

# **Instructions for Laser Cutting Module**

**Hangzhou IECHO Science & Technology Co.,Ltd**

## Directory

1. Overview.....	2
2. Risk control warning.....	2
3. Composition&Working Principle of Laser Module.....	2
4. Technical Parameters.....	3
5. Installation points of laser cutting head.....	3
5.1. Laser optical machine structure assembly.....	3
Figure 1 ·Laser components installation.....	3
5.2. Laser wiring.....	3
Figure 2 ·Control box inside.....	4
Figure 3. Back and top switches of control box.....	4
5.3. Water cooling circulator connection.....	5
5.4. Air source access.....	6
5.5. Laser module installation.....	7
Figure 8 .The installation of laser cutting head.....	8
6. The installation and setting of laser software.....	8
6.1. Software Installation.....	8
6.2. Communication serial port settings.....	8
6.3. Laser tool parameter setting.....	8
Figure 9.....	9
6.4. Power on.....	9
6.5. The setting of Laser cutting depth of focus.....	10
6.6. The setting of Laser cutting depth of focus.....	11
7. Precautions for using laser.....	11
7.1. Common laser faults and solution.....	12
Statement.....	13

## 1. Overview

The laser intelligent cutting module is a high-efficiency digital automatic cutting tool module, which is designed based on the TK model. The laser light source produced by American Coherent Company and the unique control circuit can control the constant laser output power and density, so as to make the material to be cut uniformly and smoothly. Meanwhile, the laser is equipped with water cooling and smoke & dust removal system. And the automatic feeding and receiving system, as well as the CCD camera help realize the continuous cutting of material.

## 2. Risk control warning



- ❖ **Turn on the water cooling device before starting the laser, and make sure that the water level of the water cooling device is normal**
- ❖ **During the laser cutting process, it is forbidden to touch the cutting head with your hands!**

## 3. Composition&Working Principle of Laser Module

Coherent 100w laser, beam expander, 50.8mm focusing lens, water cooling cycle machine, smoke&dust suction pipeline, coaxial protective gas pipeline, laser feeding belt and other components. The laser module is installed on the three-module models, and connected with the power adapter and switch board in the laser control box through a flexible cable. The universal machine head is connected with a soot removal device, a water cooling cycle device and a coaxial protective gas blowing pipe.

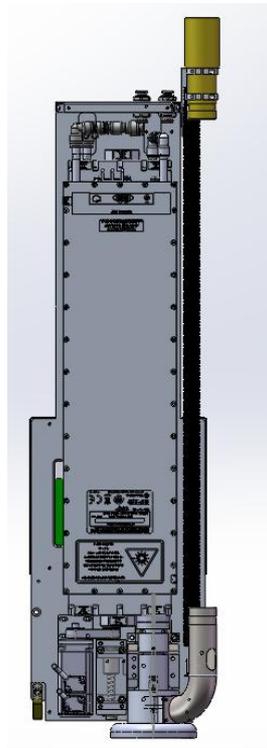
In the system, a specially designed control system controls the laser output to a nearly constant power density during cutting, as well as achieve the 0.1mm ultra-small spot with the optical structure. The exhaust gas generated during cutting is completely purified by the soot removal device. In order to realize continuous cutting of materials, we also equip the flexible and detachable conveyor belt, which realize the multi-purpose function of one machine.

