

K0822C

## **OPTICAL FIBER LASER ENGRAVER Operation Manual**

**HONESTY DESERVES SINCERE  
BEHAVIOR BEFORE WORK**



**Luoyang Xincheng Precision Machinery Co.,Ltd**



## Introduction

Thanks for choosing SFX laser marking series products. Please carefully read the following instruction before you use the equipment. (The drawings in the instruction manual are for reference only and subject to change without prior notice)

Please keep in mind when using :

**Safety First**

Welcome to keep in touch with us for a long term cooperation and put forward your sincere opinions and suggestions so that we can serve you better in the future.

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## **Warning!**

Any operation of the system other than those specified in this manual may expose the operator to dangerous laser radiation! The SFX LASER series markers adopt a closed laser light path design, which can effectively prevent the leakage of laser radiation. During the normal operation of the marking machine, no additional parts and items shall be added inside the marking machine. This marking system shall not be used when the sealing cover is open. Do not look straight at the laser light or reflect laser light, in case of injury to the eyes!

## **Electrical Safety**

Maintenance and adjustment of electrical equipment in the marking system must be carried out SFX the trained professional staff t who is familiar with all the parts of the system. Please pay special attention to the following points:

- \* Please do not turn on the power,when the equipment is not working and maintenance adjustment is needed.
- \* The Equipment should be well grounded and checked regularly.
- \* Whenever possible, use one hand to operate the electrical equipment to prevent circuits in the human body
- \* For the testing of the marking system, some special measuring techniques are needed, and the selection of reference sites is decided SFX professional technicians.

**Warning:** Do not put your hand under the laser lens when the equipment is working!  
Do not look straight at the laser light or reflect laser light, in case of injury to the eyes!

## **Preface**

Thanks for choosing SFX laser marking series products

Please read this manual carefully before use.

Laser marking system is a high and new technology product that integrate the optics, precision machinery, laser technology, electronic technology, computer and control technology.

The correct use and maintenance of this system is very important for better performance and extended life.

Through this manual, you can have a preliminary understanding of the working principle of the laser marking system, and able to use and maintain the marker correctly according to the described methods and steps.

# 1. Introduction and Model

## 1.1 Introduction

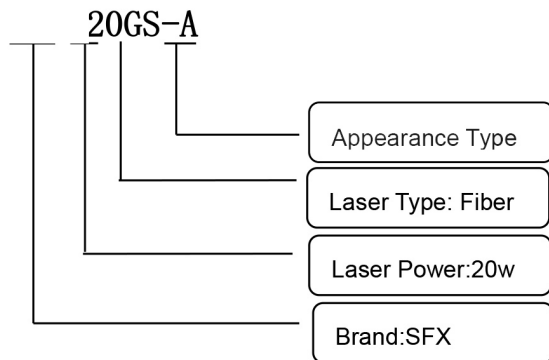
The equipment mainly uses optical fiber laser, high speed precision galvanometer and the control system that easy to operate.

It is a collection of laser technology, precision mechanical and electronic technology and computer technology , and widely used in electronics, computers, clocks and hardware and other industries.

It can applied to a variety of metals (stainless steel, aluminum, iron, copper, etc.) and non-metal (PVC, etc.).

It also has many advantages ,such as large output power, small volume, high precision, fast speed, good stability, no pollution and low noise.

## 1.2. Model



# 2. Basic Structure and Principle

## 2.1. The basic structure and principle of the machine

SFX laser marking system is composed of the components including the fiber pulsed laser source, the control cabinet, computer-control system, optical scanning galvanometer with driver, lens and the elevated work bench.

The Working Principle:

The high-pulse laser beam emitted SFX the fiber laser source ,is projected onto the reflection lens of X and Y galvanometer.

The galvanometer then rapidly swings ,according to the program under the control of the computer, to make the laser scan in X and Y 2D direction.

The laser beam is then focused through the optical lens, to form a fine spot with high energy density on the surface of the processed object.

This pulsed high-energy light spots can ablate on the surface of objects and sputter out tiny spots.

Under computer control of this process, presetting various characters, graphics, etc. can be permanently marked on the surface of the object.

## 2.2. The basic structure and principle of the main components

### 2.2.1. The Control Cabinet

Control the operation of the whole equipment, including the indication and control of laser power supply, X and Y galvanometer driver, alarm system, emergency switch control, computer control of laser marking graphics.

Structure: power of the laser /galvanometer and control card, control card, computer, metal case.

### 2.2.2. Fiber Pulsed Laser Source

Fiber pulsed laser is specially developed for high speed and efficient laser marking systems. It provides an ideal high power laser energy source for industrial laser marking machine and other applications.

Compared with traditional laser, fiber pulsed laser can improve the efficiency of pump light conversion SFX more than 10 times per watt, and is designed with low energy consumption, suitable for laboratory or outdoor operation.

This laser is compact, self-contained and can use at any time, and could also be embedded directly into the user's device. The laser can emit a pulse laser with a wavelength of 1064nm, which is controlled through the standard interface.

The laser needs to use a 24V dc power supply.

### 2.2.3. Optical Scanning Galvanometer

The function of optical scanning galvanometer is to deflect the laser beam irradiated on it.

There are two sets of this part in the laser marking system, which are installed on the top of the focusing field lens.

This part has been well adjusted before leaving factory, and users are forbidden to adjust it.

### 2.2.4. Optical Field Lens

The optical field lens is the optical focusing system. It is used to focus laser beam on the surface of work piece and ensure good focusing effect in the working area.

The part shall not be removed without authorization except for the replacement of protective lenses.

### 2.2.5. Computer-control System

The SFX LASER fiber series marking system uses the special computer control card and software control system( Please refer to the software instruction manual for software application).

### 2.2.6. Work Bench

The work bench is a 1D adjustment worktable, convenient for using and accurate positioning of the work piece

## 3. Technical Parameters

### 3.1. Specification

\* Marking area: It varies according to the focal length of the selected lens.

For example:

F=160 ,the marking area is 110mm×110mm

F=210 ,the marking area is 150mm×150mm

F-254, the marking area is 175mm×175mm

\* Marking speed: Maximum line speed 2000-12000mm/s

\* Minimum line width: 0.01mm

\* Marking depth: 0.01~0.3mm

## 4. Installation

### 4.1. Requirement of the installation environment

Installation environment must be in accordance with the following provisions of the

Environment. Any damage or shortened life of the equipment caused by an environment that is not conducive to the operation will not be covered by the warranty

\* The ambient temperature is required to be between 5 °C and 30°C

\* The humidity is required to be 40-80%. No condensation.

\* Power requirement: 100-240V, 50-60Hz, 10A. Three wire system with reliable grounding wire..

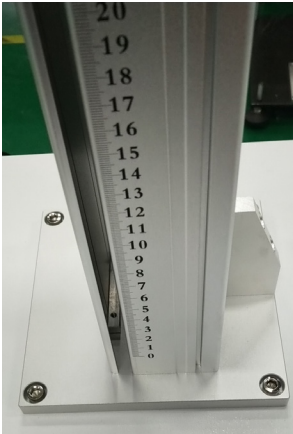
\* Equipment space needs to be smoke-free and dust-free. Please avoid to place the equipment into the environment like metal polishing, grinding and other dust serious working environment.

\* If dust is generated during marking production, dust extraction device shall be installed.

\* Some environments should be installed anti-static floor, strengthen shielding and so on.

## 4.2. Installation

### 4.2.1. The lift and computer display



A. Pick up the lift, align to the four fixed holes on the cabinet, and tighten the screws. The installation methods may differ by different models, please refer to the install instructional video or contact the manufacturer for guidance.

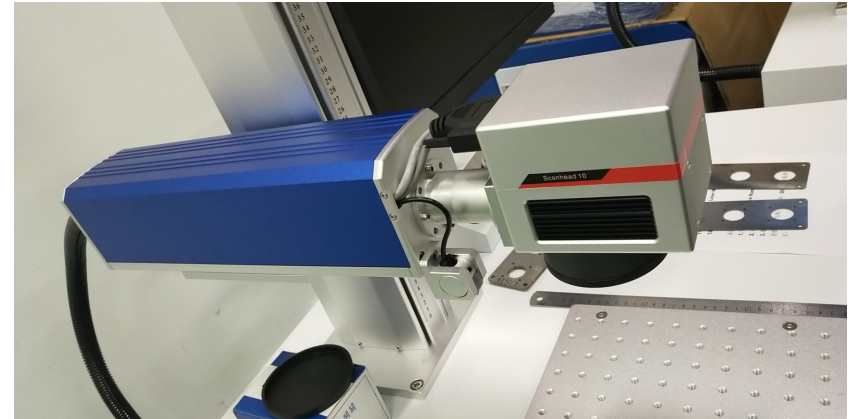
B. Pick up the display fixing bracket and fix it on the lifting bracket. Fix the display on the display bracket and plug in the reserved power cord and VGA signal cable. Tighten the screws to prevent the signal cable from coming loose.



### 4.2.2. The Light Path

Place the light path on the lifting bracket and fix the positioning screw at the bottom of the light path.

Please make sure that the galvanometer lens is aligned to the center of the work table and lock the positioning screw.



## 5. Operation steps

### 5.1. Power-on



- Plug in the aviation plug and power on.
- Turn on the air switch.
- Press PC button to turn on the computer.
- Turn on the key switch and red light
- Open the Ezcad software on the computer.

## 5.2. Power-off

- a. Turn off Ezcad software.
- b. Turn off Key Switch and Red Light
- c. Turn off PC
- d. Turn off Air Switch    e. Power off.

## 6. Routine maintenance and solution for common faults

In order to increase the service life of laser marking system, please follow the steps:

### 6.1. Clearance of System Appearance

Before and after operation, firstly make sure that the working environment is clean, then clean the laser system.

### 6.2. Common Fault and Solution

Fault phenomenon	Fault cause	solution
1. Main control circuit is not workable and indicator is light.	<ol style="list-style-type: none"> <li>a. Check the power supply and power plug</li> <li>b. Check the air switch</li> </ol>	<ol style="list-style-type: none"> <li>a. Change power plug</li> <li>b. Open air switch</li> <li>c. Contact us</li> </ol>
2. Power supply is normal working, but laser is not workable.	<ol style="list-style-type: none"> <li>a. Check laser switch</li> <li>b. Check laser switch connector</li> <li>c. Check if the Ezcad restore the defaults or not</li> <li>d. Check if laser power is 24V</li> <li>e. Wrong boot order</li> </ol>	<ol style="list-style-type: none"> <li>a. Open laser switch</li> <li>b. Change laser switch</li> <li>c. Delete Ezcad and decompress it again</li> <li>d. If laser power is not 24V, change the laser power.</li> <li>e. Power off and waiting 5 mins, then power on in turn.</li> </ol>

3. Galvometer scanner is not workable	<ol style="list-style-type: none"> <li>a. Red point is not moveable.</li> <li>b. Ezcad cannot send signal</li> <li>c. Open Ezcad and "invalid device"</li> </ol>	<ol style="list-style-type: none"> <li>a. Change galvometer scanner power</li> <li>b. Check PC software and hardware</li> <li>c. Check controller power and USD cable</li> </ol>
4. Uneven marking character	<ol style="list-style-type: none"> <li>a. Wrong focus</li> <li>b. Check light path</li> </ol> <p>Check if there is a big power machine around the laser system</p>	<ol style="list-style-type: none"> <li>a. Adjust focus</li> <li>b. Adjust light path</li> </ol> <p>Install stabilized voltage set</p>
5. When marking characters or pictures, the marking effect is not clear	<ol style="list-style-type: none"> <li>a. Check if the marking surface and the galvometer scanner is parallel.</li> </ol>	<ol style="list-style-type: none"> <li>a. Adjust the marking surface</li> </ol>
6. There is laser light but power is week.	<ol style="list-style-type: none"> <li>a. Check if the lens is clear or not</li> </ol>	<p>Use alcohol wipe/pad to clear the lens from the lens center to the outside.</p>
7. When marking number or character is okay, but the picture is not okay.	<ol style="list-style-type: none"> <li>a. The picture has not converted into plt file.</li> </ol>	<ol style="list-style-type: none"> <li>a. Install CoreDRAW software and convert</li> <li>b. Contact us.</li> </ol>