MANUAL Kit Z-Upgrade with Oldham

Suivi des évolutions

Indice	Date	Description de l'évolution	Auteur
0.0	07/09/2021	Création	FBR
1.0	07/10/2022	MAJ	FBR

Rédacteur	Responsable X	Qualité
FBR	FBR	FBR

Le kit Nécessite :

Pieces Imprimées

R_Arm	X1
L Arm	X1
B Arm	X1
R BF_Retainer	X1
L BF_Retainer	X1
B BF_retainer	X1
R SFU Bracket	X1
L SFU Bracket	X1
B SFU Bracket	X1
Oldham Top	X3
Oldham Bottom	X3
Oldham middle	X3
Retainer cache	X2

Matériel :

SFU-1204	X3
SFU-1204 Nuts (+balls)	X3
BK10	X3
Roulement 608-ZZ	X3
Goupilles 7mm (optionnel)	X3
Ecrou BK	X3
Coupleur disques 5-8mm	X3
Aimant 8mm	X12
Bille acier 6mm MAGNETIQUE	X12
(Optionnel) Graisseur M6	X3
Inserts laiton m3	X8
Inserts laiton m2	X4
Inserts laiton m5	X12
Inserts laiton m4	X12
Vis pans creux M6 16mm	X24
Vis pans creux M6 20mm	X2
Vis pans creux M6 55mm	X2
Rondelle M6	X20
Vis pans creux M5x30mm	X12
Vis pans creux M4x12mm	X12
Vis pans creux M3x20mm	X8
Vis M2x8mm	X4
Vis M3x14 Fraisées	X3
Vis M3x16mm	X4
Tnut M3	X3
Tnut M6	X28

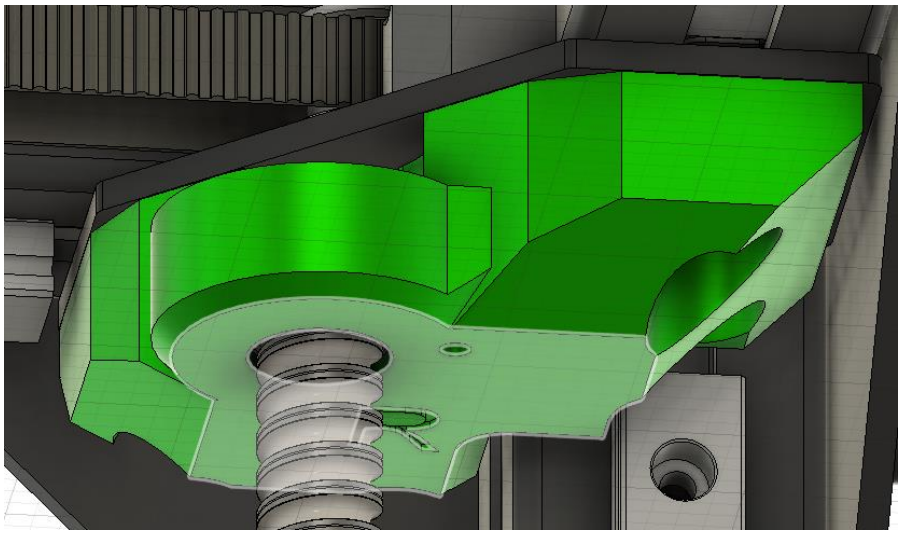
SOME FIGURE IN THIS MANUAL ARE NOT EXACLY BASED ON THE ACTUAL PART YOU WILL GET/PRINT. IT DOES NOT CHANGE THE WAY FOR THE ASSEMBLY SINCE THE PARTS DOESN'T CHANGE THAT MUCH TO JUSTIFY A MANUAL FULL REVISION

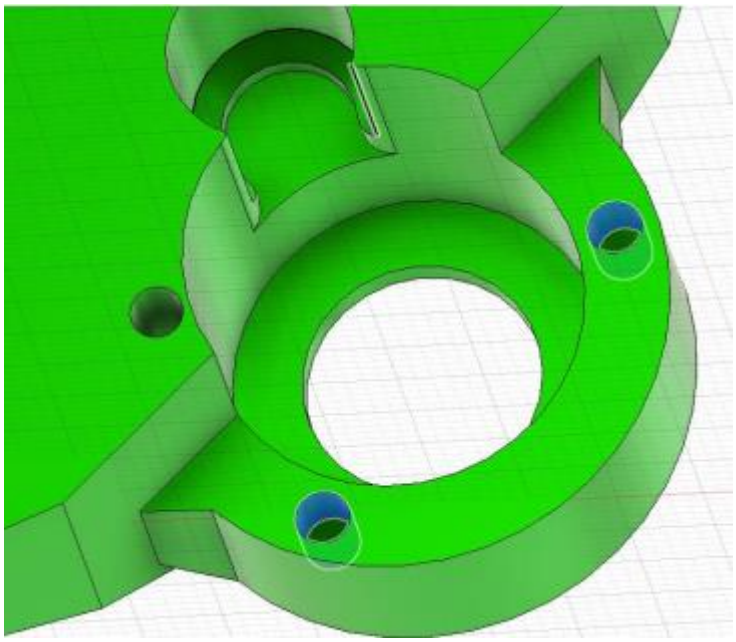
Retainers

Each block is fixed under the XY idlers: 4x M6x16 screw with the M6 Tnut through the Aluminium plate

For assemblies not made, follow the RR manual and add the part to the screwing

For assemblies already made, disassembly of the XY idlers will be necessary





Insert 2x m2 inserts here

!!! Do not insert 608ZZ Bearings now!!!

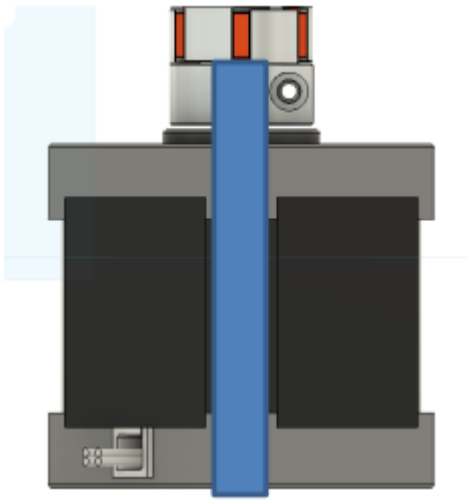
The rear retainer will serve as a support for the vertical 3030 posterior extrusion: remove the upper aluminium angle. The thin slide goes up on the upper horizontal extrusion, use the M3x14 screws with 3 m3 Tnut to secure it

Be careful to remove this angle only with the electronic back plate already in place to block his alignment

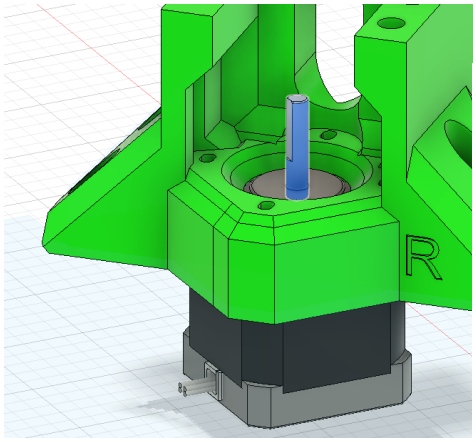
R+L Motor Blocks

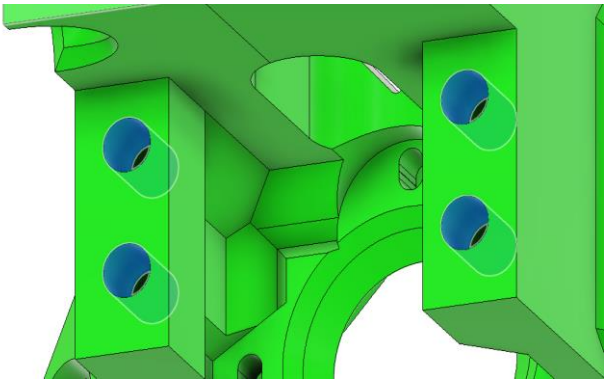
Cut the NEMA axes so that the 5mm coupler reaches 0.2mm (cutter blade) depending on your motors or structural size, a different value may be more suitable. Attach the lower part of the coupler and insert the red spider

It is not necessary to put the original thrust bearing, the BK10 supports the screw and the bed.



