

Manual for L3VER M1 motor block

Suivi des évolutions

Indice	Date	Description de l'évolution	Auteur
0.0	22/06/2022	Création	FBR
0.1	10/10/2022	MAJ	FBR
0.2	09/02/2023	MAJ	FBR

BOM :

Printed parts

Top Part	X1
Bottom Part	X1
Lever	X2

Hardware :

T-nut M6	X6
alu spacer OR printed spacer	X3
T-nut M5	X3
Inserts brass m4	X3
Inserts brass m5	X2
F695-ZZ / 2RS	X12
695-ZZ / 2RS	X6
Shoulder bolts m4D5 35mm	X3
Shoulder bolts m4D5 45mm	X2
Countersunk m6x12	X3
Washer M5	X2
Washer M4	X2

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Countersunk M5x40	X2
Flanged M5 hex nut	X2
Microshim 1mm m5	X7
M6x14	X3
M5x40	X3
M5x15	X2

Pre-check

BEARINGS



It is a good idea to check bearings health before assembly, it can solve issue before spending time on a painfull full check.

- Choose a 2RS or a ZZ protection to remove the dust to be a future issue
- Check the bearing armor (ZZ) it should be flat, no pinch, no deformations
- Roll it by hand to check an eventual hard point, proof of an internal issue
- Check the presence of dark oil coming from a junction (used bearing), if present, change the bearing. (Bearing are generally cover by a clean film of clear oil/lubricant that is normal)

The M1-M2 design has been made with not need and possibilities to compress the bearing, meaning there will be no issues relative to that.

BELTS



I always advised to use quality genuine Gates belts in order to have less issues in the future, be sure to have the good length (at least 15mm more on each side)

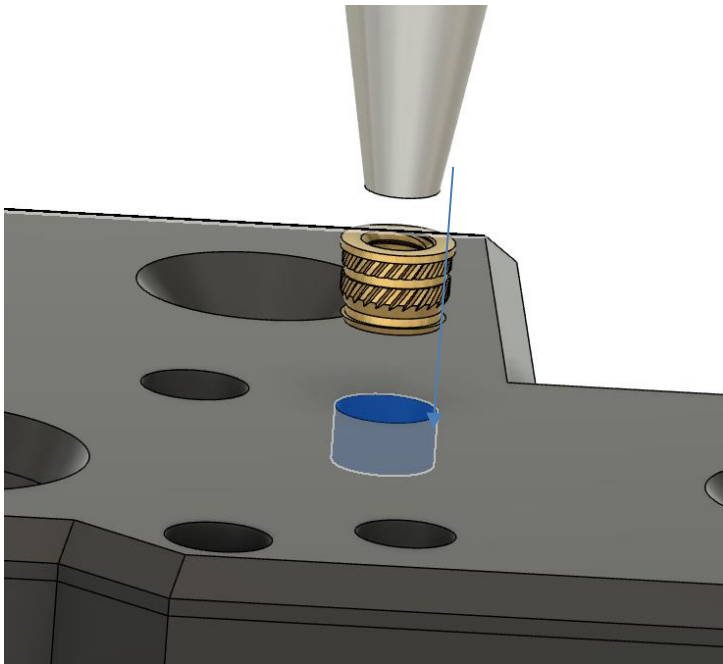
I personally experienced non straight belt with no-name ones, it leads to issue during printing by moving the belt path contact up and down the bearing leading to friction, loose of steps, and even rapid faillures. Choose quality first 😊

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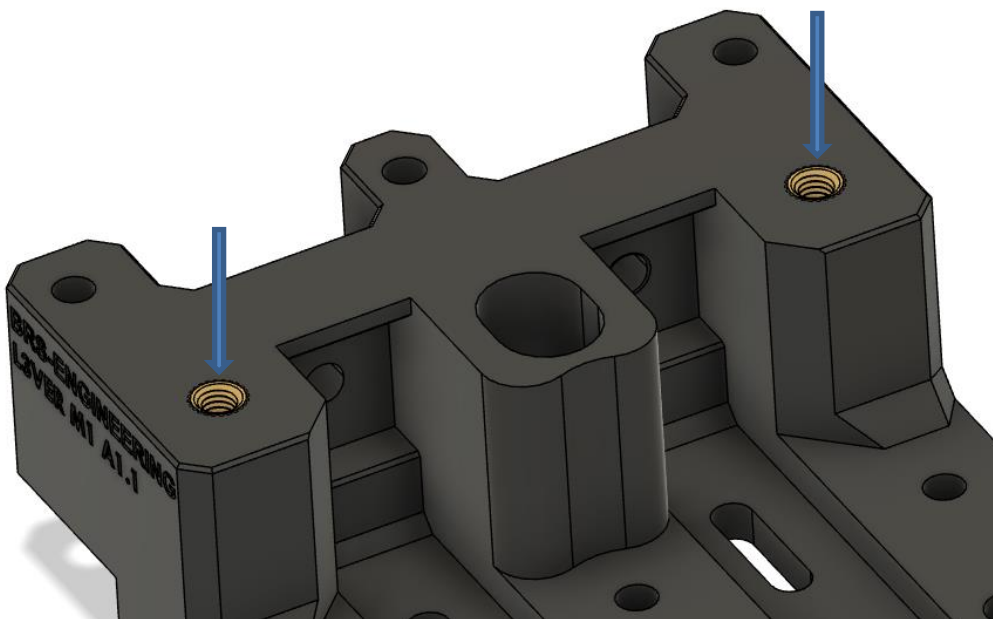
Part preparation

1/ HEAT INSERTS

Insert m4 Inserts in the required places with a soldering iron

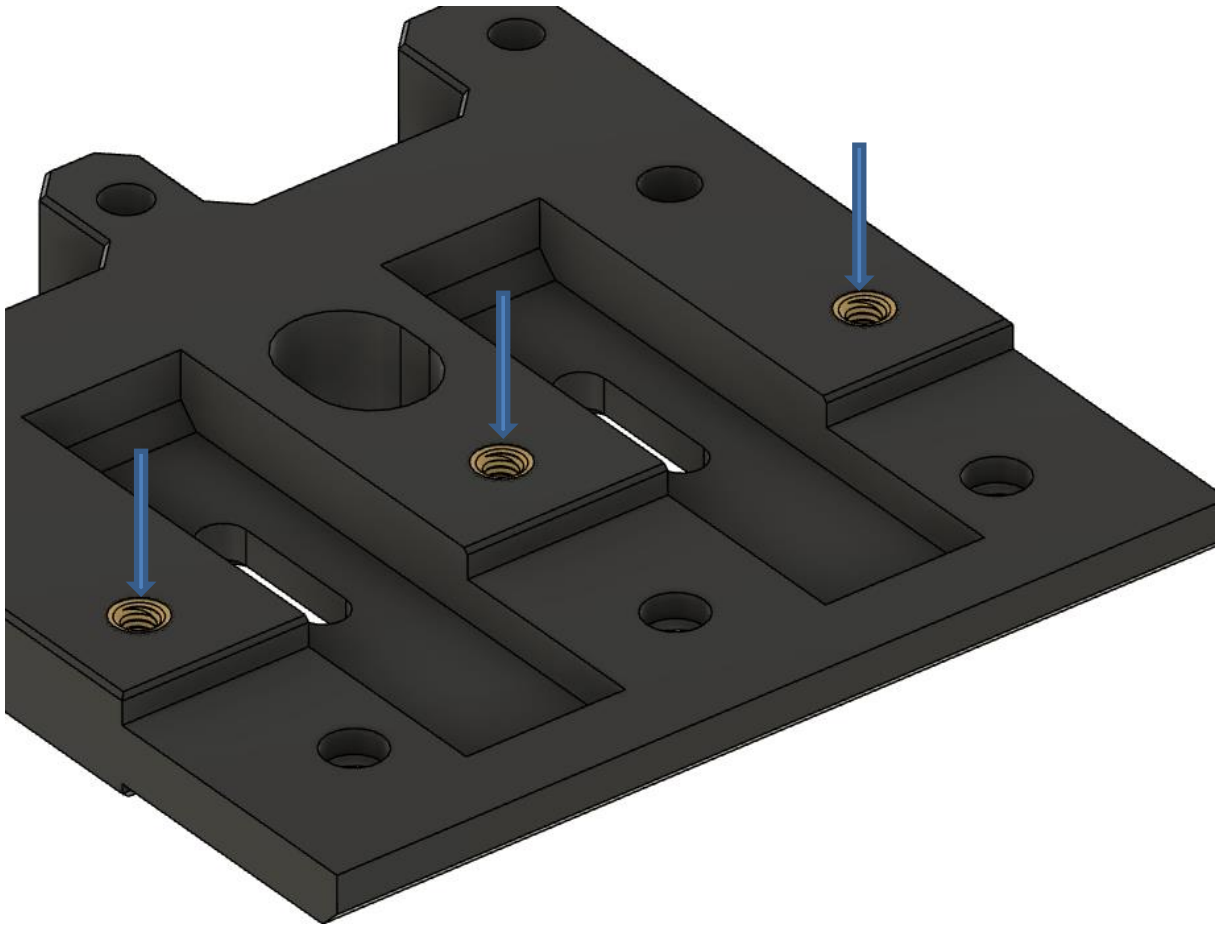


Here the places where a m5/m4 insert is needed:



2x M5 Insert on the bottom part

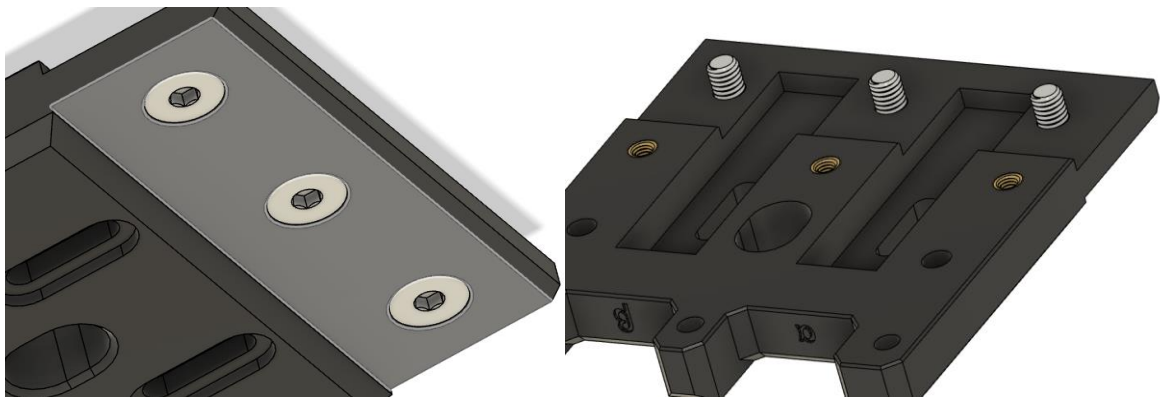
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3x M4 inserts on the under the top block
(For BRS-E Orders, those inserts are already installed)

