

Zaribo MK3 Assembly Manual

Ver 0.2, 01.14.2019

Table of contents

Chapters	Page
List of required tools	1
Notice	2
Assembly instructions	
1: Subframe	3
2: Y-axis (part 1/2)	10
3: Z-axis (part 1/2)	24
4: X-axis	
5: Z-axis (part 2/2)	
6: Extruder (part 1/2)	
7: Power supply	
8: Motherboard	
9: Extruder (part 2/2)	
10: LCD display	
11: Y-axis (part 2/2)	
12: Cable routing	
13: Setup and calibration	

List of required tools

Necessary:

- scalpel
- hex keys in sizes 2.5mm, 3mm, 5mm, 6mm
- ratchet with 5mm and 6mm hex bits
- pliers
- calipers (at least 162mm width)

Recommended in addition:

- ball-headed hex keys in sizes 5mm
- etc.*

Notice:

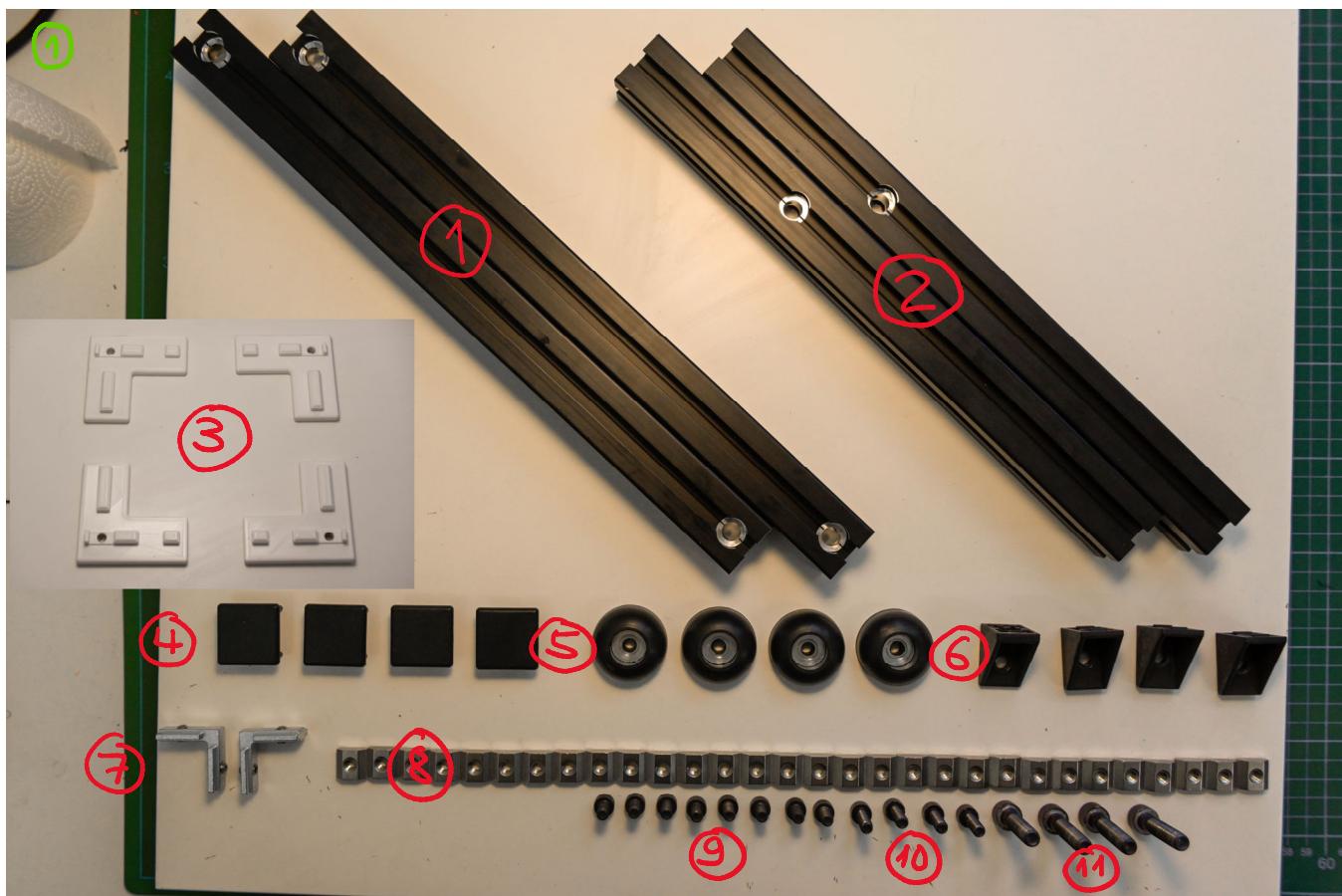
Before you proceed with any of the construction steps, please do the following:

- 1: Make sure that the required parts (which are listed at the beginning of each chapter) are all present, correct and not damaged. If that isn't the case, please contact our support and we will provide you with a replacement as quickly as possible.
- 2: Remove any support material from the included plastic parts.
- 3: Make sure to have access to all of the listed tools. Do not attempt to build without these as the use of incorrect tools may lead to breakage of parts or a faulty construction. If a tool that we use is optional, it will be noted at the corresponding step.

Assembly instructions

1: Subframe

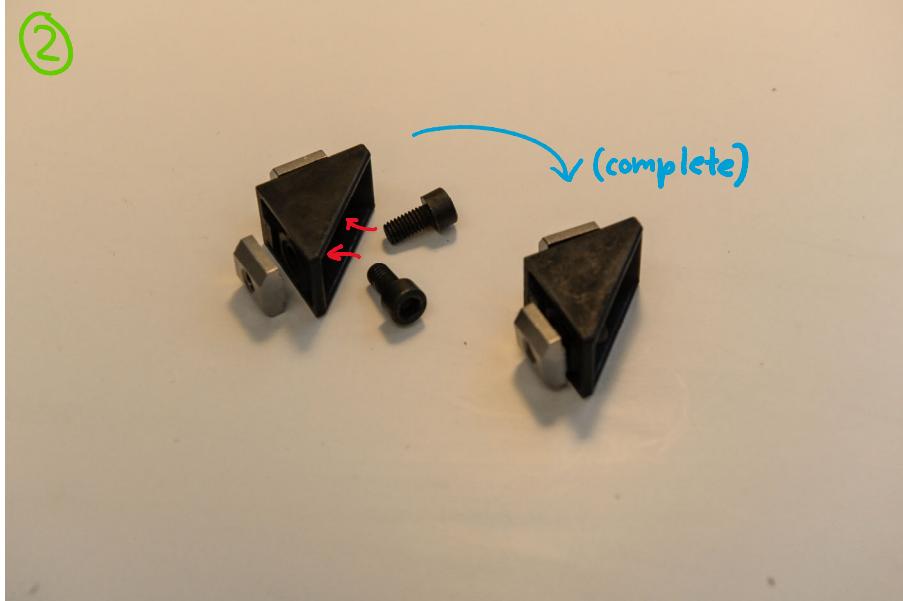
You will need the following parts to complete the subframe:



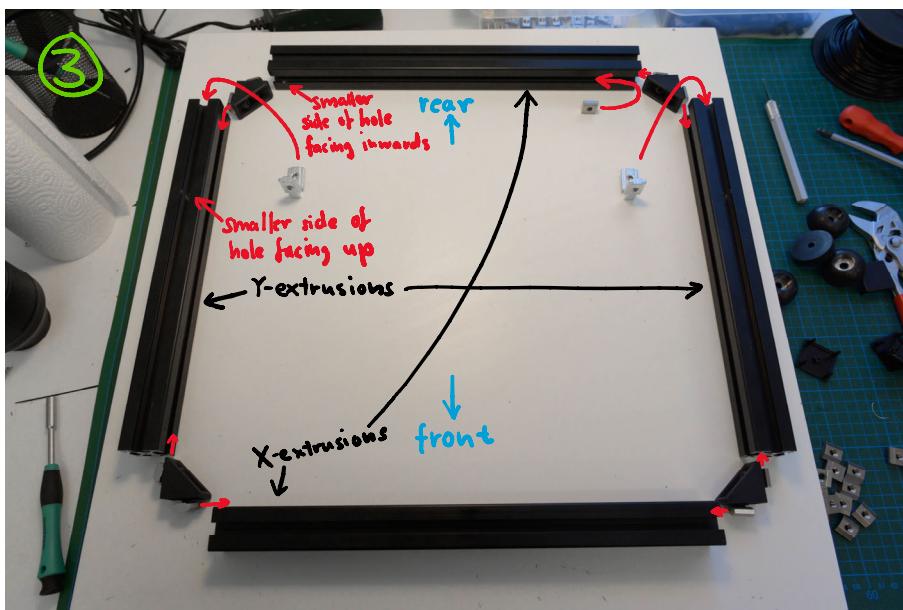
- ① 2x X-extrusion
- ② 2x Y-extrusion
- ③ 4x plastic L-brackets
- ④ 4x extrusion end caps
- ⑤ 4x rubber feet
- ⑥ 4x corner bracket

- ⑦ 2x metal L-brackets
- ⑧ 30x T-nuts
- ⑨ 8x M6x12mm hex socket screws
- ⑩ 4x M6x20mm hex socket screws
- ⑪ 4x M8x40mm hex socket screws

Important: Make sure that the surface that you are working on is perfectly flat. By using an uneven work surface you risk building a skewed frame, which may lead to the printer not being able to be calibrated.



Using M6x12mm screws and T-nuts, prepare the four corner brackets as seen in the picture. Don't tighten them fully, the T-nut should have a generous amount of play (will be useful in the next step).



Lay out the extrusions so that the X-extrusions are (when viewed from above) horizontal and the Y-extrusions vertical. The X-extrusions should be oriented with the larger holes towards the outside. The Y-extrusions should have the larger side of the hole facing downwards.

Insert one metal L-bracket into the top slot of each Y-extrusion so that the inside of the L-bracket faces away from you.

Insert a single T-nut into the rear X-extrusion, in the slot facing the front (Use picture 4 as reference).

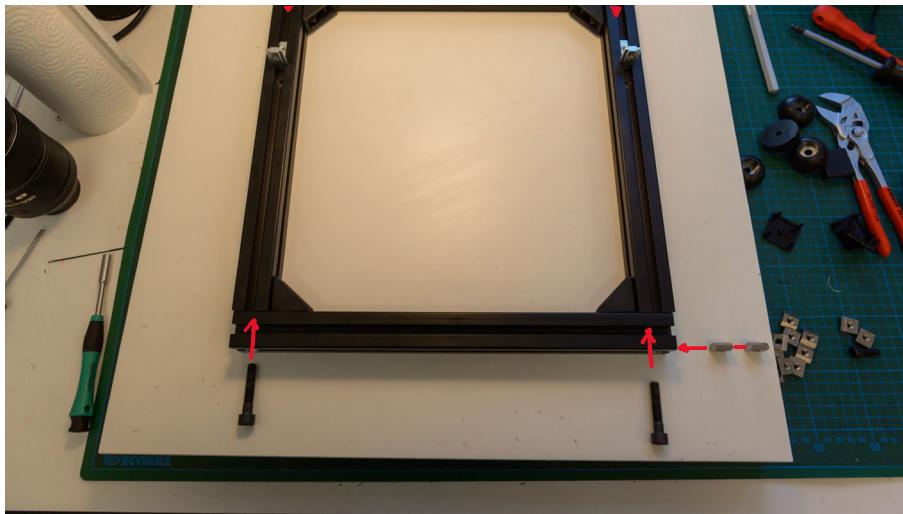
Finally, slot together the four extrusions as seen in picture 3, using the corner brackets from step 2. Do not tighten the corner bracket screws yet.



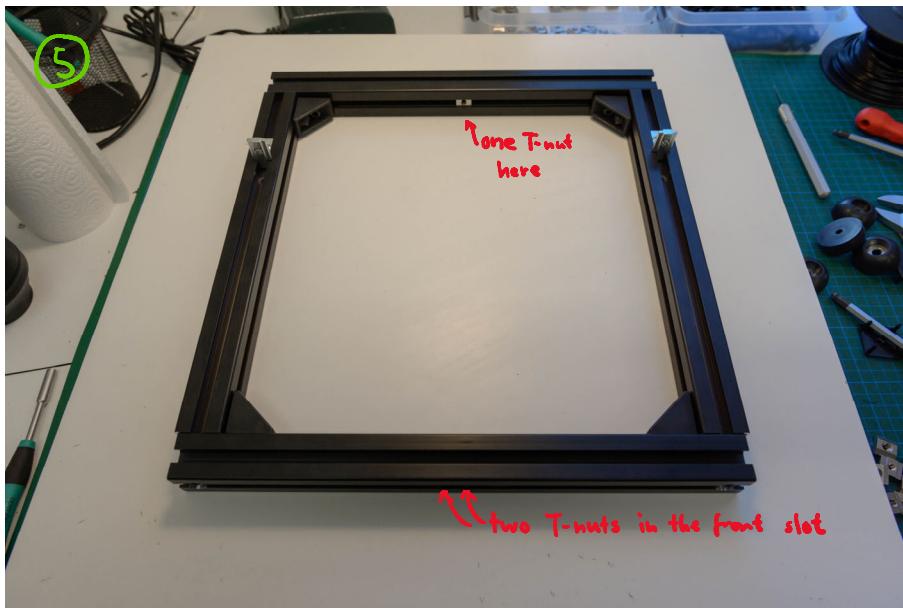
Insert two T-nuts into the forward facing slot of the front X-extrusion.

Now screw in the four M8x40mm screws, connecting the four extrusions together.

