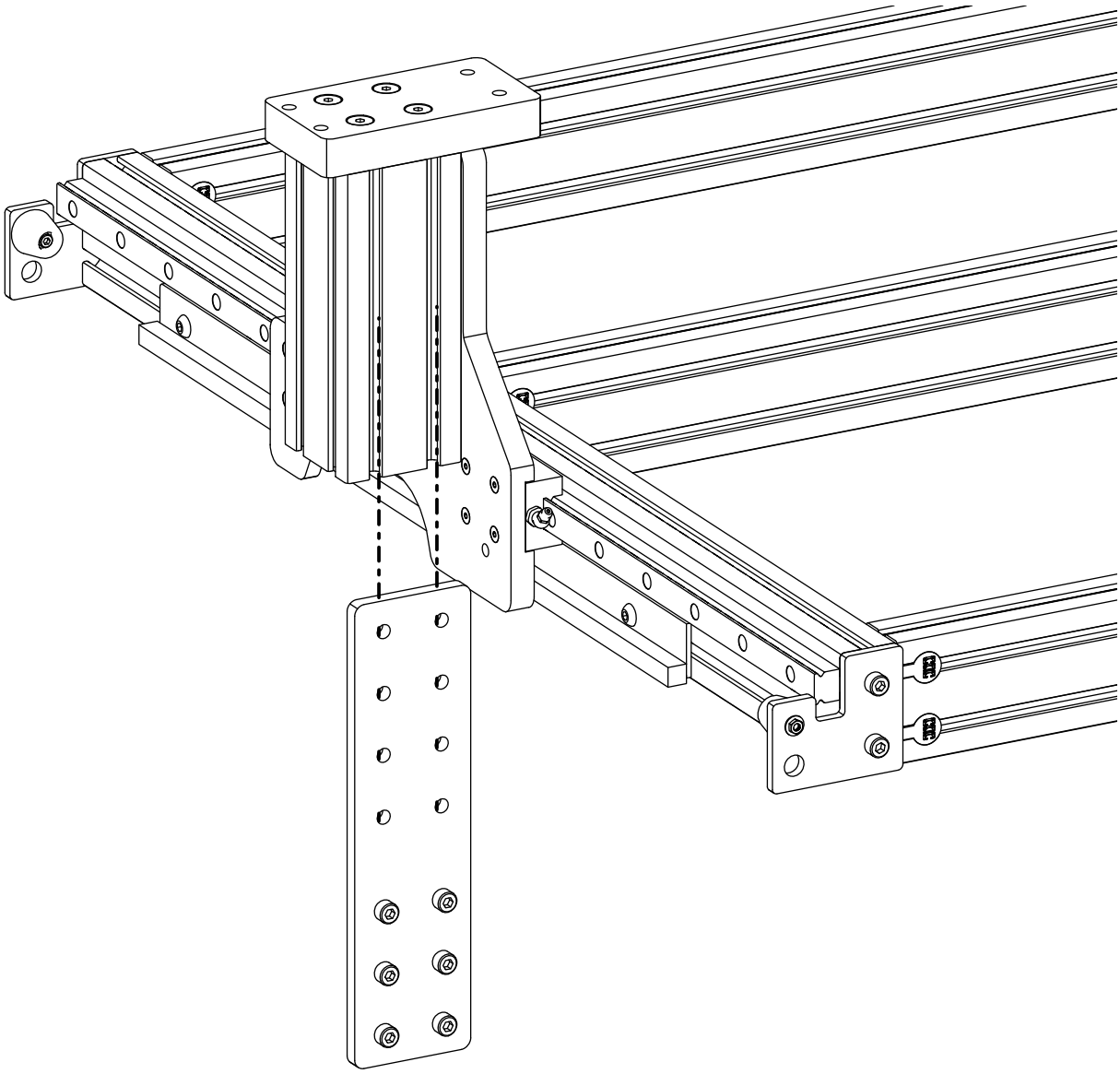
- Bring the Gantry Interface Plate flush with the top of the gantry plate



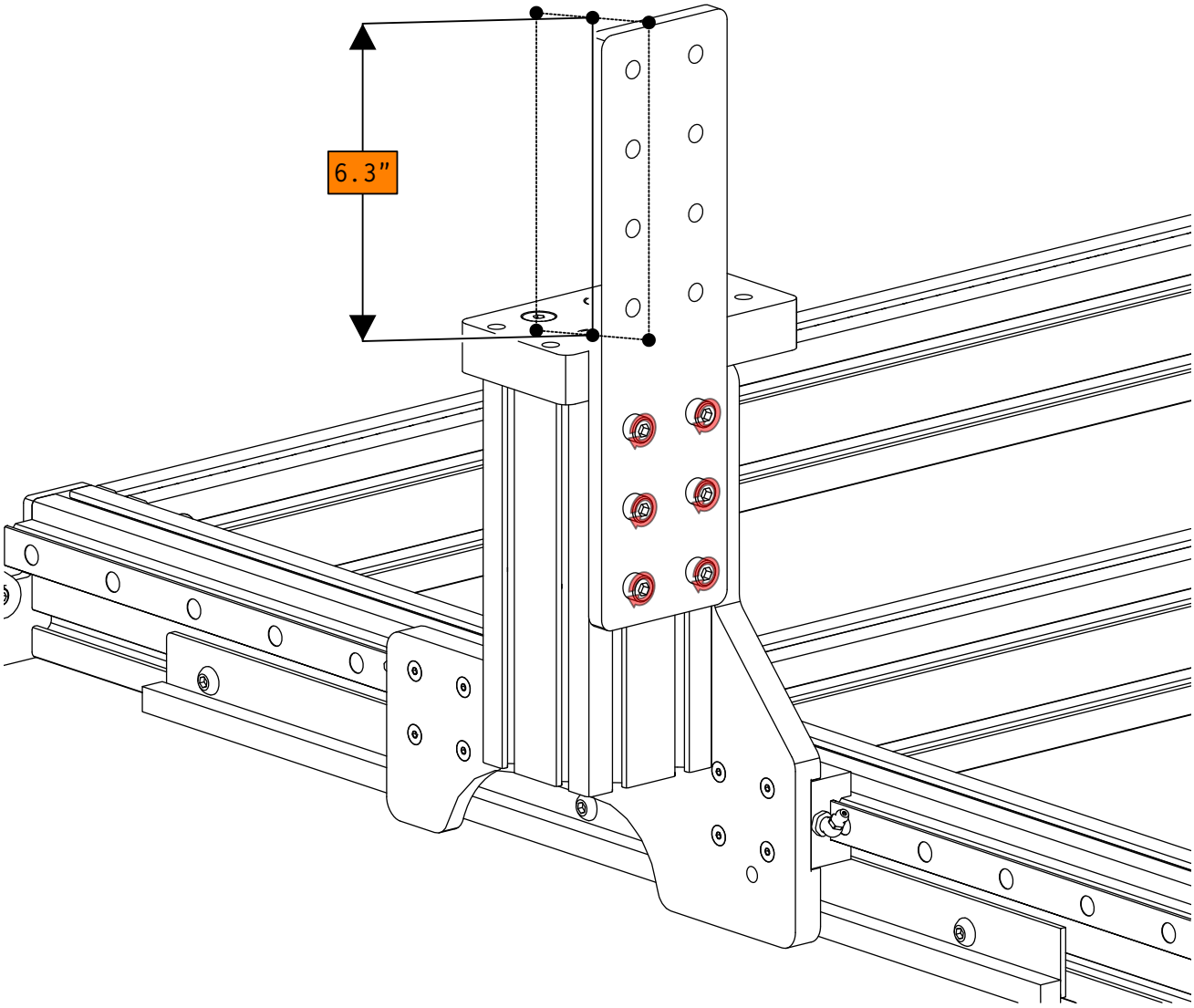
- Fully tighten the highlighted fasteners.



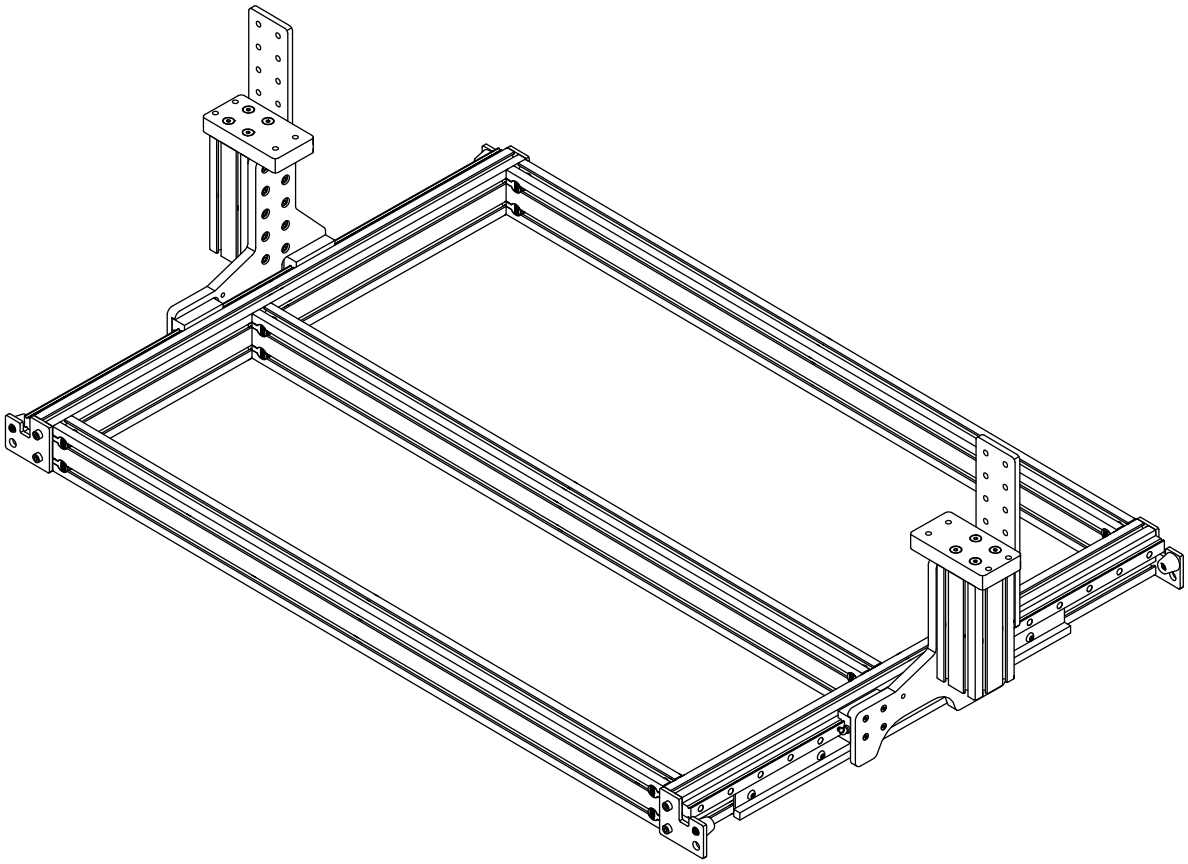
- Thread the indicated fasteners into the Riser Joining Plate.



- Slide the Joining Plate into the indicated t-slots.



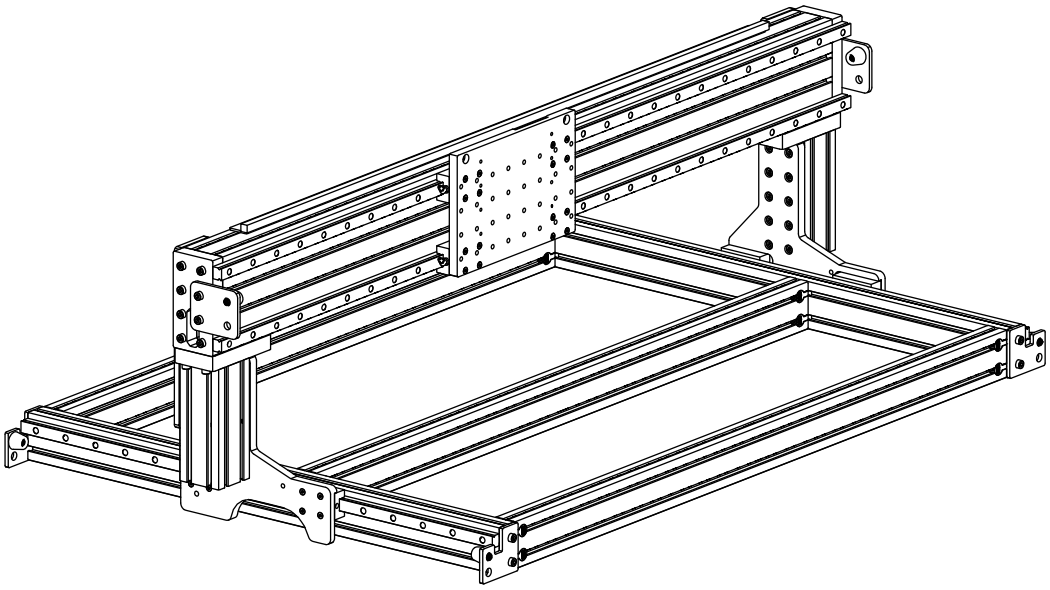
- Align the Joining Plate so that it is 6.3" (160mm) above the riser plate as indicated.
- Tighten the highlighted fasteners.



- Repeat these steps on the other side of the machine.

3

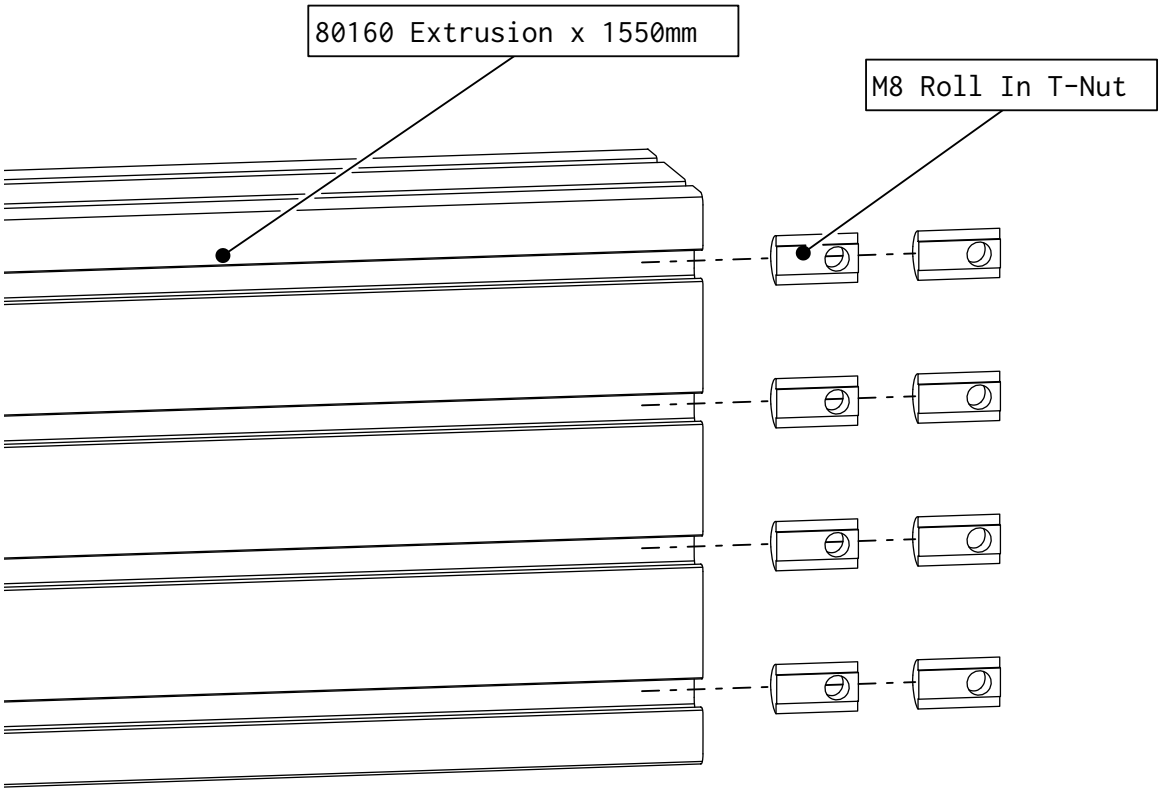
Gantry Assembly



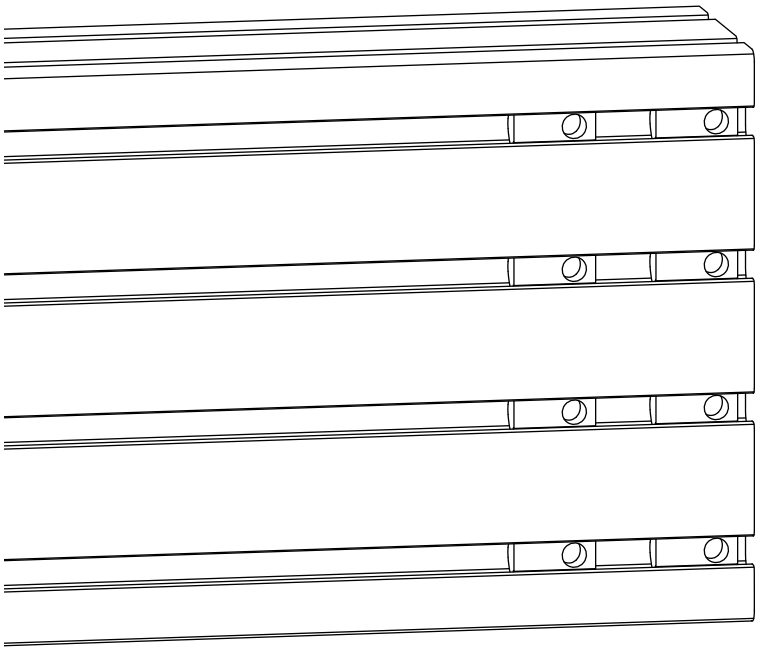
3.1 Gantry Extrusion Installation

The following parts and bags will be used in this section:

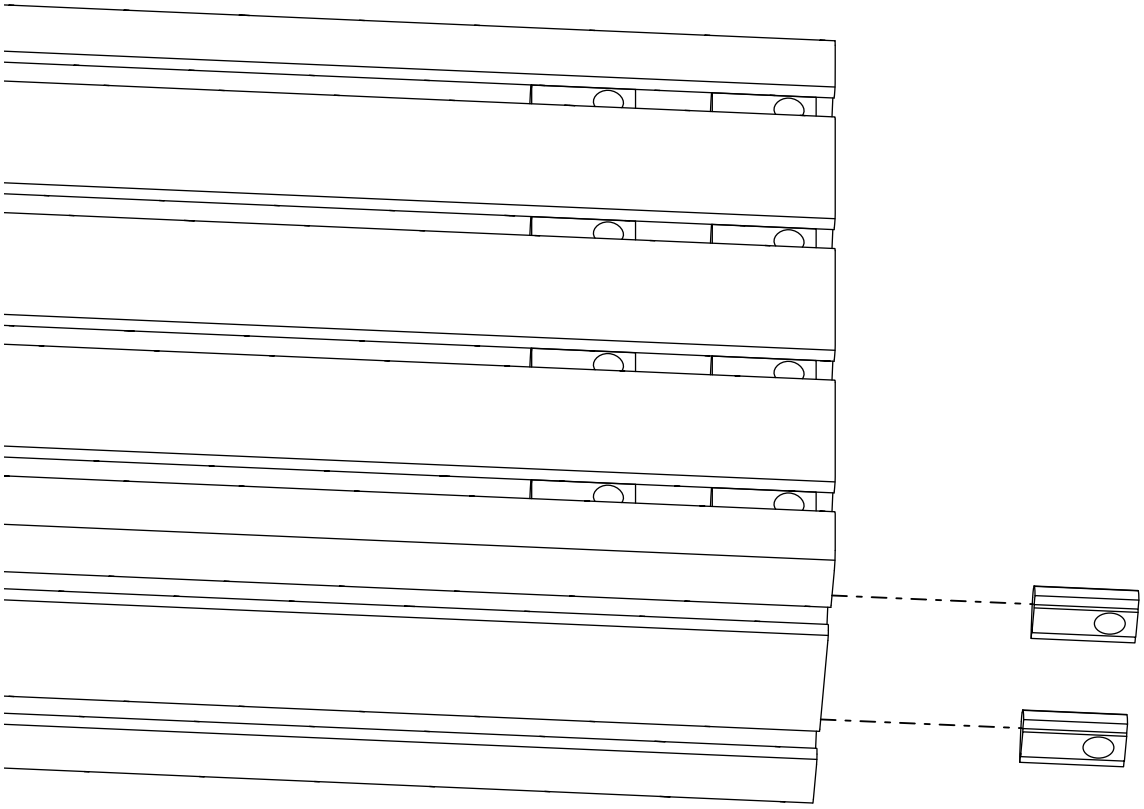
- (1) 80160 - 1550mm
- (1) (CRP820-00-FAST) PRO Linear Riser Assembly Fasteners
  - (8) M8 x 35mm Socket Head Cap Screw
  - (16) M8 x 20mm Socket Head Cap Screw
  - (20) M8 Roll-in T-nut
- (1) (CRP833-00) Gantry End Cap Kit
  - (6) M8 x 35mm Socket Head Cap Screw
  - (1) (CRP830-03) Gantry End Cap



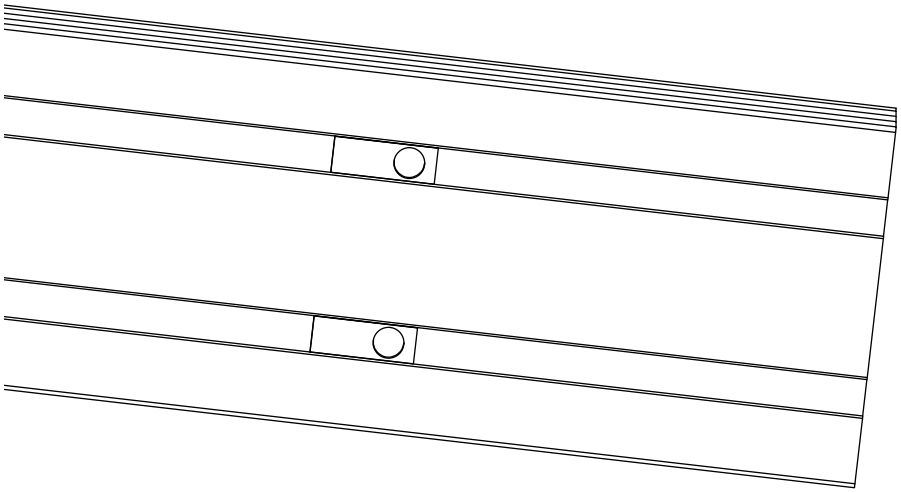
- Slide t-nuts into the indicated t-slots.



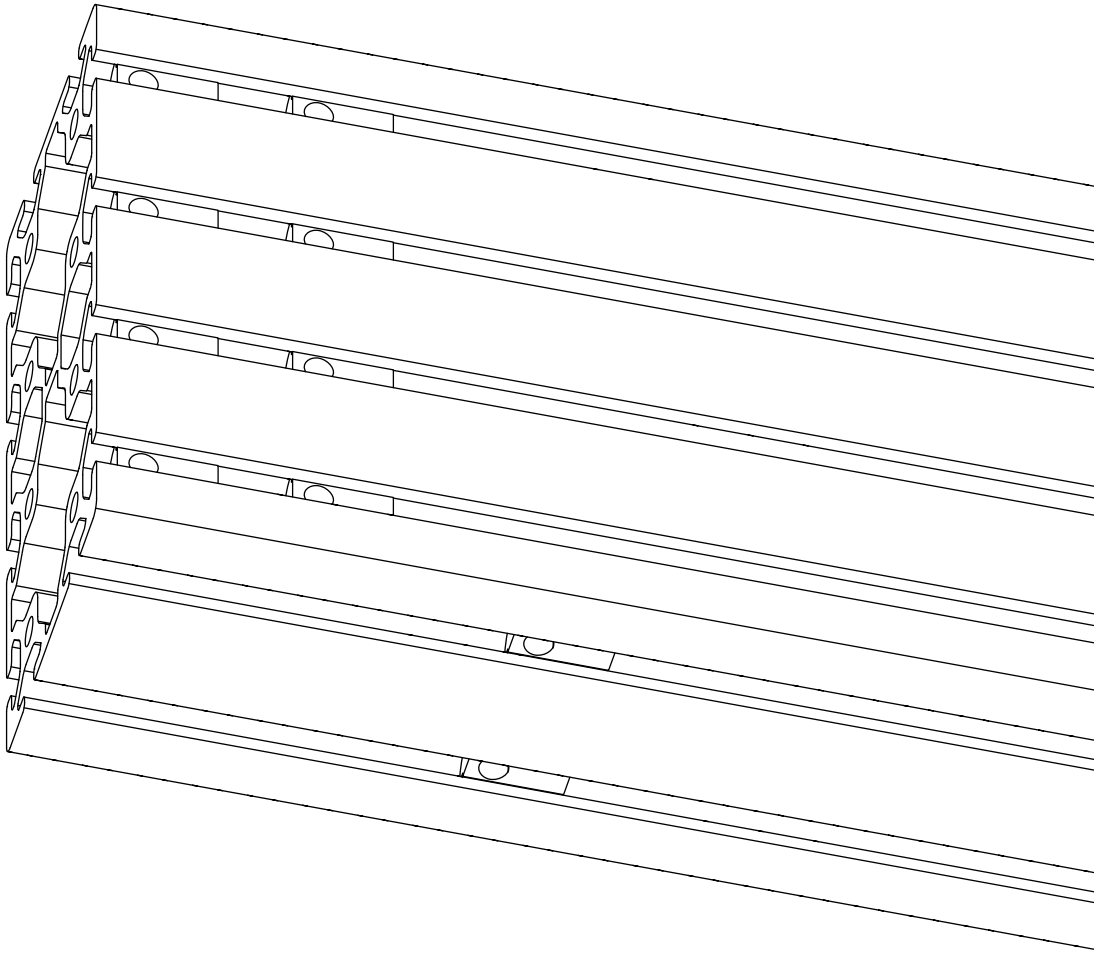
- Orient the t-nuts as indicated.



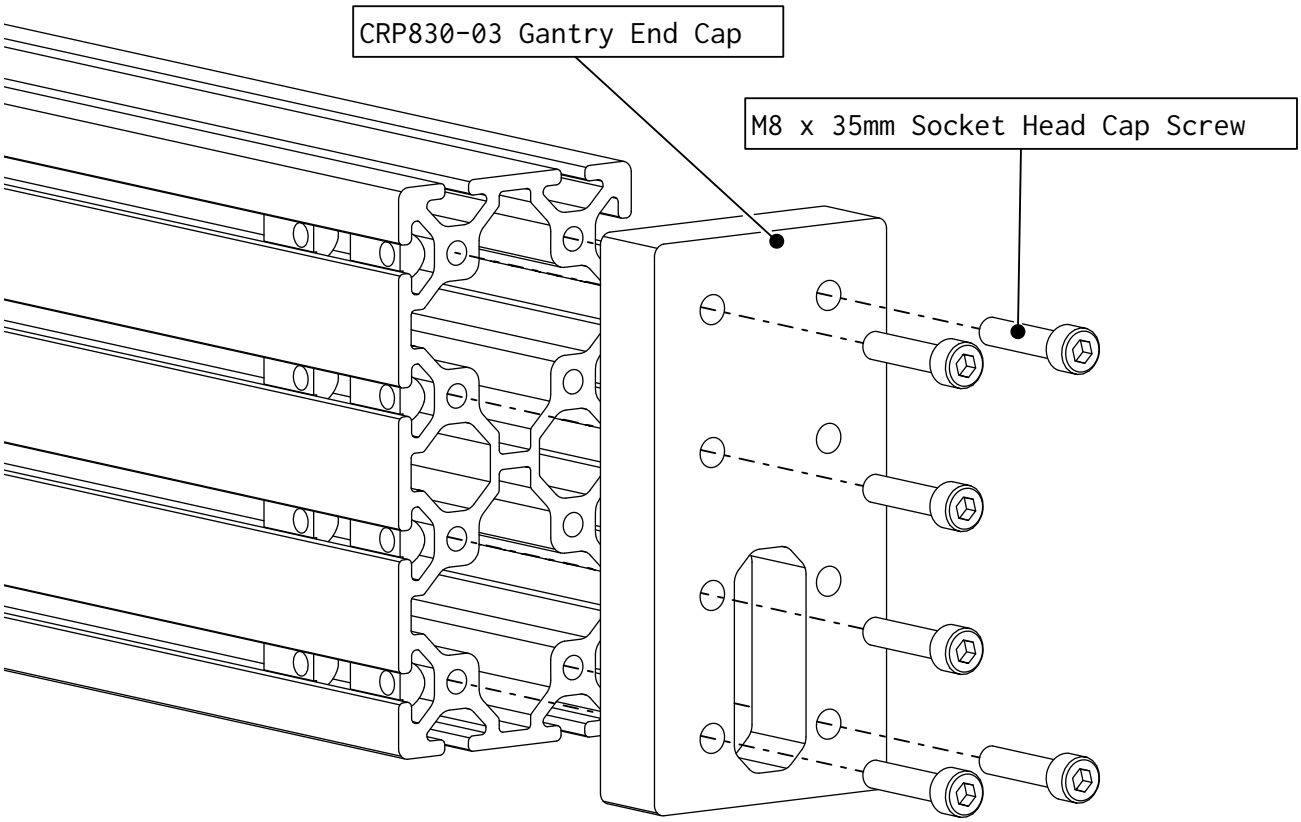
- Slide t-nuts into the indicated t-slots.



- Orient the t-nuts as indicated.



- Repeat these steps on the other end of the extrusion.

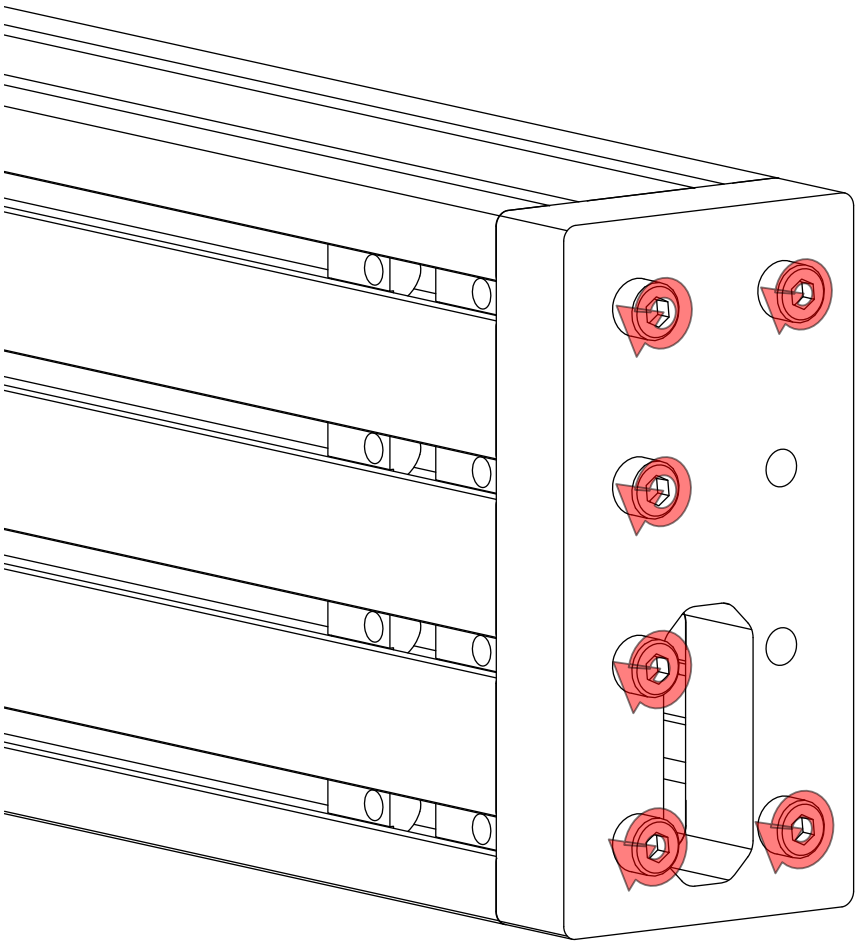


- Install a Gantry End Cap on one end of the extrusion as indicated.

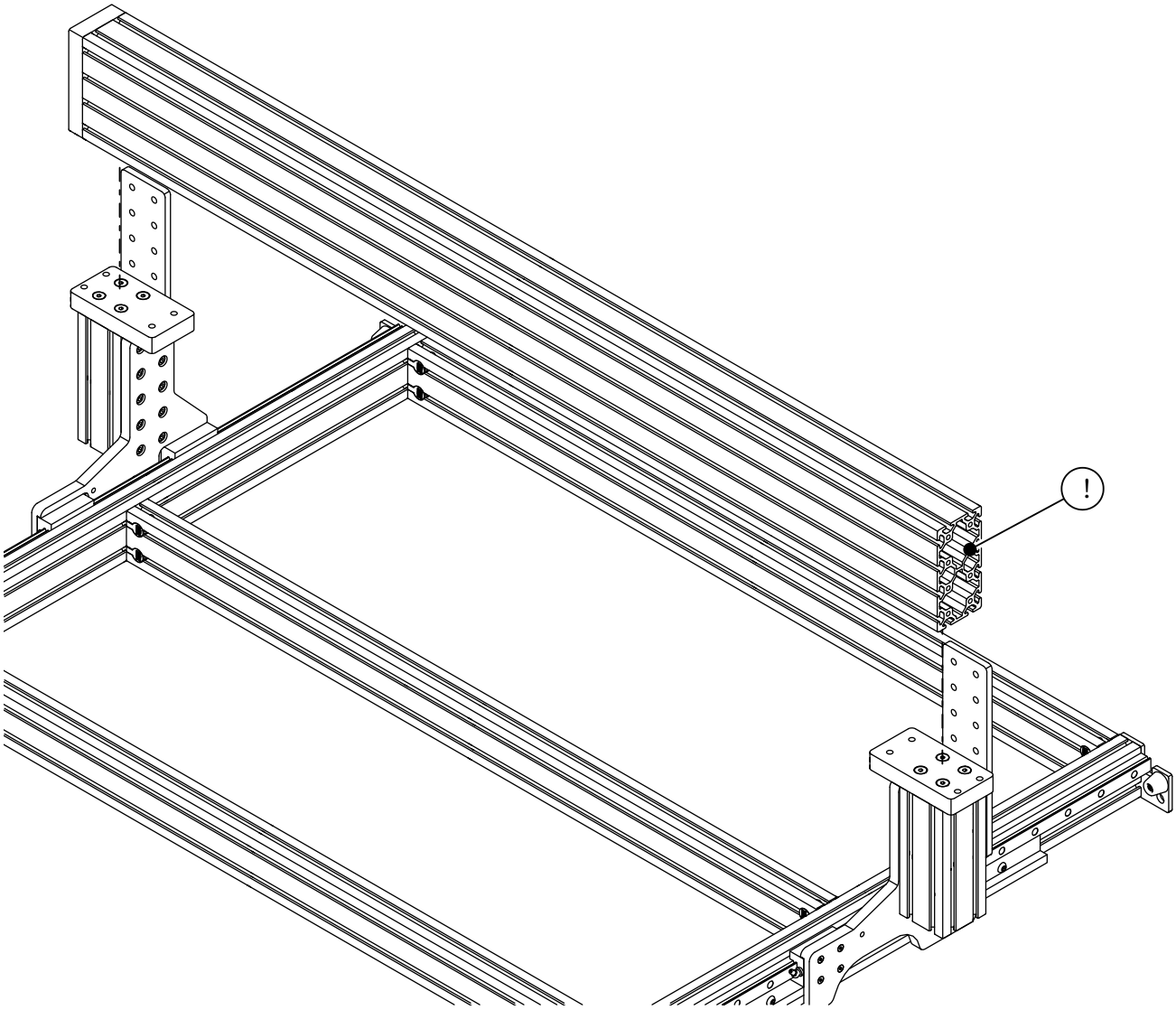
  Note: The tapped holes on the bottom of the cap (not pictured here) need to be on the outside of the machine.

  Note: Do not repeat this step on the other side of the extrusion at this time; you will need to access the t-slots at the other end.

  Note: Do not install fasteners in the remaining two holes of the Gantry End Cap. The remaining two clearance holes are for mounting the bumper plate.

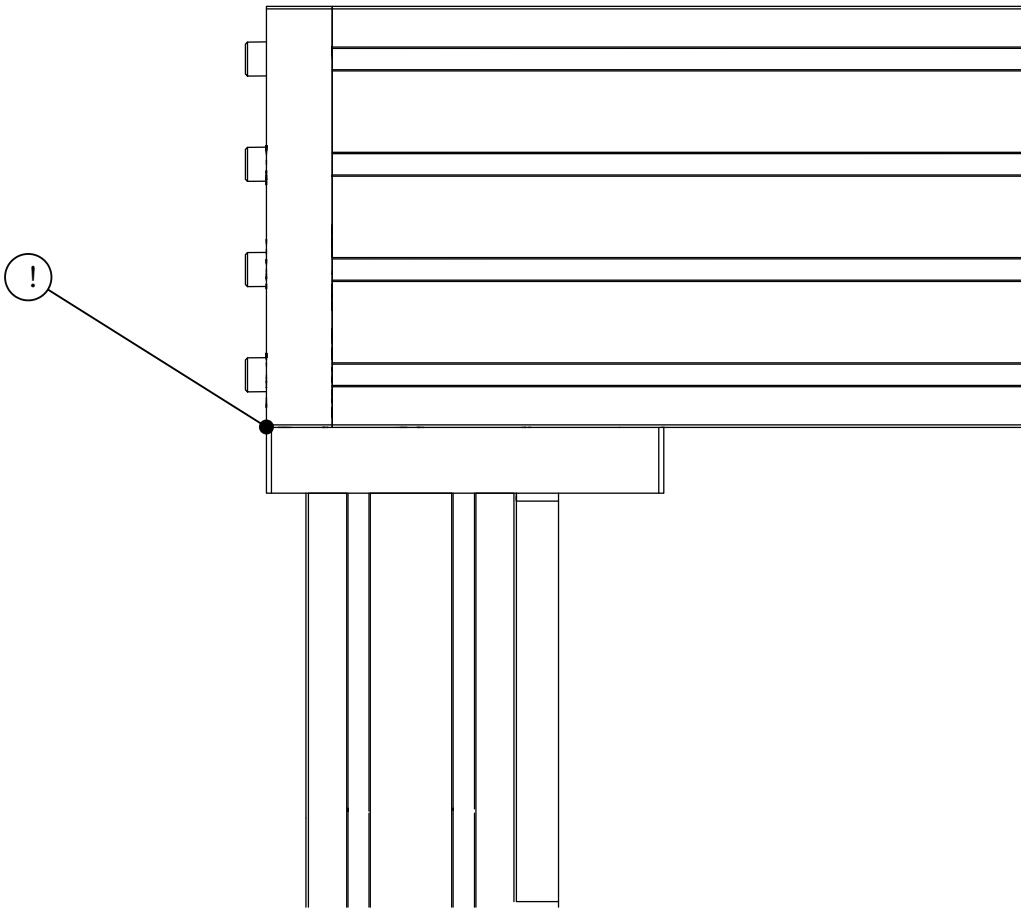


- Tighten the highlighted fasteners.

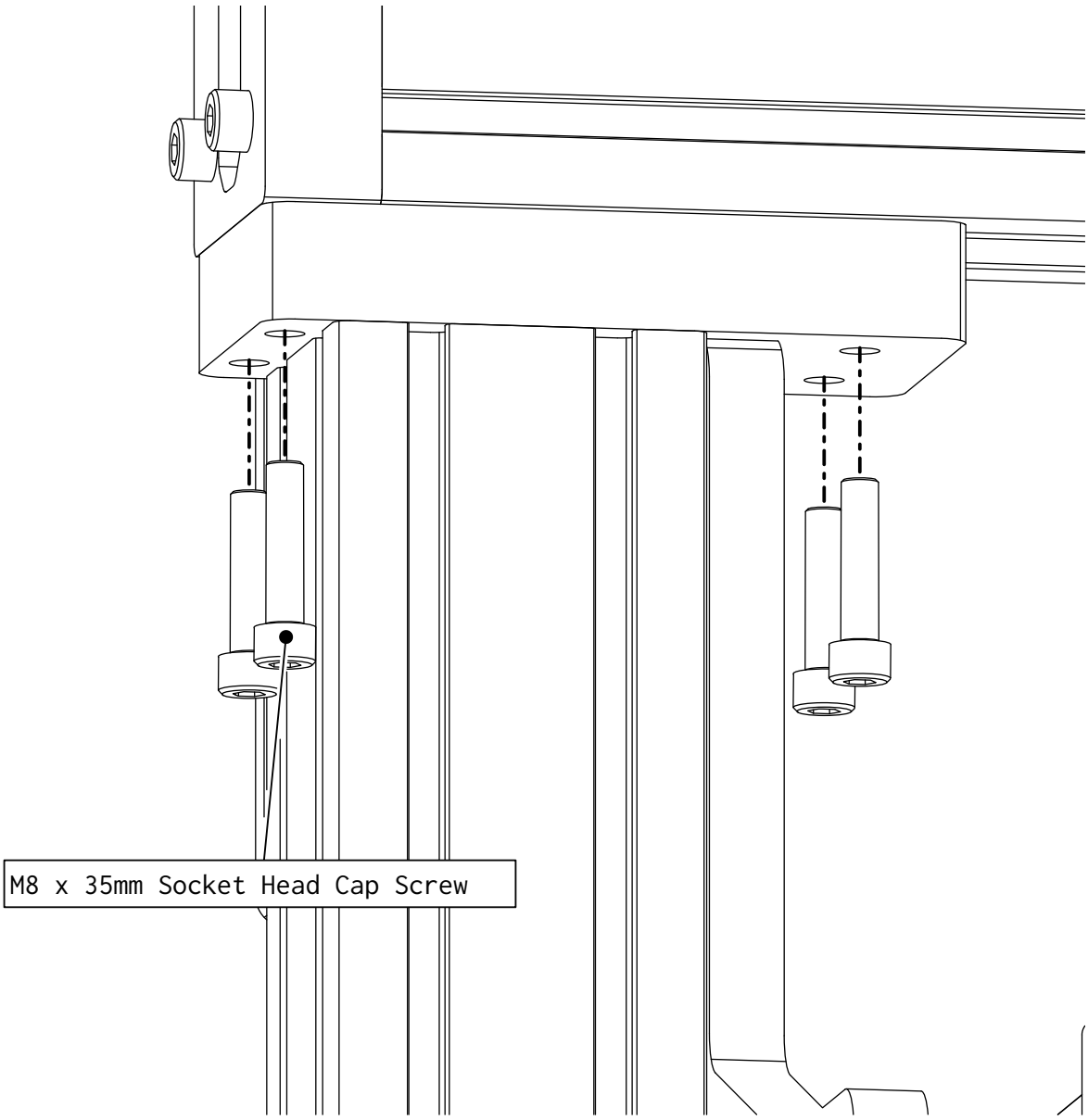


- Carefully lower the extrusion onto the risers as indicated.

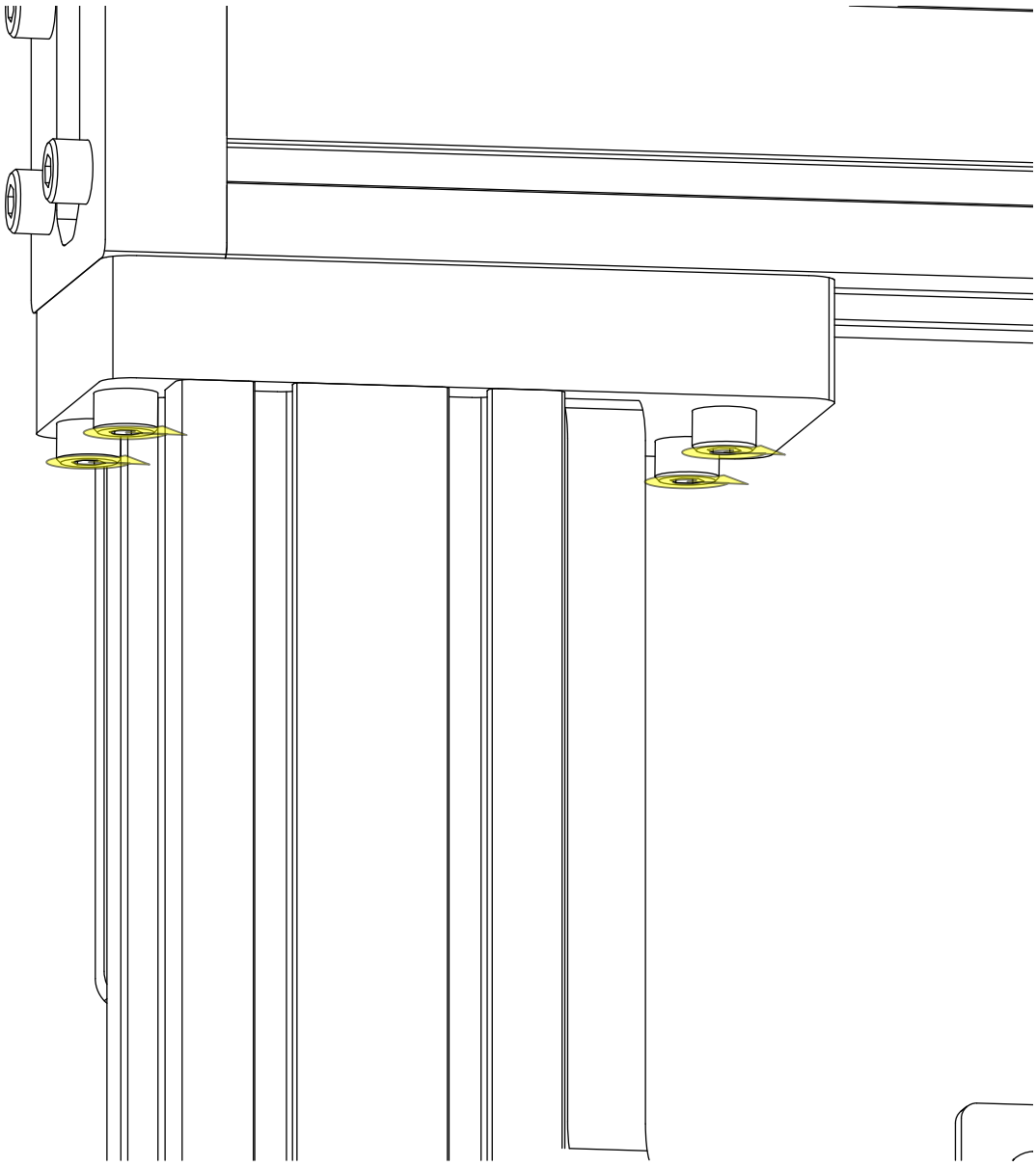
Note: This step can be made easier by sliding the risers to the end of the machine.



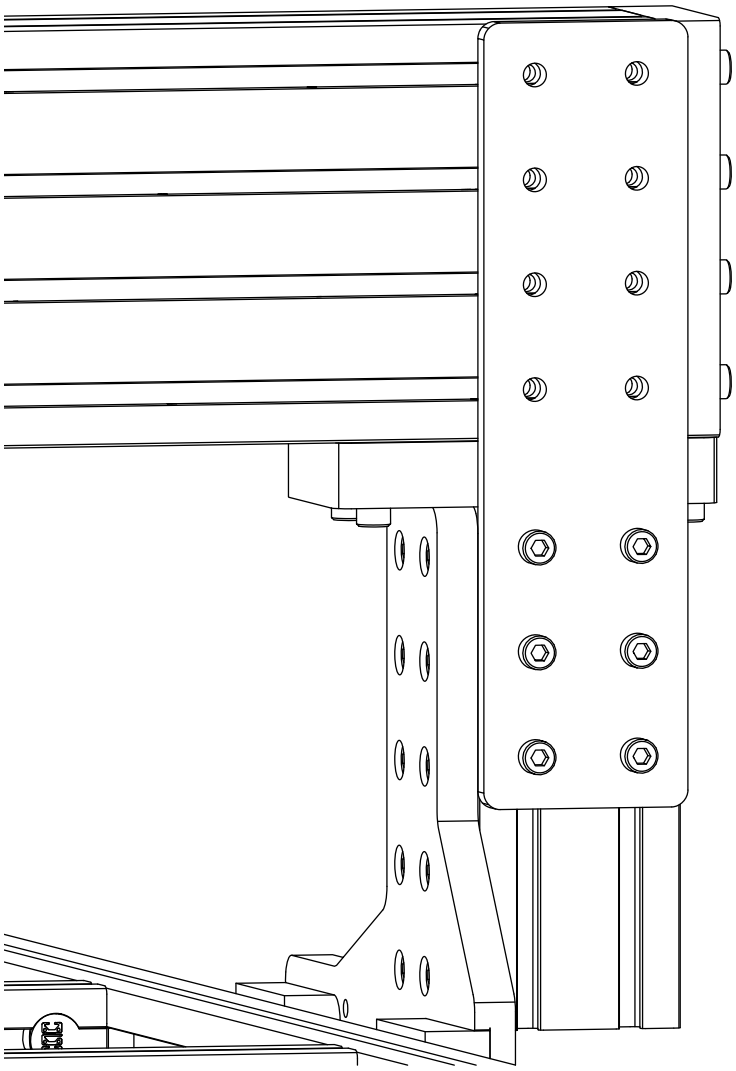
- Bring the End Cap flush with the Interface Plate as indicated.



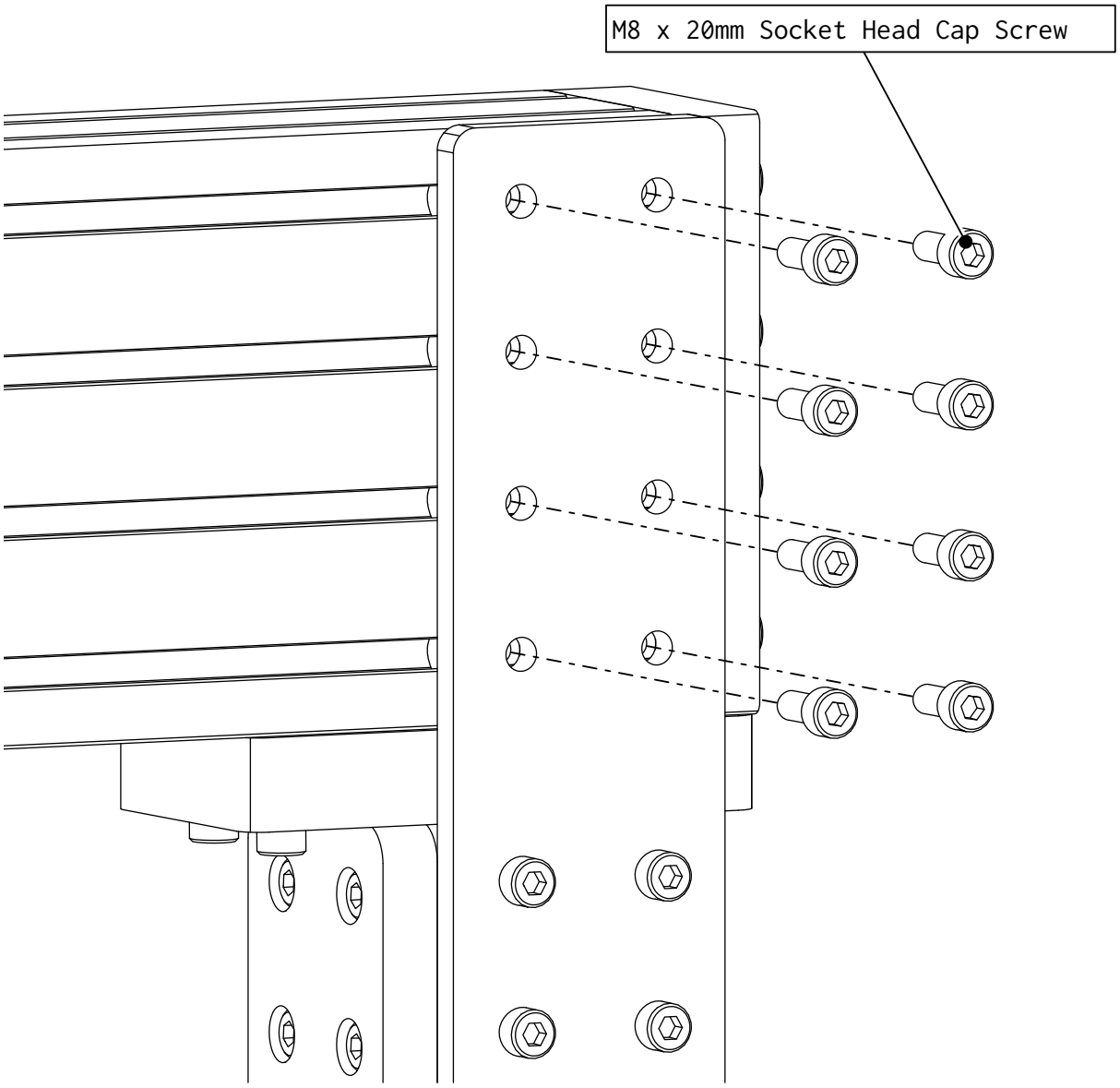
- Attach the gantry to the Interface Plate as indicated.



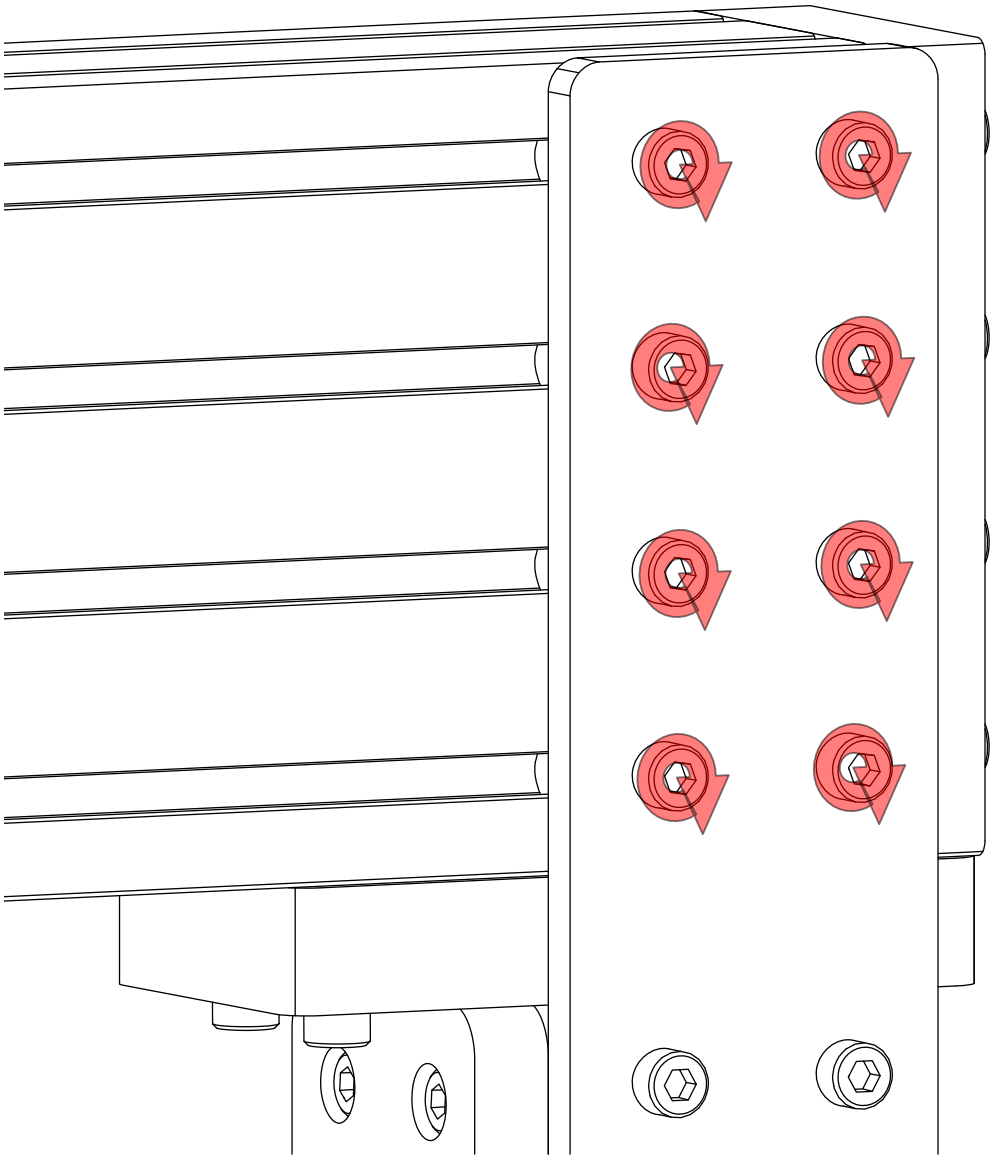
- Partially tighten the highlighted fasteners.



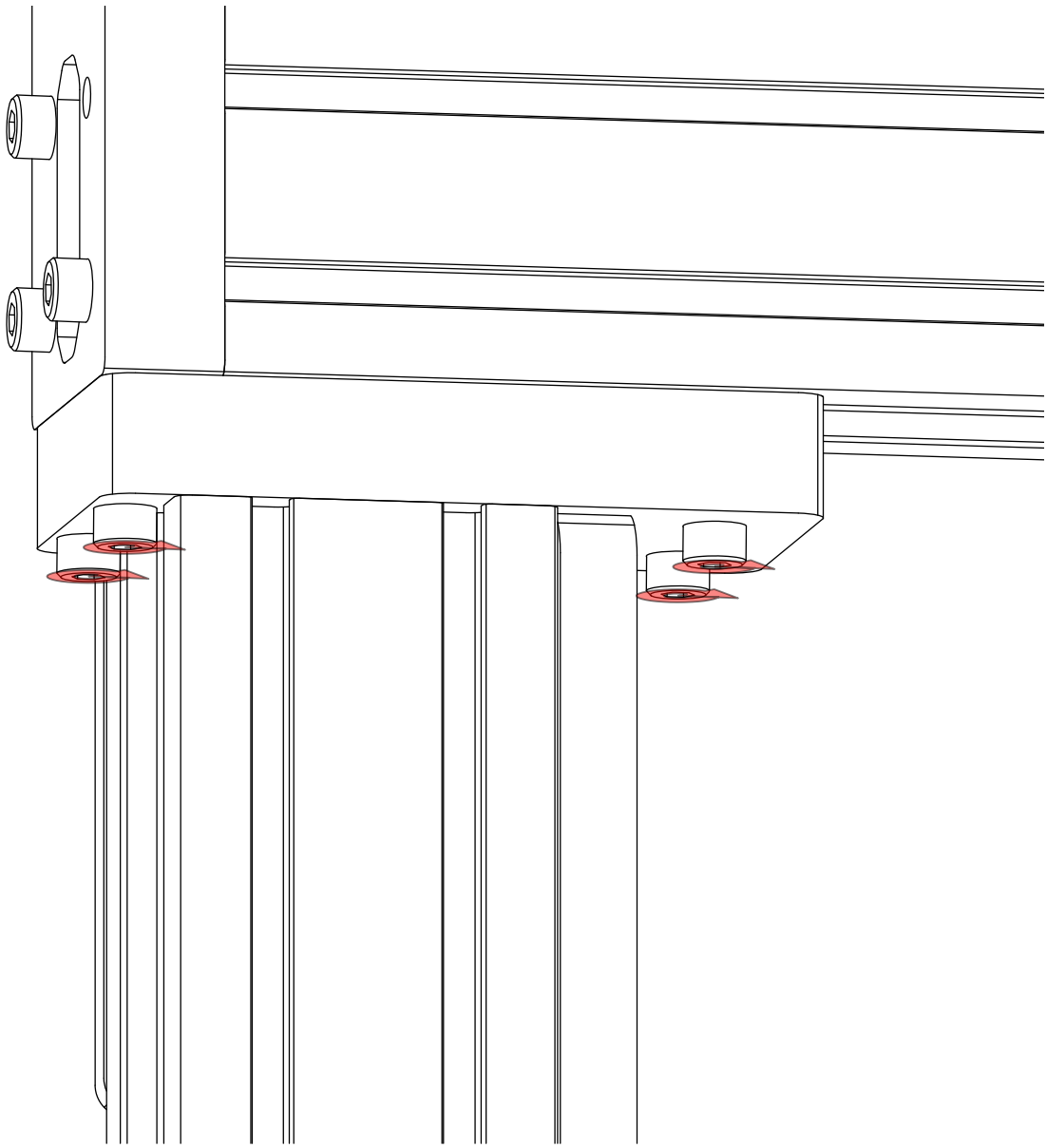
- Align the t-nuts in the gantry with the holes on the Joining Plate.



