User
Manual

10W High Performance
400x400mm Blue Laser Engraving Machine

01 Security Statement

Before using this laser engraving machine, it is essential to carefully read and understand the following safety statements.

- **Eye Protection**: Laser engraving machines use Class 4 laser technology, and direct exposure to the laser beam may cause damage to the eyes. During operation, please ensure to wear the provided protective goggles to prevent laser radiation.

- **Ventilation Requirements**: When using a laser engraving machine, ensure that the operating environment is well-ventilated. Laser processing may generate harmful gases and odors, so avoid operating in enclosed spaces to reduce the accumulation of harmful gases and smoke particles.

- **Equipment Maintenance**: Regularly inspect the operational condition of the equipment to ensure that all components are functioning properly. In the event of any abnormalities, cease operation immediately and contact customer support for assistance.

- **Pre-Startup Inspection**: Before each use, conduct a comprehensive check of the equipment to ensure all components are functioning properly, especially the status of the laser.

- **Equipment Placement**: Position the laser engraving machine on a stable surface and ensure that there are no obstructions around it to prevent instability or interference during operation.

- **Child and Pet Safety**: Please place the laser engraving machine in a location that is inaccessible to children and pets to prevent potential harm.

- **Laser Engraving Materials**: Only use materials suitable for laser engraving machines, and check their applicability and safety before operation.

- **Keep Away from Flammable Materials**: Avoid directly exposing the laser beam to flammable materials during laser processing to reduce the risk of fire.

- **Avoid Reflective Surfaces**: Prevent direct exposure of the laser beam to surfaces that may produce reflections to minimize the risk of reflected light posing a danger to people and equipment.

- **Fatigue and Alertness**: Avoid operating the laser engraving machine when fatigued or in a mentally impaired state to reduce the risk of errors due to lapses in attention.

- **Fire Safety Equipment**: Equip the vicinity of the operating area with appropriate fire safety equipment to address potential fire hazards.

- **Temperature Control**: Avoid operating the laser engraving machine under extreme temperature conditions to ensure its performance and safety.

- **Avoid Solo Operation**: Whenever possible, avoid operating the laser engraving machine alone, especially for teenagers, to ensure that timely assistance is available when needed.

- **Material Compatibility**: Before laser engraving, ensure that the materials used are compatible with the equipment to prevent the generation of harmful substances.

- **Dust Prevention Measures**: Regularly clean the interior and exterior of the laser engraving machine to prevent dust from affecting equipment performance.

- **Laser Power Settings**: Exercise caution when setting the laser power based on different materials and project requirements to avoid damaging the materials or equipment. For initial use, it is advisable to conduct power tests to determine the most suitable settings for your needs.
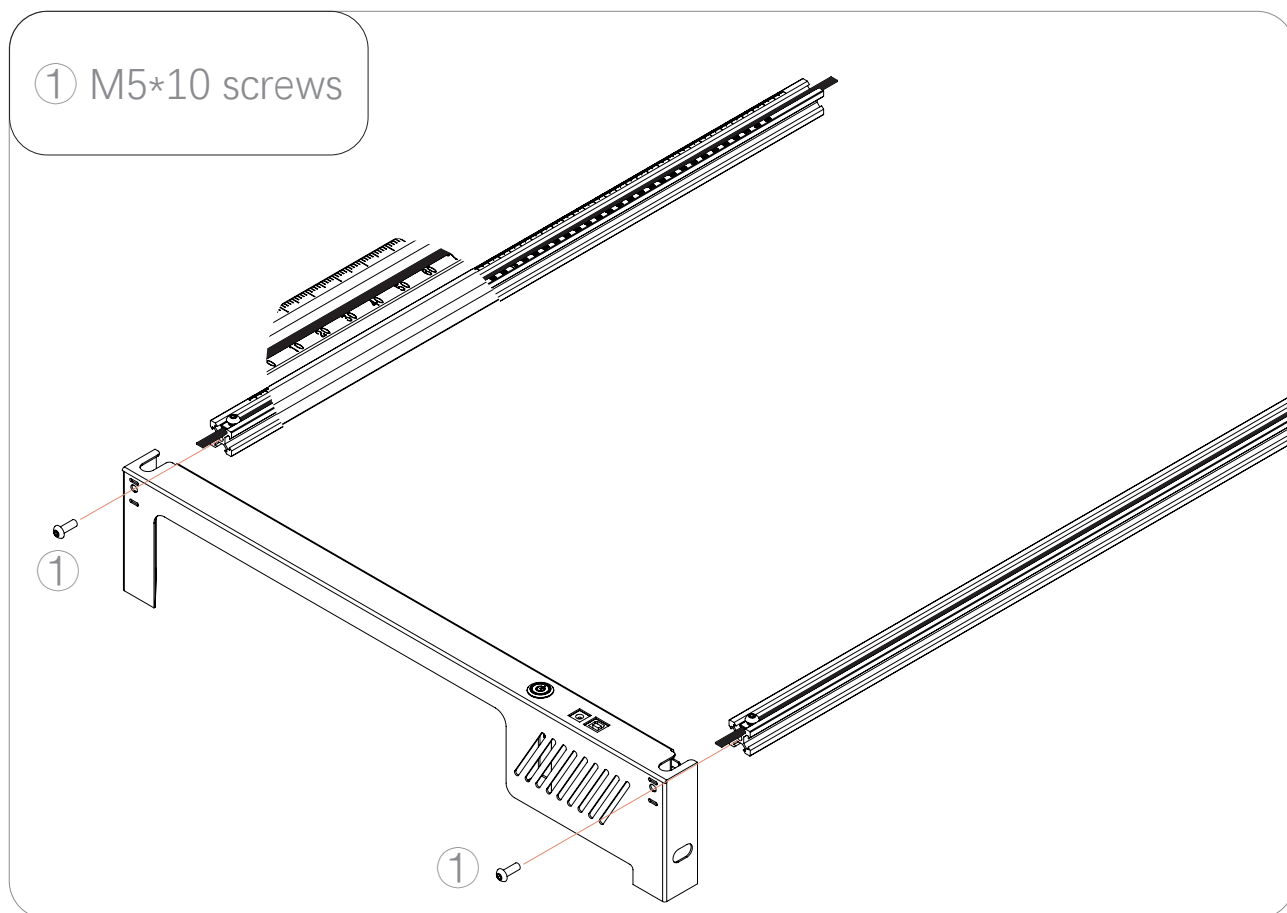
Linear guide

Back frame

Laser module

Linear guide

Front frame
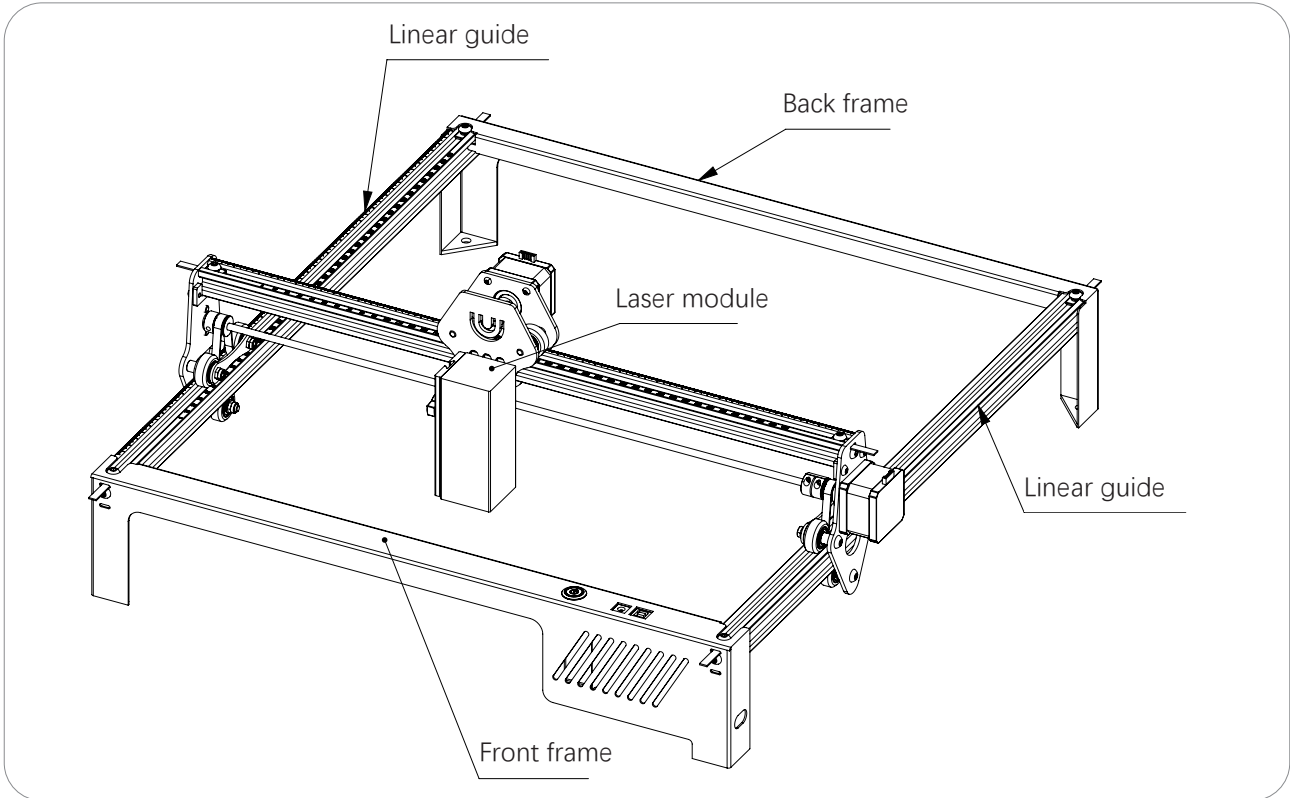
02 Product Highlights

- **New Upgraded Compressed Spot Laser Shaping Technology**: This product adopts the latest 10W laser beam shaping technology diode laser, with 0.08mm ultra-fine laser focus ,with super cutting penetration and precision, engraving & cutting speed is faster than ordinary compressed spot Increased by 60%, it can cut 15mm thick wood, 12mm acrylic, carved ceramics and stainless steel, etc., which can meet your carving and cutting needs to the greatest extent.

