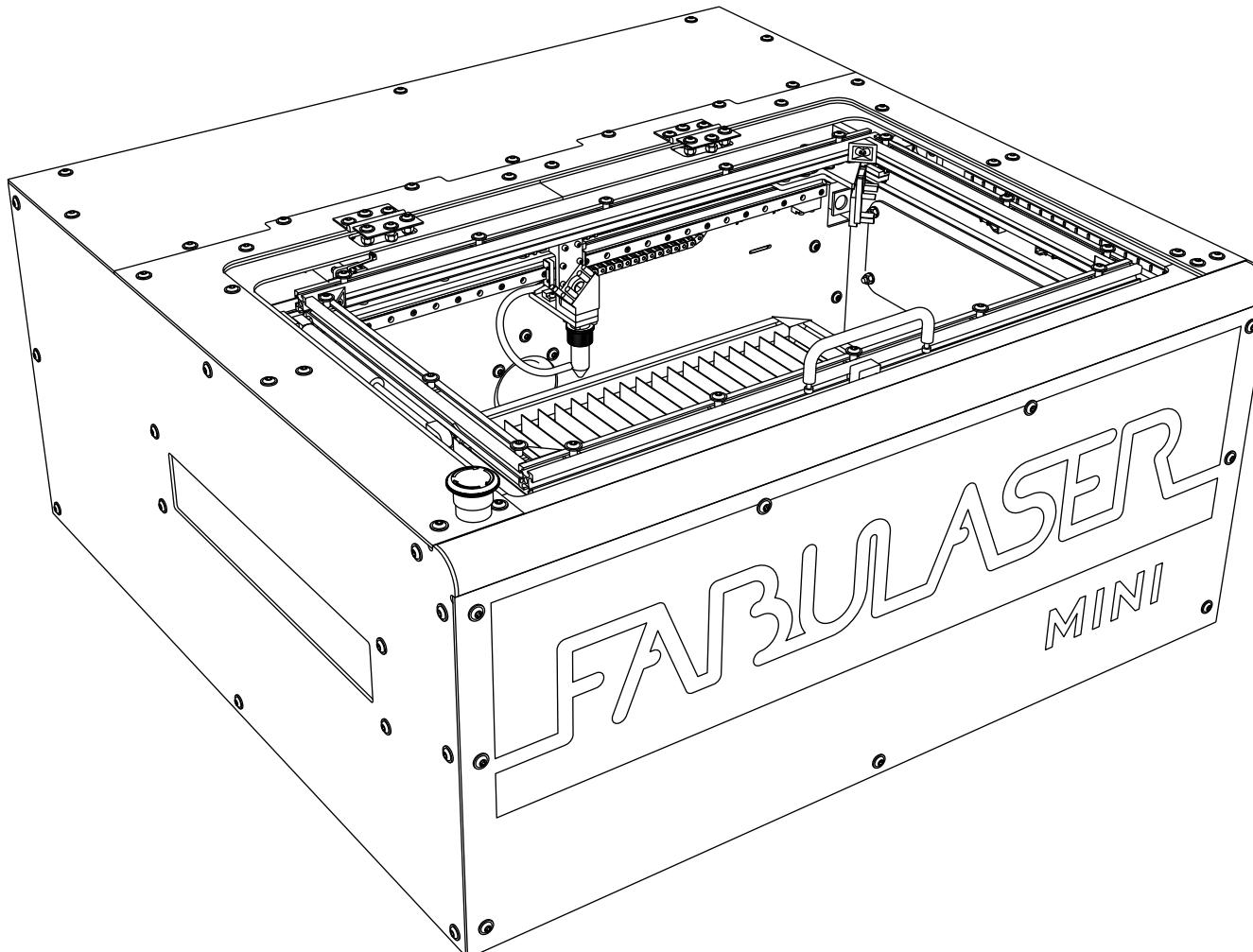


# ASSEMBLY MANUAL OF THE FABULASER MINI

Step by step instructions



## ASSEMBLY MANUAL BY

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Liane Sayuri Honda

## MACHINE HARDWARE BY

Daniele Ingrassia /  
InMachines Ingrassia GmbH



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# HOW TO USE THIS MANUAL

This manual provides you a step-by-step guide on how to assemble the Fabulaser Mini laser cutter machine. It was developed to be visually instructive, with only necessary text support.

When the step is complex, it is divided into substeps.

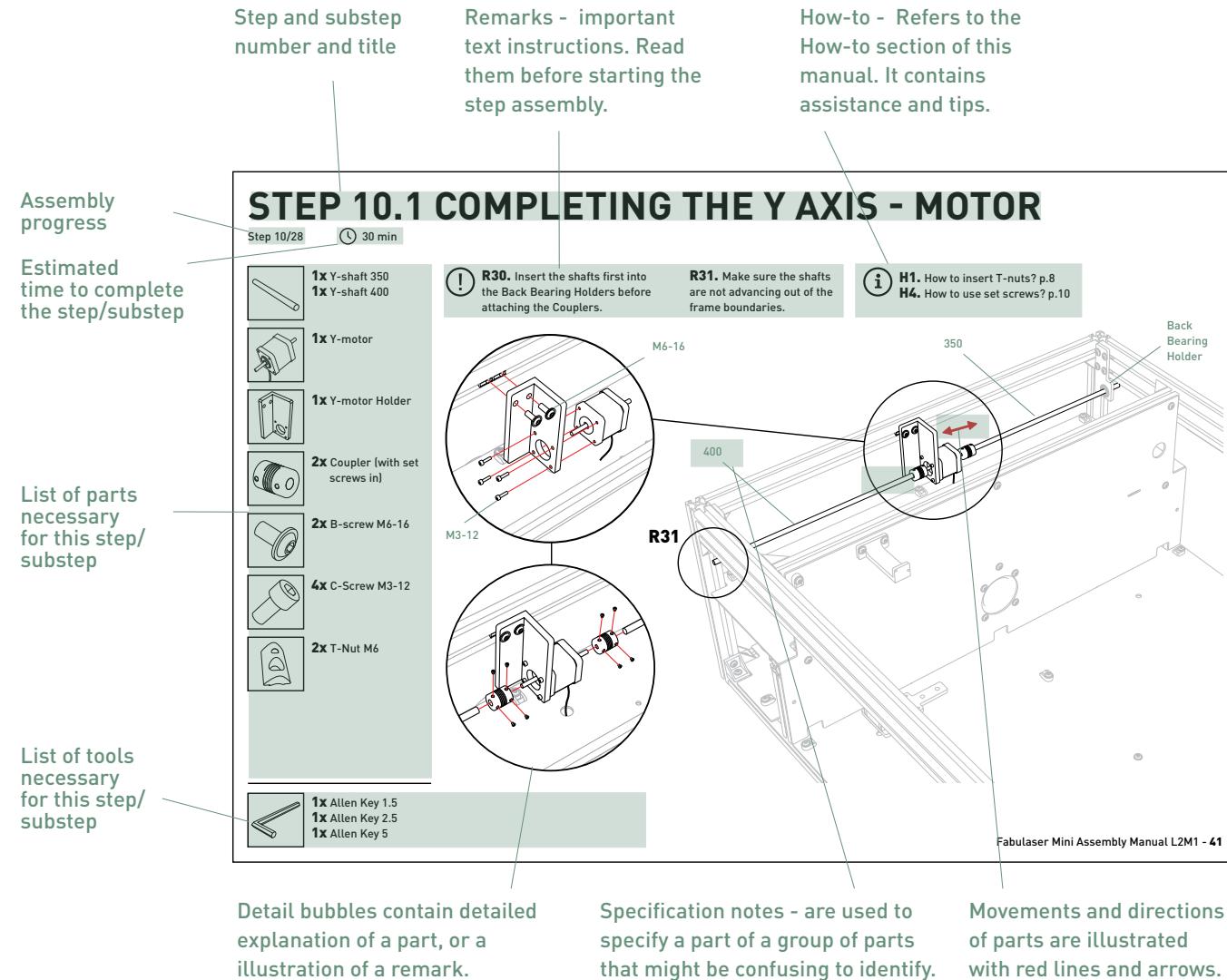
Colors are often used to aid and facilitate the identification of parts. If it is necessary to print this manual, make sure to print it in color. However, we highly recommend you to use it digitally to save paper and ink.

Please read the safety instructions before starting the assembly.

Start each step or substep by separating the necessary parts and tools. Then, read the remarks and how-to's related to the step, since they contain important information regarding the assembly. After that you can start assembling by following the visual instructions of the main image and detail bubbles.

In the images, the parts that are already assembled are colored grey, to facilitate the visualization of what needs to be done in the step/substep.

The wires that are already fixed are not always illustrated, also to facilitate the visualization on what needs to be focused.



# SAFETY INSTRUCTIONS

- ! Read these safety instructions carefully before starting the assembly of the machine.

During the building of FabuLaser Mini, it is mostly required to assemble mechanical parts. However, in some steps, it is required to deal with potentially dangerous situations, due to the involvement of water, electricity and laser light. It is, therefore, really important to follow the safety rules, and to have an adult supervision.

For steps involving **wiring and electricity**, it is highly recommended to read carefully the following instructions before connecting the machine to the electricity power socket (220V) :

- Verify if the cables are not damaged from the packaging, or being damaged during/after the assembly.
- Make sure the cables are firmly connected (check it by pulling it lightly after connecting).
- Make sure cables are correctly connected by double-checking the connections with the wiring diagrams and instructions.
- Make sure there are no short-circuits in the wiring. It is recommended to use a multimeter with the “beep” diode function. It is mostly important, to check if there is not a short-circuit between: Line and Neutral; 24V+ and 24V-.
- Verify if the endstop switches, window switches and the emergency button are functional; it is possible to check them with a multimeter with the “beep” diode function.
- Make sure the “Laser +” cable is well isolated.

For the steps involving the calibration of the **laser beam** path, the following safety rules must be observed before starting it:

- Make sure to execute the laser calibration with minimum

2 people: one checking the laser path and the other operating the computer.

- Make sure your computer is running only the UGS software and nothing else; if the UGS is running too slow, try it with another computer.
- Do not use your phone and lower its volume to avoid distractions.
- Make sure to do the calibration in a room without anything flammable that could potentially set on fire.
- Make sure to do the calibration in a room without other people involved.
- Make sure the calibration is done far away from the windows, or that the windows' blinds are closed.
- Make sure to alert other people of what you are doing, to avoid that somebody enters the room suddenly without notice.
- Make sure that all mechanical parts have been correctly installed and that the moving parts can move freely.
- Make sure that all the wiring has been correctly connected and that it has been tested beforehand with the electricity power socket (220V).
- Make sure the water connections have been firmly done and that the water is flowing to the proper direction.
- Make sure the Water Chiller is switched on.
- Always wear transparent plastic safety goggles.
- Always wear long clothes.
- Be ready to push the emergency button if the laser stays on, or if the beam is going to the wrong direction.
- Make sure to have all the Mirror Holders, the Laser Head and the Mirrors installed before starting the calibration. (check Step 21)
- Make sure the laser tube is installed pointing to the correct direction; the end with a hole, through which the laser will come out, should be pointing to the First Mirror.
- Make sure the laser tube is not damaged, cracked, or leaking water from any point.

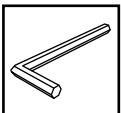
- Make sure the laser path is hitting the mirror(s); if not sure, use something to block the laser beam from hitting anything on the first test. It is recommended to use a flat wood plank.
- Never stand in the direction of the laser beam.
- Remove only the necessary housing parts. Keep the rest attached as a protection.
- Always close the machine window to activate the window switches.
- Make sure to not stick the tape to the mirror, but only to the holders.
- Use a masking tape which is thick enough. Make a single test to make sure it does not set on fire. If it is too thin, it is possible to use two pieces of tape overlapped.
- If possible, have close to you a fire extinguisher, or a bucket full of water.

Additional safety rules for the **water connection** of the machine:

- Make sure the Water Chiller has water inside (5 liters) and that all the tubes' connections have been done before starting it (check Step 19 and 25.)
- Make sure no water is leaking from any point/junction/connection.
- Make sure the tubes are not bent and/or blocked anywhere.
- Make sure the machine is disconnected from the electricity power socket while testing the water implant (check Steps 6, 16 and 24).

# LIST OF TOOLS NEEDED

Before starting, check if you have all the necessary tools to avoid unexpected interruptions during the assembly.



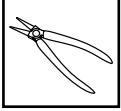
**1x** Allen Key 1.5  
**1x** Allen Key 2.5  
**1x** Allen Key 3



**1x** Wrench 5  
**1x** Wrench 5.5  
**1x** Wrench 7



**1x** Cutter



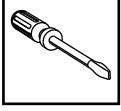
**1x** Needle Nose Plier



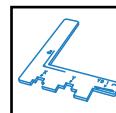
**1x** Small Plier



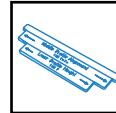
**1x** Screwdriver  
Phillips



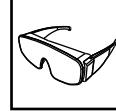
**1x** Screwdriver  
slotted small



**2x** Template 1  
(included)



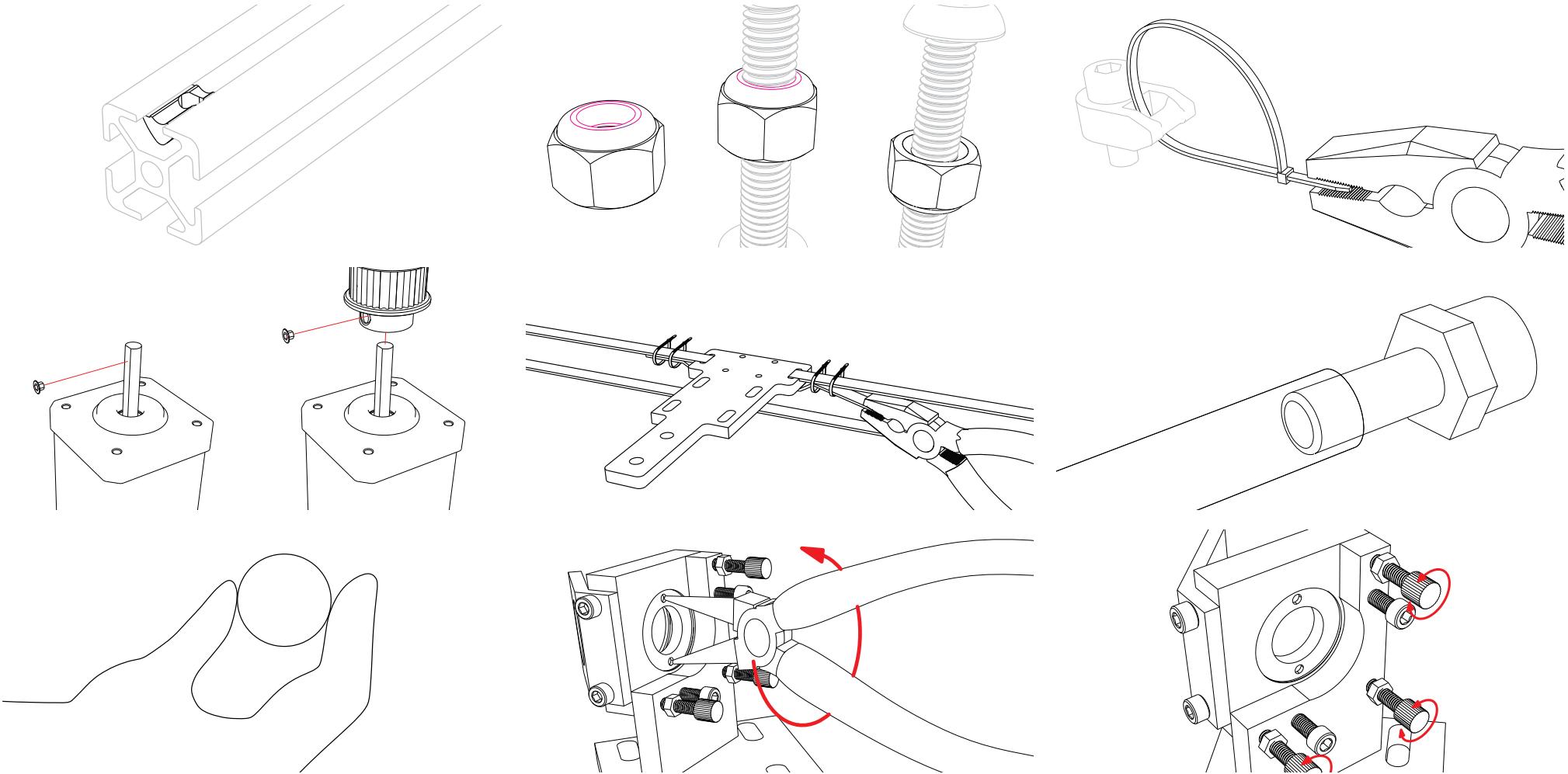
**2x** Template 2  
(included)



**1x** Plastic Safety  
Goggles

# HOW-TO SECTION

Instructions and tips to assist the assembly



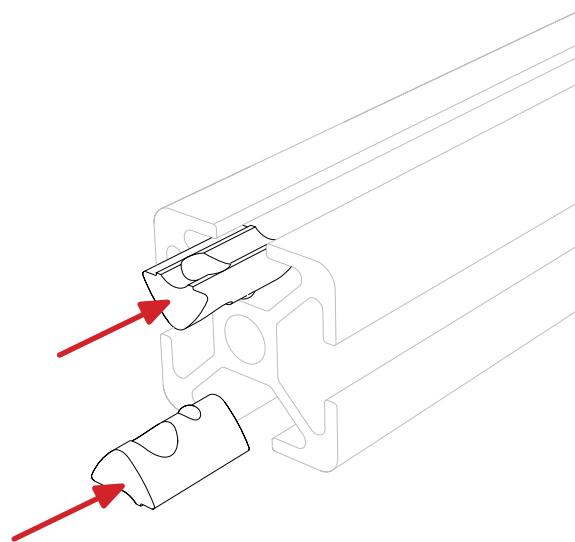
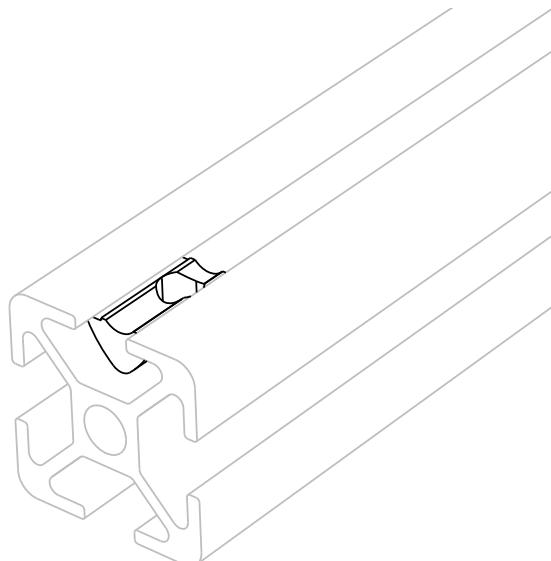
# H1. HOW TO INSERT A T-NUT IN A PROFILE

T-nuts need to be inserted in the profiles to enable the screws to be fixed. The correct position of the T-nut is with the ball pointing towards the center of the profile.

There are two different ways of inserting a T-nut into a profile.

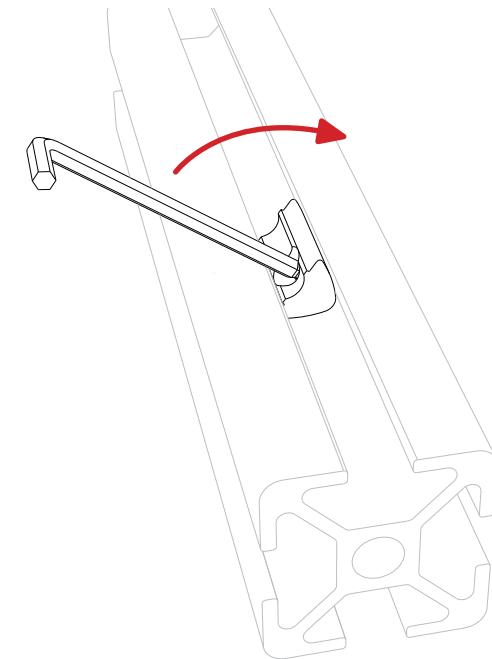
## Option 1

If the profile is not yet blocked at the ends, the T-nut can be inserted from the side of the profile, by sliding it in the slit in the correct position.



## Option 2

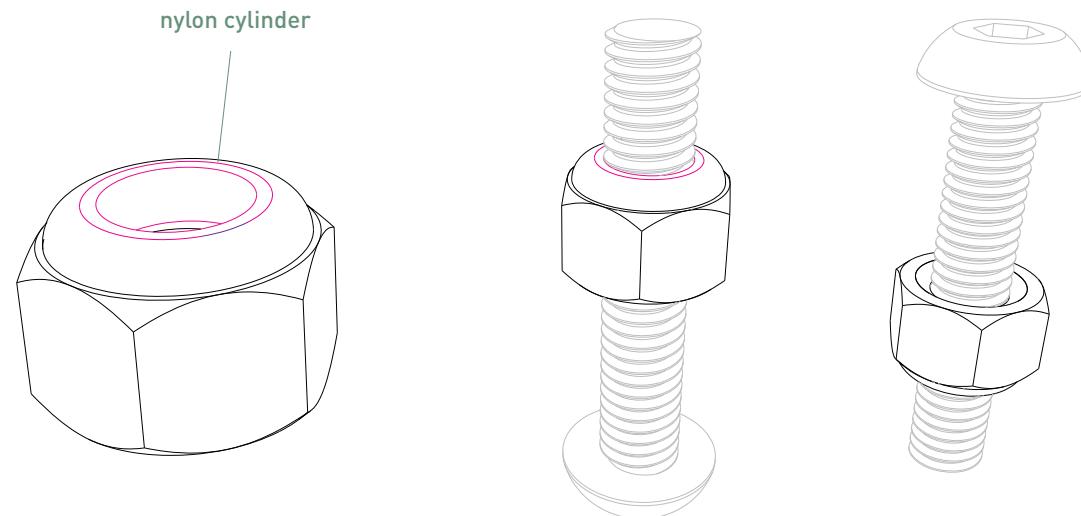
Insert the T-nut sideways in the profile slit. Using a small screwdriver or an allen key, stick the tool in the T-nut hole and turn it to the correct position.



## H2. HOW TO USE LOCK NUTS

Lock Nuts have a nylon cylinder inserted in them which prevents them from getting loose. The nylon cylinder is always coloured so it's easy to recognise which side it is in.

The Lock Nut can be attached onto screws in only one direction i.e. the nylon needs to point away from the screw head.



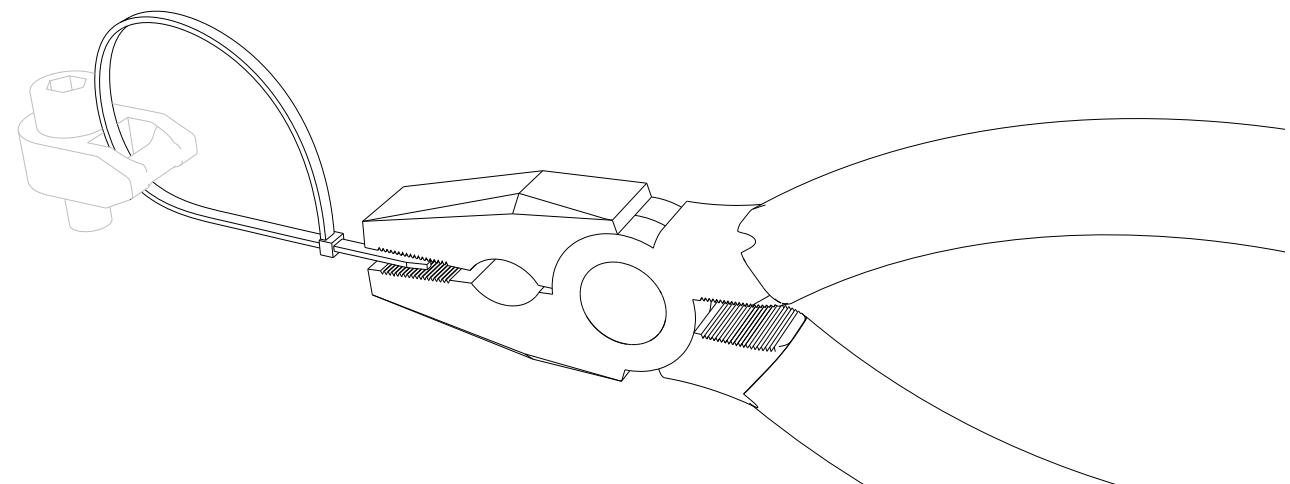
## H3. HOW TO USE CABLE TIES

The Cable Ties are mainly used in combination with the Wire Fixers to fix the cables and tubes.

Please look at the orientation of the Cable Ties: the flat side of the head should be facing inwards.

To tighten it, use the pliers to have a better grip.

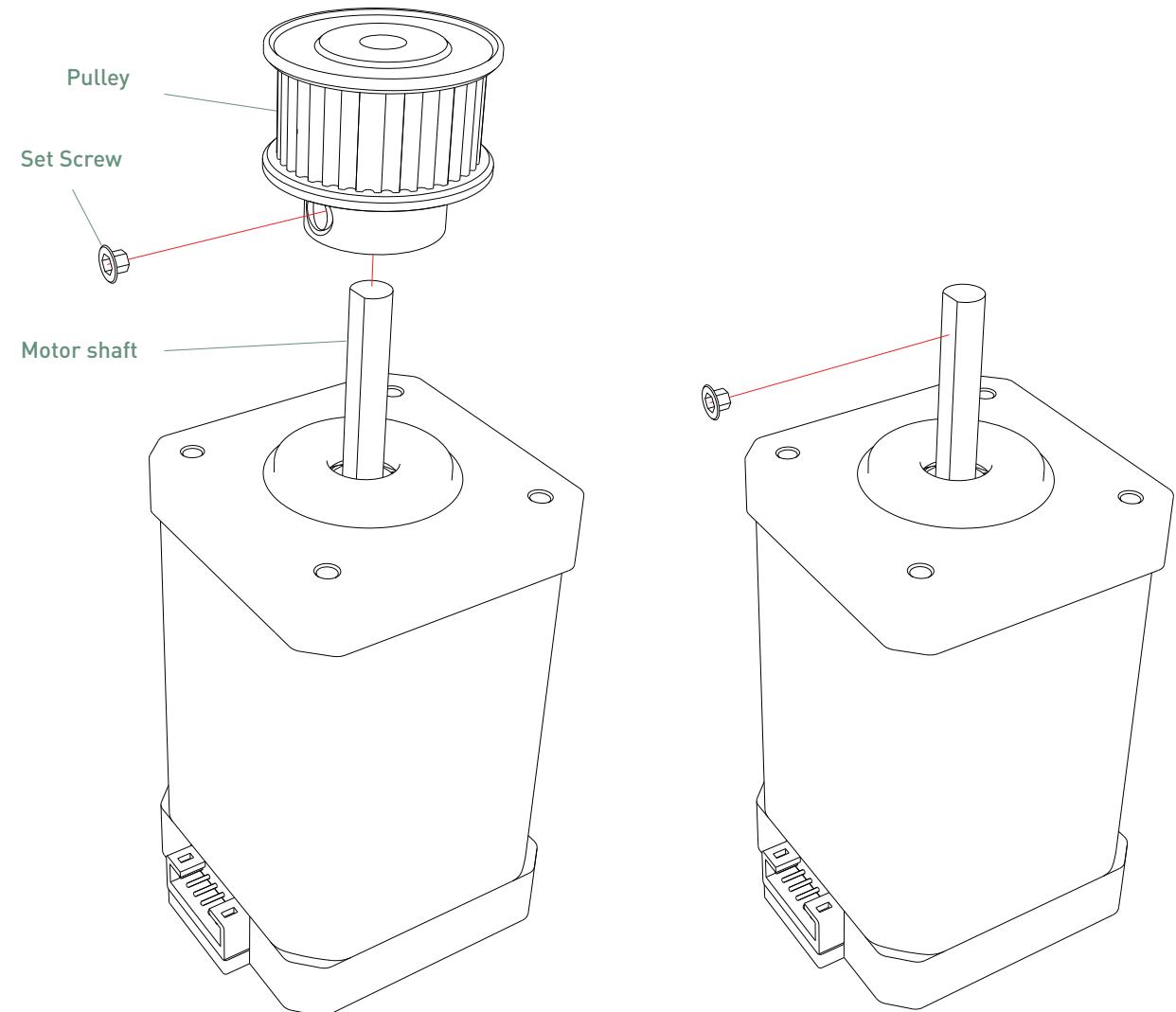
After tightened, cut the excess of the Cable Tie.



# H4. HOW TO USE SET SCREWS

Set Screws are small screws used to fix parts (such as Pulleys) on motor shafts.

They have to be tightened against the flat side of the motor shaft as illustrated here.



# H5. HOW TO TIGHTEN THE BELT

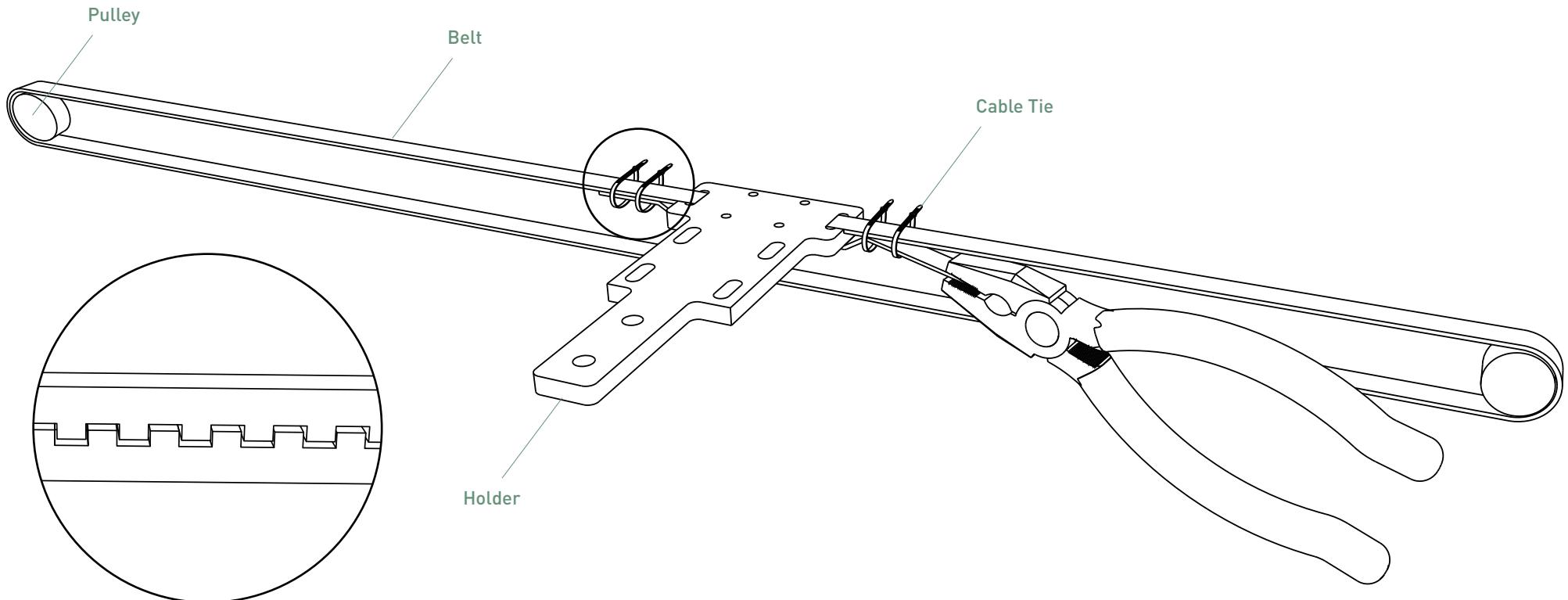
There has to be some tension on the belts in order for the X and Y-axis to move smoothly.

To tension the belt, first tie one of its ends to the holder using two cable ties, tightening them very well.

Pass the belt around the pulleys, and then through the other handle of the holder. With pliers, pull the end of the belt, using some strength to create the desired tension.

Tighten the Cable Ties on the belt while pulling it with the plier in order to keep the tension. Make sure that the teeth of the belt are gripping when tightened. This helps the belt to keep the tension.

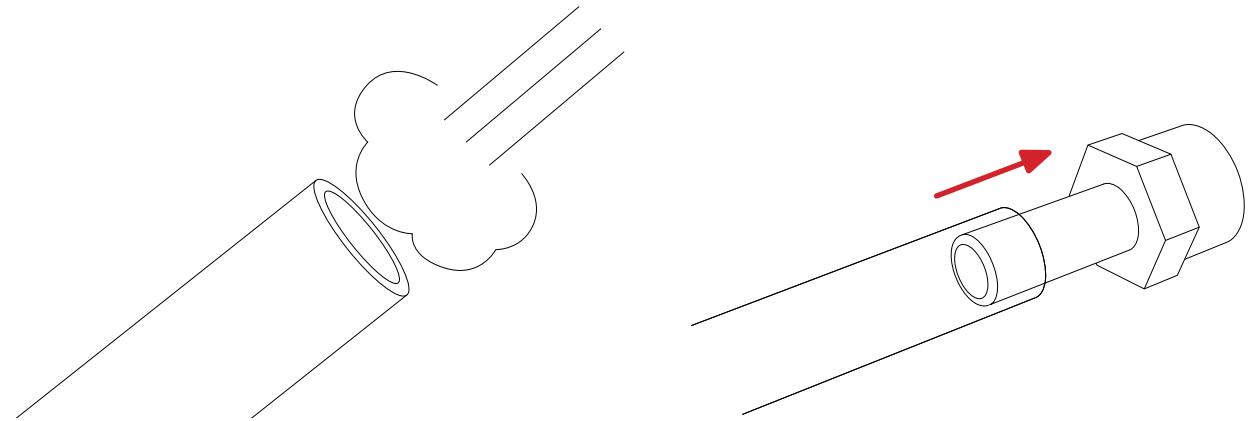
After tying the ends of the belt, cut its excess close to the Cable Ties.



## H6. HOW TO INSERT THE TUBES EASILY

If the inside of the tube is moist, it becomes easier to slide the connectors and Laser Tube in.

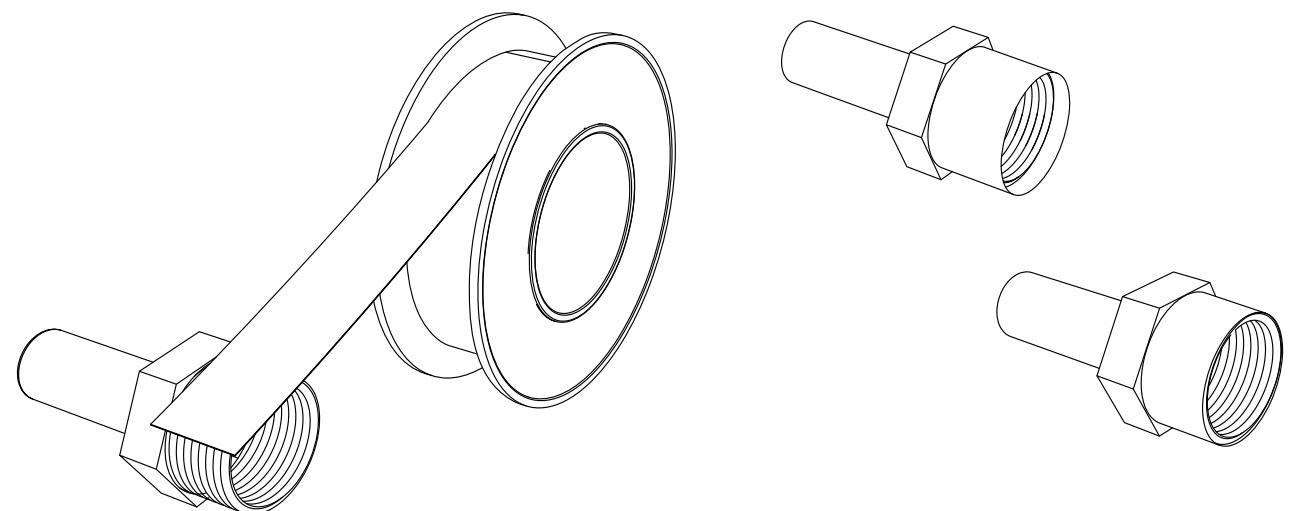
For that purpose, blow the end of the tube using your breath.



## H7. HOW TO USE TEFLON TAPE

Wrap the teflon tape around the thread clockwise.

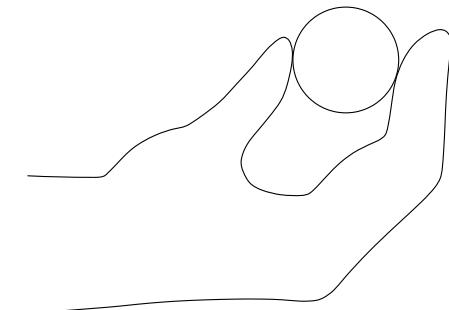
Remove any teflon tape sticking out of the thread, otherwise particles will block the cooling circuit.



## H8. HOW TO HOLD THE MIRROR

The mirrors used in the Mirror Holders are small discs in 2 sizes (20 mm and 25 mm). The 20 mm mirrors have one opaque side and one mirrored side. The mirrored side is used to redirect the laser beam. The 25 mm mirror have two mirrored sides. Use the yellow side to redirect the laser beam.

The mirrored sides have to stay clean in order to reflect the laser beam properly. For this reason, it is very important to not touch them. The mirror has to be held carefully on the sides. Any dirt, scratch marks or grease will influence negatively the results of the cut and engraving.

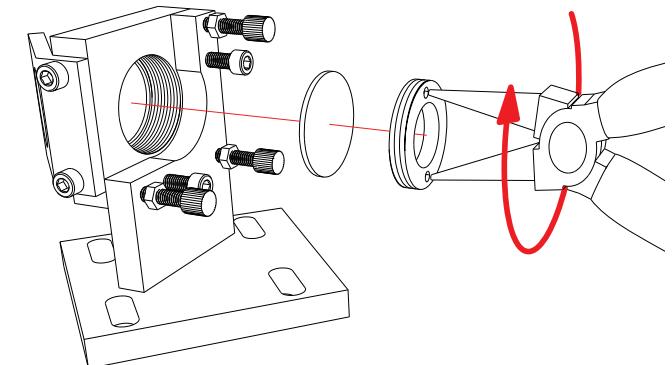
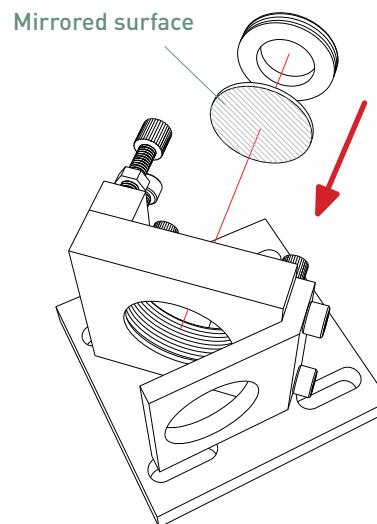
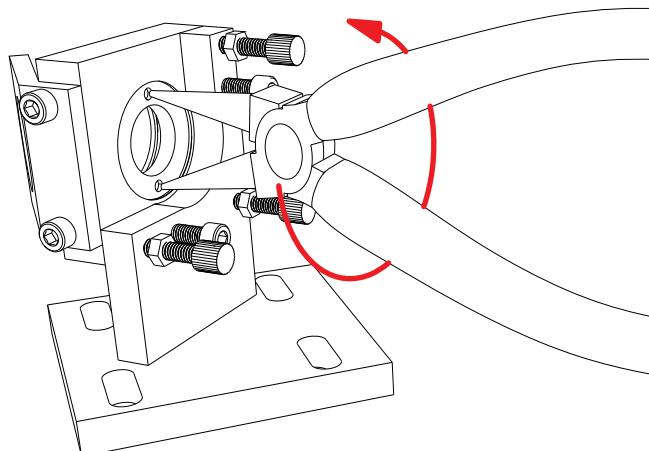


## H9. HOW TO INSERT THE MIRROR

To insert the mirror, first remove the ring by unscrewing it with the Needle Nose Pliers. The ring has two indents for this purpose.

Remember to hold the mirror on the sides. DO NOT TOUCH THE MIRRORED SURFACE. Insert the mirror in the correct position as illustrated.

Once the mirror is in, put the ring back and tighten it loosely with the Needle Nose Pliers. If you tighten too hard it might crack the mirror.



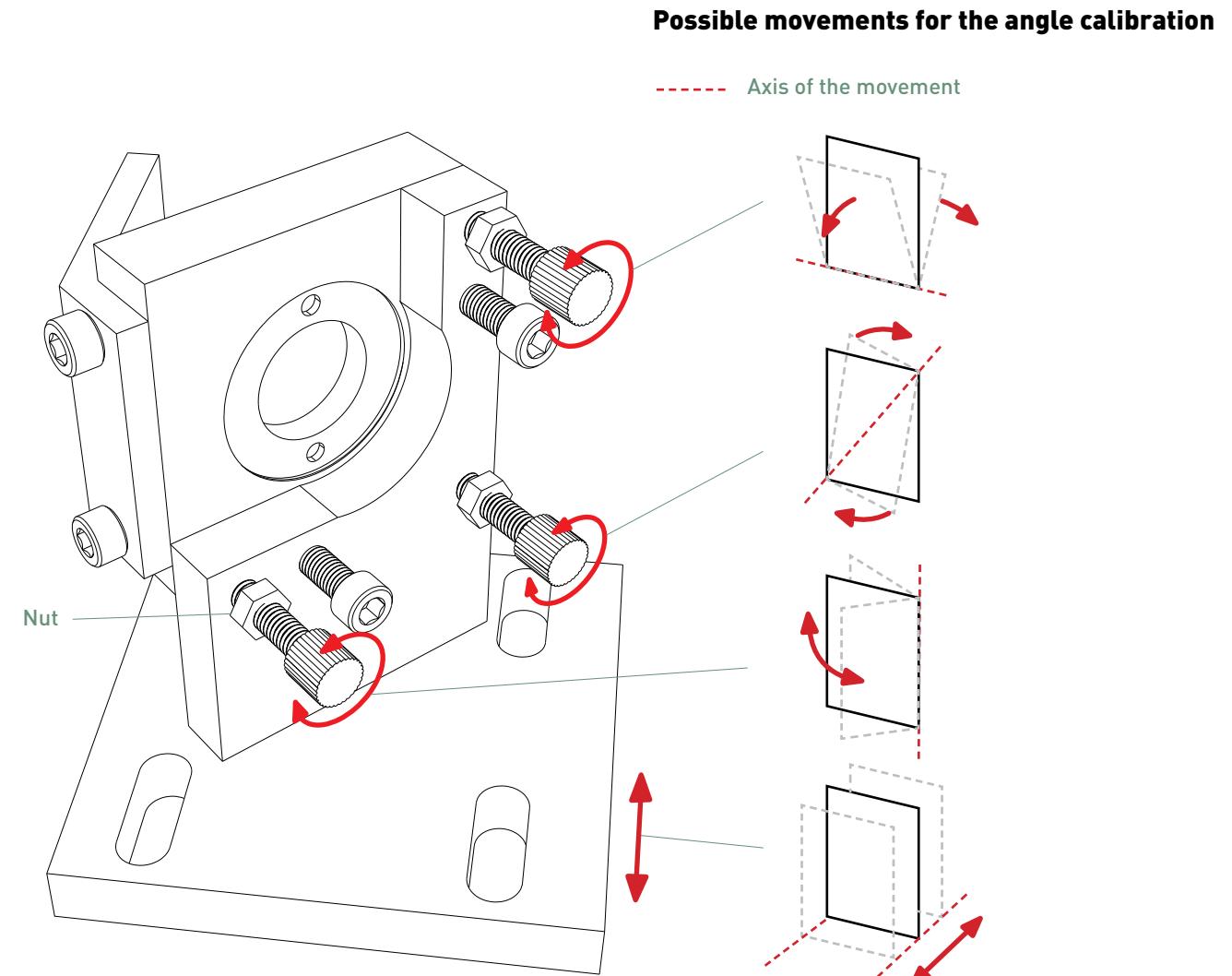
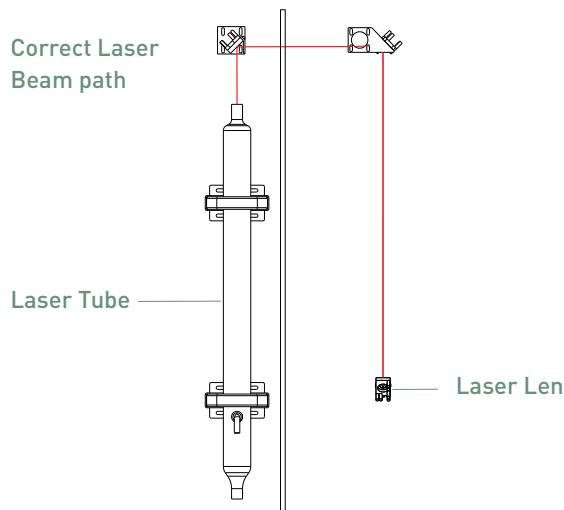
# H10. HOW TO CALIBRATE THE MIRROR ANGLE

For the machine to cut and engrave well, it is important that the laser beam is directed correctly to the Laser Lens. The mirrors are responsible to redirect the beam. For that, they need to be positioned in the correct angle.

Each Mirror Holder contains 3 knobs. By rotating each knob, the angle of the mirror can be calibrated in different directions as shown in the image. Also, the entire Mirror Holder can be moved back and forth if necessary.

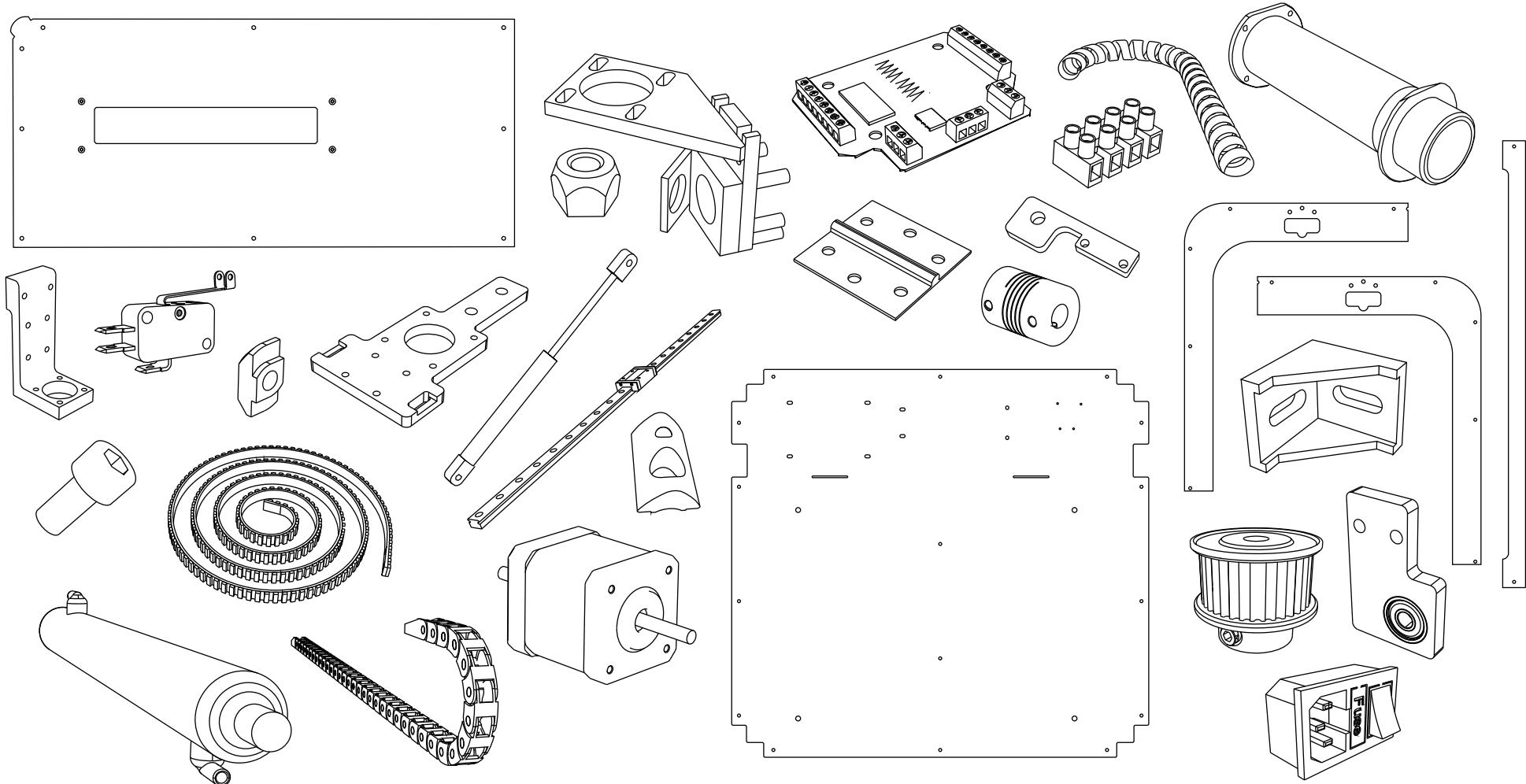
The knobs push the corners of the holder, tilting the mirror. To facilitate the calibration, reset the holder by unscrewing the knobs until they are not touching the holder.

After the calibration, tighten the nuts very carefully to fix the desired position.



# ARE YOU READY?

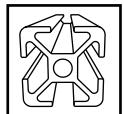
# Let's start!



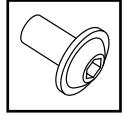
# STEP 1. BUILDING THE BOTTOM FRAME

Step 1/33

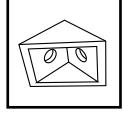
⌚ 20 min



**3x** Profile 30-770  
**2x** Profile 30-800



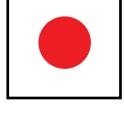
**12x** B-screw M6-12



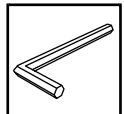
**6x** Bracket 30



**12x** T-nut M6



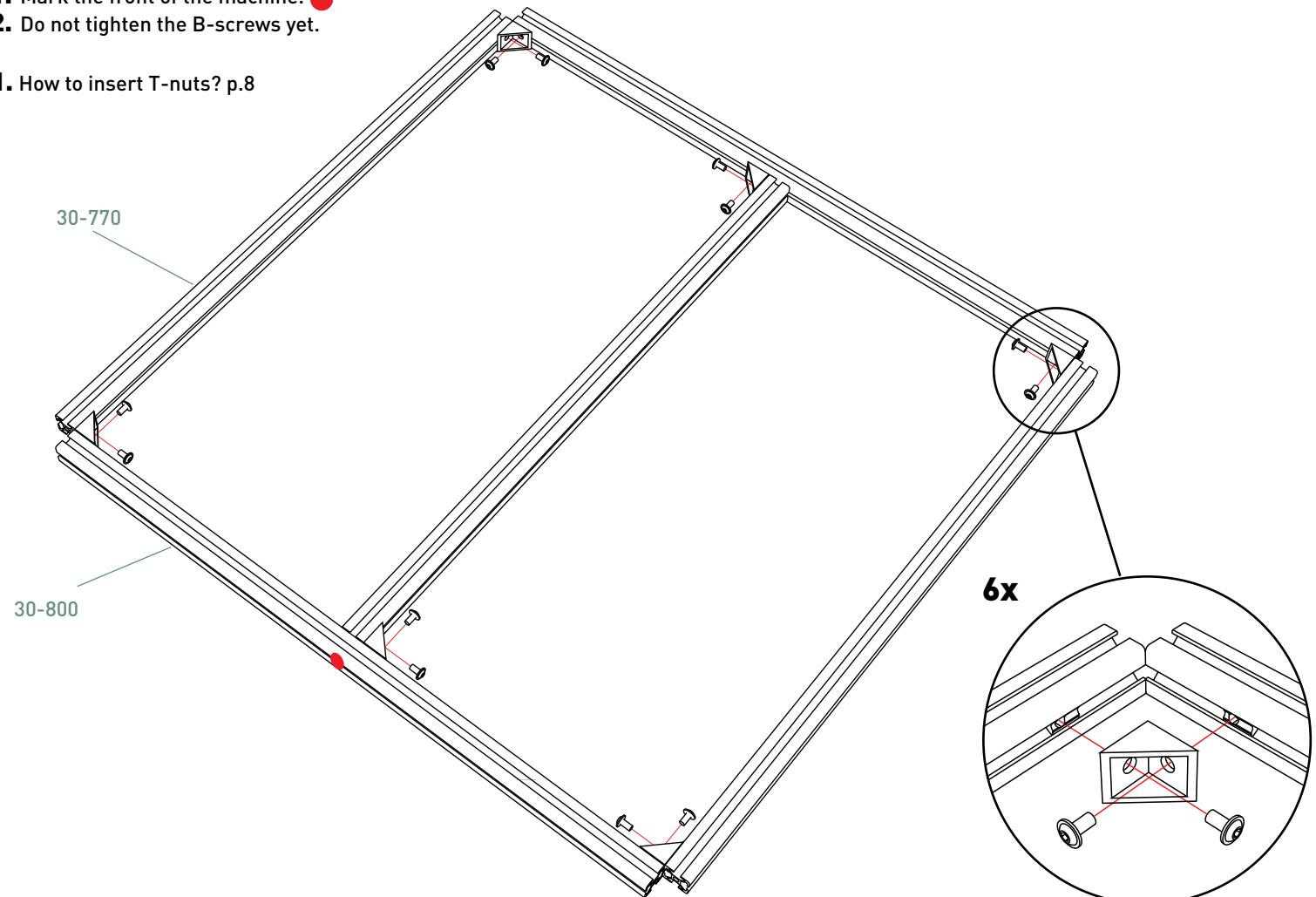
**1x** Red Dot Sticker



**1x** Allen Key 1.5  
**1x** Allen Key 5

❗ **R1.** Mark the front of the machine.   
**R2.** Do not tighten the B-screws yet.

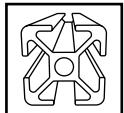
ℹ **H1.** How to insert T-nuts? p.8



# STEP 2.1 ATTACHING THE CORNER PROFILES

Step 2/33

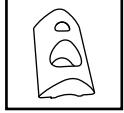
⌚ 30 min



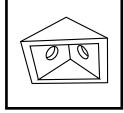
**2x** Profile 30-380  
**2x** Profile 30-350



**16x** B-screw M6-12



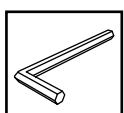
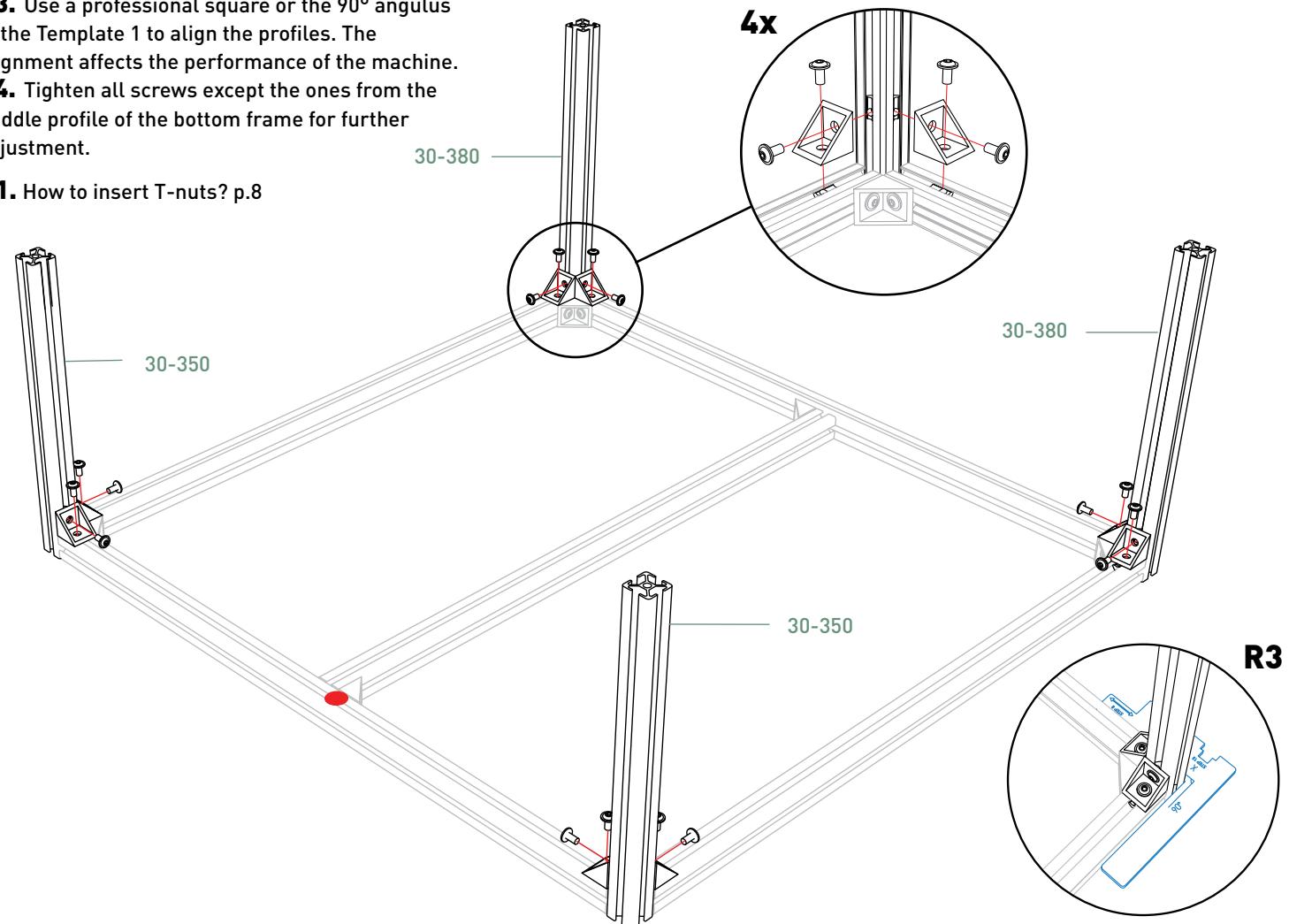
**16x** T-nut M6



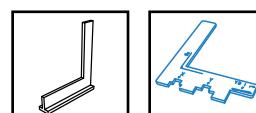
**8x** Bracket 30

- ! **R3.** Use a professional square or the 90° angulus of the Template 1 to align the profiles. The alignment affects the performance of the machine.  
**R4.** Tighten all screws except the ones from the middle profile of the bottom frame for further adjustment.

- ! **H1.** How to insert T-nuts? p.8



**1x** Allen Key 1.5  
**1x** Allen Key 5



**1x** Square **or**  
**1x** Template 1

# STEP 2.2 ATTACHING THE WIRE FIXERS

Step 2/33

⌚ 10 min



**3x** B-screw M6-16



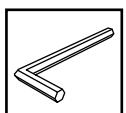
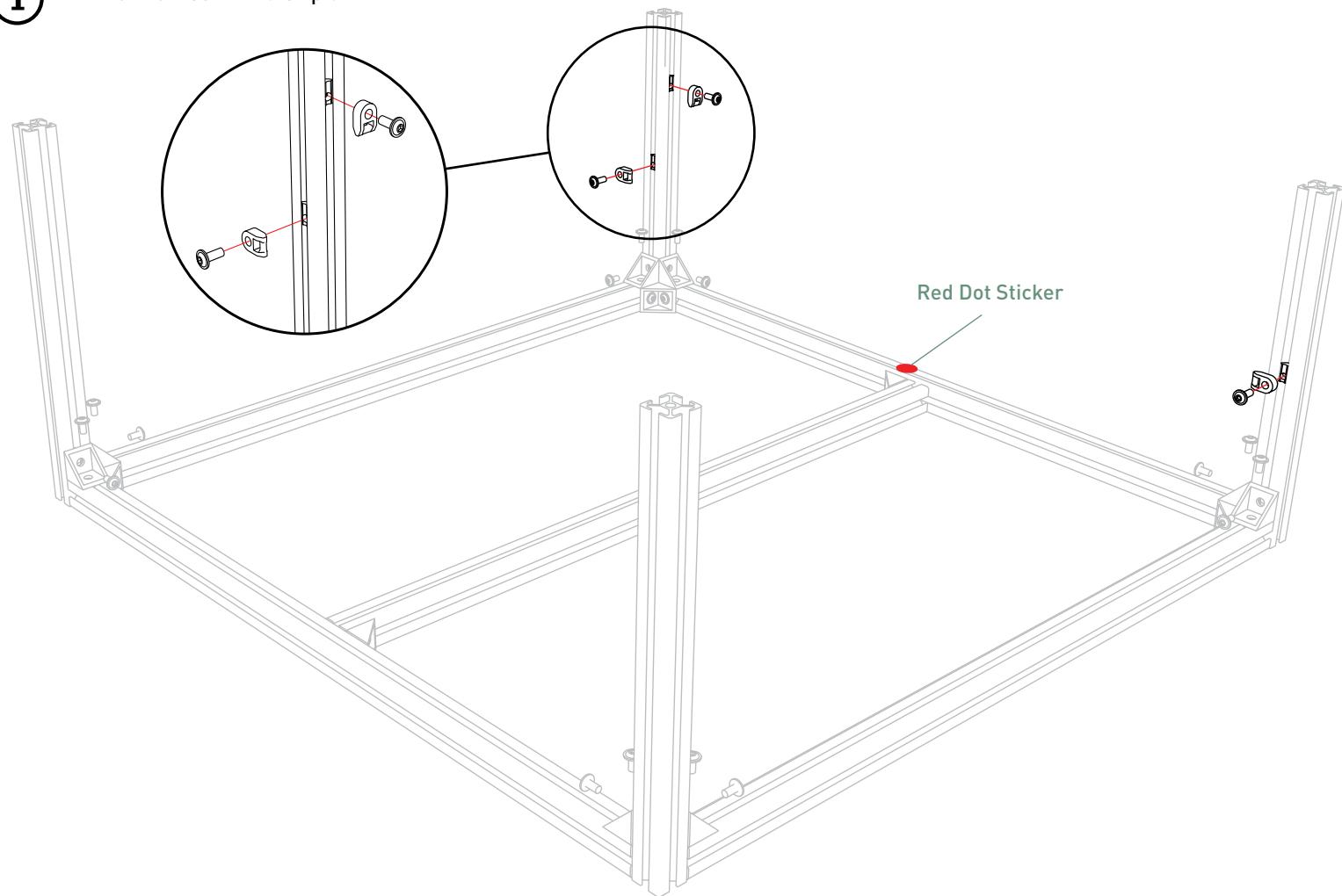
**3x** T-nut M6



**3x** Wire Fixer



**H1.** How to insert T-nuts? p.8



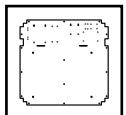
**1x** Allen Key 1.5

**1x** Allen Key 5

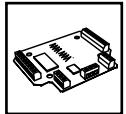
# STEP 3.1 PREPARING THE BOTTOM PANEL

Step 3/33

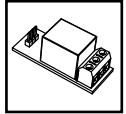
⌚ 30 min



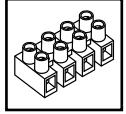
**1x** Bottom Panel



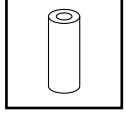
**1x** Converter PCB



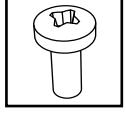
**1x** Relay



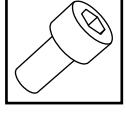
**2x** Terminal Block



**12x** Standoff



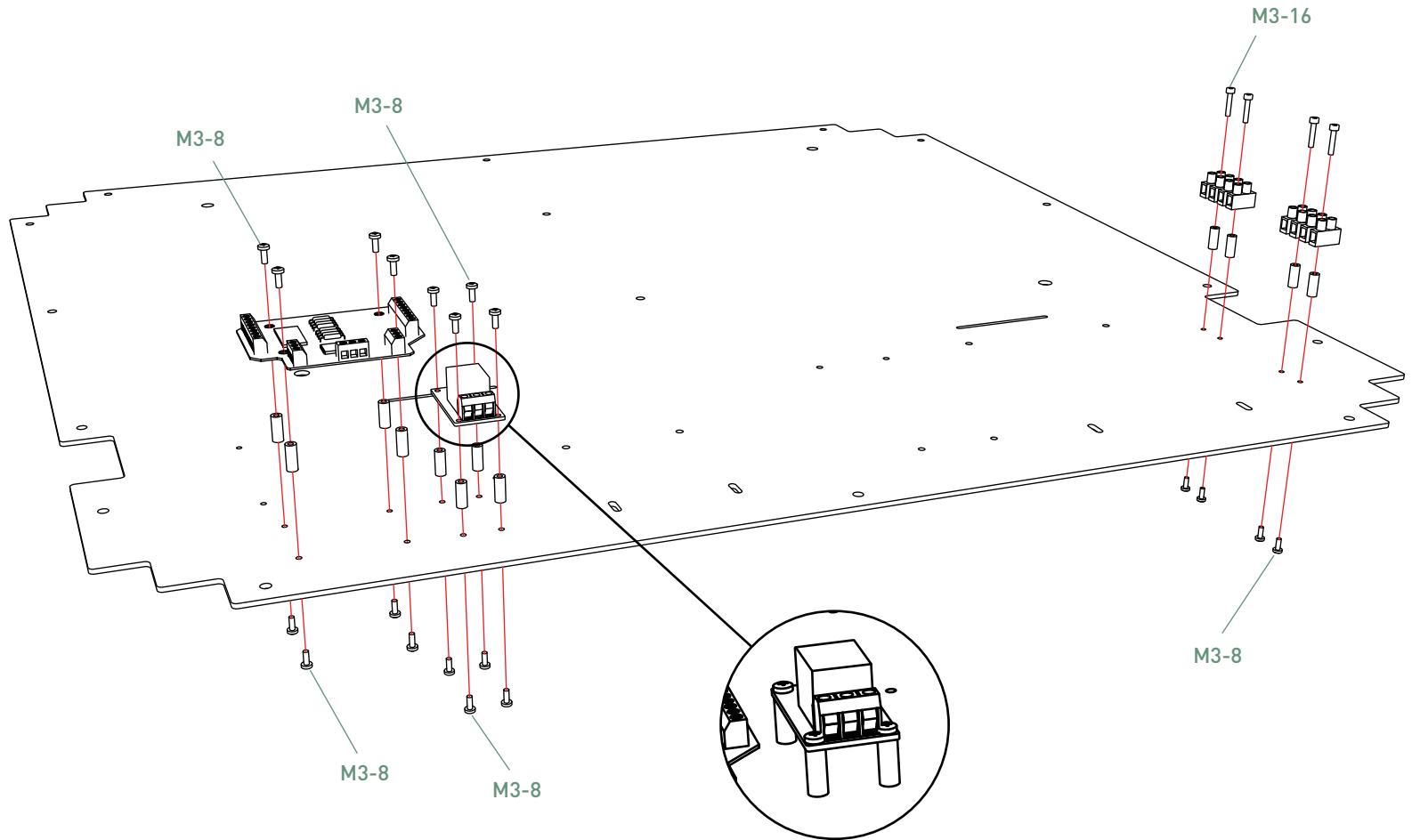
**20x** Plastic-screw  
M3-8



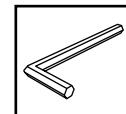
**4x** C-screw M3-16



**R5.** Remove the protective foils  
from the panel.



**1x** Screwdriver  
Phillips

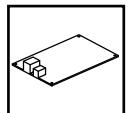


**1x** Allen Key 2.5

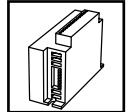
# STEP 3.2 PREPARING THE BOTTOM PANEL

Step 3/33

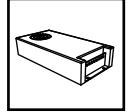
⌚ 30 min



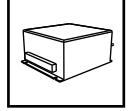
**1x** Laser Controller



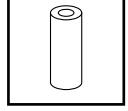
**2x** Motor Driver



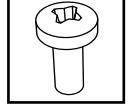
**1x** Motor Power Supply



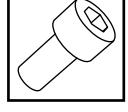
**1x** Laser Power Supply



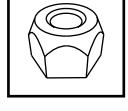
**4x** Standoff



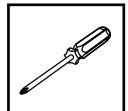
**8x** Plastic-screw M3-8



**8x** C-screw M4-12



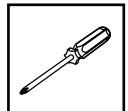
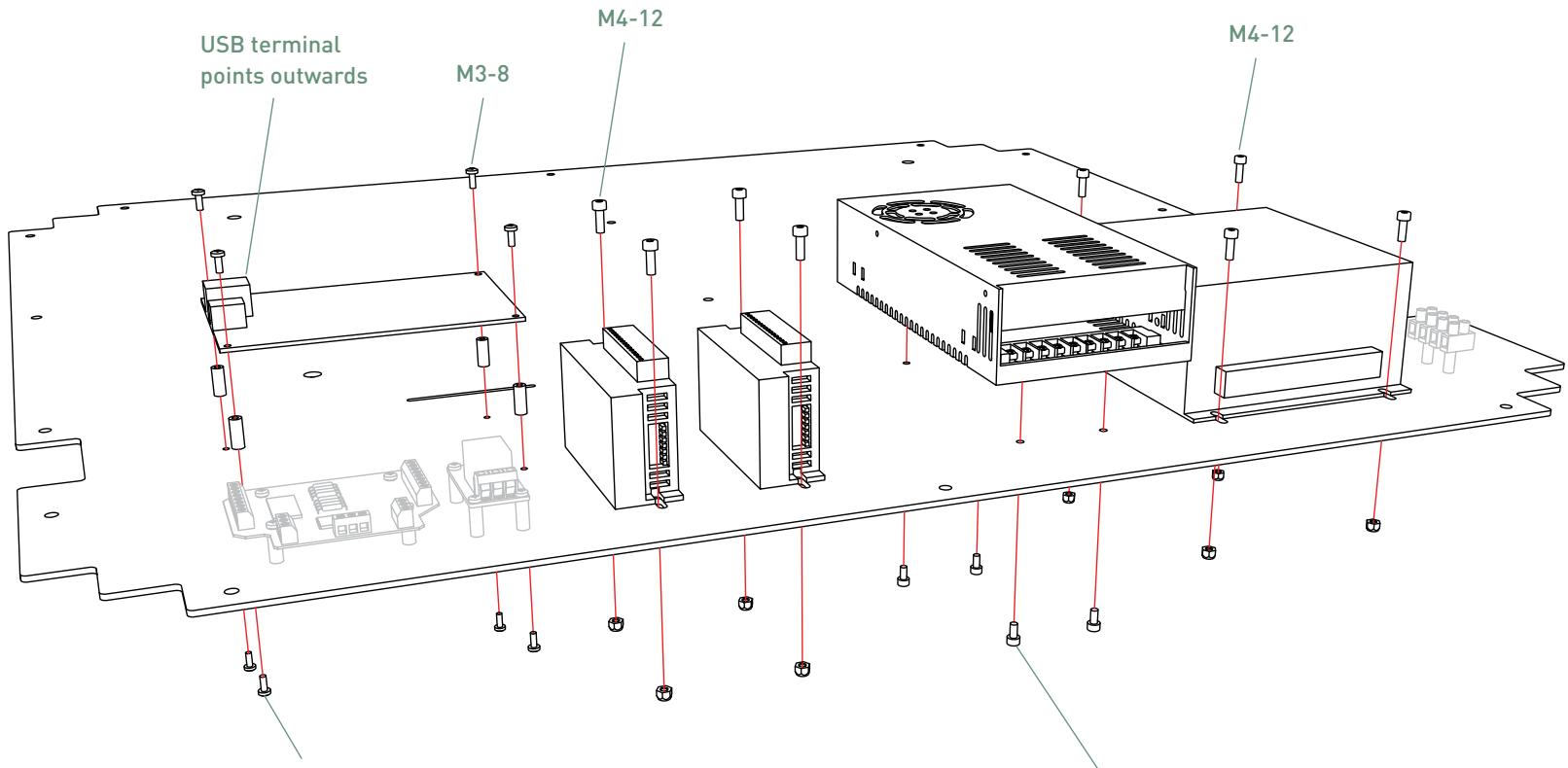
**4x** C-screw M4-8



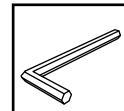
**8x** Lock Nut M4



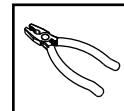
**H2.** How to use Lock Nuts? p.9



**1x** Screwdriver  
Phillips



**1x** Allen Key 3

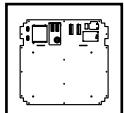


**1x** Small plier **or**  
**1x** Wrench 5.5

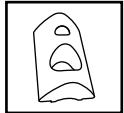
# STEP 4. ATTACHING THE BOTTOM PANEL

Step 4/33

⌚ 20 min



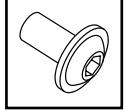
**1x** Prepared Bottom Panel (Step 3)



**16x** T-nut M6



**14x** Wire Fixer



**14x** B-screw M6-16  
**2x** B-screw M6-12



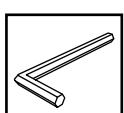
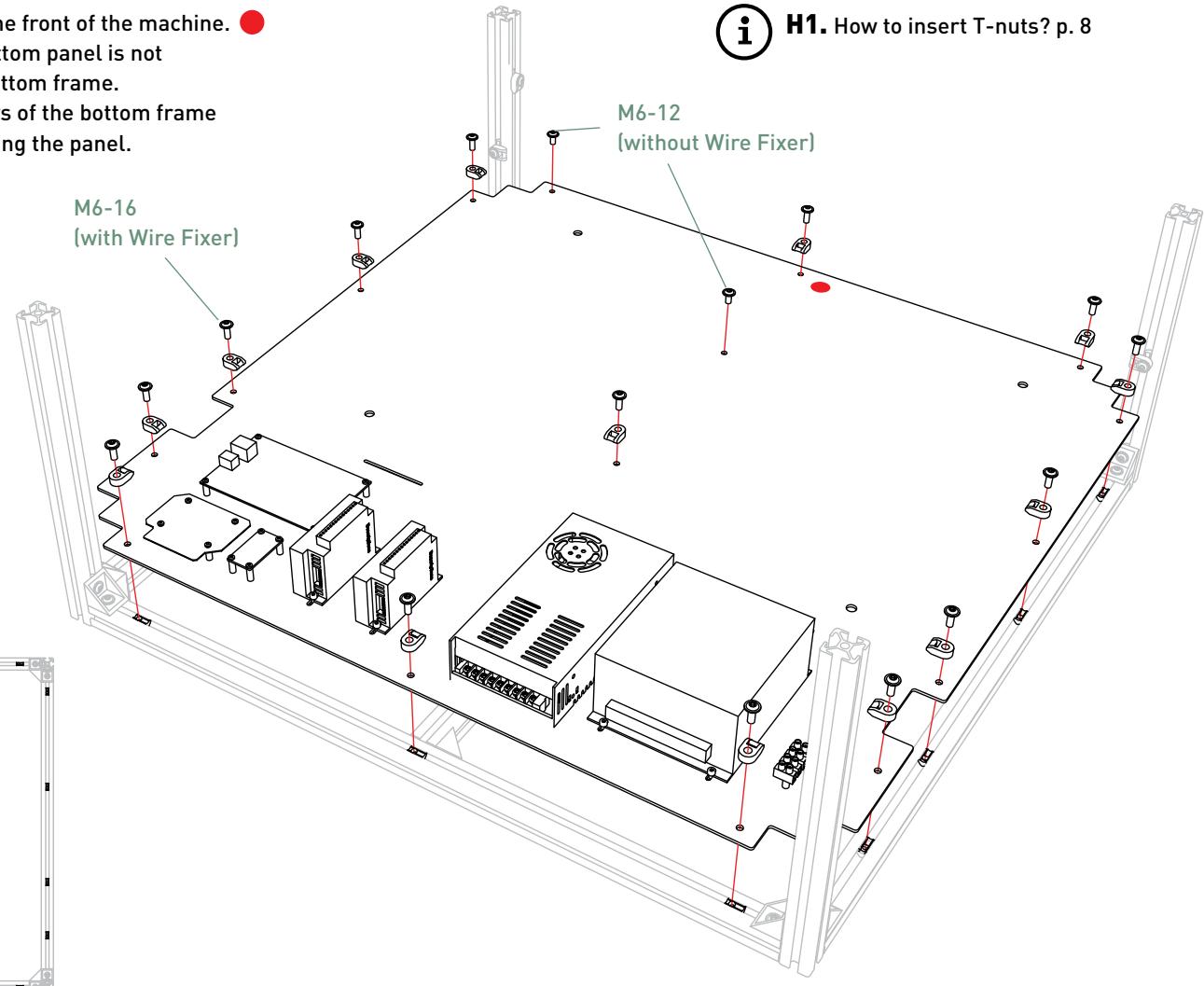
**R6.** Pay attention to the front of the machine.

**R7.** Make sure the bottom panel is not protruding from the bottom frame.

**R8.** Tighten the screws of the bottom frame middle profile after fixing the panel.



**H1.** How to insert T-nuts? p. 8

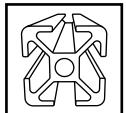


**1x** Allen Key 1.5  
**1x** Allen Key 5

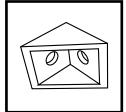
# STEP 5.1 INSTALLING THE SEPARATOR PANEL PROFILES

Step 5/33

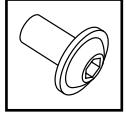
⌚ 10 min



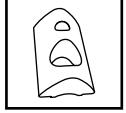
**2x** Profile 30-150



**2x** Bracket 30



**4x** B-screw M6-12

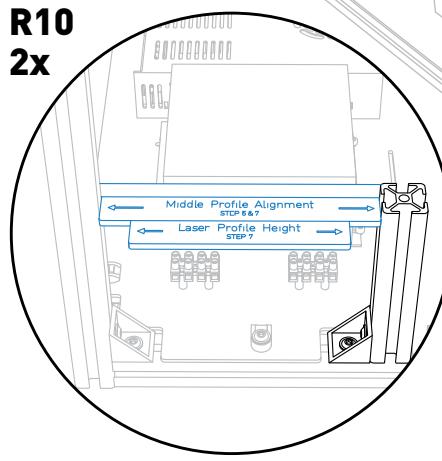


**4x** T-nut M6

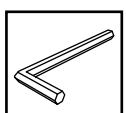
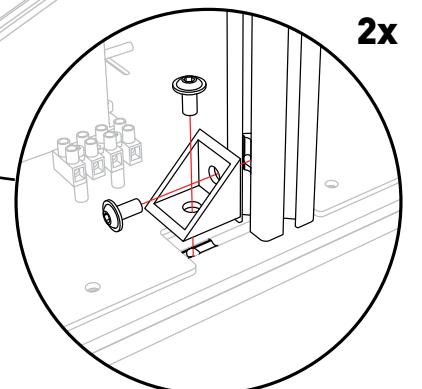
- R9.** Align the brackets and profiles perfectly on the sides. They should not protrude from the bottom frame sides.  
**R10.** Use the Template 2 (Middle Profile Alignment) to measure the distance from the back vertical profile.

- H1.** How to insert T-nuts? p. 8

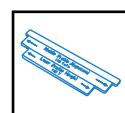
**R10  
2x**



**2x**



**1x** Allen Key 1.5  
**1x** Allen Key 5

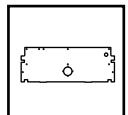


**1x** Template 2

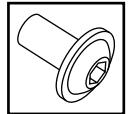
# STEP 5.2 INSTALLING THE SEPARATOR PANEL

Step 5/33

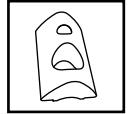
⌚ 10 min



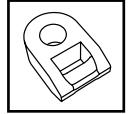
**1x** Separator Panel



**1x** B-screw M6-12  
**1x** B-screw M6-16



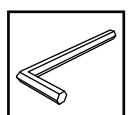
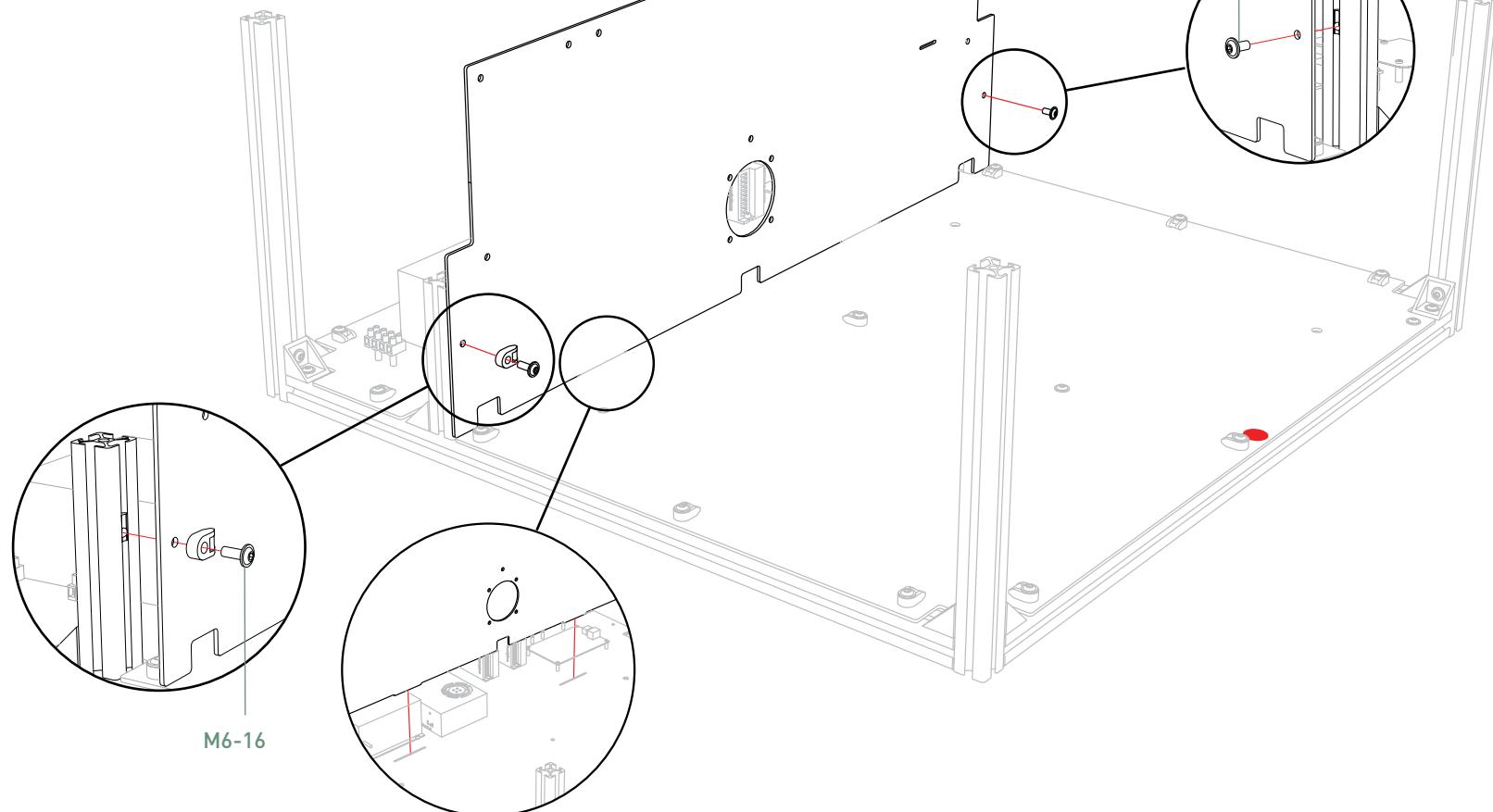
**2x** T-nut M6



**1x** Wire Fixer



**R11.** Remove the protective foils from the panel.

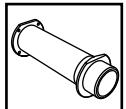


**1x** Allen Key 1.5  
**1x** Allen Key 5

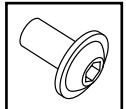
# STEP 5.3 ATTACHING THE EXHAUST TUBE

Step 5/33

⌚ 15 min



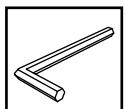
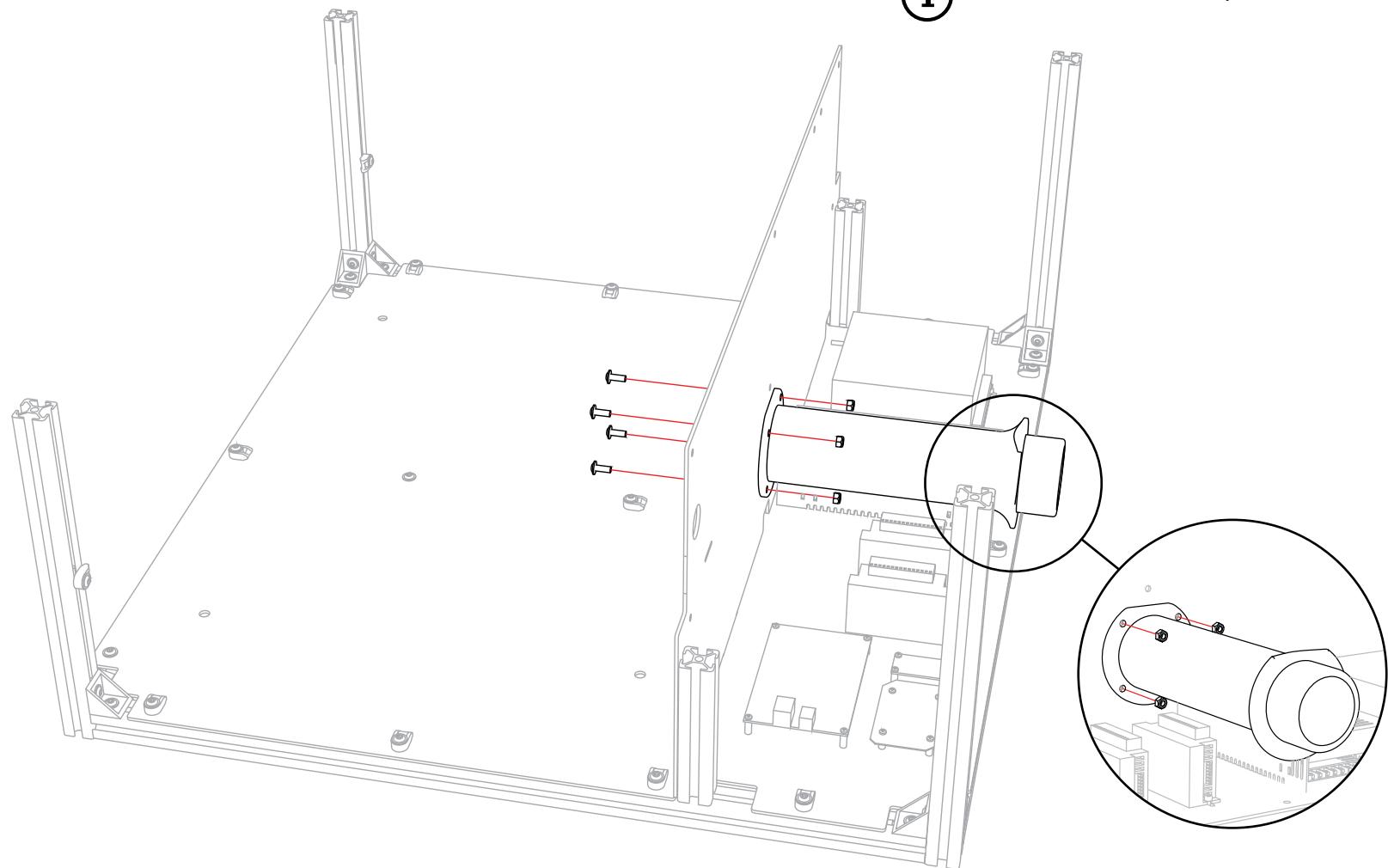
**1x** Exhaust



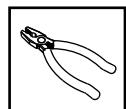
**4x** B-screw M6-16



**4x** Lock Nut M6



**1x** Allen Key 5

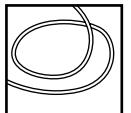


**1x** Small plier **or**  
**1x** Wrench 10

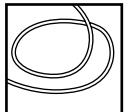
# STEP 6.1 WIRING AC

Step 6/33

⌚ 15 min



**1x** Laser + Motor Power Cable

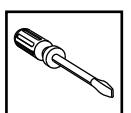
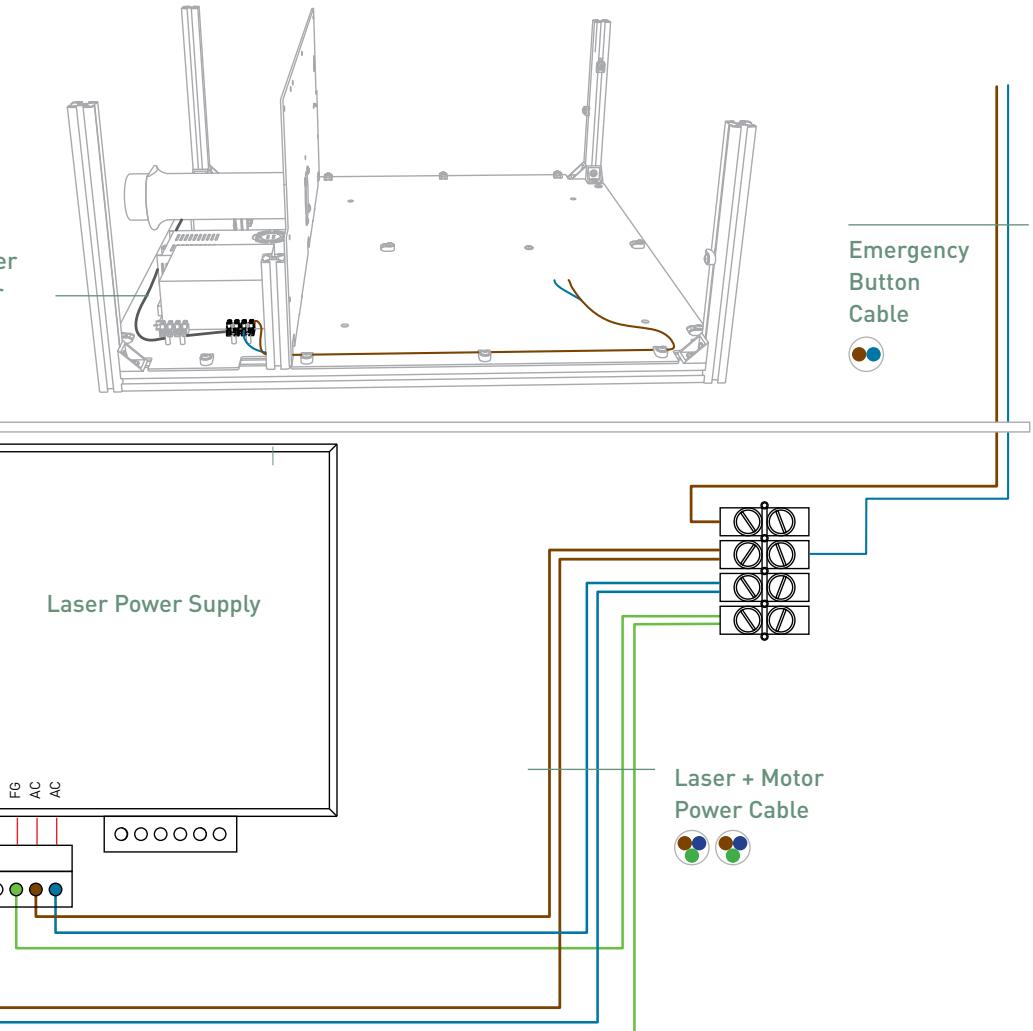


**1x** Emergency Button Cable

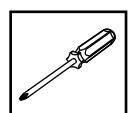


**R12.** The Laser Power Supply terminals can be removed to facilitate the wiring.

**R13.** Leave the Emergency Button Cable on the Bottom Panel. The emergency button will be connected to it in step 26.3.



**1x** Screwdriver slotted small

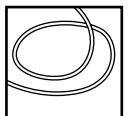


**1x** Screwdriver Philips 6

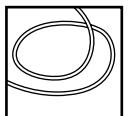
# STEP 6.2 WIRING DC 1

Step 6/33

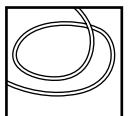
⌚ 30 min



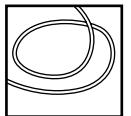
**1x** Controller Power Cable



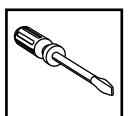
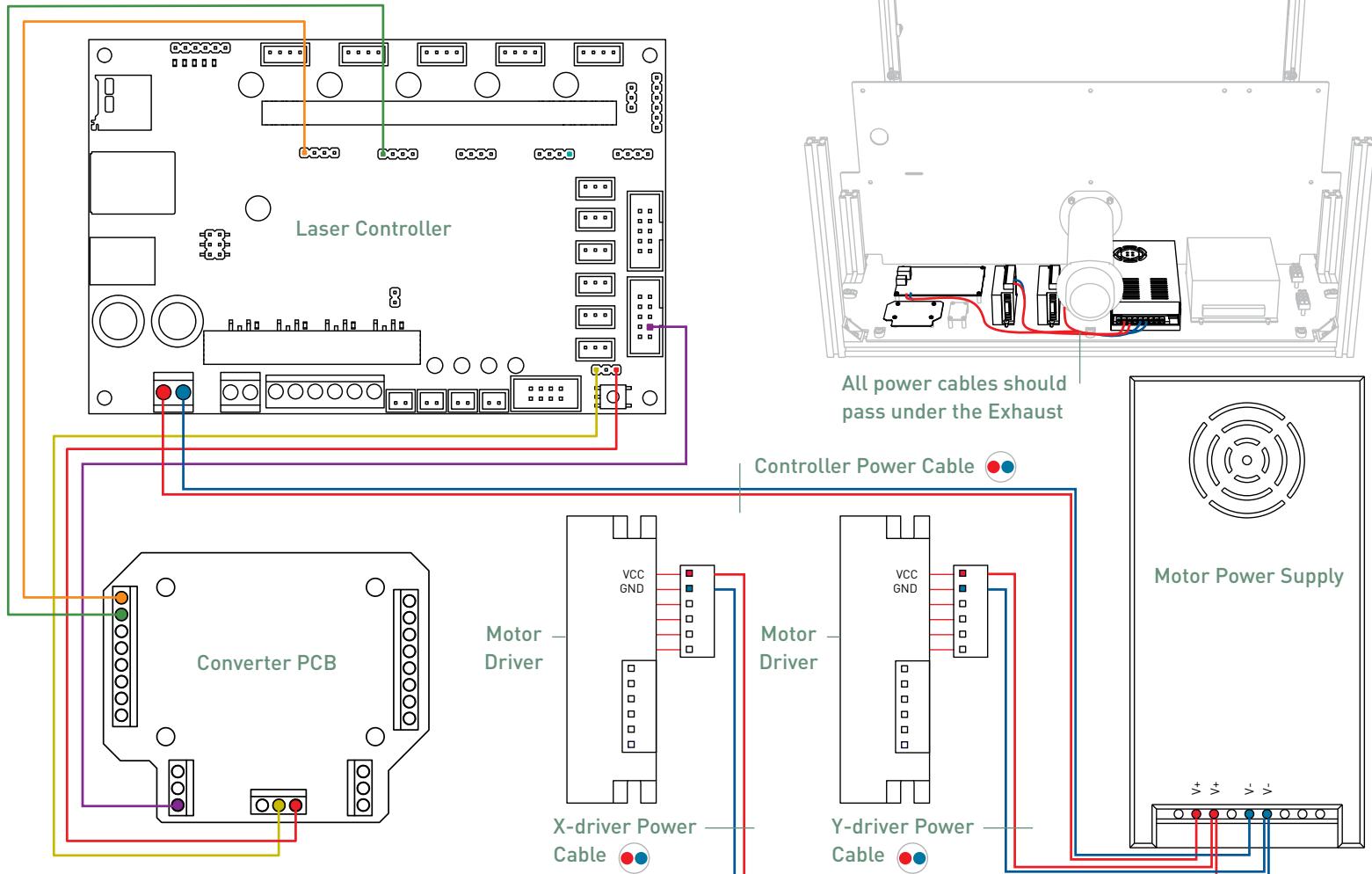
**5x** Jumper Cable



**1x** X-driver Power Cable



**1x** Y-driver Power Cable



**1x** Screwdriver slotted small

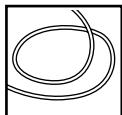


**1x** Screwdriver Philips 6

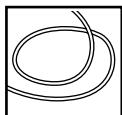
# STEP 6.3 WIRING DC 2

Step 6/33

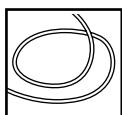
⌚ 15 min



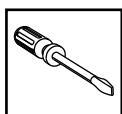
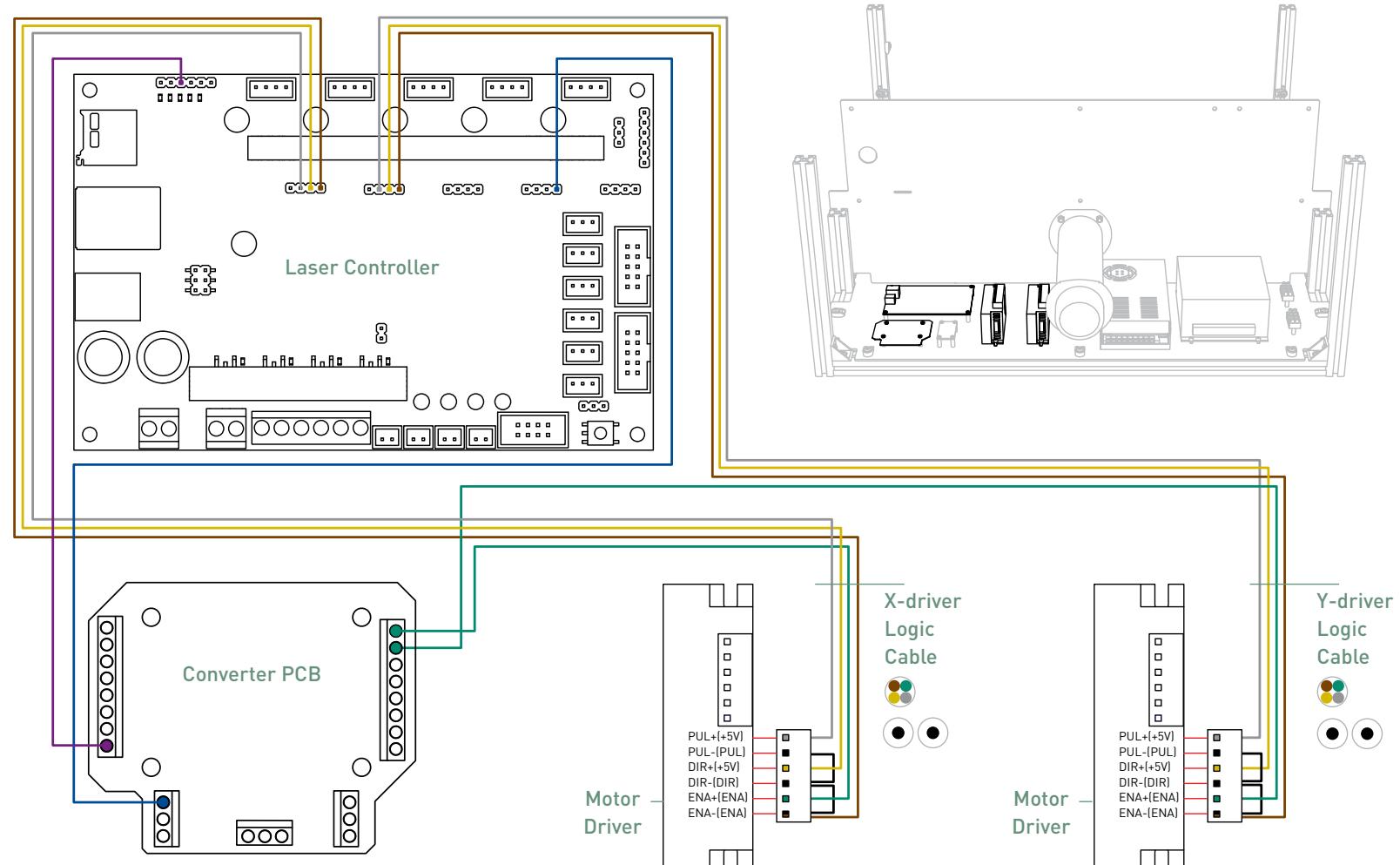
**1x X-driver Logic  
Cable**



**1x Y-driver Logic  
Cable**



**2x Jumper Cable**



**1x Screwdriver  
slotted small**

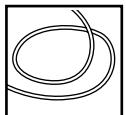


**1x Screwdriver  
Philips 6**

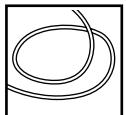
# STEP 6.4 WIRING DC 3

Step 6/33

⌚ 20 min



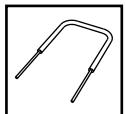
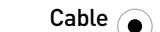
**1x** Laser Logic Cable  
+ Resistor



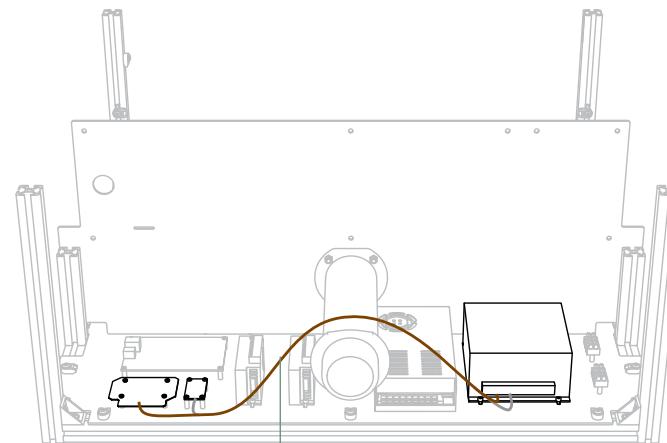
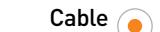
**4x** Jumper Cable



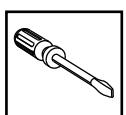
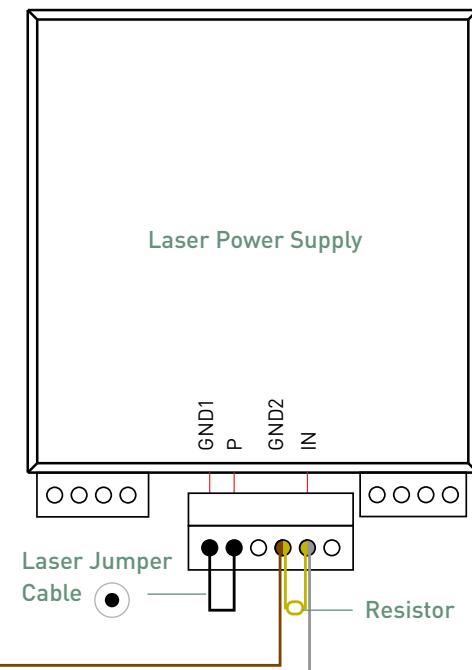
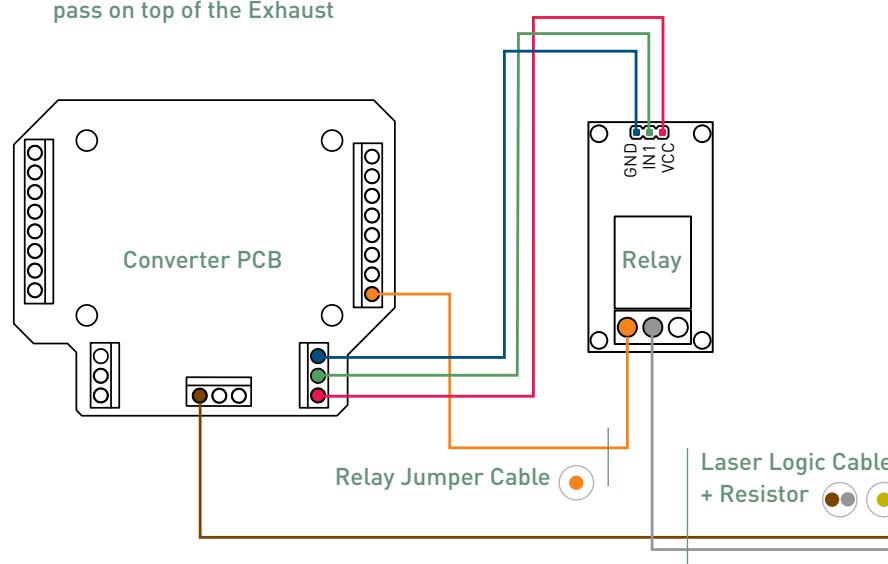
**1x** Laser Jumper  
Cable



**1x** Relay Jumper  
Cable



**R14.** The Laser Power Supply terminals can be removed to facilitate the wiring.



**1x** Screwdriver  
slotted small



**1x** Screwdriver  
Philips 6

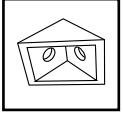
# STEP 7.1 ATTACHING THE BACK PROFILE

Step 7/33

⌚ 20 min



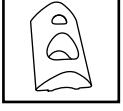
**1x** Profile 30-800



**2x** Bracket 30



**4x** B-screw M6-12



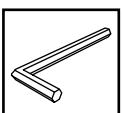
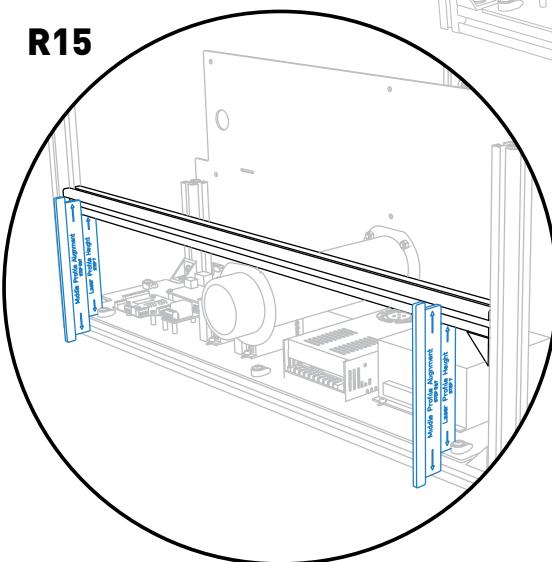
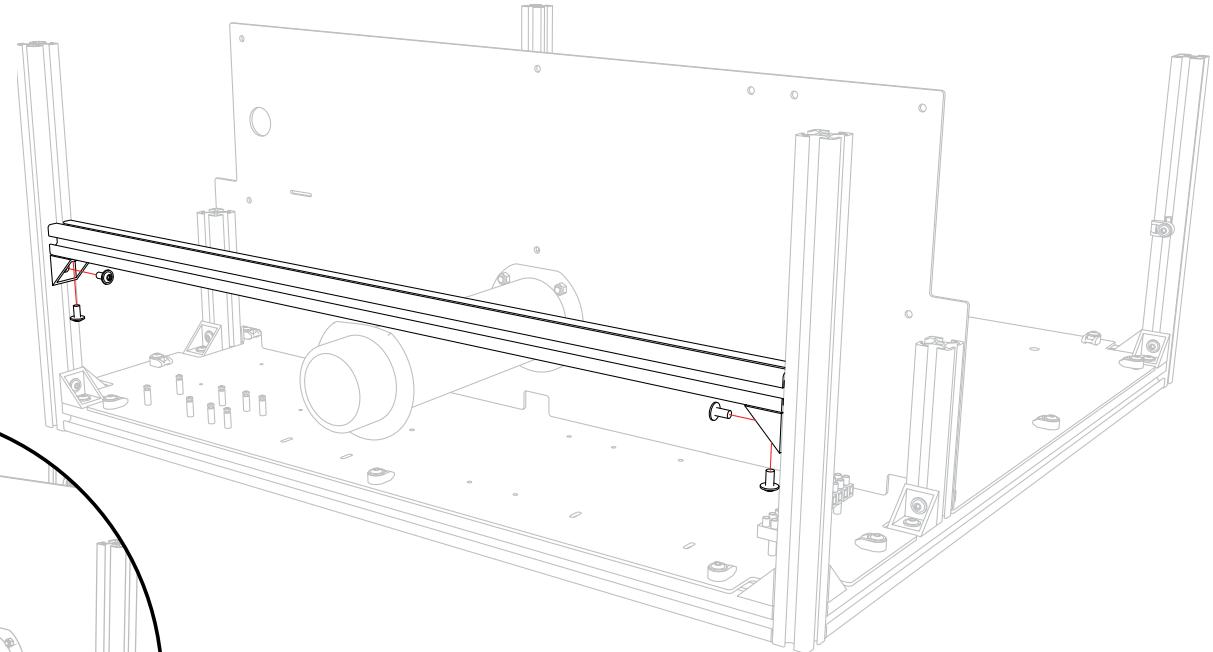
**4x** T-nuts M6



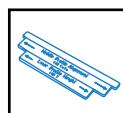
**R15.** Use 2x Templates 2 (Laser Profile Height) to align the profile.



**H1.** How to insert T-nuts? p.8



**1x** Allen Key 1.5  
**1x** Allen Key 5



**2x** Template 2

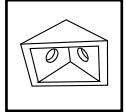
# STEP 7.2 ATTACHING THE MIDDLE PROFILE

Step 7/33

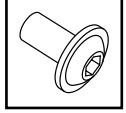
⌚ 20 min



**1x** Profile 30-860



**2x** Bracket 30



**7x** B-screw M6-12



**7x** T-nuts M6

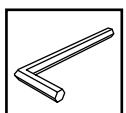
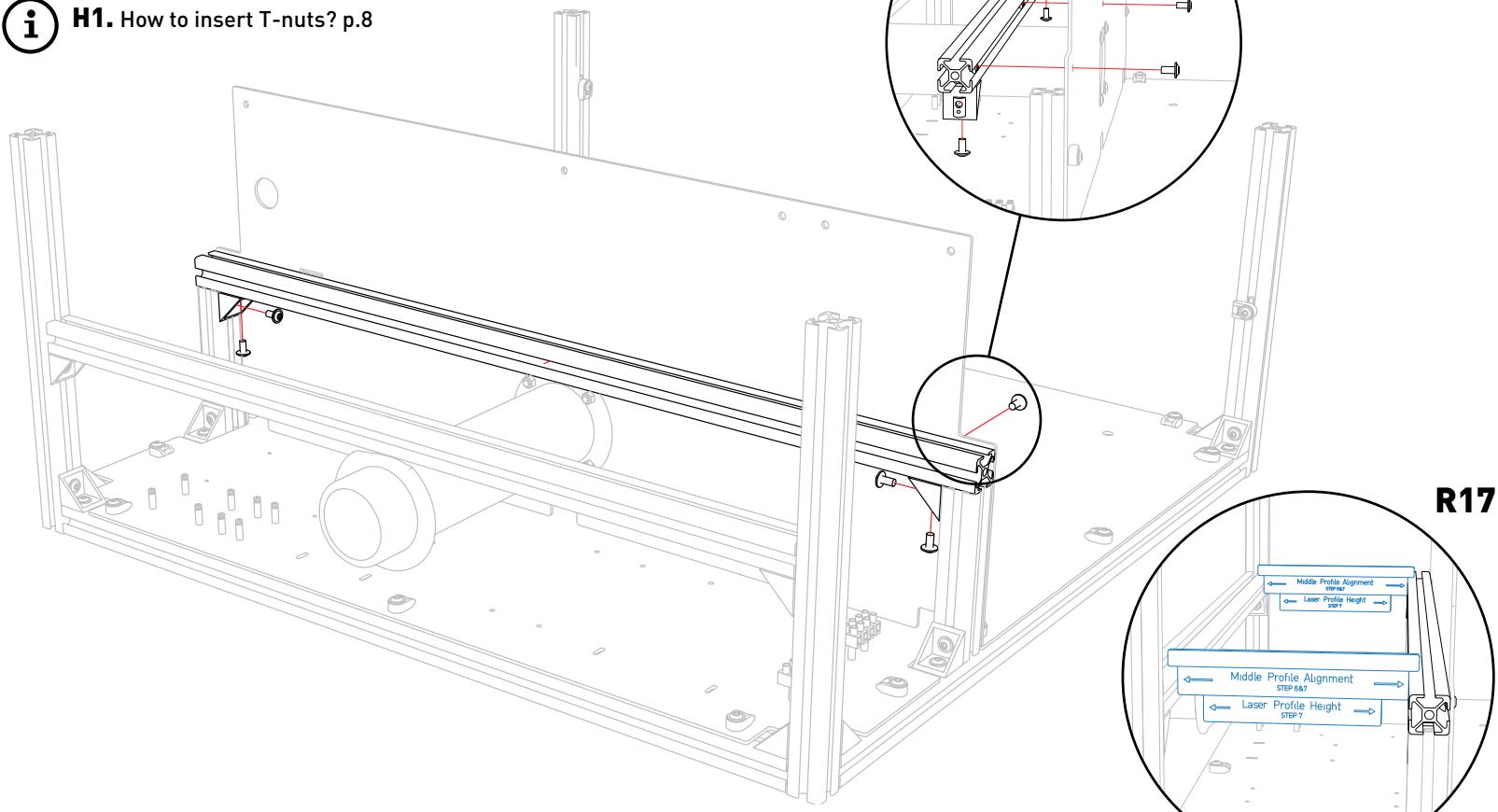


**R16.** Insert the T-nuts in the profile and align them with the Separator Panel holes, before fixing the brackets.

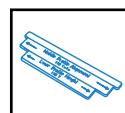
**R17.** Use the Templates 2 (Middle Profile Alignment) to fix profile with the correct distance from the back profile.



**H1.** How to insert T-nuts? p.8



**1x** Allen Key 1.5  
**1x** Allen Key 5

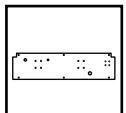


**2x** Template 2

# STEP 7.3 ATTACHING THE LASER PANEL

Step 7/33

⌚ 15 min



**1x** Laser Panel



**6x** B-screw M6-16



**6x** T-nut M6



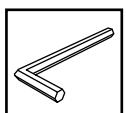
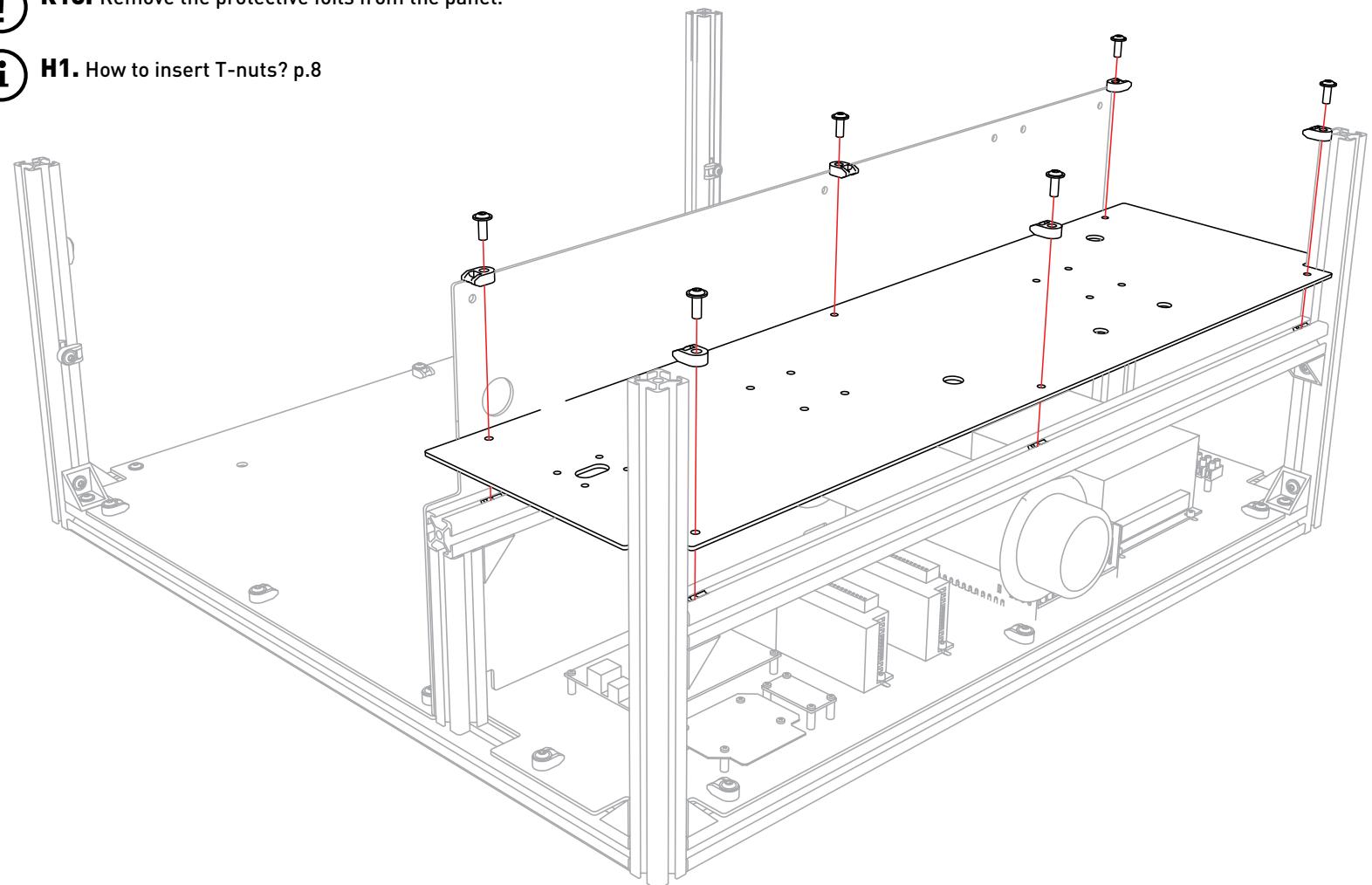
**6x** Wire Fixer



**R18.** Remove the protective foils from the panel.



**H1.** How to insert T-nuts? p.8



**1x** Allen Key 5

**1x** Allen Key 1.5

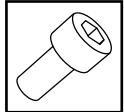
# STEP 8.1 PREPARING THE Y AXIS - GUIDES

Step 8/33

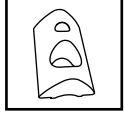
⌚ 10 min



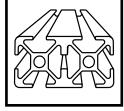
**2x** Linear Guide Y



**20x** C-screw M3-12



**20x** T-nut M3

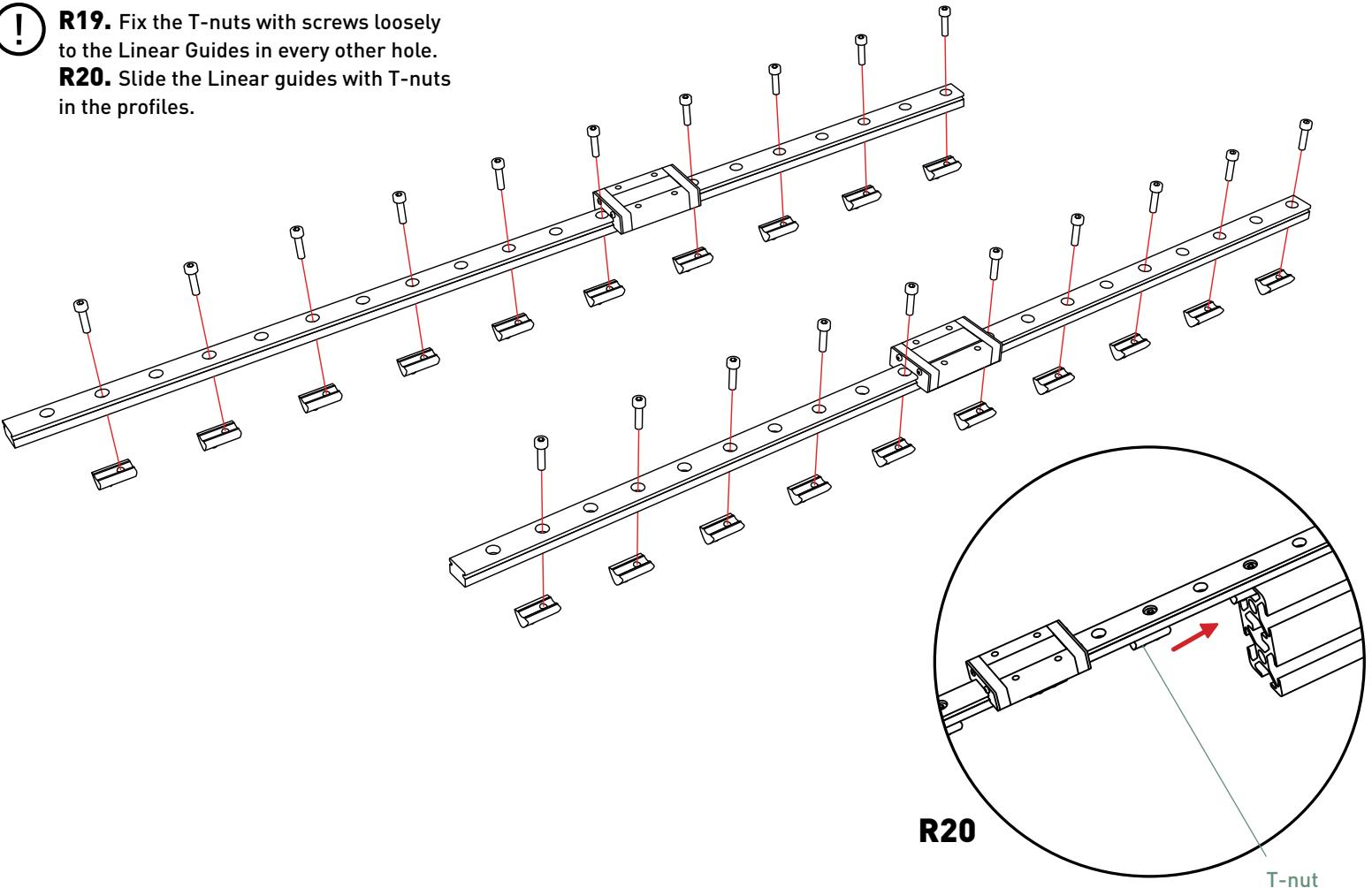


**2x** Profile 3060-770



**R19.** Fix the T-nuts with screws loosely to the Linear Guides in every other hole.

**R20.** Slide the Linear guides with T-nuts in the profiles.



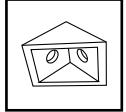
# STEP 8.2 PREPARING THE Y AXIS - BRACKETS

Step 8/33

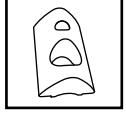
⌚ 10 min



**4x** B-screw M6-12



**2x** Bracket 30



**4x** T-nut M6

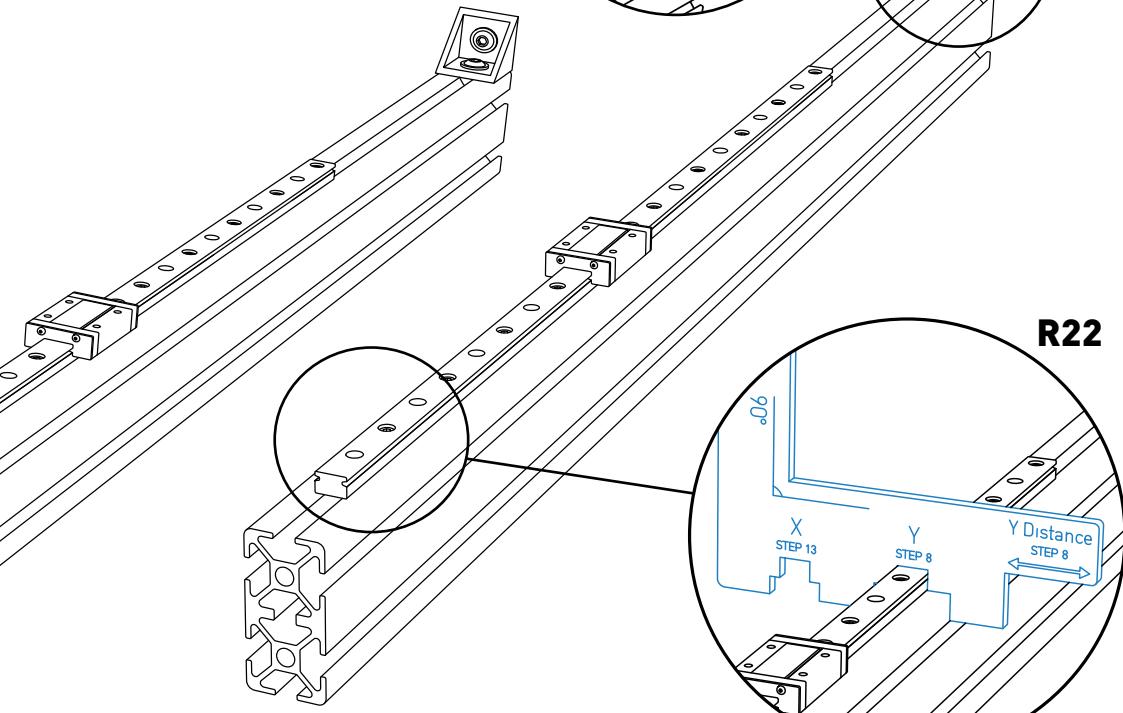
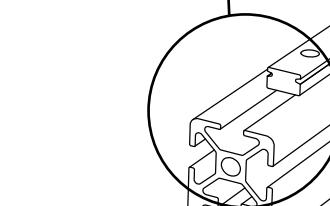
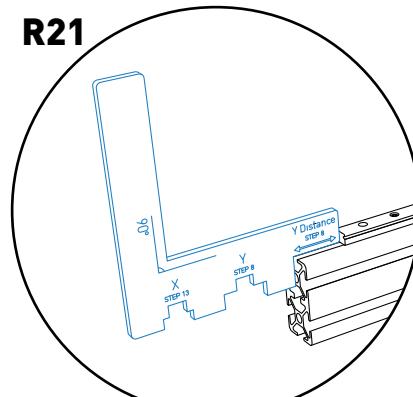


**R21.** Use the Template 1 (Y Distance) to position the Linear Guide in the correct distance to the end of the profile.

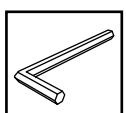
**R22.** Use the Template 1 (Y) to align the Linear Guide in the middle of the profile and tighten the screws, starting with the extremities ones.

**R23.** Don't tighten the B-screws and T-nuts of the Brackets yet.

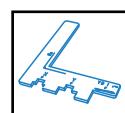
**R21**



**R22**



**1x** Allen Key 1.5  
**1x** Allen Key 5

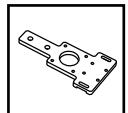


**1x** Template 1

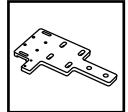
# STEP 8.3 PREPARING THE Y AXIS - HOLDERS

Step 8/33

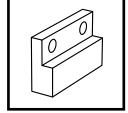
⌚ 10 min



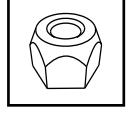
**1x** X-holder Left



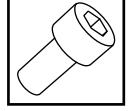
**1x** X-holder Right



**1x** Y-endstop Magnet

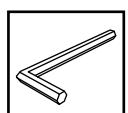
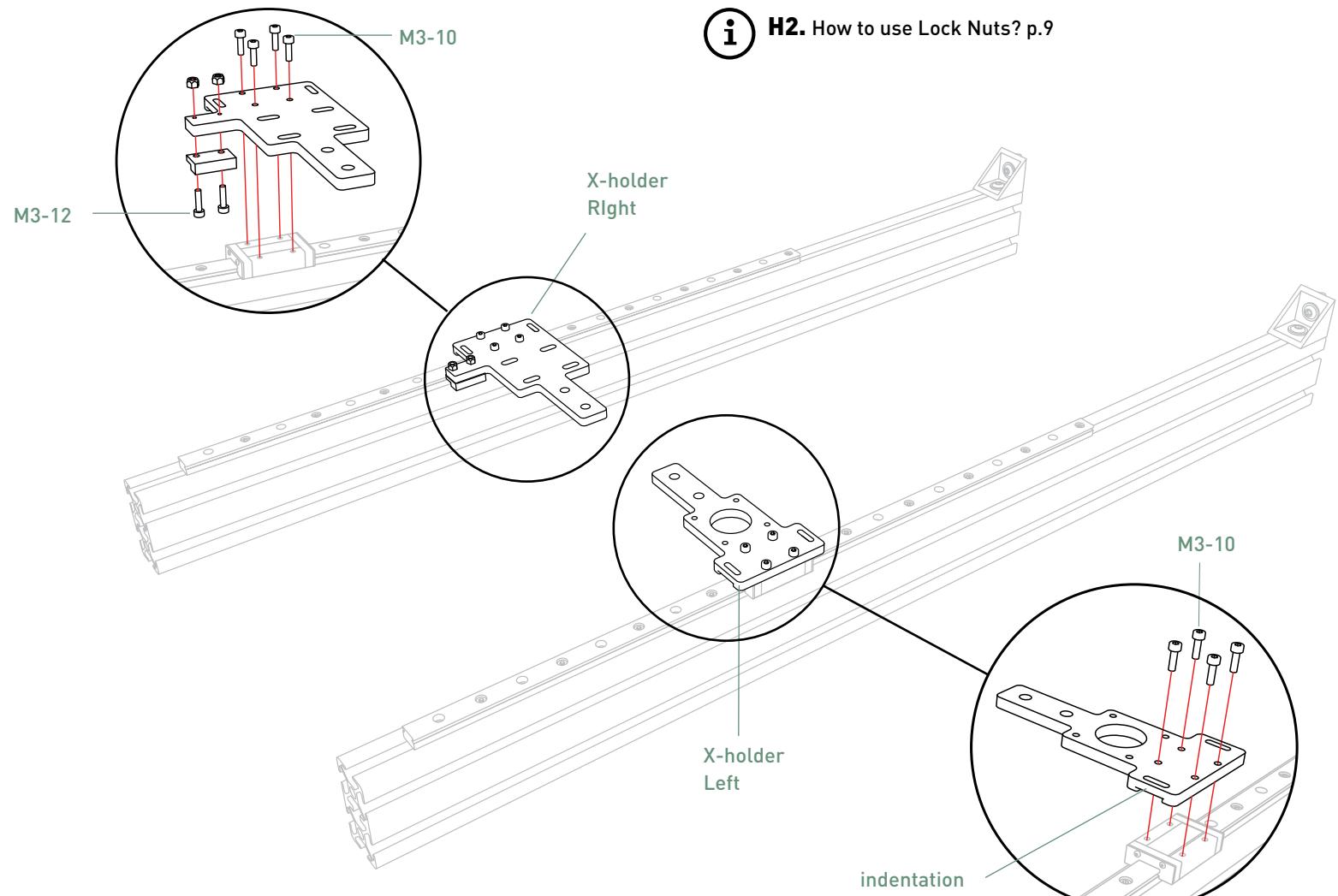


**2x** Lock Nut M3

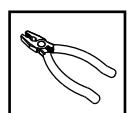


**8x** C-screw M3-10

**2x** C-screw M3-12



**1x** Allen Key 1.5  
**1x** Allen Key 2.5

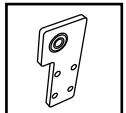


**1x** Small plier **or**  
**1x** Wrench 5.5

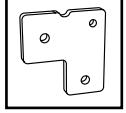
# STEP 8.4 PREPARING THE Y AXIS - HOLDERS

Step 8/33

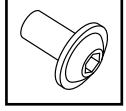
⌚ 10 min



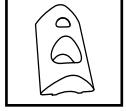
**2x** Back Bearing Holder



**2x** Front Pulley Holder



**12x** B-screw M6-12

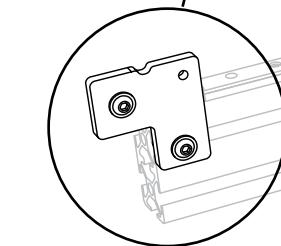
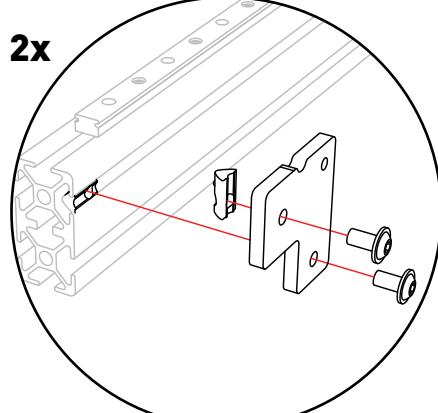


**12x** T-nut M6

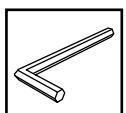
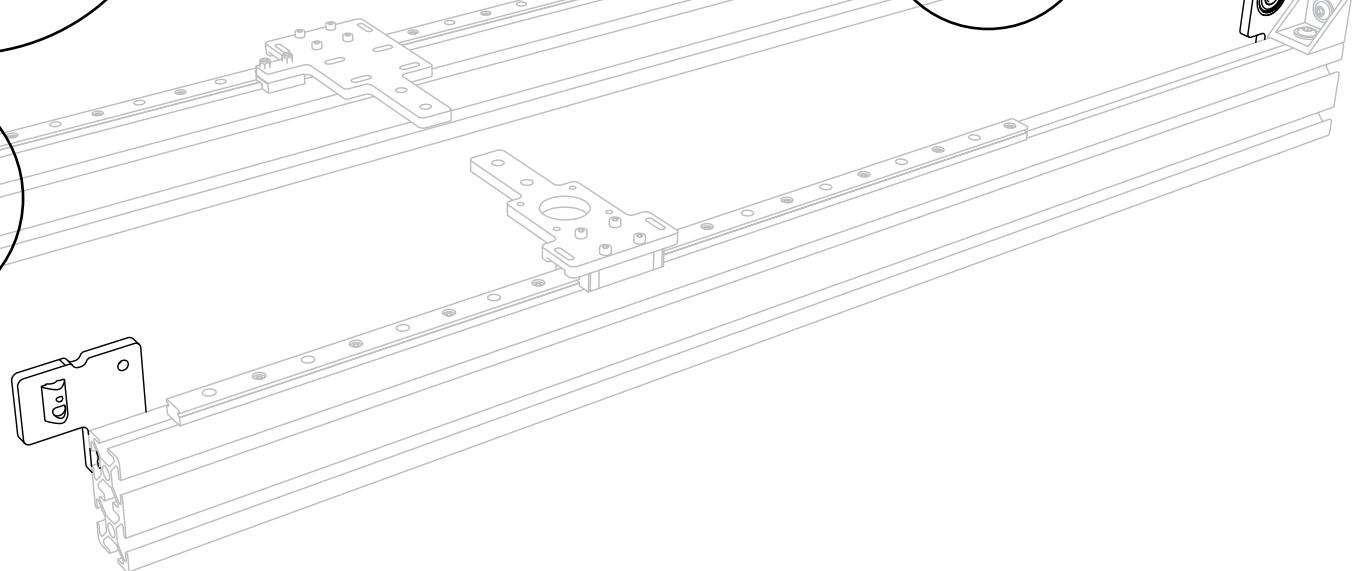
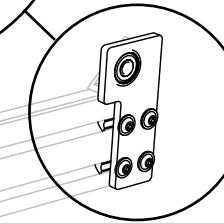
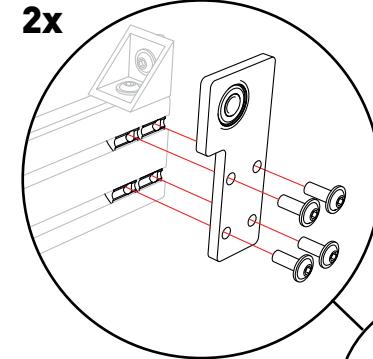


**R24.** Don't tighten the screws yet.

**2x**



**2x**

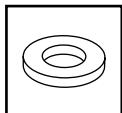


**1x** Allen Key 5

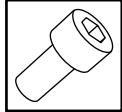
# STEP 8.5 PREPARING Y AXIS - PULLEYS

Step 8/33

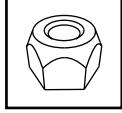
⌚ 15 min



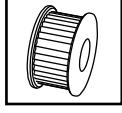
**12x** Washer M6



**2x** C-screw M6-40



**2x** Lock Nut M6



**2x** Y-pulley Front

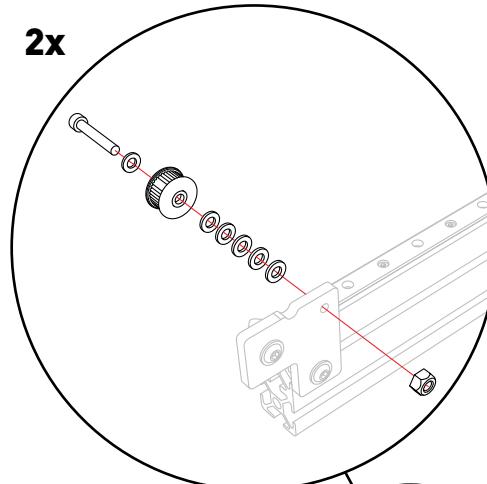


**R25.** Don't fully tighten the screws. The pulleys should be able to rotate freely.

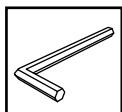
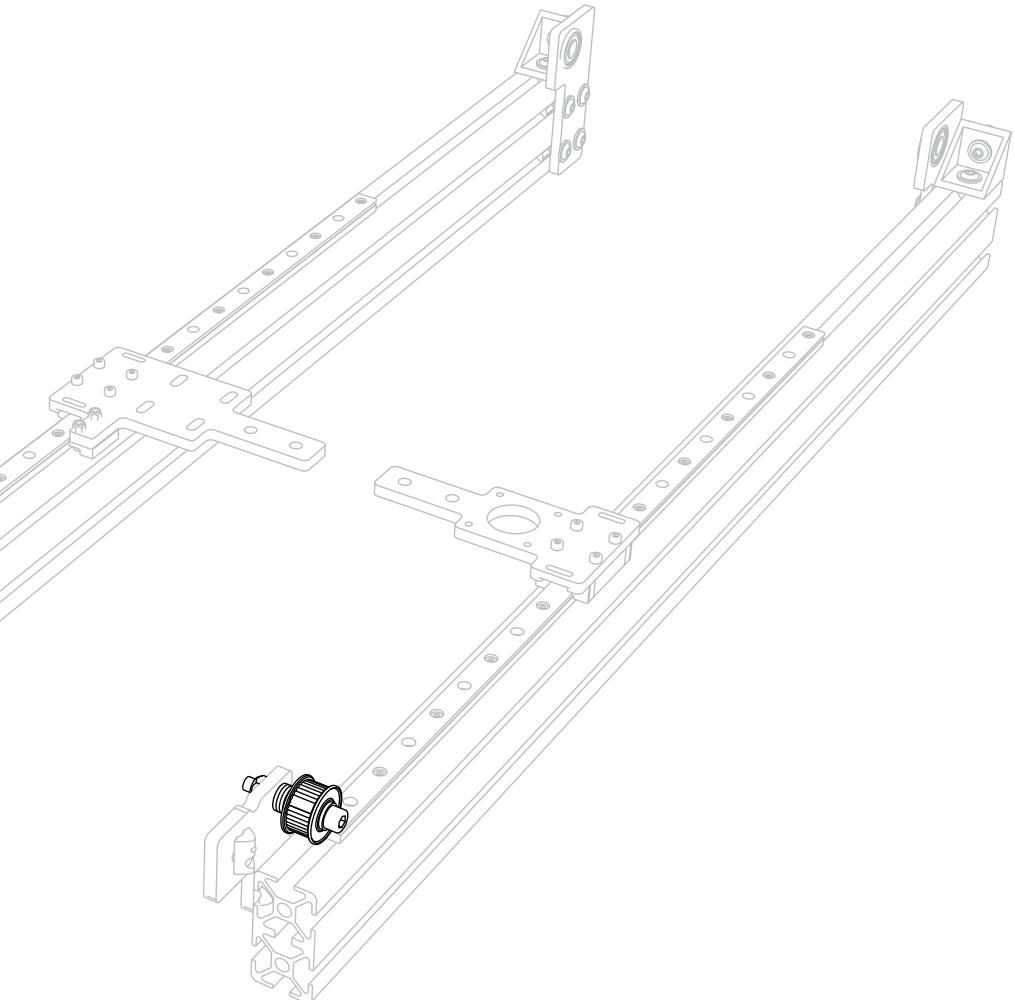


**H2.** How to use Lock Nuts? p.9

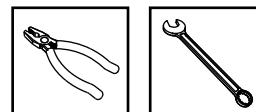
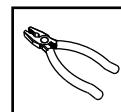
**2x**



**R25**



**1x** Allen Key 5

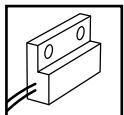


**1x** Small plier **or**  
**1x** Wrench 10

# STEP 8.6 PREPARING THE Y AXIS - SWITCHES

Step 8/33

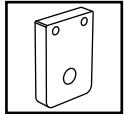
⌚ 10 min



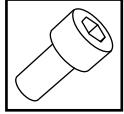
**1x** Y-endstop Sensor  
+ X-endstop Sensor  
+ Endstop Cable



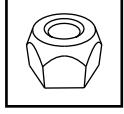
**R26.** The Y-endstop Sensor is connected to the X-endstop Sensor, which will be fixed in step 15.1.



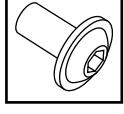
**1x** Y-endstop Holder



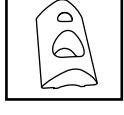
**2x** C-screw M3-12



**2x** Lock Nut M3



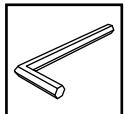
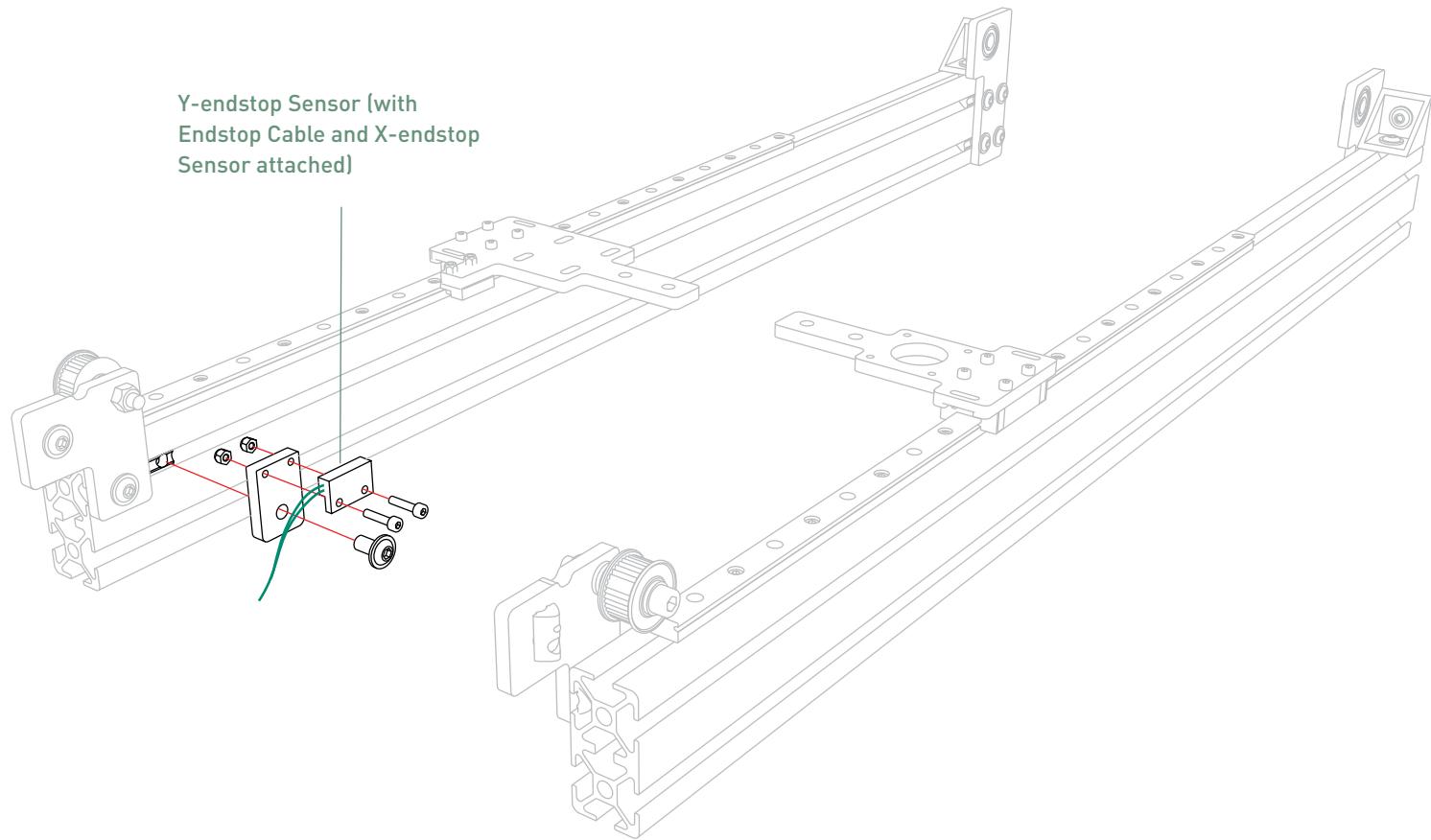
**1x** B-screw M6-12



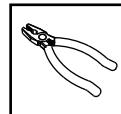
**1x** T-nut M6



**H1.** How to insert T-nuts? p.8  
**H2.** How to use Lock Nuts? p.9



**1x** Allen Key 2.5  
**1x** Allen Key 5



**1x** Small plier **or**  
**1x** Wrench 5.5

# STEP 9.1 COMPLETING THE FRAME - SIDES

Step 9/33

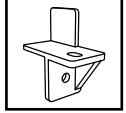
⌚ 25 min



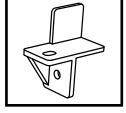
**2x** Prepared Y-axis  
Left (Step 8)



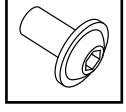
**2x** Prepared Y-axis  
Right (Step 8)



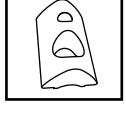
**1x** Front Spacer Left



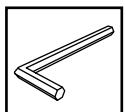
**1x** Front Spacer Right



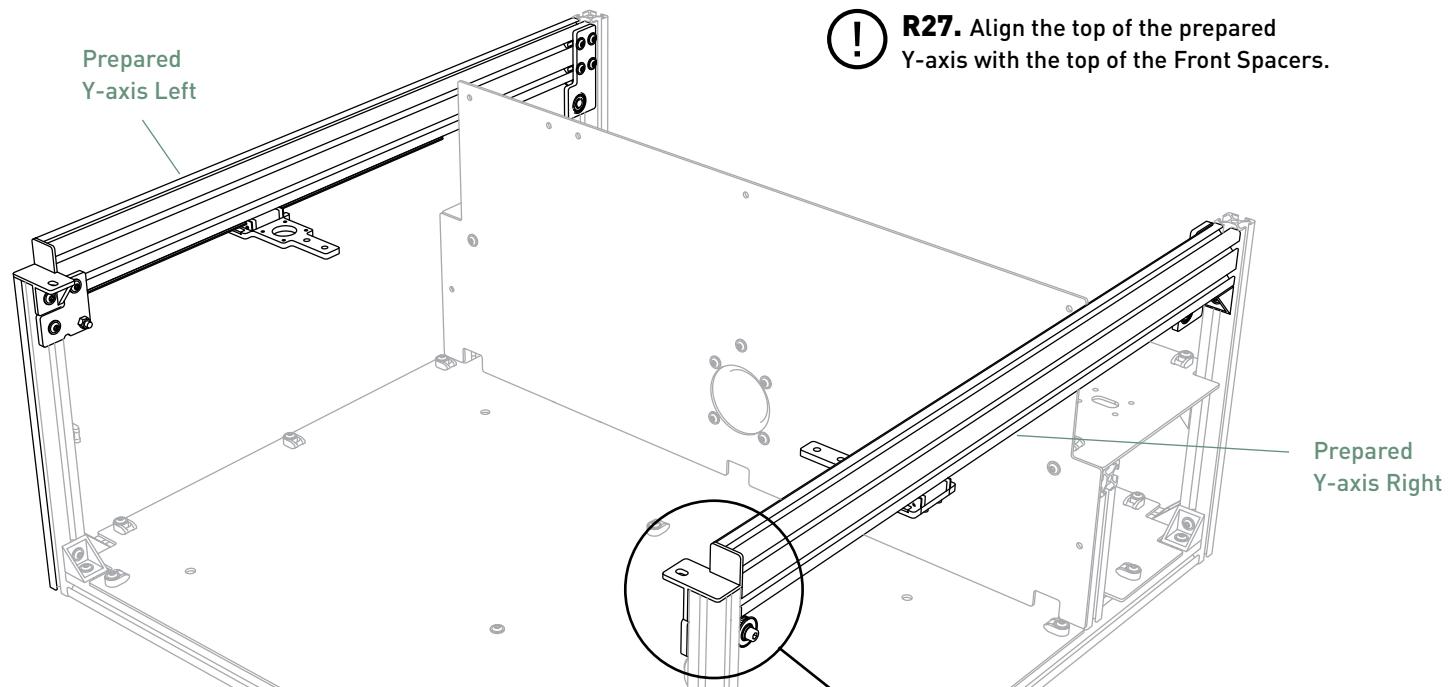
**2x** B-screw M6-12



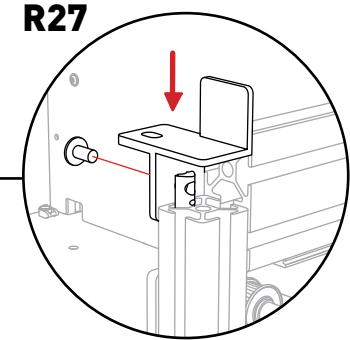
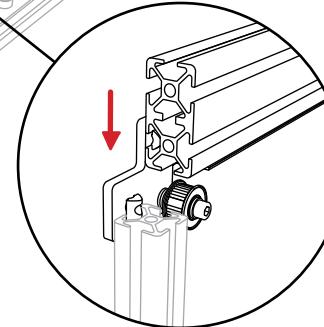
**2x** T-nut M6



**1x** Allen Key 5



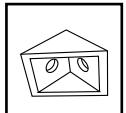
**R27.** Align the top of the prepared  
Y-axis with the top of the Front Spacers.



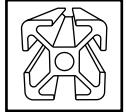
# STEP 9.2 COMPLETING THE FRAME - BACK

Step 9/33

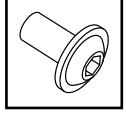
⌚ 15 min



**2x** Bracket 30



**1x** Profile 30-800



**4x** B-screw M6-12

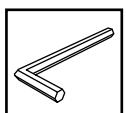
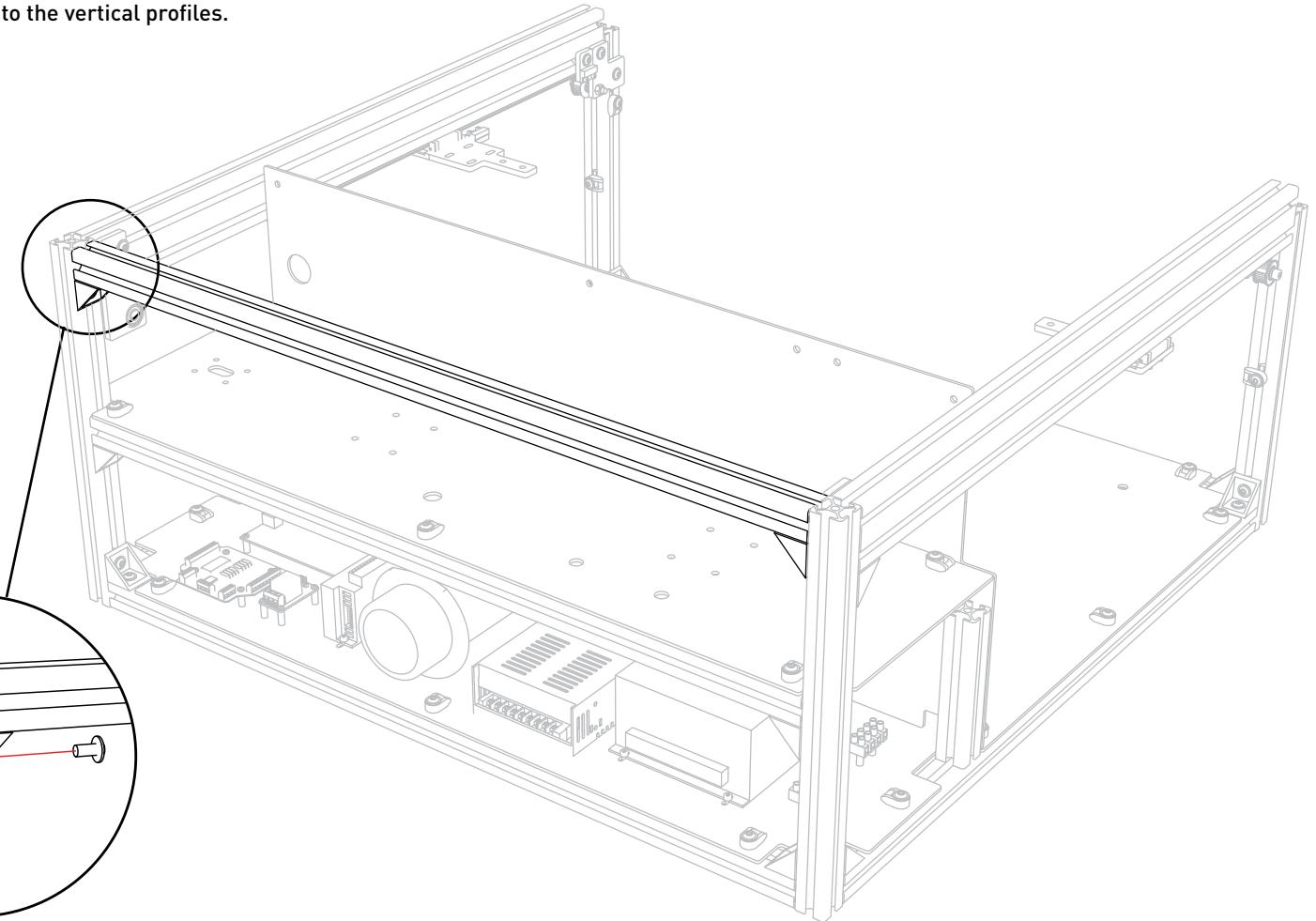
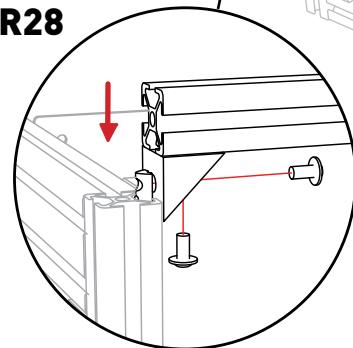


**4x** T-nut M6



**R28.** Attach the brackets and T-nuts to the profile first and then slide them into the vertical profiles.

**R28**

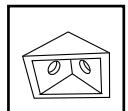


**1x** Allen Key 5

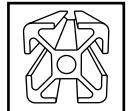
# STEP 9.3 COMPLETING THE FRAME - MIDDLE

Step 9/33

⌚ 20min



**2x** Bracket 30



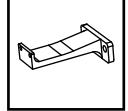
**1x** Profile 30-800



**6x** B-screw M6-12  
**3x** B-screw M6-16



**9x** T-nuts M6



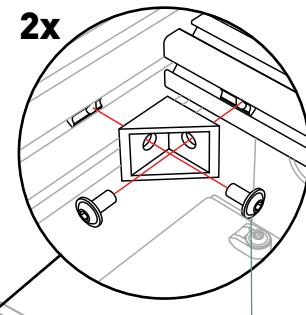
**1x** Switch Holder



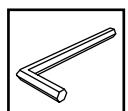
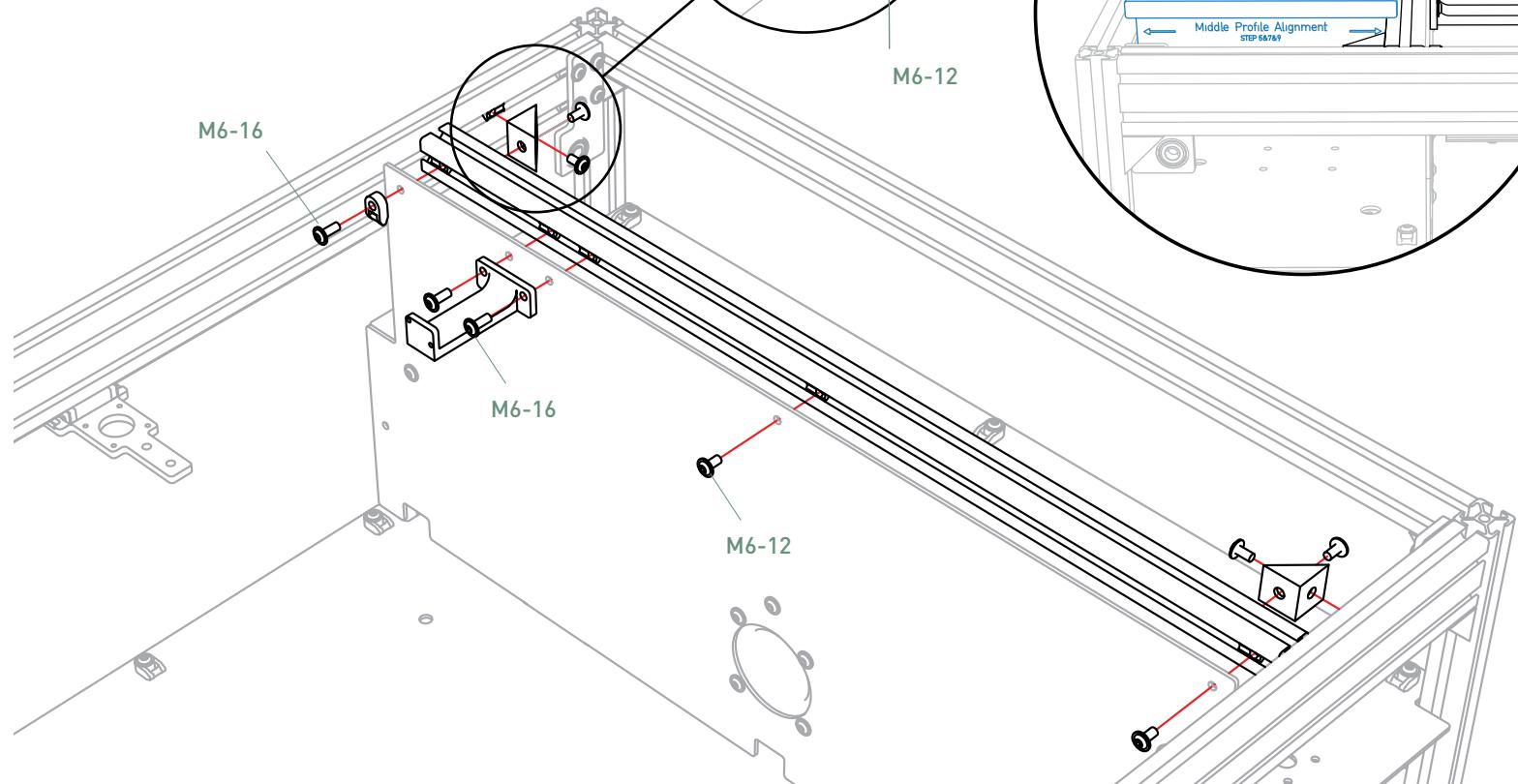
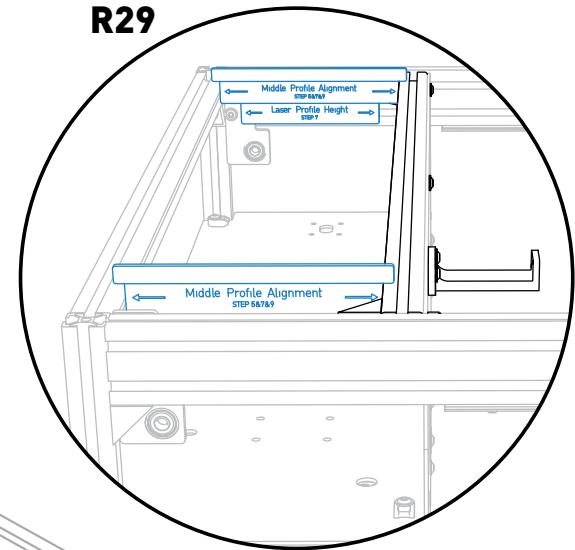
**1x** Wire Fixer

**!** **R29.** Use 2x Templates 2 to measure the distance to the back profile and tighten all the B-screws.

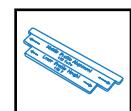
**i** **H1.** How to insert T-nuts? p.8



M6-12



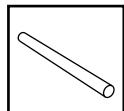
**1x** Allen Key 1.5  
**1x** Allen Key 5



**2x** Template 2

# STEP 10.1 COMPLETING THE Y AXIS - MOTOR

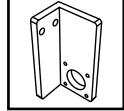
Step 10/33    ⏰ 25 min



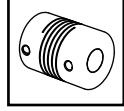
**1x** Y-shaft 350  
**1x** Y-shaft 400



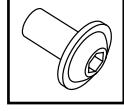
**1x** Y-motor



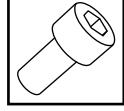
**1x** Y-motor Holder



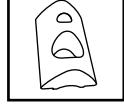
**2x** Coupler (with set screws in)



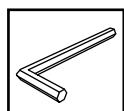
**2x** B-screw M6-16



**4x** C-screw M3-12



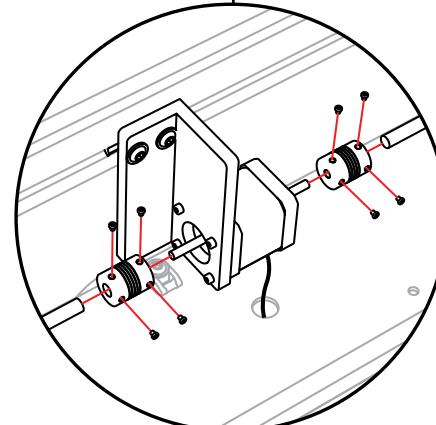
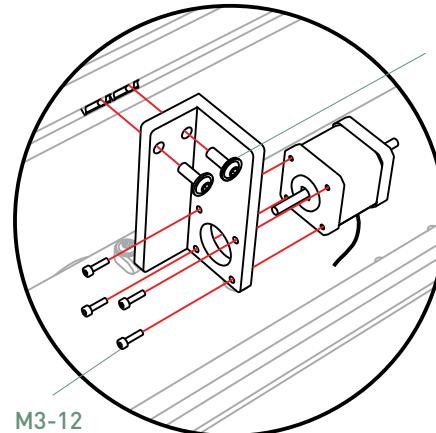
**2x** T-nut M6



**1x** Allen Key 1.5  
**1x** Allen Key 2.5  
**1x** Allen Key 5



**R30.** Insert the shafts first into the Back Bearing Holders before attaching the Couplers.

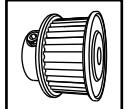


# STEP 10.2 COMPLETING THE Y AXIS - BELTS

Step 10/33  30 min



**8x** Cable Tie



**2x** Y-pulley Back  
(with set screws in)



**2x** Y-belt

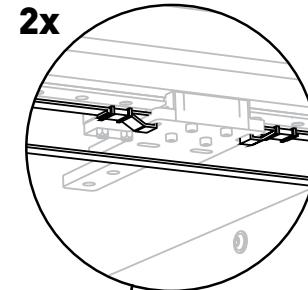


**R32.** Both belts should have more or less the same tension after fixed.

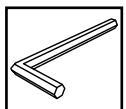
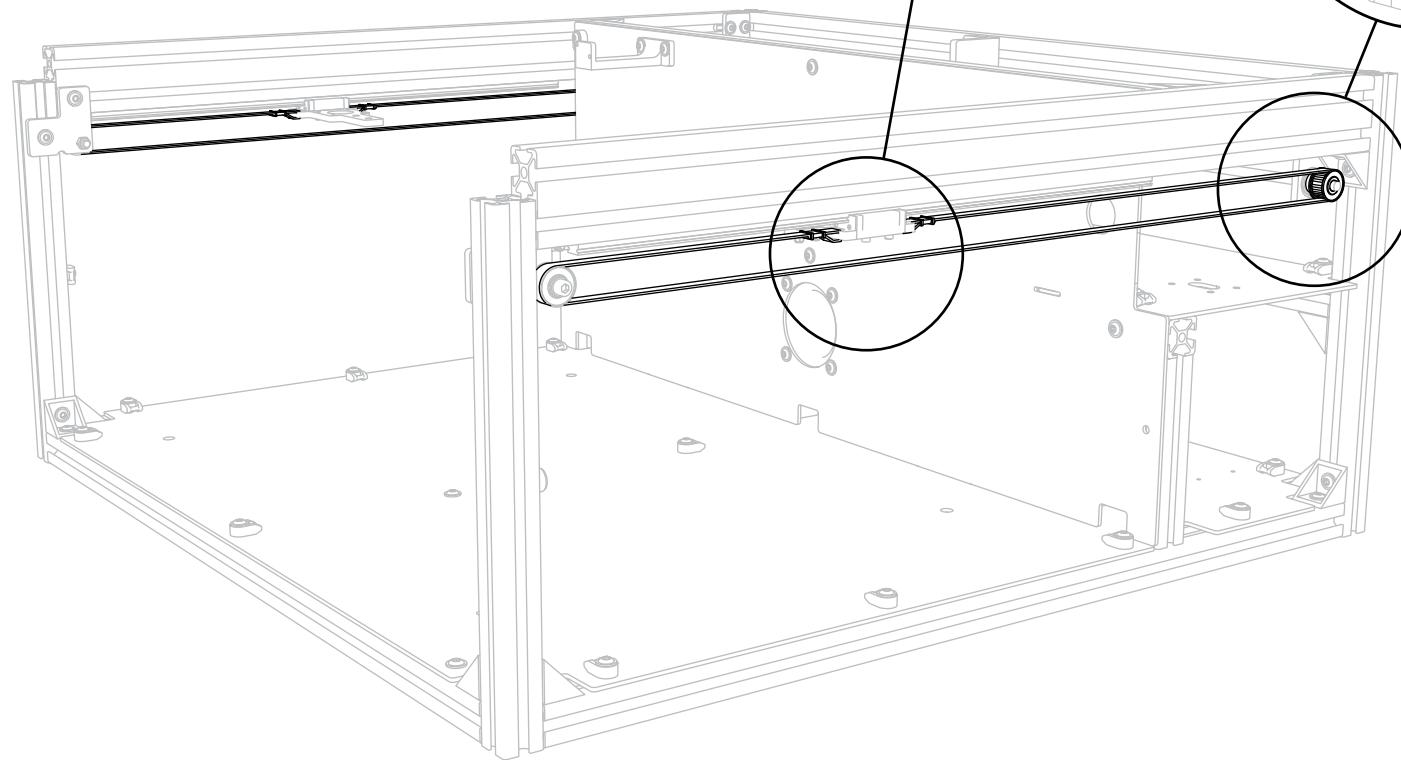
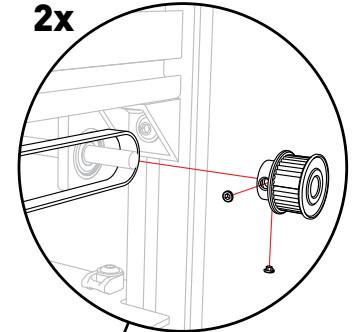


- H3.** How to use cable ties? p.9
- H4.** How to use set screws? p.10
- H5.** How to tighten the belt? p.11

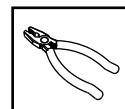
**2x**



**2x**



**1x** Allen Key 1.5



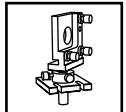
**1x** Small plier

# STEP 11. INSTALLING LASER PATH

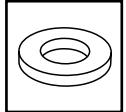
Step 11/33      ⏰ 25 min



**2x** Laser Tube Holder



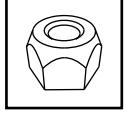
**1x** Mirror Holder 25



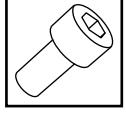
**4x** Washer M5



**8x** B-screw M6-20



**8x** Lock Nuts M6  
**4x** Lock Nuts M5



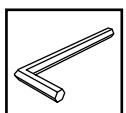
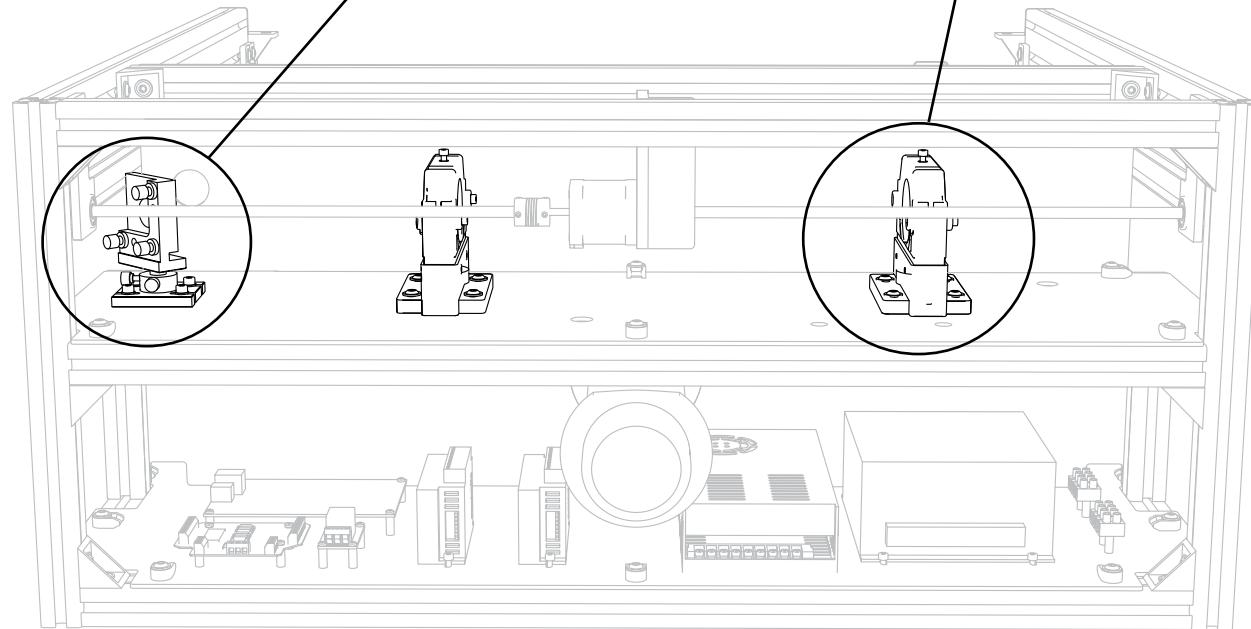
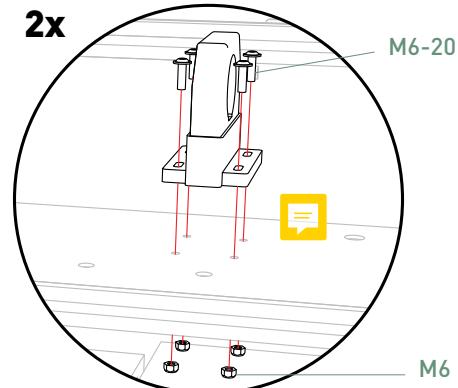
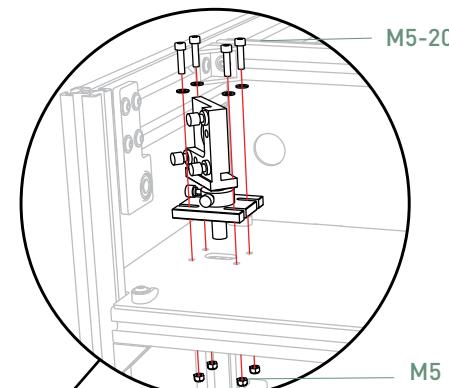
**4x** C-screw M5-20



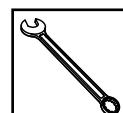
**R33.** Don't fully tighten the screws for fine adjustment of the laser beam.



**H2.** How to use Lock Nuts? p.9



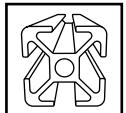
**1x** Allen Key 4  
**1x** Allen Key 5



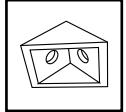
**1x** Wrench 8  
**1x** Wrench 11

# STEP 12.1 PREPARING THE BED - FRAME

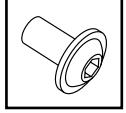
Step 12/33  15 min



**2x** Profile 30-400  
**2x** Profile 30-600



**4x** Bracket 30



**8x** B-screw M6-12



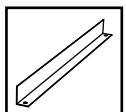
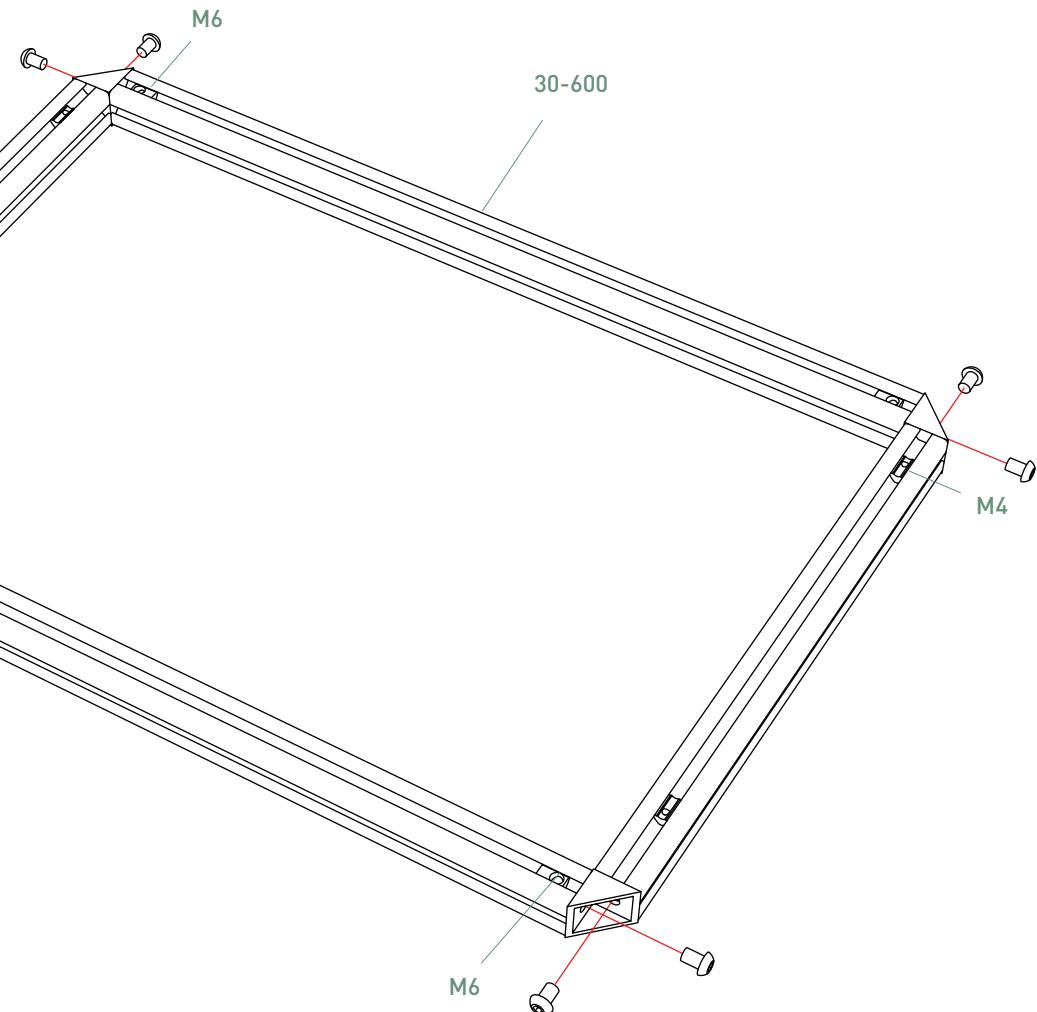
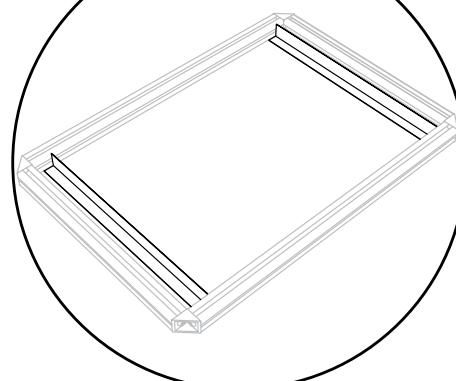
**4x** T-nut M4  
**4x** T-nut M6



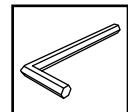
**R34.** Make sure the lamellas fit  
inbetween the profiles.



**H1.** How to insert T-nuts? p.8



**2x** Lamellas



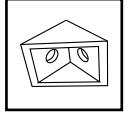
**1x** Allen Key 5

# STEP 12.2 PREPARING THE BED - LAMELLA SUPPORT

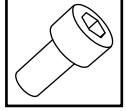
Step 12/33  15 min



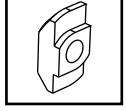
**2x** Profile 20-660



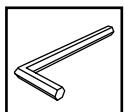
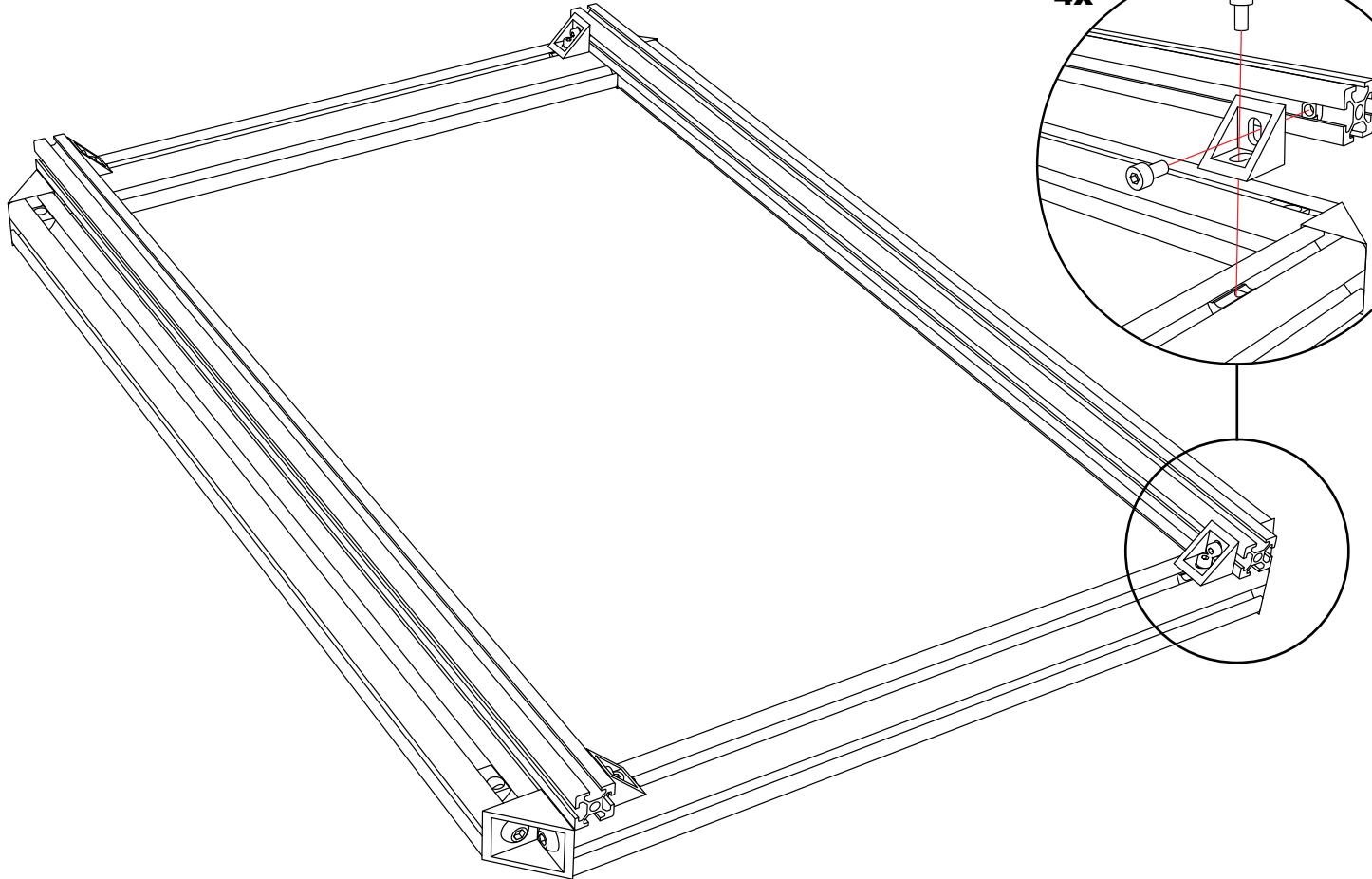
**4x** Bracket 20



**8x** C-screw M4-8



**4x** Hammer Nut M4



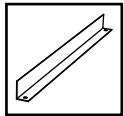
**1x** Allen Key 1.5

**1x** Allen Key 3

# STEP 12.3 PREPARING THE BED - LAMELLAS

Step 12/33

⌚ 25 min



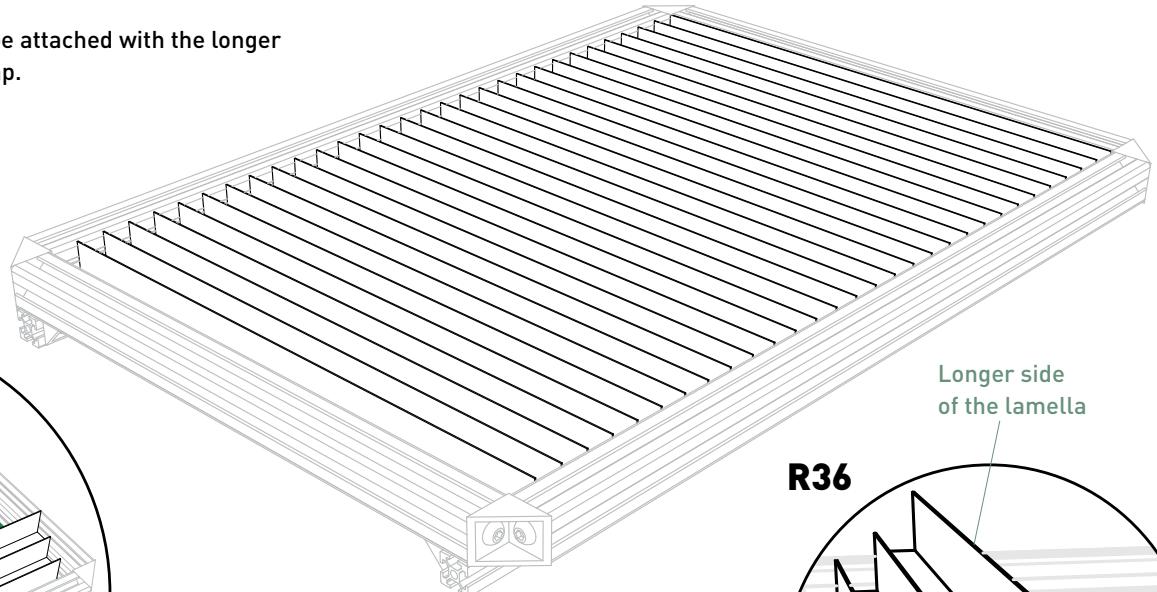
**30x** Lamella



**R35.** Turn the bed and fix the double-side tape on the Profile 20-660. Do not cut the exceeding tape in width.

**R36.** Attach each lamella by firmly pressing it against the tape, to have a strong adhesion. Make sure there are no gaps inbetween the lamellas. The shorter side of the lamella should be facing down.

**R37.** The last lamella should be attached with the longer side facing down to close the gap.



**2x** Double-sided tape



**1x** Cutter

# STEP 12.4 PREPARING THE BED - BED SUPPORT

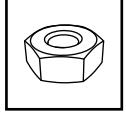
Step 12/33    ⏰ 10 min



**4x** Bed Leg



**4x** Bed Adjuster



**4x** Nut M6

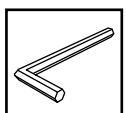
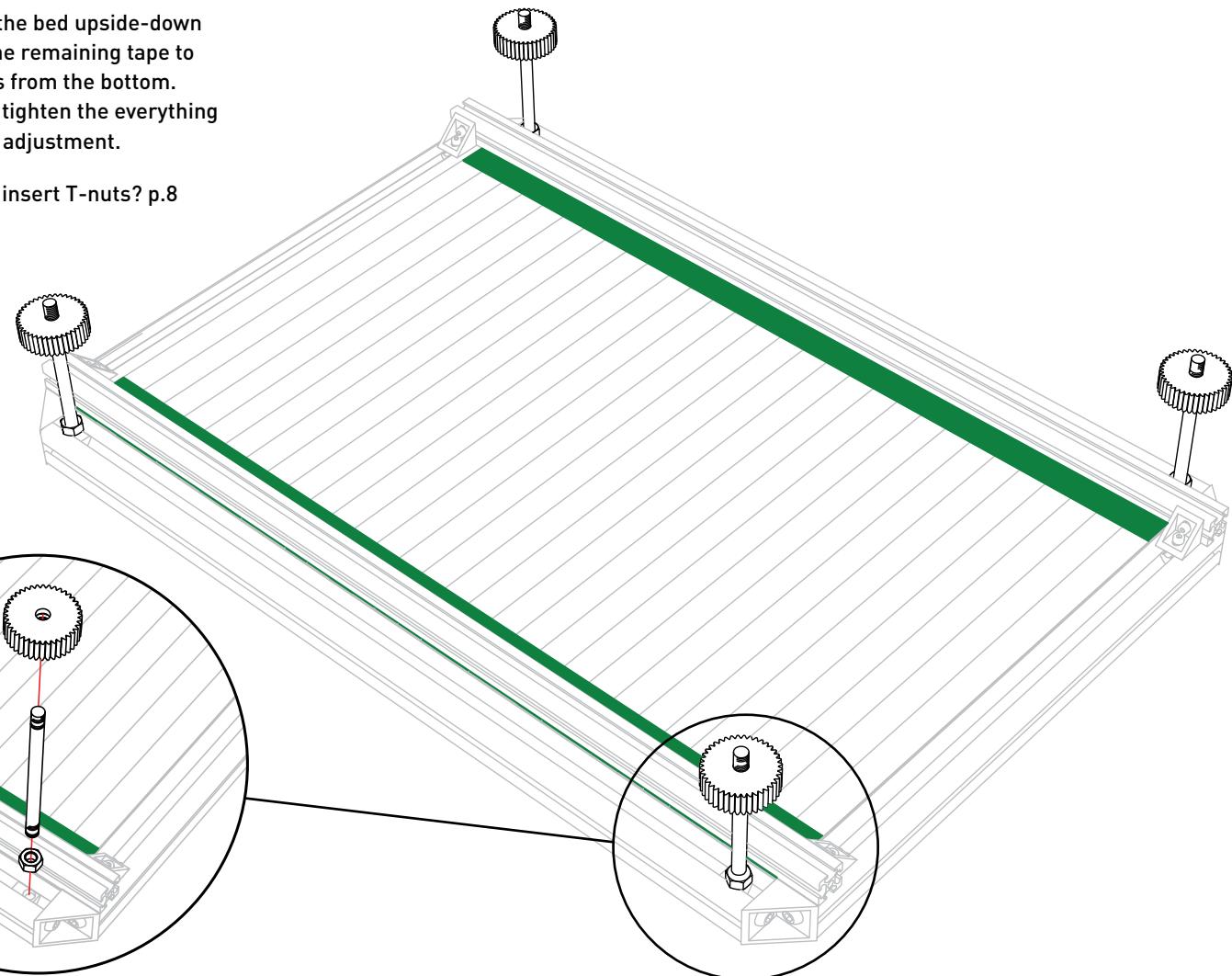


**R38.** Turn the bed upside-down and press the remaining tape to the lamellas from the bottom.

**R39.** Don't tighten the everything yet for later adjustment.



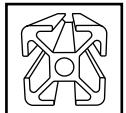
**H1.** How to insert T-nuts? p.8



**1x** Allen Key 1.5

# STEP 13.1 PREPARING THE X AXIS - GUIDE

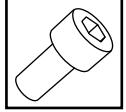
Step 13/33  15 min



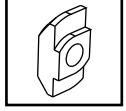
**1x** Profile 20-700



**1x** Linear Guide X



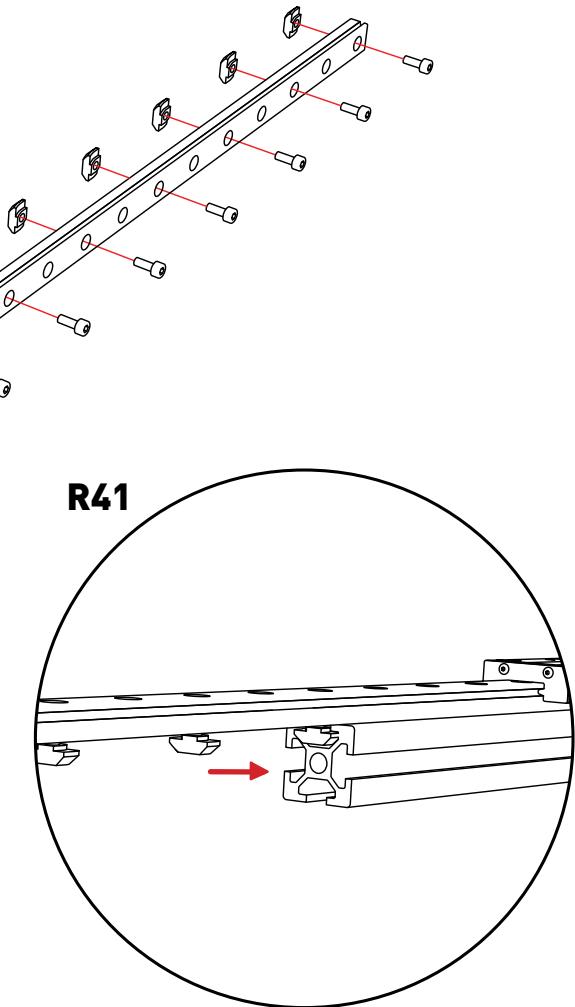
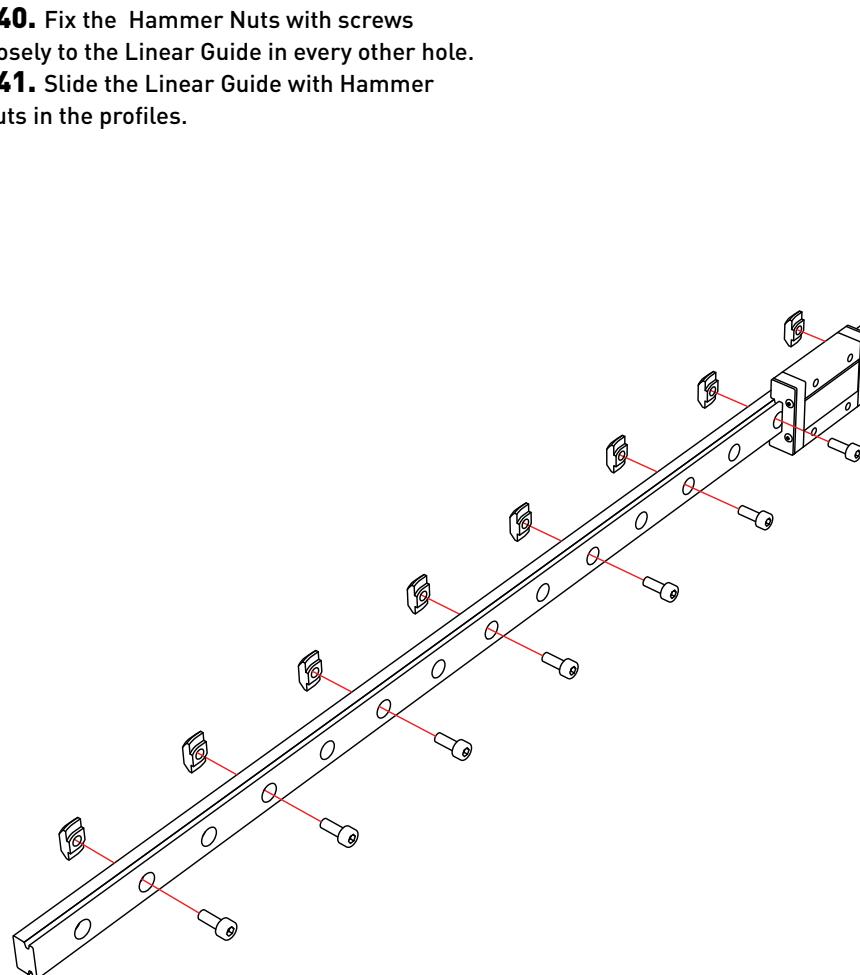
**14x** C-screw M3-8



**14x** Hammer Nut M3



- R40.** Fix the Hammer Nuts with screws loosely to the Linear Guide in every other hole.  
**R41.** Slide the Linear Guide with Hammer Nuts in the profiles.



**R41**

# STEP 13.2 PREPARING THE X AXIS - HOLDER

Step 13/33  20 min



**4x** C-screw M3-8

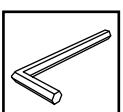
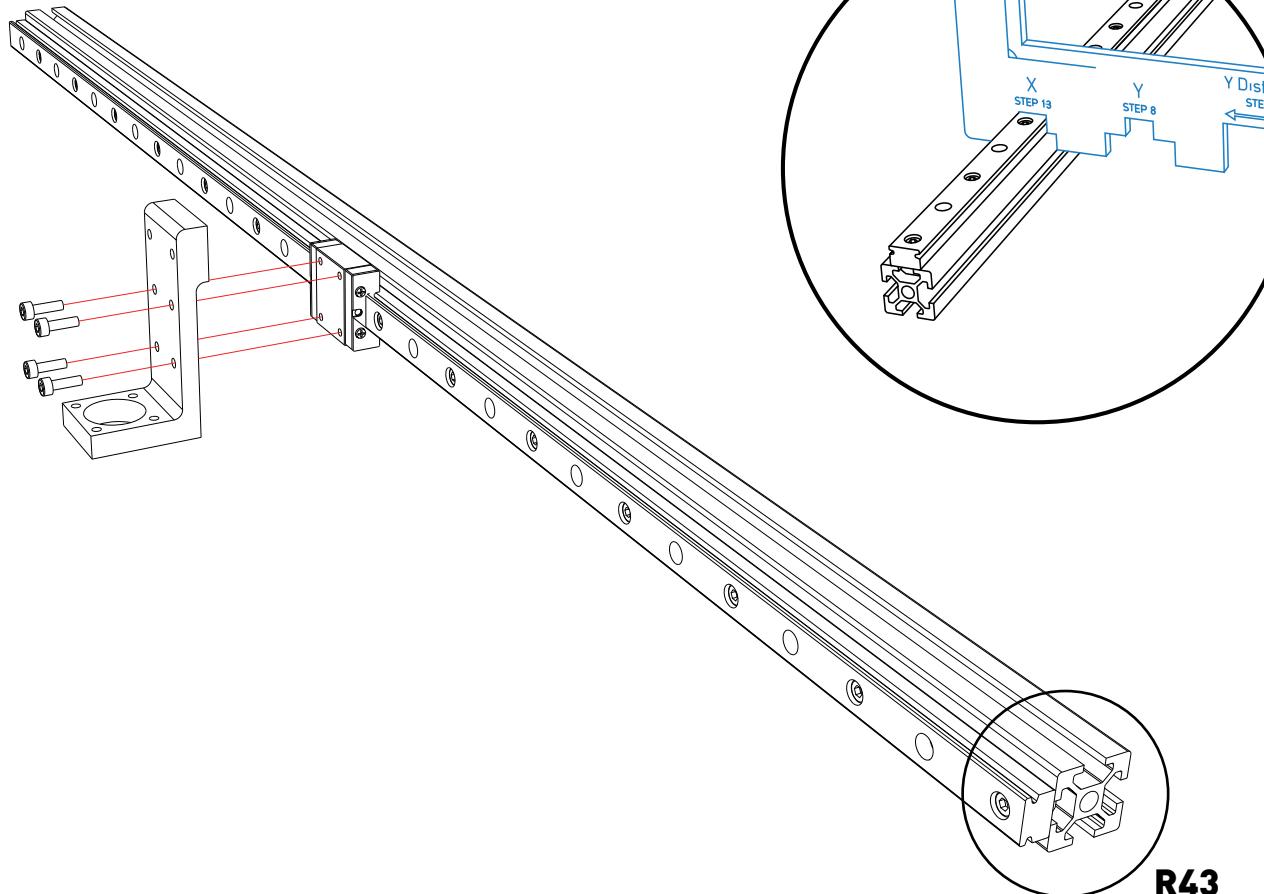


**1x** Laser Head Holder

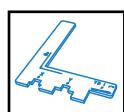


**R42.** Use the Template 1 (X) to align it and tighten the screws, starting with the extremities ones.

**R43.** Align the ends of the linear guide and the profile.



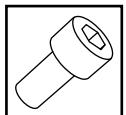
**1x** Allen Key 2.5



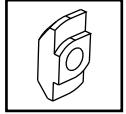
**2x** Template1

# STEP 13.3 PREPARING THE X AXIS - HOLDER

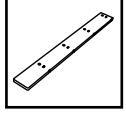
Step 13/33  10 min



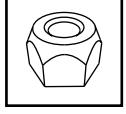
**4x** C-screw M5-12  
**2x** C-screw M3-30



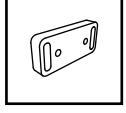
**4x** Hammer Nut M5



**1x** Chain Holder



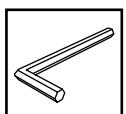
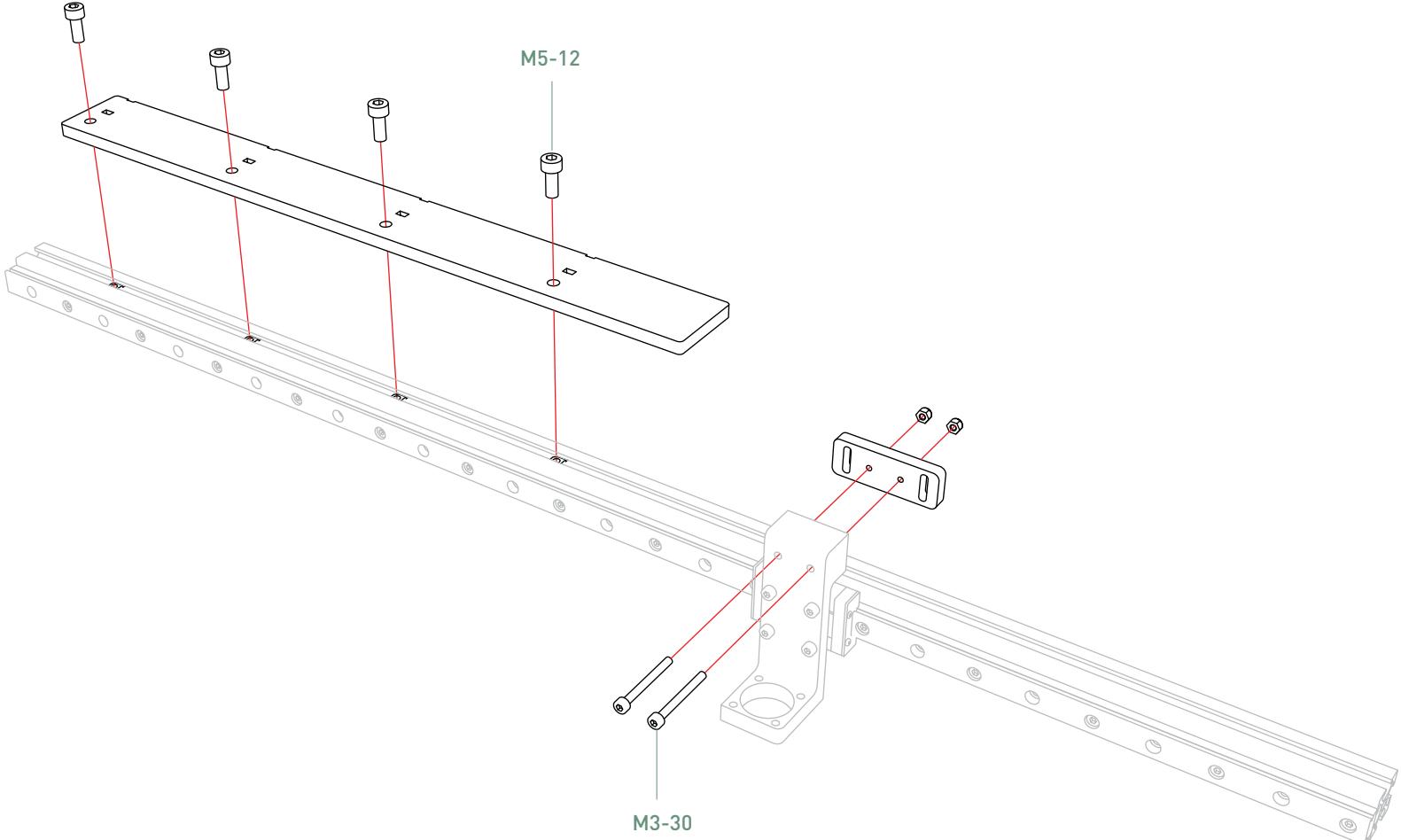
**2x** Lock Nut M3



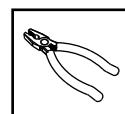
**1x** X-Belt Attacher



**H2.** How to use Lock Nuts? p.9



**1x** Allen Key 2.5  
**1x** Allen Key 4



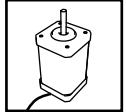
**1x** Small plier **or**  
**1x** Wrench 5.5

# STEP 14.1 INSTALLING THE X AXIS 1

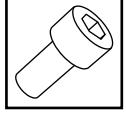
Step 14/33  20 min



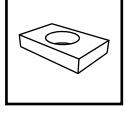
**1x** Prepared X-axis  
(Step 13)



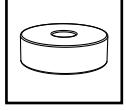
**1x** X-motor



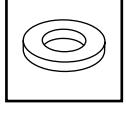
**4x** C-screw M3-10  
**3x** C-screw M6-10  
**1x** C-screw M6-35



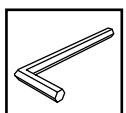
**4x** Flat Nut M6



**1x** X-bearing



**2x** Washer M8 Big  
**10x** Washer M6

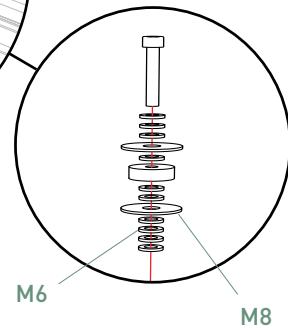
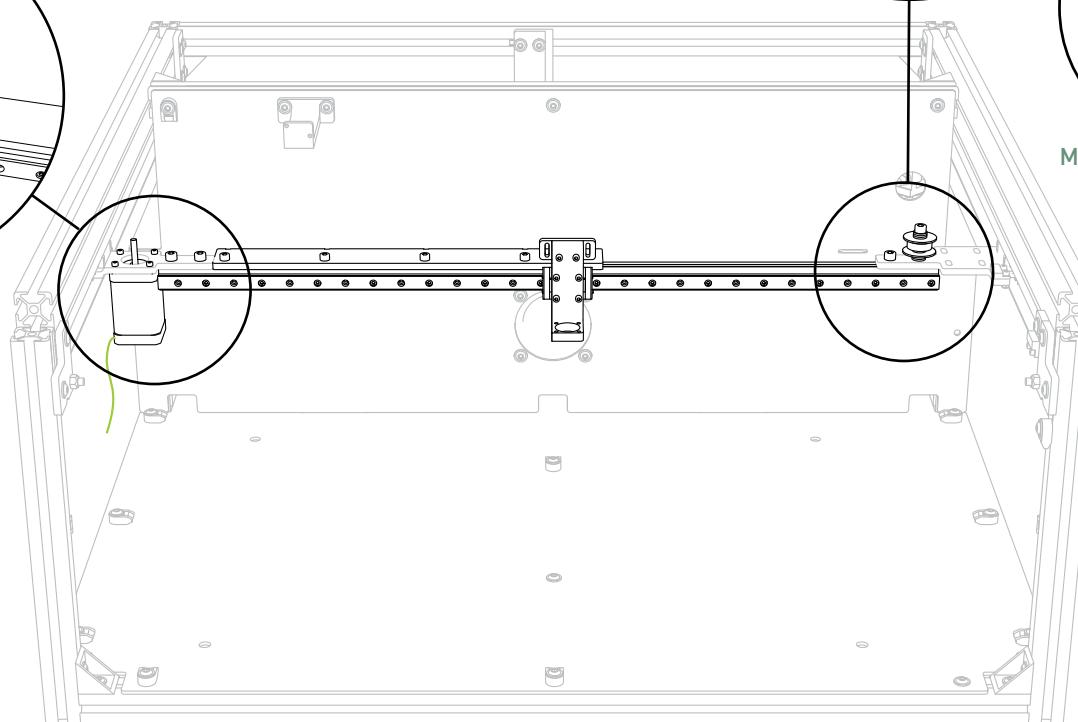
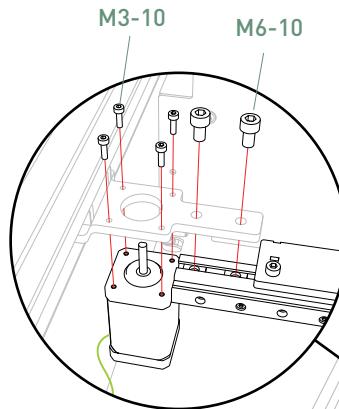


**1x** Allen Key 2.5  
**1x** Allen Key 5



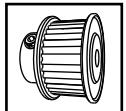
**R44.** Slide in the Flat Nuts before fixing the prepared X-axis.

**R45.** Do not tighten the screws of the X-axis profile for precision alignment.

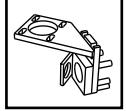


# STEP 14.2 INSTALLING THE X AXIS 2

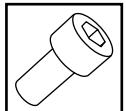
Step 14/33  20 min



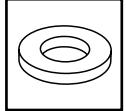
**1x** X-pulley (with set screws in)



**1x** Mirror Holder 20



**4x** C-screw M5-20



**4x** Washer M5



**4x** Lock Nut M5



**R46.** Tighten one of the set screws of the Pulley to the flat side of the motor shaft.

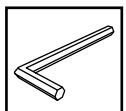
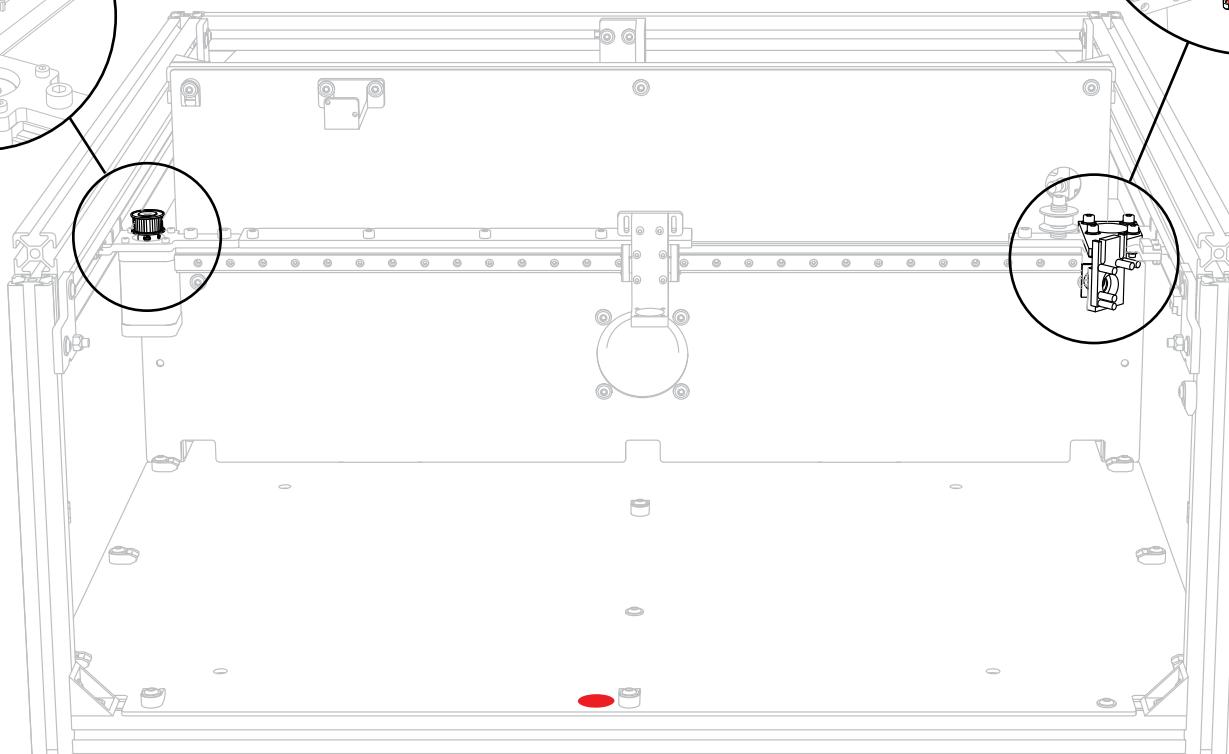
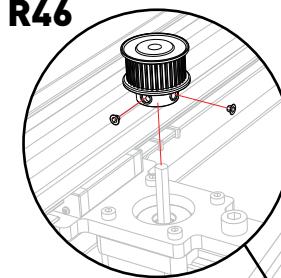
**R47.** Do not tighten the screws of the Mirror Holder 20 for precision alignment.



**H2.** How to use Lock Nuts? p.9

**H4.** How to use set screws? p.10

**R46**



**1x** Allen Key 2.5  
**1x** Allen Key 4



**1x** Small plier **or**  
**1x** Wrench 8

# STEP 14.3 INSTALLING THE X AXIS 3

Step 14/33  30 min



**1x** X-belt



**4x** Cable Tie

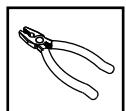
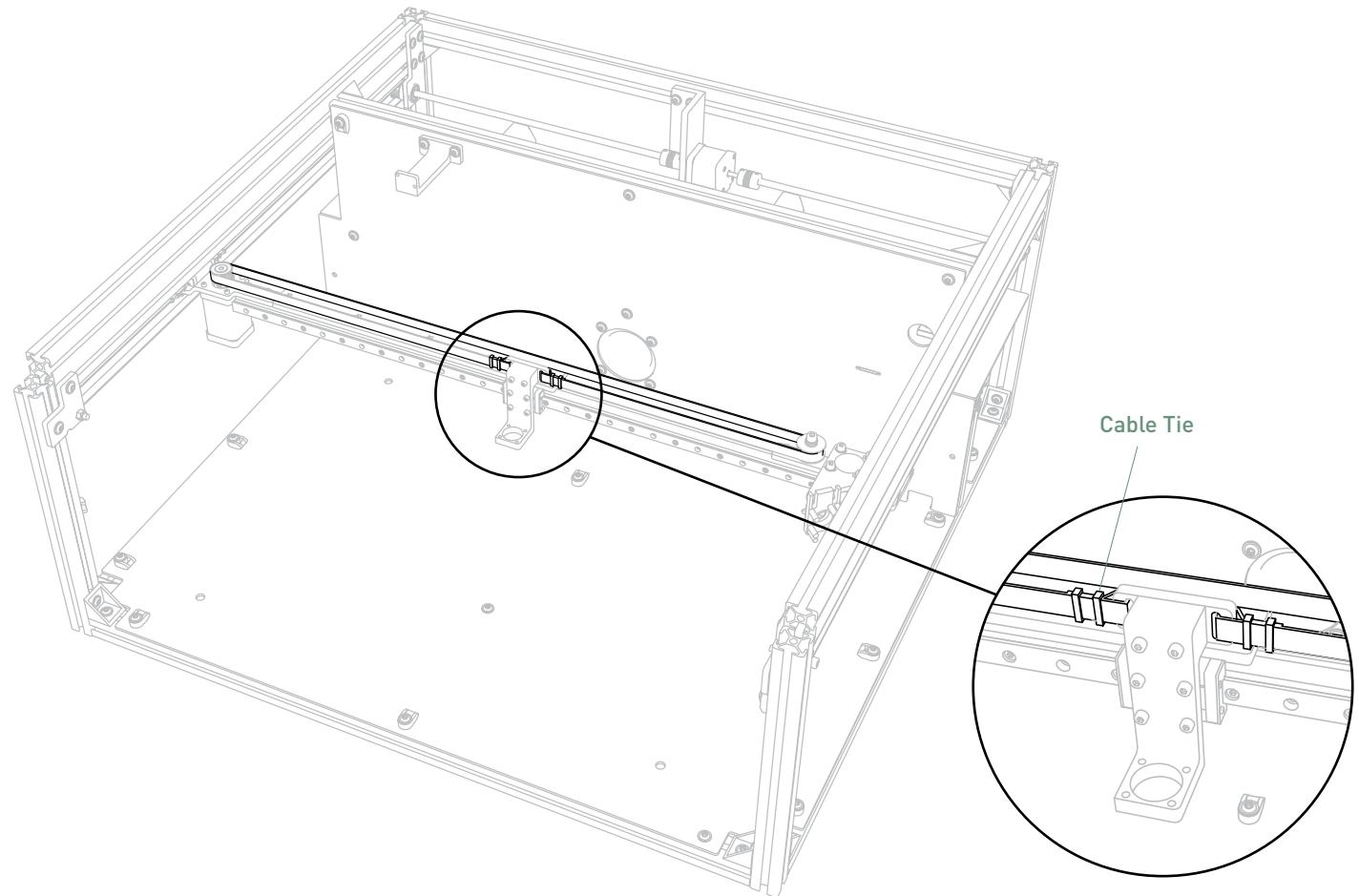


**R48.** Make sure the belt is horizontal by adjusting the height of the pulley on the motor shaft.



**H3.** How to use cable ties? p.9

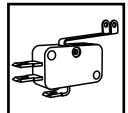
**H5.** How to tighten the belt? p.11



**1x** Small plier

# STEP 15.1 INSTALLING THE SWITCHES

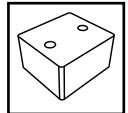
Step 15/33    ⏰ 40 min



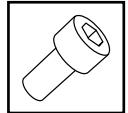
**1x** Window Switch



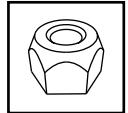
**3x** B-screw M3-8



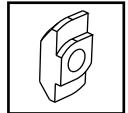
**1x** X-endstop Holder



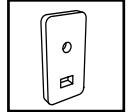
**4x** C-screw M3-20



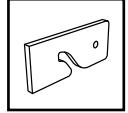
**2x** Lock Nut M3



**5x** Hammer Nut M3



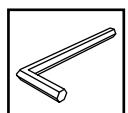
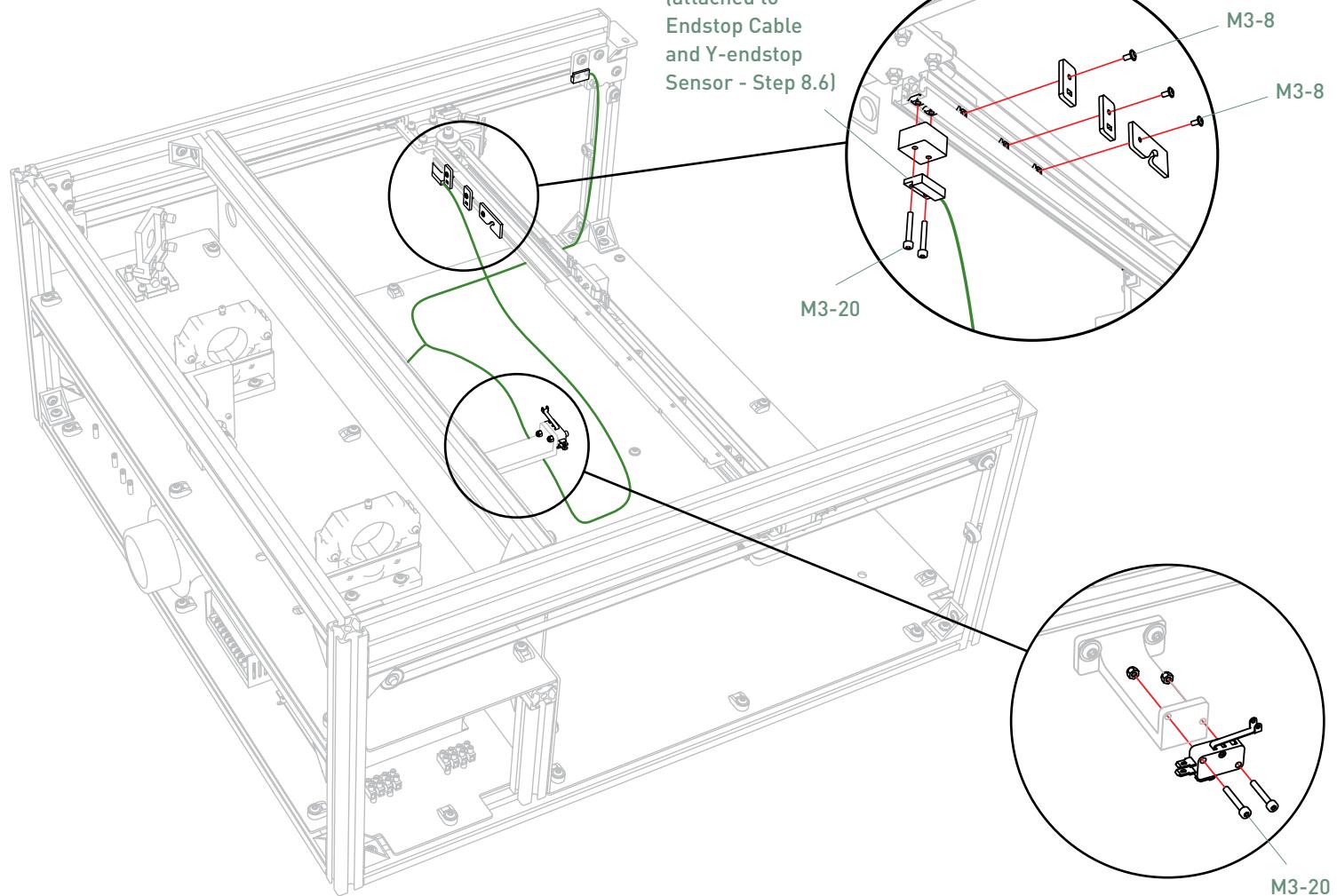
**2x** X-wire Fixer



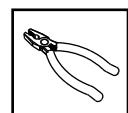
**1x** X-wire Inserter



**H2.** How to use Lock Nuts? p.9



**1x** Allen Key 2.5

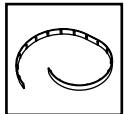


**1x** Small plier **or**  
**1x** Wrench 5  
**1x** Wrench 5.5

# STEP 15.2 INSTALLING THE LED STRIPS

Step 15/33

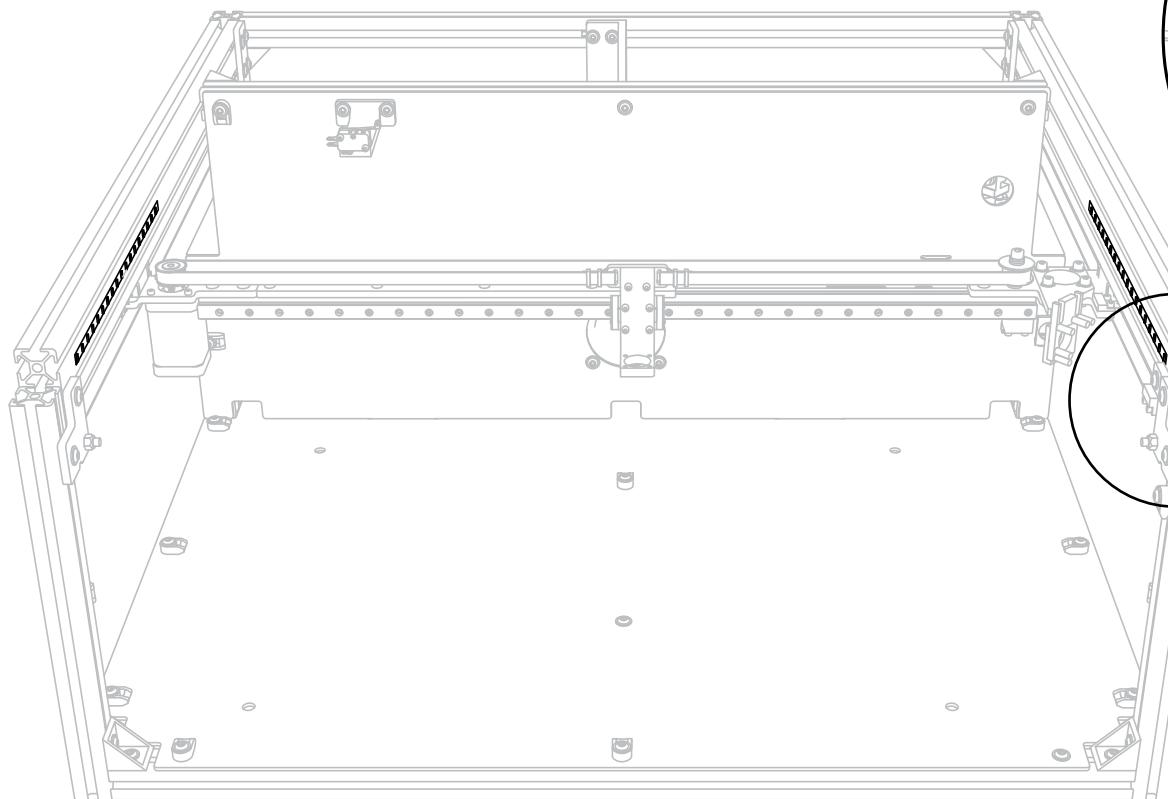
⌚ 10 min



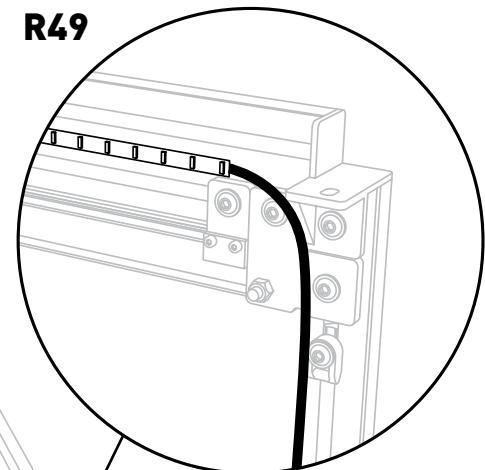
2x LED Strip



- ! **R49.** Remove the protective paper from the LED Strips and tape them on the side of the Profiles 3060-770 with the cables pointing to the front of the machine.



**R49**

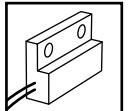


# STEP 16.1 WIRING 1

Step 16/33  20 min



**12x** Cable Ties

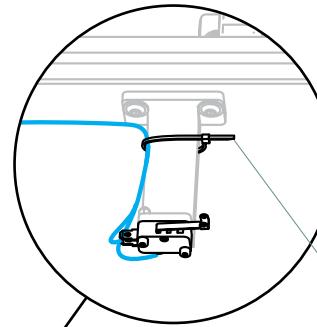


**1x** Window Sensor

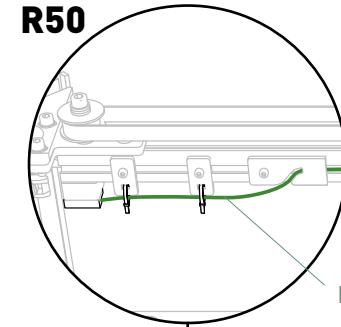


**R50.** Insert the Endstop Cable into the profile using the X-wire Inserter.  
**R51.** Colors are only illustrative.

**i** **H3.** How to use Cable Ties? p.9



Cable Tie



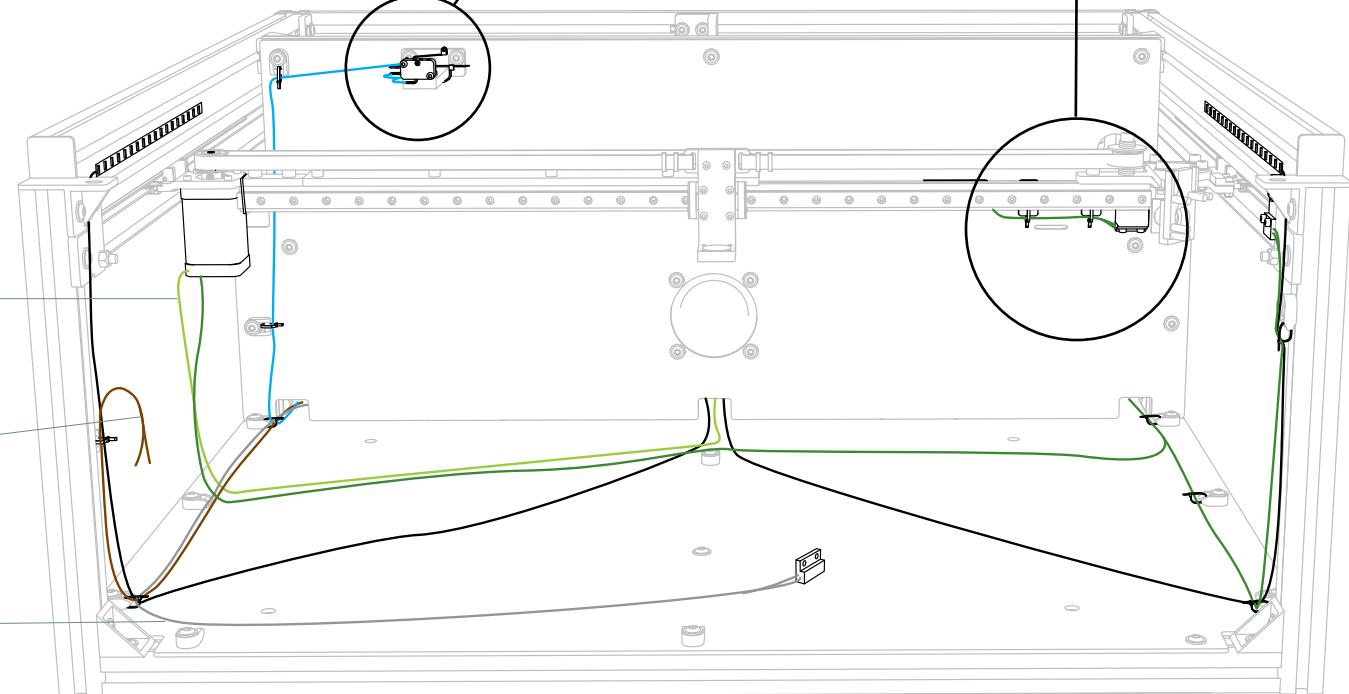
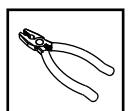
Endstop Cable

X-motor Cable

Emergency  
Button Cable  
(Step 6)

Window Sensor  
Cable

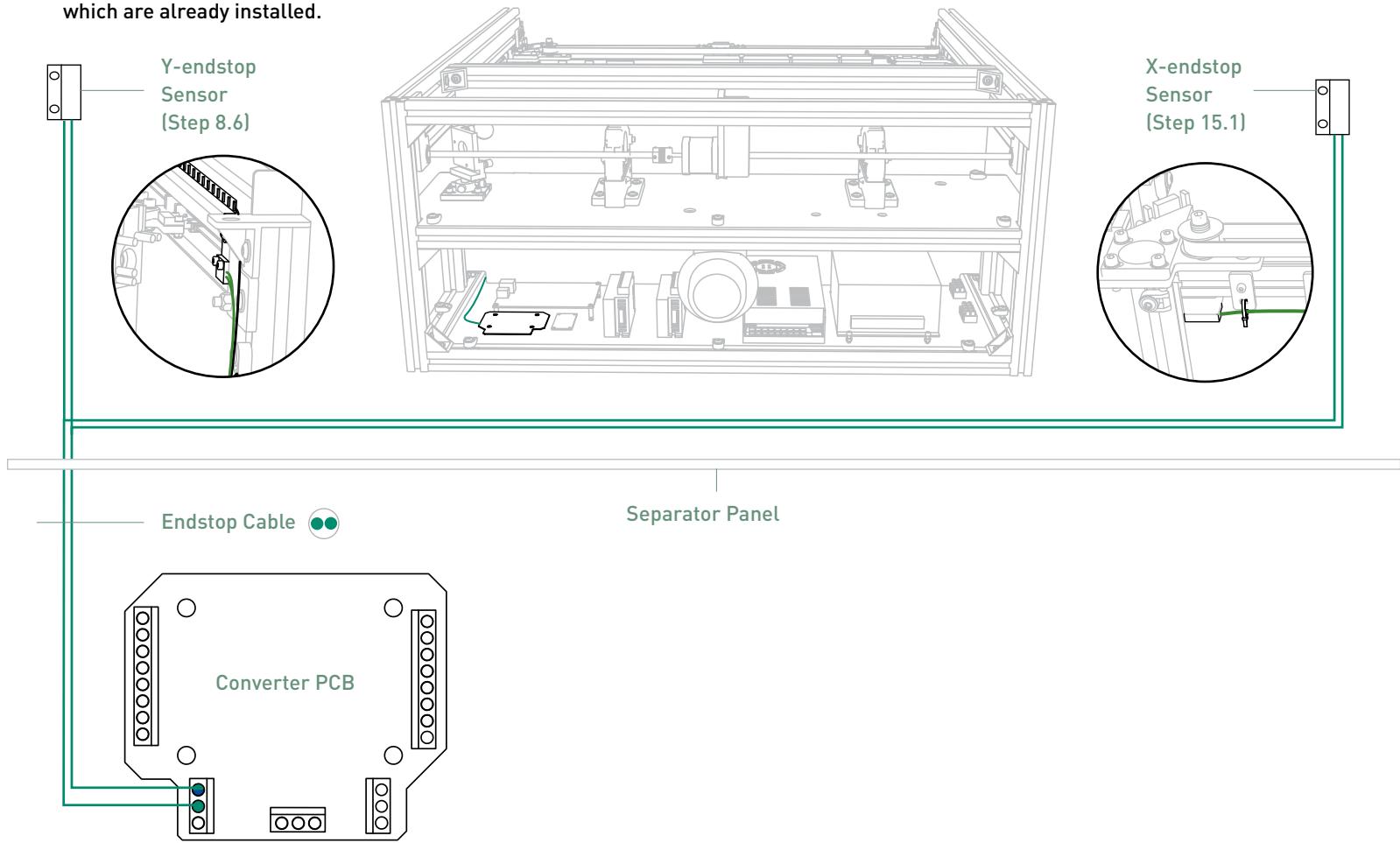
**1x** Small plier



# STEP 16.2 WIRING 2

Step 16/33  10 min

- R52.** The Endstop Cable is attached to the Y-endstop and X-endstop, which are already installed.

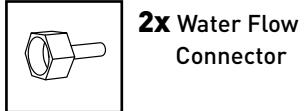


# STEP 16.3 WIRING 3

Step 16/33  20 min



**1x** Water Flow Sensor  

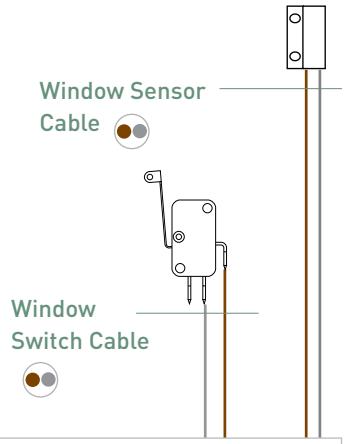
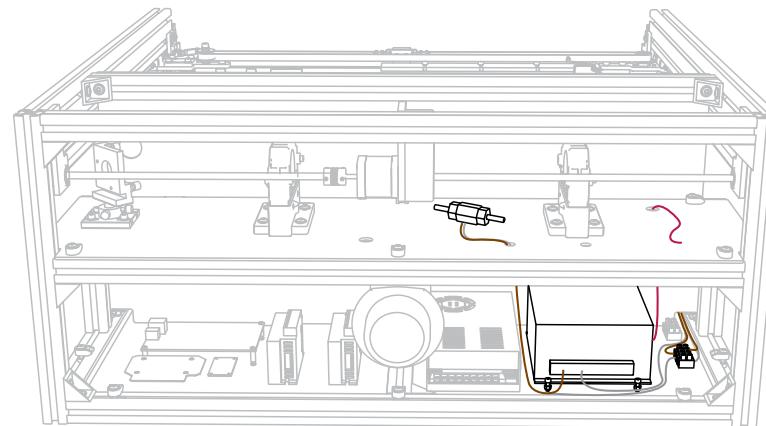
**2x** Water Flow  
Connector



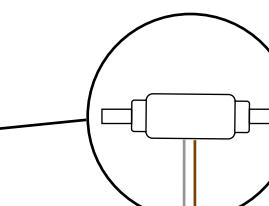
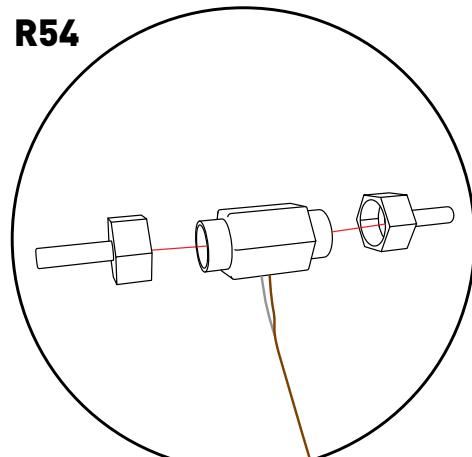
**1x** Teflon Tape

**R53.** The Laser Power Supply terminal can be removed to facilitate the wiring.  
**R54.** Use Teflon tape to attach the Water Flow Connectors to the Water Flow Sensor.

**i** **H3.** How to use Cable Ties? p.9  
**H3.** How to use Teflon Tape? p.12

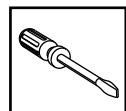
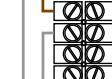
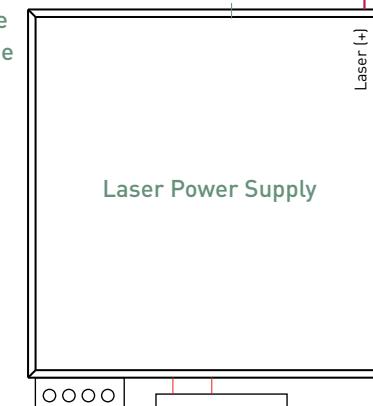


**R54**

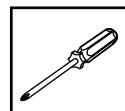


Waterflow  
Sensor Cable  


Laser (+) Cable  
(attached to the  
Laser Power  
Supply)  

**1x** Screwdriver  
slotted small



**1x** Screwdriver  
Phillips



**1x** Wrench 24

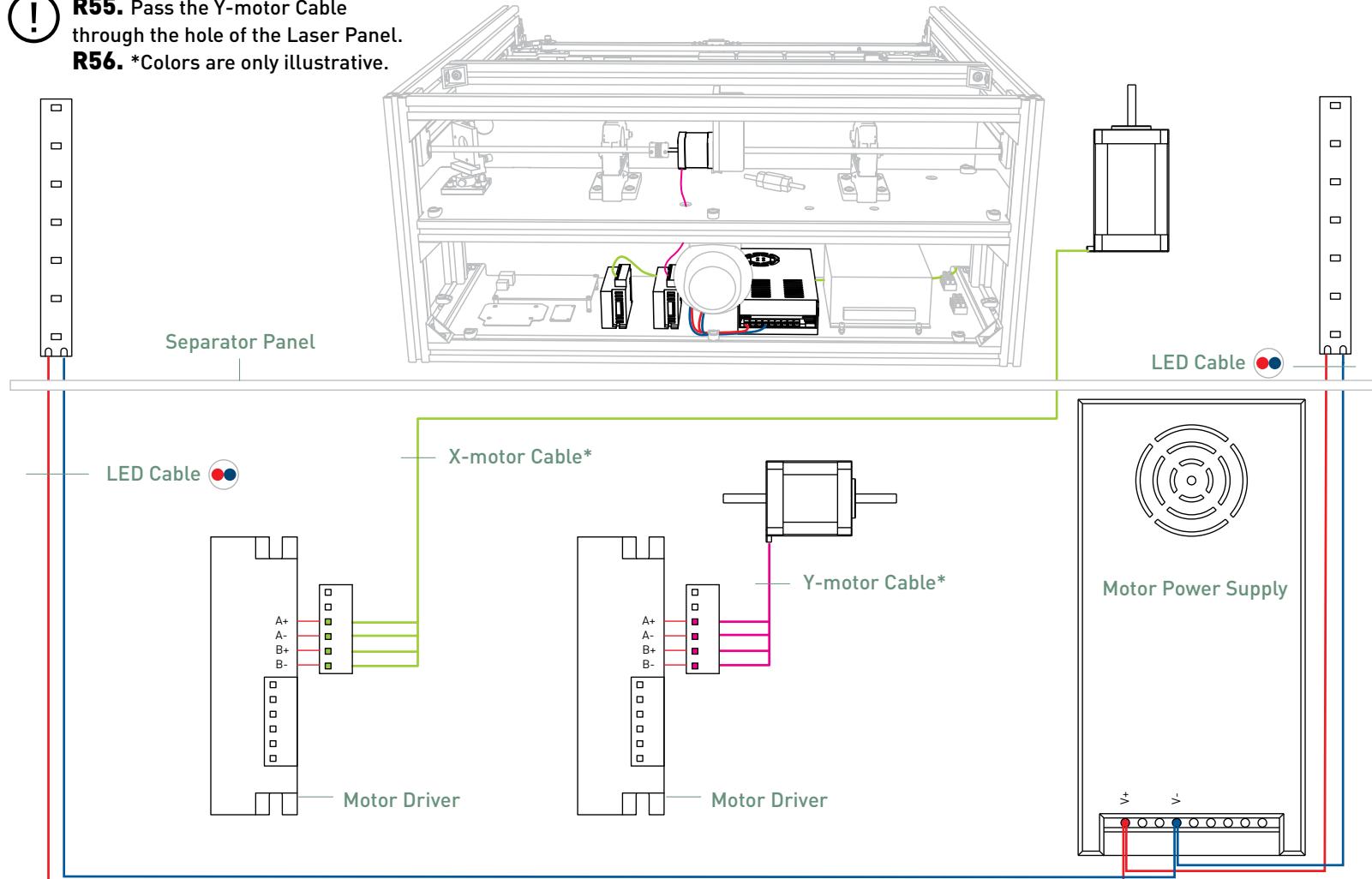
# STEP 16.4 WIRING 4

Step 16/33  20 min

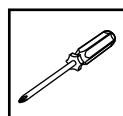


**R55.** Pass the Y-motor Cable through the hole of the Laser Panel.

**R56.** \*Colors are only illustrative.



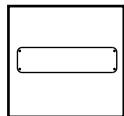
**1x** Screwdriver  
slotted small



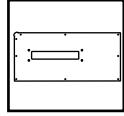
**1x** Screwdriver  
Phillips

# STEP 17.1 PREPARING THE SIDE PANELS

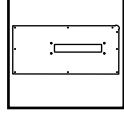
Step 17/33  20 min



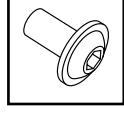
**2x** Air Panel



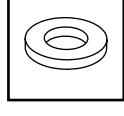
**1x** Right Panel



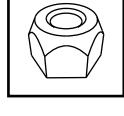
**1x** Left Panel



**8x** B-screw M6-20



**24x** Washer M6



**8x** Lock Nut M6

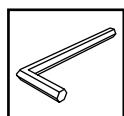
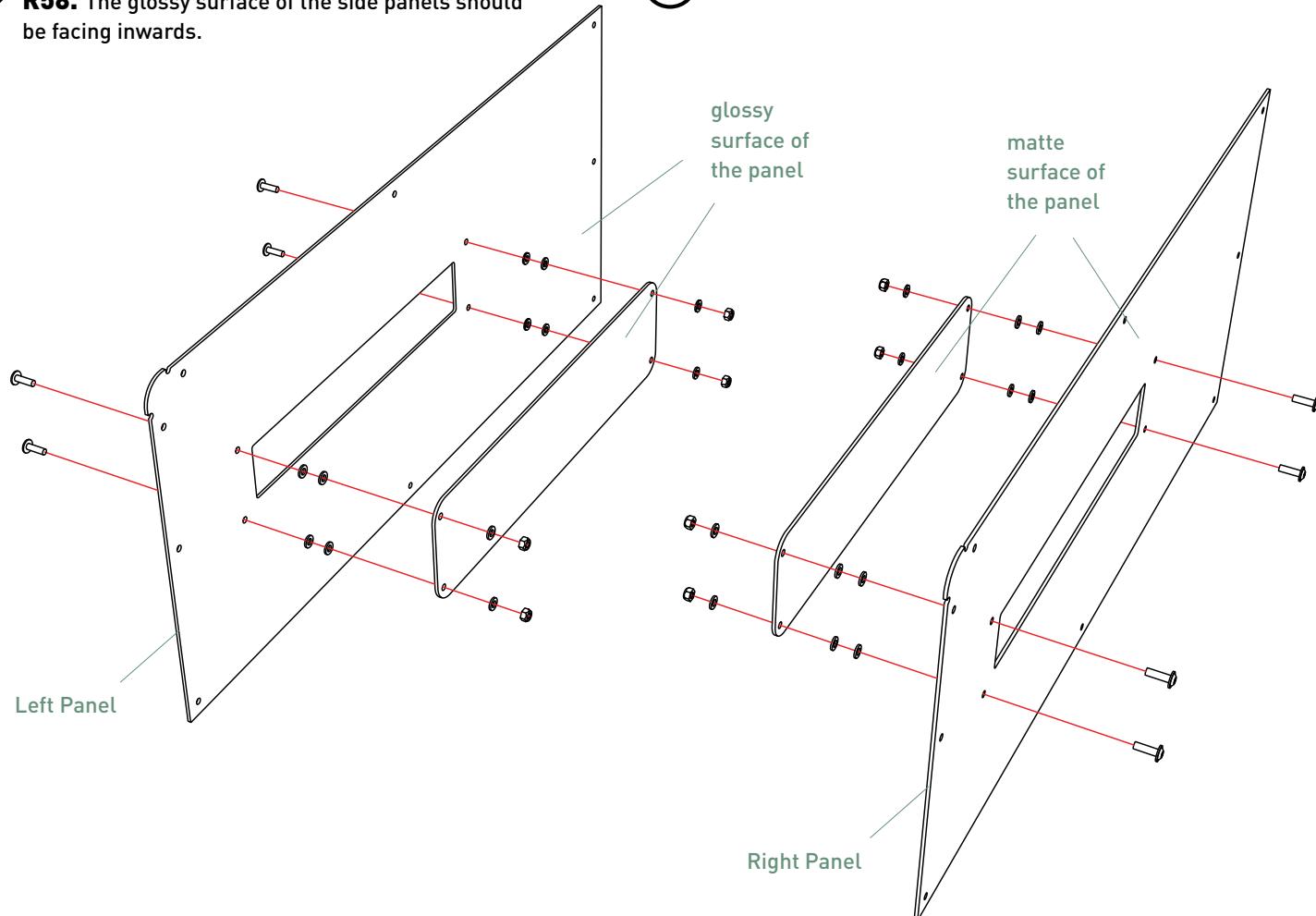


**R57.** Remove the protective foils from the panels.

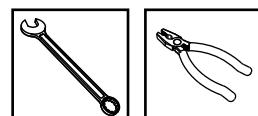
**R58.** The glossy surface of the side panels should be facing inwards.



**H2.** How to tighten Lock Nuts? p.9



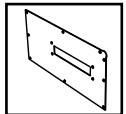
**1x** Allen Key 5



**1x** Wrench 10 **or**  
**1x** Small plier

# STEP 17.2 ATTACHING THE LEFT PANEL

Step 17/33      ⏰ 15 min



**1x** Prepared Left Panel  
(Step 17.1)



**9x** B-screw M6-12



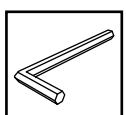
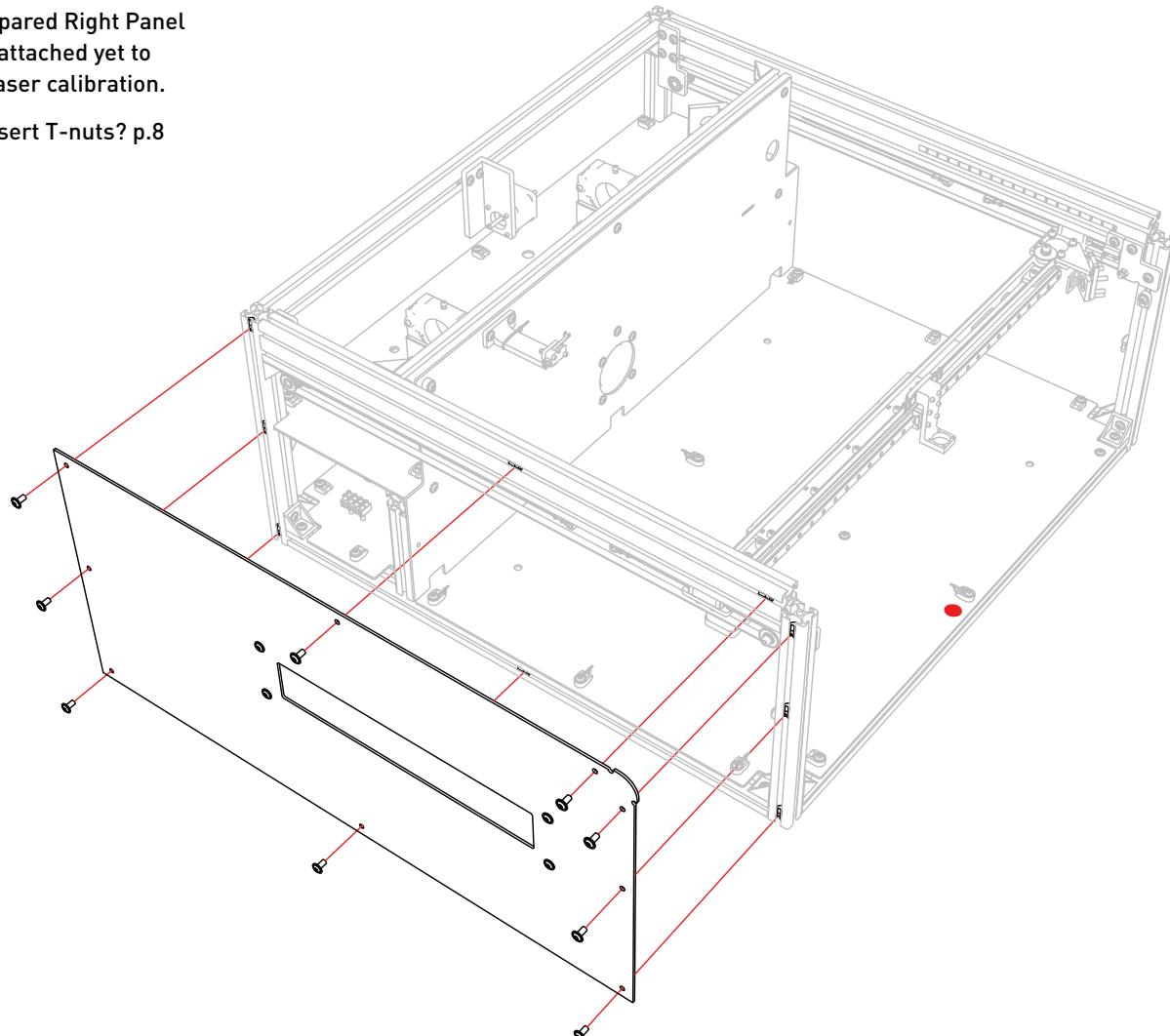
**9x** T-nut M6



**R59.** The Prepared Right Panel should not be attached yet to facilitate the laser calibration.



**H1.** How to insert T-nuts? p.8



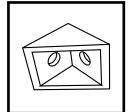
**1x** Allen Key 5

# STEP 17.3 ATTACHING THE FILLETED PROFILE

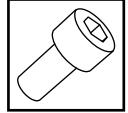
Step 17/33  30 min



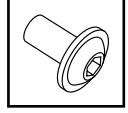
**1x** Profile Fillet



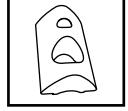
**2x** Front Bracket



**3x** C-screw M3-12



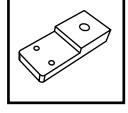
**4x** B-screw M6-12  
**1x** B-screw M6-16



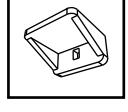
**5x** T-nut M6  
**1x** T-nut M3



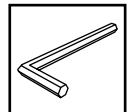
**2x** Lock Nut M3



**1x** Window Sensor Holder



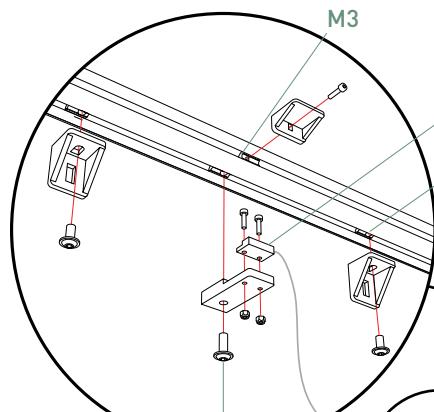
**1x** Front Window Holder



**1x** Allen Key 2.5  
**1x** Allen Key 5



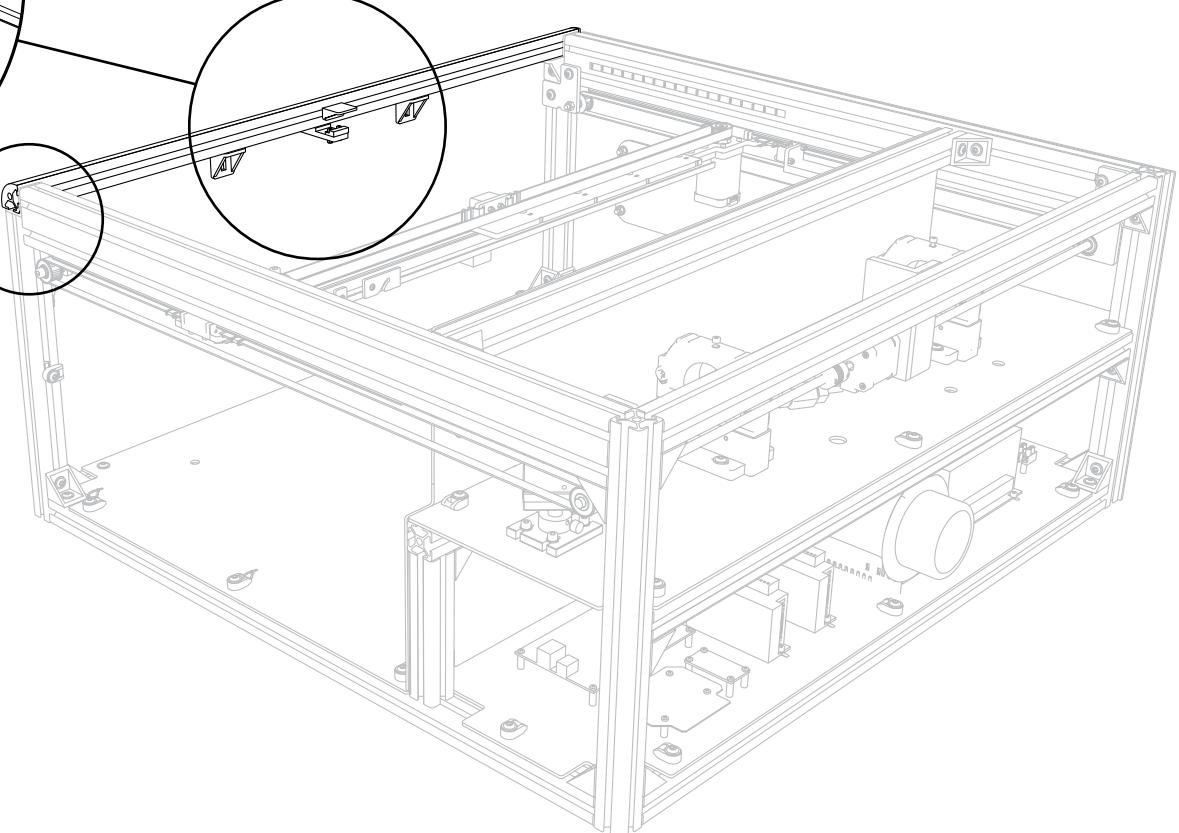
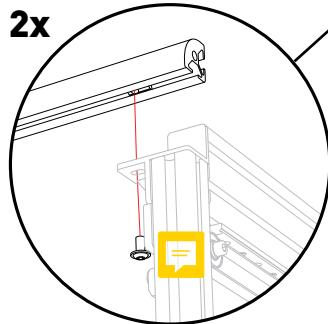
**1x** Wrench 10 **or**  
**1x** Small plier



Window Sensor  
(installed in step 16.1)

M6

M6-16



**R60.** Do not tighten the screws yet for later adjustments.



**H1.** How to insert T-nuts? p.8

**H2.** How to tighten Lock Nuts? p.9

# STEP 17.4 ATTACHING THE FRONT PANEL

Step 17/33  20 min



**1x** Front Panel



**7x** B-screw M6-12  
**2x** B-screw M6-16



**7x** T-nut M6



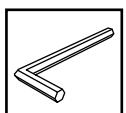
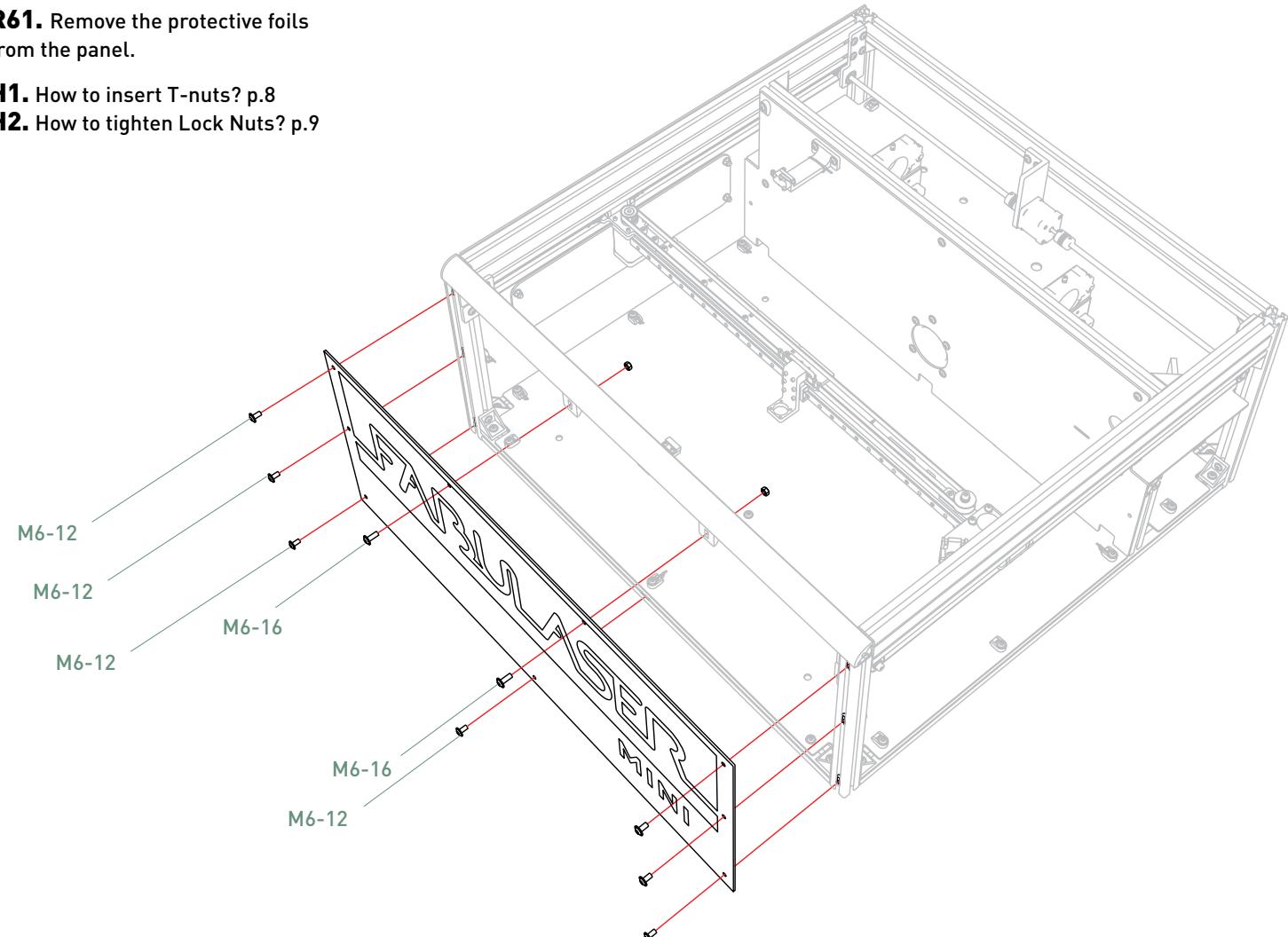
**2x** Lock Nut M6



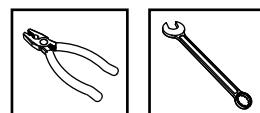
**R61.** Remove the protective foils from the panel.



**H1.** How to insert T-nuts? p.8  
**H2.** How to tighten Lock Nuts? p.9



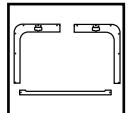
**1x** Allen Key 5



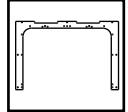
**1x** Small plier **or**  
**1x** Wrench 10

# STEP 18.1 PREPARING THE TOP PANELS

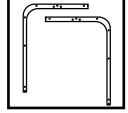
Step 18/33    ⏰ 45 min



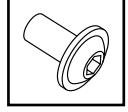
**1x** Sub Panels  
(3 pieces - Left,  
Right and Front)



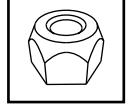
**1x** Top Front Panel



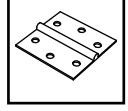
**1x** Spacers Panels  
(2 pieces - Left  
and Right)



**11x** B-screw M6-16  
**6x** B-screw M6-20



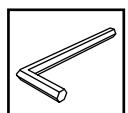
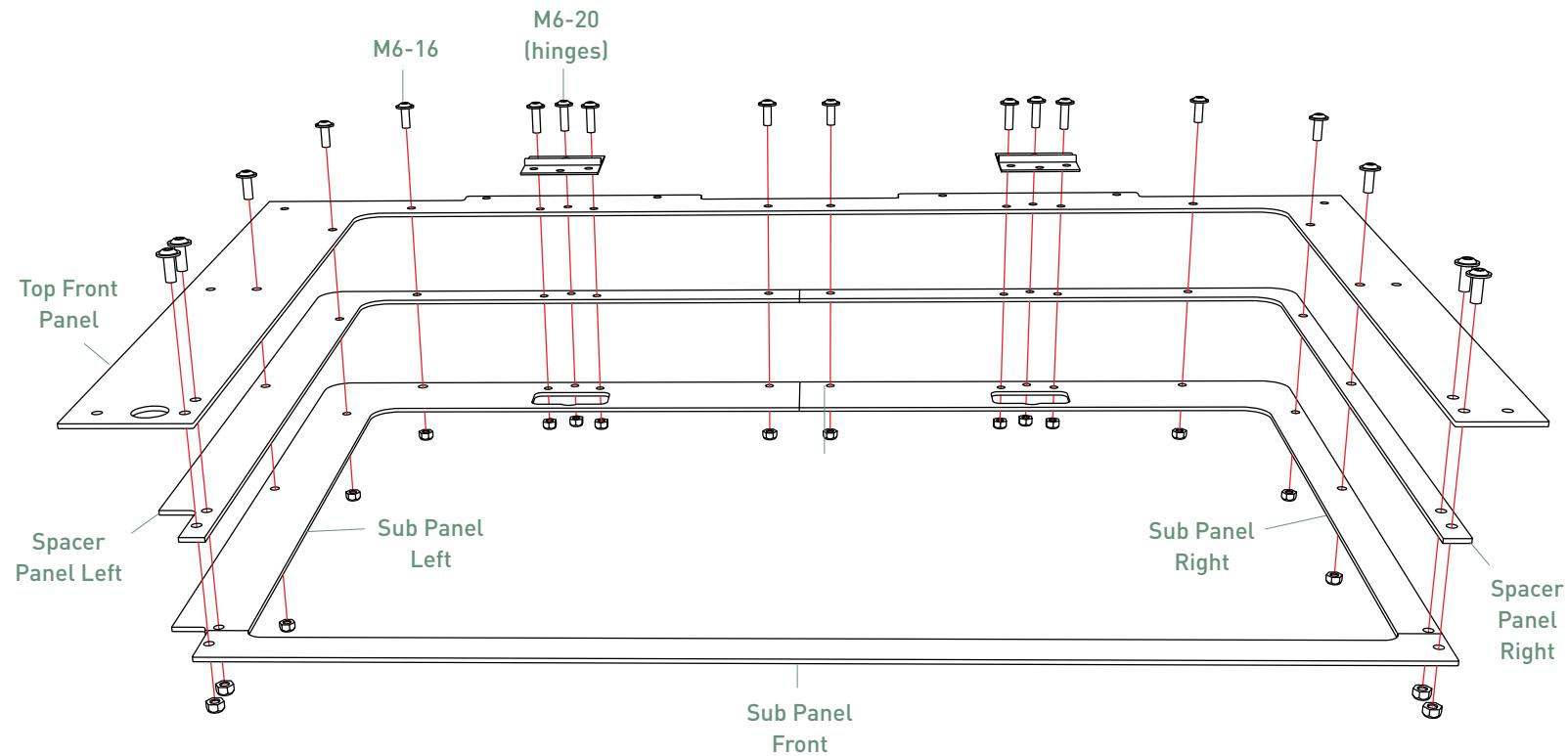
**17x** Lock Nut M6



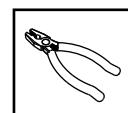
**2x** Hinge

**!** **R62.** Remove the protective foils from the panels.  
**R63.** The glossy surface of the panels should be  
facing down.

**i** **H2.** How to use Lock Nuts? p.9



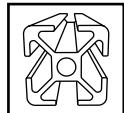
**1x** Allen Key 5



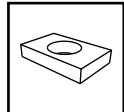
**1x** Small plier **or**  
**1x** Wrench 10

# STEP 18.2 PREPARING THE WINDOW FRAME

Step 18/33  10 min



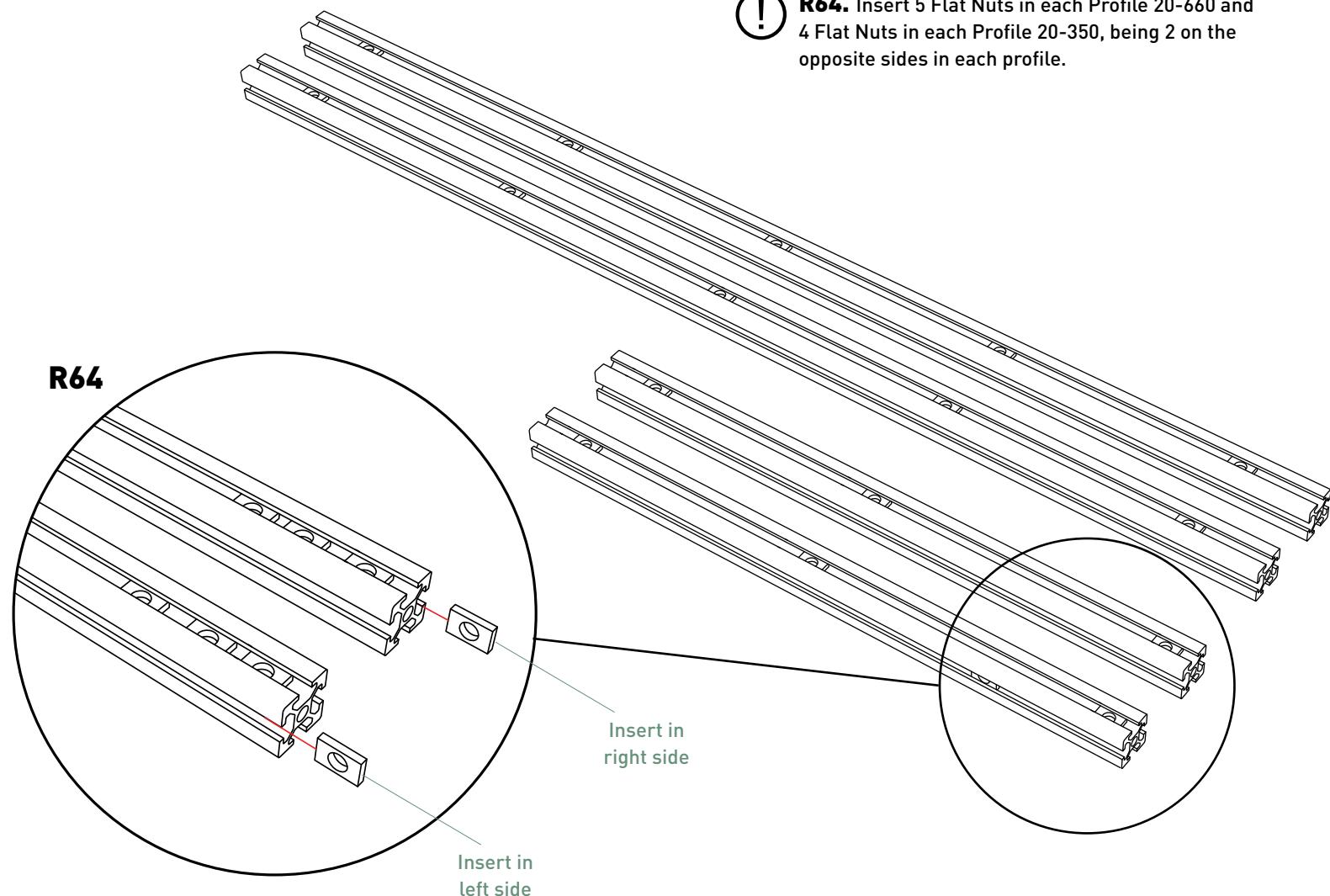
**2x** Profile 20-660  
**2x** Profile 20-350



**18x** Flat Nut M6



**R64.** Insert 5 Flat Nuts in each Profile 20-660 and 4 Flat Nuts in each Profile 20-350, being 2 on the opposite sides in each profile.

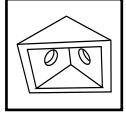


# STEP 18.3 ASSEMBLING THE WINDOW FRAME

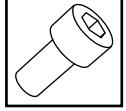
Step 18/33  30 min



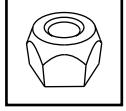
**4x** Prepared Profiles  
(Step 18.2)



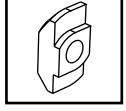
**4x** Bracket 20



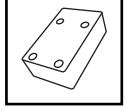
**2x** C-screw M3-16  
**2x** C-screw M3-20  
**8x** C-screw M4-8



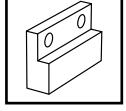
**3x** Lock Nut M3



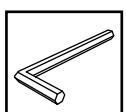
**8x** Hammer Nut M4  
**2x** Hammer Nut M3



**1x** Window Magnet Holder



**1x** Window Magnet



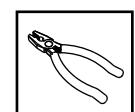
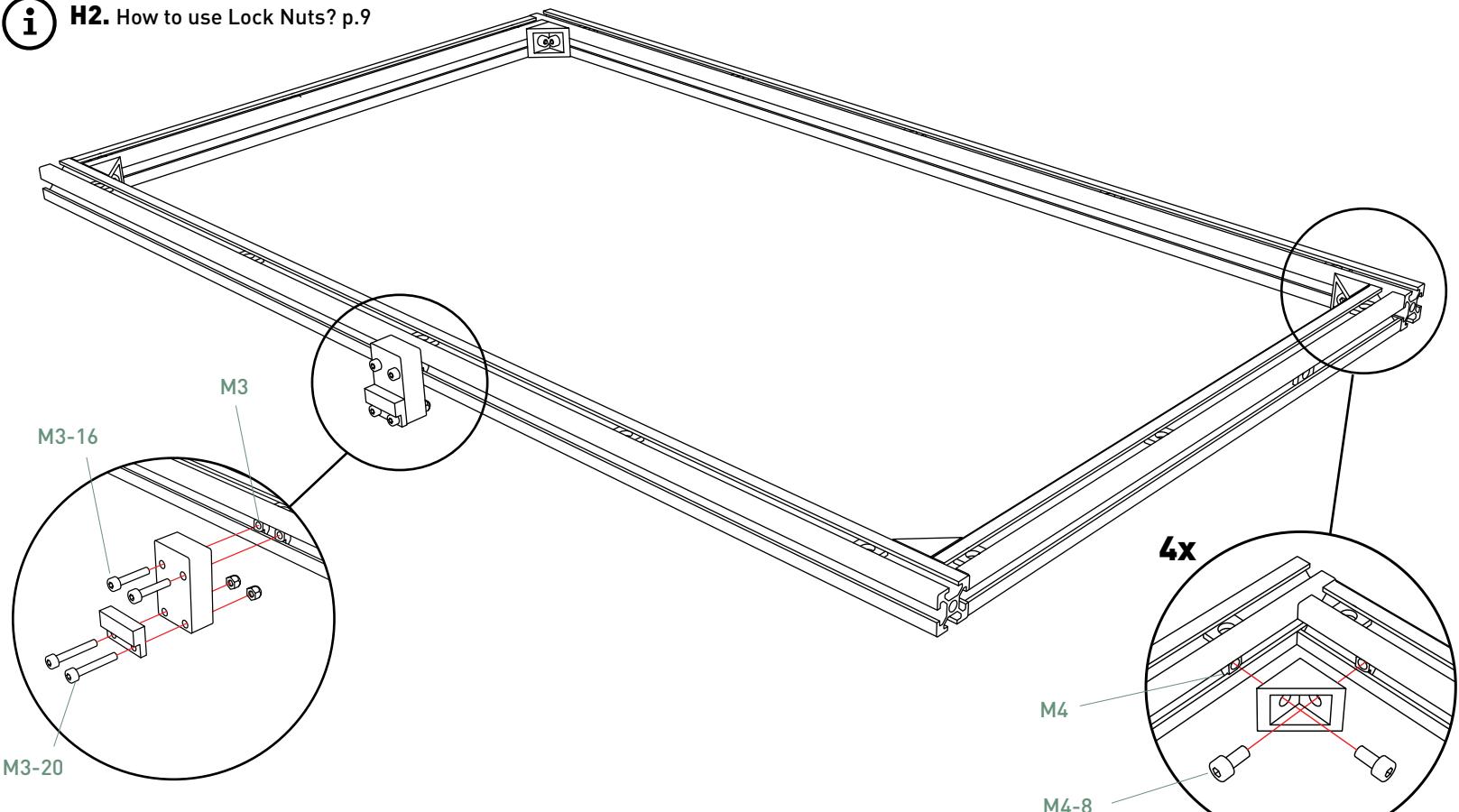
**1x** Allen Key 2.5  
**1x** Allen Key 3



**R65.** Do not tighten the screws  
of the Window Magnet Holder for  
later adjustments.



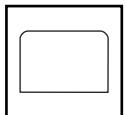
**H2.** How to use Lock Nuts? p.9



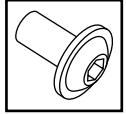
**1x** Small plier **or**  
**1x** Wrench

# STEP 18.4 ATTACH WINDOW TO FRAME

Step 18/33    ⏰ 20 min



**1x** Window



**16x** B-screw M6-10

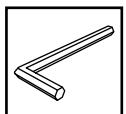
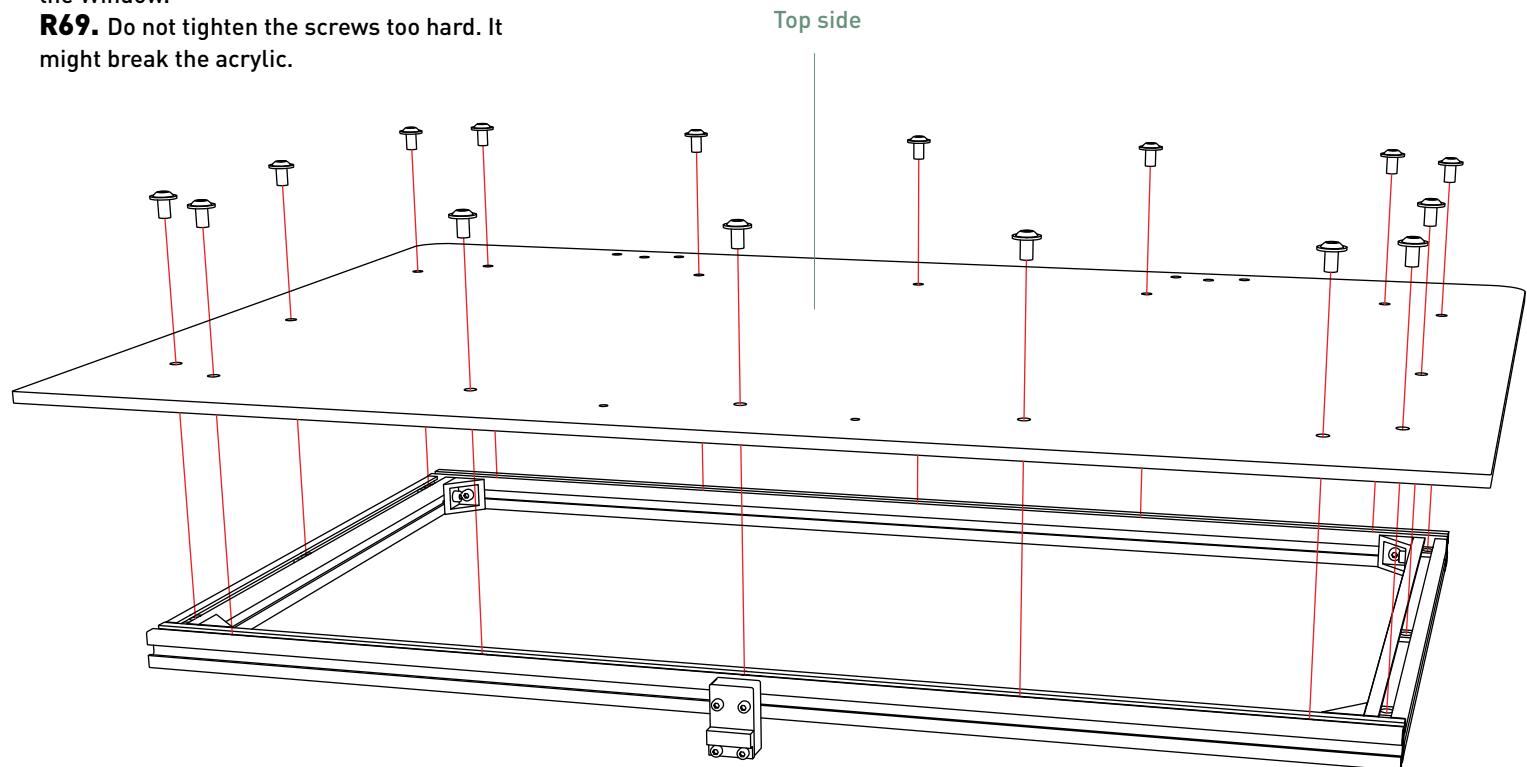


**R66.** Pay attention to the indication of top and bottom of the Window.

**R67.** Remove the protective foils of the Window.

**R68.** Be careful not to scratch the surface of the Window.

**R69.** Do not tighten the screws too hard. It might break the acrylic.

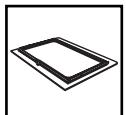


**1x** Allen Key 5

# STEP 18.5 FIXING THE WINDOW

Step 18/33

⌚ 30 min



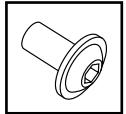
**1x** Prepared Window  
(Step 18.4)



**R70.** Do not tighten the screws too hard.  
It might break the acrylic.



**1x** Top Panel Set  
(Step 18.1)



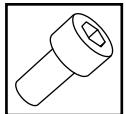
**6x** B-screw M6-16



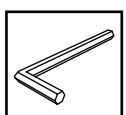
**6x** Lock Nut M6



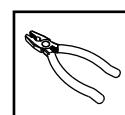
**1x** Handle



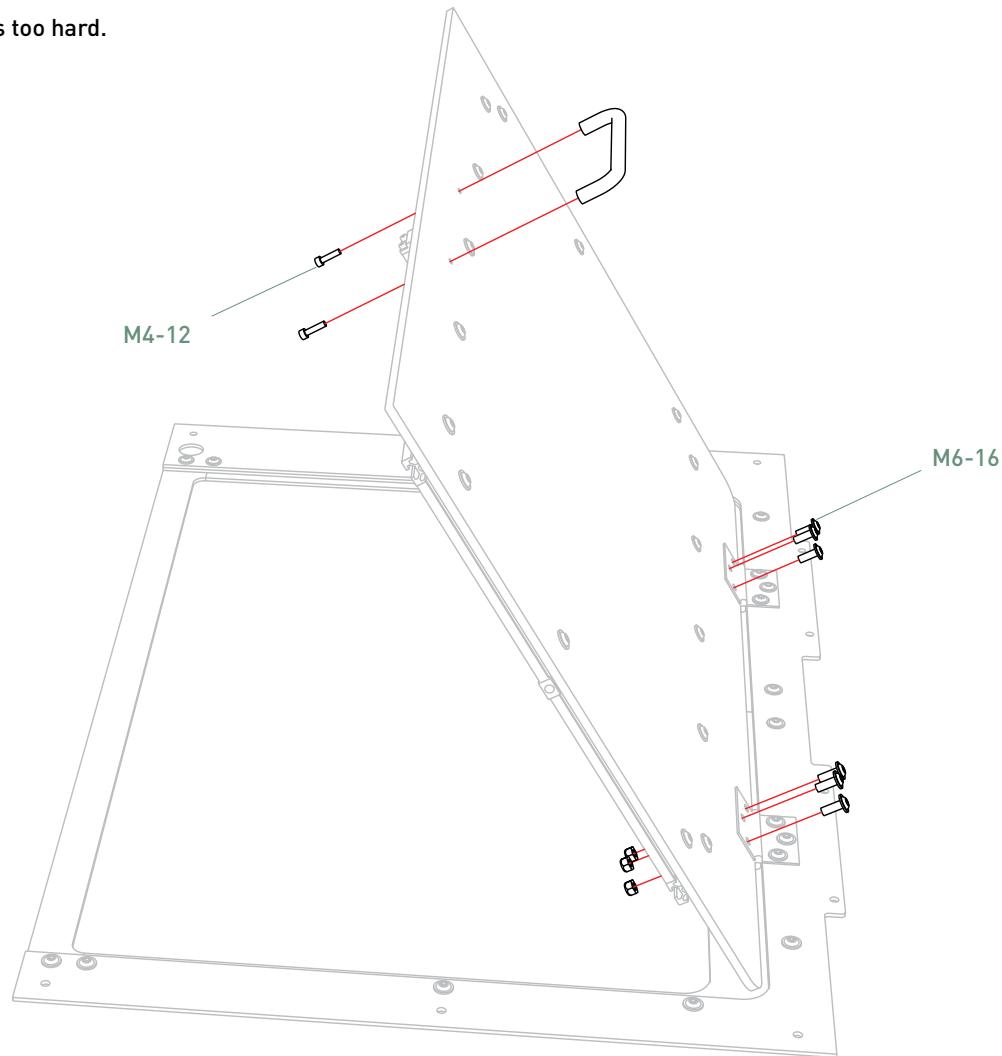
**2x** C-screw M4-12



**1x** Allen Key 3  
**1x** Allen Key 5



**1x** Small plier **or**  
**1x** Wrench 10



# STEP 19.1 INSTALLING LASER TUBE

Step 19/33

⌚ 30 min

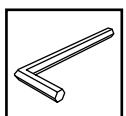
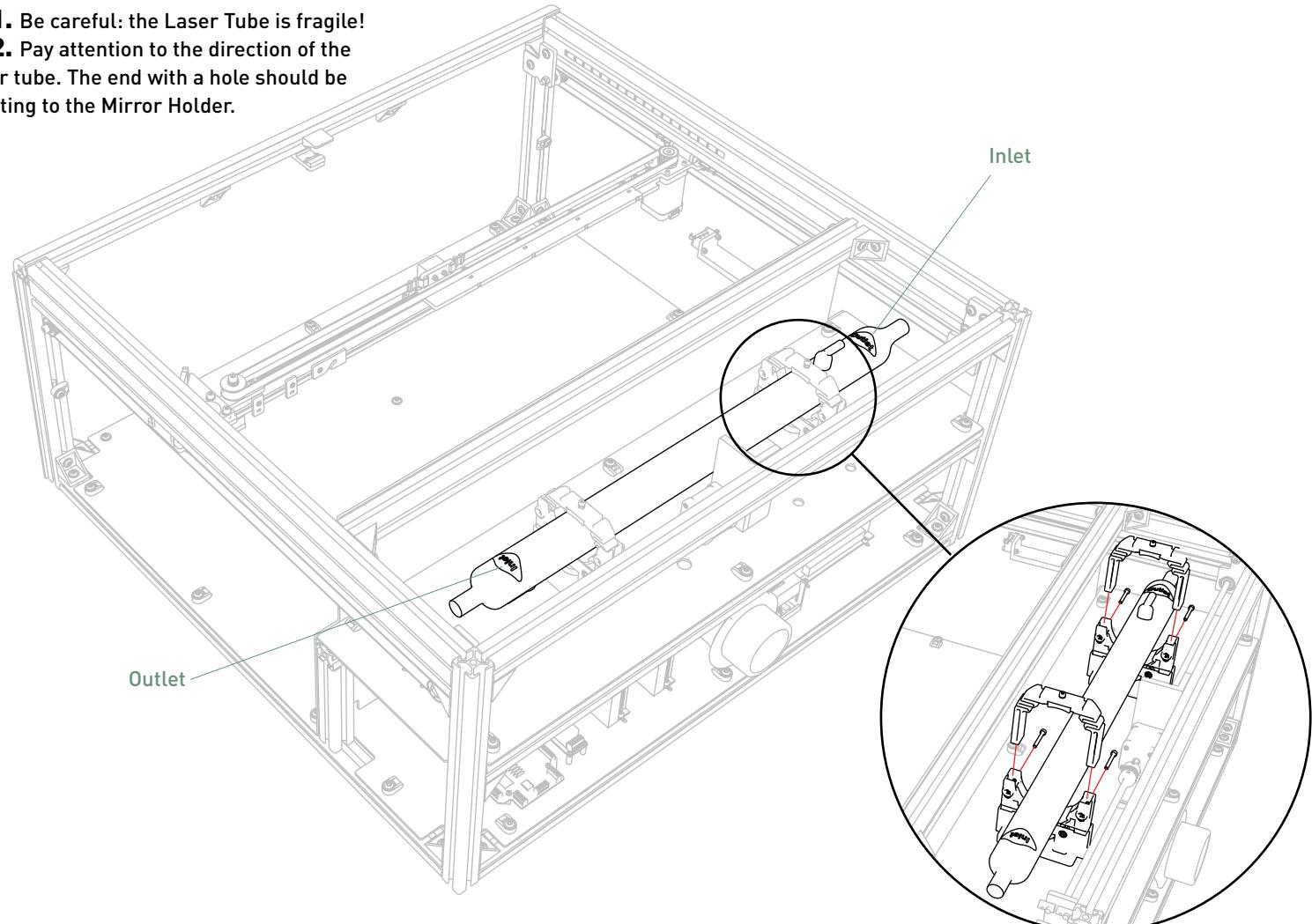


1x Laser Tube



**R71.** Be careful: the Laser Tube is fragile!

**R72.** Pay attention to the direction of the laser tube. The end with a hole should be pointing to the Mirror Holder.

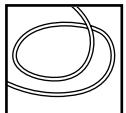


1x Allen Key 3

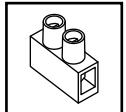
# STEP 19.2 WIRING LASER TUBE

Step 19/33

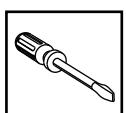
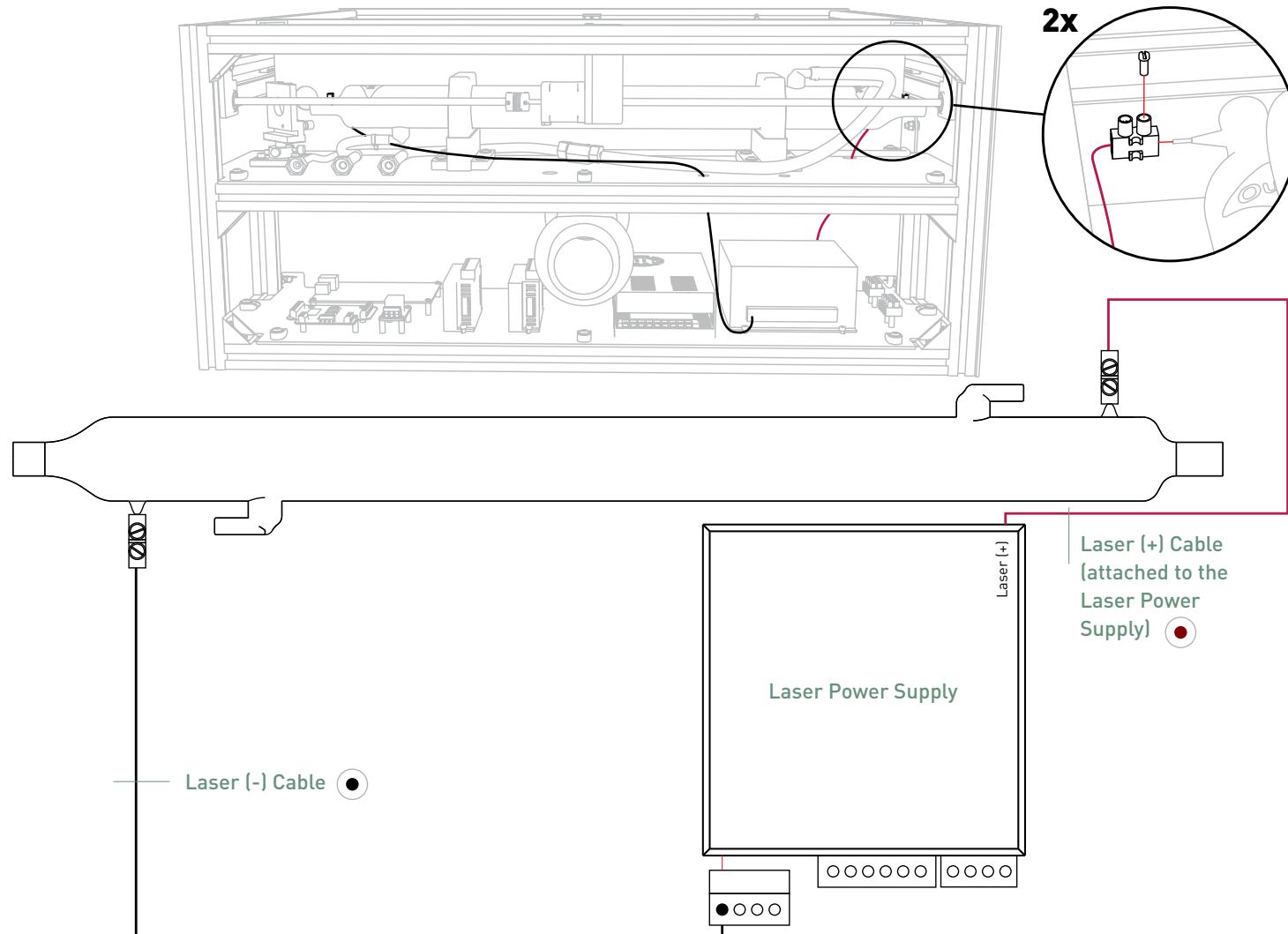
⌚ 15 min



**1x** Laser (-) Cable



**2x** Laser Attachment



**1x** Screwdriver  
slotted small

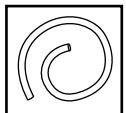


**1x** Screwdriver  
Phillips

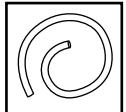
# STEP 19.3 INSTALLING THE WATER AND AIR TUBES

Step 19/33

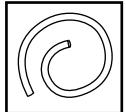
⌚ 25 min



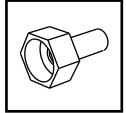
**1x** Water Outlet Tube Inside



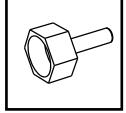
**1x** Water Inlet Tube Inside (2 pieces)



**1x** Air Tube Inside



**2x** Water Connector Inside



**1x** Air Connector Inside



**7x** Cable Ties



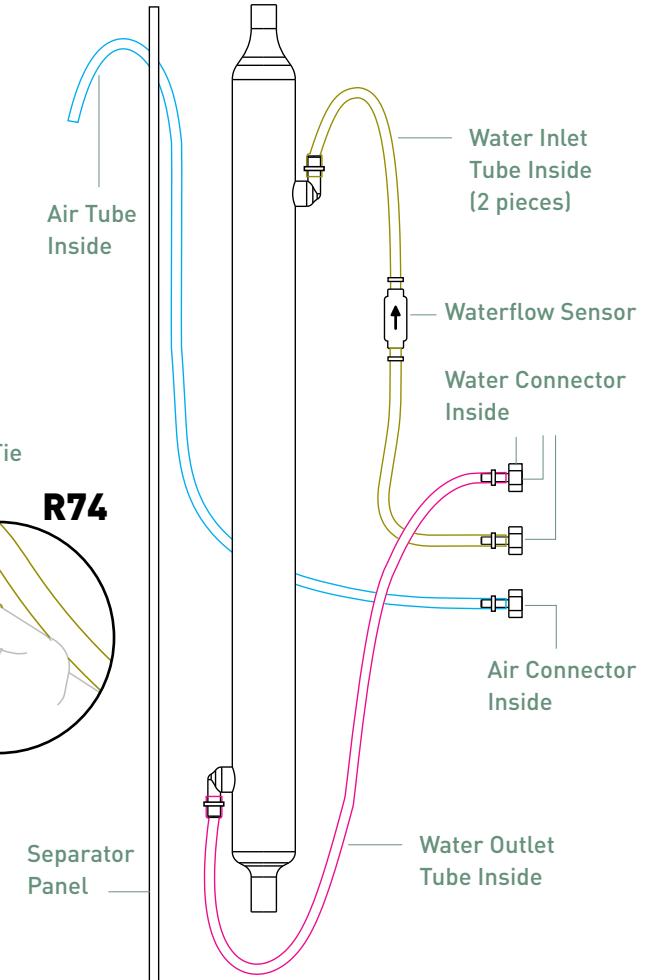
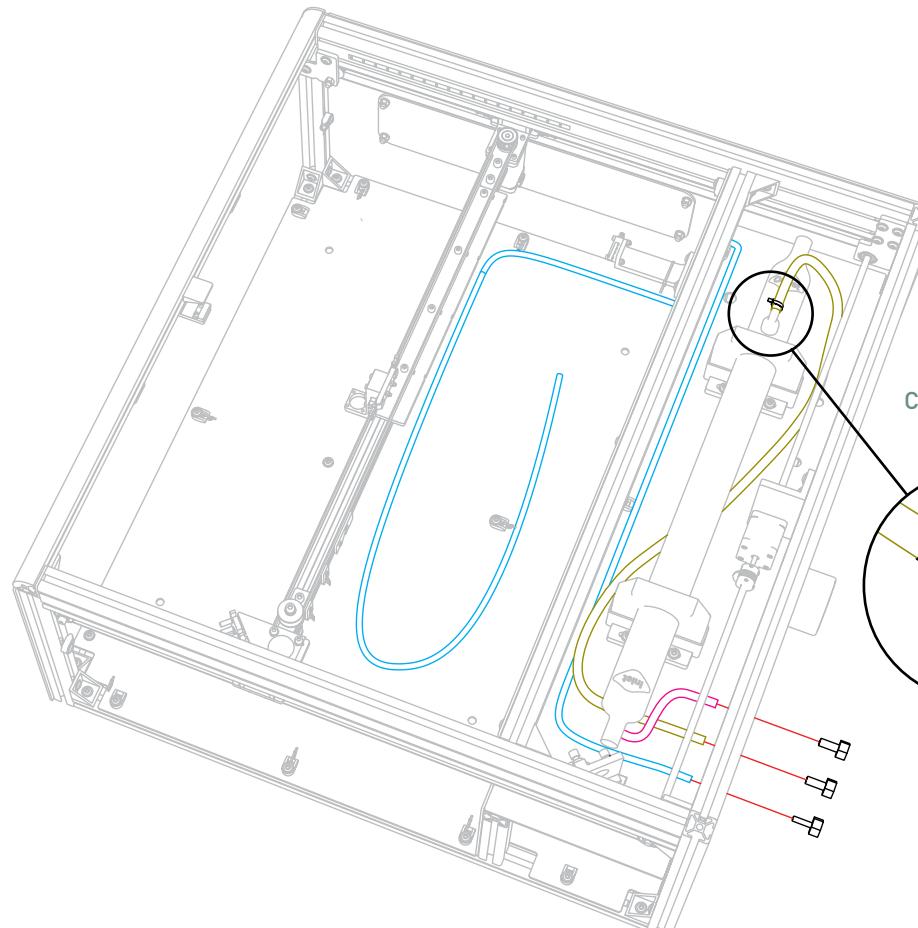
**R73.** Pay attention to the direction of the Water Flow Sensor.

**R74.** Fix the tubes with Cable Ties.



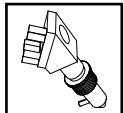
**H3.** How to use cable ties? p.9

**H6.** How to insert the tubes easily? p.12

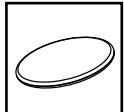


# STEP 20.1 INSTALLING THE LASER HEAD

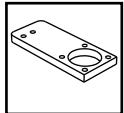
Step 20/33  15 min



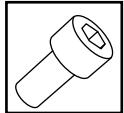
**1x** Laser Head



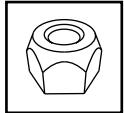
**1x** Mirror 20



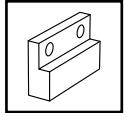
**1x** Chain End Holder



**2x** C-screw M3-12  
**4x** C-screw M3-16



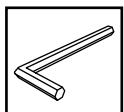
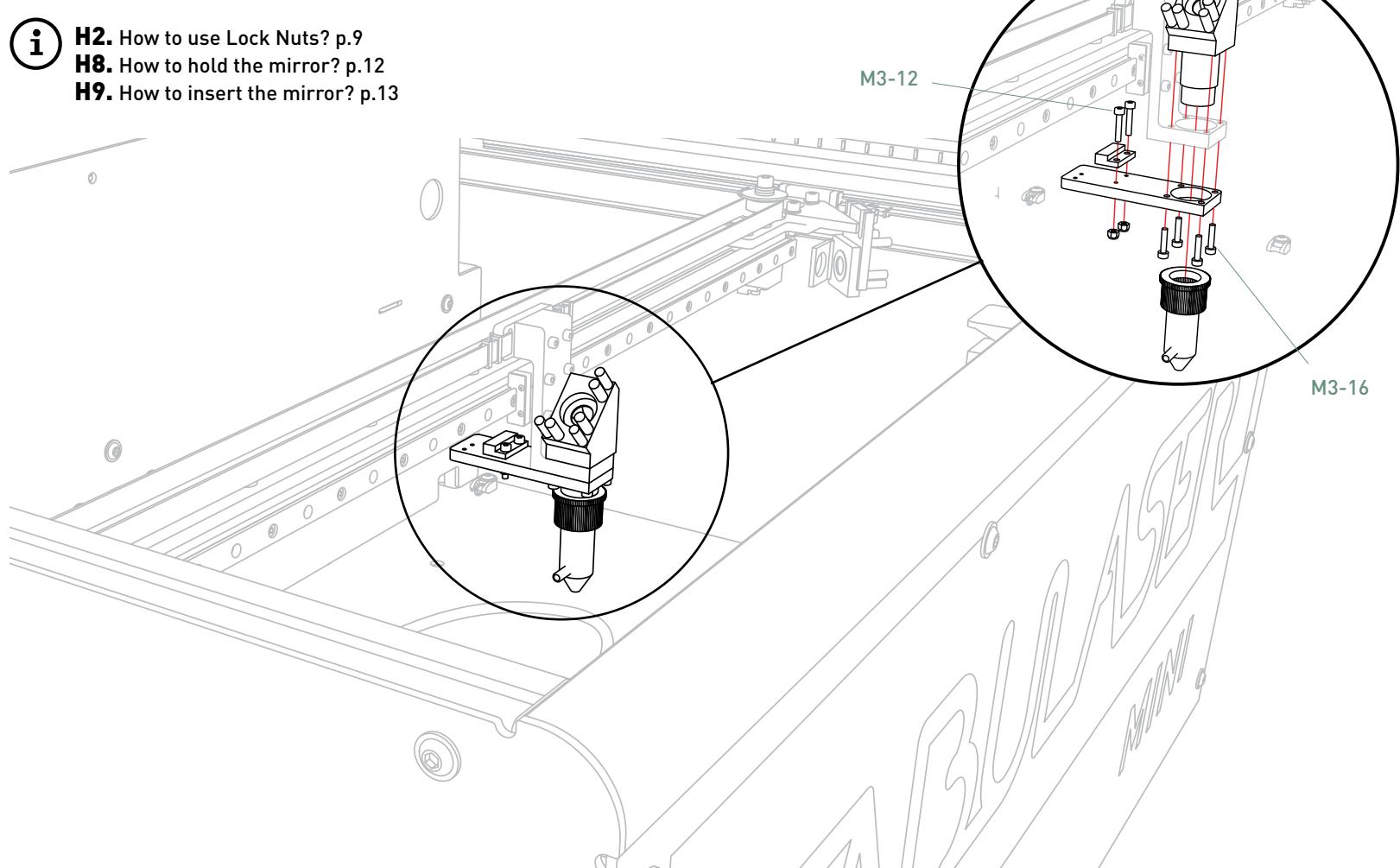
**2x** Lock Nut M3



**1x** X-magnet

**!** **R75.** Do not touch the mirrored surface!  
**R76.** Insert the mirror in the Laser Head.

**i** **H2.** How to use Lock Nuts? p.9  
**H8.** How to hold the mirror? p.12  
**H9.** How to insert the mirror? p.13



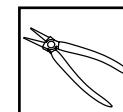
**1x** Allen Key 2.5



**1x** Wrench 5.5



**1x** Small plier



**1x** Needle Nose Pliers

# STEP 20.2 INSTALLING THE CHAIN

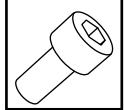
Step 20/33  15 min



**1x** Chain



**4x** Cable Ties



**2x** C-screw M3-12



**2x** Lock-nut M3



**R77.** Remove the excess segments of the Chain.

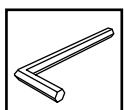
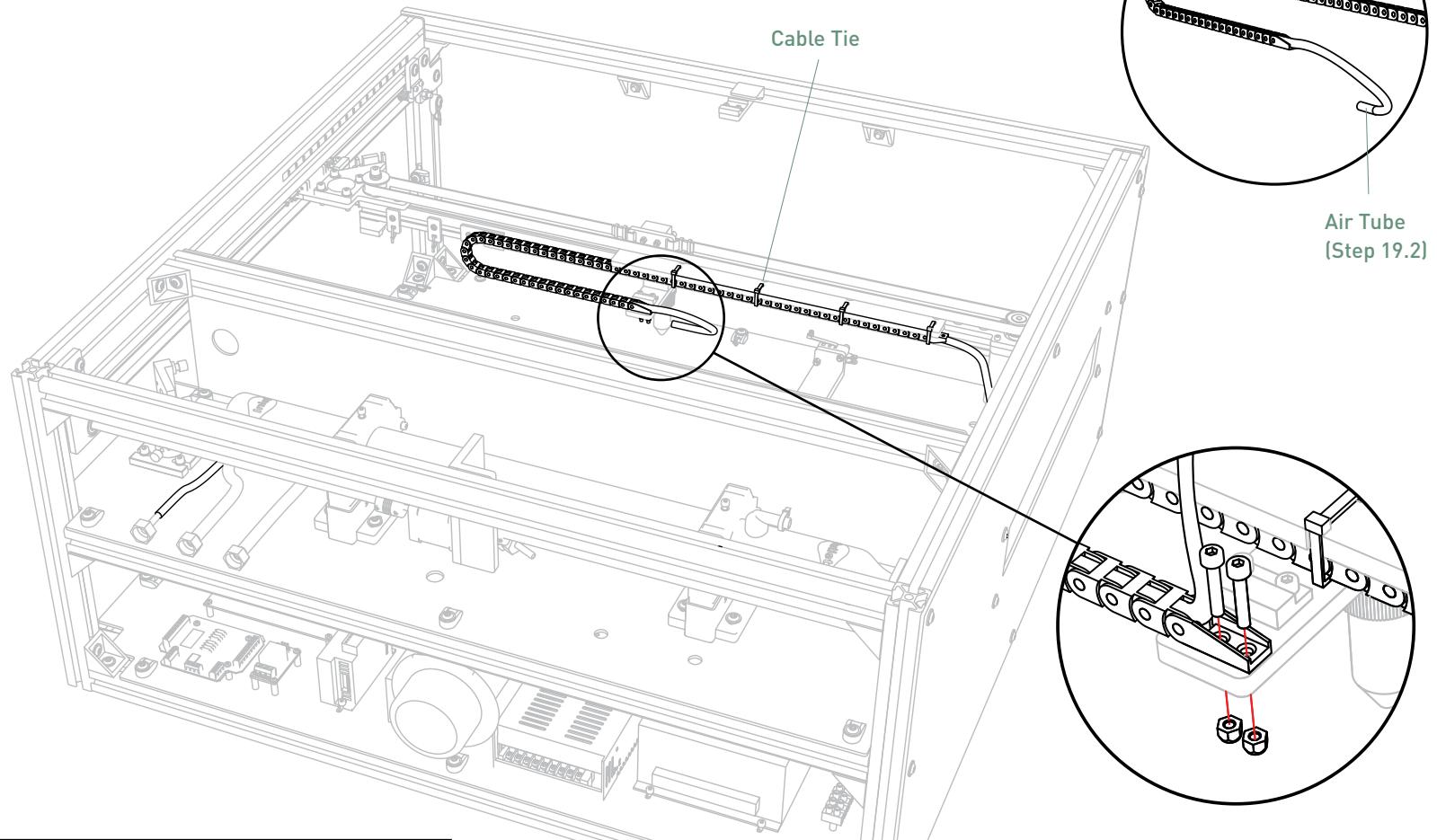
**R78.** Insert the Air Tube in the Chain.

**R79.** Make sure the length of the tube is good for the movements of the X-Axis and cut the excess.

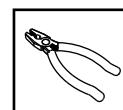


**H2.** How to use Lock Nuts? p.9

**H3.** How to use cable ties? p.9



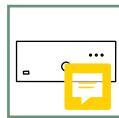
**1x** Allen Key 3  
**1x** Allen Key 5



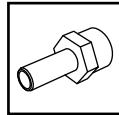
**1x** Small plier **or**  
**1x** Wrench 10

# STEP 21.1 PREPARING BACK PANEL - CONNECTORS

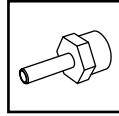
Step 21/33      ⏰ 15 min



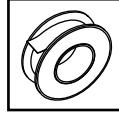
**1x** Back Panel



**2x** Water Connector Outside



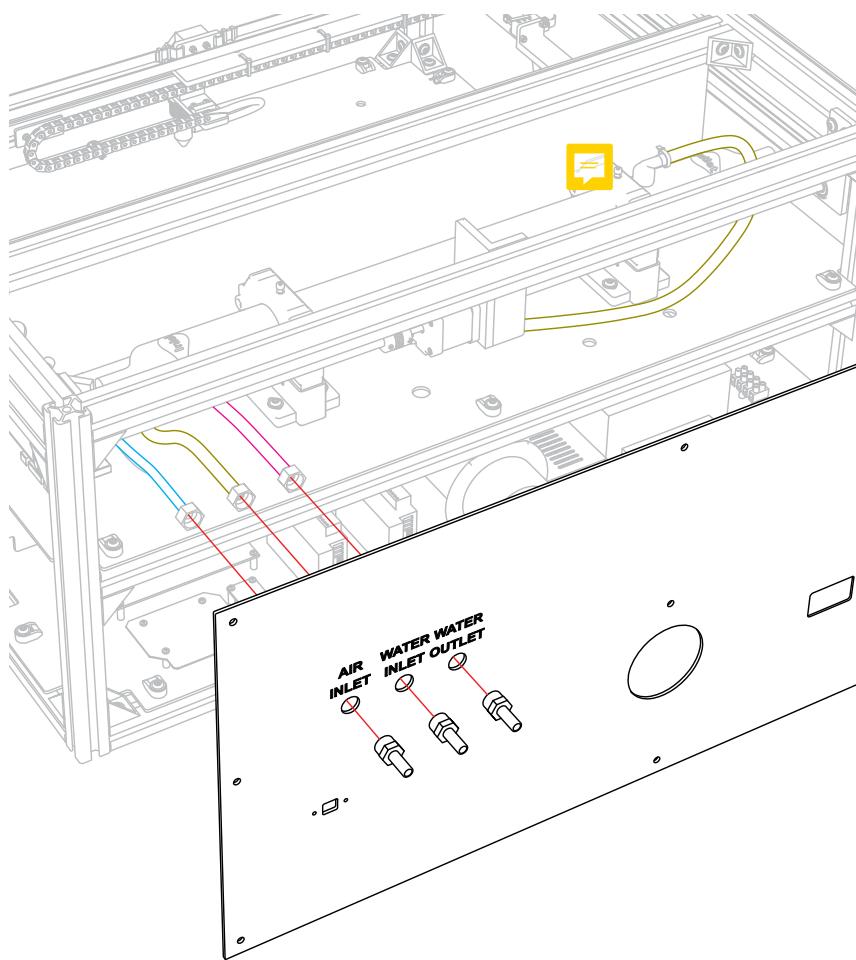
**1x** Air Connector Outside



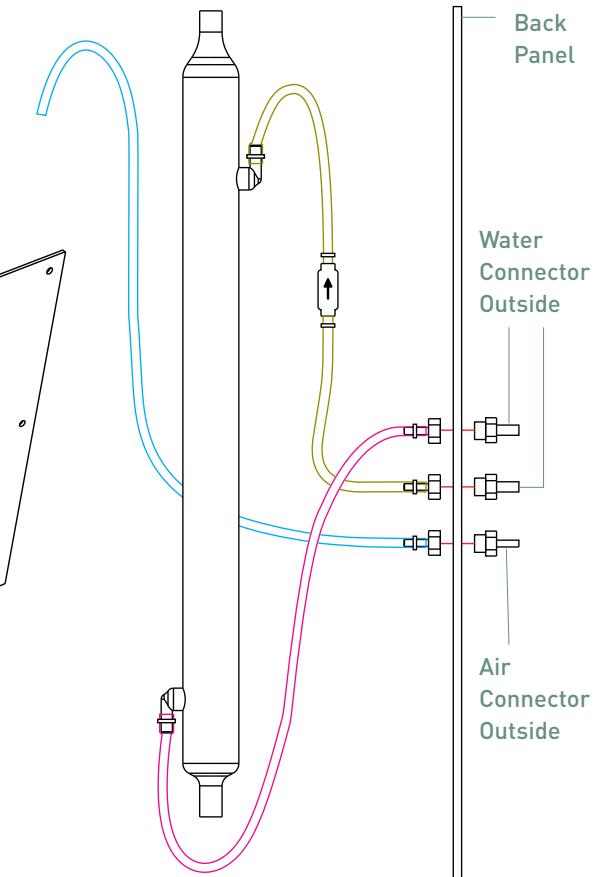
**1x** Teflon Tape



**R80.** Remove the protective foils of the panel.



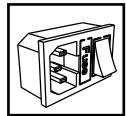
**H7.** How to use Teflon tape? p.12



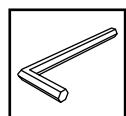
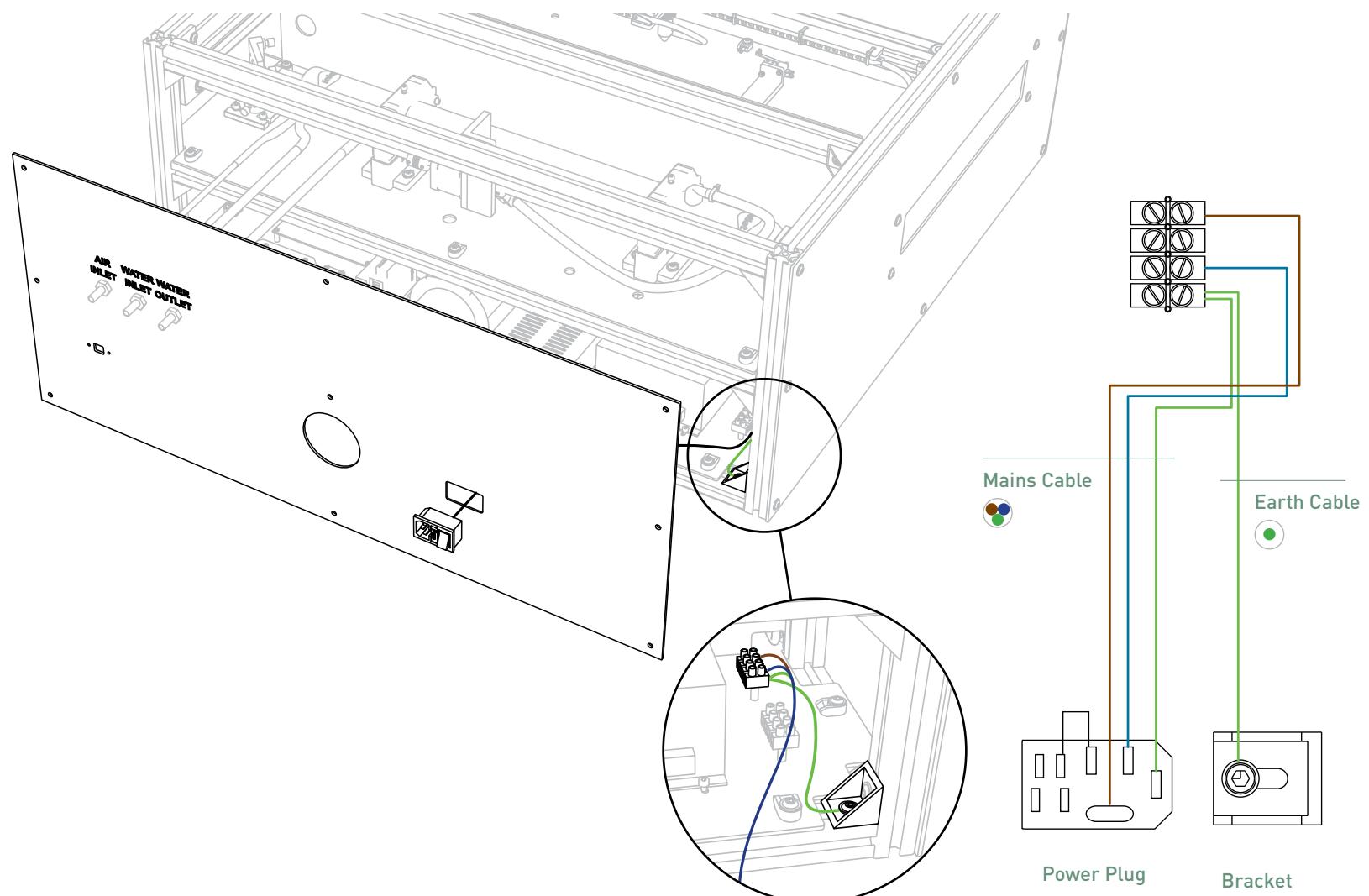
# STEP 21.2 PREPARING BACK PANEL - POWER PLUG

Step 21/33

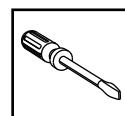
⌚ 30 min



**1x** Power Plug +  
Mains Cable +  
Earth Cable



**1x** Allen Key 1.5  
**1x** Allen Key 3  
**1x** Allen Key 5

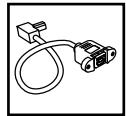


**1x** Screwdriver  
slotted small

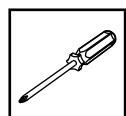
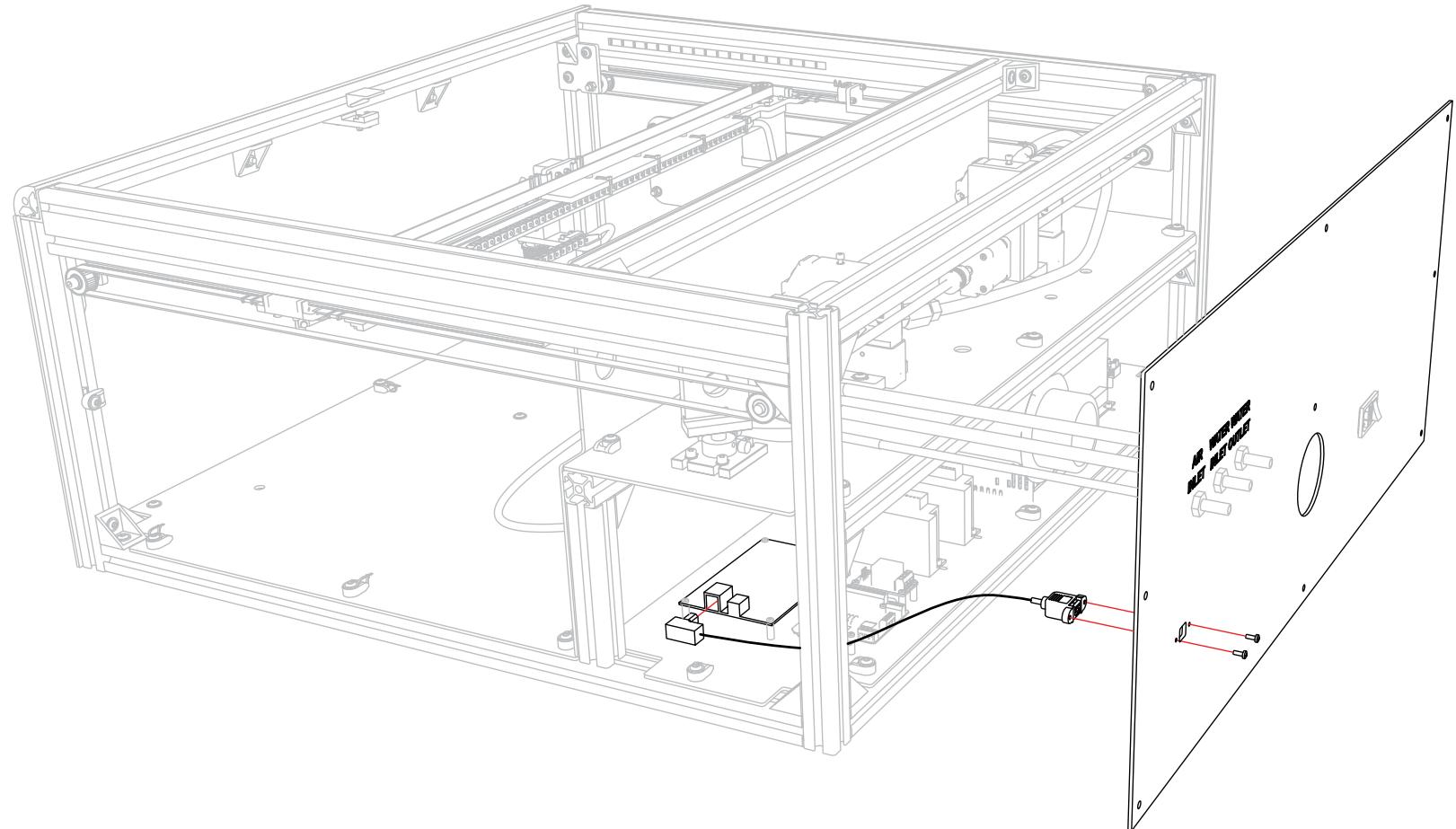
# STEP 21.3 PREPARING BACK PANEL - USB

Step 21/33

⌚ 15 min



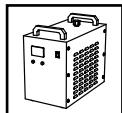
**1x** USB Cable Inside



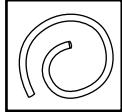
**1x** Screwdriver  
Phillips

# STEP 22. CONNECTING THE CHILLER

Step 22/33      ⏰ 20 min



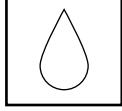
**1x** Water Chiller



**2x** Water Tube  
Outside



**4x** Cable Ties



**1x** 5L distilled water  
(not included)

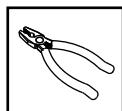
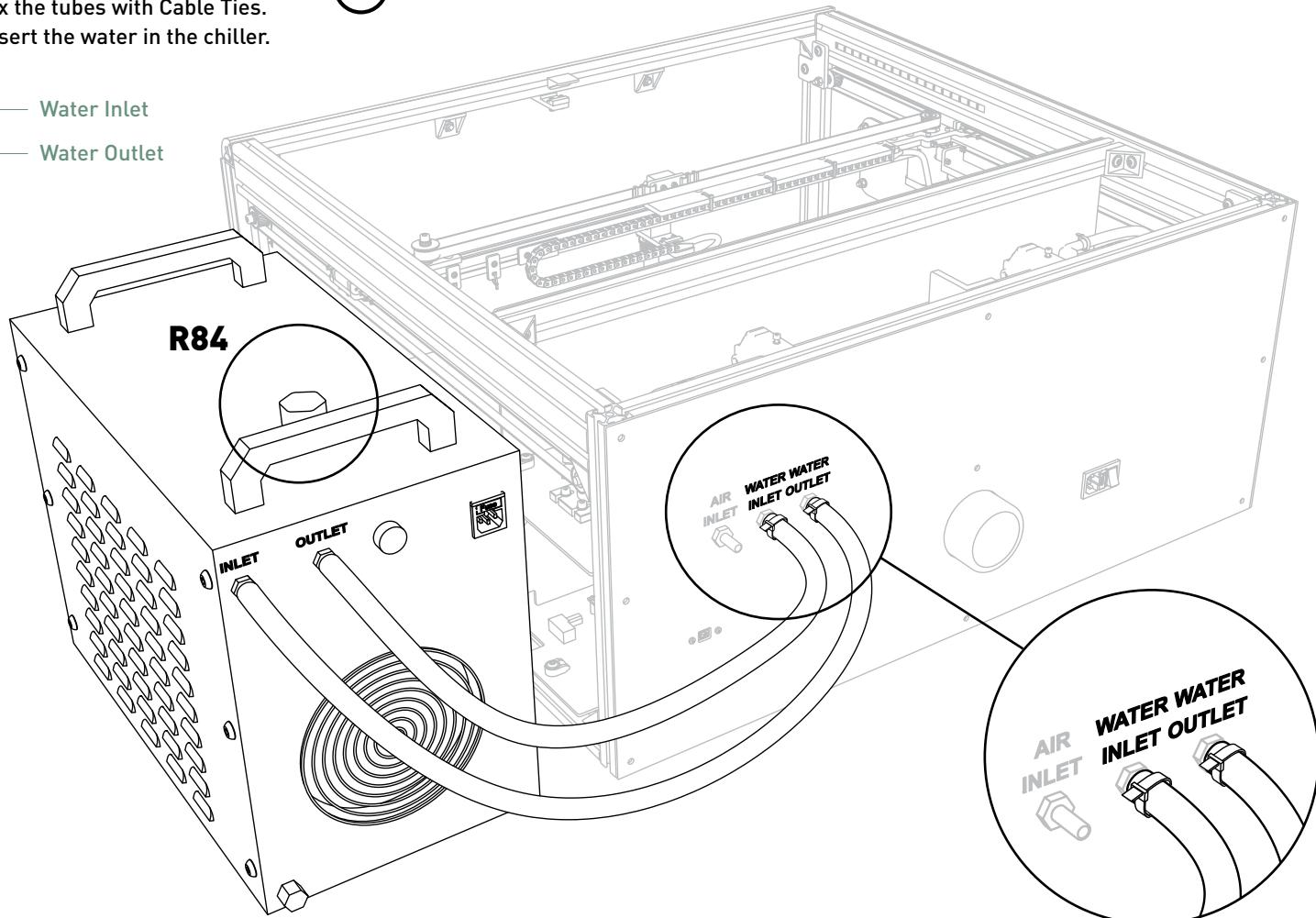


- R82.** Connect inlet to outlet.
- R83.** Fix the tubes with Cable Ties.
- R84.** Insert the water in the chiller.



- H7.** How to use Teflon tape? p.12

Chiller Outlet — Water Inlet  
Chiller Intlet — Water Outlet



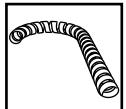
**1x** Small plier



**1x** Wrench 19

# STEP 23.1 ORGANIZING THE WIRES - FRONT

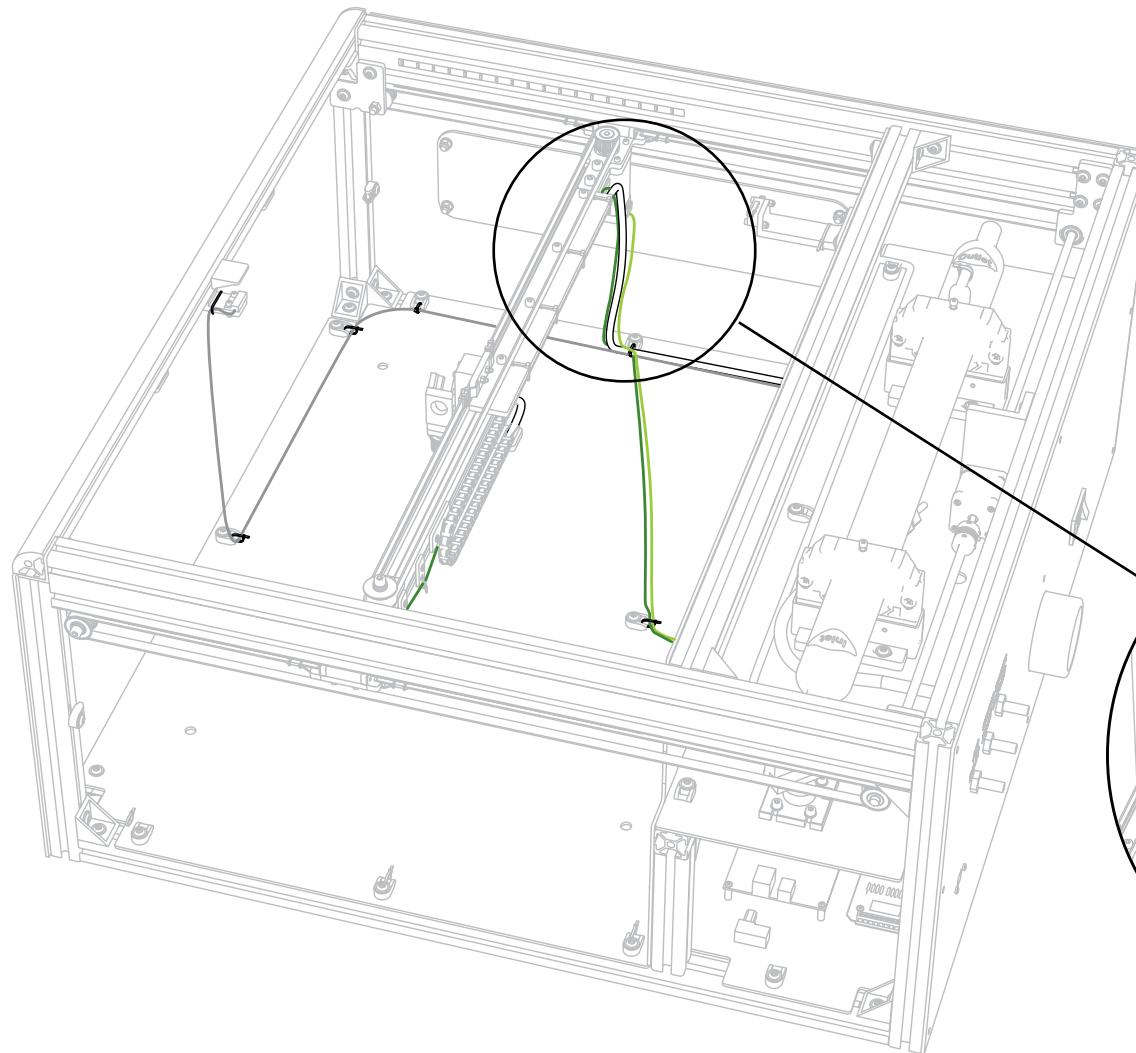
Step 23/33  20 min



**1x** Cable Wrapper



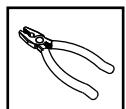
**6x** Cable Tie



**R85.** Make sure the X-axis can move freely without stressing the wires, then tighten the cable ties and cover the moving wires and tube with the cable wrapper.

**R86.** Make sure nothing is crossing the laser path.

**R87.** Tighten all cable ties in the front.



**1x** Small plier

# STEP 23.2 ORGANIZING THE WIRES - BACK

Step 23/33

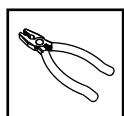
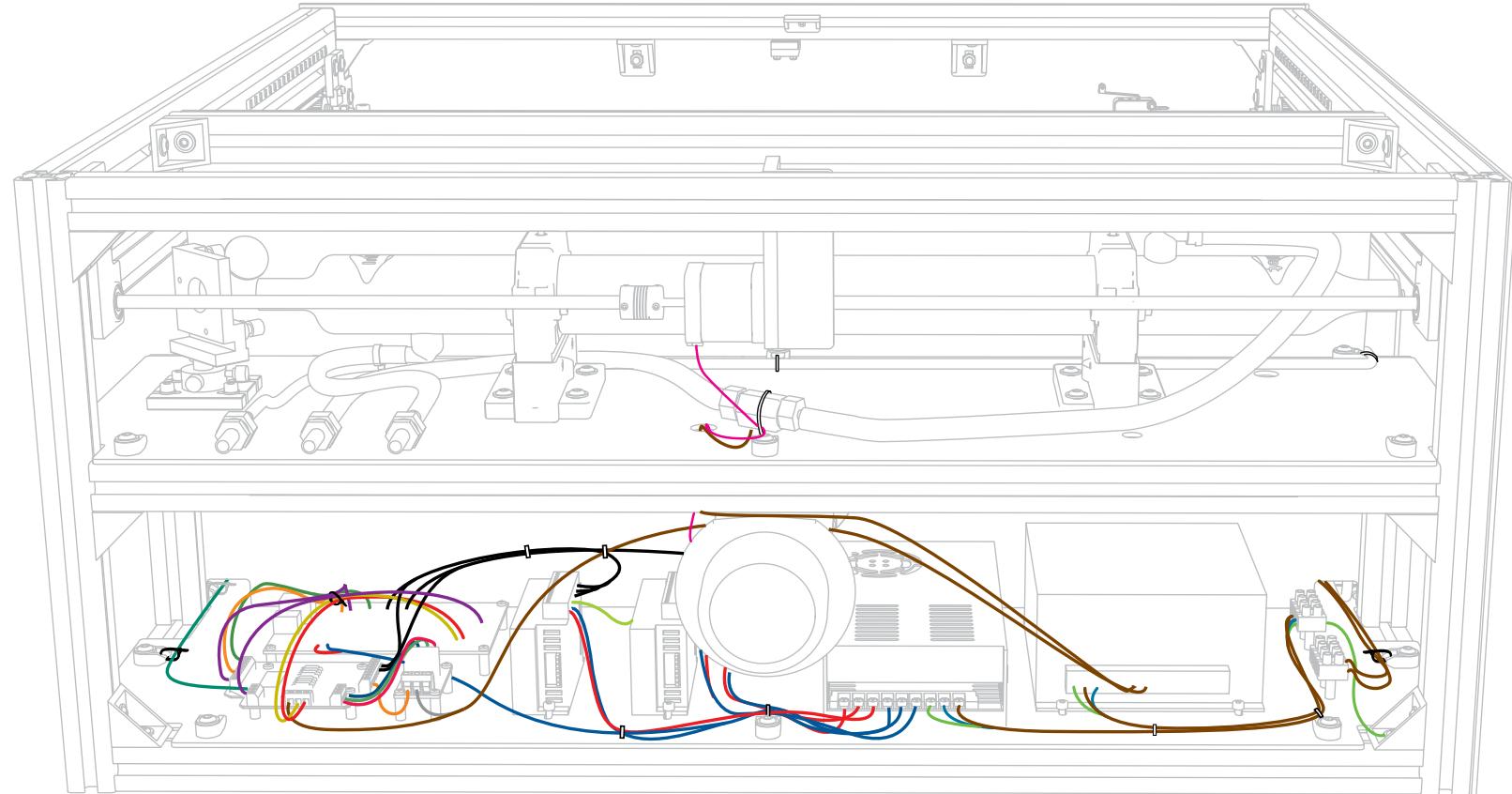
⌚ 15 min



**10x** Cable Ties



**R88.** Separate logic and power cables as much as possible to avoid interference.



**1x** Small plier

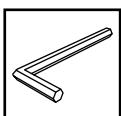
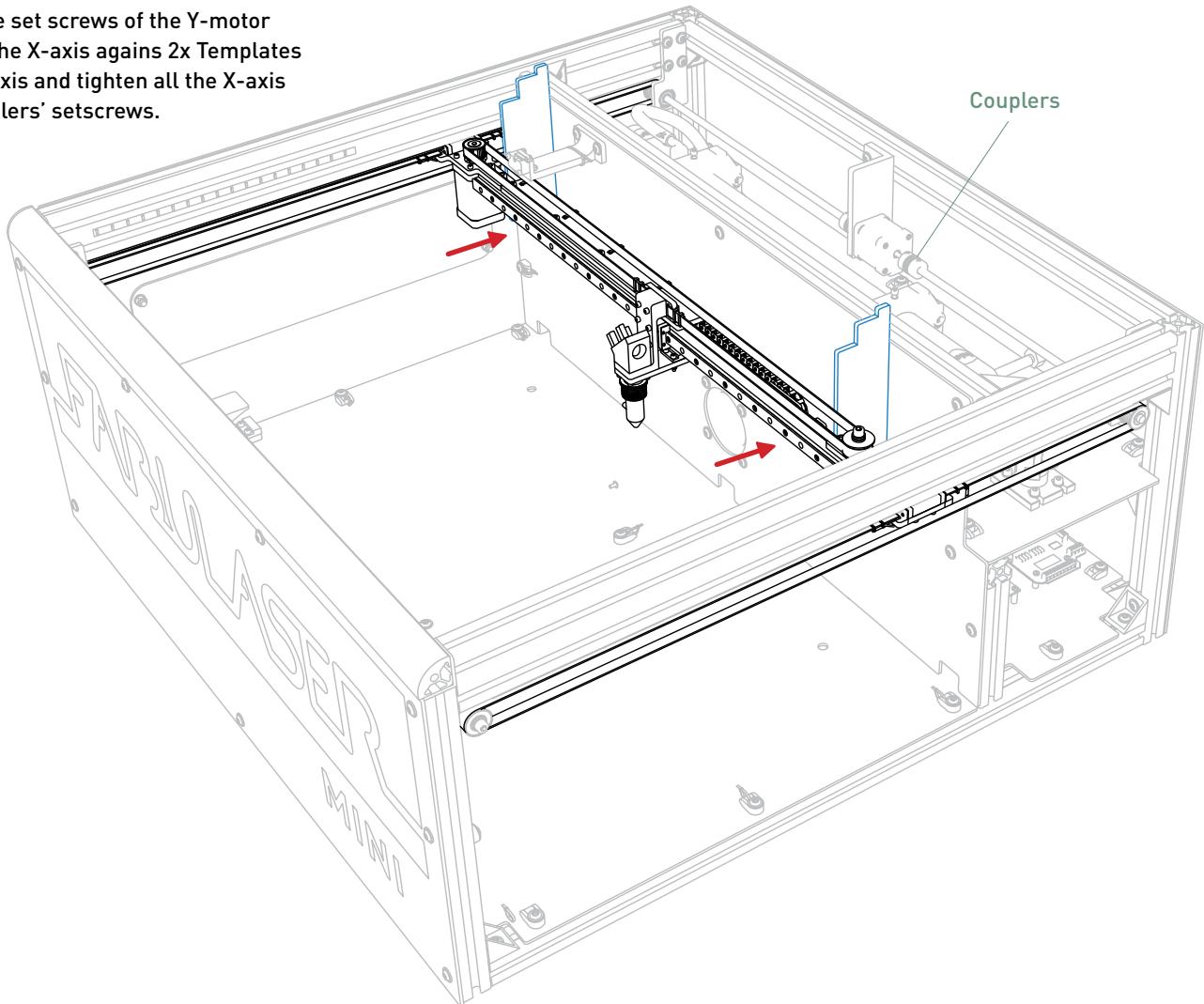
# STEP 24. ALIGNING THE Y-AXIS

Step 24/33

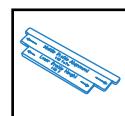
⌚ 15 min



**R89.** Loosen the set screws of the Y-motor Couplers. Push the X-axis against 2x Templates 2 to align the Y-axis and tighten all the X-axis screws and Couplers' setscrews.



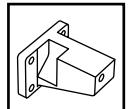
**1x** Allen Key 1.5  
**1x** Allen Key 3  
**1x** Allen Key 5



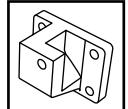
**2x** Template 2

# STEP 25. INSTALLING THE PISTONS

Step 25/33  40 min



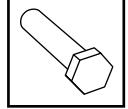
**1x** Piston Support Left



**1x** Piston Support Right



**1x** Window Piston Left  
**1x** Window Piston Right



**1x** H-screw M6-30  
**1x** H-screw M6-60



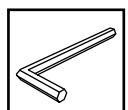
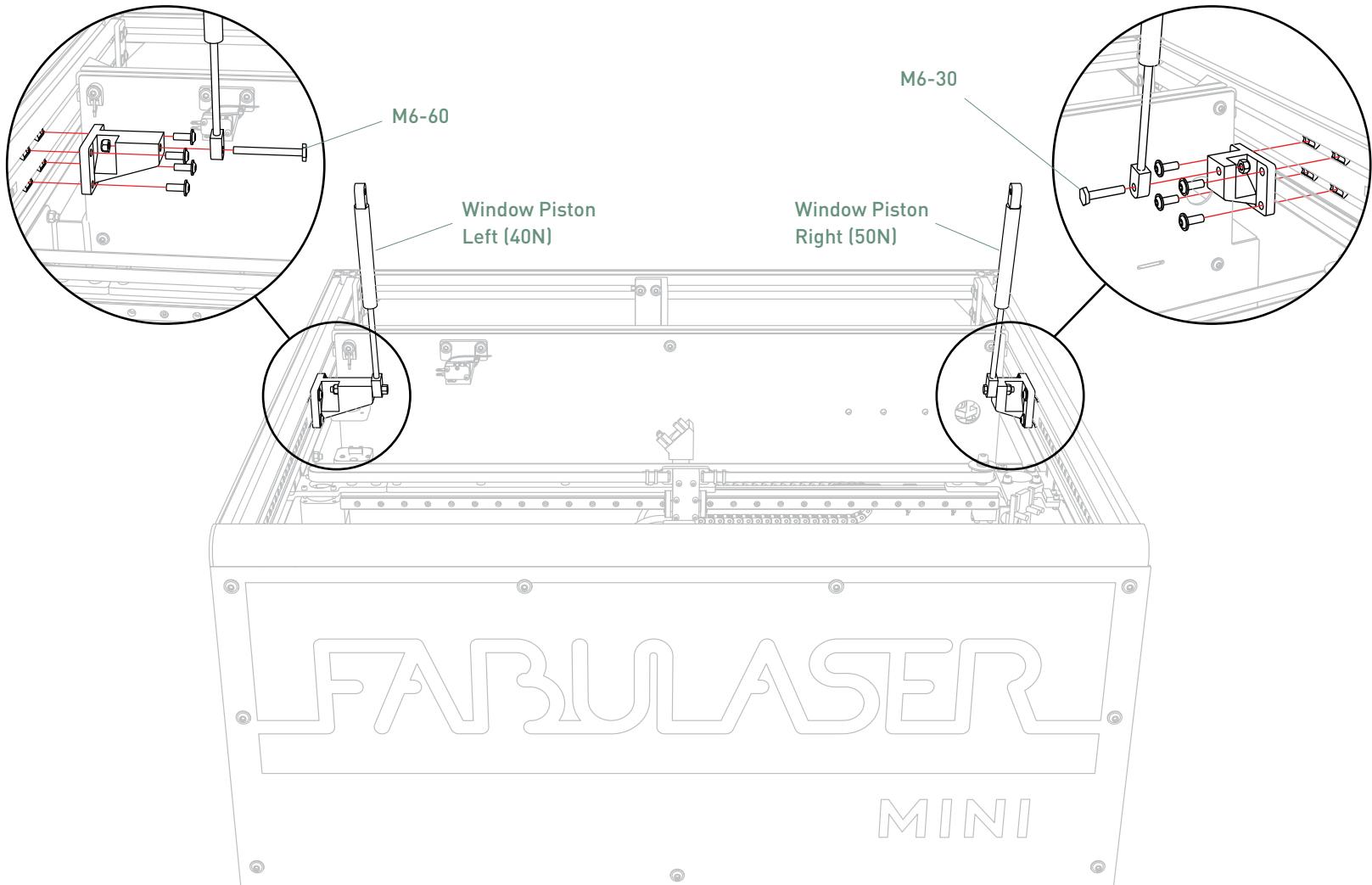
**8x** B-screw M6-16



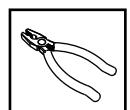
**8x** T-nut M6



**2x** Lock Nut M6



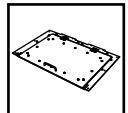
**1x** Allen Key 3  
**1x** Allen Key 5



**1x** Small plier **or**  
**1x** Wrench 10

# STEP 26.1 INSTALLING TOP PANELS SET

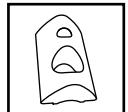
Step 26/33  20 min



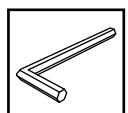
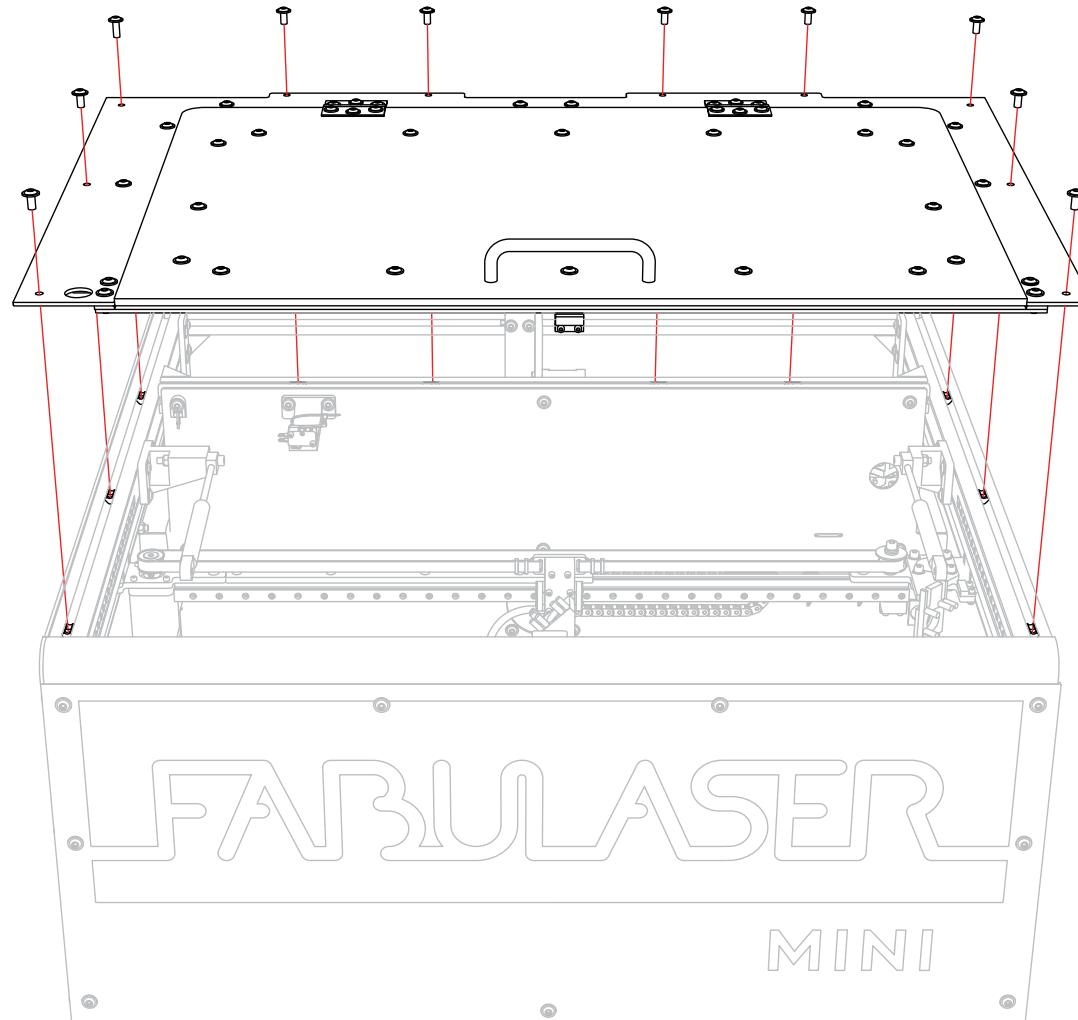
**1x** Prepared Top Panels and Window (Step 18)



**10x** B-screw M6-12



**10x** T-nut M6

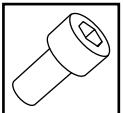


**1x** Allen Key 1.5  
**1x** Allen Key 5

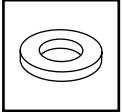
# STEP 26.2 FINALIZING THE WINDOW

Step 26/33

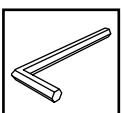
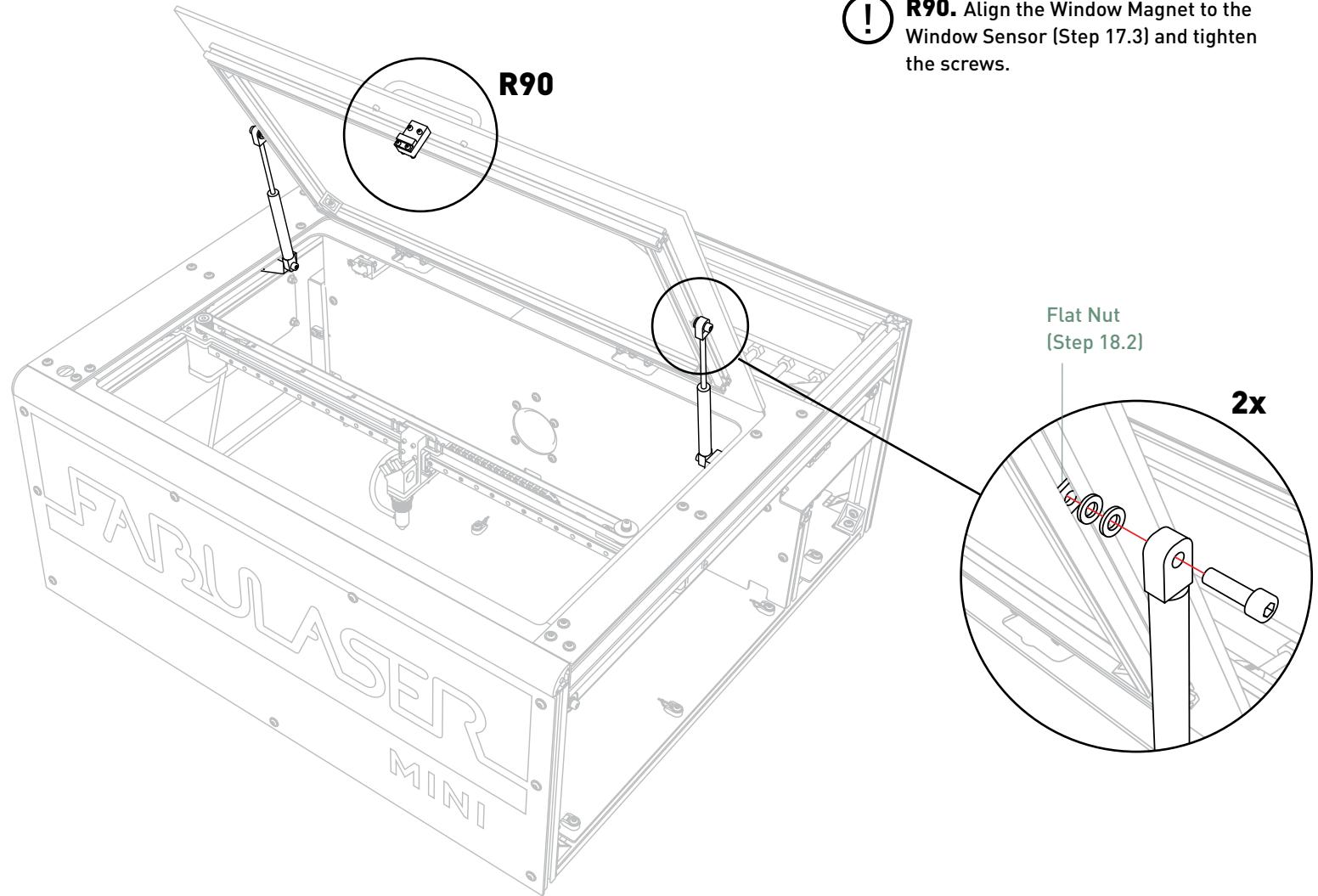
⌚ 20 min



**2x** C-screw M6-20



**4x** Washer M6

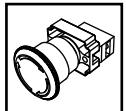


**1x** Allen Key 5

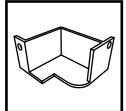
# STEP 26.3 INSTALLING THE EMERGENCY BUTTON

Step 26/33

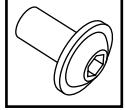
⌚ 10 min



**1x** Emergency Button  
(with screws in)



**1x** Cover



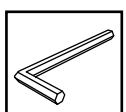
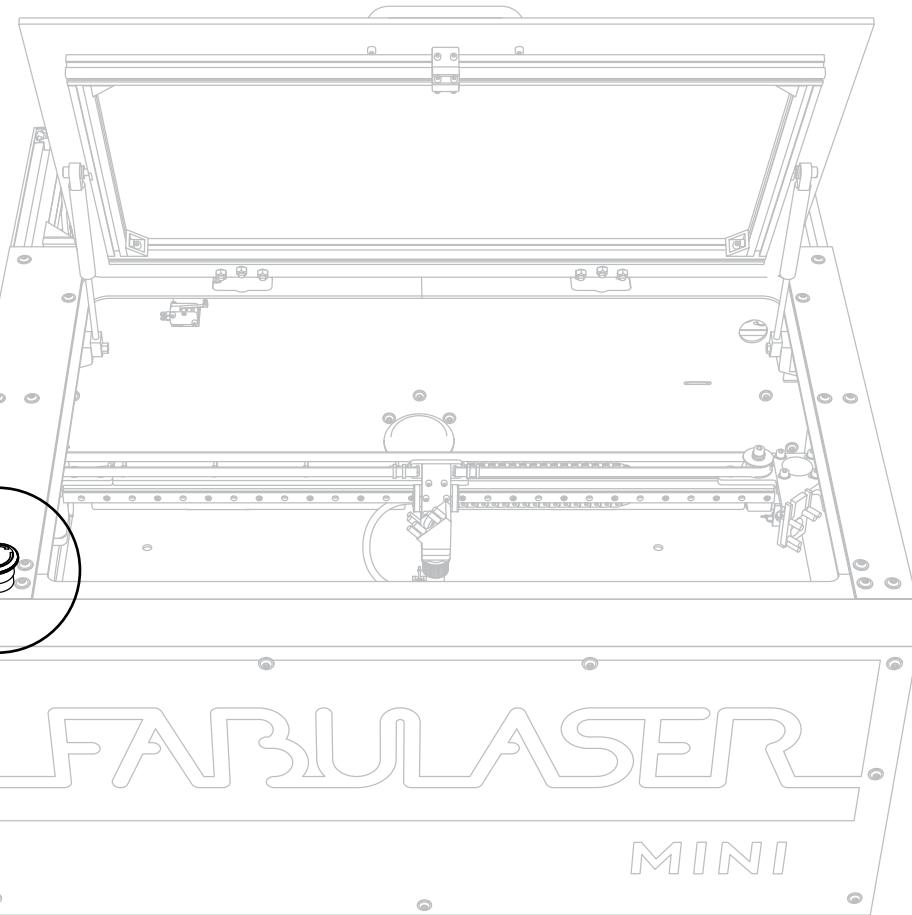
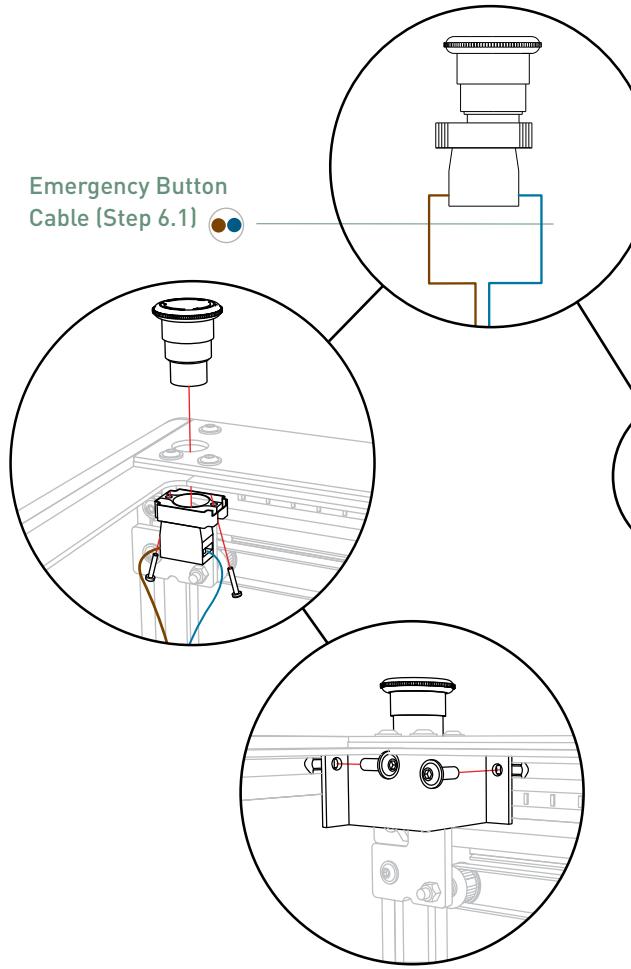
**2x** B-screw M6-12



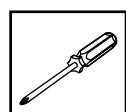
**2x** T-nut M6



**R91.** Attach the Emergency Button Cable to the Emergency Button installed in Step 6.1.



**1x** Allen Key 5



**1x** Screwdriver  
Phillips

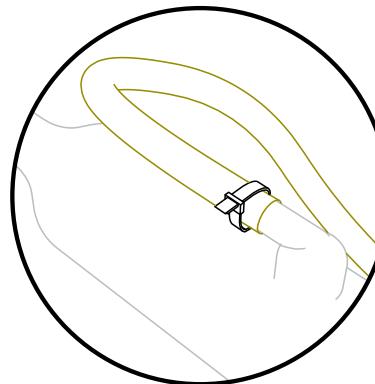
# STEP 27. FINAL CHECKING AND ADJUSTMENTS

Step 27/33

⌚ 30 min

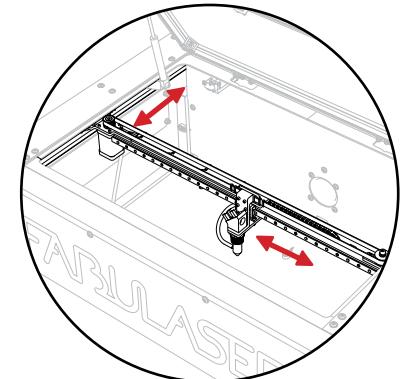
## Securing the water flow

- Make sure all tubes connections are securely tightened with a cable tie or clamps.
- Connect the water chiller to the power and leave it on for 5 min observing if there is any water leaking from the water connections. If it leaks, redo the connection.



## Checking the mechanics

- Make sure that the Y and X-axis are aligned and moving smoothly (if you move them too fast there will be a noise).
- Make sure the belts are tight enough and equally.



## Checking the closures

- Make sure there is no open gap in the housing, checking inbetween all the panels and frame.
- Tighten all screws except the ones fixing the mirror holders.
- Check if the window is closing properly and well aligned to the top panel set.

## Checking the electronics

- Double check if all wiring connections are correct.
- Connect the machine to the power and turn it on and off quickly to check if the power connections are correct.
- Test the emergency button by pressing it while the machine is on. It should turn off immediately.
- Check if the Window Sensor and switch are working by ???

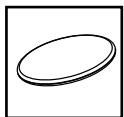
## Securing the laser path

- Make sure all parts are securely fixed and nothing can get in the way of the the laser path. If necessary use more cable ties.
- Make sure the cable ties are tightened.

# STEP 28.1 THE LASER BEAM OVERVIEW

Step 28/33

⌚ 10 min



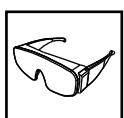
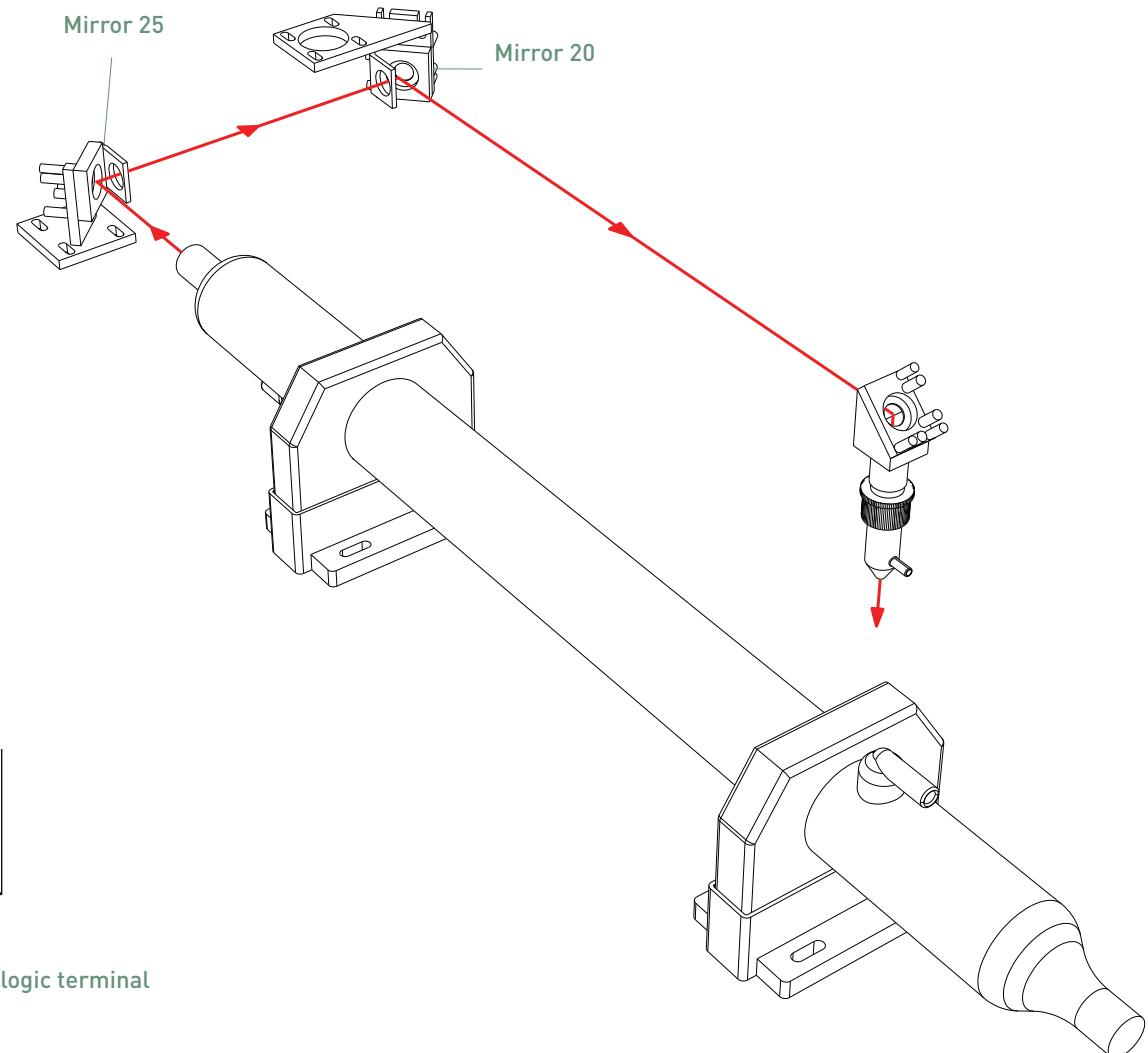
1x Mirror 20  
1x Mirror 25



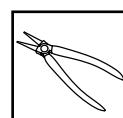
- R92.** Insert the mirrors in the Mirror Holders carefully.
- R93.** Wear clothes that cover most of the body and safety goggles during the whole step.
- R94.** Do not stand in the direction of the laser beam during the shootings.
- R95.** Remove the logic of the Laser Power Supply to enable the shootings through the Laser Power Supply button.
- R96.** To shoot the laser, quickly press the button of the Laser Power Supply.
- R97.** Use two overlapping pieces of tape to calibrate the laser. Only one piece will burn too much and possibly create fire.



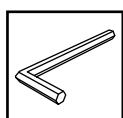
- H8.** How to hold the mirror? p.12
- H9.** How to insert the mirror? p.13



1x Safety Goggles



1x Needle Nose Pliers

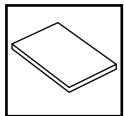


1x Allen Key 2.5

# STEP 28.2 LASER TEST AND LASER TUBE ALIGNMENT

Step 28/33

⌚ 10 min



**1x** Wood Plank  
(aprox. 15 x 15 mm)



**R98.** Place the wood plank in front of the laser to make the first test.

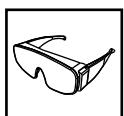
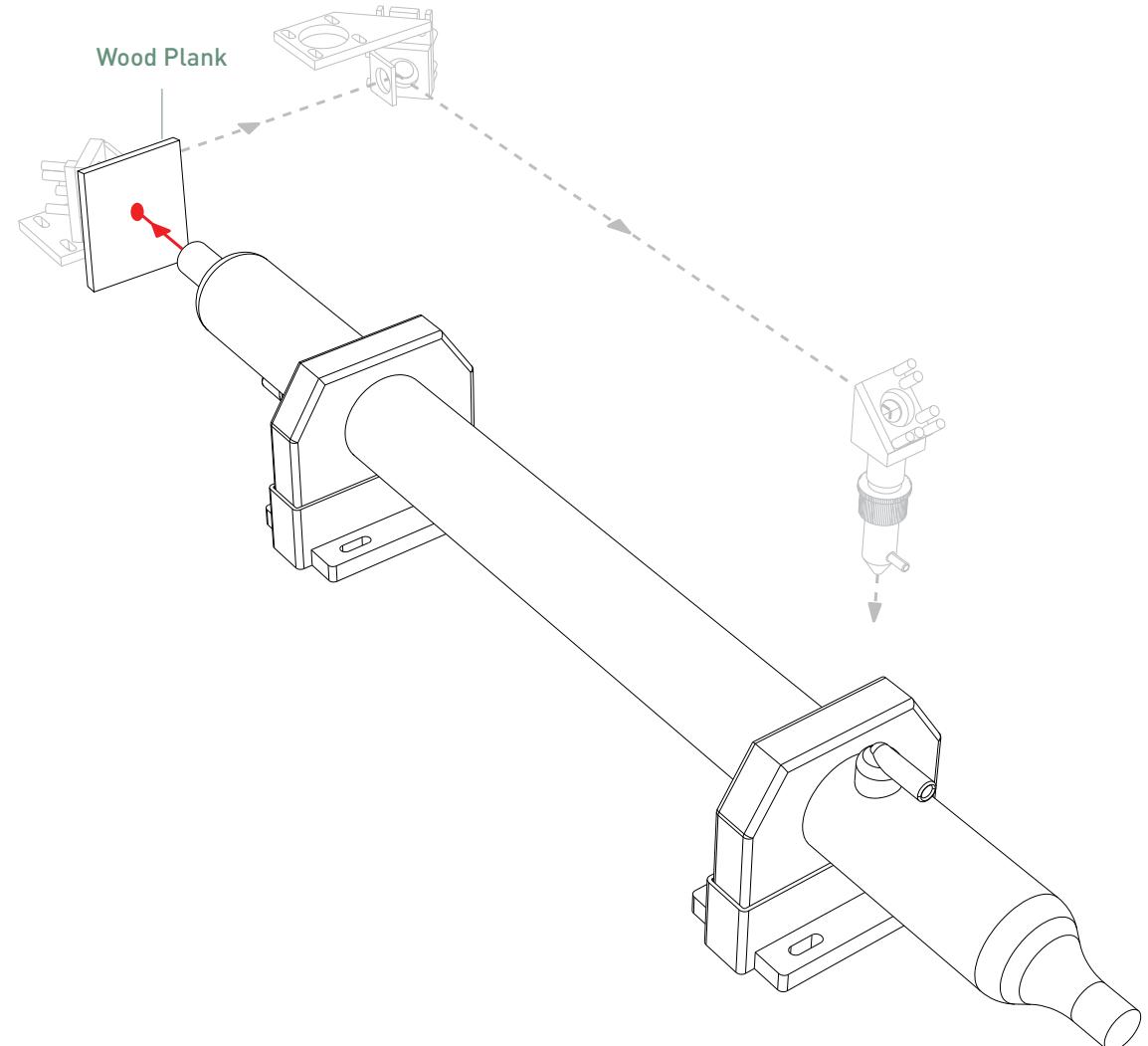
**R99.** Turn on the machine and the water chiller.

**R100.** Quickly press the button of the Laser Power Supply.

**R101.** Turn off the machine to check the result.

**R102.** Align the laser tube with the Laser Panel, making sure both Laser Holders have the same distance from the panel's edge.

**R103.** Tighten the screws of the Laser Holders and Mirror Holders enough to be able to move them with some strength for a fine calibration.

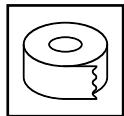


**1x** Safety Goggles

# STEP 28.3 LASER CALIBRATION - FIRST MIRROR

Step 28/33

⌚ 20 min



1x Masking Tape

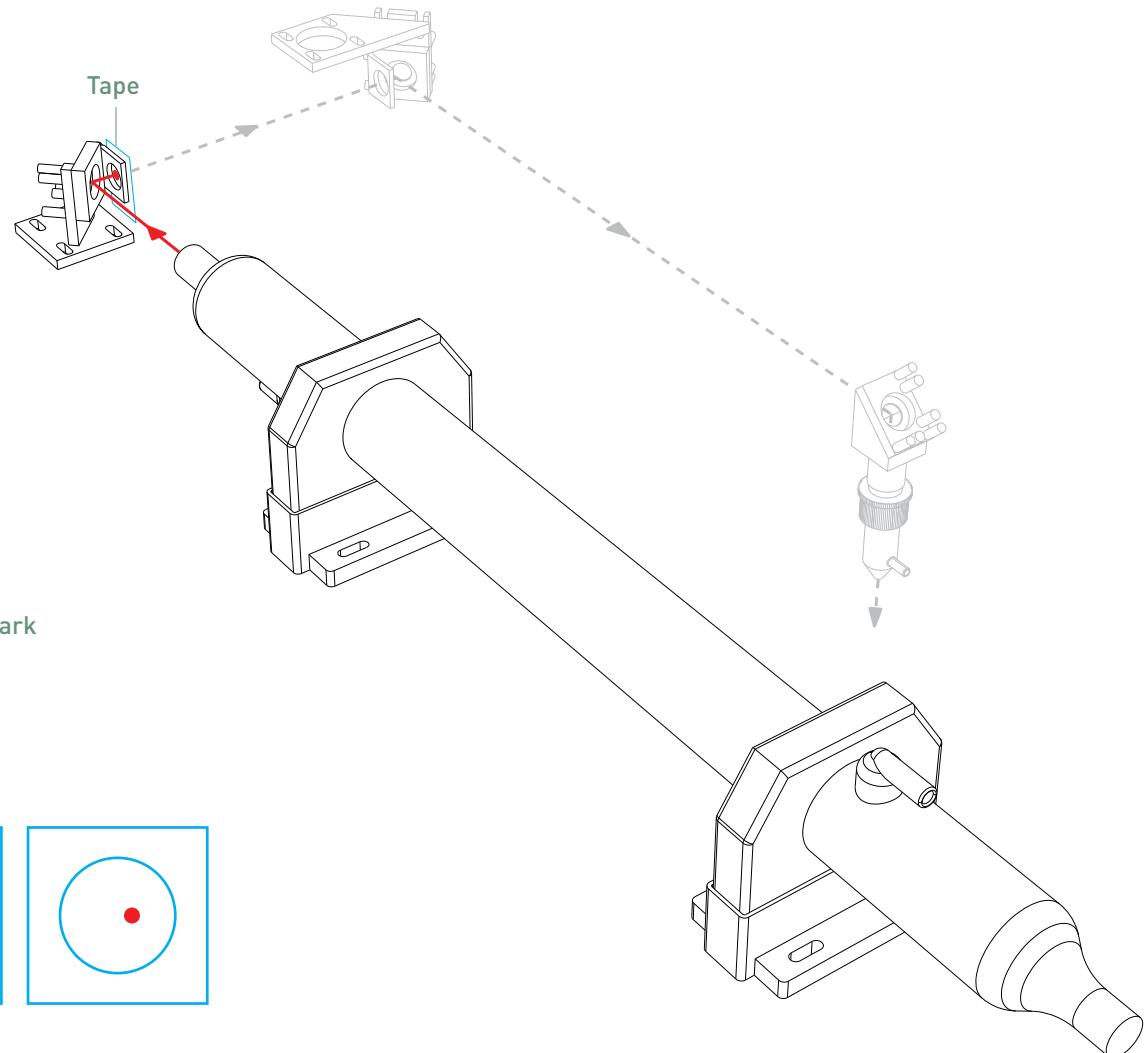


**R104.** Place the double layered tape on the outer frame of the first Mirror Holder. Press on the inner border of the frame to mark the tape with the frame shape.

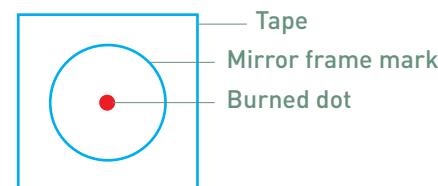
**R105.** Calibrate the angle of the mirror until the burned dot is more or less in the center of the frame mark.



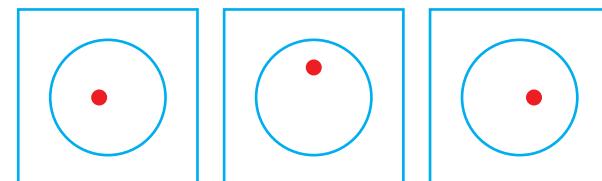
**H10.** How to calibrate the mirror angle? p.14



Correct result



Wrong results



1x Safety Goggles

# STEP 28.4 LASER CALIBRATION - SECOND MIRROR

Step 28/33

⌚ 20 min



1x Masking Tape



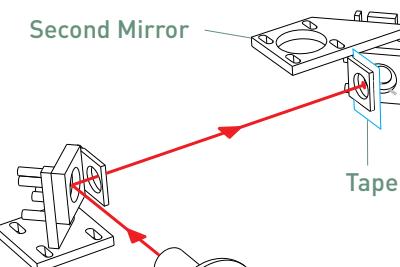
**R106.** The goal of this step is to align the laser beam with the Y-axis.

**R107.** Start by moving the X-Axis as close as possible to the Separator Panel. Place the double tape on the outer frame of the second Mirror Holder and shoot the laser.

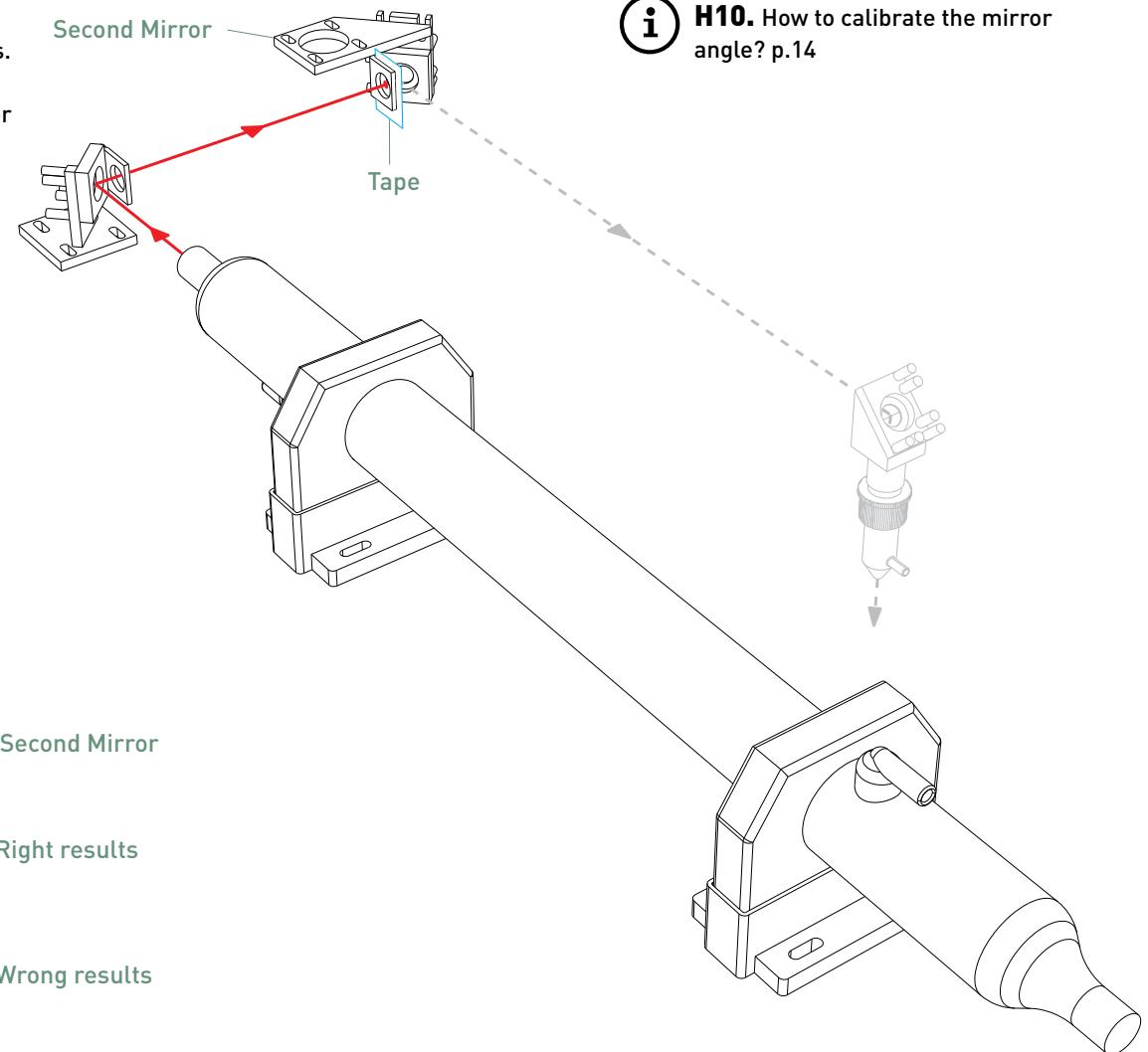
**R108.** Move the second mirror to the mid-range position and add one layer of tape on top of the previous tape. Shoot the laser again and observe the position of the first and second burned dots.

**R109.** Calibrate the mirror aiming to align the dots and repeat the process until the dots are overlapping.

**R110.** In this stage it is more important that the dots are overlapping than centralized.



**H10.** How to calibrate the mirror angle? p.14



1x Safety Goggles

# STEP 28.5 LASER CALIBRATION - SECOND MIRROR

Step 28/33

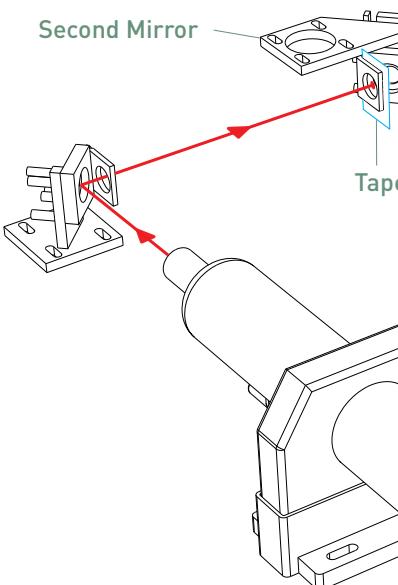
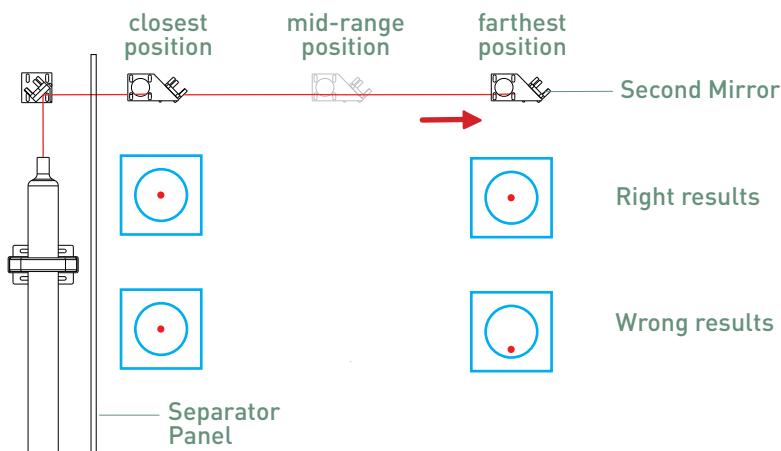
⌚ 15 min



1x Masking Tape



**R111.** Repeat the process described in the previous substep but this time alternating between closest position and farthest position.



**H10.** How to calibrate the mirror angle? p.14



1x Safety Goggles

# STEP 28.6 LASER CALIBRATION - LASER HEAD

Step 28/33

⌚ 30 min



1x Masking Tape

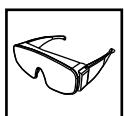
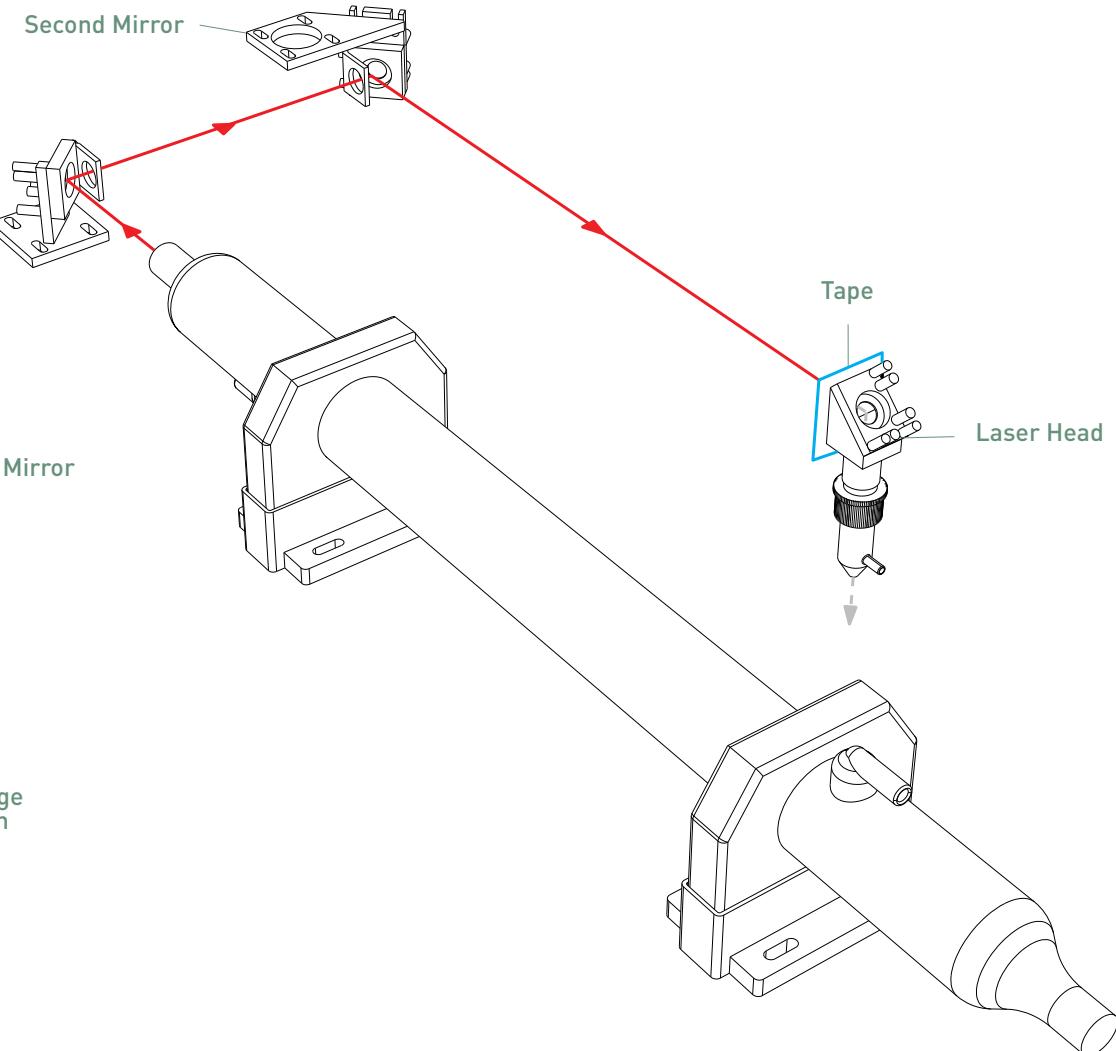
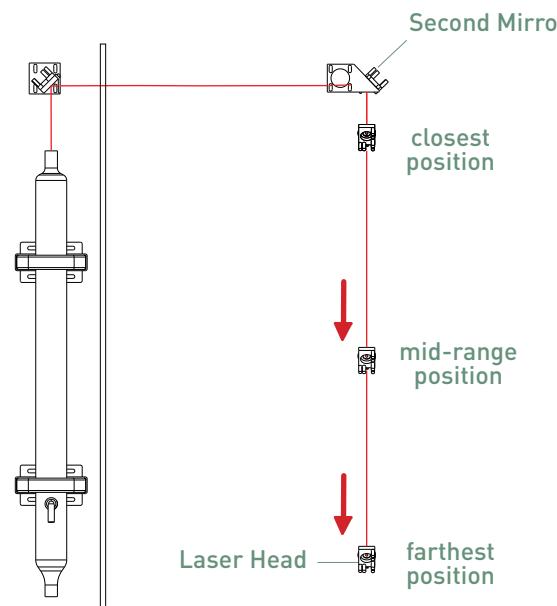


**R112.** Move the second Mirror Holder to the mid-range position and the Laser Head as close as possible to the Second Mirror.

**R113.** Place a double tape on the outer frame of the Laser Head and repeat the calibration explained in step 28.4, aligning first the closest position with the mid-range position, and then to the farthest position.



**H10.** How to calibrate the mirror angle? p.14



1x Safety Goggles

# STEP 28.7 LASER CALIBRATION - LASER HEAD

Step 28/33

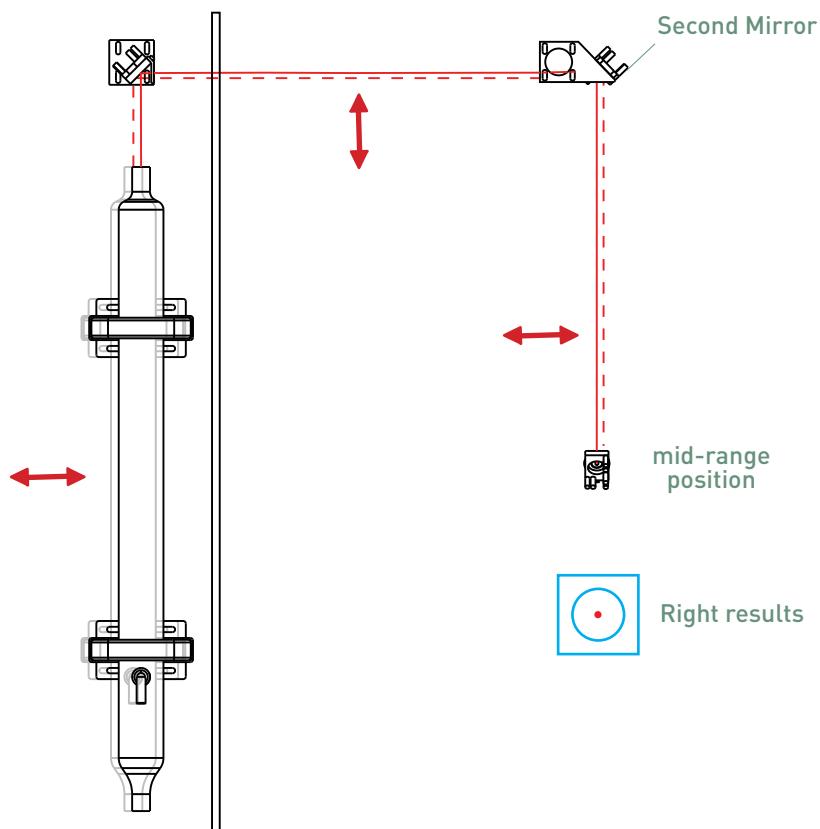
⌚ 15 min



1x Masking Tape



**R114.** Now that the beam is aligned and perpendicular, it is necessary to centralize the beam in the Laser Head.



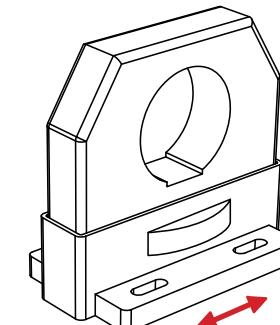
**R115.** To not lose the current alignment, tighten the nuts of the Mirror Holders and try to centralize the beam by moving the laser tube (move both holders equally left or right, up or down)

**R116.** If the beam cannot be centralized by moving the laser tube, move the entire Mirror Holder carefully.

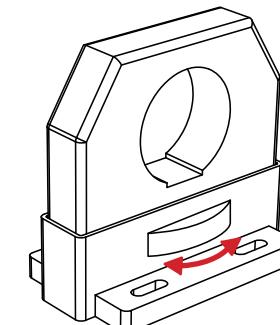
**R117.** After moving check if the beam is still aligned by performing steps 28.4, 28.4 and 28.6 again.



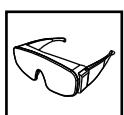
**H10.** How to calibrate the mirror angle? p.14



Move the Laser tube holder left or right to move the Laser Tube left or right.



Rotate the knob to move the Laser Tube up or down.



1x Safety Goggles

# STEP 28.8 LASER CALIBRATION - LASER HEAD

Step 28/33

⌚ 20 min



1x Masking Tape

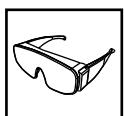
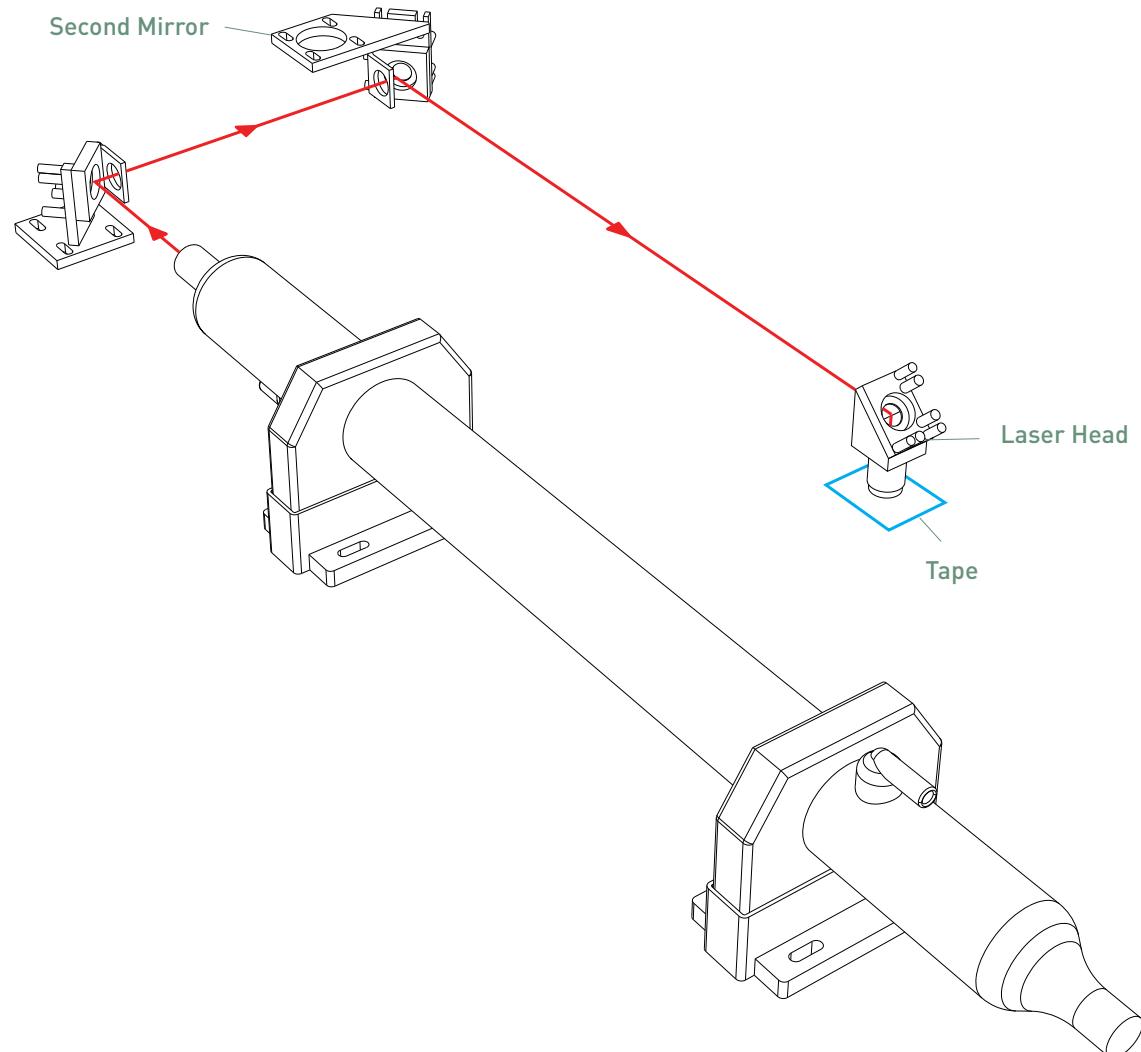


**R118.** Open the Laser Head and tape a piece of tape on the open tube. Press the tape against it to mark the circle area.

**R119.** Calibrate the mirror angle until the burn mark is in the middle of the circle.



**H10.** How to calibrate the mirror angle? p.14



1x Safety Goggles

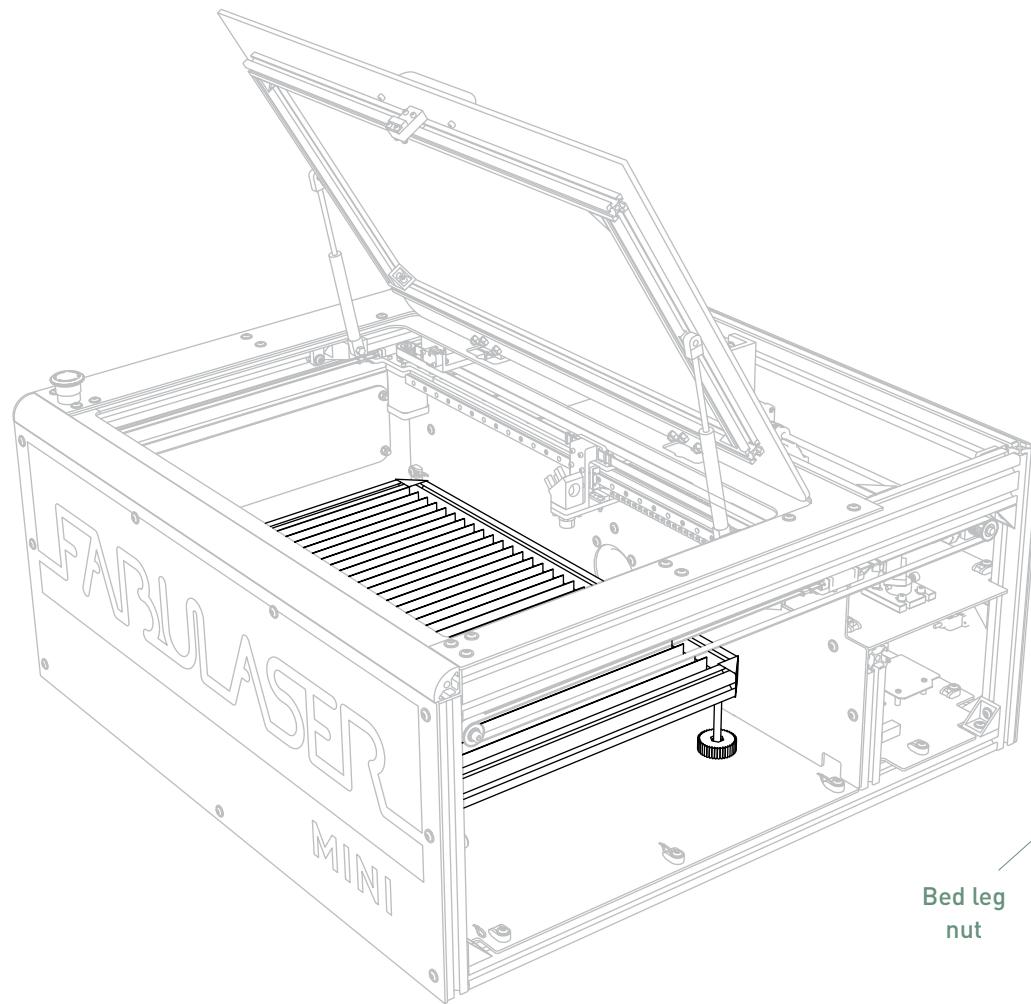
# STEP 29. INSERTING THE BED

Step 29/33

⌚ 5 min

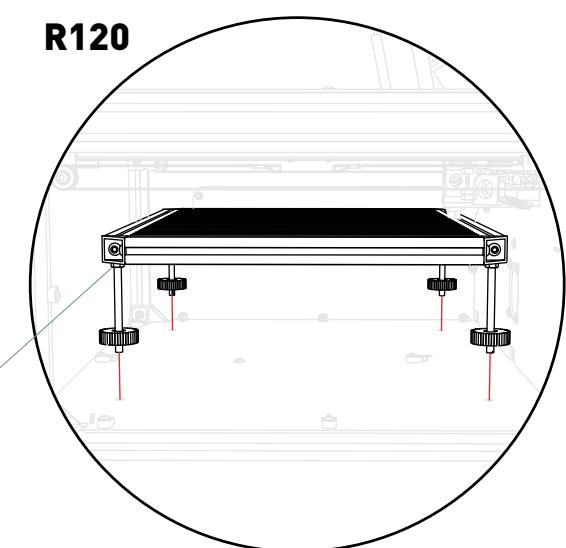


1x Prepared Bed  
(Step 12)



**R120.** Adjust the position of the bed legs to fit the holes in the Bottom Panel and fix them by tightening the nuts.

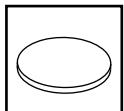
**R120**



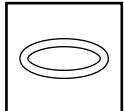
1x Wrench

# STEP 30. INSERTING THE LENS

Step 30/33  10 min



**1x** Laser Lens

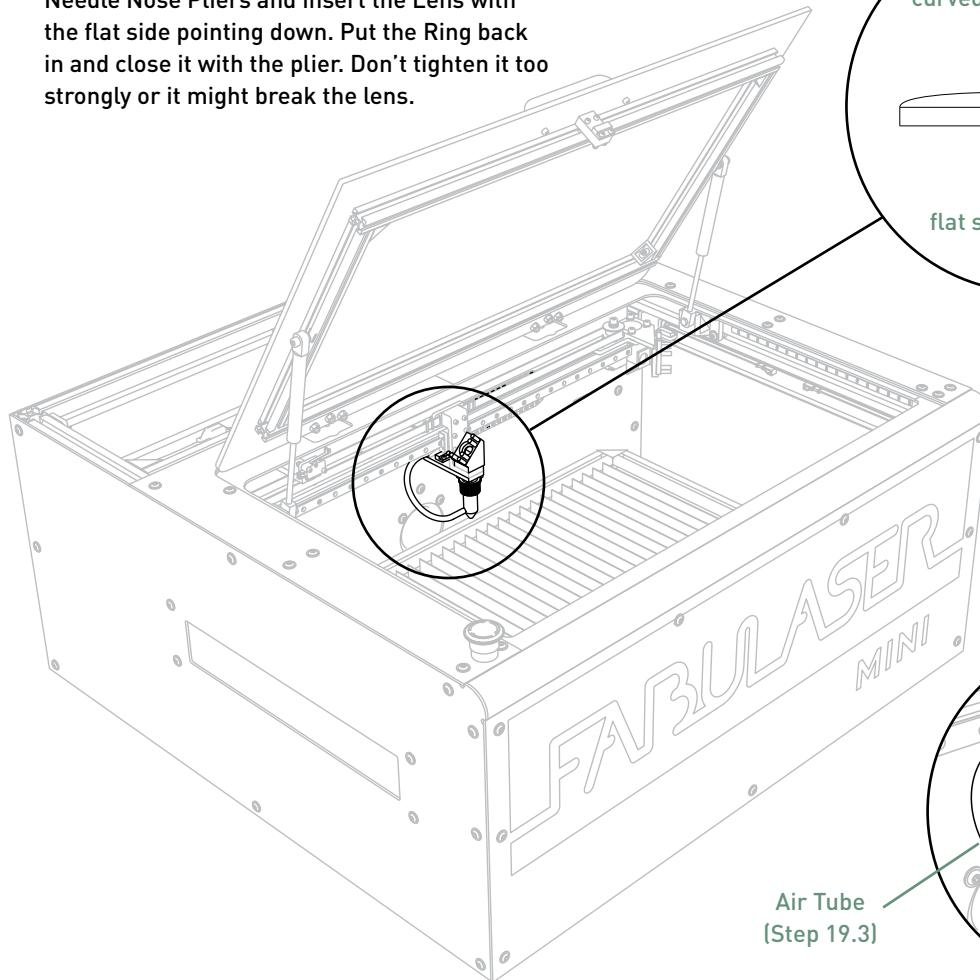


**2x** Rubber Ring



**R121.** DO NOT TOUCH THE LENS SURFACES.

**R122.** Open the ring of the Laser Head with Needle Nose Pliers and insert the Lens with the flat side pointing down. Put the Ring back in and close it with the plier. Don't tighten it too strongly or it might break the lens.



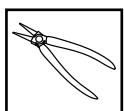
**R122**

curved side of the lens

flat side of the lens

Lens      Rubber Ring

Air Tube  
(Step 19.3)



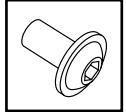
**1x** Needle Nose Plier

# STEP 31.1 INSTALLING RIGHT SIDE PANEL

Step 31/33      ⏰ 15 min



**1x** Prepared Side Panel Right (Step 17.1)



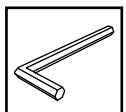
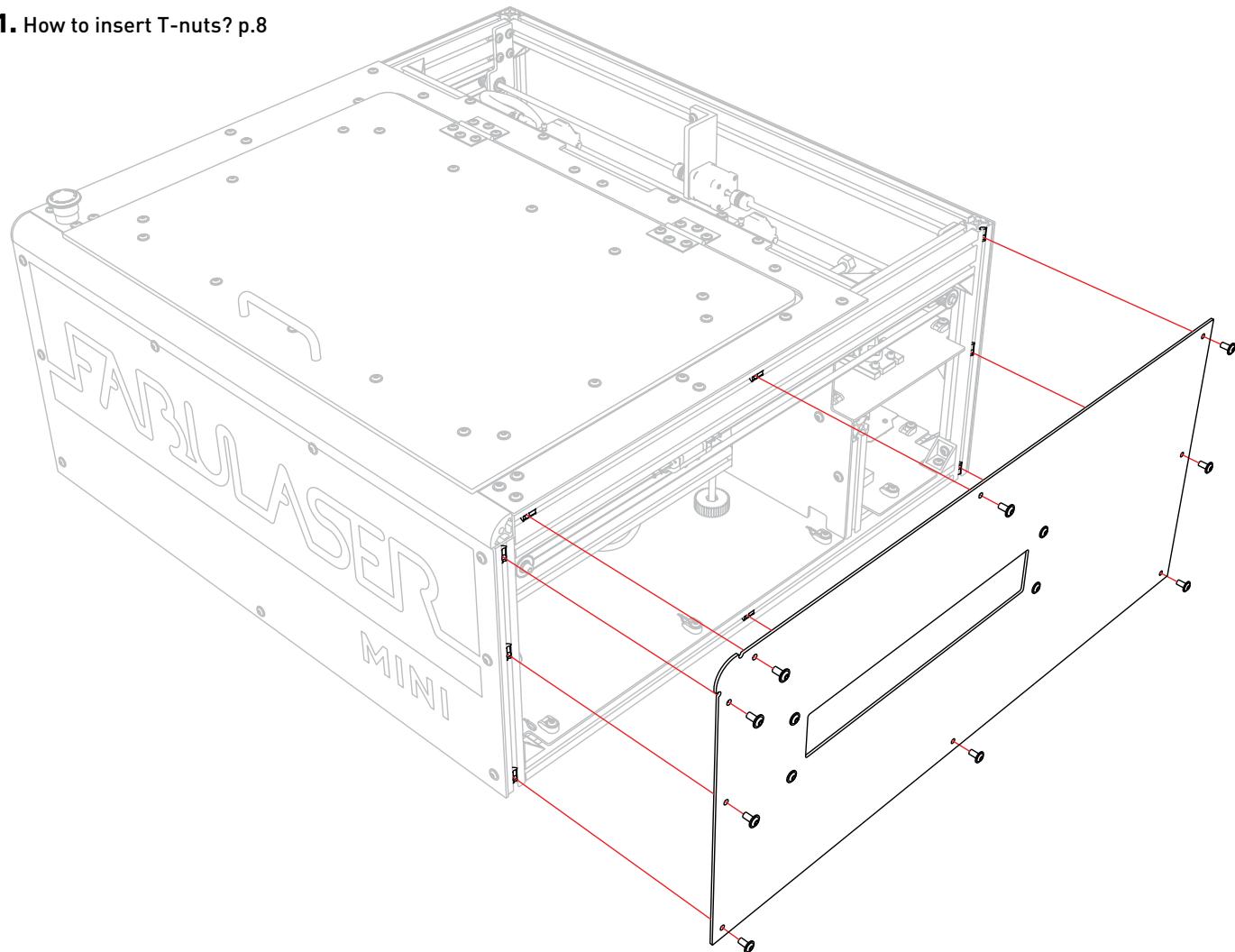
**9x** B-screw M6-12



**9x** T-nut M6



**H1.** How to insert T-nuts? p.8



**1x** Allen Key 1.5  
**1x** Allen Key 5

# STEP 31.2 SAFETY STICKERS - INSIDE

Step 31/33

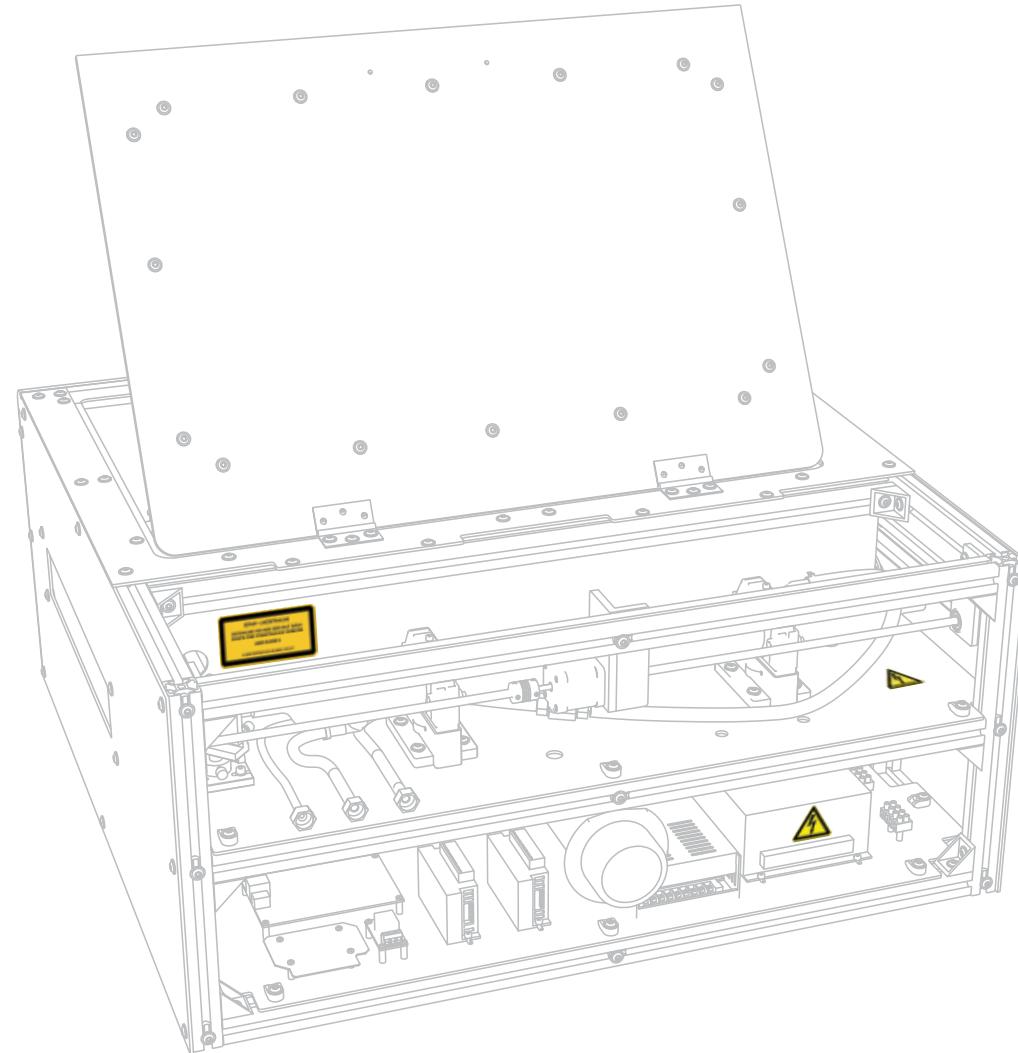
⌚ 5 min



**2x** High Voltage  
Sticker



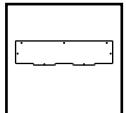
**1x** Danger Laser  
Sticker



# STEP 31.2 INSTALLING TOP BACK PANEL

Step 31/33

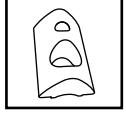
⌚ 15 min



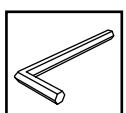
**1x** Top Back Panel



**8x** B-screw M6-12



**8x** T-nut M6



**1x** Allen Key 1.5

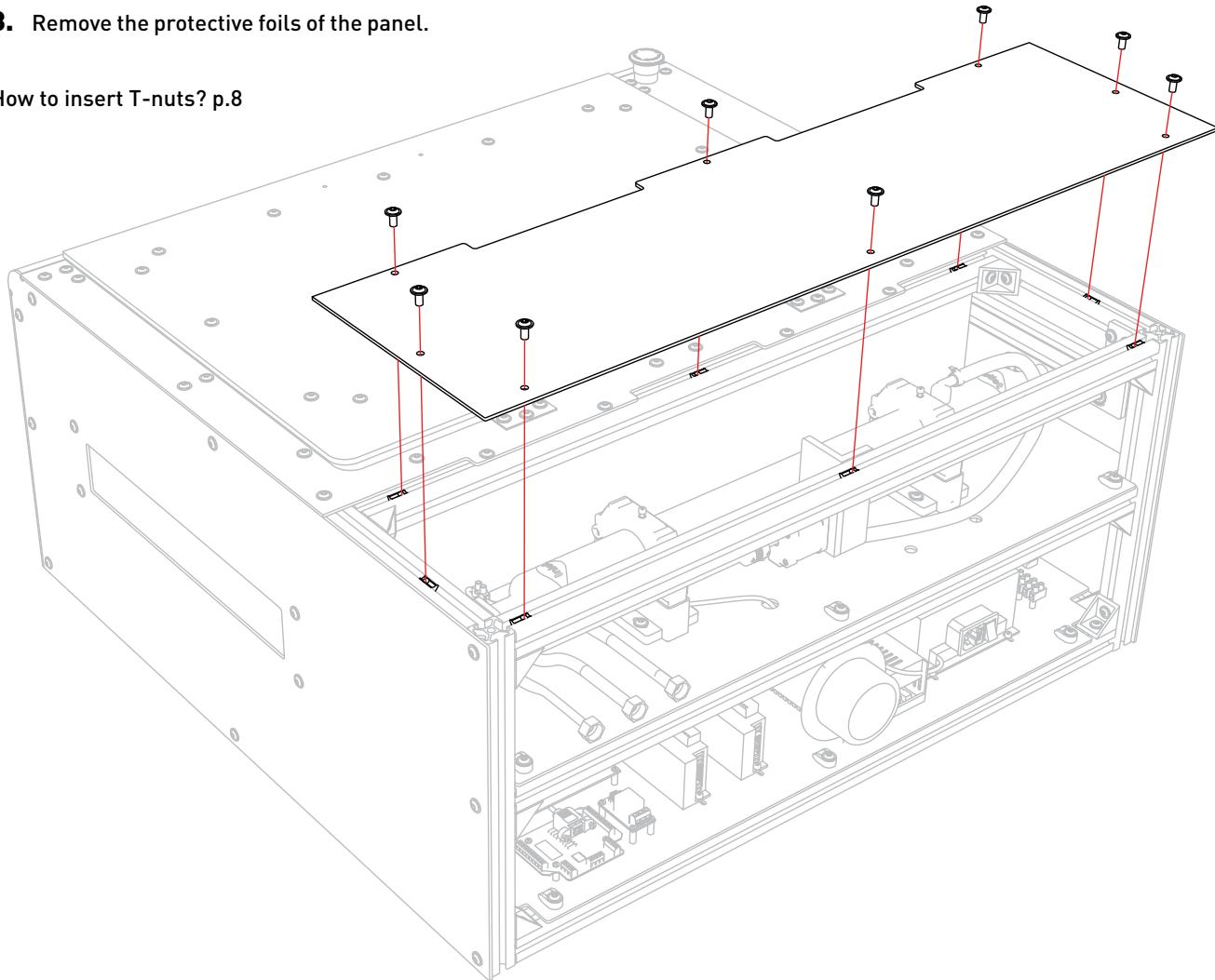
**1x** Allen Key 5



**R123.** Remove the protective foils of the panel.



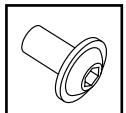
**H1.** How to insert T-nuts? p.8



# STEP 31.3 INSTALLING BACK PANEL

Step 31/33

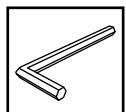
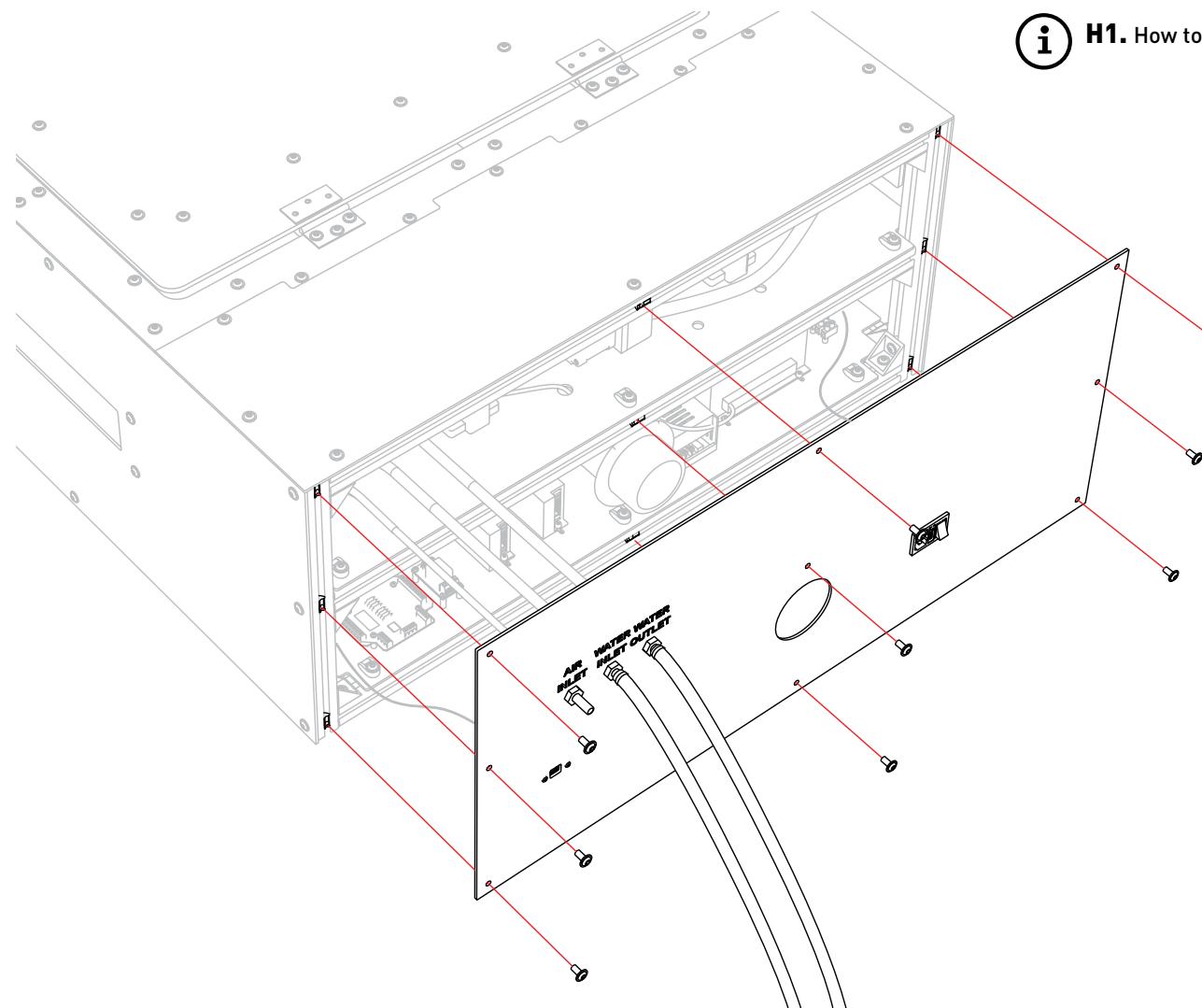
⌚ 20 min



**9x** B-screw M6-12



**9x** T-nut M6

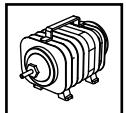


**1x** Allen Key 1.5

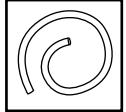
**1x** Allen Key 5

# STEP 32. ATTACHING AIR COMPRESSOR

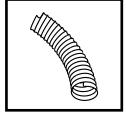
Step 32/33  20 min



**1x** Air Compressor  
(purchased  
separately)



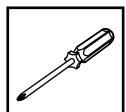
**1x** Air Tube Outside



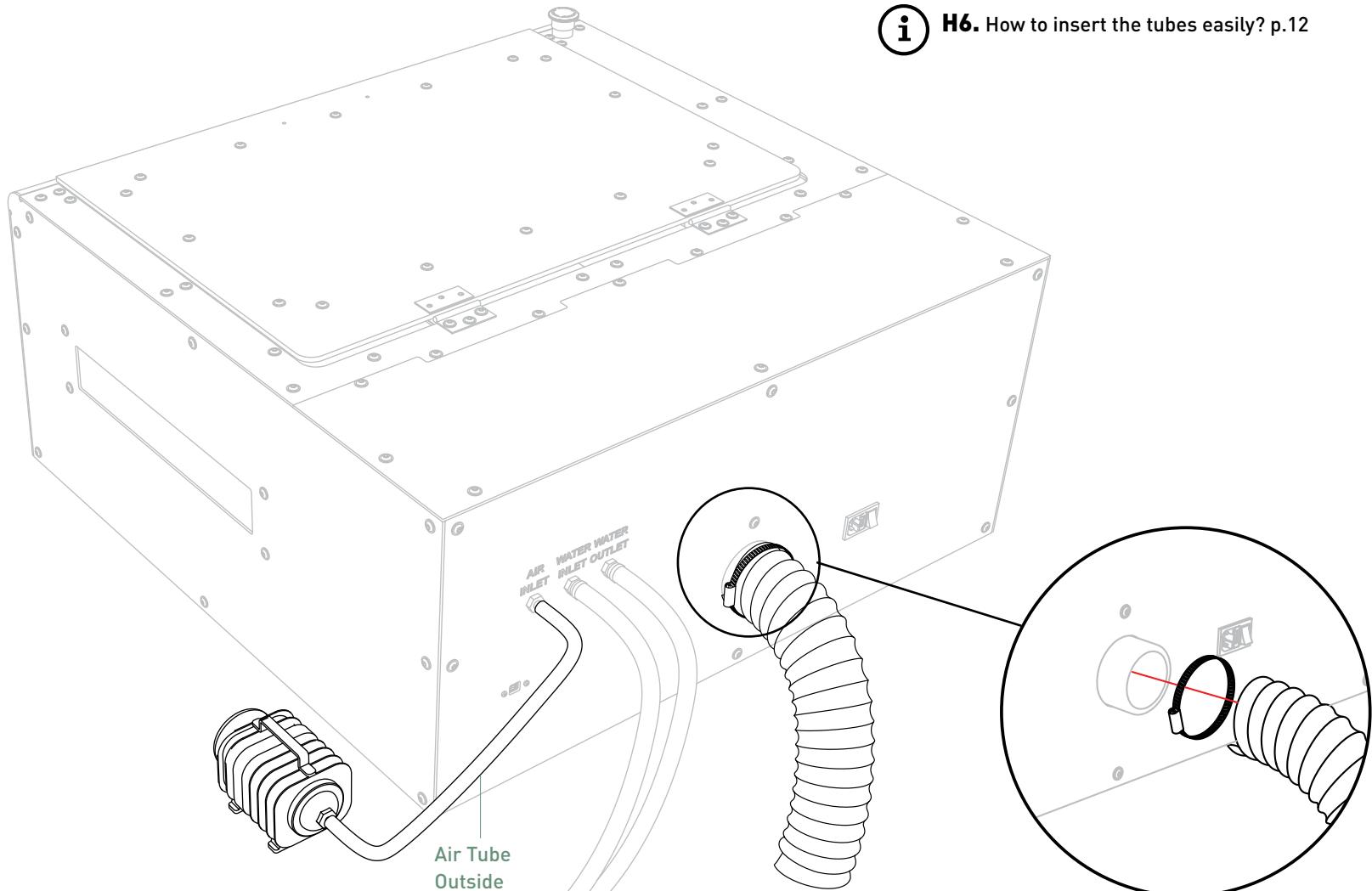
**1x** Exhaust Hose



**1x** Hose Clamps



**1x** Screwdriver  
Phillips



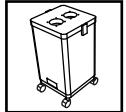
# STEP 33. ATTACHING THE AIR FILTER

Step 33/33

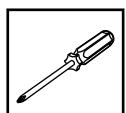
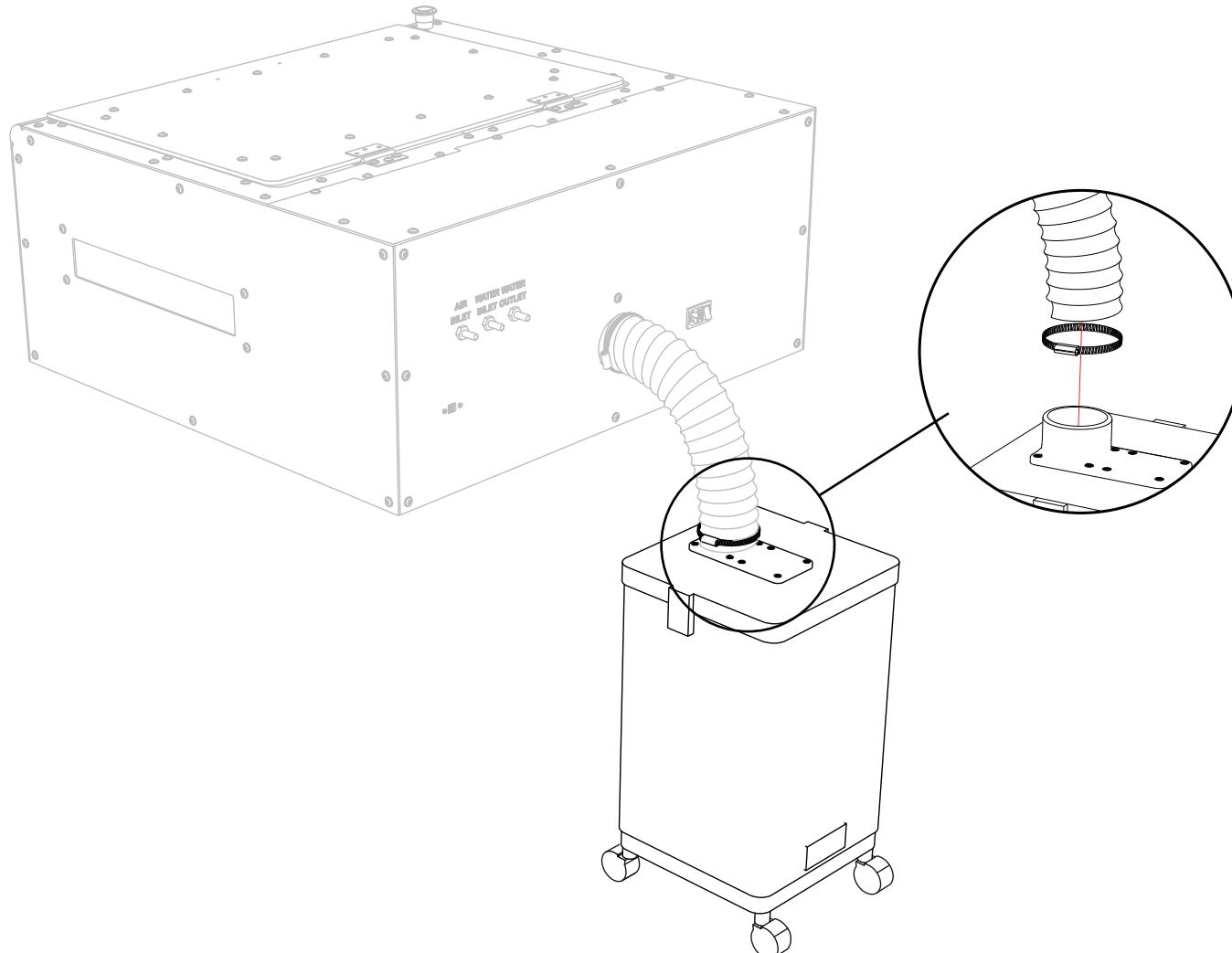
⌚ 20 min



**1x** Hose Clamps



**1x** Air Filter



**1x** Screwdriver  
Phillips

# STEP 34.1 SAFETY STICKERS - BACK

Step 34/33

⌚ 5 min



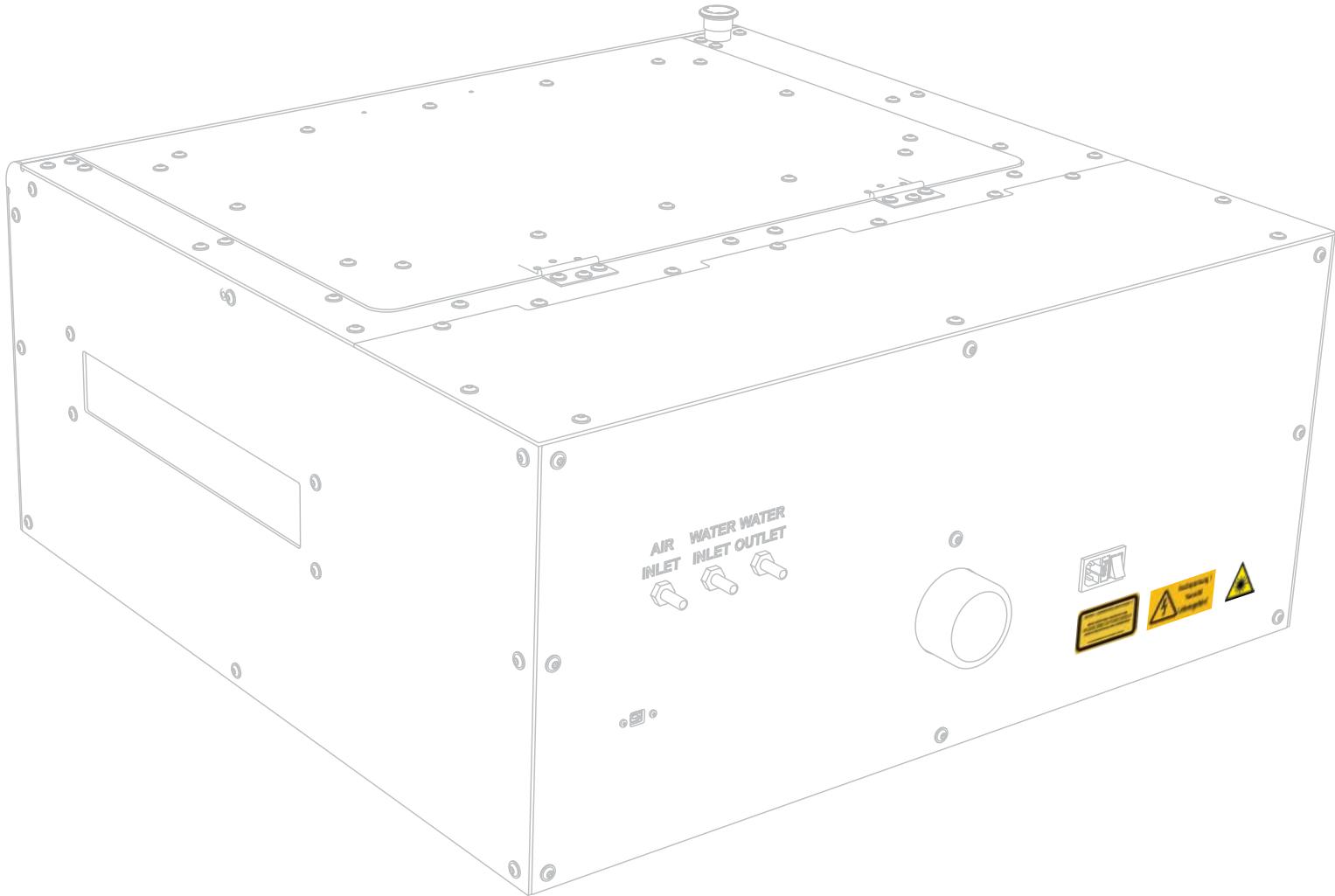
**1x** Laser Class  
Sticker



**1x** High Voltage  
Extended Sticker



**1x** Laser Beam  
Sticker



# STEP 34.2 SAFETY STICKERS - TOP

Step 34/33

⌚ 5 min



**1x** Caution Sticker



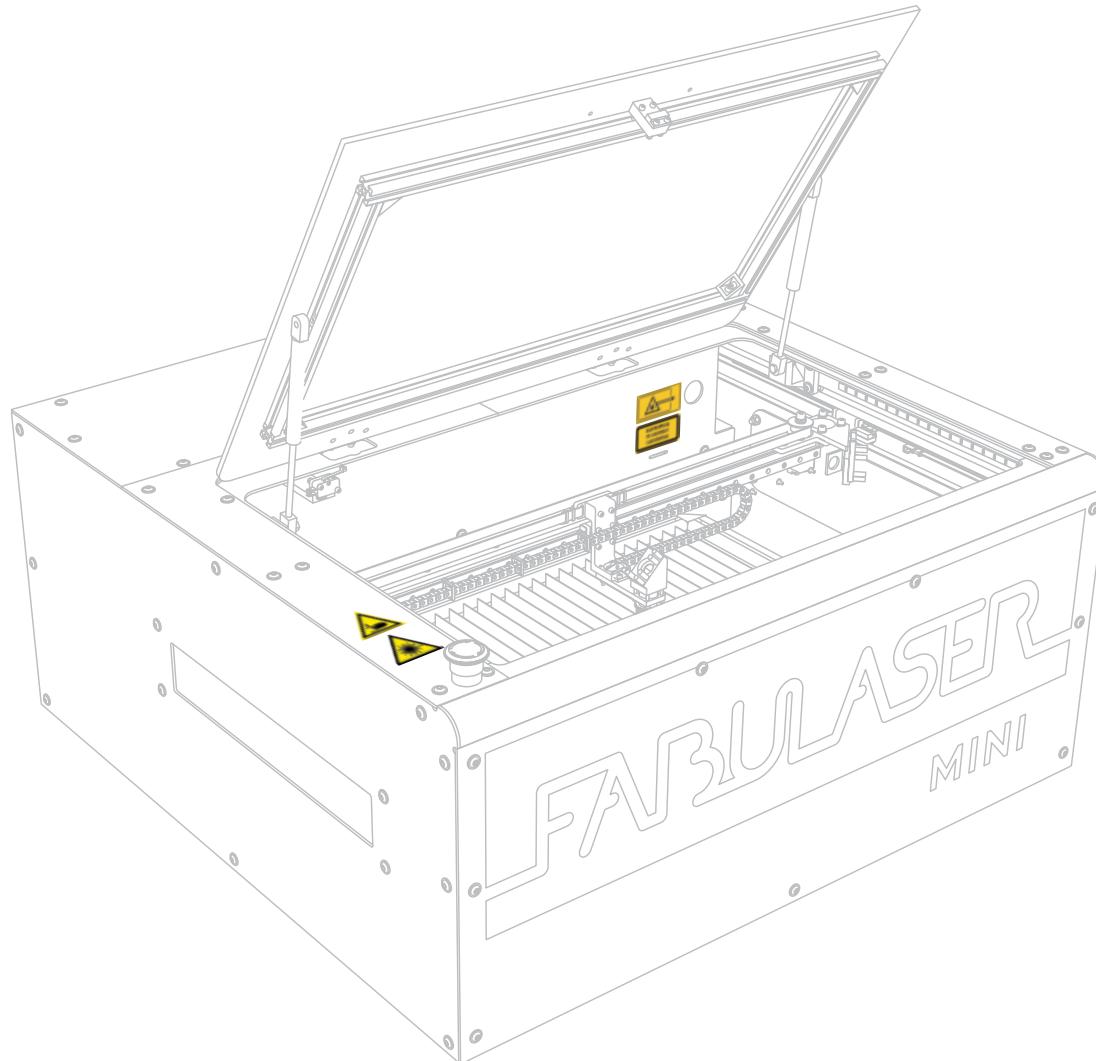
**1x** Laser Beam  
Sticker



**1x** Laser Path  
Sticker



**1x** Invisible Laser  
Sticker

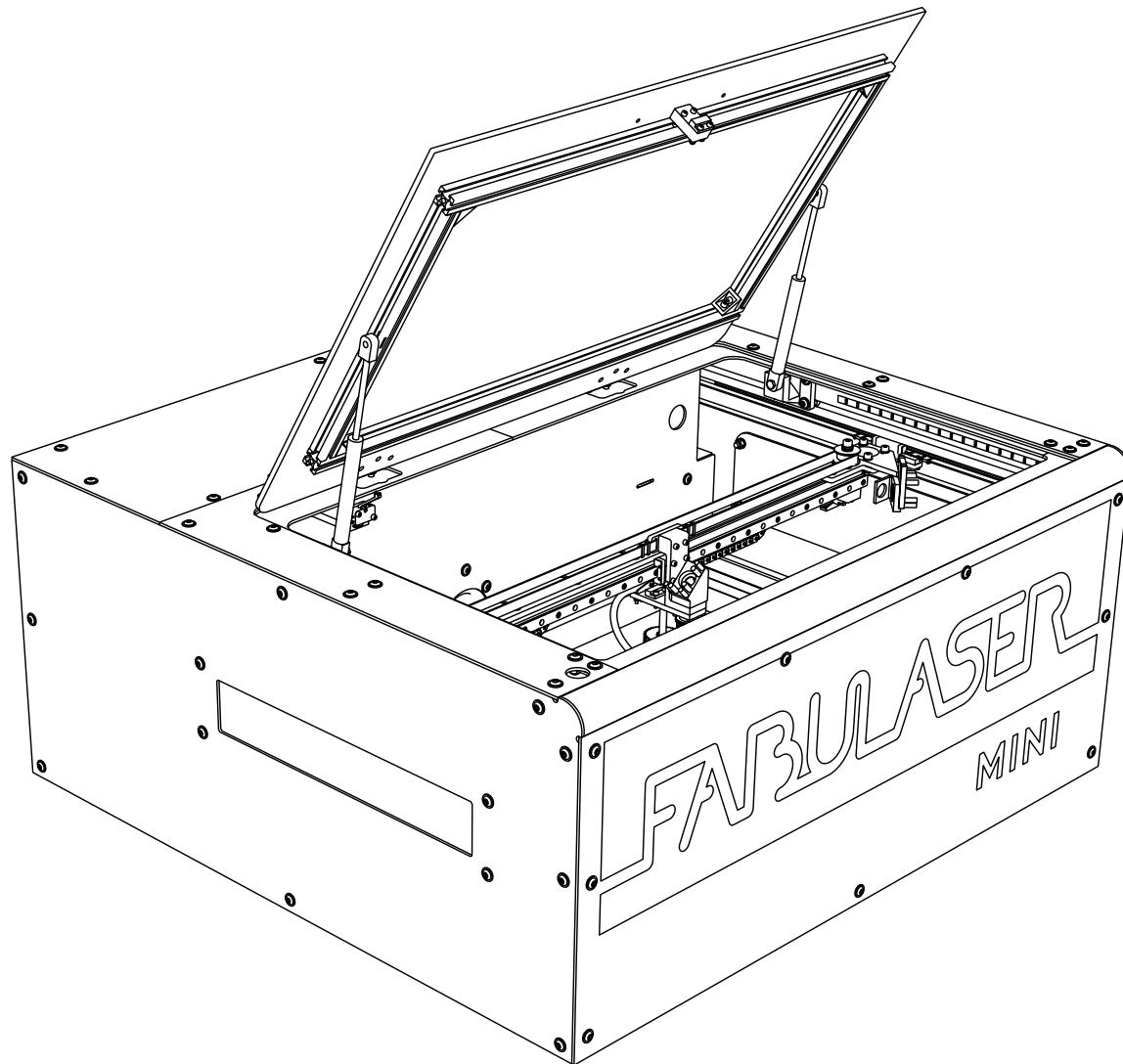


# STEP 35. CELEBRATE!

Congratulations! You just finished assembling a complete laser cutter machine!

Now your Fabulaser Mini is ready to assist you on your projects.

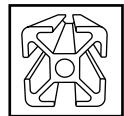
Have fun!



# TROUBLESHOOTING

PROBLEM	CHECKS AND SOLUTIONS	PROBLEM	CHECKS AND SOLUTIONS
The machine axis are not moving	<ul style="list-style-type: none"><li>• The machine is not switched on.</li><li>• The power plug is disconnected.</li><li>• The fuse, located inside the main power plug, is open or has been removed.</li><li>• The Stepper Power Supply does not receive electricity; check the relevant connections.</li><li>• The Stepper Power Supply is damaged; check if there are 24V with a multimeter.</li><li>• The Stepper Shield does not receive the 24V; check the relevant connections.</li><li>• If only one axis does not move, maybe that one Stepper Driver is damaged; change it and try again.</li><li>• The couplers, belts or pulley are loose; check them.</li><li>• The Endstop Switches are triggered; check if the axis are away from them and/or anything is blocking them.</li></ul>	The laser is not firing	<ul style="list-style-type: none"><li>• The machine is not switched on.</li><li>• The power plug is disconnected.</li><li>• The fuse, located inside the main power plug, is open or has been removed.</li><li>• The laser power supply does not receive electricity; check the relevant connections.</li><li>• The laser tube does not receive power; check Laser+ and Laser- connections.</li><li>• The chiller is switched off (the water flow sensor is not active); switch the water chiller on.</li><li>• The laser window is open; close it.</li><li>• The laser path lost its calibration; check it with masking tape, see “how to calibrate” the laser. (Step 21)</li><li>• The window switches and relative cables are damaged; check them and change them in this case.</li><li>• The GCode is wrong and does not contain any “M3” and “SXX” values.</li><li>• The “Laser Comm” cable is damaged; check it.</li><li>• The Laser Power Supply wiring is not correct; check it.</li></ul>
It is not possible to connect to the machine	<ul style="list-style-type: none"><li>• Within the UGS software, check if you are using the correct COM port (serial port); change it in this case.</li><li>• Check if the baud rate is 9600, change it in this case.</li><li>• Check if the USB to Serial connections are correct.</li><li>• The Arduino could be damaged; check if the green light (located into the Arduino board) is on.</li></ul>		
The machine stops in the middle of a job	<ul style="list-style-type: none"><li>• Check if the stepper motor cables are not close to the USB to Serial Cable.</li><li>• Check if your PC is not blocked and/or too slow.</li><li>• Check if the USB to Serial has not been accidentally removed.</li><li>• Check if the endstop have not been triggered during the job.</li><li>• Check if the chiller has not been powered off accidentally.</li></ul>		

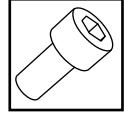
# LIST OF PARTS



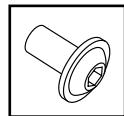
**2x** Profile 3060-770  
**2x** Profile 30-150  
**2x** Profile 30-350  
**2x** Profile 30-380  
**2x** Profile 30-400  
**2x** Profile 30-600  
**3x** Profile 30-770



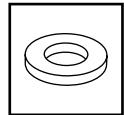
**1x** Profile Fillet



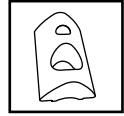
**20x** C-Screw M3-8  
**12x** C-Screw M3-10  
**31x** C-Screw M3-12  
**10x** C-Screw M3-16  
**10x** C-Screw M3-20  
**2x** C-Screw M3-30  
**20x** C-Screw M4-8



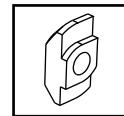
**16x** B-Screw M6-10  
**130x** B-Screw M6-12  
**71x** B-Screw M6-16



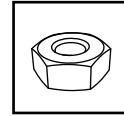
**8x** Washer M5  
**50x** Washer M6  
**2x** Washers M8 Big



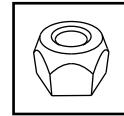
**25x** T-nut M3  
**4x** T-nut M4  
**173x** T-nut M6



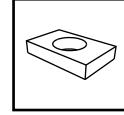
**16x** Hammer Nut M3  
**12x** Hammer Nut M4  
**4x** Hammer Nut M5



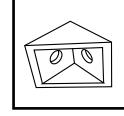
**10x** Nut M6



**16x** Lock Nut M3  
**8x** Lock Nut M4  
**8x** Lock Nut M5



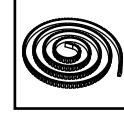
**22x** Flat Nut M6



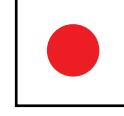
**4x** Bracket 20  
**30x** Bracket 30  
**4x** Bed Connector 20



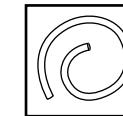
**2x** Linear Guide Y  
**1x** Linear Guide X



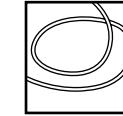
**1x** X-belt  
**2x** Y-belt



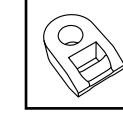
**1x** Red Dot Sticker



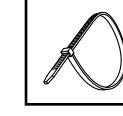
**1x** Water Outlet Tube Inside  
**1x** Water Inlet Tube Inside



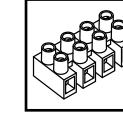
**1x** Power Cable  
**1x** Laser Power Cable  
**1x** Main Power Cable  
**1x** Emergency Button Cable  
**1x** Earth Cable  
**1x** Back Window Switch Cable  
**1x** Front Window Switch Cable  
**1x** Endstop Cable



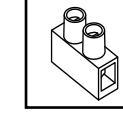
**24x** Wire Fixer



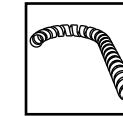
**200x** Cable Tie



**2x** Terminal Block

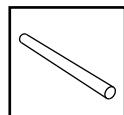


**2x** Laser Attachment

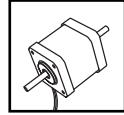


**1x** Cable Wrapper

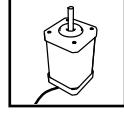
# LIST OF PARTS



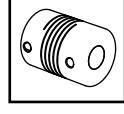
**1x** Y-shaft 350  
**1x** Y-shaft 400



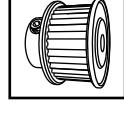
**1x** Y-motor



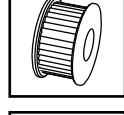
**1x** X-Motor



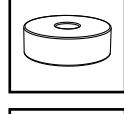
**2x** Coupler



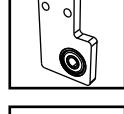
**2x** Y-pulley Back  
**1x** X-pulley



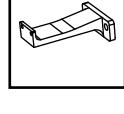
**2x** Y-pulley Front



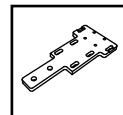
**1x** X-bearing



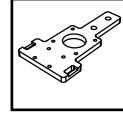
**2x** Y Back Bearings Holder



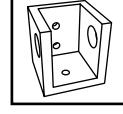
**1x** Back Window Switch Holder



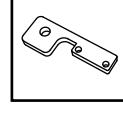
**1x** X-Holder Right



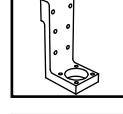
**1x** X-Holder Left



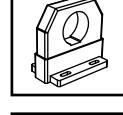
**2x** Y Front Pulley Holder Left



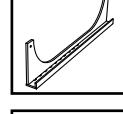
**1x** X-Endstop Holder



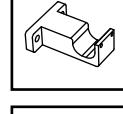
**1x** Laser Head Holder



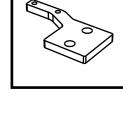
**2x** Laser Tube Holder



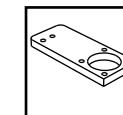
**1x** Chain Holder



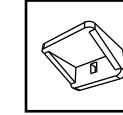
**1x** Front Window Switch Holder



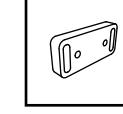
**1x** Y-Endstop Holder



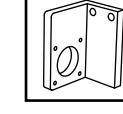
**1x** Chain End Holder



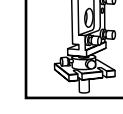
**1x** Front Window Holder



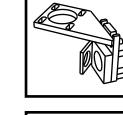
**1x** X-Belt Attacher



**1x** Y-Motor Attachment



**1x** Mirror Holder 25



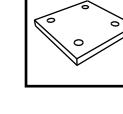
**1x** Mirror Holder 20



**1x** Laser Head

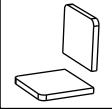
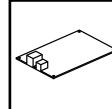
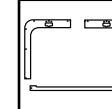
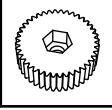
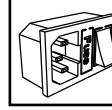
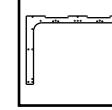
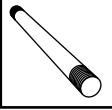
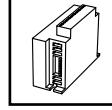
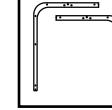
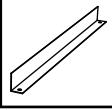
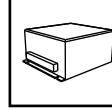
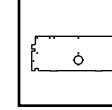
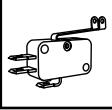
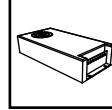
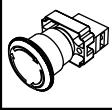
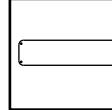
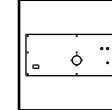
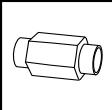
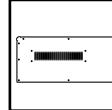
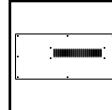
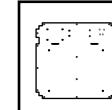
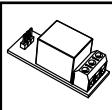
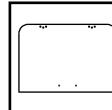
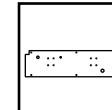


**4x** Rubber Ring

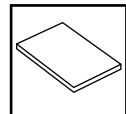


**3x** Second Mirror Support

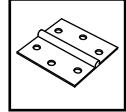
# LIST OF PARTS

	<b>2x</b> Pair of Frame Spacers		<b>1x</b> Laser Controller		<b>1x</b> Top Front Inside Panel (3 pieces)
	<b>4x</b> Bed Adjuster		<b>1x</b> Power Plug + Mains Cable + Earth Cable		<b>1x</b> Top Front Panel
	<b>4x</b> Threaded Rod M8-120		<b>2x</b> Motor Drive		<b>1x</b> Window Spacers (2 pieces - Left and Right)
	<b>30x</b> Lamella		<b>1x</b> Laser Power Supply		<b>1x</b> Internal Separator Panel 330 x 870 mm
	<b>1x</b> Window Switch		<b>1x</b> Motor Power Supply		<b>1x</b> Top Back Panel
	<b>1x</b> Emergency Button		<b>2x</b> Air Intake Panel		<b>1x</b> Back Panel
	<b>1x</b> Water Flow Sensor		<b>1x</b> Side Panel Right		<b>1x</b> Front Panel
	<b>1x</b> Laser Jumper <b>1x</b> Main Power Jumper		<b>1x</b> Side Panel Left		<b>1x</b> Bottom Panel 800 x 760 mm
	<b>1x</b> Relay		<b>1x</b> Window Panel		<b>1x</b> Laser Panel 230 x 870 mm

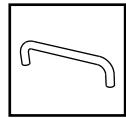
# LIST OF PARTS



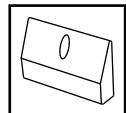
**1x** Wood Plank



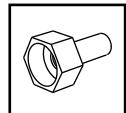
**2x** Hinge



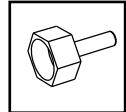
**1x** Handle



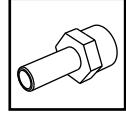
**1x** Window Back Support



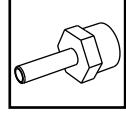
**2x** Water Connector Inside



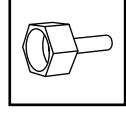
**1x** Air Connector Inside



**2x** Water Connector Outside

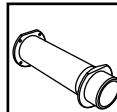


**1x** Air Connector Outside

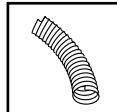


**2x** Water Flow Connector

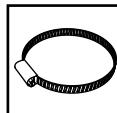
**1x** Foot Switch



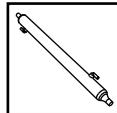
**1x** Exhaust Tube Inside



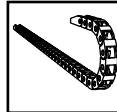
**1x** Exhaust Hose



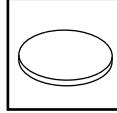
**3x** Hose Clamps



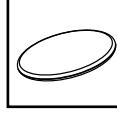
**1x** Laser Tube



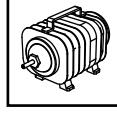
**1x** Chain



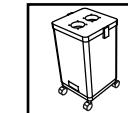
**1x** Lens



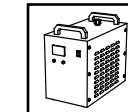
**2x** Mirror 20  
**1x** Mirror 25



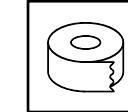
**1x** Air Compressor



**1x** Air Filter



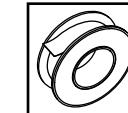
**1x** Water Chiller



**1x** Masking Tape

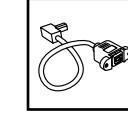


**1x** Double-sided Tape

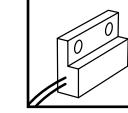


**1x** Teflon Tape

**1x** Radial Fan

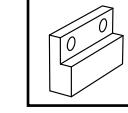


**1x** USB Cable Inside



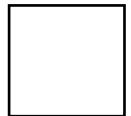
**1x** Window Sensor

**1x** Y-endstop Sensor  
+ X-endstop Sensor  
+ Endstop Cable



**1x** Window Magnet  
**1x** X-endstop Magnet  
**1x** Y-endstop Magnet

# LIST OF PARTS



**2x** Fuse

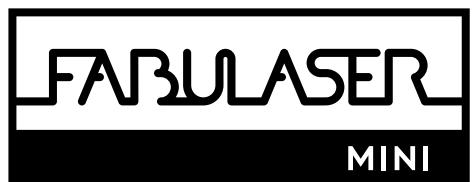


**2x** LED Strip



**1x** Window Piston  
Left

**1x** Window Piston  
Right

**FABULASER.NET**

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