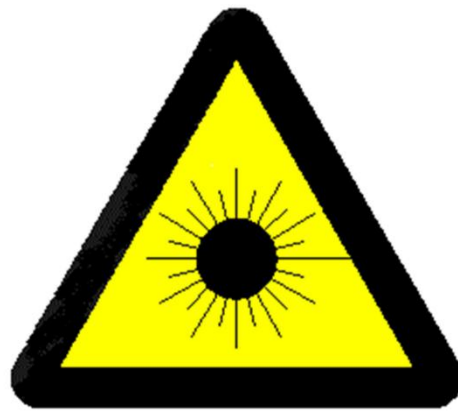


# Laser Machine

## User Manual

**Model:X700,X900**



These are GB4 kinds of laser Engraving machines. Laser is dangerous, please take care of your eye and skin, avoiding radiation of laser

# Catalog

1 Prolog.....	3
2 Summary	
2.1 Character.....	4
2.2 Main Area Instruction.....	5
3 Machine Installation and Directions	
3.1 Laser Tube Installation.....	6
3.2 Connection of water pipe, air pipe, air pump and water pump.....	6
3.3 Ventilator and ventiduct connection.....	8
3.4 Light Tube Installation.....	8
3.5 Instruction of the power input/ output of equipment.....	9
3.6 Auxiliary Control Area Instruction.....	9
3.7 Connection of USB Cable.....	10
4 Machine Operation	
4.1 Software Installation.....	10
4.2 Adjustment of Optical Path.....	10
5 Machine Working.....	错误！未定义书签。
6 Machine Mainterance and Announcement	
6.1 Ground wire Connection.....	15
6.2 Machine Maintenance.....	15
	6.3 Notes 16

# 1 Prolog

Thank you for choosing Redsail Products !

The user manual provides the users with installation, commissioning, parameter settings, troubleshooting and daily maintenance of the relevant considerations and guidance.

In order to operate the machine correctly and safely, please be sure to read this user manual and to know exactly of the operation before that you operate the machine. And please keep well of the manual so that you can read it when you need it.

If you have any suggestions of our products or need our help, please make contact with us:  
Tel: 0531-86516855/56/57, fax 0531-86516858.

## Notes:

- ✧ Please be sure turn off the power when you are connecting the wire of the machine.
- ✧ The electronic components inside of the machine are very sensitive to the static electricity, so do not put other objects into the side of the machine or make other objects touch on the main circuit board.

1. After turning off the AC power, the device's internal drives, motherboards, laser power indicator light does not go out it shows that high pressure inside the device is still very dangerous, do not touch the internal circuits and components.

2. Please be sure make the machine ground.

## 2

## Summary

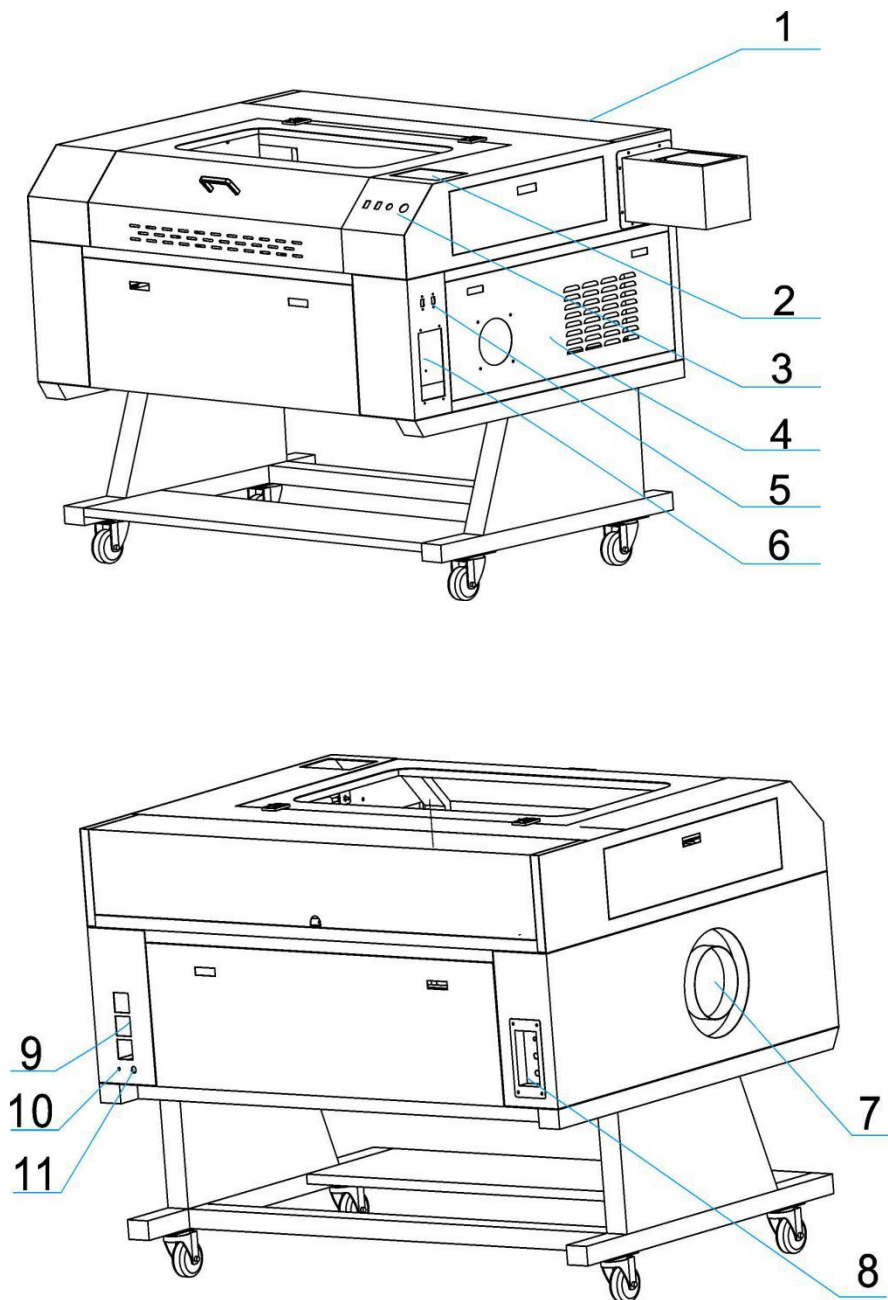
This Series laser cutting machine adopts with high performance exposure of drive wheels, with high engraving and cutting speed, high running accuracy, positive and negative move sensitivity traits and so on.