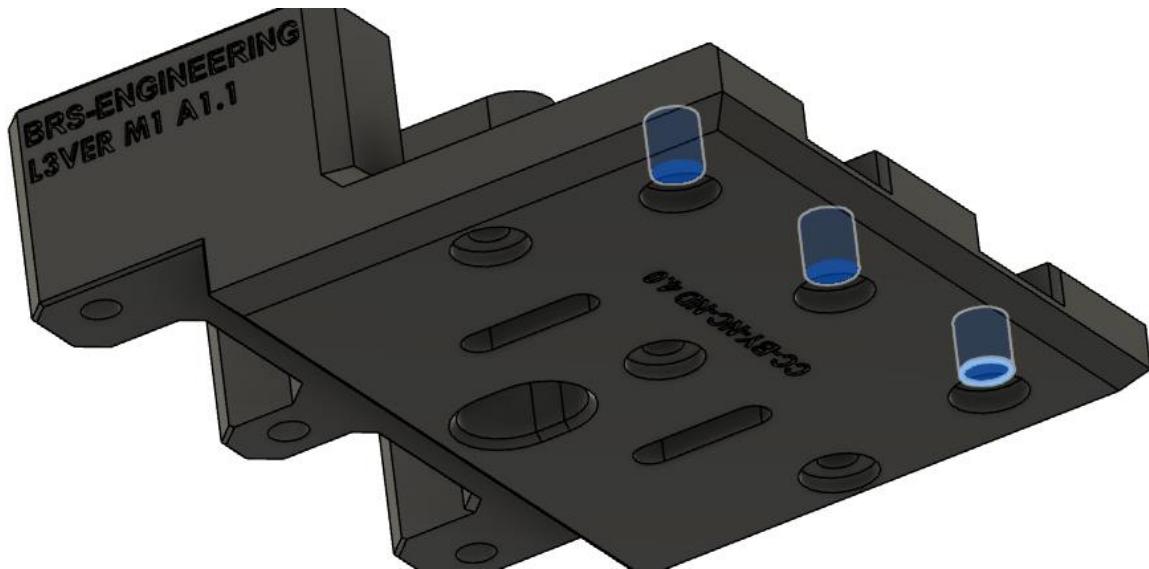
2/ SCREWS

Install the 3x M6 countersunk screw with the T-nut now, let it loose

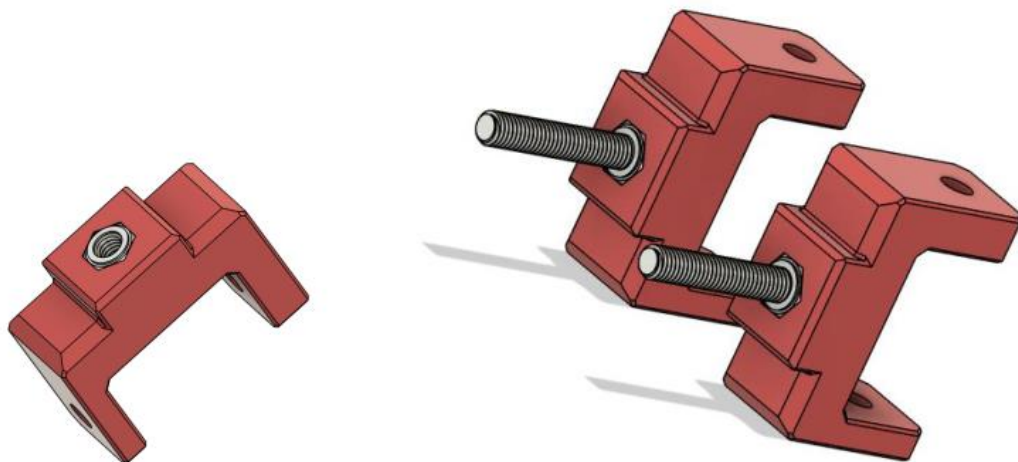


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Install 3x M6 with T-nut here



3/ LEVER ARM

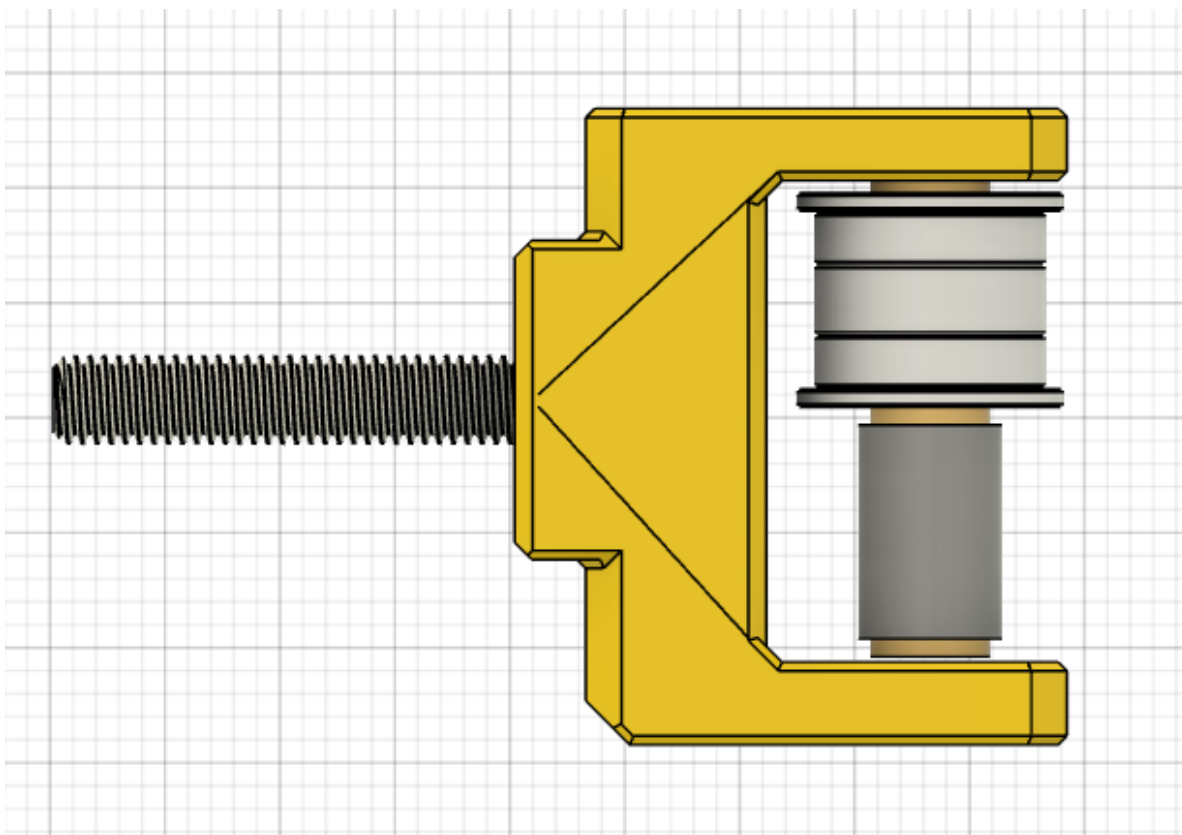
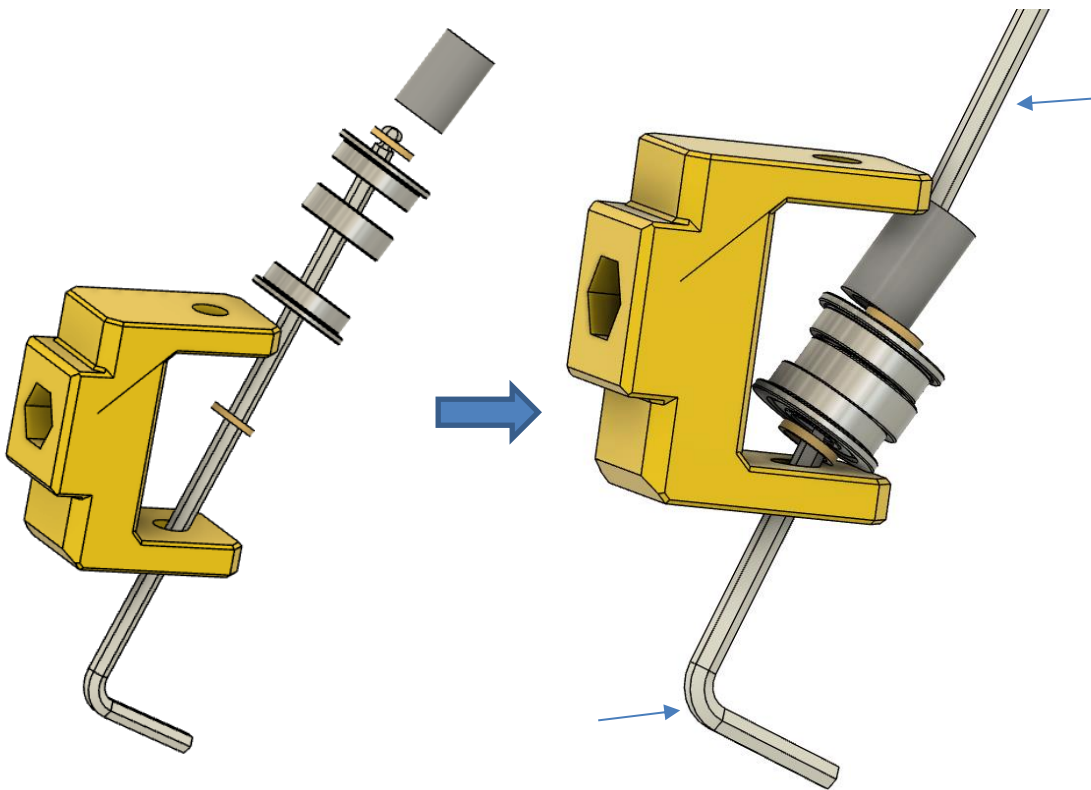


Insert a M5 Nyloc in each lever and tighten the m5x40 screw to it with a dip of cyanoacrylate or threadlocker Countersunk m5x40 completely. This assembly is definitive. Repeat it for the other one

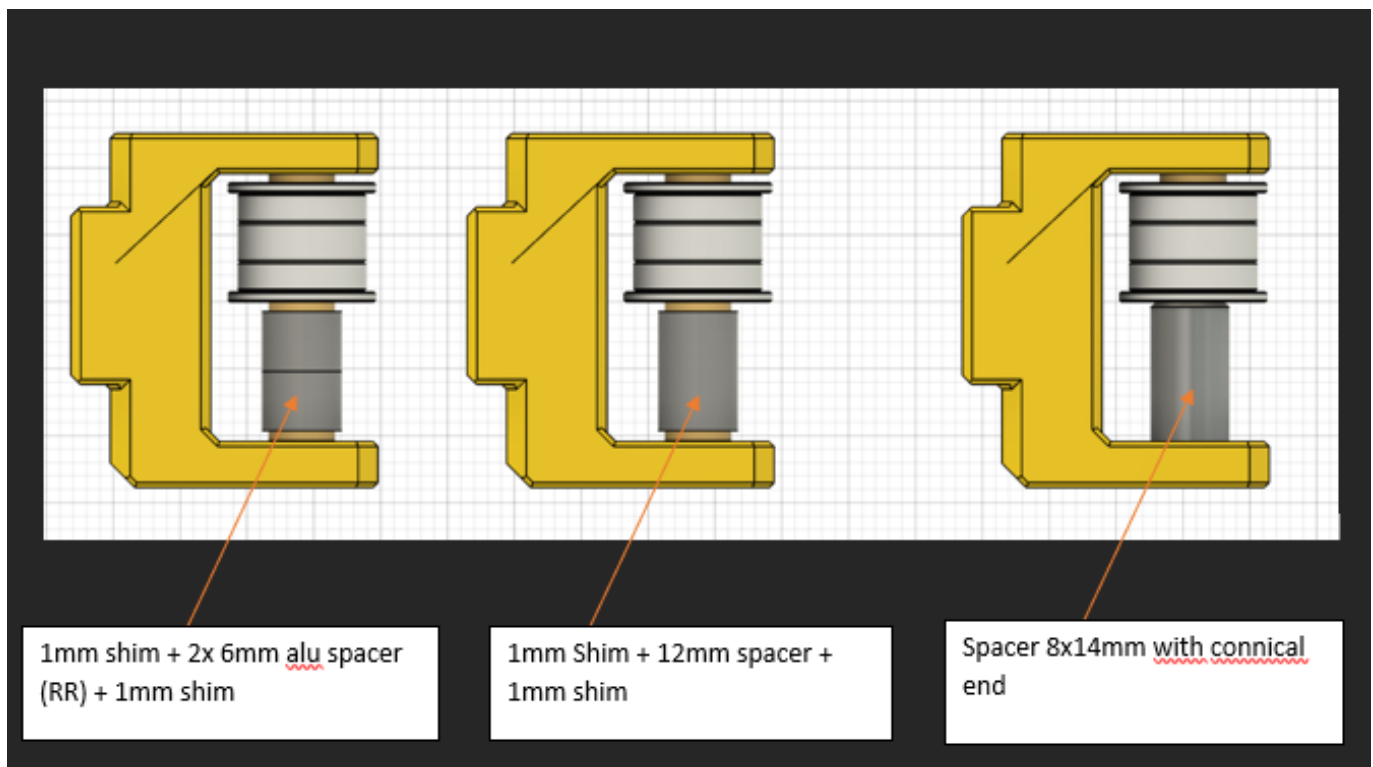
You can already pre install the LEVERS stacks outside for ease of installation:

Use an allen key to slide the stack and the spacer inside. Then use the key to lever the stack in position.

