

ASSEMBLY INSTRUCTIONS

Version 1.2



Introduction

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- **Sources :**

<http://reprap.org/wiki/RepRap>
<http://www.repetier.com/>

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- **Update:**

Last update : 25/07/2014

- **Links:**

Reprap community: <http://reprap.org/wiki/RepRap>

Repetier-Host: <http://www.repetier.com/>

3D models database: <http://www.thingiverse.com/>



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μDelta introduction

μDelta is developed by eMotion Tech. This new 3D printer is easy to assemble and to operate without loss of performances.

Data sheet:

DATAS

- Printing surface Ø110 x 190mm
- Layer height [0,1 - 0,35]
- Electronic type Teensylu + 4 Stepsticks (integrated firmware)
- Motors NEMA 17
- Belt Type GT2
- Extrusion Head Hexagon 0.4
- Dimensions : Height 440mm Width 250mm Depth 250mm
- Nominal printing speed 70mm/s
- Max speed 200mm/s
- Nominal speed 130mm/s
- Average precision 100 microns
- Average precision (Z) 50 microns
- Operating system Windows™ XP, Windows™ Vista, Windows™ 7+, Ubuntu 12+
- Consumable PLA 1.75mm
- Provided with Repetier preset for μDelta
- Connectivity USB
- Power supply provided yes, 12V 120W

STRUCTURE

- Laser cut Acrylic 5mm
- Extruder core printed in ABS with 0.2mm layer height
- Smooth rod 8mm
- Manufactured Plate plywood 12mm

ERGONOMY

Easy to mount: A 3D printer kit with an intuitive assembly

- Simple electronic, no soldering
- Easy wiring and assembly
- Belt adjustment with ergonomic belt tensioners

Easy to calibrate: A simplified software

- Fully software calibration
- Pre-configured open-source software (no firmware upload required, Repetier Host and Slic3r pre-configured)

Easy to maintain

- Quick height adjustment with the software

OPTIMISATION AND UPGRADE

You can improve the μDelta by adding the following option (soon available on eMotion Tech website):

- Spool holder with fan
- LCD screen controller to print without computer
- Lighting with circular LED
- Heated bed

Safety instructions

General safety instructions

ALWAYS HAVE ADULT SUPERVISION WHEN USING THE PRINTER.

The nozzle can reach 270°C, **TO AVOID BURNING, DO NOT TOUCH THE NOZZLE WHILE THE PRINTER IS WORKING.**

KEEP THE PRINTER AWAY FROM CHILDREN AND ANIMALS.

OPERATE IN A VENTILATED ROOM. Plastic fumes effects are not known. In case of use in a closed room we recommend the use of an extractor fan.

The addition of protections is your responsibility. Safety can be improved by:

- An emergency stop button
- Housing protection
- Smoke detector

CE marking

μDelta is a 3D printer kit. It includes all the parts you need for assembling but does not include additional protections.

Electrical safety.

The power supply provided is labelled CE. The Power supply is protected against short-circuit and do not need any modifications. The μDelta operate at voltage of 12V and is not concerned by the low voltage directive.

Further information

Information above are not exhaustive.

We used sources of information we consider as reliable. However, we cannot guarantee that all these information are true and complete.

We assume no liability for loses, injuries or damages due to assembly, transporting, storage, use, assembly, transporting or removal of the product.

ASSEMBLY

Bill of materials

A. Printed parts



1x Core



12x rod clamp



1x filament guide

B. Acrylic parts

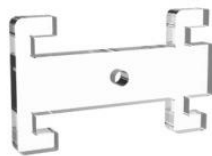
Acrylic parts can be covered with protection and it may remain pieces of plastic. Remove it before use

We provide additional parts.

1. Tensioner



6x eM 1



6x eM 2

2. Slider



6x eM 3



6x eM 4



6x eM 5

3. Motor holder



3x eM 7



6x eM 6

4. Extruder



2x eM 8



1x eM 9



1x eM 10



2x eM 11



1x eM 12



1x eM 13

C. Smooth rods and connecting rods



6x Ø8x400mm smooth rod



6x Connecting rod

D. Mechanical parts



9x Linear bearing



1x Spring



3x 624 ball bearing
1x 604 ball bearing



1x drive wheel



3x GT2 Belt



3x GT2 Pulley

A. Screws, nuts and washers



6x M3x10mm screw
14x M3x20mm screw
20x M3x25mm screw
15x M3x30mm screw
11x M3x50mm screw
1x M4x50mm screw
4x M4x25mm screw
6x M2.5x16mm screw
3x Wood screw



60x M3 nut
4x M3 wing nut
8x M4 nut
6x M2.5 nut



76x Ø3mm washer
8x Ø4mm small washer
4x Ø4mm big washer



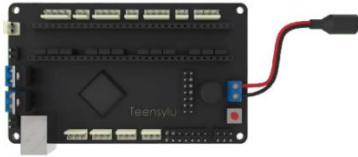
1x M4 Nylstop nut



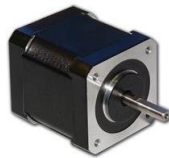
8x M3 grub screw

We provide more Screws nuts and washer than necessary.

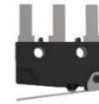
B. Electronics



1x Teensylu



4x Nema 17 motor



3x endstop



2x Fan 3x3

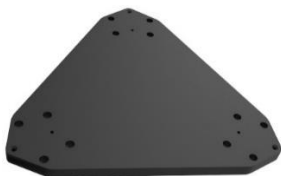


4x stepstick

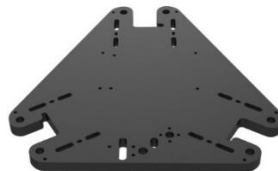


1x Power supply

C. Additional parts



1x inferior frame



1x superior frame



1x Print bed



1x Ø4xM6mm pneufit



1x Ø4x 1/8 "pneufit



1x braided sleeve



1x PTFE tube



30x Zip tie



3x pad



1x adhesive tape

D. Hexagon kit



1x Hexagon hot end



1x Thermistor



1x cartridge heater



1x Hex key 3



1x Wrench 4.5

A. Options

Parts of the following section are not included in the basic μDelta kit. You can find them on eMotion Tech website.



1x Spool holder frame



3x Chock



1x 6x6 fan



8x Spool holder clamp



4x Ø8mm rod



4x 608 ball bearing



16x M3x20 or M3x25 screw



16x M3 nut



1x LED

Tools

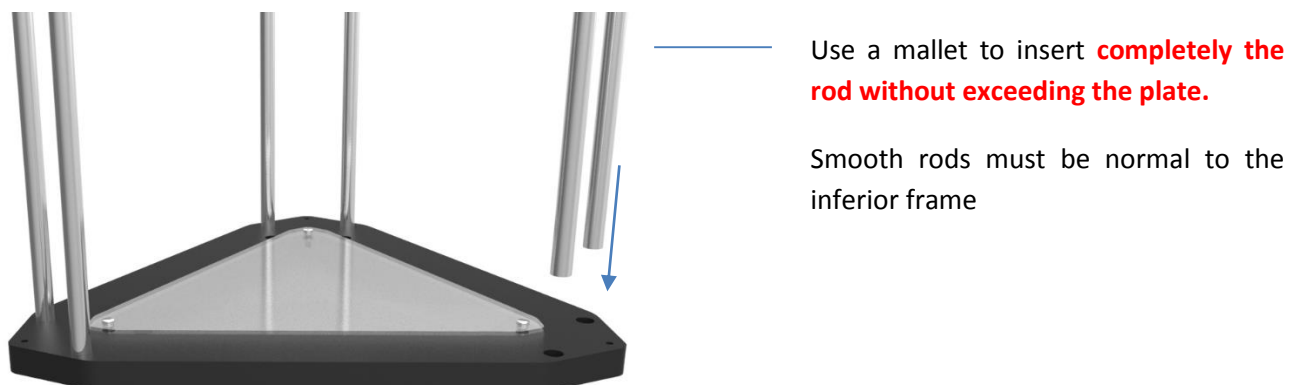
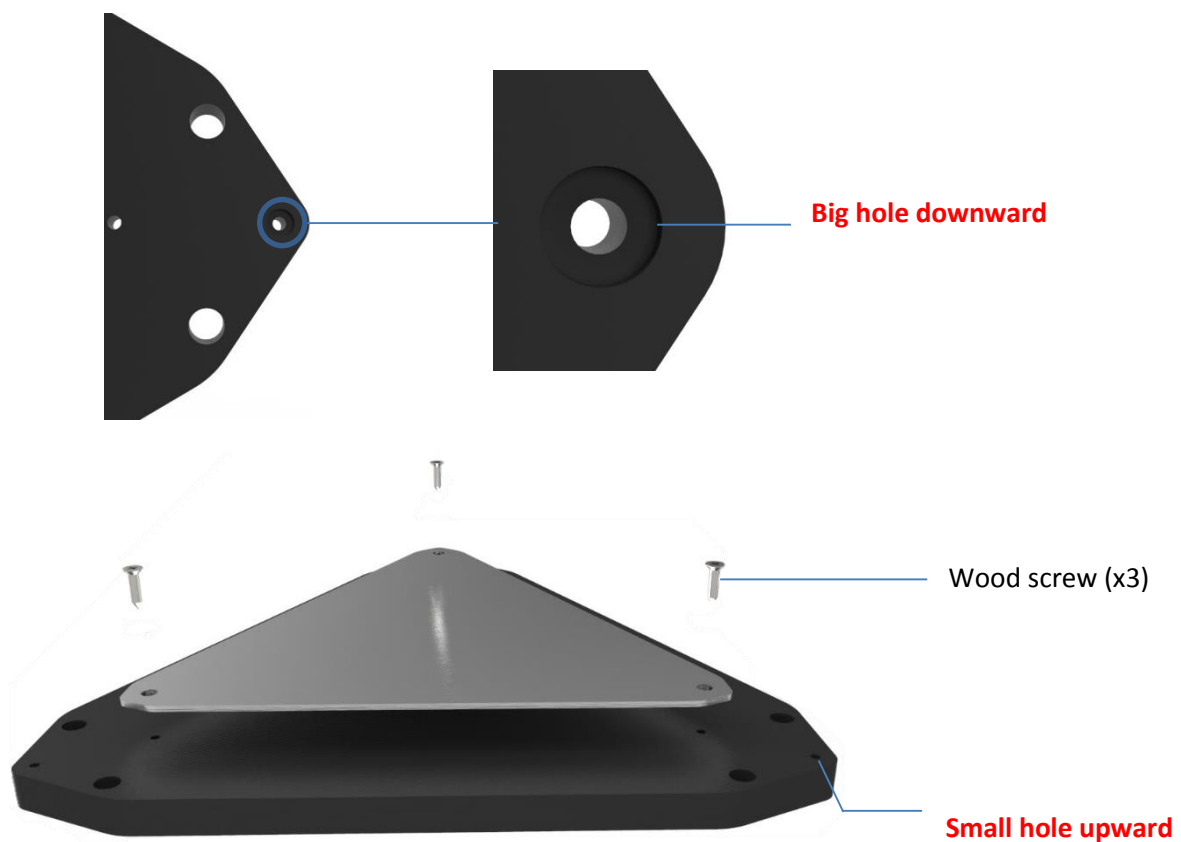
- Mallet
- Slot screw driver
- Philips screw driver
- ceramic screwdriver
- Wrench 5,5 and 7
- Wrench 4,5(provided)
- Hex key (provided)
- Long nose pliers
- Cutting pliers
- utility knife
- Meter

Mechanical assembly

A. Bottom assembly

1. Inferior frame

- 1x Inferior frame
- 6x Ø8x400mm smooth rod
- 1x Print bed
- 3x Wood screw



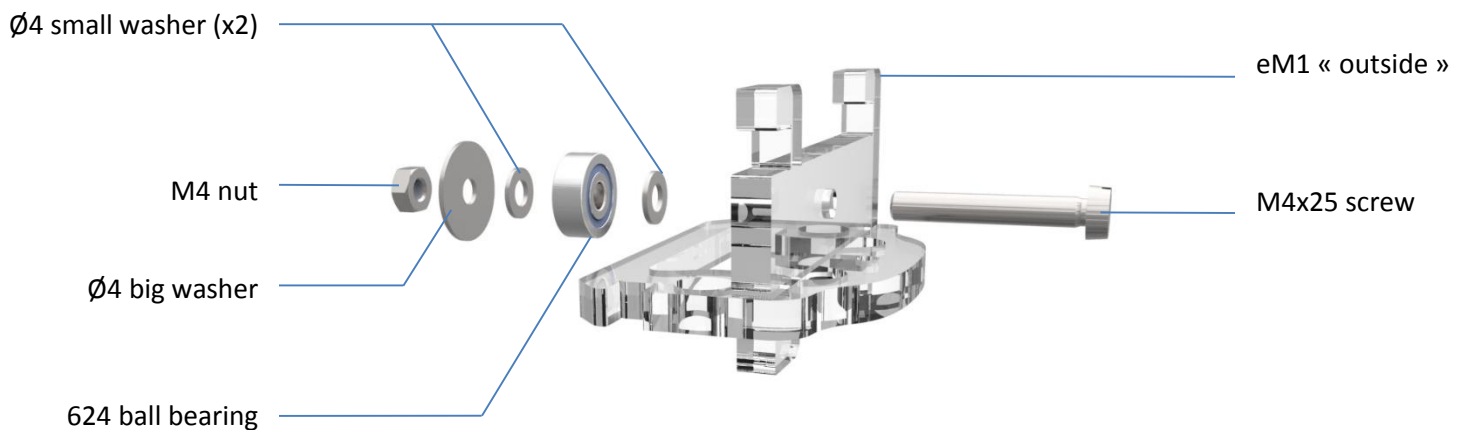
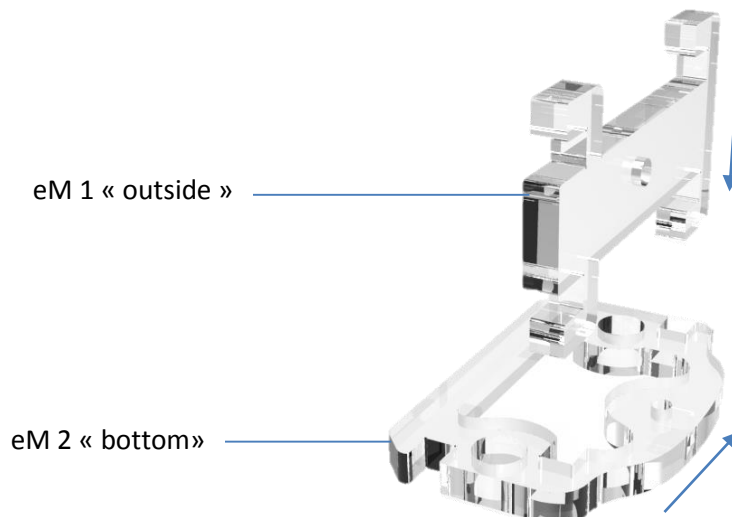
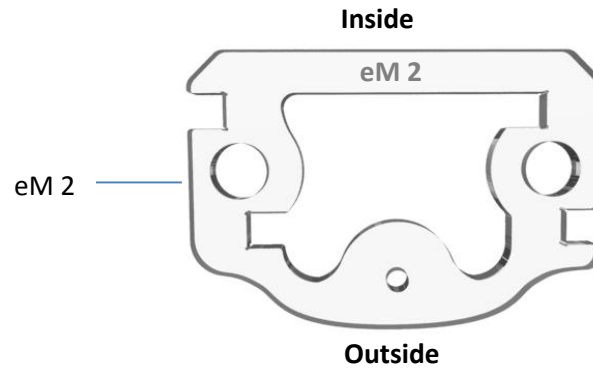
2. Tensioner

- 6x eM1
- 6x eM2
- 3x 624 ball bearing
- 3x M3x50 screw
- 3x M4x25 screw
- 3x Ø3mm washer
- 3x Ø4mm big washer
- 6x Ø4mm small washer
- 3x M3 nut
- 6x M4 nut

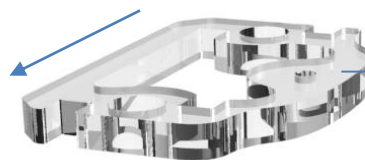
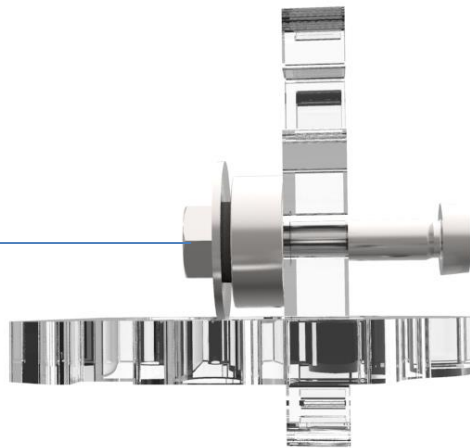


Repeat this operation for each corners

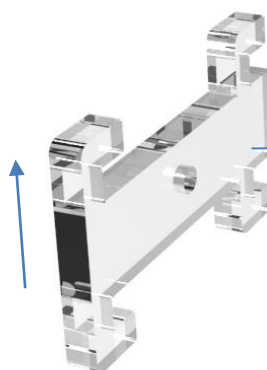
Acrylic parts can be covered with protection and it may remain pieces of plastic. Remove it before use



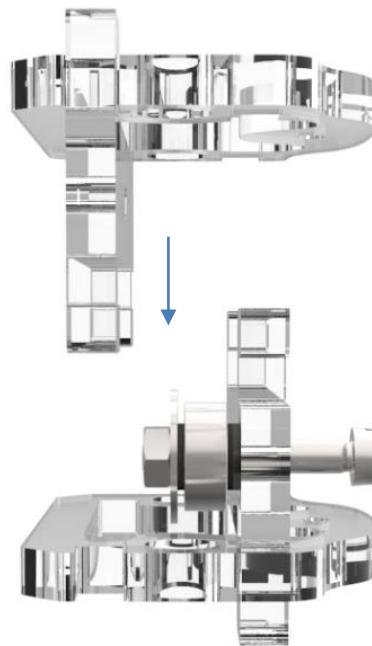
Nut **at the end of the screw**



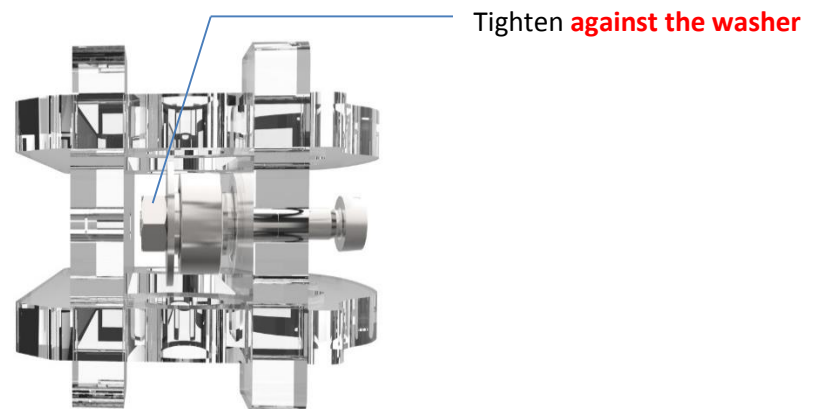
eM 2 « top »



eM 1 « inside »



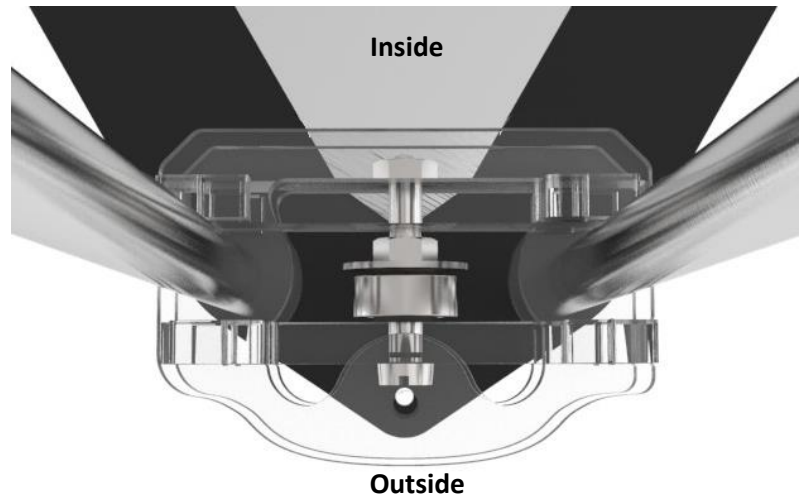
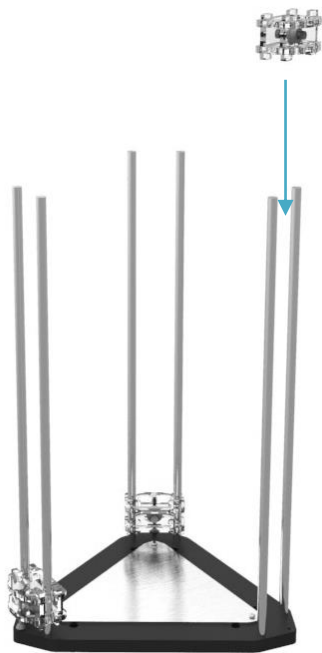
Tighten nuts moderately to avoid breaking Acrylic parts



