

Dake Auto Feeding Laser Cutting Machine

User Manual

Jinan DAKE CNC Equipment Co.Ltd

DAKE Auto-feed Fabric laser cutting machine

Respect of customer

Thank you for purchasing our company laser cutting machine. Before you first use the machine, please read this user's manual in detail, will be able to help you skillfully use the machine.



Our aim is to continuously improve and perfect the company's products, so you can use the machine may have a little difference with the instruction for use. If you have changes, we will use the attached way to inform, please understanding! You are not clear, please contact the company's after-sales service, we will meet your requirements.



Due to the input and output power supply, laser power and laser tube could live, especially the high voltage side of laser tube, you must be careful in use, to avoid electrical shock. Pay attention to safety!

Right to declare

This book by the copyright law and international copyright treaties and relevant legal protection, please do not copy without permission book part or all of the content. Follow the principle of sustainable development, and this specification may be necessary to modify, will no longer notice.

This manual introduces in detail the installation of DK1830 laser cutting machine, using methods and relevant operation and maintenance procedures. Before you opened the package to install and use the machine, please pay attention to the following:

- ☑ The operator should have related technical training, or have a specialist guidance.
- ☑ This manual will help you understand the machine and operation can cover everything.
- ☑ This manual contains many help you safety, economy, adjust measures to local conditions for operation and common troubleshooting, and other important tips. If you can follow these tips, can not only avoid dangerous accident, reduce maintenance costs, reduce down time, also can improve the reliability and working life of the machine.
- ☑ Beside u instruction should be stored in the machine for easy reference.
- ☑ The color of the machine in the manual is the reference color, and its function is independent of the color.

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
- 13) If the machine malfunctions or a fire occurs, turn off the power immediately.
- ☒ Do not operate if there is a suspicious fault. If you suspect that the product is damaged, please check with the maintenance personnel of the company and do not continue to operate.
 - ☒ Do not operate in a humid environment.
 - ☒ Do not operate in an explosive environment.
 - ☒ Keep the product surface clean and dry.
 - ☒ It is recommended that everyone involved in this machine read this manual:

Operators: Includes personnel who assemble, troubleshoot routine work, remove work waste, maintain machinery, and dispose of waste.

Maintenance: including maintenance, overhaul, maintenance personnel

Catalogue

1830 automatic feeding laser cutting machine manualII

Catalogue.....V

Chapter 1 Outlines

1.1 Laser development prospect and application range:.....1

1.2 The advantages of laser processing technology.....2

1.3 Product introduction.....3

1.4 The main technical indicators.....3

Chapter 2 The structure of the auto-feed fabric laser cutting machine.....5

2.1 structure description.....5

2.2 system composition Automatic feeding laser cutting machine schematic.....5

(2) the control system schematic diagram.....6

Chapter 3 The installation of the laser cutting machine.....8

3.1 remove the packing.....8

3.2 the machine is put.....8

3.3 external mains wiring diagram:.....9

3.4 the structure of the laser tube and installation.....9

3.5 the installation of the laser power supply.....11

3.6 water cooling machine installation:.....11

3.7 the installation of air compressor and pump.....13

3.8 the installation of the exhaust fan.....15

3.9 the installation of the control software.....16

Chapter 4 Light path structure and the adjustment method.....16

4.1 optical components structure.....16

4.2 adjust the laser path.....18

4.3 How to choose the right focal length focusing mirror (this method is suitable for professional people)20

Chapter 5	Operation Panel and Description.....	22
5.1	Schematic diagram of the operation panel	22
5.2	Switch diagram of automatic feeding laser cutting machine	23
5.3	Basic operational procedures for machine operation	24
 Chapter 6		
Precautions and Maintenance		
6.1	Daily operation precautions.....	24
6.2	Maintenance	26
 Chapter 7		
Common Faults and Troubleshooting		
29		
7.1	Laser head does not emit light.....	29
7.2	Laser energy is weak	32
7.3	Automatic feeding laser cutting machine solution to the problem of cleaning the bottom unevenness	32
7.4	The phenomenon of spot scattering, non-focusing, and barrel heating of the automatic feeding laser cutting machine	32
7.5	Sparks at the laser head exit:	33
7.6	Water Cooler Alarm	33
7.7	X or Y axis does not move or move abnormally	33
7.8	There is jitter in the laser head or beam	34
7.9	The length of the cloth is not the same or not deep.	34
7.10	Missing or chaotic	35
7.11	Misalignment, non-closing or incorrect size when cutting cloth	35
 Chapter8		
Warranty Regulations		
35		
 Chapter 9		
Maintenance Service Report		
36		

Chapter 1 Outlines

1.1 Laser development prospects and application range:

Laser is a major invention of human beings since the 20th century, after atomic energy, computers, and semiconductors. It is called "the fastest knife", "the most accurate ruler", "the brightest light" and "the strange laser". Its brightness is 20 billion times that of sunlight, and only the light emitted by a moment of hydrogen bomb explosion can be compared with it. The laser is also an ideal parallel light. When it passes through the convex lens, it will converge to the focus of the lens. The temperature in a small range near the focus can reach several thousand degrees or even tens of thousands of degrees, which is enough to melt and vaporize the metal or non-metal.

The laser has excellent directionality, high brightness and excellent coherence, which is especially suitable for material processing. Laser processing is the most promising area for laser applications, and more than 20 laser processing technologies have been developed. The spatial controllability and time control of the laser are very good, and the degree of freedom of the material, shape, size and processing environment of the processed object is very large, and is particularly suitable for automated processing. The combination of laser processing system and computer numerical control technology can constitute an efficient automatic processing equipment, which has become a key technology for enterprises to implement timely production, opening up broad prospects for high-quality, high-efficiency and low-cost processing and production. At present, mature laser processing technologies include: laser rapid prototyping technology, laser welding technology, laser drilling technology, laser cutting technology, laser marking technology, laser de-balancing technology, laser etching technology, laser trimming technology, laser storage technology, Laser scribing technology, laser cleaning technology, laser heat treatment and surface treatment technology.

Laser cutting technology is widely used in the processing of metal and non-metal materials, which can greatly reduce processing time, reduce processing costs and improve workpiece quality. Pulsed lasers are suitable for metallic materials, continuous lasers are suitable for non-metallic materials, and the latter is an important application area for laser cutting technology. The modern laser has become the "sword" of the "cutting iron and mud" that people are imagining.

Laser marking technology is one of the largest applications for laser processing. Laser marking is a marking method that uses a high-energy-density laser to locally illuminate a workpiece, causing a chemical reaction of the surface material to vaporize or undergo a color change, thereby leaving a permanent mark. Laser marking can produce a variety of text, symbols and patterns, the size of the characters can be from millimeters to micrometers, which has special significance for the anti-counterfeiting of products. Excimer laser marking is a new technology developed in recent years. It is especially suitable for metal marking and can achieve sub-micron marking. It has been widely used in microelectronics industry and bioengineering.

The laser welding technology has a bath cleaning effect, which can purify the weld metal and is suitable for welding between the same and different metal materials. Laser welding has a high energy density and is particularly advantageous for metal welding with high melting point, high reflectivity, high thermal conductivity and physical properties. Laser welding uses a laser beam that is less powerful than cutting metal to melt the material without vaporizing it, and after cooling it becomes a continuous solid structure. The application of lasers in the industrial field has limitations and shortcomings. For example, laser cutting of food and plywood is unsuccessful. The food is cut and

burned, and cutting plywood is far from economically economical.

Laser drilling technology has the advantages of high precision, versatility, high efficiency, low cost and remarkable comprehensive technical and economic benefits, and has become one of the key technologies in the modern manufacturing field. Prior to the advent of the laser, only harder materials could be used to punch holes in less rigid materials. This makes it extremely difficult to punch holes in the hardest diamond. This type of operation is fast and safe after the laser appears. However, the holes drilled by the laser are conical rather than cylindrically machined, which is inconvenient in some places.

