



Wisely Laser Machinery Limited
No. 7 Building, No. 5 Industry Zone Shutianpu, Matian, Guangming District, Shenzhen 518106 China
Tel: 0086-755 32998419 Fax: 0086-755 32998439 E-mail: sales@wwlaser.hk
www.wwlaser.com www.wwlaser.hk www.wisely-laser.com



User Manual

- CO2 Laser Marking Machine III



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Thanks

It is our honor to be one business partner of yours, our aim is to offer high-quality, easy-operation laser marking solution to each customer.

Wisely Laser Machines brings you new concepts of industrial laser marking system - proudly designed and built right here in China.

Before using the machine, we kindly advise you to read the user manual carefully.



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Chapter 1 Brief Introduction and Applications

1.1 Brief introduction of machine

Wisely laser marking adopts world's most advanced technology, it is the third-generation laser marking system. It adopts CO2 metal laser source to achieve marking function by ultra-high-speed scanning system. The CO2 laser marking conversion is efficient, longer lifespan and energy-saving.

It can carve non-metal materials wood, acrylic, glass, leather, MDF, ABS, PVC, PET, paper, marble, stone etc. And painted metals materials, such as gold, silver, copper, brass, aluminum, stainless steel, silicon steel, carbon steel, chrome steel, cast iron, titanium, molybdenum, carbon fiber and so on.

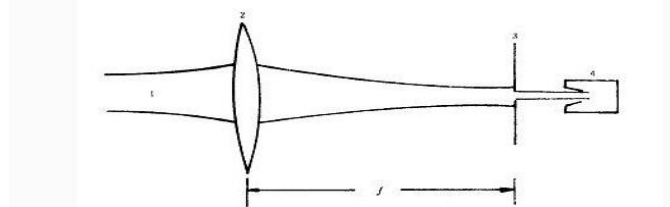
1.2 Typical application range

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

Specification:

Mode	CR70	Pulse Width	<130ns@20kHz
Nominal Output Power	70W	Single Pulse Energy	1.0mj@20kHz
Output Power Tenability	10-100	Delivery Cable Length	2m
Wavelength	10640nm	Power Supply	DC 24V
Repetition Frequency Range	1-20kHz	Max.Power Consumption	200W
Output Power Stability	<3%	Dimensions	260×391×120mm
Beam Quality (after beam expander)	<1.5	Cooling	Forced Air
Polarization State	Random	Operating Temperature Range	0-40°C
NOHD	4500cm	Divergence Angle	0.5mrad

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

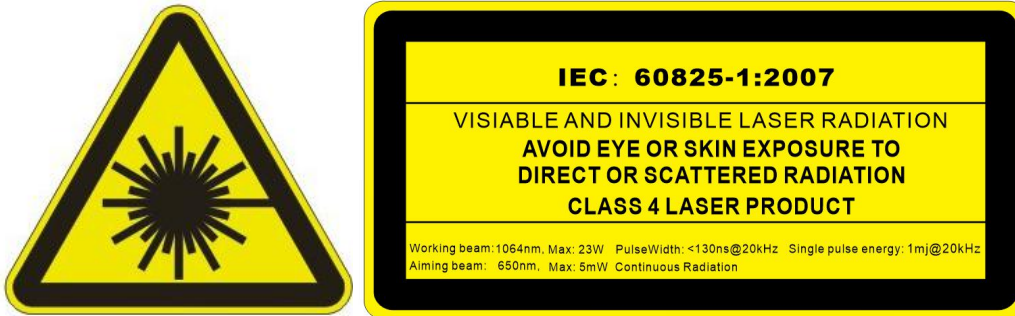


Chapter 2 Safety Instruction

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 Laser Light Pointer (Class 3B)

The 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, this person can help you 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).

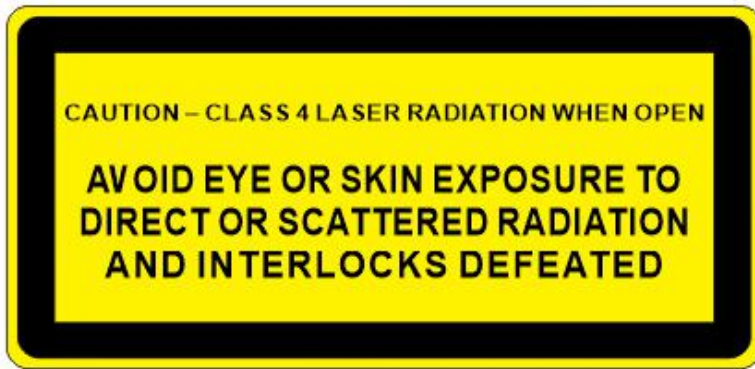
2.3.2 Fire

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!



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.



2.3.5 Training

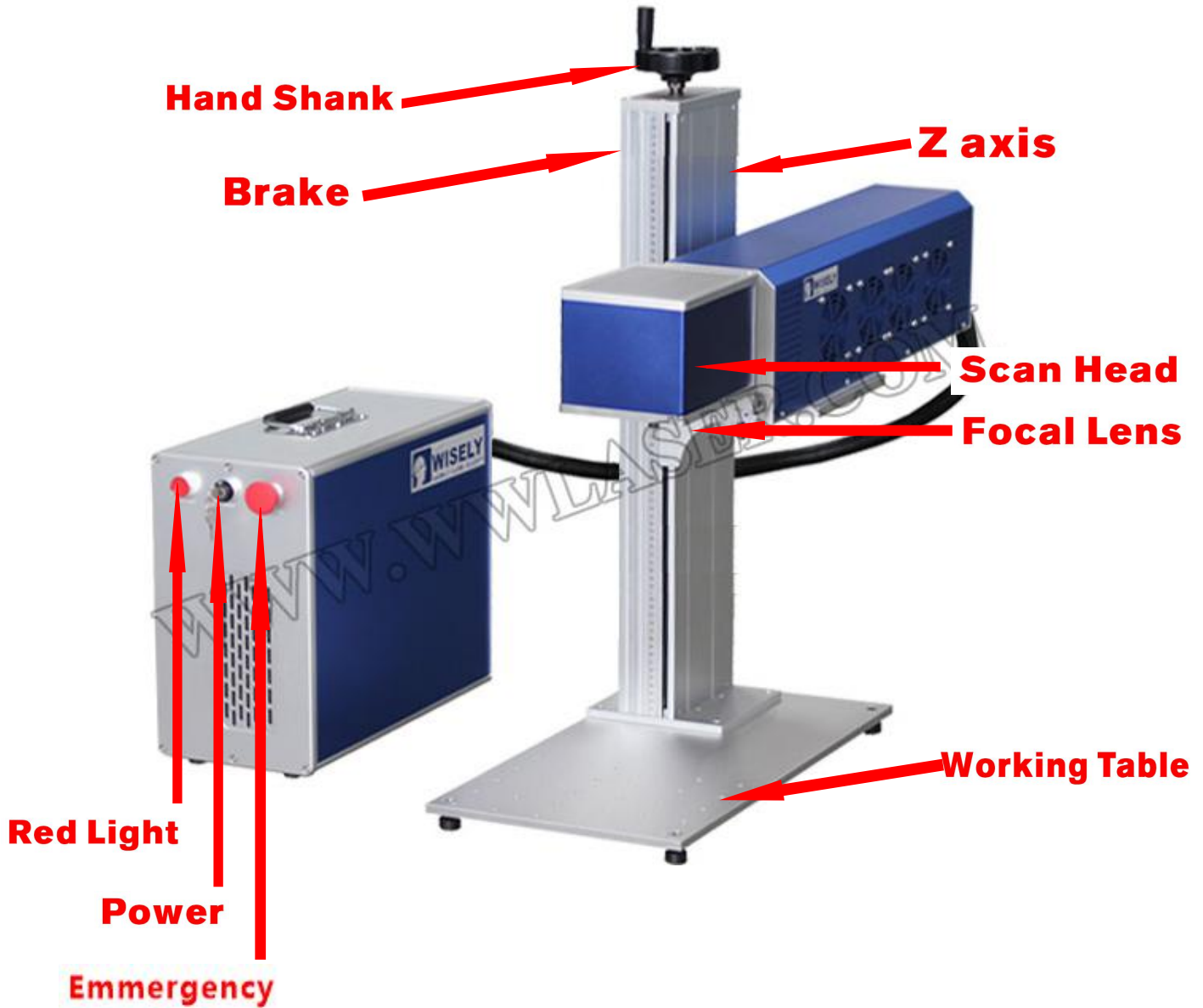
Any distributor/dealer/agent/end-user who works with Wisely Laser must send his technician to our factory for machine training before the machine sales and operation. The training is of great importance for the laser safety.

