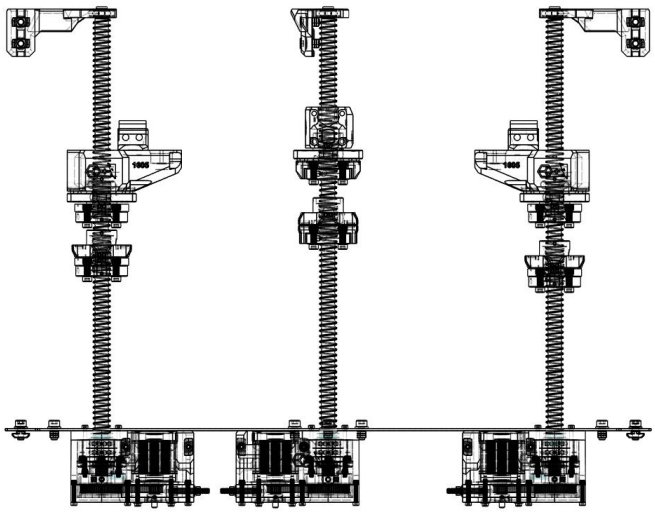
Z-Upgrade 3.2c/d manual

Suivi des évolutions

Indice	Date	Description de l'évolution	Auteur
0.0	27/10/2024	Création	FBR
0.1	12/11/2024	M3x25mm to full M3x20mm change	FBR
0.2	19/11/2024	3.2b revision / StarLock design	FBR
0.3	20/01/2025	3.2c revision / Belt lenght + Screws changes 25-22mm	FBR
0.4	13/02/2025	Small details additions to the manual for fine tuning	FBR
0.5	16/06/2025	Spring retainers variant	FBR

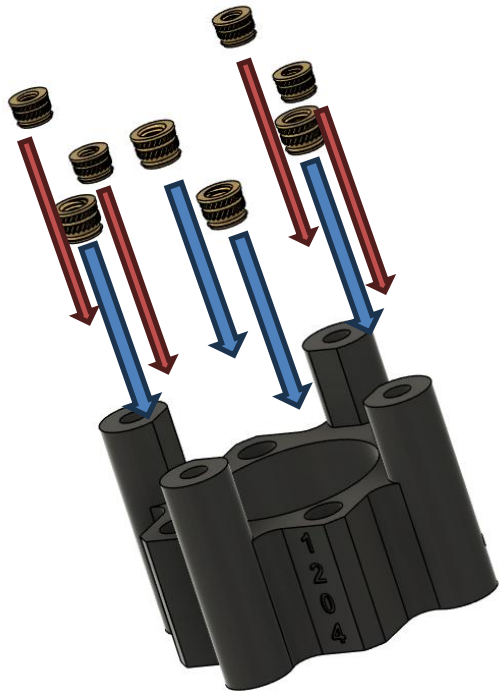


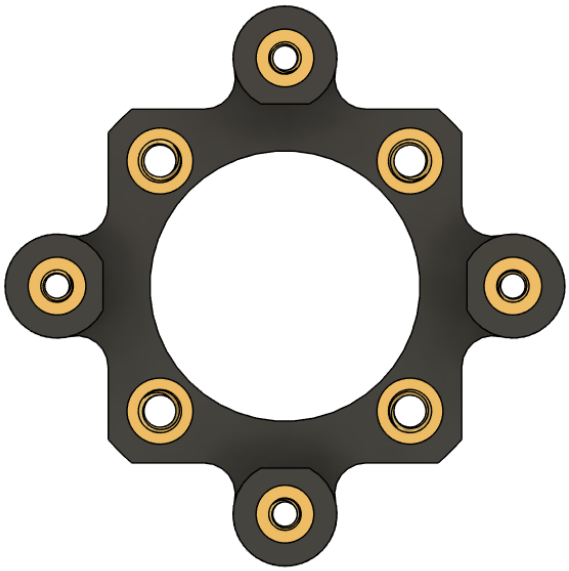
1 Part preparation

Standard StarLock

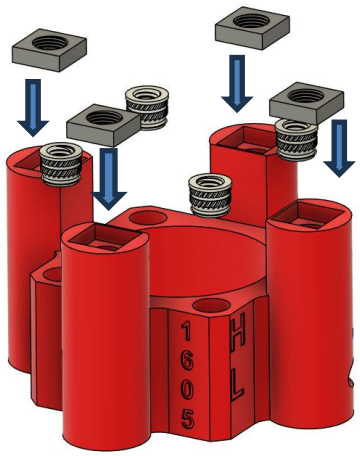
Start to prepare the 3 Blocks

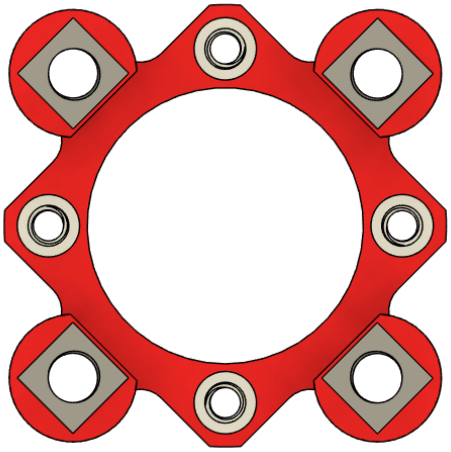
Install the 4x M3 insert and the 4x M4 inserts in each Starlock



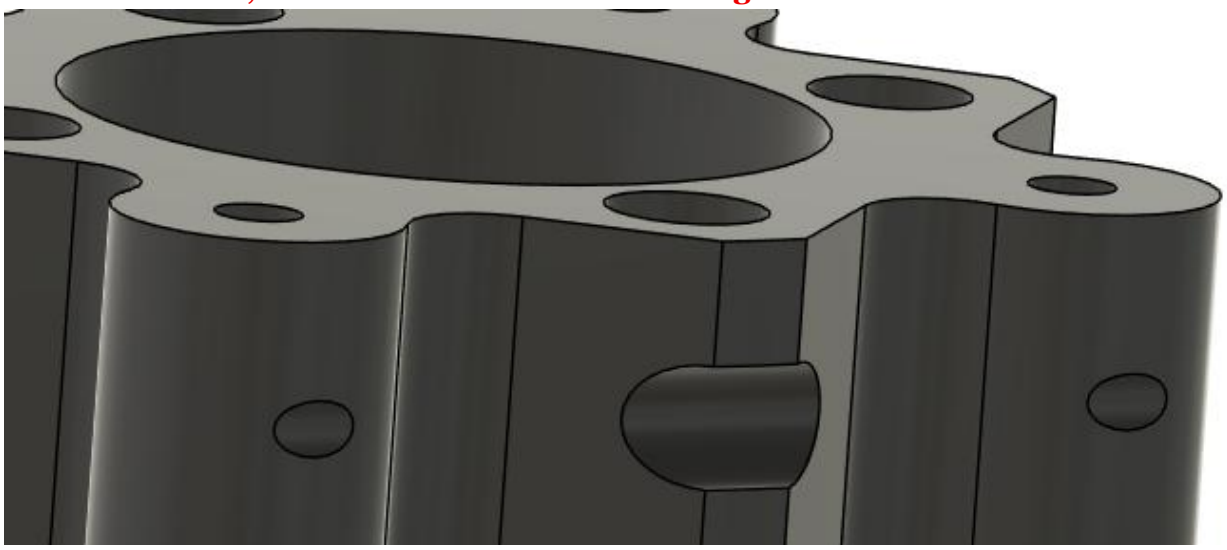


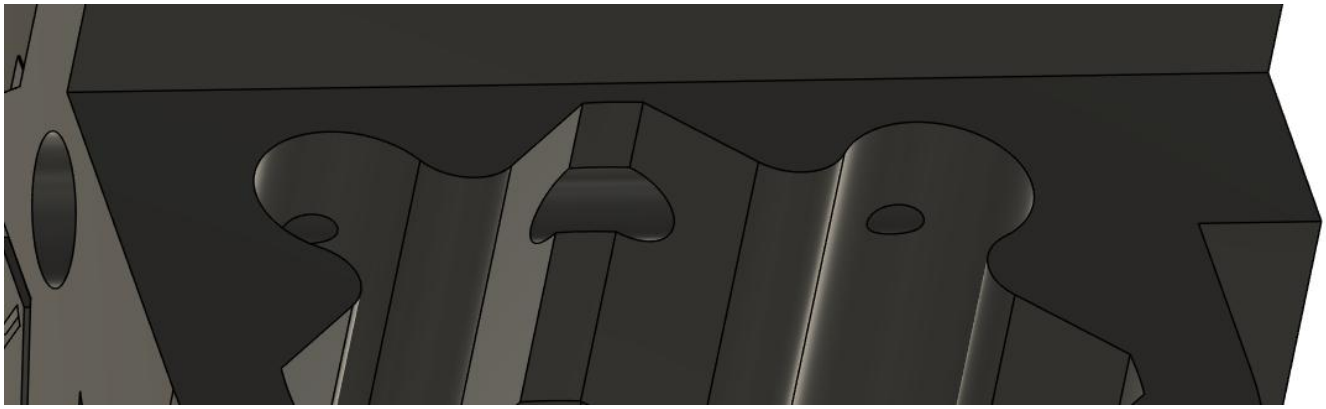
H variant Starlock:

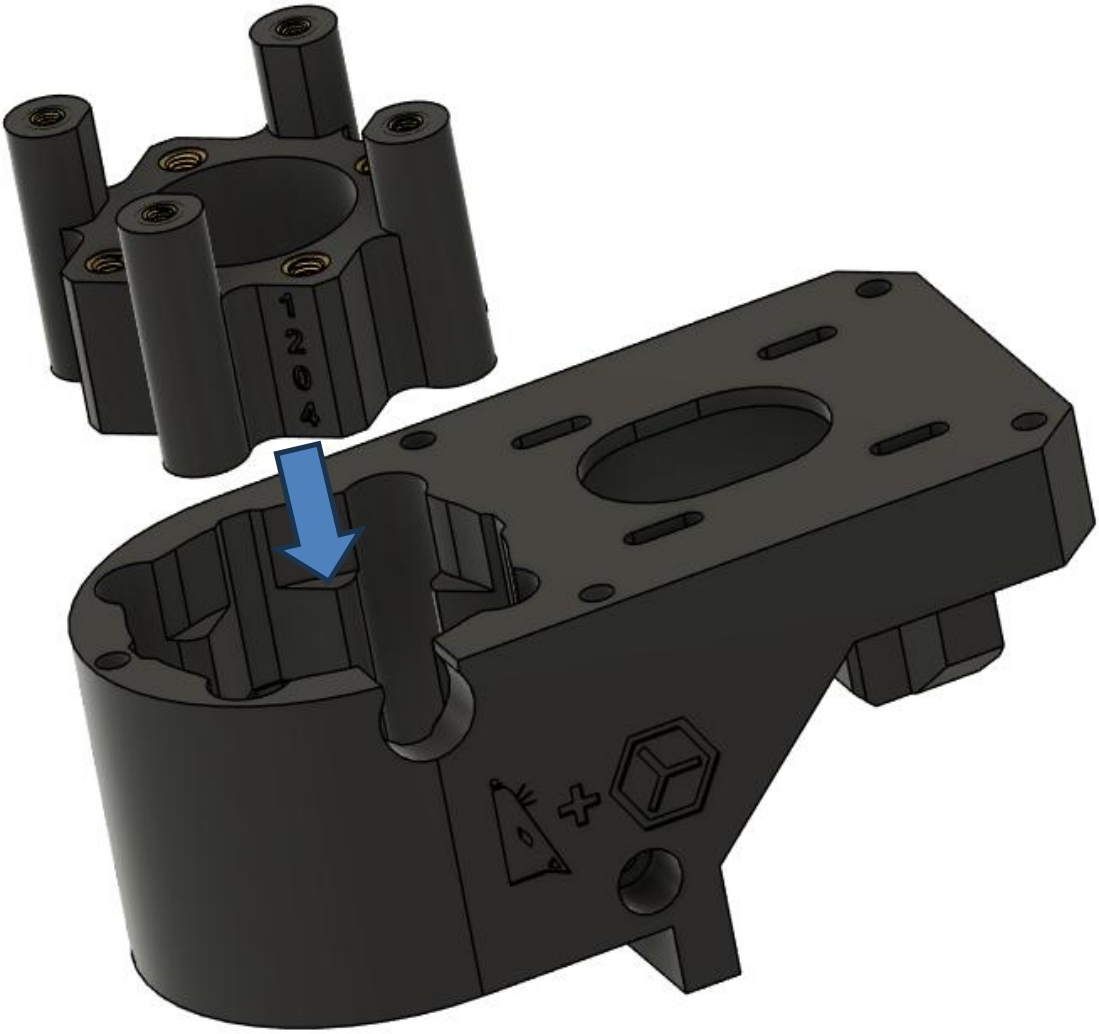


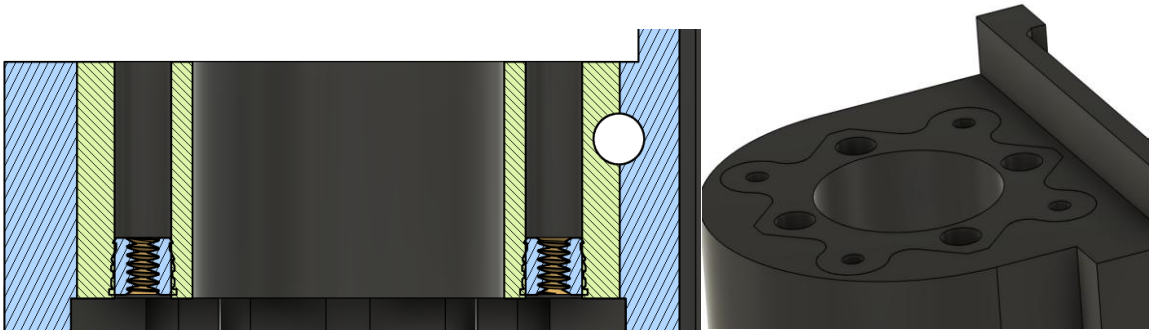


You need to pressfit with some Superglue points the Starlock design **WARNING: They have a direction; ther is a notch on the side to align**