### 2.1 Specifications:

Model	X700	X900
Laser Type	Water cooling Co2 sealed glass	
Control System	DSP	
Control Software	AutoLaser	
Working Type	Engraving/Cutting	
File format supported	plt、ai、dxf、bmp、jpg、dst...	
Interfere	USB/U disk, support from Coreldraw, AutoCAD to output	
Driver Type	Stepper Motor	
Moving Type	High Speed Wheel	
Laser Power	50W (optional 60W)	60W(optional 80-100W)
Exhausted fan	Yes	
Air Assist	Yes	
Red Dot	Yes	
Rotary	Optional	
Total Power	<1000W	
Voltage	AC 220V±10%/50~60HZ	
Size (mm)	1160*870*950 (50W) 1410*870*950 (60W)	1360*970*950

Cooling-down method	Water Cooling	
Working Area (mm)	700*500	900*600
Up and Down Table	200	
Table	Knife Table (Optional Honeycomb table)	
Front and Back feeding	Yes	
Cover Protection function	Yes	
Light	Yes	

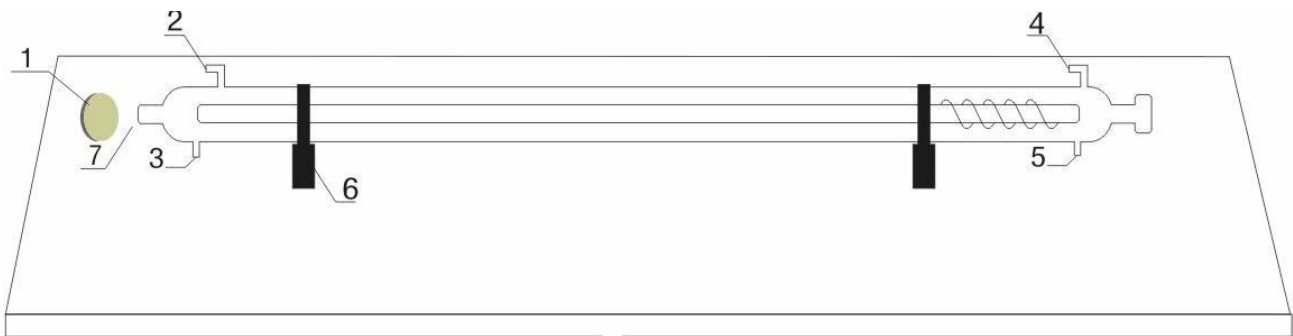
## 2.2 Main Area Instruction



Note: 1·Back Cover (For laser Tube, refer to 3.1), 2·Control Panel, 3·Auxiliary Control Area  
4·Control Box, 5·USB output, 6·Main control area , 7·Ventilator connection area  
8·water pipe/air pipe installation, 9·Output socket, 10·port for ground wire, 11·Air plug  
installation

