



Shandong HOACE INTELLIGENT Equipment Co.,Ltd.

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HF Series User Guide

Fiber Laser Marking Machine



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PREFACE

Dear Customer:

Thank you for choosing Hoace Intelligent.

This fiber laser marking machine is intended for personal and professional use. Hoace Intelligent is committed to providing the highest level of customer satisfaction and support.

To ensure a favorable customer experience, we kindly suggest that the customer can thoroughly read the User Guide provided with your equipment before using it. Your usage experience and suggestions will be essential for Hoace Intelligent to improve our product and service.

Should you have any questions, you can get support from Hoace Intelligent Official Customer Support with any of following contact.

Email: help@hoace.com

SUGGESTION & FEEDBACK : <https://www.hoace.com/support/suggestion-feedback/>

Again, thank you for choosing Hoace Intelligent.
Sincerely,

Hoace Intelligent Official Team



Hoace Intelligent cannot be held responsible for any direct or indirect damages, which result from using or working with the products electric circuits or software described herein.

The apparatus must be used only by trained and skilled personnel. Before use the manual should be read and followed carefully.

Furthermore, Hoace Intelligent reserves the right to change or alter any product described herein without prior notice



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Chapter 1 Brief Introduction and Applications

1.1 Brief Introduction

Hoace fiber laser marking adopts world's most advanced technology, it is the third-generation laser marking system. It adopts fiber laser source to achieve marking function by ultra-high-speed scanning system. The fiber laser marking conversion is efficient, longer lifespan and energy-saving.

It can carve metal materials and some non-metallic materials, such as gold, silver, copper, brass, aluminum, stainless steel, silicon steel, carbon steel, chrome steel, cast iron, titanium, molybdenum, multi-coated metals, painted metals, ABS, carbon fiber, coated non-metallic material, PVC, PET, painted non-metallic materials and so on.

1.2 Application

Application in promotional gifts, Apple Products, watches & jewelry, auto parts, mechanical engineering, medical technology, security & ID, Lighting & house electronics, kitchen ware, bathroom parts, electronics&semiconductors, machine tools and mold making, precision bearings, food packaging and so on.

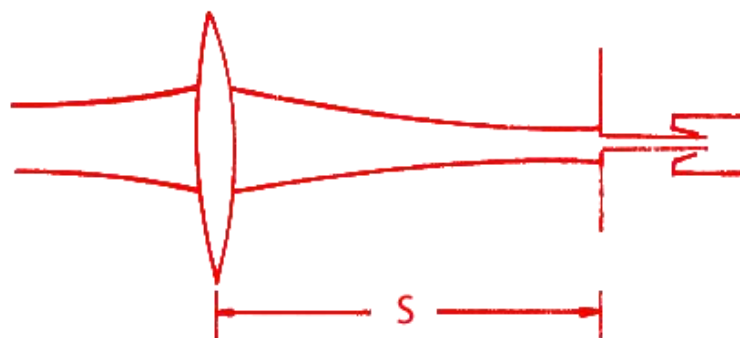
1.3 Introduction of Fiber Laser Source

Hoace Machine adopts the fiber lasers with feature high peak power, high pulse energy and optional output beam size. They are widely used in marking, precision drilling and engraving on non-metal and high reflection metals. The key components of the lasers are developed and manufactured in house to ensure the lasers' reliability and uniformity.

Specification :

Nominal Output Power	20W	Fiber Cable Length	2-5m
Output Power Tenability	10-100	Power Supply	DC 24V
Wavelength	1064nm	Max.Power Consumption	200W
Pulse Width	120-200ns	Operating Temperature	0-45°C
Single Pulse Energy	1-1.25mj	NOHD	4500cm
Output Power Stability	<3%	Polarization State	Random
Beam Quality	<1.5	Divergence Angle	0.5mrad

More information: The below image shows that the divergence angle of laser is around 0.5mrad.

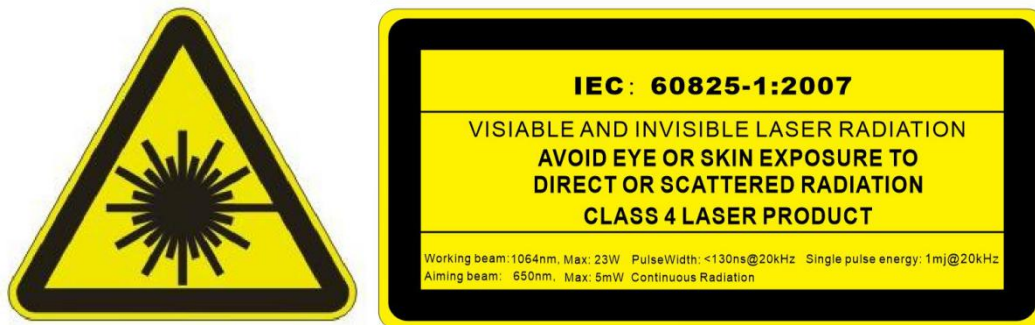


Chapter 2 Safety Instruction

2.1 Safety Classification (laser /electricity)

2.1.1 Only 4-level safety engineers are allowed to operate and maintain laser machine

Four-level laser will produce dangerous and invisible radiation while the laser machine is working, the radiation will be harmful to worker's eyes and skin. Radiation of Sub-shot and reflection is also harmful to people.



When the red radiation produces refraction to eyes, it will focus on the retina, eyes will be hurt easily. In a word, you should always wear protective glasses during the machine operation or maintenance.

2.1.2 Avoid Red Light Pointer (Class 3B)

The wavelength of aiming beam is 650nm, and its max power is 5mw, we strongly advise the operator to avoid eye or skin exposure to direct or scattered radiation. After you find the focus length for marking subject, then you can power off the laser light pointer by pressing the button named “Red



Light Pointer” or “Red Dot Pointer” on the machine!

2.2 Safety precautions

2.2.1 Don't work alone

When the operator does service or maintenance for machine, it is better to have an assistant who is familiar with risk and high-voltage laser radiation knowledge besides him. Once an accident occurs, the assistant can help the operator turn off the laser equipment.

2.2.2 Allow air circulation appropriately

Some materials during the laser processing will produce harmful fume, so the operator might as well install exhaust system / fume purifier.

2.3 Warning

2.3.1 Wear Protective Glasses / Goggle

Protective glass plays a protective role (for direct radiation, radiation reflected and scattered radiation). However, even if the operator wears the goggle, he can not look directly at the spot very often, intense laser radiation still can damage the protection tool.