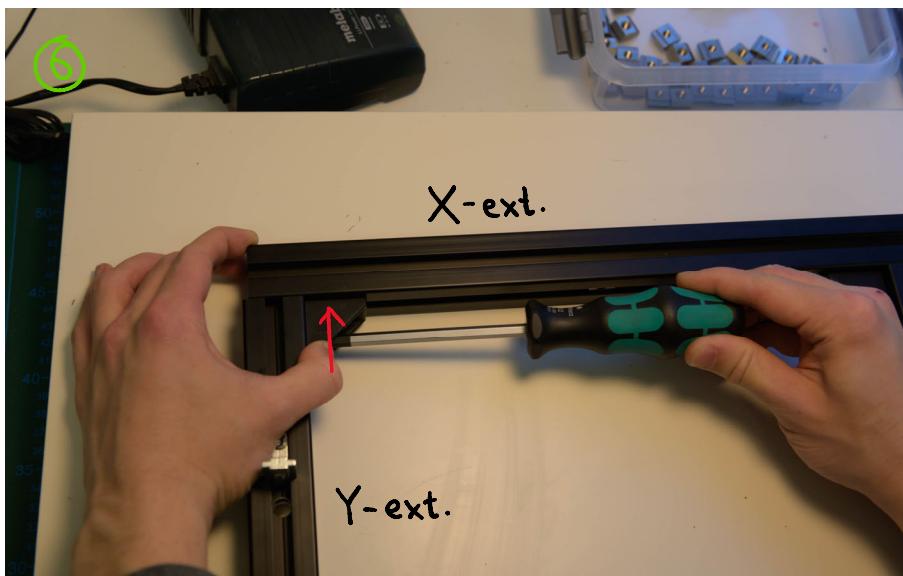
Tightening with full force is not necessary, just



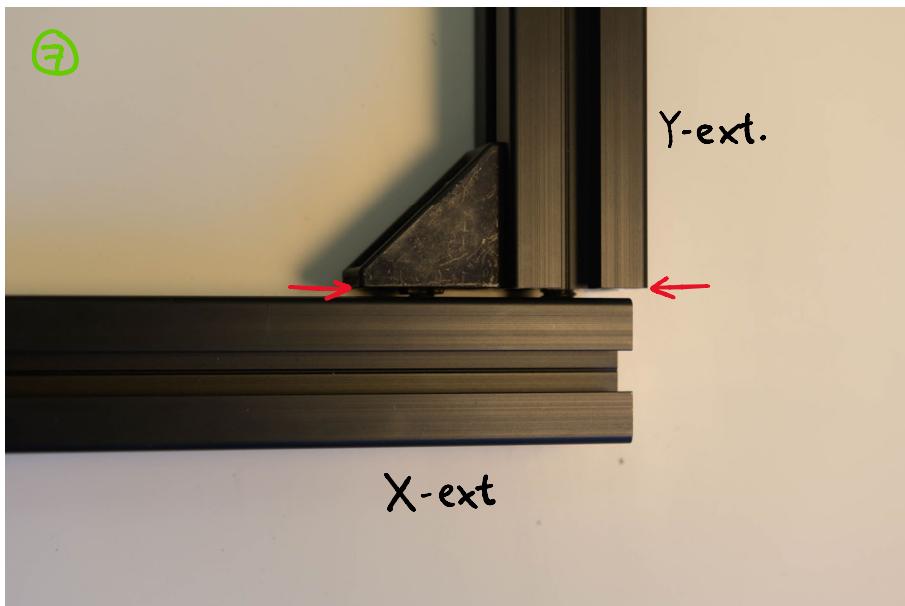
Now screw in the four M8x40mm screws, connecting the four extrusions together. Tightening with full force is not necessary just yet, but make sure there is no gap between the extrusions.



Your frame should now look like this.

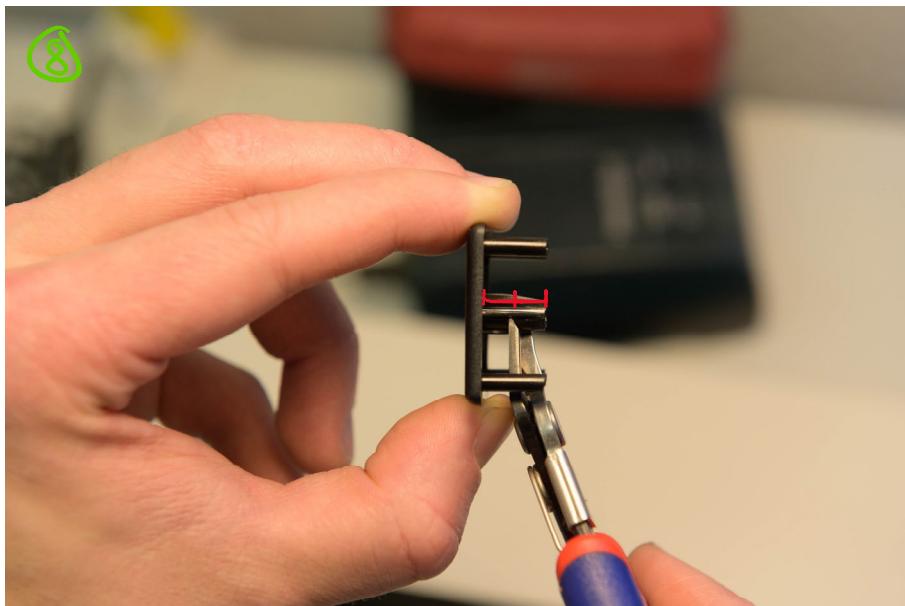


While pushing the corner bracket up against the corresponding X-extrusion, tighten the screw facing the Y-extrusion. This way the corner bracket's position on the Y-extrusion will be set correctly. Repeat for the other 3 corners.



Now loosen the four M8x40mm screws by about 2-3mm.

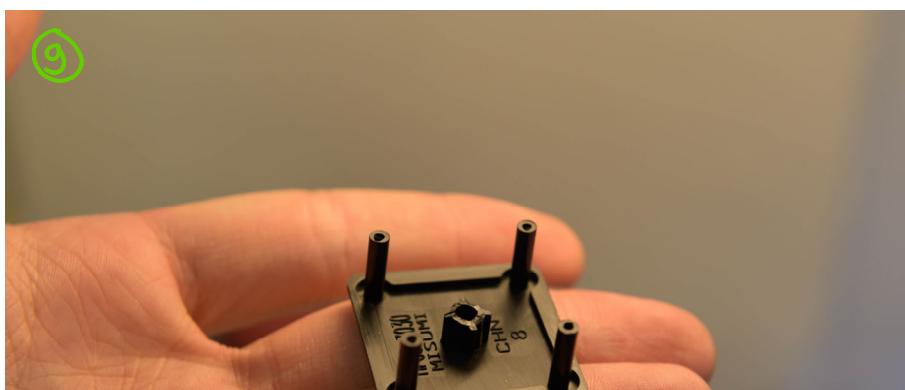
Each corner bracket should now sit flush with the end of the corresponding Y-extrusion.



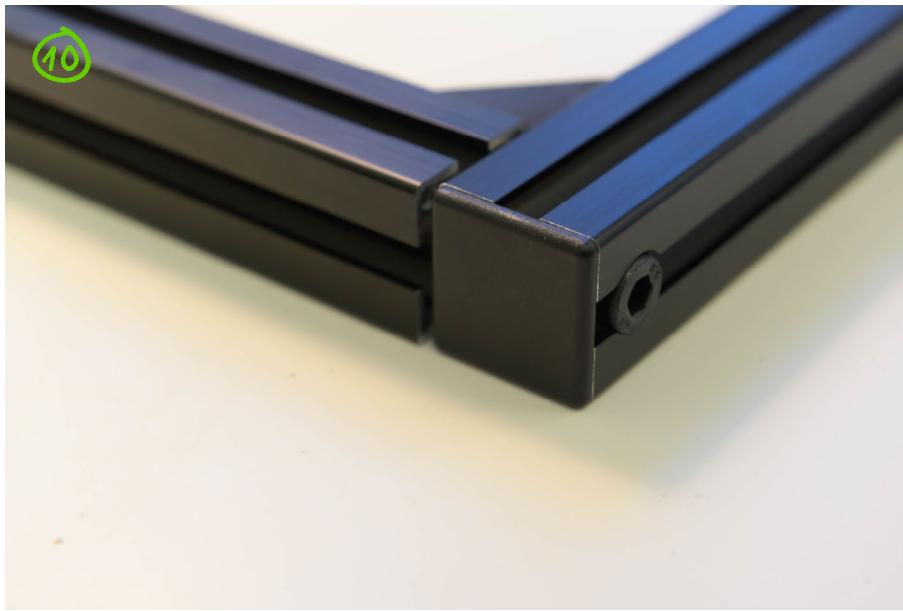
The middle part is too long to fit on the end of the extrusions due to clearance issues with the M8x40mm screws.

Trim the middle part of the extrusion end caps at about the halfway point. Be careful not to cut them too short, as they may lose their ability to hold onto the end of the extrusion.

Trim all four end caps.



After trimming, they should look like this.



Now install the caps onto the ends of the two X-extrusions. The thickness of the cap is 3mm, which we will use to align the X-extrusions with the corner brackets.



Reminder: Note that at this point in time the M8x40mm screws are loose.

Using a flat surface as a reference (such as the tool seen in the picture) make sure that the surfaces marked in blue are perfectly aligned and that the extrusions are at a 90° angle in relation to each other. Now tighten the loose M6x12mm screw in the corner bracket, fastening the bracket to the X-extrusion.

After repeating this for the other 3 corners, check thoroughly that the marked surfaces are indeed correctly aligned.



While holding the frame in place steadily, fully tighten the four M8x40mm screws with a ratchet.

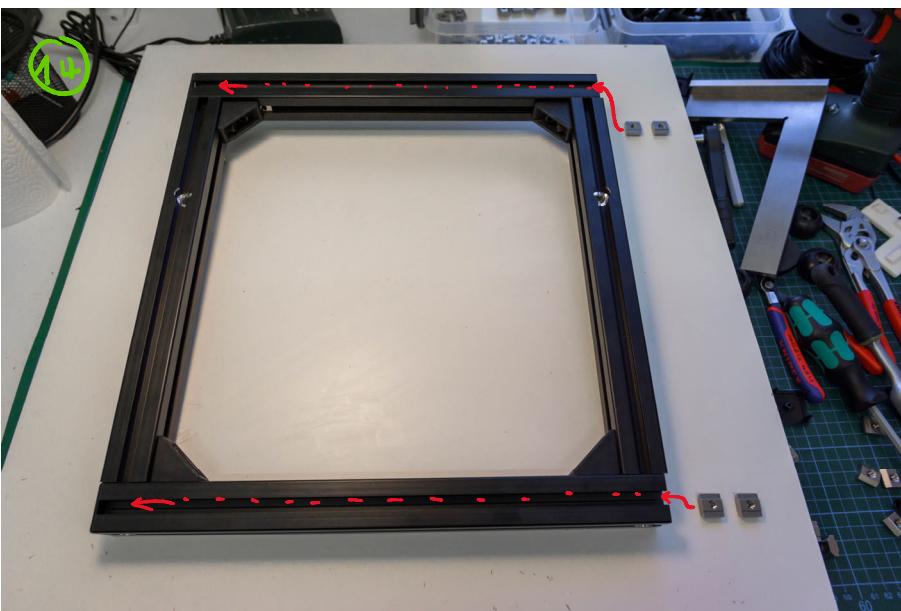


12

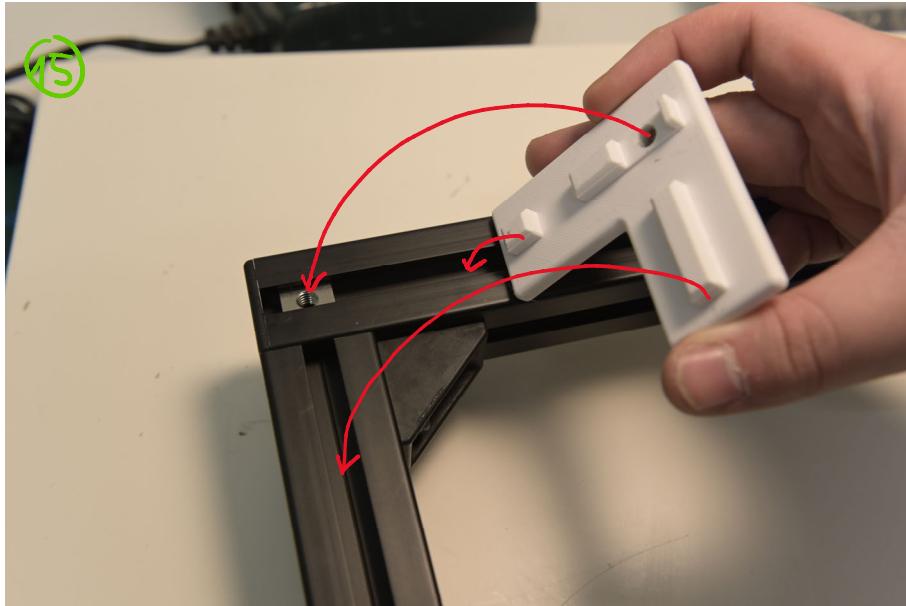


Now do the same for the eight M6x12mm screws in the corner brackets.

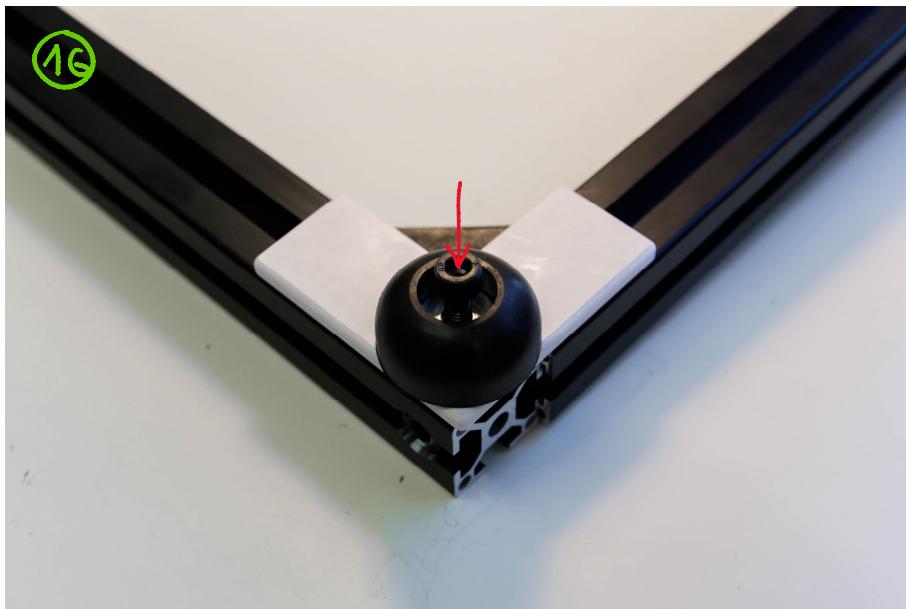
After this, the frame should be perfectly flat and not rock on a flat surface, like a badly made chair might do.



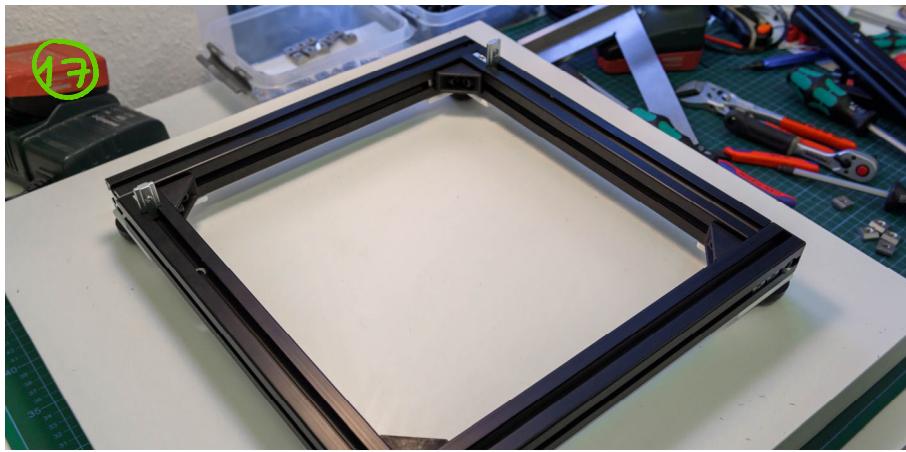
14
Flip the frame upside down, remove the two extrusion caps from the right side, and insert two T-nuts into the (now) upper slots of each X-extrusion.



