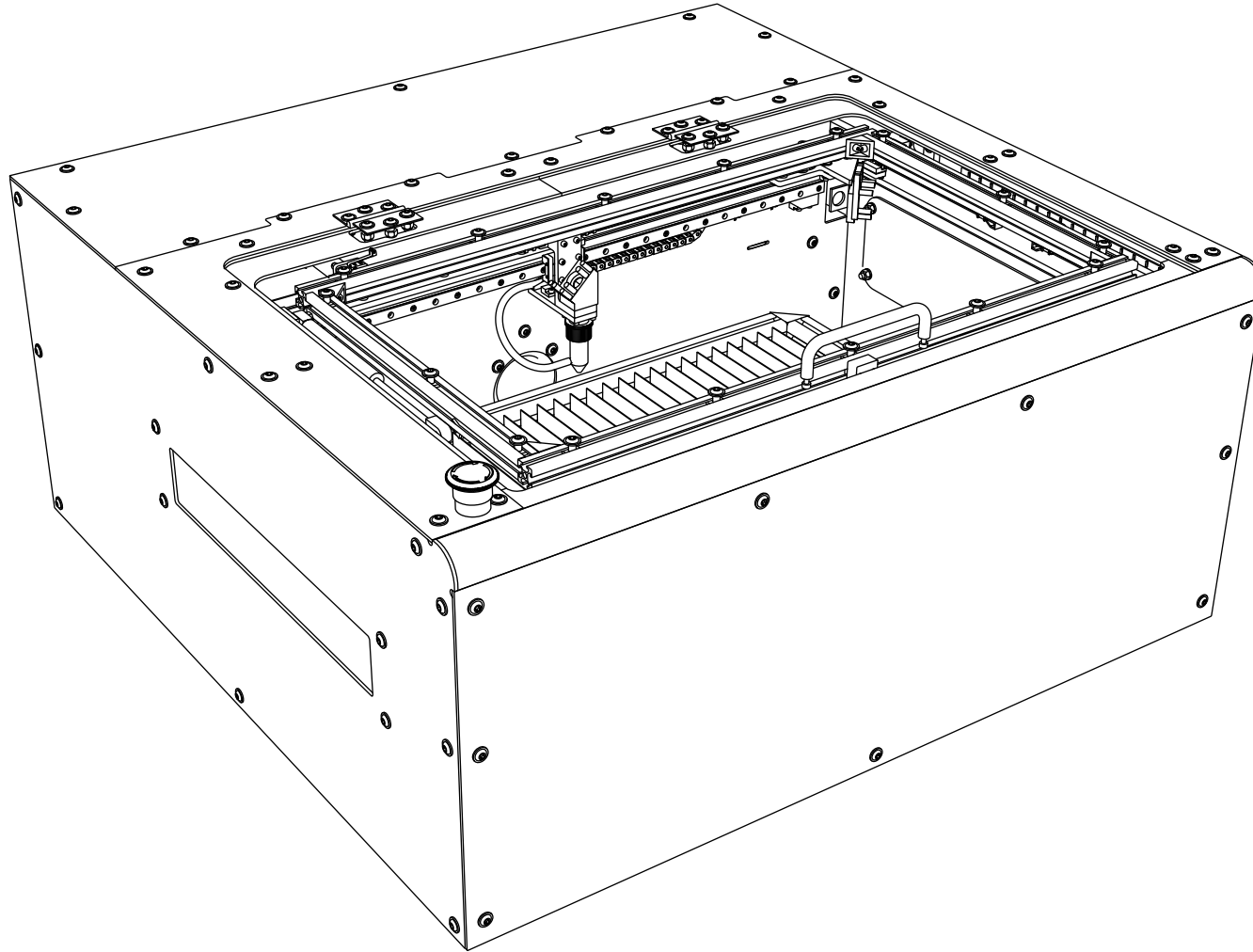


THE OLSK SMALL LASER V1 USER MANUAL

Software and hardware starter guidelines



USER MANUAL BY

Marc Kohlen
Liane Sayuri Honda

MACHINE HARDWARE BY

Daniele Ingrassia /
InMachines Ingrassia GmbH



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InMachines team cannot be held responsible for any casualties resulted from misuse or alterations of the OLSK Small Laser V1 machine.

Please read this manual carefully before operating the machine.

1. SAFETY



Read these safety instructions carefully before using the machine.

Laser Safety

This laser cutter is a Laser Class 1 machine, according to EN 60825 standard.

Do not:

- Disassemble the machine nor remove the cover when the machine is plugged in;
- Try to defeat the door interlocks;
- Stare too long into the laser beam while the machine is running;
- Operate the laser when the mirrors are removed or altered.

Fire Safety

Beware that the laser, in contact with flammable material, can generate fire.

- **Do not** leave the machine unattended while it is running.
- Make sure a fire extinguisher(CO2) is nearby.
- Keep the inside of the machine clean, remove leftovers of cut material.
- Always have the air assist, water chiller and exhaust (air filter/radial fan) running while operating the machine.

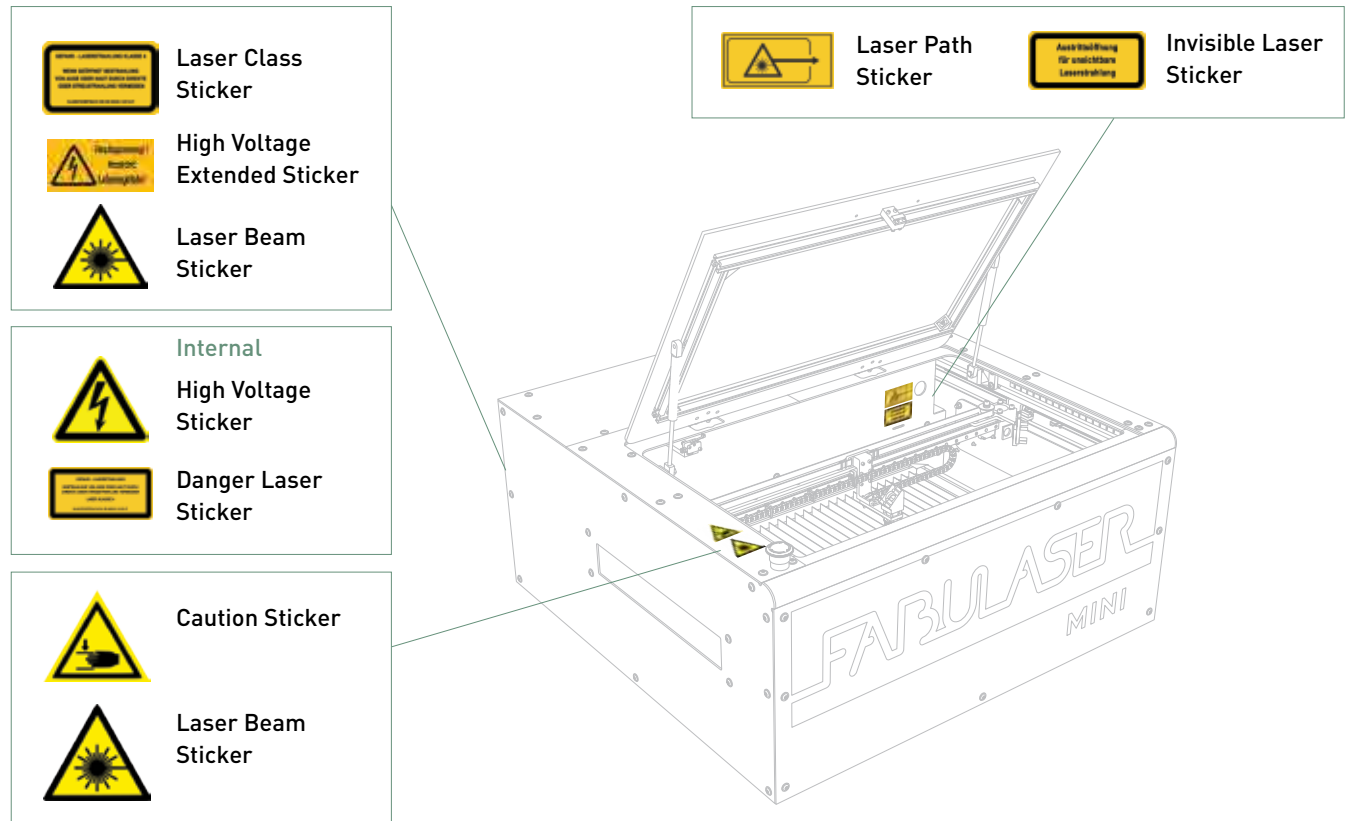
Exhaust Safety

Not every material can be cut because of toxic vapors produced while cutting. They can harm your health and harm the machine.

