CRS Water-cooled UV Laser Marking Machine Manual

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1. Safety Instructions

1.1 The hazards of lasers and precautions

Please read this user manual carefully before using this product.

In this user manual, we provide you with important product safety operating procedures and other reference information. To ensure your personal safety when operating this product and to achieve the best performance of the product, please follow the following precautions and warnings as well as other relevant operating procedures in this manual during operation.

Laser marking machine is a Class 4 laser product with dangerous, invisible laser radiation. This product emits infrared laser radiation with a wavelength of 355nm, which can cause damage to eyes and skin directly or indirectly exposed to such light intensity. This infrared radiation is invisible, and the laser beam can cause irreversible damage to the retina or cornea. Before operating the laser marking machine, be sure to wear appropriate and certified 1064nm near-infrared band laser protective glasses.

Important:

✧ Never look directly at the fiber output connector, and make sure to wear appropriate protective goggles when using the laser to avoid injury.

✧ Do not open the laser, because there are no product parts or accessories for users to use inside the laser.

✧ When using this product, please use a properly grounded power supply and normal voltage.

✧ Before starting the laser product, please ensure that the ambient temperature and humidity are within the specified range.

✧ Do not expose the product to an overly humid environment.

✧ The laser is cooled by air. Please ensure that the ambient air is dry and clean.

✧ Operations or adjustments beyond the scope specified in this manual may cause dangerous radiation damage.

✧ Keep the output galvanometer clean. After each use, please cover the protective cover. Do not touch the field lens with your hands, and do not use any solvent to clean the field lens. When necessary to clean and maintain the lens, be sure to use lens paper.

Warning:

✧ Operations or adjustments beyond the scope specified in this manual may cause radiation damage.

wavelength （nm)	optical density
355	>6

As shown in the table below, all safety warning signs (not limited to those affixed to the body of the laser) during the operation of the laser marking machine are included:

		
Warning label – Hazard symbol	Explanatory label (Take 5W as example)	Alternative label for laser aperture
		
Alternative label for Class 4	Must be grounded	Electrical Hazard

2. Reference standards

IEC 60825-1:2014
EN ISO 12100:2010; EN 60204-1:2018
EN ISO 11553-1:2020+A11:2020
EN ISO 12100:2010;
EN 60204-1:2018
EN ISO 11553-1:2020+A11:2020
FDA number: 2320736-000

Please note:

◎ According to EU and national standards and requirements, lasers must be classified according to their output power and laser wavelength. All high-power MFSC series laser products belong to Class 4 products (according to EN 60825-1, Chapter 8)

3. Machine introduction and connections

Two type of chiller

3W and 5W machine use 05 model chiller

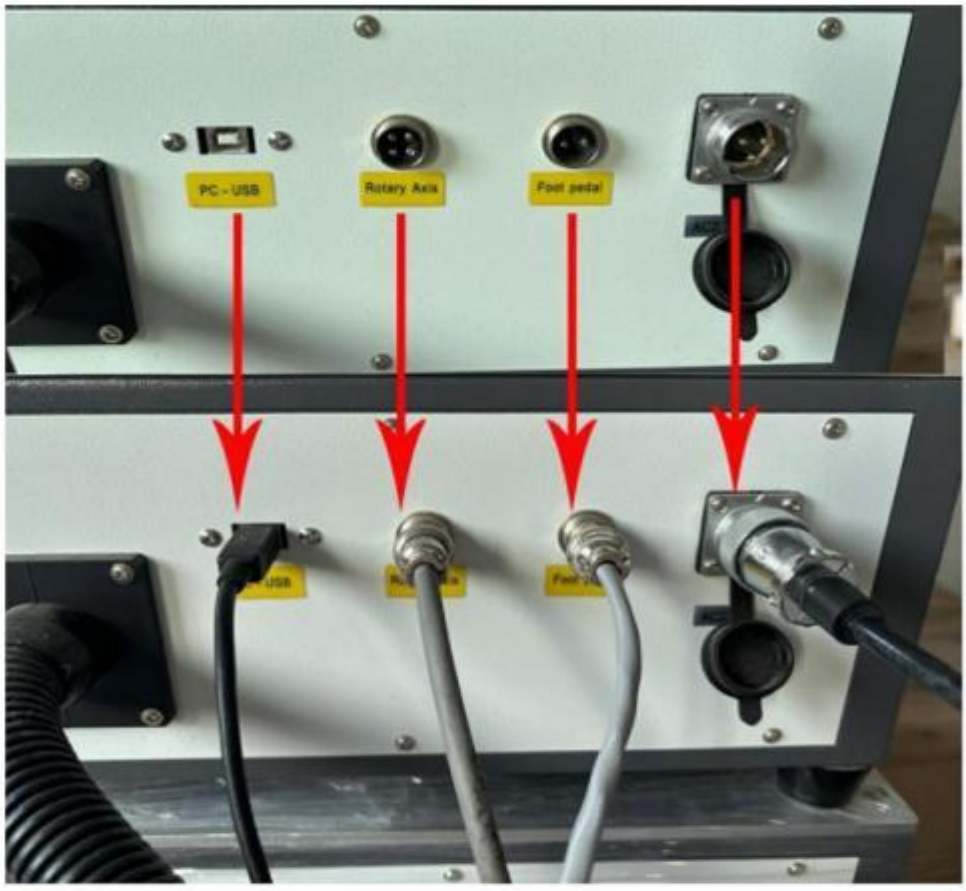
10W and 15W machine use 10 model chiller

Note: TWO brand water chiller can be choosed, depend on yourself.

4. Packing list

5. Connections

You will get 4 cables as following picture, USB cable, power cable, the cable for foot pedal and rotary axis (optional):



The USB Cable | The cable of rotary axis | The cable of foot pedal | The power cable

Connect the water pipe like above picture, not distinguishing between inlet and outlet.(Tips: If your UV laser is air cooling version, please ignore this step.)

6. Power on

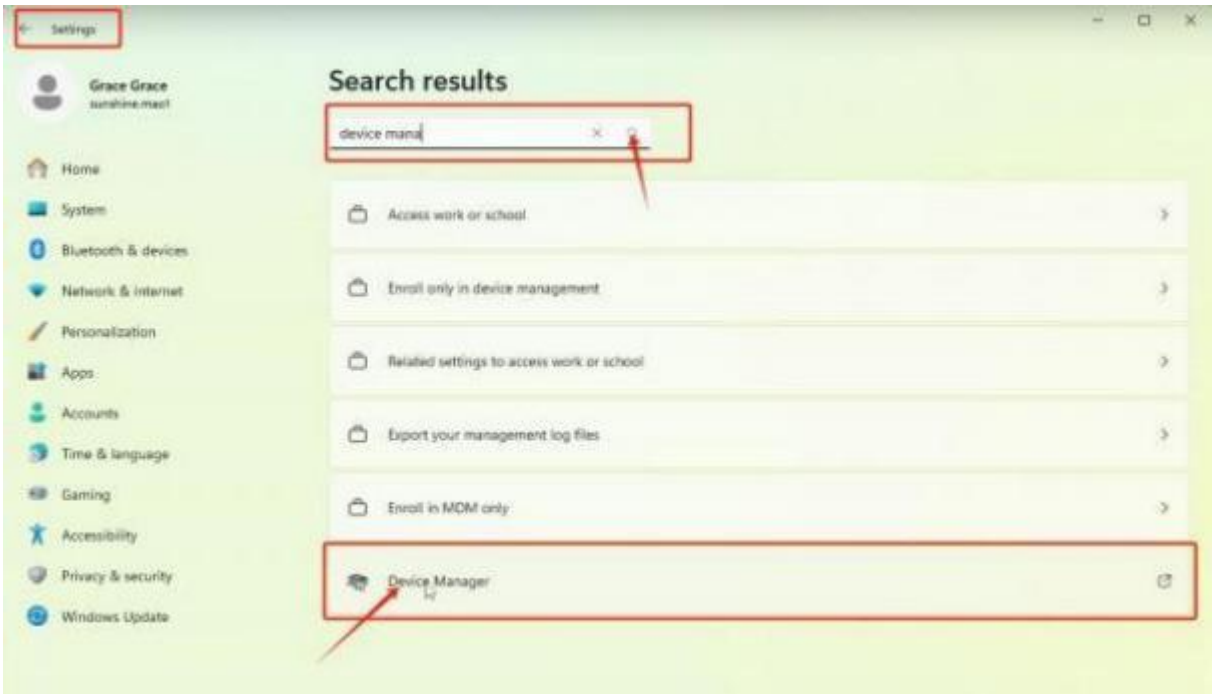
Turn on the following three switches:Laser switch-->Power switch-->Emergency switch
(When the machine is in working, keep the emergency switch in the open position)

