

ASSEMBLY MANUAL

For VERTEX3D.org by Martin Lexa y Alberto López
English versión by Martin Lexa and Tereza Sedlackova

Version 0.97 Lightening load.
Latest update: 05. 02. 2022

0. INTRODUCTION	5
0.1. SAFETY WARNING	6
0.2. MANIPULATION AND USE INSTRUCTIONS	9
0.3. TOOLS	12
1. FRAME MAP	13
1.1. XY FRAME PREPARATION I	14
1.2. XY STRUCTURE PREPARATION II	15
1.3. XY FRAME ASSEMBLY	16
1.4. XY FRAME CORNERS PREPARATION	17
1.5. XY FRAME CORNERS ASSEMBLY	18
1.6. ANTI-VIBRATION FEET ASSEMBLY	19
1.7. Y STRUCTURE PREPARATION	20
1.8. Z FRAME ASSEMBLY	21
1.9. Z FRAME CORNERS ASSEMBLY	22
1.10. Z FRAME ON XY FRAME ASSEMBLY	23
1.11. ZY ANGLE PREPARATION	24
1.12. ZY ANGLE ASSEMBLY	25
1.13. Z BOTTOM REINFORCEMENTS PREPARATION	26
1.14. Z BOTTOM REINFORCEMENTS ASSEMBLY	27
1.15. Z REINFORCEMENT THREADED RODS PREPARATION	28
1.16. Z TOP REINFORCEMENTS PREPARATION I	29
1.17. Z TOP REINFORCEMENTS ASSEMBLY I	30
1.18. Z TOP REINFORCEMENTS PREPARATION II	31
1.19. Z TOP REINFORCEMENT ASSEMBLY II	32
1.20. Z HORIZONTAL THREADED ROD ASSEMBLY	33
1.21. Z VERTICAL THREADED RODS ASSEMBLY	34
1.22. FINISHING FRAME ASSEMBLY	35
2. Y AXIS MAP	36

2.1. Y MOTOR PREPARATION	37
2.2. Y MOTOR HOLDER PREPARATION	38
2.3. Y MOTOR HOLDER ASSEMBLY	39
2.4. Y TENSIONER PREPARATION	40
2.5. Y TENSIONER HOLDER ASSEMBLY.....	41
2.6. Y LINEAR RAIL HOLDERS PREPARATION	42
2.7. Y LINEAR RAILS PREPARATION	43
2.8. Y LINEAR RAIL HOLDERS ASSEMBLY.....	44
2.9. Y CARRIAGE PREPARATION.....	45
2.10. Y BELT HOLDER PREPARATION.....	46
2.11. Y CARRIAGE ASSEMBLY	47
2.12. Y BELT ASSEMBLY I.....	48
2.13. Y BELT ASSEMBLY II.....	49
2.14. Y BELT ASSEMBLY III.....	50
2.15. Y BELT ADJUSTMENT I	51
2.16. Y BELT ADJUSTMENT II	52
2.17. HEATBED ASSEMBLY	53
 3. X AXIS MAP	54
 3.1. X END MOTOR IDLER PREPARATION I	55
3.2. X END MOTOR IDLER PREPARATION II	56
3.3. X END MOTOR IDLER PREPARATION III	57
3.4. X MOTOR PREPARATION	58
3.5. X MOTOR ASSEMBLY	59
3.6. X END IDLER PREPARATION I	60
3.7. X END IDLER PREPARATION II	61
3.8. X TENSIONER PREPARATION I	62
3.9. X TENSIONER PREPARATION II	63
3.10. X AXIS ASSEMBLY	64
3.11. X CARRIAGE PREPARATION	65
3.12. X CARRIAGE ASSEMBLY	66
 4. Z AXIS MAP	67

4.1. Z MOTOR HOLDERS PREPARATION.....	68
4.2. Z MOTOR HOLDERS ASSEMBLY.....	69
4.3. Z MOTORS ASSEMBLY	70
4.4 X AXIS ON STRUCTURE ASSEMBLY	71
4.5. Z SMOOTH RODS ASSEMBLY	72
4.6. Z TOP PREPARATION	73
4.7. Z TOP ASSEMBLY	74
5. EXTRUDER MAP	75
5.1. EXTRUDER BODY PREPARATION I	76
5.2. EXTRUDER BODY PREPARATION II	77
5.3. EXTRUDER BODY PREPARATION III	78
5.4. EXTRUDER MOTOR PREPARATION	79
5.5. EXTRUDER COVER PREPARATION	80
5.6. HOTEND ASSEMBLY	81
5.7. EXTRUDER MOTOR ASSEMBLY	82
5.8. EXTRUDER COVER ASSEMBLY	83
5.9. X CARRIAGE FILAMENT SENSOR CABLE PREPARATION.....	84
5.10. X MOTOR CABLE PREPARATION.....	85
5.11. EXTRUDER ASSEMBLY ON X CARRIAGE	86
5.12. FILAMENT SENSOR ASSEMBLY.....	87
5.13. FS COVER ASSEMBLY	88
5.14. EXTRUDER IDLER PREPARATION I	89
5.15. EXTRUDER IDLER PREPARATION II	90
5.16. CHECK EXTRUDER MOTOR GEAR ALIGNMENT	91
5.17. EXTRUDER IDLER ASSEMBLY.....	92
5.18. HOTEND NOCTUA FAN ASSEMBLY I	93
5.19. HOTEND NOCTUA FAN ASSEMBLY II	94
5.20. FAN SUPPORT ASSEMBLY	95
5.21. FAN SHROUD ASSEMBLY	96
5.22. PRINT FAN ASSEMBLY.....	97
5.23. INDUCTIVE SENSOR ASSEMBLY.....	98
5.24. EXTRUDER CABLES ORGANIZATION I	99

5.25. X BELT ASSEMBLY	100
5.26. X BELT TENSION ADJUSTMENT	101
5.27. X CARRIAGE BACK PREPARATION	102
5.28. EXTRUDER CABLES ORGANIZATION II	103
5.29. X CARRIAGE BACK ASSEMBLY	104
5.30. EXTRUDER CABLES ORGANIZATION III	105
 6. ELECTRONICS MAP	 106
 6.1. MEANWELL PSU PREPARATION	 107
6.2. MEANWELL PSU ASSEMBLY	108
6.3. PSU CABLES PREPARATION	109
6.4. MOSFET PREPARATION	110
6.5. LCD PREPARATION I	111
6.6. LCD PREPARATION II	112
6.7. LCD ASSEMBLY ON XY STRUCTURE	113
6.8. EINSY RAMBO BOX PREPARATION I	114
6.9. EINSY RAMBO BOX PREPARATION II	115
6.10. EINSY RAMBO BOX ASSEMBLY	116
6.11. EINSY RAMBO ASSEMBLY	117
6.12. WIRING PREPARATION	118
6.13. EINSY RAMBO WIRING	119
6.14. MOSFET ASSEMBLY	120
6.15. MOTOR X WIRING PREPARATION	121
6.16. EINSY RAMBO COVER ASSEMBLY	122
6.17. PRINTER FIRMWARE PREPARATION	123
6.18. PRINTER FIRMWARE BURNING	124

0. Introduction



Time to assemble: 8 - 20 hours

All tools included

No soldering required

Latest STL printed parts at:
github.com/Vertex3dPrinters/VERTEX-XL

Instagram:
instagram.com/vertex3dorg/

Facebook forum:
Facebook.com/groups/vertex3d

0.1. Safety Warning

The Vertex XL 3D printer brings the power of additive manufacturing to your home/office/workshop. It is a robust and precise machine with moving parts and parts that heat up to high temperatures, please use it with caution. Make sure the printer is out of reach of children, pets, and untrained people.

The content of this assembly guide is protected by the intellectual property rights belonging to VERTEX3D. Any use of its content for content by third parties, whether for profit or not, can be prosecuted.

Before assembling and using your VERTEX XL 3D printer, make sure you have read and understood all the instructions in this manual (mainly the pages highlighted in yellow). Failure to follow the warnings and instructions may result in injury, equipment damage, fire, or property damage for which VERTEX3D is not responsible.

Use the gloves provided in the KIT when mounting the linear guides for the X and Y axis. Keep the linear guides greased at all times.

Clean the smooth sheet base with isopropyl alcohol or soap and water. If you are going to print materials other than PLA, use separating agents before each print such as lacquer or glue stick to avoid breaking the PEI sheet. Let the surface cool down before removing the prints, do it slowly and without sudden movements so as not to break the PEI sheet.

Any software or electronic modification will automatically void its warranty.



Electrical safety

- Before connecting the Vertex XL 3D printer to the electric power, make sure that the local voltage line corresponds to the voltage indicated on the PSU (power supply unit), you can change it on the back switch of the power supply to 110v or 220v. The yellow sticker on the PSU will show you where to find the switch.
- Make sure the Vertex XL 3D Printer is plugged into a properly grounded power point.
- Do not use the 3D printer if the plug, power cord, or any other part is damaged. Contact the supplier to replace the damaged part.
- Do not try to repair the power cable and do not use any adapter.
- Disconnect the 3D printer from current when performing maintenance.
- Disconnect the 3D printer from current if you are not going to use it for a long time.
- Disconnect the 3D printer during a severe electrical storm and whenever there is a risk of an unstable power grid or storm.
- Be sure to protect electronic components from electrostatic discharge (ESD), especially when assembling the printer or performing maintenance.
- Please use the original components provided by VERTEX3D.org you will find any replacement in the site.
- Do not make any unauthorized electronic modifications to the device. This will automatically invalidate the warranty.

Personal Safety

- When using the VERTEX XL 3D printer, stay alert and watch what you're doing. Do not operate the 3D printer if you are tired, under the influence of alcohol or drugs.
- Make sure nothing interferes with the moving parts of the VERTEX XL 3D Printer. Keep your hair, clothing, and accessories away from the moving parts of the 3D printer.
- Do not touch the nozzle, heated bed, or printing plate when they are heated: just before printing starts, during printing, or after printing finishes. You can check the temperatures on the screen.

Safe manipulation

- The Vertex XL 3D printer is designed for use at room temperature, with relative humidity levels of 30% to 60%.
- Do not use the Vertex XL 3D printer in humid or wet environments. Make sure the 3D printer is completely dry before plugging it into electricity and turning it on.
- Do not expose the Vertex XL 3D printer to intense heat (temperatures above 45°C/113°F) or strong/long-term UV light.
- Do not use the Vertex XL 3D printer in dusty environments.
- Use the Vertex XL 3D printer in a ventilated environment, but make sure that no air is directed directly at the printer (fan, air conditioning, open window...)
- Do not use the Vertex XL 3D Printer close to flammable liquids or gases.
- When using the Vertex XL 3D Printer, do not leave it unattended for too long.

0.2. Manipulation and use instructions

Throughout the guide you will find the following symbols:

-  To inform you or give you some advice or curiosity.
-  To warn you of something you need to pay attention to.

Keep your workplace tidy! Use only the pieces you need for the given chapter/step. Use small containers to sort bolts and nuts to make sure they don't get scattered

 **Each bag of screws corresponds to each chapter of this guide, we suggest you to open each bag according to the chapter number.**

If you find any small scratches on any of the components, please note that it is because each component is tested before shipping. It will not affect performance or print quality.



Keep the electronic components inside the protective bag until instructed that it is time to install them. Handle electronic components with care: hold them on their sides only. Avoid touching chips, capacitors, and other electronic parts.

Before manipulating any of the electronic components, touch a conductive material (any type of metallic material) to remove any static charge you may have. Please note that carpets or wool and certain synthetic fabrics can easily accumulate static electricity.

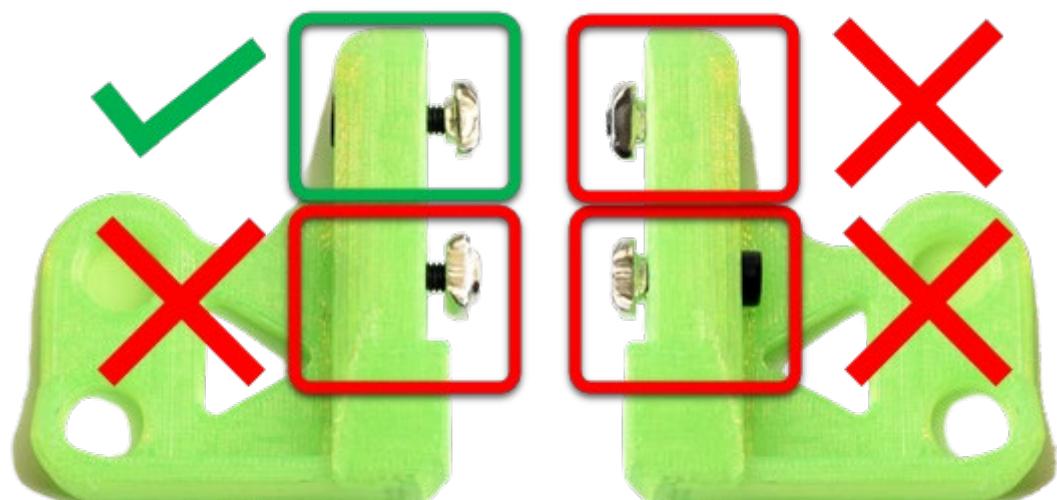
⚠ Most of the screws used during the assembly of the 3D printer must be tightened carefully: not too much, not too little.

For this reason, we strongly recommend that you do not use any electric screwdriver. The torque of the electric screwdriver may be too high and cause over-tighten the screws, causing the printer parts to misalign or even break the printed plastic parts.

Even though you can adjust the torque on the electric screwdriver (about 2Nm), the fast rotation of the screw may melt the plastic part due to friction making the part useless.

Throughout this guide, you will often be instructed to use **M4 T-Nuts**. There are two techniques you need to understand to complete the assembly successfully:

1. Insert the screw into the plastic part hole and **screw the M4 T-nut from the other side onto the screw tip (only 4 turns)**. Then **align the T-nut with the slot in the aluminium profile** to secure printed part.
2. Put the printed part on it's position, **slide the M4 T-nut into the aluminium profile slot** and push it using an Allen key under the printed part until it aligns with the screw hole, then screw to secure it.



If a nut keeps coming out of its slot, use a small piece of tape to seal the slot after inserting the nut inside. Remove the tape when you start to tighten the screw. **Do not use glue** to secure the nut as it can get into the threads and not allow you to tighten the bolt properly. Also, one day you may need to remove the nut and reuse it when you upgrade the printer.



Embed hexagonal nuts in printed parts

To embed an hex nut into its slot in a printed part, use a longer screw that is threaded the full length (M3x14, for example). Insert it from the other side and screw the nut manually using the Allen key, until reaching the screw head. Use the screw to embed the nut into the printed part, and then tighten the screw to insert it all the way. Remove the screw afterward.

Before beginning any assembly step, make sure you have read and understood all written instructions.

⚠️ Not all the pictures shows the finalized result, so DO NOT skip over the text and DO NOT proceed sentence by sentence either.

i If you have any questions, consult our technical support team through the live chat or email info@vertex3d.org

0.3. Tools



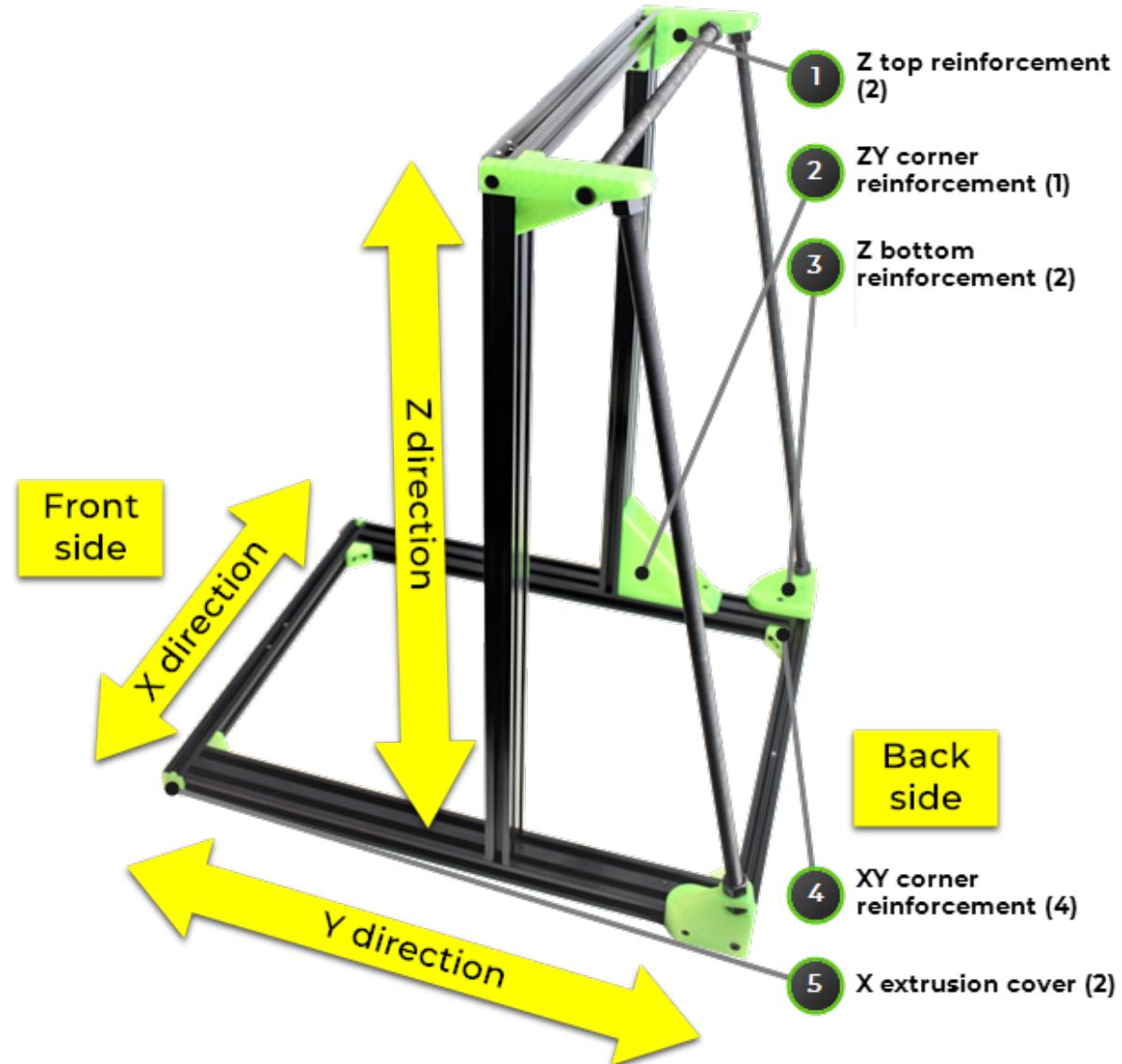
The KIT includes these tools:

- Allen keys of the following sizes:
 - 4 mm
 - 3 mm
 - 2,5 mm
 - 2 mm
 - 1,5 mm
- Needle nose pliers
- Philips screwdriver

Other useful tools (not included) :

- Meter or ruler over 20cm
- Framing square
- Marker

1. Frame map



1.1. XY Frame preparation I



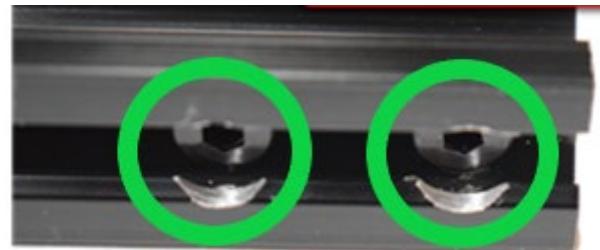
Place the XY base aluminium extrusions as shown in the picture:

- x2 2020 aluminium extrusions 40cm
- x2 2040 aluminium extrusions 56cm

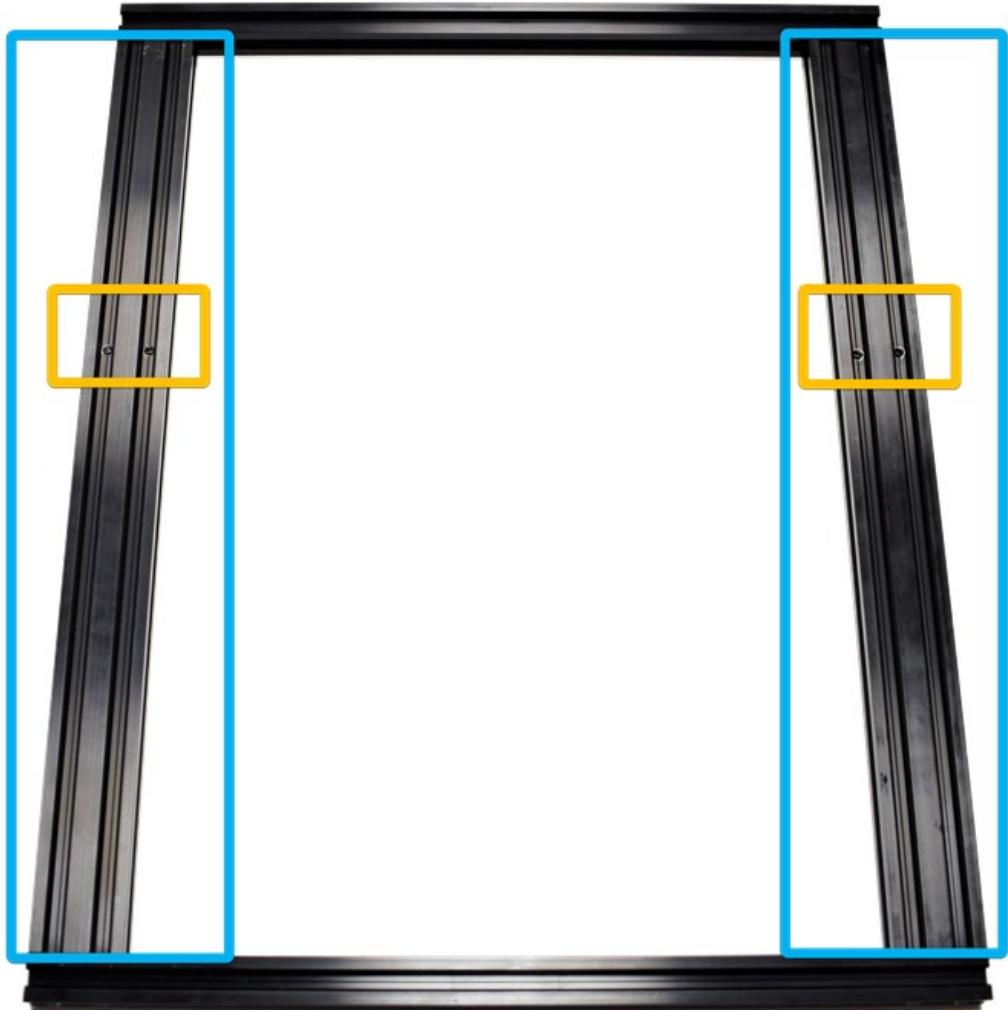
The shorter 2020 aluminium extrusions 40cm will be placed in the X direction (horizontal):

- **2020 profile** front.
- **2020 profile** rear.

In both 2020 profiles there are **4 holes** in each, make sure that the part with the larger holes faces out as there will be input screw heads.



1.2. XY Structure preparation II



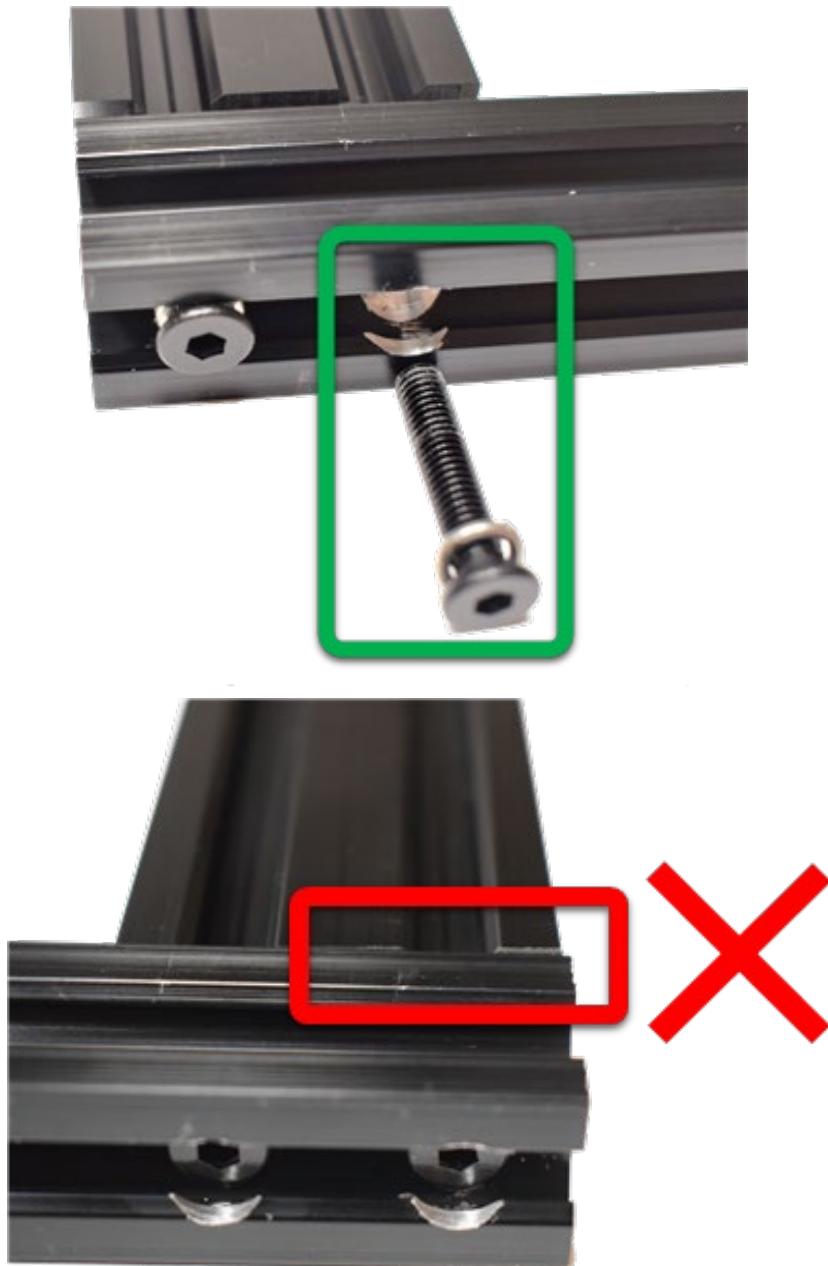
Between the 2020 aluminium extrusions placed in the previous step, place the **2040 46cm aluminium extrusions** vertically.

i Both **2040 aluminium extrusions** are the same no matter which side you put them on.

⚠ There are **two holes** in these **2040 aluminium extrusions**, they are not exactly in the middle, they must be closer to the back than to the front as shown in the picture.

As in the 2020 aluminium extrusions installed in the previous step, there are **two holes** in **each 2040 profile** with the larger holes on. The big holes must face down and the small ones up as shown in the picture.

1.3. XY Frame assembly



Prepare **x8 M5x25 bolts** and **x8 M5gw grower washers**.

Before inserting the **M5x25 screws**, make sure to put the **M5gw grower washers** on them.

Start at the preferred corner of the frame. Insert the **screw** through the 2020 aluminium extrusion and tighten it against the corresponding 2040 aluminium extrusion.

Repeat this step in the remaining 3 corners with two screws per corner.

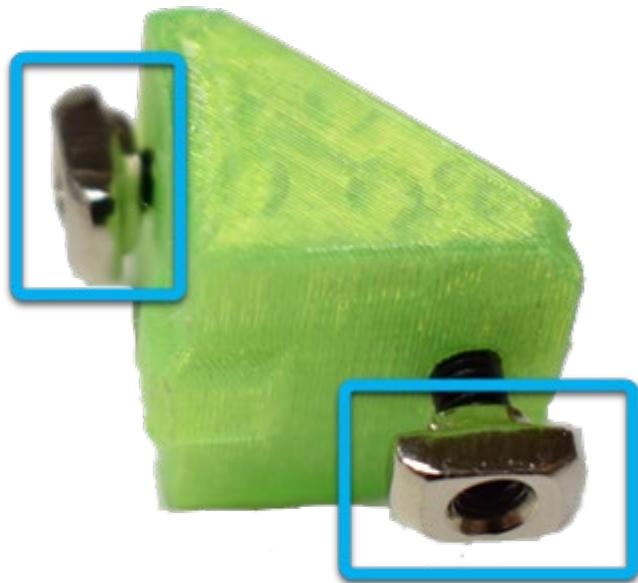
! Do not fully tighten the screws! When all of them are in place, make sure the frame is on a completely flat surface.

! Do not over-tighten the screws, the frame may bend slightly and may affect the rest of the assembly.

! Make sure that the aluminium extrusions are aligned with each other. Avoid what is shown in the **second image**. Once aligned, tighten the screws.

i If you have any framing square, you can use it to make the aluminium extrusions alignment easier.

1.4. XY Frame corners preparation



Prepare x4 frame corners (printed parts) as follows:

Insert **x2 M4x10** screws into the 2 holes on the printed part. On the other side, screw **x2 T-M4 nuts** onto the tips of the screws:

- Screw only 4 turns.
- Orient the nuts, so that they align with the aluminium extrusions groove.

Repeat this step another 3 times with the rest of the XY frame corners.

You should see something similar to what is shown in the image.

1.5. XY Frame corners assembly



Insert a frame corners (printed part) prepared in the previous step into the aluminium extrusion corner, the **T-M4 nuts** have to be aligned with the groove.

Make sure the frame corner is aligned.

i When tightening the M4x10 screws, the **T-M4 nut** will turn 90° by itself, securing the printed part to the frame, if it does not turn, loosen and tighten again until you see it turn.

i If you have any framing square, you can use it to check the frame perpendicularity in this point.

Repeat this action on the other 3 corners.

1.6. Anti-vibration feet assembly

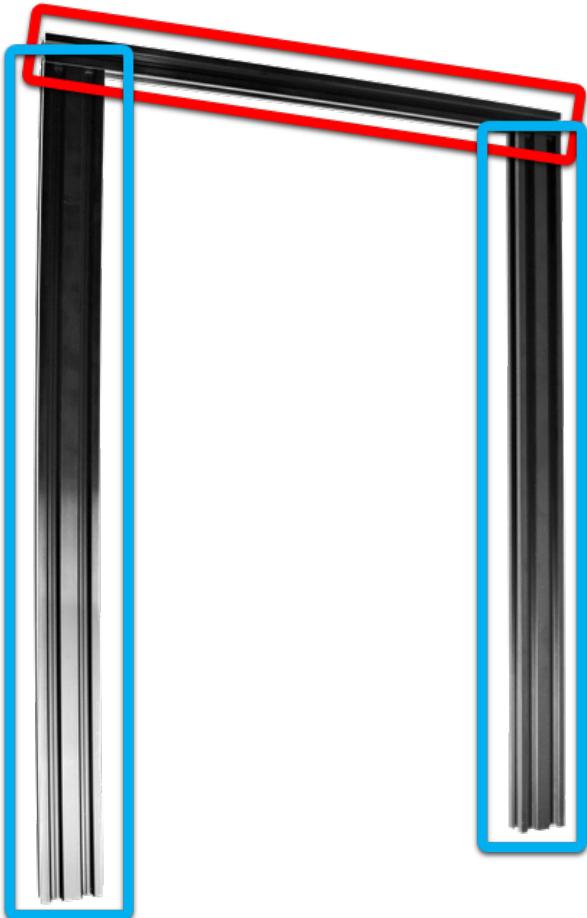
Before continuing, install the Anti-Vibration feet (printed part).

Slide x2 legs into the bottom of the front and rear 2020 aluminium extrusions as shown in the picture.

Position them at each of the four corners of the XY frame.



1.7. Y Structure preparation

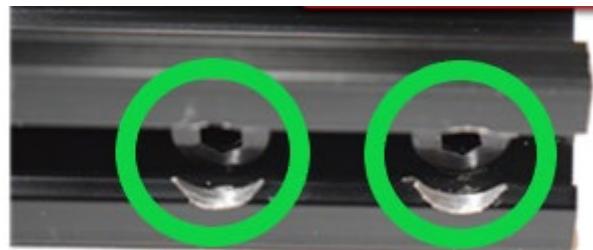


Place the rest of the aluminum extrusions on a flat surface as shown in the photo:

- X1 2020 aluminium extrusion 40cm.
- X2 2040 aluminium extrusions 56cm.

The **2020 aluminium extrusion 40cm** has to be placed horizontally.

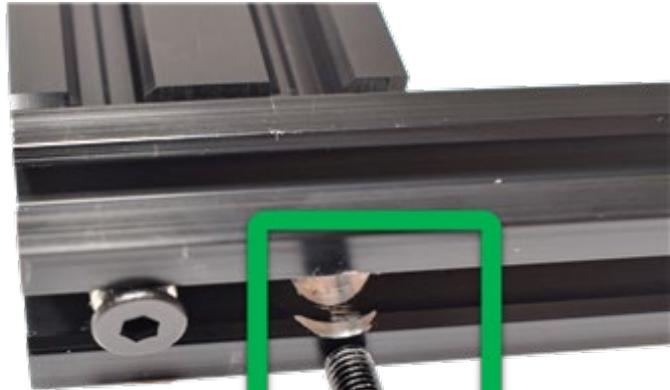
 Make sure that the bigger drilled holes face outside.



The **2040 aluminium extrusions 56cm** have to be placed vertically.

 Both **2040 aluminium extrusions** are the same, no matter which side you choose.

1.8. Z Frame assembly



Prepare **x4 M5x25 bolts** and **x4 M5gw grower washers**.

Before inserting the **M5x25 screws**, make sure to put the **M5gw grower washers** on them.

Start at the preferred corner of the frame. Insert the **screw** through the 2020 aluminium extrusion and tighten it against the corresponding 2040 aluminium extrusion.

Repeat this step in the remaining 3 corners with two screws per corner.