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 WISELY laser management approval.

Chapter 3 Machine Introduction



Chapter 4 Machine Installation

4.1 Unpacking

- 1) Make sure the goods 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

5.1 Find one laptop or PC for the portable machine




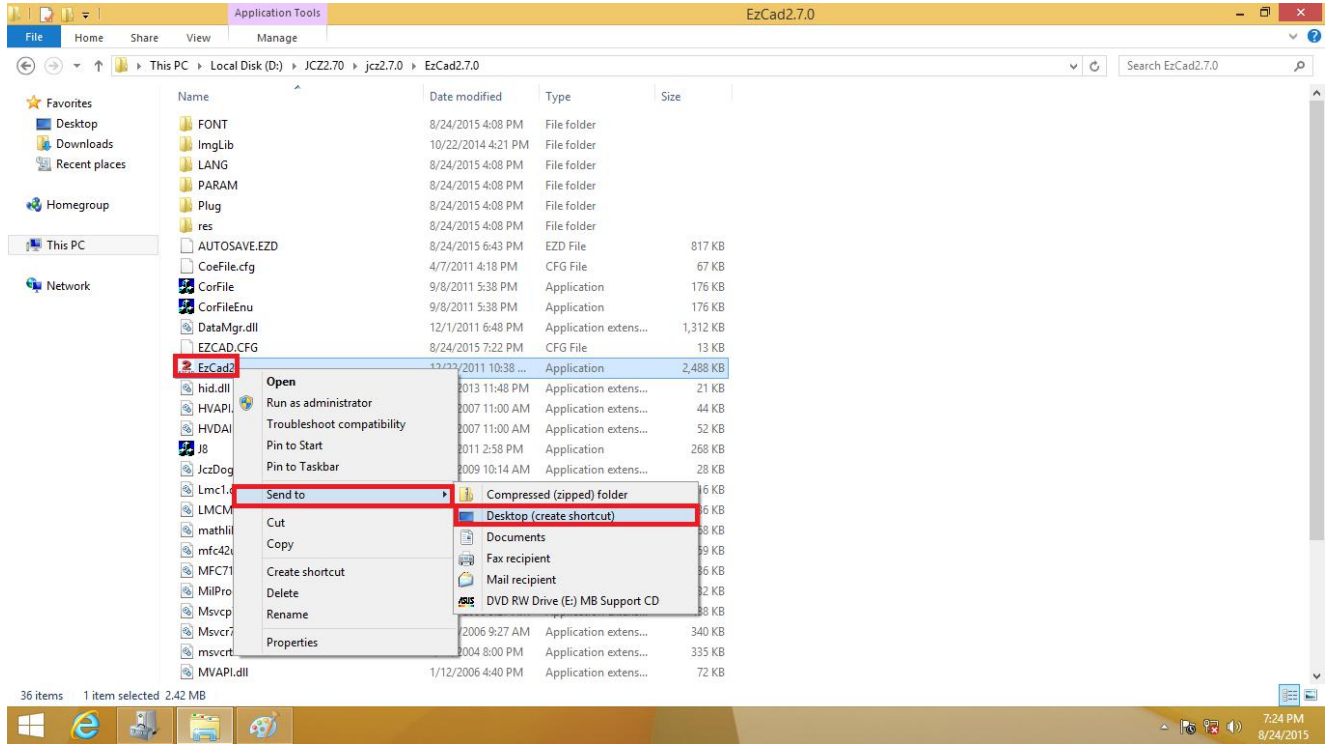
5.2 Find the CD Disk or USB in the tool box with machine

-  Driver
-  EzCad2.7.0
-  Parameter Settings

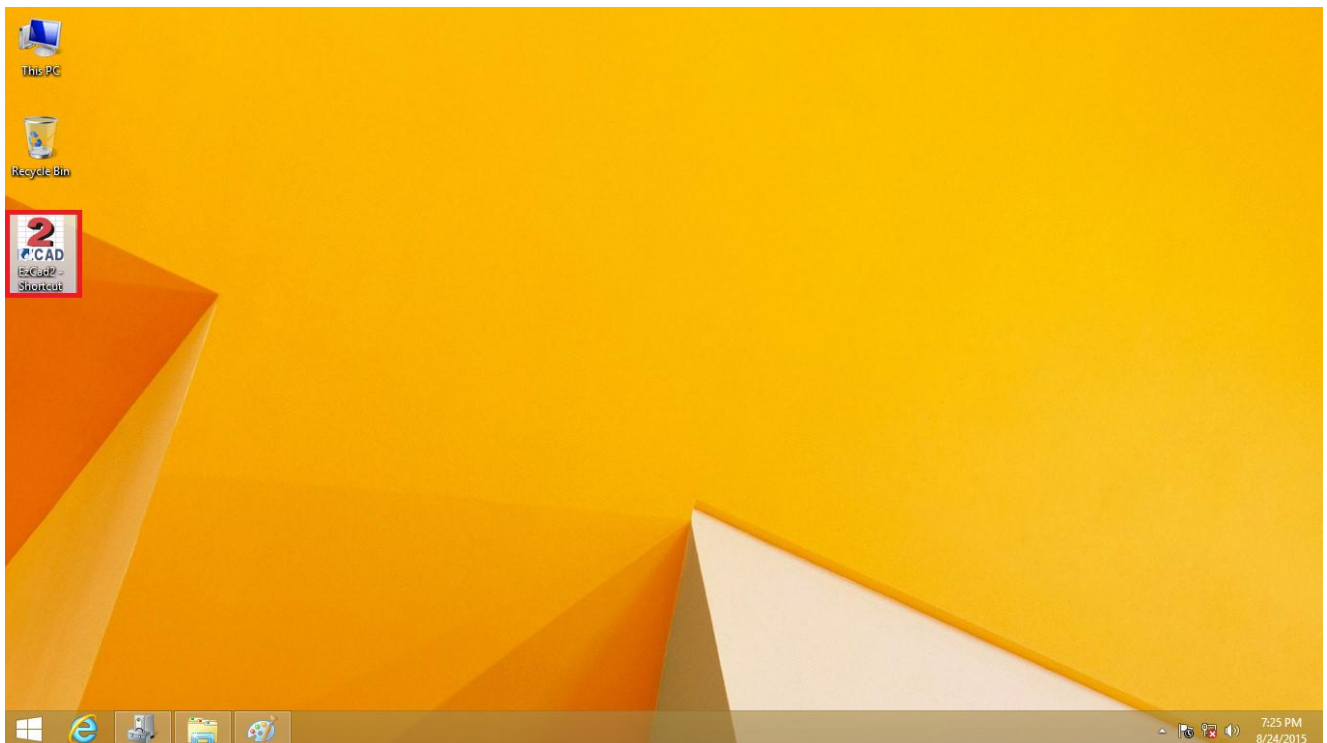
5.3 Copy the software to your laptop or PC

5.4 Do the software installation

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



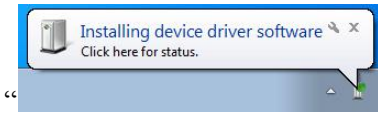
You can see the icon of “EzCad” is on the desktop of your computer



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!

