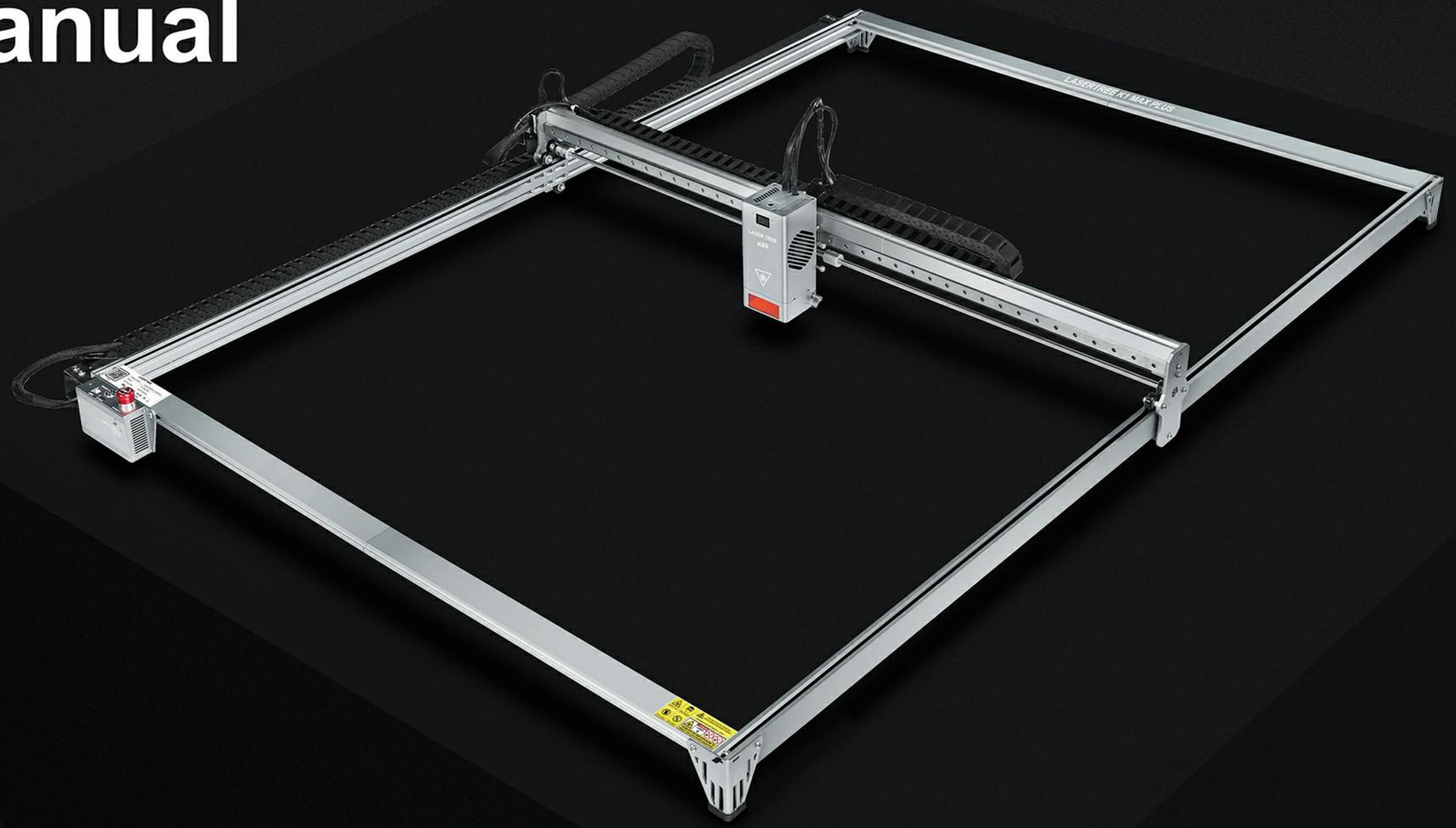
LASERTREE

K1 MAX PLUS
User Manual



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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.

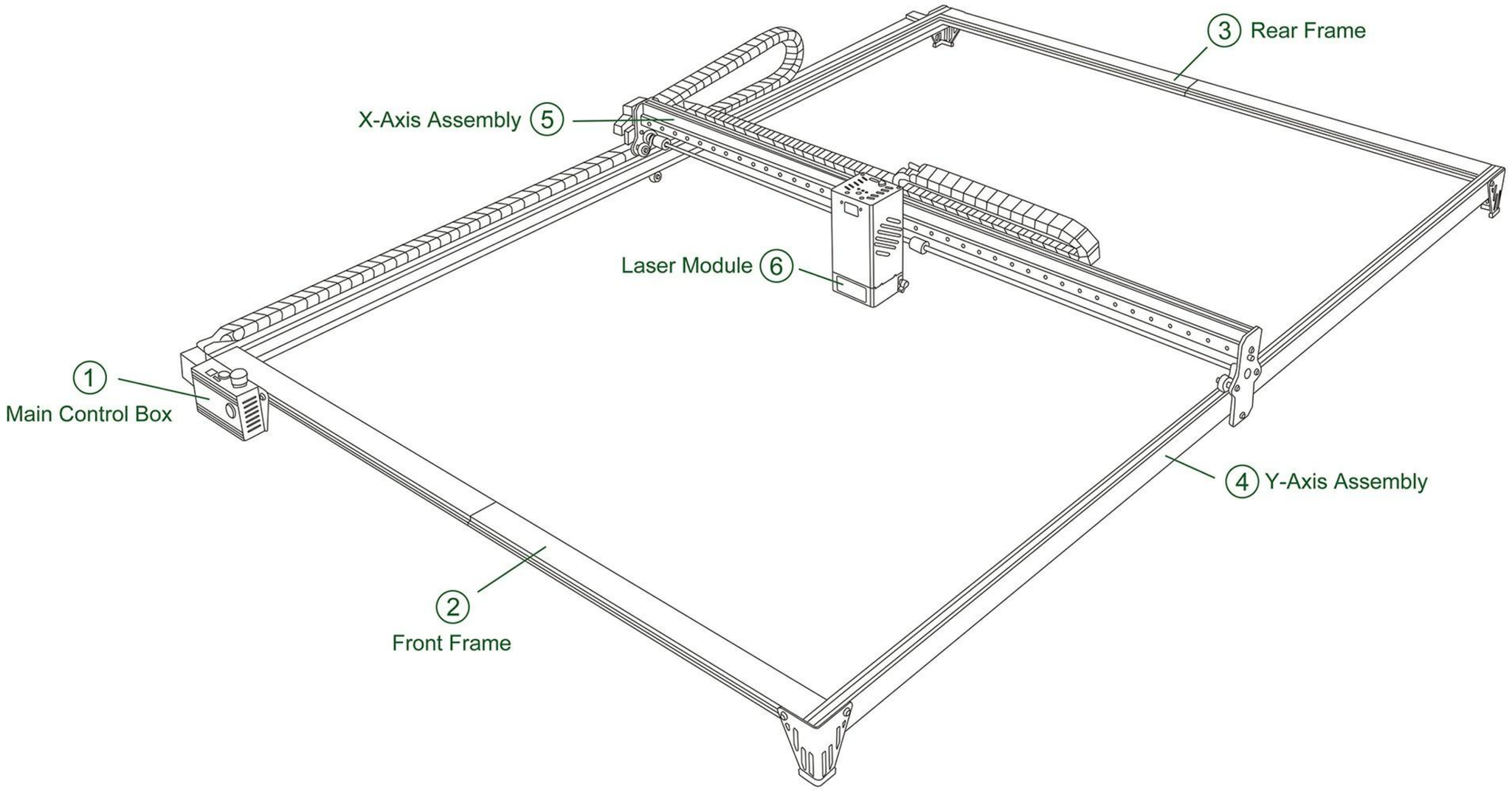
1. Sharp edges may cut your hands when assembling the stand, gloves are recommended.
2. Laser beam have high energy and heat, direct contact with eyes or skin may cause serious injury. When the laser is working, always pay attention to the position and direction of laser beam movement.
3. Children or 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

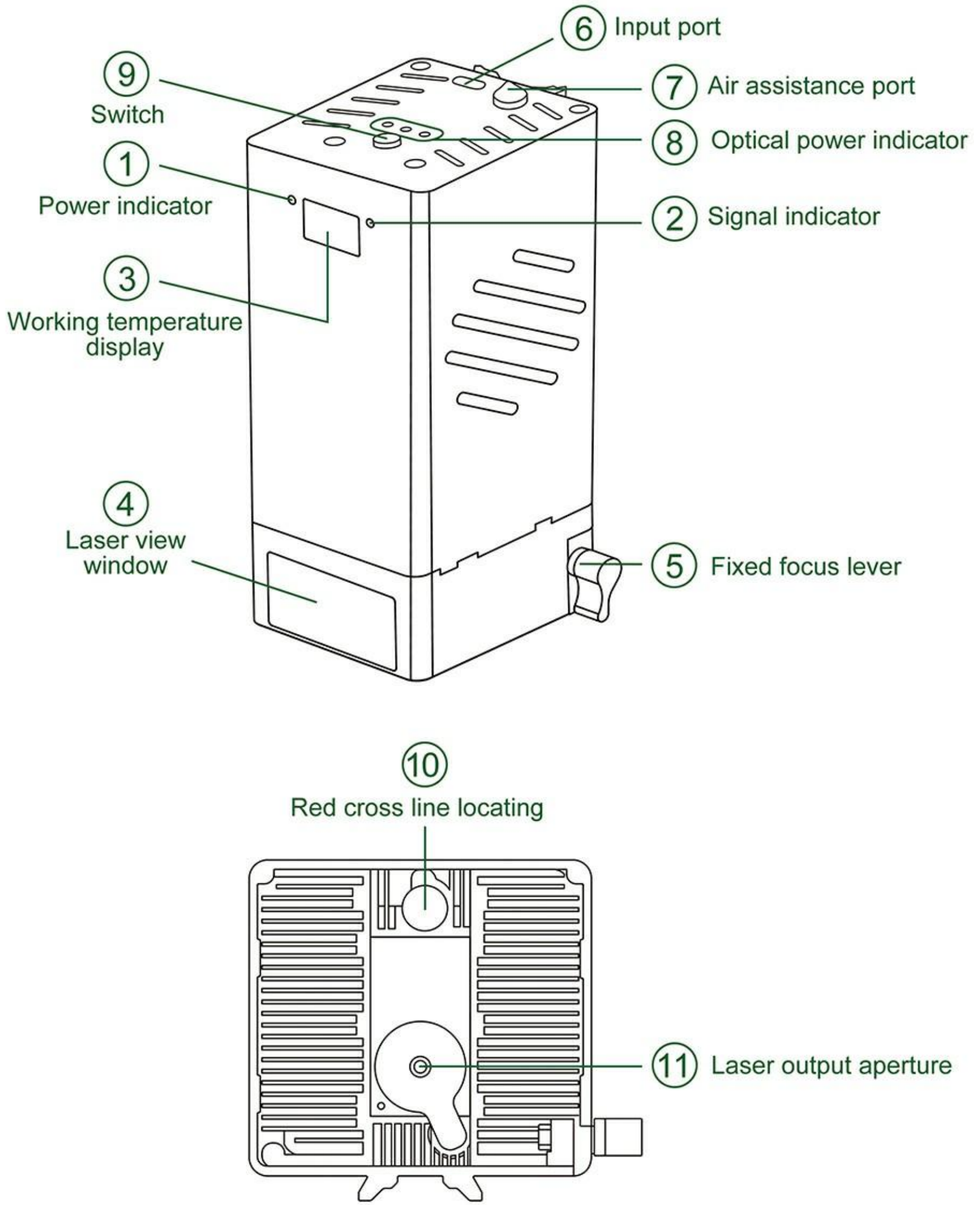
Brand	LASERTREE	Support Software	LightBurn & LaserGRBL
Model	K1 MAX PLUS	Air Assistance	Yes
Engraving Area	1000*1500 mm	Rotation Axis Output	Yes
Engraving Speed	20000 mm/min	Offline Engraving	Yes
Wavelength	450nm (±10nm)	Emergency Stop	Yes
Focus length	40mm	Tilt Protection	Yes
Optical Power	60W+	Status Indicator	Yes
Input	DC24V 10A	Operating Temperature	0-40°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 bult-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℃, the buzzer will sound an alarm.

It is suggested to keep the laser working temperature below 55℃ and environmental temperature below 35℃ 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.	**Optical power switching order** 60W 20W 40W

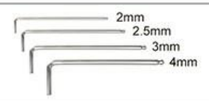
4. PACKING LIST

	X-Axis A x1
	X-Axis B x1
	Y-Axis A x2
	Y-Axis B x2
	Front Frame x2
	Rear Frame x2
	Linear Guide Rail A x1
	Linear Guide Rail B x1
	Coupling Shaft A x1
	Coupling Shaft B x1
	X-axis Drag Chain Guide x2
	Y-axis Drag Chain Guide x2

	X-axis Transmission Unit x1
	X-axis Motor Mounting Plate x1
	Y-axis Motor Mounting Plate x1
	Y-axis Pulley Mounting Plate x1
	Y-axis Drag Chain Fixing Plate x1
	Y-Axis Drag Chain Carrier Link Plate x1
	Y-axis Drag Chain Support Foot x2
	X-axis Cable x1
	Y-axis Cable x1
	Distribution Box x1
	Main Control Box x1
	Support Foot x3

	Power Adapter x1
	AC Cable x1
	USB Cable x1
	60W Laser Module x1
	Air Pump x1
	Protective Glasses x1
	Material Pack x1

Splicing KIT	
	Linear Splicing Connector A x10
	Linear Splicing Connector B x10
	Flat Screw M5*16 x41

Tool KIT	
	Cleaning Brush x1
	8-10 Open Spanner x1
	4.5 Open Spanner x1
	L-Allen wrench x1
	Cable Ties x3
	Timing Belt x2
	Sleeve Coupling x1
	TF Card x1
	Card Reader x1
	Spare Laser Protective Lens x2
	Air Pump Filter Sponge x2

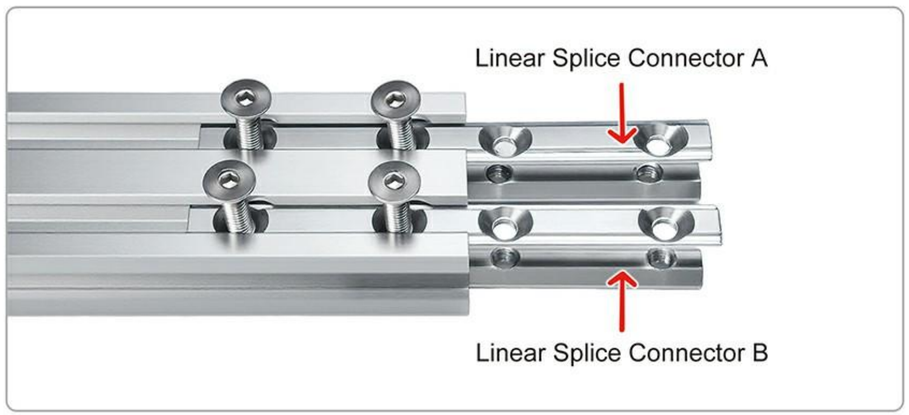
	Round Screw M4*18 x1 (Screw E)
	Round Screw M5*10 x4 (Screw C)
	Round Screw M5*16 x8 (Screw F)
	Round Screw M5*20 x21 (Screw A)
	Flat Screw M2.5*4 x2 (Screw B)
	Flat Screw M3*6 x7 (Screw I)
	Flat Screw M3*12 x20 (Screw H)
	Flat Screw M5*20 x1 (Screw G)

