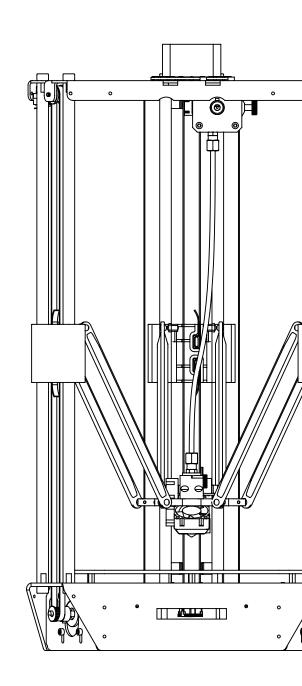




ASSEMBLY INSTRUCTIONS





INTRODUCTION



• Target :

Propose a visual assembly instruction guide of the MicroDelta Rework.

• Designers of the MicroDelta Rework :

eMotion Tech: http://www.emotion-tech.com

Hugo FLYE Mohamad KOUBAR Thibault MOREL

Authors of this document :

eMotion Tech: http://www.emotion-tech.com

Mohamad KOUBAR Anthony BERNA Hugo FLYE

• Photographics credits :

Pictures and 3D representations made by eMotion Tech : http://www.emotion-tech.com

• Sources :

http://reprap.org/wiki/reprap

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http://creativecommons.org/licenses/by-nc-sa/4.0/



• Update:

Last update: 28/03/2017

• Links :

You can find more informations on the following links:

eMotion Tech's website : http://www.emotion-tech.com RepRap community : http://reprap.org/wiki/reprap





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MICRODELTA REWORK INTRODUCTION

The MicroDelta Rework 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 : Ø150x200mm

• Layer height : [0.1 - 0.4]

• Electronic type : eMotronic (32 bits, 96 MHz)

Motors : NEMA 17Belt type : GT2

• Extrusion Head : Hexagon 0.4

• Dimensions: Height 440mm, Width 250mm, Depth 250mm

• Nominal printing speed : 80mm/s

• Max speed : 200mm/s

Nominal travel speed: 150mm/s

• Average precision (X,Y): 100 microns

• Average precision (Z): 50 microns

• Operating system : Windows, Linux and Mac OS

• Consumable : PLA 1.75mm (or ABS and others plastics with heated bed option)

• Provided with Repetier-Host pre-configured for µdelta

• Connectivity : USB

• Power supply provided: 24V, 150W

STRUCTURE

- Upper and lower plates made of bended stainless steel
- Machined aluminium core
- 10mm rectified Smooth rods
- Plastic injected sliders

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 adjustement with the software
- Easy to reload the filament



Documents and guides

User guide

How to use the MicroDelta Rework?

Under Windows and Linux: Windows / Linux User Guide

Under Mac OS X: MAC OS X User Guide

Other ressource

Configuration files

Path:

MicroDelta Rework > Logiciels-Software > Configuration

3D ressources

Differents 3D printed parts are availables for the MicroDelta Rework.

Path:

MicroDelta Rework > Ressources_3D >

IN CASE OF TROUBLE

Frequently Asked Questions

Path: «Support» section.

Link: Frequently Asked Questions



AVAILABLE OPTIONS

In order to upgrade your printer to make its use more pleasant, it is possible to add different elements :

- Heating bed kit up to 110°C
- LCD controller screen to print without a computer

Coming soon:

- Lighting LED designed for the Micro Delta Rework
- Dual extrusion head for bi-color printing



SAFETY INSTRUCTIONS

General safety instructions

NEVER LEAVE THE PRINTER WORKING WITHOUT SUPERVISOR.

The nozzle can reach 270°C, do not touch the nozzle while the printer is working.

A supervisor is needed when the printer is used with young people.

KEEP PRINTER AWAY FROM CHILDREN AND ANIMALS

Operate in a ventilated room. Plastic vapors effets 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 own responsibility. Safety can be improved by :

- An emergency stop button
- Housing protection
- Smoke detector

Electrical safety

The power supply provided is labelled CE. The power supply is protected against short-circuit and do not need any modification. The µdelta operate at 12V and is not concerned by the low voltage directives.

Further informations

Informations above are not exhaustive.

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

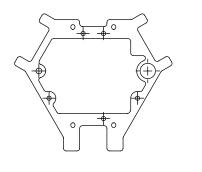
We assume no liability for loses, injuries or damages due to assembly, transporting, storage or removal of the product.



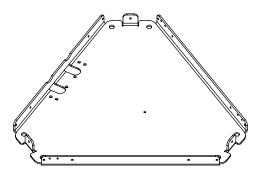
ASSEMBLY



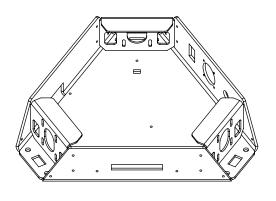
A. Metal parts



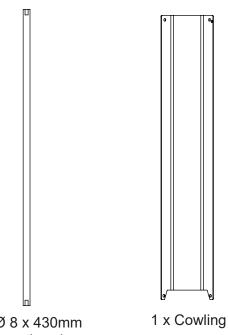




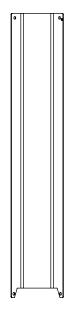
1 x Upper plate



1 x Lower plate



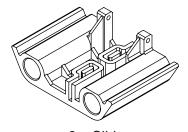
6 x Ø 8 x 430mm smooth rod



B. Plastic parts

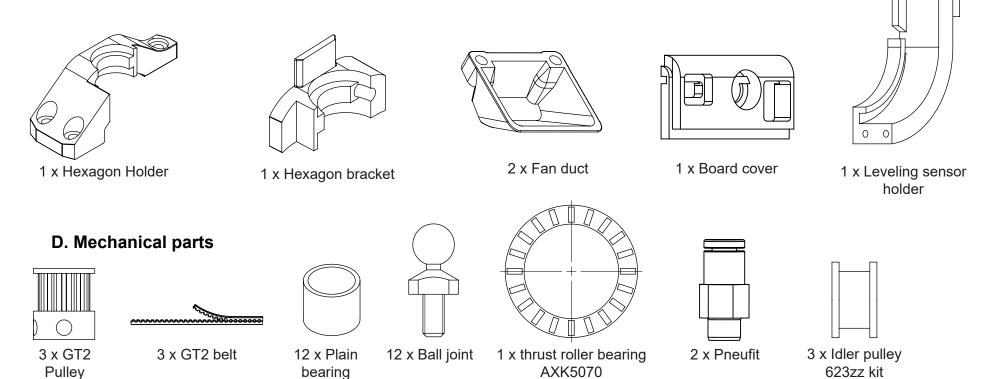


6 x Connecting rod

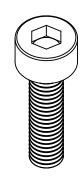


3 x Slider

C. Printed parts

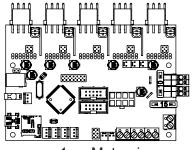


E. Hardware

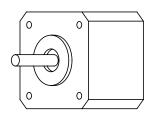


- 6 x M2.5x8 Screw
- 2 x M2.5x12 Screw
- 29 x M3x8 Screw
- 14 x M3x12 Screw
- 4 x M3x20 Screw
- 12 x M6x16 Screw
- 16 x M3 Washer
- 2 x M3 Knurled nut
- 1 x M5x12 Knurled screw
- 10 x 3mm Spacer

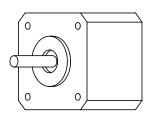
F. Electronic



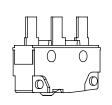
1 x eMotronic



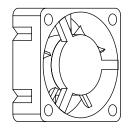
3 x Short motor (34 mm)



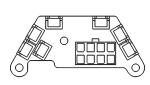
1 x Long motor (48 mm)



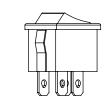
3 x endstop (color connectors)



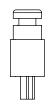
4 x 3 cm fan



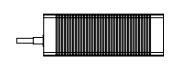
1 x Interfacing board



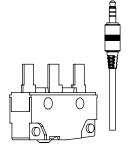
1 x ON/OFF Switch



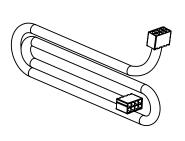
1 x Reset button



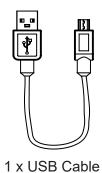
1 x Power supply



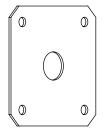
1 x Bed leveling sensor



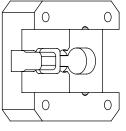
1 x Core extension cable



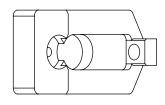
G. Kit Extruder



1 x Extruder cover



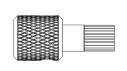
1 x Body extruder



1 x Mobile extruder



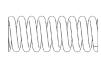
1 x Knurled screw M5x12 mm



1 x Driving wheel



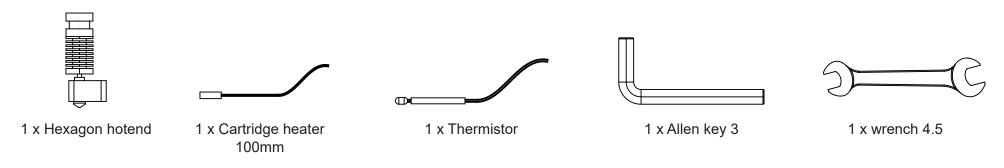
1 x 693zz bearing

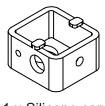


1 x Spring

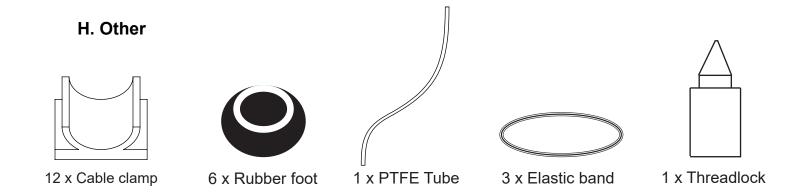


H. Kit Hexagon (printhead)





1 x Silicone cap





LIST OF NEEDED TOOLS

- Wrench 5.5; 8; 9; 10.
- A set of allen key (fournie)
- Cutting pliers
- WD40

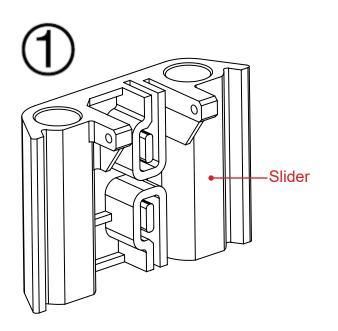
MECHANICAL ASSEMBLY

SLIDERS ASSEMBLY

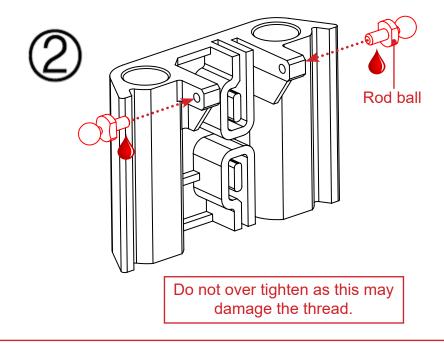
Needed parts:

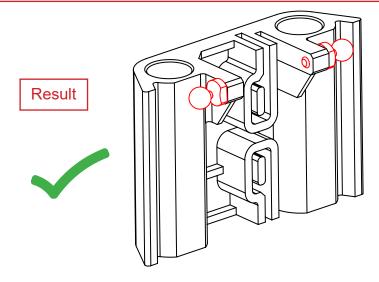
- 3 x Slider
- 6 x Rod ball
- 12 x Plain bearing

Target : screw the 6 ball joints (2 per slider) as shown in the following figures.





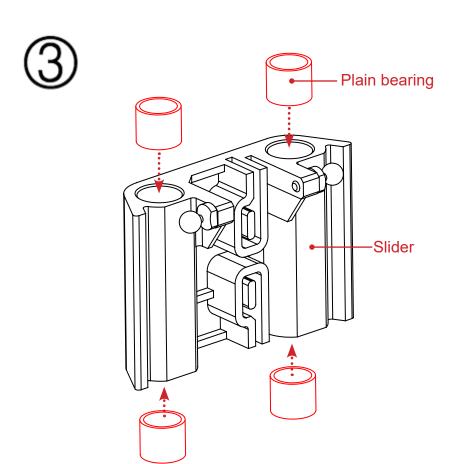


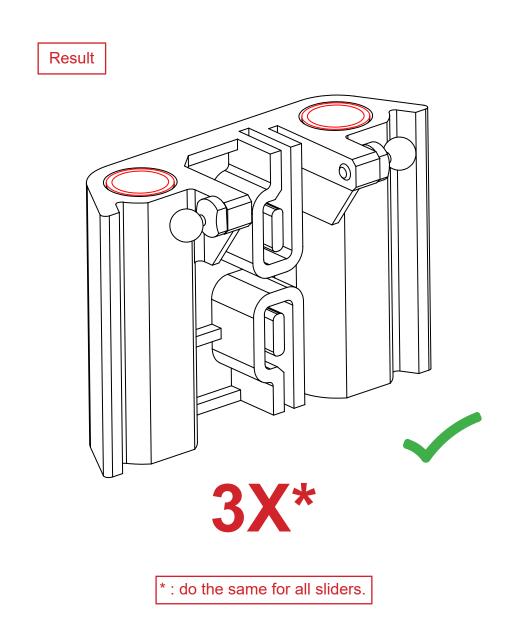




*: do the same for all sliders.

Target: insert the plain bearings in their housing as shown below (4 pieces per slider).

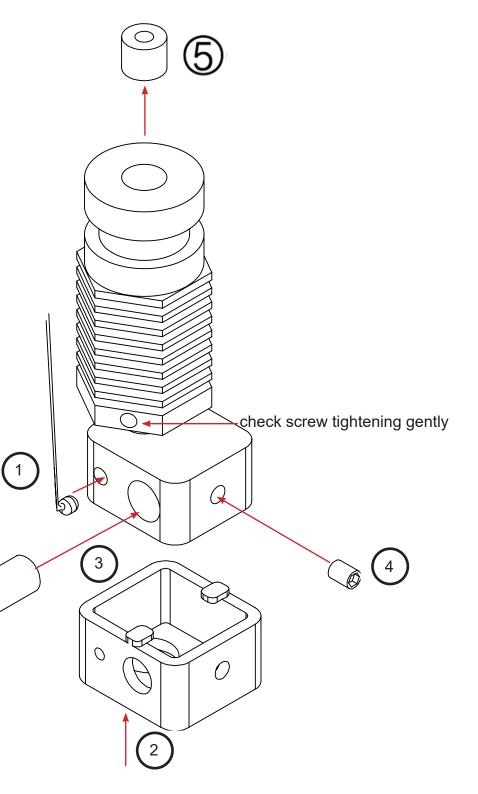


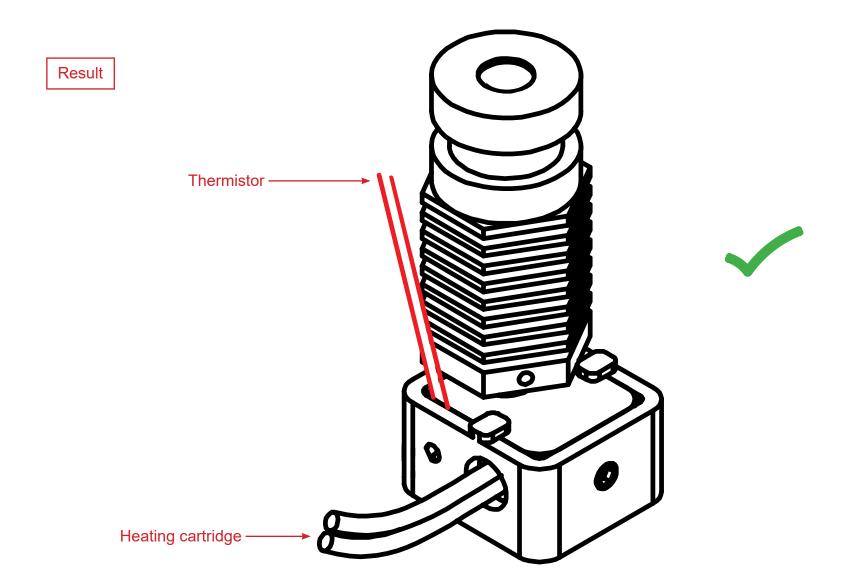


PRINTHEAD ASSEMBLY

- 1°) thermistor into the heating block (fold the thermistor's cables)
- 2°) silicon sleeve on to the heating block
- 3°) heater cartridge into the heating block
- 4°) grub screw in the heating block
- 5°) Unscrew the brass insert (not used)

