

Makertech


Linear Rail Upgrade

Written By: Makertech




Step 1 — Kit Contents



 Check that you have all of the following:

- 3D Printed Parts (x4)
- Rails (x4)
- Fastener pack
- 5x8 Coupling
- M4 Threaded Inserts (x11)

 You will also need (not included):

- Allen keys, Drill with metal bits (2mm/3mm), Side Cutters, Pliers, Soldering Iron (for threaded inserts)

Step 2 — Dissassembling the Platform



- Begin by disassembling the platform from the base.
- Do this by first untying the belt from the platform.
- Then remove the heated bed and place it to one side, you don't need to disconnect its wiring.
- If you have the Pi Camera installed, unmount it also, again you don't need to disconnect it from the pi board.
- Finally, remove the old HDPE linear guides holding the platform in place.
- The platform should now be free for the next step of drilling the holes for the linear rails.

Step 3 — Disassembling the Gantry



- Next, remove the tool carriage and Y-belt from the gantry. Do not cut the belt, it will be re-used.
- Free the y-endstop from the gantry.
- The lead screw bracket at the top of the printer can also be removed, this part can be disregarded as it won't be re-used.
- Disconnect the y-motor from its cable.
- Use side cutters to break the cable ties holding the cables to the gantry.
- Free the lead screw coupling from the z-motor shaft.
- Finally remove the HDPE linear guides from the gantry and the entire gantry part should now be free.

Step 4 — Disassembling the Z-Pillar



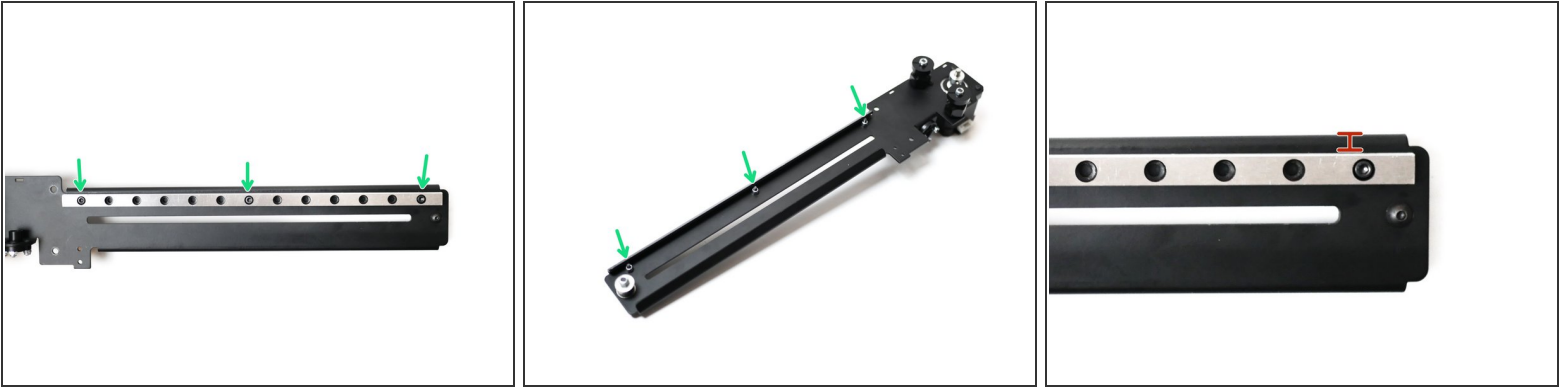
- If you have an extruder installed on the vertical pillar, remove it now.
- Next, unfasten the bolts connecting the pillar to the support bracket at the top of the pillar.
- Remove the the motor bolts at the bottom of the pillar.
- The pillar should now come free.

