

Laser machine Rabbit HX-1630

(with auto feeding fabric from a roll)

Safety requirements:

Laser improper use can lead to personal injury, so please carefully before using laser the safe use of knowledge, in order to avoid personal injury, and to prevent the product or damage in connection with any of the other products. In order to avoid the possibility of danger, this product only can be used within the prescribed scope.

- 1) whenever laser mustn't point to your own or another's eyes, even if the laser in the case of closed will also open the possibility of mistake.
- 2) laser is not a toy, do not give children, intelligence is not complete, for people who do not know use laser properties, in such a case, easy to cause damage.
- 3) due to this kind of laser is not visible, near the equipment it is forbidden to place inflammable, explosive, in case of laser deviation fires.
- 4) are not visible laser, use laser recommends wearing special goggles.
- 5) product grounding. This product except through the power cord grounding conductor. To prevent electrostatic cuts, ground wire must be connected to the ground. With this product before use, should ensure that this product is properly grounded.
- 6) when the machine work, top cover plate, the machine to prevent laser from cuts.
- 7) for machines with laser and high pressure parts, it is strictly prohibited to non-specialists disassemble the machine without authorization.
- 8) in the process of machine work, the operator must observe the conditions of the machine work (such as hook edge deformation, paper is spread is blocked by high by air pressure blower laser, the abnormal sound machine, the water temperature of circulating water, etc.).Prohibit the operator to leave, in order to avoid unnecessary loss.
- 9) no boot, when voltage instability or voltage regulator must be used.
- 10) must be kept clean water circulation, water temperature should not exceed 15-35 degrees, the high pure water (recommended).
- 11) the proposed current meter maximum state of the boot time not too long, lest breakdown laser power supply, shorten the life of laser tube.
- 12) laser power supply using the fundamental limitation of not more than 35 ma) (that is, the current meter maximum

Catalogue

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4.1 optical components structure	
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Chapter 1 Outlines

1.1 Machine parameters

Model	Rabbit HX-1630 auto-feeding system
Working area	1600mm×3000mm
Cutting Speed	0—60m/min
Laser power control	0-100%
Laser power	100w
Cooling system	Water cooling
Mechanical resolution	0.025mm
Smallest Character Engraving	Chinese 2mm, English 1mm
Locating Precision	$\leq \pm 0.01\text{mm}$
Voltage	220V/50Hz , 110V/60Hz optional
Total power	1500W
Supported Graphic Format	BMP PLT DST AI DXF
Motor	Leadshine Servo motor
Working Environment	0℃~45℃
Working Humidity	5% ~95%

Chapter 2 Machine Configurations

2.1 Structure describing

Complete working system by laser cutting, laser power, laser cutting host software, exhaust fan, air compressor, water cooling machine, air ducts, computer, communication cable, etc. According to the work object configuration of equipment have printers, scanners, and all kinds of design software and so on.

2.2 System composition

Laser machine have 5 composition: Machinery platform, optical system, drive system, control system and auxiliary system

- machinery platform: The machine cover, such as the guide, base, reflective frame of mechanical parts.
- optical system: By the laser tube, laser power, laser, reflection lens and focus lens
- drive system: By three high precision imported linear guide, step motor, and several gears.
- control system: By the high speed DSP control card, switching power supply, stepper motor drives.
- auxiliary system: water chiller air compressor, exhaust fan

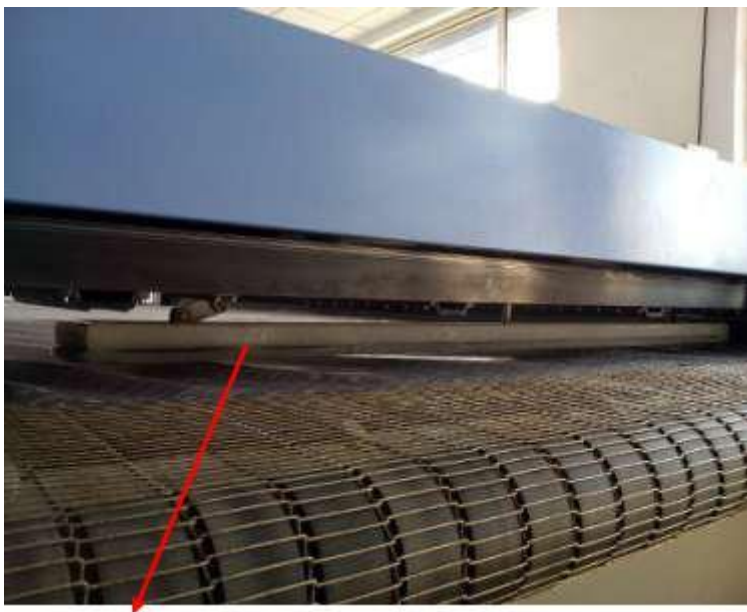
Machine photo:



(1) Auto-feeding system with Nets worktable(stainless steel)



Groove on the shaft rubber can effectively prevent the platform in the process of feeding cheap, thus increasing the accuracy of the feed



Pneumatic pressure cloth feeding device, when a version (3 m) length of fabric cutting,

cylinder automatically down then follow the mobile platform deliver fabric to



receiving box
cylinder



and then move the next version of the cutting

rides, the whole process fully automated, do not need artificial auxiliary.

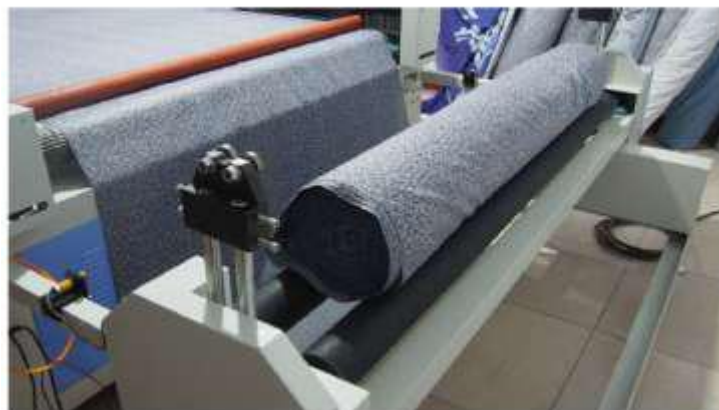
Pneumatic pressure cloth feeding the benefits of migration is to prevent the process of feeding material and improve the accuracy of continuous cutting feed.

- Simple Bracket can support within 30kgs weight For roll materials like fabric, leather, paper ...



Optional:

2. Rubber Bracket for Roll materials (support 1000kgs weight)



After one version cutting, the materials are all sent to the receiving box, machine cutting and people collecting at the same time, very convenient one people operate is ok.



(2) Control panel and USB connection

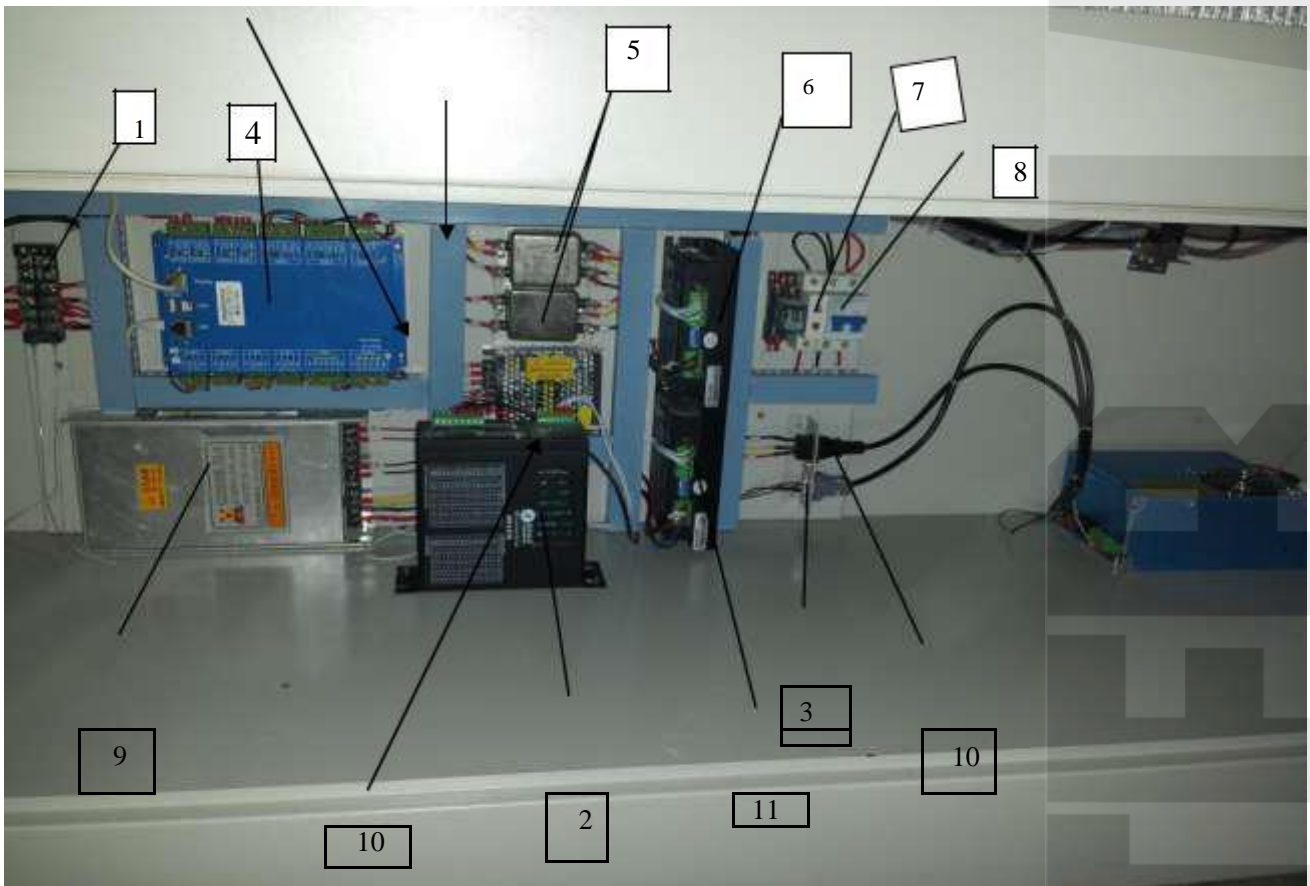
Easy to operate, USB offline control system: design on one computer and used on many machines, saving the PC memory source.