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



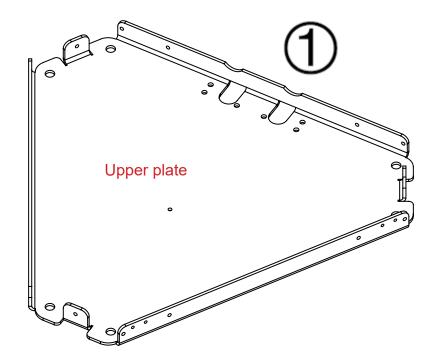


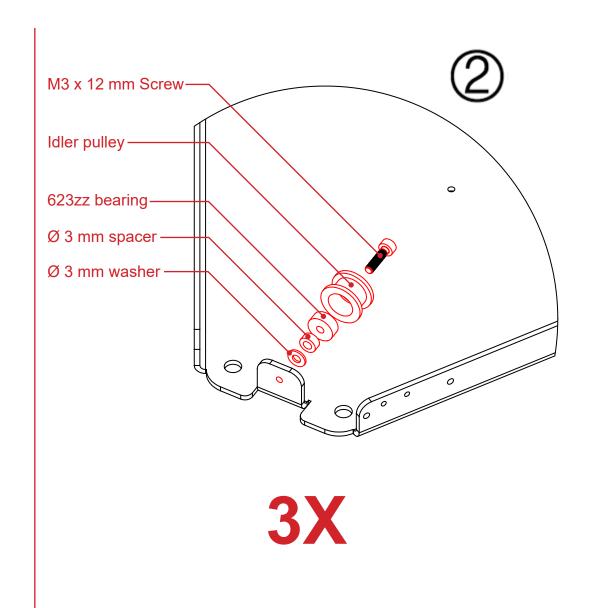
UPPER PLATE ASSEMBLY

Needed parts:

- 1 x Upper plate
- 3 x Idler pulley
- 3 x Endstop
- 3 x Ø 3 mm spacer
- 3 x Ø 3 mm washer
- 3 x M3 x 12 mm screw
- 3 x 623zz bearing
- 6 x M2,5 x 8 mm

Target: mount the pulleys on the upper plate







Target: mount the endstops on the upper plate

Each endstop connector has a different color :

Alpha axis endstop : redBêta axis endstop : blue

- Gamma axis endstop : yellow

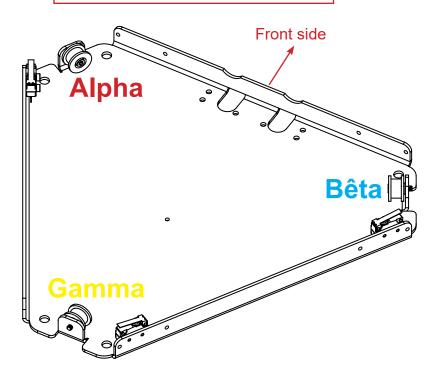


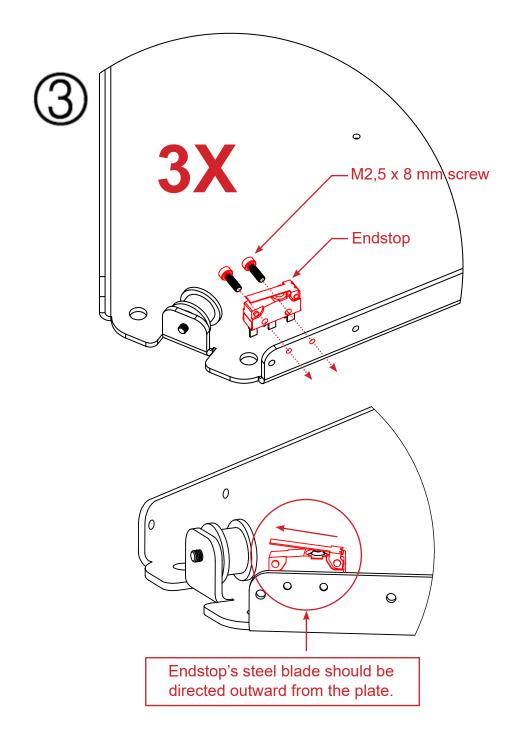


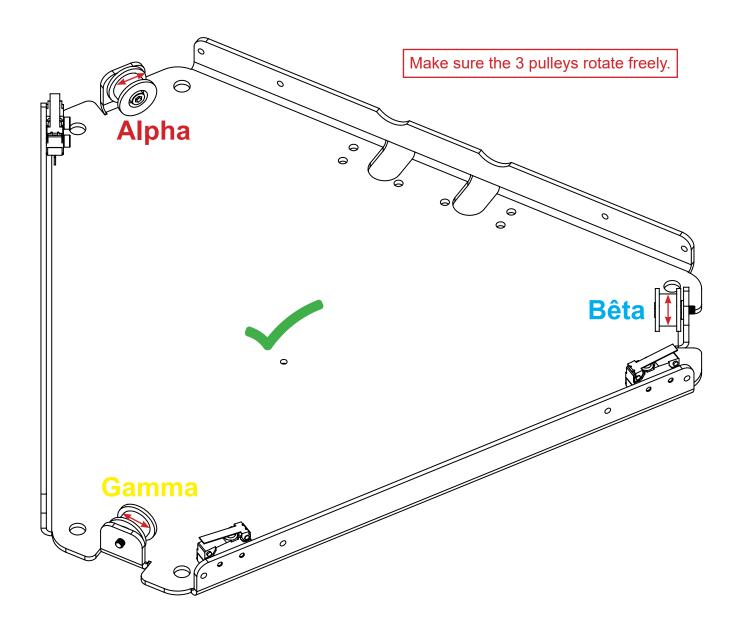


Be sure to mount each endstop on its dedicated location. Respect the color code.

Pay attention to the direction of mounting.





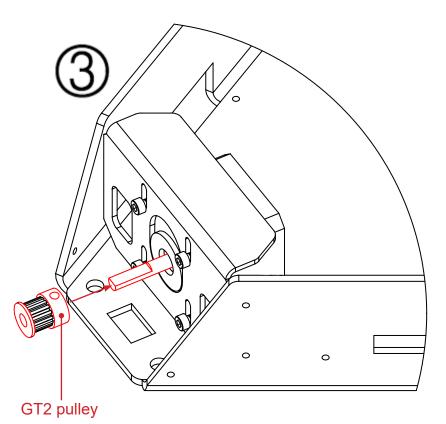


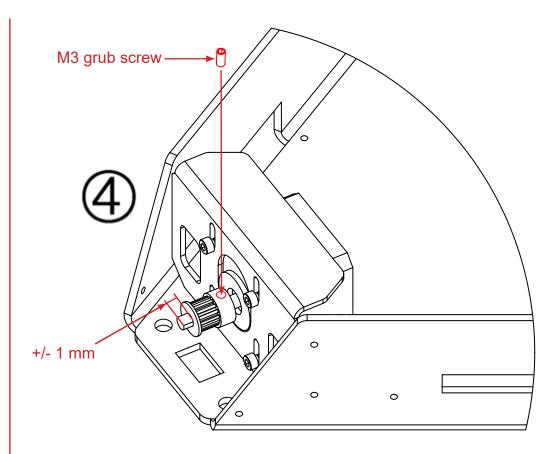
If you have the HeatBed option, please go to the page 72 to mount this element!

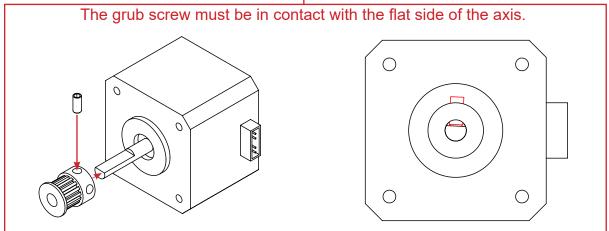
LOWER PLATE ASSEMBLY

Needed parts: Repeat the operation on the two other towers & check the motor's 1 x Lower plate orientation using the connectors 3 x Short motor as reference 16 x M3 x 8 mm screw 12 x Ø 3 mm washer 3 x GT2 pulley 4 x M3 x 12 mm screw 1 x 3 cm fan 1 x On/Off switch 1 x «Reset» button 4 x Ø 3 mm spacer 1 x eMotronic board Target: mount the stepper motors on the lower plate Short motor Motor's connector Ø 3 mm washer M3 x 8 mm screw Allow gravity to drop the motor to the bottom of the notch and pretighten a single screw to hold the motor in this position.

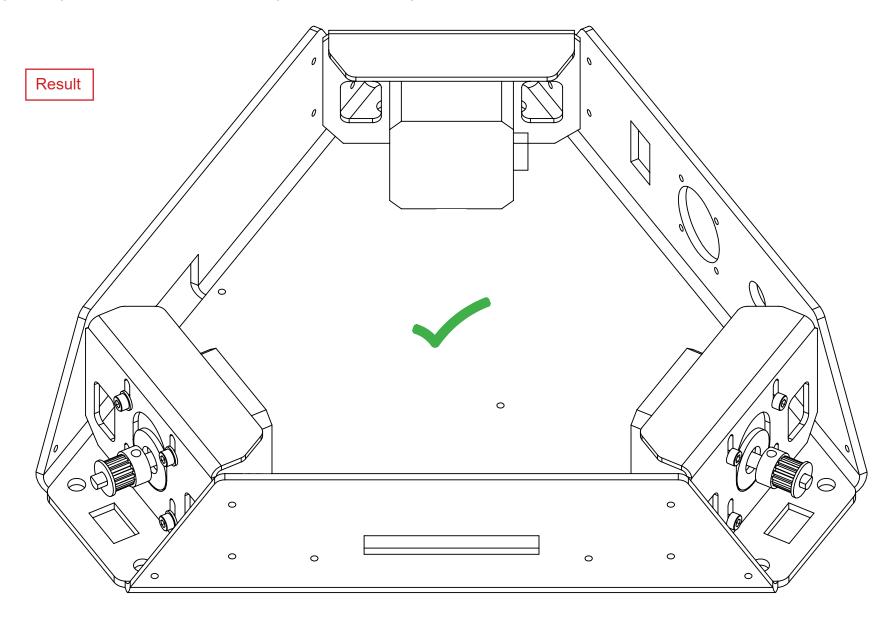
Target: mount GT2 pulleys on the motor's axis



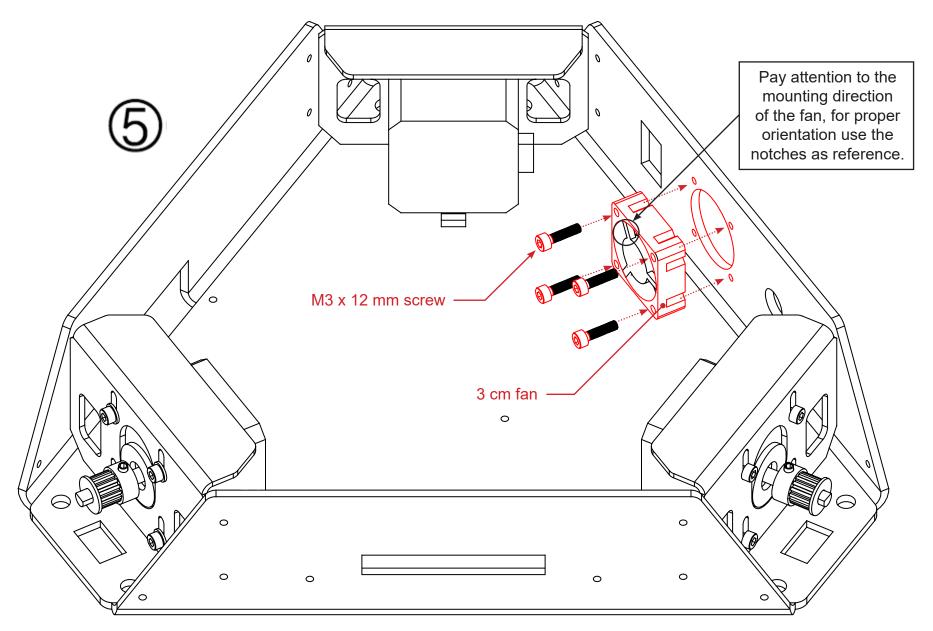




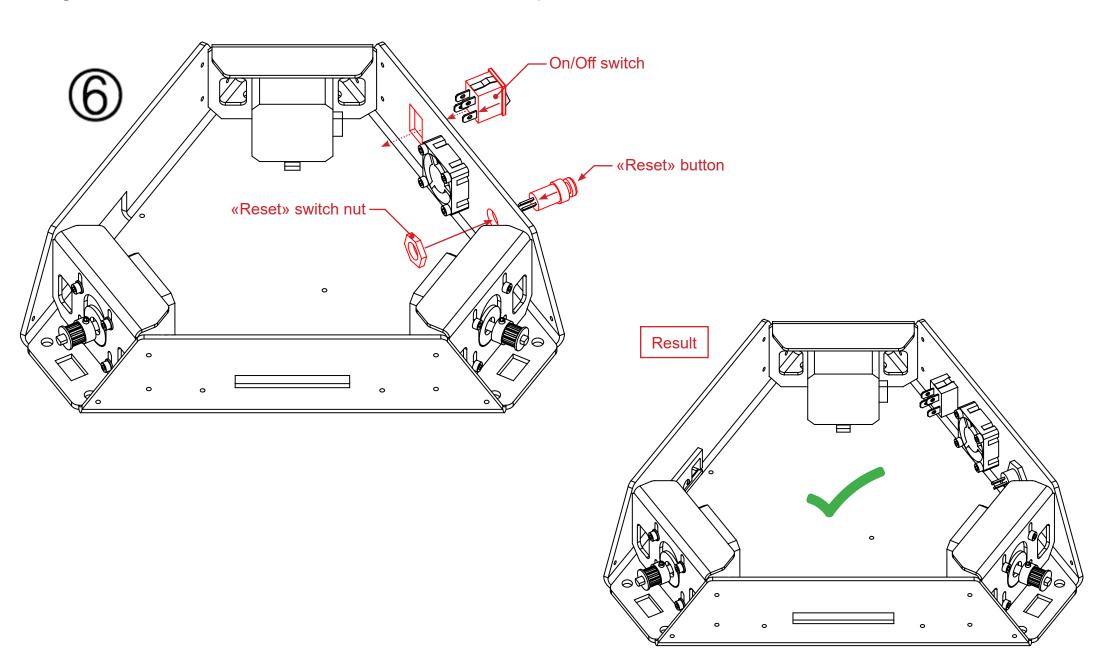
Target: repeat steps 2, 3 and 4 on the other two peaks of the lower plate.