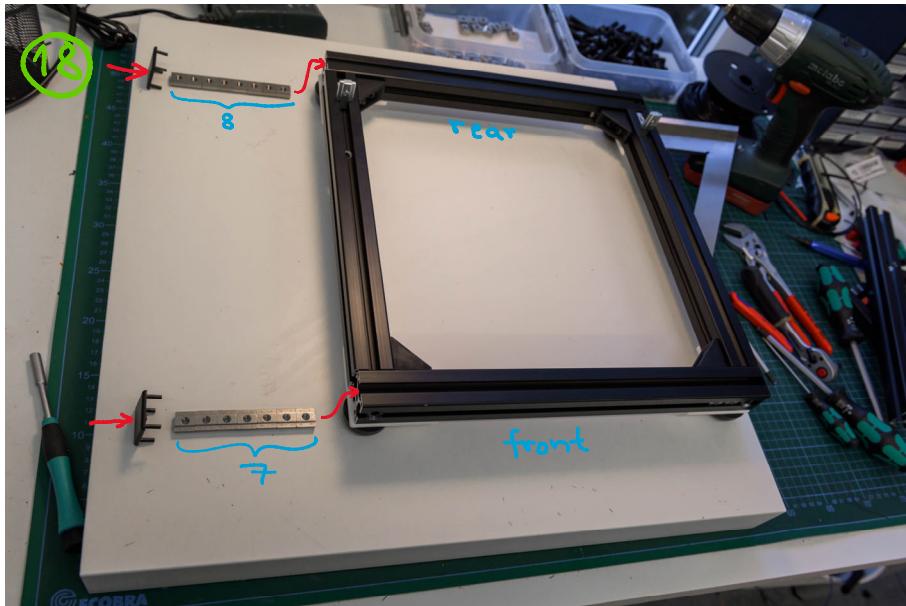
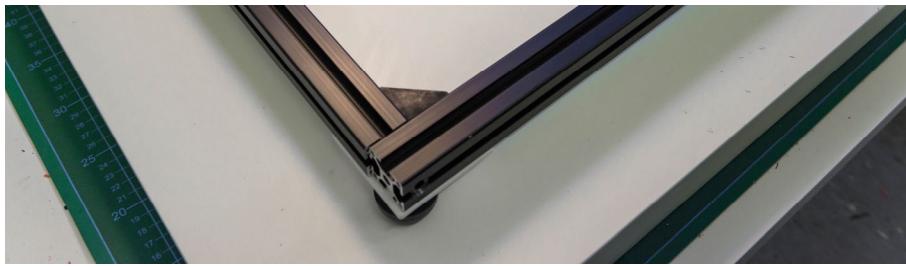
For each corner, set a T-nut in the position as seen in the picture, and place a plastic L-bracket over it. There are two "left L-brackets" and two "right L-brackets".



For each corner, place one of the rubber feet onto the bracket. Use a M6x20mm screw to secure it and the L-bracket into place.



Flip the frame back over. It should be rock steady on its feet.



Insert 8 T-nuts into the top of the rear X-extrusion, and 7 T-nuts into the top of the front X-extrusion. Finally, reattach the two extrusion caps to the frame.

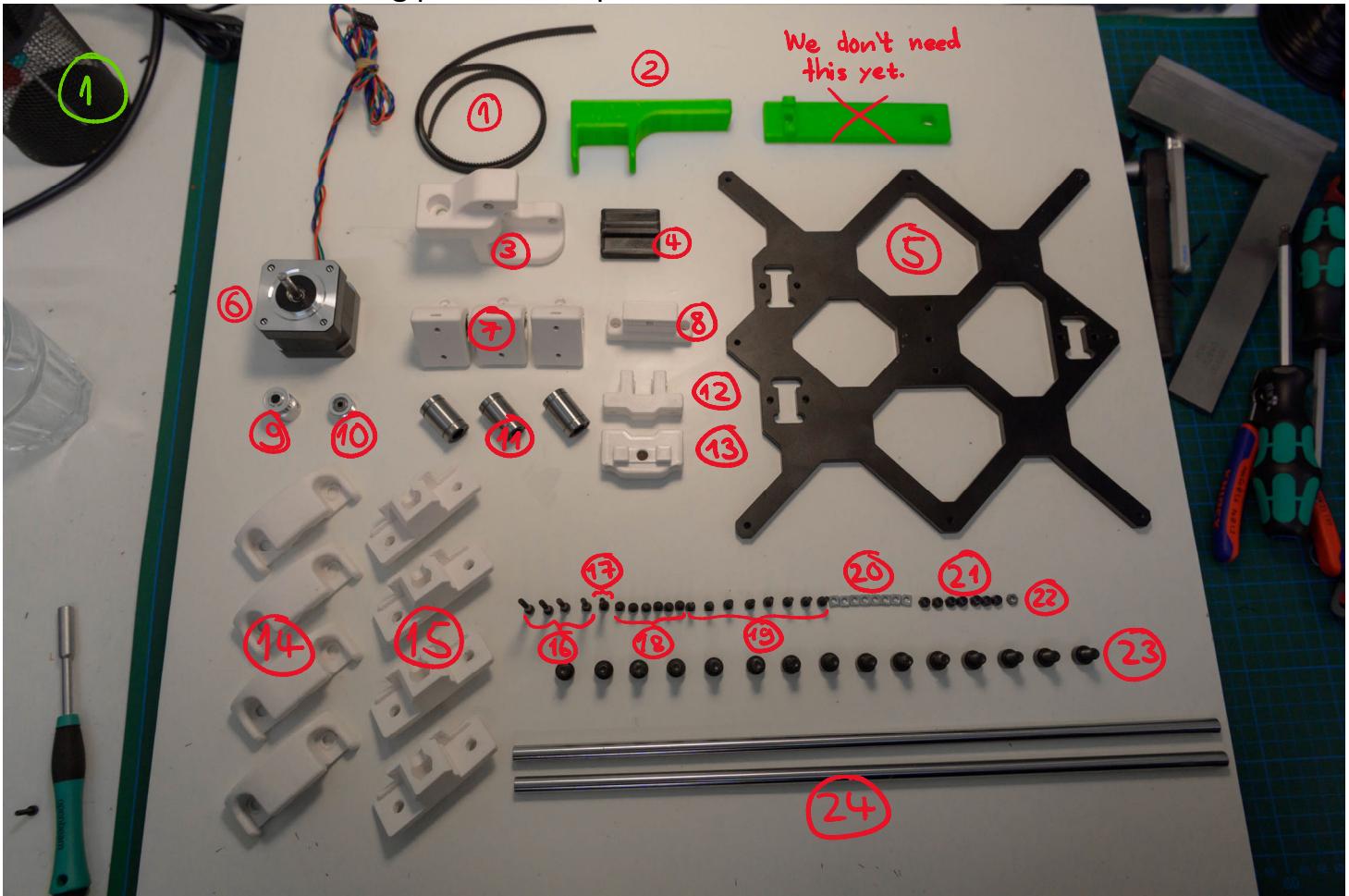
Your subframe is now complete.

2: Y-axis (part 1/2)

You will need the following parts to complete the Y-axis:

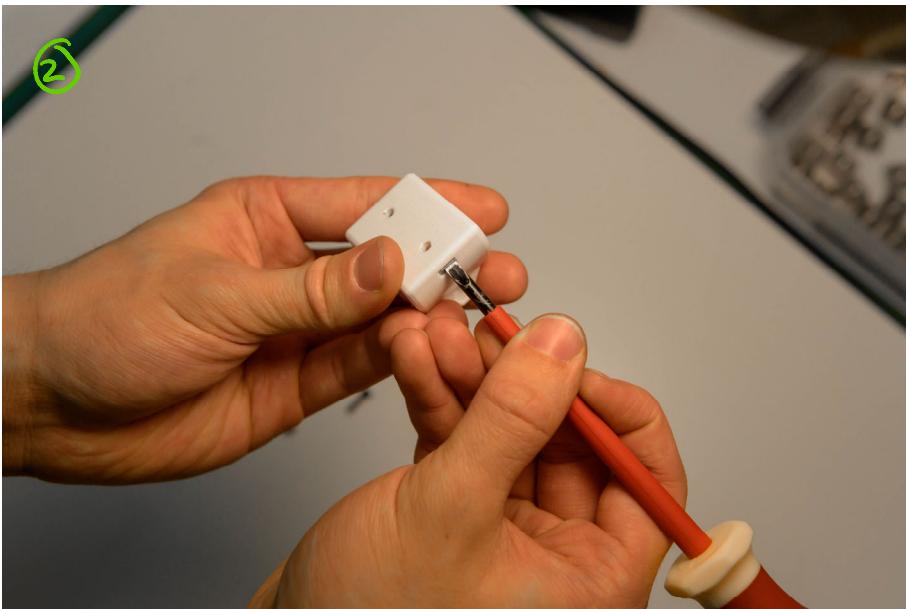


You will need the following parts to complete the Y-axis:

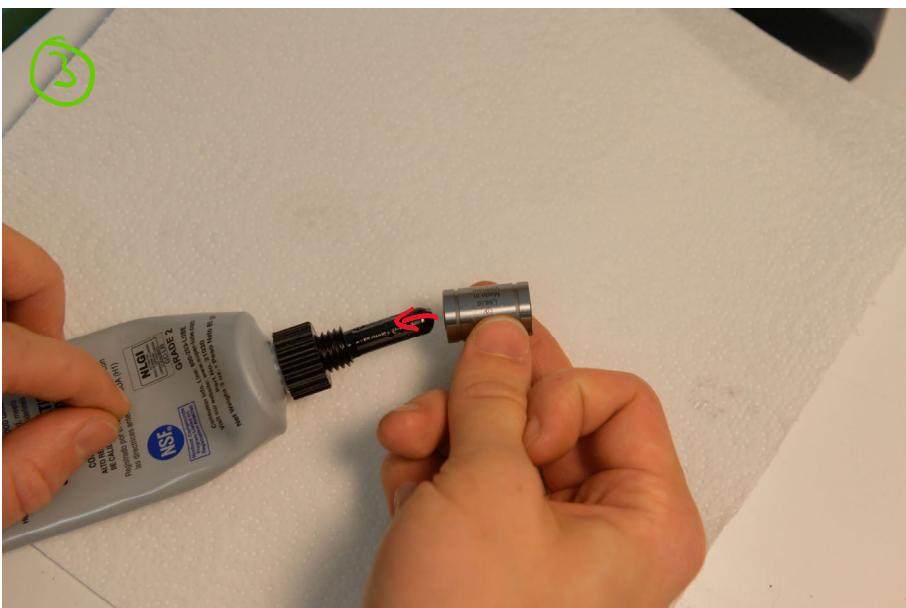


- 1x ~ 90cm toothed belt
 - 1x build tool 1
 - 1x Y-motor mount
 - 1x Y-motor mount support
 - 1x heat bed carriage
 - 1x stepper motor
 - 3x bearing mount
 - 1x belt mount
 - 1x toothed pulley
 - 1x toothless pulley
 - 3x linear rod bearings
 - 1x belt tensioner part 1

- (13)** 1x belt tensioner part 2
 - (14)** 4x Y-rod mount part 2
 - (15)** 4x Y-rod mount part 1
 - (16)** 4x M3x35mm screws
 - (17)** 1x M3x22mm screw
 - (18)** 6x M3x10mm screws
 - (19)** 8x M3x12mm screws
 - (20)** 8x M3 square nuts
 - (21)** 7x M3 self locking nuts
 - (22)** 1x M3 nut
 - (23)** 15x M6x12mm screws
 - (24)** 2x 360mm rods



Take a bearing mount, and insert a square nut into either side as seen on the left.



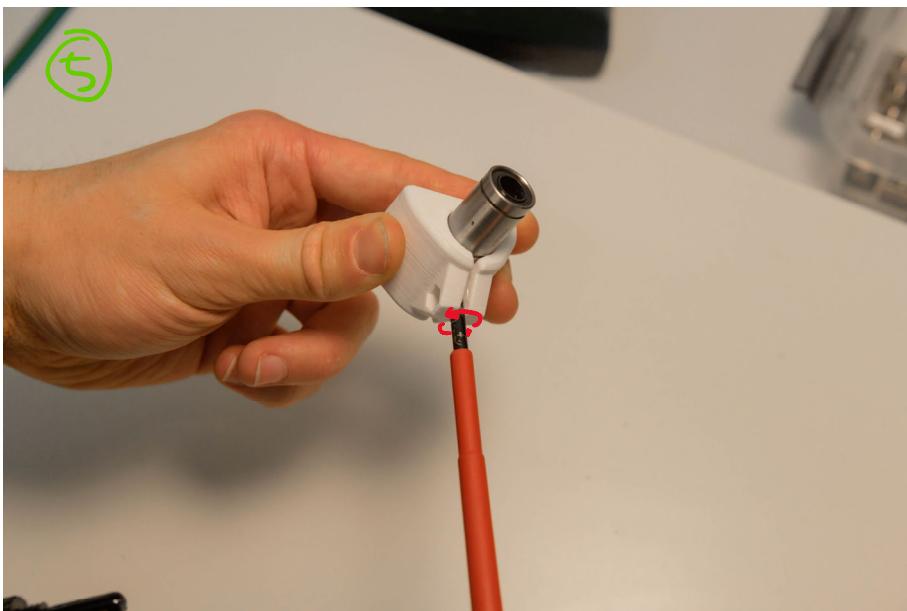
(RECOMMENDED:
Replacing the factory oil of the bearings
with grease will make the printer
significantly quieter, but does not
otherwise affect printing performance.)

You can buy this grease off our website,
which will include the special nozzle seen
in the picture.)

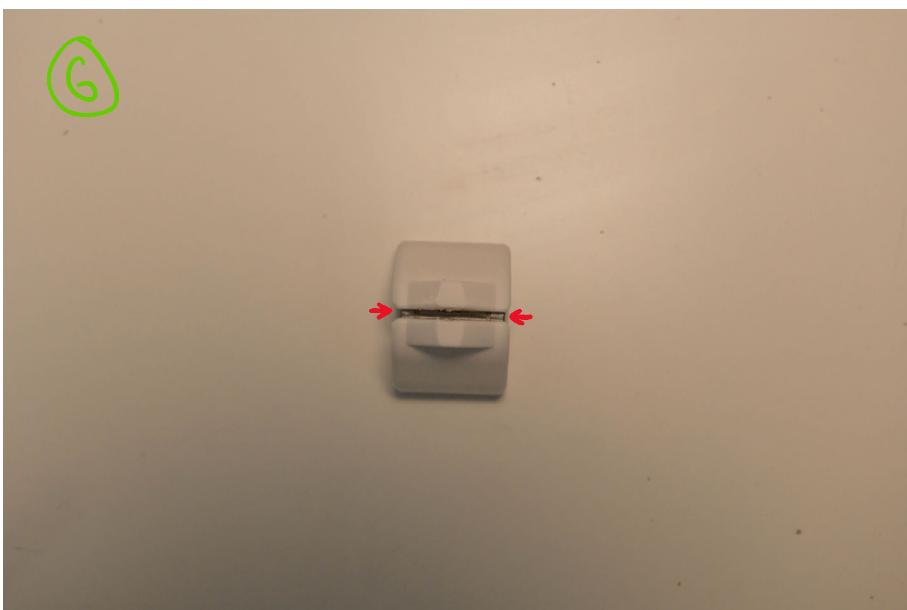
Slide the bearing onto the nozzle fully.



Force the grease into the bearing by
squeezing the tube, and the factory oil
should seep out the other end. You are
done when you see grease come out the
end of the bearing.