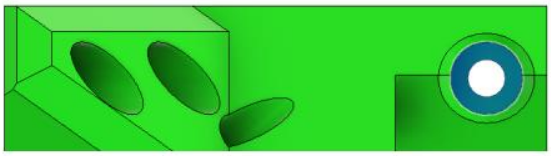
Attach the NEMA to the block, do not over-tighten the screws so you can manage the alignment later





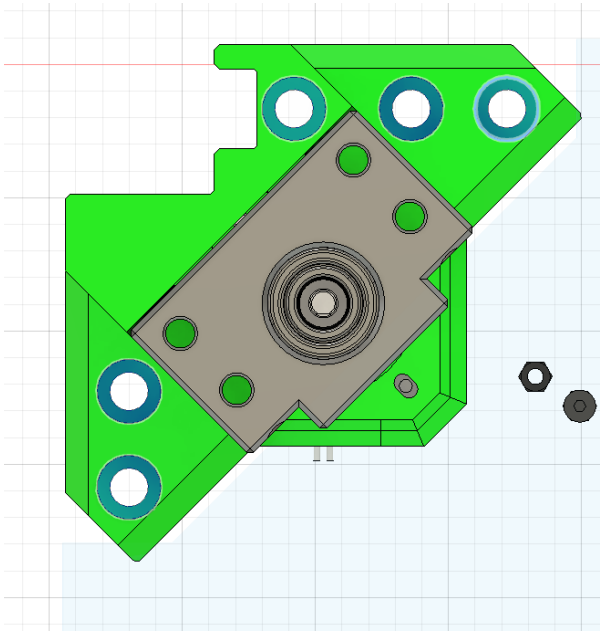
Insert the M5 brass inserts hot, THIS STEP REQUIRES A GREAT PRECISION in the 4 top holes, they must reach the flower or slightly below.

Insert 4 M5 30mm screws, take the thread loosely.



The vertical mounting hole, use to secure and align the SFU at the end, made for a m6x16 + Tnut

Place the block on the machine angle and insert 4 screws M6 16mm and one M6 55mm,



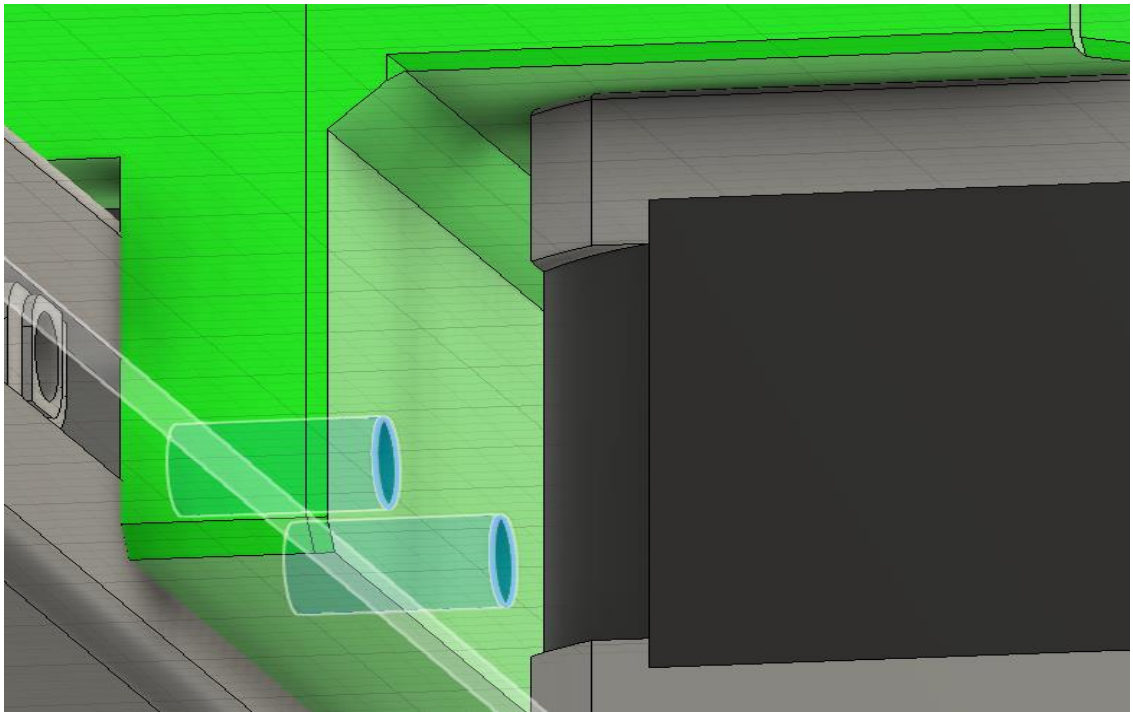
with their Tnut and let loose

Rear motor Block

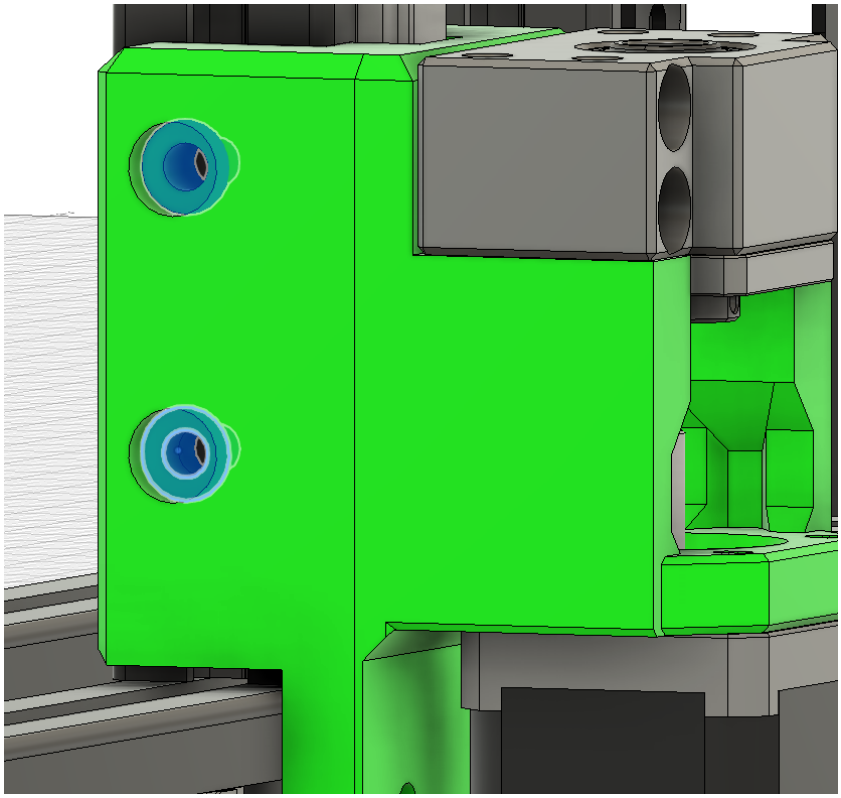
Mount the NEMA in the same way as the front blocks.

Warm insert the 4 M5 inserts

Once assembled, attach 2 12mm M6 screws with two Tnuts on bottom holes



Insert in bias and come position the other inserts by hand, the operation is not obvious but feasible! The use of ball nuts can simplify the task.



