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CO2 Laser Cutter Maintenance Manual

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Chapter 1. Optical System Issues

I. Laser Head Not Emitting Light

(1) Observe the laser output inside the laser tube. If there is laser light inside the tube:

A: Check the laser intensity at the laser tube output, and clean the output of the laser tube.

B: If the color of the laser light inside the tube is obviously abnormal, it can be determined that the laser tube is leaking or has aged, and attempt to replace the laser tube.

C: If the color of the laser light inside the tube is normal and the output intensity is normal, adjust the optical path for testing.

(2) If there is no light inside the laser tube:

A: Check if the cooling water is flowing properly.

B: If the cooling water is flowing properly, short the water protection circuit for testing.

C: Check if the power supply to the laser is normal.

D: Check if the connections related to the laser power supply are reliable (whether the control card wiring is reversed), check along the cable for any abnormalities.

E: Attempt to replace the laser power supply or control board for testing.

(Key components: laser tube, cooling water, water protection, laser power supply, signal line, control board)"

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II. Beam Scatter, Lack of Focus, and Overheating of the Laser Tube

1. The water temperature in the laser tube is too high.

2. The lenses are heavily contaminated.

3. The position of the laser tube holder is not reasonable, causing deformation inside the tube.

4. Misalignment of the optical path leads to poor focusing and is the main cause of the heating of the focusing barrel.

5. Improper lens selection and failure to consider processing depth when adjusting the focal length result in poor focusing.

6. Quality issues with the laser tube.

Troubleshooting methods:

1. Ensure that the water temperature inside the laser tube is below 30 degrees Celsius.



2. Adjust the optical path to ensure its correctness, and consider the processing depth when adjusting the focal length.
3. Require regular cleaning of the lenses by the customer to ensure they are free from contamination; choose the appropriate focusing lens to ensure a good beam quality.
4. Observe if the position of the laser tube holder is reasonable and adjust it accordingly.
5. Replace the laser tube. (Key components: water temperature, lenses, laser tube position, optical path, laser tube)"

III. When engraving or cutting with the laser head, there is light but it is very weak; pressing the 'laser' button does not produce any light.

1. It is protected by opening the cover, and the light is only available when the cover is closed.
2. The light is biased and the light path is not adjusted properly.
3. Water protection, poor water flow

IV. Continuous light

1. In the parameter setting, check whether the laser type is correct. It is the main cause of continuous lighting failure.

V. The light is intermittently flickering.

1. Check if the signal cable between the laser power supply and the control board is securely connected or if there are any loose connections that could result in an unreliable connection.
2. Verify if the water circulation is functioning properly. Check if the water flow is intermittent or inconsistent, and make sure there are no issues with the water protection mechanism.

VI. The low light intensity is unstable.

For customers who only perform low-power processing:

- A. One approach is to increase power attenuation by using old reflection and focusing lenses or dual focusing lenses. This reduces laser power and keeps the laser tube operating in the linear region, thus improving laser output stability.



B. Choose a low-power laser tube to minimize the nonlinear region.

For customers who perform both high-power and low-power processing:

C. To reduce this phenomenon, you can change the processing technique. When processing in layers, try to evenly distribute deep and shallow processing, avoiding long periods of high-power processing followed by long periods of low-power processing. Aim for short bursts of high-power and low-power processing to minimize power instability caused by temperature changes.

D. Minimize the power difference between layers. Avoid prolonged high-power processing above 90% of laser power, and for low-power processing, try to avoid working currents between 5mA and 6mA.

VII. Capable of firing, capable of self-checking, but does not emit light when sending data (check if the computer settings are correct).

1. It could be that the water connection is reversed, meaning that the coolant inlet of the chiller is connected to the outlet of the machine, and its outlet is connected to the inlet of the machine. This is a common possibility.

2. Check the 3rd and 4th pins on the laser power supply. If they are connected, then it is normal, but if they are not connected, then the water protection has been triggered, indicating that the water inlet and outlet may be reversed.

3. It may also be possible to short-circuit the 2nd and 4th pins of the laser power supply by connecting them with a wire, and then test if the laser emits light when pressing the "Test Laser" button. If the laser emits light, then both the power supply and the tube are working properly. If the laser does not emit light, then either the power supply or the tube may have a problem.

VIII. The current was 20mA at first, then 17mA, and it could not be cut through. No light came out, and there was no light at the first reflector. I saw red light coming out of the laser tube!

Reason: The reflector inside the laser tube is broken and cannot reflect the laser light.



IX. After the customer replaced the laser tube and pressed test to produce light, there was no light in engrave cut.

Solution: Use a multimeter to measure the DC voltage at the first and fourth corners of the power supply and see if there is any change. If there is a change, it means there is a signal and there is a problem with the power supply. If there is no change, it means the signal has not passed, the line contact is poor or the PCI card is not inserted good.

Chapter 2. Circuit system problems

I . The light output of the laser power supply is unstable

- A. First check the light path to ensure it is correct.
 - B. Reduce the processing speed.
 - C. Adjust the blowing volume to ensure that there is no powder adhesion.
 - D. Use short focal length lenses, and the depth of processing should be considered when adjusting the focal length.
 - E. Replace laser power supply test
- (Key points: speed, air blowing, optical path, focal length, lens, laser power supply)

II .High pressure ignition

There are two phenomena of ignition inside the laser tube and ignition outside the tube. In both ignitions, obvious firecracker sounds can be heard. When observed, when igniting inside the tube, an obvious discharge arc can be seen in the tube, and when ignition outside the tube can An obvious discharge arc was seen at the ignition point. The ignition outside the tube was mainly at the high-voltage joint or next to the high-voltage line.

- 1. Fire inside the tube:
 - A. The water in the laser tube is not full and there are bubbles.
 - B. The laser tube electrode lead is in poor contact.
 - C. The power-on sequence is incorrect.



D. Laser tube quality issues.

2. Lighting outside the tube:

A. The high-voltage connector is loose and has poor contact.

B. The ambient air is humid, and there is too much moisture at the high-voltage joint. The high-voltage joint discharges outward, causing sparks.

C. The high-voltage line is leaking and damaged.

Method of exclusion:

1. Fire inside the tube:

A. Observe whether there are bubbles in the laser tube. If there are any, the bubbles must be eliminated. The method is to put the laser tube upright in the direction of the water inlet when the water is flowing, and let the bubbles flow out.

B. If the spark is at the electrode, turn off the power and check if any electrode lead is loose and ensure that the lead is well connected.

C. Customers are required to power on in the following sequence: first turn on the main power supply, wait until the machine is reset, and then turn on the laser power supply to prevent pre-ionization of the power supply from causing the laser tube to ignite.

D. Replace the laser tube.

2. Lighting outside the tube:

A. Pull the wires at both ends of the high-voltage connector to see if there is any looseness and ensure that the connector is well connected.

B. In humid weather, ensure that the air at the high-pressure joint is dry and there is no moisture on the high-pressure joint seat.

C. The high-voltage wire is damaged and must be replaced. Do not wrap it with electrical tape.

Note: High-voltage ignition will cause the motherboard to work abnormally, and in severe cases, it can cause the motherboard to crash.

III. The power is set to 100%, but the current on the ammeter is less than

10MA

1. The power of the laser tube is too weak

2. The high-voltage package of the laser power supply is broken, and there is something wrong with the laser power supply.

3. The control panel displays 100%, and the power in the software has not been changed. After the change, download the configuration and download the current data.

4. The voltage is too low

5. In addition to engraving, you can also try cutting to see how much current there is.

6. Press the laser on the panel to shoot, and then see what the current is at this time.

IV. How to judge whether the laser tube is broken or the power supply is broken?



Turn off the laser machine, unplug the green 6-wire terminal on the power supply, and then turn it on.

Press the test button on the laser power supply and see if the red light on the power supply is on. If the red light is on, the tube is broken. If the red light is not on, the power supply is broken!



Chapter 3. Mechanical Transmission Operation Failure

I . No action on startup or abnormal reset

(1) Check whether the LCD screen or fluorescent lamp of the machine is displayed or on.

A: If not, check the power supply system or main power fuse;

B: If it is displayed, check whether the indicator light on the control board is on. If it is not on, it means that the control board is not supplying power. Check whether there is a problem with the switching power supply or the power supply is abnormal. If there is no problem with the switching power supply, it is the control board. Fault.

(2) Check the drive indicator light.

A: If it does not light up, check whether the voltage output of the power supply switching power supply is normal. If not, the switching power supply is faulty or the switching power supply is not energized.

B: If the indicator light is on, check whether the motor wire contact is good.

(Key parts: power supply, fuse, control board, driver, switching power supply, circuit)

(3) Check whether the sensor is dusty, has poor contact or is damaged (wipe off the dust on the sensor or replace it);

(4) Check whether the flexible conductor data cable is in poor contact or damaged (trim the data cable and re-plug or replace the data cable);

(5) Check whether the ground wire contact is reliable or whether the high-voltage wire is damaged (reground or replace the high-voltage wire);

(6) The motor wire has poor contact.

II .Automatically reset during work

The main reasons are caused by loose control panel, connecting wires, unreliable motherboard, ground wire and slight high-voltage ignition failure.

1. Check the grounding condition of the machine and measure whether the ground wire meets the standard (resistance to ground should not be greater than 5 ohms). The ground wire needs to be modified to meet relevant standards.

2. Check whether the connection cable is loose or the control panel buttons have poor contact.

3. Is there any strong current or magnet in the location of the machine?

4. Check whether there are errors in the original graphics, such as intersections, unclosed graphics, missing strokes, etc., correct the errors in the graphics, and then output the test.

5. If there is no problem in outputting other graphics, it means that the graphics are wrong and the graphics need to be re-exported or re-created.

6. Check whether the laser tube or laser power supply sparks or disconnect the laser power supply for testing.

7. If the problem still exists, replace the motherboard and test the computer.

(Key points: ground wire, control panel, connecting wires, interference, graphics problems, high-voltage ignition, laser power supply, control board)

III. Misalignment problem

(1) Misalignment of new machines

1. The drive capability is insufficient!
2. Poor contact of motor wires
3. Voltage is unstable
4. The top screw on the synchronization wheel is not tight (see the picture below:)



5. Too fast



6. The guide rails are not parallel (Y-axis misalignment)
7. There is a problem with the file
8. The control card is not working
9. The ground wire is not connected properly and there is interference.
10. There is a problem with the drive
11. There is a problem with the motor

(2)、Dislocation for old machines

1. The slider is worn and has high resistance!
2. There is interference in the ground wire, check if it is connected properly!
3. Aging of driver motor
4. Speed fast!

(3)、It is normal to engrave things with a Y axis less than 20 cm, but if the engraving is greater than 50 cm, the X-axis is misaligned. It takes 4 minutes to engrave at the correct position, but after a while it goes to another place to engrave.

1. Try changing the file, there may be something wrong with the file.
2. The ground wire is not connected properly and there is interference.
3. The drive is aging and its driving capability is no longer good.
4. The motor is broken
5. The slider is loose and the gap is large. Replace the slider!

IV.Operation problems of each axis

(1)X axis is not working Y is working properly



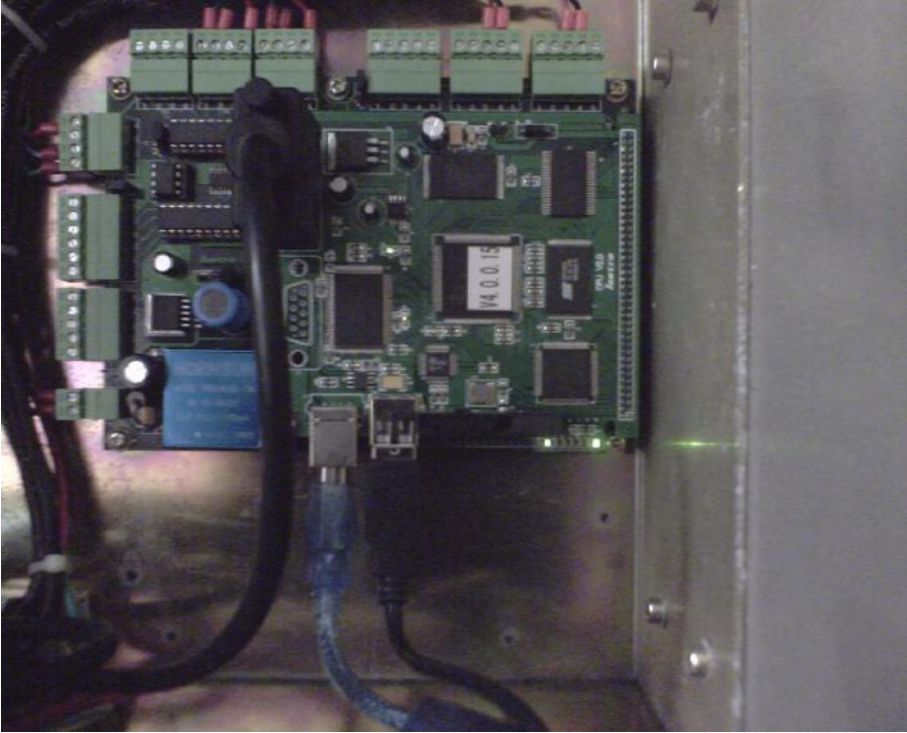
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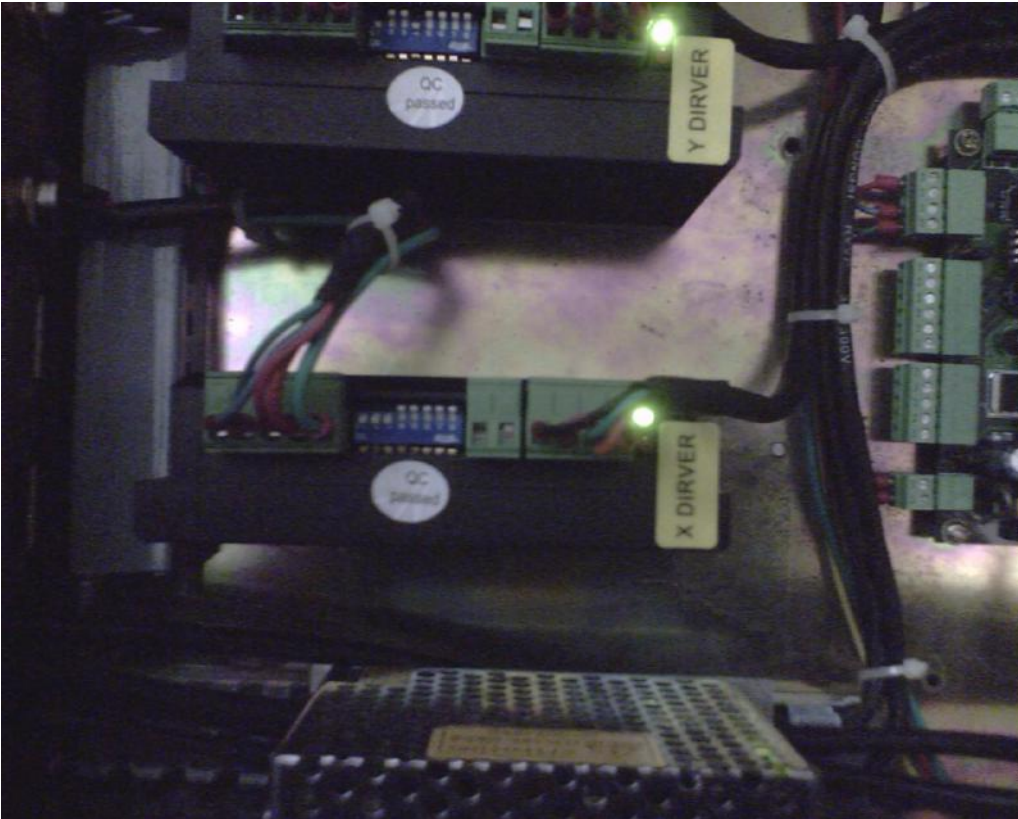
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1517, offline,

Press the X direction on the control panel and the machine will not move. Press the Y direction and the machine will run normally. X axis is not working!

The customer checked the light on the offline card. When pressing the X-axis, the light comes on, indicating there is a signal!

Reasons: 1. The X-axis driver may be broken. Check to see if the green light on the driver is on. If it is on, the driver is normal. If the red light is on or the light is off, the driver is broken and a new driver needs to be replaced!

2. Replace the motor and check if there is any problem with the motor. Unplug the wire of the Y motor, plug the X motor into the Y driver, and press it up and down to see if it moves horizontally.

3. Replace the drive. Change the Y drive to the X-axis drive. Press the left and right X-axis on the panel to see if the X-axis moves. If it moves, the X-axis drive is broken!

4. Push the laser head with your hand to see if it moves. If the laser head moves easily, the motor or driver is broken. If it cannot be pushed and the motor is locked, there may be a signal problem with the control card.

(2)、X-axis is noisy

Detect the four motor wires of the X-axis

1. Turn the multimeter to the test position, as shown in the picture:



2. Use one side of the multimeter to measure any of the four motor wires.



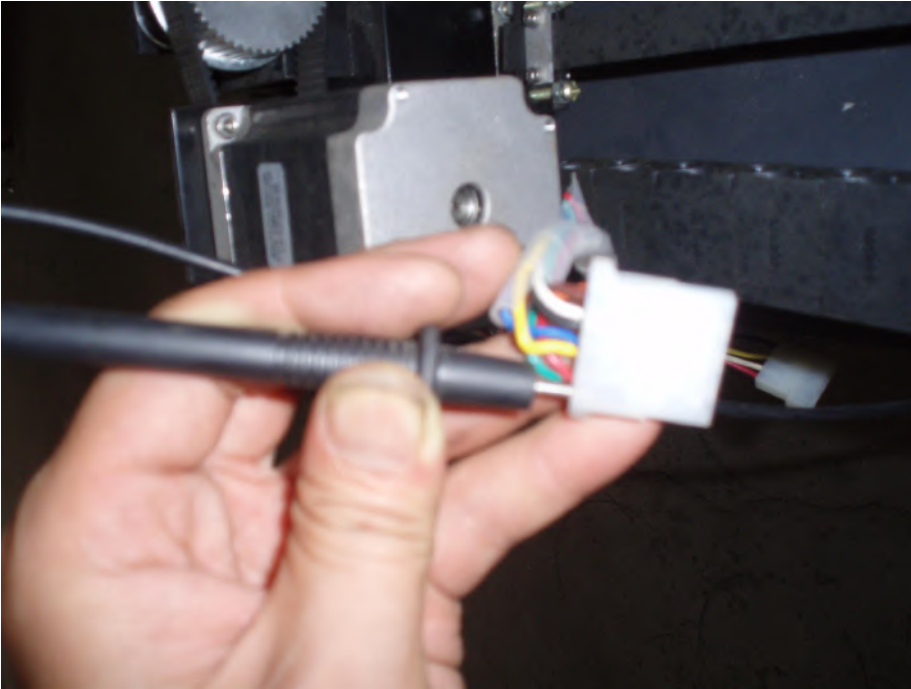
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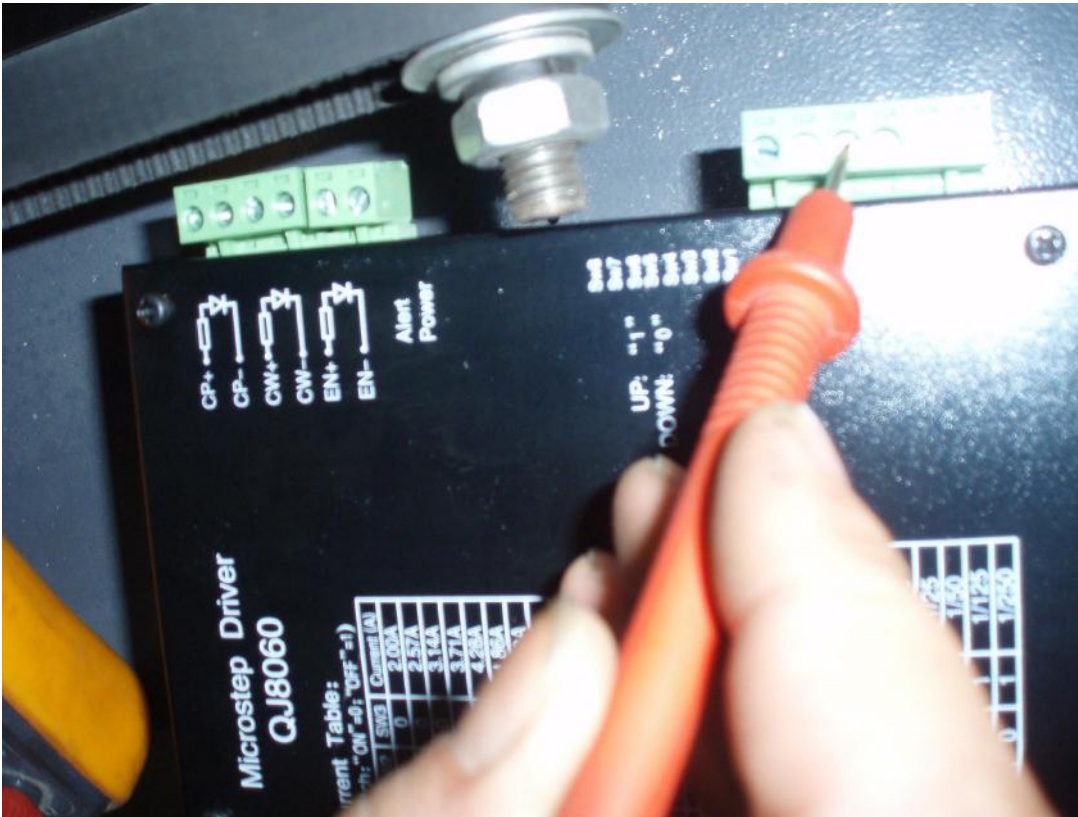
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3. Use the other side of the multimeter to measure the A+ A- B+ B- four corners on the X driver.



One of them is connected, it will ring, and there is sound. If it is connected, there is no problem with this line..

2. Test all four wires on the motor like this. If there is a problem with any wire, A+A- B+ B- are not connected at the four corners of the driver, then there is a problem with this wire and the contact is poor.!

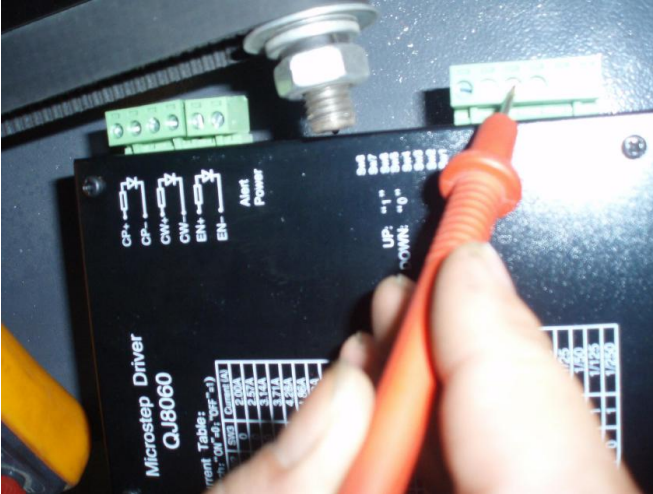
(3) Single axis operation failure

Turn the multimeter to the test position, as shown in the picture:



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2. Use a multimeter to put one side of the multimeter on the A+ terminal of the driver and the other side on the A- terminal of the driver to see if there is continuity; then use the same method to test if there is continuity on B+ and B-.

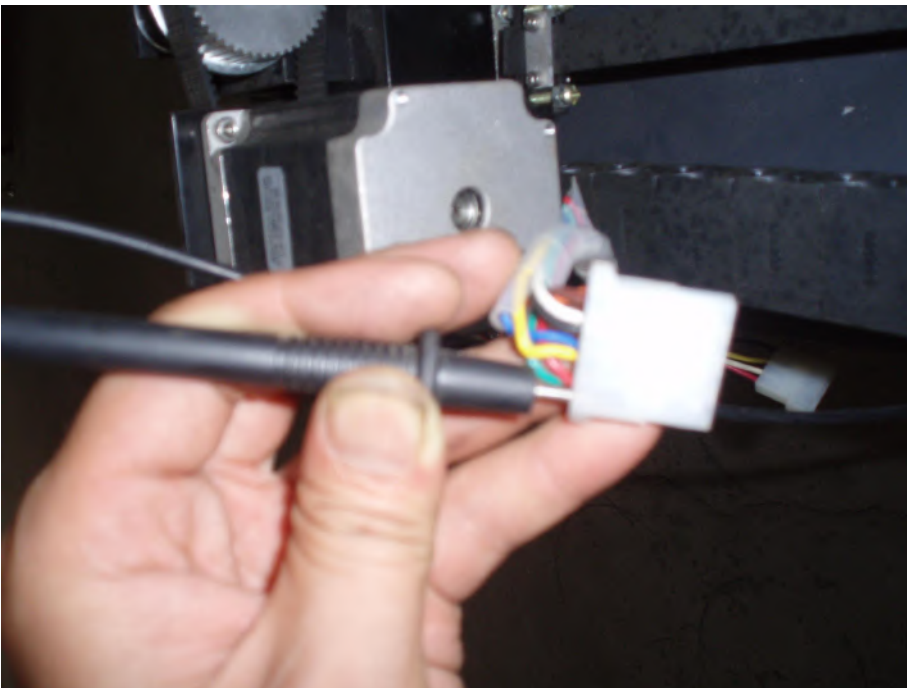


3. If both are connected, the X-axis motor is broken and needs to be replaced with a new one.

If A+A- (B+B-) does not work, use a multimeter to measure it again, with one side at A+ and the other side measuring the same wires of the same color of the motor (there are four wires in total, A+A-B+B-), connect one wire each. and using threads of the same color)

A+ is connected to one of the wires, A- is also connected to one of the wires, and similarly, B+B- is also connected to one of the wires. You can directly detect wires of the same color, or you can Go test it out

If you find out which wire is blocked, you can try it yourself to see if there is a bad contact, or you can try a new wire yourself!



Disassemble the wire trough, then swap the terminals of the X and Y axis drivers, then move the X machine

forward and backward, press Y, the machine moves left and right, see if there is still one axis that is not moving, if so, the motor is broken!



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After checking, we found that the subdivision of the X-axis driver is different from that of the Y-axis. We accidentally touched the driver when we were cleaning the machine. Let the customer adjust the X-axis according to the subdivision of the Y-axis, and the machine can run normally. !



V、 When the Y-axis laser head moves, press down to move downward, and



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press up to move downward as well.

Reason: Replace the spare chip 26LS31 in the control card and re-plug the cable.◦

VI.The lifting platform makes a noise when it moves and is stuck.

Solution: Loosen the screws and readjust the belt below, adjust the screw so that the four corners of the platform are at the same height. Or add some engine oil to the screw.

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Chapter 4. Problems With Cutting And Engraving During Use

I .Detail engraving issues

(1) Draw a 10cm circle in the software, but the actual engraving or cutting is 22cm, which is larger than the actual size.

Solution: Taking the 9060 model as an example, change the pulse and moving distance in the software to 6400 and 36 (see the picture below)



(2) **The image engraved by the rotating axis is larger than the actual image, why?**

Solution: Because the set parameters are incorrect, the parameters need to be changed.

(3)The carvings are of varying shades or not very deep.

1. Check whether the water flow in the water circulation system is smooth (the water pipe is bent or broken);
2. Check whether the focal length is normal (recalibrate);
3. Check whether the optical path is normal (recalibrate);
4. Check whether the paper on the plate is too thick and whether there is too much water (correct again);
5. Check whether the beams are parallel (adjust the belts on both sides);
6. Check whether the lens is broken (replace);
7. Check whether the lens or the emission end of the laser tube is contaminated (reclean);
8. Check whether the water temperature is higher than 30°C (replace the circulating water);
9. Check whether the laser head or focusing lens is loose (tighten it);
10. Check whether the countertop is flat
11. Laser tube aging;



12. Whether the voltage is stable and the laser current intensity must reach 8mA;

(4) Missing engraving, random engraving

1. Check the grounding condition of the machine and measure whether the ground wire meets the standard (resistance to ground should not be greater than 5 ohms). The ground wire needs to be modified to meet relevant standards.
2. Check whether the connection cable is loose or the control panel buttons have poor contact.
3. Is there any strong current or magnet in the location of the machine?
4. Check whether there are errors in the original graphics, such as intersections, unclosed graphics, missing strokes, etc., correct the errors in the graphics, and then output the test.
5. If there is no problem in outputting other graphics, it means that the graphics are wrong and the graphics need to be re-exported or re-created.
6. Check whether the laser tube or laser power supply sparks or disconnect the laser power supply for testing.
7. If the problem still exists, replace the motherboard and test the computer.

(Key points: ground wire, control panel, connecting wires, interference, graphics problems, high-voltage ignition, laser power supply, control board)

{5}. Laser Clean the uneven bottom

1. The processing speed is too fast and the laser tube response speed cannot keep up.
2. The air blowing flow rate is incorrect, which causes the processing powder to stick to each other and form horizontal protrusions.
3. The optical path is deflected or the focal length is wrong, resulting in scattered light beams and uneven bottom.
4. The selection of focusing lenses is unreasonable. Short focal length lenses should be selected as much as possible to improve beam quality.

(6) Cleaning hook edge is misplaced and not closed

1. Is the edited file correct (re-edit);
2. Whether the selected target exceeds the page (re-select);

(7) Are the engraved files different from the painted files? There is a problem with the X-axis and the motor is noisy.

- a. Grounding problem, the power supply shell is grounded
- b. The transverse motor has poor contact, replug the motor wire.



- c. There is a problem with the driver or motor. Replace the driver and motor and take a look.
- d. The idle distance/turning speed is too high,
- e. Turn off the machine and push the beam to see if the laser head moves. If it doesn't move, the load is too high. Apply some oil.
- f. There is a problem with the control system.

II 、 The laser head always touches the machine when returning to the origin.

Reason: It may be that the Y-axis limit switch has poor contact. Move the laser head to the lower left corner and return to the origin. The machine moves Y first and press the Y limit switch. If the machine can return to the origin, the switch has poor contact.

III 、 When cutting at high speed, when pausing and restarting, it will cut at low speed, first slowly and then quickly.

Solution: Download the configuration file again

Chapter5. Cooling System Problems

I . When using the laser engraving machine chiller, the flow alarm (the red light on the panel is on) is directly connected to the water outlet and water inlet with water pipes, and there is no water flow.

A: The water level in the water storage tank is too low. Solution: Add water and check the leakage of the pipeline.

B: The water pipe is blocked or bent and the water flow is blocked, and the water inlet and outlet are connected in reverse.

II . There is no water in the laser tube

A: Is the water pump or chiller powered on or damaged?

B: Is the water pipe blocked or bent in the middle?



Chapter 6. Software Problem

I .Common computer problems

1. The font size gradually decreases (reinstall the operating system);
2. The amount of data is too large to calculate the laser path (wait for a while or increase the computer memory);
3. The calculation path does not respond for a long time. Restart the computer to test.

II . When the machine is engraving or cutting and I click the stop keyboard or stop it in the software, and then continue to engrave other files, the machine does not respond.

Solution: Reopen the software to work

III.Pigmente problem The new software does not work properly, the laser head moves, but does not engrave or cut. You can also move by pressing the direction keys.

A. Push the laser head by hand. If it moves, it proves that the hardware is normal. If it doesn't move, there may be something wrong with the software.

B. Output may not be selected in the layer.

C. The USB machine does not download the configuration, download syscfg. If connected to the machine with a cable, download the current data,

Download the configuration and start again; if you use a U disk, download the data, output the configuration file to the U disk, insert the U disk into the machine, click Start and run again

D. Check whether the firmware version and function library version are consistent. You can take pictures of the control panel and card.

If the customer sends the software for testing, the problem is that the card version is 4015 and



the software version is 4019, so they do not match.

V、The speed 1-15 in the software cannot be used, but everything else is normal.

The start speed is set higher than the constant speed const speed, which is inconsistent.

VI、The working area of the machine is 900*600, but it can actually only work 820*520. The setting cutting area is 60*60mm, but the actual cutting area is 53*53?

(1) Check whether the X Y area setting in the software, file, working platform, is 900*600.

(2) Pulse 6400, setting 36 for engraving machine and 24 for cutting machine per movement. Or change it slightly until the actual area is exactly the same as the set area.

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VII. There are horizontal lines when engraving the seal

A: Adjust resolution and step size

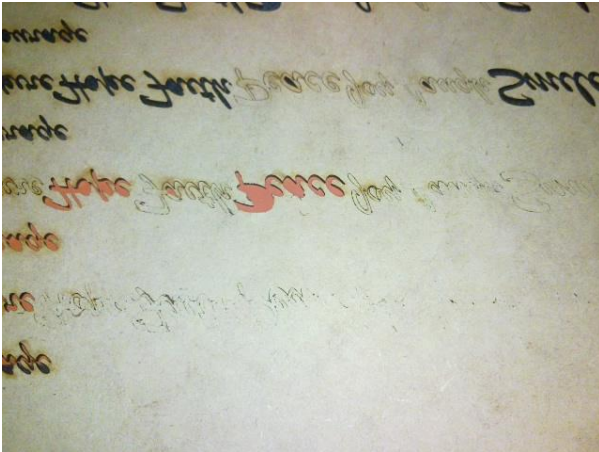
VIII. An error occurred when opening the control card

A. Pull out the card and wipe the metal where it contacts the card, or change the card.

B. The driver is not installed or the card slot is broken.

Chapter 7. Comprehensive feedback on customer issues

1. The reasons for the following situations are as shown in the figure:



a Laser

Some places are cut through, some are not.

The reason for this is that the light path is biased, adjust the light!

Others may be that the focal length is wrong, or the platform is uneven, or the voltage may be unstable!

2. The customer has just replaced a new laser tube and power supply, but the light is very weak and cannot cut 1mm acrylic.

Reason:

(1). The light path is incorrect and needs to be dimmed.

(2) Check whether the laser tube emits light and whether the document can be processed normally.

(3) Press test/laser to see if there is light coming out.

(4). Test 4-5. If the voltage is 5v, it proves that there is no problem with the control box. If the voltage is lower than 5v, the USB card in the control box needs to be replaced.



2-4: Controlling the transmission of the laser manually, you can press the "TEST" button on the operation panel.

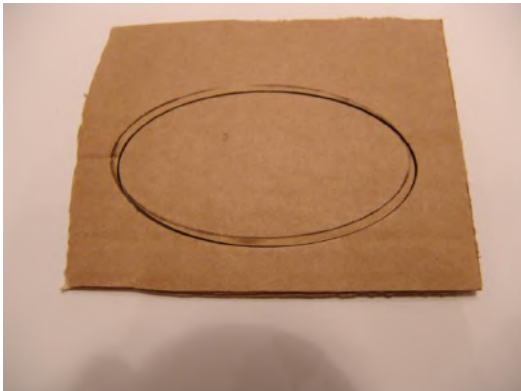
When it can give out the laser (light)

(5). Find an acrylic and place it directly at the light outlet. Use maximum power to see if you can burn a hole. It is possible that the light is deflected on the metal. See if the current can reach 28mA.

(6). Remove the fifth wire and see if the power is greater than before. If so, the chip on the USB card is broken. Replace the card or chip.



3. The light from the laser head always hits the place you don't want to engrave (as shown in the picture). Have you wiped the focusing mirror and reflector, but it still doesn't work?



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Answer: The light path is not correct. Adjust the light path and adjust the three screws of the third reflector.

If you have any interesting in weihua laser product, please don't hesitate to contact us!

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