

PRODUCT MANUAL

BURN DOWN ETERNITY

Laser engraver



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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

CE FC RoHS FDA   MADE IN CHINA



LETTER FROM TWOTREES

Dear Customers,

Thank you for choosing us.

It's customer-oriented idea, continuous innovation and pursuit of excellence that enable everybody 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

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.

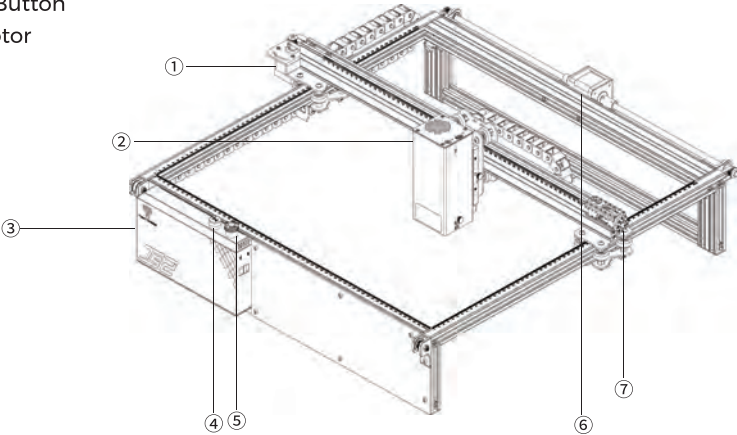
The laser diode is a sensitive component, please prevent static damage. (This product has an electrostatic protection design, but there is still a possibility of damage).

CONTENTS

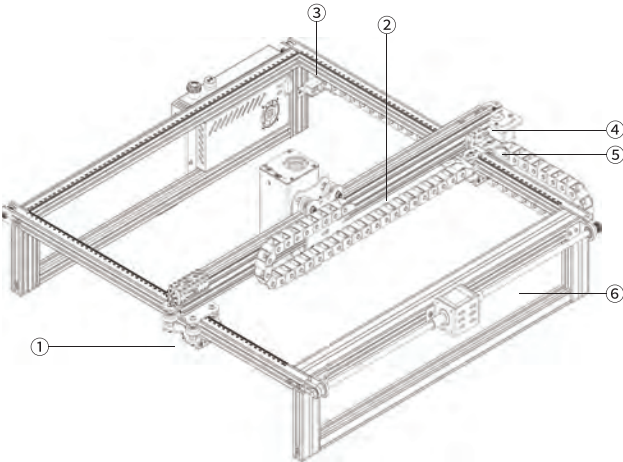
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ABOUT YOUR MACHINE

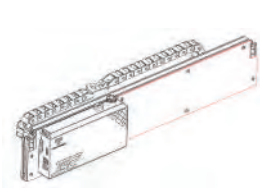
- 1. X-axis Stepper Motor
- 2. Laser Module
- 3. Control Box
- 4. Flash Buzzer
- 5. Emergency Stop Button
- 6. Y-axis Stepper Motor
- 7. X-axis Tensioner



- 1. Y-axis Tensioner
- 2. X-axis Drag Chain
- 3. Y-axis Endstop/Limit Switch
- 4. X-axis Endstop/Limit Switch
- 5. Y-axis Drag Chain
- 6. Y-axis lead rod



PART LIST



Front Frame X1



Y-axis Left Frame X1



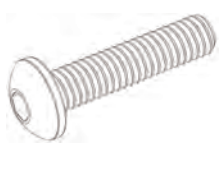
Y-axis Right Frame X1



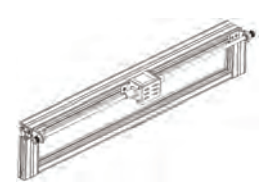
Screw Bolt M3*6X12



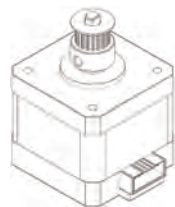
Y-axis drag chain Holder X1



Screw Bolt M5*20 X1



Back Frame X1



X-axis Stepper Motor X1



X-axis Crossbeam X1



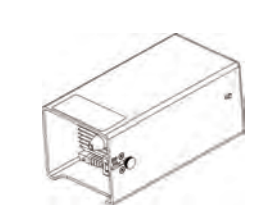
Data Cable x1



Power Cable X1



Power Adapter X1



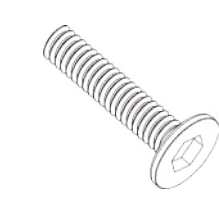
Laser Module X1



Screw Bolt M4*10X2



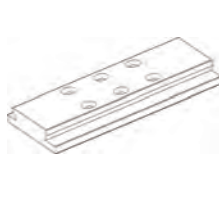
Cup head screw M5*25X6



M3*12 Countersunk Screw X4



M3*14 Countersunk Screw X4



Slide fixing seat X1



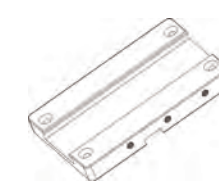
Cup head screw M5*40X2



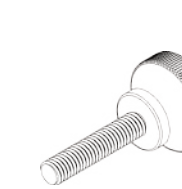
Screw Bolt M4*16 X5



Cup head screw M3*6X4



Slider X1



Setp screw X1



Tool Package X1

Usage notice

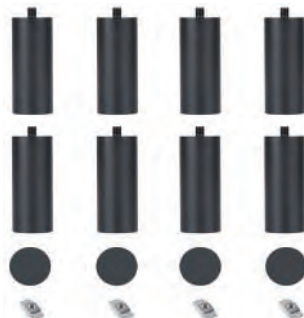
Make sure the cutting area under the laser is metal or non-flammable.
Ensure that the room or area you are operating the laser in is sufficiently labeled to prevent someone from unknowingly walking into an active work area.
Never use the laser except for the purpose intended.
When engraving mirror, stainless steel and other reflective materials, please paint the surface black to prevent damage to the laser head from reflective light.
The machine should be placed securely on a flat surface to avoid dropping or being hit.
Be within reach of the Emergency Stop or pause button when the machine is in operation.
In the event of an emergency, or if there are any conditions that may result in injury to yourself or others, the is equipped with an Emergency Stop button on top of the Controller.
When pressed, this button will latch in the Stop position. To reset, twist the red knob clockwise.



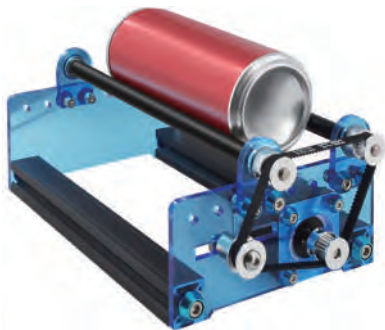
Optional accessories (Not Included)



Honeycomb Platform



Leg extension kit



Rotate Module



Air Pump

Visit www.twotrees3d.com for details

Schematic diagram of complete machine



The standard machine kit comes with air assistance accessories, but does not come with an air pump (if you need an air pump, please consult service team of the official website)