Before wearing the glass, please:

1. Check whether it is damaged or not.
2. Be sure you are wearing the right glass, because the protective glass for CO2 laser can't protect the laser radiation emitted from fiber laser (CO2 laser and fiber laser has different wave length).

2.3.2 Fire

Although the four-level laser output power is not high, the operator should pay more attention to the fire when the laser is working in high power and low speed.

2.3.3 Interlock Machine Door

Each machine has the interlock, the machine door must be closed during operation in case of the laser leak. Once you open the door of machine, the machine will stop working, and there will not be any laser output.

If you want to continue to run the machine, you have to close the door of machine, and click "Mark" in the software once again!





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2.3.4 Laser Aperture

Once you see the below label on the machine, you must avoid eye or skin exposure to direct or scattered radiation, this label tell us where the laser output directly.

LASER APERTURE

2.3.5 Training

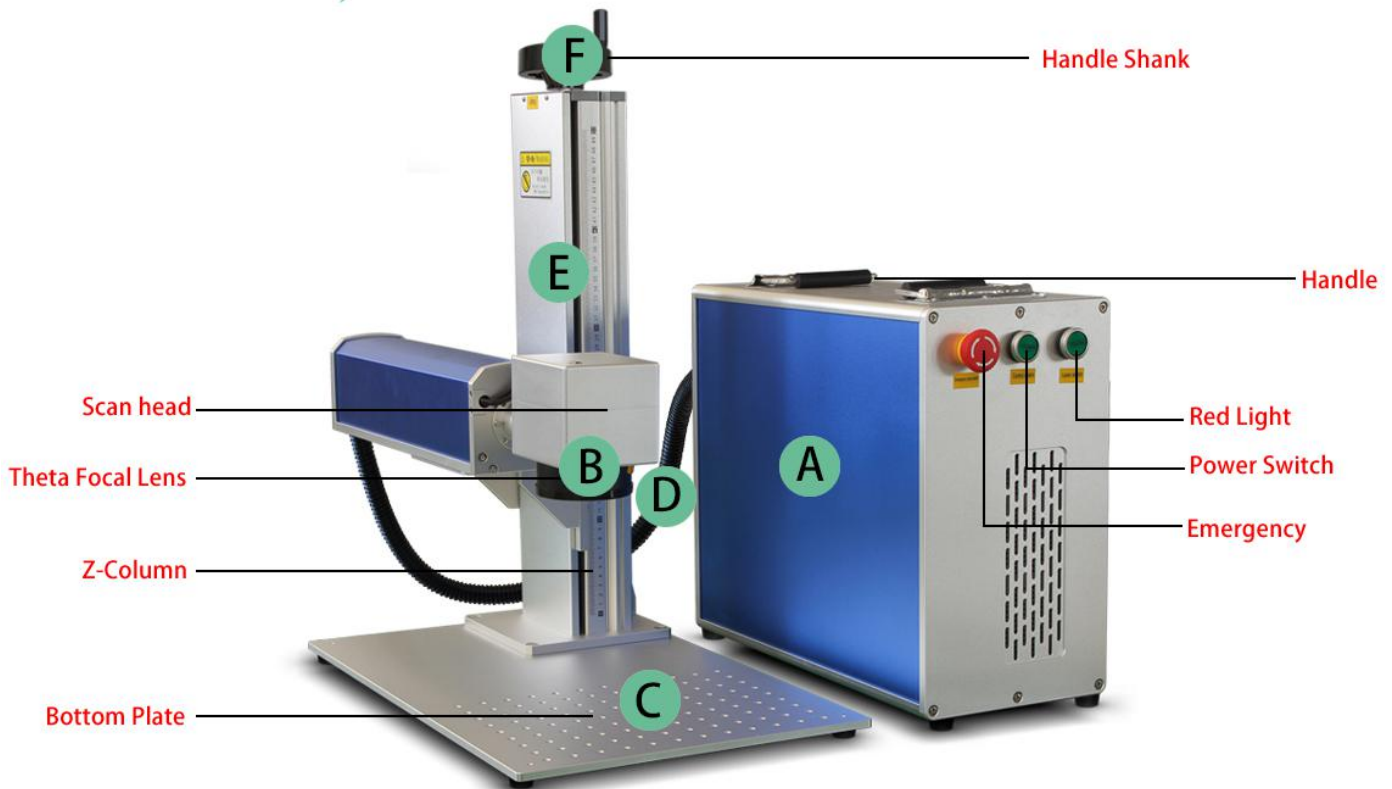
Any distributor/dealer/agent/end-user who works with Hoace Laser must send his technician to our factory for machine training before the machine sales and operation. The training is of great importance for the laser safety.



Remarks: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Do not make any change to laser marking system without written authorization from Hoace laser management approval.

Chapter 3 Machine Introduction



Main Parts

A. Main Tower—This houses the fiber laser source, its mainboard, and various connections.

B. Galvo Lens Head—The high-speed galvanometer scanning head focuses the laser beam to a fine point, directing it to proper locations on the target material during engraving.

C. Worktable—This platform holds the target material, with optional positioning bars to ensure precise alignment.

D. Laser Cable—This transmits the laser beam from its source to the galvanometric lens.

E. Support Column—The support column holds the laser arm and includes a precise graduated rule for quickly adjusting height to work with different materials and thicknesses.

F. Height Adjustment Knob—This wheel moves the laser arm up and down for the correct alignment across different materials and thicknesses.



Main Tower

A. Stepper Motor—This motor helps control attached rotary axes.

B. Mainboard—This circuit board works with your software to control the laser.

C. Mainboard Power Supply—This device draws 0.5A to convert standard electricity to 5V 3A power for the mainboard.

D. Laser Power Supply—This device draws 6.8A to convert standard electricity to 24V 14.6A power for the fiber laser source.

E. Galvanometer Power Supply—This device draws 2.5A to convert standard electricity to 15V 2A power for the scanning lens.

F. Fiber Laser Source (Inside Casing)—This component creates the laser beam and transfers it to the fiber optic pathway to the scanning lens.

