# Laser Engraving Cutting machine

# User Manual

# Product description

Laser Machine Dear Customers:

Thanks for choosing our Laser machine. Please carefully read this instruction before using, which is helpful to you use this machine well. Our aim is continuous improvement and improving existing products. So, maybe the machine is differing from the instruction. If there is going to be some change, we will tell you by attached sheet. We regret any inconvenience. Please contact with our After-sale service department if anything is unclear, we will try our best to meet your requirement. Because the I/O power, laser power or laser tube is electrical, please be more careful when you operate the machine to avoid electrical shock.

Do not place flammable and explosive materials on the work surface, because this product uses a water chiller to cool the laser tube, so when using the machine, please pay attention to the safety of electricity, and avoid water hitting the electrical accessories and short-circuiting.

When the machine is not in use, please cut off the main power supply of the machine. And cut off the power supply of the chiller and air pump. If the ambient temperature is relatively low, please take care to take out the water in the chiller. Prevent the chiller from freezing.

The laser tube is a fragile glass material, so when installing and disassembling, be sure to handle it with care. It is divided into positive and negative poles, please be sure to connect them correctly.

Please read this manual carefully and refer to the RD control board hardware and RD software software instructions to use this product.

1. The machine is composed of five parts: mechanical platform, optical system, drive system, control system and auxiliary system.

Mechanical platform: It is composed of accessories such as machine cover, guide rail, bottom frame, mirror seat and so on.

Optical system: consists of laser tube, laser power supply, laser head, three mirrors and a focusing lens.

Drive system: It is composed of three imported balanced linear guides with high precision, stepping motor and multiple gears.

Control system: It is composed of high-speed DSP control card, switching power supply and stepper motor driver.

Accessory system: consists of circulating water pump, air pump and exhaust fan.

2. Introduction of electrical components:
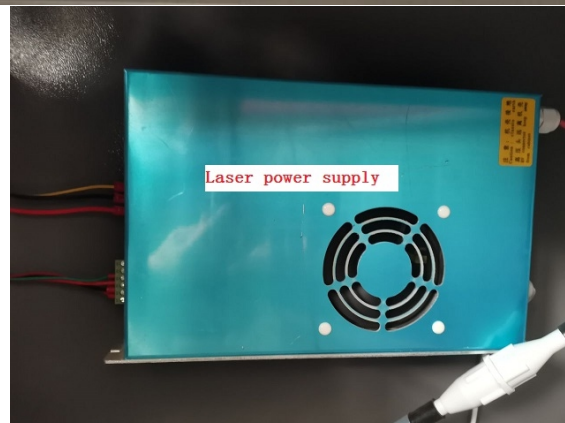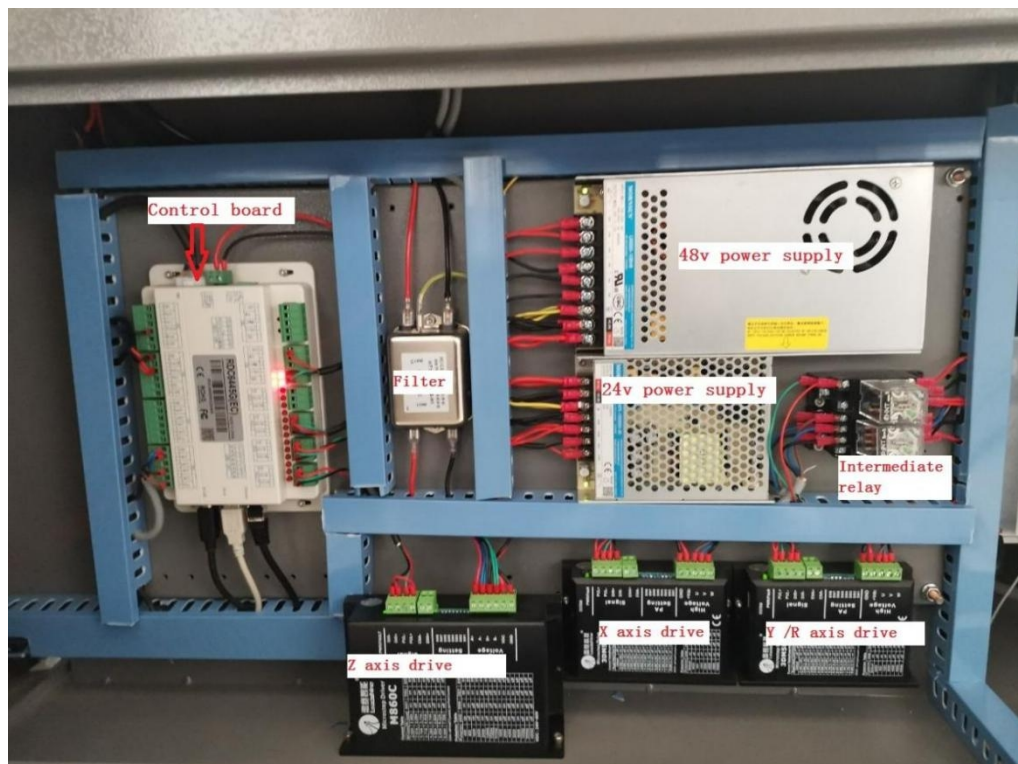
## 3. Install the laser tube first