- Thread the socket head cap screws into the t-slots as indicated.



- Tighten the highlighted fasteners.

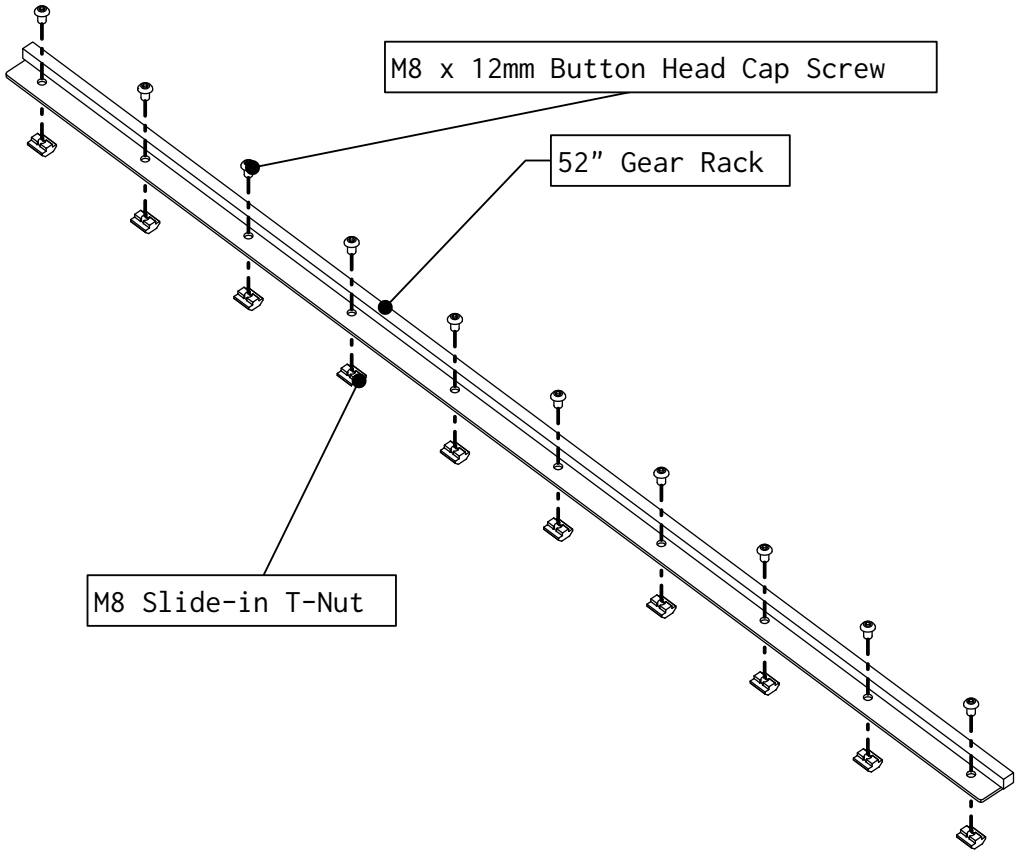


- Fully tighten the highlighted fasteners.

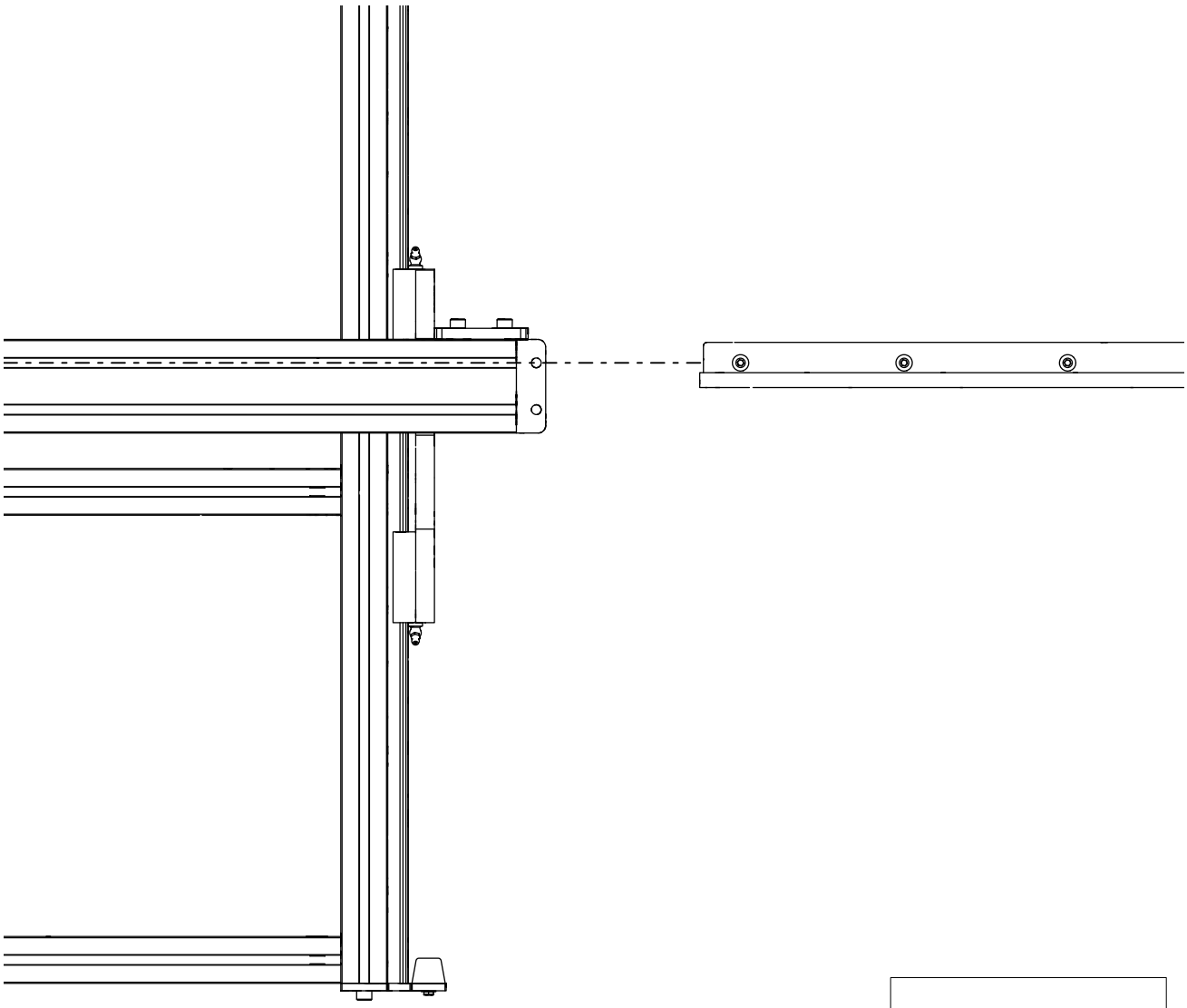
3.2 Gantry Gear Rack Installation

The following parts and bags will be used in this section:

- (1) (MGM-52-FAST-40) 52" Gear Rack Fastener Kit
  - (10) M8 Slide-in T-nut
  - (10) M8 x 12mm Button Head Cap Screw
- (1) 52" Gear Rack



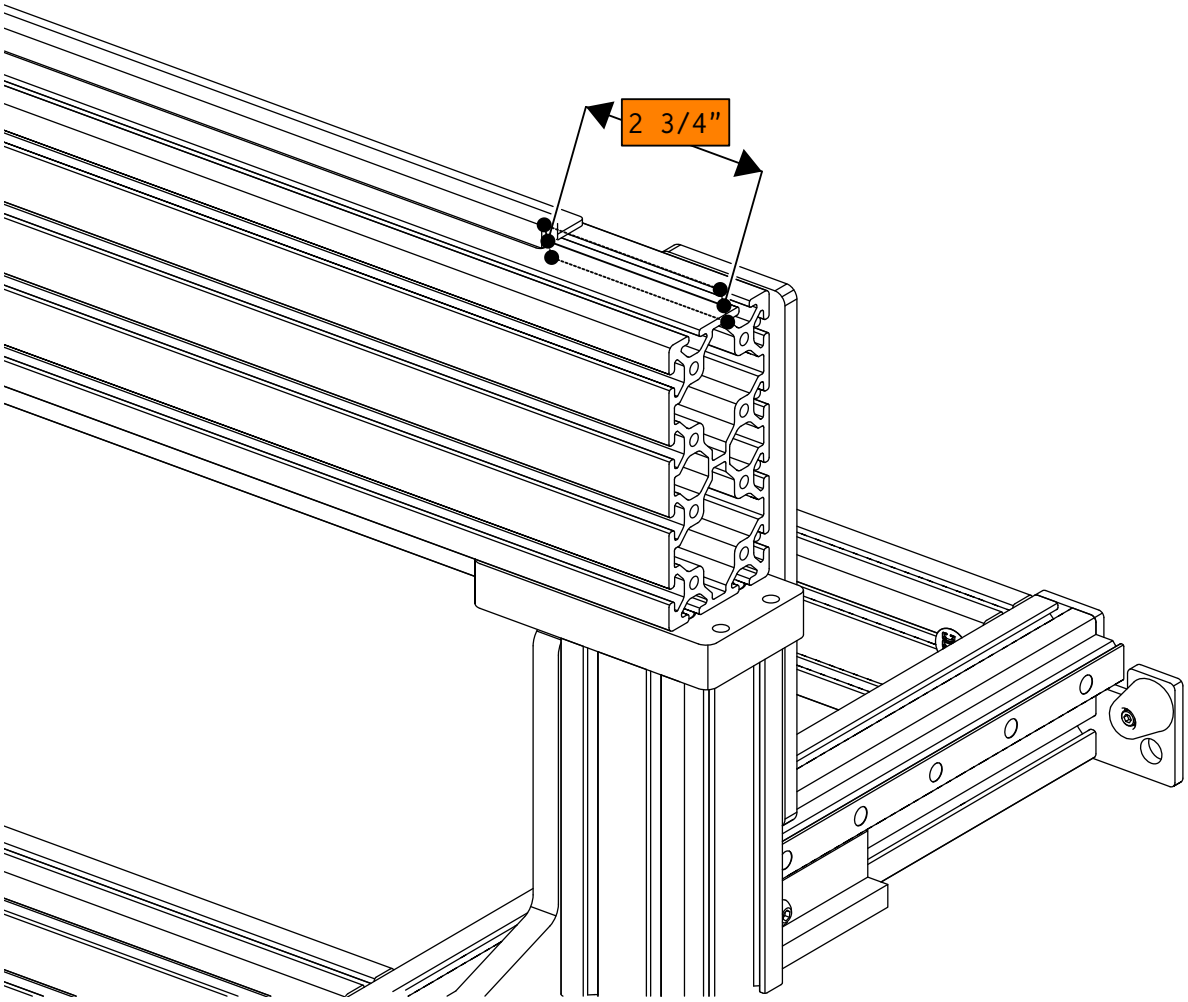
- Thread the indicated fasteners into the gear rack.



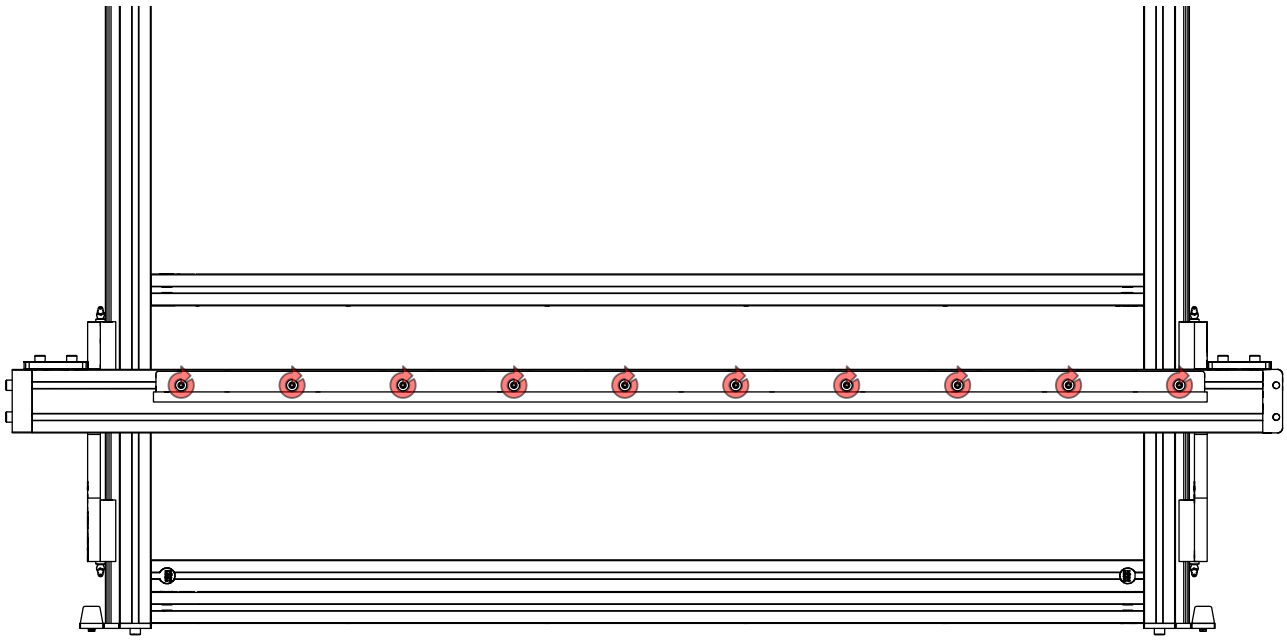
Top View

- Slide the threaded gear rack into the indicated t-slot.

  Note: The gear teeth should face away from the joining plate.



- Adjust the gear rack so that the end is approximatly 2 3/4" (70mm) from the end of the extrusion.

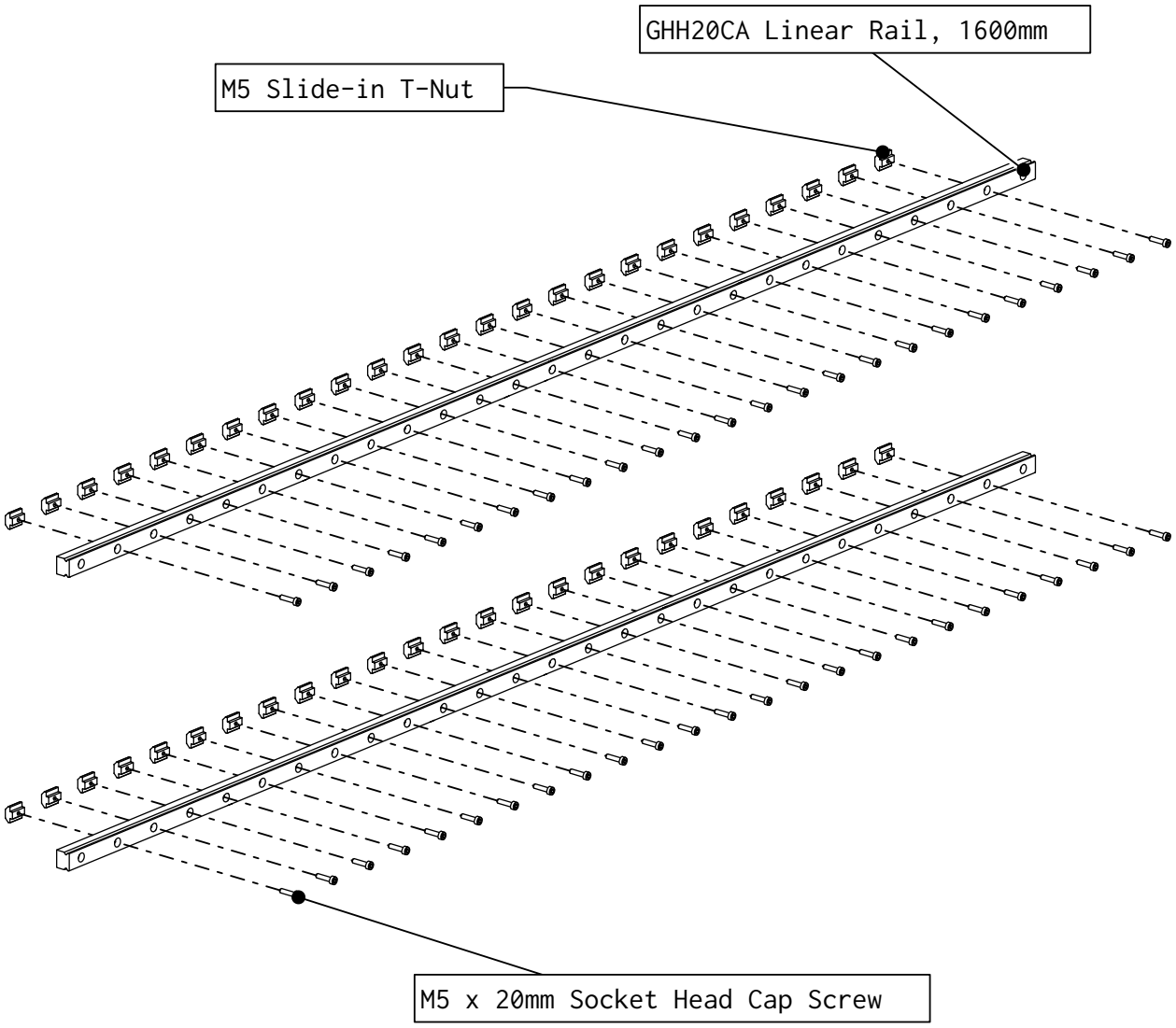


- Tighten the highlighted fasteners.

3.3 Linear Rail Installation

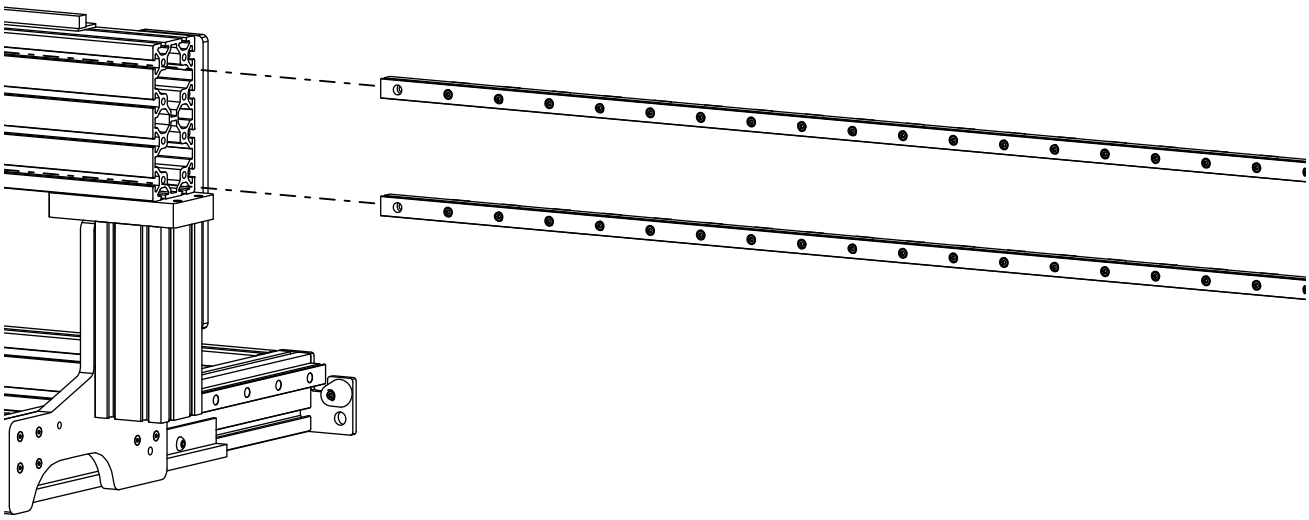
The following parts and bags will be used in this section:

- (2) Linear Rail - 1600mm
- (2) (GH20-1600-FAST) Linear Rail Fasteners, 1600mm Length
  - (27) M5 Slide-in T-nut
  - (27) M5 x 20mm Socket Head Cap Screw
  - (27) Linear Rails Hole Covers
- (1) (GHH20-JIG-00) Linear Rail Setting Kit
  - (2) (GHH20-JIG) Linear Rail Setting Jig
  - (4) M8 x 25mm Socket Head Cap Screw
  - (4) M8 Roll-in T-nut
- (1) (CRP833-00) Gantry End Cap Kit
  - (6) M8 x 35mm Socket Head Cap Screw
  - (1) (CRP830-03) Gantry End Cap

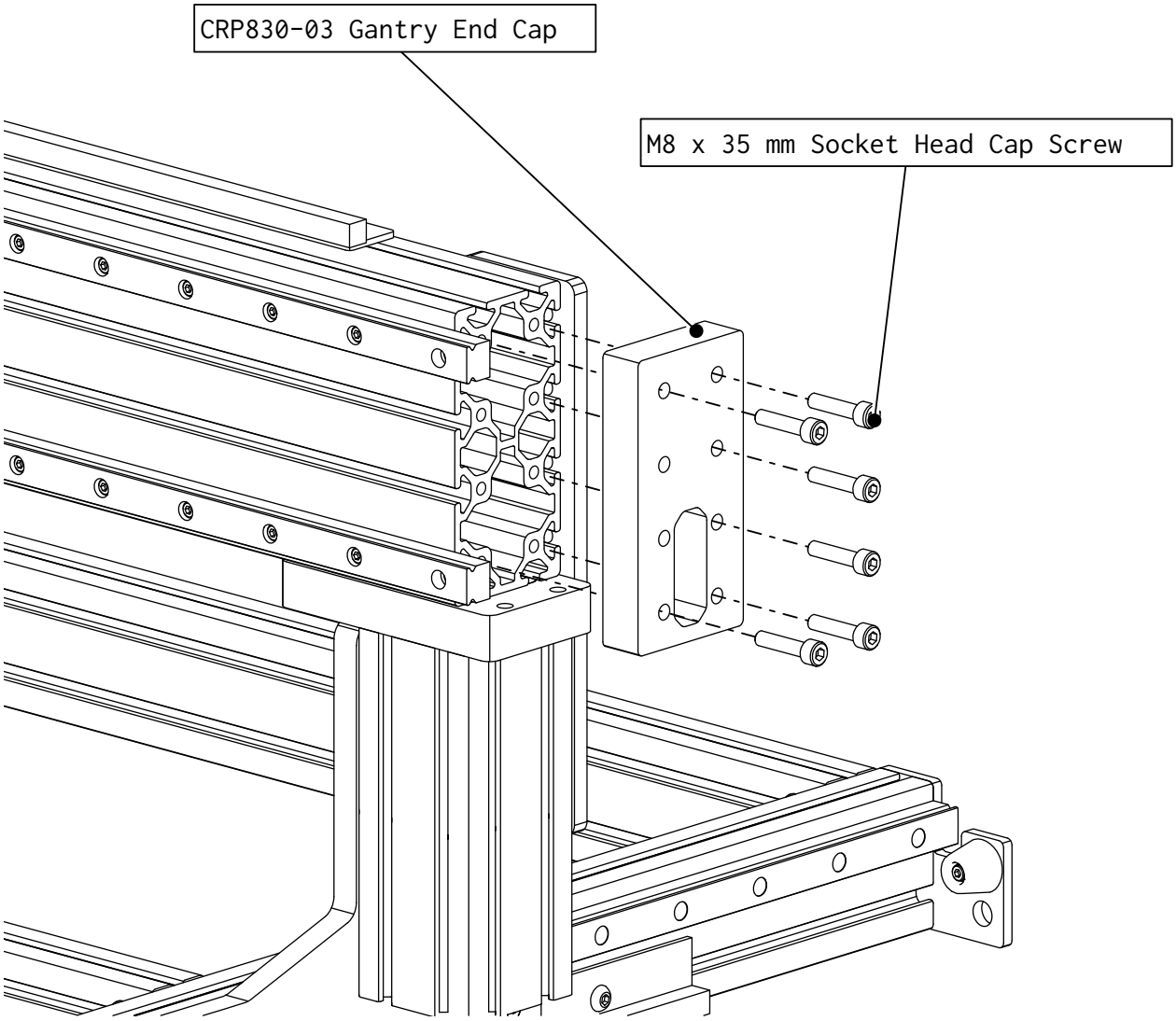


- Thread the indicated fasteners into the linear rails.

  Note: The outermost holes do not have fasteners.



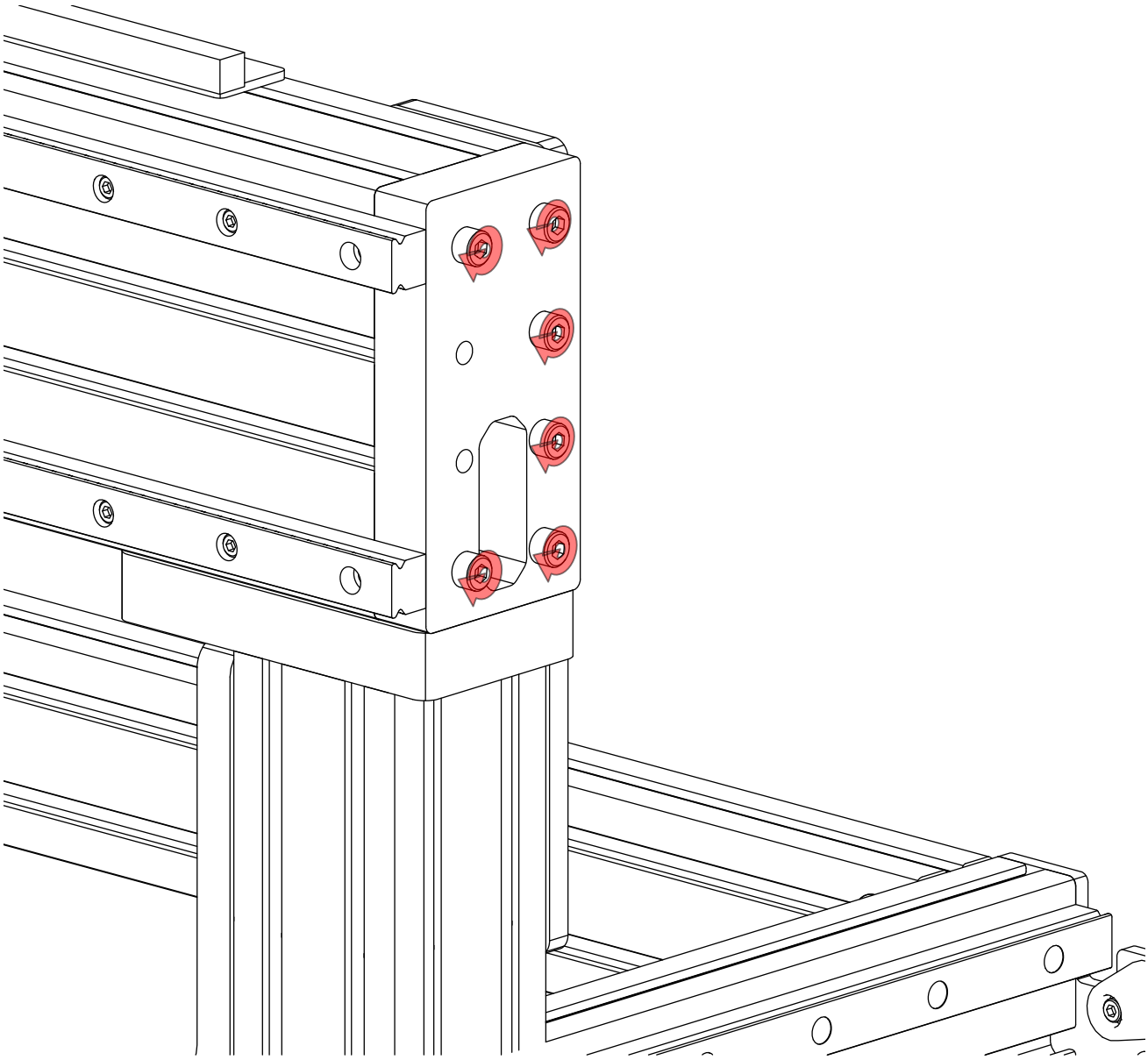
- Slide the threaded rails into the indicated t-slots.



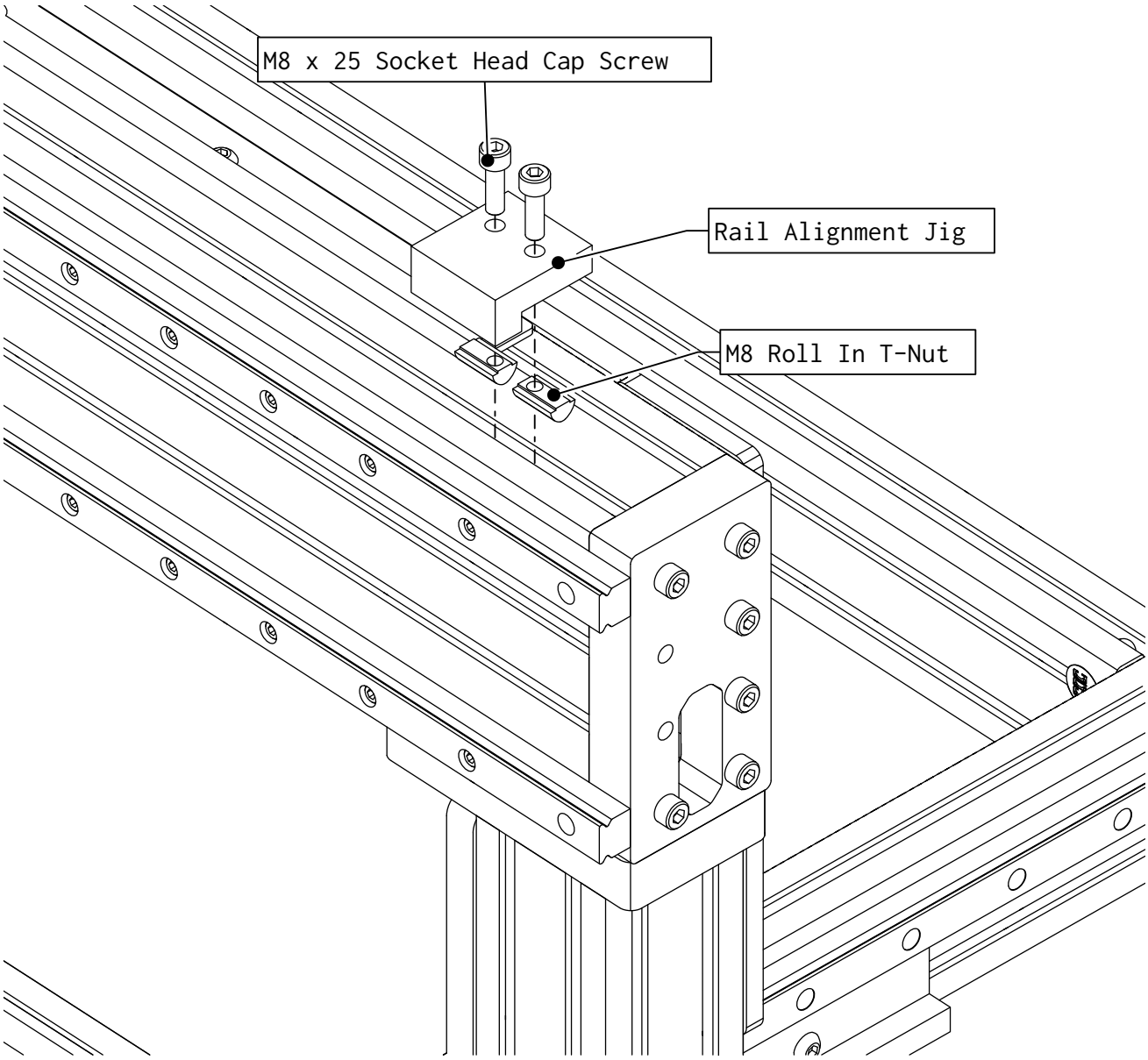
- Install a Gantry End Cap on the other end of the extrusion as indicated.

  Note: The tapped holes on the bottom of the cap (not pictured here) need to be on the outside of the machine.

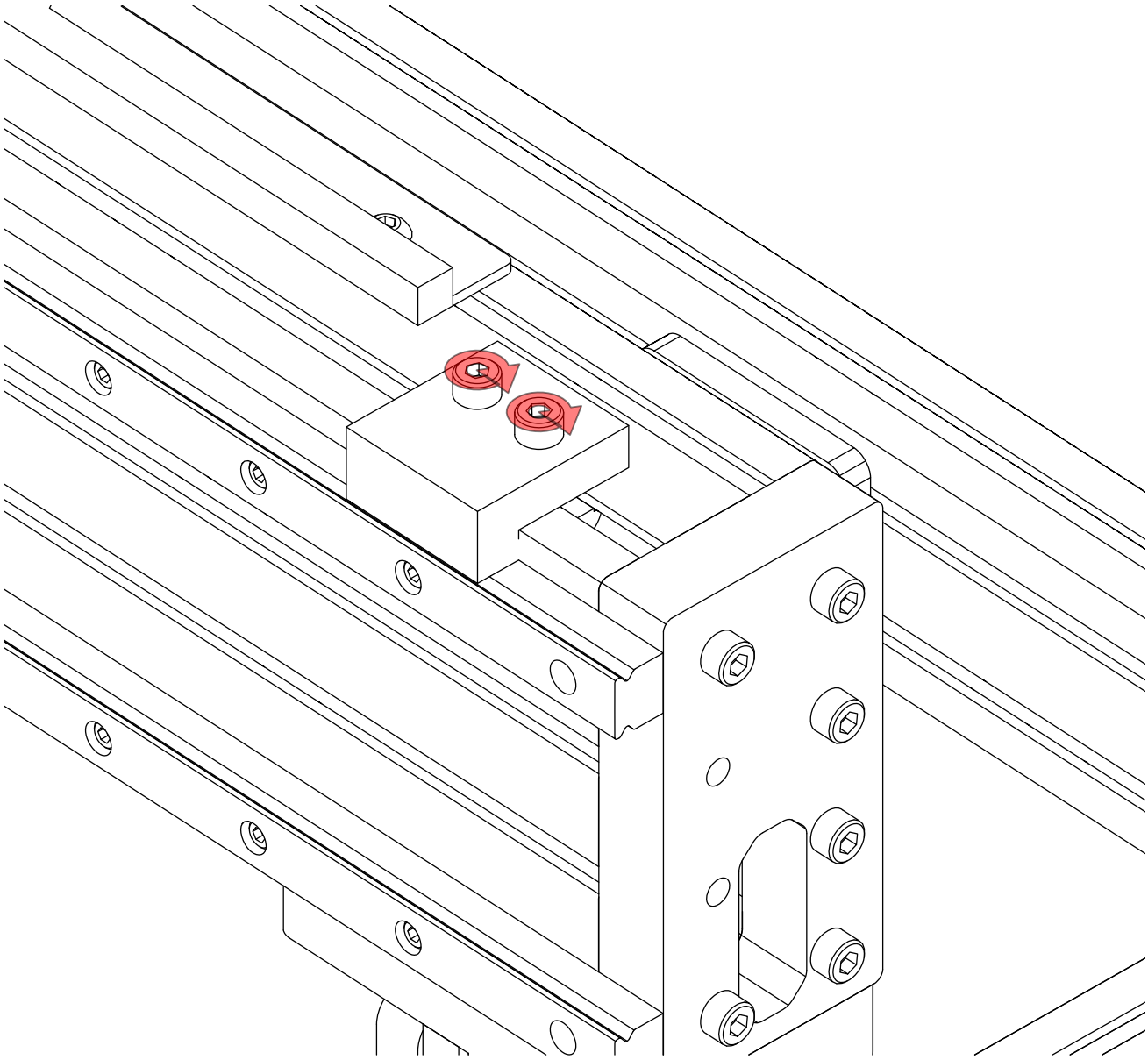
  Note: Do not install fasteners in the remaining two holes of the Gantry End Cap.



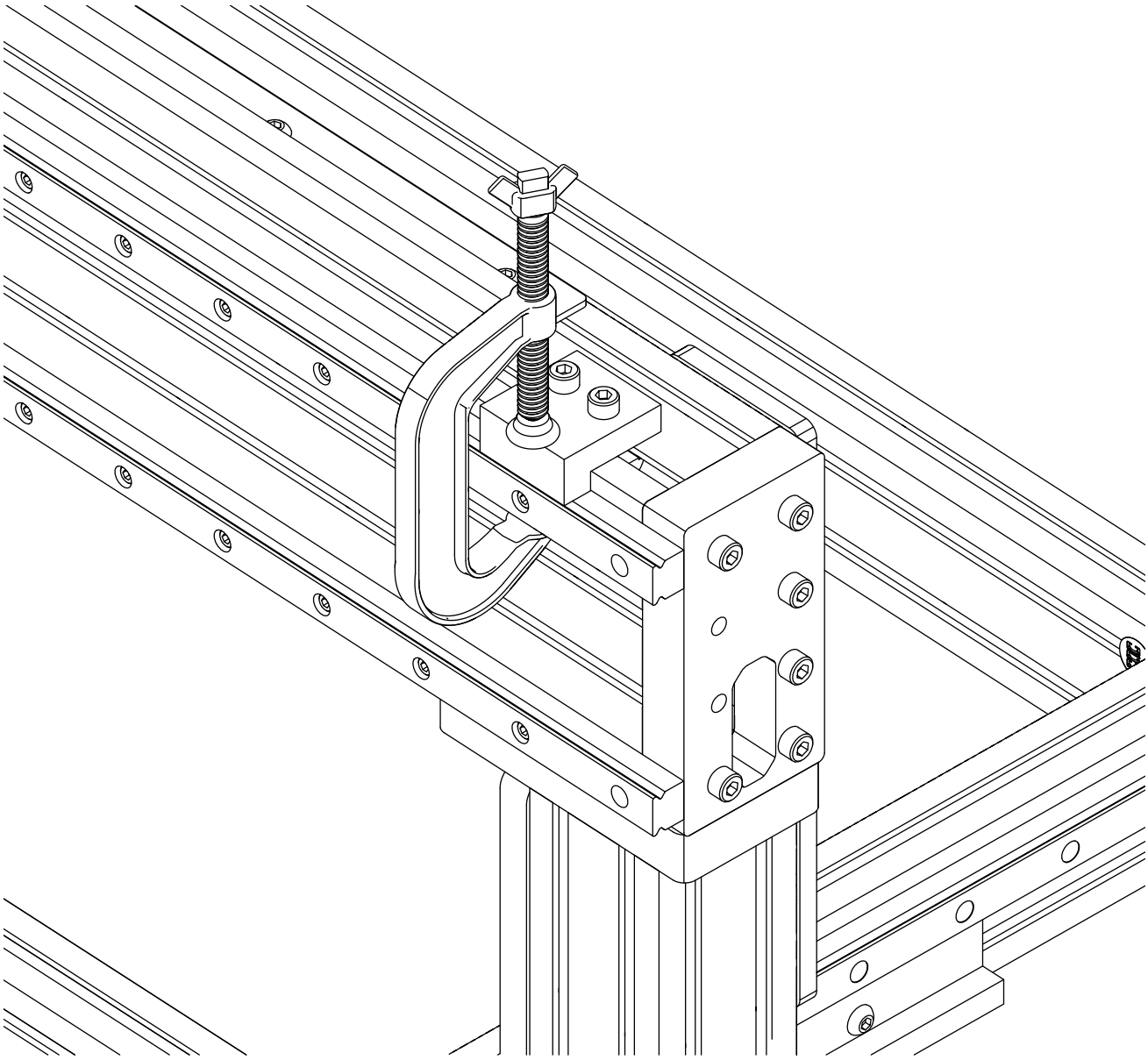
- Tighten the highlighted fasteners.



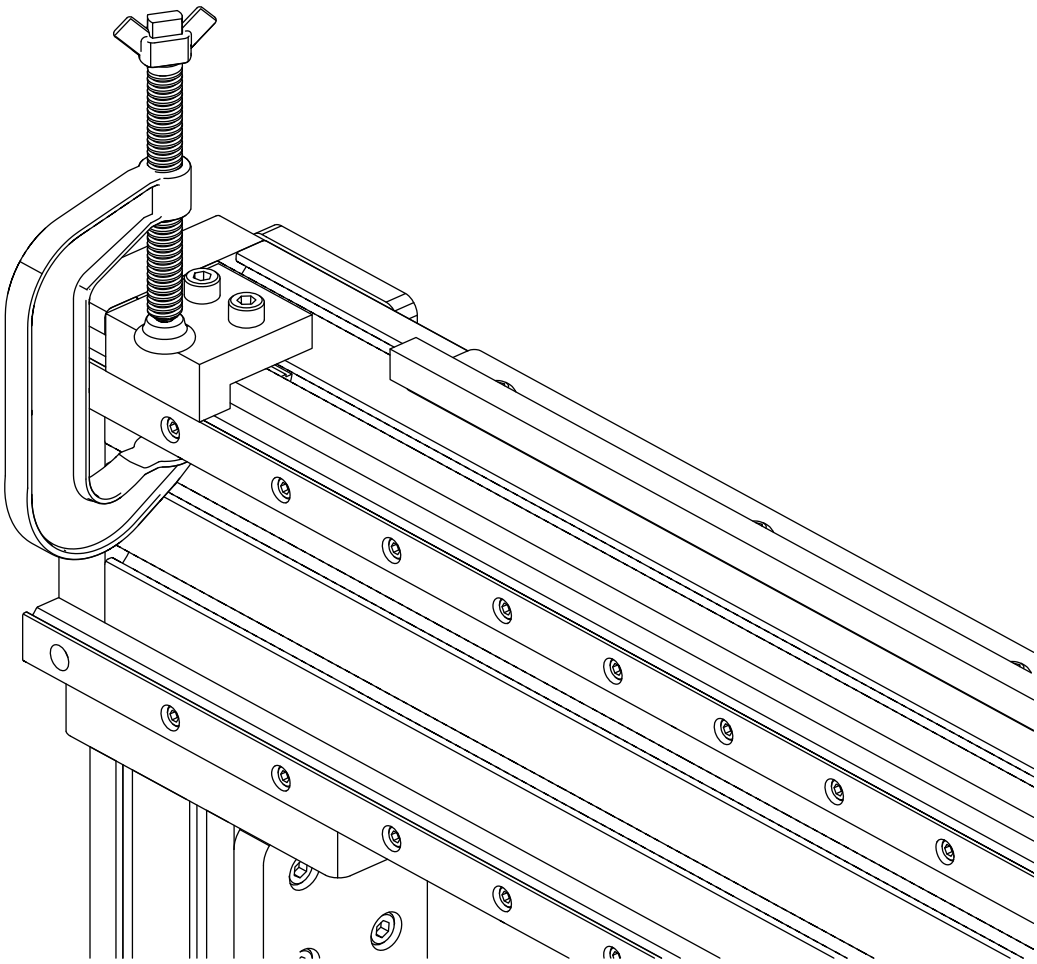
- Attach a Rail Adjustment Jig at one end of the gantry as indicated.



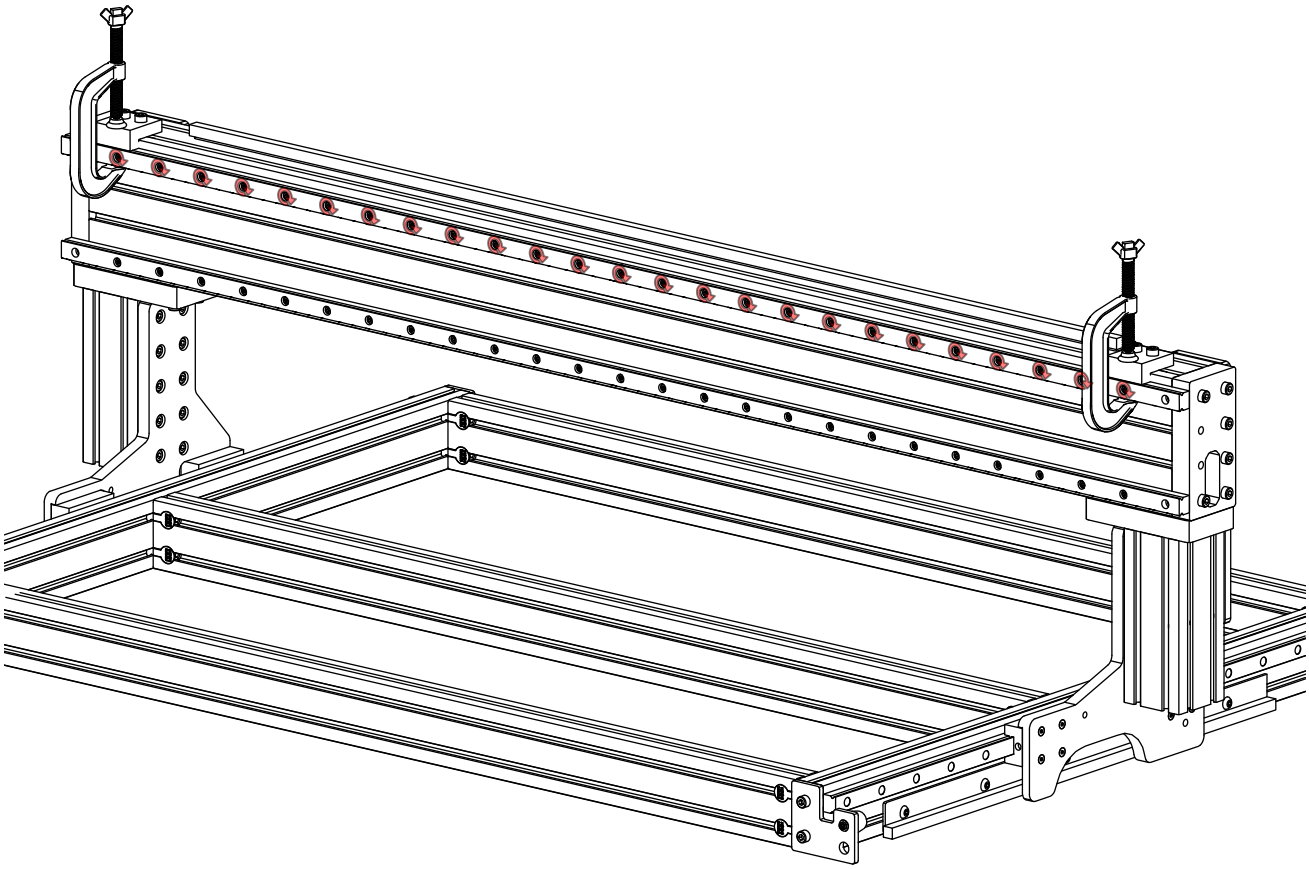
- Tighten the highlighted fasteners.



- Clamp the end of the rail to the rail Rail Adjustment Jig.

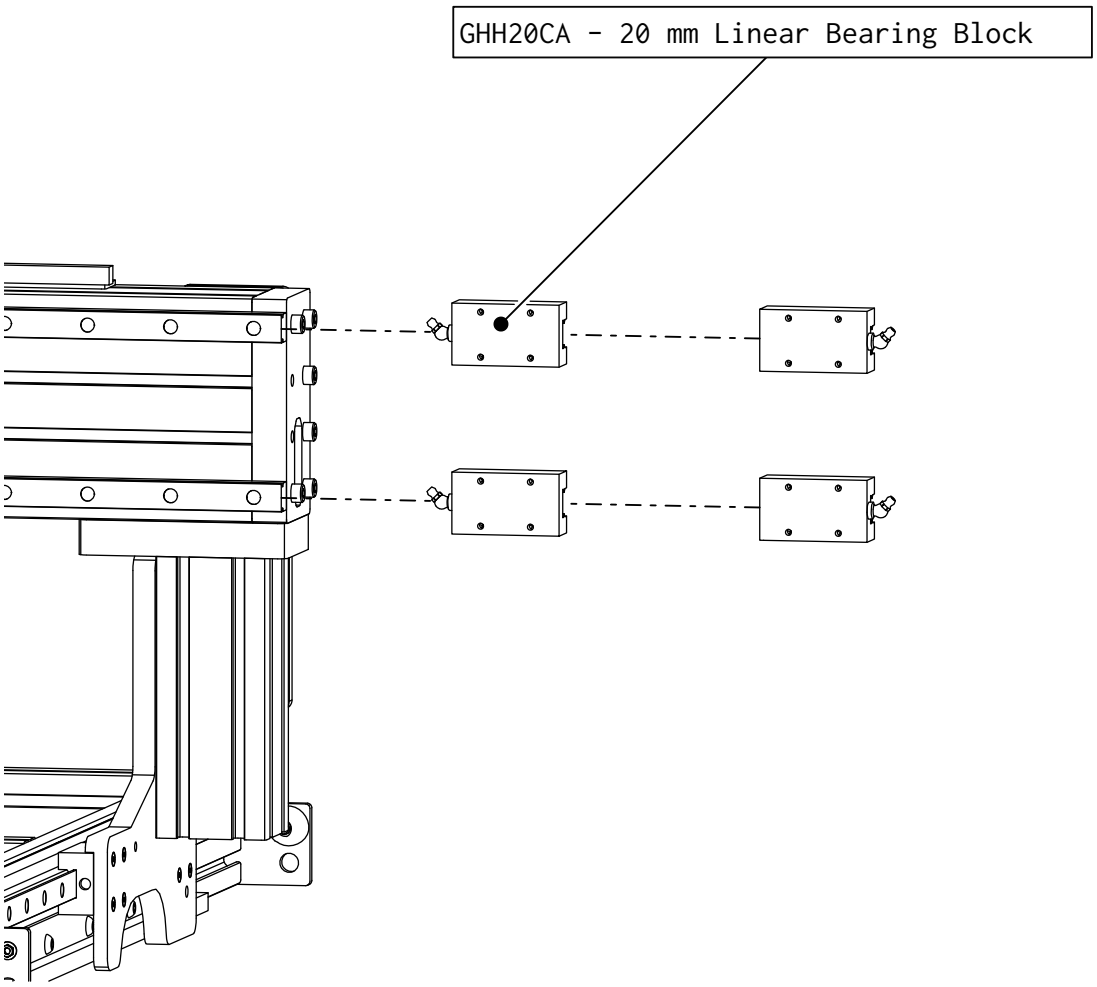


- Repeat the previous steps to clamp the other side of the rail.



- Tighten the highlighted fasteners.

  Note: Do not tighten lower rail at this time.



- Remove the clamps and rail jigs.
- Slide the linear blocks onto the rails as indicated.

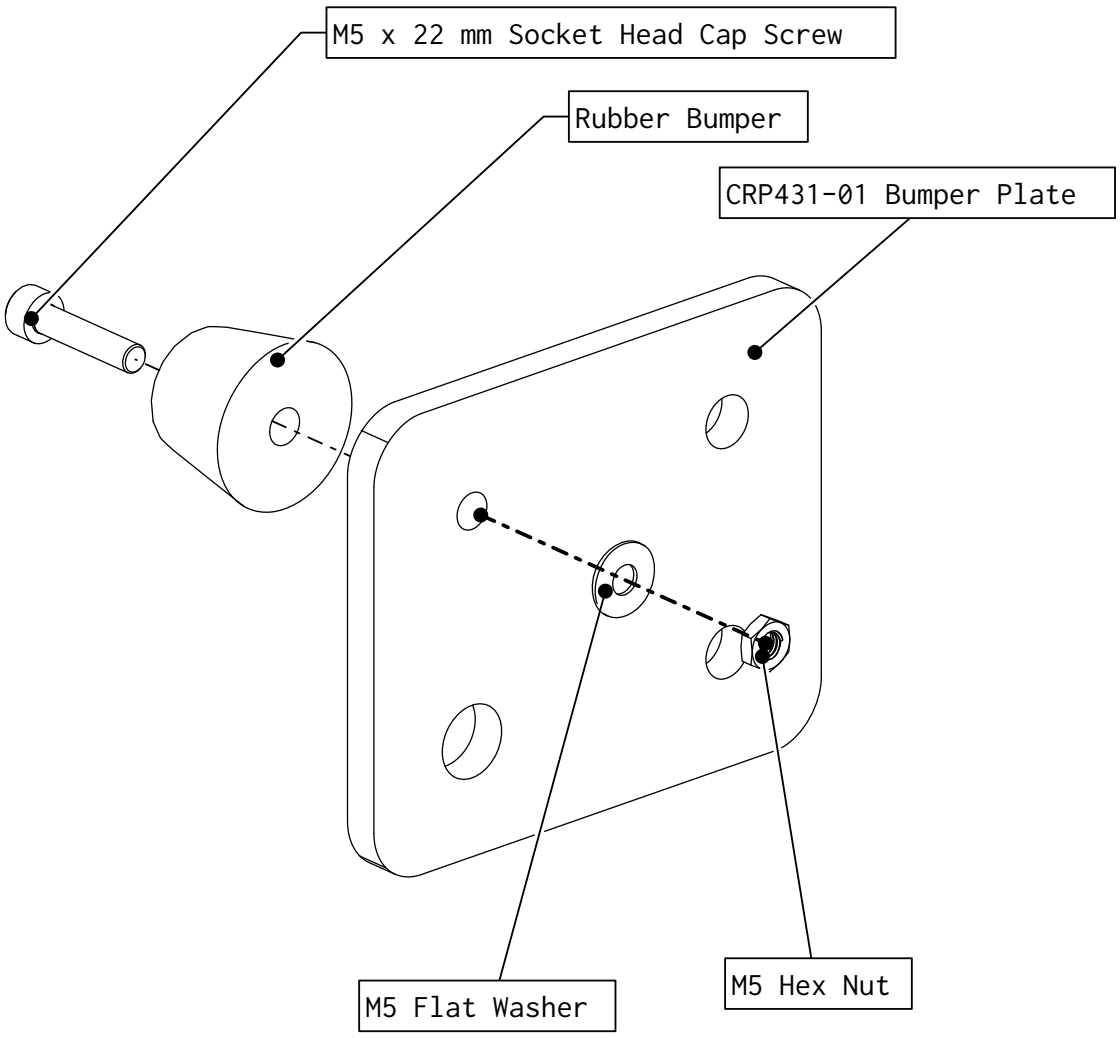
Note: Follow the same procedure as before to remove the plastic bearing retainer.

Note: Use the grease gun to lubricate the blocks after installation.

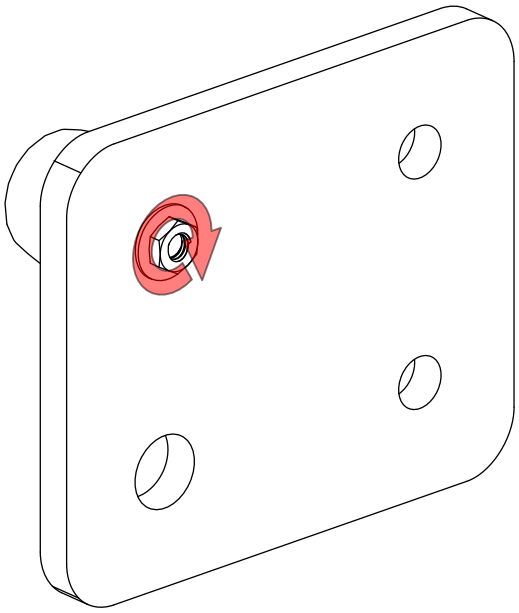
3.4 Gantry Bumper Installation

The following parts and bags will be used in this section:

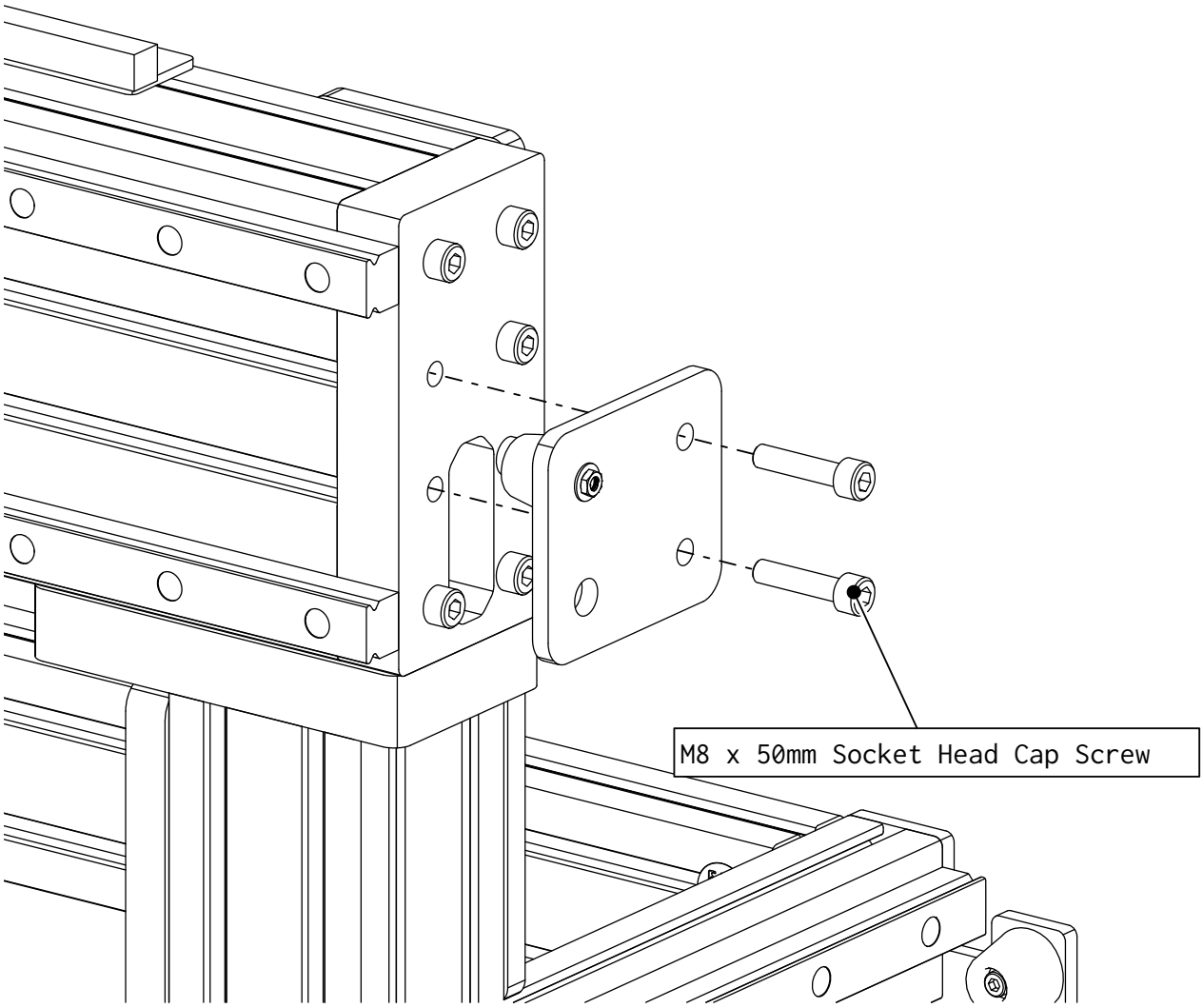
- (2) (CRP831-00) PRO Gantry Axis Bumper Kit
  - (1) (CRP831-01) PRO Gantry Axis Bumper Plate
  - (1) (CRP831-00-FAST) Pro Gantry Axis Bumper Fastener Kit
    - (1) M5 x 22mm Socket Head Cap Screw
    - (1) 10-32 Flat Washer
    - (1) M5 Hex Nut
    - (1) Rubber Bumper
    - (2) M8 x 50mm Socket Head Cap Screw



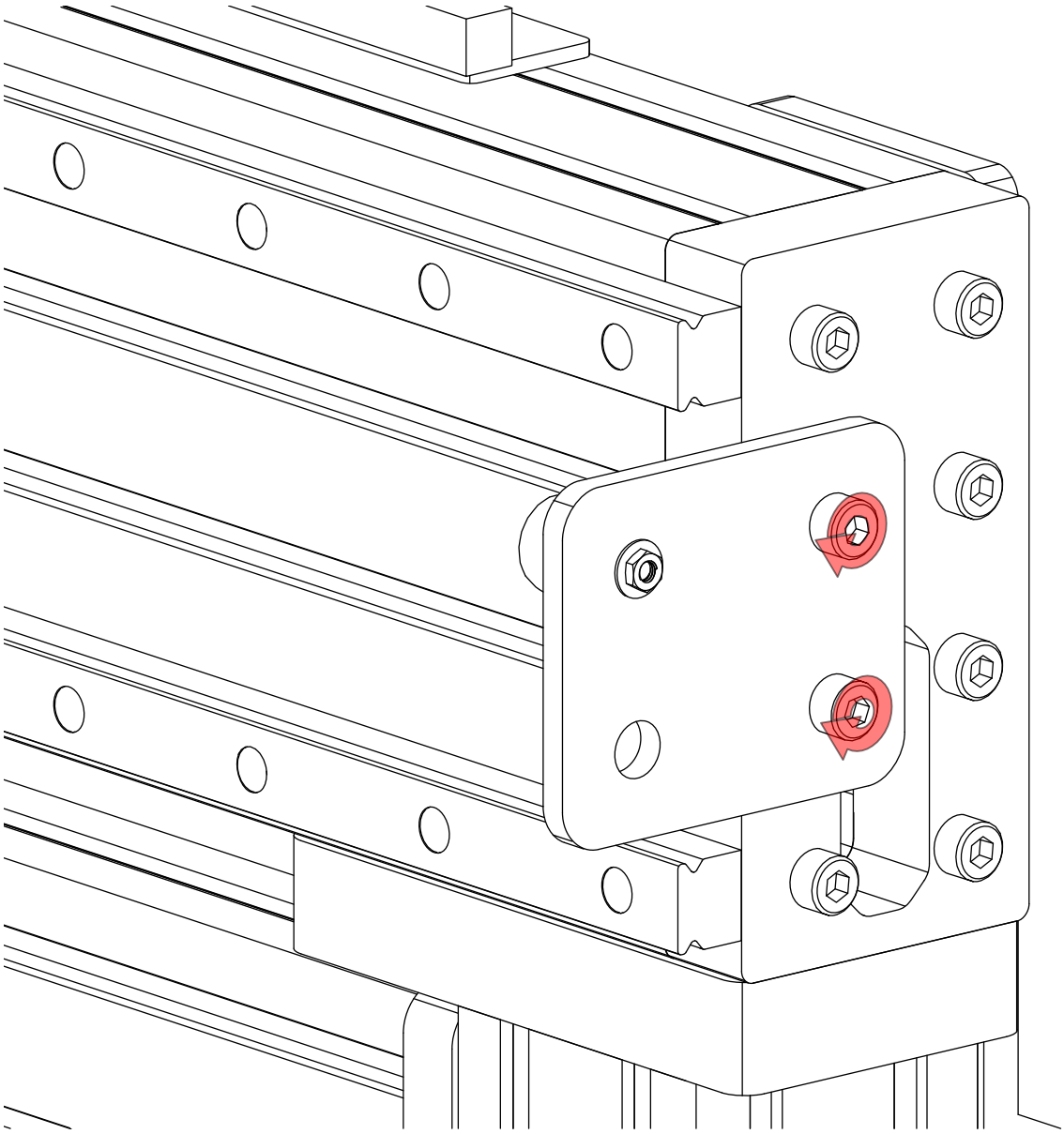
- Attach the rubber bumper to the gantry bumper plate.