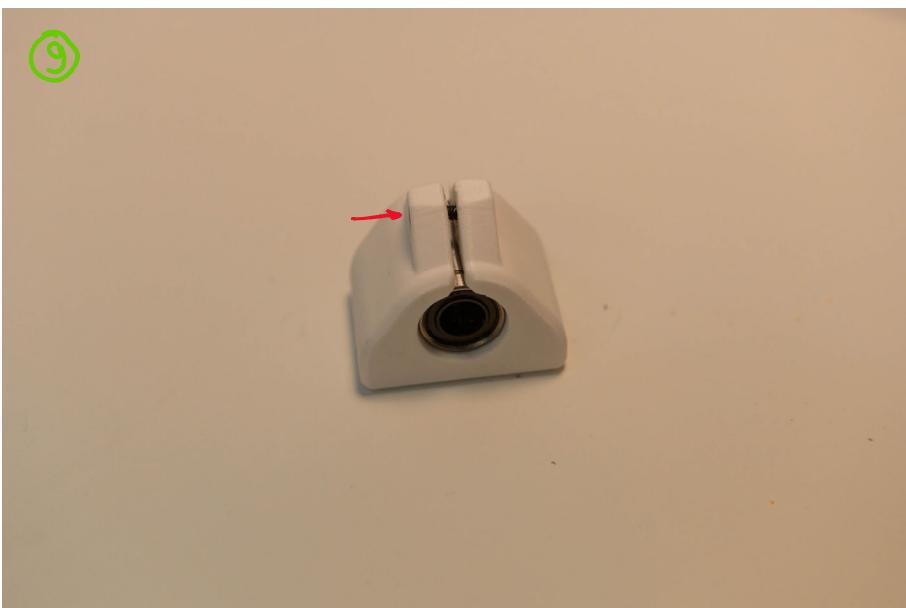
Insert the bearing into the bearing mount by prying the case open slightly and very carefully with something like a flathead screwdriver.



The bearing should be seated exactly in the middle.



Also, the inner rails containing the ball bearings should be aligned with the red markings in the picture. This is so that after the installation the weight of the heat bed and carriage is transferred into the rod optimally.



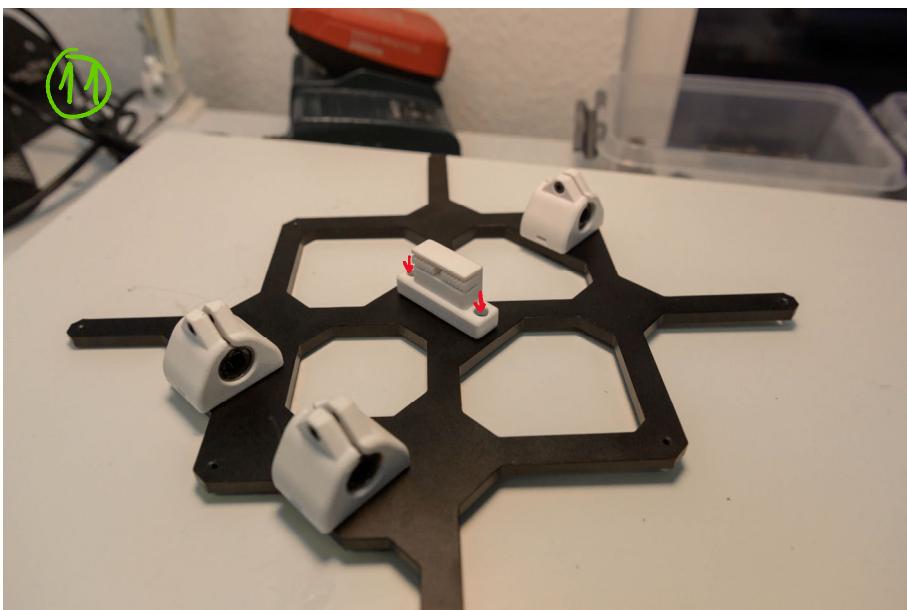
Now repeat this for the other two bearings.



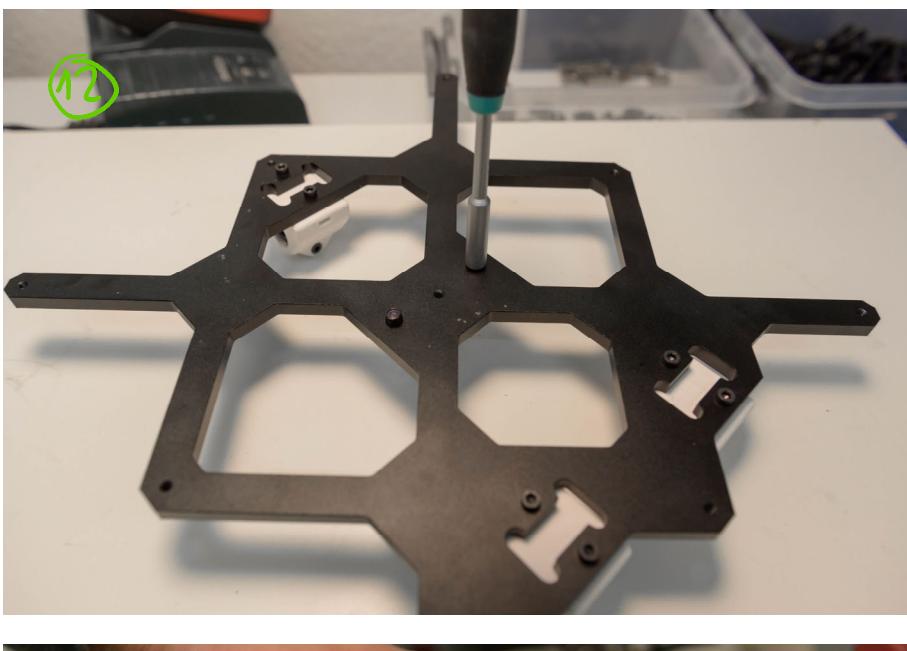


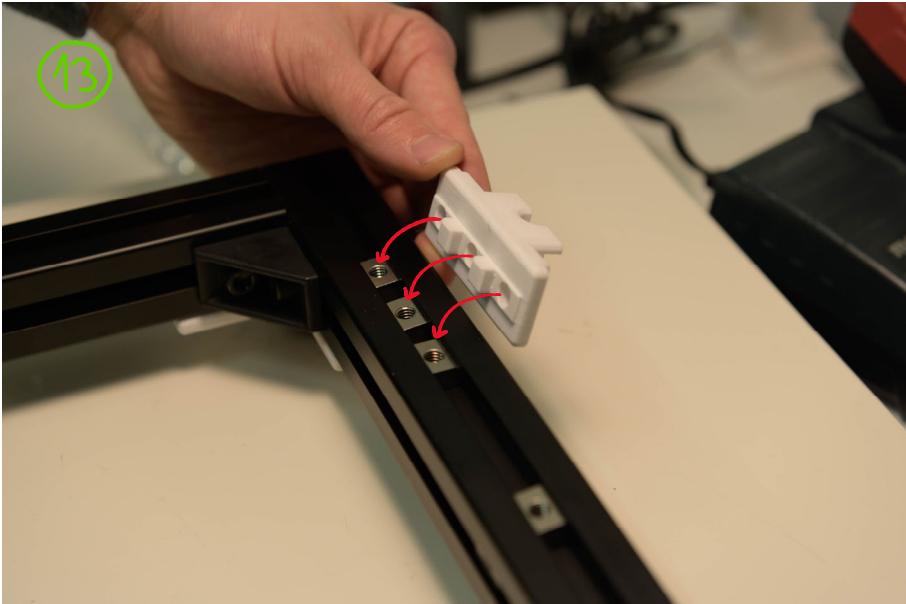
Using six M3x12mm screws, fasten the three completed bearings to the heat bed carriage. Leave these screws ever so slightly loose, as we will tighten them later in the assembly process.

Orient the bearing mounts with the head of the 10mm screws facing inwards.



Flip the carriage over, and install the belt mount, with the belt slits facing the side with two bearings. Do this using two 12mm screws and two self-locking nuts from the other side.

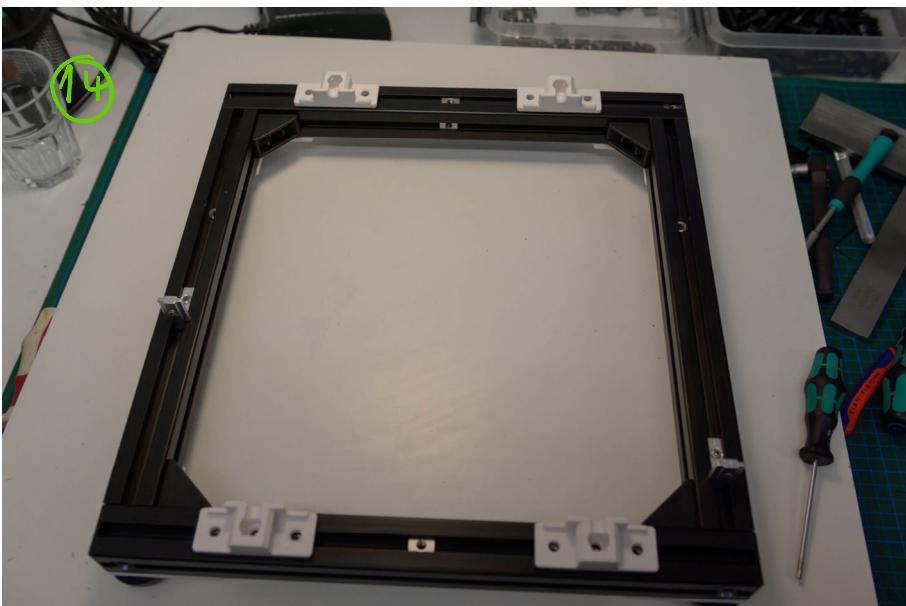




Put away the carriage for now.

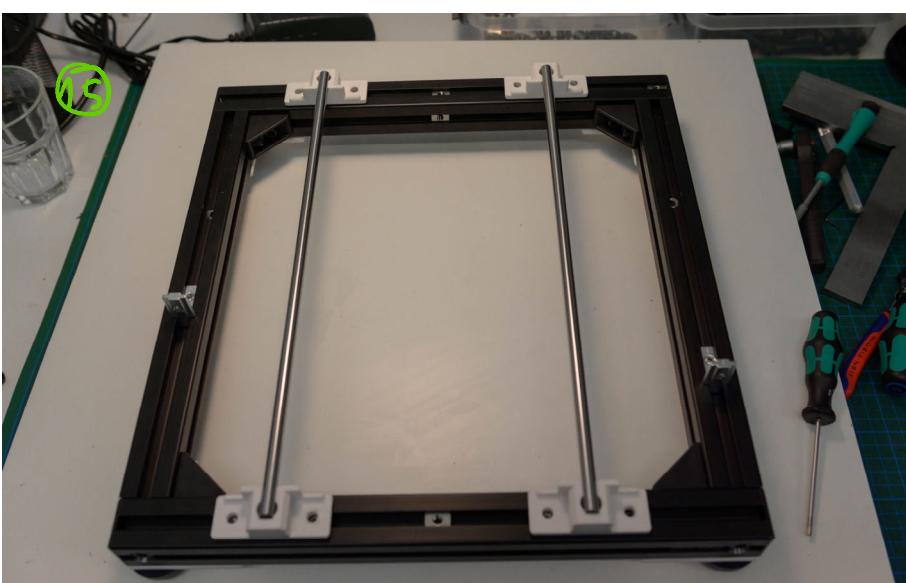
Do the following four times, for each corner.

Insert a rod mount part 1 piece onto the frame, with each of the holes dedicated to a T-nut.

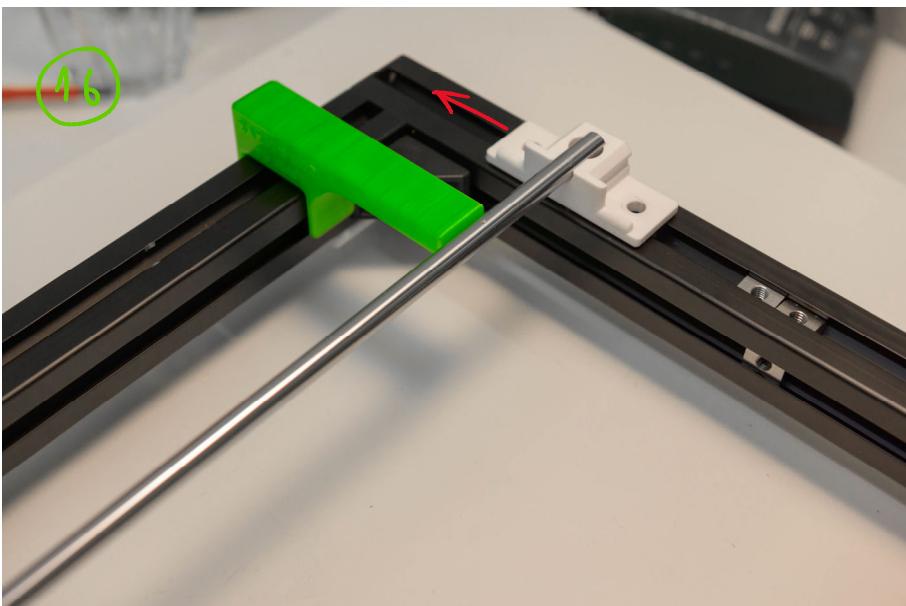


Your frame should look like this.

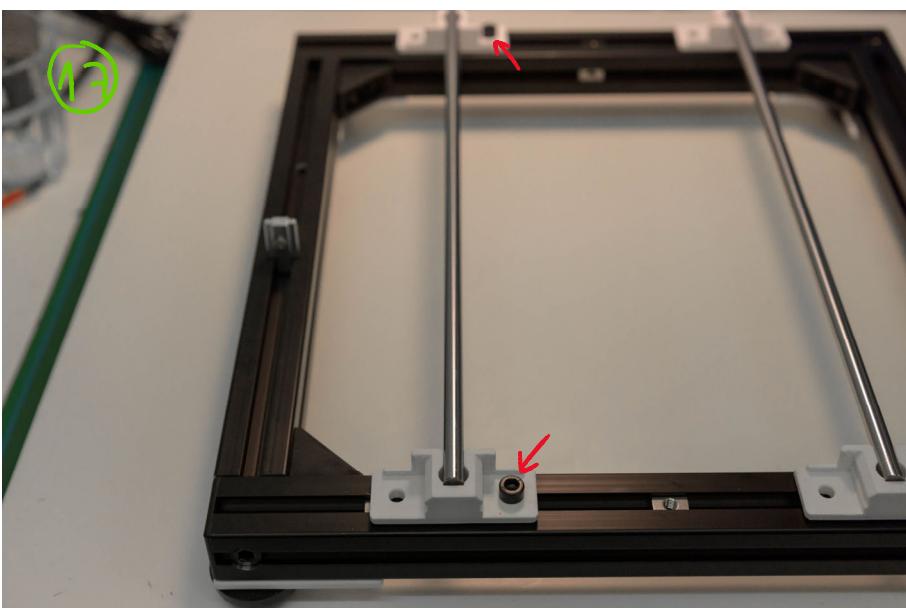
Align them so that the left two mounts are roughly directly above each other, same thing for the right two.



