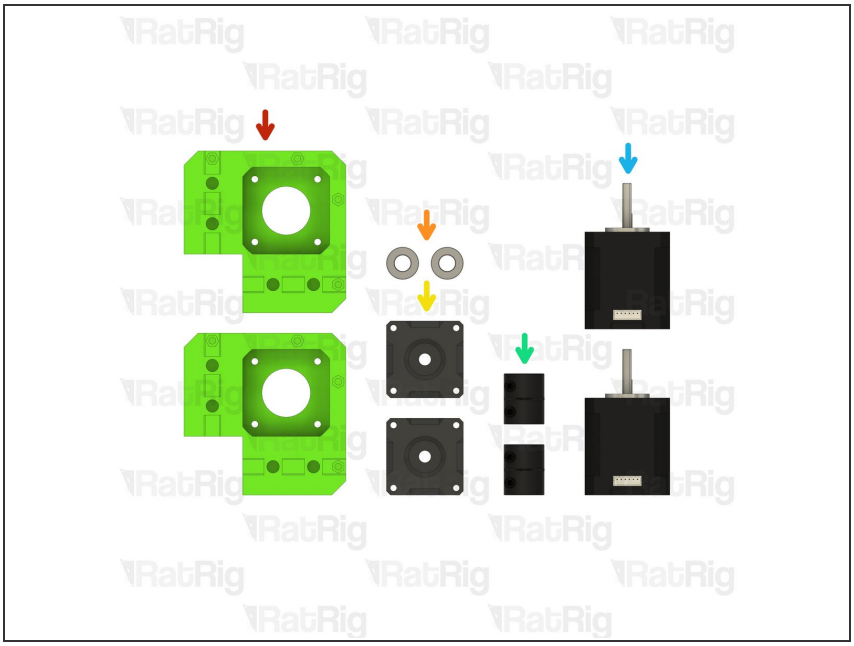
Rat Rig

02. Z-Axis Assemblies

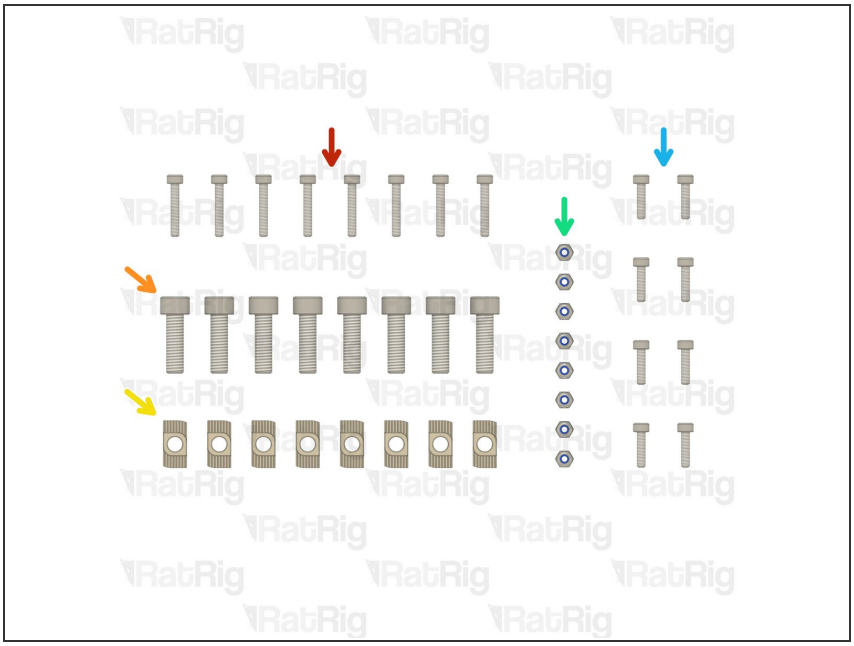
Written By: Simon Davie

Step 1 — Prepare the front z-axis motor parts - Part 1



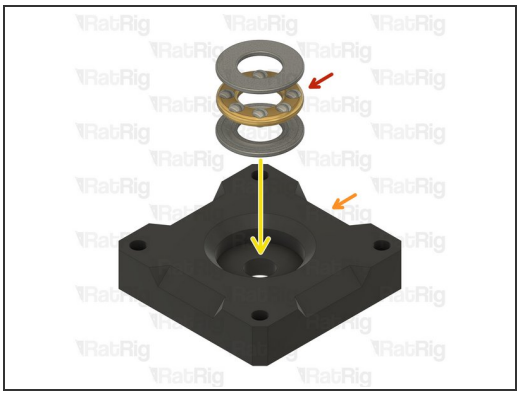
- 2x lead_screw_motor_cage_front_3.1 printed part
- 2x Axial Thrust Bearing
- 2x pillow_block printed part
- 2x Rigid Lead Screw Coupler
- 2x 48mm NEMA17 Stepper Motor

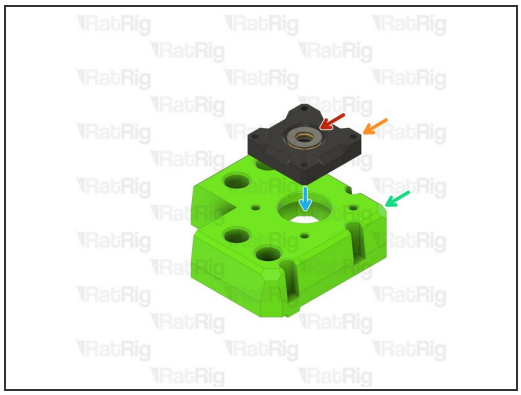
Step 2 — Prepare the front z-axis motor parts - Part 2



- 8x M3x18 Cap Head Screw
- 8x M6x20 Cap Head Screw
- 8x 3030 Drop-in T-Nut - M6
- 8x M3 Nylon Locking Hex Nut
- 8x M3x12 Cap Head Screw

