



4. Z-axis assembly

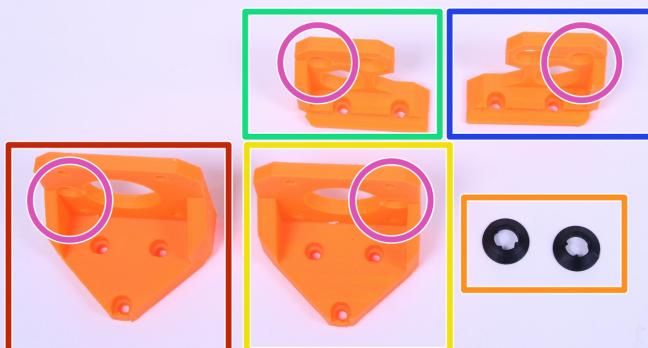
Written By: Josef Prusa

Step 1 — Get the necessary tools



- 13/17mm spanners
- 3.6mm flathead screwdriver
- Needle-nose pliers
- 2.5 and 1.5mm Allen key

Step 2 — 3D printed parts



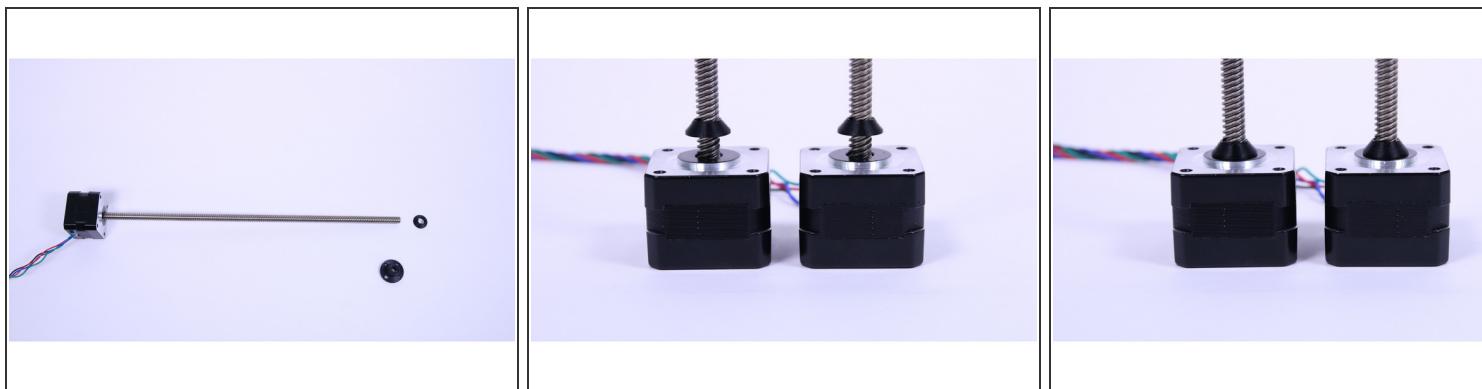
- Z-axis-top-left
- Z-axis-top-right
- Z-axis-bottom-left
- Z-axis-bottom-right
- Z-screws covers
- Use the hole for 8 mm smooth rod as an orientation key in the next steps.

Step 3 — Screw Z-axis-bottom parts to the frame



- Place parts on the frame as shown in the picture.
- ⚠** Note the frame orientation (PRUSA logo has to be visible).
- 📌** All screws in this step are M3x10 (6 pcs).
- Use 2.5mm Allen key to tighten the parts to the frame. **The screws must be perpendicular to the frame.**
- ⚠** Tighten them gently, no superhuman force required.
- ℹ** Note: If you have troubles tightening the screws, try to place them from the other side of the frame to clean the thread. Then place them again from the previous side. Proceed with caution, or you might break the screw.

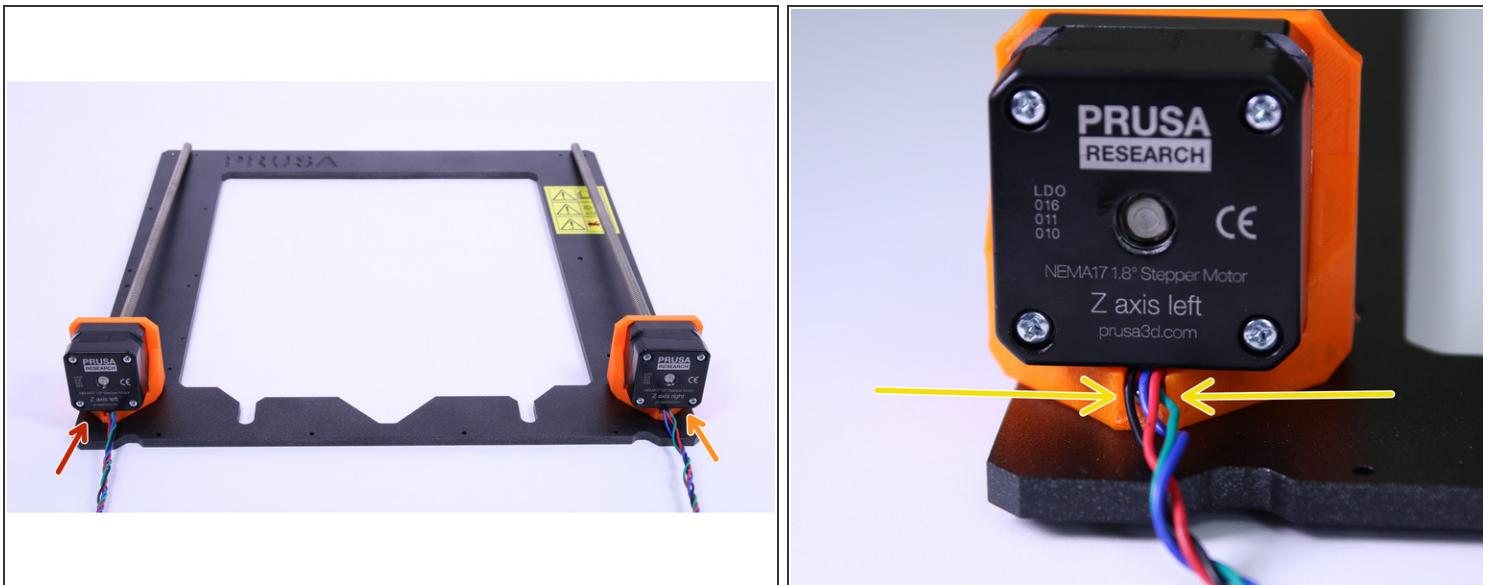
Step 4 — Placing the Z-screw covers



- Remove the trapezoid nuts from the motors.
- Screw the Z-screw covers onto both leadscrews.

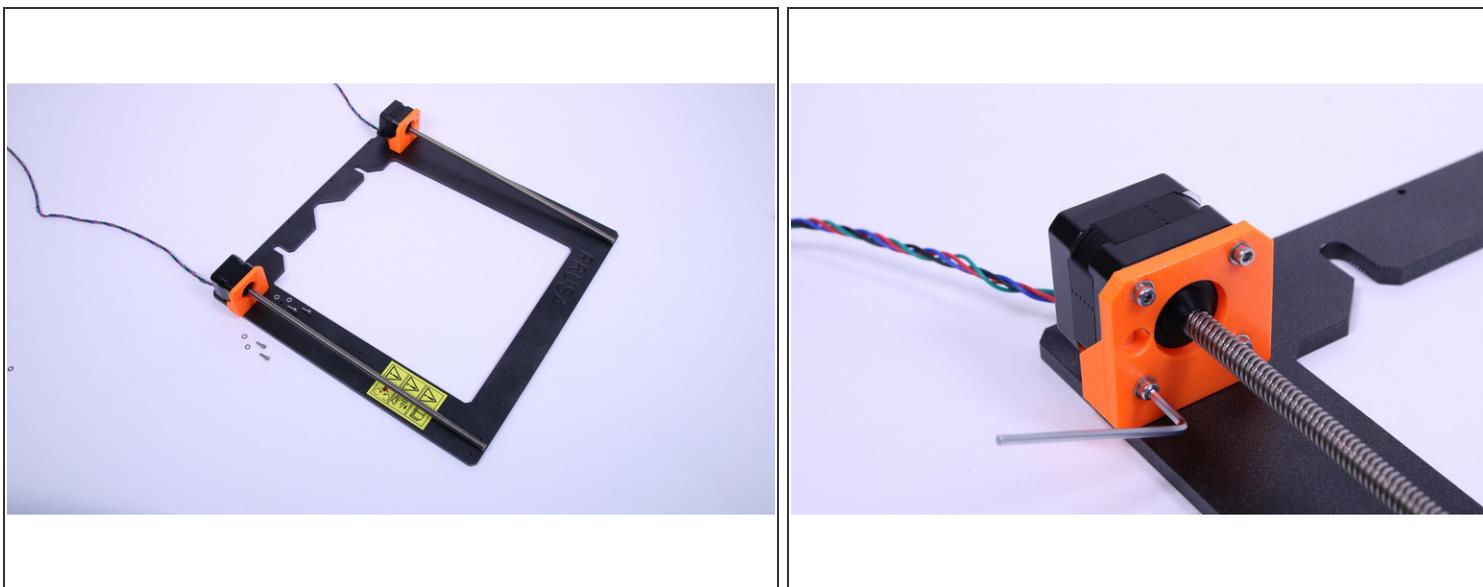
⚠ Covers should be screwed fully to the motor, but not too tight! The motor should keep spinning freely.

Step 5 — Placing the Z-motors



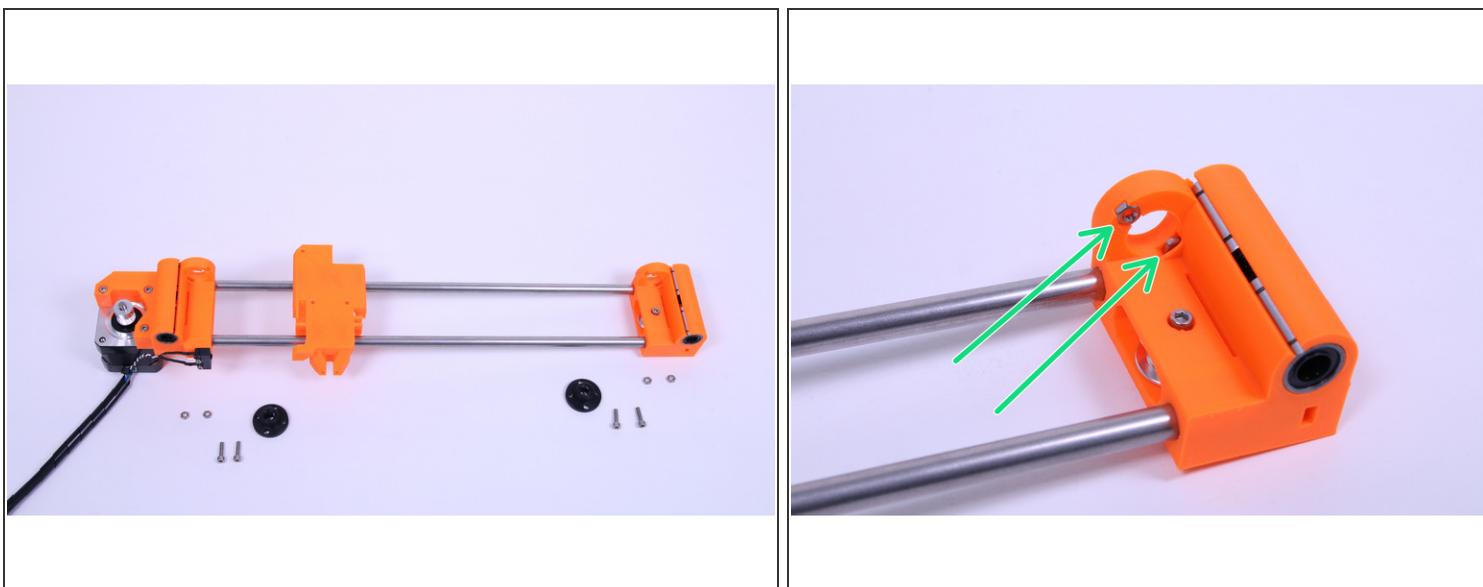
- Place the Z motors on the frame.
 - Z motor left (labeled with Z axis left)
 - Z motor right (labeled with Z axis right)
- ⚠** Ensure the correct position of the motors (left/right).
- ⚠** Ensure the wires are not pinched between the motor and the holder (see detailed photo).

Step 6 — Tighten the Z-motors



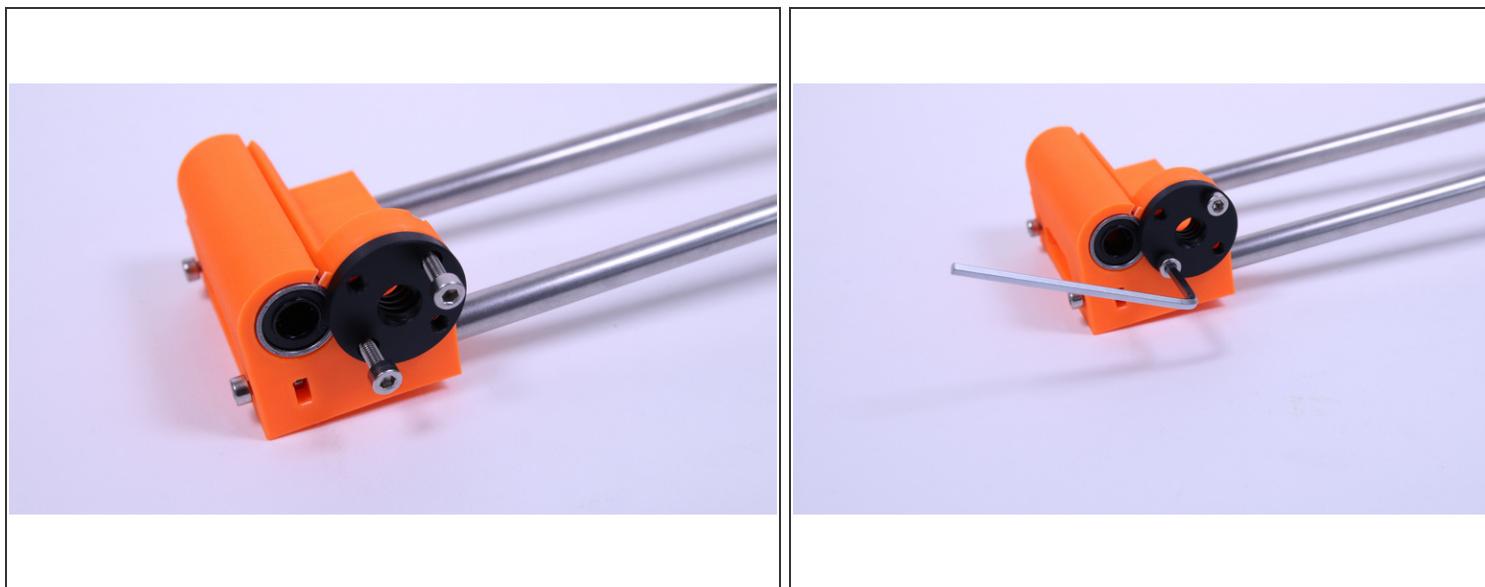
- (i)* Use M3x10 screws (8 pcs) and M3w washers (8 pcs).
● Use 2.5mm Allen key to tighten the motor to the printed part.

Step 7 — Placing trapezoid motor nuts



- Insert M3 nuts (4 pcs) in the printed parts as shown in the picture.
(i) Nuts orientation does not matter.

Step 8 — Tighten trapezoid motor nuts



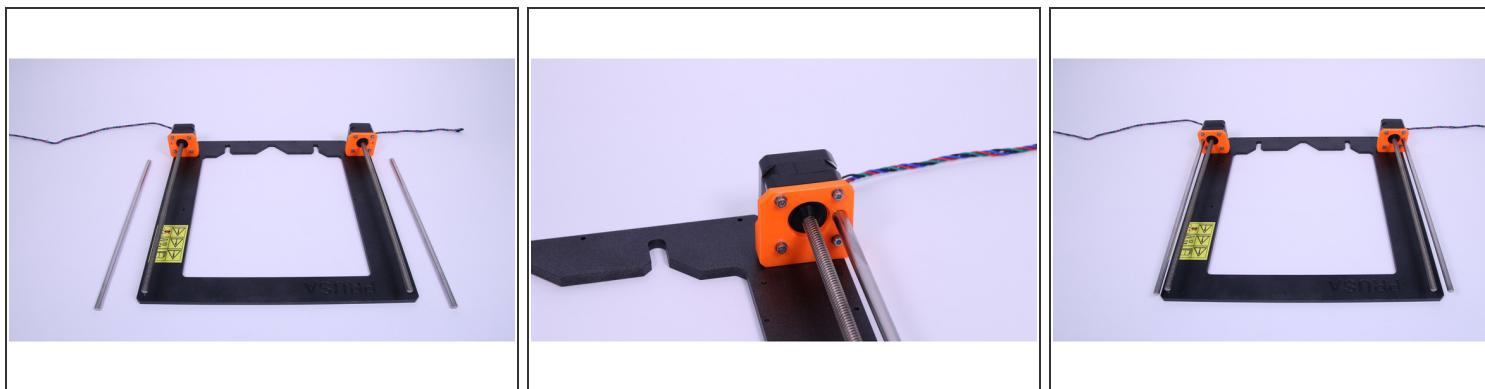
- Use M3x12 screws (4 pcs) to tighten nuts in place.
- Use 2.5mm Allen key to tighten the screws.

Step 9 — Identifying rod length



- In the following steps, use the shortest rods (320 mm).

Step 10 — Preparing the Z-rods



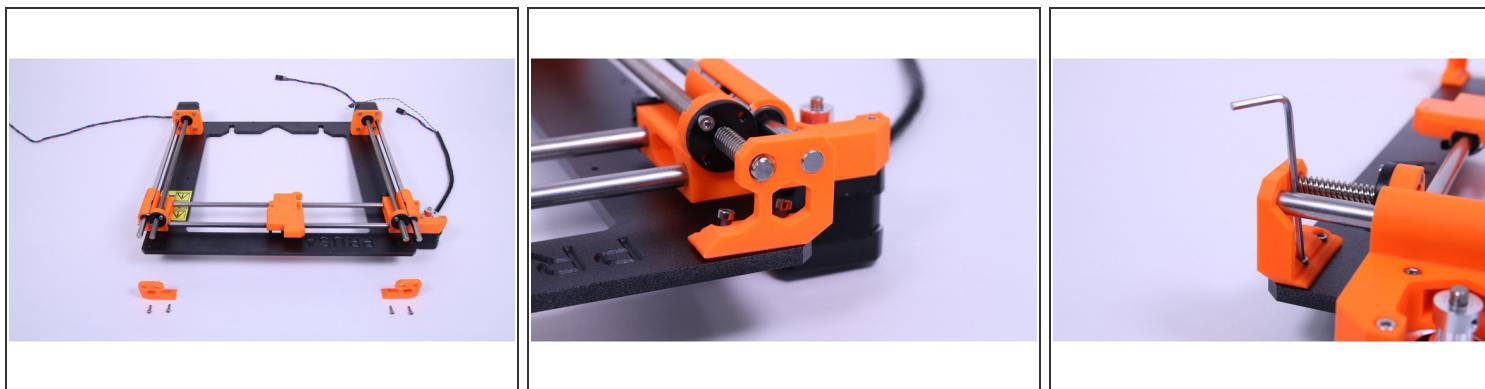
- Insert Z-rods (the shortest ones) inside the Z-axis-bottom parts.

Step 11 — Assembling the X-axis



- Carefully slide the X-axis on rods and trapezoid screws. By rotating both screws simultaneously let the X-axis to slide until both trapezoid screws are exposed as in the picture.
- ⚠️ Insert the X-axis very carefully, perfectly in axis with the bearings and with a minimal force.

Step 12 — Placing the Z-axis-top parts

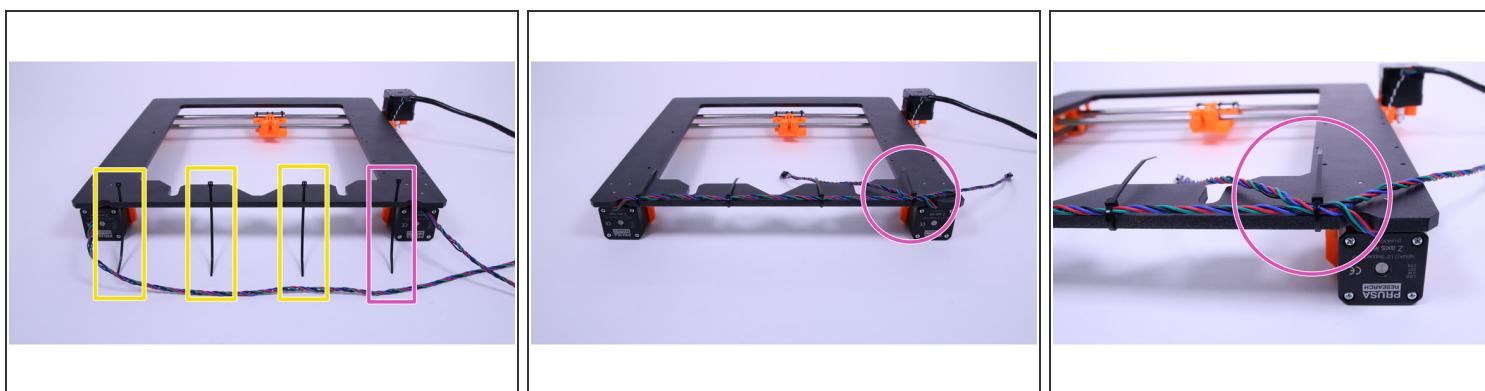


- Place parts on the frame as in the picture.
- Use 2.5mm Allen key to tighten the parts to the frame.

⚠ Check both leadscrews in the upper part of printer, they shouldn't touch the edges of the printed part. If so, release the motor holder at the bottom and slightly move it.

📌 All screws in this step are M3x10 (4 pcs).

Step 13 — Cable management



- Insert the zipties in the holes at the bottom of the frame.
- Tie the cables to the frame as shown in the picture.
- Note that the left Z-motor cables are tied with the last ziptie.

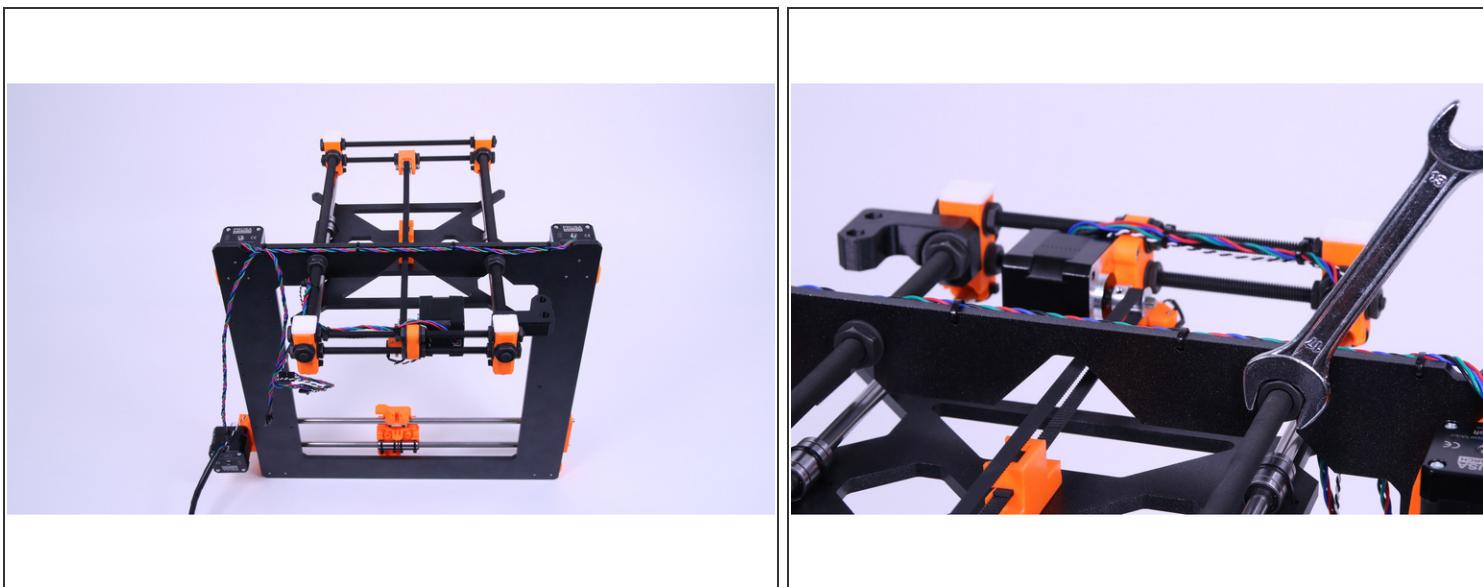
Step 14 — Cleaning up



- Use pliers and cut the excess ziptie.

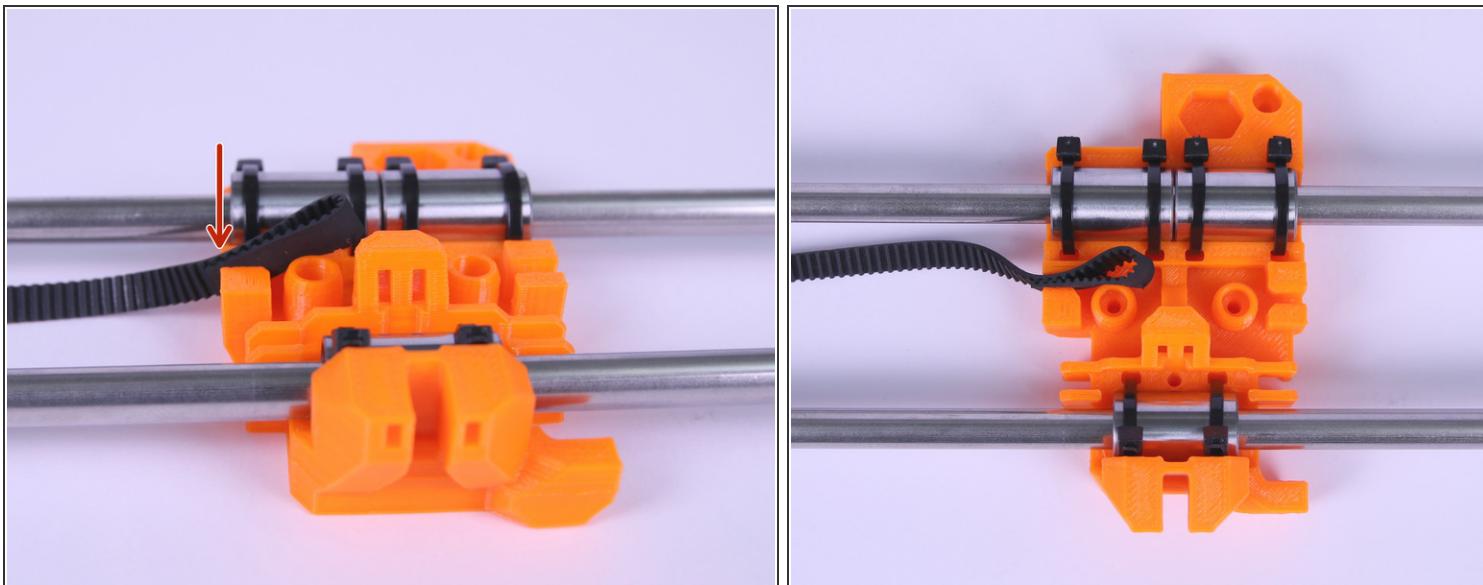
 Note the position of the connecting ziptie.

Step 15 — Assembling the Y-axis



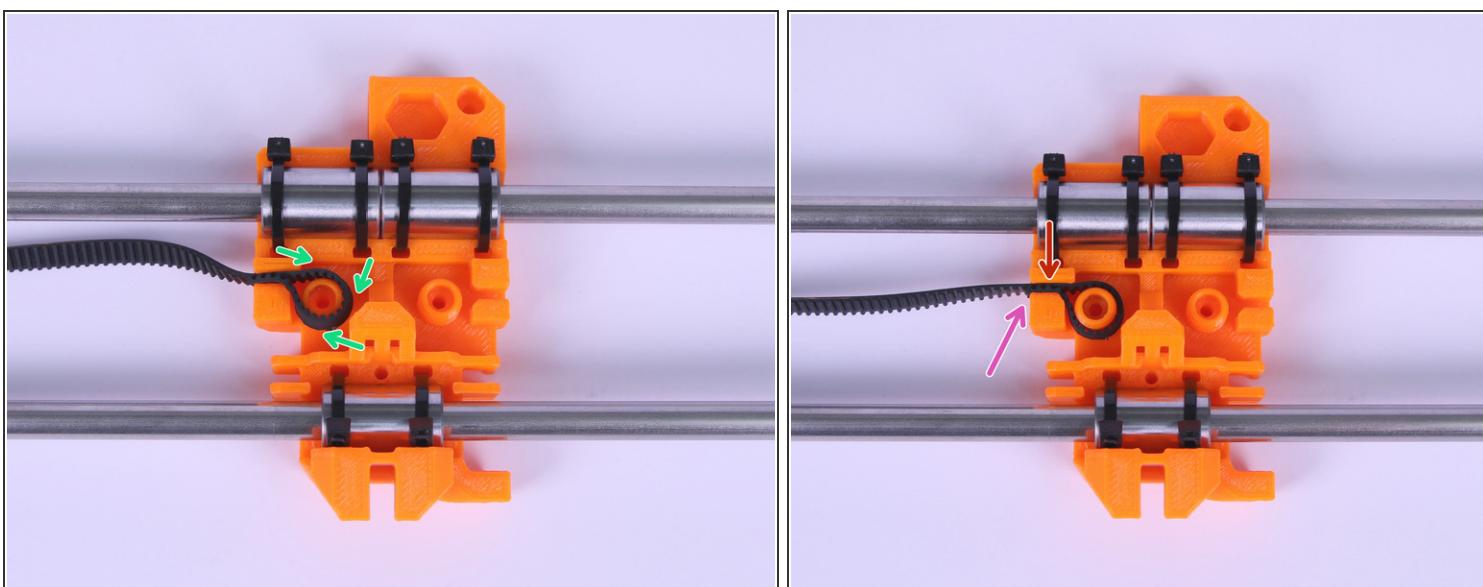
- Grab the Y-axis assembly in your hand and slide it into the frame. You should be able lift the constructed printer as a whole.
 - Tighten the M10n nuts to the frame.
- ⚠️** Ensure that there is a washer between a nut and the frame on both sides.
- ⚠️** Ensure the correct orientation of the Y-axis assembly and the frame (longer part should be on the side with motors).

Step 16 — Assembling the X-axis belt, part 1



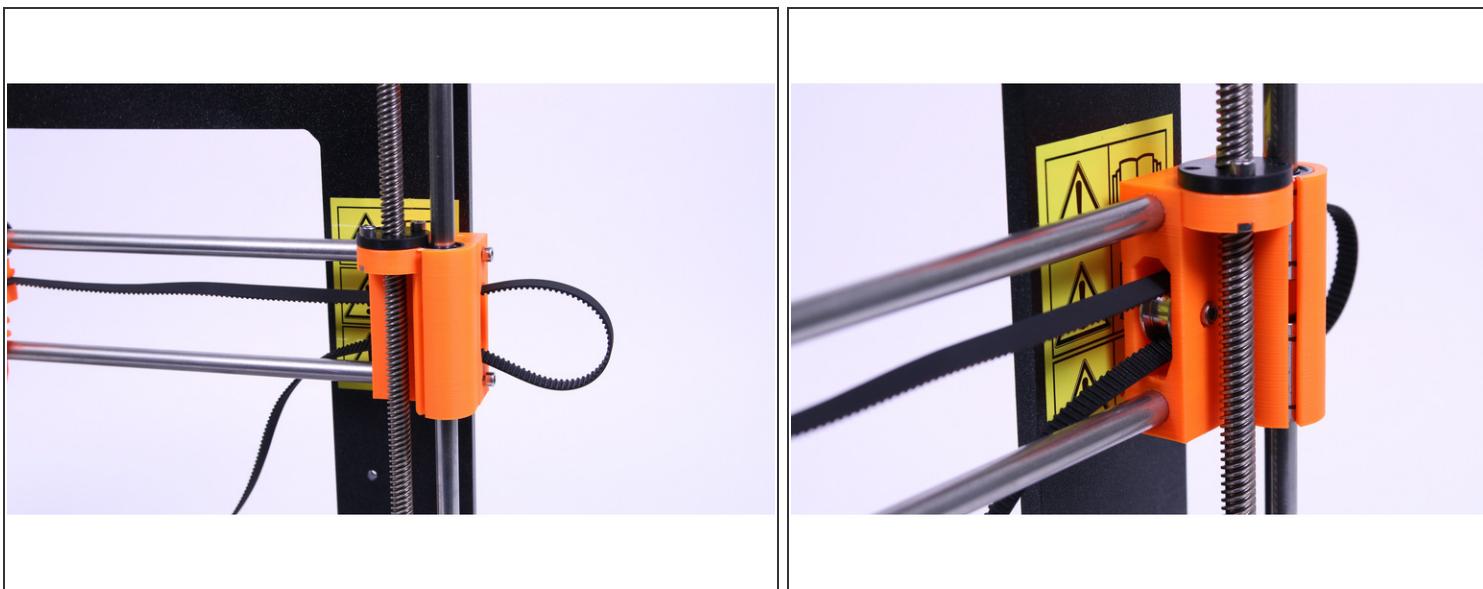
- Insert the flat part of the X-GT2 belt (longer one) into the X-carriage as in the picture.
- ⓘ A reference video is included at step 25 covering steps 16-24.

Step 17 — Assembling the X-axis belt, part 2



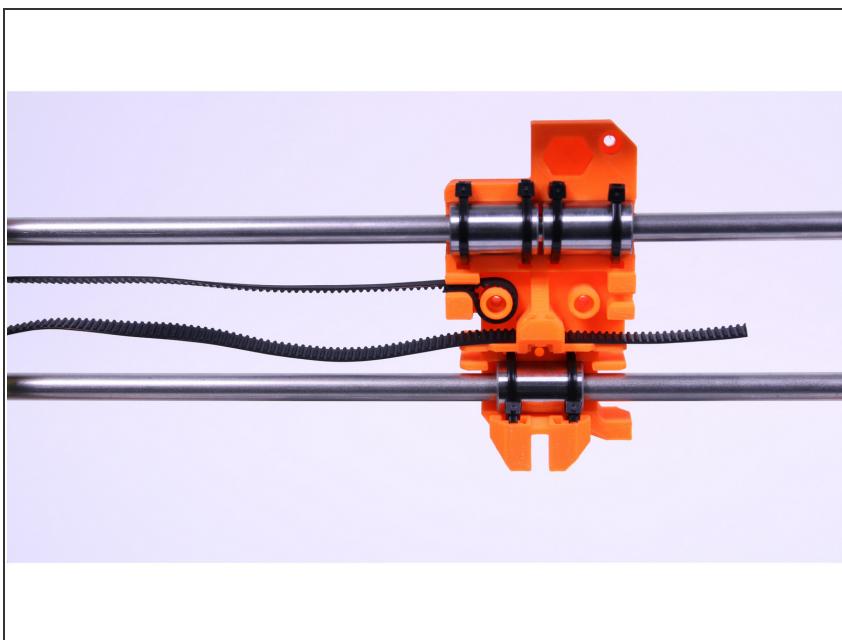
- Guide the belt around the pin as shown in the picture.
 - Insert the belt all the way into the belt holder as shown in the picture.
- ⚠ Note that there is no belt going out of the X-carriage, it's IMPORTANT.

Step 18 — The X-axis belt idler guide



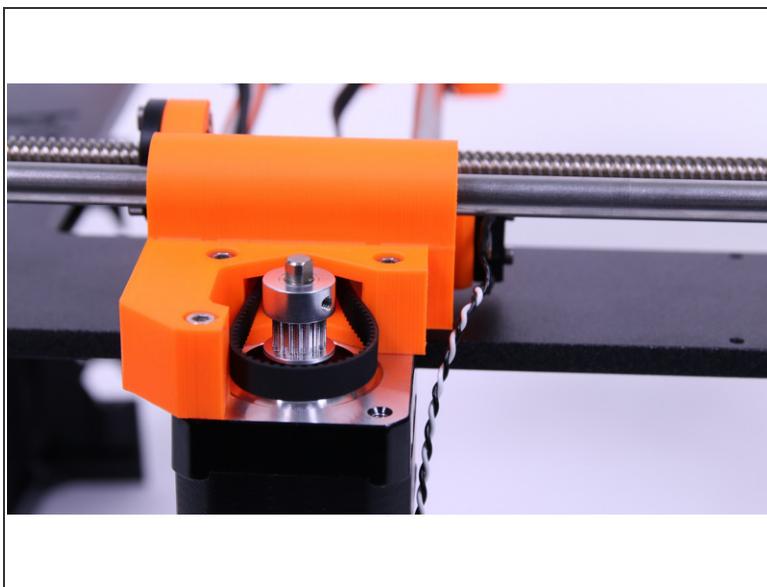
- Guide the X-axis belt through the X-end-idler, around the 623h bearing with the housing and back.

Step 19 — The X-axis belt carriage guide



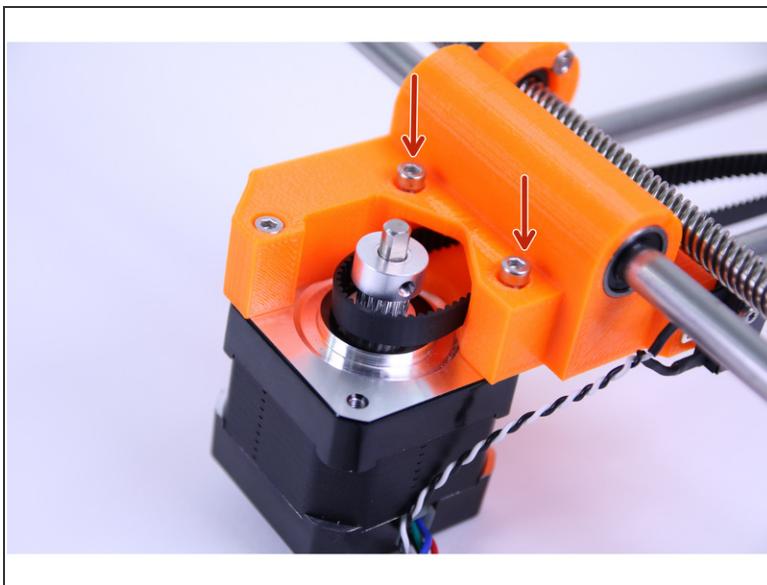
- Guide the X-axis belt through the X-carriage.

Step 20 — The X-axis belt motor guide



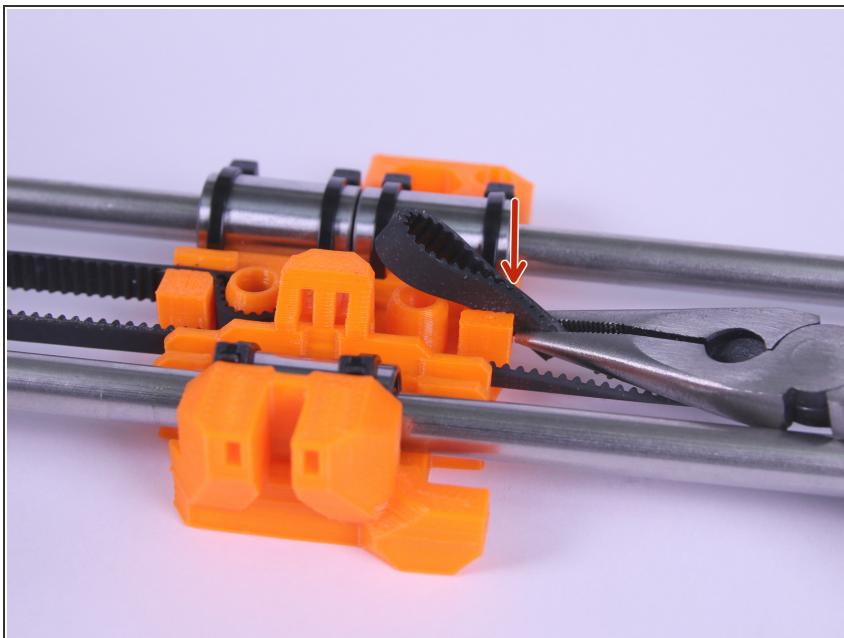
- Guide the X-axis belt through the X-end-motor, around the GT2-16 pulley and back.

Step 21 — Loosening the motor



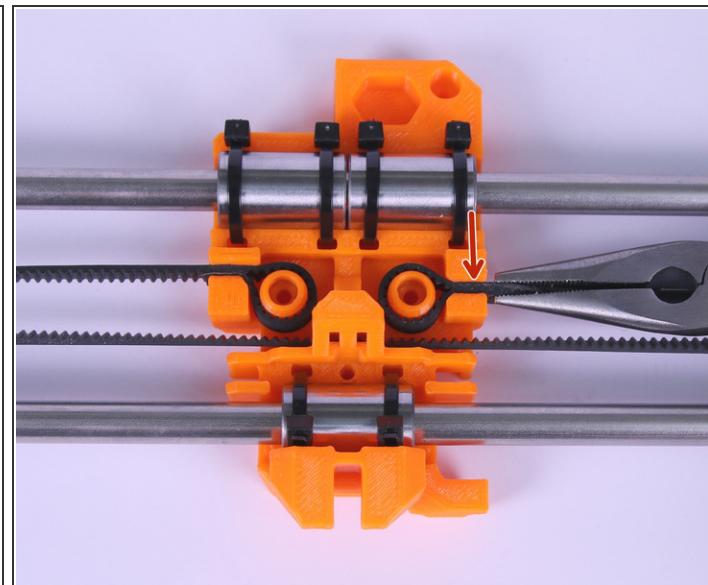
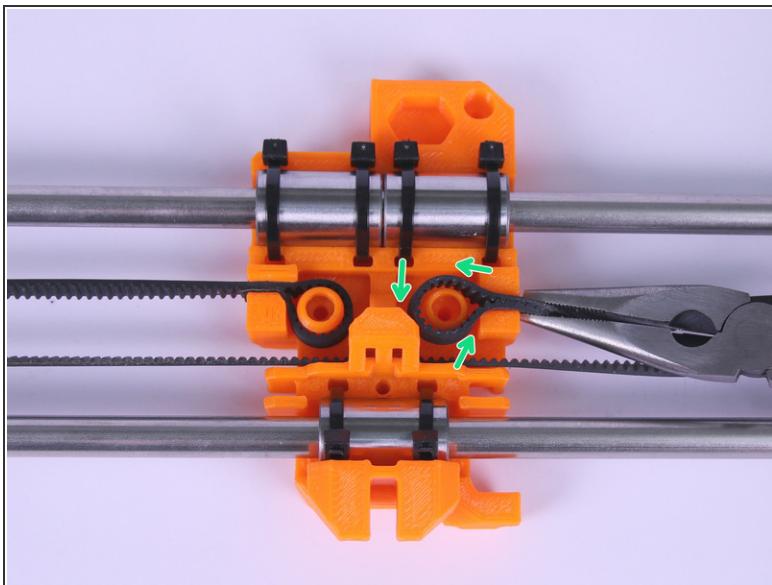
- Remove the two M3x18 screws.
 - Rotate the motor counter-clockwise as shown in the picture.
- (i) This step is illustrative, you don't need to remove the frame.

Step 22 — Tightening the X-axis belt, part 1



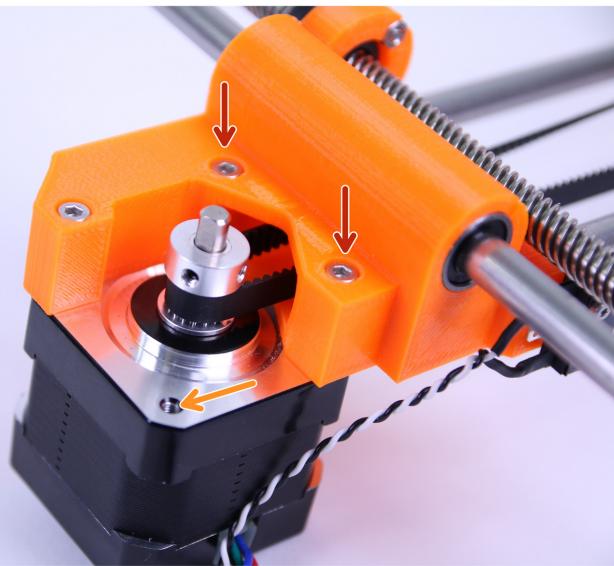
- Use pliers to tighten up the X-axis belt.
- Insert the flat part of belt as shown in the picture.

Step 23 — Tightening the X-axis belt, part 2

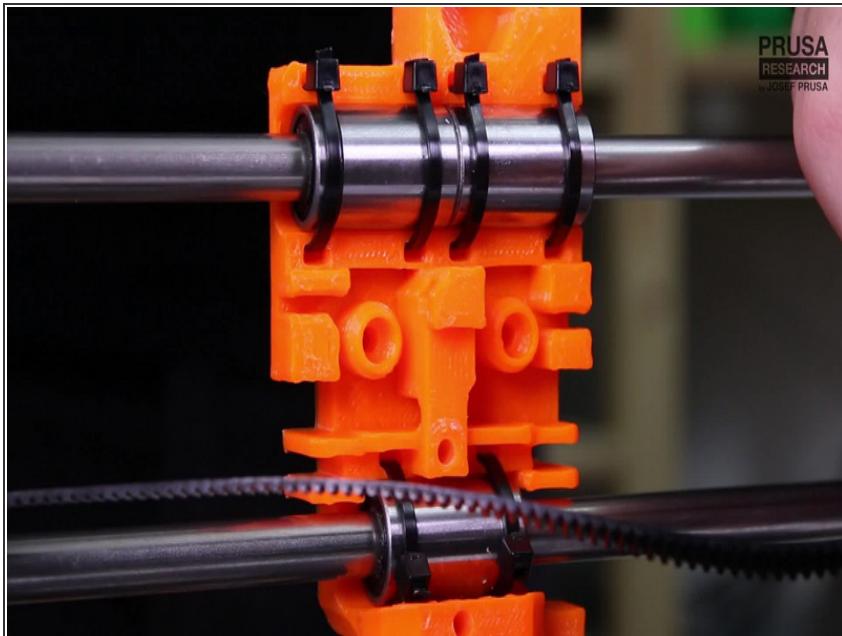


- Guide the belt around the pin as shown in the picture.
 - Push the belt all the way into the X-carriage.
- ⚠** The belt shouldn't be tight at the moment.

Step 24 — Tensioning the belt

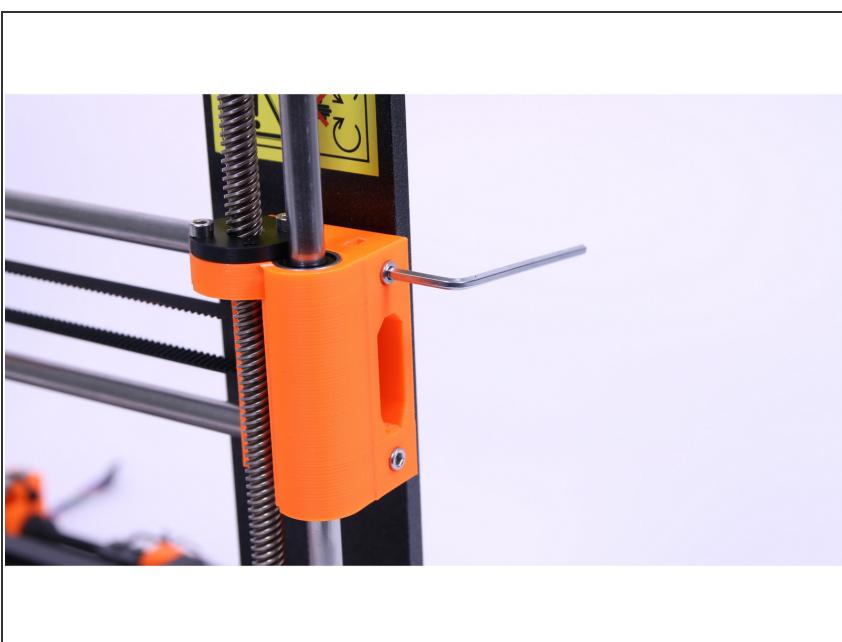


- Rotate the motor back
 - Screw in the removed M3x18 screws
- ⚠** If you have to apply too much force and are experiencing troubles, rotate the motor back, repeat previous step while making the belt more loose.
- i** The belt should be quite tight, it should 'ping' like a music string.
- i** This step is illustrative, you don't need to remove the frame.

Step 25 — VIDEO for steps 16-24

- Insert the flat part of X-GT2 belt (longer one) into the X-carriage, around the pin. Guide the X-axis belt through X-end-idler, around the 623h bearing with the housing and back. Guide the X-axis belt through the X-carriage. Guide the X-axis belt through the X-end-motor, around GT2-16 pulley and back.
 - Remove the two M3x18 screws. Rotate the motor counter-clockwise.
 - Insert the flat part of the belt around the pin.
 - Rotate the motor back. Screw in the removed M3x18 screws.
- (i)** Video is available in an online (digital) version only.

Step 26 — Adjusting tension screws



- Gently tighten both screws until slight force is applied on both smooth rods.

Step 27 — All done!



- Congratulations! You've just assembled the Z-axis.
- You can continue by assembling the Extruder in the next chapter - [5. Extruder Assembly](#)