7. Software installation

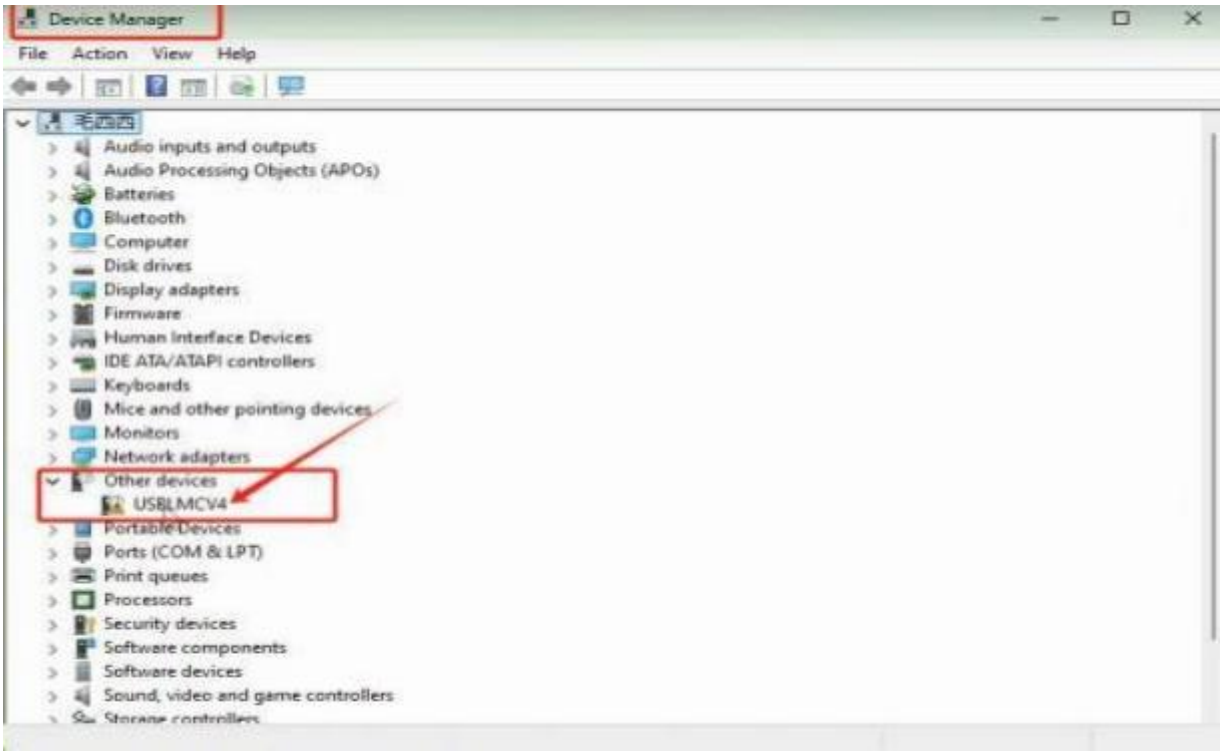
Note: Turn off the anti-virus software(if there are any) and firewall before downloading and then install the software.

Step1: Open USB flash drive folder on computer for spare

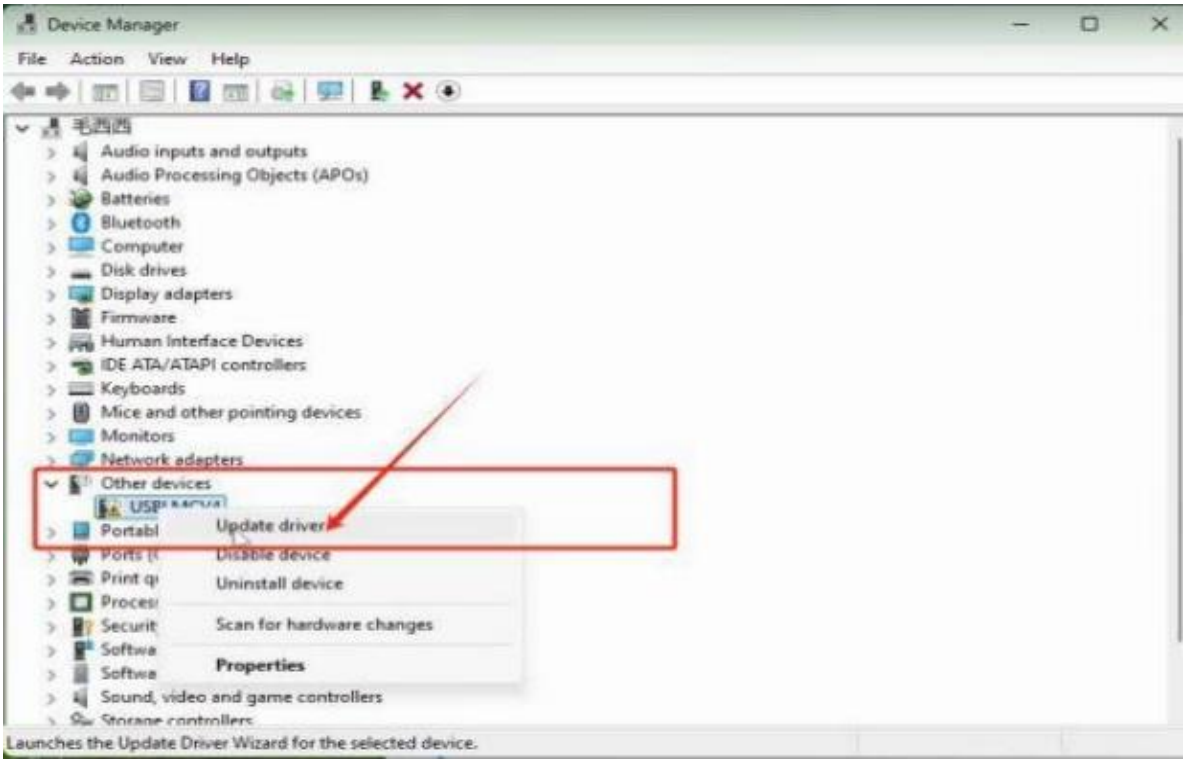
Step2: Open setting--find out “Device Manage”



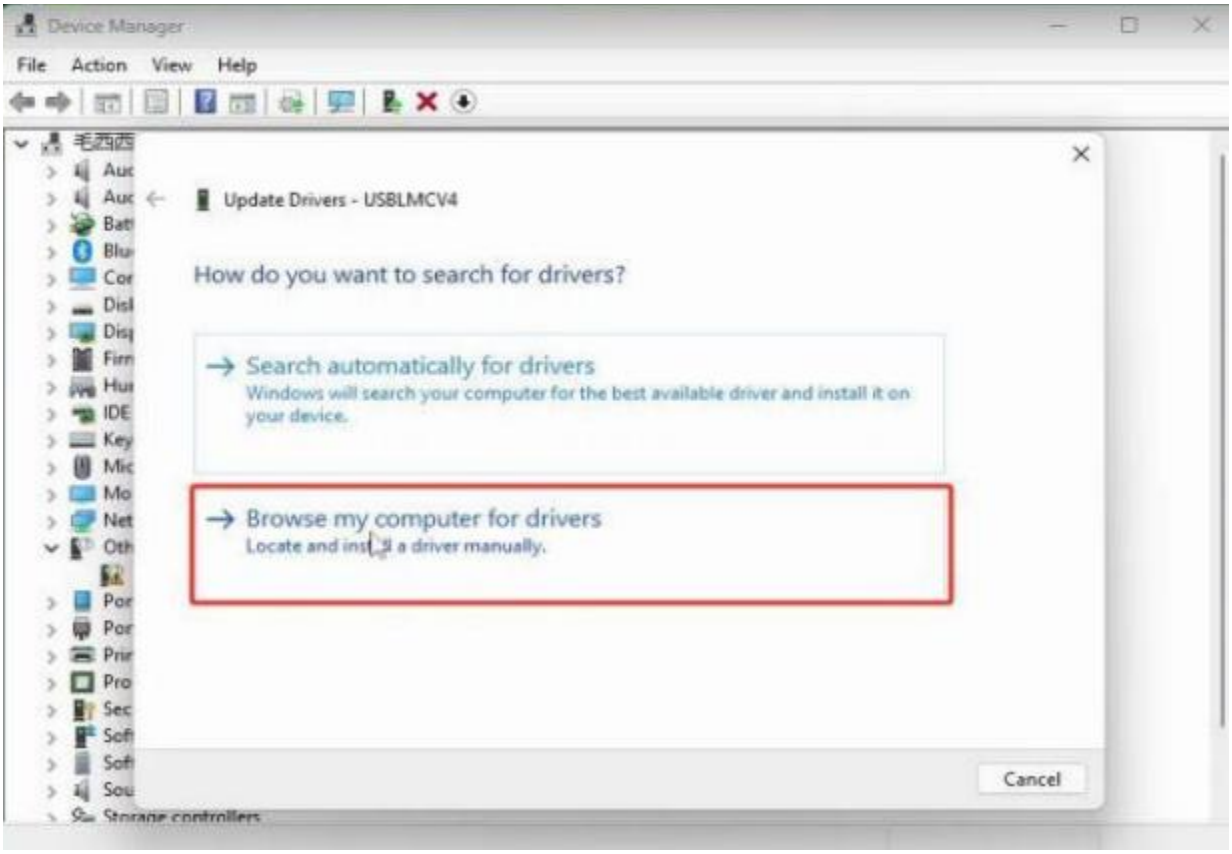
Step3: Click the “ Device Manager “and open the “other devices”--Shows “ USBLMCV4”