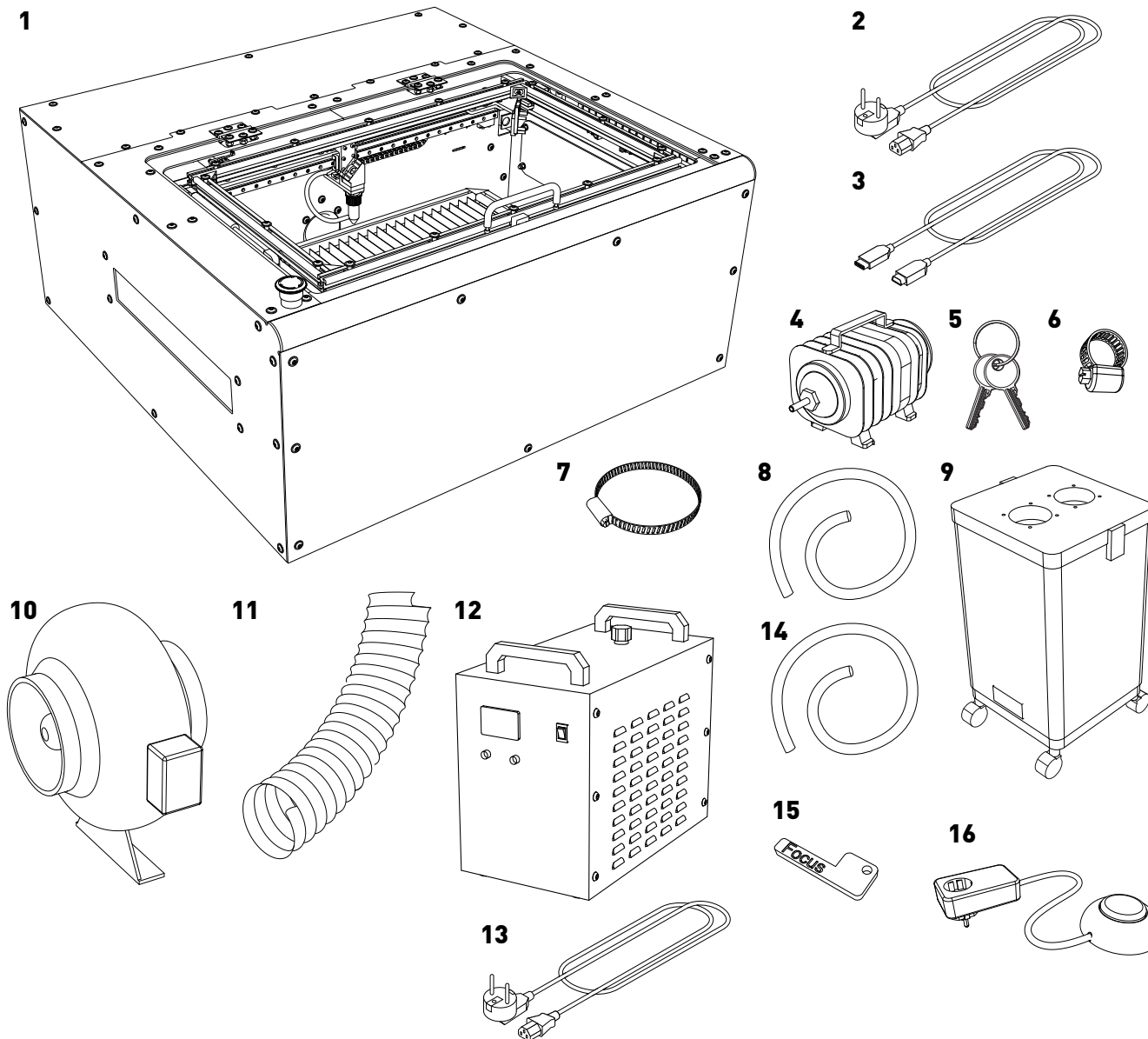
- Check what material you are using. Each material comes with a data sheet. Make sure the data sheet is available.
- Always operate with the exhaust on.
- Do not use materials such as PVC or any other material which contains chloride.
- Always operate with the exhaust switched on.
- The exhaust hose should not exhaust into enclosed rooms and areas with people, especially when you are NOT using the filter box.

Warning Labels

Warning stickers are placed in specific locations of the machine. If any label is damaged or removed, it must be replaced immediately.



2. CONTENT DELIVERED



1. OLSK Small Laser V1 machine
2. Power Cable
3. USB Cable
4. Air Compressor
5. Emergency Button Keys
6. 4x Small Clamps
7. 3x Hose Clamps
8. Air Tube
9. Air Filter
10. Radial Fan
11. 2x Exhaust Hose
12. Water Chiller
13. Water Chiller Power Cable
14. 2x Water Tube
15. 3x Focus Tool
16. Foot Switch

OLSK SMALL LASER V1 SPECIFICATIONS

Power requirements: 220 V 1000 W max
 Laser source: CO2 40 W
 Laser lens: 18 mm, 50,8 focal length
 Resolution: 0.05 mm
 Working area: 600 x 400 mm
 Max. cutting thickness: 8 mm acryl glass
 6 mm MDF
 15 mm poplar

Frame: anodized aluminum
 Housing: aluminum composite
 Connection: USB 2.0
 Max. speed: 400 mm/s
 Possible data formats: DXF, SVG, PNG, BMP, JPG

3. INSTALLING THE WATER CHILLER

1. Connect the water tubes inlet to outlet.

Chiller Outlet — Water Inlet

Chiller Intlet — Water Outlet

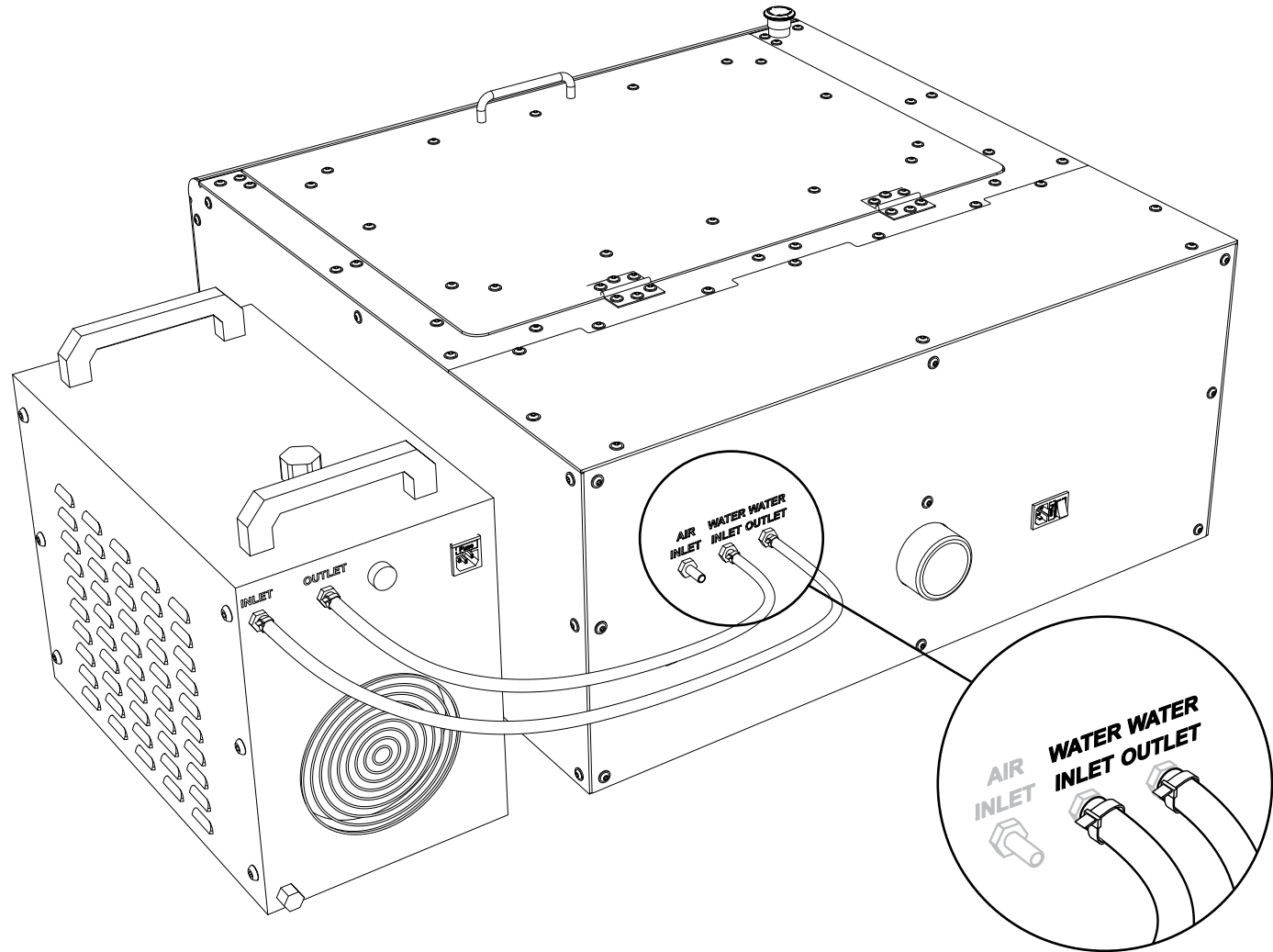
2. Fix the tubes with the small clamps.