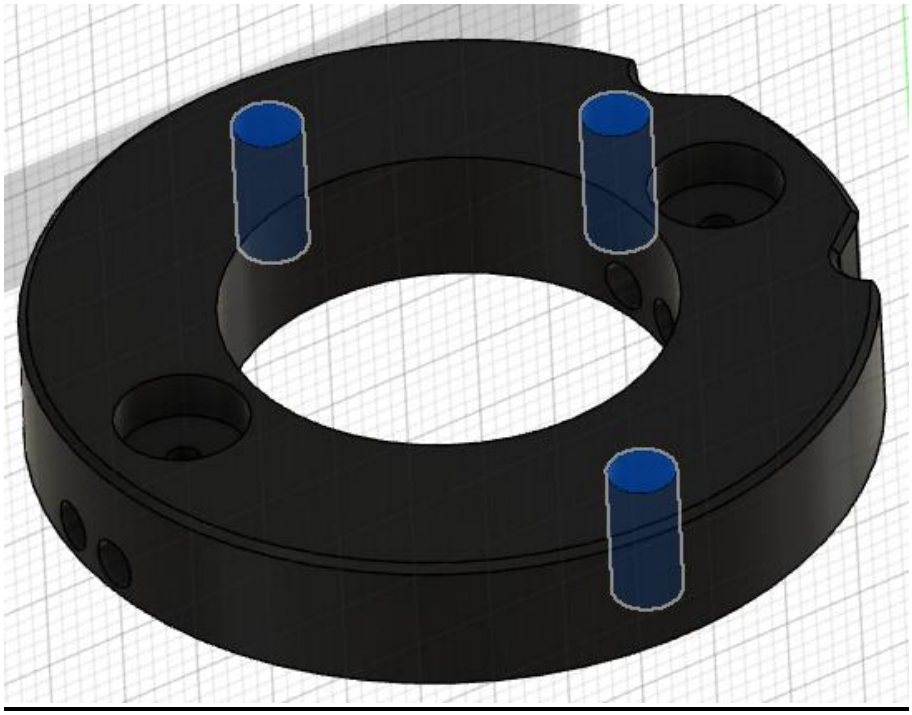
Similarly, do not tighten for adjustments according to

SFU ARM Assembly :

-Part preparation

Install all inserts and all the dowel pins

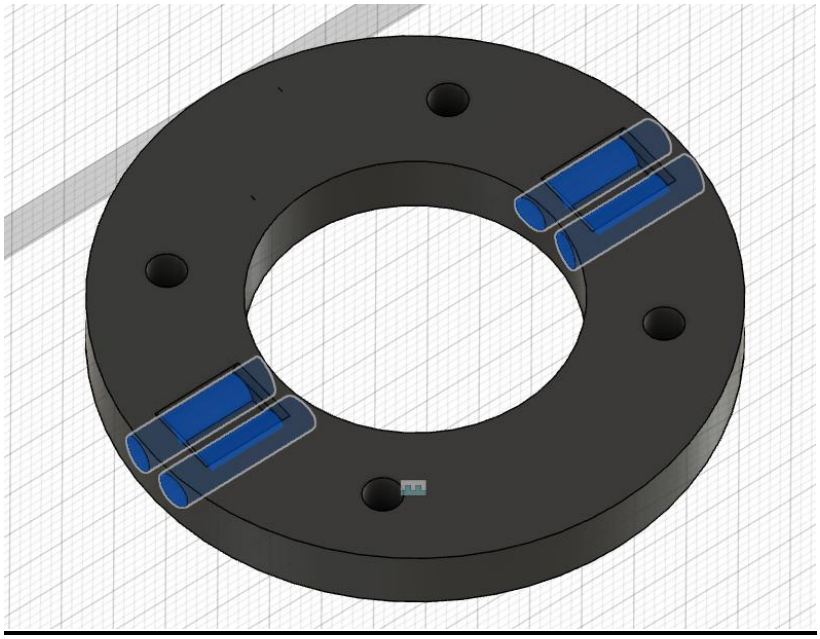
M4 inserts here on the lower ring



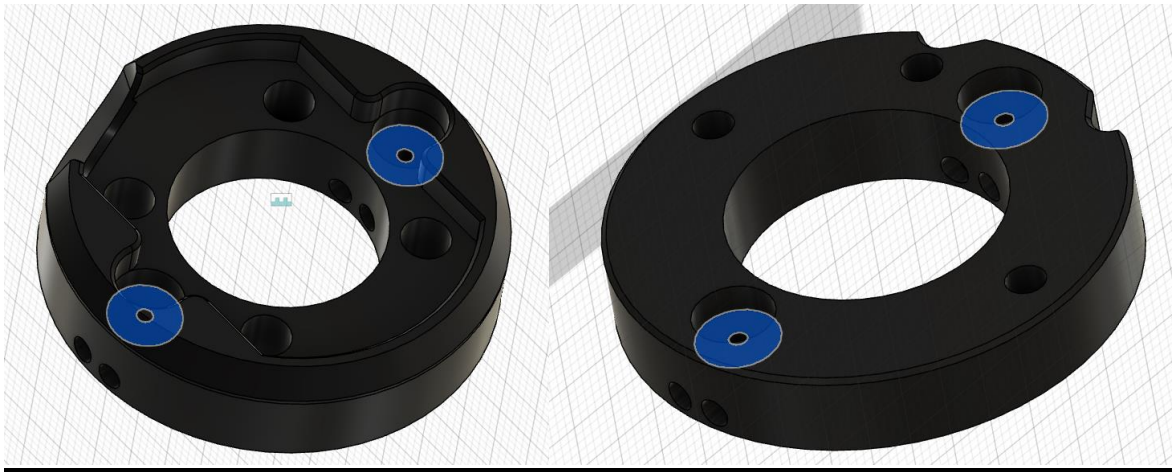
M3 inserts here

The R and the left parts contains 3 slots for inserts, mirored between R and L, the rear one is either a left or a right part, we only use the 2 laterals holes at 180° angle.

THE LAST REVISION IS REBUILD AROUND A UNIFIED CENTRAL DISK? ONLY INSERT THE DOWEL PIN ACCORDINGLY WITHOUT THE M2 INSERTS AND M2x8 SCREWS



Dowel pin on every 3mm holes



8x3mm magnets here on the lower and upper parts.

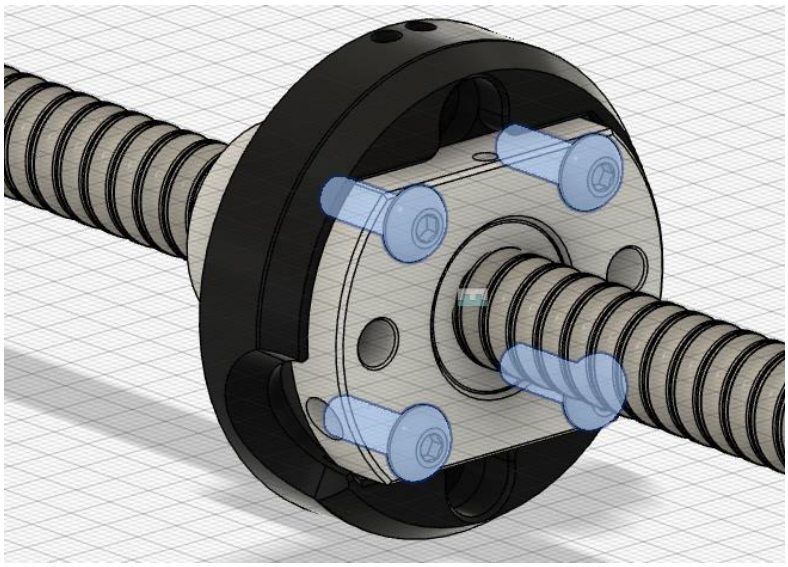
Center ring build

You can assemble the 2 middle parts / SINCE LAST REVISION THE CENTRAL RING IS UNIFIED

