LA•SEA
EFR LASER

CAUTIONS

1. Water Inlet and Outlet of Laser Tube

Attention: The water inlet and outlet shall follow the principle of low into higher drainage. Please refer to the following diagram.

① In order to fully circulate the cooling water of the laser tube, it is necessary to ensure that the **water flow enters from the low point and drain away from the high point** under the pressure of the water so as to achieve the cooling of the entire laser tube.

② **If the flow direction is opposite**, it is possible that the cooling water can not fill the whole pipe, resulting in poor cooling, power reduction and the phenomenon of tube burst.

③ If there is air bubbles in the laser tube, before the dimming, lift the water outlet side, until **the bubble is completely discharged**, and then fixed laser tube. Please be careful not to allow residual bubbles in the laser tube. On one hand it will influence the luminous effect, on the other hand it will lose the laser power. If the laser tube is poor cooling caused by bubble for long time, it may burst.

2. Installation Instructions

① According to **the marked fixed position** on the tube, fix the laser tube on the machine and keep it be fixed on the horizontal plane.

② **Connect respectively** the positive and negative line of **laser power supply to** the positive and negative line of **laser tube**. Pay attention to avoiding incorrectly connected line and make sure good insulation. (The rear end with the spiral glass tube is positive end)

③ **Connect the chiller with the laser**, the chiller outlet is connected to the laser inlet, and the chiller inlet is connected to the laser outlet.

④ **Open the chiller** to ensure that the cooling water is filled with the laser water cooling tube and the bubbles are completely drained.

⑤ When the laser tube is started, it normally adjusts 50-60% of the power to work.

⑥ Within the recommended maximum current, using laser can still be output rating power. Exceeding the recommended maximum current, using the laser will shorten the life of the laser tube;

3. If the following fault occurs, please check the below items.

① **Weak Power/Low Power**, please check:

a) The windows of laser tube is clean or not. If there is scratch, dirt or dust. The bracket is placed correctly or not.

b) Output current and voltage, cooling water temperature, cleanliness and water flow.

c) Lens & mirror surface is clean or not, hot or not. Laser path is shifted or not.

② **High voltage side firing**

a) High voltage is close to metal or not; if there is something around high voltage cap or not.

b) Indoor humidity is too high to conduct electricity; Avoid condensation in summer

c) Power supply and laser tube high voltage wire and connections is damaged or not.

③ **Laser tube broken, water cooling cap dropped**

a) Water temperature should be between 15℃-25℃, and should avoid cooling water freezing In cold area. After laser is power off, please discharge the water if the temperature is under ZERO.

b) When laser is working, the water cooling must be working on same time to protect laser tube(please test if the laser is on/off along with water on/off.)

c) Cooling water pipe is folded or pressed or not.

d) There is bubble inside laser tube or not.

e) Water pressure and water flow is working or not; water flows in low level and flows out on high level.

④ **Laser tube windows dirt**

a) During laser tube working, the environment and material cutting smoke may pollute the windows easily. We recommend user check the windows at least every two weeks, and clean it if any pollution. Please soak cotton swabs by 75% alcohol, clean the windows from the center to edge only in one direction. Please do not clean it back and forth which may scratch the windows, and makes power down.

b) **Warning**: if user cannot check every two weeks, and clean the pollution in time, the laser tube runs with pollution in long time, not only the laser power will down, the windows will break also. We will not give warranty for any problem because of this reason.

4. **Warning: If the laser tube is powered on without circling cooling water, it will break immediately. In this condition, the laser tube will have no warranty.**

Before install and test the laser tube, please wear the protection glasses first.

If the laser needs to be returned to the manufacturer for repair, please make sure to use the complete original packaging.

Before package and transport, please make sure to contact Beijing EFR Laser S&T Co., Ltd and get agreement in advance.

Before packaging, the cooling water in the laser tube must be vented completely.