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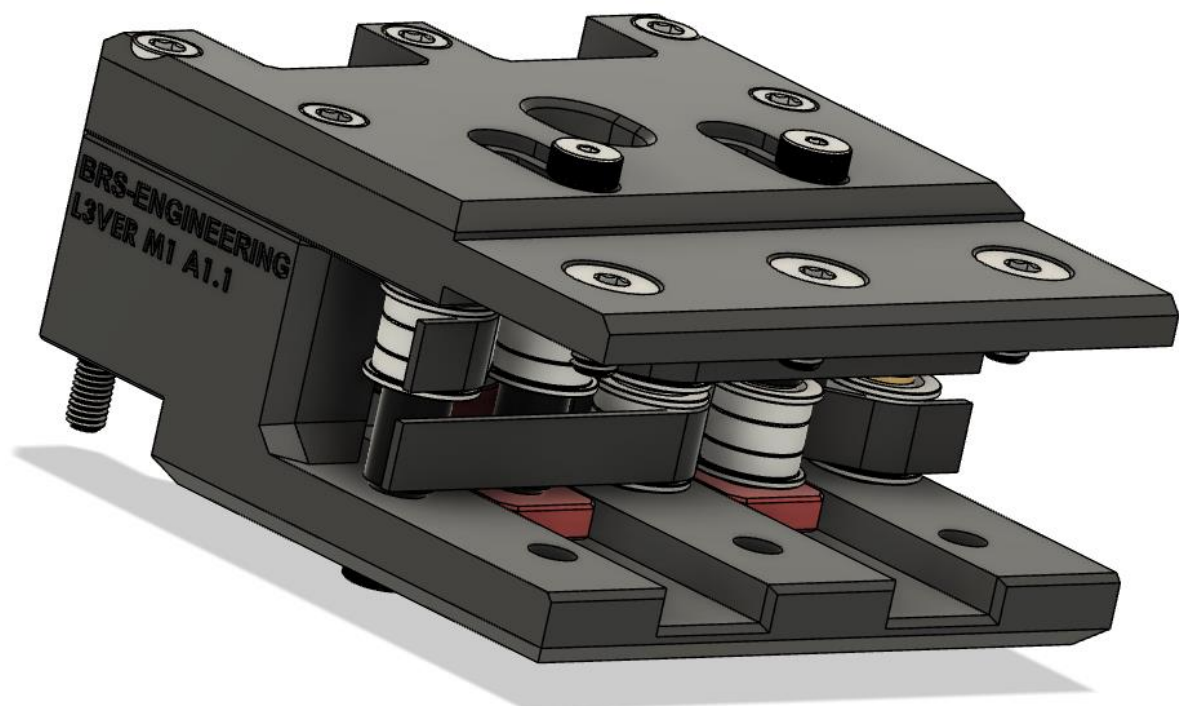


Be aware the stacking has to be reverted to the other Lever, as they are not symmetrical.

Install the m5 nylock in the Lever parts. Add a bit of threadlock in. Then screw the

BRS ORDER GENERALLY ARRIVED PREASSEMBLED (If not told otherwise depending the ask)

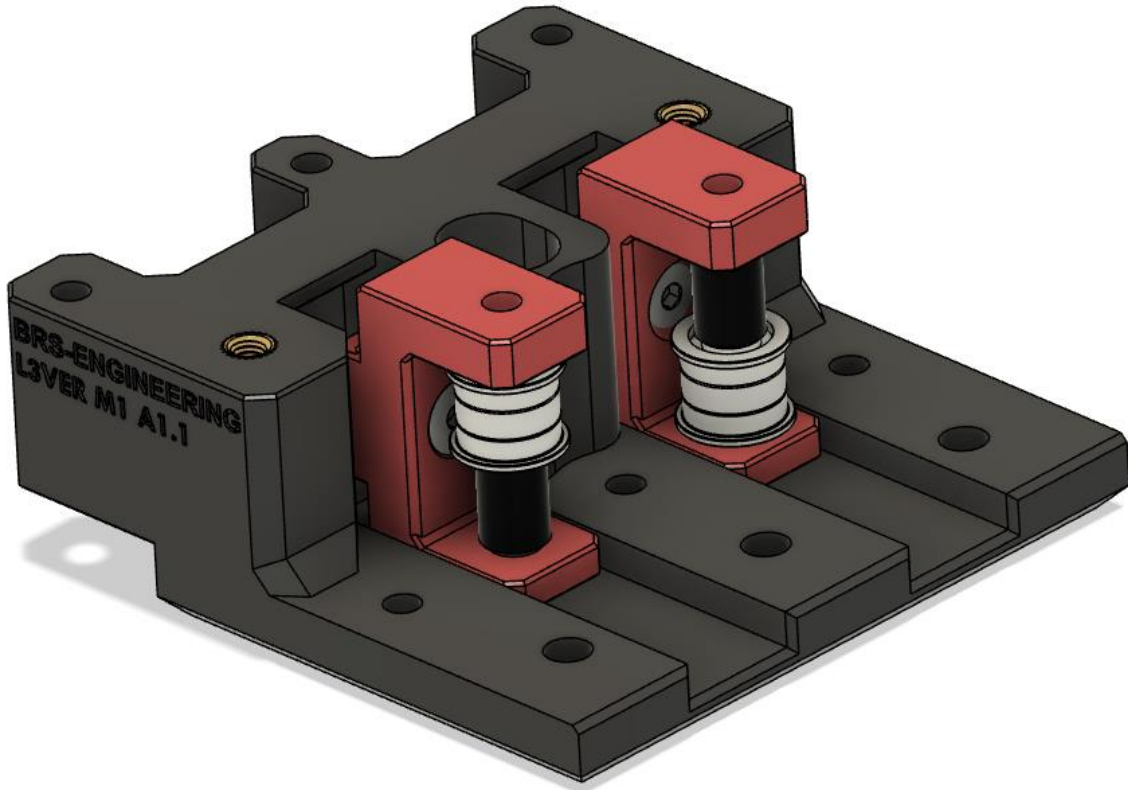
You can try to make an assembly out of the machine to understand the mechanism



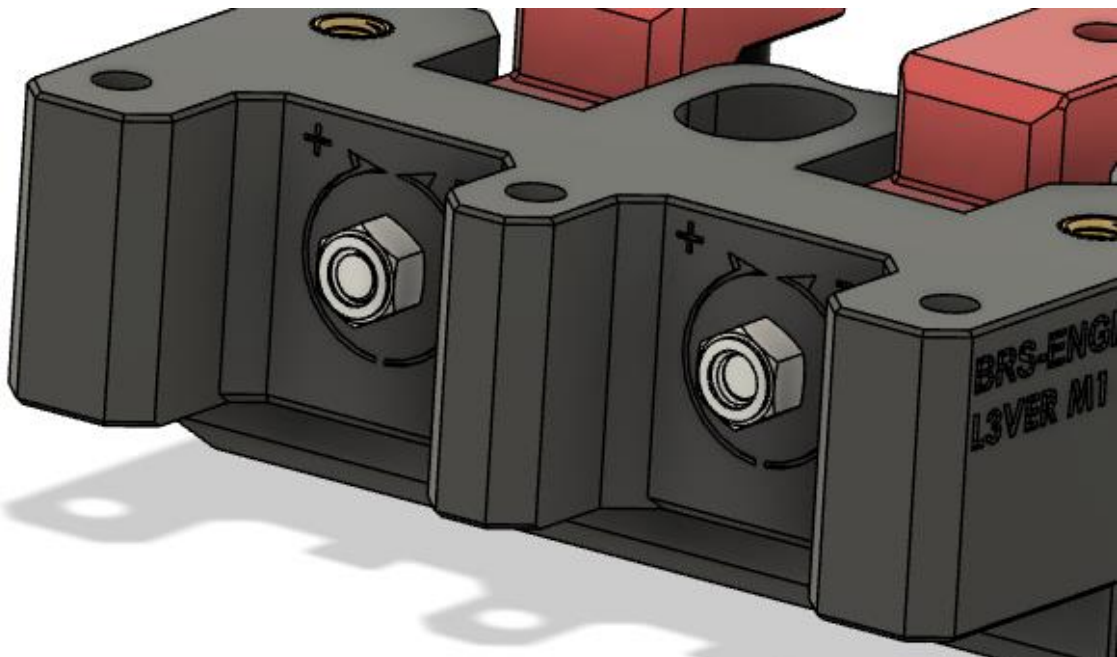
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Mainparts installation