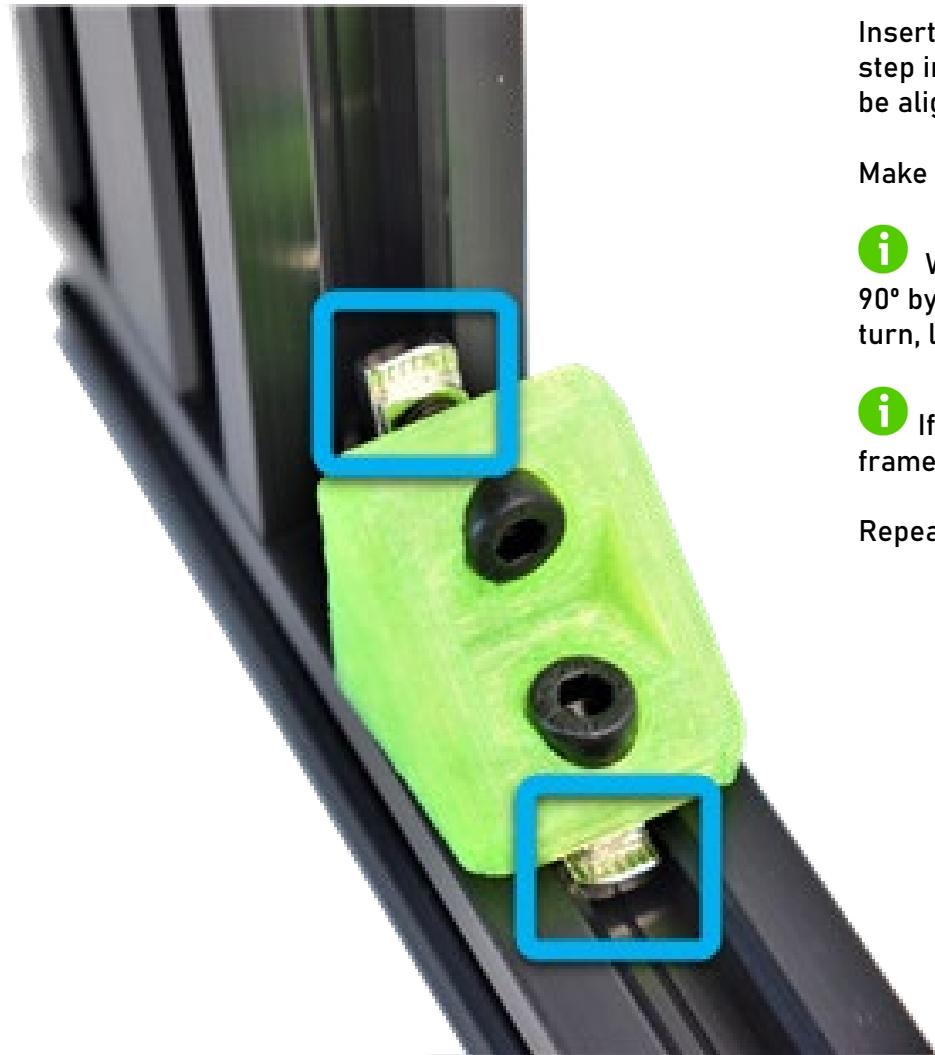
! Do not fully tighten the screws! When all of them are in place, make sure the frame is on a completely flat surface.

! Do not over-tighten the screws, the frame may bend slightly and may affect the rest of the assembly.

! Make sure that the aluminium extrusions are aligned with each other. Avoid what is shown in the **second image**. Once aligned, tighten the screws.

i If you have any framing square, you can use it to make the aluminium extrusions alignment easier.

1.9. Z Frame corners assembly



Insert a frame corners (printed part) prepared in the previous step into the aluminium extrusion corner, the **T-M4 nuts** have to be aligned with the groove.

Make sure the frame corner is aligned.

i When tightening the M4x10 screws, the **T-M4 nut** will turn 90° by itself, securing the printed part to the frame, if it does not turn, loosen and tighten again until you see it turn.

i If you have any framing square, you can use it to check the frame perpendicularity in this point.

Repeat this action on the other 3 corners.

1.10. Z Frame on XY frame assembly



Take the XY frame and leave it on a flat surface.

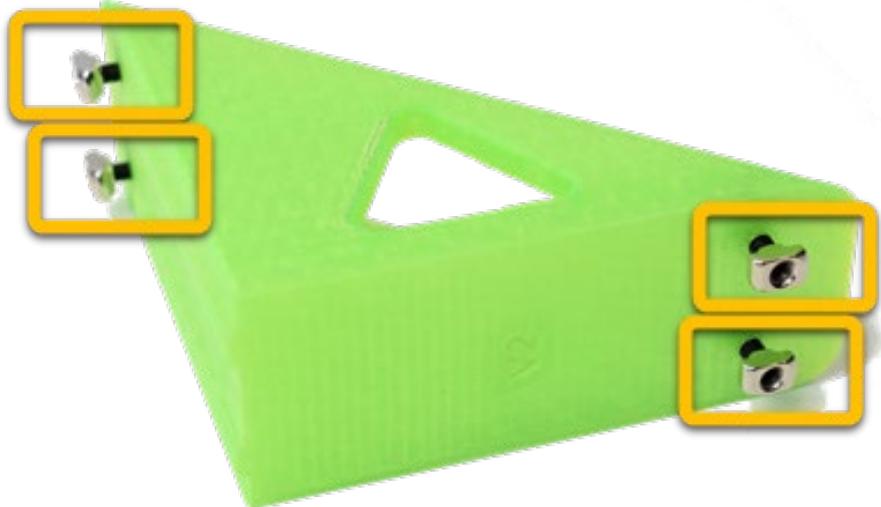
Insert **x2 M5x25 screws** and **x2 M5gw washers** in each 2040 aluminium extrusion from the bottom.

Put the Z frame on top and **tighten the screws** to secure both frames.

i If you have any framing square, you can use it to check the frame perpendicularity in this point.

! Do not over-tighten the screws, the frame may bend slightly and may affect the rest of the assembly.

1.11. ZY Angle preparation



Take the ZY reinforcement angle (printed part).

Insert **x4 M4x10 screws** into the printed part 4 holes.

On the other side, screw four **T-M4 nuts** onto the screw tips:

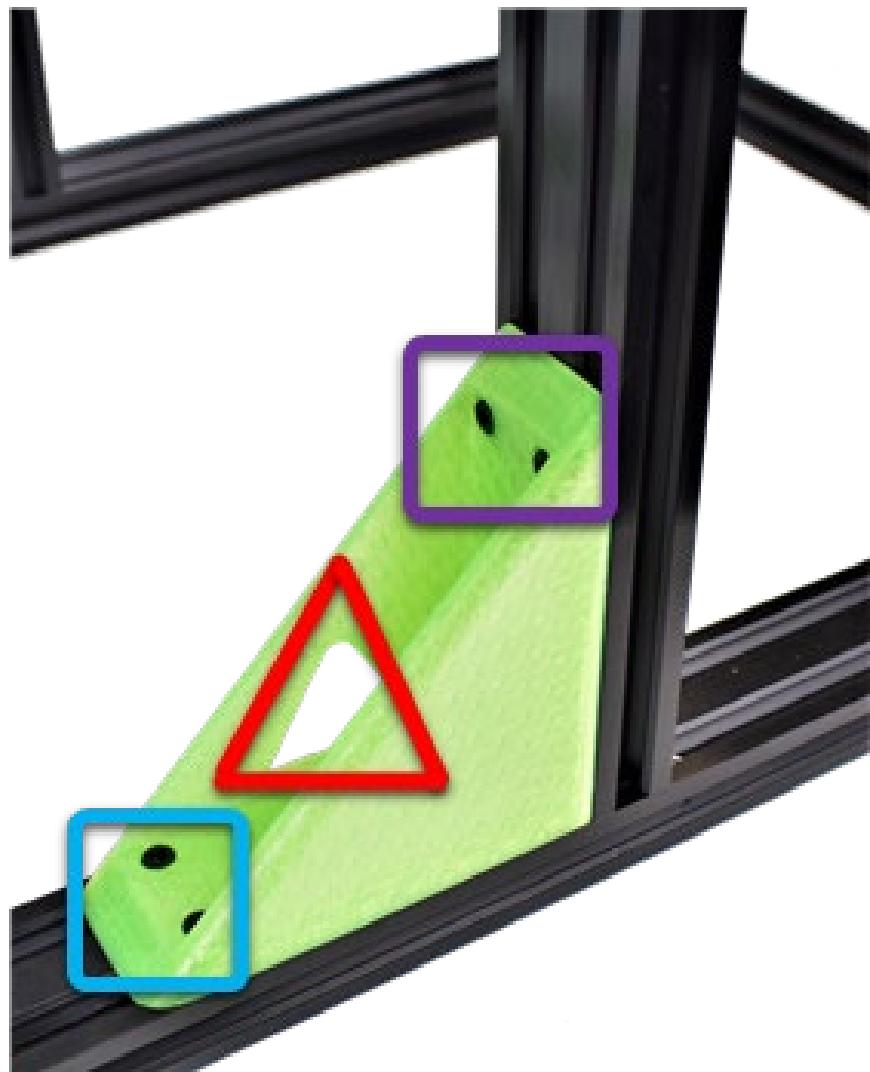
- Screw only 4 turns.
- Orient the nuts so that they align with the aluminium extrusions groove.

You should see something similar to what is shown in the image.



If you have any questions, go to step 2 to see the position.

1.12. ZY Angle assembly



Take the frame and turn it until the back is facing you in the shortest part.

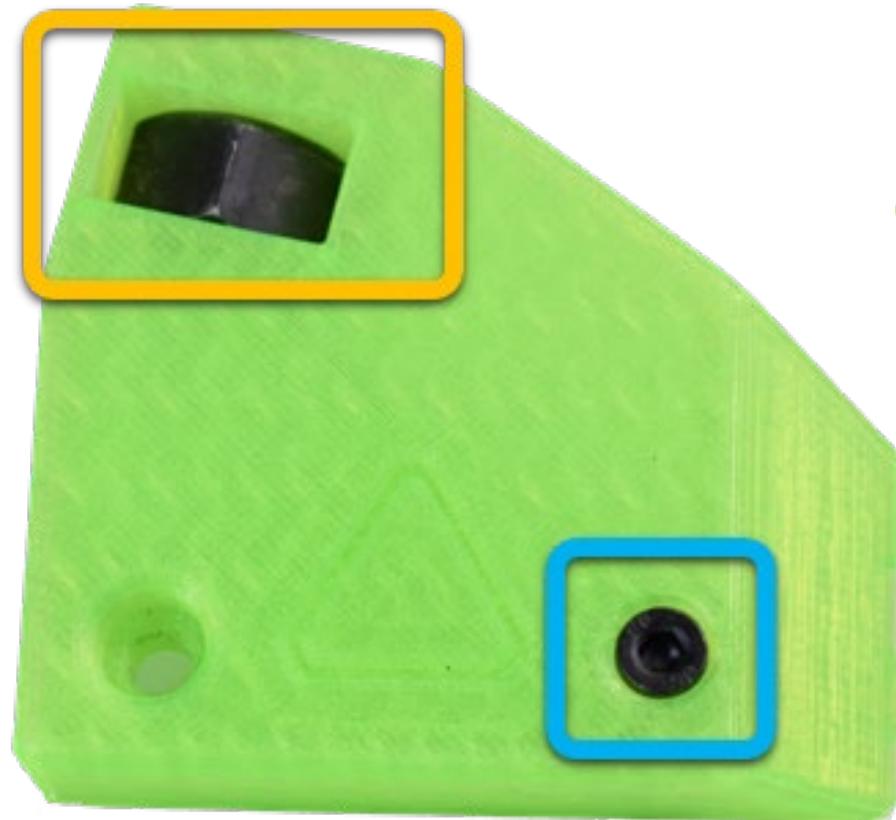
Place the ZY angle (printed part) over the right aluminium extrusion grooves. The **hole with the Vertex logo** must be towards the inside of the frame.

Lightly tighten the bottom with **x2 M4x10 screws**, do not fully tighten them, you have to be able to move the part.

i If you have any framing square, you can use it to check the frame perpendicularity in this point.

Push the ZY angle against the 2040vertical aluminium extrusion and tighten the **x2 upper M4x10 screws**. Then finish tightening the **x2 lower M4x10 screws**.

1.13. Z Bottom reinforcements preparation



Take the bottom Z reinforcements (printed parts) and insert **x1 M12n nut** into the slot.

Insert **x1 M4x12 screw** and screw **x1 T-M4 nut** from the other side onto the tip of the screw as you have done in the previous steps.

i The other holes remain free for now.

Repeat this operation on the other Z bottom reinforcement.

1.14. Z Bottom reinforcements assembly



Place the Z bottom reinforcement on the back of the frame as shown in the photo.

i If you have any doubts, go to step 2 to see the position.

! Make sure you have mounted the Anti-vibration feet as you will not be able to put them on after installing this part.

Align the **M5 hole** in the printed part with the threaded hole in the 2020 aluminum extrusion, insert **x1 M5x12 screw** and tighten it.

Tighten **x1 M4x12 screw**.

From the top side groove of the 2040 aluminium extrusion, slide and push **x1 T-M4 nut** under the printed part then align it with the remaining hole.

Once aligned, insert **x1 M4x12 screw** and tighten it to fully secure the printed part.

Repeat the same process for the other Z bottom reinforcement on the opposite side.

1.15. Z reinforcement threaded rods preparation



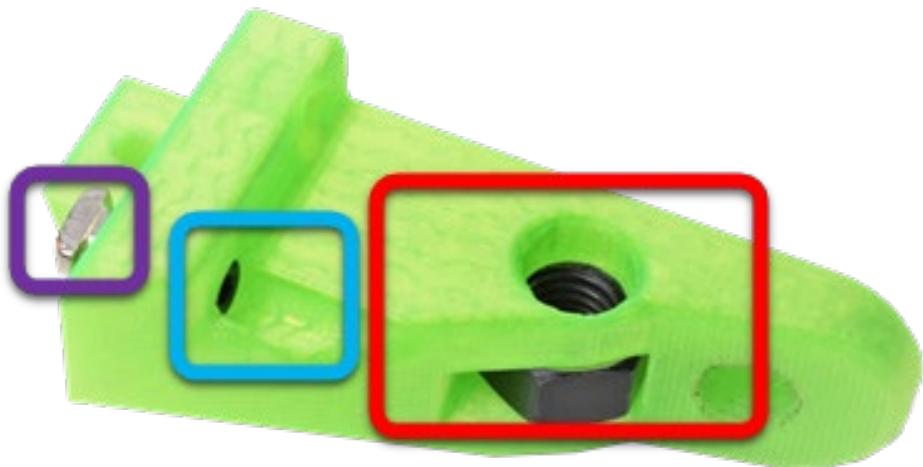
Take **x2 longer thread rods**.

Take **x4 M12 nuts** and screw them onto each side of each threaded rod about 5cm far from the ending.

Screw **x1 threaded rod** into the previously assembled Z bottom reinforcement until reaches the bottom.

Repeat the same action on the opposite side.

1.16. Z Top reinforcements preparation I



Take x1 Z top reinforcement (printed part) and insert **x1 M12n nut** into the slot.

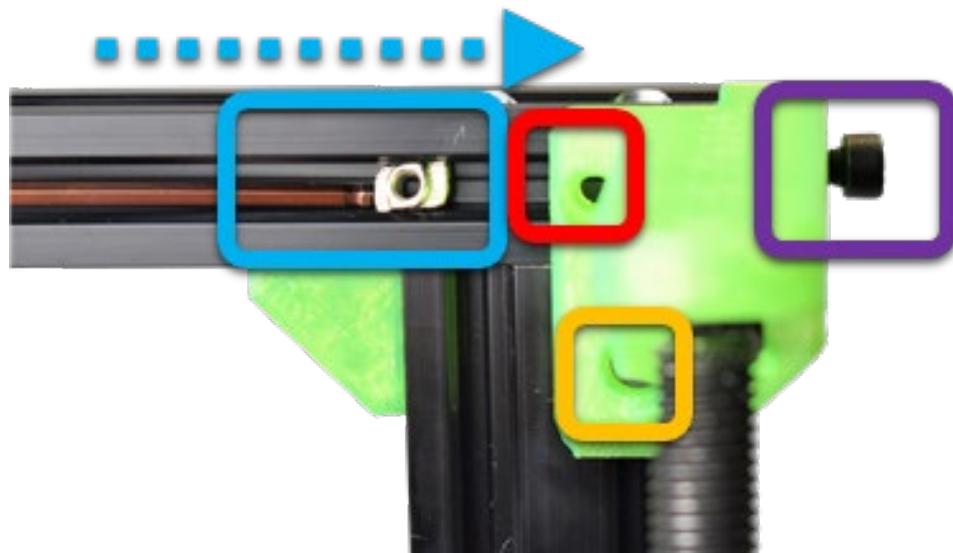
Insert **x1 M4x12 screw**.

Insert **x1 T-M4 nut** on the tip of the **M4x12 screw** as you have done before.

i The other two holes remain free for now.

Repeat the same operation on the other Z top reinforcement.

1.17. Z top reinforcements assembly I



Place one of the Z top reinforcements on its respective top corner, in the case of the photo, it is shown on the right side from the back. The **T-M4** nut must be aligned with 2040 aluminium extrusion vertical groove.

Align the **M5 hole** in the printed part with the **M5 thread hole**.

Insert **x1 M5x12 screw** and tighten it.

Tighten **x1 M4x12 screw**.

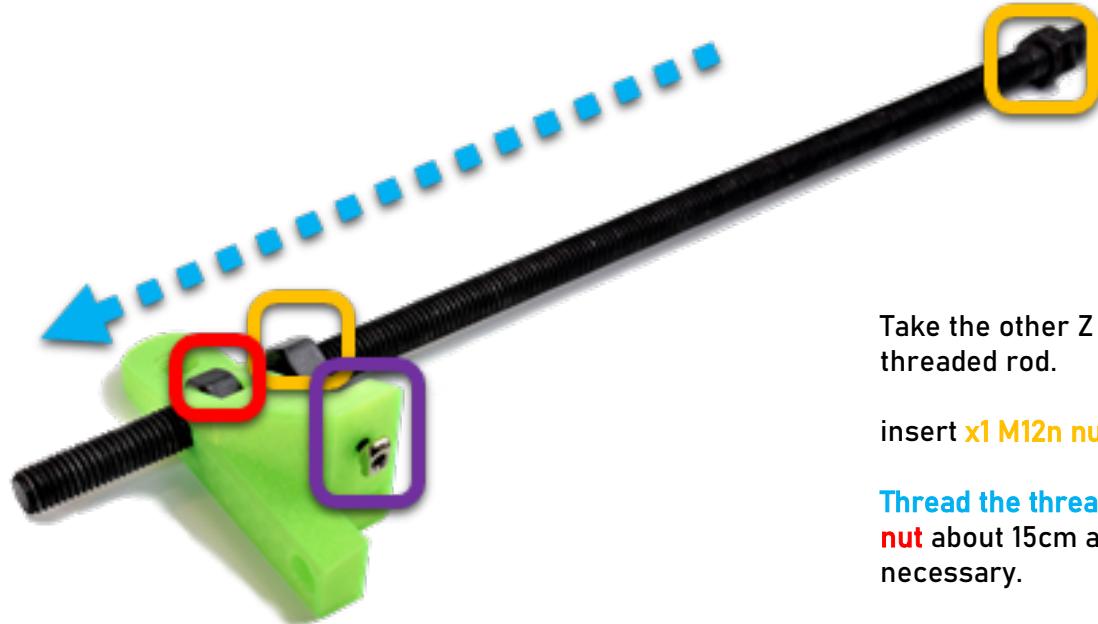
Slide and push **x1 T-M4** nut into the remaining hole, you can use the small allen key for this.

After aligning the **T-M4 nut**, insert **x1 M4x12 screw** and tighten it.

i The vertical threaded rod should still not touch the printed part yet. In any case, it should be aligned with the hole in the printed part where it will be tightened on later.

⚠ DO NOT install the othey Z top yet.

1.18. Z top reinforcements preparation II



Take the other Z top (printed part) and the remaining short threaded rod.

insert **x1 M12n nut** into each end.

Thread the threaded rod through the printed part and the **M12n nut** about 15cm as shown in the picture. Move the **M12N nuts** if necessary.

1.19. Z top reinforcement assembly II

Reapply what you have done in step 2.17

- i** The vertical threaded rod should still not touch the printed part yet. In any case, it should be aligned with the hole in the printed part where it will be tightened on later.



1.20. Z Horizontal threaded rod assembly



Now that you have the two Z top reinforcements assembled, connect both parts with the horizontal threaded rod.

Screw the horizontal threaded rod through the other printed part and **M12n nut** until it lines up on both sides.

Tighten by hand to the sides the **x2 M12n nuts**, one fully left and the other one fully right using equal force against the printed parts.

i The distance between both nuts is more or less 36cm.

1.21. Z Vertical threaded rods assembly



⚠ Make sure you have inserted **x1 M12n nut** on each side of each vertical threaded rod before continuing.

Screw the vertical threaded rod into it up over the printed part to the end.

⚠ Do not use too much force, you are tightening over a plastic part!

Tighten by hand the **M12n nuts** fully up and down against the top and bottom printed parts.

i The distance between these nuts should be around 51cm.

1.22. Finishing frame assembly



Take the pre-cut textile sleeves to the exact length provided in the KIT and **cover** the 3 threaded rods to protect them and give them a better looking.

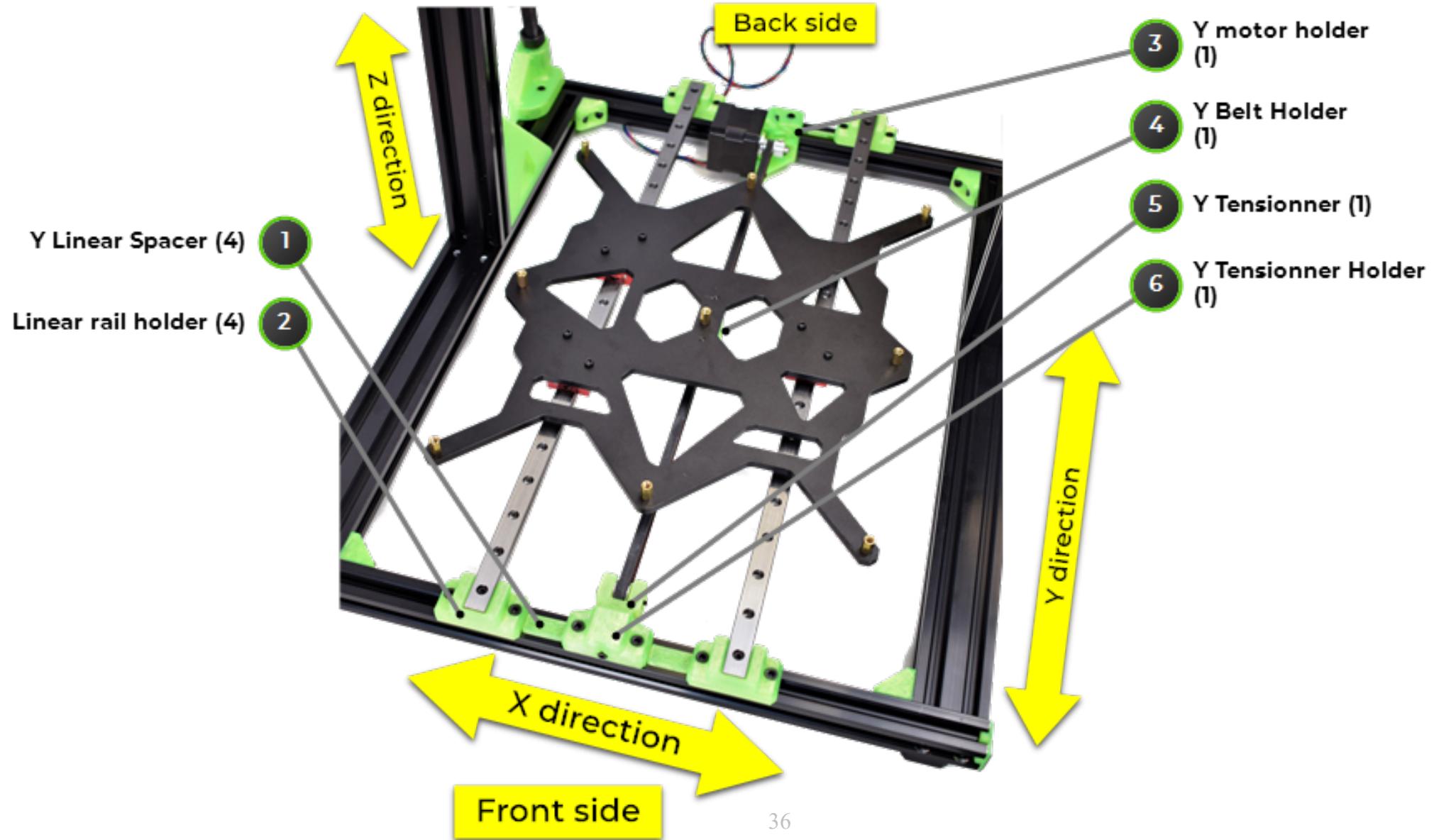


Insert x2 2020 aluminium extrusion covers (printed parts) into the front 2020 aluminium extrusion.

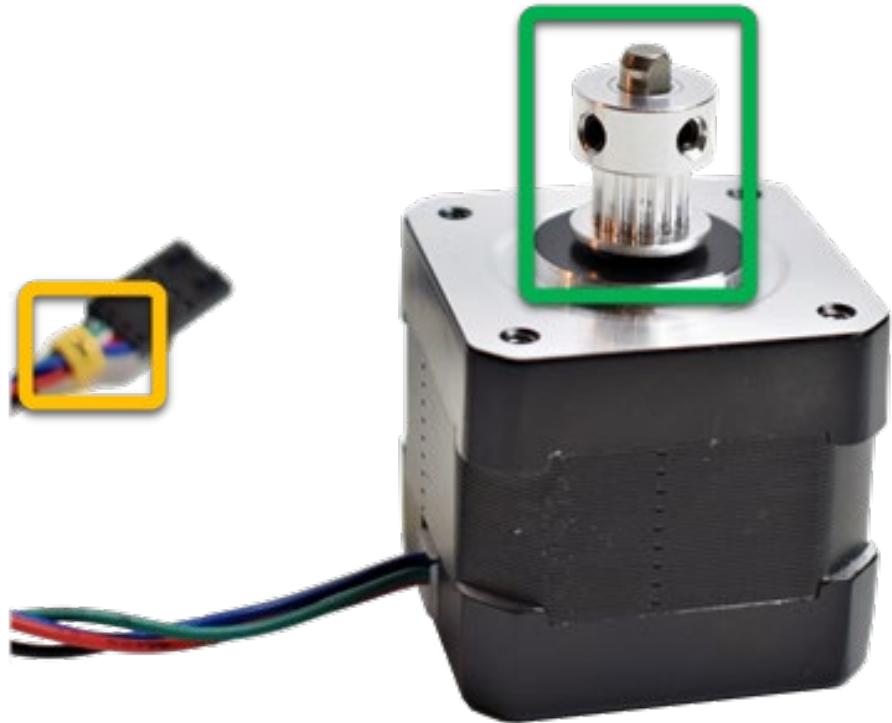
⚠ The geometry of the frame should be as good as possible at this point. If you feel a big frame deviation, we recommend you to check the frame assembly chapter again. However, if you feel a small deviation, don't worry, the printer software is capable of making slight compensations.

i Take a step back and look at the size of your new VERTEX XL 3D printer. Impressive right?

2. Y Axis map



2.1. Y motor preparation



From the motos box, take the motor with the Y **yellow label** at the end of the cable.

⚠ Each motor has a different cable length, make sure you use the correct motor at all times.

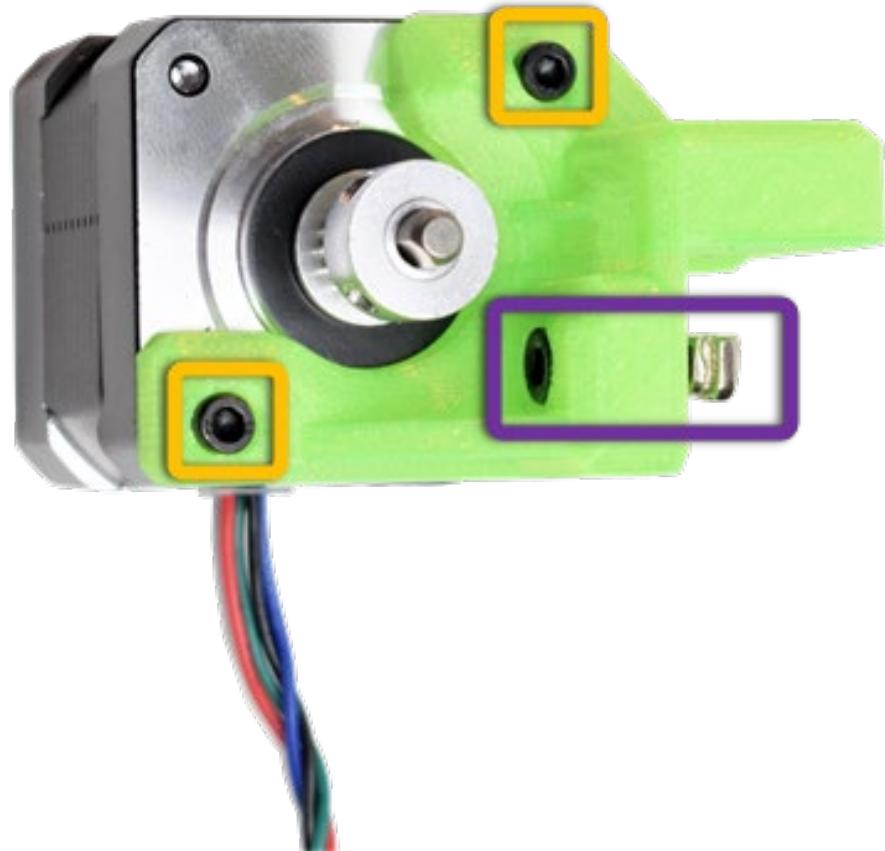
Place **x1 Gt2- 16 toothed pulley** on the motor shaft and leave a small gap of about 1mm (you can put a zip tie between the pulley and the motor).

⚠ Notice the orientation of the pulley in the photo.

⚠ The motor shaft is not completely rounded, one of the grub screws must to be tightened on the flat side.

Tighten the two grub screws to secure the **Gt2-16 toothed pulley** to the motor.

2.2. Y motor holder preparation



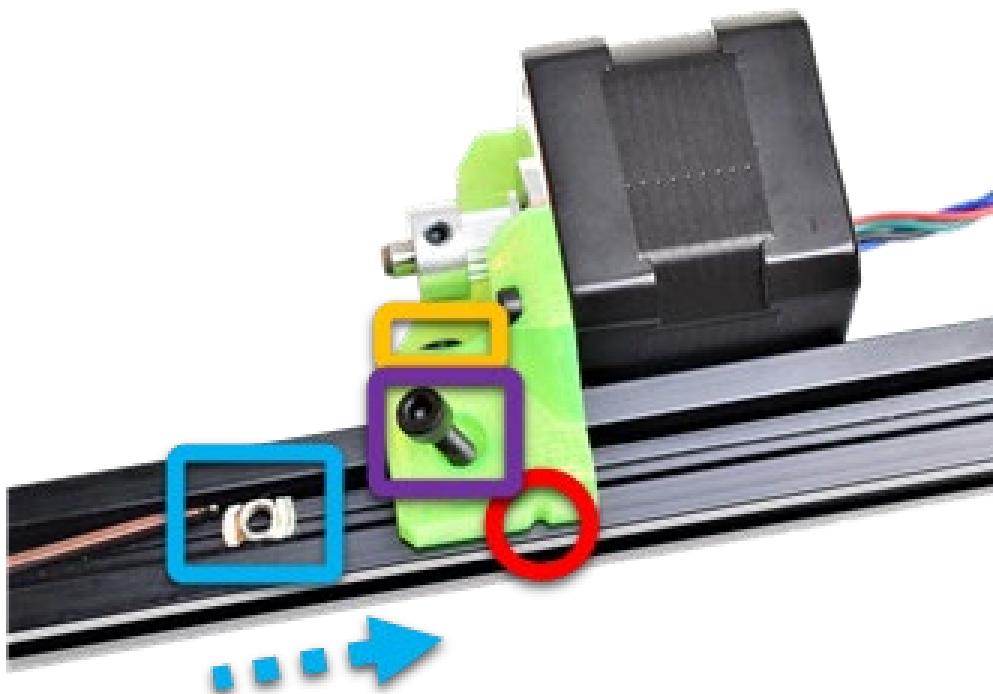
Take the Y motor holder (printed part) and place the motor as you see it in the picture

⚠️ Notice the cable orientation.

Using **x2 M3x10 screws**, secure the Y motor to the printed part.

Insert **x1 M4x12 screw** and screw **x1 T-M4 nut** onto the tip as before.

2.3. Y motor holder assembly



Looking at the frame from the **back**.

i If you have doubts, visit step 3.

Take the previously prepared Y motor holder and lightly tighten the **M4x12 screw**. Don't fully tighten it, you should be able to move the printed part.

i The motor must be inside the frame.

There is a **small cut** in the printed part. This **cut** must be aligned exactly in the middle of the 2020 aluminium extrusion that is 20cm from the end (not counting the Z bottom reinforcements). For this, you will need a meter or a ruler at least 20cm long.

Once the part is aligned, tighten the **M4x12 screw**.

Slide and push **x1 T-M4** nut through the top 2020 aluminium extrusion groove.

Align it with the hole, insert and tighten **x1 M4x12 screw**.

2.4. Y tensioner preparation



Take the Z tensioner holder (printed part),

Insert **x2 M4x12 screws**, and screw **x2 T-M4 nuts** onto the tips.

Take the Y-tensioner arm (printed part) and insert **x1 623h smooth pulley**.

Insert **x1 M3x25 screw** through the **smooth pulley 623h**.

Embed **x1 M3nN hex nut (Nyloc)**.

