

# SCULPFUN S10 Series

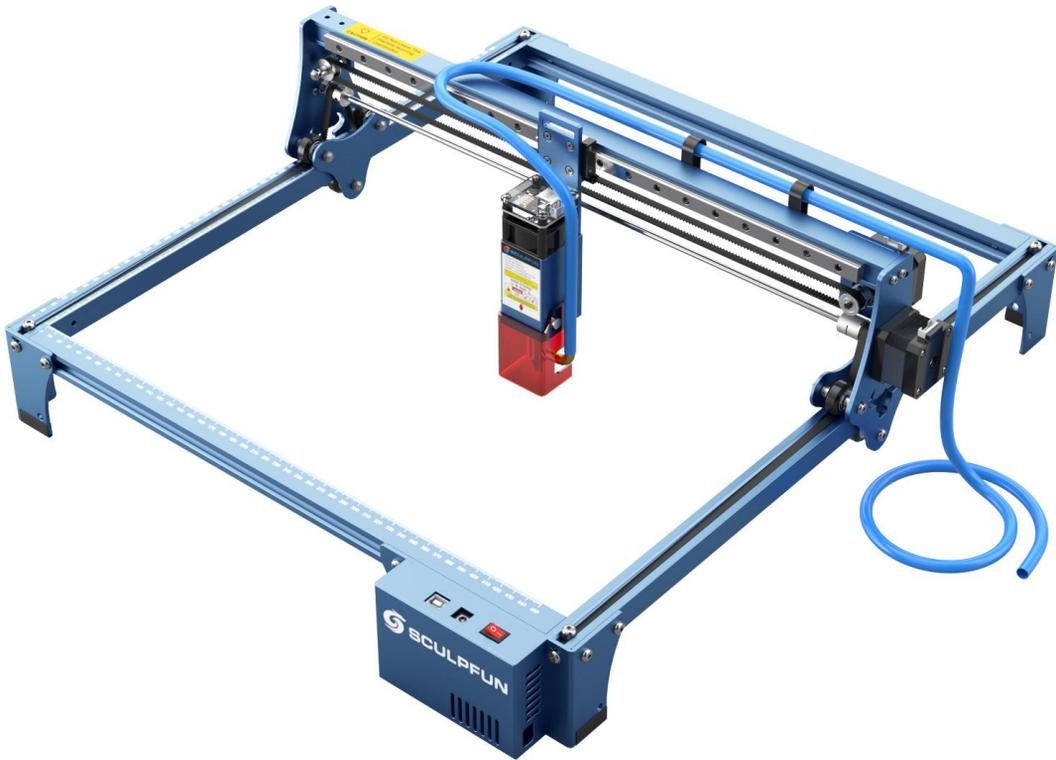
## Laser Engraving Machine User Manual

### **Note: Which engraving software should I choose?**

For professional or cutting purposes please try LightBurn

For Beginner or simple engraving please try LaserGRBL

They both have official websites or YOUTUBE tutorials, you can have a quick look to choose.



**MADE IN CHINA**

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## Security Statement

Before starting laser engraving, please read this safety guide carefully. It mentions situations that require special attention, including warnings about unsafe behaviors. Please observe and pay attention to this statement to protect your safety.

### 1. Laser safety

This machine uses Class 4 laser products. The power of the laser is so high that it may cause eye injuries and burn the skin.

We installed a laser shield on the laser, which can filter out the diffuse reflected light at the laser focal point. We gave away goggles, you can bring goggles if you need them.

### 2. Fire safety

Since the material is burned or evaporated during cutting, the high-intensity laser beam generates extremely high temperatures and generates a lot of heat. Please try to keep indoor ventilation or add exhaust equipment.

Certain materials can catch fire during cutting, especially flammable materials such as wood and paper.

**During the engraving process, please try to put a metal pad or other fireproof pad on the bottom of the engraving machine to protect the safety of the table or workbench.**

Always keep a working fire extinguisher nearby.

### 3. Material safety

Do not engrave materials with unknown properties.

Recommended engraving materials: wood, acrylic, bamboo, leather, fabric, paper, black-coated cermet.

Materials that are not recommended: glossy metal, transparent materials, reflective materials, plastic, etc.

**At the end of the manual we attached which materials are not suitable for engraving.**

### 4. Safe to use

The engraving machine can only be used horizontally, and ensure that the engraving machine is reliably fixed. Fixing holes are reserved on the four tripods, and other devices can be used to fix them on the workbench. Prevent accidental displacement or falling of the work surface during work to cause fire;

It is strictly forbidden to point the laser towards people, animals or any combustible materials, regardless of whether it is in working condition or not.

Teenagers must have parental supervision during use.

# Introduction of SCULPFUN S10 Engraving Machine

The SCULPFUN S10 laser engraving machine uses a fixed-focus laser. The way to focus the laser on the engraved object is: place the fixed-focus column on the surface of the engraved object, slide the laser module until the edge touches the fixed-focus column, and fix the module screw by hand, Take off the fixed-focus column to complete the fixed-focus.

The laser protective cover can help us block most of the glare. You don't have to wear glasses all the time, and people around you can also do not wear goggles. But you can wear goggles if you feel it is necessary.

The laser power of the SCULPFUN S10 laser engraving machine is about 10W. It can easily cut some wood panels, acrylic, and engrave blackened metal. However, it is not recommended to cut reflective materials and transparent materials.

The engraving machine of SCULPFUN S10 supports PWM control (pulse width modulation). PWM will make the engraved patterns more layered.

Right-angle measuring ruler: X-axis and Y-axis contain precise scale lines, which is convenient for you to measure the size of engraving objects quickly. The 410x420mm large-area engraving interval can meet your various engraving needs.

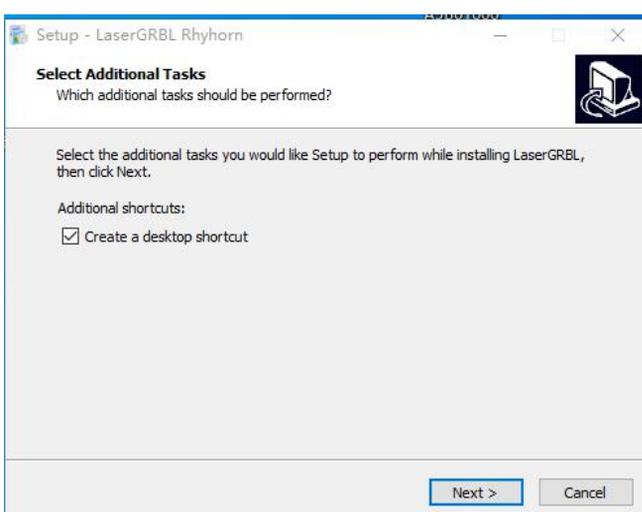
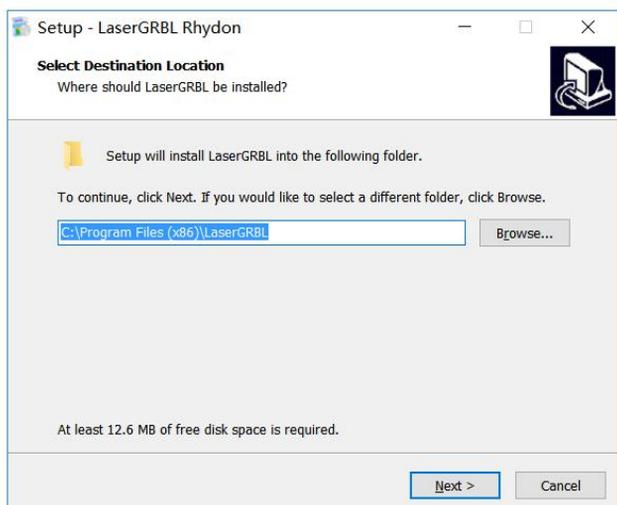
Extensive compatibility: The machine can be compatible with various mature engraving software, such as LaserGRBL, LightBurn, Benbox, GbrlController, LiteFire, supports PWM mode engraving, supports Windows system, and also supports MAC system (LightBurn), engraving file format supports JPG, PNG, DXF, SVG, G-code, NC, BMP, etc. **We recommend LightBurn first, because it is very professional in cutting. For beginner could also try LaserGRBL, It is relatively simple and good at carving.**

Safety design: The machine is equipped with a power switch to facilitate emergency power off. Fixing holes are reserved on the four feet and the body structure to facilitate fixing the machine and the data cable.

## Instructions for using engraving machine

### Section 1. Download LaserGRBL software

1. LaserGRBL is one of the best free DIY laser engraving software for laser beginner, easy to learn. **For professional laser cutting purposes please try LightBurn.** we can download it from LaserGRBL website: <http://lasergrbl.com/download/>. Double-click the software installation package to start the software installation, keep clicking Next until the installation is complete



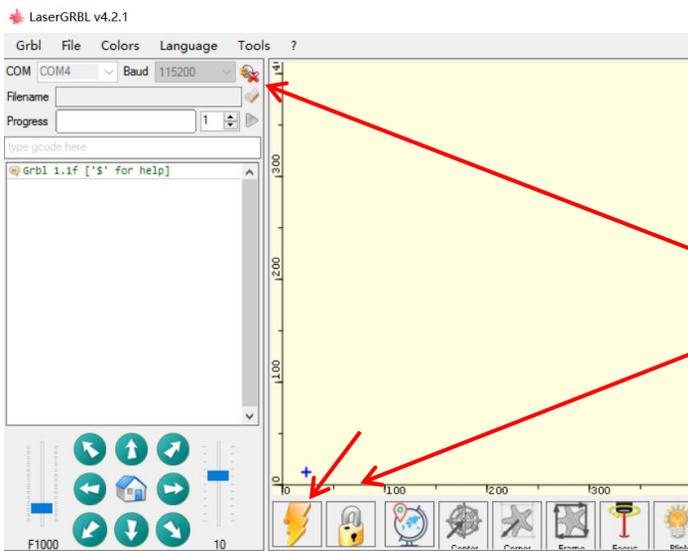
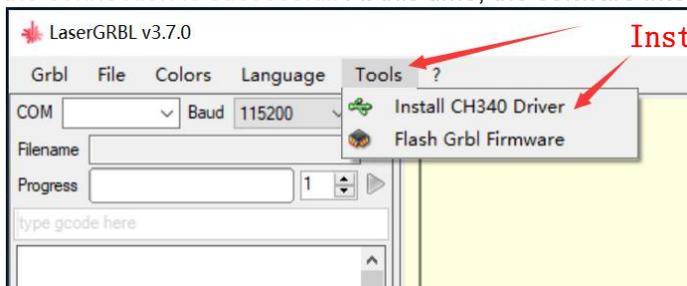
## Section 2. Connect the laser engraving machine

1. Connect the engraving machine to the computer installed with LaserGRBL software, plug in the power of the engraving machine, turn on the LaserGRBL software, select the correct port number and baud rate in the software-115200, (in general, the COM port does not need to be manually To select, but if you have multiple serial devices connected to the computer, you need to manually select, you can find the port of the laser engraving machine in the device manager of the Windows system. The simpler way is to try the displayed port numbers one by one Again).

Install the driver. In the LaserGRBL software, click "Tools">"install CH340 Driver" to install the driver.

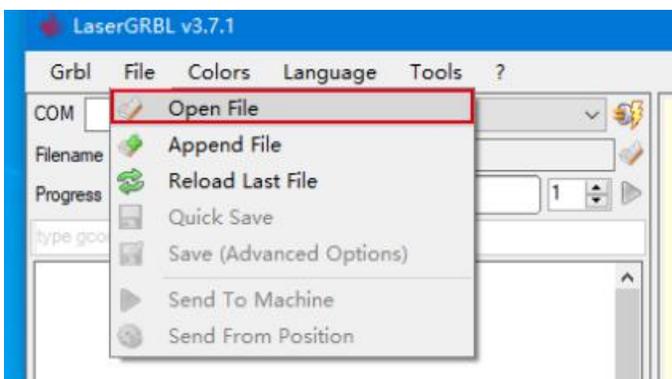


2. Click the lightning connection icon  in the software. When the lightning icon changes to a red icon, the connection is successful. At this time, the software interface icons all become colored.



## Section 3. Engraving preparation and preview

1. Select the engraving file. Open the LaserGRBL software, click "File"> "Open File" in turn, and then select the graphics you want to engrave for engraving. Currently LaserGRBL supports files in NC, G-Code, BMP, JPG,, PNG,, DXF and other formats.



## 2. Picture parameters, engraving mode, engraving quality settings

- a.** LaserGRBL can adjust the sharpness, brightness, contrast, highlight and other attributes of the target image. When adjusting the image parameters, you can see the actual effect in the preview window on the right, and you can try to adjust to the effect you think is satisfactory.
- b.** The engraving mode usually selects "line-to-line tracking" and "1bit jitter". 1bit jitter is more suitable for engraving grayscale graphics. If you want to cut, please select vector or centerline engraving mode.
- c.** 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. The laser spot used by the S10 engraving machine is a rectangular spot of 0.15mm, Therefore, the recommended engraving quality range is 5-8. Different materials have different responses to laser irradiation. Therefore, the specific value also depends on the specific material engraving test.
- d.** At the bottom of the preview window, you can also rotate, mirror, and cut the image.
- e.** After completing the above settings, click Next to enter the settings of engraving speed, engraving energy and engraving size

**Adjust as you like** → Brightness, Contrast, White Clip

**Suitable for carving** → Line To Line Tracing

**Suitable for cutting** → Vectorize!, Centerline

**Represents the density/mm of laser dots** → Quality

## 3. Set the engraving speed, engraving energy and engraving size

- a.** It is recommended to use 1000 for the engraving speed. This is the value that we think is the best engraving effect after repeated experiments. Of course, you can increase or decrease this speed according to your own preferences. A faster speed will save engraving time, but it may bring The slower speed is the opposite of the decline in the engraving effect.
- b.** In the selection of laser mode, there are two commands for laser on, M3 and M4. It is recommended to use the M4 command when engraving in the 1bit jitter mode, and the M3 command is recommended for other situations. If your laser only has the M3 command, please check whether the laser mode is enabled in the GRBL configuration. For the description of GRBL configuration, please refer to the official description of LaserGRBL.
- c.** The choice of engraving energy is based on different materials. We have attached engraving and cutting parameters of common materials at the end of the manual for your reference.
- d.** Finally set the size you want to engrave, and click the "Create" button to complete the setting of all engraving parameters.

**Engraving Speed** → Engraving Speed 1000 mm/min

**Engraving Energy** → S-MIN 0 0.0%, S-MAX 1000 100.0%

**Engraving Outline Size** → Size W 80.0 H 56.0

**Click to finish setting** → Create!

#### 4. Move the laser head position, laser focusing

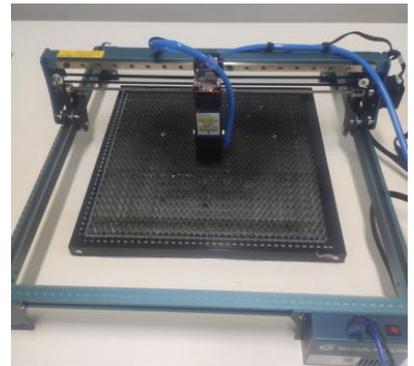
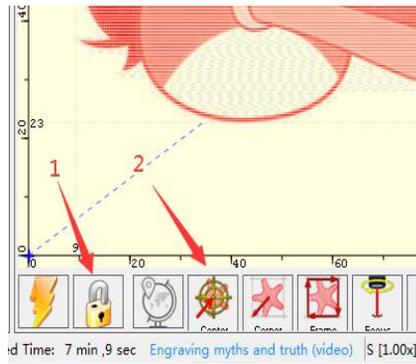
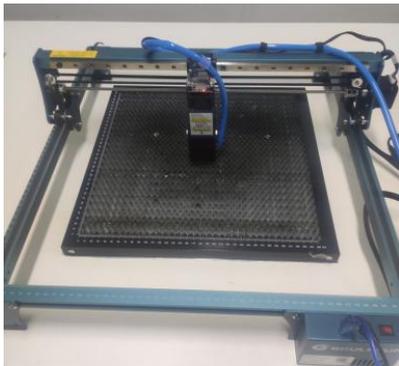
S10 does not have a limit switch, so the origin (0,0) position of S10 in the LaserGRBL software is: The point which the axis of the laser is aligned when power on and software lock  . In other words, you turn on the power supply, connect to the engraving machine, and then click the software lock  . At this time, the laser axis position is the origin (0,0)

Because we will use a centered laser in the next step to determine the position of the engraving pattern, if the original position of the laser is improper, it may collide with the laser, so it is recommended to move the laser to the middle of the frame every time before engraving the pattern.

The S10 series engraving machine uses a fixed-focus laser + sliding device to adjust the laser so that the laser focus is irradiated on the surface of the engraved object. It is divided into the following steps:

**a:** Place the fixed-focus column on the surface of the carved object, and slide the laser down so that the laser shell is in close contact with the 50mm fixed-focus column.

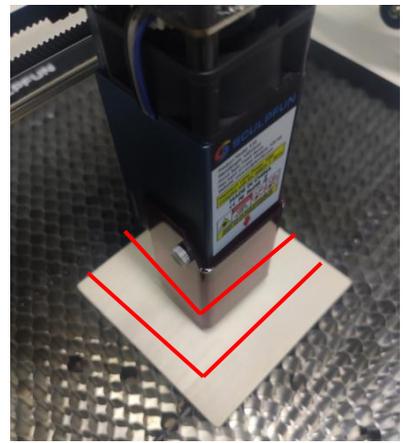
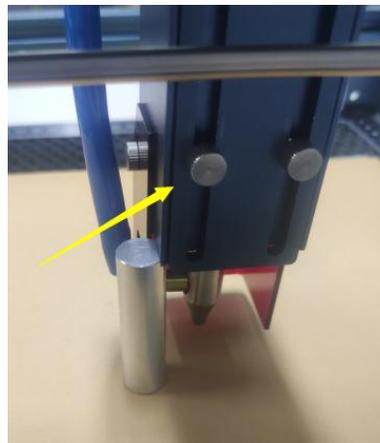
**b:** Tighten the fixing screws of the laser and remove the fixed focus column.



Before each engraving image , Move the laser to the middle of the frame.

Click the center button

Move the laser to the center of the frame again



Place the 50mm fixed column on the surface of the carved object

Tighten the fixing screws, And remove the fixed focus column

Adjust the position of the sculpture, Make the engraving object and the laser shell outline parallel, while the center point also coincides

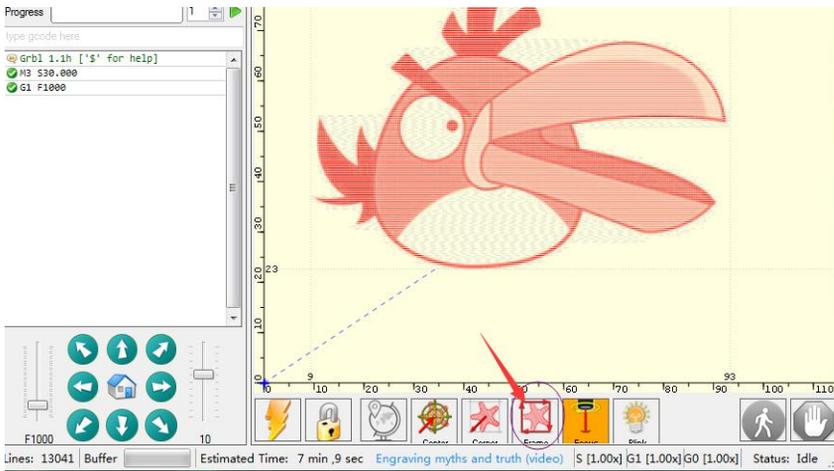
## 5. Position the preview engraving pattern position

Regarding how to locate the engraving pattern, that is, how to make the pattern engraved in the correct position of the engraving object, this is an important topic for laser engraving machines.

The S10 engraving machine uses the click to center position  to make the laser to center of the pattern, at the same time, move the engraving object to make the engraving object coincide with the center of the laser, so that the axes of the two have coincided. Note that at this time, try to observe the outline of the engraved object and make it parallel to the outer outline of the laser.

The next step is to determine the specific engraving position, the axis has been coincident, by scanning the outline , you can know exactly where the laser engraved pattern will be and the size of the engraved pattern.

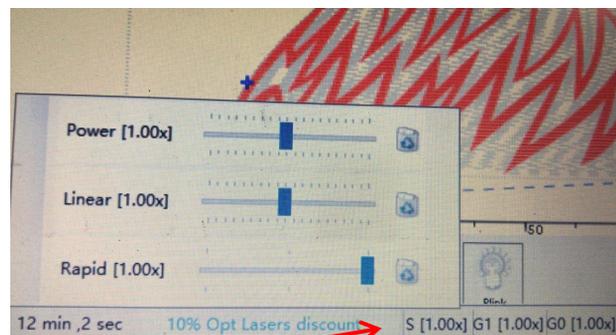
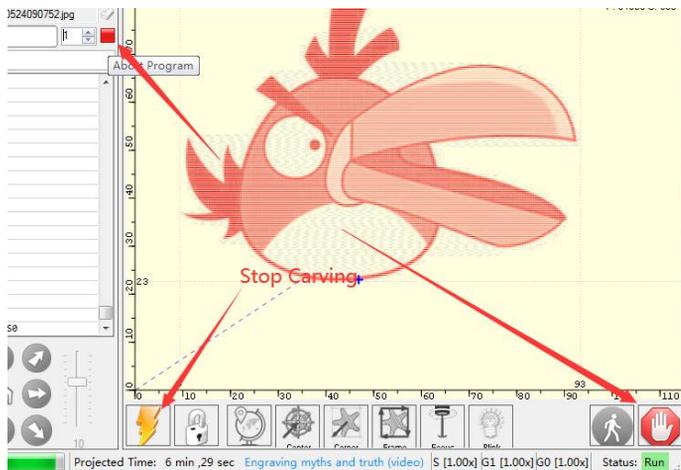
The outline of the engraved pattern previewed in the software is the actual scanned outline, and the position of the engraved pattern can be previewed through this operation.



Scan the outline, you can preview the precise position of the engraved pattern

## Section 4. Start carving and control during the carving process

1. Click  to start engraving, and fill in the number of repeated engravings here .
2. There are four forms of emergency stop: pause in the lower right corner ; cancel all data immediately ; stop engraving , or directly turn off the power switch on the control box is also an emergency stop method.
3. The laser energy adjustment, line width and speed adjustment during engraving are as shown in the figure below



laser Power, Linear, Speed adjustment

## Section 5 Suggest parameters for engraving for LaseGRBL

S10 engraving machine common material engraving parameter table suggestion

	Material	Quality	laser Energy(S-Mx)	Speed mm/min
engraving	Basswood	5-8	200	1000
	Plywood	5-8	200	1000
	Bamboo	5-8	100	1000
	Acrylic (black)	5-8	150	1000
	Kraft paper	5-8	80	1000
	Stone/ceramic tile	10	50	1000
	Paited Stainless steel /aluminum alloy	10	1000	600

Test environment: Turn off air assisted.

Note: This is a very conservative parameter recommendation. The actual number of times needs to be adjusted according to the actual materials and test results. For laser cutting, I recommend one pass cut when air assist is on.

The meaning of the software parameters in the table:

Quality                      laser Energy(S-Mx)                      Speed

Repeat carving rounds

### Suggestion for engraving and cutting:

1. When engraving, you can initially test the parameters, engrave the effect, and then formally engrave. The two parameters of pattern preview and quality are very important when engraving. Generally use Line to line mode.
2. When cutting, try to increase the quality and energy, and slow down the speed appropriately. Mode generally used: Vectorize/Centerline

## Section 6. Common Problems Possible Causes Treatment

Common problem	Possible cause	Solution
<p style="color: red;">The engraving machine cannot be connected to the software (here refers to the LaserGRBL software)</p>	Driver Missing, Cannot connect	In the LaserGRBL software, click "Tools">"install CH340 Driver" to install the driver, and restart the computer after installation to connect
	Multiple LaserGRBL software open repeatedly	Close LaserGRBL software that is open repeatedly
	Incorrect port number	Select the correct port number
	Incorrect baud rate selection	Baud rate to be selected: 115200
	the data line is unconnected	Check whether the data line is connected correctly.
	an unknown source. (Code 52)	the computer system is too old
	USB port problem of the computer	Try a different USB port
<p style="color: red;">The engraving line is not straight</p>	The belt is not tight	Re-tension the belt
	Belt screws are not locked at both ends	Tighten the set screws on both ends of the belt
	Rollers are not locked, brackets are wobbling	Adjust the eccentric nut under the bracket, lock the eccentric nut so that the bracket does not wobble.
	The laser stand extends too much that causes the laser to shake.	Raise the laser to let it as close to the top as possible to reduce laser wobble
	When the engraving picture is small, the line is not straight	You should slow down the engraving speed, this will reduce the laser shaking

# Section 7. LightBurn installation tutorial

Lightburn is a very professional laser engraving software, almost the best. He looks very complicated at first, but the function is very powerful, as long as a little study can be mastered. It is especially convenient for cutting. It is suitable for windows or MAC systems and has a one-month free trial period.

The official website: <https://lightburnsoftware.com/>

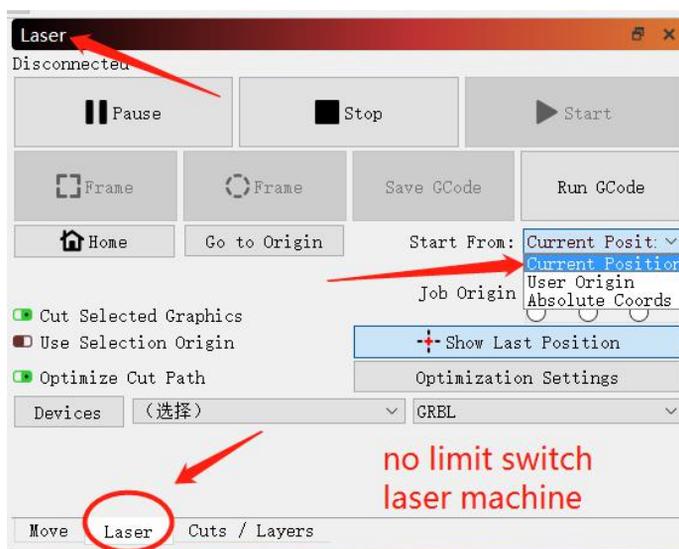
download address: <https://lightburnsoftware.com/pages/trial-version-try-before-you-buy>

YOUTUBE tutorial: <https://www.youtube.com/channel/UC-TdV9ThMD6E4MZtA6eZsQ>

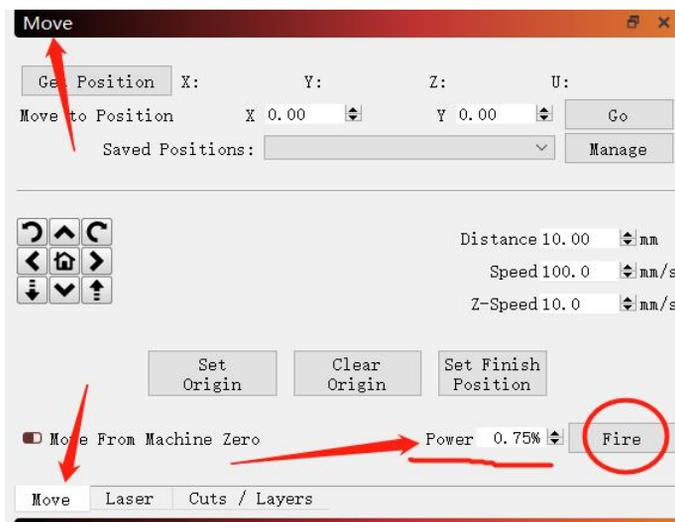
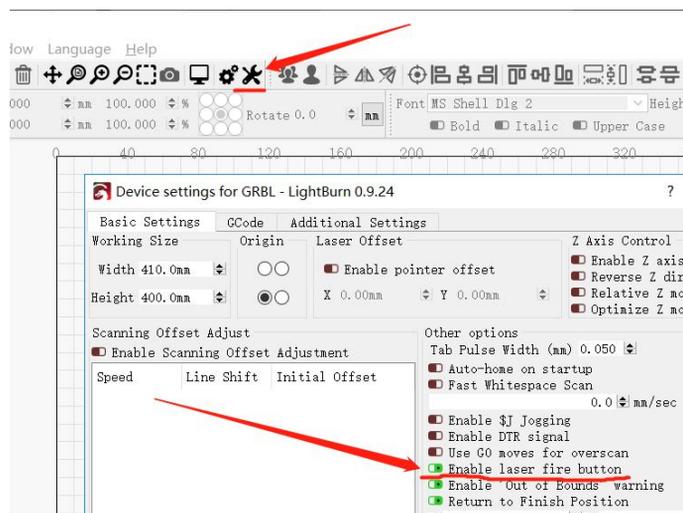
Regarding the use of lightburn, I suggest to watch the official website tutorial or YouTube video directly. I think this is the best laser cutting software at present, and it is equipped with a detailed tutorial, so you can learn it quickly. There is no detailed introduction here.

## Key points need attention

1、 when setting the origin position, you need to select the current position. Because the S10 series does not have a limit switch, you need to select the current position option. This setting is required for machines without limit switches.



2、 How to make the laser light up weakly and use it as an indicator light?



3、 How to position laser engraving? suggest: Fire laser light 0.75% power—Center the axis of object and the laser —Framing to preview engraving position

## Section 8 Suggest parameters for cutting of materials LightBurn

**Table1 Cutting parameters for common materials of S10 engraving machine suggestion**

	Material	Number of passes	Max power %	Air assist	Speed
cutting	3mm Basswood	1	100	on	300mm/min
	6mm Plywood	1	100	on	180mm/min
	10mm Plywood	6	100	on	300mm/min
	2mm Bamboo	1	100	on	300mm/min
	3mm Acrylic (black)	1	100	off	300mm/min
	10mm Acrylic (black)	10	100	off	180mm/min
	2mm Leatherwear	1	100	off	300mm/min
	4.5mm MDF board	4	100	on	180mm/min
	5mm Light wood	5	100	on	300mm/min
	10mm Light wood	1	100	on	180mm/min

Air assist Test environment: Turn on air assisted maximum wind force

Note: This is a very conservative parameter recommendation. The actual number of times needs to be adjusted according to the actual materials and test results. For laser cutting, I recommend one pass cut when air assist is on.

## Section 9 Important notes for machine maintenance and use

1、 If it is used on an extremely smooth desktop, it is best to fix the four feet with a cable tie, or put a rubber anti-skid pad under the four feet.

This can effectively prevent the machine from sliding during engraving.

2、 The belts and pulleys need to be checked for tightness regularly. If they are loose: the belt can be reinstalled and tightened; the pulley can be adjusted by the eccentric nut.

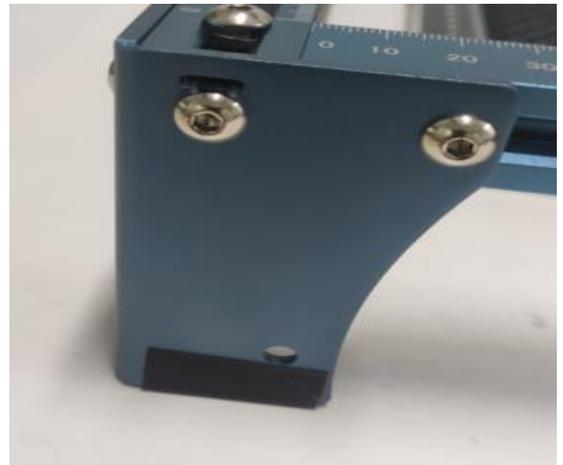
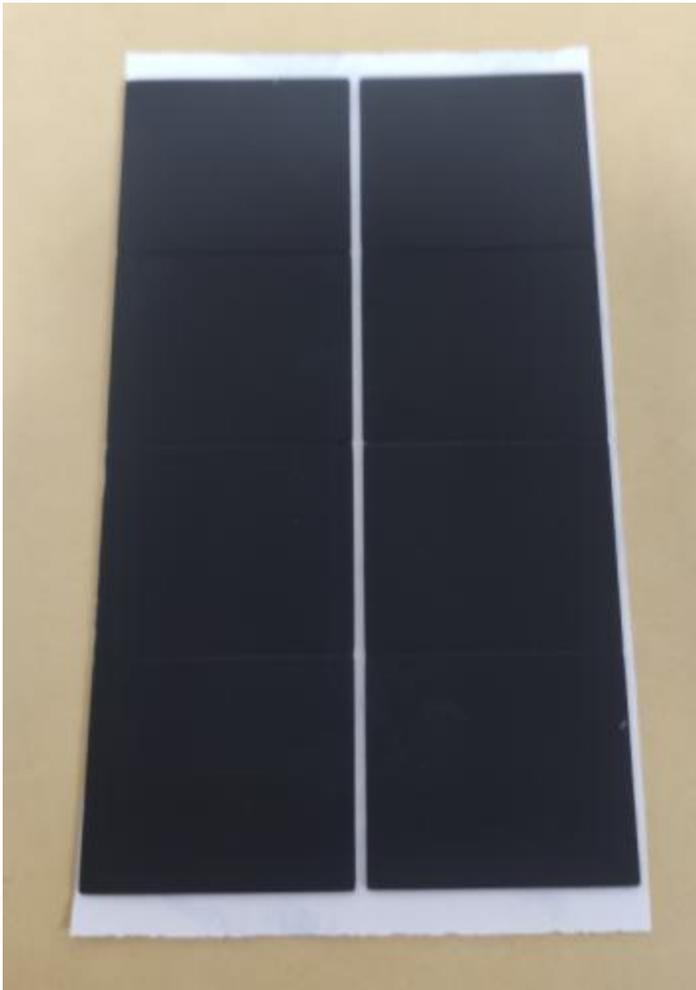
3、 If the laser feels that the energy is not strong enough, first check whether the laser lens is contaminated by dust. You only need to clean the lens to increase the laser power again. The laser lens and eye protection cover should be cleaned regularly. You can refer to the following link

<https://www.youtube.com/watch?v=29N5Runr52Y>

## Installation of Anti-slip rubber on the four feet

If you use the machine on a particularly smooth table, it may slip. We have reserved a large number of fixing holes on the four feet of the machine. You can fix the machine with iron wires; or stick to the four feet through the non-slip rubber sheet we presented.

The specific operation is shown in the figure:



The rubber pad may loosen when exposed to high temperature on the metal. This is normal and you need to stick it tightly again. Or a proper loose stick will keep the rubber more fixed to the metal.

Another way is to flatten the rubber block on the table and place the machine on the rubber block, which can also prevent the laser from sliding

# Use of the square ruler

As for the point (0.0) in the lower left corner, we are not to detect the laser moving distance, it is mainly design as a right-angle measuring ruler, which is convenient for measuring the size of the engraved object. As shown below.

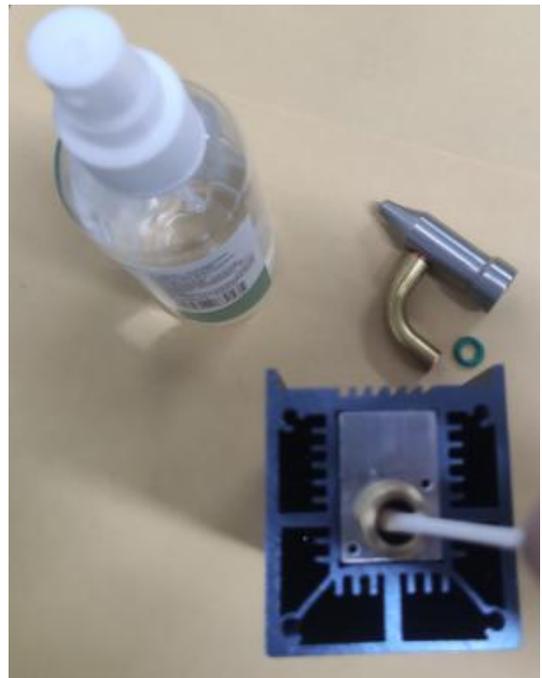
So we suggest that you place the laser in the center of the machine at the beginning to avoid collisions during laser moving.



**Square Measuring Ruler**

# How to clean the laser lens and laser nozzle to make it clear and refresh the laser power?

1、 I recommend using a round-tip cotton swab to directly rotate and wipe the lens and Laser nozzle, as shown in the figure below. **The dust on the laser lens will be cleaned, which can help refresh the laser power. (Dust on the lens blocks the laser, which will affect the laser power)** It is recommended to clean the lens when you feel the laser is weakened. When using a cotton swab to wipe, it can be dipped in alcohol for better effect



2. You can also refer to this video

<https://www.youtube.com/watch?v=29N5Runr52Y>

# Motor and connector collision error

1. After you receive the machine or find the motor collision fault during use, you only need to loosen the x-axis beam screw and recalibrate it.



2. You can also refer to this video。  
<https://youtu.be/7cUf5kowxdE>



## Sculp your fun !

**Manufacturer: Shenzhen Sculpfun Technology Co., Ltd.**

**Address: Building D, Longguang Jiuzuan Business Center South, Daling Community, Minzhi Street, Longhua District, Shenzhen, Guangdong, China 518131**

### Customer Service:

➤ For detailed warranty policy, please visit our official website at: [www.sculpfun3d.com](http://www.sculpfun3d.com)

➤ For Laser Engraver technical support and service, please email: [support@sculpfun3d.com](mailto:support@sculpfun3d.com)



Scanner APP:  
QR Code Reader  
/Barcode Scanner  
or any APP with scanner