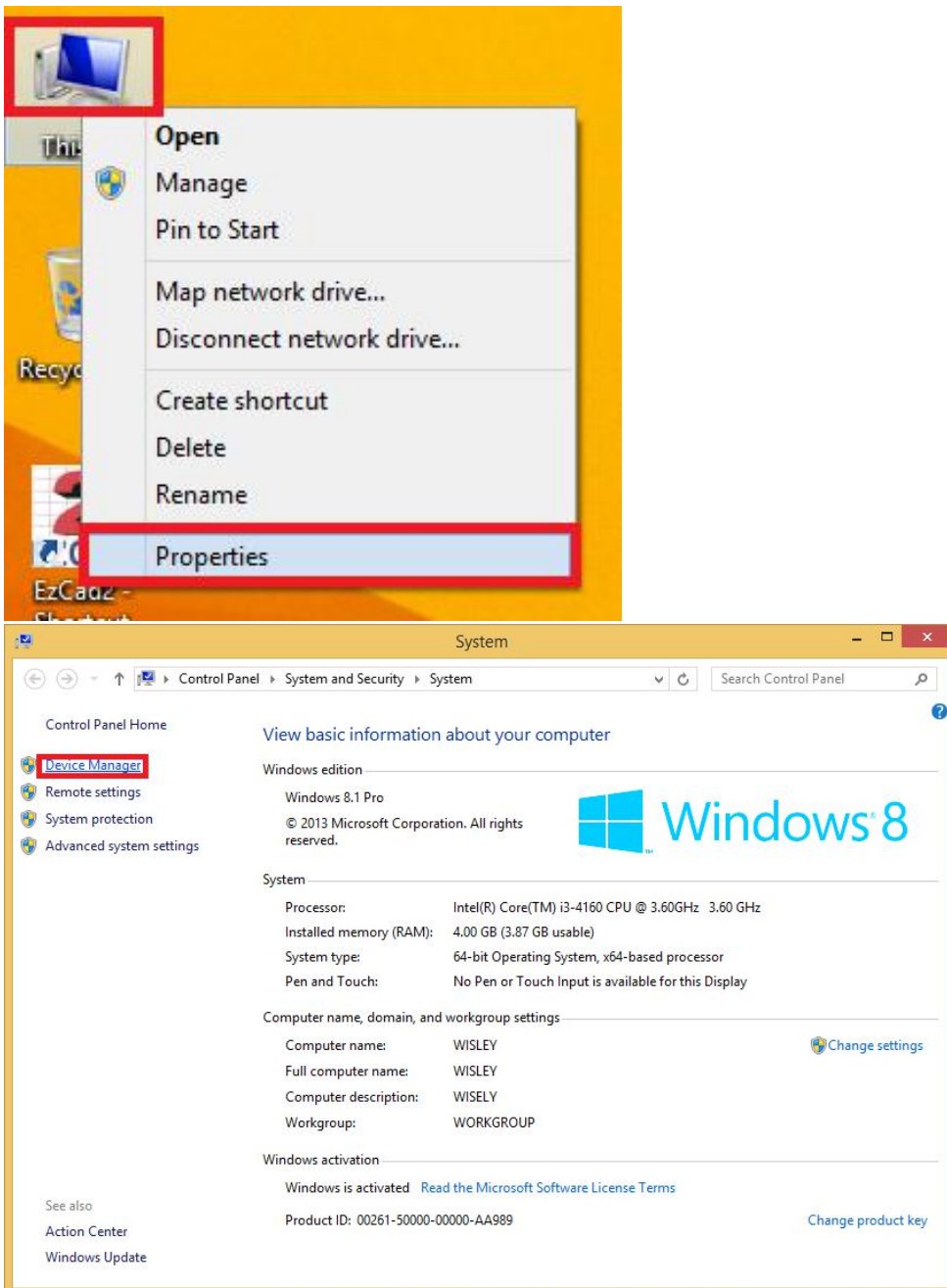
THIRD STEP: Power on the machine

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

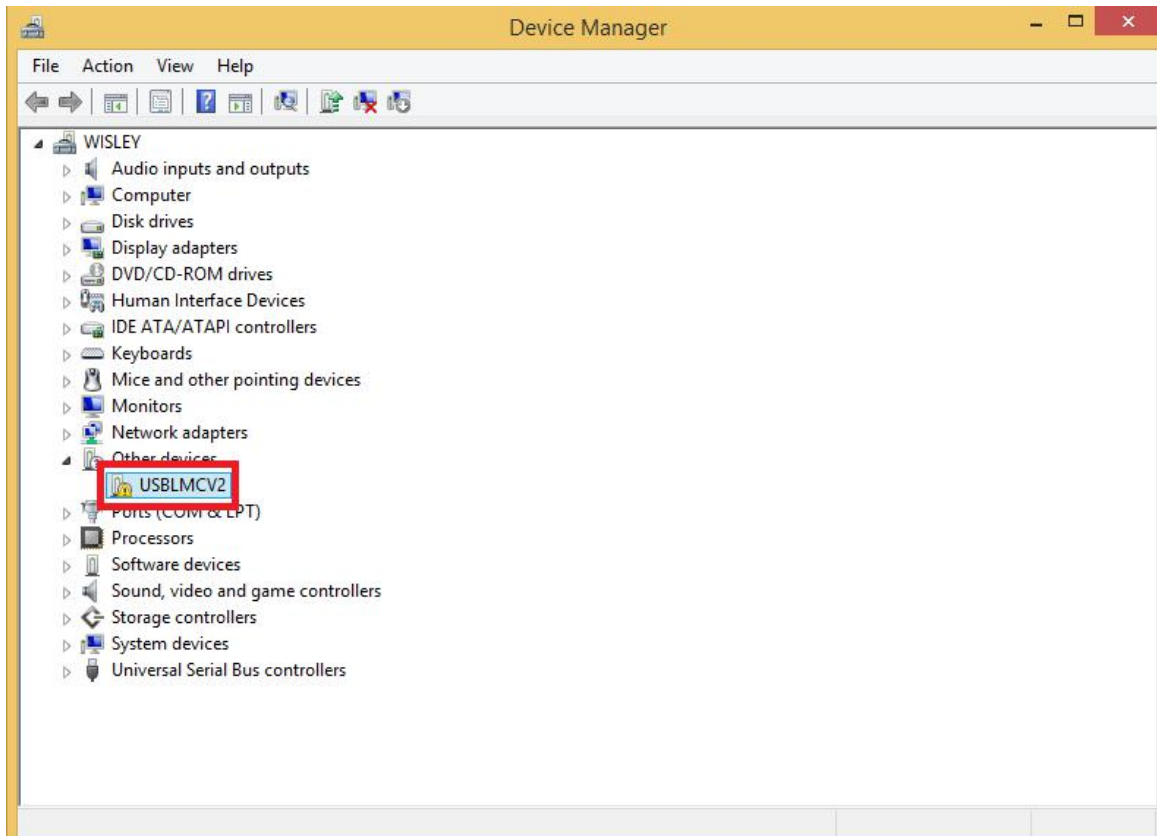
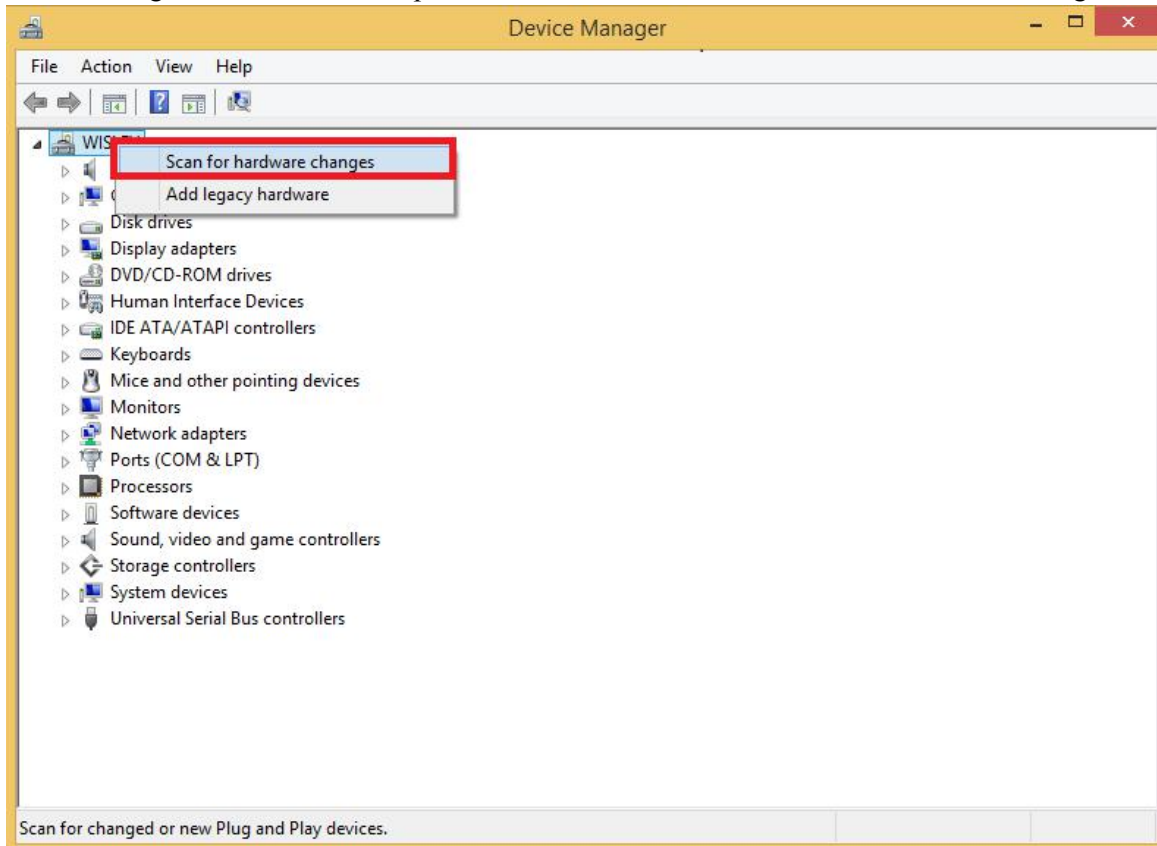