3. Insert the distilled water in the chiller.

4. Plug the Water Chiller Power Cable in the Water Chiller Power socket.

5. Turn on the water chiller for 5 min to test if there is any water leakage.

6. If the connections have leakage, tighten the small clamps.



1x Water Chiller



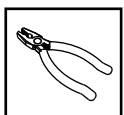
2x Water Tube



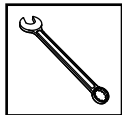
4x Small Clamps



1x min. 6L distilled water
(not included)



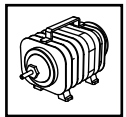
1x Small plier



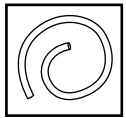
1x Wrench 19

4. INSTALLING THE AIR ASSIST AND EXHAUST

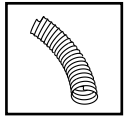
1. Connect the air compressor with the Air tube.
2. Connect the Exhaust Hose to the machine and fix it with a Exhaust Clamp.
3. On the other end of the Exhaust Hose, connect the Air Filter or the Radial Fan.
4. If the Radial Fan is connected, a second exhaust hose should be connected to it with its end put outside of a window.



1x Air Compressor



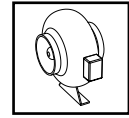
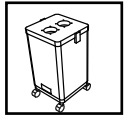
1x Air Tube Outside



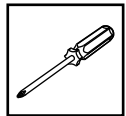
2x Exhaust Hose
(1x for Air Filter or
2x for Radial Fan)



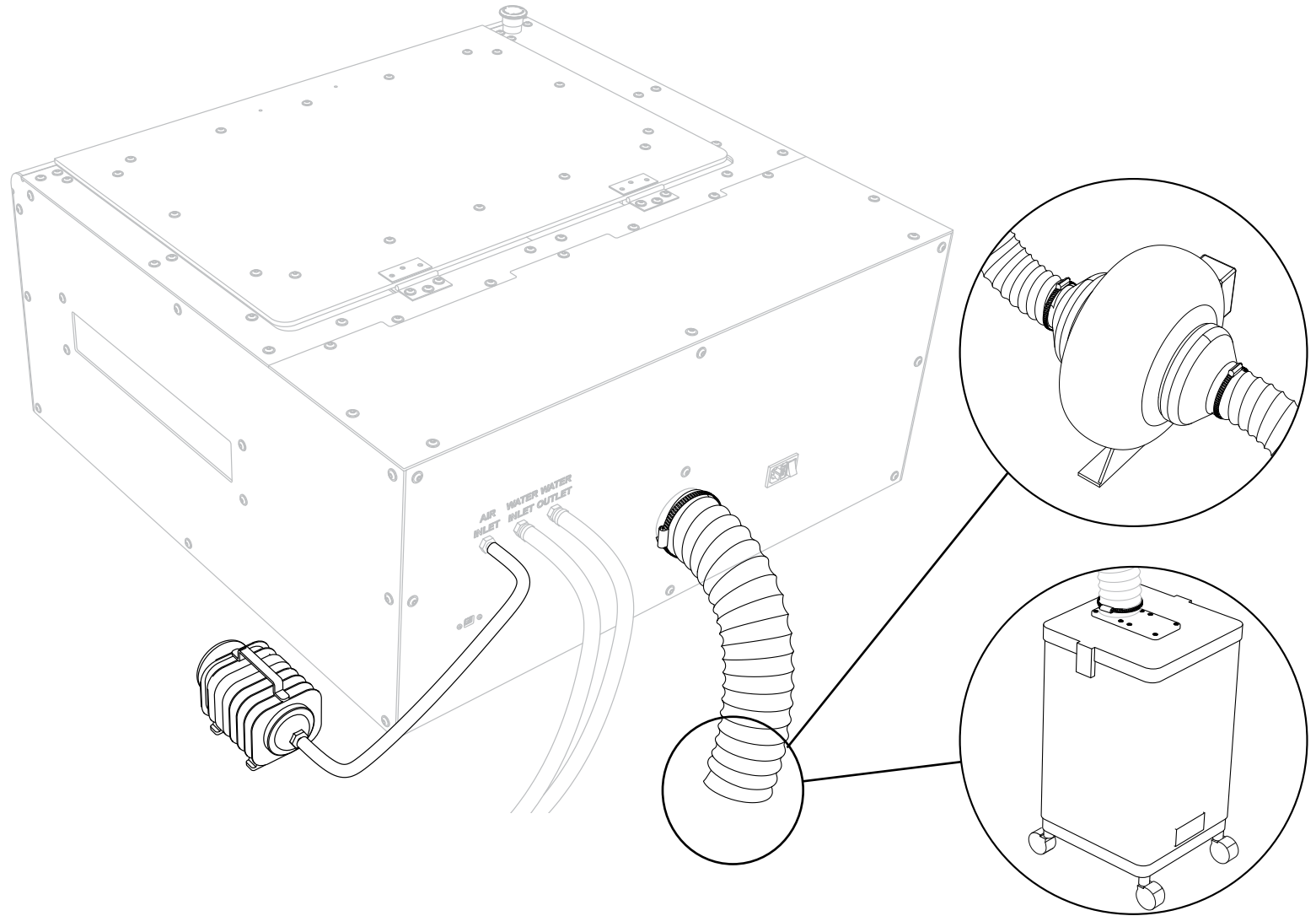
1x Hose Clamps



1x Air Filter or
1x Radial Fan

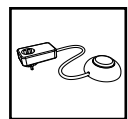


1x Screwdriver
Phillips

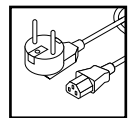


5. INSTALLING THE MACHINE POWER

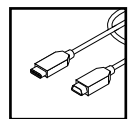
1. Connect the Power Cable and the USB Cable in their respective sockets.
2. Connect the foot switch to the power.
3. Connect the machine, the water chiller, the air compressor, the air filter/radial fan to an extension cable.
4. Connect the extension cable to the foot switch. This facilitates turning on all the devices at once.
7. In sequence, select the suction power of the air filter manually according to the need.