Step 5 — Platform Rails



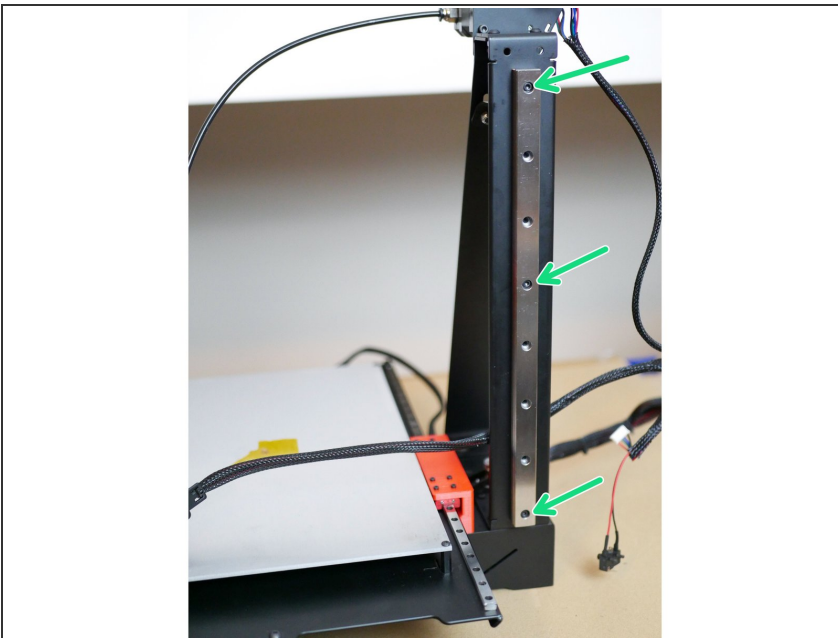
- Use a 2mm metal drill to create 3 holes on either side of the platform.
 - Place one of the 40cm rails on the platform, 4mm +/-1mm from the edge.
 - Use a pencil to mark out where you are going to drill.
- Secure the rail as shown with three M2 x 10mm bolts and M2 Nyloc Nuts
- Be very careful with the carriage, either secure or remove them very carefully. If they fall off and are hit, the ball bearings inside them will escape!

Step 6 — Gantry Rail



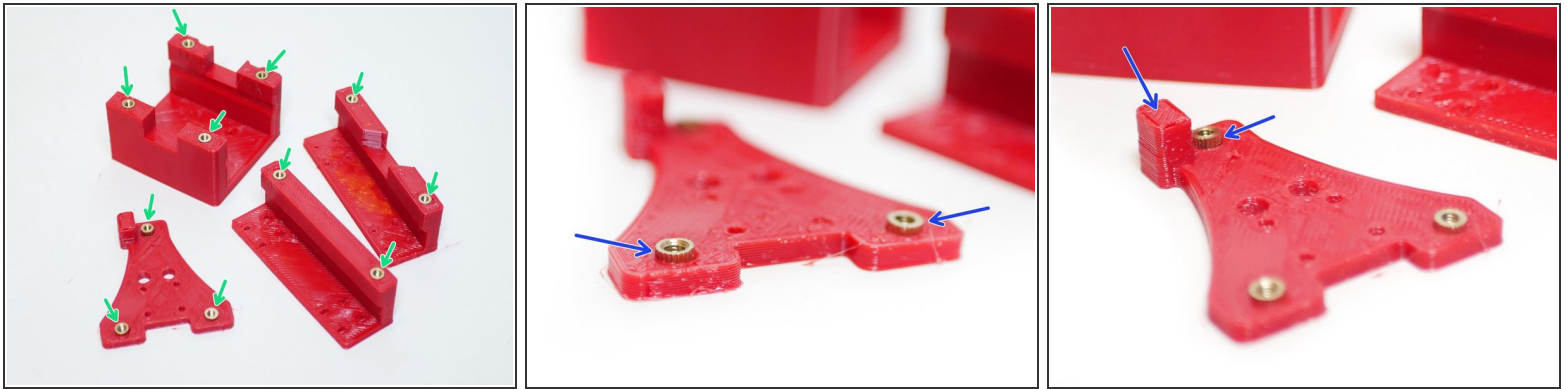
- Use a 3mm bit to drill three holes into the gantry.
- The rail should be fitted 5mm from the top edge of the gantry.
- Secure with M3 x 12mm Cap and M3 Nyloc Nut