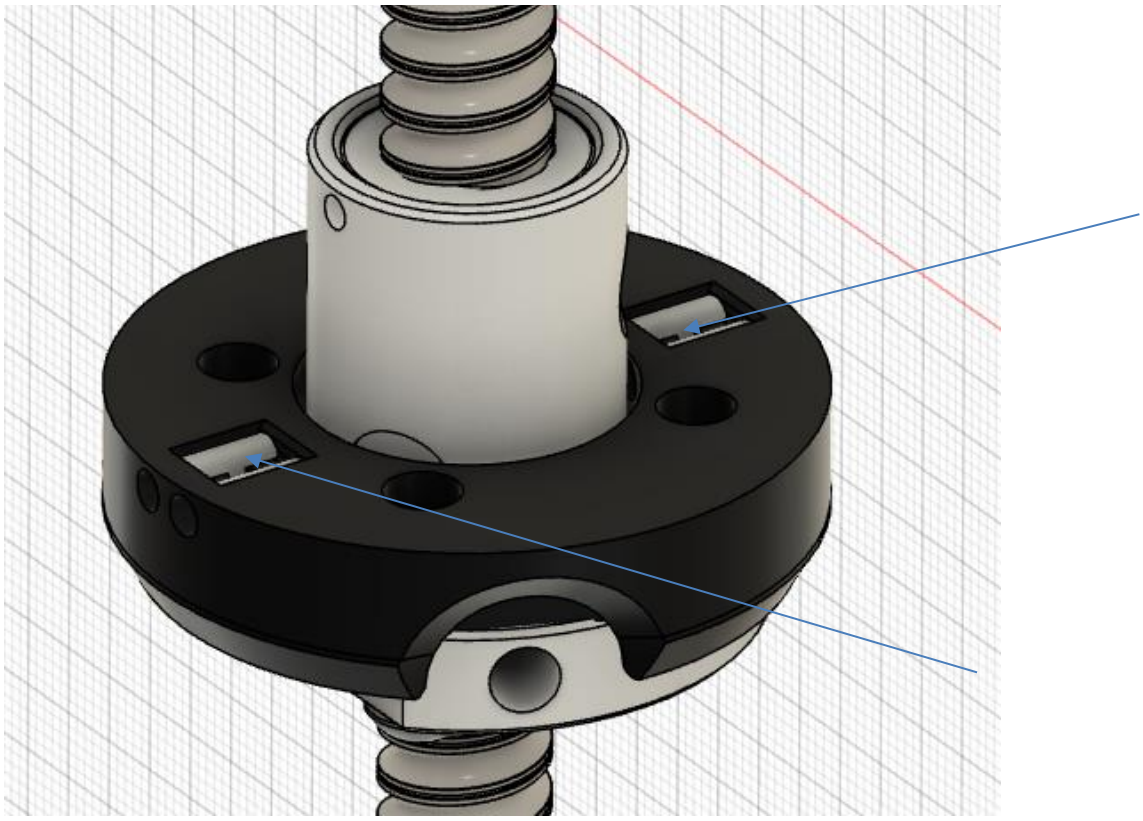
EPAHT can handle 25Kg on ech disc without issue

Other materials can see this number bellow, but we need less than a 2Kg resistance in a VC300. This design is made to last or be used in a very heavy solution, like 8-10-12mm bed for custom size VC 800+

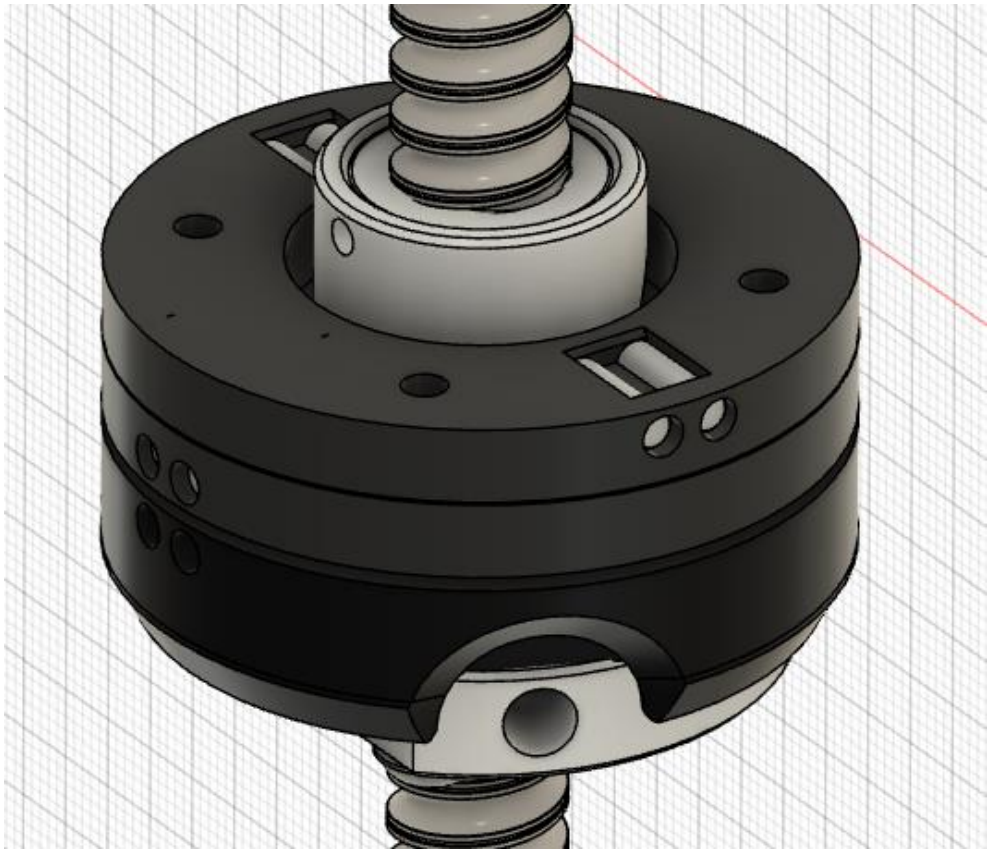
SFU1204 assembly



Install the lower disc, 4 m4x12 are needed fo each



Install 2 ball bearing on the dowels.



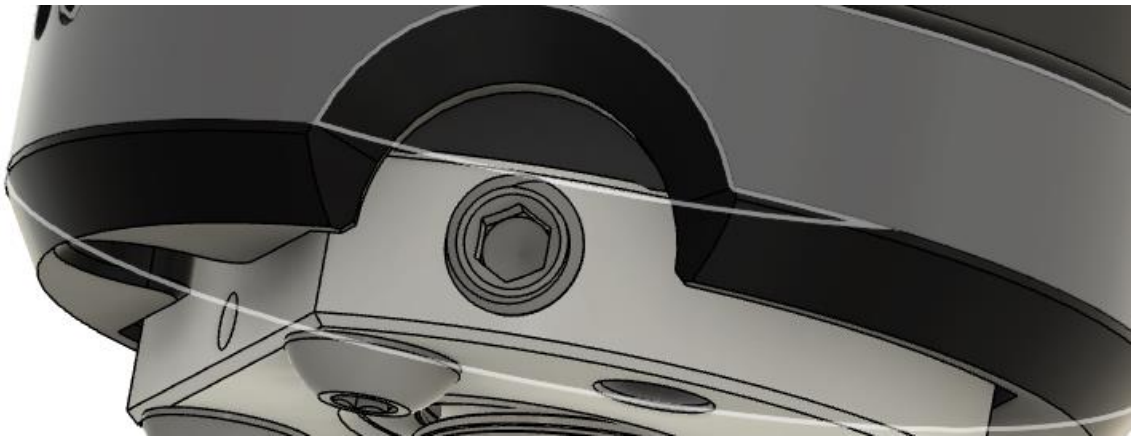
Stack the assemble central disks and install the 2 other balls bearing