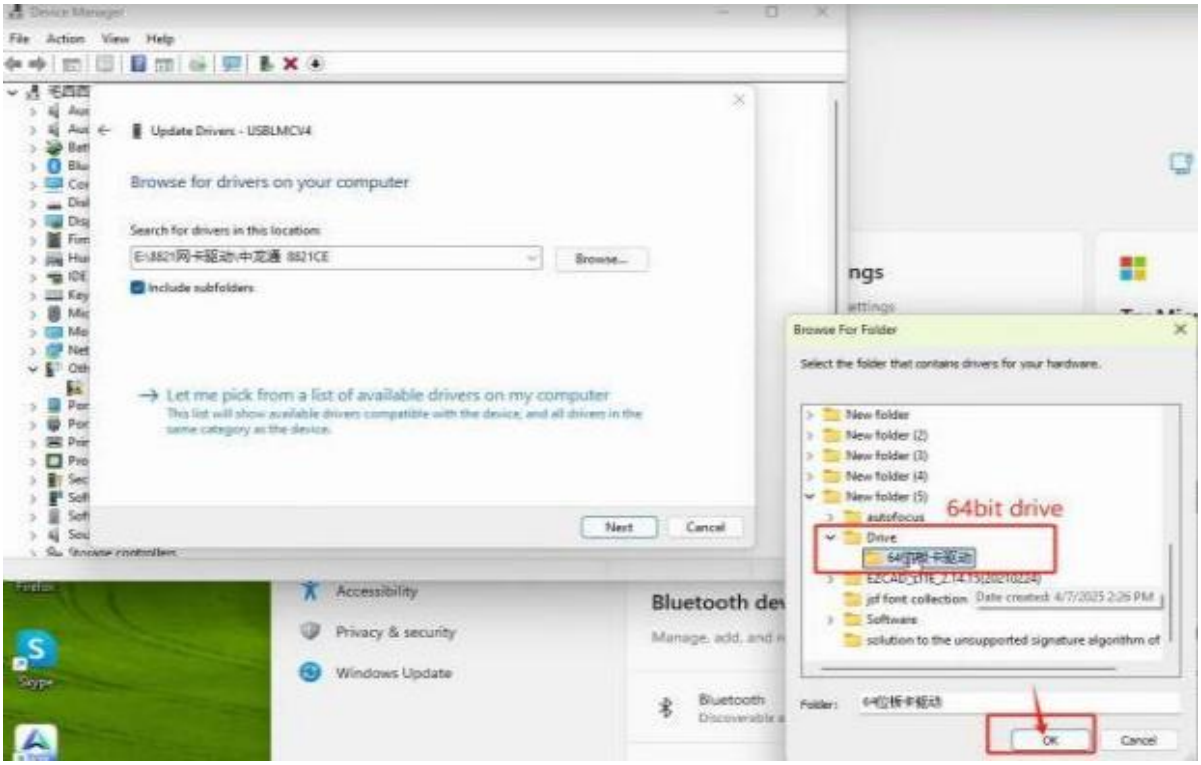


Step4: Select "USBLMCV4", right click the mouse and select "update driver "

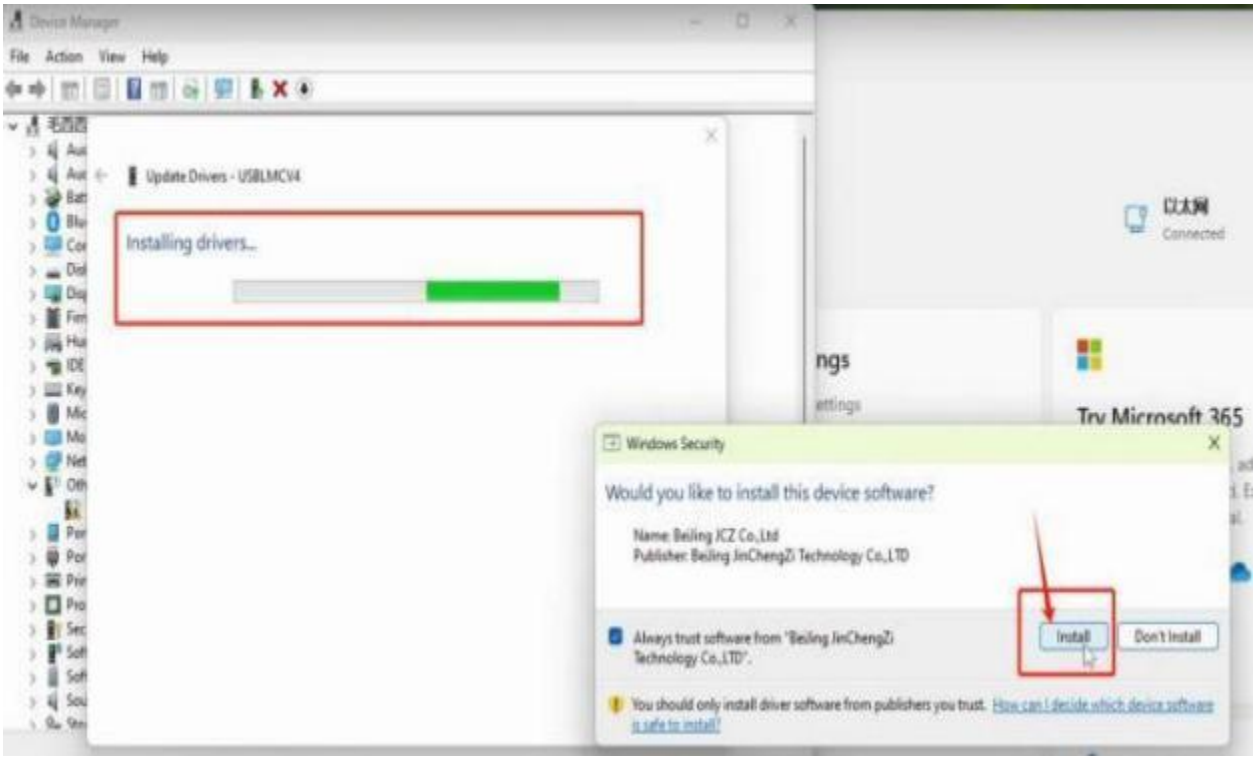


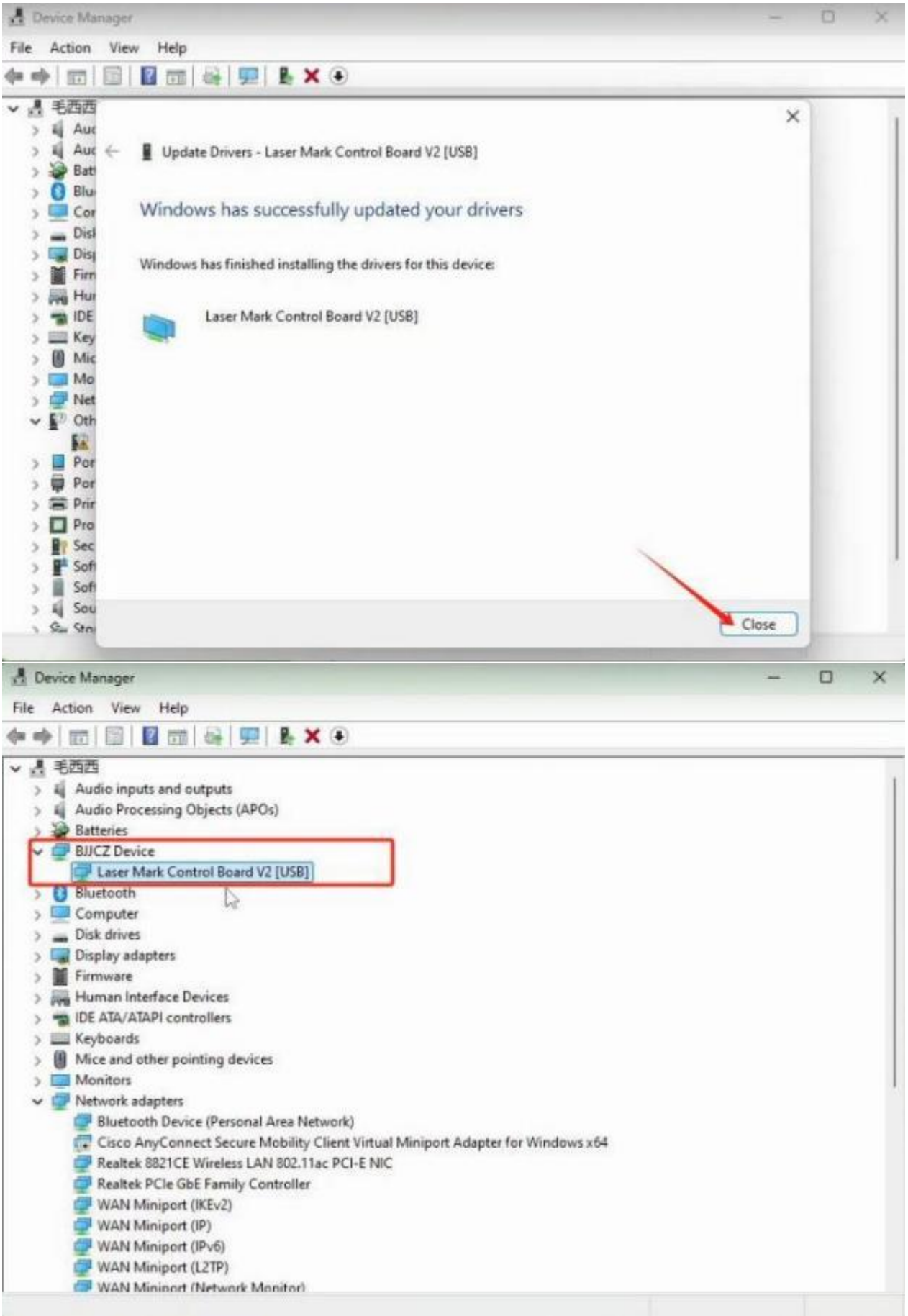
Step 5：Choose Browse my computer for drivers--Browse--choose the 64bit Drive--Click “OK” --Click “ Next”