- **Sturdy Structural Design**: The all-metal structural design makes the machine extremely sturdy, which improves the engraving accuracy, and the structural frame is very durable and remains open for upgrades. During use, users can keep the frame and replace it with other new lasers, or replace the longer Y-axis profile to expand the engraving area.

- **New Eye Protection Design**: The laser filter cover can filter 98% of ultraviolet rays entering the eyes. Users can watch the laser engraving without wearing goggles (it is recommended to wear goggles when watching), and at the same time, animals can be prevented from catching the laser spot.

- **Wide Compatibility**: The machine is compatible with various mature engraving software, such as LaserGRBL, LightBurn, Benbox, GrblController, LiteFire, supports PWM mode engraving, PWM engraving makes the pattern more layered,supports Windows system, Apple system (LightBurn), engraving file format supports JPG, PNG, DXF, TIF ,BMP,PDF,NC,SVG,AI, etc.

- **Product Purpose**: Personalized engraving, handicraft production, custom decoration, and more.

03 Packaging List

SN	Proj.		Spec.	QTY.	Unit	Notes
1	Linear guide			2	PCS	
2	Laser module (10W)			1	PCS	
3	Back frame			1	PCS	
4	Front frame			1	PCS	
5	Data line		1.5m	1	PCS	
6	Cork coaster		2mm	2	PCS	
7	Goggles		Dark Green	1	PCS	
8	Power adapter		Output:12V/5A	1	PCS	
9	Manual		10W User Manual	1	PCS	
10	Tool Box	Fixed focus column	18mm	1	PCS	
		Metal sheet	86*54*0.21mm	2	PCS	
		Basswood	130*65*3.0mm	2	PCS	
		Packing bags	10*15cm	2	PCS	
		Black tie	3*100mm	4	PCS	
		Brush		1	PCS	
		Wrench	8-10*85*1.5mm	1	PCS	
		M2 Wrench	L,2mm	1	PCS	
		M3 Wrench	L,3mm	1	PCS	
		Fishbone bag	6*10cm	1	PCS	
		M5 T-nuts	10*15*1.5mm	3	PCS	
		M5*6 screws	M5*6, Level 12.9	3	PCS	
		M5*10 screws	M5*10, Level 12.9	5	PCS	

04 Quick Installation Guide

① M5*10 screws

Step 1

### Attach the linear guide rail to the front frame using screws.

- Locate the fitting shown and place it in the location shown, noting the orientation of the number marks and tick marks on the linear guide.
- Tighten the M5*10 screws, and pay attention to the two linear guides not to install them backwards.

Tip:

Put the screws in first, but don't tighten them, and tighten them all after they are all in place.
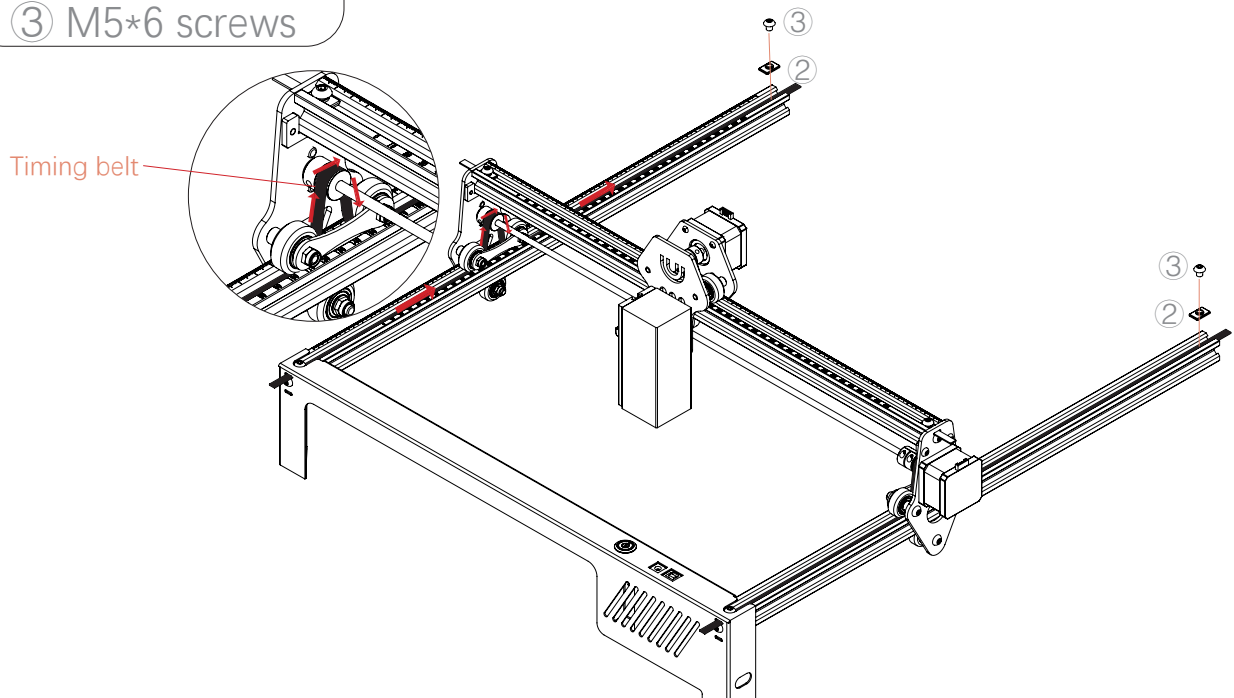
Required tools:

3mm Allen key and M5*10 screws.
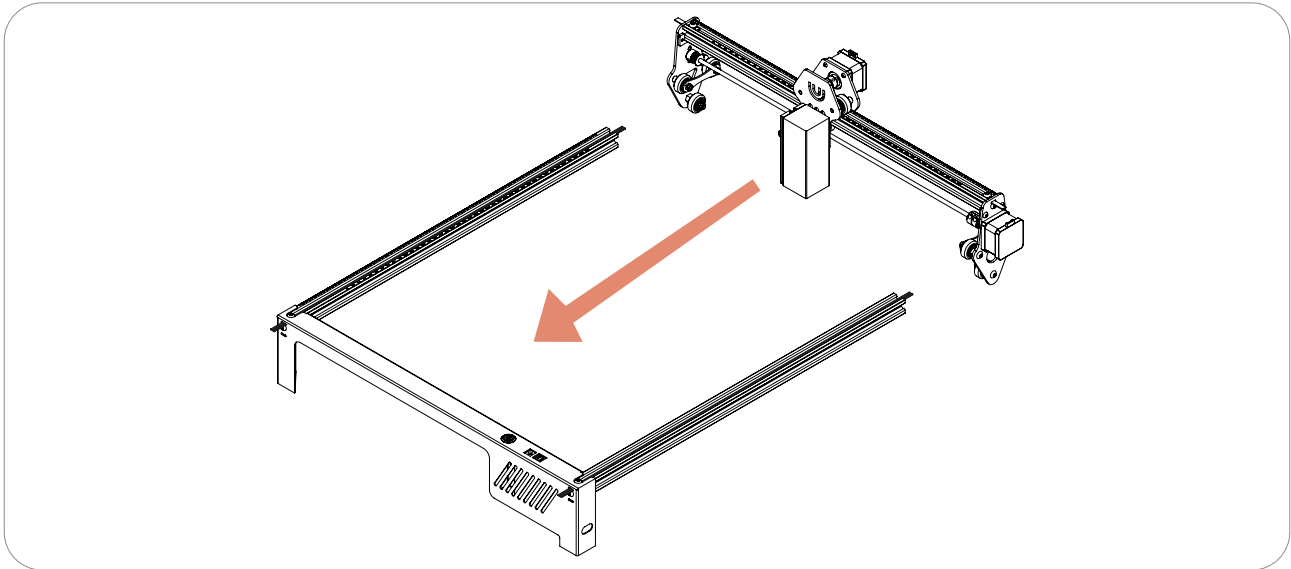
② T-nuts
③ M5*6 screws

③
②

Timing belt

③
②

Step 2
After installing the laser module, adjust and secure the timing belt.

- After pushing the laser module into the linear guide rail in the indicated direction, the timing belt passes through the synchronous wheel; Adjust the position of the timing belt appropriately to avoid friction between the timing belt and the timing wheel; Use T-nuts to lock the timing belt with M5*6 screws.

Tip:

T-nut fixing method: first put the T-nut into the groove and rotate and fix, and then lock the T-nut with screws; The T-nut is as close to the end as possible.

① M5*10 screws
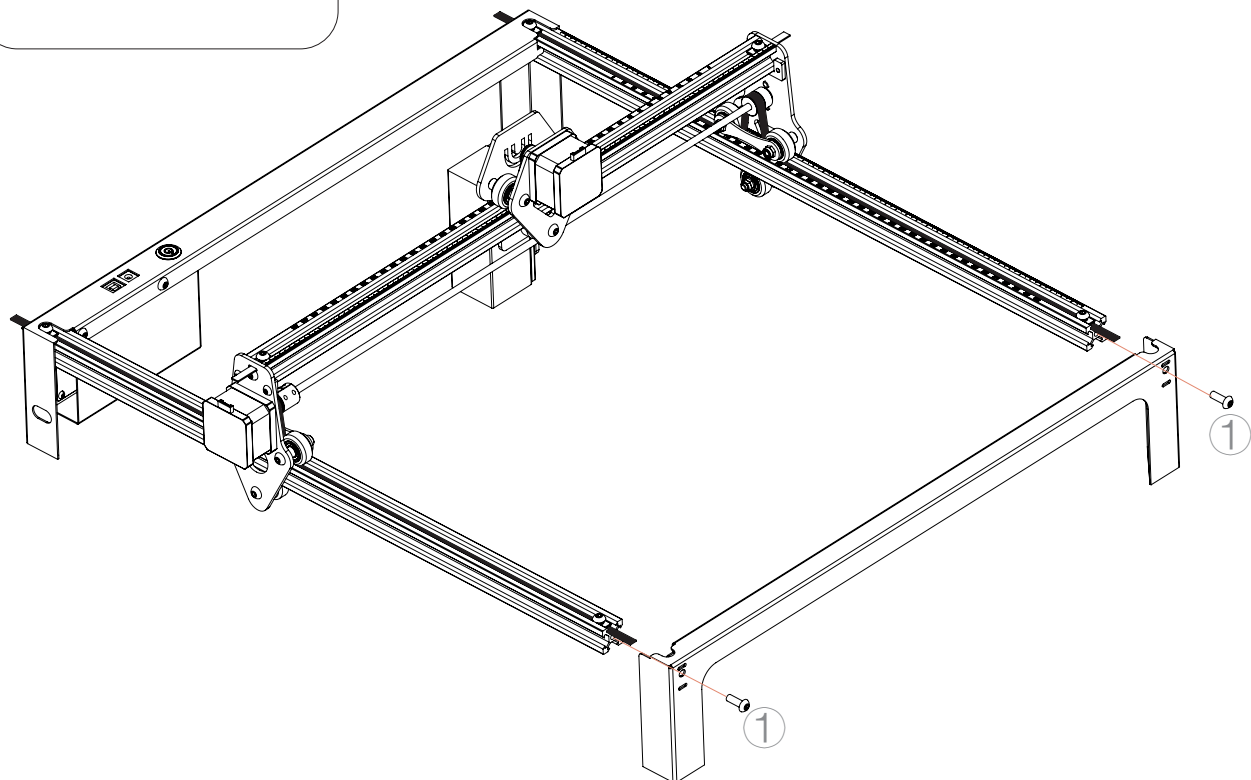
Step 3
Attach the linear guide rail to the back frame using screws.