## 4. Technical Parameters

## 5. Installation points of laser cutting head

### 5.1. Laser optical machine structure assembly

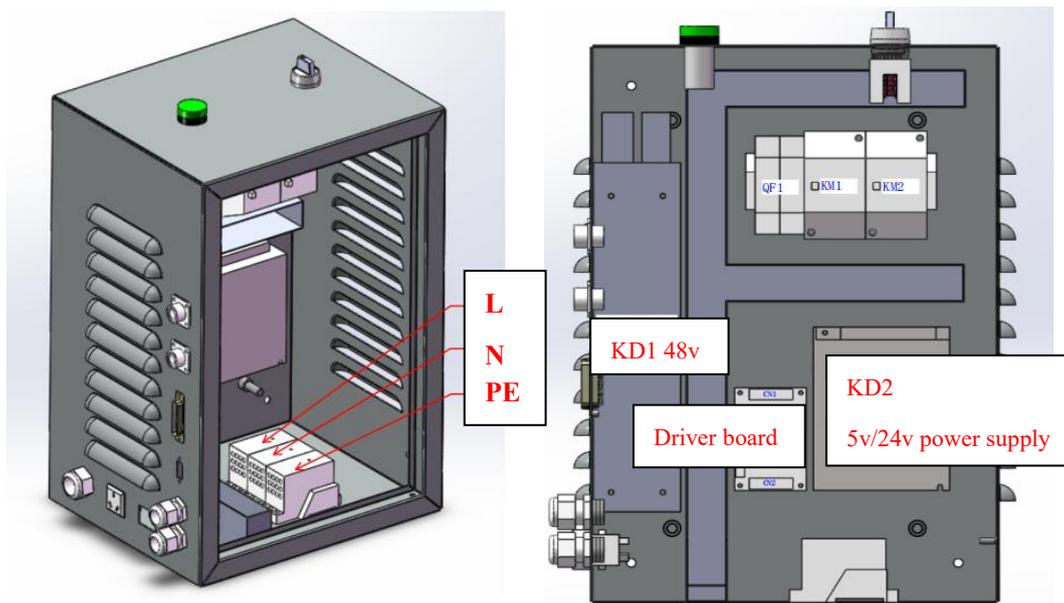
As shown in the figure, installing the 4x-beam expander, focusing lens soot pipe and cover, height motor and other components.



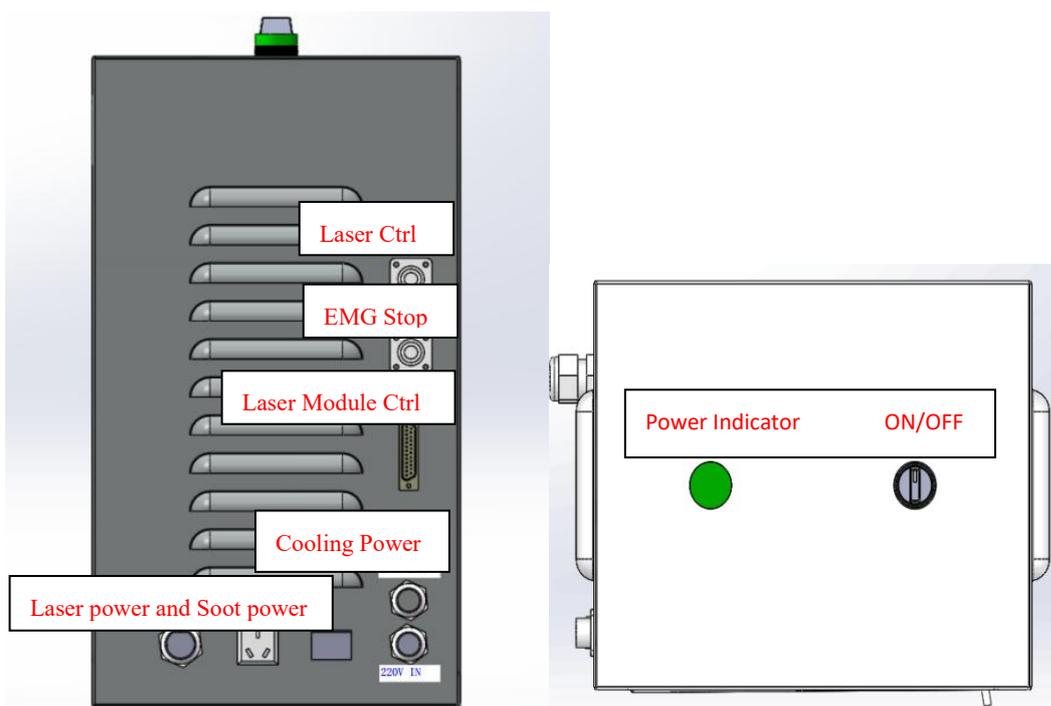
**Figure 1 ·Laser components installation**

### 5.2. Laser wiring

Refer to the wiring diagram to connect the circuit, water cooler, motors, laser control switch board, etc.



