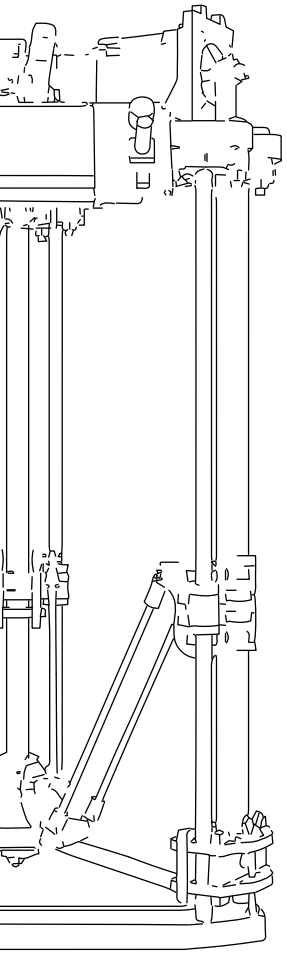
Documentation version 1.42



µdelta

ASSEMBLY INSTRUCTIONS

REV 1.1

Motion TECH

INTRODUCTION

INTRODUCTION

• Target :

Prupose a visual guide of the differents steps to build and use a µdelta printer

• Designers :

Hugo Flye
Thomas Batigne
Antony Soury

• Autors :

eMotion Tech : http://www.reprap-france.com

Antony Soury
Loic Déchaseaux
Hugo FLye
Thomas Batigne

• Photographics Credits :

Pictures and 3D représentations made by eMotion Tech :
http://www.emotion-tech.com
Pictures Director : Antony Soury

• Sources :

http://reprap.org/wiki/reprap
http://www.repetier.com/

• Licenses :

• Update :

Last Update : 11/12/2014

• Links:

You can found more informations on the following links :

RepRap community : http://reprap.org/wiki/reprap
Repetier-Host software : http://www.repetier.com/
3D models database : http://www.thingiverse.com/

SUMMARY

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 Ø110x190mm
• Layer height [0.1-0.35]
• Electronic type Teesylu + 4 Stepsticks (integrated firmware)
• Motor 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 (X,Y) 100 microns
• Average precision (Z) 50 microns
• Operating system Windows™ XP, Vista, 7,8, Ubuntu 12+
• Consumable PLA 1.75mm (or ABS and others plastics with heated bed opton)
• Provied with Repetier preset for µdelta
• Connectivity USB
• Power supply provided, 12V, 120W

STRUCTURE

• Lasercut Acrylic 5mm
• Extruder core printed in ABS 0.2mm
• 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 adjustement with the software
• Easy to reload the filament

OPTIMISATION AND UPGRADE (Options and Développements soon avalaible)

You can improve the µdelta by adding the following options

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

SAFETY INSTRUCTIONS

General safety instructions

NEVER LEAVE THE PRINTER WORKING WITHOUT SUPERVISOR.

The nozzle can reach 270°C, to avoid burning, 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 CHILDRN AND ANIMALS

Operate un a ventilated room. Plastic fumes effets are not known. In case of use in a closed rom, 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

CE marking

µdelta is a 3D printed 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 informations

Information above are not exhaustive.

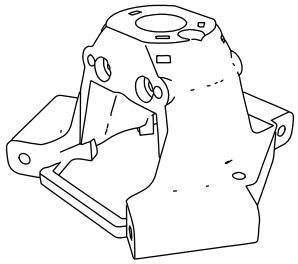
We used sources of informations we consider as reliable. However, we cannot guarantee that all these information are true and complete.

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

ASSEMBLY

BILL OF MATERIALS

A. Printed parts



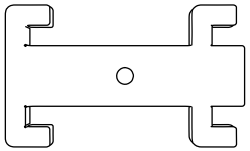
1x Core

1x Filament Guide

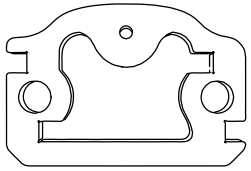
Acrylic parts can be covered with protection and it may remain pieces of plastic. Remove it before use.

We provide additionnal parts.

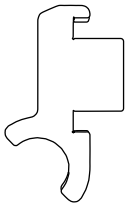
B. Acrylic parts



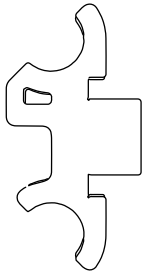
6x eM1
TENSIONER



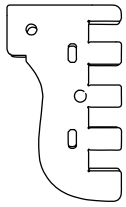
6x eM 2



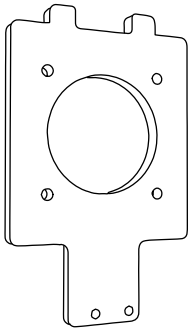
6x eM 3
SLIDER



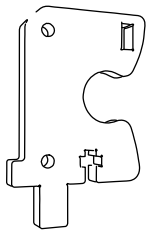
6x eM 4



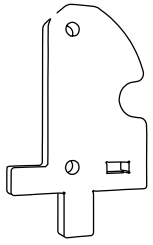
6x eM 5



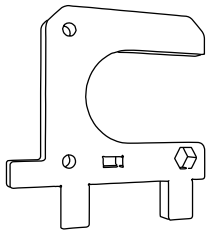
3x eM 14
MOTOR HOLDER



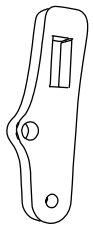
2x eM 8
EXTRUDER



1x eM 9

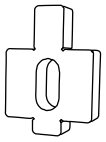


1x eM 10



2x eM 11

1x eM 12



1x eM 13

C. Smooth rods and connecting rods

6x Ø8x400 Smooth rod

6x Connecting rod

D. Mechanical parts

9x Linear bearing

1x Spring

3x GT2 Pulley

3x GT2 Belt

3x 624 Bearing
1x 604 Bearing

1x Drive wheel

E. Screws, nuts and washers

6x M2.5x16 screw
15x M3x12 screw
12x M3x20 screw
4x M3x25 screw
3x M3x30 screw
10x M3x50 screw
16x M4x25 screw
1x M4x50 screw
12x M5x30 screw
3x Wood screw

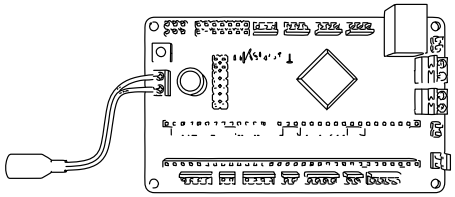
6x M2.5 Nut
3x M3 Wing Nut
32x M3 Nut
20x M4 Nut
12x M5 Nut

1x M3 Nylstop Nut

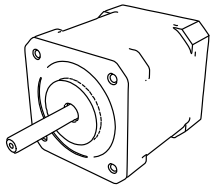
45x Ø3 Washer
19x Ø4 Washer
4x Ø4 Big washer

4x M3x3 Grub Screw

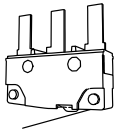
F. Electronic



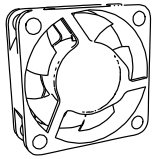
1x Teensylu



4x Nema 17 motor



3x Endstop

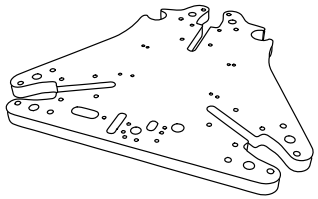


2x 3x3 Fan

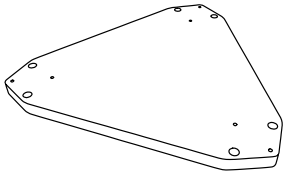
4x Stepstick

1x Power supply
1x USB Link

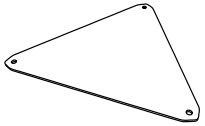
G. Others



1x Superior frame



1x Inferior frame



1x Print bed

1x Ø4xM6
Pneufit

1x Ø4x1/8"
Pneufit

1x PTFE tube

3x motor Bracket

6x Shaft Support

1x Braided
sleeve

30x Zip tie

3x Pad

1x Adhesive tape

H. Hexagon Kit

1x Hexagon hot end

1x Cartridge heater

1x Thermistor

1x Allen key 3

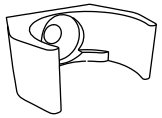
1x Wrench 4.5

I. Options

1x Heated bed and thermistor

3x Idler

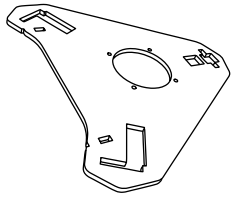
1x Tube



1x tube holder

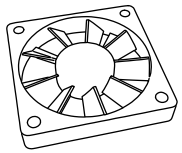
1x Polyimide tape

HEATED BED KIT



1x Spool holder frame

3x Spool block



1x 60x60 Fan

3x 624 Bearing

7x M4x20 Screw

7x M4 Nut

7x Ø4 Washer

SPOOL HOLDER KIT

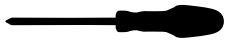
1x LED ring

LED KIT

TOOLS

Mallet

Slot screwdriver



Philips screwdriver

Wrench 5.5

Wrench 7

Allen key (provided)

Long nose pliers

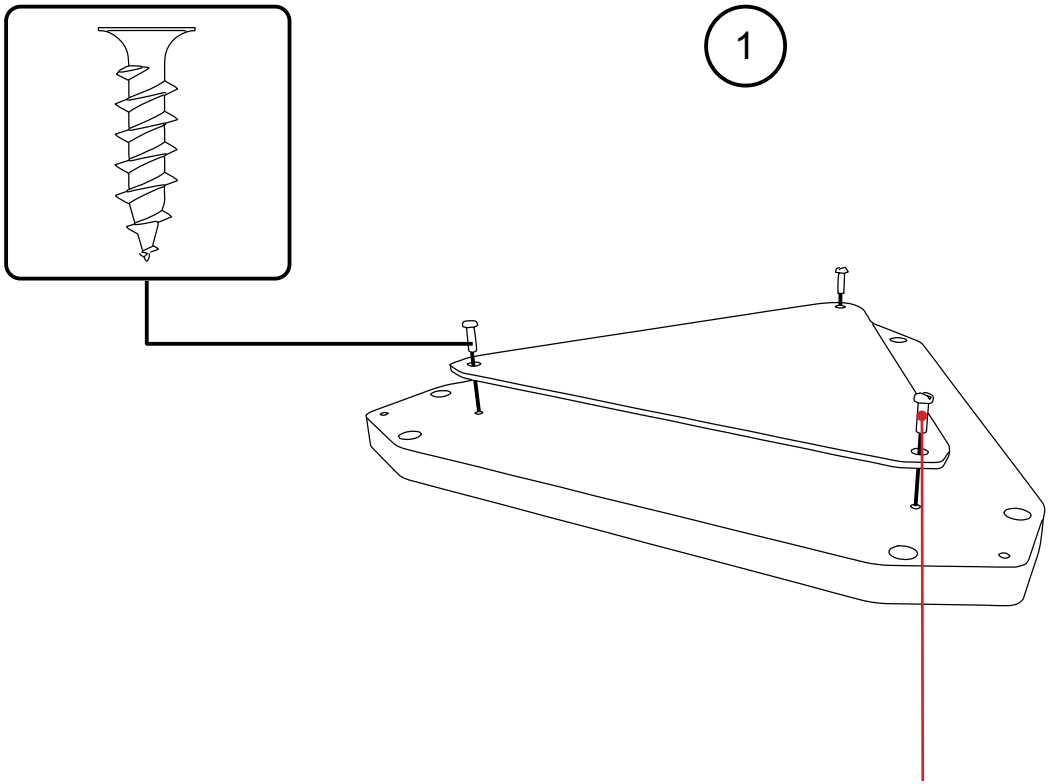
Cutting pliers

Utility knife

Meter

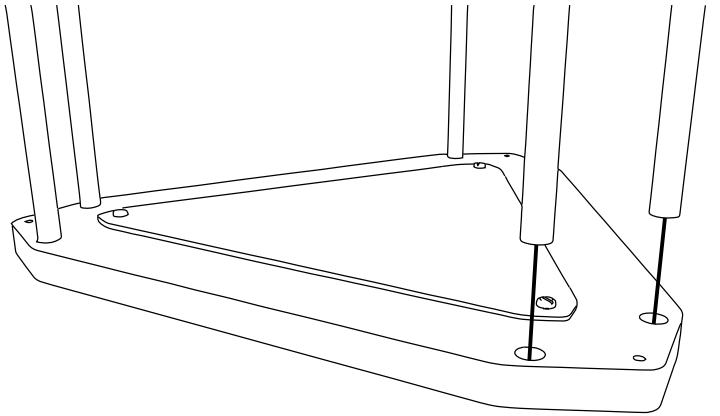
MECHANICAL ASSEMBLY

1



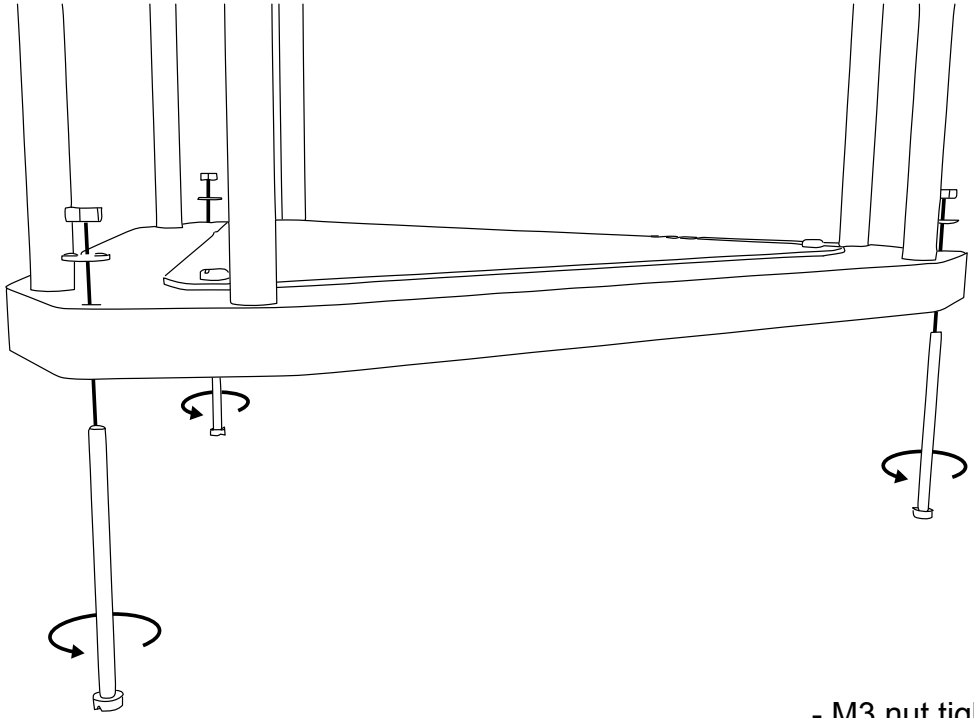
Wood screw (x3)

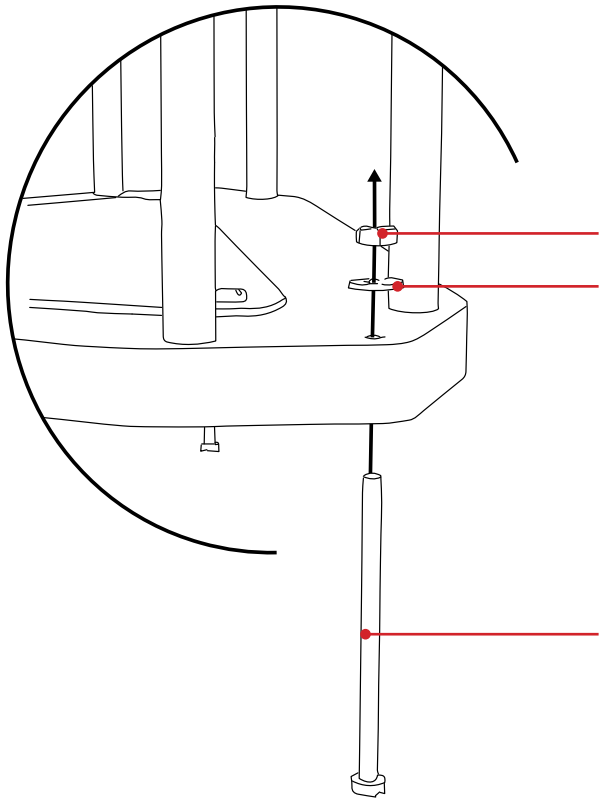
2



- Use a mallet to insert completely the rod without exceeding the plate

- Smooth rods must be normal to the inferior frame

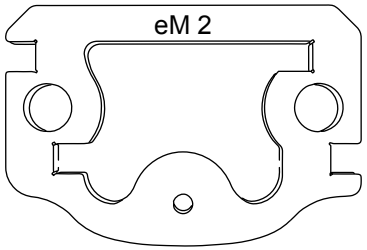




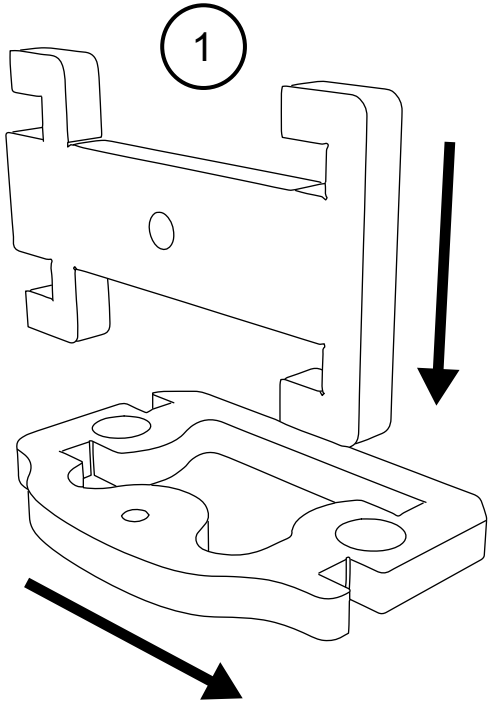
- M3 nut tighten against the frame

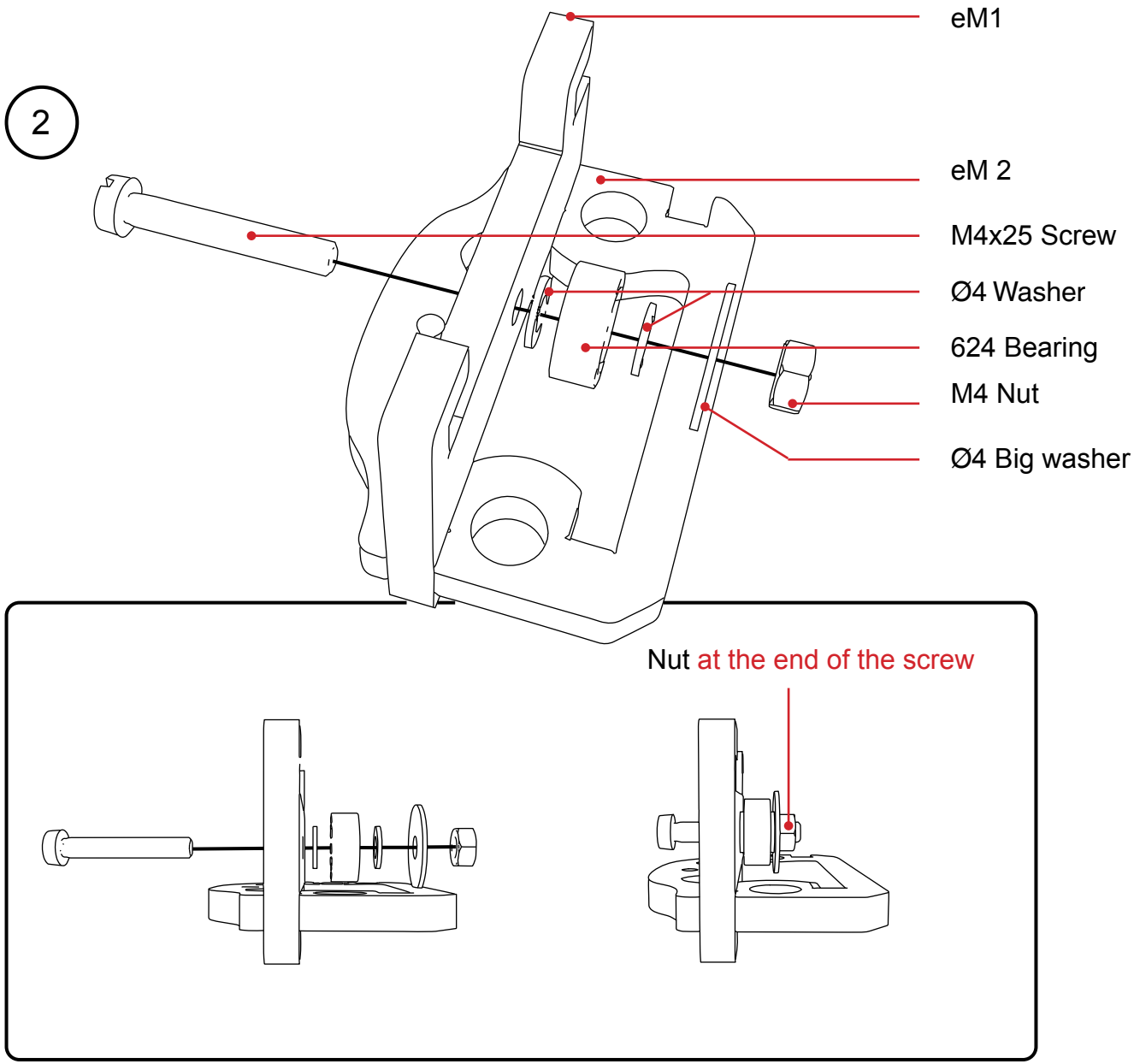
- Repeat this operation for each corners

Inside the µdelta



Outside the µdelta

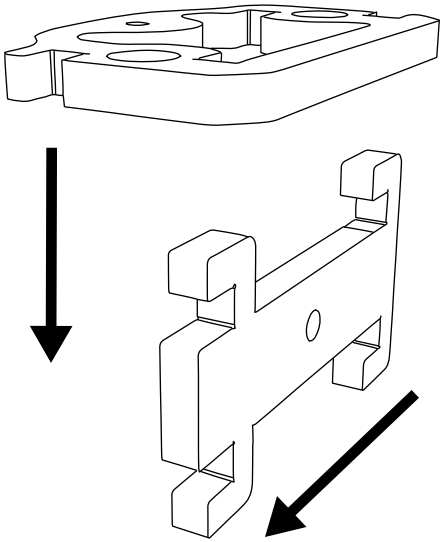




Caution : for thie step, take care of the orientation of the tensioner

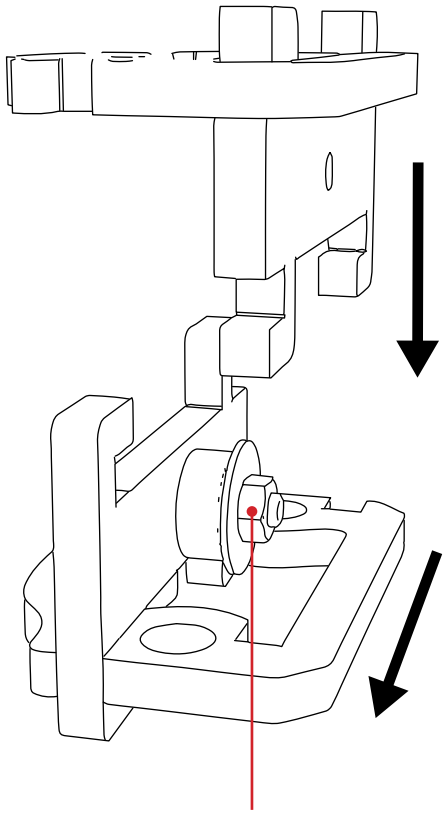
Acrylic parts can be covered with protection and it may remain pieces of plastic, remove it before use.

1



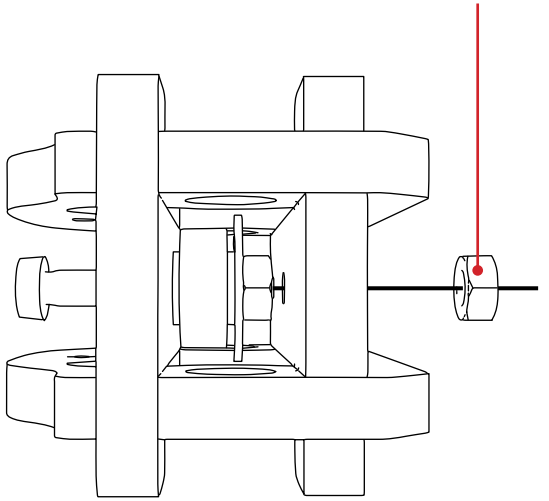
Tighten nuts moderately to avoid breaking acrylic parts