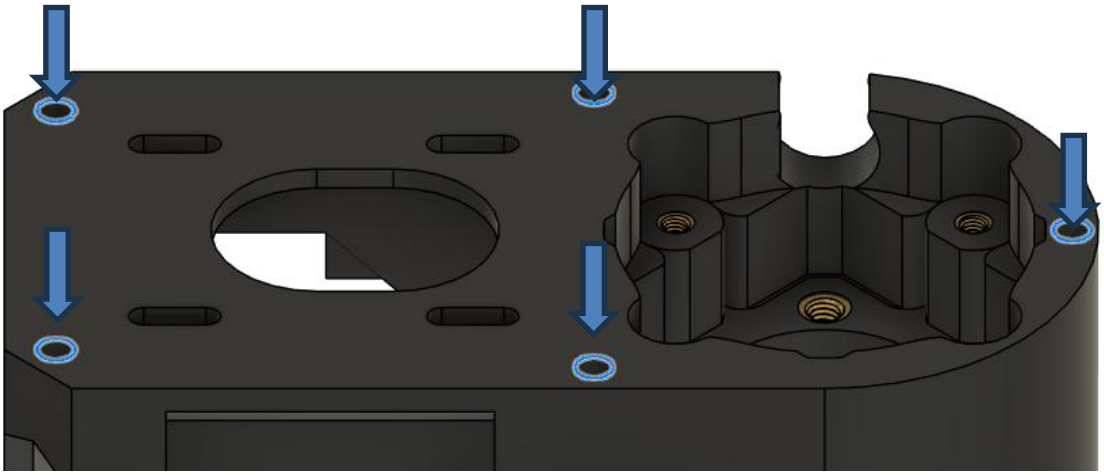




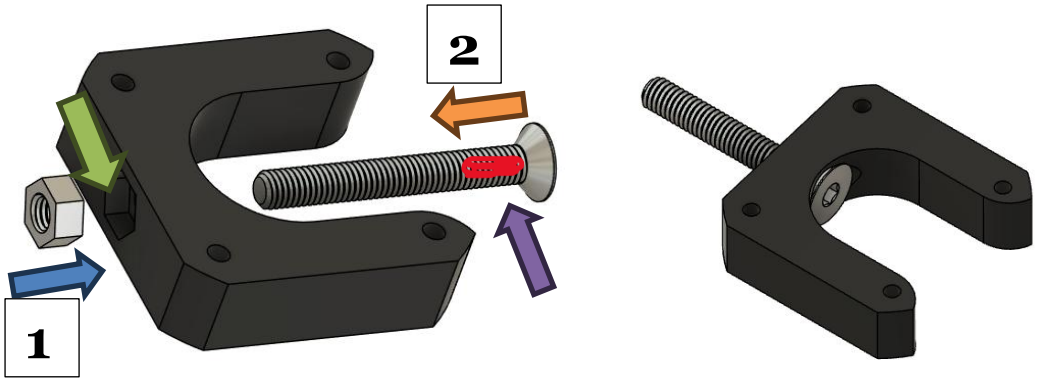
It is important for this part to be flush with the mainblock

This has been designed to get better surfaces and a more clean printing experience and a stronger join

You will need to place m3 inserts at those places on the 3 pillar base blocks: 2

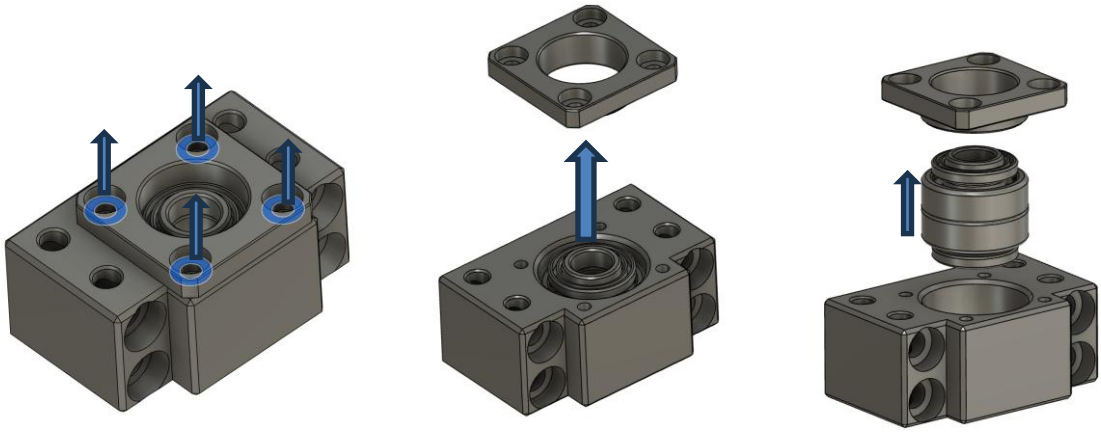


Assemble the tensionner :



Apply glue in the nut part location. Install a M5 nut or a Nyloc M5, then let it dry 5 min.
Apply glue on the first 6mm of the screw. Install the screw fully! Let it dry 10min

Disassemble the BK10:



Remove the 4x M4 screws and remove carefully the internal, some force can be needed to remove the 608 bearings

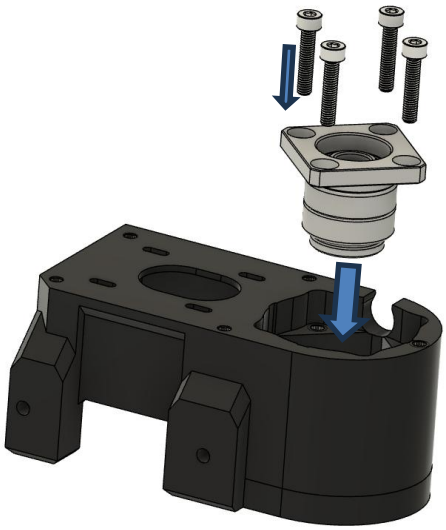
We will keep only that- At this setup you can replace those bearings with optional angular contact ones

A bit more expensive but better in lifespan for heavy assembly

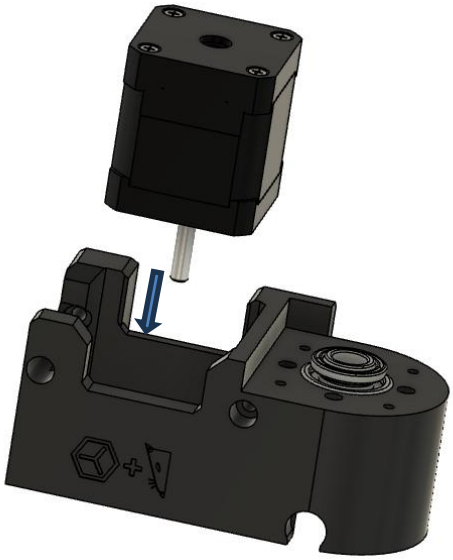
2 Preassembly

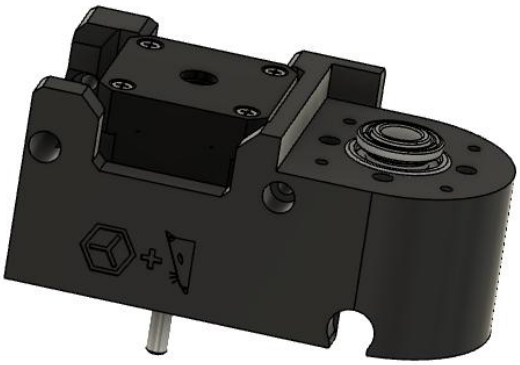
BODY :

Insert the BK10 internals on in the 3 blocks and secure it with the BK10s M4 short screw