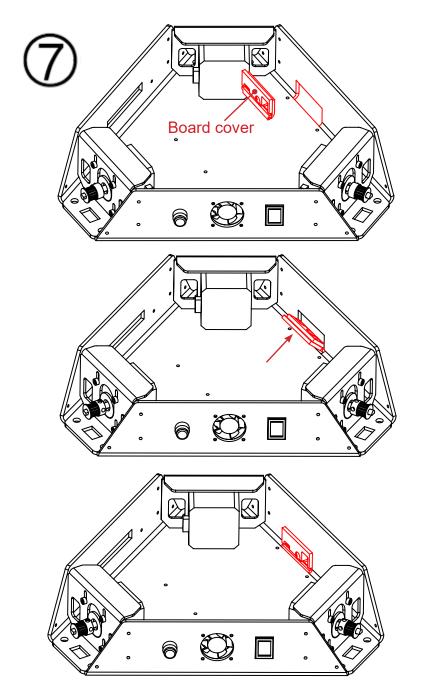
Target: fix the electronic board fan like shown below

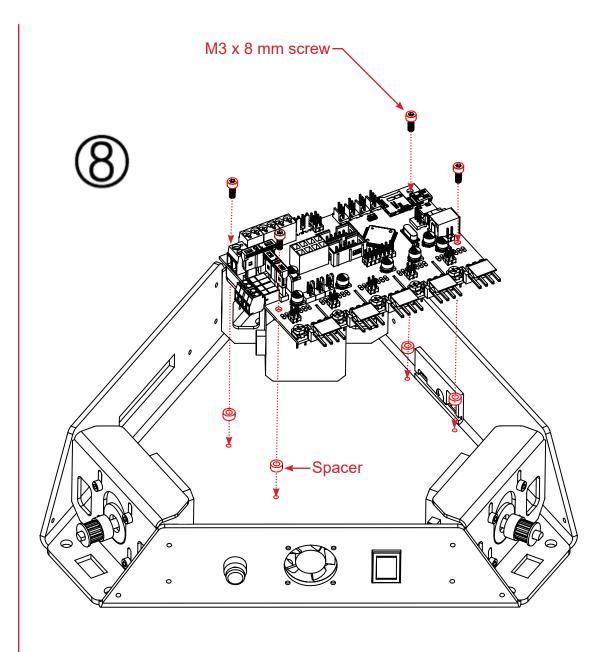


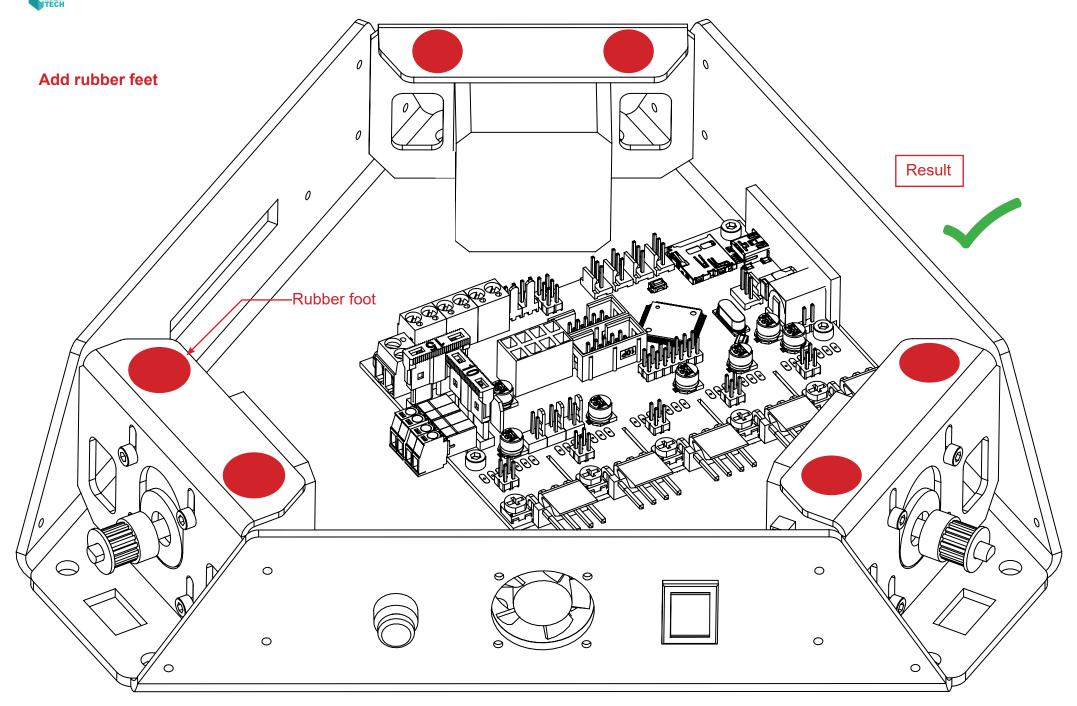
Target: mount the On/Off switch and the «Reset» button on the lower plate



Target: install the eMotronic board and its protective cover



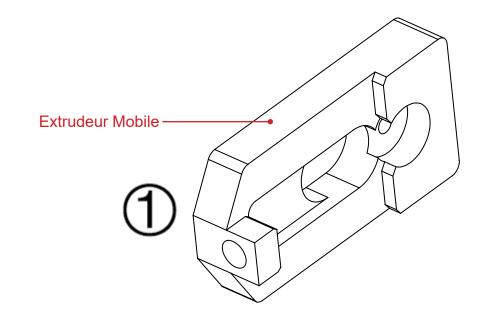


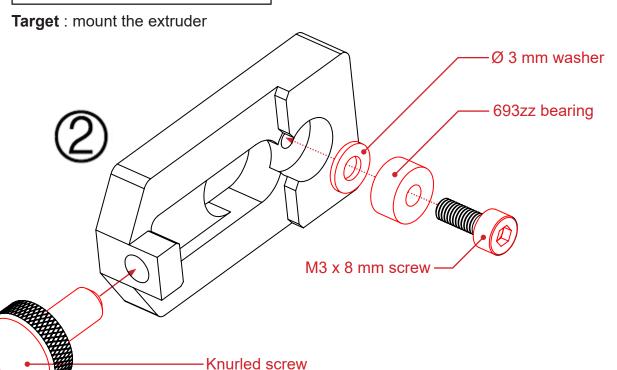


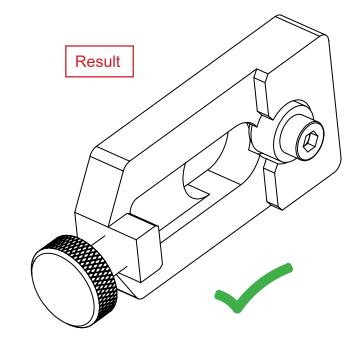
EXTRUDER ASSEMBLY

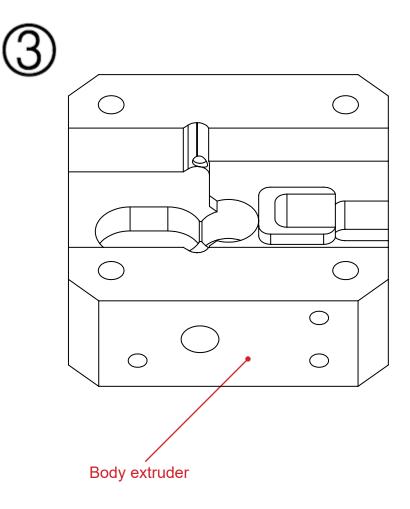
Needed parts:

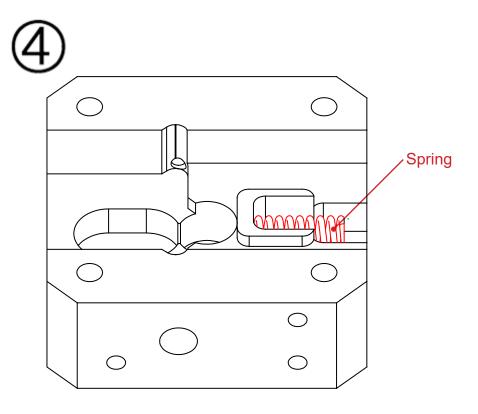
- 1 x Extruder cover
- 1 x Body extruder
- 1 x Extruder mobile
- 1 x Driving wheel
- 1 x M5 x 12 mm Knurled screw
- 1 x Ø 3 mm washer
- 1 x 693zz bearing
- 1 x M3 x 8 mm screw
- 4 x M3 x 20 mm screw
- 1 x Long motor
- 1 x Spring









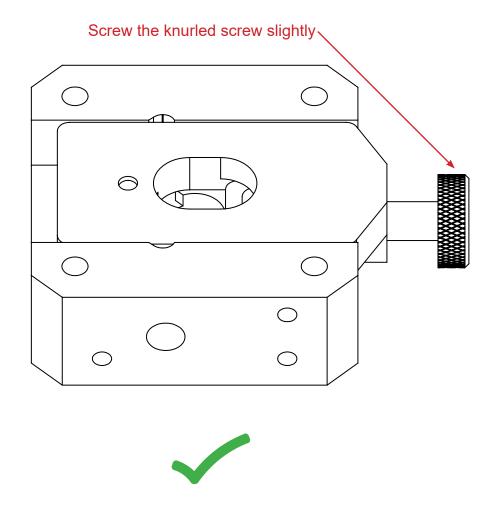




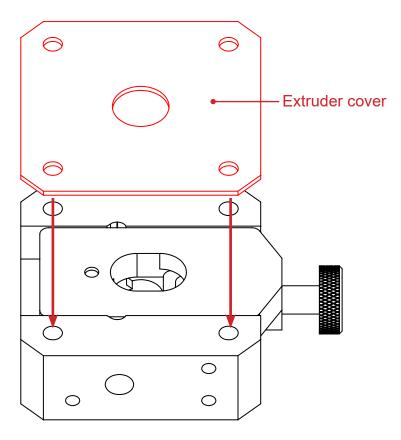
Place «Extruder Mobile» on «Body extruder.» The spring should remain in its place.

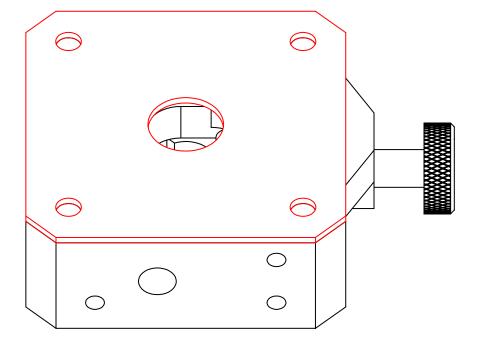
Extruder mobile

Body extruder

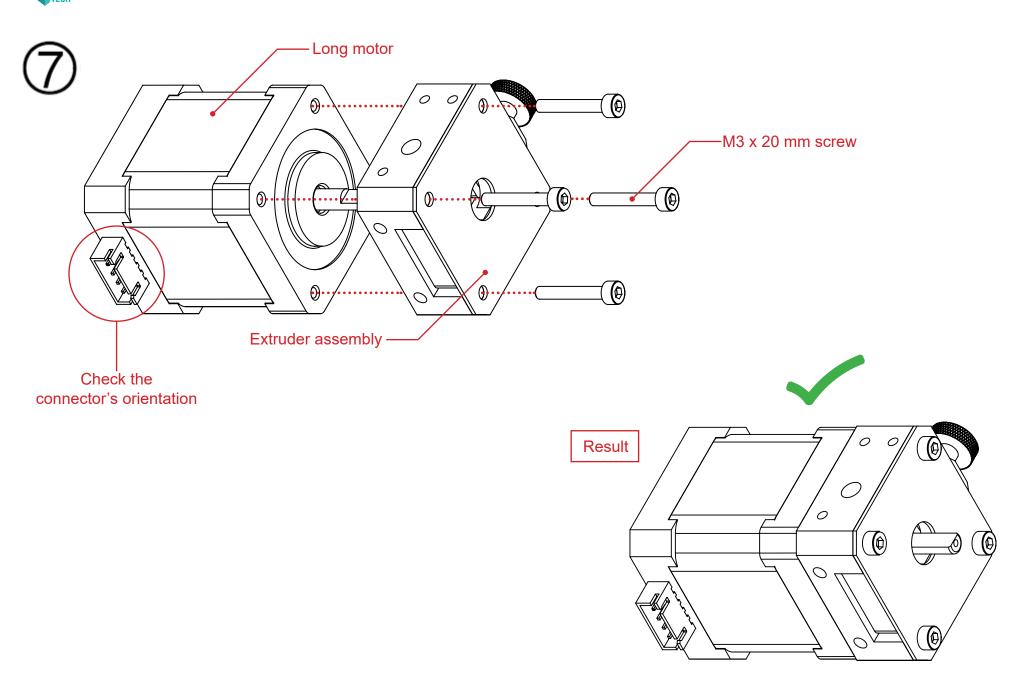


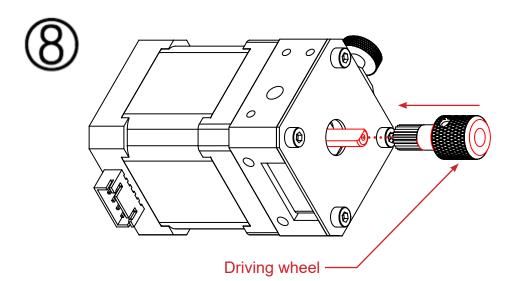


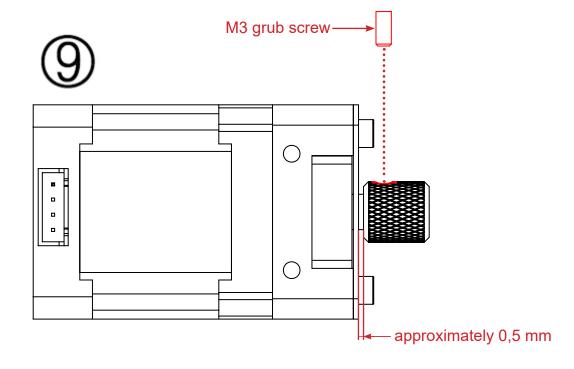


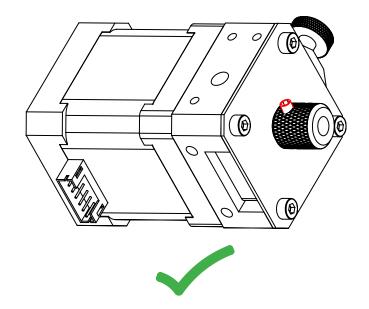


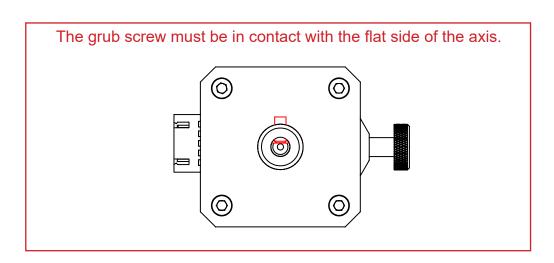














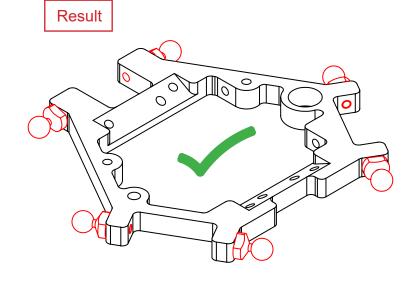
CORE ASSEMBLY

Needed parts:

- 1 x Core
- 6 x ball joints
- 3 x 3 cm fan
- 4 x M3 x 8 mm screw
- 3 x M3 x 12 mm screw
- 5 x M3 x 20 mm screw
- 2 x Fan duct
- 3 x Ø 3 mm spacer
- 1 x Hexagon holder
- 1 x Hexagon bracket