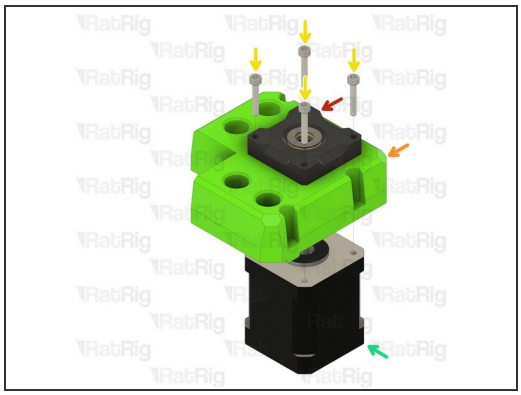
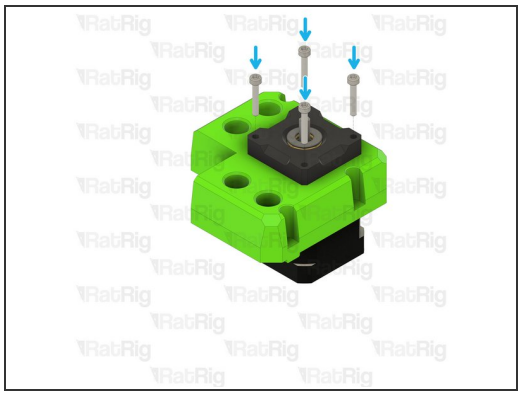
Step 3 — Assemble the pillow block





- Axial Thrust Bearing
  - The axial thrust bearing has three components. Two end caps and an inner bearing assembly.
- pillow_block printed part
- Assemble the axial thrust bearing into the pillow_block as shown
  - Make sure that the thrust bearing is fully inserted into the printed part. The top ring of the thrust bearing should be flush with the top of the pillow_block.
  - If desired, you may add a drop of light oil to the inner bearing assembly of the thrust bearing
- lead_screw_motor_cage_front_3.1 printed part
- Place the pillow_block assembly atop the lead_screw_motor_cage_front_3.1 in preparation for the next step

Step 4 — Install the NEMA17 z-axis motor

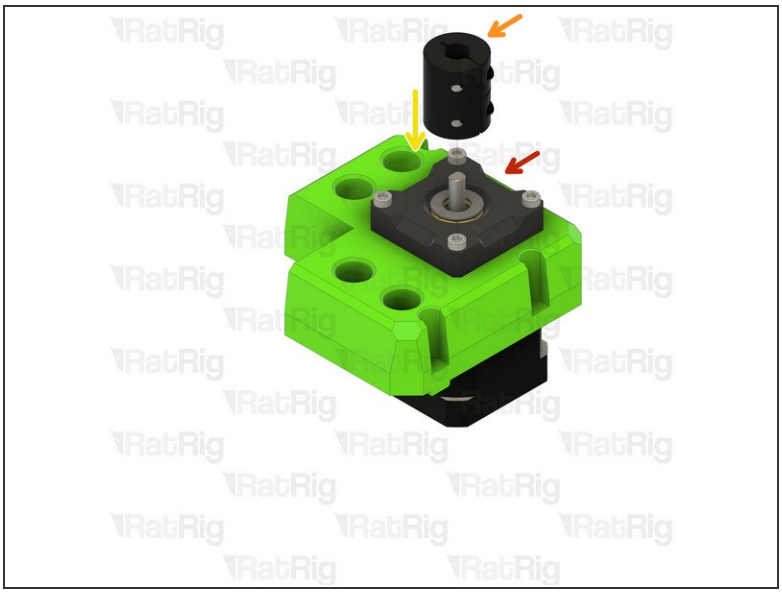




- pillow_block and axial thrust bearing assembly
- lead_screw_motor_cage_front_3.1 printed part
- M3x18 Cap Head Screw
- 48mm NEMA17 Stepper Motor

  Insert the NEMA17 motor into the lead_screw_motor_cage printed part, as shown
- Insert each M3x18 cap head screw through the pillow block, the lead screw motor cage, and fasten them into the NEMA17 motor

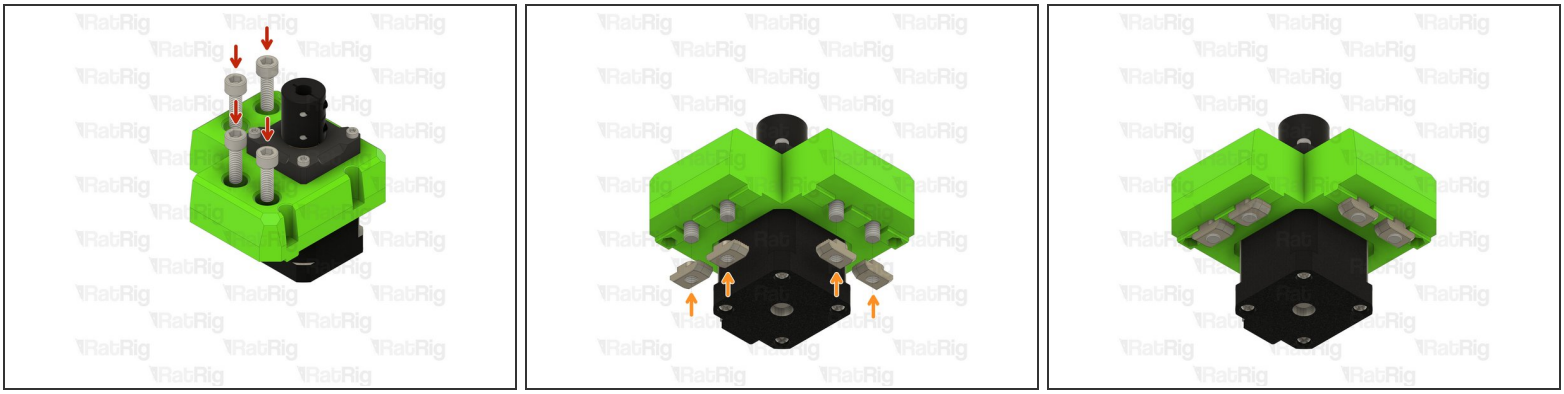
Take care not to over tighten the M3x18 screws as you can damage the printed parts