**Figure 2 · Control box inside**



**Figure 3. Back and top switches of control box**

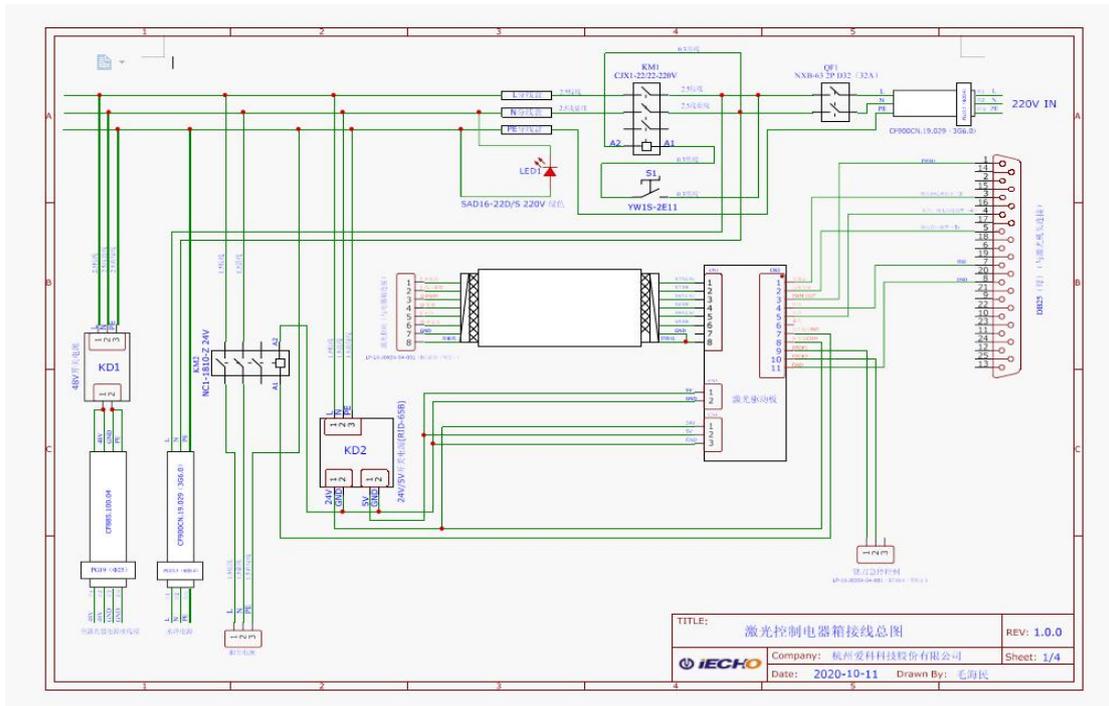


Figure 4. Wiring diagram

### 5. 3. Water cooling circulator connection

Connect the water circulation power wires with the reference to the wiring diagram, and connect the water circulation pipeline according to the water inlet and outlet. The working temperature of adding pure water is 15-30 °C. And it is recommended to set it to 2 °C below room temperature for saving energy.