Stack the upper disk

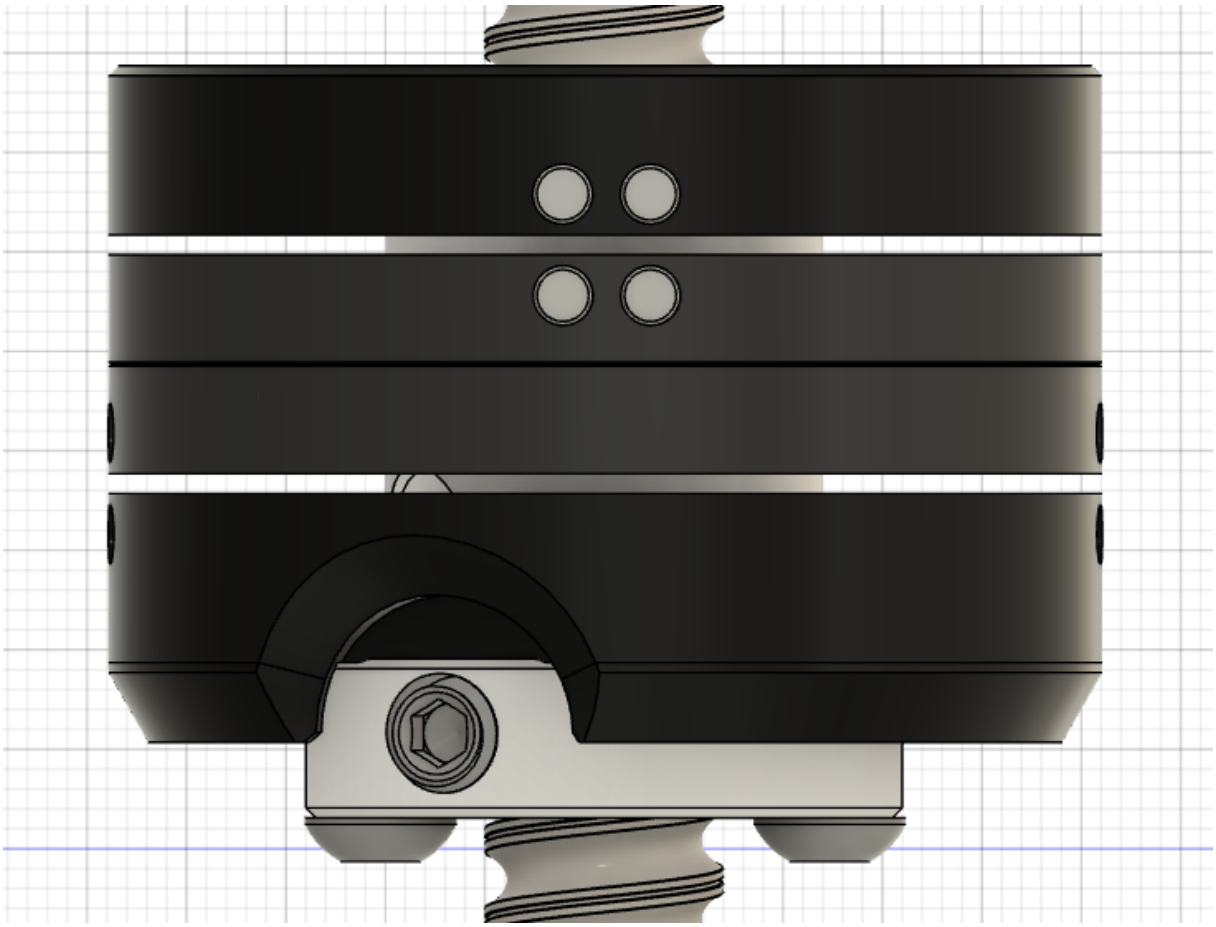
Before fixing the top to the Arm, make sure everything is in place and can wobble without any hard point. The ball bearings can be a bit unstable, the load of the bed will secure it in place.

-Grease it !

Apply grease un the nut, you can know if it's full by looking for grease presence under at the seal of the ballscrew, half a mm of it should appears. Close the hole with a grease nipple or a m6 headless 5mm screw



-Final checks



Check that the disks are paralells to each others

Check the balls bearing still in the dowel chanel

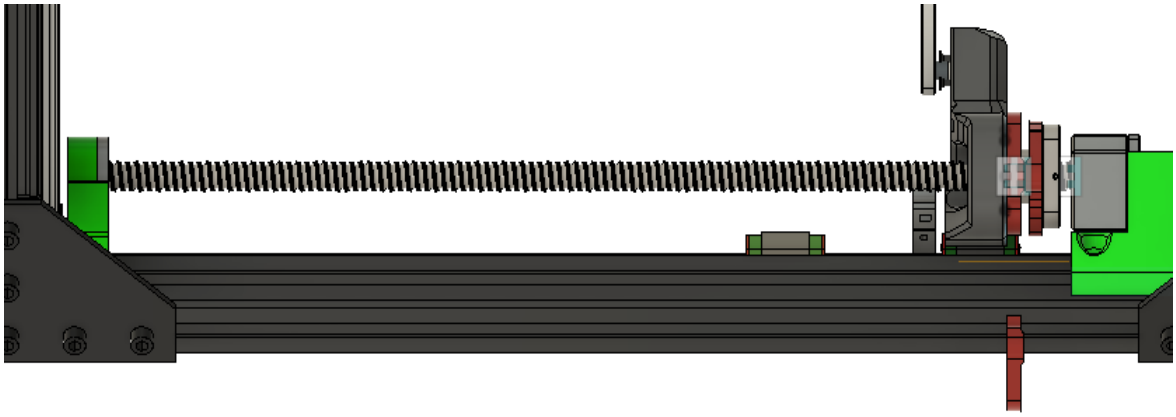
Make the kinematic works a bit: try to simulate a wobble by hands

DON'T FORGET TO TUNE THE Z_MAX distance in Klipper

Z Axis assembly on the Frame

Remove the screws from the BK10 and insert the screws on the bottom pitch of the ball screw, slide the retaining nut, screw it partially. Pre-position loosely, the second part of the coupler by reassembling it as far as possible against the clamping nut. Insert the top of the screw into the top retainer ring (without bearing). Flip the axis to remove the BK10 on the bottom bracket insert platform, secure the BK10 with the m5 nuts.

Repeat on each axis

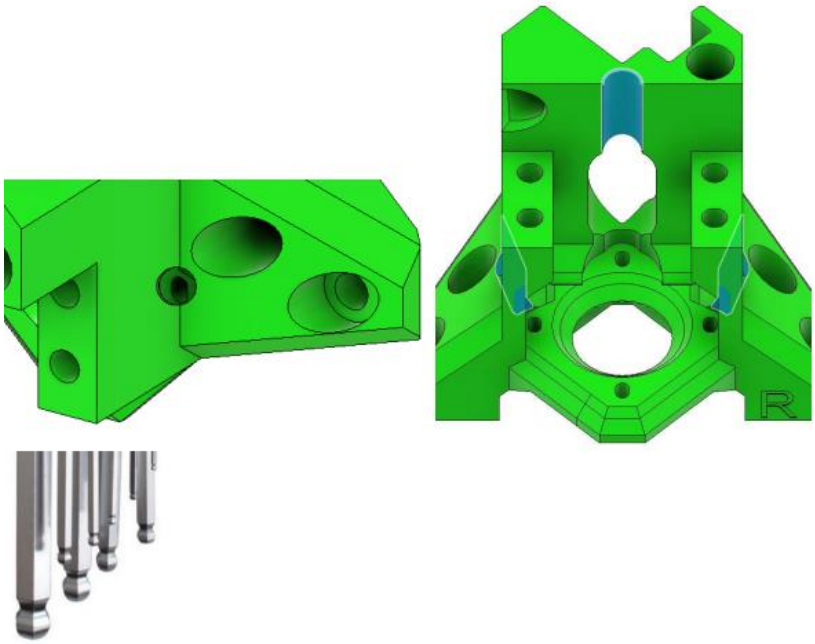


Check for consistent NEMA/BK10/Ball Screw/retainer alignment.