## 3 Machine Installation and Directions

### 3.1 Tube Installation



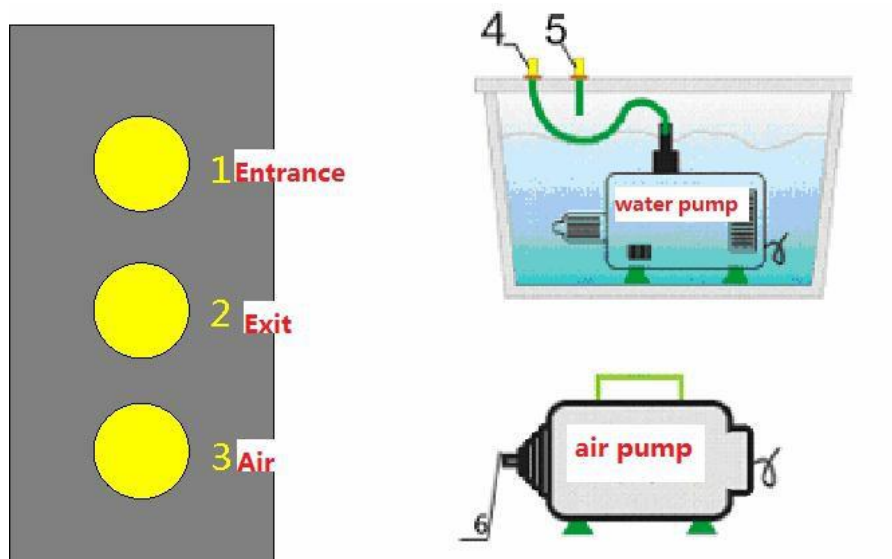
**1. Reflecting mirror frame 2. Water outlet 3. Cathode - 4. Water inlet 5. Anode + 6. Laser tube stand 7. Laser exit**

(Figure 1)

Please refer to Figure 1 when you install the laser tube. According to Figure 1, solder the anode wire (pink /thick line), the cathode wire (black/ blue line) in the correct location of laser tube.(While soldering, please don't keep the electric soldering iron touching the welding point in so long a time in case it burn out the laser tube),poor soldering is not allowed. After finish soldering, please package the welding point with high voltage tape. After soldering, connect the in/out water pipe with the entrance/exit on the laser machine (The connection of laser tube must complete with the principle water come in from the anode and out from the cathode).

## 3.2 Connection of water pipe, air pipe, air pump and water cooler

### 3.2.1.1 (If your machine is matched with water pump)

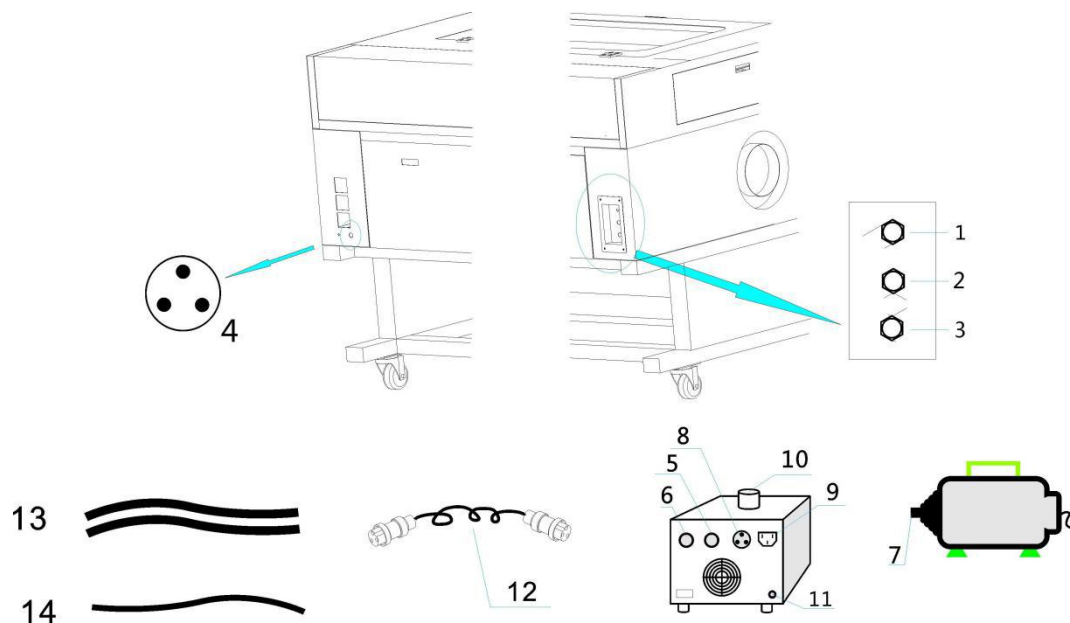


附图 2 (2-1)