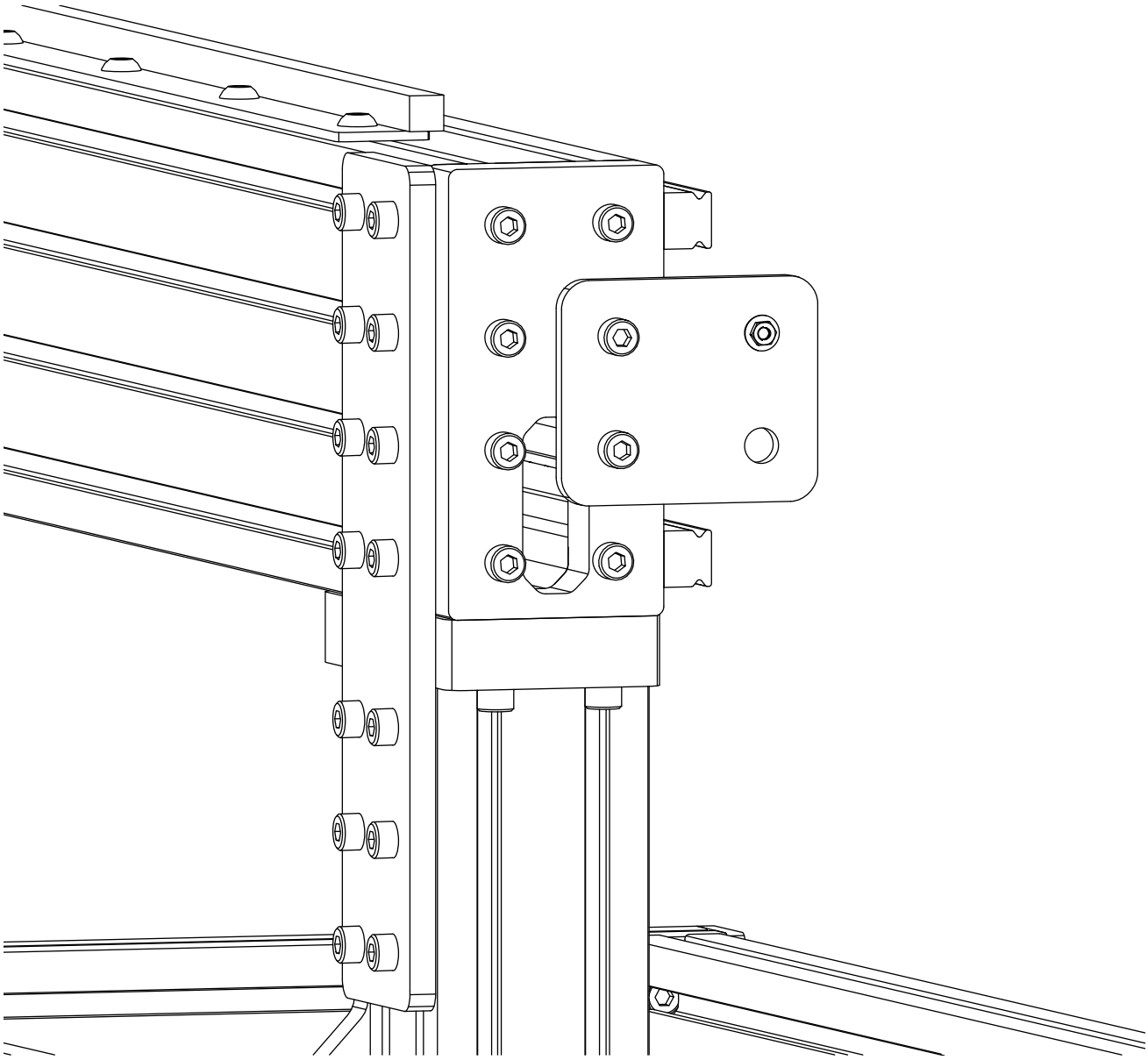
- Tighten the highlighted fastener.



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



- Tighten the highlighted fasteners.

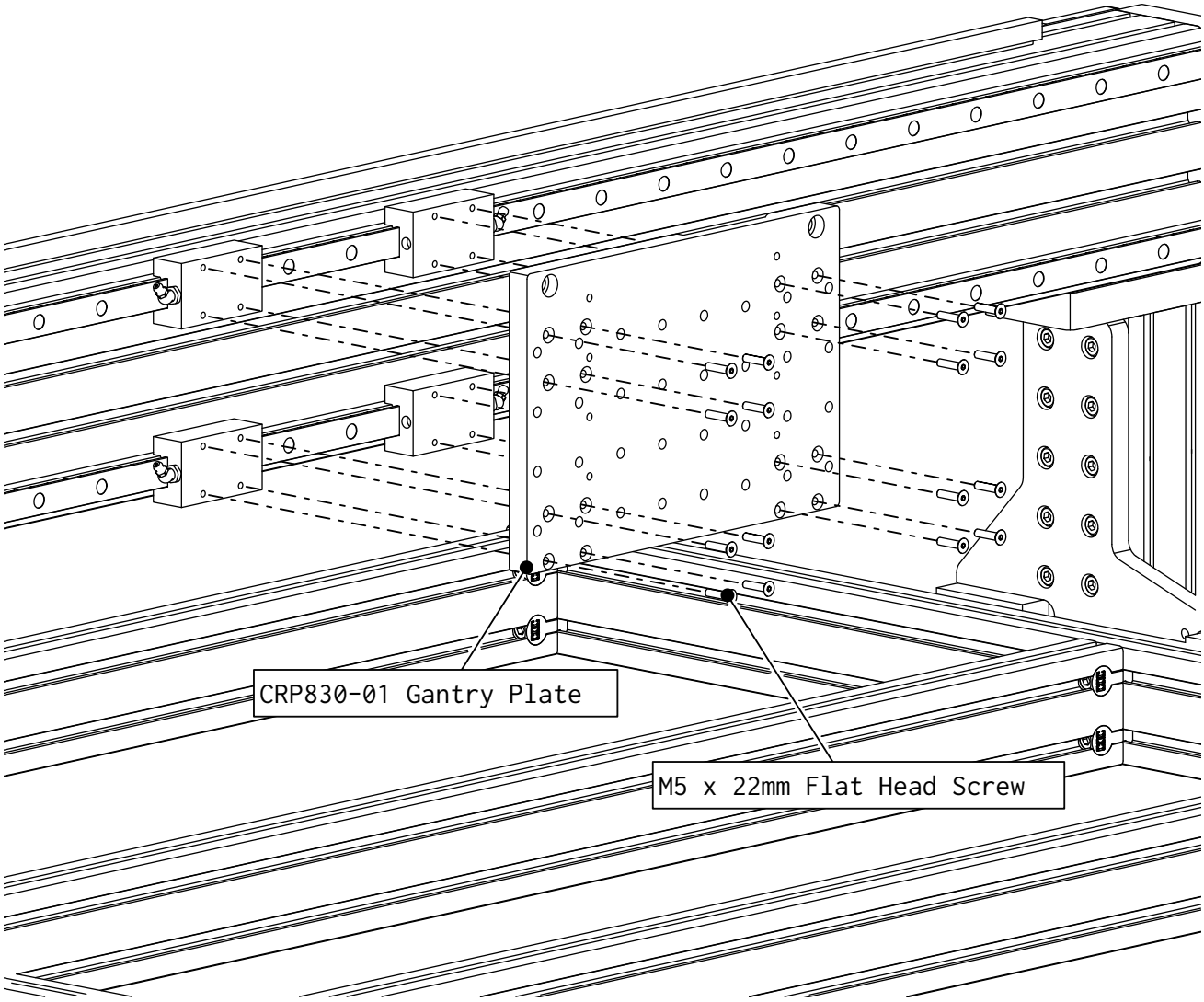


- Repeat these steps on the other side of the gantry.

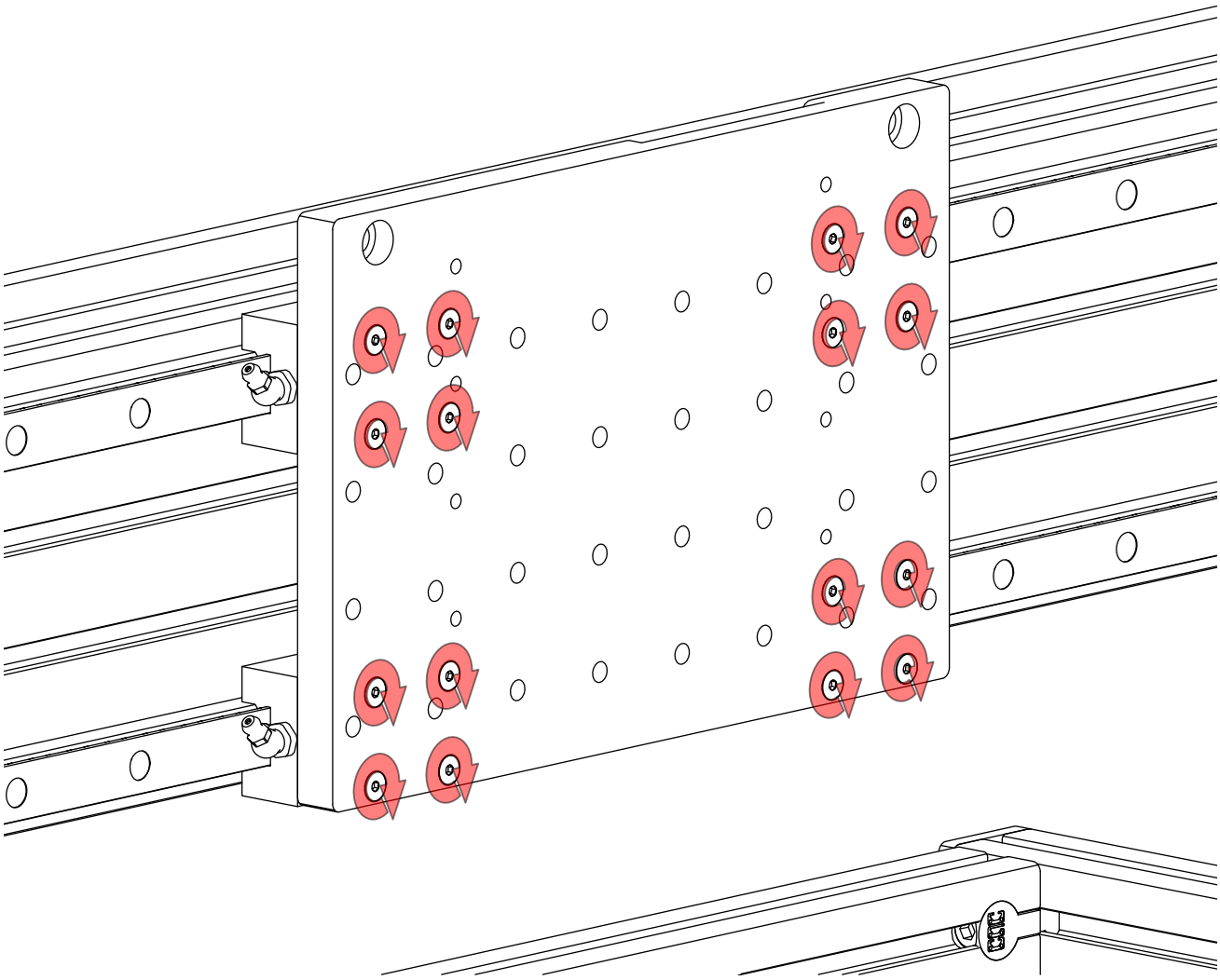
3.5 Gantry Carriage Installation

The following parts and bags will be used in this section:

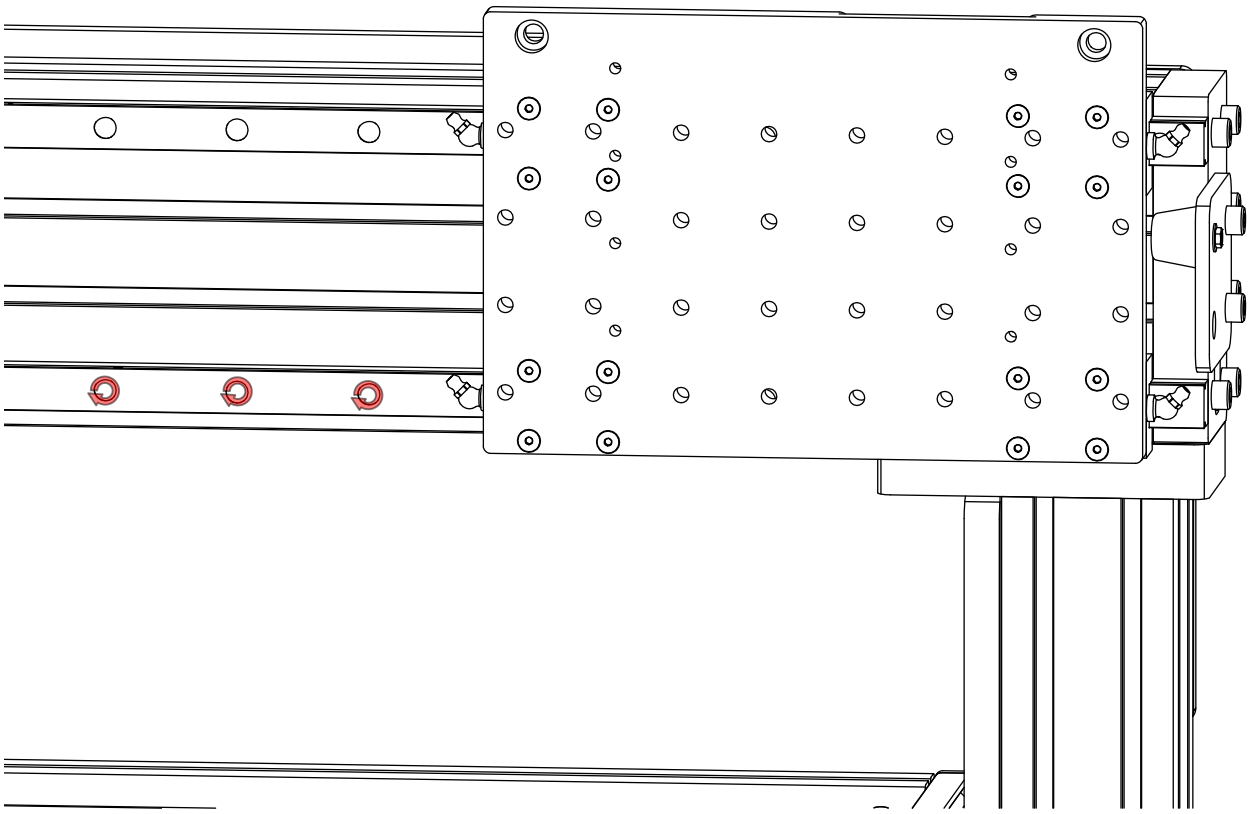
- (1) (CRP830-01) PRO Linear Main Gantry Plate
- (1) (CRP830-02) PRO Linear Gantry R&P Mount Plate
- (4) Linear Bearing Block
- (1) (CRP832-00-FAST) PRO Linear Gantry Carriage Fasteners
  - (16) M5 x 22mm Flat Head Screw
  - (2) M8 x 20mm Steel Dowel Pin
  - (2) M8 x 20mm Socket Head Cap Screw



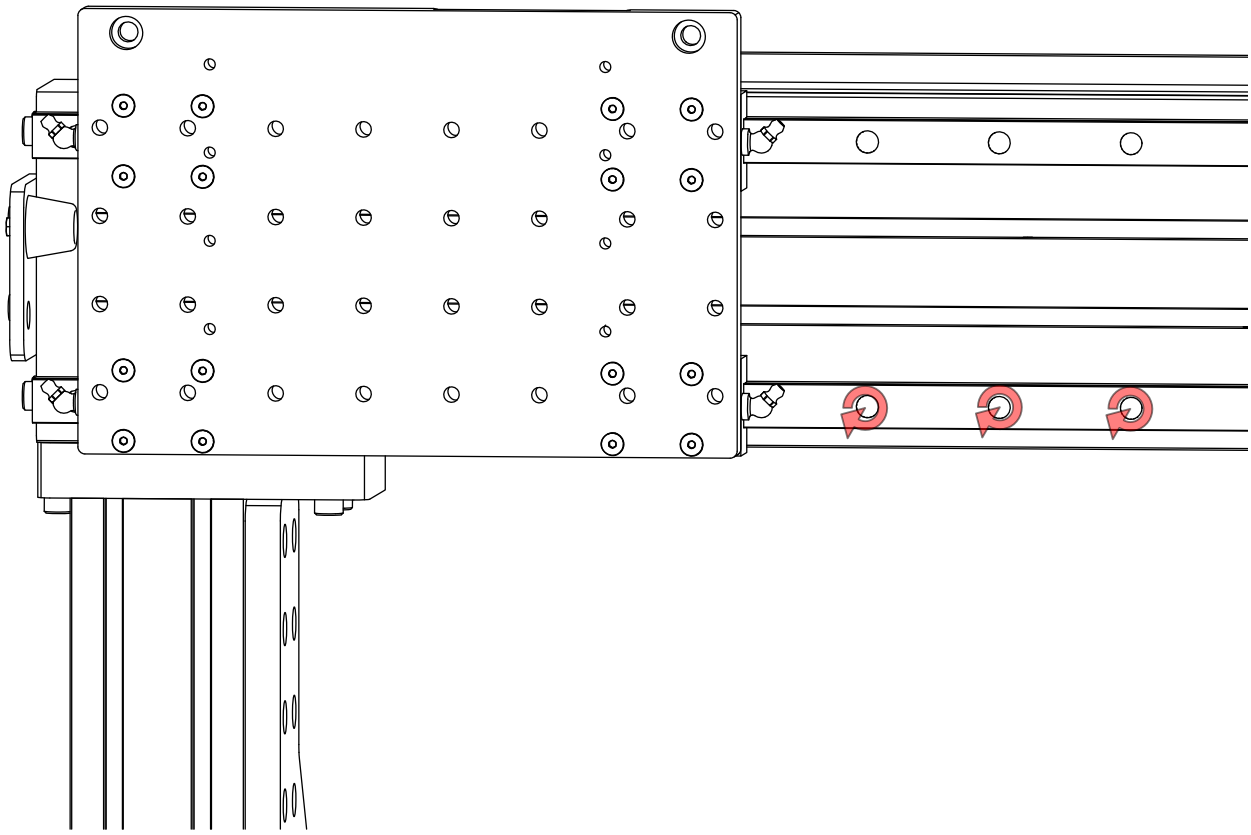
- Attach the Gantry Plate to the bearing blocks as indicated.



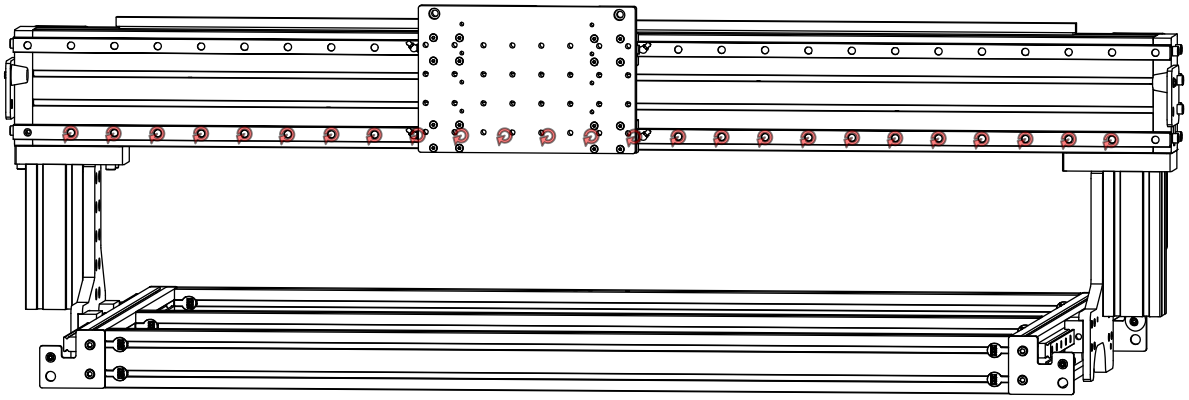
- Tighten the highlighted fasteners.



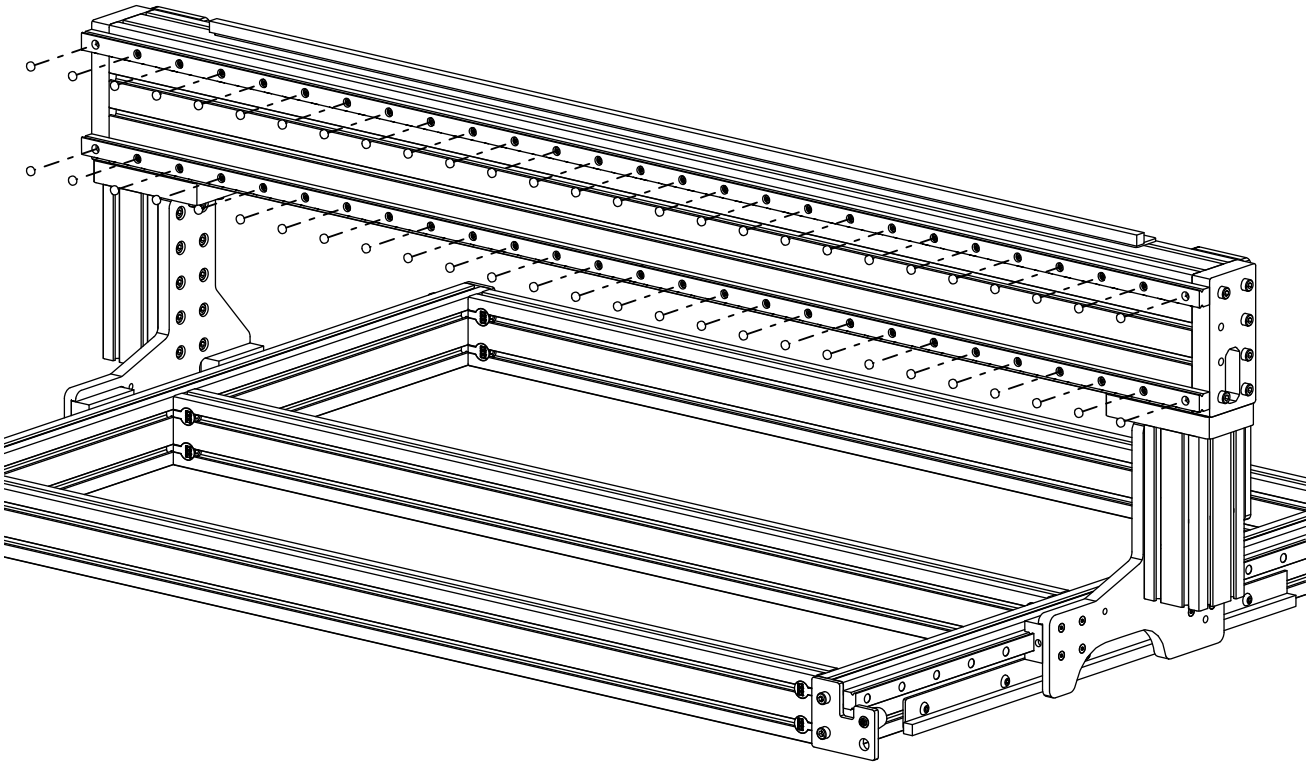
- Slide the Gantry Plate to one end of the gantry.
- Fully tighten the 3 fasteners near the gantry plate.



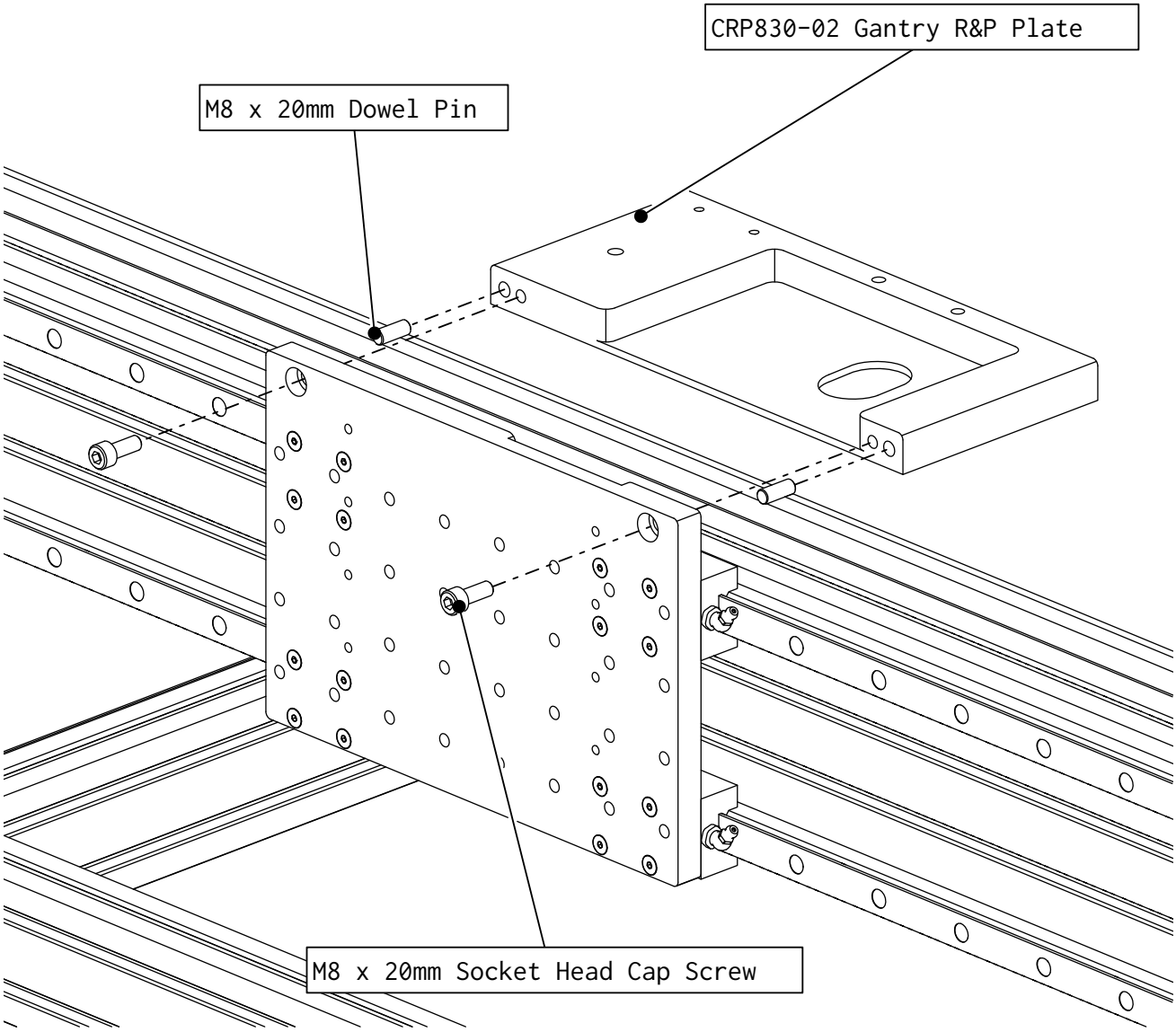
- Slide the Gantry Plate to the other end of the gantry.
- Fully tighten the 3 fasteners near the gantry plate.



- Fully tighten the highlighted fasteners.

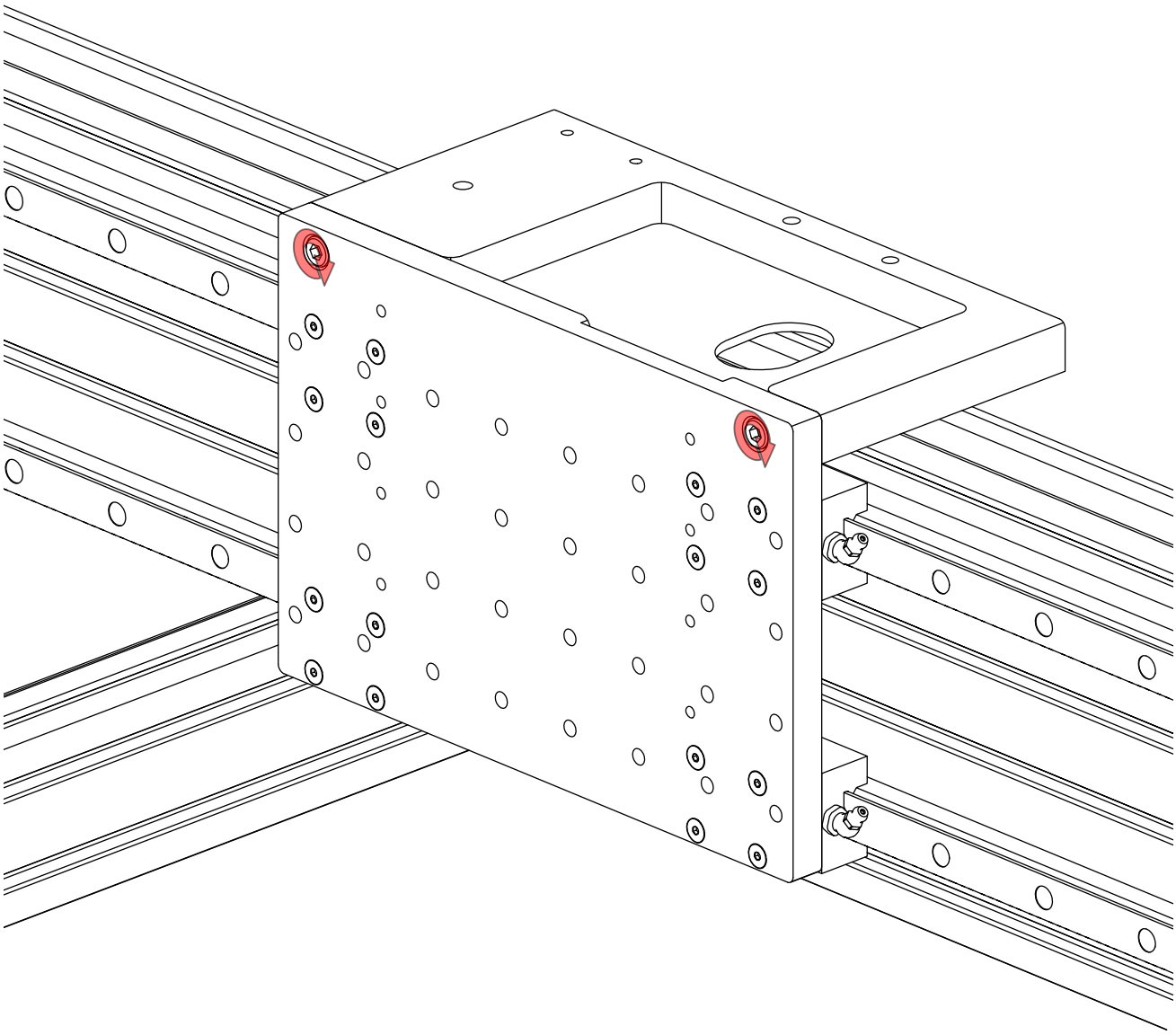


- Install covers in each of the rail counterbores, including the four without fasteners.



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

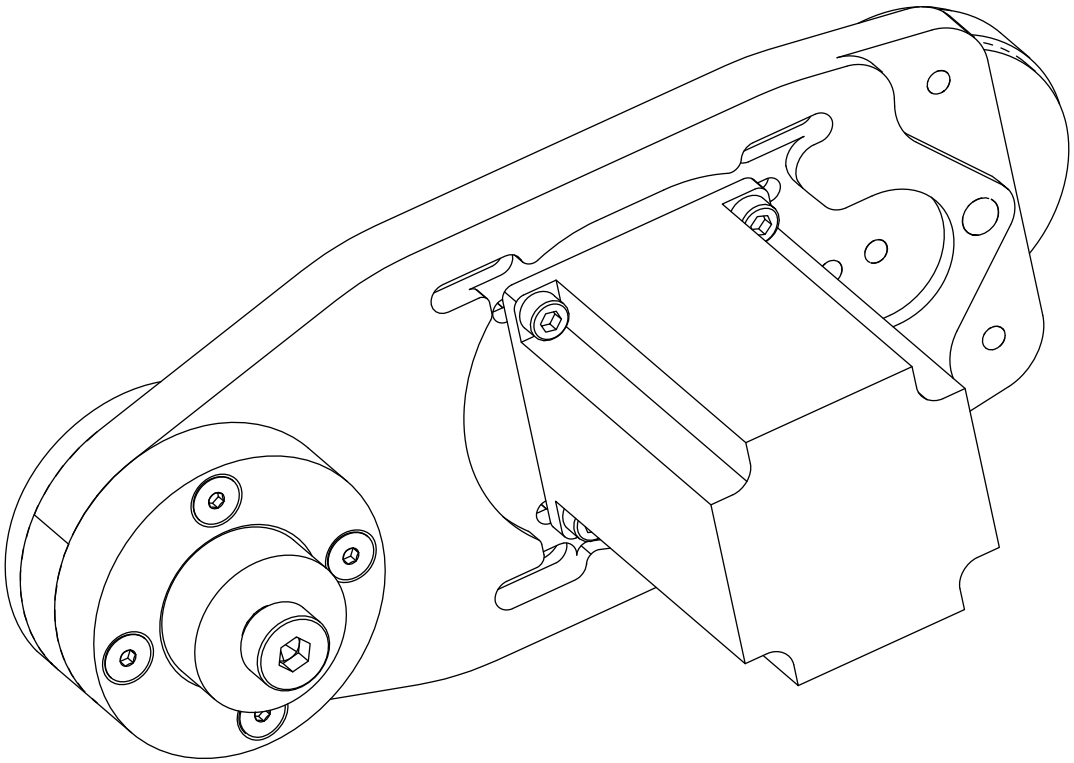
Note: The Gantry Plate has 2 dowel pins that seat in the Gantry R&P Plate.



- Tighten the highlighted fasteners.

4

Rack and Pinion Drive Installation

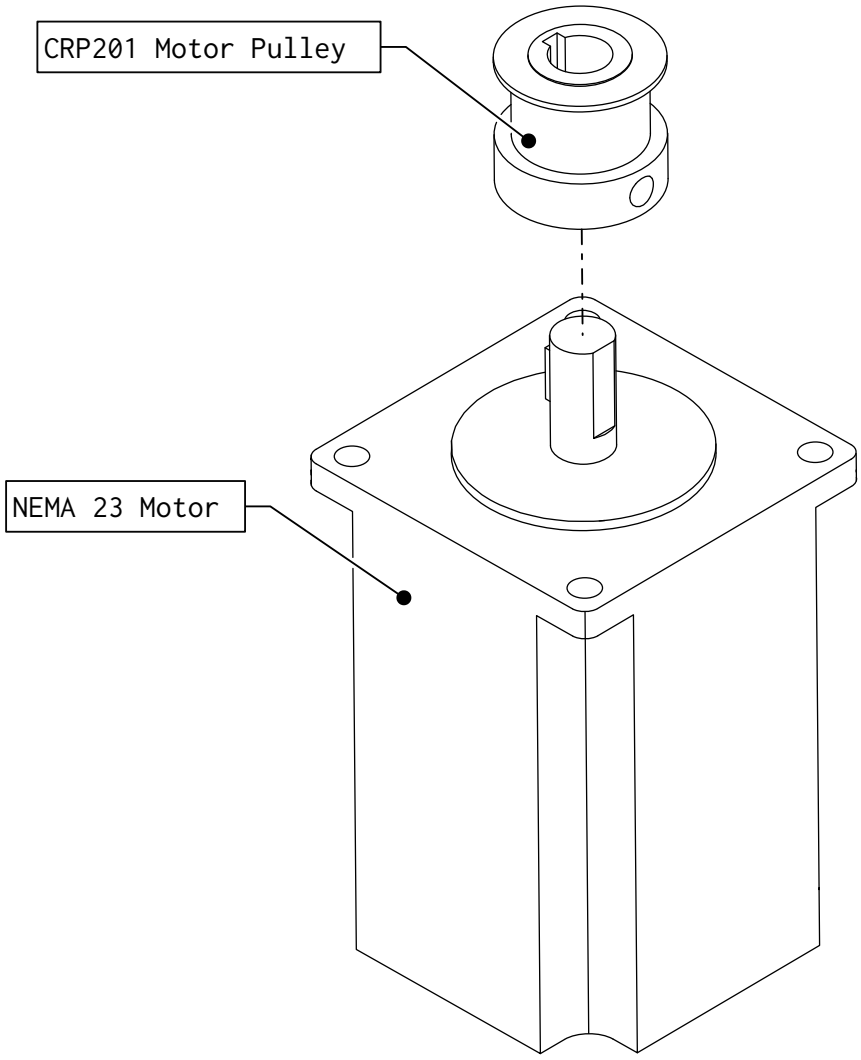


4.1 NEMA 23 Drive Assembly

The following parts and bags will be used in this section:

- (3) NEMA 23 Motor
- (3) (CRP320-00-01) PRO Rack and Pinion Drive Kit
  - (1) (CRP325-00) PRO Nema 23 Spindle Assembly
  - (1) (CRP320-00-BASE) PRO Rack and Pinion Drive Plate
  - (1) (CRP201-09) Nema 23 R&P Motor Pulley
  - (1) (CRP320-00-FAST-375) PRO R&P Fastener Kit, N23
    - (4) M5 x 14mm Socket Head Cap Screw
    - (1) (CRP320-03) PRO Rack and Pinion Cam Tensioner
    - (1) (CSA201-8C) 1/2" Eccentric Collar Bearing Cap
    - (1) (CRP320-08) PRO Pivot Shaft, 2"
    - (4) M5 Hex Nut
    - (1) 5/16" Flat Washer
    - (1) Nema 23 R&P Drive Belt
    - (1) M6 x 20mm Socket Head Cap Screw

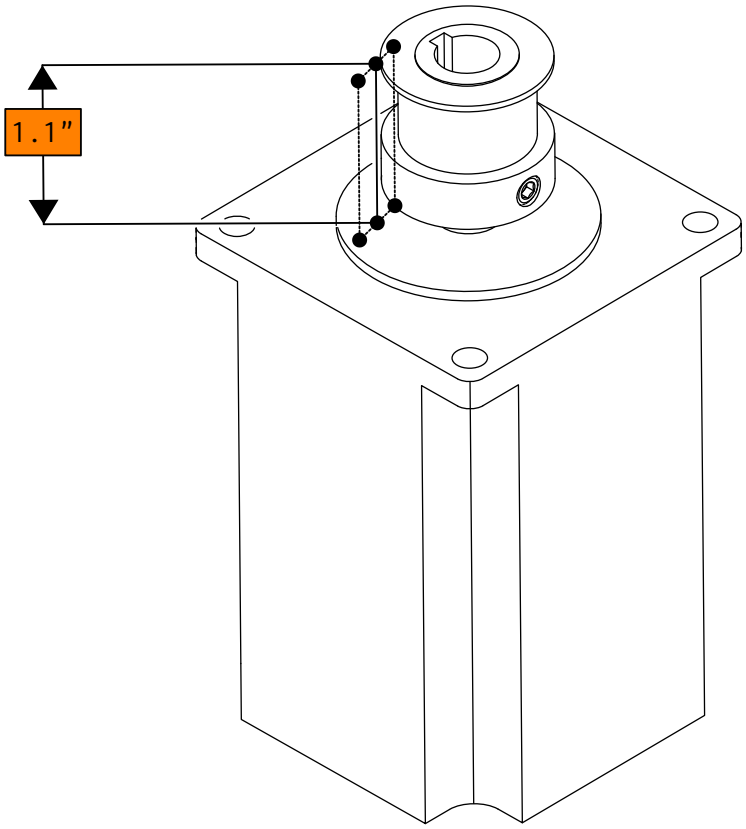
Note: Skip to the next section if you purchased the NEMA 34 Motor Kit.



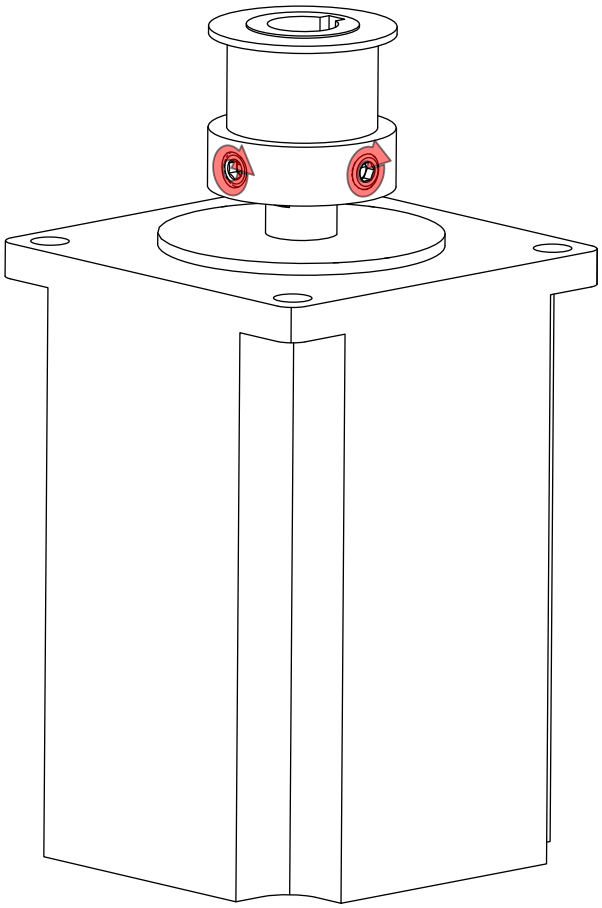
- Slide the motor pulley onto the motor shaft as indicated.

  Note: A simplified model is shown here, the motor pulley has gear teeth.

  Note: Please ensure that motor keys are installed into the motor shaft prior to attaching the motor pulley (motor keys are included either separately in a small bag, or pre-installed in the motor shafts).

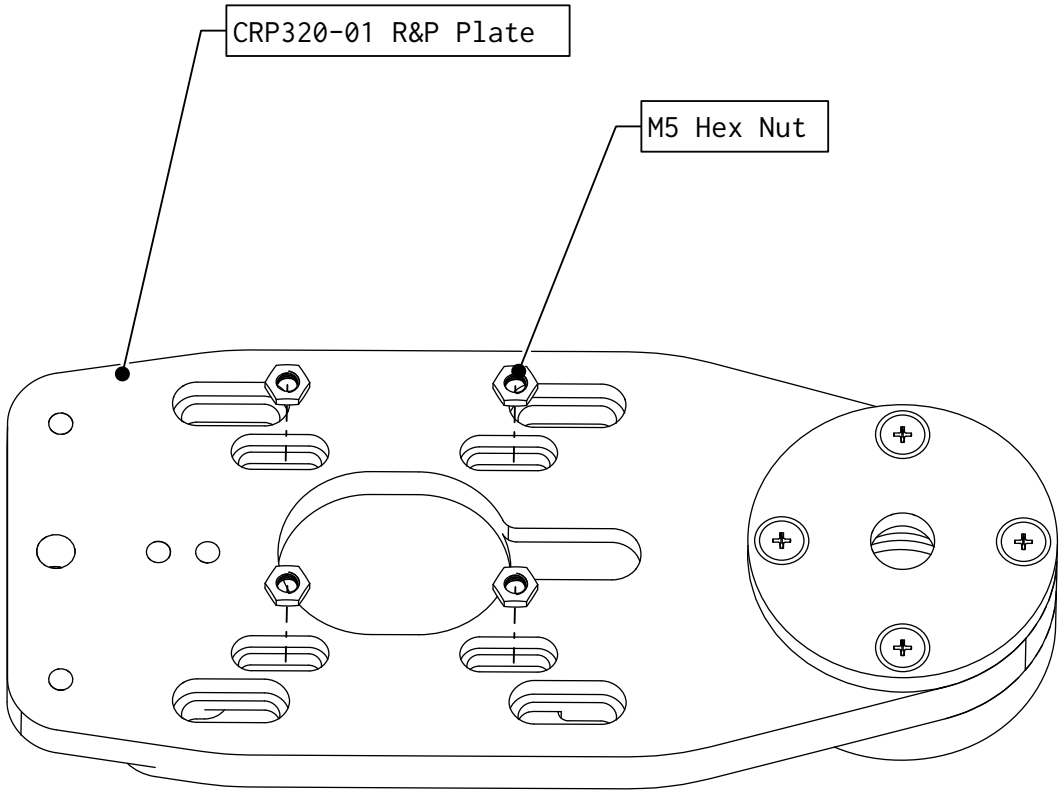


- Adjust the motor pulley such that the top of the pulley is 1.1" (28mm) from the motor flat.

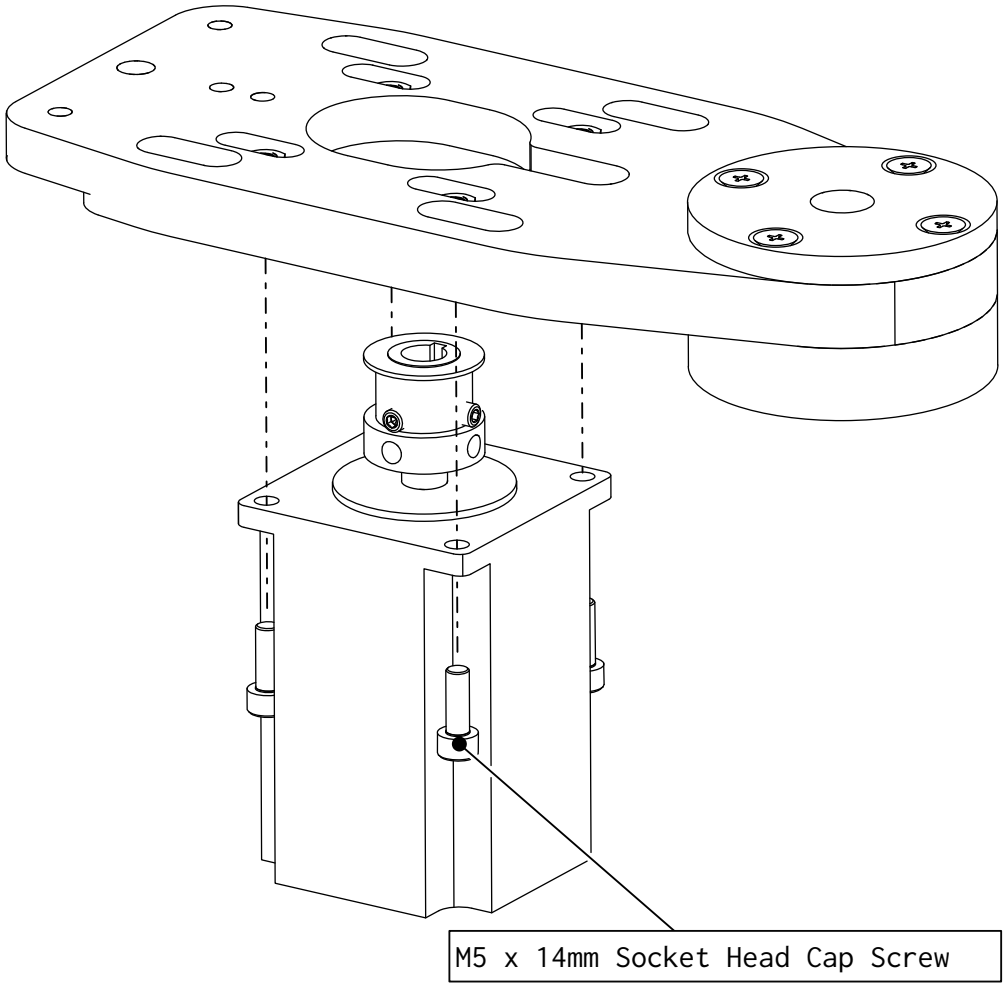


- Apply blue thread locker to the set screws. (Not Included)
- Tighten the highlighted fasteners.

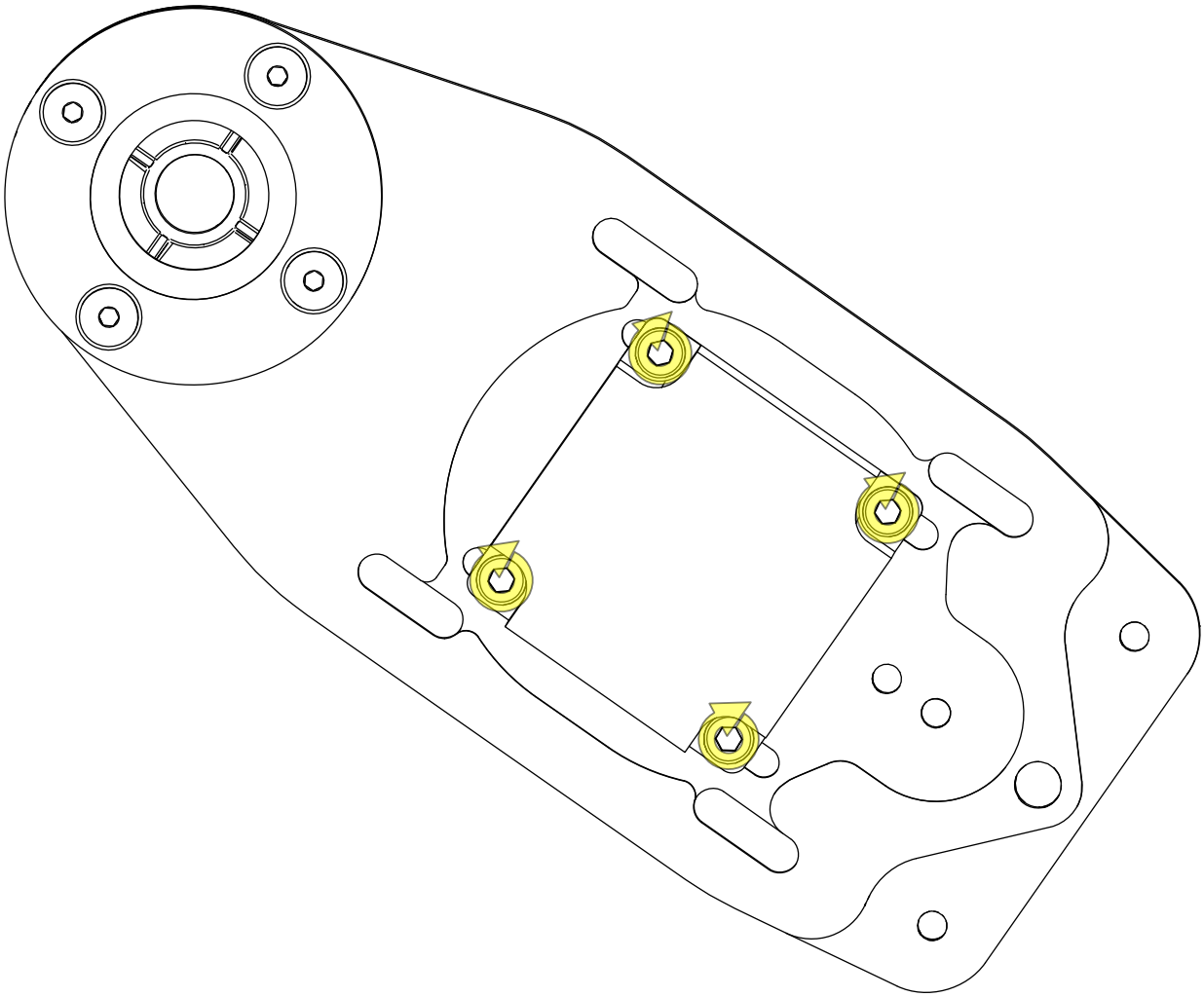
Note: Do not over tighten but ensure fasteners completely seated.



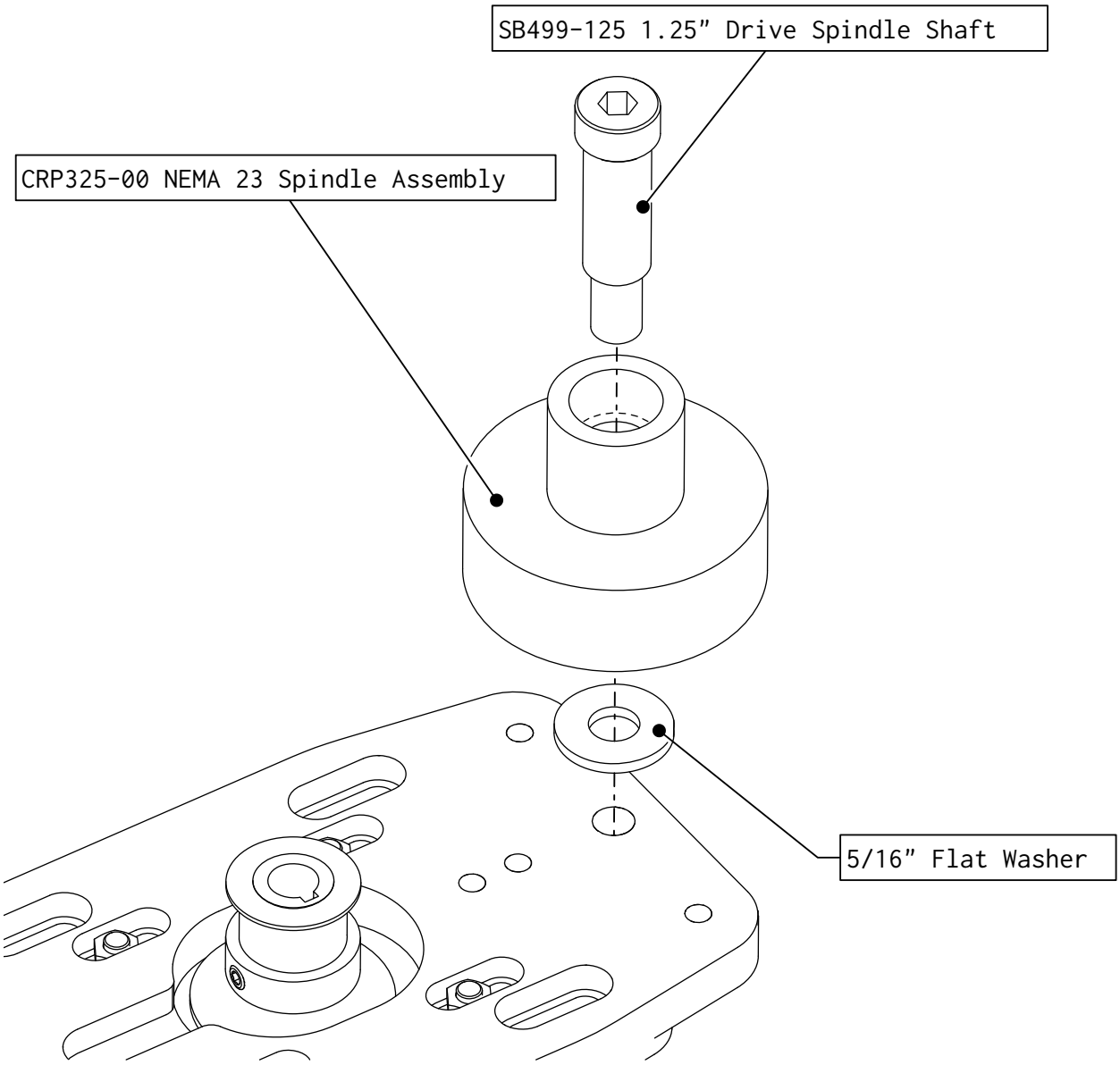
- Carefully set hex nuts in the indicated slots.