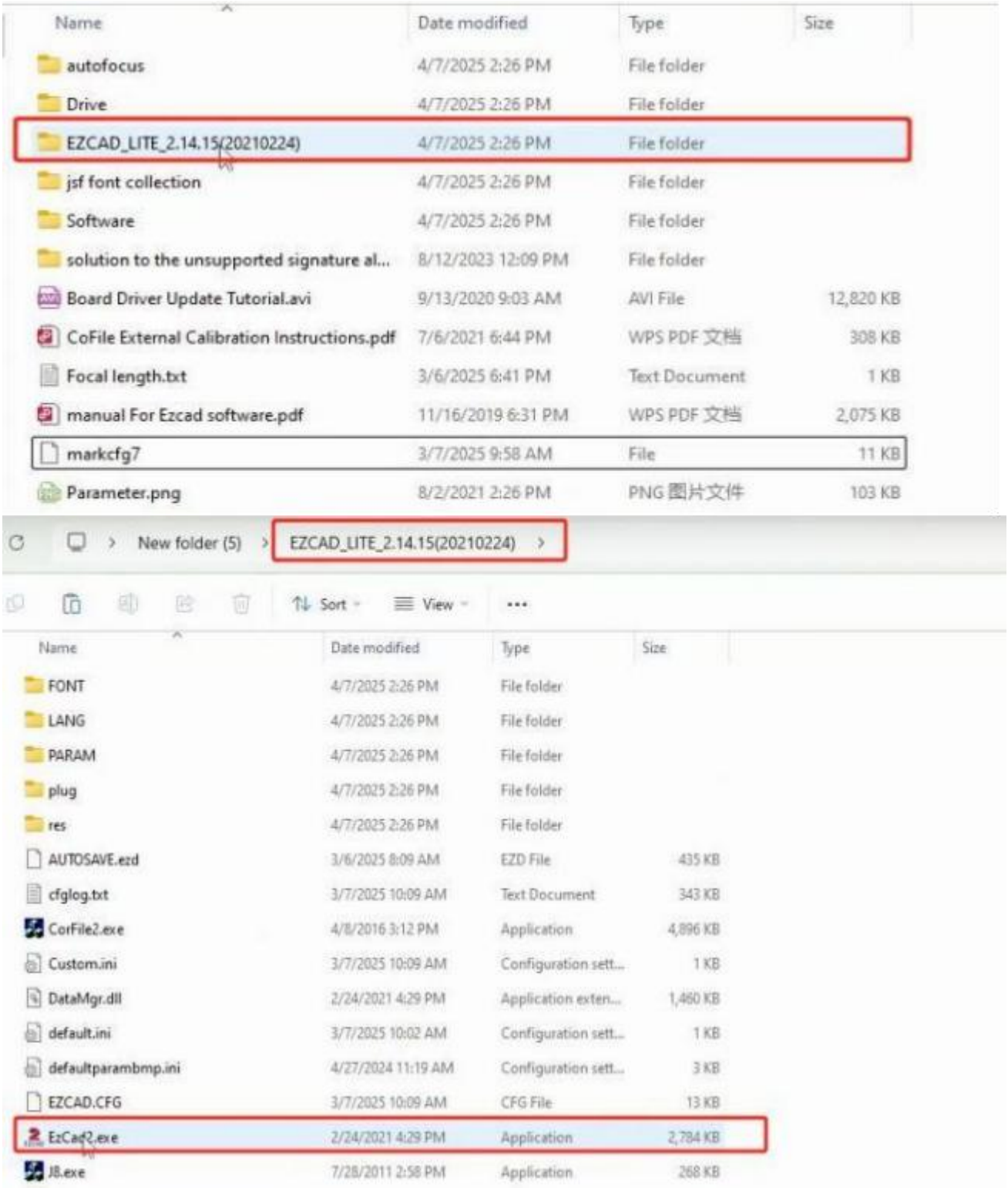


Step 6 ： Start install the drive, it will be come out a notices--Choose “ Install”-when finished,click the “close”--you will see the drive name “ Laser mark control board V2’’ on device manger

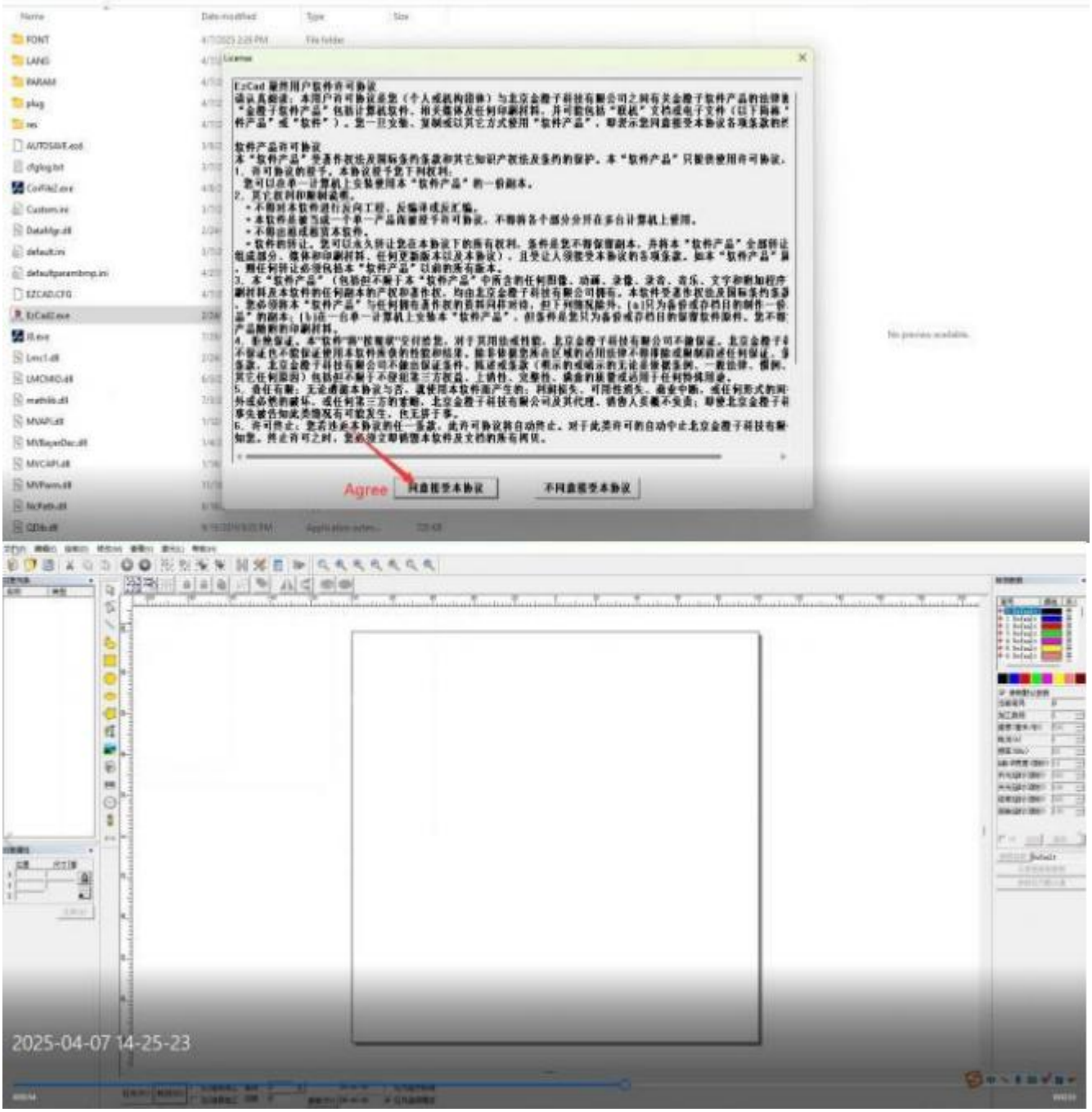



Device Manager
File Action View Help
Update Drivers - Laser Mark Control Board V2 [USB]
Windows has successfully updated your drivers
Windows has finished installing the drivers for this device:
Laser Mark Control Board V2 [USB]
Close
Device Manager
File Action View Help
Audio inputs and outputs
Audio Processing Objects (APOs)
Batteries
BJJCZ Device
Laser Mark Control Board V2 [USB]
Bluetooth
Computer
Disk drives
Display adapters
Firmware
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Bluetooth Device (Personal Area Network)
Cisco AnyConnect Secure Mobility Client Virtual Miniport Adapter for Windows x64
Realtek 8821CE Wireless LAN 802.11ac PCI-E NIC
Realtek PCIe GbE Family Controller
WAN Miniport (IKEv2)
WAN Miniport (IP)
WAN Miniport (IPv6)
WAN Miniport (L2TP)

Step 7: Start install software--Open the software folder--open Ezcad lite 2.14-- double click “EzCad 2 .exe”



Step 8: The software will notices whether you agree to the installation. Click "Agree" to enter the homepage of the software--Software installation complete