Ball joint

Core

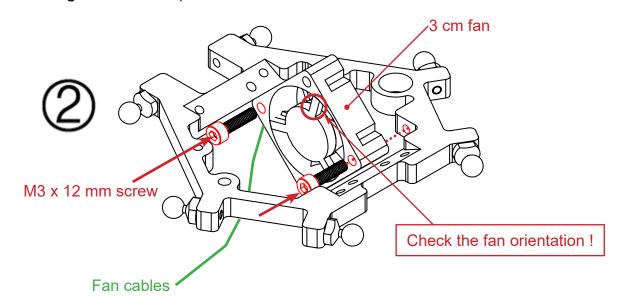


Target: mount the ball joints on the core

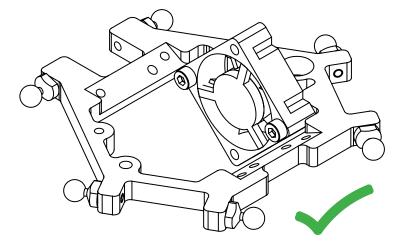


= add some threadlock to the thread

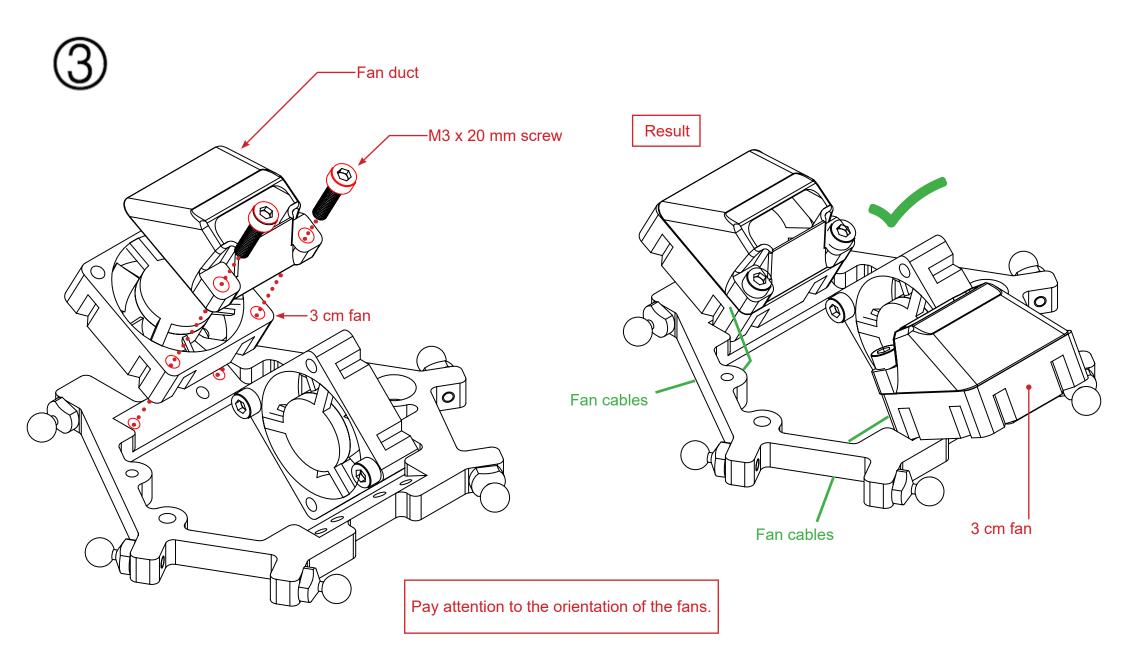
Target: mount the prinhead's fan



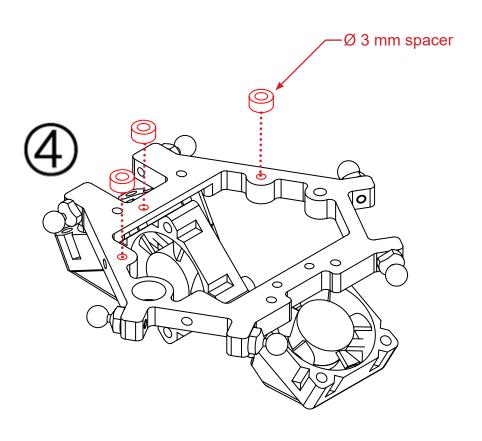


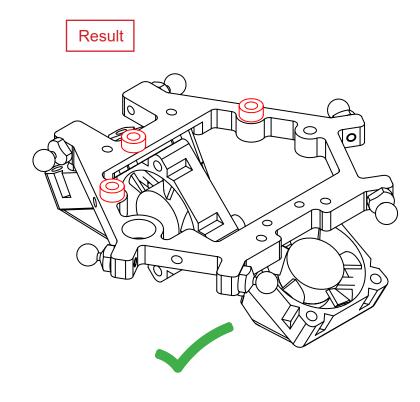


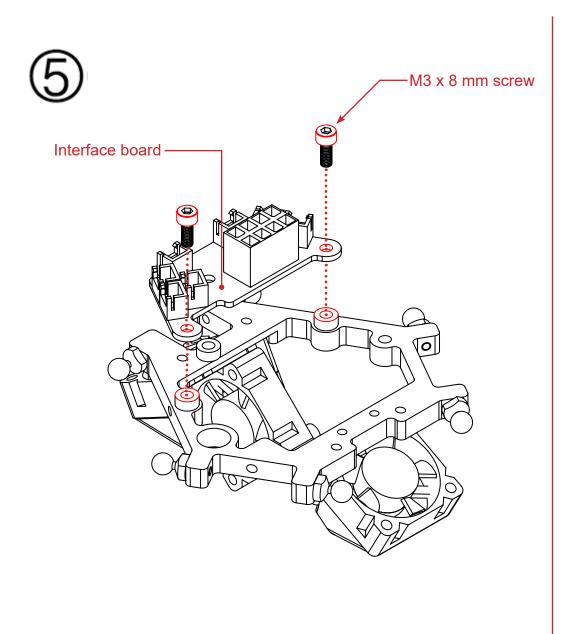
Target: mount the 2 other fans



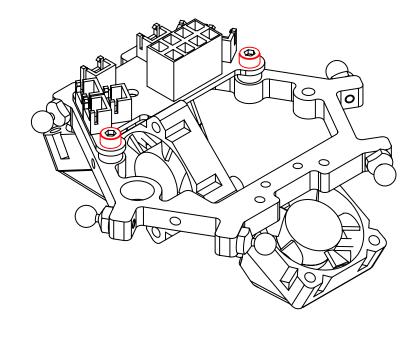
Target: mount the interface board on the core





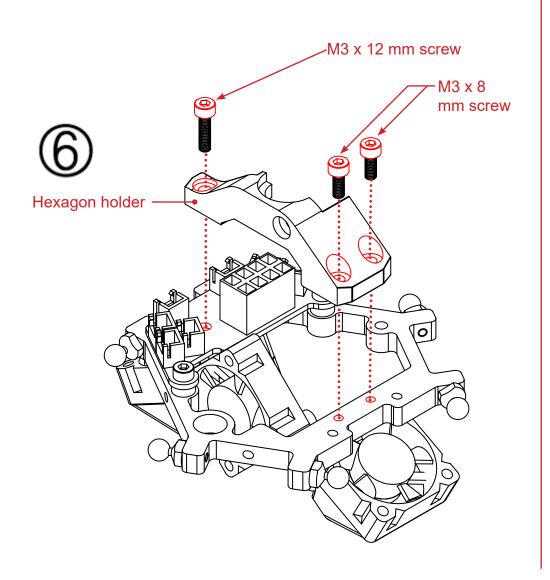


Result

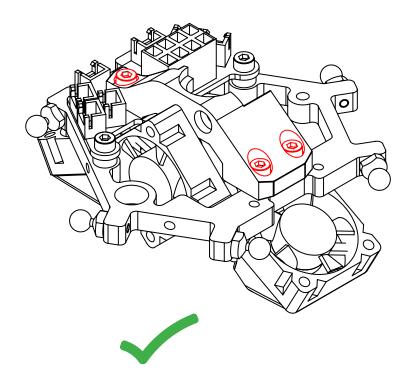




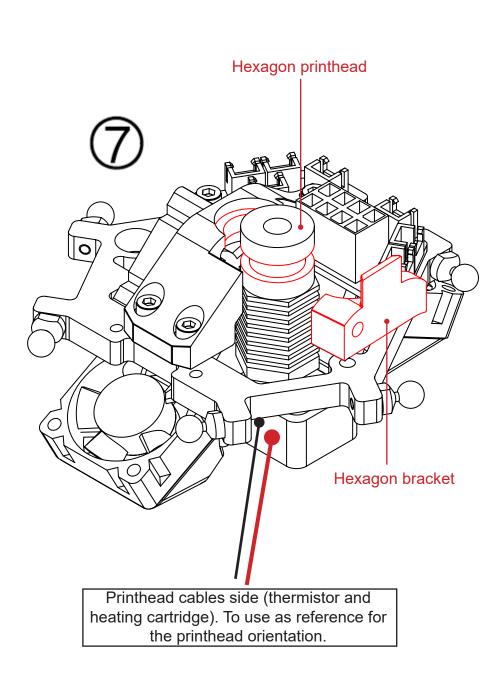
Target: mount the Hexagon holder on the core

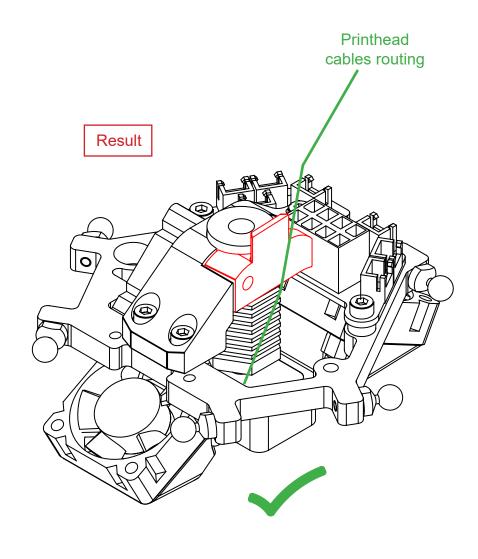


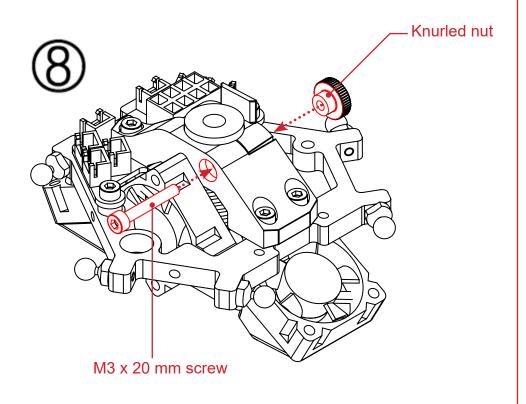
Result



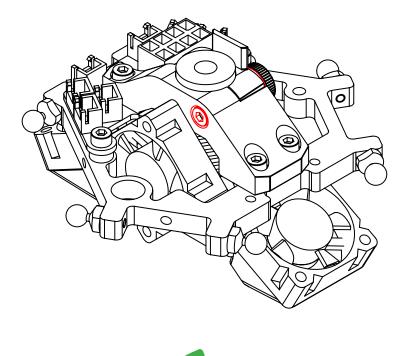
Target: mount the printhead and the bracket





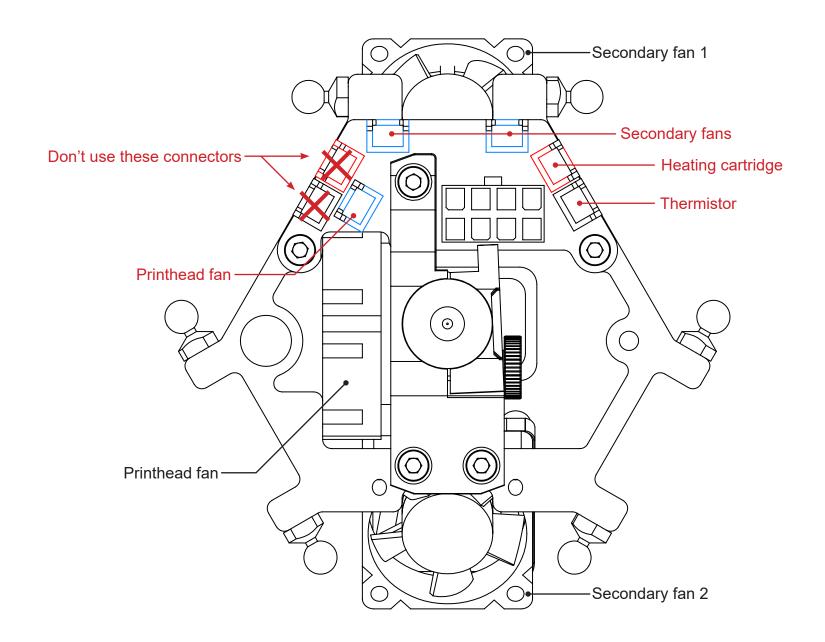


Result





Target: connect core's components on the interface board

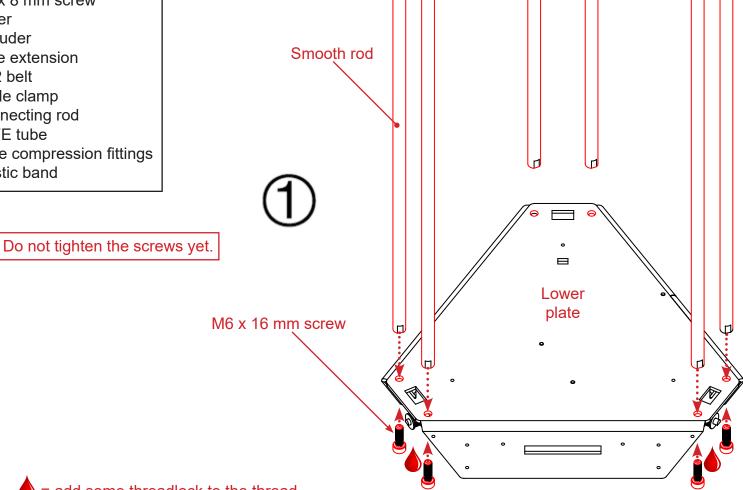


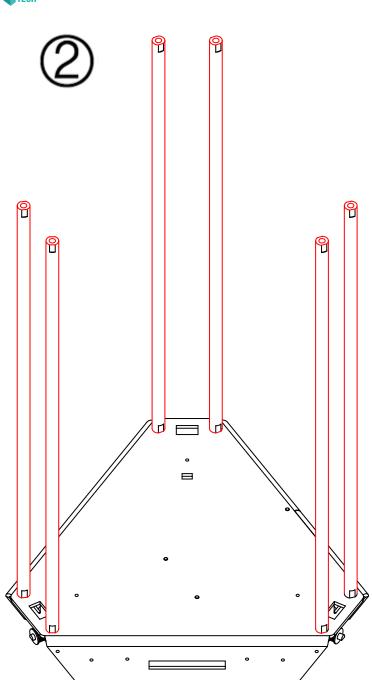
FINAL ASSEMBLY

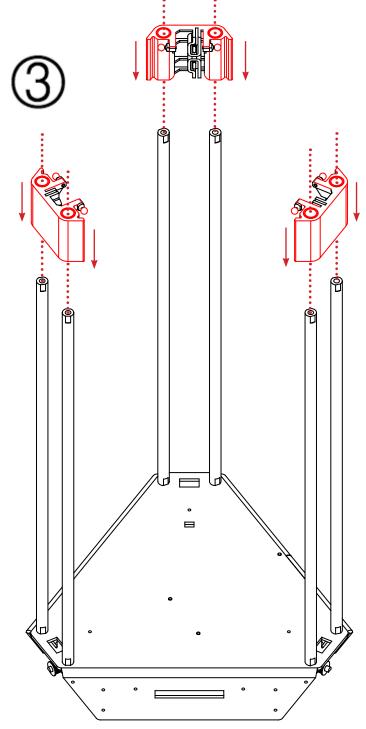
Needed parts:

- 1 x Lower plate
- 1 x Upper plate
- 1 x Cowling
- 6 x Smooth rod
- 12 x M6 x 16 mm screw
- 7 x M3 x 8 mm screw
- 3 x Slider
- 1 x Extruder
- 1 x Core extension
- 3 x GT2 belt
- 11 x Cable clamp
- 6 x Connecting rod
- 1 x PTFE tube
- 2 x Olive compression fittings
- 3 x Elastic band

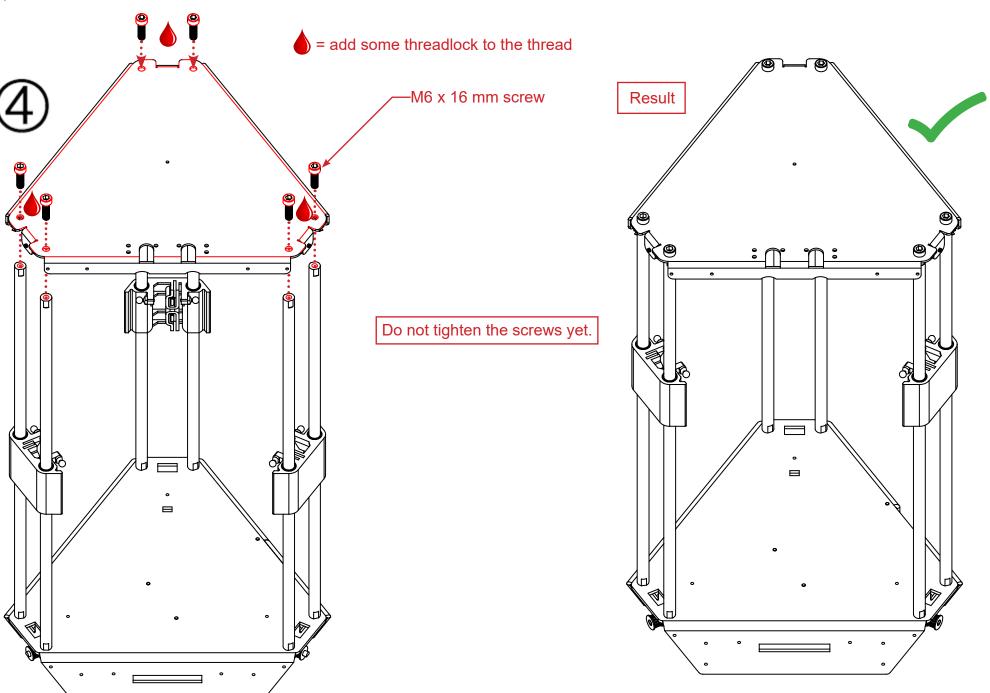
Target: assemble the machine and each of the pre-assembled elements











Target: tighten the smooth rods and check that sliders slide as free as possible.

Warning: this step is very important. It is imperative for the proper functioning of translations in order to obtain the best printing quality.

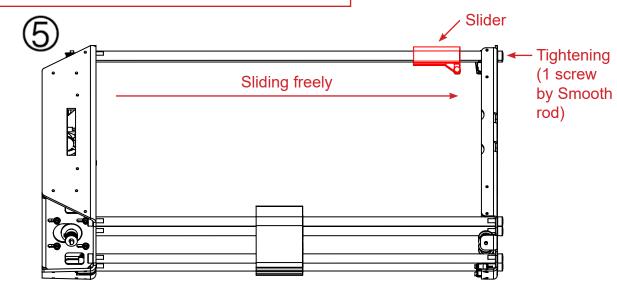
Adding WD40 to the rods and plain bearings will greatly assist sliding.