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



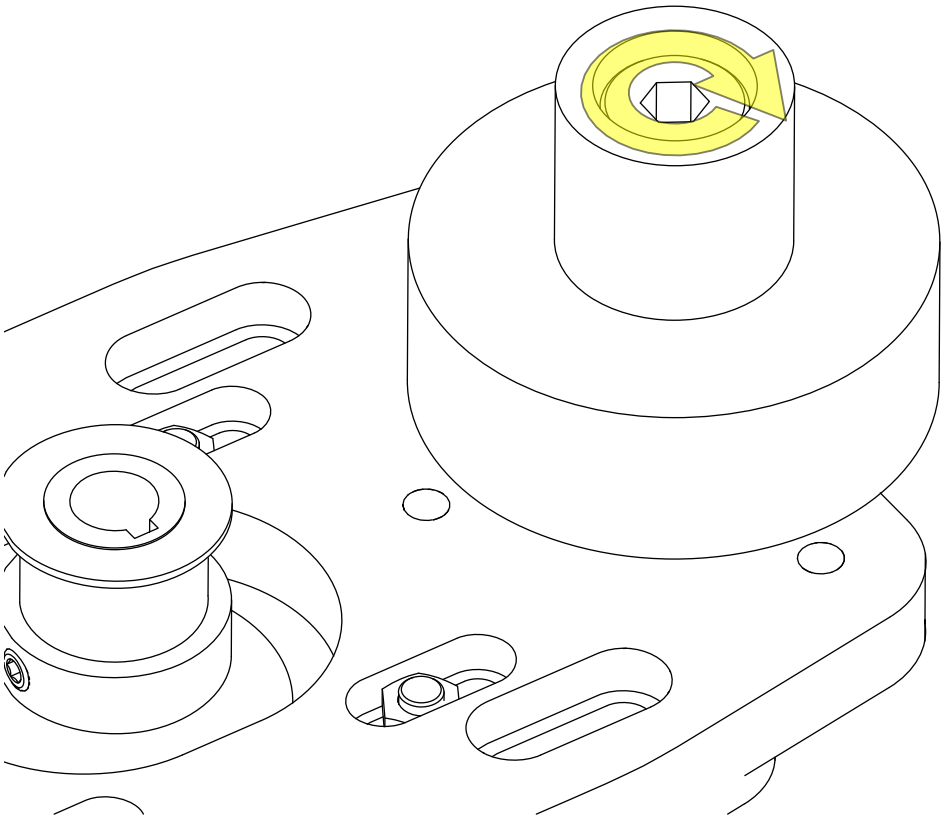
- Partially tighten the highlighted fasteners.



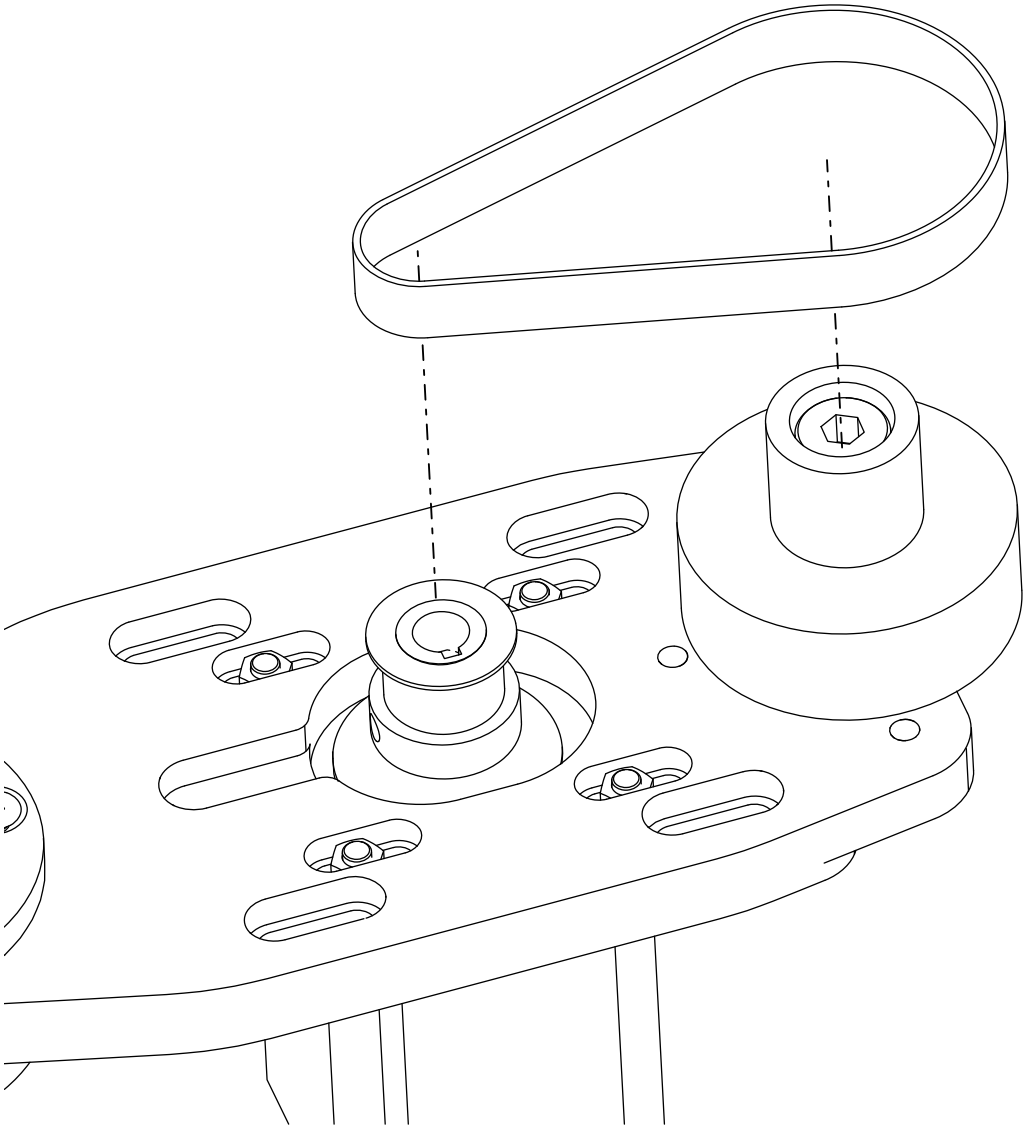
- Attach the drive spindle to the R&P Plate as indicated.

Note: A simplified model is shown here, the drive spindle has gear teeth.

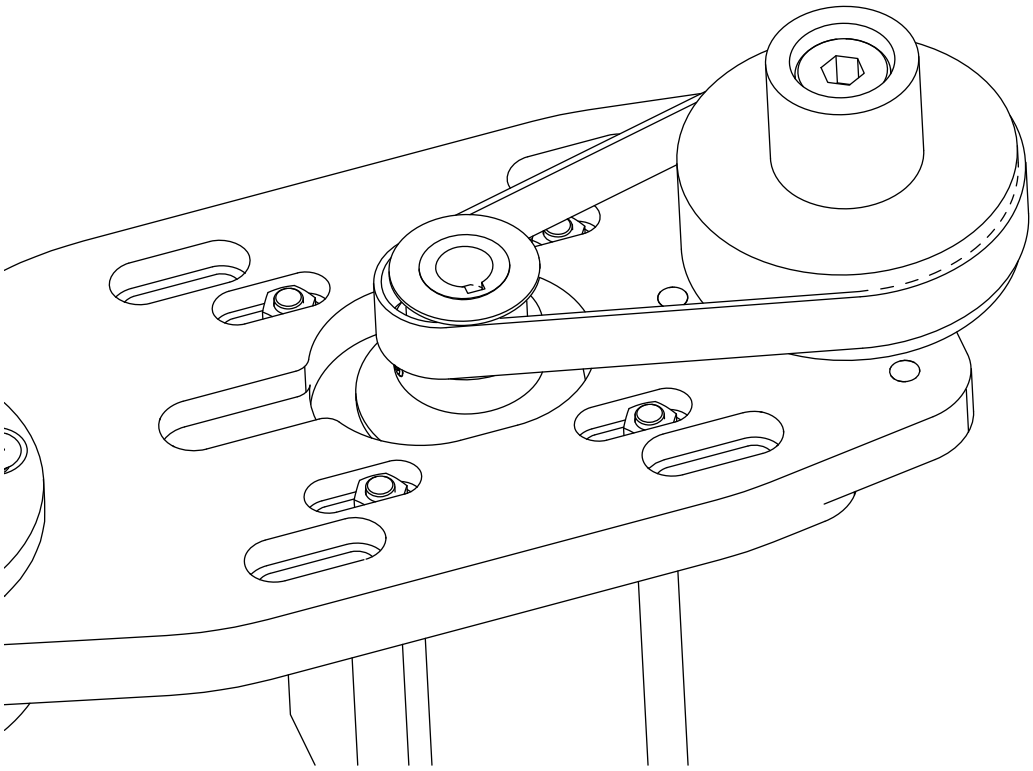
Note: Your spindle may have the shaft installed in the spindle already, held in place with a plastic hex nut for protection during shipping. The plastic hex nut must be removed prior to installing your spindle.



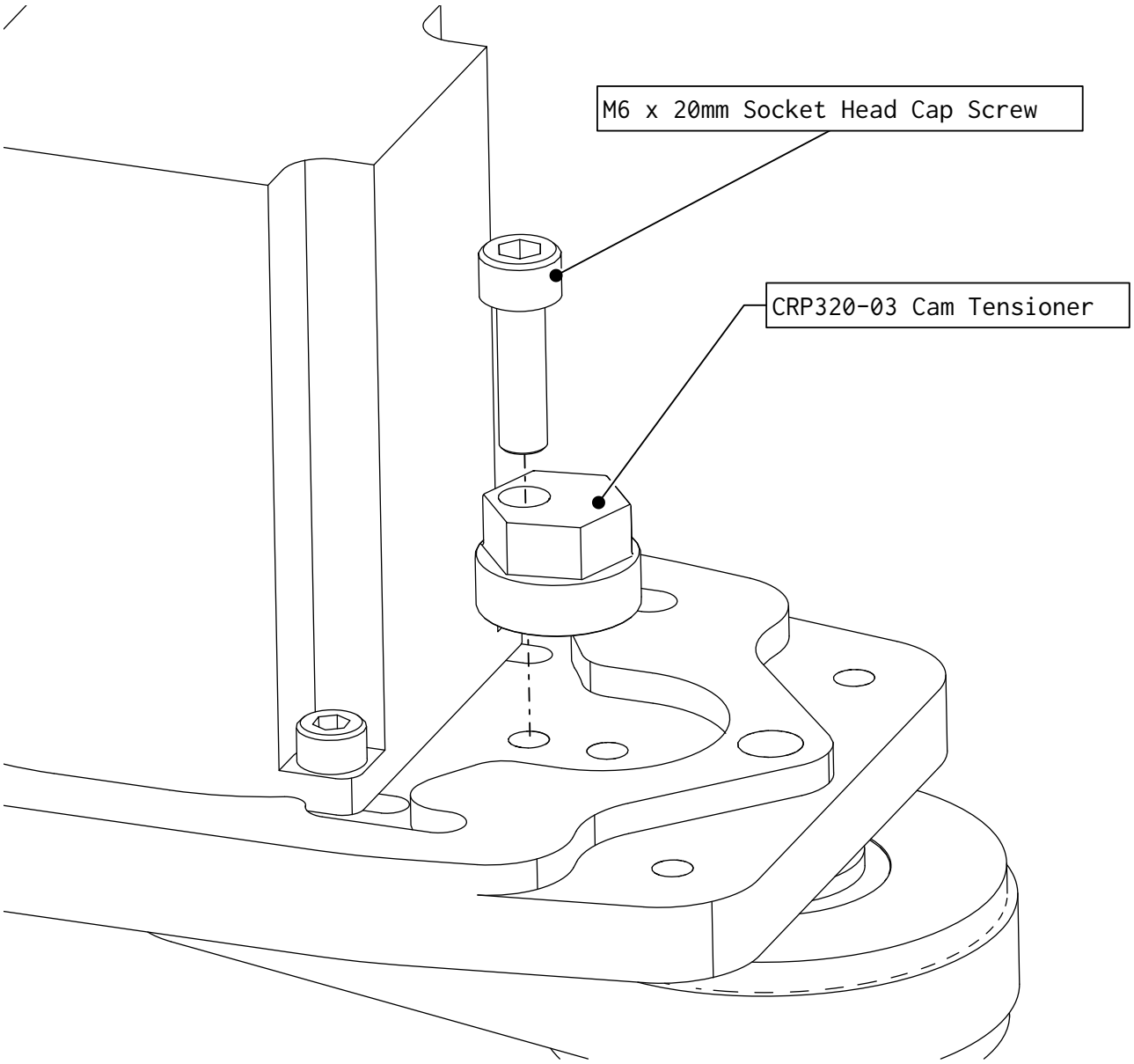
- Partially tighten the highlighted fastener.



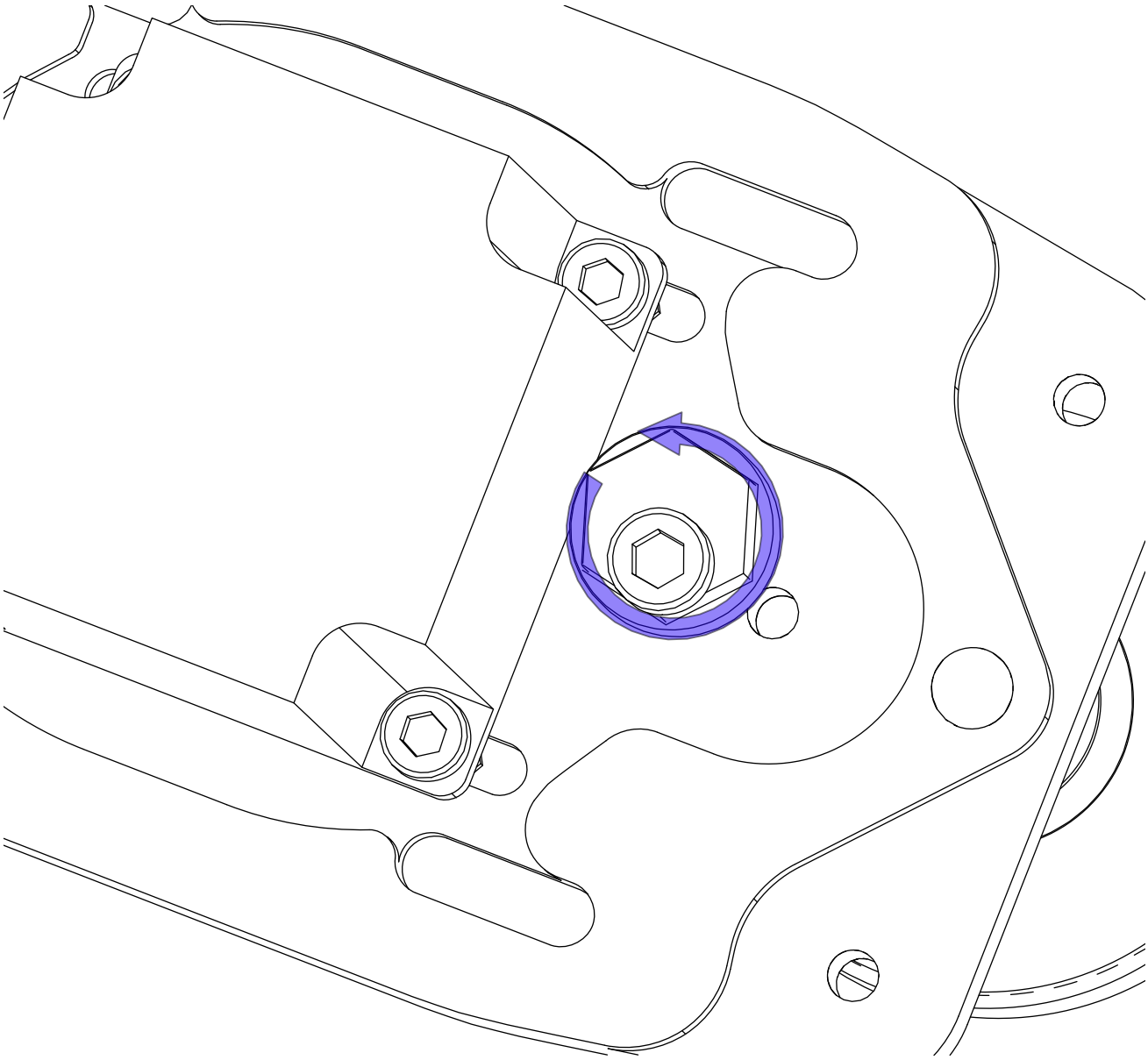
- Slide the drive belt around the motor pulley and drive spindle.



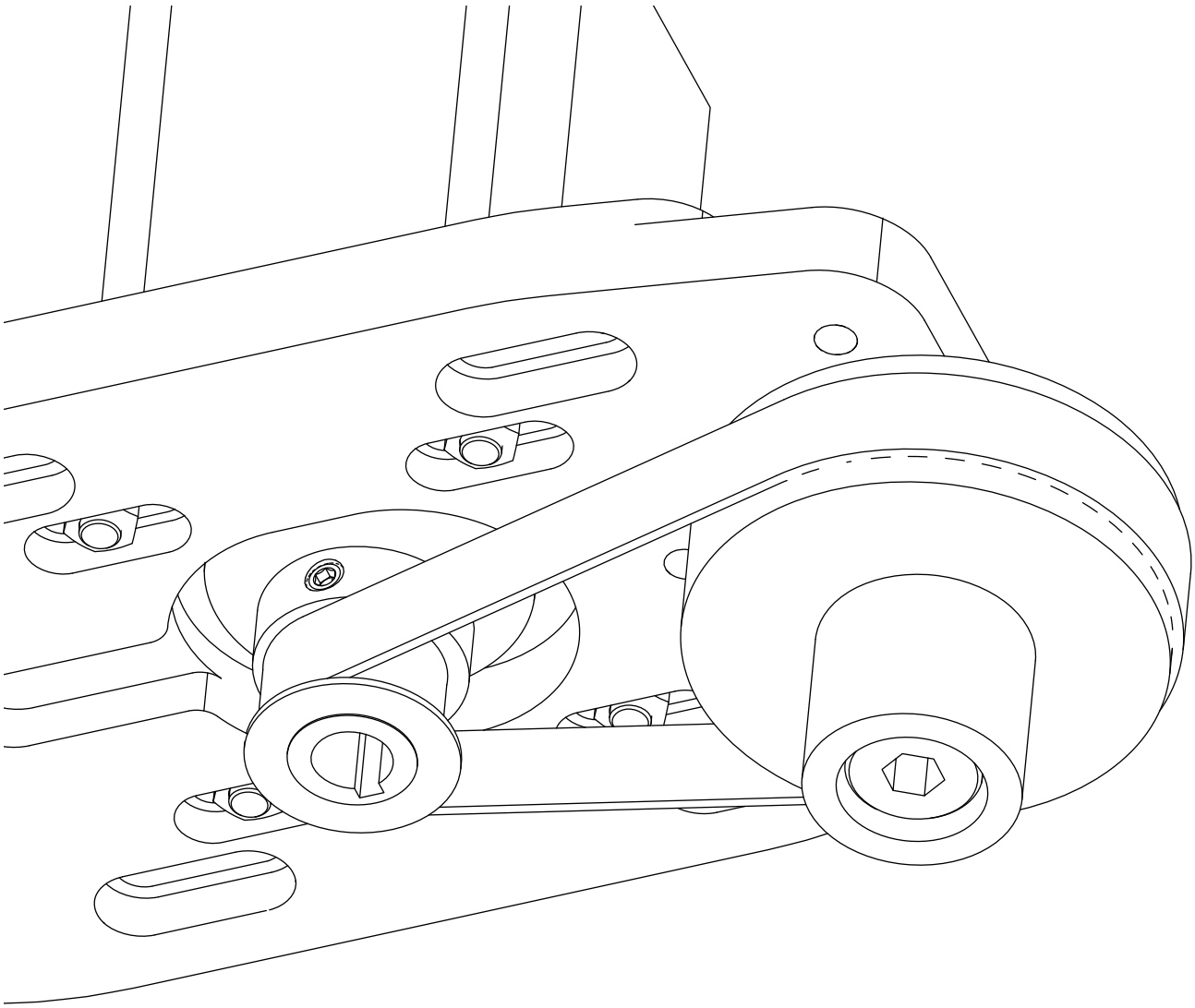
- Slide the motor closer to the drive spindle if necessary.



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

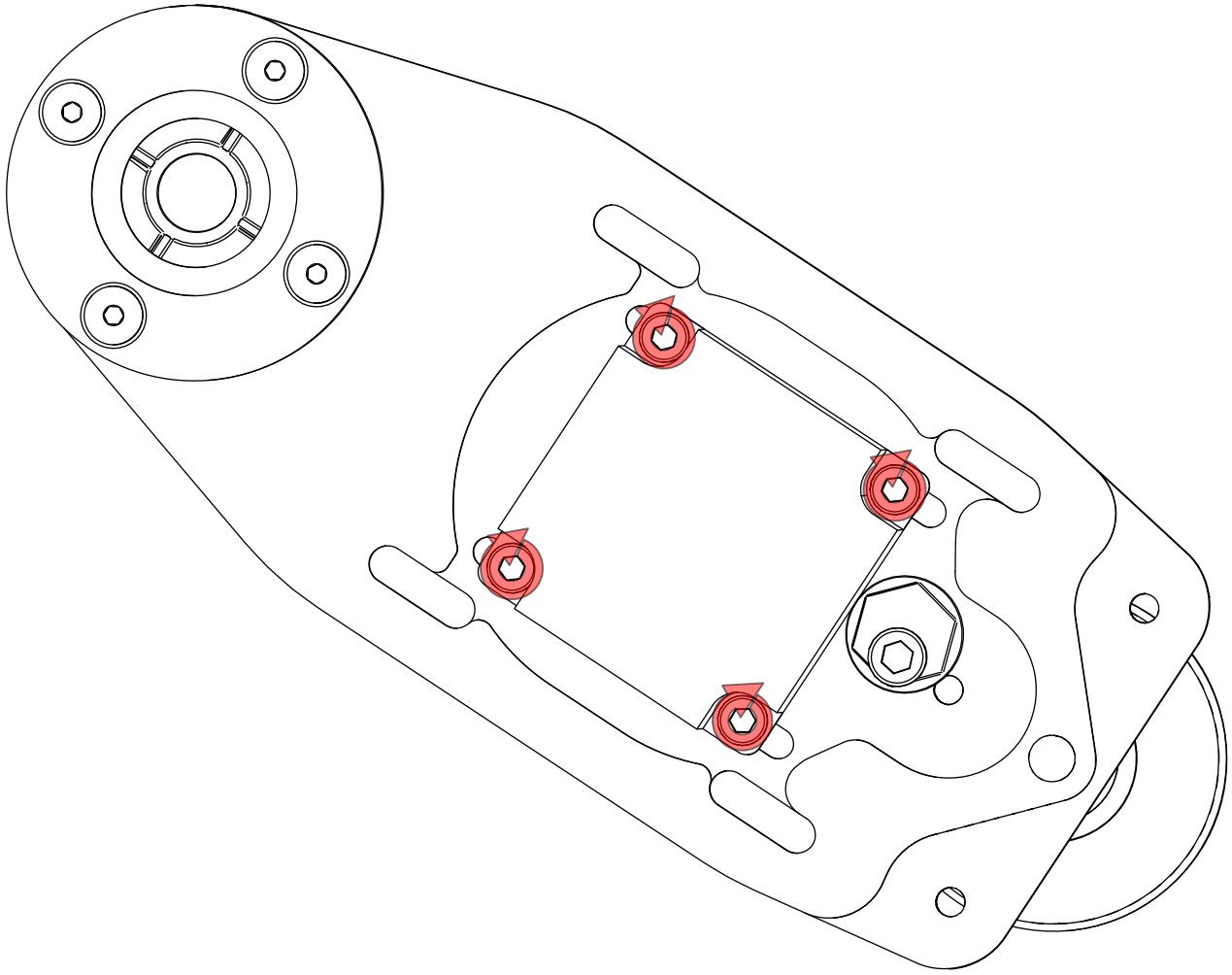


- Use a 16mm wrench to turn the Tensioner Cam against the motor.



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

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



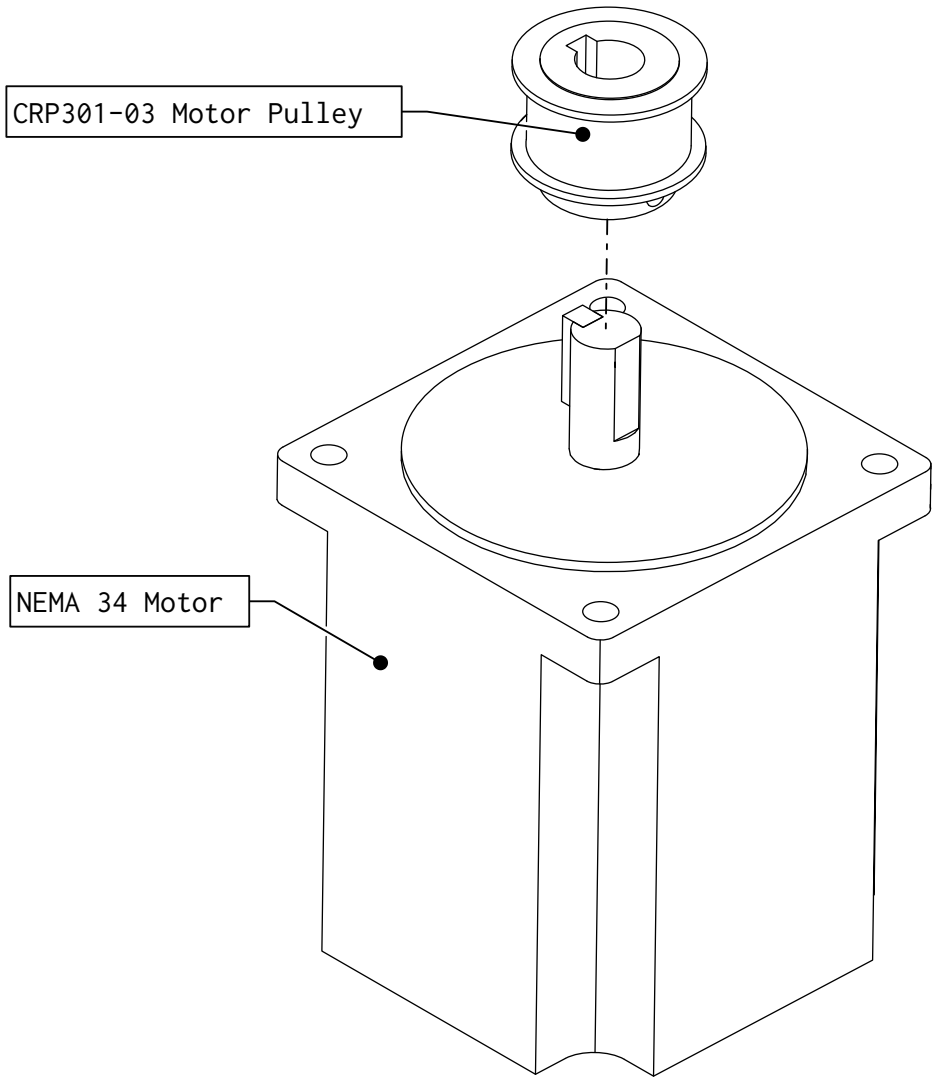
- Fully tighten the highlighted fasteners.

4.2 NEMA 34 Drive Assembly

The following parts and bags will be used in this section:

- (3) NEMA 34 Motor
- (3) (CRP320-00-01) PRO Rack and Pinion Drive Kit
  - (1) (CRP324-00) PRO Nema 34 Spindle Assembly
  - (1) (CRP320-00-BASE) PRO Rack and Pinion Drive Plate
  - (1) (CRP301-03) Nema 34 R&P Motor Pulley
  - (1) (CRP320-00-FAST-500) PRO R&P Fastener Kit, N34
    - (5) M6 x 22mm Socket Head Cap Screw
    - (1) (CRP320-03) PRO Rack and Pinion Cam Tensioner
    - (1) (CSA201-8C) 1/2" Eccentric Collar Bearing Cap
    - (1) (CRP320-08) PRO Pivot Shaft, 2"
    - (4) M6 Hex Nut
    - (1) 5/16" Flat Washer
    - (1) Nema 34 R&P Drive Belt

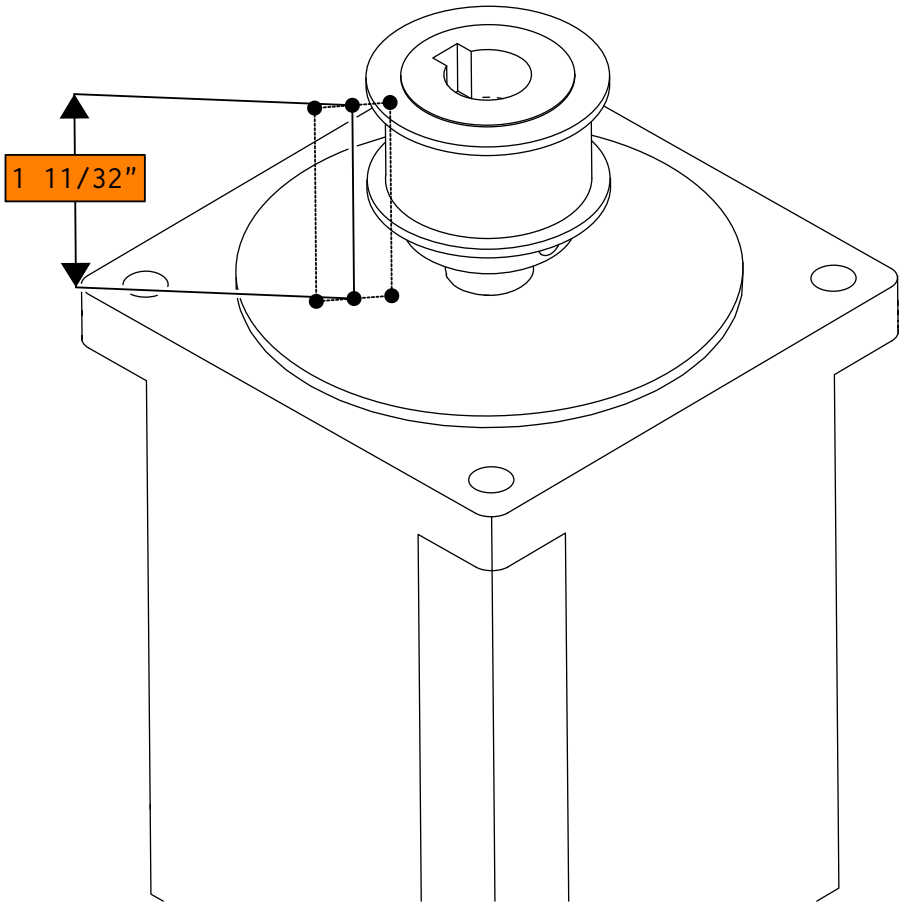
Note: Skip to the next section if you purchased the NEMA 23 Motor Kit.



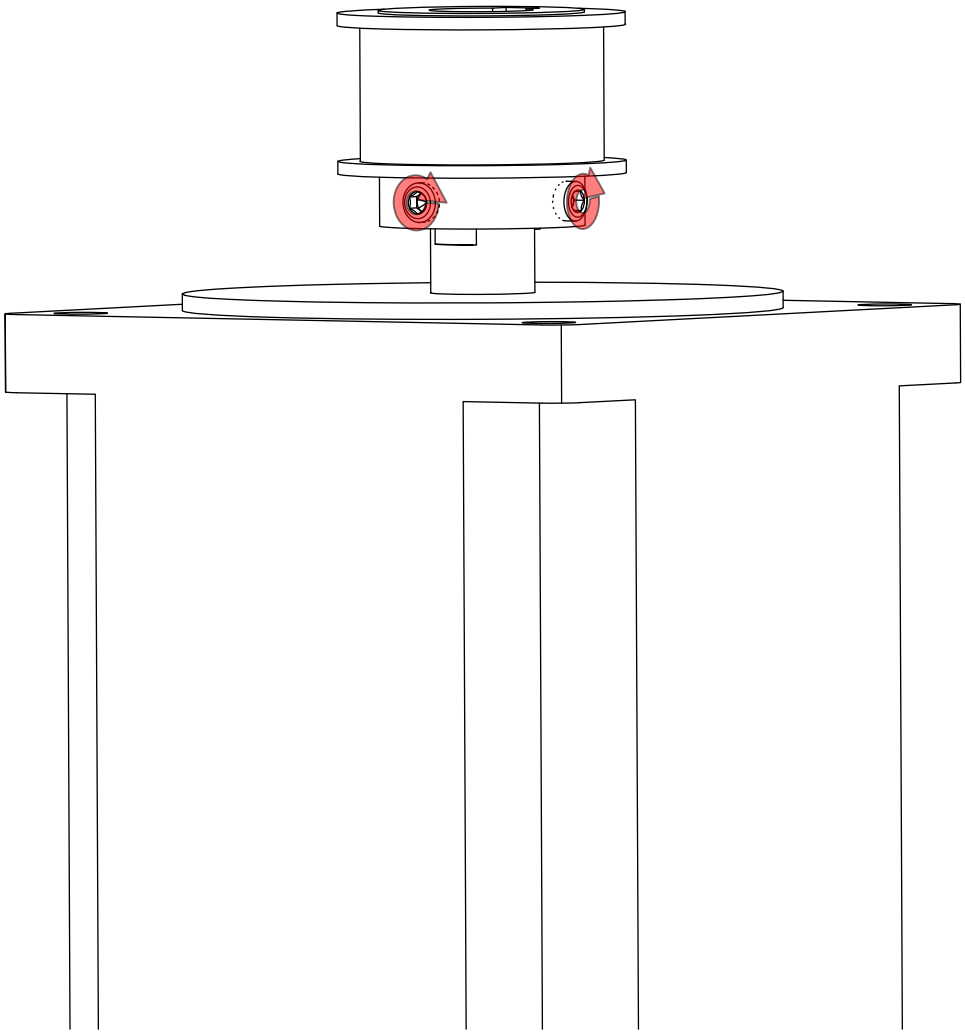
- Slide the motor pulley onto the motor shaft as indicated.

  Note: A simplified model is shown here, the motor pulley has gear teeth.

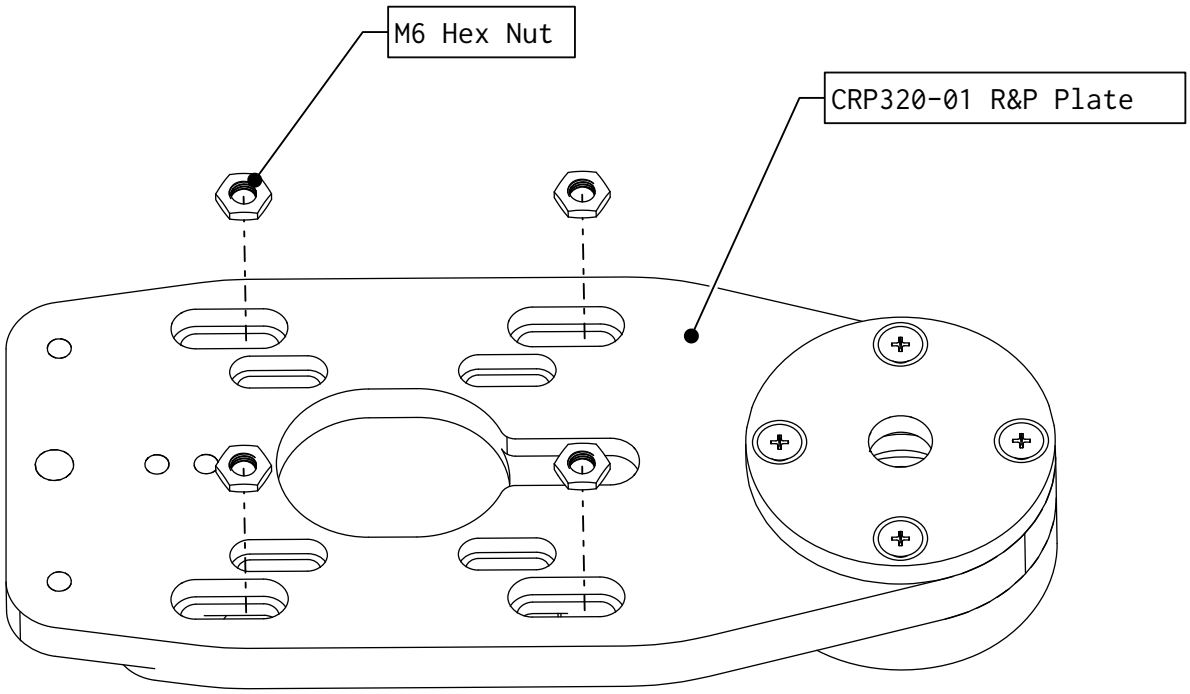
  Note: Please ensure that motor keys are installed into the motor shaft prior to attaching the motor pulley (motor keys are included either separately in a small bag, or pre-installed in the motor shafts).



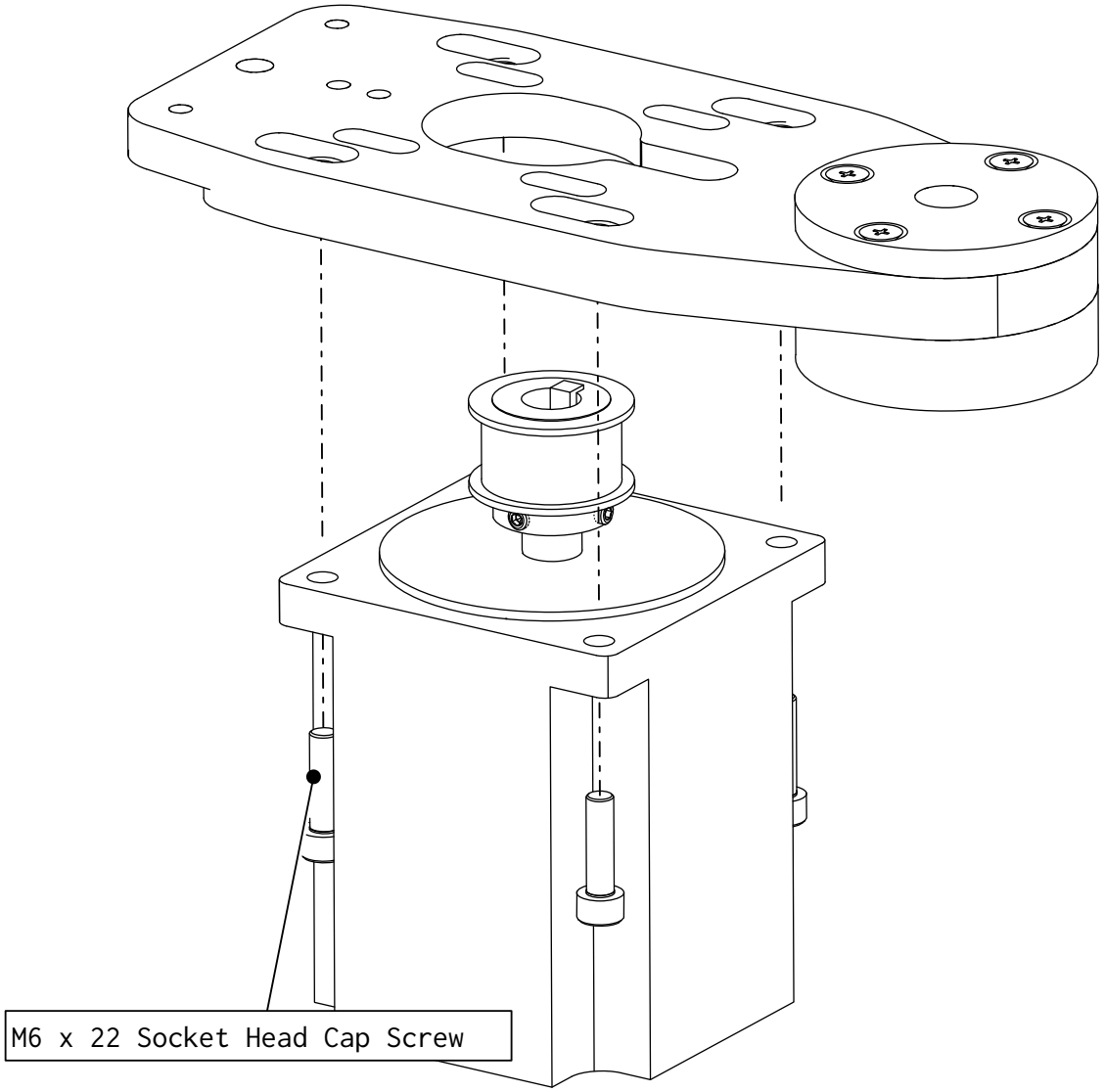
- Adjust the motor pulley such that the top of the pulley is 1 11/32" (34mm) from the motor flat.



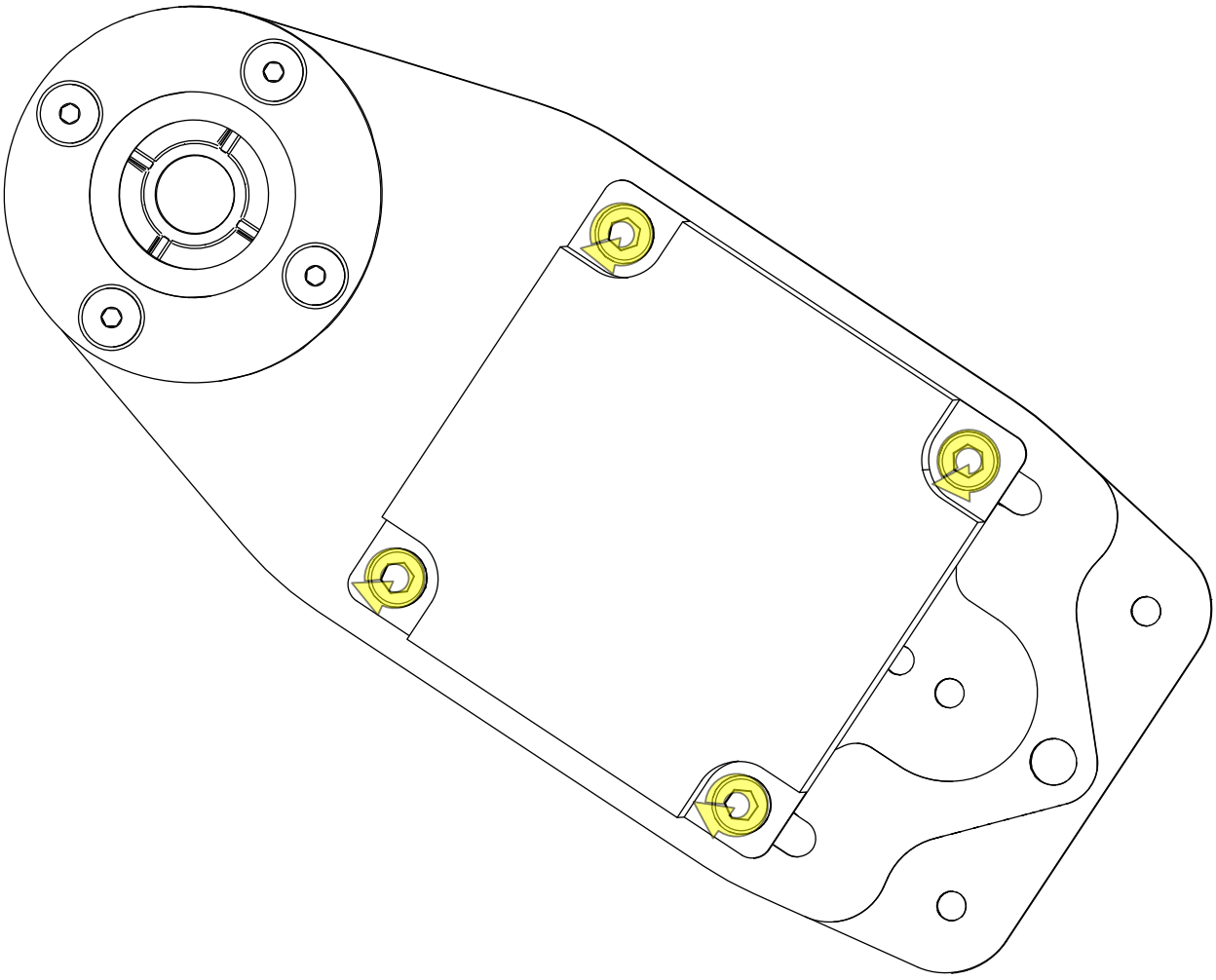
- Apply blue thread locker to the set screws. (Not Included)
- Tighten the highlighted fasteners.



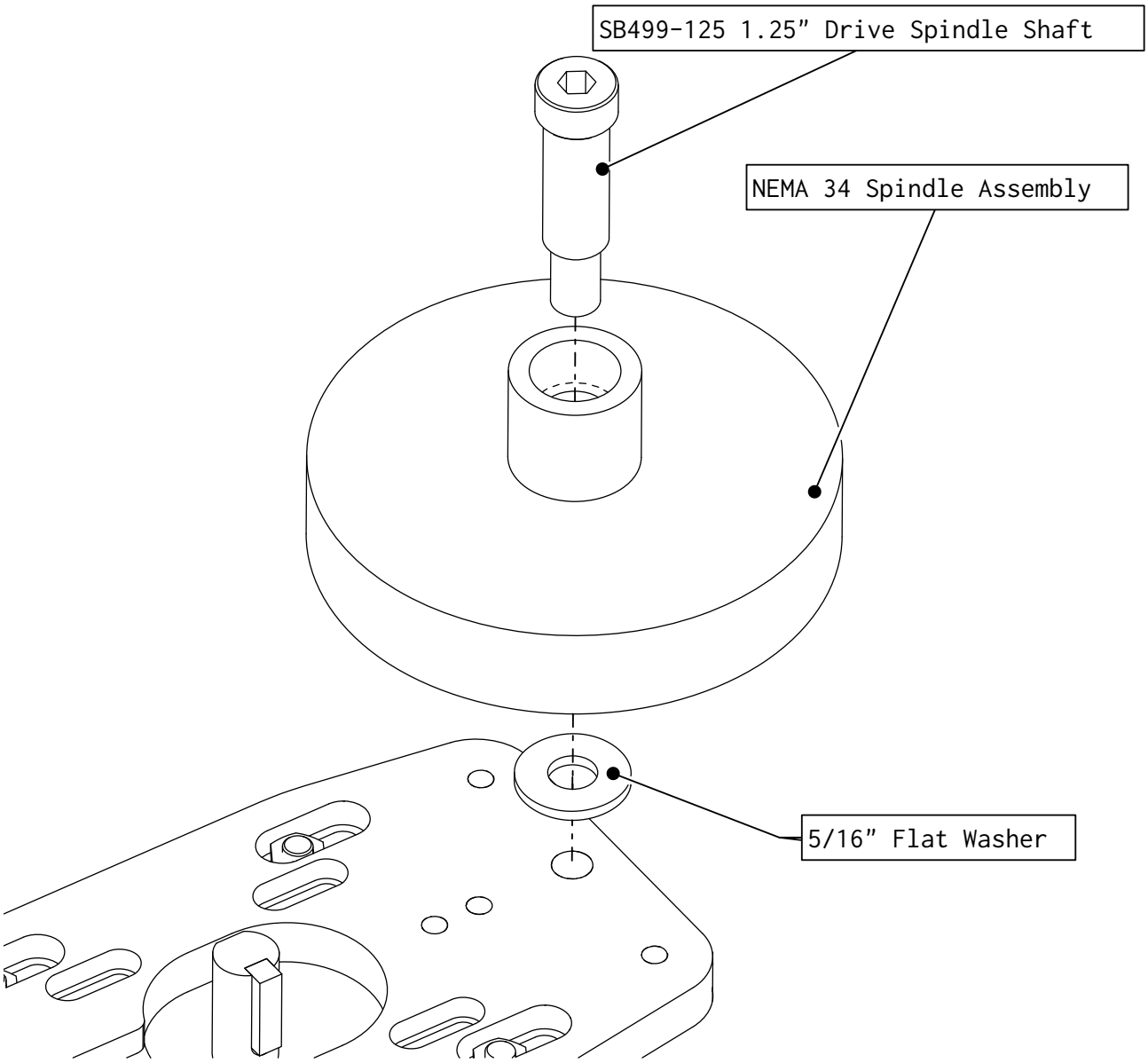
- Carefully set hex nuts in the indicated slots.



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



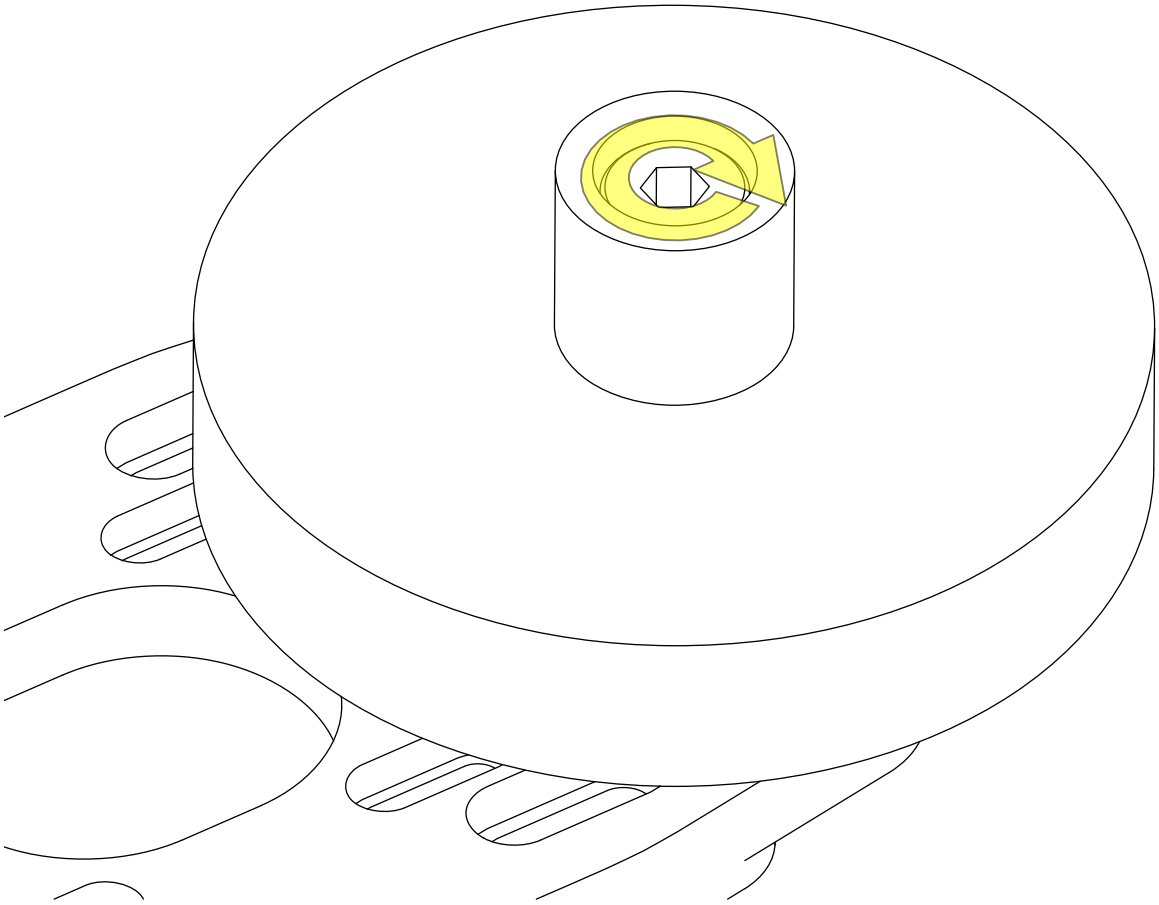
- Partially tighten the highlighted fasteners.



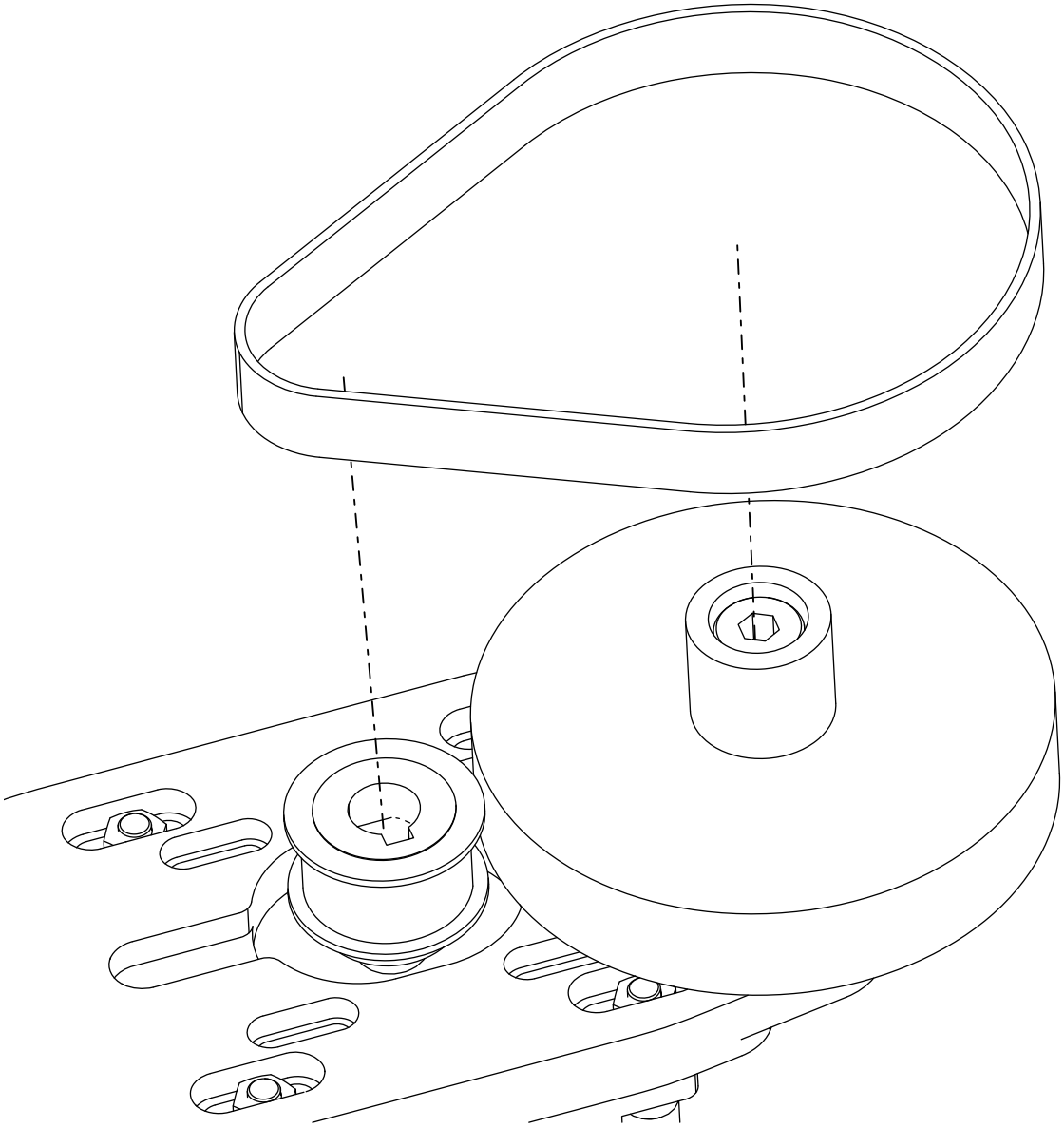
- Attach the drive spindle to the R&P Plate as indicated.

Note: A simplified model is shown here, the drive spindle has gear teeth.

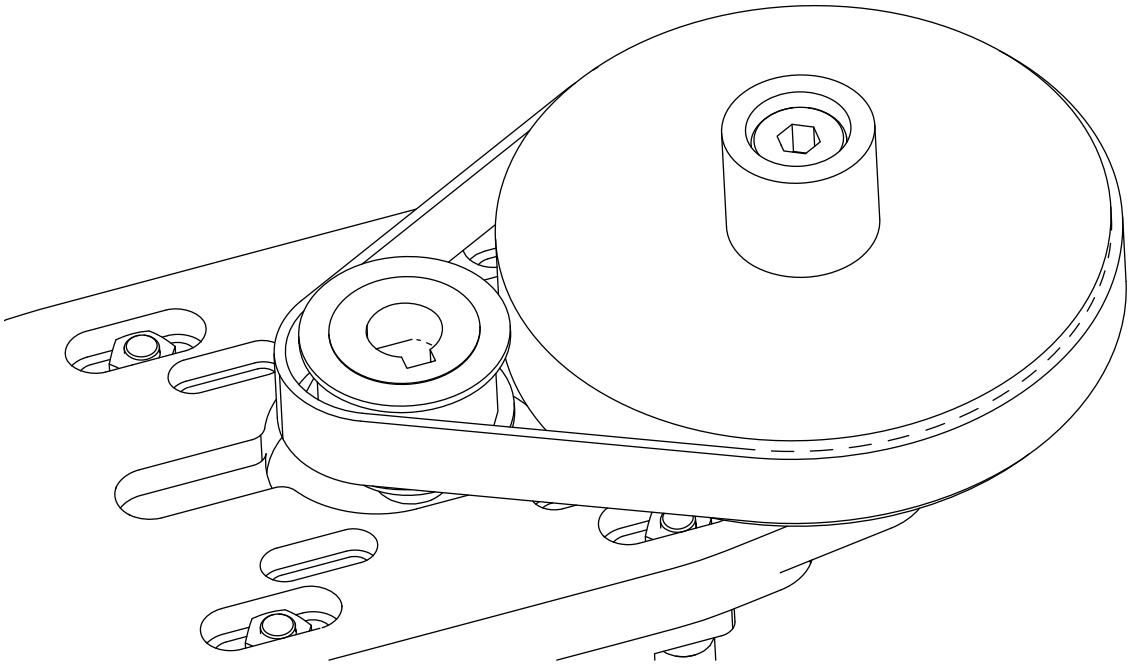
Note: Your spindle may have the shaft installed in the spindle already, held in place with a plastic hex nut for protection during shipping. The plastic hex nut must be removed prior to installing your spindle.