Lasers are also widely used in the electronics industry. It can be used for precision machining of micro-instruments, fine dicing of fragile and fragile semiconductor materials, and adjustment of the resistance of micro-resistors. With the improvement of laser performance and the emergence of new lasers, the application of lasers in VLSIs has become a key technology that many other processes cannot replace, showing encouraging prospects for the development of VLSI.

Laser technology is a product of high technology, which has promoted the in-depth development of scientific research and opened up many new disciplines, such as nonlinear optics, laser spectroscopy, laser chemistry, and laser biology. Lasers are used to study the mechanisms of photosynthesis, hemoglobin, DNA, etc., which are closely related to life. The laser will also become the new standard for time and length, and any high-precision timepiece and meter can be calibrated with a laser beam of a specific wavelength.

Lasers will also play a significant role in nuclear energy applications. Optimistic experts estimate that by 2020 a powerful laser will produce a safe and economical thermonuclear fusion, similar to the nuclear reaction process inside the star. If realized, thermonuclear fusion will bring enormous social and economic benefits, and the energy crisis will cease to exist. At that time, the electricity generated by the fusion of hydrogen in a bucket of water is enough for a city to use.

China advocates the strategy of rejuvenating the country through science and education and sustainable development. Modern technologies like lasers will play an extremely important role. In the past ten years, China has included lasers in high-tech projects. In the future, this work will not only be included in the 863 plan, but also included in the 973 plan. The laser has prepared us a good prospect and gives us the opportunity to work on innovation. Especially for the younger generation, to see the prospects in this area, and to strive for innovation, there will be much to be done. At present, laser technology has been integrated into our daily lives, and in the years to come, lasers will bring us more miracles.

1.2 Advantages of laser processing technology

The field of processing is the largest area of application for laser technology. Laser processing technology is a technology that uses the characteristics of the interaction between laser beam and matter to mark, cut, weld, surface treatment, perforate, micro-machine, and identify objects as light sources. It has become an industrial production automation. Key technology. The valuable properties of the laser – good coherence, good monochromaticity, good directionality and high brightness – determine the advantages of lasers in the processing sector:

1. The laser is used as the processing method, and there is no processing force between the workpiece and the workpiece. It has the advantages of no contact, no cutting force and small heat influence, so there is no mechanical deformation, which ensures the original precision of the workpiece and high energy laser beam. The energy and its moving speed are adjustable, so that a variety of processing purposes can be achieved. At the same time, it has a wide adaptability to materials, and it can produce very fine marks on the surface of various materials and has excellent durability.
2. The spatial controllability and time control of the laser are very good, and the degree of freedom of

the material, shape, size and processing environment of the processing object is very large, and is especially suitable for automatic processing and special surface processing. And the processing method is flexible, and can also meet the requirements of industrial mass production;

3. The laser scribing is fine, the lines can reach the order of millimeters to micrometers, and the marking and modification made by the laser marking technology are very difficult, which is extremely important for product anti-counterfeiting;

4. The laser can be processed on a variety of metals and non-metals, especially materials with high hardness, high brittleness and high melting point.

5. The laser beam is easy to guide and focus to realize the transformation in all directions. It is easy to cooperate with the CNC system and process complex workpieces. Therefore, it is an extremely flexible processing method.

6. The combination of laser processing system and computer numerical control technology can form an efficient and automatic processing equipment, which can produce various texts, symbols and patterns, easy to design the pattern with software, change the content of the mark, adapt to the high efficiency of modern production, fast-paced .

7. Laser processing has no pollution source, it is a clean and pollution-free high environmental protection processing technology;

8. Using laser processing, high production efficiency, reliable quality and good economic benefits.

Laser processing technology has been widely used in all walks of life, opening up broad prospects for high-quality, high-efficiency, pollution-free and low-cost modern processing and production.

1.3 Product Introduction

Automatic feeding laser cutting machine is a professional laser cutting equipment integrating light, machine and electricity. It is produced by our company. The key components are imported components. It has novel appearance and unique structure, ensuring smooth feed of fabric. At the same time, it effectively corrects the left and right offset of the fabric to ensure the regularity of the cut lines of the cut piece. The fuselage is integrally welded and subjected to stress treatment to ensure excellent mechanical stability. Longitudinal cycle belt transmission structure and servo drive ensure high speed and precision of cutting. The whole system comes standard with high-end laser accessories, with sufficient light energy and stable light output; according to the customer's industry and process requirements, multi-head cutting can be added to improve efficiency. The touch panel's LCD control panel provides an excellent experience for customers to control the machine.

The application field and scope of the automatic feeding laser cutting machine are very wide. The different models of our company have different designs for different industries. I believe that the models you purchase can help your work. The following application areas may be useful for you to expand your application and use laser equipment flexibly.

☒ **Printing and packaging industry:** rubber version laser cutting; paper products laser cutting.

☐ **craft gift industry:** bamboo laser engraving; wood book laser engraving; mahogany laser engraving; two-color plate laser engraving; box-shaped crafts laser engraving; chessboard laser engraving; paper; marble; granite; ceramics; shells; horns; resin; Sebum and so on.

☒ **Advertising industry:** plexiglass laser cutting); all kinds of enamel laser production; two-color plate laser engraving.

☒ **Leather garment industry:** All kinds of shoes, leather and leather artificial leather cutting and surface cutting; all kinds of clothing, fabric cutting.

1.4 Machine parameters

Model	DK1830 auto-feeding fabric laser cutting machine
Working area	1800mm×3000mm
Cutting Speed	10-800mm/s
Laser power control	0-100%
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	3000W
Supported Graphic Format	BMP PLT DST AI DXF
Motor	Jiemeikang hybrid servo drive, geared motor
Laser Power	130w/150w
Working Environment	0°C ~ 45°C
Working Humidity	5% ~ 95%

Chapter 2 Machine Configurations

2.1、 Structure describing

Complete working system by machine body, auto feeding system, 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

The automatic feeding laser cutting machine consists of six parts: mechanical platform, optical system, transmission system, control system, auxiliary system and automatic feeding frame.

☑**Mechanical platform:** It consists of mechanical parts such as cover, guide rail, base and mirror frame.

☑**Optical system:** consists of laser tube, laser power supply, laser head, mirror and focusing mirror

☑**Drive system:** It consists of three high-precision imported linear guides, three stepper motors and synchronous pulleys.

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

☑**Auxiliary system:** water cooler, blown air pump, smoking exhaust fan.