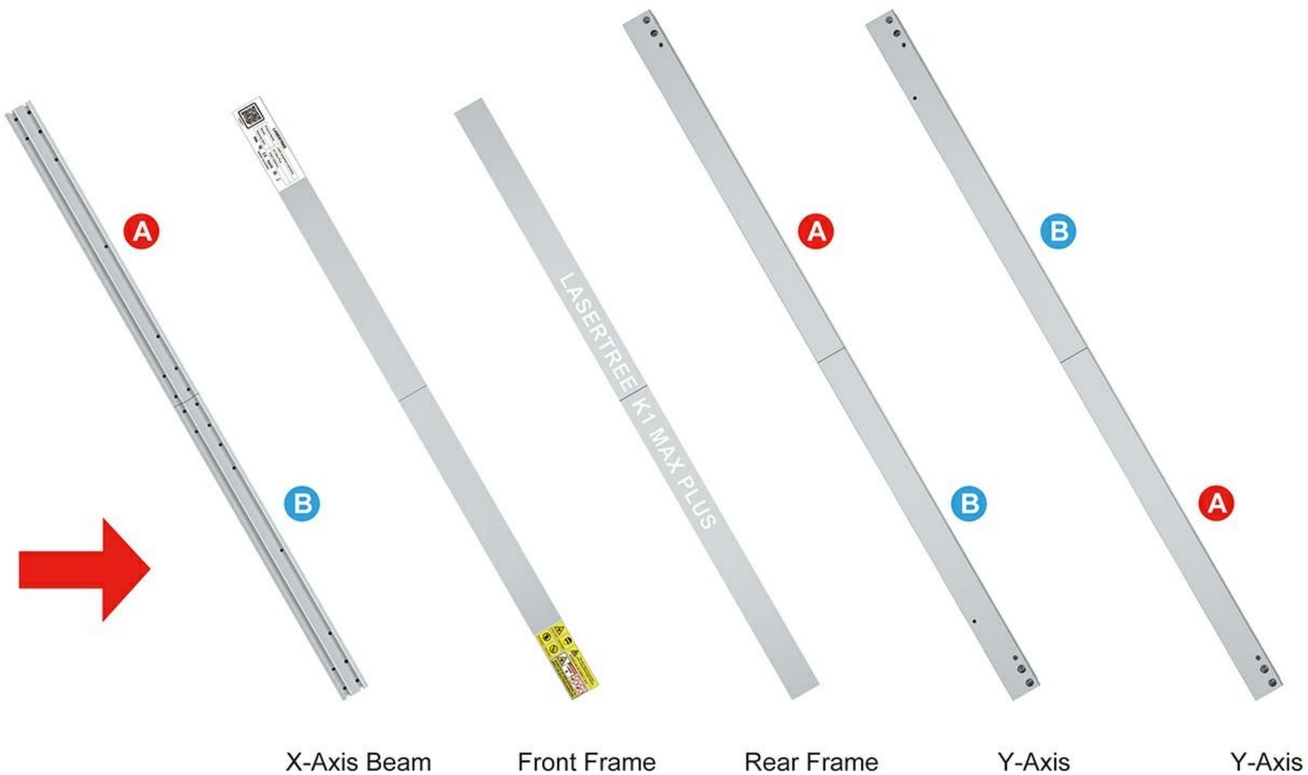
	Flat Screw M5*25 x1 (Screw G)
	Thin Flat Screws M4*6 x28 (Screw D)
	Limiting Column Sleeve 5*8*8 x1 (Screw G)
	Limiting Column Sleeve 5*8*12 x1 (Screw G)
	Fasten Screw M4*5 x5 (Screw G)
	T-Nut x5 (Screw G)
	Adjusting Screw M4*30 x2 (Screw G)
	Hexagonal Copper Column M3*13+3 x3 (Screw J)

5. INSTALLATION GUIDE

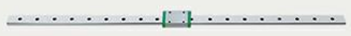
5.1 Assembly of main frame

1. Assemble the front/rear frames and X/Y-axis frames using linear splicing connectors.





5.2 Assembly of X-axis

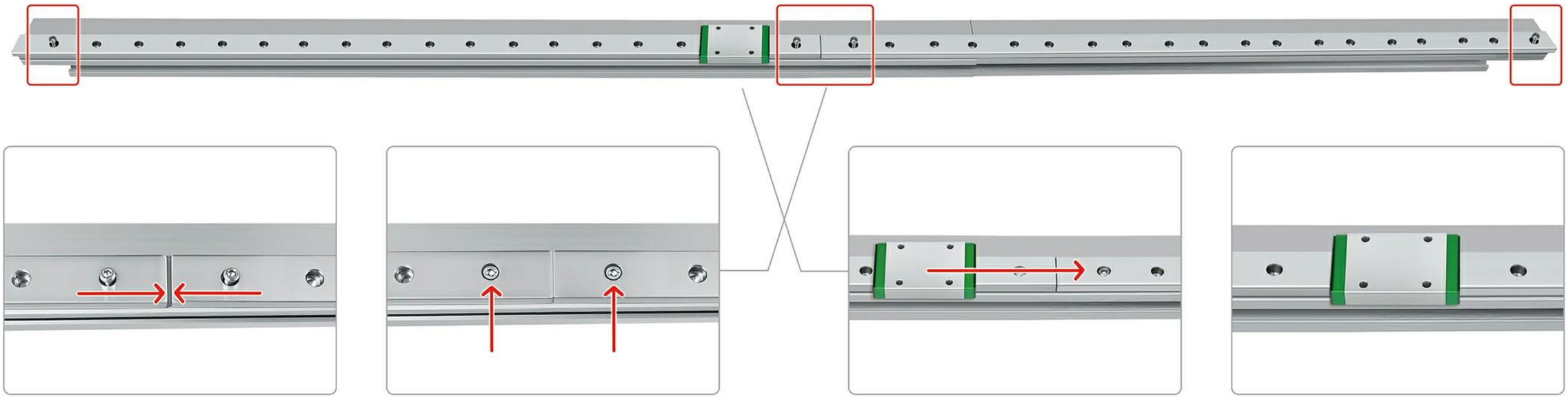

Linear Guide Rail A x1

Linear Guide Rail B x1


Flat Screw M3*12 x20 (Screw H)

1. Assembly of X-axis linear guide rail.

① **Installation:** Install linear guides A and B into the designated holes on the X-axis, and tighten the front and rear screws on the outermost side of each guide. Note: None of the screws should be fully tightened at this stage; they are only for temporary positioning.

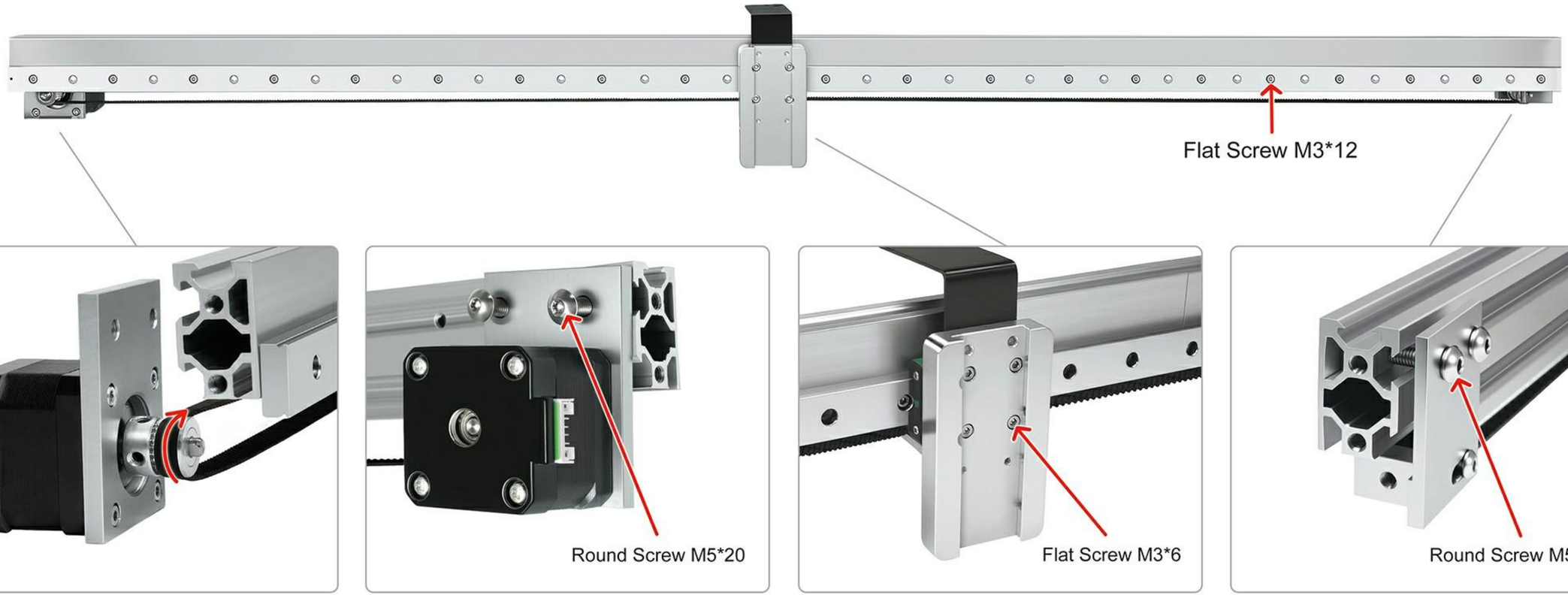


② **Adjust the Gap and Height:** Focus on adjusting the gap and height at the junction between the rails A and B. Ensure a smooth transition and consistent surface level between the two, with no visible gap or misalignment. Once properly adjusted, securely tighten the two key screws in the center to lock the relative position in place.

③ **Test sliding and fixing:** After completing the above steps, perform a manual sliding test to ensure smooth movement without any binding. If there is any binding, fine-tune the screws until it is smooth. Once the test passes, tighten all the fixing screws in sequence to complete the process.

X-axis Transmission Unit x1 | X-axis Motor Mounting Plate x1 | Round Screw M5*20 x4 (Screw A) | Flat Screw M3*6 x4 (Screw I)

2. Assembly of X-axis transmission unit.

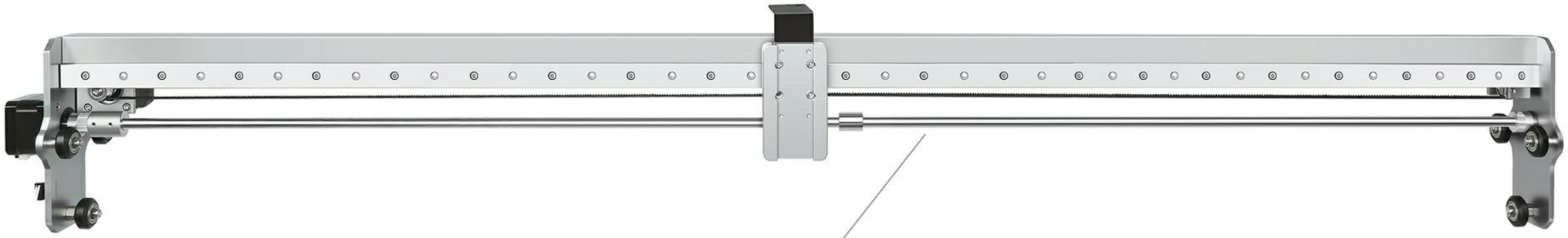


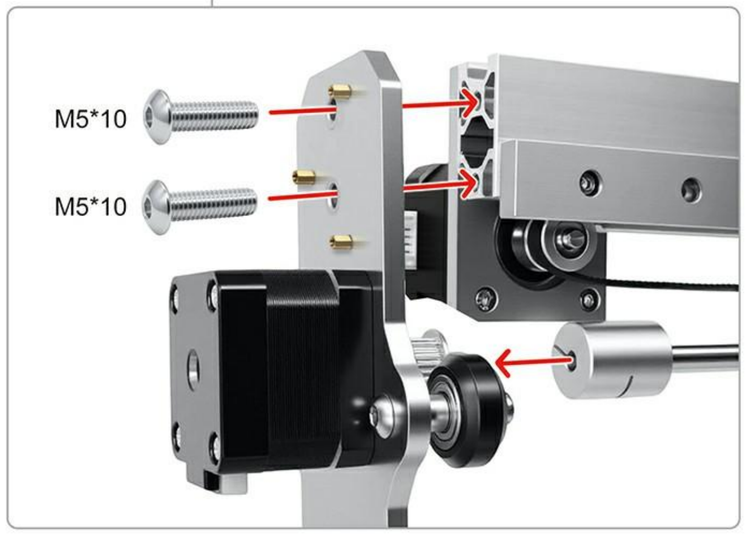
① Flatten the belt to avoid twisting; correctly insert the belt into the guide groove of the motor fixing plate, align the fixing plate with the left rear hole, and tighten the screws.

② Align the drive unit slider with the linear guide groove and secure.

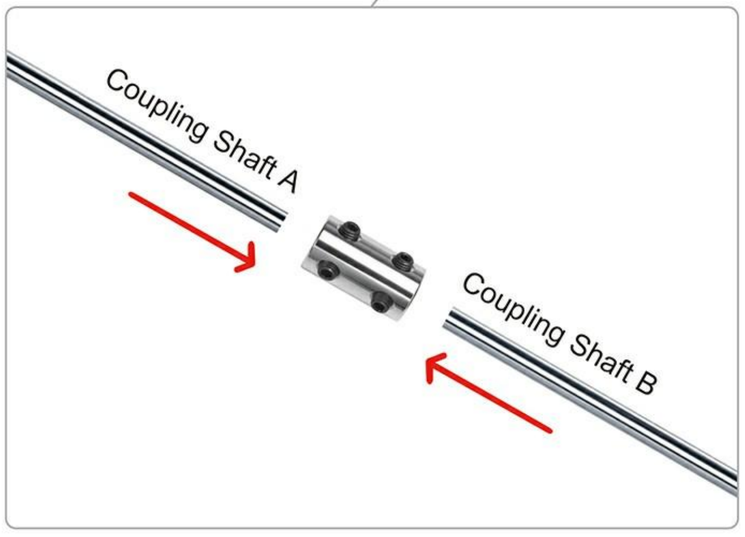
③ Align the mounting plate with the right rear hole of the X-axis and tighten the screws.