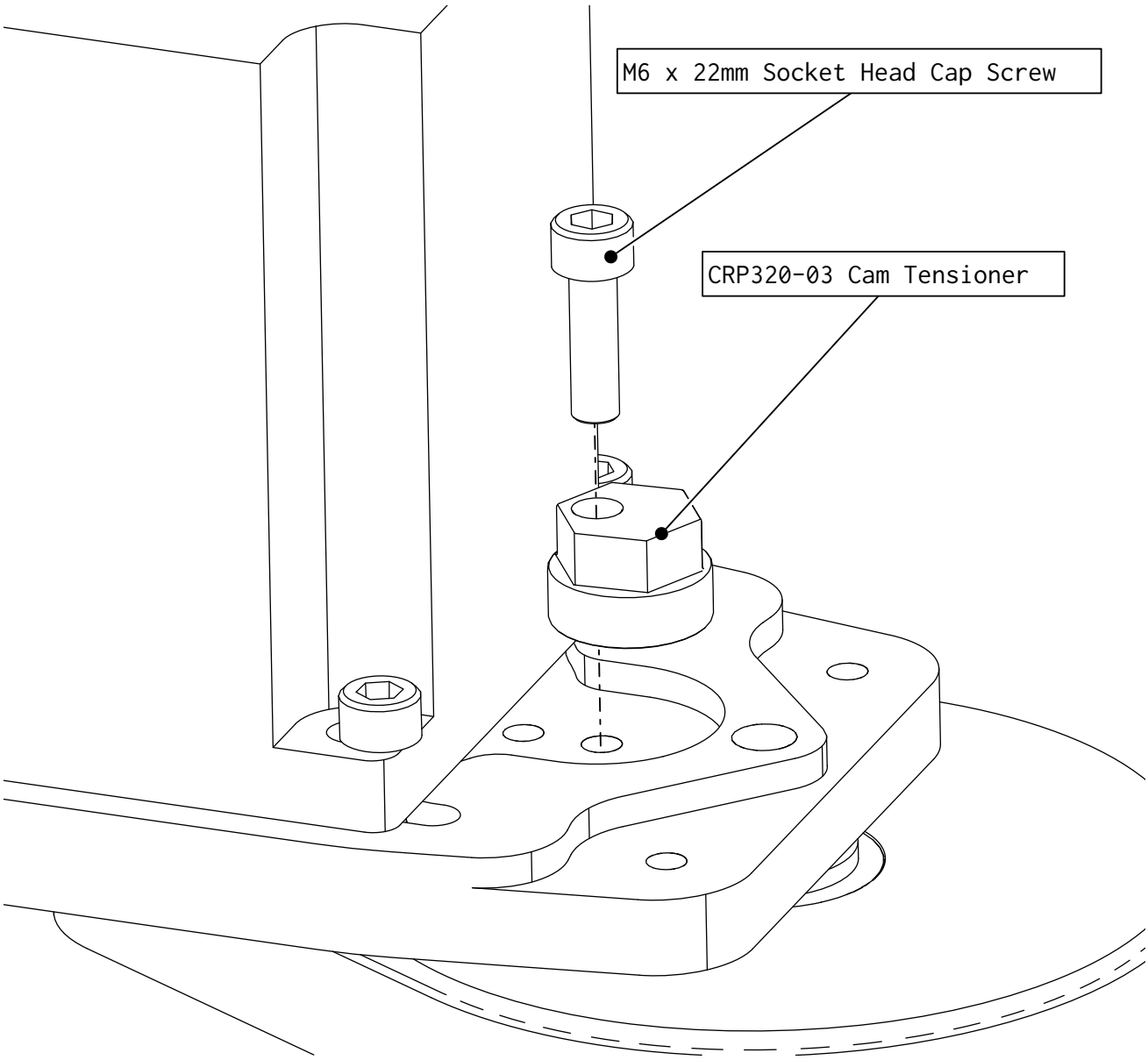
- Tighten the highlighted fastener.



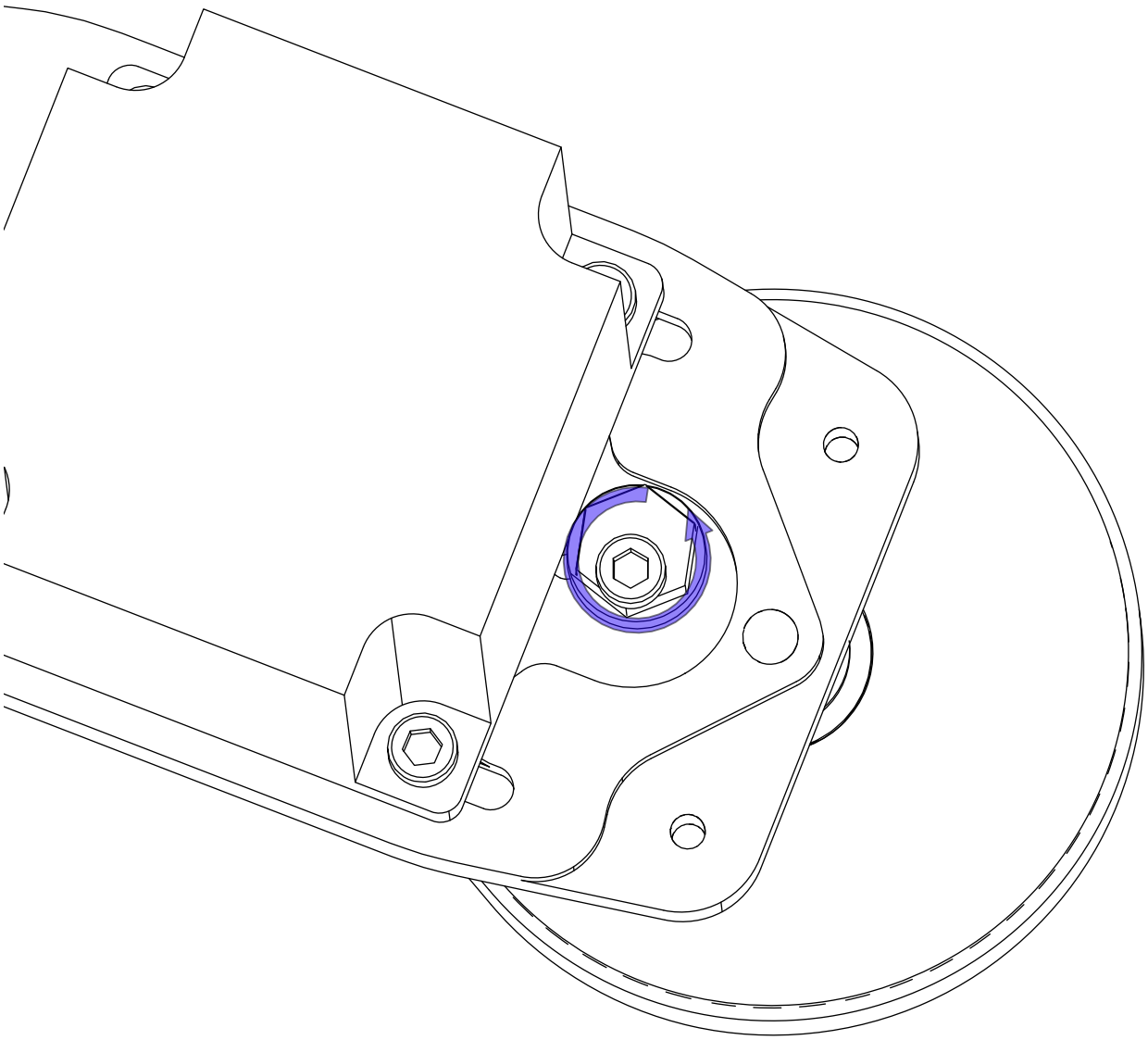
- Slide the drive belt around the motor pulley and drive spindle.



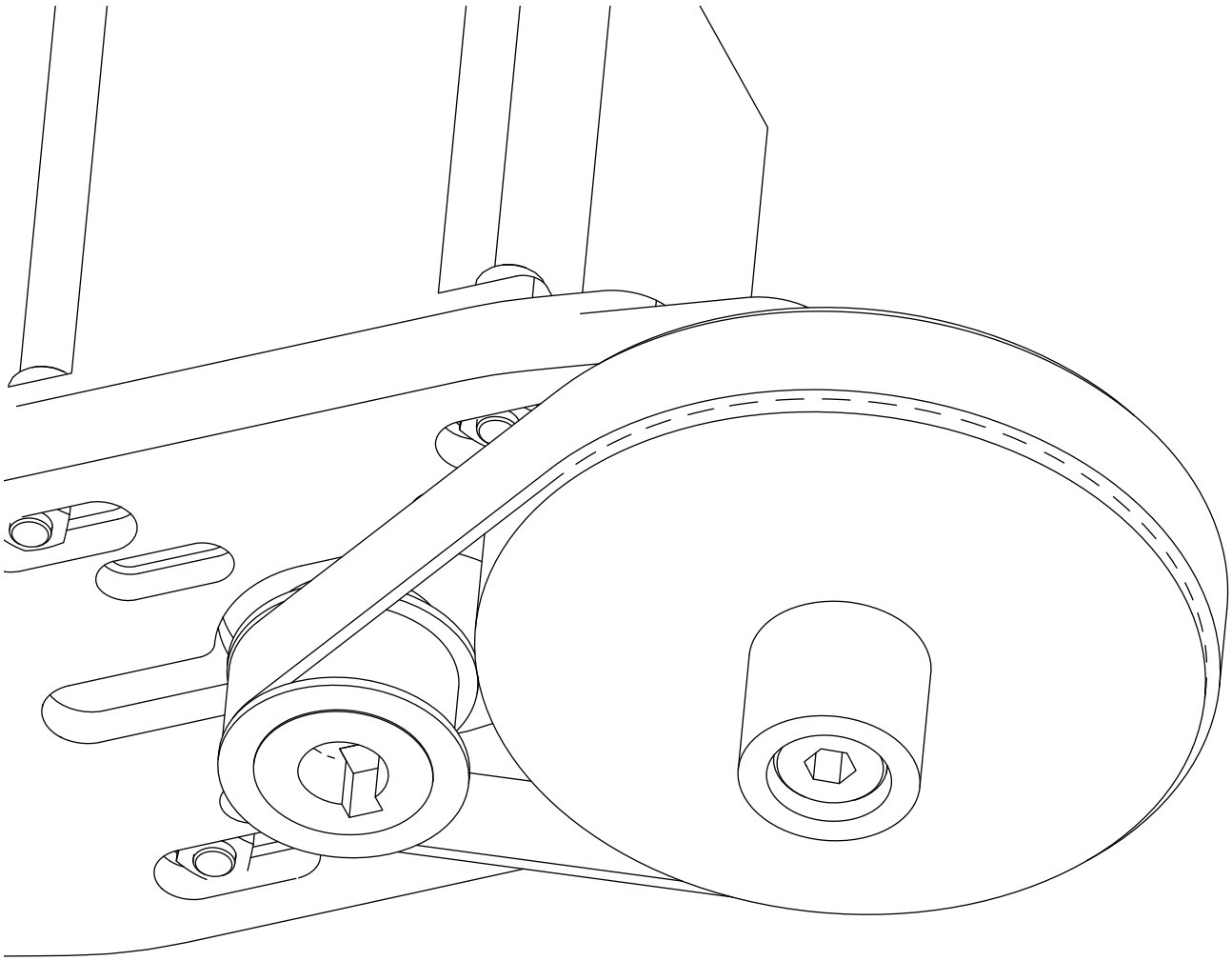
- Slide the motor closer to the drive spindle if necessary.



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

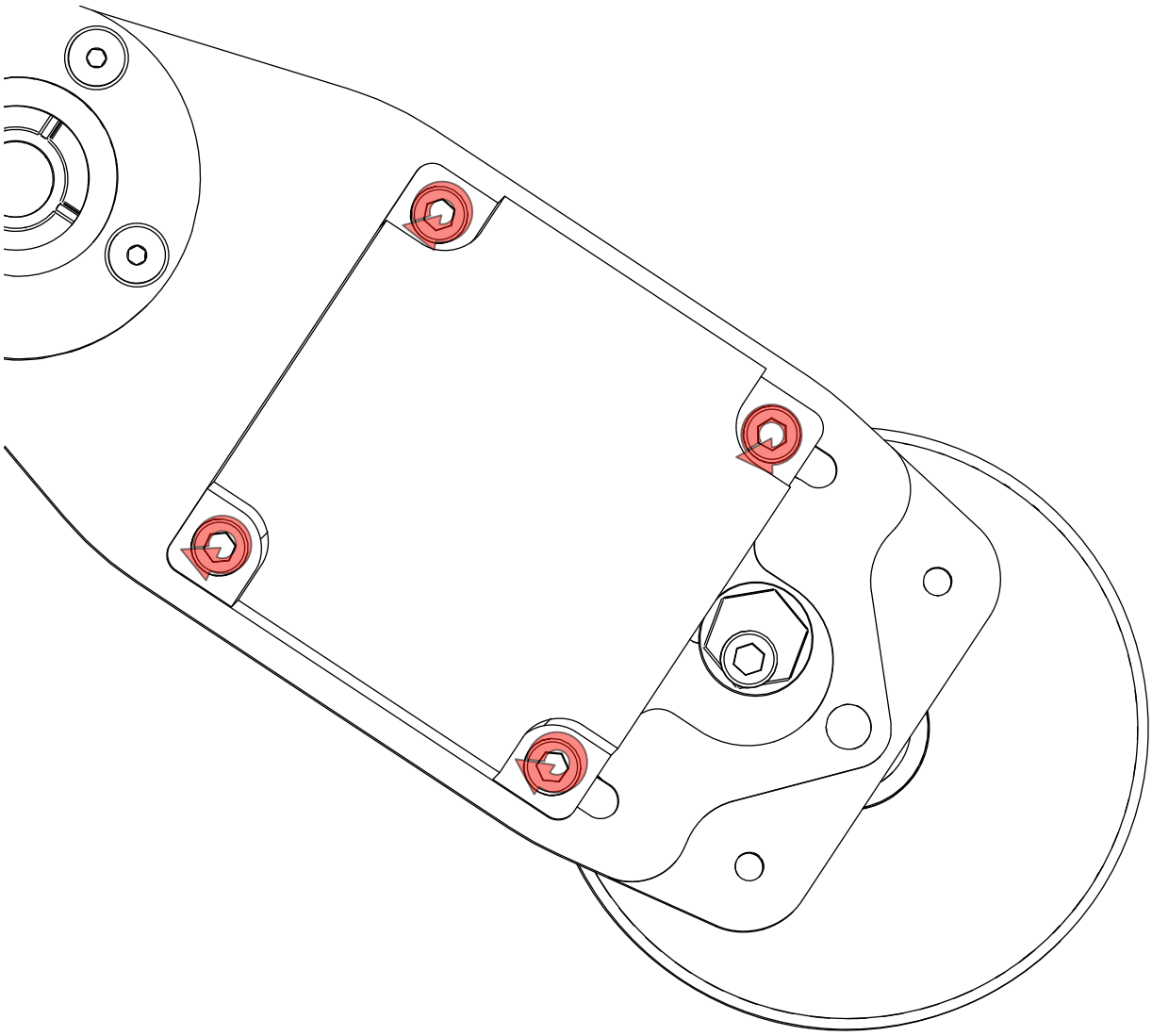


- Use a 16mm wrench to turn the Tensioner Cam against the motor.



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

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



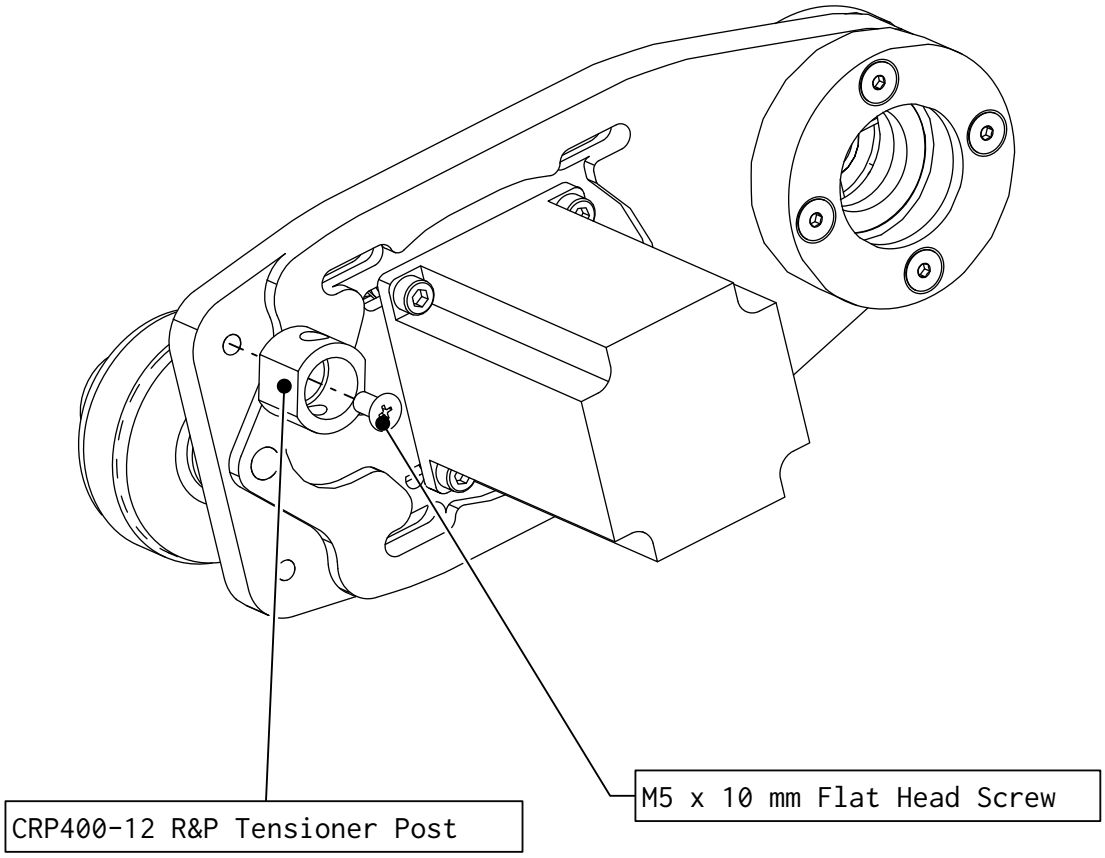
- Fully tighten the highlighted fasteners.

4.3 R&P Drive Installation

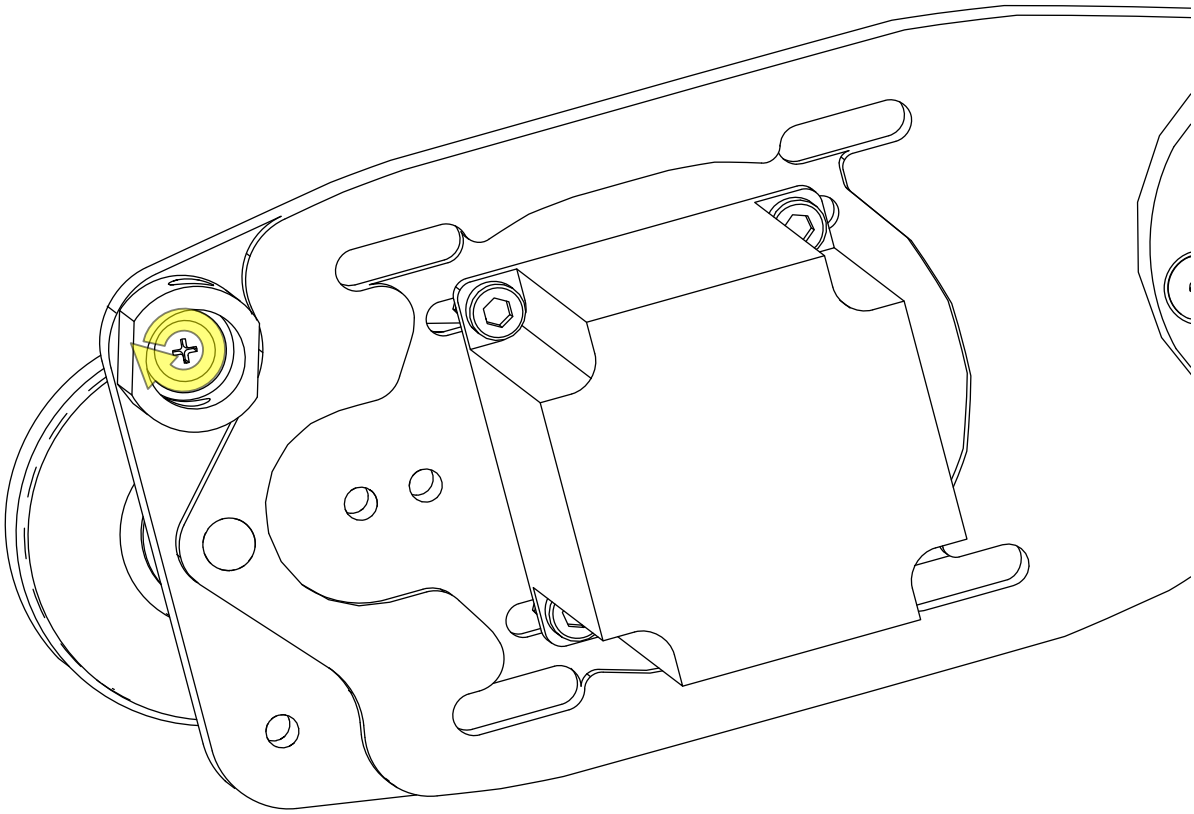
The following parts and bags will be used in this section:

- (2) (CRP320-00-TEN) PRO R&P Tension Kit
  - (1) M8 x 90mm Hex Cap Screw
  - (1) (CRP400-12) Tension Bolt post
  - (1) M8 x 10mm Hex Cap SCrew
  - (3) M8 Flat Washer
  - (1) (CRP301-07) Carraige Tension Bracket
  - (1) 16mm x 25mm Die Spring
  - (1) M6 x 12mm Flat Head Screw
- (1) (CRP320-00-TEN-GANTRY) PRO Gantry R&P Tension Kit
  - (1) M8 x 90mm Hex Cap Screw
  - (1) (CRP400-12) Tension Bolt post
  - (1) M8 x 10mm Hex Cap SCrew
  - (3) M8 Flat Washer
  - (1) (CRP301-11) Carraige Tension Bracket
  - (1) 16mm x 25mm Die Spring
  - (1) M6 x 12mm Flat Head Screw

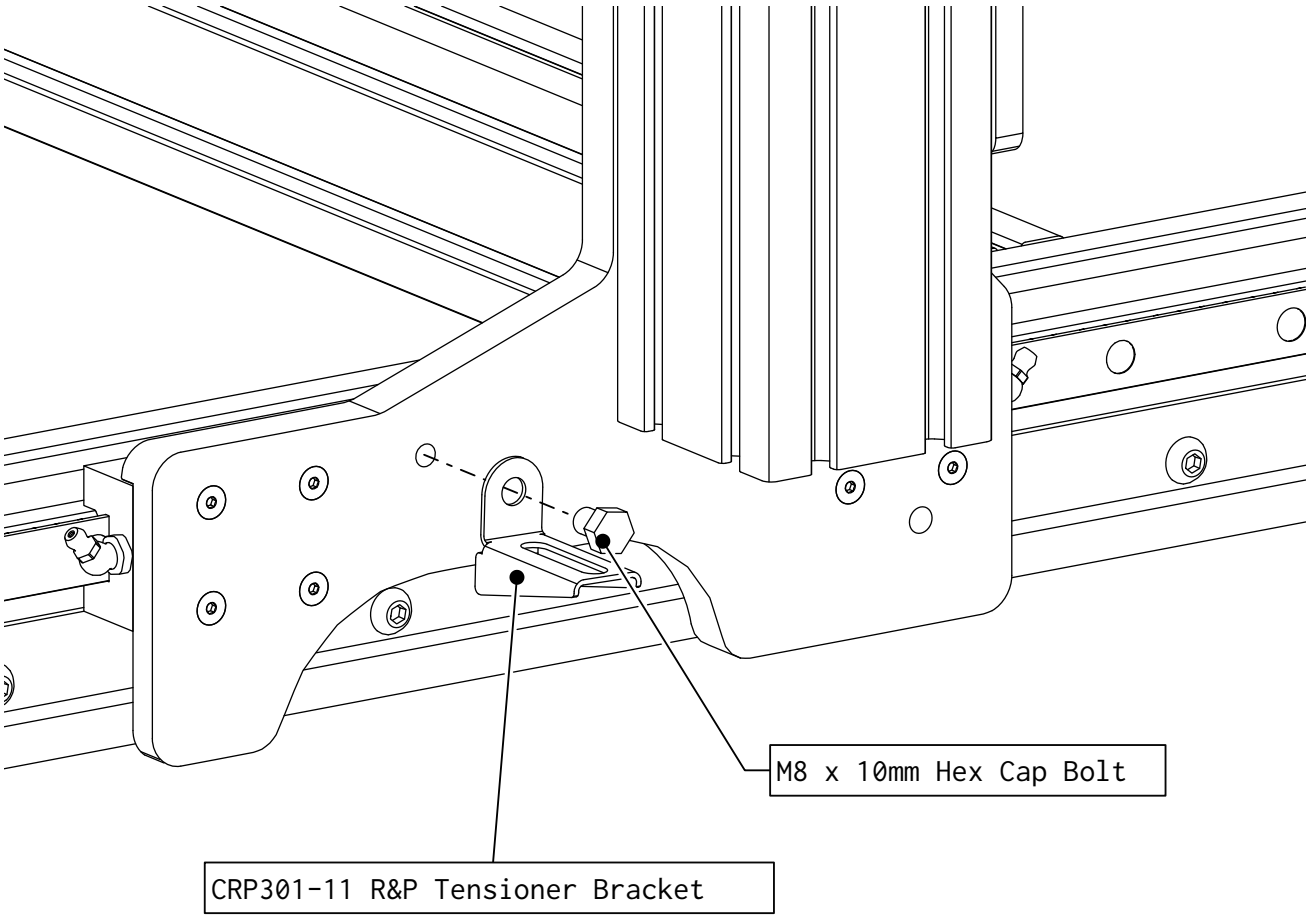
Note: Although a NEMA 23 motor is pictured, the remaining R&P steps are the same for both motor sizes.



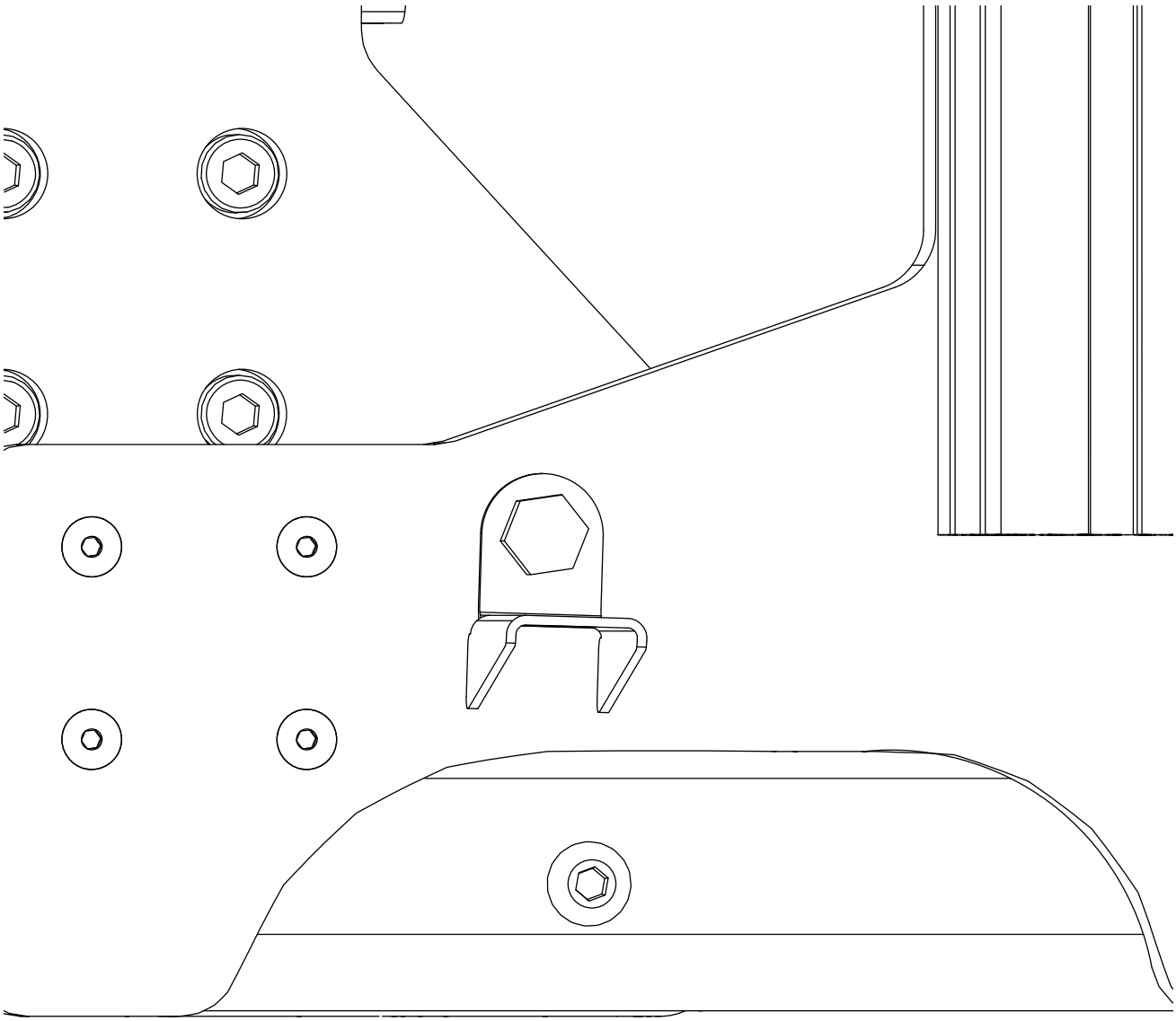
- Attach the Tension Post to the R&P Plate as indicated.



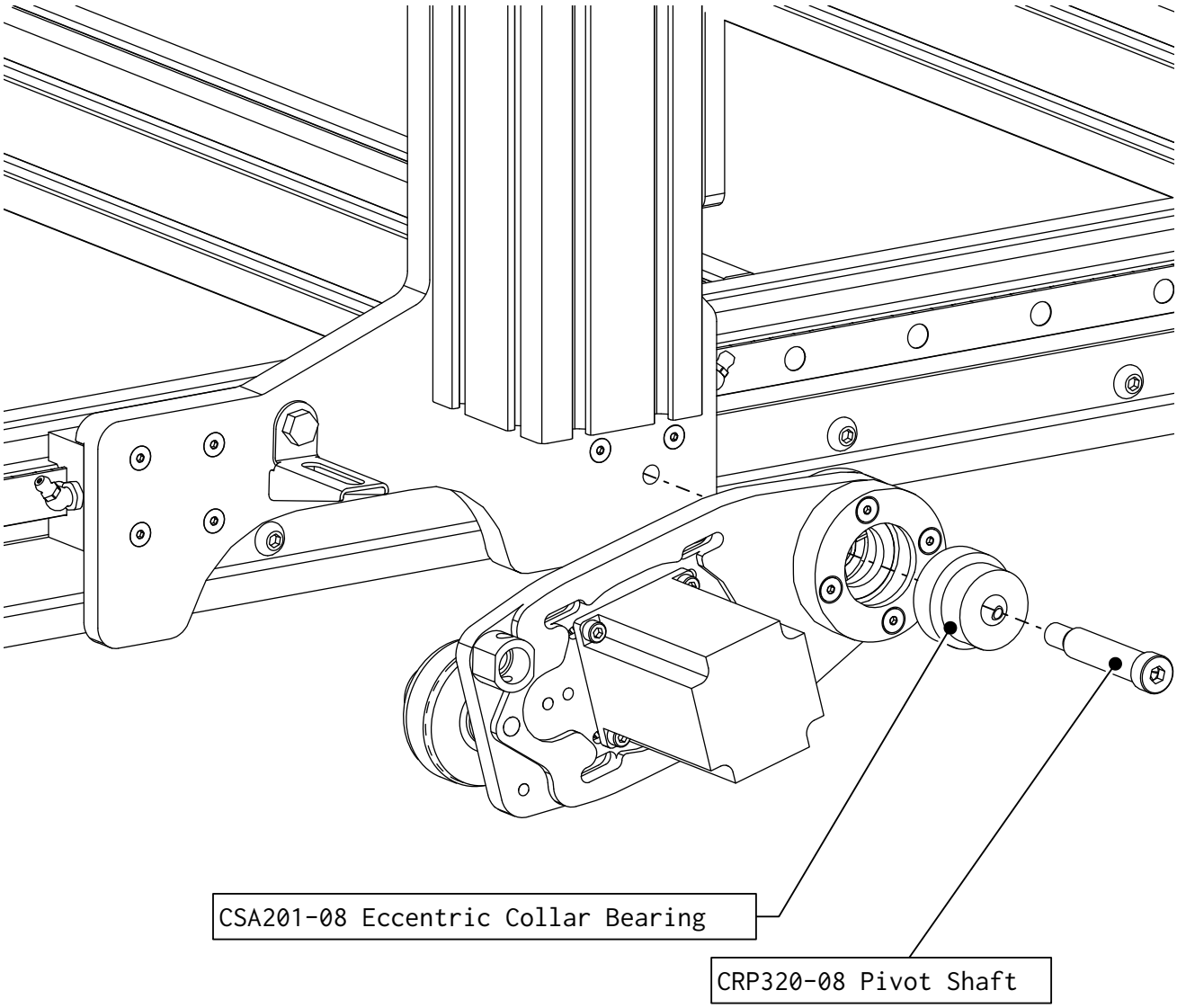
- Partially tighten the highlighted fastener.



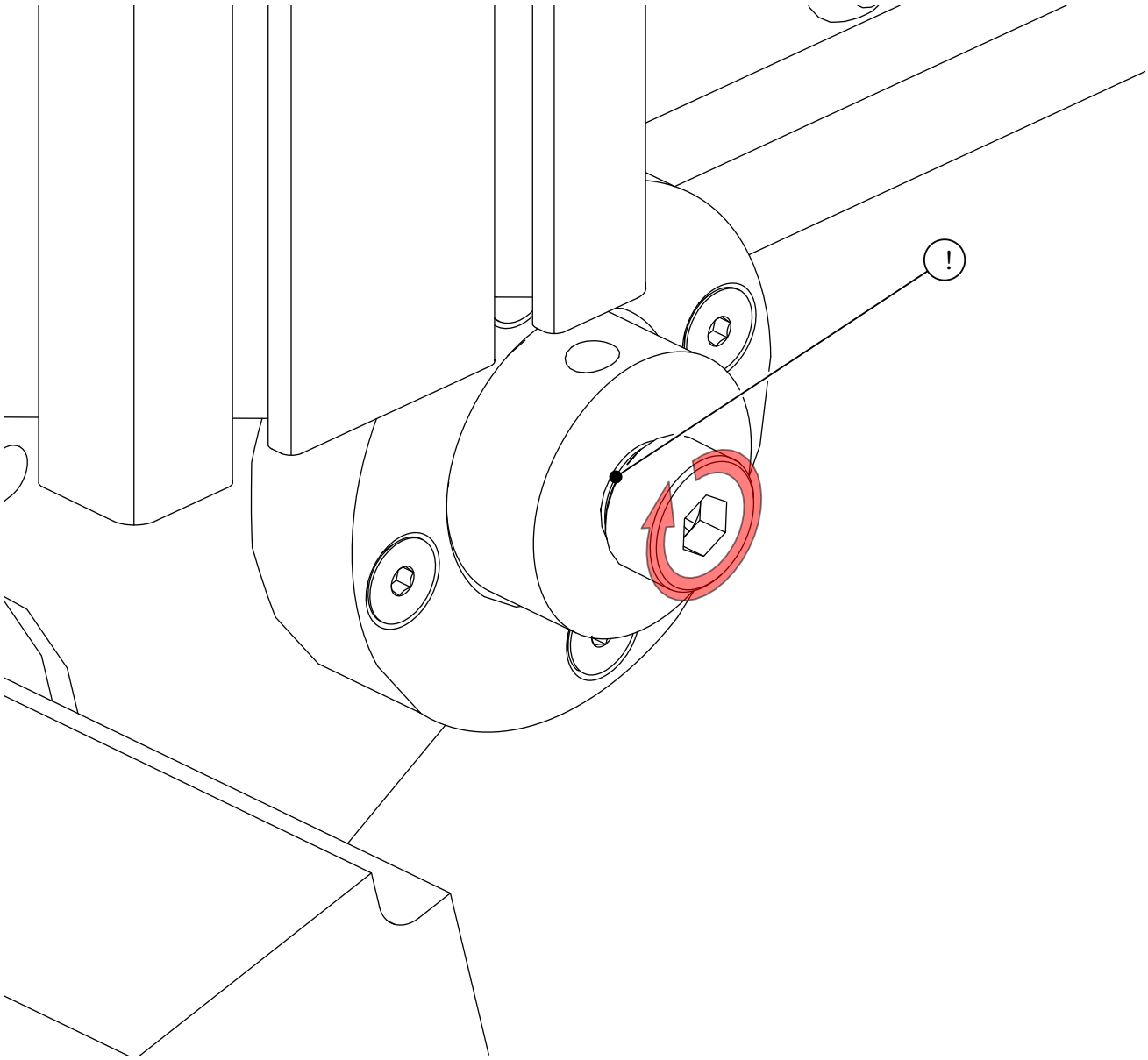
- Attach the Tension Bracket to the Riser Plate as indicated.



- Partially tighten the highlighted fastener.

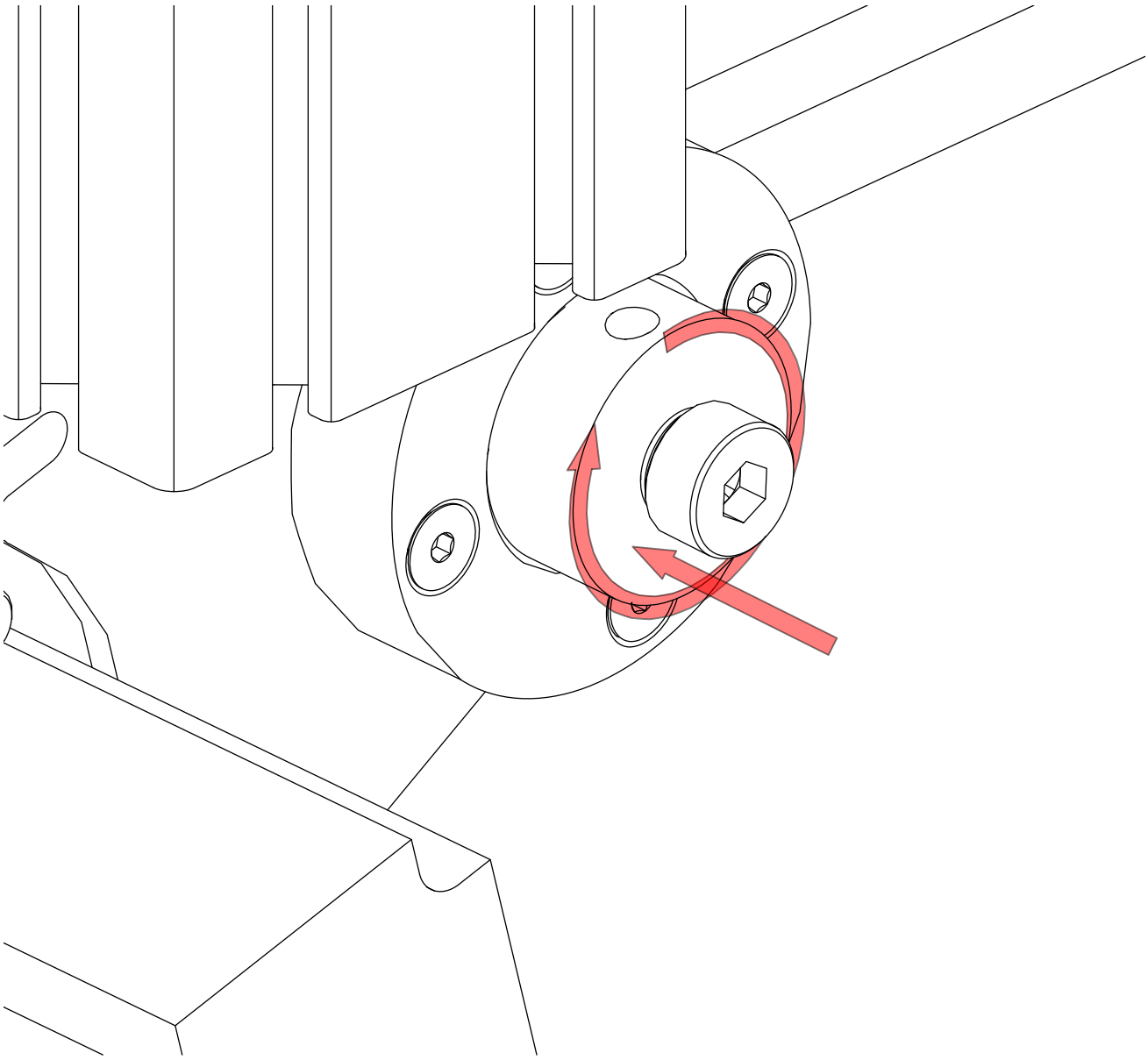


- Attach the R&P Assembly to the Riser Plate as indicated.

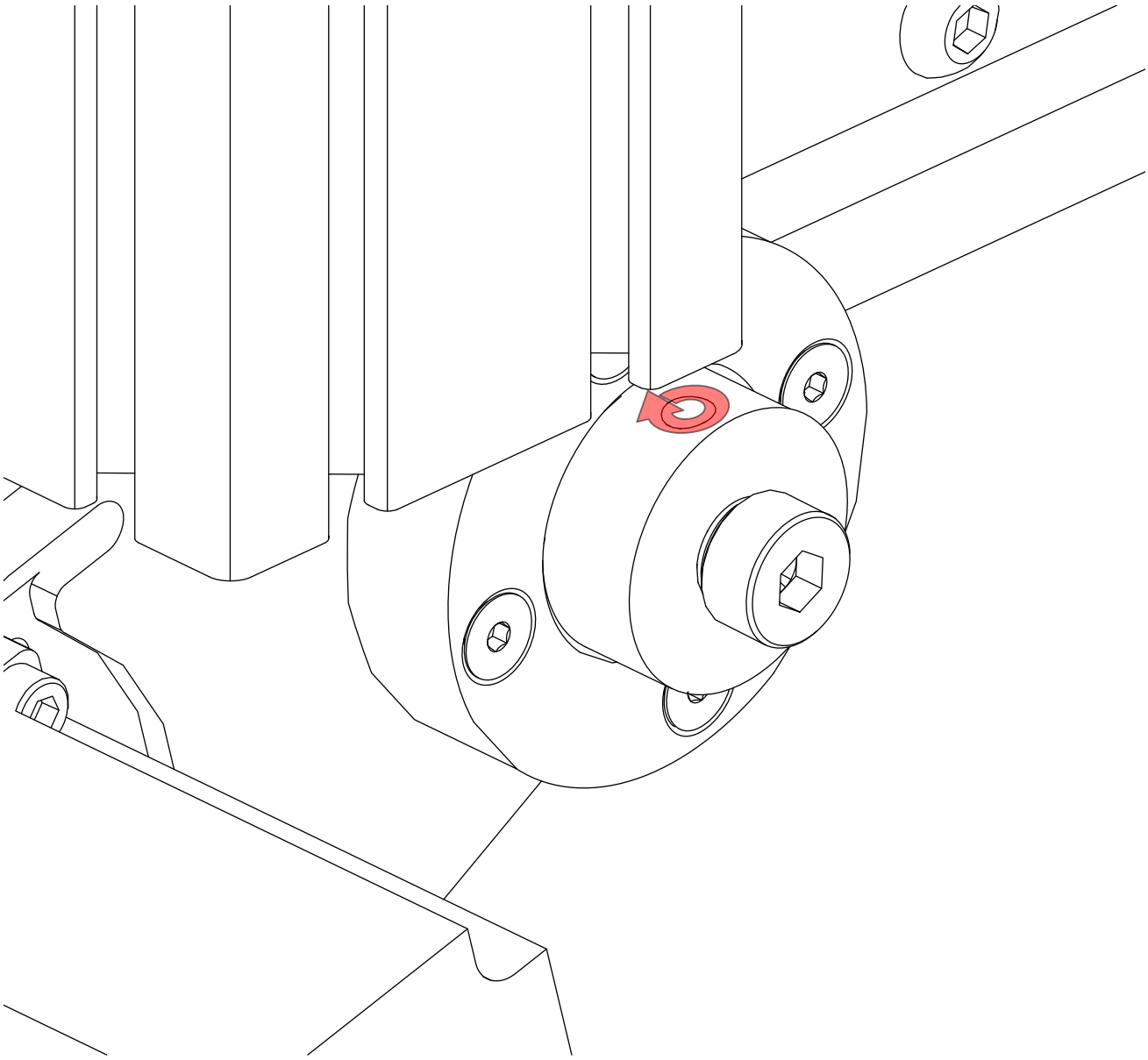


- Fully tighten the highlighted fastener.

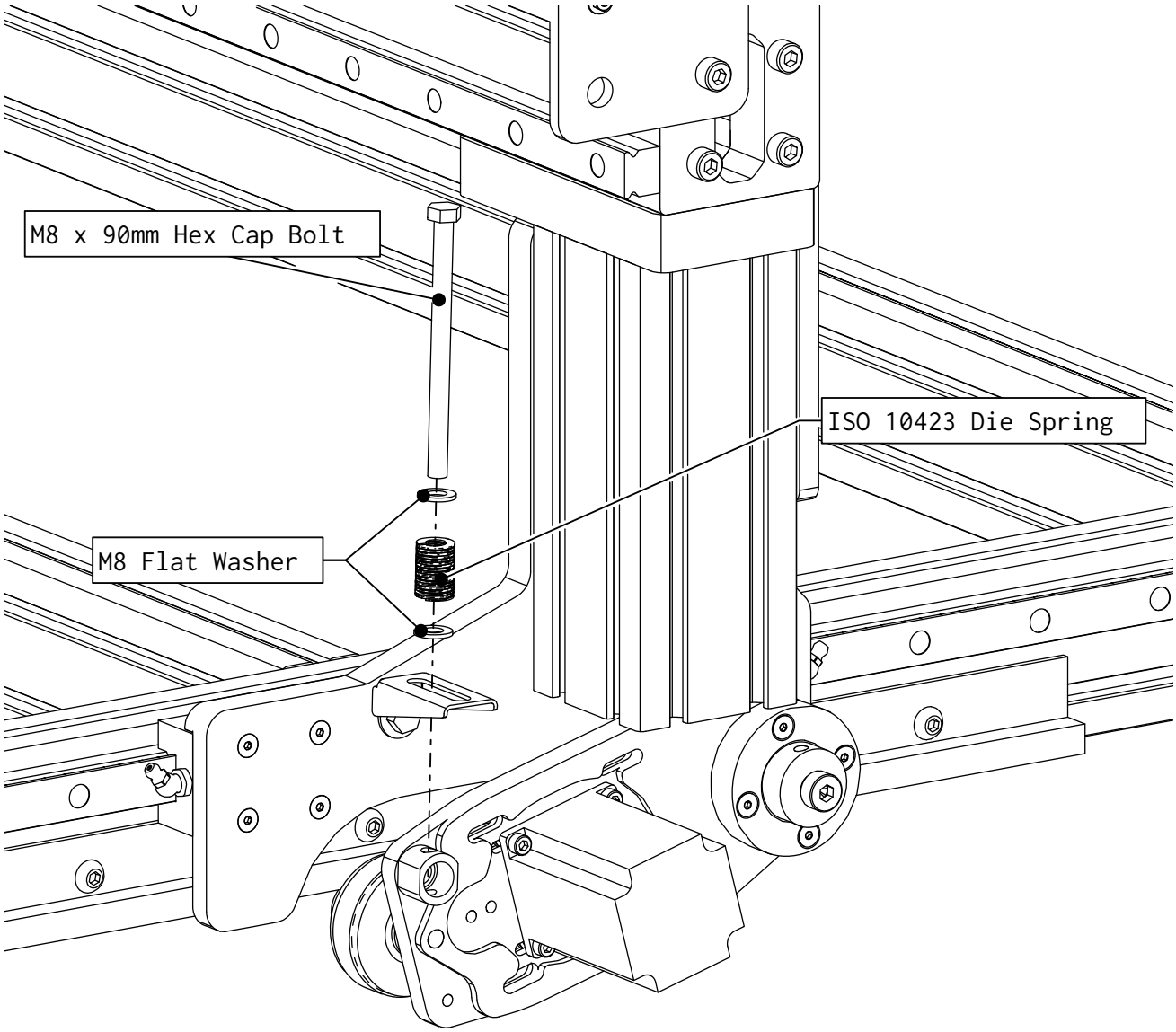
  Note: There will be gap between the head of the shoulder bolt and the Collar Bearing.



- While pushing in on the collar bearing eccentric, rotate it clockwise until the collar bearing starts rotating inside of the plate.

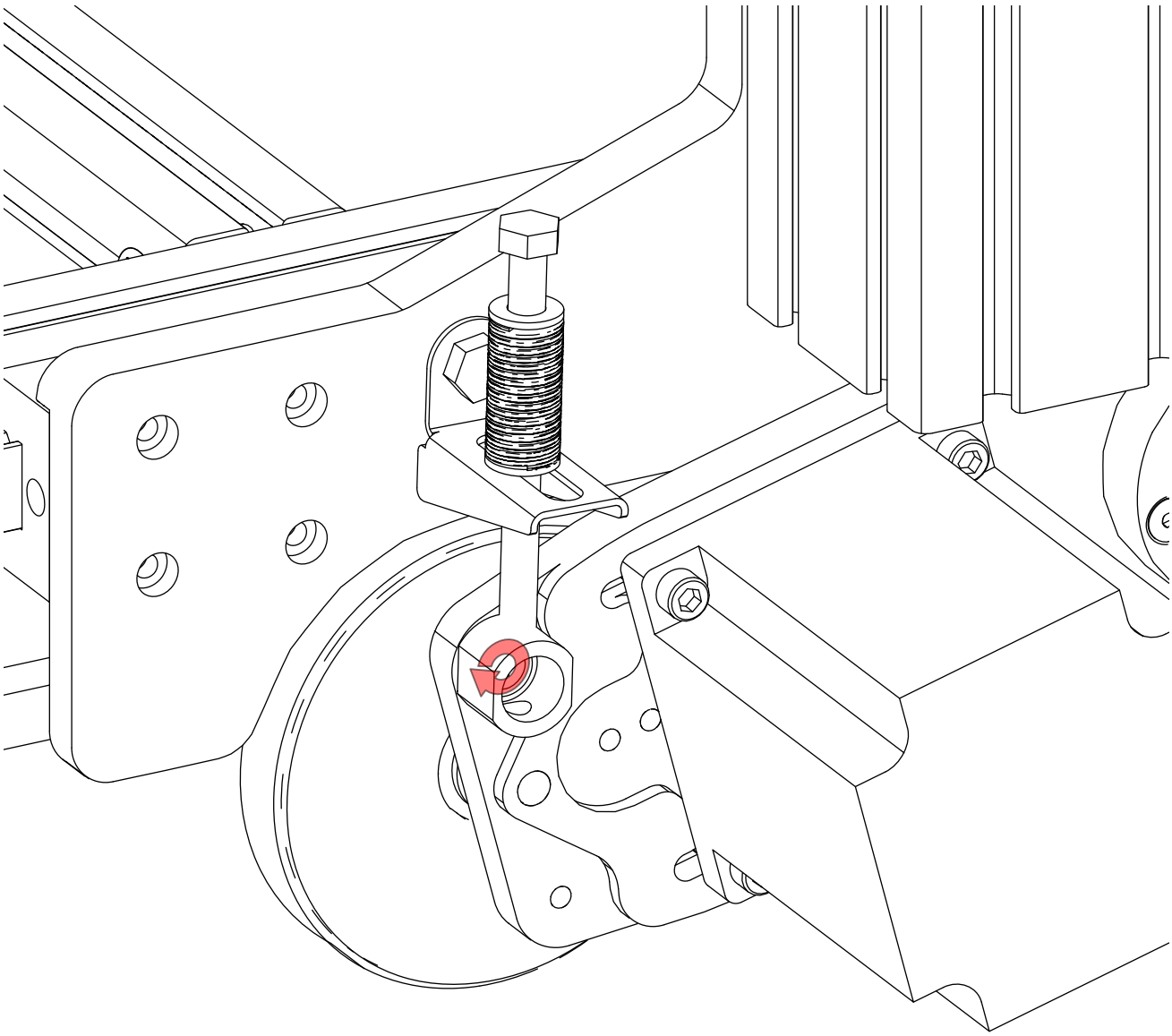


- Tighten the set screw on the side of the eccentric.



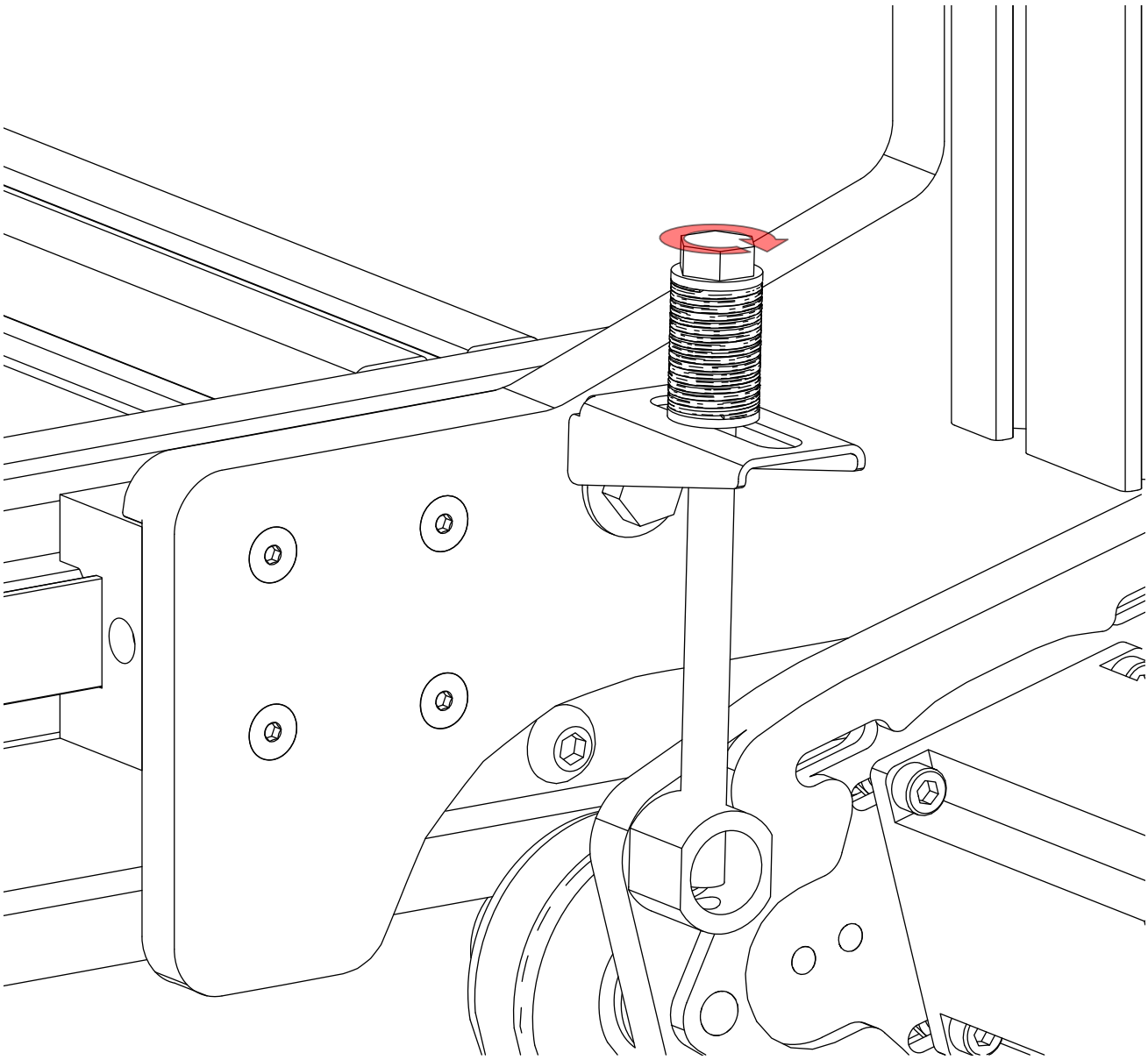
- Install the tension spring and bolt as indicated.

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

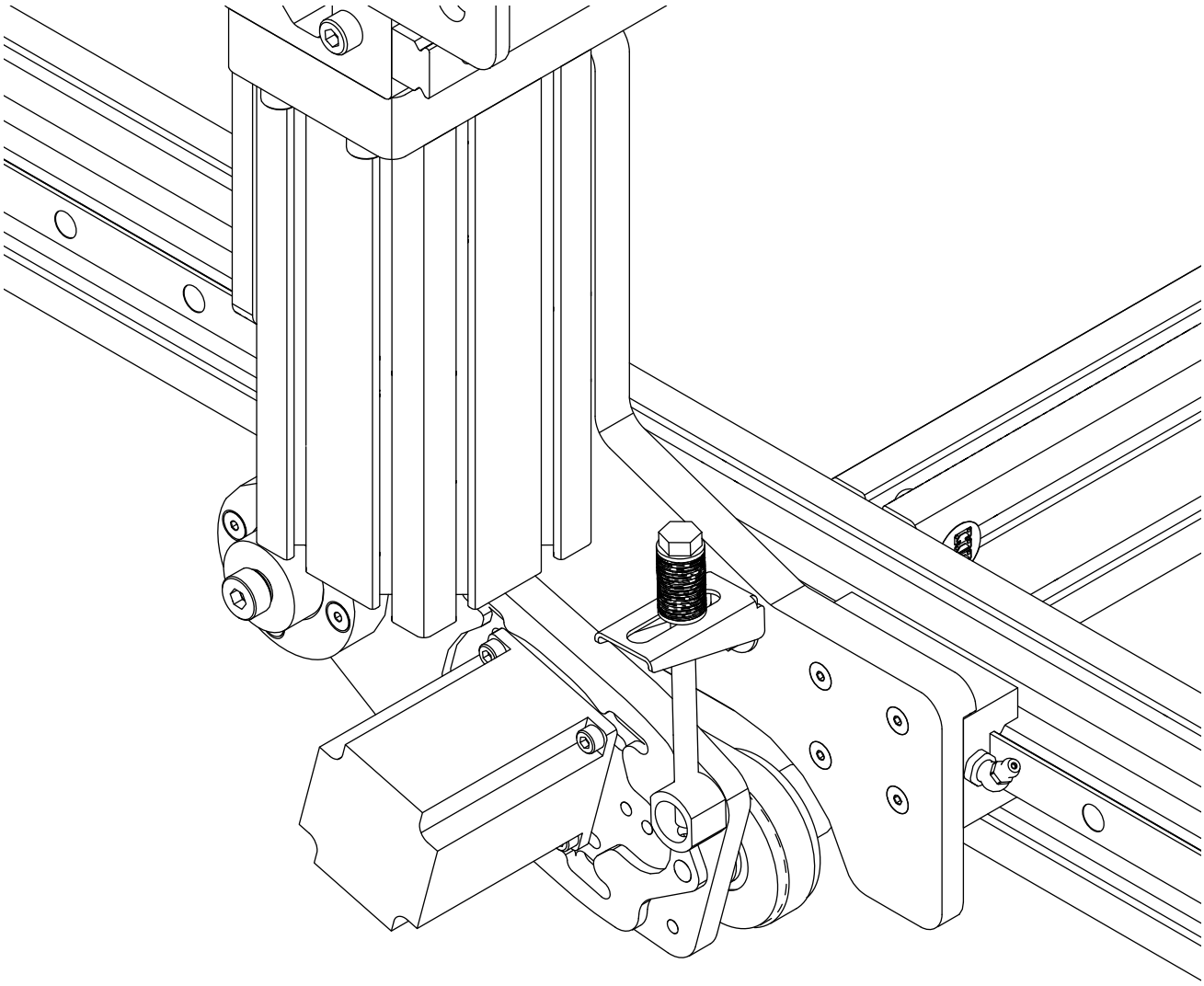


- Tighten the highlighted fasteners.