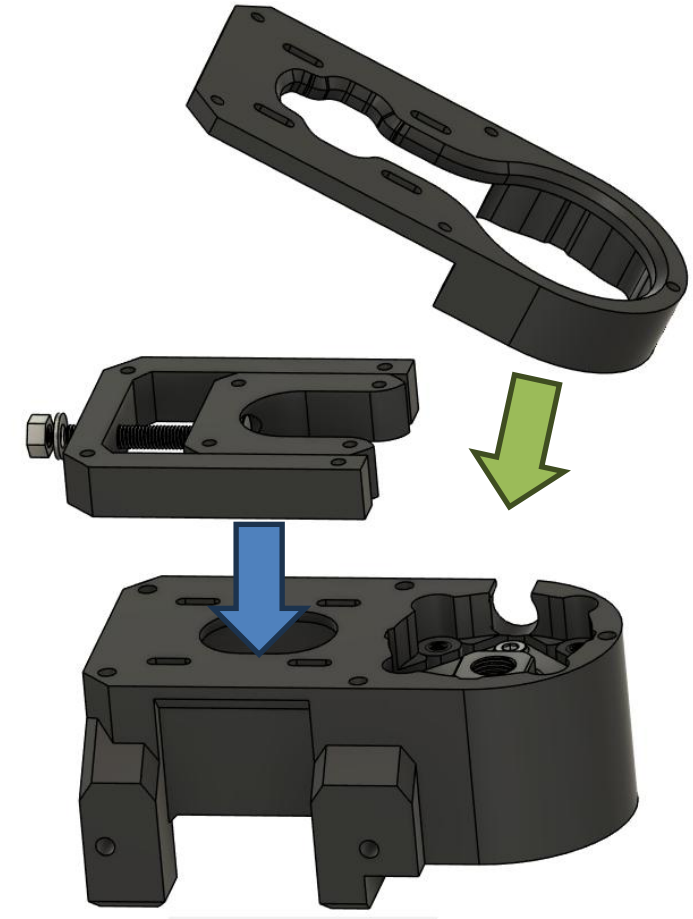
Install the NEMA

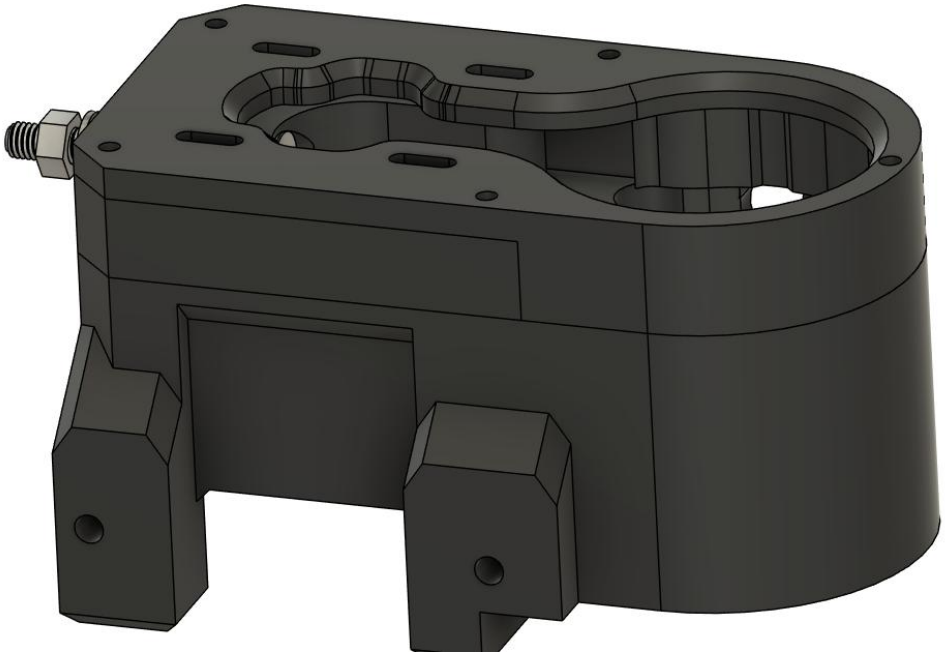




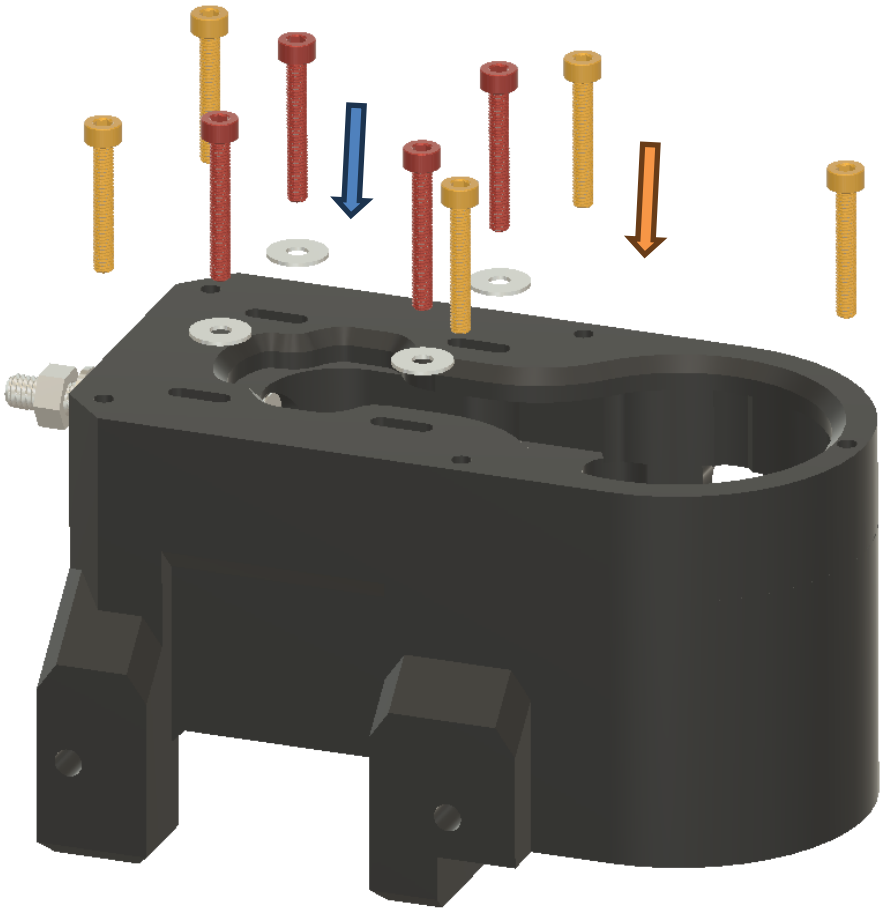
It should be flush

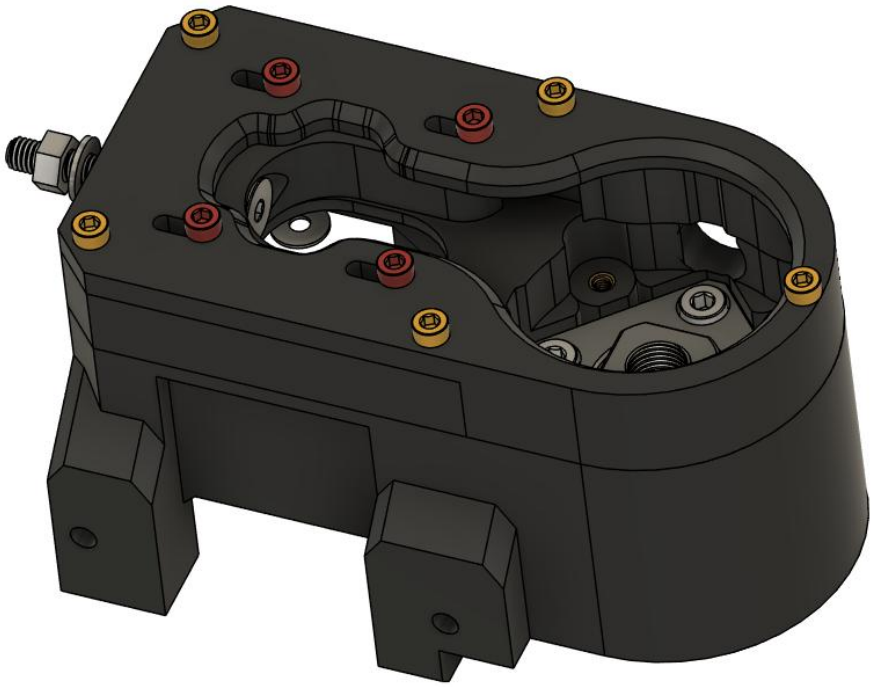
Now fot the under section and the tensionner



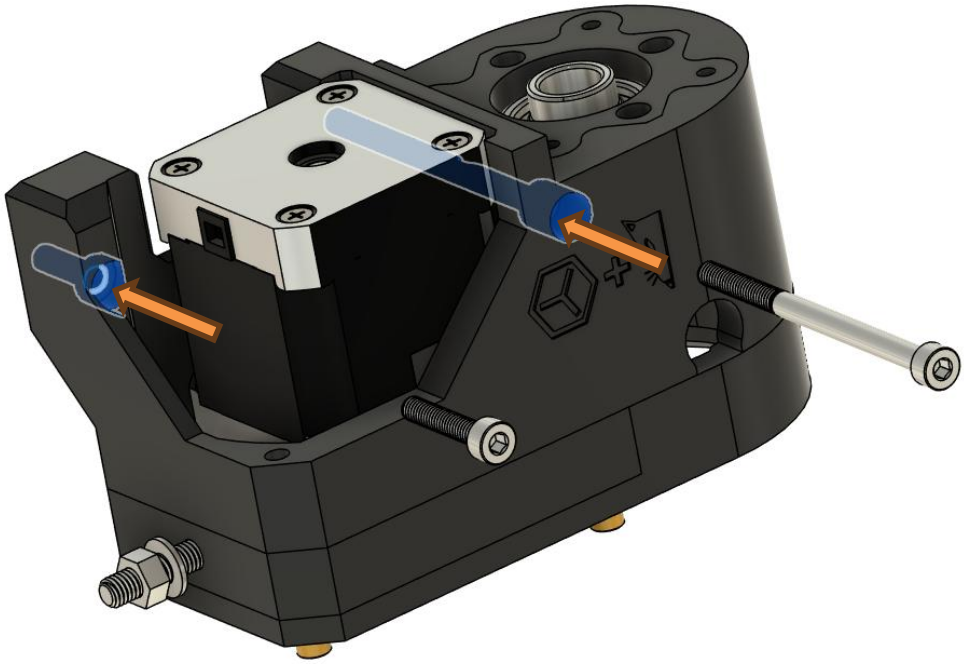


Then close it with the M3x22mm screw and then the M3x20mm to close the bottom. M3 washers are not mandatory.





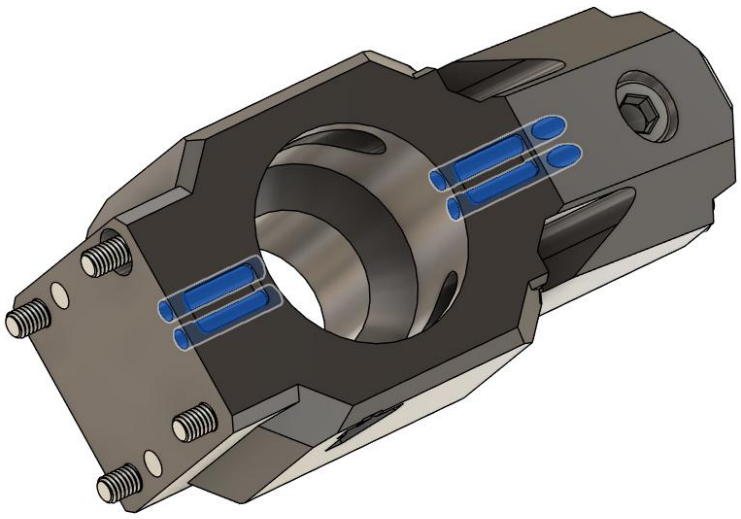
Add the retaining m4x20mm and m4x60mm bolts for the frame anchor. Add a M4 Tnut on each, Same logic for the rear part, but this time with a M4x90mm instead of the M6x60



ARMS:

Fo the arms, place m3 inserts at the same spots than a regular VC4.0 kit

Install the pins (From the Wobblex kit) or in the BRS Oldam packet (14mm pins)

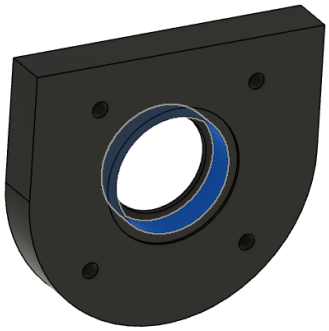


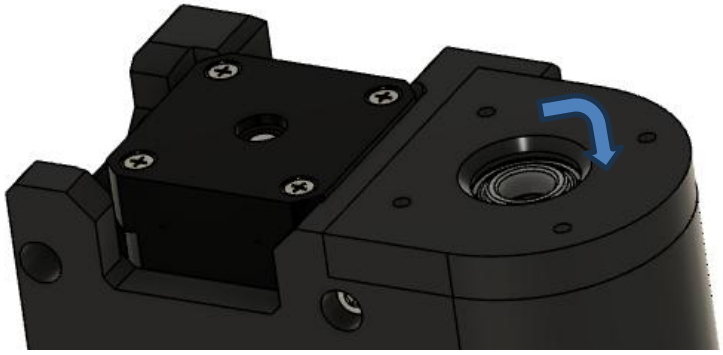
The rest is quite straightforward, install the bed grabber and the specific shortened custom Wiper from the kit.

3 Assembly

The easier way to do it is to lean the machine on the back or the side, but that is completely up to you depending the status of the machine (Kit or already assembled)