Step 5 — Install the rigid lead screw coupler



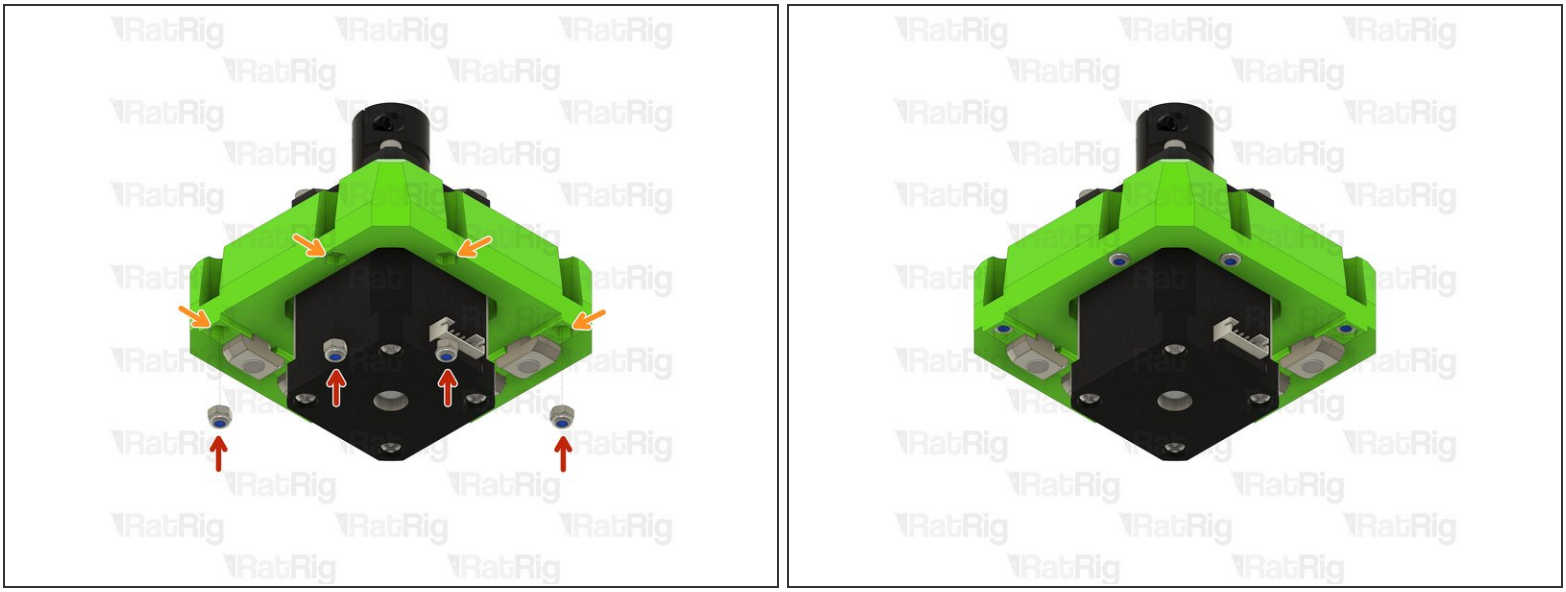
- Assembly from the previous step
- Rigid Lead Screw Coupler
- Install the lead screw coupler on to the exposed shaft of the NEMA17 motor
- Apply downward pressure to the top of the lead screw coupler whilst tightening the marked screw
- Tighten the marked M3 screw to secure the lead screw coupler to the motor shaft

Step 6 — Install the frame mounting fasteners



- M6x20 Cap Head Screw
  - Insert each M6x20 cap head screw into the lead screw motor mount as shown
- 3030 Drop-in T-Nut - M6
  - Loosely thread a 3030 T-Nut onto each of the M6x20 screws. Do not tighten them at this point.

Step 7 — Install the panel trim fasteners - Part 1



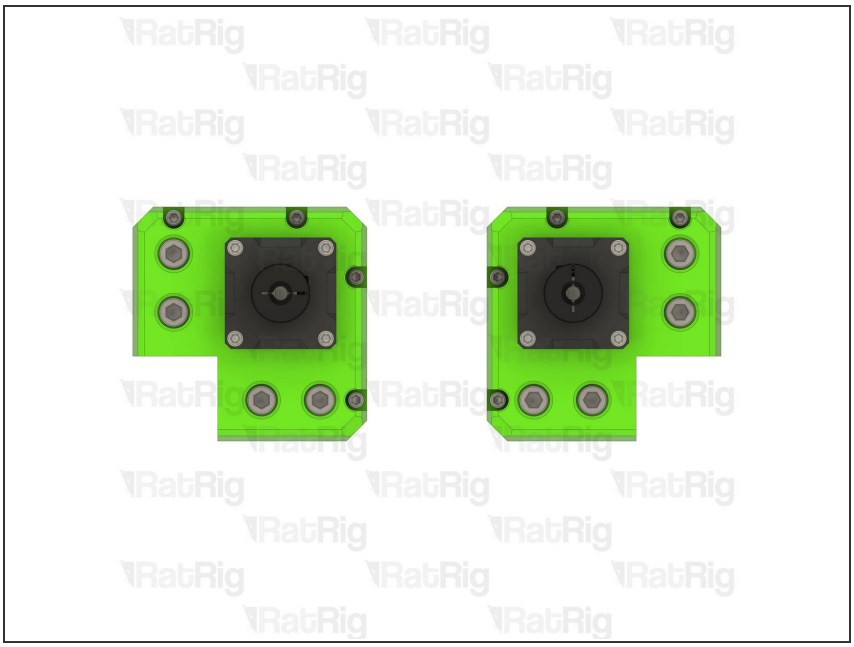
- M3 Nylon Locking Hex Nut
- Insert an M3 nut into each marked position
  - Do not worry about fully seating the M3 nuts into the mount, this will be done in the next step