Connection Inputs

- A. Laser Cable—This transmits the laser beam from its source to the galvanometric lens.
- B. USB Cord Input—This port connects the device to your control computer.
- C. Microcomputer Adapter—This port enables the connection of an optional.
- D. Foot Pedal Cord Input—This port enables optional pedal control of laser activation to free your hands for manual adjustment of the target material.
- E. Rotary Axis Cord Input—This port enables use of a rotary axis engraver with a 4-pin connection cable. (Compatible rotary axis devices are sold separately.)
- F. Power Cord Input—This 3-pin port connects to the device's standard 3-prong power cord



Power Controls

- A. Total Power—Activates the mainboard inside the main tower. Insert your key and turn this first during startup and last during shutdown.
- B. Scan Head—Activates the galvanometer on the laser arm. Press this second during startup and shutdown.
- C. Fiber Laser—Activates the fiber laser source. Press this last during startup and first during shutdown

Chapter 4 Machine Installation

4.1 Unpacking

- 1) Make sure the machine packaging is good in condition.
- 2) Remove the packing material around the machine.
- 3) Check shipping list carefully, report the shipper any unmatched projects as per PI/contract.

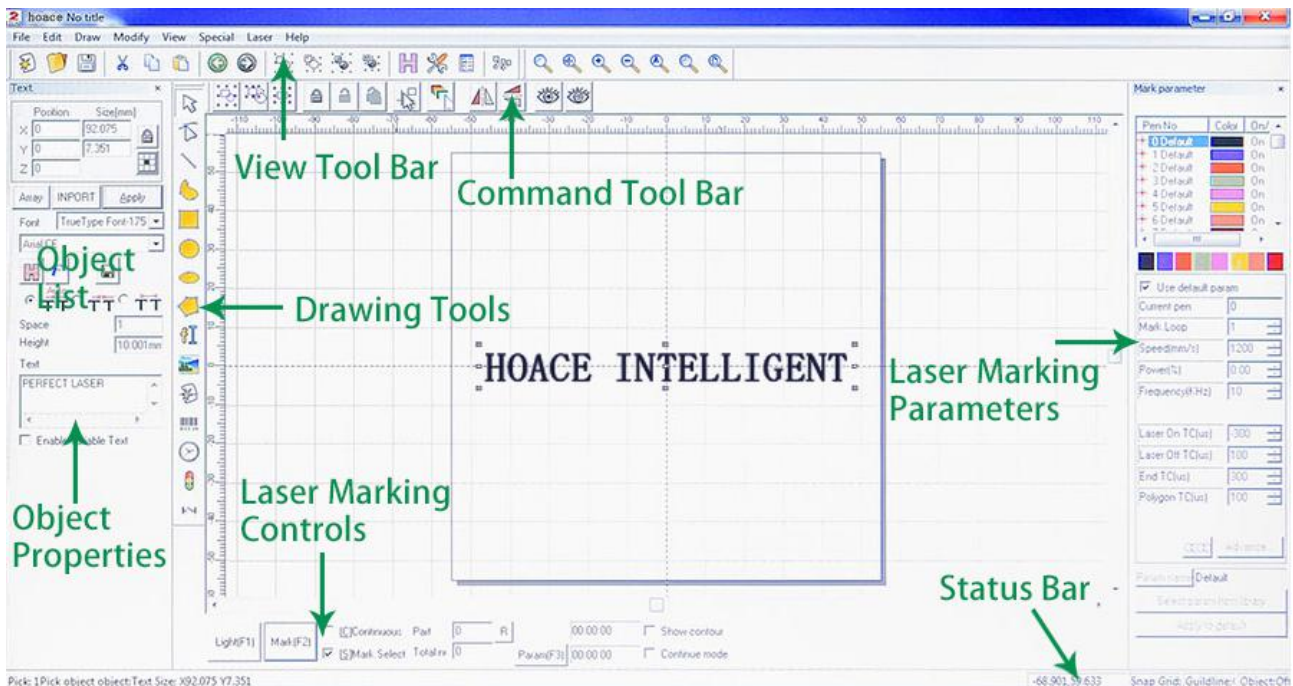
4.2 Space and environment

- 1) The system should be installed at the place without dust, strong electrical magnetic field, oil and smoke.
- 2) It is forbidden to expose the machine in the acid steam or other caustic gas.
- 3) To avoid vibrating and shocking, the floor should be flat and hard.
- 4) Earth Wiring is necessary (Make sure your wall socket has earth wiring).

4.3 Air-cooling system

Fiber laser adopts air-cooling system built-in, just keep the temperature between 0°C and 45°C.

Chapter 5 Software Installation



Control Computer

This fiber laser marker is controlled by the included EZCad software, which must be installed on a compatible computer to direct the laser. See its separate manual for full details on its components and use. Some features which are particularly important to note include the following parameters and controls:



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- **Loop Count**—Specifies how many times the laser beam will repeat its path, creating greater contrast in the marked image.
- **Speed**—Specifies the speed of the beam in millimeters per second, with greater speed creating less contrast in the marked image.
- **Power**—Specifies the % of the machine's rated power that will be used, with greater power creating greater contrast. Note again that running the machine at greater than 80% power will shorten its service life and 10–75% is recommended for most applications.
- **Frequency**—Specifies the laser's frequency in kilohertz (kHz), with higher frequency producing a denser laser mark and darker engraving.
- **Red (F1)**—Tells the laser guidance to illuminate the current laser path.
- **Mark (F2)**—Fires the laser beam for testing and focus improvement.