Here the SPI join is not used

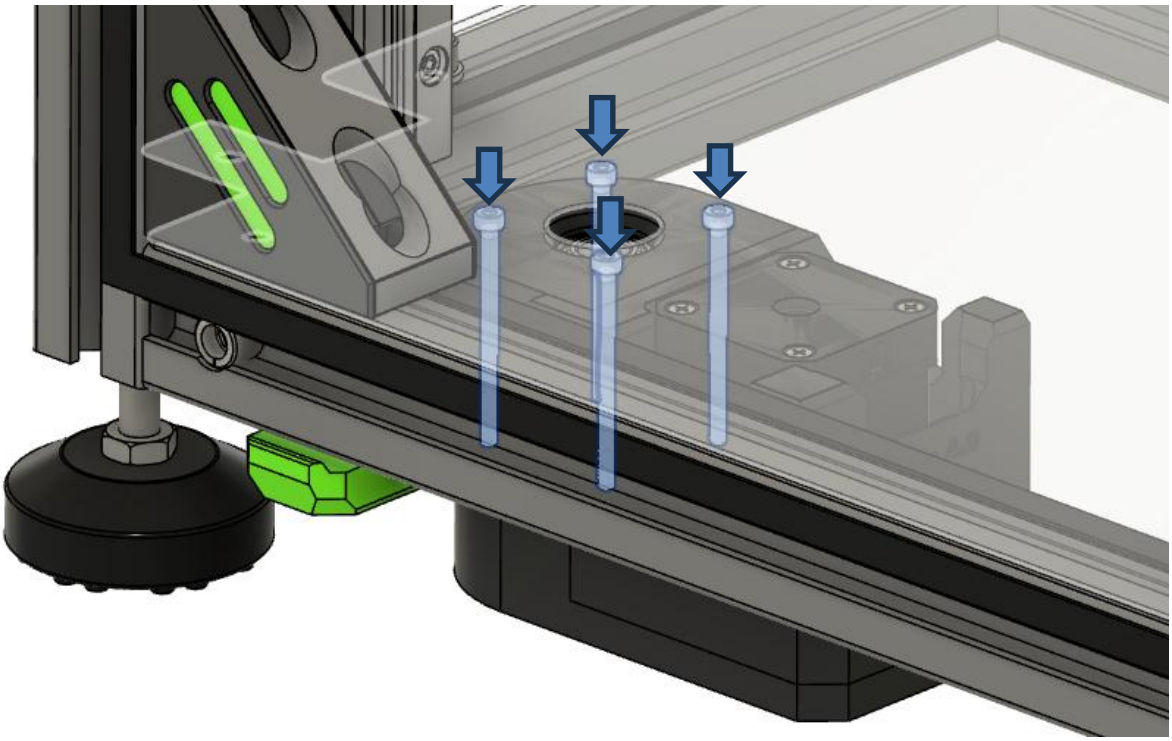


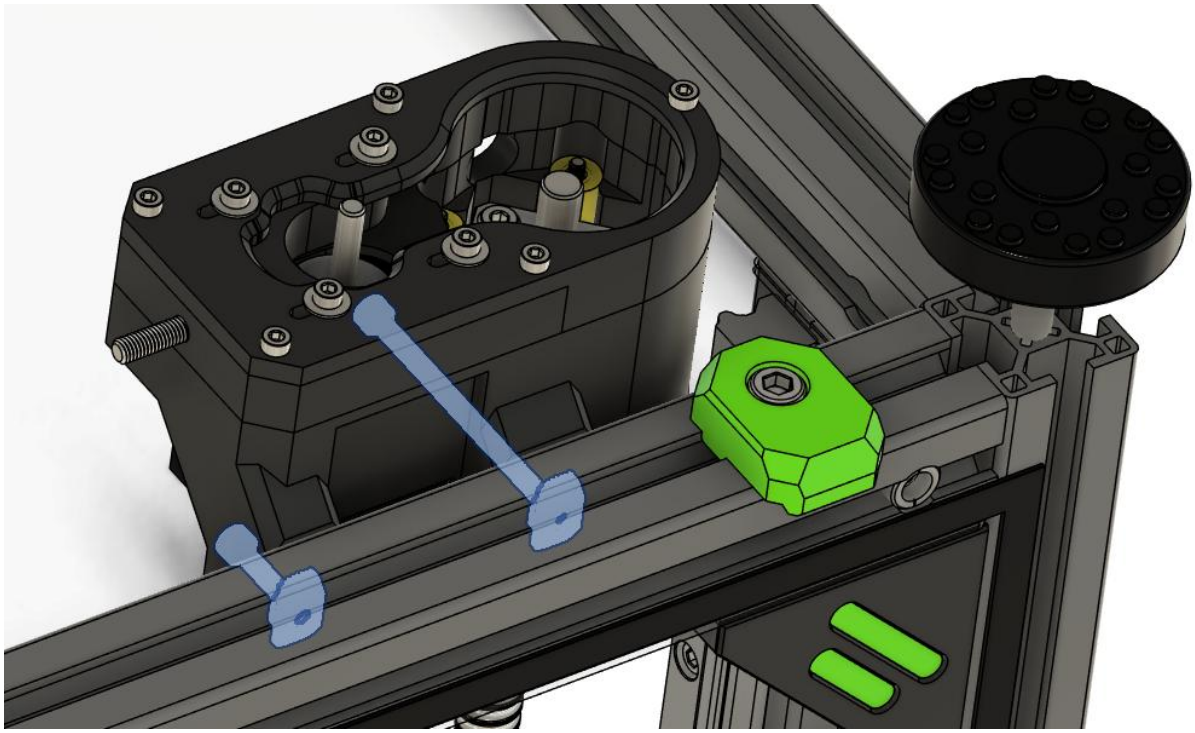


You can now place it on the M3 plate hole and add the 4x M3x45mm to retain it

Don't forget to tight the anchors points (2x per blocks)

In the H revision, M3 are swapped for M5x50 screws

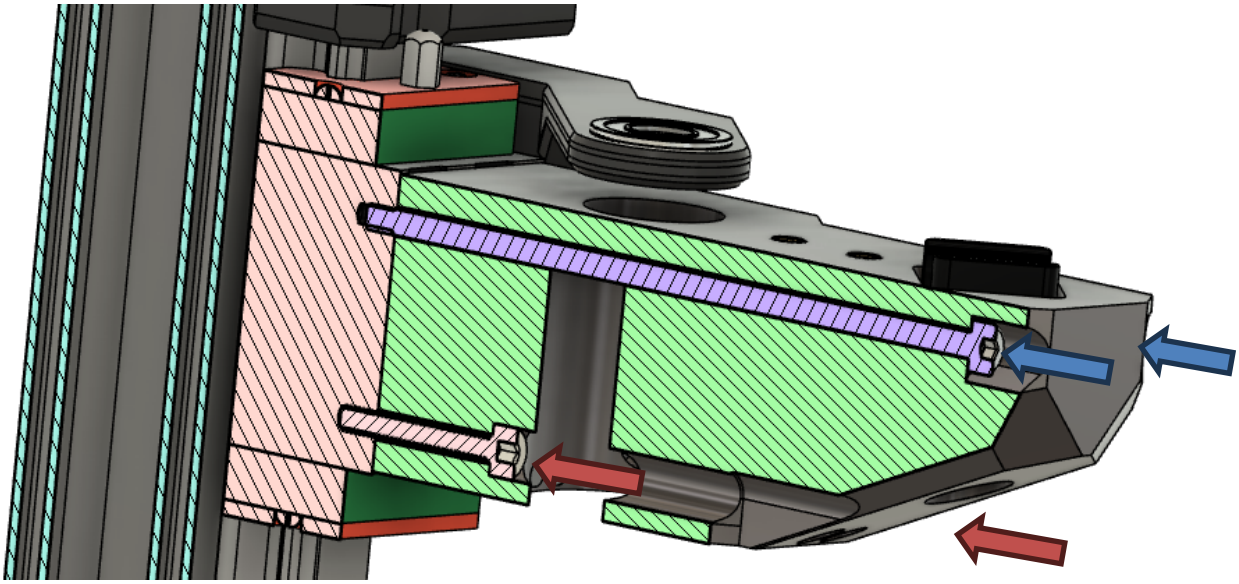


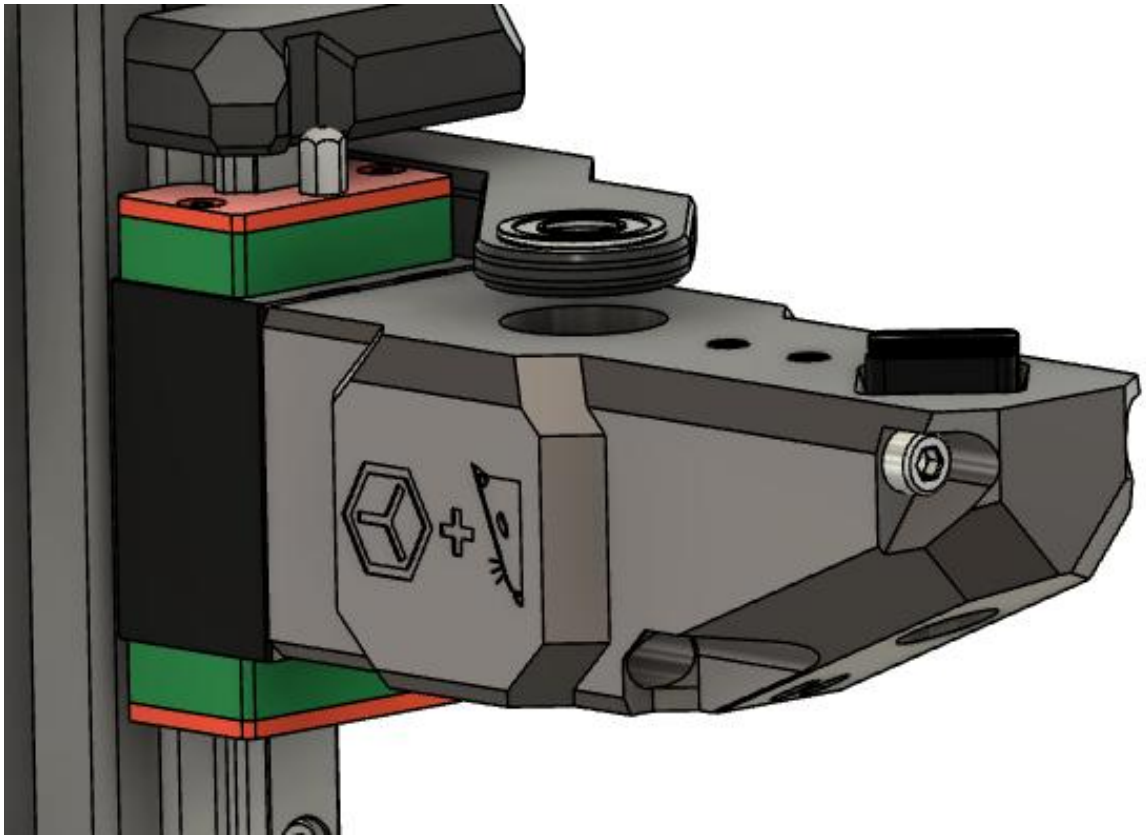


Repeat this process for the 3 blocks

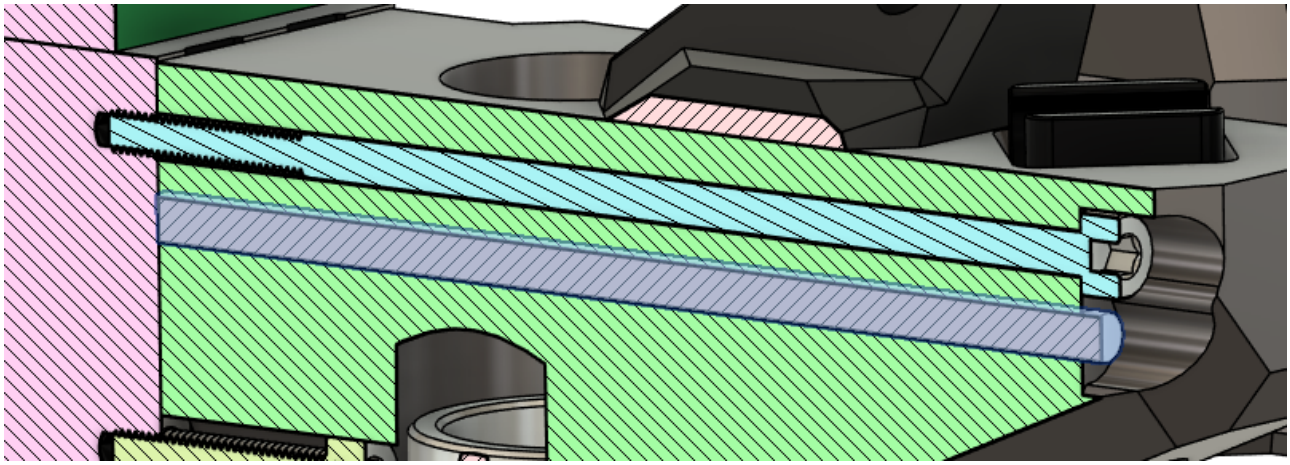
We can now install all the arms

Same logic than the stock ones, but this time we use the 2x m4x100mm and 2x M4x20mm





