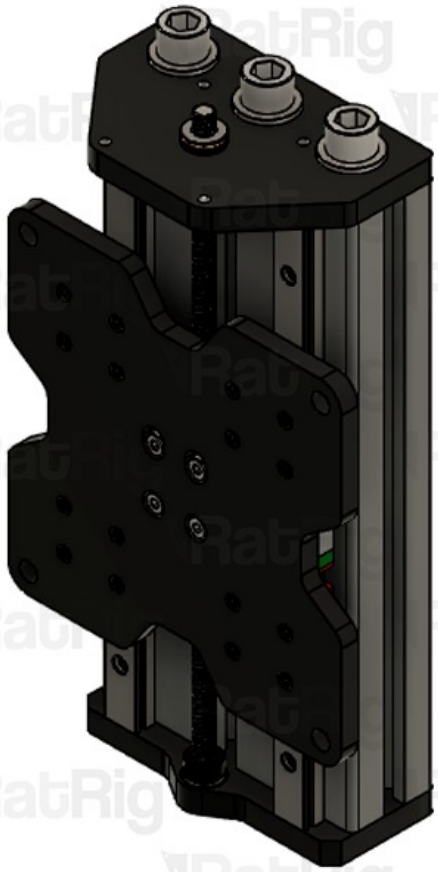
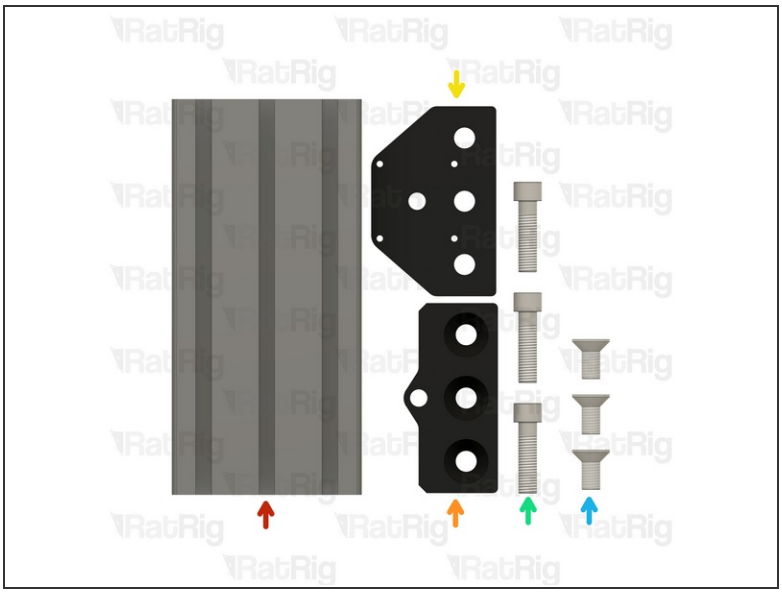
Rat Rig