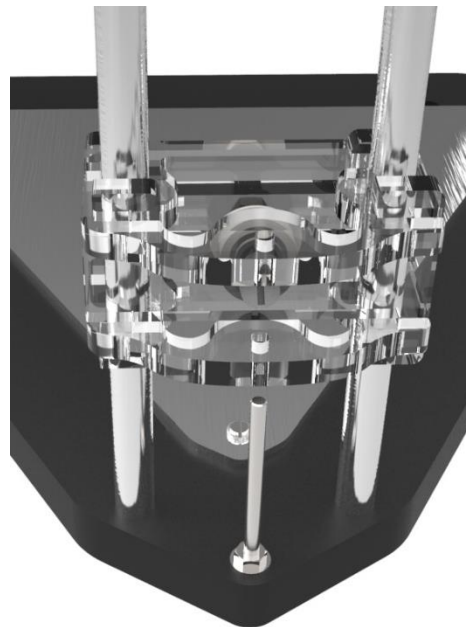
M4 nut

Tighten **moderately**

You can add a drop of glue to maintain the nut on position



Do not put the screw
through the slider

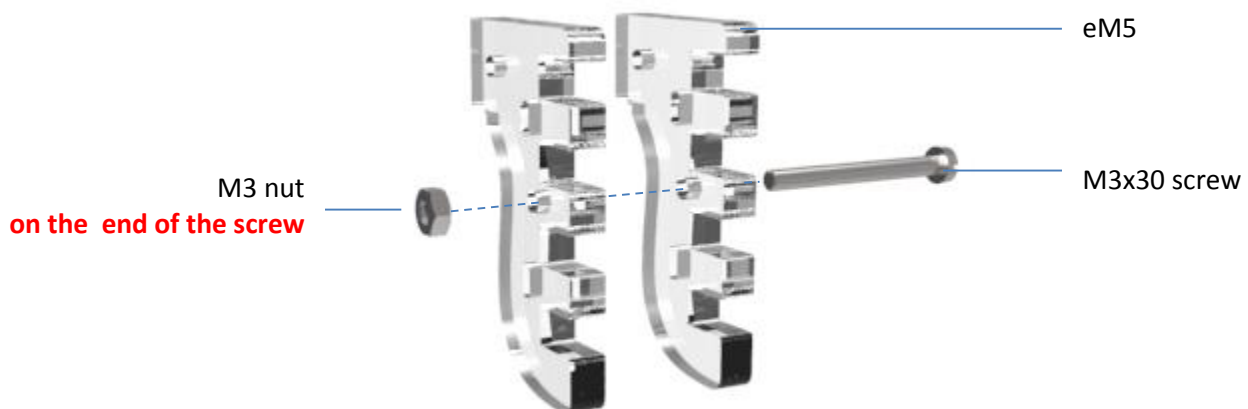
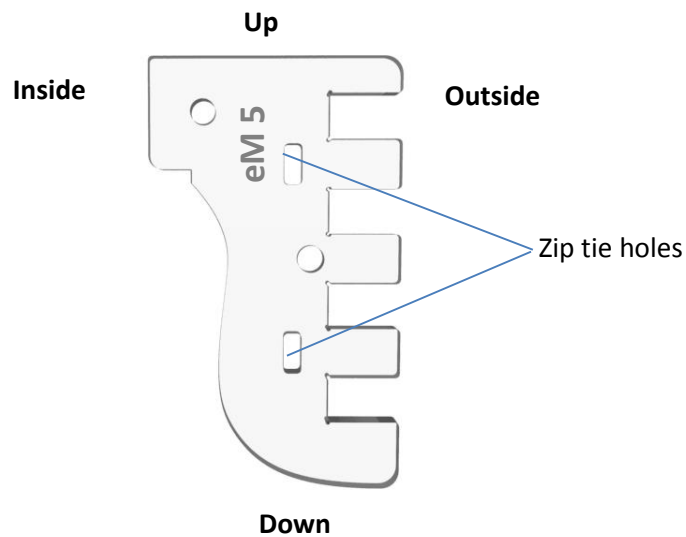


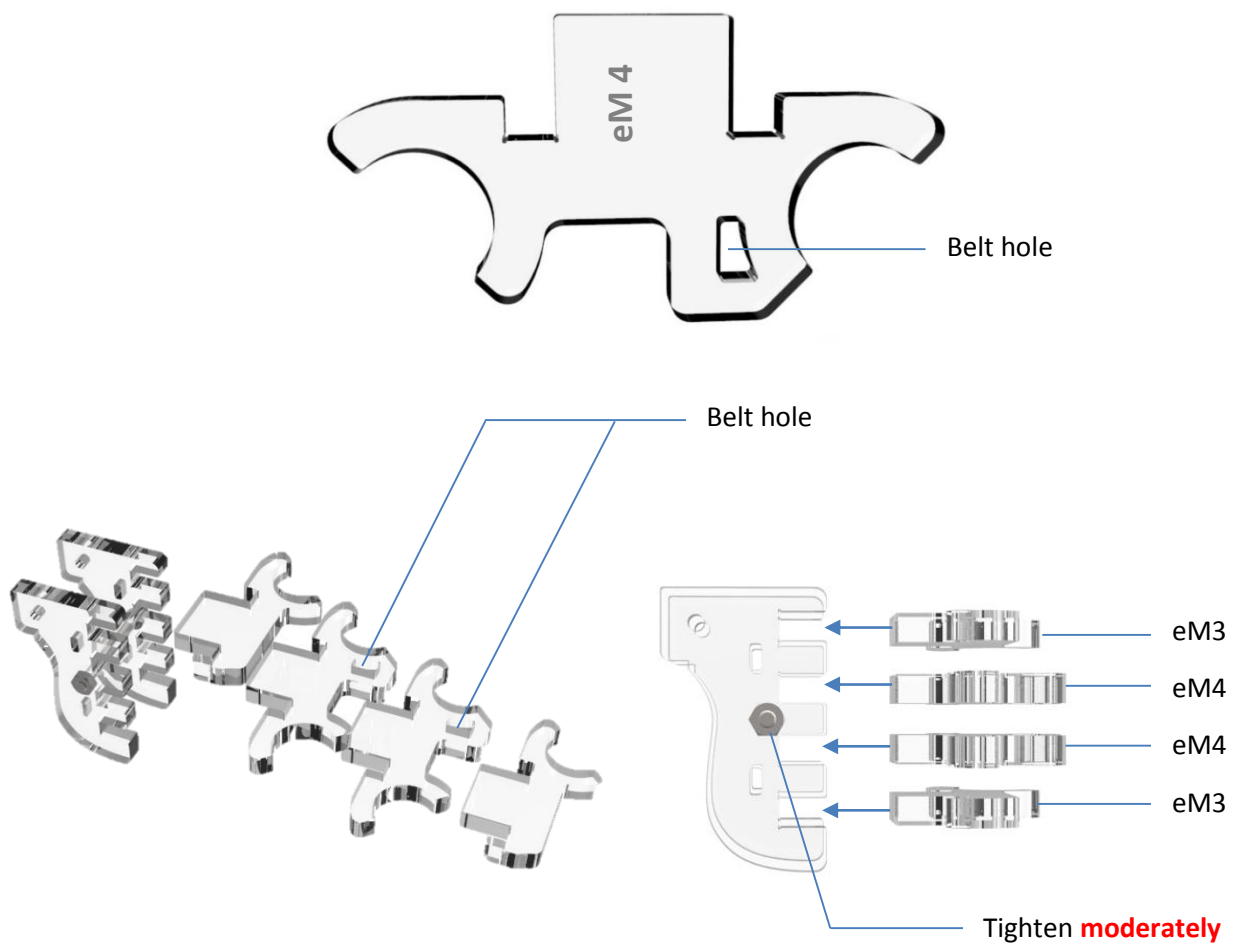
Repeat the operation for the others tensioners.

3. Sliders

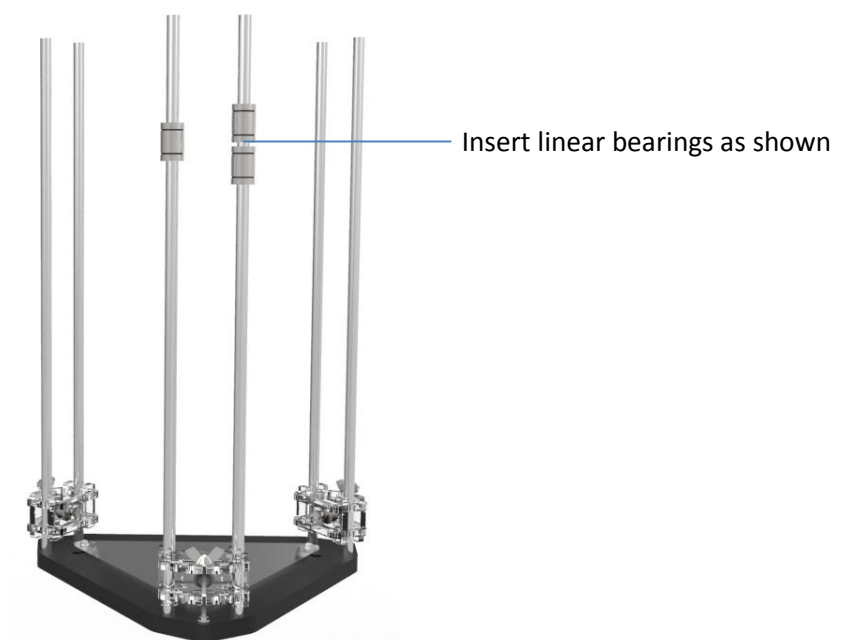
- 6x eM3
- 6x eM4
- 6x eM5
- 12x Zip tie
- 9x Linear bearing
- 3x M3x30 screw
- 3x M3 nut

Assemble all sliders in the same way.



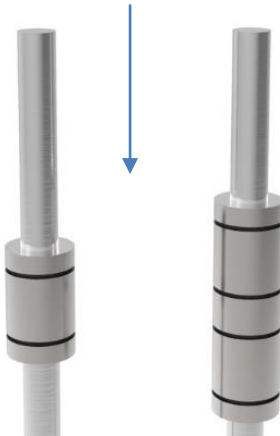


After tightening the screw, eM3 parts may move, it is not a problem.



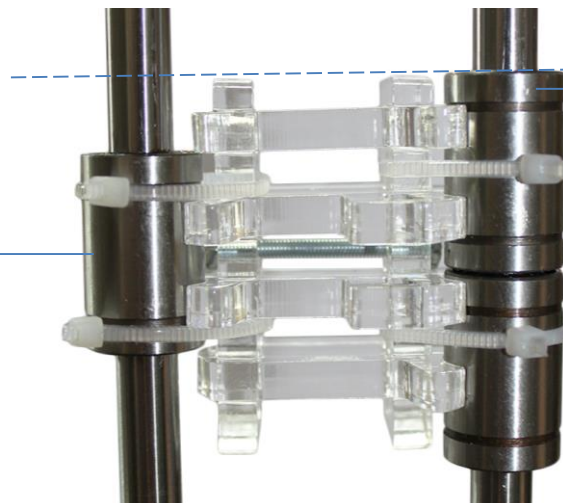


The four fixations must be on the same side than the two linear bearings



Insert a zip tie in each hole. Tighten the zip ties to fasten the slider.

This bearing must be centered.



This bearing must **not exceed** the slider

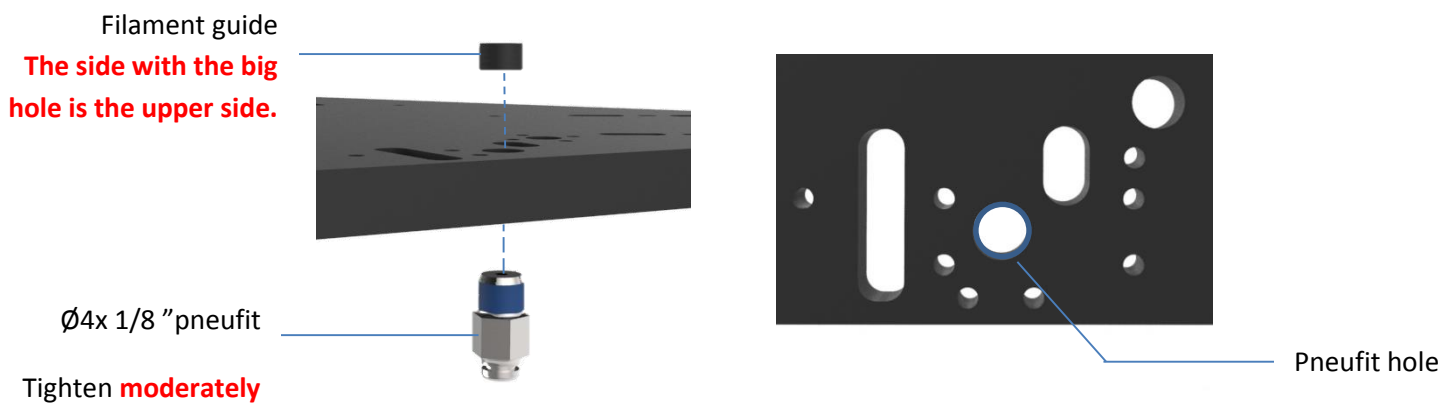
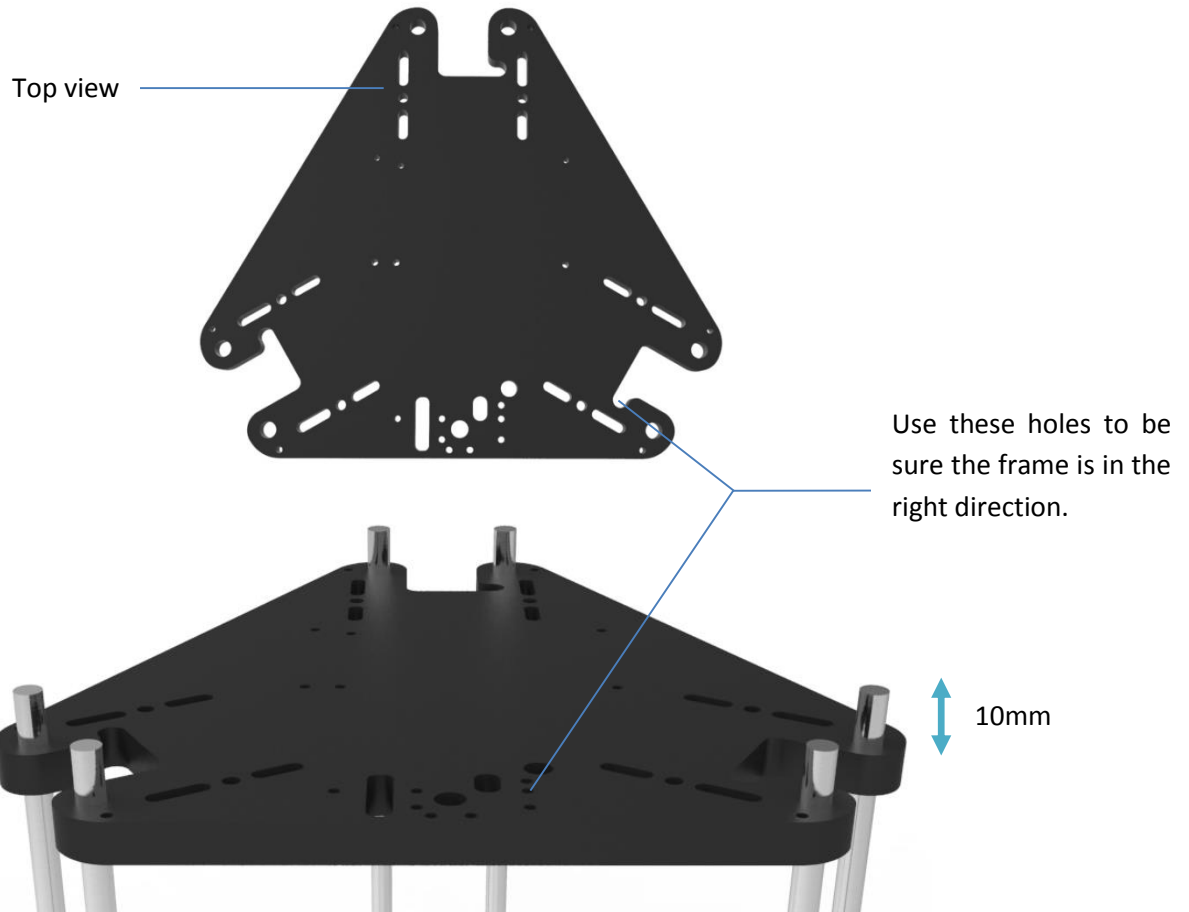
B. Top assembly

1. Motor holder assembly

- 3x eM7
- 6x eM6
- 1x Superior Frame
- 3x Nema 17 motor
- 3x GT2 pulley
- 3x Endstop
- 1x Ø4x 1/8 "pneufit
- 12x Rod clamp
- 1x Filament guide
- 6x M2.5x16 screw
- 6x M3 grub screw
- 6x M3x10 screw
- 6x M3x20 screw
- 12x M3x25 screw
- 6x M3x30 screw
- 6x M2.5 nut
- 18x M3 nut
- 30x Ø3 washer

Make sure to insert the superior frame correctly.

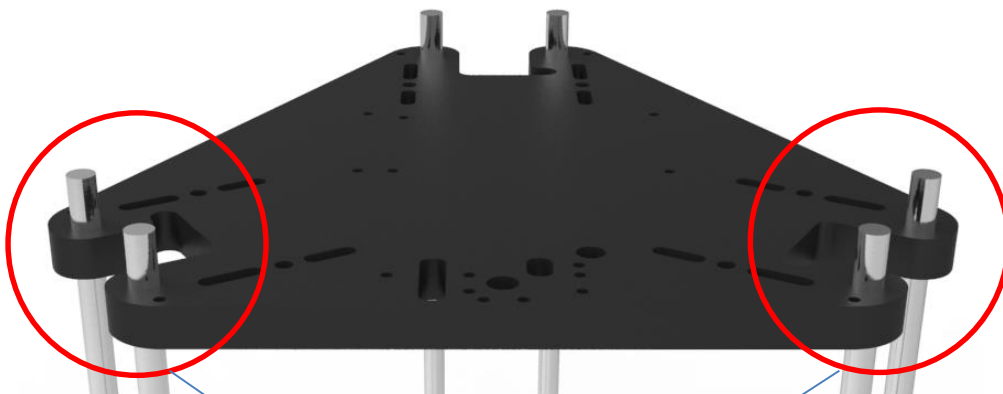
The frame must easily slide. Do not use the mallet to insert it.



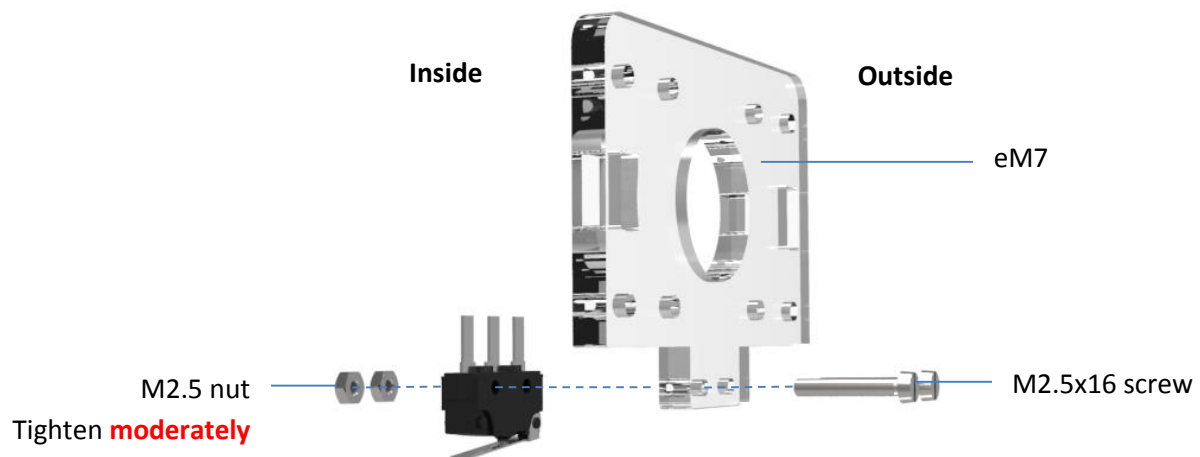
Be careful, the following step is very important!

You have to compare the wire length of the three endstops :

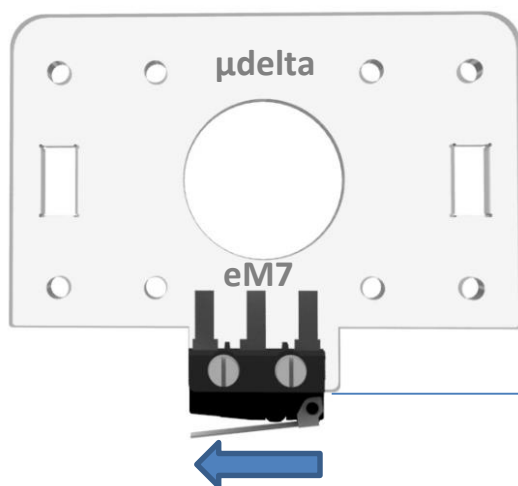
- If the **3 wires** have the **same length**, this information may not apply to you. Go to the next page.
- If you have **2 wires longer**, you have to use this endstop for the motor holder shown below.