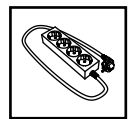
1x Foot Switch



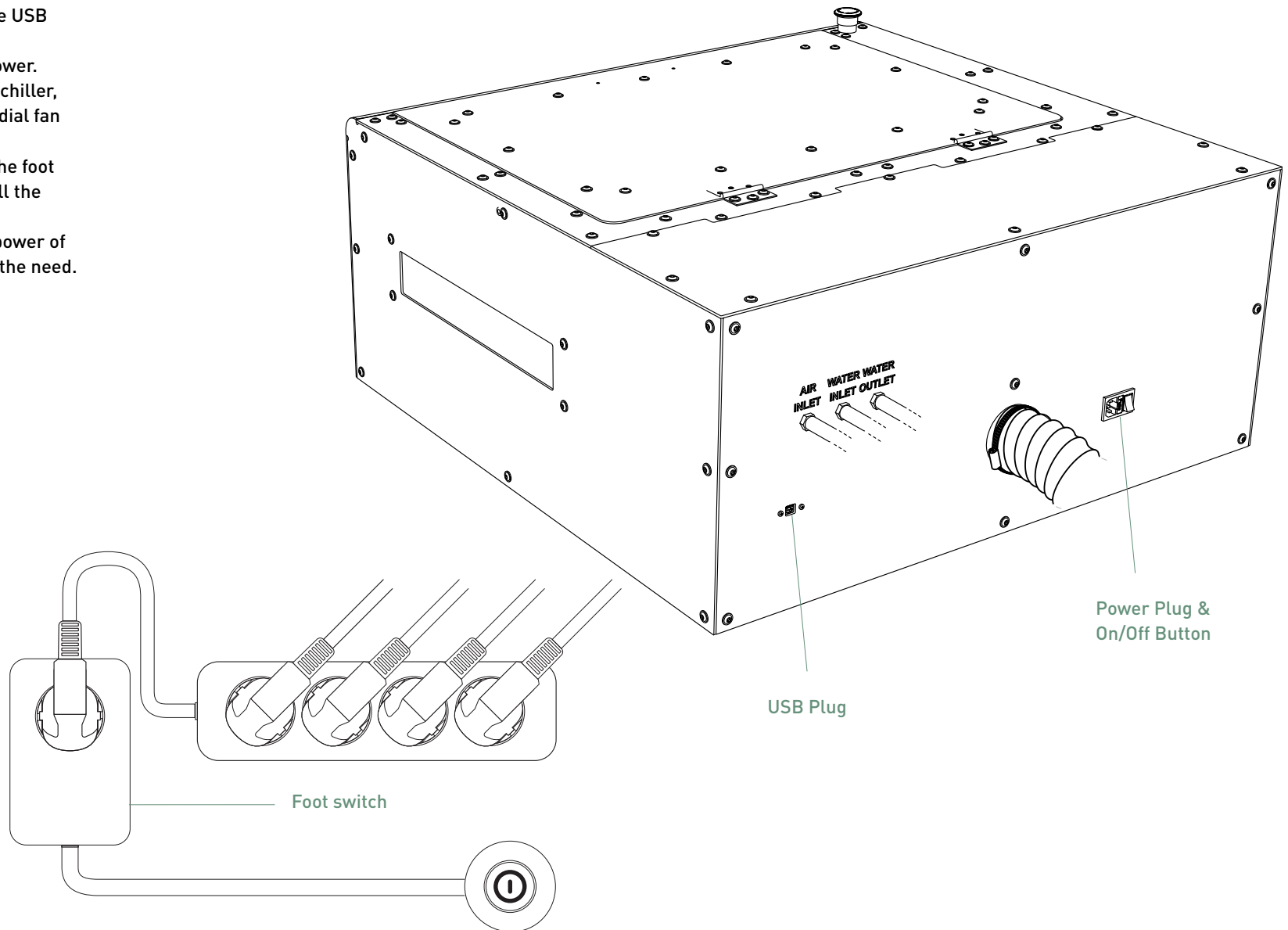
1x Power Cable



1x USB Cable

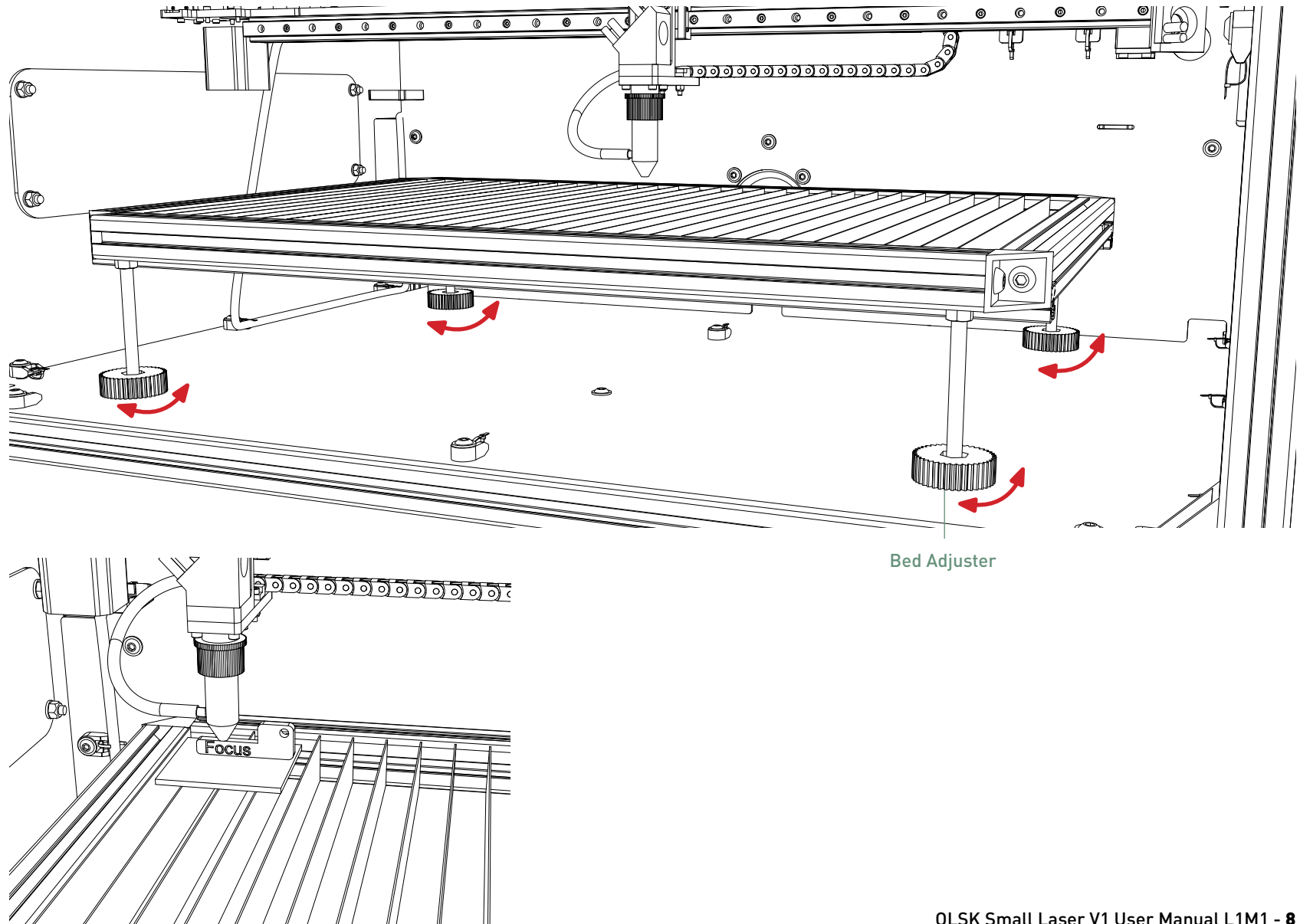


1x Power extension
(not included)



6. ALIGNING THE BED

- 1.** To align the bed, fix the laser head at its lowest height range by unscrewing the ring and the head to loosen it and tightening the ring against the head to fix it in the desired position.
- 2.** Place a thin, rigid and flat material in one corner with the focus tool on top as shown in the illustration.
- 3.** Move the bed upwards or downwards by rotating the bed adjusters below it until the focus tool is slightly touching the laser head.
- 4.** Repeat the procedure in the four corners of the bed.



7. IMPORT MACHINE SETTINGS IN VISICUT

1. Download and install the latest version of Visicut software* (OBS: The software interface may change according to the version.)
2. Download the OLSK Small Laser V1 settings from the repository. Save it in a folder of your choice.
3. Open the Visicut software.
4. In the menu, go to Options > Import Settings.
5. Select the downloaded settings file.
6. For extra information on Visicut operation, visit the Visicut Manual website**.

* <https://visicut.org/>
** <https://github.com/t-oster/VisiCut/wiki/Visi-Cut-manual>



This area corresponds to the cutting area of the machine.

After the settings are imported, the Fabulaser Mini should appear here (they share the same settings).

8. PREPARING FILE FOR LASER CUTTING

1. Save your drawing in .svg or .dxf format.

! Your drawing must be a vector image. A pixel image can be engraved but cannot be cut.