- Locate the back frame shown and place it in the position shown, noting the rear frame orientation.
- Tighten the M5*10 screws.

Tip:
Put the screws in first, but don't tighten them, and tighten them all after they are all in place.

Required tools:
3mm Allen key and M5*10 screws.

05 Software Installation and Connection

This product supports the most popular LaserGRBL software at present. It is open source software, easy to use and powerful. Unfortunately, LaserGRBL software only supports Windows system (Win XP/Win 7/Win 8/Win 10,etc.). Of course, for Mac users, you can choose LightBurn, LightBurn is also a very good engraving machine software, but this software is charged, and the software also supports Windows system.

This product performs engraving or cutting by receiving instructions from a computer. During the working process, the engraving machine must maintain a data connection with the computer, and the software (LaserGRBL or LightBurn) cannot be closed.

Installing and Connecting LaserGRBL

1.LaserGRBL is one of the most popular DIY laser engraving software in the world, we can download it from LaserGRBL official website: https://lasergrbl.com/download/

2. Double-click the software installation package to start the software installation, then click Next until the installation is complete.
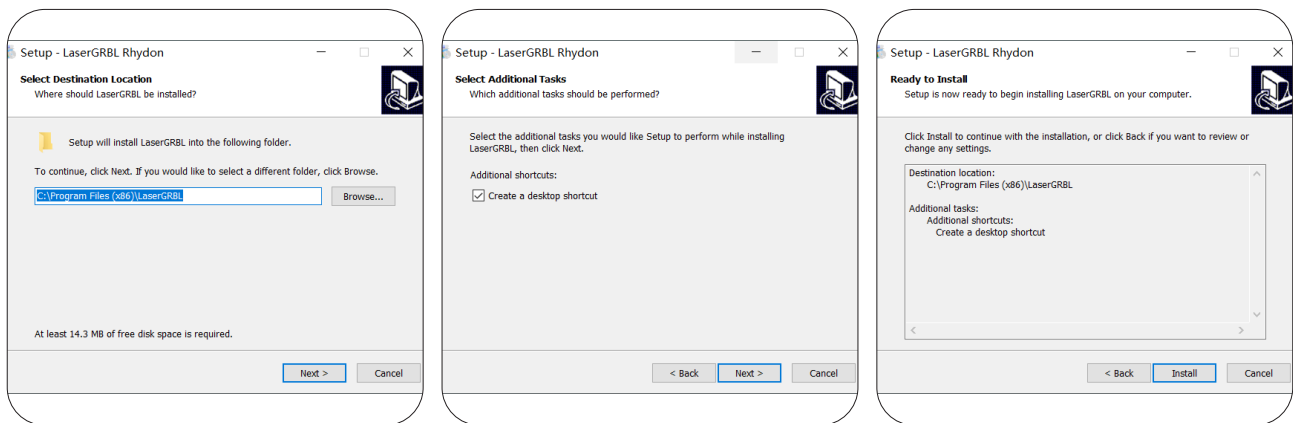

Add a custom button

LaserGRBL software helps users to add custom buttons, and you can add custom buttons in the software according to your own usage habits. LaserGRBL's official custom button is recommended here. Custom button download address:https://lasergrbl.com/usage/custom-buttons/

Next, we load the custom button into the LaserGRBL software. In the LaserGRBL software, right-click the empty space next to the button at the bottom -> Import Custom Button, then select the custom button compression package you just downloaded, press (Y) until there is no more pop-up window to complete the custom button installation.

07
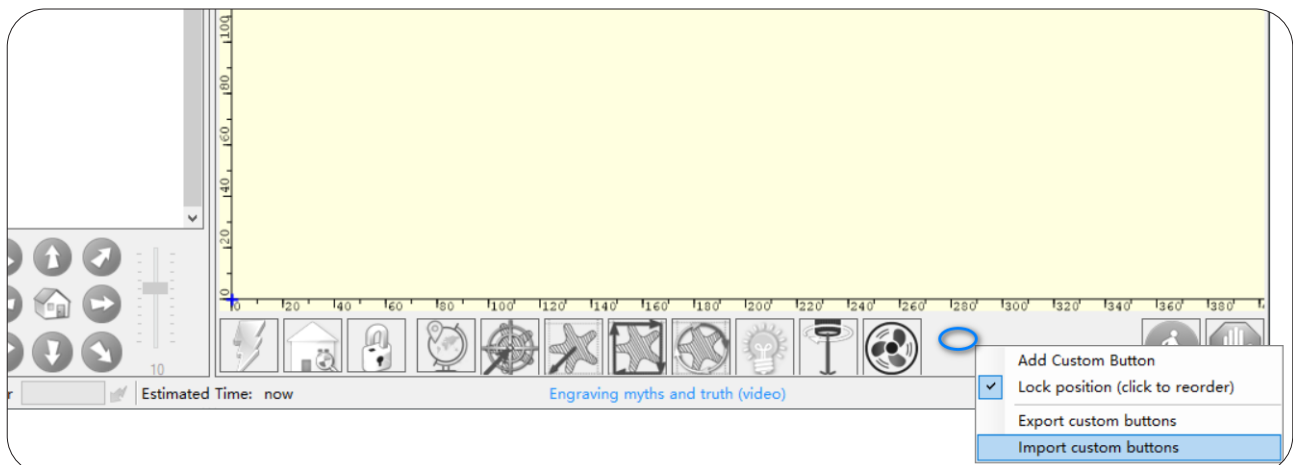
Connect with device

1. Connect the device via USB to a computer with LaserGRBL software installed.

2.Plug in the power cord and press the power switch to power on the device.

3.Select the correct COM port and baud rate in software--115200.

4.In the Settings, the Firmware type is changed to Grbl and click Save.

5.Click on the "Lightning"connection symbol in the software.When the "lightning bolt"sign turns into a red "X" sign,it means the connection is successful.
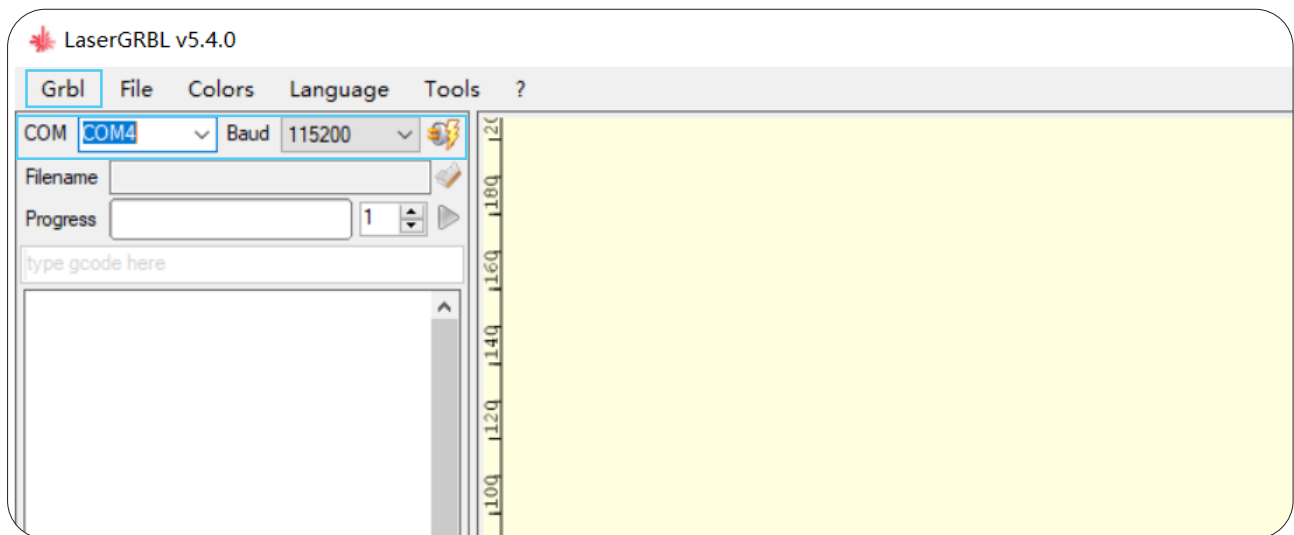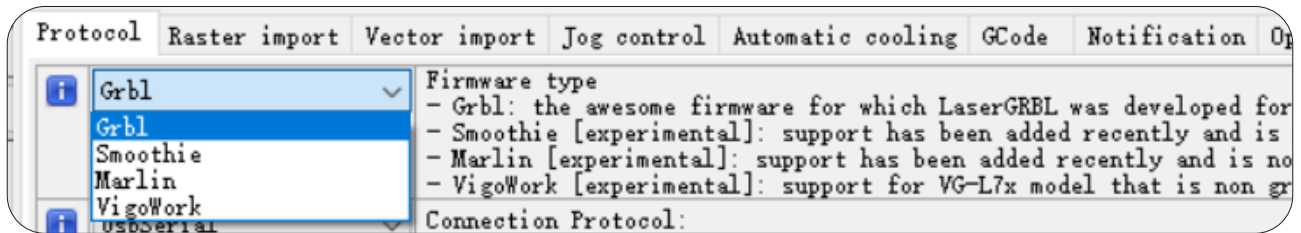
Engraving/Cutting Data Reference

In order to provide users with a better experience, we have prepared several sets of engraving/cutting data for reference,FIY. ps: select 20 lines/mm for quality!