Step 7 — Z-Pillar Rail



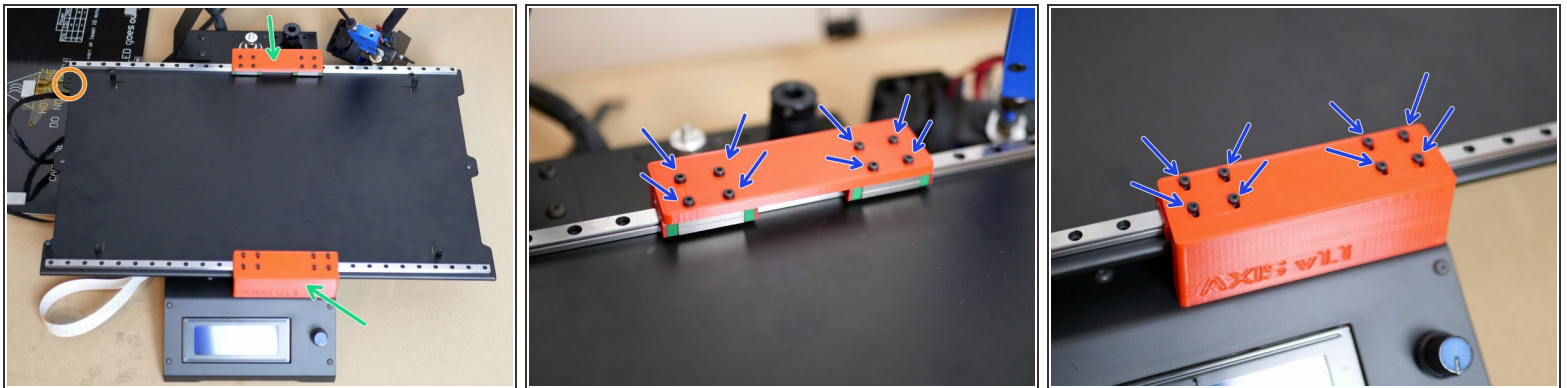
- Align the thicker 15mm rail to the centre of the pillar and create marks for three holes.
 - Drill three 3mm holes into the pillar.
 - Secure the rail with three M3 x 12mm cap bolts and M3 nyloc nuts.
- ⓘ Re-install the z-pillar when done.

Step 8 — Preparing 3D Printed Parts



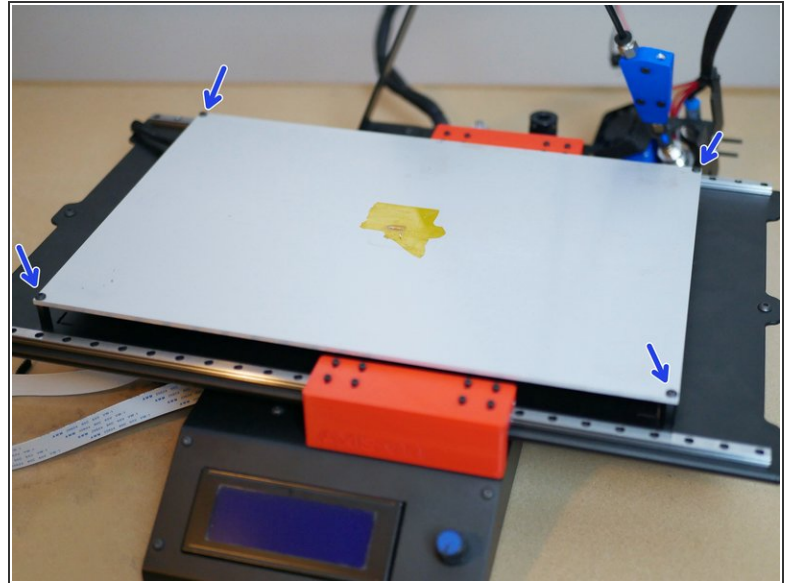
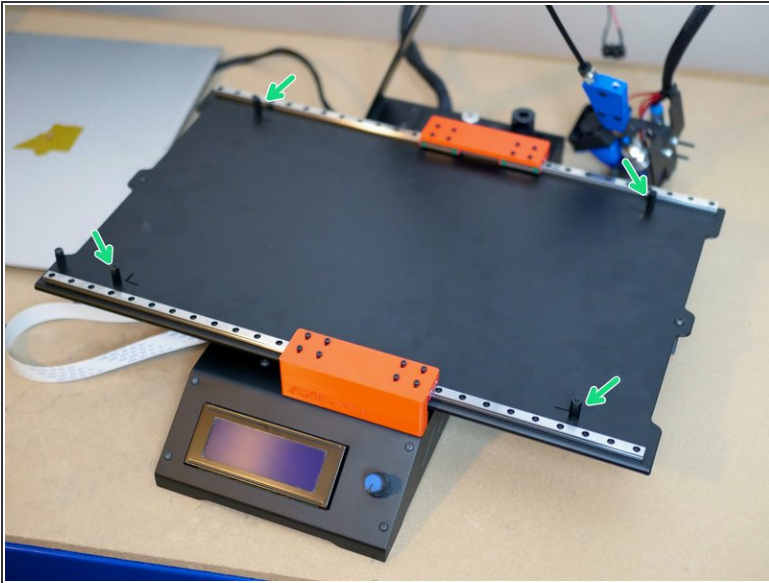
- Using a soldering iron push the threaded inserts into the 3D printed parts as shown.
 - M4 Threaded Insert
- Note that the inserts on the Tool Carriage part need to protrude out on the side shown.