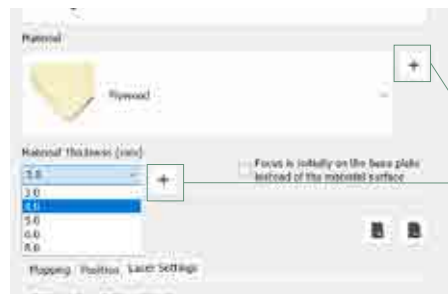
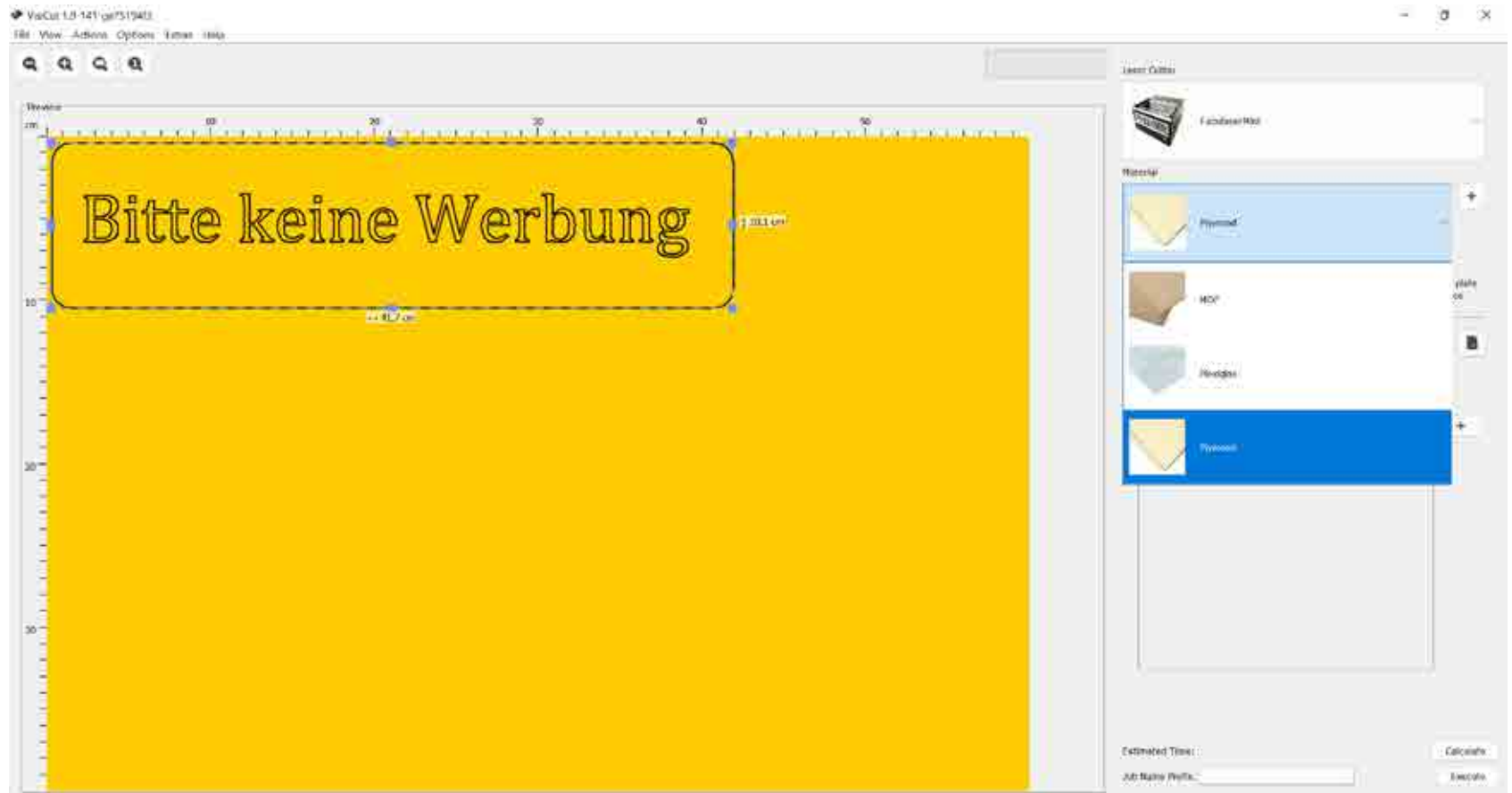
2. Open the Visicut software.

3. Open the drawing file in Visicut in the menu File > Open.

4. Scale the drawing and arrange it in the cutting area as desired. The machine considers by default the zero position (0,0) as the top-left corner of the artboard.

5. More drawings can be placed in the cutting area at the same time through the import function. (Menu File > Import)

6. In the right column, under Material, select the material and thickness. If the correct material and/or thickness is not available, you can try different settings yourself and add it to the library by clicking on the “+” button.



Click on the “+” button to save new settings of materials or material thickness.

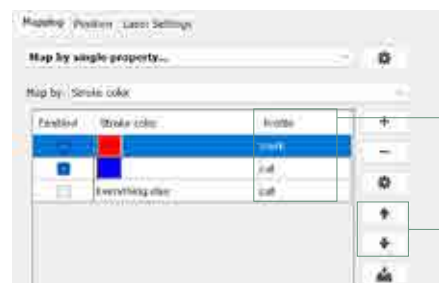
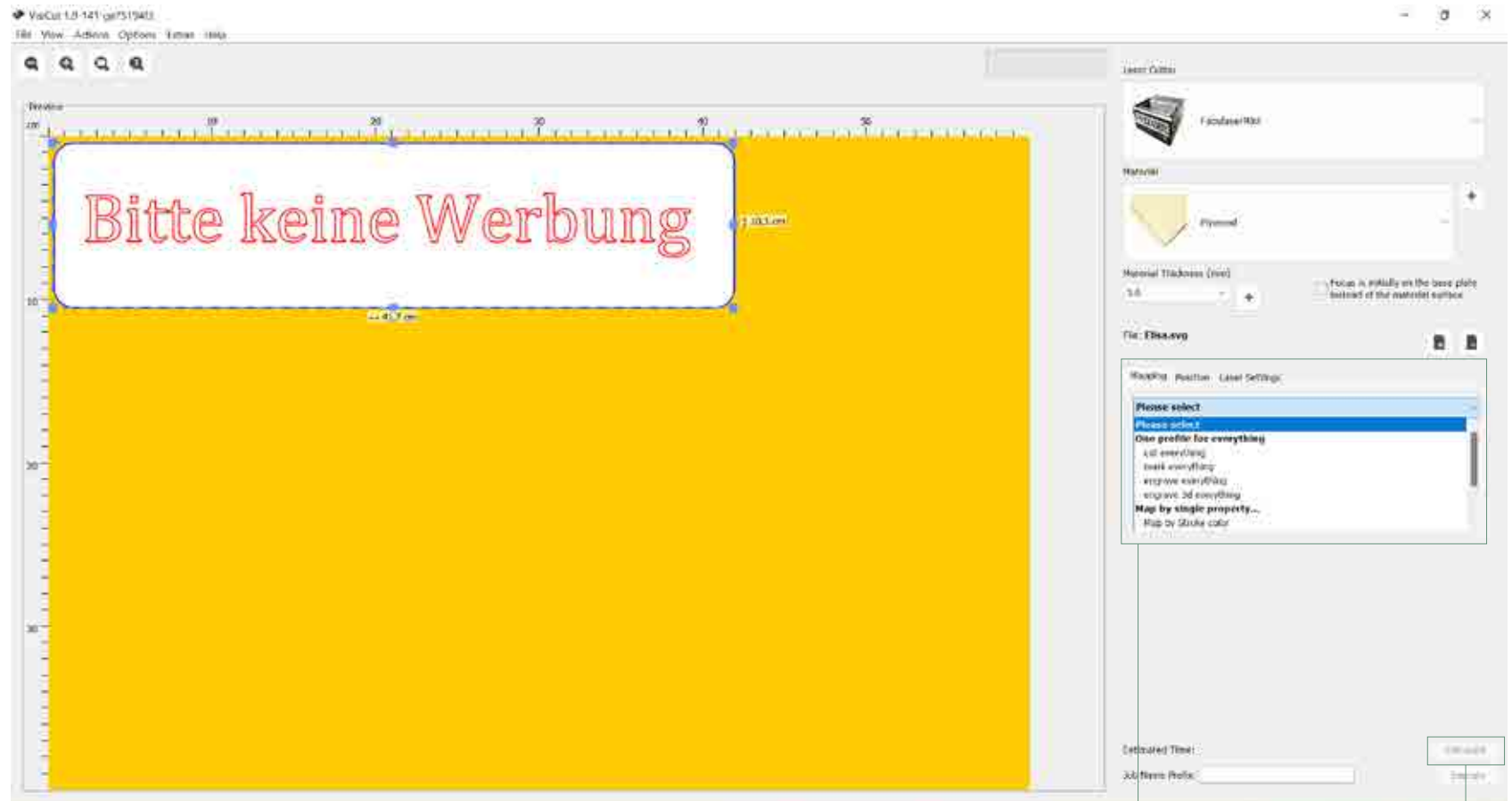
7. Under the Mapping tab, it can be selected which part of the drawing should be cut, engraved or marked. The selection can be done according to the drawing properties such as stroke color, stroke width, color and type, which must be set before the drawing file is saved and opened in Viscut.

8. In the Mapping tab it is also possible to enable and disable parts and chose their order of execution. For example, it is a good practice to mark before cut, since the parts might move after cut.

9. Next, click on “Calculate” button on the bottom right corner of the interface to estimate the amount of time the job will take.

10. In the menu, click on File > Export Laser Code.

11. Save the cutting file with the name and location of your choice, adding “.nc” in the end of the file name. (example: if the file name is “MyFirstCut”, save the file as “MyFirstCut.nc”)



Select here which parts of the drawing need to be cut, marked or engraved.

Use the arrows to change the order of execution.