Material	Conversion Tool	Laser Mode	S-MAX	Speed(mm/min)	Perform multiple passes
Basswood	Line to Line Tracking	M4	400	6000	1
MDF	Line to Line Tracking	M4	400	6000	1
Stainless steel	Line to Line Tracking	M4	1000	1000	1
3mm Basswood	Vectorization	M3	900	500	1
3mm Black Acrylic	Vectorization	M3	900	300	1
5mm Basswood	Vectorization	M3	900	200	2
3mm Hardwood	Vectorization	M3	900	300	2

Installing and Connecting LightBurn

1. We can download the installation package from LightBurn official website: https://lightburnsoftware.com/pages/download-trial

2. Double click the installer package to install (ps: LightBurn is paid software, for better experience, it is recommended to purchase the genuine version, here we will demonstrate the installation of the trial version), click "Install" in the pop-up window.
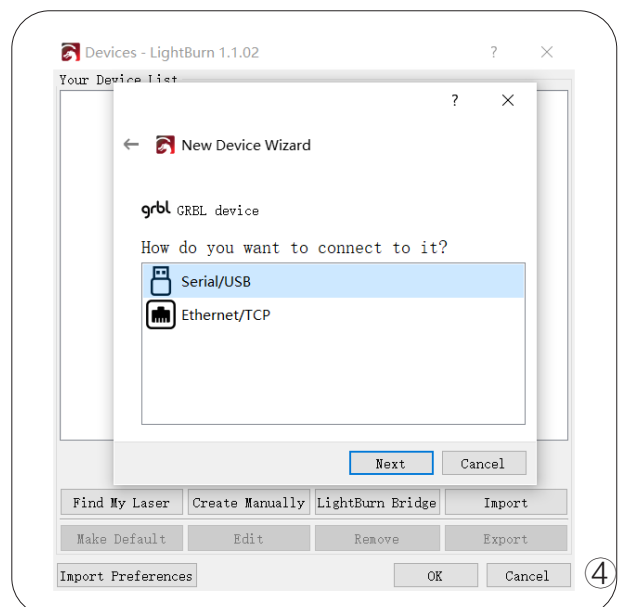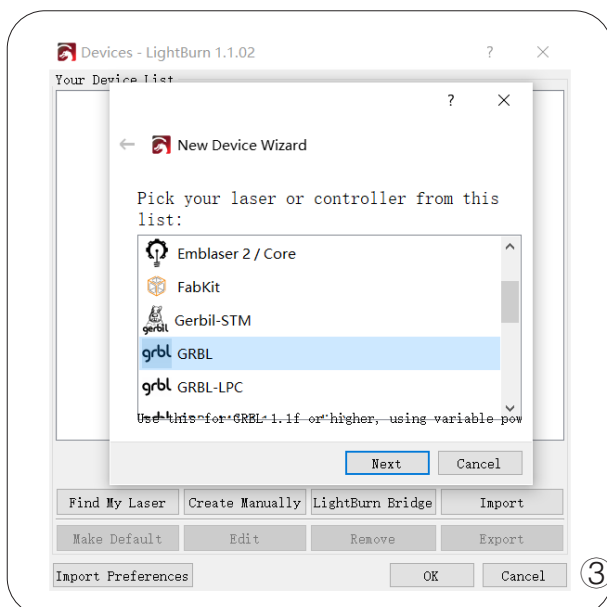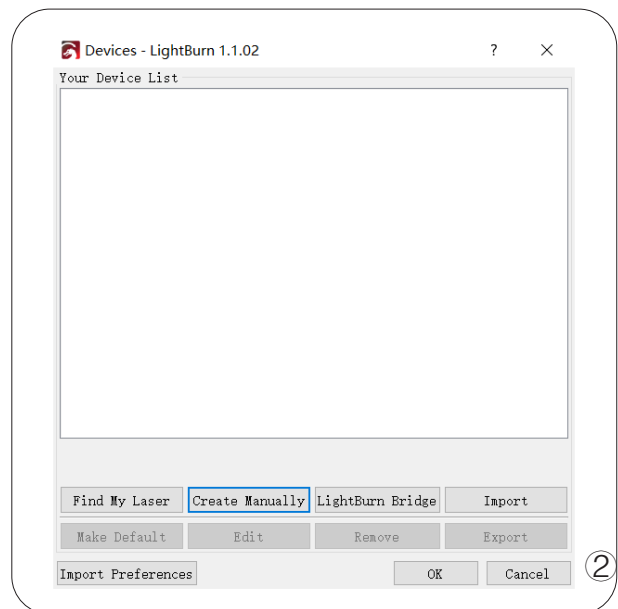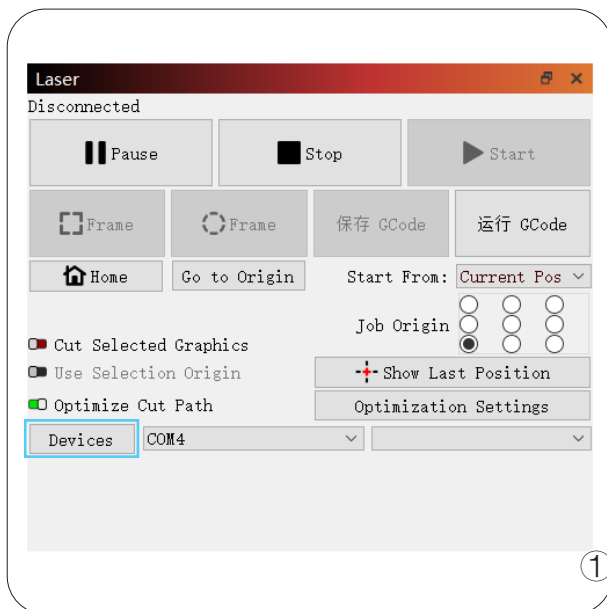
3. Click Start your free trial, installation is complete.

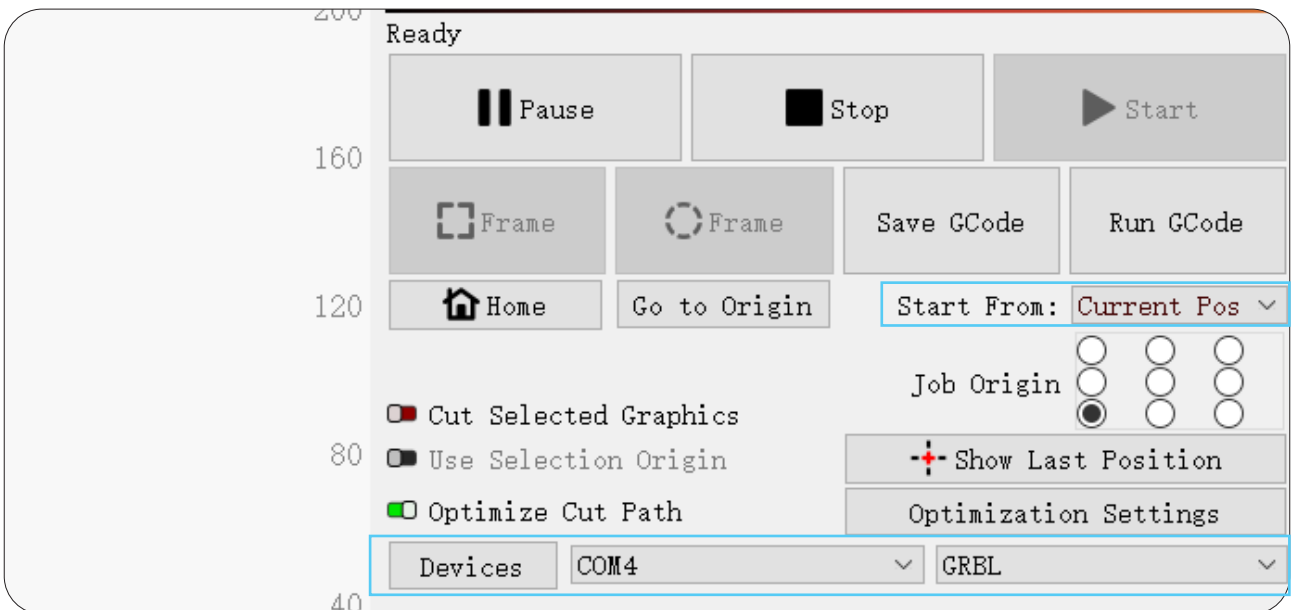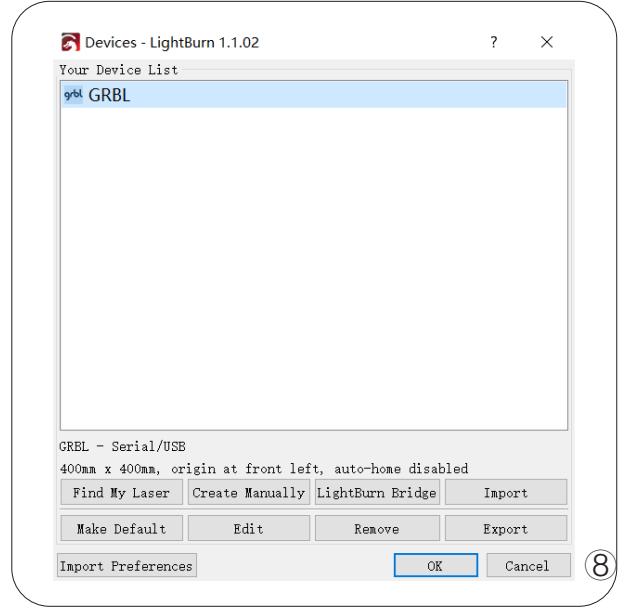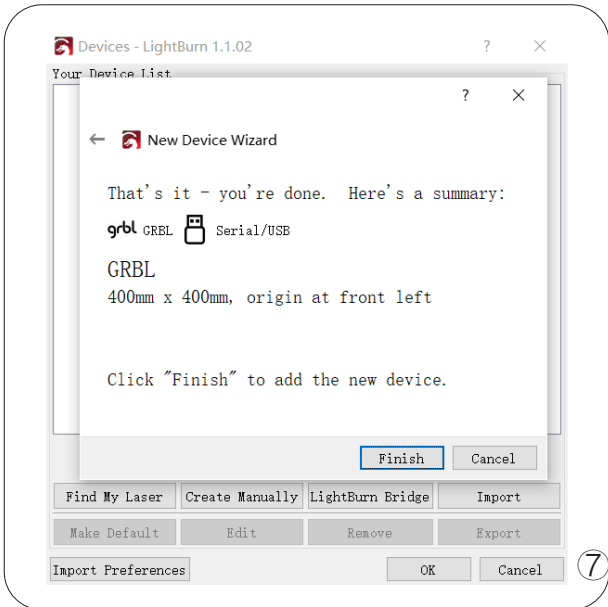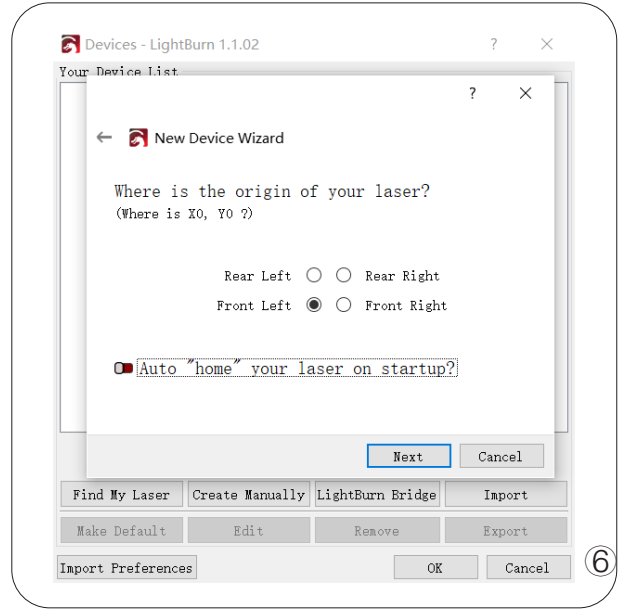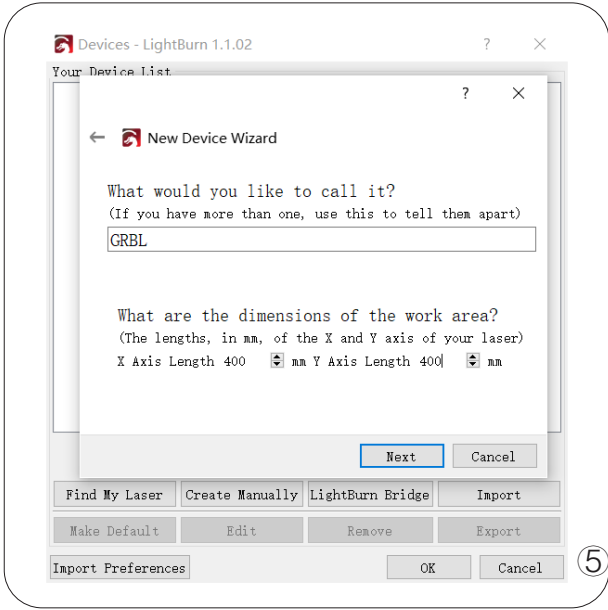## Connect with device