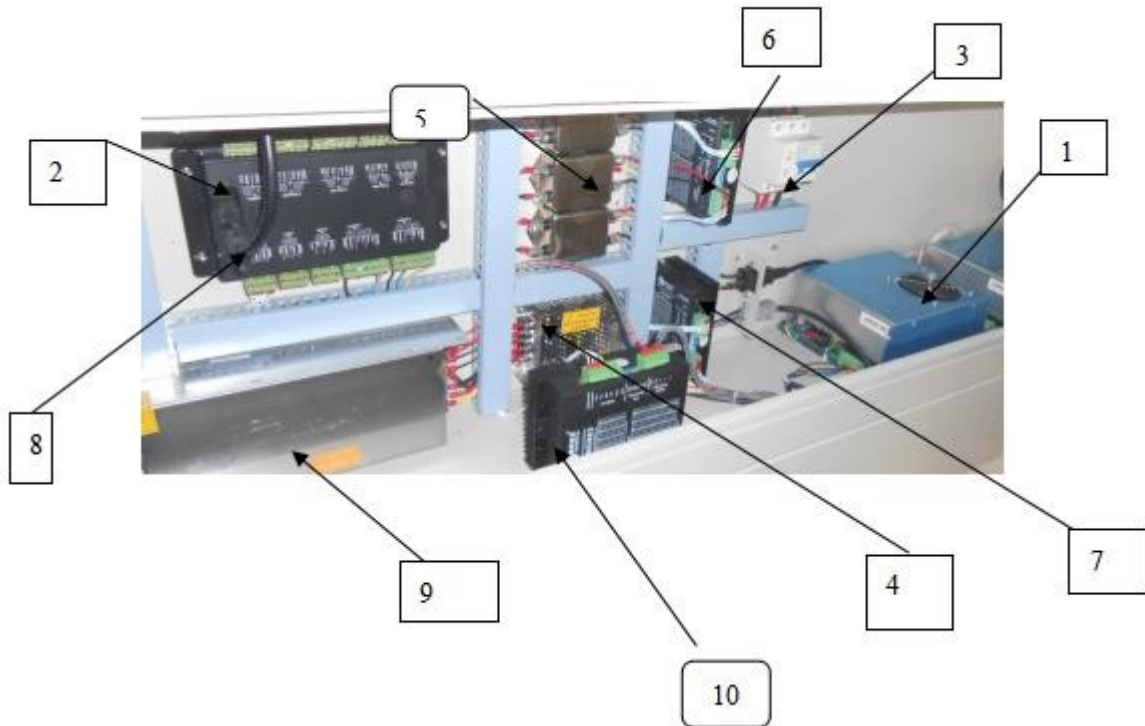
☑**Automatic feeding rack:** the raw materials to be processed are transported to the bed by the motor

(1)Machine photo:



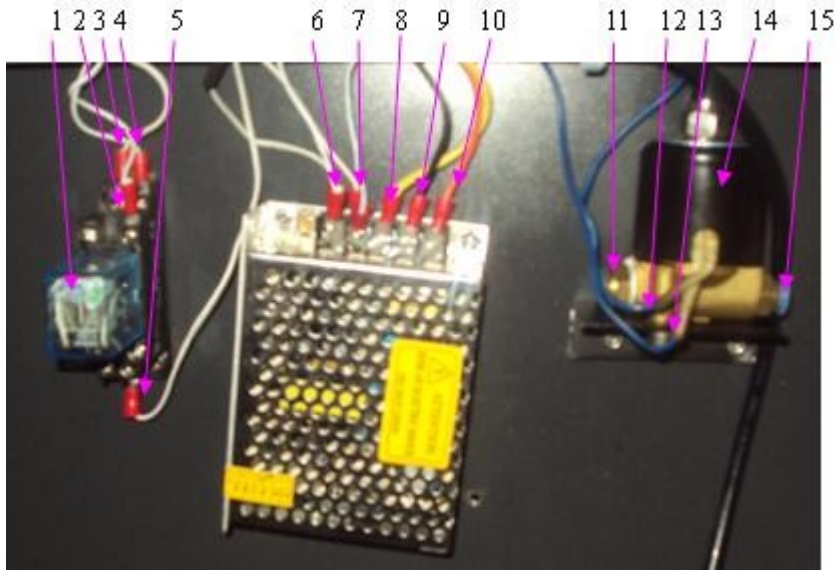


(1) Schematic diagram of the control system (double-head laser switchboard)



- 1. Laser power supply
- 2. Laser control card
- 3. Air switch
- 4. 24V DC power supply
- 5. is a filter
- 6.X-axis motor driver
- 7.X-axis motor driver
- 8. Control card data cable
- 9. 48V DC power supply
- 10. Driver for feeding motor

(2)Wiring diagram of solenoid valve (this device is optional)



- 1 is DC24V relay
- 2 is the 13 pin of the relay, connected to the laser control board OUT1
- 3 is the 12-pin of the relay, connected to the COM (ground) of the DC24V power supply.
- 4 is the 14-pin of the relay, connected to the +24V of the DC24V power supply.
- 5 is the 8-pin of the relay, connected to the solenoid valve
- 6 COM (ground) for DC24V power supply
- 7 is +V for DC24V power supply
- 8 is the ground for DC24V power supply
- 9 is the N (negative) of the DC24V power supply.
- 10 is the L (positive) of the DC24V power supply.
- 11 is the air outlet of the solenoid valve
- 12 connected to the 8 feet of the relay
- 13 Connect to the +24 (positive) of the DC24V power supply
- 14 solenoid valve
- 15 is the air inlet of the solenoid valve

Chapter 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:



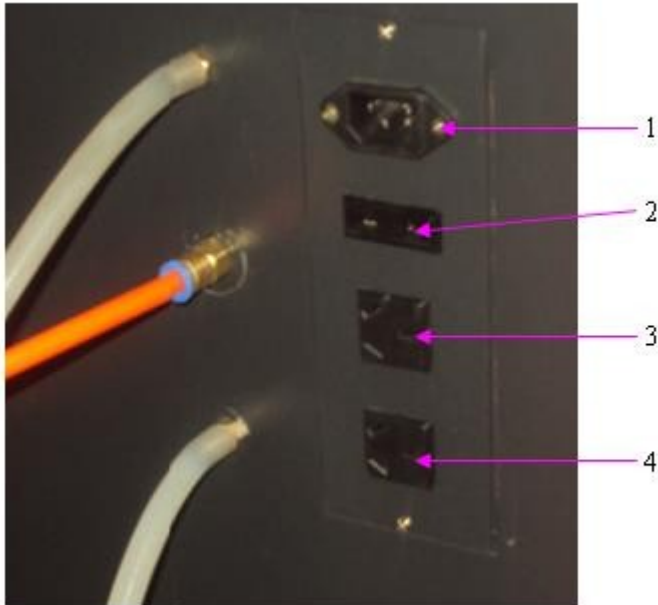
- 2 -can be move arbitrary direction
- 1- Fixed the machine



put the machine to machine flat, each block are fixed, cannot let the machine shaking, work shaking affects the effect of cutting or cutting machine, or even cause damage to the machine or affect the security of person.

Select the installed air humidity is not more than 50% of the location, and well ventilated

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- output supply for water chiller



When you plug in power socket, sometimes produces the electric spark, electric shock, carefully to avoid electrical shock, pay attention to personal safety!

3.4 Laser tube structure

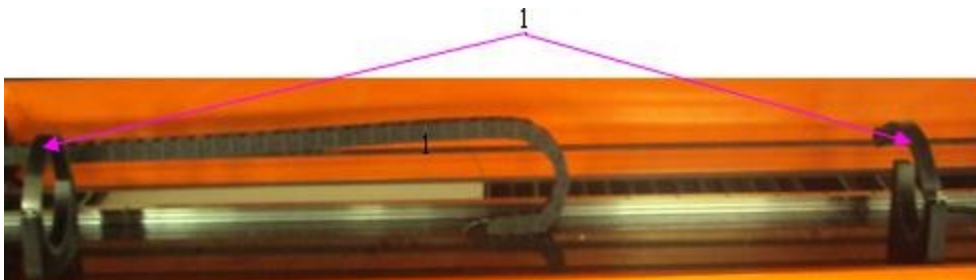
- **Laser tube**

The full name of the laser tube should be: glass-sealed CO2 laser, which is the most critical component in the laser machine. Because the laser is packaged in a glass tube, it is commonly called 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 main specifications and models use laser power as the most important basis. The current common models are: 15W, 25W, 40W, 60W, 80W, 100W, 120W, 130W, 150W.
- Different power laser tubes are mainly divided into different lengths. For example, the 60W laser tube is 1200mm or 1250mm, and the 80W length is generally 1600mm.
- **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) 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.