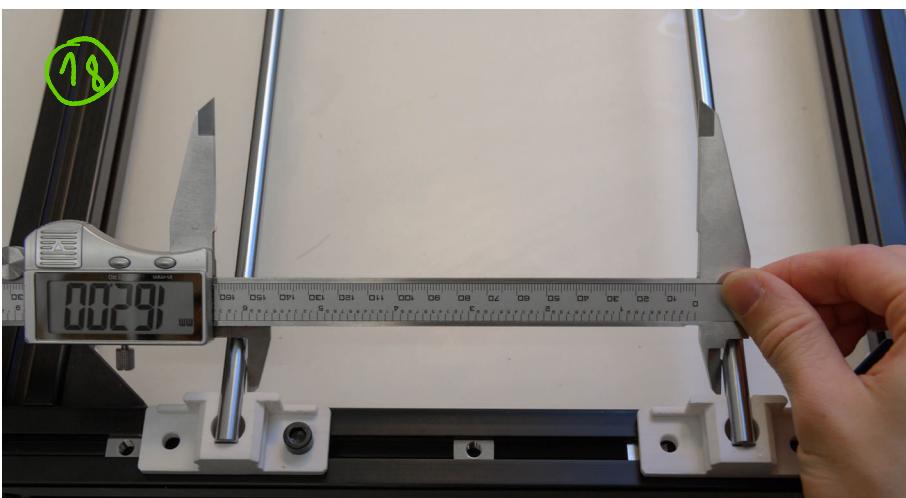
Now click in the two 360mm rods as seen in the picture.



Use the build tool 1 to align the left rod to be perfectly parallel with the left Y-extrusion. Do this by placing the tool once at the top and pushing the rod to the left, and doing this again at the bottom.



Secure the left mounts in place using the marked holes, using two M6x12mm screws. These screws are temporary and will be removed later on. Make sure to not shift the part while screwing them in. If this does happen, repeat the alignment from the previous step.



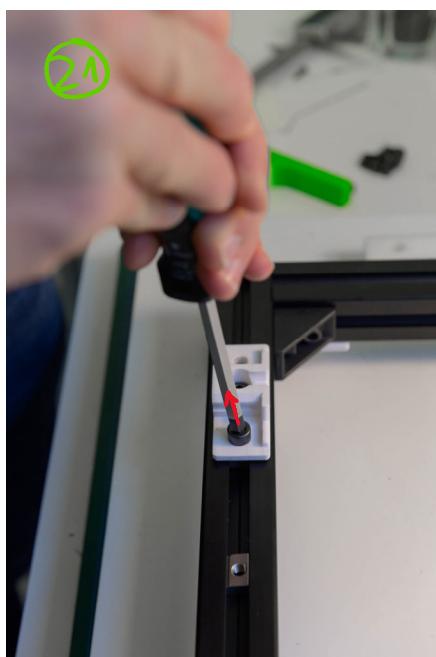
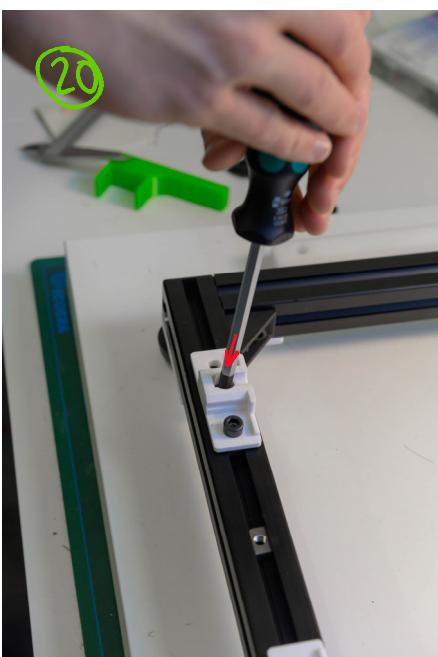
Now we will set the right mounts. Do this with a calliper (or something equally accurate) set to exactly 162mm. Using the same technique from setting the left rod, make sure the two rods are parallel.

Now fasten the right two mounts in place, again using the right holes and two M6x12mm screws.



Detach the front ends of the rods, and insert the carriage we previously assembled. The side with two bearings should face the left. Now reattach the front ends of the rods.

Slide the carriage back and forth. This should feel and sound completely smooth. This however doesn't yet mean that you have done a good job. While sliding the carriage back and forth lightly, slowly tighten the six 12mm screws that we left loose earlier. You will notice that the carriage's movement will no longer be as silent and smooth as before, but this is normal (up to a certain extent).

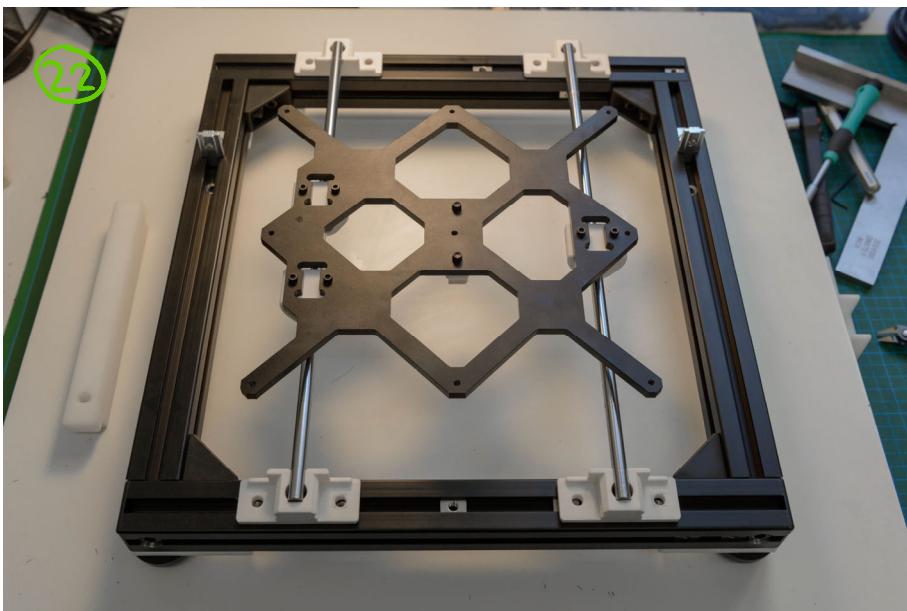


The carriage should still be able to be moved with very little force, and not stop instantly when pushed. Indicator of bad alignment is when the movement of the carriage doesn't feel linear, but rather like an electric motor or a zip.

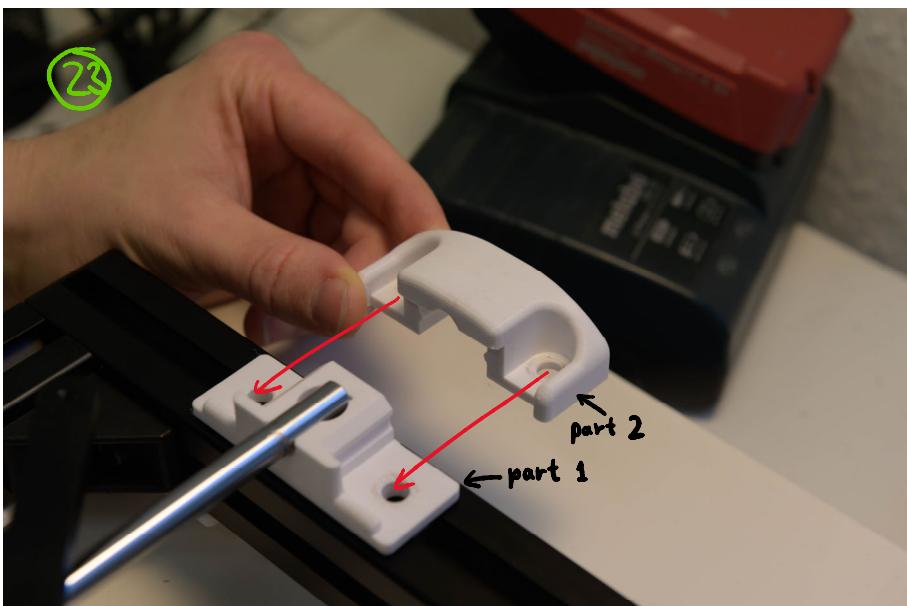
If you are happy with the alignment, remove the carriage along with the rods. Then screw in the middle screw for all four mounts. Finally, remove the temporary screws.



You may now reattach the carriage and the rods.



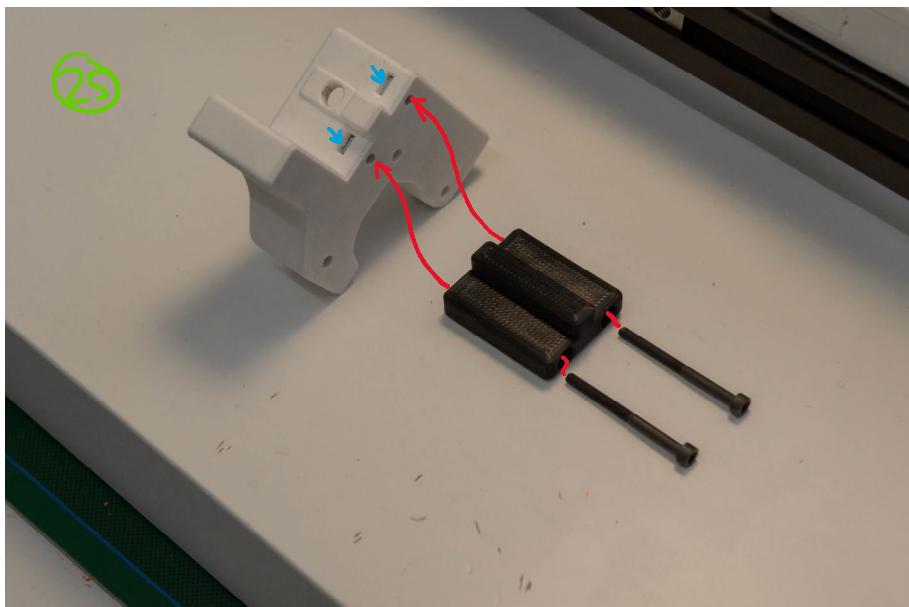
You may now reattach the carriage and the rods.



Slide part 2 of the mount onto part 1 for all 4 corners.

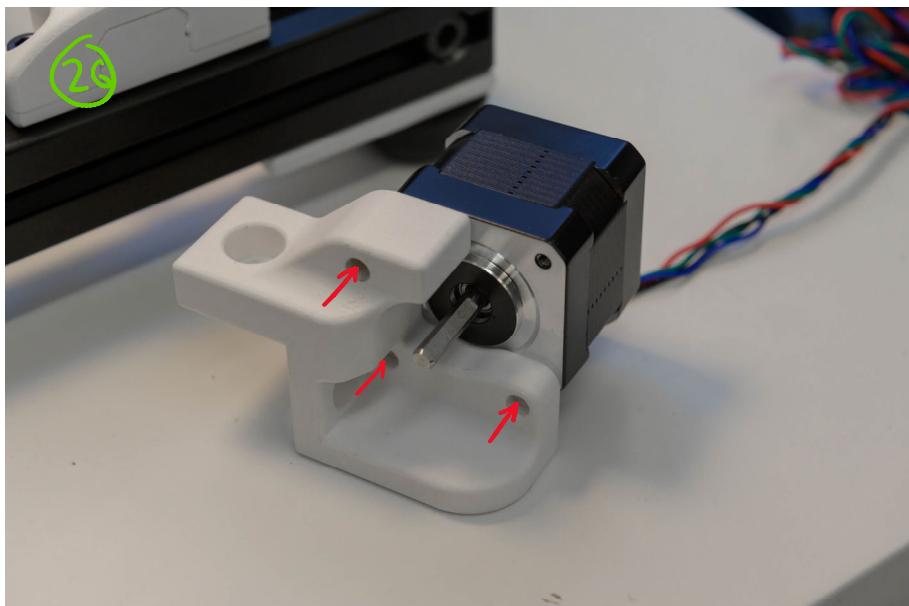


Screw them in place using two M6x12mm screws for each one.

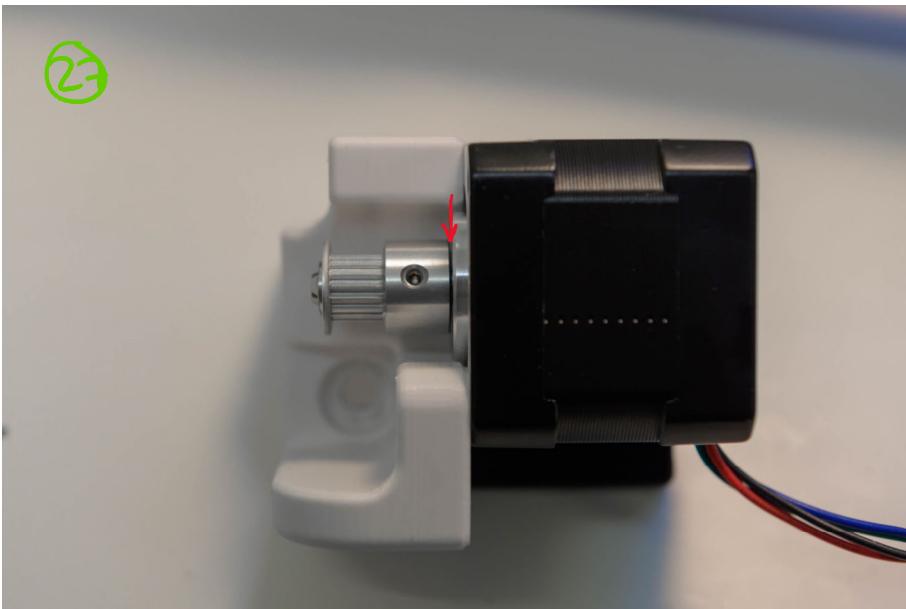


Motor mount assembly:

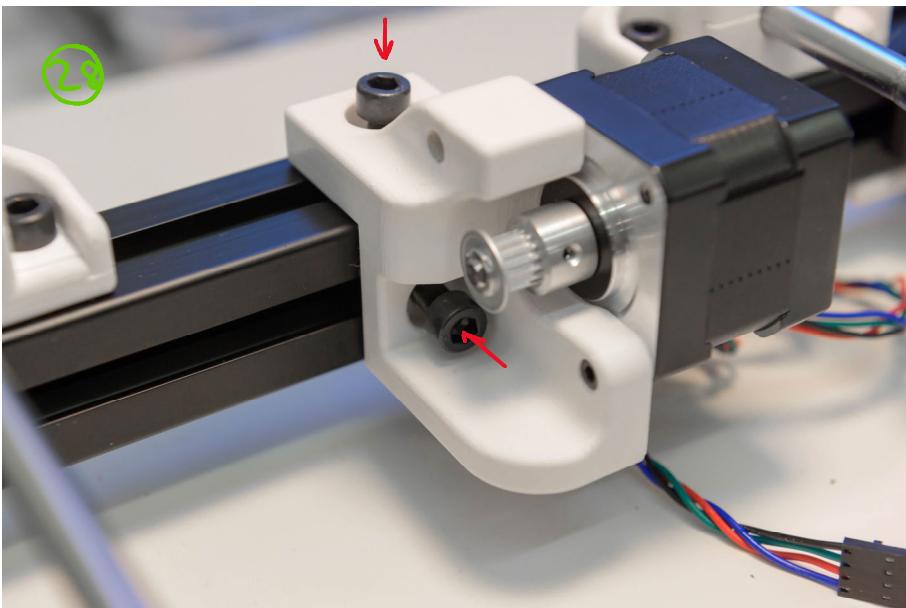
Insert two square nuts into the slots marked by the blue arrows. Then screw the black support piece onto the motor mount using two M3x35mm screws.