Step 8 — Install the panel trim fasteners - Part 2

- M3x12 Cap Head Screw
  - Insert each M3x12 cap head screw into the lead screw motor mount as shown
  - Slowly tighten the each screw to seat the M3 nut below
  - Take care not to over tighten the M3x12 screws as you can damage the printed part

These screws are used to mount the **optional** printed trim part when using a base panel

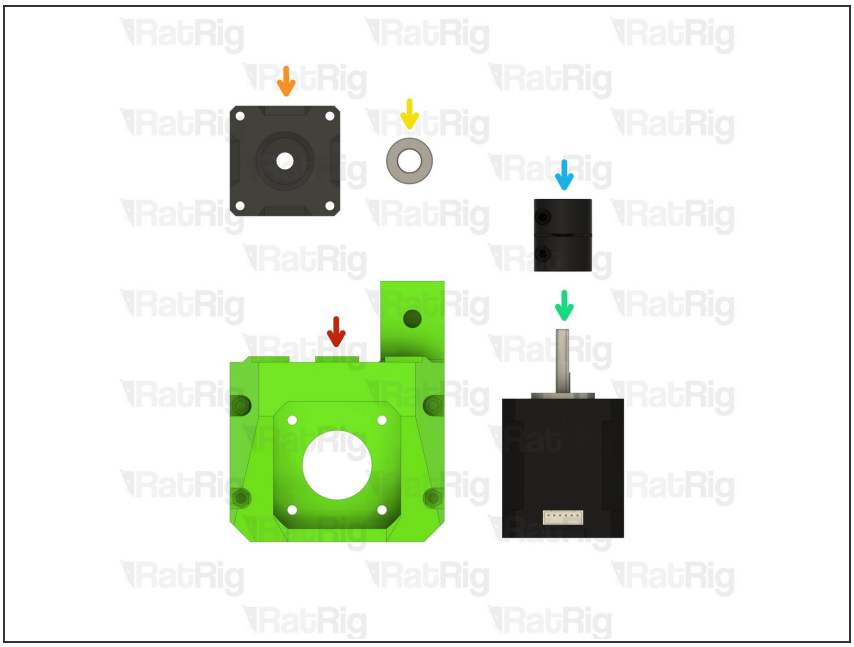
Step 9 — Assemble the second front Z-axis motor mount



Repeat **Steps 3 to 8** to assemble the right Z-axis motor mount

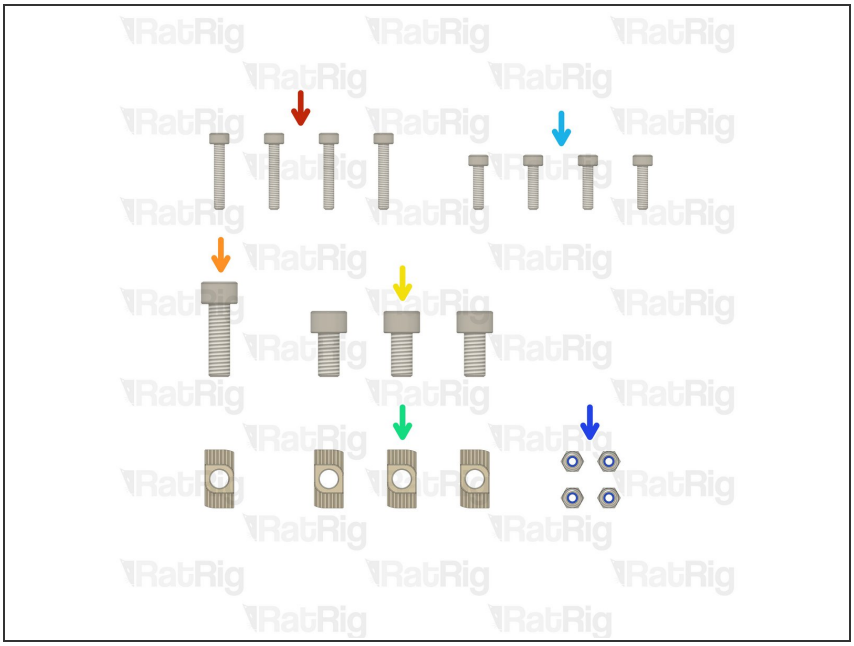
Once you have both front Z-axis motor mounts assembled as shown, proceed to the next step

Step 10 — Prepare the rear z-axis motor parts - Part 1



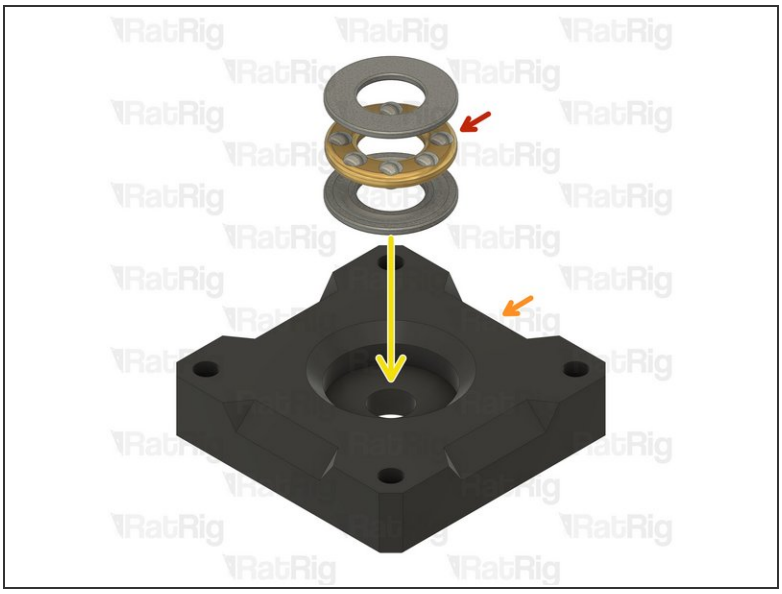
- lead_screw_motor_cage_rear_3.1 printed part
- pillow_block printed part
- Axial Thrust Bearing
- 48mm NEMA17 Stepper Motor
- Rigid Lead Screw Coupler