Step 9 — Installing the Platform



- Begin by installing the two 3D printed parts to the Base with two M4 x 6mm Bolts.
- ❗ Next line up the linear rail carriages on the platform with the holes on the 3d printed brackets.
 - Secure the platform to the brackets using M2 x 6mm cap bolts.
 - Double check you have the correct orientation, the heated bed cable relief mount should be in the top left.

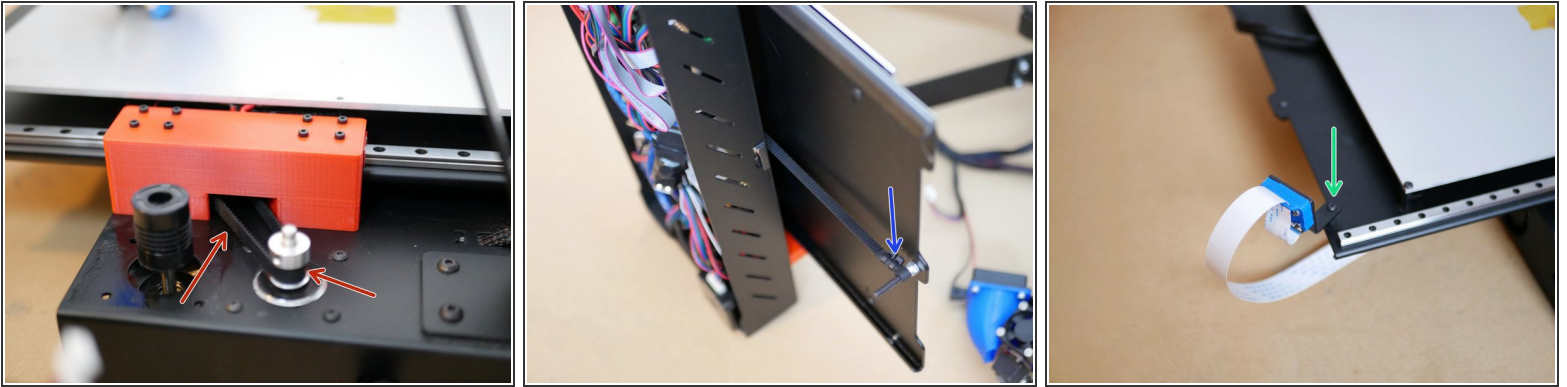
Step 10 — Mounting the Heated Bed



 A heated bed is required for this upgrade to properly work.

