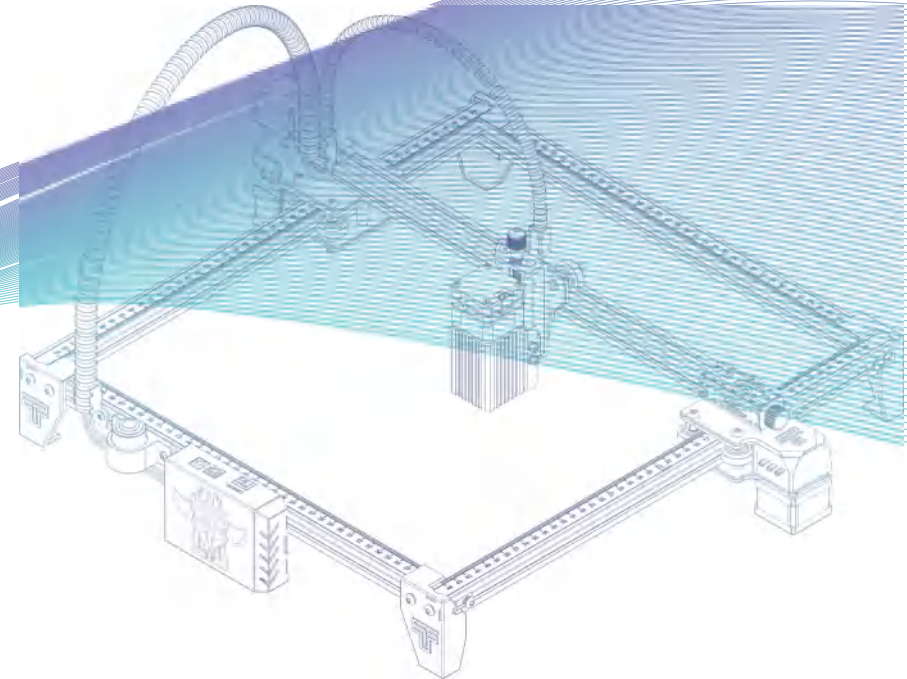


PRODUCT MANUAL

BURN DOWN ETERNITY

Laser engraver



TEL: +0086-0755-23987110

Http: www.twotrees3d.com

E-mail: service@twotrees3d.com

Facebook: <https://www.facebook.com/twotrees3d>

Address: Room 402, Building 11, No.9 Qilin Road, Nankeng Community,
Bantian Street, Longgang District, Shenzhen, Guangdong, China, 518000

TTS memory card short chain: <https://bit.ly/3yQAJyt>

Youtube channel short link: <https://reurl.cc/VjQa1n>

Note: The picture is for reference only, the actual product shall prevail



LETTER FROM TWOTREES

Dear Customers,

Thank you for choosing us.

It's customer-oriented idea, continuous innovation and pursuit of excellence that enable every-body to have wonderful experience in using process.

We believe that this manual will be helpful.

Hope you enjoy the good time with TwoTrees.

If you have any problems, please feel free to contact us via:

Website: www.twotrees3d.com

Facebook: <https://www.facebook.com/groups/twotrees3Dprinter/>

For general inquiry: info@twotrees3d.com For technical support: service@twotrees3d.com

We will contact you within 24 hours.

Sincerely yours,

TwoTrees Team

PRECAUTIONS

EN

Please follow the instruction, due to misuse will be at your own risk.

1. Avoid looking steadily at the laser, which may damage your eyes.
2. Avoid touching directly during the machine working.
3. You can place a metal plate under the engraved or cut object to prevent your table being burned through.
4. Avoid combustible object or gas.
5. Keep it away from children or pregnant women.
6. Do Not take apart the laser without instructions.
7. Do Not use it on material that reflects the light.
8. Wear goggles while taking off the laser cover.
9. Turn off the power when not use.

SAFETY GUIDELINES

Warning: Laser engraving machine cannot directly carve or cut material that reflects the light; may cause injury.

The product has a high engraving speed and is not recommended for industrial cutting. And the laser head is a consumable.

Do not operate the laser head directly with your hands. Please wear goggles.

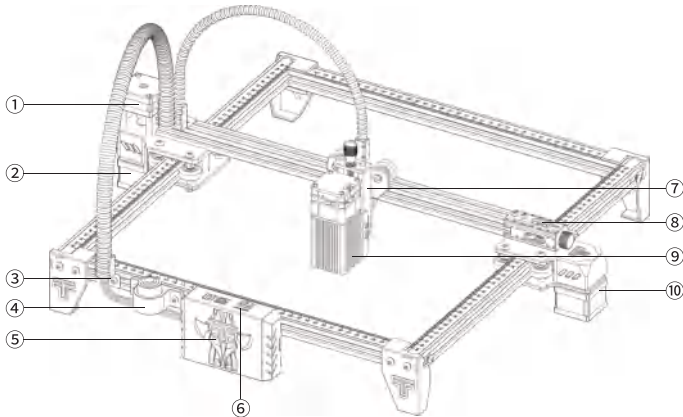
The laser diode is a sensitive component, please prevent static damage. (This product has an electrostatic protection design, but there is still a possibility of damage).

CONTENTS

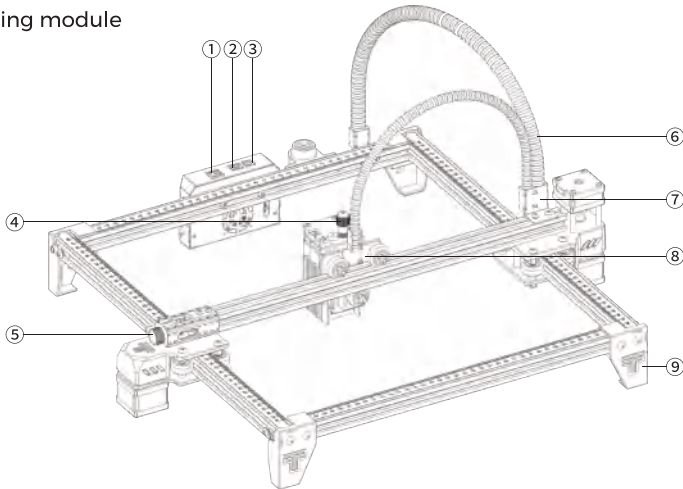
ABOUT YOUR MACHINE	02
Part list	03
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Adjustment	22
Adjust the focus	23
Description of motherboard PCB	25
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ABOUT YOUR MACHINE

- 1. X-axis motor
- 2. Y1 motor
- 3. Bellows holder
- 4. Fixed-length column holder (optional)
- 5. Motherboard
- 6. TF card slot
- 7. Lifting Module
- 8. Tensioner
- 9. Laser module
- 10. Y2 motor



- 1. Switch
- 2. USB-PC interface
- 3. Power interface
- 4. Adjusting screw of lifting module
- 5. Thumb screw
- 6. Bellows
- 7. Bellows X-axis holder
- 8. Carriage
- 9. Foot pad



PART LIST



Y-axis right frame X1



Y-axis left frame X1



Y-axis front profile X1



Y-axis back profile X1



Tensioner module X1



Laser module X1



Foot Pad X4



Carriage and lifting module X1



X-axis beam X1



Motherboard and wires X1



Bellows X axis Holder X1



Bellows Holder X1



M5*20 X8



M4*20 X10



M5*10 X4



M4*50 X3



M3*8 X4



Tool Kit X1



Power Supply X1



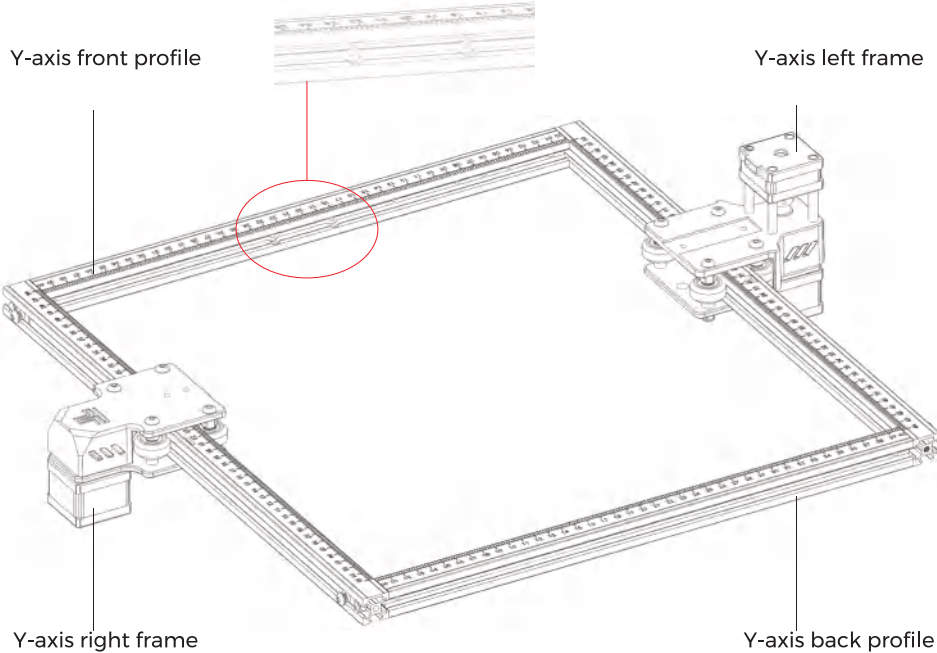
USB Cable X1

MAIN PARAMETERS

Model	TTS
Machine Size	570*510*150 mm
Machine Weight	3 kg
Engraving Size	300*300 mm
Laser Wavelength	445±5 nm
Engraving Accuracy	0.1 mm
Engraving Speed	10000mm / min
Software Support System	Mac, Windows
Material	Aluminum Profile + Plastic Parts
Electrical Requirement	12V 4A DC
Motherboard	LTS ESP32 Motherboard (32bit)
Laser Power	DB-5500S / DB-5500 / DB-2500mW (Optional)
File Format	NC,BMP,JPG,PNG,GCODE,ETC
Supported Software	LaserGRBL (Windows), Lightburn (Common)
Power Type	USA / EU Plug (Optional)
Software Support Languages	Chinese, English, Italian, French, German
Working Environment	RHTemperature 5-40°C, Humidity 20-60%RH
Engraving Method	USB Connect PC, TF Card (APP, Webpage control)
Engraving Materials	Wood, Plastic, Paper, Leather, Sponge Paper, Alumina
Engraving Mode	Image carving / Text carving / Scanning carving / Contour carving / Pixel carving