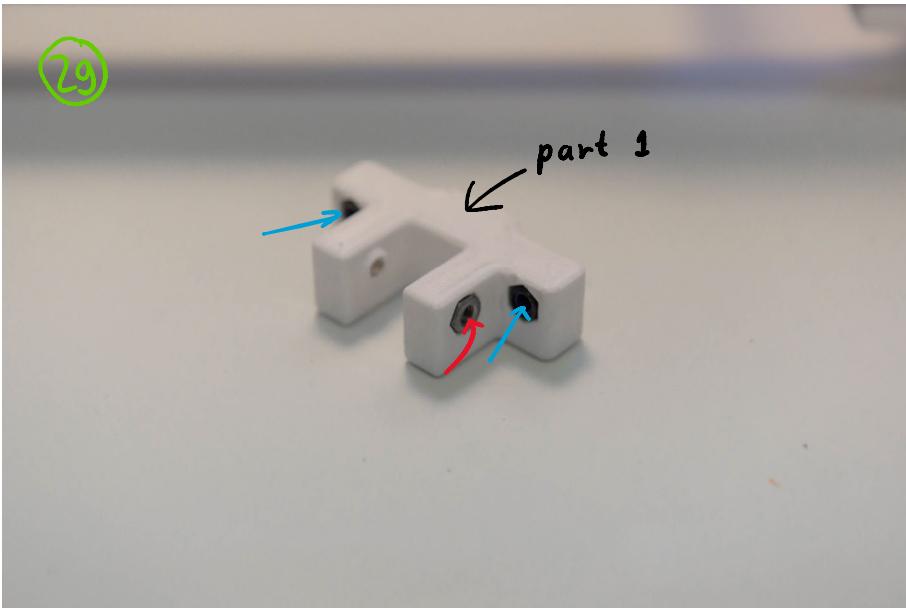
Attach the motor onto the motor mount, with the cables exiting downward. Use three M3x10mm screws as marked by the red arrows.



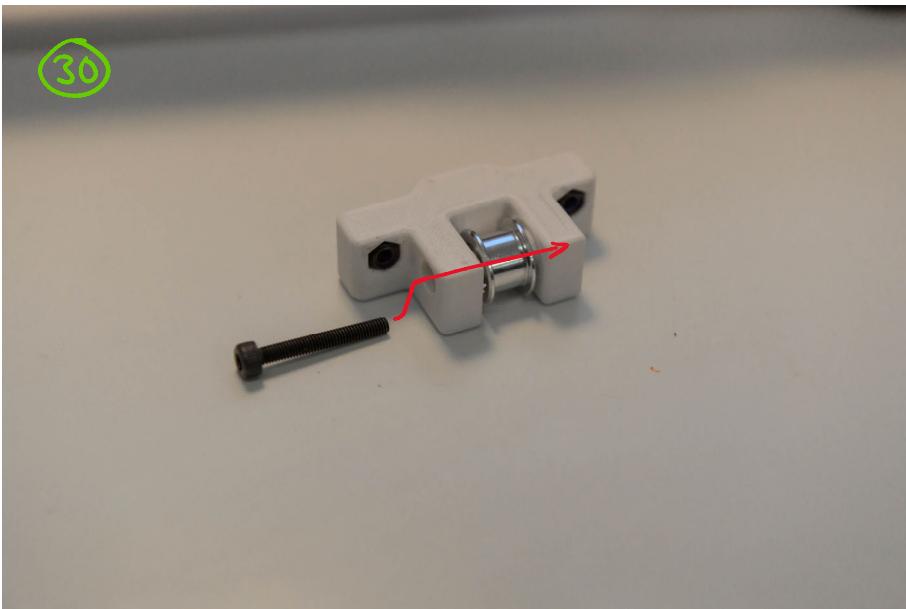
Slide the toothed pulley onto the motor shaft. The pulley has two fastening screws, make sure one of them is aligned with the flat surface of the shaft. Leave a thin gap between the pulley and the motor face, as to avoid rubbing.



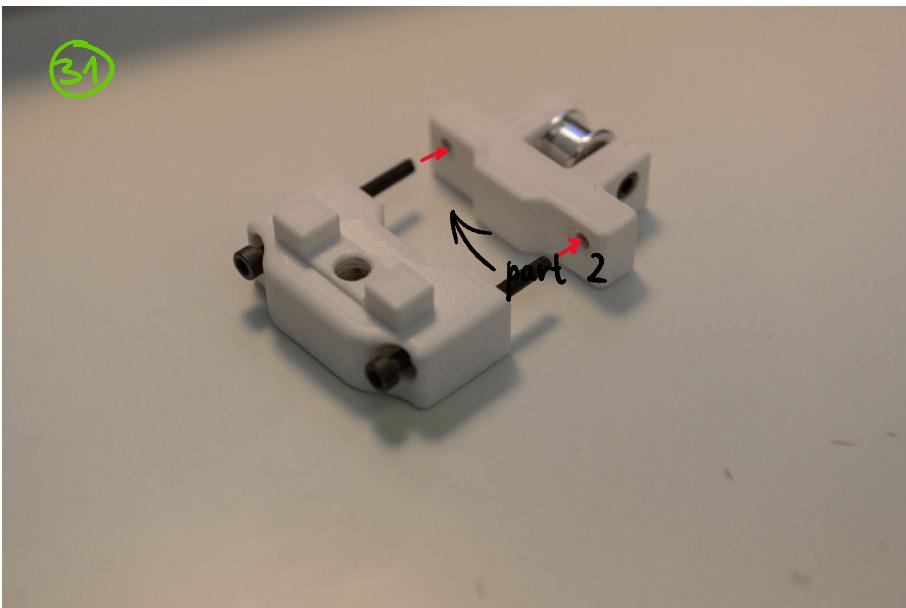
Now attach the motor assembly to the rear extrusion, with the motor on the inner side of the frame. Use two M6x12mm screws and the two T-nuts that we inserted into the extrusion in chapter 1.



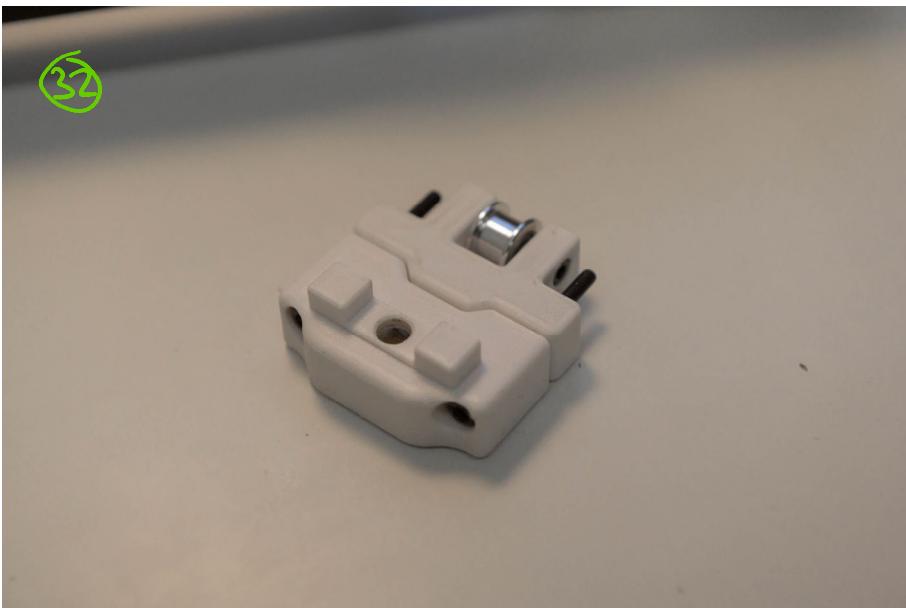
Belt tensioner assembly:
Insert two self-securing nuts into the base of part 1 (blue), and a normal nut into the hexagonal slot of the tensioner fork (red).



Using an M3x22mm screw as an axis, install the pulley as seen in the picture. The fork may bend inwards very, very slightly, but don't risk breaking the part and make sure that the pulley moves freely.



Connect the second part of the belt tensioner to the first using two 35mm screws as seen in the picture.



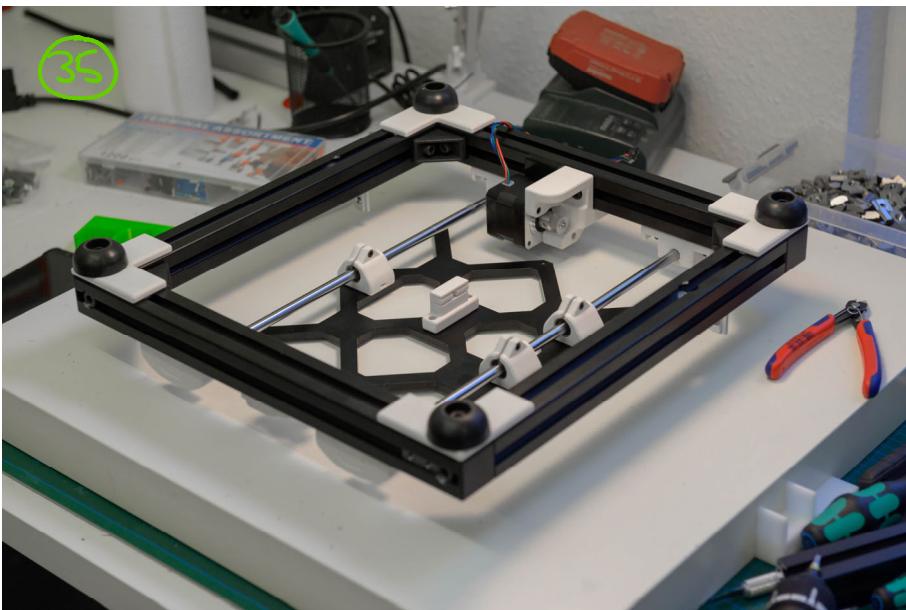
Screw them together completely, so that the self securing nuts are pulled into their slots fully.



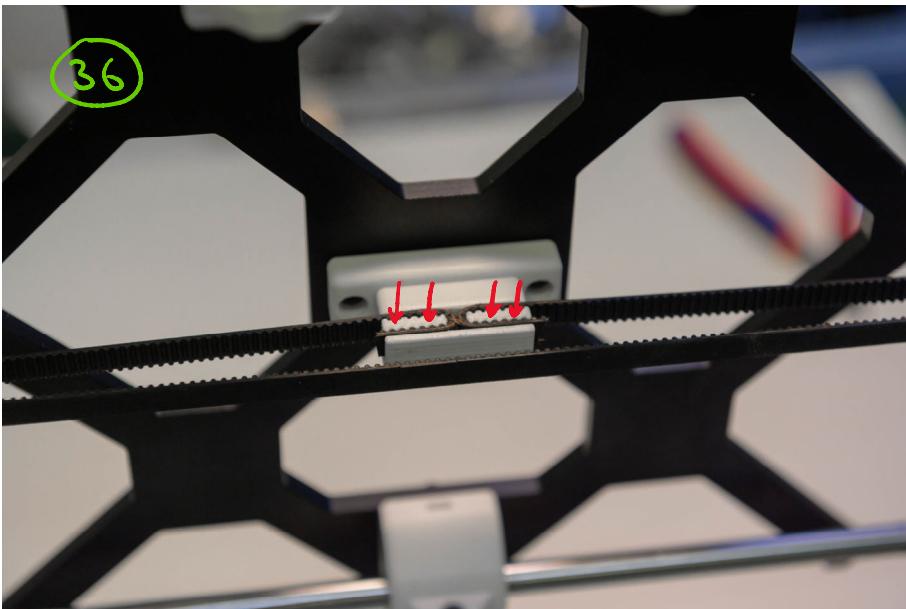
Now unscrew them again, in order to maximise tensioning range for later on.



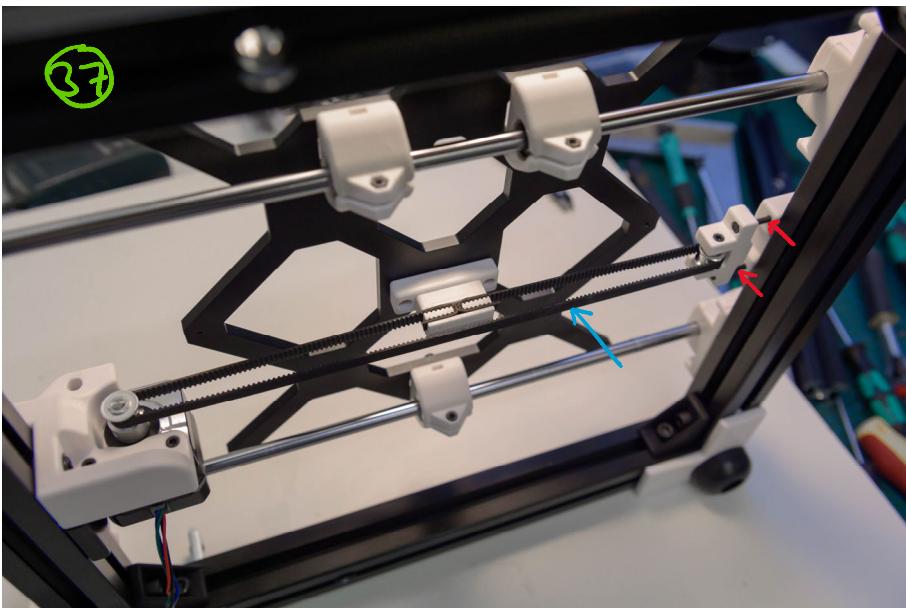
Install the part onto the front part of the frame.



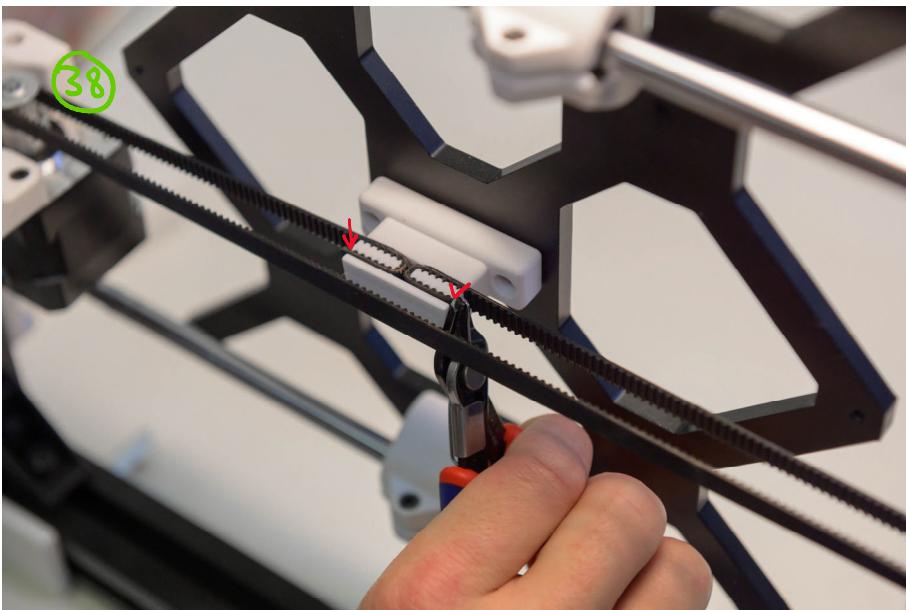
Flip the frame on its back.