Y-axis Motor Mounting Plate x1
Y-axis Pulley Mounting Plate x1
Coupling Shaft A x1
Coupling Shaft B x1
Sleeve Coupling x1
Round Screw M4*18 x1 (Screw E)
Round Screw M5*10 x4 (Screw C)





3. Secure the left Y-axis motor mounting plate with M5*10 screws.



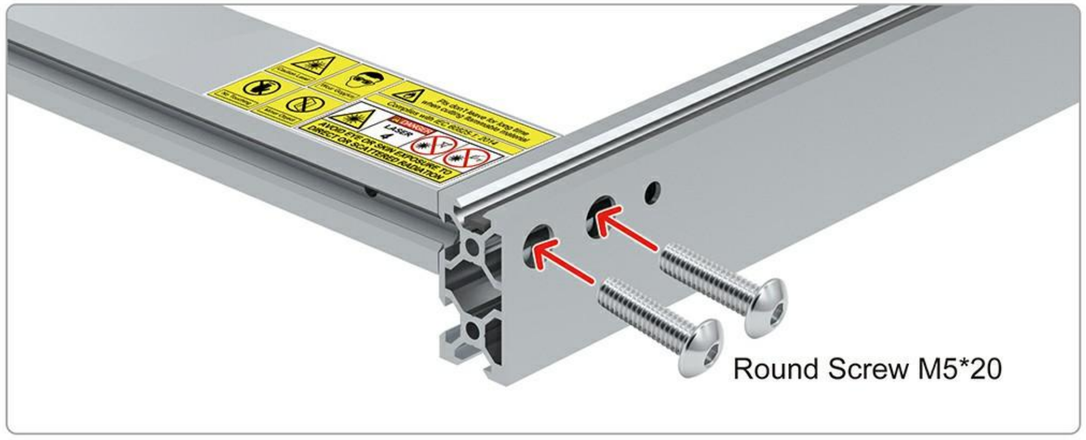
4. Install the sleeve coupling onto the connecting shaft and tighten it, then align and embed its flat end into the Y-axis motor mounting plate.

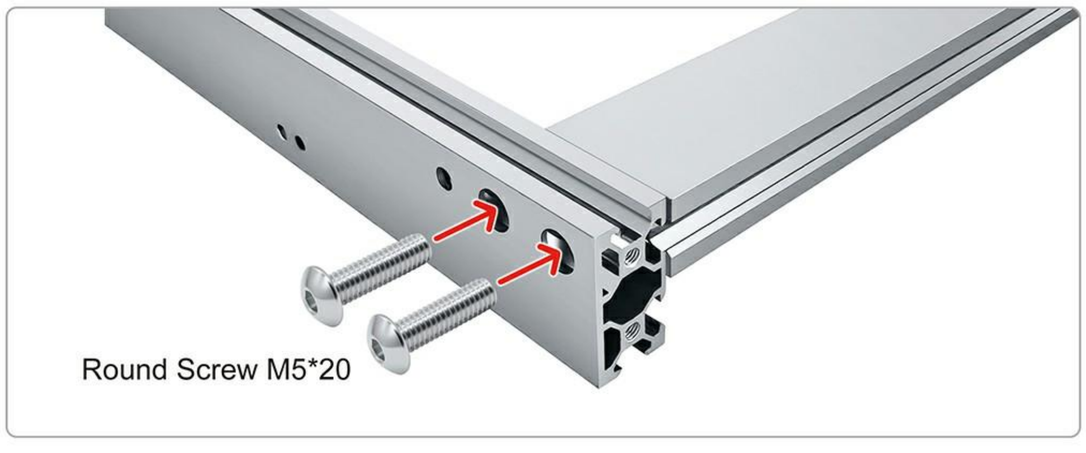
5. Secure the right Y-axis pulley mounting plate with M5*10 screws and adjust the tension of the X-axis timing belt with M4*18 screws.

5.3 Assembly of engraving machine

Round Screw M5*20 x8 (Screw A)

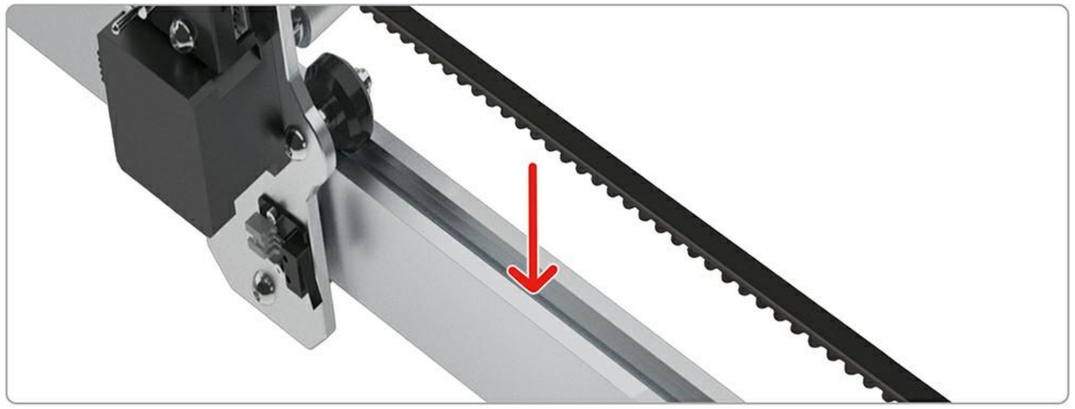
1. Push the X-axis into the Y-axis grooves on both sides.Use M5*20 screws to fix the front frame and rear frame.

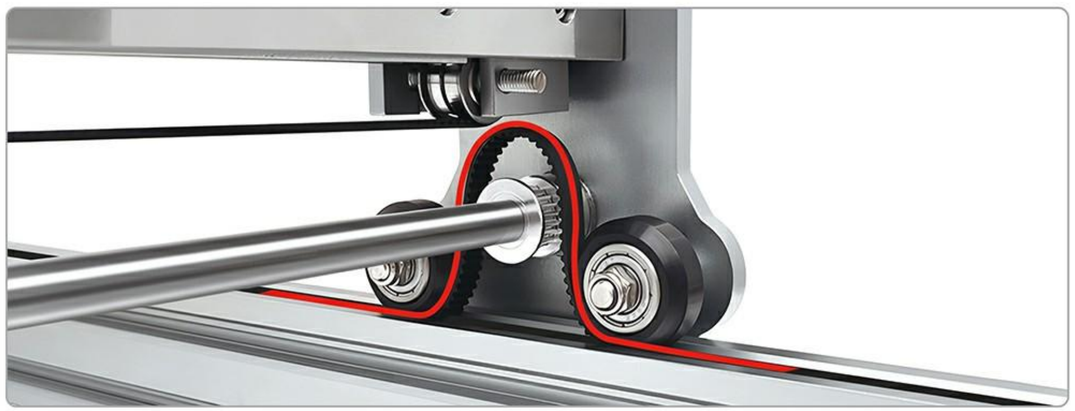




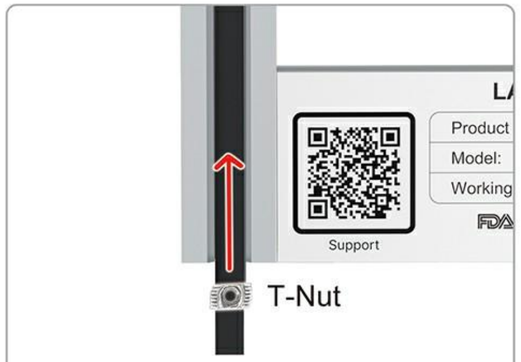
Timing Belt x2 T-Nut x5 (Screw G)

2. Make the timing bet face downward. Pass the timing belt through the X-axis puey by hand or using the appropriate tool so that it is fits snugly and enures a smooth motion of the timing belt over the pulley.
(Same operation for both left and right sides)



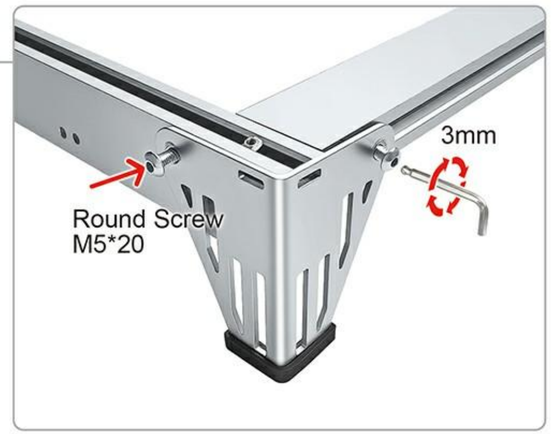


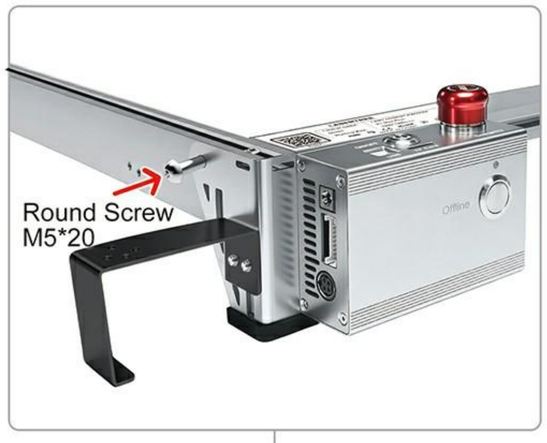
3. Ensure a T-nut is inserted into the groove at each of the four corners of the Y-axis frame.

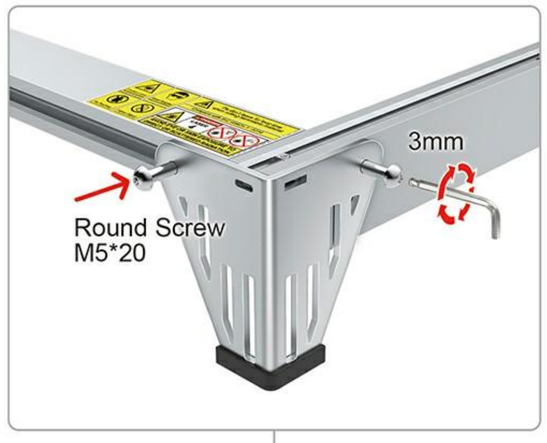


Main Control Box x1 | Support Foot x3 | Y-axis Drag Chain Support Foot x2 | Round Screw M5*20 x8 (Screw A) | Thin Flat Screws M4*6 x4 (Screw D)

4. Fix the drag chain support foot to the left Y-axis support angle and the control box, and lock the support angle to the engraving machine frame.





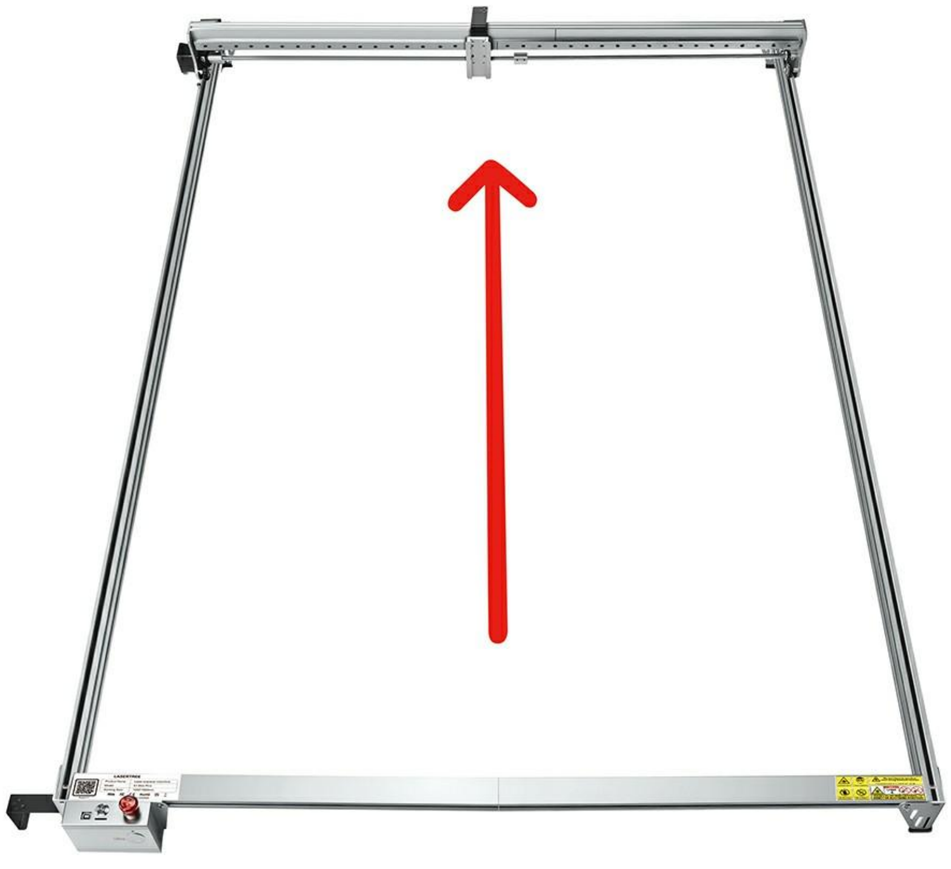


Fasten Screw M4*5 x4 (Screw G)

5. Adjust the fastening timing belt.

① Fix the rear frame and timing belt:
Use the M4x5 setscrew to secure the rear end of the timing belt to the rear frame.

② Position the X-axis:
Push the X-axis backward to ensure that the X-axis is in close contact with the rear frame without any gap.



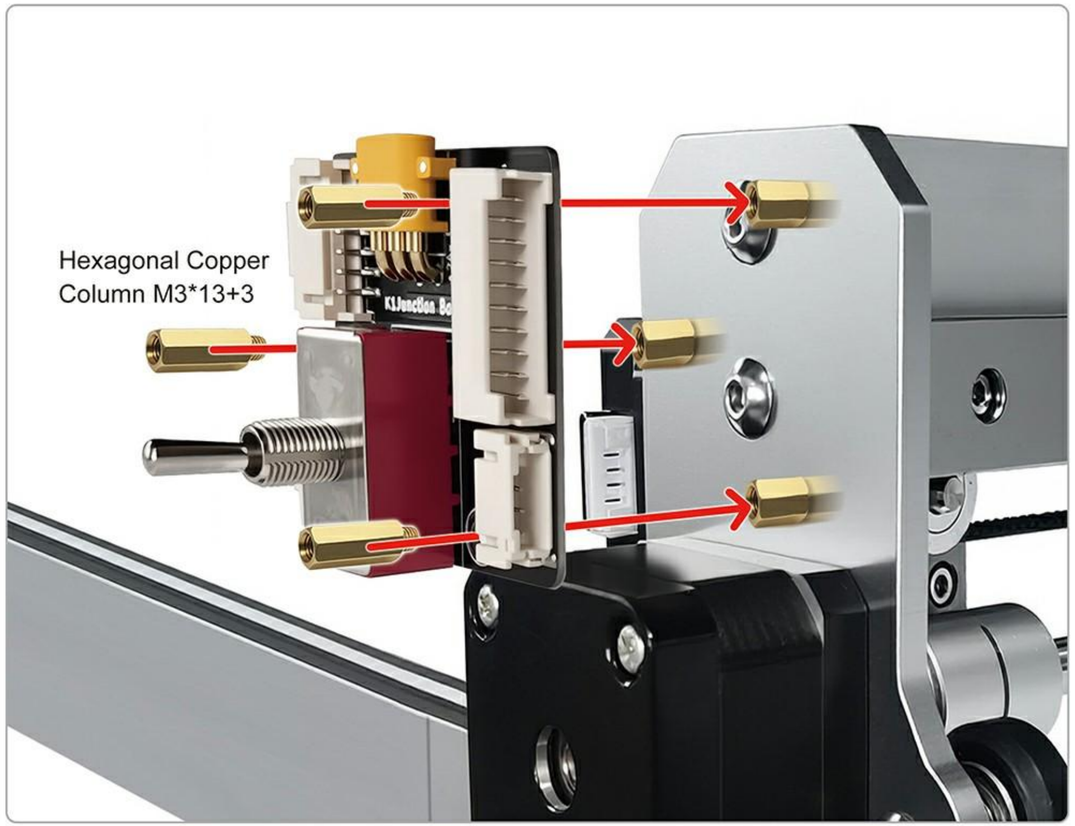
③ Fix the front frame and timing belt:
Pull the Y-axis timing belt forward to the correct tension and secure with the M4*5 set screws.