Use the long wired endstops for these motors holders

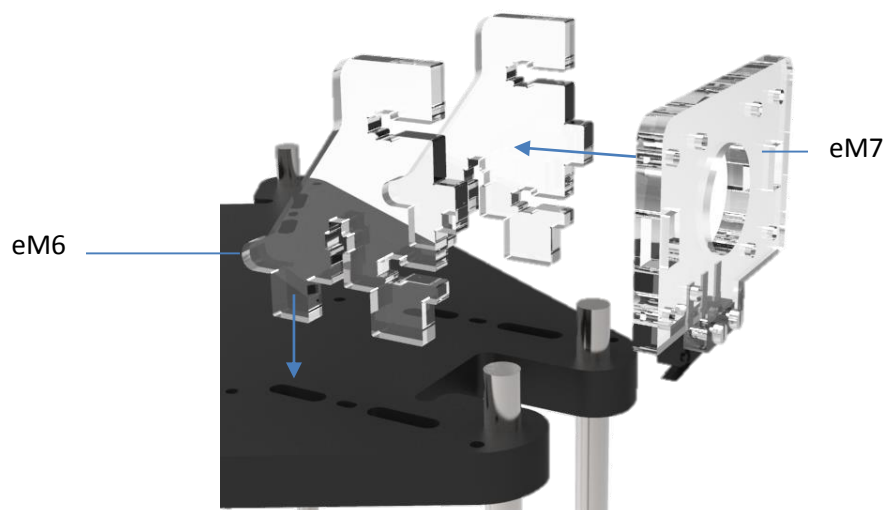


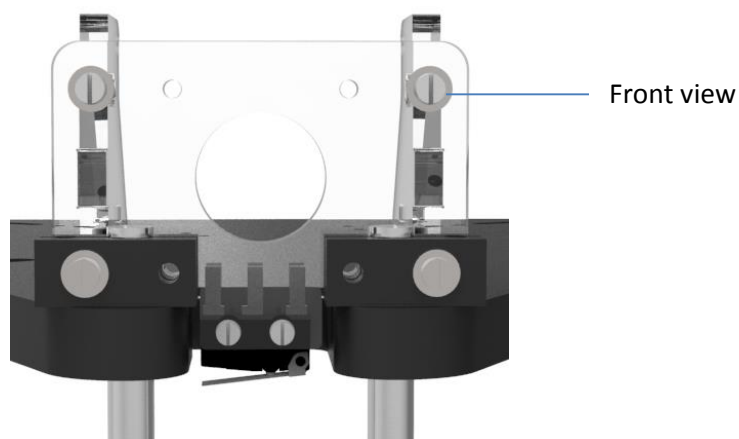
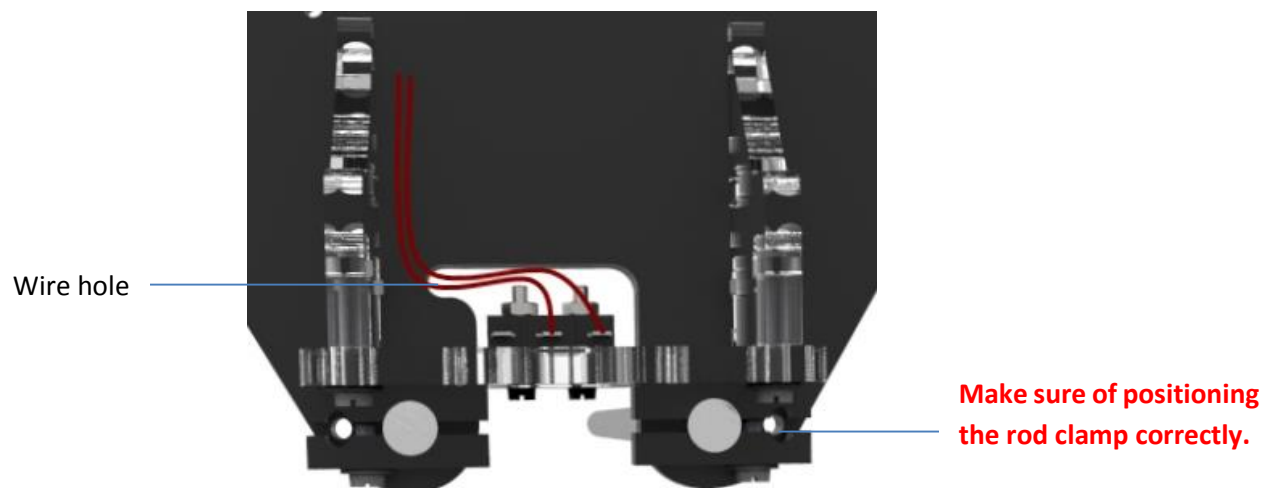
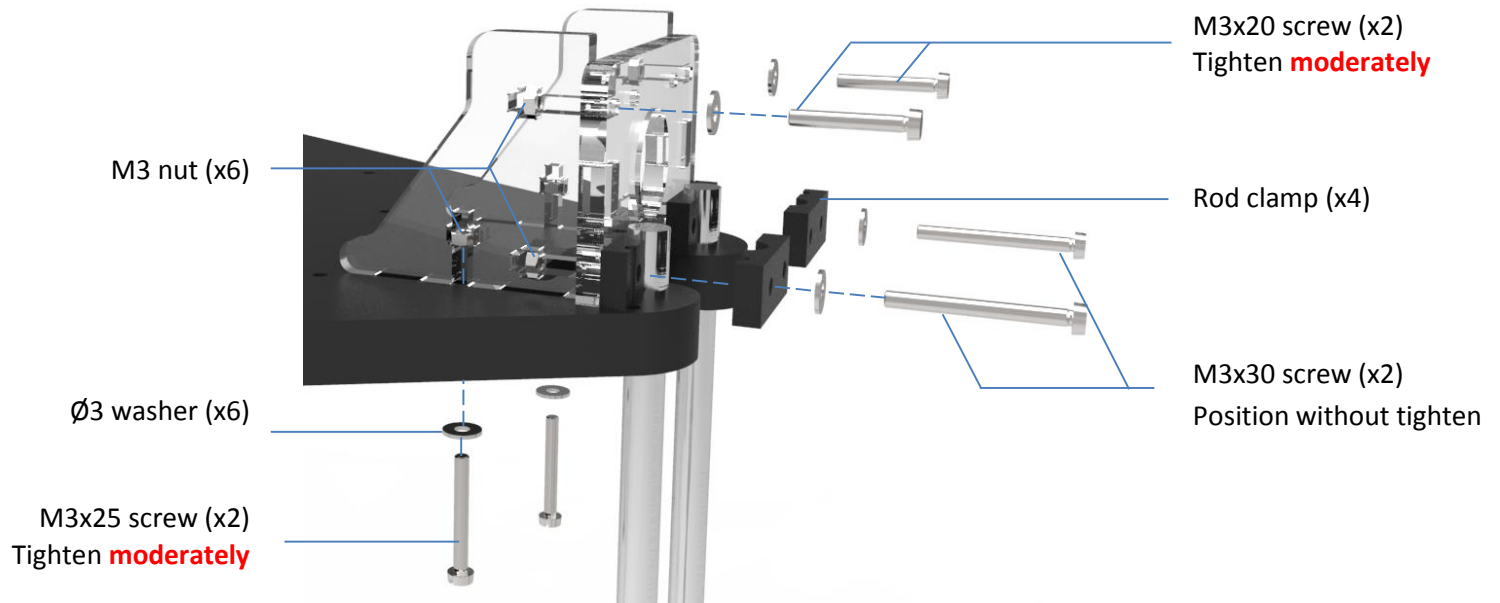
To improve the visibility we do not represent endstops wires



You must assemble the endstop as shown in the left figure

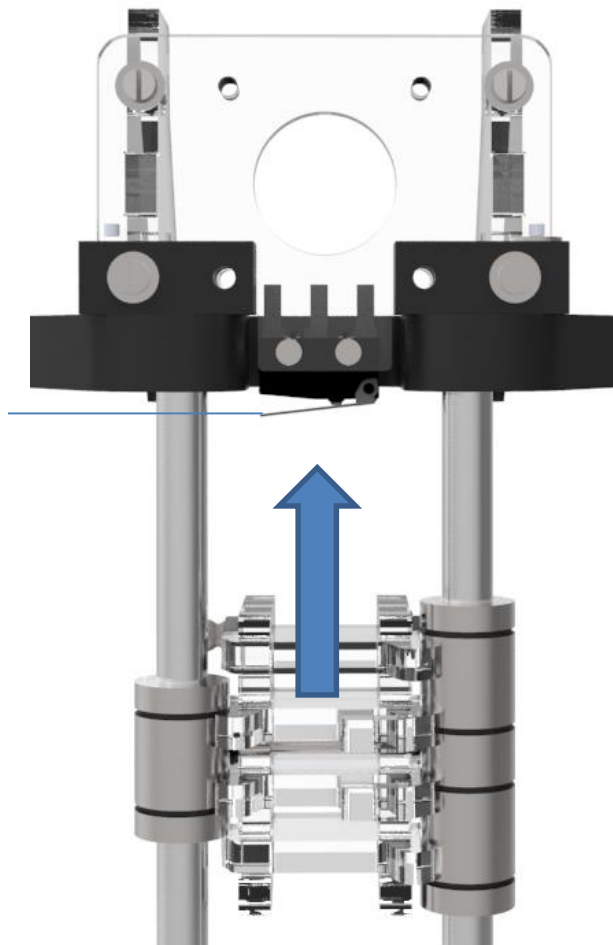
Push the endstop on the left when you tighten it





Check that the slider switches the endstop:

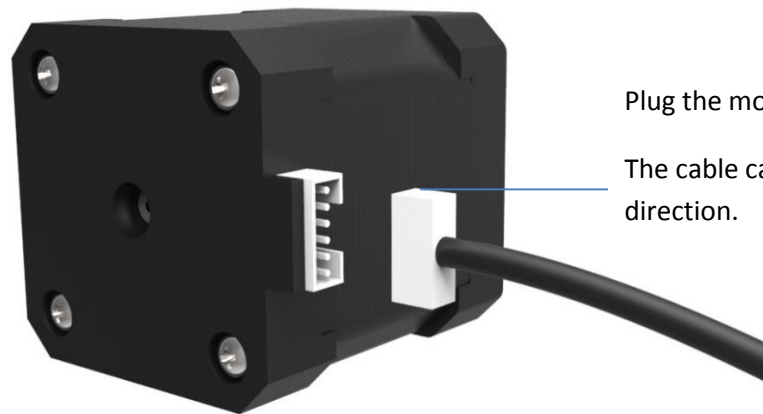
You must hear a “CLICK”



If the slider doesn't switch the endstop there are two solutions:

You have to push the endstop on the left when you tighten it.

You have to disassemble and assemble the endstop properly

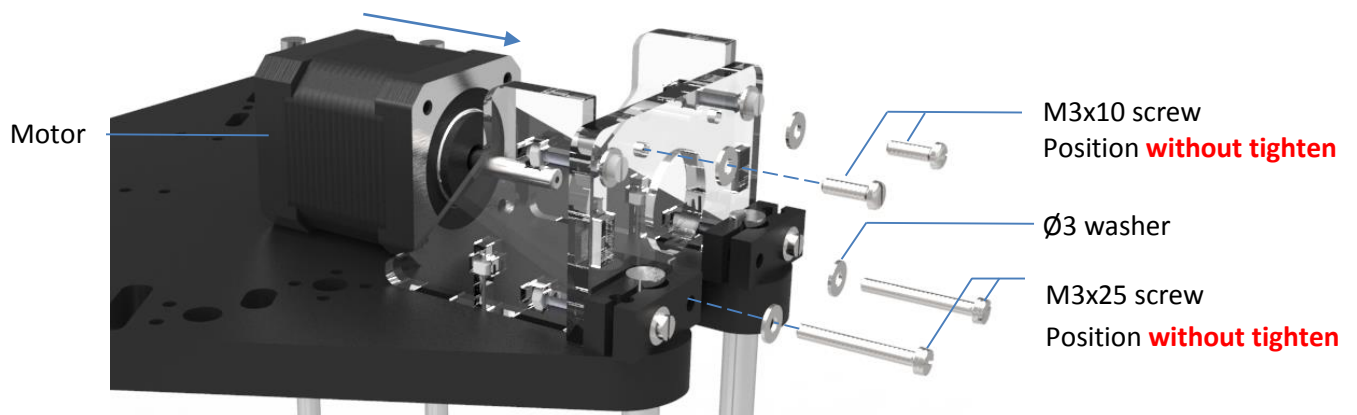
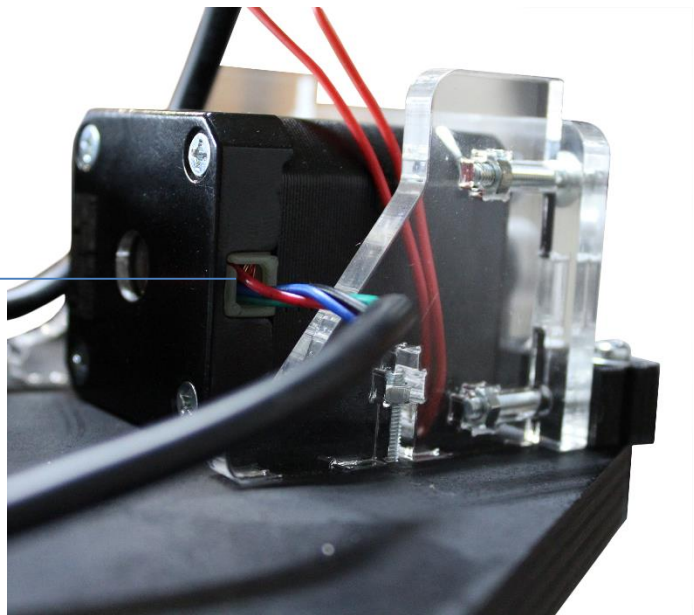


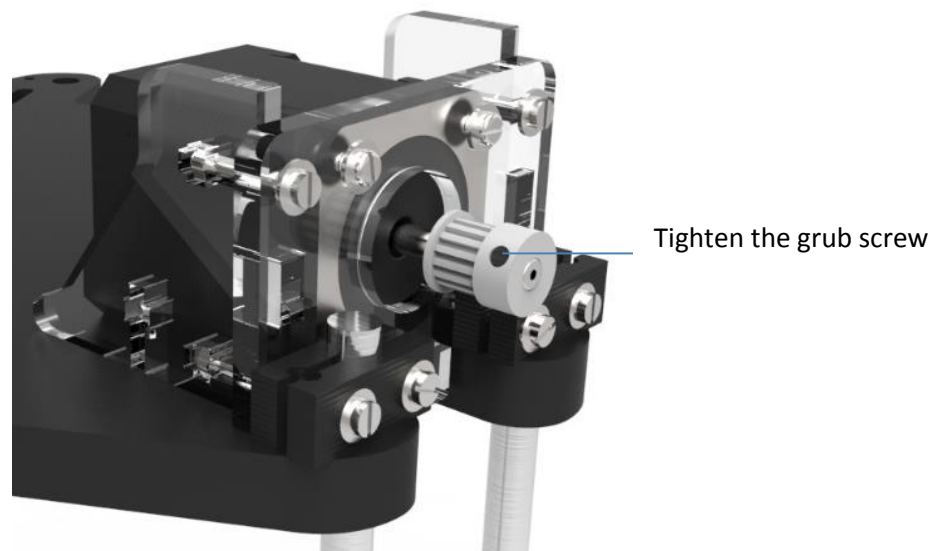
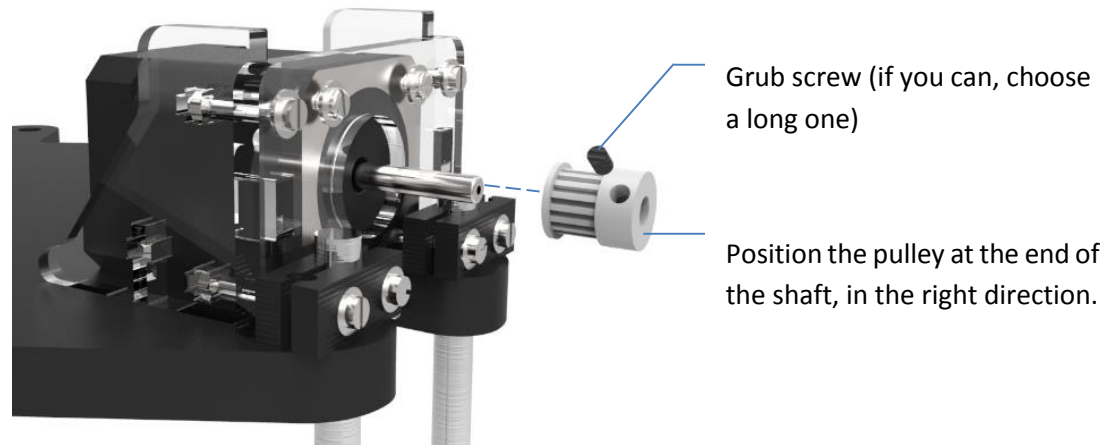
Plug the motor cable

The cable can be plugged in only one direction.

Position wires on the edge

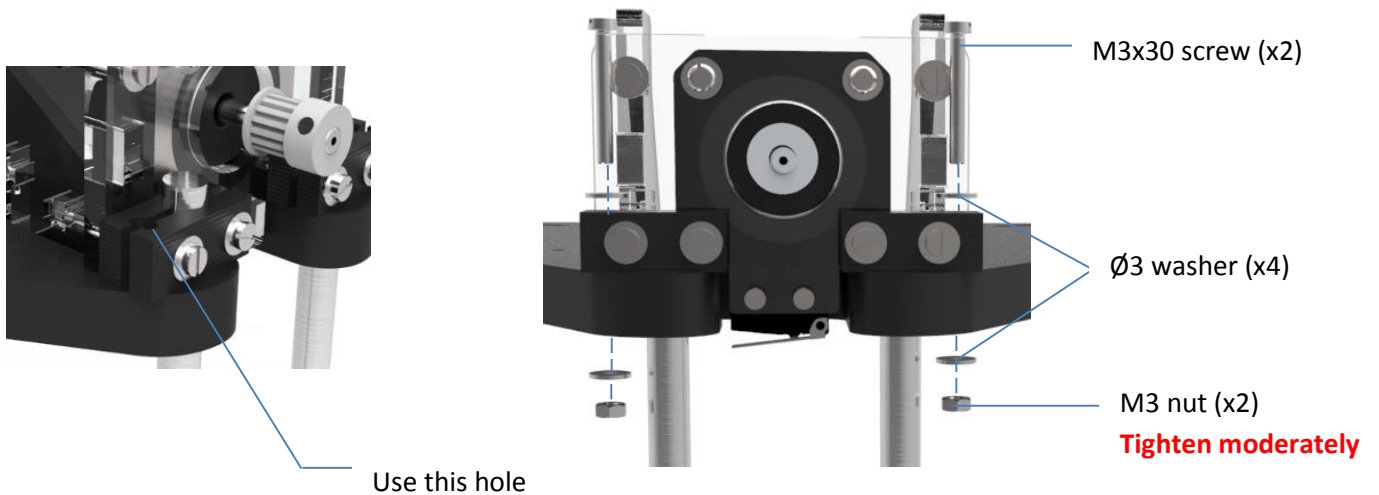
Put the endstop wires through the hole





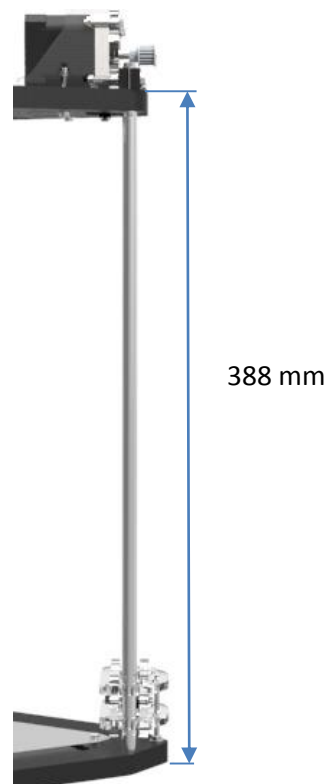
2. Superior frame fixation

- 6x M3x30 screw
- 12x Ø3 washer
- 6x M3 nut

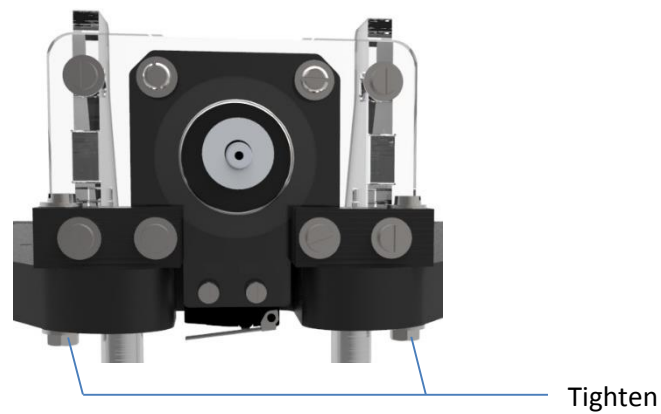
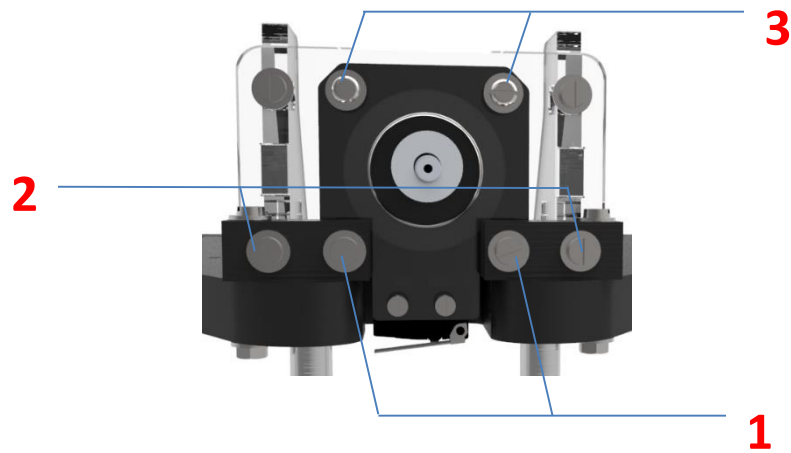