5. 1 Find one laptop or PC for the Portable laser marking machine



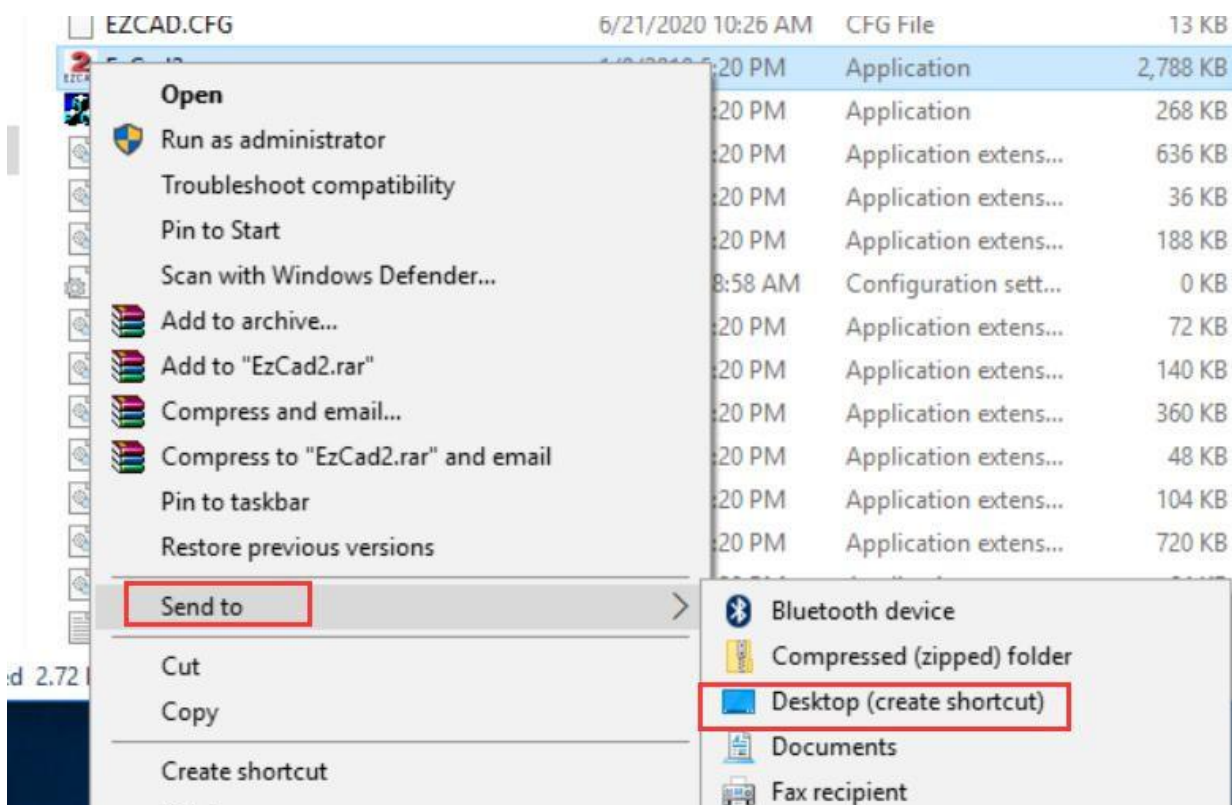
5.2 Find the CD Disk or USB in the tool box with machine

- Driver
- Ezcad2.14.10
- Marking files
- Parameter Settings

5.3 Copy the software to your laptop or PC

5.4 Do the software installation

FIRST STEP: Open the folder “EzC2.14.10”, find the icon “ EzCad2 ”, then send the shortcut to desktop of computer, as shown in the figure.



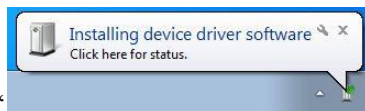
You can see the icon of “EzCad” is on the desktop of your computer



SECOND STEP: Find the electric power for the machine, the input should be AC220V/50HZ/1PH or 110V/60HZ/1PH (that depends on your local electric power supply), **NO 380V!**

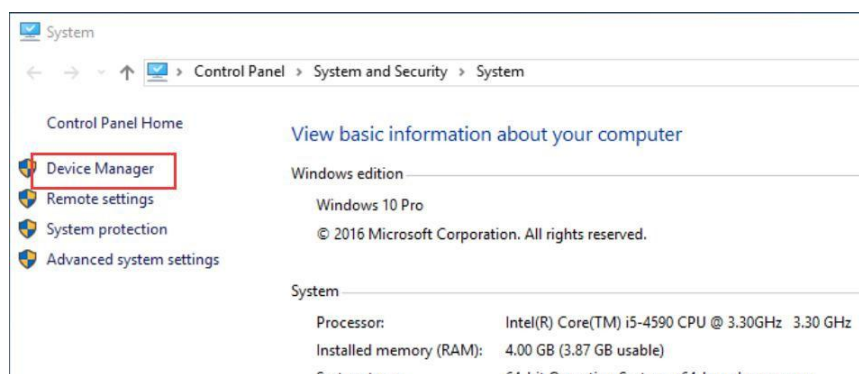
THIRD STEP: Power on the machine

FORTH STEP: Connect the machine with laptop or PC via USB cable, then the computer will show

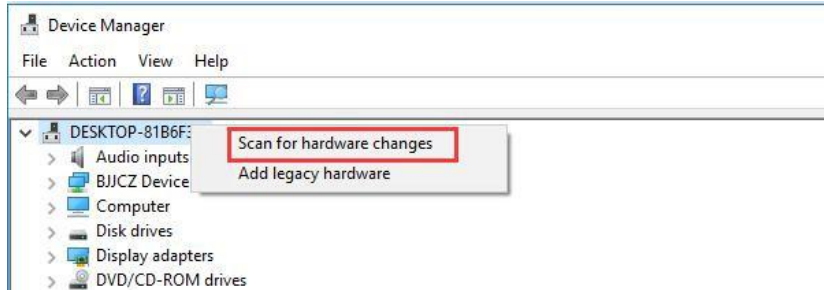


“?”. Usually, you need to install the driver manually at the first time (If the driver can not be installed well automatically).

FIFTH STEP: Find “My Computer”, right-click to choose “Properties” and “Device Manager”, as shown in the figure.



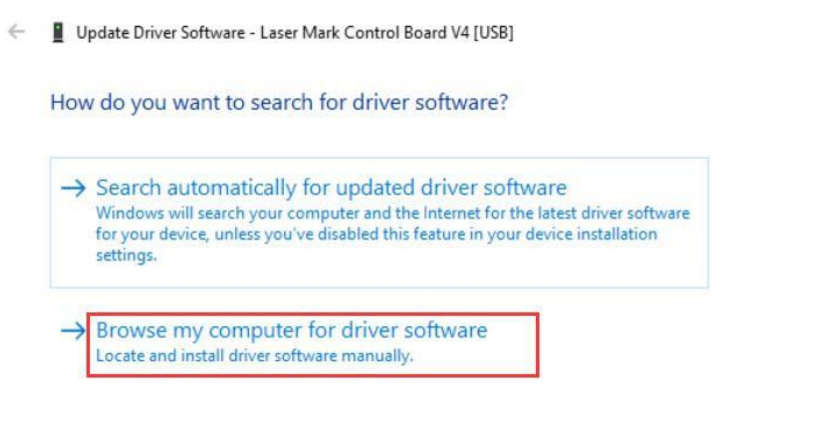
SIXTH STEP: Click “Device Manager”, then right-click to choose “Scan for hardware changes”, you will see “USBLMCV2”, right-click to choose “Update Driver