“...”. Usually, you need to install the driver manually at the first time (If the driver can not be installed well automatically).

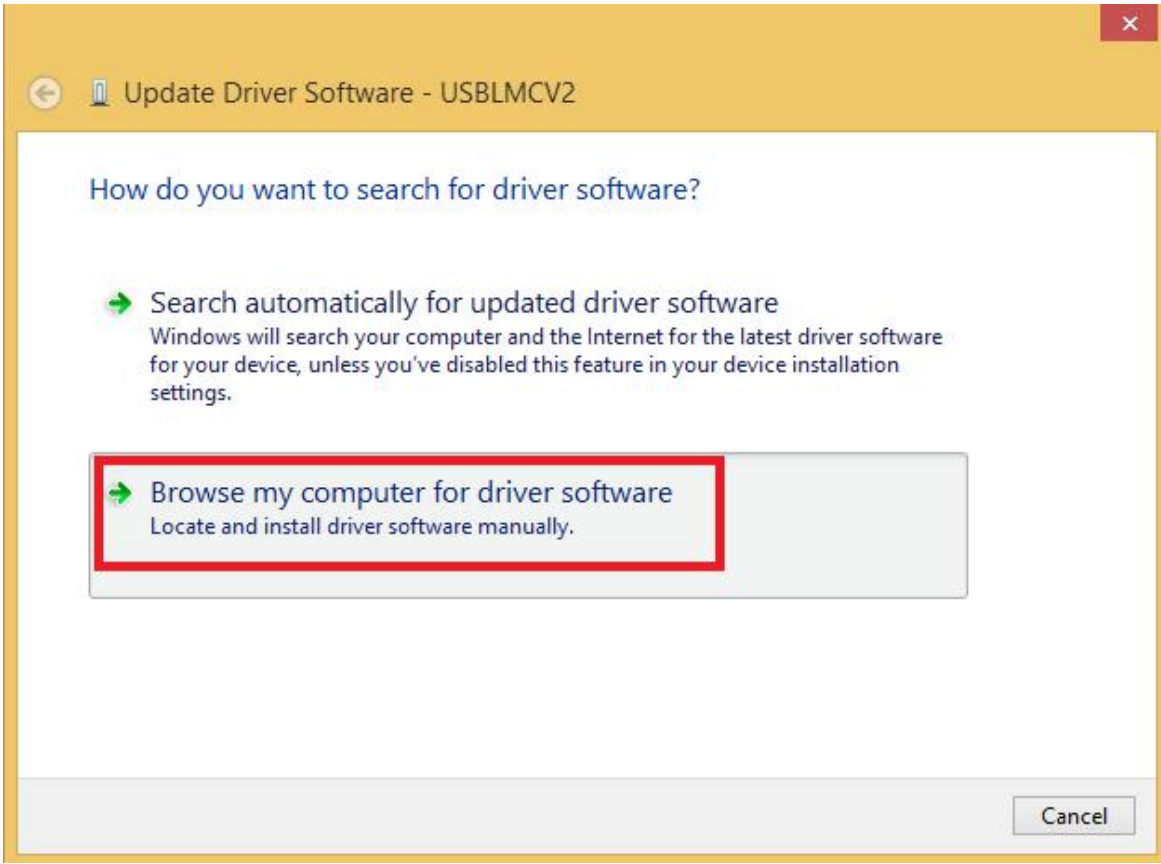
FIFTH STEP: Find “My Computer”, right-click to choose “Properties” and “Device Manager”, as shown in the figure



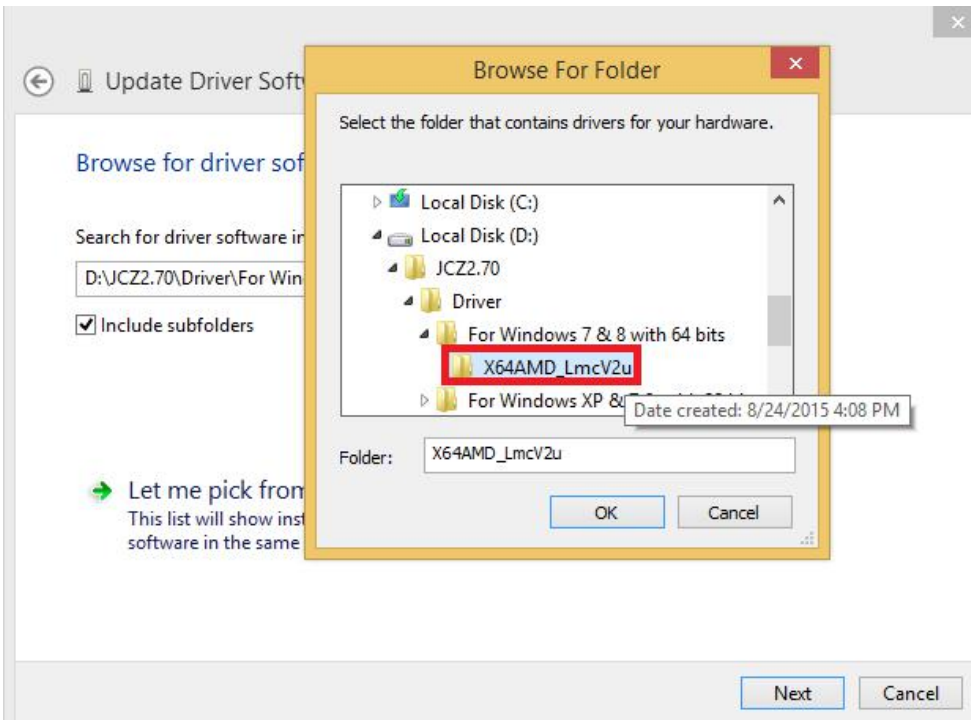
SIXTH STEP: Click “Device Manager”, then right-click to choose “Scan for hardware changes”, you will see “USBLMCV2”, right-click to choose “Update Driver Software USBLMCV2”, as shown in the figure