This operation is essential. This will influence your printing quality

Measure the distance between the bottom of the inferior frame and the top of the superior frame. **This distance must be 388mm for each smooth rod.**



Once the frame is well positioned, tighten moderately the screws in the order below

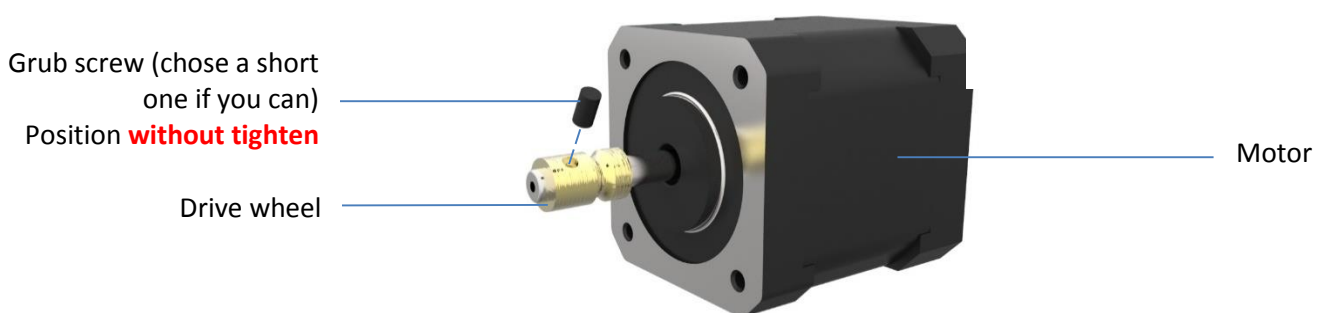


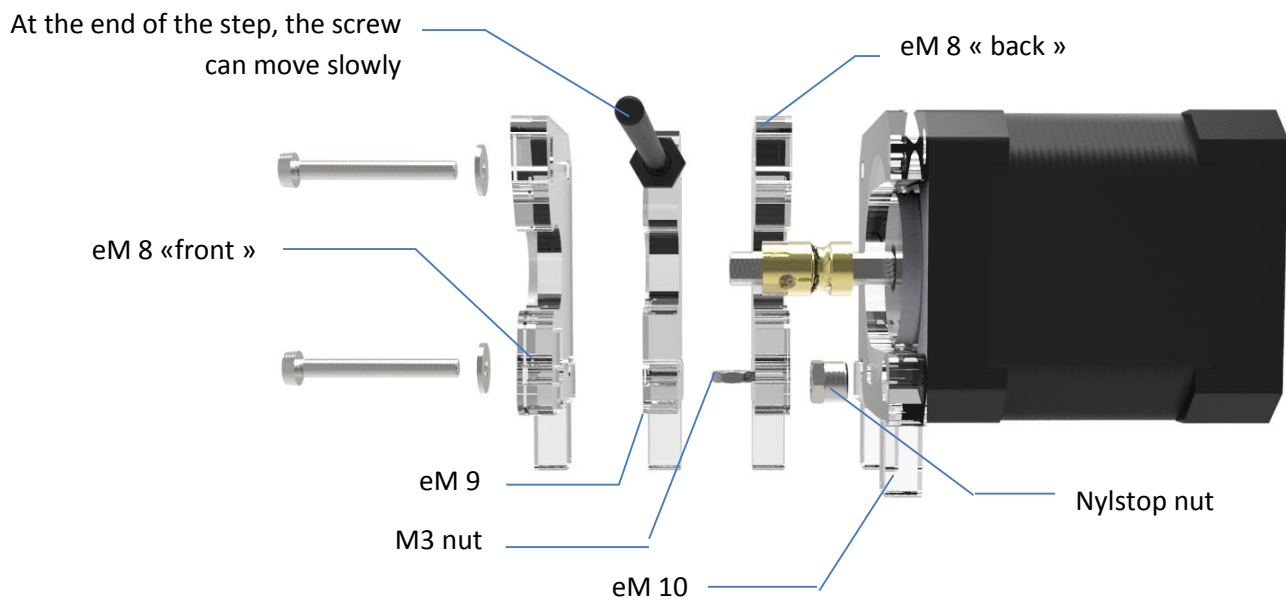
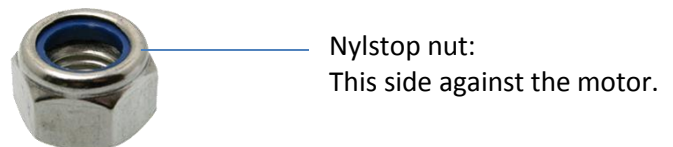
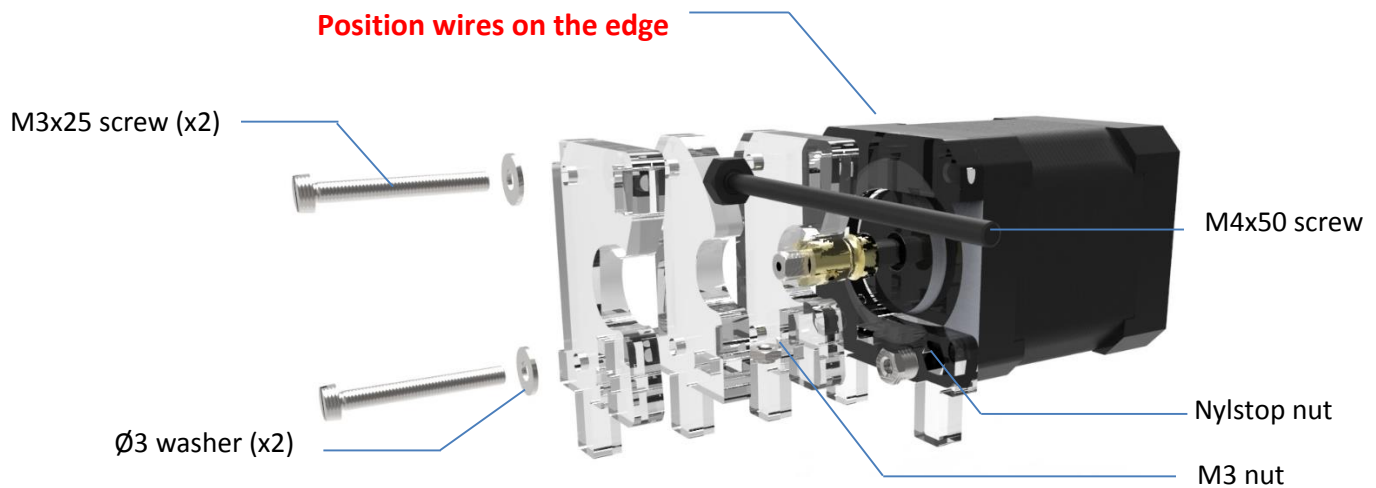
Repeat this operation for the other rods. **The height of the frame must be the same for all the rods.**

At the end of this step check the height of each rods.

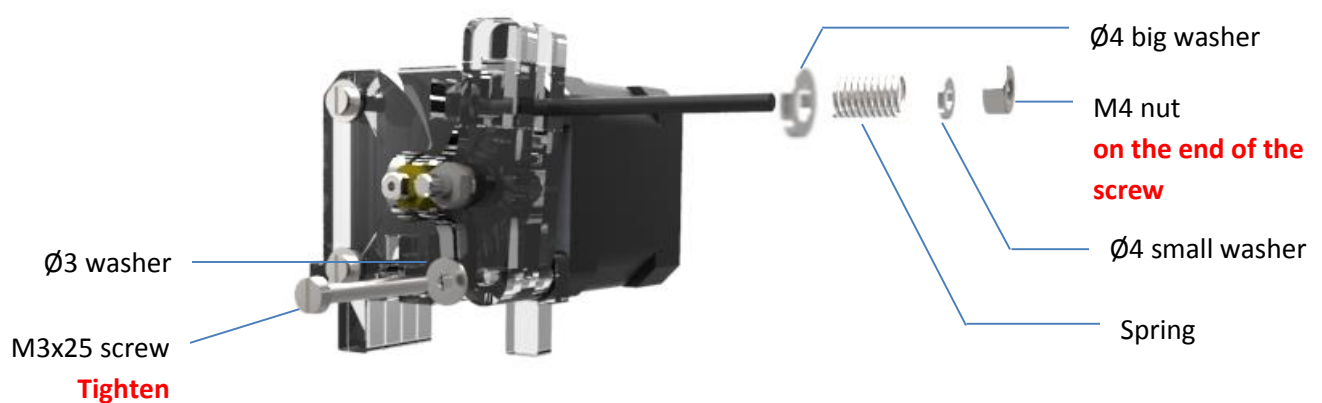
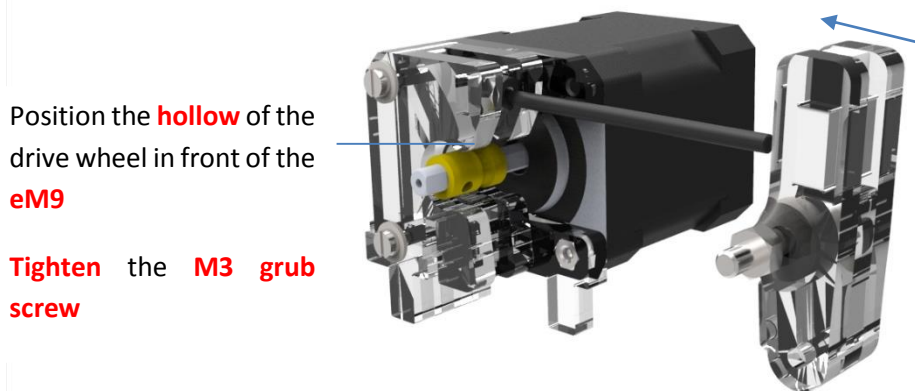
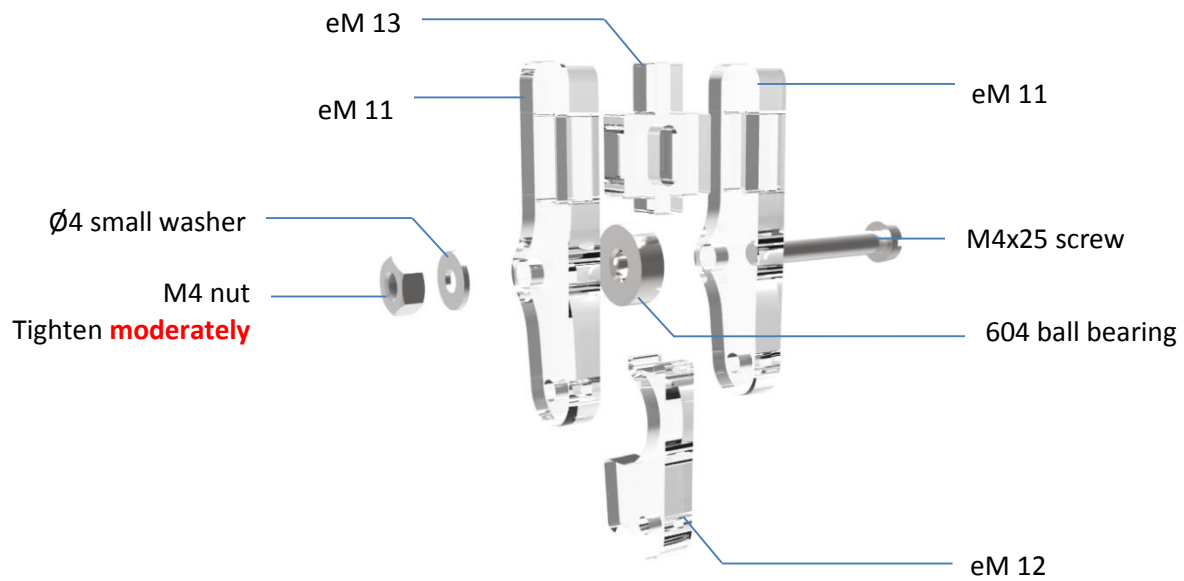
3. Extruder assembly

- 2x eM8
- 1x eM9
- 1x eM10
- 2x eM11
- 1x eM12
- 1x eM13
- 1x 604 ball bearing
- 1x Drive wheel
- 1x Spring
- 1x Nema 17 motor
- 4x M3x25 screw
- 2x M3x20 screw
- 1x M4x25 screw
- 1x M4x50 screw
- 3x M3 nut
- 2x M4 nut
- 1x Nylstop nut
- 7x Ø3 washer
- 1x Ø4 small washer
- 2x Ø4 big washer

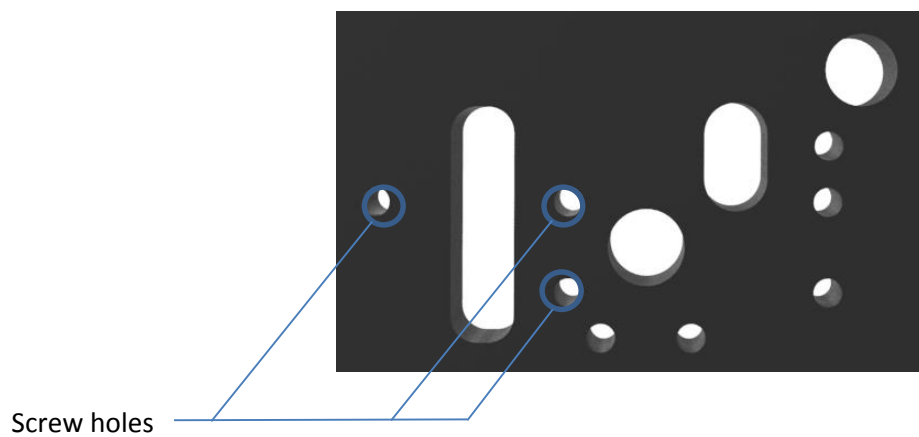
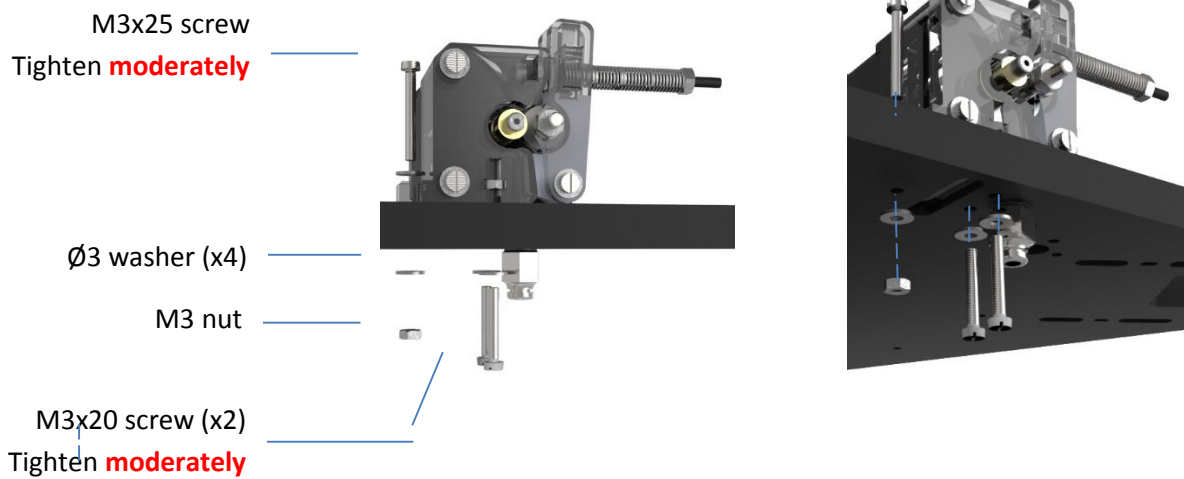
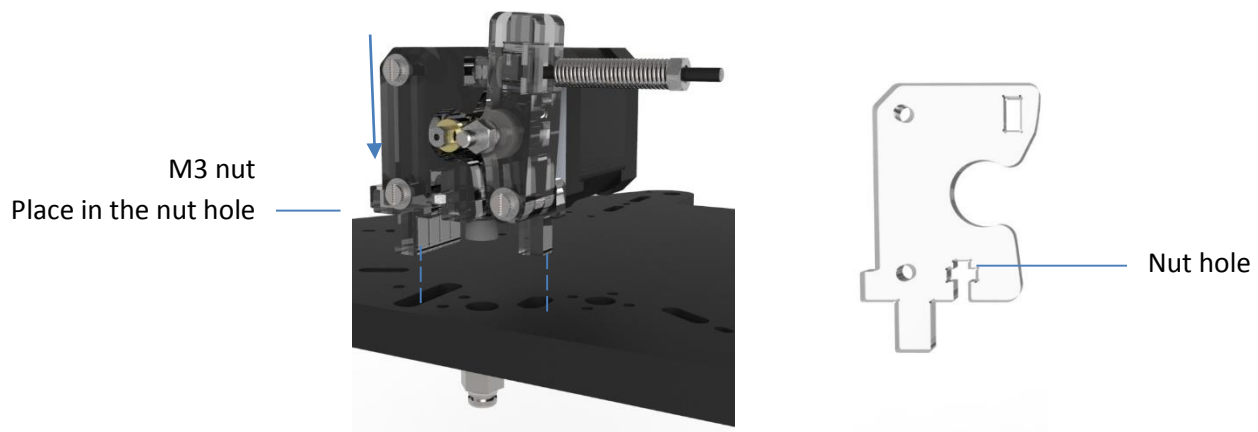




Position the M4 nut of the M3x50 screw between the two eM8. Position the M3 nut into the eM8 “back”

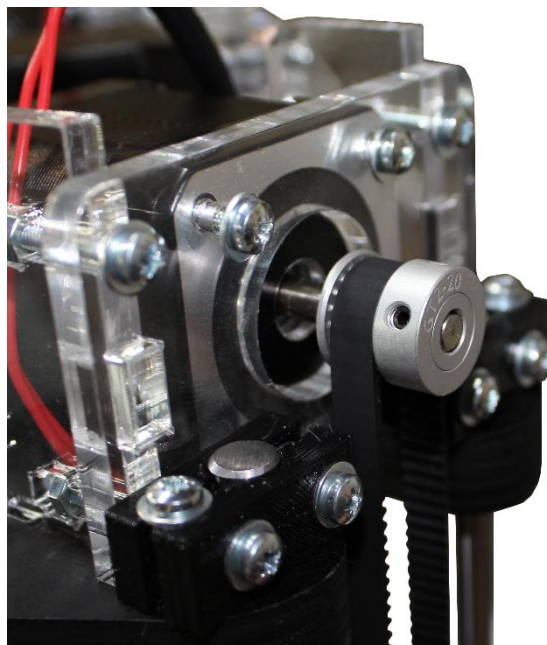
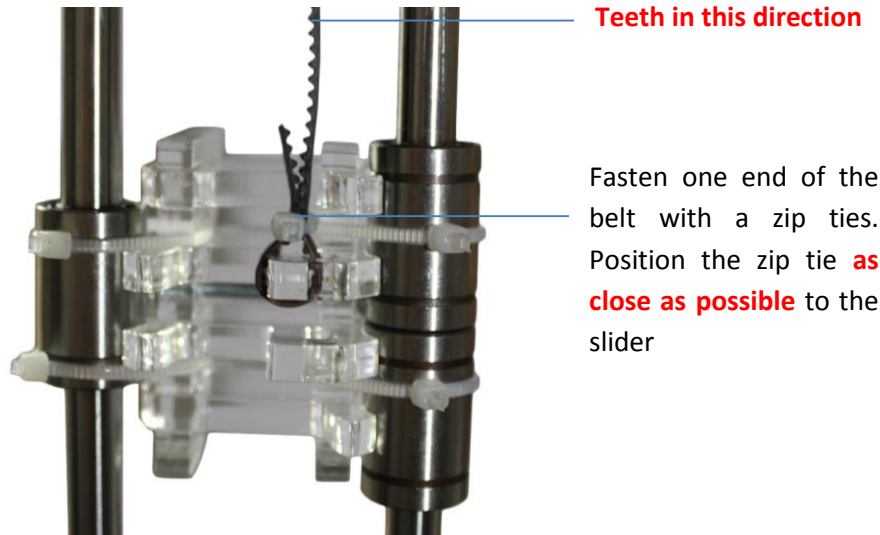


You can download a printable wrench to simplify the tightening (Available on our download center).