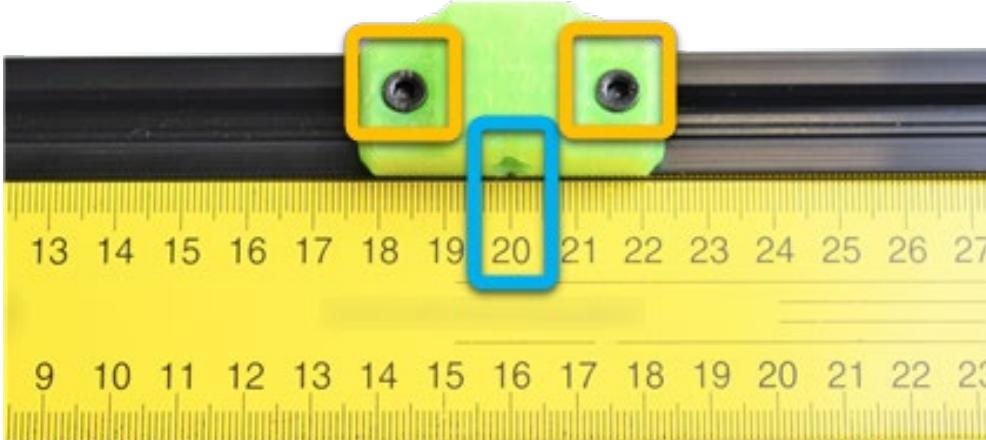
i To embed nuts, you can make use of the technique that we showed you on page 11.

! Do not over-tighten the screw. The pulley should rotate freely without resistance.

Embed **x1 M3nN hex nut (Nyloc)** into the slot on the Y-tensioner arm. This can be a bit tricky as it's very tight by design so it won't move in the future.

i For now, set aside the Y-tension arm, you'll install it later.

2.5. Y tensioner holder assembly



Take the Y tensioner holder that you have prepared in the previous step and place it over the front 2020 aluminium extrusion groove.

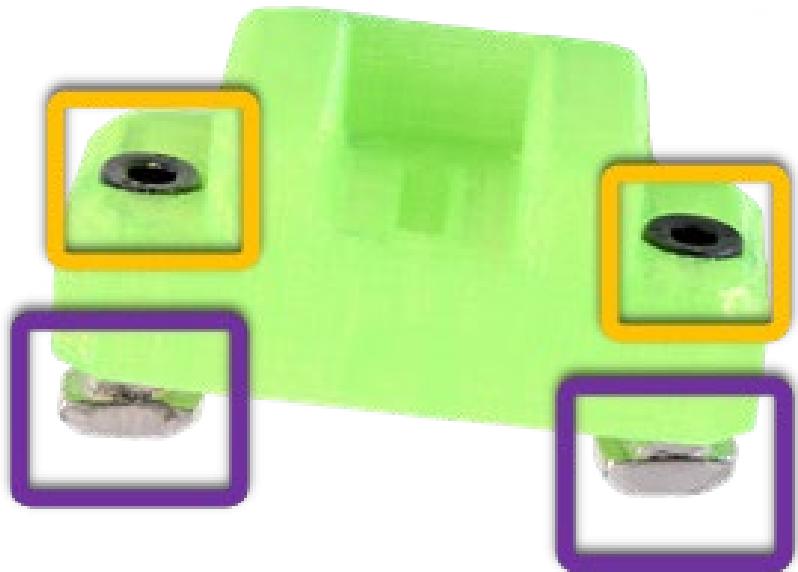


If you have any doubts, visit point 3.

As was with the Y motor holder, the Y tensioner body has a **small cut** that must be aligned exactly to the middle, 20cm from the end of the front 2020 aluminium extrusion as shown in the image (not counting the 2020 aluminium extrusion covers you installed in the step 1.22). For this, you will need a meter or a ruler at least 20cm long.

Once aligned, tighten the **x2 M4x12 screws** checking that it has not moved once tightened.

2.6. Y Linear rail holders preparation

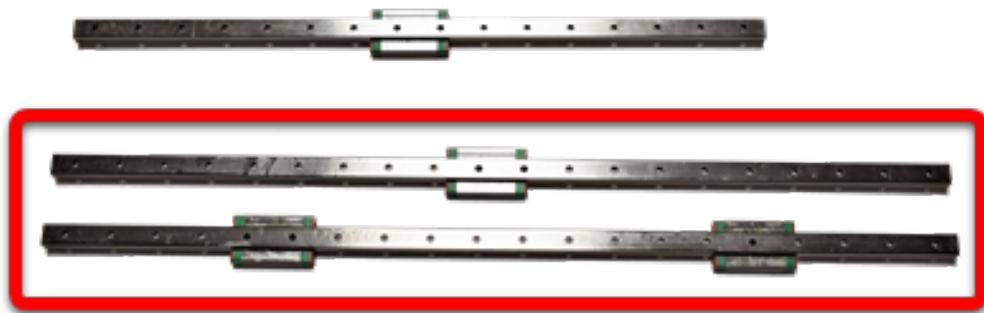


Take x1 Y linear rail holder part (printed part).

Insert **x2 M4x12 screws** and screw **x2 T-M4 nuts** onto the tip of the bolts.

Repeat this on the other 3 printed parts.

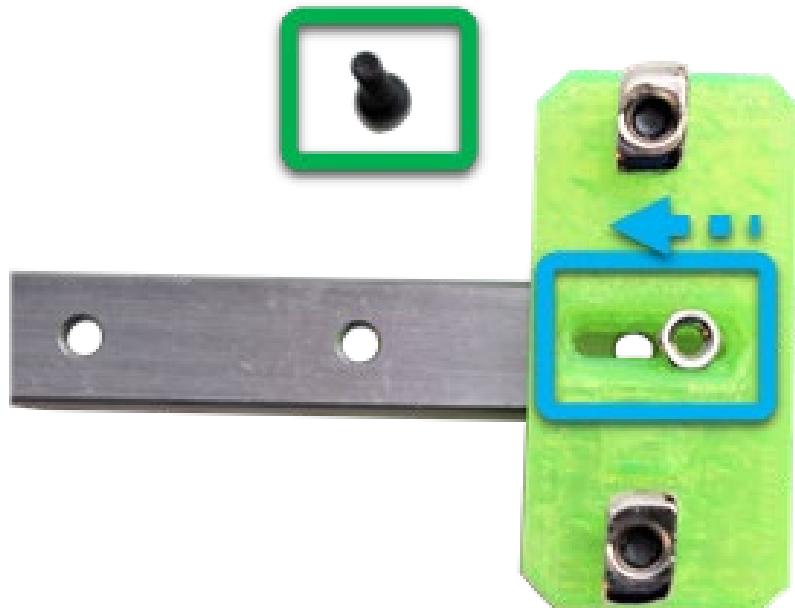
2.7. Y linear rails preparation



⚠ Use the gloves provided in the KIT to manipulate with the linear rails and keep them greased at all times. The linear rails are made of steel and could rust.

ℹ If any block has come off the linear rail, insert it as straight and slowly as you can, the small balls from the block could come out.

Of the three linear rails, take the **two longest**.



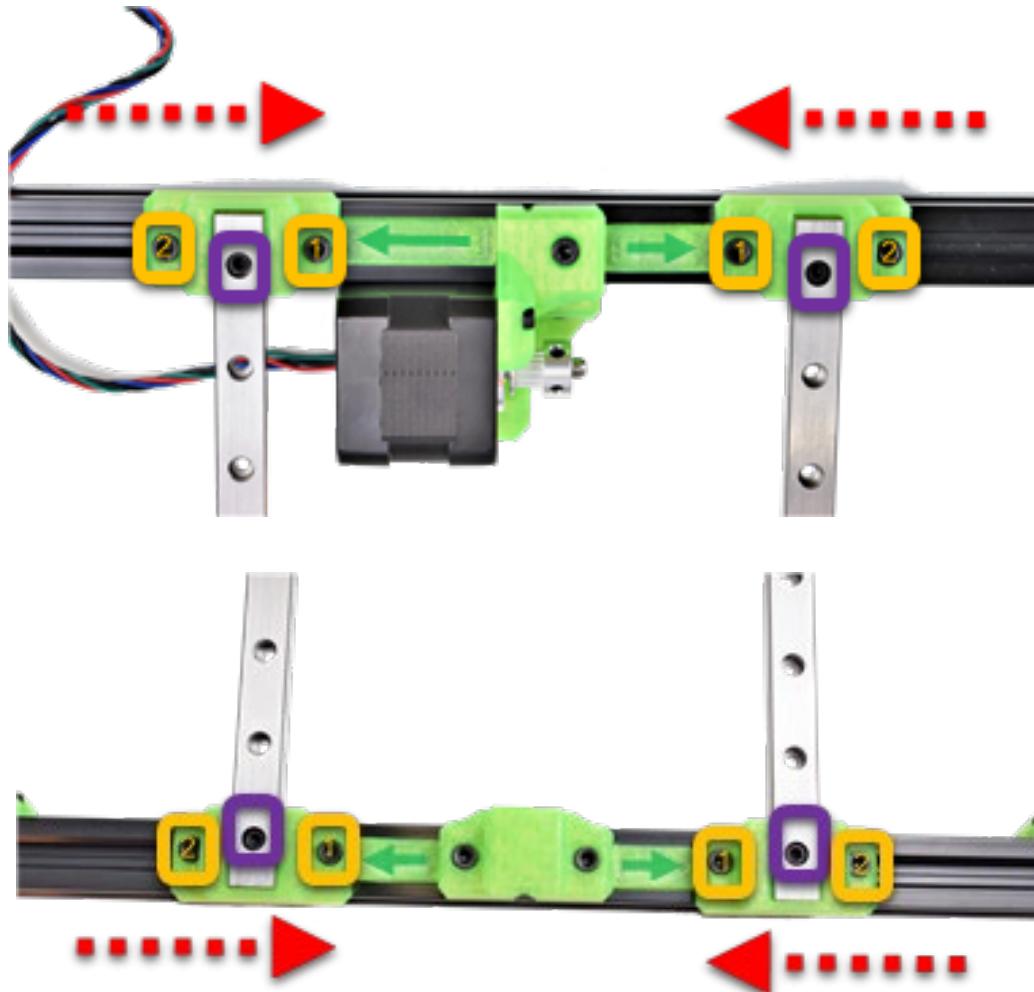
Take a linear rail support Y (printed part) at the bottom, you will find a **oblong gap**. Install one of the linear guides on the support as shown in the photo.

In the upper part, put an **M3X14 screw** in the first hole of the linear guide and in the lower part, an **M3n hexagonal nut**.

⚠ DO NOT fully tighten the screw, you will tighten it later.

Repeat this process on the other three linear guide supports.

2.8. Y linear rail holders assembly



Take the Y-axis linear rails that we have prepared in the previous steps and lay them out on the front 2020 profiles like a bridge. The T-M4 nuts must fit into the grooves of the 2020 profiles to tight them correctly.

⚠ Looking at the printer from the front, the linear rail with two blocks goes to the left and the linear rail with one block goes to the right.

Now take the spacers (printed pieces) provided in the KIT in a bag called **SPACERS** and place them as indicated in the images. The pieces have letters and arrows. Mind the letters on them:

- B = Back. (Rear)
- F = Front. (Frontal)

The **arrows** on the spacers indicate the direction in which they have to point, in this case towards the linear guides at all times (outside of the frame).

Push the Y linear rails supports onto the spacers, this will give you the exact distance they should be attached.

Once adjusted, tighten the **M4x12 screws** to secure the Y Linear Guides to the frame.

⚠ DO NOT tighten the M3x14 screws yet.

2.9. Y Carriage preparation



This is the final position that the carriage will have where the heated bed will be installed, but first, you must prepare it.

⚠ Make sure that the Y carriage is oriented at all times as shown in the image.

Prepare **nine M4x8b** screws and **nine spacers**.

Insert one **M4x8b** screw into each of the perimeter holes and one in the centre through the bottom of the Y-carriage, screw the nine spacers onto each screw as shown. Use the pliers and the corresponding hex key provided in the KIT to give them the final tightening.

i The orientation of the spacers does not matter.

⚠ Make sure all spacers are tight and screwed to the Y-carriage.

2.10. Y belt holder preparation



Flip the carriage Y over the spacers.

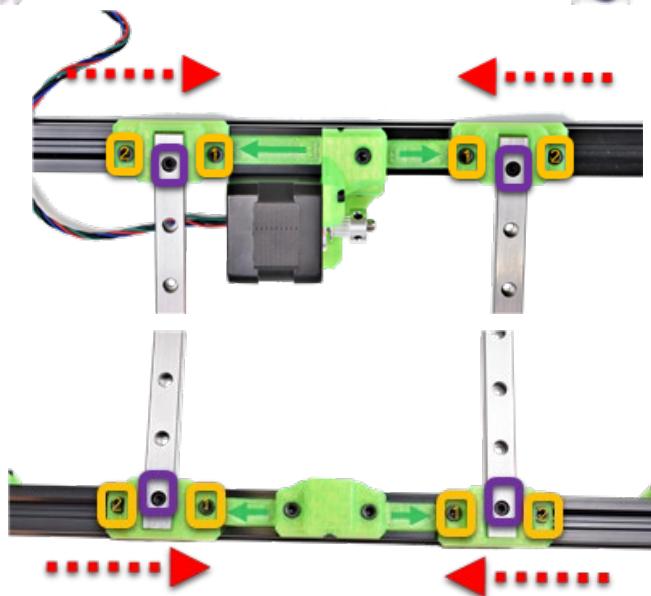
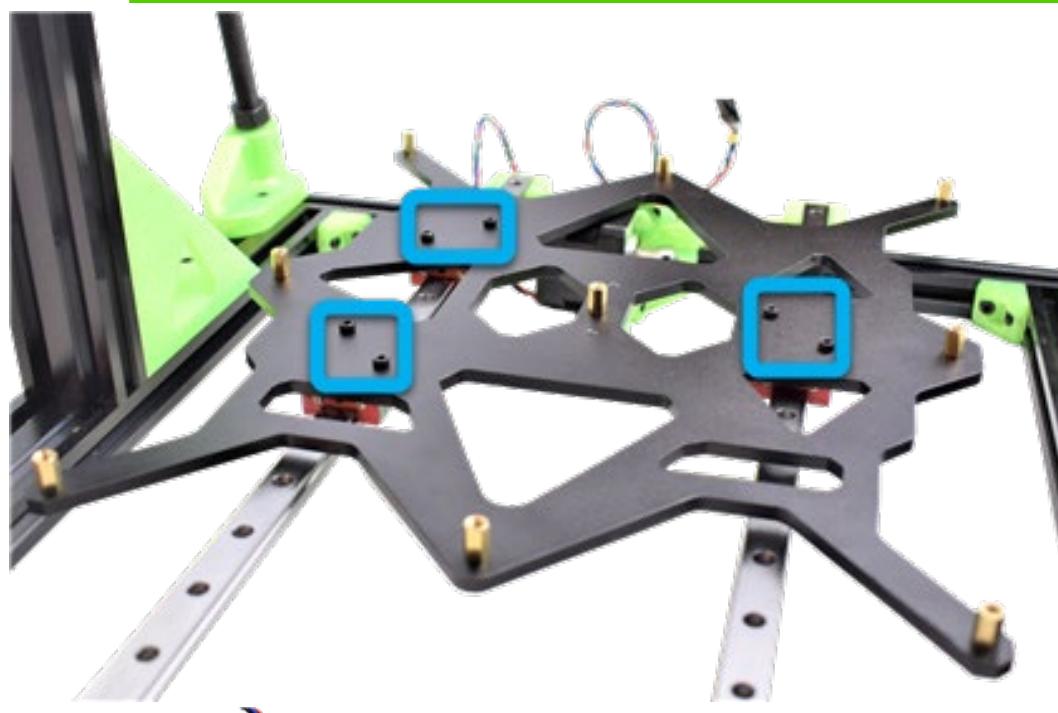
Take part Y Belt Holder (printed part).

The part is designed that there is only one possible way to install it:

- The middle hole of the part must match the head of the middle M4x8b screw of the Y-carriage.
- The teeth of the part must be facing to the left, in the direction of the **4 holes** where the linear rail slide will be fixed.

Attach the Y Belt Holder printout to the Y-carriage using two **M3x10 screws**.

2.11. Y Carriage assembly



Flip the Y-carriage back over so that the spacers are facing up.

Align the **six holes** with their respective Y linear rail feet as shown in the photo.

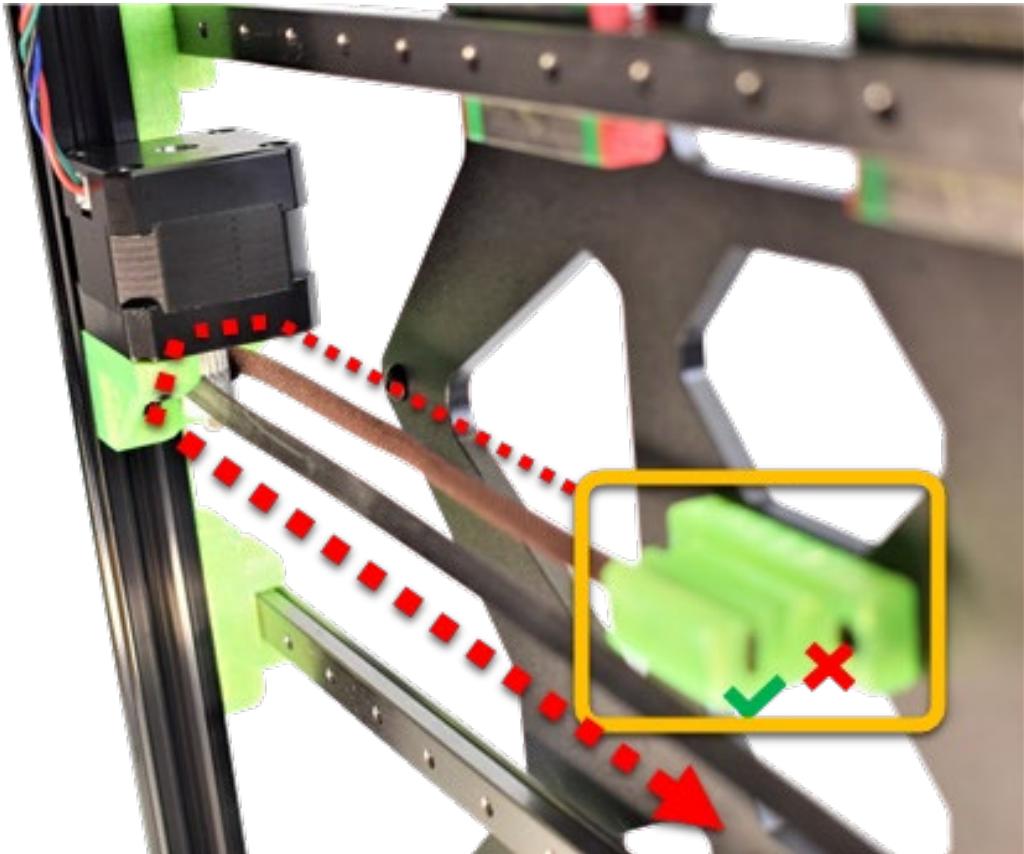
To fix each block, use two **M3 washers** and two **M3x10 screws**.

⚠ Once secured, move the Y-carriage back and forth by hand to check that it moves freely.

If it moves freely, move the Y carriage forward and tighten the four **M3x14 screws** on the Y linear guide rails. Repeat the same by moving the carriage backward.

If it does not move freely, check the assembly again from point 3.8.

2.12. Y belt assembly I



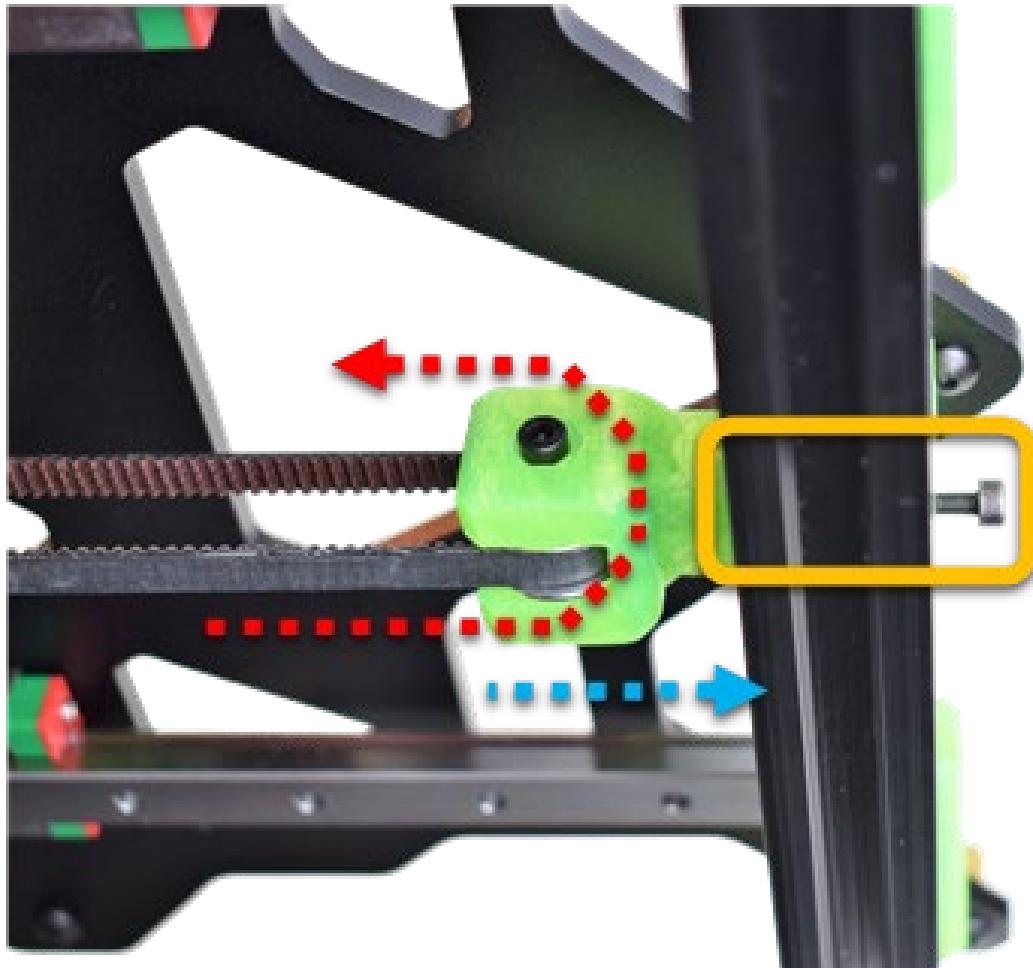
Lay the printer on its right side so that you have easy access to the bottom of the printer.

Move the Y-carriage approximately to the middle.

⚠ It is important that the both ends of the belt must be aligned with the ends of the printed part where they are inserted. Use the entire length of the belt, the belt is cut to be just long enough.

Take the Y-Axis belt provided in the KIT (both are 90cm long) and insert one end from the left side into outside toothed (marked with the ✓ symbol) of the printed **Y Belt Holder** as shown in the image. The toothed belt should face inward, **pass it over the Y-axis motor pulley, and back under the printed part**.

2.13. Y belt assembly II



Insert the belt tensioner arm Y that you prepared in chapter 3.4.

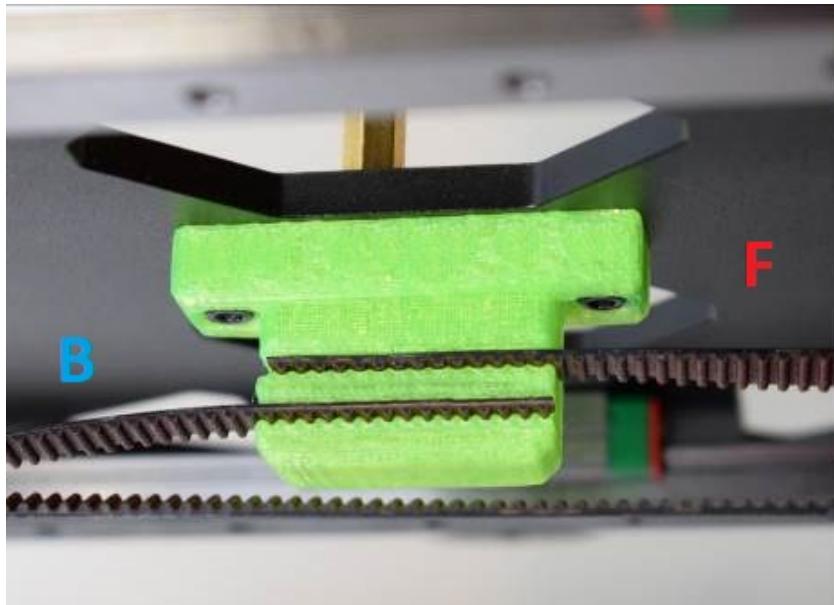
⚠ The tensioner arm piece is designed to go into only one position. If you need it, please see the photo.

Insert an **M3x20 screw** through the hole in the Y-axis timing belt tensioner body but do not tighten it yet.

Guide the belt from below through the smooth pulley 623h so that it comes back to the centre point from the previous step.

i If the tensioner arm comes off, don't worry, in the next step, we will put the belt in the right place and finish the installation.

2.14. Y belt assembly III



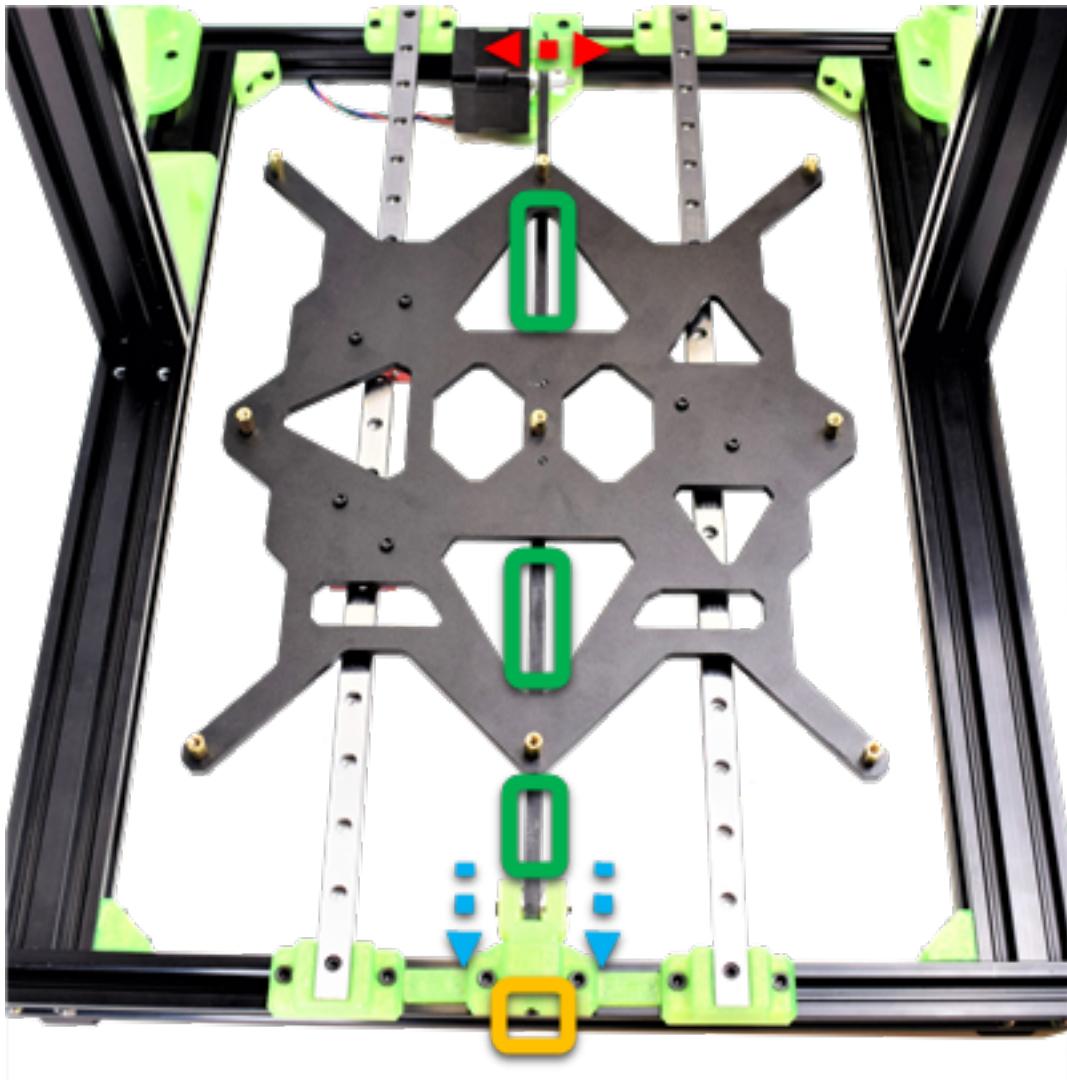
Insert the other end of the Y belt into the row of teeth at the top of the printed part.

The **F** corresponds to the front of the printer, and the **B** corresponds to the back.

i Use the thinnest allen key to push the strap in to prevent it from coming off in the future.

! Before putting the printer in its natural position, make sure that both ends do not fall from the printed part as shown in the image. They should be aligned on the same level.

2.15. Y belt adjustment I



Position the printer back on its feet.

You should be able to see the entire **Y belt** through the Y-carriage holes.

Now **lightly** tighten the **M3x20 screw** that goes through the body and the tensioner arm of the Y-belt to give it tension.

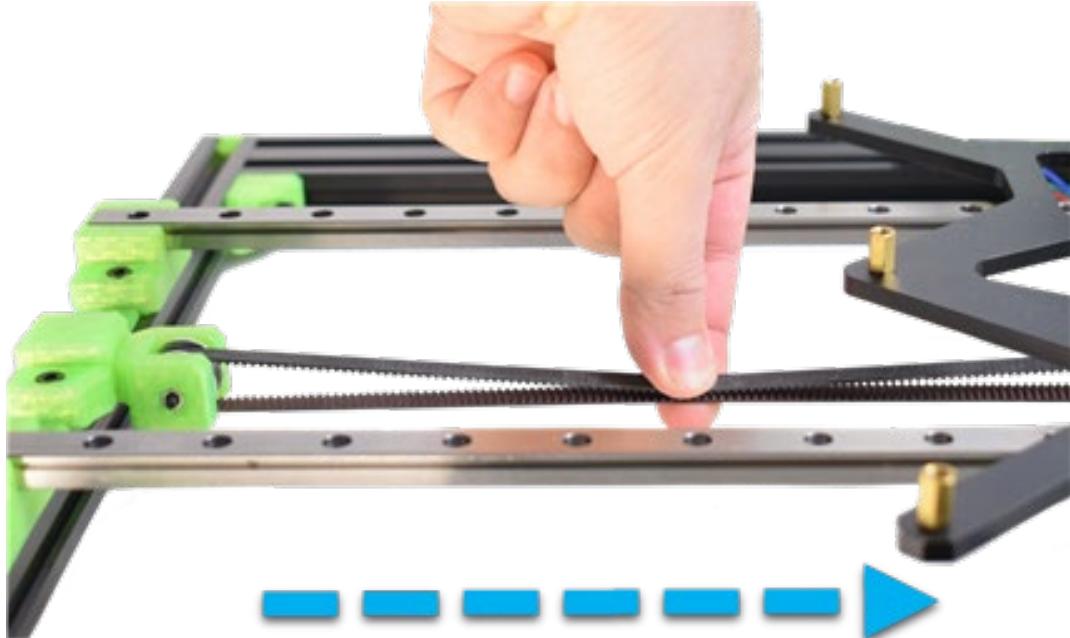
⚠ DO NOT overtighten the screw M3x20, we will adjust the tension in the next step.

The belt must be straight and parallel to the linear rails. To adjust it, you can loose the grub screws on the Y-motor pulley, **and move it from left to right** to achieve straightness.

The Y belt tension can be adjusted by loosening or tightening the **M3x20 screw** on the Y tensioner:

- By tightening the screw, the tensioner arm Y is **drawn towards** you, and therefore the belt will become tighter.
- Loosening the screw produces the opposite effect.

2.16. Y belt adjustment II



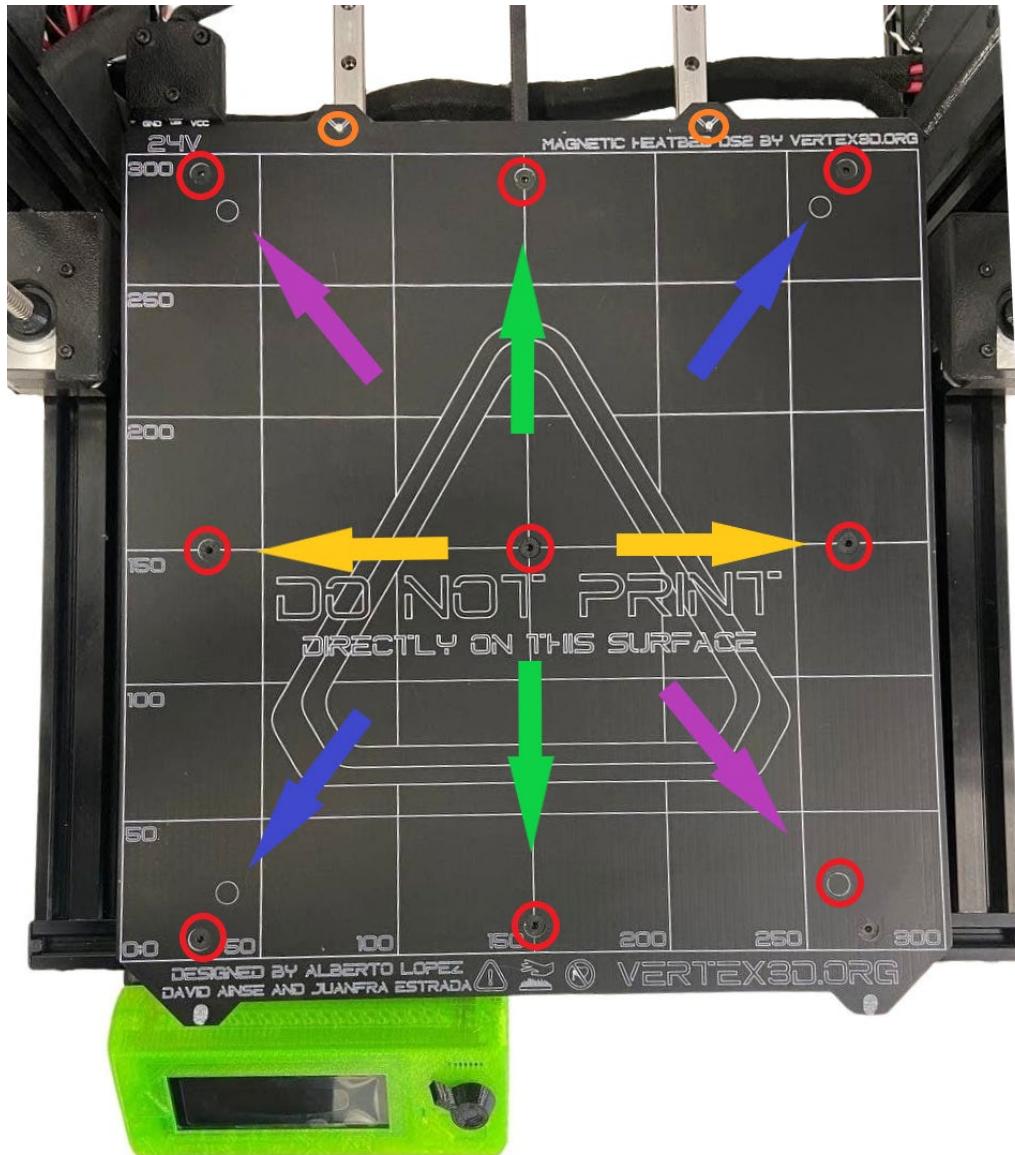
Push the Y carriage all the way back with your hand. By using your fingers, tighten the belt. You should be able to join the top with the bottom but feel some resistance.

i Use the same force you use when you press the button to turn on your computer.

⚠ If the belt tension is too low, by moving the Y-carriage with your hand, you will notice that the belt miss steps (hops). On the other hand, if the belt tension is very high, you will notice a high resistance to movement.

i After assembly, and during the first initiation, the printer will tell you if the belt tension is correct or needs to be checked.

2.17. Heatbed assembly



Take the heated bed and remove the metal plate.

Align the **nine holes** on the heated bed with the nine gold spacers on the Y Carriage.

Insert and tighten **nine M4x8c screws** starting from the middle.

⚠️ For a correct leveling of the surface, screw them diagonally.

Remove the protective plastics from the metal plate.

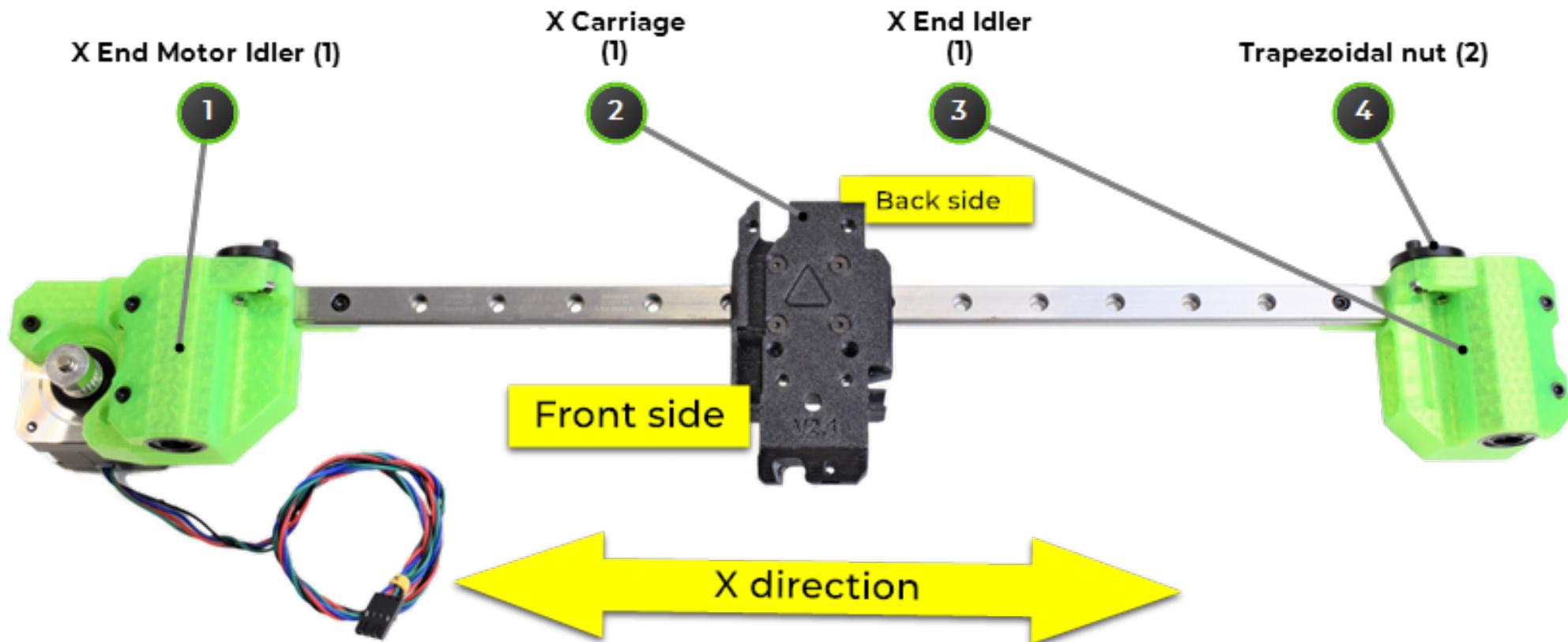
⚠️ The protective plastics are a transparent sheet that is removed effortlessly on each side. Do not attempt to remove the yellow PEI sheet as this is the surface you will be printing on.

Place the metal sheet on the heated bed using the **rear screws** of the heated bed as a stop.

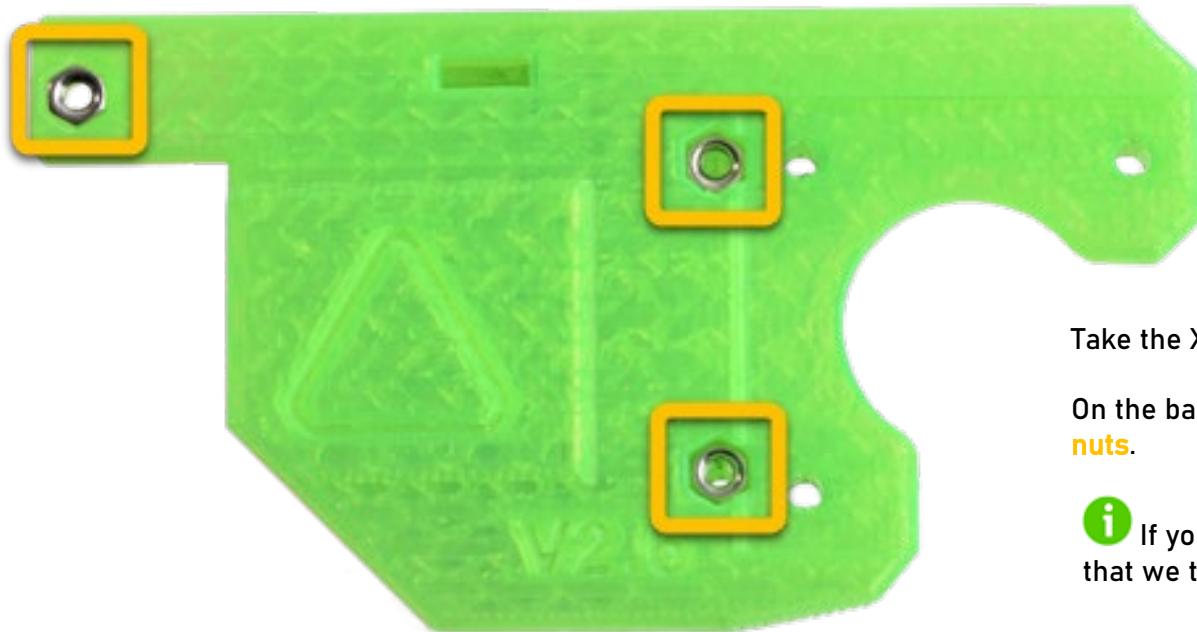
i If one side of the smooth sheet is damaged, you can use the other side to continue printing.



3. X Axis map



3.1. X End Motor Idler preparation I



Take the X End Motor Idler part (printed part).

On the back (the part with the Vertex logo), insert **three M3n hex nuts**.



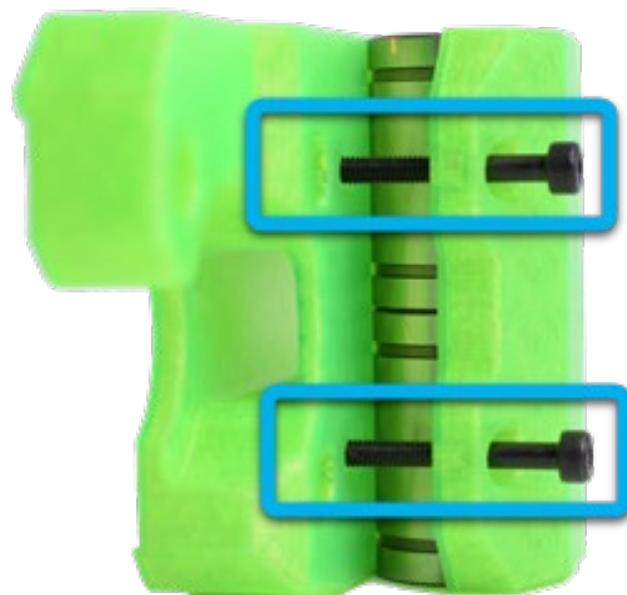
If you find it difficult, you can make use of the technique that we teach you on page 9.

3.2. X End Motor Idler preparation II



⚠ Before inserting the bearings, note that the **ball lines** on the bearings do NOT have to be aligned as shown in the picture.

Take two LM10UU bearings provided in the KIT and insert them through the printed part into their housings. They must be perfectly aligned both at the top and at the bottom.



Fix the bearings in place using **two M3x30 screws** that you will tighten directly into the nuts installed in the previous step.

⚠ Do not over-tighten these screws, the printed part could break. It is enough that they exert a little pressure.

3.3. X End Motor Idler preparation III



Take the piece as it's comfortable for you and insert **two hexagonal nuts** in their housings.

On the other side, insert a **trapezoidal nut** included in the KIT and fix it with **two M3x14 screws**.

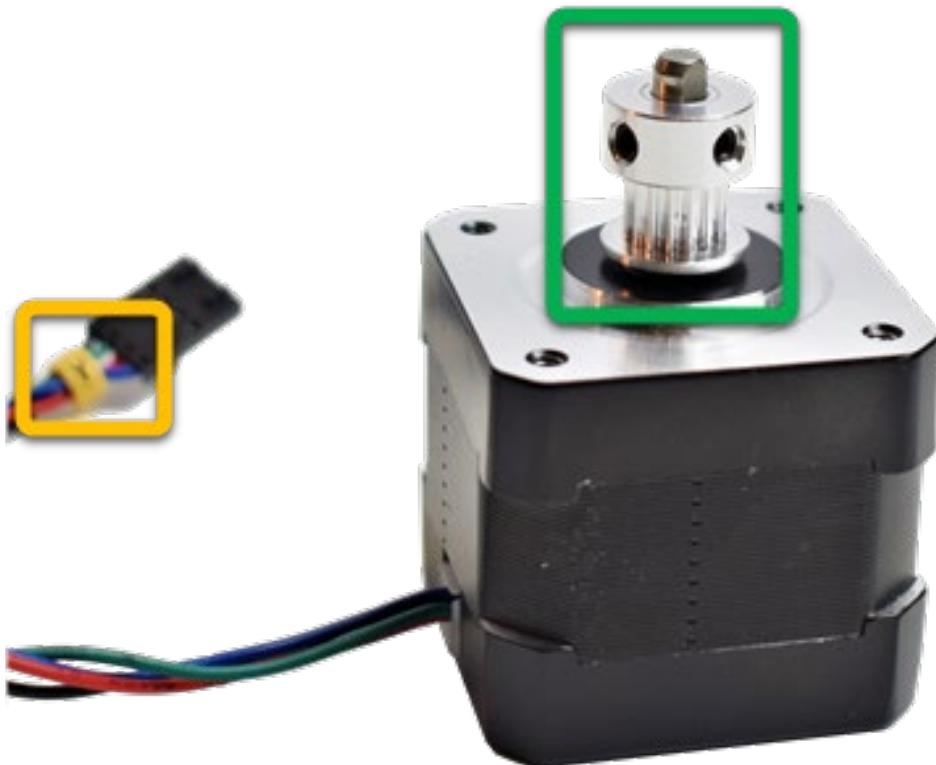


! The protruding part of the **trapezoidal nut** must be inserted into the printed part.

i **Trapezoidal nuts** are rounded pieces of black plastic with a threaded hole.

i **Two of the four trapezoidal** nut holes will remain without screws, this is normal.

3.4. X motor preparation



From the box with the motors, take the motor with the **yellow label** at the end of the X cable.

⚠️ Each motor has a different cable length, make sure you use the correct motor at all times.

Place a **toothed pulley** on the motor shaft and leave a small gap of about 1mm (you can put a zip tie between the pulley and the motor).

⚠️ Mind the orientation of the pulley in the photo.

⚠️ The motor pin is not completely rounded, one of the screws has to be fixed on the flat side.

Tighten the two grub screws to secure the toothed pulley to the motor.

3.5. X motor assembly



Take the X End Motor Idler printed part that you have prepared in previous steps.

Place the X motor as you see in the image. The **motor cable** must face down.

Attach the motor using **three M3x14 screws**.

3.6. X End Idler preparation I

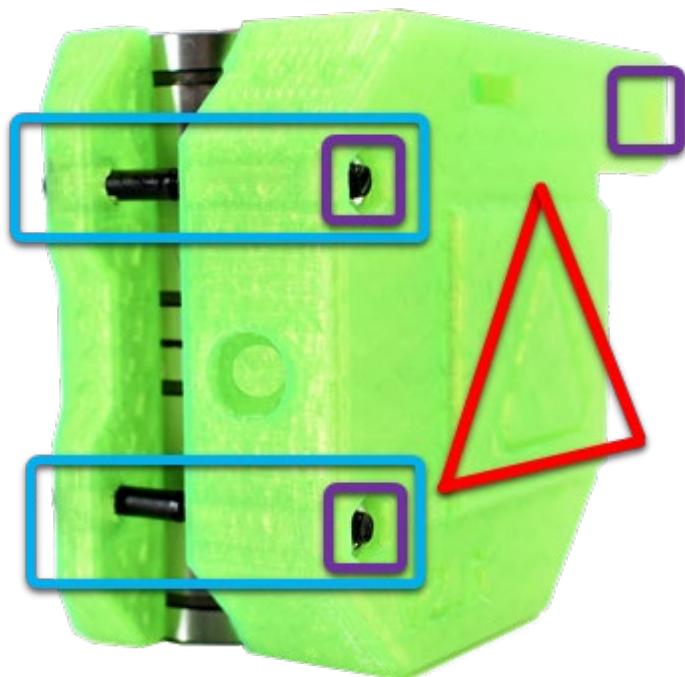


Take the X End Idler part (printed piece).

On the back part with the **Vertex logo**, mount **three M3n hex nuts**.

i If you find it difficult, you can make use of the technique that we teach you on page 9.

! Before inserting the bearings, note that **the ball lines on the bearings do NOT have to be aligned as shown in the picture**.

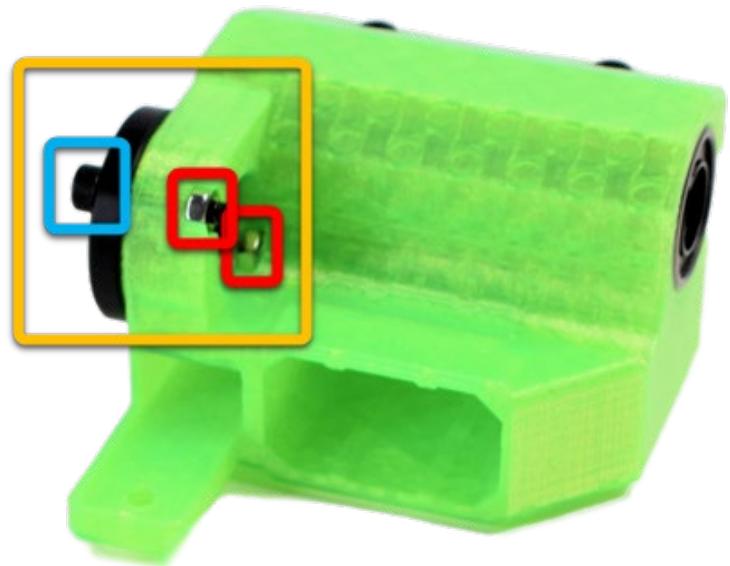


Take two LM10UU bearings provided in the KIT and insert them through the printed part into their place. They must be perfectly aligned both at the top and at the bottom.

Fix the bearings in place using **two M3x30 screws** that you will tight directly into the nuts installed in the previous step.

! Do not over-tighten these screws, the printed part could break. It is enough that they exert a little pressure.

3.7. X End Idler preparation II



Take the piece as it's comfortable for you and insert **two hexagonal nuts** in their housings..

On the other side, insert a **trapezoidal nut** included in the KIT and fix it with **two M3x14 screws**.



⚠ The protruding part of the **trapezoidal nut** must be inserted into the printed part.

i **Trapezoidal nuts** are rounded pieces of black plastic with a threaded hole.

i **Two of the four trapezoidal** nut holes will remain without screws, this is normal.

3.8. X tensioner preparation I



Take tensioner X (printed part).

On the inside, there is a hole for a hex nut. Insert an M3nN (Nylock) nut into the nut following the technique on page 9.

Insert the **remaining 623h** smooth pulley into the printed part.

Align the hole in the tensioner with the hole in the smooth pulley and insert an **M3x14 pin** through from side to side.

⚠️ Insert the pin fully, it should not stick out at either end.

3.9. X tensioner preparation II



Take the X End Idler (printed part) and [insert](#) it into the X End Idler part you prepared in the previous steps.



Insert an **M3x25 screw**.

 **DO NOT fully tighten yet.**

3.10. X Axis assembly



⚠ Use the gloves provided in the KIT to manipulate the linear guides and keep them greased at all times. The linear guides are made of steel and could rust.



i If any block has come off the linear guide, insert the slider as straight and slowly as you can, the balls could come out.

Take the remaining 40cm long linear rail (the shortest one). Make sure you are facing all **four holes** in the block.

Insert the left end of the linear rail into the X End Motor Idler printout and the right end into the X End Idler printout.



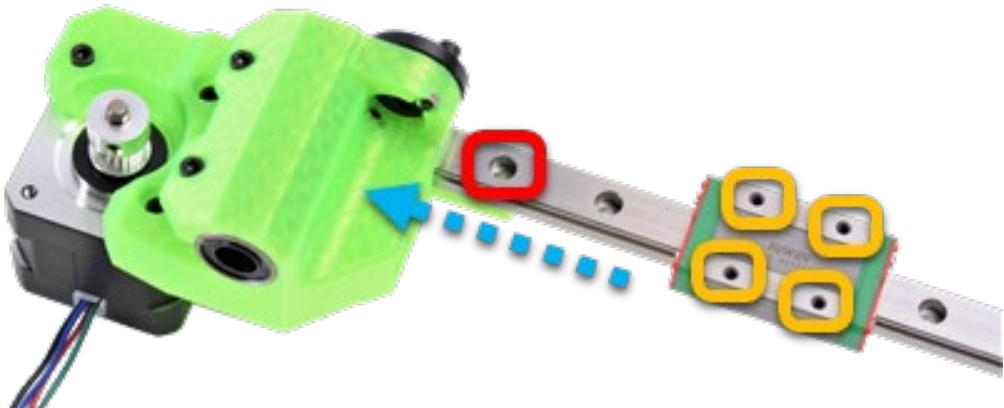
i If you have any questions, visit point 4.

On both sides, push the linear guide until it stops. Align the **second hole** in the linear guide with the hole in the printed parts.

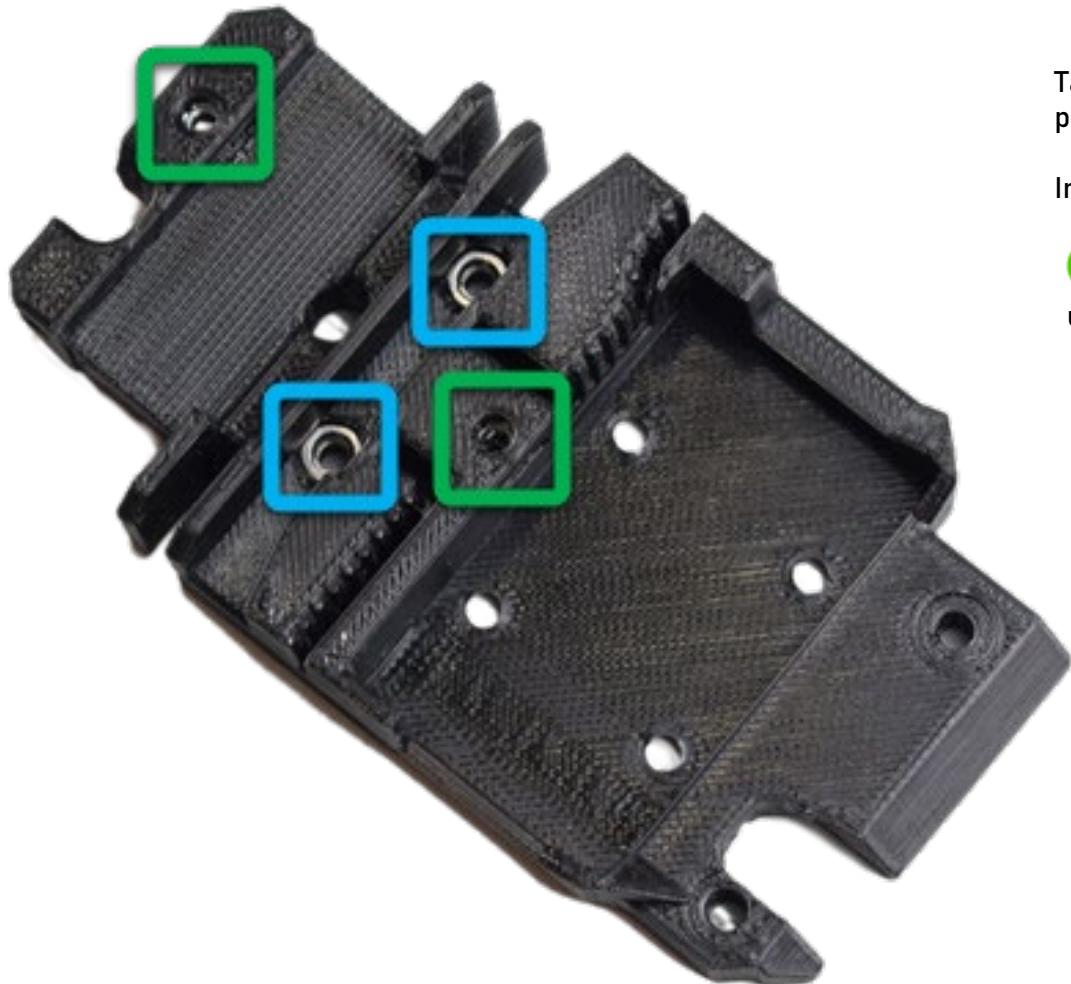
Insert an **M3x8 screw** into each hole which will be fixed to the M3 hex nut on the other side.



⚠ DO NOT tighten these two screws yet.



3.11. X Carriage preparation

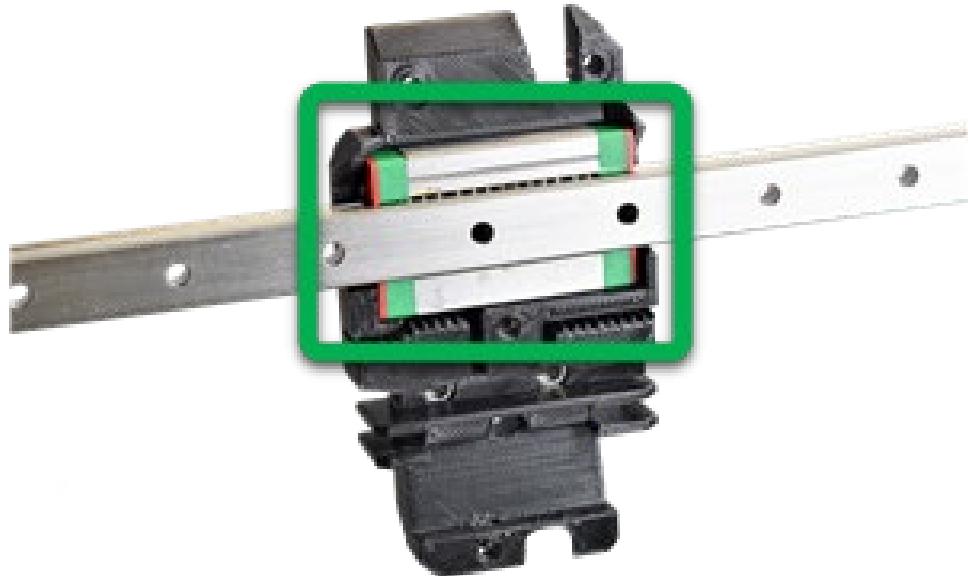


Take **two M3n nuts** and use the technique we showed you on page 9 to countersink nuts.

Insert **two M3nS square nuts** into their sockets.

i Square nuts could come off while handling the part. Do not use glue to fix them as it could affect the thread.

3.12. X Carriage assembly



Take the X-carriage and press it against the **X-axis slide**, it fits perfectly. The holes should line up with the linear slide as shown in the image.

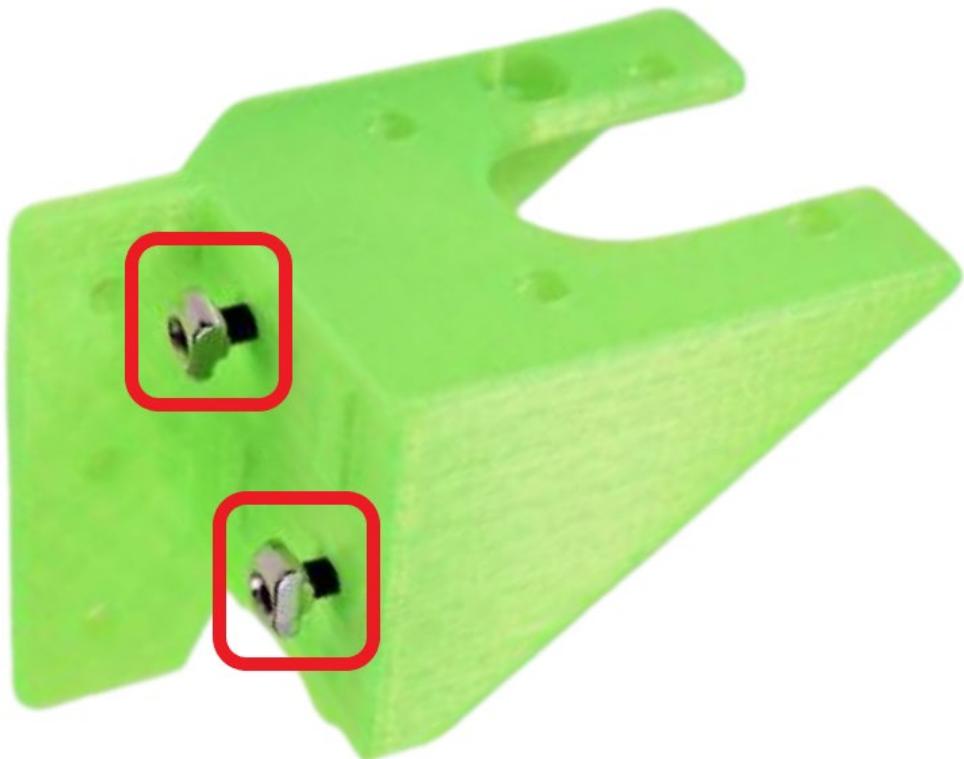
Fix the X-carriage with **four screws M3x6c**.



4. Z axis map



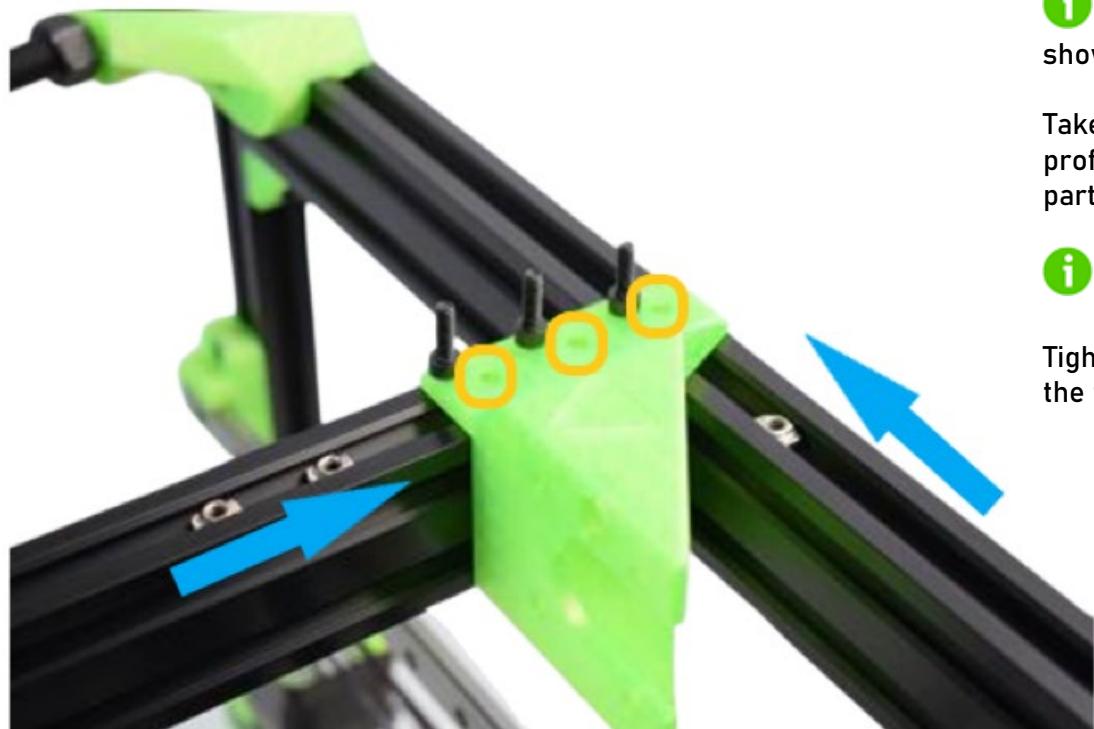
4.1. Z motor holders preparation



Take the left and right Z motor mounts (printed parts).

Insert **two M4x12 screws**. Screw the **T-M4 nuts** onto the tip.

4.2. Z motor holders assembly



Put the Z-axis supports to the frame as shown in the image. Push the piece down against the frame while tightening the **two M4x12 screws** prepared in the previous step.

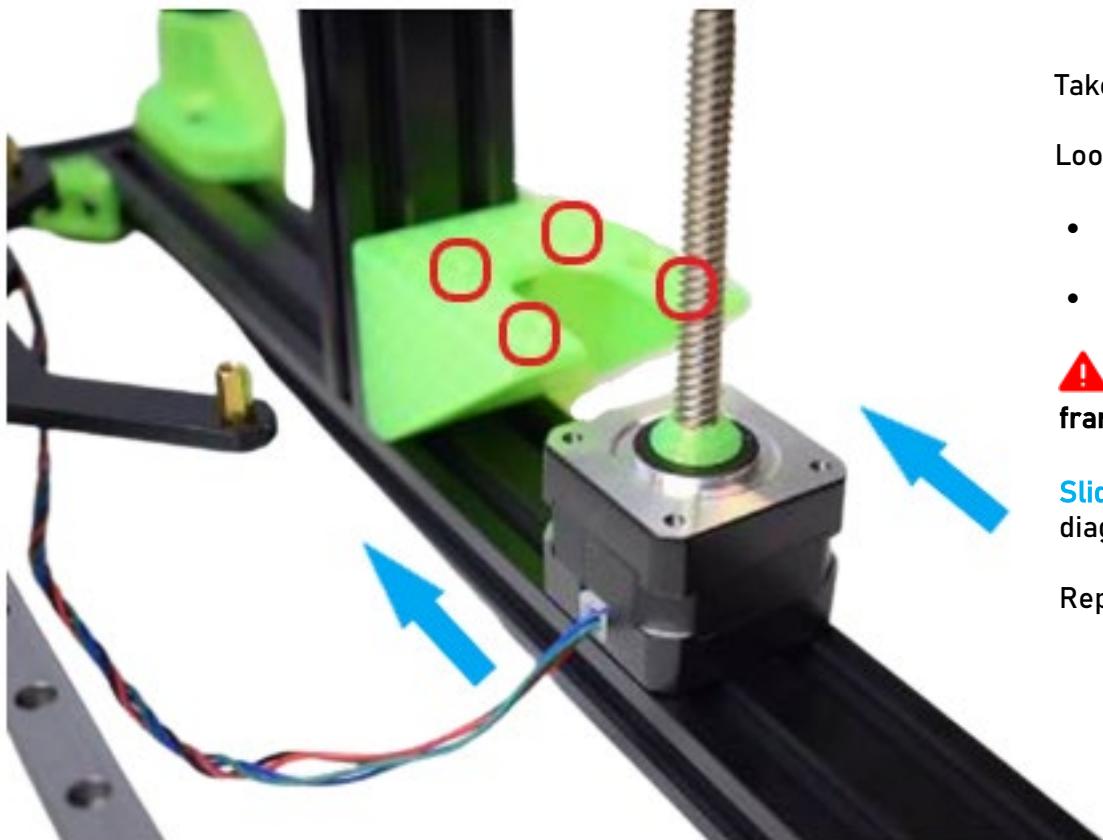
i Lay the construction on the side you are going to work on as shown in the image.

Take **three T-M4 nuts** and **slide** them over the slots in the 2040 profiles, aligning them with their respective holes in the printed part.

i You can use the small allen key to push the T-M4 nuts.

Tighten the **M4x10 screws** to attach the printed part completely to the frame.

4.3. Z motors assembly



Take the Z-axis motors from the motor box.

Looking at the structure from the front:

- The motor with the **shortest** cable is the one on the left.
- The motor with the **longest** cable is the one on the right.

⚠ Both cables must be oriented towards the inside of the frame.

Slide and fix the motors with **four M3x8 screws** per motor diagonally.

Repeat the same process on the opposite side.

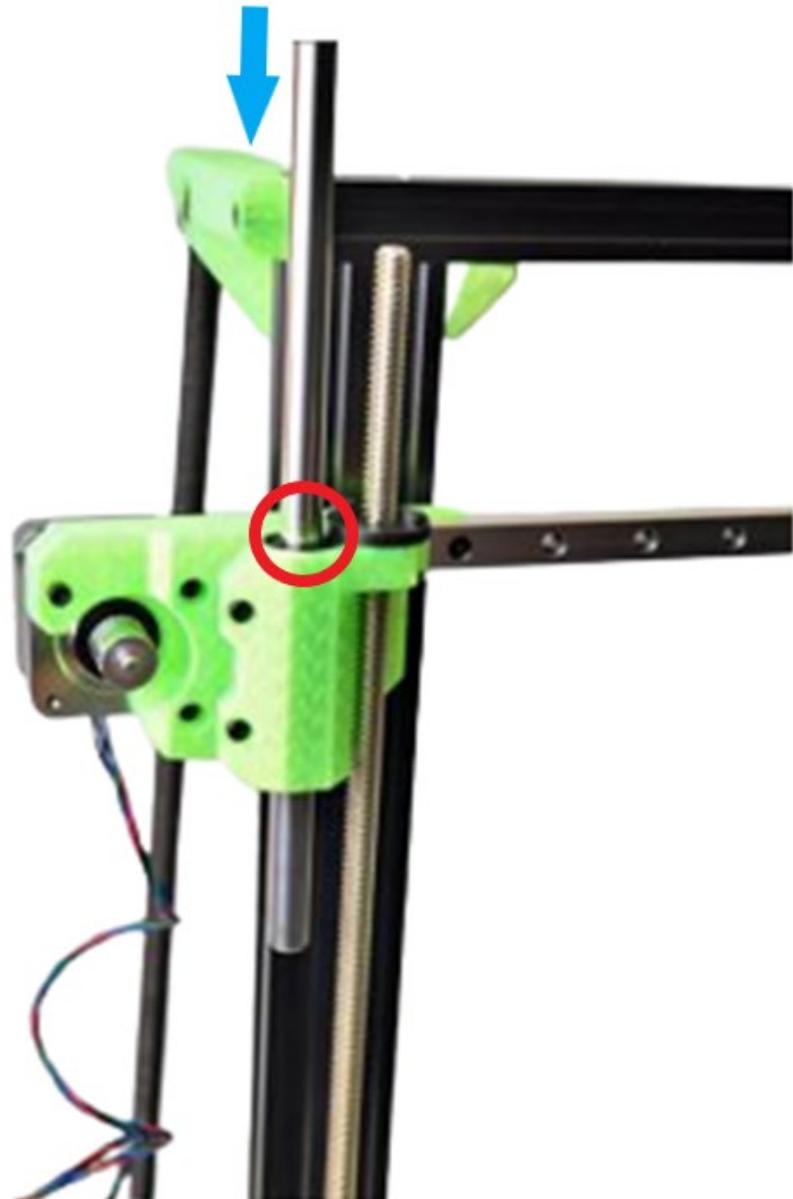
4.4 X axis on structure assembly



Take the X-axis assembly that you have assembled in previous steps and carefully seat it on the threaded spindles of the Z motors.

 **Do not thread the shaft in yet as this could damage the trapezoidal nuts.**

4.5. Z Smooth rods assembly



From above, **slide** the smooth rods **down through the linear bearings**.

i Proceed with caution, it will be easier if you rotate the rod while sliding it down.

⚠ DO NOT insert the smooth rods into the bearing at an angle.

⚠ DO NOT push, or force, accompany the rod as it slides down.

⚠ Make sure the threaded shafts of the Z motor do not bend.

Once the rod is fully inserted, push it into the round socket of the Z motor installation at the bottom.

When you already have the two smooth rods assembled, proceed with your fingers to turn the threaded spindles at the same time in an anti-clockwise direction.

⚠ When turning the spindles, if you feel a lot of resistance you may not be going in straight. Do not force the trapezoidal nuts as they could be damaged.

4.6. Z top preparation

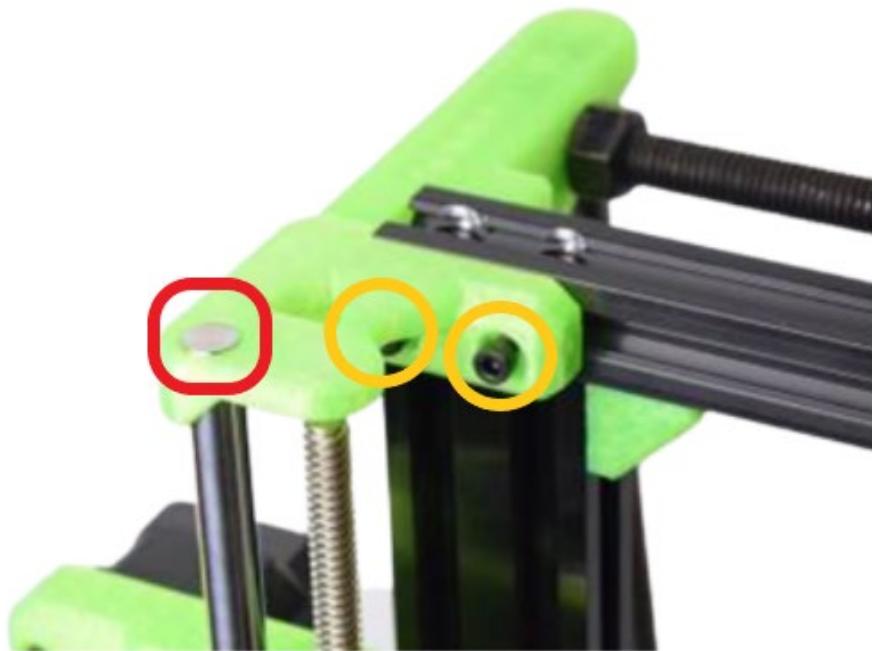


Take the two Z top pieces.

Insert **two M3x12 screws** into the holes on the Z top part (printed part). Thread **two T-M4 nuts** onto the top of the screws.

Repeat the same process for the opposite side.

4.7. Z top assembly



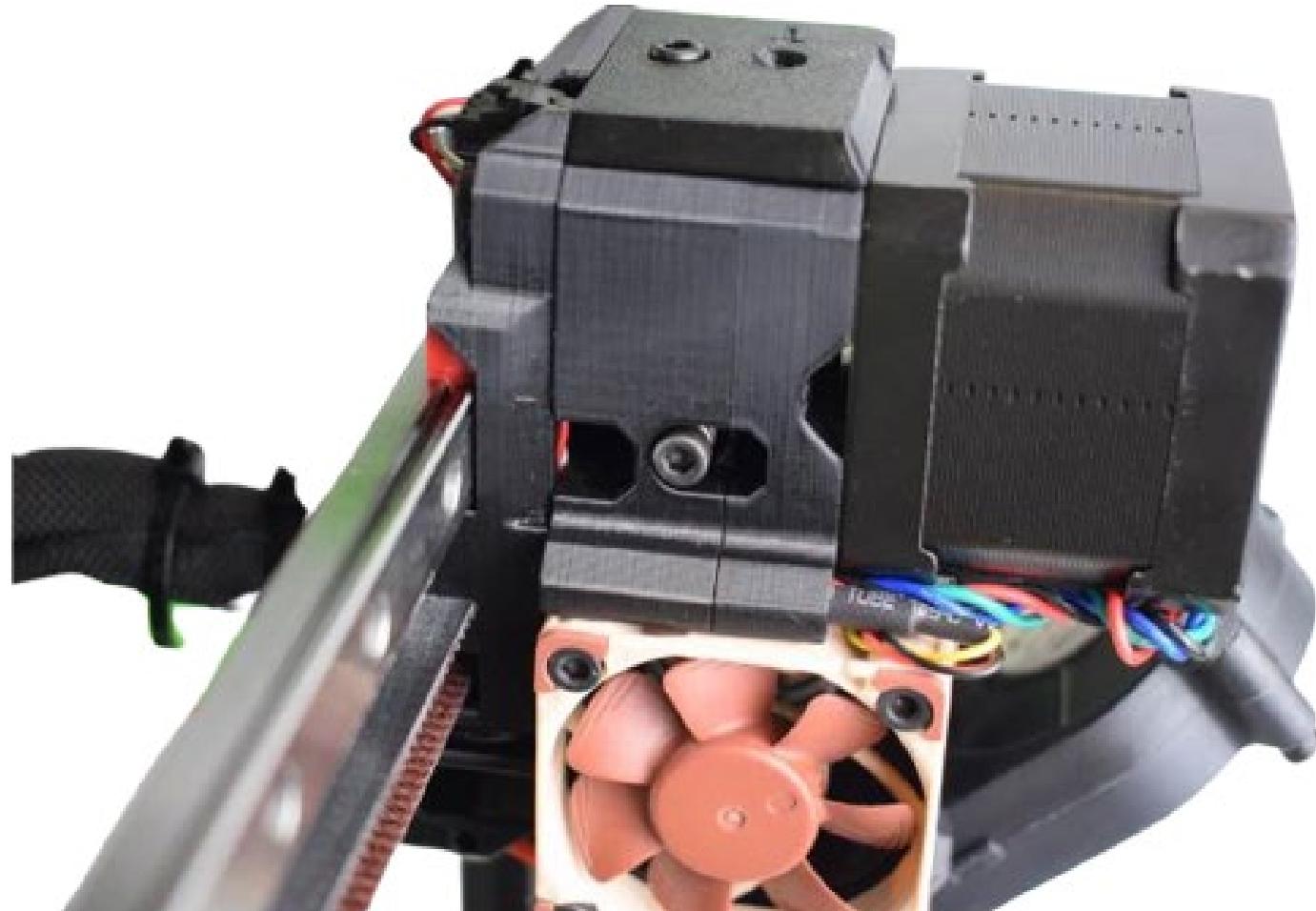
Embed the Z top part (printed part) in the **smooth rod** and the **T-M4 nuts** in the slot of the upper profile 2020 as shown in the image.

i The threaded spindle of the Z motors never touches this part, it's fine that way.

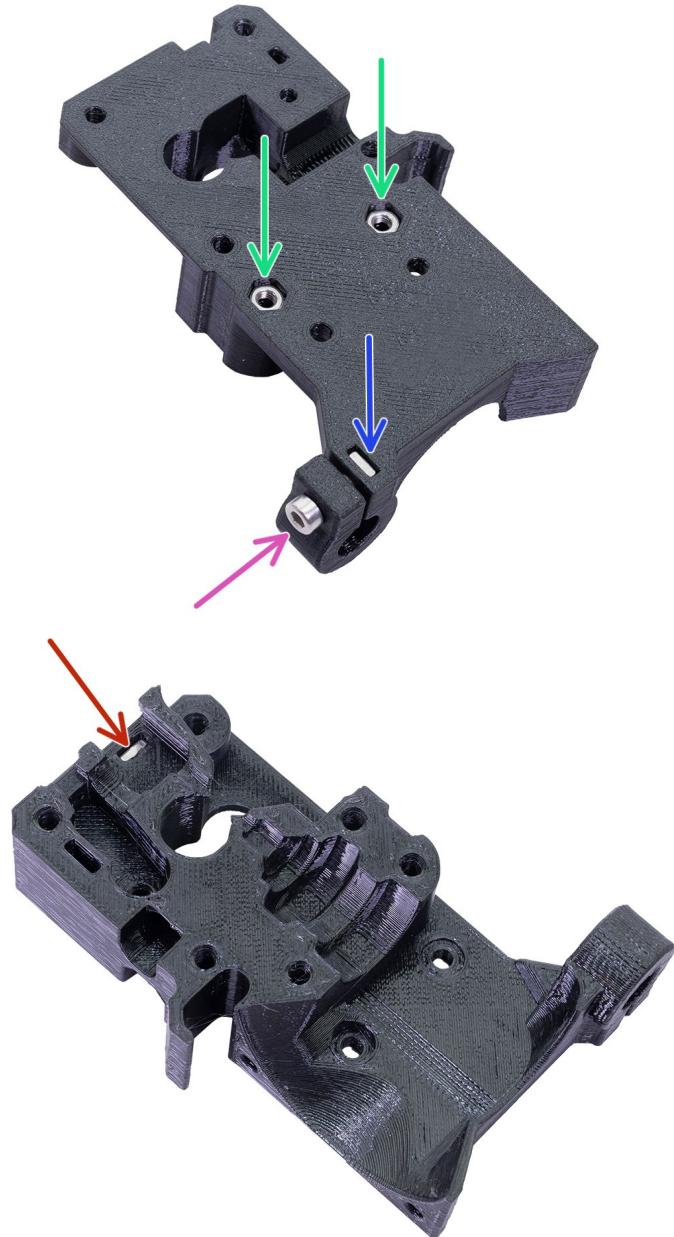
Make sure that before tightening it is perfectly aligned with the upper profile 2020. Then proceed to fix the piece by tightening the **two M4x12 screws**.

Check that the Z Top part is properly aligned with the 2020 pro top profile rod by running your finger, it should be aligned.

5. Extruder map



5.1. Extruder body preparation I



Take the Extruder Body part (printed part).

Inlay **two M3n nuts**.

i Use the technique explained on page 9.

Insert an **M3nS nut** into its housing.

Insert an **M3x10 screw**.

Flip the part over and insert **an M3nS nut** into its socket.

5.2. Extruder Body preparation II



Prepare the following printed parts:

- Extruder Body
- Adapter printer
- FS lever

Insert the **small magnet (10x6x2)** into the FS lever piece.

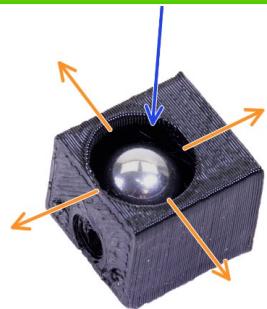
Insert the FS lever part on the Extruder Body part and fix it with an **M3x18 screw**.

⚠ Do not fully tighten, the FS lever should move freely.

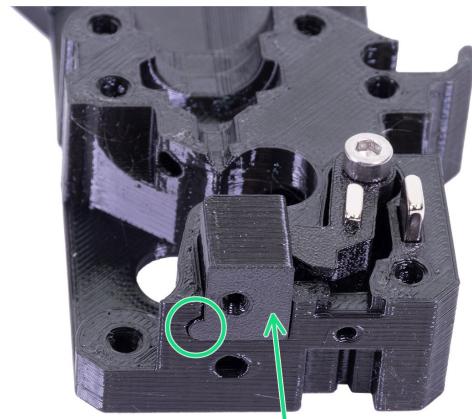
Insert the **large magnet (20x6x2)** into the Extruder Body.

⚠ The two magnets must repel each other!

5.3. Extruder Body preparation III



Take the metal ball and **insert it** into the Adapter Printer part.

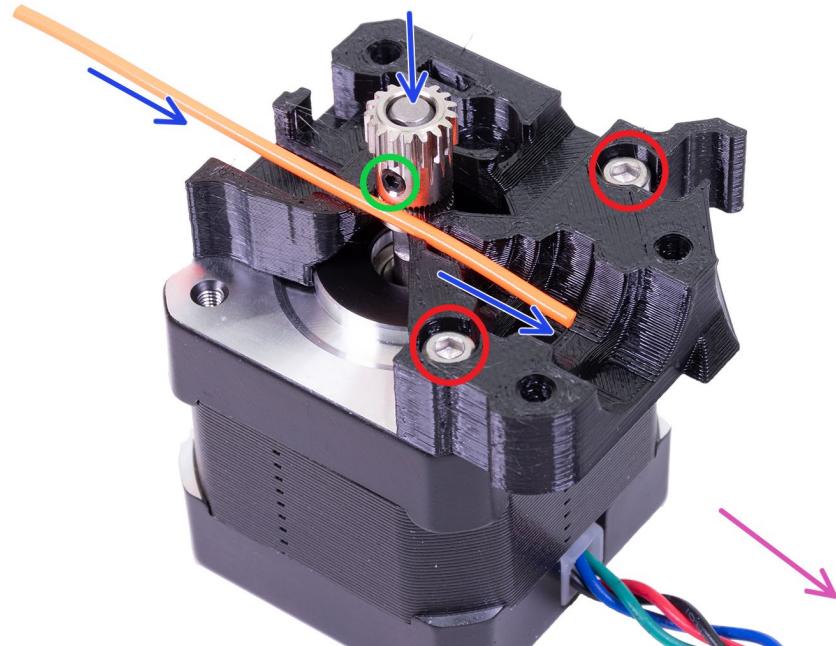


Take the Extruder Body part and **insert** the Adapter Printer part into its housing until the end.



Insert two M3x10 screws.

5.4. Extruder motor preparation



Take the remaining motor with the Vertex logo engraved, it has EXTRUDER inscribed on it.

Take the Motor Cover part (printed part) and place it on top of the motor, orienting it as shown in the image.

i Look the **motor cable** as a reference.

Attach the printed part to the motor with **two M3x10 screws**.

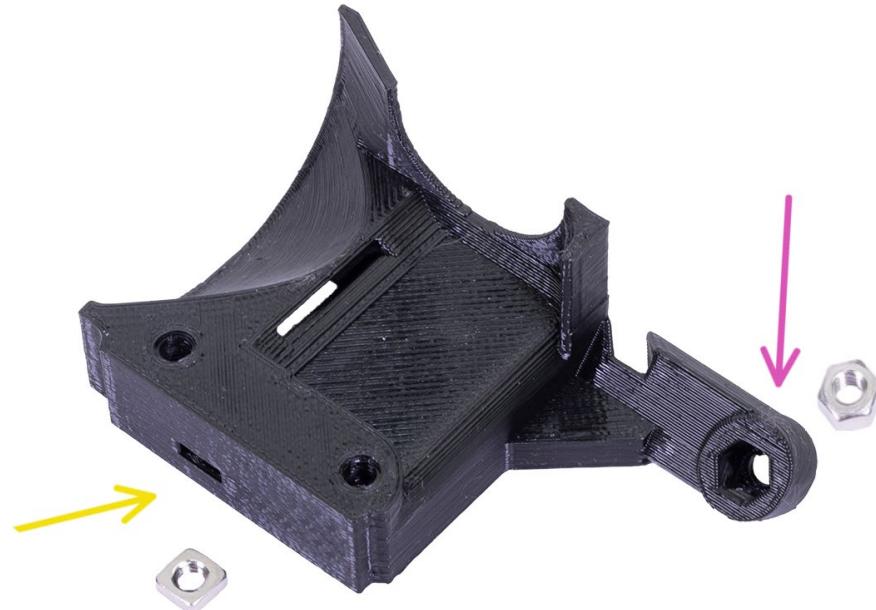
Insert the gear with the **grub screw** into the motor spindle so that the toothed part faces up as shown in the picture.

Place a piece of filament or the smallest hex key over the channel of the printed part to align the gear groove.

Once aligned, tighten the **grub screw** on the spindle at its flat.

! Check again if the channel on the gear is aligned with the channels on the printed part.

5.5. Extruder cover preparation



Insert an **M3nS nut** into the Extruder Cover printout.

Insert an **M3n hex nut** into its slot on the "arm" of the Extruder Cover piece.

5.6. Hotend assembly



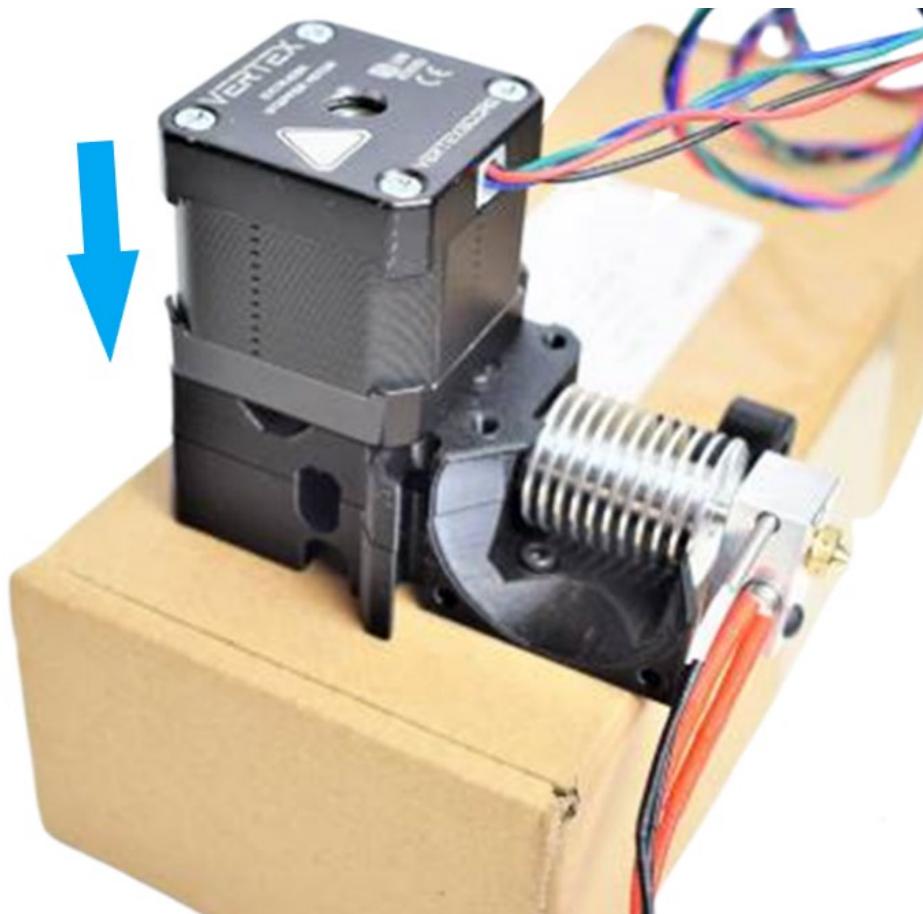
To make the assembly easier, place the prepared Extruder Body on a cardboard box, as shown in the image.

Insert the pre-assembled hotend into the Extruder Body printed part.



The cables should be on the LEFT side.

5.7. Extruder motor assembly



i If any of the magnets come off you can use glue. Make sure they repel each other.

Insert the extruder motor sub-assembly prepared in step 6.4 over the Extruder Body printout and Hotend.

! Make sure both parts are aligned as shown in the image.

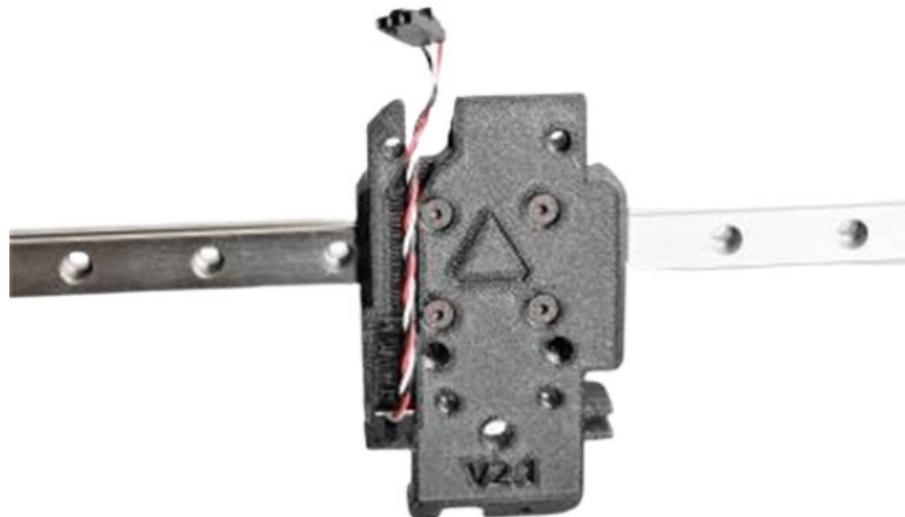
5.8. Extruder cover assembly



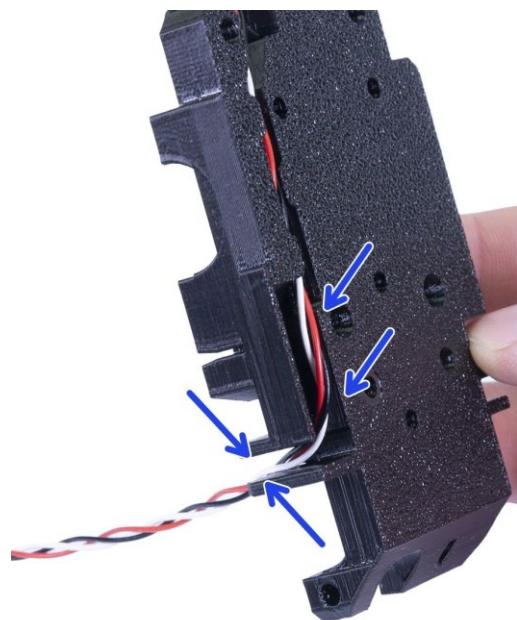
Insert the Extruder Cover printout that you prepared in step 6.5. on the hotend.

Insert and tighten the **two M3x40 screws**. These screws stick out a couple of millimeters on the other side, this is intentional. Let them sink into the cardboard.

5.9. X Carriage filament sensor cable preparation

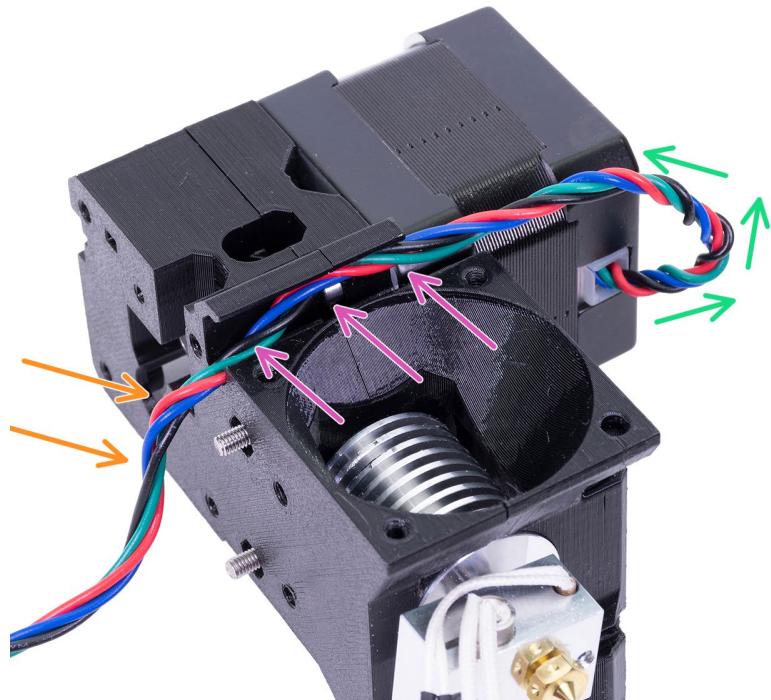


Take the **Red** / **White** / **Black** braided cable that corresponds to the filament sensor and present it as shown in the image, trying to leave approximately the same length at the top.



Guide the filament sensor cable through the **slot** in the X Carriage.

5.10. X motor cable preparation

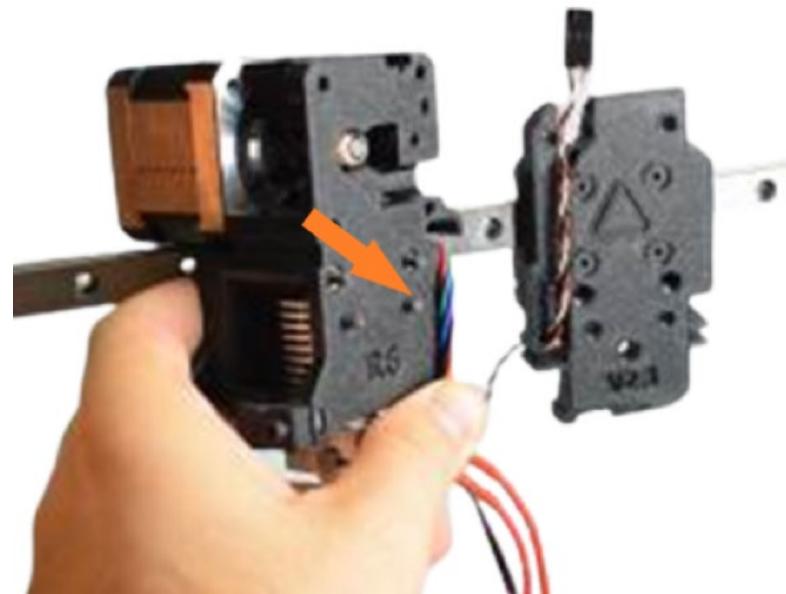


Make a small loop under the extruder motor leaving about 3cm of cable to facilitate future maintenance.

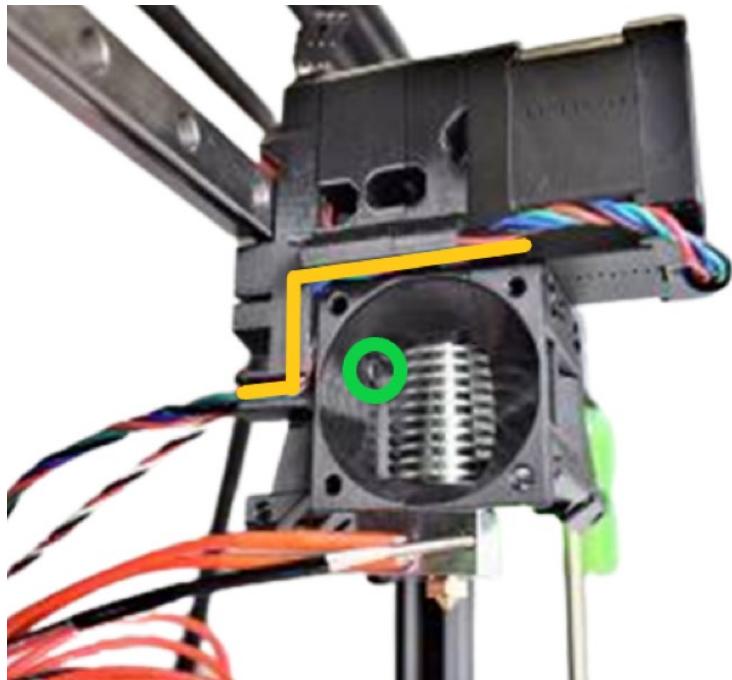
Guide the cable through the channel of the printed parts to the back.

Bend the cable down to prepare it for attachment to the X carriage.

⚠ Proper installation is important for final assembly



5.11. Extruder assembly on X carriage



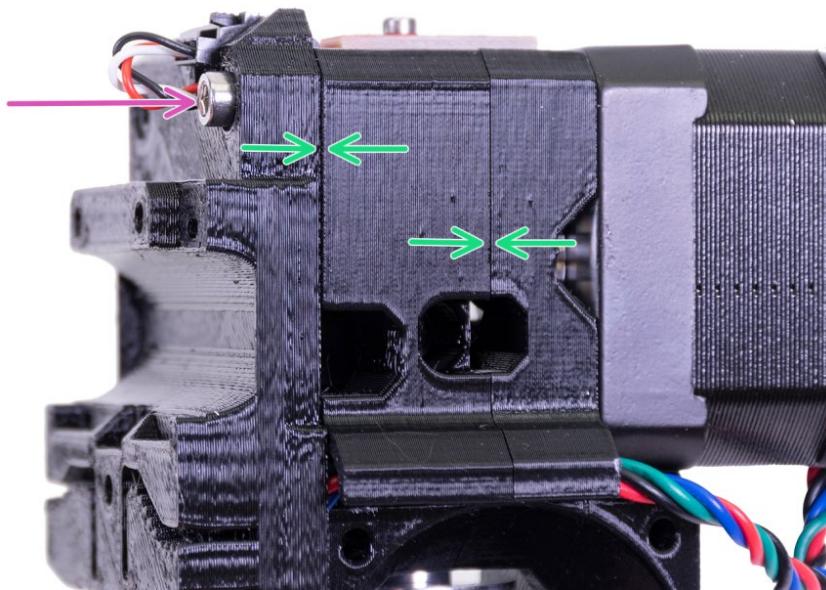
Guide the Extruder motor cable through the slot in the Extruder and X Carriage.

i Remember to leave some slack so that the cable is not too tight.

Place the Extruder assembly on the X Carriage.

! Check, that the cable is not pinched by the printed parts.

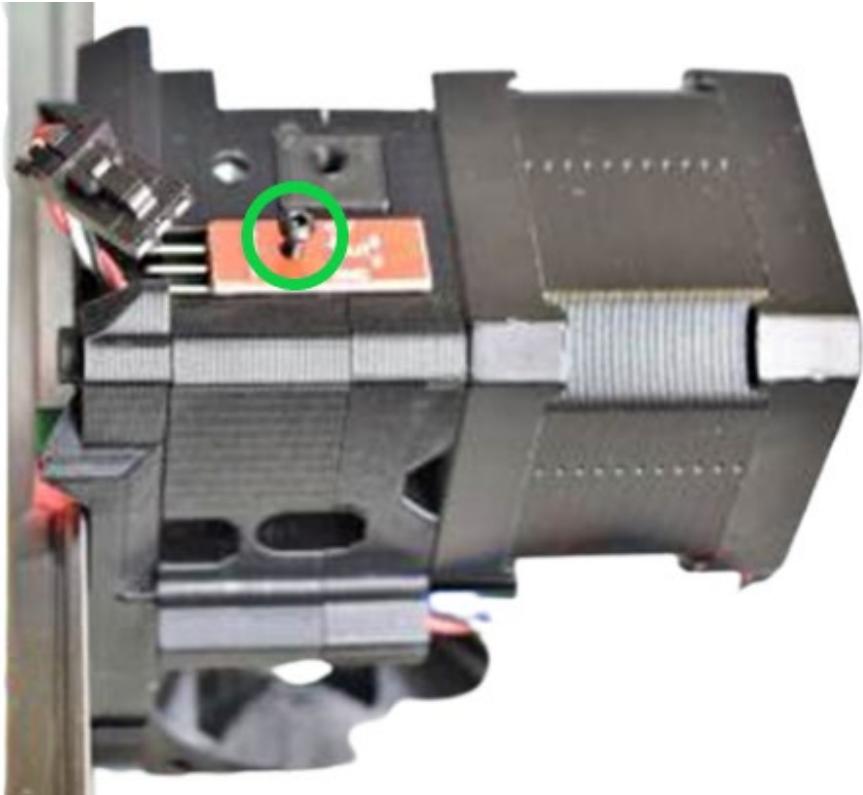
Use the **two M3x10 screws** one on each side near the hotend heatsink to secure the hotend assembly to the X-carriage.