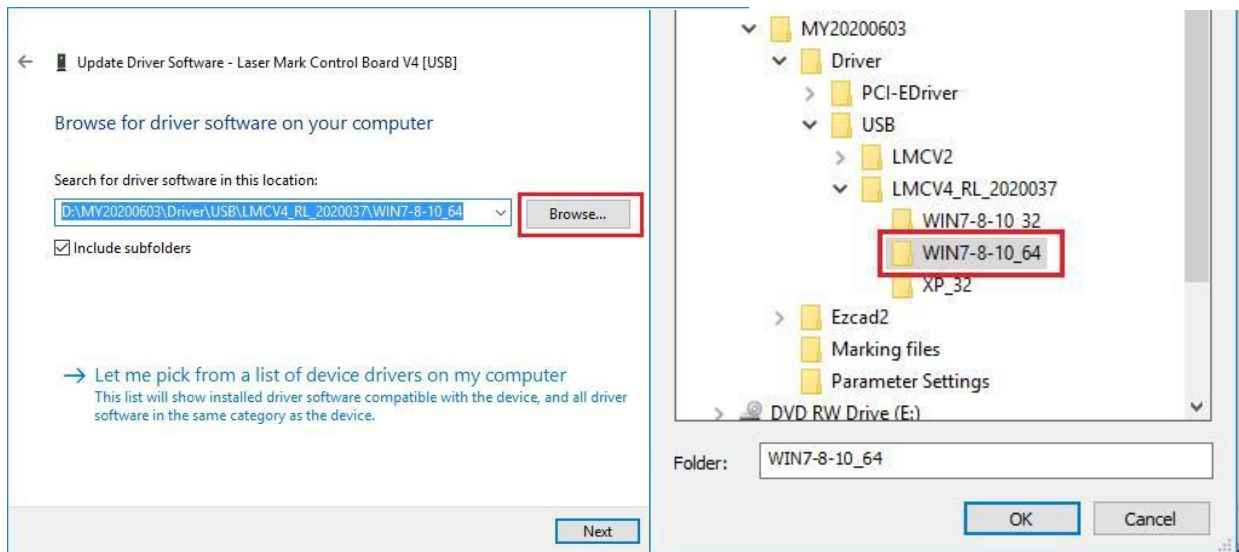
Software USBLMCV2”, as shown in the figure.



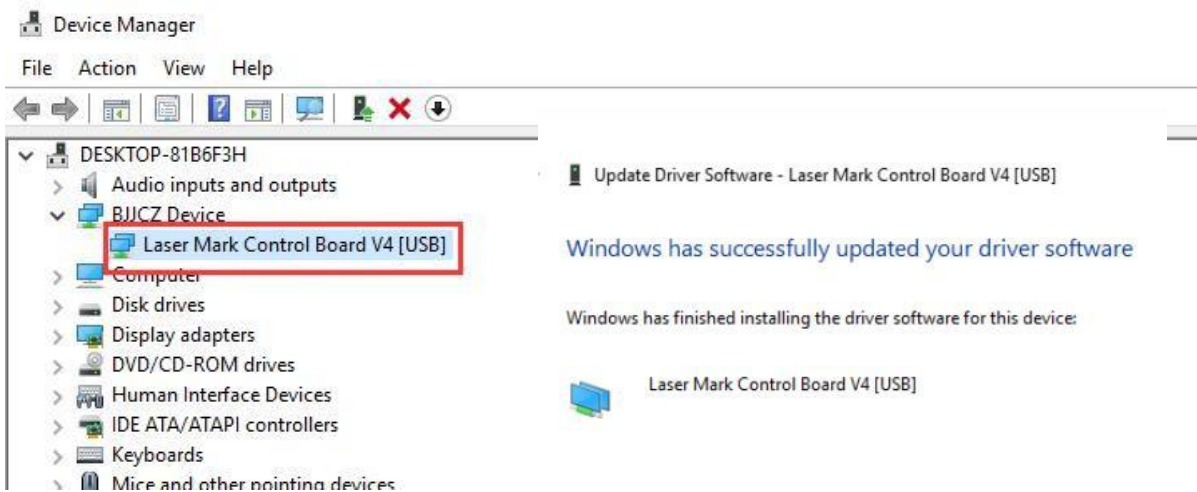
SEVENTH STEP: Choose the path of Driver (remember where you put the driver), as shown in the figure




EIGHTH STEP: Check the OS of your laptop or PC, then choose the right driver. There are two drivers for the software, one is for **Windows 7 / 8 / 10 with 64 bits**, the other one is for **Windows XP / 7 / 8 / 10 with 32 bits**. For example, our computer has Windows 8/64bits, then we choose the driver **“WIN7-8-10_64”** to install, as shown in the figure