1/ INITIAL POSITIONNING

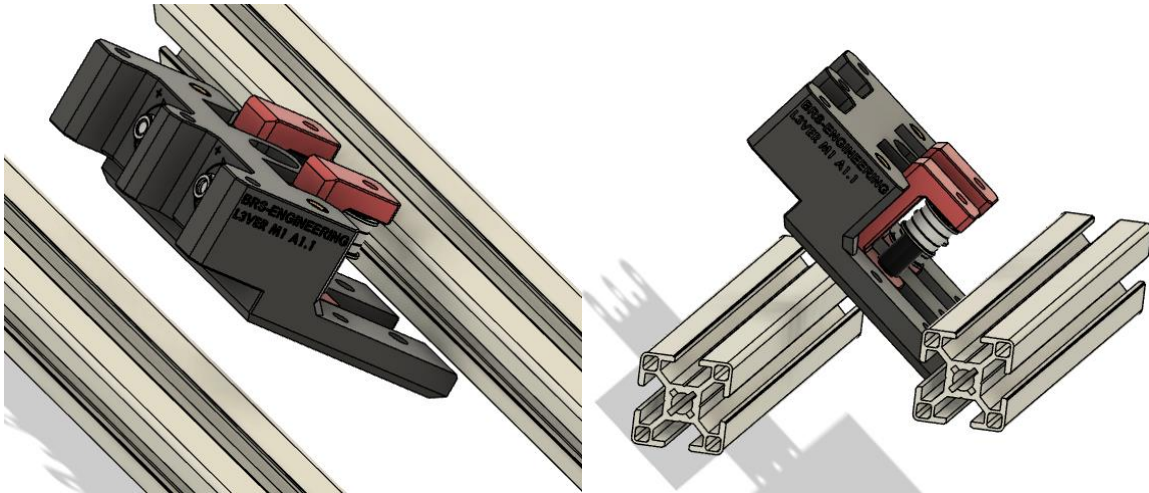


Here what you should have at this

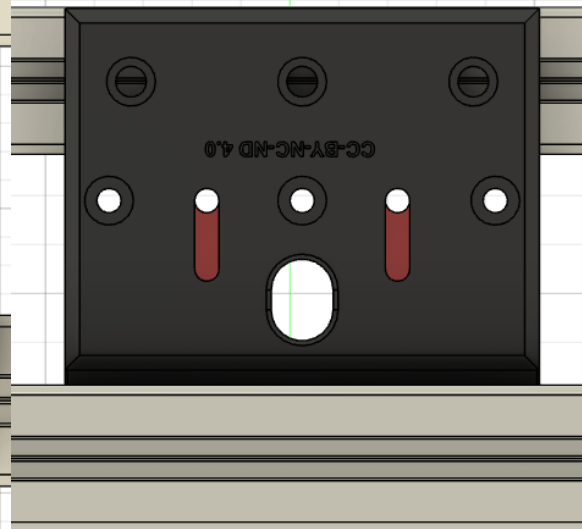
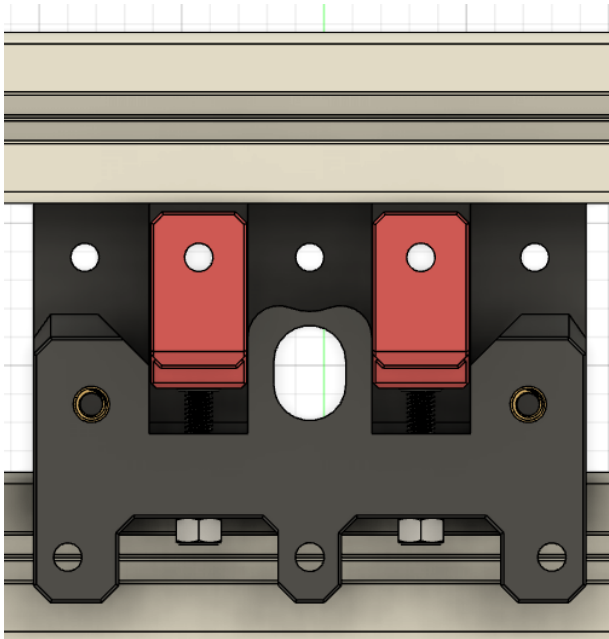
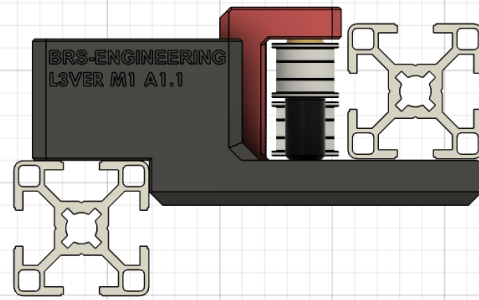
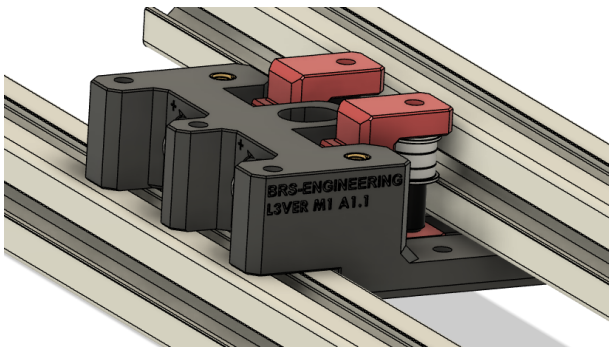


Lock the levers with a m5 nut and a m5 washer

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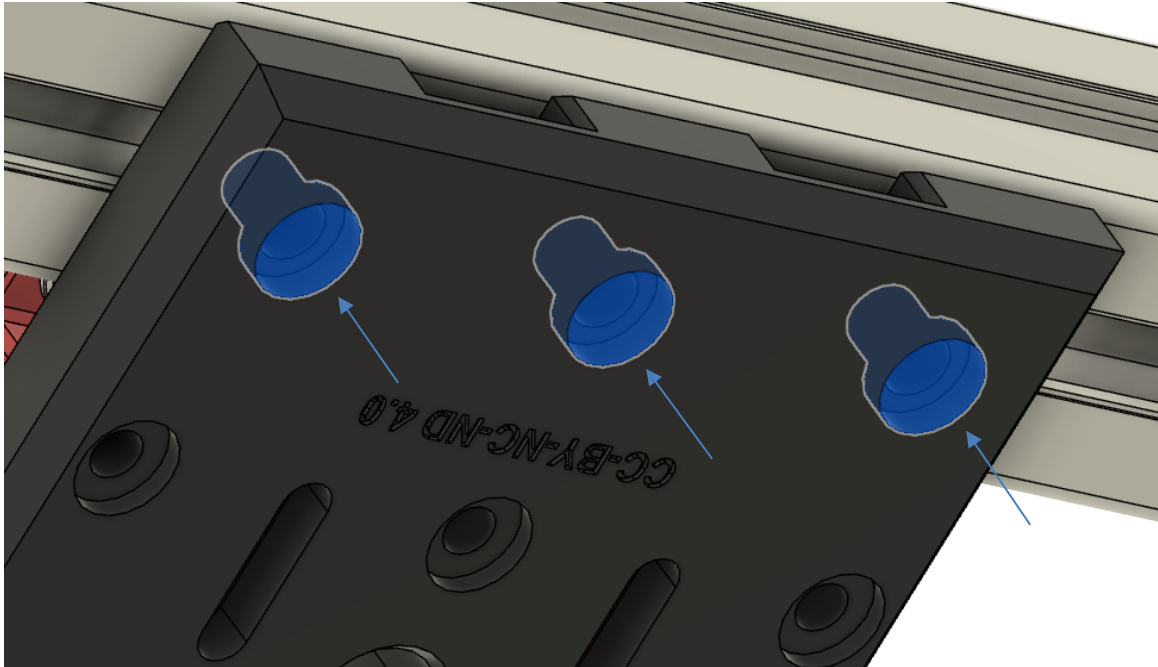
Incline the model and it should perfectly take place in between the 2 3030 extrusion, it can be placed anywhere in the rear space, centering it is generally a better design choice!



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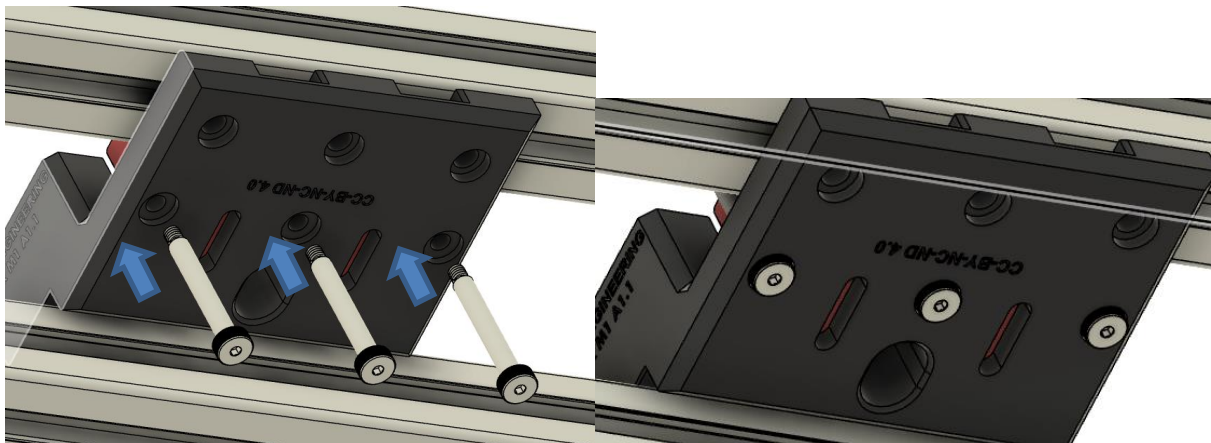
It should look like this, *The design has been made for 3mm electronic plate, Please consider to remove 1 mm from CAD on the lower lip if you want to use a 4mm plate*

