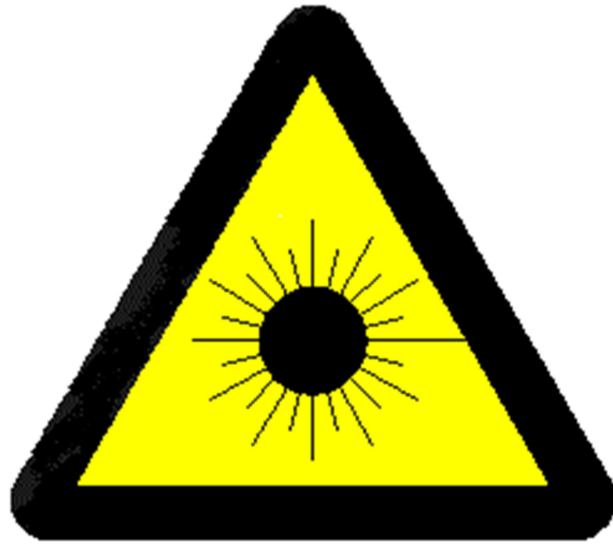




CM-Series Laser Engraving &Cutting

Readsail Tech Co.,Ltd



This type of Laser Cutting Machine is
GB4 series Laser Product .Please note laser
radiation when use it. Avoid your eyes or skin
get direct or scattering radiation!

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Prolog

Thank you for choosing Redsail Products ! This use manual provides the users with Machine's Safety, installation ,operation and daily maintenance of the relevant considerations and guidance.

For your safety, proper use the product, be sure to read this manual carefully before operation, to be fully understood and save it for your later use.After purchase this machine, check the model, all parts listed on the packing list and check for shipping damage . If any part is missing or damage, Please immediately contact local dealer or manufacture. Thank you for choosing Redsail Products again !

This user manual operating instruction is for convenient understanding. It may be some different from the product, there may be some different when the products get upgrade , it is only for reference.

This User Manual Application:

This manual applies to our M-series Laser Cutting&Engraving Machine.

Matters need attention

All of the products will be full tested before delivery. Considering transportation and other reasons, please confirm the following points:

- During transport, device is deformed or damage, please dont use if the device is damaged to avoid the hurt from danger, please inform our company or local agent in time for such condition.
- Please make sure the package is intact, accessories and User Manual is complete. Please keep the User manual and accessories well for the future use.
- Please make sure this device is consistent with that you have ordered, otherwise it maybe cause the fire or device damaged because of the wrong power connection.

Chapter 1 Safety Directions

1.1 Machinery Safety

1.1.1 General Safety Rules

(1) Know your machine

For your personal safety, read this manual and CNC system manual carefully, Know applications and limitations of the machine, and potential danger related to the machine, make the operation according to the manual direction.

(2) Keep working area clean

Mussy environment and working table may cause an accident.

(3) Don't use it in the dangerous environment

Don't use it in wet or rainy place, or expose it to rain. Keep good lighting in working area.

(4) Non-professionals don't touch

All visitors must keep a safe distance in working area.

(5) Please don't make the forcible operation for the machine

(6) The machine need to work in the safety speed.

(7) Please use the right tools, don't take the forcible operation to make the machine or additional device working.

(8) Wear the proper clothing

Avoid wearing loose clothing, gloves, necklaces, bracelets or jewelry which is possible to go with the moving part of the machine. Recommend to take non-slip shoes, wear the cap which can cover the long hair.

(9) Please don't do maintenance when the machine is working

Machine maintenance should be made properly, such as lubrication and adjustment.

(10) Must be close the machine power when repair, replace the parts or assembly and reassemble the motor.

(11) Dont make the machine running when nobody

1.1.2 General Safety Items

Please read this manual and CNC system manual carefully before operation, make the operation according to according to the User Manual directions.

1.1.3 Machine Hanging and Transport safety

Dangerous Remind

Total weight of CM series device is about 300KGS---600KGS (you can check the weight from the packing list), all handling equipment's safe loading-bear must more than 50% of your device. Must use the enough strength rope when hanging the machine, in order to avoid damaging the machine, otherwise may cause the rope broken, handling equipment or machinery fall damaged, even causing casualties.

Warning

No matter how to lift the machine, please check the balance carefully, prohibit to move the machine without balance, otherwise will cause injuries or damage the machine.