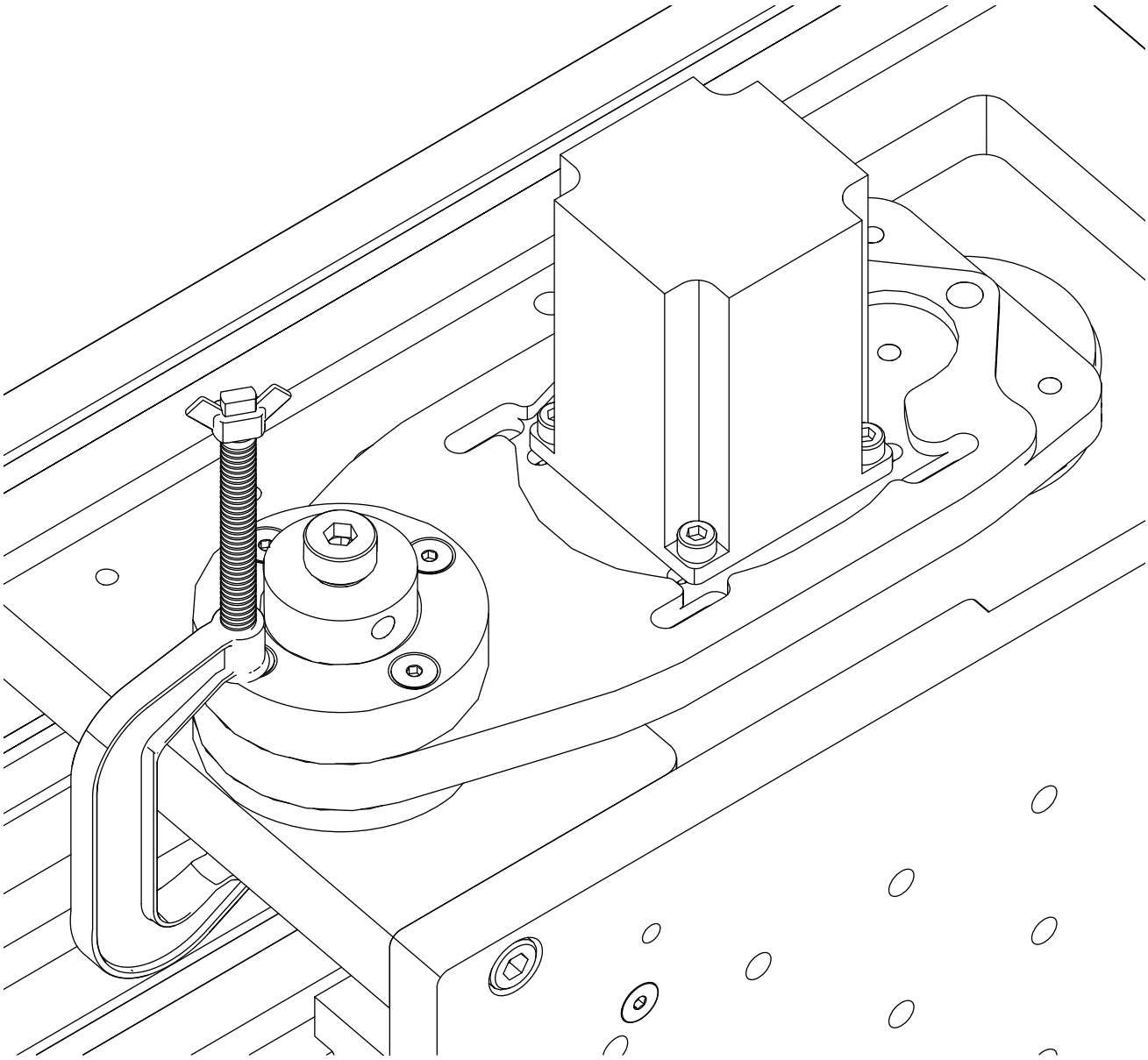
  Note: Do not over tighten.



- Adjust the tensioner bolt until gear is seated in rack, then tighten another 3 revolutions.



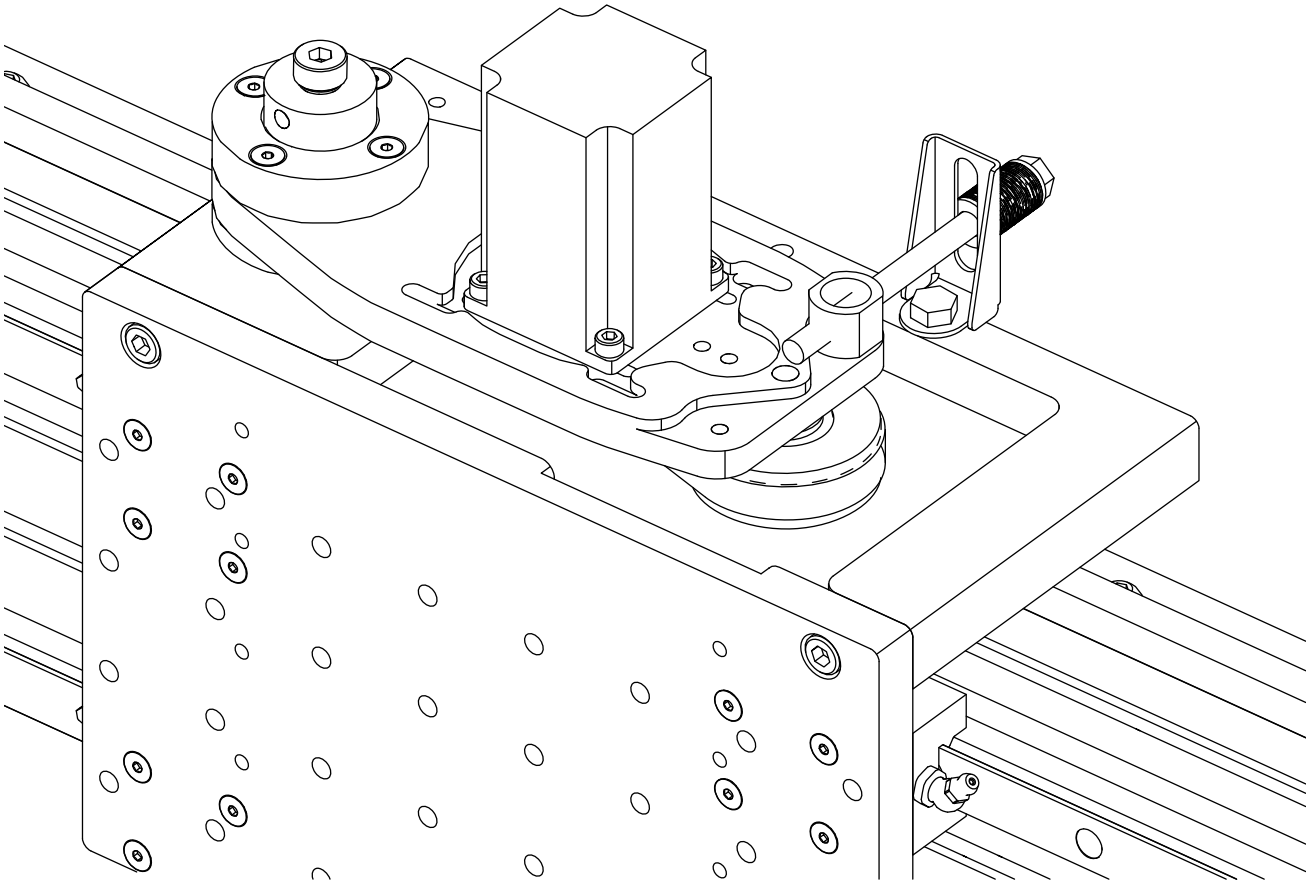
- Repeat these steps on the other side of the machine.



- Repeat these steps again on the gantry.

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

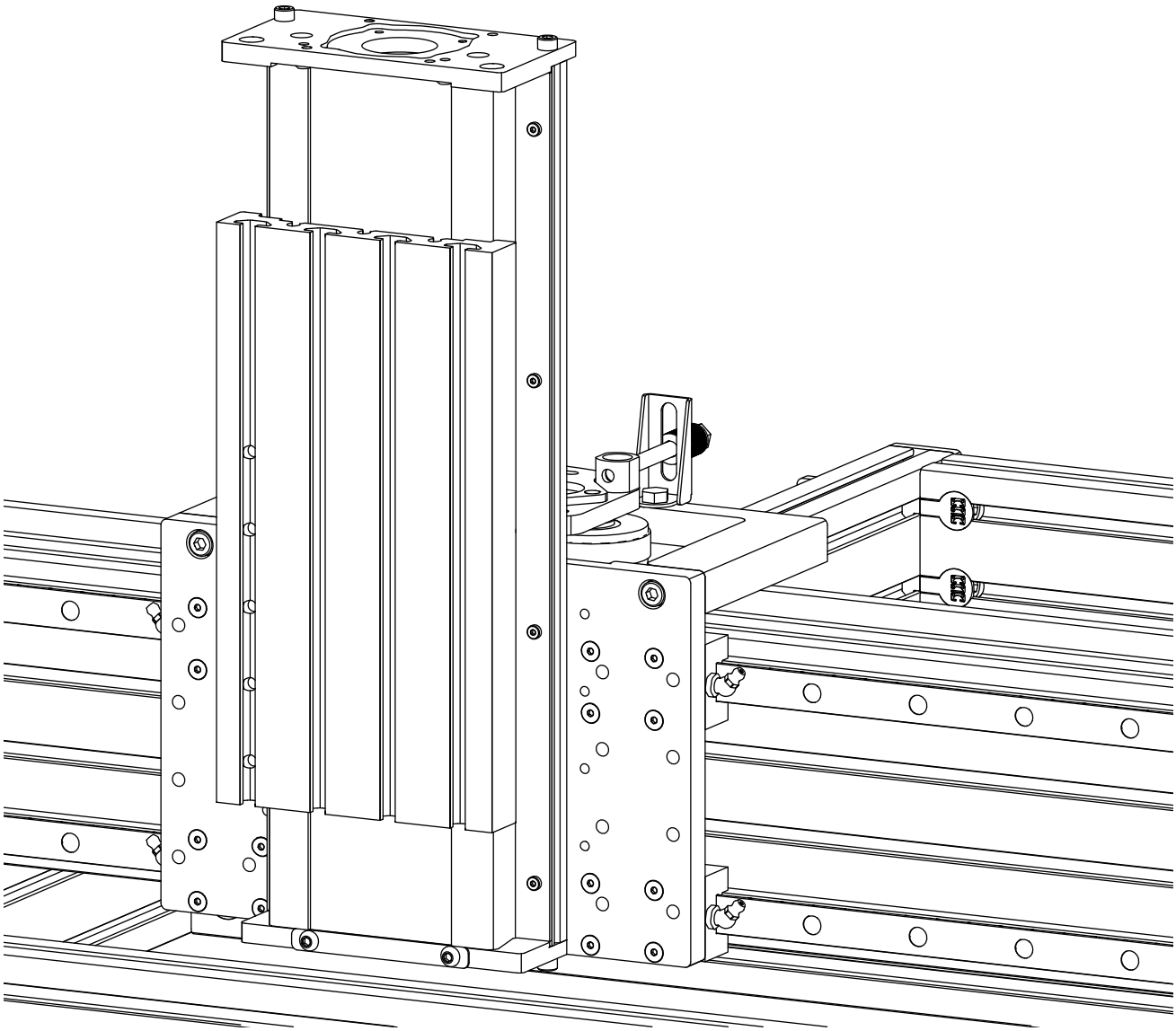
Note: The gantry uses a slightly different tension bracket than the one used on the risers, however the installation process is the same. This bracket is pictured on the next page.



- The tensioner assembly should be installed as pictured.

5

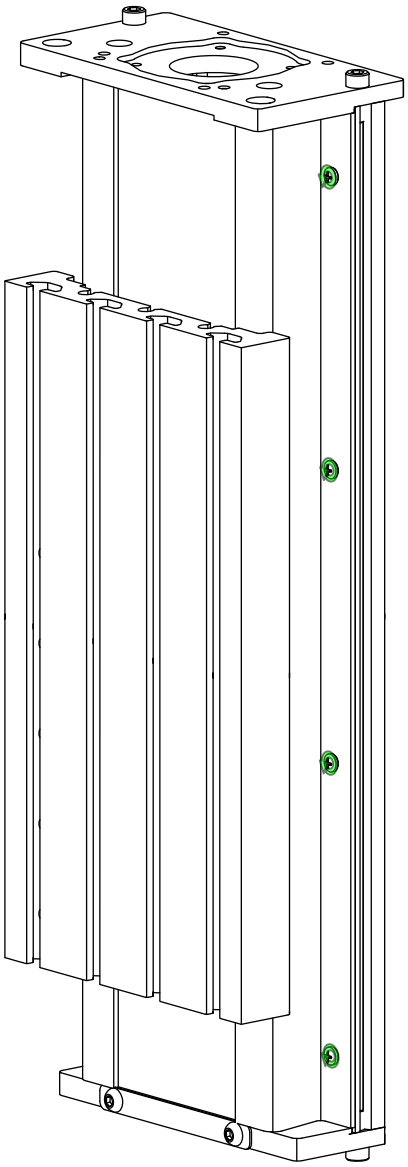
Z-Axis Assembly



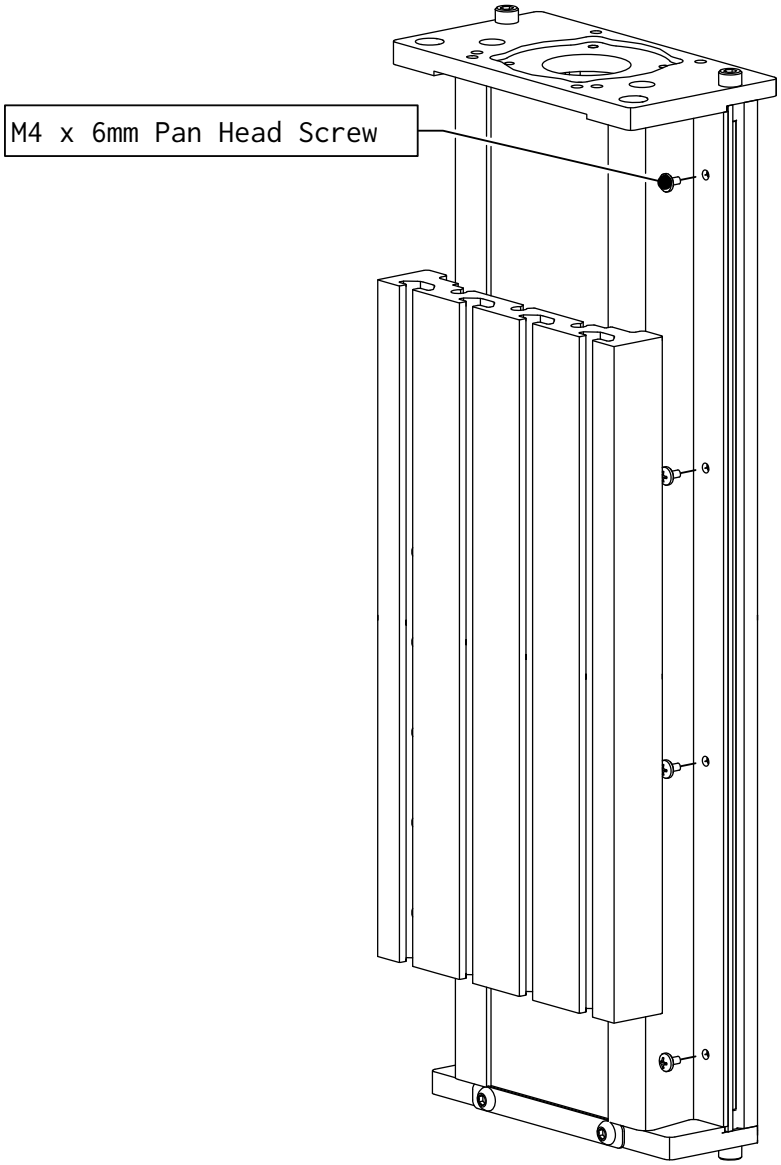
Z-Axis Installation

The following parts and bags will be used in this section:

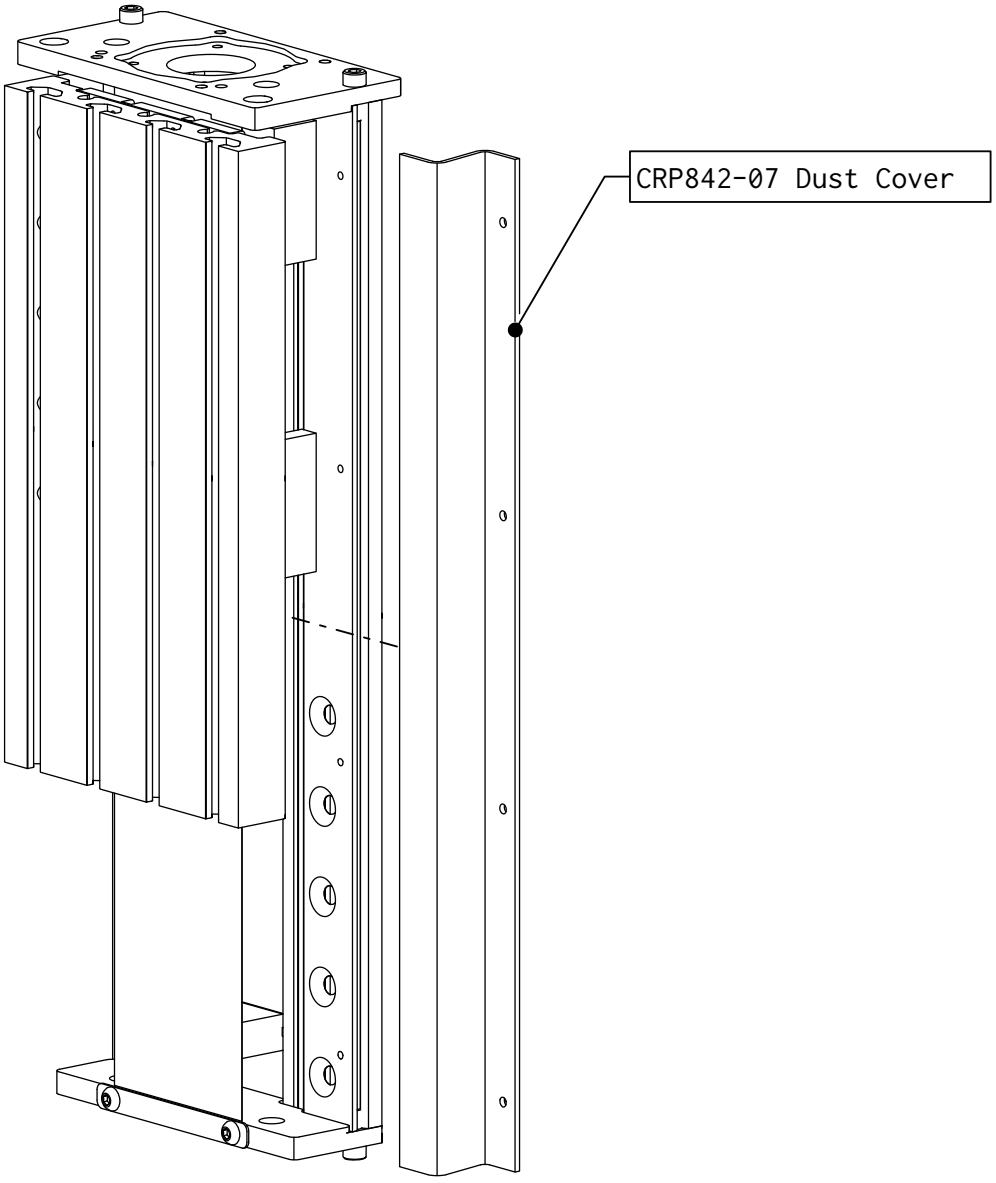
- (1) NEMA 23 or 34 Motor (Optional)
- (4) M5 x 12mm Socket Head Cap Screw (If using NEMA 23 Kit)
- (4) M6 x 16mm Socket Head Cap Screw (If using NEMA 34 Kit)
- (1) CRP840-00 Ballscrew Axis
- (1) (CRP840-00-FAST) Ballscrew Axis Fastener Kit
  - (8) M8 x 25mm Flat Head Screw



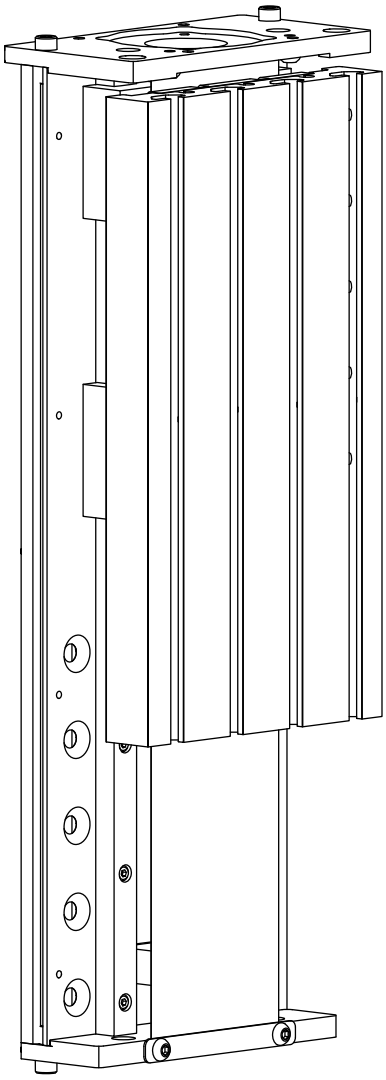
- Loosen the screws holding the dust covers to the Z-axis



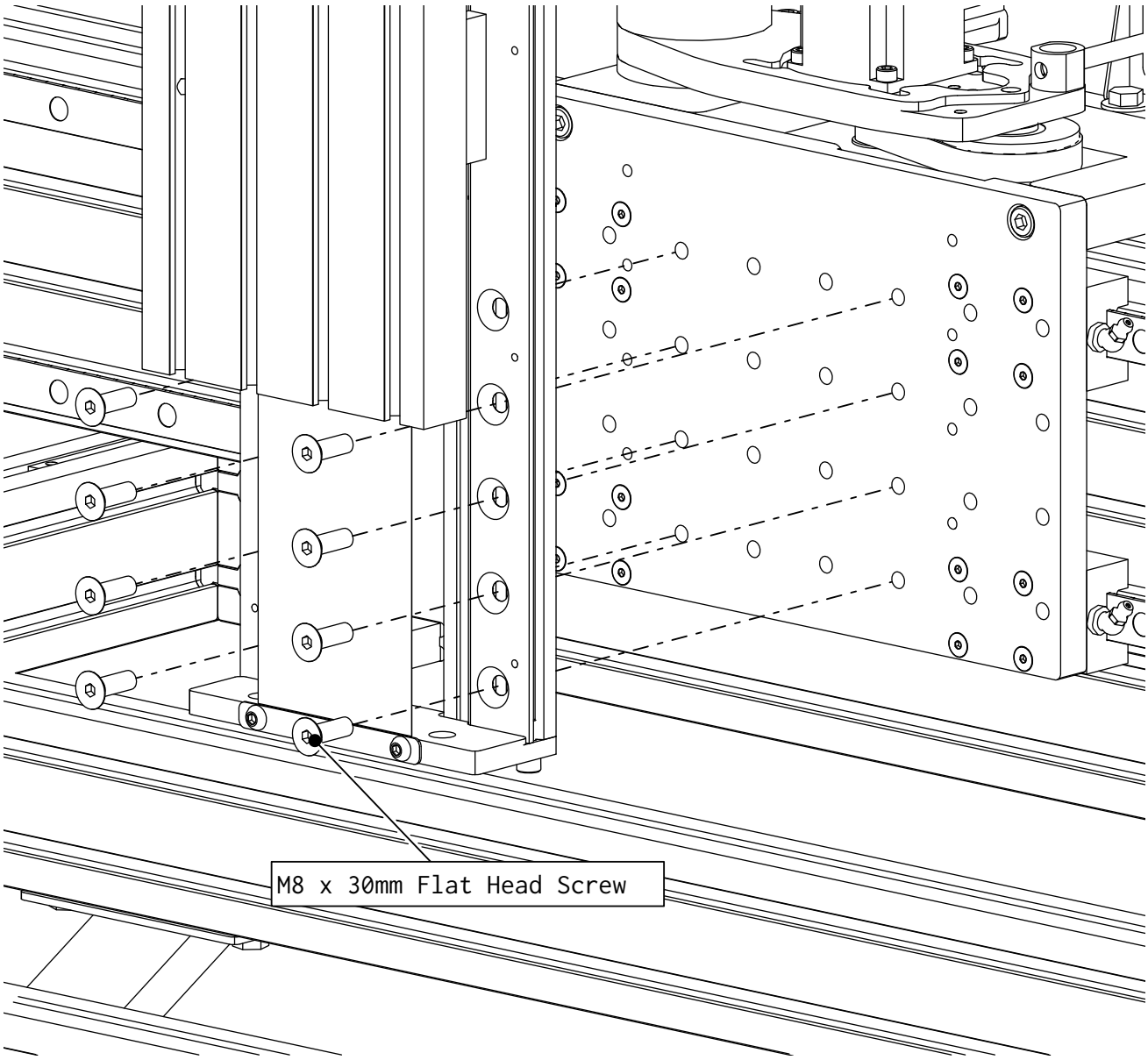
- Remove the screws, and set aside.



- Remove the dust cover, and set aside.

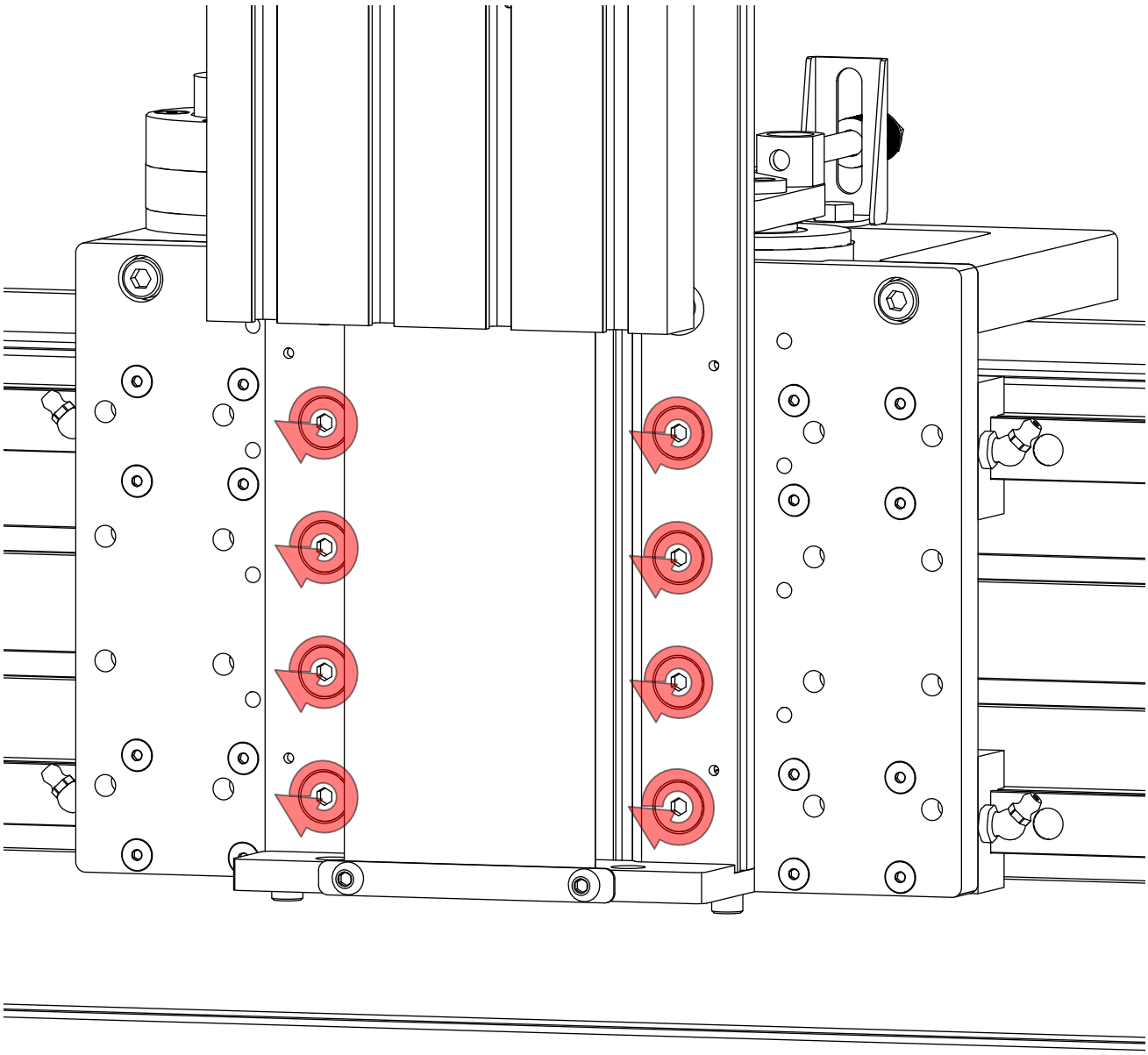


- Repeat these steps on the other side.

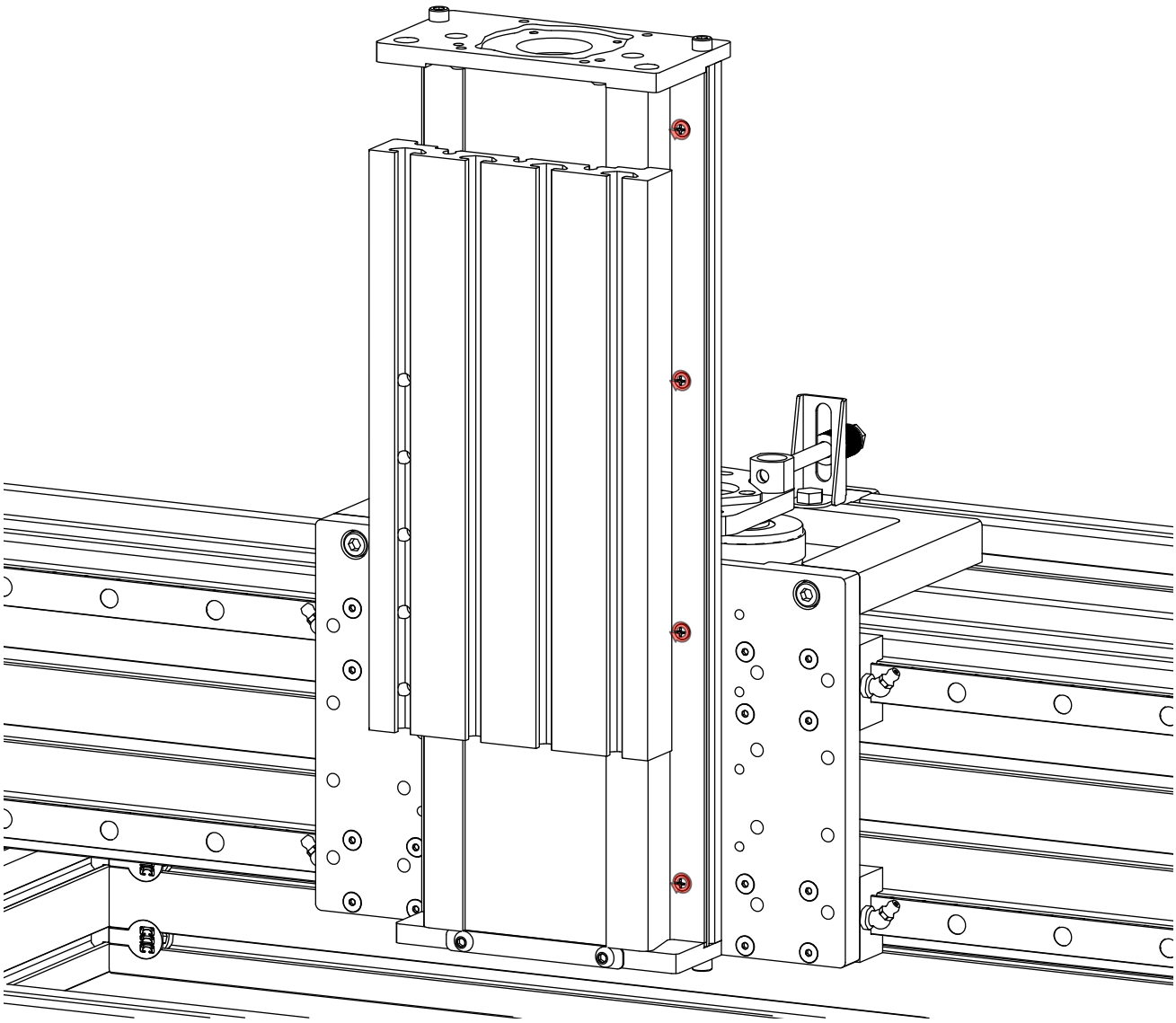


- Attach the Z-axis to the gantry carriage as indicated.

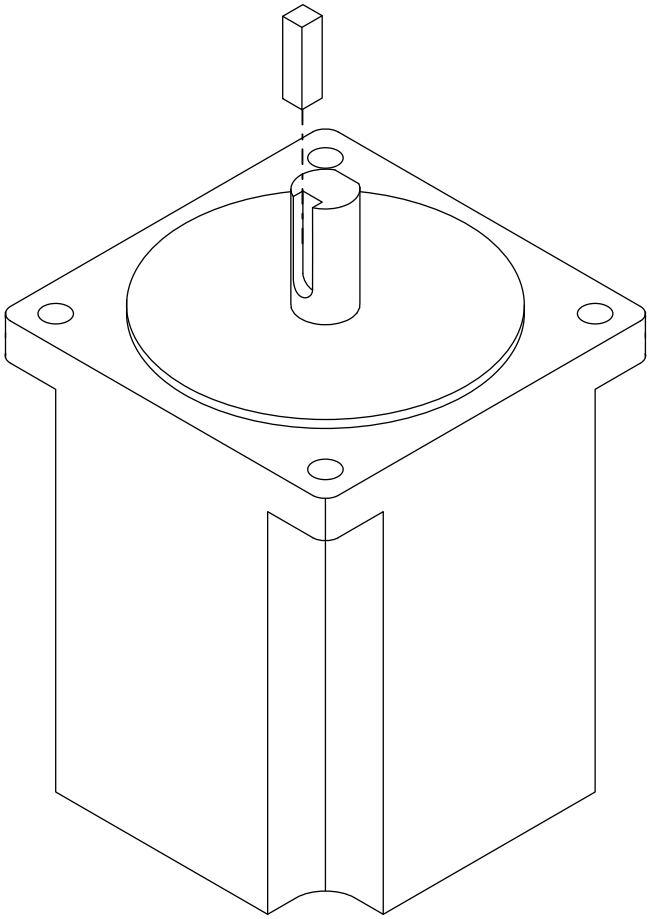
  Note: You may need to turn the z-axis coupler to move the z-axis mounting plate to the highest position.



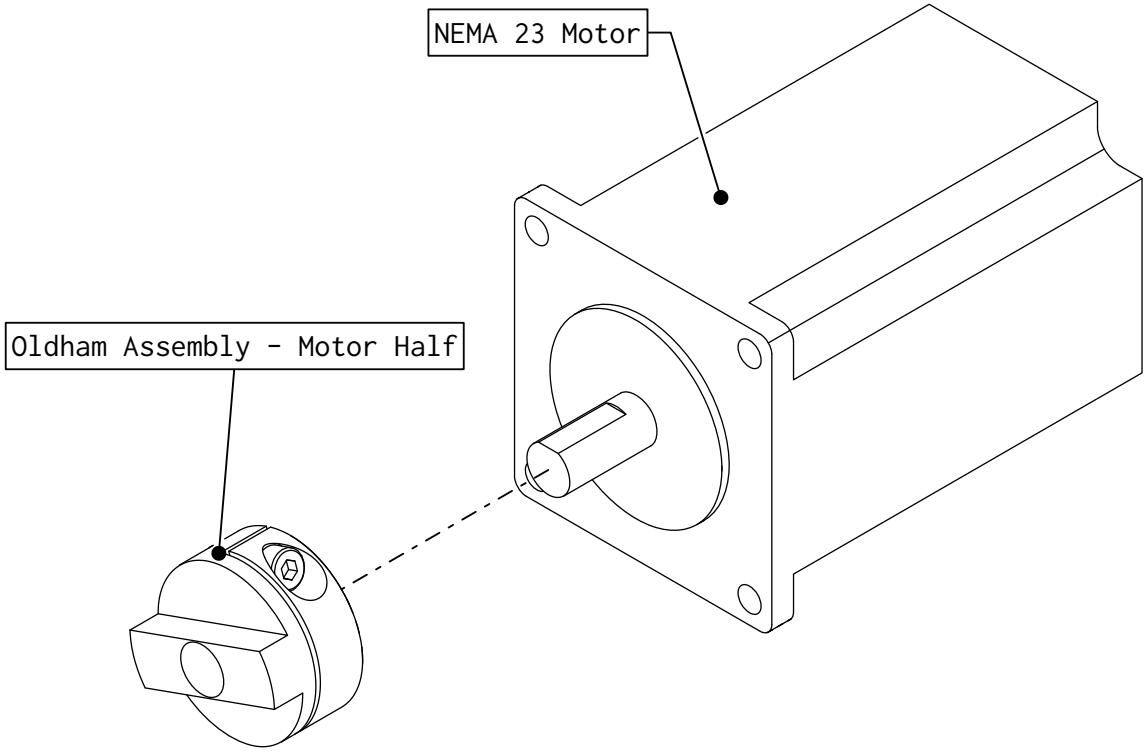
- Tighten the highlighted fasteners.



- Reattach the dust covers.

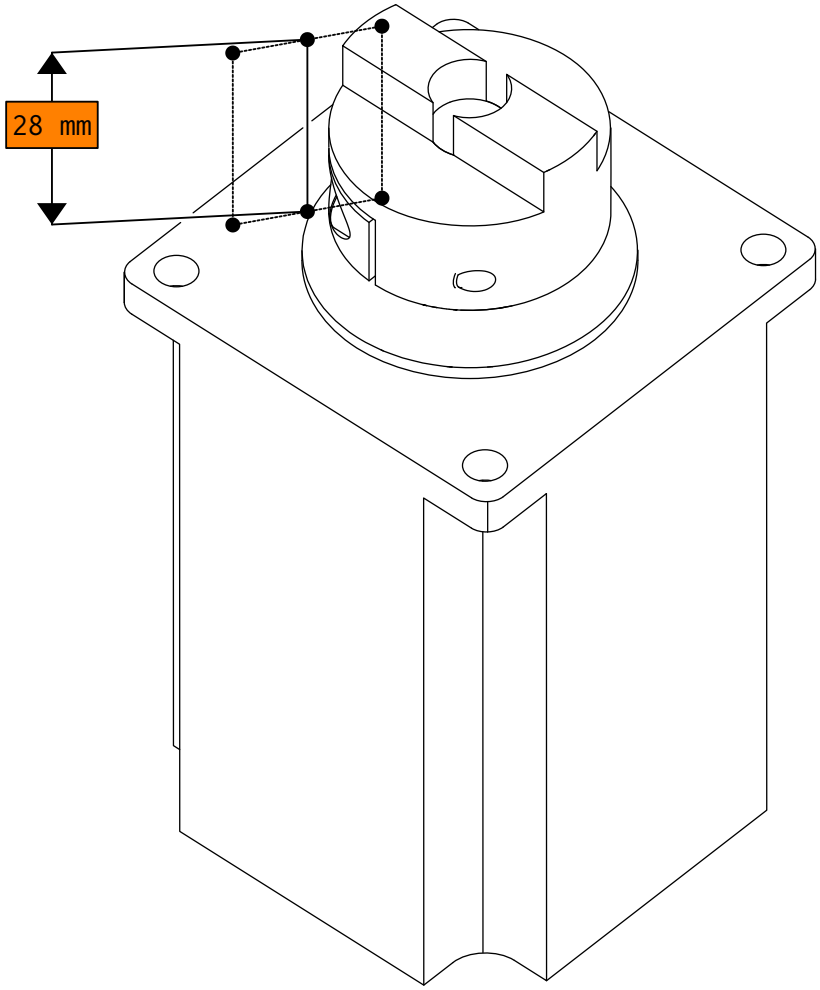


- Using a pair of pliers, remove the key from your remaining motor.



- Slide a oldham coupler half onto a motor as indicated.

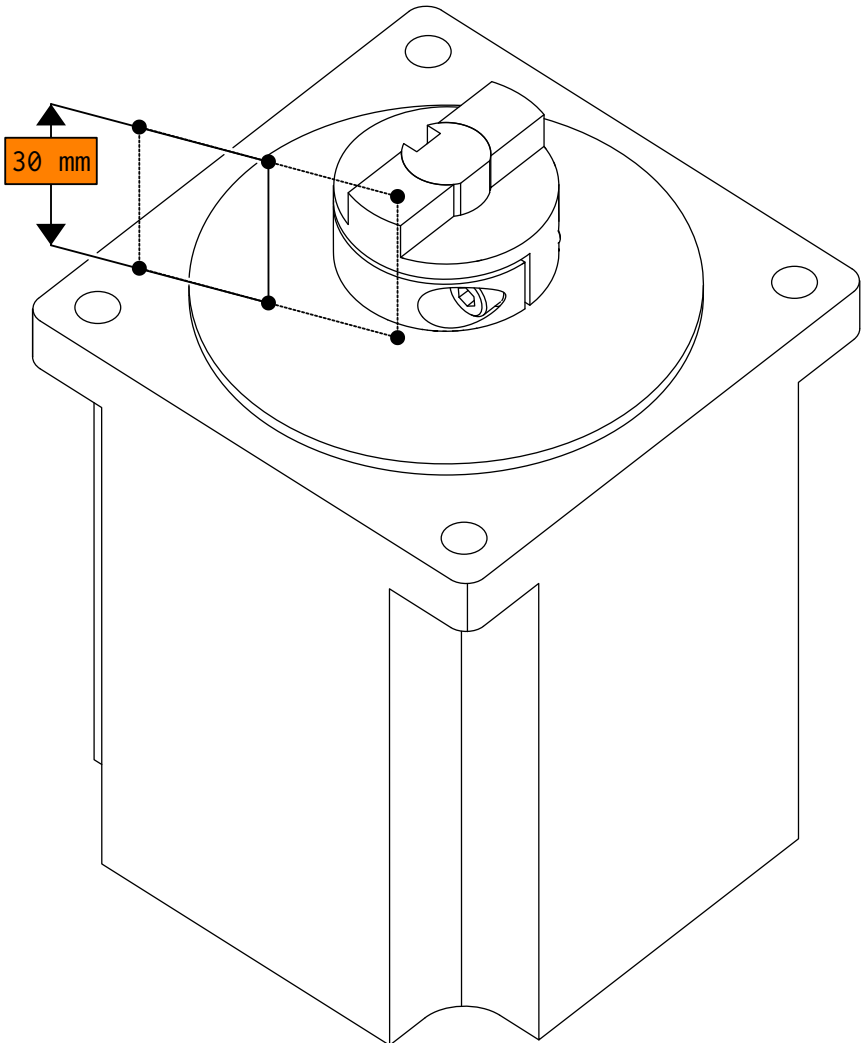
  Note: If you have a NEMA 34 Motor Kit, complete this step with a NEMA 34 motor.



- Bring the lower face of the coupler flush with the end of the motor shaft.

  Note: If are using different NEMA 23 motors, use the indicated measurement instead.

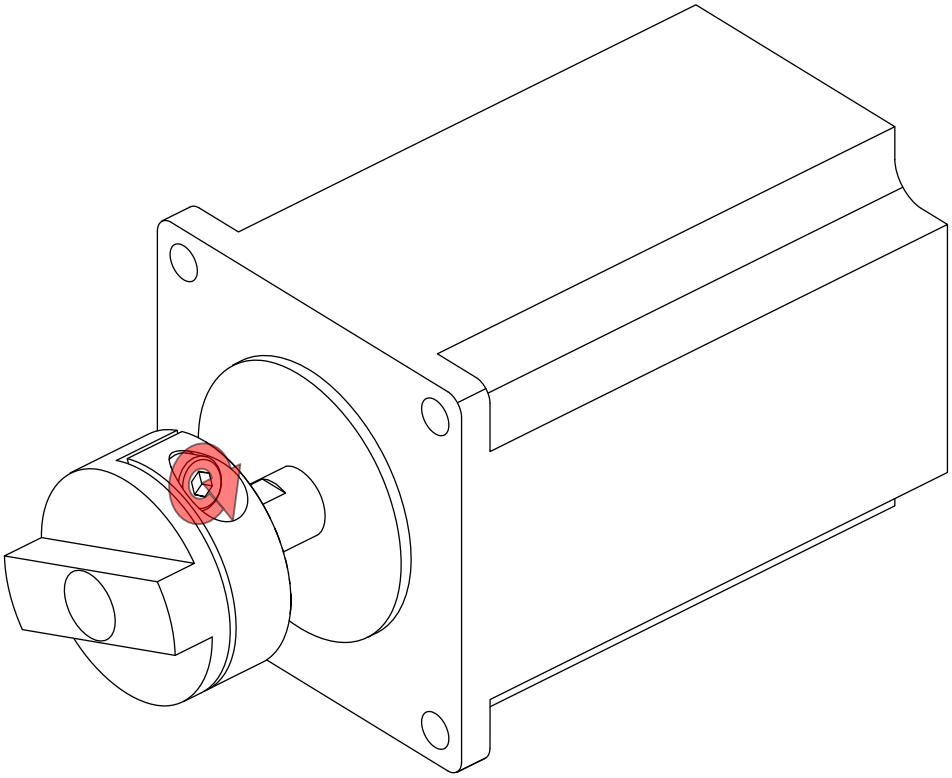
  Note: Skip this step if you purchased a NEMA 34 Motor Kit.



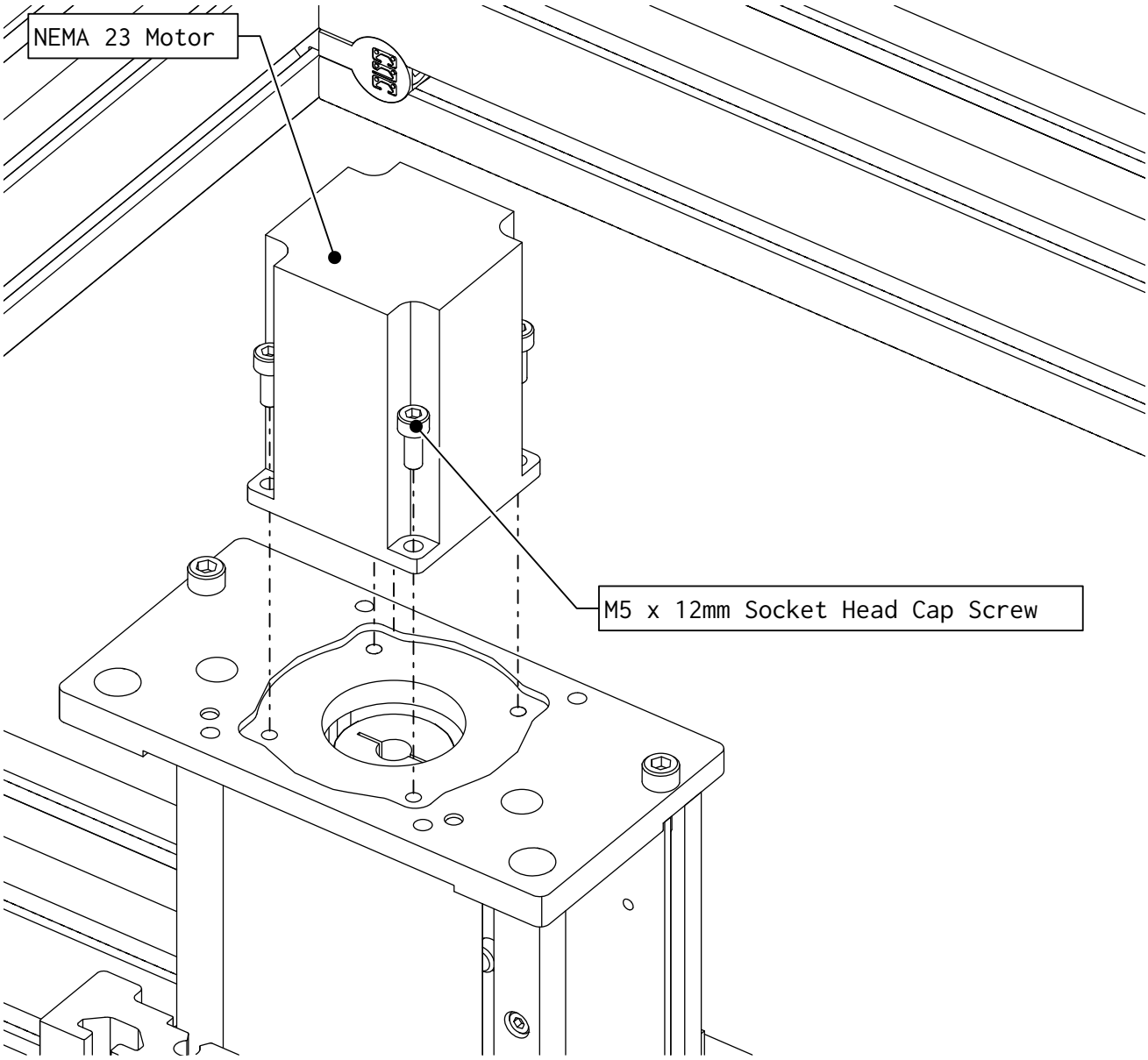
- Bring the upper face of the coupler flush with the end of the motor shaft.

  Note: If are using different NEMA 34 motors, use the indicated measurement instead.

  Note: Skip this step if you purchased a NEMA 23 Motor Kit.

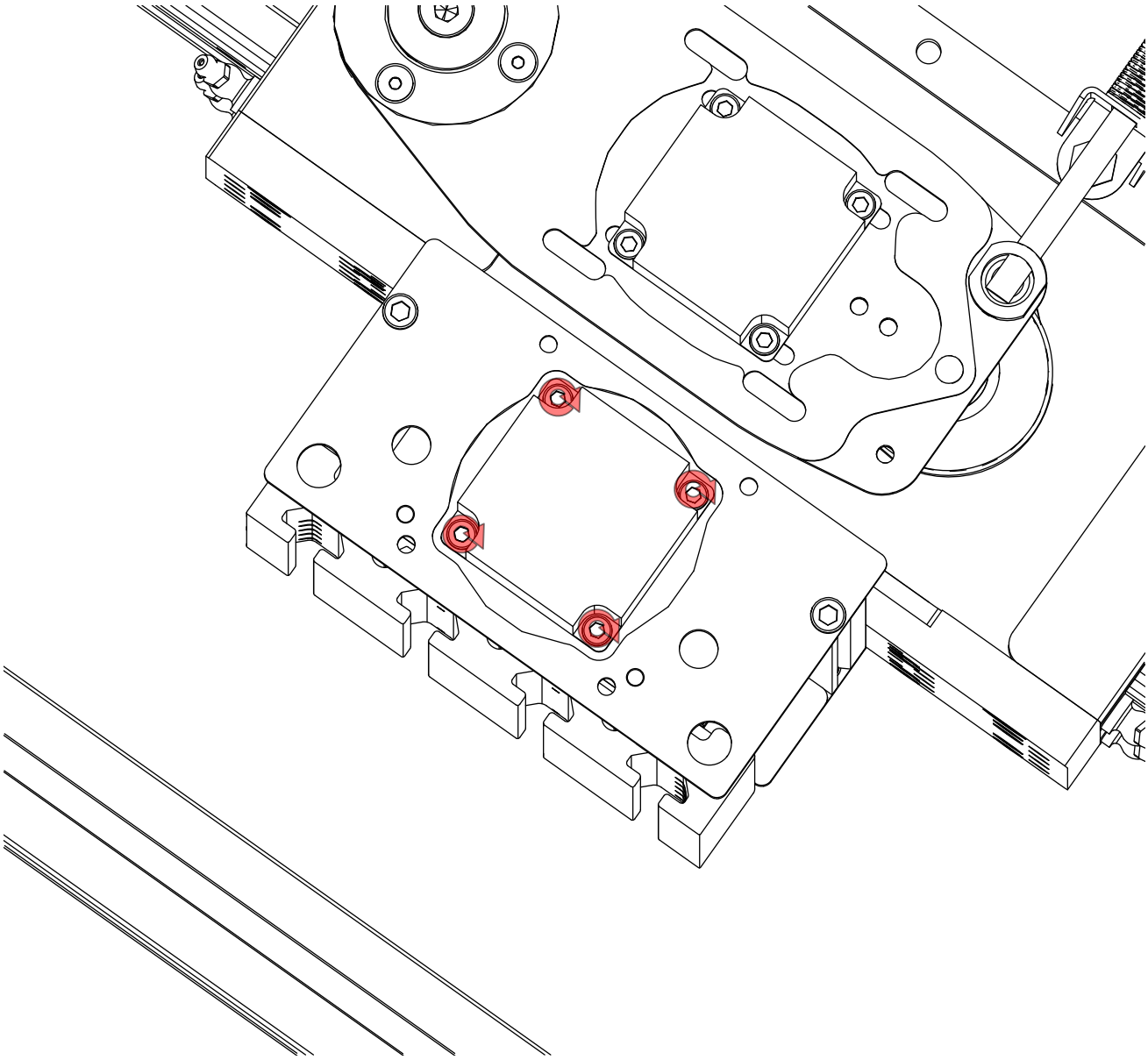


- Tighten the highlighted fasteners.

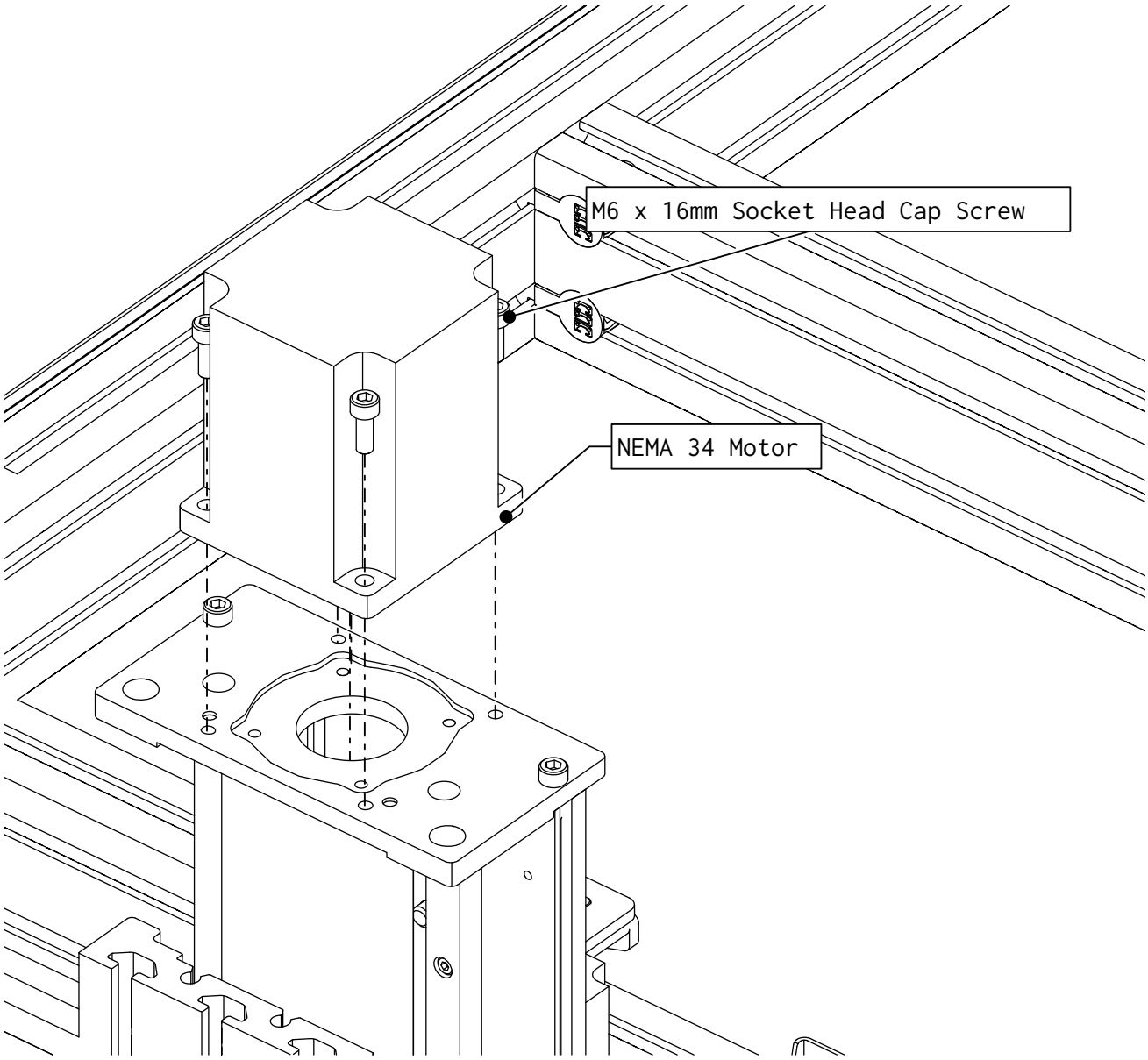


- Install the z-axis motor as indicated.

Note: Skip this step if you purchased a NEMA 34 Motor Kit.

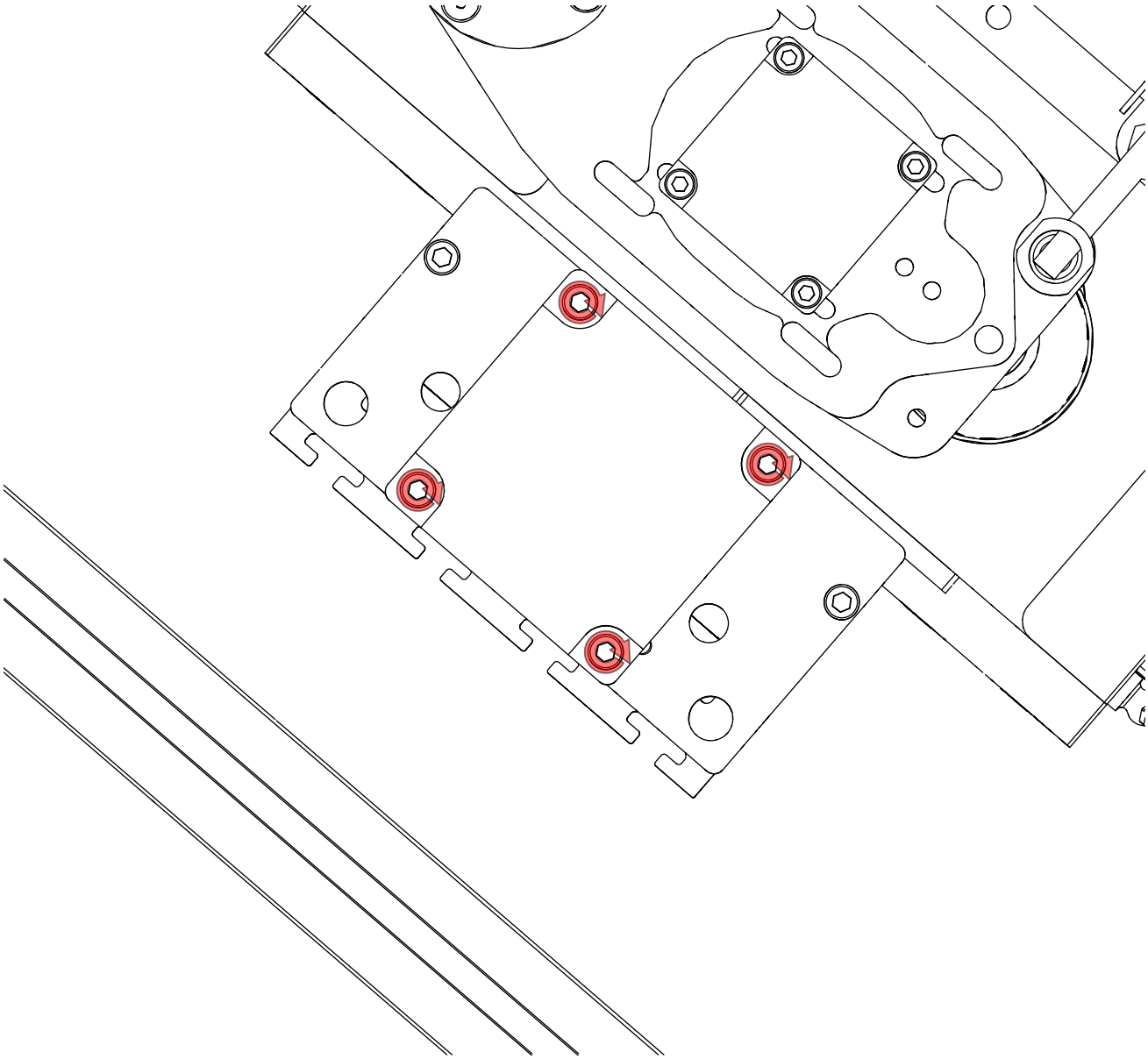


- Tighten the highlighted fasteners.