If no mounting errors have been made on the Vcore structure, or on the printing of parts, or on the insertion of m5 inserts, the alignment should be correct. Partially insert the 608zz bearing to finish the control. You can play on the sets of coins to get there. Once this matches, remove the 3 assemblies and tighten the NEMA support.

Reinsert the 3 sets and insert the bearings completely into their cage, a circlip comes to lock the screw from the top (optional) The quality of the assembly will depend on its installation. His absence is not a problem.

Tighten the 4 screws of each BK10, couplers, brackets.

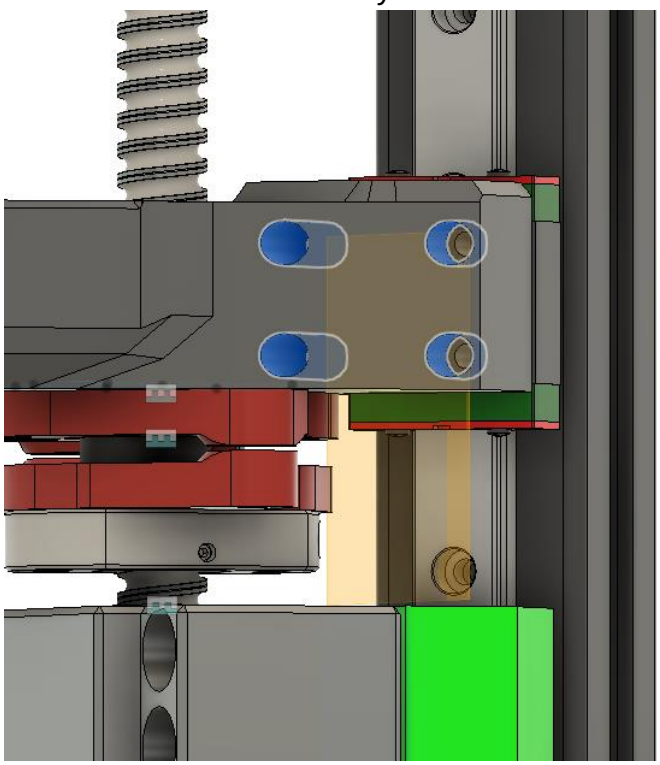


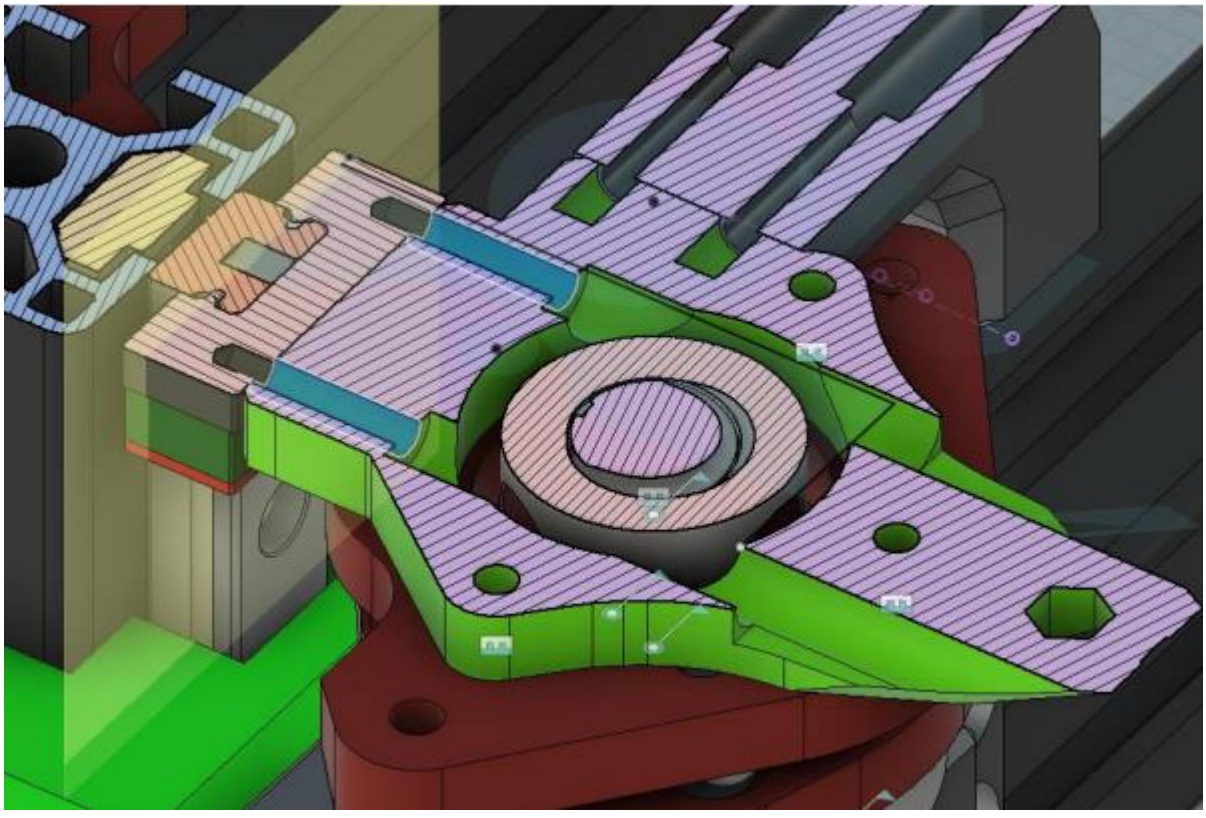
Since the last revision 1.6, support pieces (slight differences) of the lateral oblique openings help the tightening of the Nemas; use a round end alen wrench removing the 3 set in no longer needed.

Insert the 3 608ZZ bearings, use a sleeve to force the retraction into the printed part. The fit is very tight, you will have to force its insertion, this is normal, be careful not to damage the

shielding of the bearing. Apply the circlip using specific pliers. If it does not fit, the assembly is prône to be faulty, the circlip is not mandatory but is recommended A gap is possible between the BK10 and the motor mount, a margin is made for adjustment, so this is normal