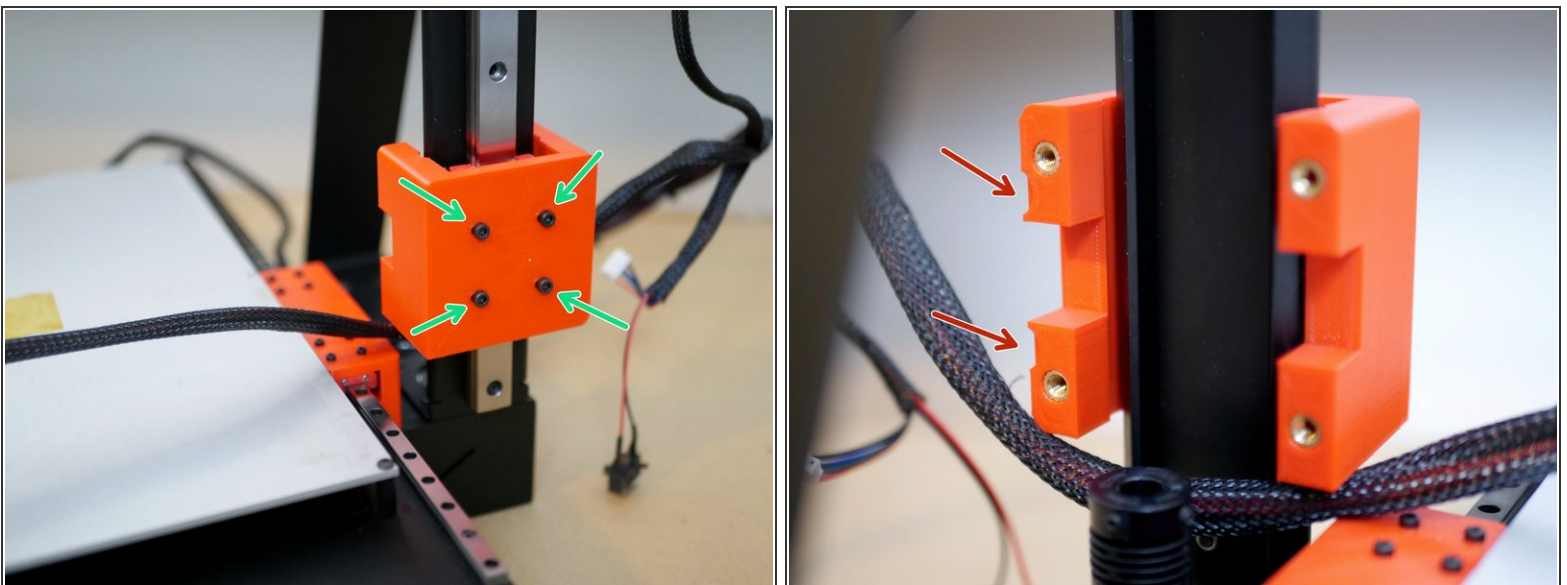
- The heated bed needs to be raised 5mm before it can be installed. To do this we replace the 10mm stand-offs with 15mm ones.
- With the 15mm stand-offs installed, re-mount the heated bed.

Step 11 — Platform Belt and Pi Cam



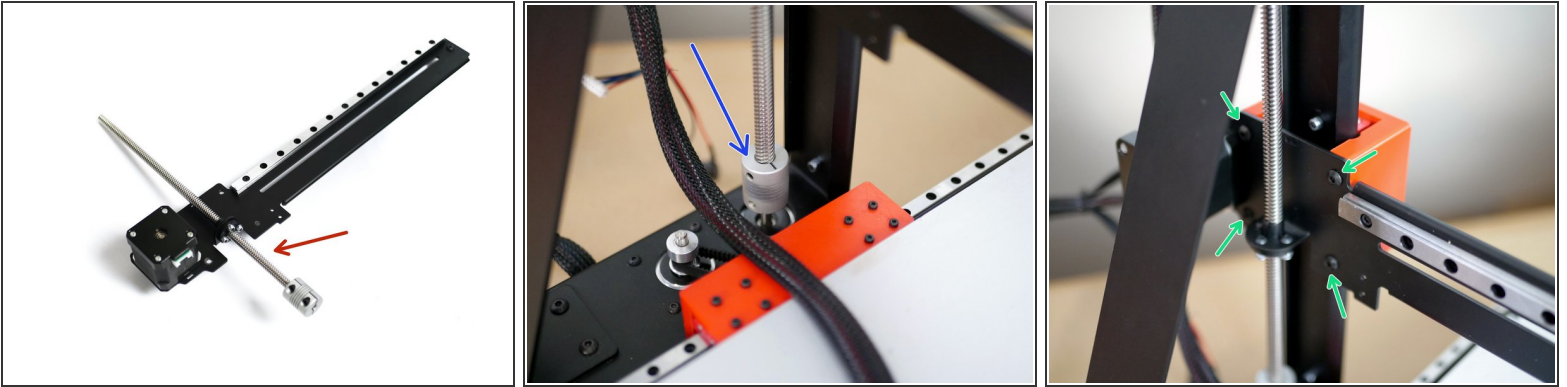
- Re-install the belt by first wrapping it around the pulley on the motor and then feeding it in through the rear bracket and around the bearings.
 - ☑ You will need to use a pen to guide the belt around the bearings.
- Secure the belt to the bolts on the ends of the platform.
- Re-attach the Pi-cam if you have that upgrade.

Step 12 — Gantry Carriage



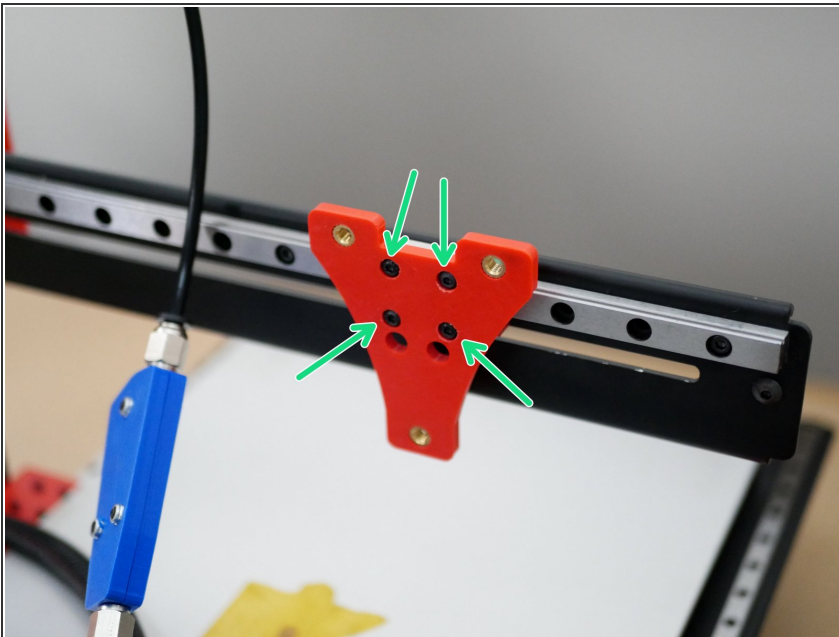
- Fix the gantry carriage to the Z-Rail as shown with four M3 x 8mm cap head bolts.
- Note the orientation of the carriage. The side with the small insets should point towards the rear of the printer.

Step 13 — Fixing the Gantry



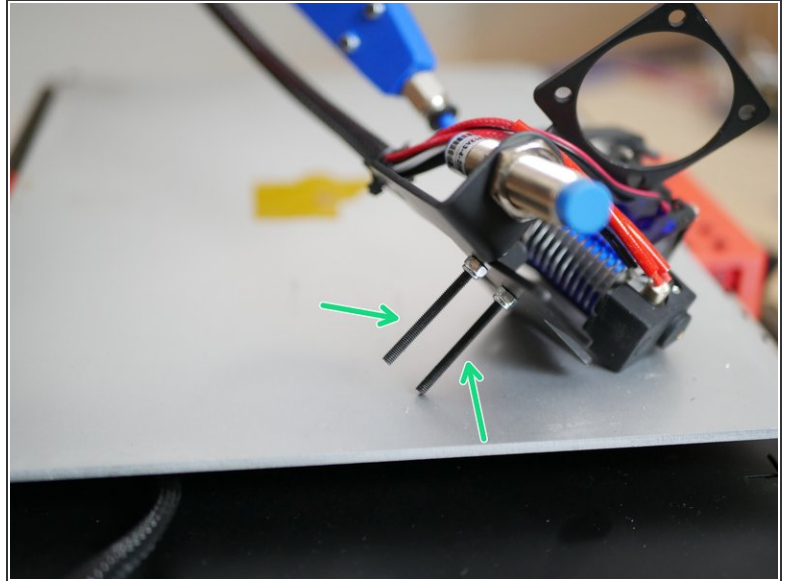
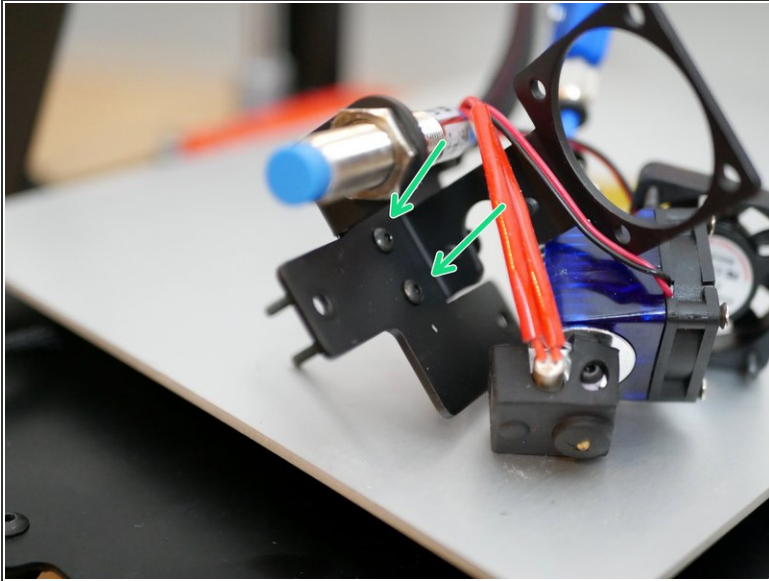
- Re-attach the the lead screw to the gantry.
 - Next fix the coupling to the z-motor shaft.
 - Finally, fix the gantry to the carriage with four M4 x 6mm bolts.
- i** You can also now reattach the end stop and cables.

Step 14 — Tool Carriage



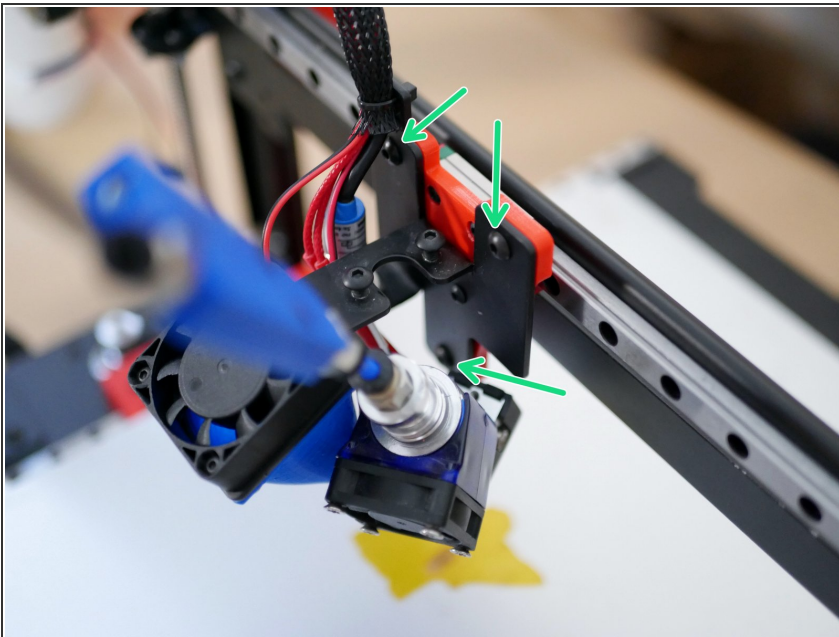
- i** Fix the 3D printed tool carriage to the gantry rail.
- M3 x 6mm button head