- Install the z-axis motor as indicated.

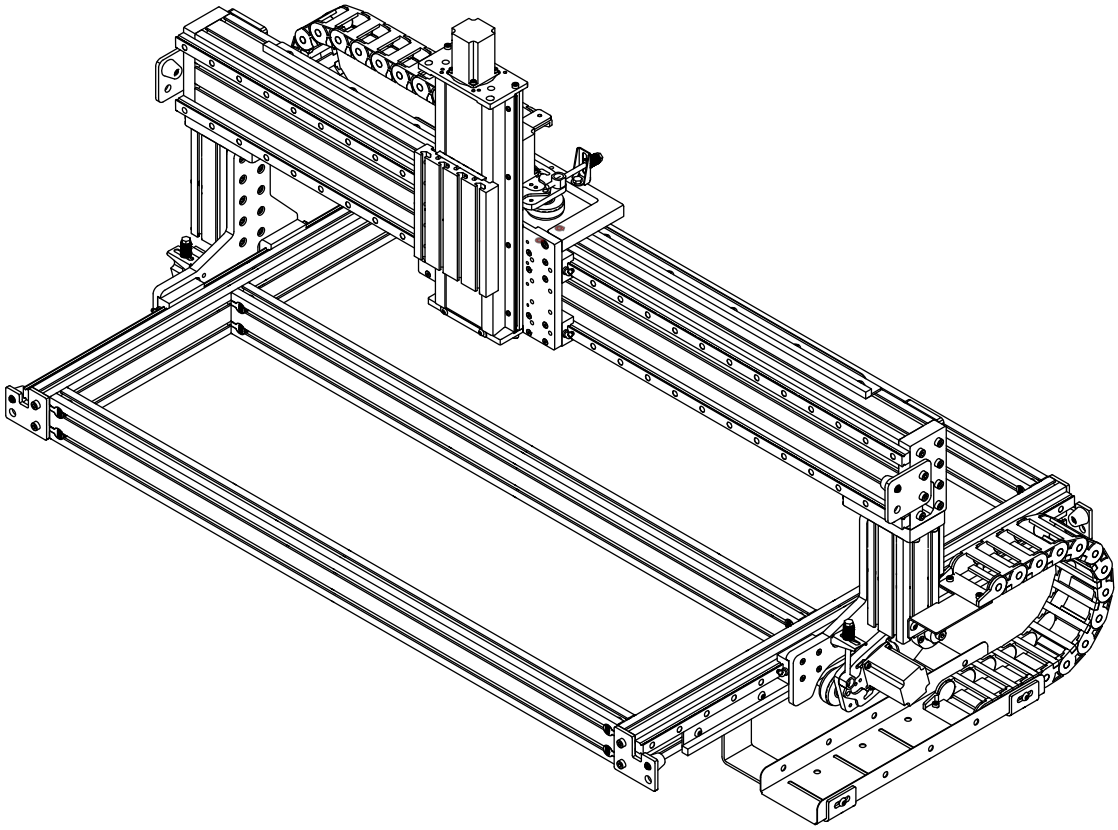
Note: Skip this step if you purchased a NEMA 23 Motor Kit.



- Tighten the highlighted fasteners.

6

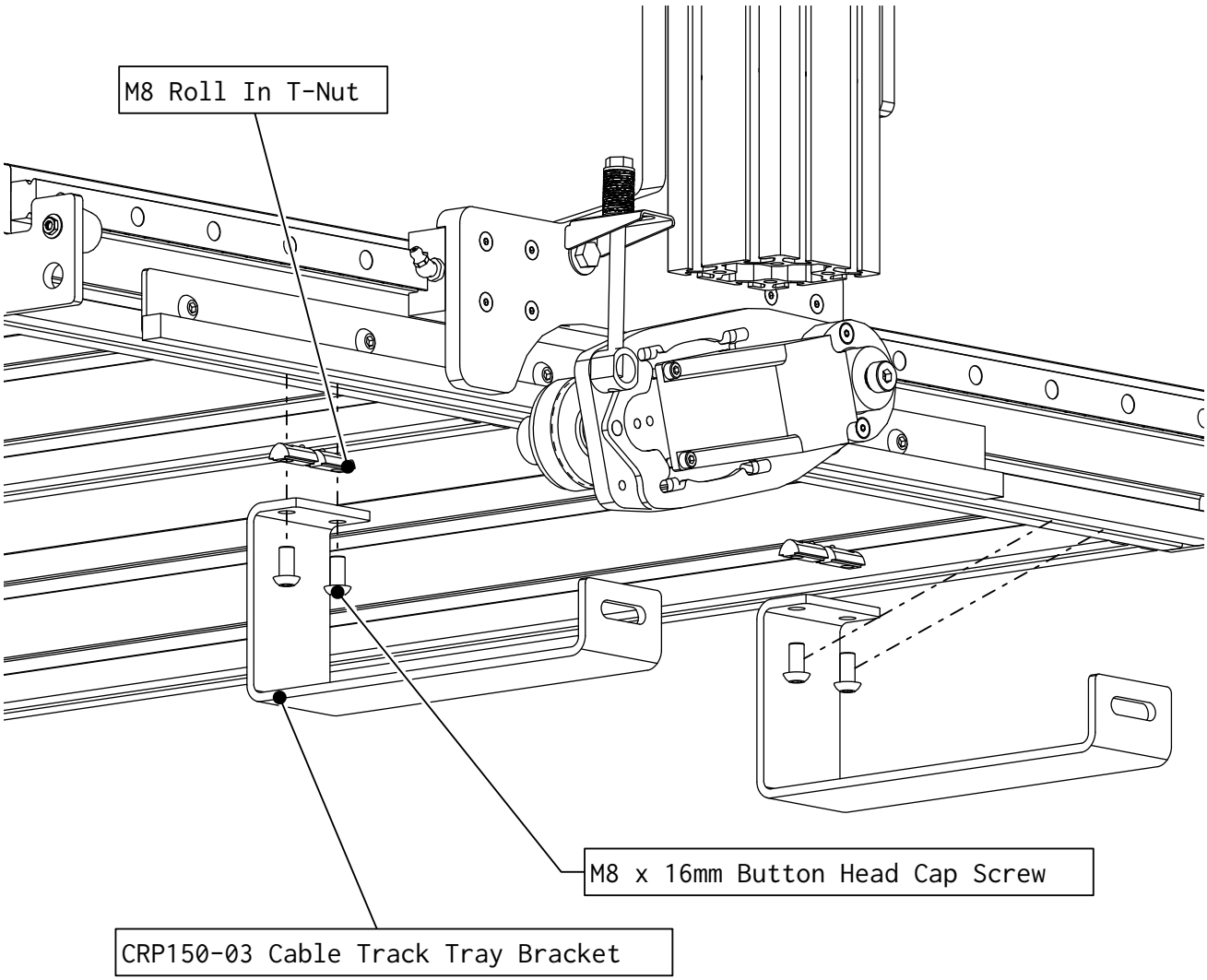
Cable Track Assembly



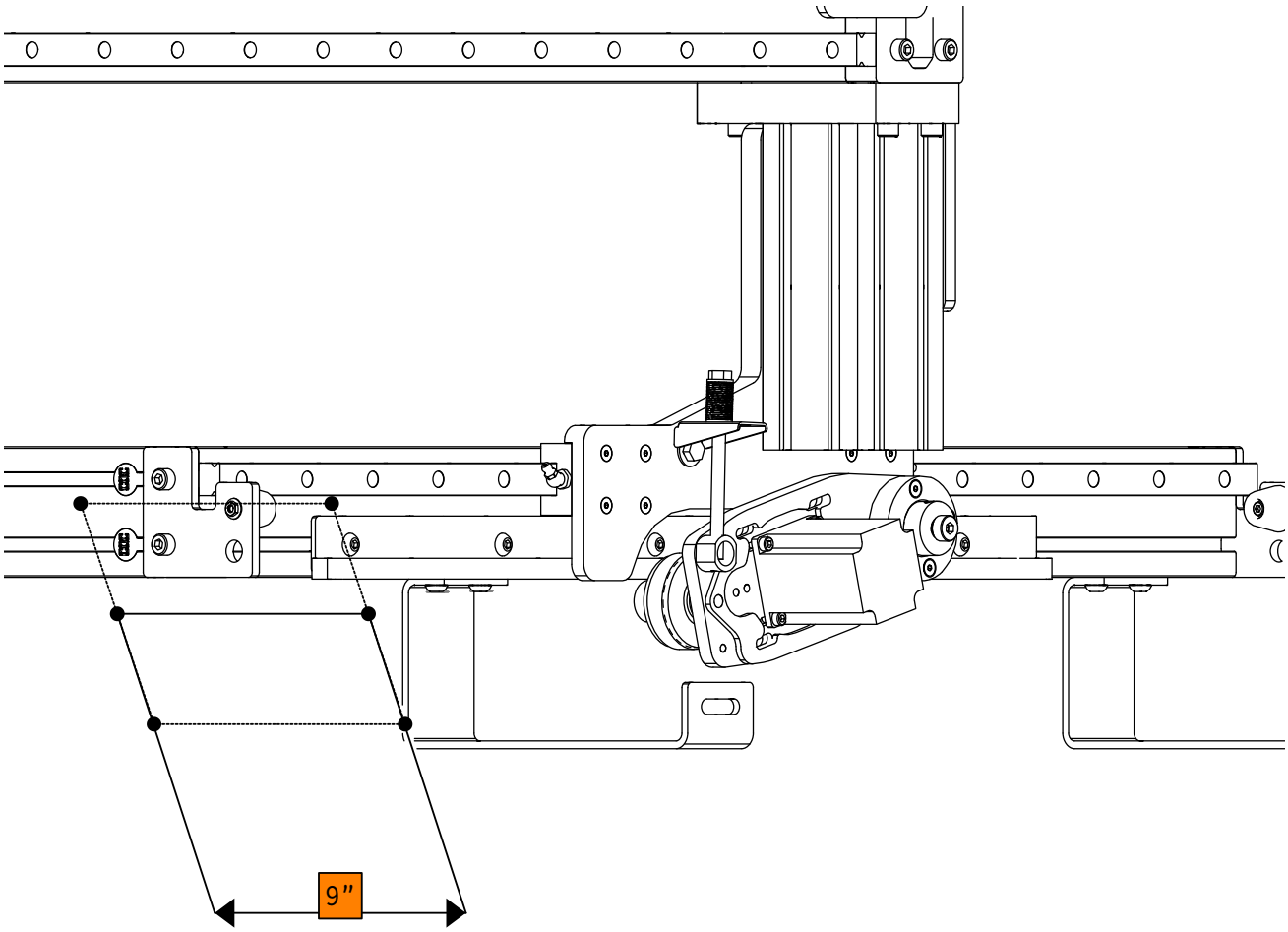
Cable Track Installation

The following parts and bags will be used in this section:

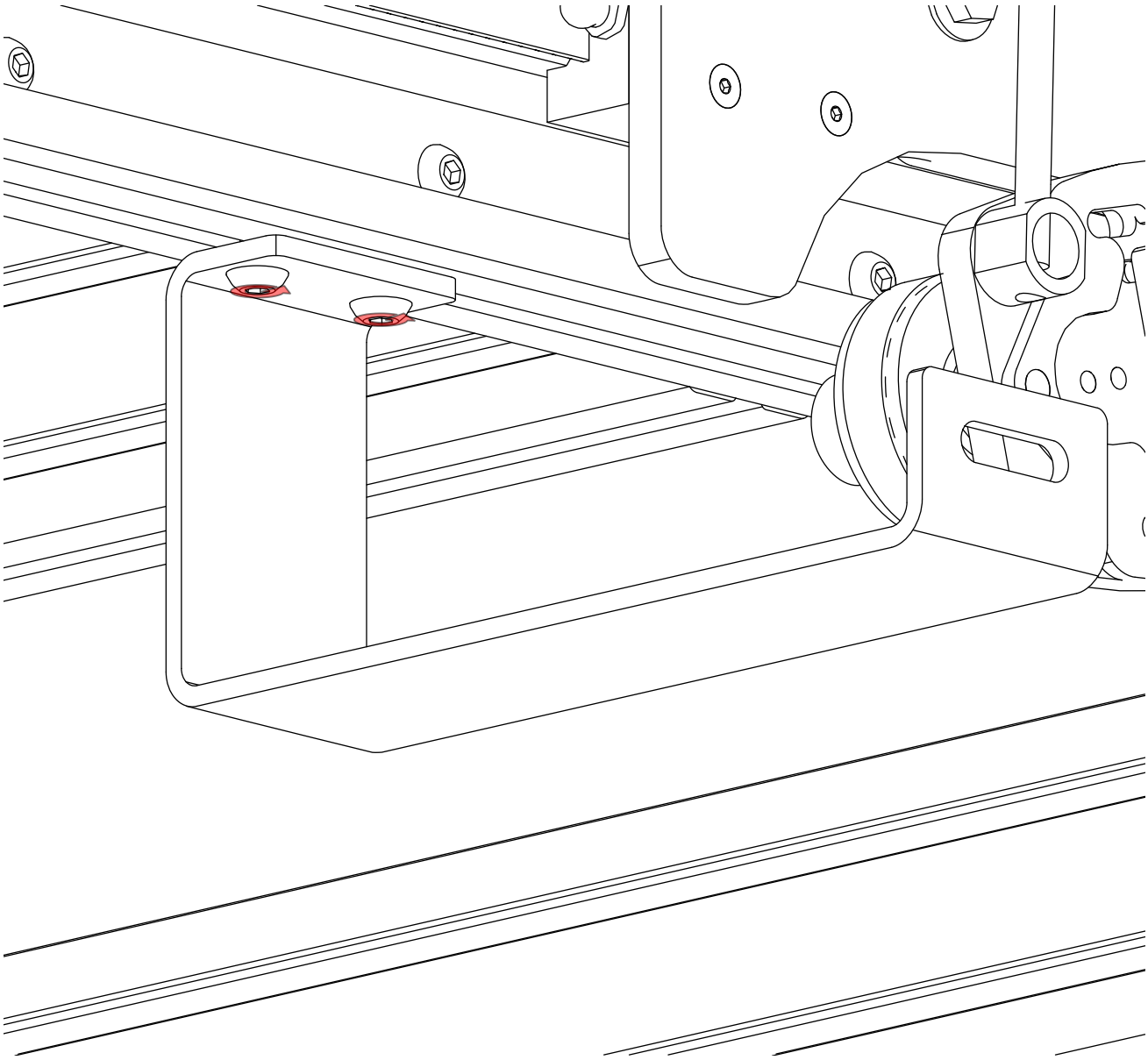
- (1) 75mm Cable Track Section
- (1) 50mm Cable Track Section
- (1) Cable Track Tray
- (1) Short Cable Track Tray
- (2) (CRP150-03) Cable Tray Bracket
- (1) (CRP150-09) Cable Tray Bracket
- (1) (CRP150-08) Cable Tray Bracket
- (1) (CT-TRAY-X-PRO-SHORT-FAST) X Short Cable Tray PRO Fasteners
  - (6) M8 x 12mm Button Head Cap Screw
  - (6) M8 Flanged Hex Nut
  - (4) M8 x 16mm Button Head Cap Screw
  - (4) M8 Roll-in T-nut
- (1) (CT-TRAY-Y-PRO-FAST) Y Cable Tray PRO Fasteners
  - (6) M8 x 12mm Button Head Cap Screw
  - (6) M8 Roll-in T-nut
- (1) (CT-FAST-PRO-16.1) Cable Track Base Kit Fasteners
  - (10) (SK-M6-12) M6 x 12mm Socket Head Cap Screw
  - (6) (HNJ-M6) M6 Hex Nut
  - (6) (91090A105) 1/4" Flat Washer
  - (2) (BHCP-M8-12) M8 x 12mm Button Head Cap Screw
  - (2) (TNR-M8) M8 Roll-in T-nut



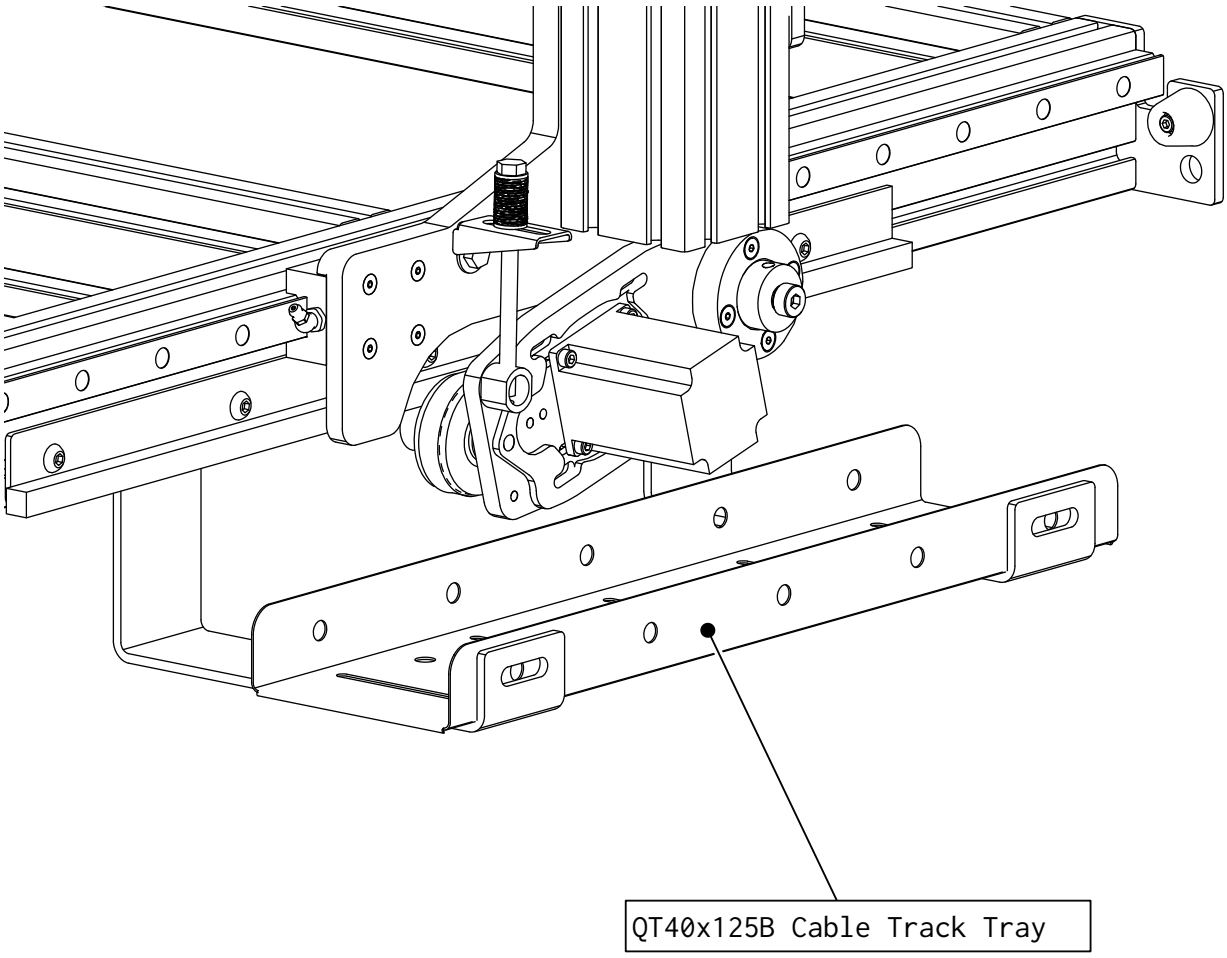
- Attach the Cable Track Bracket to the base extrusion as indicated.



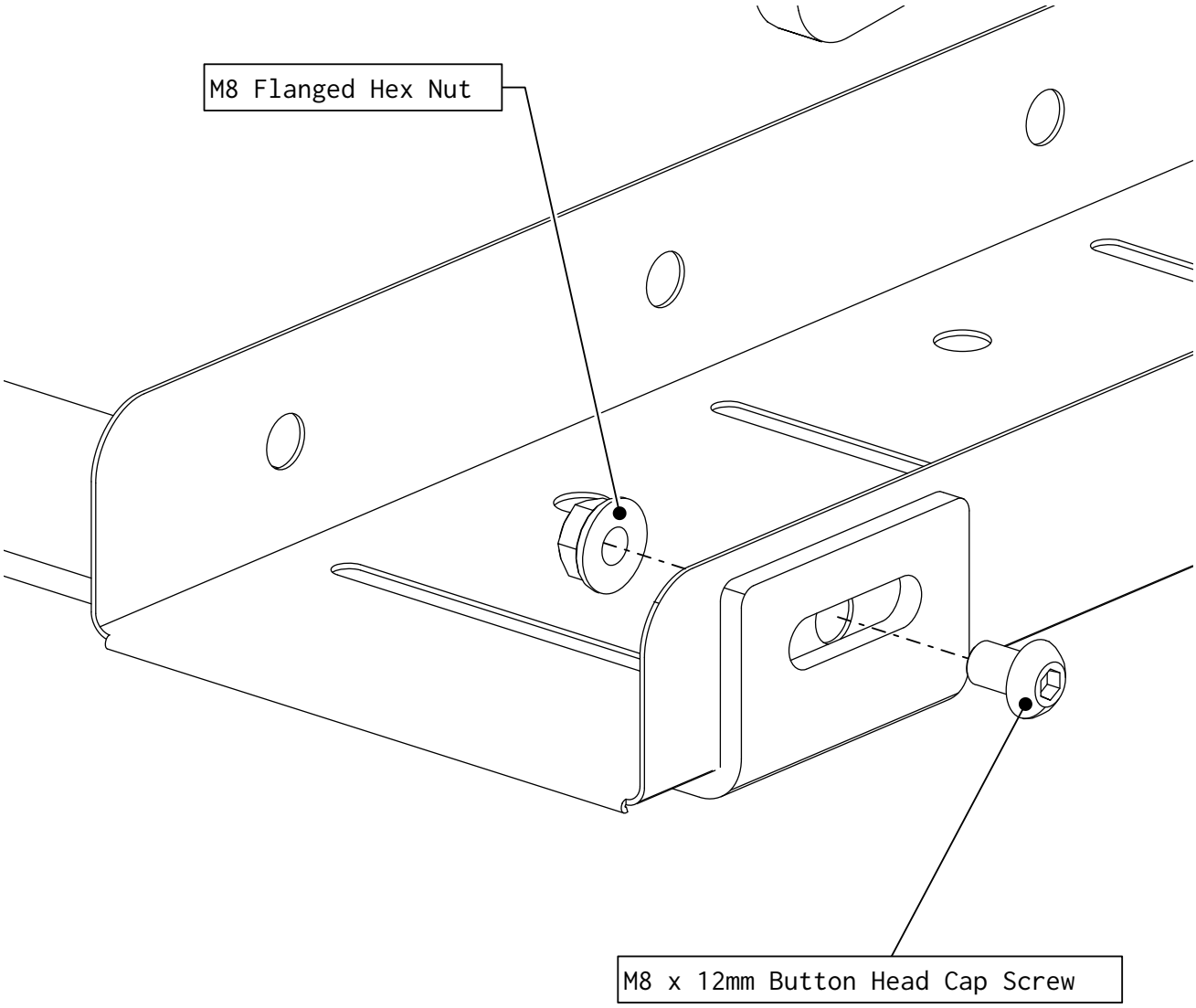
- Bring the Bracket approximatly 27" (700mm) from the end of the table.



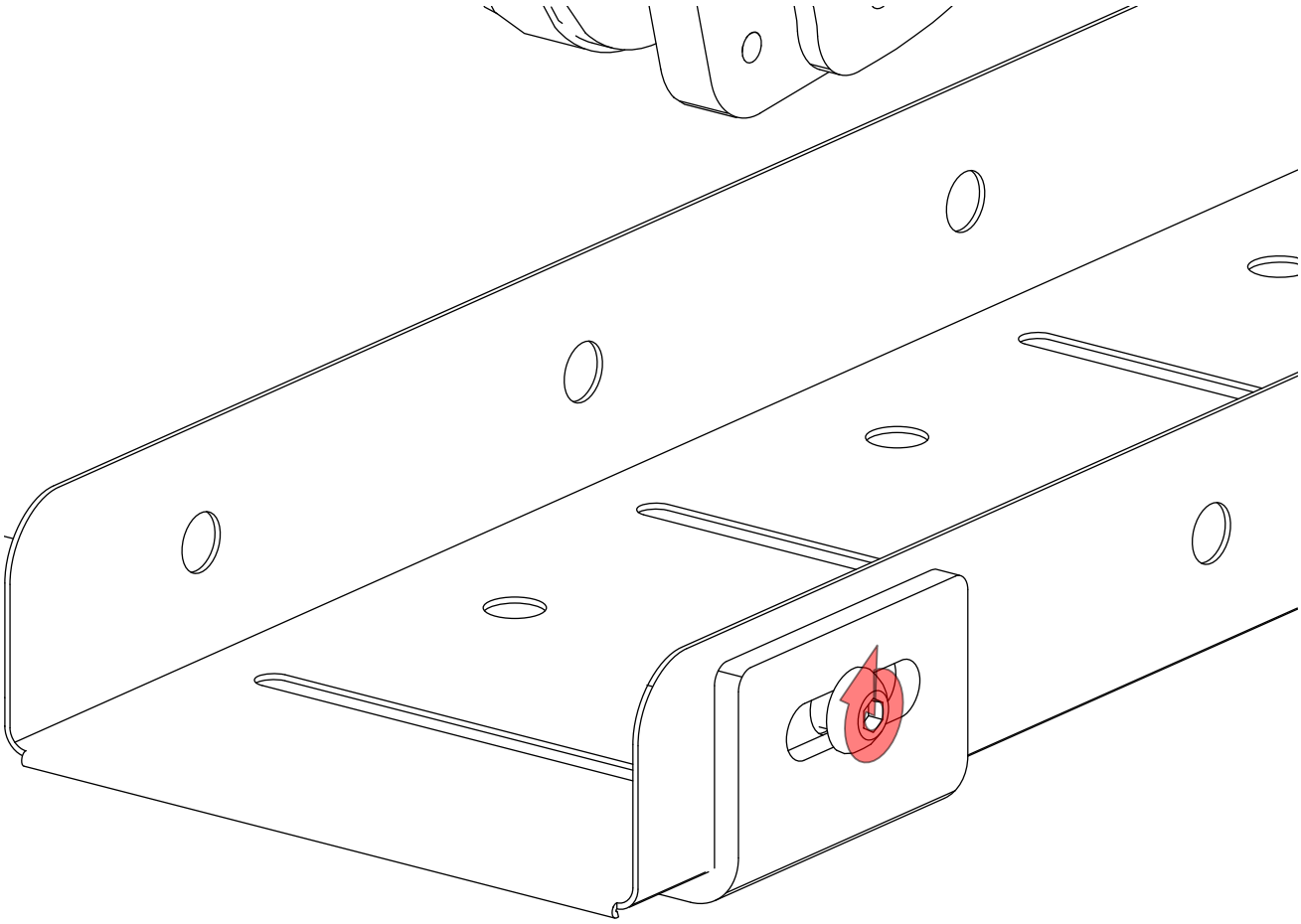
- Tighten the highlighted fasteners.



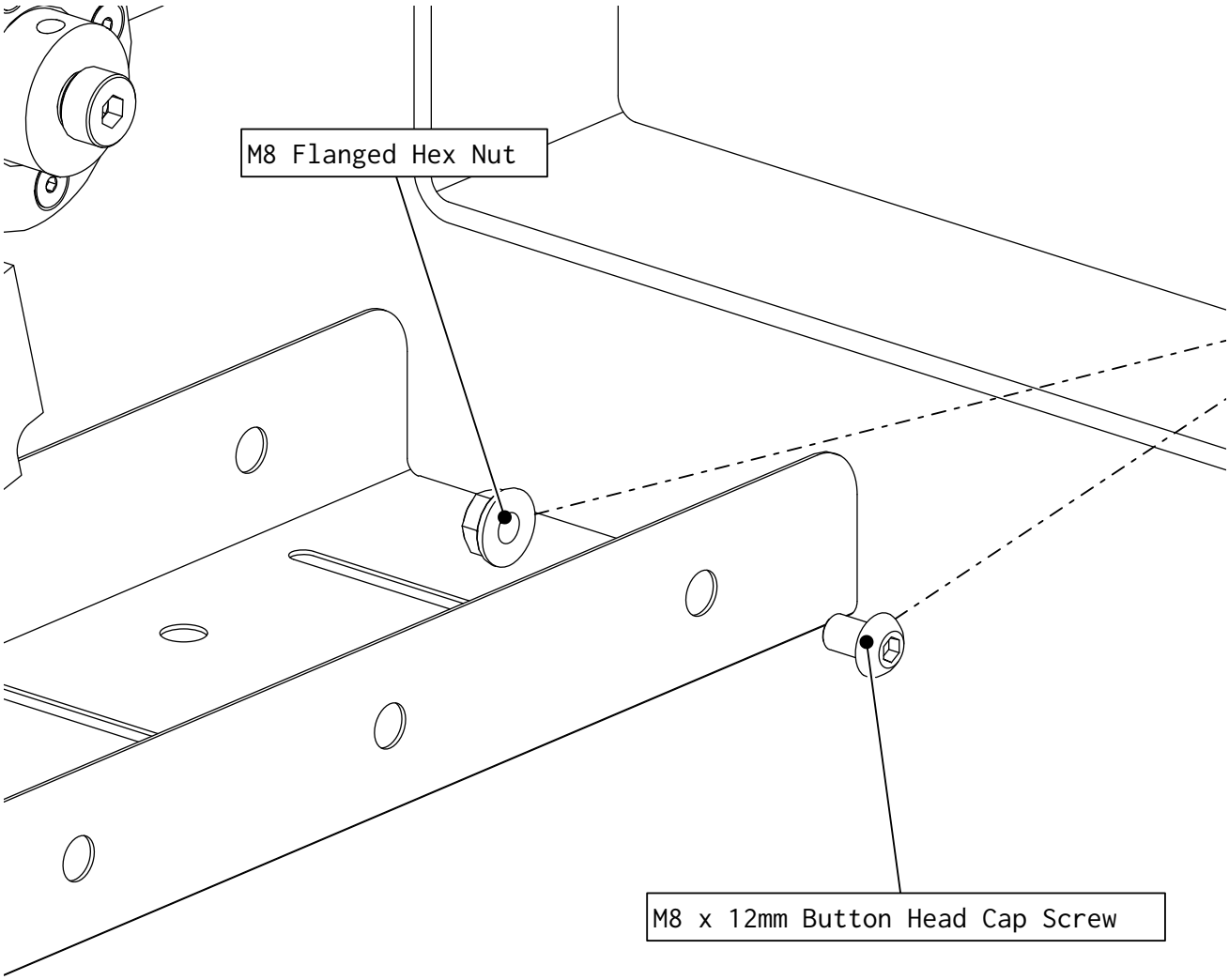
- Set a Cable Track Tray on the brackets



- Attach the cable track to the front bracket.

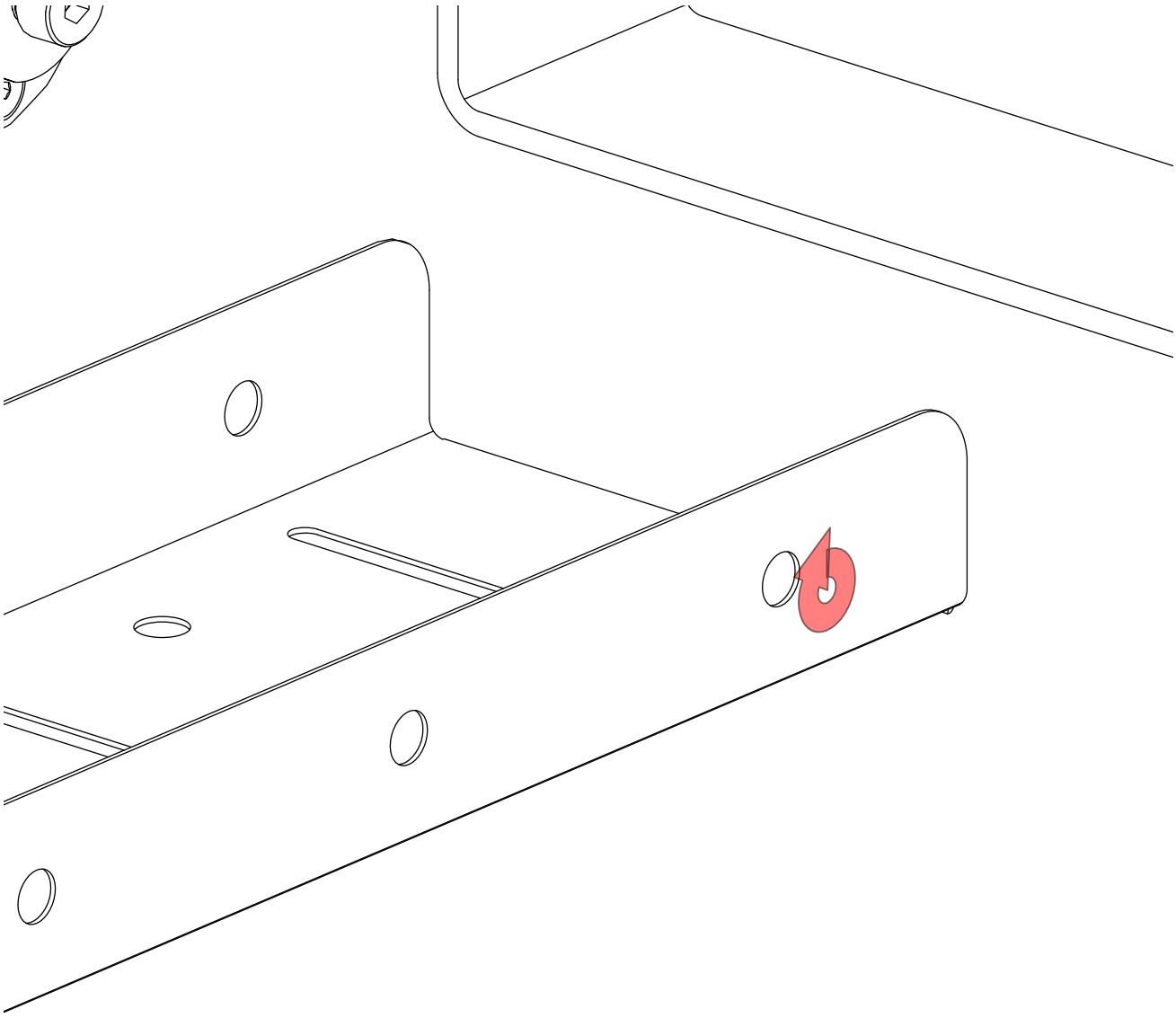


- Tighten the highlighted fasteners.

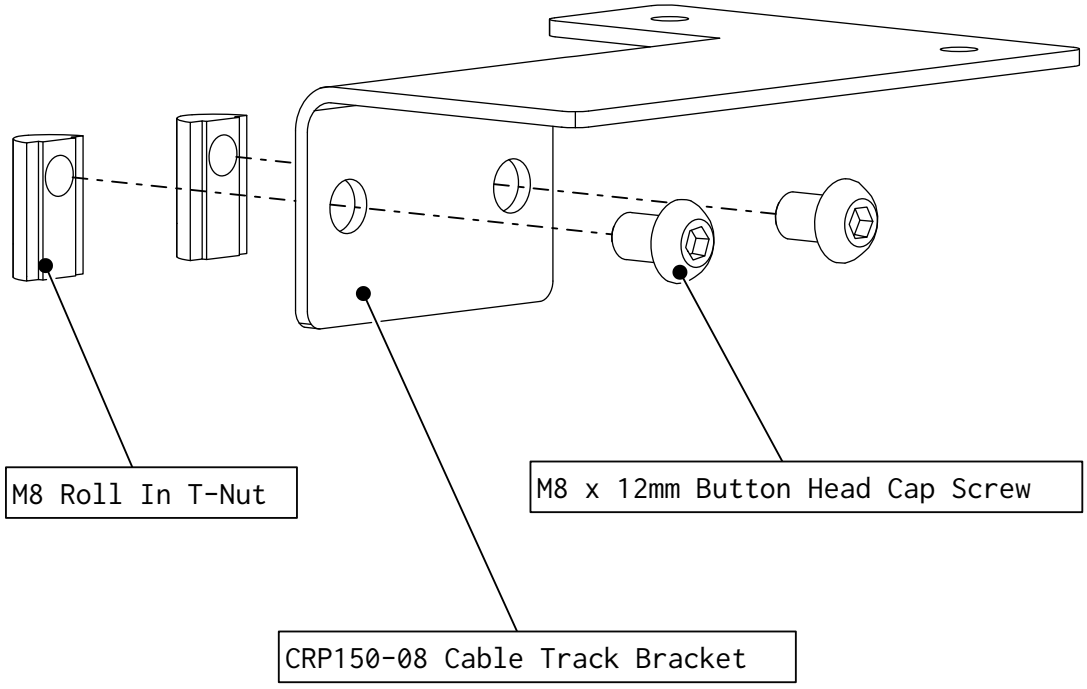


- Adjust the other bracket as necessary and attach to the cable tray as indicated.

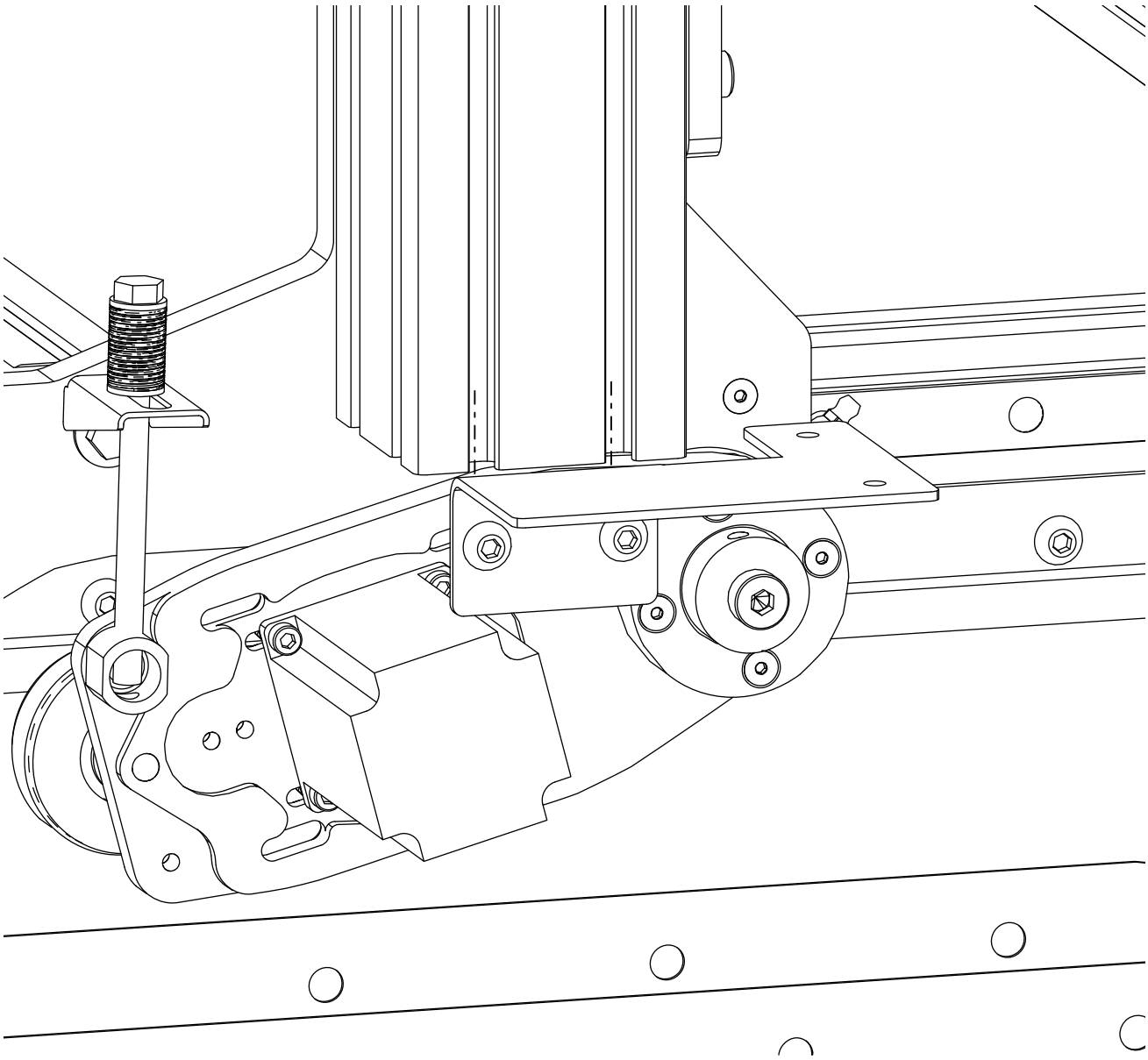
  Note: You may need to loosen the fasteners holding this bracket to the machine to adjust it's position.



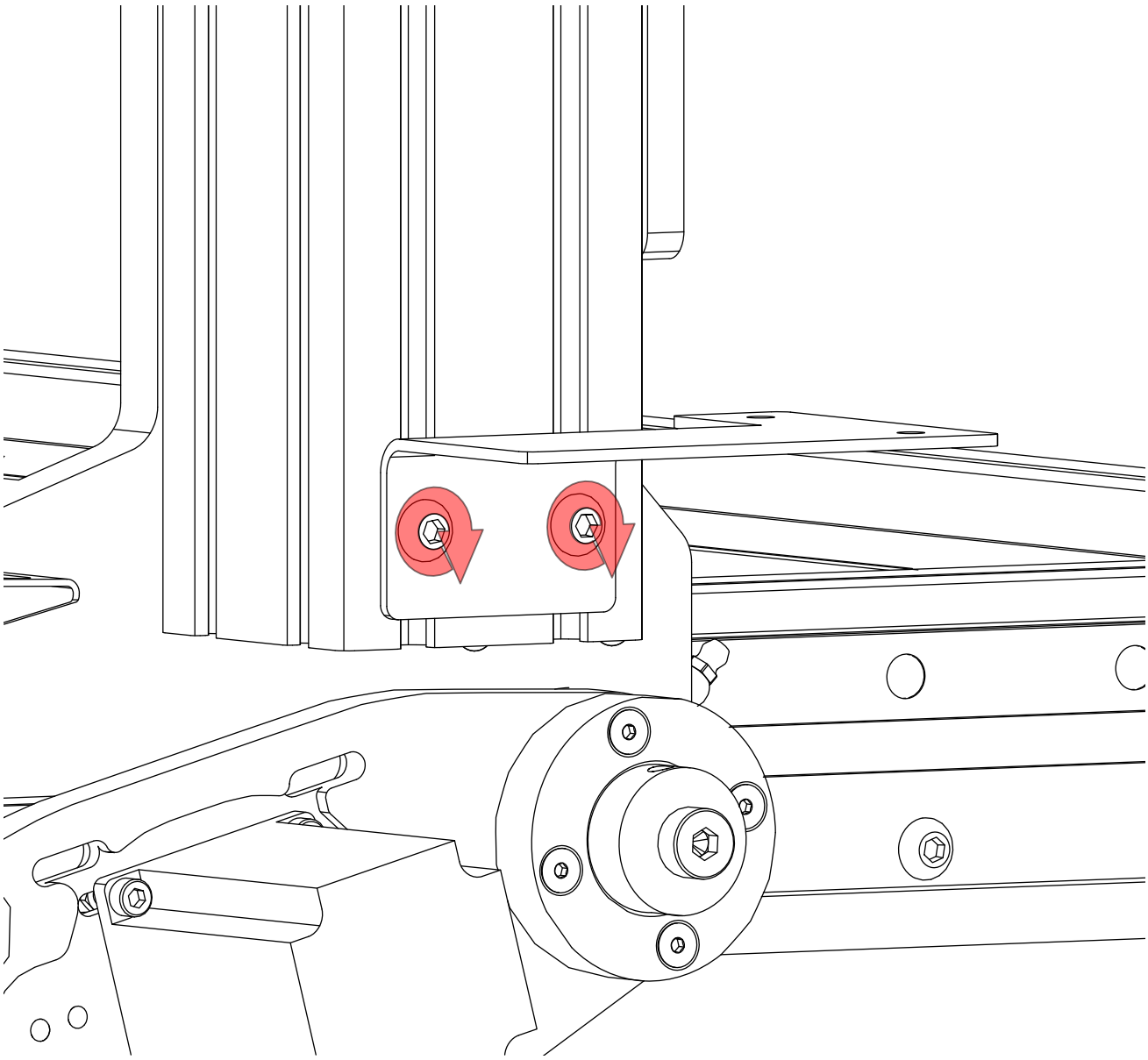
- Tighten the highlighted fasteners.



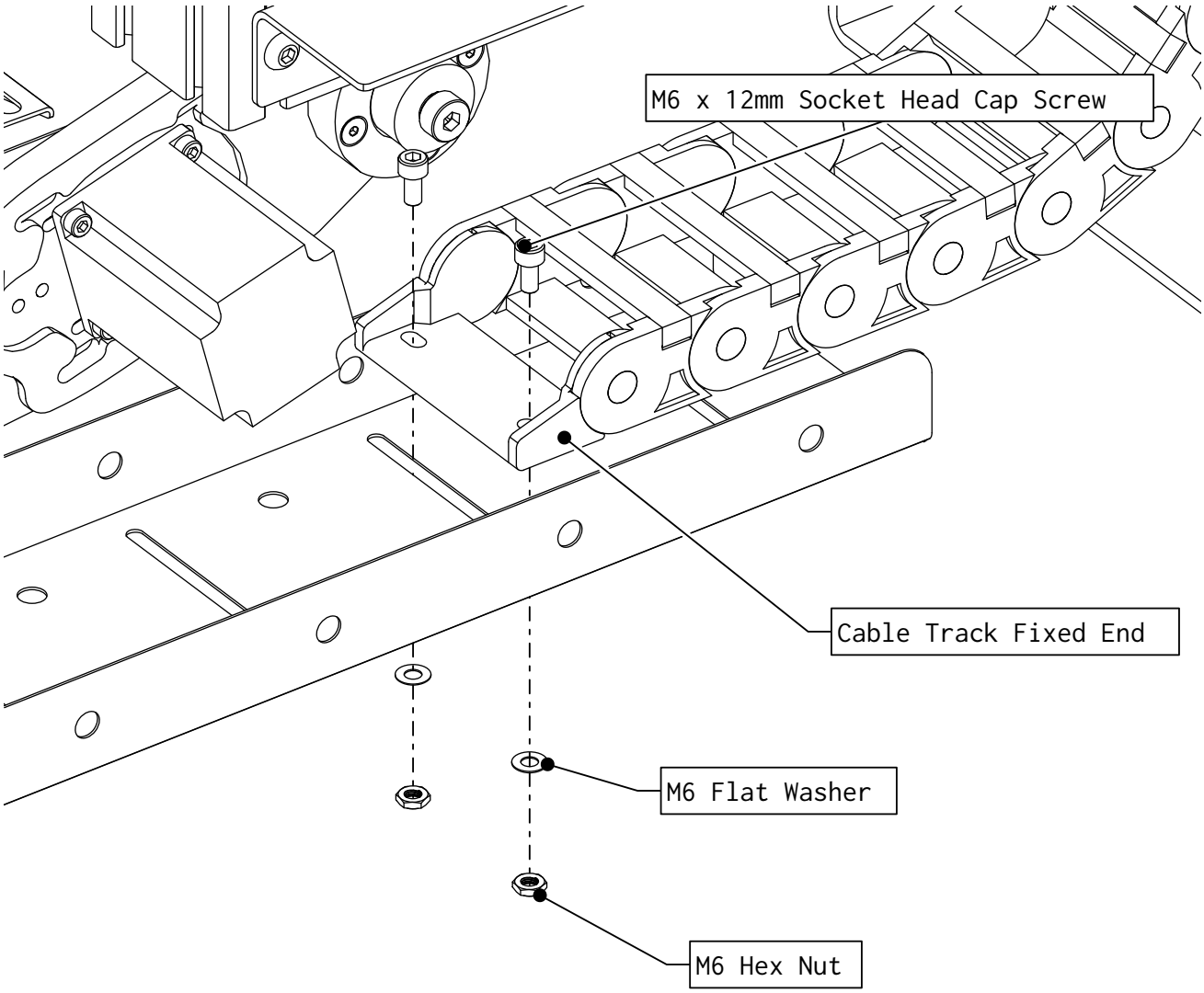
- Prethread fasteners into the riser cable track bracket as indicated.



- Slide the riser cable track bracket into the riser extrusion.

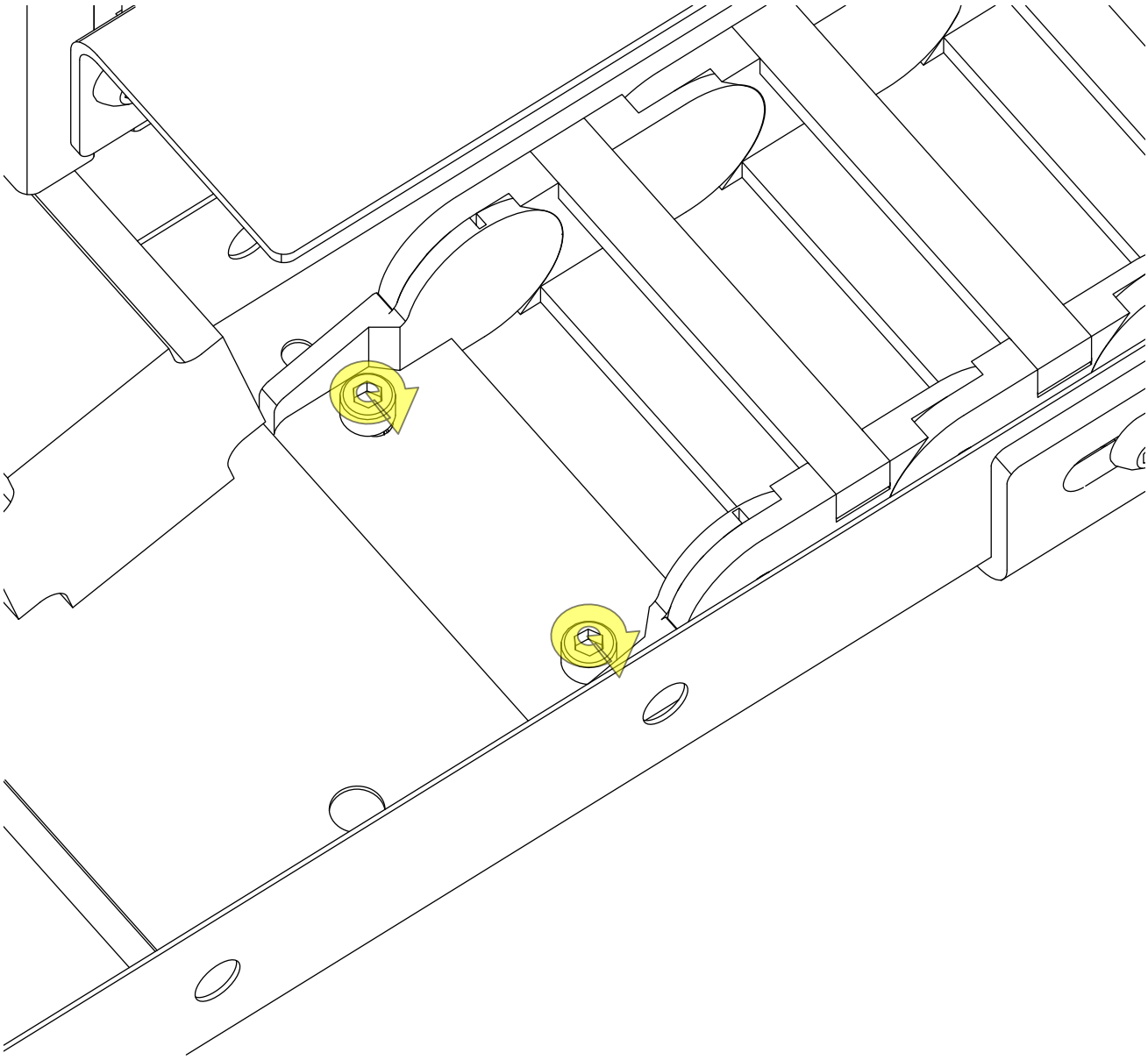


- Tighten the highlighted fasteners.

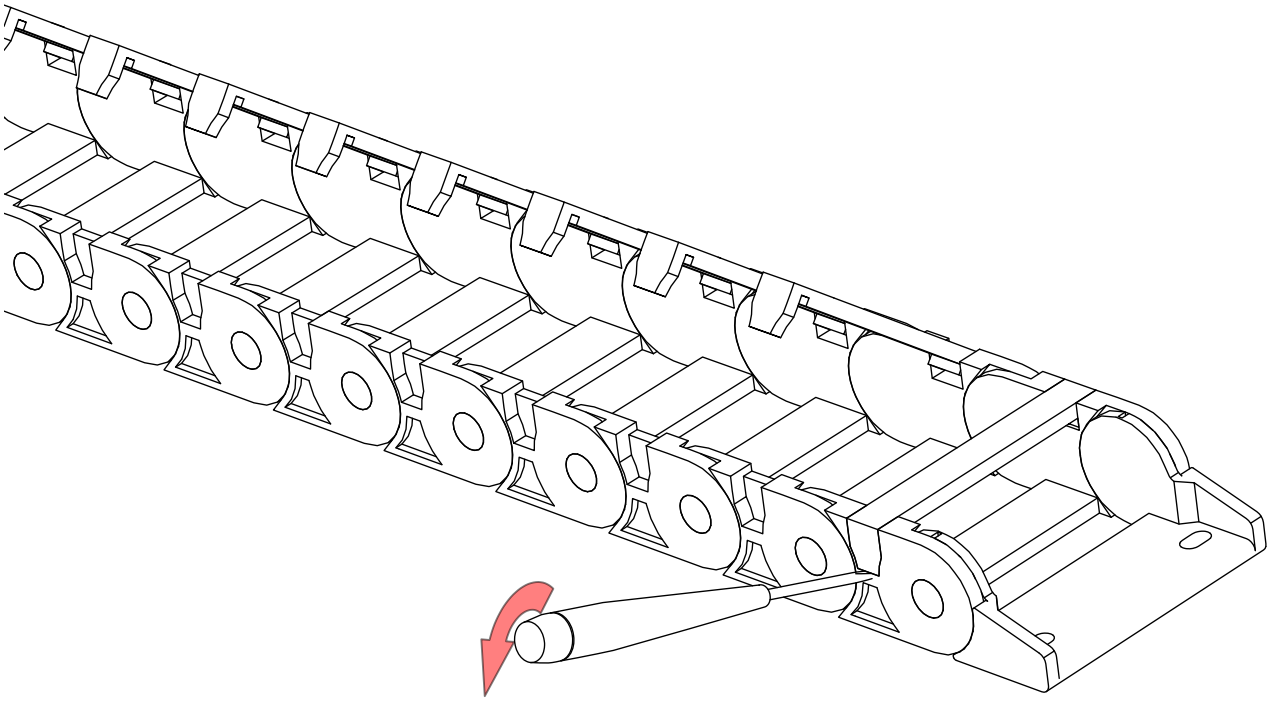


- Attach the fixed end of the cable track to the tray, 5 slots from the end of the tray as indicated.

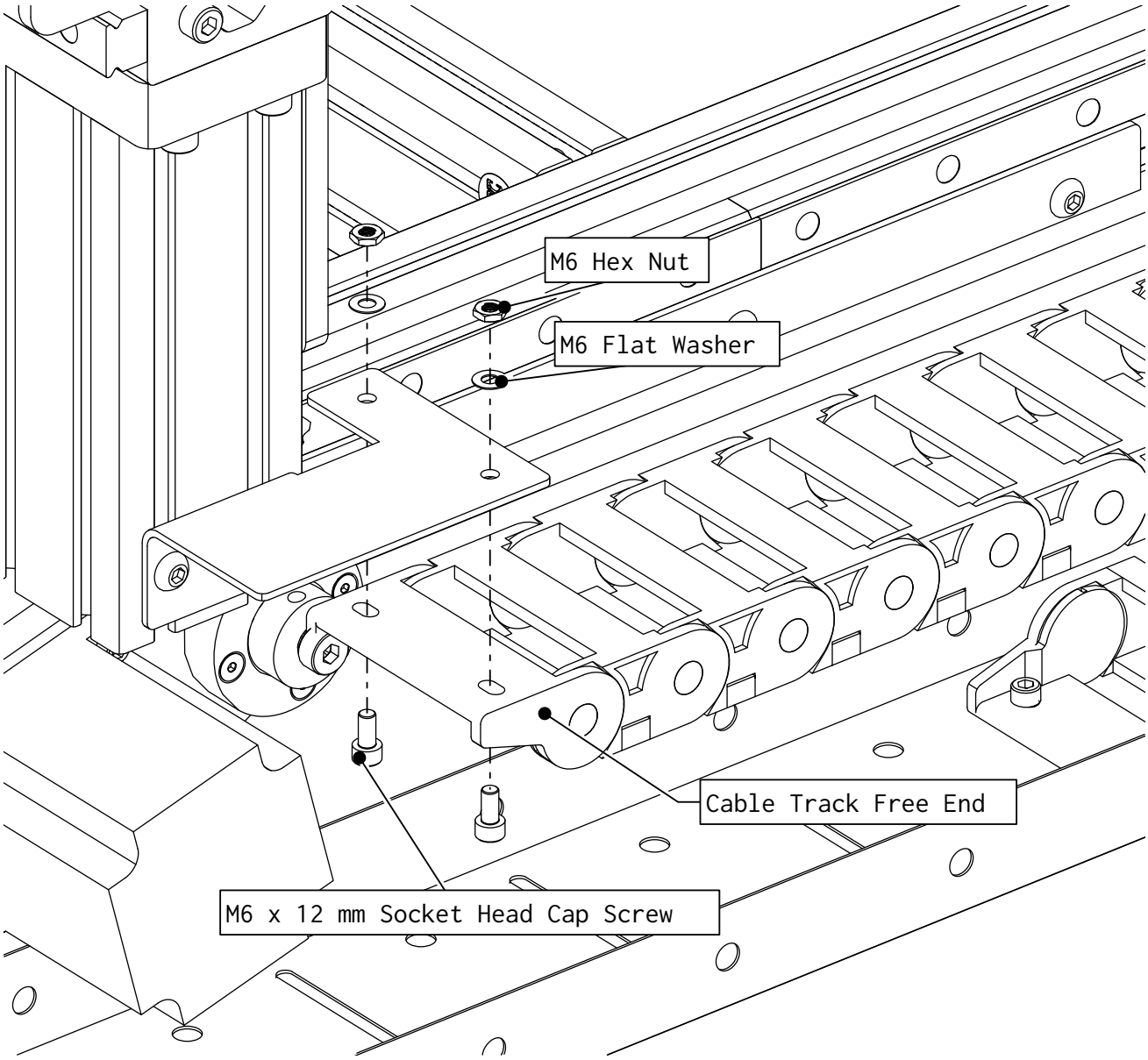
  Note: The fixed end of the cable track is the one which does not rotate independantly.



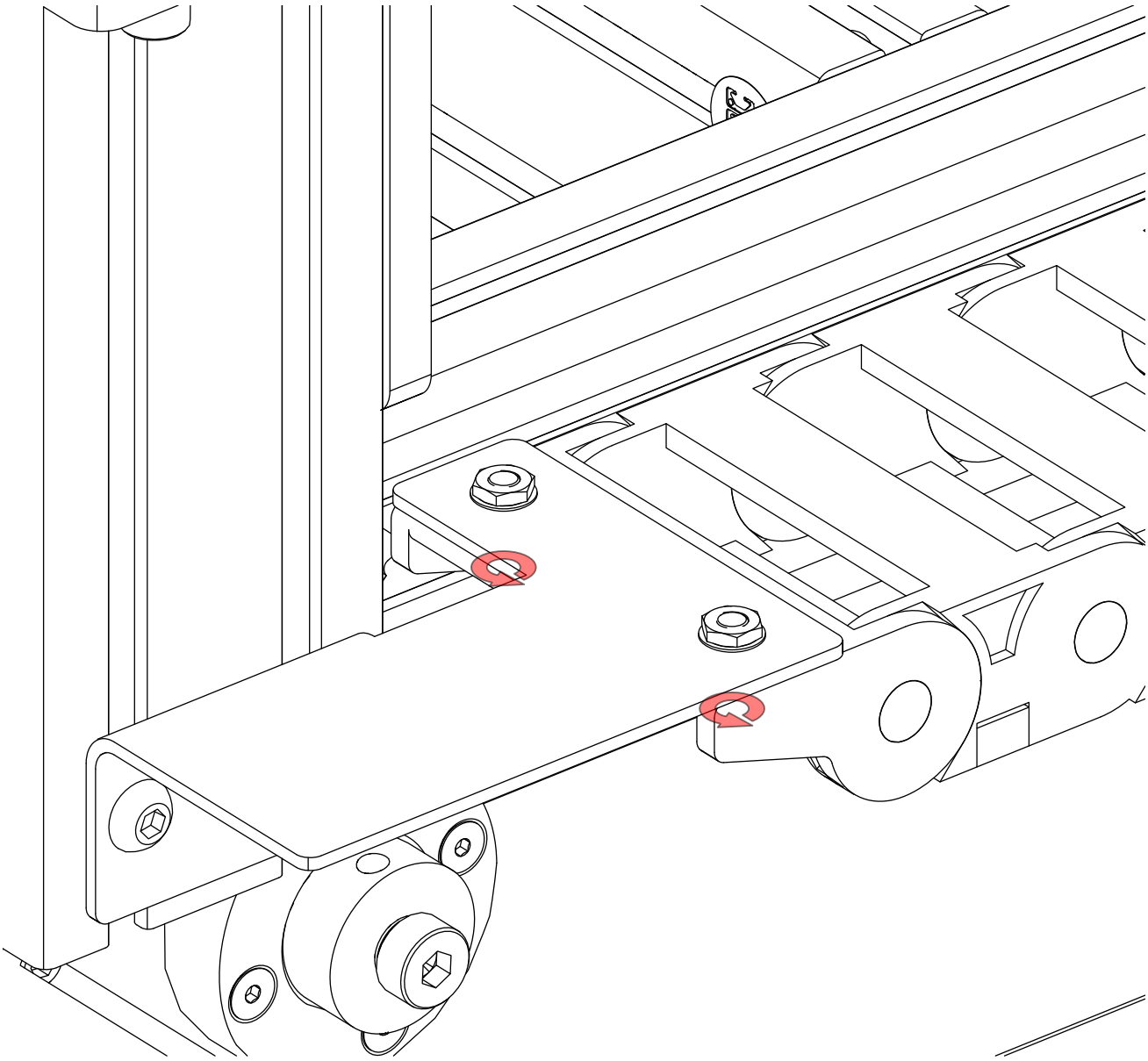
- Partially tighten the highlighted fasteners.



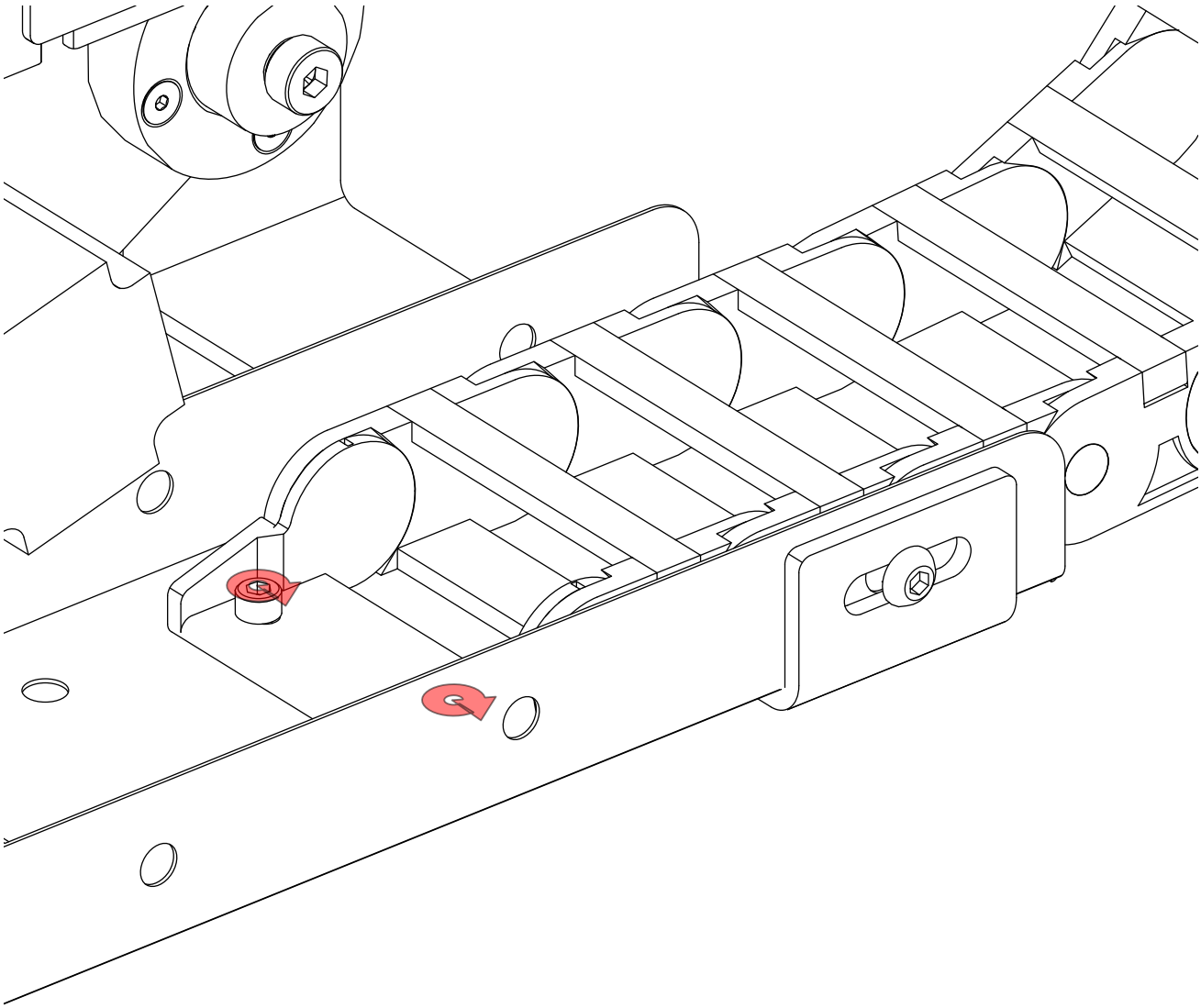
- Use a screwdriver to lift open the cable track sections, and route the cable through the track.



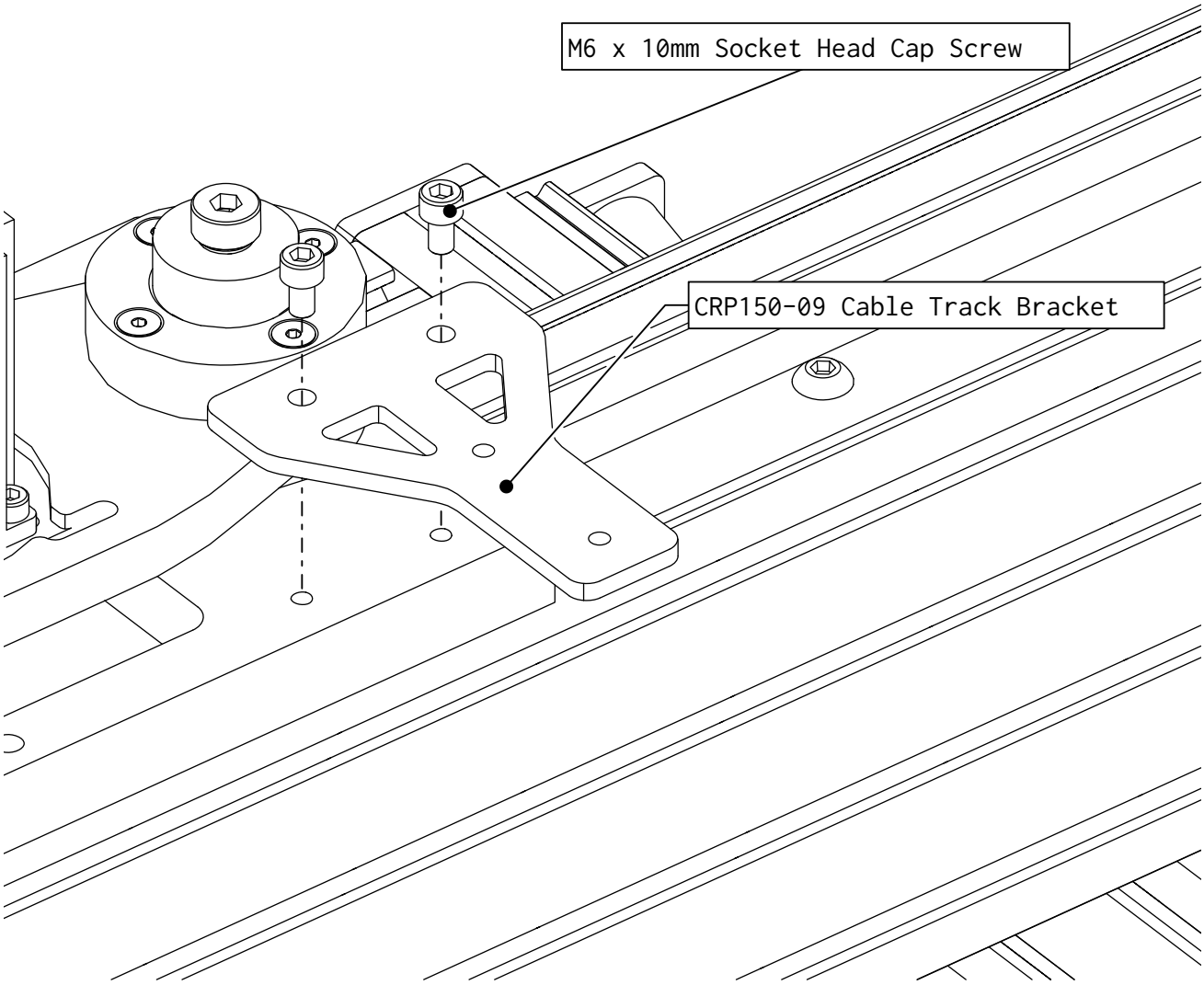
- Attach the remaining end of the cable track to the riser bracket as indicated.



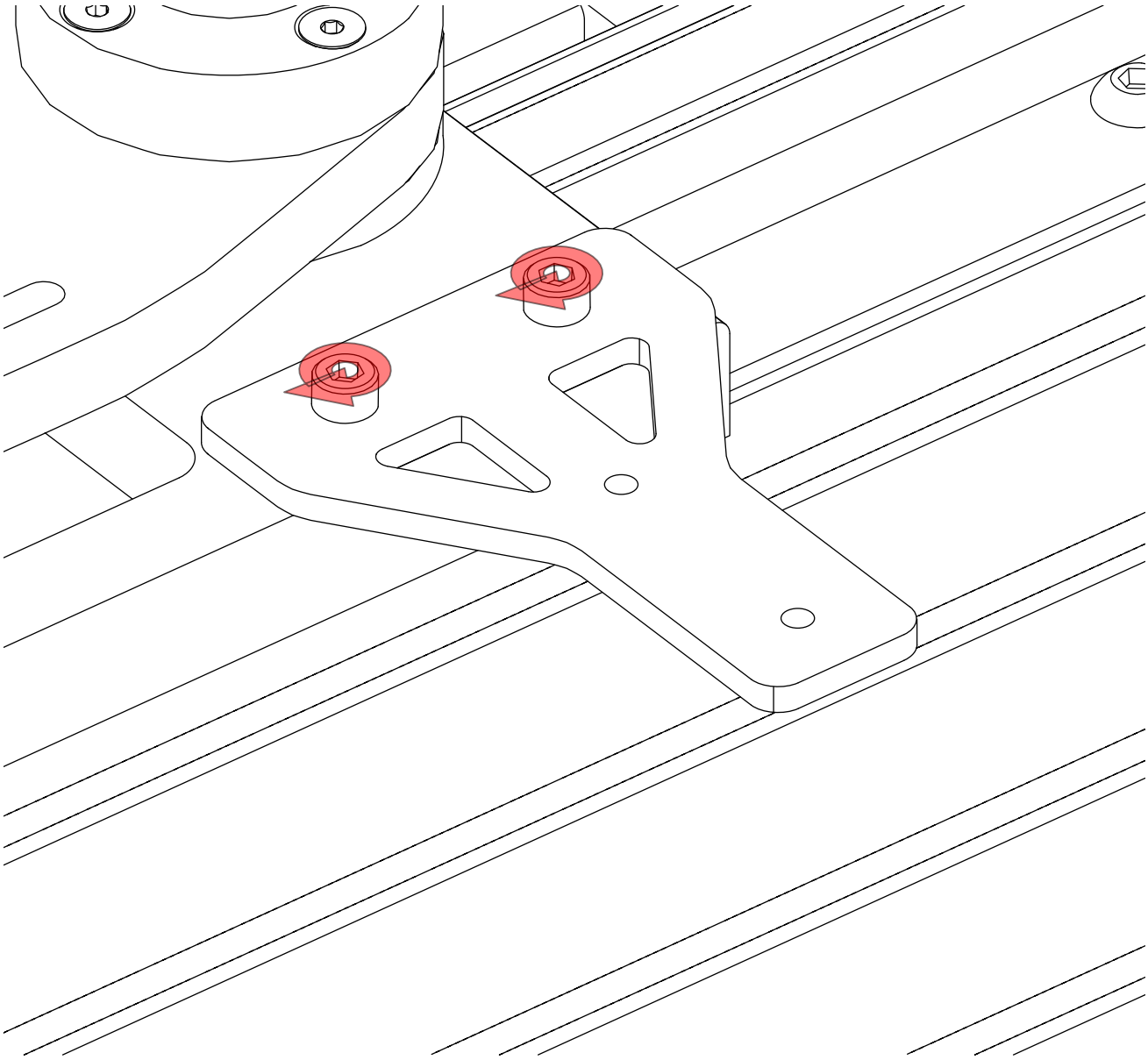
- Tighten the highlighted fasteners.



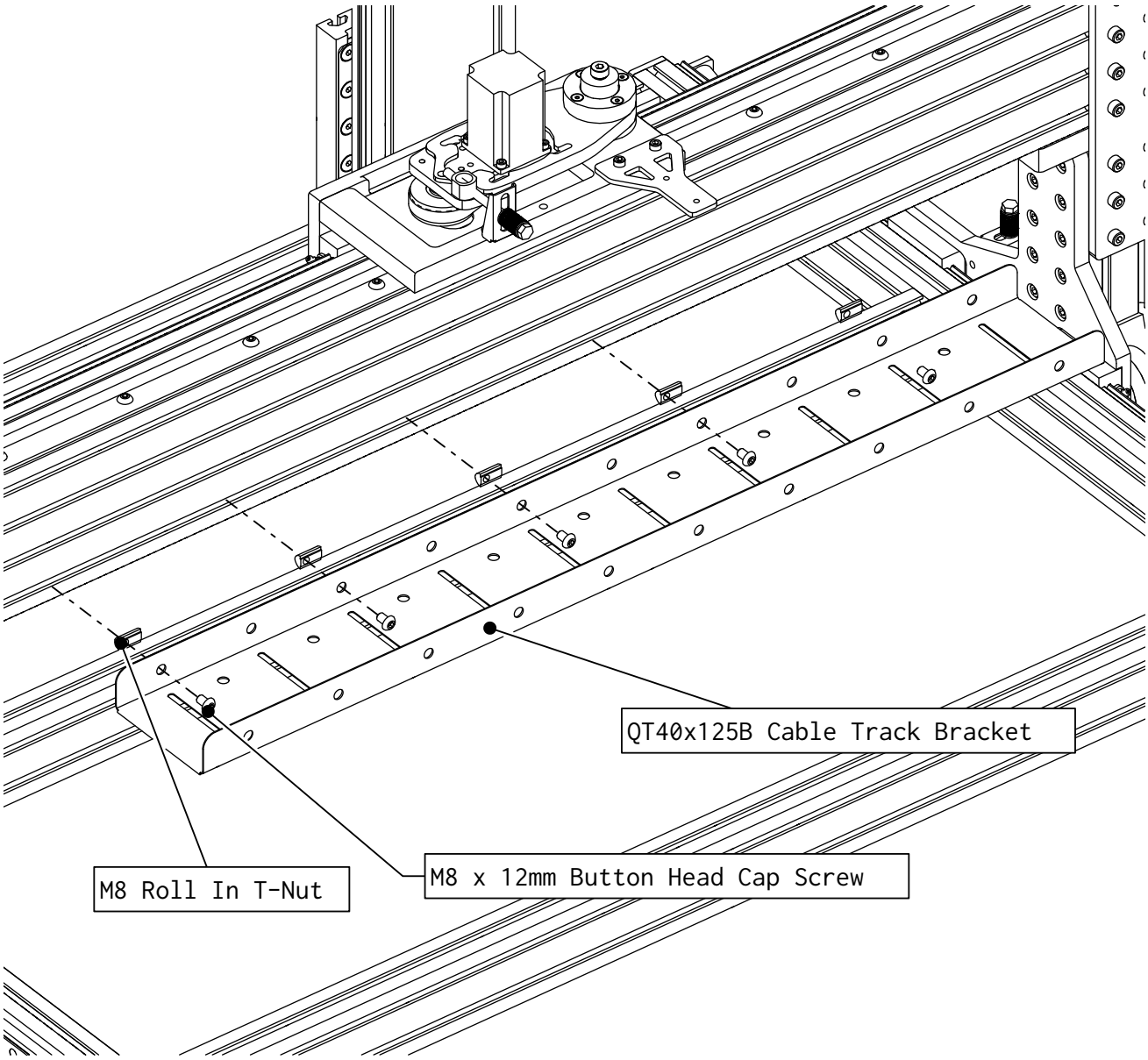
- Fully tighten the highlighted fasteners.



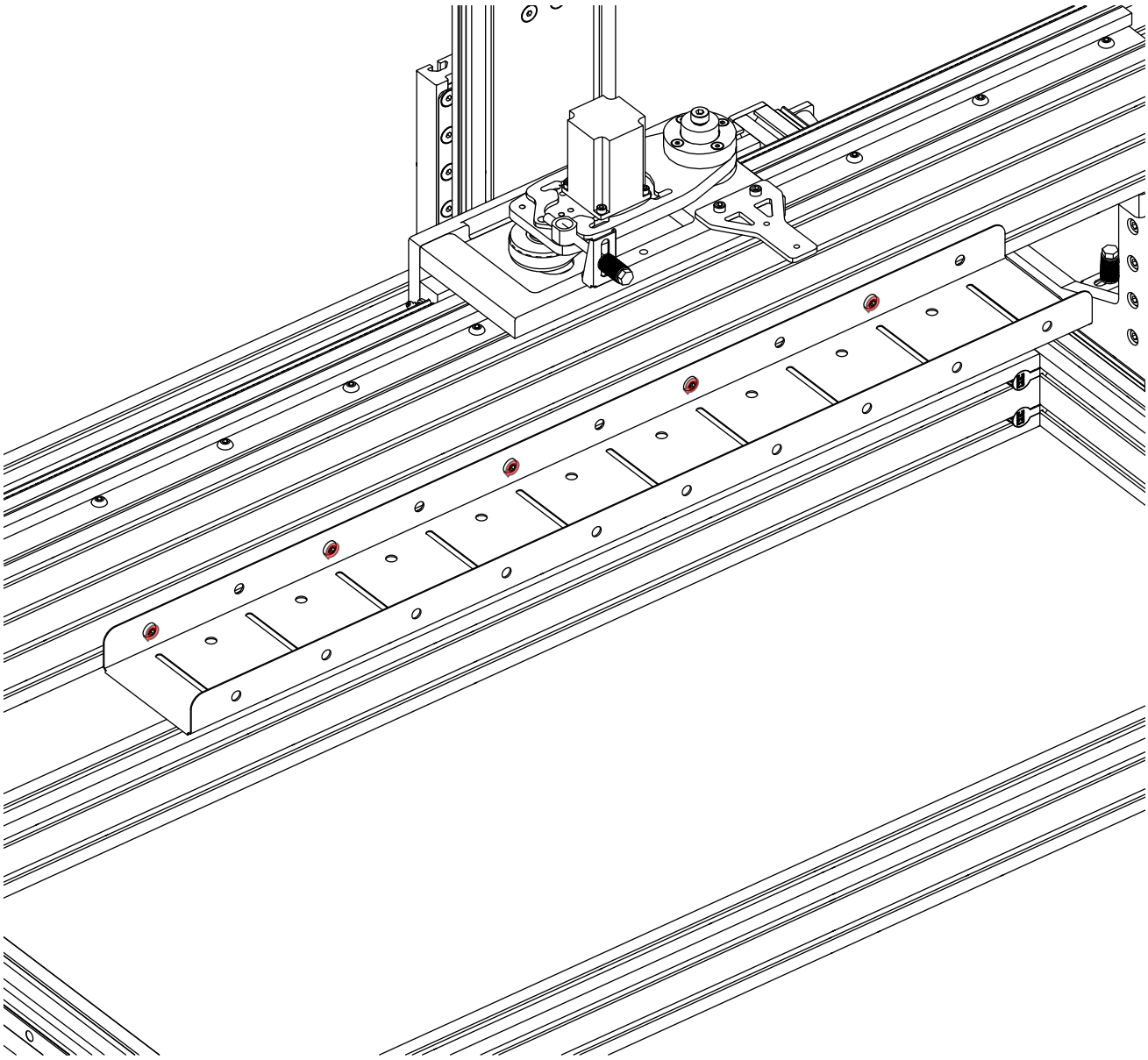
- Attach the gantry cable track bracket to the Gantry R&P Plate as indicated.



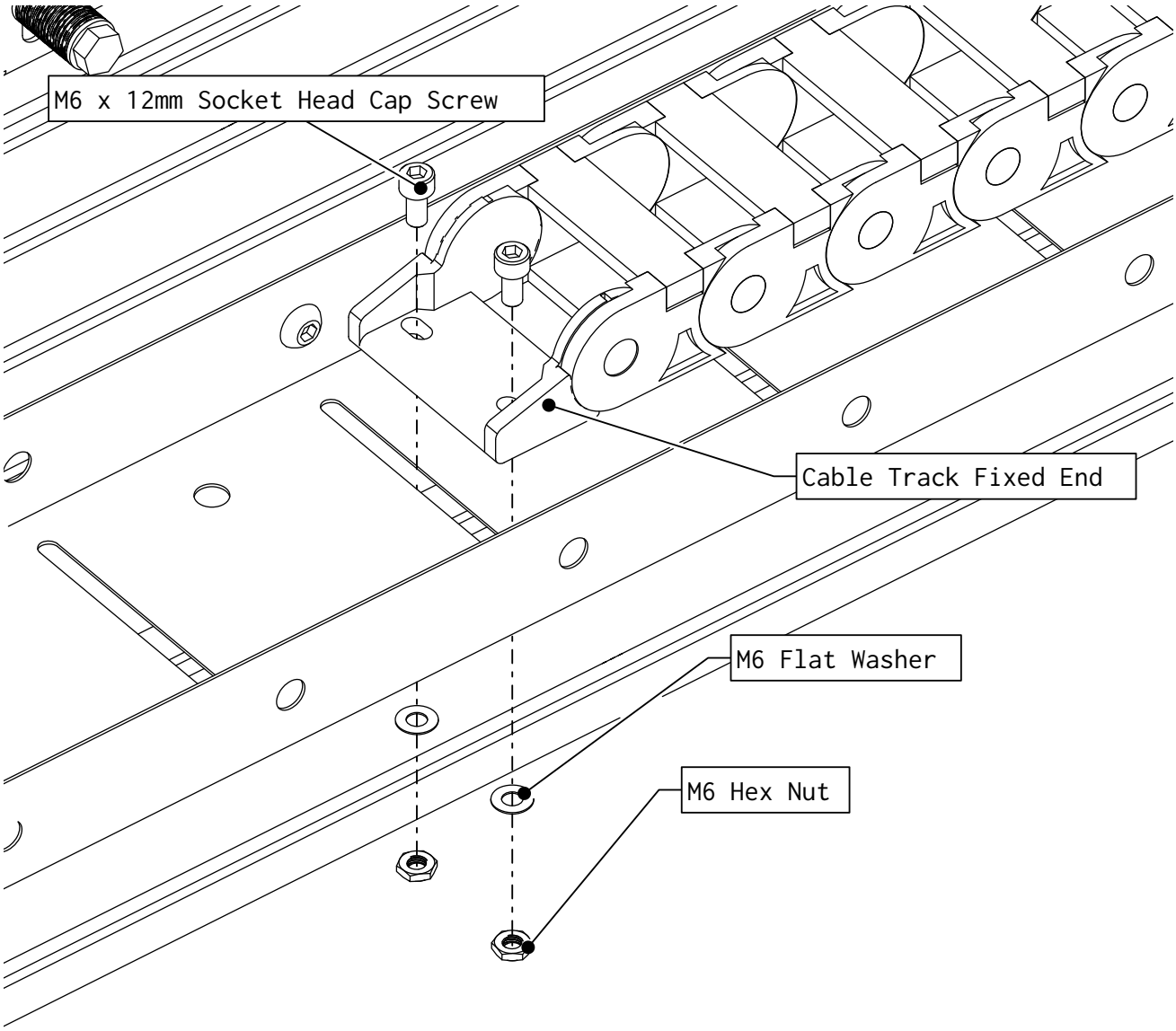
- Tighten the highlighted fasteners.



- Attach a cable track tray to the bottom t-slot of the gantry extrusion as indicated.

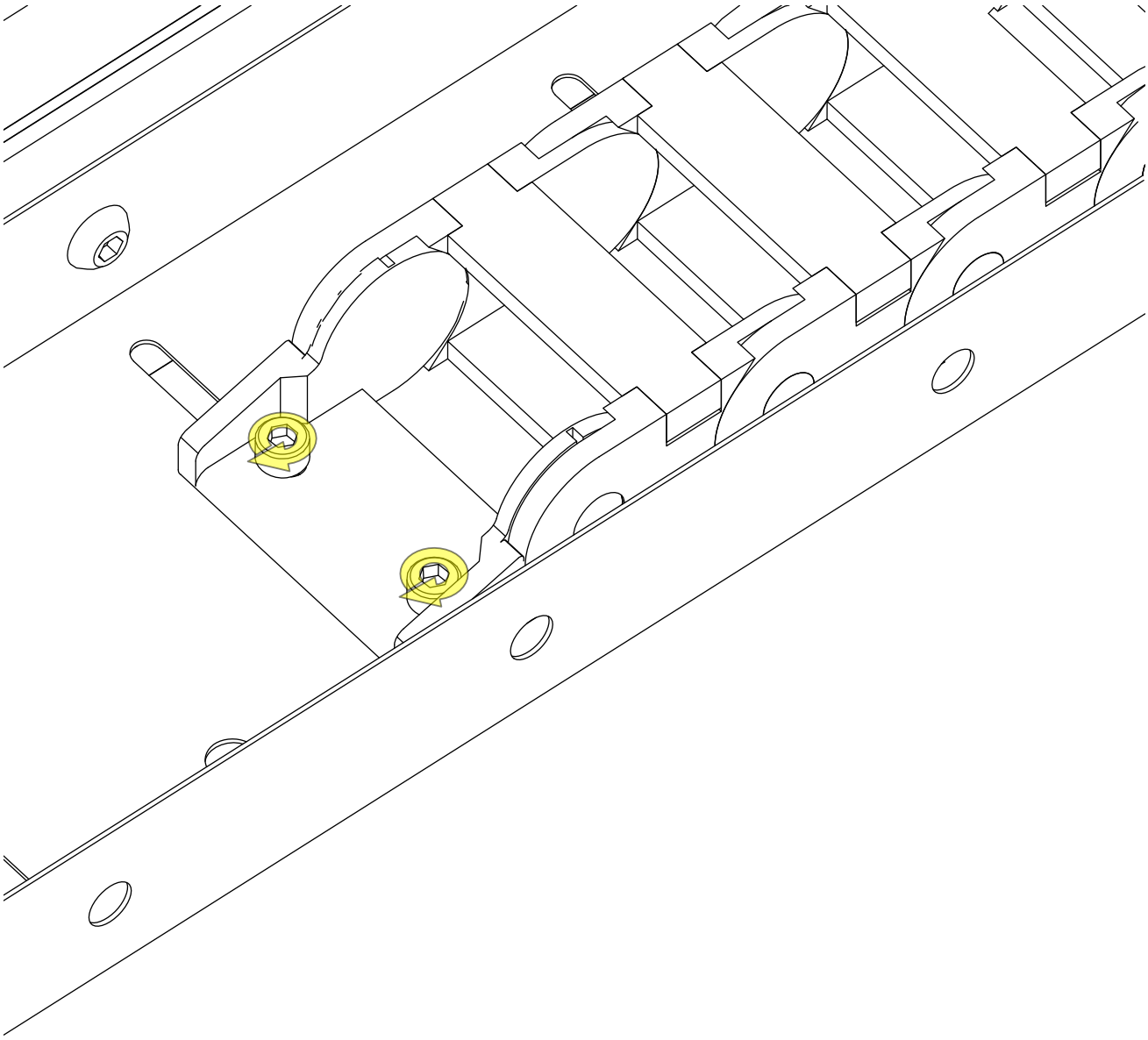


- Tighten the highlighted fasteners.

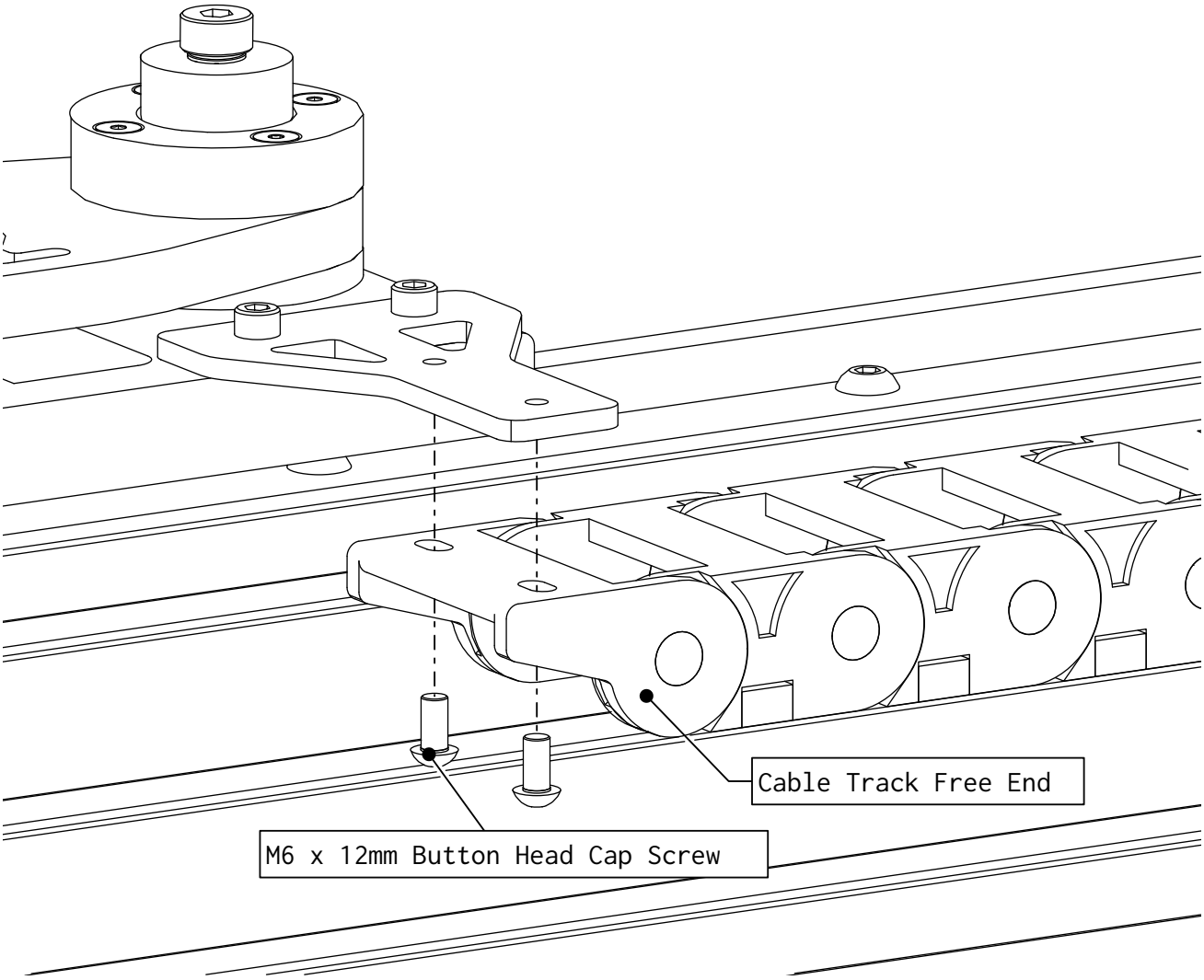


- Attach the fixed end of the cable track to the tray as indicated.

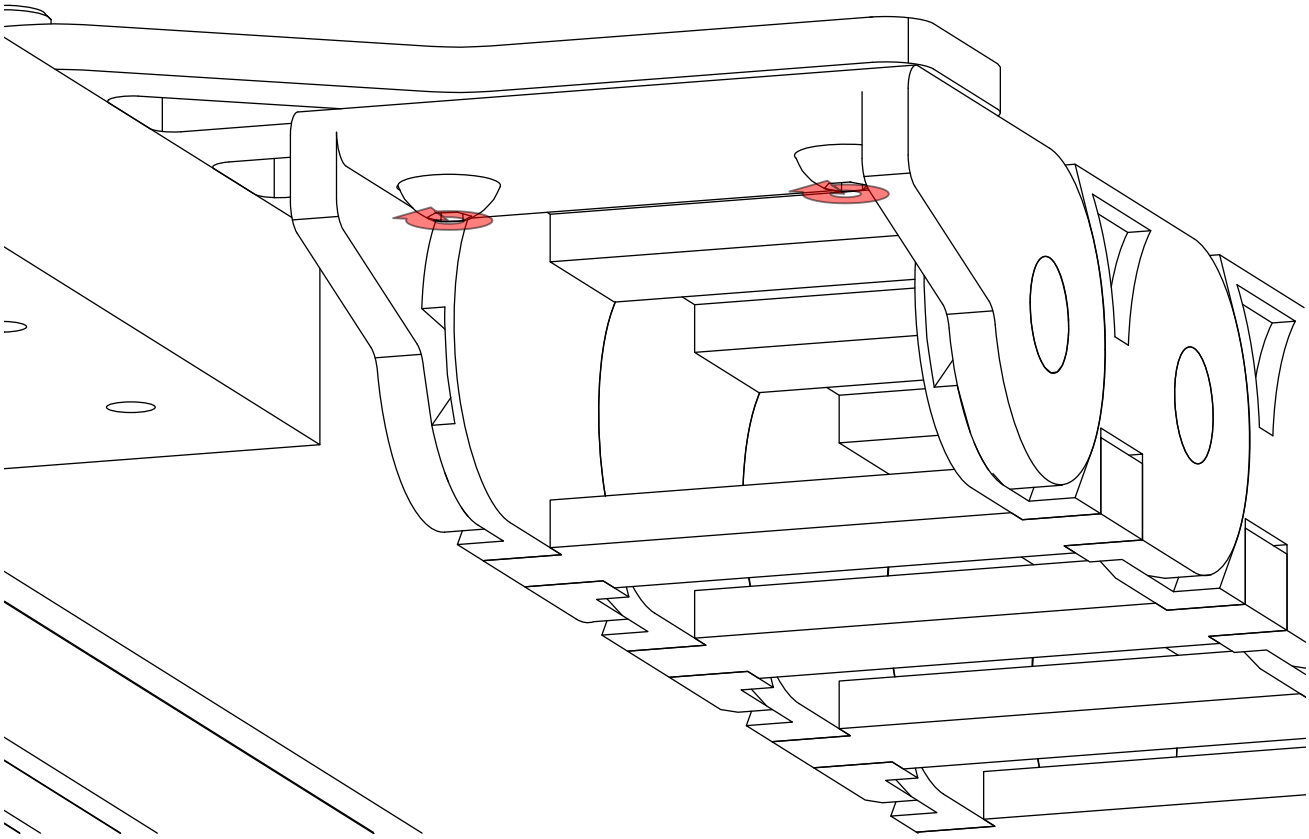
  Note: The fixed end of the cable track is the one which does not rotate independantly.



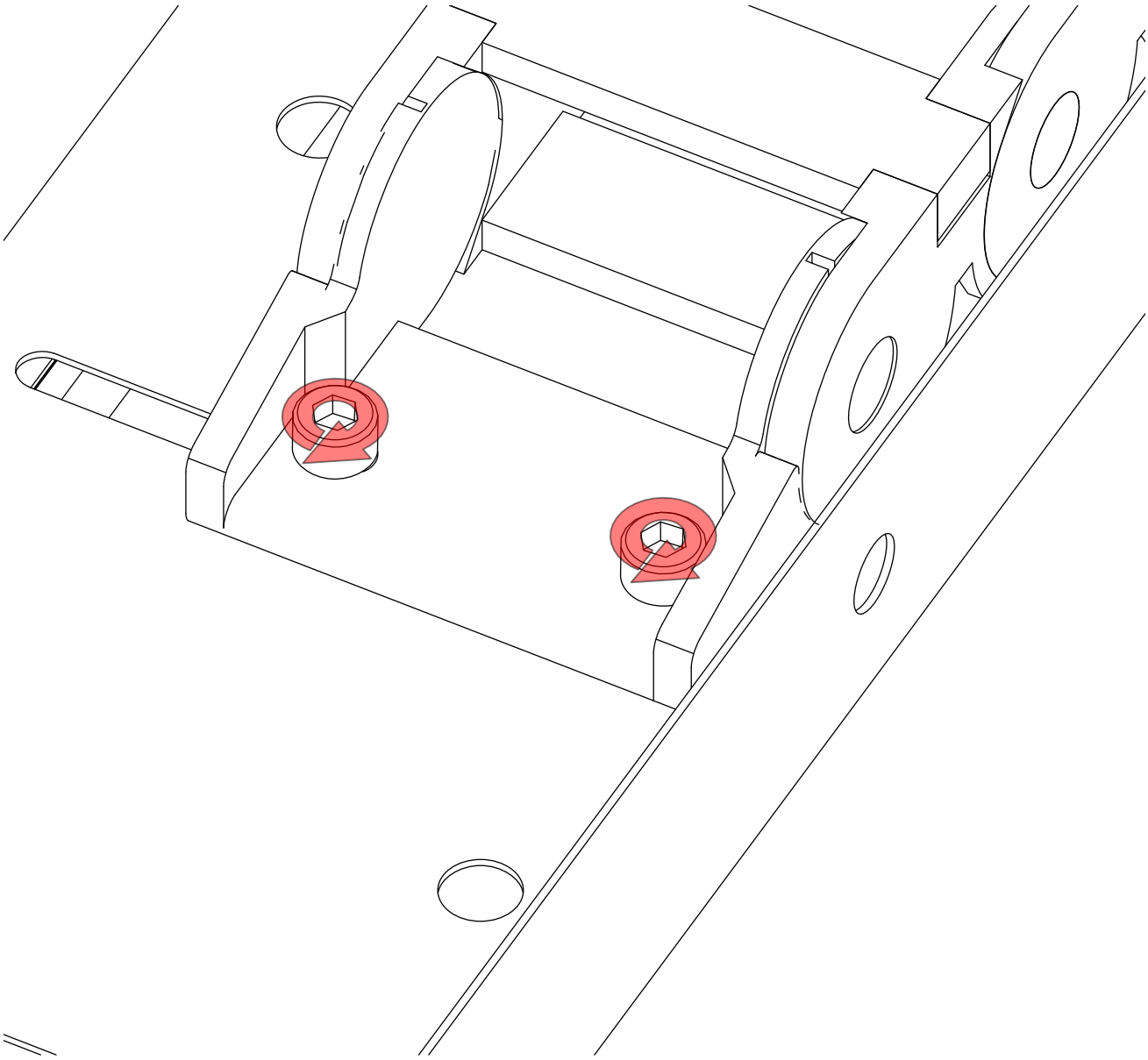
- Partially tighten the highlighted fasteners.



- Attach the remaining end of the cable track to the bracket as indicated.



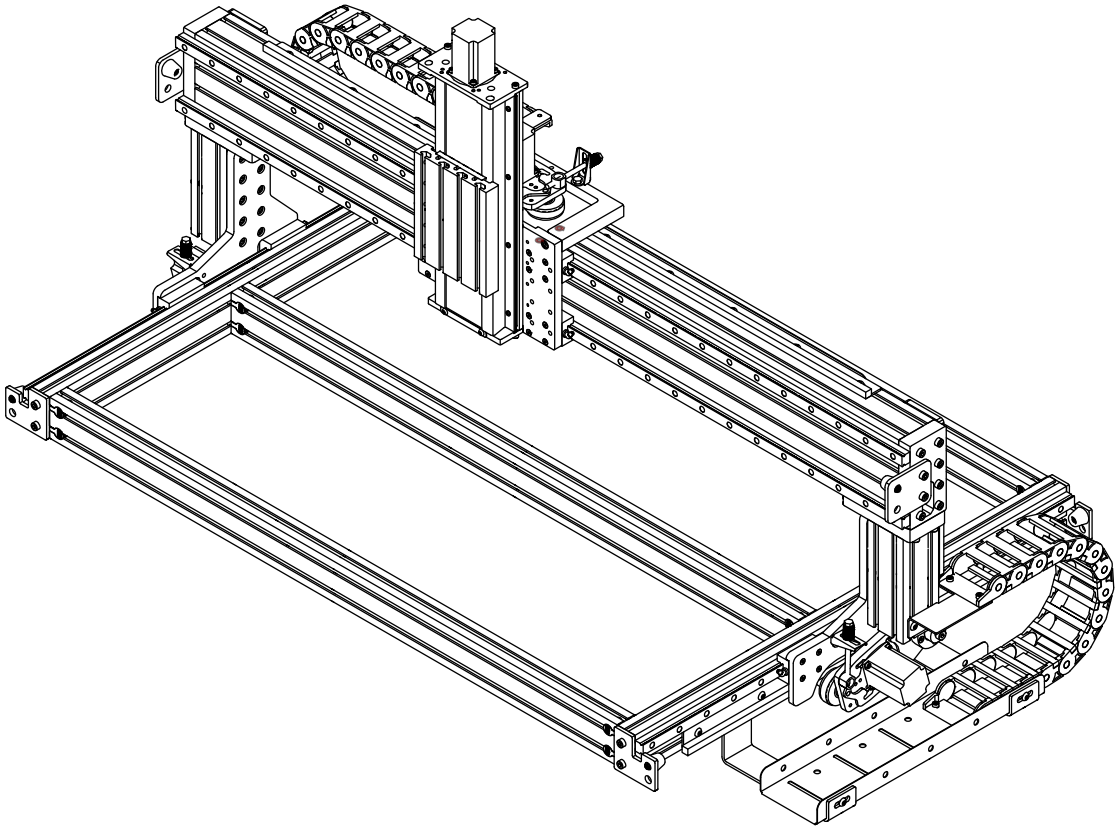
- Tighten the highlighted fasteners.



- Fully tighten the highlighted fasteners.

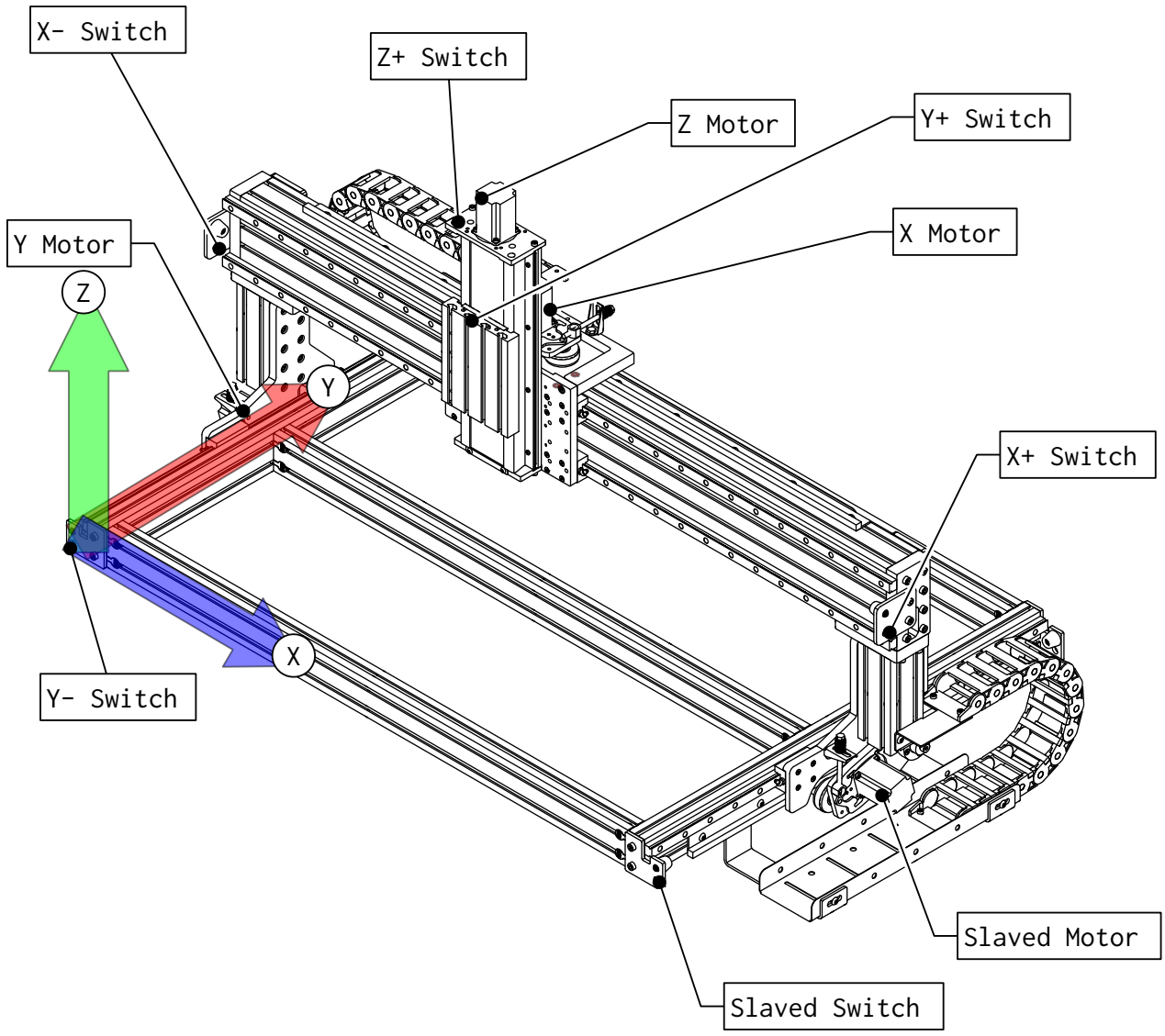
7

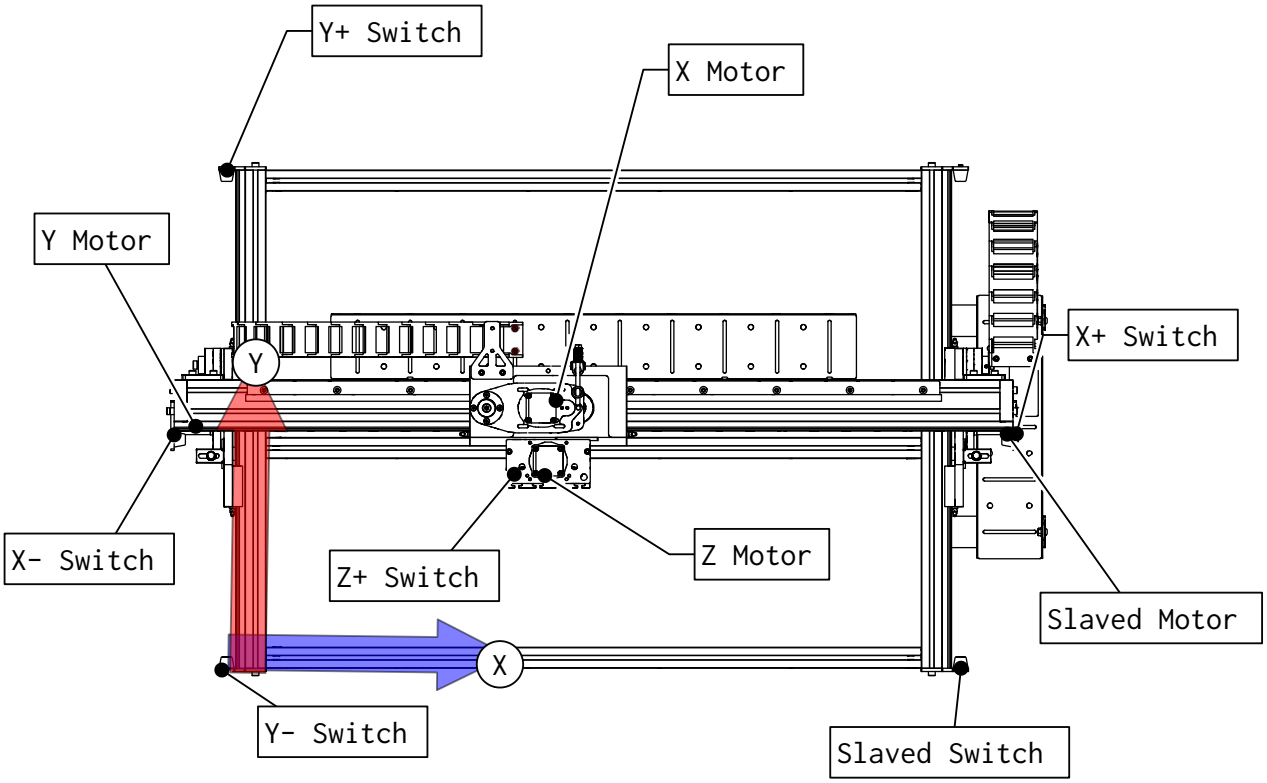
Motor and Sensor Connections

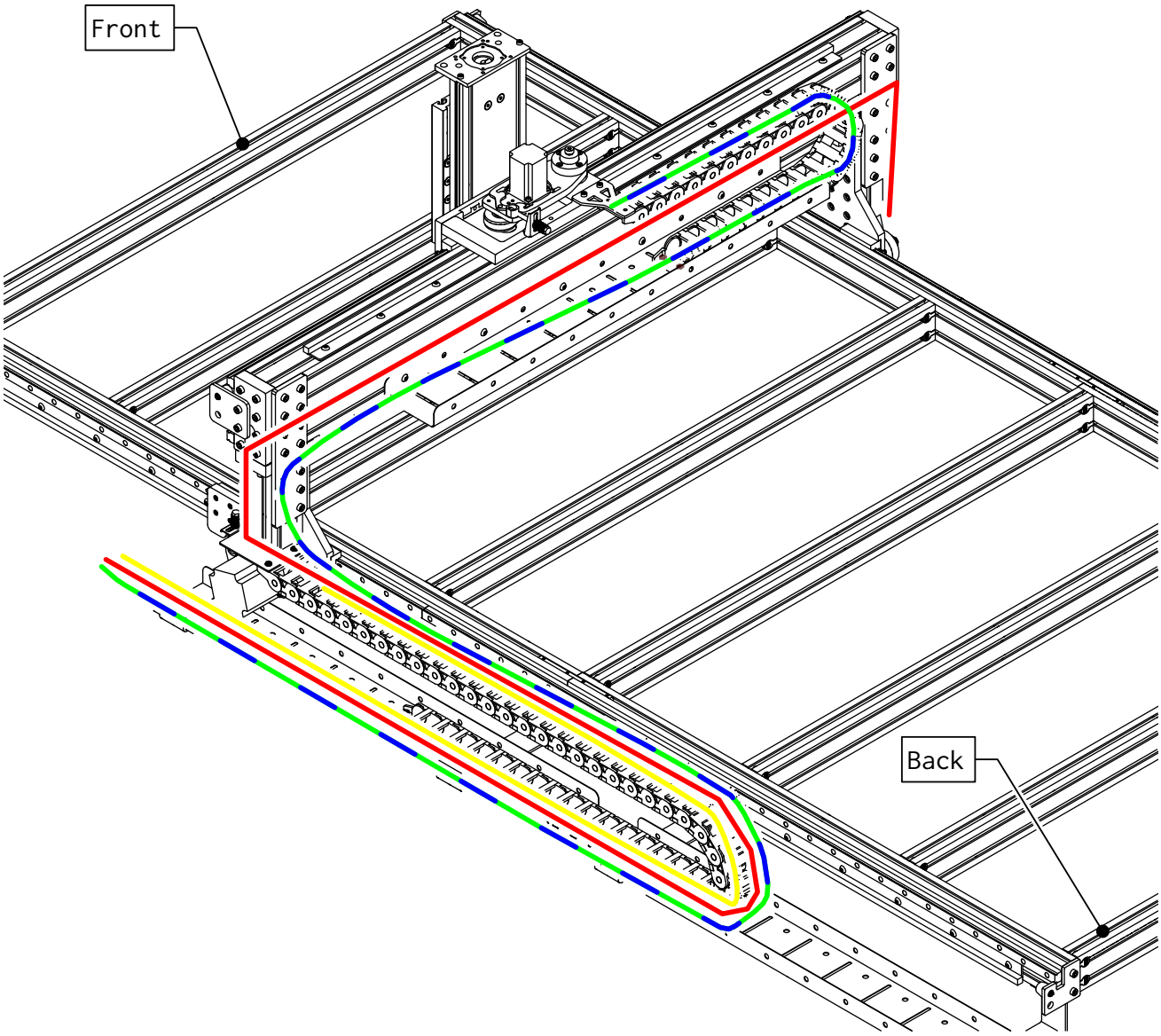


Motor and Sensor Connections

The following two diagrams show the correct installation of motors and sensors on your assembled machine. Installing your motors and sensors per these diagrams will help insure compatibility with the XML files we provide. If you only purchased a 4 sensor homing kit, you will omit the Y+ and X+ sensors.



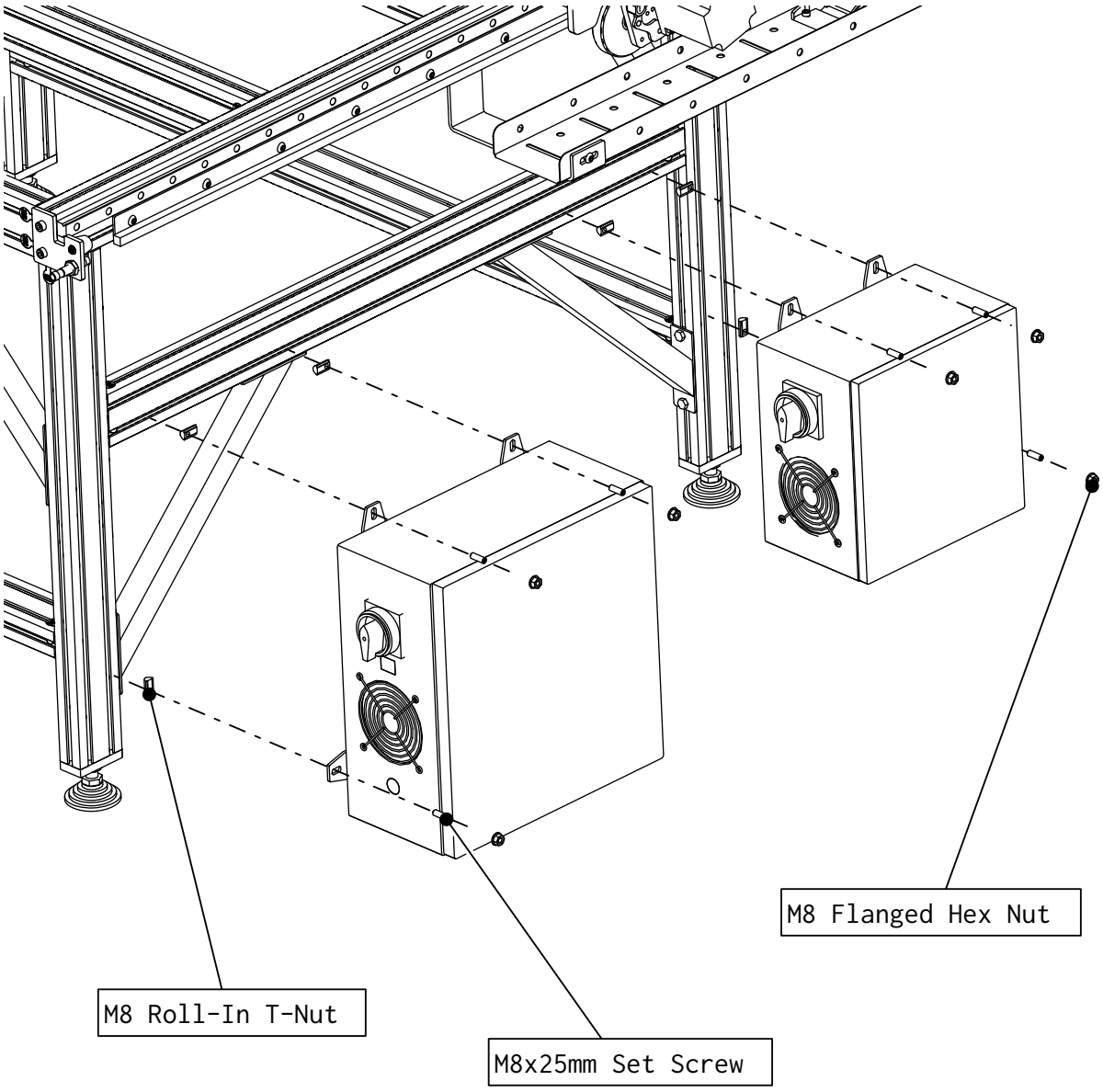




The colored lines indicate the recommended routing for motor cables in the system:

Note: The picture shows the 4896 PRO machine, the overall wiring strategy does not vary between machines.

Axis	X	Y	Z	Slaved
Color	Blue	Red	Green	Yellow
Length	20′	20′	20′	12′



If you purchased a Plug and Play Electronics Kit and/or a VFD, you may attach these to the leg kit using the indicated fasteners.

Next Steps

Once you have completed the physical installation of your motors and sensors, the next steps are to install and configure Mach 3 software, and to configure your PC to communicate with your machine controller. Links to specific instructions for these steps can be found below:

- http://www.cncrouterparts.com/mach-3-xml-files-p-161.html
- http://www.cncrouterparts.com/ethernet-smoothstepper-software-setup-guide-p-286.html