Support the BMP, AI, PLT, DXF, DST etc, graphic format

It could change speed instantly during the cutting according to the different requirement of curve and straight line.



Control system Schematic diagram (photo for reference, pls in kind prevail)



- Terminal
- Servo motor
- Signal of laser power supply socket
- Control card (powercut)
- Filter
- 6 - X axis motor driver
- Light
- Protection switch
- DC48V Supply for stepper motor
- DC24Vsupply for control card
- for Y axis motor driver

Chaper 3 machine installation

3.1 Remove the packing

On the packing first to check whether there is any damage on the laser tube, and then check whether there is any scratch on the machine appearance and accessories are complete. If there is any damage on the packaging or before open the machine during the installation process have any damage, please inform us of the company or authorized agent.

3.2 Placement machine

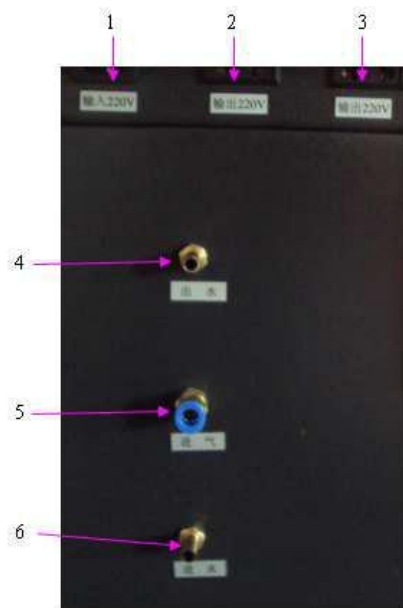
Laser machine should be placed in ventilated dry place, away from the ground to close. After debugging good machine don't move the machine as far as possible, otherwise need to adjust the light path.

After put, machine four casters, if found the machine shaking, can adjust the screw at the bottom of the adjusted after tighten nut, and fixed. Structure diagram is as follows:



- 2 - can be move arbitrary direction
- Fixed the machine

3.3 Supply connection Schematic diagram:



- 1- input supply Connect with 220V
- 2- output supply for air compressor
- 3- output supply for water chiller
- 4- air output
- 5- air input
- 6- water input

3.4 laser tube structure

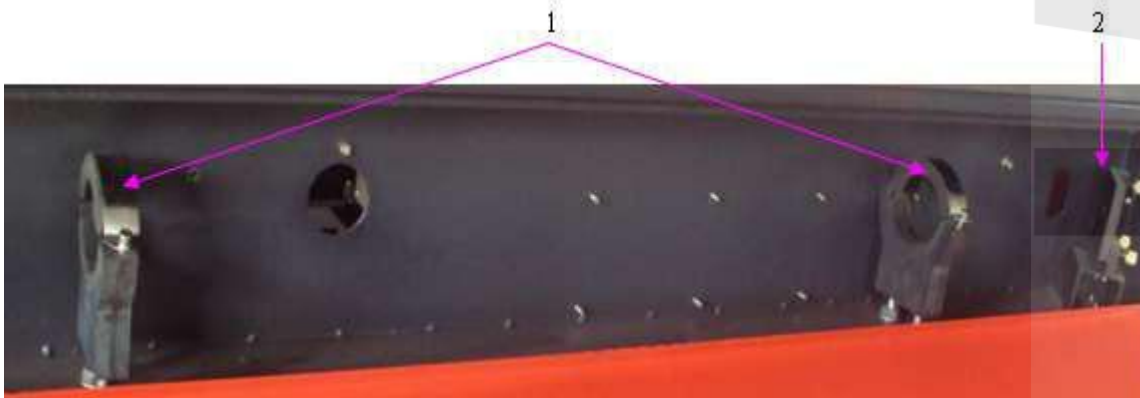
- CO2 sealing Laser tube
- Laser tube structure:

Laser tube is the most critical components in laser machine. Commonly used hard glass, generally USES the layer of sleeve structure. Discharge tube is the most inside layer, layer 2 for water cooled bushing, the most outer layer of the trachea. The thickness of the discharge pipe generally has no effect on output power, mainly considering the diffraction effect caused by the light spot size, should according to length.

Length of coarse, tube short fine point. Discharge tube length is proportional to the output power. Within the scope of a certain length, discharge tube per meter length of the output power increases with the total length. Discharge tube in both ends connect to store the trachea, trachea has a small hole at the end of the storage and discharge tube, the other end through the spiral muffler and discharge tube are interlinked, so it can make the gas in the discharge tube and store circulating in the trachea, the gas discharge tube exchange at any time. Work is the purpose of water-cooled cooling gas, make the output power is stable.

□ **Laser tube installation:**

- head and water - cooling interface cannot be subject to lateral external force. The fixed laser tube first two seat screw down, put the laser tube in two seat, put in the laser tube is Yin extreme (the light side) at the first reflector, laser tube of the distance from the first reflecting mirror is the best when the light in 2-5 cm, hold the laser tube is fixed with a snap ring



1 – laser tube fixed ring

2 – reflective mirror

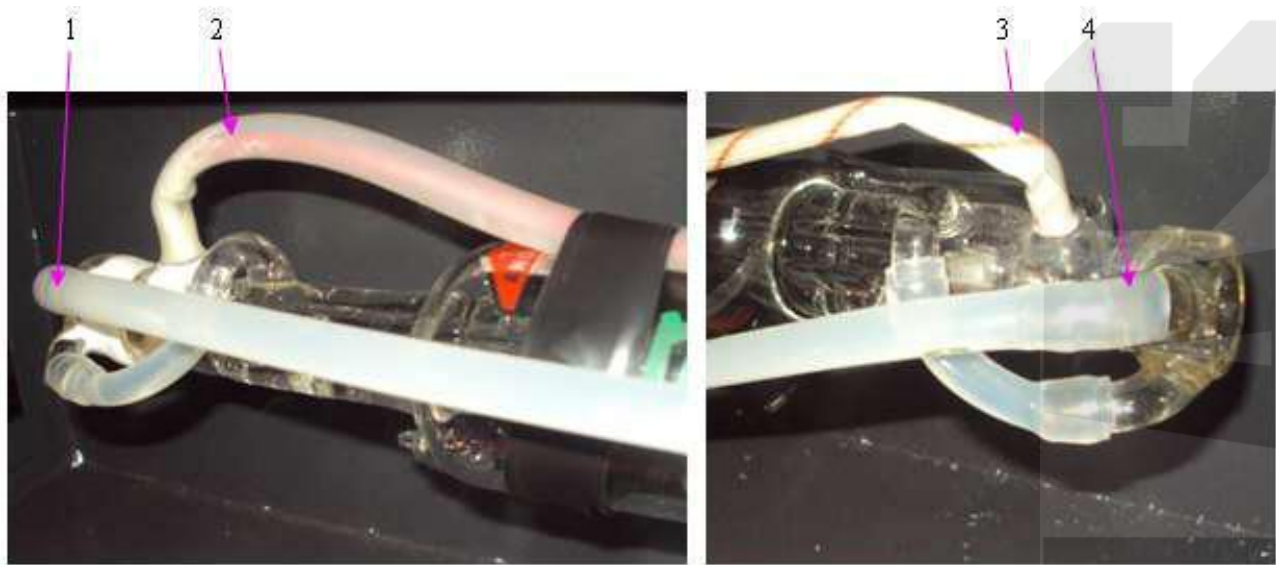
The water tube installation:

- the installation requirements of laser tube conduit to drink water from the cathode, anode and meet water "descend into the out" principle, namely the water inlet downwards, outlet up, and the interface can't leak. When installing a rubber hose, to apply a small amount of water on the water gap, for easy installation. Open the water-cooled machine power, let the cycle in a minute observation of laser tube have blisters, if there is a bubble, rotate it slightly under the position of the laser tube to squeeze blisters.
- laser in use process, can't form scale in the cooling tube, lest cause jams cooling water; Once found, 20% of dilute hydrochloric acid cleaning cooling pipe, remove scale.