1605 Reinforced version need some 5x100mm steel rod in the holes

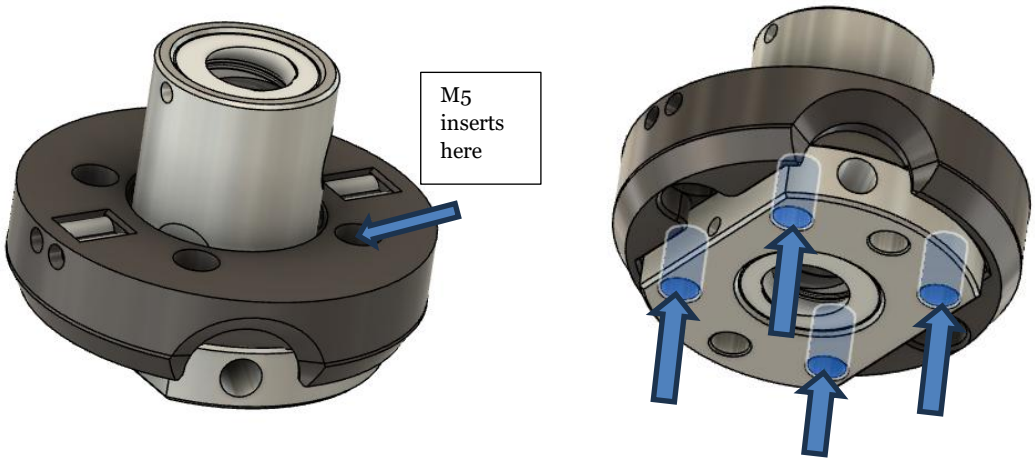


I personally glue then and pressfit them with a hammer

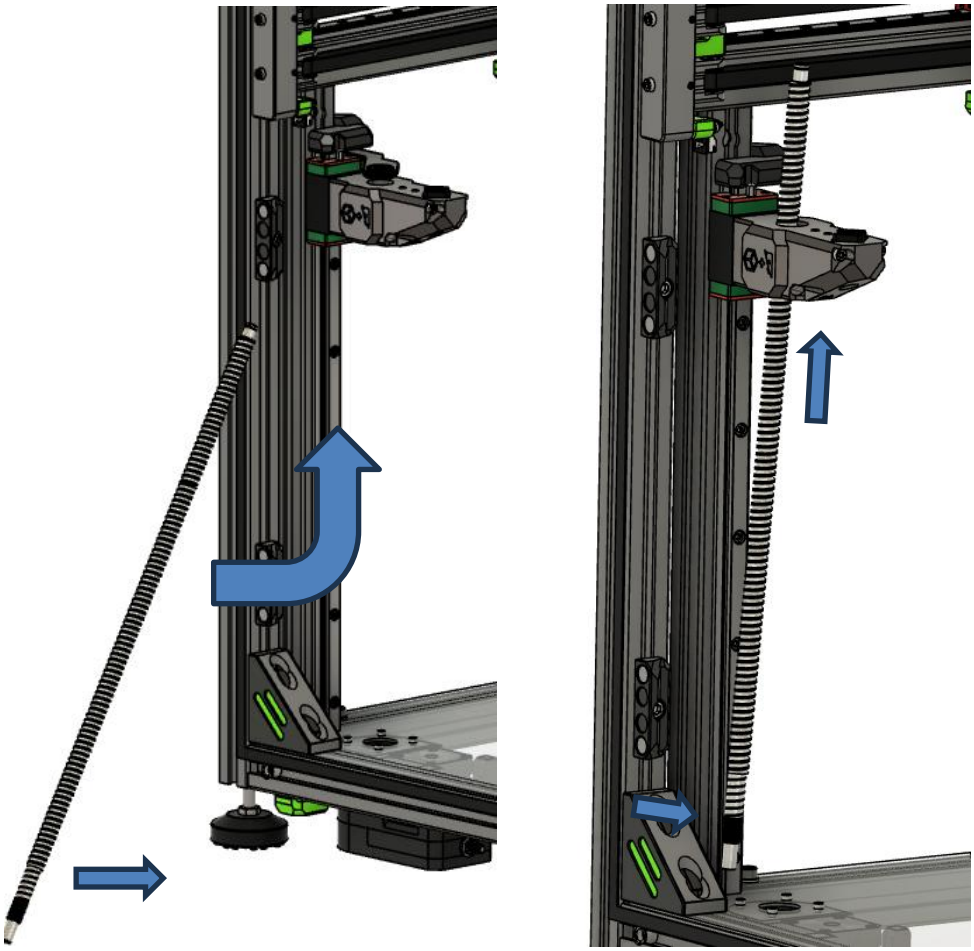
Once done, depending the Oldham / WobbleX choice made, you can prepare the ballscrews

4 BRS-Oldham

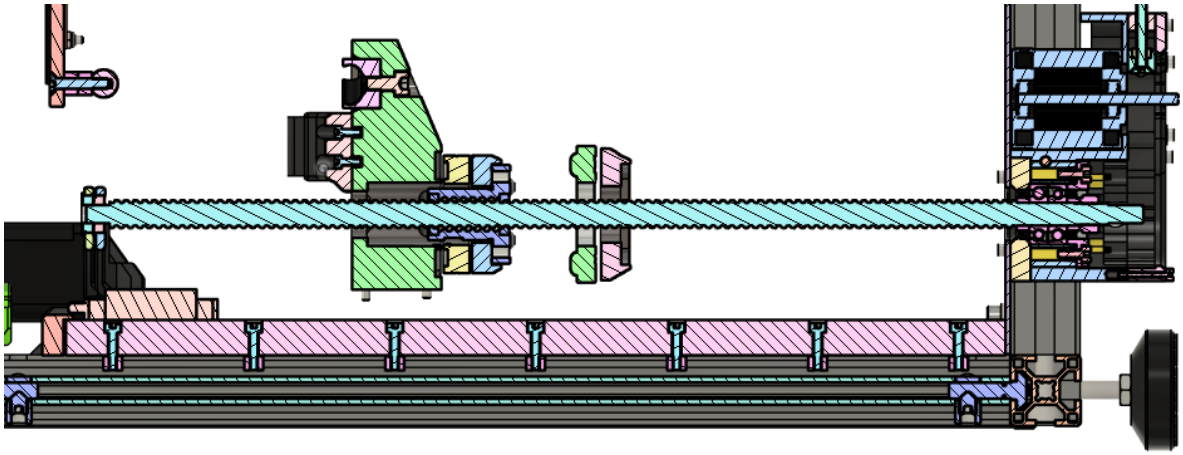
You need to assemble the lower ring on the Ballscrew Nut first

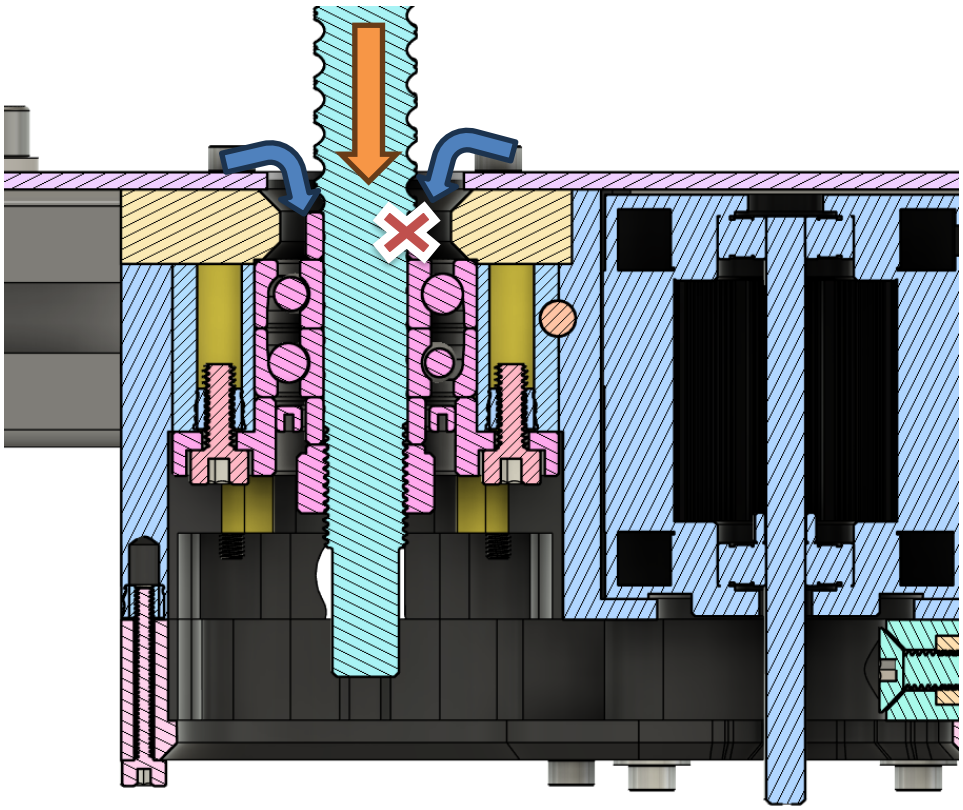


Then M4x16mm (1204 version) or M5x16 (1605 version)

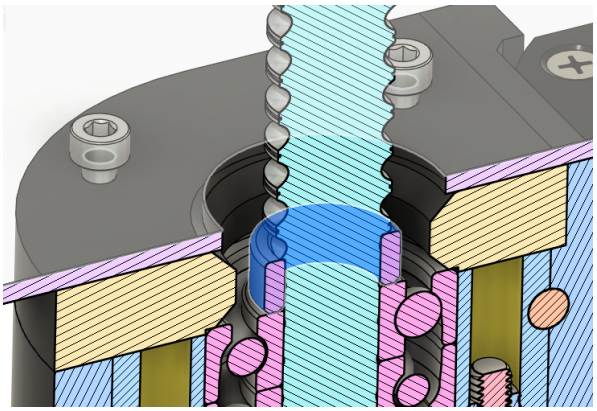


On this picture, the Nut and the Oldham are not represented, but should be positioned on the middle of the ballscrew BEFORE. **NEVER REVOVE THE NUT FROM THE SPINDLE**



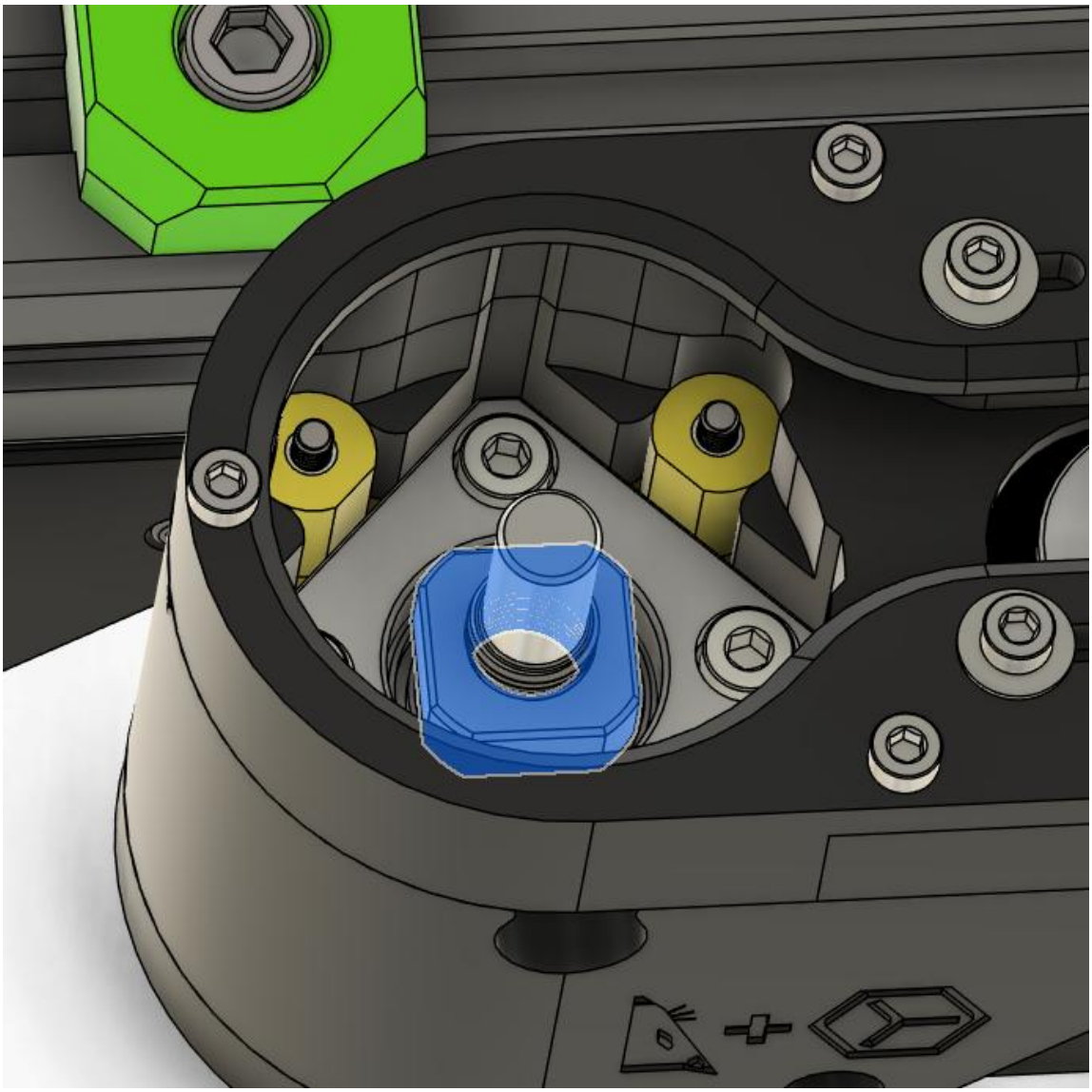


Assemble the ballscrew to the maximum, against the first spacer.



You need to first insert it in the arm hole, you may need to remove the top retainer to give you clearance, and then place the machined end in the lower motor block through the BK10 Internals

When the spindle it inserted in the BK10, be sure it goes against the black spacer, and add the retaining nut (don't overtight it)



5 WobbleX

3.2C revision :

For the wobbleX (12/16), same logic: Ad some M5x20 to fix the BS nut to the lower ring, add the WobbleX middle ring and install it the same way with the spindle motion seen above.