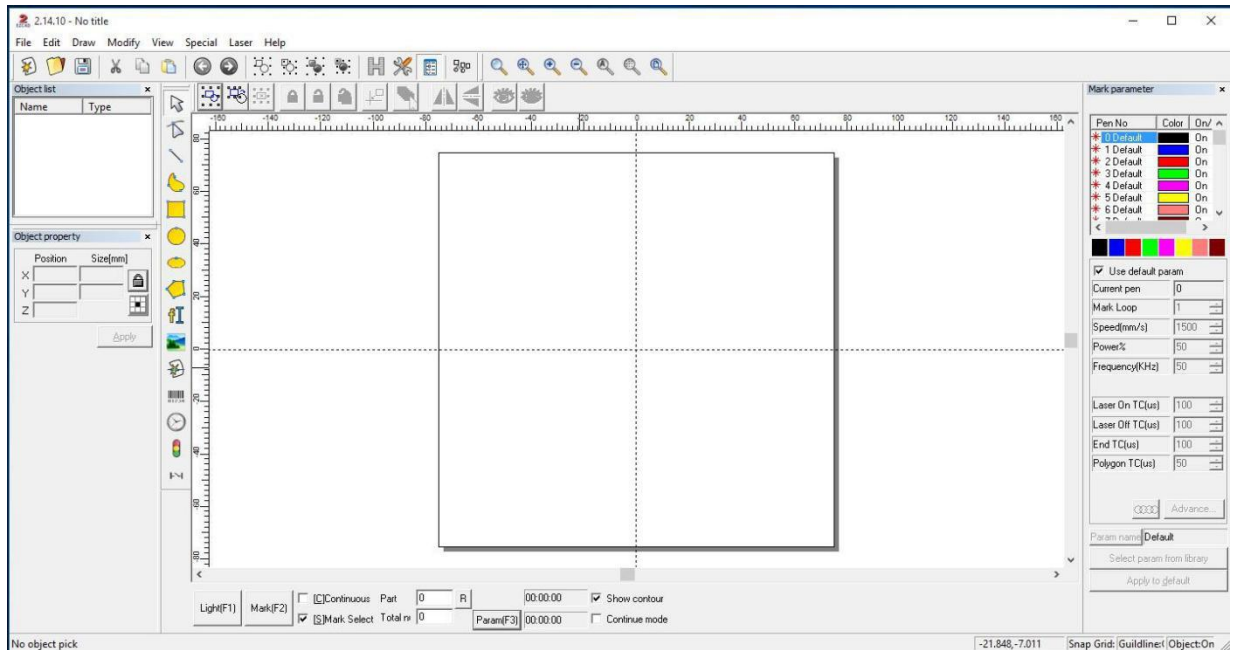


NINTH STEP: After finishing the driver installation, you will see “Laser Mark Control Board V4 [USB]” on “Device Manager”, as shown in the figure.



Now you see the driver “**Laser Mark Control Board V4 [USB]**” was installed successfully.

TENTH STEP: Click the icon  to run the software “EzCad”, as shown in the figure

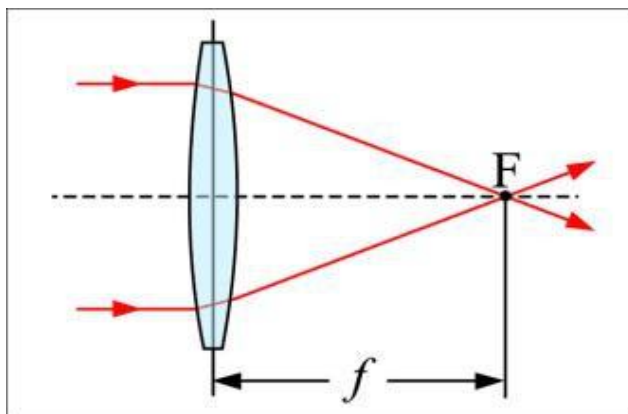


Chapter 6 Find the correct Focal Length

FIRST STEP: To know what the focal length is

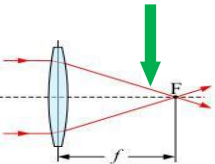

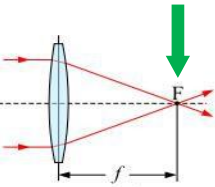

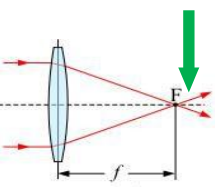

Definition: The focal length of an optical system is a measure of how strongly the system converges or diverges light. For an optical system in air, it is the distance over which initially collimated (parallel) rays are brought to a focus. A system with a shorter focal length has greater optical power than one with a long focal length; that is, it bends the rays more sharply, bringing them to a focus in a shorter distance.

Check by visiting: https://en.wikipedia.org/wiki/Focal_length



Briefly speaking, the further distance the marking object from the FL we choose, the weaker laser we get.

SECOND STEP: What difference on the marking object if we choose different focal length

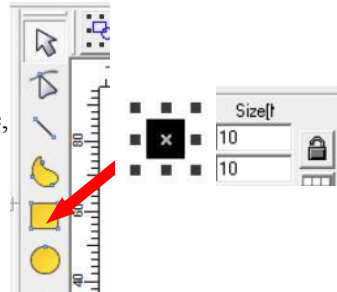
		<p>Less than the correct FL</p>
		<p>Correct FL</p>
		<p>More than correct FL</p>

After checking the above pictures, we will see: when we use the wrong FL for marking object, then we can not get the strongest laser power.

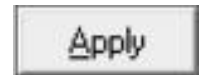
THIRD STEP: To know how to measure the focal length

- 1) Run the software

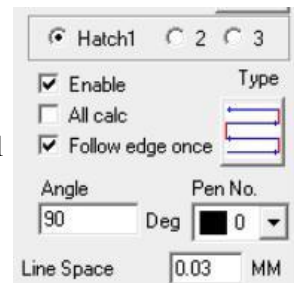
- 2) Draw a box - 10*10mm size,



then click "Apply"



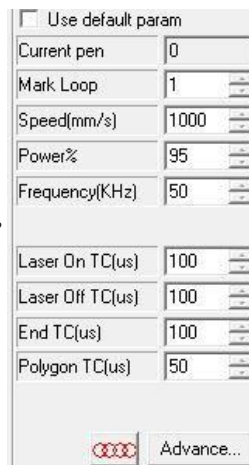
- 3) Set "Hatch" - Angle 90 - Line Space 0.03mm - Hatch 1



then click



- 4) Set "Speed", "Power", "Frequency",



then click



- 5) Press F1  on keyboard or click  to preview the position, then put the marking object to the correct position.