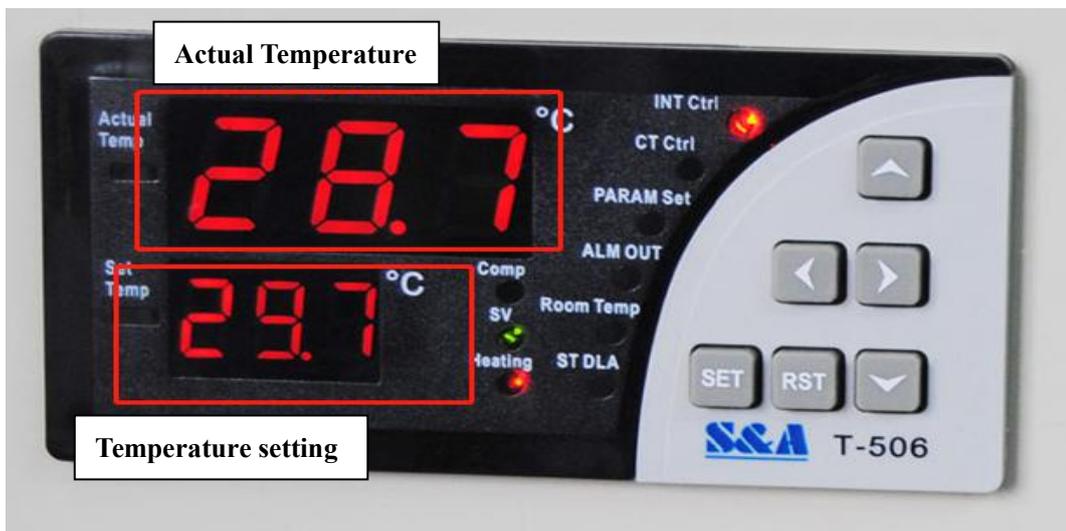
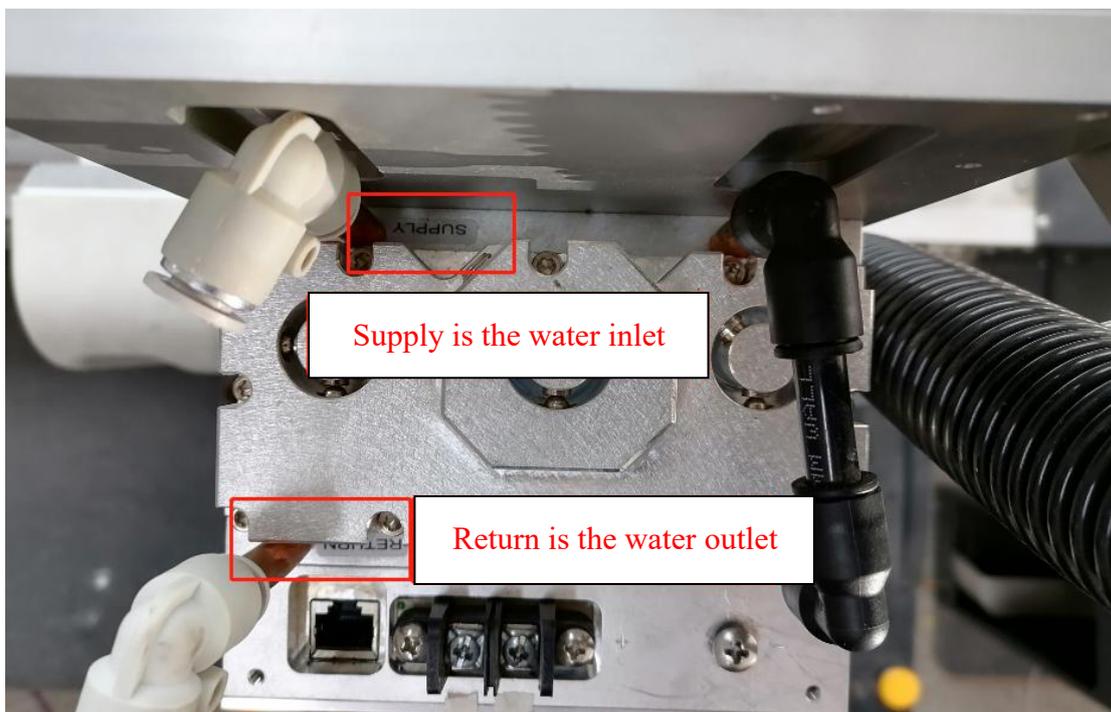