1. Water inlet 2. Water outlet 3. Air inlet 4. Water outlet 5. Water inlet 6. Air outlet

Step: 1--4 2--5 3--6

### 3. 2. 1. 2 (If your machine is matched with water chiller)



Note:

Figure 2 (2-2)

1: water inlet 2: water outlet 3: air pipe 4: Air plug (signal input) 5: water outlet (water chiller) 6: water inlet(water chiller) 7 air pump outlet 8: Air plug (signal output) 9: power input 220V 10: water inlet (water chiller) 11: water outlet 12.Signal cable for water chiller 13.Water Pipe (2 pcs) 14.Air Pipe

Step: 13(1--5) 13(2--6) 14(3--7) 12 (4--8)

### 3.2.1 Connection of water pipe, air pipe, air pump and water cooler

- 1) Please make the water chiller full of 3/4 water.
- 2) Please connect the water pipe, air pump and signal wire with the connectors at the back of the machine according to the above Figure

### 3.2.2 Functions of accessories:

#### (1) Function of air pump:

To prevent smoke dusts which were generated in the processing of materials into the gas nozzle to pollute the focus lens

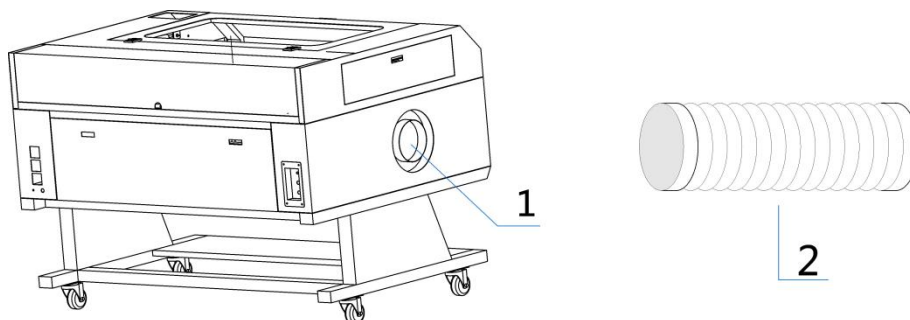
Blow away the dust, avoid the different depth in the processing.

To prevent the smoking from the incensive materials in the processing.

#### (2) Function of Water Chiller:

Before machine working, please do make sure there is full of recycled water in the laser tube, otherwise, it will damage the laser tube and can not be repaired. Please do keep the water clean before you put it in the water cooler, dirty water will have bad effect on the laser, and decrease the life of laser tube (Pure water is recommended). At the same time, please pay attention to the water temperature, and keep the water temperature less than 35°C during the machine working, if temperature too high or too low, the laser machine may not work properly, even to damage the laser tube. In winter, when you use laser machine, keep the water temperature in the water chiller not less than 2°C. After finish one day work, you must blow away the water in the laser tube in case frosts crack the laser tube.

## 3.3 Ventilator and Ventiduct Connection



(Figure 3)

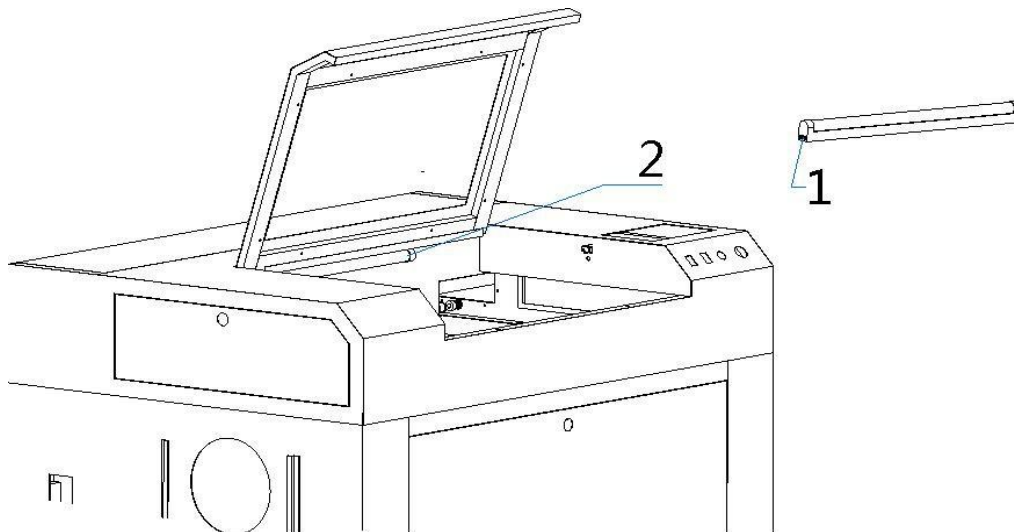


Note: 1.Installation hole 2.Vent-Pipe

Connection for the exhausted fan, Vent-pipe and machine:

(1) Following the above figure shows,put the ventiduct respectively connected with air exhaust fan air inlet and machine's air outlet, and for a reasonable Fixed,to improve the machine exhaust efficiency

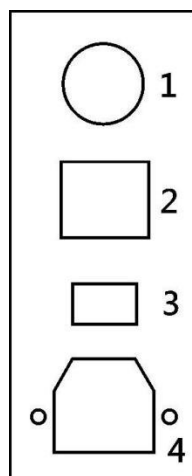
### 3.4 Light Tube Installation



(Figure 4)

Installation: As figure 4, put light tube (1) on the hold(2), and insert the tube power input plug into tube hole.

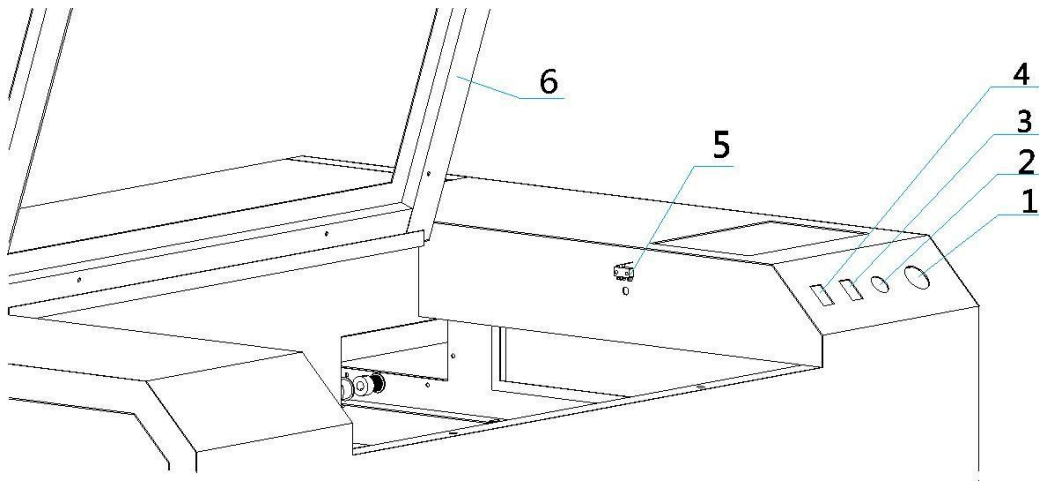
### 3.5 Instructions of the power input / output of equipment



(Figure 5)

1: Main power switch : the total power of control equipment 2.Lamp switch: Control lighting inside the device 3: Laser Switch: Control laser beam switch. 4: Input voltage: 220V

### 3.6 Auxiliary Control Area Instruction

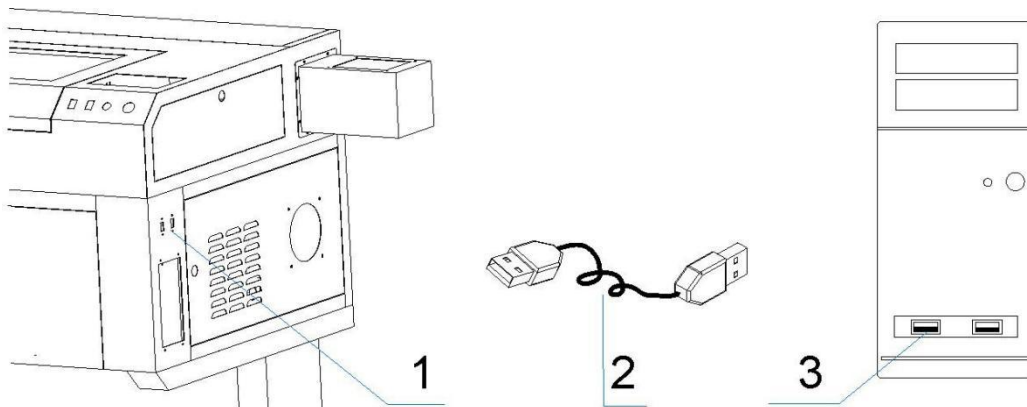


(Figure 6)

- 1· **Emergency stop switch:** Control the power on/off for the main part, such as switch power supply, laser power supply and so on.
- 2· **Cover protection switch:** control device to open and close the cover , the device processing and pause function. The machine will work either the cover is opened or closed when the key is turned to the right. When the key is opened and the cover is closed, the machine will begin to work by pressing “OK” button on the control panel, the machine will stop working when opening the cover.
- 3· **Red Dot indicator lamp(Optional):** When open this switch, the indicator will be on(installed on laser head), for fix origin point and fix the position of laser beam.
- 4 • Spare
- 5· **Spring switch** 6· **Cover**

### 3.7 Connection of USB Cable

Please connect the two ends of the USB Cable (which came along with the machine) with the USB port of control board in the machine and computer. (Figure 6)



( Figure 7)

Note: 1·Device USB port 2·USB cable 3·Computer USB port

This system supports offline work, here is the way: By downloading the parameters of the file in the software to the USB flash memory, then plug the USB flash memory into the USB port of the equipment. (like shown in the above figure), with the guide of the notice showed in the LCD control panel, you can directly send the data into the motherboard, finish the downloading and make the offline work.