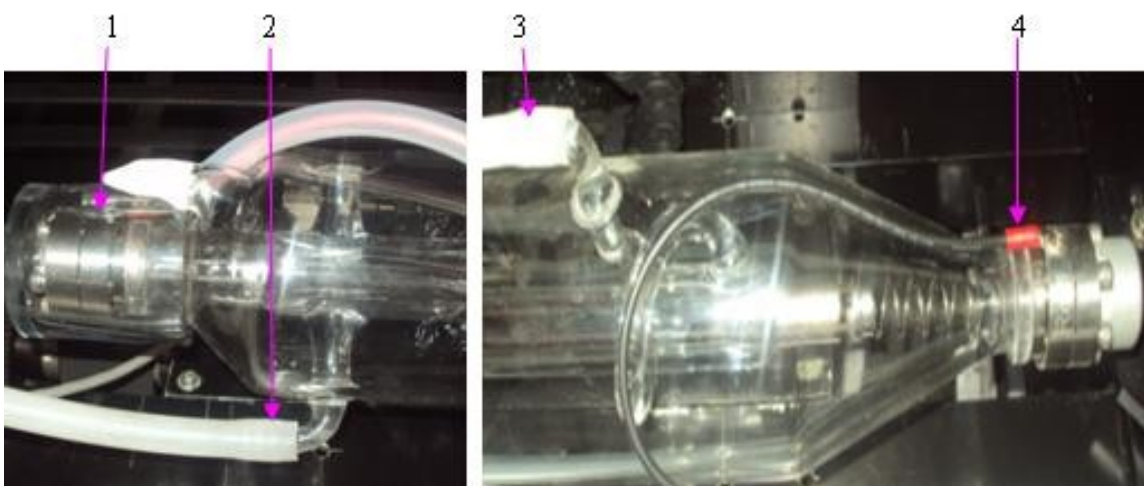


Note: cooling water shall not be frozen in a cold district, especially the laser after downtime, must not let water storage in the laser tube, so as to avoid water ice lead to crack

3.5 Laser supply installation

1) Power cable installation on the laser tube

According to the laser electrical performance parameters, the matching power supply is correctly selected; the positive and negative poles of the laser tube are correctly distinguished, generally the laser output end is the negative pole (-) and the other end is the positive pole (+). If you need to solder the connecting electrode lead, you must first use the fine sandpaper to gently remove the oxide layer on the head before soldering the wire. Also, please note that the temperature should not be too high, and the time should not be too long, otherwise it is easy to leave a leak. After a long period of work, there will be dust accumulation near the high voltage positive electrode (+), which will affect the use effect. In order to prevent the high voltage electrostatic field from adsorbing particles on the high voltage electrode, the electrode can be potted by insulating silica gel. Then connect the positive and negative electrodes of the laser power supply to the positive and negative terminals of the laser tube.



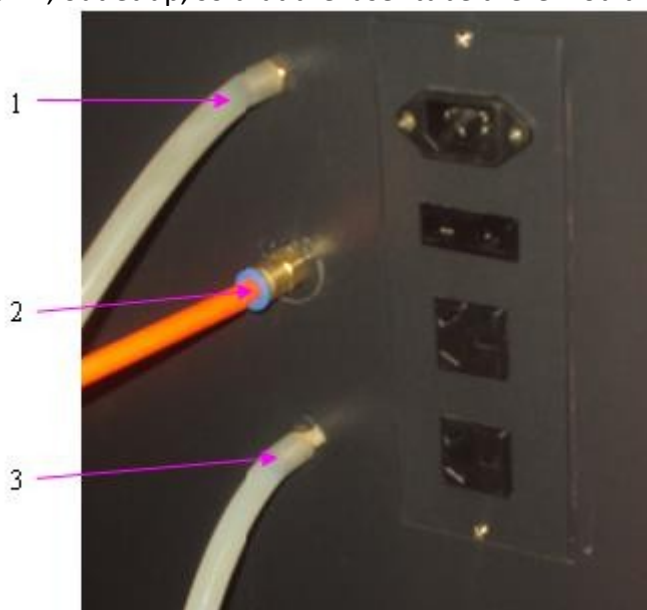
- 1 - For the positive electrode of the laser tube
- 2- For the inlet of the laser tube
- 3- For the outlet of the laser tube
- 4- The negative pole of the laser tube



- 1) drive mode for high pressure of the laser tube, working voltage is around 18 kw or more, so please don't literally disassembling the power non-specialists. When disassembling the power to electrostatic discharge, and then, to avoid electric shock danger!
- 2) want to distinguish the laser tube is negative, don't put is negative wrong, otherwise it will affect the service life of laser tube, and may even damage the laser tube.

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- is the water outlet of the laser tube. This interface is connected to the water inlet of the water cooler.
- 2-is the inlet of the laser tube, this interface is connected to the air outlet of the air compressor
- 3- is the water inlet of the laser tube, this interface is connected to the water outlet of the water cooler

a) The cooling water in the water cooler requires: the cooling water is pure water, preferably

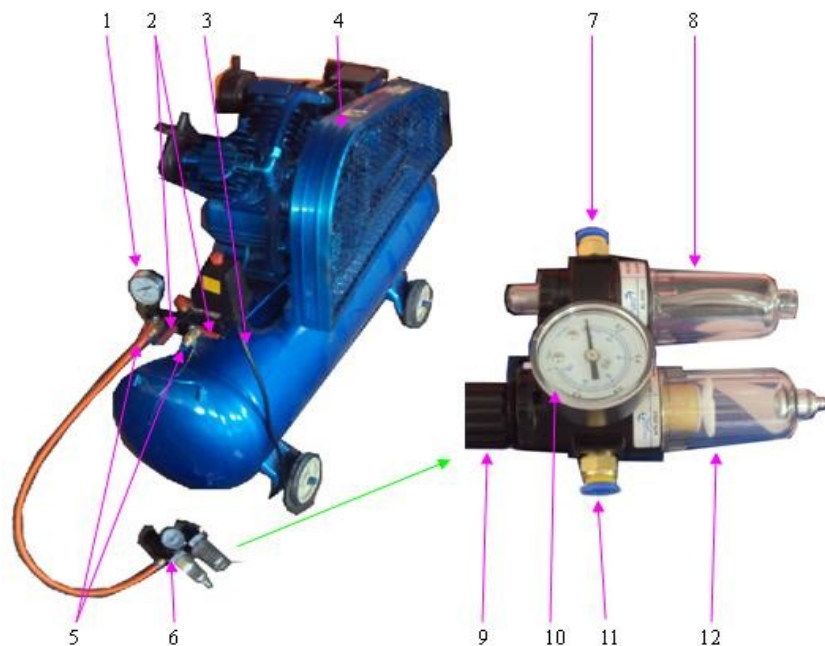
high-purity water, and the water temperature of the cooling water should be paid attention to frequently. The water temperature should be controlled within the range of 15 ° C-30 ° C, not too high or too low, especially In the summer, once the water temperature is too high, you should replace the cooling water in time or stop for a while.

b) Ensure that the flow rate of the cooling water is 2L -4L/min, otherwise the effect will be poor, which will cause the laser mode to be bad (the good laser of the mode is a round and bright round spot), and the spot becomes not round. Will cause power to drop. The water in the water-cooled machine should be filled up, otherwise the cooling water in the laser tube will not be filled every time it is turned on.

C) It is recommended to replace the circulating water in the water cooler regularly. It is recommended to replace it every seven days.