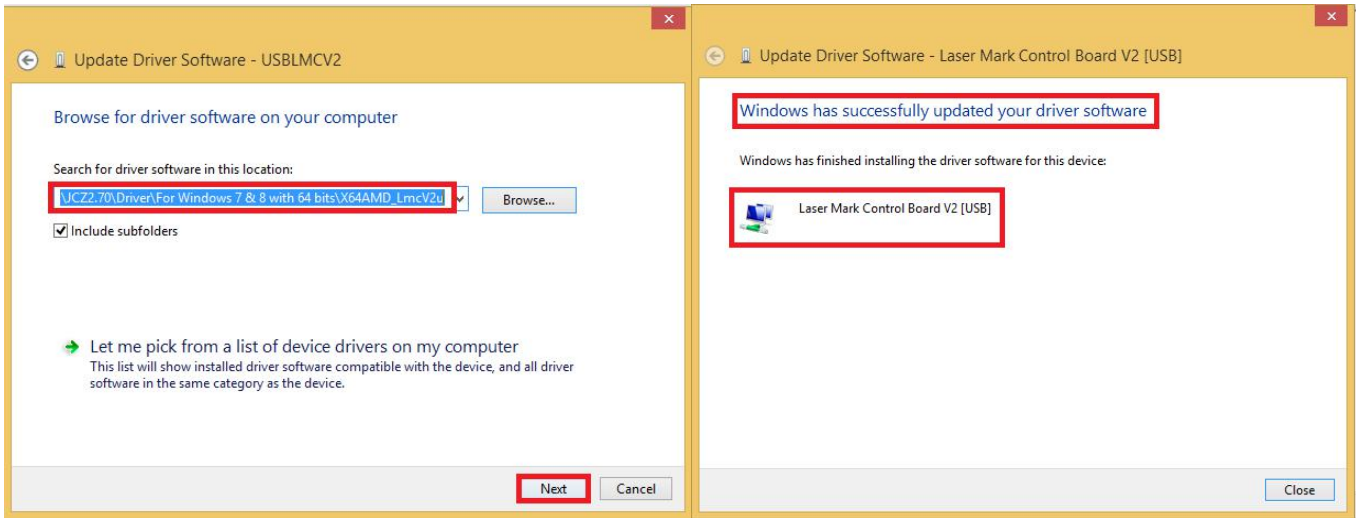


SEVENTH STEP: Choose the path of Driver (remember where you put the driver), as shown in the figure

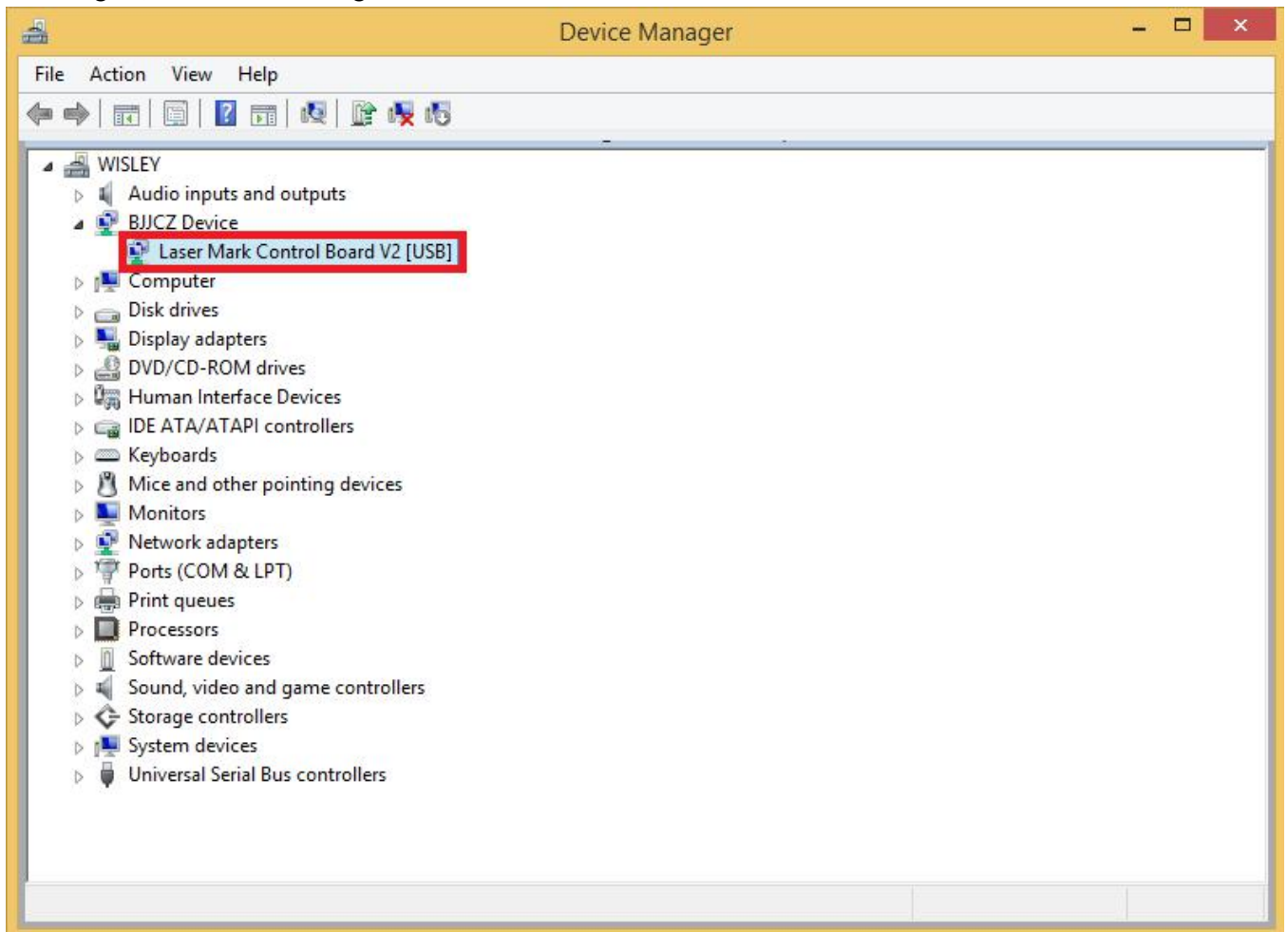


EIGHTH STEP: Check the OS of your laptop or PC, then choose the right driver. There are two drivers for the software, one is for **Windows 7&8 with 64 bits**, the other one is for **Windows XP&7 with 32 bits**. For example, our computer has Windows 8/64bits, then we choose the driver “X64AMD_LmcV2u” to install, as shown in the figure