Step 11 — Prepare the rear z-axis motor parts - Part 2



- 4x M3x18 Cap Head Screw
- 1x M6x20 Cap Head Screw
- 3x M6x12 Cap Head Screw
- 4x 3030 Drop-in T-Nut - M6
- 4x M3x12 Cap Head Screw
- 4x M3 Nylon Locking Hex Nut

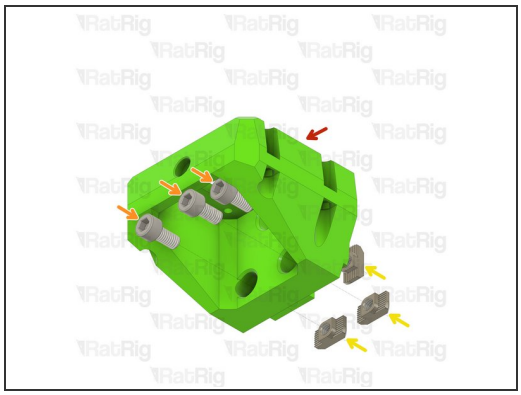
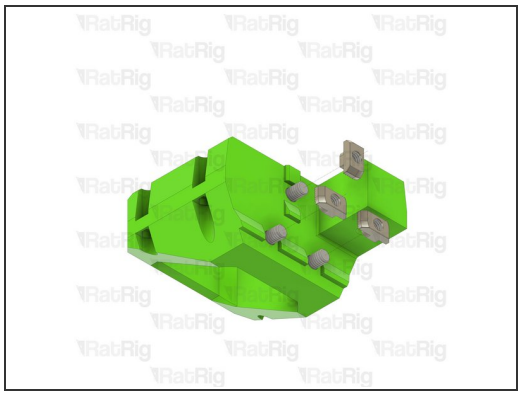
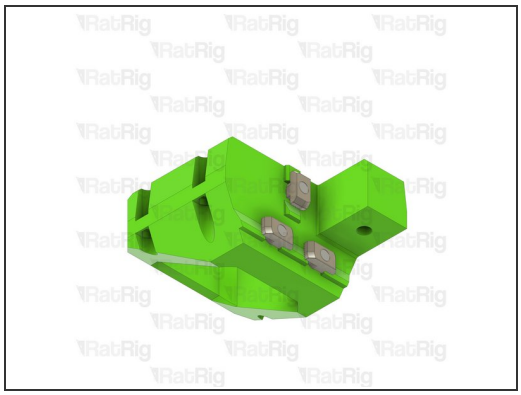
Step 12 — Assemble the pillow block



- Axial Thrust Bearing
  - The axial thrust bearing has three components. Two end caps and an inner bearing assembly.
- pillow_block printed part
- Assemble the axial thrust bearing into the pillow_block as shown
  - Make sure that the thrust bearing is fully inserted into the printed part. The top ring of the thrust bearing should be flush with the top of the pillow_block.
  - If desired, you may add a drop of light oil to the inner bearing assembly of the thrust bearing

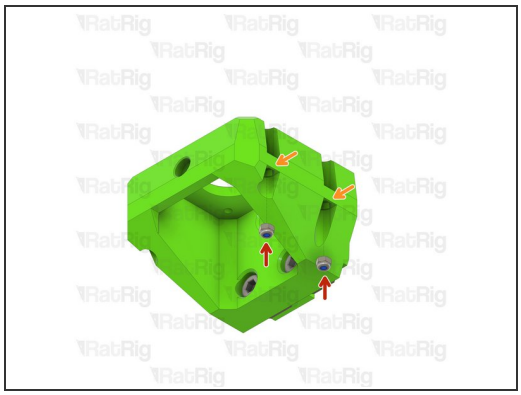
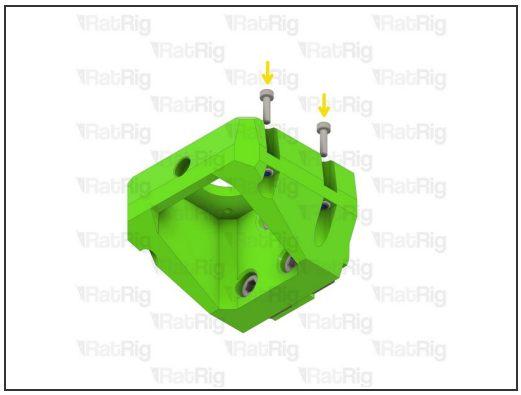
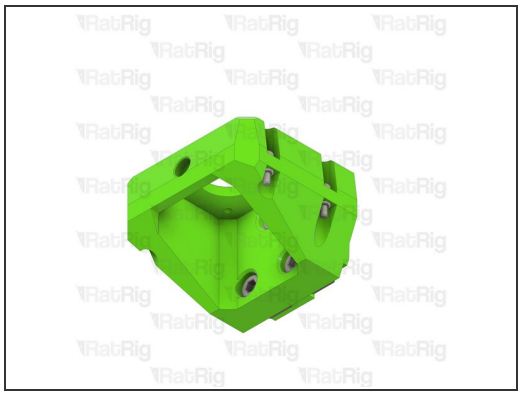
Set the pillow block assembly aside until **Step 17**

Step 13 — Install the rear frame mount fasteners

- lead_screw_motor_cage_rear_3.1 printed part
- M6x12 Cap Head Screw
  - Insert each M6x12 cap head screw into the lead screw motor cage as shown
- 3030 Drop-in T-Nut - M6
  - Loosely thread a 3030 T-Nut onto each of the M6x20 screws. Do not tighten them at this point.