How to connect this device to computer in LightBurn software?

Click Create Manually -> scroll down to GRBL -> Serial/USB -> name it GRBL(you can customise it here) X and Y axis is 400mm x 400mm -> set the origin on the front left -> Done.

And select the correct COM port.

Devices - LightBurn 1.1.02

New Device Wizard

What would you like to call it?
(If you have more than one, use this to tell them apart)

GRBL

What are the dimensions of the work area?
(The lengths, in mm, of the X and Y axis of your laser)
X Axis Length 400   mm Y Axis Length 400   mm

Next   Cancel

Find My Laser | Create Manually | LightBurn Bridge | Import
Make Default | Edit | Remove | Export
Import Preferences   OK   Cancel

⑤

Devices - LightBurn 1.1.02

New Device Wizard

Where is the origin of your laser?
(Where is X0, Y0 ?)

Rear Left ○ ○ Rear Right
Front Left ● ○ Front Right

Auto "home" your laser on startup?

Next   Cancel

Find My Laser | Create Manually | LightBurn Bridge | Import
Make Default | Edit | Remove | Export
Import Preferences   OK   Cancel

⑥

Devices - LightBurn 1.1.02

New Device Wizard

That's it - you're done. Here's a summary:

grbl GRBL Serial/USB

GRBL
400mm x 400mm, origin at front left

Click "Finish" to add the new device.

Finish   Cancel

Find My Laser | Create Manually | LightBurn Bridge | Import
Make Default | Edit | Remove | Export
Import Preferences   OK   Cancel

⑦

Devices - LightBurn 1.1.02

Your Device List
grbl GRBL

GRBL - Serial/USB
400mm x 400mm, origin at front left, auto-home disabled

Find My Laser | Create Manually | LightBurn Bridge | Import
Make Default | Edit | Remove | Export
Import Preferences   OK   Cancel

⑧

Ready

‖ Pause   ■ Stop   ▶ Start

⬚ Frame   ◌ Frame   Save GCode   Run GCode

⌂ Home   Go to Origin   Start From: Current Pos ▼

Job Origin ○ ○ ○
            ○ ○ ○
            ● ○ ○

⊹ Show Last Position

◻ Cut Selected Graphics
◻ Use Selection Origin   Optimization Settings
◼ Optimize Cut Path

Devices   COM4 ▼   GRBL ▼

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Engraving/Cutting Data Reference

Material	Engraving parameters		Cutting parameters		
	Speed	Power	Speed	Power	Size(mm)
Basswood	100%	40%	5%	90%	<=8
Corrugated paper	100%	15%	10%	90%	<=5
Cardboard	100%	25%	5%	90%	<=4
Kraft paper	100%	15%	40%	100%	<=1
Paper	100%	25%	45%	100%	<=1
Hardwood	100%	40%	5%	90%	<=5
Bamboo	100%	40%	5%	90%	<=3
Felts	100%	20%	10%	100&	<=3
Leather	100%	30%	10%	100%	<=5
Plastics	100%	20%	10%	100%	<=3
Non-transparent acrylic	100%	30%	5%	90%	<=5
Fabric	100%	15%	10%	100%	<=2
Ceramics	50%	50%	X		
Gooselite	50%	50%	X		
Marble (colored)	50%	50%	X		
Shale	50%	50%	X		
Brick	50%	50%	X		
Stainless steel	50%	50%	X		
Painted metal	50%	50%	X		
Electroplated metal	50%	50%	X		

06 Quick Engraving/Cutting Guide

a. Device Placement:

- Place the laser engraving machine on a stable surface.
- Ensure that the worktable surface is level to prevent material from shaking.

b. Power Adapter Connection:

- Insert the power adapter and connect it to a stable power outlet.
- Connect the laser engraving machine to the computer using a data cable.

c. Connection to the Computer:

- Manually connect the laser engraving machine after starting the software.
- Install drivers (If required).

d. Device Startup Steps:

- Open the design software.
- Import design files or create a new project.
- Configure engraving parameters, including power and speed.
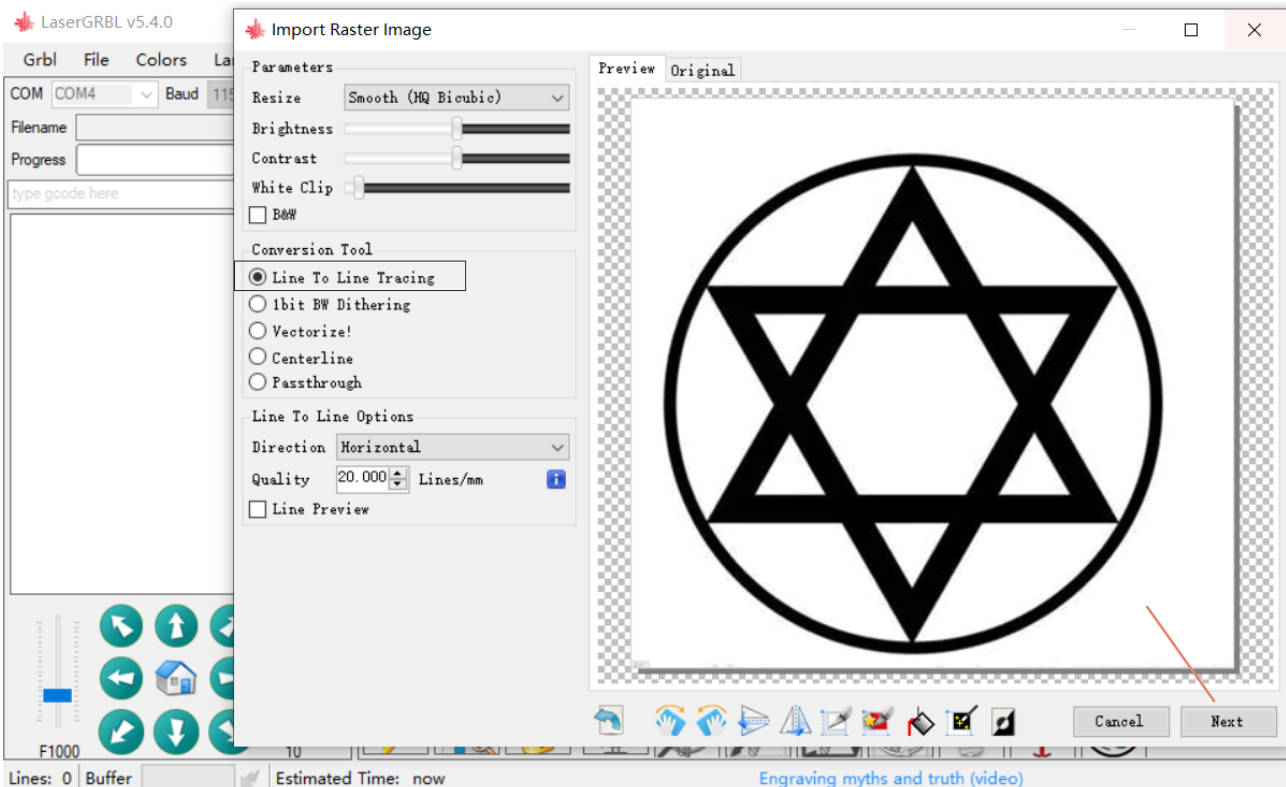- Click the "Start" button to initiate the engraving process.

07 Case Demonstration

Case 1.We use a black metal sheet with dimensions of 86*54*0.21mm for engraving demonstration in the LaserGRBL software.
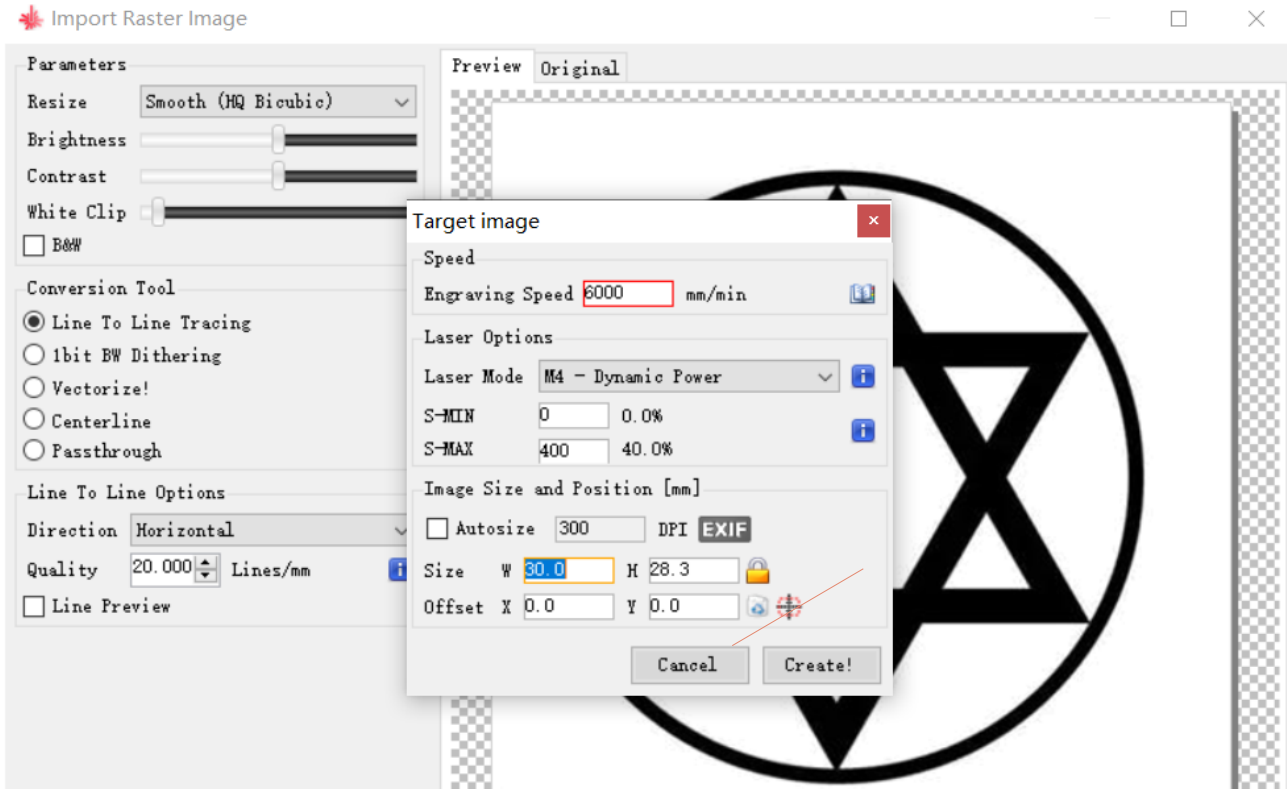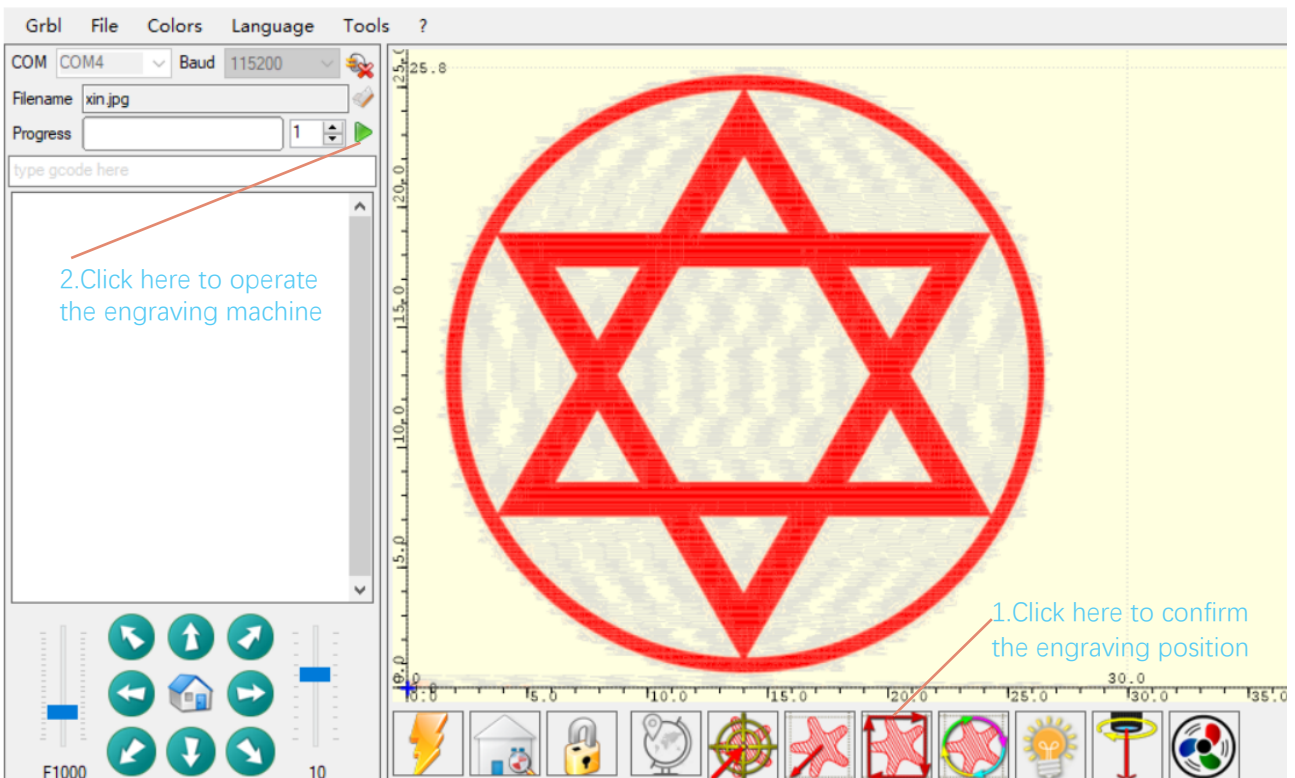
The following are the operating steps:

1.Click here to connect with the laser engraving machine

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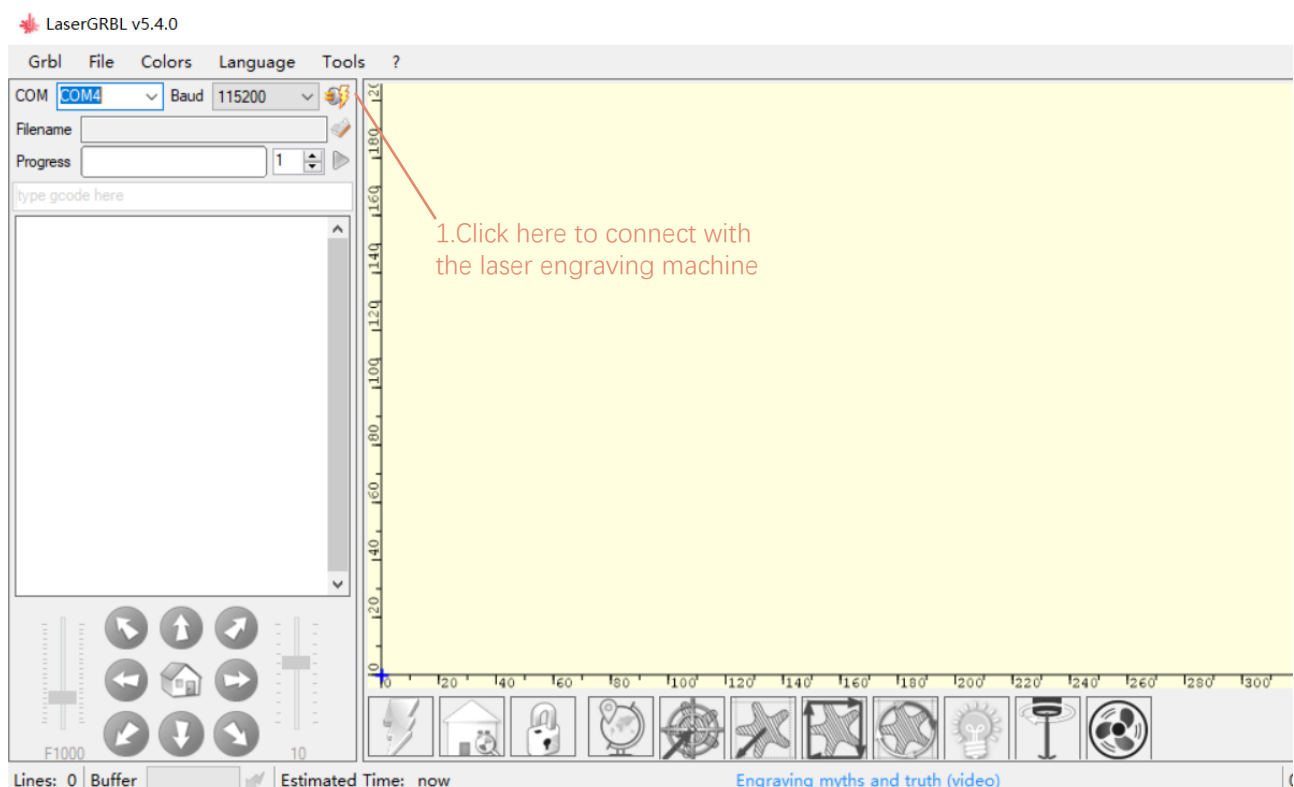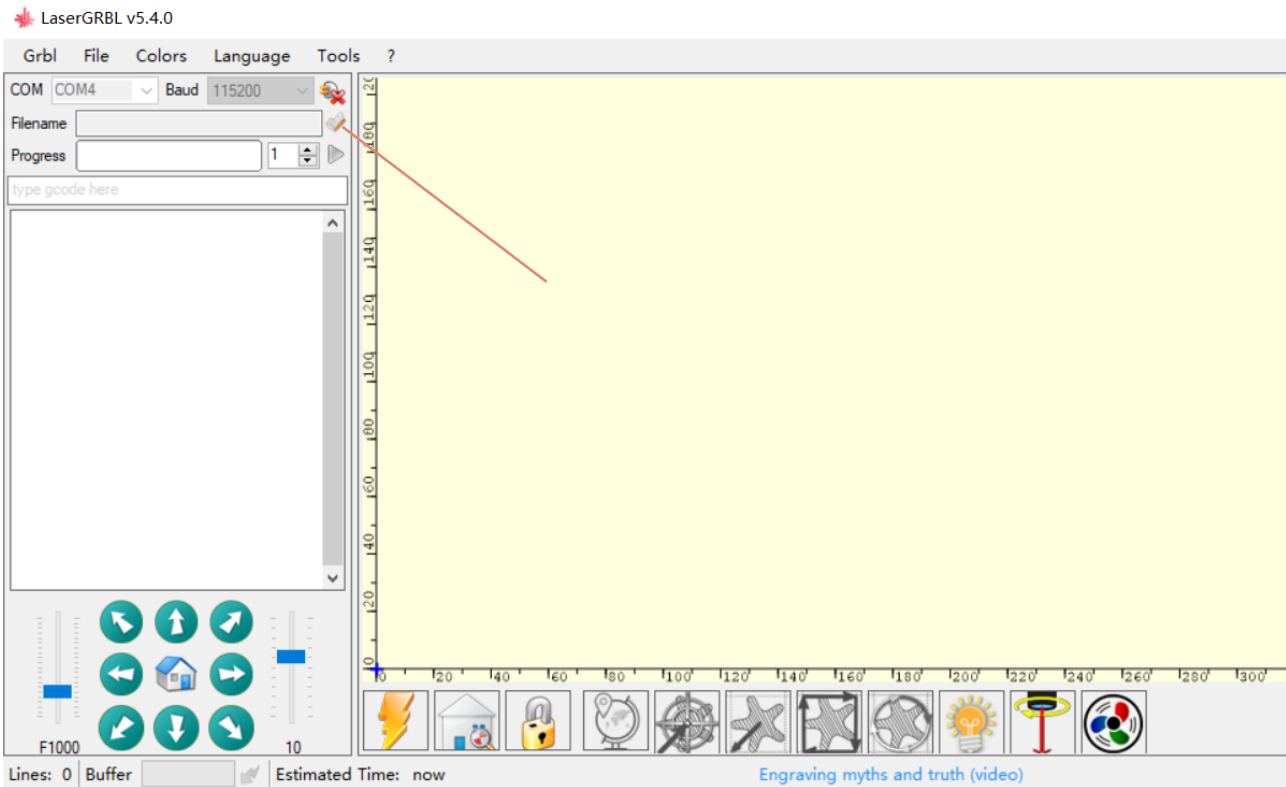
2.Click on the location indicated by the red arrow to import the pattern file for engraving or cutting.

3.The red-boxed section in the illustration is for reference only. You can choose according to your situation, then click 'Next.'

4.Depending on the material, set the appropriate speed and parameters for maximum or minimum values. If engraving, select the laser mode as M4; if cutting, choose the laser mode as M3. According to your needs, set the appropriate working size,then, click 'Create'.
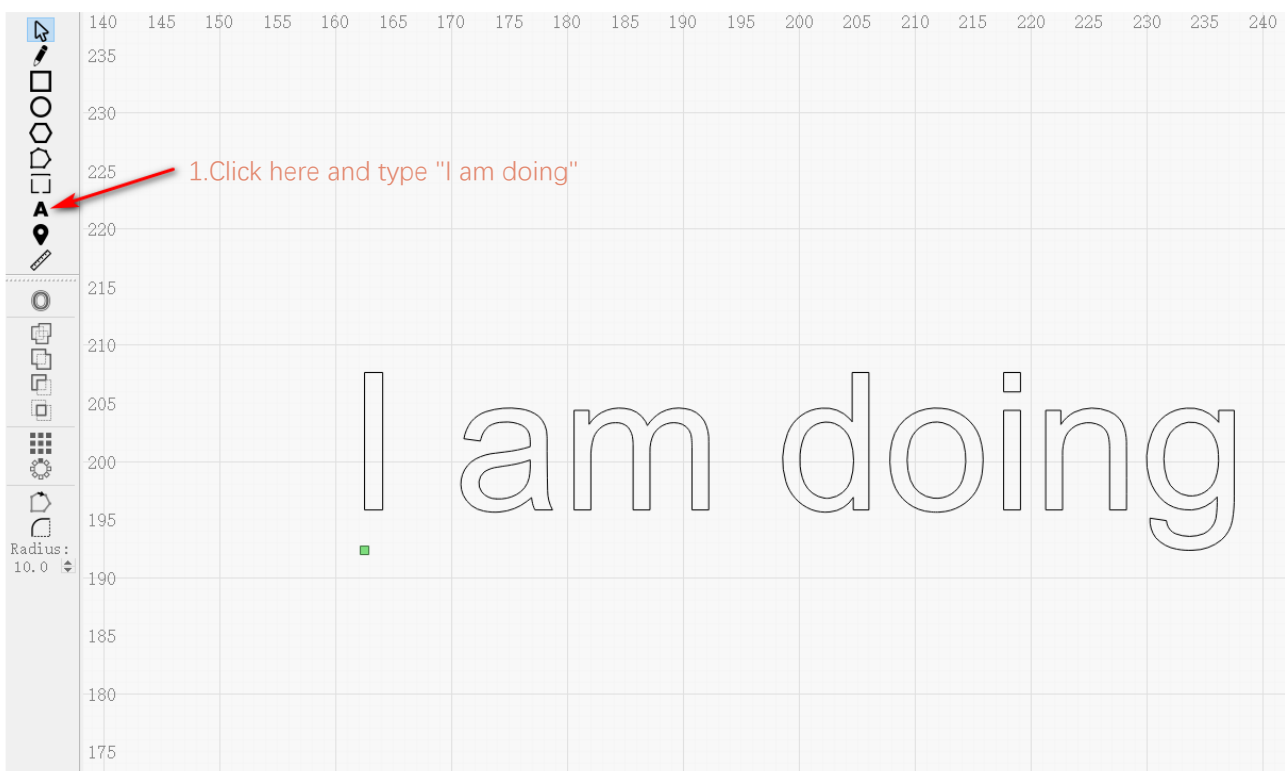

5.Please follow the steps indicated by the blue text in the image.

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Material: Sheet Metal(Black)
Engraving Speed: 6000 mm/min
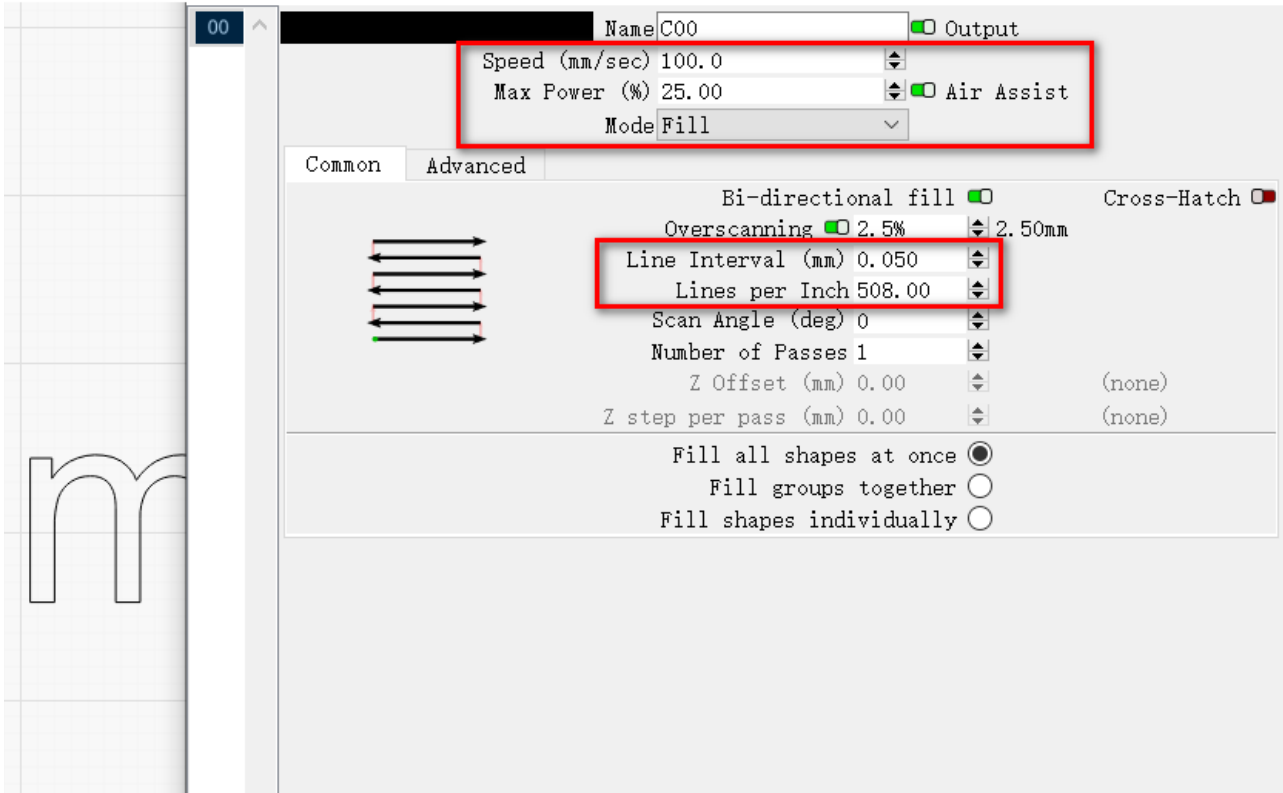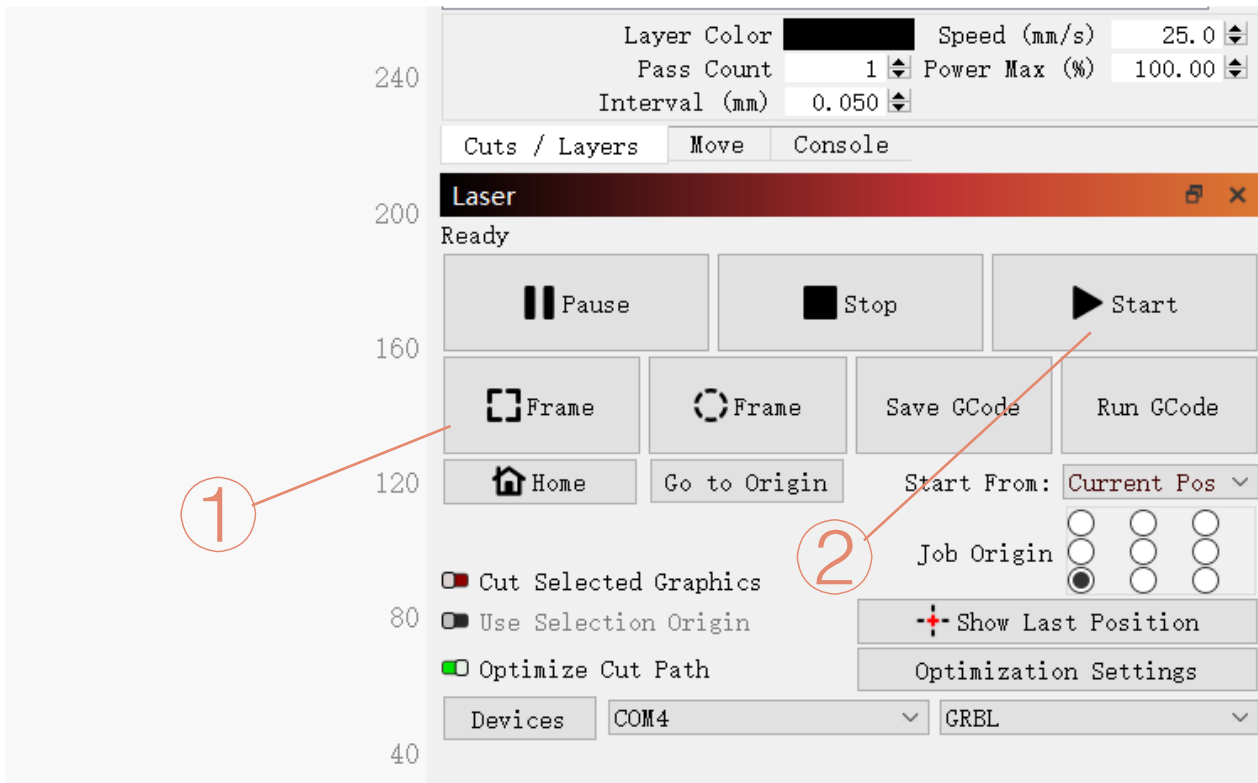Laser Mode: M4-Dynamic Power
S-MIN: 0
S-MAX: 400

6.Finish.

Case 2.We use a black metal sheet with dimensions of 86*54*0.21mm for engraving demonstration in the LightBurn software.

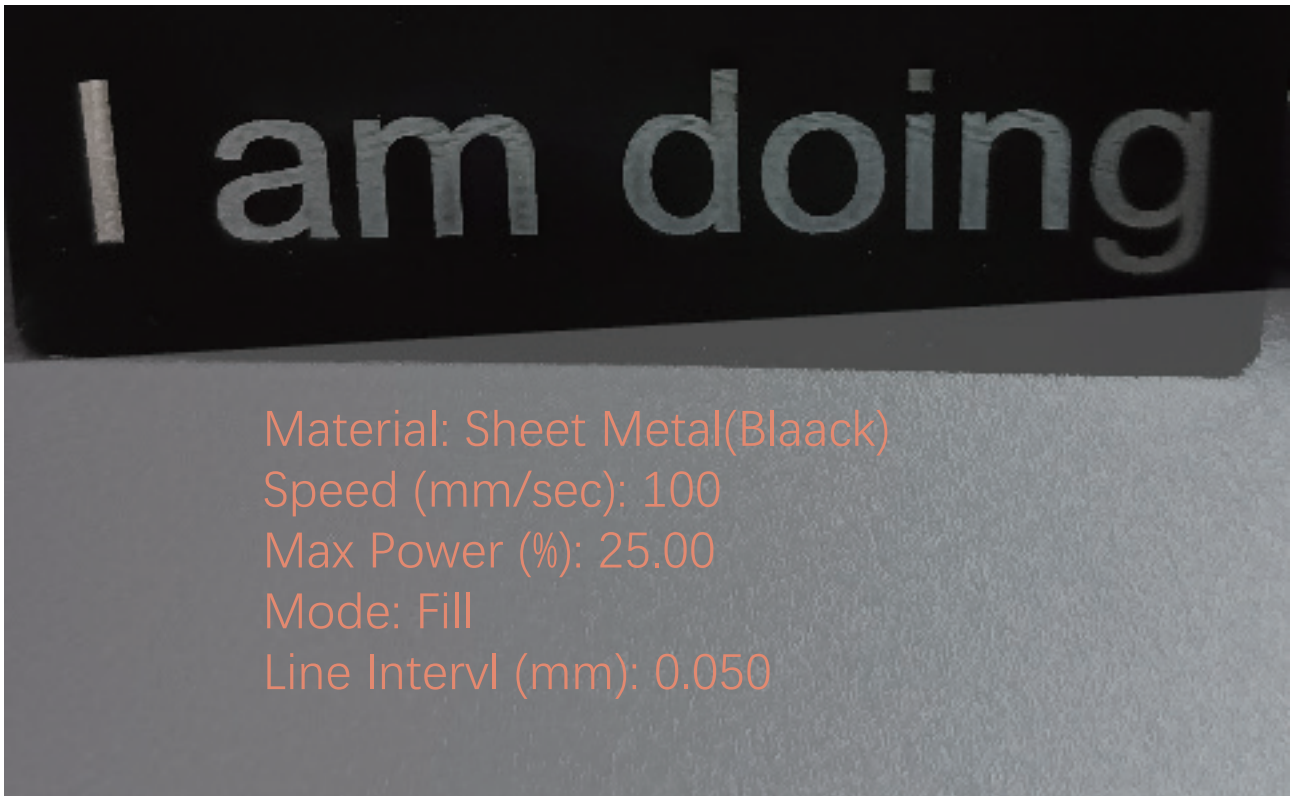The following are the operating steps:

2.Depending on the material, set the appropriate speed and parameters for maximum values. According to your needs, set the appropriate working size,then, click 'ok'.

3.Please follow the steps indicated by the red text in the image.

Material: Sheet Metal(Blaack)
Speed (mm/sec): 100
Max Power (%): 25.00
Mode: Fill
Line Intervl (mm): 0.050

4.Finish.

08 Laser Fixed Focus

The effect of engraving or cutting depends largely on the focus of the laser. This product adopts fixed focus laser, and the focusing method is simple and fast. The specific focal position is about 18mm from the bottom of the laser filter cover.

The precise laser focusing steps are as follows:

1. Move the laser to the surface of the material

to be engraved or cut;

2. Place the fixed focus column on the surface

of the engraved or cut material;

3. Release the slider knob on the side of the laser

and slide freely until it touches the fixed focus column;

4. Tighten the laser side guide knob;

5. Remove the fixed focus column;

6. Complete focusing.
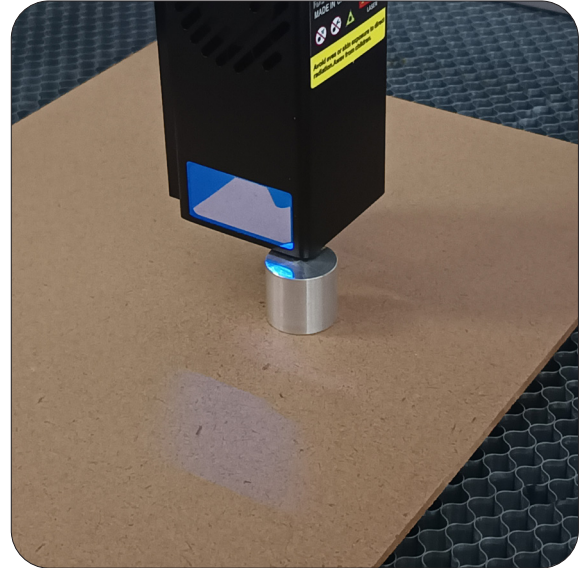
09 Common Problems and Solutions

Q:In the LaserGRBL software it shows that it cannot connect to the device, i.e. the driver has not been successfully installed.
A:In the LaserGRBL software, click on "Tools" > "intallCH340 driver" to install the driver, then restart the software after installation and connect again.

Q:Incorrect port selection when connecting to LaserGRBL software.
A:When the driver is successfully installed, the correct port number will appear, just make sure you click on the correct port number.

Q:The device does not connect properly when the LaserGRBL software is opened repeatedly and there are multiple open screens.
A:Just close the repeatedly opened software screens.

Q:Heavy shadows in the lines when the machine is cutting or engraving work.
A:Adjust the contact surface of the timing belt and the timing wheel so that no friction occurs between the two sides of the timing belt and the timing wheel as far as possible, and at the same time the tightness of the timing belt in each position is as consistent as possible.

Q:After the installation was completed, it was found that the laser assembly was oscillating back and forth.
A:Use the open-end wrench inside the toolbox to properly tighten the eccentric nut of the laser assembly.