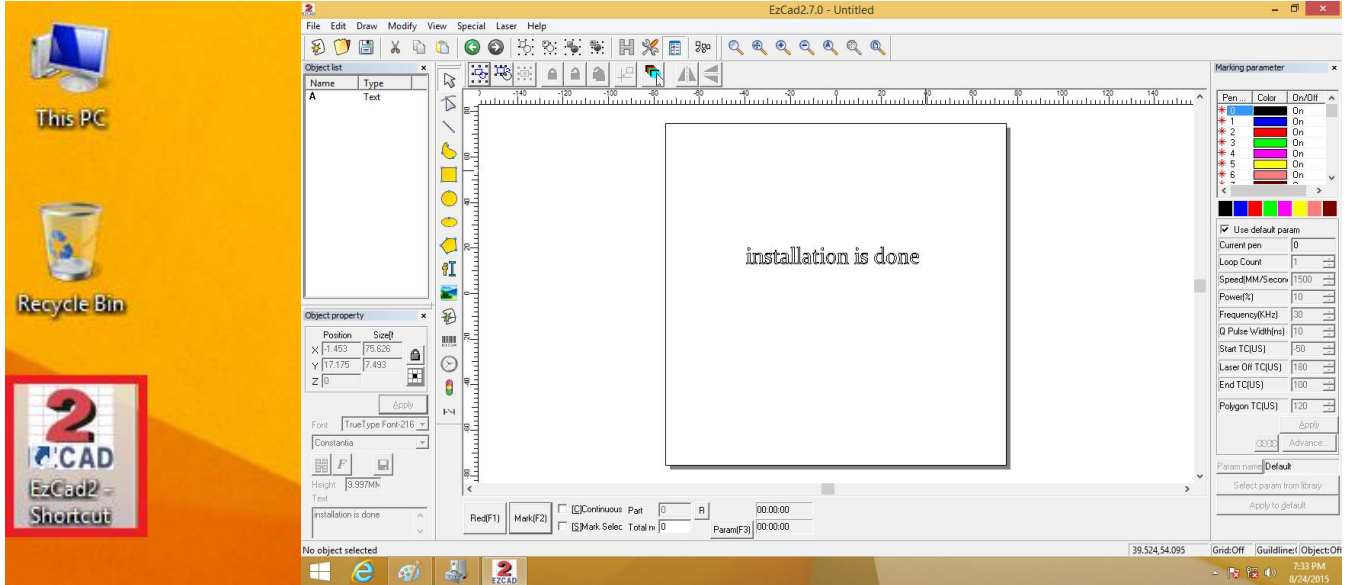


NINTH STEP: After finishing the driver installation, you will see “Laser Mark Control Board V2 [USB]” on “Device Manager”, as shown in the figure.



Now you see the driver “Laser Mark Control Board V2 [USB]” was installed successfully.

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

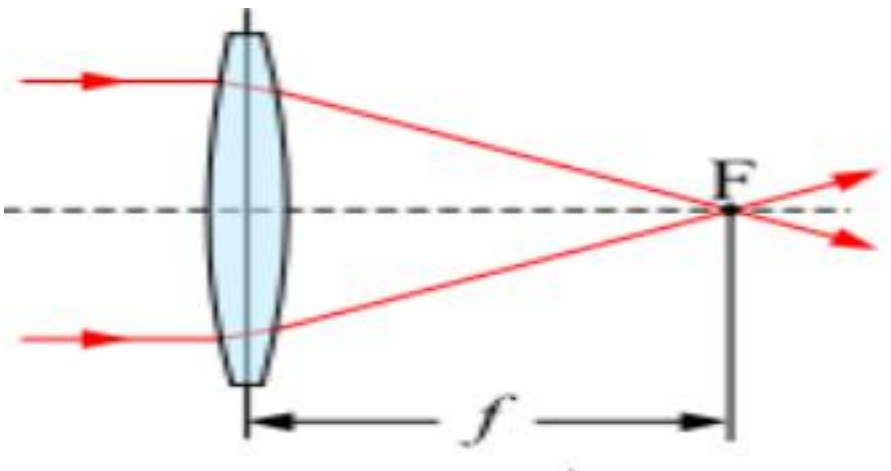


Chapter 6 Find the correct Focal Length

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

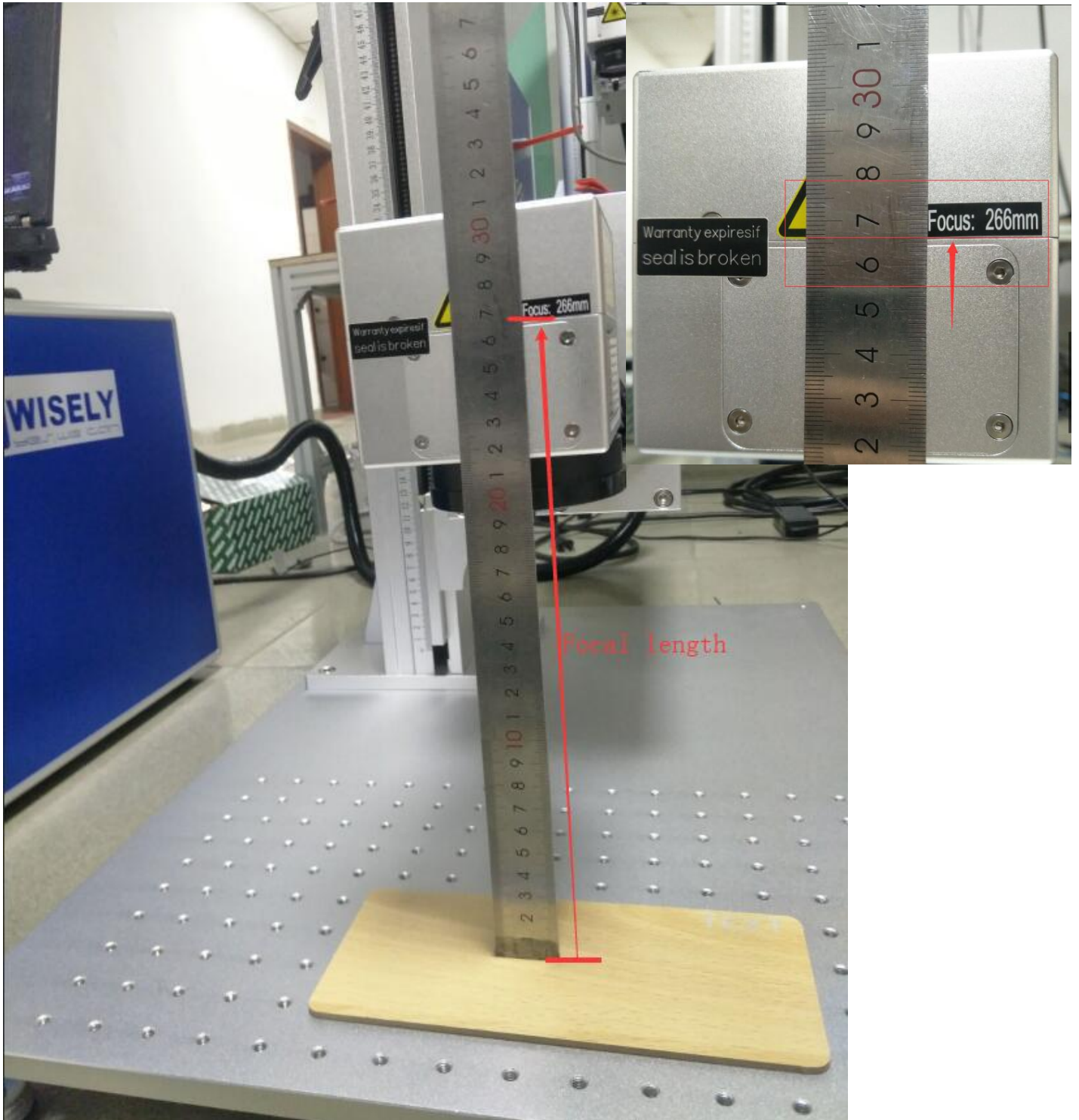


Briefly speaking, the further distance the marking object from the FL we choose, the weaker laser we get.