Step 15 — Tool Carriage Belt Bolts



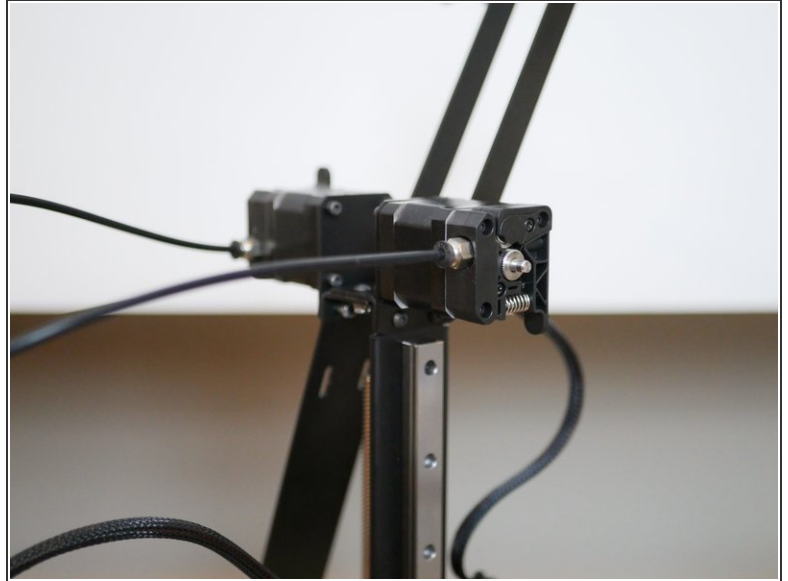
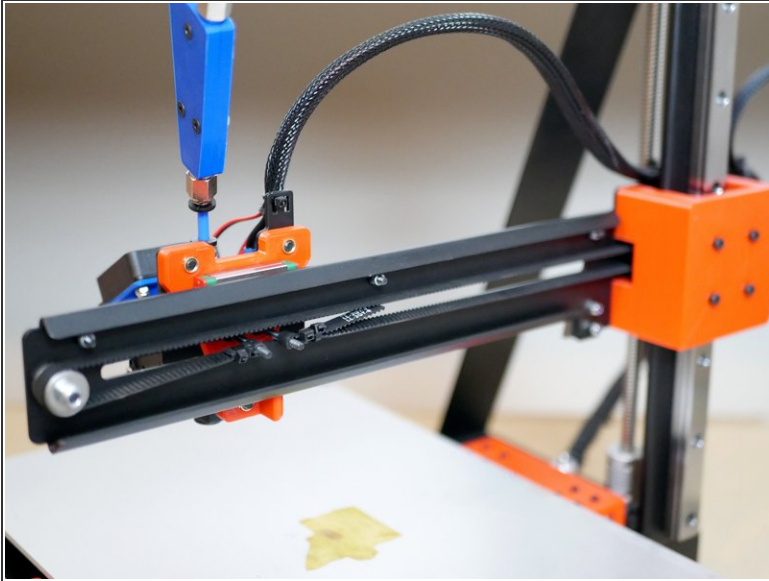
- Replace the M3 x 25mm bolts on the metal tool carriage with the two M3 x 35mm bolts.


Step 16 — Tool Carriage Mounting



- Mount the metal tool carriage onto the 3D printed one with three M4 x 6mm bolts.




Step 17 — Y-Belt and Extruder



-  Finally, re-attach the belt and the extruder.

Step 18 — Printing



-  Printing should be the same as before, the only thing to be aware of is that the z-height has been reduced by approx 5mm.
-  Along with the stability improvements you should also now be able to run the AXIS at higher speeds.
-  You can see it printing [here](#).