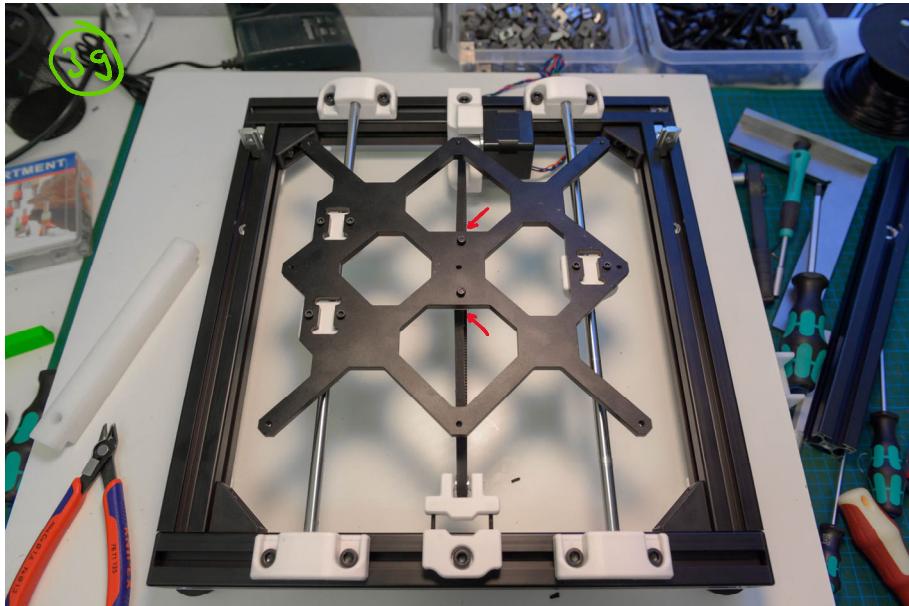
Push the belt into the belt mount as seen in the picture. You may use a flathead screwdriver for this, but proceed with caution as not to break the mount.



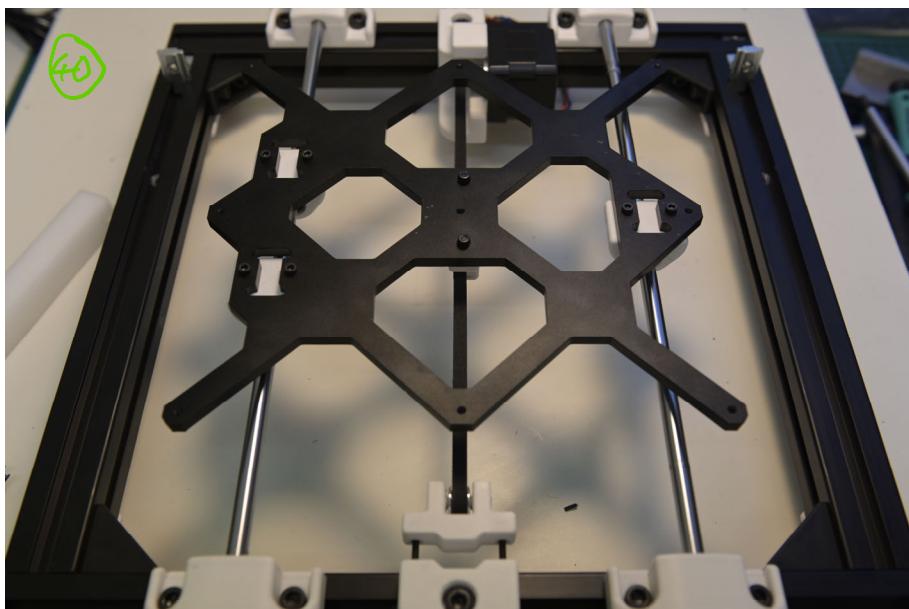
The belt should look like this. Use the two screws marked in red to adjust the tension on the belt. To give you an idea of how much tension is optimal, the belt when plucked in the area marked blue should produce a sound at roughly 110Hz. For those people with a good ear, that is two octaves below the standard 440Hz A. Alternatively, use a tuning device like a normal person.



Cut off any excess from the right and left side of the belt mount.



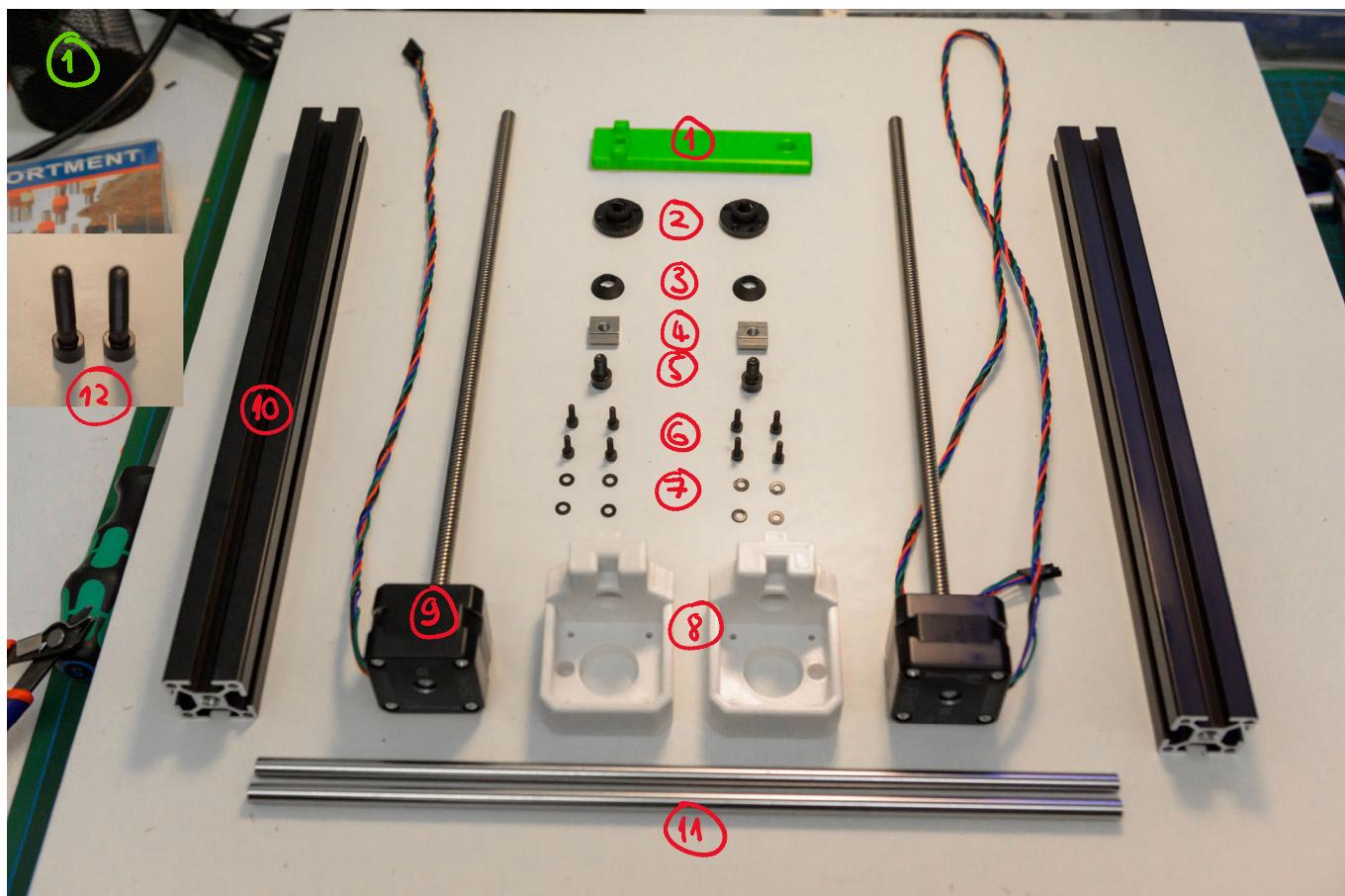
The picture on the left is an example of bad motor and tensioner alignment. Loosen the three M6x12mm screws that hold the tensioner and motor mount in place in order to adjust their position along the extrusion. Close one eye when judging the alignment, or you WILL get confused.



Once you are done with alignment and the belt tension is set correctly and your frame looks like this, you have completed part 1 of the Y-axis.

3: Z-axis (part 1/2)

You will need the following parts to complete part 1 of the Z-axis:



- ① 1x build tool 2
- ② 2x POM nuts
- ③ 2x Z-screw covers
- ④ 2x T-nuts
- ⑤ 2x M6x12mm screws

- ⑥ 8x M3 washers
- ⑦ 2x Z-motor mounts (left and right)
- ⑧ 2x Z-motors (left and right, length depends on model)
- ⑨ 2x Z-extrusions (length depends on model)
- ⑩ 2x Z-rods (length depends on model)

- (4) 2x T-nuts
- (5) 2x M6x12mm screws
- (6) 8x M3x10mm screws

- (7) 2x Z-extrusions (length depends on model)
- (8) 2x Z-rods (length depends on model)
- (9) 2x M8x40mm screws



Do the following for both motors:

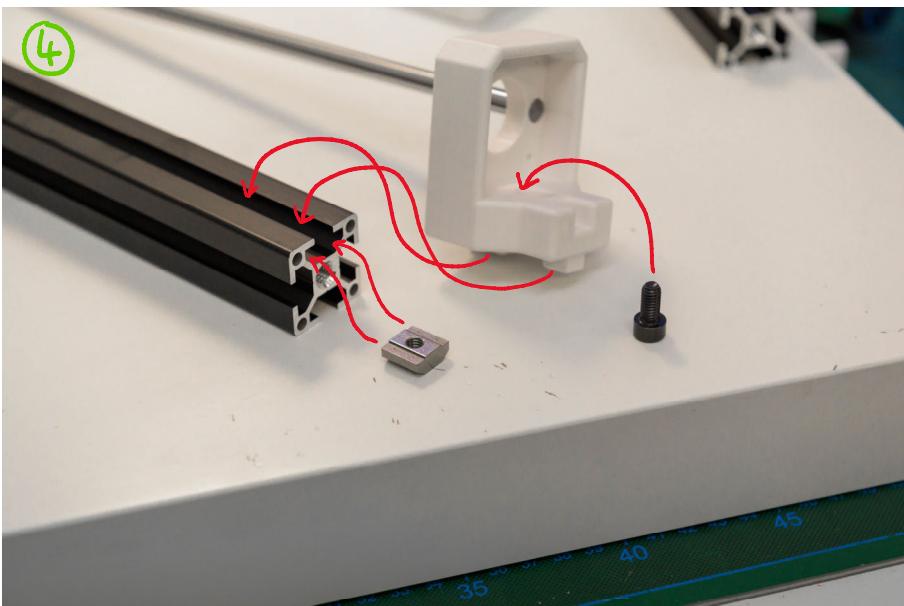
As the rods will probably not fit into the motor mount's slot from the start, you will have to widen the hole. Do this very carefully by using an 8mm reamer. Optimally, you will widen the hole just enough so that you can tap the rod in, and it will not fall out under its own weight. It is ok if the rod, when seated, isn't 100% straight, as long as there is no play.



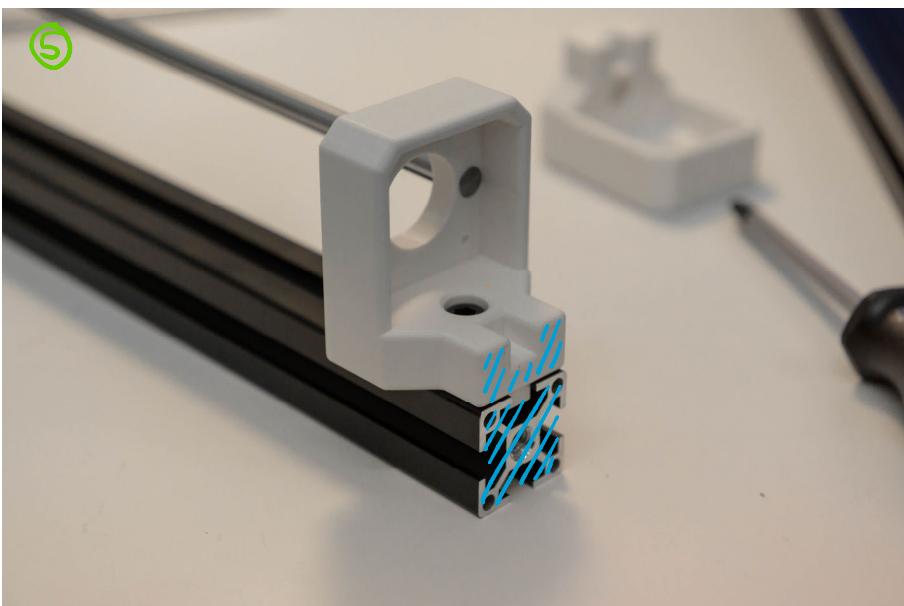
Make sure the rod sits flush with the inside of the mount.



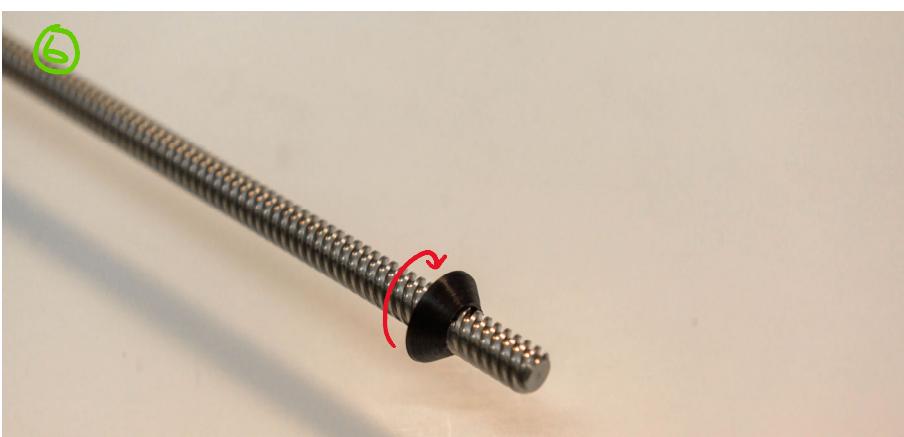
Using an M6x12mm screw and a



Using an M6x12mm screw and a T-nut, secure the motor mount to a Z-extrusion.



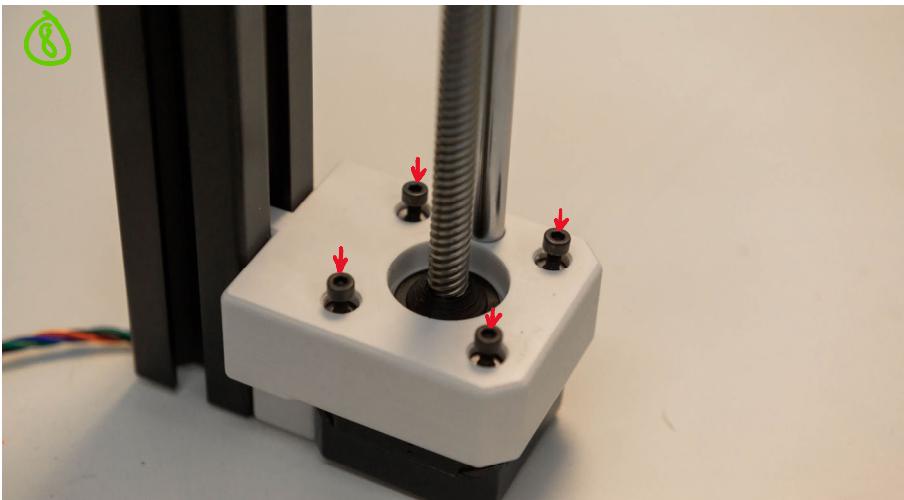
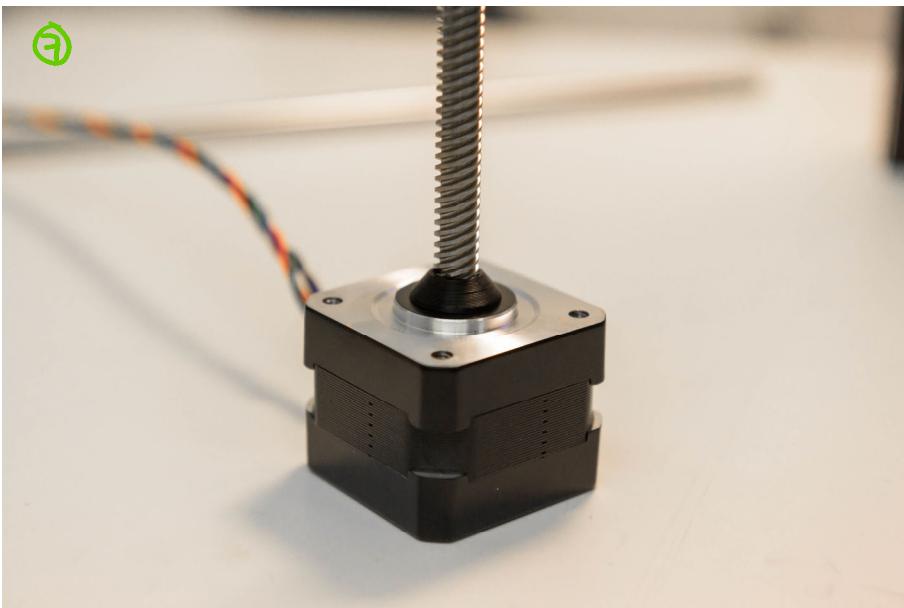
Make sure that the surfaces marked in blue are flush with one another.



Screw a Z-screw cover onto the motor and position it at the very bottom as seen in the picture below.



Screw a Z-screw cover onto the motor and position it at the very bottom as seen in the picture below.



Using 4 M3x10mm screws and 4 M3 washers, screw the motor into the motor mount from below, with the cable exit facing the extrusion.

NOTE: The two motors have different cable lengths. The right motor has the longer cable and the left one the shorter cable. What you see on the left is the RIGHT motor, with the longer cable.

If any of the screws have a lot of

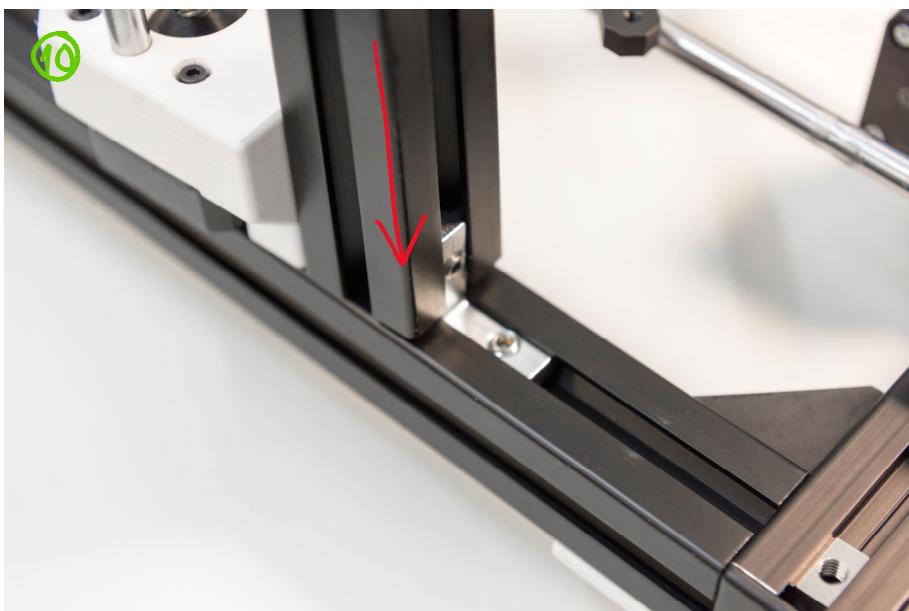


longer cable.

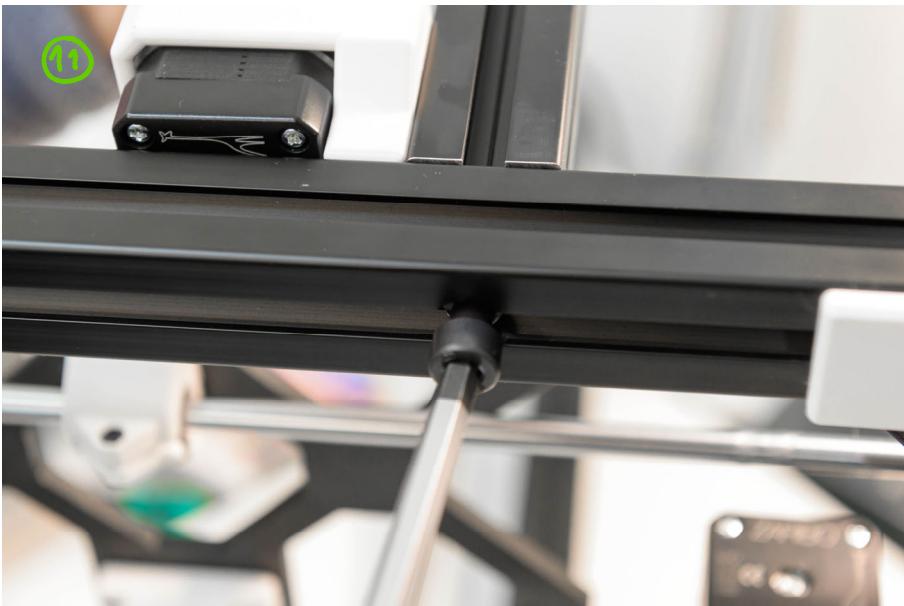
If any of the screws have a lot of resistance when being screwed in, reseat the motor and try again.



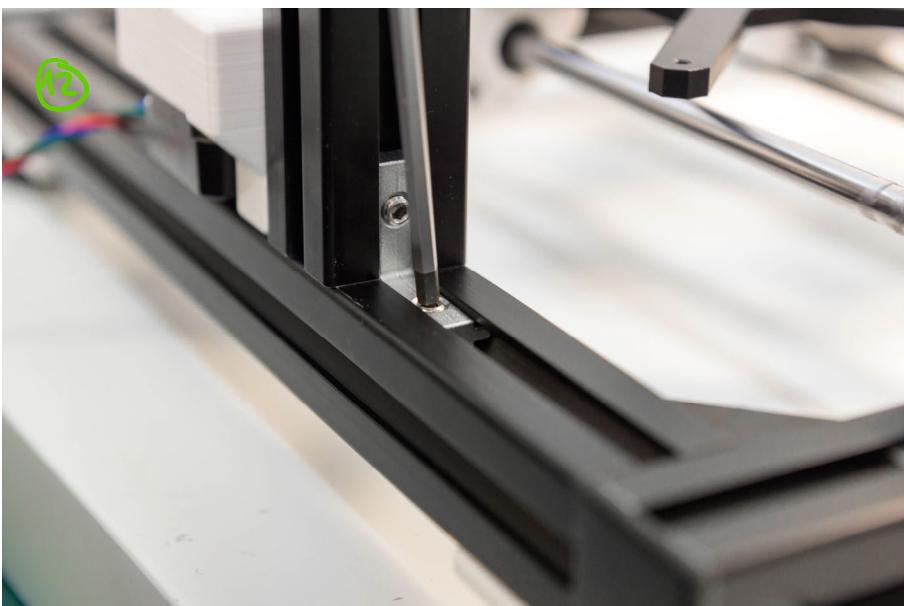
It should now look like this.



Insert the assembly onto the frame over the hole in the extrusion as seen in the picture.



Screw in the M8x40mm screw from the bottom, making sure that there is no gap between the Z- and Y-extrusion.



Evenly, switching back and forth, slowly tighten the two screws in the L-bracket. This is so that the L-bracket is perfectly aligned in both channels.



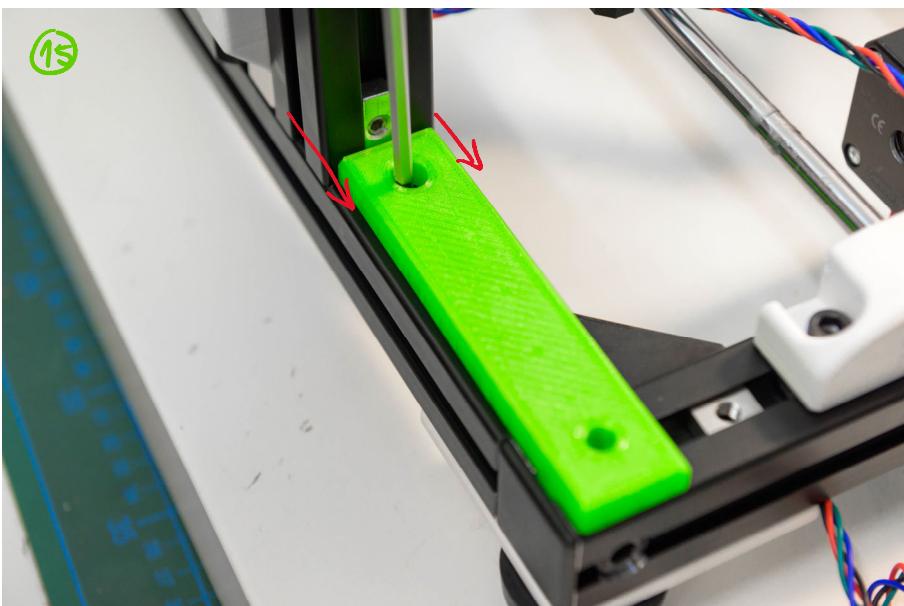
This is roughly what that should look like.

Now loosen the lower screw. If the bracket is aligned properly, it should not move after loosening.



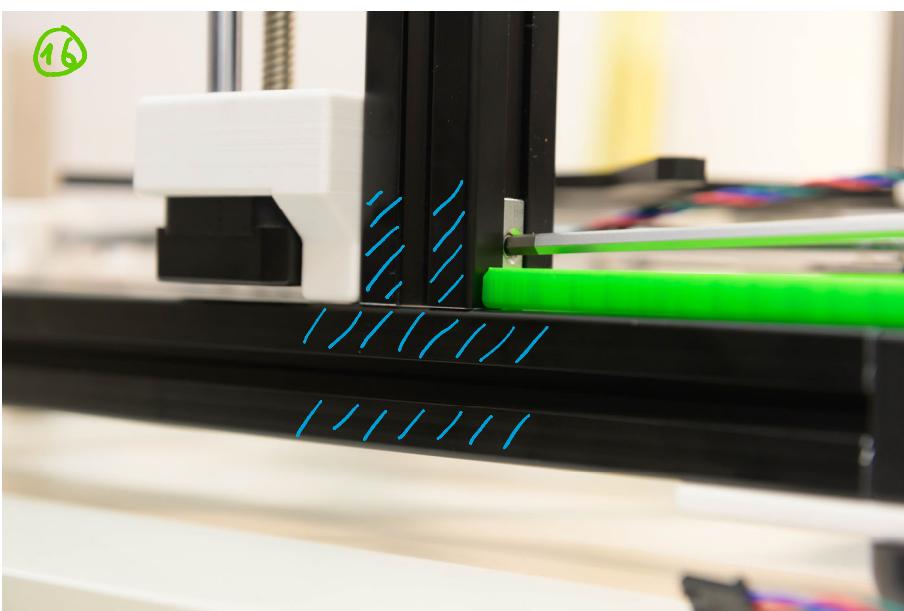
Loosen the M8x40mm screw.

You should now be able to move the entire Z-assembly forward and backward slightly.



Position the build tool 2 as seen in the picture, with the two studs in the rear X-extrusion.

Slide the Z-extrusion against the tool, and retighten the lower bracket screw.

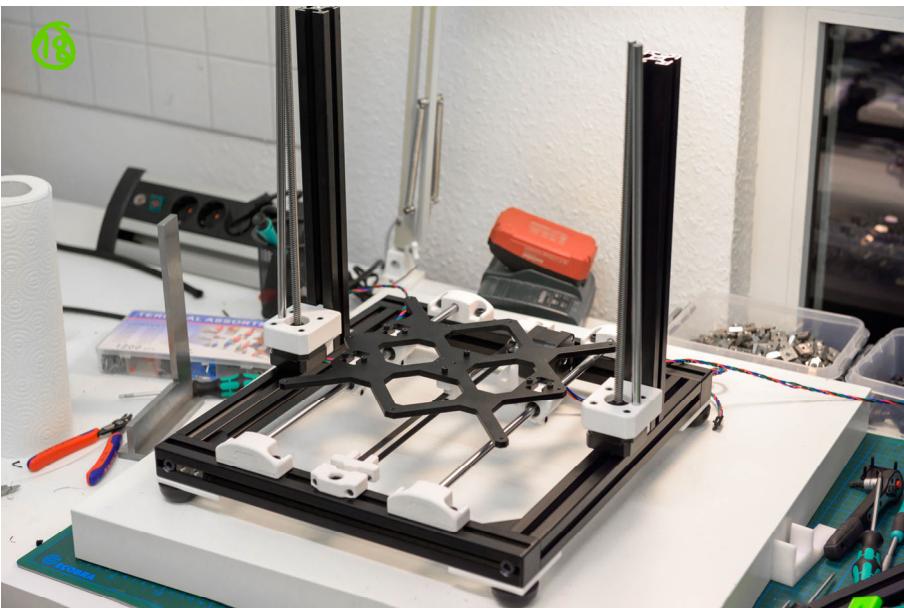


Once the lower screw is tight, loosen and retighten the upper screw, making sure that there is no gap between the Z- and Y-extrusion.

Make sure that the surfaces marked in blue are perfectly aligned.



Using a ratchet, tighten the M8x40mm screw. Make sure that the Z-extrusion doesn't twist out of alignment under torque.



After completing both sides, your 3D printer should look like this.

Part 1 of the Z-axis is now complete.

4: X-axis

You will need the following parts to complete the X-axis:

