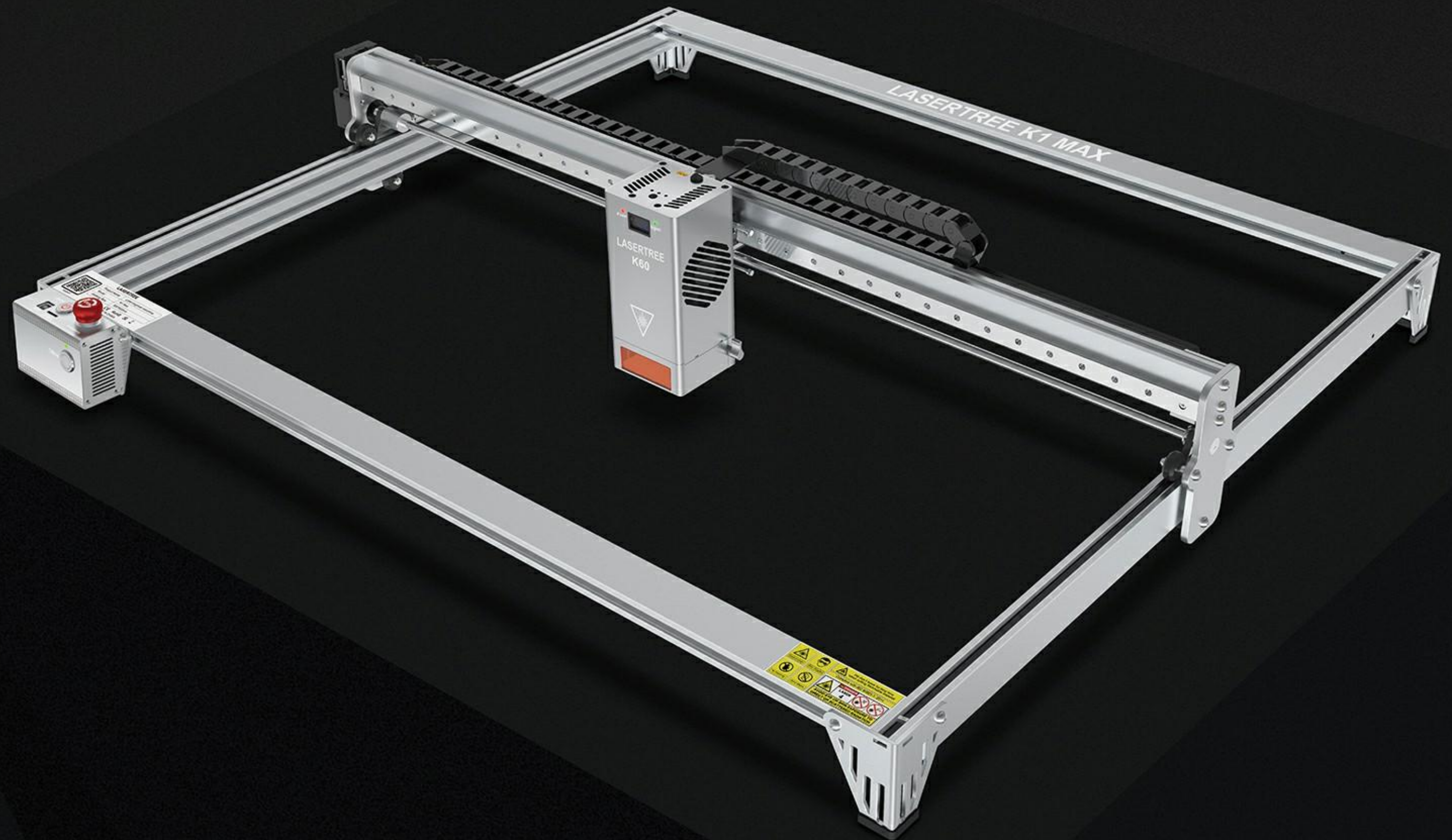


LASERTREE

# K1 MAX USER MANUAL



# CONTENT

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## 1. SAFETY STATEMENT

Before using the laser engraving machine, please peruse this safety manual attentively to comprehend the operating protocols and potential hazards associated with the laser engraving machine.

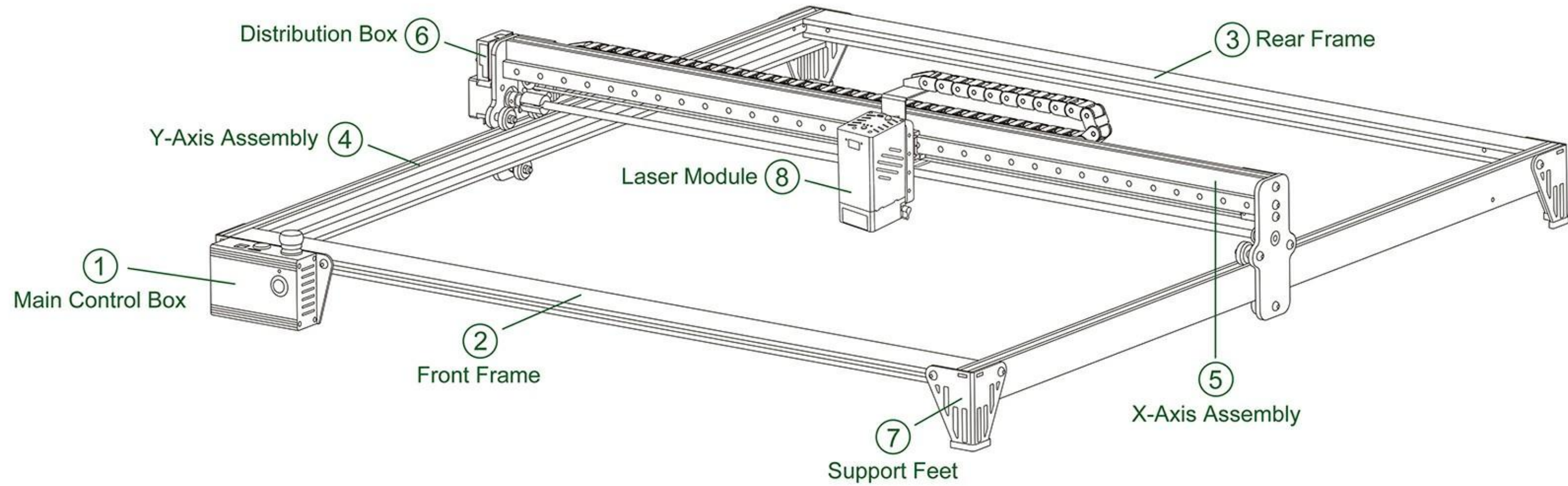
1. Sharp edges may cut your hands when assembling the stand, gloves are recommended.
2. Laser beam have high energy and heat, direct contact with eyes or skin may cause serious injury. When the laser is working, always pay attention to the position and direction of laser beam movement.
3. Children or teenagers are strictly prohibited from using the laser engraving machine alone.
4. The laser engraver should be placed on a stable table top. Before use the laser, please clean the work area to ensure that the surrounding environment is safe and free of debris, flammable and explosive items, etc. to prevent potential safety hazards.
5. Before using the laser, carefully check the power connection of the laser engraver. Make sure that the power cord is intact and the plug is firmly connected to avoid accidents caused by power problems.
6. When the laser is working, you must wear professional protective glasses to protect your eyes from laser damage. Protective glasses can block the laser light and avoid direct exposure to the eyes.
7. When the laser is working, the engraving area should be paved with metal or non-combustible mats to prevent the laser from burning the workbench or causing fire and other safety hazards.
8. When the laser is working, please do not leave the equipment during operation. Stay focused and pay close attention to the operation of your equipment, to prevent the engraving or cutting material from catching fire.
9. When the laser is working, some materials produce smoke during laser cutting. Please keep the room well ventilated.
10. Residue and debris can accumulate during the cutting and engraving process. Please clean up the work area promptly.
11. Please ensure that a fire extinguisher is located near the laser engraving machine and that regular maintenance and inspections are conducted to promptly respond to any accidents that may occur.

## 2. SPECIFICATION PARAMETERS

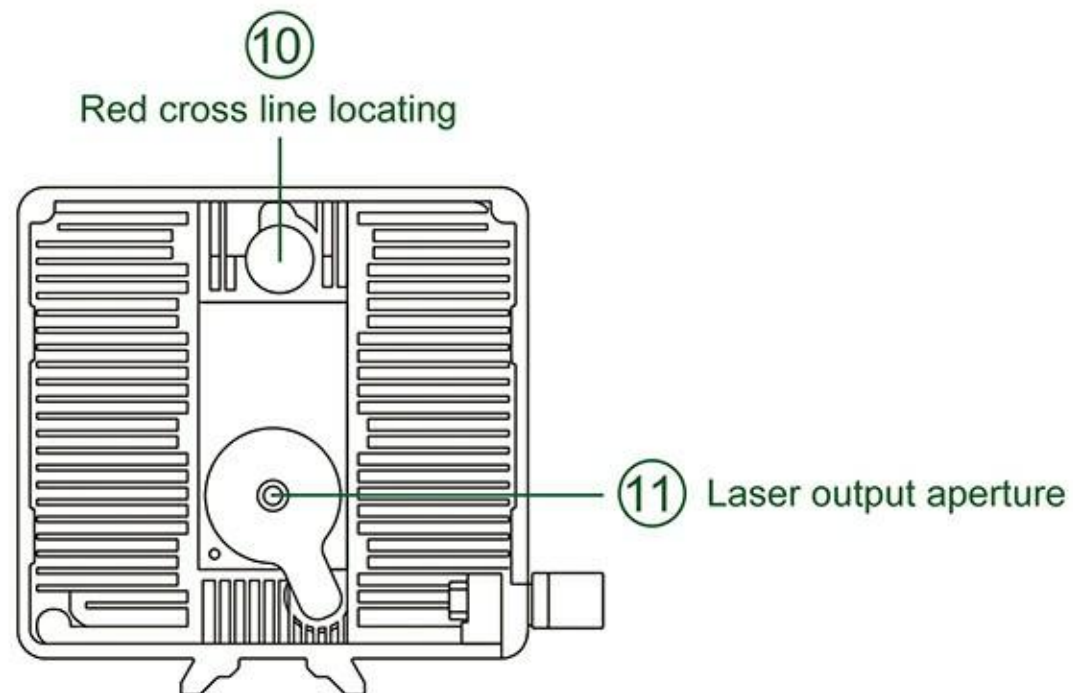
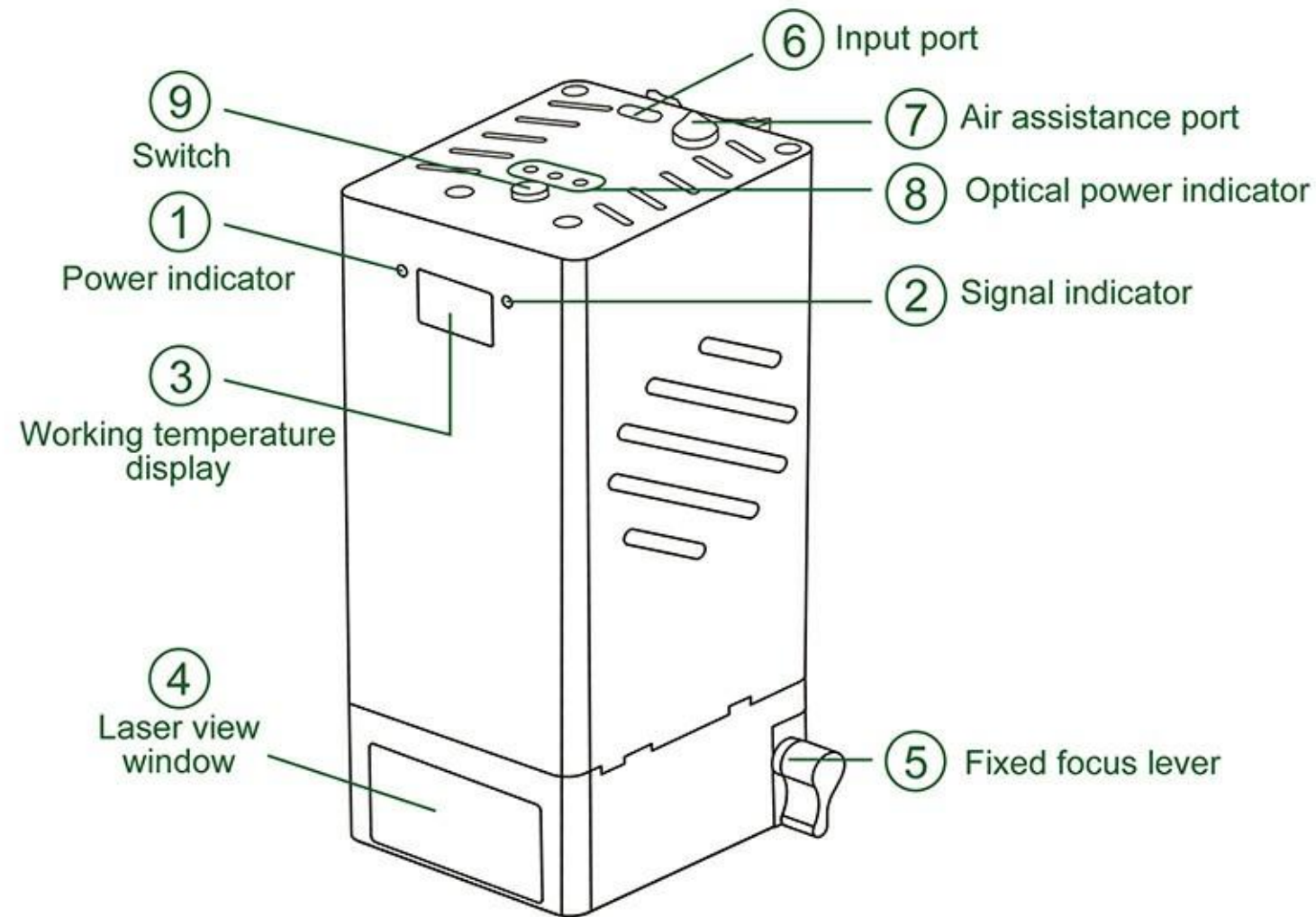
Brand	LASERTREE	Support Software	LightBurn & LaserGRBL
Model	K1 Max	Air Assistance	Yes
Engraving Area	800*600mm	Rotation Axis Output	Yes
Engraving Speed	20000mm/min	Offline Engraving	Yes
Wavelength	450nm (±10nm)	Emergency Stop	Yes
Focus length	40mm	Tilt Protection	Yes
Optical Power	60W+	Status Indicator	Yes
Input	DC24V 10A	Operating Temperature	0-60°C

## 3. ABOUT LASER ENGRAVING MACHINE

### 3.1 Laser Engraving Machine



### 3.2 Laser Module



① **Power indicator**  
It is red when power supply is connected.

② **Signal indicator**  
It is green when signal is received.

③ **Working temperature display**  
The laser output power stability and service life are closely related to laser working temperature. With the built-in thermistor at the highest temperature near the diode, you can see its working temperature in real time.

When the laser working temperature is above 55°C, the buzzer will sound an alarm.

It is suggested to keep the laser working temperature below 55°C and environmental temperature below 35°C to achieve great power stability and durability.

⑨ **Switch**

Function 1	Function 2	
When an over-temperature alarm occurs, press once can turn off the buzzer alarm sound.	The default power is 60W optical power, long press 5S to enter the power switching mode and switch to 40W optical power. Continuous short press can switch the optical power.	<b>Optical power switching order</b> 