C. Belt positioning.

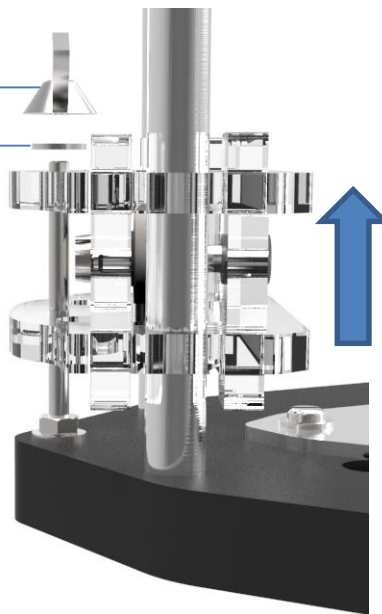
- 3x Belt
- 18x Zip tie
- 3x Ø3 Washer
- 3x M3 wing nut



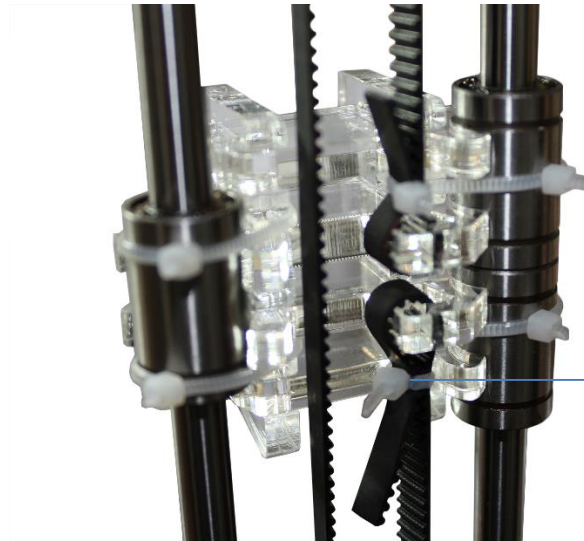


Wing nut **at the end of the screw**

Ø3 washer



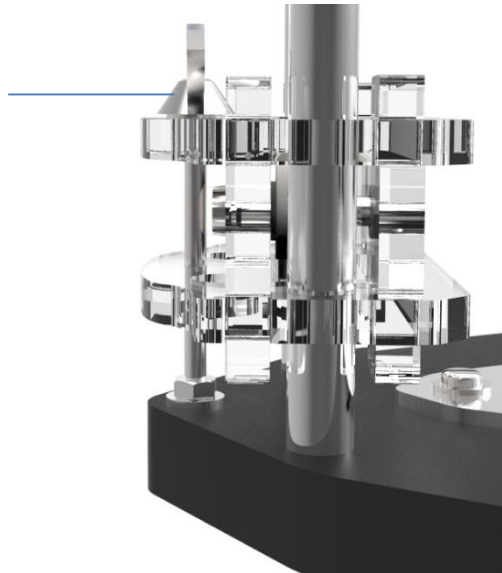
Once the wing nut is positioned,
push the tensioner through the
nut



Fasten the free end of the belt and fix it with a Zip ties.

Make sure the belt is **slightly tight**

Tighten the wing nut to tight the belt.

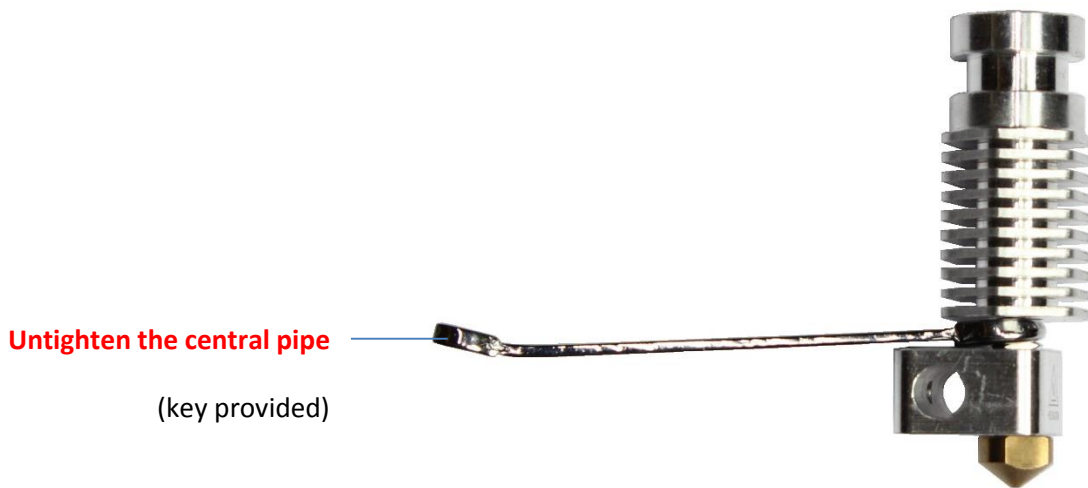


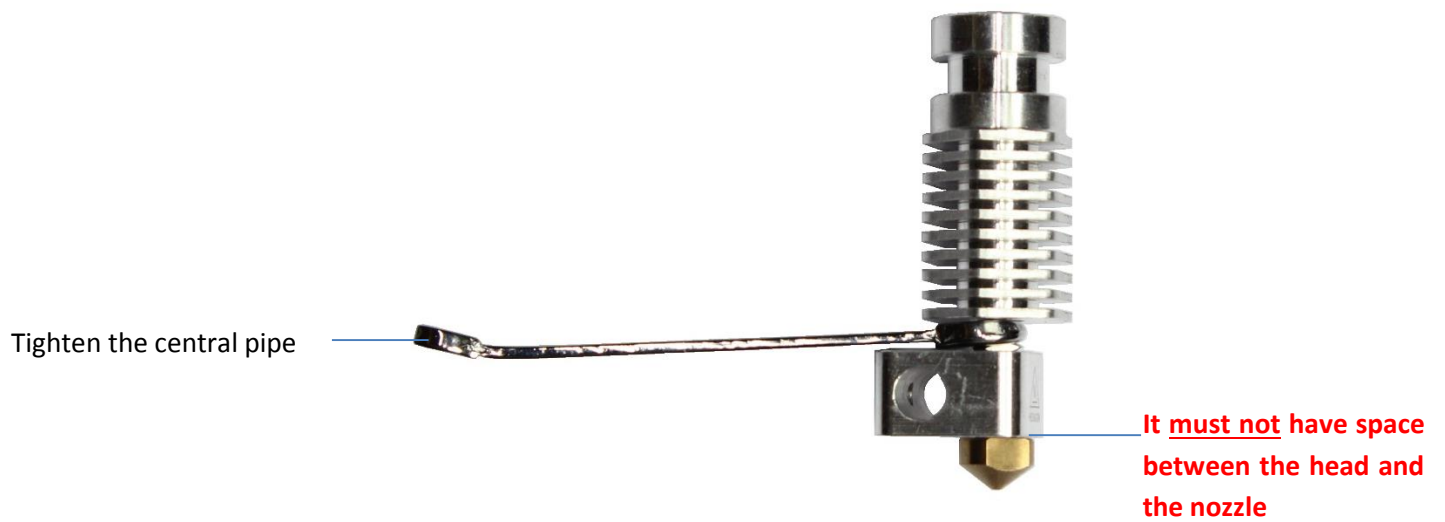
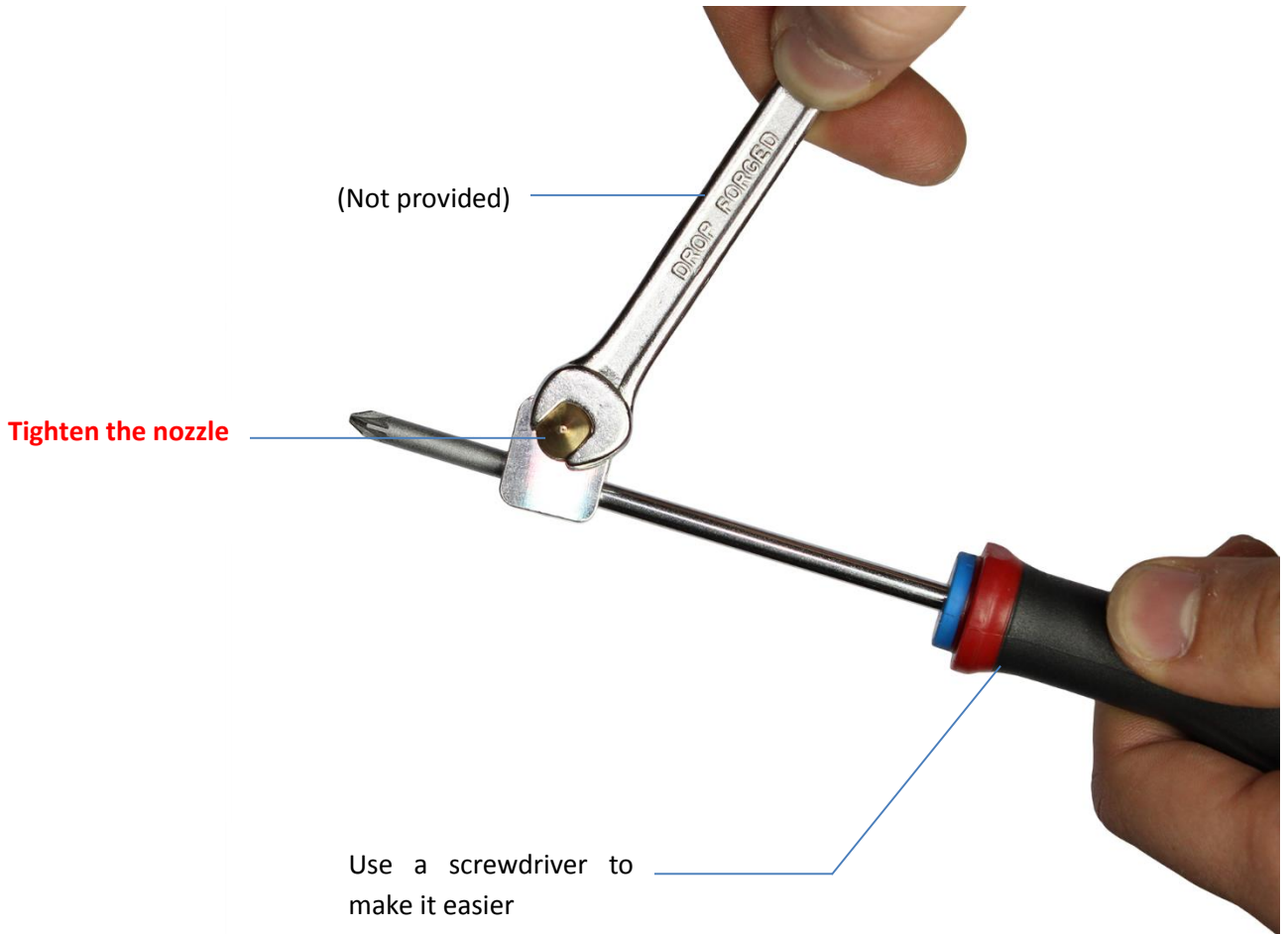
Repeat the operation with the others sliders.

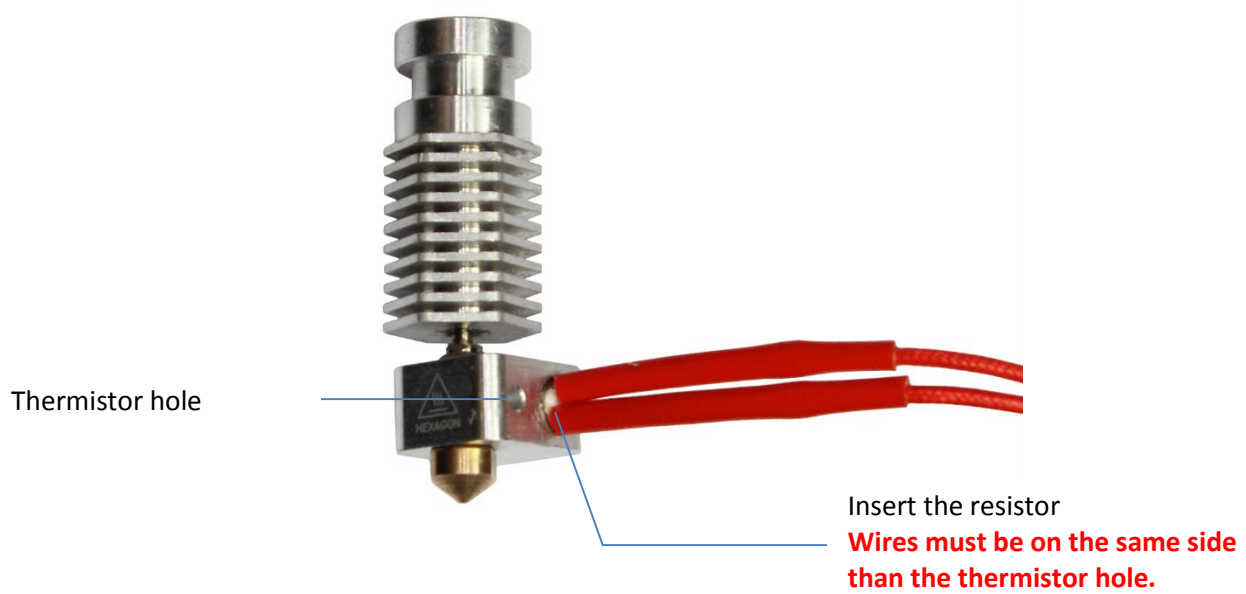
Core

A. Core assembly

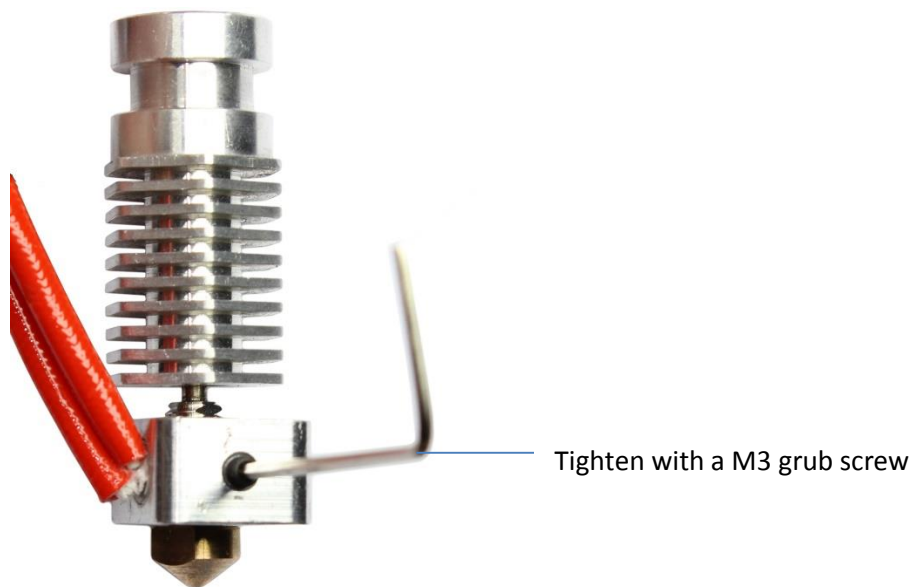
- 1x core
- 1x Hexagon 1.75 kit
- 2x 3x3 Fan
- 6x M3x20 screw
- 4x Ø3 washer
- 1x Ø4xM6mm pneufit
- 3x Zip tie

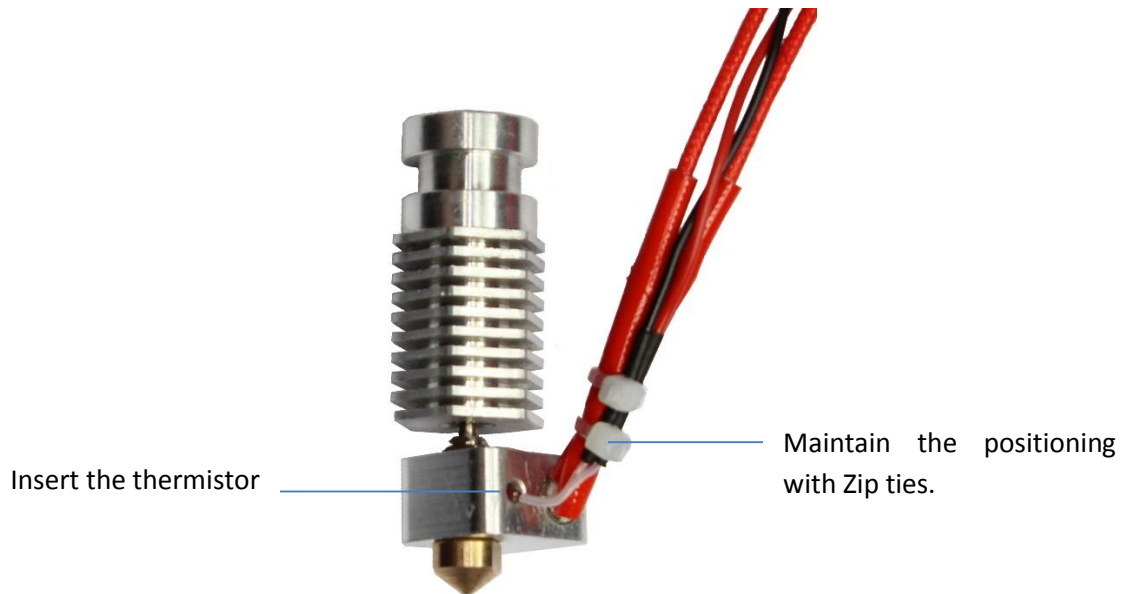






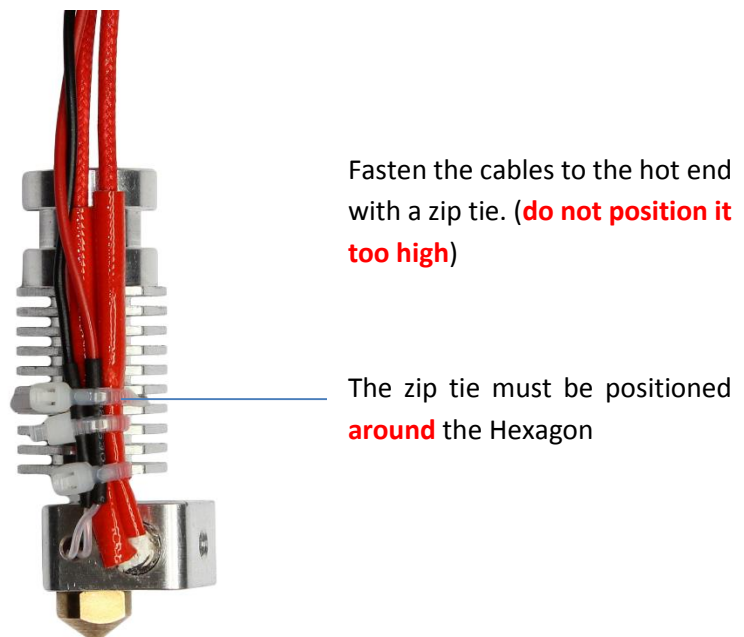
If you cannot insert the cartridge heater, file slightly the 6mm hole.



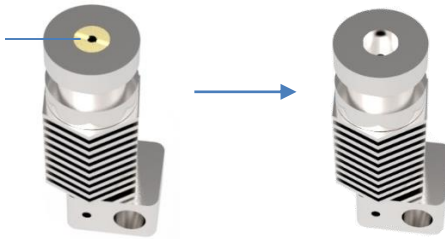


Be careful! If the thermistor goes out of the hot end, your printer could be damaged.

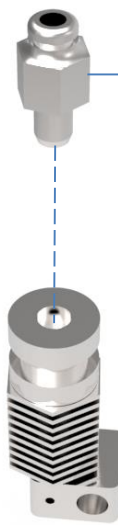
You can use a drop of high temperature silicone to maintain the thermistor into the hot end. (Not provided)



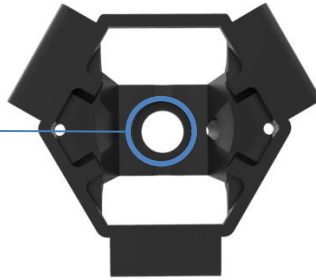
Unscrew the filament guide



Screw the Ø4xM6mm pneufit

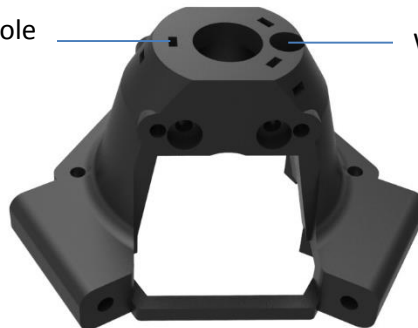


Make sure the core is free of impurities.