ASSEMBLY

1. Install the frames After assembly of frames

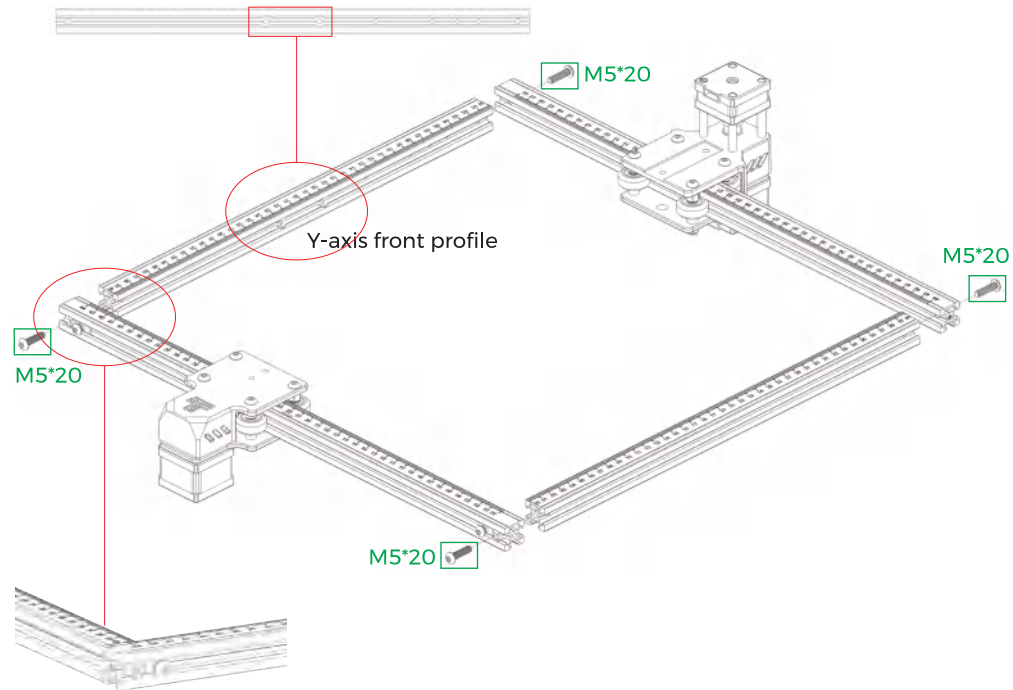


- Note:**
- ① The position of each frame cannot be changed.
 - ② The countersunk head pore (the enlarged part) of Y-axis front profile faces inside.

1.2 Install the frames

Screw M5*20 x 4

The countersunk head pore of Y-axis front profile faces inside. And the graduated side faces up. The profile scale is used to measure the size of the engraved object.

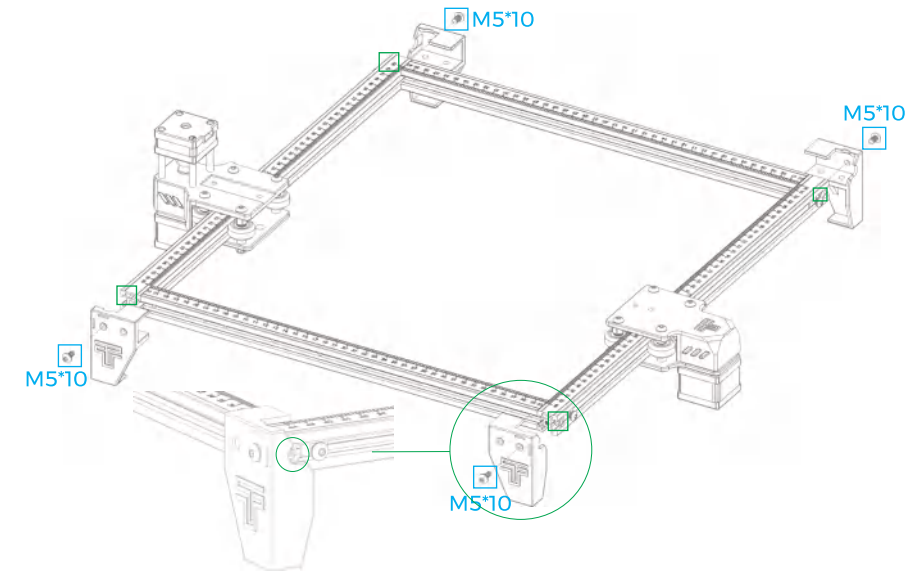


1. First you need to install the frame while you don't need to tighten the screws;
2. Make sure all profiles align.

2. Install the foot pads

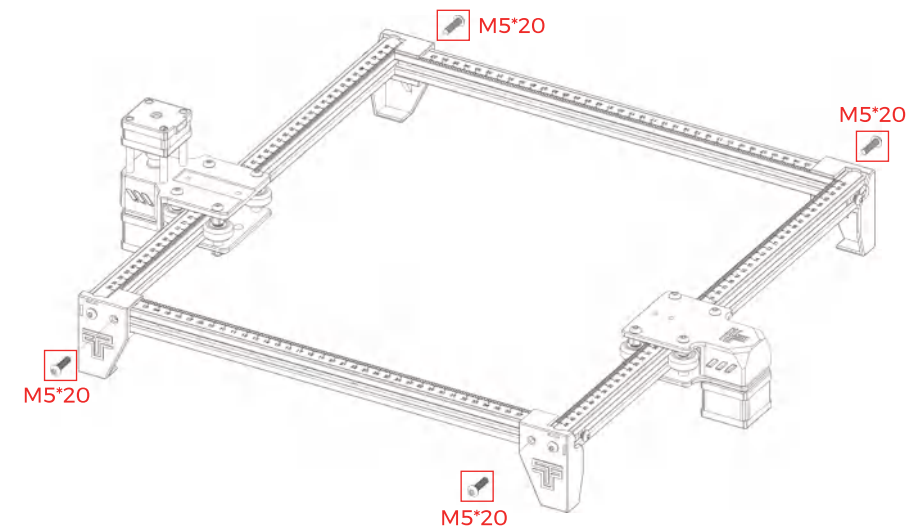
Screw M5*10 x 4

- ① Push the foot pads in. First tighten the screw M5*10 in blue area, and then tighten the screw M5*20 in green area



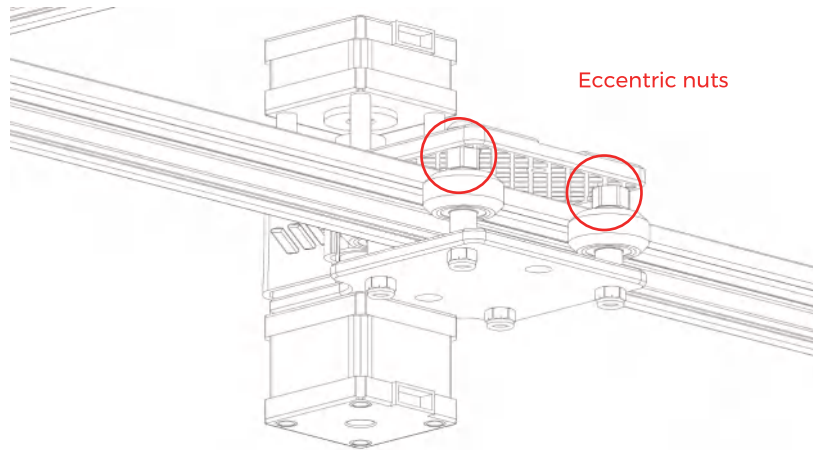
Screw M5*20 x 4

- ② Finally, tighten the M5*20 screws in red area. Note: Please follow the steps above to tighten the M5*20 screws.

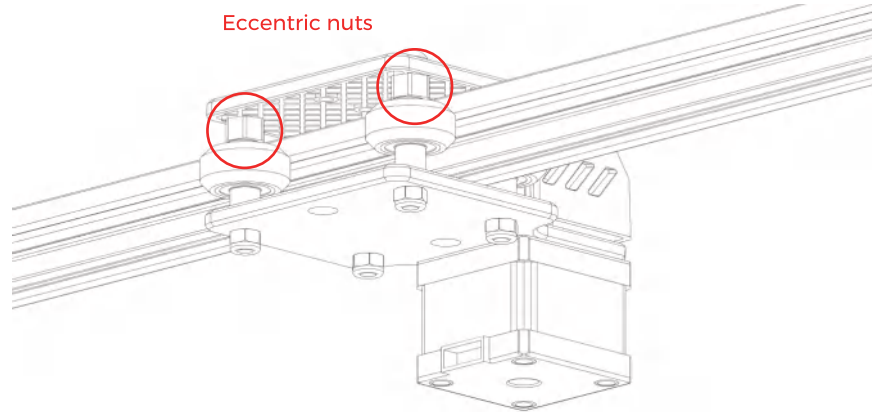


Check whether the POM wheel of the left and right parts of the Y-axis fits the profile, and whether the movement is smooth and there is no jam

Left unit



Right unit



Note: ① It is the most appropriate position to feel a little friction between the POM wheel and the profile when rotating the POM wheel.
 ② If the wheel rotates in the air and does not fit the profile, the eccentric nut can be adjusted clockwise from the direction of the screw head with an open-end wrench.