Insert an **M3x40 screw** through the X carriage all the way through the extruder to tighten into the Extruder motor.

! Check that the **gaps** between the pieces close well

5.12. Filament sensor assembly



Place the filament sensor on top of the Extruder Body, the U-shape part of the sensor must be facing down.

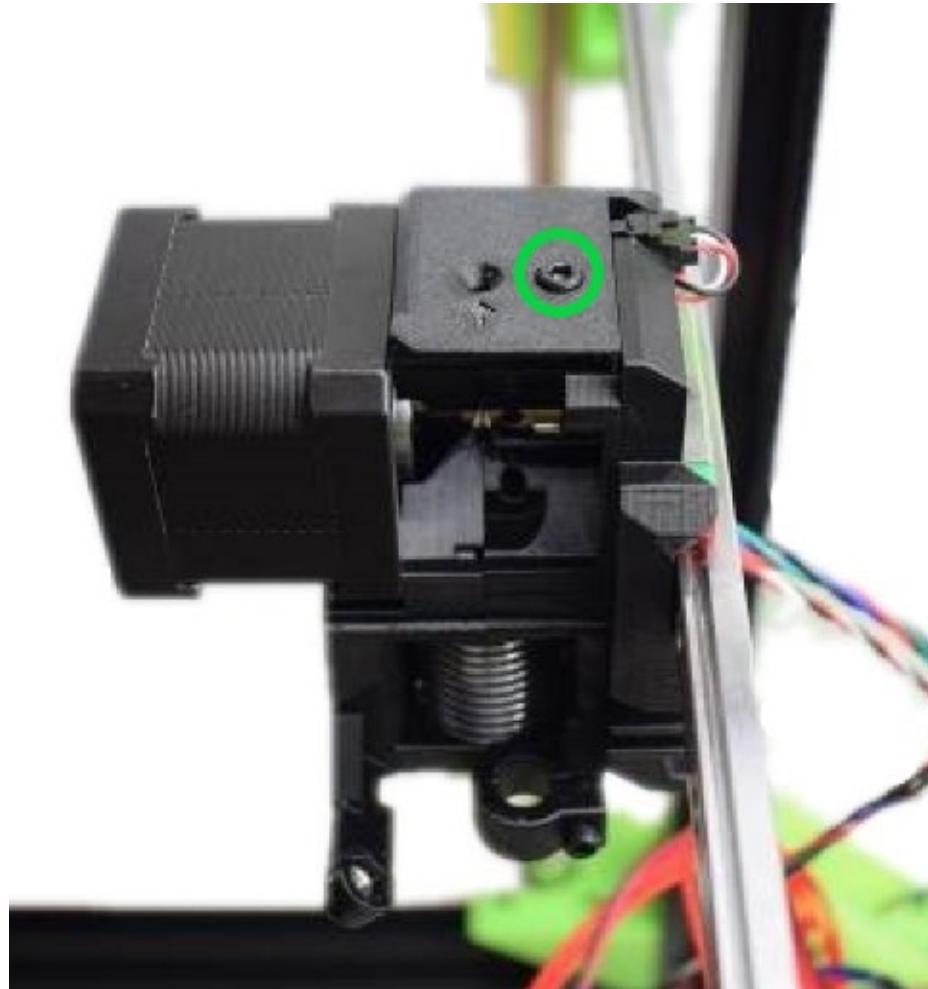
Secure the filament sensor in place with an **M2x8 screw**. The screw threads directly into the printed part, it does not have a nut.

 **Do not over-tighten the M2x8 screw.**

Connect the filament sensor cable to the filament sensor pins. Looking at the extruder from the front, the cables from left to right are:

BLACK GND – WHITE – RED 5V

5.13. FS Cover assembly

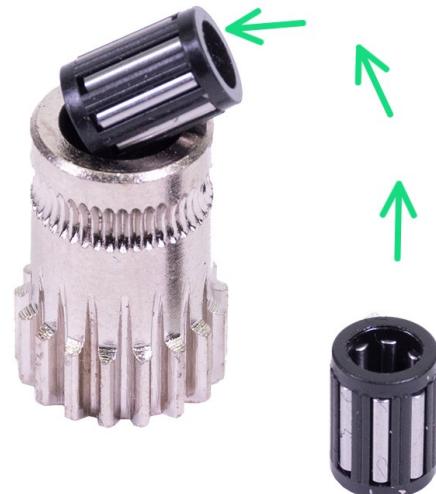


Place the FS cover printed components on the Extruder, over the filament sensor.

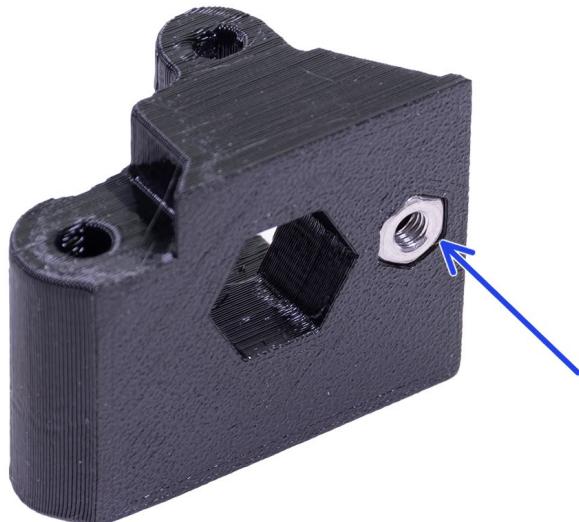
i The small arrow indicates the hole through which you will load and unload the filament.

Attach the FS cover to the extruder with an **M3x10 screw**.

5.14. Extruder Idler preparation I



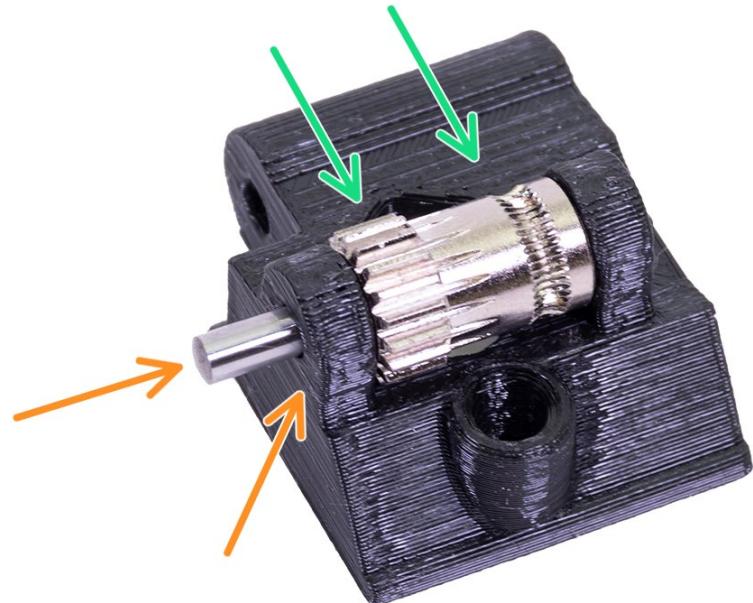
Insert the **two bearings** into the remaining gear.



Inlay **an M3n hex nut** into the Extruder Idler part (printed part).

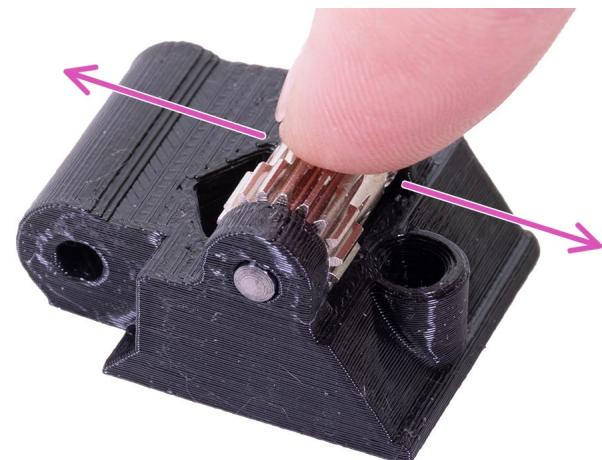
i Use the technique we teach you on page 9.

5.15. Extruder idler preparation II



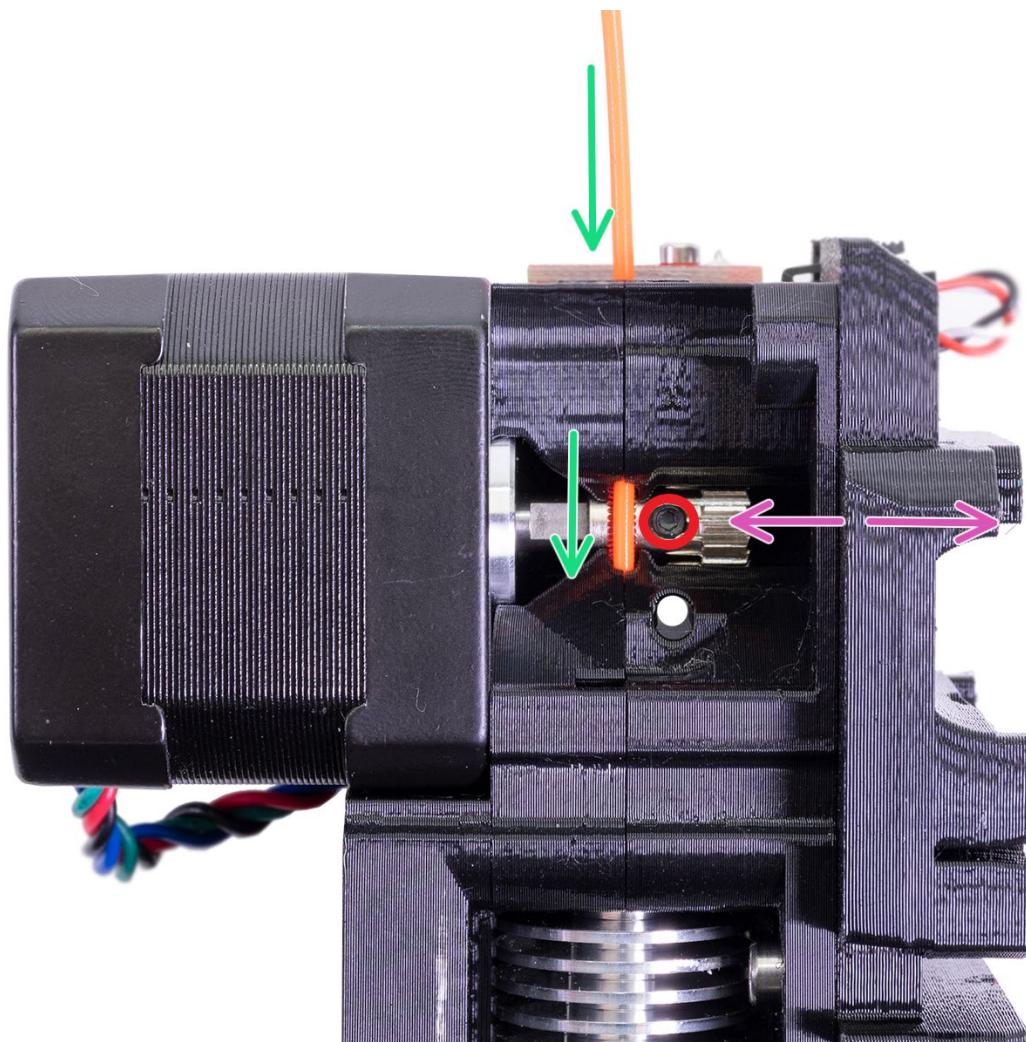
Insert the gear into the Extruder Idler as shown in the image.

Insert the pin that will act as the axis on which the gear will rotate.



⚠ Make sure the gear turns freely.

5.16. Check extruder motor gear alignment



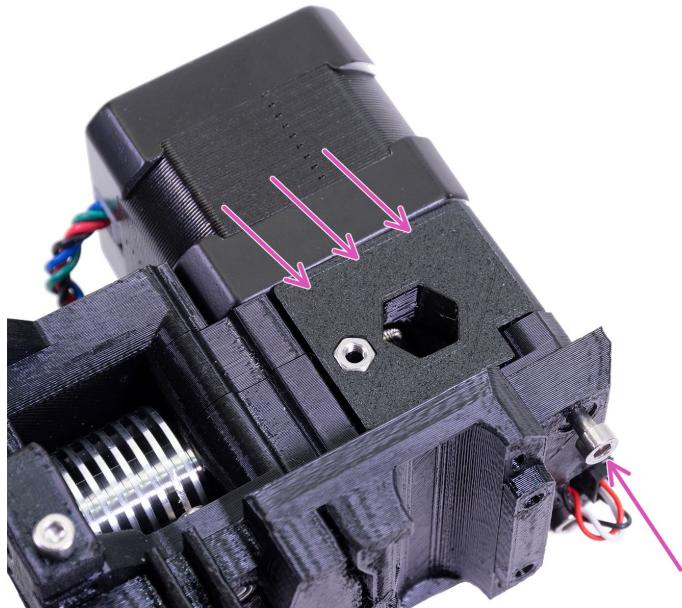
Before assembling the Extruder Idler, check that the Extruder motor gear is aligned.

Insert a piece of filament or the smallest hex key through the hole as shown in the image. The gear channel should be perfectly aligned with the filament.

If not, you can loosen the **grub screw** and move the gear left or right.

Retighten the **grub screw** once you are satisfied.

5.17. Extruder Idler assembly



Insert the Extruder Idler into the hole left in the Extruder, so that the gear is inside the extruder.

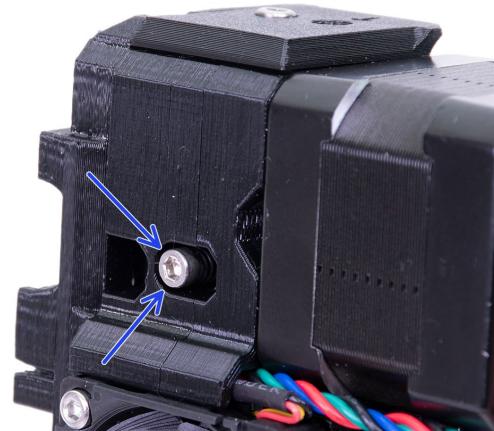
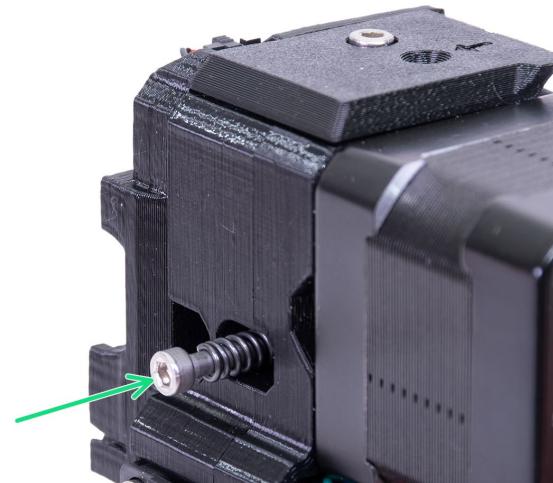
Secure it with an **M3x40 screw**. This screw serves as the hinge pin for the Extruder Idler, so do not over-tighten it. The Extruder Idler must move freely.

⚠ Check that you can open and close the Extruder Idler. If not, loosen the **M3x40 screw** a bit.

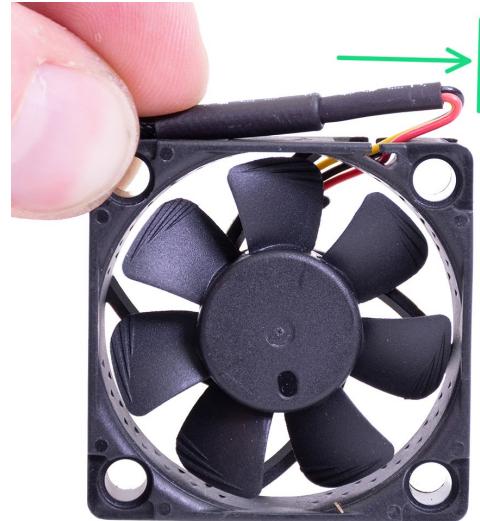
Insert spring into an **M3x40 screw** and this in turn into the hole shown in the picture.

i Hold the Extruder Idler on the other side with your hand to be able to screw.

Tighten the **M3x40 screw** until the head is almost flush with the plastic part.



5.18. Hotend Noctua fan assembly I

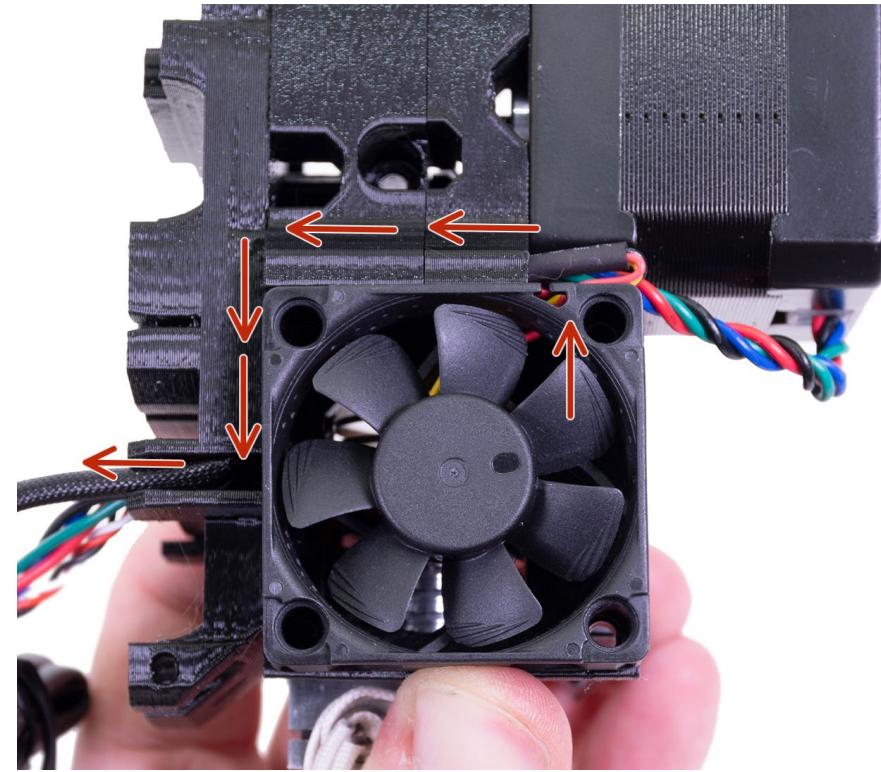
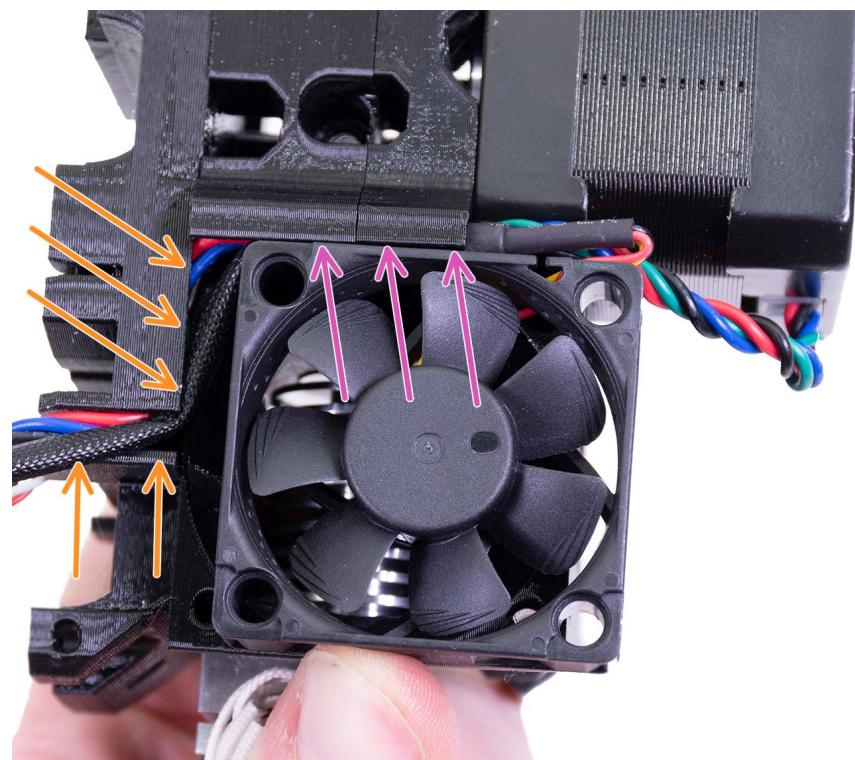


On the Noctua fan cable (brown), **make the loop** shown in the image.

Guide the cable through the same channel you routed the Extruder motor cable.

⚠ Make sure the **cable stays inside the slot.**

The path followed by the cable is as follows



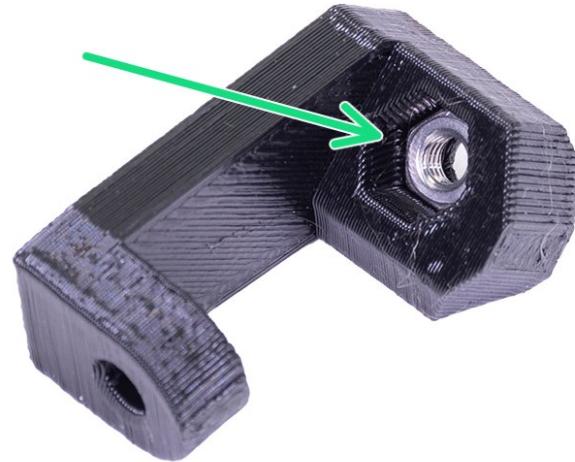
5.19. Hotend Noctua fan assembly II



Insert and attach an **M3x14 screw** in the holes marked in the image, the other three holes are free for now.

⚠ The screw threads into the printed part itself, don't use too much force.

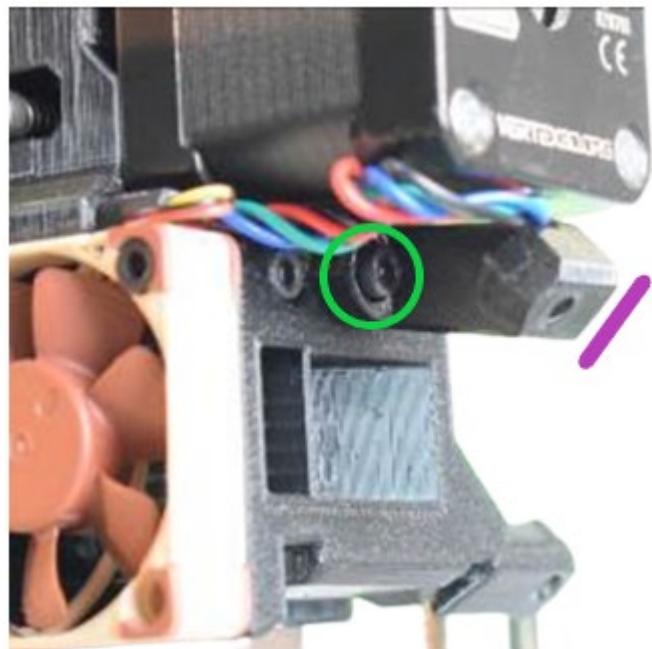
5.20. Fan Support assembly



Thread an **M3n hex nut** into the housing on the Print Fan Support print part.

i Use the technique we teach you on page 9.

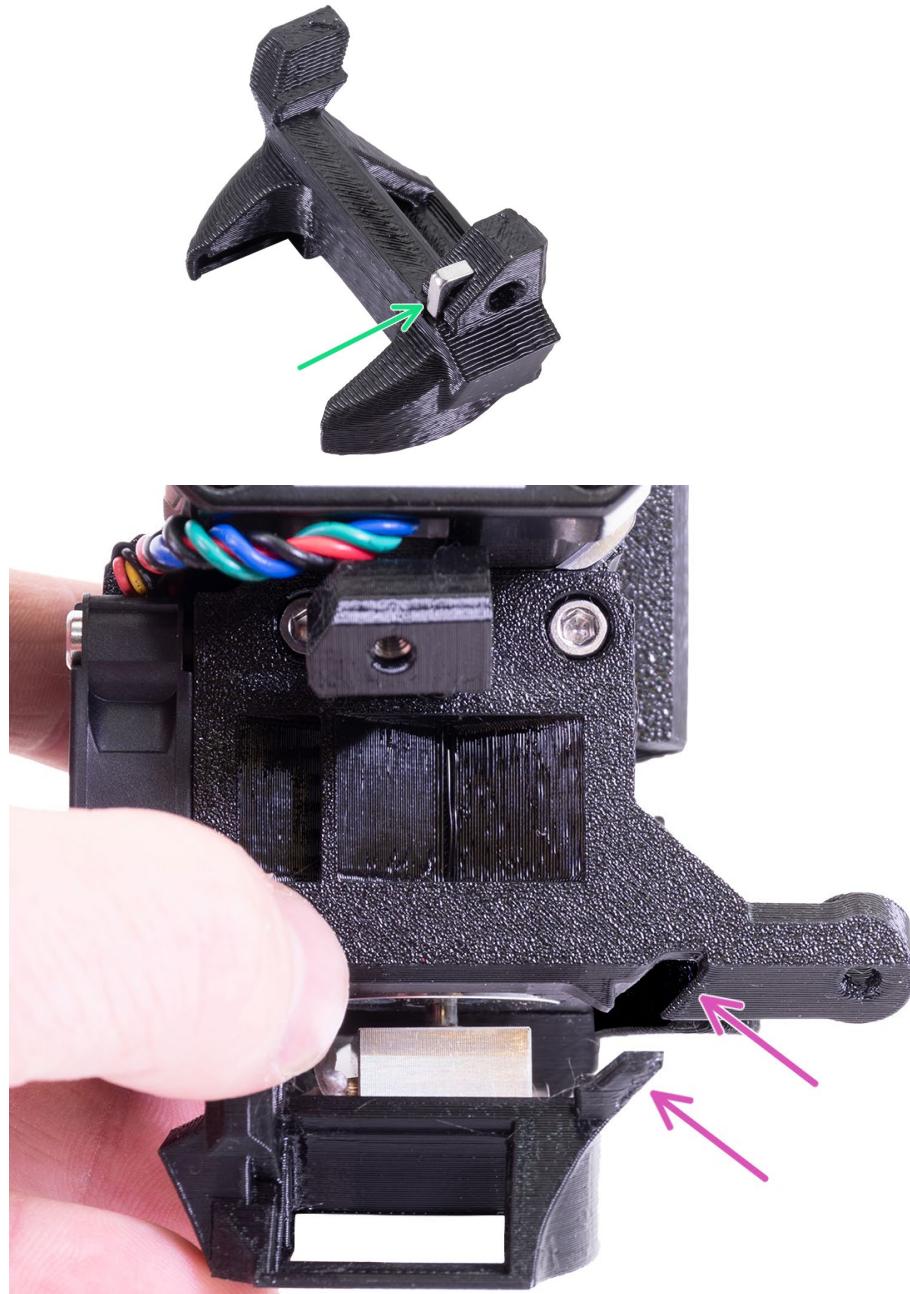
! It is important that you insert the nut to the end.



Attach the Print Fan Support part using a **M3x10 screw**.

! Make sure the part is tilted as shown in the image.

5.21. Fan Shroud assembly



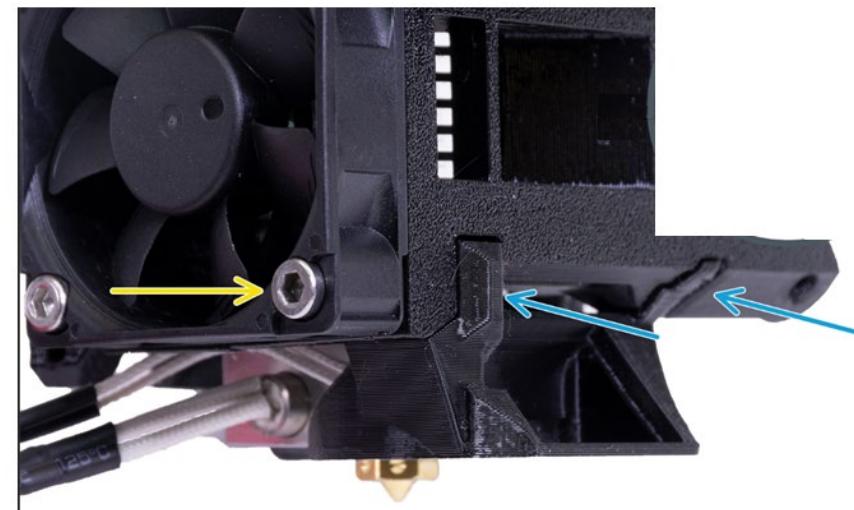
Take the Fan Shroud part (printed part)

Insert an **M3nS nut** into the housing.

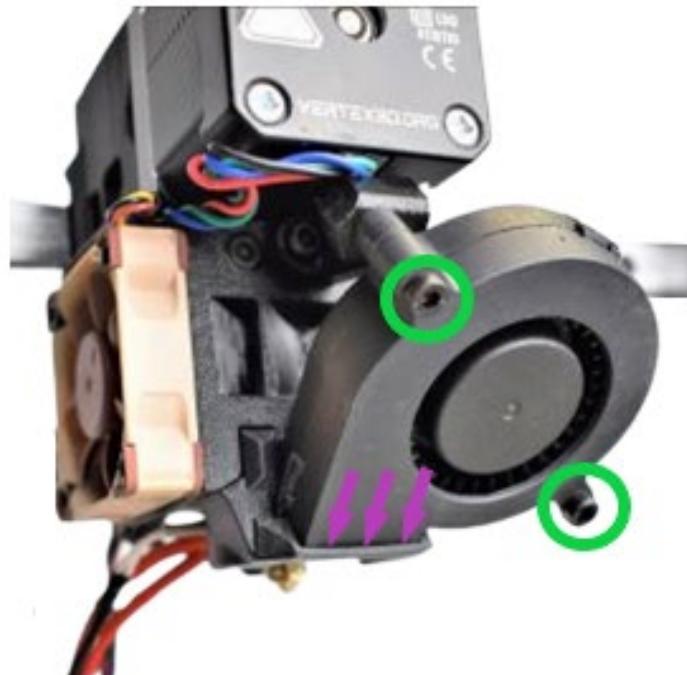
i As a curiosity, this piece is the only one printed in another material, specifically ASA to withstand the heat that comes from the Hotend.

Looking at the **placing** shown in the picture, **insert** the Fan Shroud into the extruder.

Inserte un **tornillo M3x20** que atraviesa el ventilador y la pieza impresa Fan Shroud.



5.22. Print Fan assembly

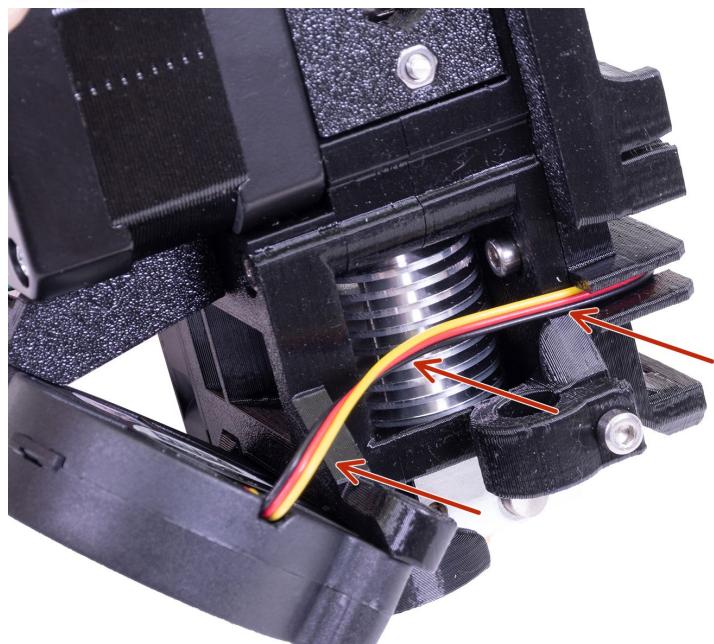


Put the **cover fan** into the slot on the Fan Shroud printed part.

Insert and tighten **two M3x20 screws** into the layer fan as shown in the image.

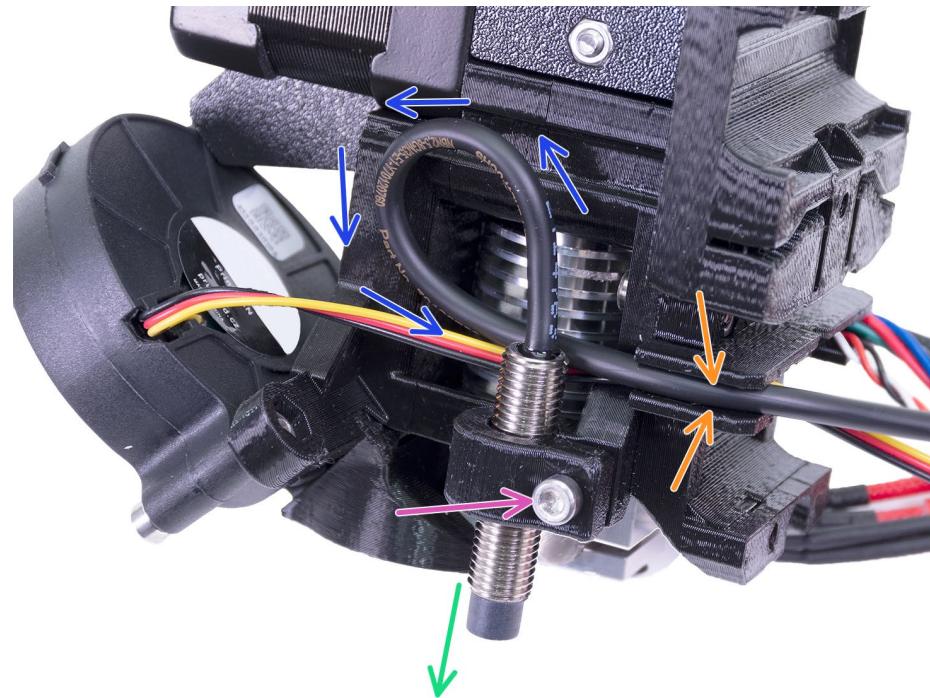


Do not use too much force, it is a plastic part.



Put the **fan cover cable** through the slot of the X Carriage on the right side as shown in the image.

5.23. Inductive Sensor assembly



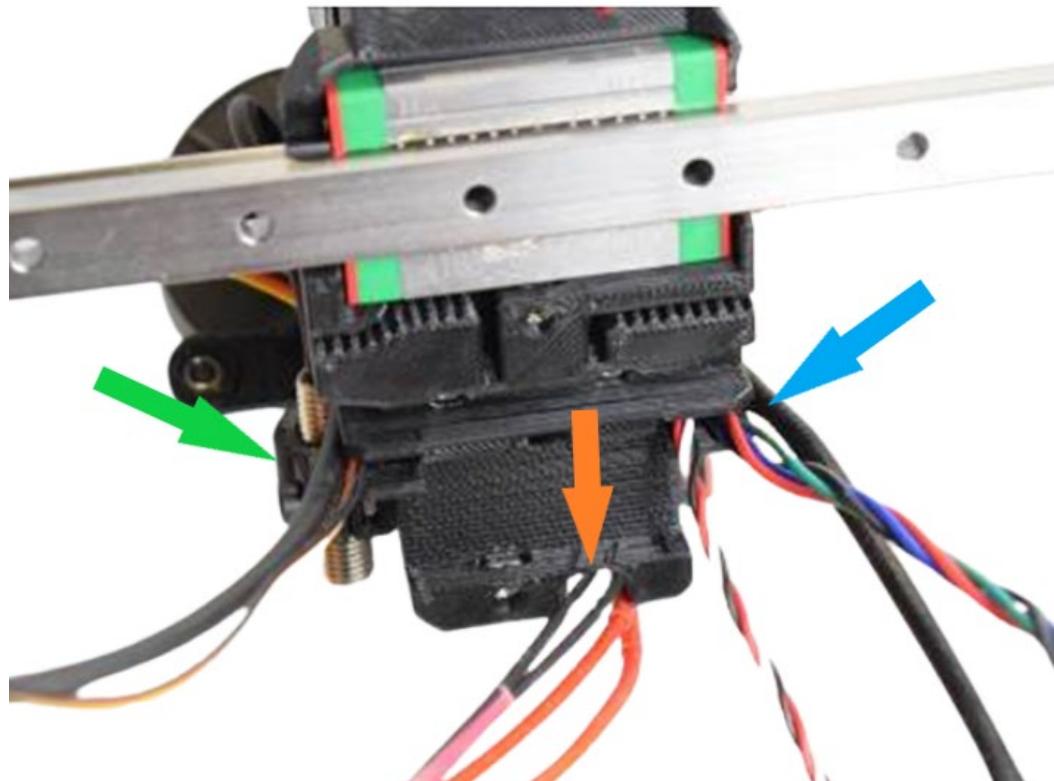
Make a **loop** with the cable of the inductive sensor and **insert** the sensor on it's hole of the printed part.

Slightly tighten the **M3x10 screw**.

i The inductive sensor tip has to be almost as low as the tip of the nozzle on the hotend. We will adjust it later.

Guide the inductive sensor cable through the slot on the X Carriage.

5.24. Extruder cables organization I



On the **left slot** on the X Carriage:

- The Yellow/Black/Red print fan cable and above it the inductive sensor cable.

On the **right slot** on the X Carriage:

- The filament sensor cable. Red/Black/White.
- The extruder motor cable. Green/Red/Blue/Black.
- The Noctua hotend fan cable. Black.

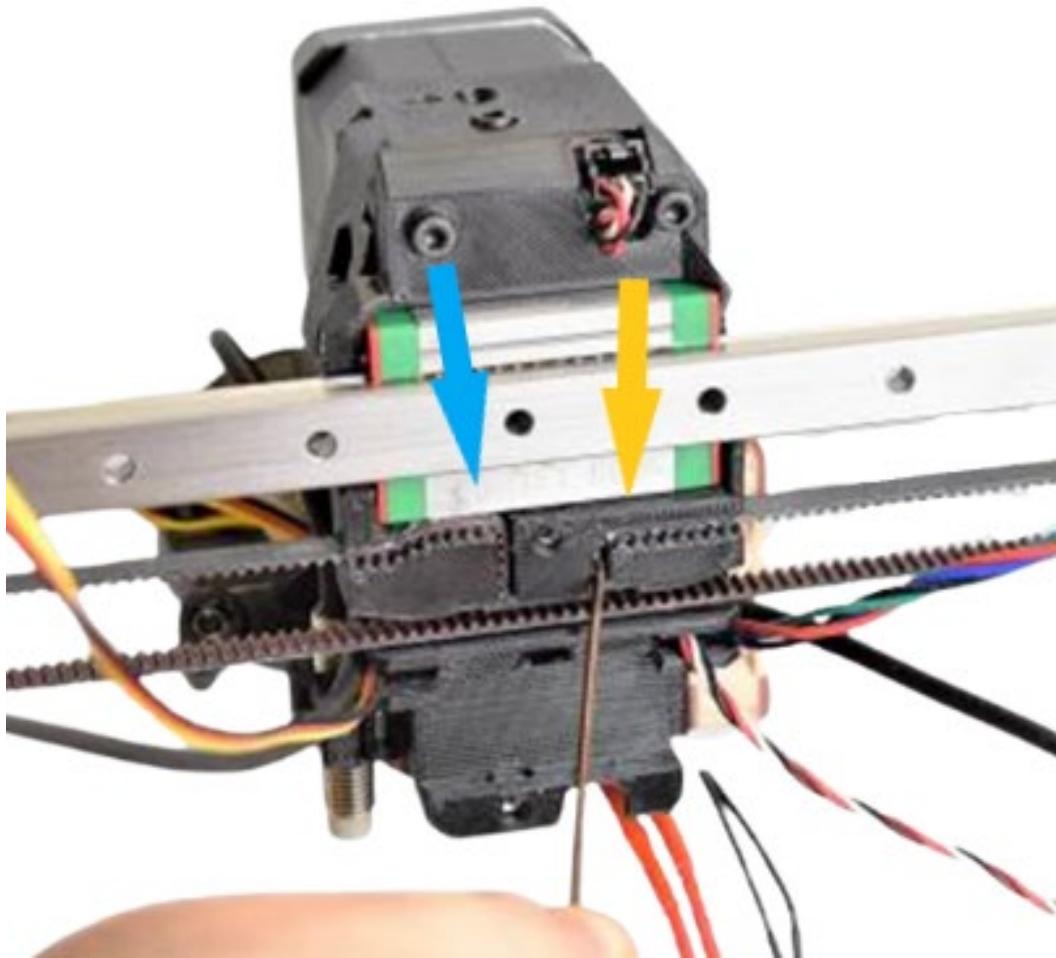
In the **lower slot**:

- The heater cartridge cable. Red.
- The thermistor cable. Red/Black.

For now, keep these three group of cables separate.

i You can move the cables to keep them tidy.

5.25. X belt assembly



Take the X-axis belt (90cm).

Insert the tip of the X belt into the **right tooth row** of the X carriage print component. Guide it to the X motor pulley and return through the channel below as shown in the image. Continue the belt through the smooth pulley 623h of the X Tensioner printed part and return the belt over and insert the other end into **the left row** of teeth on the X Carriage printout.

i Use the smallest hex key to push the strap all the way inside.

! Make sure that the belt does not twist at any point.

5.26. X belt tension adjustment



Tightening the **M3x25 screw** will tense the belt while loosening this screw which will cause the opposite effect.

As you did in point 2.16, push the Extruder by hand to one of the two ends of the X-axis. Using your fingers, tighten the belt. You should be able to bring the top to the bottom together easily but still feel some resistance.

i Use the same force you use when you press the button to turn on your computer.

⚠ If the belt tension is too low, by moving the Y-carriage by hand you will notice that the serrated belt misses steps (jumps). On the other hand, if the belt tension is very high, you will notice a high resistance to movement.

i After assembly, and during the first initiation, the printer will tell you if the belt tension is correct or needs to be checked.

5.27. X Carriage Back preparation



Take the X Carriage Back and Cable Holder pieces.

Thread an **M3n nut** into the X Carriage Back.

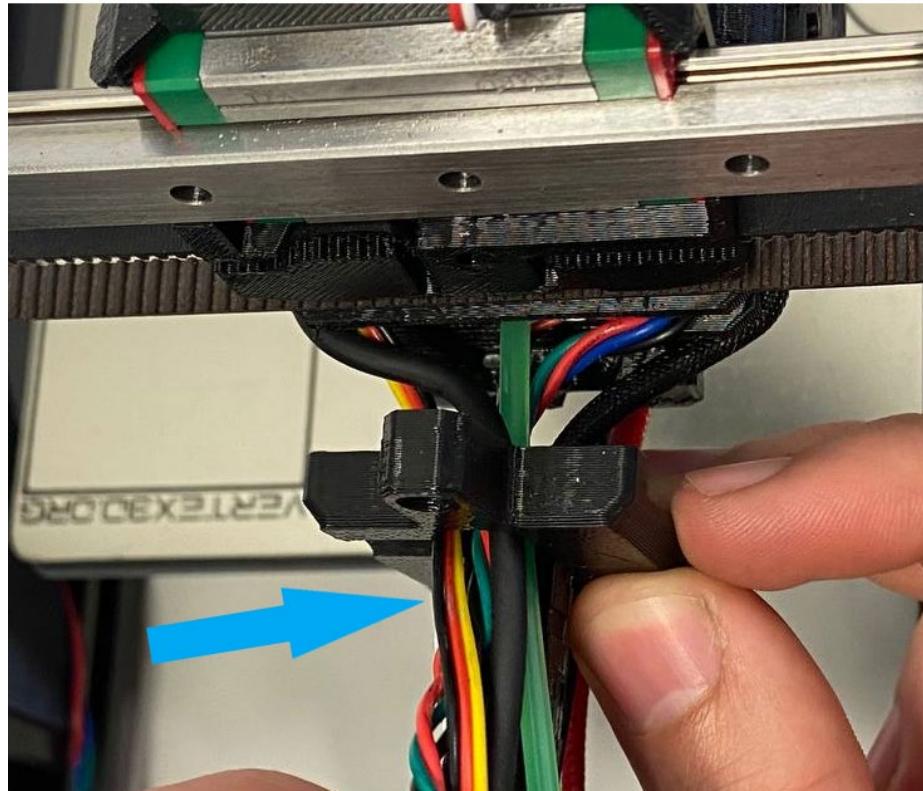
i Use the technique we teach you on page 9.

Insert an **M3x40 screw**.

To assemble both pieces, screw and **M3x40 screw** through the Cable Holder on the X Carriage Back.

! Align both pieces.

5.28. Extruder cables organization II



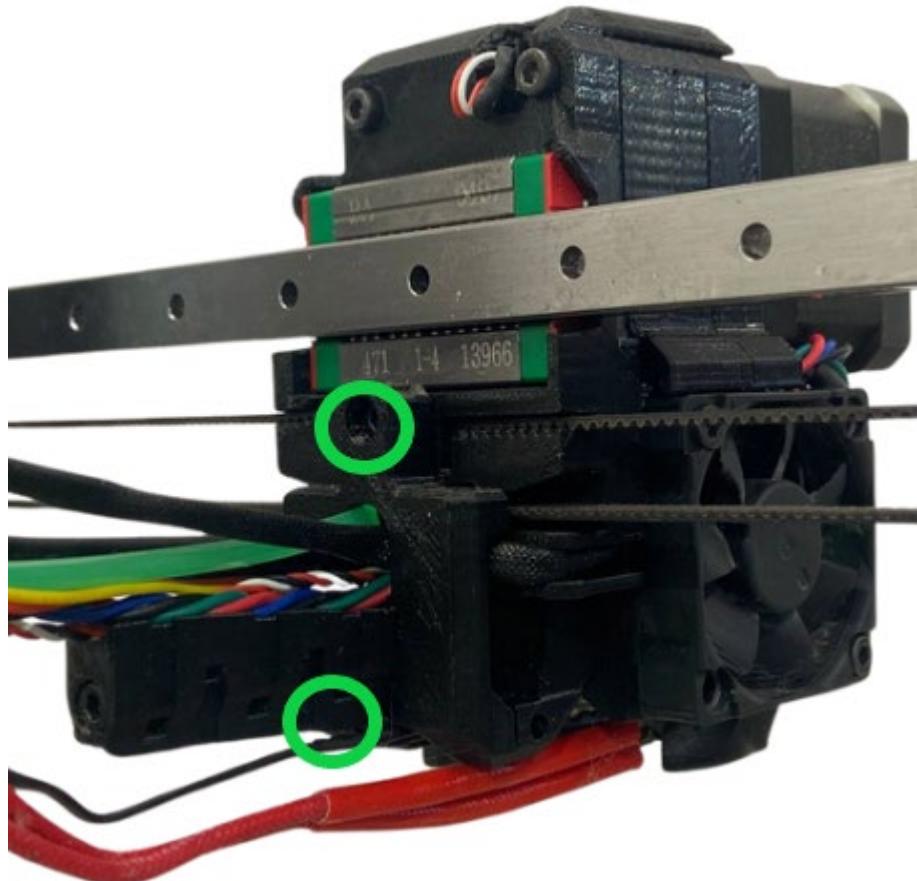
Take the 3mm black nylon (in the picture it is green) included in the KIT and insert it into the prepared hole in the X Carriage printed part. Just below the belt.

Take the X Carriage Back printout and insert the following wires through the hole as shown in the image.

- Inductive sensor
- Print fan
- Filament sensor
- Extruder motor
- Hotend Noctua fan
- 3mm Nylon

⚠ Do not insert the cables that come out from below corresponding to the hotend through the hole. Let them hang.

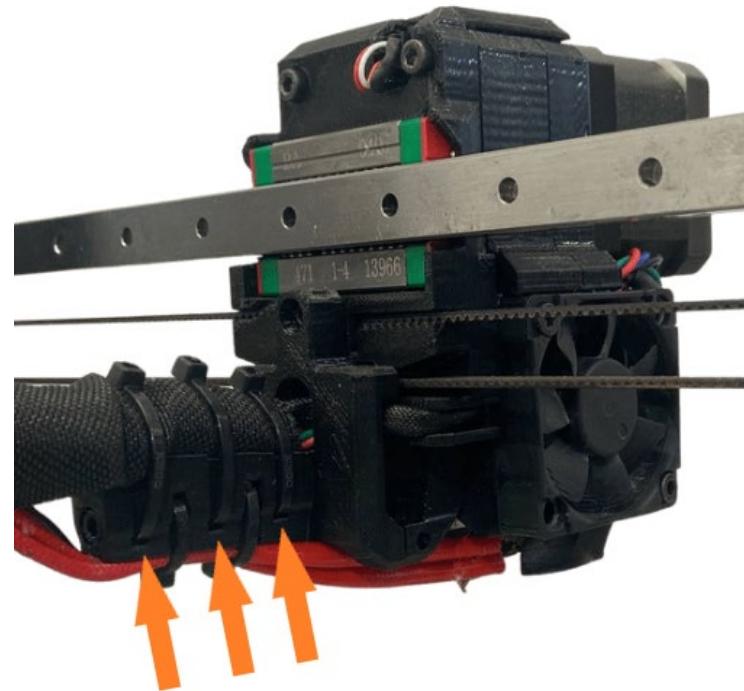
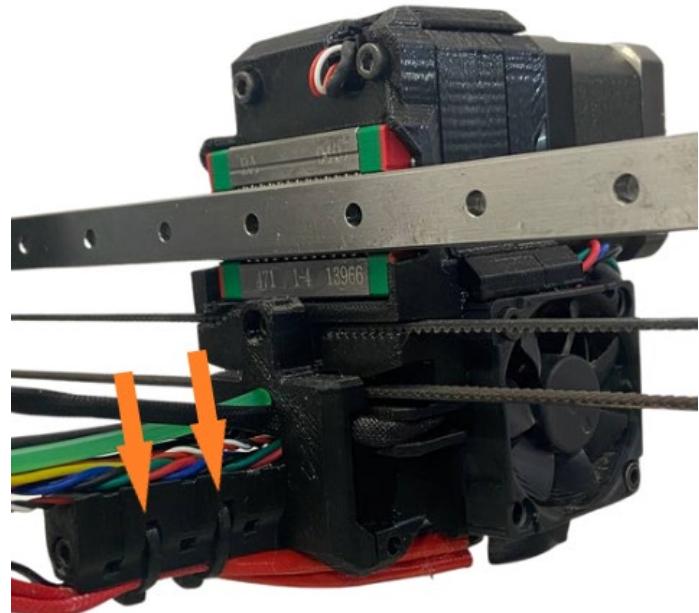
5.29. X Carriage Back assembly



Attach the X Carriage Back to the X Carriage with **two M3x10 screws**. One at the top and one at the bottom.

⚠ Make sure that the 3mm black Nylon guide (in the image it is green) is still well inserted in its place.

5.30. Extruder cables organization III



Guide the heating cable and hotend thermistor underneath as shown in the image.

Fix the lower cables with two **zip ties**.

⚠ Do not tighten the **zip ties** with excessive force. It could break the wires.

⚠ The head of the **zip ties** must be down,

Take the longest textile sleeve, wrap it around the upper cable group, except for the hotend cables.

Gently twist the sleeve around **ONLY** the top wires so that you can slide it onto the extruder as shown in image 2.

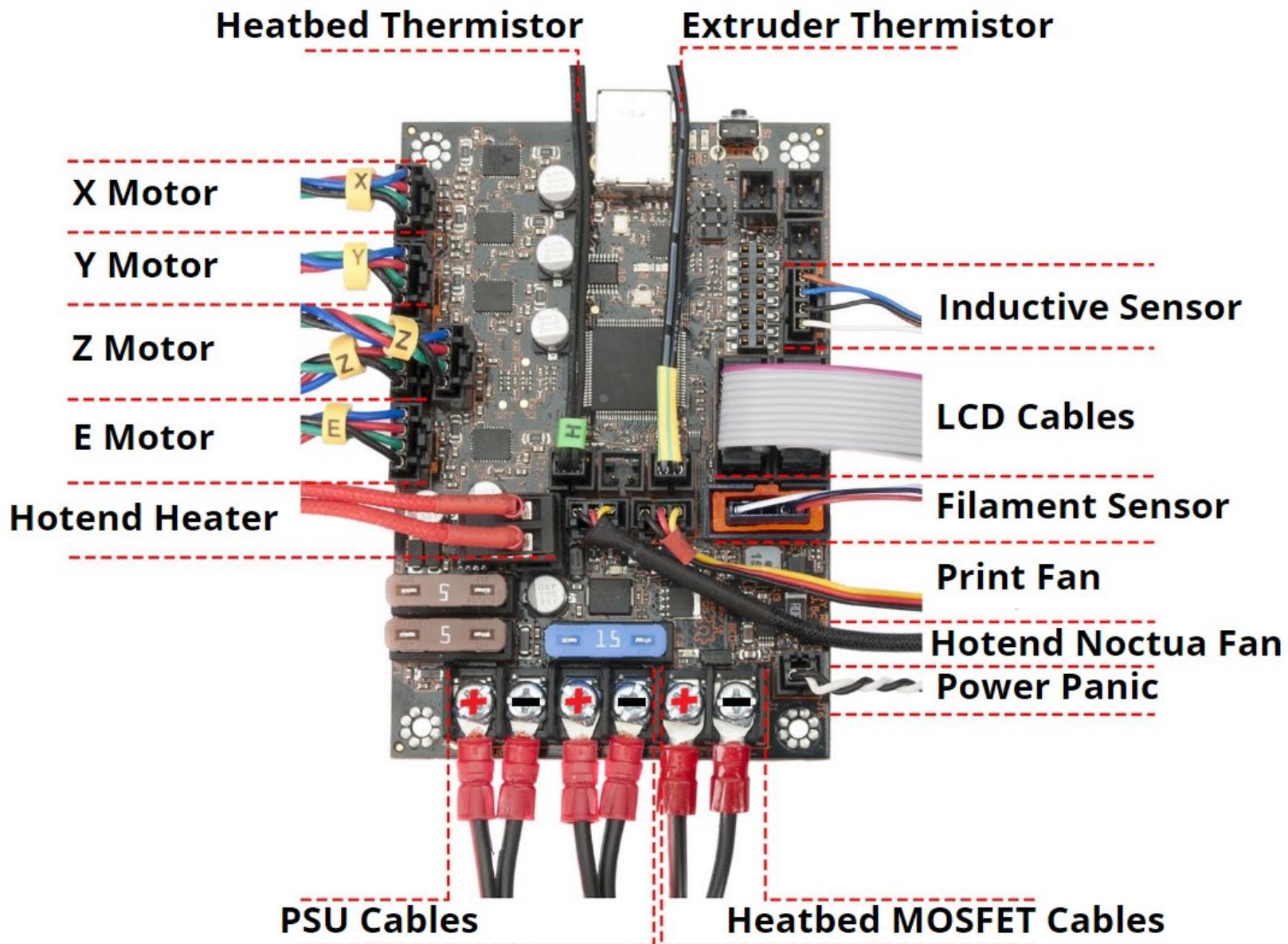
Secure the cables unit with **three zip ties**.

Now insert the lower cables of the hotend into the textile sheath as shown in the image and twist the textile sheath with your fingers clockwise in a spiral to give the completion more firmness.

⚠ Do not tighten the flanges with excessive force. It could break the wires.

⚠ The head of the cable ties must face up.

6. Electronics map



6.1. Meanwell PSU preparation



Take the pre-assembled Meanwell power supply.

Insert an **M4x10 screw** at the top and screw on a **T-M4 nut**.

Insert an **M4x10 screw** at the bottom and screw on an **M4 T-nut**.



The other two holes remain free for now.



6.2. Meanwell PSU assembly



Place the power supply to the construction as shown in the image.

Push the power supply against the frame by hand.

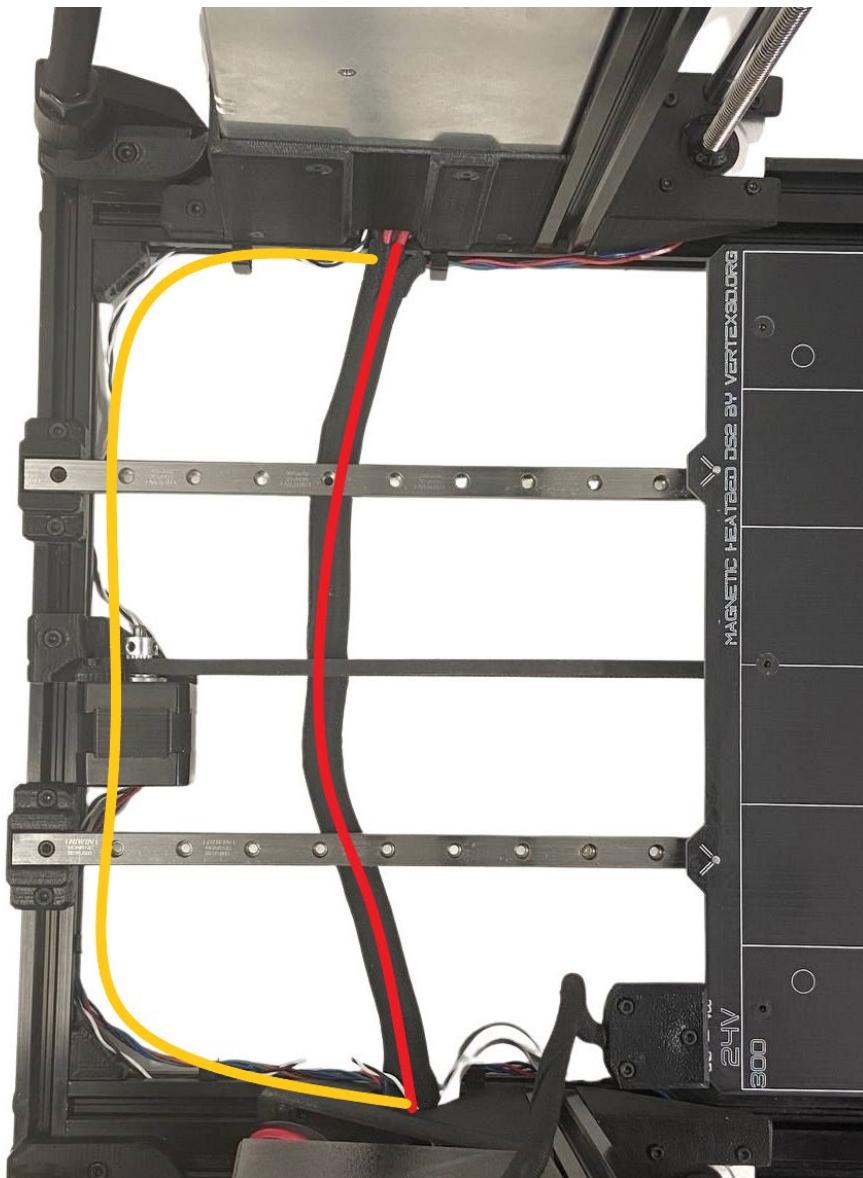
Tighten the **lower M4x10 screw** and repeat the same on the **upper M4x10 screw**.

Lay the printer down, slide and align with the side holes of the power supply two T-M4 nuts through the slot of the 2040 profile.

⚠️ Avoid laying the printer on the X axis. Be careful with the X axis when laying the printer!

Insert and tighten **two M4x10 screws** to fully secure the PSU to the frame.

6.3. PSU cables preparation



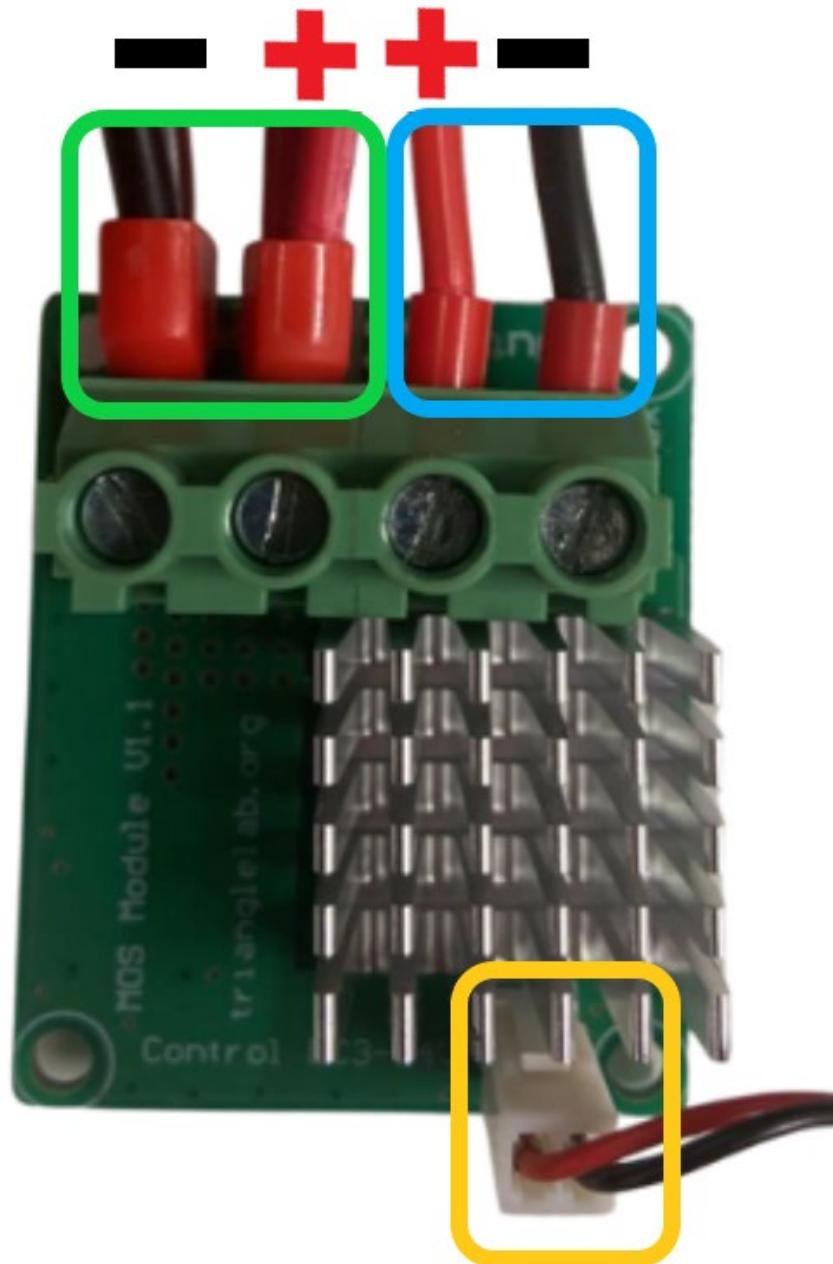
Cover the power cables (**BLACK** and **RED**) with the remaining textile sleeve, pass them under the linear rails and insert them into the Vertex logo shaped hole of the Z Corner print.

Sew with the staples (printed parts) the Power Panic cable (**BLACK** and **WHITE**) **making a U around the back 2020 profile** below the linear rails as shown in the image and insert the cable into the hole shaped like the Vertex logo on the printed part Z Corner.

⚠️ Be careful when sewing the Power Panic cable, you could pinch it with the staples.

i The Power Panic cable is bypassed from the rest as it otherwise receives electrical noise from the PSU power cables which could damage the Einsy Rambo board.

6.4. MOSFET Preparation



Take the **power cables** you sheathed in step 7.1 and the power cables coming out of the heated bed.

Loosen the screws on the left side of the Mosfet and connect the **cables from the power supply** on the left side following the order .

BLACK - / + RED

Loose the screws on the right side of the Mosfet and connect the **heat bed cables** on the right side following the order.

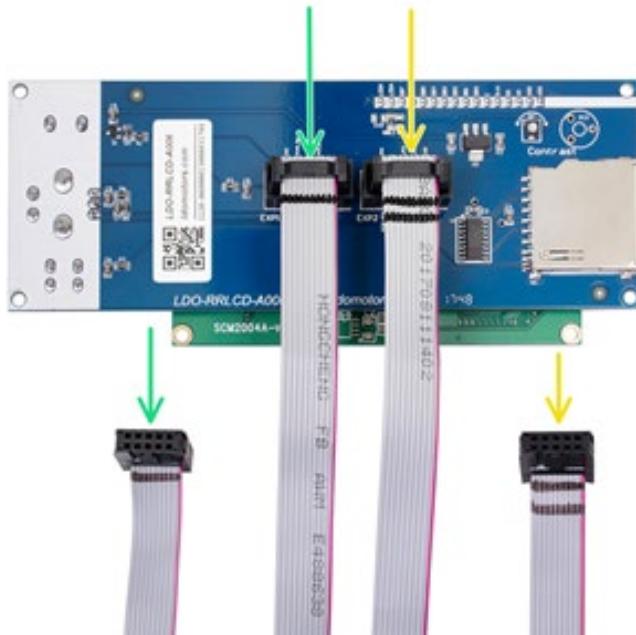
RED + / - BLACK

Connect the **signal cable**.

⚠ Check again that the connection is correct.

i The mosfet is used to release electrical voltage that produces the large size of the heated bed. Otherwise, it would pass directly through the Einsky Rambo board and could damage it.

6.5. LCD preparation I



Take the LCD electronics and signal cables.

Connect the cables as shown in the image. Black stripes painted on the wires indicate the position on both the LCD and the Einsy Rambo board.

- **1 black stripe** on the pin with the EXP1 inscription on the left.
- **2 black stripes** on the plug with the inscription EXP2 on the left.

 Check again that the connection is correct.



Take the LCD Support A and LCD Support B parts (printed parts).

Insert two **M3x10 screws** and thread **two T-M4 nuts** onto the screw tips.

 Mind that LCD Support A has one tab that the other does not.

6.6. LCD Preparation II



Take the LCD Support A and LCD Support B parts that you have prepared in the previous step and slide them onto the electronics board as shown in the picture.

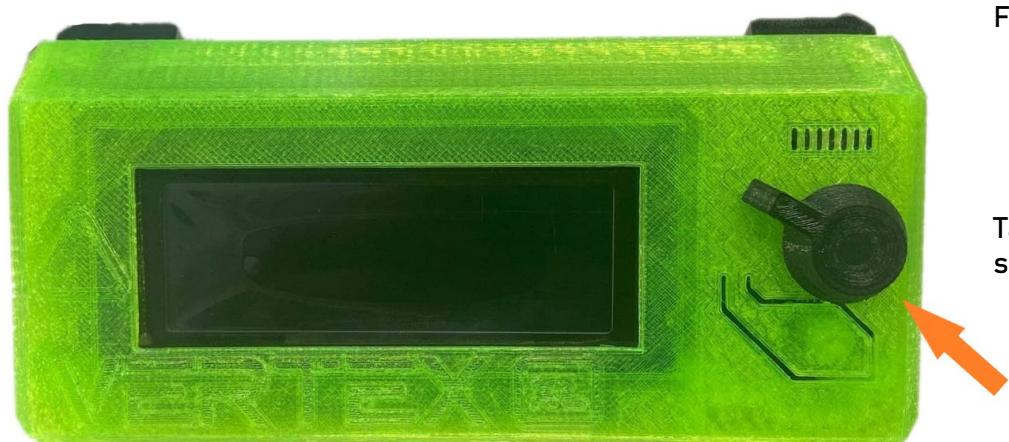
⚠ The LCD Support A piece with the plate goes to the right.

Take the LCD Cover part (printed part) and fit it over the electronics board.

⚠ In the central part of the LCD Cover piece there is a small plate on which the electronic board has to fit.

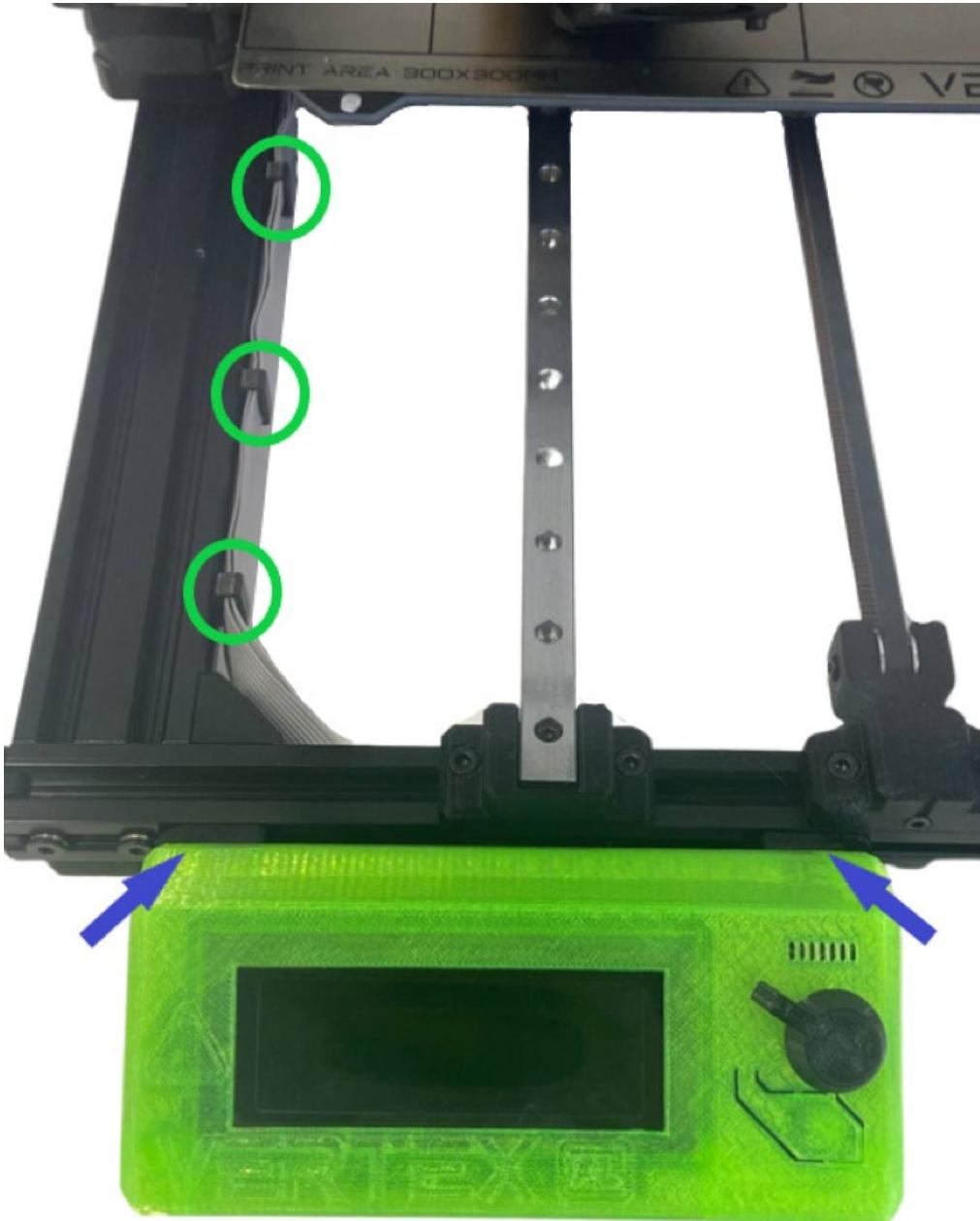
i The LCD Cover piece has two indentations that mark the position of the supports.

Fix the LCD cover part and electronics with **two M3x10 screws**.



Take and **insert the LCD Button** piece into the potentiometer sticking out the other side.

6.7. LCD assembly on XY structure



Place the LCD assembly on the left side of the XY frame.

Secure the LCD assembly by tightening the **two M3x10 screws**.

Pass the cables under the front 2020 profile and **staple them** (printed pieces) along the left 2040 profile until the cables are inserted through the Vertex logo shaped hole in the Z Corner piece.

⚠ Take special care when inserting the staples into the LCD cables.

6.8. Einsy Rambo Box preparation I



Take the Einsy Rambo Body piece (printed piece).

Prepare and put **eight M3n hex nuts**.

- i Use the technique we explained on page 9.

6.9. Einsy Rambo Box preparation II

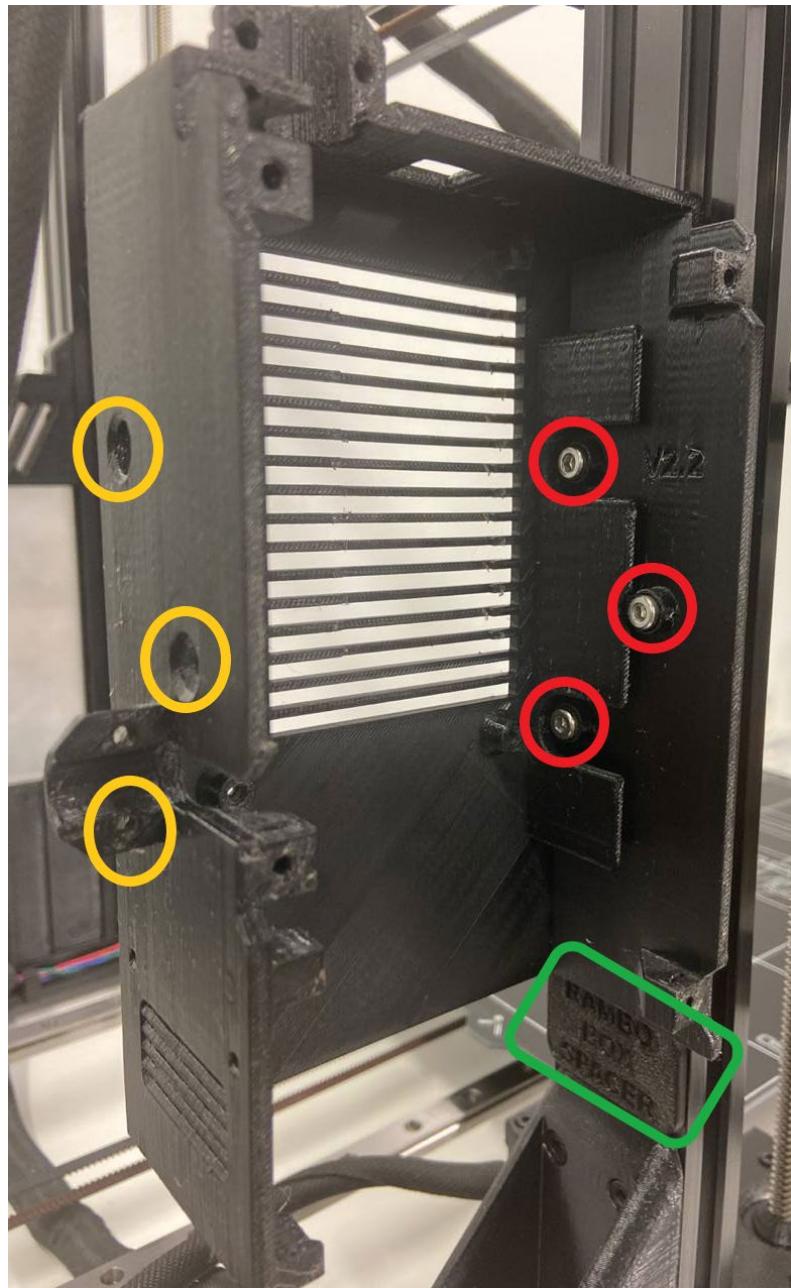


Insert **four M3nS nuts** into their sockets.

⚠ Check, that the holes of the nut and printed part are aligned.

Insert **three M4x10 screws** and screw **three T-M4 nuts** onto the tip.

6.10. Einsy Rambo Box assembly



From the bag labeled SPACERS, take the **RAMBO BOX SPACER** printed part.

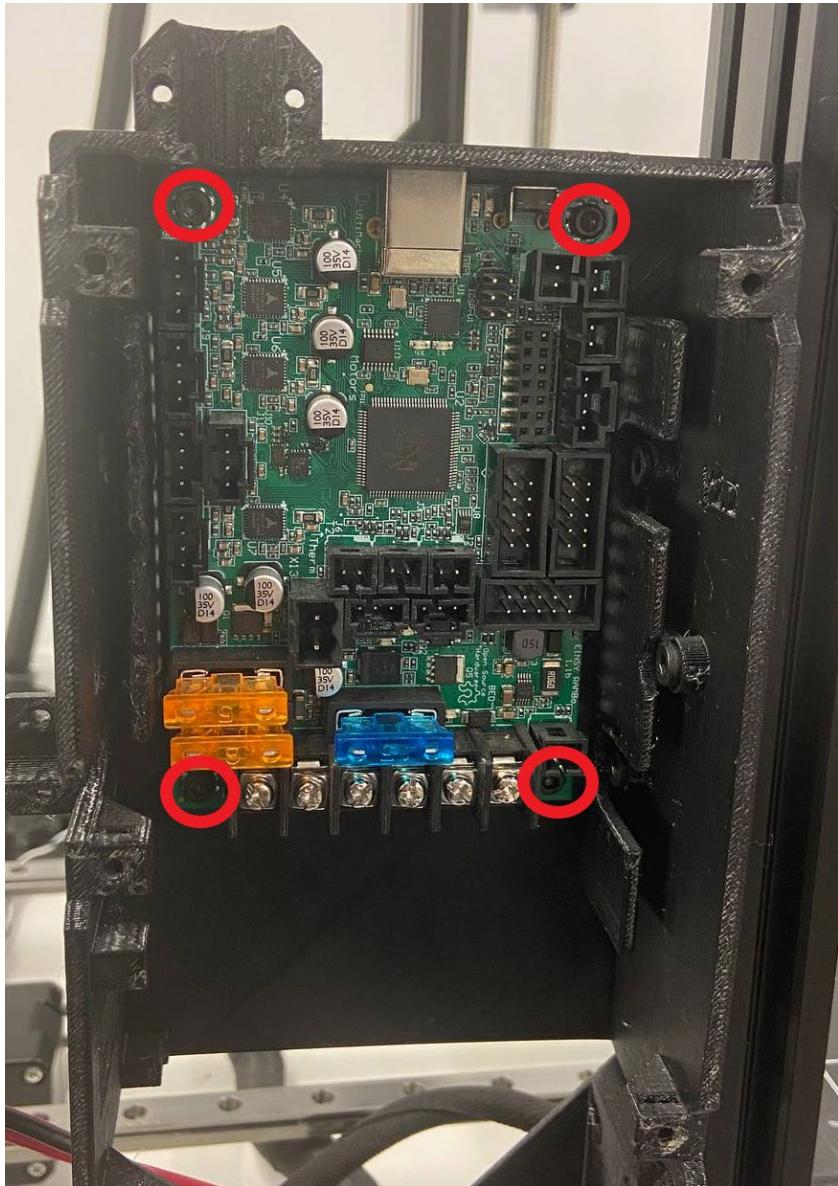
Place the **RAMBO BOX SPACER** piece on the Z Corner piece and on top of it, present the Einsy Rambo Body piece.

i The **RAMBO BOX SPACER** indicates the exact position of the Einsy Rambo Body box.

Tighten the **three M3x10 screws**.

i You can put the hex key through the **three back holes**.

6.11. Einsy Rambo assembly



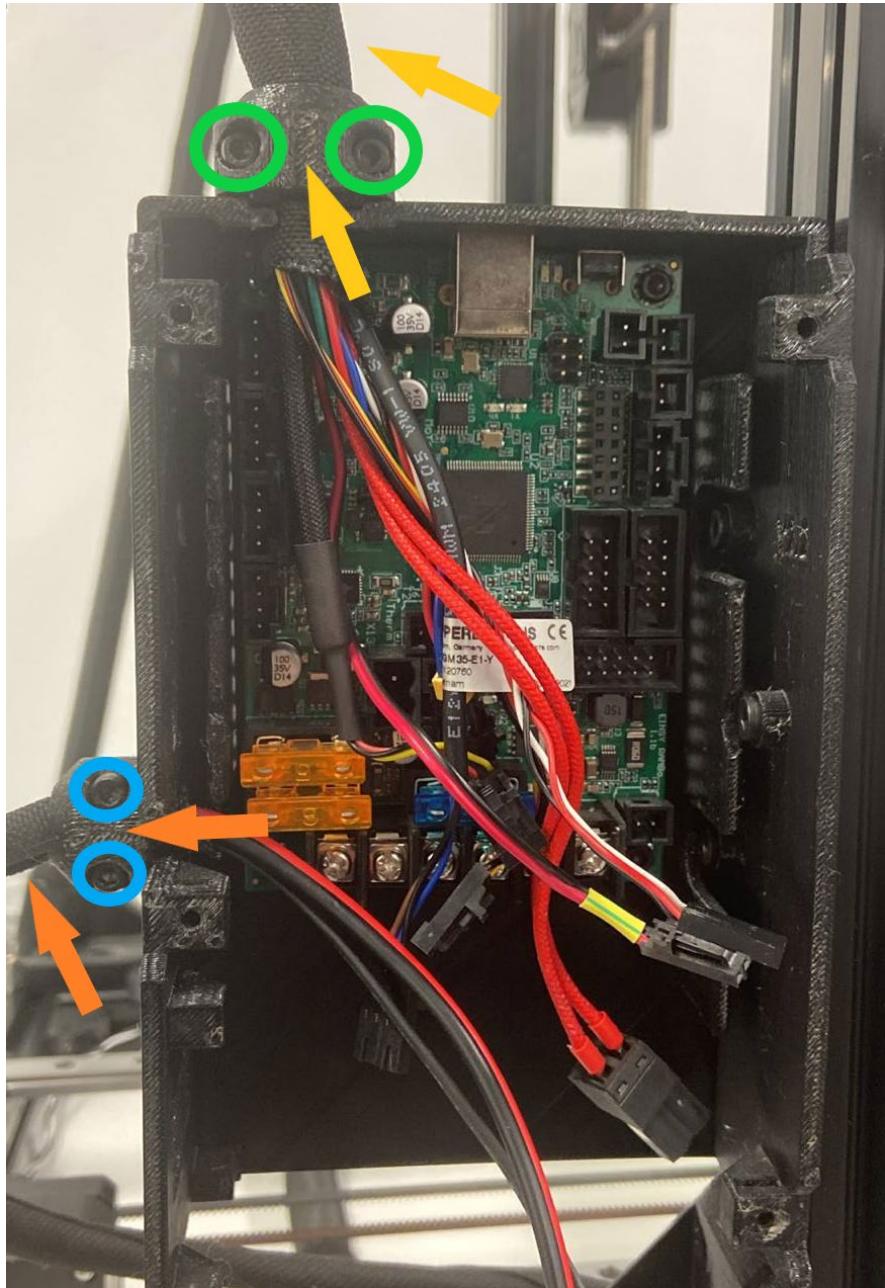
Take the Einsy Rambo Board and insert it into the Einsy Rambo Body Box that you have installed in the previous step.

Align the four holes in the board with the four holes in the box.

Insert and tighten **four M3x10 screws**.

⚠ Do not use excessive force.

6.12. Wiring preparation



Position the **wire hose** coming from the extruder on top of the electronics box.

Place the Extruder **cable cover piece** over the extruder hose in position.

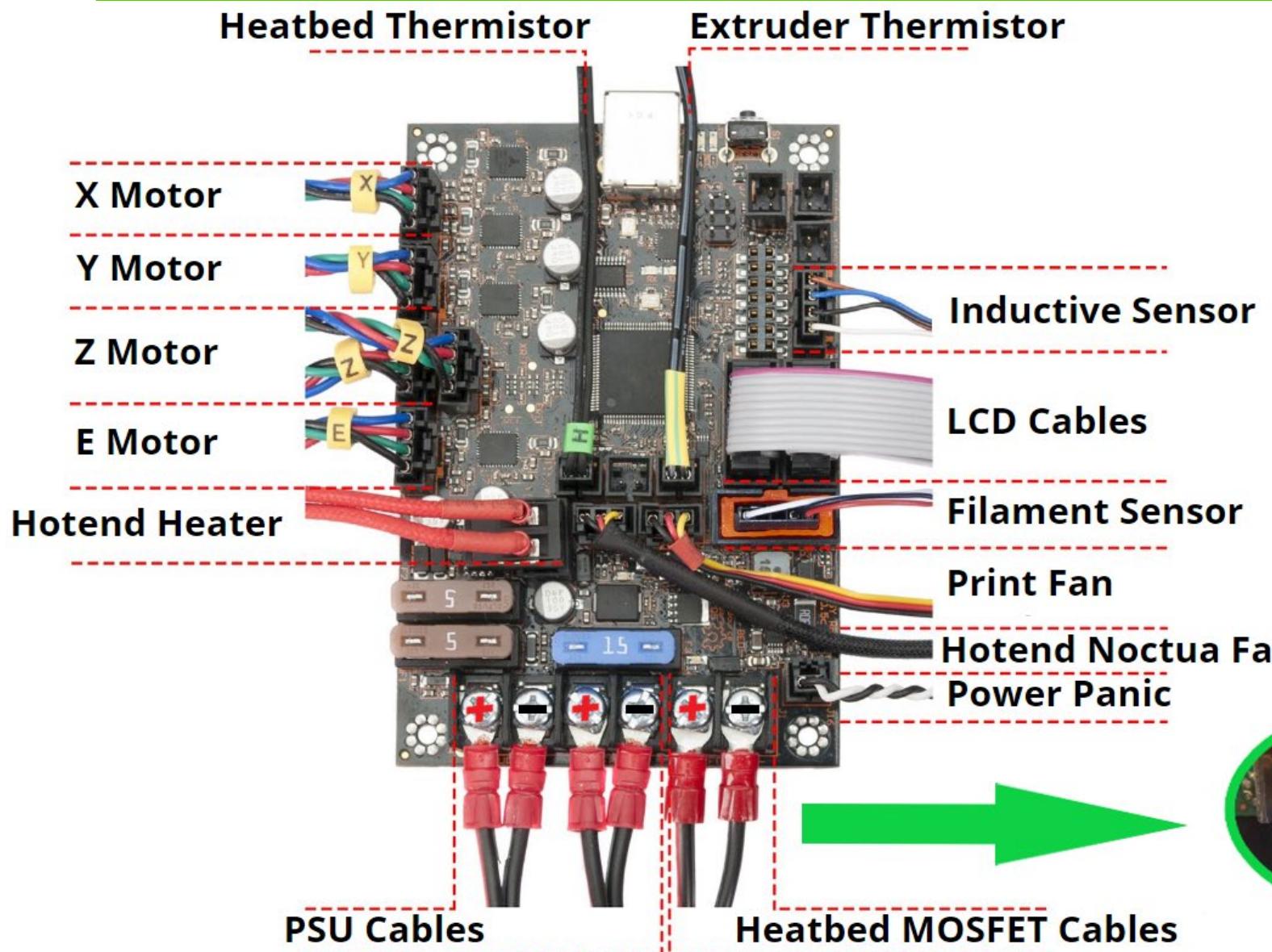
Insert and tighten the **two M3x10 screws**.

Position the **cable hose** coming from the heated bed.

Place the **Heatbed cable cover piece** over the heat bed hose in position.

Insert and tighten the **two M3x10 screws**.

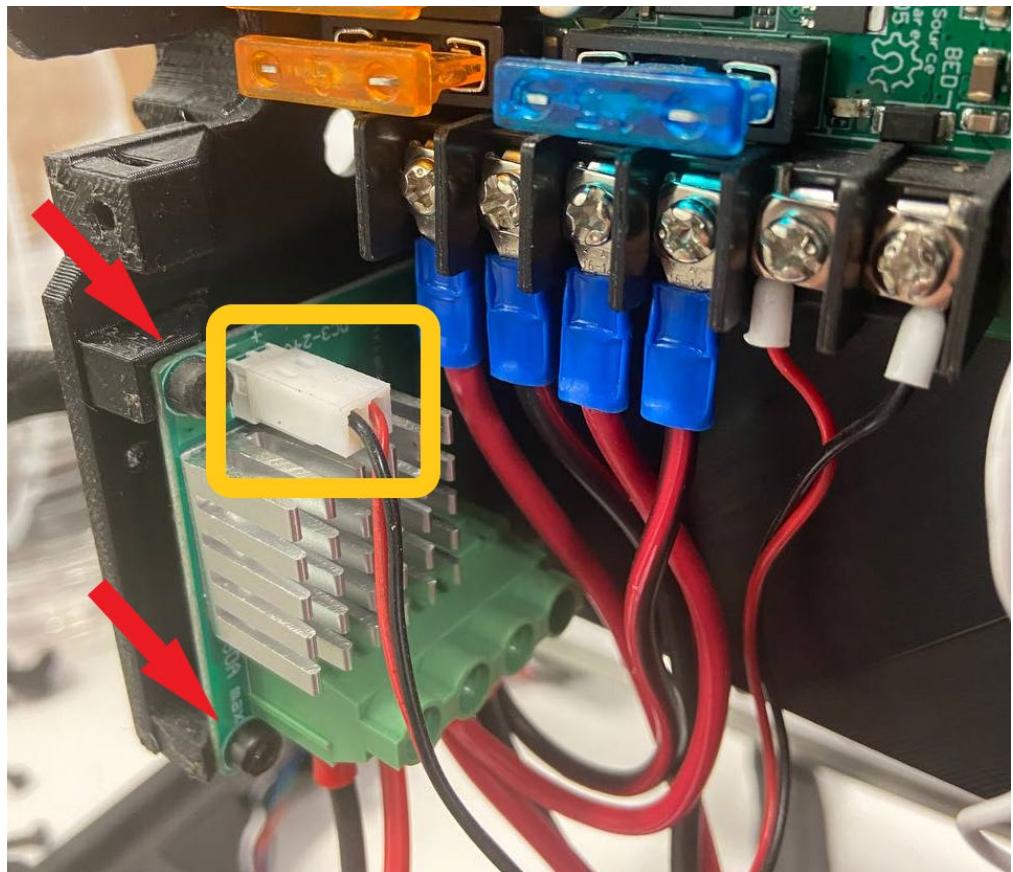
6.13. Einsky Rambo wiring



⚠️ The magnifying glass can help you understand where the hot bed MOSFET signal wire connects.



6.14. MOSFET assembly



Place the MOSFET in its location inside the Einsy Rambo Body box.

⚠ Note the orientation of the MOSFET.

i The printed part itself fits perfectly on the MOSFET board.

Using **two M3x10 screws** on the left side, attach the MOSFET to the printed part.

⚠ Remember you are screwing into plastic, please do not try to overtighten the screw.

⚠ Make sure the signal cable is connected.

i You now have a global position of the wiring for you to compare.

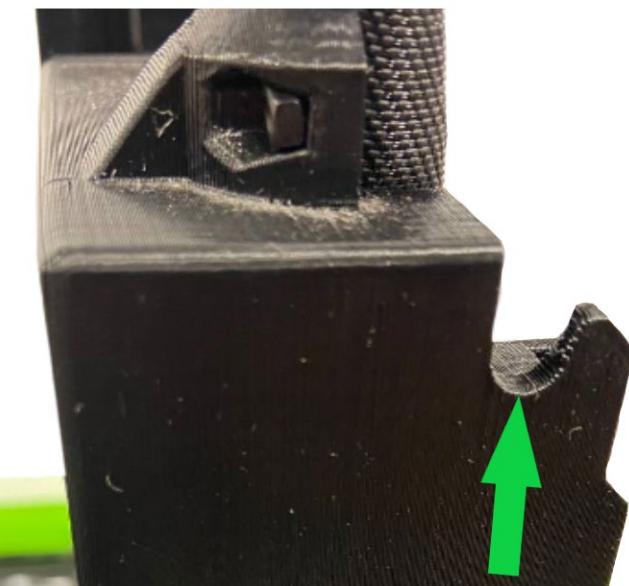
⚠ Make a final check of all wiring.

6.15. Motor X wiring preparation



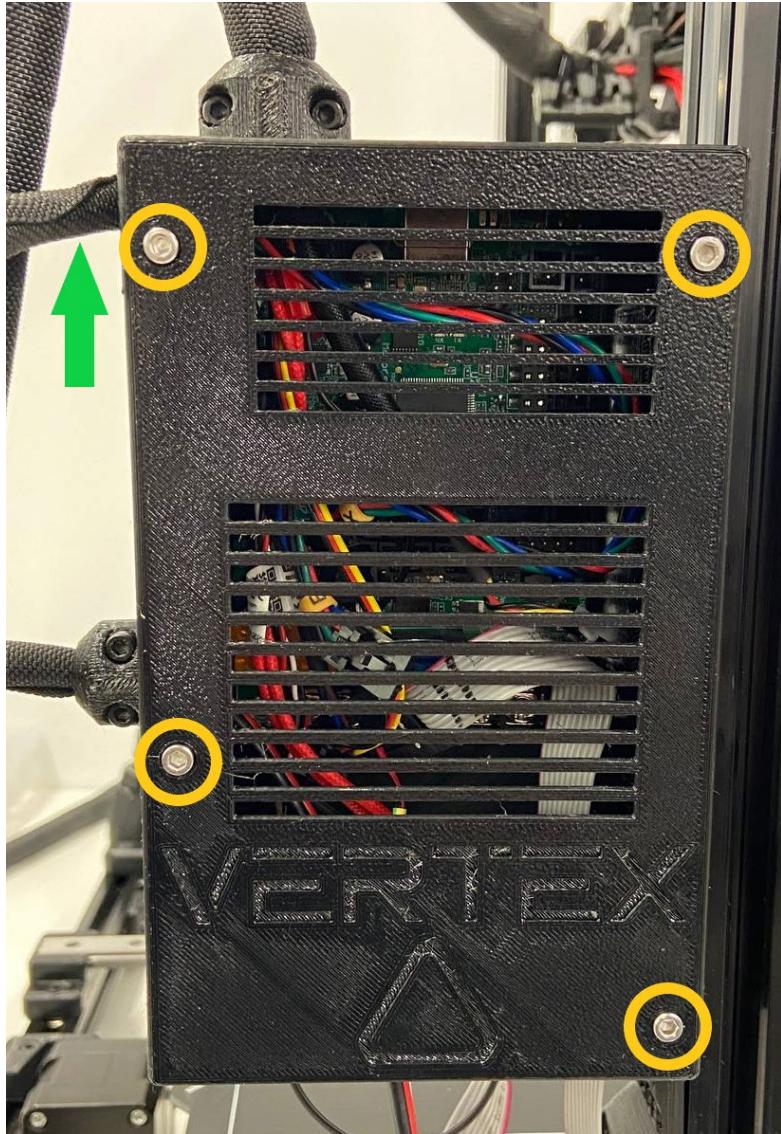
Cover the X motor cable with the remaining small textile sleeve and pull it out through the rear slot of the box as shown in the image.

i You may find it easier to sheath the X motor cable if you disconnect it.



Pull the motor cable X through **the hole** in the electronics box.

6.16. Einsy Rambo Cover assembly



⚠️ Notice where are the X motor cable.

Take the Einsy Rambo Cover part (printed part).

Before closing the electronics box. Plugin and turn on the printer on, check that the screen turns on and that the electronic setup is correct.

⚠️ Try to have the cables organized so as not to pinch any when screwing the cover.

Place the Einsy Rambo Cover piece over the electronics to cover it and keep the wires inside.

Insert and tighten the **four M3x10 screws**.

6.17. Printer FIRMWARE preparation

FIRMWARE

Firmware 3.10.2

SuperSlicer 2.3.57.7

No necesita de instalación

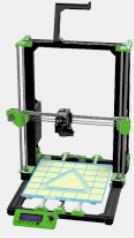
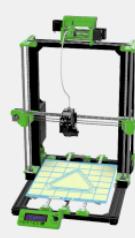
Encontrarás los perfiles de la VERTEX XL integrados de manera oficial en el SUPER SLICER.

Configuración>Ayudante de configuración>VERTEX

SuperSlicer Vertex Edition - Configuration Wizard

Vertex

XL Family

VERTEX XL

0.4 mm nozzle
Alternate nozzles:
 0.25 mm nozzle
 0.6 mm nozzle
 0.8 mm nozzle

VERTEX XL MMU2S

0.4 mm nozzle
Alternate nozzles:
 0.25 mm nozzle
 0.6 mm nozzle
 0.8 mm nozzle

Select all standard printers in this page < Back Next > Finish Cancel



Visit <https://vertex3d.org/en/72-firmware>

Download **Firmware**.

Download and open **Super Slicer Vertex Edition** for the platform you use.

Select the **VERTEX XL printer with 0.6mm nozzle**.

i If you change the nozzle in the future, you should change the diameter here.

Click finish.

i You can come back here later to set up your filaments in Settings > Configuration Wizard

6.18. Printer FIRMWARE burning

The screenshot shows two main sections. On the left, under 'FIRMWARE', there is a link to 'Firmware 3.10.2' with a green 'Descargar' button. On the right, under 'SuperSlicer 2.3.57.7', there are download links for Windows, Mac, and Linux, with a note that it 'No necesita de instalación'. Below these, there is a note about finding profiles and configuration steps.

FIRMWARE

Firmware 3.10.2

Descargar

Cambios en 3.10.2

Lee más

SuperSlicer 2.3.57.7

No necesita de instalación

Encontrarás los perfiles de la VERTEX XL integrados de manera oficial en el SUPER SLICER.

Configuración>Ayudante de configuración>VERTEX

Firmware flasher

Firmware image: Browse

Serial port: Rescan

Progress:

Status: Ready

Advanced: Output log

Flash!

Open the .zip file you downloaded from the **Firmware** and unzip the file ending in .hex to the desired path.

Connect the printer to the USB plug of the electronics box as shown in the image and in turn to the computer with the blue USB provided in the KIT.

Turn on the printer.

In the menu above the **Super Slicer Vertex Edition**, go to **Settings > Flash printer firmware**.

The following window will open.

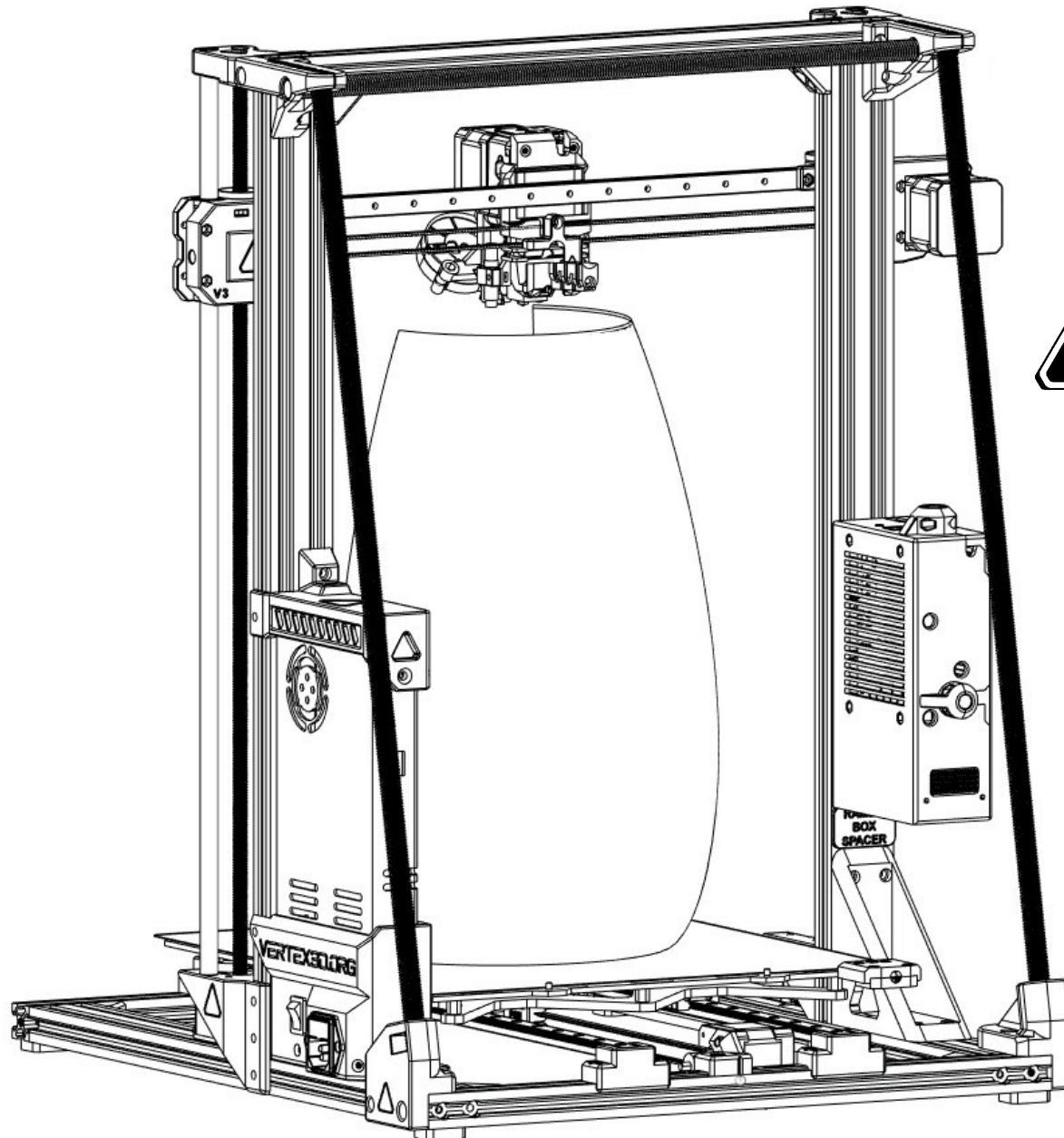
Click **Browse** and select the unzip .hex file.

In the **Serial port** section: The printer should appear along with the text COM.

Click on **Flash** and you will see the Progress bar start to fill up.

⚠ Do not turn off your computer or printer while you are doing this process.

⚠ Do not disconnect the USB until finished. The % of progress will also appear on the printer screen.



On behalf of the entire VERTEX3D team, we would like to personally thank you for placing your trust and support in us. We hope you enjoy your brand new VERTEX XL printer.

If you have any questions, consult the technical support team via live chat or email

info@vertex3d.org

Instagram:

instagram.com/vertex3dorg/

Facebook forum:

facebook.com/groups/vertex3d