3.7 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

Description of the air pump (this is the conventionally used air blowing device)

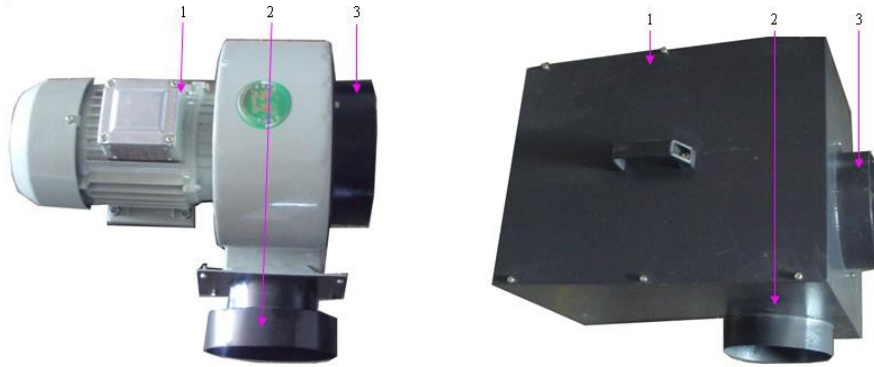


- 1 is the air pump
- 2 is the air outlet of the air pump

3.8 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 Celeron above 2.1GHz, memory 256M or more, hard disk 20G or more

Software requirements: Microsoft Windows operating system (Windows2000, winXP)

The installation of the software is very simple, the user just copies the software on the CD directly to the hard disk, and then double-click the powercut.exe installation file.

You can then install it automatically according to the prompt "Next" system. After the installation is complete, there will be a “powercut application” icon. Double-click it to communicate with the laser via the USB port or network.



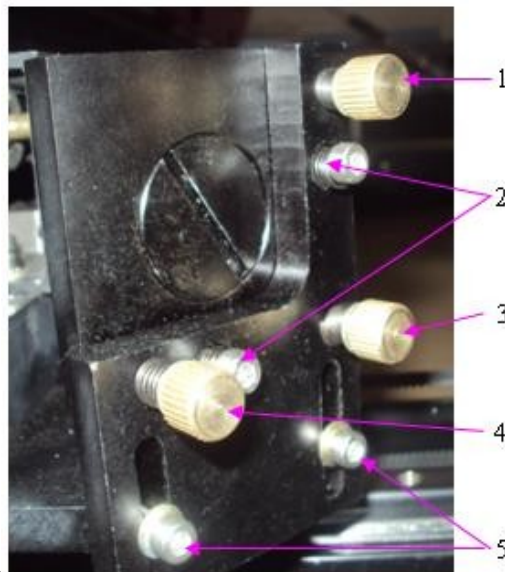
- Users are strongly advised to install genuine CorelDraw or AutoCAD software, otherwise the software may run abnormally. The company is not responsible for machine damage and legal disputes caused by such reasons.
- The system must be encrypted when running this system. Please take care of it. If you lose, you must re-purchase

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 , 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.

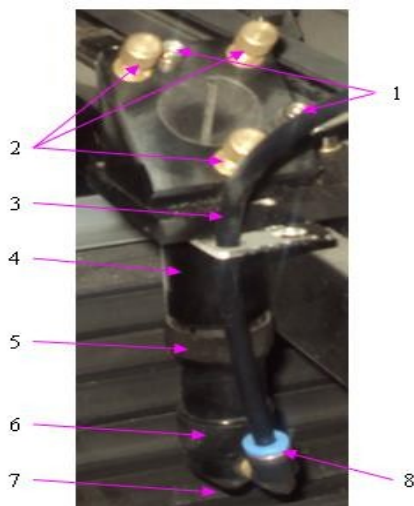


1. Laser frame structure diagram

- (1) for adjusting screw up and down, can only be fine-tuning. When the screw tightening laser downwards migration
- (2) for retaining screw
- (3) adjusting screw for the upper left or lower right, when the screw to tighten the laser into the upper left corner
- (4) for adjusting screw, when the screw tightening laser right deviation
- (5) 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:



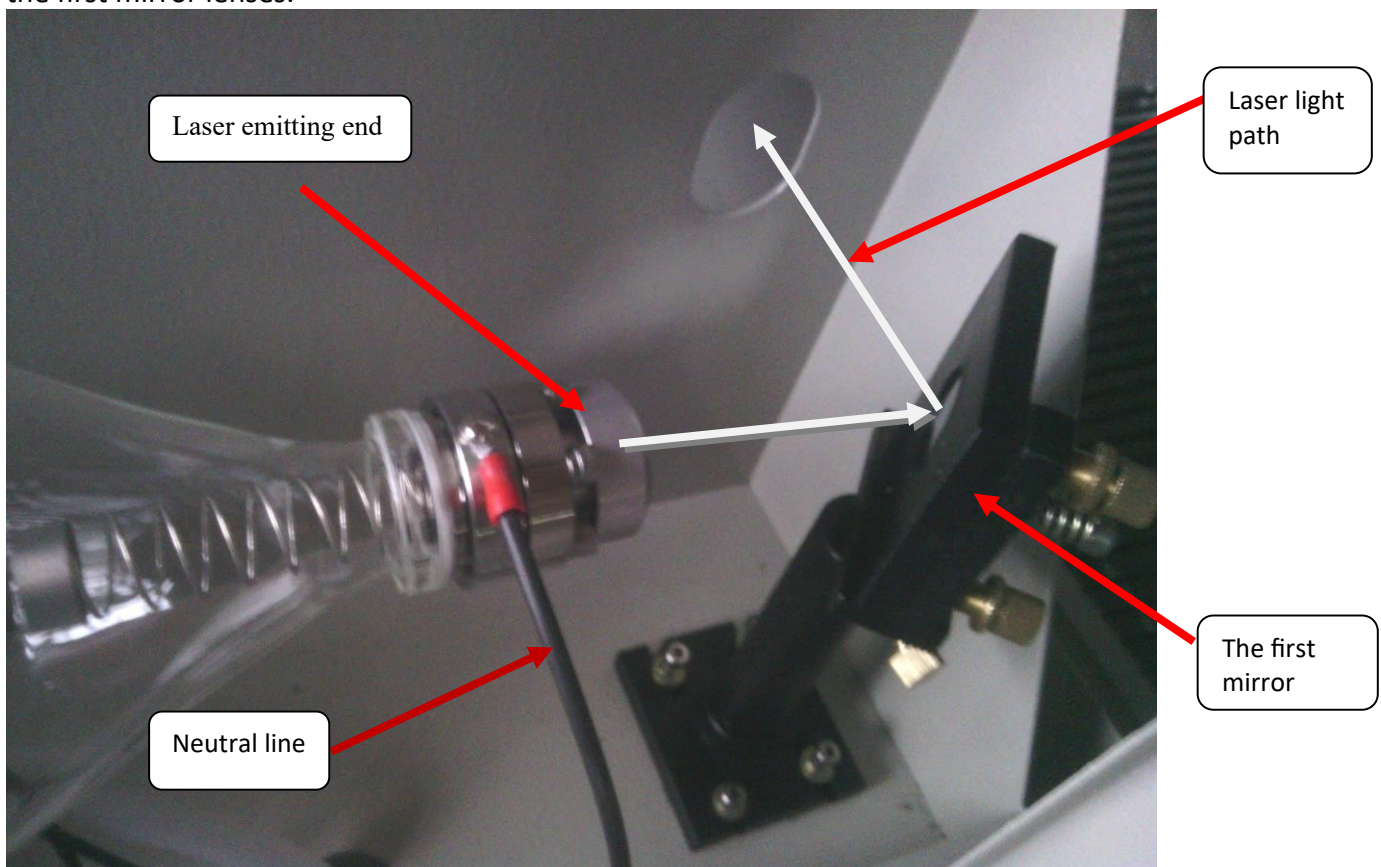
- 1- fix the screw
- 2- adjust the screw
- 3- airway tube
- 4- lens cone
- 5- For the lock cap, used to adjust the up and down and fixed
- 6- For the lock cap, inside is focusing mirror
- 7- For the outlet and laser output
- 8- air inlet

4.2 Laser path adjust



suggest wear gloves when adjusting light path, in case of the laser beam to hand

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.



2. 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.

3. 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.

4. 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.

5. 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.