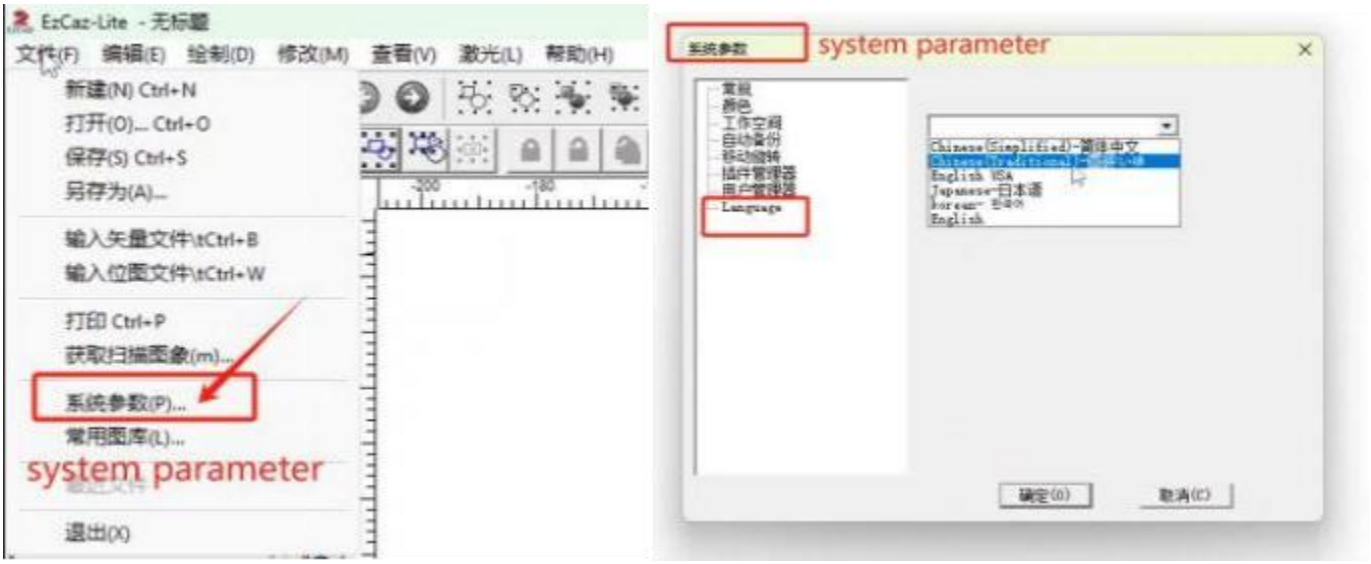


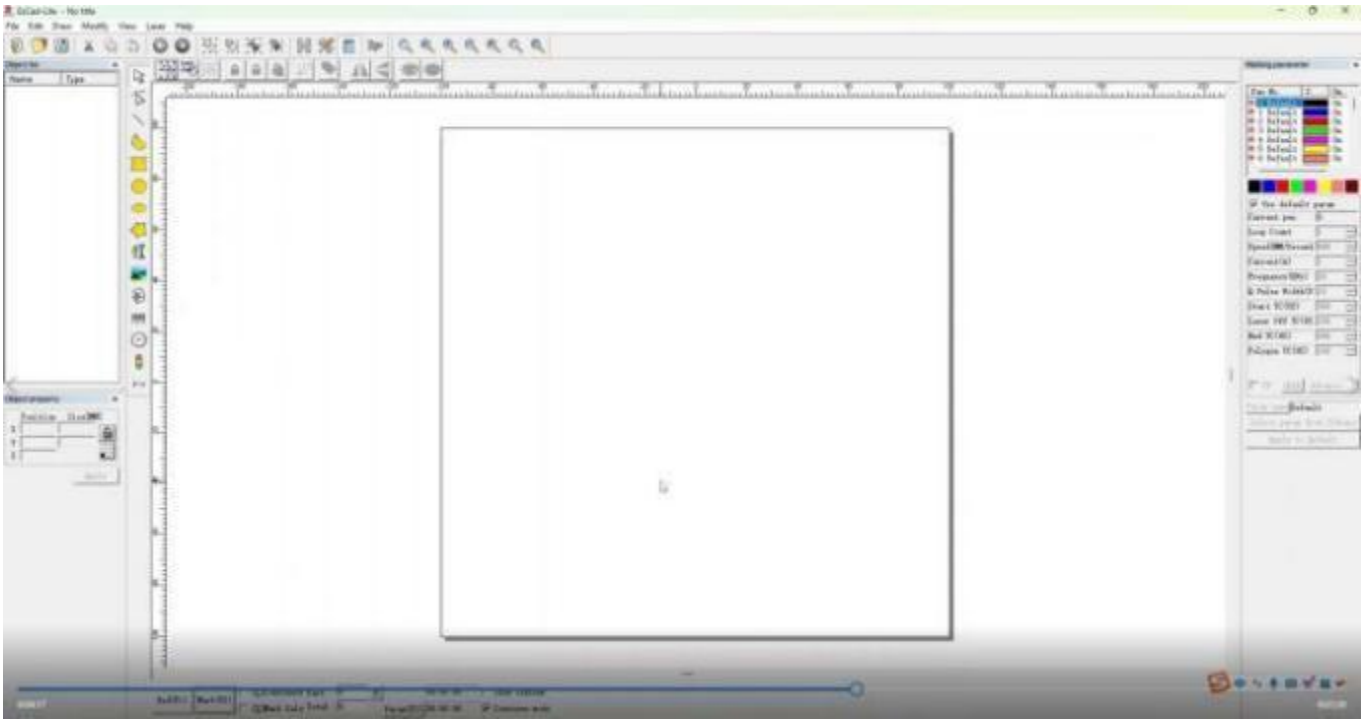
(Ezcad Home Page)

For the introduction of the software page, please read the "Manual"
Get more detail please click the below link:
https://youtu.be/RxXOsDfdPKc

Step 9:change language to English .

Open Ezcad Home Page--Click Files--System parameter--Language,choose the language you need, and then click OK--Close the software and open it again, and the new language will be applied.





8. Focus setting

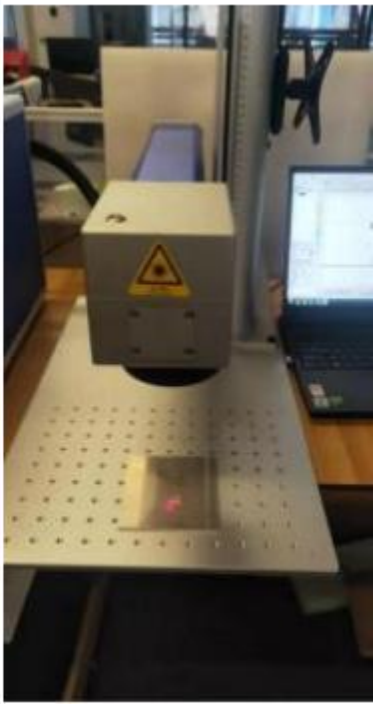
8.1 In the case of using the original field lens

This way just fit for the filed lens which come with machine. After you change new filed lens and can't use this way to adjust focus length .

This machine has double red lights for positioning, no need focusing ruler. Double red light help customers make focus quickly and easily.

Step 1: Open the lid of Field lens and press the button on the top;

Step 2: Spin the lifting wheel to make two red dots coincident to get the best focal length (as we already set up the best length at the two red dots coincident point before delivery), so each time after you put different thickness materials on working table, just adjust the lifting wheel to make the two dots coincident will be ok.



8.2 In the case of using another field lens

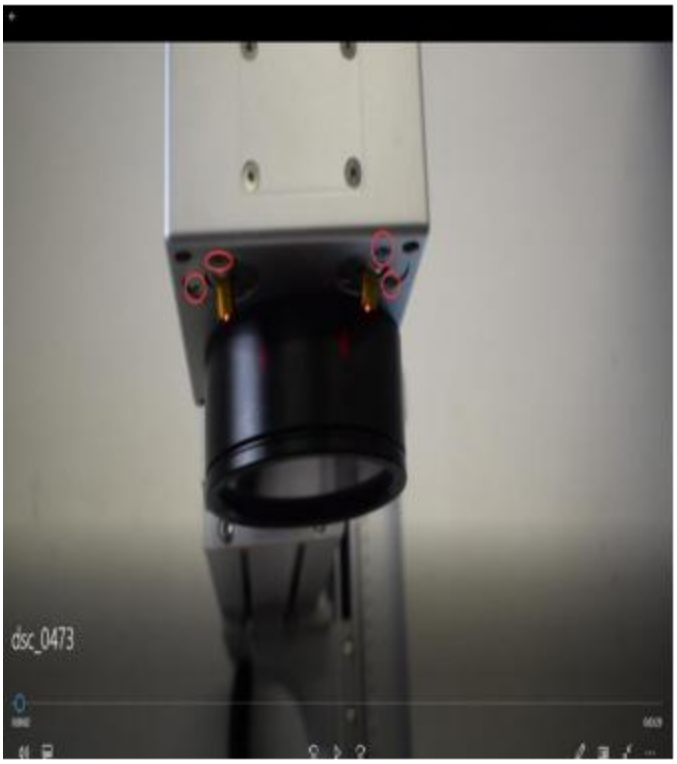
For example: if your machine is 5W 175*175mm type, the default factory setting of the machine is 175*175mm. when you want to change to a 110*100mm field lens for marking, there are two focusing methods for you :