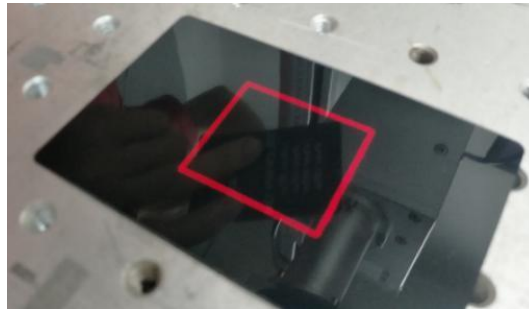



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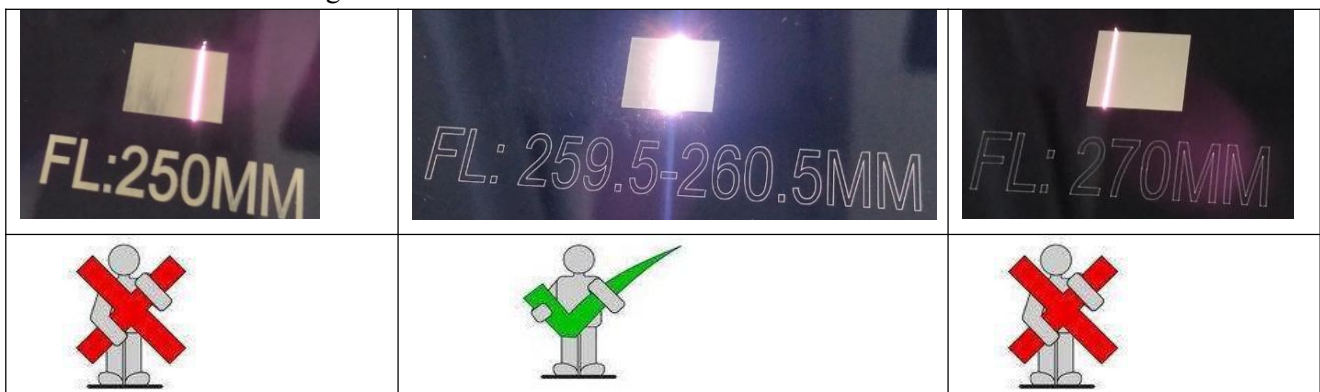
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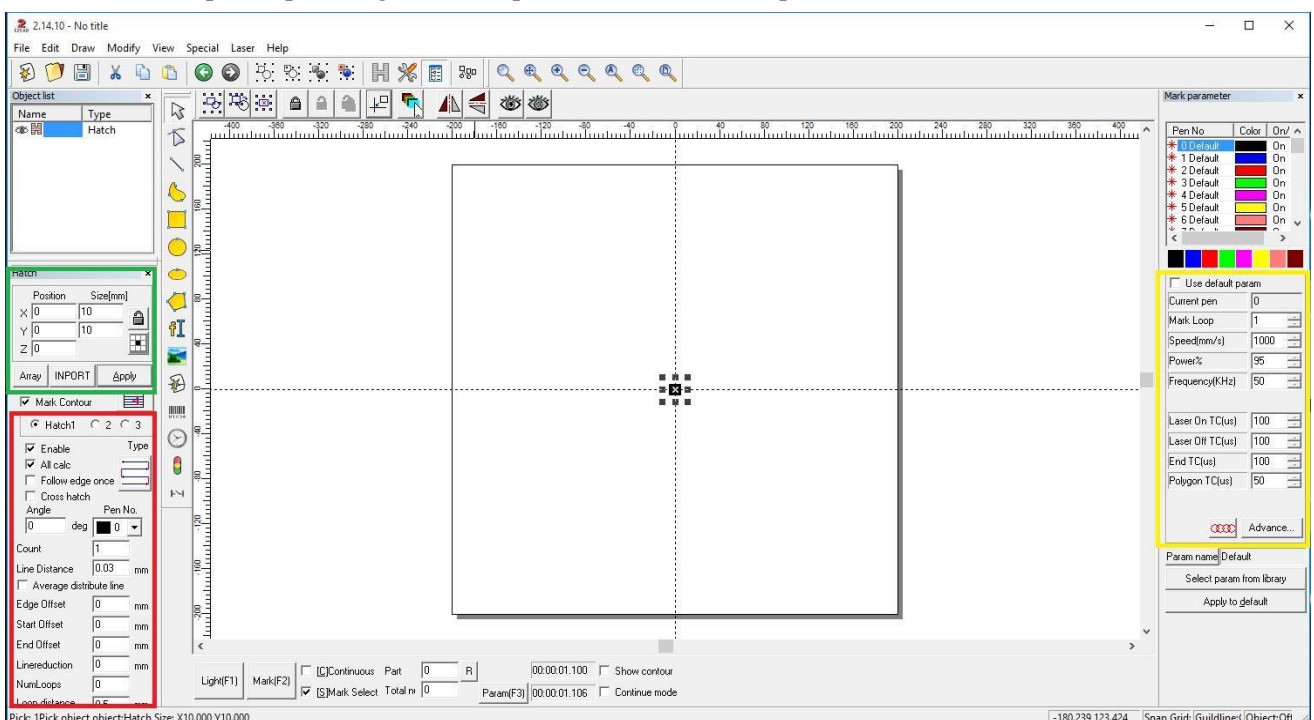
Select “Mark Selec” and “Continuous”, then Press F2  on keyboard or click



7) Raise or fall the Z axis manually, try to find the strongest laser firing. When you found the strongest laser, then you find the Focal Length. We will give the value for the FL to clients after testing the machine.