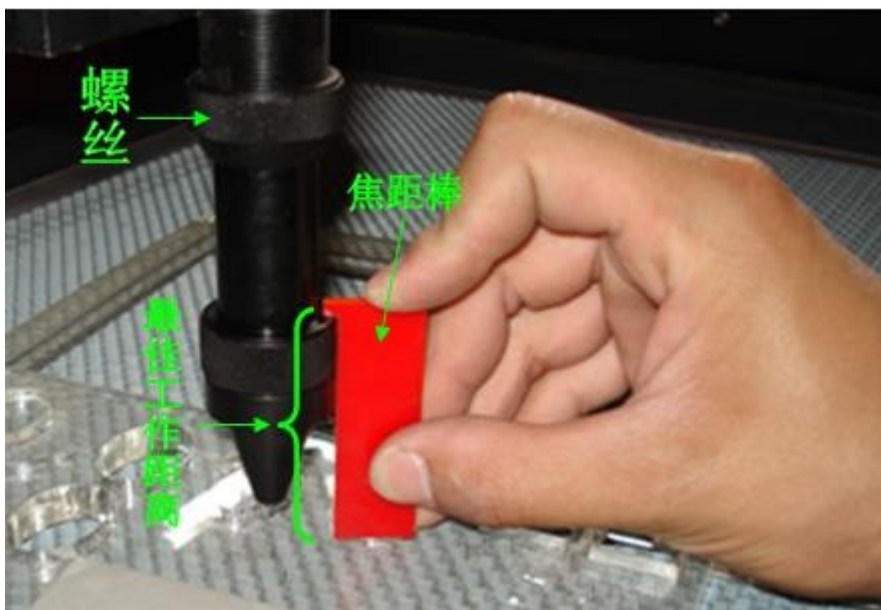


Adjust the laser tube must cut off all the power supply, avoid electric shock risk!

Adjust the laser tube, don't touch the high pressure end of the laser tube, to avoid static shock people !

6. 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)

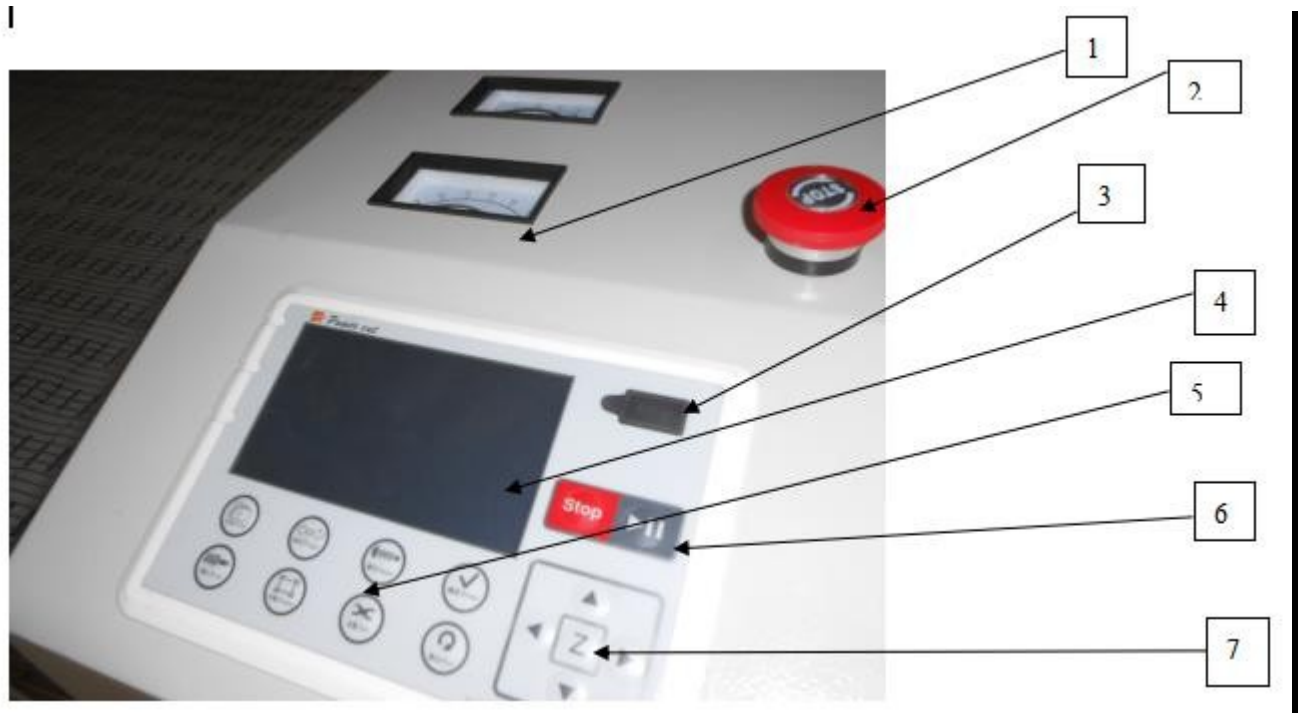
Laser materials processing is the direct reasons of the lack of depth and the processing speed: the effective power of the laser processing density is small. For the same material, the effect of laser processing load on processing materials mainly depends on the laser light power density (note: not power), 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



- 1 is the laser ammeter
- 2 Emergency stop switch
- 3 USB access hole
- 4 Control panel display interface
- 5 panel control area
- 6 Stop/Start
- 7 motion button

Button function description

Go left,
 go right,
 go forward,
 walk backwards

Frame: the outer border of the cut object

Laser: Press the laser tube to start illuminating to detect the intensity and dimming of the light.

Stop: Press once when the cutter is working, the machine stops working and returns to the working origin.

Reset: Press this button to return the laser head to the upper right corner of the machine.

Pause: Stop the working laser head and press the start button to continue working.

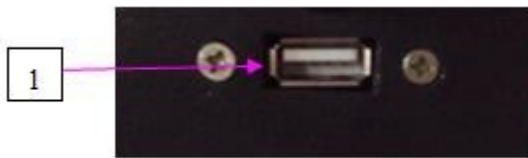
Emergency: cut off the motor power

For more use, software installation, operation, see the attached "PowerCut Manual"

5.2 Switch diagram of automatic feeding laser cutting machine



From left to right: emergency stop button, machine button, laser tube power button, chiller button



1 is a USB interface

5.3 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) shut down

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

Chapter 6 Precautions and Maintenance

The application of automatic feeding laser cutting machine is more and more common. For many customers (especially those who use less time), the correct use of laser engraving machine and some routine maintenance are particularly important. Let's briefly talk about it. Some problems to be aware of the operation and maintenance of the automatic feeding laser cutting machine:

6.1 Daily operation precautions

- 1) Avoid looking directly at the laser with your eyes.
- 2) Use the laser in the controllable area and add a warning sign.
- 3) It can't be used without permission. Only professionally trained personnel can operate it.
- 4) Keep the laser beam path as close as possible to prevent laser leakage.
- 5) Try to avoid the height of the laser head being equal to the height of the human eye.
- 6) Pay attention to the ventilation or exhaust conditions of the laser processing environment.
- 7) After each boot, it is necessary to check whether the water cooler is out of water. It is forbidden to start the cold water cooler without water.
- 8) The water in the water cooler should be filled up. The water temperature is around 15-35 degrees. If the water temperature is too high, the circulating water should be replaced. It is best to use purified water for circulating water to ensure that the water is clean and free of debris. It is necessary to change the circulating water regularly (recommended to change it once every seven days).
- 9) Due to the laser and high pressure parts inside the machine, non-professionals are strictly prohibited to disassemble the machine without authorization.
- 10) The mirror and focusing mirror should be wiped with professional lens paper. After the wipe, the alcohol can be installed after the alcohol is completely evaporated.
- 11) Pay attention to protect the output window of the laser to avoid the smoke generated during the working process (including during the debugging optical path) from being sputtered onto the outer surface of the output window to prevent the outer surface of the output window from being contaminated. It must be equipped with smoking equipment, and the output window should be contaminated. The power will drop. At this time, the outer surface of the output window can be gently wiped with absorbent cotton or silk cloth and anhydrous alcohol.