3.1 Put the synchronous belt of the carriage on the synchronous wheel of the X-axis motor

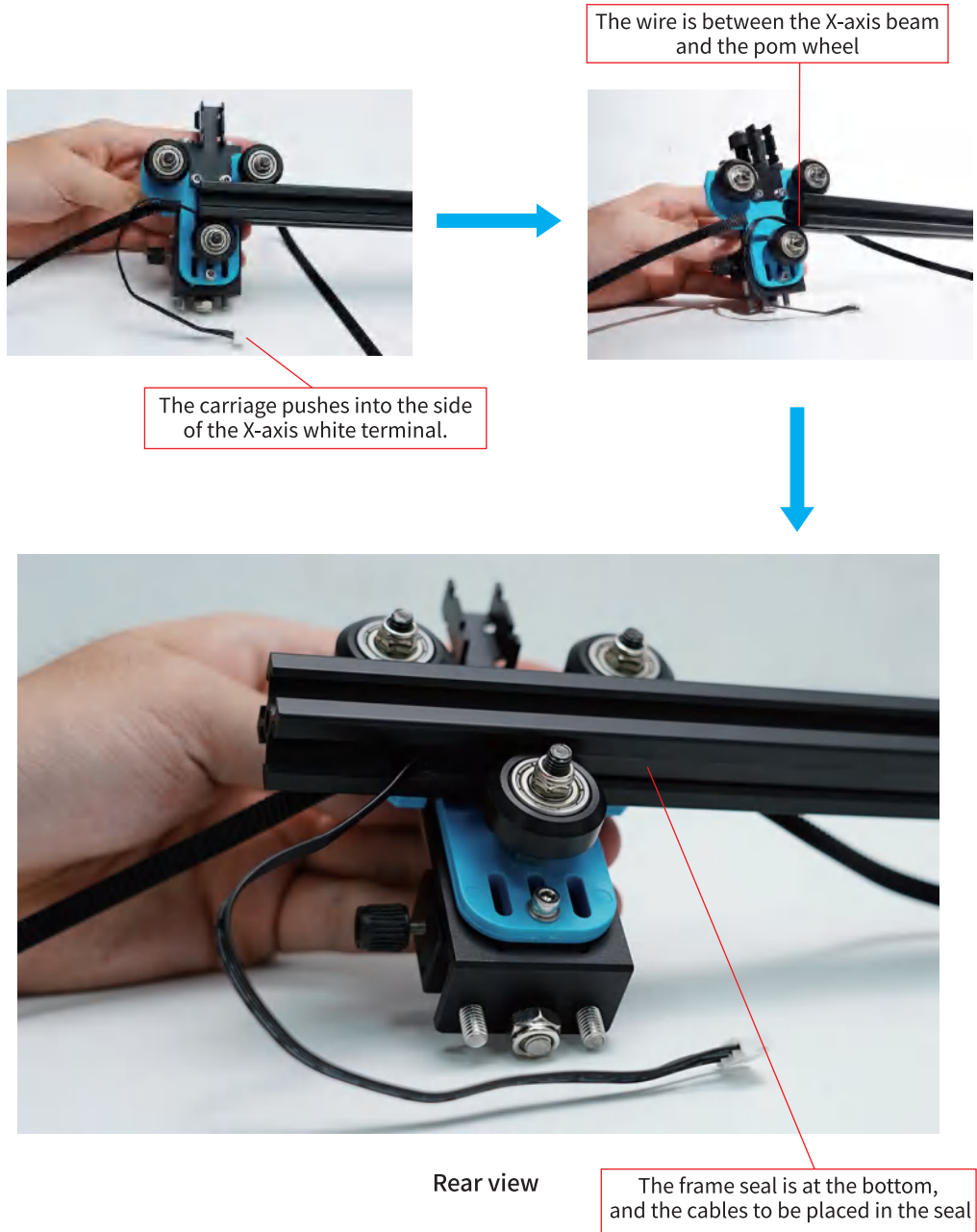
Carriage and lifting module X1



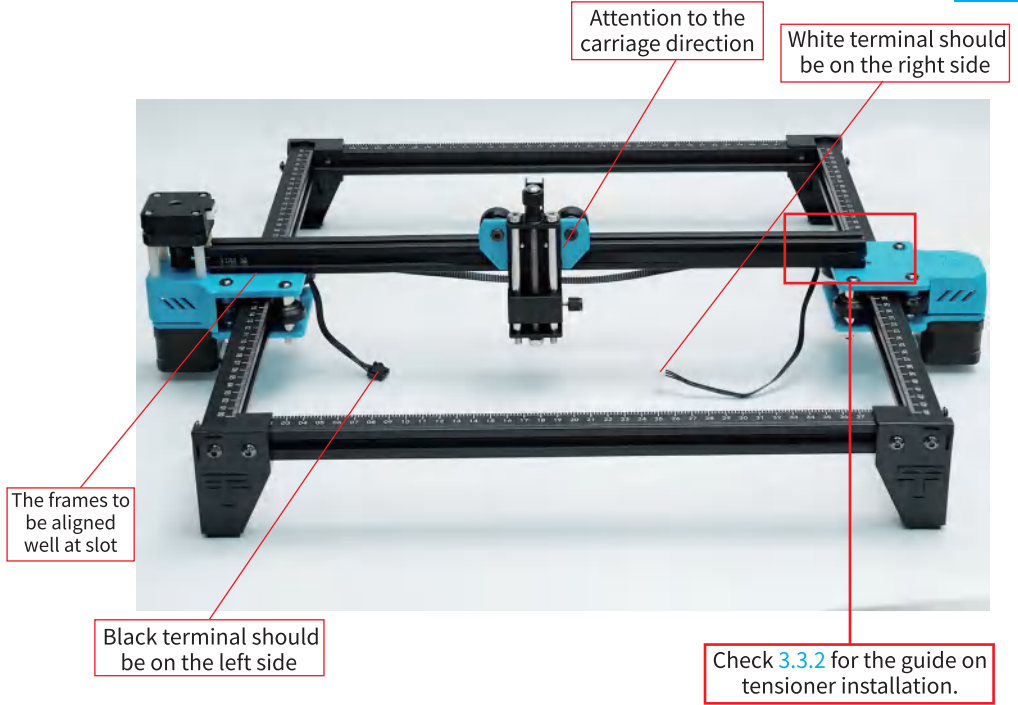
The teeth of the timing belt face the timing pulley



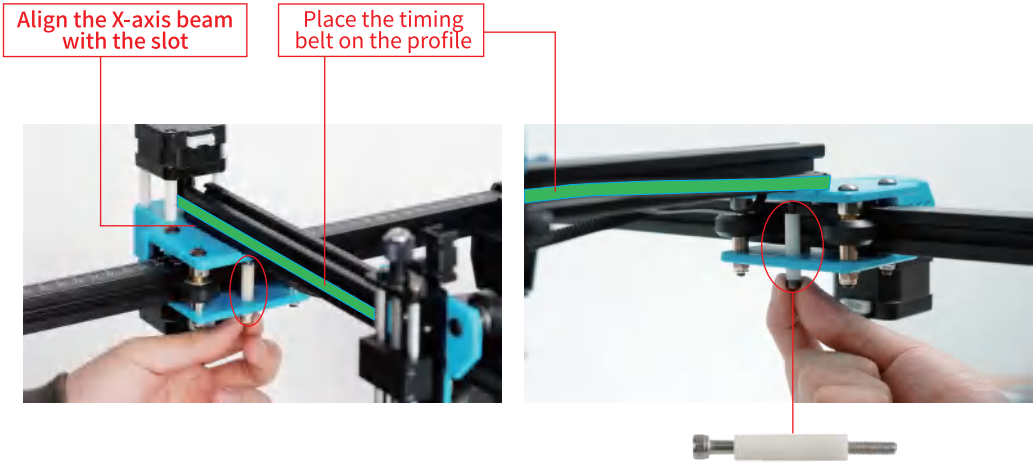
3.2 Push the carriage into the X-axis beam



3.3 Place the assembled carriage on the machine frame and hand-tighten the screws, then assemble the tensioner.



3.3.1 Fixed X-axis beam



First screw two M4 * 50 screws to fix X axis beam (not too tight, adjust X axis beam parallel)

3.3.2 Tensioner Installation

① You need to disassemble the tensioner first, unscrew the hand screw of the tensioner to take out the Tensioner Inner Parts and unscrew the top screw to take out the idler.



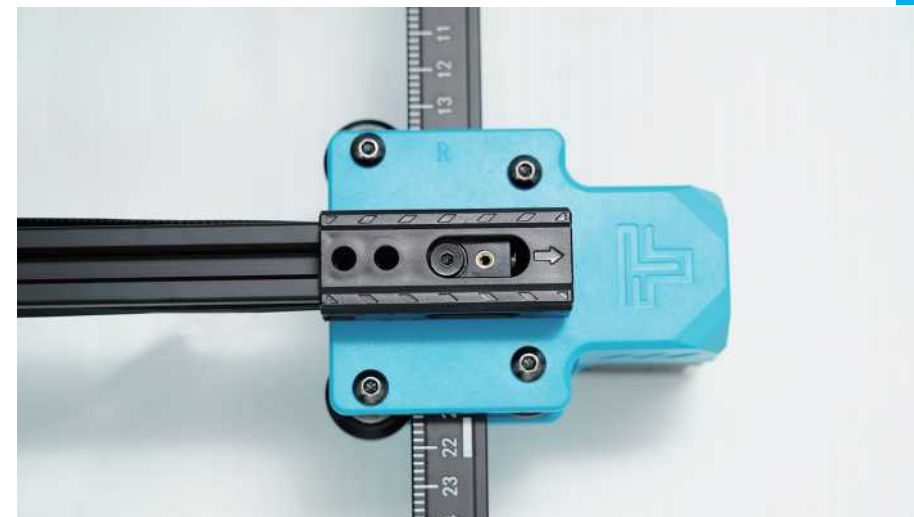
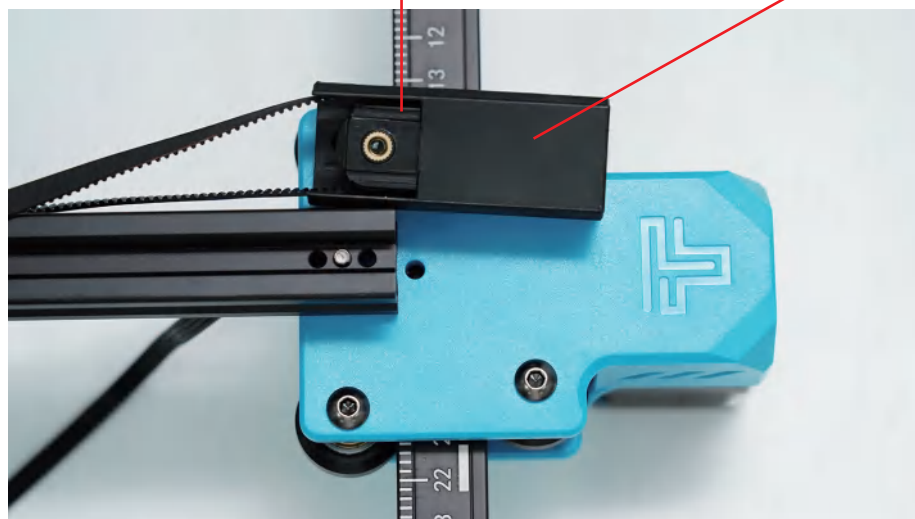
② Put the timing belt of the carriage on the idler of the tensioner, and then lock the screw to the inner part of the tensioner



③ Push the tensioner internals into the tensioner housing shell (Tensioner has a fixed slot, pay attention to the installation method)