## 4 Machine Operation

### 4.1 Software Installation and Operation

Before installing the software, please turn on the power(before turn on the power, please must check if the power is normal, water circulation is ok, connect USB cable), please copy all content in CD to your computer as spare. And refer to “User Manual for Controller” to install it step by step.

Before using the device, please read this user manual and the control system user manual carefully, know all functions for the software, please refer to the control system user manual for the detail operation.

### 4.2 Adjustment of Optical Path

After connecting all accessories of the machine, please switch on the power of water cooler (in front of water cooler), when the water inside the laser tube circulate normally, then please switch on the machine(including Leakage protector, Emergency switch and General supply switch)

Optical path adjustment:

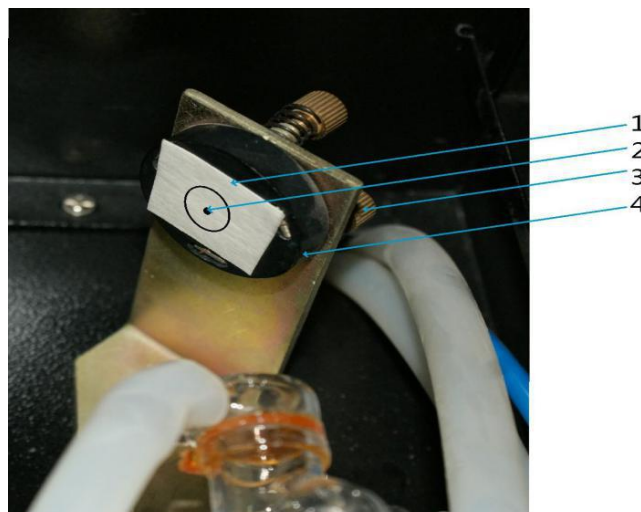
**Adjusting laser beam is the important step in use. After finishing of the adjusting for optical path, you can engrave and cut sample.**

Optical path adjustment directly affects the quality of engraving and cuttin. Now just make the explanation for one of optical path.

#### Steps:

The first step: Regulate test power to below 50%, to keep the power not too high.

The second step: Optical path adjustment between laser tube and the first reflecting Mirror. Put the test paper (paper self-adhesive tape) in front of the first reflecting mirror, then press “Pulse/Run ” button slightly(loose immediately after pressing slightly, only you can see the spot on the test paper), then check whether there is a spot in the center of the first reflecting mirror. If in the center, you have finished the first step. If there is no spot or the spot is not in the center, please adjust the location and the height of the first reflecting mirror holder (or laser tube) to meet above standard. (Below Figure)



(Figure 8)

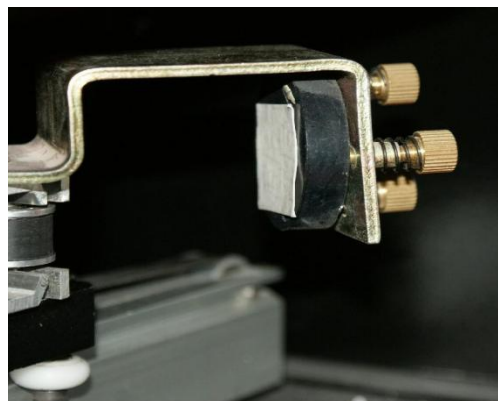
- 1.Masking paper (choose the test paper for adjust the laser beam)
- 2 Test spot
- 3.Adjusting screw
4. First Reflecting Mirror Holder

The third step: Optical path adjustment between the first and the second reflecting mirror.