Secure it with x3 M6x14 and T-nuts



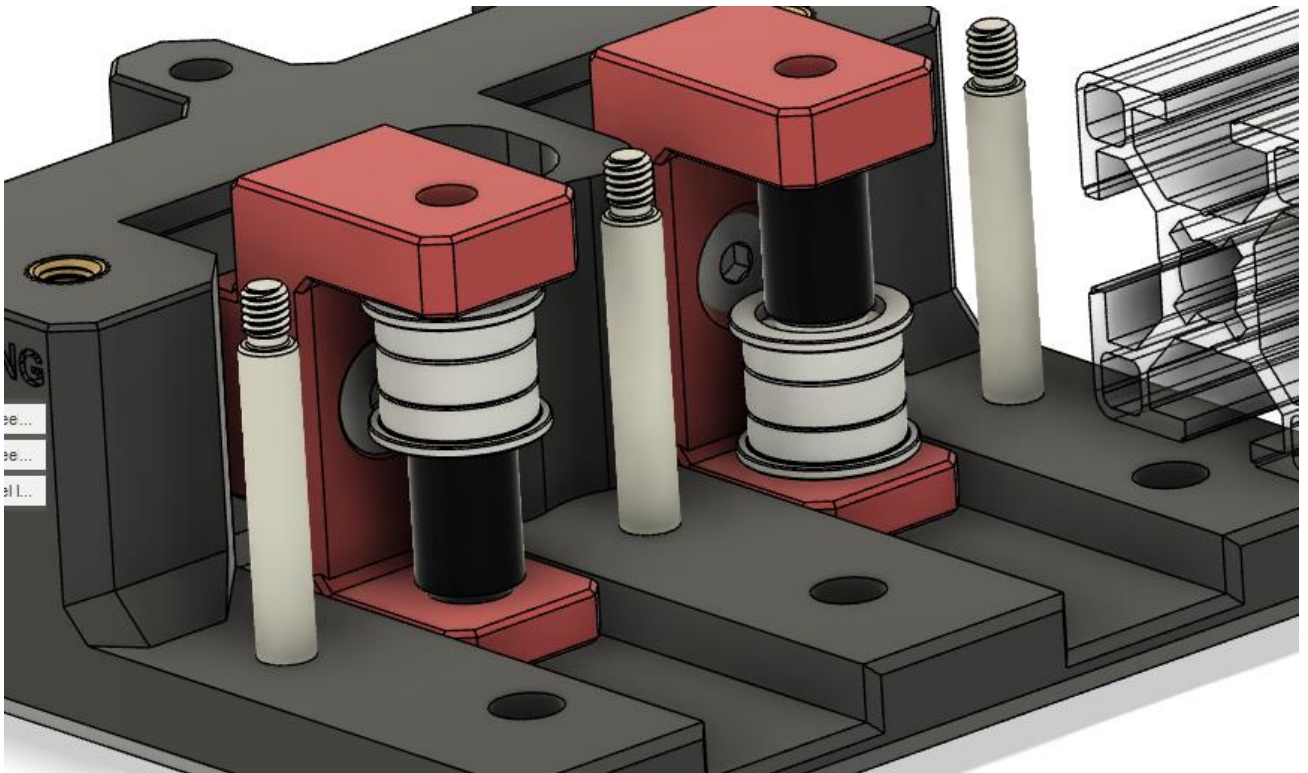
M6x14+M6 T-nut on those 3 holes

2/ MOUNTING THE BEARING STACKS

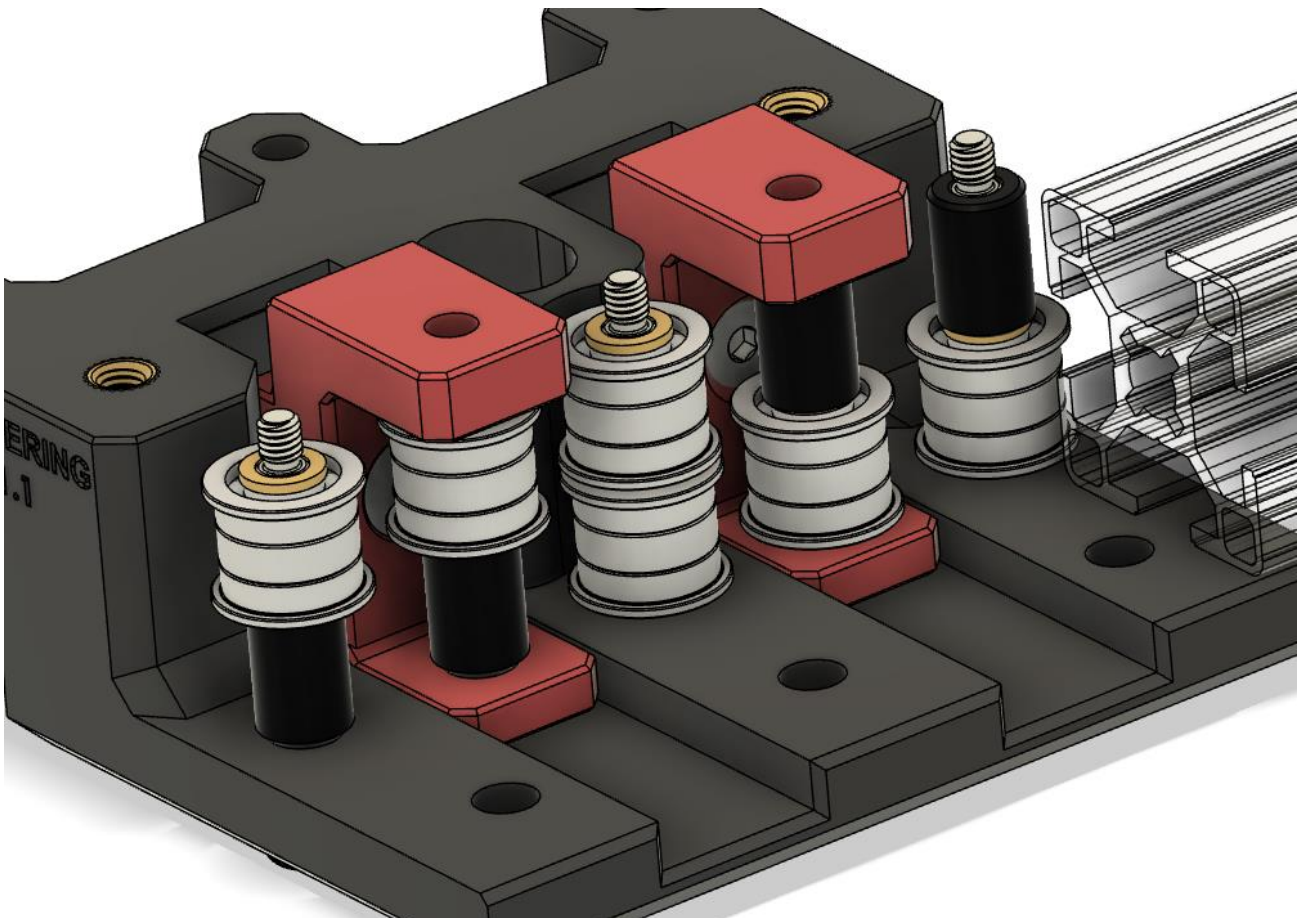


Install the x3 D5M4x35mm shoulder bolts. The holes are tight, preventing it to fall, you will need to push it a bit.

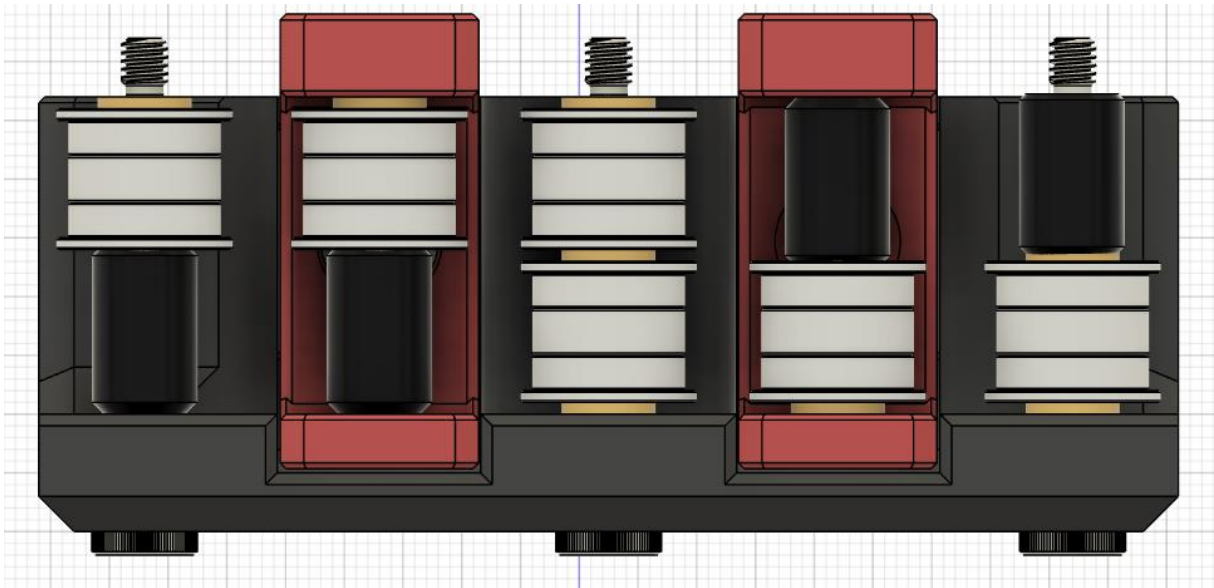
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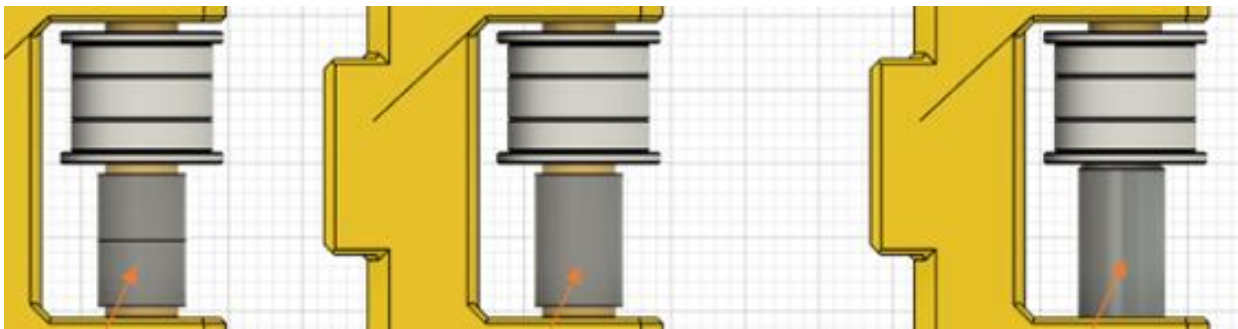
Install the bearings stack with spacer and Shim: here a detail of the order (be aware R and L has to be inverted to match each belts)



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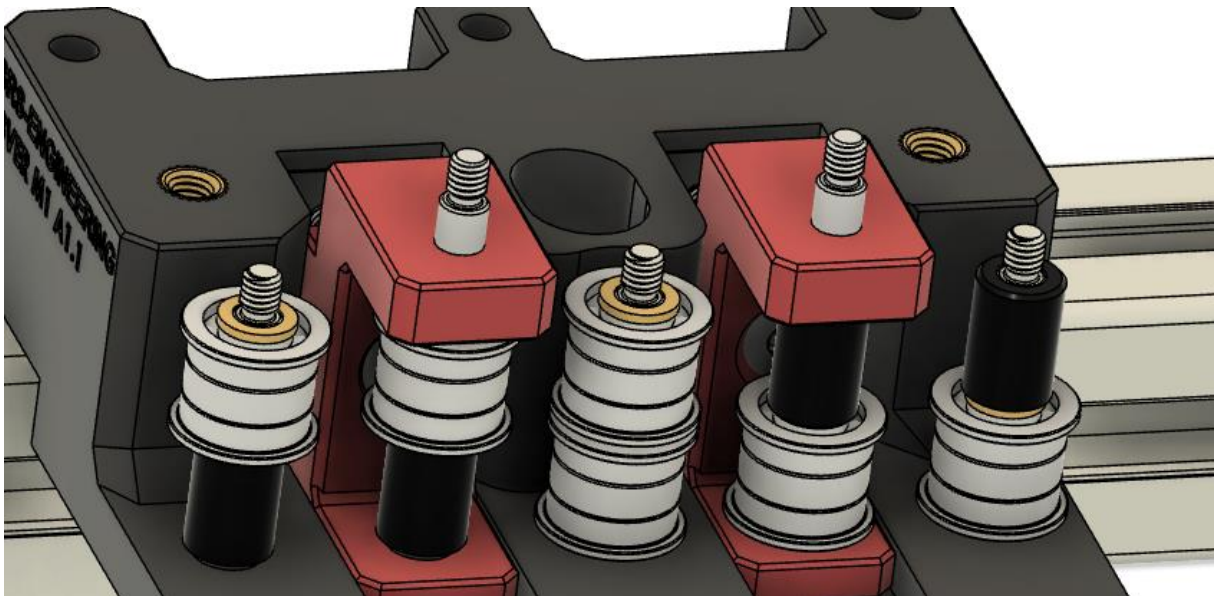
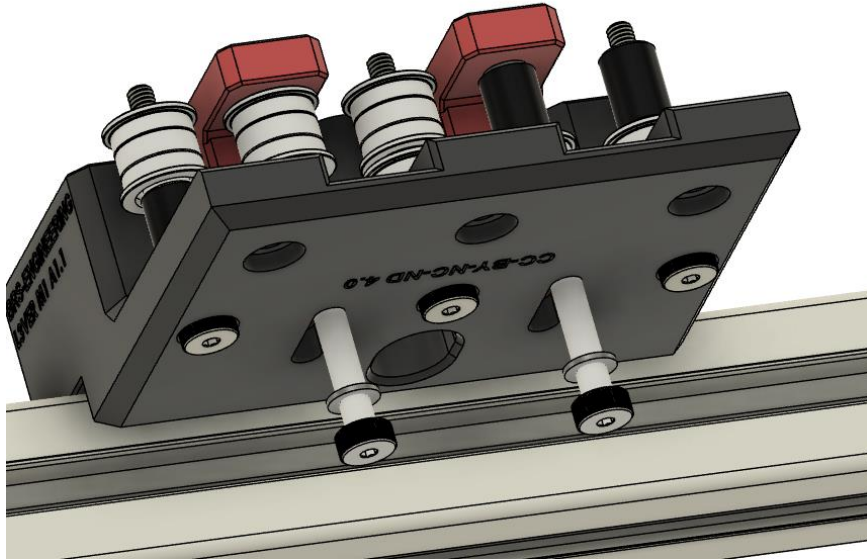


This is a sample exemple, You can use a 14mm spacer (no shim), a 12mm spacer (+2x 1mm shim) or 2x 6mm alu spacer like RR does, with 2x shim



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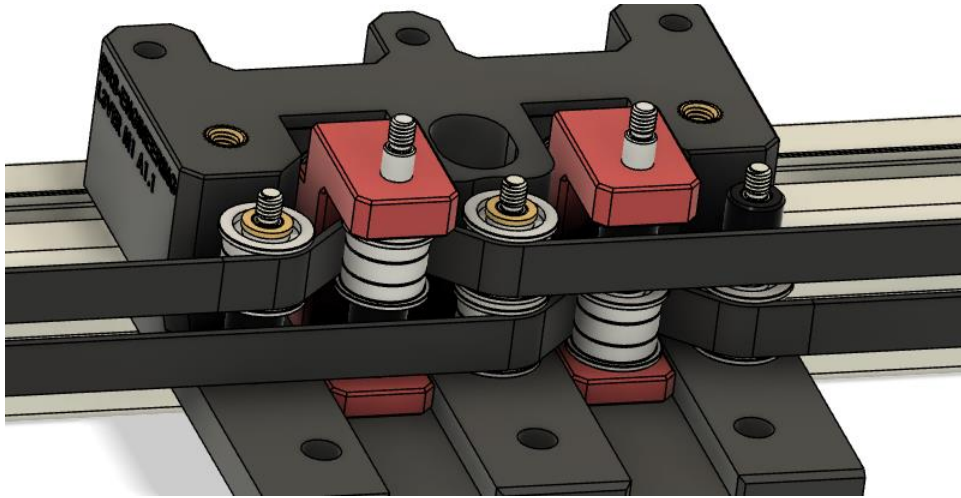
From bellow, insert the 2x D5M4x45 shoulderbolt with a 8x5x1 microshim, this will secure the Lever assembly for belts routing.



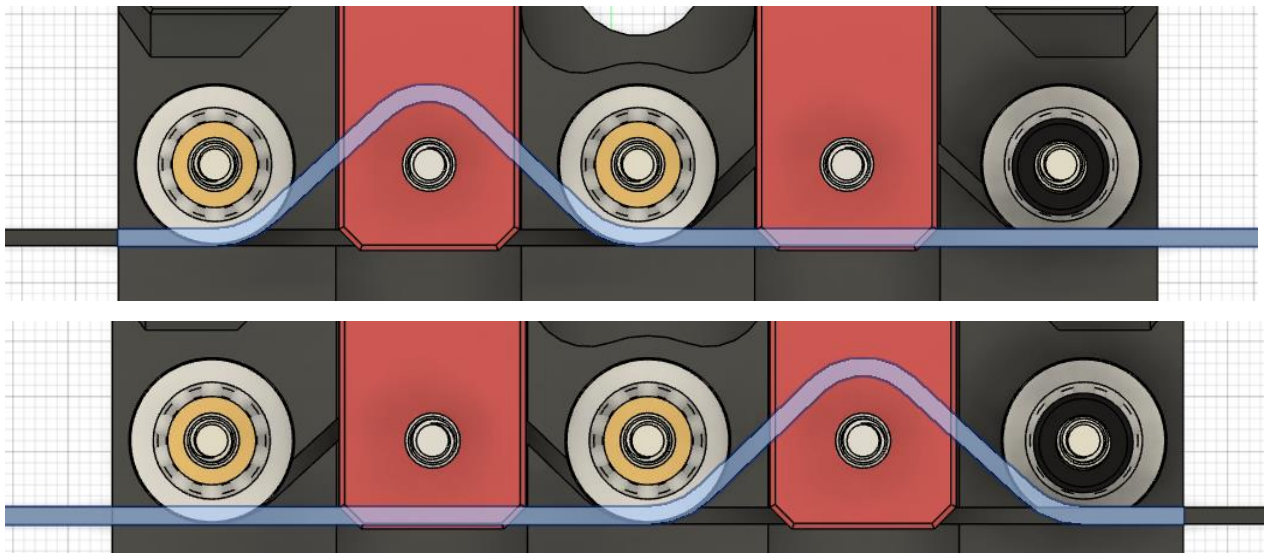
The threaded tips will looks like this

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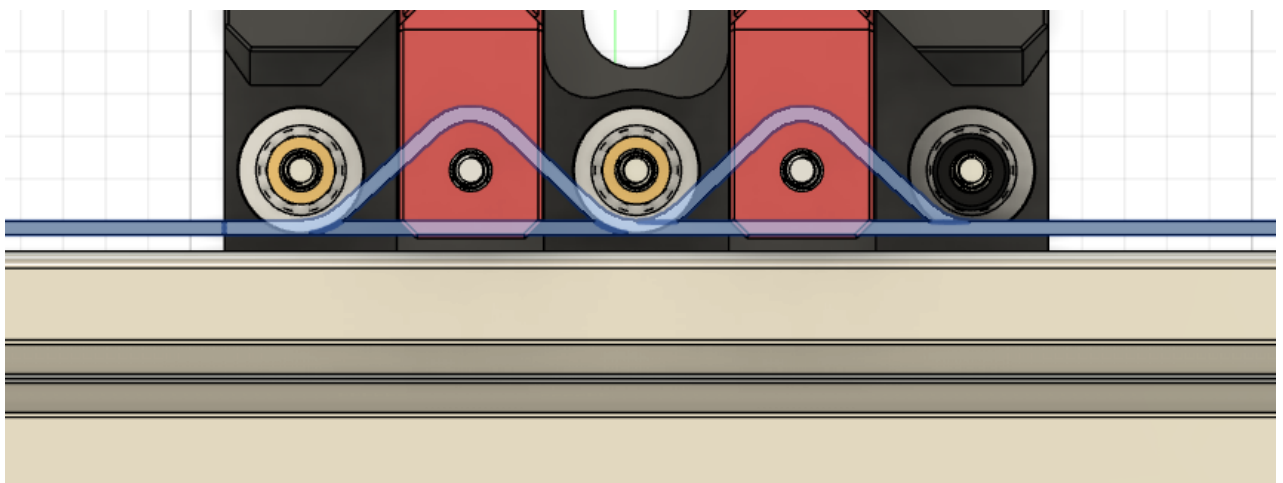
3/ BELTS ROUTING



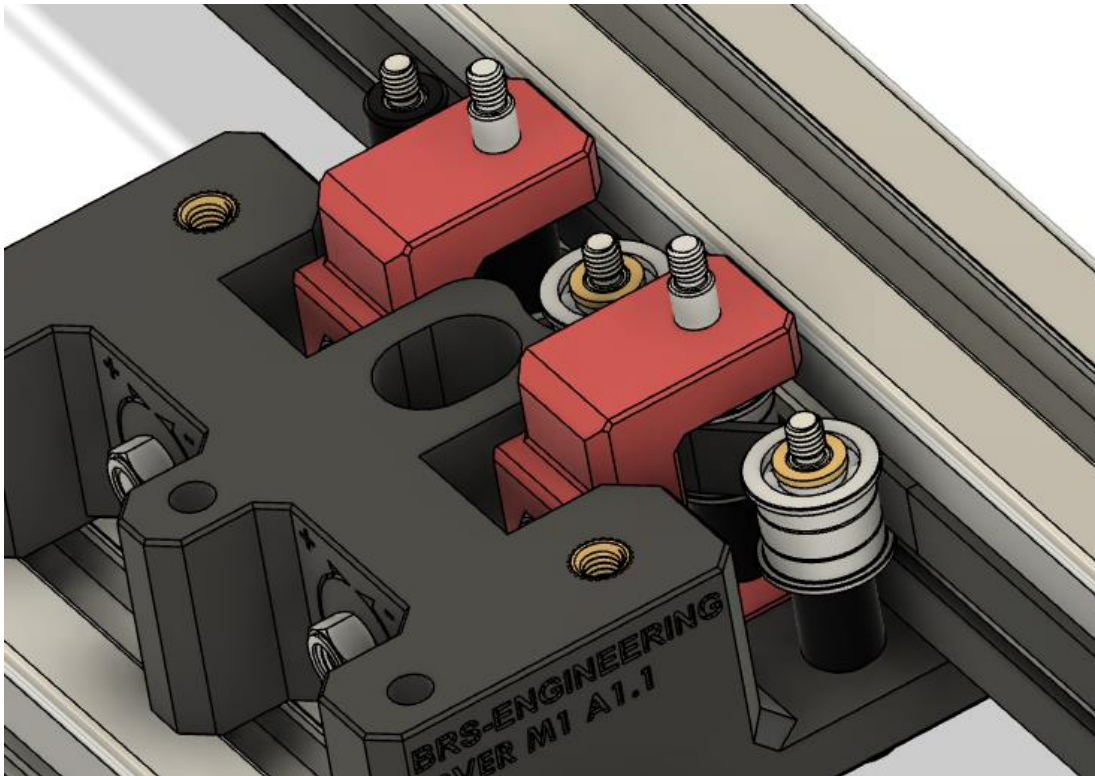
Route the belts, follow this picture, the lever's idler will take the toothed side on them, the other will get the smooth side.



The clearance is very short with the aluminium 3030 extrusion, from the top you can manage to route the belt with pliers and even zip ties to align the belts in the correct paths.

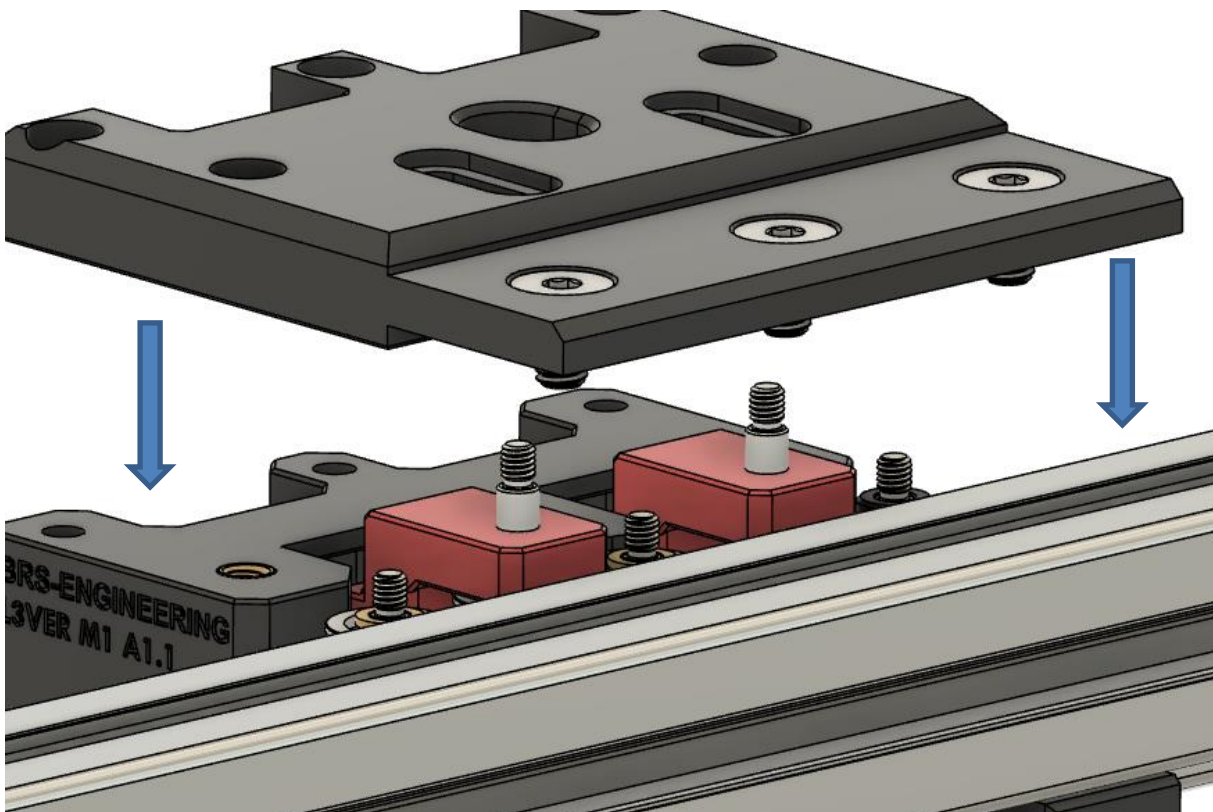


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4/CLOSING THE M1

Once done, you can secure the whole assembly with the top plate

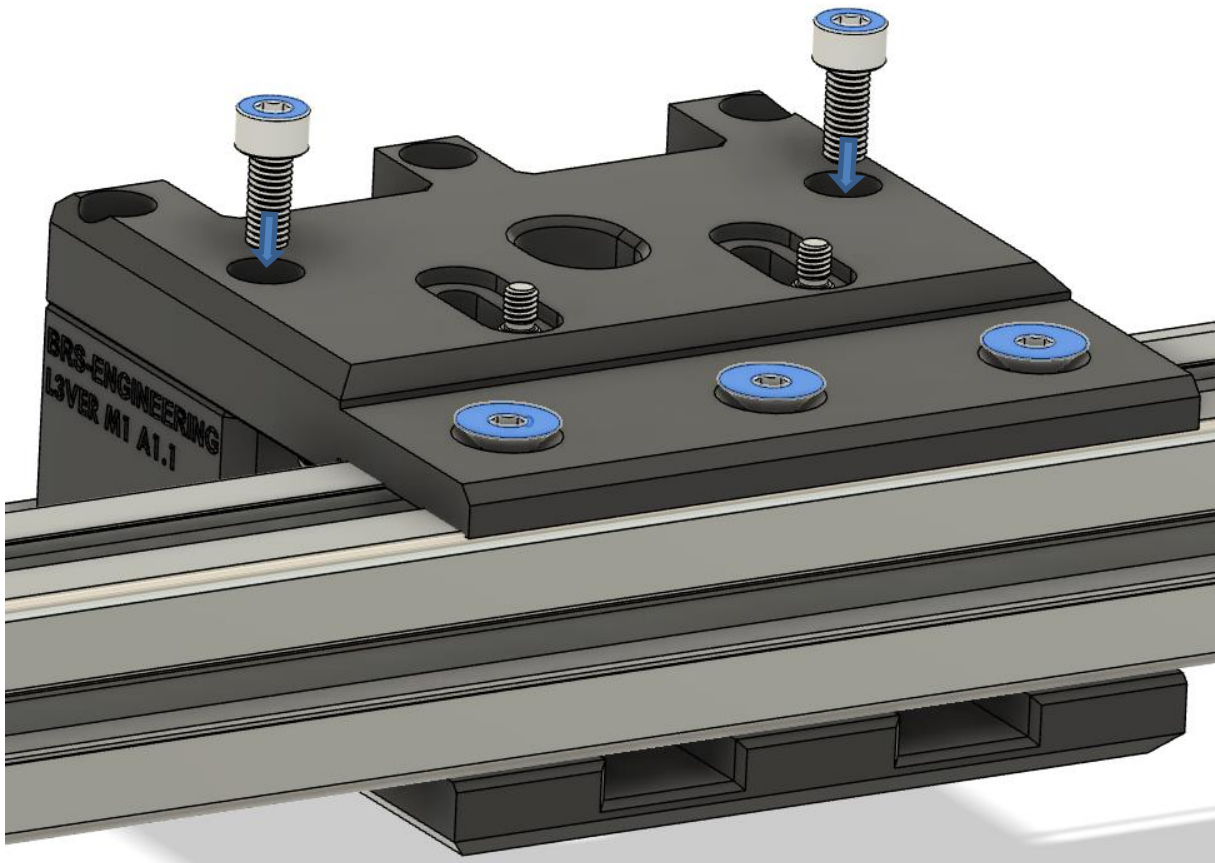


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Use the 3x 35mm shoulder bolts from bellow and adjust them few turns each to heavenly fix the top part

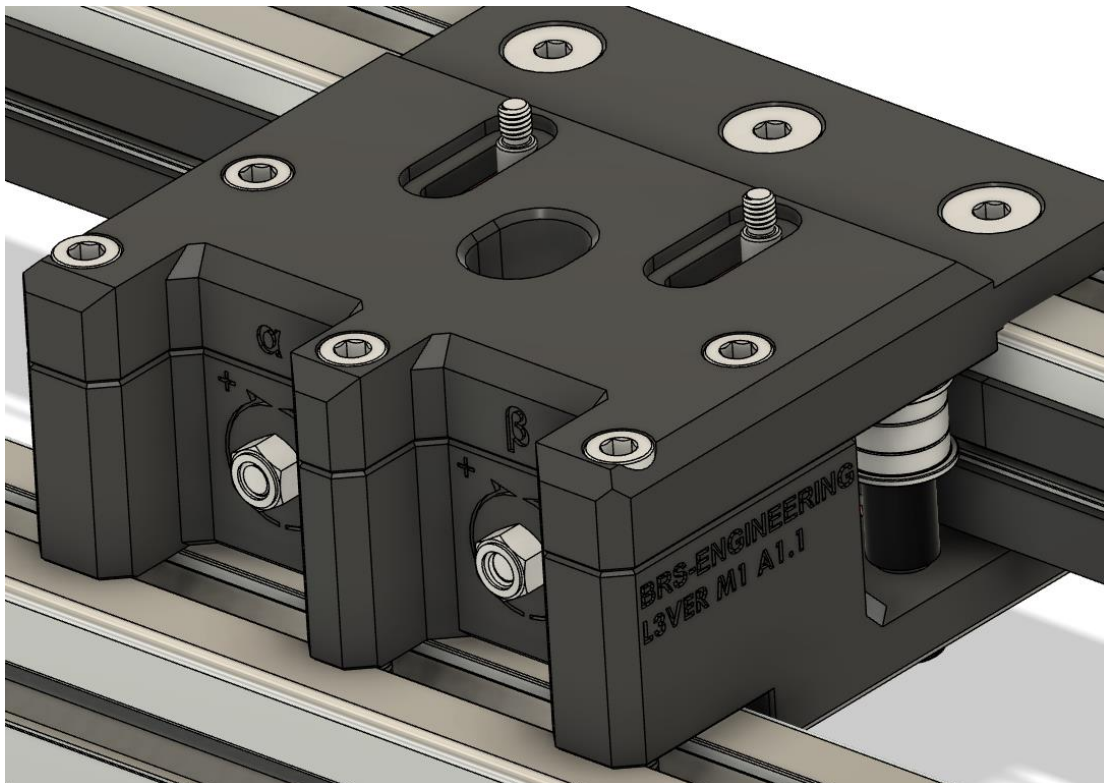
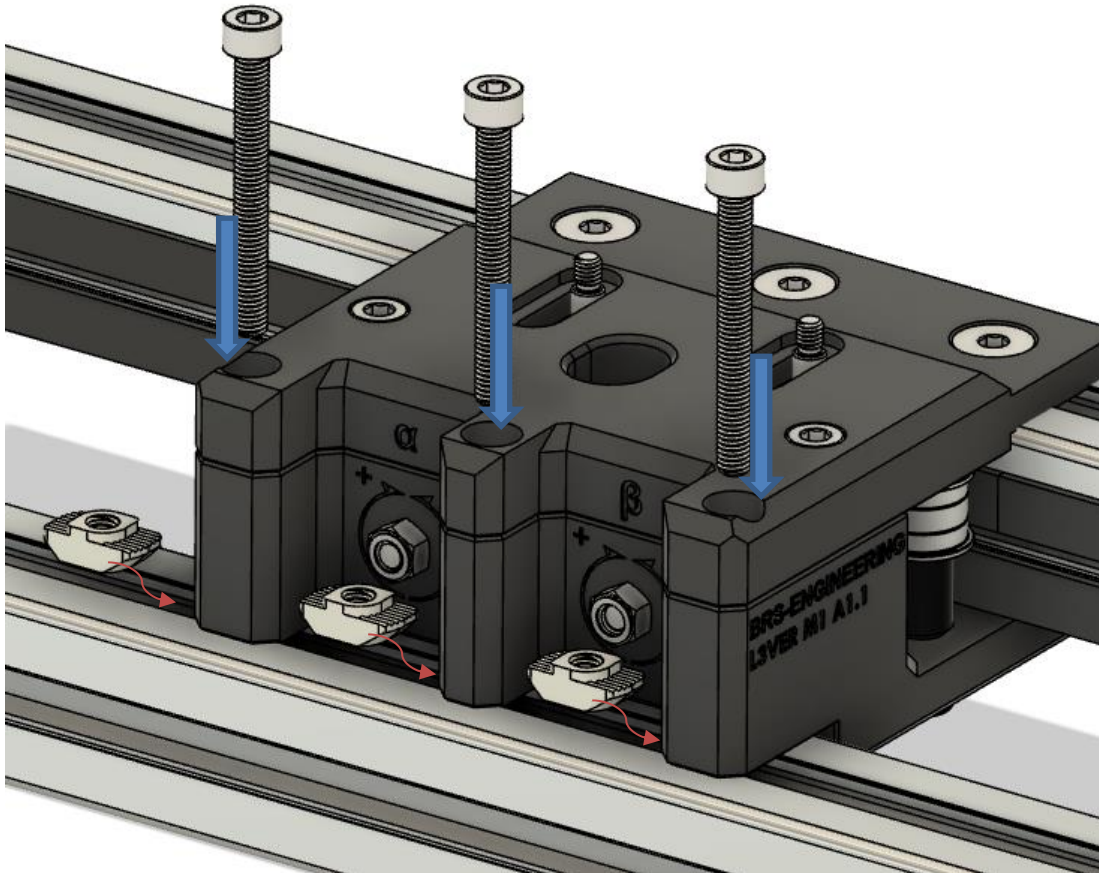


Then secure the ensemble with the x3 M6 countersunk the and 2x m5x15 screws at the top



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Then, glide m5 Tnuts in the 3030 slot to grab the m5x40mm screws:

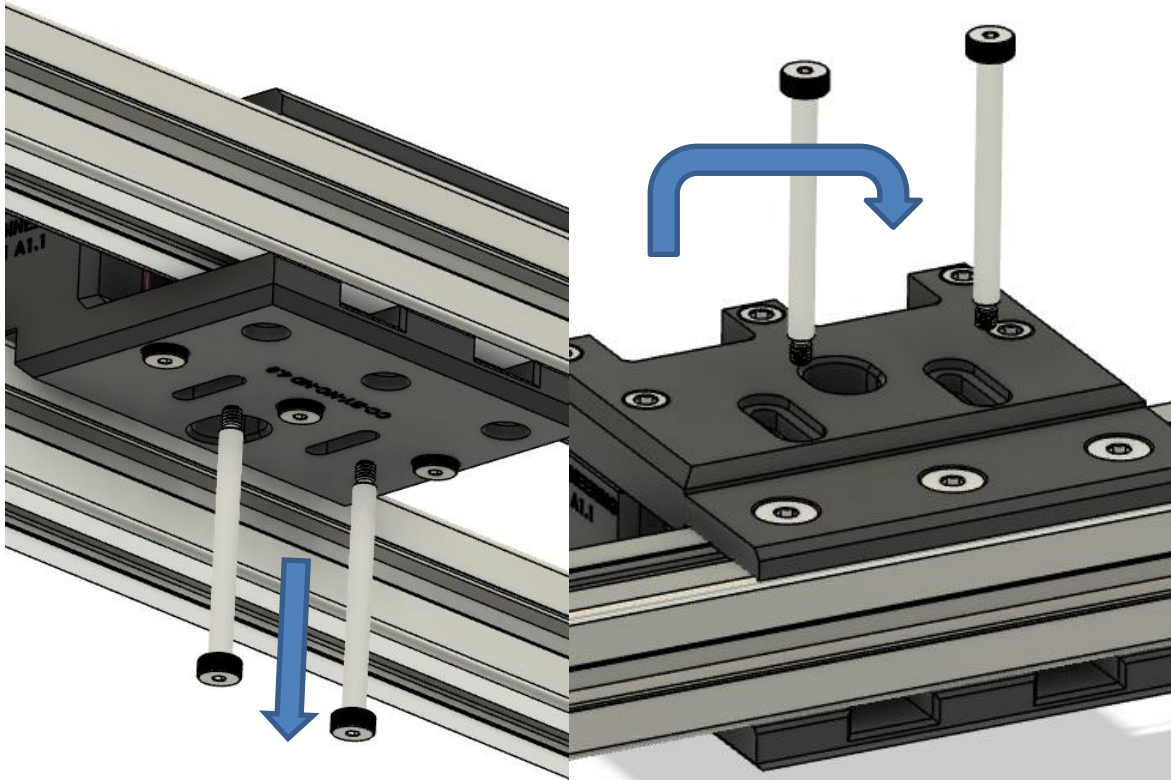


This should end like this

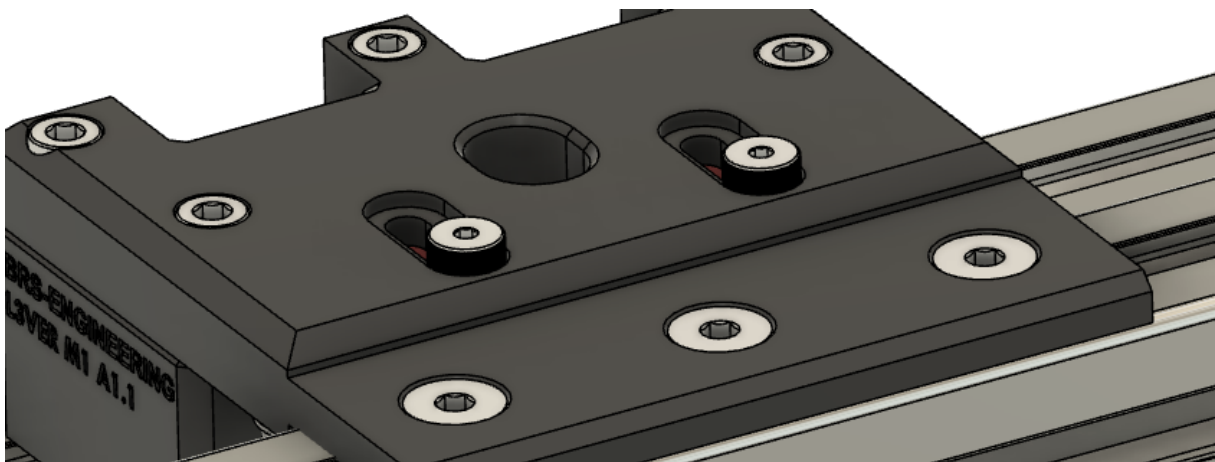
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For the next step, make sure that the belts are not under tension.

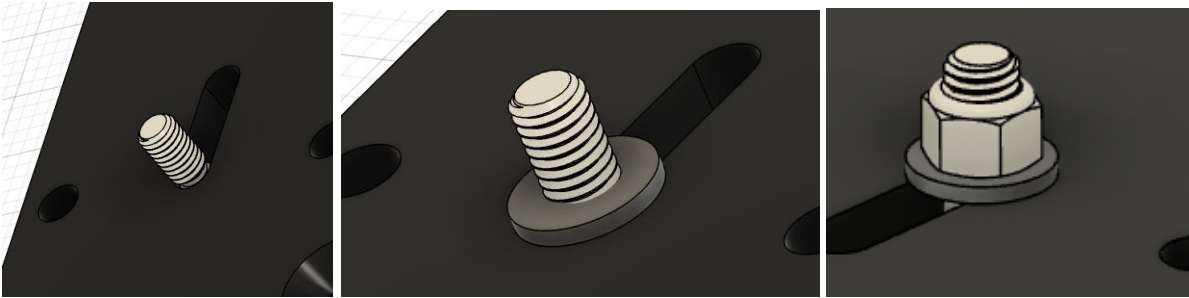
You need to carefully remove the 2x D5M4x45mm Shoulder bolts and reverse their orientation, like this:



Keep the 8x5x1mm shim on it and reinsert it completely.



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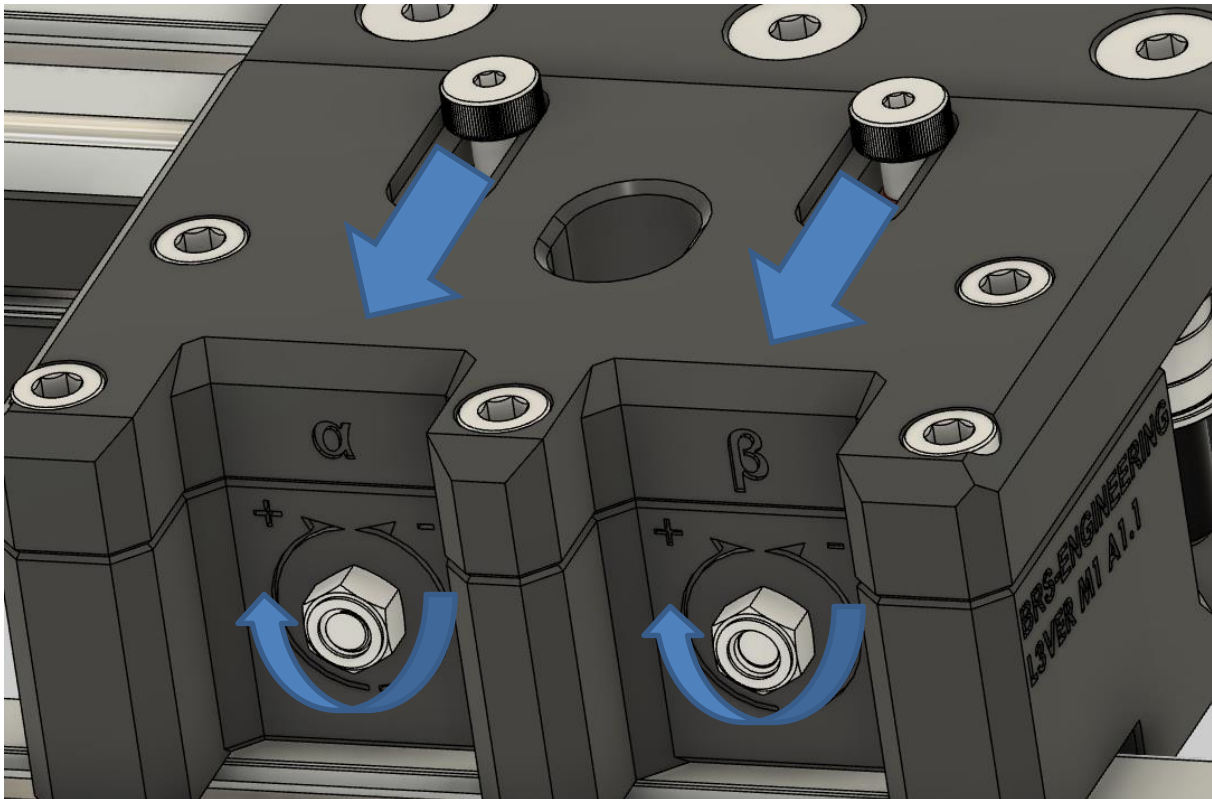


Install a m4 washer with a M4 nyloc nut on the other side to lock the mechanism.

5/ CONTROLS

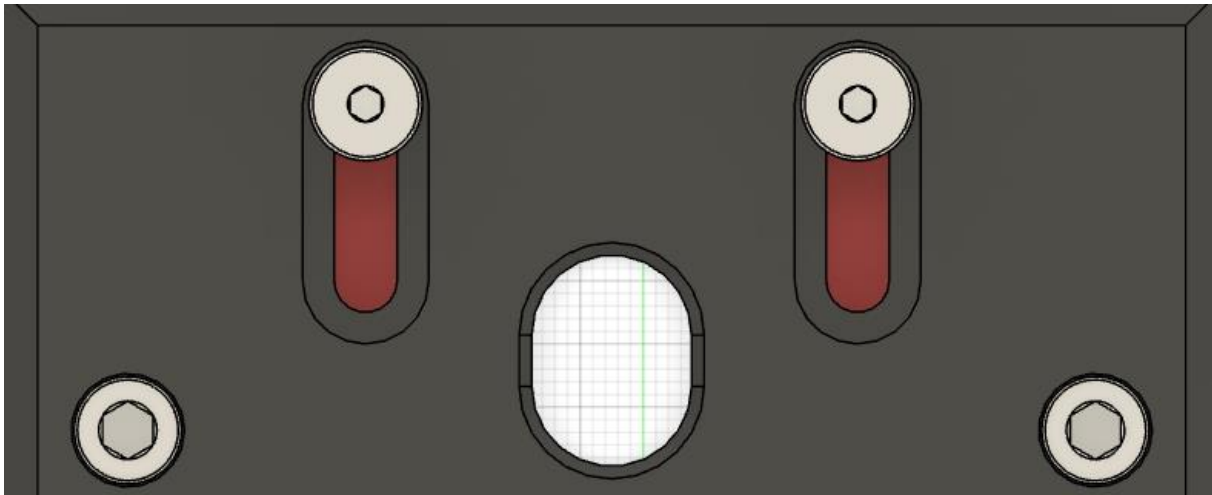
At this point you can control the motion of it by gliding it inside.

There is +-14-17mm of travel here.



You can no proceed to finish the belt path routing, clamp them to the head when the LEVER are completely untight and apply a bit of a tension when doing so, this way you will be more accurate to finish the tension.

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The hole in the center is generally enough to passthrough the toolhead wire, easy for a CANbus system, still possible with a full cable harness.

6/ TUNING

To use it:

-unscrew a bit the lever shafts



-place the gantry in the front position to check the matching on each side to the front blocks

-turn the M5 nut of the LEVER accordingly to apply symmetric tension



-Check the tension with the tension frequencies procedure

<https://github.com/FlorentBroise/BRS-Printers-Mod/blob/main/manuals/belt.pdf>

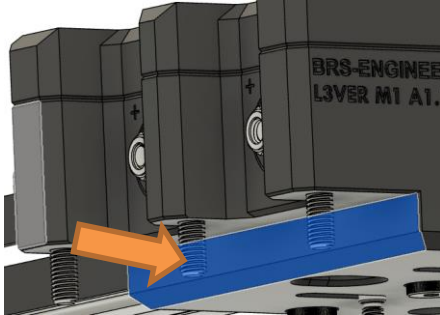
-Tight back the top m4 nyloc to secure the block

-This tension procedure has to be done several time, over time, for the system to settle

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-You can confirm the correct tension or adjust it in the Shaper, still be aware the system will settle over few days, with a usage of it, repeat it accordingly.

! This mod has been designed for a 3mm plate for Electronic panel ! It works with 4mm too with a slight modification



IMPORTANT Checks:

THIS STEP IS IMPORTANT : Move the toolhead at 45° then 135° to individually check if we have a good belts alignments. If you feel a repetitive pattern of resistance, recheck the alignment in the block until the movement is smooth.

Depending of the quality of the printer used to produce the part it may be an issue if you are not very good with dimensionnal accuracy. BRS-Engineering parts you ordered are prechecked to match alignments, no issues will occur with them.

625 bearing can be faulty but this is more rare, giving a hard point in the rotation sequence, generally a damage shielding or an oil leak can be a good indicator of their status. Check if the rotation by hand seems flawless.

LAST CHECK

- 1- Check the tightening of all screws, (to be done after few hours of use)
- 2- Check the alignments
- 3- Hard point checks
- 4- Double check everything before switching on!
- 5- It is a good idea to recheck the screws tightening after one week.
- 6- Input shaper will move after few days, time to the system to settle and adapt. Don't forget to remake one time to time to be perfectly tuned

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Disclaimer

The system is designed to operate on a correctly assembled Vcore 3. Even a slight mounting error can make it impossible to upgrade. If the parts to be printed are made by the customer, check the dimensions after the print, they need to be respected : a bad dimension will block (+ -0.08mm) the assembly. The kit is installed in the simplest way without destructive modifications of the machine This kit is an optional upgrade, intended for an informed public and with advanced experience, its assembly and / or its function and / or its quality of execution are the responsibility of the customer and are not guaranteed in public view. of parameters by BRS-E. BRS-Engineering accepts no responsibility in the event of bad sourcing (bad quality and / or bad dimensions self-prints), bad assembly by the customer, or bad assembly of the based Vcore. The kit has proven its POC and POW in quality controls at BRS-E as well as at a test customer, As is, the design works with all expected expectations By purchasing the kit, or by having it done by BRS-Engineering, you accept the CGU as well as the previous disclaimer

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