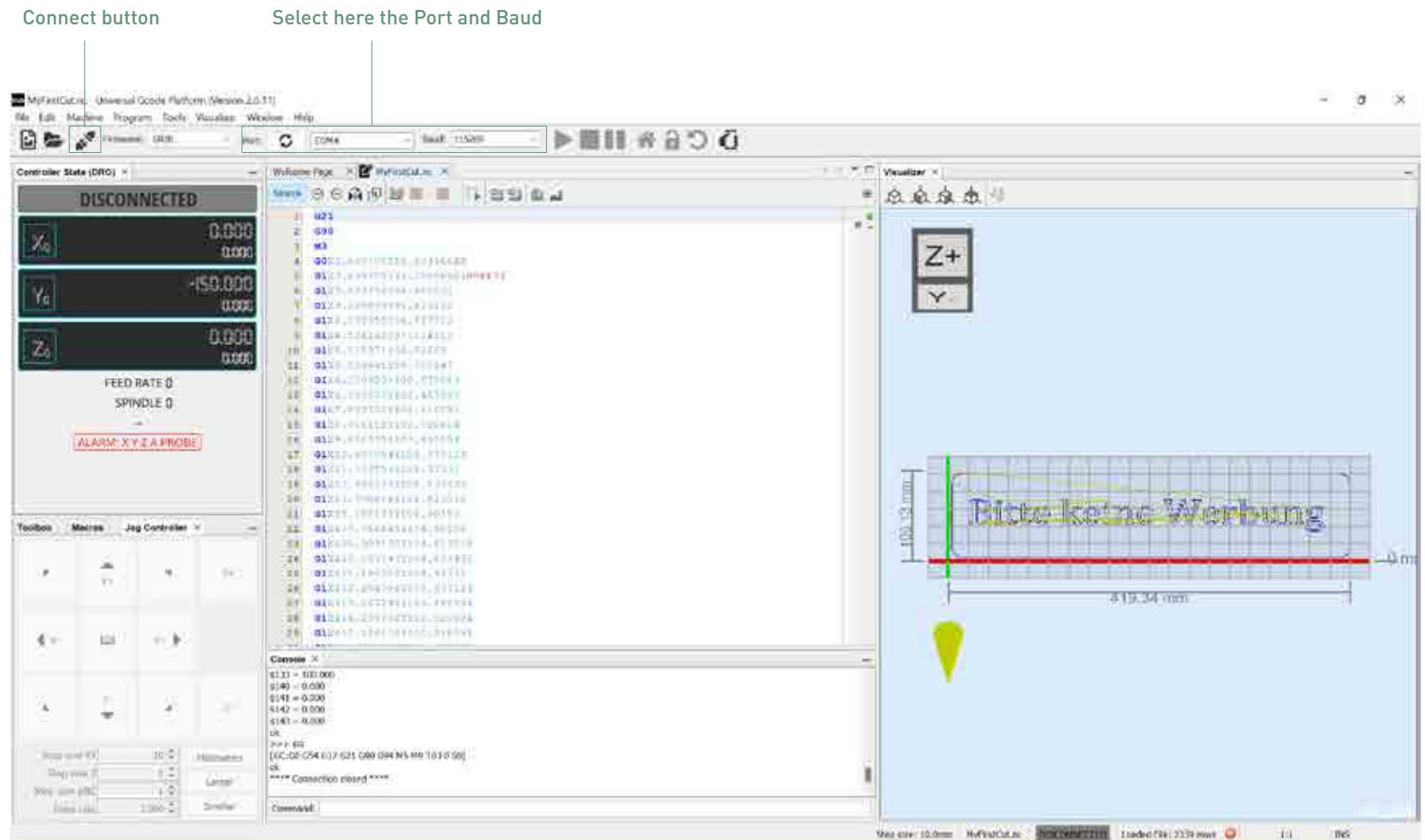
Select here the type of mapping

Click on “Calculate” to calculate a time estimation.

9. CONNECTING THE OLSK SMALL LASER V1

1. Download and install the latest version of the UGS Platform software* (OBS: The software interface may change according to the version.)
2. Turn on the OLSK Small Laser V1 and connect it to the computer using the USB Cable.
3. In the upper bar, select the correct Port and Baud.
4. Click on the Connect Button to connect to the machine.
5. In the Menu, open the ".nc" exported from Visicut (File > Open).

*https://winder.github.io/ugs_website/



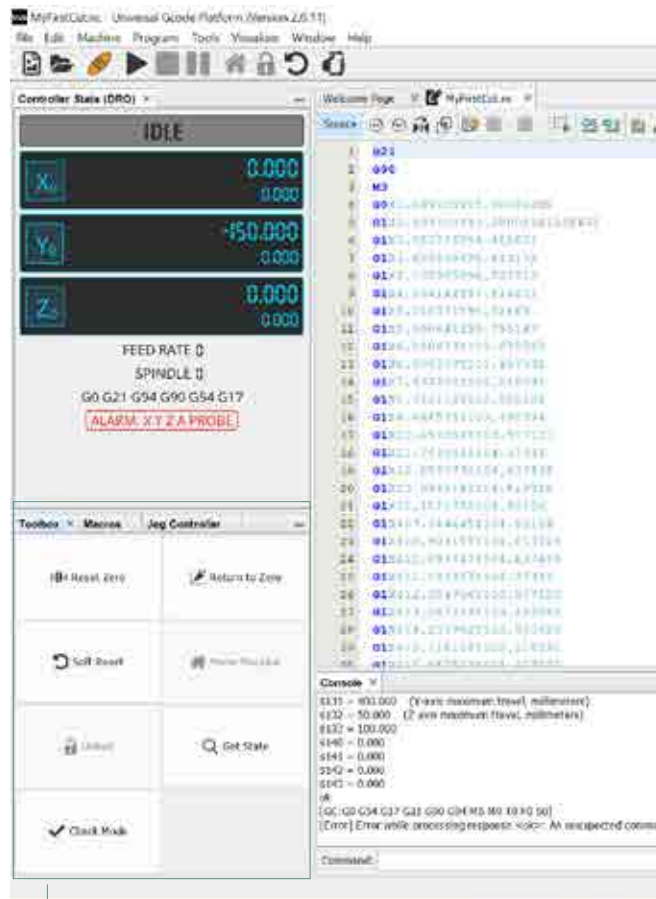
10. POSITIONING AND CONTROLLING

1. Open the window of the machine and place the material on top of the lamella bed. The bed is the cutting area of the machine.

2. With the machine connected in the UGS Platform software, it is possible to move the laser head through the Jog Controller (OBS: once the laser head hits the endstops, the Jog Controller will be disabled. Disconnect the machine and move it by hand away from the endstops to regain controll).

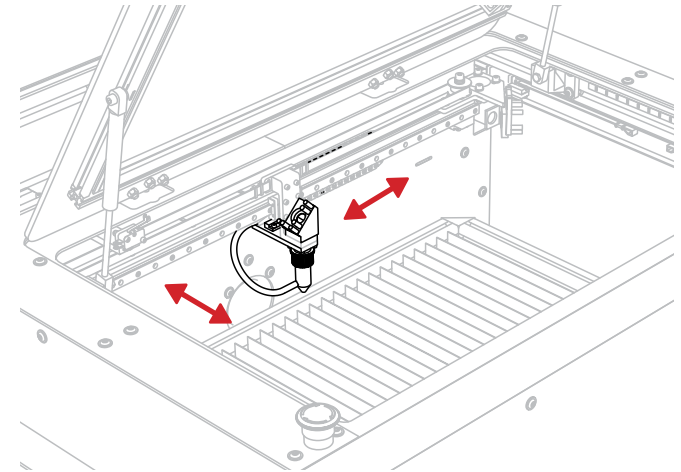
3. When a starting point is chosen (by moving the laser head with the Jog Controller or by hand), click on “Reset Zero” under the Toolbox tab to define it. This way it is possible to return to the exact coordinates by clicking on the “Return to Zero” button.

4. If the Jog Controller is not enabled, it could be that the machine is locked. If that is the case, click on “Unlock” under the Toolbox tab to unlock the machine.



Toolbox

Moving the laserhead by hand might be easier to position the starting point, however, the software does not recognize the coordinates movemens. It is necessary to click on “Reset Zero” to record the new position.