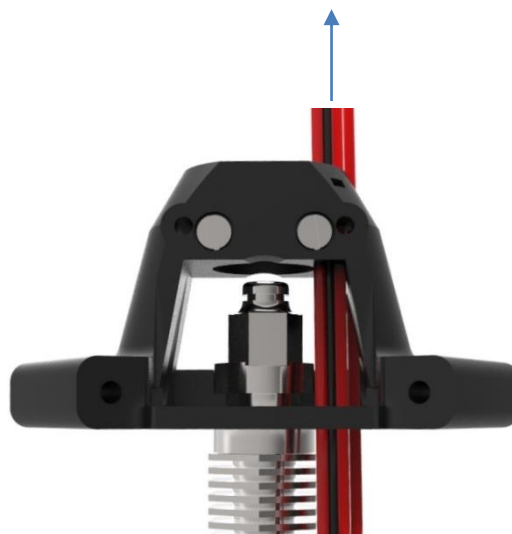
Zip tie hole

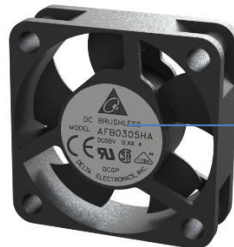
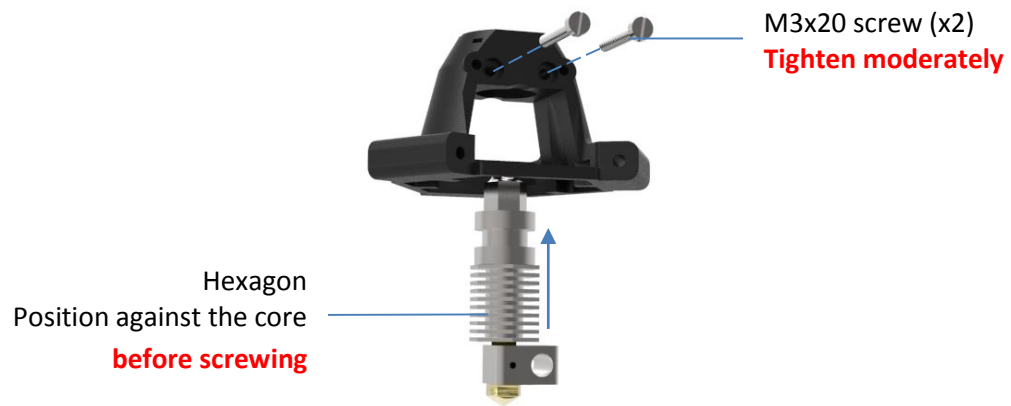
Wire hole



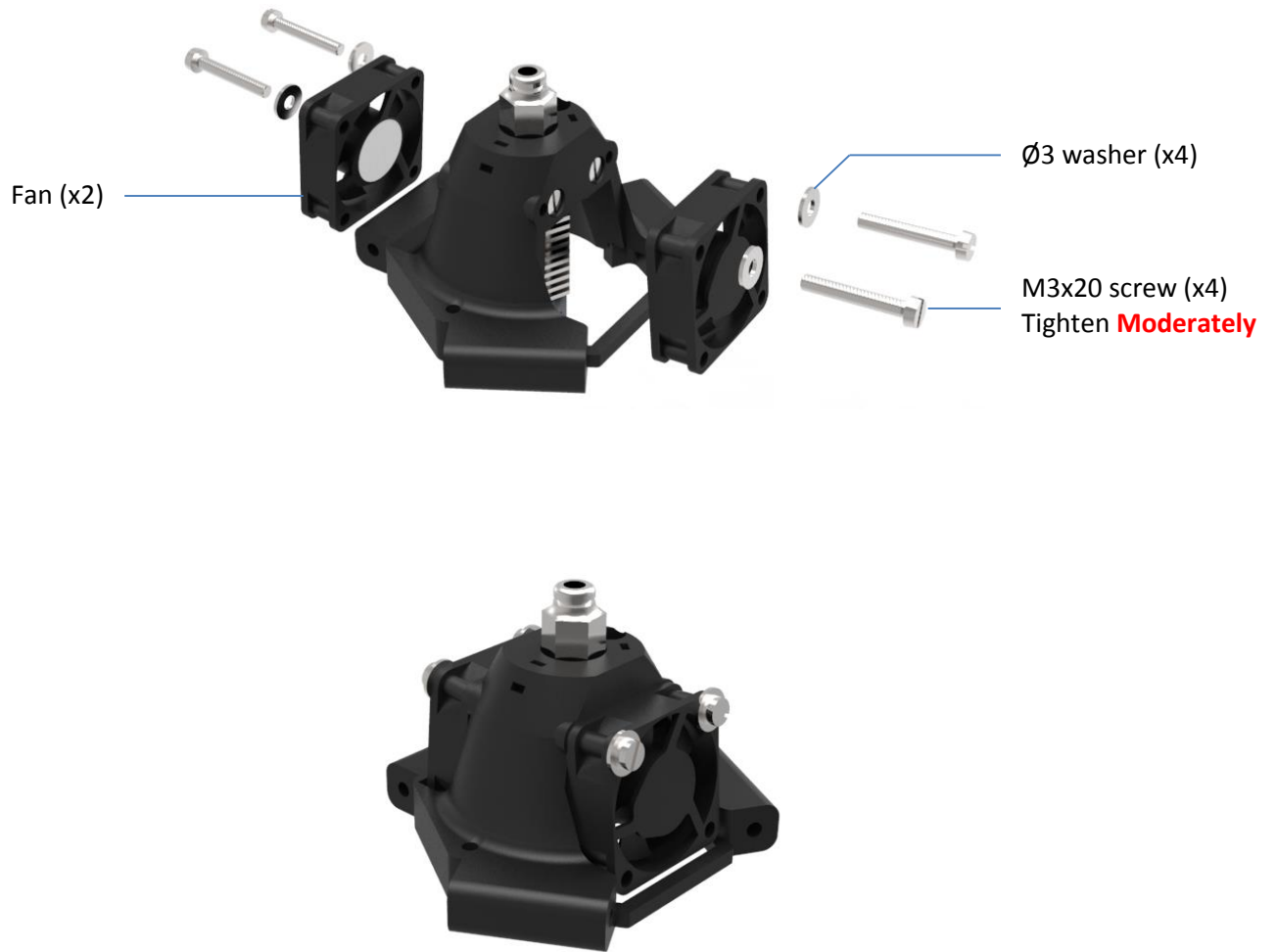
Put the cables through the wire hole.

If you have LED put the cables through the hole





This side must be oriented
toward the hot end

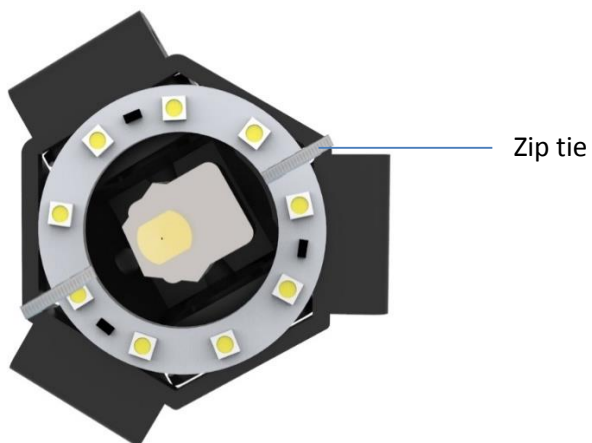
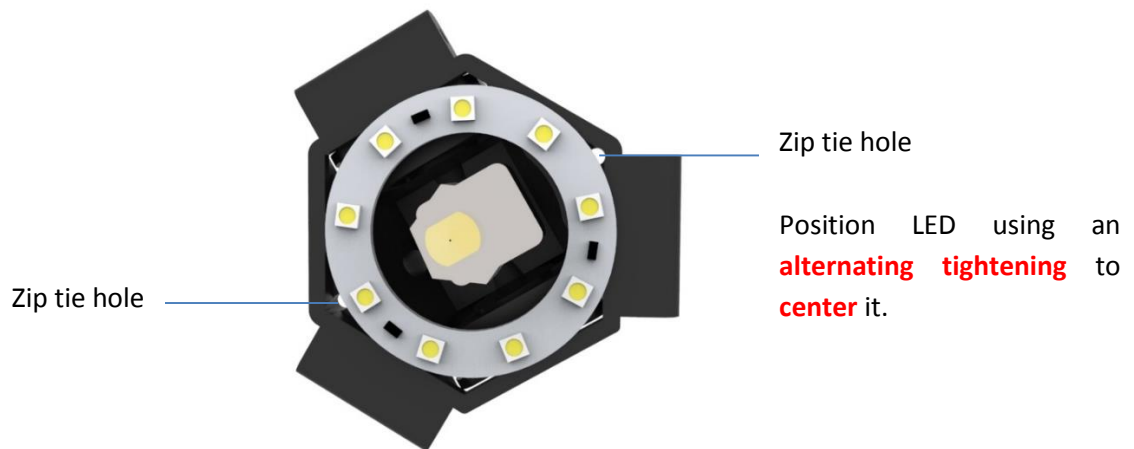


Place the wires of the fan on the same side than the resistor wires

B. LED (optional)

Parts of the following section are not included in the basic μDelta kit. You can find them on eMotion Tech website.

- 1x LED
- 2x Zip ties



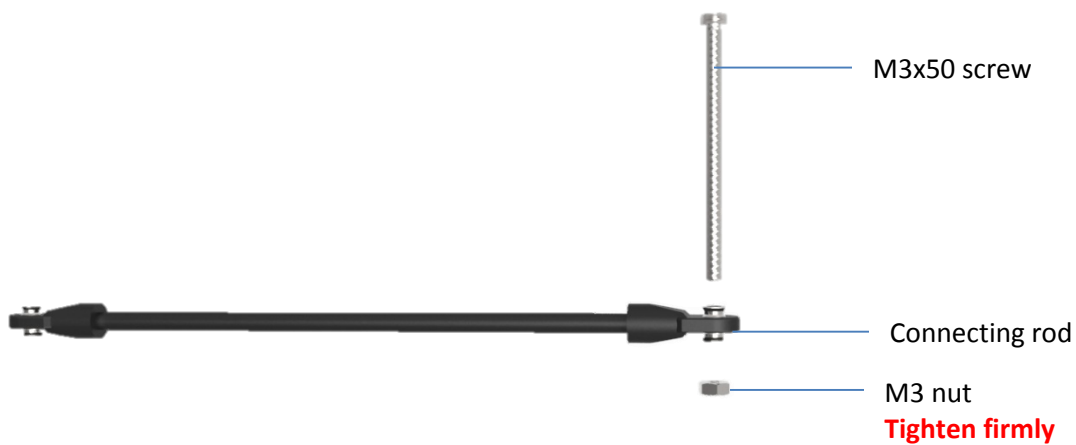
C. Connecting rods positioning.

- 6x Connecting rod
- 18x M3 nut
- 6x M3x50 screw
- 12x Ø3 washer

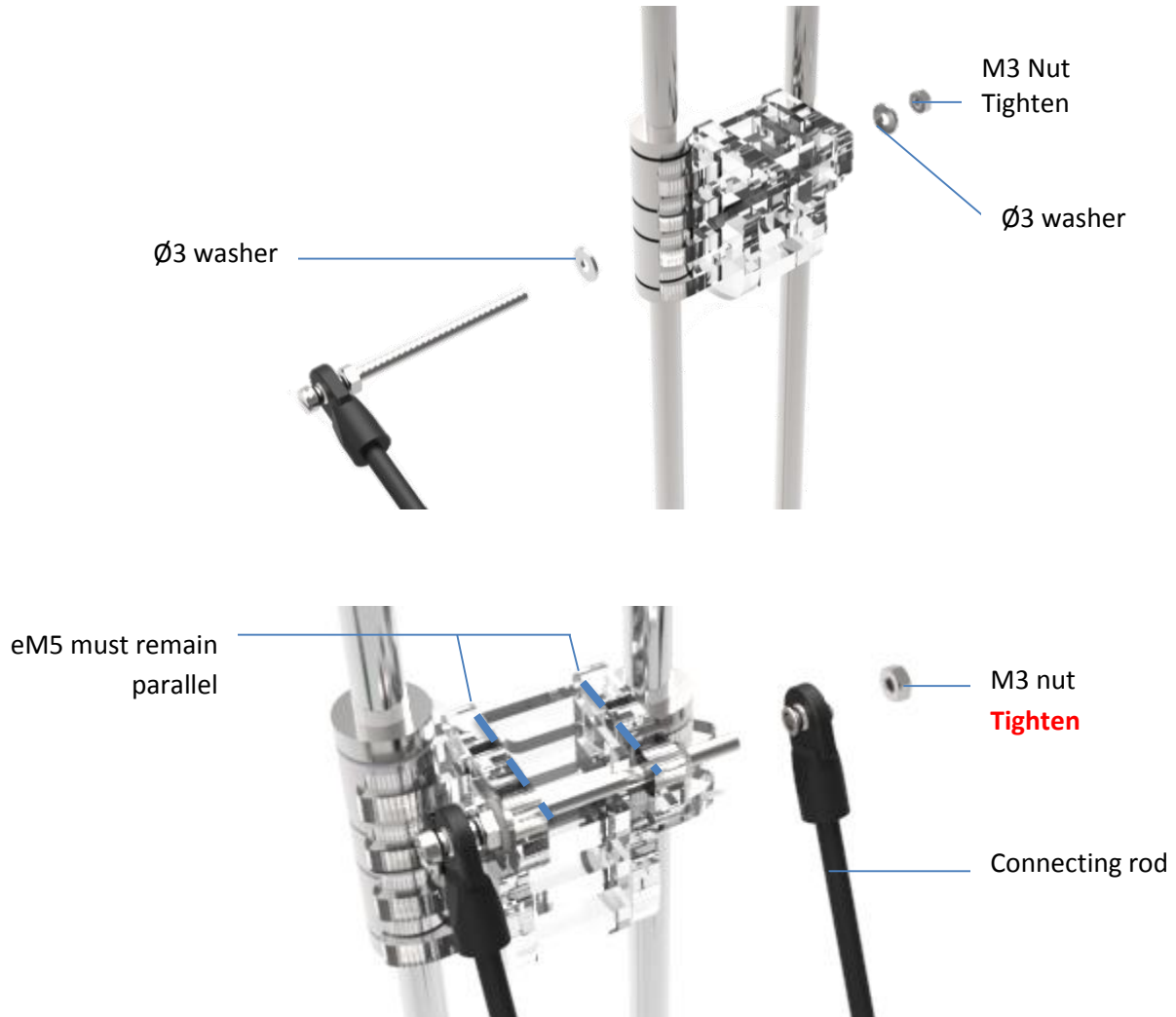


Check this nut is tighten.

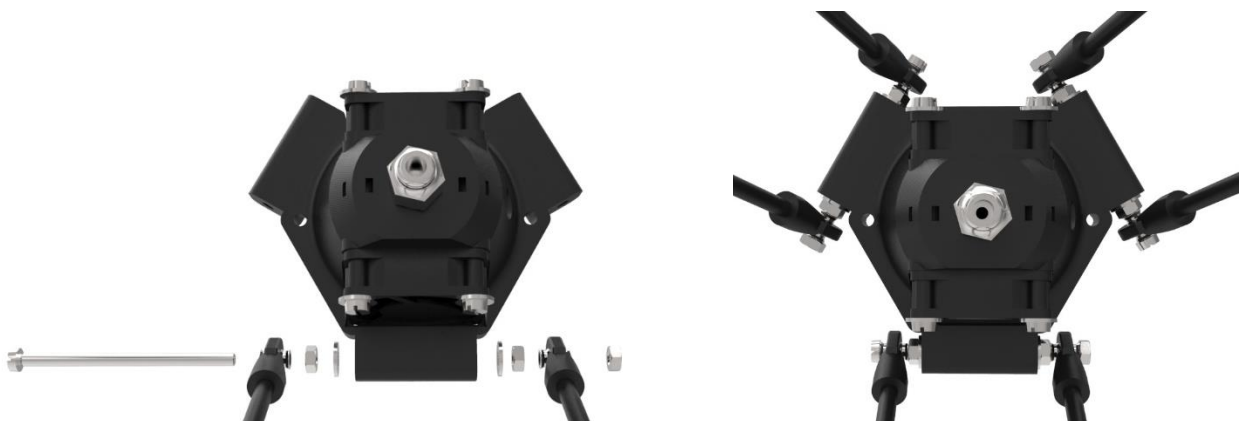
You can add glue to maintain the assembly.



The assembly must not twist the slider.



Repeat the operation with the other sliders and for the core.

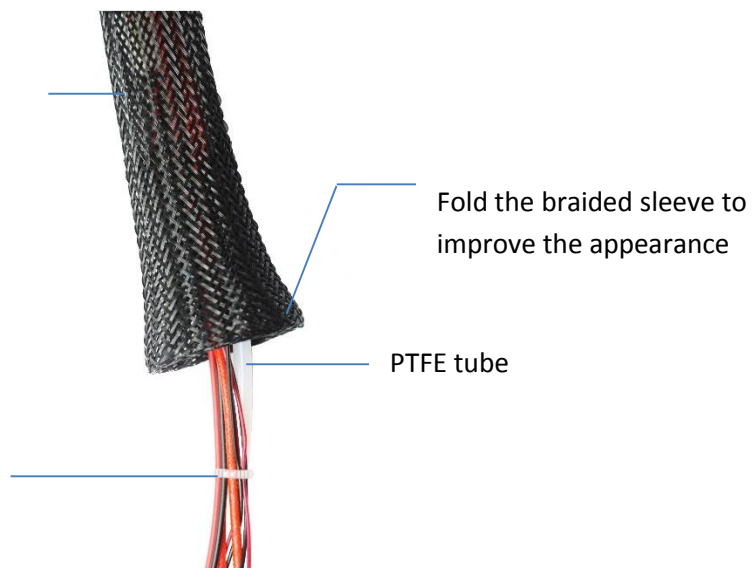


Finishing

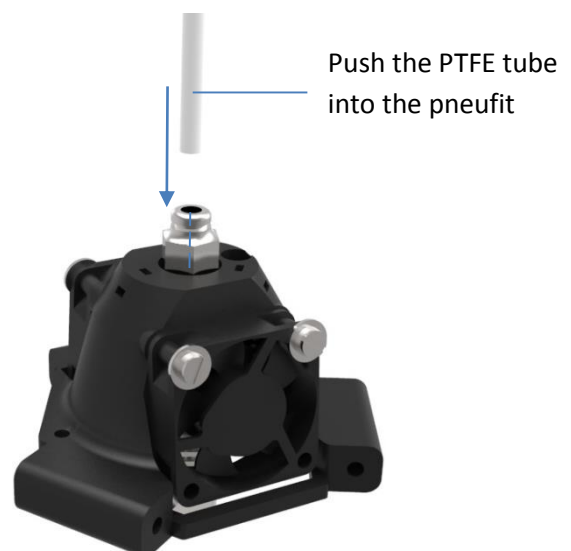
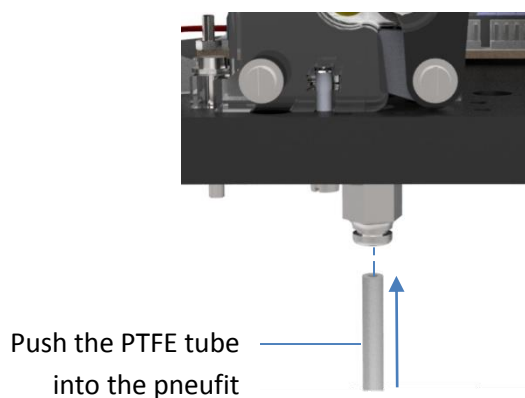
- 1x PTFE tube
- 8x Zip tie
- 1x braided sleeve
- 3x pad
- 1x adhesive tape
- 1x M3x50 screw
- 1x M3 nut
- 1x Ø3 washer

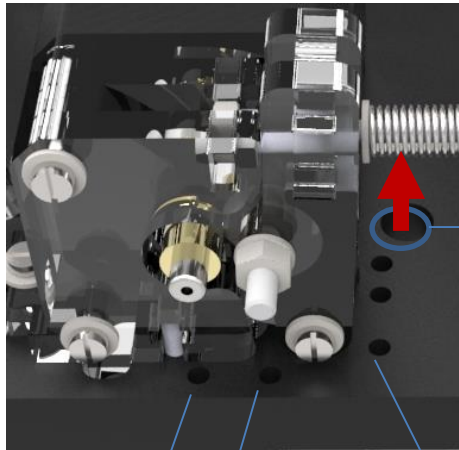
Push the cables and the PTFE tube trough the braided sleeve

Fasten the cables with zip ties



PTFE tube length must be 35cm. cut carefully the end of the PTFE tube if they are flattened



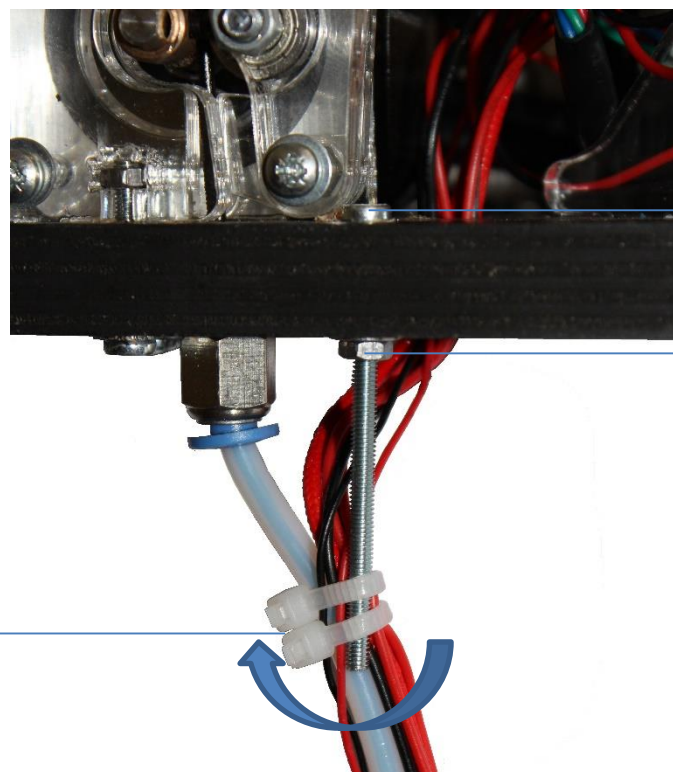


Push the cables through the hole.