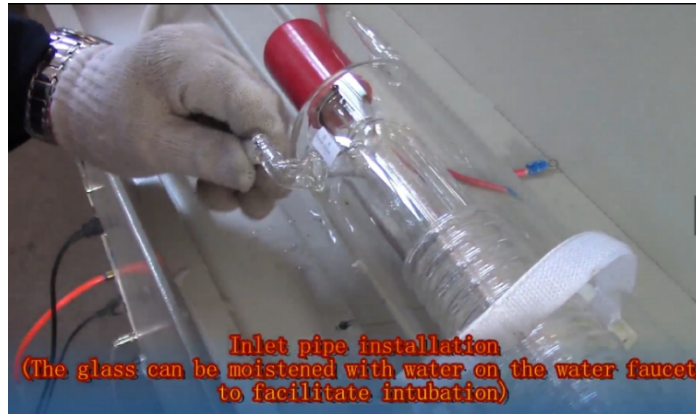Open the lid of the laser tube on the back of the machine and install the laser tube. Follow the steps below:

(1) Place the laser tube on the bracket, and pay attention to the water outlet of the laser tube must be placed upward.
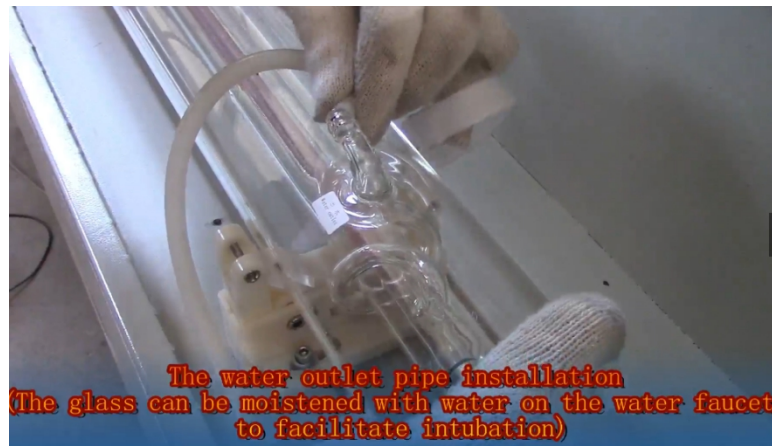
Note: When disassembling the laser tube, first unplug the water outlet pipe of the laser tube.



Place the laser tube on the holder



The outlet pipe interface faces upwards

(2) Install the laser tube inlet pipe, as shown in the figure below:

Inlet pipe installation
(The glass can be moistened with water on the water faucet, to facilitate intubation)

(3)  Install the water outlet pipe of the laser tube, as shown in the figure below:


The water outlet pipe installation
(The glass can be moistened with water on the water faucet to facilitate intubation)

(4)  Install the negative electrode of the laser tube


Install negative wire

(5) Install the anode of the laser tube

Install the positive wire

(6) Place the laser tube on the fixed bracket, keep the position of the laser head of the laser tube and the frame position of the first reflector at about 3 cm, and then on the fixed bracket. As shown below:



The light from the frame 2-3cm

(7) Finally, fix the laser tube, fix the bracket, and complete the installation.



Fixing the laser tube bracket
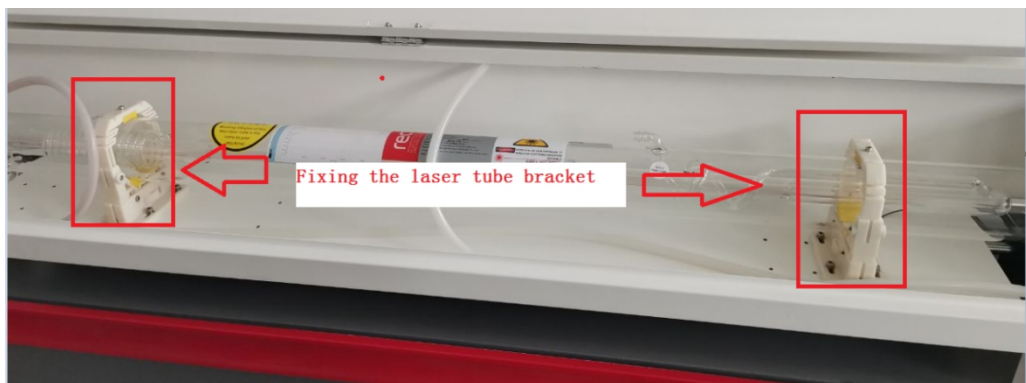
## 4. Connect the chiller.

First, pour an appropriate amount of pure water into the chiller, and then connect the water inlet and outlet. Connect the alarm output port of the chiller to the water protection port of the machine. Connect the power cord of the chiller to the socket on the back of the machine.

Before using the machine, you need to turn on the switch on the front of the chiller to make the water in the laser tube circulate in use.

Note: (1).If the machine is used in a working environment with a relatively low temperature, the water in the chiller needs to be drained after each use of the machine to avoid freezing damage to the chiller, or the machine and the chiller should be placed in an environment with a suitable temperature use.

(2) .The water in of the machine is connected to the outlet of the chiller, and the water out of the machine is connected to the inlet of the chiller. Please must connect it correctly.
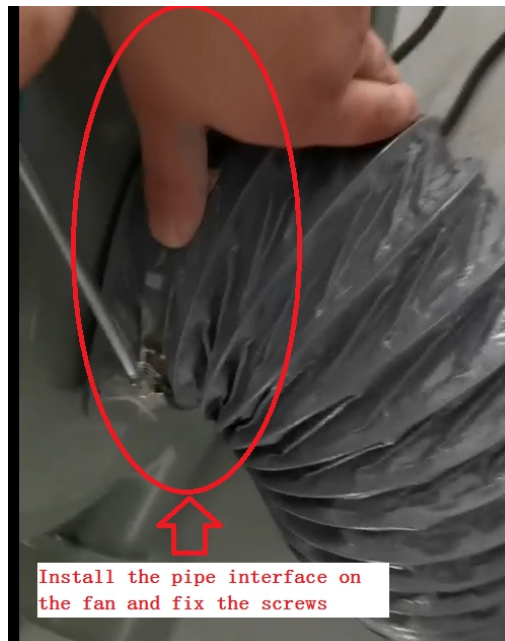
Before turning on the machine, you can turn on the switch on the front of the chiller to make the laser tube water circulate
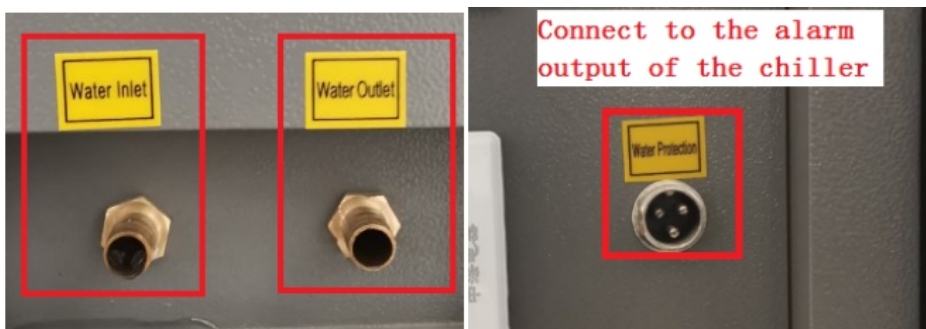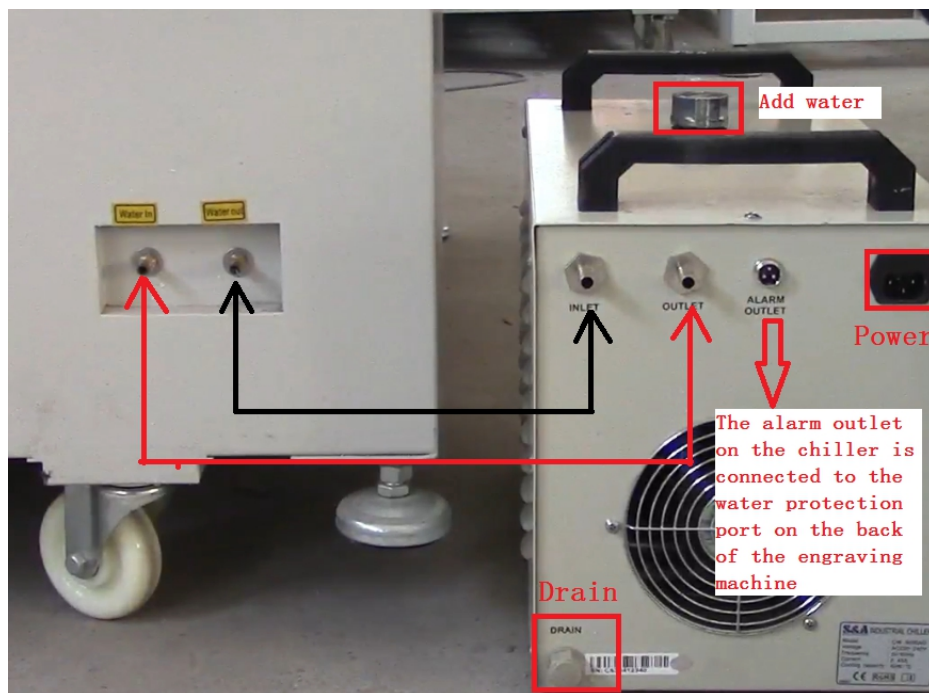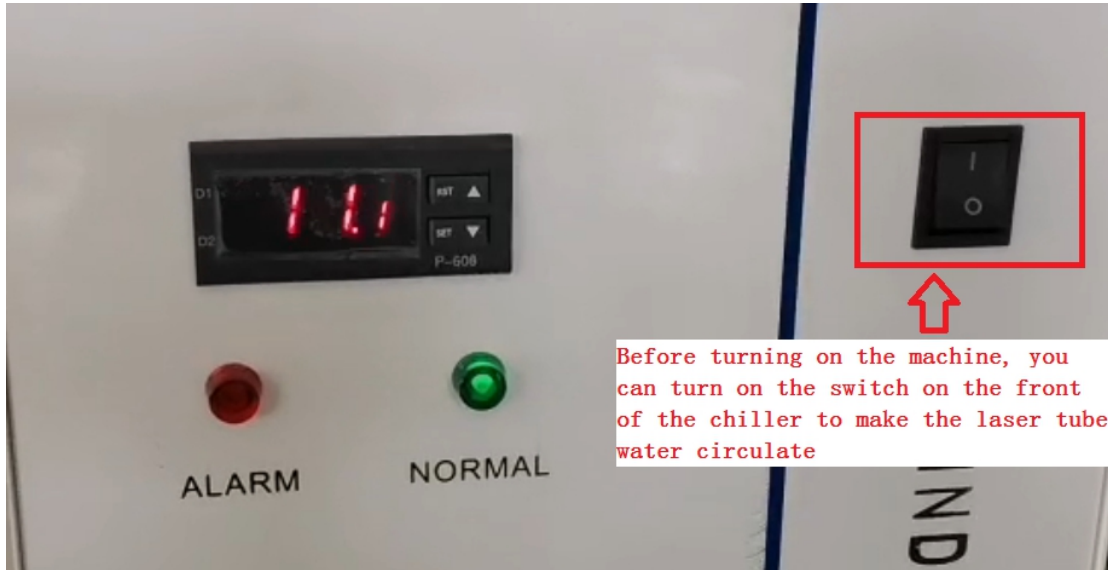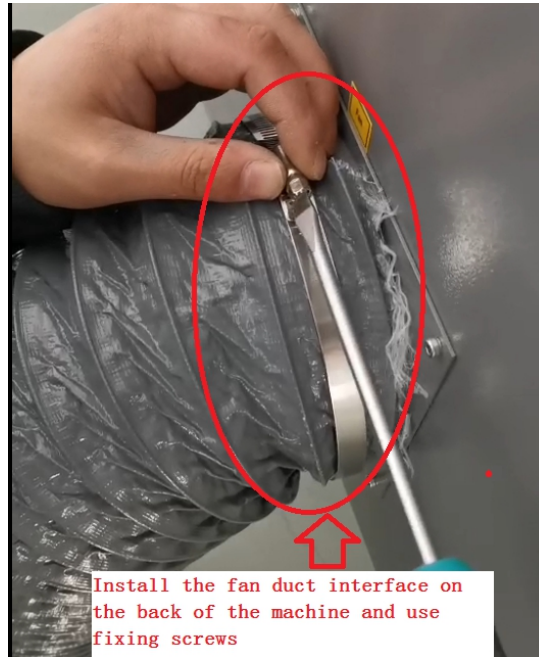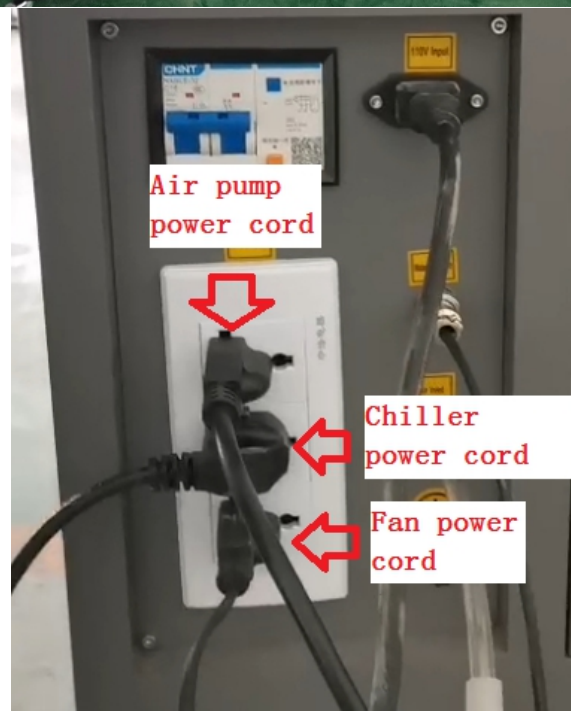
## 5. Connect the air pump and fan

Connect the air pump outlet port to the corresponding machine port. Connect the power cord to the socket on the back of the machine.



Install the air pump interface first



Connect to the air inlet on the back of the machine



Connect to the air pump

Air Inlet
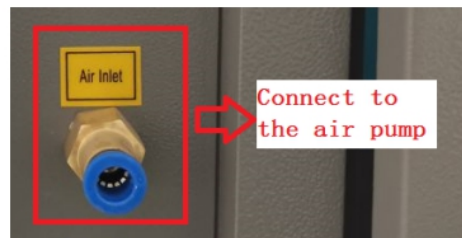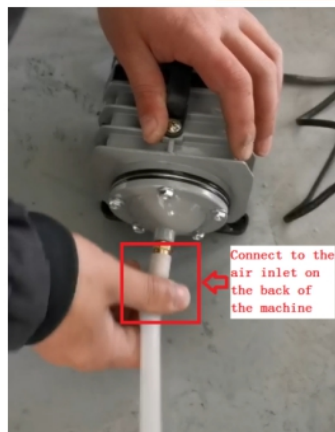
If you need to use a fan, please connect the fan as shown in the figure below. Connect the fan power cord to the socket on the back of the machine.



Install the fan duct interface on the back of the machine and use fixing screws



Install the pipe interface on the fan and fix the screws
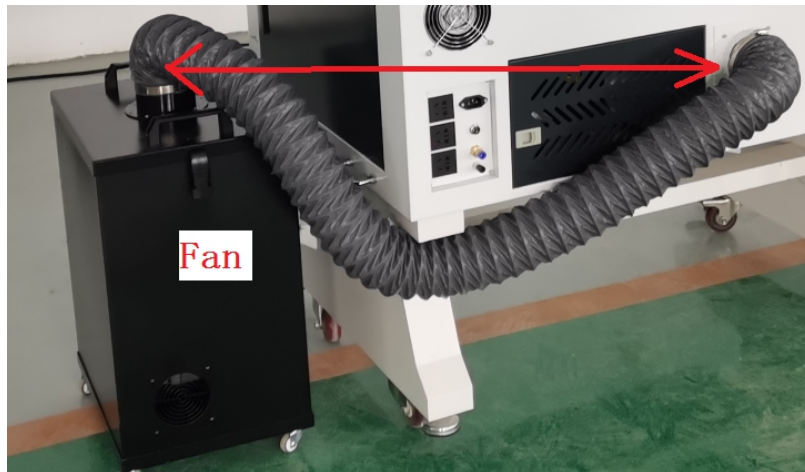
Note: If the machine is powered by AC110V, the socket on the machine is also 110V, so be sure to check the power supply voltage level of the chiller, fan, and air pump. The voltage levels of these three are required to be consistent with the machine voltage levels. In other words, if the voltage level on the label on the back of the machine is 220V, the power supply voltage of the chiller, air pump and fan should also be 220V

6. Machine power supply:

(1) Connect the ground wire to the machine first.

(2) Connect the power cords of the chiller and air pump to the outlets at the back of the machine.

(3) If you use a fan, you need to connect the fan's power cord to the socket on the back of the machine

(4) First check the voltage level label on the back of the machine, and connect the
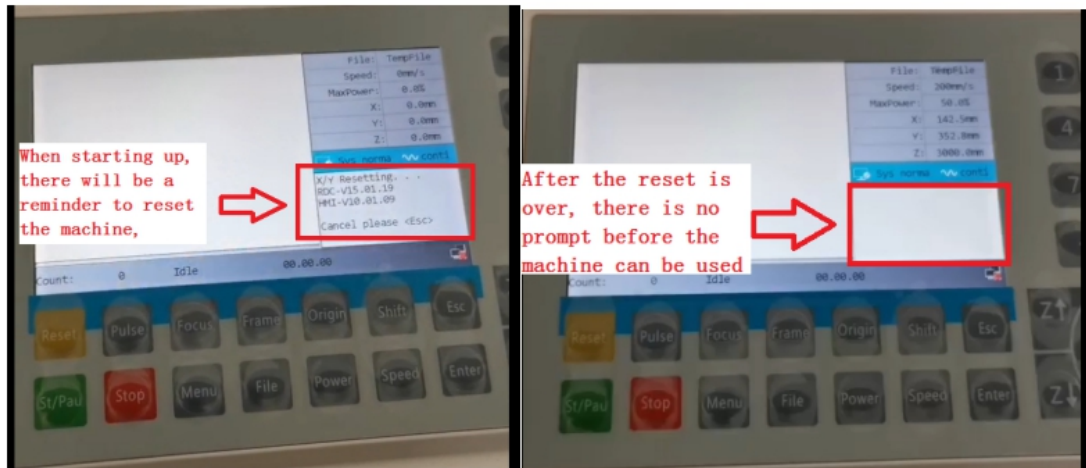
corresponding power supply voltage according to the voltage level

(5) Turn on the circuit breaker on the back of the machine.

(6) Turn on the emergency stop switch on the front panel of the machine, turn on the key switch, and if the light is used, turn on the light switch.
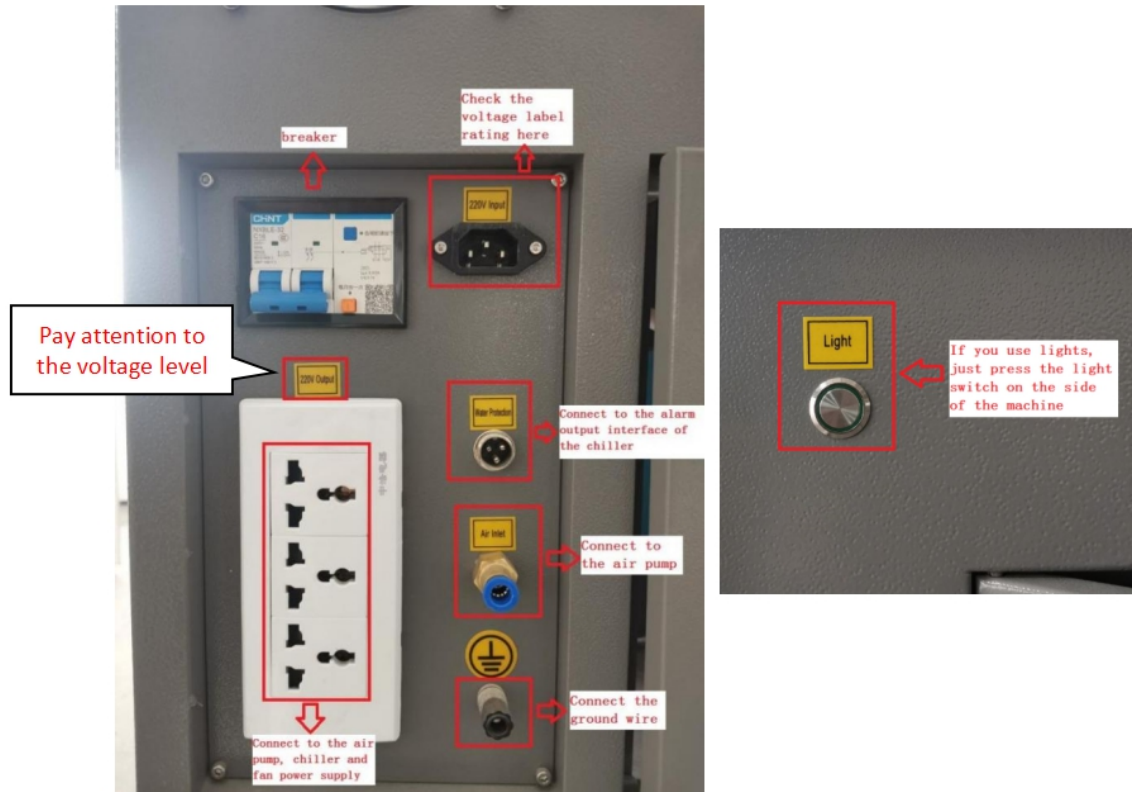
## 7. Software installation:

(1) Copy the files in the U disk to the computer,

(2) Connect the USB data cable to the PC interface corresponding to the computer and the machine, open the device manager, find other devices, and you will find the USB driver display with an exclamation mark.

(3) Double-click the software installation package, click the installation option, select the installation path, after installing the software, and then click Install USB driver to install. After the installation is complete, you can see that the USB driver has been installed in other devices in the Device Manager.



Connect the PC/USB interface of the machine to the USB interface of the computer with a data cable



RDWorksV8Setup8.01.48
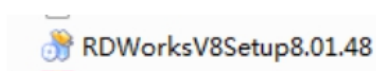
2 Double-click the installation package.

## 8. Dimming

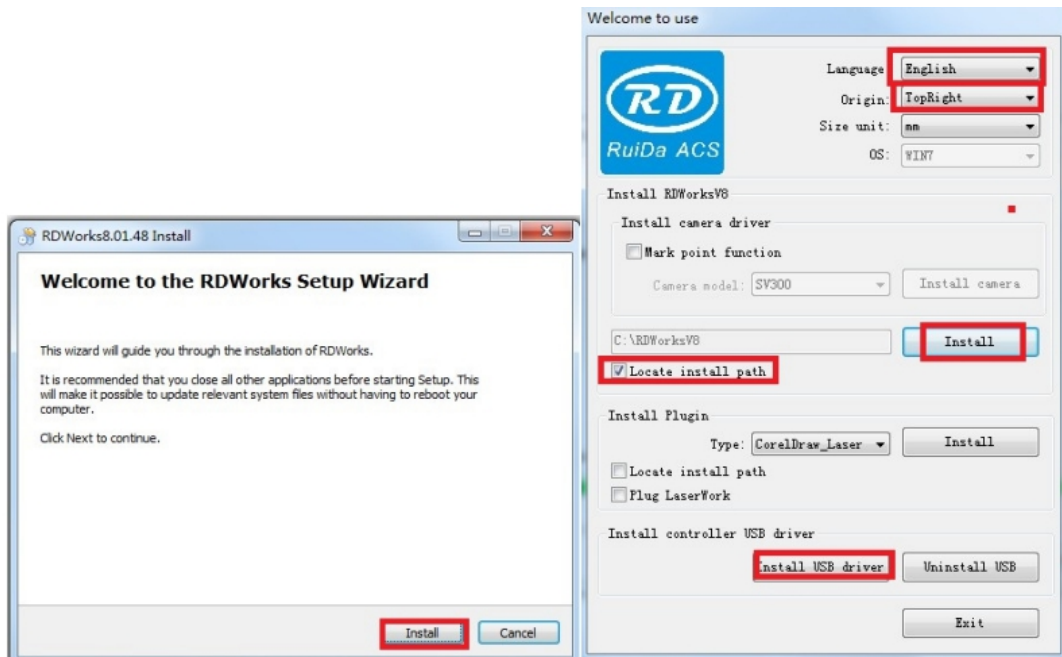After the laser tube is installed, the chiller and air pump are connected to the machine. After the machine is powered and the software is successfully installed, the dimming test can be performed. The steps of the dimming test are as follows:

(1) First, keep the laser and the first reflector at a distance of 3-4mm, and adjust the angle screw of the first reflector to center the light of the first reflector.

(2) Then by adjusting the screw on the first reflector, the beams marked by the second reflector at the two extreme positions of the Y-axis are located at the same point, and the screws that need to fix the first reflector are adjusted to complete.

The light of the second mirror is centered by adjusting the position of the first mirror. And fix the position screw of the first reflector.

(3) By adjusting the second reflector so that it is at the two extreme positions of the X axis, the beams marked by the third reflector at the two extreme positions of the X axis are located at the same point, and then fix the screws of the second reflector ,

By adjusting the position screw of the second mirror, the light of the third mirror is centered and finally fixed.

(4)Adjust the beam of the laser head: Place the tape on the laser head, and adjust the reflector screw on the laser head to make the beam at the center of the outer ring of the laser head.

Note: Each time you adjust the light, you can press the Pulse button on the control panel, and the laser will work at one point.

Note: The specific operation steps can refer to the dimming video. If the laser tube of the machine is not removed from the machine, just check whether the second and

## 9. How to find the focal length

As shown in the figure below, place the focus rod below the laser head, and adjust the distance between the laser head and the top of the focus rod by adjusting the yellow screw. As shown below:
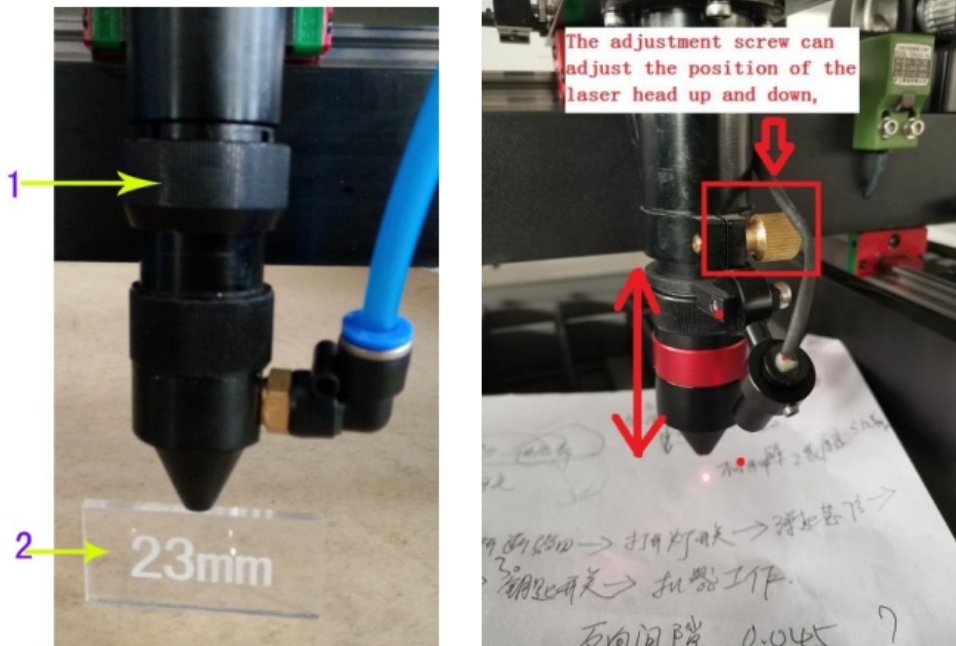


## 10. Machine use

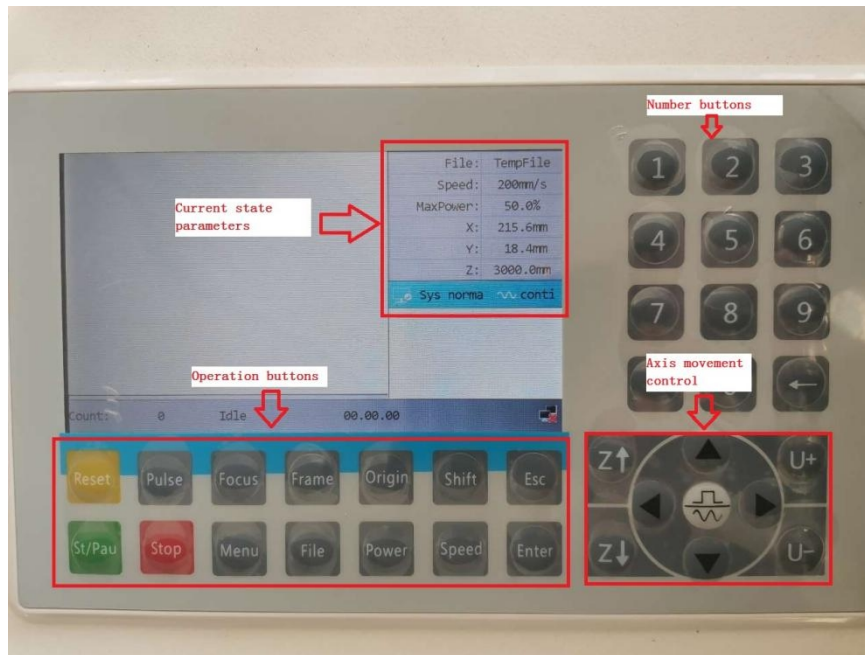Before the machine leaves the factory, we have saved the parameters to the RD control board. When using it for the first time, you can read the factory parameters to view the settings, but try not to change the factory parameters. If you need to view the factory parameters, you can click on the factory under the software menu. Set up and view factory parameters.

(1) Software interface introduction

(2) You can draw graphics or add text, edit the content that needs to be processed, and you can also import pictures or vector diagrams that need to be processed, select the processing method according to your needs, and set the processing parameters. For example, cutting work is required, and the black layer represents the cutting work, as shown in the figure below, set the parameters as required.



(3) If you need to scan, for example, you need to scan text or pictures without cutting. If you need to cut the rectangle instead of scanning, you can add another layer and set the scanning parameters, as shown in the figure below:

Scan text

Cutting rectangle

Which layer is selected, the parameters of that layer are displayed

(4) After setting the processing parameters, you can download the settings in the software to the RD control board. You can also just click to start.

The laser head can be moved to a suitable position by the up, down, left, right and buttons on the control panel, click the "origin" button and the "Frame" button on the panel, or click the "Go scale" option on the software to check the working track of the laser head , And then start processing.



(5) Introduction to the control panel:

| | |
|---|---|
| Reset | Reset the whole system. |
| St/Pau | To start or pause the work. |
| Pulse | Let the Laser to splash. The pluse key is used when dimming |
| Stop | Stop working or motor axis motion. |
| Menu | User parameters, factory parameters, language settings, etc. |
| Frame | To track by the current file's frame. |
| File | The management of the memory and U disc files. |
| Origin | Set the relative origin. |
| Power | set the power of "Laser" Key. |
| Speed | set the direction keys' move speed. |
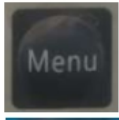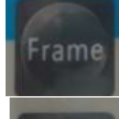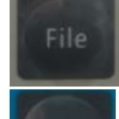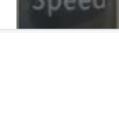
Esc — To stop work, or to exit to some menu.

Enter — Validate the change.

To move the X axes and Y axes or Up, down, left and right functions

Z↑ / Z↓ — Moving Z axis direction

U+ / U- — Moving U axis. If there is an automatic feeding device, U-axis will be used

Point movement and continuous motion switching.

Digital key 0~9： Used to set parameters.

Note: (1) The control panel mainly reflects some data parameters of the control board, and can also reflect some functions in the software. You want to change the factory parameters in the computer software (because the parameters are set before leaving the factory, it is not recommended to change) or To set user parameters, you need to read the parameters first, and then write the parameters.

(2) The origin limit of the machine is at the upper right, so the upper right is the origin of the machine. When installing the software, there will be a prompt to select the origin position, or there is also an origin position selection in the control panel.

(3) U disk can also be directly connected to the machine to process the files in the U disk, but first, the files in the U disk are files saved in the RD software format.

## 11. The protection function of the machine:

Water protection: The water chiller must be turned on first to realize water circulation in the laser tube before the laser tube can emit light, otherwise the laser tube will not emit light and the machine cannot cut.

Cover opening protection: There are interlock switches on the left and right sides of the machine, that is, when the cover is opened during the working process, the laser stops emitting light and the XY axis motor stops working. There will be a prompt on the control panel that the machine is protected. Function: When the machine cover is closed, according to the prompt on the control panel, you can confirm to continue processing, or exit to stop working. As shown below:
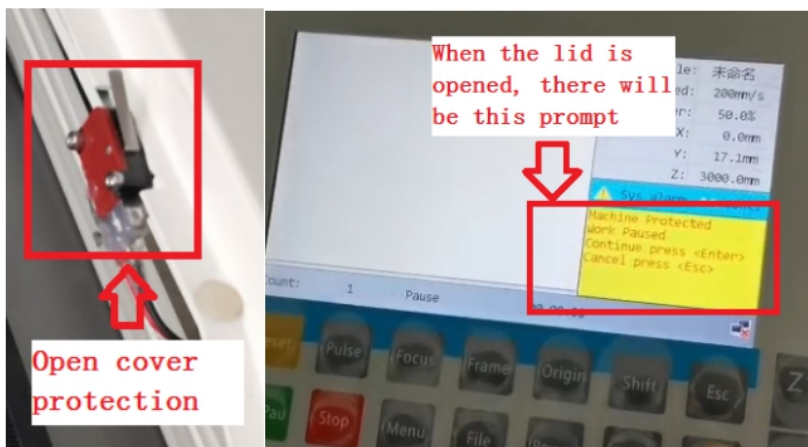


Warning light: The machine has a two-color warning light. Yellow means that the machine is working, which serves as a warning.

When the green light of the machine is displayed, it indicates that the machine has stopped working and is safe and operable. As shown below.
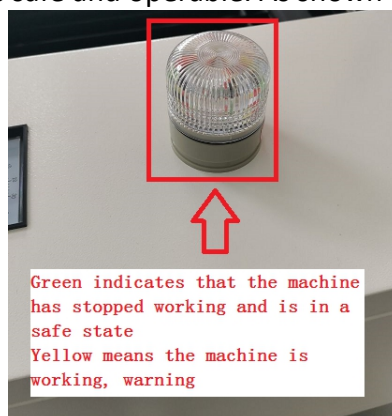


This manual mainly introduces the general operating steps of the machine. For the use of machine control system and software, please refer to the RD software operating instructions and the RD6445G user manual.The software instructions, RD control system instructions, and software installation package are in the U disk.