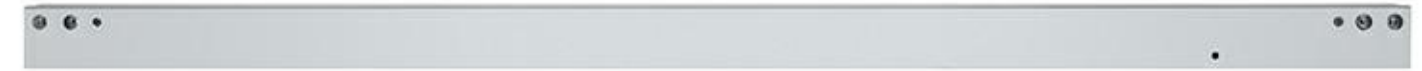
## 4. PACKING LIST

A



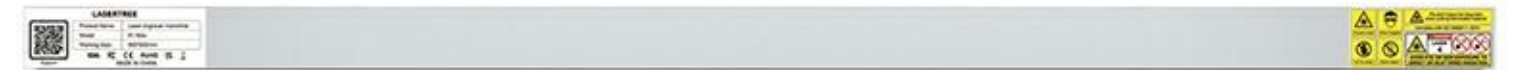
X-Axis Assembly x1

B



Y-Axis Assembly x2

C



Front Frame x1

D



Rear Frame x1



X-Axis Pulley Fixing Plate x1



Support Feet x3



Main Control Box x1



Y-Axis Timing Belt x2



Main Cable x1



Power Adapter x1



AC Cable x1



Card Reader x1



TF Card x1



USB Cable x1



Laser module x1



Spare Laser Protective Lens x2



Honeycomb Panel x1



Desktop Protection Plate x1

LASERTREE K1 MAX

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M4\*30 Adjusting Screw x2



T-Nut x4



M4\*5 Fasten Screw x4



M4\*18 Round Screw x1



M5\*10 Round Screw x2



M5\*20 Round Screw x16



M5\*20 Flat Screw x1



Limiting Column Sleeve x1



Material Pack x1



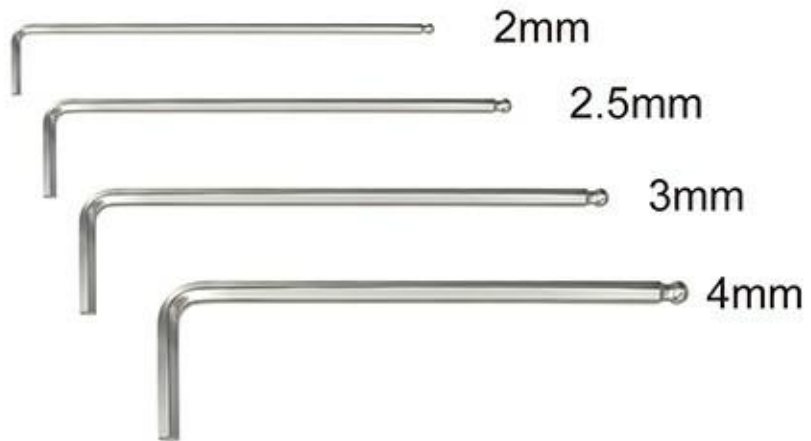
Air Pump User Manual x1



K1 Max User Manual x1



Square Pad x4



L-Allen Wrench x4



8-10 Open Spanner x1



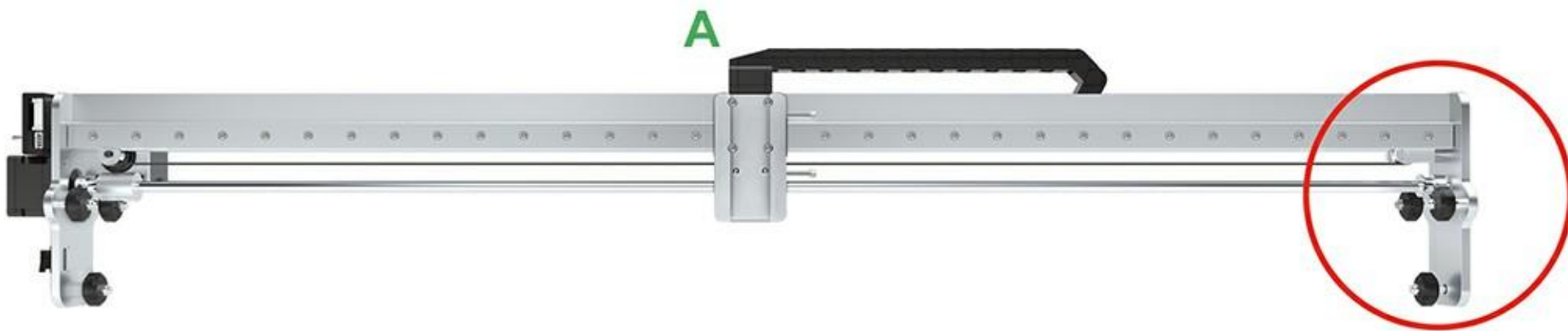
Cable Ties x1



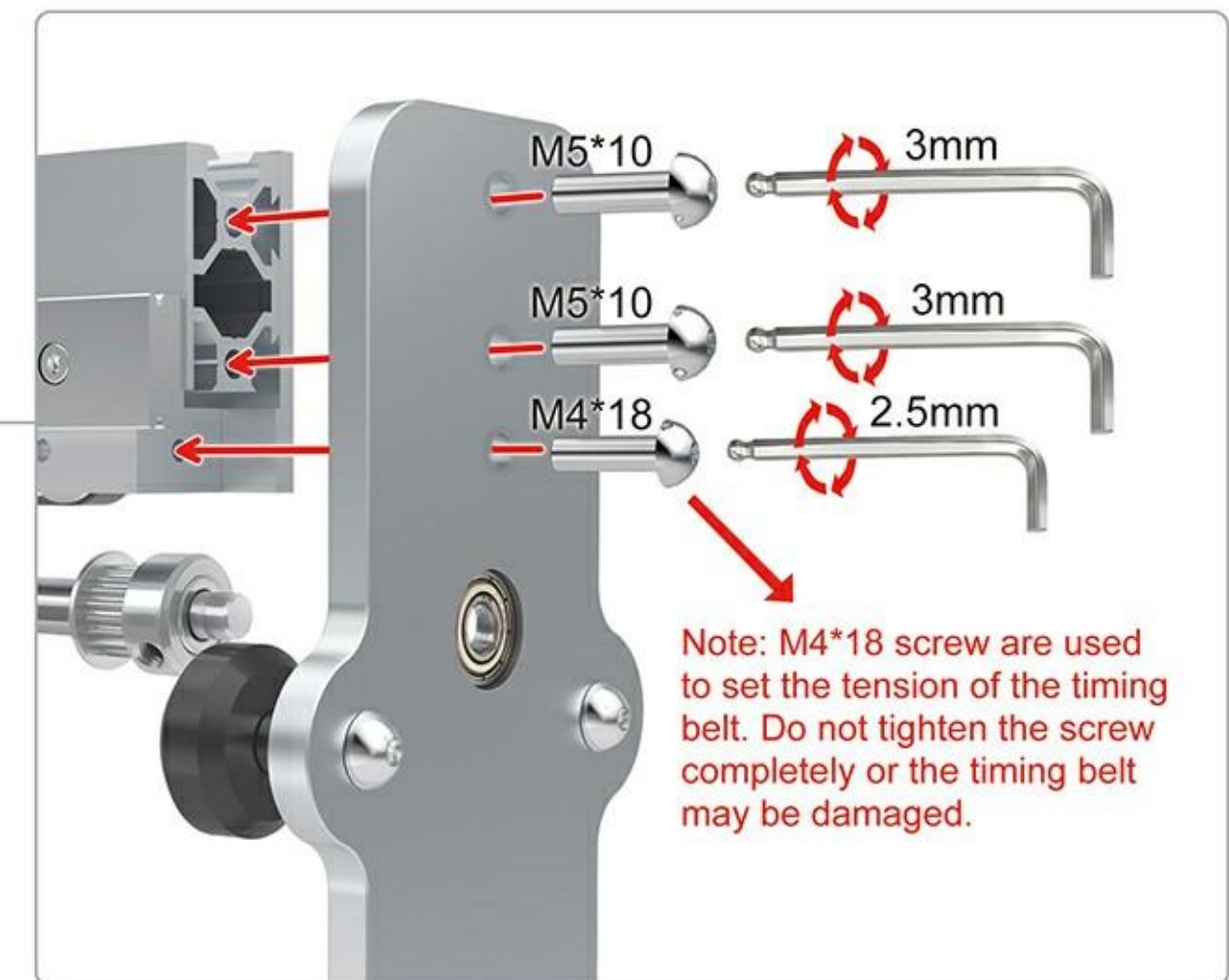
Cleaning Brush x1

## 5. INSTALLATION GUIDE

### 1/7 Assembly of X-axis pulley



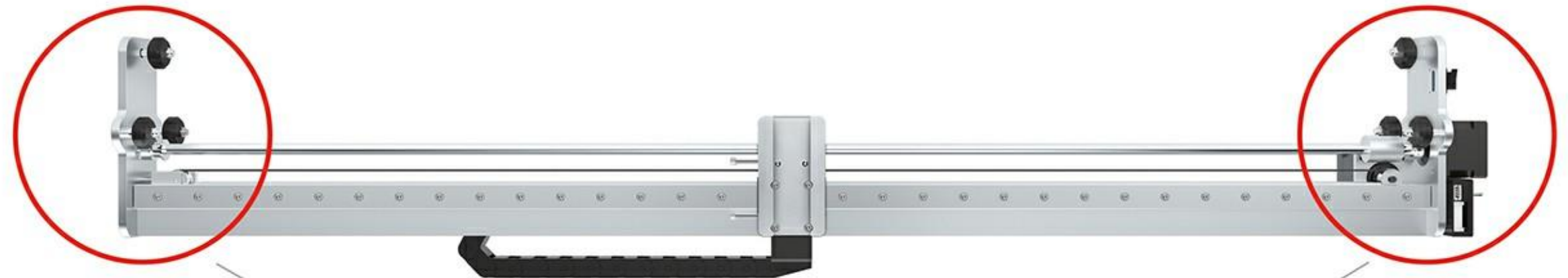
Attach the pulley plate to the right side of the X-axis using the corresponding screws as shown in the diagram.



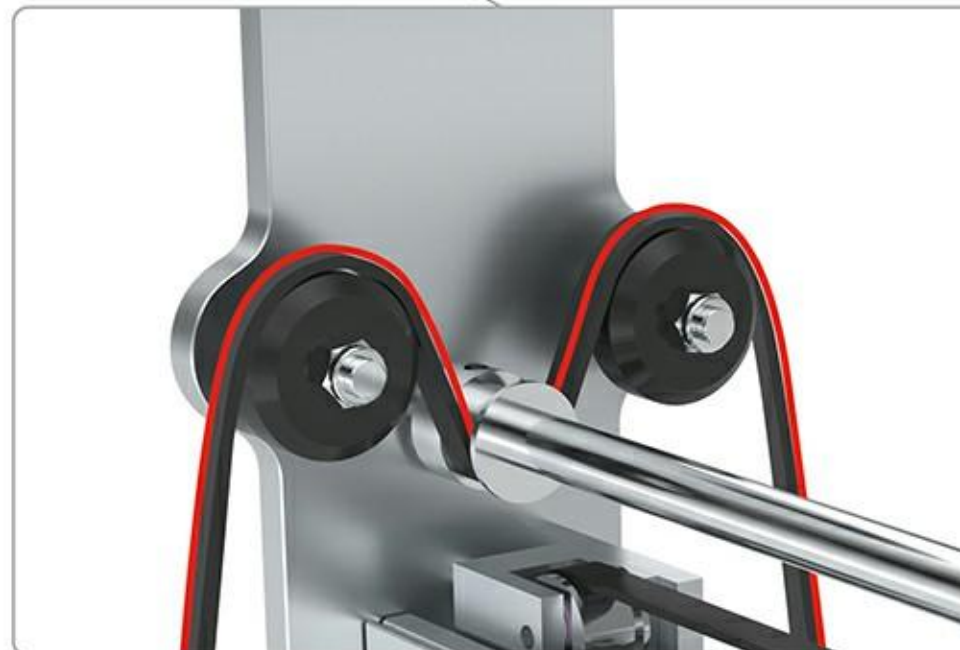
## 2/7 Assembly of timing belt and Y-axis



Step 1: Flip the X-axis

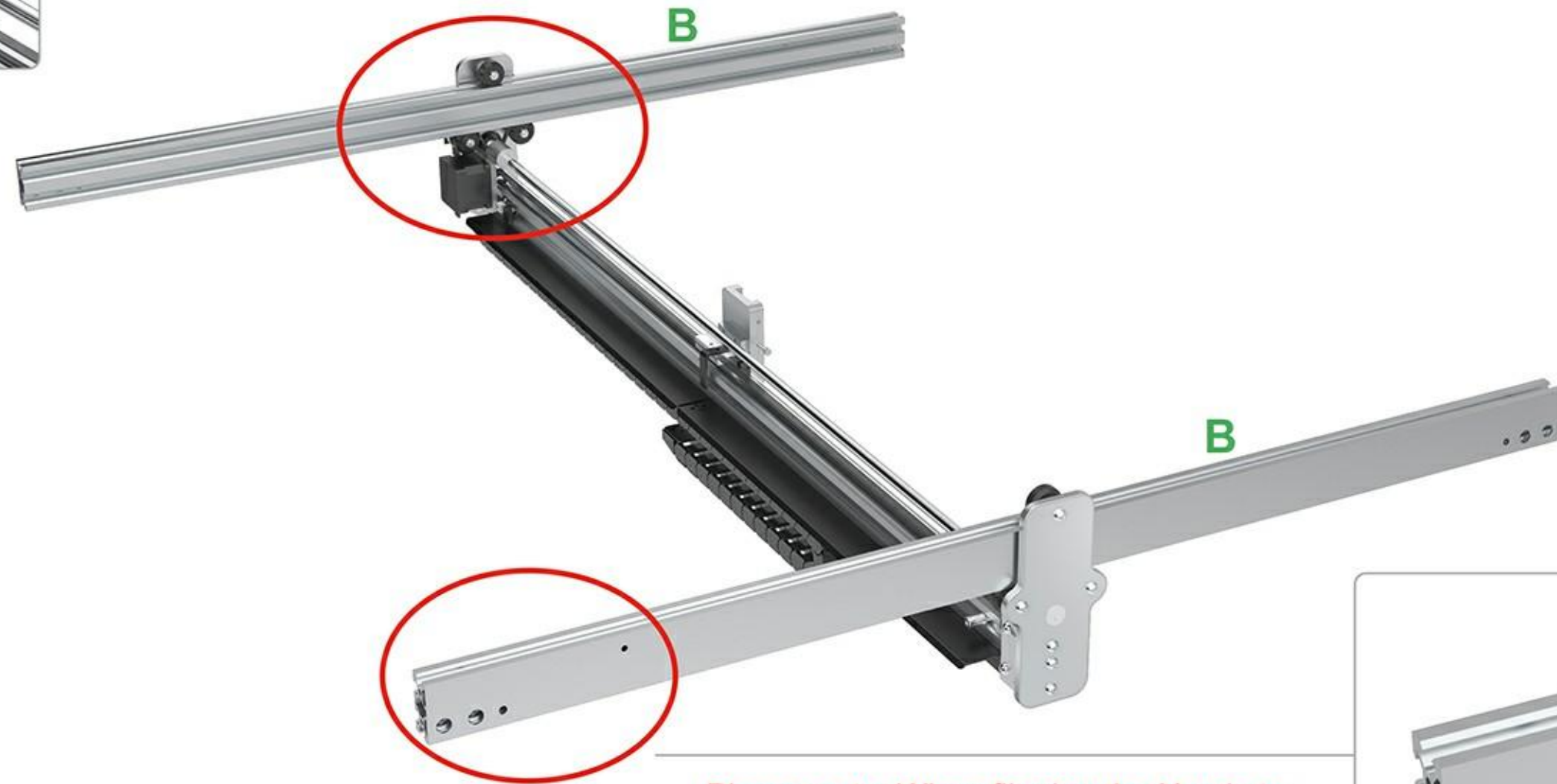
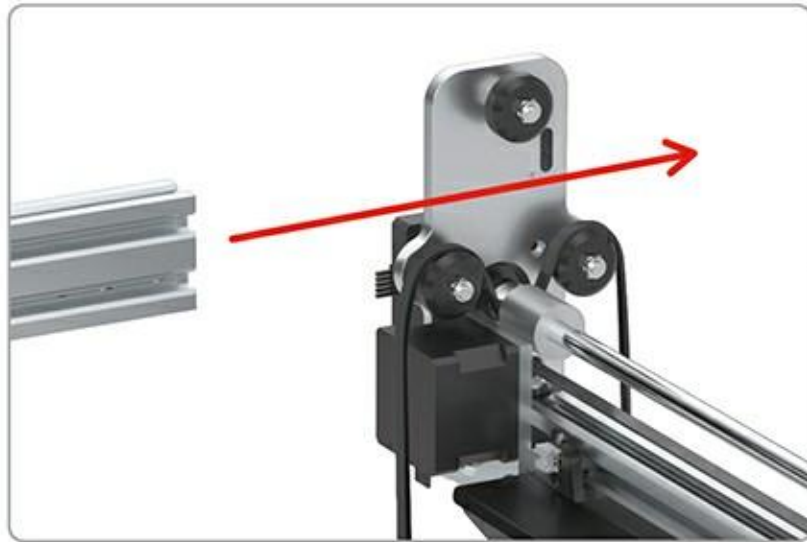


Step 2: Pass the timing belt through the X-axis pulleys and gears.  
(Both ends operate in the same way)



Note: When installing the timing belt, keep the belt teeth upwards.

Step 3: Pass the Y-axis beam through the pulley fitted with the timing belt. (Both ends operate in the same way)



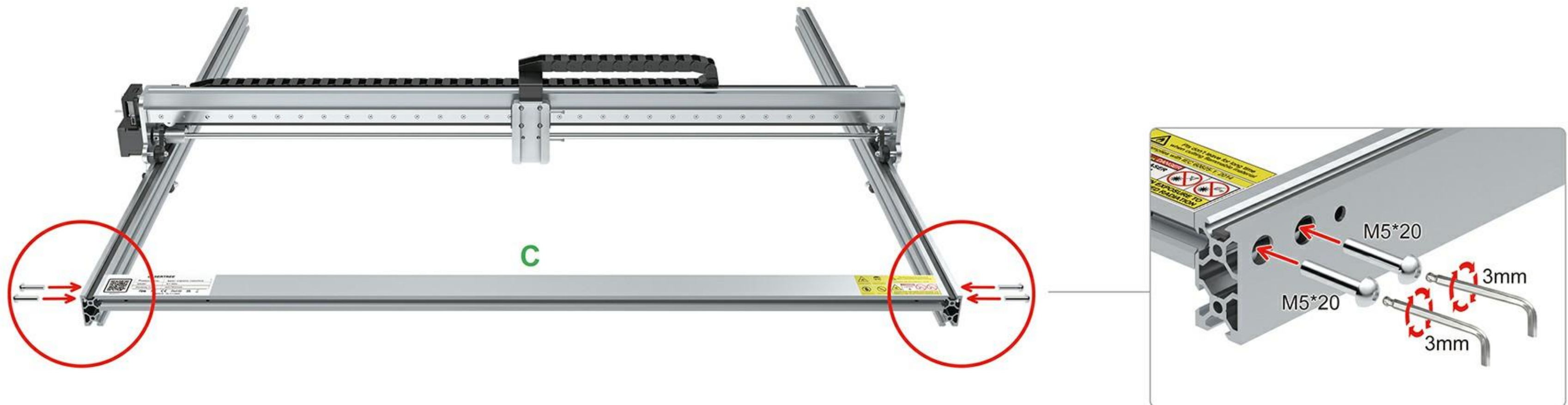
Please note: When flipping the X-axis to install the Y-axis, the holes in Y-axis should be downwards.



### 3/7 Assembly of front frame



Step 1: Use M5\*20 round screw to fix the front frame.



# LASERTREE K1 MAX

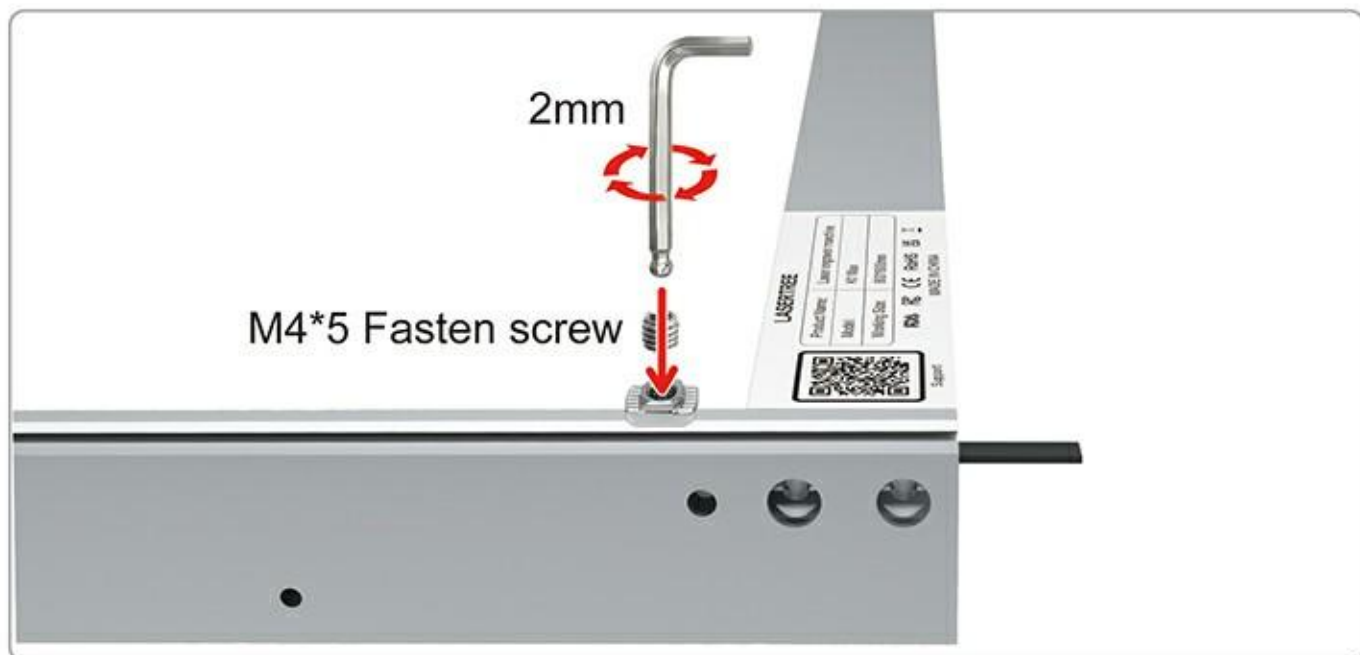
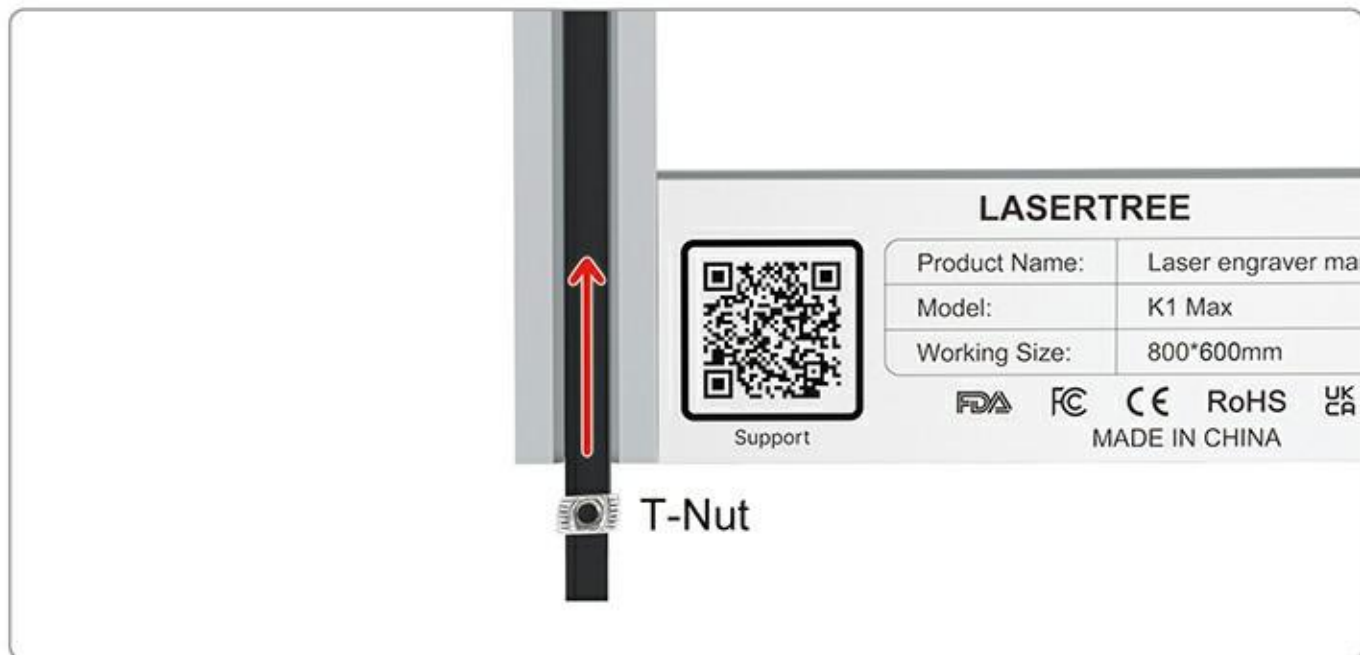


T-Nut x2



M4\*5 Fasten Screw x2

Step 2: To adjust the belt, push the T-nut into the Y-axis front frame groove and secure the timing belt with the M4\*5 fasten screw. (Same operation for left and right sides)



Main Control Box x1

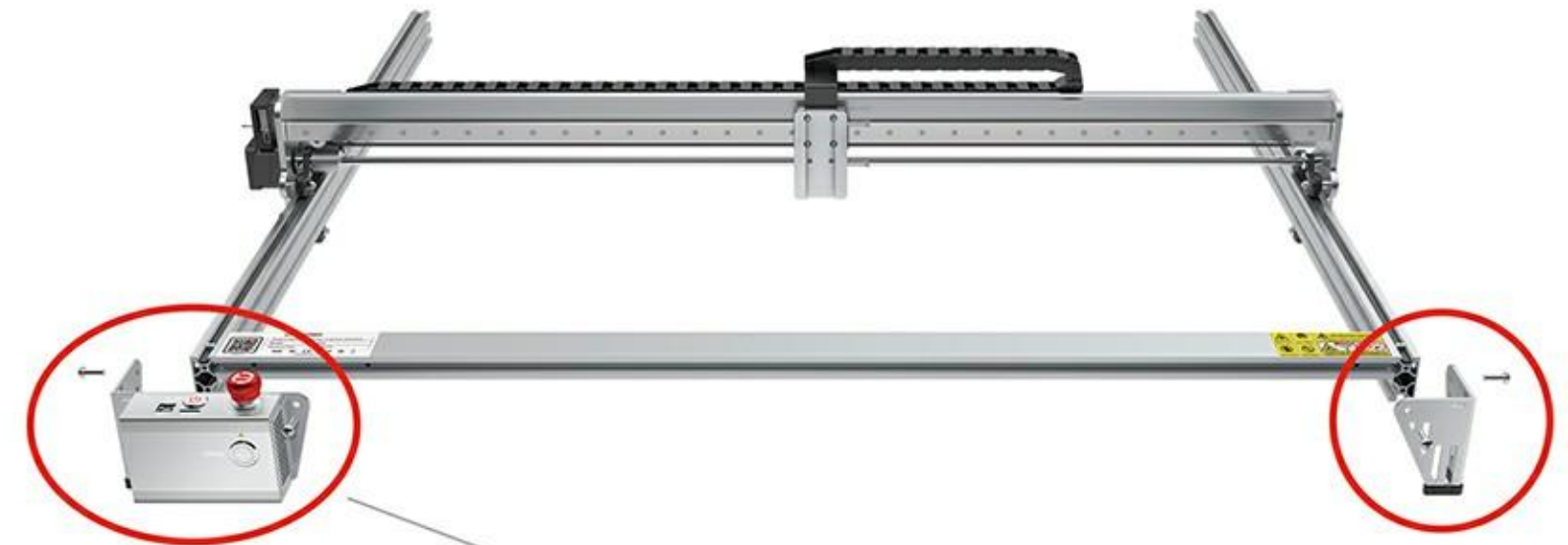


Support Feet x1



M5\*20 Round Screw x4

Step 3: Use M5\*20 round screw to install the support corners on both sides of the front frame.



## 4/7 Assembly of rear frame

D

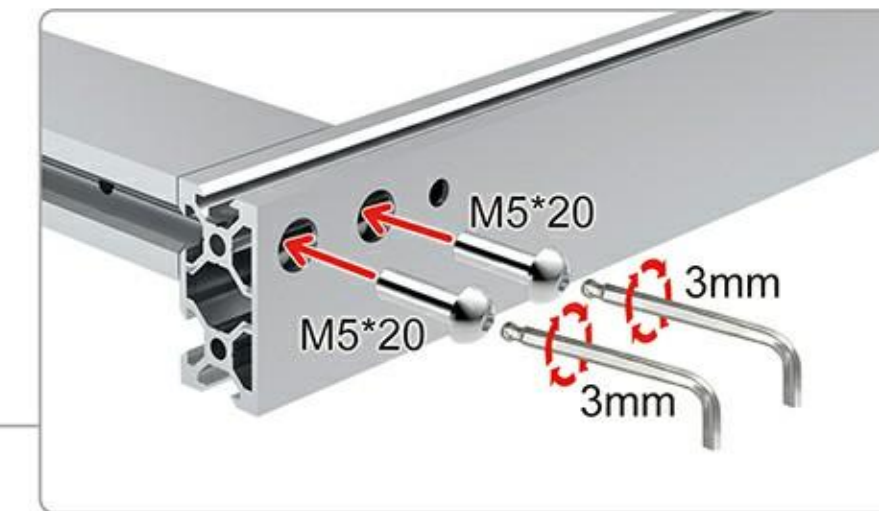
LASERTREE K1 MAX



Rear Frame x1

M5\*20 Round Screw x4

Step 1: Use M5\*20 round screw to fix the rear frame.



Step 2: Push the X-axis towards the front beam for a snug fit.



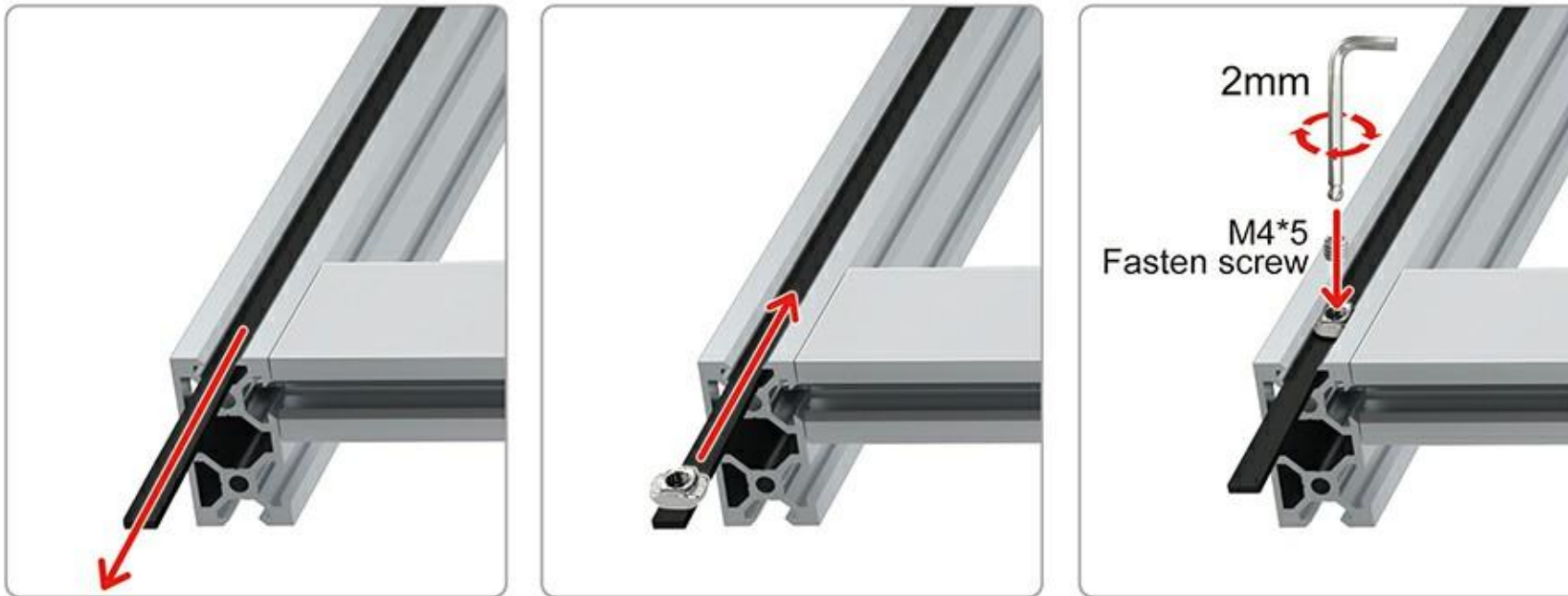


T-Nut x2



M4\*5 Fasten Screw x2

Step 3: Adjust the belt, then push the T-nut into the Y-axis groove and secure the timing belt with the M4\*5 fasten screw.

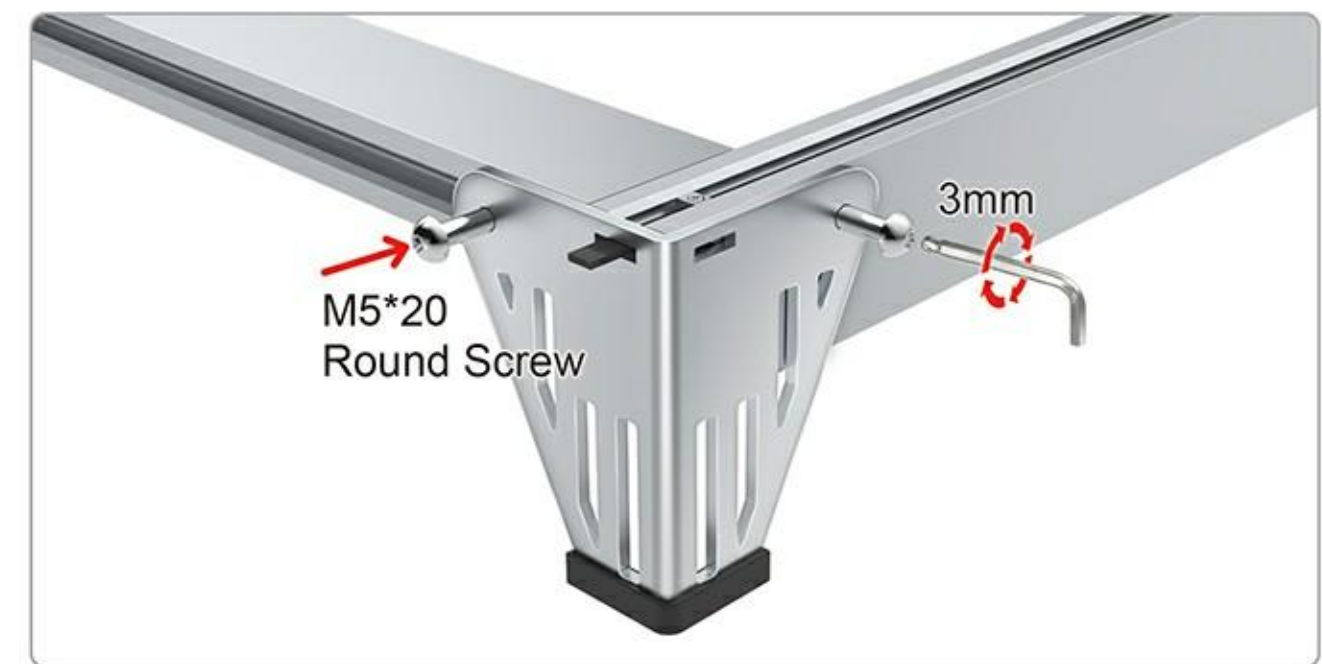


Support Feet x2



M5\*20 Round Screw x4

Step 4: Use M5\*20 round screw to install the support corners on both sides of the rear frame.



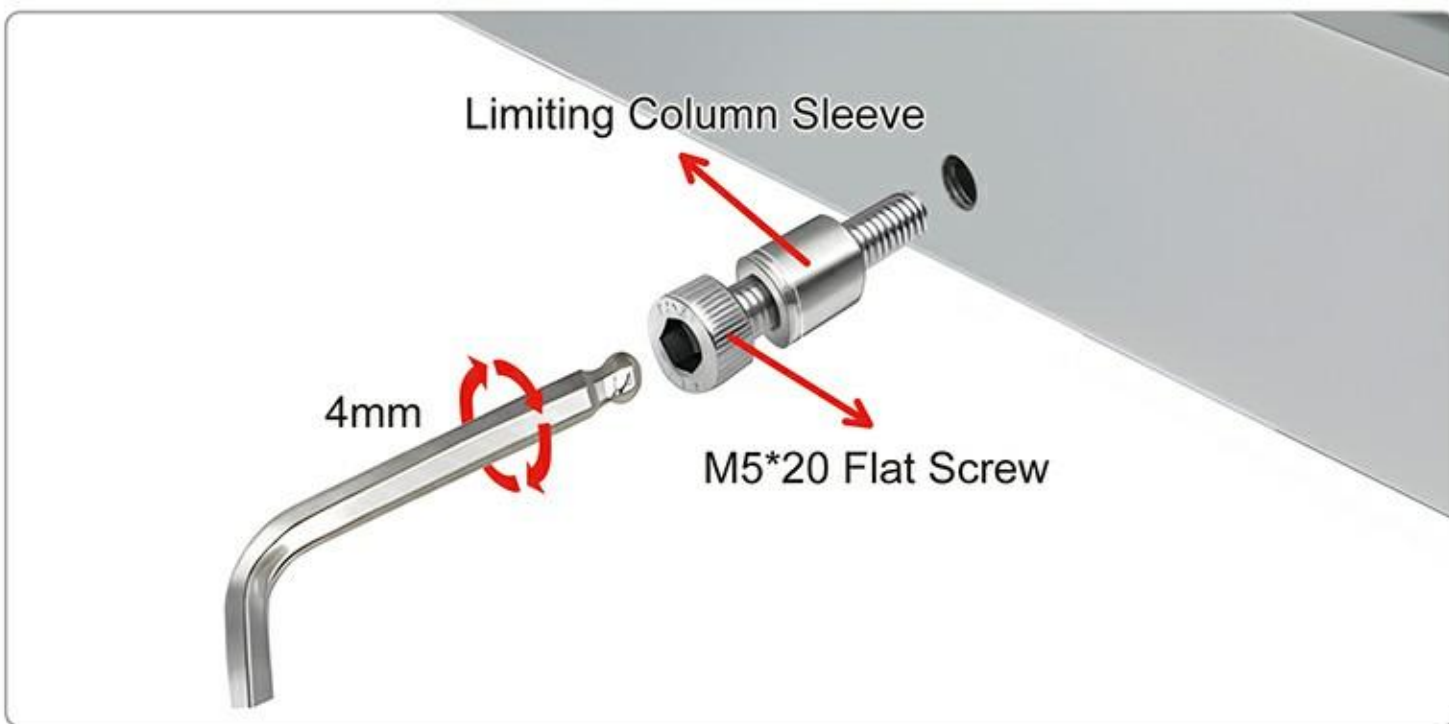
### 5/7 Assembly of limiting column



M5\*20 Flat Screw x1



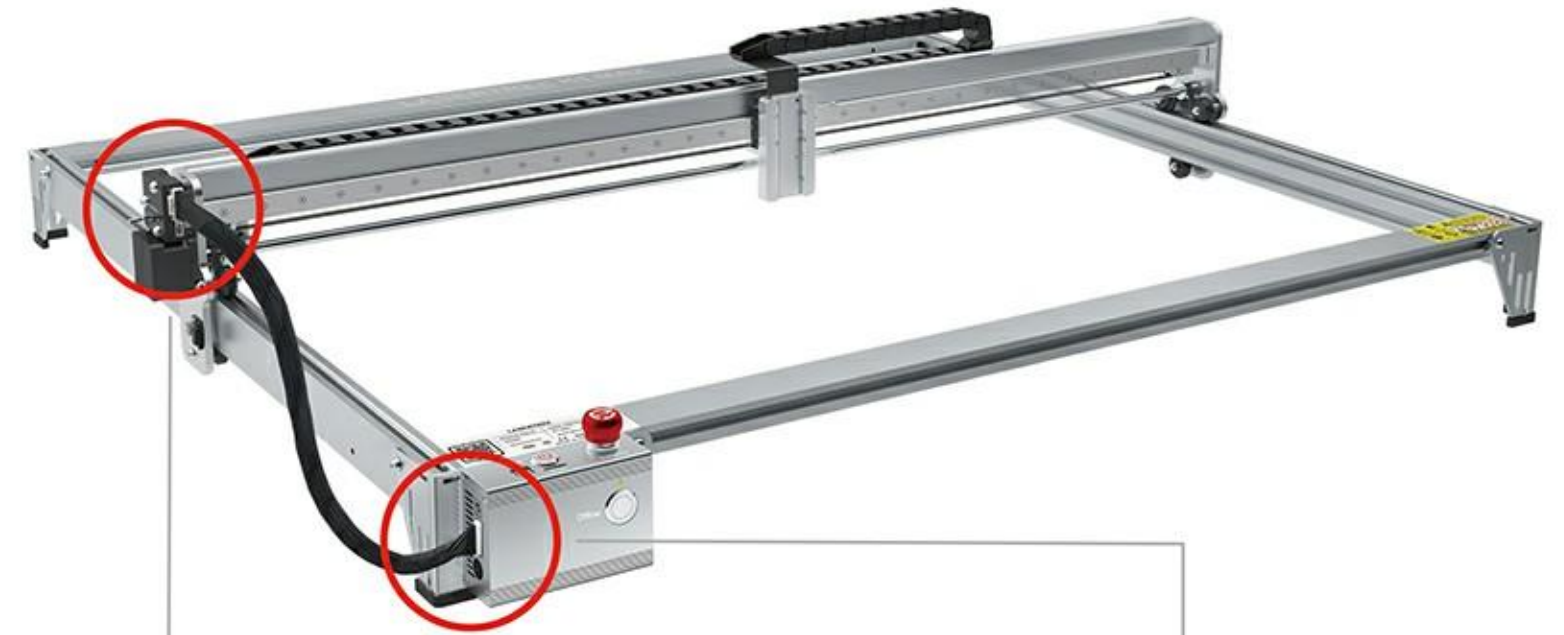
Limiting Column Sleeve x1



### 6/7 Assembly of main cable



Main Cable x1



Distribution box and motor connection.

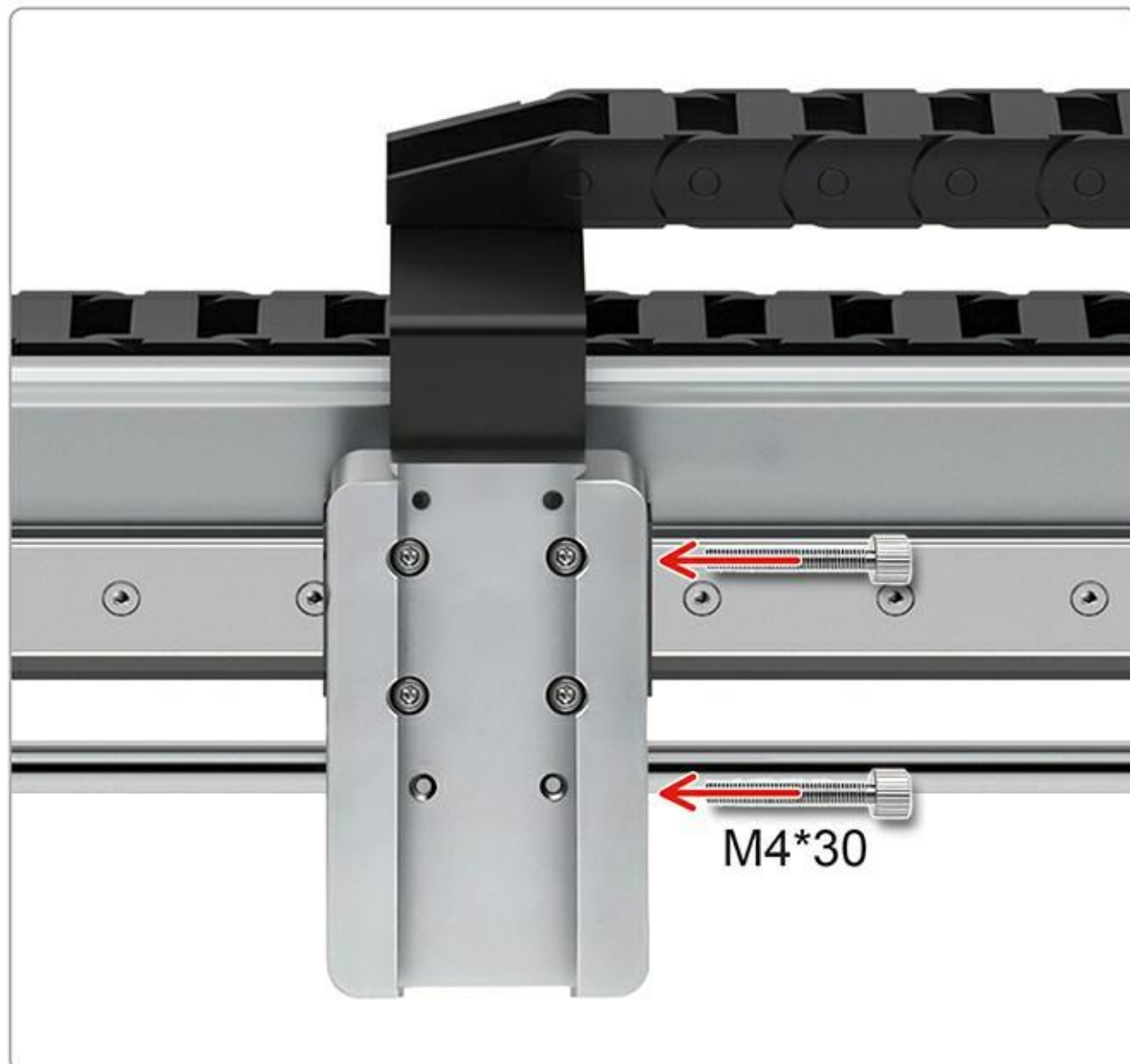


Mainboard control box connection.

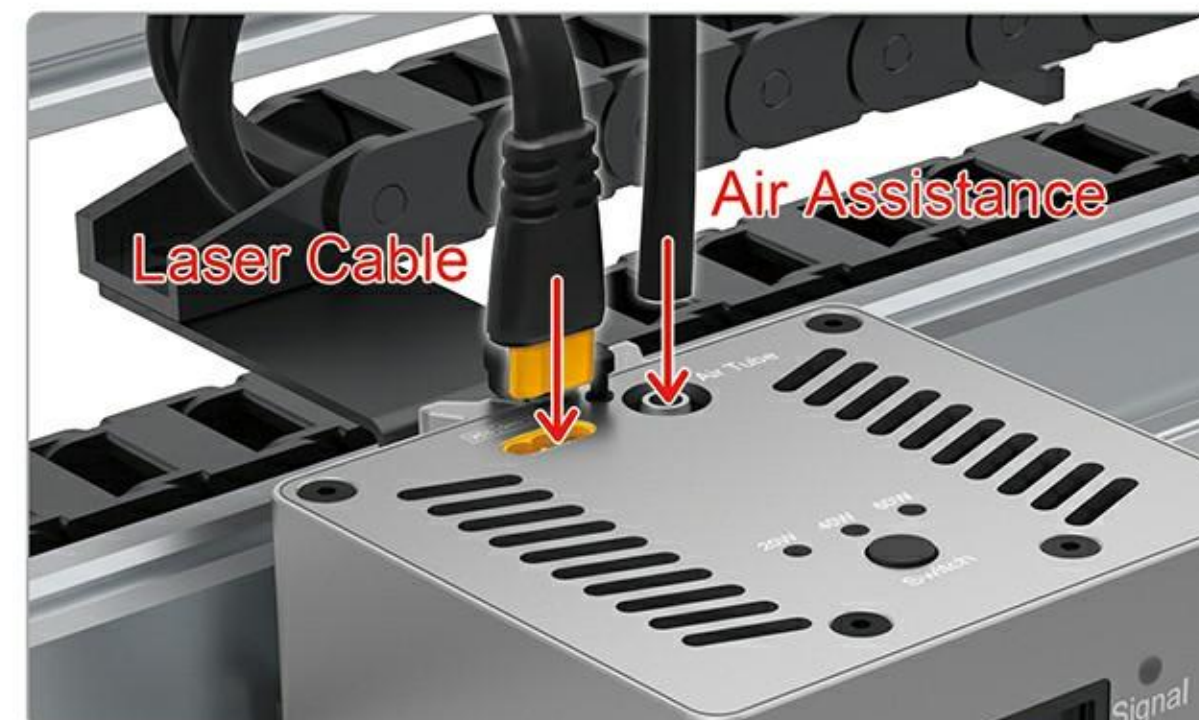
## 7/7 Assembly of laser module



Step 1: Attach the M4\*30 adjusting screw into the first and third holes of the X-axis dovetail backplate.



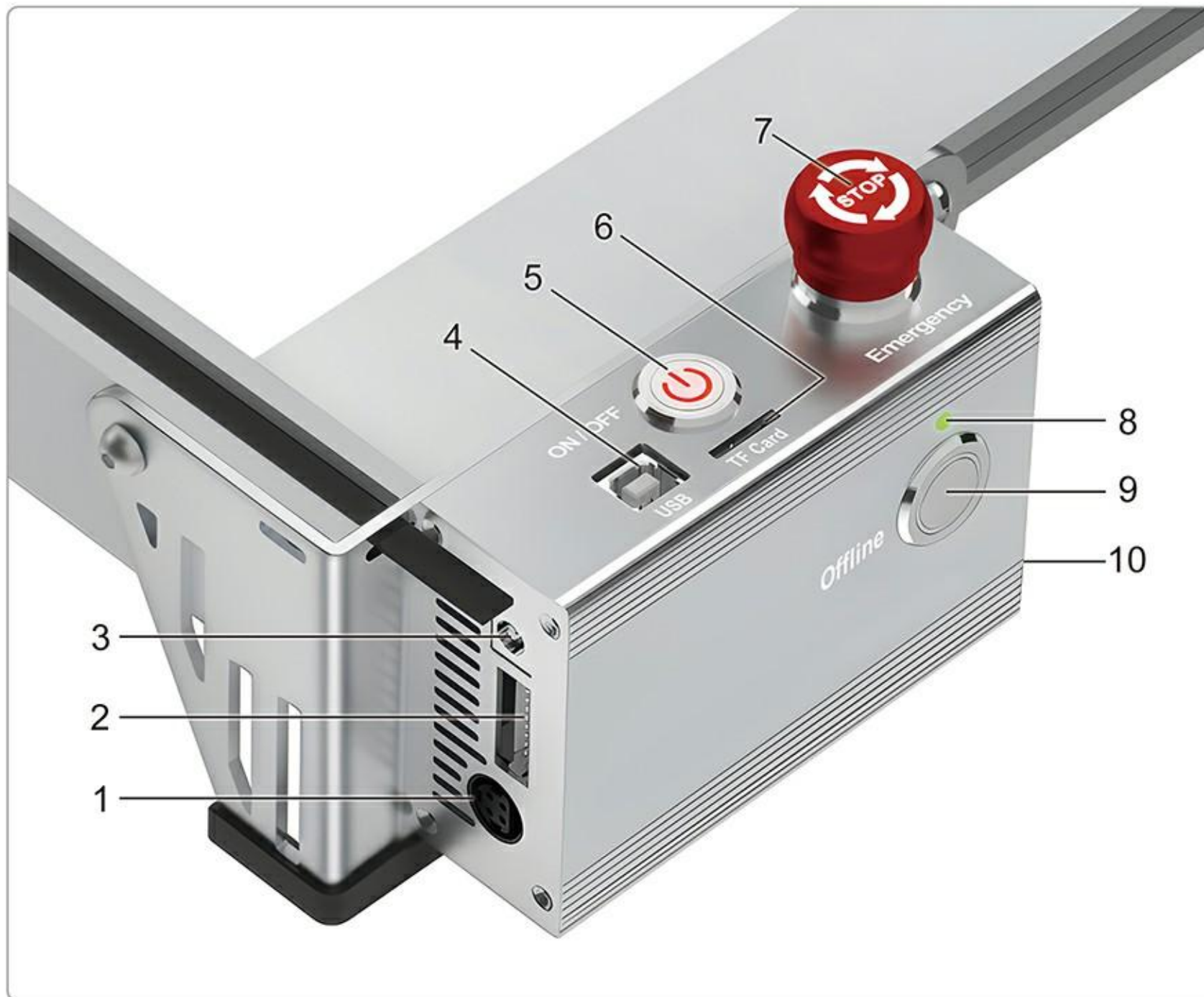
Step 2: Assemble the laser module and connect the inputs and air assist to the laser module.



Laser module connection.

## 6. INTERFACE DESCRIPTION

### 6.1 Main Control Box Interface Description



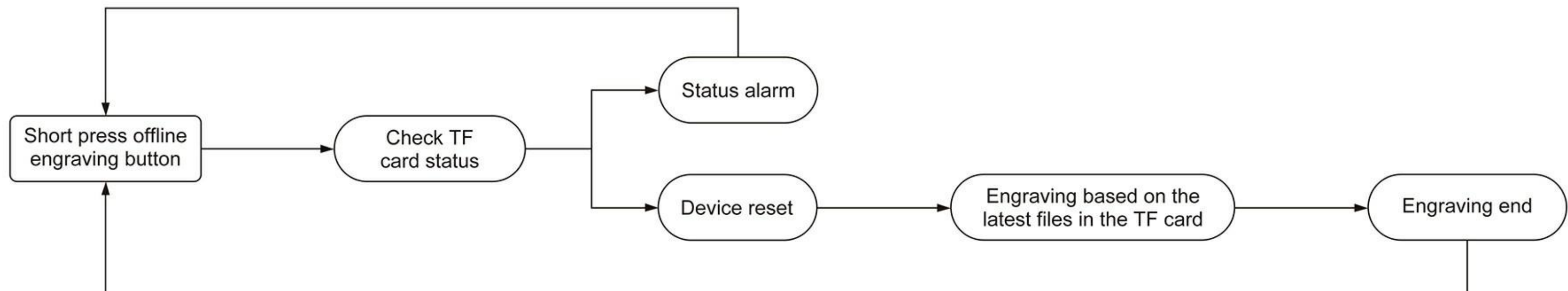
1. Power input: aviation 4P plug, voltage DC 24V, current 10A.
2. Device main cable interface: PHB2.0-2\*10PIN buckle terminal, connected to the distribution box.
3. Air assistance output: DC5.5\*2.1mm socket, output DC 24V.
4. USB-PC interface: port type USB-B, Connect with PC and burn program.
5. Power switch: self-locking switch, controls the current on and off of the whole machine, with red indicator light.
6. TF card slot: stores offline engraving files. The recommended TFcard type is Class 10, 4~16G, Fat32 format. The supported offline engraving file format is .nc .gc.
7. Emergency stop switch: stops the device action and PWM signal output and disconnects the device from the PC.

8. Status Indicator

Indicator	Description
Red always on	No TF card is inserted and the PC is not connected to the engraving machine.
Red flashing	No TF card inserted.
Green always on	No TF card is inserted and the PC is connected to the engraving machine.
	The TF card inserted with .gc .nc file. The PC is connected or not connected to the engraving machine.
	The TF card inserted without .gc .nc file. The PC is connected to the engraving machine.
Yellow always on	TF card inserted without .gc .nc file. The PC is not connected to the engraving machine.
Yellow stays on for 2s	TF card without .gc .nc file.
Blue always on	Engraving machine at work

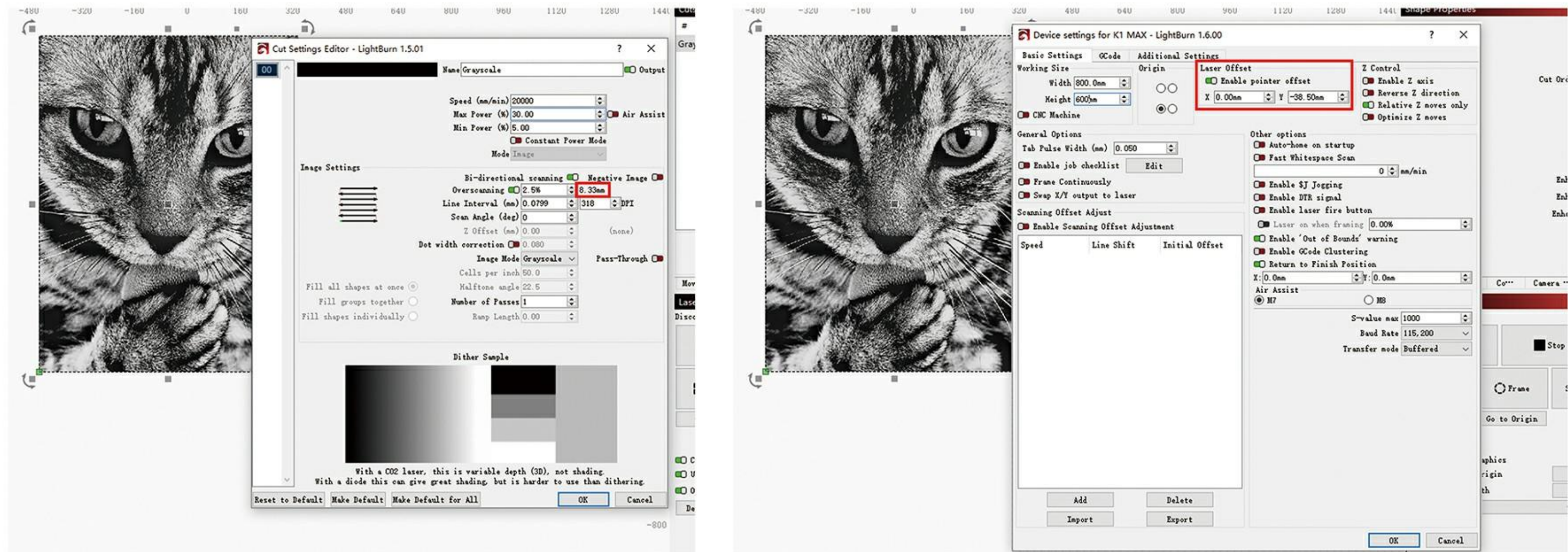
Note: After successfully connecting to the computer, the connection status (green light is always on) will not change until the hardware is reset or the power is turned on again.

9. Offline engraving button: needs to be used with a memory card.



**Note:**

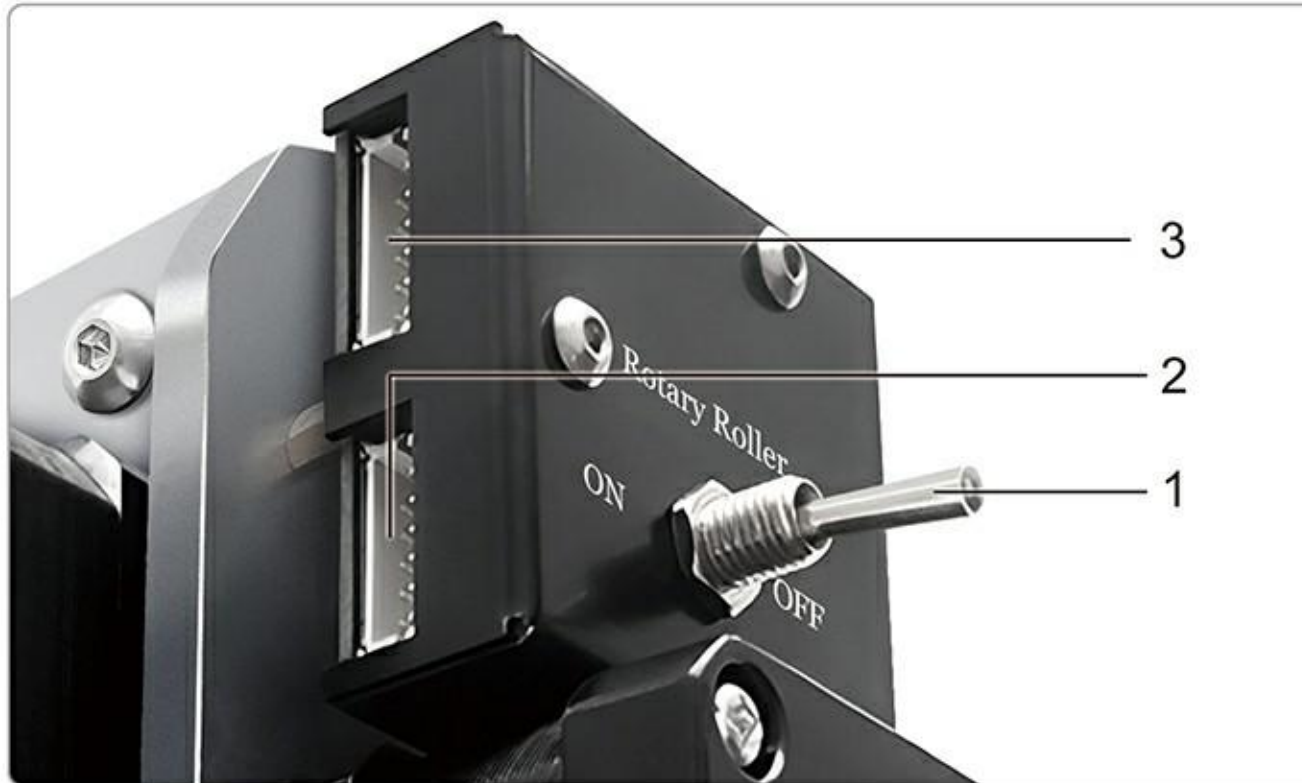
1. If you short press or long press the offline engraving button during engraving, the device will have no action.
2. Since there is overscan in engraving, when exporting the .gc.nc file using engraving software, the X-axis offset should be set according to the overscan offset value. Just set the X-axis offset larger than the overscan offset value.



10. Buzzer: Integrated on the mainboard for status alarm.

Indicator	Description
"di" one sound	Offline engraving completed
"di~" long sound	Device tilt

## 6.2 Distribution Box Port Description



1. Rotary axis switching: Y-axis motor and rotary axis motor control switching.
2. Y-axis motor output and limit signal input.
3. X-axis motor output and limit signal input.
4. Laser module output interface: MR30 port (DC 24V, GND, PWM)
5. Device main cable interface: Connect to the main control box.
6. Rotary axis output: PH2.0-4PIN terminal, connected to the rotary table motor.

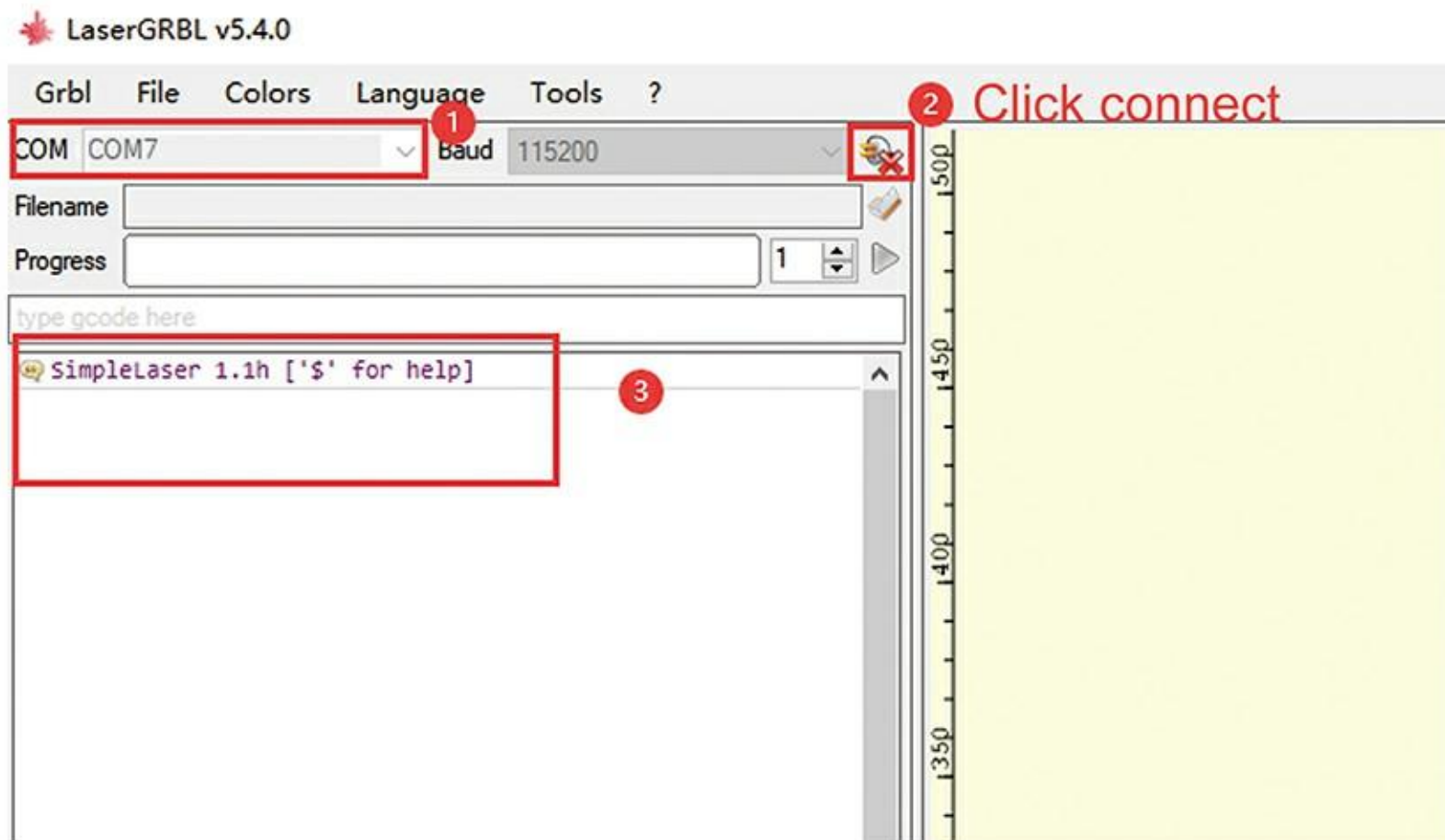
## 7. SOFTWARE CONNECTION GUIDE

The K1 MAX supports LaserGRBL and LightBurn engraving software.

### 7.1 LaserGRBL

LaserGRBL download address: <https://lasergrbl.com/download/>  
(You can refer to the usage in the [https://lasergrbl.com/.](https://lasergrbl.com/))

- 1) Connect one end of the USB data cable to the engraving machine and the other end to the USB port of the computer with LaserGRBL software installed.
- 2) Connect the power port of the engraving machine through the DC24V adapter and turn on the power switch.
- 3) Open the LaserGRBL software on the computer, select the correct COM port and click connect. If the status bar displays "SimpleLaser 1.1h", the connection is successful.



## 7.2 LightBurn

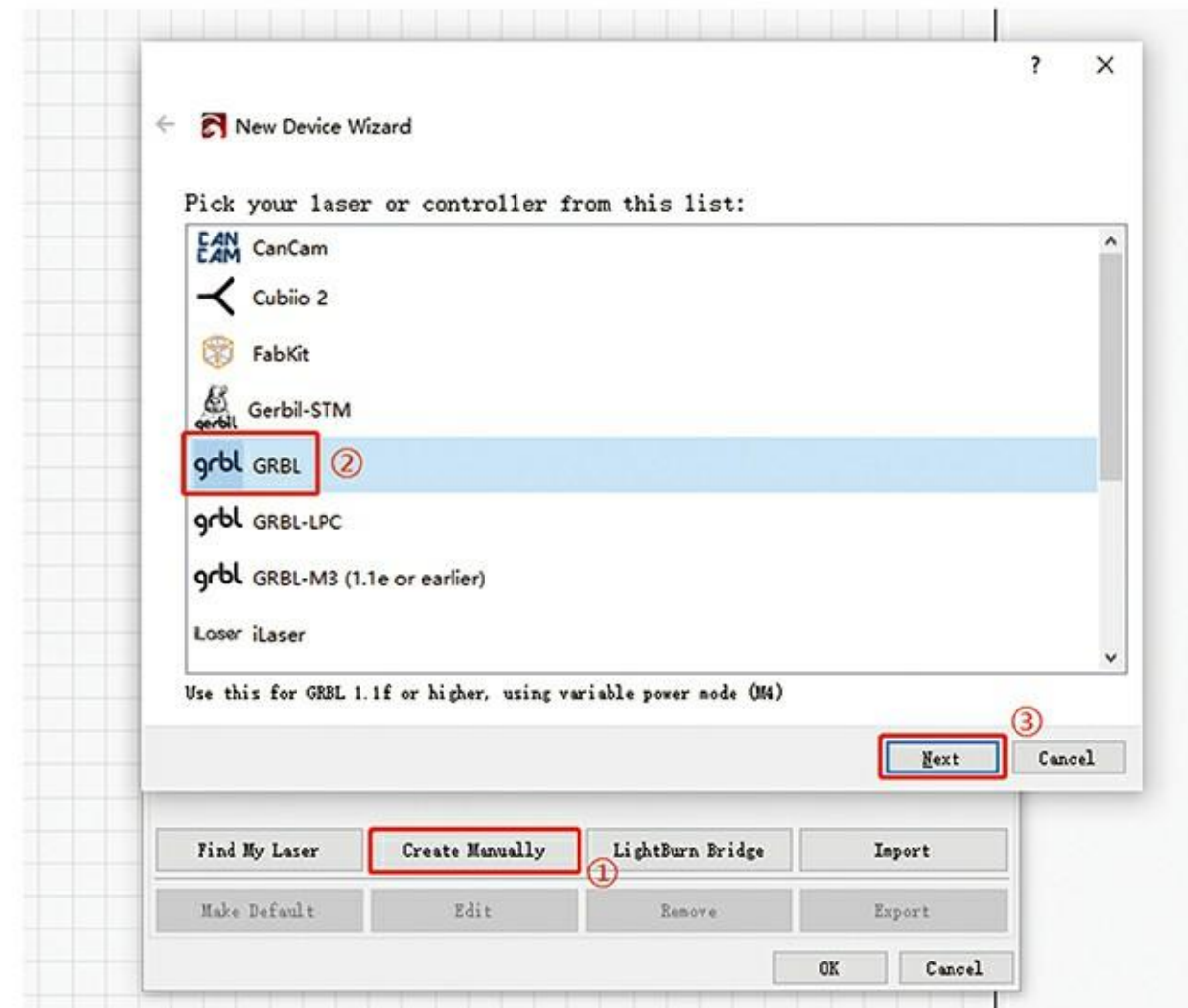
LightBurn download address: <https://lightburnsoftware.com/pages/download-trial>

(Please be aware that you will need to buy lightBurn yourself as it is not available for free. You can refer to the usage in the <https://lightburnsoftware.com/>.)

- 1) Connect one end of the USB data cable to the engraving machine and the other end to the USB port of the computer with LightBurn software installed.
- 2) Connect the power port of the engraving machine through the DC24V adapter and turn on the power switch.
- 3) Open the LightBurn software, select "Start Your Free Trial" or "Activate License". (Figure 1)
- 4) Create a new device, select "GRBL". (Figure 2)



(Figure 1)



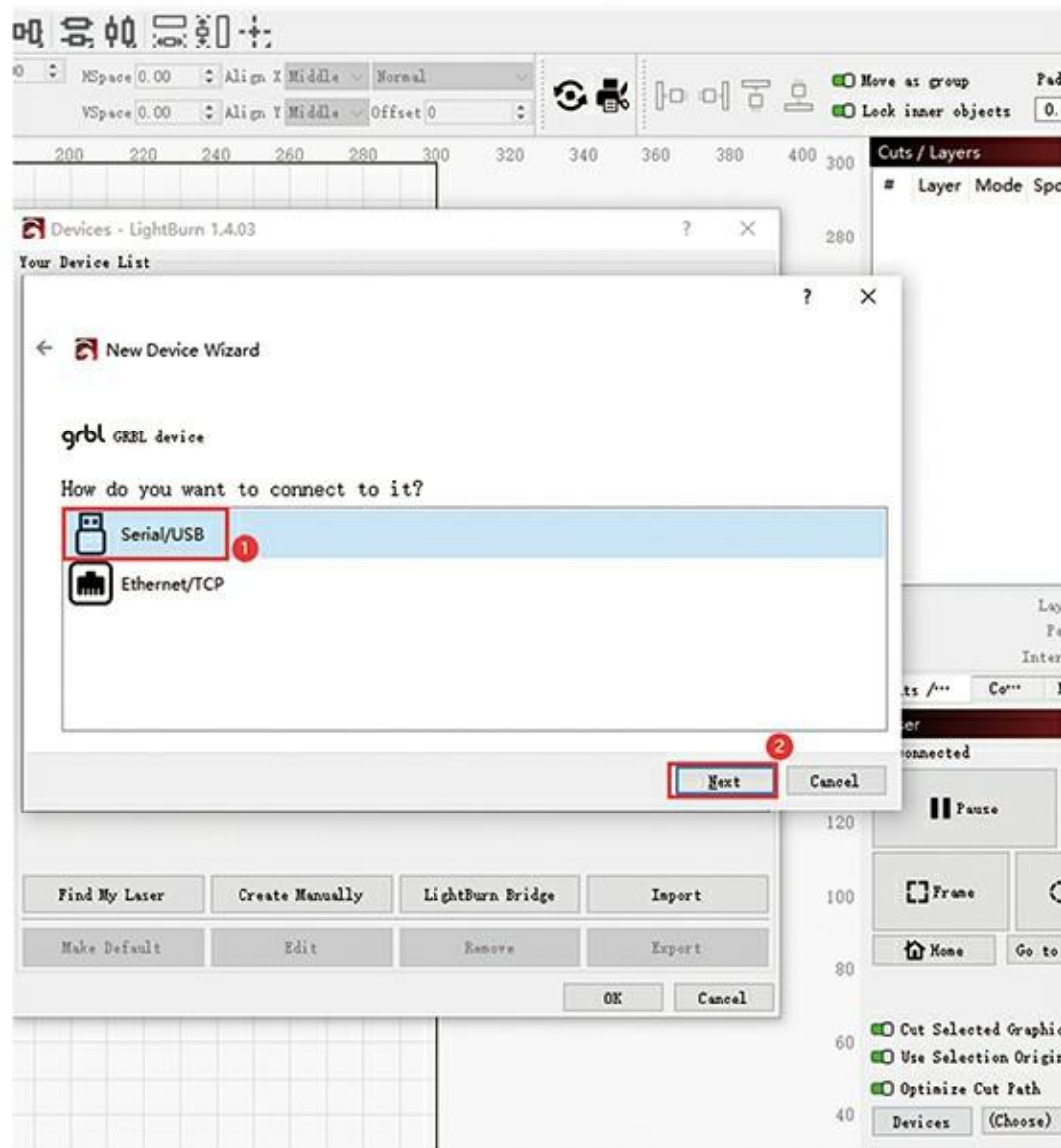
(Figure 2)

5) Select USB connection. (Figure 3)

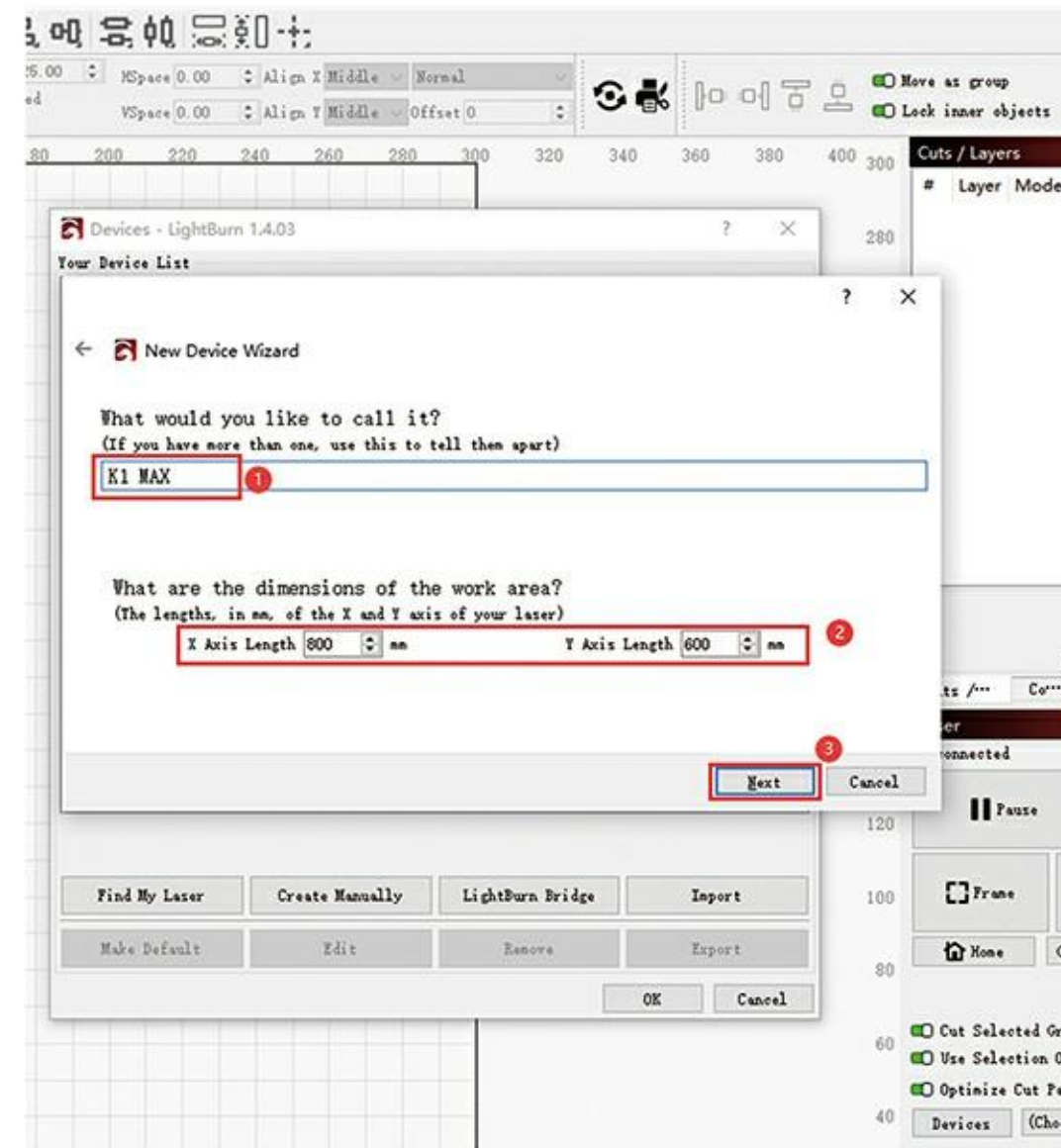
6) Set the engraving size to 800\*600mm and modify the device name "K1 MAX". (Figure 4)

7) Set the origin position of the machine and turn off automatic reset on power-on. (Figure 5)

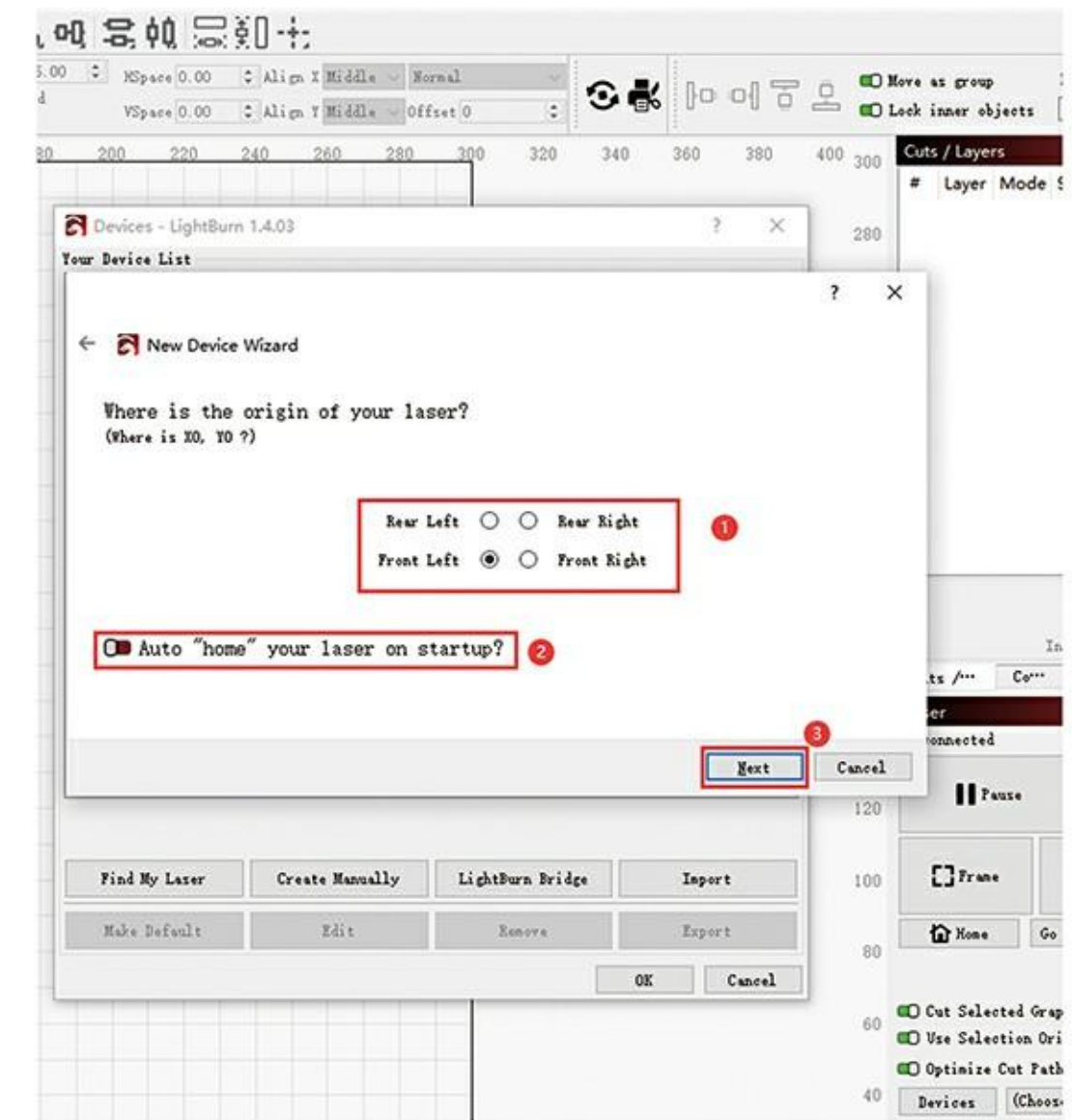
(If you need to automatically reset every time you turn on the computer, please tick step 2 of the attached diagram.)



(Figure 3)



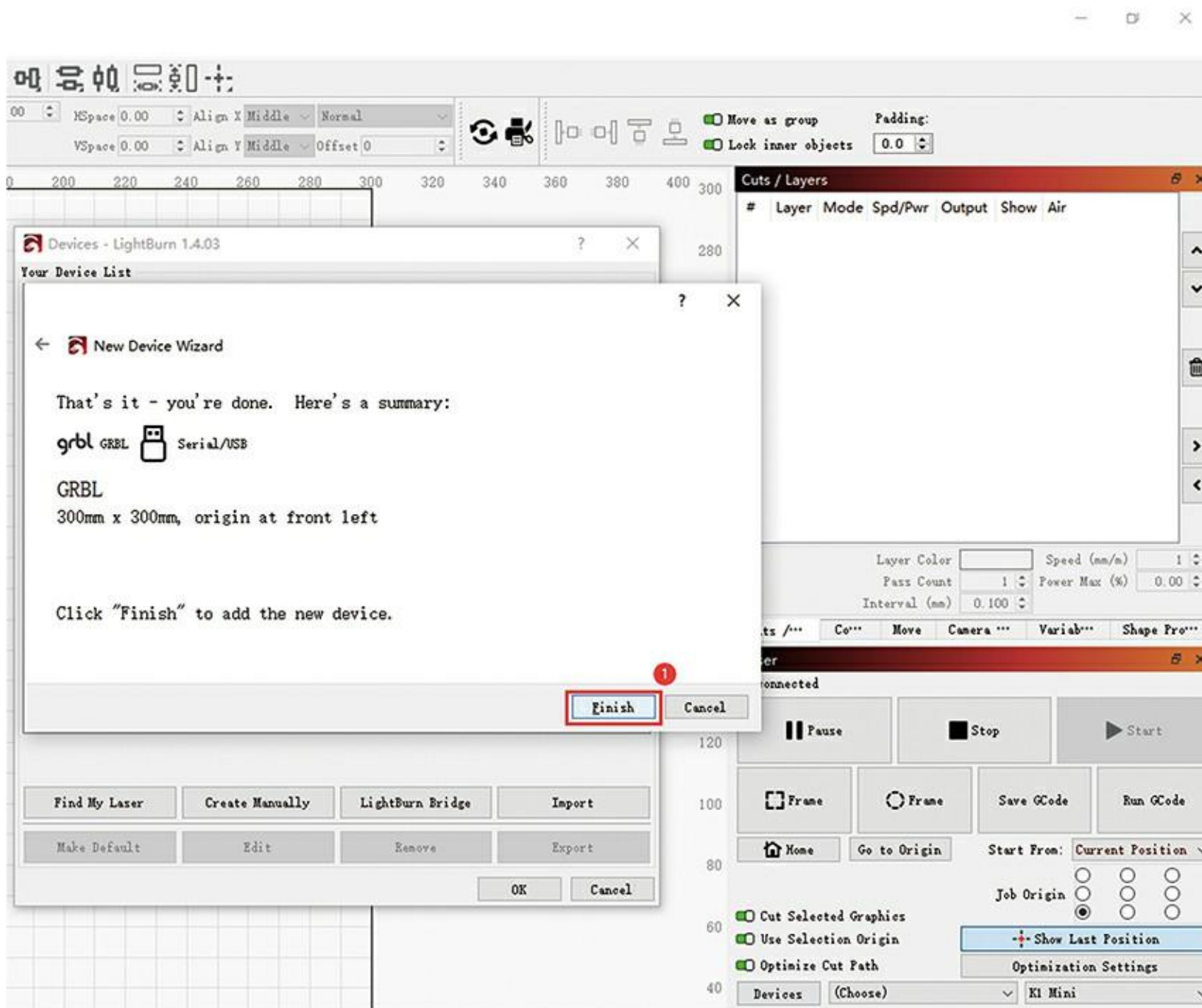
(Figure 4)



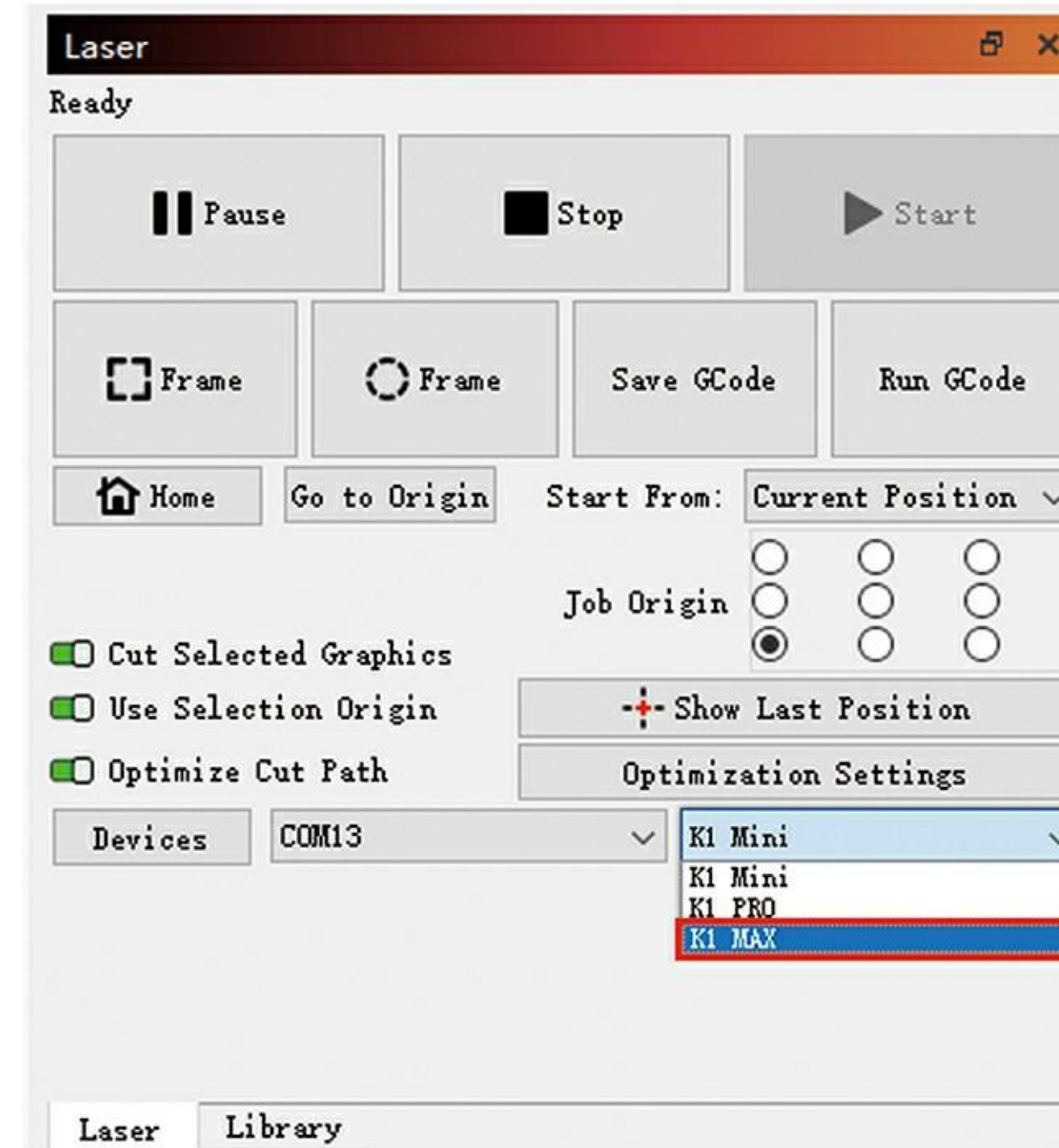
(Figure 5)

8) Complete software setup. (Figure 6)

9) Select the "K1 MAX" device and the correct COM port. When the status bar displays Ready, the device is successfully connected. (Figure 7)



(Figure 6)

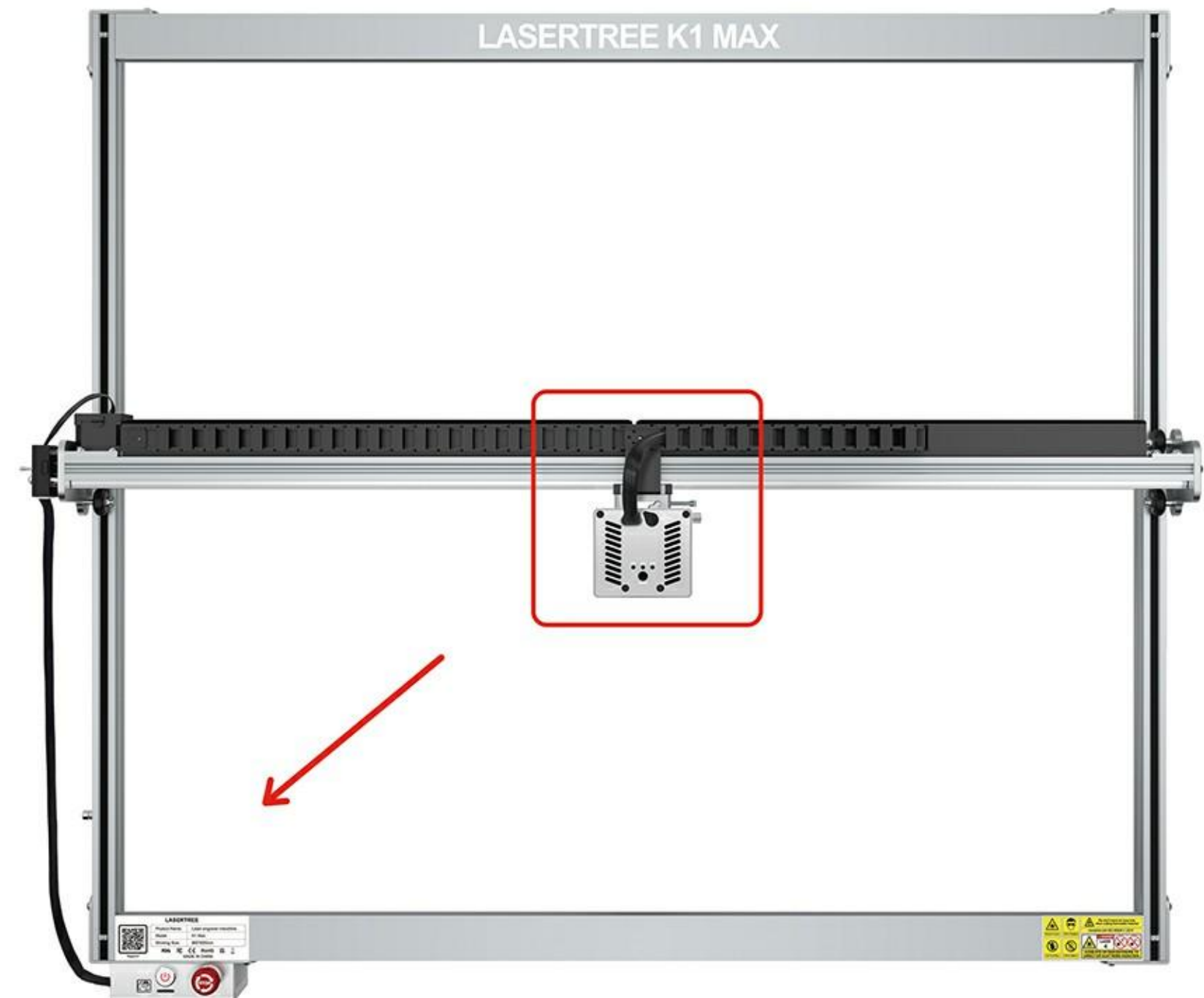
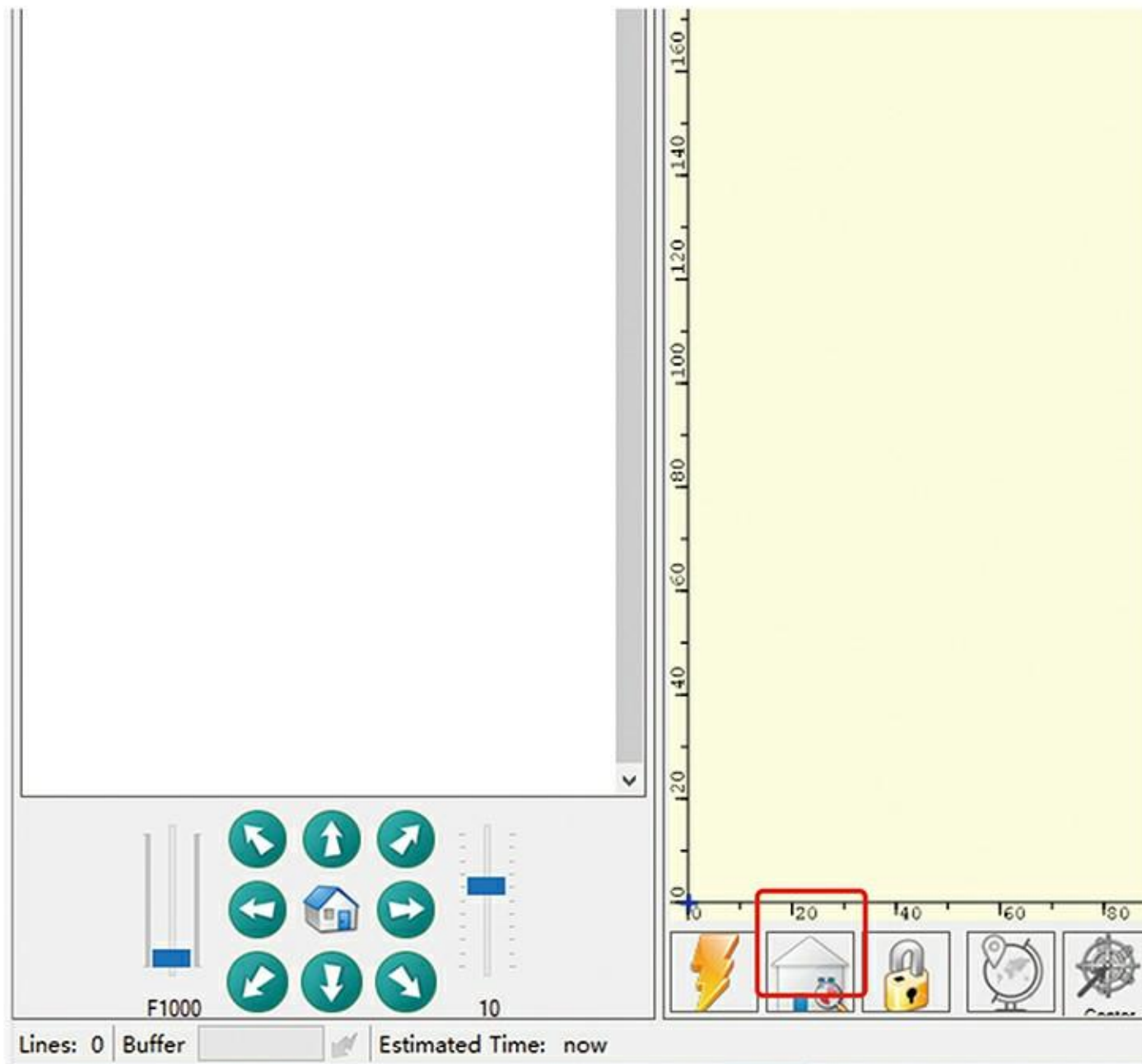


(Figure 7)

## 8. MACHINE TEST GUIDE

### 8.1 LaserGRBL

- 1) Engraving machine reset test: Find the reset button on the default interface of LaserGRBL and click it. Under correct operation, the laser module should be moved to the side of the control box and stopped moving when it hits the limit column.

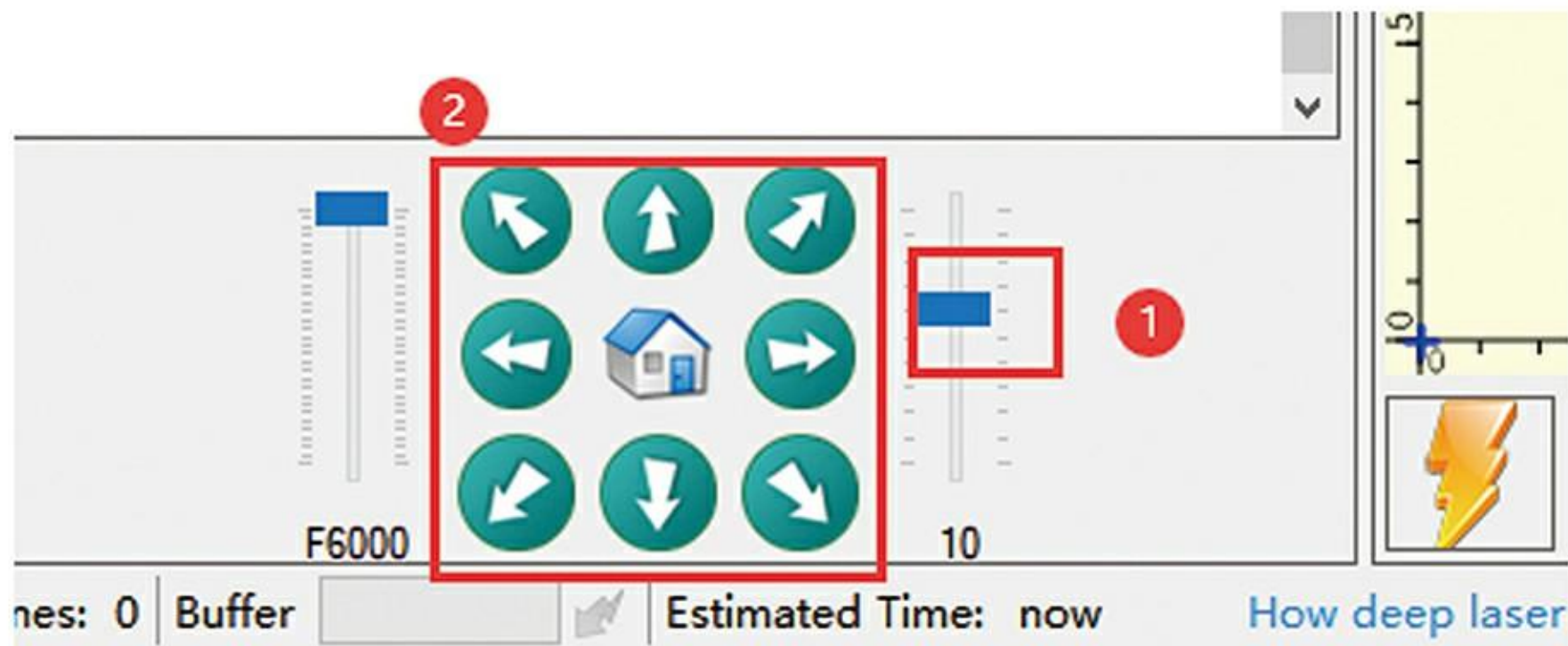


2) Engraving machine movement test:

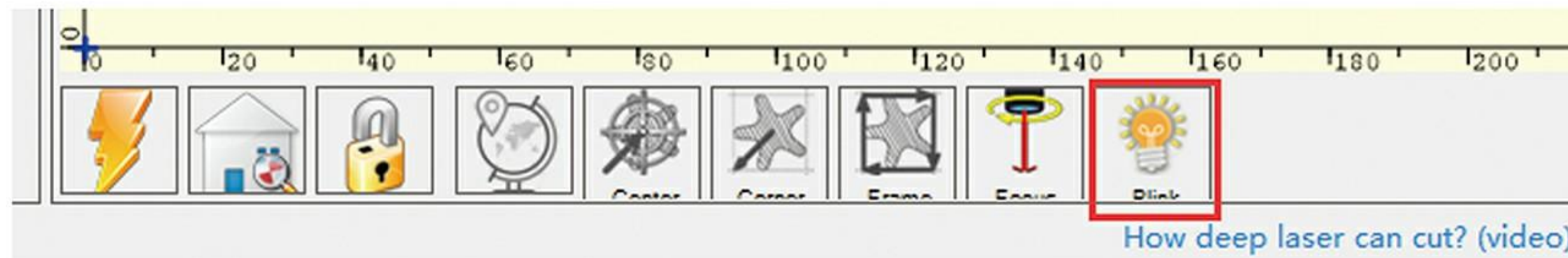
① Find the direction button on the default interface of LaserGRBL and set the moving distance and speed.

(The recommended moving distance is 10mm.)

② Click in any direction. Under correct operation, the laser module should move in the direction shown by the arrow.

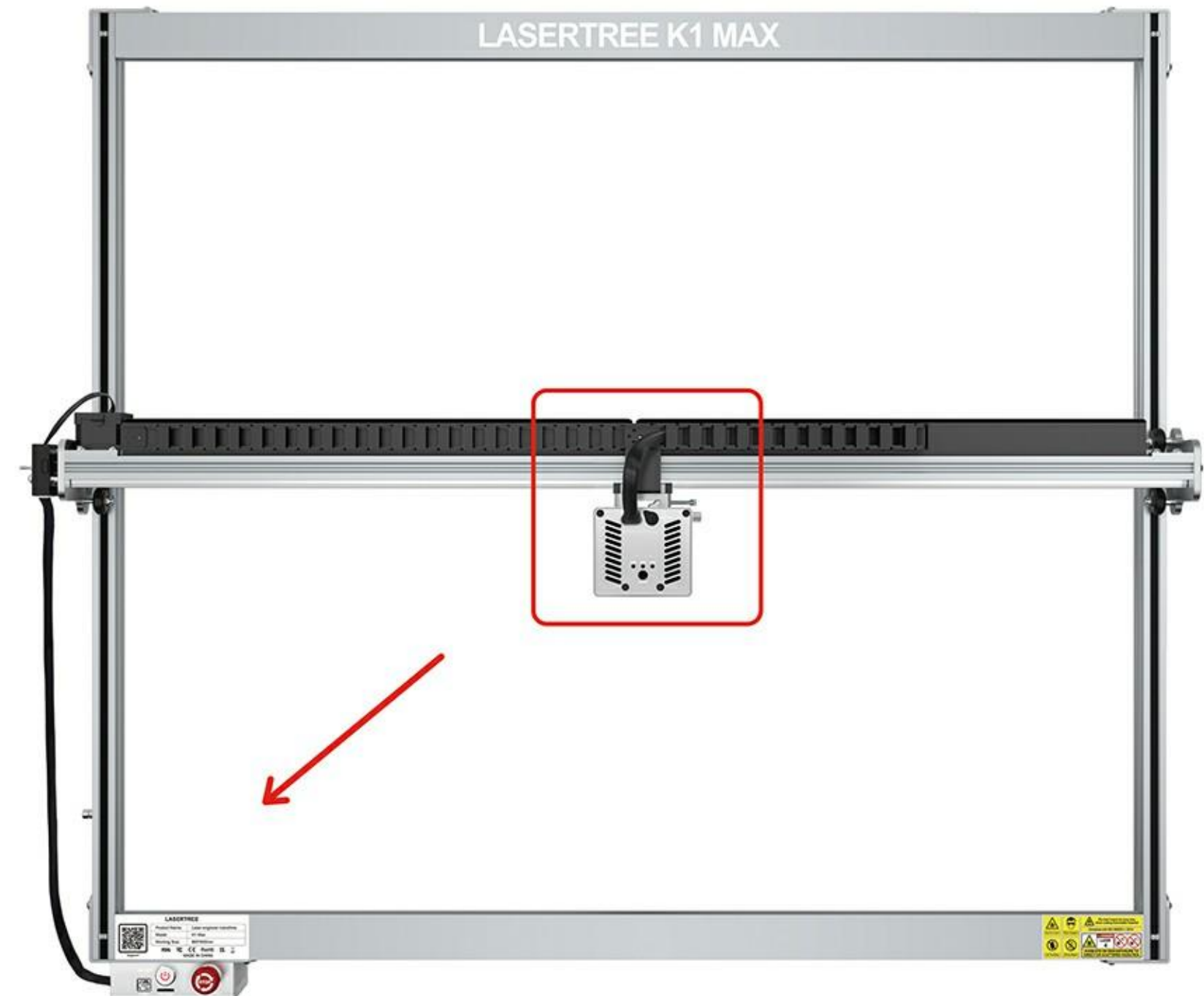
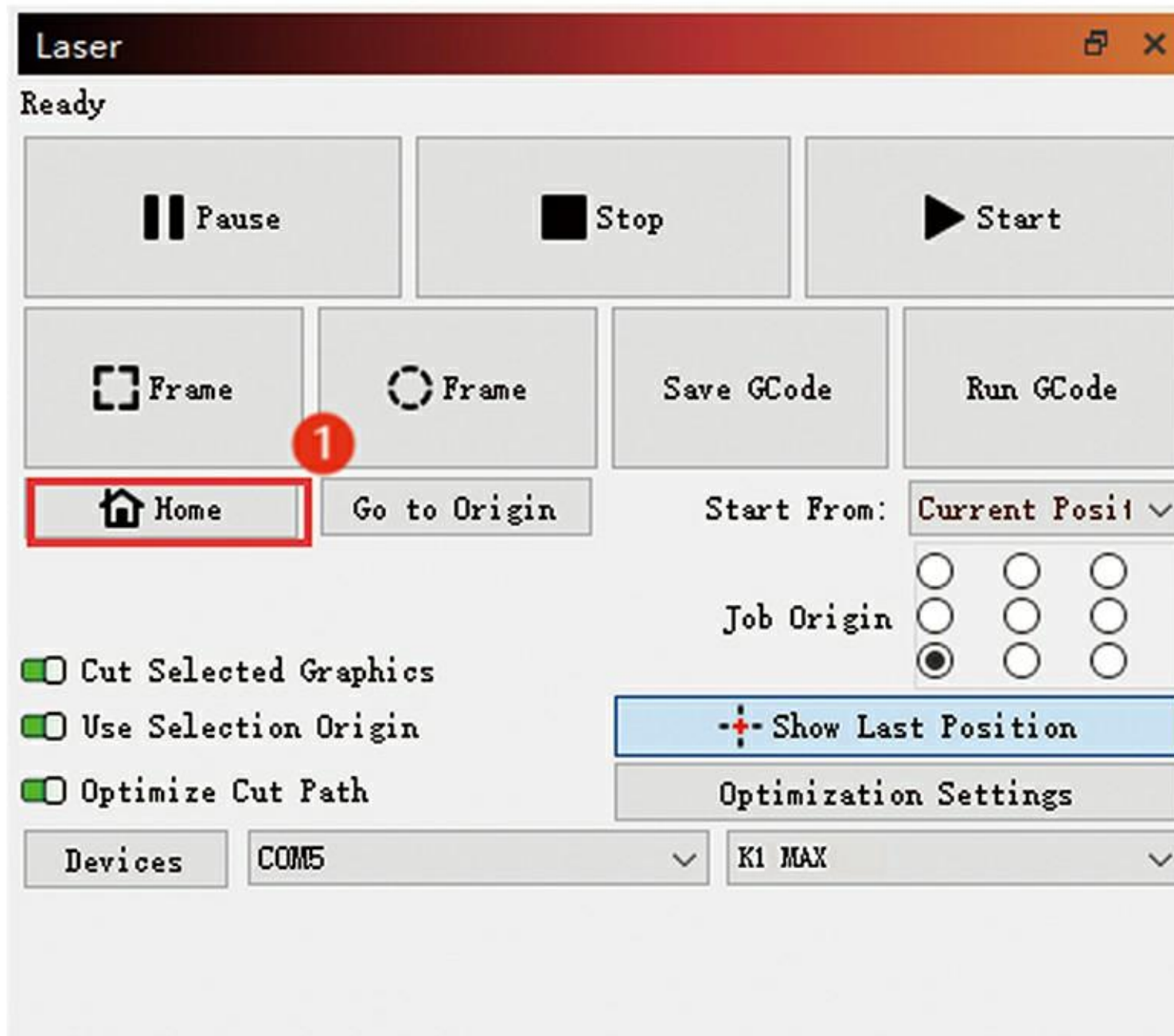


③ Engraving machine laser module light test: Find the light button on the LaserGRBL default interface and press and hold it. Under correct operation, the laser module should emit blue light normally.



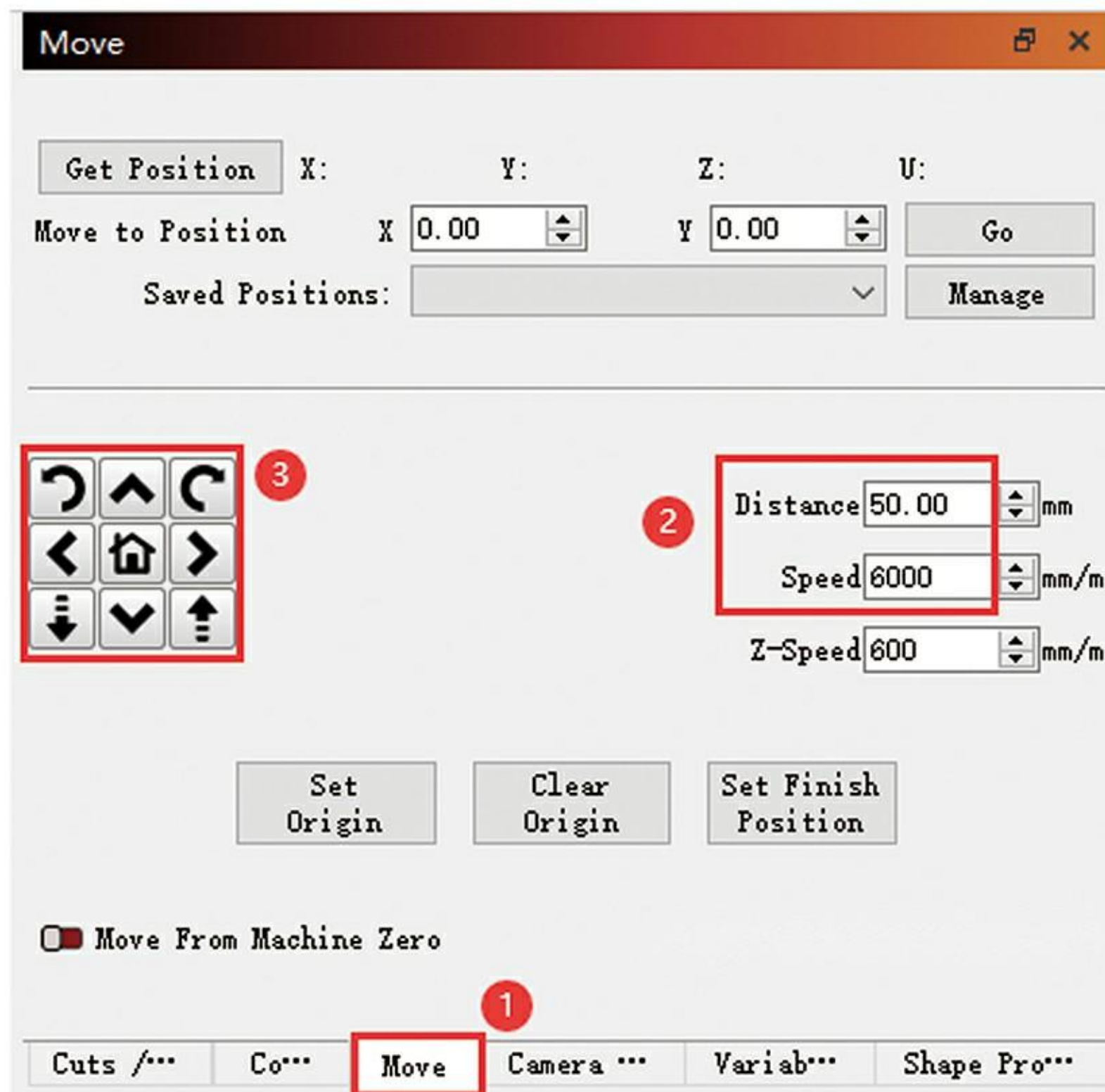
## 8.2 LightBurn

- 1) Engraving machine reset test: Find "Home" in the lower right corner of LightBurn default interface and click on it. Under correct operation, the laser module should be moved to the side of the control box and stopped moving when it hits the limit column.



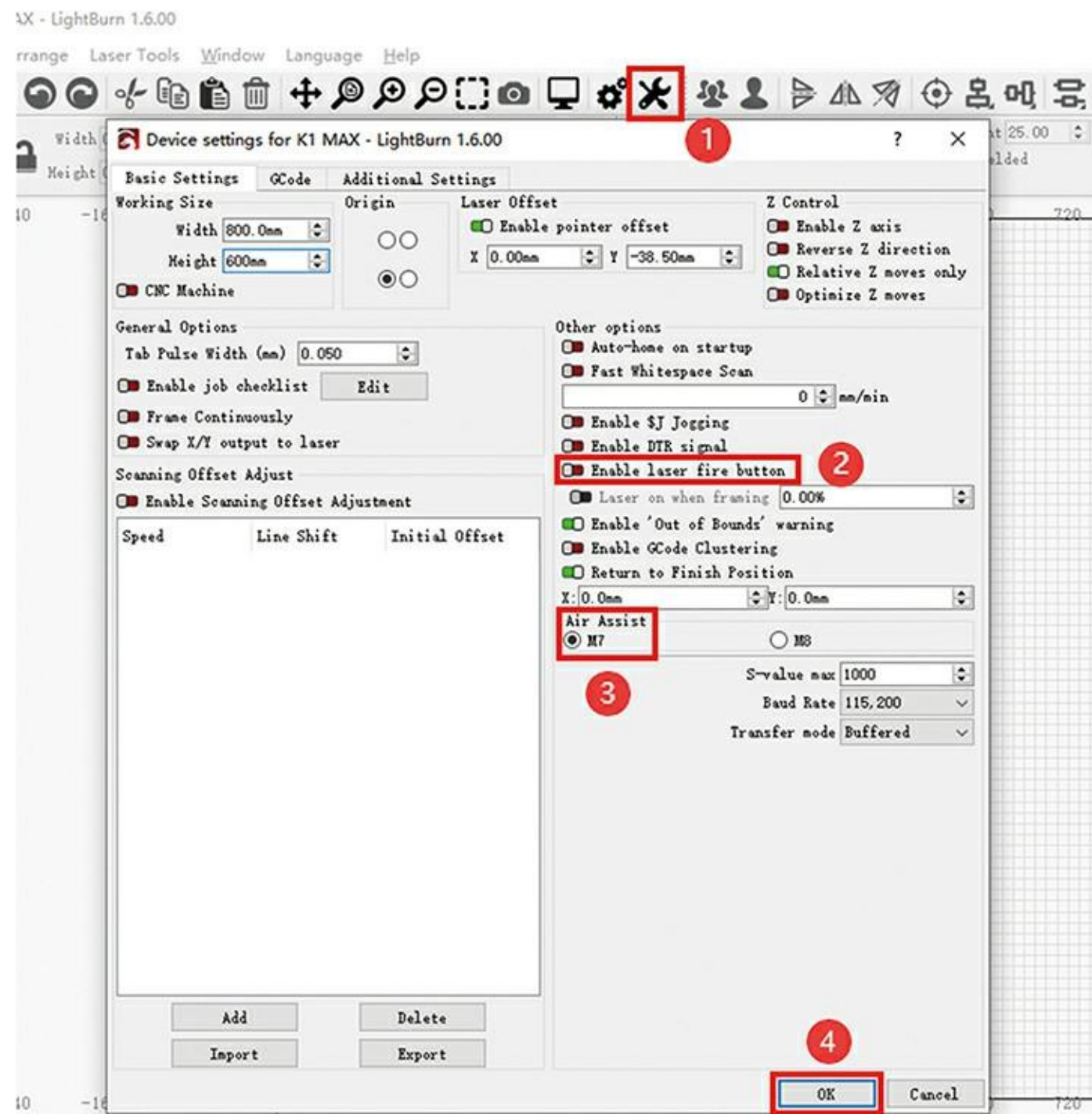
2) Engraving machine movement test:

- ① Find "Move" in the lower right corner of LightBurn default interface and open it.
- ② Set the moving distance and speed. (The recommended moving distance is 50mm.)
- ③ Click in any direction. Under correct operation, the laser module should move in the direction indicated by the arrow.

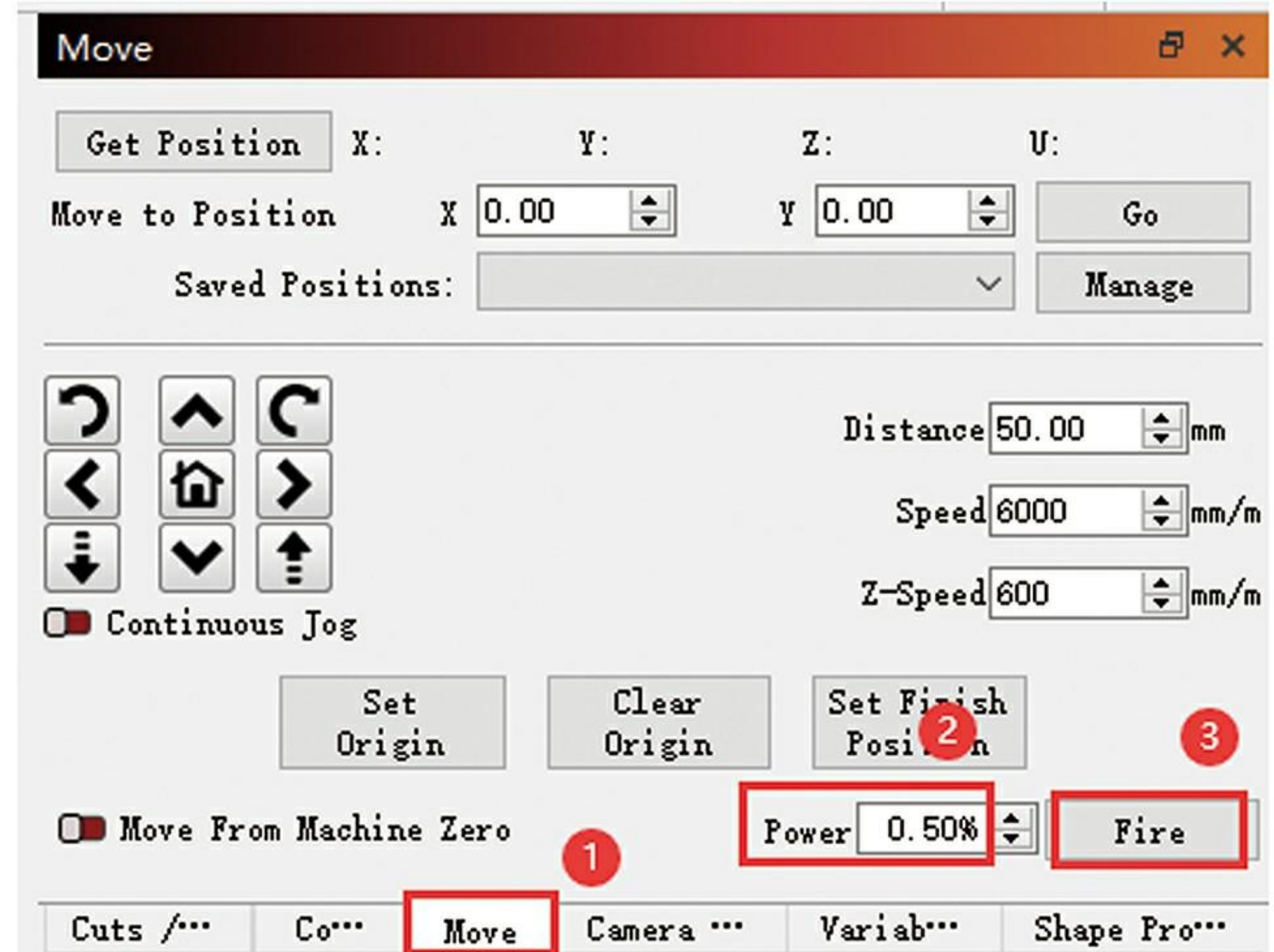


3) Engraving machine laser module light test:

- ① Open the device settings, turn on the laser ignition option and set air assist to M7. (Figure 1)
- ② Find "Move" in the lower right corner of the LightBurn default interface, set the optical power to 0.5% and click "Fire".  
Under correct operation, the laser module should emit blue light. (Figure 2)



(Figure 1)



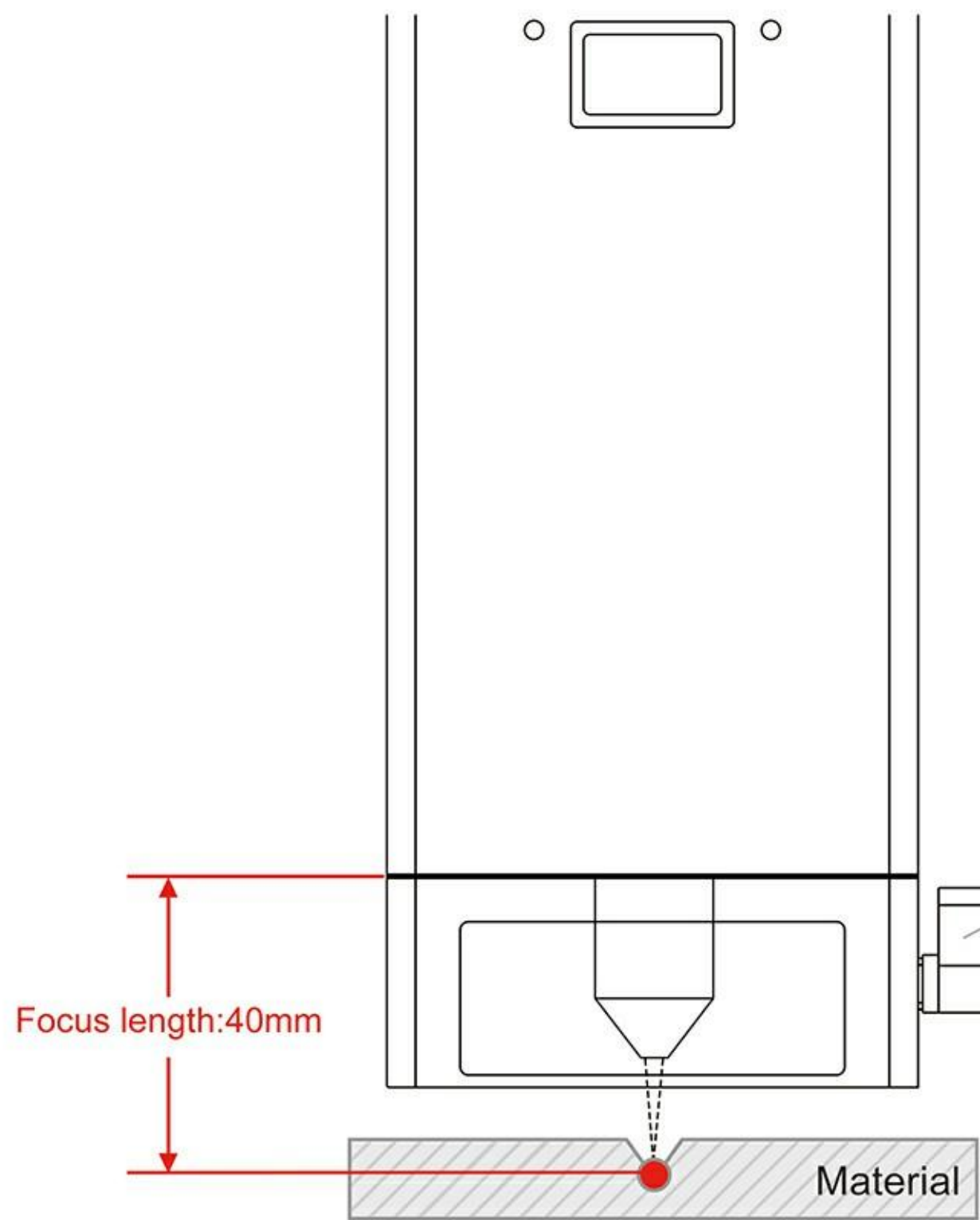
(Figure 2)

## 9. LASER MODULE FOCUS GUIDE

The K1 MAX laser module has a working focal length of 40mm.



When cutting, you only need to make the focus locate a bit lower than the surface of materials.

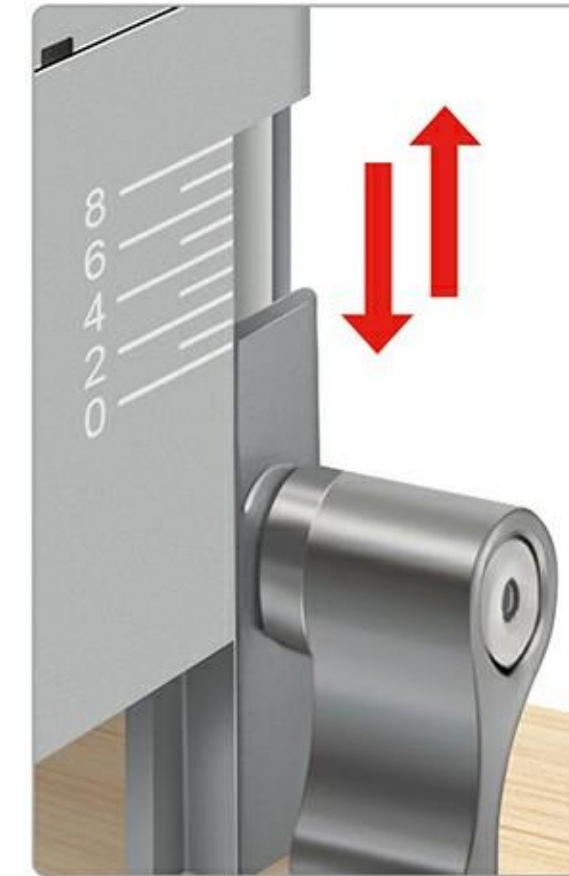
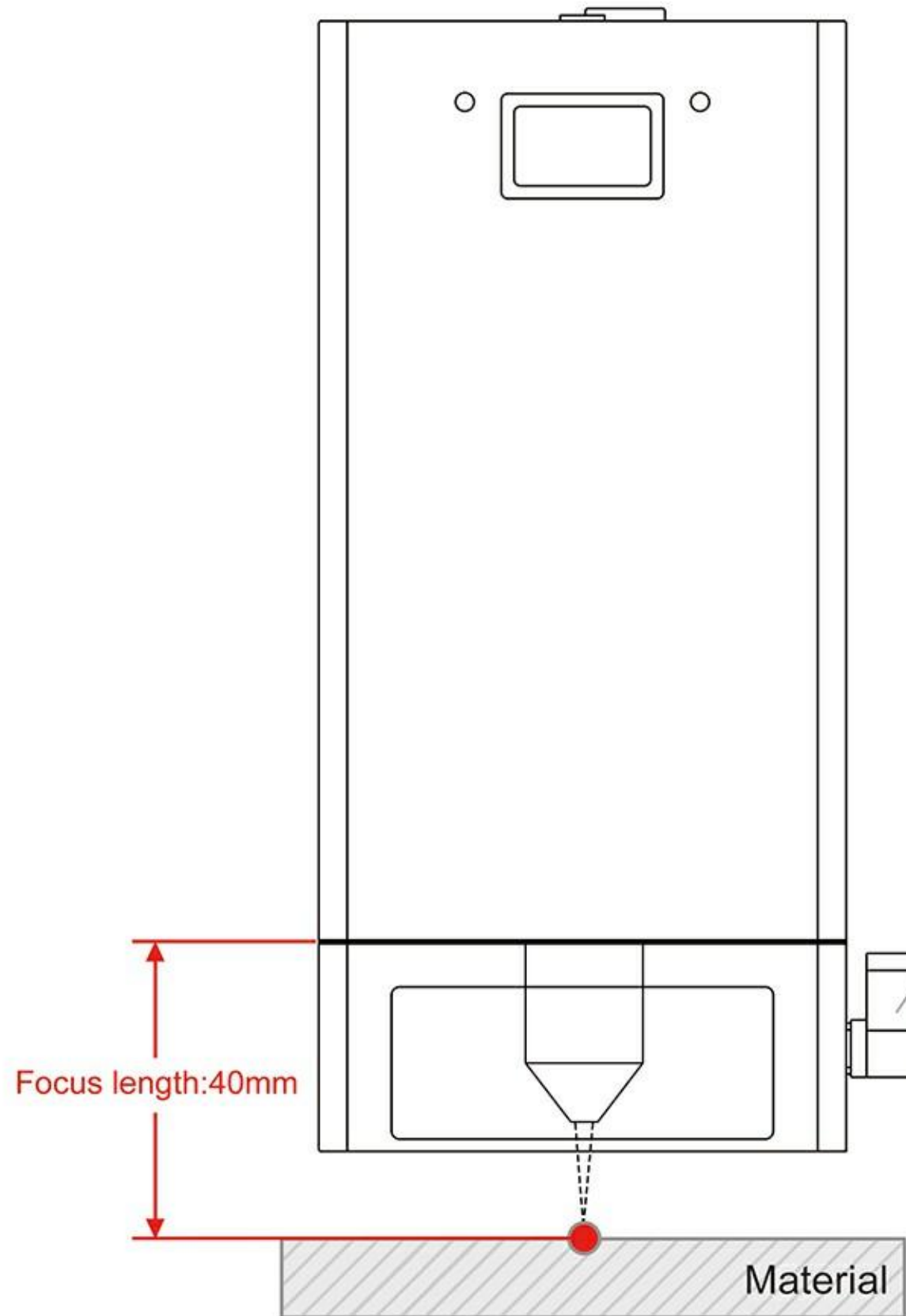


For example, if you want to cut 12mm material, the focus should be 6mm lower than material surface. Please adjust the fixed focus lever to 6mm.

Fixed focus lever usage reference							
Material thickness	< 5mm	5mm	8mm	10mm	12mm	15mm	≥30mm
Fixed focus lever	0mm	2mm	4mm	5mm	6mm	7mm	7mm



When engraving, please ensure that the focus is located on the material surface.



For example, if you want to perform engraving, just adjust the fixed focus lever to 0mm.

Reference settings for engraving

Parameter Material	Fixed focus lever (mm)	Speed (mm/min)			Max Power			Line Interval
		20W	40W	60W	20W	40W	60W	
Basswood Plywood	0	12000	15000	18000	50%	45%	30%	0.05
Pine Board	0	10000	12000	15000	55%	50%	40%	0.05
Stainless Steel	0	9000	10000	13000	60%	70%	80%	0.01

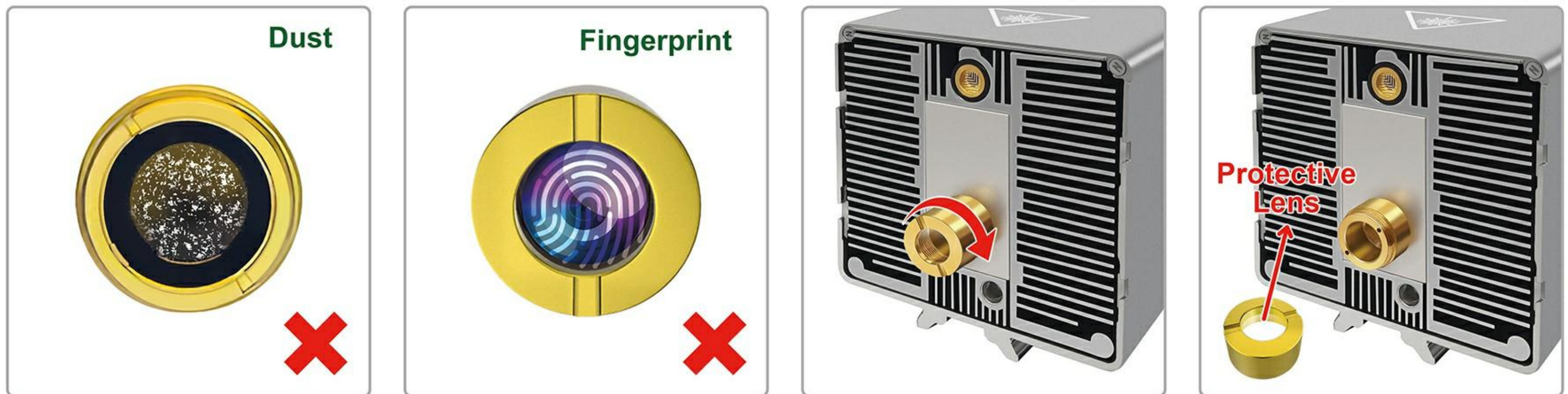
## 10. MAINTENANCE

1. When the laser module is used for a long time, you need to use an alcohol swab to wipe the laser protective lens to ensure the best cutting and engraving performance.

**⚠ Caution for lens cleaning:**

- Before wiping the lens, make sure the power is turned off and the laser module is disconnected from the engraving machine.
- After wiping, allow the lenses to dry naturally for 3 to 5 minutes before use.

2. When the laser module is not used for a long time, please ensure that the lens is not polluted by dust.



Use the alcohol swab to clean or replace with a spare protective lens.

\* For more information about maintenance, please contact us at [lasertree@micost-optotech.com](mailto:lasertree@micost-optotech.com).



# LASERTREE

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