Be careful: 1204 and 1605 version got some differences:

-Discs are larger, and use a different layout, 1605 and 1204 are not compatible between each others

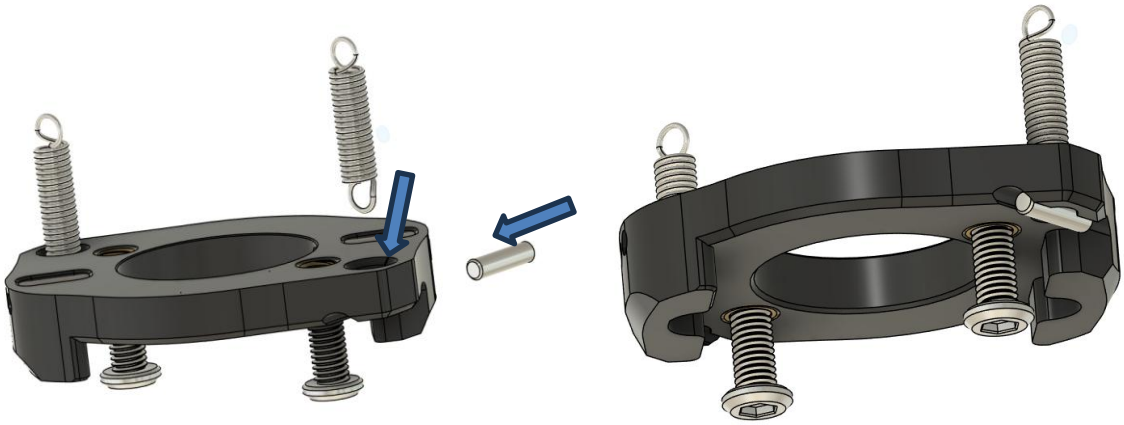
-Arms got a different hole layout and dimension as their pins position

-In some case scenarios, you may need to remove the arm partially to insert the BS spindle

At this point you can change the methods, as few exist to get to the same objective.

Use the pins for the Wobblex Kit which are included

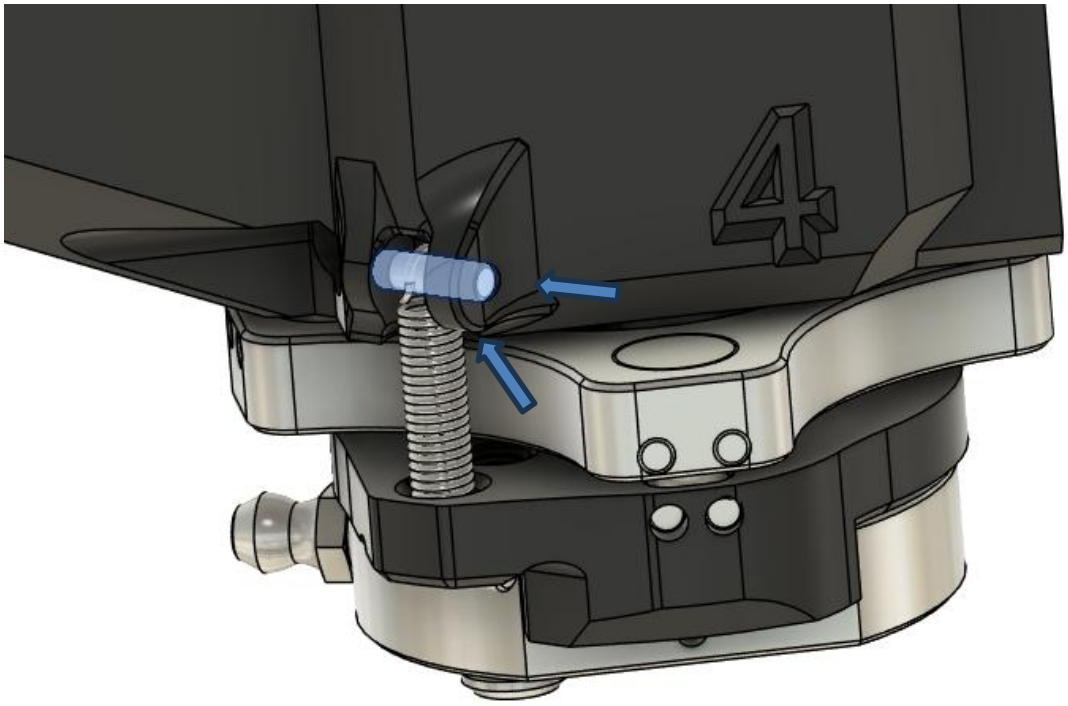
3.2D revision :



The last revision features a spring retainer to avoid lifting the full assembly and loose the ball from the WobbleX

Insert the spring in the hole, secure it with a pin

This under ring feature only 2 M5 screw new, proved to be enough in this case.

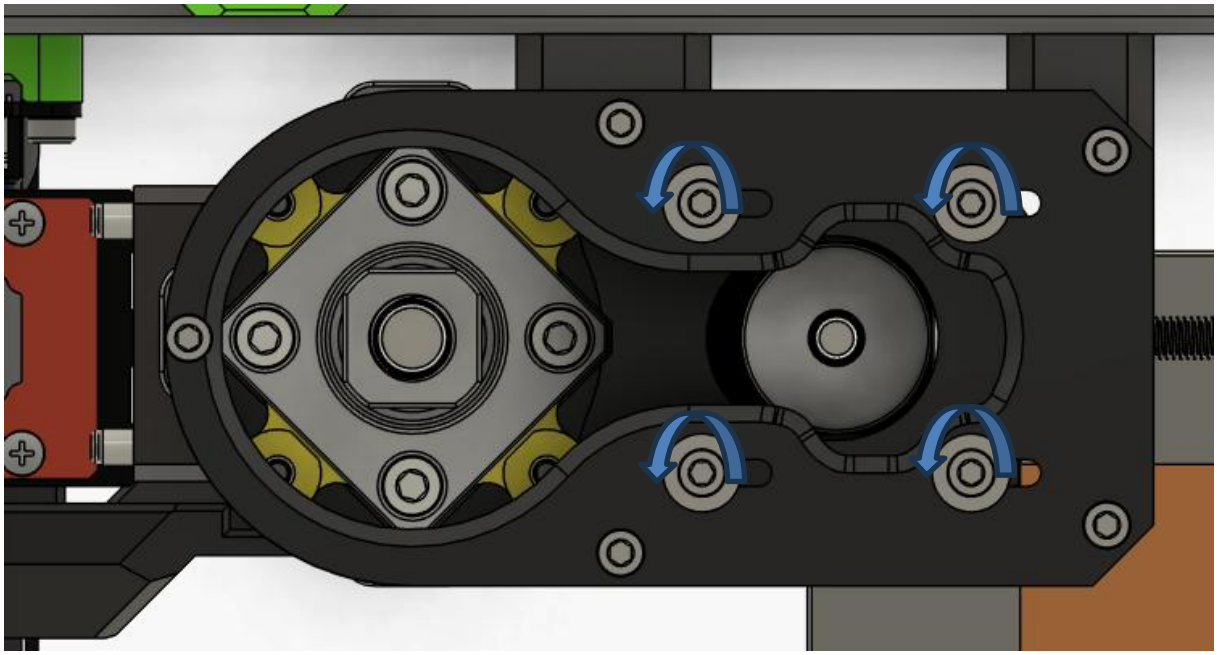


At the end of the unit assembly, use a plier to tension the spring and reach the arm mount point, secure it with a 3x6mm pin on each side

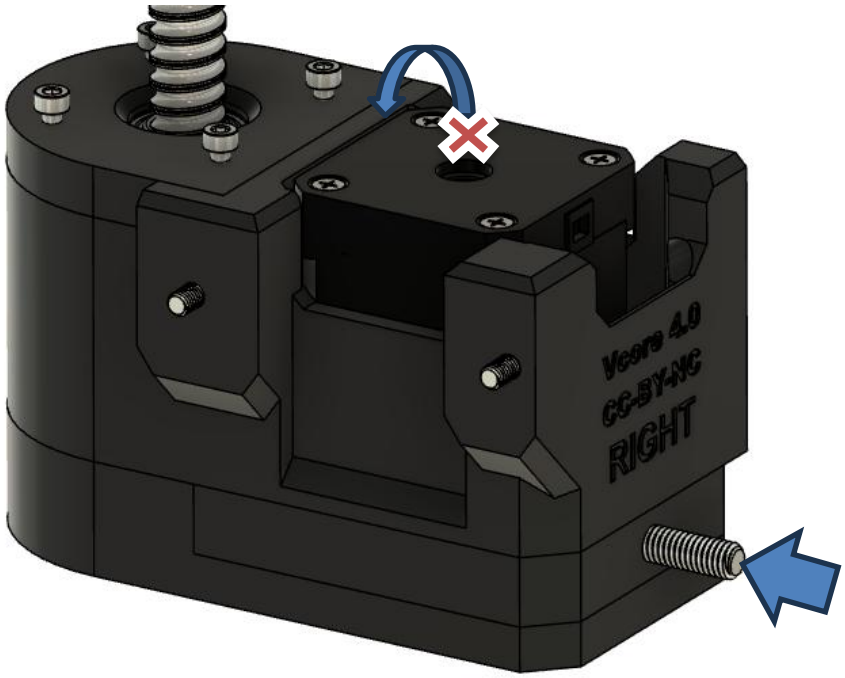
6 Z-Belts

For the purpose of the exemple, let's isolate the next pictures of the full frame.

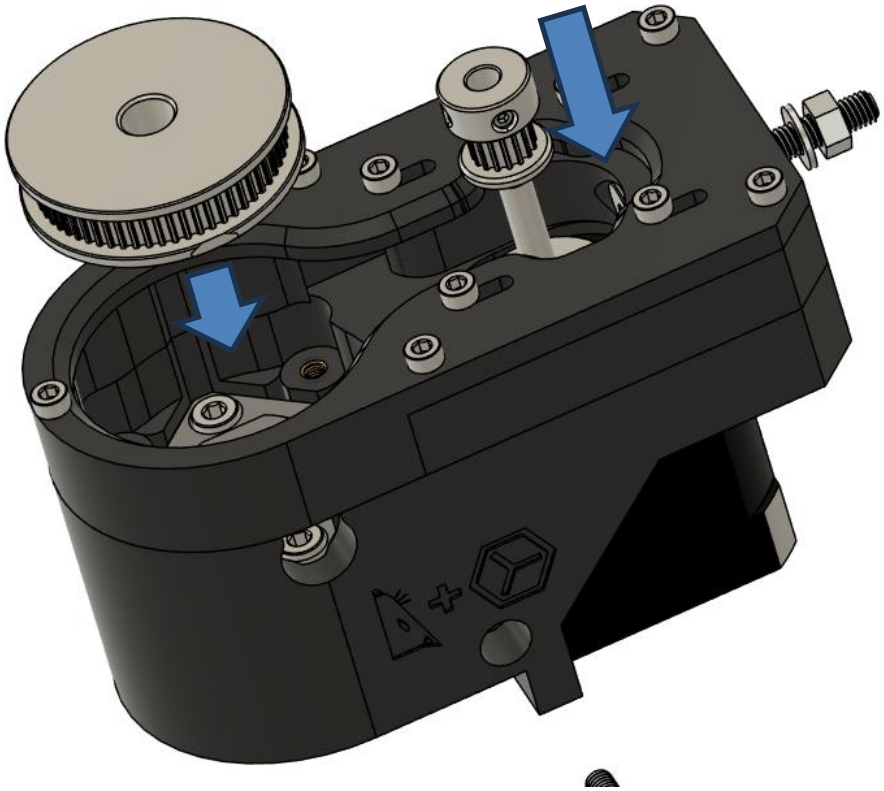
To insert the belt and the 60T pulley, we need the motor the closest possible from the spindle



Unscrew a bit the 4 NEMA retainer screws



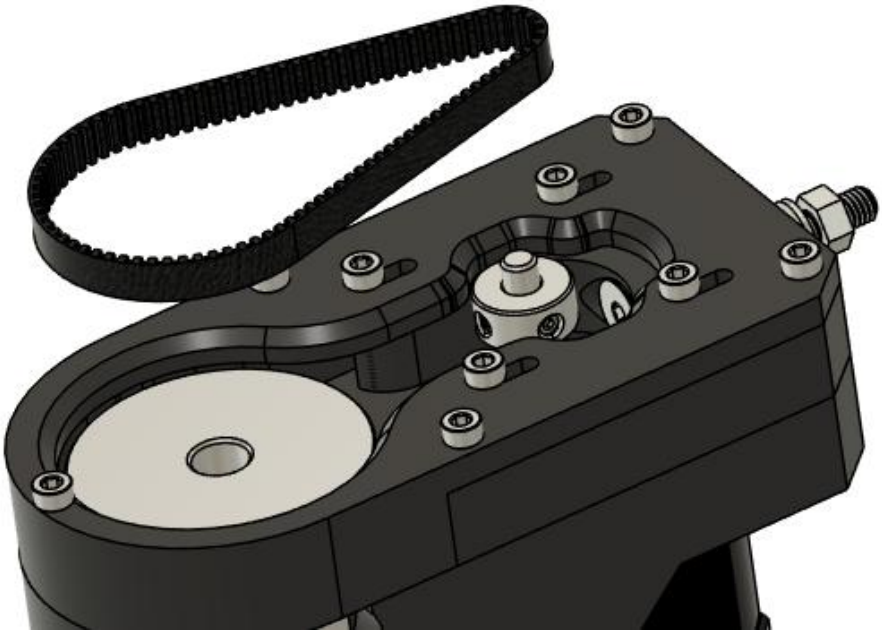
Push the M5 bolt to gain the minimal position.

