

Laser Welder Manual

一、注意事项Precautions



警告 Warning



请不要让 YAG 激光照射到皮肤，可能会造成灼伤。请不要让 YAG 激光照射到可燃物，可能会造成火灾。Please do not let the YAG laser shine on the skin, which may cause burns. Please do not let the YAG laser illuminate the combustibles, which may cause a fire.



当心烫手 激光加工中或加工刚结束时，请不要

马上触摸工件，此时工件可能出于高温状态。When laser machining or just after machining, do not touch the work-piece immediately, and the work-piece may be at a high temperature.



请牢固连接指定的电线电缆，如使用容量不足的电缆或连接方式方法不正确，会引起火灾。Please connect the specified wire and cable securely. If the cable with insufficient capacity or the connection method is incorrect, it may cause a fire.



请不要损伤电源电缆，连接线。一旦损伤，会造成触电、短路、期货。如有

损坏、需要修理、更换，请与本公司联系。Please do not damage the power cable or cable. Once damaged, it will cause electric shock, short circuit, and futures. If it is damaged, need to be repaired or replaced, please contact us.



请定期对本设备进行维护保养。Please perform regular maintenance on this equipment.



机器运行中出现焦臭味、异常声音、异常发热、冒烟等异常现象时，请立即切断电源，尽快联系本公司。否则会造成触电火灾。If abnormal phenomena such as burnt smell, abnormal sound, abnormal heat, smoke, etc. occur during the operation of the machine, please cut off the power immediately and contact the company as soon as possible. Doing so may result in electric shock.



请保证接地良好，如不接地，在故障和漏电时，可能会造成触电或损坏设备。Please ensure that the grounding is good. If it is not grounded, it may cause electric shock or damage to the equipment during faults and leakage.



设备通电中会产生磁场，易受磁场影响

的其他设备请不要接近。A magnetic field is generated when the device is energized, and other devices that are susceptible to magnetic fields should not be approached.



请保持设备电源部分干爽，如果电源部分进水会破坏绝缘，会造成触电和短路，甚至火灾。Please keep the power supply of the equipment dry. If the water supply part of the power supply will damage the insulation, it may cause electric shock, short circuit or even fire.



当设备使用中请不要覆盖毛毯、布等，

这样会影响散热，可能造成发热、起火。When the device is in use, please do not cover the blankets, cloth, etc., which will affect the heat dissipation, which may cause heat and fire.



请不要将本设备用于金属加工以外的用途。请在本设备的使用场所内放置灭火器，以防止火灾。Please do not use this device for purposes other than metalworking. Place a fire extinguisher in the place where the device is used to prevent fire.

二、安装要求 Installation requirements

本设备必须有经过专业人员培训的人进行操作，操作人员必须熟读用户手册。

The operator must get professional training for this machine and read this user manual.

请将本设备安装在牢固的水平无倾斜的场所。

Install the unit in a tight, level, unobstructed location.

设备输入电压为单相 AC220V 50HZ 容量 35A 以上 $\pm 10\%$ 或三相 AC380V 50HZ 容量 35A 以上 $\pm 10\%$ 本设备必须接地。

The equipment input voltage is single-phase AC220V 50HZ (300W) capacity 35A or more $\pm 10\%$ or three-phase AC380V 50HZ (500W) capacity 35A or more $\pm 10\%$ This equipment must be grounded.

请将本设备安装在周围温度 5~40°C、周围湿度 85%一下，无剧烈温度变化的场所使用。另外请避免以下场所使用。

Please install this equipment in a place where the ambient temperature is 5~40° C, the ambient temperature is 85%, and there is no severe temperature change. Also please avoid using in the below place.

- 垃圾、灰尘、油污多的场所 Garbage, dust, oily places
- 震动及冲击多的场所 a place with many vibrations and impacts
- 处于高频干扰源的场所 In a place with high frequency interference sources
- 易结露的场所 a place that is easy to dew

设备各个部件与墙体至少保持 60CM 以上，以利于通风散热。

Keep all parts of the equipment and the wall at least 60CM to facilitate ventilation and heat dissipation.

三、操作说明 Operation instructions

注：本设备为激光焊字机，不可用于长时间的不间断连续焊接。如需进行连续焊接，请咨询我公司工程师为你提供解决方案。

Note: This equipment is a laser welding machine and cannot be used for long-term uninterrupted continuous welding. For continuous welding, please consult our engineers to provide you with a solution.

3.1 开机步骤 Operation procedures

本款焊字机操作简单方便，操作步骤如下：

This type of welding machine is simple and convenient to operate. The operation steps are as follows:

① 对于新机器要先注入冷却水（一般饮用纯净水）。把冷却水加入冷却系统水箱中的水位线之内，然后，盖上水箱盖。

For new machine, water tank must be filled with water (General drinking pure water). Put water to the water tank within the water line in the tank. Then cover the tank cover.

② 检查电源接线是否正确，电源是否正常，打开电源总开关。

Make sure the wires connection of the power supply is correct, then open the Main Power in the back of power case.

③ 对于新机器以及刚更换过激光管或冷却水的机器，要打开空气开关，等待冷水机运行 5 分钟，让水冷系统排出所有水泡，检查冷水机水压表压力是否正常。

For new machines and machines which have just been replaced the laser tube or cooling water, turn on the Main power, wait water tank running for 5 minutes to make the water cooling system to discharge all blisters and check the water pressure on pressure gauge is correct.

④ 按下开机按钮，便会出现操作页面，在“开机”图标显示时，就可以使激光焊接电源开机了，此时进入充电阶段，耗时两分钟，在此期间任何按键都不会响应。

Press the power button, the operation page will appear. When the “power on” icon is displayed, the laser welding power can be turned on. At this time, it enters the charging phase and takes two minutes. During this time, any button will not respond.

⑤ 待充电完毕后，系统自动完成氙灯预燃，点灯成功后会在界面上显示出“累计出光次数：*****”说明可以进行下一步的操作。当开机完成后，调节控制屏幕上面的电流、脉宽、频率、设置参数。

After the charging is completed, the system automatically completes the pre-ignition of the xenon lamp. After the lighting is successful, the “Freq(HZ) number of light-emitting times: *****” will be displayed on the interface to indicate the next step. When the power is turned on, adjust the StartA (A), Pulse width(ms), Frequency(HZ), and setting parameters on the control screen.

⑥ 手持焊接时，需要按横臂上转换按钮，切换手持枪，调整手持枪焊接焦距，注意使用持枪焊接时，拔掉脚踏板、手持枪。不得对着人或着易燃物，避免伤害到人或者造成火灾。

When holding the hand soldering, you need to press the shift button on the cross arm to switch the hand gun and adjust the welding focus of the hand gun. Pay attention to the use of the gun when welding, remove the foot pedal and hold the gun. Do not face people or flammable materials, avoid harming people or causing

fires.

⑦ 手持焊接时，注意使用参数，大电流焊接时，脉宽不得超过 3，脉宽大可能会影响烧坏光纤头。

When using hand soldering, pay attention to the use of parameters. When welding with high current, the pulse width should not exceed 3, and the pulse width may affect the burnt fiber head.

3.2 电源控制板功能介绍 Parameters setting

参数设置与调节：焊接参数包括电流、脉宽、频率等 3 个参数，电流调节范围为 30~300A，段长调节范围为 0.1~20.0ms，脉宽为零时不出光，频率调节范围为 0.5~60.0Hz，小于 0.5Hz 即为 0Hz 表明为单点焊。，这三个参数除了自身的范围限制外，还受整机功率和氙灯最大单脉冲激光功率的制约，例如，将电流调至最大 500A，段长调至 15.0ms，此时频率最大就只能调到 1.4Hz，若想继续增大频率，则需要将电流和段长这两个参数之一或同时减小。

Parameters adjustment: StartA (A), Width(ms), Freq(HZ)

StartA(A) range is 30~300A. (Laser power)

Width(ms) range is 0.5~10.0ms. (The size of laser point)

Freq(HZ) range is 4~50HZ. (Laser speed)

For example, if you weld stainless steel, StartA(A) is 30A, Width(ms) is 1.5ms, Freq(HZ) is 15HZ. If you weld iron sheet or galvanized sheet, you need increase StartA or Width or both of them.

For different material and thickness, parameters setting are different.

关机操作：当显示光标在“关机”位置，关闭总电源，将关闭激光电源和照明灯。

Turn off: Press “Off” on the screen – Press Black button – Press “Main Power” .

3.3 激光光路的维护保养Maintenance

机器经调试后，一般不需对内部结构进行调整，用户要做的维护工作，只是定期换冷却水和灯管。灯为消耗品，寿命约为 500 小时（具体时间与客户设备使用状况有关）。当激光输出能量下降到原能量的 2/3 时，即要换灯。维护保养时，一定要先关掉电源。

After testing machine, there is no need to adjust its internal structure usually, You just need to change cold water and tube regularly. Lamp is consumable, which has a life of 500 hours (the life is related to the using time and status of equipment). When the output of laser dropped to the 2/3 of primary energy, you need to change it. When you maintain machine, you must turn power off first.

更换灯管要在关掉电源后等待至少 3 小时，更换时要格外小心，以免损坏其他部件。When you change xenon lamp, you should wait 3 hours at least after power off. And you should be careful to avoid damage other parts of machine.

更换灯管步骤: Procedure of changing xenon lamp:

打开光具座防尘罩，用胶布把激光棒两头封好，防止进灰。
Tape the laser rod at both ends sealed to prevent dust.

四、维护与保养Maintenance

冷凝器，通风孔，过滤网 Condenser, Airway, Filter

要保持系统冷却能力的最优化，冷凝器、通风孔、过滤网都应保持清洁无尘土，应定期检查并按要求清洗。过滤网很容易从两侧拿下，用柔和清洗剂和水洗去堆积的灰尘，重新安装前应漂洗和凉干。

Keep the system cooling capacity optimization, both the condenser, airway, filter kept clean without dust, should be regularly check and clean as requirement.

水系统 Water chiller

定期清洗水箱、漂洗过滤器滤芯或更换滤芯及更换循环水，保证水系统的洁净。

Clean the water tank regularly, rinse the filter cartridge or replace the filter and replace the circulating water to ensure clean water systems.

液体液位 Water Level

要定期检查是否需要加液。通常，水箱的水要以覆盖水箱中的盘管为准，当低于盘管时需应加液，根据水质定期换水，如遇水泵水流量偏小，是由于水泵有空气闷堵泵体内所致，可按下水过滤器上红色按钮排出水路系统内空气，待水流量正常后即可。水路混有气泡时将会减小水的透光率，透明软管中有气泡或水箱回水口处有气泡时，应检查回水管路是否漏气，水箱水位是否偏低。

Need to check regularly if the water tank need to add water. Usually, the water tank level is subject to cover the coil prevail. When the water is below the coil, it means water need to be added. Water need to change regularly according to the water quality. change the water pump in case If the water flow is too small, it is because the water pump body is blocked by air. U can press the red button on water filter to discharge the air in the water system until the water flow is back to normal level. Water transmittance will be reduced when the water is mixed with air bubbles. When there are air bubbles in the transparent hose or water tank outlet got bubbles,

please check if the return water pipe is leaking or if the water tank level is low.

定期清洁灰尘 Clean the dust regularly

当灰尘过多时, 卸下隔尘网, 用空气喷枪、水管等将隔尘网上的灰尘清除, 油性污垢请用中性洗涤剂清洗, 隔尘网重新安装前应凉干, 经常清洁隔尘网可以延长冷水机的使用寿命, 减少冷水机电能消耗。

Clean the dust on the air filters regularly : When excessive dust, remove the air filters and clean the dust on it by air gun or water pipes. Oily stains please clean with mild detergent. Air filters should be dry before re-install. Keep the air filters clean regularly can extend the life of the chiller and reduce the chiller energy consumption.

水箱的维护保养 Maintenance of water tank

1、在冬季环境温度降至 0℃以下时, 水箱内的冷却水会结冰, 使水箱破损。当室温降至 15℃以下时, 请将冷水机的低温报警温度设为 5℃以使冷水机能正常启动。

When the temperature drops to 0℃ in the winter, the water in the water tank will be frozen to damage the water tank. So when the room temperature drops below 15 °C , please set the alarm temperature 5℃ to make water tank work normally.

2、若长时间不使用, 请把水箱及腔体、水管内的水排干, 避免形成水垢。

If you're not using this machine for long time, please drop out the water in water tank, cavity and water tubes to avoid causing scale.

3、冷水机水温与室温温差不得大于 4℃, 否则容易结露, 这会使 YAG 晶体端面以及光学镜片上出现污渍和露斑, 影响激光能量输出。

The temperature differences between water tank temperature and room temperature shall not be more than 4℃, or it will be easy to make condensation. Then stains and spots will appear on the YAG crystal and optical lenses to affect the output of laser energy .

4、对设备外部的污渍, 请用干布或略湿的布擦拭。特别脏的地方, 请用稀释的中性洗涤剂或酒精擦拭。请不要使用特殊溶剂或汽油等, 否则可能造成外观变色。

Please use a dry cloth or a slightly damp cloth to clean stains on the device outside. Use diluted neutral detergent or alcohol wipe for the special dirty place. Do not use special solvents or gasoline, or it may cause the appearance of discoloration.

5、开关、按钮等请用手小心一个一个地操作, 禁止胡乱操作、用硬物操作。同时进行多个

切换等都会造成设备故障。

Please operate switches and buttons carefully, it is forbidden to operate with a hard object and mishandled. Simultaneous multiple switch will cause the device error.

6、过滤器滤芯请每月换一次，更换滤芯拆卸滤杯时请使用随设备配送的专用工具。

Change the filter cartridge once a month, please replace the filter and remove the bowl with the special tools of the device.

7、请使用纯净水加入水箱中，禁止使用自来水或未处理的水作为冷却水，否则会缩短激光器使用寿命。

Using pure water instead of tap water or untreated water as cooling water, otherwise it will shorten the laser life.

8、不要再没有启动氙灯电源的情况下，长时间运行制冷机，否则可能因结露造成激光晶体损坏。

Don't make the refrigerator long - running when the xenon lamp power is off, or it may cause damage to the laser crystal due to condensation.

1. **五、故障与维修 Common problems with solutions**

机器不运转(无制冷或泵不作用) **The machine is not running** 检查电源线是否连接到电源插头。

Check whether the power line is connected to the power supply plug.

检查电源开关是否开启 Check whether the power switch is started.

检查面板电源是否开启 Check whether the panel power is started.

2. **泵不能正常工作 Water pump can not work normally**

检查整个系统的液体水平。Check the water level of the whole system.

检查泵马达是否运转。Check whether the pump motor is running.

检查循环系统是否有堵塞。Check whether the circulatory system is blocked.

3. **泵抽吸不足 Water pump suction deficiency**

检查是否电压太低 Check whether the voltage is too low.

检查是否管直径过小 Check whether the pipe diameter is too small.

检查是否流体粘度太高。Check whether the fluid viscosity is too high.

检查连接管是否受到了限制。Check whether the connection pipe is limited.

4. 无制冷或冷不足 No refrigeration or not cold enough

检查是否电压过低或过高。Check whether the voltage is too low or too high.

检查通风处是否有堵塞。Check whether the ventilation is blocked.

检查环境温度，过高的环境温度会引起制冷压缩机短时停机。

Check the ambient temperature, too high temperature will cause the compressor short shut down.

检查是否过多的热量被转到冷却液体里，因为这会超过制冷系统的冷却能力。

Check whether the excess heat is transferred to the cooling liquid, because it would exceed the refrigeration system's cooling ability.

5. 工作台在使用一段长时间后，如使用时出现活动间隙时（此间隙是由于日常使用中的金属件之间的磨擦造成的），只需打开防尘罩，调节丝杆螺丝即可。

After the workbench has been used for a long period of time, if there is a moving gap during use (this gap is caused by friction between metal parts in daily use), simply open the dust cover and adjust the screw.

6. 红外线不亮，检查 5V 电源开关否烧坏。

The red light is off, check 5V power supply is burnt or not.

7. CCD 屏幕都不亮，检查 12V 电源开关是否烧坏。

CCD Display is not bright, check 12V power supply is burnt or not.

8. CCD 屏幕显示无信号、亮红灯，按屏幕最后一个按键，亮绿灯在按倒数第二个键找到 BNC 模式。

The CCD screen displays no signal, red light, press the last button on the screen, and the green light is in the BNC mode when the second last key is pressed.

9. 点灯失败：Lamp is not ignored

①检查急停开关是否被按下，导致点灯失败。Check Stop button

②检查氙灯是否烧坏，灯管亮不亮。

Check the xenon lamp is burnt or not, the lamp is on or off.

10. 预燃成功，但踩脚踏不出激光

① 脚踏踩坏

C: 更换脚踏

Lamp is ignored, but the laser didn't come out when press the pedal switch. You should change a new pedal switch.

11. 预燃成功，放电正常。Lamp is ignored, and the laser can come out normally.

1) 光弱 Light is weak:

- | | |
|-------------|-----------|
| ① 氙灯老化 | C: 更换氙灯 |
| ② 镜片老化或被打花 | C: 更换镜片 |
| ③ 镜片蒙尘 | C: 清理镜片 |
| ④ 光路散 | C: 重新调整光路 |
| ⑤ 激光棒面花或腔体脏 | C: 清理 |

- ① Xenon lamp is aging , you should change a new xenon lamp.
- ② Lens is aging and with many dot. You should change lens.
- ③ Lens is dirty, you should clean lens.
- ④ Light path is not straight, you should adjust the light pat.
- ⑤ Laser crystal or cavity is dirty, you should clean them.

2) 出光火力不均匀。Laser power is not stable

- ① 电压不稳 C: 检查电压、安装稳压器，输入电压应为 $AC220 \pm 10V$ 。Voltage is not stable , you should check the voltage and install a stabilizer, input voltage is $AC220 \pm 10V$.

12. 制冷机工作中升温过快 Heating up too fast in the working of water tank

- | | |
|----------|----------------|
| ① 压缩机未工作 | C: 重新启动制冷机 |
| ② 制冷剂汇漏 | C: 重加制冷剂 (R22) |
- ① Compressor not working, you should Restart the water tank.
 - ② Leakage of refrigerant, you should re add Re refrigerant.

六、安全规范 Safety norms

本机属贵重设备，使用者应正确操作，以免损坏。本机内有高压电，强激光和高压水流。意外情况下有可能对周围人员造成不同程度的伤害。必须先关闭总电源，才能进行维修和检查。

This machine is expensive equipment, you should operate it correctly to avoid damage. There are high-voltage, high power laser and high pressure water inside this machine. In case of an accident on the surrounding can cause people damage in varying degrees.

You must turn off the main power before maintenance and inspection.

此激光机属于第四类激光装置（Class 4 laser）。对于任何不按照此操作手册的任何操作，使用或调校，都可能导致使用者接触到有害辐射，调校激光应带保护眼睛，避免直接照射。

This laser machine belongs to the class 4 laser device. Any operation, use or adjustment that is not in accordance with the operation manual may lead users exposed to harmful radiation, and adjust the laser with eye protection to avoid direct exposure.

如被激光灼伤：如果使用者的手部或手指直接或间接被激光照射，伤处类似于“普通热辐射”（normal radiated heat），虽然激光脉冲所造成的灼伤无害，但要注意避免伤口收到感染，为伤口消毒，如情况严重，请去医院诊治。

Such as the laser burns: If the user's hand or fingers expose to the laser irradiation directly or indirectly, the wound caused by the laser that is similar to the "ordinary thermal radiation (normal radiated heat) burns" is harmless, but you should be careful to avoid wound infected. Disinfect for the wound. if the situation is serious, please go to the hospital for treatment.

七、保修 Warranty

保修期：本产品自购买之日起保修 12 个月。

Warranty for 12 months from the whole machine.

保修范围：Warranty range

. 氙灯，保护镜片，滤水器，顶针为耗材，无保修

Xenon lamp, protection lens, water filters, petal switch and thimble are consumables, they are not in warranty.

. 镜片保修三个月 Lens for 3 months warranty

. 其余整机保修 12 个月 The rest whole machine for 12 months warranty