3.5 Laser supply installation

The power supply cord on the laser tube installation

Distinguish correctly the laser tube is negative, generally is the laser output is negative (-), the other end to the positive (+).



1 - water inlet

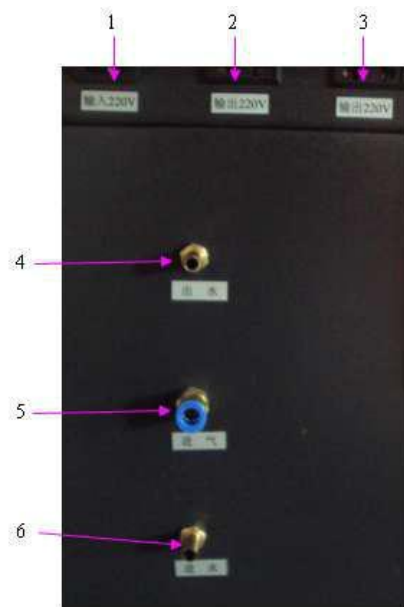
2- laser tube anode

3- laser tube cathode

4- water outlet

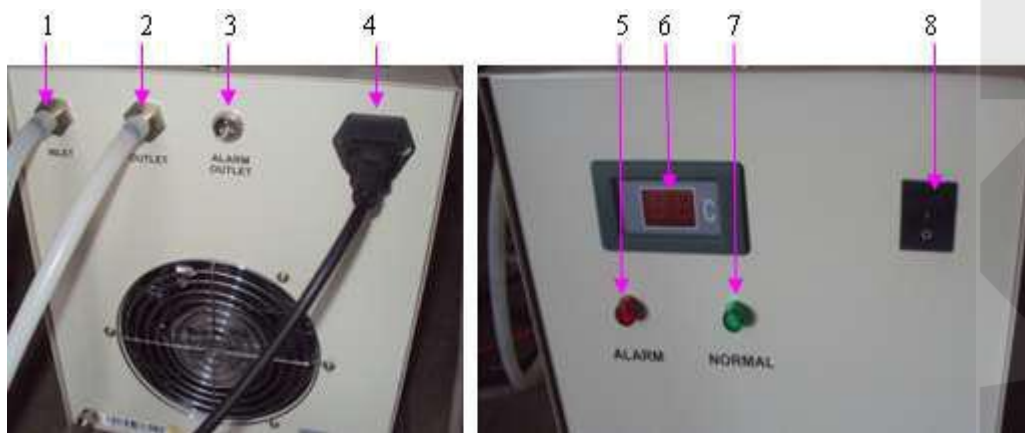
3.6 Water chiller installation:

Outlet and inlet of water cooling machine on rubber hose. Open the machine power supply, water cooling machine start working, loop observation of laser tube have blisters after 1 minute, if you have blisters slightly rotating laser tube to squeeze blisters. Note: the laser tube inlet side down, outlet up, so that the laser tube there would be no blisters.



- 1-mainly input supply connect with 220V supply
- 2-output connect with air compressor
- 3-output connect with water chiller
- 4-outlet water connect with water chiller input water
- 5-air input connect with air compressor
- 6-water input connect with water chiller output

Water chiller (higher than 80w laser power match water chiller)



- 1- water inlet connect with machine outlet
- 2- water outlet connect with machine inlet
- 3- water protection line
- 4- water chiller supply
- 5- alarm light
- 6- temperture display screen
- 7- working Light
- 8-supply switch

water-cooled machine cooling water requirements: cooling water with pure water, had better be highly purified water, and often pay attention to the water temperature of cooling water, water temperature should be controlled in the range of 15 °C to 30 °C, may not be

too high or too low, especially in the summer, once found, high temperature cooling water should be replaced in a timely manner or stop to rest for a period of time.

to ensure that the cooling water flow in 2 l - 4 l/min, otherwise the result is bad, will cause the laser mode is not good (mode laser typing is a good one round and round and shiny

spots), light spot less round to cause a decline in power. Water to fill in the water-cooled machine, otherwise each boot for the laser tube cooling water filling and dissatisfaction phenomenon occurs.

(C) on the replacement of water cooling machine in the circulating water regularly, suggest you to change once every seven days.

Laser power under 80w, pls use water pump

Laser power higher than 80w, pls use water chiller

3.6 air compressor and air pump installation

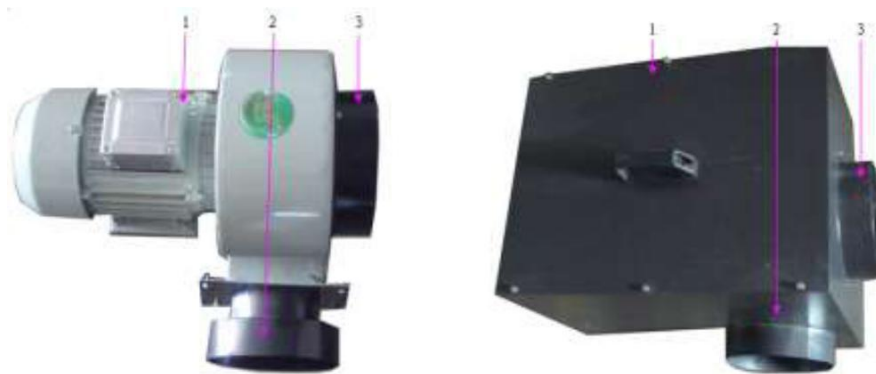
Applicable materials: wood, plywood, MDF, die board, paper, leather flammable materials cutting

- 1-display table
- 2 air output control switch
- 3- air compressor supply line
- 4- air compressor
- 5- air outlet
- 6- air filter
- 7- air filter outlet
- 8- oil filter equipment
- 9- air pressure adjust device
- 10- air pressure display table
- 11-air compressor inlet
- 12-air filter's filtering device

3.7 the installation of exhaust fan

The air inlet of fan with white tube and machine exhaust port connection, plug in the power cord of the fan.

Fan for a long time use, can make the fan inside the accumulation of a lot of solid dust, let the fan make a big noise, in addition to flavor and is unfavorable to the exhaust. When appear insufficient suction fan smoke not free, turn off the power supply first, will be discharged into the duct and the duct on the fan, remove the inside of the dust, and then put the fan on, and pull out the inside of the blades, until clean, then put the fan installed.



1-exhaust fan

2- exhaust fan outlet

3- exhaust fan inlet

3.9 Control software installation

Hardware requirements:

CPU	> 2.1G
Internal storage	>256M
Hard disk	>20G

Software requirements:

Microsoft Windows operation system (Window2000、WinXP)

Software installation is very simple, users only need to put the CD the software copy directly to the hard



disk, and then double-click on the run is ok, then put the installation switch. After you finish



will appear, then put double it, about the detail information pls check the software introduction

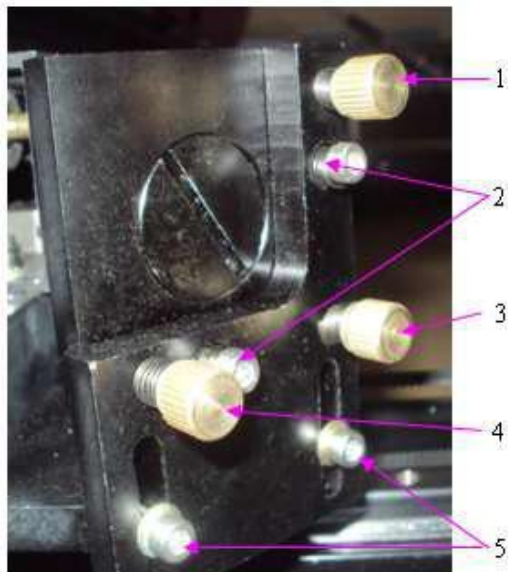
Chapter 4 laser path adjust

4.1 optical components structure

The light path is the route by laser. Complete three light route laser tube, reflection lens and focus lens and light system device. The stand or fall of light path adjustment is directly related to the effect of cutting cutting, so be patient and meticulous.

Note: before the machine start to work to ensure that the cooling water circulation is in good working order, otherwise it will damage the laser tube.