Zip tie holes

Fasten the braided sleeve to the frame with zip ties

Screw hole



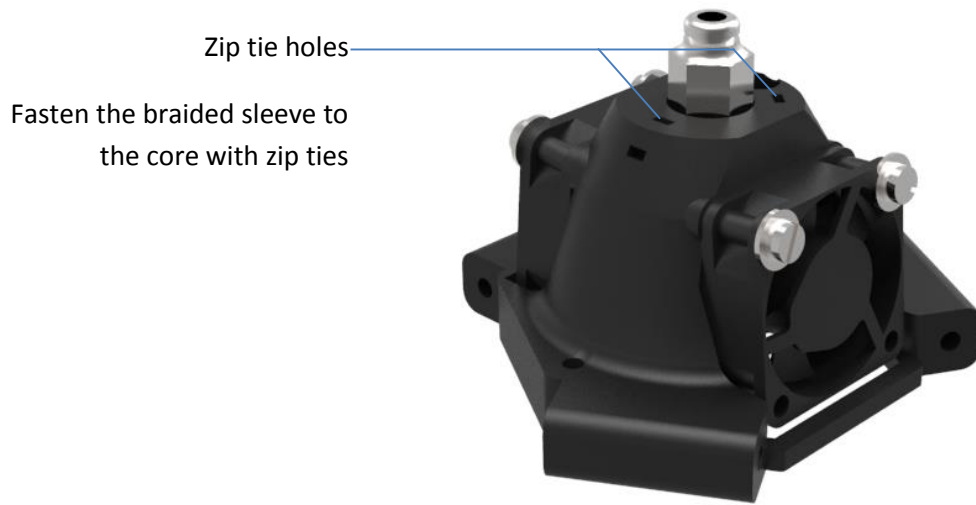
M3x50 screw

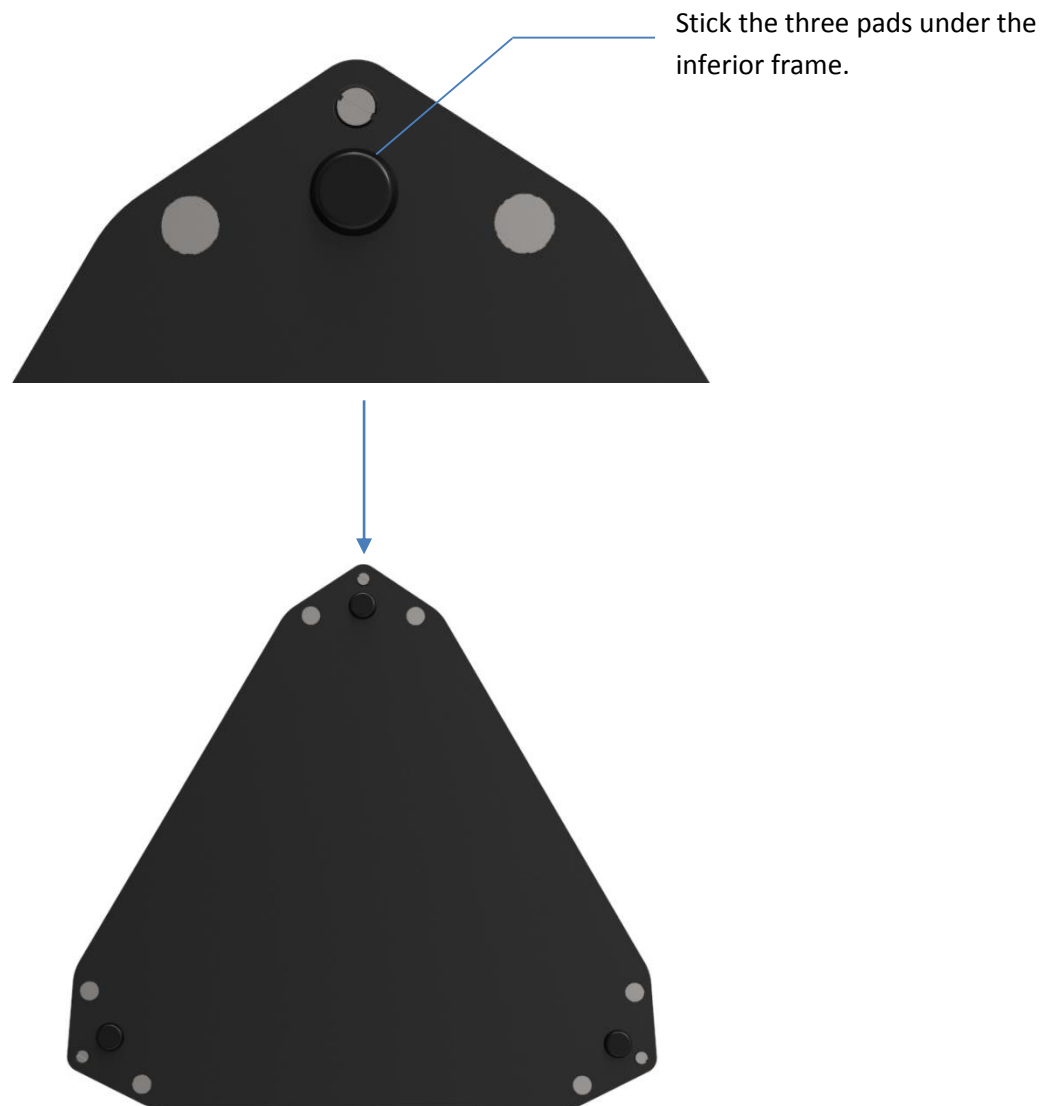
Ø3 washer
M3 nut
tighten

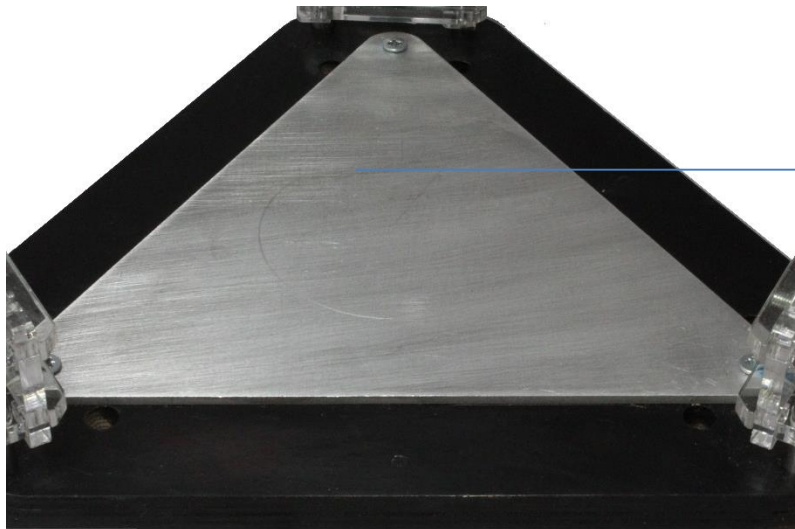
Fasten the wires and the PTFE tube with two zip ties.

You can bend the screw to reduce strain in PTFE tube.

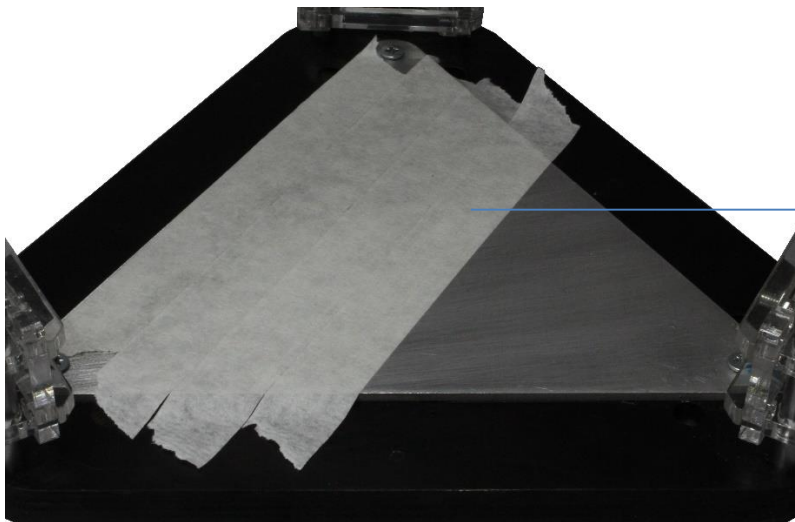
This screw prevent the sleeve from blocking the end stops.



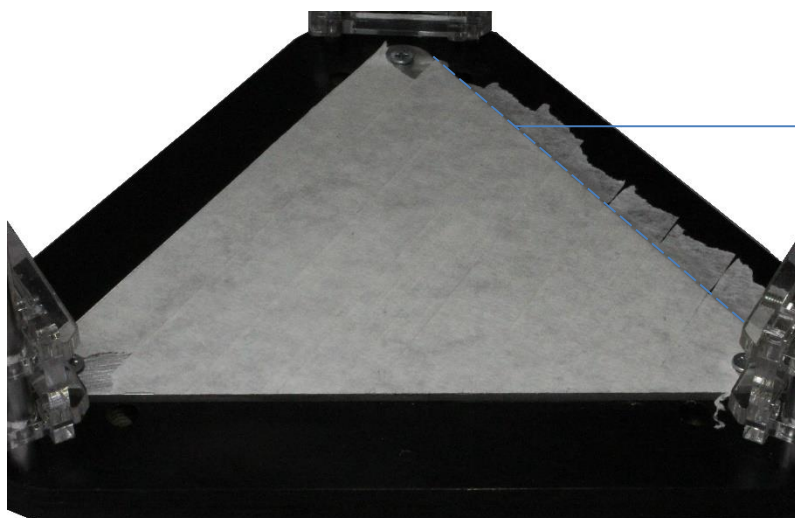




Remove the dust



Cover the bed with
adhesive tape

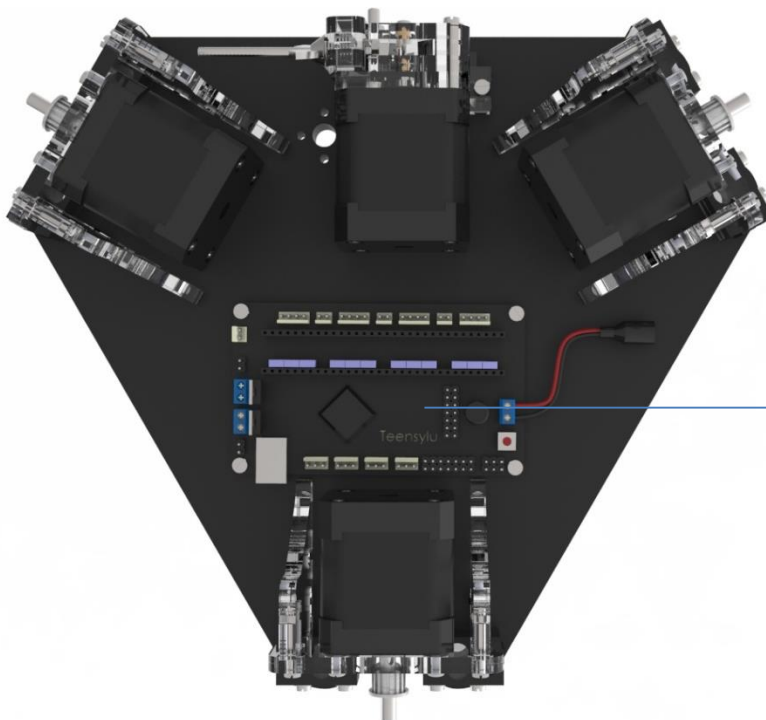


Cut the adhesive tape
with a utility knife

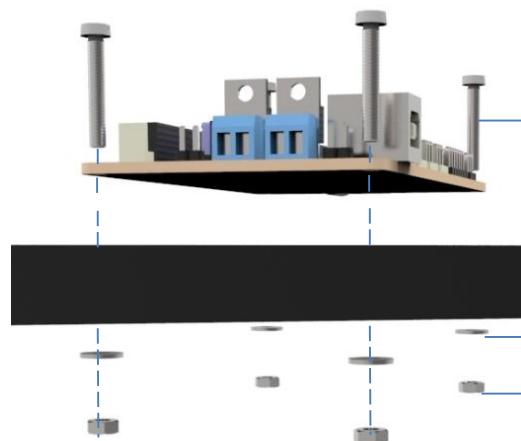
Electronics assembly

A. Teensylu

- 1x Teensylu
- 4x M3x25 screw
- 8x M3 nut
- 4x Ø3 washer



You must position the teensylu as shown on this image.



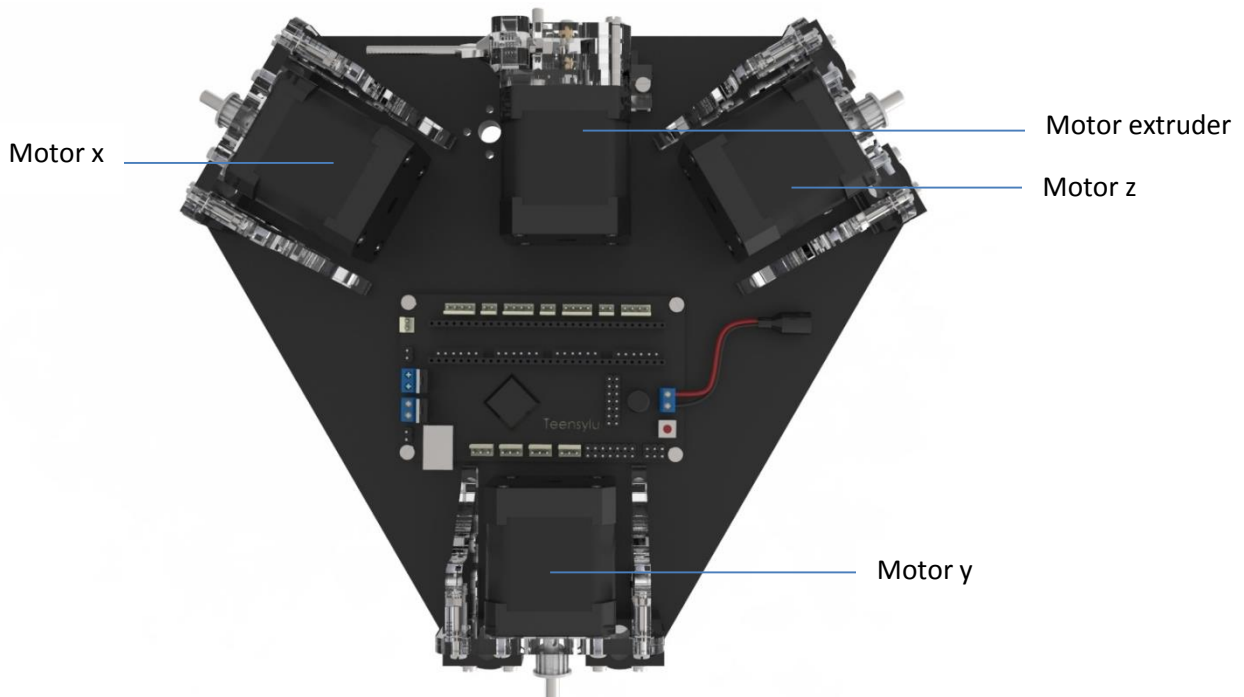
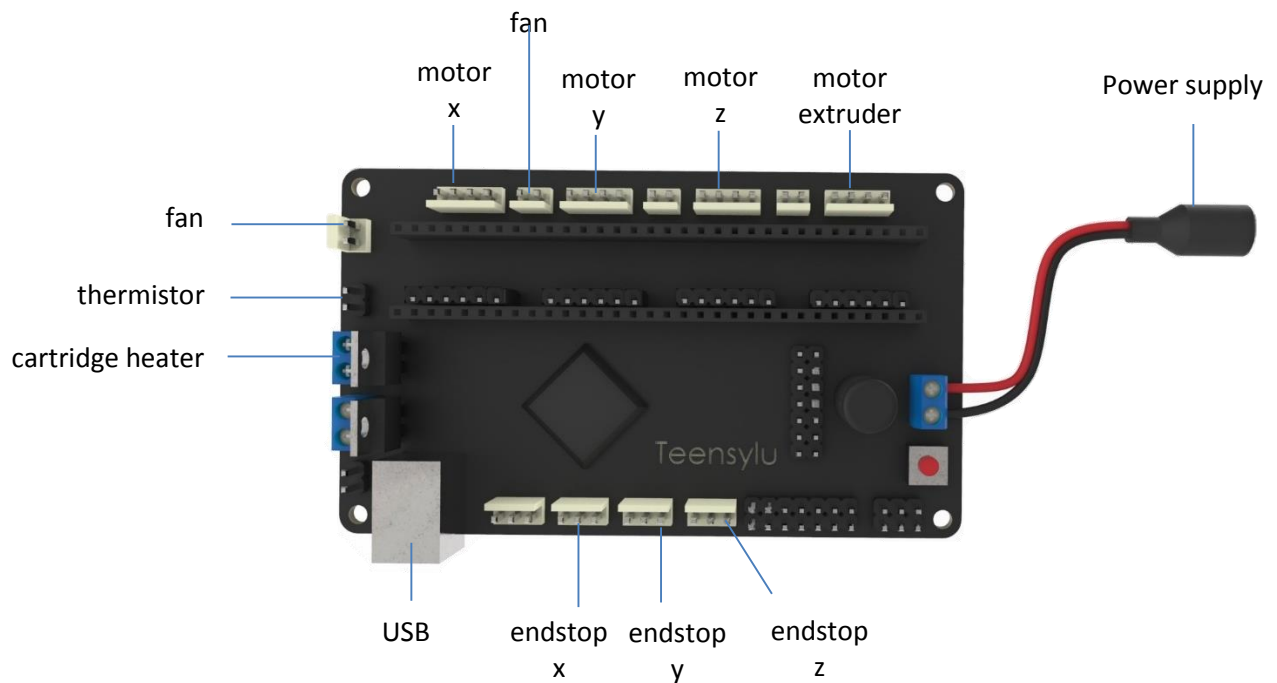
M3x20 screw (x4)

Ø3 washer (x4)

M3 nut (x8)
Tighten moderately

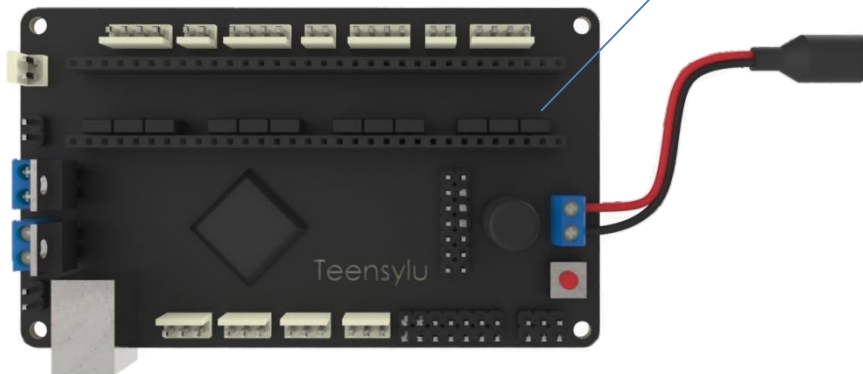
B. Connections

Wiring id detailed in the next page

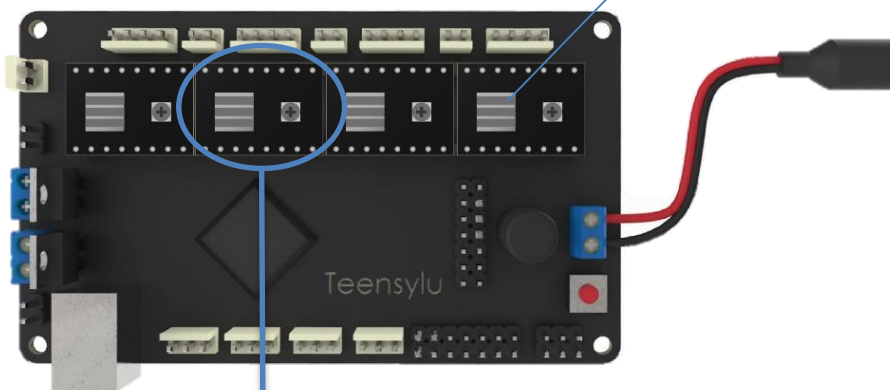


4. Stepsticks

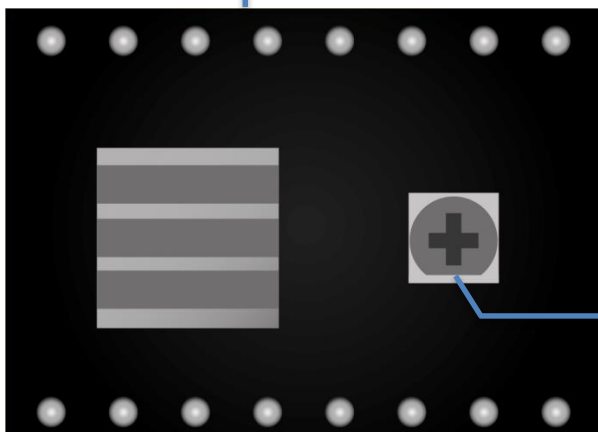
Make sure that you have 12 jumpers connected to the teensylu



Be careful: The orientation is very important!
(A wrong connection of the stepstick could cause **permanent damage**)



Plug the stepstick according to the illustration.