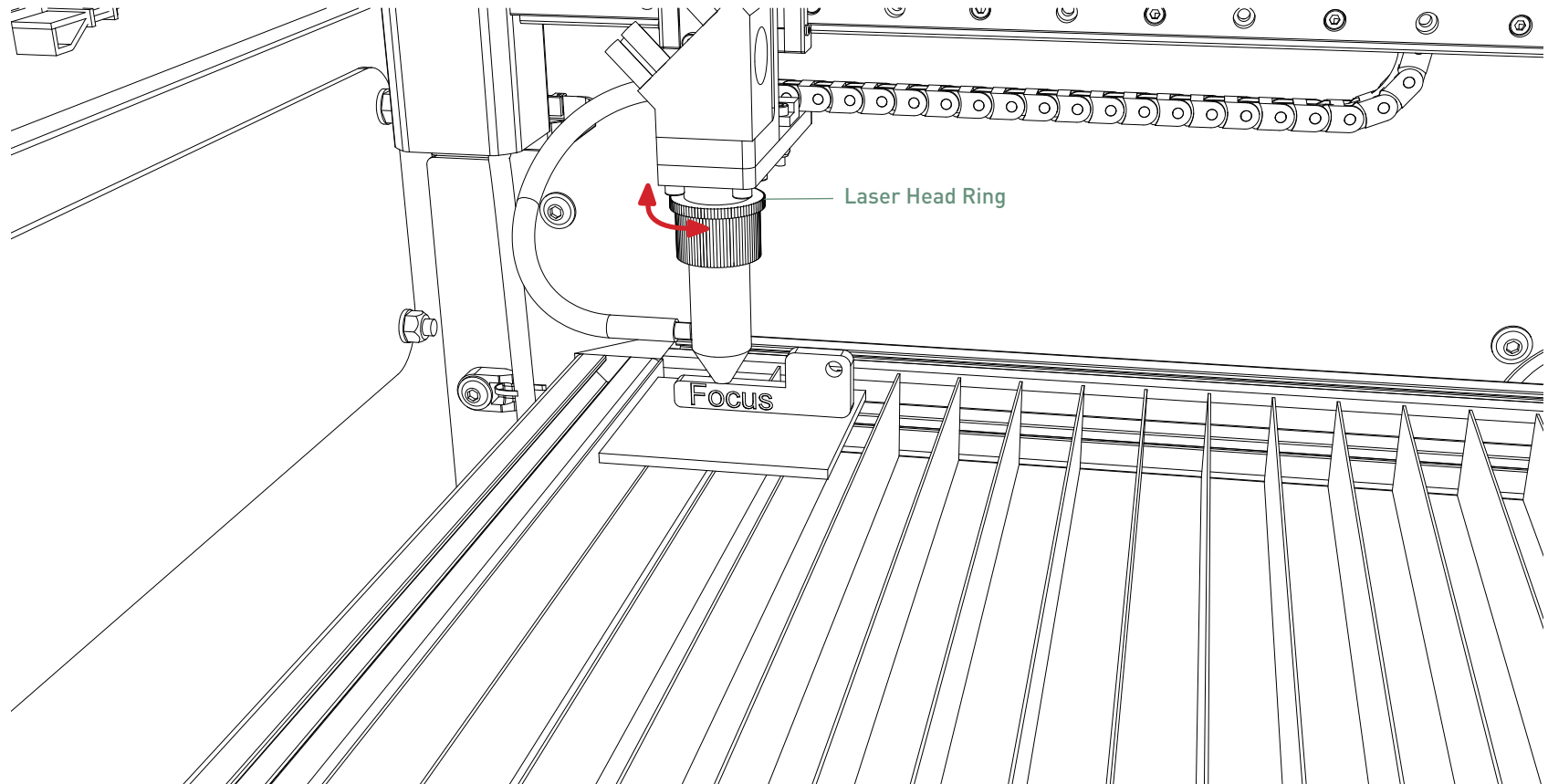
Under the Jog Controller tab it is also possible to define the step size (length of the movement) and the feed rate (speed of the movement).



Jog Controller

11. SETTING THE FOCUS

- 1.** The focus of the laser needs to be adjusted according to the thickness of the material.
- 2.** To set the focus, place the focus tool on top of the material as illustrated.
- 3.** Move the laser head up or down until it is slightly touching the focus tool, by unscrewing the ring and the laser head to loosen it and tightening the ring against the laser head to fix it.
- 4.** Remove the focus tool and store it in a safe place.



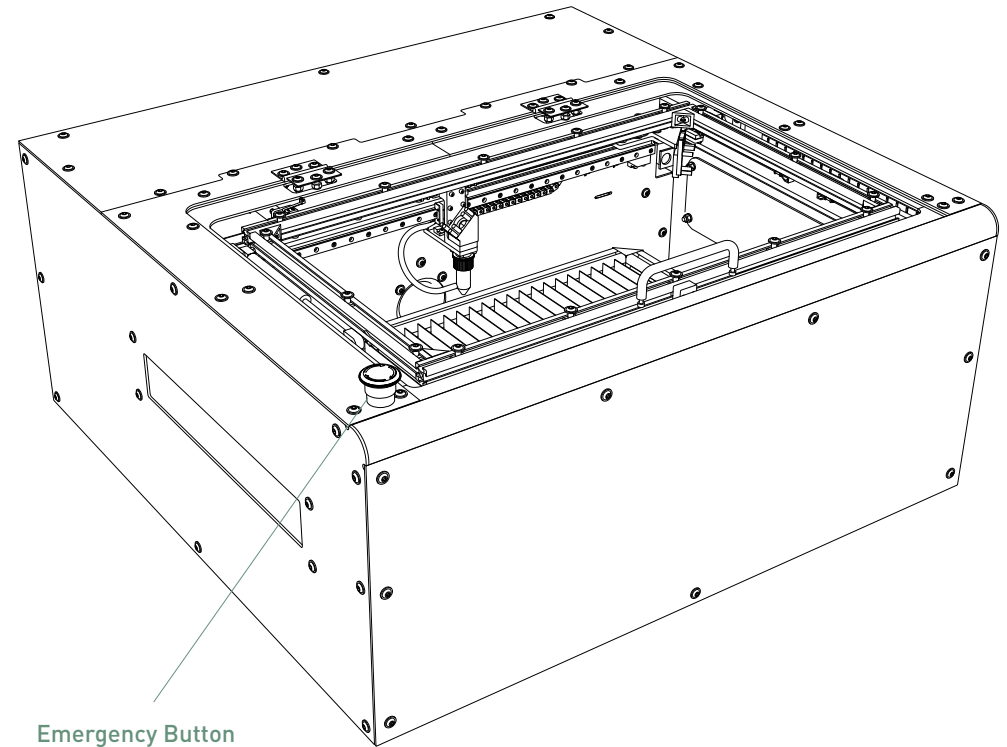
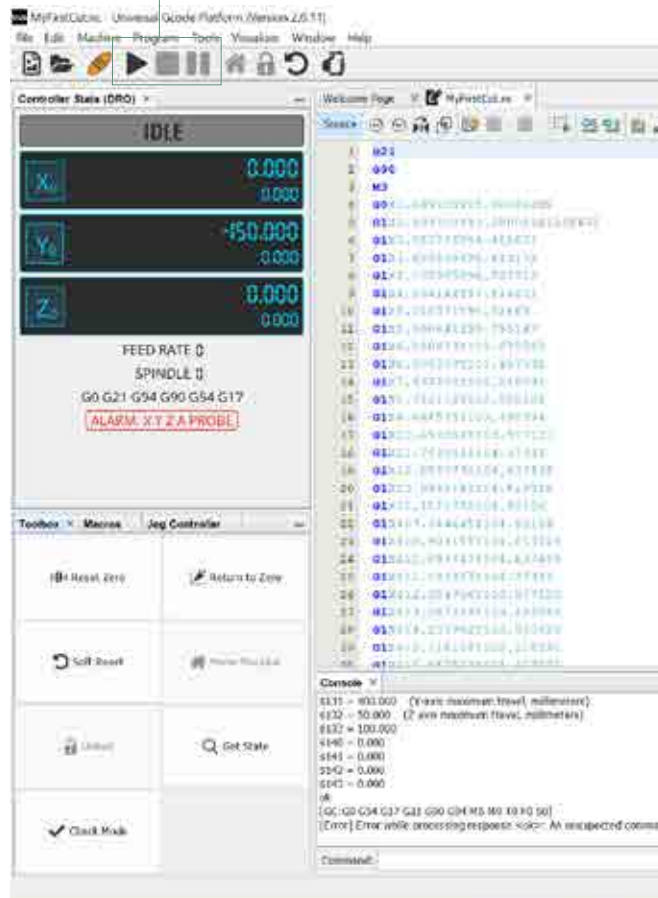
12. LAUNCHING THE JOB



Before launching the job, make sure the air filter/radial fan, air compressor and water chiller are on.

Click on the play button to launch the job.

1. Close window of the machine.
2. Click on the play button to launch the job.
3. Click on the pause button to pause the job and click on play again to resume it.
4. Click on the stop button to stop the job. Stopping the job will reset it and it is not possible to resume from where it stopped.
5. Pay attention to the machine while it is working and be ready to press the emergency button at any moment, if anything unexpected occurs.
6. The emergency button has key and can be locked to avoid unwanted use of the machine.