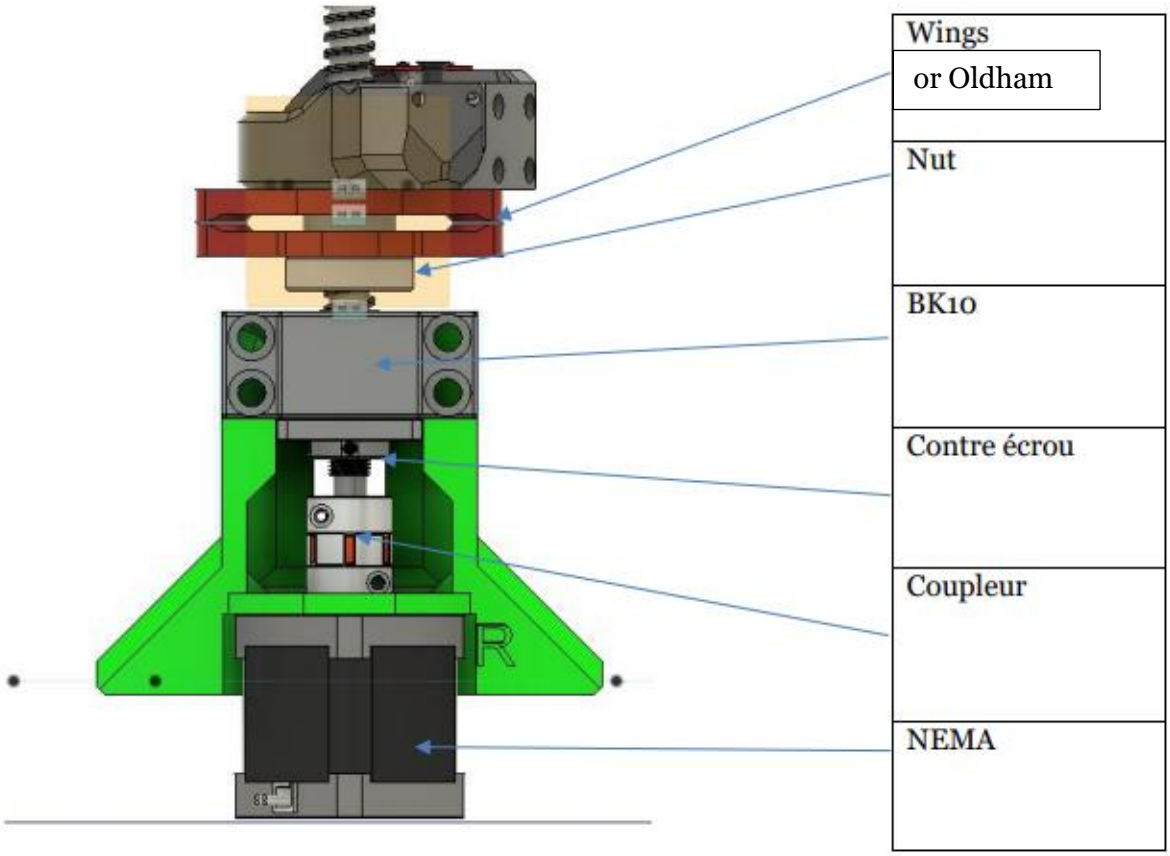
Screw the arms to the trolleys of the 3 linear rails.

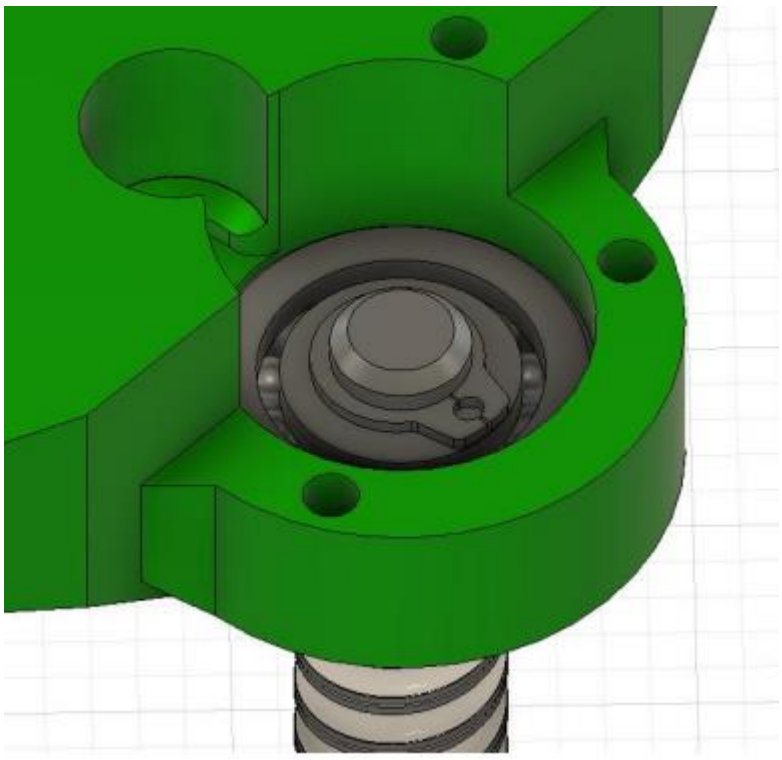




Control a rotation without hard points, without deviations.

Double check the screw clamps.

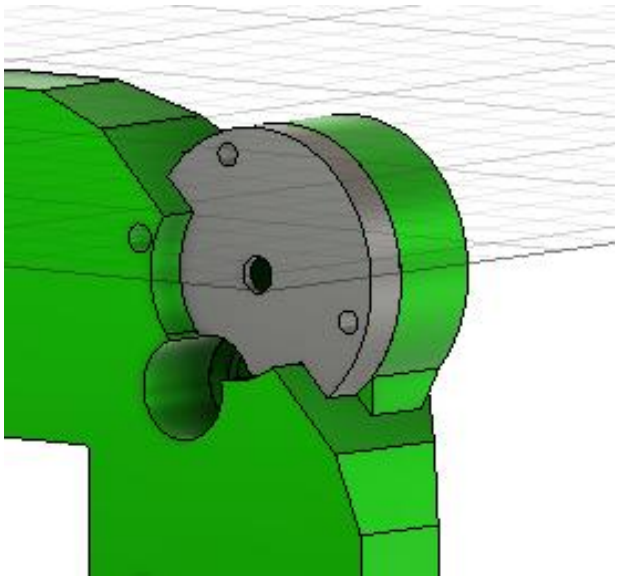




Install the circlip (optional)

Tighten the 4 screws of each BK10, the couplers, the supports.

You can attach the bearing protectors on top of the retainers (except rear) and screw them with 2x m2 8mm



Strictly recheck the alignment of the screw in relation to the upright of the printer, finish tightening the low supports as soon as the dimensions are satisfied

Check the rotation without hard points, without excessive deviations (there will be some).

-Clean the ball screws with a clean cloth and lubricate them with a HIWIN GS04 type grease or any other lithium based grease compatible with bearings

CAUTION, grease loaded with particles such as Graphite, ..., are to be avoided, do not use WD40 (except cleaning), dry PTFE lubricants are also to be avoided

-Close the m6 openings of the ballnuts with grub screws or M6 grease nipples

Position the nuts of the screws at the bottom, control the rise of the arms by releasing the coupling from the magnetic decoupler, control a fluid and linear movement, without hard points and without the arm rubbing the SFU1204. Repeat the alignment if this not the case.

Check the parallelism of the decoupling wings, the 3 balls must be at the interface of the 6 magnets. A lack of parallelism will over time deform the parts by stress and compromise the functions.

The decoupling wings or Oldham are capable of handling up to 2.4mm circular deflection. This is more than enough for C7 grades.

If the ball screw or its nut touches the wing, then either the Grade is not C7 or the screw is defective or incorrectly fitted Double check the screws tightness.

screws and reciprocal m3 hammer nuts on the upper part Slide them in using a magnetic alen key.