Process description

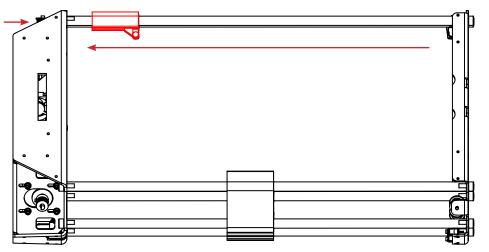
- 1) Lay the printer on its side as shown in Figure # 5.
- 2) Push the slider to the far right and tighten screws on this side.
- 3) Push the slider to the far left and tighten the screws on the **left side**.
- 4) Push the slider again **to the far right** and check that it slides well. If it is not the case, loosen the right screws and re-tighten.
- 5) Push the slider again to the left and check that it slides well. If this is not the case, loosen the left screws and re-tighten.
- 6.) Repeat this process as many times as necessary until the slider slide freely. Low resistance on the left side is ok (next to the bottom plate).

Repeat this process for each axis.

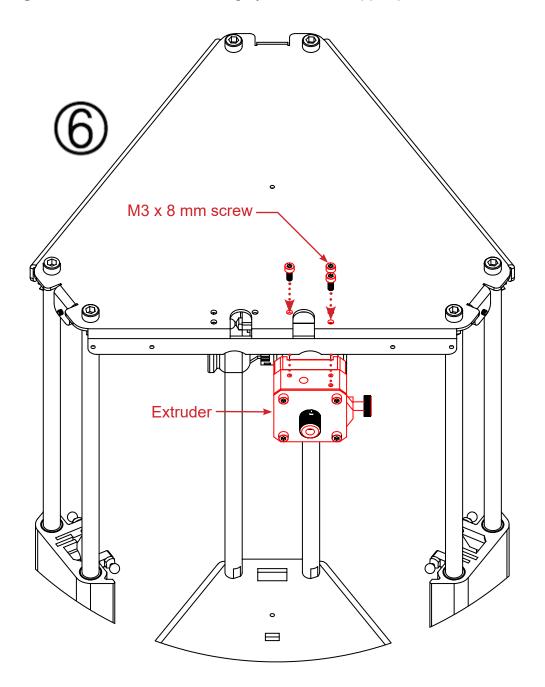
Note: if the sliding of a slider forces: you may need to remove one plane bearing of the 4 in the slider.

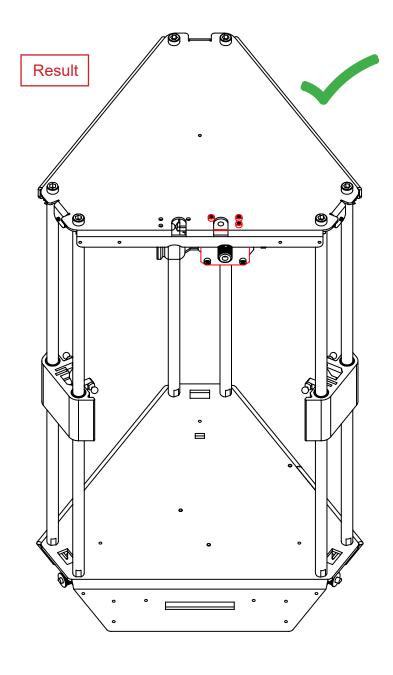




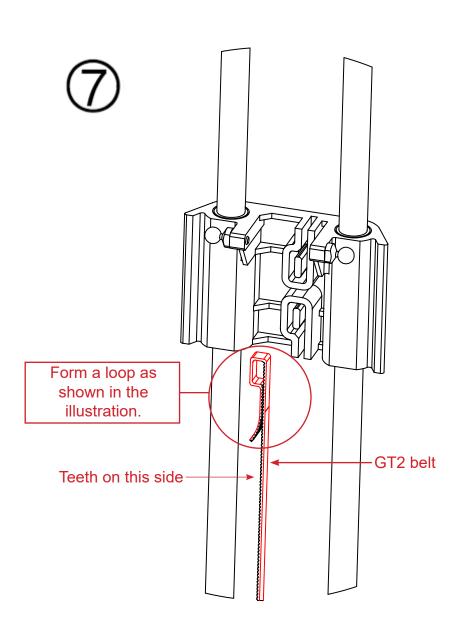


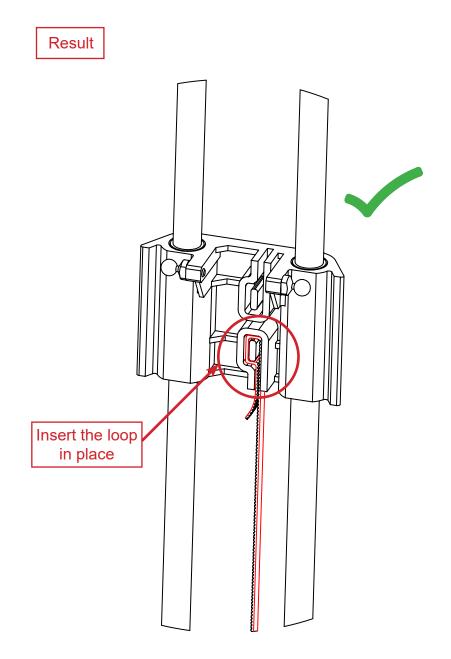
Target: mount the filament driving system on the upper plate

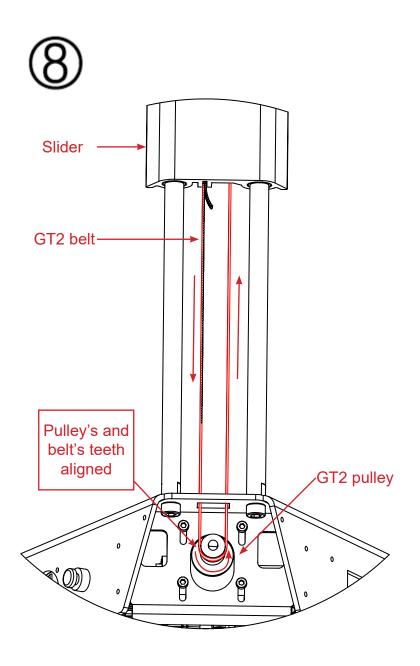


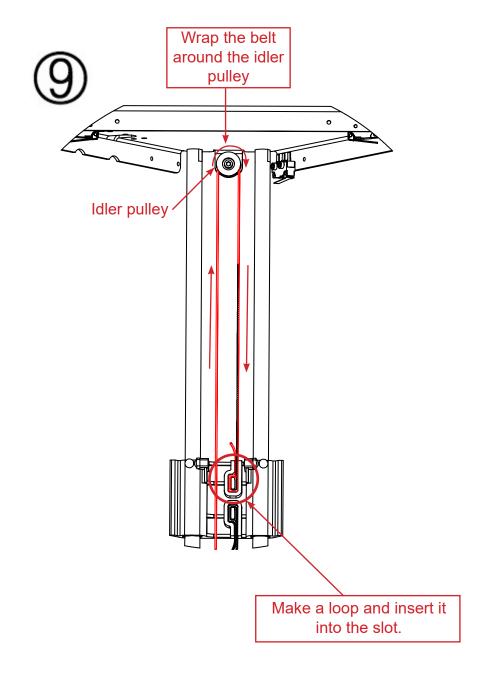


Target: mount the belts on each sliders

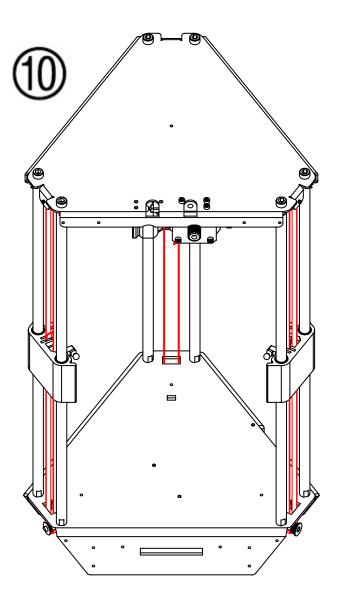






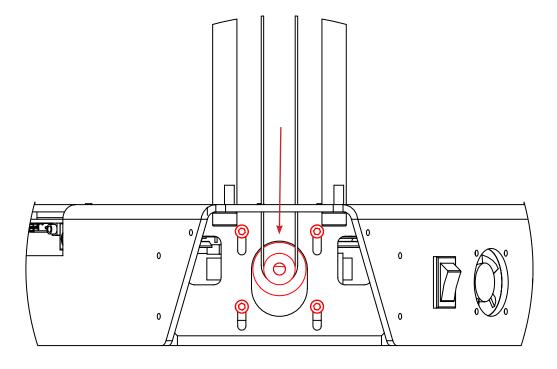


Mount a belt on each axis.

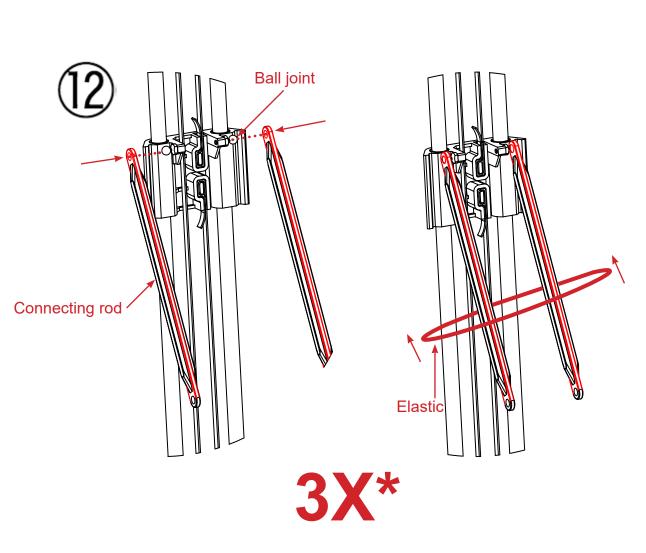




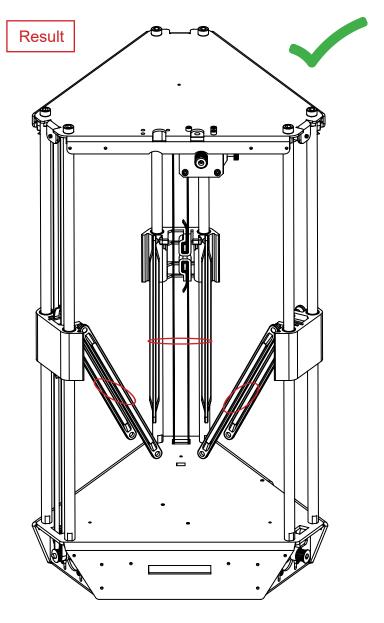
- 1) Loosen the screw holding the motor
- 2) Press the motor down **for tensioning the belt**
- 3) Tighten the four screws



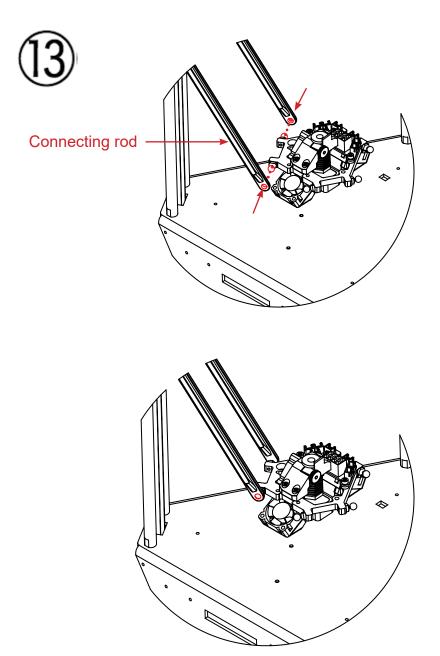
Target: clip the connecting rods on the sliders ball joints

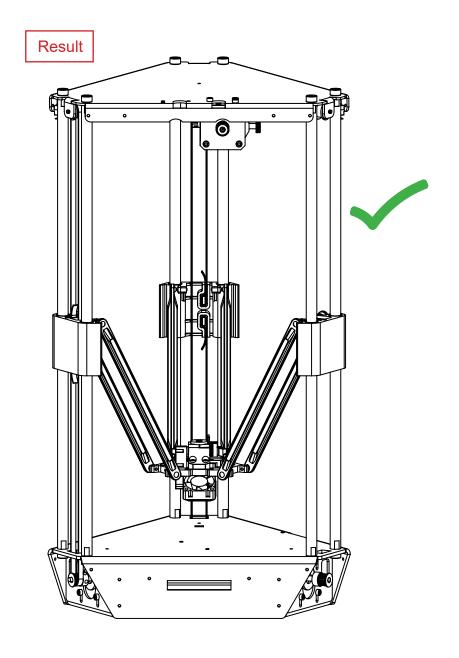


- Clip the connecting rods on the ball joints
- Put the 3 elastic bands around the connecting rods.

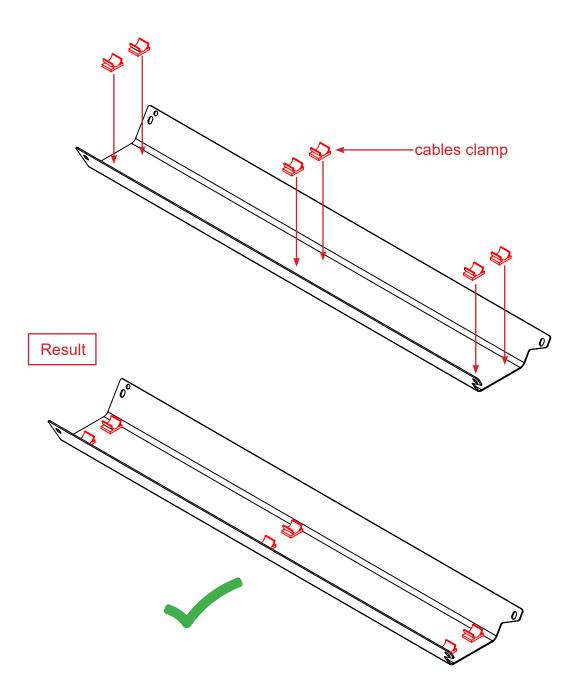


Target: clip the connecting rods on the ball joints of the core

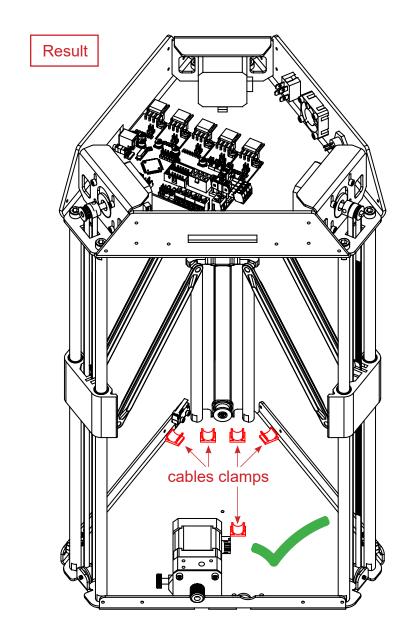




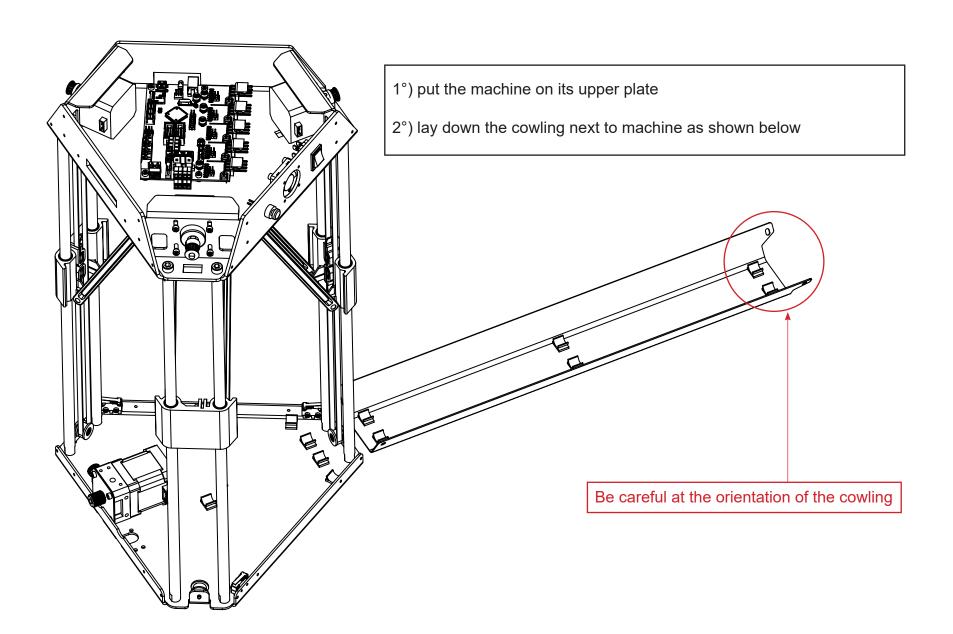
Target: stick cable clamps on the cowling

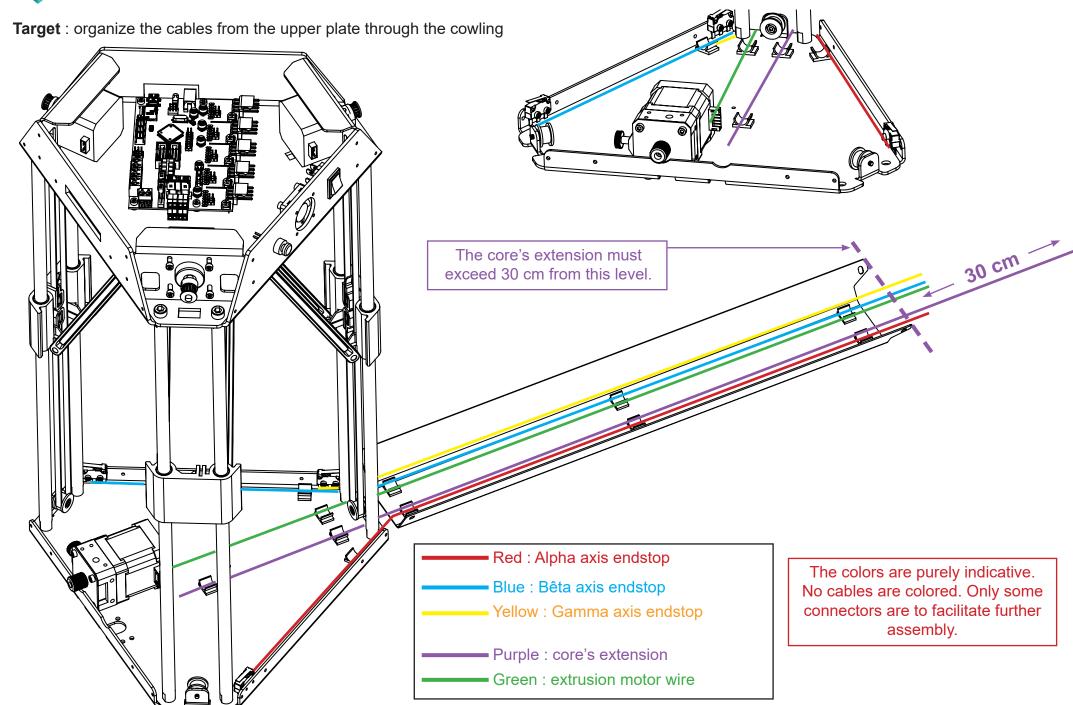


Target: stick the cable clamps on the upper plate

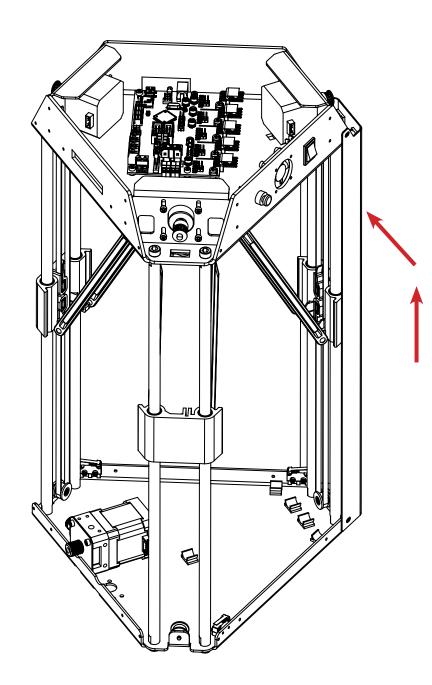


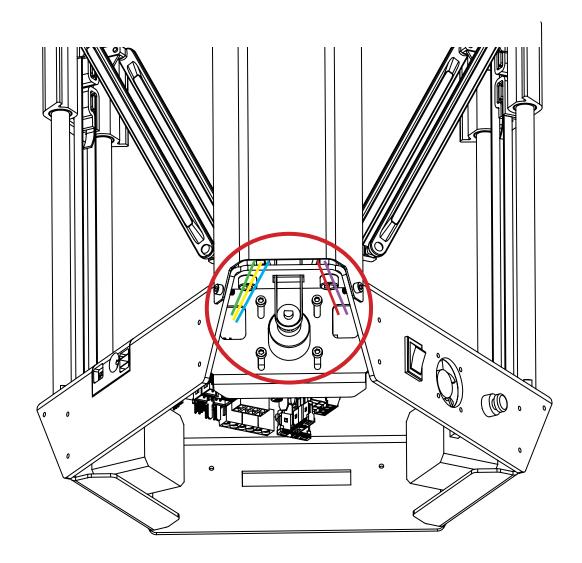
Target: prepare the machine and the cowling before wiring





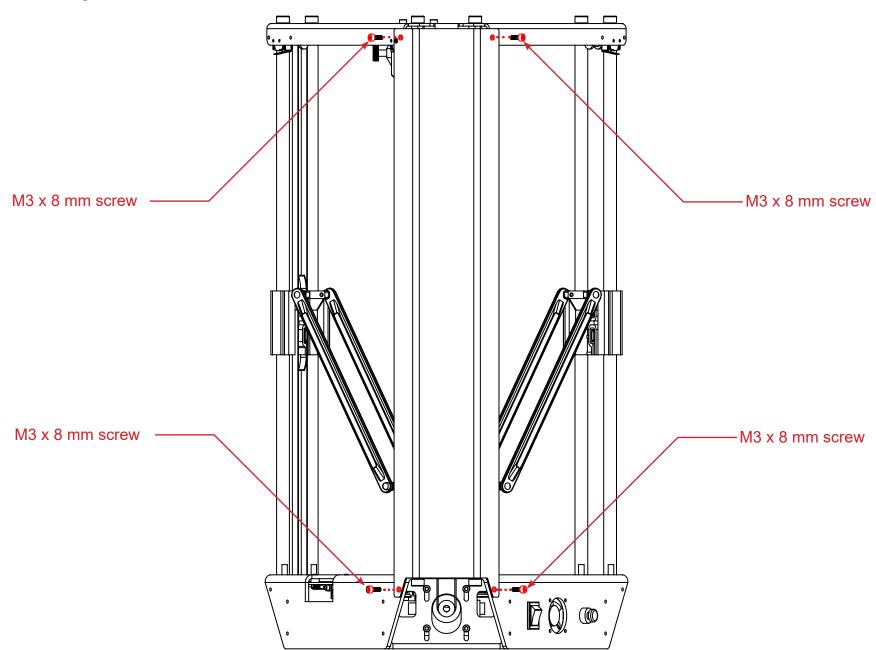
Stand up the cowling along the Z axis



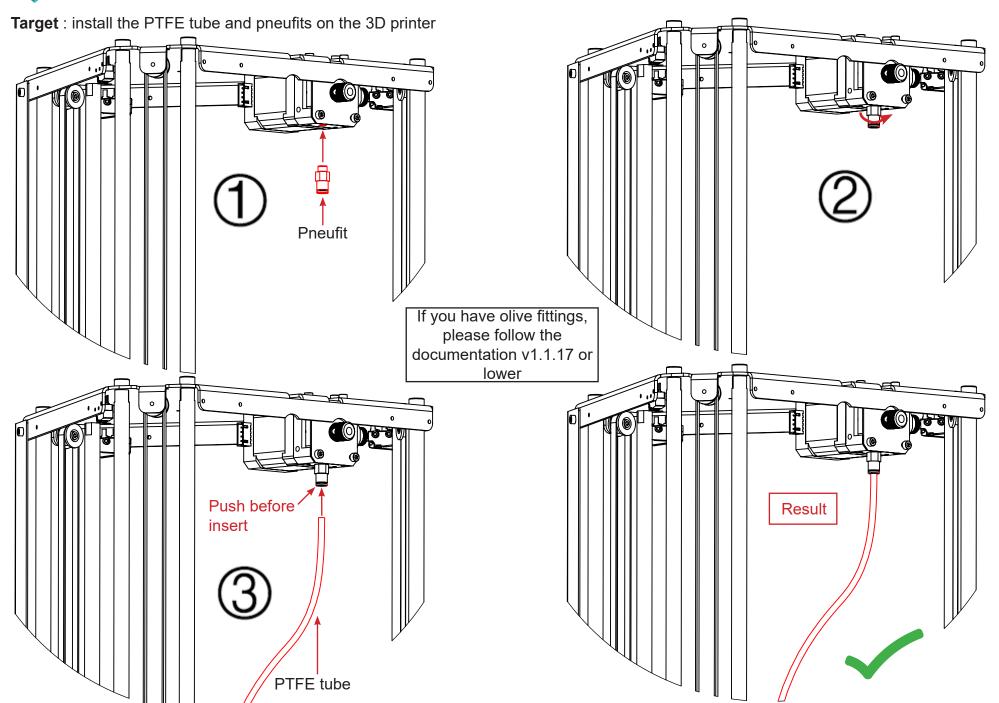


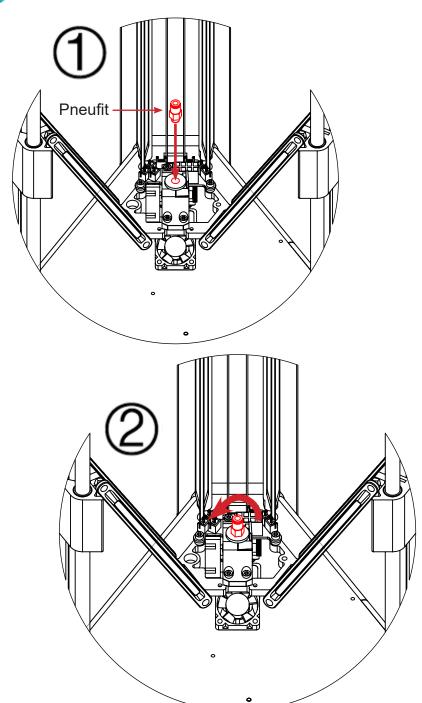
Route the cables through the two dedicated holes as shown above.

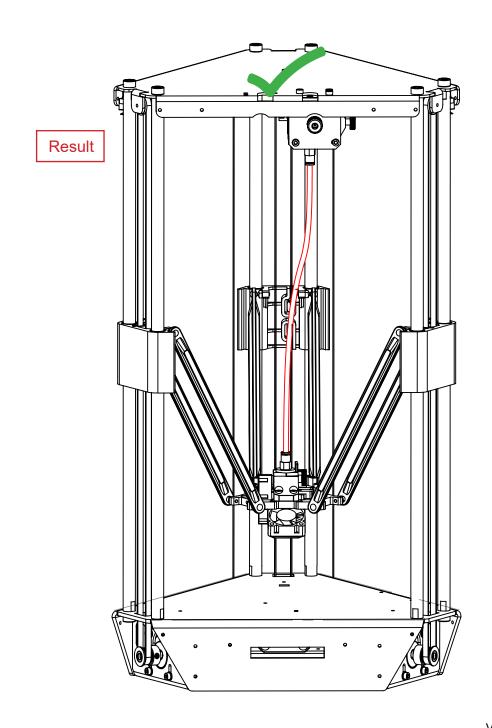
Target: Fix the cowling to the machine



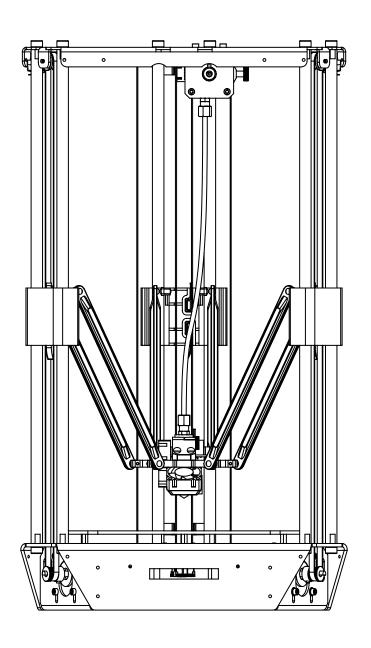


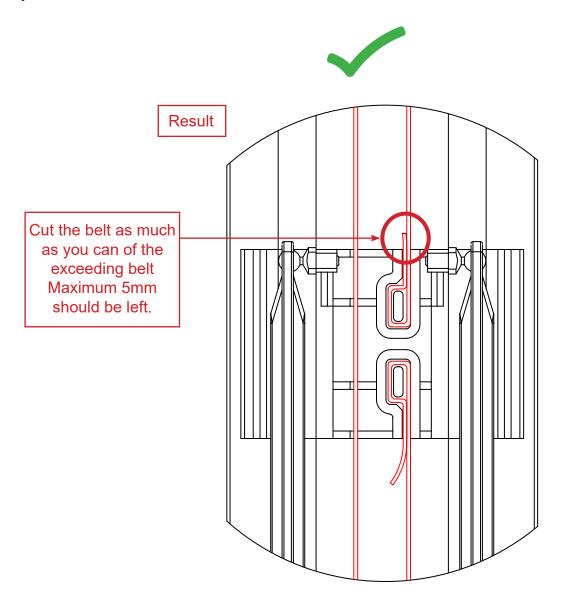






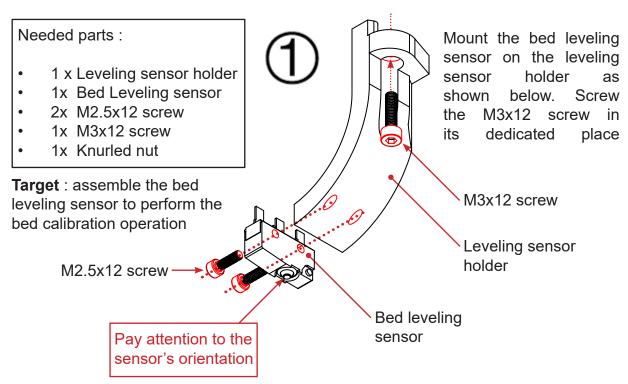
Target: cut the belt to prevent it stucking in the idler pulley

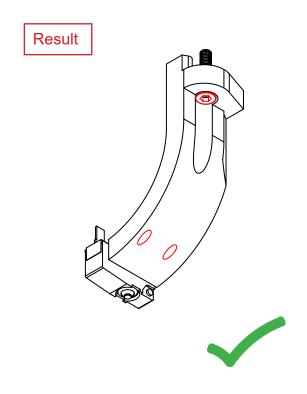




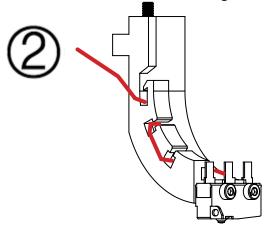


BED LEVELING SENSOR ASSEMBLY





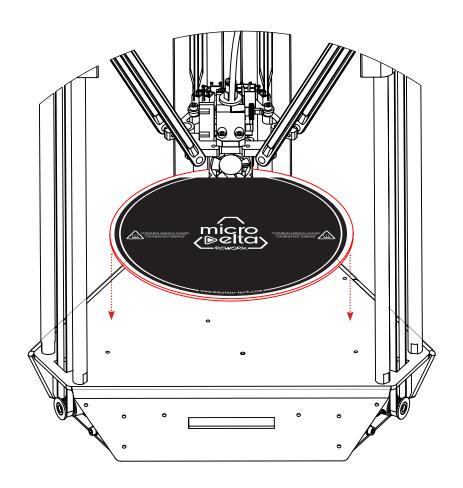
Route the sensor's cable through its dedicated slots on the leveling sensor holder.

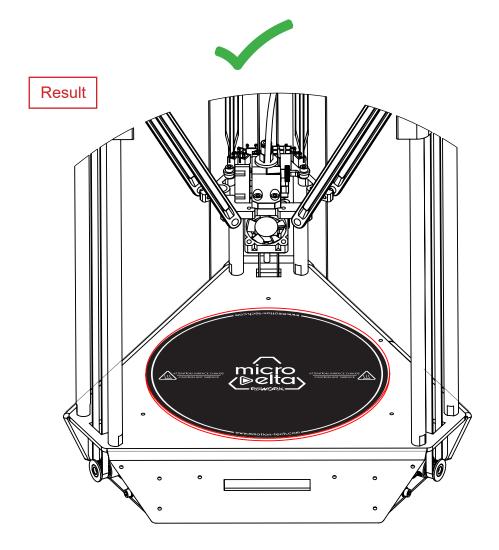


NOTE:

This assembly will subsequently be used to calibrate the printer, more precisely to level the printing surface in order to obtain an identical first layer height over the entire printing plate. Instructions of use of this item will be detailed in the user's guide.

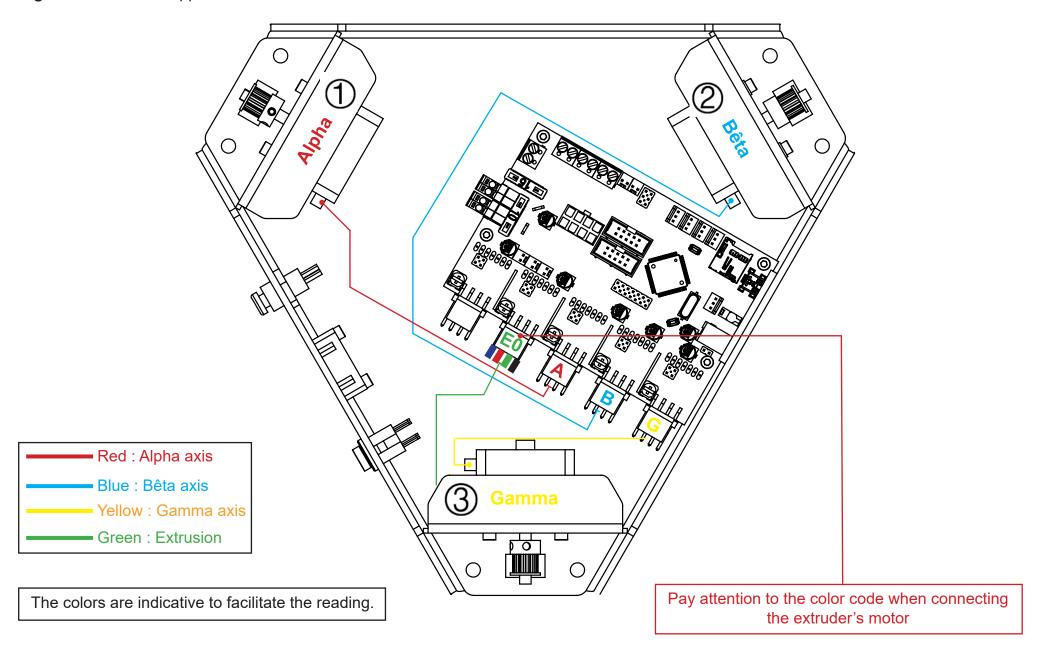
Target: fixation and orientation of the 3dBedFix (in the case of a printer without heabed)



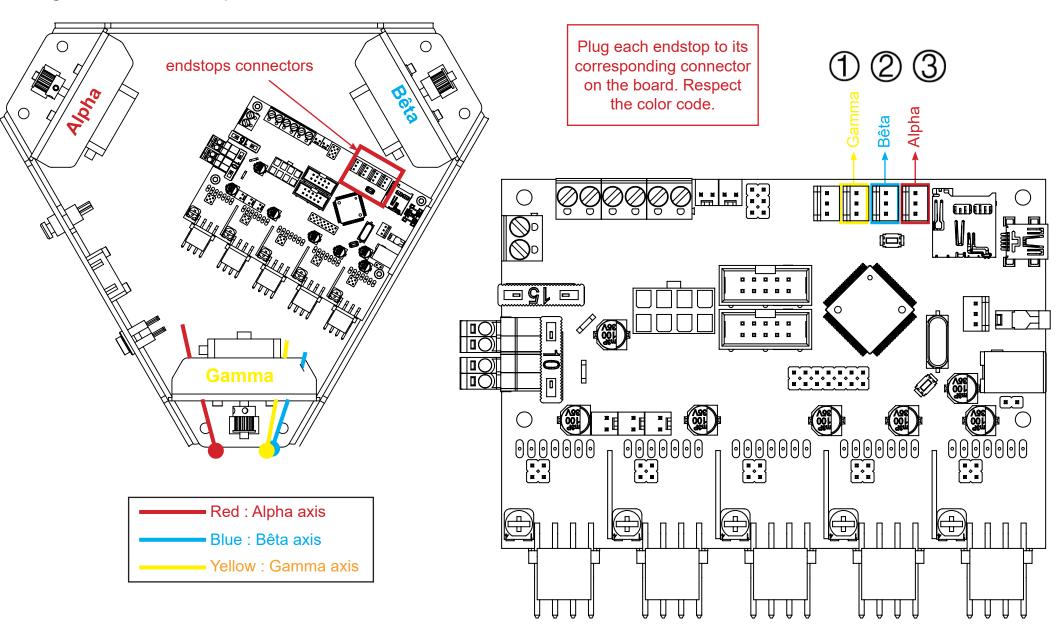


ELECTRONIC ASSEMBLY

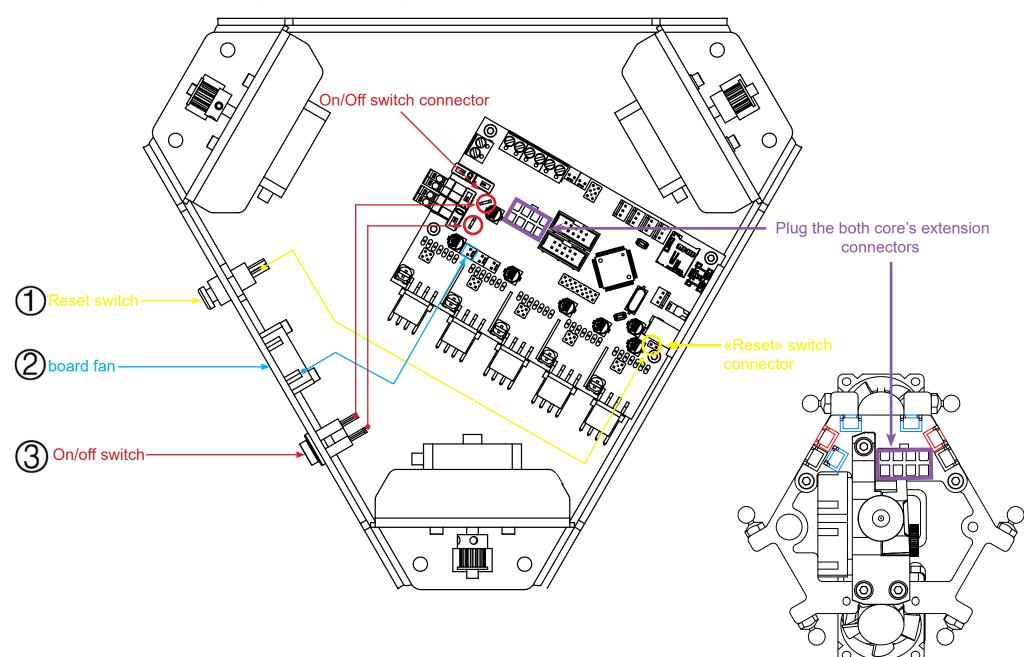
Target: connect the stepper motors to the eMotronic



Target: connect the endstops to the eMotronic board



Target: connect the core's extension cable, the «Reset» button, the On/Off switch and the board fan



CONGRATULATIONS! Your 3D printer is now functional!

If you have options > please follow the dedicated section in the annexe.

If not, you can go to the user guide.





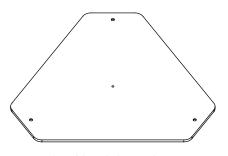
ANNEXE



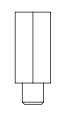
HEATING BED

Needed parts :

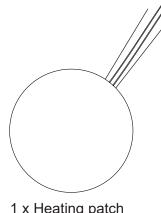
- 1 x Lower plate
- 1 x Heating patch
- 1 x Aluminium plate
- 3 x M3 x 10 mm countersunk screw
- 3 x Standoff spacer
- 1 x Adhesive patch «3dBedFix»







3 x Standoff spacer



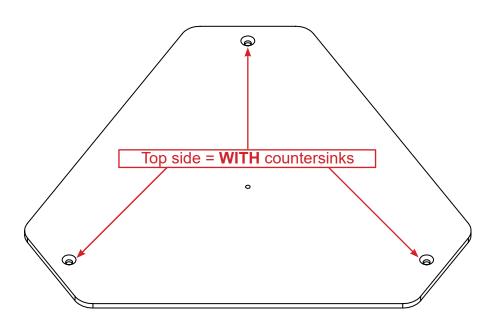
1 x Heating patch

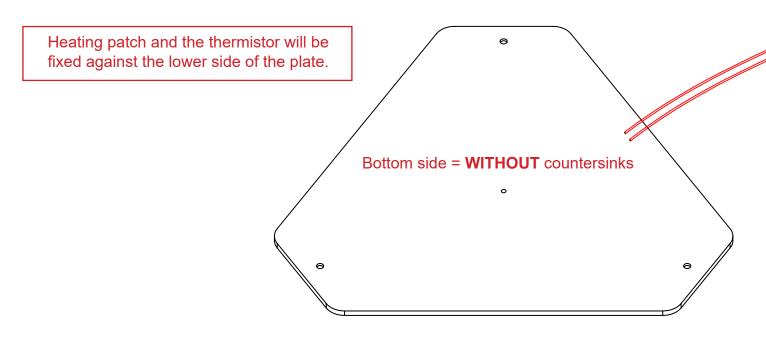


3 x M3 x 8 mm Countersunk screws

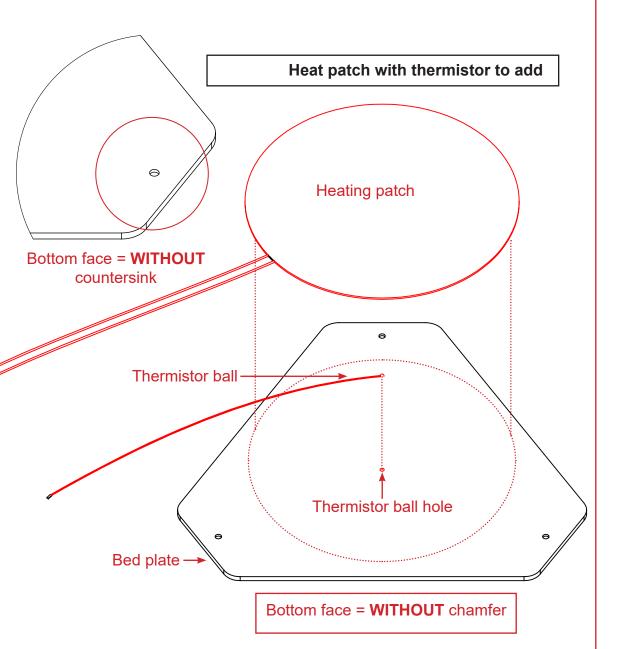


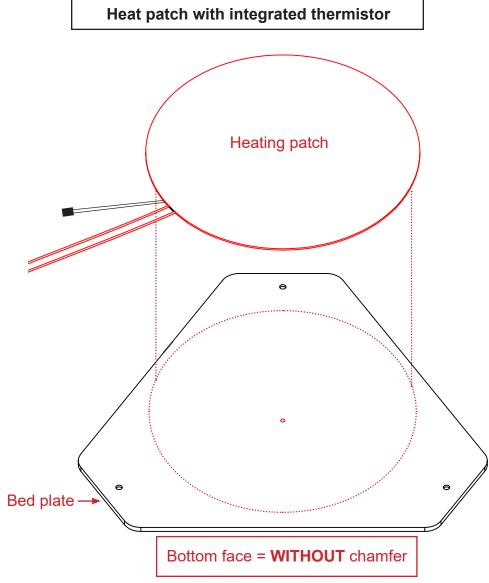
1 x 3DBedFix



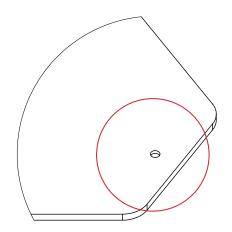


Target: assemble the aluminium plate, the heating patch and the thermistor (2 cases)

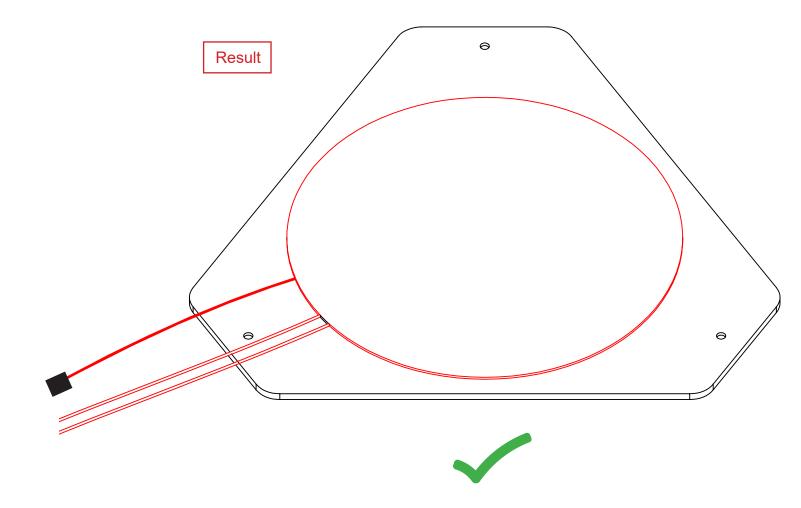






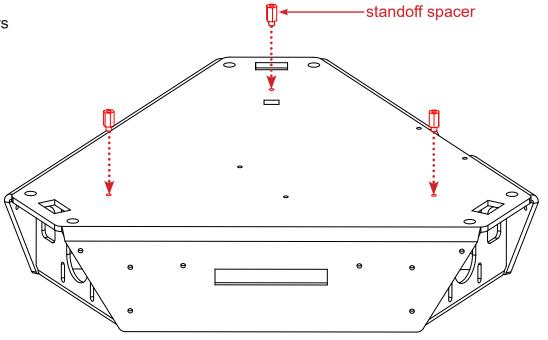


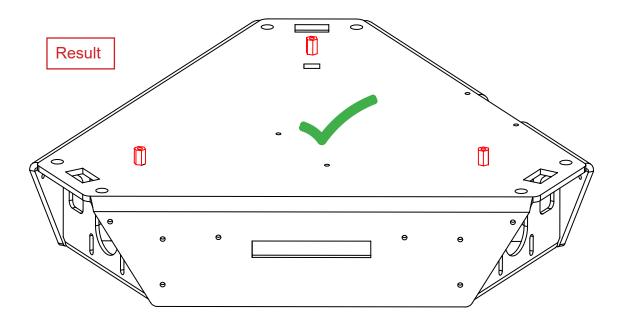
Bottom face = **WITHOUT** countersink



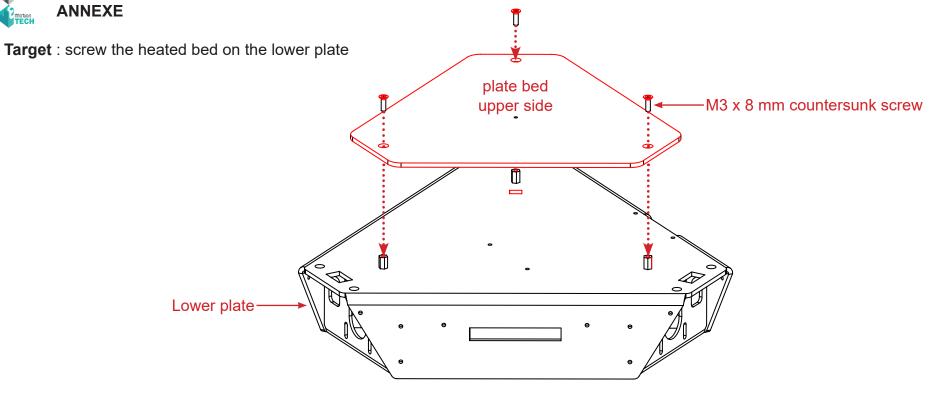


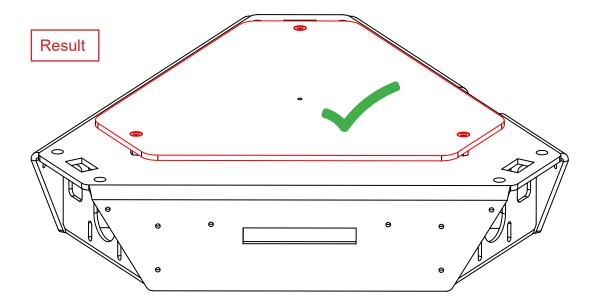
Target: mount the standoff spacers



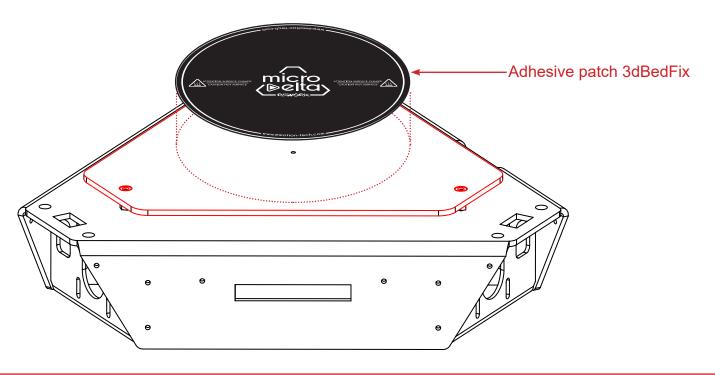


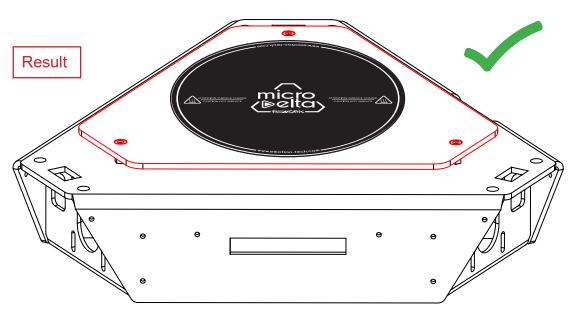




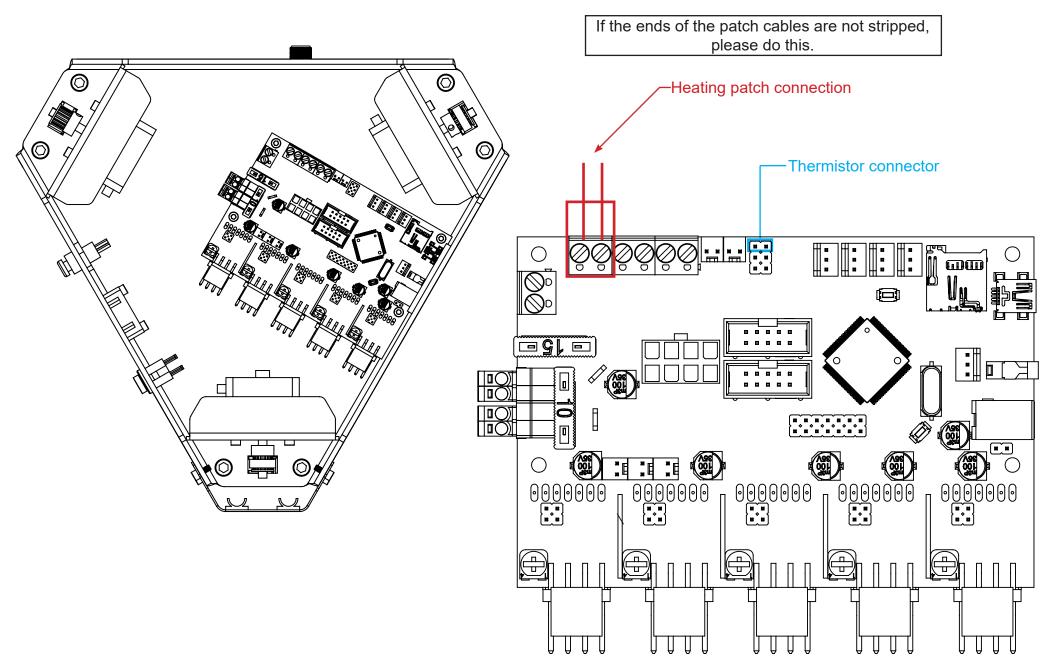


Target: Apply the adhesive patch «3DBedFix» on the heated bed





Target: plug the heating patch and the thermistor of the heating bed



Modifying the configuration file:

1°) Go to the Support section of www.emotion-tech.com. In the «MicroDelta Rework / Software / Software / Configuration» tree you will find all the available versions of the configuration file.

Download the version that corresponds to your printer (depending on your options)

- 2°) Unzip the downloaded file and copy its content into the SD card of the eMotronic board. Replace existing files if necessary.
- 3°) Press the Reset button.

LCD SCREEN

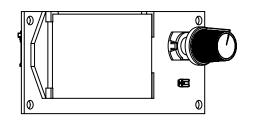
Needed parts:

- 1 x Right side LCD cover
- 1 x Left side LCD cover
- 1 x Front plate LCD cover
- 1 x LCD screen
- 6 x M3x12mm screw
- 2 x Ribbon cable

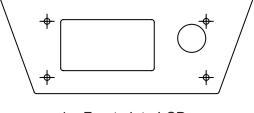
Target: mount the LCD screen on the 3D printer.

Pre-requisites:

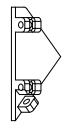
The two screen covers (right and left) are to be printed by yourself. To download these two parts, go Support section of www.emotion-tech.com, then go to «MicroDelta Rework / Ressources_3D / Option LCD».



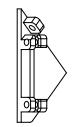
1 x LCD screen



1 x Front plate LCD cover

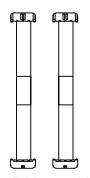


1 x Right side LCD cover



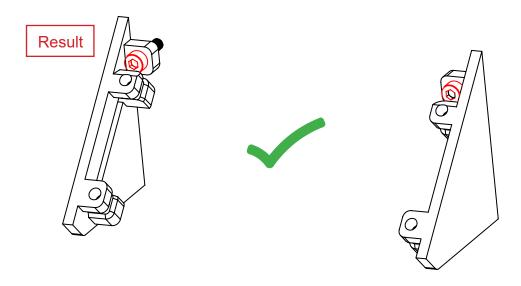
1 x Left side LCD cover 6 x M3x12mm screw

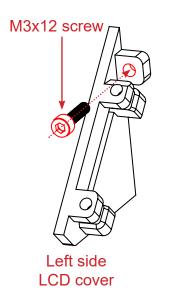


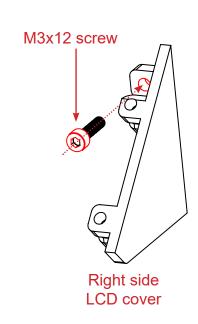


2 x Ribbon cable

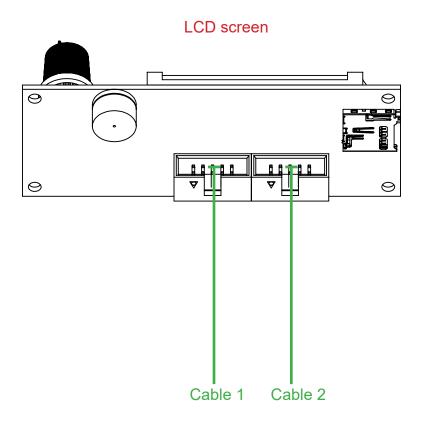
Targer: preposition the screws in the printed covers



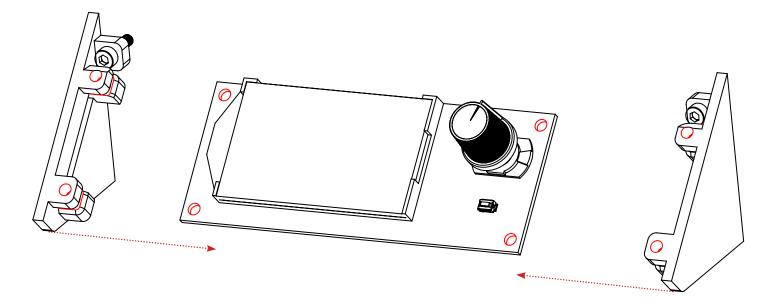


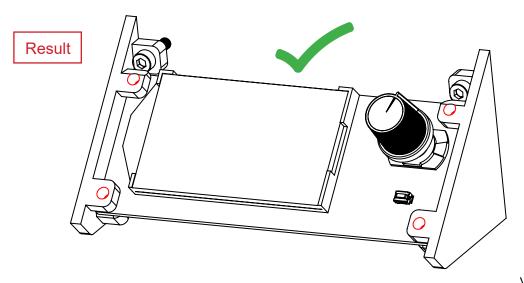


Target: Plug the Ribbon cables on the screen

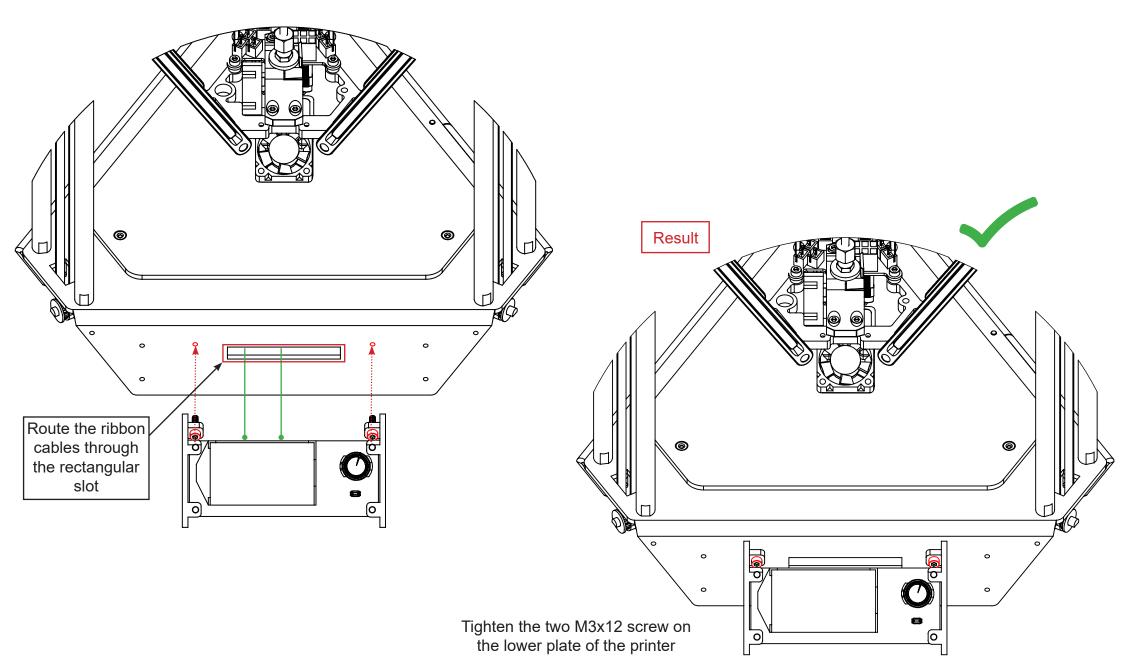


Target: preposition the LCD screen between the two covers (right and left)

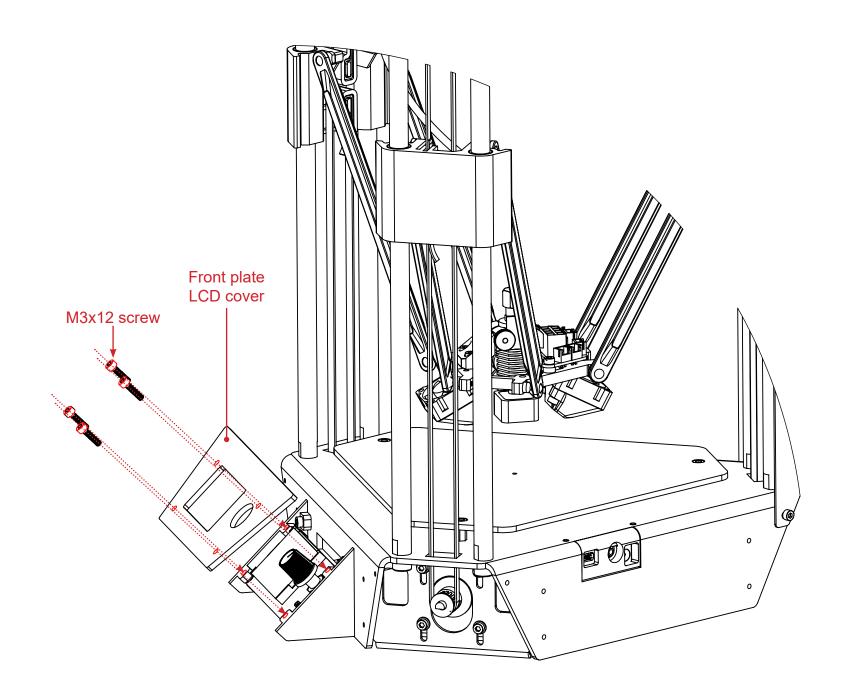


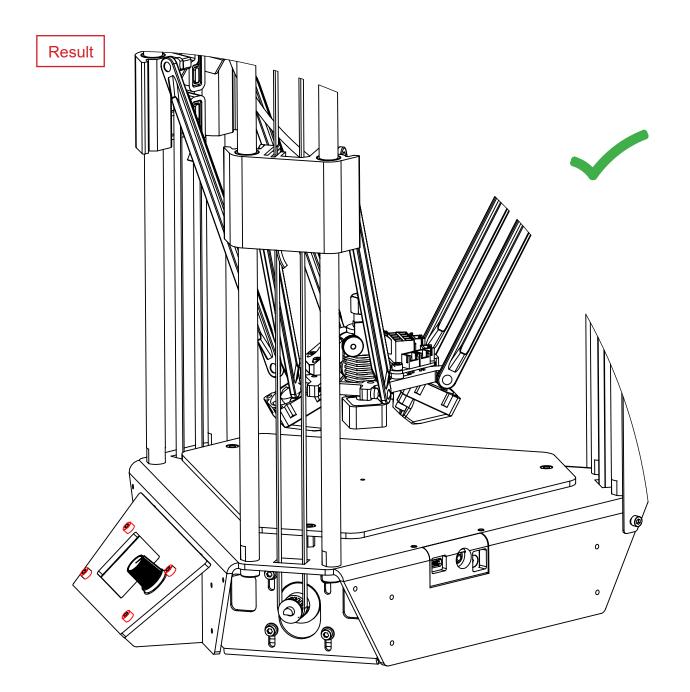


Target: mount the LCD on the printer

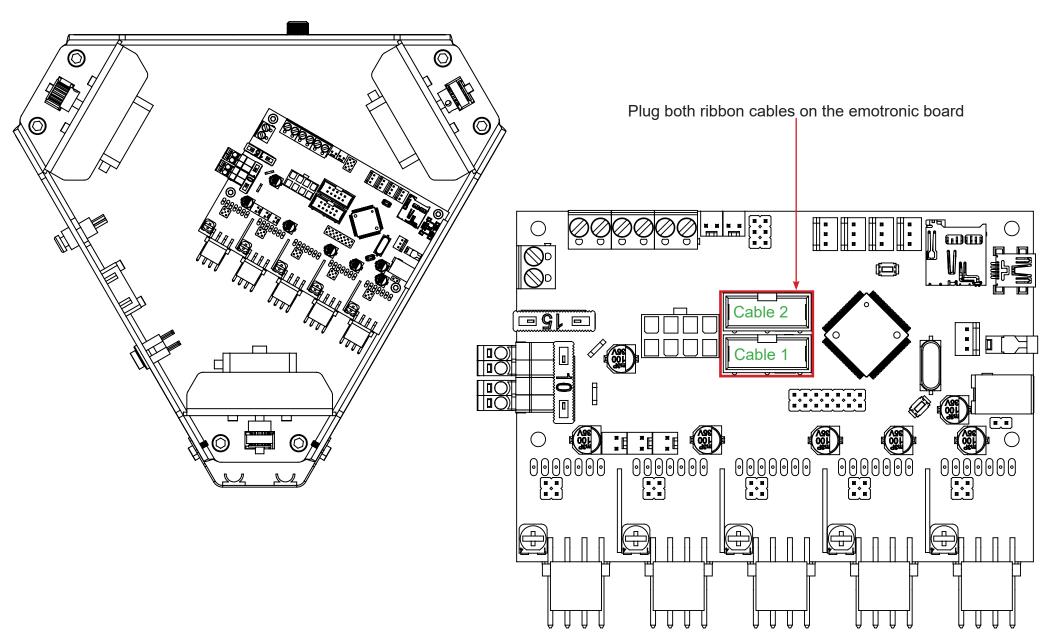


Target: mount the front plate LCD cover





Target: connect the LCD screen to the eMotronic board



Target: modifying the configuration file

Note: Without modification of the configuration files, your LCD screen will be preconfigured on a stable version (and therefore plug & play). However, if you want to acquire the latest version of the firmware, you can follow the following tutorial.

1°) Go to the Support section of www.emotion-tech.com. In the «MicroDelta Rework / Software / Software / Configuration» tree you will find all the available versions of the configuration file.

You will notice that two versions are available:

- Stable version
- A Beta version (in development, it integrates the function of calibration of the plate)

Download the version that corresponds to your printer (depending on your options)

- 2°) Unzip the downloaded file and copy its content into the SD card of the eMotronic board. Replace existing files if necessary.
- **3°)** Press the Reset button.

Target: contrast adjustment

Only the revision 1.1 of the LCD screen requires a contrast adjustment.



rev 1.0



rev 1.1

To change the contrast:

- 1) from the Micro SD card, open the file «config.txt»
- 2) find the variable named «panel.contrast»
- 3) change its value from «19» to «38»
- 4) save the file
- 5) press the Reset button





Thank you for choosing MicroDelta Rework

www.emotion-tech.com