1. laser frame structure diagram



(2) for adjusting screw up and down, can only be fine-tuning. When the screw tightening laser downwards migration

(3) for retaining screw

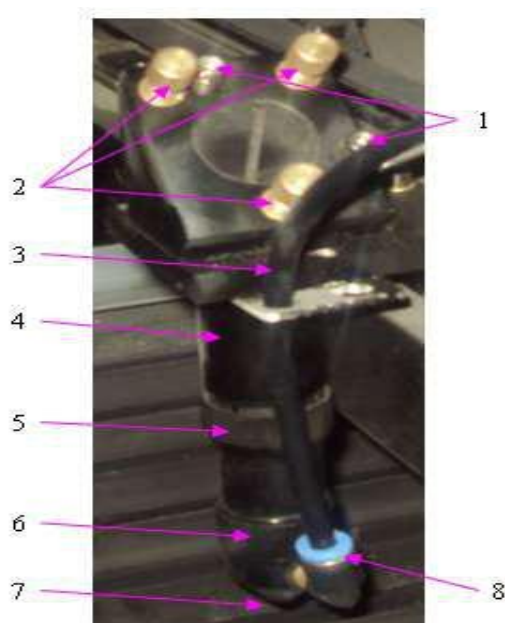
(4) adjusting screw for the upper left or lower right, when the screw to tighten the laser into the upper left corner

(5) for adjusting screw, when the screw tightening laser right deviation

(6) for adjusting screw up and down, up and down to a wide range of adjustment

In regulating, the adjusting screw up and down and left adjusting screw tightening at the same time, the laser will shift to the left; About adjusting screw and upper adjusting screw tightening at the same time, the laser will shift up.

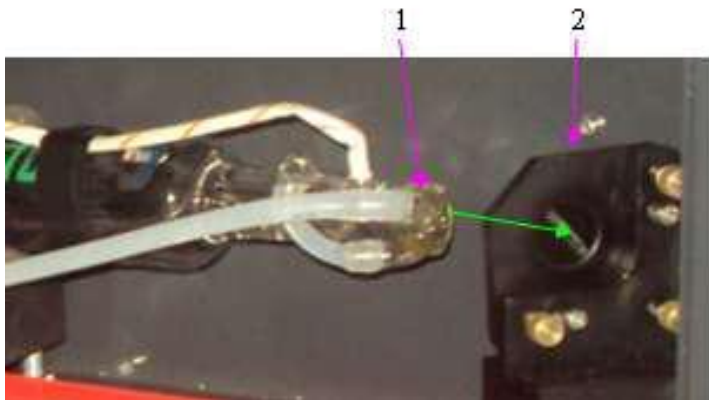
2. light system schematic diagram:



- 1- fix the screw
- 2- adjust the screw
- 3- airway tube
- 4- lens cone
- 5- For the lock cap, used to adjust the up and down and fixed
- 6- For the lock cap, inside is focusing mirror
- 7- For the outlet and laser output
- 8- air inlet

4.2 laser path adjust

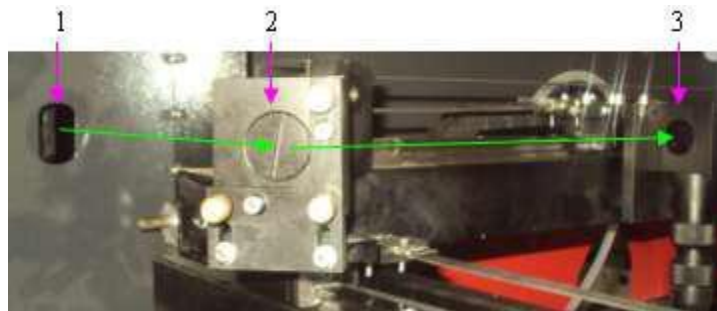
Laser beam from the laser tube first shot at the center of the first mirror area (laser beam effect in the center of the mirrors within the scope of ± 5 mm). With acrylic or other transparent non-metallic materials before the mirror, so we can see mirror through acrylic transparent or other non-metallic materials, press some switch, let the laser diode laser, the laser will leave on acrylic transparent or other non-metallic materials burn marks (dot), try to observe the position of the light effect on the mirror, and then adjust the position of the laser tube light, laser from laser tube to hit the center of the first mirror lenses.



- 1- laser power outlet
 - 2- reflective mirror 1
- Green line is the road of laser

1) Adjust the first reflecting mirror.

With acrylic or other transparent non-metallic materials in the second reflection mirror, adjust the first mirror knob screw, the laser from laser tube to hit the center of the second mirror lenses.



1-laser power output place(first reflective mirror)

2-second reflective mirror

3-third reflective mirror

Green line is the laser running road

- **Step 1:** move X beam Y front, made the first reflector and the shortest distance between the second reflecting mirror, in front of the second mirror on block transparent acrylic or other non-metallic materials, press some switch, transparent acrylic or other non-metallic materials on a point, observe the test points in the second position on the mirror, adjust the first reflecting mirror, try to make light works in the center of the second reflecting mirror.
- **Step 2:** first on the laser light into the hole with double-sided adhesive tape or paper can play a tag object, such as press some switch, plastic or paper tape leaves spot, move to Y X beam back-end 30 cm, between the first reflector and the second reflector distance become far, press some switch, contrast test before and after light spot whether overlap, such as not overlap, please adjust the first reflector, try to make two points .
- **Step 3:** move X beam back to front, Y axis in laser light into the hole on plastic or paper tape can play a tag object, such as press some switch, plastic or paper tape leaves try light; To move X beam to Y back-end 60 cm, make the first reflector and longer distance between the second reflecting mirror and press some switch, contrast test before and after light spot whether overlap, such as not overlap, please adjust the first reflector, try to make two points of light overlap .
- **Step 4:** the second and the third step of operation, over and over again until the two laser points coincide.(every 30 cm X beam move, in turn, additive, 60, 90... until you reach the wide size)

2) Adjust the second reflective mirror

Step 1: before the third mirror with a small piece of the acrylic board or paper can play a tag object, such as laser will be moved to the nearest second reflecting mirror, according to some, a laser spot on

Step 2: laser will be moved to the furthest away from the second mirrors to play on a laser spot.

Step 3: if two laser spot do not overlap, adjust the adjusting screw of the second reflecting mirror, make the two laser spot overlap.

Step 4: repeated the first and second step operation, until the two laser points coincide.

3) Adjust the tube



after adjustment on a few steps, a few frames reflecting laser can fall at the same point, but not necessarily in the center of the mirror. Next to adjust the position of the laser tube, make its laser beam in the center of the third mirror.



First step: move the laser head to the first from the second reflector laser tube and the nearest place, in the third mirror (laser light into the hole) on plastic or paper tape can play a

tag object, such as press some switch, double-sided adhesive tape or paper leaves test points, adjust the laser tube (with 12 * 14 wrench adjustment screws) from the lower pole of the laser tube support, try to make light can hit to the center of the laser light into the hole.



repeat that move light steps 1, 2, a few frames reflecting laser can fall at the same point, and in the third mirror (laser light into the hole) center.



such as laser spot on the partial laser tube should be down. Laser spot offset should be laser tube moving upward. Before the laser spot, the location of the laser tube should move

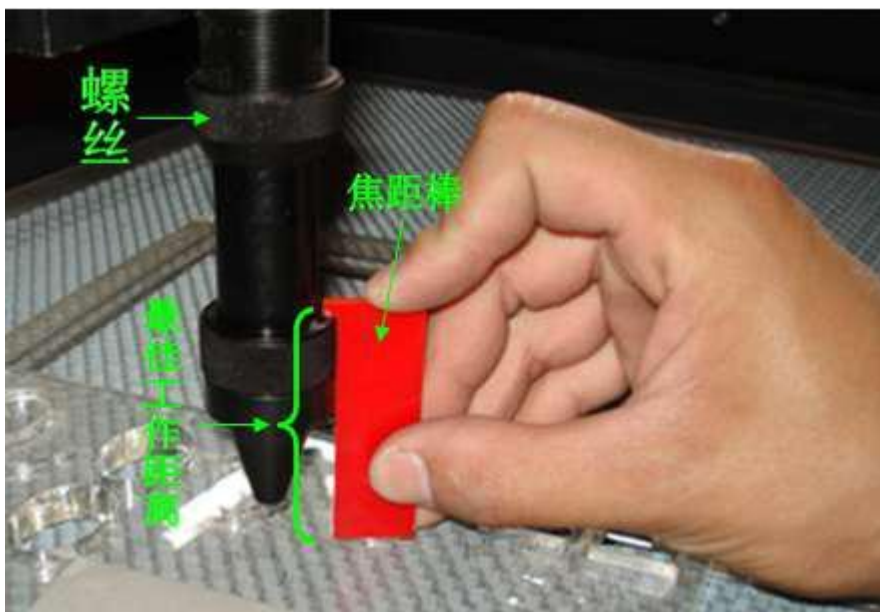
forward. After laser spot, the location of the laser tube should be back ward. In the process of transfer must be micro laser tube, and cannot be rushed.

4) Inspection standard:

- Firstly: laser spot in all within the scope of the center of the mirror
- Secondly: Laser respectively to the workbench of the four corners, laser point fall on the same point and the center of the laser beam from the third mirror through it.

5) Adjust the focus lens

Put a piece of the acrylic plate on the worktable, point try to see if by penetrating acrylic around before and after laser vertical. No vertical adjustment screws on the third mirror will light up the vertical, make the strongest so far, the energy of the laser spot thus the laser with the focusing lens to vertical; And then adjust the focal length of the focusing lens, will focus on the screw loosening of lens, the distance of the laser head to move up and down, that is, adjusting the focal length of the laser, make cutting line of the finest and most, minimize the play in the laser spot on the surface of the object's deepest, this distance is the best machine working distance, to write down the work of numerical, convenient use.



When we are machine factory, will give the customer a for this machine use the focal length of the rods, the focal length rod from the location in the above to distance on the surface of the materials, the working distance of this distance is the best.

4.3 the focal length of how to choose appropriate focus lens (this method is suitable for very professional staff use)

Laser materials processing is the direct reasons of the lack of depth and the processing speed: the effective power of the laser processing density is small.

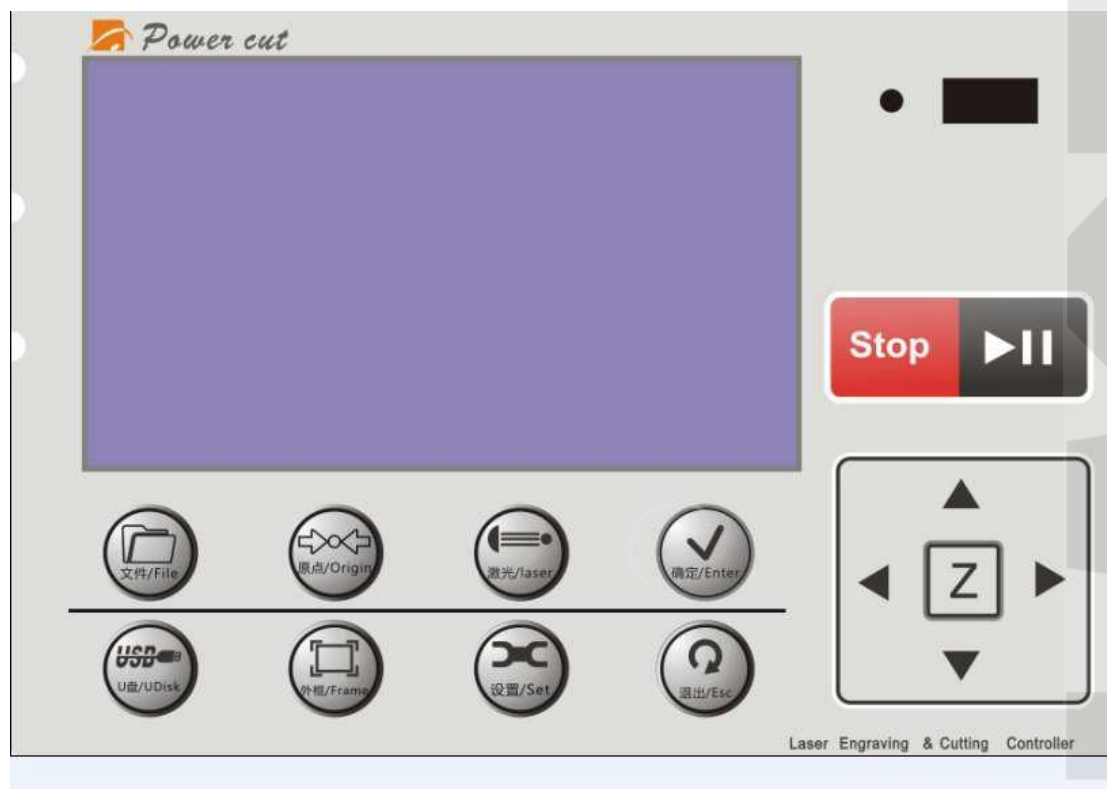
For the same material, the effect of laser processing load on processing materials mainly depends on the laser light power density (note: not power), light power density refers to the power per unit area, the calculation formula is:

Laser power density = laser power/laser light spot area

To get the strong laser power density, when cannot increase the power of laser tube, can adjust the focal length of the focusing lens to reduce the area of the laser spot, meet the needs of increasing the laser power. For most applications, reduce the area of laser speckle is increasing laser tube working current or replace larger laser tube more effectively, and lower cost.

- size for: the shorter the focal length, the smaller is the focus, the shorter the depth of focus also; The longer the focal length, the greater is the focus, with the depth of focus is, the
- longer focal size and the depth of focus is a pair of contradiction. Depth of focus is refers to the laser focus can be formed after the processing capacity of the length of the laser power concentration areas
- the longer the depth of focus on processing thick the better, but this will make the focal point, and then decreases cutting ability.
- the smaller the depth of focus, good for cutting ability, but can make narrowing the focus, and so on the depth of cut. At the same time, increased smoothness requirements for
- processing platform, which is not flatness sensitive platform.
- Focus lens selection principle is: in the case of possible, try to use a shorter focal length of the focusing lens. When cutting speed cannot satisfy the needs of customers, a shorter focal
- length of the focusing mirror should be replaced. At the same time, it is recommended that the customer is equipped with a variety of different focus lens focal length, to adapt to the different material thickness of the processing requirements.
- The right way to focus should be followed:
- Focus lens focal length of the reference value, through the experiment many times near this value, to determine a processing capacity of the strongest points, as to the focal length of the correct application, even if is the same lens, in the case of different material, material thickness, the best focus position will change, namely according to different material and thickness, the coke quantity is different. From coke: focus on the process of laser is a divergent process after come first, in order to achieve the best cutting ability, focus lens focus of physical completely with the surface of the material does not necessarily can get the best processing effect, should according to the different situation, adjust the focus to the materials of a certain depth, the best processing effect can be obtained, this is from the focal depth values are obtained, from the amount of coke size and material of the material and thickness are related.

Chapter 5 operation panel and instructions



(control panel)

5.1 the keys function introduction



1. (File): According to the file into memory under main interface information interface; Long according to the current setting of the file information for file into the interface



2. (U Disk)



3. (origin)



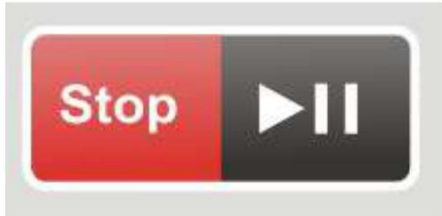
4. (Frame)


5.  (Laser)


6.  (Set)。

7.  (Enter)

8.  (Esc)

9.  (Stop)

10.  (direction)

11.  Z axis and X axis change。

5.2 computer connection problems

Problem performance phenomenon:

1. read and write parameters, dozen don't start outh;
2. can't read and write parameters;
3. transfer file is nvalid.

Solve the steps:

1. check to see if the USB cable connection correct, good. Check whether the USB line interface is connected to the PC.
2. check the USB driver is properly installed, to install the driver.
3. new insert a good USB port on the computer.
4. put equipment power shut down for three minutes, then back on.
5. restart the computer, to the equipment and the computers are grounded.
6. replace a computer.

5.4 U disk read and write

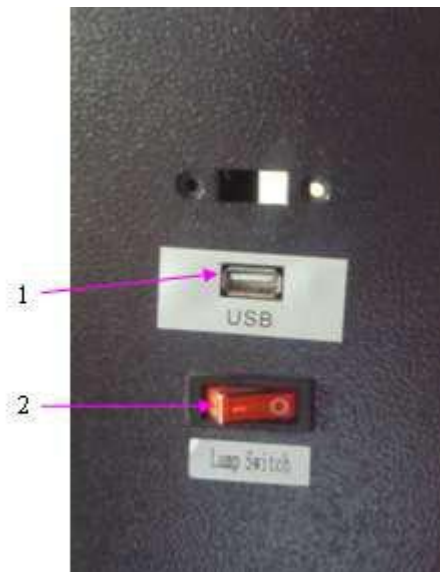
Click on the U disk file, display "U disk is empty or rong" Answer: U disk error.

The solution:

The first step, check the usb interface is correct;

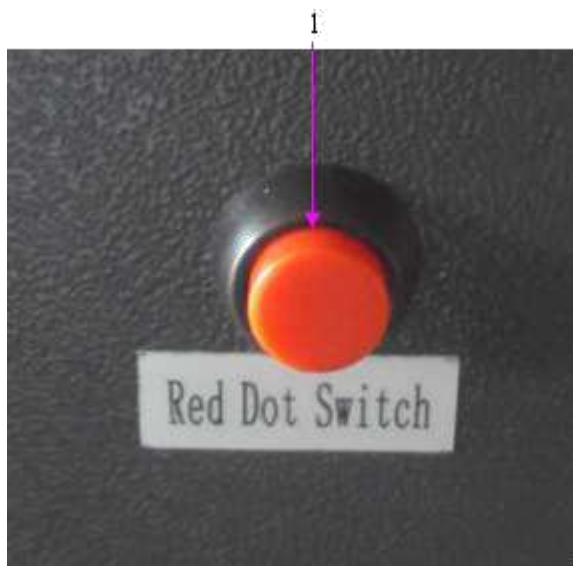
The second step, anew in a type of usb flash drive.