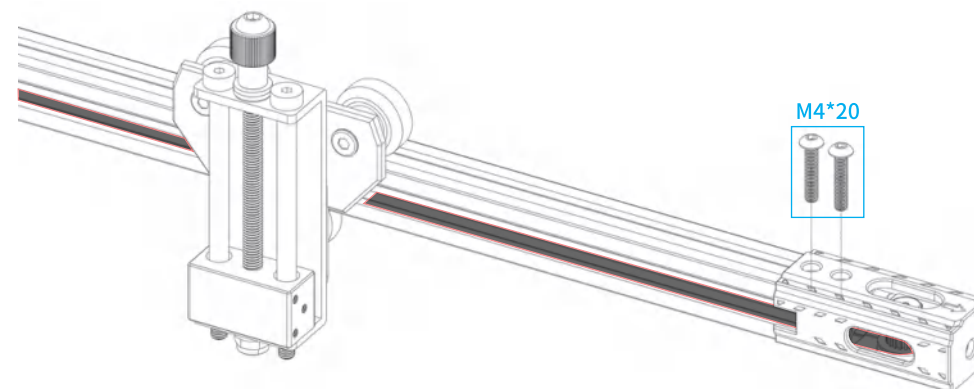
Tensioner has slot, pay attention to assemble them in right direction and push them in into the right position

Tensioner housing shell



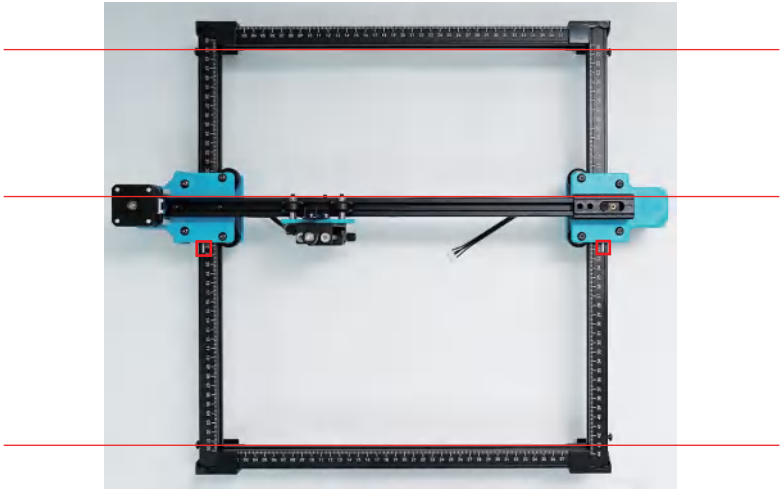
④ Lock up the tensioner retaining screws

screw M4*20 x2



The teeth of the timing belt should face the guide groove

4 Adjust the X-axis beam to make sure it is parallel with the front and back frame.

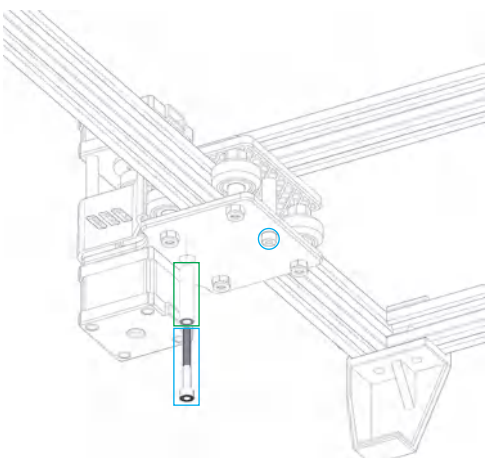


Note: When installing, please make sure that the X-axis beam is parallel to the front and rear beam profiles. You can use the rectangle on the scale for auxiliary adjustment. Without parallelism, the Y-axis will be difficult to move and affect the engraving effect.

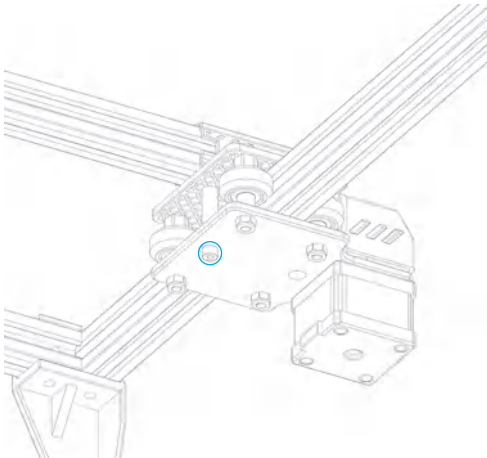
Turn over or lift the machine and tighten three M4 * 50 screw and isolation column 4 * 7 * 30 by using a wrench.



isolation column 4*7*30 x 1
screw M4*50 x 1

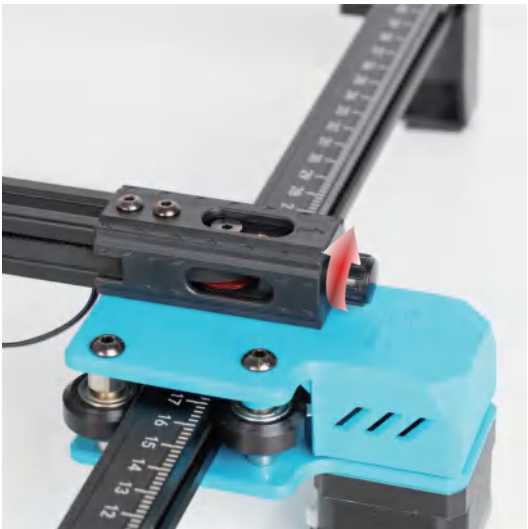
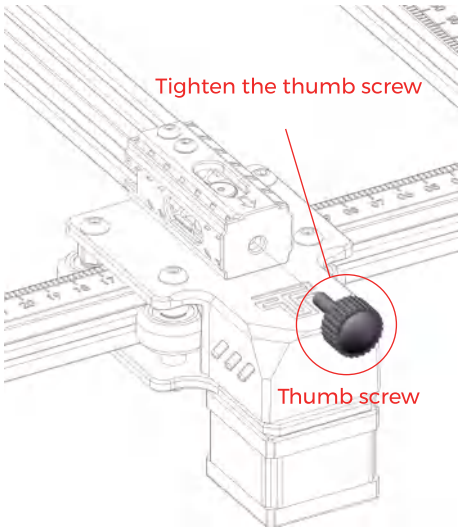


left assembly



right assembly

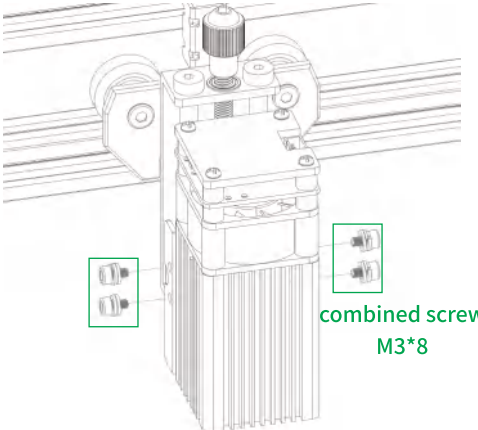
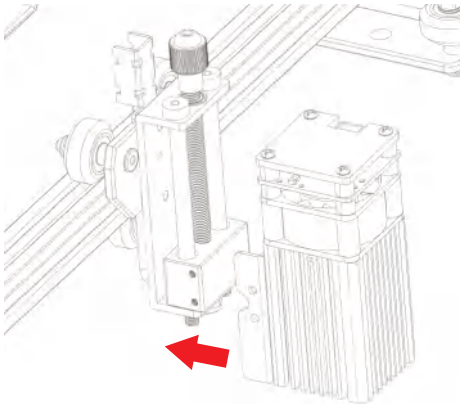
5. Tighten the X-axis synchronous belt.



Note: Synchronous belt needs to be tightened, otherwise it may cause the problem of engraving misalignment.