First of all, put the test paper(paper self-adhesive tape) in front of the mirror of the second reflecting mirror holder, using direction keys on the control panel to move the track to the top left corner, press "Pulse/Run" key and check the location of the spot. Then move the track to the lower left corner, press "Pulse/Run" key again, To check whether the two spots( the top left corner and the lower left corner) coincide with each other. If the two spots coincide with each other and near to the center of the mirror, it shows optical path between the first reflecting mirror and the second reflecting mirror is correct; if not, please adjust the screws at the back of the first reflecting mirror holder to make sure the spots coincide with each other. Then adjust the location of the first mirror holder (X-axis direction), to make sure the light reflected by the first reflecting mirror hit on the second reflecting mirror(Center). Below Figure:



The first reflecting mirror holder



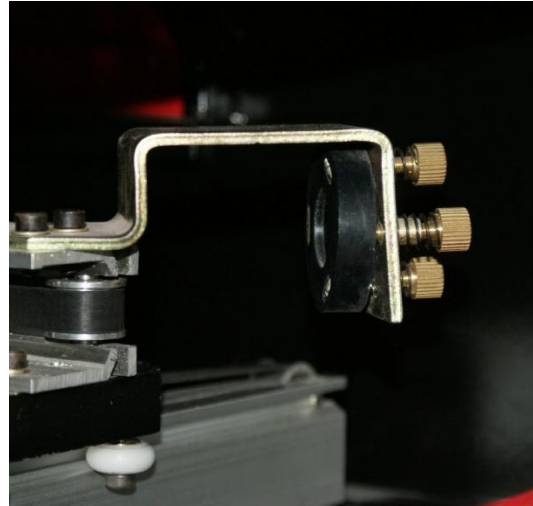
The second reflecting mirror holder  
(Figure 9)

The fourth step: Optical path adjustment between the second and the third reflecting mirror.

First, move the laser head to the left of the X axis, put the test paper in front of the hole of the laser head, press "Pulse/Run" key slightly and check the spot. Then move the laser head to the right of the X axis, press "Pulse/Run" again, and check whether the two spots coincide with each other, if coincide and the two spots are within the hole of the laser head, then optical path is correct. If not, please adjust the screws on the second mirror holder to reach above standard( Attention: the principle of optical path adjustment is the same between mirror 1 and 2, 2 and 3 ). Then adjust the location of second mirror holder (Y-axis direction) and the height of the laser tube, to make sure the spots are within the hole of laser head (center is better). Below Figure:



Laser Head



The second reflecting mirror holder

(附图 10)

The fifth Step: Optical path adjustment between the third reflecting mirror and the focus lens.

Paste the test paper under the laser head, and press "Pulse/Run" key, to check whether the spot is in the center of the test paper. If in the center, optical path is correct; if not, need move the location of laser head (there is three screws on the laser head, you can adjust laser head's location with these three screws) to adjust the optical path and let the spot is in the center. Below Figure



The sixth Step: laser processing

1·The third reflecting mirror holder

2·Laser head

1 After adjusting optical path and measuring focal length with focusing plate, then you can process objects. Below Figure:

2  
(Figure 11)



(Figure 12)

## 5 Machine Working

According to the User Manual for software, please download the working file into Laser Device.

5.1 Before operation, please put the working materials on the working table of the device.

(Note: Keep the working materials flat, otherwise will affect the working result)

5.2 Press “Up, Down, Left, Right” key on the control panel to move the laser head to the suitable position according to the original working position which is set up in the software, it should be coincident, then press “Origin” key to fix the original position for laser head

5.3 Adjust the focal length (Attached figure 1)

5.4 Press “Start” key to start the work.

## 6 Machine Maintenance and Note

The key of normal and stable work for laser equipment is do routine maintenance and maintenance of equipment. If it has Good maintenance not only can extend the service life of machine, reduce equipment failure rates, but also can improve product quality. In order to use this equipment better, please read the following brief introduction for routine maintenance of laser equipment and precautions for reference.



## **6.1 Ground wire connection**

As the equipment has some sensitive components such as the switching power supply, laser power supply, filter and other components. However, in the usage of these parts will have a certain static interference. In order to minimize static interference and reduce a series of failures caused by static electricity, so should note the following points before installation.

6.1.1 The voltage should be 220V, should install the regulator if out of range or unstable.

6.1.2 It should be “Left wire is Zero, right wire is Fire” as the standard wiring for the power plug, and the ground wire terminal should be reliable, fully grounded. If not, should be adjusted.

6.1.3 If the customer have a reliable earth grounding (or use an iron bar with the length more than one meter to go into the ground, fully ground). The installation for the device can be done when the above conditions are met. Don't install too many equipment which is not related to this device when installation because the current-carrying capacity of power strip is limited. In order to protect the personal safety of operators and equipment to work properly, the ground wire must be grounded reliably in any condition.

## **6.2 Equipment maintenance**

6.2.1 Replacement of water and water tank cleaning.( Recommends cleaning the water tank and replace the recycled water once a week)

Attention: Must ensure the laser tube filled with circulating water before the machine working. The quality and the temperature of the circulating water will affect the life of the laser tube directly, recommend to use the pure water, and keep the temperature below 35°C. If more than 35 °C, then the recycled water need to be replaced or add the ice into the water to cool down the water (Recommends that users select the water chiller, or use two water tanks).

Cleaning tank (Changing the water): Firstly turn off the power, unplug the tube inlet, let the water of the laser tube flow into the tank automatically, unplug the water pipe and signal cable. Open the water tank, clean out the dirt of the water chiller, replace the circulating water, connect the water pipe and signal cable, order all joints. Turn on the power, and run for 2-3 minutes (Make sure the laser tube filled with circulating water).

## 6.2.2 The cleaning of the exhausted fan

As a long time usage for the exhausted fan, will accumulate a lot of solid dust inside the fan to make the great noise, and also it is bad for exhaust and clean the smell. When the fan have insufficient suction and poor smoking, we should turn off the power, unload pipe inlet and outlet on the fan, clean the dust inside, then invert the fan, and stir the fan blade, until it is cleaned up, then install the fan well.

6.2.3 Lens cleaning (Recommend cleaning before work every day, the device must be in a shutdown condition), there are three mirrors and one focus lens on the machine (No.1 mirror is in the exit of laser tube (Upper left corner of the machine), No.2 mirror is in the left of crossbeam, No.3 mirror is on the top of the fixed part of laser head, focus lens is inside the adjustable lens cone), Laser is launched from the laser head by reflected through these mirrors, focused. Lens is easy to get the dust or other contaminants, caused the laser reduction or lens damaged. Don't need to take off the No.1 and No.2 mirrors when cleaning, just use the paper with the washing liquid to make the rotating cleaning along with center to the edge of the lens carefully. No.3 mirror and focus lens need to be taken off from the holder, clean them with the same way, Please put it back after cleaning.

Attention::

- (1) Should wipe the mirrors and lens slightly, don't make any damage for the coating surface.
- (2) Cleaning process should be done carefully to avoid falling.
- (3) When installing the focus lens, be sure to keep convex surface downward.

6.2.4 The cleaning of guide way (Recommend cleaning once every two weeks. Do it under shutdown condition) Guide, linear axis as one of the core components of equipment, its function is to play the role of guidance and supporting. In order to ensure the machine has high precision, requiring that their guide, linear guide with high precision and good stability of the movement. During operation, due to in the processing the working materials will have a lot of corrosive dust and smoking, these large quantities of smoking and dust will deposit in the rails, surface of linear axis, not only great influence for the precision of the equipment, but also the rail line shaft surface will form corrosion point, shorten the equipment's life. To make the machine working normally and stably, ensure the processing quality, Routine maintenance work for the guide and linear axis should be done carefully.

Attention::

- (1) Cleaning guide: please prepare the dry cotton, lubricating oil.
- (2) Cleaning of the linear guide: Firstly, move the laser head to the right side (or left side), wipe with a dry cloth until it is shiny cleaned, plus with a little lubricating oil, push the laser head slowly several



times, let the lubricating oil scatter uniformly.

#### 6.2.5 Tighten screws, the coupler

After working a period of time, the screws and Coupling of the moving joint will loose, it will affect the stability of the mechanical movement, therefore, should observe if the driving components have strange sound or abnormal phenomena when the machine running, to strong and maintain in time if find any problems. While the machine is running for some time, should reinforced the screws one by one with a tool. The first reinforcement should be done after the device running about one month.

#### 6.2.6 Optical inspection

The optical system for Laser Engraving is completed by mirror's reflection and Lens' focus, focus lens will not have the offset problem in the laser path, But the three mirrors is fixed by the mechanical parts, more likely to make the offset, so recommend the user need to check the laser path before working every time to ensure it is normal.

### 6.3 Equipment Notes

6.3.1 Fill the water before turning on the machine, we should observe the circulation of the water at any time during the machine working, to ensure that the circulating water is normal, and protect the normal working for laser tube.

6.3.2 Follow the sequence of the machine's power on/off: when start the machine, firstly open the water chiller, then open the power switch, open the laser switch at last. When close the machine, firstly close the laser switch, then close the power switch, close the water chiller at last.

6.3.3 Control the water temperature inside the laser tube, generally should not exceed 35 degrees. In winter, when we finish working, should let out the water inside the laser tube, to prevent the laser tube damaged by frost.

6.3.4 Keep the machine clean, especially the lens, dirty lens will affect the reflecting efficiency, processing samples and lens' life, when cleaning the mirror and lens. Should use a cotton swab dipped in anhydrous alcohol to wipe slightly, to protect the surface of lens.

6.3.5 Do not place the inflammable and explosive materials in the laser reflecting area and around the machine, do not place reflective materials on the platform.

6.3.6 During processing, the operator should not leave the machine without allowed, Should always pay attention to the machine's working condition, Shutdown the power immediately for any abnormal condition.

6.3.7 Ground Wire is very important, it must be fully grounded, and the machine's power supply and the computer need to share the same power row and grounded.