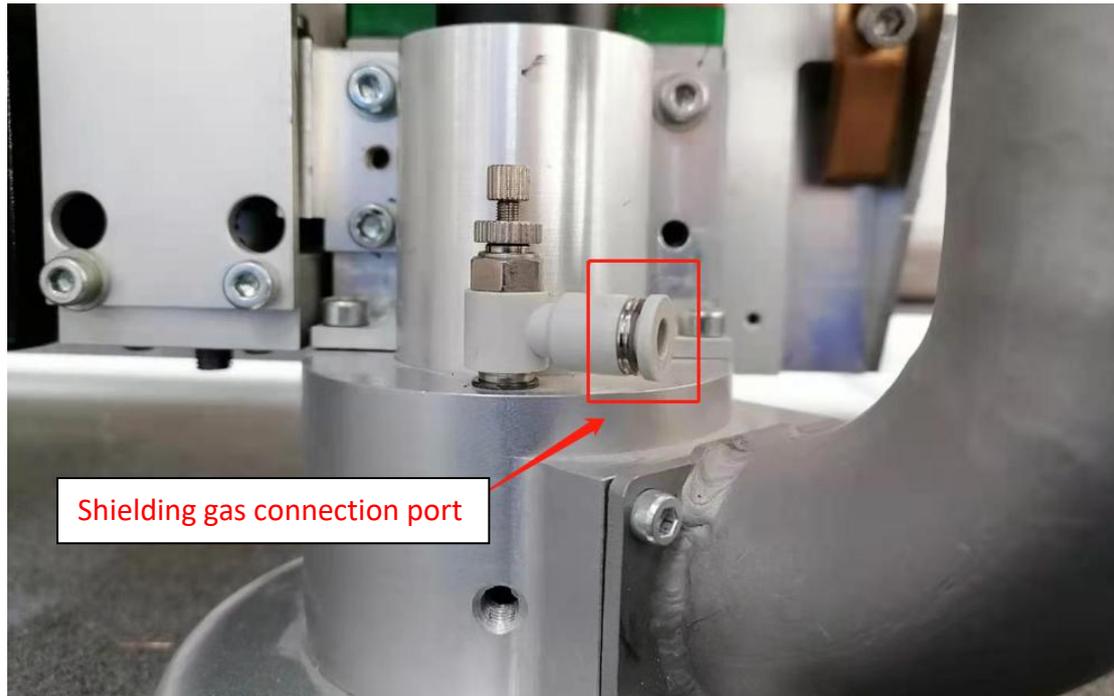
Figure 5 · Temperature setting



**Figure 6 · Water circulation interface**

**5. 4. Air source access**

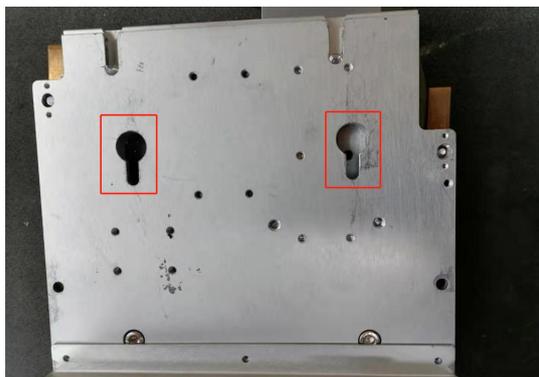
Connect the air pipe in power box to the laser cutting head



**Figure 7. Pneumatic connection**

### 5. 5. Laser module installation

Place the laser cutting head on the module with the auxiliary device. Align the two big pins with the holes firstly, and then tighten the four screws.