Press the middle span of the timing pulley with your finger to make sure the belt is flexible. If the belt is too loose or too tight, it needs to be adjusted.

5.4 Assembly of distribution box

Distribution Box x1 | Y-axis Drag Chain Fixing Plate x1 | Hexagonal Copper Column M3*13+3 x3 (Screw J) | Flat Screw M3*6 x2 (Screw I)

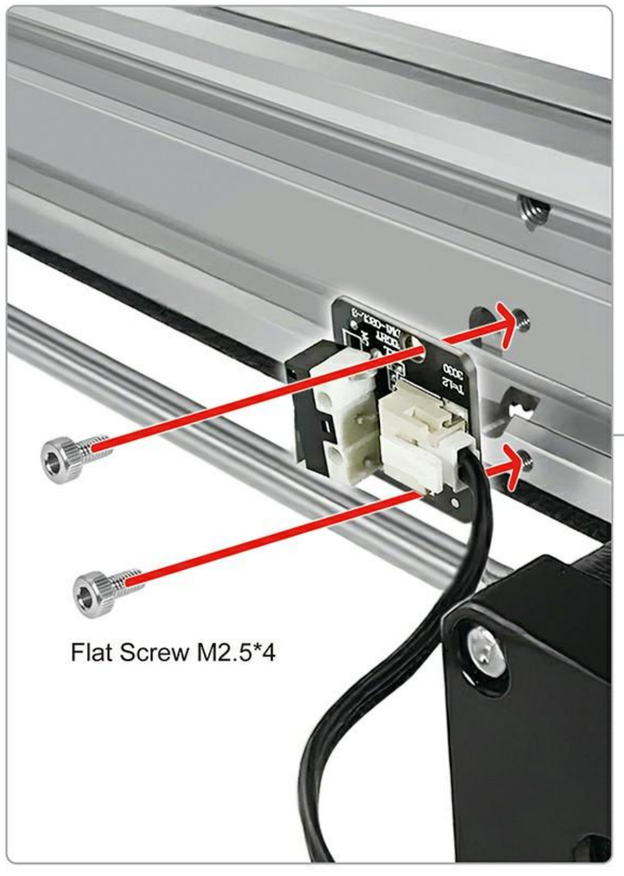
1. Use M3*13+3 hexagonal copper column to secure the junction box driver to the Y-axis motor pulley.

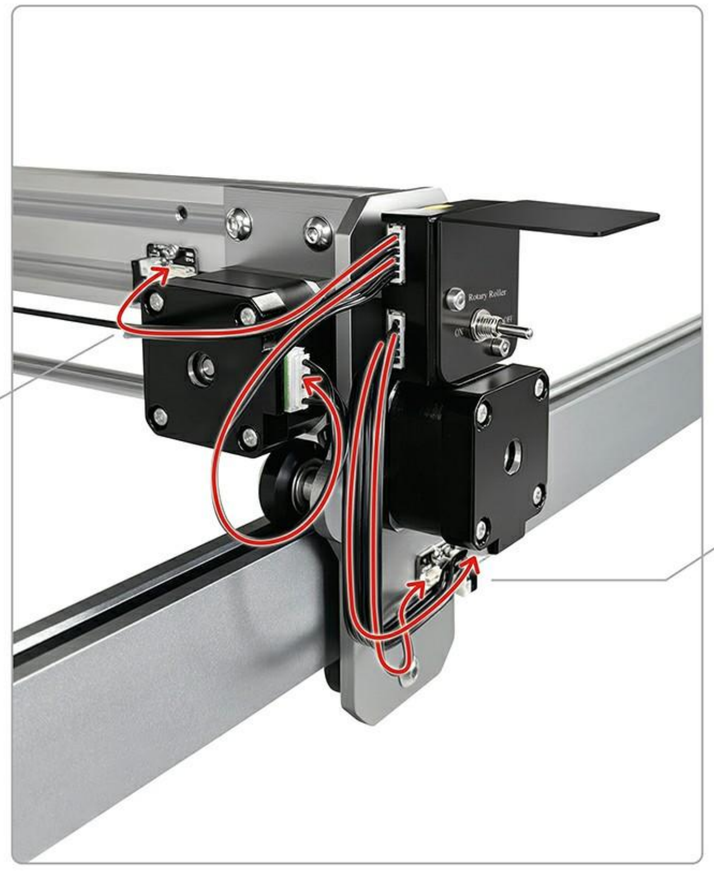


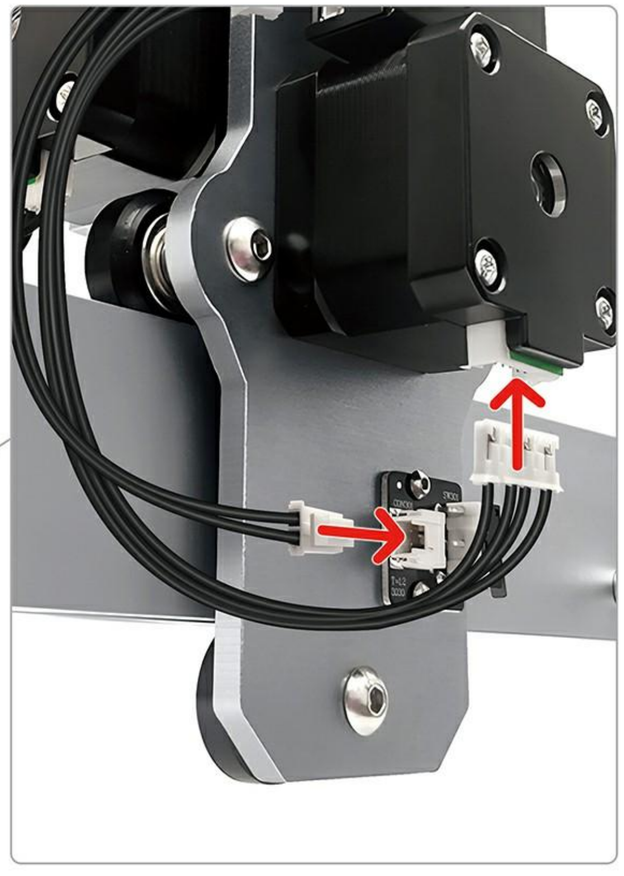
2. Assemble the distribution box housing and the Y-axis drag chain fixing plate.

Flat Screw M2.5*4 x2 (Screw B)

3. Connect the distribution box cables.

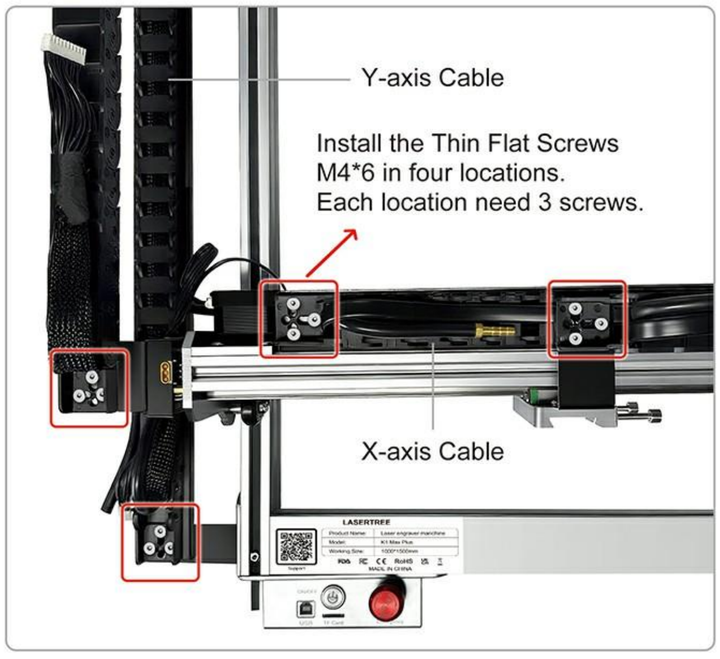






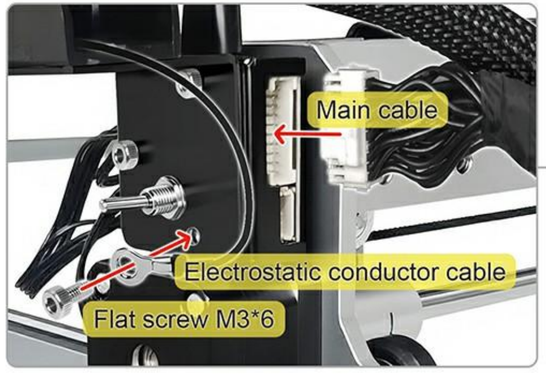
5.5 Assembly of X-axis and Y-axis drag chain and cable

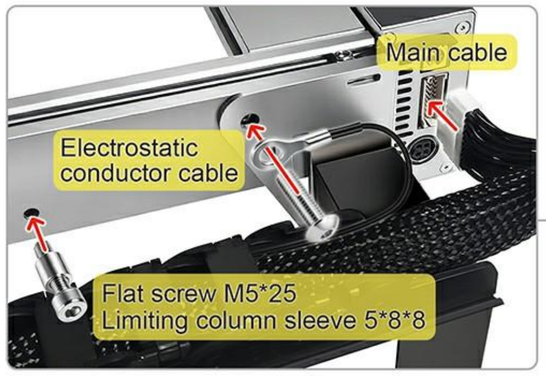
X-axis Drag Chain Guide x2
X-axis Cable x1
Y-Axis Drag Chain Carrier Link Plate x1
Thin Flat Screw M4*6 x23 (Screw D)
Y-axis Drag Chain Guide x2
Y-axis Cable x1
Round Screw M5*16 x8 (Screw F)

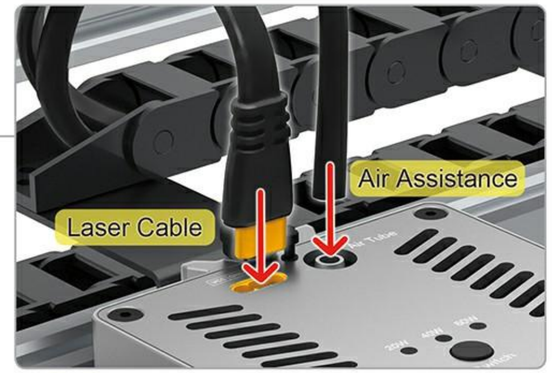


5.6 Connection cable

Flat Screw M5*20 x1 (Screw G)
Flat Screw M5*25 x1 (Screw G)
Limiting Column Sleeve 5*8*8 x1 (Screw G)
Limiting Column Sleeve 5*8*12 x1 (Screw G)
Adjusting Screw M4*30 x2 (Screw G)
Flat Screw M3*6 x1 (Screw I)
60W Laser Module x1

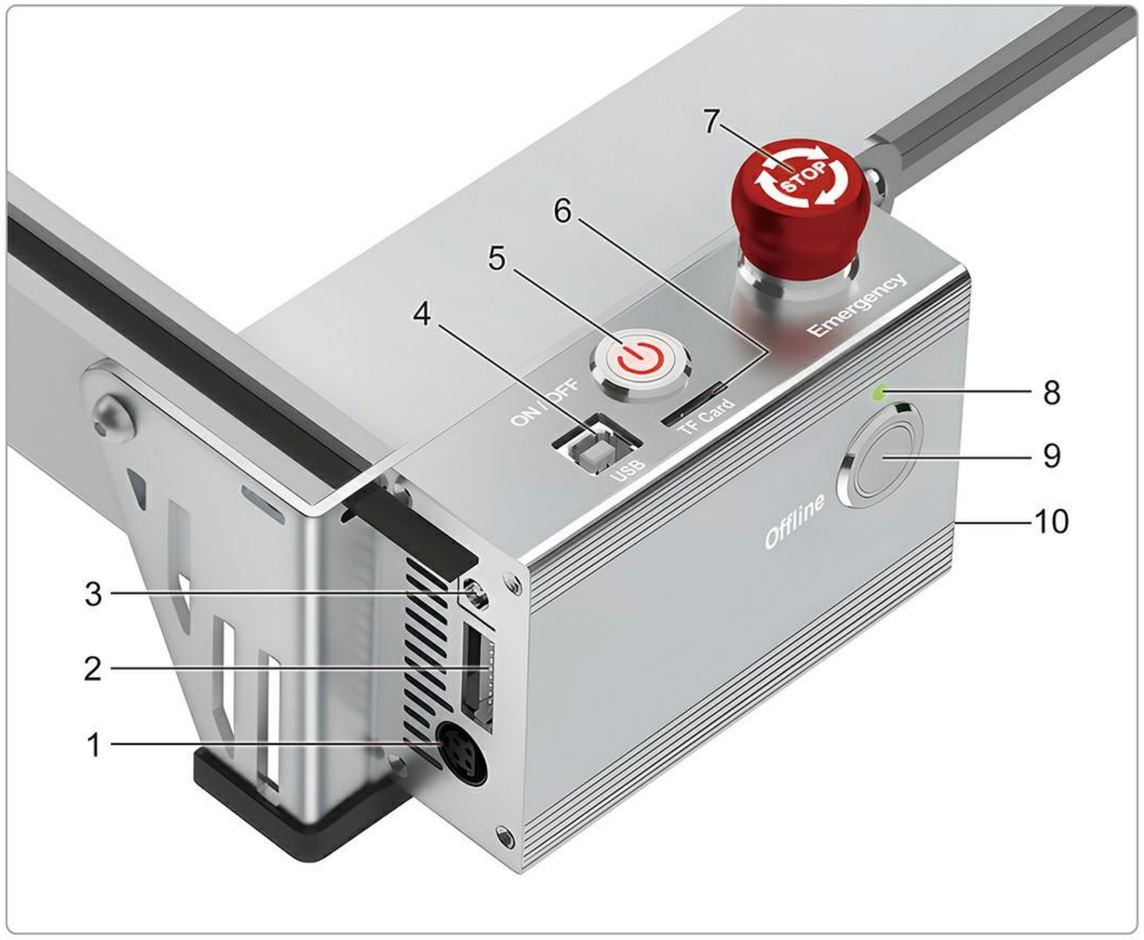






6. INTERFACE DESCRIPTION

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.

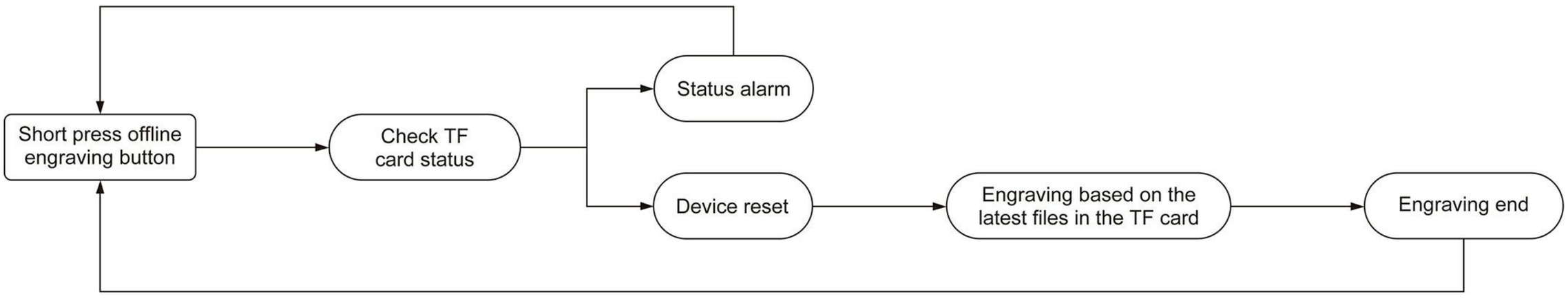
7. Emergency stop switch: stops the device action and PWM signal output and disconnects the device from the PC.

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.

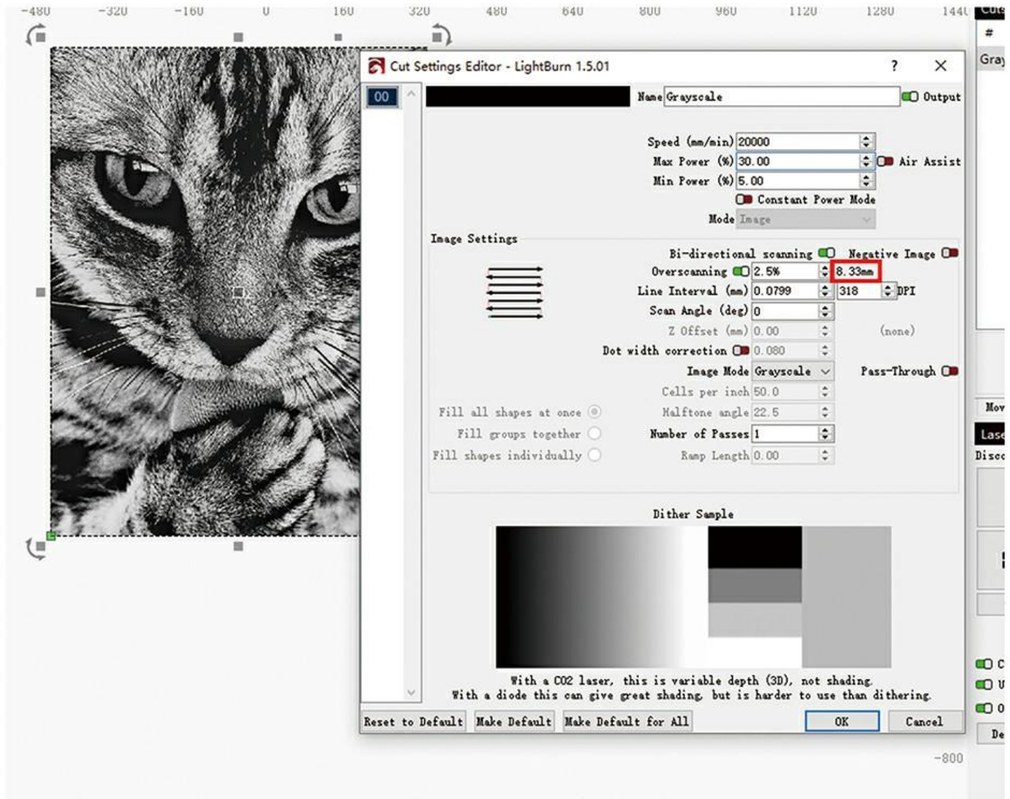
9. Offline engraving button: needs to be used with a memory card.

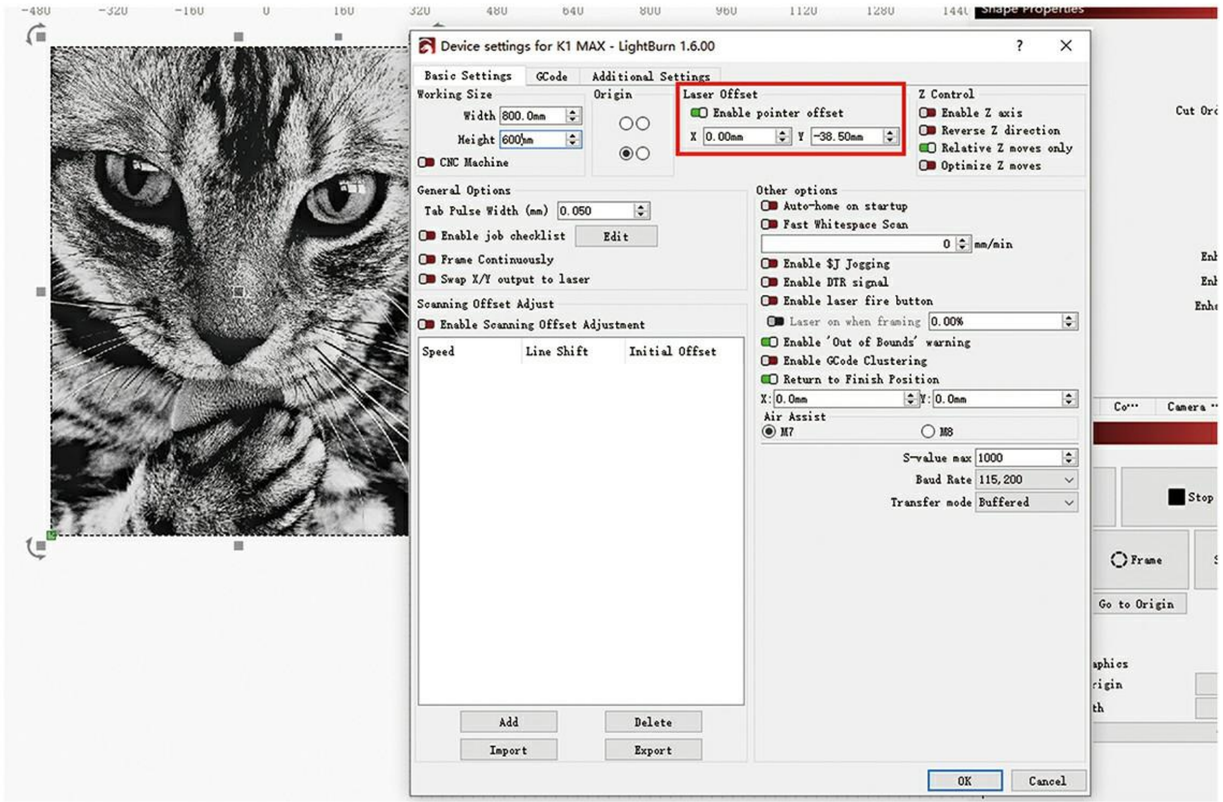


Note:

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.

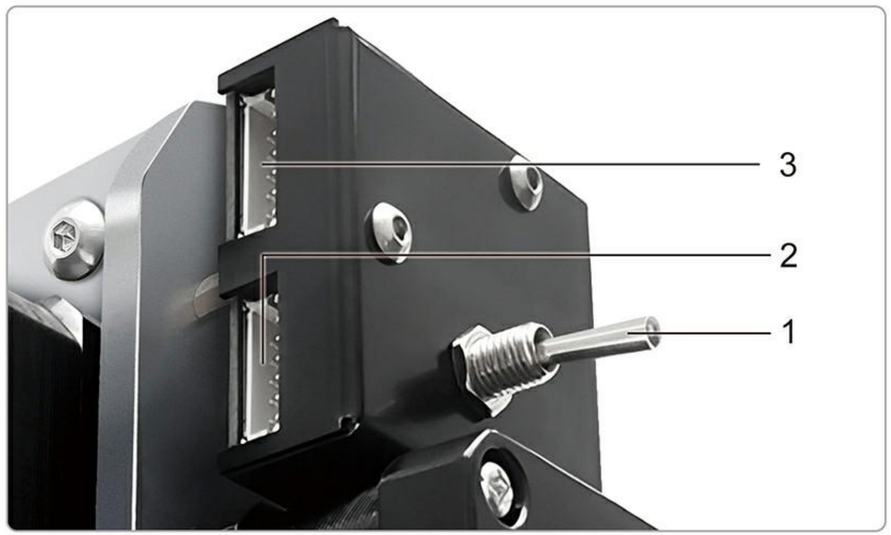




10. Buzzer: Integrated on the mainboard for status alarm.

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.

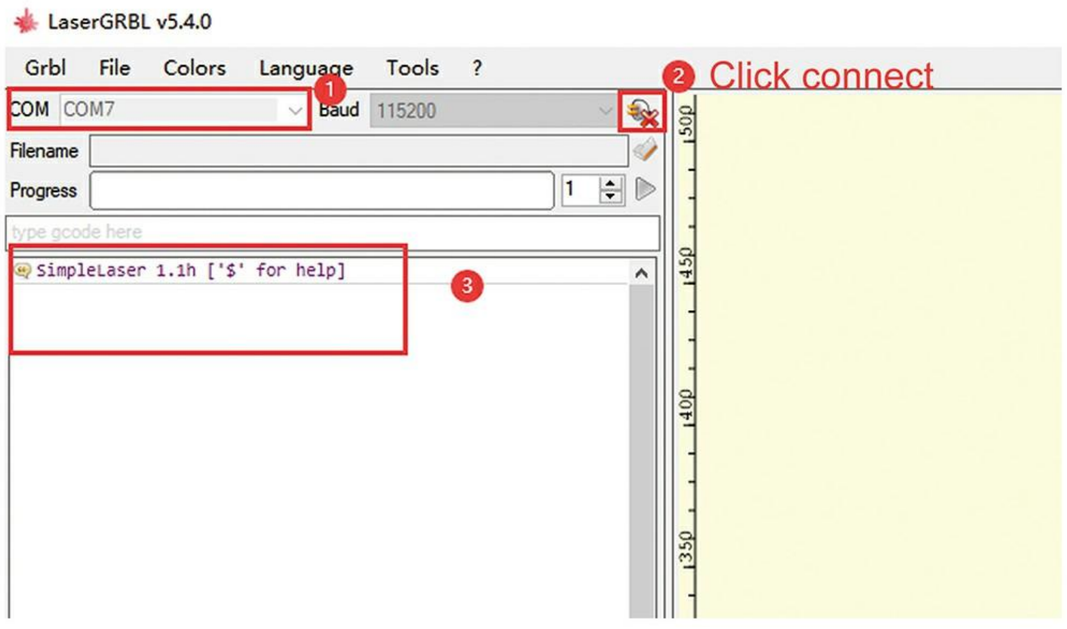
7. SOFTWARE CONNECTION GUIDE

The K1 MAX PLUS 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/.)

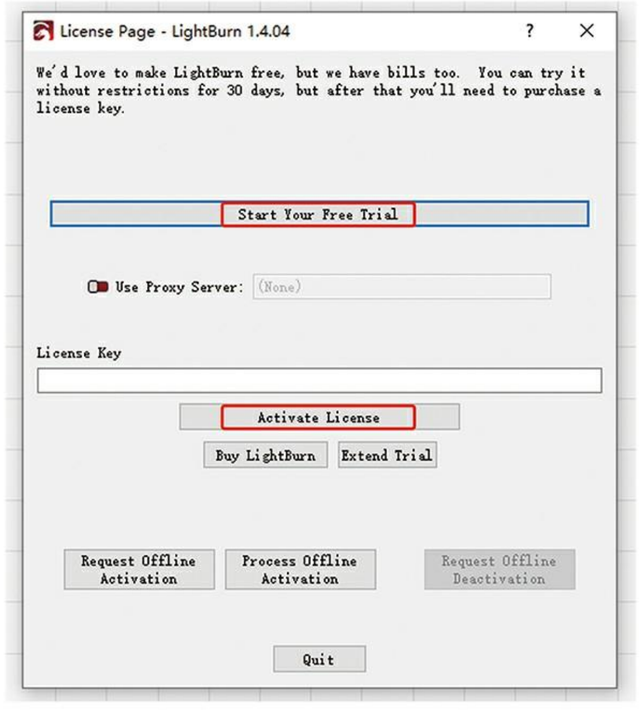
1) Connect one end of the USB data cable to the engraving machine and the other end to the USB port of the computer with LaserGRBL software installed.
2) Connect the power port of the engraving machine through the DC24V adapter and turn on the power switch.
3) Open the LaserGRBL software on the computer,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



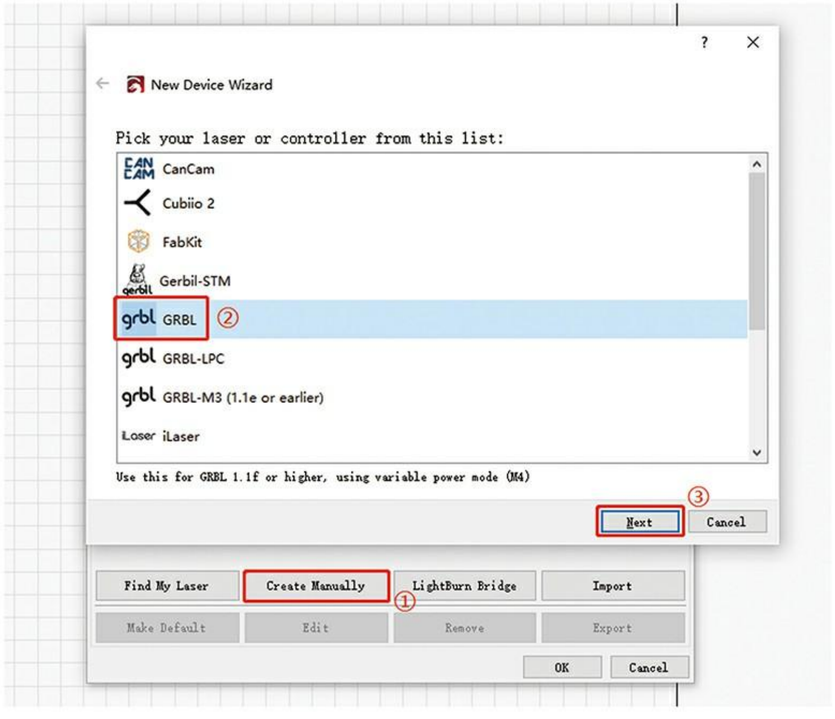
7.2 LightBurn

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 “Actirate License”. (Figure 1)
4) Create a new device, select "GRBL". (Figure 2)



(Figure 1)



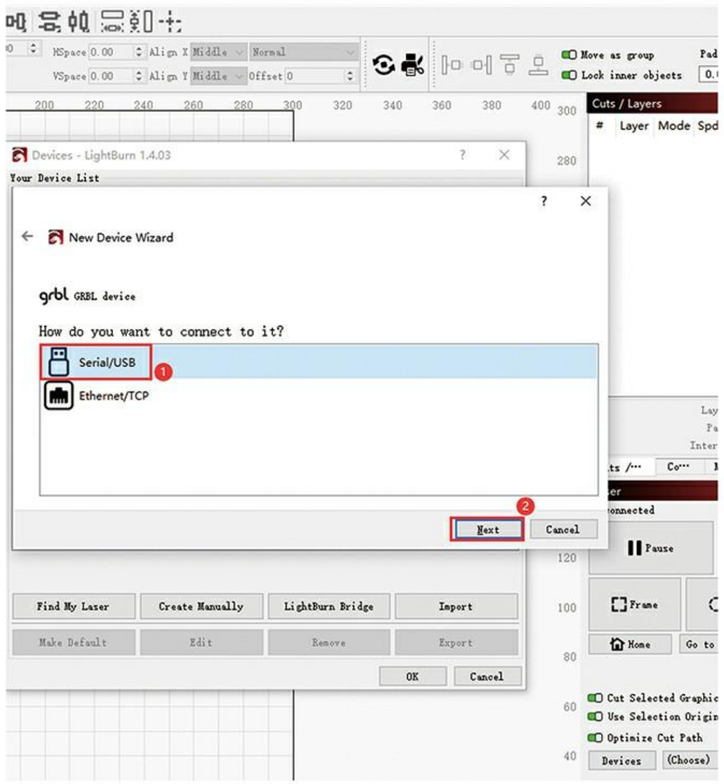
(Figure 2)

5) Select USB connection. (Figure 3)

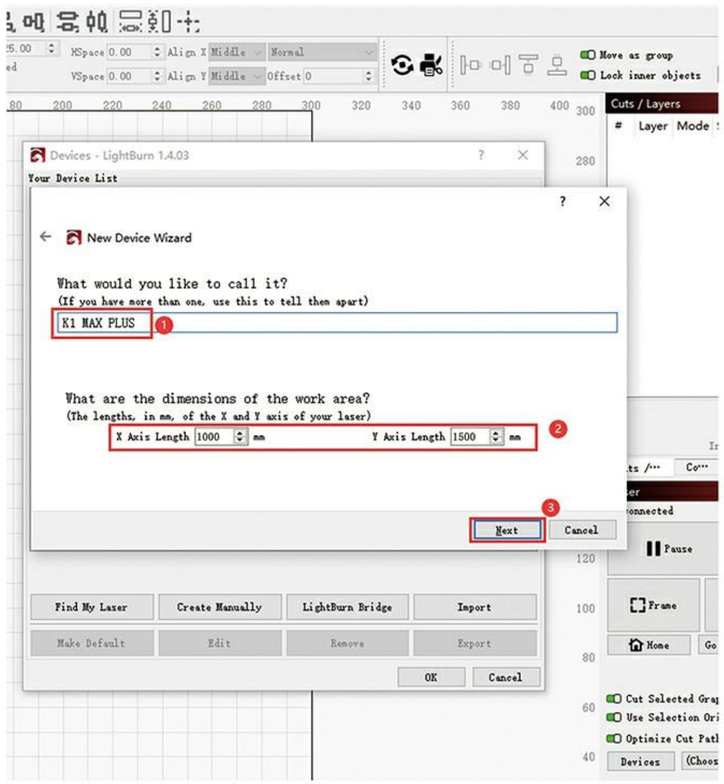
6) Set the engraving size to 1000*1500mm and modify the device name "K1 MAX PLUS". (Figure 4)

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

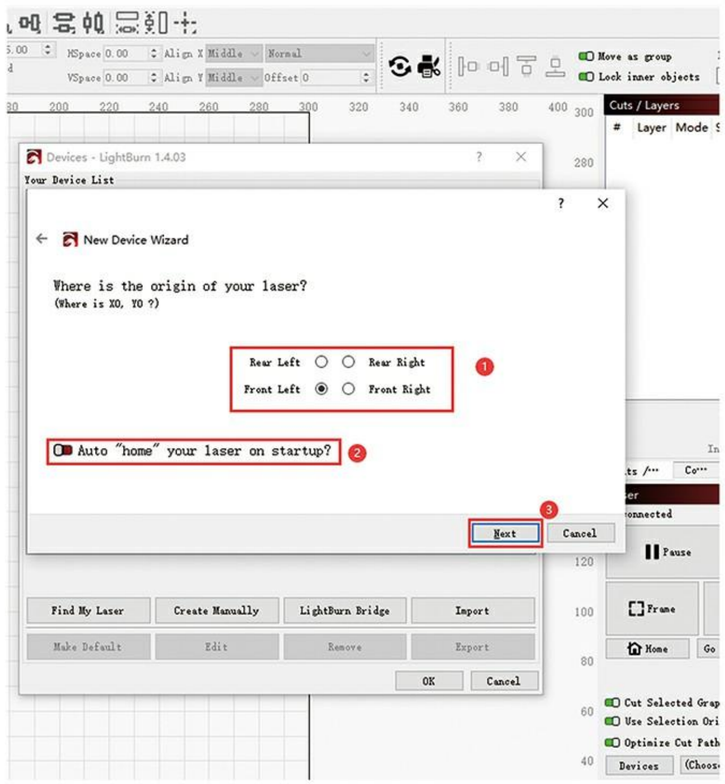
(If you need to automatically reset every time you turn on the computer, please tick step 2 of the attached diagram.)



(Figure 3)



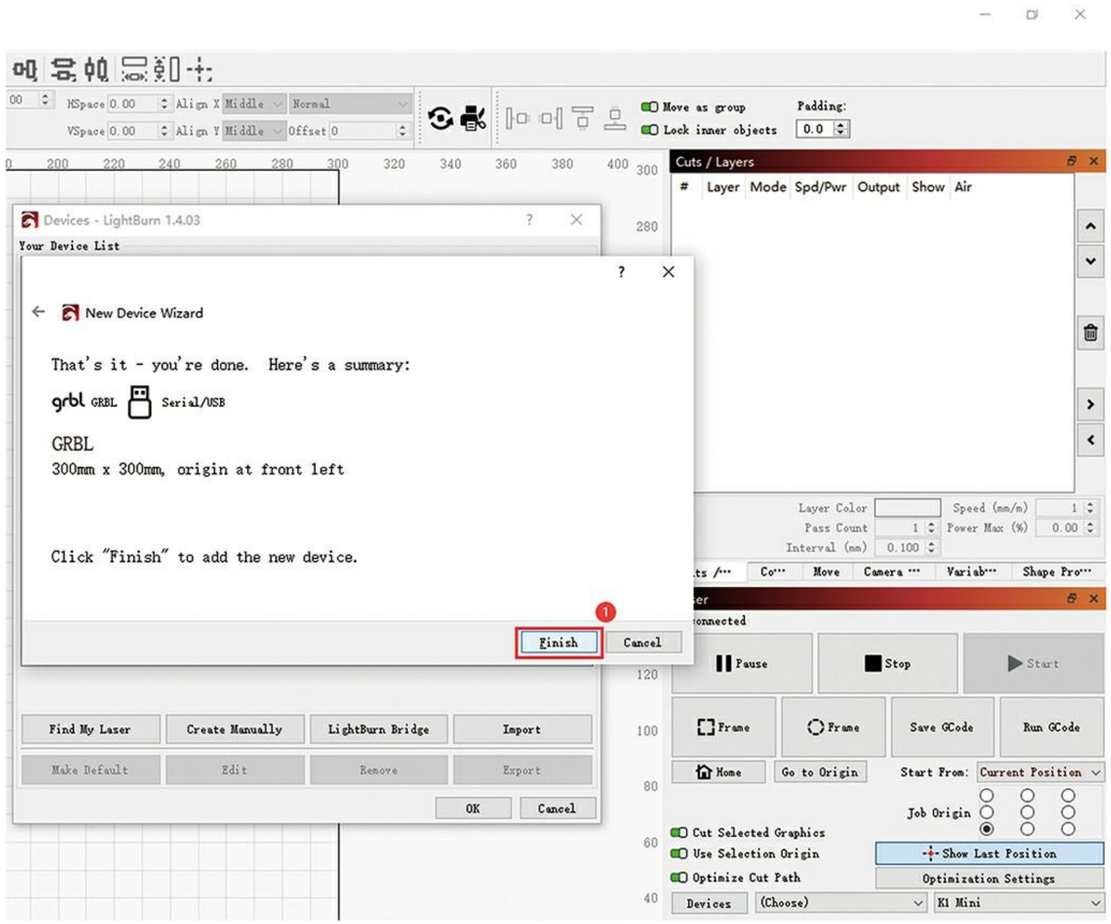
(Figure 4)



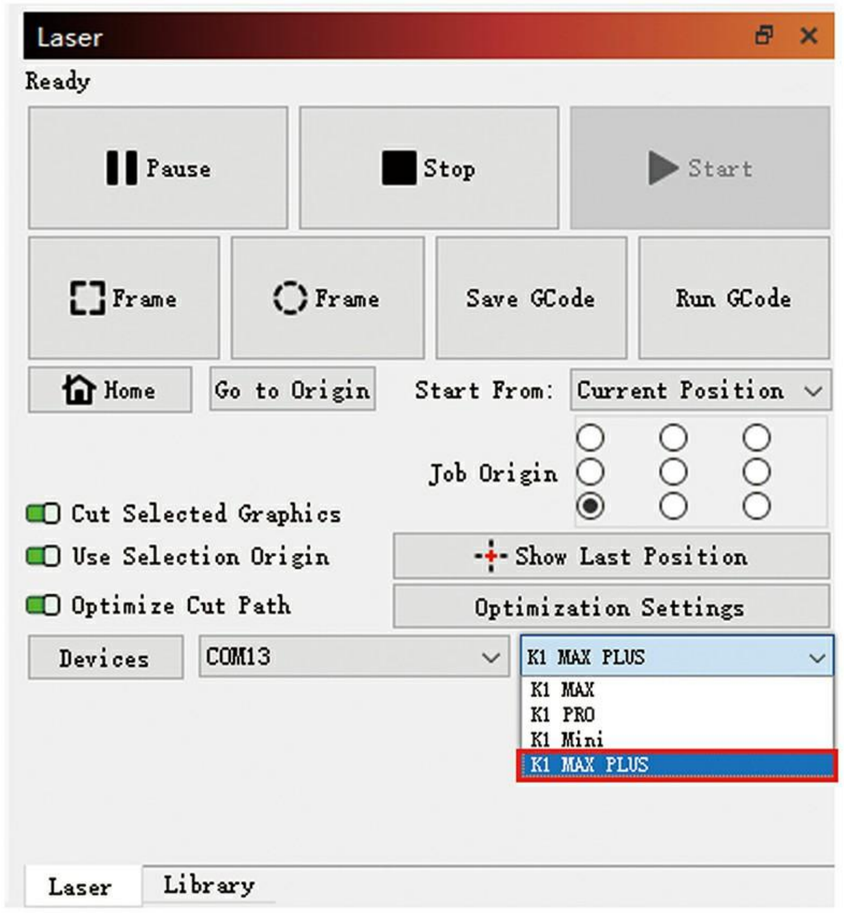
(Figure 5)

8) Complete software setup. (Figure 6)

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



(Figure 6)

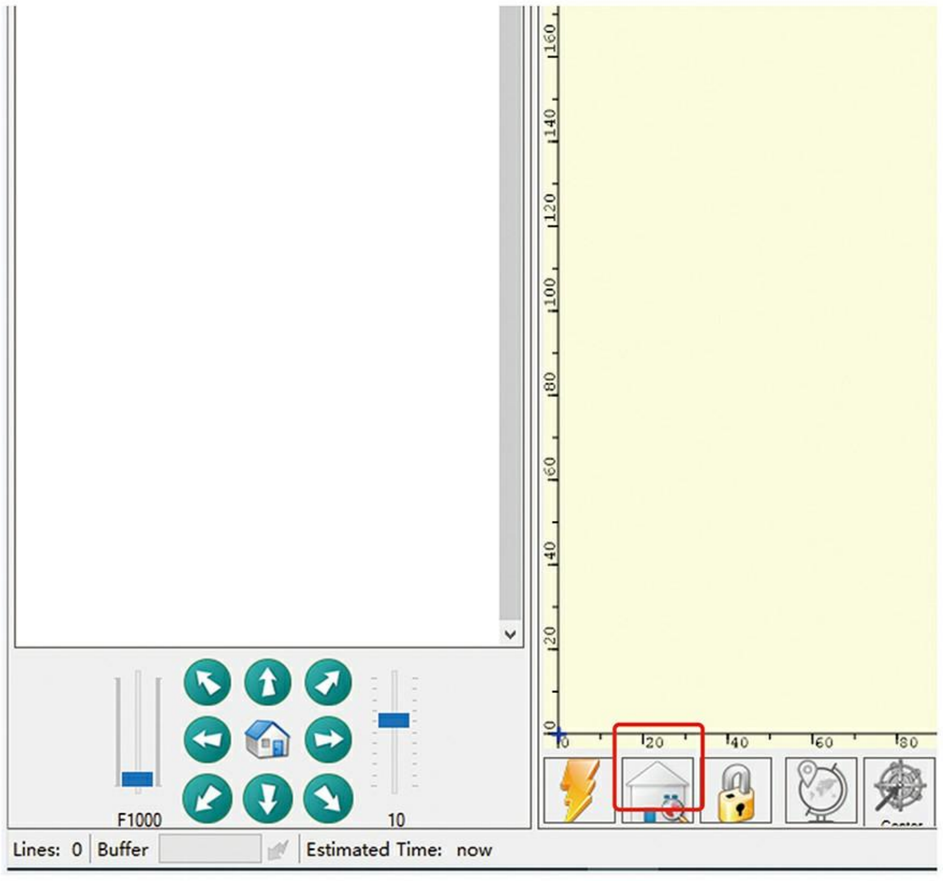


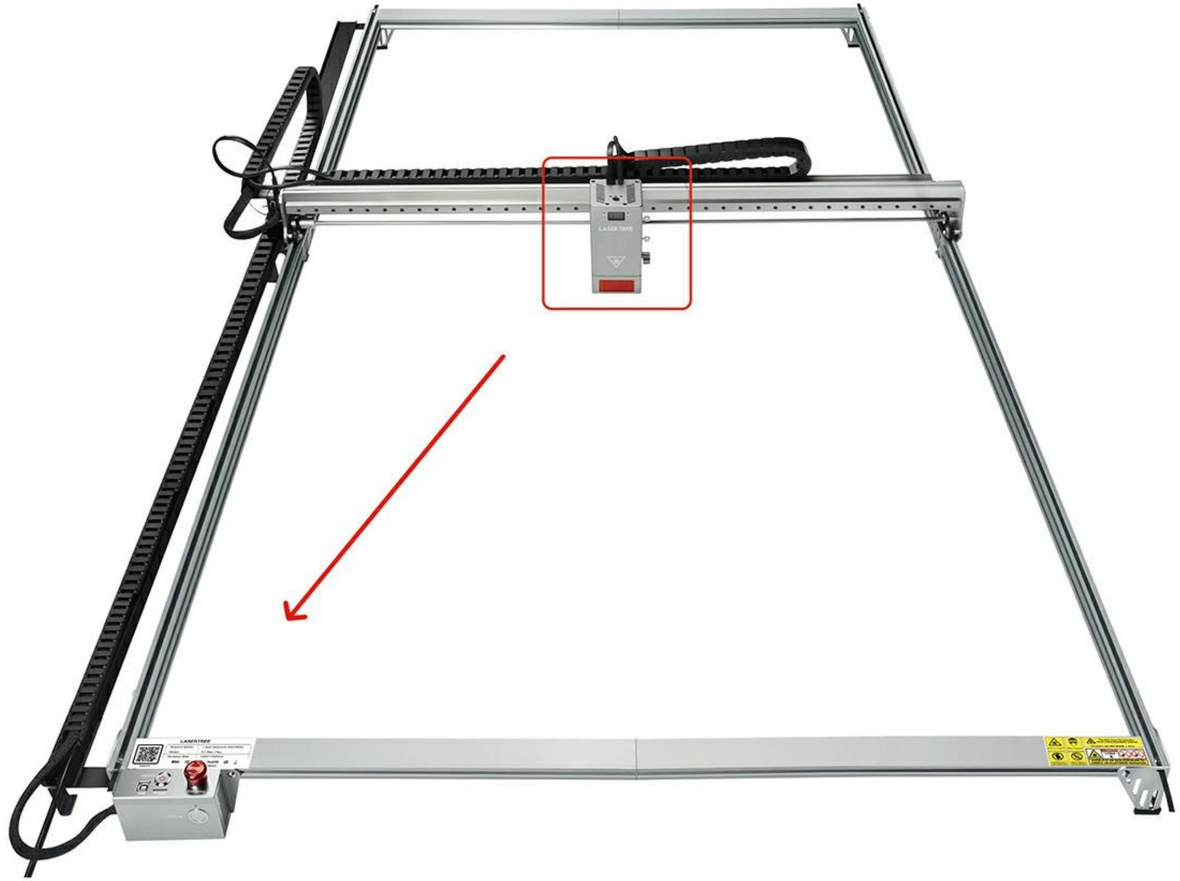
(Figure 7)

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, 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.

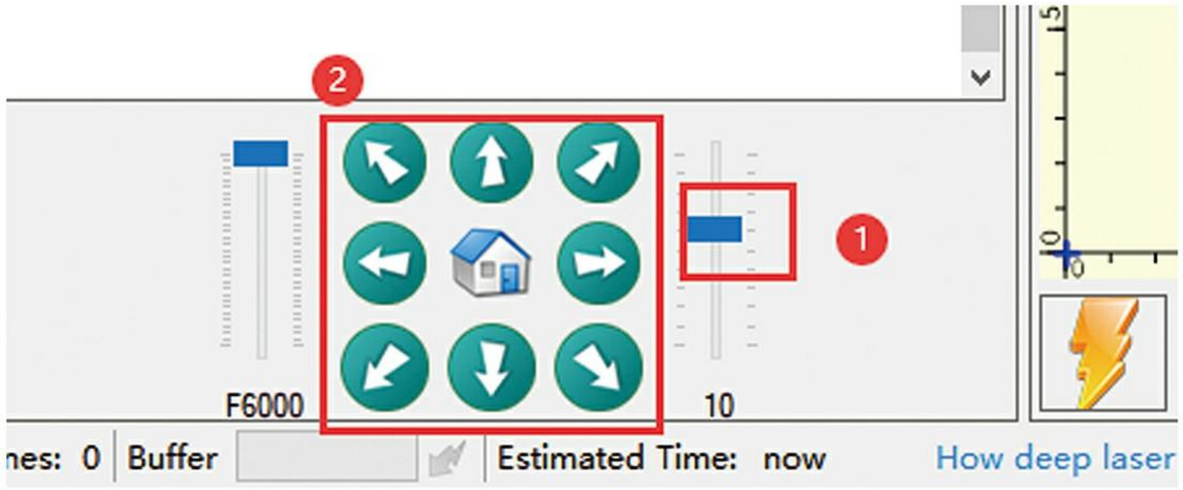




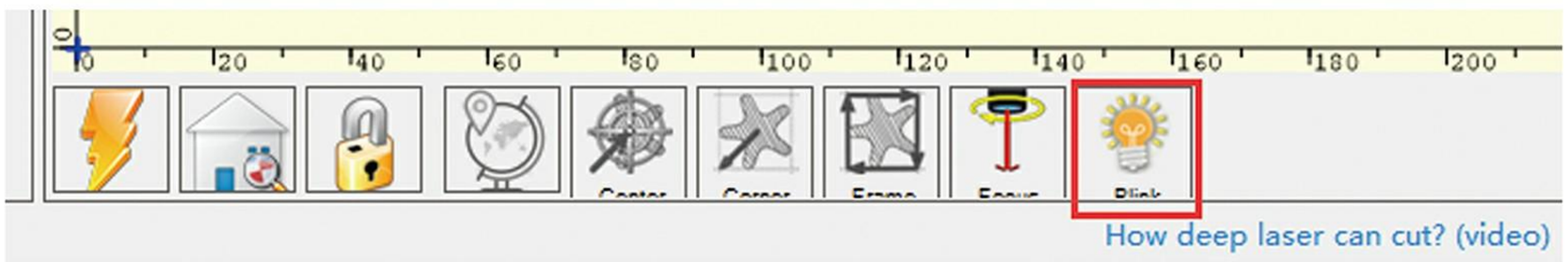
2) Engraving machine movement test:

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.

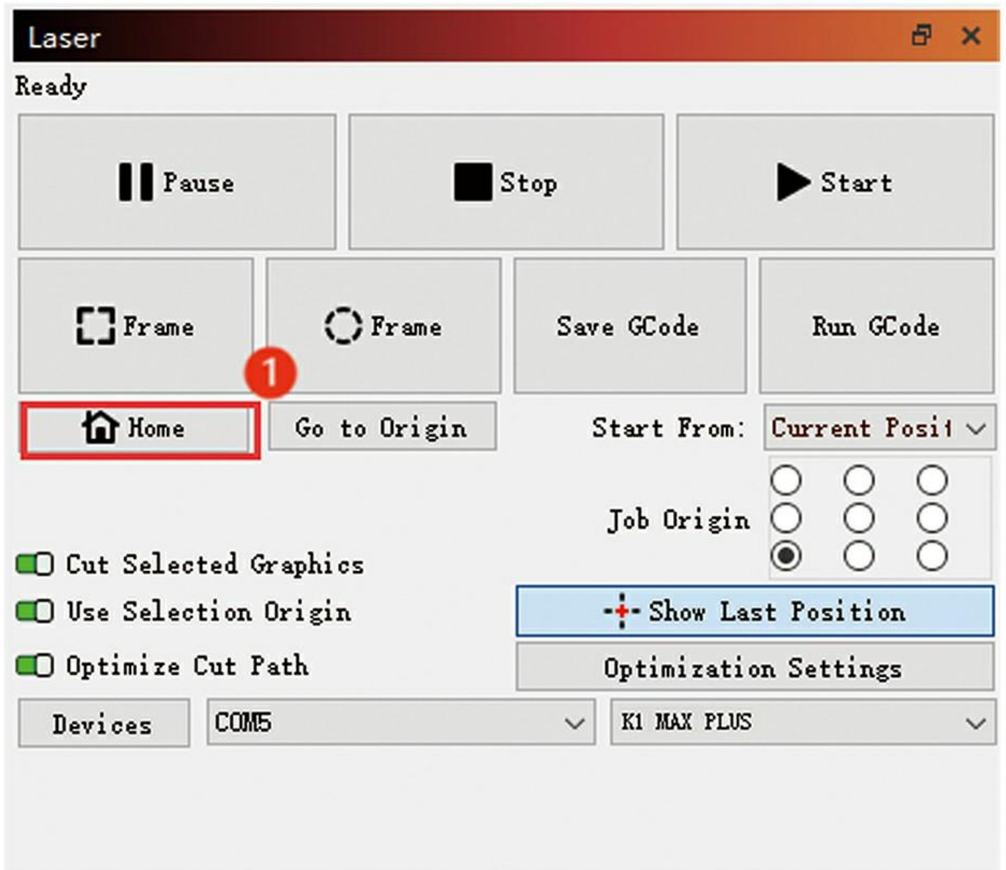


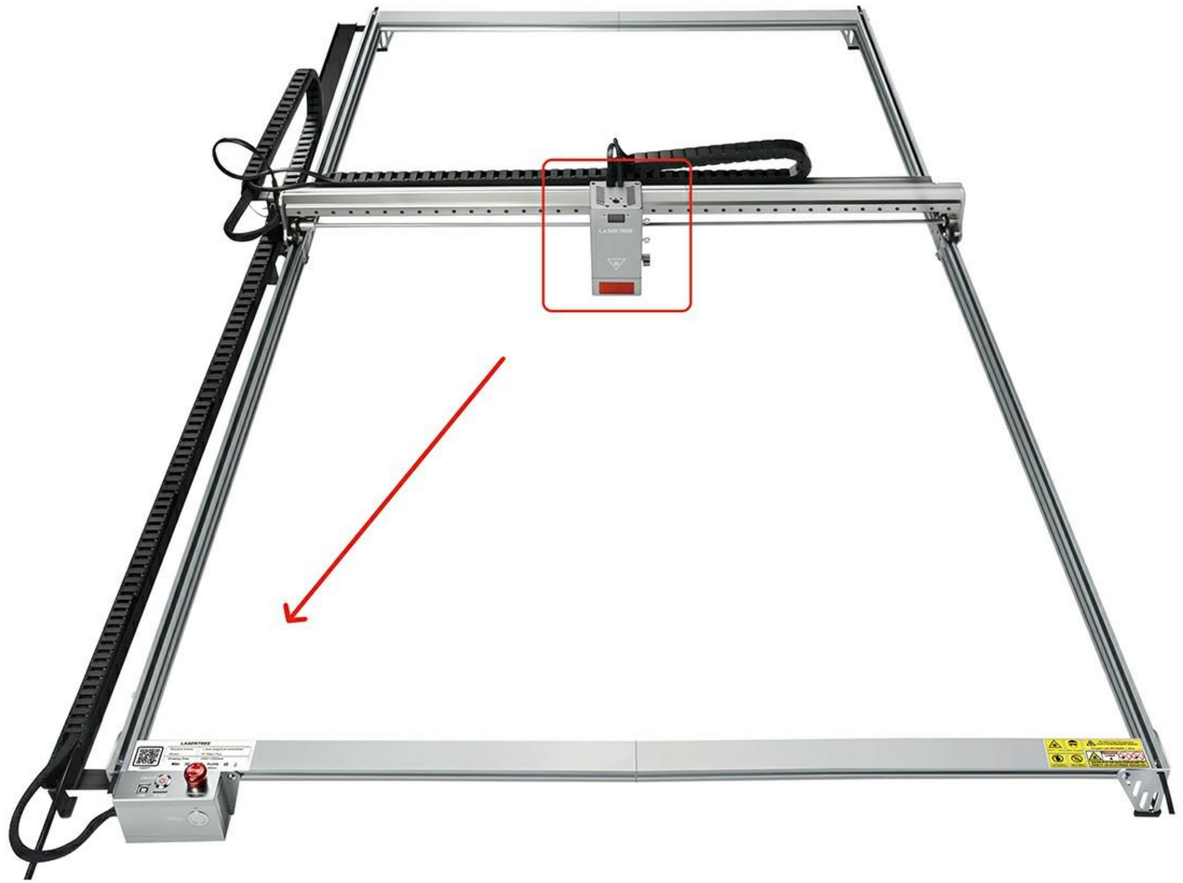
③ Engraving machine laser module light test: Find the light button on the LaserGRBL default interface and press and hold it. Under correct operation, the laser module should emit blue light normally.



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.



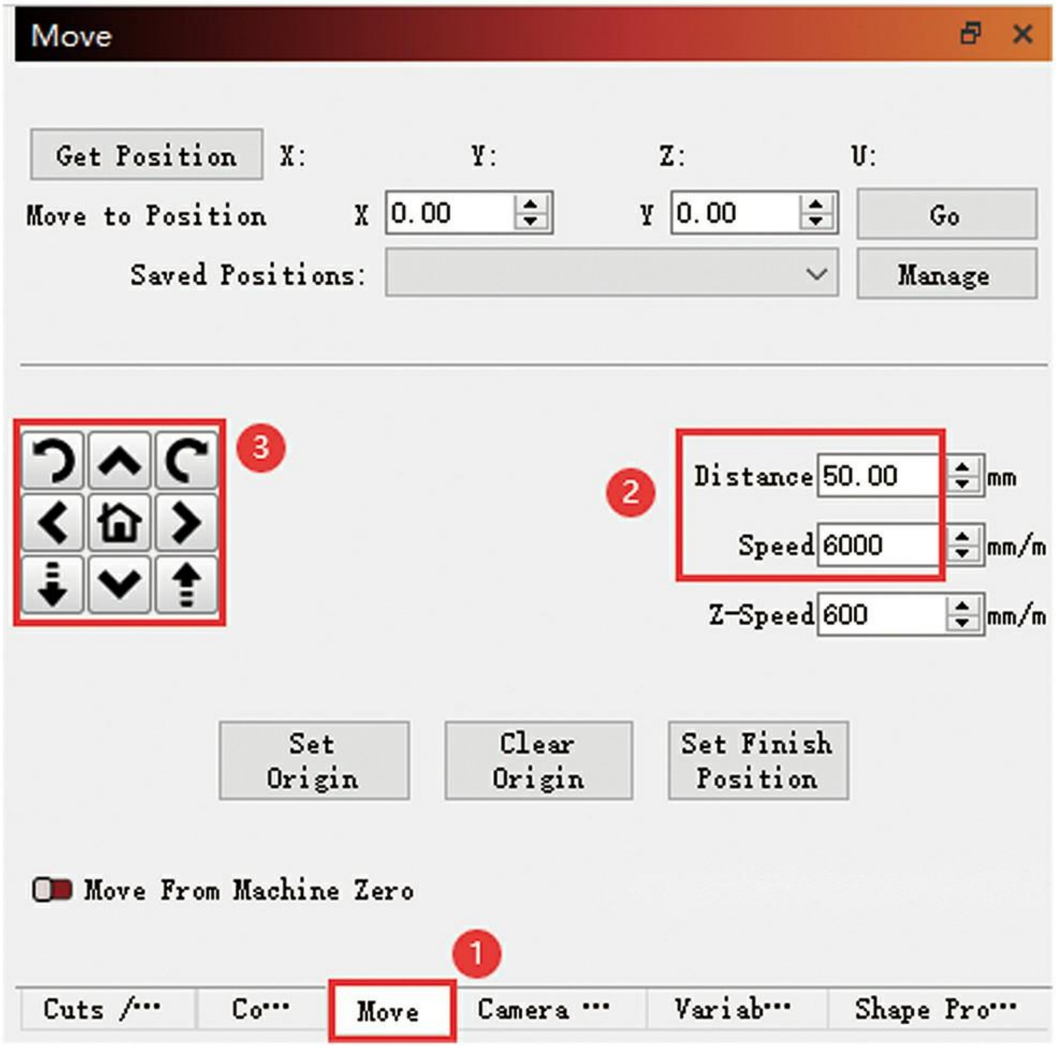


2) Engraving machine movement test:

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.)

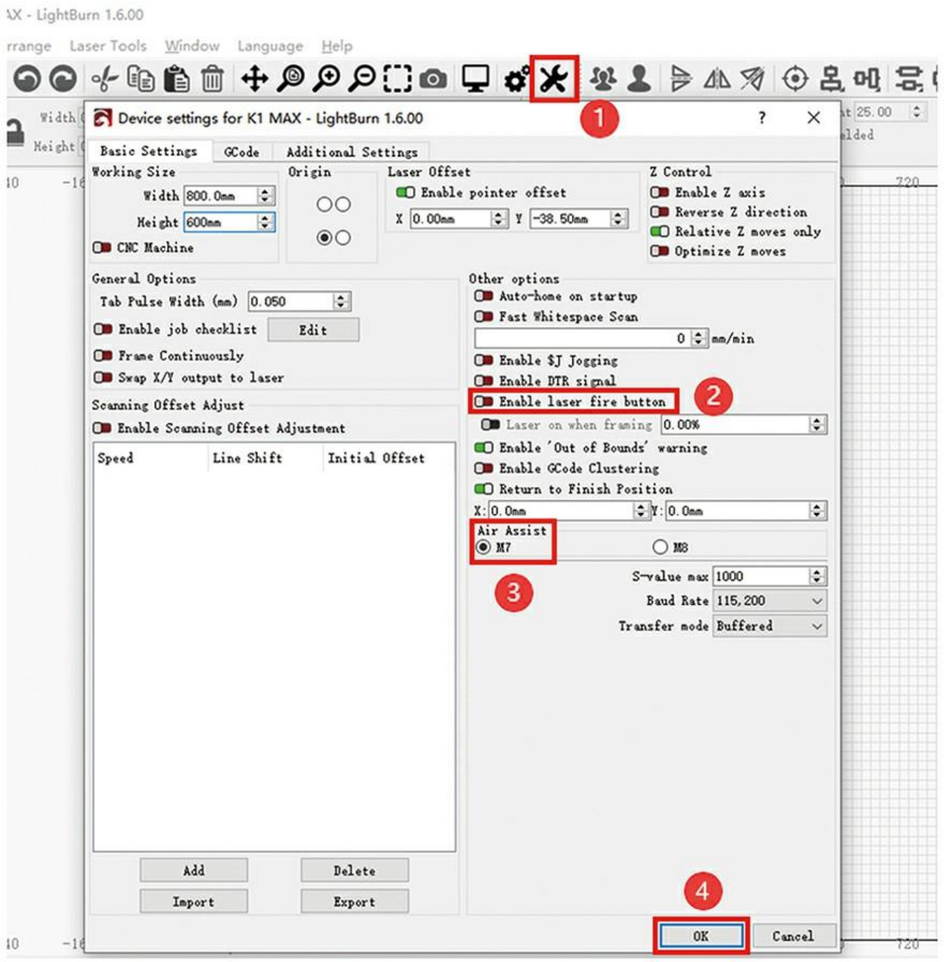
③ Click in any direction. Under correct operation, the laser module should move in the direction indicated by the arrow.



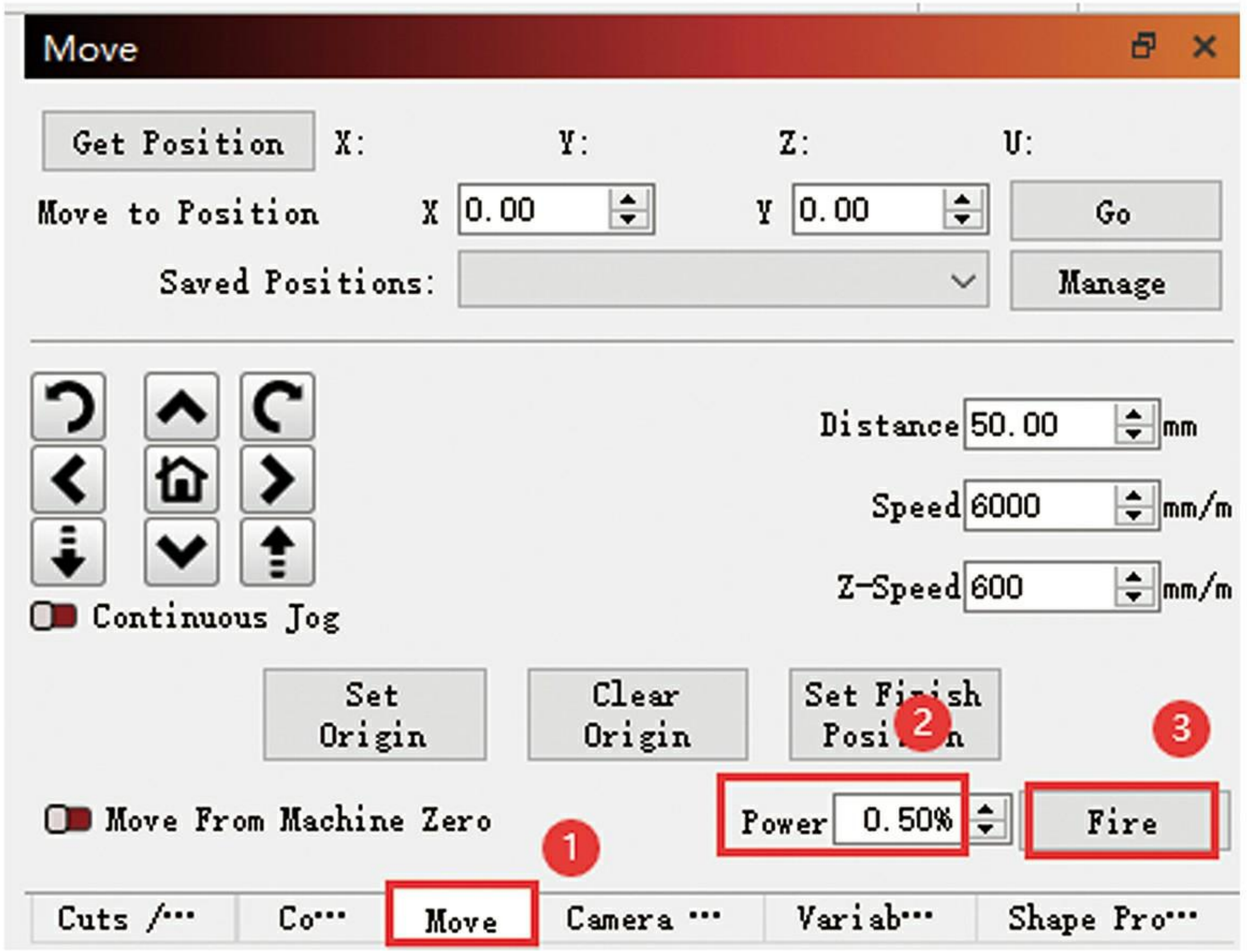
3) Engraving machine laser module light test:

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)

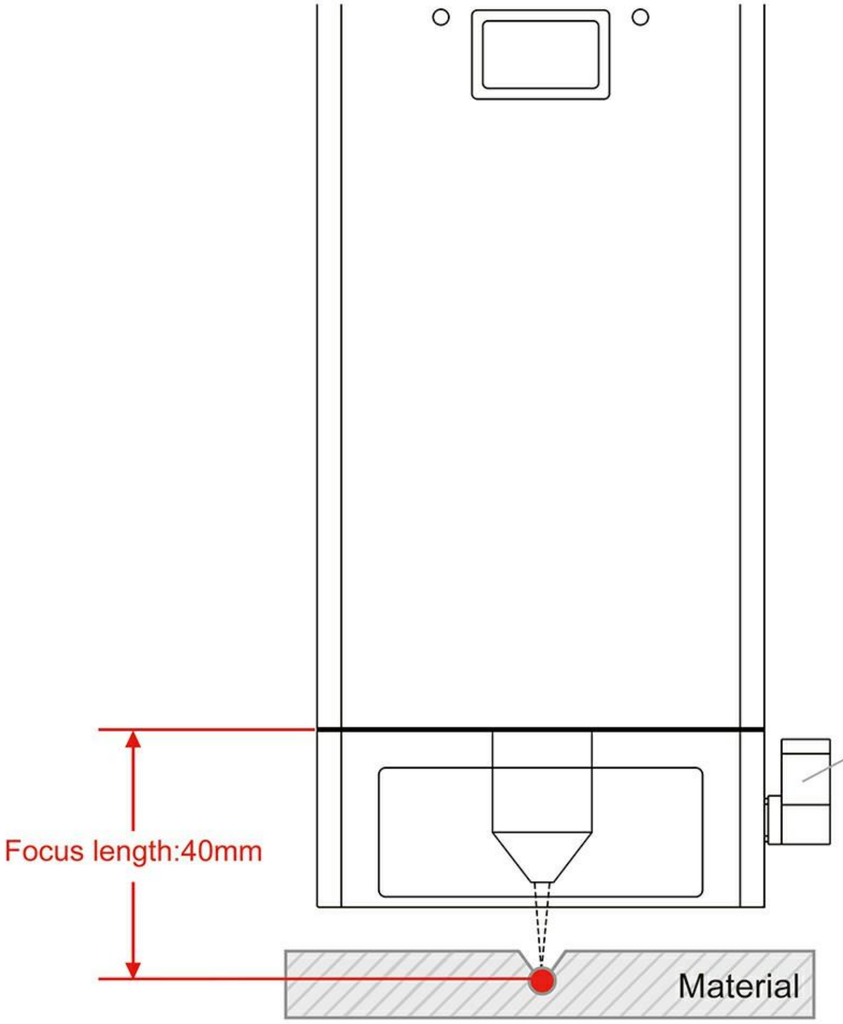


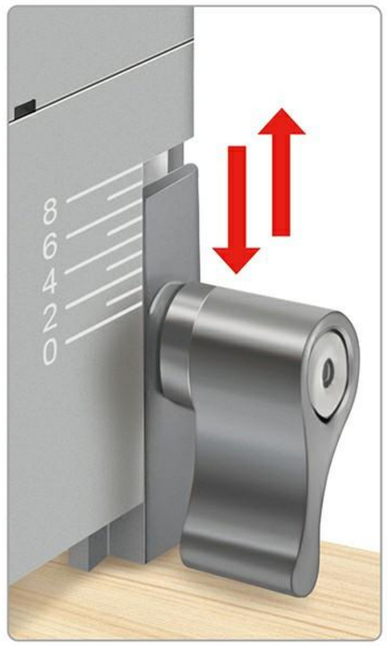
(Figure 2)

9. LASER MODULE FOCUS GUIDE

The K1 MAX PLUS 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.

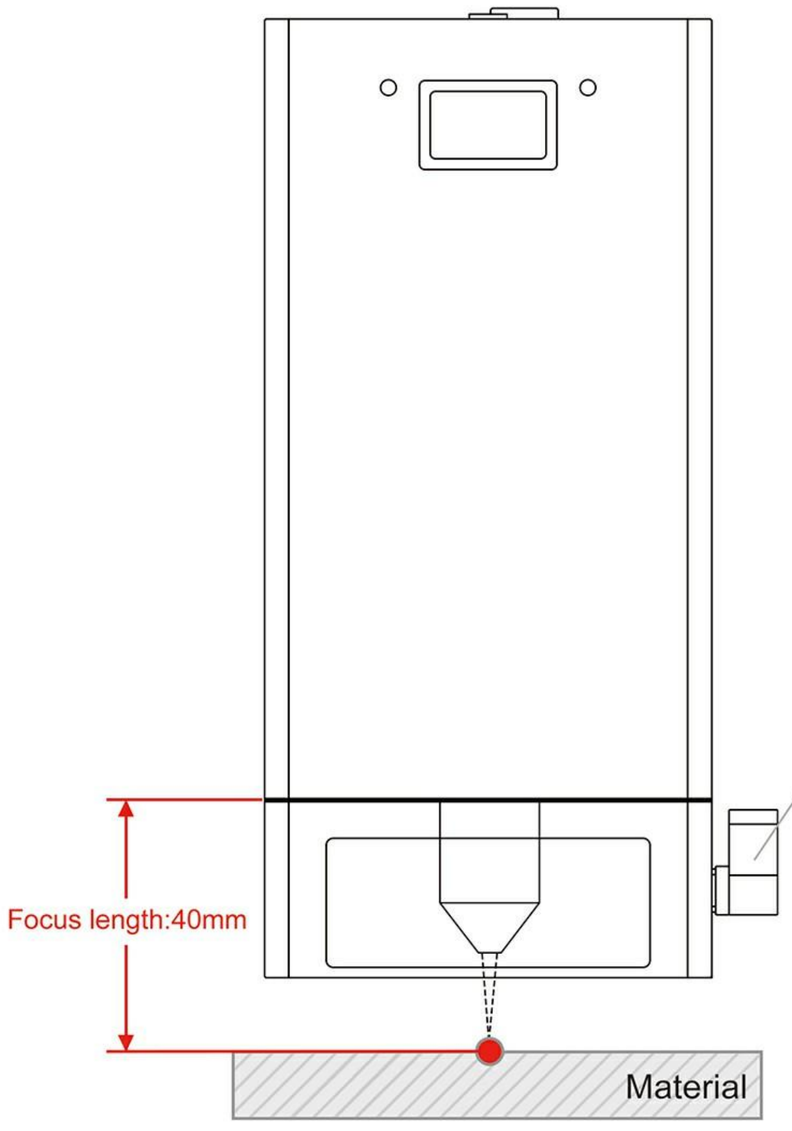


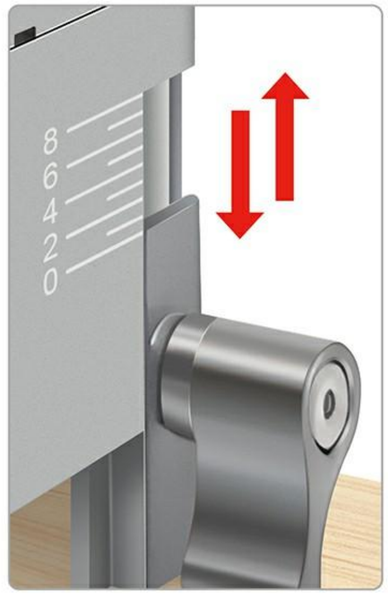


For example, if yo want to cut 12mm material, the focus should be 6mm lower than material surface. Please adjust the fixed focus lever to 6mm.

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.

LASERTREE

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MADE IN CHINA

K1 MAX PLUS_Rev1.0.Aug.2025