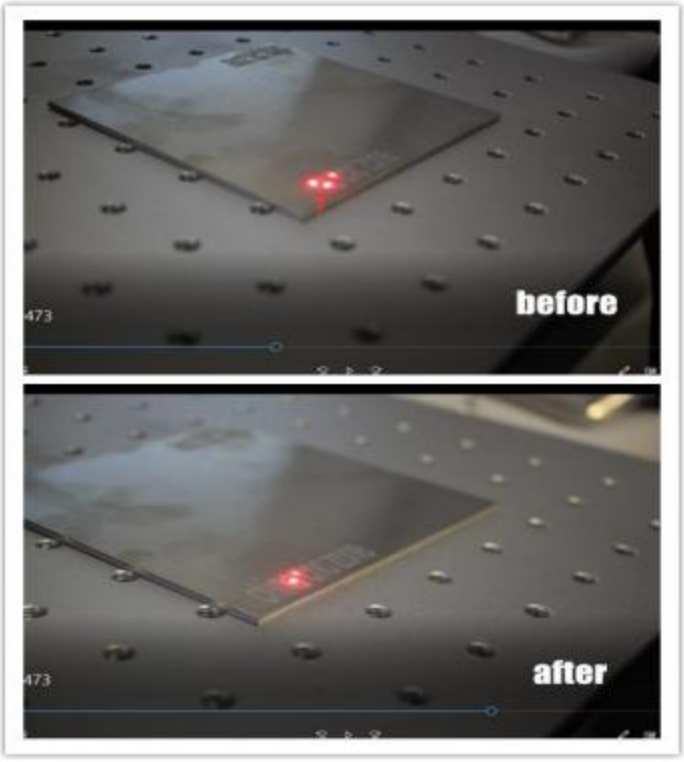
(1) . By changing the original 175*175mm to 110*110mm, the coincidence of red lights can not be used as a standard for judging whether it is the best focal length or not. you should use the best focal length we provided for 110*110mm.

(2) . Or find the best focus length by yourself: Marking a “TEXT” file by choosing continue , then spin the lifting wheel till get the brightest spark of laser (or the sharpest voice of laser), then this point is the best focus length.

(3) When the machine is at the best focal length, loosen the screws and adjust the angle of the two red lights to make them coincident.

(4) When the two red dots are coincident, tighten the screws to complete setting. So each time when you put different thickness of materials, just spin the lifting wheel to make the two dots coincident will be ok.





8.3 Field lens replacement

Step1: Hold the field lens and then turn the field lens clockwise

Step2: Software change the filed lens: Click “Files”--Parameter system parameter--change the filed size after replacement

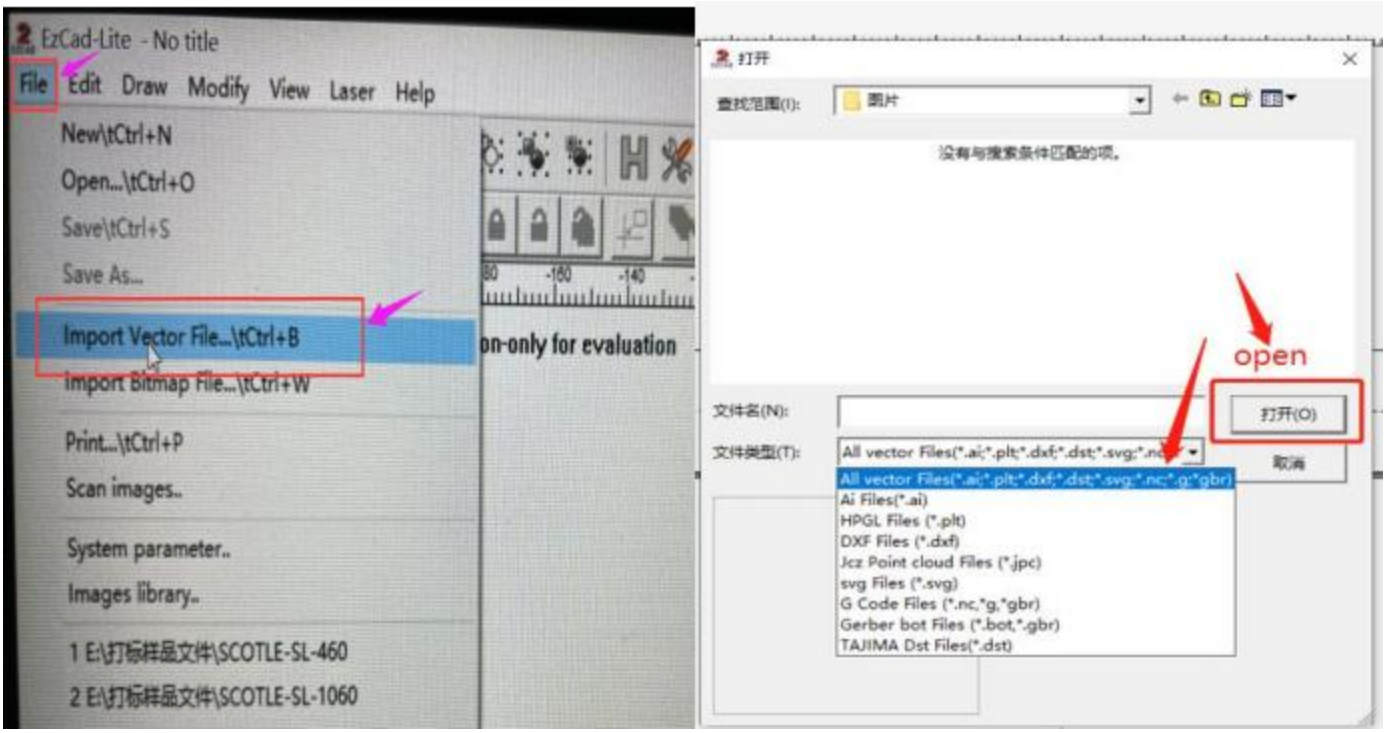
Step3: Readjust the focus(Refer to the focus setting way)

9. How to use the software to mark?

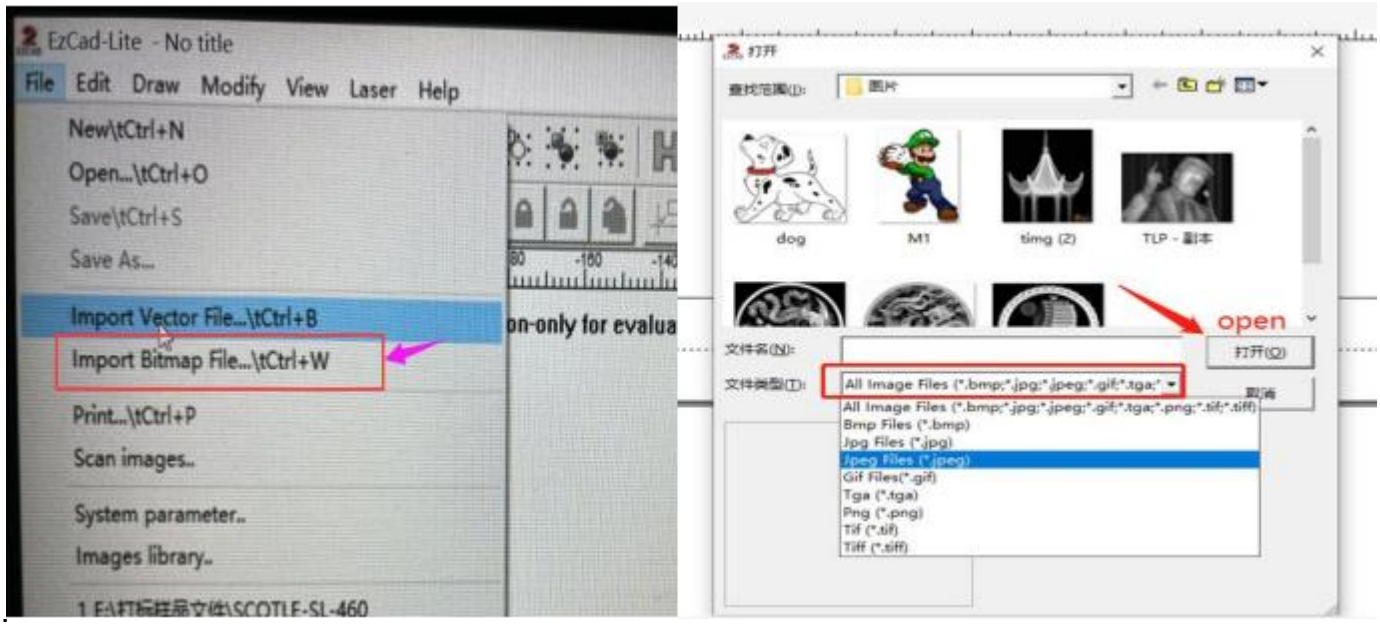
9.1 import Files

Step 1: Click Files in the upper left corner

Step 2: Click Import Vector File (CAD Format), open marking File.