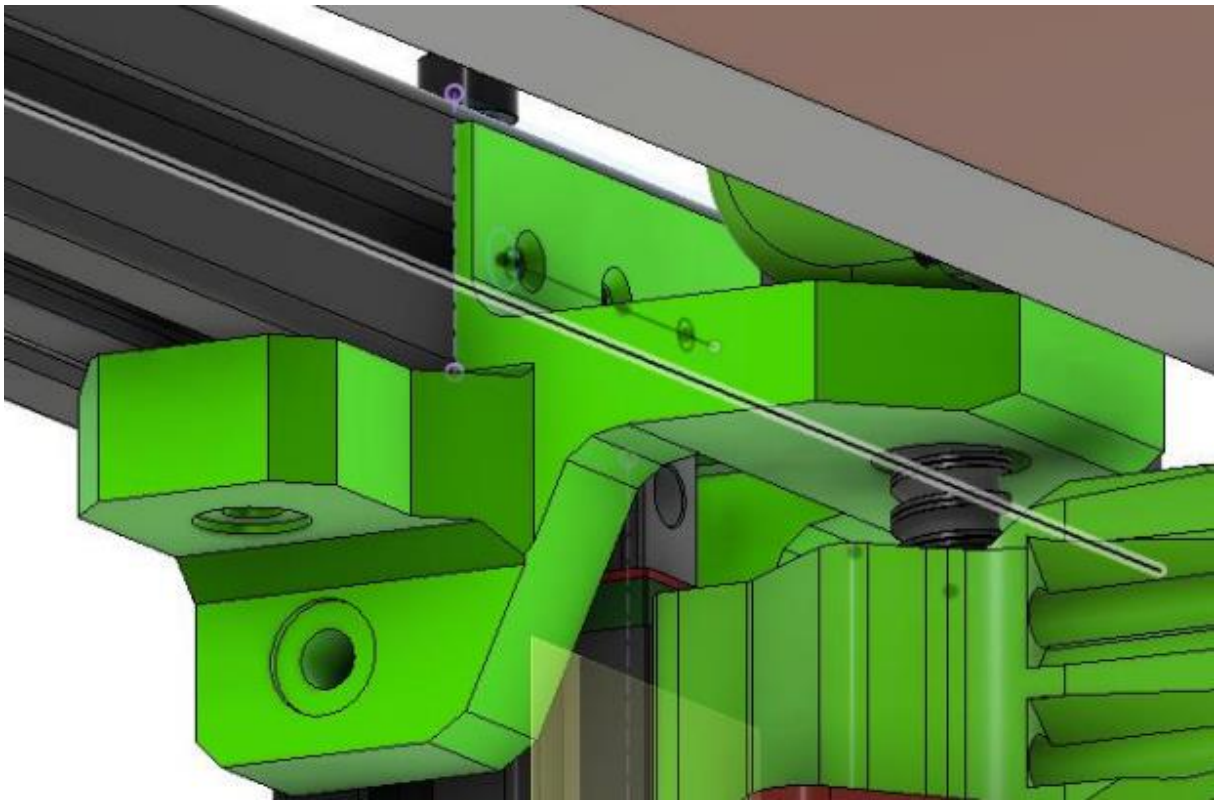
Control and / or adjust the depth of the Y endstop so that the distance between the back of the EVA does not collide with the rear bar and the top of the binding. As is the print volume with an EVA Mono 5015 is 410x410x364

For the dual 5015 count 410x385x364 * For Mod 7530 count 410x375 * *(active)

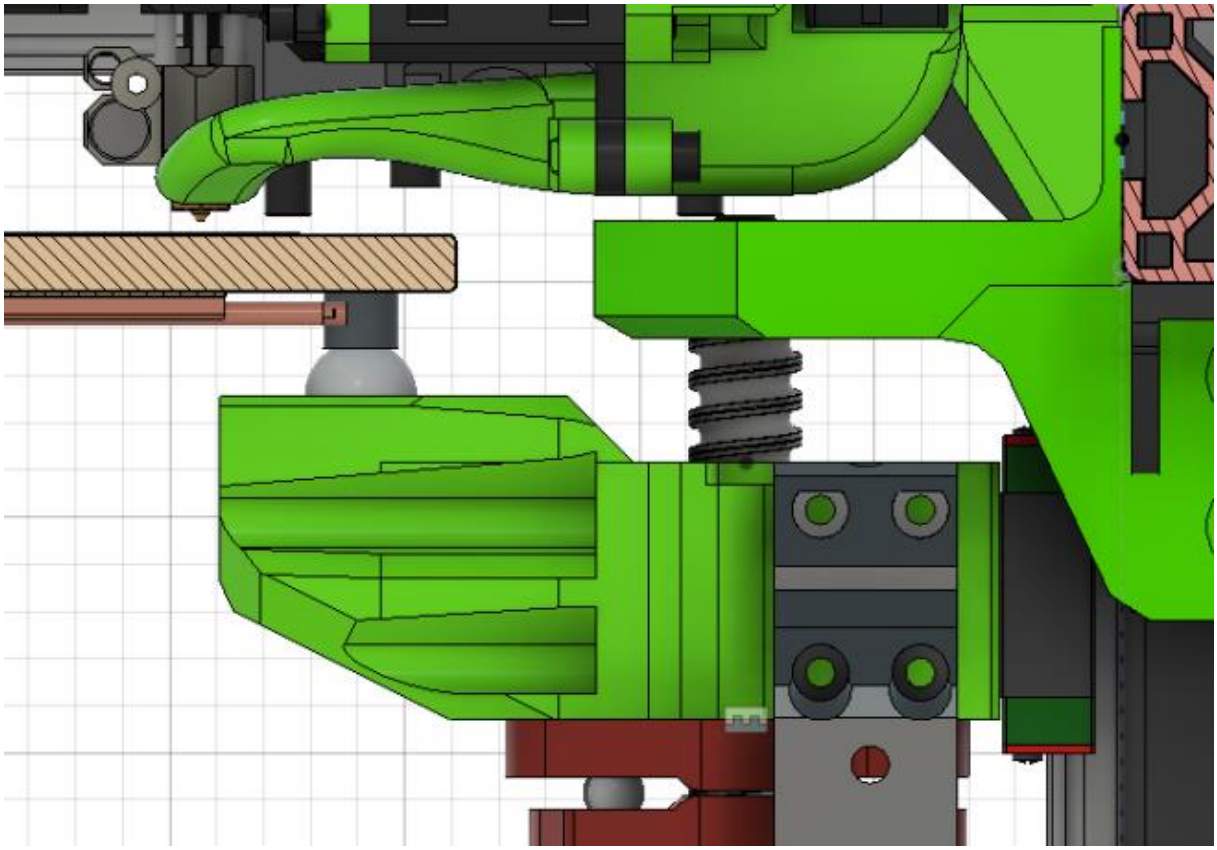
ATTENTION: These figures relate to my mounting on a 400mm ^ 3

It is mandatory to make your own limits and measurements to integrate them into Klipper's printer.cfg. The breakage of the machine or the ball screws is a risk if this step is not carried out rigorously.

For the Z axis, it is MANDATORY to modify the line [Stepper_Z] position_max: 364 (+ - 5mm) (your value). A ball screw can literally twist the frame or crush parts due to its high torque, **THE MISTAKE WOULD BE FATAL** for the machine or your fingers.



Install the 3 screws by hand to bring the bed to the level of the nozzle to check the margins. A safety distance is provided for the Tilt adjust and for a margin of error.



7-Options :

1- Bed drag chain : 3 parts needed, 1020 chain, 2 printed parts, M5x12 and Tnut m5

Final checks :

1- Check screw tightness.

2- Check Alignments

3- Hard Spot Checks

4- Lubrication Checks (Rails + BS)

5- Check motor wiring, order on stepper!!!! If not done; possible system break

6- Check engine functions in Klipper with “STEPPER_BUZZ STEPPER=stepper_z”

7- Z-probe check!!! if not breakable possible

Disclaimer :

The system is designed to operate on a properly assembled Vcore. Even a slight mounting error can make it impossible to upgrade. That said the quality of the design or the prints are strictly related to the assembly made by yourself.

If the parts to be printed are made by the customer, check the dimensions at the printer output. : Bad rib will block the assembly.

The machine will lose between 35 and 45mm Z travel

The kit is installed in the simplest way without destructive modifications of the machine, the old system can be reinstalled

This kit is an optional upgrade, its assembly and/or its function and/or its quality of execution are the responsibility of the customer. BRS-Engineering relieves itself of all responsibility in case of poor sourcing (poor quality and/or bad dimensions), bad customer assembly, or bad assembly of the basic Vcore.

The kit has proven are POC and its POW in quality control at BRS-E, As is, the design works with the expected expectations

By purchasing the kit, or having it done by BRS-Engineering you accept the GTC as well as the previous disclaimer

Thanks to you and your support

If you are satisfied with the design and function of this upgrade, and if you are going for the dematerialized solution without going through my printing services, consider a small symbolic donation on my website to allow me to continue the R&D, which is particularly time-consuming. (425h for this upgrade)

PayPal