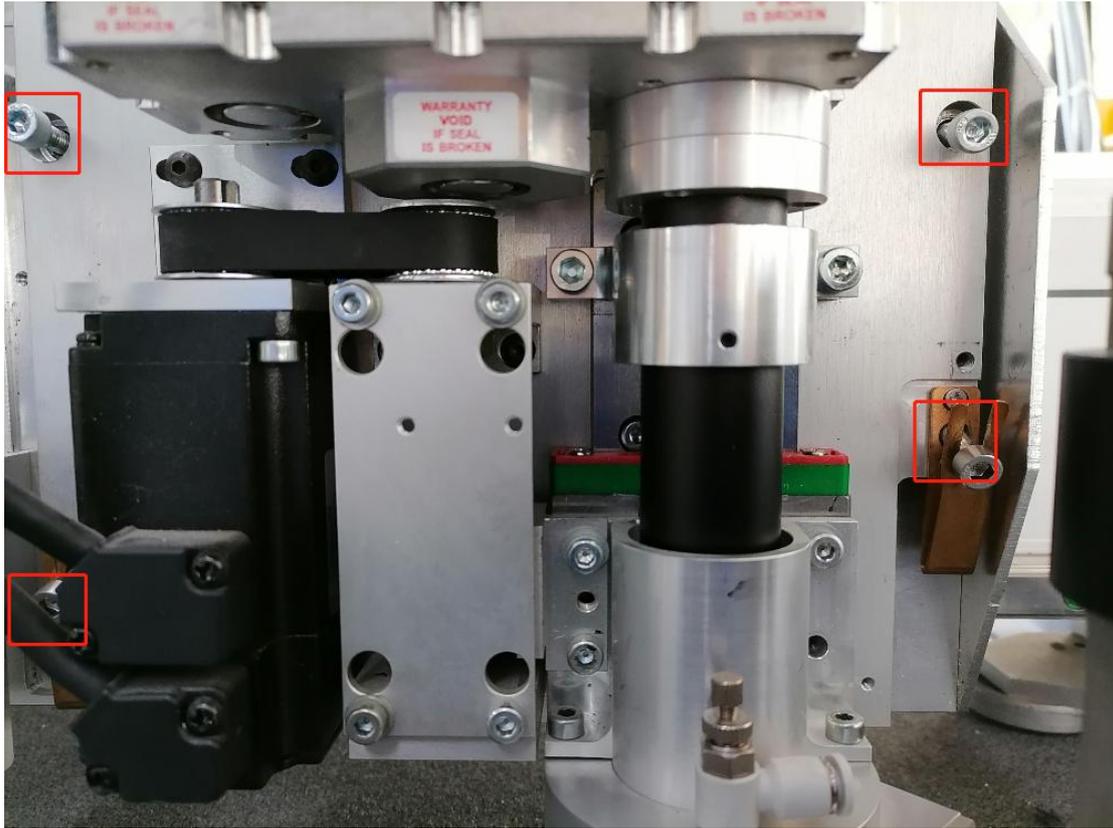


Figure 8 .The installation of laser cutting head

## 6. The installation and setting of laser software

### 6. 1. Software Installation

#### Laser software version requirements:

DSP program version: special program for laser operation

CutterServer software version: CutterServer v6

IBrightCut software version: IBrightCut v5

### 6. 2. Communication serial port settings

Using Cuterserver software, open [System Configuration]-[Serial Configuration], and set the corresponding serial port of the laser.

### 6. 3. Laser tool parameter setting

In the special parameters of the Cuterserver software, the tool name is selected as LASERHEAD.

If the selection is successful, the laser tool icon will appear on the cutterserver interface.

Right-click the laser icon to set the appropriate cutting parameters: such as XY motion speed, motion acceleration, etc.

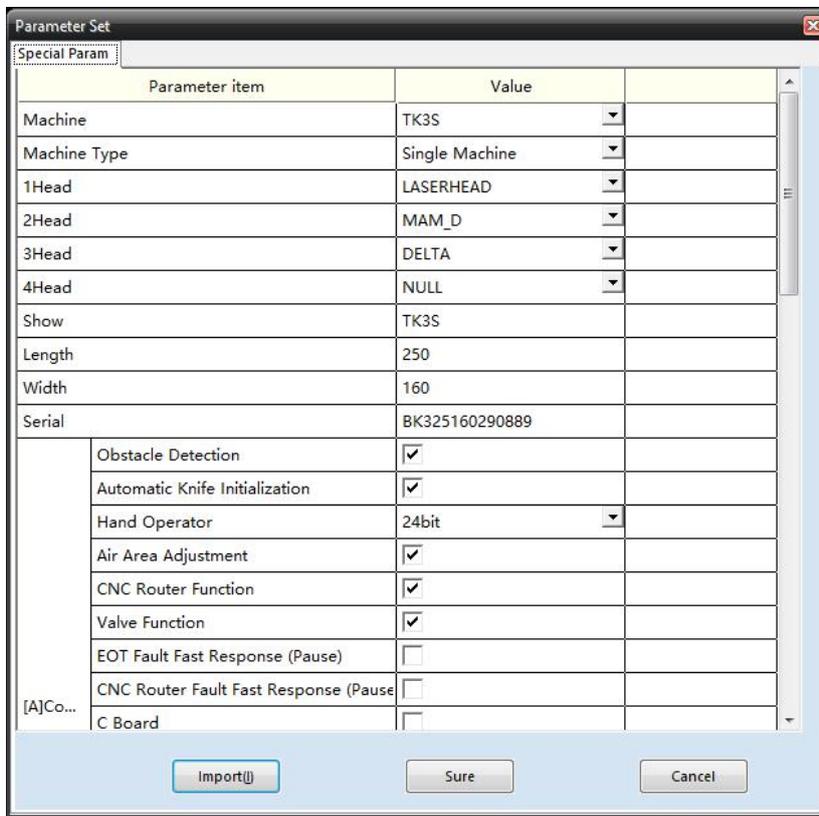


Figure 9

#### 6. 4. Power on

Boot steps:

(1) Check the water level of the water cooler machine weather the air source is normal. If the water level is lower than the normal water level, add pure water as required.