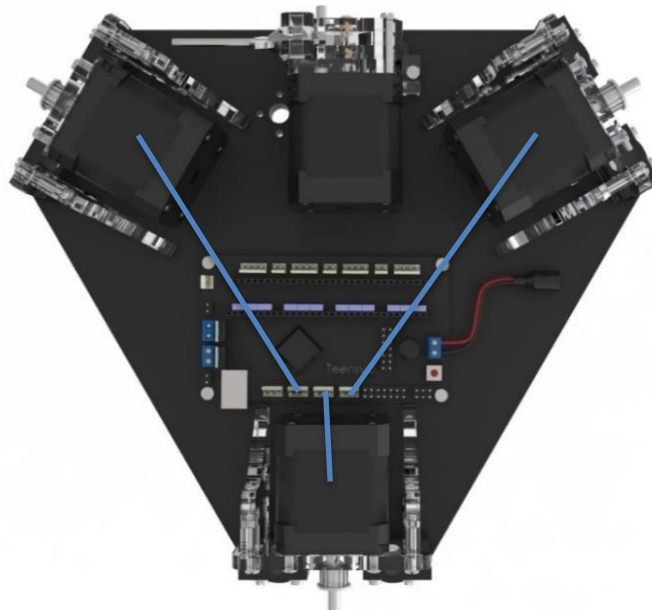
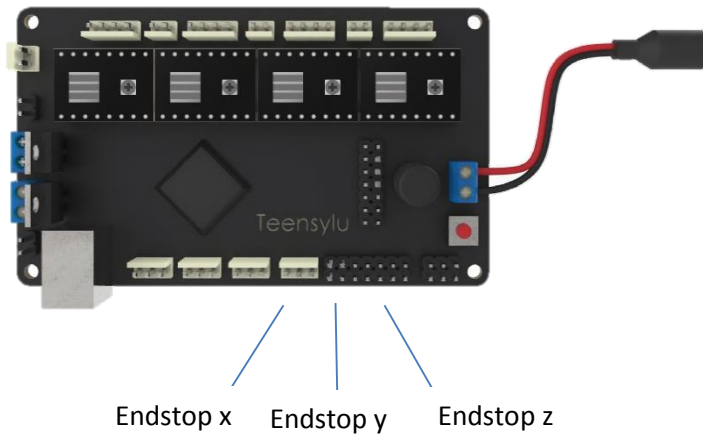


Make sure the flat is positioned as shown the image.

5. Endstops

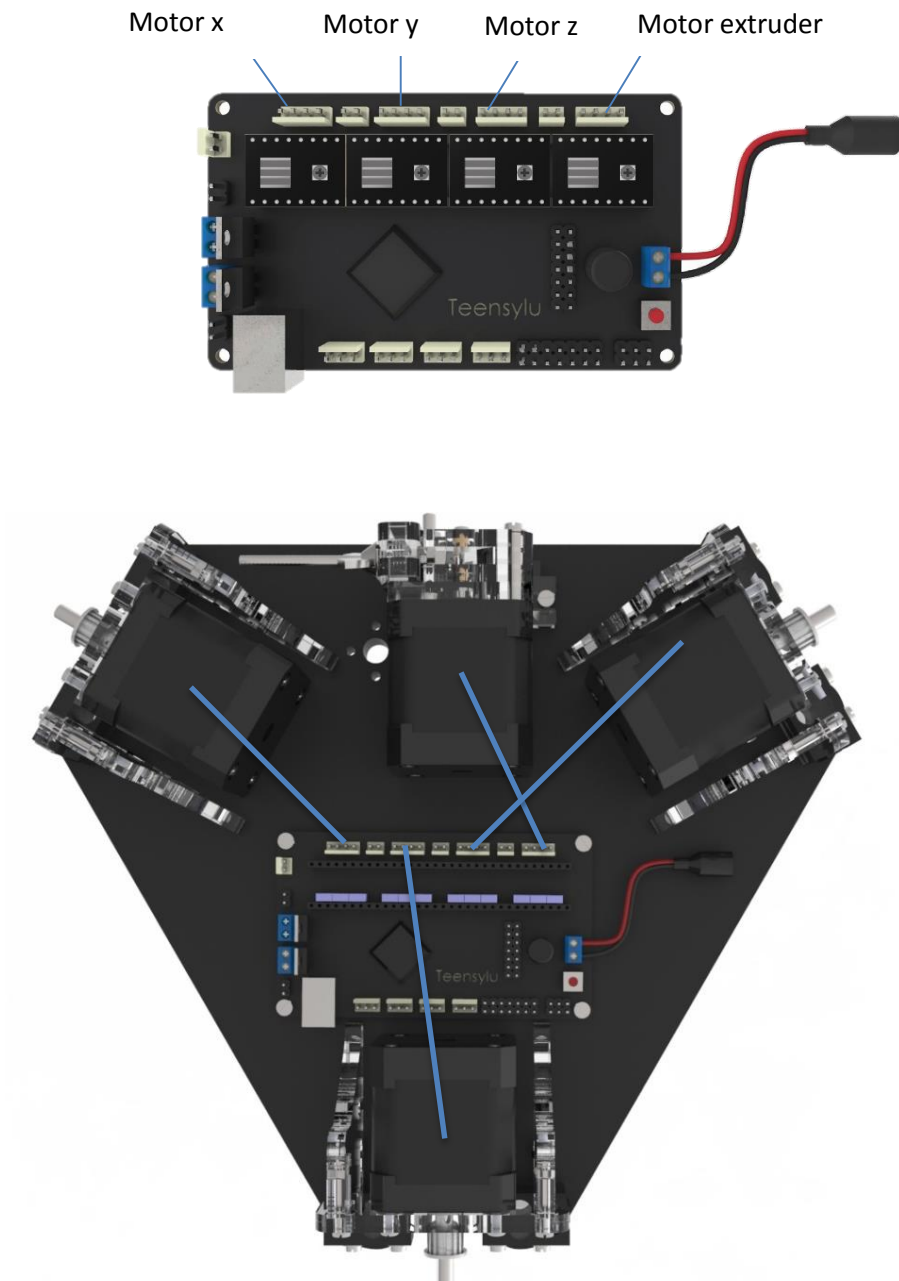
Plug the endstops according to the illustration below. The endstops can be plugged in only one orientation.

If you cannot plug the endstop , we provide extensions.



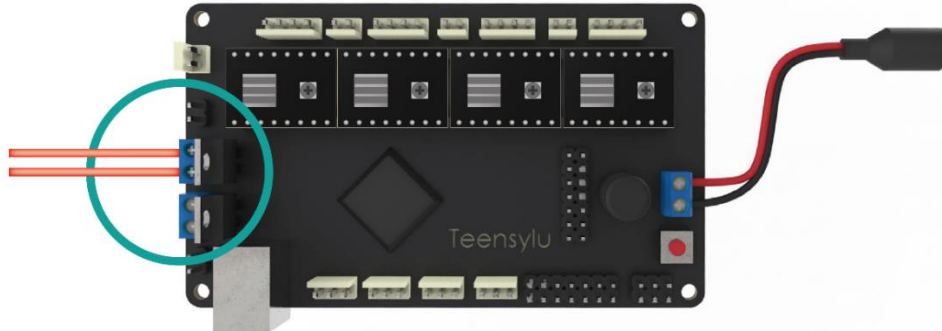
6. Motors

Plug the motors according to the illustration below. The motors can be plugged in only one orientation.



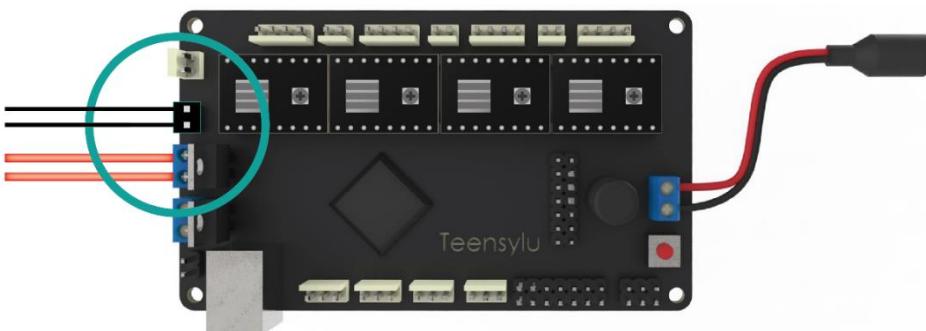
7. Cartridge heater.

Screw the cable of the cartridge heater.



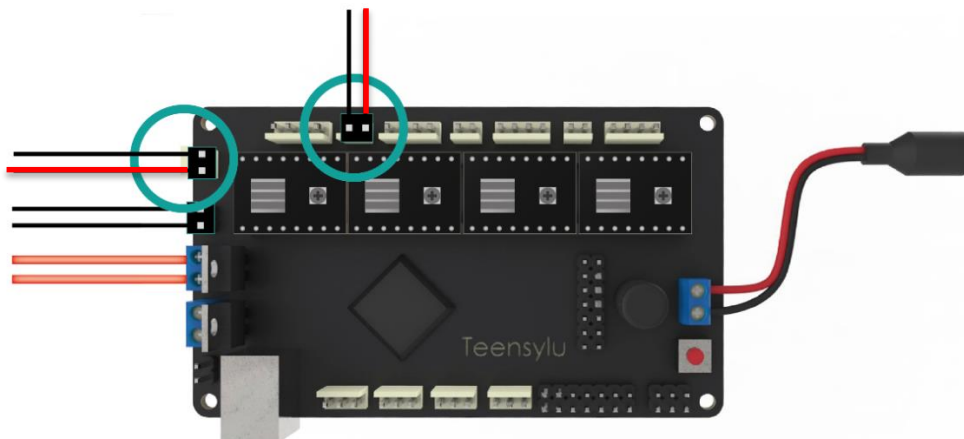
8. Thermistor

Plug the thermistor.



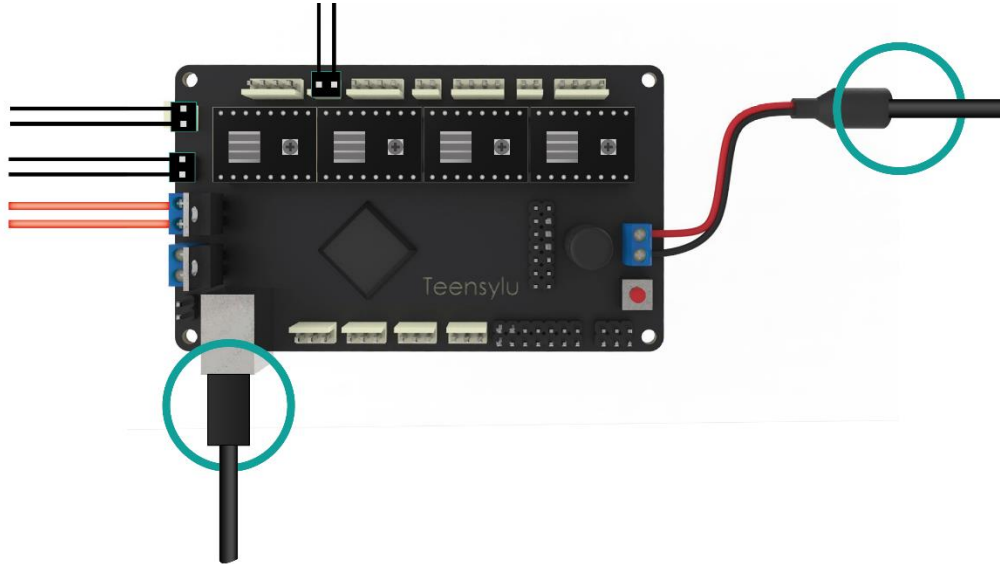
9. Fans

Plug the fans according to the illustration below. The fans can be plugged in only one orientation.



10. USB and power supply

Plug the USB cable and the power supply.

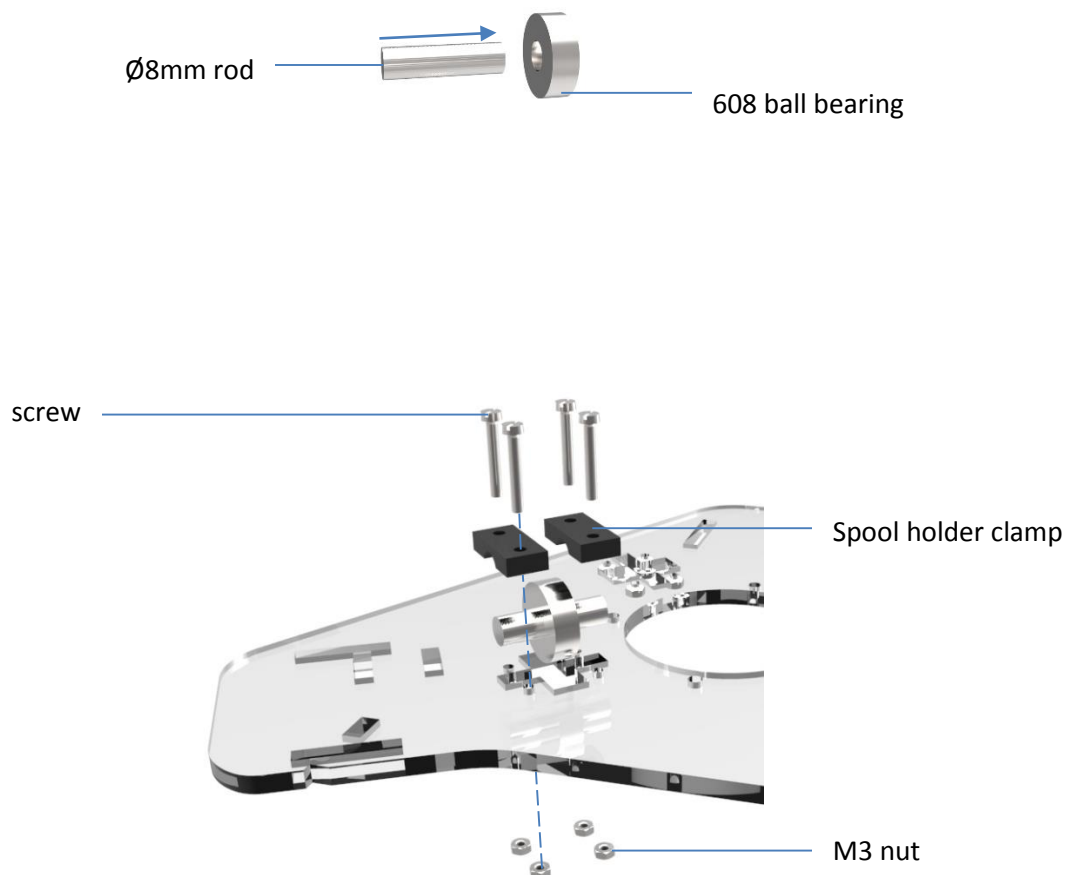


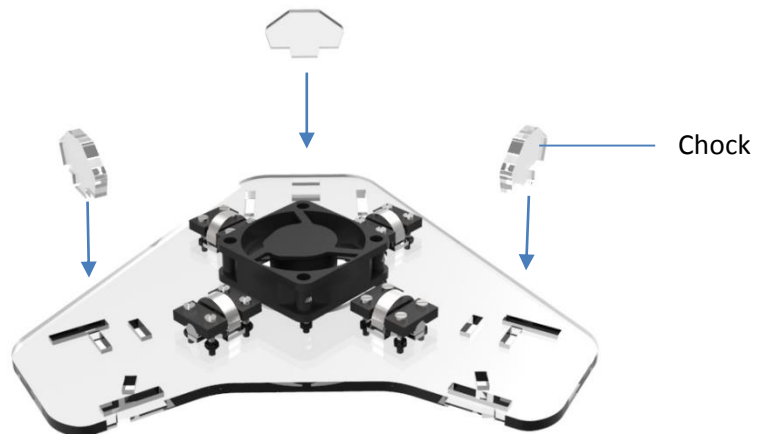
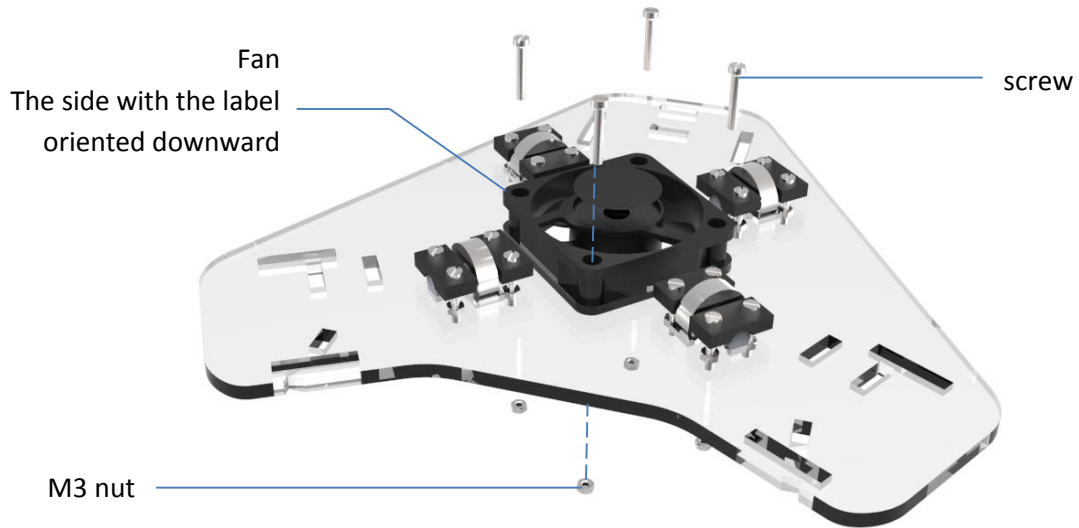
Annex 1: Spool holder

A. Assembly

Parts of the following section are not included in the basic μDelta kit. You can find them on eMotion Tech website.

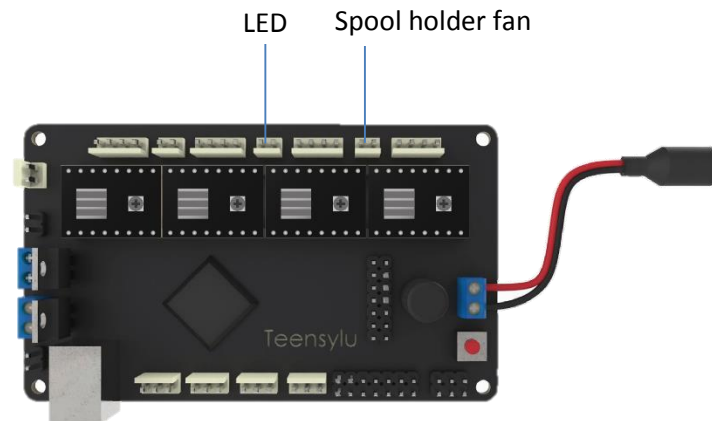
- 4x Ø8mm rod
- 4x 608 ball bearing
- 1x 6x6 fan
- 3x Chock
- 1x Spool holder frame
- 20x M3x20 or M3x25 screws (both can be used)
- 20x M3 nut
- 8x spool holder clamp





B. Connections

Plug the fan and the LED according to the illustration below. They motors can be plugged in only one orientation.





CONGRATULATION