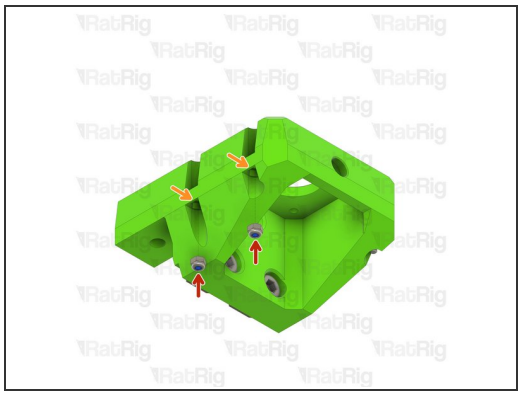
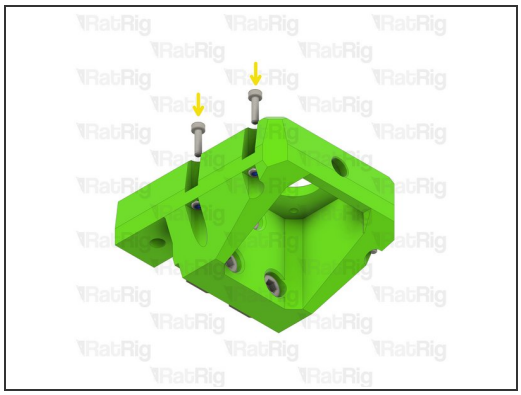
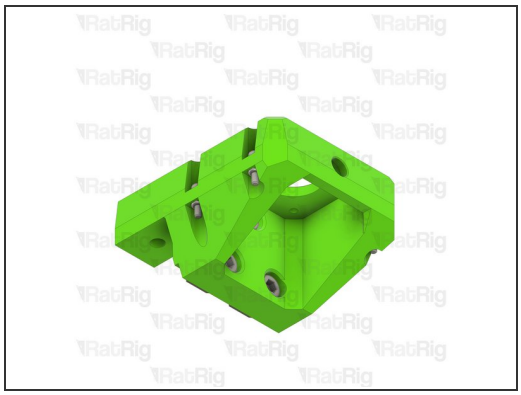
Step 14 — Install the panel trim fasteners - Part 1

- M3 Nylon Locking Hex Nut
- Insert an M3 nut into each marked position
- M3x12 Cap Head Screw
  - Insert each M3x12 cap head screw into the lead screw motor cage as shown
  - Slowly tighten the each screw to seat the M3 nut below
  - Take care not to over tighten the M3x12 screws as you can damage the printed part

These screws are used to mount the **optional** printed trim part when using a base panel

Step 15 — Install the panel trim fasteners - Part 2

- M3 Nylon Locking Hex Nut
- Insert an M3 nut into each marked position
- M3x12 Cap Head Screw

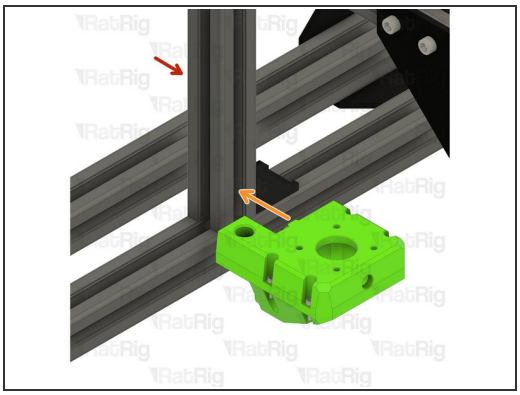
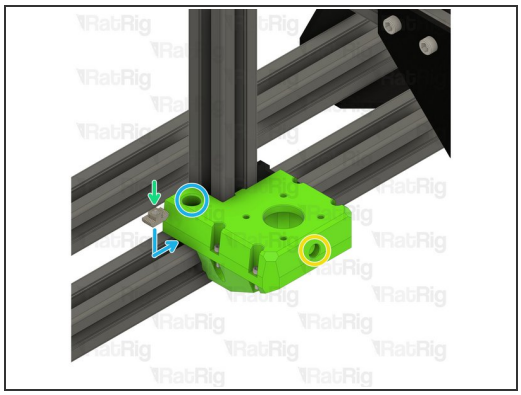
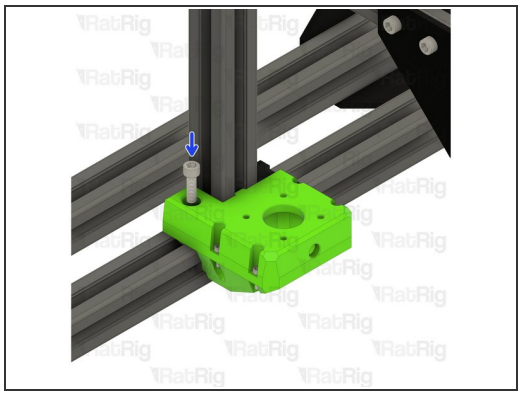
ⓘ Insert each M3x12 cap head screw into the lead screw motor cage as shown

ⓘ Slowly tighten the each screw to seat the M3 nut below

⚠ Take care not to over tighten the M3x12 screws as you can damage the printed part

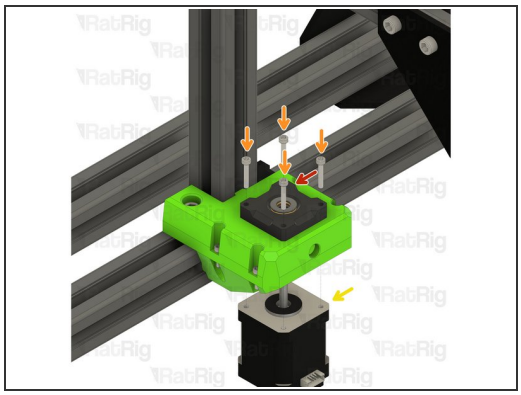
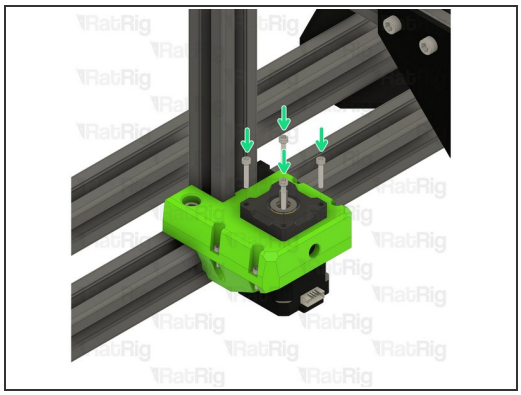
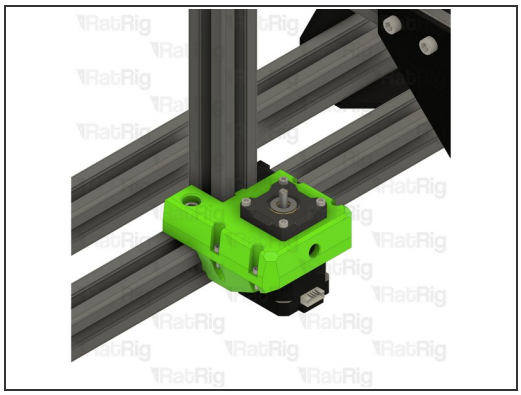
ⓘ These screws are used to mount the **optional** printed trim part when using a base panel

Step 16 — Fasten the rear mount to the V-Core 3.1 frame - Part 1

- V-Core 3.1 Frame Assembly
- Install the rear lead screw motor cage onto the frame as shown
  - The rear lead screw motor cage is designed so that it can only be installed in the correct position. If the part doesn't fit correctly, check the position of the 3030 T-nuts and make sure it is positioned as shown
- Tighten the three M6x12 screws inside the rear lead screw motor cage to secure it to the frame. The top M6x12 screw can be accessed through the marked hole
- 3030 Drop-in T-Nut - M6
- Place the 3030 T-nut into the extrusion channel and slide it under the lead screw motor cage as shown. Position the T-nut so that you are able to see it through the marked hole
- M6x20 Cap Head Screw
  - Insert the M6x20 screw as shown and secure it into the previously positioned 3030 T-nut

Step 17 — Install the rear NEMA17 z-axis motor

- pillow_block and axial thrust bearing assembly
- M3x18 Cap Head Screw
- 48mm NEMA17 Stepper Motor

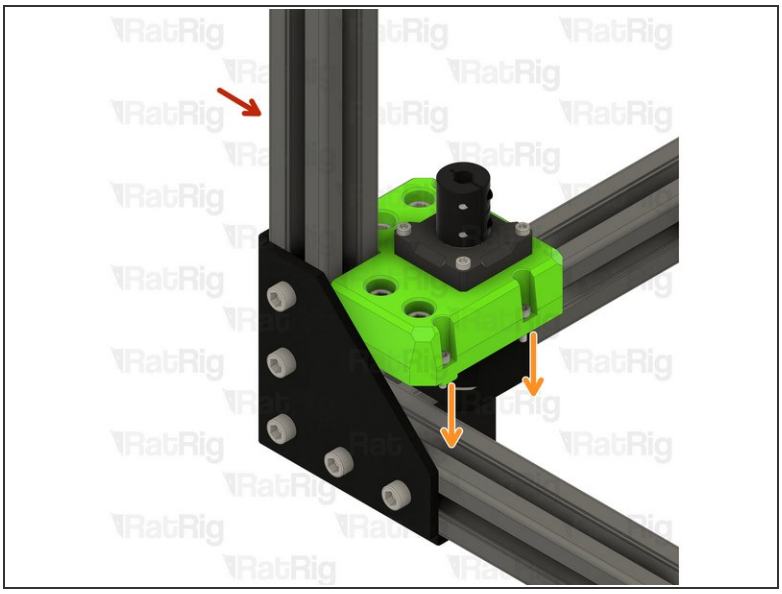
  ⓘ Insert the NEMA17 motor into the rear lead screw motor cage printed part, as shown
- Insert each M3x18 cap head screw through the pillow block, the lead screw motor cage, and fasten them into the NEMA17 motor

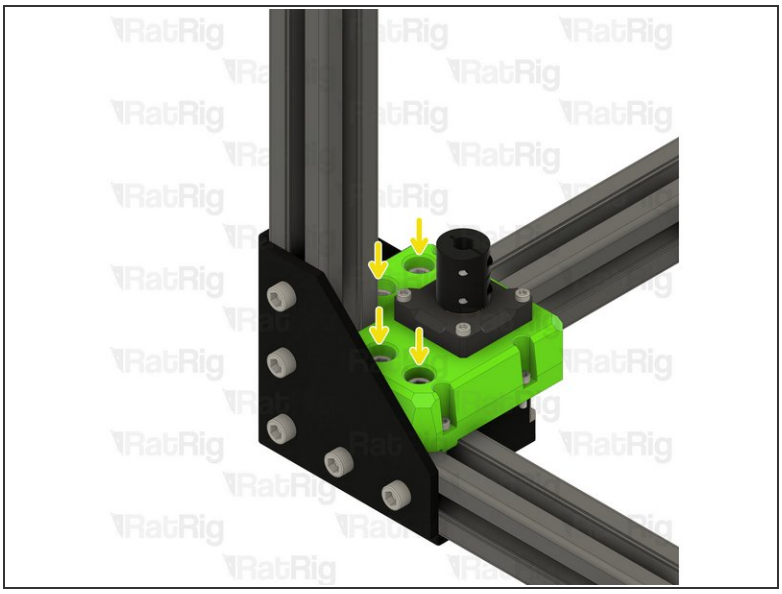
⚠ Take care not to over tighten the M3x18 screws as you can damage the printed parts

Step 18 — Install the rear right lead screw coupler

- Rigid Lead Screw Coupler
- Install the lead screw coupler on to the exposed shaft of the NEMA17 motor
- Apply downward pressure to the top of the lead screw coupler whilst tightening the marked screw
- Tighten the marked M3 screw to secure the lead screw coupler to the motor shaft

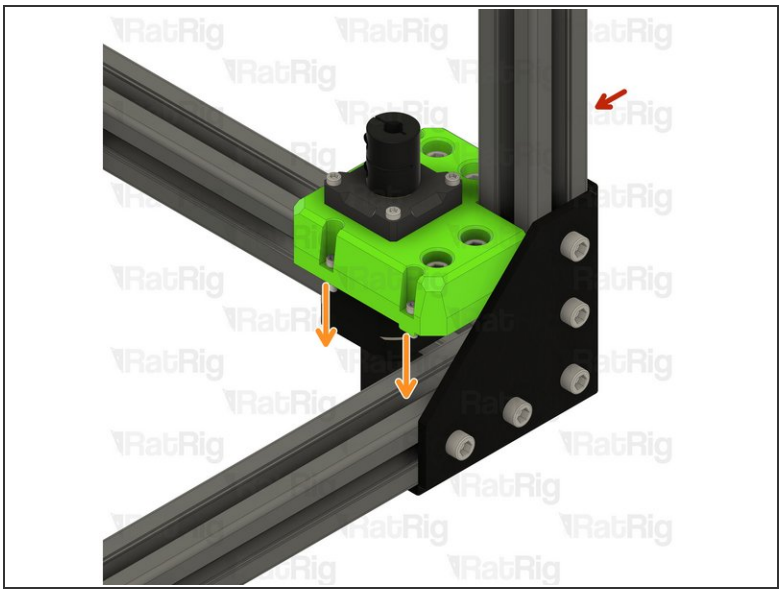
Step 19 — Fasten the front left mount to the V-Core 3.1 frame

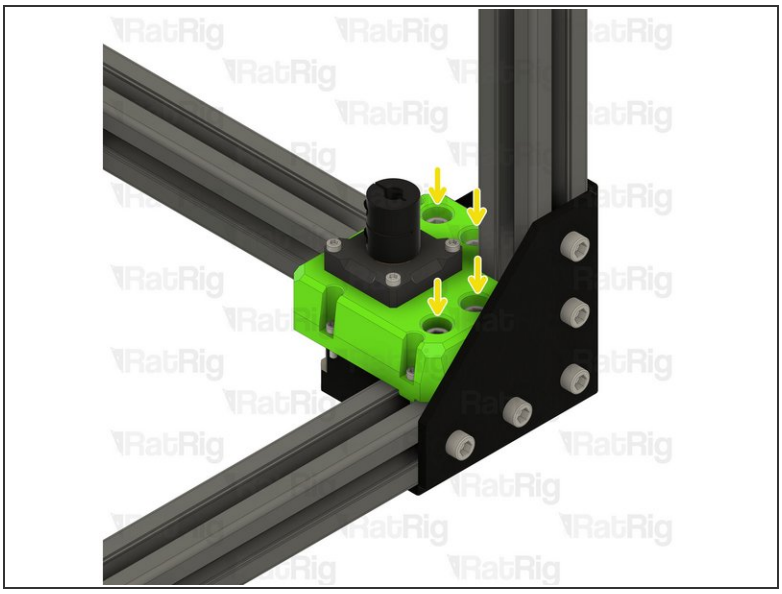




- V-Core 3.1 Frame Assembly - Front Left Corner
- Install the front left lead screw motor cage onto the frame as shown
  - The front lead screw motor cages are designed so that they can only be installed in the correct position. If the part doesn't fit correctly, check the position of the 3030 T-nuts and make sure the assembly is positioned as shown
- Tighten the four marked M6x12 screws to secure the front lead screw motor cage to the frame

Step 20 — Fasten the front right mount to the V-Core 3.1 frame

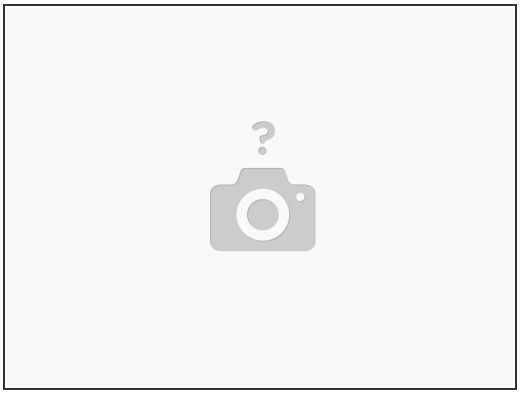




- V-Core 3.1 Frame Assembly - Front Right Corner
- Install the front right lead screw motor cage onto the frame as shown

  The front lead screw motor cages are designed so that they can only be installed in the correct position. If the part doesn't fit correctly, check the position of the 3030 T-nuts and make sure the assembly is positioned as shown
- Tighten the four marked M6x20 screws to secure the front lead screw motor cage to the frame

Step 21 — Next guide



- Continue with the next guide: 03. Linear Rails