- 12) Always turn on the fan during work to avoid contaminating the lens and focusing mirror.
 - 13) It is strictly forbidden to place any irrelevant total reflection or diffuse reflection objects in the equipment to prevent the laser from directly reflecting on the human body or flammable materials.
 - 14) In the winter, the water in the laser tube must be drained to avoid cracking the laser tube.
 - 15) During the working process of the machine, it must be manned, especially high-power cutting or cutting materials with high organic content to prevent abnormal or fire. The operator who has not been trained normally shall not operate the machine, or any operator shall not operate in violation of the regulations, and any damage caused by it shall not be liable to us. The operator must always observe the machine's working conditions (such as: whether the paper laid on the hook is blocked by the air compressor, the abnormal sound of the machine, the water temperature of the circulating water, etc.).
 - 16) Since such lasers are invisible, safety should be taken during work. It is strictly forbidden to place flammable or explosive materials near the equipment to prevent fire from laser deviation.
 - 17) When the automatic feeding laser cutting machine works or debugs the light path, please be careful not to enter any part of the body into the light path transmission area to avoid injury. It is recommended to wear protective glasses when adjusting the optical path and adjust the current intensity to prevent danger when the optical path is greatly deviated.
 - 18) Supply voltage: fluctuations in the supply voltage can cause unstable operation of the equipment. If the voltage is too high, it will cause permanent damage to the power supply system of the equipment. In order to avoid the voltage fluctuations caused by the burning and burning of the electrical appliances and circuits, and to ensure the stability of the machine, it is recommended that the user install a power supply regulator of at least 5000W. Especially for users whose voltage is not stable enough, please be sure to install a voltage regulator.
 - 19) Use the button to apply even force. Do not force the button to prevent damage to the button.
 - 20) If the machine malfunctions or a fire occurs, turn off the power immediately.
 - 21) When the relative humidity of the environment exceeds 80%, do not work, otherwise it will affect the life of the machine or damage the electronic circuit.
 - 22) Do not start working when thunder and lightning.
- The above items must be strictly observed by the user, otherwise the manufacturer will not be responsible for any personal injury or damage to the machine.

6.2 Maintenance

1. Water cooler replacement and tank cleaning (recommended to clean the tank and replace the circulating water once a week)

Note: The laser tube must be filled with circulating water before working.

The water quality and water temperature of the circulating water directly affect the service life of the laser tube. It is recommended to use high-purity water and control the water temperature at 15-35 ° C. If it exceeds 35 ° C, it is necessary to replace the circulating water, or add ice cubes to the water to lower the water temperature. (It is recommended that the user choose a cooling machine or use two water tanks). Cleaning the water tank: first turn off the power supply, unplug the water inlet hose, let the water in the laser tube automatically flow into the water tank, open the water tank, clean the water tank, replace the circulating water, and arrange the joints. And run for 2-3 minutes (fill the laser tube with circulating water).

2. Fan cleaning (recommended cleaning once a week)

The long-term use of the fan will cause a lot of solid dust to accumulate inside the fan, which will cause a lot of noise and is not conducive to exhaust and deodorization. When there is insufficient suction of the fan, the power supply is first turned off, the air inlet pipe and the air outlet pipe on the fan are removed, the dust inside is removed, and then the fan is inverted, and the fan blades are pulled up until it is clean. Then install the fan.

3. Cleaning of optical lenses

In the introduction of the previous machine, it has been said that there are three block mirrors and a focusing mirror on the cutting machine (the first mirror is located at the exit of the laser tube, that is, the upper left corner of the machine, and the second mirror is located at the beam). At the left end, the third mirror is located at the top of the fixed portion of the laser head, and the focusing mirror is located in the adjustable barrel of the lower part of the laser head. The laser is reflected by these lenses, and is focused and emitted from the laser head. After using the optical lens (mirror and focusing mirror) for a period of time, especially when the organic matter is smoked, the dust will accumulate. If it is not maintained in time, the accumulation of smoke generated by the cloth will corrode the surface of the lens, and the damaged lens cannot be coated. Fully reflecting and transmitting laser light will absorb the heat generated by the laser, which will affect the cutting effect and cause the lens to burst. Do not remove the cleaning of the first mirror and the second mirror. Use lens paper or absorbent cotton with medical alcohol to gently wipe along the center of the lens to the edge. Note that it is not possible to rub or contact the lens with a rough material. The third reflecting lens and the focusing mirror need to be taken out from the frame. First, unscrew the lens barrel on

which the focusing lens is placed from the laser lens barrel, and take care to prevent it from falling and damage. Then blow off the floating dust on the surface; then gently wipe it with cotton wool and alcohol, and then put it back as it is.



- The lens should be wiped gently, and the surface coating should not be damaged.
- Wipe the process gently to prevent falling
- When rubbing the lens, it can't be rubbed back and forth, and it can't be rubbed with fine material. Because the surface of the lens is coated with a special metal film, the damage of the film will cause a large amount of laser energy attenuation.
- Wipe cotton can only be used once. After rubbing, check that there is no cotton thread or other residue left. After the alcohol has evaporated, it can be turned on.

4. Cleaning of the guide rails (recommended cleaning once every half month, shutdown operation)

The guide rail and the linear shaft are one of the core components of the equipment, and its function is to guide and support. In order to ensure the machine has high machining accuracy, the guide rail and straight line are required to have high guiding precision and good motion stability. During the operation of the equipment, due to the large amount of corrosive dust and smoke generated during processing, the smoke and dust are deposited on the surface of the guide rail and the linear shaft for a long time, which has a great influence on the processing precision of the equipment. An etch point is formed on the surface of the linear axis of the guide rail to shorten the service life of the device. In order to make the machine work stably and ensure the quality of the products, it is necessary to carefully carry out the daily maintenance of the guide rails and linear axes.

Note: Please prepare the cleaning rails - dry cotton cloth, lubricating oil

Cleaning the guide rail of the cutting machine: first move the laser head to the far right (or left side), wipe it with a dry cotton cloth until it is bright and dust-free, plus a little oil (can use sewing machine oil, do not use oil), Push the laser head a few times to the left and right to distribute the lubricant evenly.

5. Fastening of screws and couplings

After the motion system is working for a period of time, the screws and couplings at the joint of the movement will be loose, which will affect the smoothness of the mechanical movement. Therefore, it is necessary to observe whether the transmission parts have abnormal noise or abnormality during the operation of the machine, and find problems in time. Rugged and maintenance. At the same time, the machine should tighten the screws one by one with the tool. The first tightening should be about one month after the device is used.

6. Bearing oil

Laser cutting uses a large number of bearings. In order to ensure good cutting and cutting effects, some bearings need to be refueled regularly (except for oil-impregnated bearings). Wipe off the floating soil on the bearing with a clean soft cloth, use the needle tube to draw the oil into the needle tube, then slowly inject the bearing with the needle, and slowly rotate the bearing when filling the oil.

7. Laser tube maintenance:

The laser tube in the automatic feeding laser cutting machine is cooled by circulating water. After long-term use, there will be some white scale in the tube. We can add a small amount of vinegar in the circulating water, remove the scale inside the tube, and then use it. The clean water flushes the inside of the laser tube so that the laser tube will be in optimal working condition and its life will be extended.

8. Inspection of the light path

The optical path system of the automatic feeding laser cutting machine is completed by the reflection of the mirror and the focusing of the focusing mirror. In the optical path, there is no offset problem in the focusing mirror, but the three mirrors are fixed by the mechanical part, offset It is more likely, although there is usually no offset, but it is recommended that the user check whether the light path is normal before each work.