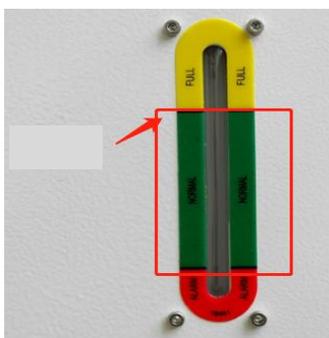
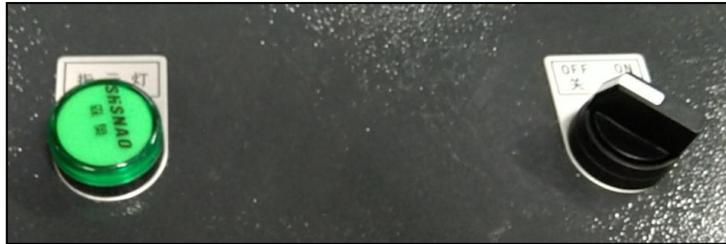


Figure 10 .Water level display

- (2) Turn the knob switch to ON, the laser power is turned on, and the power indicator light is on, the coaxial shielding gas is blown out from the cutting head.



**Figure 11 . Power switch and indicator light**

- (3) Place the material, turn on the suction fixation

**Figure 12 . Smoke and dust intake suction adjustment device**



- (4) Turn on the power of dust purification , adjust the suction port, and prepare for cutting.

## 6. 5. The setting of Laser cutting depth of focus

Click to manual knife initialization



If the cutting material is within 1mm, the knife drop depth is set to 10.3mm. If the cutting material is 3mm, the knife drop depth setting is reduced by 1.5mm, and the focal point is placed in the middle of the material.

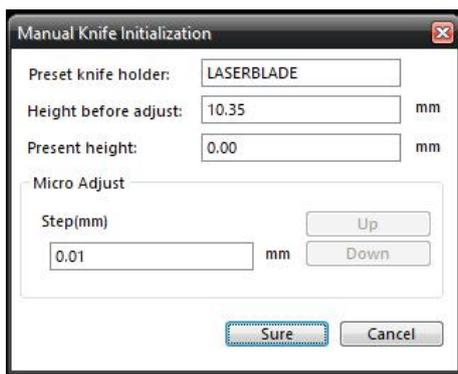


Figure 13 . Manually drop the knife

#### 6. 6. The setting of Laser cutting depth of focus

Select the laser tool in the cuttsever interface, press Ctrl+t on the keyboard, the software will pop up the laser parameter setting interface, set the corresponding parameters according to different materials .

#### 7. Precautions for using laser

- ❖ Before turning on the laser, start the water-cooling cycle equipment and ensure that the coaxial shielding gas works normally.
- ❖ If the laser head is not used for a long time, you need to use 99.95% nitrogen to dry the cooling water in the machine, and seal the inlet and outlet of the cooling water to avoid corrosion of the laser cavity.
- ❖ Before installing the optical machine components on the laser, and after removing the optical machine components, pay attention to protect the output port and take dust-proof measures. If it is polluted, it is recommended to use 99.8% purity nitrogen to blow out the pollutants.
- ❖ When assembling and transporting the laser, be careful that the cavity cannot withstand excessive stress. If the cavity is deformed, it will damage the laser.

### **7. 1. Common laser faults and solution**

(1) If the laser is not used for a long time, the cutting is abnormal after assembly, and the laser cannot emit light normally. This situation is an abnormal laser pre-ionization. If you switch to cutting with a power below 15% for a few seconds, the problem will be resolved.

(2) After sending the cutting command, the cutting head cuts directly without knife drop. This situation is a problem of material thickness setting, and the problem is solved if the material thickness is set to 1mm in the cuttersever.

(3) The slit width is too large and the cutting effect is poor. This situation may be that the laser power density is set too large or the laser focus depth is aligned with the cutting material, and the problem is solved by adjusting the laser parameter settings.

## Statement

The copyright of this technical document belongs to Hangzhou IECHO Science & Technology Co., Ltd. (hereinafter referred to as IECHO).

IECHO does not make any guarantee for this technical document, and IECHO is not responsible for any misunderstandings that may be caused by users of this technical document.

IECHO reserves the right of final interpretation if there is any discrepancy between the product purchased by the user and this technical document.

IECHO National Free Service Hotline: 400-119-1990.

**IECHO Science Technology Co., Ltd.**

No.1 Building, No.1 Weiye Road;  
Binjiang District, Hangzhou, China  
Tel: +86-571-8660 9560  
Fax: +86-571-8669 8923  
Email: sales@iechosoft.com  
Website: www.iechosoft.com