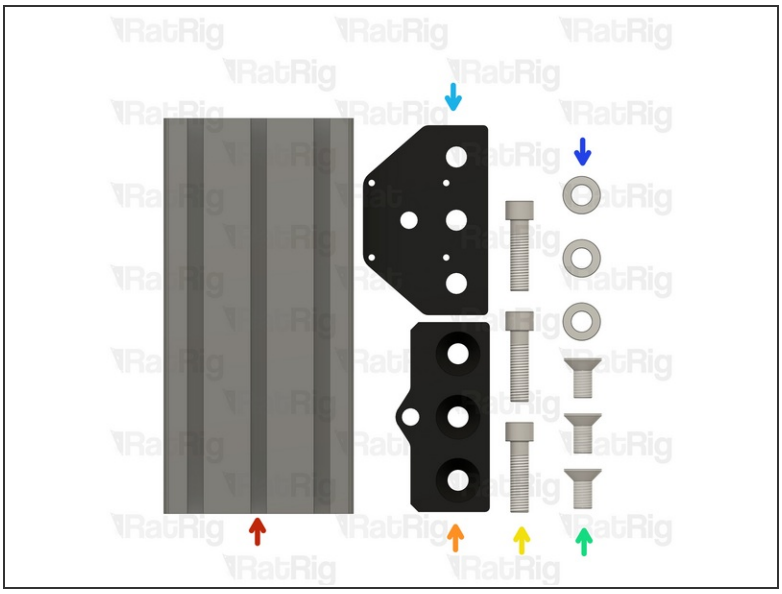
03. Z-Axis Assembly

Written By: Miguel Cruz



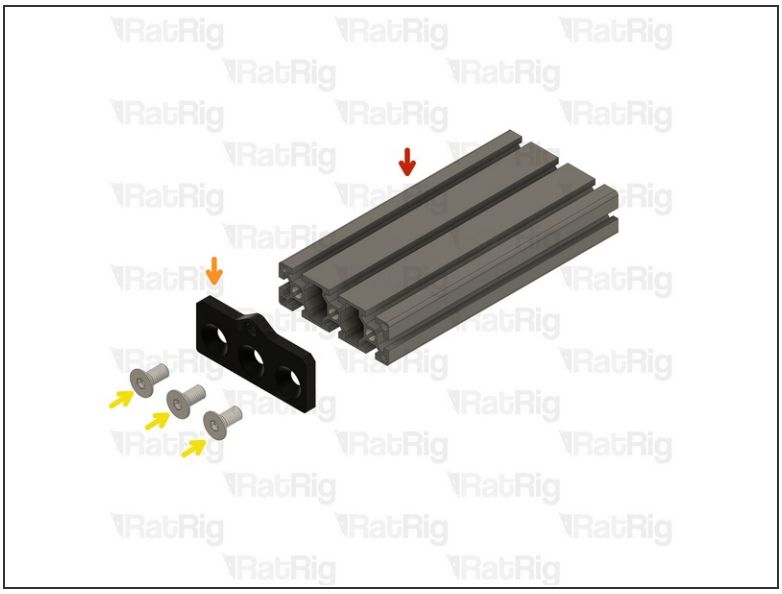
Step 1 — Prepare the Z - Axis Parts

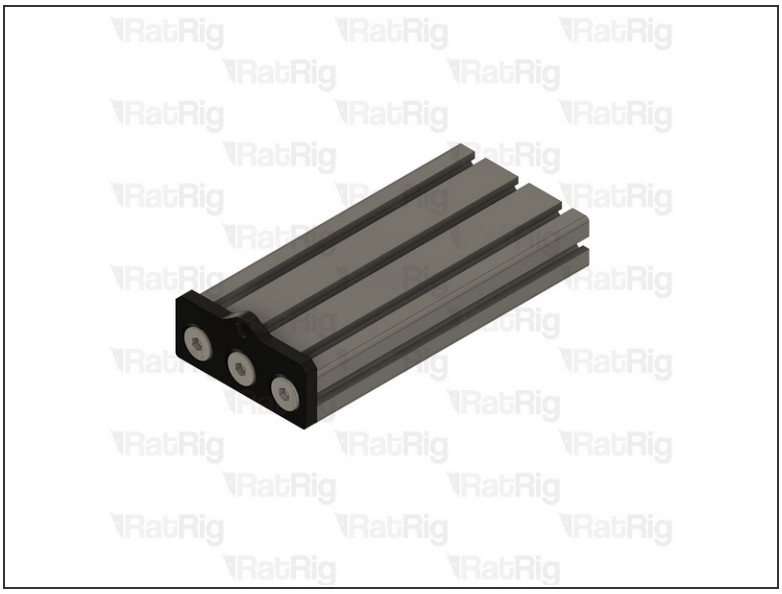




- 250mm 40120 Extrusion
- Rat Rig StrongHold ONE CNC Bottom Plate
- Rat Rig StrongHold ONE CNC TopPlate
- 3x M12x45 Cap Head Screw
- 3x M12x25 Countersunk Screw
- 3x M12 Washers

Step 2 — Install the Bottom Plate

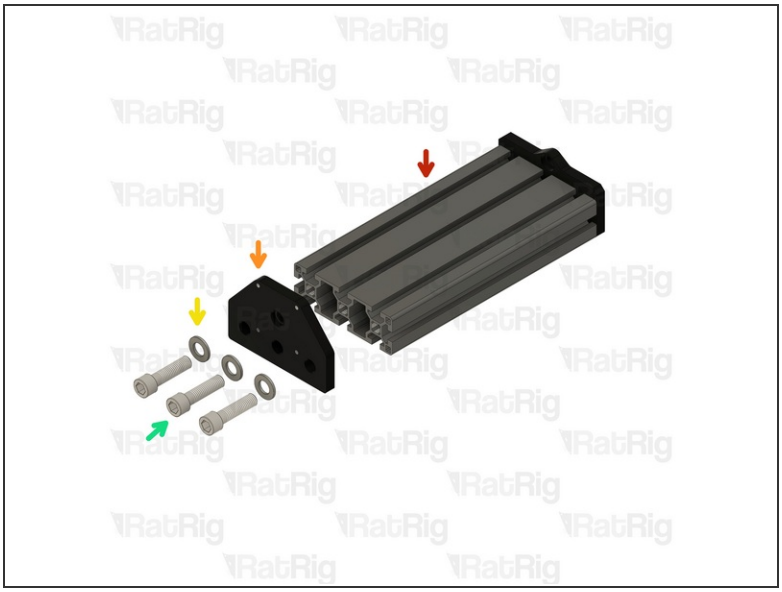




- 250mm 40120 extrusion
- Rat Rig StrongHold ONE CNC Bottom Plate
- 3x M12x25 Countersunk Screw

ⓘ Tighten the screws on the Bottom Z Plate

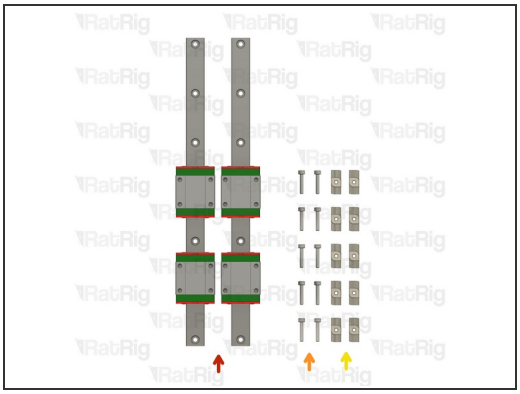
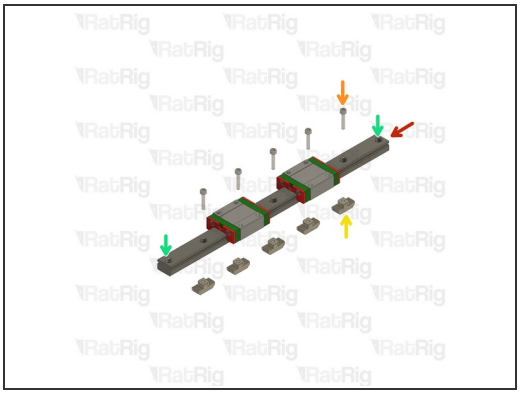
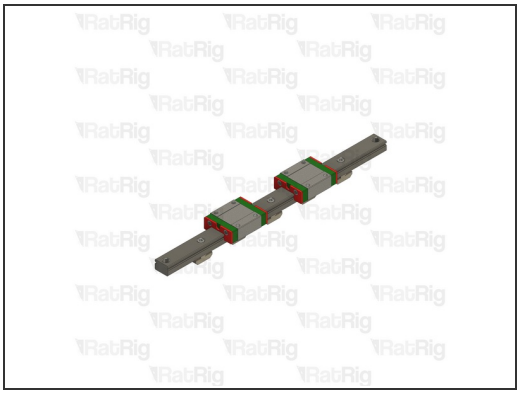
Step 3 — Install the Top Plate



- Assembly from previous Step
- Rat Rig StrongHold ONE CNC Top Plate
- 3x M12 Washers
- 3x M12x45 Cap Head Screw

ⓘ Tighten the screws on the Top Z Plate

Step 4 — Prepare the Z-Axis MGN15 Linear Rails

- 2x 250mm MGN15 Linear Rail with 2x Carriages
- 10x M3x16 Cap Head Screw
- 10x 4040 Drop-in T-Nut - M4
- Leave the holes on the ends empty

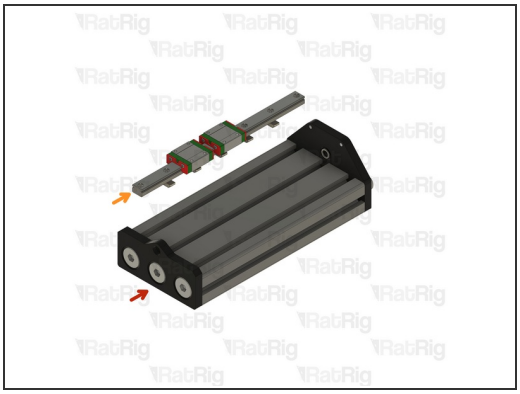
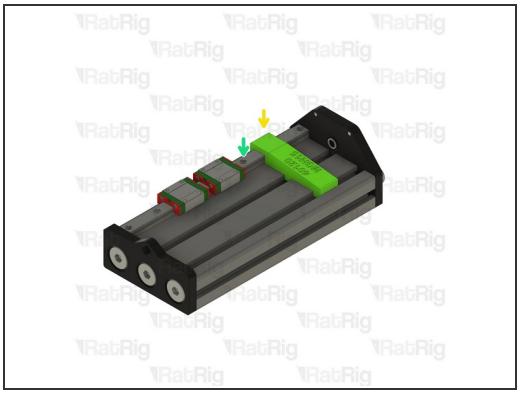
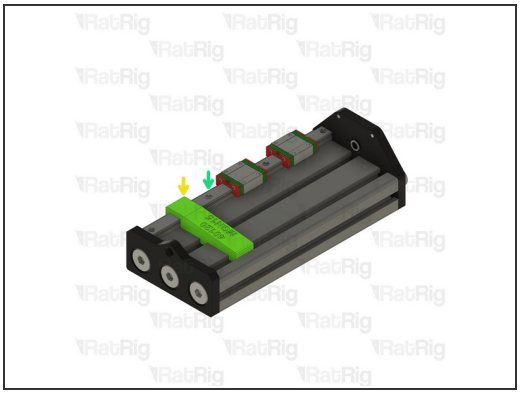
Prepare the Linear Rails as detailed in **Step 6** of the X-Axis Gantry Assembly Guide

- Insert an M3x16 Cap Head Screw into each of the holes on the linear rail and loosely thread a 4040 Drop-in T-Nut

  Repeat these instructions for the second linear rail

The linear rail carriages are not interchangeable. Do not try to use a carriage on a different linear rail than the one it was supplied with.

Step 5 — Install the MGN15 Linear Rails - Part 1

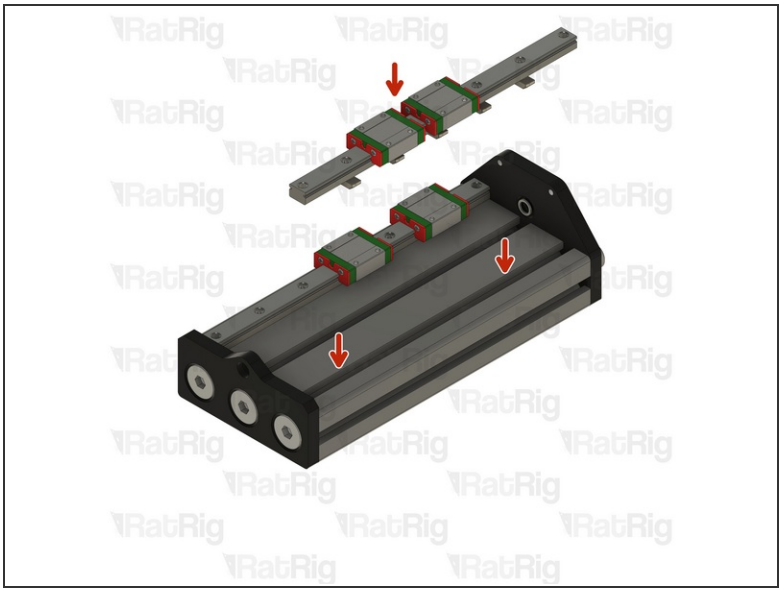




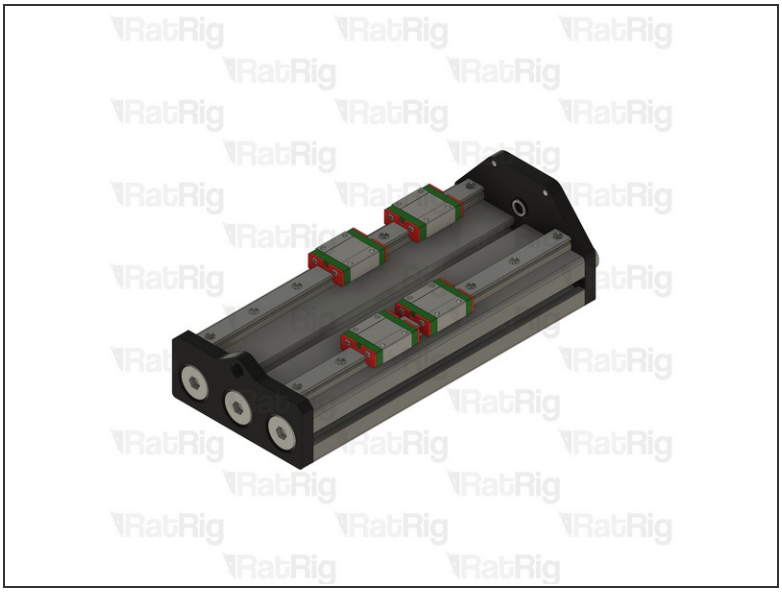
- Assembly from **Step 3**
- Linear Rail assembly from the previous step
- Install the MGN15 40120 alignment tool as shown, this will make sure the linear rail is positioned correctly
- Tighten the screw next to the alignment tool

Repeat the steps to tighten the screw on the other end of the rail

Tighten the remaining screws

Step 6 — Install the MGN15 Linear Rails - Part 2

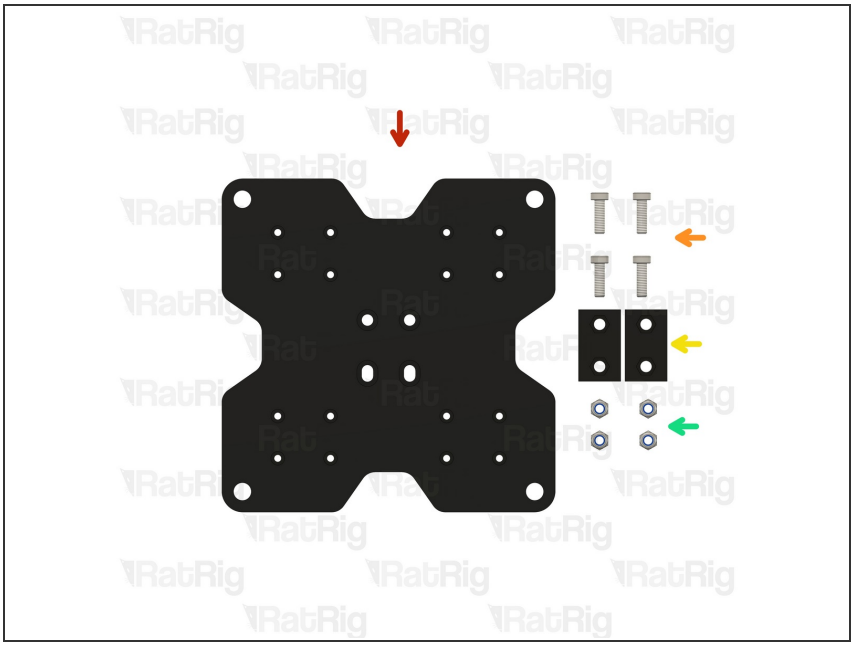




- MGN15 linear rail

Place the linear rail on to the 40120 extrusion as shown, do not tighten any of the screws at this point

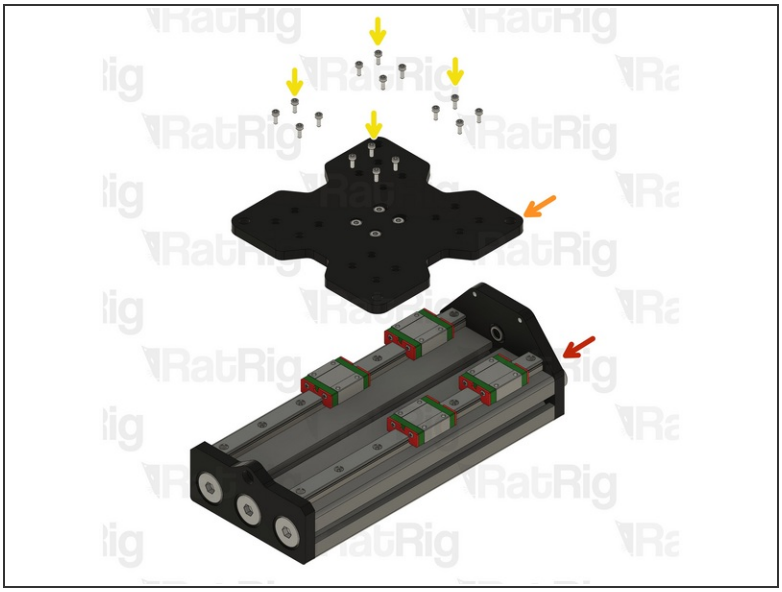
Step 7 — Prepare the XZ Joiner Plate



- Rat Rig StrongHold ONE CNC XZ Joiner Plate
- 4x M5x16 Low Profile Cap Head Screw
- 2x Nut Block for TR8x8
- 4x M5 Nylon Locking Hex Nut

Repeat **Steps 9 and 10** to assemble another XZ plate

Step 8 — Install the XZ joiner plate - Part 1



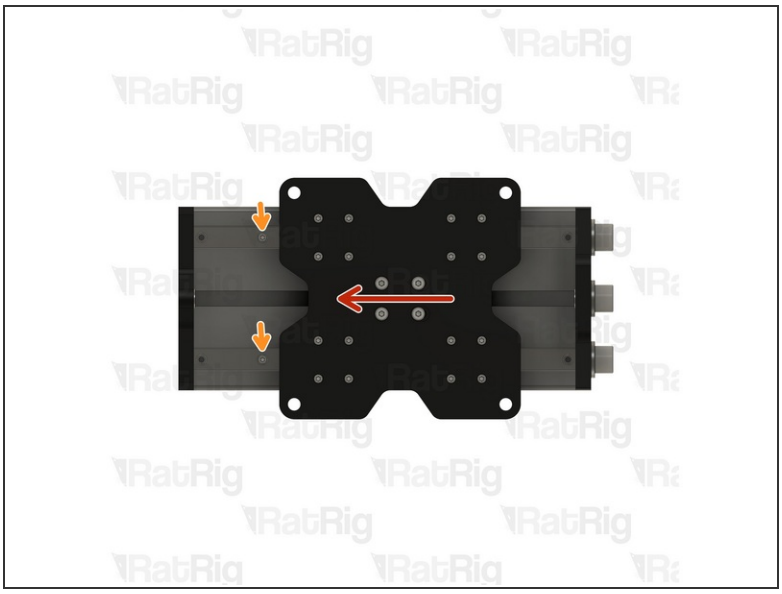
- Assembly from previous step
- XZ Plate assembly from previous step

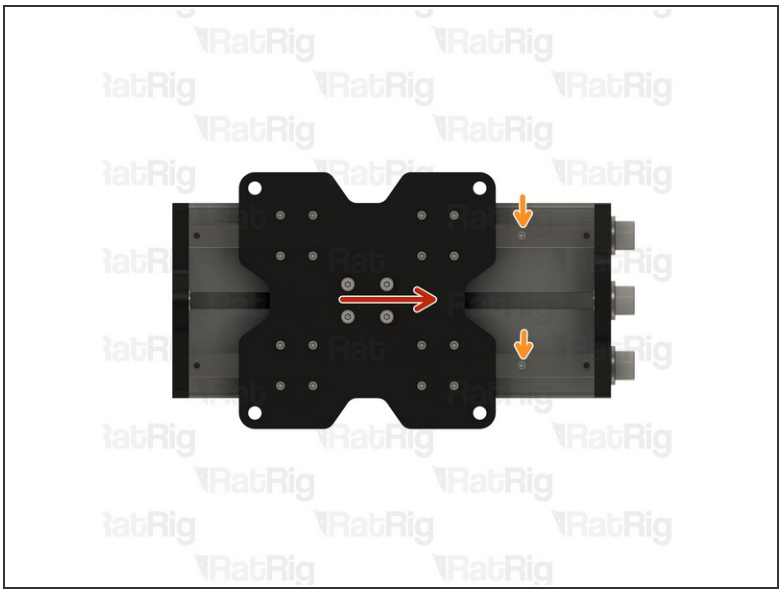
⚠ Make sure the Nut Blocks face are facing the assembly, and the threads are oriented accordingly to the linear rails

- 16x M3x8 Cap Head Screw

ⓘ Install an M3x8 screw through each hole in the plate, and into the MGN15 linear rail carriage below, lighty tighten them

Step 9 — Install the XZ joiner plate - Part 2





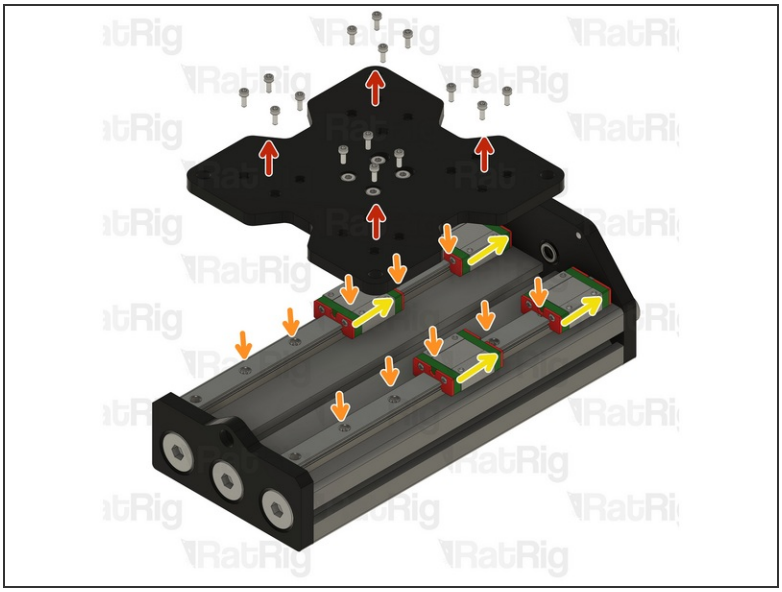
- Push the XZ Plate to the one side
- Tighten the M3x16 screw closest to the XZ plate

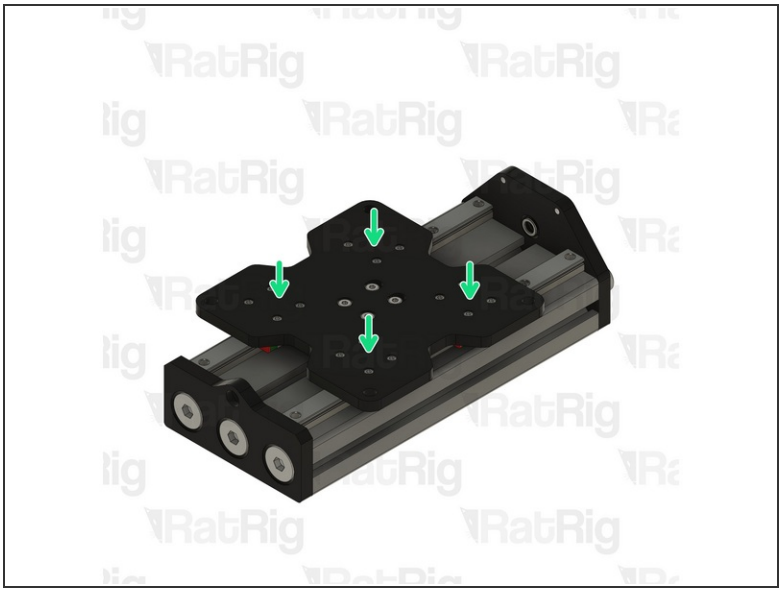
Repeat the Steps with the Plate pushed to the opposite side

If the Z-axis binds or becomes tight, check that the lower rail is aligned correctly. Loosening the screws securing the lower rail to the 40120 extrusion and repeat the steps above.

Do not overtighten the screws as it can cause the axis to bind.

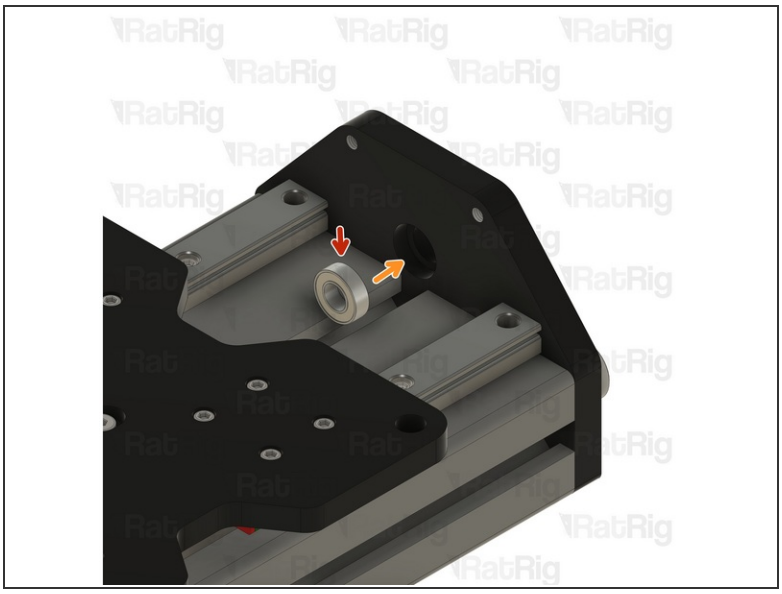
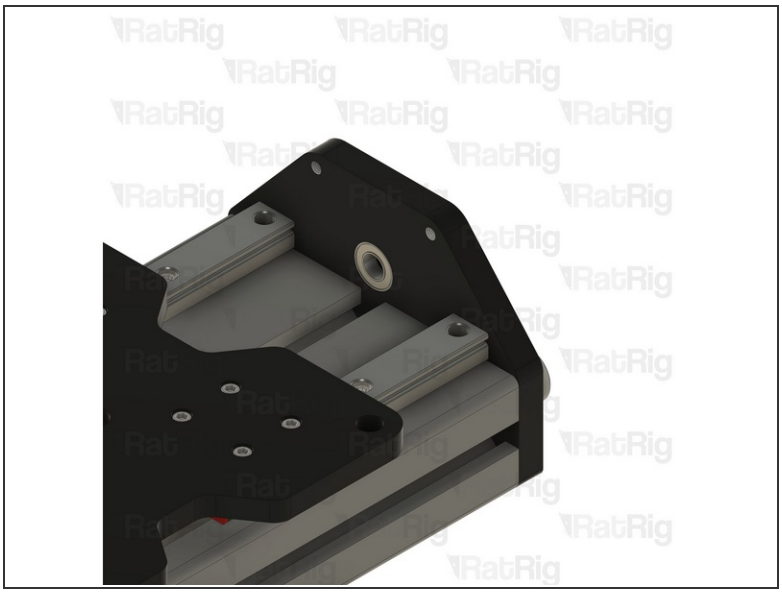
Step 10 — Install the XZ joiner plate - Part 3





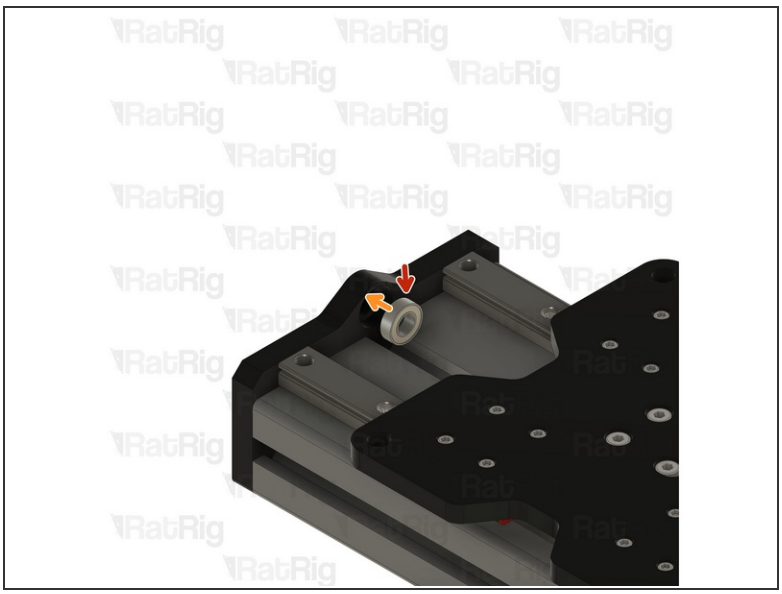
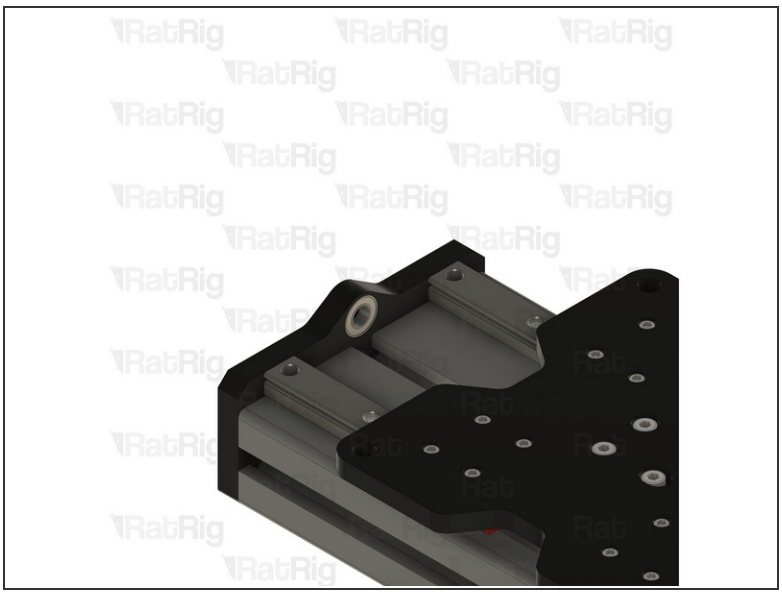
- Remove the XZ Plate
- Tighten the remaining screws on the linear rail
- Move the carriages to access the screws underneath them
- Reinstall the XZ plate and tighten the screws on it

Step 11 — Install the top lead screw ball bearing

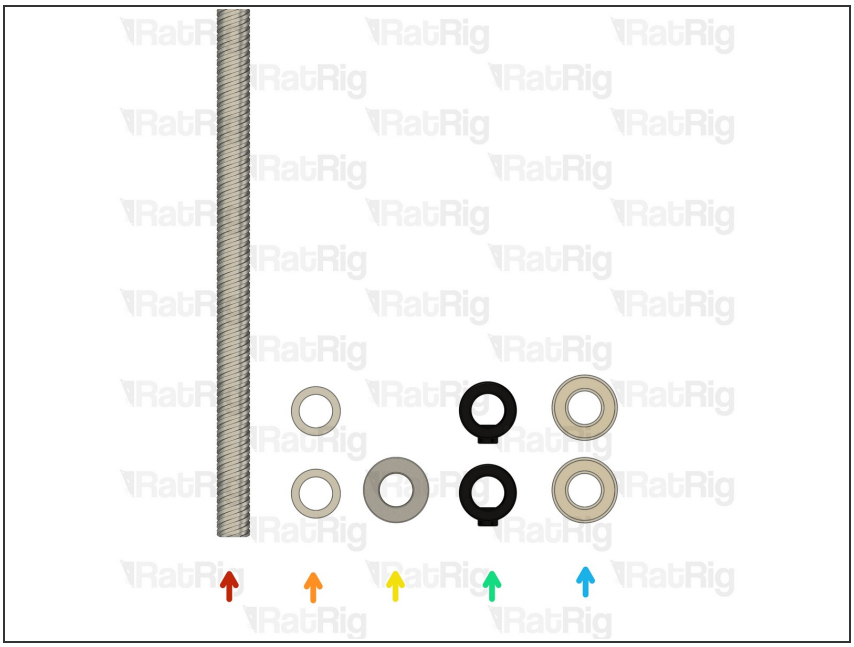
- 688ZZ Ball bearing
- Push the ball bearing against the slot on the inner side of the plate.

Step 12 — Install the Bottom lead screw ball bearing

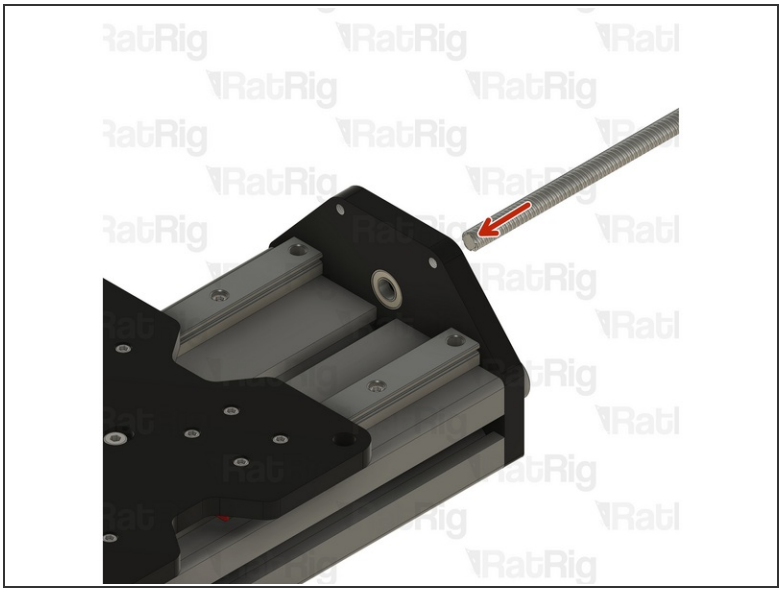
- 688ZZ Ball bearing
- Push the ball bearing against the slot on the inner side of the plate.

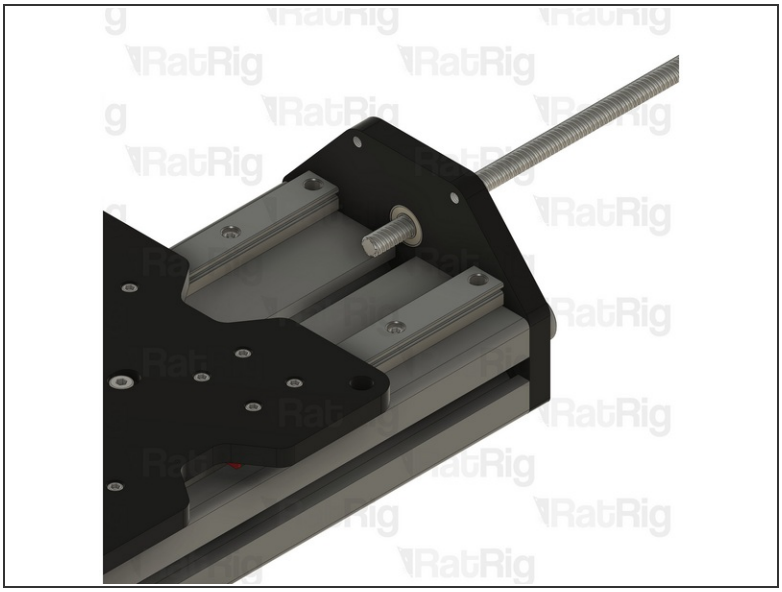
Step 13 — Prepare the Z - Axis Lead Screw Parts



- 281mm TR8x8 Lead Screw
- 2x Precision Shim 12x8x1mm
- Thrust Bearing F8-16M
- 2x Lock Collar 8mm
- 2x 688ZZ Ball Bearing

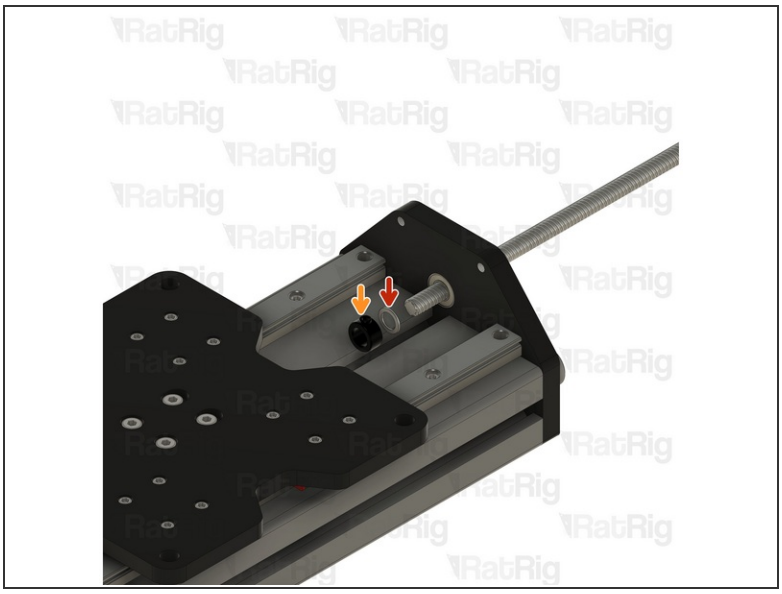
Step 14 — Install the Z - Axis Lead Screw - Part 1





- Insert the Lead Screw through the hole in the ball bearing

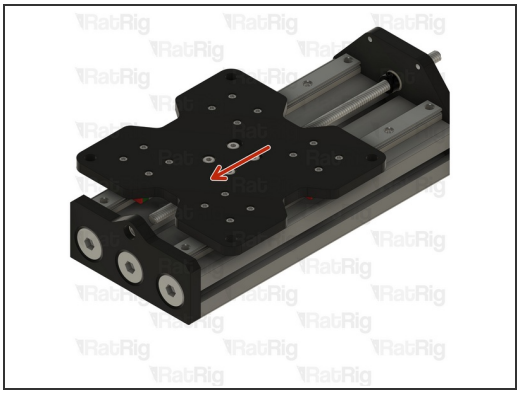
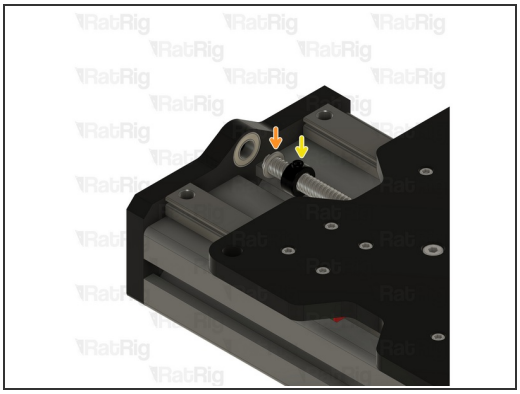
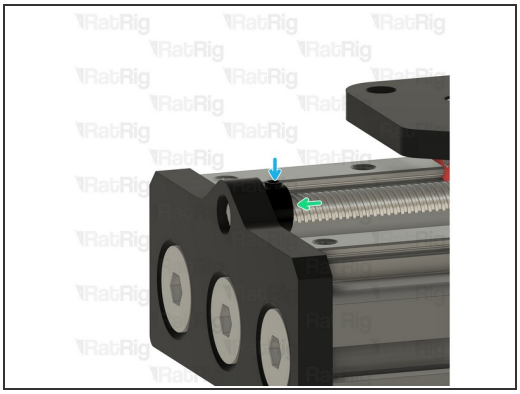
Step 15 — Install the Z - Axis Lead Screw - Part 2



- Precision Shim
- Lock Collar
- Slide the components into the Lead Screw

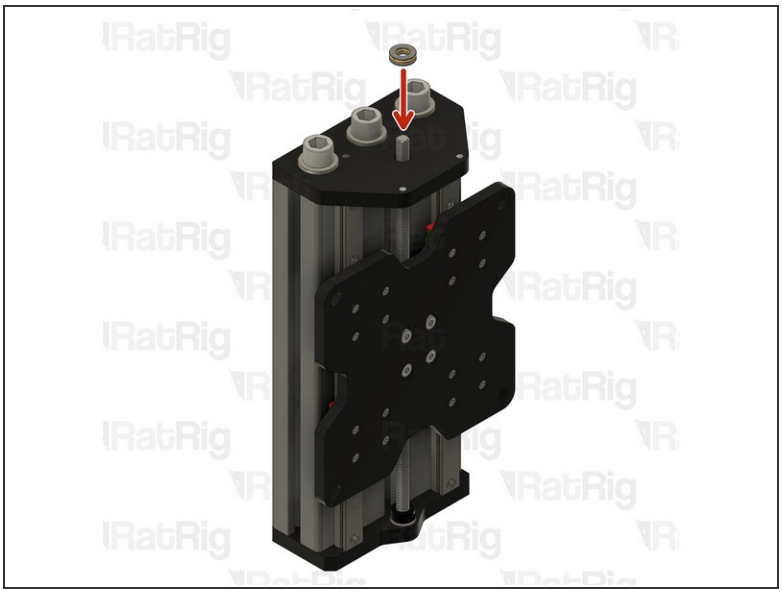
⚠ Do not tighten the screw on the Lock Collar yet.

Step 16 — Install the Z - Axis Lead Screw - Part 3

- Thread the lead Screw in to the Nut Blocks on the XZ Plate and push the assembly
- Lock Collar
- Precision Shim
- Push the exposed end of the Lead Screw through the hole in the ball bearing
- Tighten the Screws on the Lock Collars to avoid the lead screw from falling in the next steps

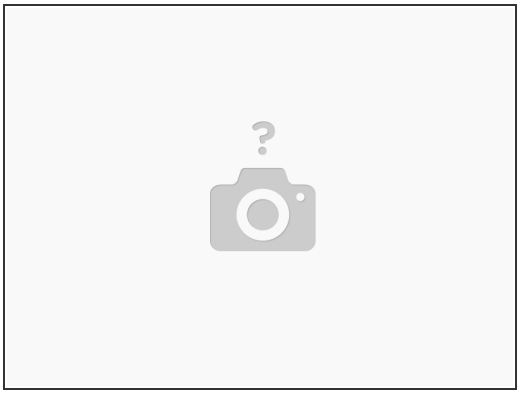
Step 17 — Install the Thrust Bearing



- Install the Thrust Bearing F8-16M on to the Lead Screw

⚠ Be careful that the bearing does not fall off whilst this assembly is set aside

Step 18 — Next guide



- Continue with the next guide: 04. Z-Axis and Steppers Installation