5.5 the profile of laser cutting machine



1- USB connection

2- light switch



Red pointer switch

5.6 the basic operation process machine operation

(a) boot

1. Open the water-cooled machine, 3 minutes to let the water cycle in the laser tube.
2. Open the host power supply.
3. Open the fan power
4. Open the laser power supply, with key check whether the light.
5. Open the control software, testing whether the up and down or so bald.
6. Put away artifacts, adjusted the focus.
7. Computer operation transfer files, start cutting.

(2) shutdown

In turn, close the laser power supply, the host, fan, water cooling machine, air compressor.

VI Precautions for use and Maintenance

It is more and more widespread application for the laser engraving and cutting machine, especially to the customers (especially to the customers who haven't tried the machine for a long time), it is very important to be able to use and maintain well. We are kindly briefly outline on how to operate and maintain well as below:

6.1 Daily caution

- 1). Please do not staring straight the laser beam.
- 2) Operate the machine in the control area, and add the signs of caution
People who have not been trained should not use the machine.

- Close the place around the laser path in case the laser escaped;
- Try to avoid the same height between the laser head and human eye;
- Pay attention to the ventilation and exhaust in the laser processing environment;
- Check the water chiller to see if it can let the water out each time after starting the machine. It is forbidden to start the machine up when water can not come out from the water chiller.
- The water in the water chiller should be full. The water temperature should be about 15-35 °C. If the temperature is too high, the water should be changed. It is better to use purified water so that there isn't any contaminant. Circulating water should be changed regularly (every week).
- Because there is laser and high-pressure in the machine, non-professional workers should not disassemble the machine without authorization.
- Reflecting mirror and focus lens should be wiped with special camera lens paper. Cleansing of mirrors and lens should be done once a week. Make sure the mirrors and lens are dry before using again. It is required that the grounding of all parts of the machine and user's computer should be safe to avoid damage of machine and injuries caused by static electricity.
- Exhaust fan must be turned on while the machine working, so as to avoid pollutions on mirrors and lens. It is forbidden to put any flammable and explosive articles close to the equipment so as to avoid fire.
- Any irrelevant total reflection or diffuse reflection objects can not be placed in the equipment to prevent the laser from reflecting on human body or flammable articles directly.
- The water in laser tube should be drawn off in winter, in order to avoid frost cracking of the tube.
- When the machine is working, operators should examine the working conditions (such as whether the laser ray has been blocked from shining on the paper used for crispening by the air coming from the air pump, unusual noise, temperature of circulating water, etc.) at any moment.
- Operators can not leave the machine when it is working so as to avoid unnecessary loss.
- The crossbeam can not be pulled by hand. The machine should be put in places where there is no interfere and harmful effect of pollution, strong electricity, strong magnetism, and so on.
- Power supply voltage: the laser will work unstable because of the fluctuation for the input voltage; if over tension, the power system will be damaged forever. So, please install a power stabilizer at least 5000W to avoid damaged by the device, circuit because of the voltage fluctuation, and also guarantee the stability.
- Especially to the customer who is at the power-instability place, it is necessary to equip with power stabilizer.
- Don't strike the keys and buttons strongly. Please press it lightly to avoid damages of those keys and buttons.

- In case there is damage or fire, please turn off the power at once.
- Please do not use the machine when the humidity is more than 80%, or it will affect the life the machine and damage the electronic parts.
- Don't start the machine when there is thunder or lightning.
- Users must be strictly adhered to the above rules; otherwise we are not responsible for any personal injury or machine damaged.

6.2 Maintenance

1) Replacement of water in chiller. (Recommended replace the water every week)

Notice: Before the laser tube working, please make sure water in the tube is full.

It is forbidden to use circulating water of poor quality, because it may affect the laser power seriously and shorten the service life of laser tube. The temperature of the water should be 15-35 °C. If the temperature exceeds 35 °C, please change the water (the right way of changing the water is to

get out of some hot water and fill in cold water) or turn off the machine to cool the water.

2) Exhaust fan cleaning. After a long time, the exhaust fan will be polluted with dusts. Please open the box of the exhaust fan, remove the two pipes, and then get rid of the dust in the fan.

3) Optical mirror and lens cleaning. Users could clean the first mirror and the second mirror directly with lens paper or cotton plus medical alcohol to gently along the central to the edge be careful not to rub with a rough material or contact them. Please clean the reflecting mirror carefully when it is on the machine, otherwise, the ray path must be readjusted!

The third reflecting mirror and the focus lens need to be taken down from the laser head to clean. Unscrew the lens tube from laser head carefully, then blow away surface dust and gently wipe with

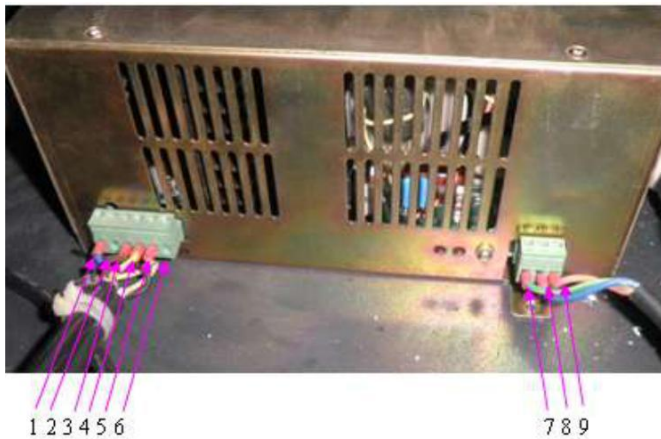
the cotton dipped alcohol, put them back after cleaning. Before using the mirrors again, please make sure they are dry.

1. Guide rails should be cleaned, and lubricant should be added onto the rail every two weeks.
2. The materials for cleaning the rail: cotton cloth and lubricant oil
3. How to clean the rail : push the laser head to one end of the rail ,and use the cotton cloth clean the rail ,after that ,add some lubricant oil on the different part of the rail ,and then ,push the laser head from one end of the rail to the opposite end, make sure the oil can be symmetrical added on the rail .
4. Tighten the screws and the shaft coupling
5. After a period of the time, the screws and the shaft coupling maybe loose, and this will affect the stability and mechanical movement of the machine. Tighten the screws and the shaft coupling every two or three months to make the machine work normally.
6. Bearing maintenance.
7. Using the soft cloth to wipe the dust which on the bearing, and then use the oil suction needle inject the oil into the bearing and slowly roll the bearing.
8. Laser tube maintenance.
9. The laser tube should avoid generating incrustation which would cause water stemming. If there is incrustation, please clean it with 20% diluted hydrochloric acid.
10. Light path
11. The light path is made of reflecting by reflector and focusing by the focus lens. The focus lens won't be skewing; but the skewing possibility of the three reflectors is high because of they are fixed by mechanical part. So we advice customers make sure to check up the light part before working.

VII. Regular failure and failure elimination

7.1. No ray

12. Did not turn on the laser power supply. The laser power switch is on the panel.
13. The laser path is not correct. It could also happen such situation when inclines large. Please refer to the previous section. 3. Check the ammeter state by pressing the testing key in the operator panel;
14. No current: check if the if the wires of the laser power supply, high-tension line and signal are connect well;
15. Current is available. Check if the mirrors or laser path is not correct;
16. Check the water circulation system works well or not;
17. Without water: check the water chiller is electrified or damaged;
18. With water: check the water inlet and water outlet if connected inversely or the water pipe is broken;
19. “Test light” button works well, but no ray when cutting or engraving. Please check if the signal cable is loose.
20. The laser power supply is broken, there are two ways,
21. The fan on the laser power supply should work after turning on the switch of the supply, otherwise the laser power supply is broken and need to be changed.
22. Check the electric wire of the laser power supply
23. Like bellow supply sample



Pin 1 is H (TH) input signal, which controls the optical switch, when the voltage $\square 3V$, the signal will agree the laser tube to send out laser, when the voltage $\square 0.3V$, the signal will not agree the laser tube to send out laser.

Pin 2 is L (TL) input signal, which controls the optical switch, when the voltage $\square 3V$, the signal will agree the laser tube to send out laser, when the voltage $\square 0.3V$, the signal will not agree the laser tube to send out laser.

Pin 3 is P (WP) input signal, which controls the optical switch, when the voltage $\square 3V$, the signal will agree the laser tube to send out laser, when the voltage $\square 0.3V$, the signal will not agree the laser tube to send out laser.

Pin 4 is G signal. This pin connects the machine body and control card.

Pin 5 is the IN input signal controls the laser power. It can be controlled by 0-5V analogue signal or 5V PWM signal.