Emergency Button

13. MAINTENANCE

GENERAL

- Try to prioritize using the radial fan over the air filter to extend the lifetime of the filter.
- Check the status of the filter, if the air flow is very low and the smoke accumulates inside the machine and/or the filter are completely black it is required to change at least the prefilter; if also the HEPA filter is black the all the filter cartridges needs to be replaced
- The linear guides need lubrication (once in 3 month), lithium grease can be applied with a napkin.
- Lubricate the cooling fans of the power supplies if too noisy (the bearing of the fan)
- Check if the level of the water chiller is full. If not you can refill it with distilled water.
- Change the water of the chiller after one year of normal use, or 6 months of intensive usage

CLEANING THE BED

- The bed lamellas can be cleaned with a soft sponge and water with soap. After scrubbing, wipe and dry it with a soft cloth.
- Do not leave many cut residues in the bed to avoid backfire on the parts or unwanted fire. You can use a vacuum cleaner to remove the residues from the bed.

CLEANING THE WINDOW

- The window is made of acrylic and can be easily scratched. Do not rub it with a sponge or microfiber cloth.
- To clean the window, wipe it with a soft cloth wet with water. If very dirty, use a non-abrasive cleaner such as soap or baby shampoo.

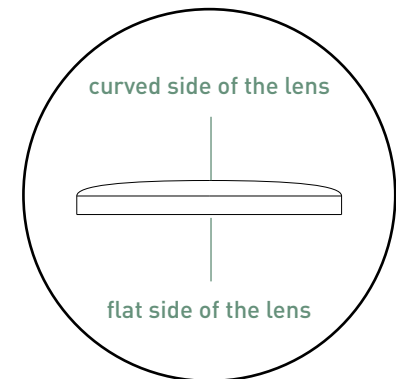
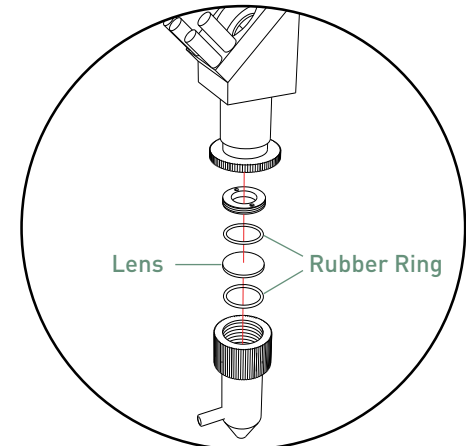
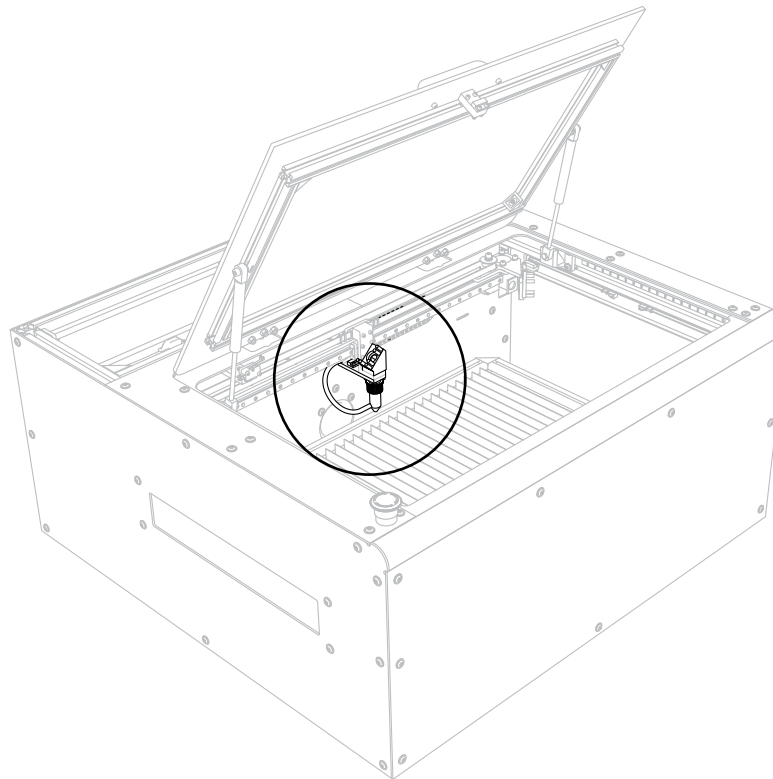
CLEANING THE LENS AND MIRRORS

- Clean the lens and mirrors with isopropyl alcohol and

optic paper only (can be bought in cameras stores). Clean the surface by rubbing the paper in only one direction.



- DO NOT TOUCH THE LENS AND MIRRORS SURFACES.
- Open the ring of the Laser Head with Needle Nose Pliers to remove and insert the Lens.
- 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.



14. TROUBLESHOOTING

PROBLEM

CHECKS AND SOLUTIONS

The machine axis are not moving

- The machine is not switched on.
- The power plug is disconnected.
- The fuse, located inside the main power plug, is open or has been removed.
- The Stepper Power Supply does not receive electricity; check the relevant connections.
- The Stepper Power Supply is damaged; check if there are 24V with a multimeter.
- The Stepper Shield does not receive the 24V; check the relevant connections.
- If only one axis does not move, maybe that one Stepper Driver is damaged; change it and try again.
- The couplers, belts or pulley are loose; check them.
- The Endstop Switches are triggered; check if the axis are away from them and/or anything is blocking them.

It is not possible to connect to the machine

- Within the UGS software, check if you are using the correct COM port (serial port); change it in this case.
- Check if the baud rate is 9600, change it in this case.
- Check if the USB to Serial connections are correct.
- The Arduino could be damaged; check if the green light (located into the Arduino board) is on.

The machine stops in the middle of a job

- Check if the stepper motor cables are not close to the USB to Serial Cable.
- Check if your PC is not blocked and/or too slow.
- Check if the USB to Serial has not been accidentally removed.
- Check if the endstop have not been triggered during the job.
- Check if the chiller has not been powered off accidentally.

PROBLEM

CHECKS AND SOLUTIONS

The laser is not firing

- The machine is not switched on.
- The power plug is disconnected.
- The fuse, located inside the main power plug, is open or has been removed.
- The laser power supply does not receive electricity; check the relevant connections.
- The laser tube does not receive power; check Laser+ and Laser- connections.
- The chiller is switched off (the water flow sensor is not active); switch the water chiller on.
- The laser window is open; close it.
- The laser path lost its calibration; check it with masking tape, see "how to calibrate" the laser. (Step 21)
- The window switches and relative cables are damaged; check them and change them in this case.
- The GCode is wrong and does not contain any "M3" and "SXX" values.
- The "Laser Comm" cable is damaged; check it.
- The Laser Power Supply wiring is not correct; check it.

15. MATERIALS AND SETTINGS

| MATERIAL | CUT | ENGRAVE AND MARK |
|-------------------|-----|------------------|
| Paper | ✓ | ✓ |
| Cardboard | ✓ | ✓ |
| MDF | ✓ | ✓ |
| Plywood | ✓ | ✓ |
| Poplar wood | ✓ | ✓ |
| Massive wood | ✓ | ✓ |
| Plexiglas (PMMA) | ✓ | ✓ |
| Acrylgas (PMMA) | ✓ | ✓ |
| POM | ✓ | ✓ |
| Rubber | ✓ | ✓ |
| Cork | ✓ | ✓ |
| Felt | ✓ | ✓ |
| Cotton | ✓ | ✓ |
| Silk | ✓ | ✓ |
| Synthetic leather | ✓ | ✓ |
| Metal* | ✗ | ✓ |
| Glass* | ✗ | ✓ |
| Stone / Ceramics* | ✗ | ✓ |

| MATERIAL | CUT | ENGRAVE AND MARK |
|------------------|-----|------------------|
| PVC | ✗ | ✗ |
| Carbon Fiber | ✗ | ✗ |
| Leather | ✗ | ✗ |
| ABS | ✗ | ✗ |
| HDPE | ✗ | ✗ |
| PVB | ✗ | ✗ |
| PTFE / Teflon | ✗ | ✗ |
| Beryllium oxide | ✗ | ✗ |
| Fiberglass | ✗ | ✗ |
| Polypropylene | ✗ | ✗ |
| Polystyrene (PS) | ✗ | ✗ |
| Polycarbonate | ✗ | ✗ |



Some materials release toxic substances when lasered. If it is not clear if the material can be used in the laser cutter, check its datasheet.

*Some materials might need engraving paste.



WWW.INMACHINES.NET

Daniele Ingrassia
Röntgenstraße 18A,
21493 Schwarzenbek

0049-177-4978312
daniele@inmachines.net

AUTHORS & LICENSORS

ASSEMBLY MANUAL (CC BY-SA 4.0)
Marc Kohlen
Liane Sayuri Honda

MACHINE HARDWARE (CERN-OHL-W)
Daniele Ingrassia / InMachines Ingrassia GmbH

CONTACTS

marckohlen@3dinx.com
licasayuri@gmail.com

daniele@inmachines.net



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