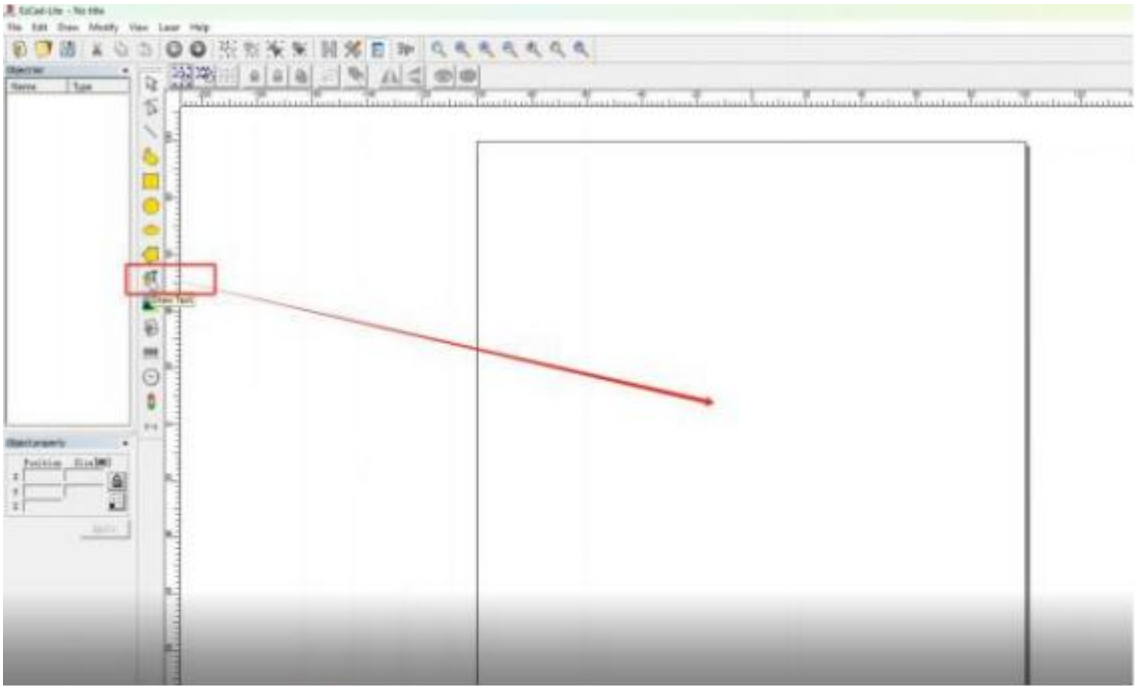
Step 3:Click Import Bitmap File (Image Format), Look for the Picture you'd like to mark, Click Open

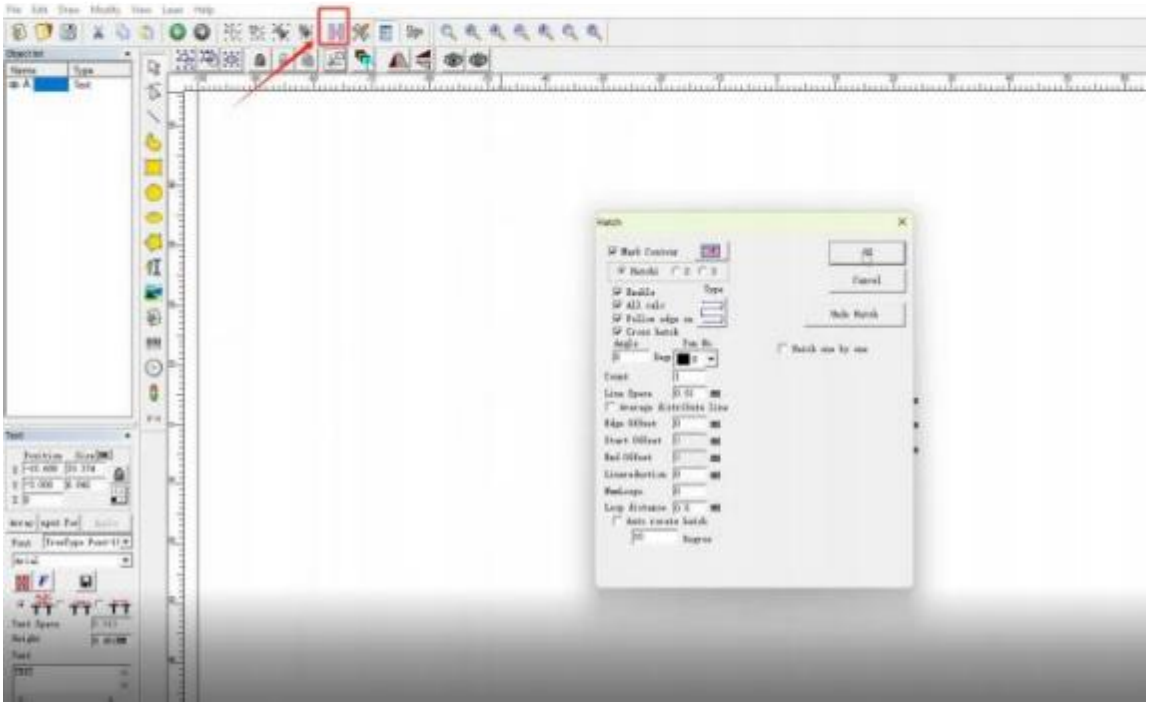


9.2 How to create text directly on the software

Step1: Draw Text to the marking frame

Step2: Click the "H", Fill in the text if you need; For example, if the text you type is empty, it needs to be filled to obtain solid text.(Refer to the sample pictures)





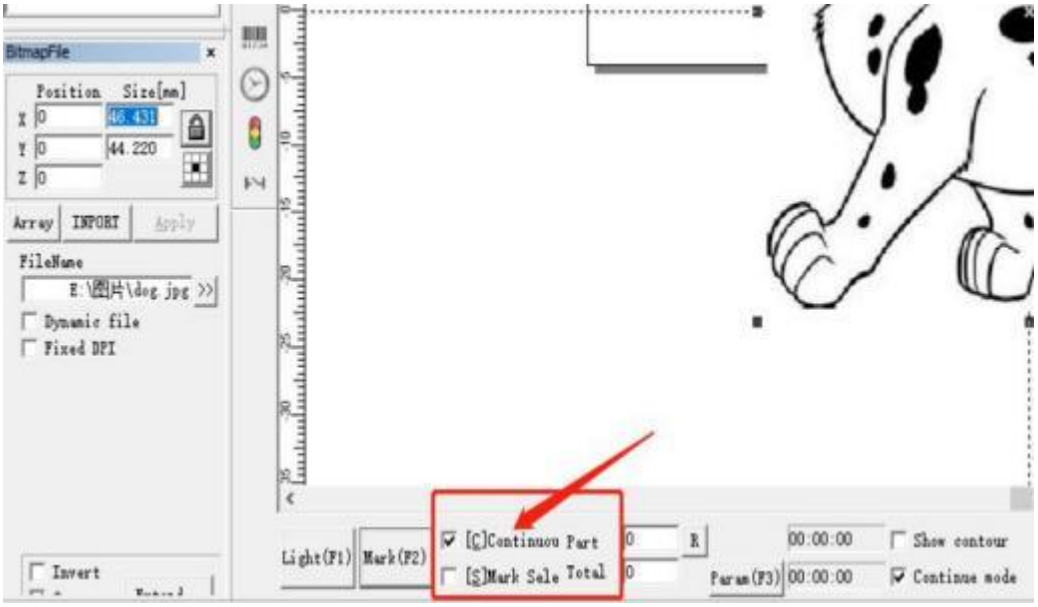
Sample:

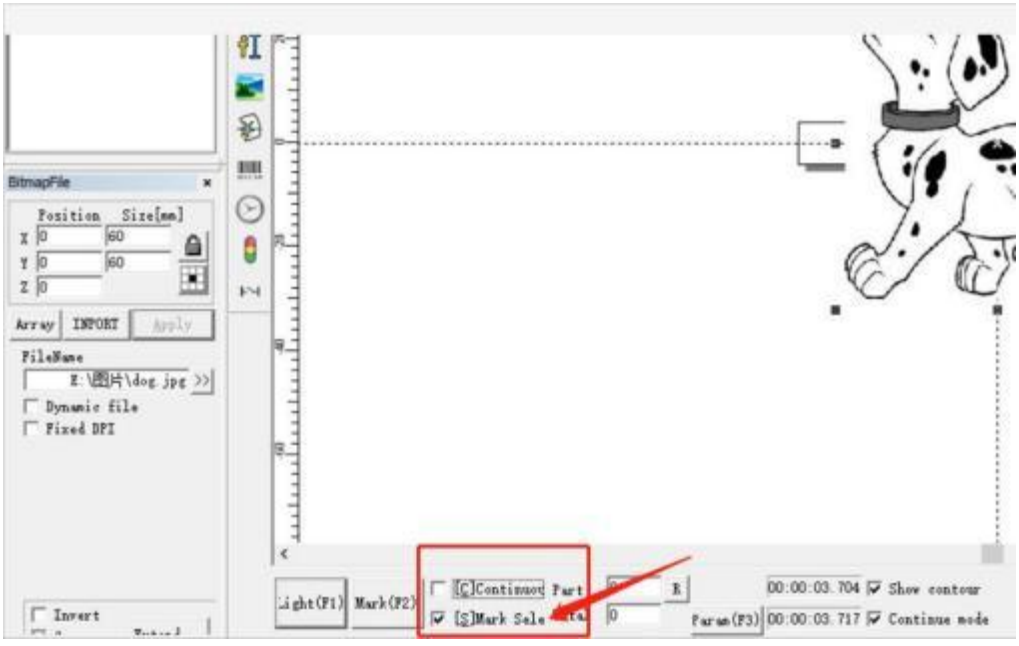
10. How to set up single marking and multiple times marking

Find out the Bottom left “Mark”