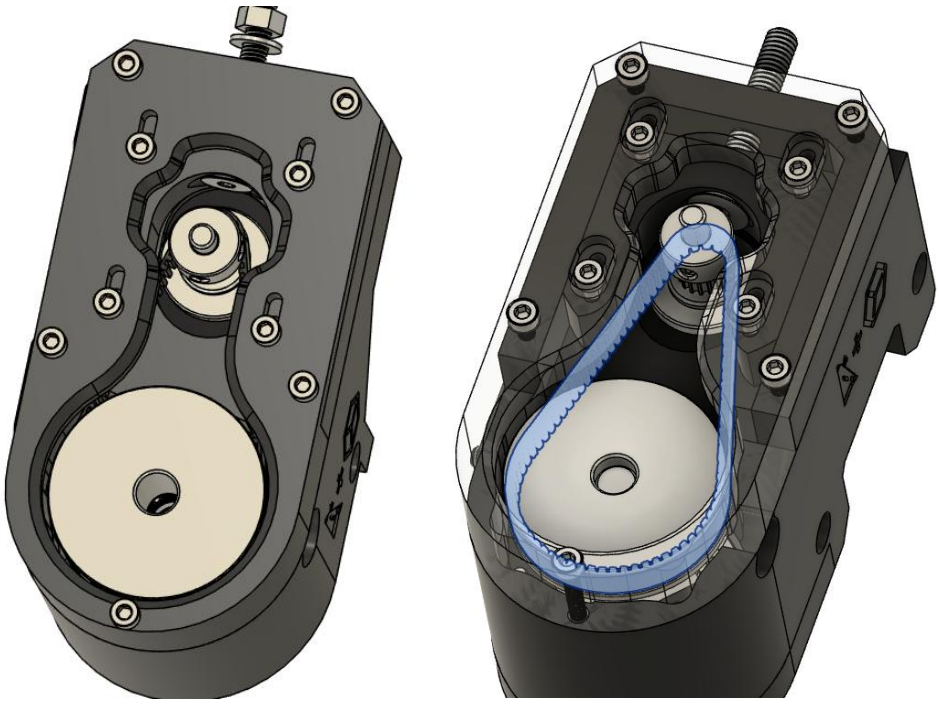


Place the 20T and the 60T, ther is few option to install the reduction here, everything can be placed in the same time!

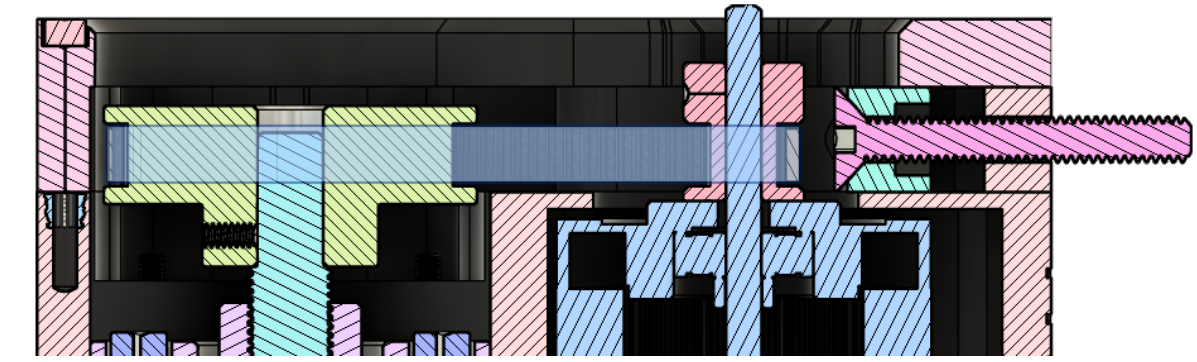
BE CAREFUL WITH THE 60T INSERTION, DO NOT FORCE IT, ALUMINIUM CAN BE DEFORMED BY THE STEEL SPINDLE

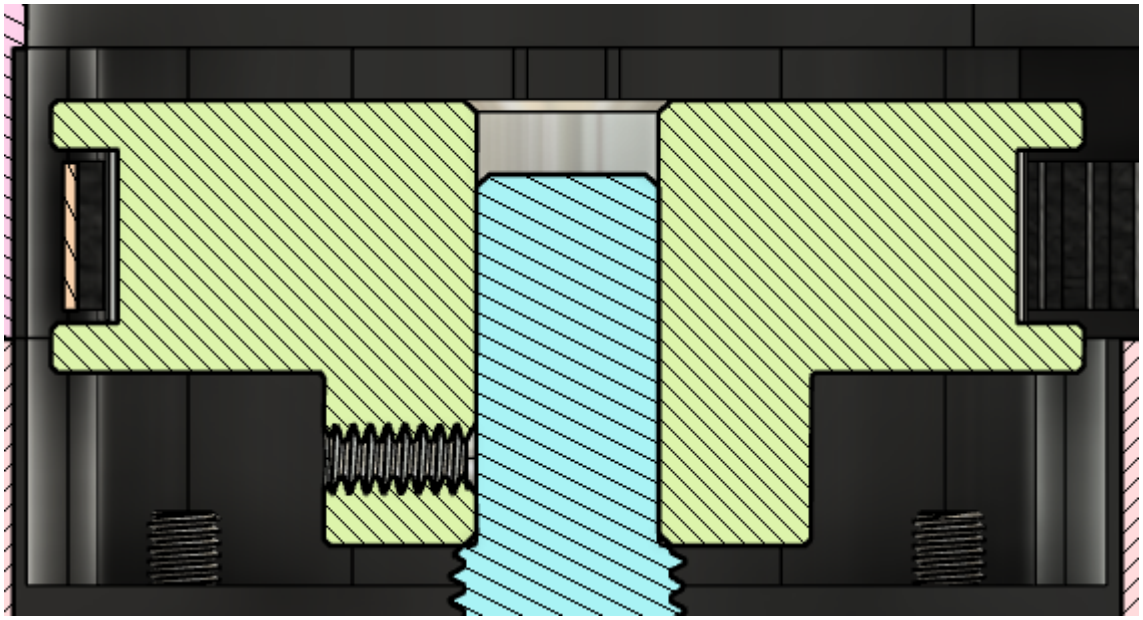
Then install the 190mm Belt and the 60T pulley. Wiggling it a bit to fit the 20T.



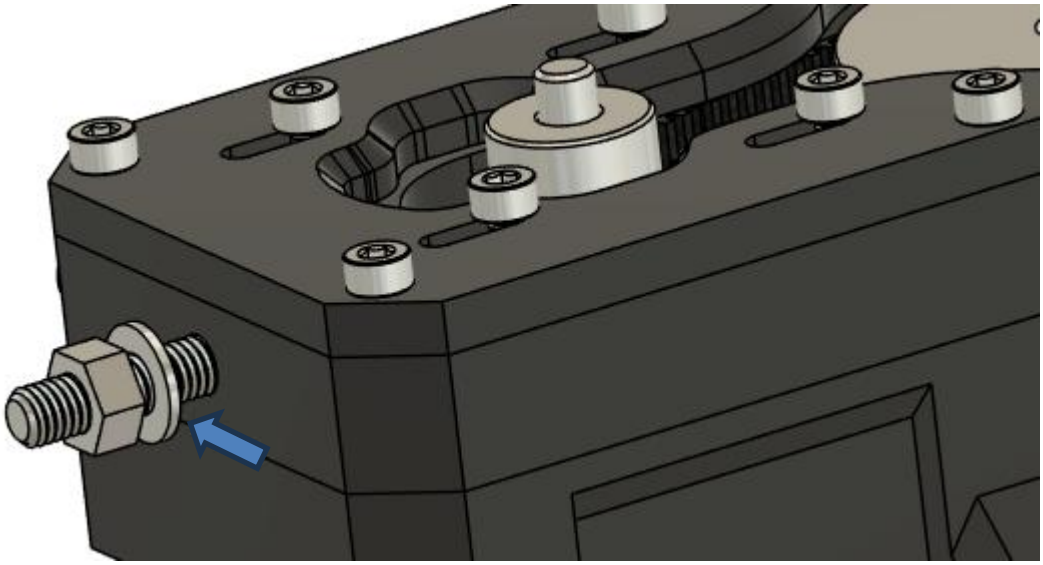


Control the aligment





You can now tighten the 60T headless screws



Now tune the belt tension through the M5 Nut + washer here

We need it to be tight but do not overtension it either, we want a ferm flex on the belt.

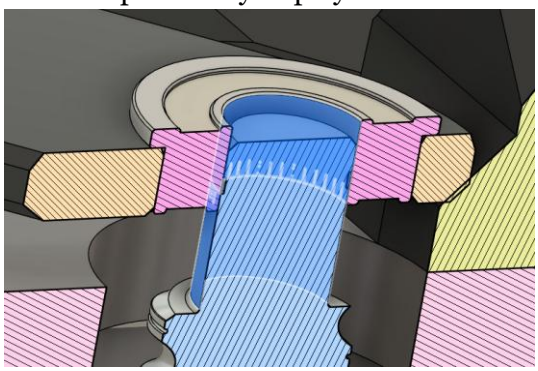
Repeat the process with the 2 other remaining block

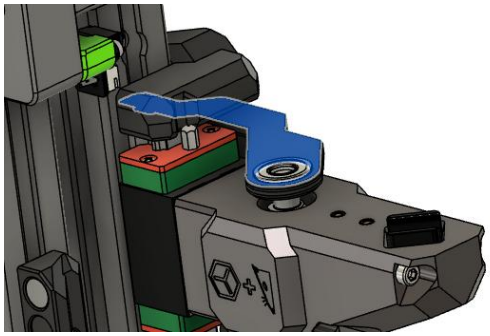
7 Final assembly

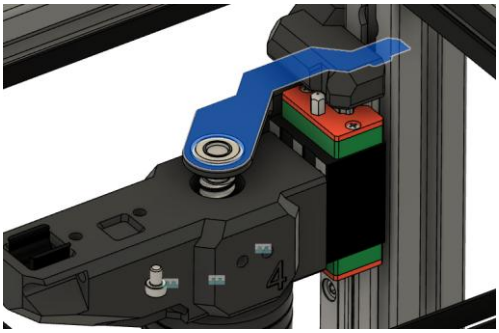
For the 1204 version, simply keep the standard stock LS/BS retainer at the top, we use the same ID 8mm bearing

If you are using the 1605 variant, use the compatible bracket designed for 10mm ID bearings (6000-2RS)

In order to get some safety for potential collision, place the retainer with 2mm margin, you have the possibility to play with the retainer position



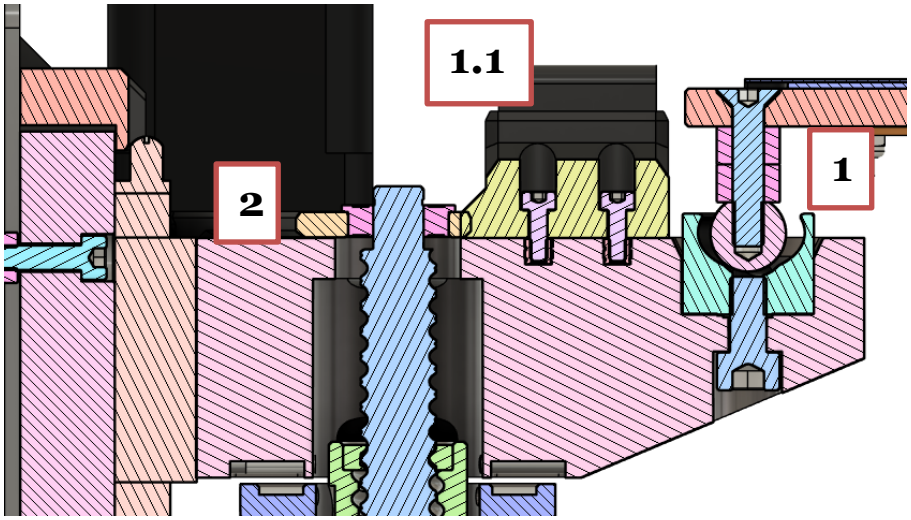




You can adjust a bit the height of them if necessary.