2

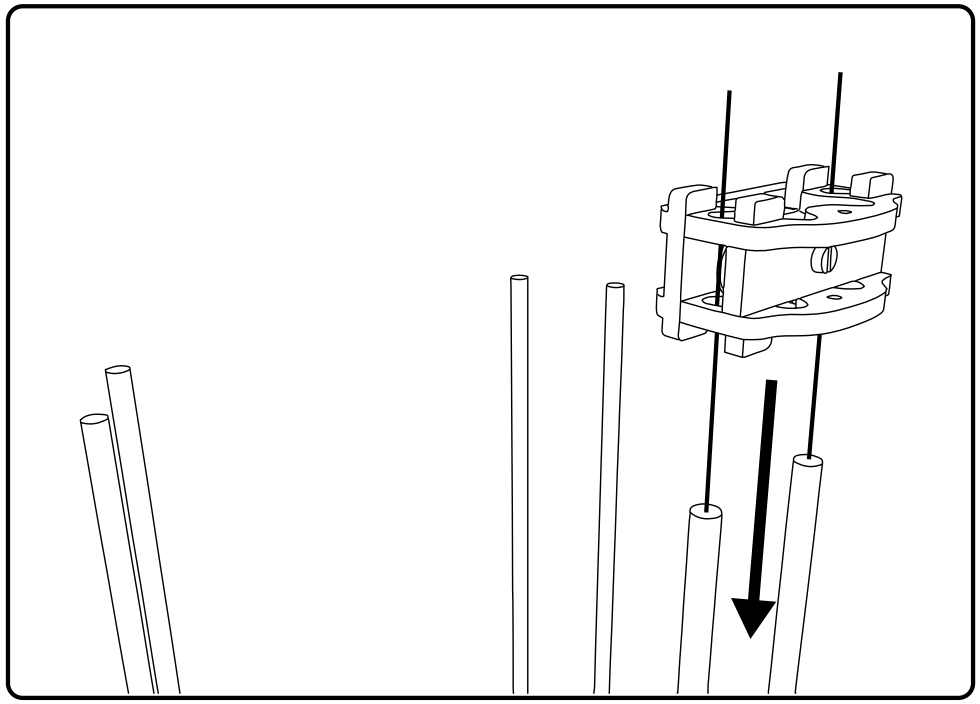


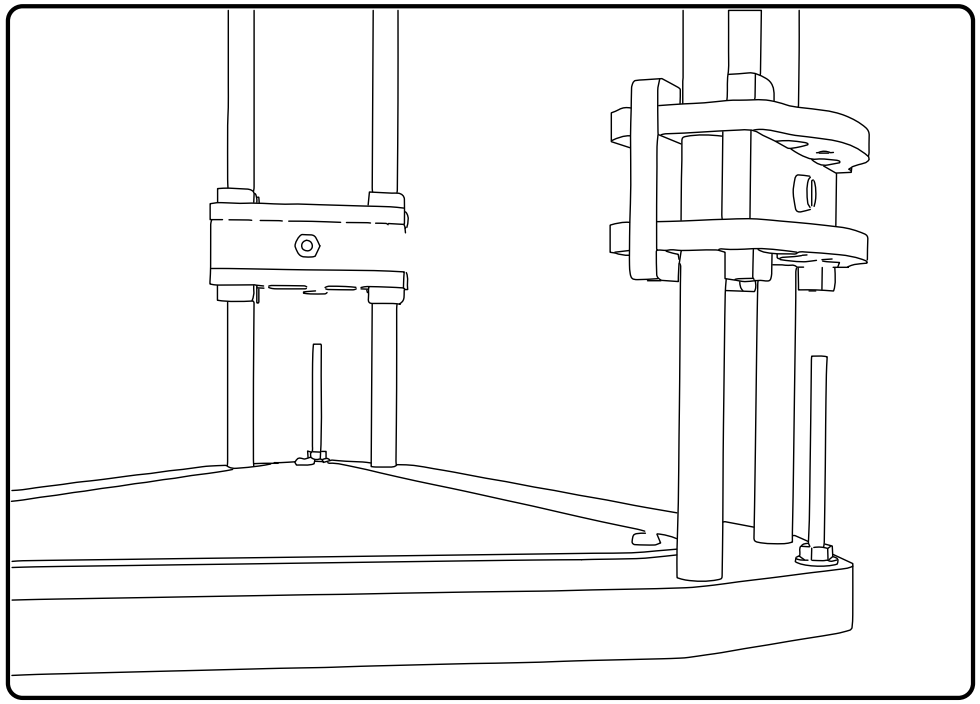
Tighten against the washer

3



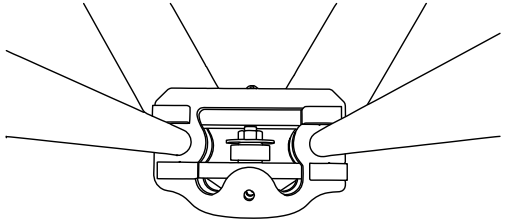
Tighten Moderately



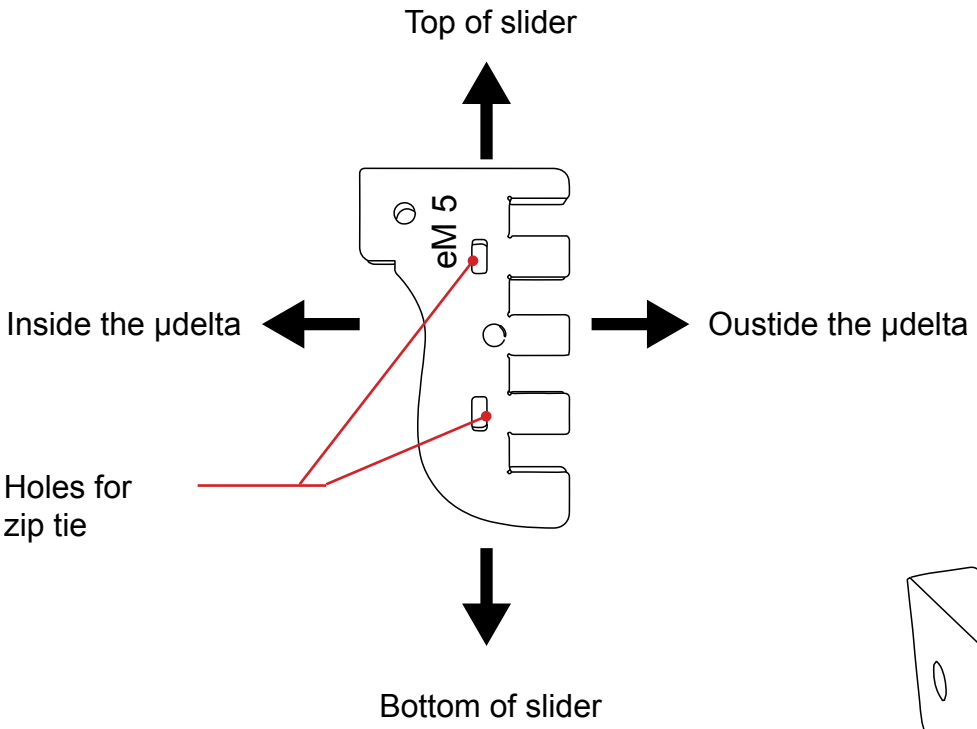


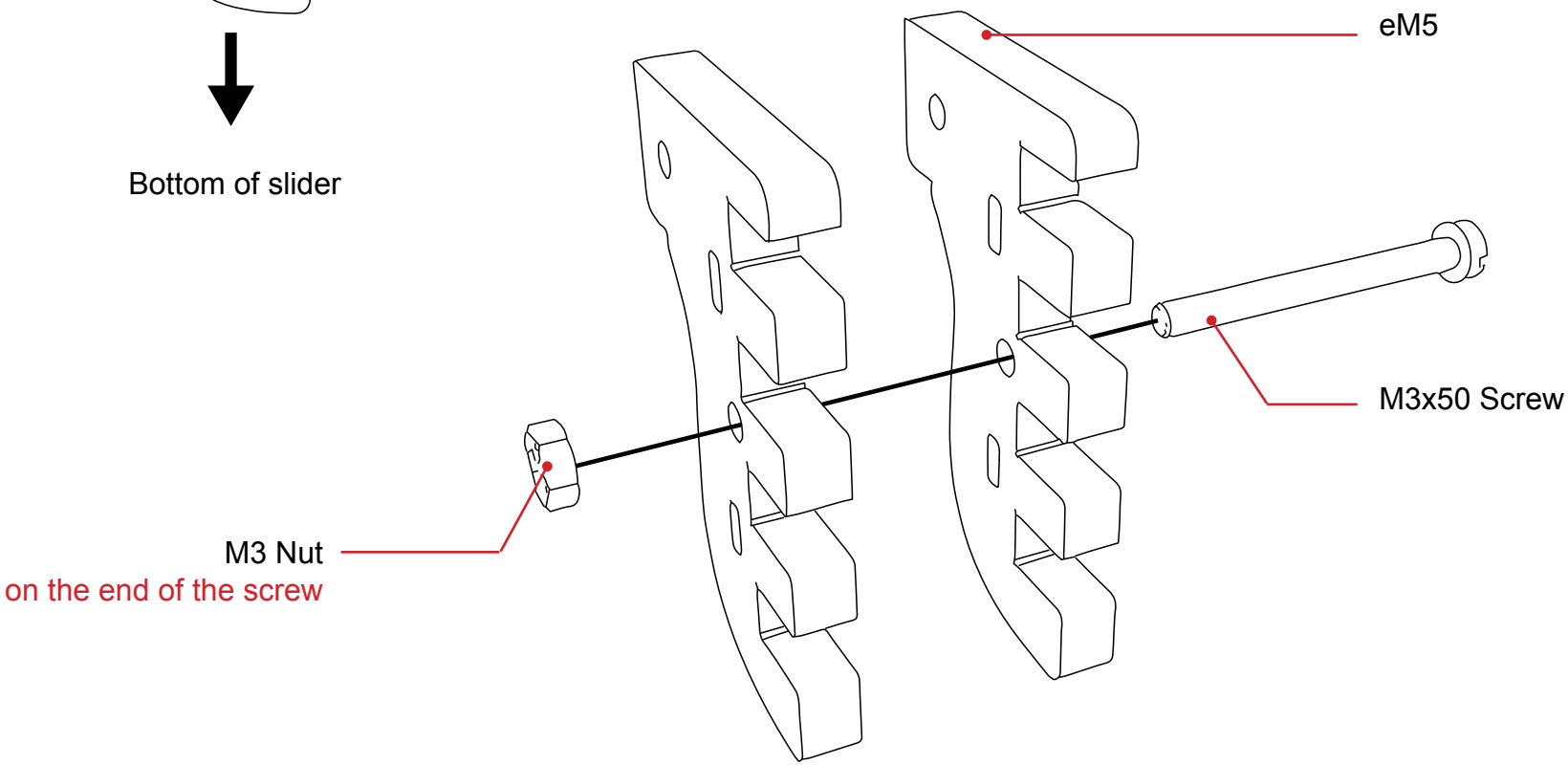
Repeat this operation for the others tensioners

Inside the µdelta

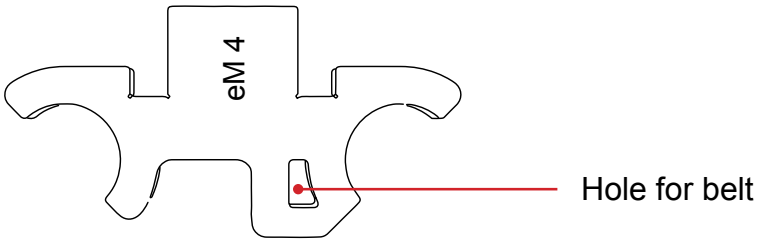


Outside the µdelta

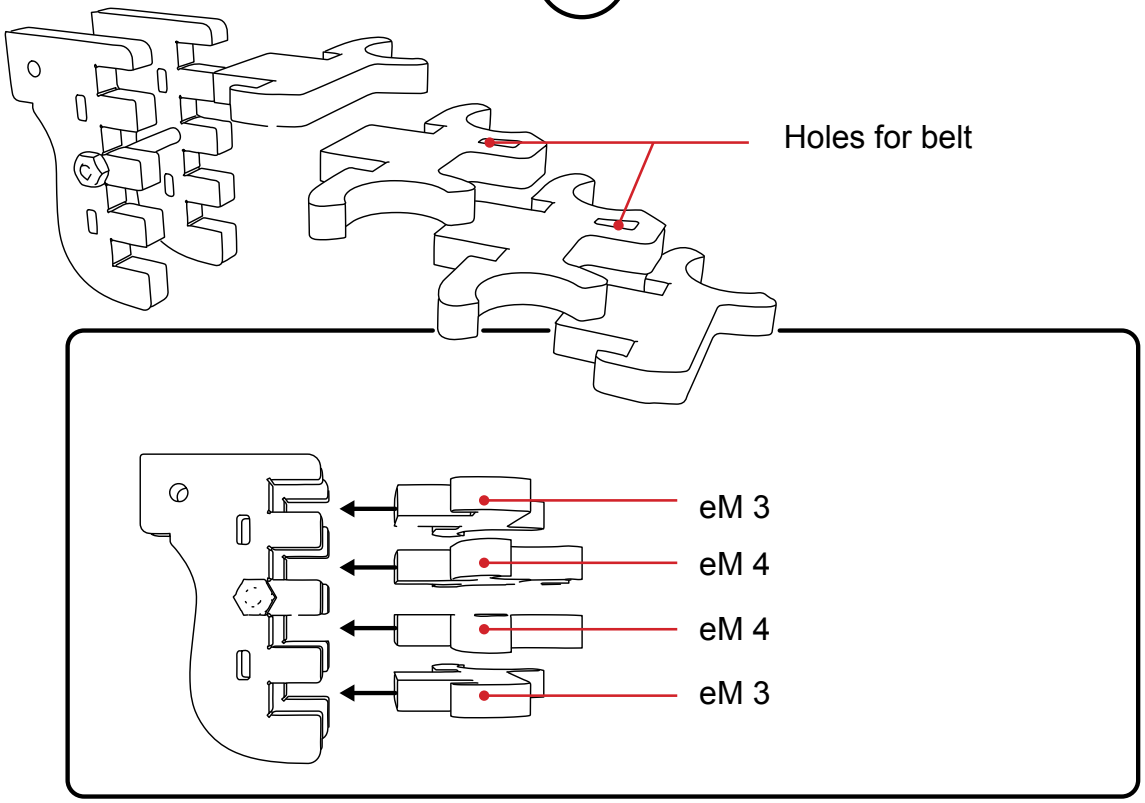




Caution : Assemble all sliders in the same way.

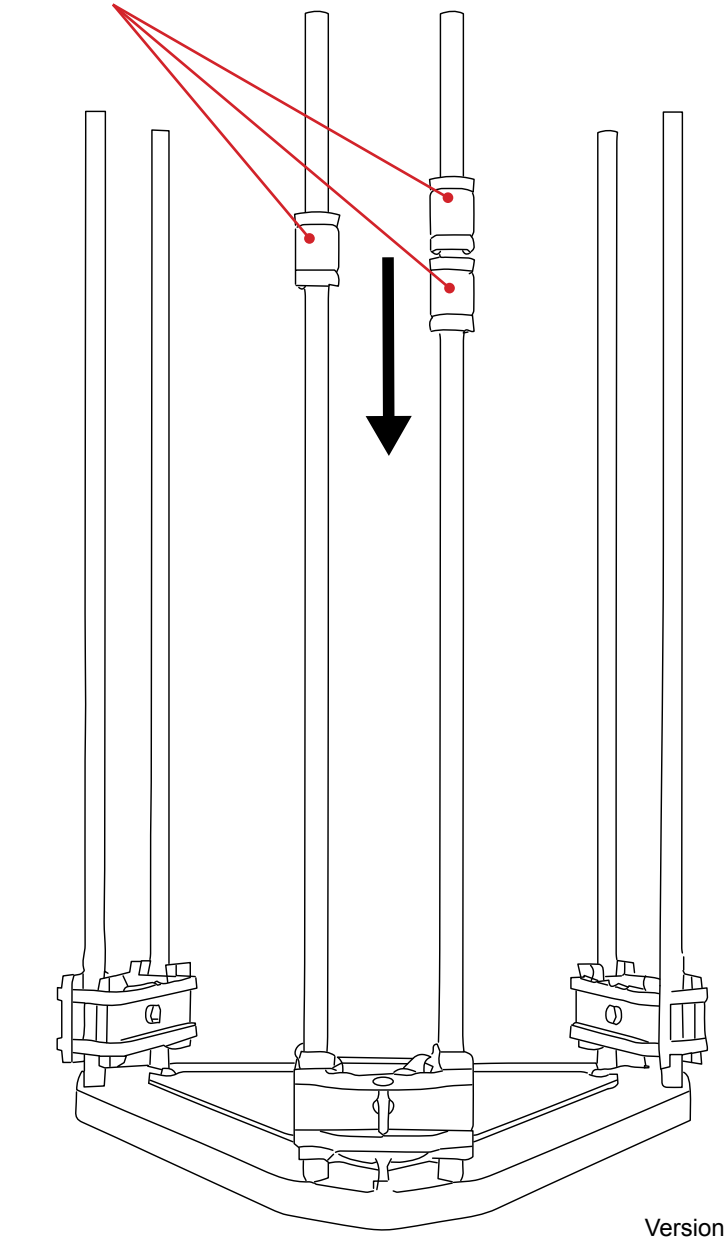


1

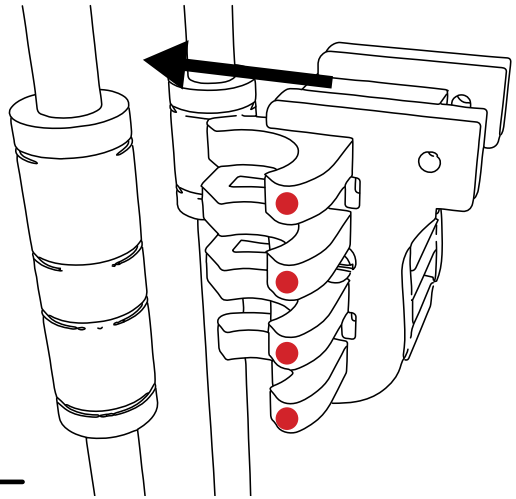


Note : After tightening screw, eM 3 parts may move, it is not a problem

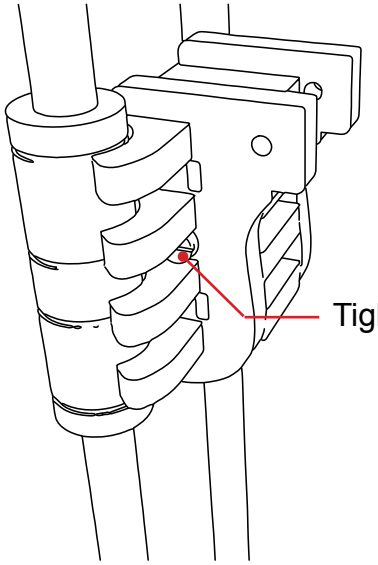
2



1



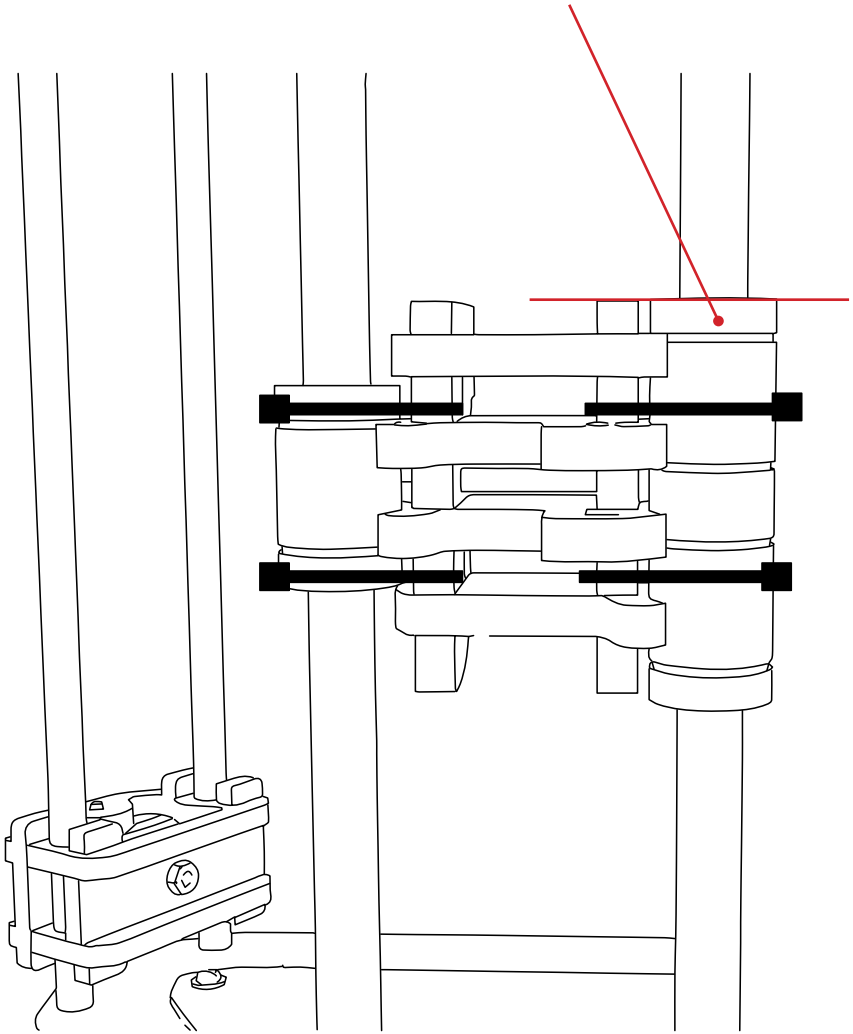
The 4 fixations must be on the same side than the 2 linear bearings



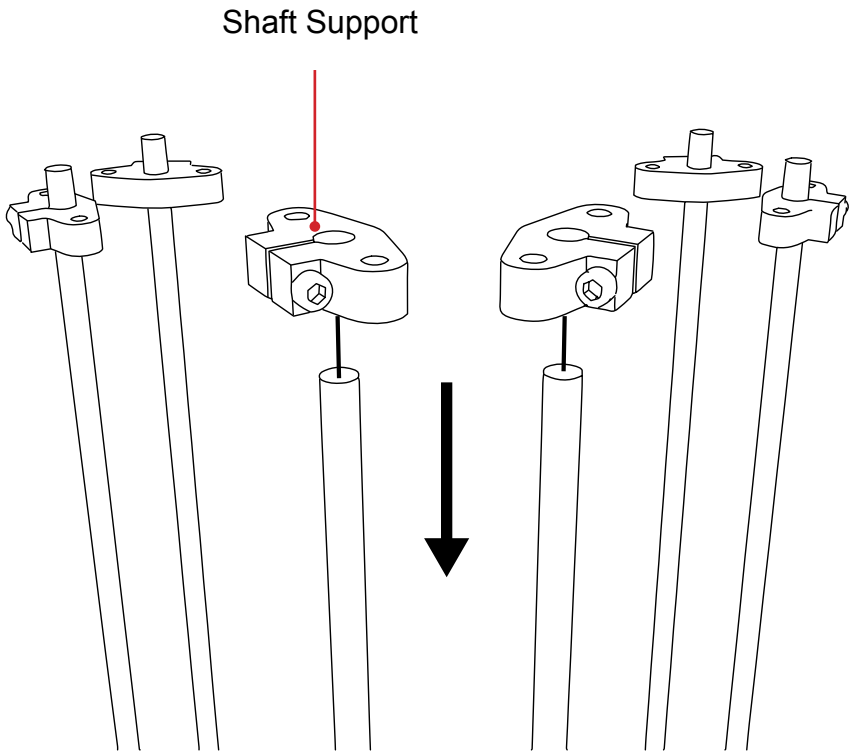
Tighten moderately

2

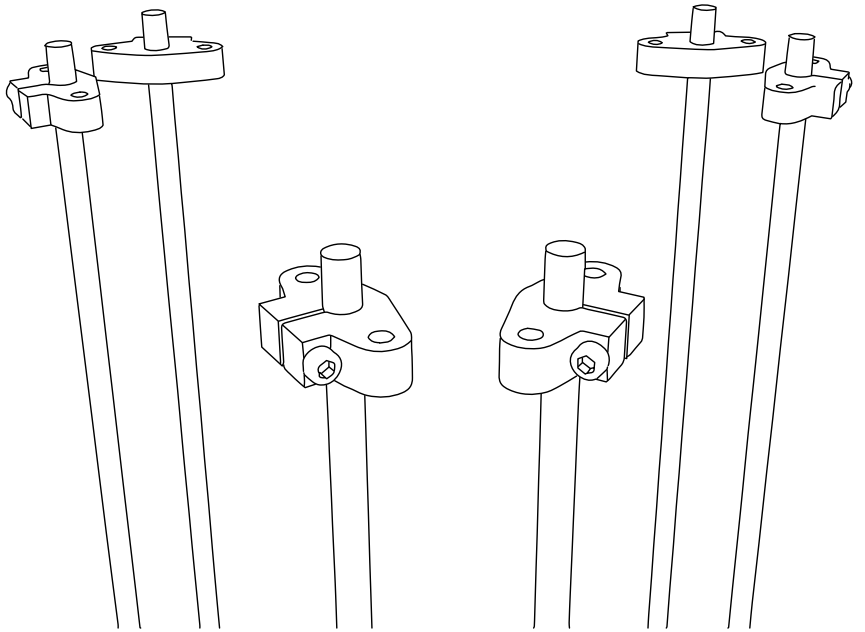
This bearing must not exceed the slider



Insert a zip tie in each holes, tighten the zip ties to fasten the slider

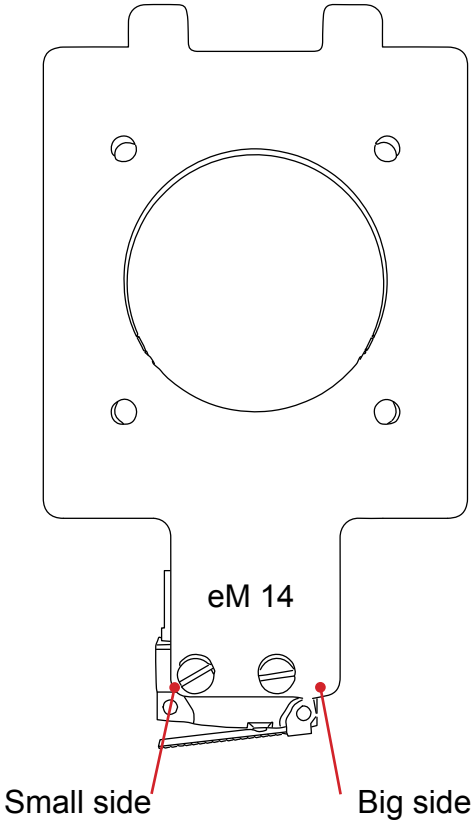


Take care of the way of shafts supports

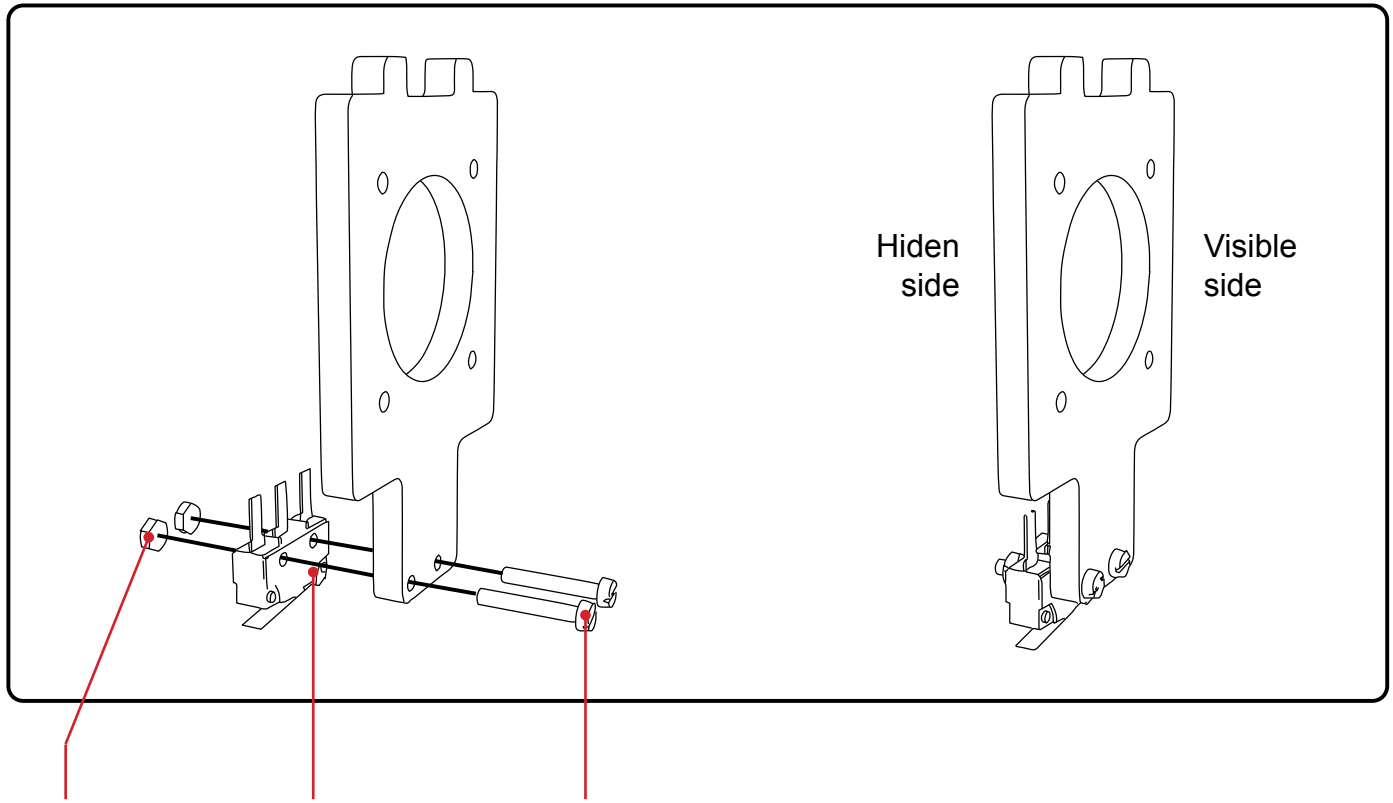


Note : Do not tighten

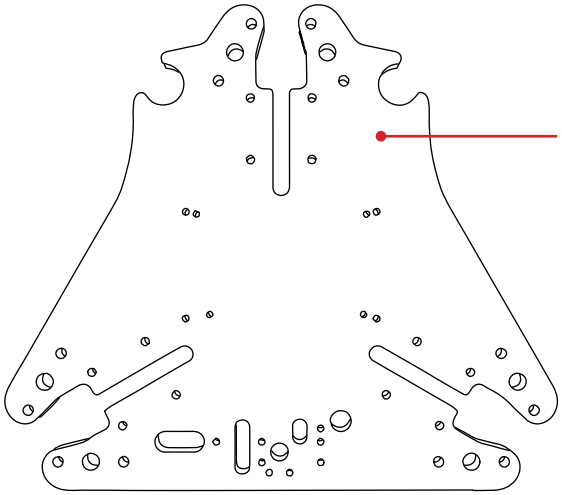
Assemble the endstop as it's show on the figure



Note : To improve the visibility, endstops wires were not represented



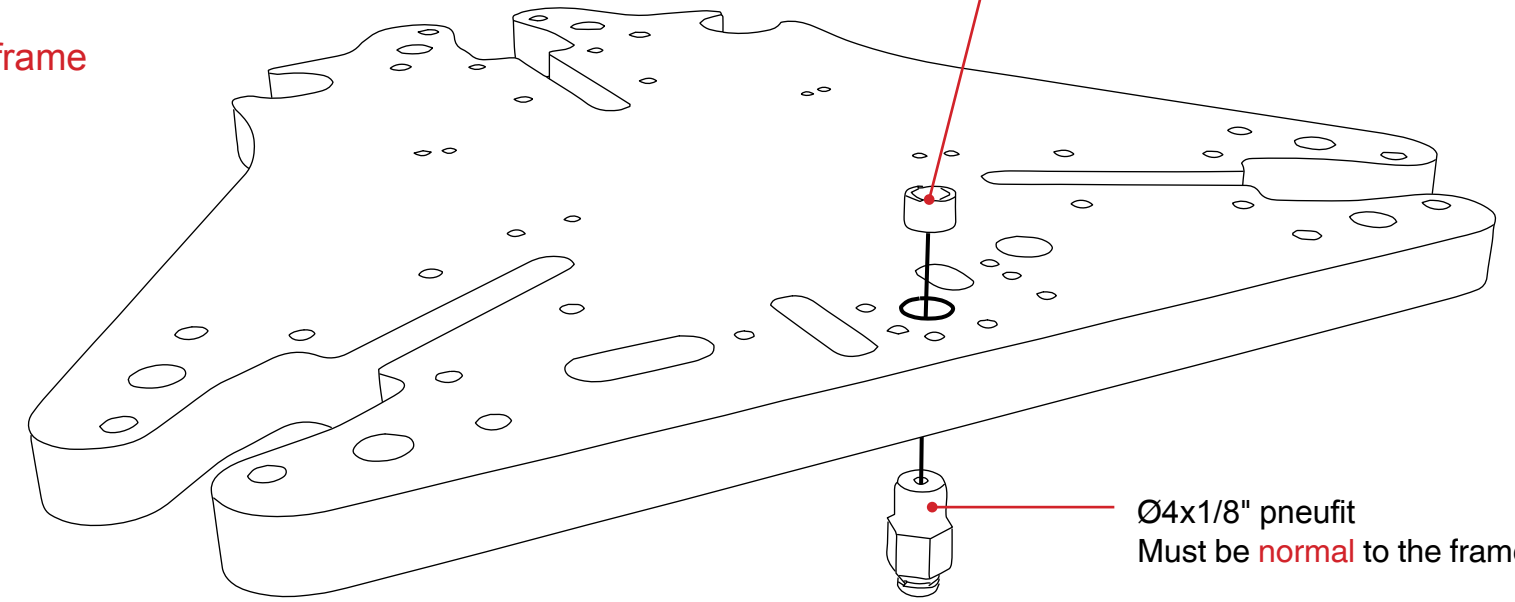
Back



Front

Top view

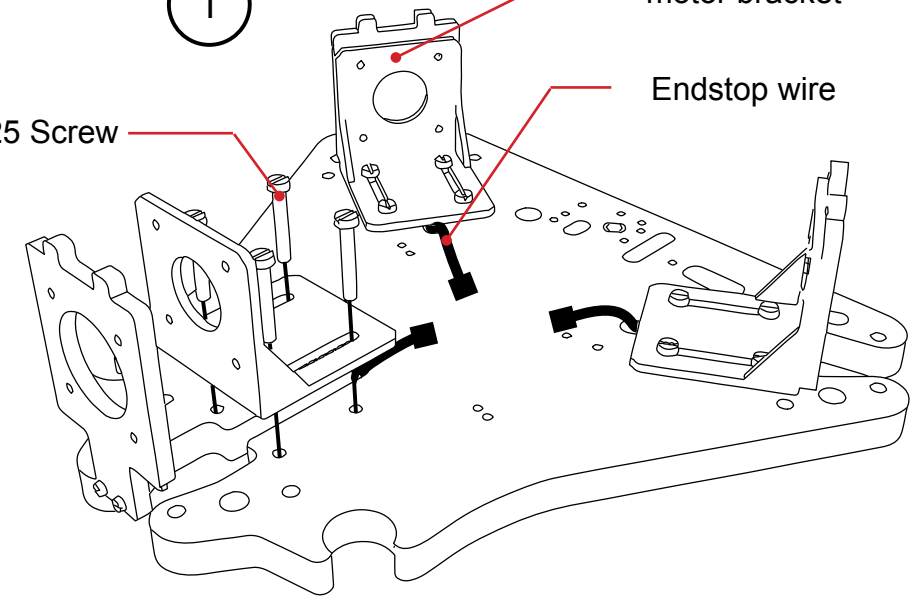
Take care to assemble the frame correctly

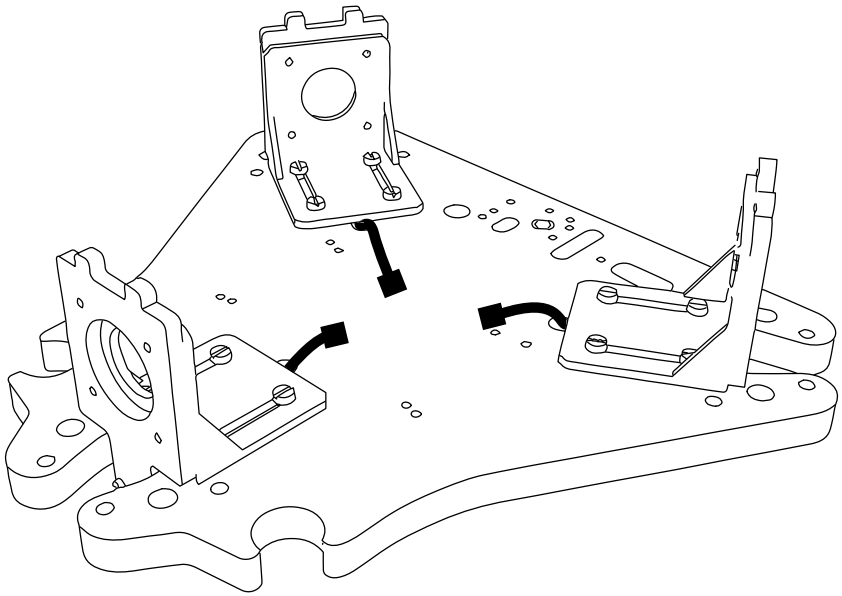


Filament Guide
The side with the big hole is the upper side

Ø4x1/8" pneufit
Must be normal to the frame

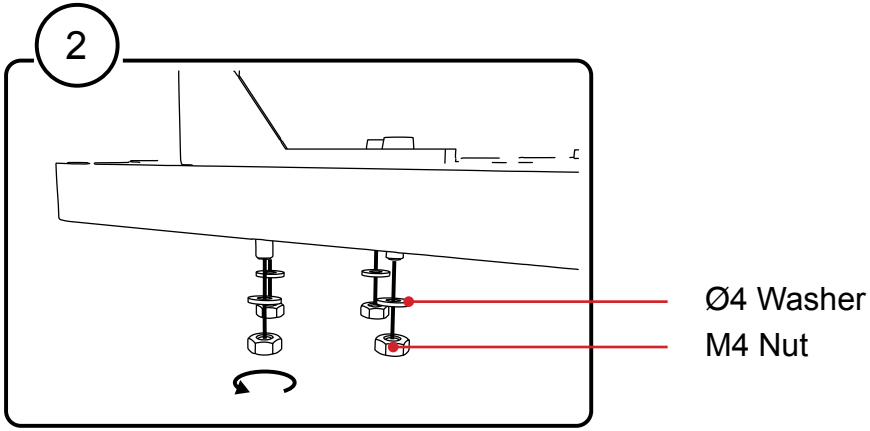
1



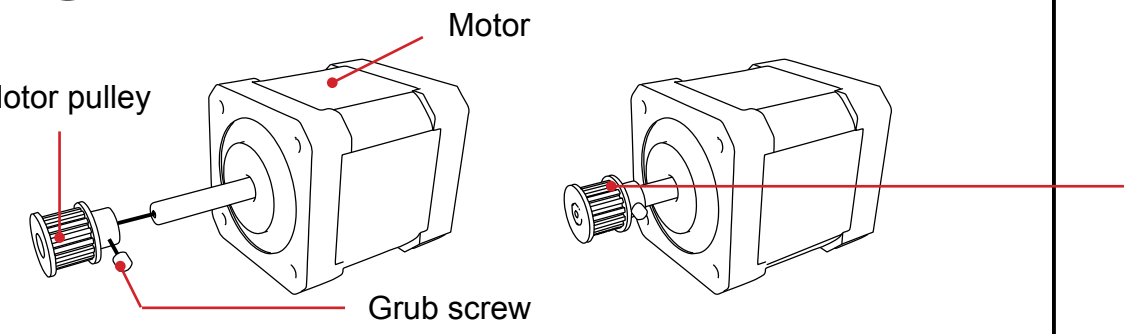


Put the endstop wires **before** the motors brackets

2



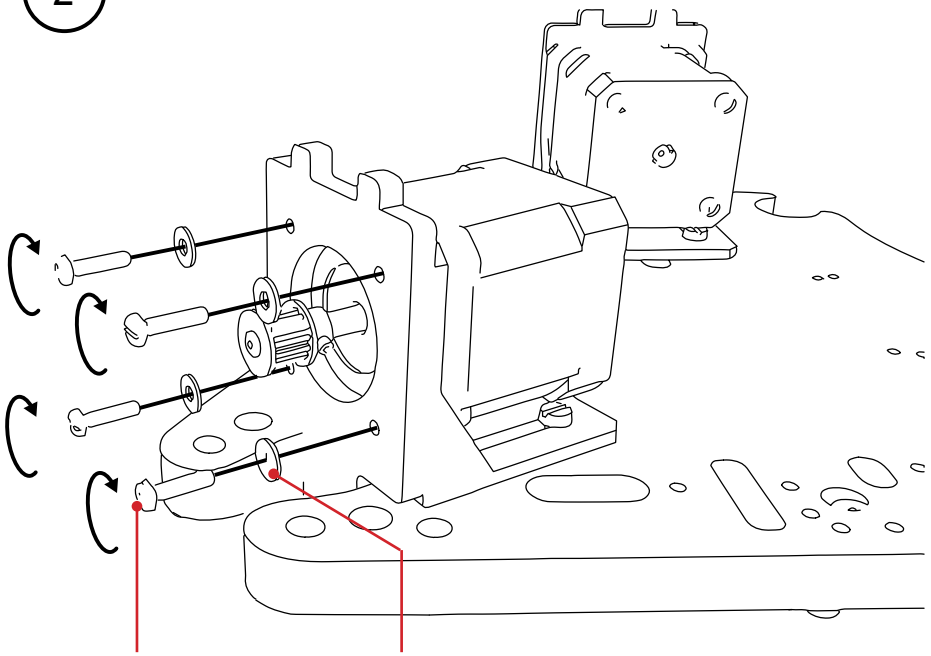
1



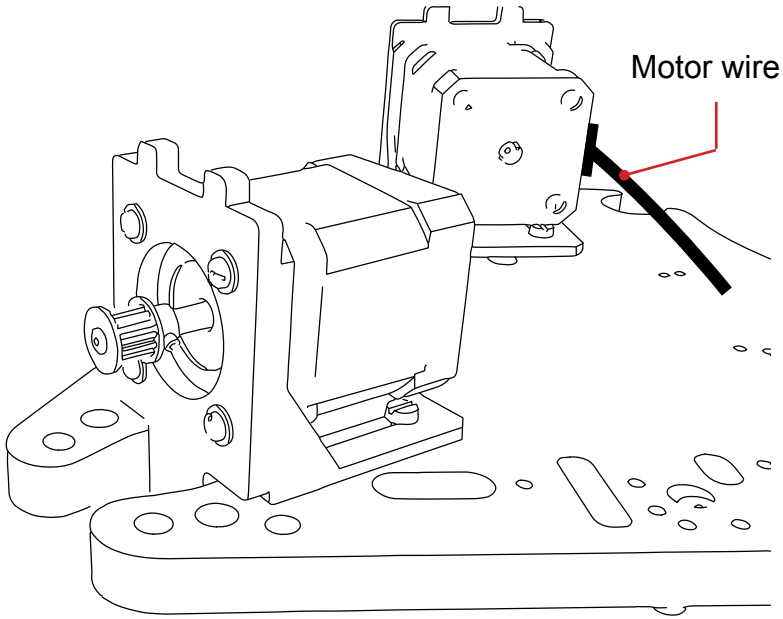
Take care of the way of the pulley
Position the pulley at 3mm from the end of the motor axe

Note : Use the Allen key given in the kit to tighten the pulley

2

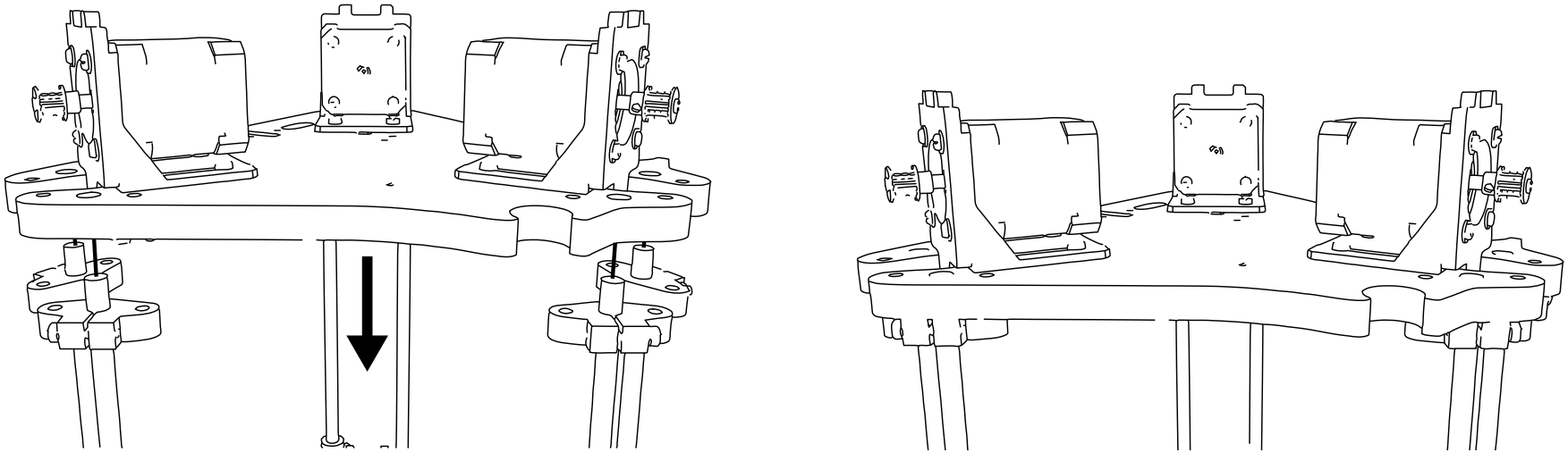


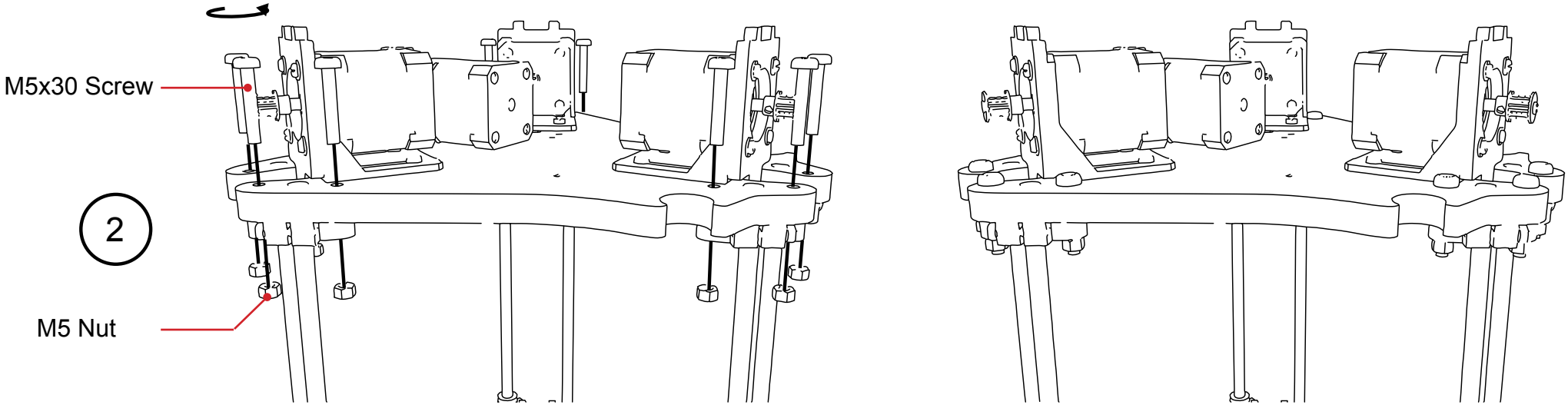
M3x12 Screw M3 Washer Tighten moderately



Motor wire must be on the side

1

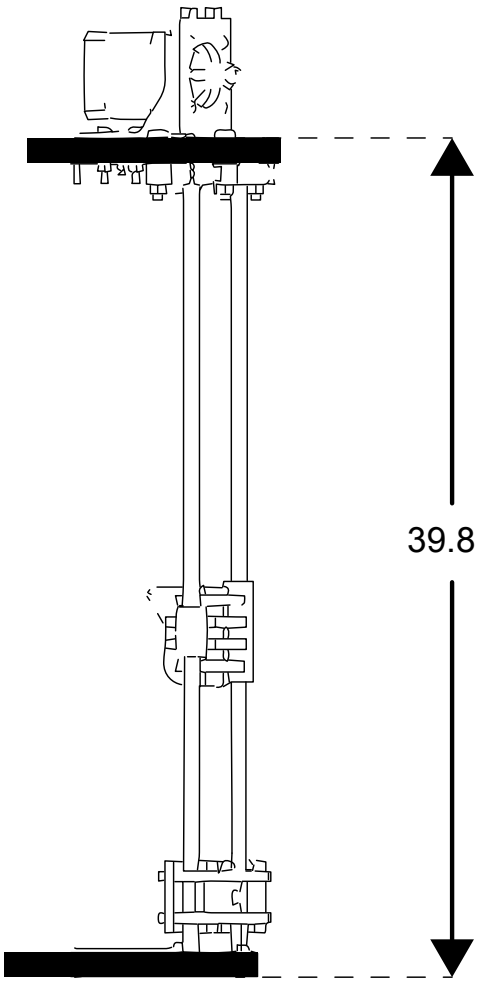




2

1

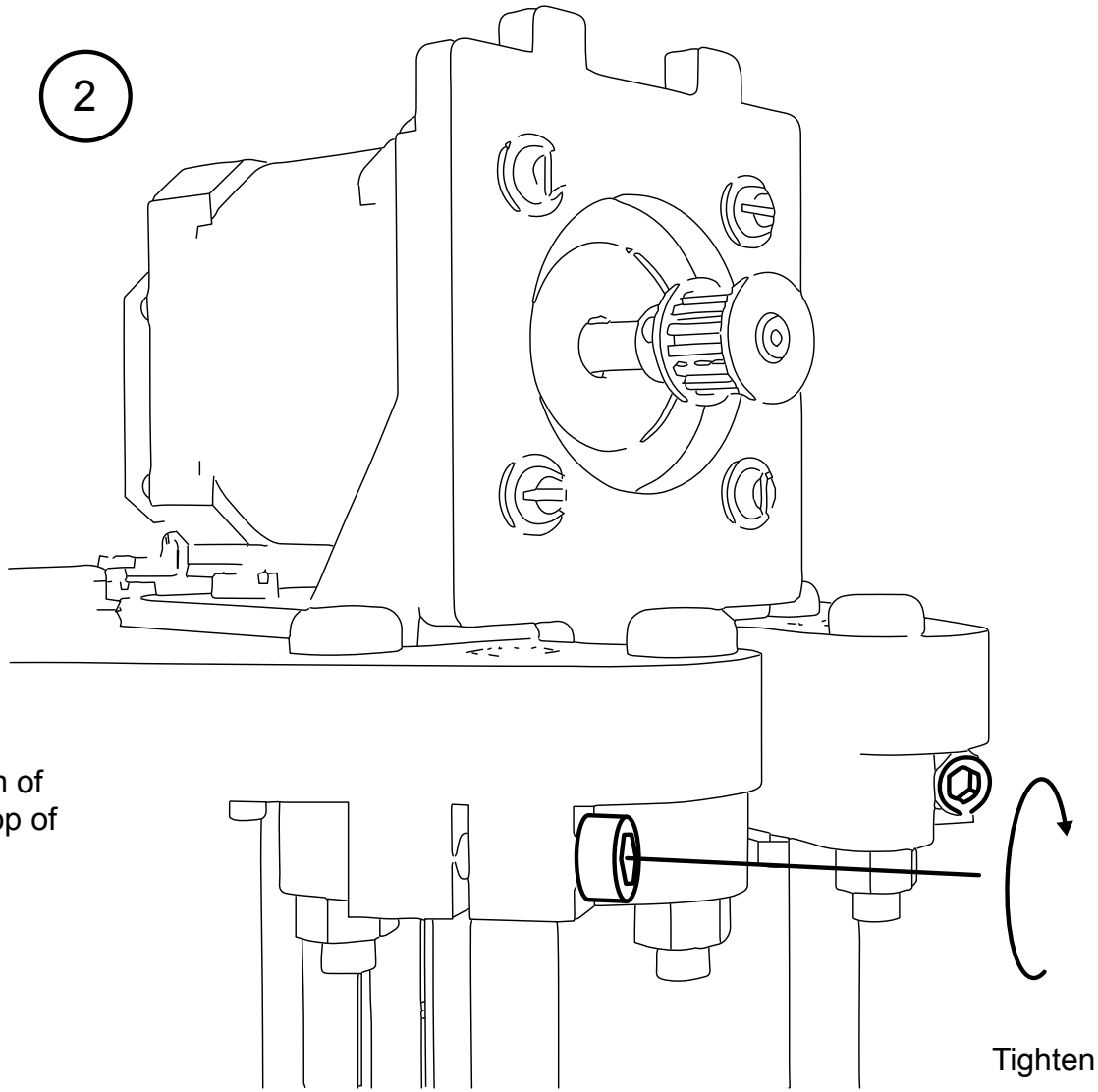
Caution : the distance must be the same for each smooth rod



39.8 cm

Distance betwen the bottom of the bottom frame and the top of the top frame

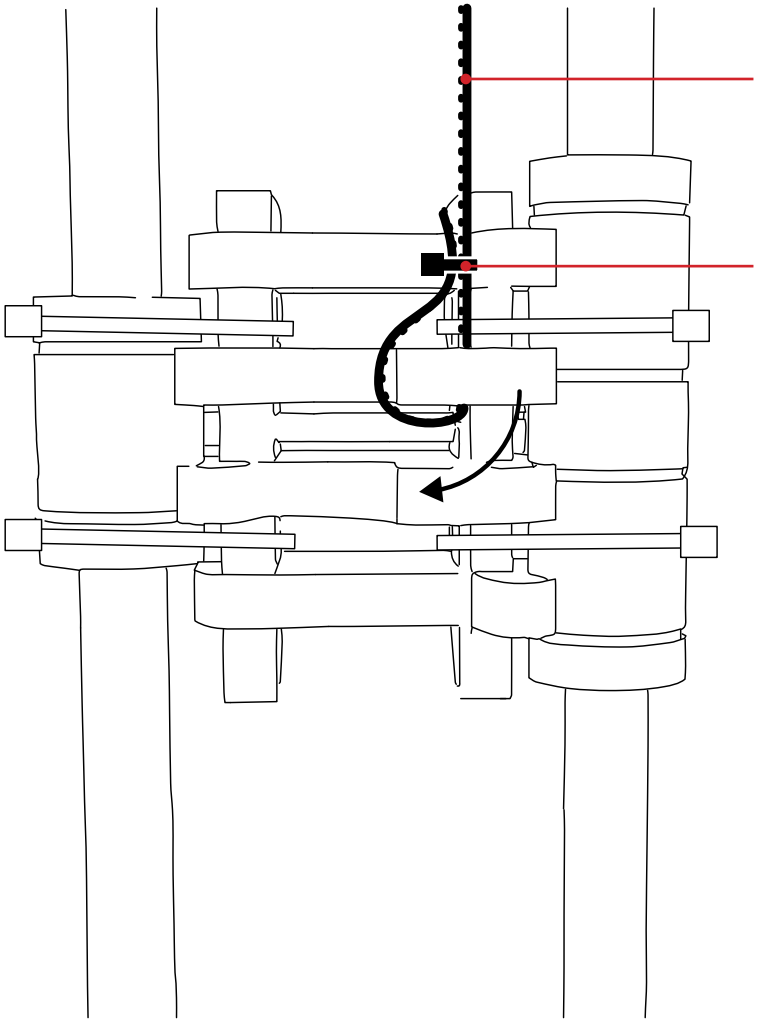
2



Tighten

1

Teeth in the direction of the pulleys

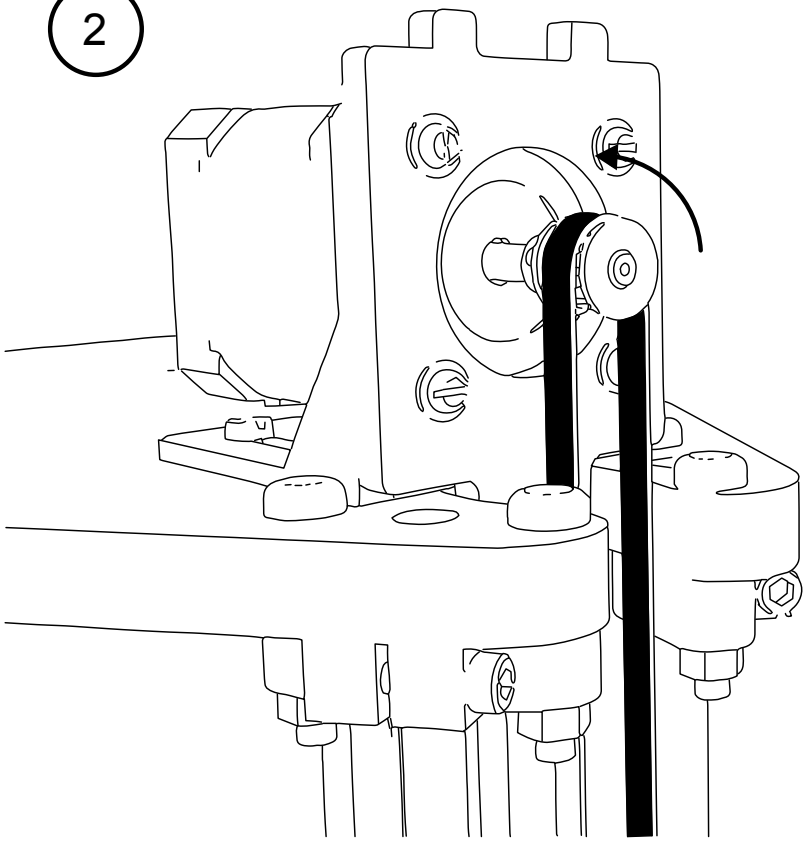


Belt

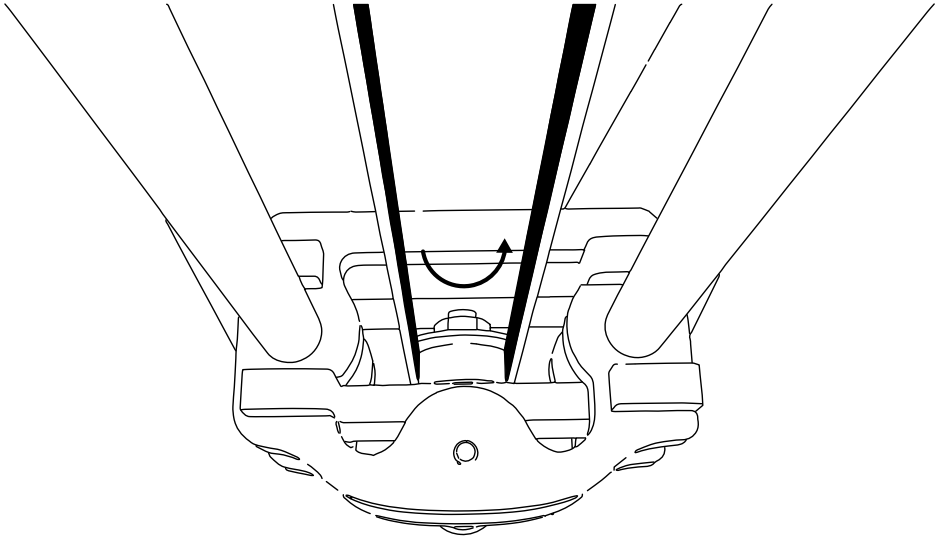
Zip tie

Position the zip tie as close as possible to the slider

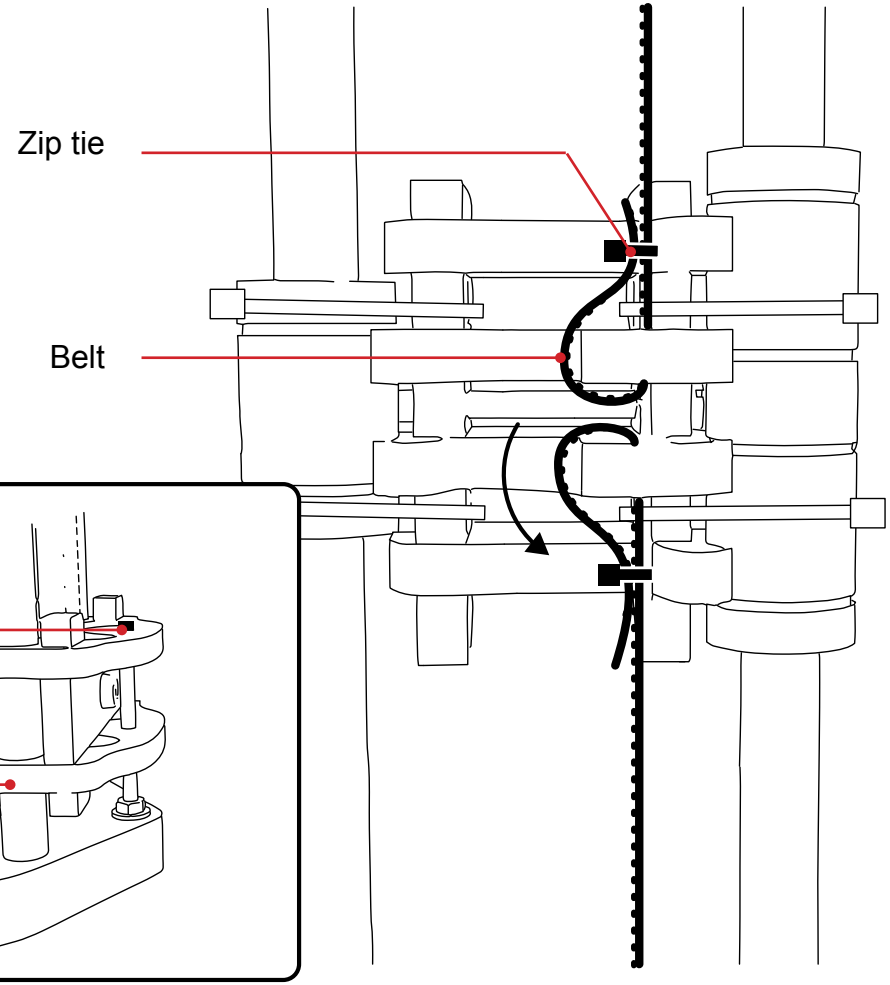
2



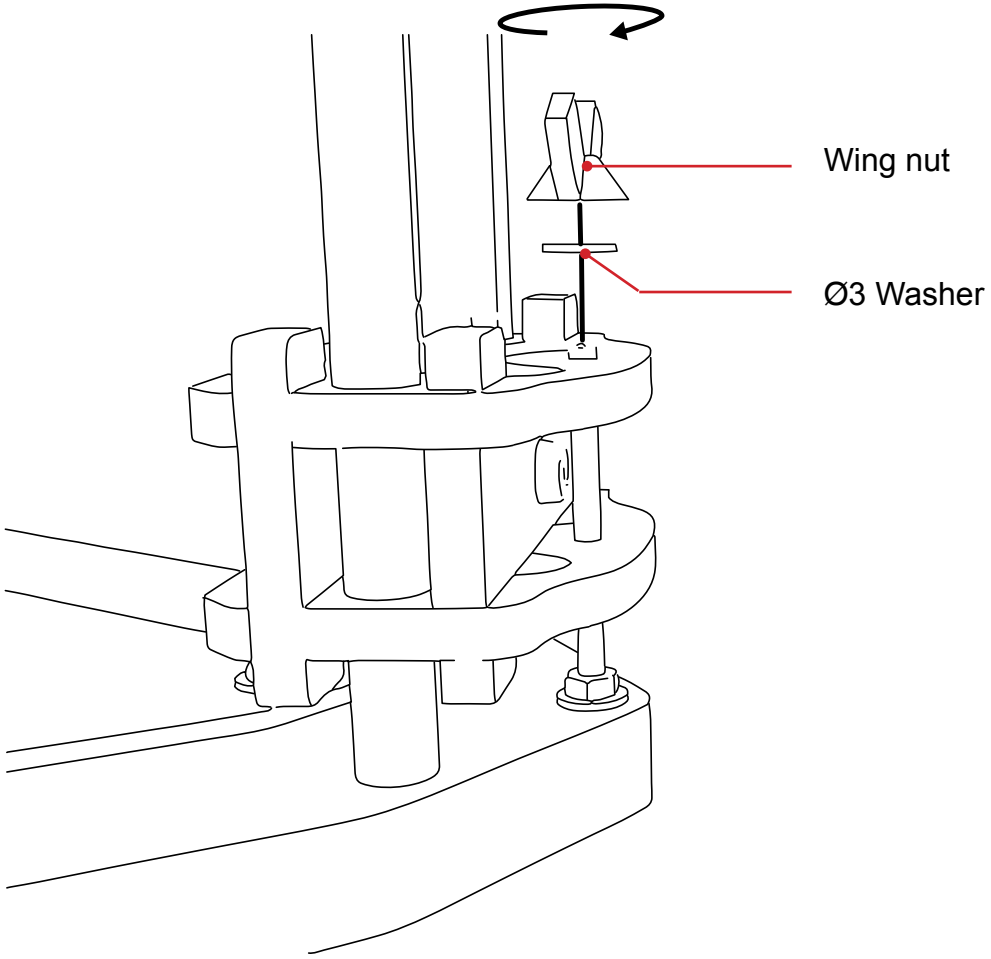
1

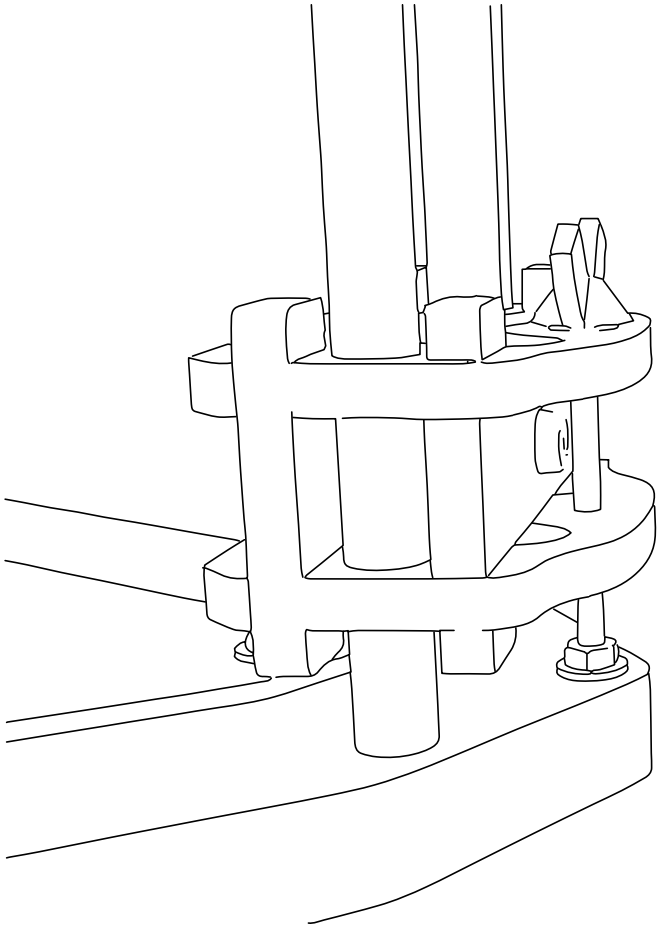


2



Make sure the belt is slightly tight when the tensioner is on the top of the screw



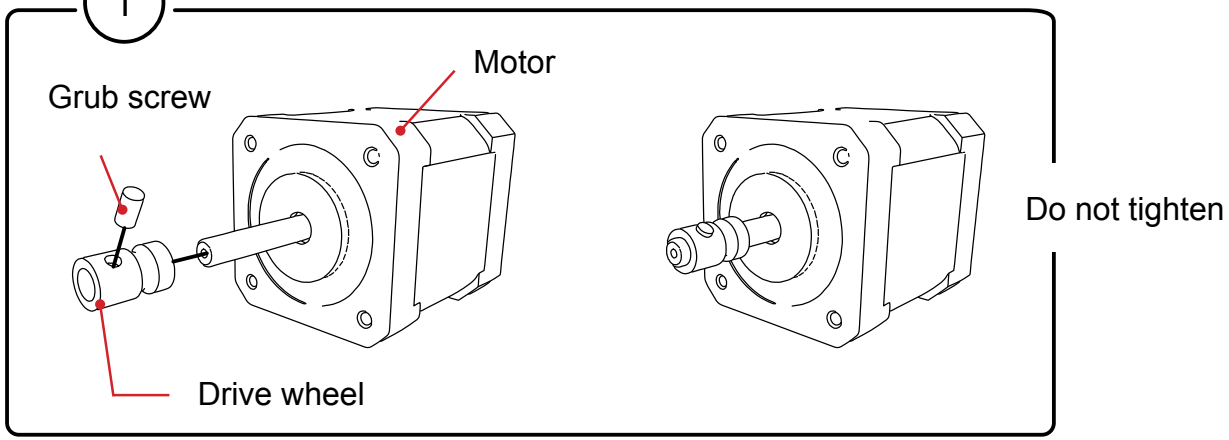


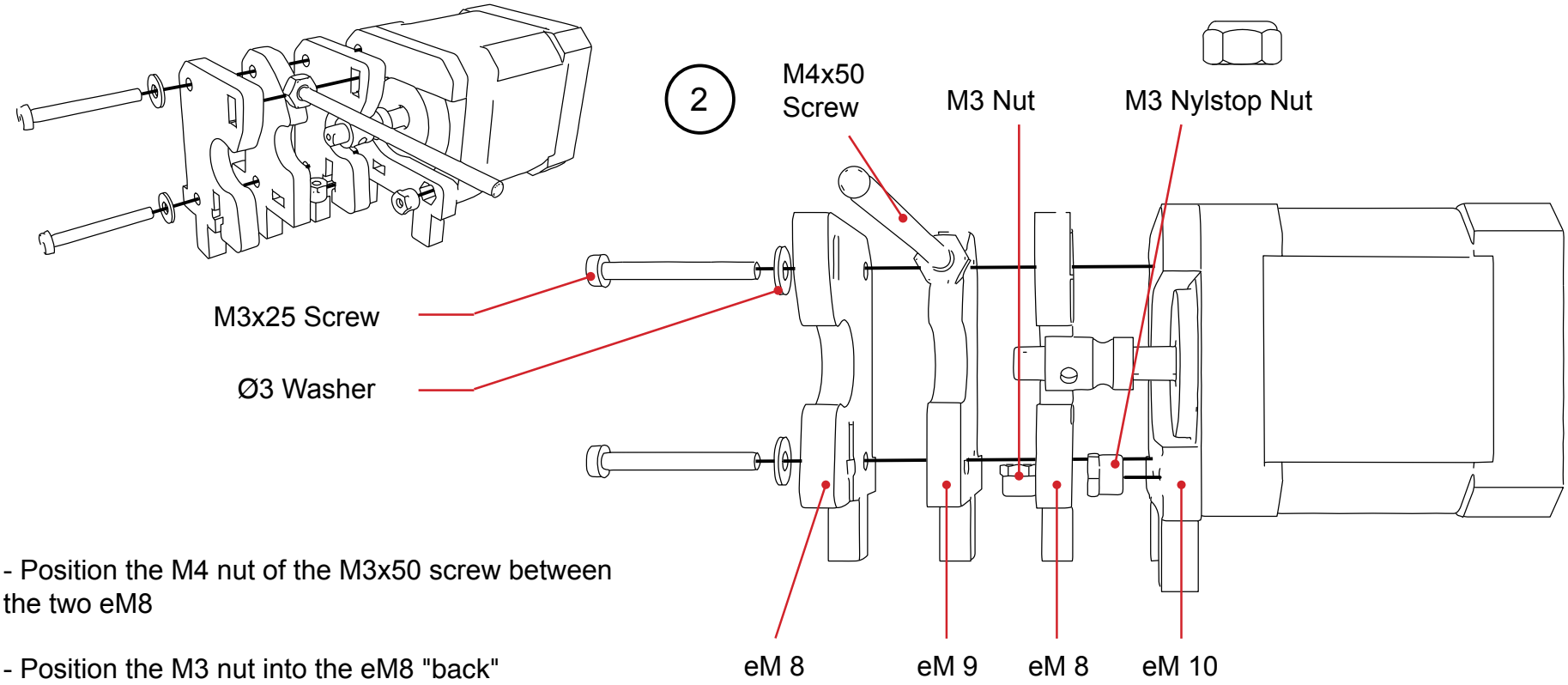
Thigten the nut to tight the belt

The belt don’t have to be too tight to avoid deformation

MECHANICAL ASSEMBLY

1

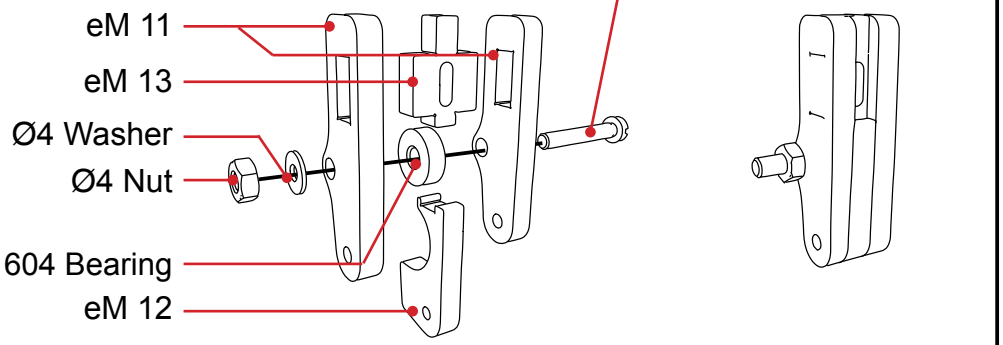




- Position the M4 nut of the M3x50 screw between the two eM8

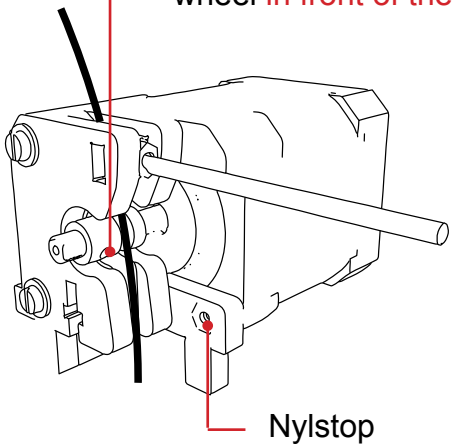
- Position the M3 nut into the eM8 "back"

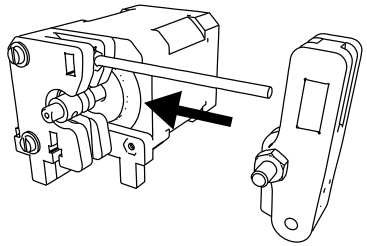
1

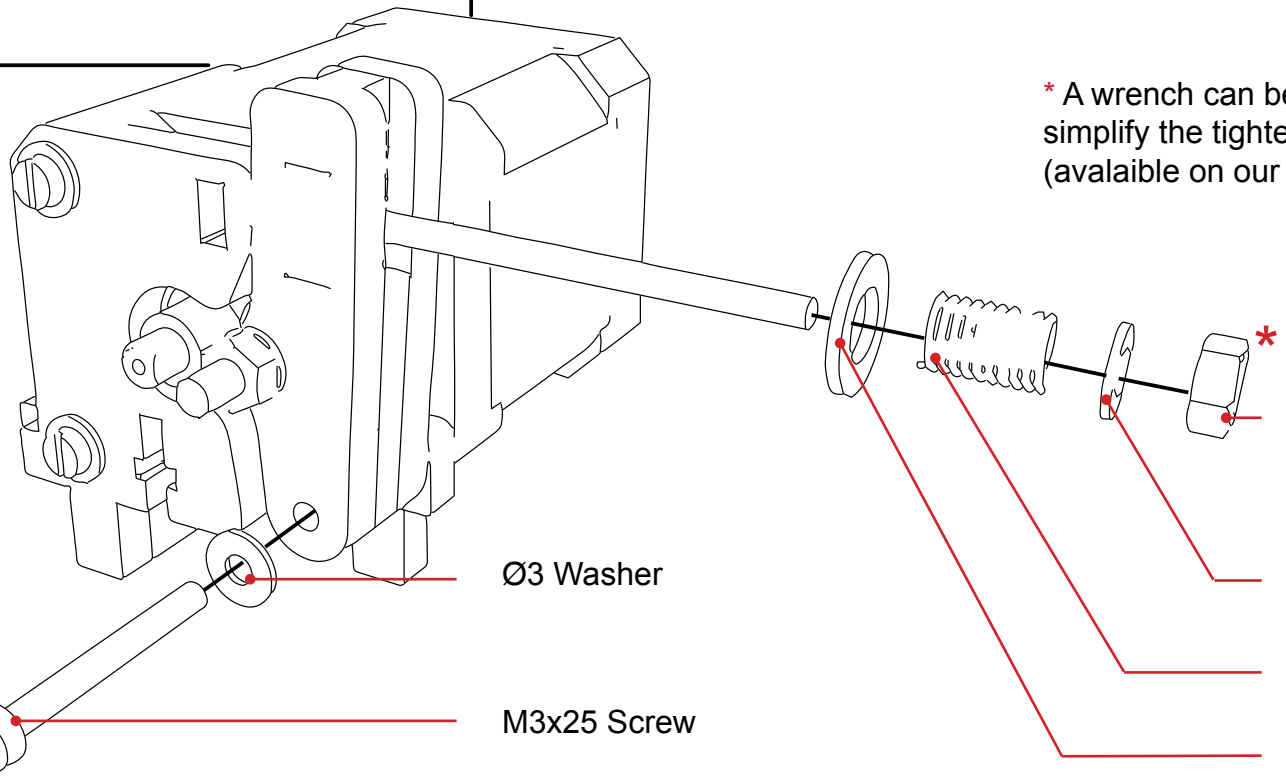


2

Position the hollow of the drive wheel in front of the eM 9



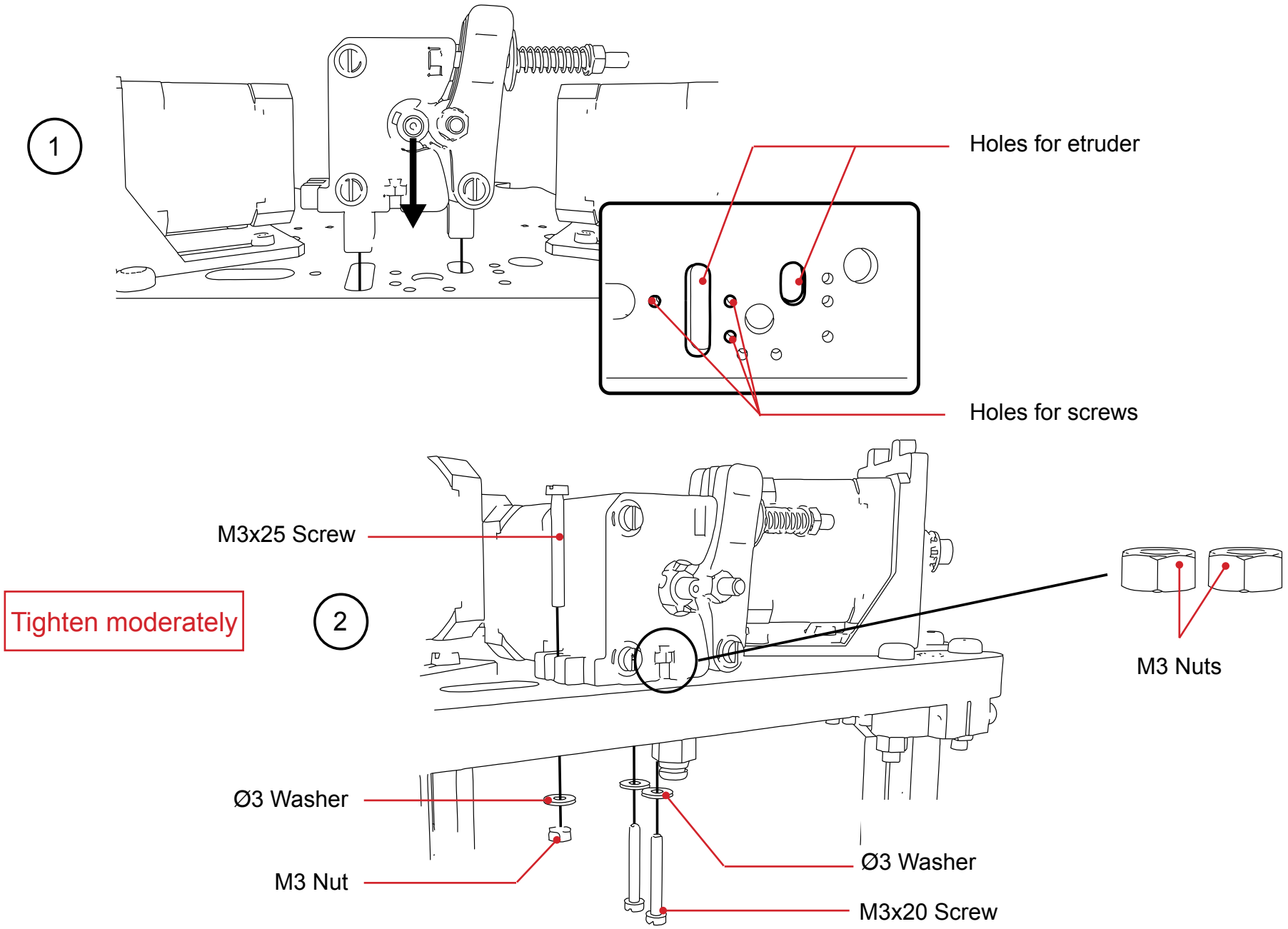




* A wrench can be printed to simplify the tightening (avalaible on our download center)

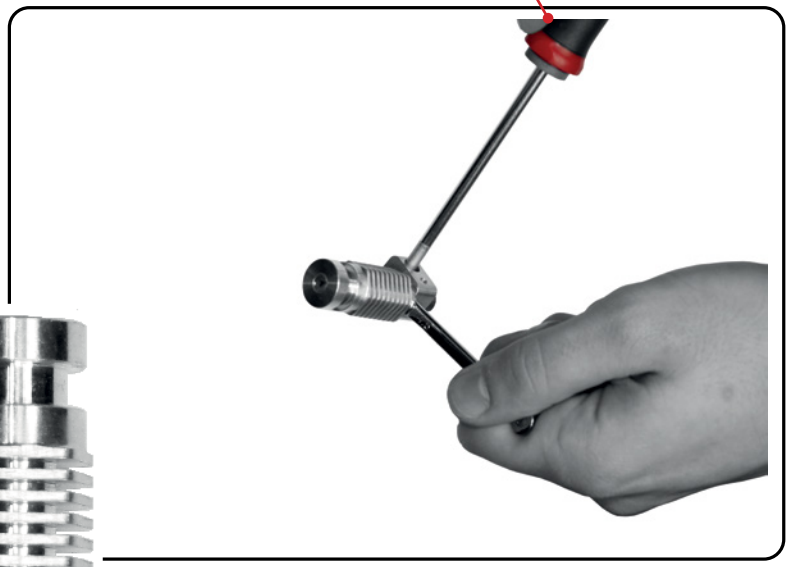
3

The M3 Screw have to be tighten but the assembly should rotate

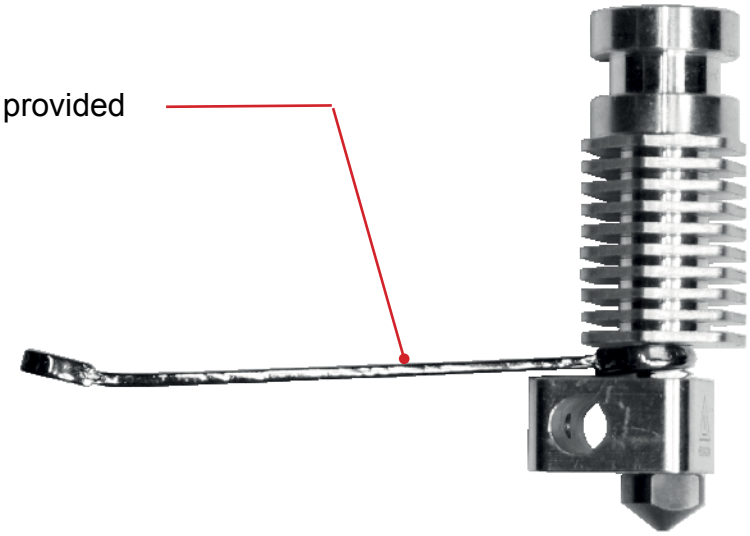

1
Holes for etruder
Holes for screws
M3x25 Screw
Tighten moderately
2
M3 Nuts
Ø3 Washer
M3 Nut
Ø3 Washer
M3x20 Screw

Use a screwdriver to make it easier

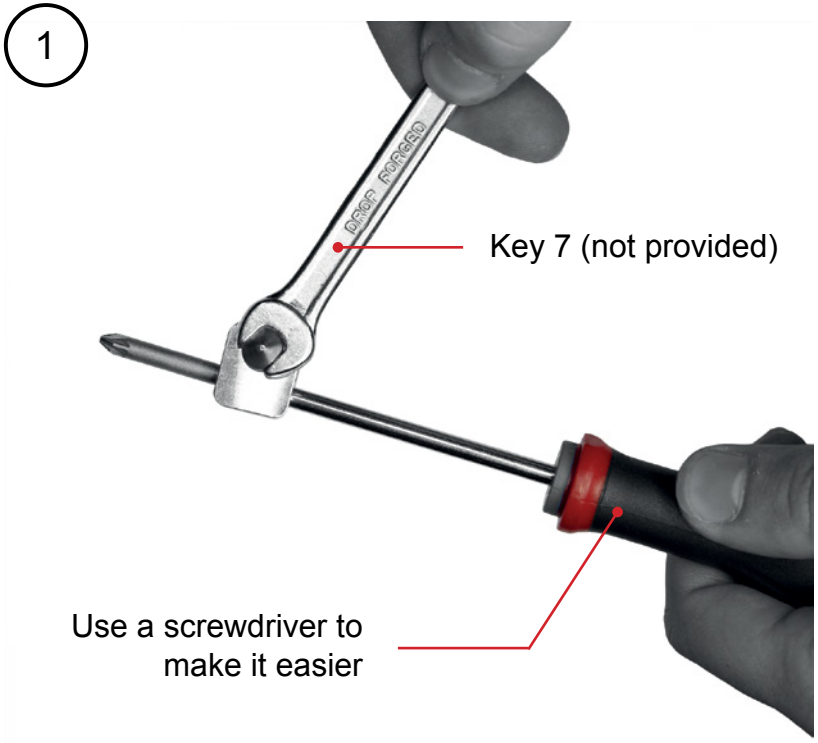
Untighten the central pipe



key provided

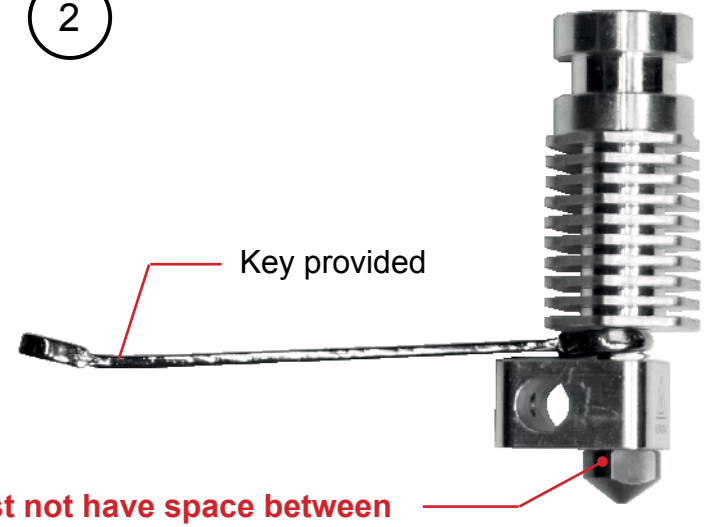


1



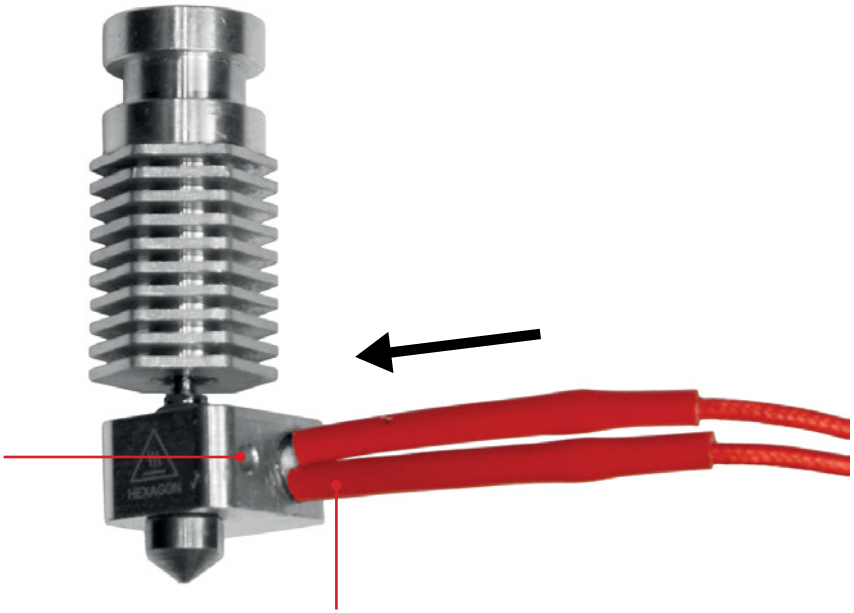
Tighten the nozzle

2



Tighten the central pipe

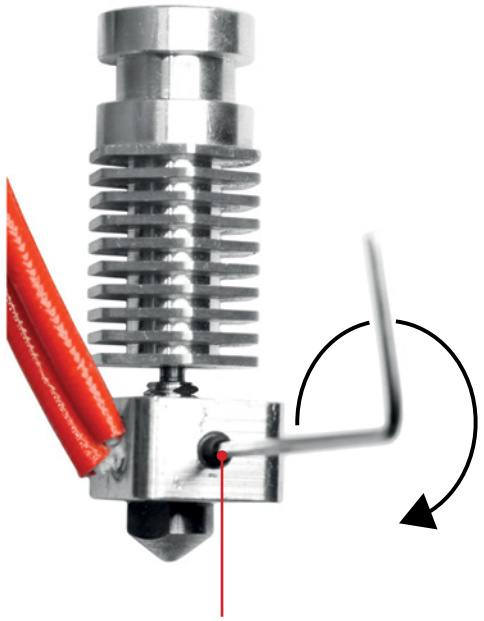
1



Hole for thermistor

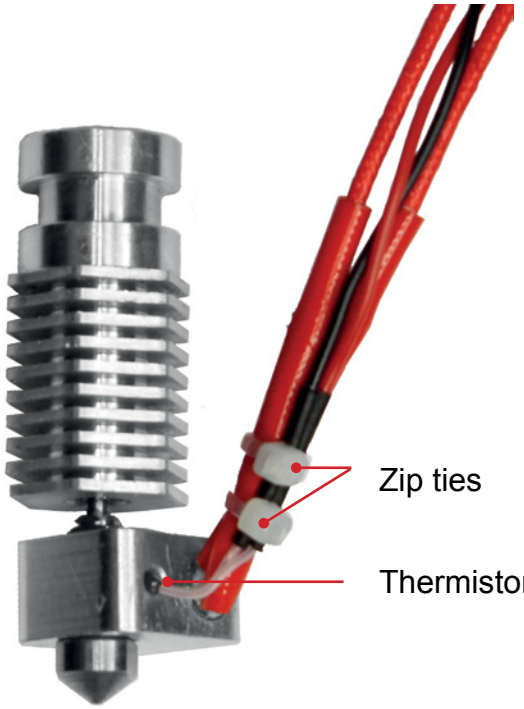
Insert the resistor
Wires must be on the same side than the thermistor hole

2



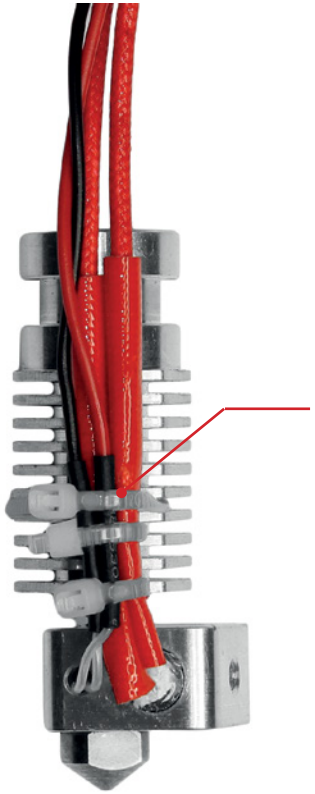
Tighten with a M3 grub screw

1



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

2



Fasten the cables to the hot end with zip tie.

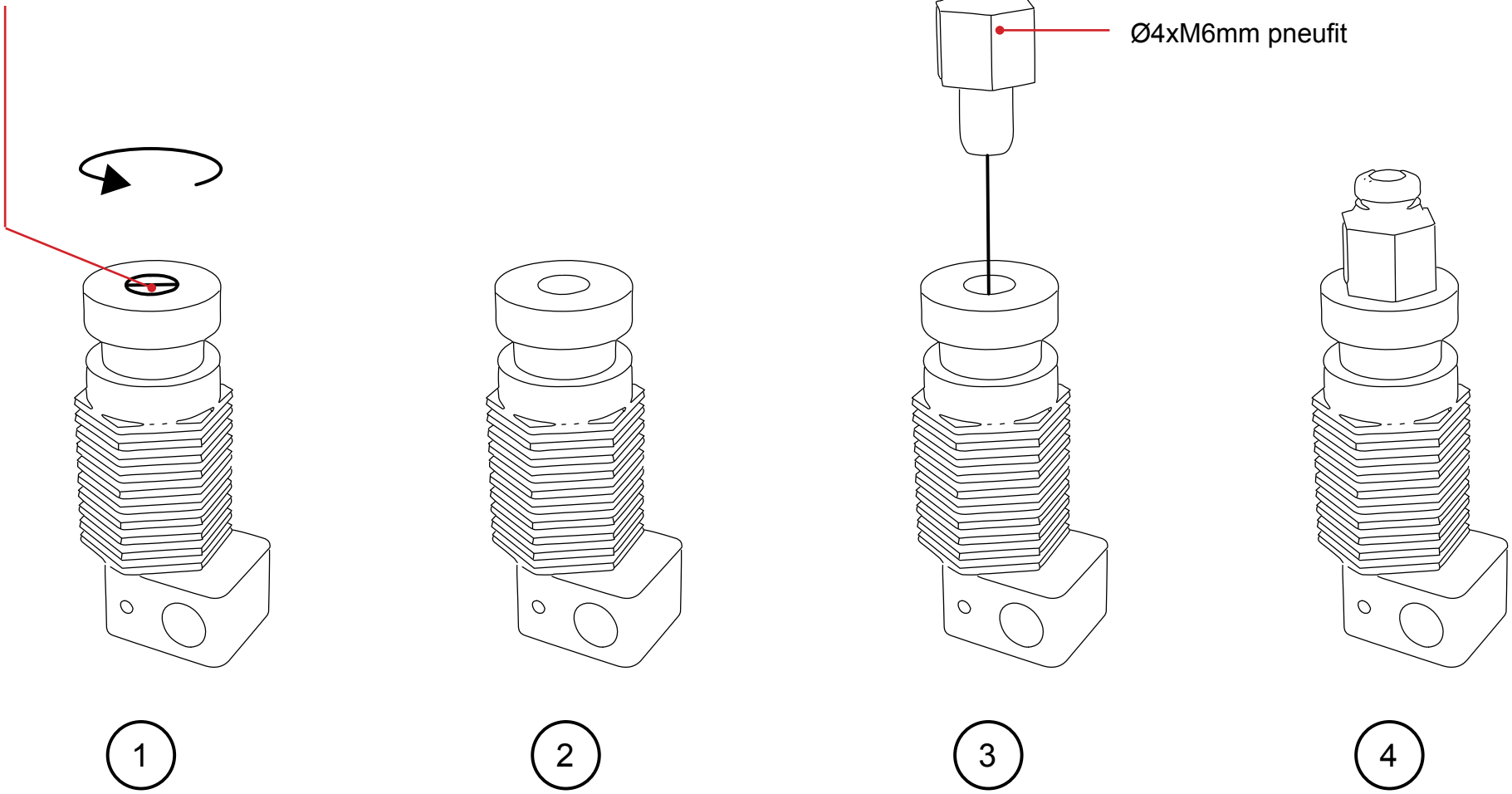
The zip tie must be positioned around the Hexagon

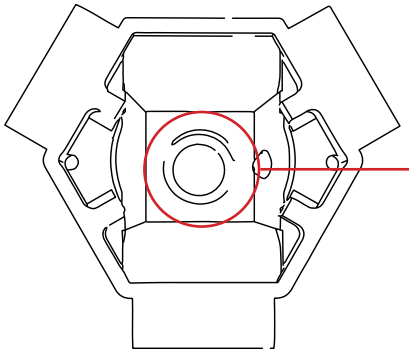
Don’t position it to hight on the hexagon

Poliymide can be used to maintain the thermistor (optional)

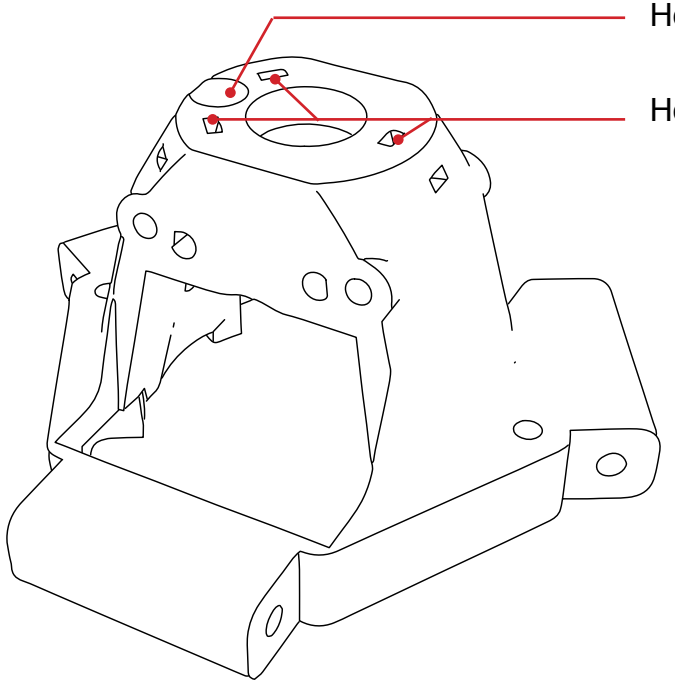
* For printing ABS with heated bed option, protect you’re heater bllock with polyimide

Unscrew the filament guide



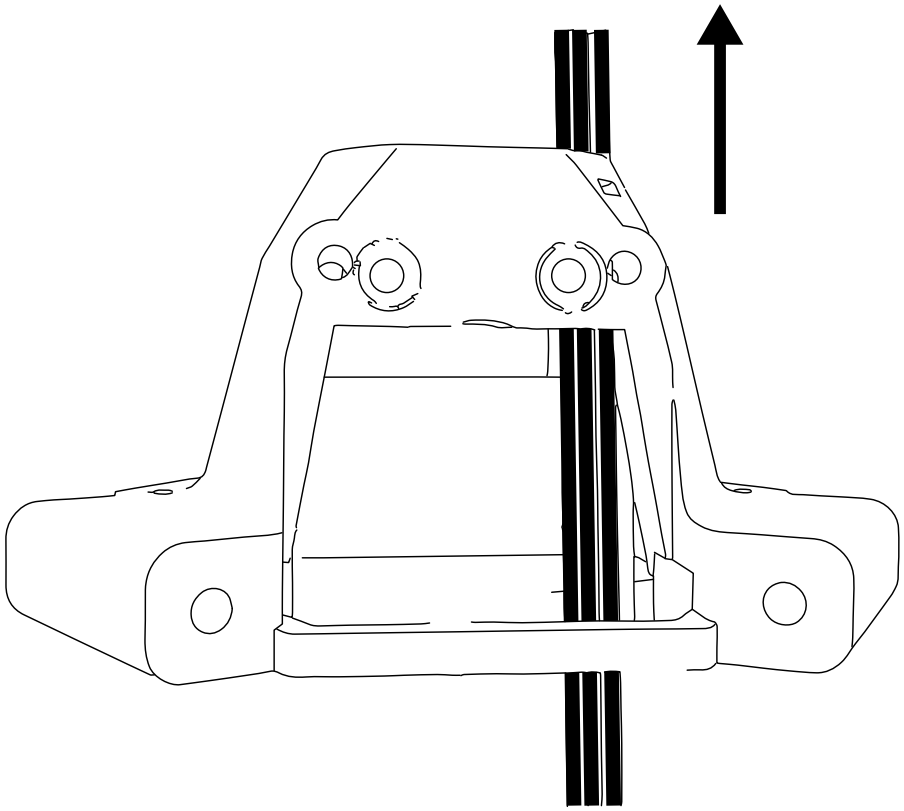


Make sure the core is free of impurities.



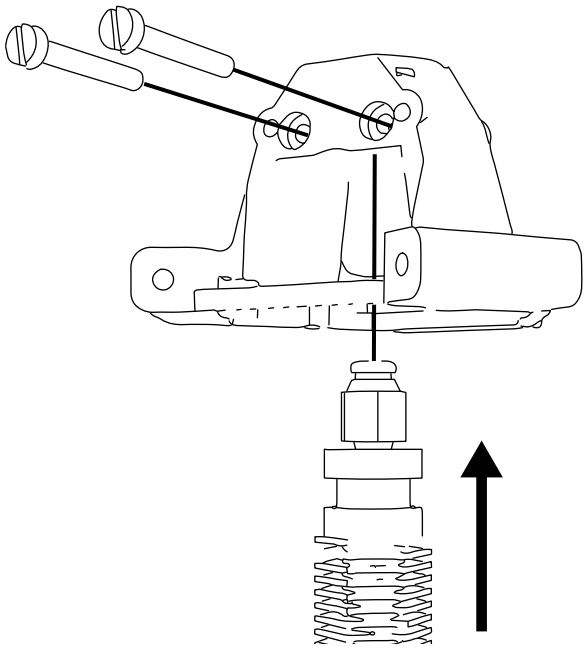
Hole for wires

Hole for Zip tie



Put the cables through the wire hole.

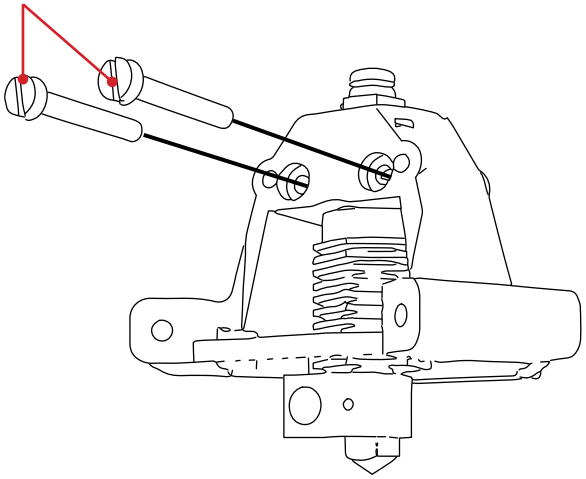
1



Position the Hexagon against the core before screwing

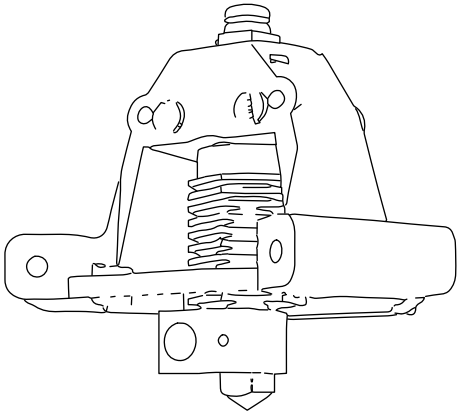
2

M3x20 screw

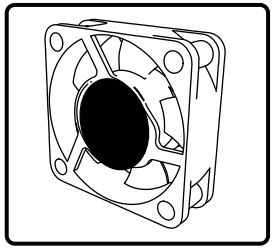


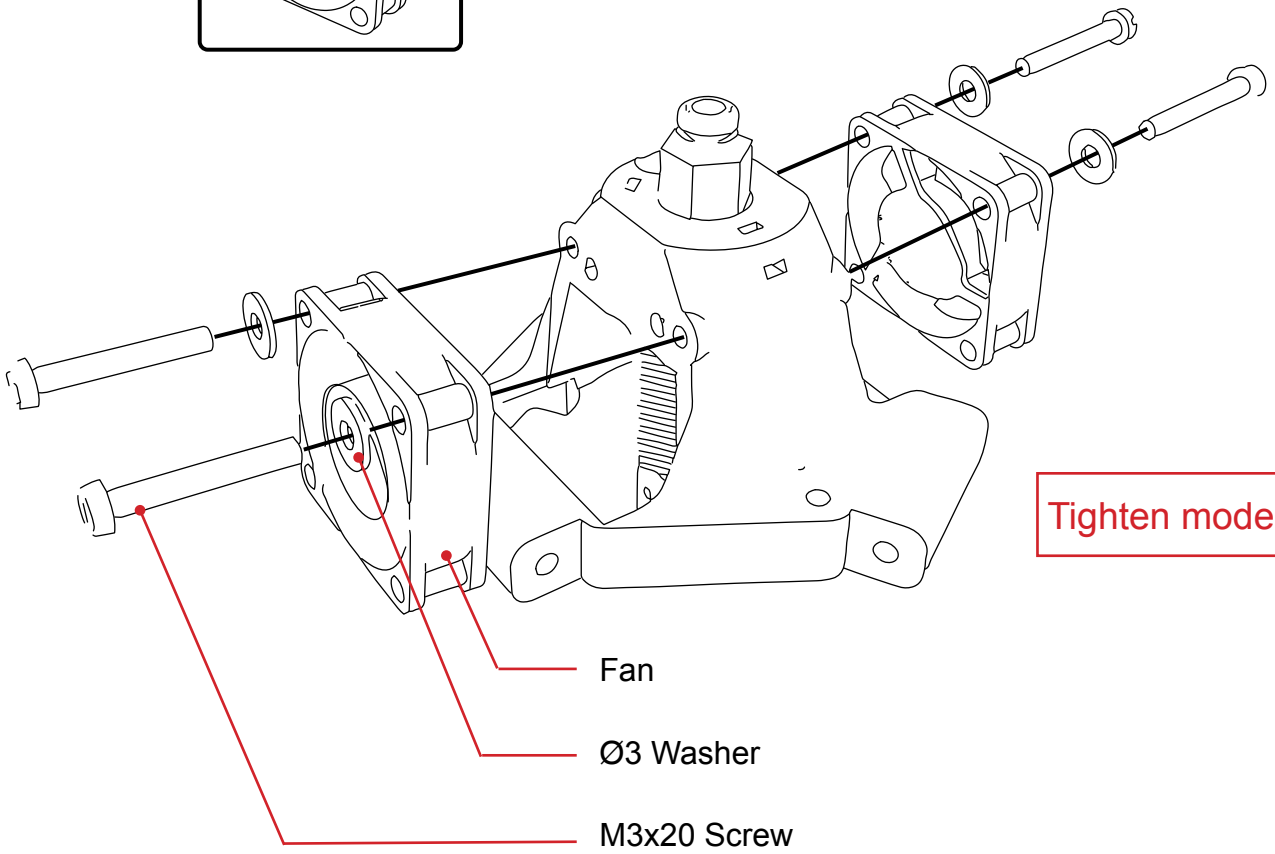
Tighten

3

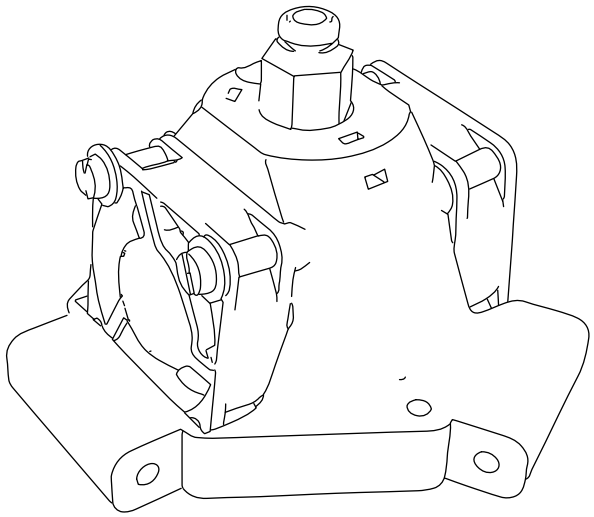


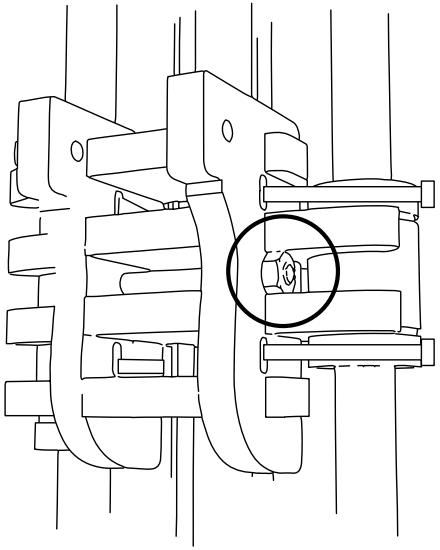
The side with the sticker must be oriented toward the hotend



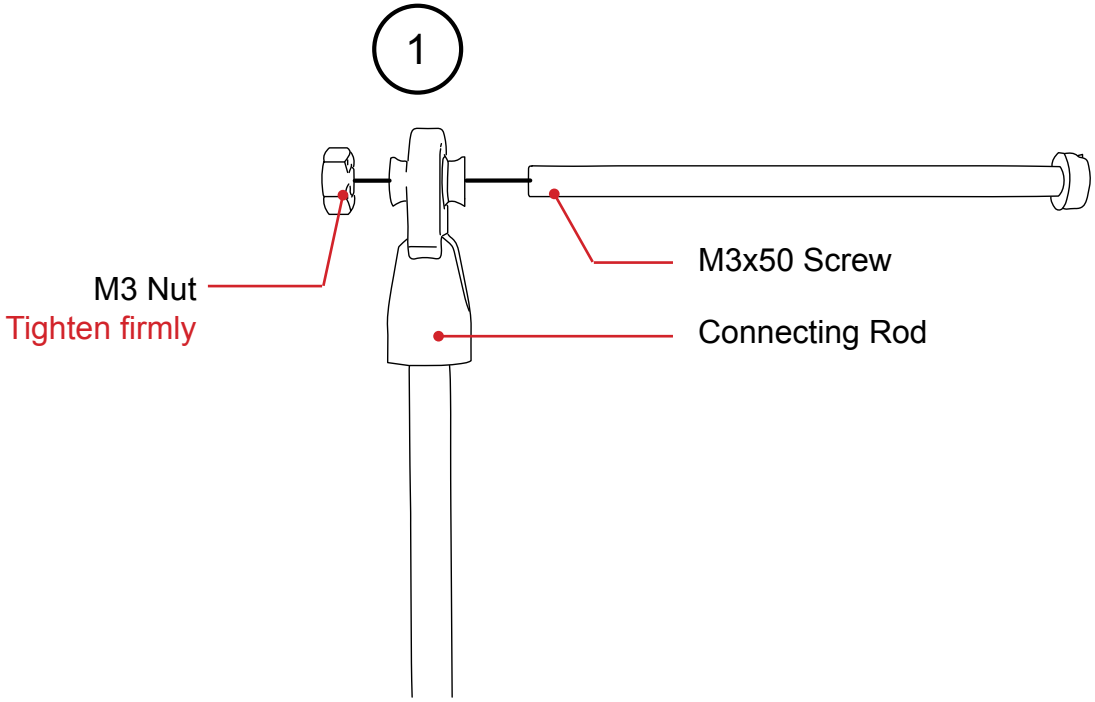


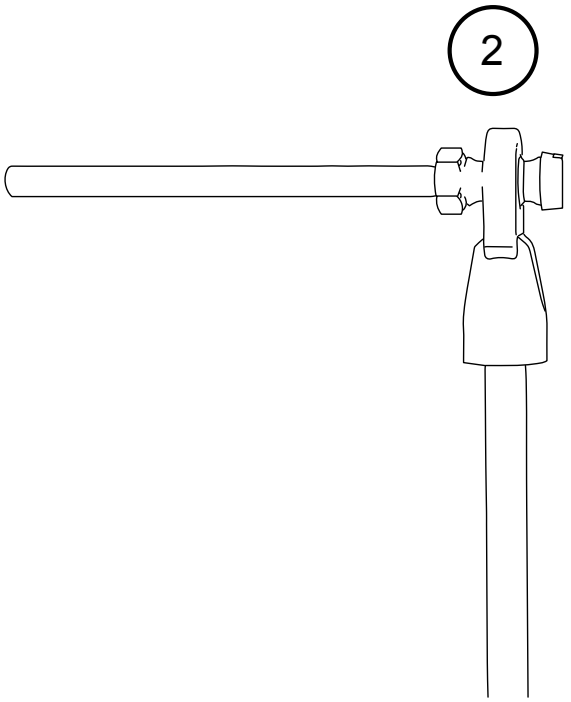
Tighten moderately

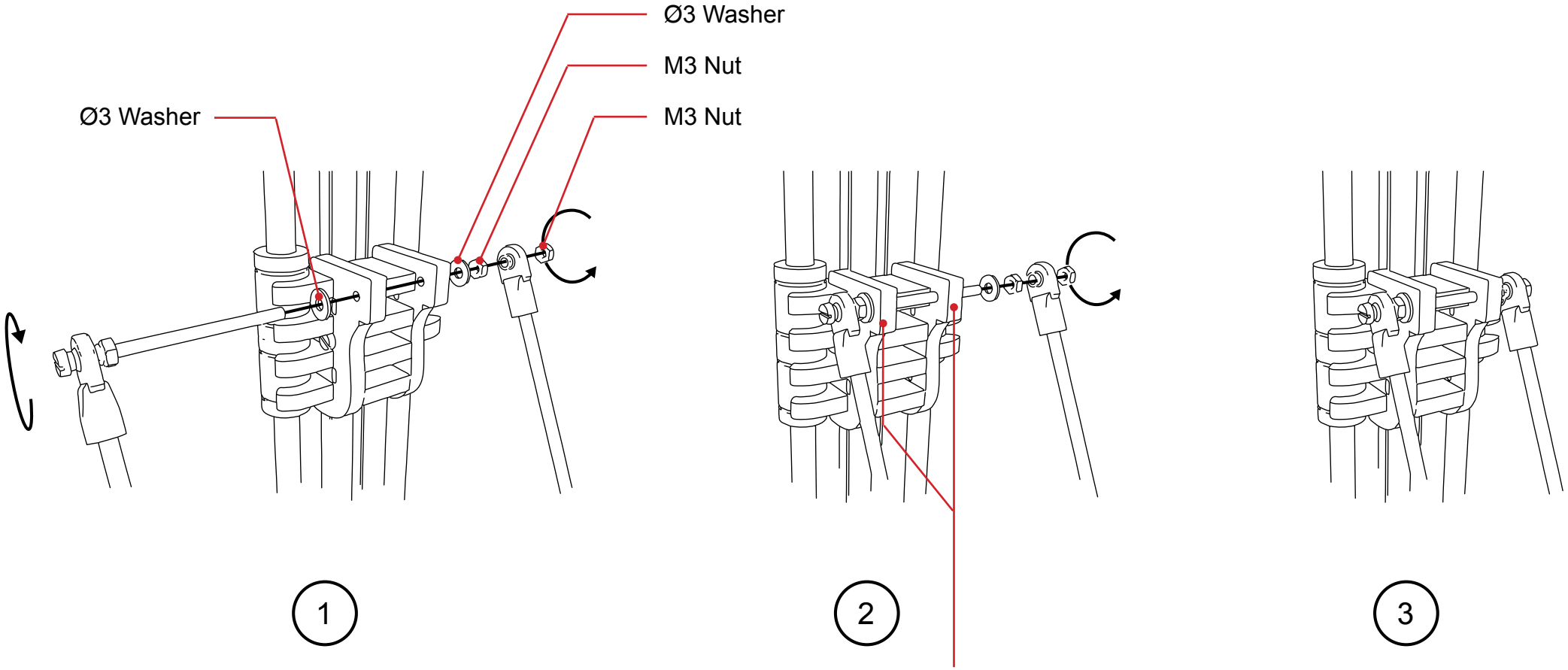




Note : Check this nut is tighten



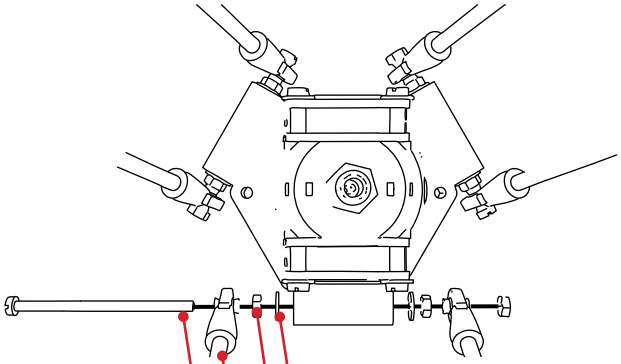




Caution : The assembly must not twist the slider.

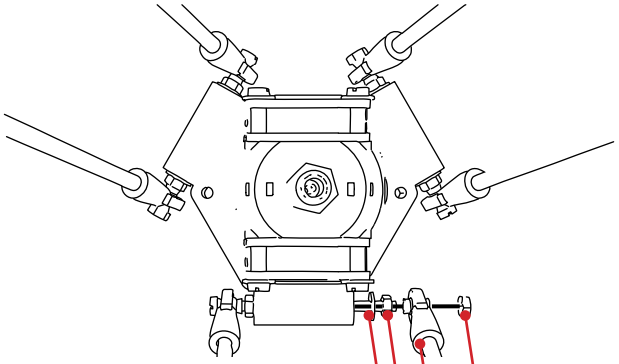
eM 5 must remain parallel

1



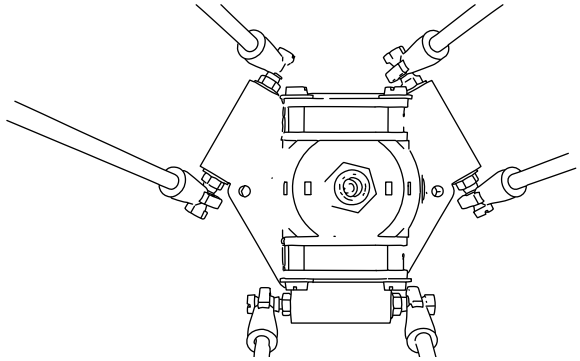
Ø3 Washer
M3 Nut
Connecting rod
M3x50 Screw

2

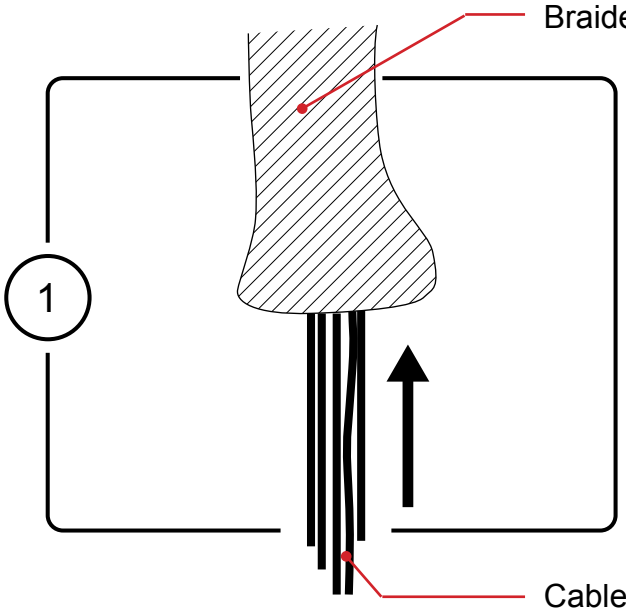


M3 Nut
Connecting rod
M3 Nut
Ø3 Washer

3

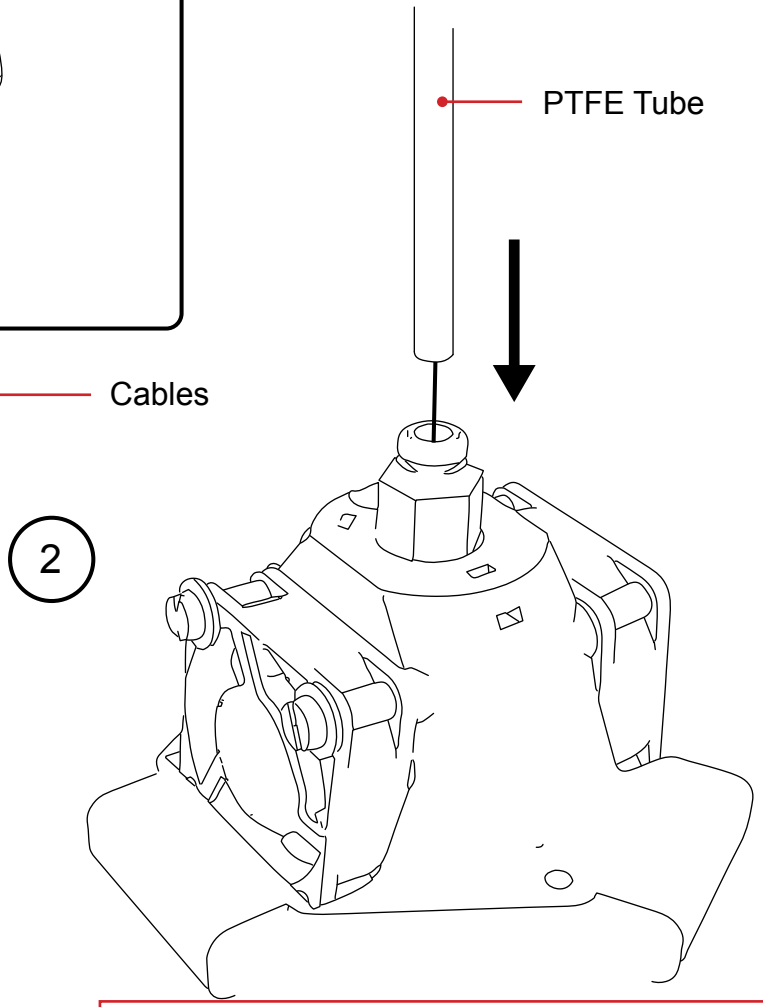


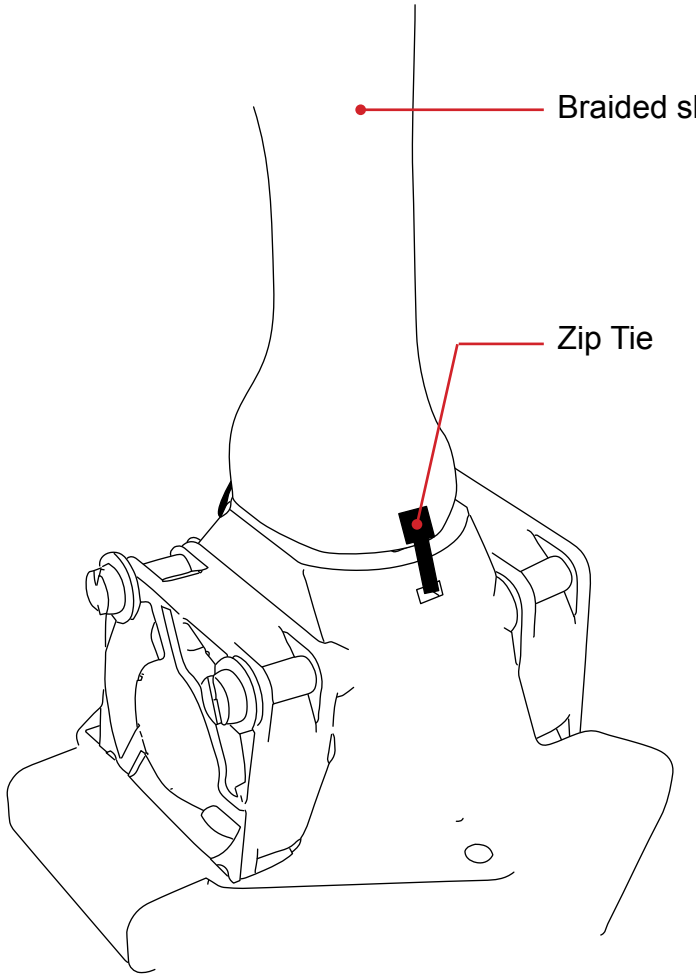
Repeat the operation with the others sides



Push the cables and the PTFE tube trough the braided sleeve

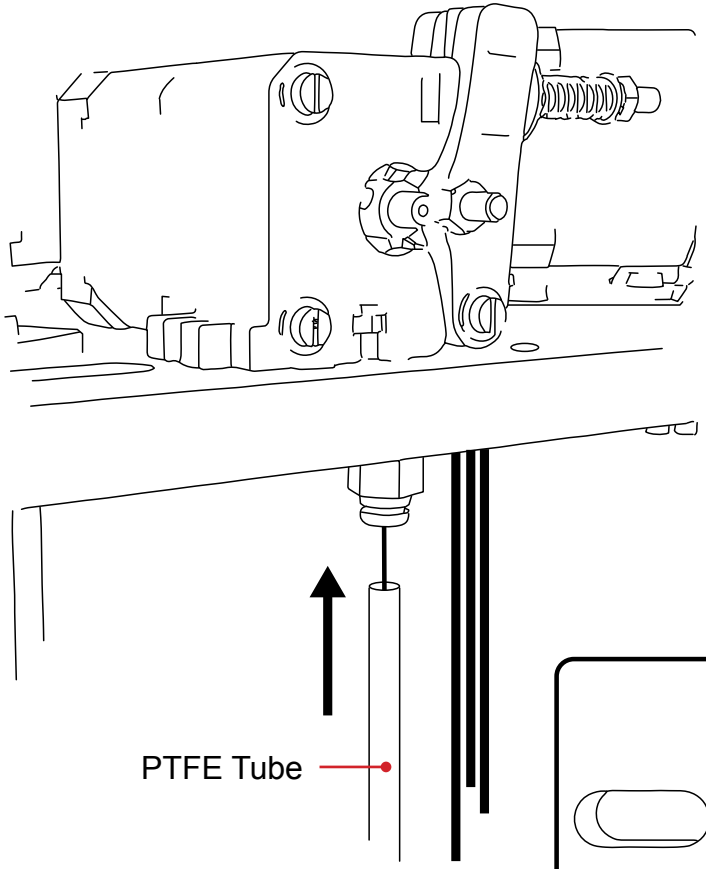
Fasten the cables with zip ties if it's needed

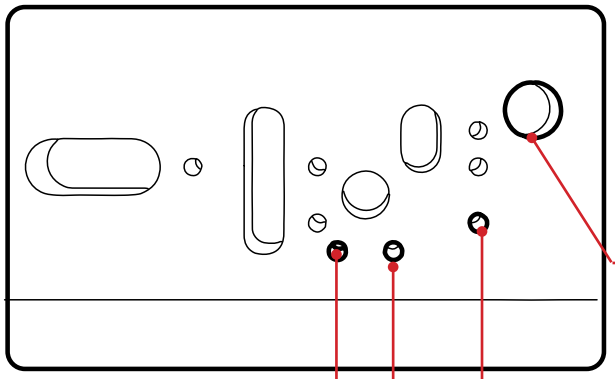




PTFE tube length must be 35cm

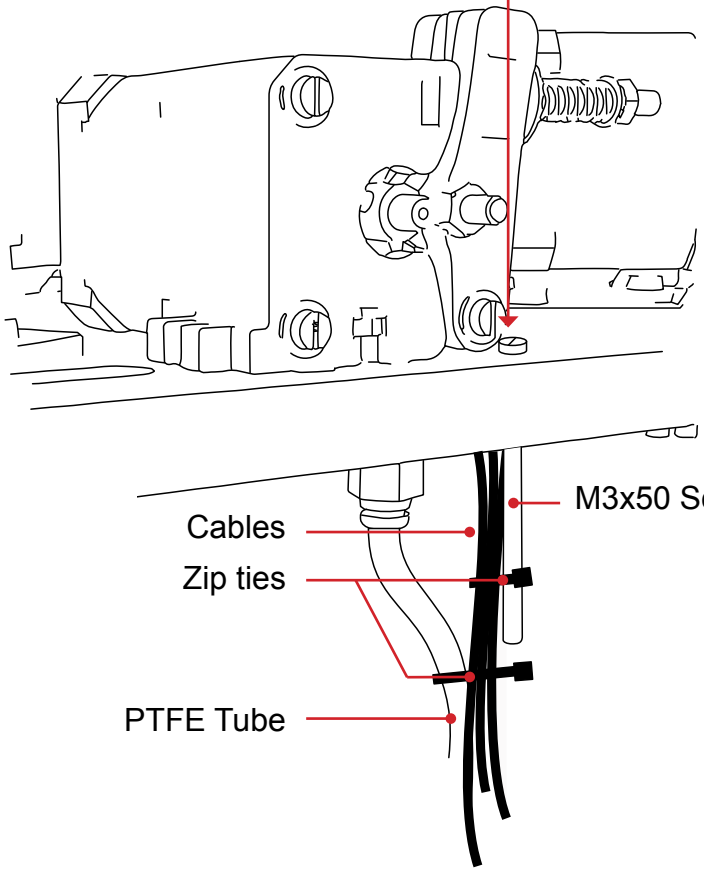
1



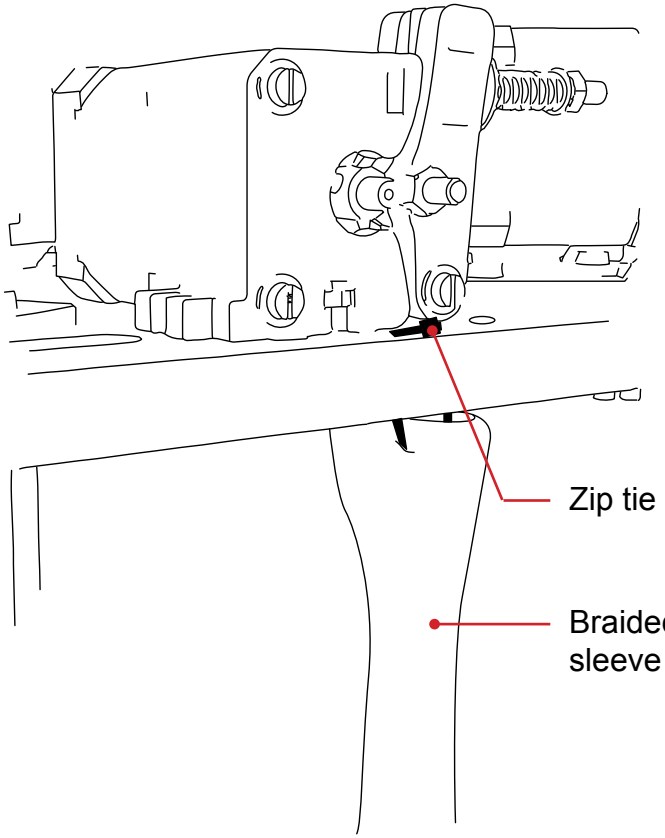


2

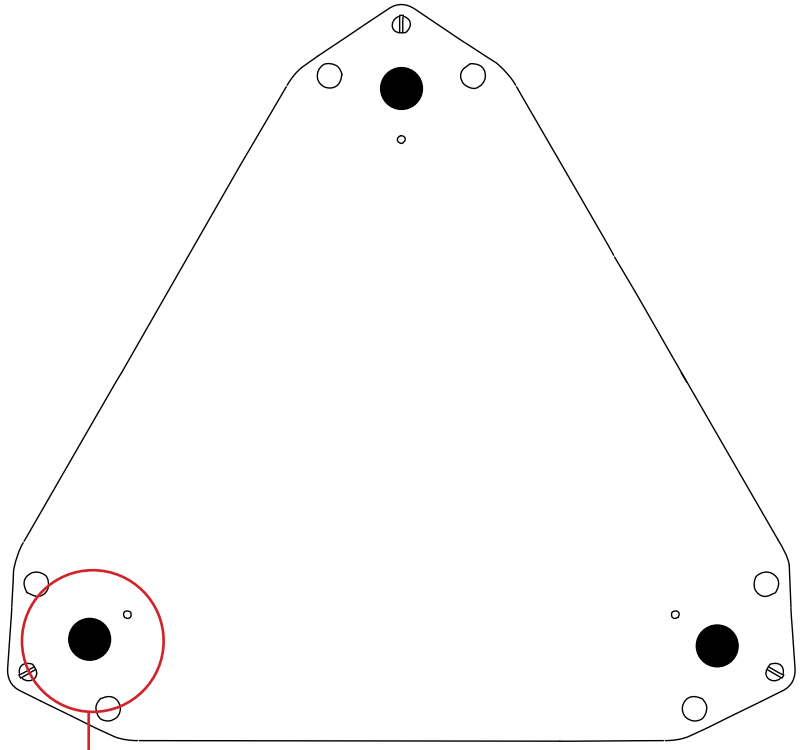
Screw is tighten with a Ø3 washer and M3 Nut to the plate



1


Zip tie
Braided sleeve

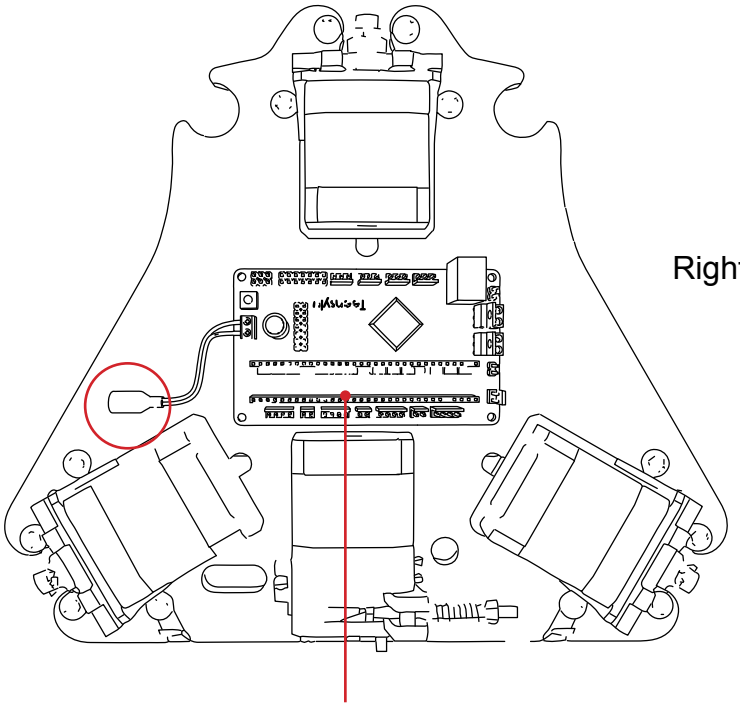
2


Stick the three pads under the inferior frame.

ELECTRONIC ASSEMBLY

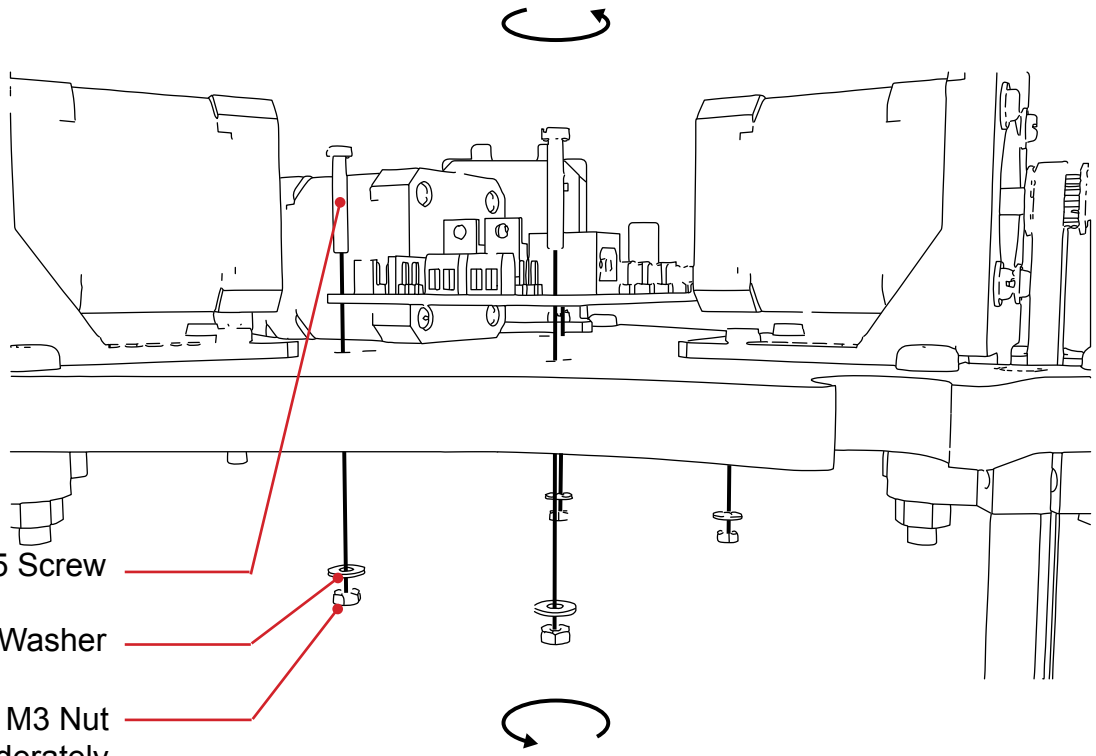
Left

Right



Teensylu

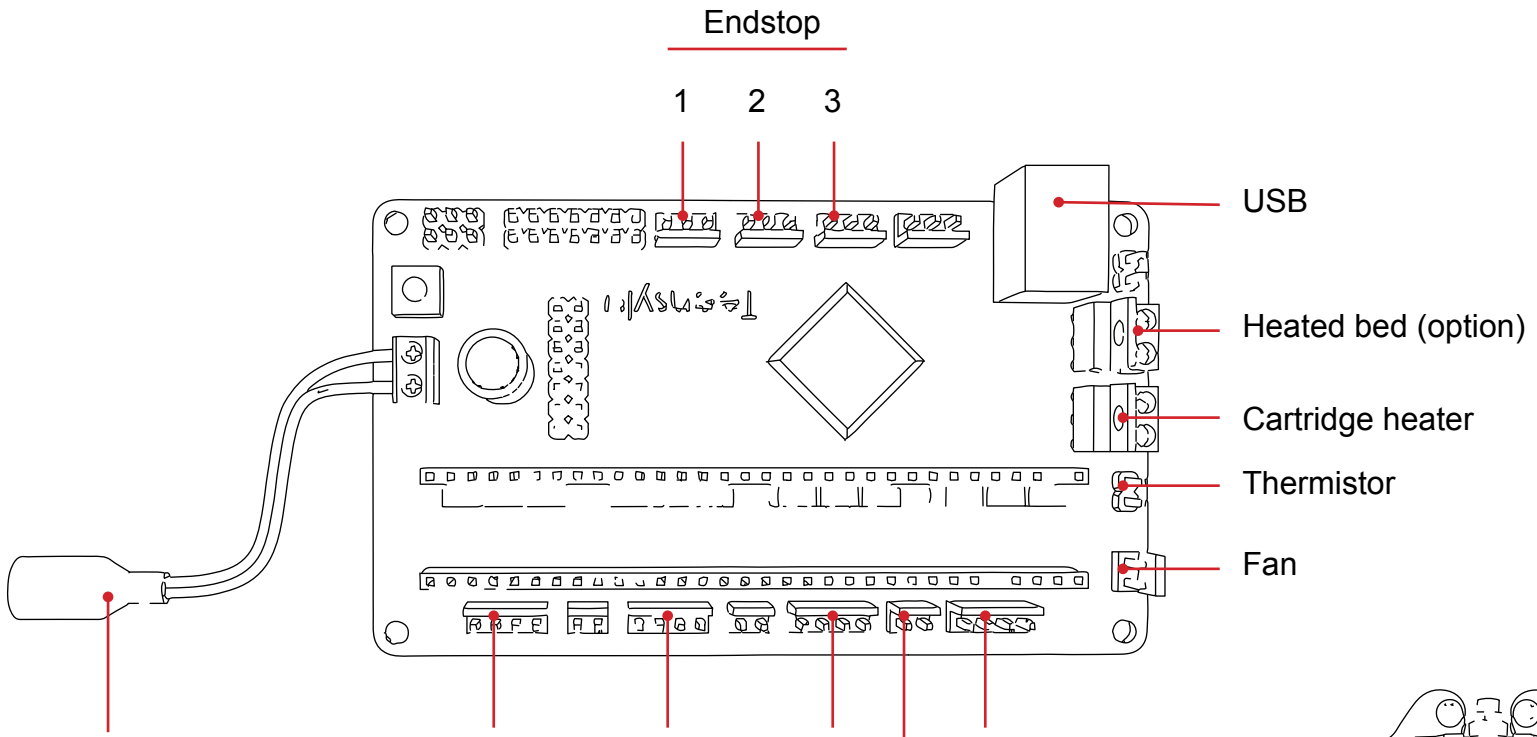
Pay attention to the teensylu orientation

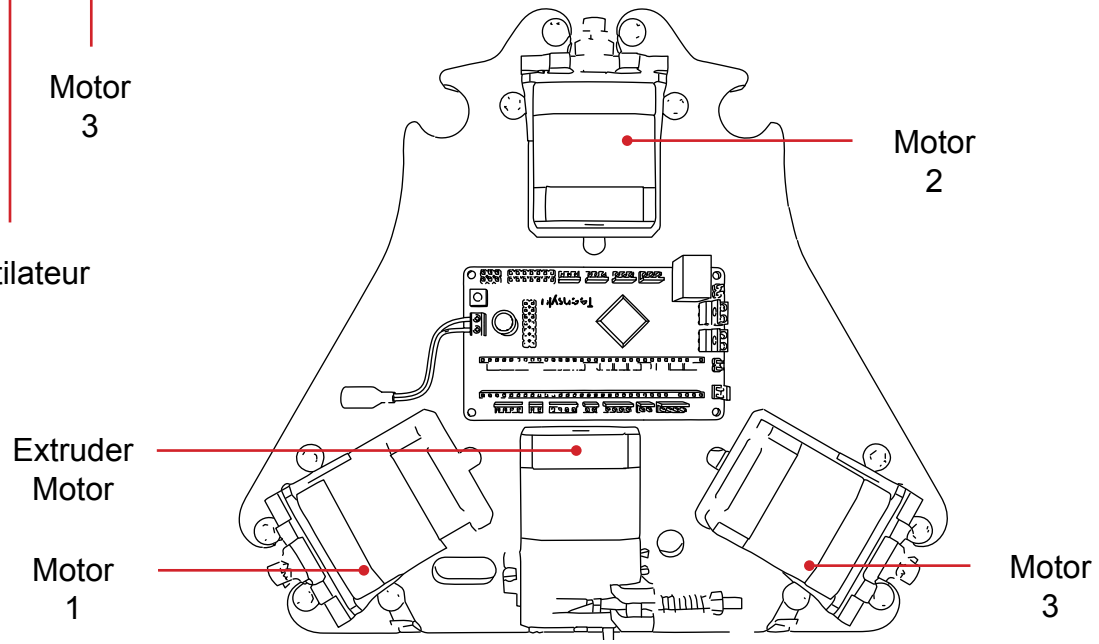


M3x25 Screw

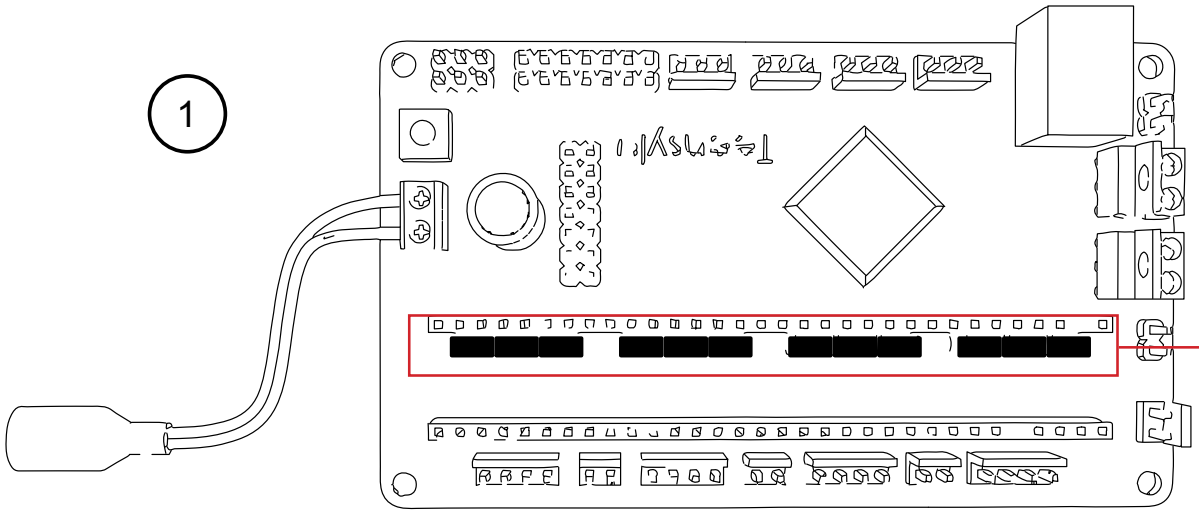
Ø3 Washer

M3 Nut
Tighten moderately


Endstop
1
2
3
USB
Heated bed (option)
Cartridge heater
Thermistor
Fan
Power supply
Motor extruder
Motor 1
Motor 2
Motor 3
Ventilateur

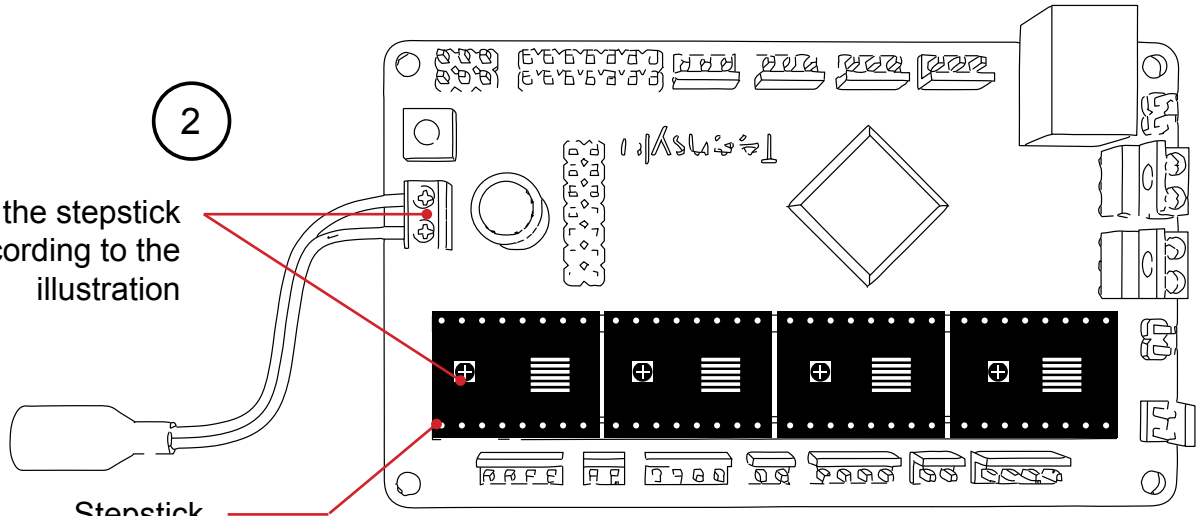

Motor 2
Extruder Motor
Motor 1
Motor 3

1



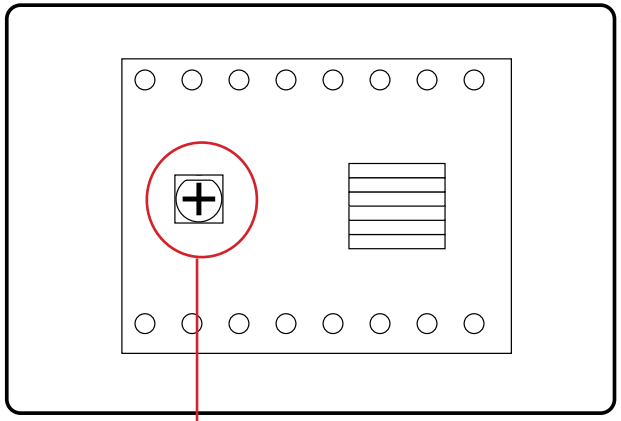
Make sure that you have 12 jumpers connected to the teensylu

2



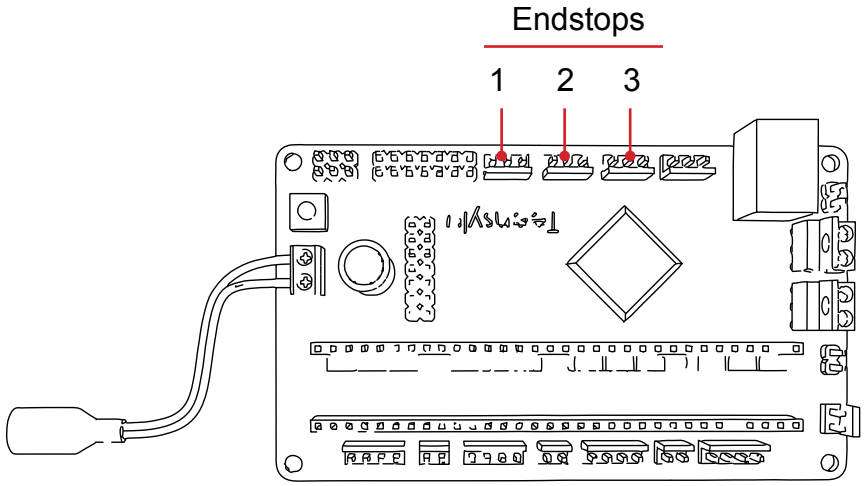
Plug the stepstick according to the illustration

Stepstick



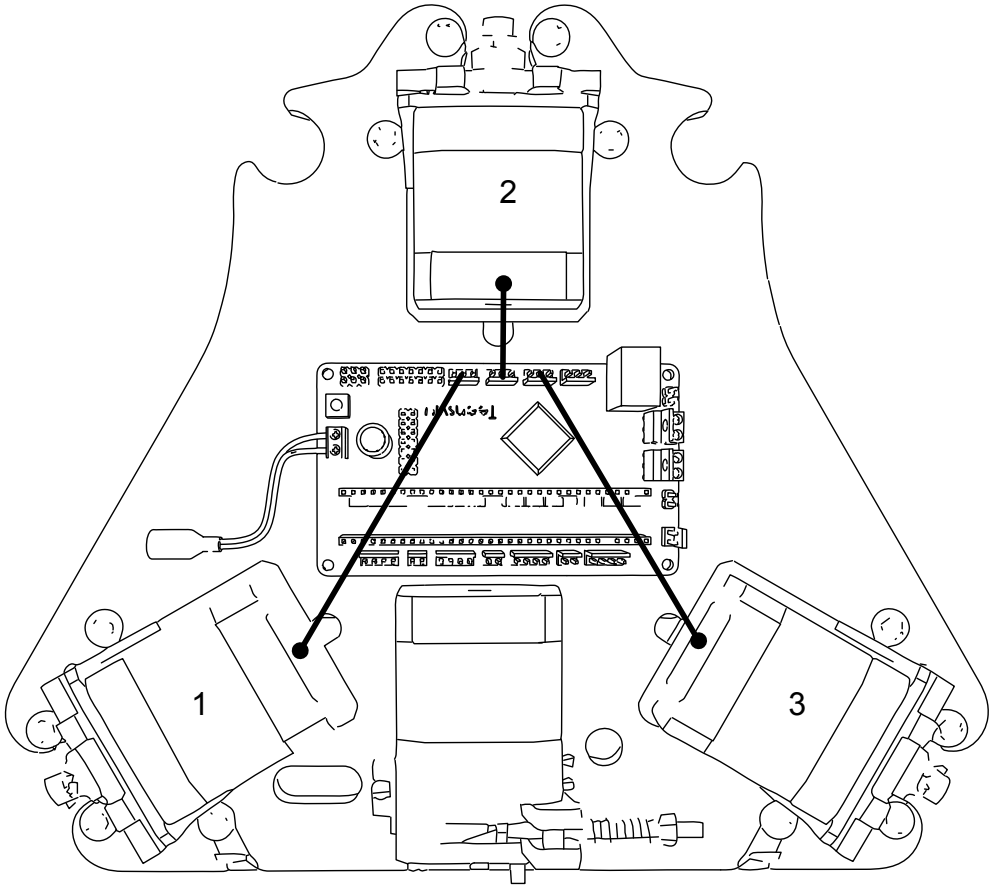
Make sure the flat is positioned as shown the image

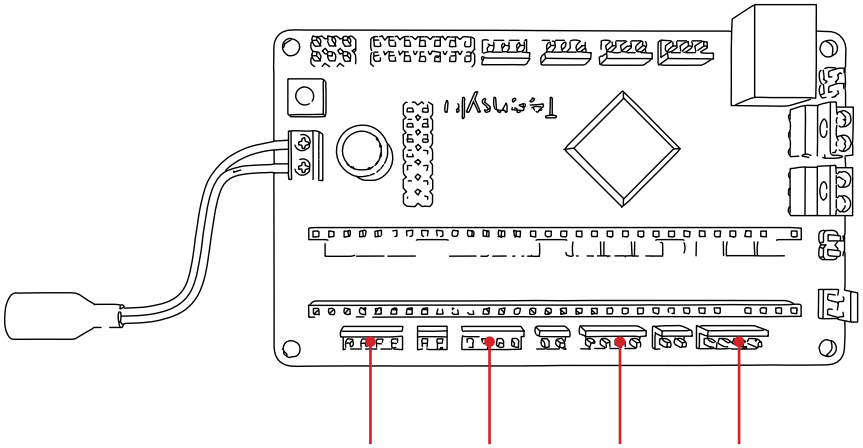
Be careful: The orientation is very important!
(A wrong connection of the stepstick could cause permanent damage)



- Plug the endstops

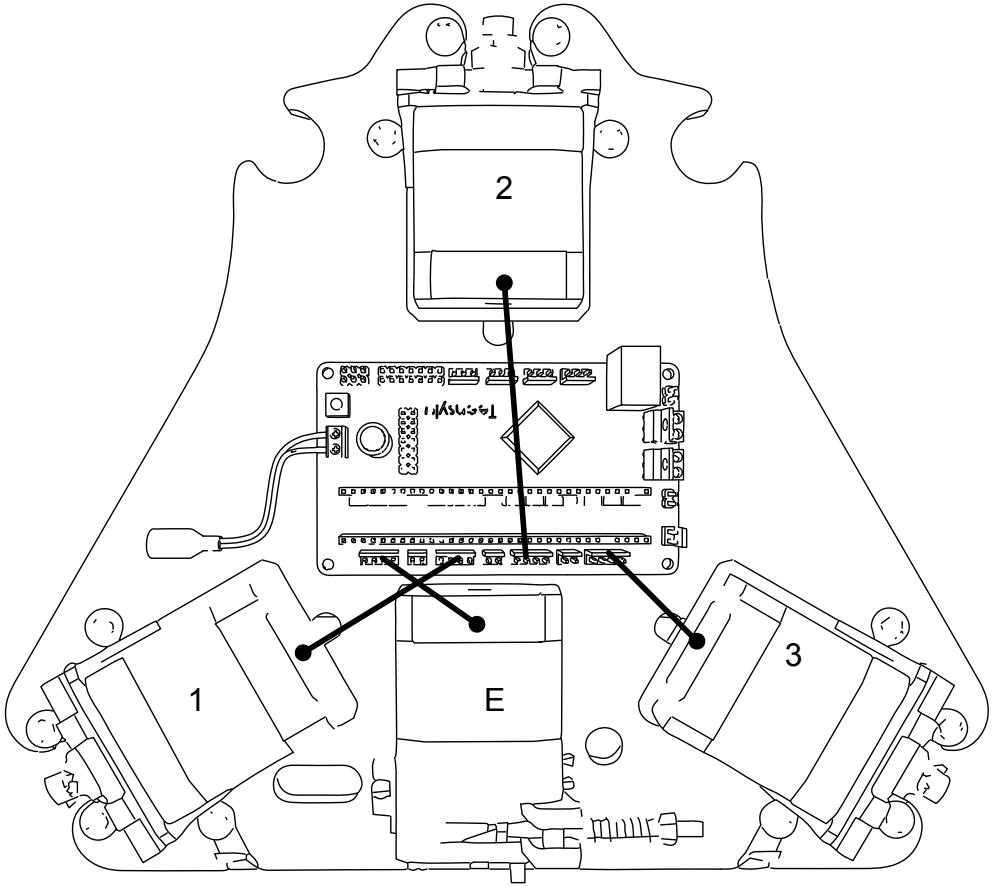
- The endstops can be plugged in only one orientation



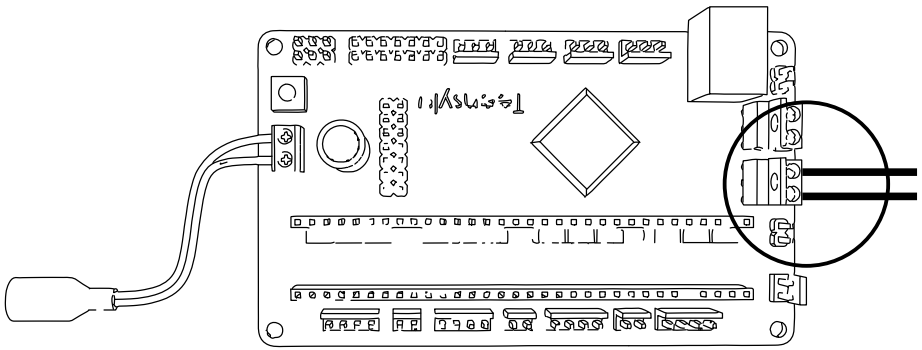


- Plug the motors

- The motors can be plugged in only one orientation



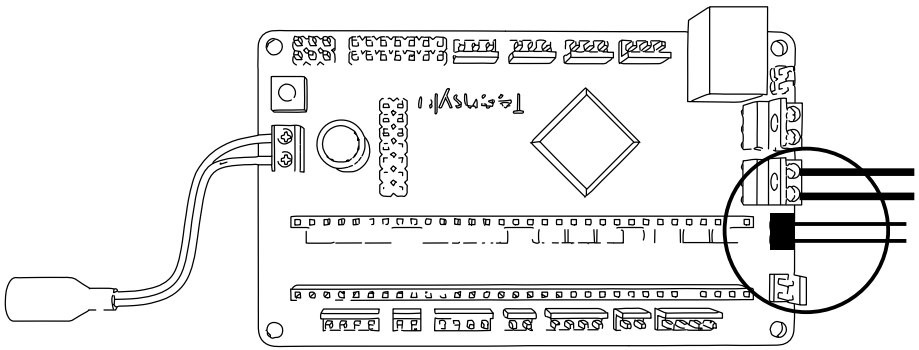
1



Screw the cables of the cartridge heater

There is no specific way, don’t forget to denude it

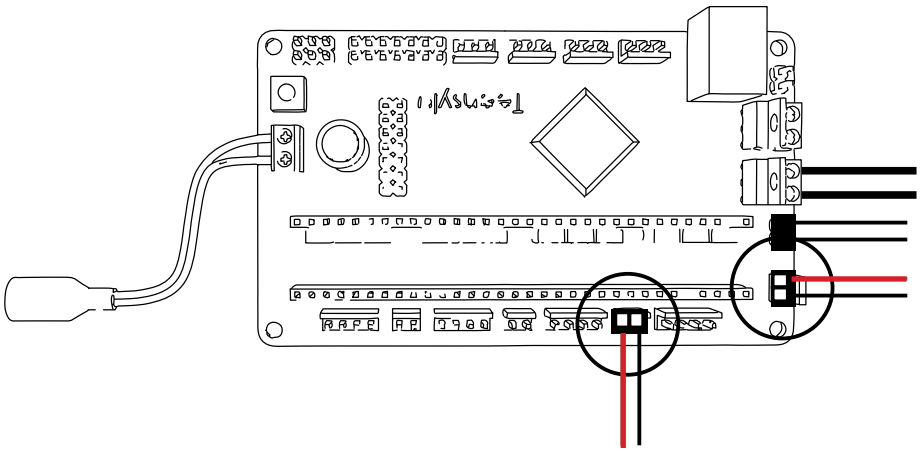
2



Plug the thermistor

There is no specific way

3

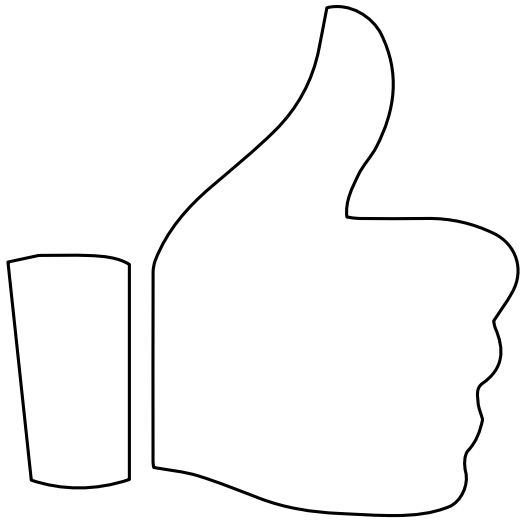


Plug the fans

the red cable show the way

CONGRATULATION !

You’re printer is now operationnal



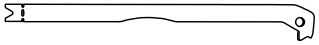
ADD-ONS

HEATED BED

1. Hardware update

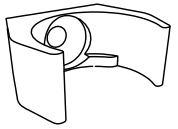
Kit :

1x Adhesif heat patch



3x Idler

1x Tube

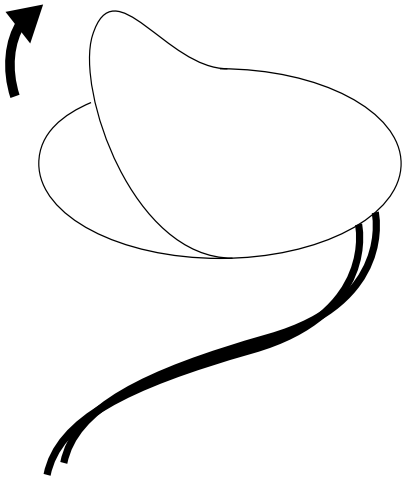


1x Tube mount

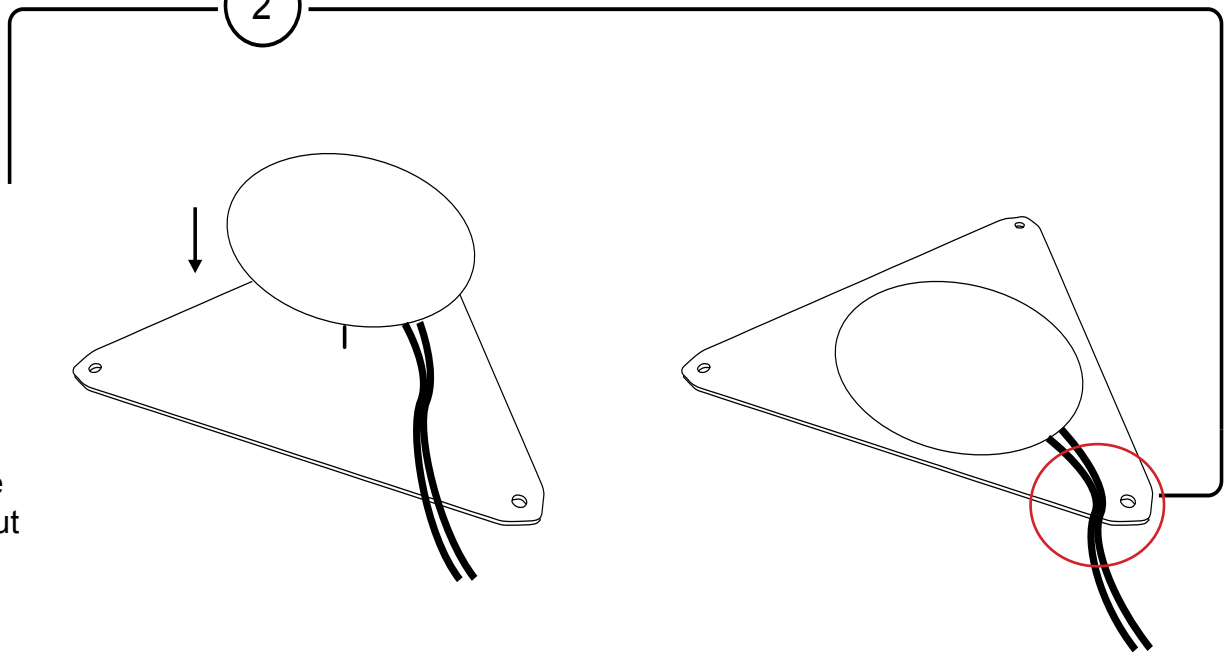
1x Polyimide tape

Prerequirement, you need an operational 3D printer

1 Remove the adhesif protection

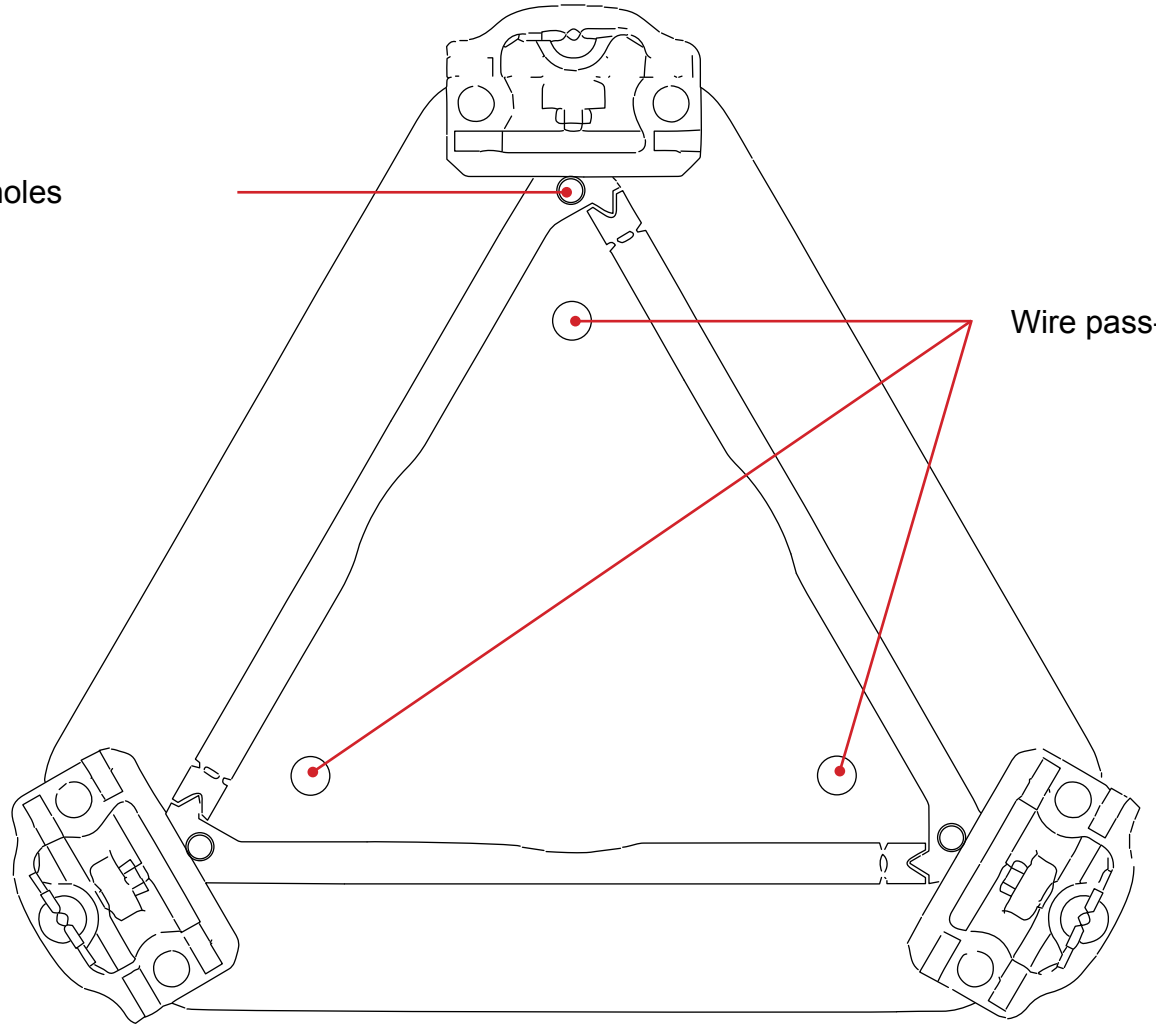


2



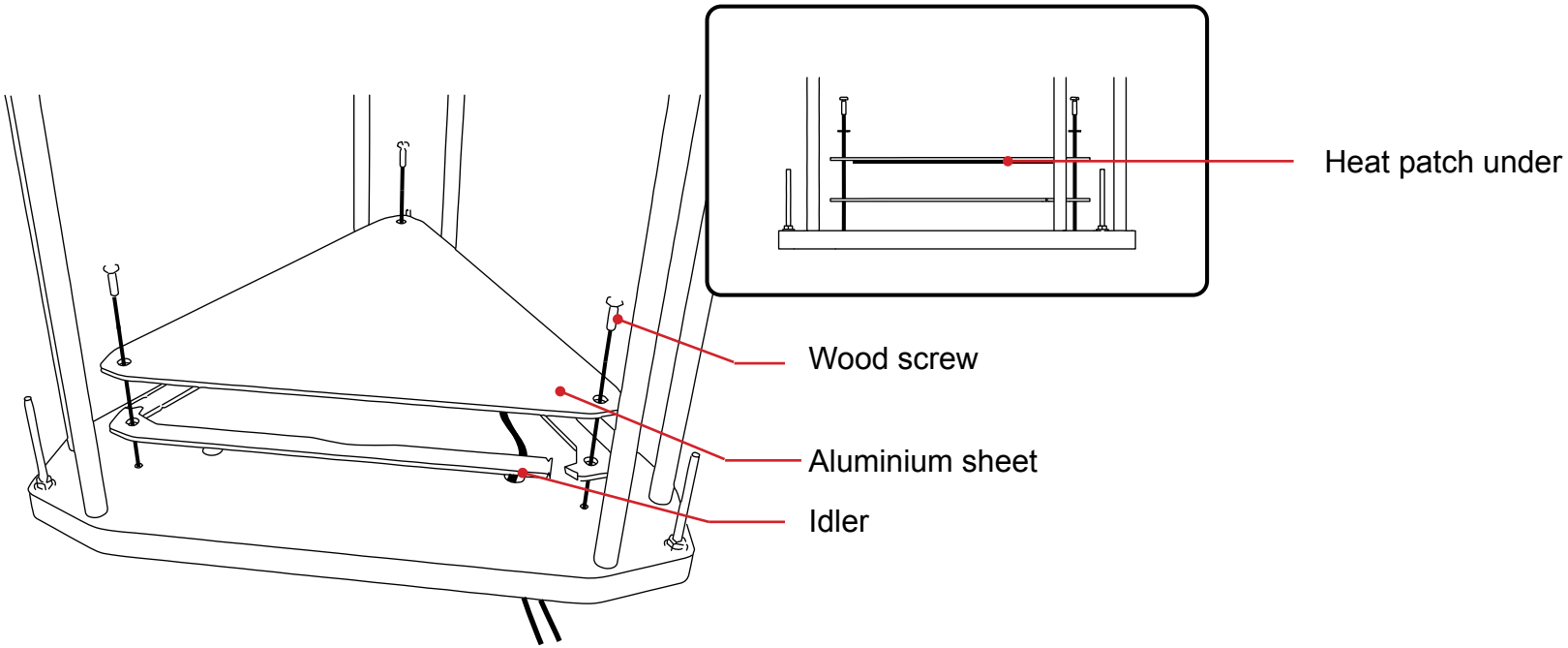
Patch the heatbed in the center of the aluminium sheet. Place the wire output close to one hole.

Place the idler and align all holes

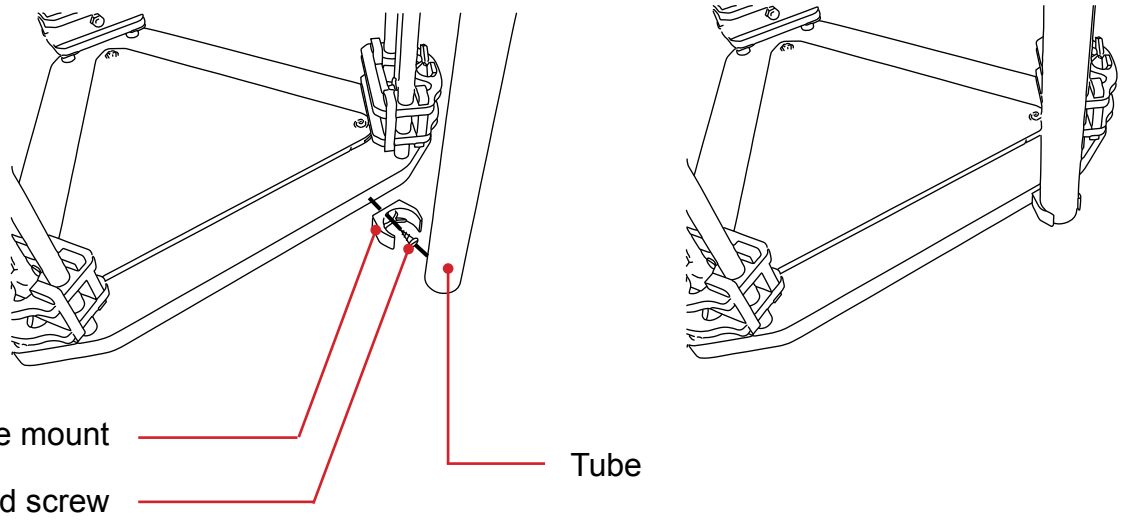


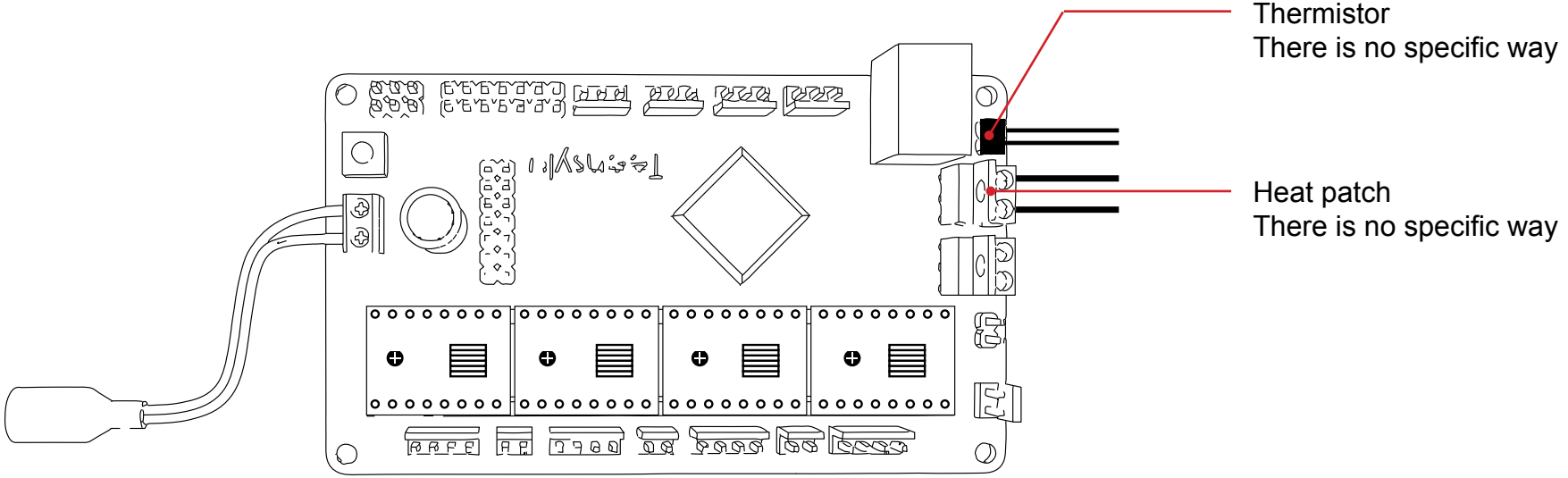
Wire pass-trough holes

1


Heat patch under
Wood screw
Aluminium sheet
Idler

2


Tube mount
Wood screw
Tube


Thermistor
There is no specific way
Heat patch
There is no specific way

2. Software update

Prerequirement :

Computer with window 7+ (others OS coming soon)

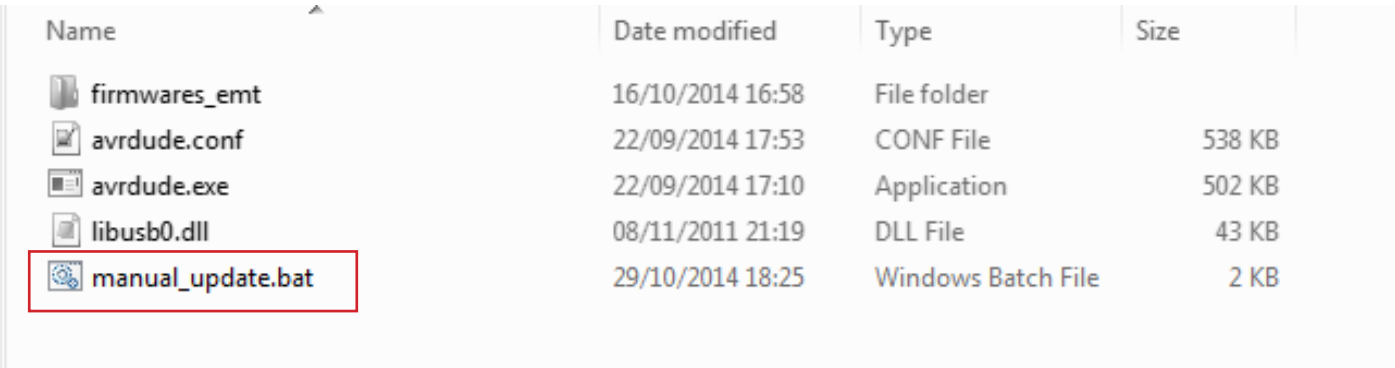
Download and install the Serial_install.exe from our download center on our website

Where download :

All files can be found on our download center or on our github

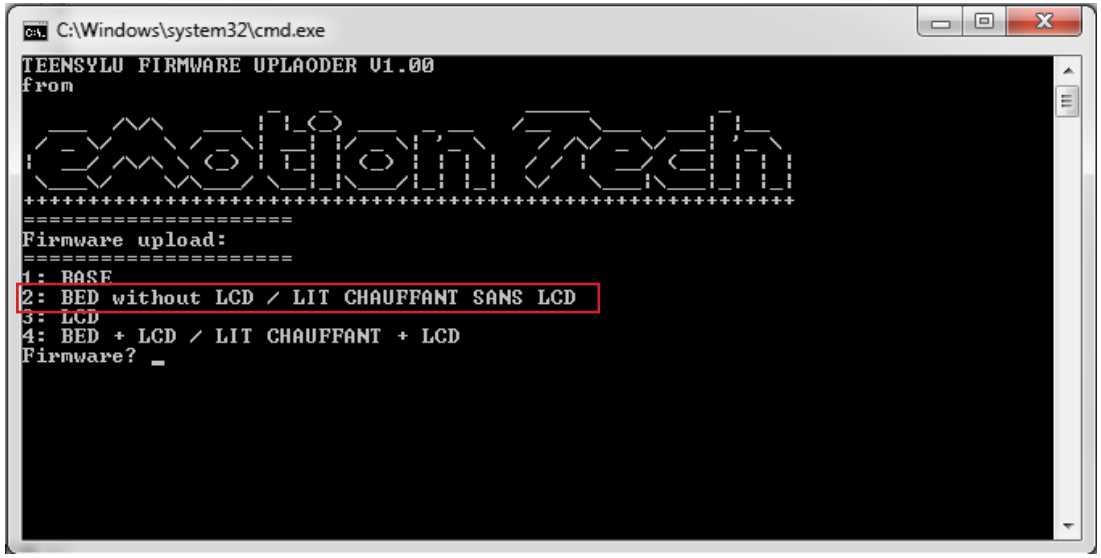
1/ Download the Manual_update_vx_xx.zip

2/ Unzip the file and open the folder

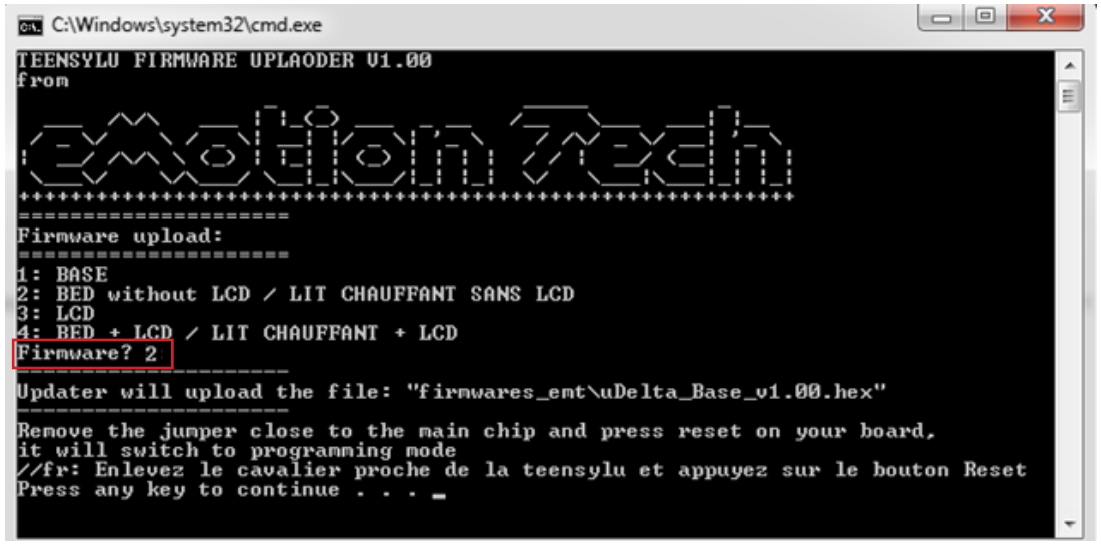


3/ Run the batch script .bat

Choose the Firmware



Choose the firmware n°2,
head bed without LCD

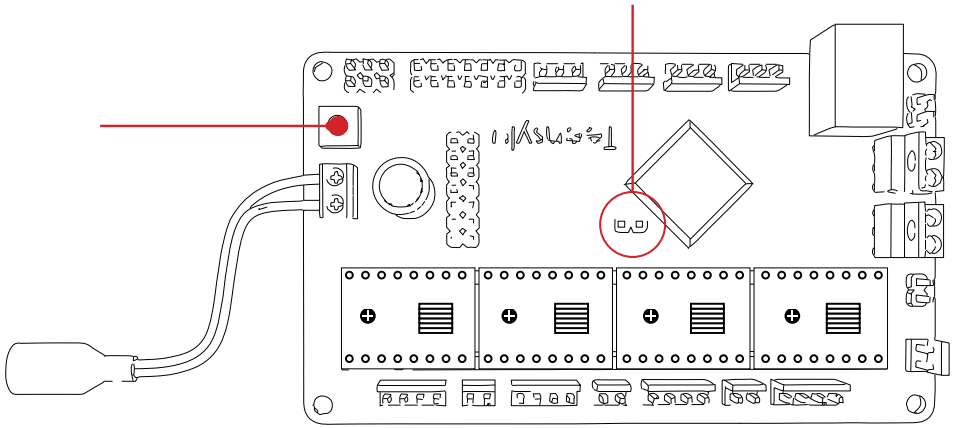


Press 2, and enter

Select the programming mode

1/ Remove the jumper

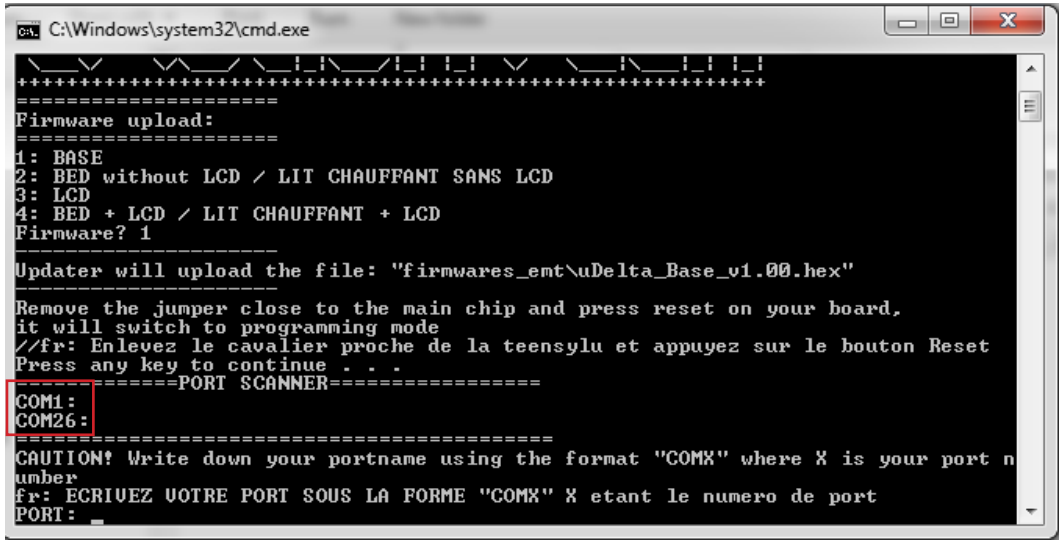
2/ Press the reset button



Please wait patiently before you computer detect and install the new COM port

Press Enter key and check your COM port name :

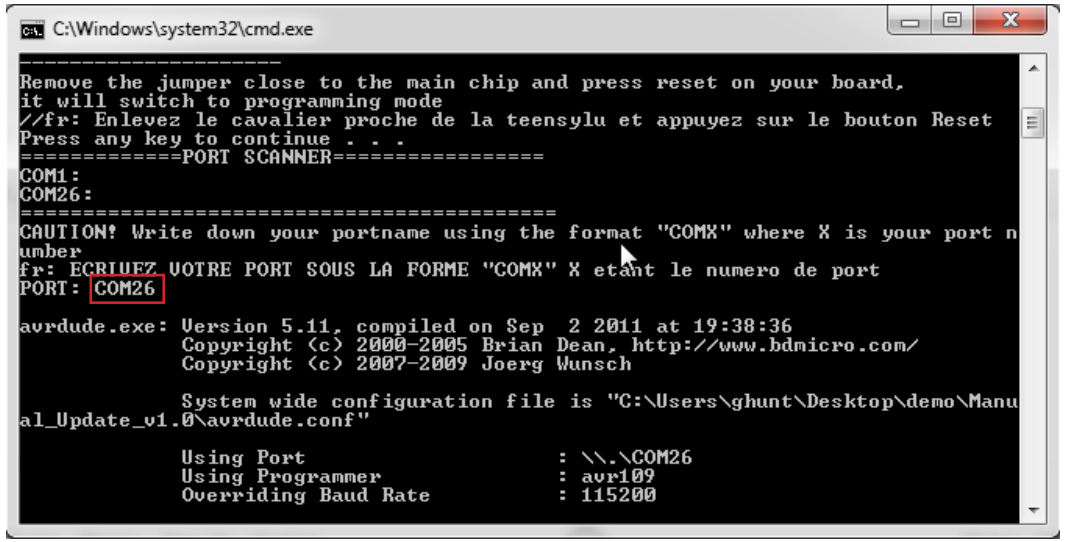
Ports are detected here



Note : Usually, the COM1 is your internal modem device, COM1 might not be the right port.

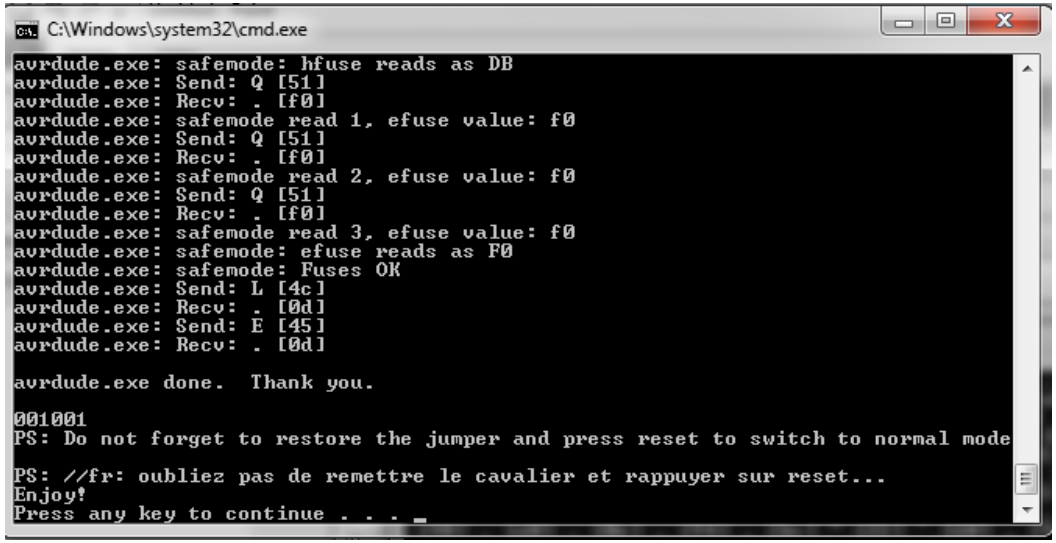
Caution: the syntax have to be perfect, ex: COM2

Type your COM port name (COM26 in our case) then press Enter key



Your screen will be filled with the hexadecimal data transfer

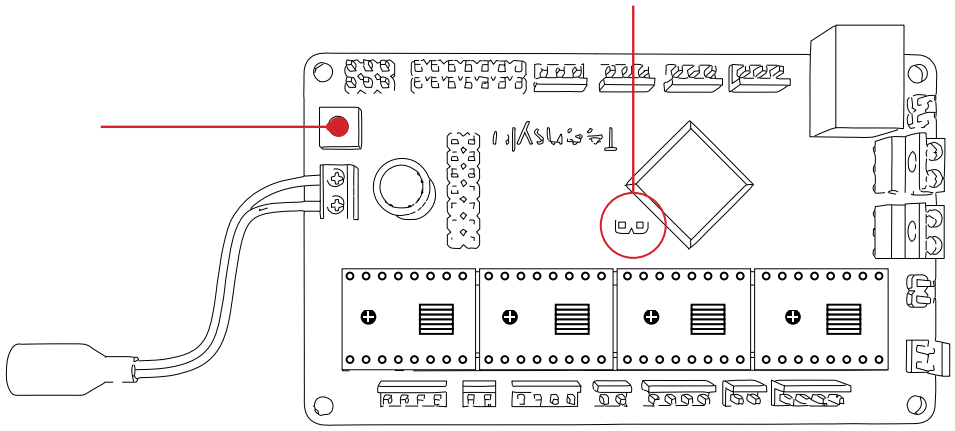
Final screen :



Leave the programming mode :

1/ Set up the jumper back in place

2/ Press the reset button

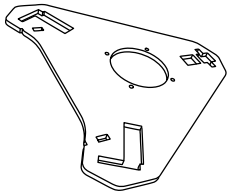


Your printer is now ready to print with the heated bed !

SPOOL HOLDER

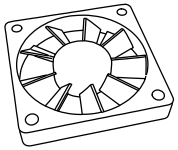
1. Assembly

Kit :



1x Spool holder frame

3x Spool block



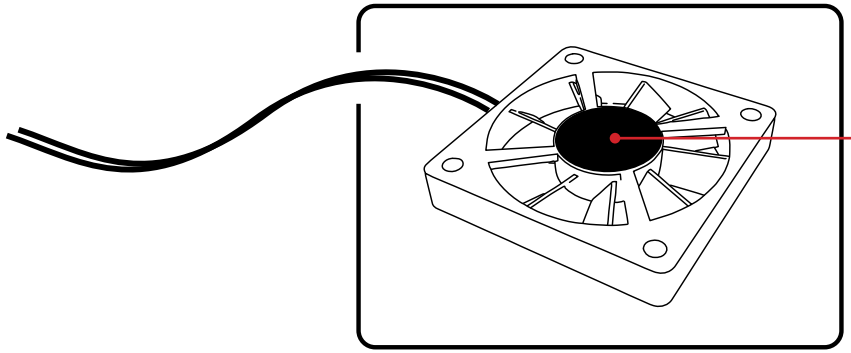
1x 60x60 Fan

3x 624 Bearing

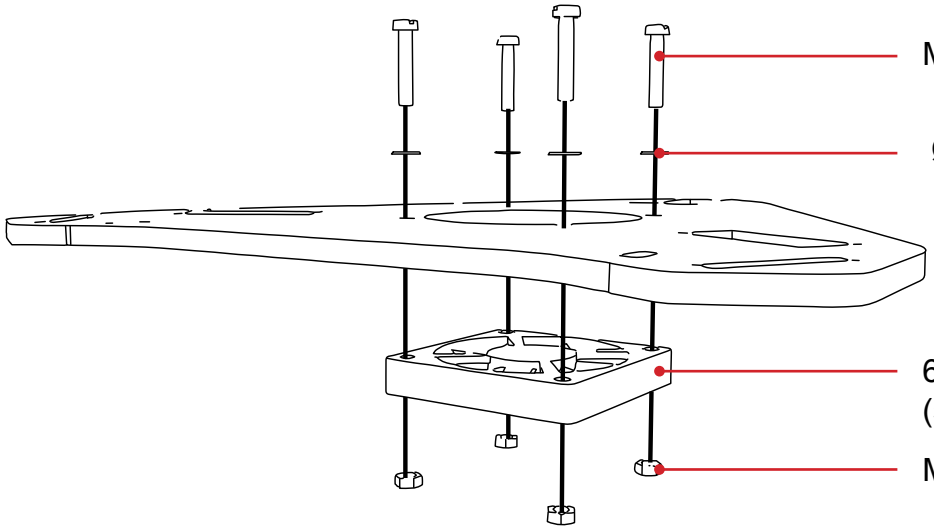
7x M4x20 Screw

7x M4 Nut

7x Ø4 Washer



Sticker on the bottom

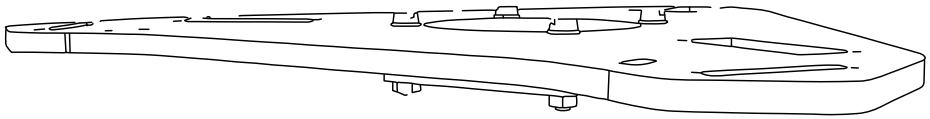


M4x20 Screw

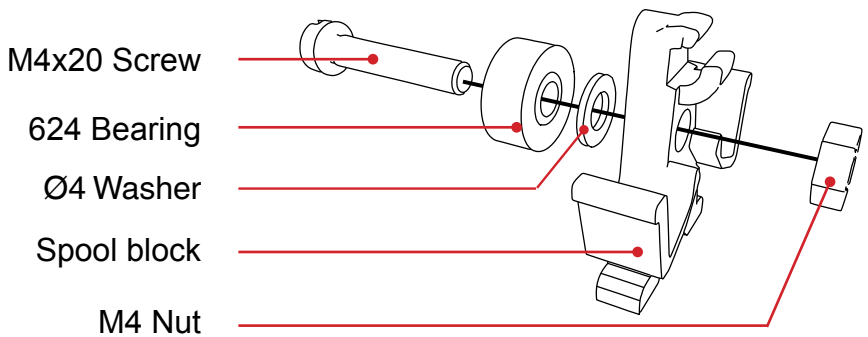
Ø4 Washer

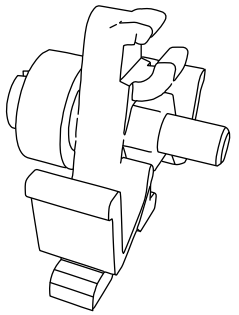
60x60 Fan
(sticker on the bottom)

M4 Nut



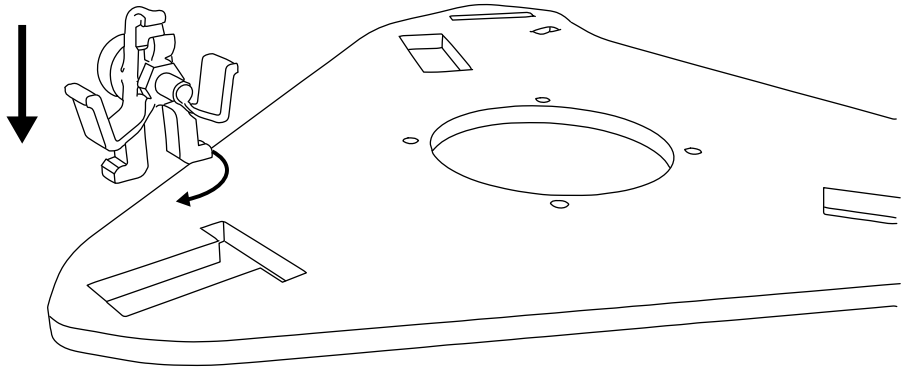
1



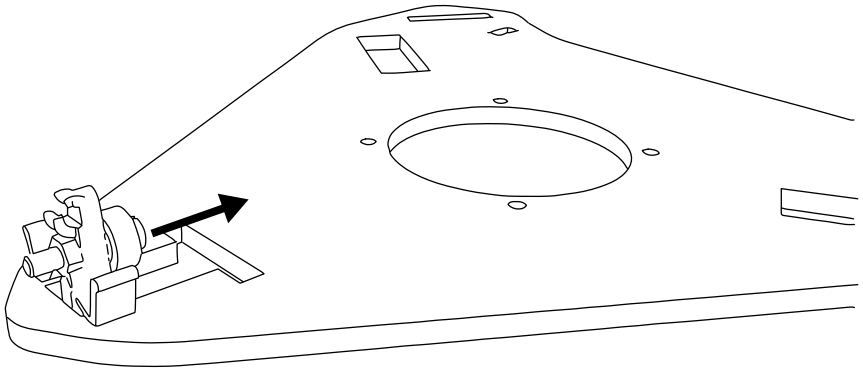


Repeat the operation for the others parts

2



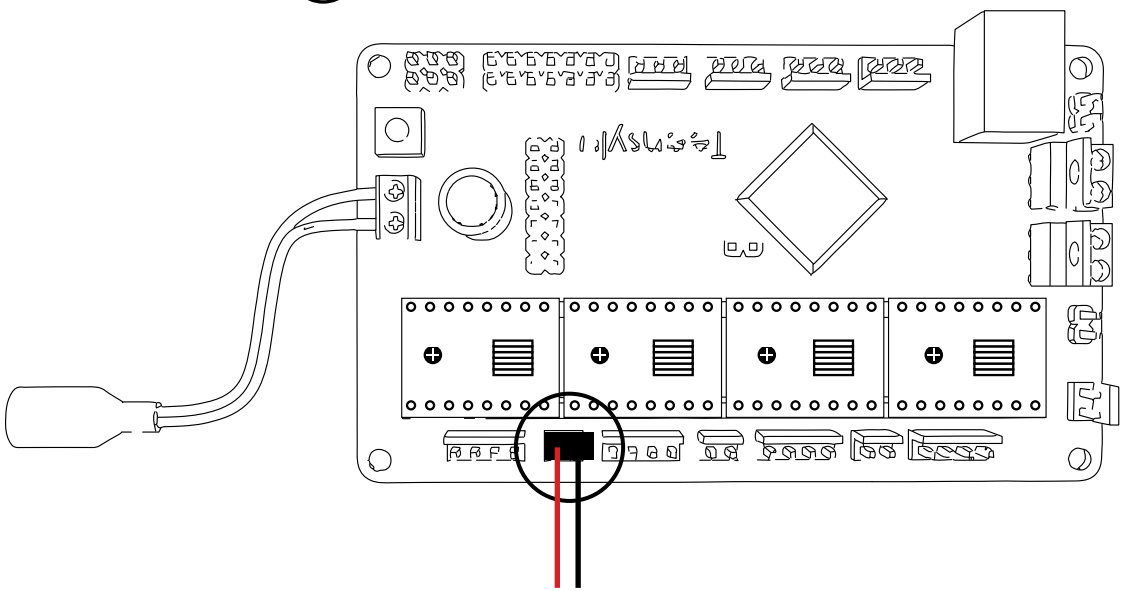
Insert and rotate the spool block to fix it



The slider allows the spool block to move according to the size of the spool

2. Connection

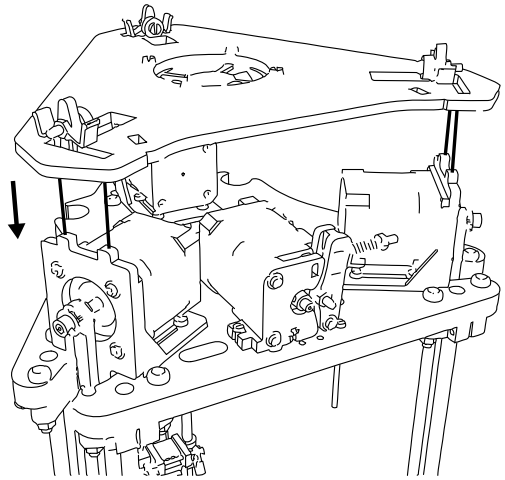
1

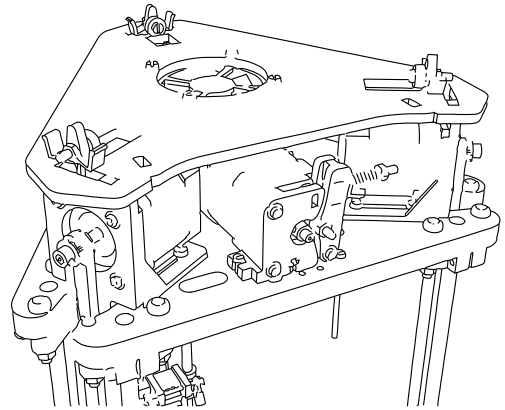


Fan

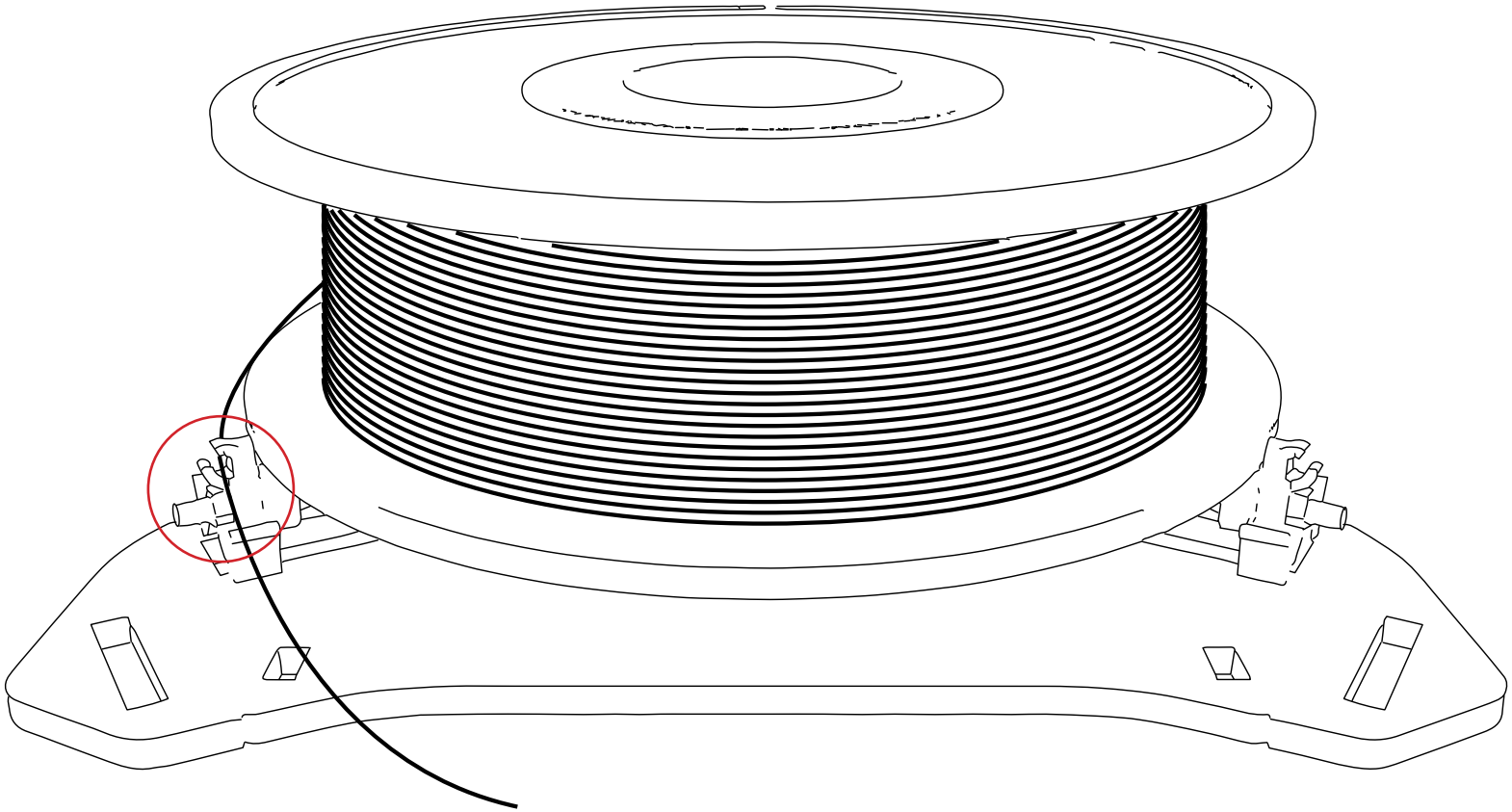
The red cable show the way

2





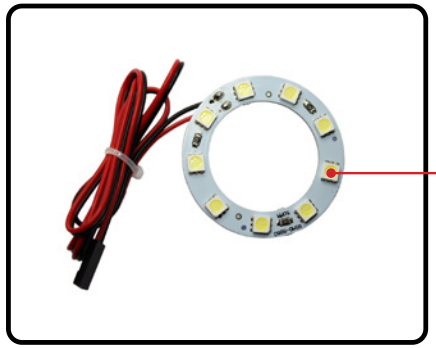
Put your spool holder on the printer



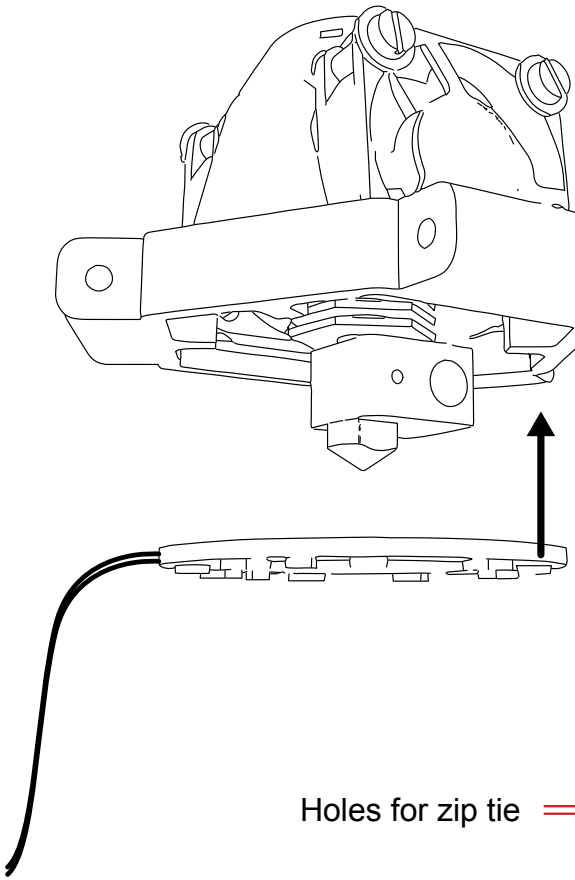
Use the filament guide, it’s finish !

LED RING

1. Assembly

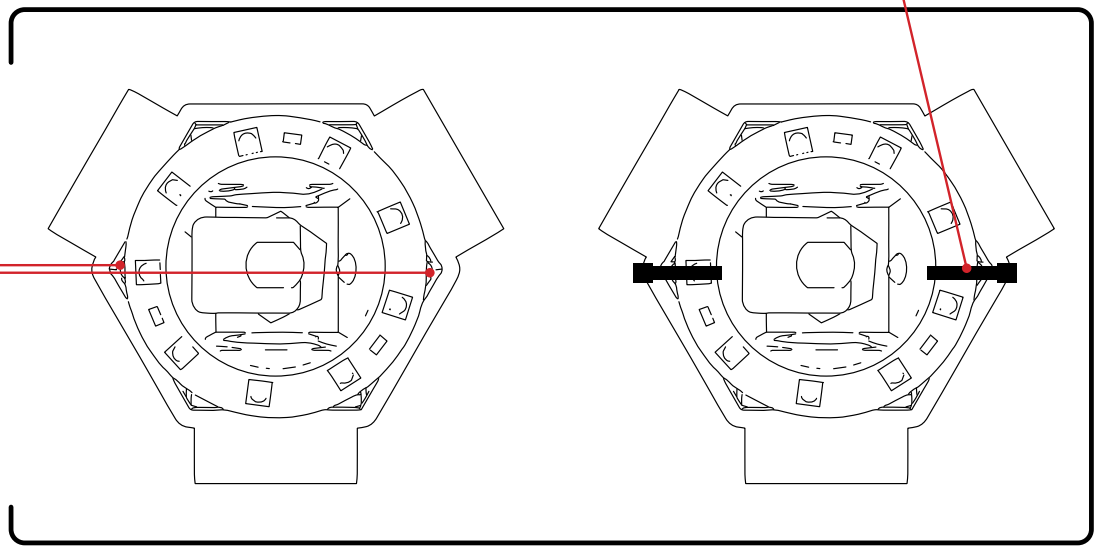


LED ring

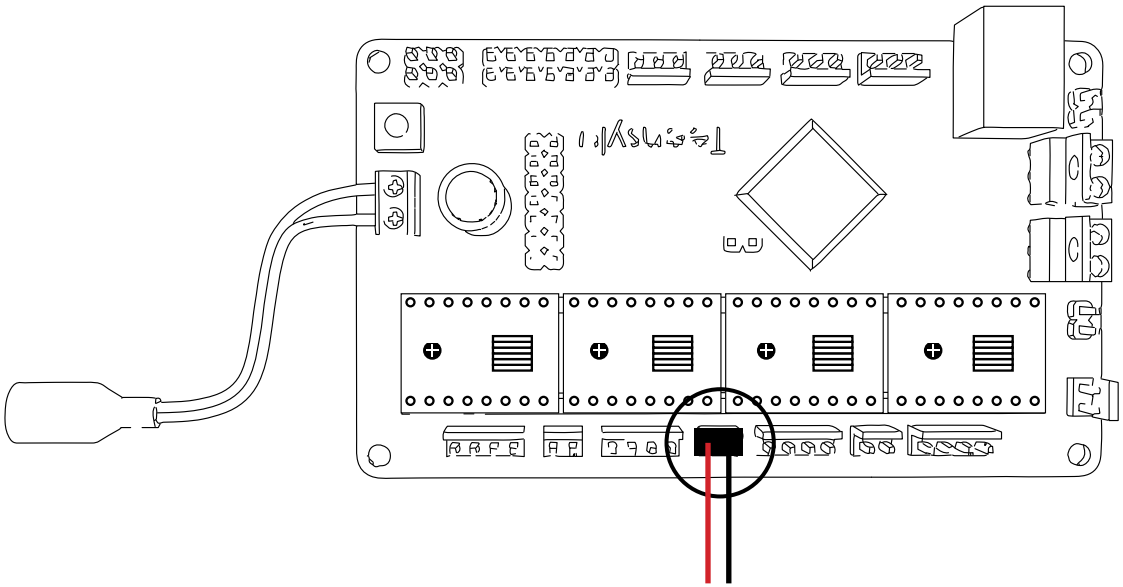


Tighten the zip tie while centering the LED ring

Holes for zip tie



2. Connection



LEDs

The red cable show the way

Put the cable into the Braided sleeve to finish

Thank you to choose the µdelta