SECOND STEP: (1. Ruler measure)

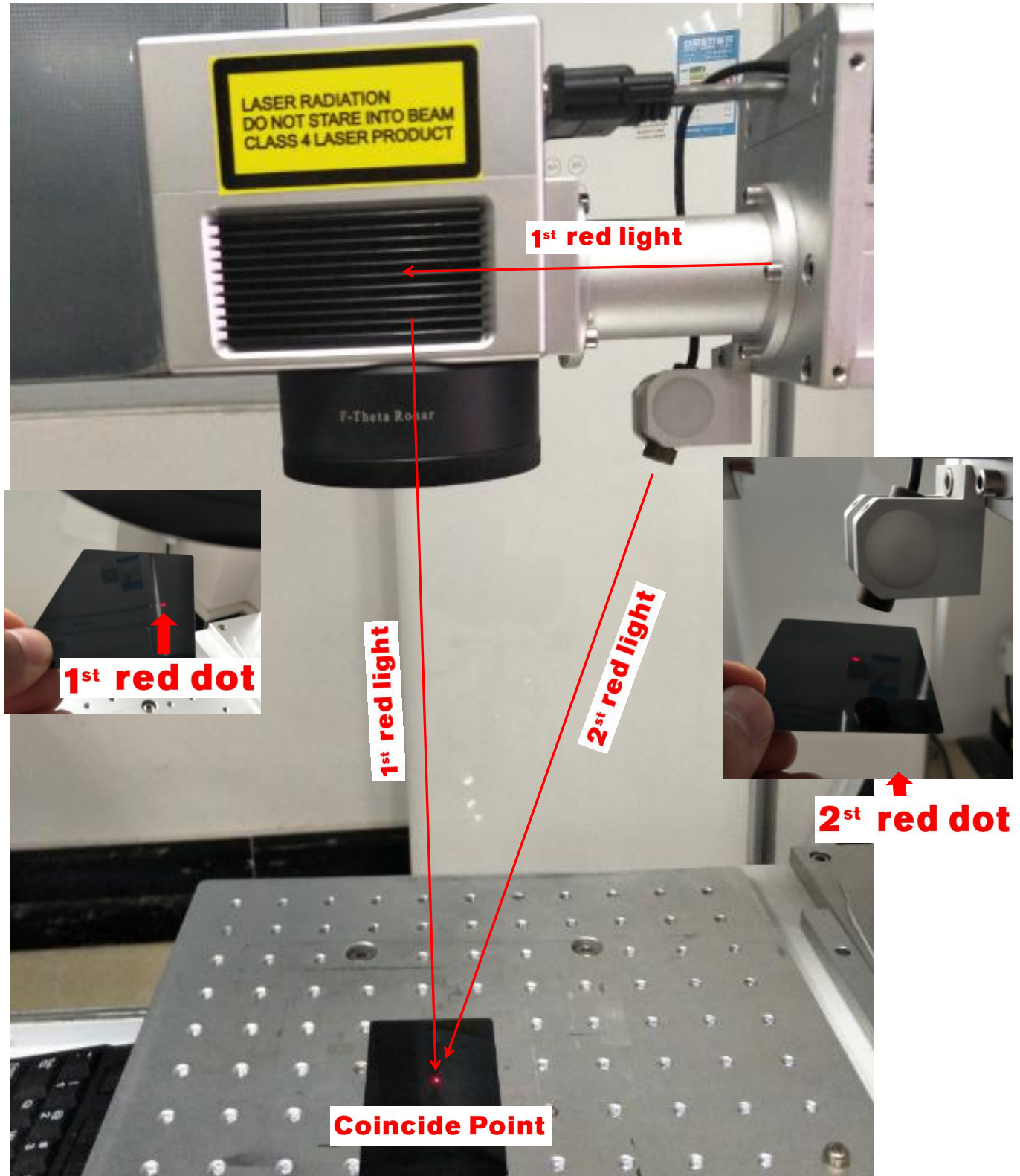
Use ruler measure from the marking object to the scan head middle line is the right focal length.

The focal length is stick to the scan head middle line for you.

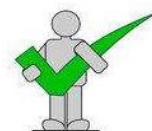
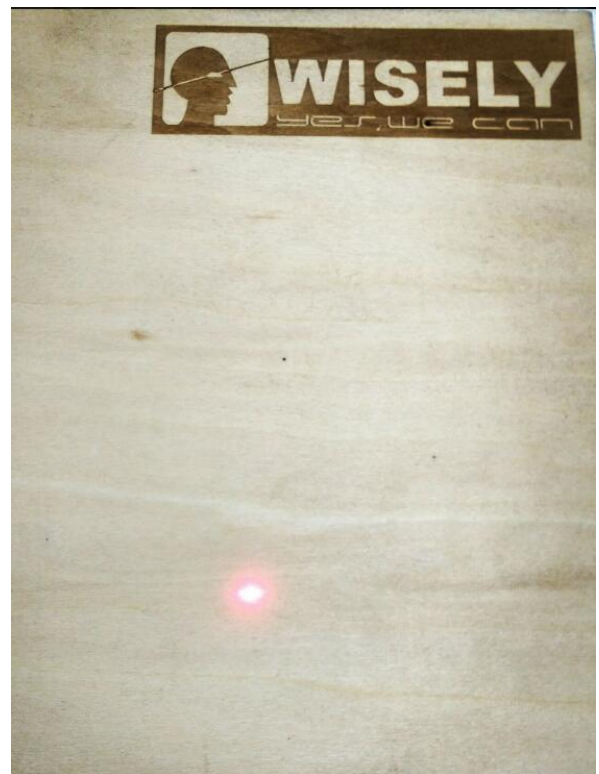
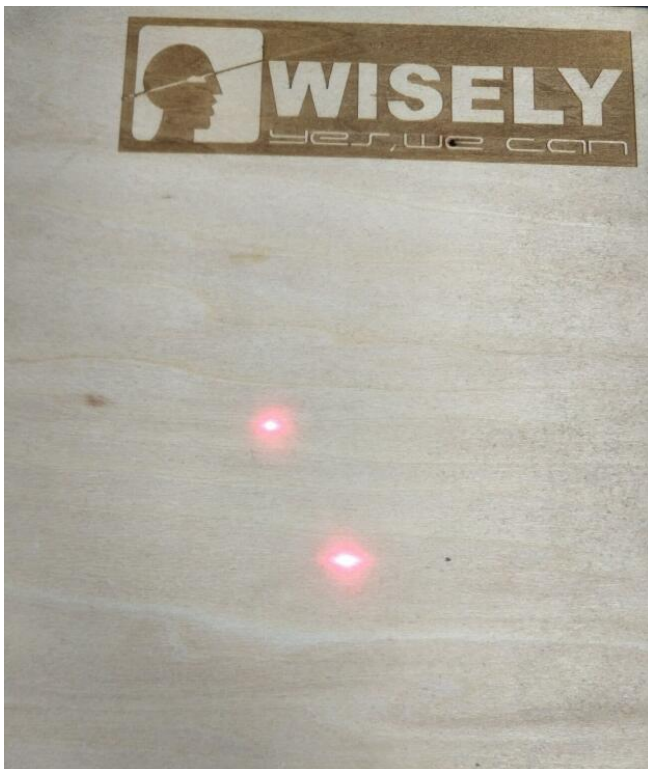
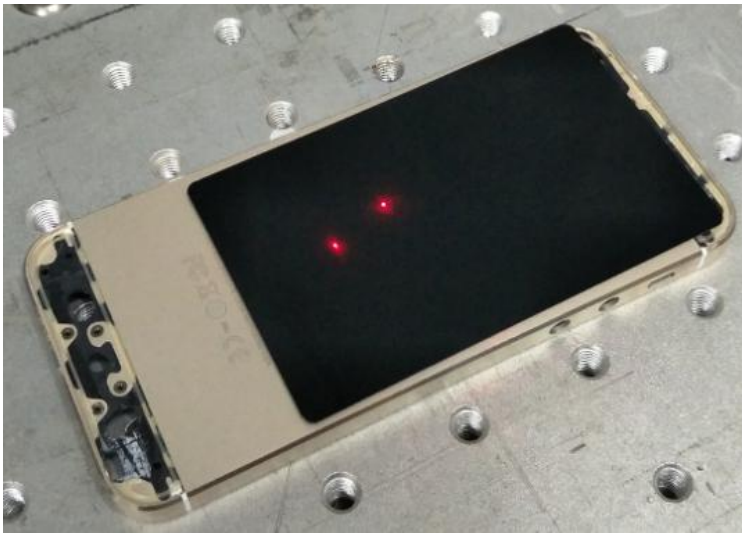


Another way to find the correct Focal Length: (2. Red points together)

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.