Pin 6 is 5V VOUT. The maximum current output is 20mA. If connect one resistor between pin 5 and pin 6, could enlarge the electricity and increase the laser tube power;

Pin 7 is the ground wire of the laser power supply;

Pin 8 is the negative electrode of the laser power supply

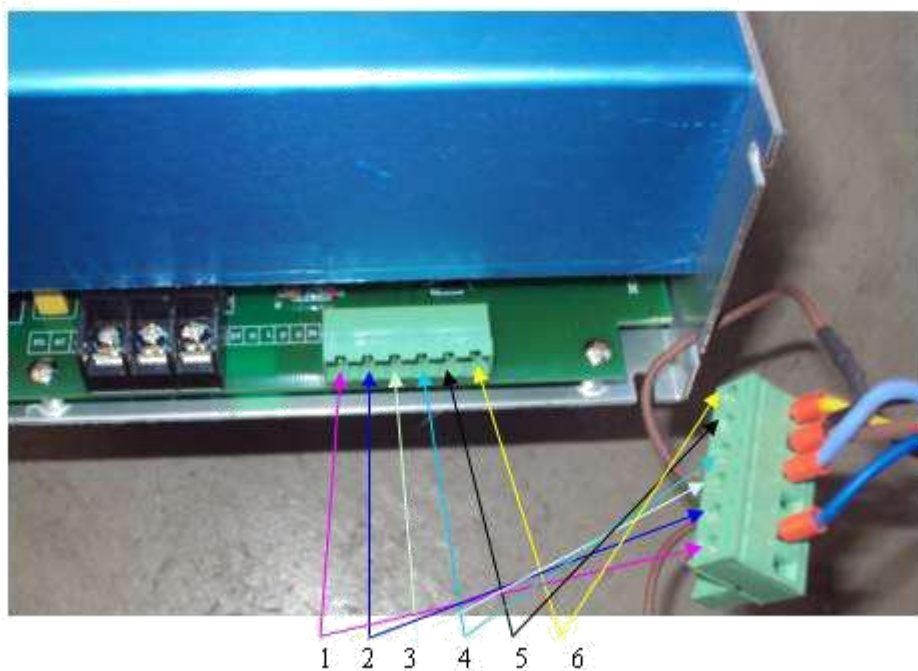
Pin 9 is the positive pole of the laser power supply;

First, check if any signal from the powercut; when ray continuously, please test the high-level voltage input signal pin 1 and control signal pin 3 by multimeter (put the positive pole into the high-level voltage input signal pin 1, negative electrode put on the ground wire pin 4), to see the voltage in the multimeter. If the voltage is much less than 3V, then no signal provided from the powercut board;

If no problem as above, test the water-cooling protect wire, short circuit the pin 3 and pin 4, to see if output while opening the laser (Do open the water chiller to cooling the laser tube when open the laser, or else will damage the laser tube); if ray, it means there is something wrong with the signal in water chiller; check the water-cooling protect wire if poor connected;

If no problem as above, check the socket of the digital line if connected well;

The pin definition of power wire (normal use for laser tube more than 100W)



Pin 1 is 5V VOUT. The maximum current output is 20mA.

Pin 2 is H (TH) input signal, which controls the optical switch, when the voltage \square 3V, the signal will agree the laser tube to send out laser, when the voltage \square 0.3V, the signal will not agree the laser tube to send out laser.

Pin 3 is L (TL) input signal, which controls the optical switch, when the voltage \square 3V, the signal will agree the laser tube to send out laser, when the voltage \square 0.3V, the signal will not agree the laser tube to send out laser.

Pin 4 is P (WP) input signal, which controls the optical switch, when the voltage \square 3V, the signal will agree the laser tube to send out laser, when the voltage \square 0.3V, the signal will not agree the laser tube to send out laser.

Pin 5 is G signal. This pin connects the machine body and control card.

Pin 6 as the IN input signal controls the laser power. It can be controlled by 0-5V analogue signal or 5V PWM signal.

7.2 The laser is very weak.

- (1) The laser tube is too old. Need to change a new laser tube.
- (2) The focus lens is dirty. Take down and clean the focus lens.
- (3) The reflector mirrors are dirty. Take down and clean the reflector mirrors.
- (4) The laser path is not right. Adjust the laser path and make it vertical with the worktable.
- (5) The focus distance is wrong. Adjust the focus distance.

7.3 The engraving surface is not plain

Fault phenomenon: there is apparent spine phenomena while cleaning the bottom; when intaglio processing, there is apparent uneven phenomena In the place of rank crossed, when Yang Eagle processing, there is apparent spine horizontal line between the place has character or no character; the deeper clean, the more apparent phenomena.

1. Failure cause

- (a) The speed is too fast. Please reduce the processing speed.
- (b) The flow of the air generated by the air pump is not steady. The powder is cumulate. Regulate the blowing of the gas, to ensure no powder adhesion, side-blowing is better.
- (c) The laser path or the focus distance is not correct. Adjust the laser path or the focus distance.
- (d) The focus lens is not suitable. Change the lens into short focal length lens.

2. Regular failure and obviate method

- (a) First, guarantee the light path is right by checking it
- (b) Lower the processing speed, increase the frequency of the laser output switch;
- (c) Adjust well for the gas well, to ensure no flour adhesion, it's better by side-blown;
- (d) Adopt the short focus Len, consider the processing thickness while adjusting the Focus Len

7.4 Spots scattered, not focusing, lens cone heat...phenomena of laser engraving machine.

1. Fault phenomena: the laser beam machining can see yellow, and the rough beam diameter, hollow spot, when the hands touch the focusing tube, has a heat feeling.
2. Fault:
 - a) water temperature of laser tube is too high.
 - b) Lens pollution.
 - c) Laser tube holder is unreasonable, which lead to the internal tube deformation.
 - d) Ray path moved to one side, the focusing effect is poor, it is the main cause of focus drum heating and the sparking in the light exit of laser head.
 - e) Lens is choose unreasonable, when adjusting the focus, not consider the depth of processing then caused the poor focusing.
 - f) There is something wrong with the laser tube quality.

3. Exclusion method:

- a) Ensure that the water temperature in the laser tube is below 32 degrees.
- b) Adjust the ray path, make sure the ray path is correct and well, and consider the processing depth when adjusting the focus length.
- c) Ask our clients clean the lens and mirrors on time, make sure that they are not polluted; Choose the focus lens reasonably, and make sure the ray light is well.
- d) Check the position of laser tube holder, and adjust it to the right position.
- e) Change another new laser tube.

7.5 Sparking from the exit of laser head

1. Check the air blowing tube of the laser head if there is strong air current shoot up, because the air tube is too long and easy to be bended, blocked or worn out. Solving method: clean or change the white color air blowing tube.
2. Check the air compressor itself if there is something wrong, for example: the air-output is too small; or it doesn't work. Solving method: change a new air compressor.

7.6 Water chiller alarming

Firstly, ensure the power supply system normally. Low voltage is easily caused water chiller alarming. So we must make sure the voltage normal, if necessary, chooses the voltage stabilizer.

- 1) Check the water quantity in the water chiller, less water could cause alarming. Solving method: fill up pure water.
- 2) Check the water tube if it is bended or blocked, whether the water protection is blocked. Solving method: clean or straighten the water tube or water protection.
- 3) Check the water temperature; see if it is much higher than the limited value. Solving method: change the water often, or restart the machine to engrave after half an hour.
- 4) Check the inner of water chiller and see is there anything wrong with the water outputting, no water or less water. Solving method: Change a new water chiller.

7.7 X axis or Y axis does not move around or move abnormally.

1. Control card loosen or stoppage.
2. Limit switch or data line stoppage, check the limit switch, if it has signal, if the line connected well.
3. Drive of equivalent axis stoppage, check the drive supply electricity or not, signals is normal or not.
4. Servomotor of equivalent axis stoppage, check the connecting line of the motor short circuit or not, if it is abnormal, change a motor please.
5. Check whether the connecting line between motor and driver is loosen or connected well or not.
6. Check whether the coupling is broken or loosen.
7. Equivalent screw rod is broken or the screw of the screw rod stoppage.
8. Equivalent axis's slide rod stoppage.
9. Driver's subdivision, electric current are different from the software designed.

7.8 Laser head or beam shaking.

1. After power off, move the laser head and beam by hand, if there is obvious resistance, please check the left tensioning wheel, lead rail and slide block. Solving method: Clean the lead rail, slide block, changes the tensioning wheel.
2. Check whether the laser head and air blowing tube are locked or not, whether the beam is shift too much or not. Solving method: adjust the beam, straighten the air blowing tube.
3. Push the laser head, check if there is a fricative or shaking. If yes, that is because the space of the slide block is too large, so change another slide block.
4. Check whether the motor and driver is connected well or not.
5. Check the transportation parts of the machine (coupling, shaft block, screw of the screw rod, straight line bearings and slide block), whether they are loosen or broken, reasonable assembling (loose or tight).
6. Start the machine, check which axis shaking, laser head or beam. Cut off the supply of one axis, check the other axis's motor and driver, if there is stoppage. Interchangeable test, find which axis' motor or drive the problem is. If there is any stoppage, change another one in time.
7. Reset in the right direction, but in the end, the laser beams can not stop or crash the machine. So we need to check the parameters of motherboard, whether sensor dust is excessive or not, the sensor cable is disconnected or the sensor is damaged.
8. If the problem still exists, may be motherboard failure, contact with the factory replacement motherboard.