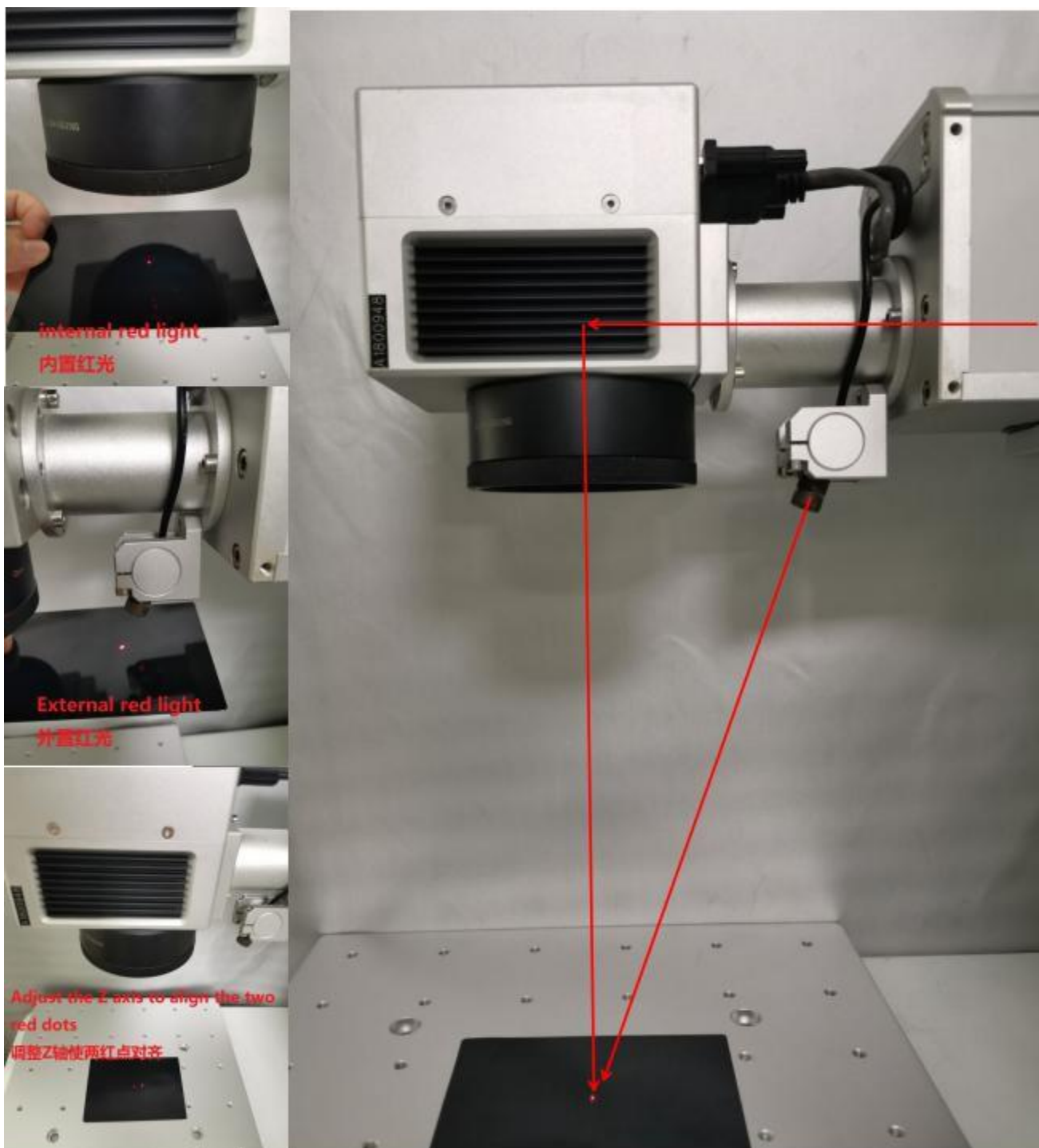


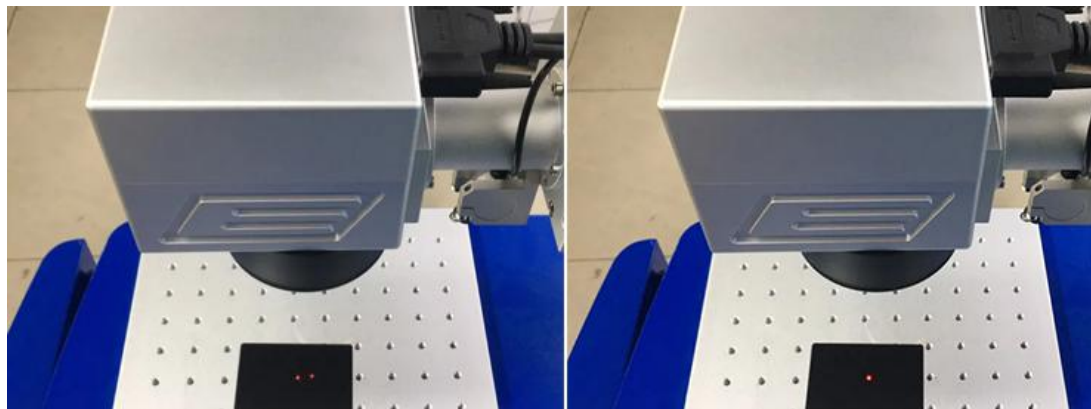
In order to help the operator get more experience, we have one picture for reference.



Another way to find the correct Focal Length

In order to find the right focal length on our machine easily, we add two red light pointers in our machine. One was installed inside the machine, and the other one is outside the machine. You can raise or fall the Z axis of the machine in order to let the two red light pointers meet together, then you find the right FL, as shown in the figure.





Chapter 7 Basic Operation

Turn ON

1. Connect the main power.
2. Turn on the laser power with the key.
3. Press the button named “Scan Head” to turn on the power of scanner.
4. Press the button named “Red Light Pointer” to turn on the Red Dot Pointer.
5. Power on your PC or laptop.
6. Connect the machine with software via USB cable.
7. Run software “EzCad”.
8. Load the material and put it in right position under the lens.
9. Close the door and adjust the right Focal Length by pulling the Z axis up and down.
10. Make or load a file which you want to mark in the software.
11. Set the marking parameter for the marking jobs.
12. Prepare to mark.

Turn OFF

1. Save files (Or you do not need to save any files).
2. Close the software.
3. Shut down your PC or laptop.
4. Power off the laser source by key, scanner and red light pointer by pressing the buttons.
5. Disconnect the main power.
6. Cover the lens with lens cover.



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Chapter 8 Regular Marking Effect Guide

In order to help new customers get the regular marking effect quickly, Hoace has some parameter settings for reference.

1. Raw Aluminum + White Marking Effect

Hatch 1:	0.04-0.06
Speed:	1000-1300
Power:	70-90
Frequency:	35-45

2. Anodized Aluminum + Black Marking Effect

There is not parameter settings for reference, because the machine can not do such marking effect at all.

3. Stainless Steel + White Marking Effect

Hatch 1:	0.04-0.06
Speed:	900-1100
Power:	70-80
Frequency:	35-45

4. Stainless Steel + Black Marking Effect + No Depth

Hatch 1:	0.008-0.01
Speed:	100-200
Power:	80-90
Frequency:	20-30

5. Stainless Steel + Black Marking Effect + A little Depth

Hatch 1:	0.01-0.02
Speed:	200-300
Power:	85-95
Frequency:	20-30

6. For other plastic marking + Black/White Marking Effect + No Depth

Hatch 1:	0.05-0.06
Hatch 2:	That depends
Speed:	700-800
Power:	20 ↑
Frequency:	40-50

Tip: The above parameter settings are just for reference, the customer might need fine adjustment.



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Chapter 9 Daily Maintenance

After a few times, you should do some daily maintenance as follows:

- 1) Electrical control system works well - connection checking
- 2) Computer system works well - virus checking
- 3) Marking software works well - parameter settings checking
- 4) Elevating platform does not loose, screw does not loose and drop
- 5) Air cooling system for fiber laser source works well - cooling check
- 6) Do not squeeze fiber, be sure the protecting cover is good
- 7) Keep lens clean
- 8) Keep equipment clean

Actually, you can do the checking once per week, it is not necessary to do the checking job every day.

Contact Us

Thank you for choosing our laser equipment for your home or shop!

For a *.pdf copy of the latest version of this manual, use the appropriate app on your smartphone or other device to scan the QR code to the right.

If you encounter any problem regarding your marking machine, do not hesitate to contact customer service with your order number at help@hoace.com

Our teams will respond within 24 hours to make things right.

You can also reach us Monday to Friday at (86) 531-85899920 between 9 am and 5:00 pm GMT+8.

Thank you and we hope you will choose us again for all your laser needs!