When machine lifting and falling, pay more attention not to make the up and down speed too fast, it maybe bring unexpected shake or strike, otherwise it will make the machine lose balance, and cause injuries or damage the machine.

When machine lifting, prohibit anybody, car to go under the machine in order to avoid the accident.

When machine lifting, prohibit to cling to the machine and also prohibit to cling to the hanger and rope in order to avoid the accident .

Attention Items

When machine lifting and handling, please note whether there is an barrier or person around the machine, please clean the barrier and let people leave before hanging. To avoid the collision and danger.

When machine is lifting and handling, control the speed not too fast, should forbid the urgent brake, in order to avoid the machine shaking to lose balance and fall down.

1.1.4 Electrical Safety

Before wiring, be sure to turn off the power.

Electronic components inside the device are particularly sensitive to static electricity ,so please don't put the foreign body inside the equipment or touch the main circuit board.

AC off , 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.

Please use the power which is same as the rated voltage frequency.

Must install the power stabilizer, when the grid voltage exceeds the rated voltage $\pm 10\%$, should not turn on the machine.

Please confirmed all wires insulation is under the good condition, avoid the leakage and electric shock.

Please check and make sure all indicators for accessories are working properly.

Be sure the machine enclosure right grounding use of range.

1.1.5 Mechanical Safety

After unpacking, firstly you must check the equipment is intact after long transportation.

Turn on the machine when the first time or when stopping using for a long time, please check if there is interfere in all axis, then lubricate the machine fully before you run the machine.

Before turn on the machine, please must check whether there are more than 2/3 coolant in the cooling tank (distilled water or purified water), when the water circulation inside the laser tube is normal, you can run the laser.

1.2 Safety Signs

For the security part in this User Manual, take the following mark, the statements about safety signs is very important, please be sure to observe! To avoid the people's injury and machine's damage.



Danger Potentially dangerous situation, it will be happened under the wrong operation.



Attention Potentially dangerous situation, it will cause the low-grade injury or middle-grade injury.










Forbid Forbid (Never do)








Force Force(Must do)


Safety Attention:

This section is direction for the important items that the user must obey, such as receipt confirmation, storage, handling, installation, wiring, operation, inspection, liquid waste disposal, etc.

Danger	
	Please supply the power for the machine according to the mentioned voltage, frequency in this manual. Otherwise the machine will be burned or cannot run normally.
	When machine running, don't touch the slip or rotating parts. Otherwise will cause injury.
	When machine running, don't touch the terminal inside the machine. Otherwise will get an electric shock.
	Within 5 minutes after the main power switch turn off , don't touch the terminal inside the machine. Otherwise will get an electric shock.
	When machine running, open flame is strictly prohibited. Otherwise will cause the fire.
	Please make the test run for the machine according to the direction in this manual. If appear the wrong operation , it may damage the machine, even cause the personal injury.
	DONT allow to remove the cover , remove the connector, pull electric cables, etc when the power is opened. Otherwise it may damage the machine, even cause





	the personal injury .
	Settings, checking, fault diagnosis and troubleshooting should be done by qualified person. Otherwise will cause the fire, electric shock or injury.
	Please don't damage or pulling electric cable vigorously, don't make too big pulling force to the cable, don't embed the fixture in the cables. Otherwise will get an electric shock and damage the machine.
	If need the sudden power cut when machine is running, please turn off the main switch immediately. Otherwise the machine may start suddenly to endanger the personal safety.
	Please dont modify the machine. Otherwise may will damage the machine.
	The handling, wiring and inspectionfor the machine can be done after 5 minutes when the power is turned off . Otherwise will get an electric shock.

■ Environment Attention



Note	
	<p>Please don't put the machine in the following environments, otherwise may be cause product breakdown or life reduction.</p> <ul style="list-style-type: none"> ➤ Direct Sunlight ➤ Ambient temperature exceeds the keep, setting and the relative temperature ➤ Relative humidity exceeds the keep, setting and relative humidity ➤ Large temperature difference and condensation ➤ Near to corrosive gas, flammable gas ➤ Too much dust, salinity and metal-powder

	<ul style="list-style-type: none"> ➤ Water, oil and medicines and chemical reagents may drip ➤ Vibration or impact can be transmitted to machine.
--	---

■ Installation Attention




Note	
	This machine is the precise product , please avoid the strong impact. Otherwise will cause the malfunction.
	Please don't tread on the product or place the heavy objects on it. Otherwise will damage the machine.
	Please don't make the metal sheet or combustible materials into the machine. Otherwise will damage the machine.
	Please according to the required size to confirm the installation location for the machine.

■ Wiring Attention



Note	
	Please use the specified power voltage. Don't connect the machine to 380V power supply directly. Otherwise machine will be burned out. Special voltage need to consult with the factory or supplier)
	<p>Please don't turn on / off power frequently, please control that below 1 times/minute if need to turn on/off many times.</p> <p>There are large apacitor in the machine, the large charging current will flow when the power is turned on, so the performance for the internal components</p>

	of machine will descend if power is turned on / off frequently.
--	---

■ Running Attention

Note	
	When running, must turn off the power immediately for any abnormal situation. Otherwise will damage the machine.
	Operator must be qualified. Otherwise will damage the machine or make the personal injury.
	Forbid printing ink, cleaning liquid or water on any circuit board. Otherwise may cause the machine cannot work properly or be damaged.

■ Maintenance and Inspection Attention

Note	
	Even if the power is off, still remain high voltage inside the machine, so please don't touch the power terminals within 5 minutes after the power is off. Otherwise it will get an electric shock.
	Please don't plug any connector when the power is on. Otherwise it will get an electric shock, or damage the accessories..

■ General Attention Items

Please note when operating	
1	Redsail have no responsibility for any damage and loss made by unauthorized modification for the machine.
2	Corrosive liquid is forbidden for lead rail and working table when cleaning the machine.
3	Prepare two units portable – type dry powder fire extinguisher to avoid the accident.
4	Please use the ink with ignition point higher than 60 °C.
5	In any emergency condition, please press the emergency stop switch.
6	When power failure, be sure to turn off the main power switch. Recover the operation after professional technician checks and repairs it.
7	In the event of fire, please turn off the main power switch firstly, use dry powder fire extinguishers to stop the fire. Don't hurry, the professional technician should check the fire reason. DONT open main power switch before finding the reason.

1.3 Warning signs

Warning sign on the machine to ensure proper and safe operation.

Warning sign on the machine is for pointing out the dangerous position and case for operator.

Please don't remove safety signs from the machine.

Chapter 2 Summary

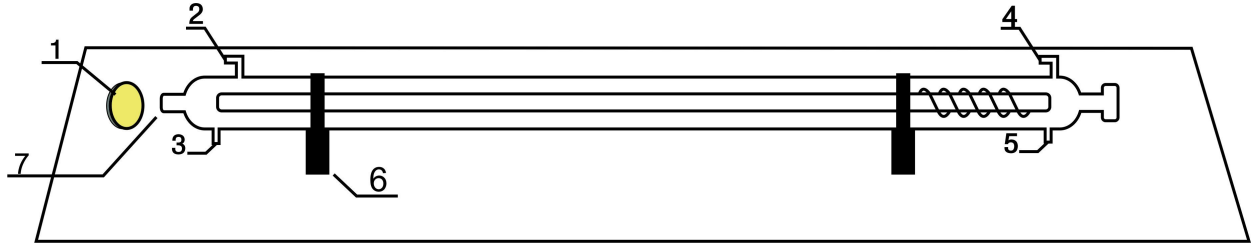
CM series Laser Engraving and Cutting Machine is equipped with high performance three-phase motors and three-phase stepper driver, with high speed cutting and high running accuracy; Also equipped with imported dual rail, make sure the cutting more smooth and running more stable.

2.1 character:

- ✧ Laser Type: Sealed Co2 glass, Laser Power: 80W/100W/130W/150W
- ✧ Working Area: Example :1400×900mm (CM1490)、1200×900mm (CM1290), Please refer to the machine model
- ✧ Cutting Speed: 0 – 24000mm/min
- ✧ Repeatability:±0.05mm
- ✧ Power Voltage: AC 220V±10%, 50/60Hz
- ✧ Total Power: <1500W
- ✧ Humidity:5 – 95%
- ✧ Min molding text: English 2×2mm
- ✧ Image Form: BMP,HPGL, PLT, DST, DXF, AI...
- ✧ Driver Motor: Micro Stepping Motor
- ✧ Cooling-down method: Forcing water cooling and protection system
- ✧ Servicing structure:Exhaust fan and exhaust duct
- ✧ Control System: DSP control system
- ✧ Compatible Software:CorelDraw AutoCAD

Chapter 3 Machine Installation and Directions

3.1 Laser Tube Installation

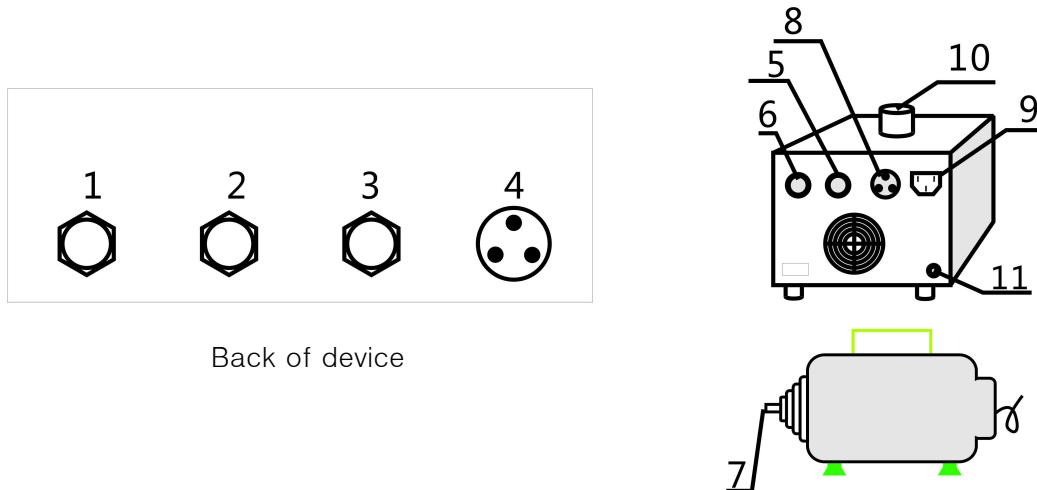


1·Mirror Holder 2·Water outlet 3Cathode- 4·Water in 5·Anode+ 6·Tube holder 7·Laser out

Please refer to the above Figure when you install the laser tube. According to Figure, 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.Especially the anode wire must be isolated from the metal parts, otherwise will appear leakage of electricity and damage the laser tube.

After soldering, connect the in/out water pipe with the entrance/exit on the laser machine (The connection of laser tube must comply 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



Note:

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

connection : 1---5 2---6 3---7 4---8 9---220V power supply

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:

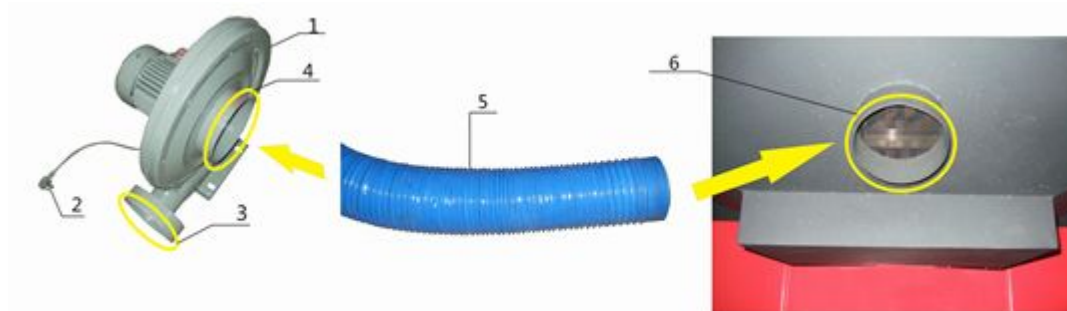
(1) Function of air pump:

- 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 peoperly, 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



1·Exhausted Fan 2·Power Input (input 220V、50HZ) 3·Air outlet 4·Air intake

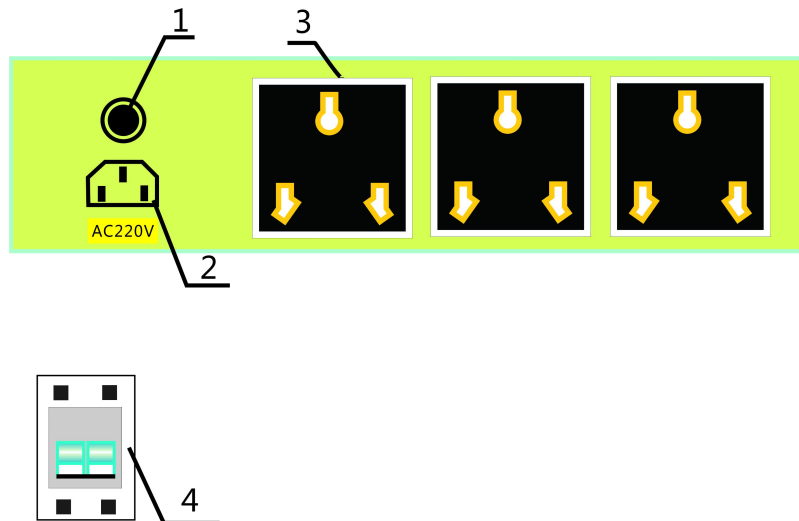
5· Vent-pipe 6·Air Outlet on the back

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

(1)Put the air exhausted fan in well-ventilated place before connection(best placed out of the window), for better exhaustsmoking

(2) Following the above figure shows, put the ventiduct 5 respectively connected with 4 air exhaust fan air inlet and 6 machine's air outlet, and for a reasonable fixed, to improve the machine exhaust efficiency.

3.4 Power Supply Input/Output Directions



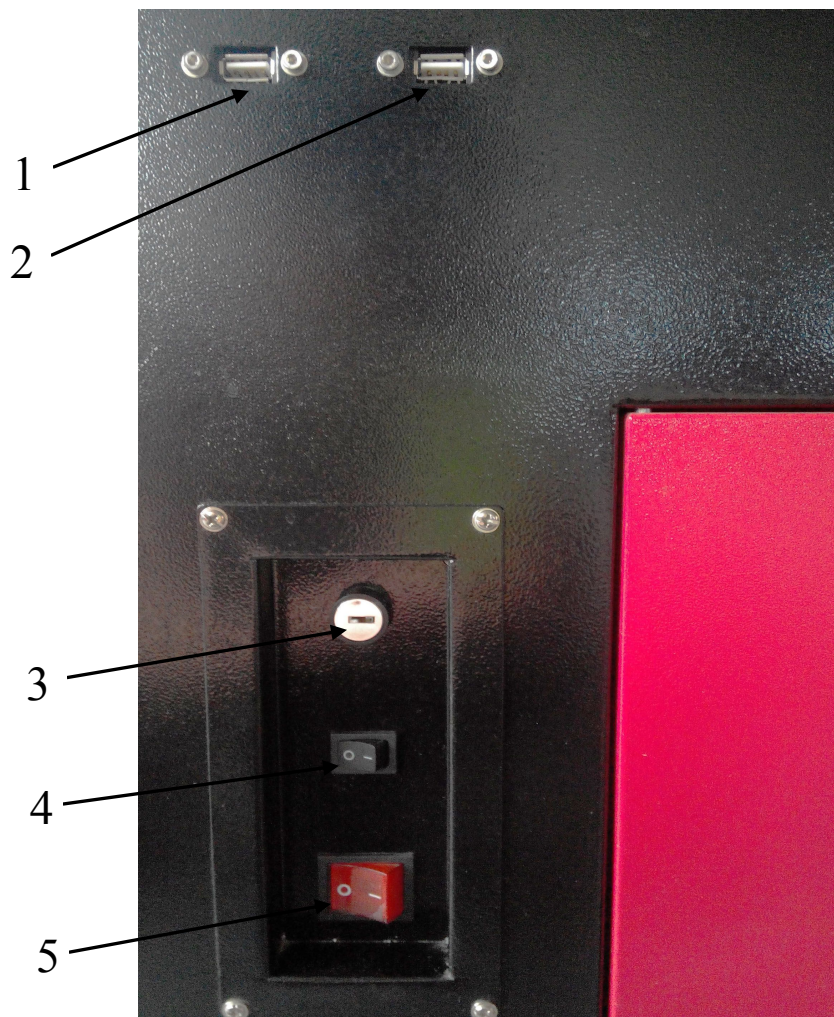
1·Ground Wire Terminal

2·AC220V Main power switch

3·AC220V Power output socket, supply the power for air pmup, water chiller.

4·Air switch: Control to protect the input for main power.

3.5 Switch Controller Directions



1·USB cable interface:connect the computer and control board of machine for data transmission.

2·U disk interface: Use U disk to transmit the data to the control board.

3·Cover protection switch : control device to open and close the cover , the device processing and pause function. The machine will work eigher 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.

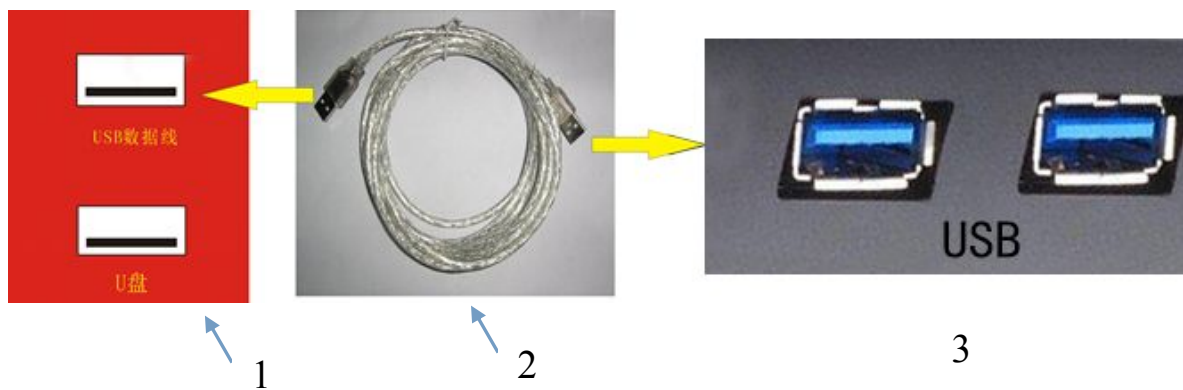
4·Laser Switch: Control laser beam switch.

5·Lamp switch: Control lighting inside the device.

3.6 USB data wire connection

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.

Below Figure:



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.

3.7 Controller Directions

Before use it, Should fully understood the control part role and purpose of each function , to avoid damaging the equipment.



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·Main power switch: Control the main power on/off.

3·Control system panel(refer control system instrument for more information).

Chapter 4 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

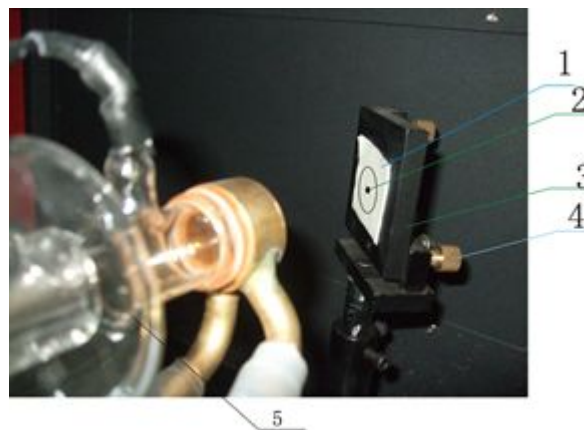
directly affects the quality of engraving and cuttin. Now just make the explanation for one of optical path.

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)

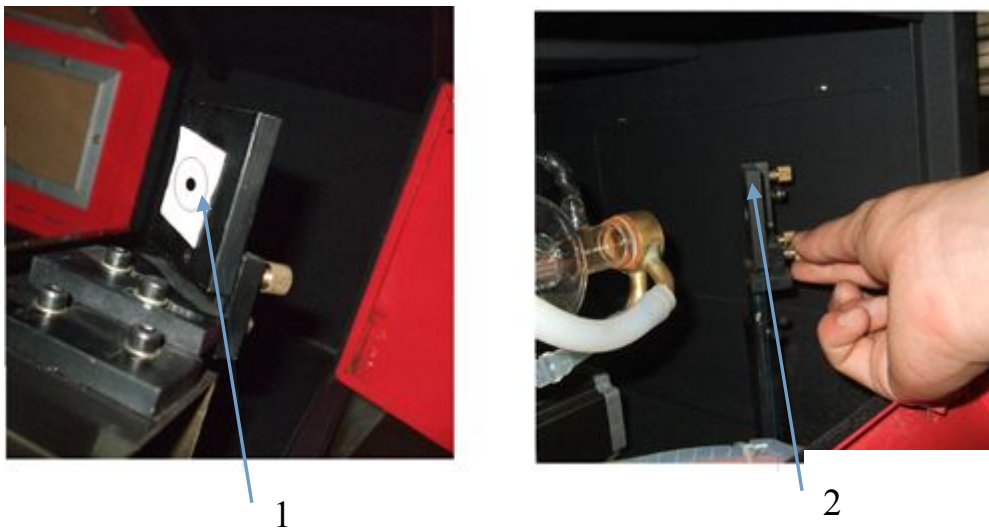


1· Masking paper (choose the test paper for adjust the laser beam) 2·Test spot 3·First Reflecting Mirror Holder 4·Adjusting screw 5·Laser Tube

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:



1·The second reflecting mirror holder 2·The first reflecting mirror holder

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:

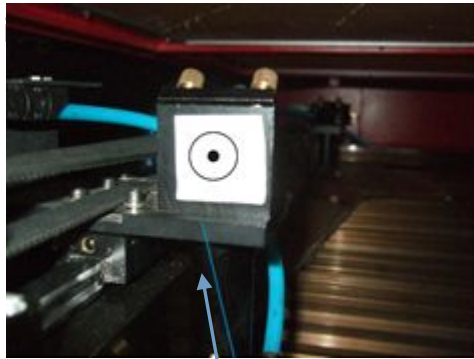
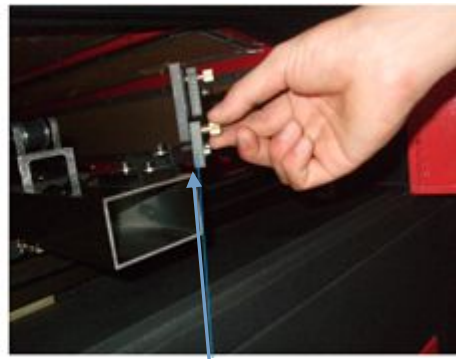


Figure 1

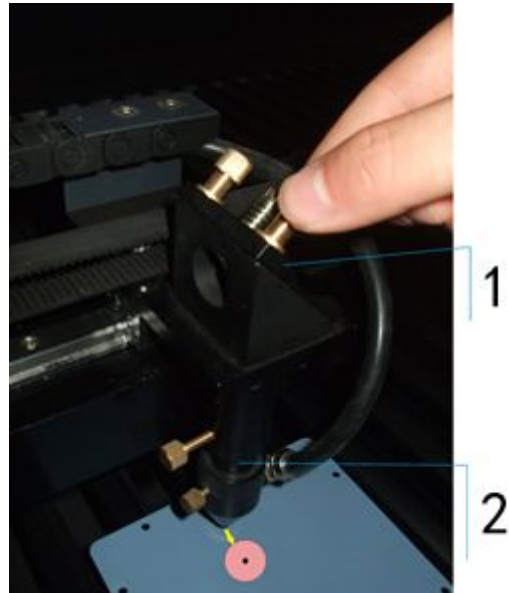


2

1·The third reflecting Mirror holder 2·The second reflecting mirror holder

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



1·The third reflecting mirror holder 2·Laser head

The sixth Step: laser processing

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



Figure 1

Chapter 5 Software Installation and Operation

5.1 Software Installation

Please insert the software CD into the computer, install the software in CD. Please read the control system user manual for more information for this section.

5.2 Software Operation

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.

Chapter 6 Machine Operation

6.1 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)

6.2 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

6.3 Adjust the focal length (Attached figure 1)

6.4 Press “Start” key to start the work.

Chapter 7 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.

7.1 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.

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

7.1.2 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.

7.1.3 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.

7.2 Equipment maintenance

7.2.1 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).

7.2.2 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.

7.2.3 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. Dont 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, dont 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 .

7.2.4 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.

7.2.5 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.

7.2.6 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.

7.3 Equipment Notes

7.3.1 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.

7.3.2 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.

7.3.3 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.

7.3.4 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.

7.3.5 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.

7.3.6 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.

7.3.7 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.



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