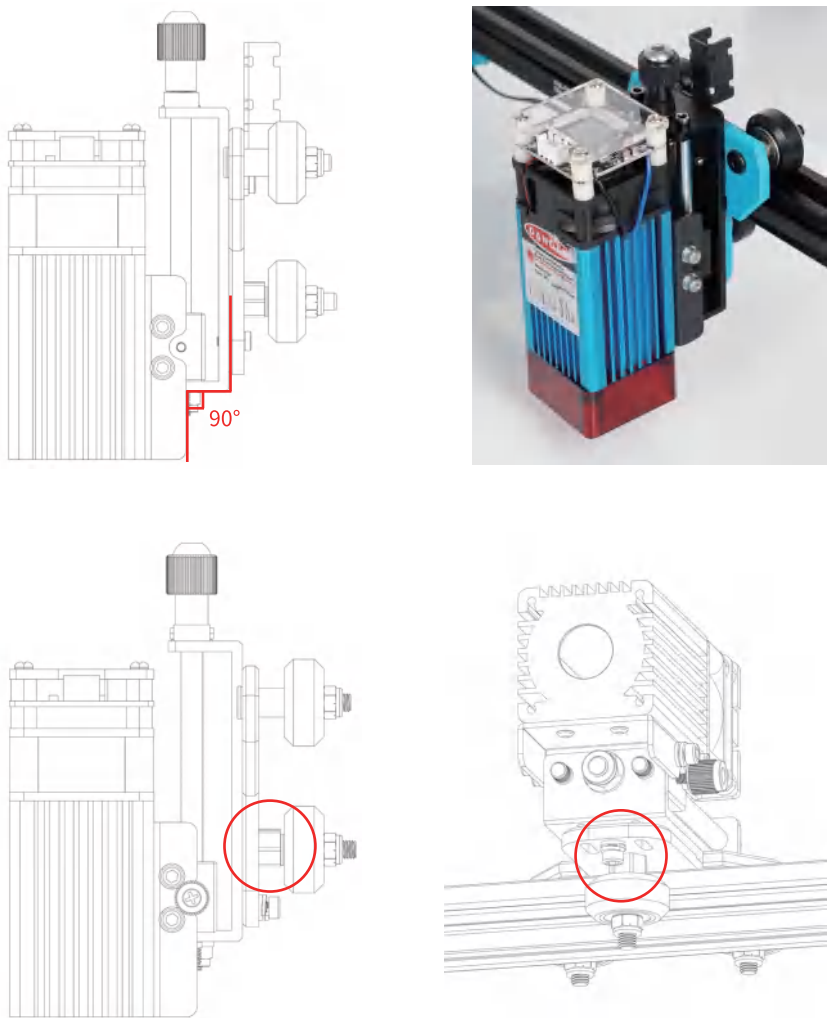
6. Install the laser module

Combined screw M3*8 x 4
Laser Module x 1



combined screw
M3*8

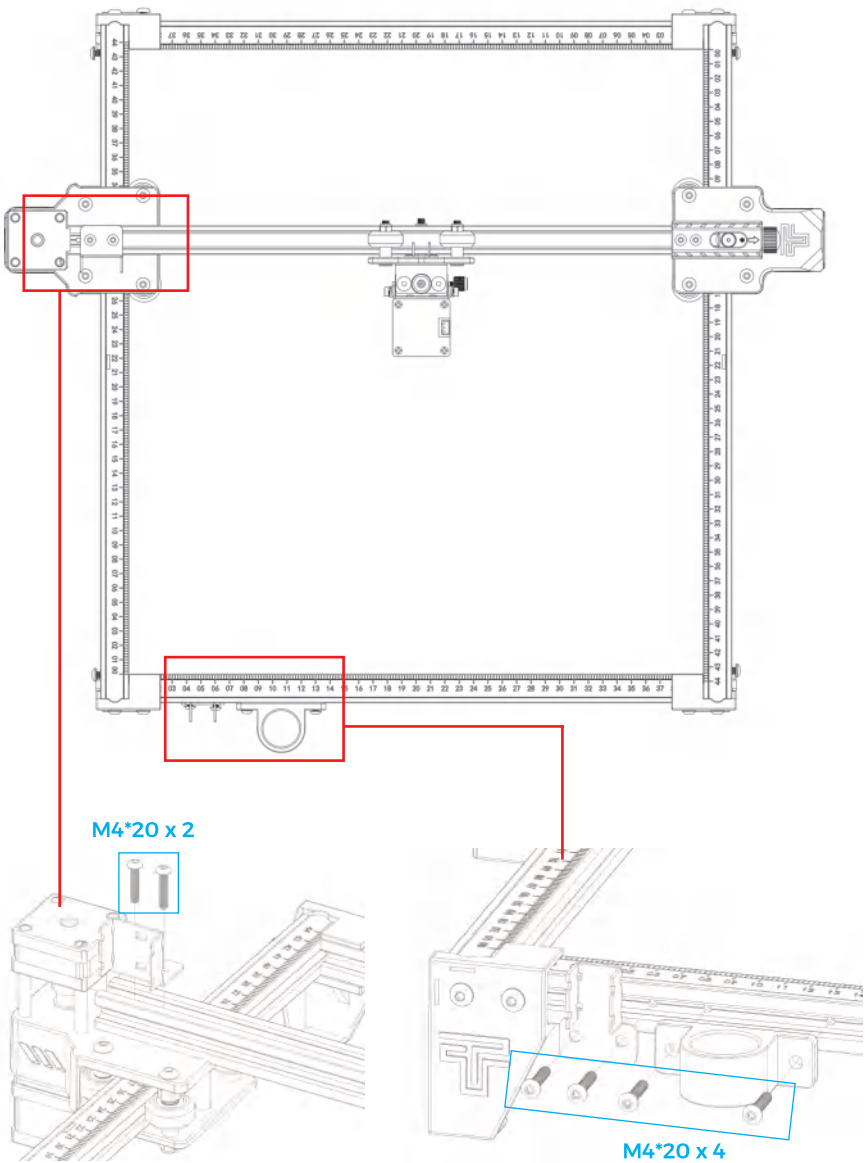
Note: Install the laser module at a vertical angle (90°).



Note: ① It is the most appropriate position to feel a little friction between the POM wheel and the profile when rotating the POM wheel.
② If the wheel rotates in the air and does not fit the profile, the eccentric nut can be adjusted clockwise from the direction of the screw head with an open-end wrench.

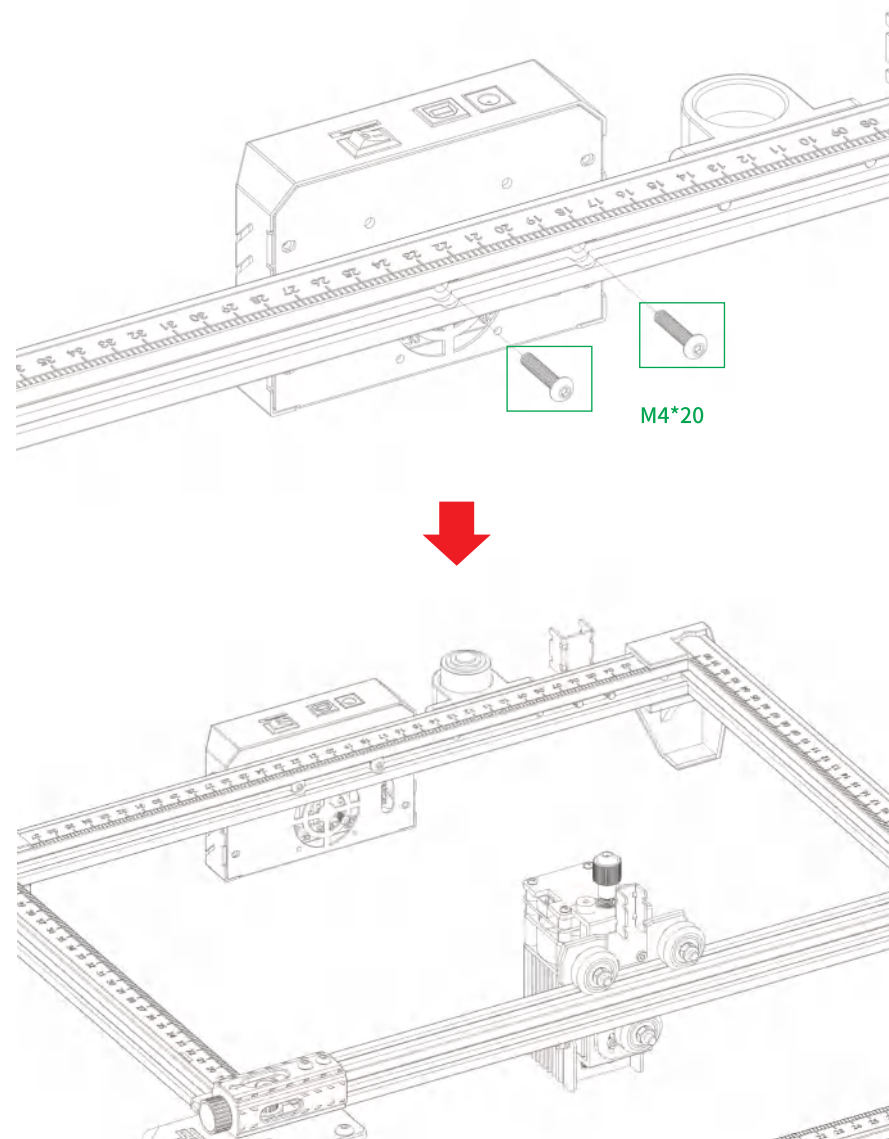
7. Install the bellows holder and Fixed-length column holder

Screw M4*20 x 6



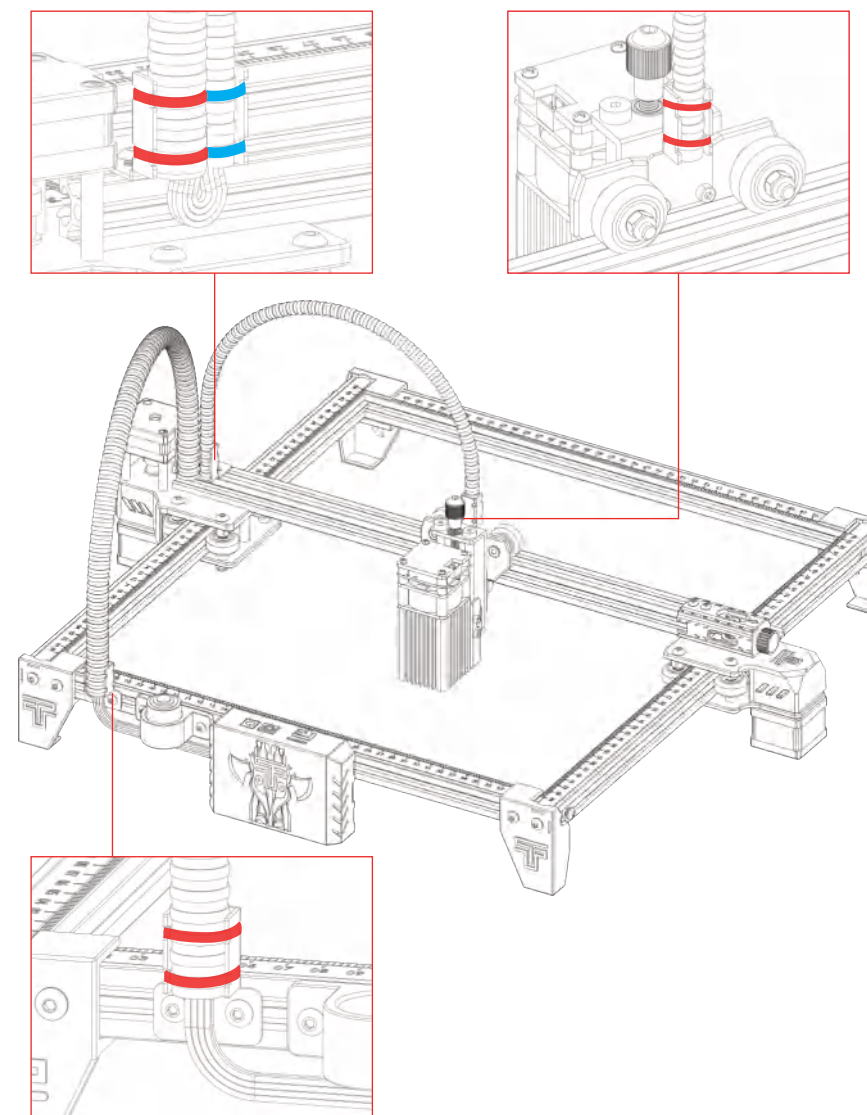
8. Install the motherboard box

Screw M4*20 x 2

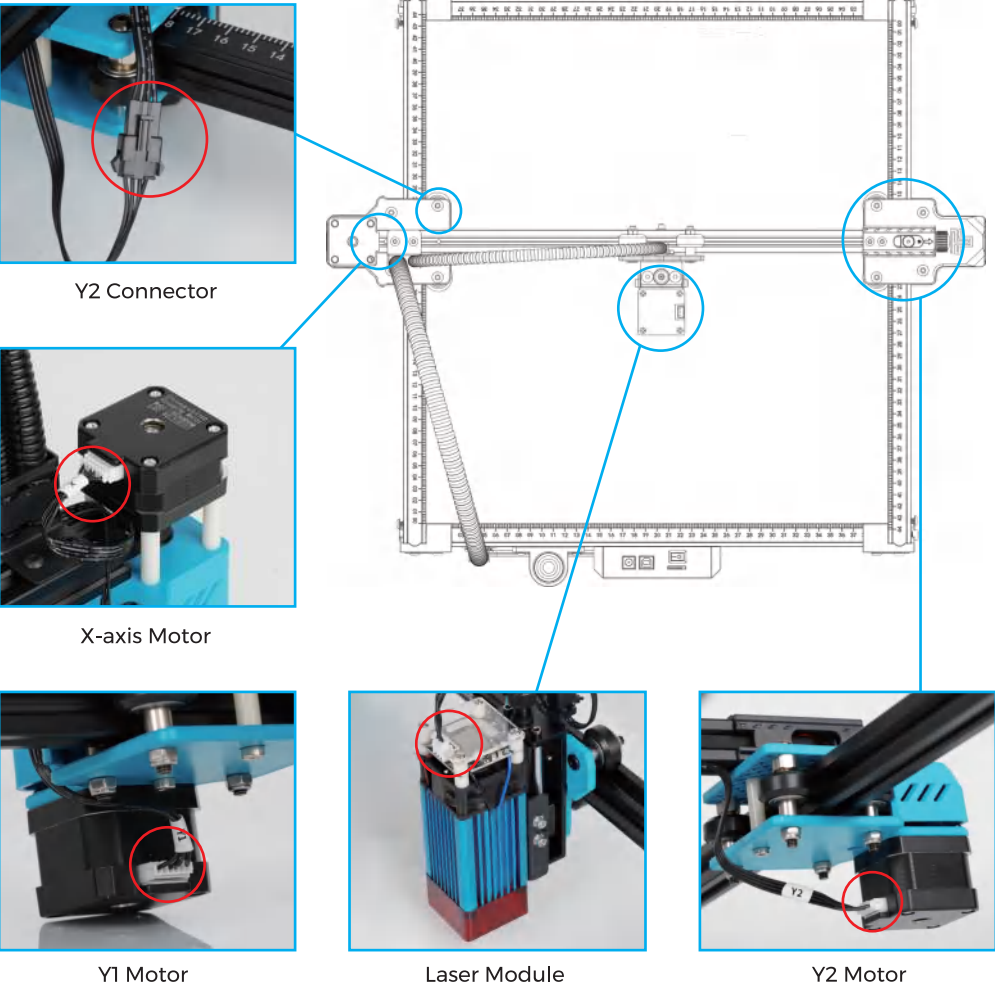


9. Install the bellows

Note: Fix the bellows with black wire tie.



WIRING

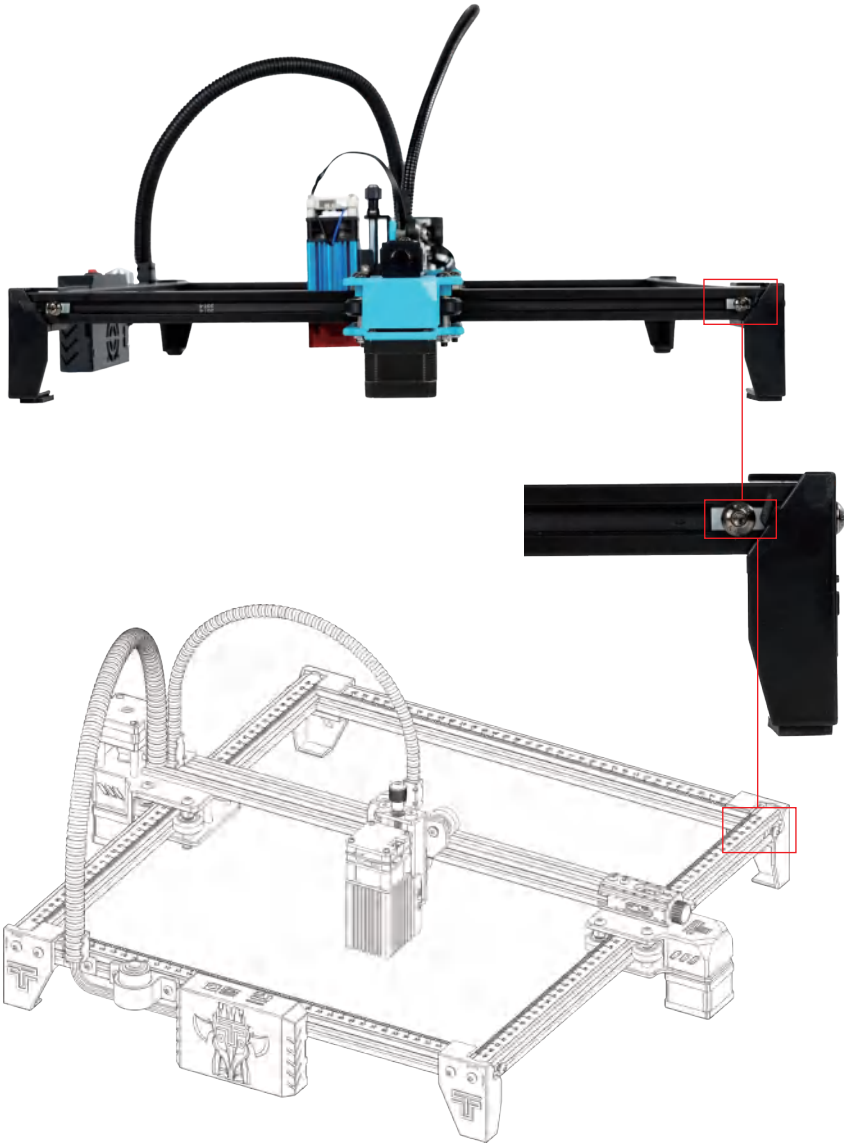


Note: Incorrect connection between X-axis and Y1 motor line will lead to abnormal movement.

ADJUSTMENT

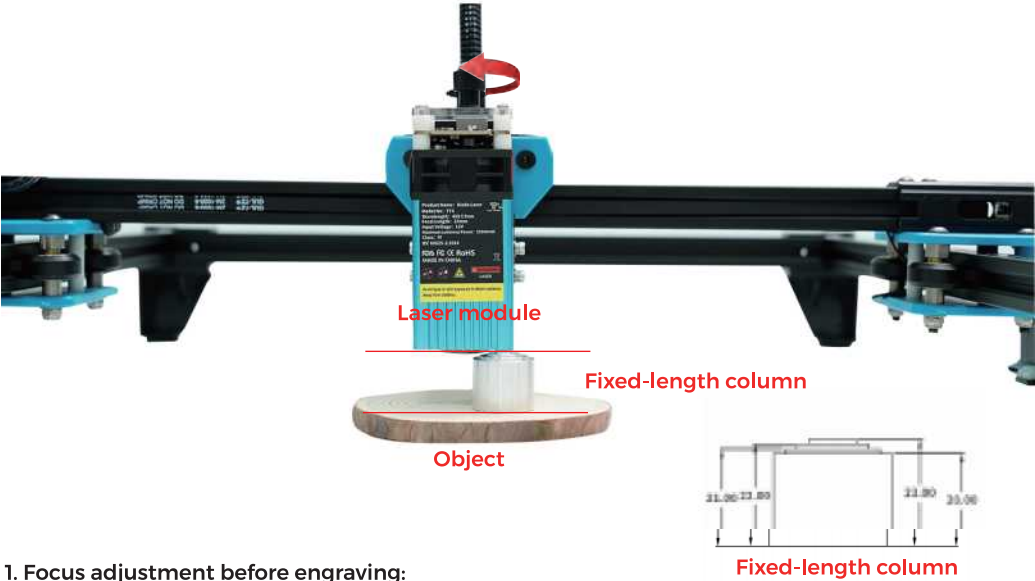
Method to adjust the synchronous belts on both sides

If they loose, first loosen the pressing screws on both sides, then fasten the synchronous belt, and push the pressing screws to the corner and tighten them.



ADJUST THE FOCUS

Method 1



1. Focus adjustment before engraving:

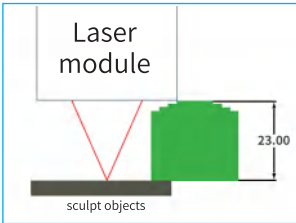
Before engraving, you need to adjust the focus. The focal point needs to be on the surface of the object to be engraved. You can use the “metal assist focus column” to assist you find the focus. The height of the focus column is 23mm .Place the column between the engraved object and the laser module, and rotate The Z-axis lift module till the laser module stick to the fixed focus column, and the laser module and the engraved object distance keep 23mm.

Focus adjustment before cutting: **(The laser module protective cover needs to be removed).**

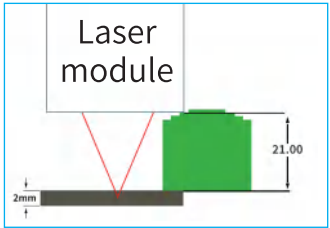
Before cutting, the focus needs to be in the middle of the fault of the engraved object, so according to different plate thicknesses, the corresponding focus should be different, working through the Z-axis lifting module up and down to keep the correct distance.

Assuming that the object thickness is 2mm, use the second “step” of the fixed focus column, and keep the laser module and the engraved object at 22mm.

The object is 4mm, use the third “step” of the fixed focus column, keep the laser module and the engraved object distance at 21mm.



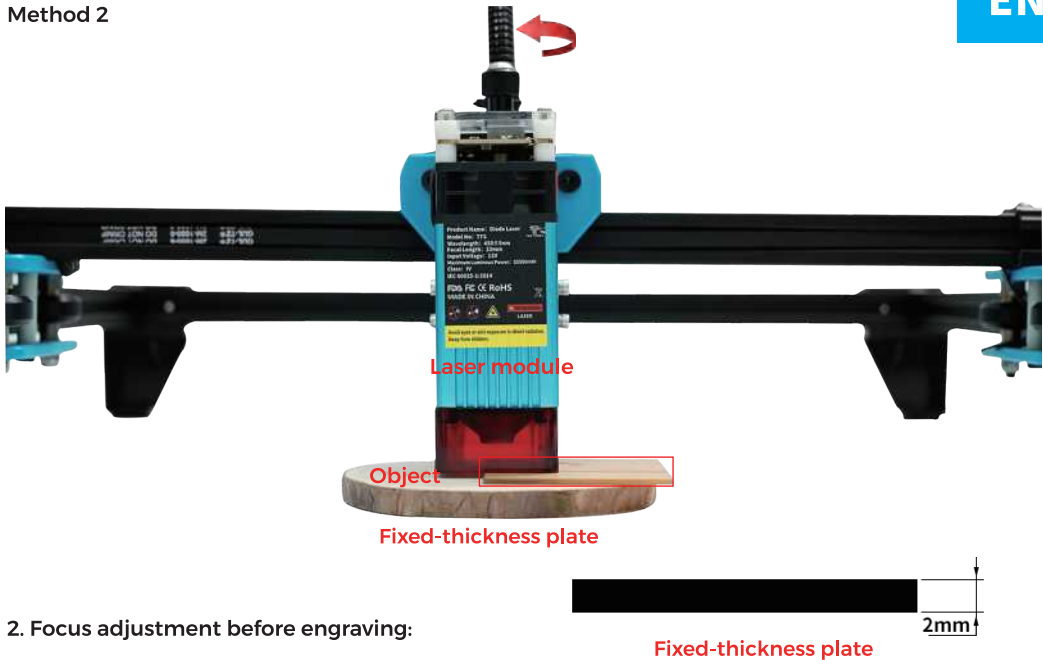
engraving



Cutting

the thickness of the engraved object is 2mm, and the second step of the fixed focus column is used

Method 2

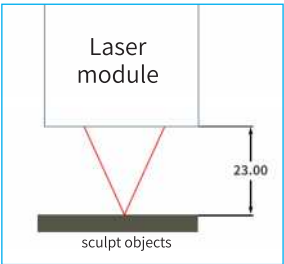


2. Focus adjustment before engraving:

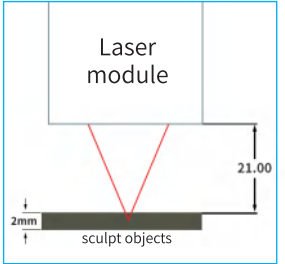
Before engraving, the focus needs to be adjusted. The focus needs to be on the surface of the engraved object. The thickness of the fixed-focus film is 2mm. The fixed-focus film can be used for auxiliary adjustment. Place the fixed-focus film between the engraved object and the laser module protective cover. Rotate the Z-axis lifting module so that the protective cover is attached to the fixed-focus film, and the laser module and the engraved object remain 23mm.

Focus adjustment before cutting: **(The laser module protective cover needs to be removed).**

Before cutting, the focus needs to be in the middle of the fault of the engraved object, so according to different plate thicknesses, the corresponding focus should be set, and the Z-axis lifting module should be rotated to adjust.



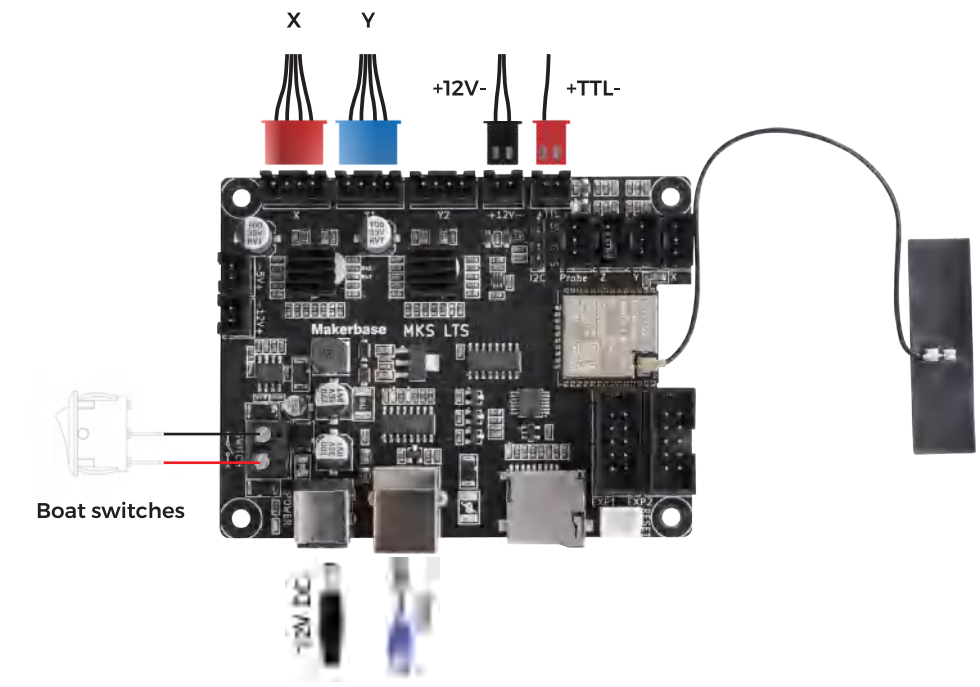
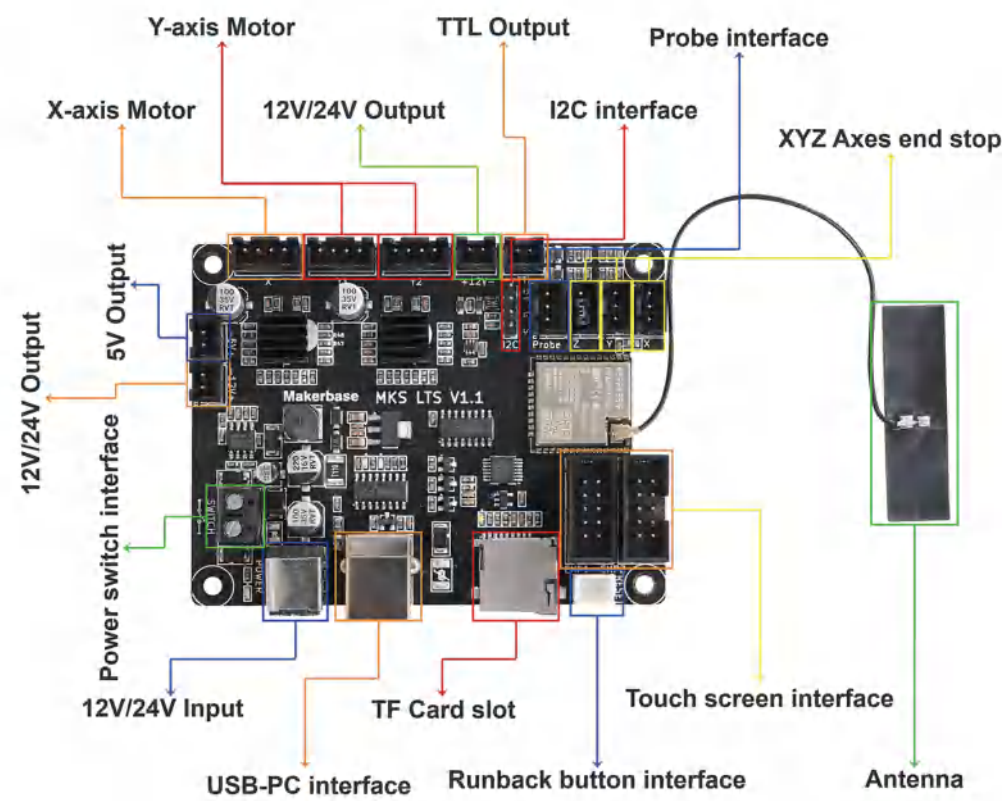
Sculpture



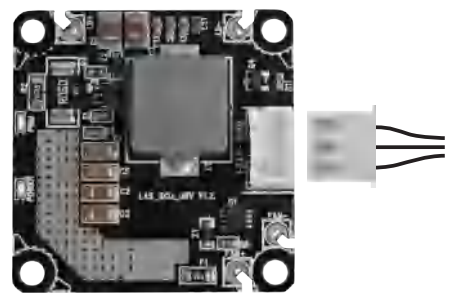
cut

PCB MOTHERBOARD PORT DESCRIPTION

WIRING DESCRIPTION



Y2 connector



Laser wiring

Note: The picture is for reference only, the actual product shall prevail

GRBL INTRODUCTION

1. Software Downloading

LaserGRBL is one of the most popular DIY laser engraving software, which can be downloaded in LaserGRBL website <http://lasergrbl.com/download/> (The installation package is also available on the TF card from the manufacturer or USB flash disk).

Brief introduction:

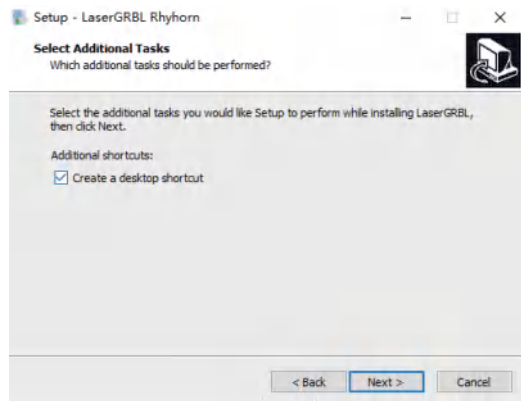
LaserGRBL is easy to use. However, LaserGRBL only supports Windows system (Win XP/Win 7 / Win 8 / XP/Win 10).

For Mac users, you can also choose LightBurn, which is also an impressive engraving software, but it's not free. And this software also supports Windows system.

Note: The engraving machine needs to be connected with the computer during engraving, and the software of the engraving machine cannot be turned off.

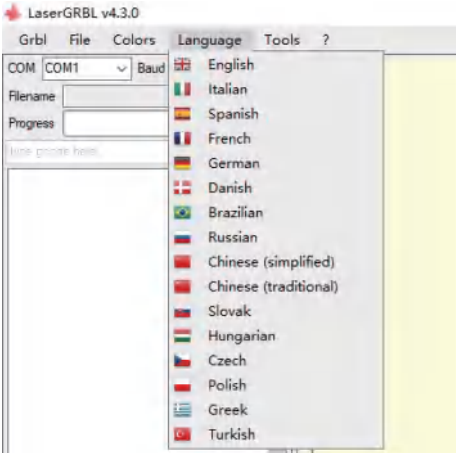
2. Software Installation

Double click the software installation package to start the software installation and click "Next"



3. Language

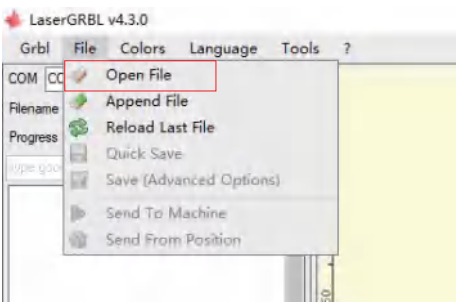
Click "Language" on the menu at the top to select the language you need.



4. Load Engraving File

Click "File" and "Open File" in turn, as shown in figure 8.1, and then select the graph you want to engrave.

LaserGRBL supports files in the formats of NC, BMP, JPG, PNG, etc.



5. Set picture parameters, engraving mode and engraving quality.

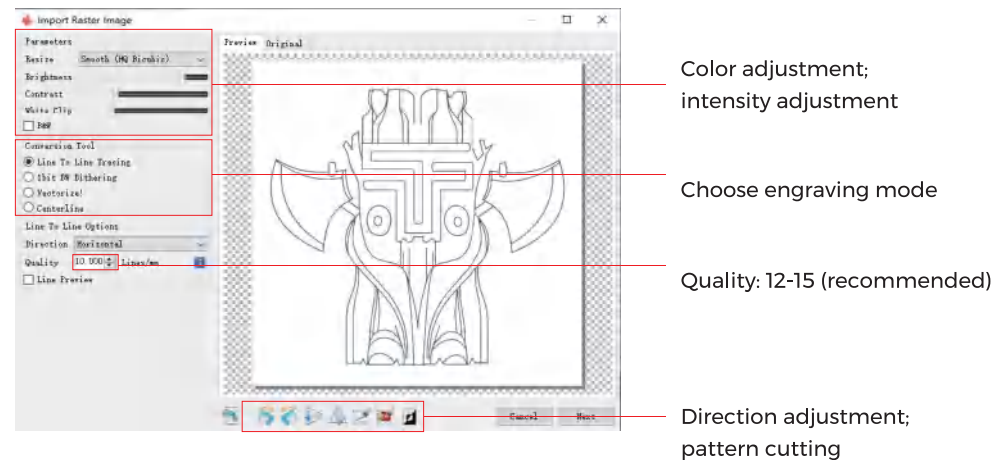
1. LaserGRBL can adjust the sharpness, brightness, contrast, highlight and other properties of the target graph. We can preview window effect during adjustment, and adjust the effect to your satisfaction.

2. In the engraving mode, "Line-to-line Tracking" and "1Bit Shaking" can usually be chosen; "1Bit Shaking" is more suitable for carving grayscale graph. Please Choose "Vector Diagram" or "Center Line" if you need cutting.

3. Engraving quality essentially refers to the line width of laser scanning. This parameter mainly depends on the size of the laser spot of the engraving machine.

Note: The recommended engraving quality range is 12-15. Different materials have different reactions to laser irradiation, so the specific value depends on the specific engraving material.

4. At the bottom of the preview window, the graph can also be rotated, mirrored, cut and so on. After completing the above settings, click next to enter the settings of engraving speed, engraving energy, and engraving size.



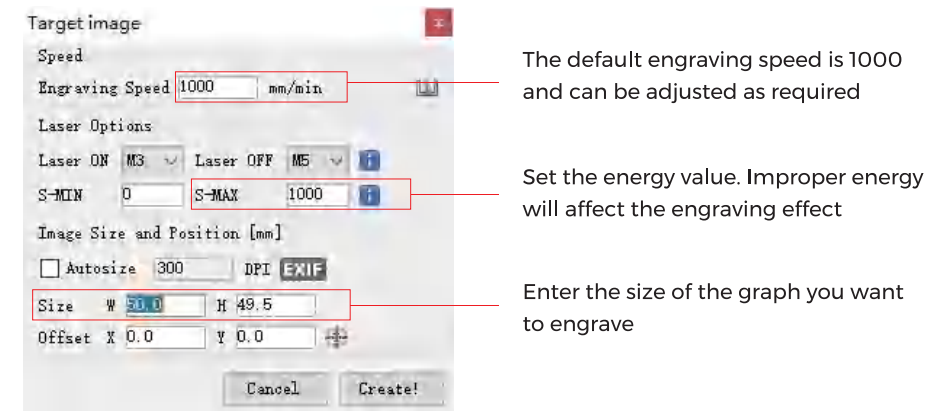
6. Set engraving speed, engraving energy, and engraving size

1. The recommended engraving speed is 1000, which is considered to be a relative appropriate value after repeated experiments. Of course, you can increase or decrease this speed according to your preference. A faster engraving speed will save time but lead to the decline in the engraving effect. Slower speed is the opposite.

2. In laser mode, there are two instructions: M3 and M4. M4 instruction is recommended for engraving in "1bit jitter" mode, and M3 instruction is recommended for other cases. If you have only M3 instruction on the laser, please check whether the laser mode is used in the GRBL configuration. Please refer to the official instructions of LaserGRBL for GRBL configuration.

3. Choice of engraving energy. Choose it according to different materials.

4. Finally, set the size and click the "Create" button to complete the setting of all engraving parameters.



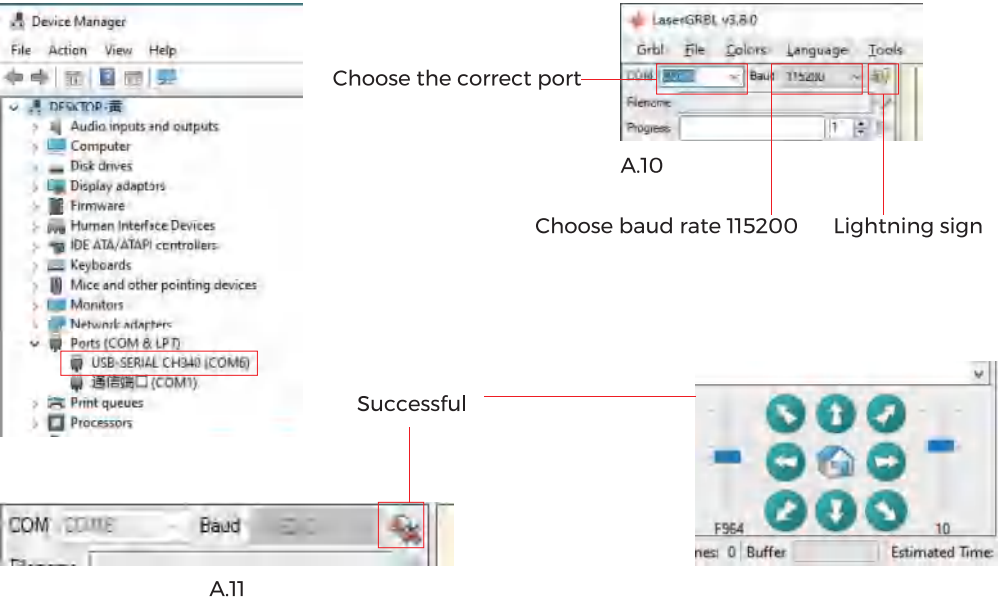
Save GCODE file

Click "File" in the menu at the top of the software interface, enter the drop-down menu, and select "Save". Copy the saved .nc file to the TF card and insert the TF card into the engraver to use the file to engrave your work.

Use the "MKSLaserTool" software in TF to add preview codes to Gcode files.

- 1. Connect the machine with the computer installed with LaserGRBL software with USB data cable.
- 2. Plug in the power.
- 3. Open LaserGRBL on the computer.
- 4. Select the specific port number and baud rate—115200 (Figure A.10)
- 5. Click the lightning sign. When the lightning sign changes to the red “X” and the direction sign is lit, it indicates that the connection is successful. (Figure A.11)

Generally, the COM port does not need to be selected manually, unless multiple serial port devices are connected to the computer, you can find the port of the machine in the device manager of the windows system (as shown in Figure A.09). A simpler way is to try the displayed port number one by one.



Note:
If you cannot find the correct port in the “Ports”, you may need to
Method 1: Click "Tools" in the menu to install CH340 driver (This function is not available in some software versions);
Method 2: Copy the "CH340ser. Exe" file in the TF Card (USB flash disk) to the computer and install it.

- 1. After the laser head has been used for a period of time, it is necessary to clean the lens of the light outlet under the laser head to ensure normal cutting ability
- 2. Wiping the lens must be done after the machine is powered off, otherwise the laser will hurt people
- 3. After wiping the lens, please dry it naturally for about 3-5 minutes and wait for the lens to dry before powering it on, otherwise the light will cause the lens to break
- 4. You can watch the video tutorial by scanning the QR code of the manual

TEST BEFORE USE

1. Turn on the machine, and connect it to the computer.

2. Movement test:

Control the machine to move up, down, left and right on the software, to check whether the direction and distance are right.(Fig. A01)

3. Laser emission test:

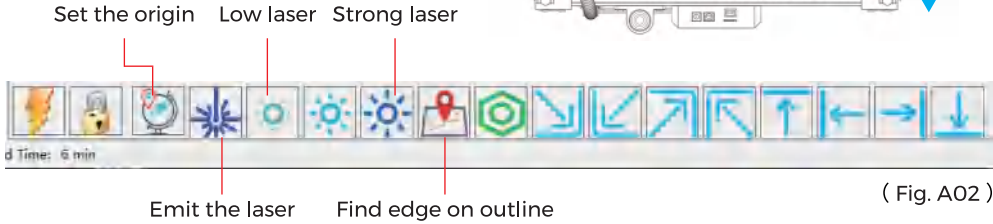
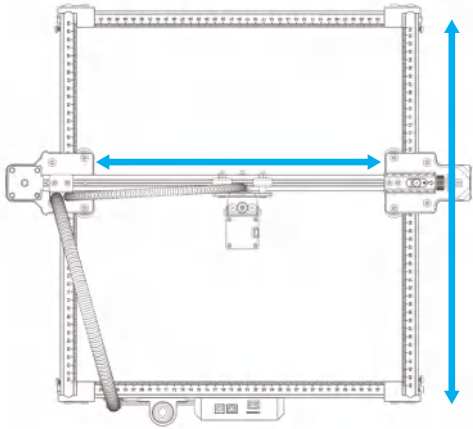
Software import custom icons, then click to sent out laser(weak laser). Wear goggles and observe whether the laser module emits blue light. (Fig. A02)

4. Test the files in the TF card:

Note: laser will generate heat and glare, which may cause harm. Please follow the instructions to avoid injury.



(Fig. A01)



(Fig. A02)

AFTER-SALES SERVICE

The guarantee period is 12 months from the date of purchase.

1. Missing/Damaged/Defective Parts

Within 7 days of the date of receipt, we will replace any parts for free of charge including shipping fees.

After 7 days of the date of receipt, we will replace any parts for free of charge. But you need to pay the shipping fees.

2. Customer Damaged Parts: You need to pay for the cost of the parts and the shipping fees.

3. Courier company loss, missing, damaged, and defective parts.

a. Lost or damaged shipments must be reported to the carrier within the carrier's claim window, and you need to inform us within 7 days of the date of receipt.

b. For any parts lost or damaged during shipping, you need to take photos or video and send them to us.

c. Once the Carrier dispute is settled, please provide us with all communications with the carrier. It is the customer's responsibility to keep us up to date with ALL communication with the carrier.

d. For Missing Parts, you need to fill out a Service Ticket.

e. For Damaged Parts, you need to fill out a Service Ticket and send us the photos or video.

f. If the part is one of the LCD Panel, Power Supply or Mainboard, you need to ship the part back to us and we will send a new one.

FCC Caution:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) this device must accept any interference received, including interference that may cause undesired operation. Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that Interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: -Reorient or relocate the receiving antenna. -Increase the separation between the equipment and receiver. -Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. -Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.