7.9 Different engraving depth or could not engrave deep depth.

1. Check whether the water circulation system is smoothly flowing (water pipes bent or broken); 2. Check whether the focal length is normal, if the focal length is wrong, please adjust the focus.
3. Check whether the laser path is right, if so, please adjust the laser path again.
4. Check whether the mirrors or lens are dirty, if so, please clean them.
5. Check whether the lenses are broken, if so, please change new one.
6. Check whether the outside of the laser tube is dirty, if so, please clean it.
7. Check whether the worktable is plain.
8. Check whether the X-axis cross girder is parallel.
9. Check whether the temperature is higher than 30 °C (change the water for cycling)
10. Check whether the laser head or Focus Len is loose (fasten them)
11. Check whether the laser tube is aging (change it; free changing within guarantee time)

7.10 Wrong engraving and not following the file engraving

1. Initialization is not correct, the data was sent out (please make a change)
2. Operation was not in order (need to key in again)
3. Control card problem
4. The configuration number of the software was problem
5. The driver fault or current subdivision numbers setting was different with the software.
6. Inverter interference or wire problem.
7. Electrostatic interference

7.11 Wrong size or not closing and malposition when its engraving

1. Edited files is it correct (reset again)
2. Select filed is it out from the size of the layout (choose again)
3. Please check with the parameter of software is it right(set again)
4. To the belt left and right, check if the tightness degree are consistent. If the synchronous belt is too loose, the performance will appear double image for engraving letter; if too tight, will damaged to the synchronous belt. Please adjust the synchronous belt if there is something wrong with it: adjust the screw to suitable degree, no double image for engraving letter and low noise while running the machine.
5. Check the belt or synchronous belt is slip or Jumping over Teeth (fasten the synchronous wheel or belt)
6. Please check the beam is it parallel.
7. Please check the pulley at the laser head is it abrade, that's made the laser head not hard up, that must need to change a new pulley.
8. Please check the computer system is it right (please installation the software again)

7.12 No output from the computer

Please check with the parameter of software running is it correctly(reset again).

1. When the laser machine was running ,is it fixed position as first or not ,after that can output the data(reset the output)
2. Please check is it not datum when its starting the job(reset again)
 1. Please check the output gorge is it same as software setting.(reset again)
 2. Please check the earth line is it stable, and the static electricity is it interference the wire(make the earth connection again)
3. Change the gorge and texting the output
4. Please installation again for the laser software and texting again
5. Please formatting the computer system and installation the software again and texting again.
6. Please check the main board gorge is it damage ,if its please repair or change a new one .

7.13 SOFTWARE ERROR ALERT INTERFACE.

The operation panel can real-time display the alert interface ,which cause by various improper operation or external disturbance signal. According to the information which display on the panel , it is easy for the user to correct the wrong operation, and exclude the external disturbance signal .

1. Soft limit stops

When found this kind of error , it show that the work scope data ,which input into the computer is bigger than the real worktable .

Solution :

Remove the laser head, and make it in the scope of the worktable. Another way is that conceal the “immediately output order “reset the proper data again, and then download the data.

2. Hard limit stops

When the user operate the machine while does not make the laser head back to the original point .It is easy cause that the processing area is bigger than the real worktable and when the laser head bump into the “size control signal “ the movement have to cease .

On the other hand, when the machine in a complex environment which have a lot of interference signal , it will also display this kind of information .

Solution :

Remove the laser head ,and make the processing graphic data in the scope of the worktable.

When we find the alert information while the laser head does not bump into the “size control signal “ so we can sure ,it is caused by the external disturbance signal . When we meet this kind of situation, please check the ground cable

3. Lack of memory space alarming

Reasons:

- a) The number of download files is more than the total number of Memory device—32
- b) The download files is too big and exceed the Memory device

Solving Method:

Make sure that the download files not exceed the total memory of Memory device. Remove the files that we don't need, release the memory space.

4. Configuration and firmware mismatching

Reasons:

After firmware updating, not download the configuration and file to match with this firmware.

Solving method:

- a) Open the installation catalogue of application procedure, operate version testing procedure, check if the function library match with firmware version, if not match, please contact with the supplier to get a matching function library.
- b) Double-click application procedure, download configuration.

5. The error of function baseband firm ware mismatching

Reason for this error:

The function base for making processing file mismatch with firm ware.

Solving method:

The version number of controller for movement is not visible for change, unless to upgrade this controller via “firm ware loading”.

6. Hardware and firm ware mismatching

Reason for this error:

After upgrading of the firm ware, hard ware doesn't support the new one.

7.14 Normal problems of software

1. When engraving with gradient, double phenomenon

This phenomenon occurs when the slope of words carved smaller, usually the reason is "wide" setting slope too large, cause calculation errors, please set "wide" little slope.

2. If you only can move a graphic with one direction, please click "Shift" or "Ctrl" to recover.

3. PLT format cannot to engrave

There are two reasons, one is the graphic is not closed, the other is graphic double.

Please detect this phenomenon with "data detect" tools

4. The size is not same with engraving/cutting samples.

Open the item" laser machine set", adjust the pulse

5. The edge is irregularity when engraving

The edge is irregularity maybe happen when you use the DSP5 .3 engraver software, that means "burr", this is mainly caused by mechanical return clearance, this is the solution:

a) Draw a box (rectangular or square), set work mode for the laser carving, the sculpture is 0.5 mm instead, then see engraving effect, theoretically, should be aligned, namely the odd interlaces did edge should be aligned, even did edge also should be aligned, only the odd and even did not have a little.

b) When you open" set engraving parameters", the parameters for different engraving speed can be seen, the reverse gap is"0", you should adjust it as the matter of fact.

c) You can chose" single-track light" when best engraving effect needed. Not to chose the draw of "dual-engrave", but when you chose it, the efficiency would be lower.

6. The X-axis or the Y-axis not move

Stir knob to chose the DC 5V, test the voltage between PULX (or PULY) and GND. Take Y axis as example, click the button of 'up' or 'down', the normal voltage is 2.8V, if it is not, we could confirm the controller was broken, please change the controller. If it is, please go to next step.

c) Exchange the output terminal of the two drivers, then press "Up" or "Down" button; if X axis works normal, it means there is something wrong with the motor on Y axis, please change a new one; if X axis doesn't work, it means there is something wrong with the driver on Y axis, please chance it;

7. X Axis and Y Axis work in only one direction;

a) Test the voltage between the DIRX and GND after pressed the multimeter into grade 5V; take the X Axis for example, press "left", then press "right" to see if there is some change on high level ($>2.8V$) and the low level ($<0.8V$); if not, the control card is broken and need to change a new one; if with change, please check the driver if works normal;

b) Please change the driver on Y Axis;

NO ray;

Test the voltage between the LAS and GND after pressed the multimeter into grade 5V; press "fixed fire" in the control panel, to see if there is some change on high level ($>2.8V$) and the low level ($<0.8V$); if not, the control card is broken and need to change a new one. Also set up the time of fixed fir as 0 millisecond, which is in the PAD03 menu.

Adjust the power from 0%~100%, enter and press "fixed fire" button, then test if any change between the DA1 and GND from 0V to 5V; if not, the control card is broken, please change it; if both with, it means there is something wrong with the laser power supply.

VIII. Regulations of repair guarantee

We are responsible for the repair of complete machine for one year. Guarantee of laser tube (we are not responsible for blowing out of laser tube caused by high water temperature and frost cracking caused by low water temperature) , mirrors and lens is three months, accessory parts is six months.

Regulations of repair guarantee

1. Within the guarantee period, our company will provide service for problems that appear in normal using conditions for free. (This point is valid only for domestic customers. Certain amount of maintenance fees will be charged by the company when offering service out of China.).
2. Certain amount of maintenance fees will be charged by the company when the guarantee period is over.
3. Our company will not provide maintenance and repair for free in circumstances that the sealing paper is damaged caused by disassembly of the machine without authorization, the machine is not used in correct way, problems caused by calamities of nature and calamities imposed by other people, or the customer can not show us the repair guarantee certificate of the product.
4. It is very important to keep the serial number of the product given by the manufacturer when the product leaves factory. Only when information contained in it has been confirmed, can customers enjoy after-sale service provided by our company.
5. The manufacturer has the right to modify specifications of the product without notification to customers in advance.
6. The manufacturer only undertakes legal responsibilities for his products sold to customers, but is not responsible for other losses caused by problems of the machine or indirect compensation responsibility. The manufacturer will not take any compensation responsibility for loss of commercial profits, service interruption or any other monetary loss caused by the use or abnormal use of the product.
7. This certificate will be valid only after being stamped by distributor. It will be invalid if altered.