You can at this point add the bearing balls into the OLDHAM/WOBBLEX assembly

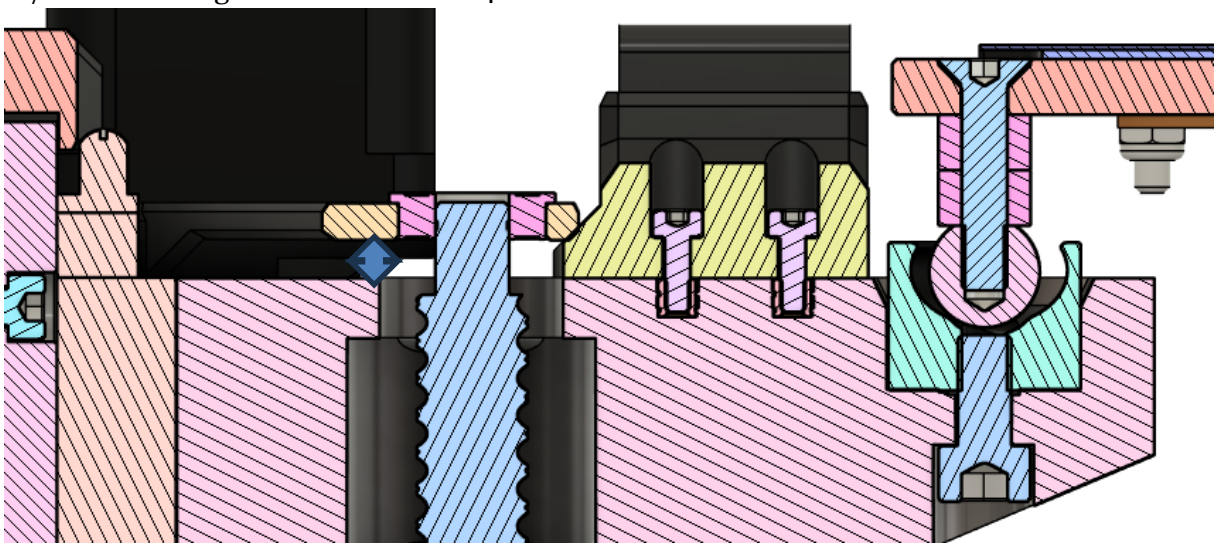
-Depending the Hot end you will use (Rapido, Magnum, Goliath, ...) or a custom bed, the max height can be different. There some adjustments that can be done to maximize it



-1/ Add some M5 washers on the bed feet, to add the necessary height missing

-1.1/ Elevate the wiper if necessary

-2/ Tune the height the the retainer: 4mm are available



8 Config cfg

The first thing to do is to correct the ***rotation_distance*** of all Z sections

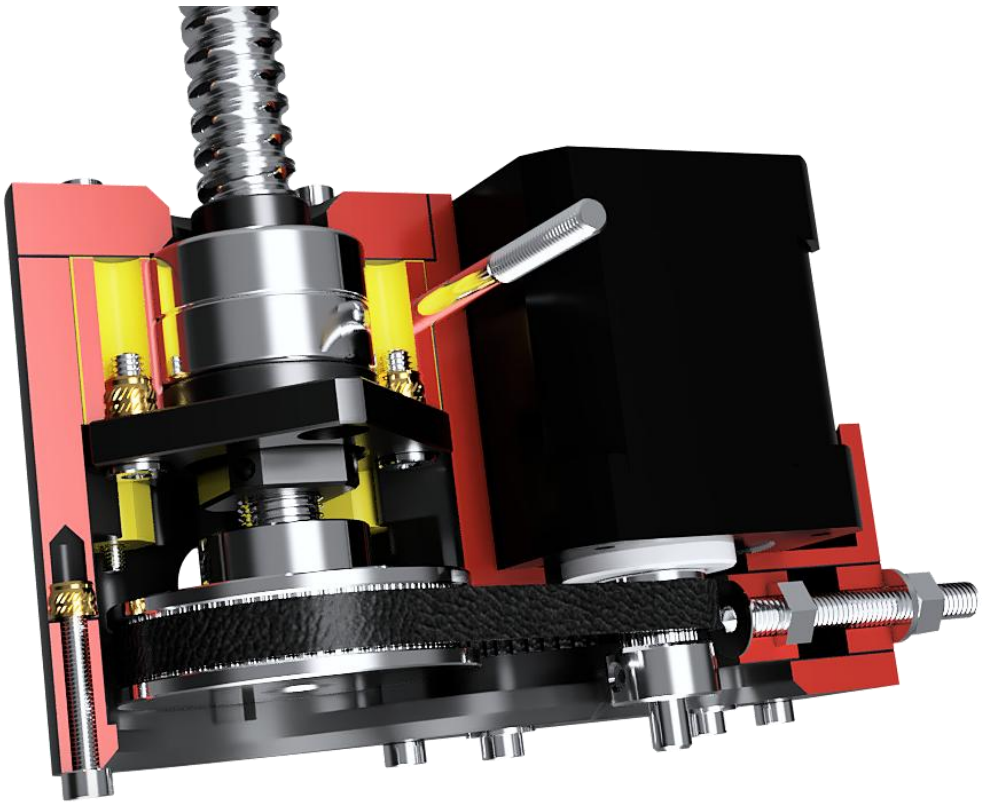
1204: ***4, transformed with the 1/3 ration to +-1.33***

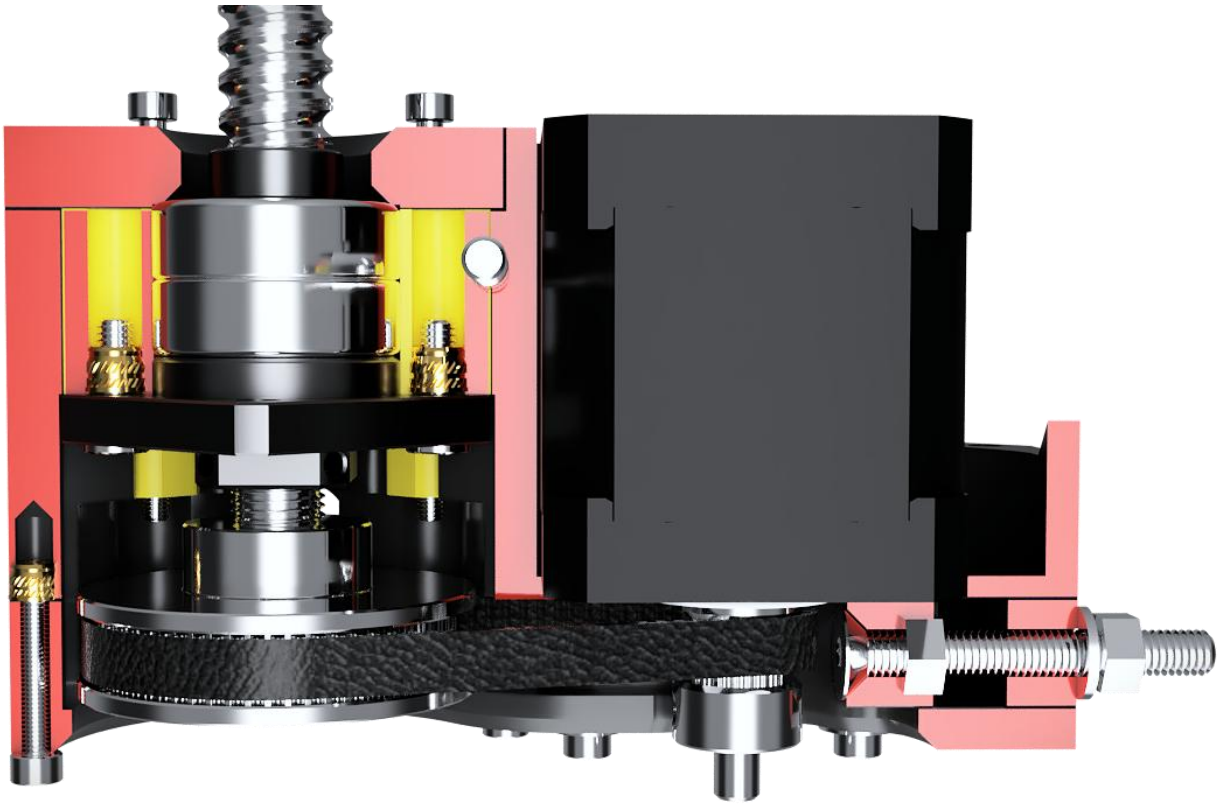
1605: ***5, transformed with the 1/3 ration to +-1.66***

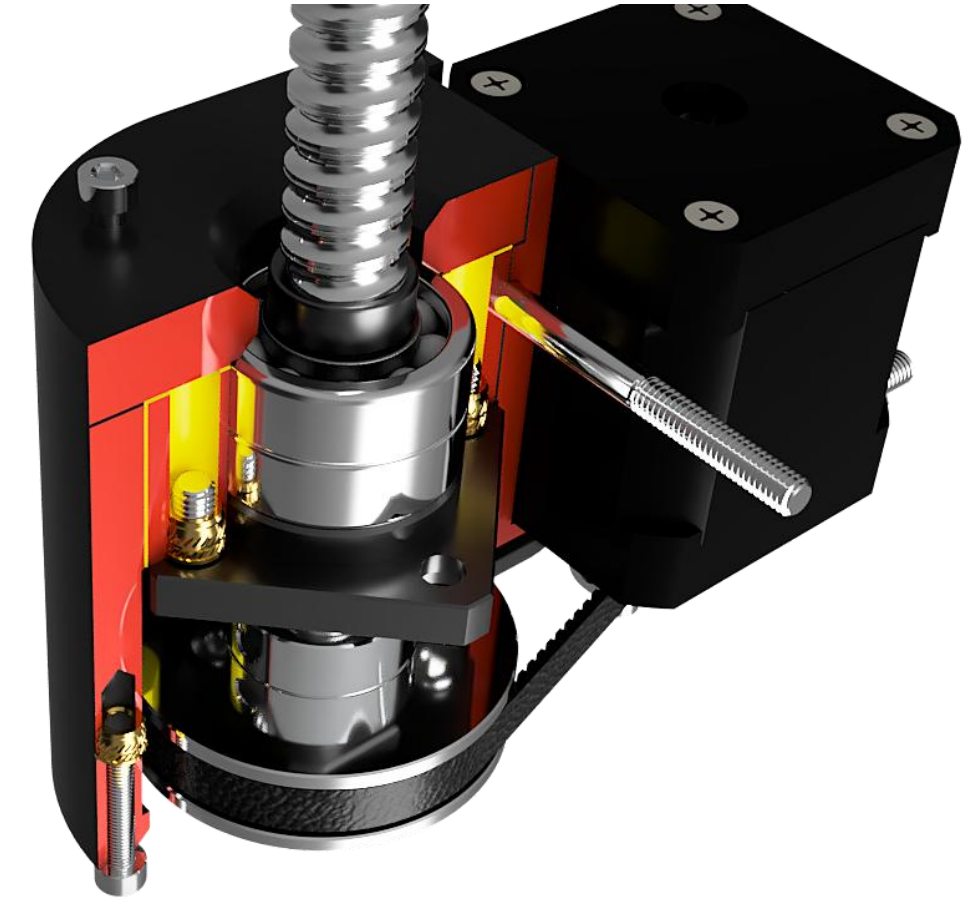
Then we need to reverse the Z motors since they are inverted (pointing the bottom)

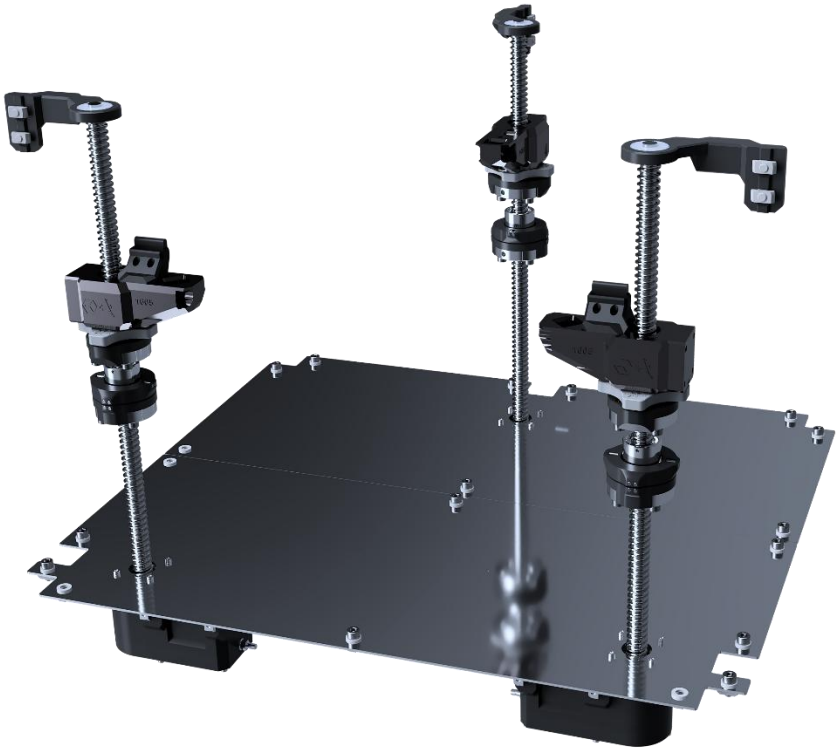
Simply add a "!" in front of the "***dir_pin***" (ex: **dir_pin: !PC12**)

9 Photo details









10 Assistance

If you need assistance ; I can help on:

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Meta Messenger: BRS-Engineering