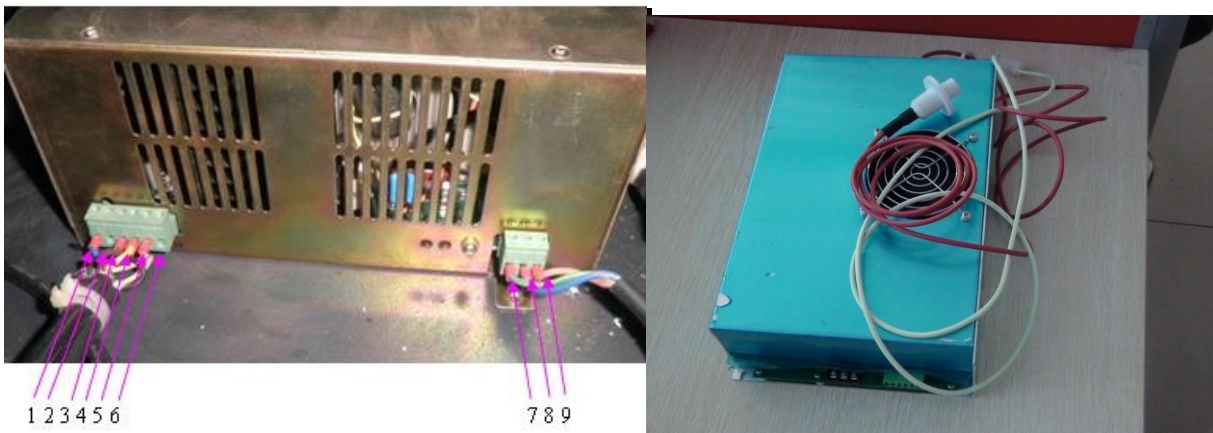
Chapter 7 Common Faults and Troubleshooting

7.1. No ray

1. Did not turn on the laser power supply. The laser power switch is on the panel.
2. 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;
3. No current: check if the if the wires of the laser power supply, high-tension line and signal are connect well;
4. Current is available. Check if the mirrors or laser path is not correct;
5. Check the water circulation system works well or not;
6. Without water: check the water chiller is electrified or damaged;
7. With water: check the water inlet and water outlet if connected inversely or the water pipe is

broken;

8. 4. "Test light" button works well, but no ray when cutting or engraving. Please check if the signal cable is loose.
9. 5. The laser power supply is broken, there are two ways,
10. 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.
11. Check the electric wire of the laser power supply
12. Like bellow supply sample



- Pin 1 is H (TH) input signal, which controls the optical switch, when the voltage $\geq 3V$, the signal will agree the laser tube to send out laser, when the voltage $\leq 0.3V$, 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 $\geq 3V$, the signal will agree the laser tube to send out laser, when the voltage $\leq 0.3V$, 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 $\geq 3V$, the signal will agree the laser tube to send out laser, when the voltage $\leq 0.3V$, 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 1 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

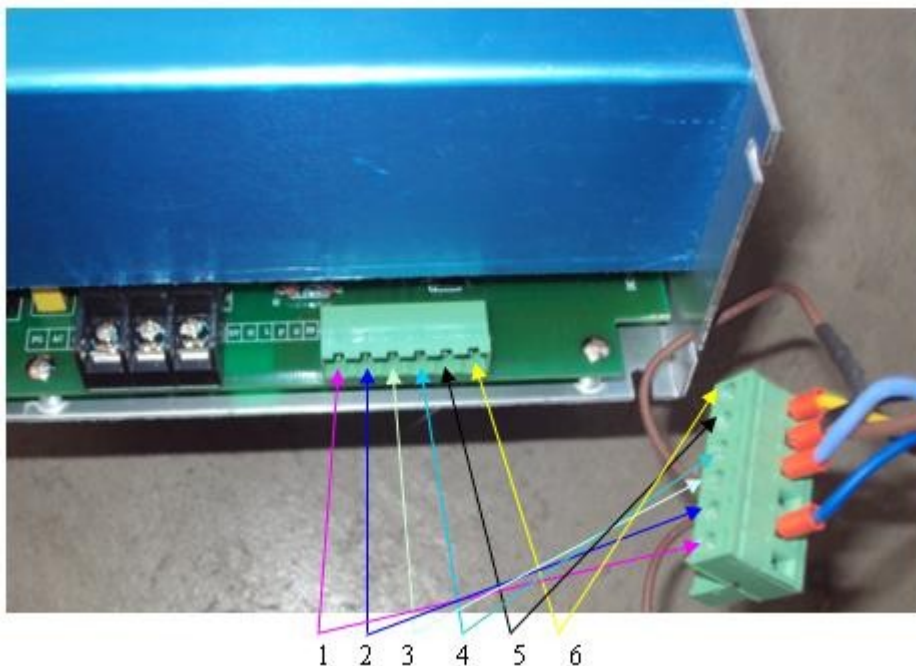
- Pin 9 is the positive pole of the laser power supply;

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 $\geq 3V$, the signal will agree the laser tube to send out laser, when the voltage $\leq 0.3V$, 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 $\geq 3V$, the signal will agree the laser tube to send out laser, when the voltage $\leq 0.3V$, 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 $\geq 3V$, the signal

will agree the laser tube to send out laser, when the voltage $\leq 0.3V$, 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 Automatic feeding laser cutting machine to solve the problem of uneven bottom

Laser cutting machine failure phenomenon: there is obvious protrusion at the bottom when cleaning

1. Reason for failure:

- a) The processing speed is too fast, and the response speed of the laser tube cannot keep up.
- b) The laser control switching frequency is too low, the laser line segment is too long, not a point beam, causing a tailing phenomenon
- c) The blowing flow is not correct, causing the processing powder to stick and form a horizontal line protrusion
- d) The optical path is offset or the focal length is wrong, generating a scattered beam, causing the bottom to be uneven
- e) Focus lens selection is unreasonable, try to choose short focal length lens to improve beam quality

2. Laser cutting machine troubleshooting method:

- a) First check the light path to ensure the light path is correct
- b) reduce the processing speed and increase the frequency of the laser output switch
- c) Adjust the amount of air blown to ensure no powder adhesion, try to use side blowing
- d) Select short focal length lens, focus adjustment should consider the depth of processing

7.4 The phenomenon of spot scattering, non-focusing, and barrel heating of the automatic feeding laser cutting machine

1. Fault phenomenon: When processing, it can be seen that the laser beam is yellow, and the beam is thick, the spot is a hollow spot, and there is a feeling of heat when the hand touches the lens barrel.

2. Cause of failure:

a) Laser tube water temperature is too high

b) The lens is seriously polluted

c) The position of the laser tube bracket is unreasonable, and the internal deformation of the tube

d) The optical path is biased and the focusing effect is poor. It is the main cause of the heat of the focusing cylinder and the spark of the laser head light exit.

e) The lens selection is unreasonable. When adjusting the focal length, the processing depth is not considered, resulting in poor focusing effect.

f) Laser tube quality problem

3. Exclusion method:

a) Ensure that the water temperature in the laser tube is below 32 degrees

b) Adjust the optical path to ensure the correct optical path. The focal length adjustment must consider the processing depth.

c) Require customers to clean the lens regularly to ensure that the lens is free of contamination; reasonably select the focusing mirror to ensure good beam

d) Observe the position of the laser tube bracket and adjust the position of the bracket

e) Replace the 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 if there is 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 PULXor 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.

b) 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 fire 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.

Chapter 8 Warranty Regulations

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.

Chapter 9 Maintenance Service Report

Customer repair date: ☐ Warranty period ☐ Outside warranty period

Name:	Arrive d date	Arrived time	Repair date	Back date	Back time
Add:					
Contact:	Phone:				
Model:	Machine series number:			Install date:	
Failure:					
Failure analysis:					
Repair content:					
Replacement parts list:					
Part name and model			QTY	Unit	Total
Customer comments and suggestions: ☐ Completed, the above is true ☐ Unfinished ☒ Other:					

User signature:
Date:

Company engineer signature:
Date: