

Bear Lab

06. Z axis motion

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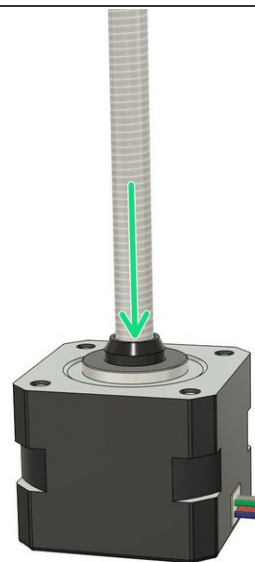


Step 1 — Printed parts verification



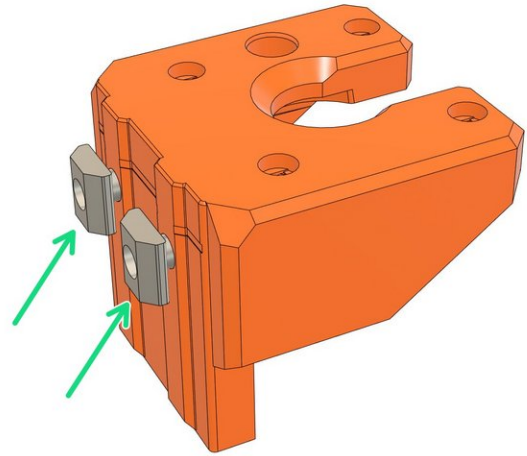
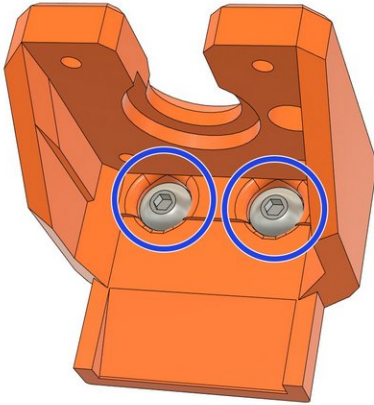
- If you didn't check the Z axis parts during the [preflight check](#) then you should do it now or you may have problems during this chapter.
- ⓘ Note that in this chapter, images will only show the MK3(S) Y carriage, but that all steps are exactly the same for the MK2(S) and MK2.5(S).

Step 2 — Z motors preparation



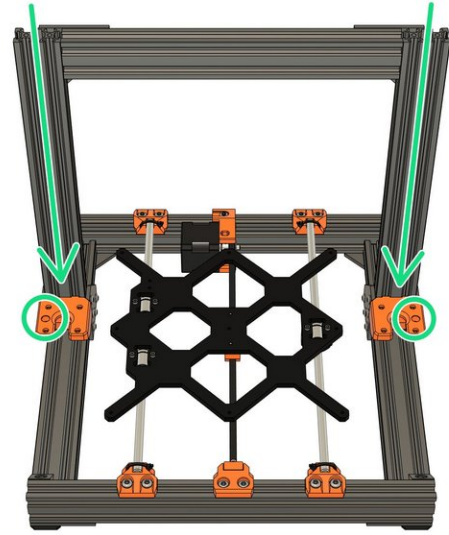
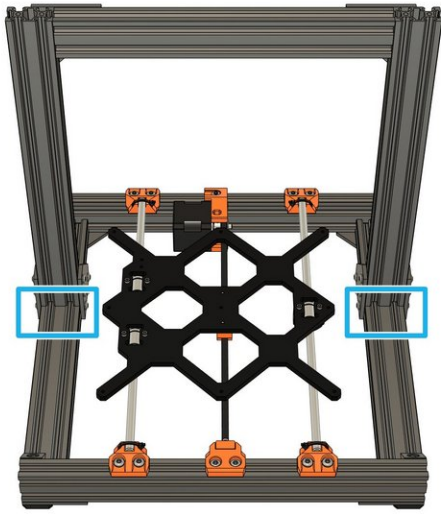
- Make sure you have removed the original lead screw covers as specified in the [preflight check and disassembly](#) guide
 - ⓘ This is not optional, the original lead screw covers are not compatible with the Bear Z motor mounts.
- Screw the Bear *z_leadcrew_caps* on both motors.
 - ⚠ The *z_leadcrew_caps* should screw down to the Z motor but should not be tight at all. Make sure the lead screw can turn freely.

Step 3 — Z motor mounts preparation



- Insert 2x M5x10 screws in the *z_motor_mount*.
- Thread 2x t-nuts on the M5 screws (1-2 turns) and place them vertically.
- Repeat with the remaining *z_motor_mount*.

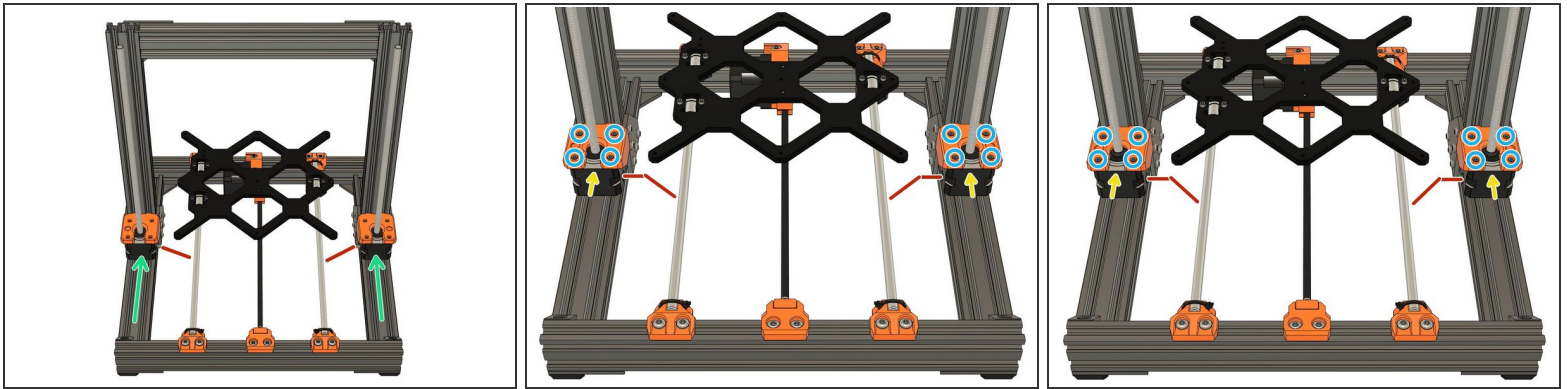
Step 4 — Z motor mounts installation



- Make sure this section is clean of dust, it will be used as reference for the `z_motor_mounts`.
- Slide the `z_motor_mount` from the top of the frame, slotting the t-nuts into the extrusion channels. Note the orientation, the hole for the Z smooth rods should be to the outside the frame
- Tighten the M5x10 strongly.

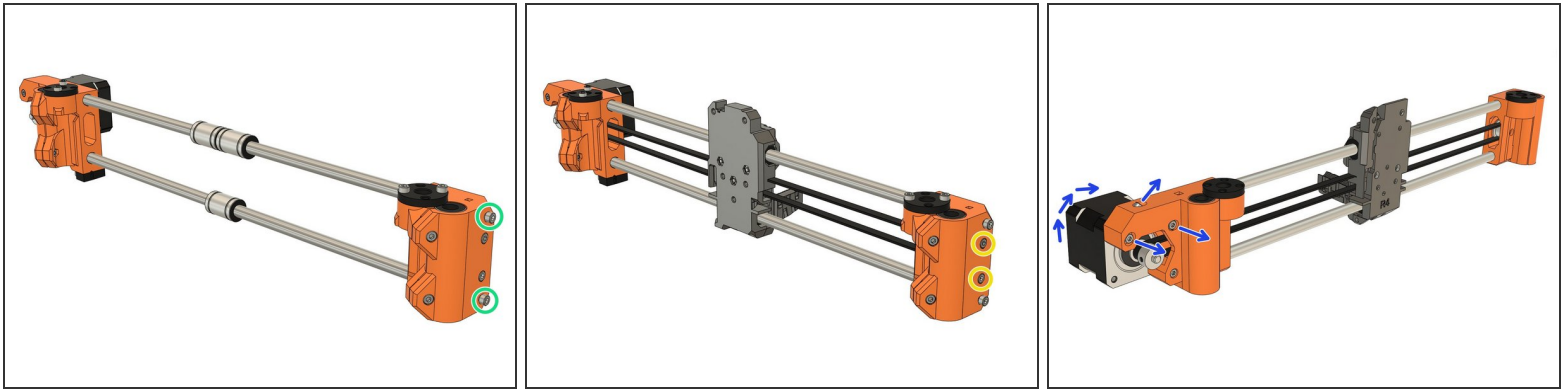
⚠ Double check the orientation of your `z_motor_mount` or it will make the next steps impossible.

Step 5 — Z motors installation



- Slide the Z motors in the `z_motor_mounts`. The motor cable should be oriented towards the inside of the frame (red lines on the images).
- ⚠ The Z motors have different cable length. The motor with shorter cables must go on the side of the dual Y axis bearing (left on the images).
- Secure the Z motors in place with 8x M3x **10** screws (reused from your original Prusa). Press the motor in the direction of the yellow arrows while tightening the screws **evenly, incrementally and in turn**.
- ⓘ Note that the previous, Bear 2.0 "z_motor_mounts", used M3x12 screws and they will be too long for these new mounts.
- ⓘ Previous version of Bear or Original Prusa are using washer on the M3x10. This is not useful anymore, you can discard them.
- ⚠ Check the orientation of your motor cables.

Step 6 — X axis preparation



i In this step we prepare the X axis for later assembly on the Z axis.

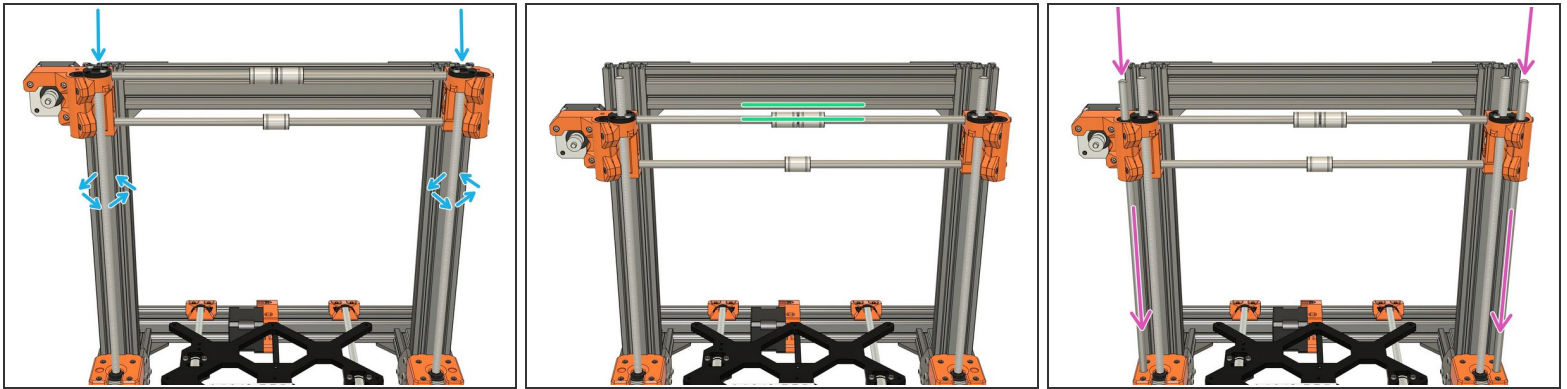
- If you are using the Bear X axis or the Original Prusa MK2(S)/MK2.5(S) X axis, you will need to unscrew the smooth rod tensioning screws, as shown (by approx. 2mm).

⚠ If you still have the X carriage (or extruder) in place, you must ensure that the X axis belt is not under tension.

- **Bear extruder and X axis (BearExxa), BearMera of Bear X axis with Bondtech extruder:** release tension using the belt tensioning screws.
- **Original Prusa MK3(S):** remove the 2x top motor screws and release tension of the screw on top of the arm. Then rotate the X motor.
- **Original Prusa MK2(S) or MK2.5(S):** remove the 2x top motor screws and rotate the X motor.

⚠ Be careful, if you still have the X carriage (or the extruder) in place you will have to disassemble the Z motors to insert the X axis in the next step.

Step 7 — X axis installation



⚠ Be careful and take your time with this step to not damage the Z lead screw nuts and bearings.

- Place the X axis on top of the Z lead screws. Carefully rotate, by hand, both Z lead screws to engage with the nuts and move down the X axis.

⚠ Never apply force on the lead screw nuts or you might damage them.

⚠ Rotate both lead screws, simultaneously, keeping the X axis level as it moves down the Z axis.

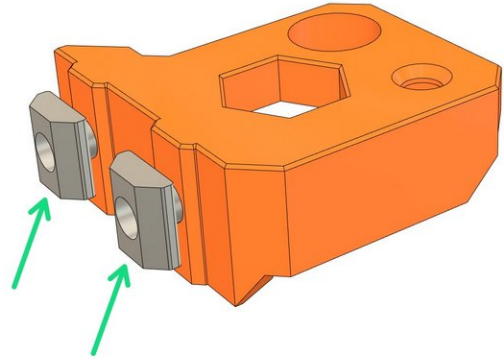
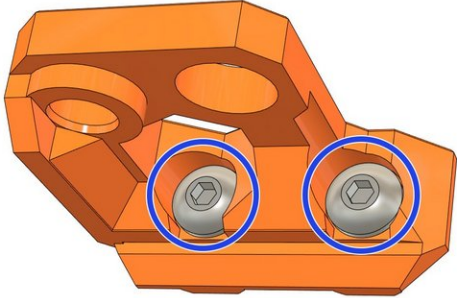
- Continue to rotate both Z lead screws until you can align the top X smooth rod with the bottom of top Z axis extrusion.

⚠ Check that the X axis is parallel and rotate one or other of the lead screws until it is.

- **Very gently**, insert the two Z smooth rods (320mm long) into the bearings and down to the Z motors. The smooth rods must be fully inserted. They must touch the Z motor body itself (you can hear a "metallic click" when you reach the motor).

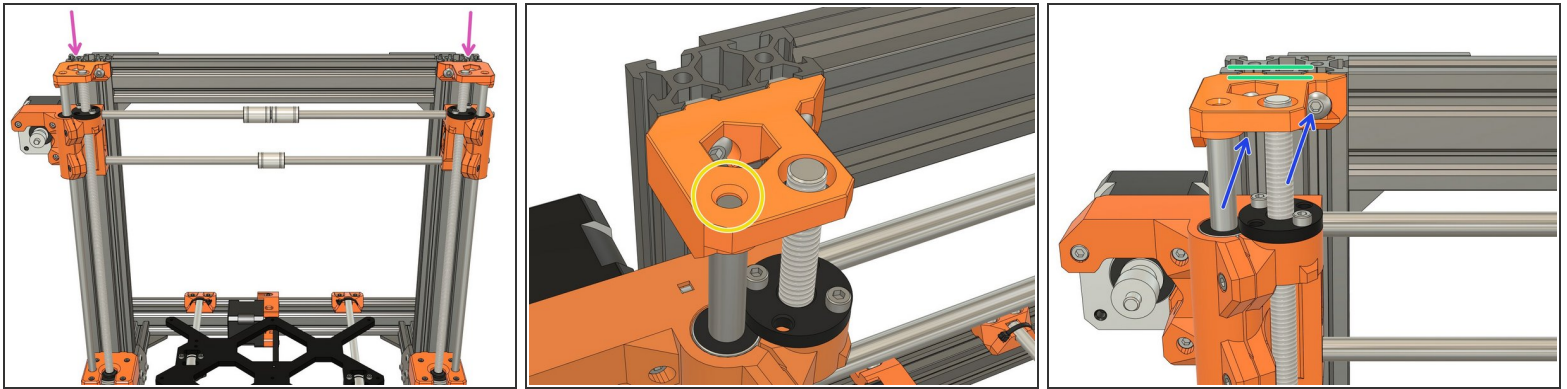
⚠ Verify the Z smooth rods are fully inserted into the Z motor mount and actually touch the Z motors. This is very important as it might affect the alignment of your X axis later.

Step 8 — Z tops preparation



- Insert 2x M5x10 screws in one of the *z_top*.
- Thread 2x t-nuts on the M5 screws (1-2 turns) and place them vertically.
- Repeat with the remaining *z_top*.

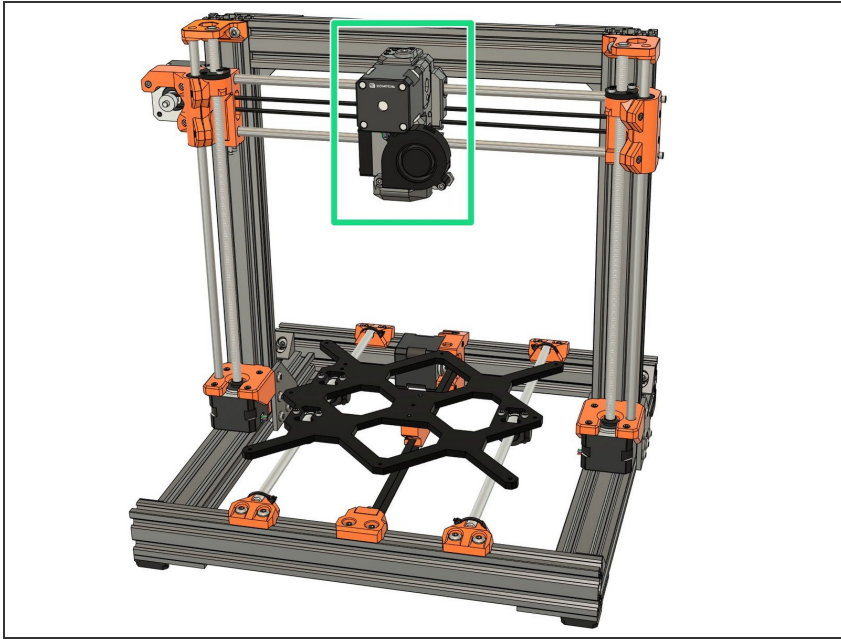
Step 9 — Z tops installation



- Install the *z_tops* on top of the Z axis. T-nuts must go into the extrusion's grooves and the smooth rods in the smallest of the two front holes.
- You must press down the *z_tops* until the smooth rod is touching the top of the hole.
⚠ This is very important as it might affect the alignment of your X axis later.
- Make sure the *z_tops* are parallel to the top of the extrusion
- Tighten the 2x M5x10 screws.

⚠ Double check that the smooth rods are fully inserted in the *z_tops*.

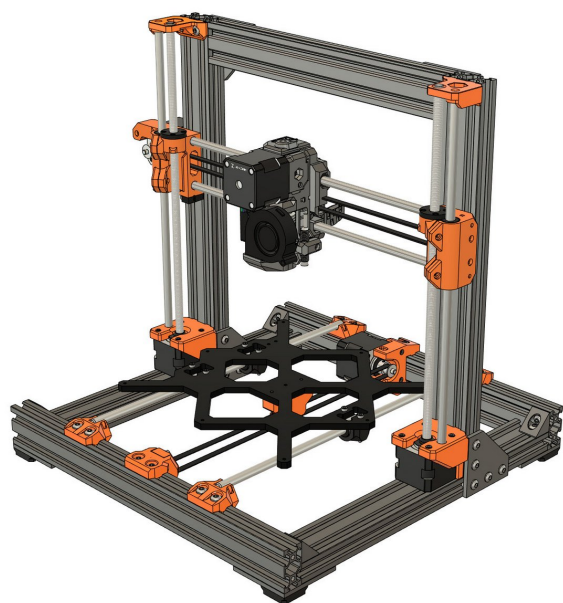
Step 10 — Extruder installation



i To install the extruder you have to follow external guides. As the Bear frame supports different extruders and X axes it would make this guide too long and complicated to follow. Thank you for your understanding :)

- Reinstall the extruder on the X axis by following the external guide(s) relevant to the extruder and X axis of your choice:
 - **BearExxa** (Bear extruder and X axis): start with [3. Extruder](#), then [4. Extruder and X axis assembly](#) up to **step 10** and finish with [5. Final adjustments and calibration](#) up **step 8**.
 - **BearMera** (E3D Hemera): start with [3. BearMera extruder](#) up to **step 14**, and then [4. Adjustments](#).
 - **Bondtech on Bear X axis**: follow [our guide here](#).
 - **Original Prusa extruders** installation guides: [MK3S+](#), [MK3S](#), [MK2.5S](#), [MK3 \(spiral wrap\)](#), [MK3 \(textile sleeve\)](#), [MK2.5 \(spiral wrap\)](#), [MK2.5 \(textile sleeve\)](#), [MK2S](#).
 - **Bondtech extruder on original Prusa X axis**: choose the guide corresponding to your extruder on support.bondtech.se/c/Prusa.

Step 11 — Next chapter



- Congratulations you have finished this chapter :)
- Go to the next chapter: [07. Heated bed.](#)