Tips: Sometimes the two points may offset, can't get together, use ruler measure the right focal length.
Then use wrench adjust the outside red light to one point.





Chapter 7 Basic Operation

Turn ON

1. Connect the main power.
2. Rotate right to release the Emergency “Stop” button.
3. Turn on the laser power with the key.
4. Press the button named “Red Light Pointer” to turn on the Red Dot Pointer.
5. Remove the lens cover.
6. Power on your PC or laptop.
7. Connect the machine with machine via USB cable.
8. Run software “EzCad”.
9. Load the material and put it in right position under the lens.
10. Adjust the right Focal Length by pulling the Z axis up and down.
11. Make or load a file which you want to mark in the software.
12. Set the marking parameter for the marking jobs.
13. 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, red light and Emergency “Stop” buttons.
5. Disconnect the main power.
6. Cover the lens with lens cover.

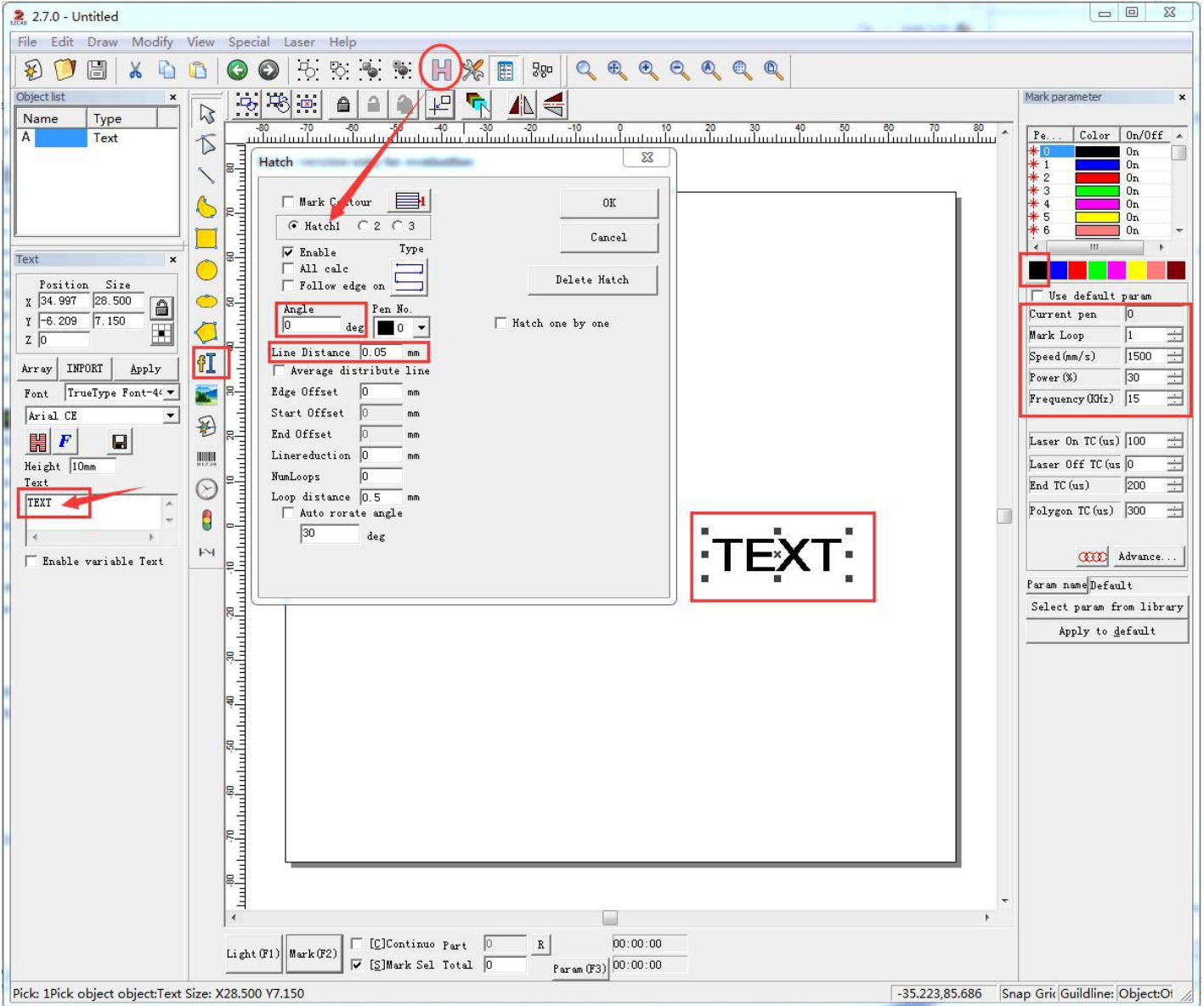
Software basic operation (More details pls read the EzCAD Software Manual)

1. How to Hatch?

First: Click , write some letters you need mark.

Second: Click Hatch 1 “Line Distance” usually setting: 0.1~0.01, Hatch 2 “Line Distance” : 0.1~0.01.
 And you can click “Type” to change different to suit your marking effect. Then click ok.

Tips: Each time you change the letters or vectors files size, you need to click the Hatch and click ok again.



2. How to setting parameters?

First: Select the files you need, set “Speed”, “Power”, “Frequency”,

Tips:

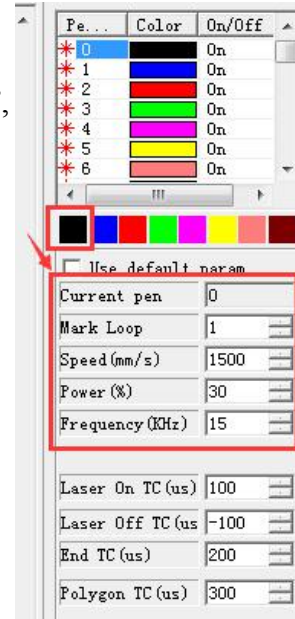
Mark Loop: Set the engraving times as you need.

Speed: 500~3000mm/s, the bigger the faster, usually under 2000.

Power: 5%~95%, the higher, the stronger power.



Frequency: 1~20KHZ, the bigger the denser of the laser spot.



Hatch: Usually 0.05~0.1, the smaller the deeper engraving.



others no change.

Second: select the files to mark on the objects.

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

2) Select “Mark Selec”, then Press F2  on keyboard or click  [C]Continuo Part [S]Mark Sel Total to mark.

Tips: Before marking you should find the right Focal Length first.

Chapter 8 Regular Marking Effect Guide

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

1. Wood/Acrylic+ Surface Marking Effect 木头/亚克力表面打标

Hatch 1:	0.05-0.1	填充
Speed:	1000-1500	速度
Power:	40-70	功率
Frequency:	5-15	频率

2. Wood + Deep Engraving Effect 木头深度雕刻

Hatch 1:	0.01-0.05	填充
Speed:	500-1200	速度
Power:	50-90	功率
Frequency:	5-15	频率
Mark loop:	5-20	

3. Glass + Surface Marking Effect 玻璃表面打标

Hatch 1:	0.05-0.1	填充
Speed:	1000-1500	速度
Power:	20-30	功率
Frequency:	10-15	频率

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

提示：参数设置仅供参考，顾客们可能需要自行好好地调试。



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 every day.