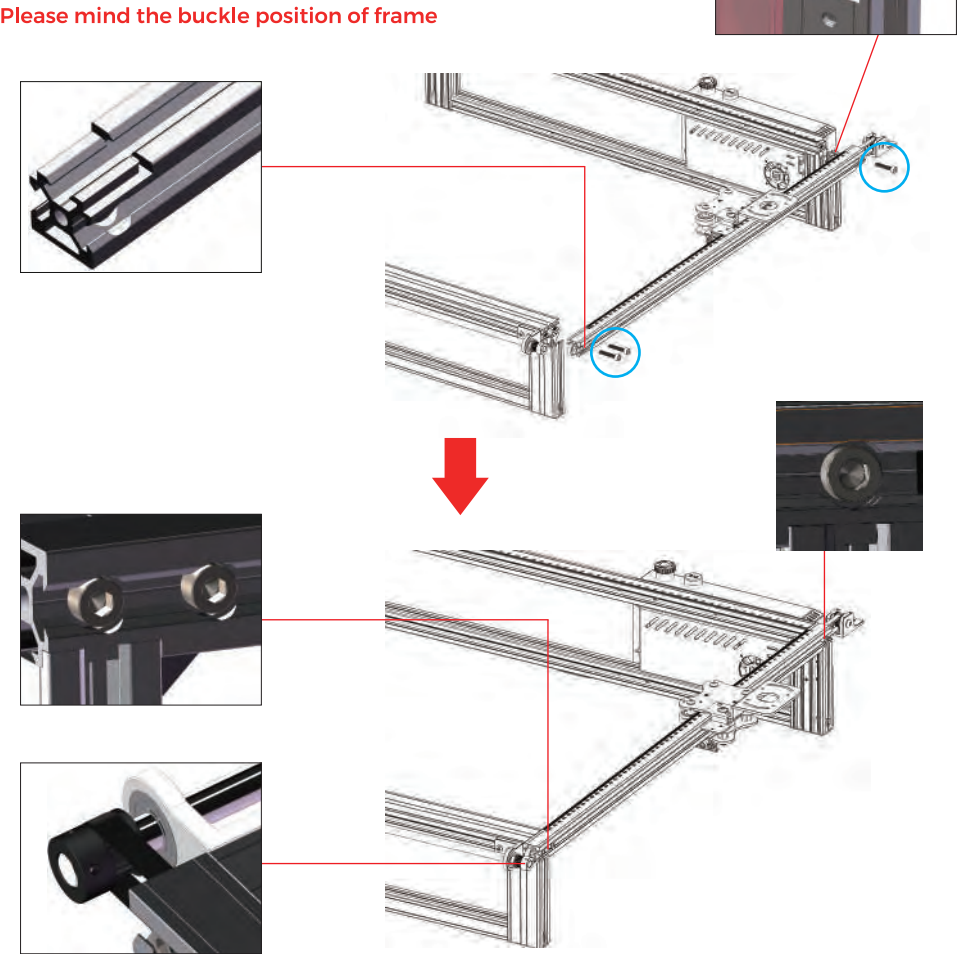
MAIN PARAMETERS

Model	TS2-40
Machine Size	735*720*190mm
Machine Weight	7.1kg
Engraving Size	410*440 mm
Laser Wavelength	445±5 nm
Engraving Accuracy	0.01 mm
Engraving Speed	6000mm / min
Software Support System	Mac, Windows
Material	Aluminum profile + Sheet metal parts
Electrical Requirement	24V 9A DC
Motherboard	DLC ESP32 Motherboard (32bit)
Laser Power	40000mw
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 connection/APP/ Wireless computer WEB terminal/Screen (optional)
Engraving Materials	Wood, Plastic, Paper, Leather, Bamboo, Sponge Paper, Alumina, Stainless Steel, Chevron, Acrylic, Glass, etc.
Engraving Mode	Image carving / Text carving / Scanning carving / Contour carving / Pixel carving

ASSEMBLY

1.1 Install the frames

- Installation of Front Frame, Back Frame and Y-axis Left Frame
Front Frame X 1
Back Frame X 1
Y-axis Left Frame X 1
Cup head screw M5*25X3

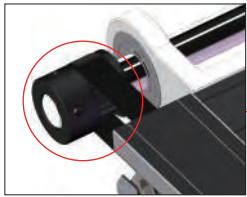


- Note: 1. Please set the Timing belt into pulley groove and profile into buckle position before tighten the screw bolts.
2.For the adjustment of the eccentric nut, please see the instructions on P27

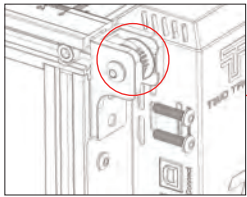
1.2 Installation of Y-axis Left Frame Timing belt & Idler Pulley

M4*16 Screw Bolt X2

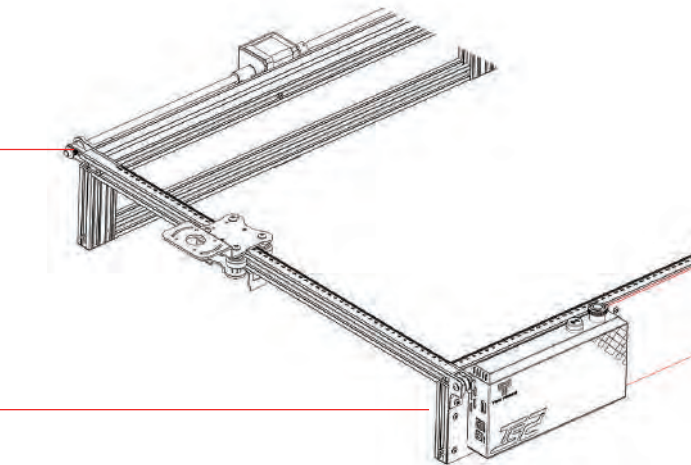
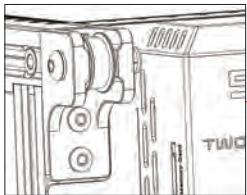
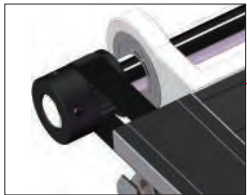
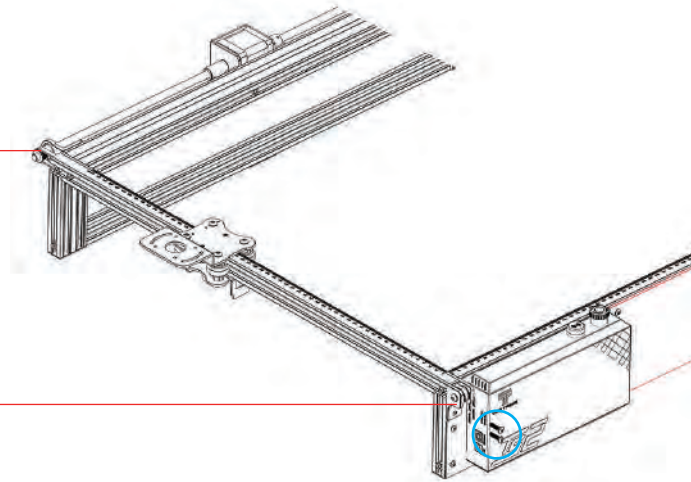
Note: Please set the Timing belt into pulley groove before installing the idler pulley.



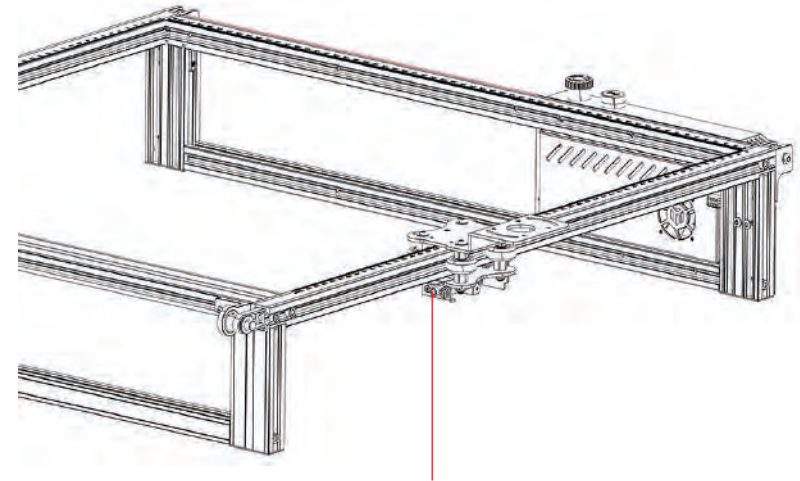
Synchronous wheel



Idler Pulley



1.3 Y-axis Left Tensioner Adjustment



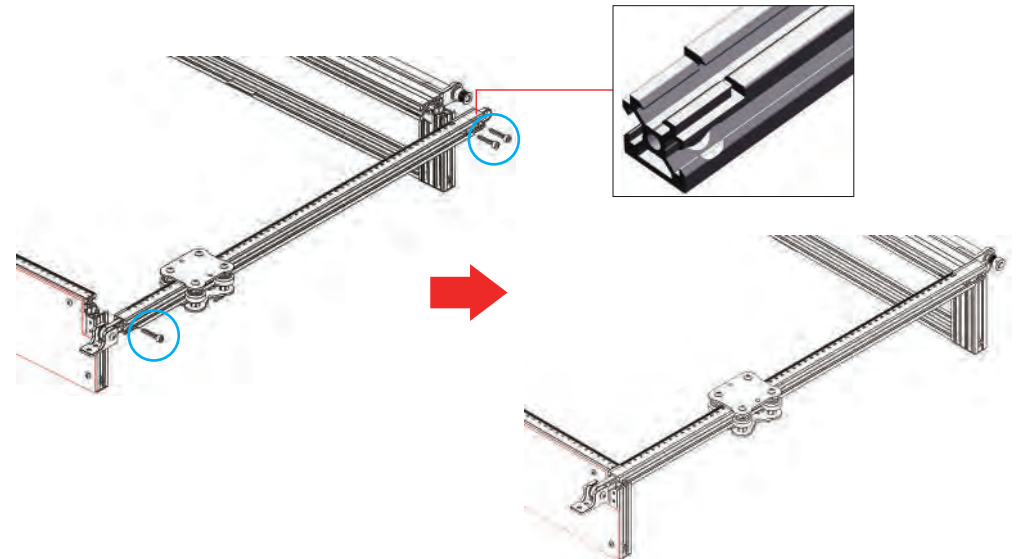
Please tighten tensioner screw in clockwise direction with hex key, or loosen the belt in counterclockwise direction.

Note: If tensioner too tight, pulley would stuck. And if too loose, it would also affect engraving results.

1.4 Installation of Y-axis Right Frame

Y-axis Right Frame Parts X1

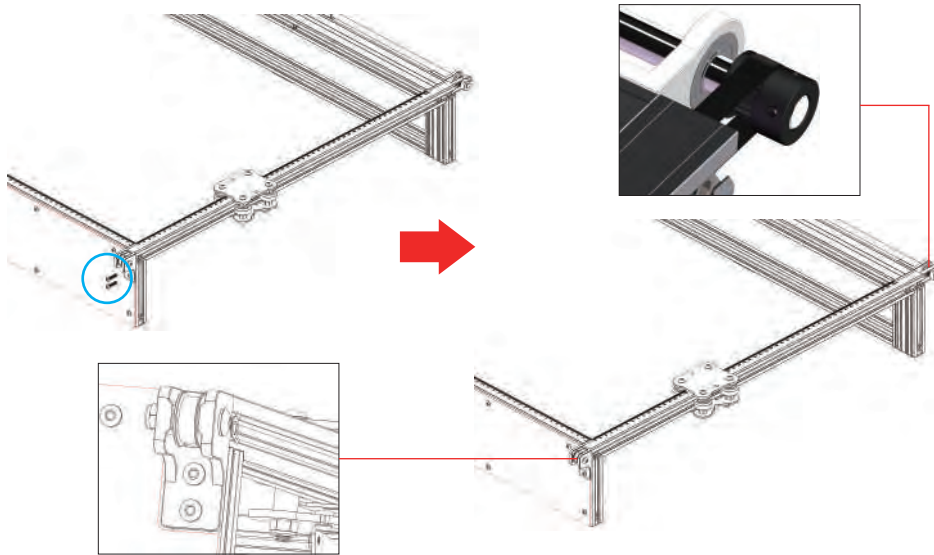
Cup head screw M5*25 X3



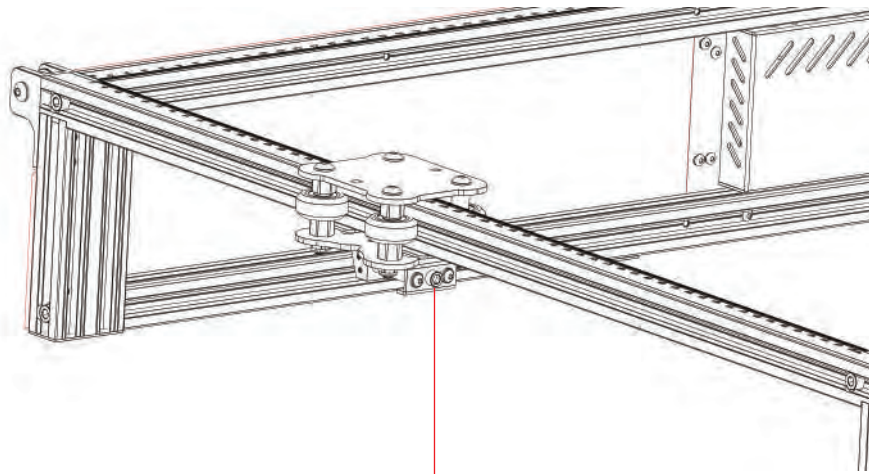
1.5 Installation of Y-axis Right Timing belt & Idler Pulley

Screw Bolt M4*16 X2

Note: Please set the Timing belt into pulley groove before installing the idler pulley.



1.6 Adjustment of Y-axis Right Tensioner



Please tighten tensioner screw in clockwise direction with hex key, or loosen the belt in counterclockwise direction.

Note: If tensioner too tight, pulley would stuck. And if too loose, it would also affect engraving results.

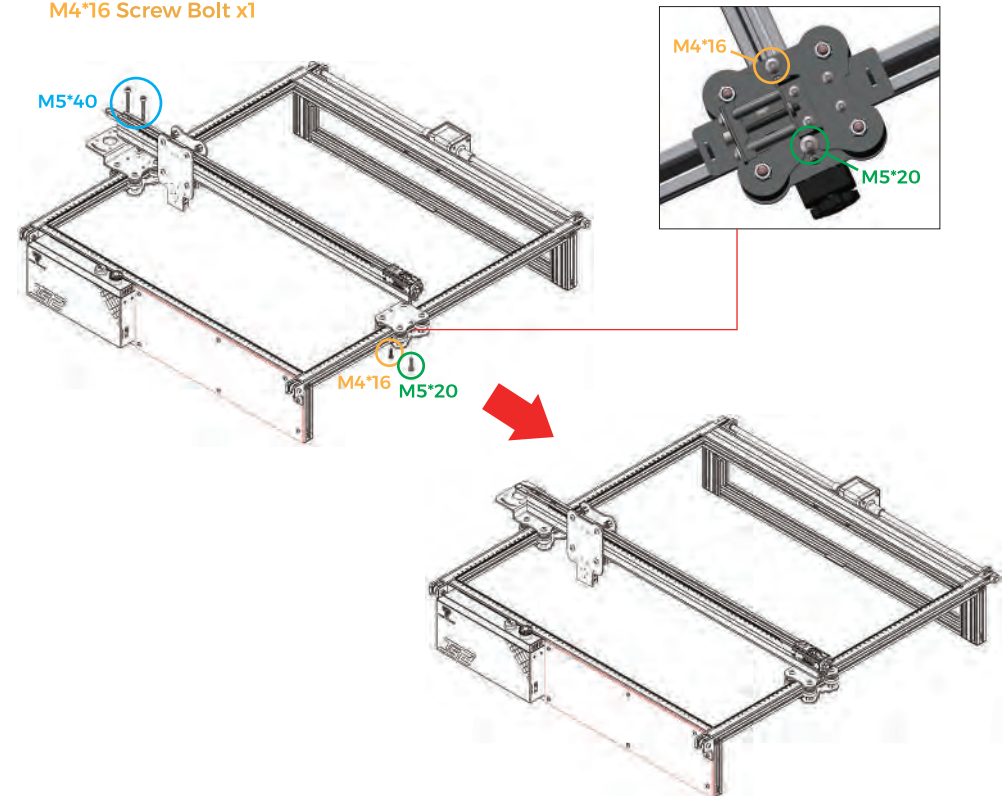
2.1 Installation of X-axis Crossbeam Parts

X-axis Crossbeam Parts x1

M5*40 Cup head screw x2

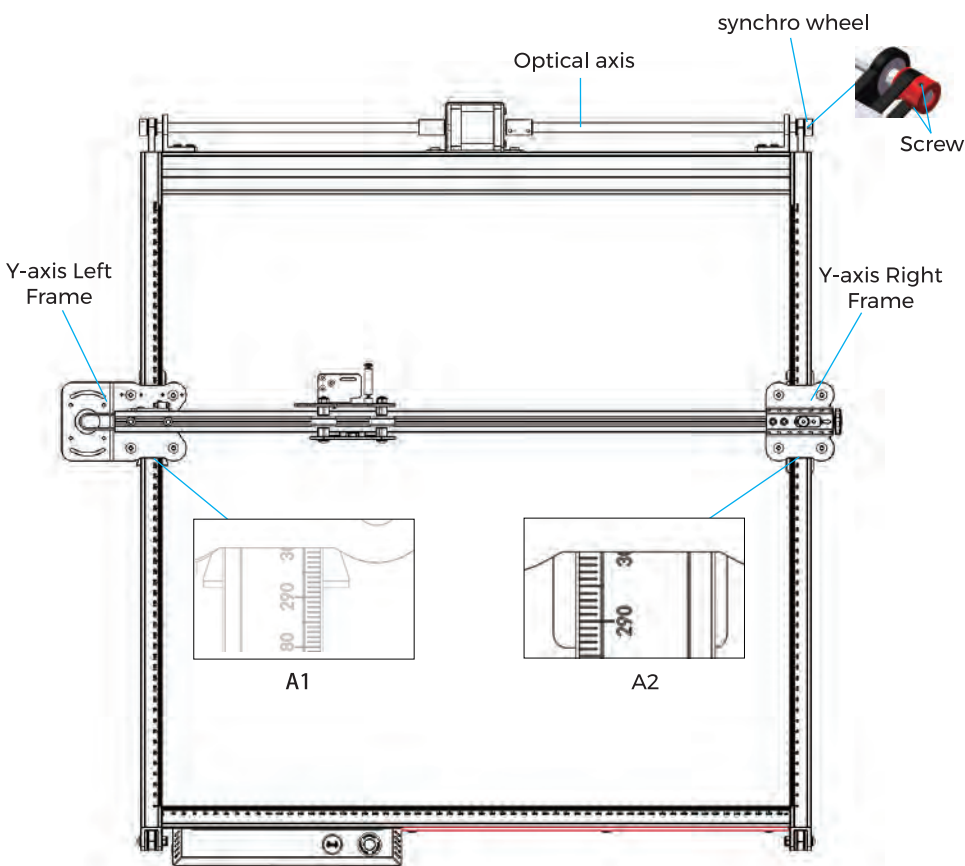
M5*20 Screw Bolt x1

M4*16 Screw Bolt x1



Note: For the adjustment of the eccentric nut, please see the instructions on P27

X-axis parallel adjustment method

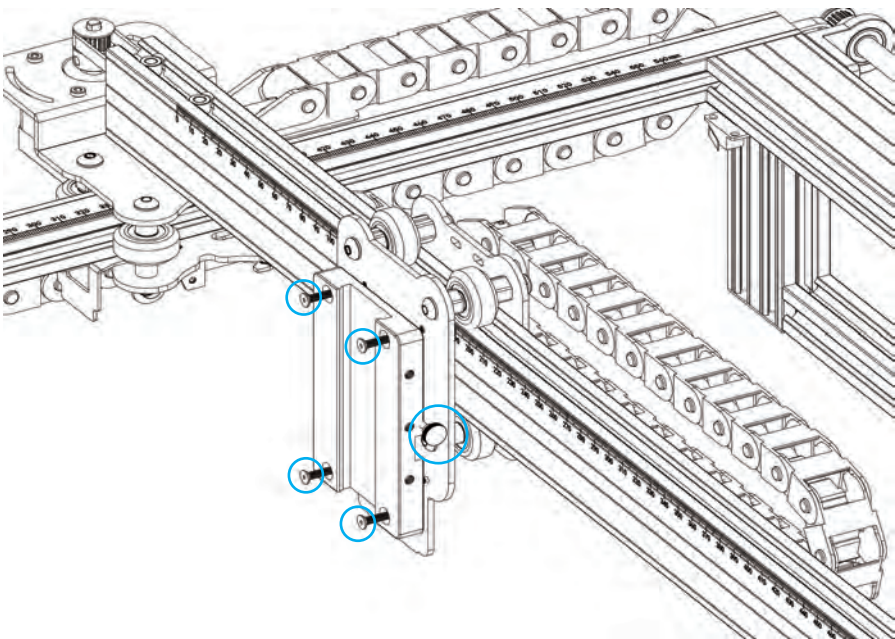


Attention: Please make sure the X-axis crossbeam is parallel to (check ruler marks on both sides as reference) while installation, otherwise it would affect movement of Y-axis and engraving effects.

- Step 1. Move the left component of the Y-axis to the scale 300 (A1)
2. Loosen the two screws on the synchronizing wheel with a hexagonal wrench, and then press the to move the right component of the Y-axis to 300 of the scale (A2).
- Then lock the two screws on the synchronous wheel (if the screws are not locked, it will affect the Y-axis movement and the engraving effect)
3. If you don't understand anything, please scan the QR code on the cover of the manual to watch the relevant video tutorials.

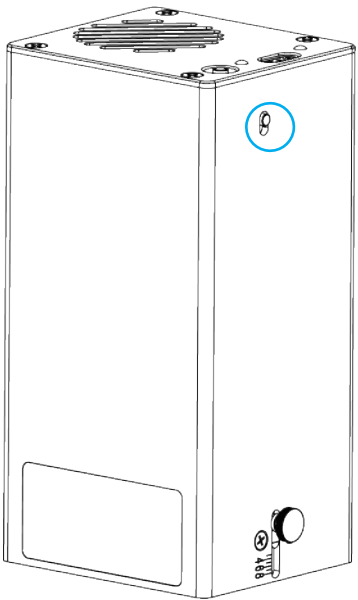
2.2 Installation of Slider A

- Slider A x1
- M3*14 Countersunk Screw X4
- Step screw X1



2.3 Adjust the power of the laser head

- Laser Module X1

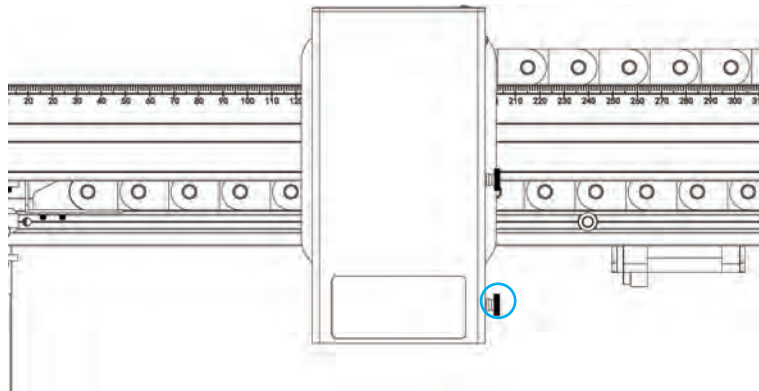
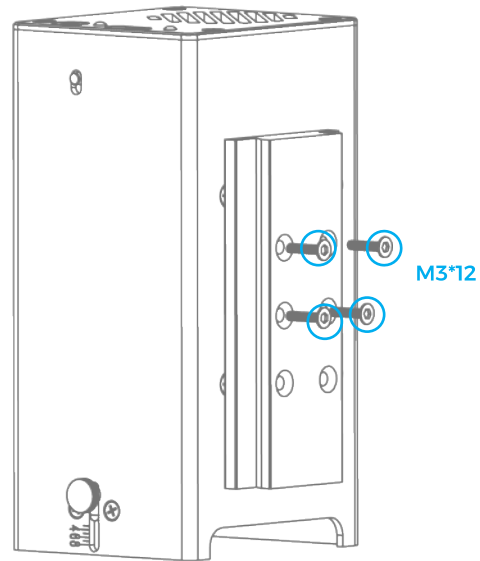


Step:Press this button to adjust the laser head power to 20w or 40w

2.4 Installation of Slide fixing seat

Slide fixing seat x1

M3*12 Countersunk Screw X4

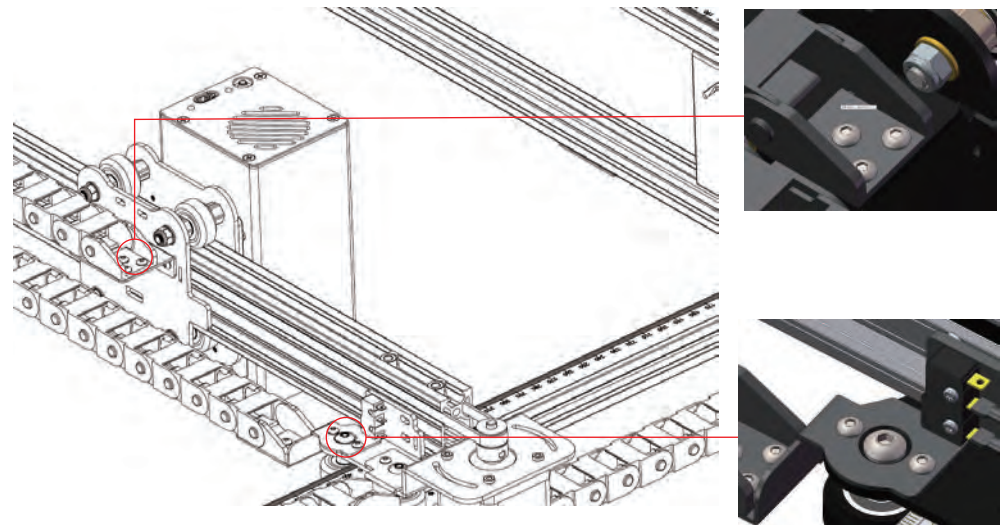
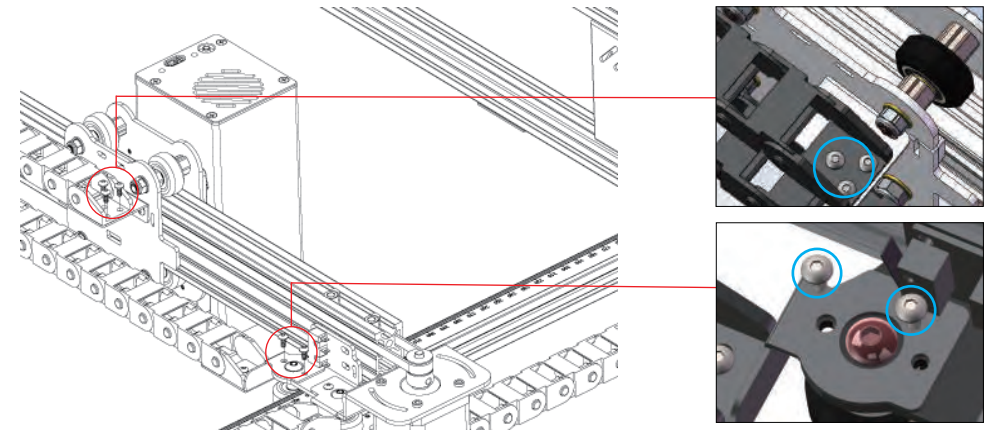


Note: Adjust the thumb screw on the laser head so that the focal distance between the laser head and the engraved object is 8mm.

3.1 Installation of X-axis drag chain

Screw Bolt M3*6X5

X-axis Cable Carriage Parts X1

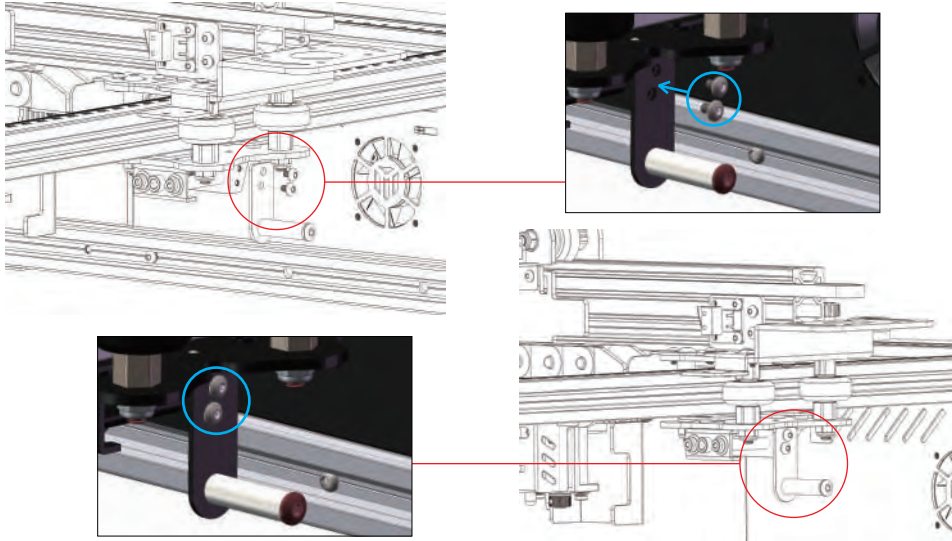


4.1 Installation of Y-axis drag chain

Installation of Y-axis drag chain Parts

Y-axis drag chain Holder X1

Screw Bolt M3*6X2

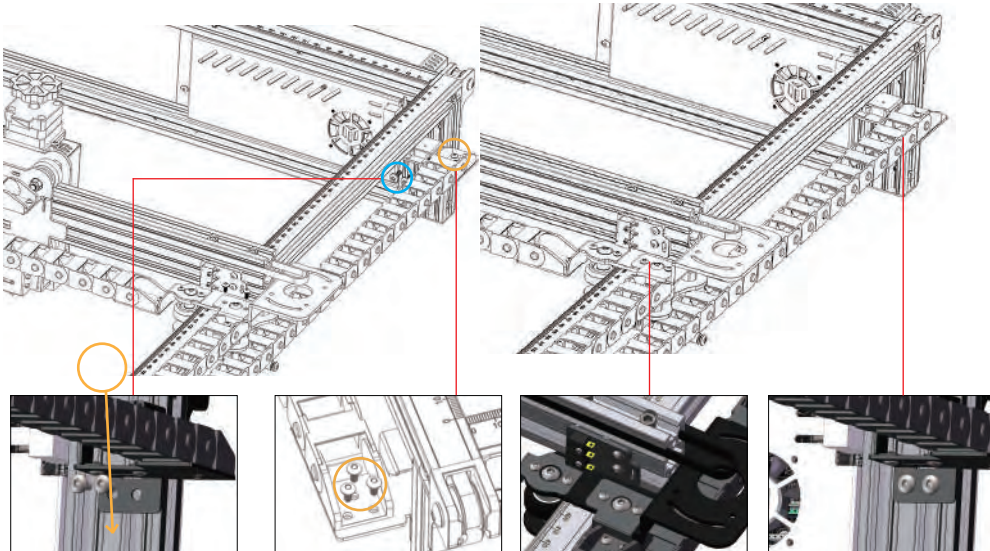


4.2 Installation of drag chain

Y-axis drag chain Parts

M3*6 Screw Bolt x5

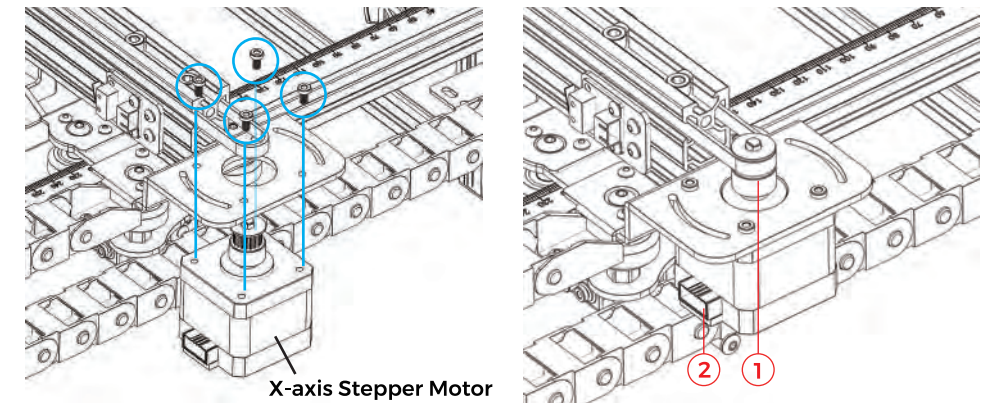
M4*10 Screw Bolt x2



5. Installation of X-axis Stepper Motor

M3*6 Screw x4

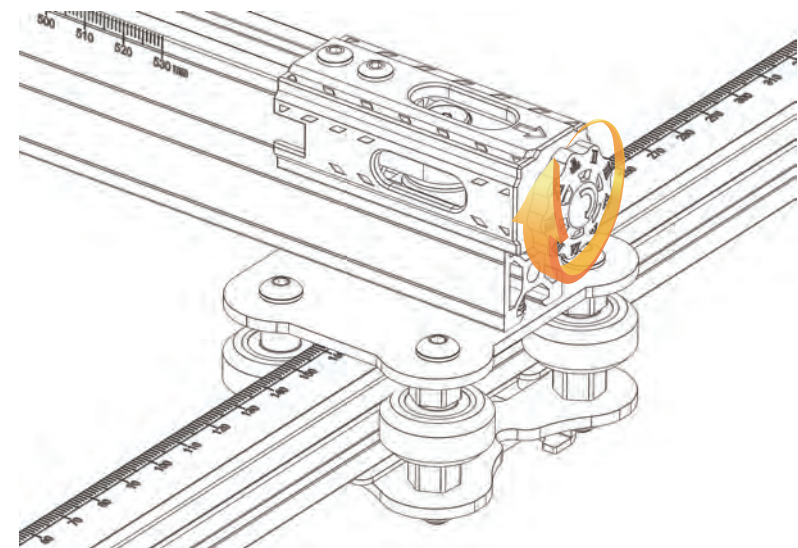
X-axis stepper motor x1



Note:

1. please put timing belt into pulley groove on stepper motor.
2. please make sure the circuit connector in the right direction as above picture.

6. Adjustment of X-axis Tensioner



Note: Please make sure the timing belt is tight to avoid engraving dislocation.

WIRING INSTRUCTION

1.1 Cable Marking Explanation

- X(2PIN)→X-axis Endstop Switch Cable
- X(4PIN)→X-axis Stepper Motor Cable
- Y(4PIN)→Y-axis Stepper Motor Cable
- A(3PIN)→ Laser Signal Cable

Note: PIN refes to the quantity of cable connecting pins

1.2 Wiring diagram



X(4PIN)→X-axis Stepper Motor Cable



X(2PIN)-axis Endstop Switch Cable



Y(4PIN)→Y-axis Stepper Motor Cable



Y(4PIN)→Y-axis Stepper Motor Cable

- Note: 1. Please make sure all wiring correct before turn on the machine.
2. Manually push the machine before powering on to see if the wire will affect the machine's movement track (the motor will be pushed after the wire is inserted, and the mainboard will be powered on, and the mainboard will be slightly locked when it is powered on, so that it is normal to feel stuck when pushing)

GRBL BEGINNER’S GUIDE

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).

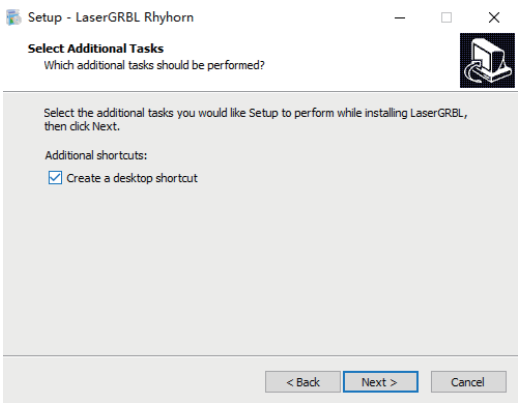
Brief introduction:
LaserGRBL is easy to use. However, LaserGRBL only supports Windows system (Win XP/Win 7 / Win 8 / XP/Win 10).

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.

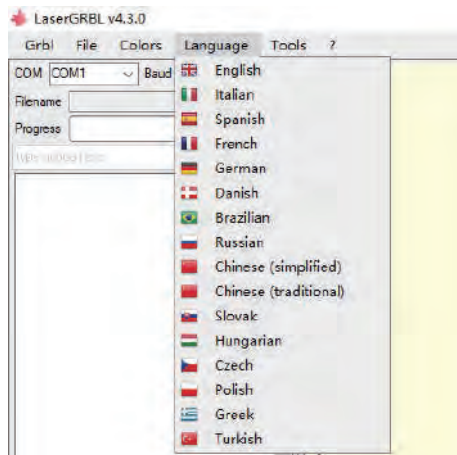
2. Software Installation

Double click the software installation package to start the software installation and click “Next” until the installation is complete.



3. Language

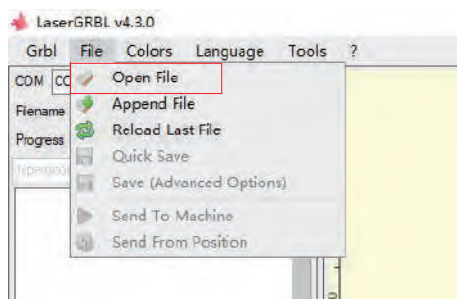
Click "Language" on the menu at the top to select the language you need.



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.

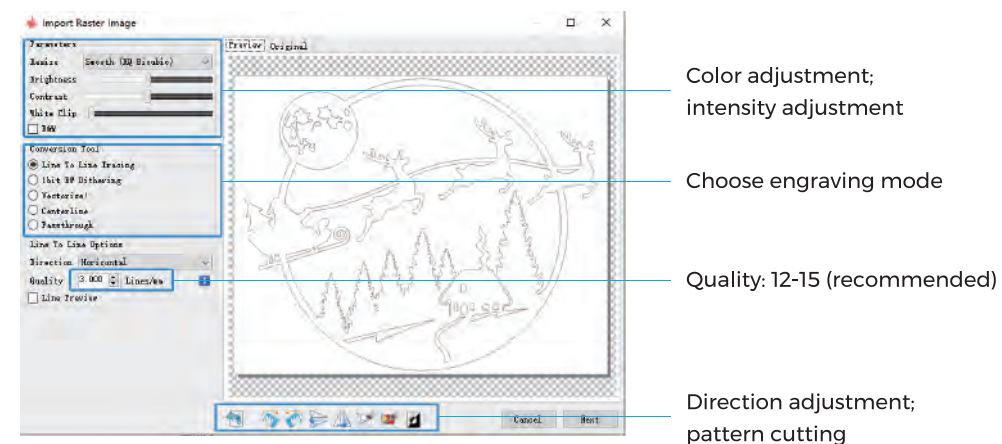
1. LaserGRBL can adjust the sharpness, brightness, contrast, highlight and other properties of the target graph. We can preview window effect during adjustment, and adjust the effect to your satisfaction.

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.

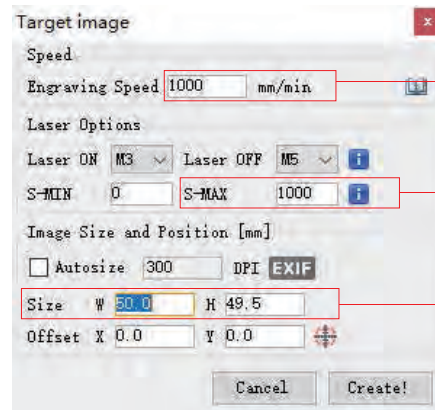
Note: The recommended engraving quality range is 12-15. Different materials have different reactions to laser irradiation, so the specific value depends on the specific engraving material.

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.



The default engraving speed is 1000 and can be adjusted as required

Set the energy value. Improper energy will affect the engraving effect

Enter the size of the graph you want to engrave

Save GCODE file

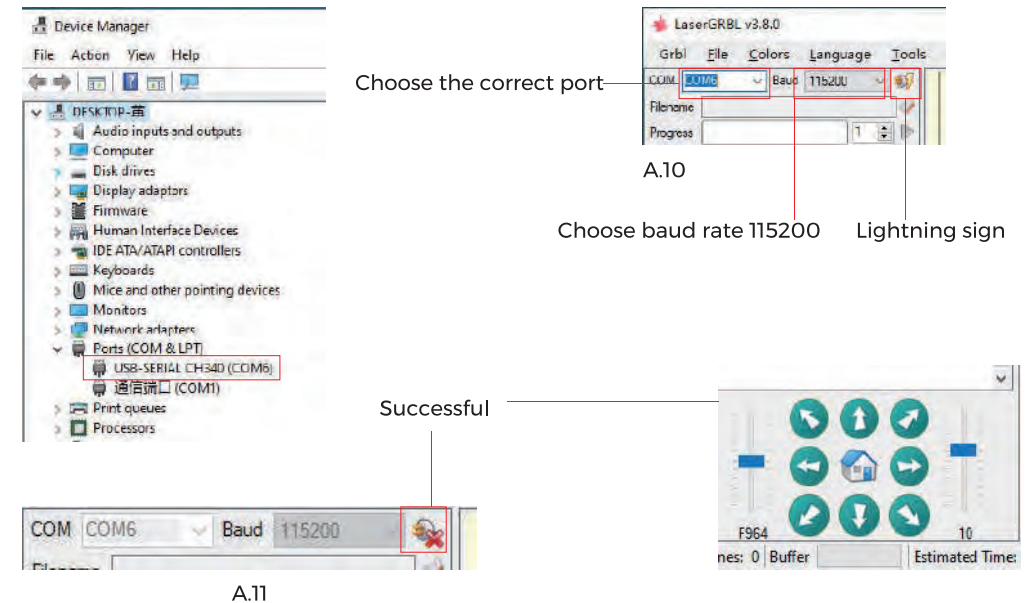
Click "File" in the menu at the top of the software interface, enter the drop-down menu, and select "Save". Copy the saved .nc file to the TF card and insert the TF card into the engraver to use the file to engrave your work.

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

CONNECT PC

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.



Choose the correct port

A.10

Choose baud rate 115200

Lightning sign

Successful

A.11

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

LightBurn INTRODUCTION

LightBurn is a charging but powerful engraving software, which can be downloaded on the its official website <https://LightBurnsoftware.com/>

(TF card or USB flash disk supplied by the manufacturer also has an installation package)

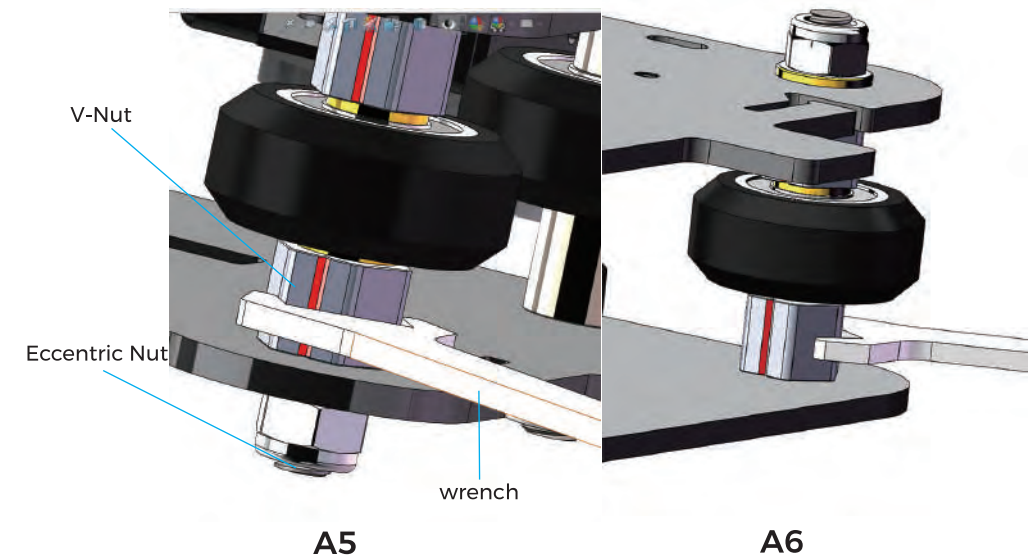
Introduction: LightBurn is a layout, editing and control software for laser engraving machine.

With LightBurn, you can:

- Import artwork in various common vector graphics and image formats (Including AI, PDF, SVG, DXF, PLT, PNG, JPG, GIF, BMP)
- Powerful editing function (You can edit the graphics you want to carve)
- LightBurn is a native application written for windows, Mac OS and Linux (But it needs to be activated with a key for permanent use, with a trial period of 30 days)

Note: during the engraving process, the engraving machine needs to be connected to the computer, and the engraving machine software cannot be closed.

About the adjustment method of the eccentric nut



When the V groove of the eccentric nut faces outward, the distance between the 4 POM wheels is the largest, that is, the loosest state (A5)

When the V groove of the eccentric nut faces inward, the distance between the 4 POM wheels is the smallest, that is, the tightest state (A6)

MACHINE TESTING GUIDE

1. Turn on the power switch, connect the USB data cable of the engraving machine to the computer, and start the machine

2. Movement test:

Control the machine to move up, down, left and right on the software, check whether the moving direction is correct (Figure A01), and check whether the moving distance is correct (Figure A02)

3. Laser emission test:

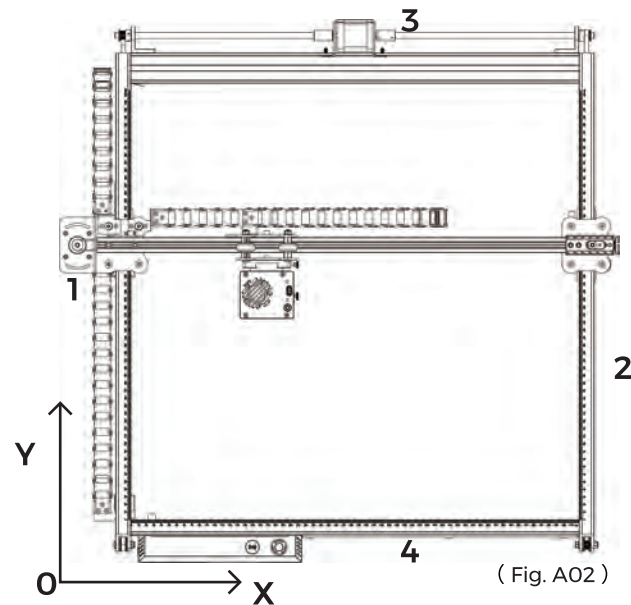
The software imports the custom icon, click on the light (low light). Wear protective glasses to observe whether the laser module emits blue light.

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)

Kind tips:

1. If the buzzer triggers the machine during the engraving process, the machine will automatically stop. This belongs to the flame alarm trigger. It is recommended to restart the machine to recover (or to recover through the reset function on the software).

2. Before the machine moves, please check whether the probe will hit other objects.

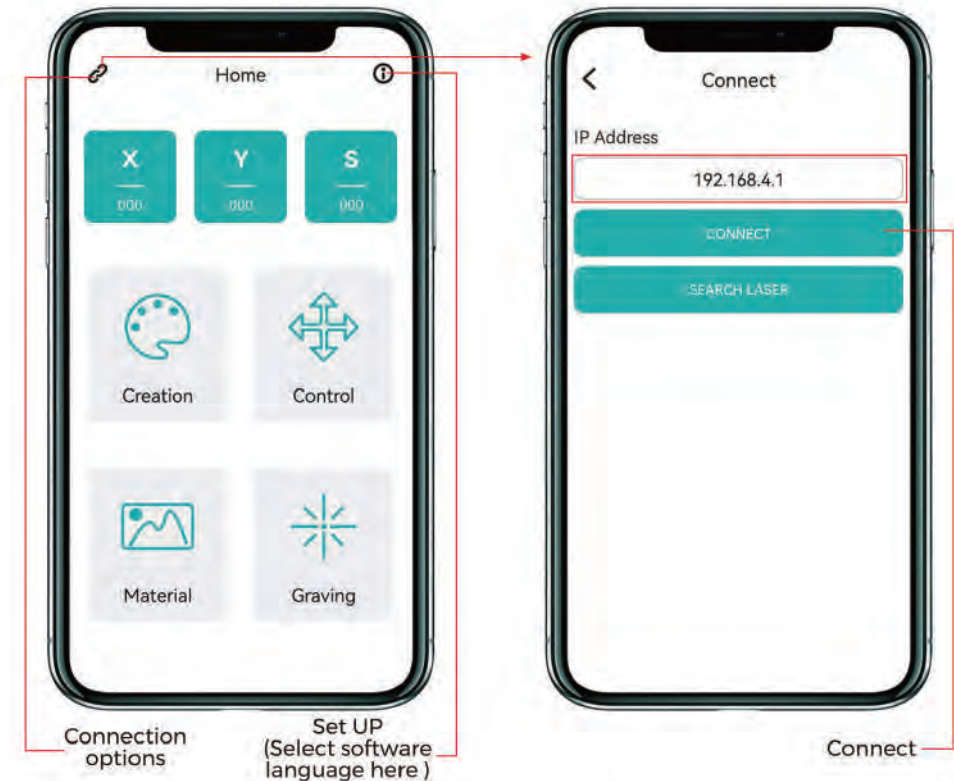
APP CONNECTION

The WIFI of this machine is a signal sent by the ESP32 chip of the main board. The machine has been set up when the machine leaves the factory. After the machine is turned on, the main board will send out the WIFI network with the name Laser_XXXXX (XXXXX refers to the serial number of the main board, the serial number of each machine), all different)

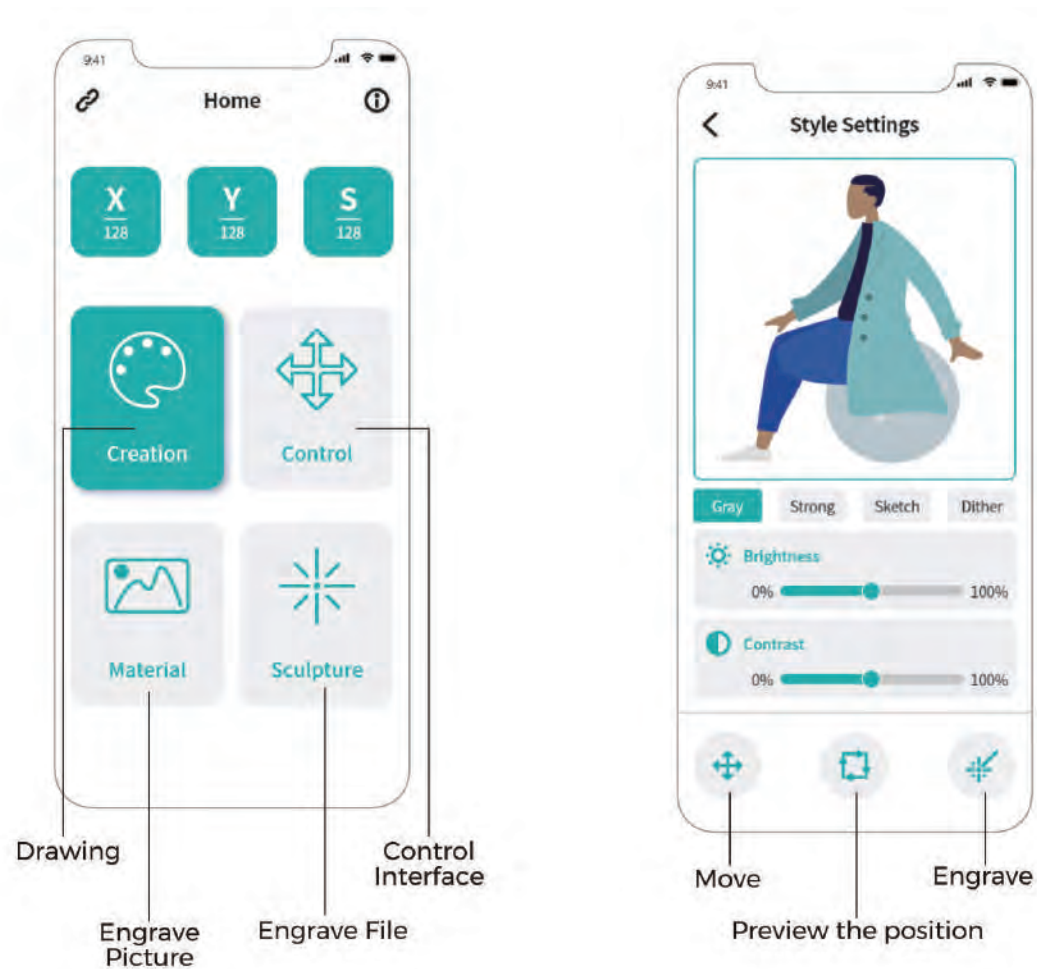
1. Open the Laser_XXXXX network found by the mobile phone connection, enter the password 12345678, and connect to the network.

2. Open the APP and enter the connection options interface. Enter the IP address: 192.168.4.1 and click connect.

3. After the APP slicing is completed, you need to insert the TF card into the motherboard when uploading files. If the upload fails, please confirm whether the TF card is normal.



APP main interface



WEB USER GUIDE

1. On the touch screen, connect a Wi-Fi.
2. Click "Tools" on the main interface to enter the next interface.
3. Click "Wi-Fi" to enter the selection interface.
4. Select the Wi-Fi to be connected, enter the password, and click "Connect".
5. After the connection is successful, you will obtain an assigned IP address.

Tip: The obtained IP is used for WEB/APP connection. You can type the address into your browser to enter the WEB control interface.

Note: The Wi-Fi used at the computer or the screen must be the same. It is recommended to use the mobile hotspot.