Choose ☑ continue means Marking multiple times

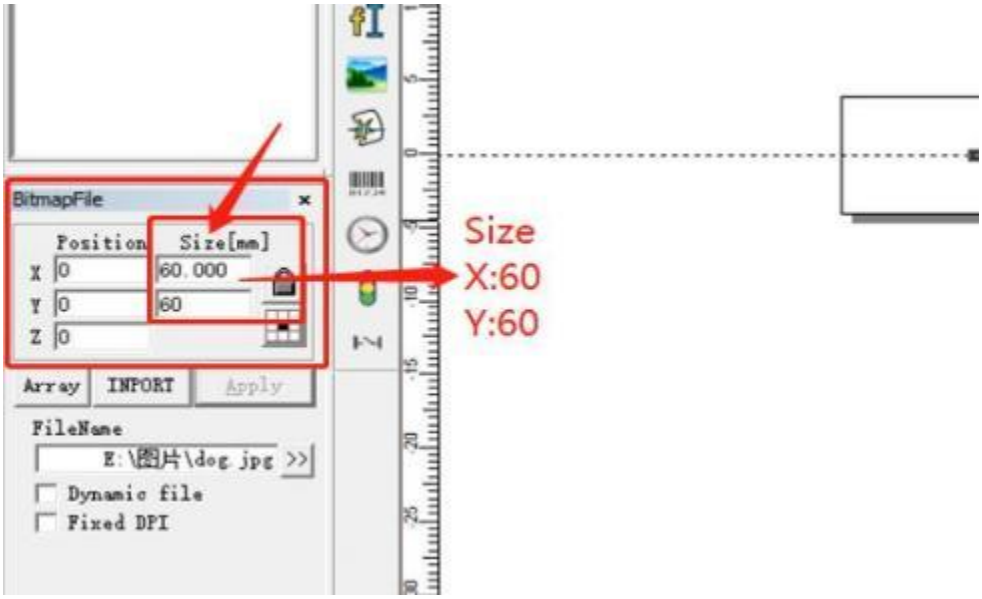
Choose ☑ sole means Single marking





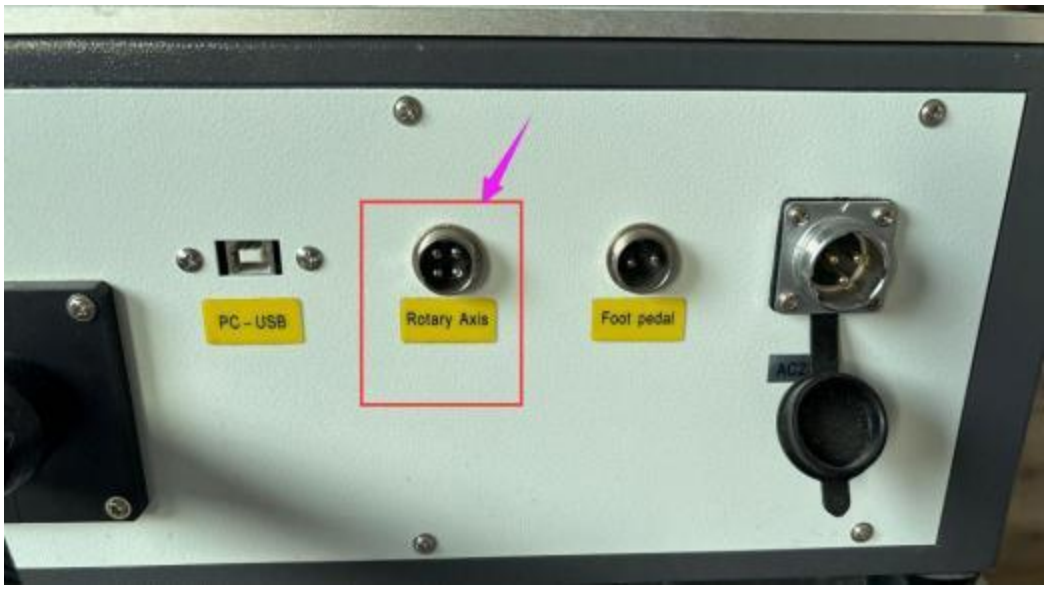
11. How to set up marking range?

Click Size, change the number to 60(X) 60(Y) <Standard Range>.



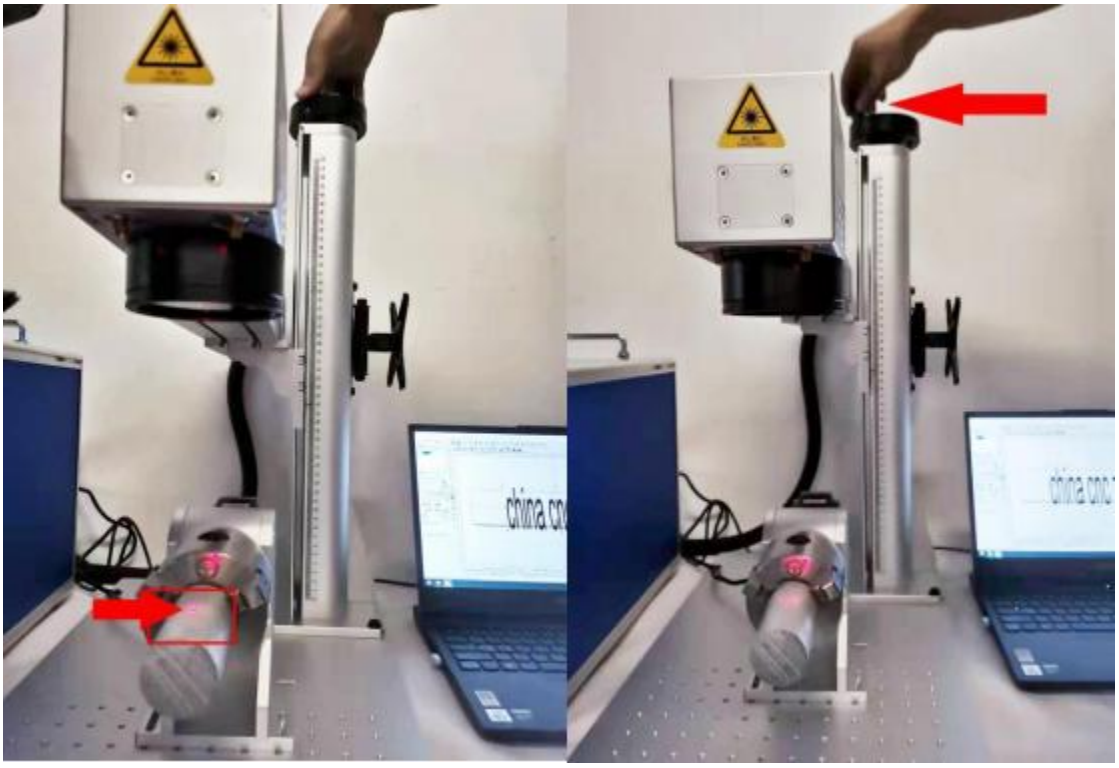
12. Rotary axis setting （ if you bought a rotary axis ）

Step1: Taking out the rotary axis and connect it to the machine as following picture.



Step2： Fixing the marking material to the rotary axis, hold the material by the tool until the material is fixed on the rotary axis.

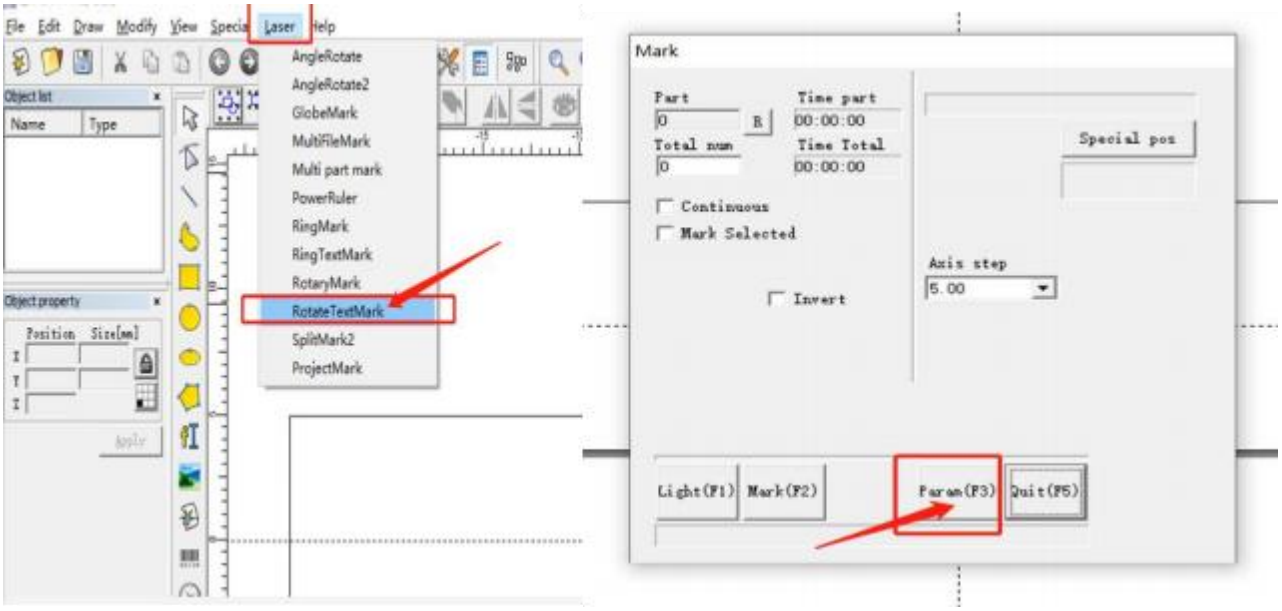
Step 3: Focusing. Adjust the distance between the material and the field lens until the two points coincide.



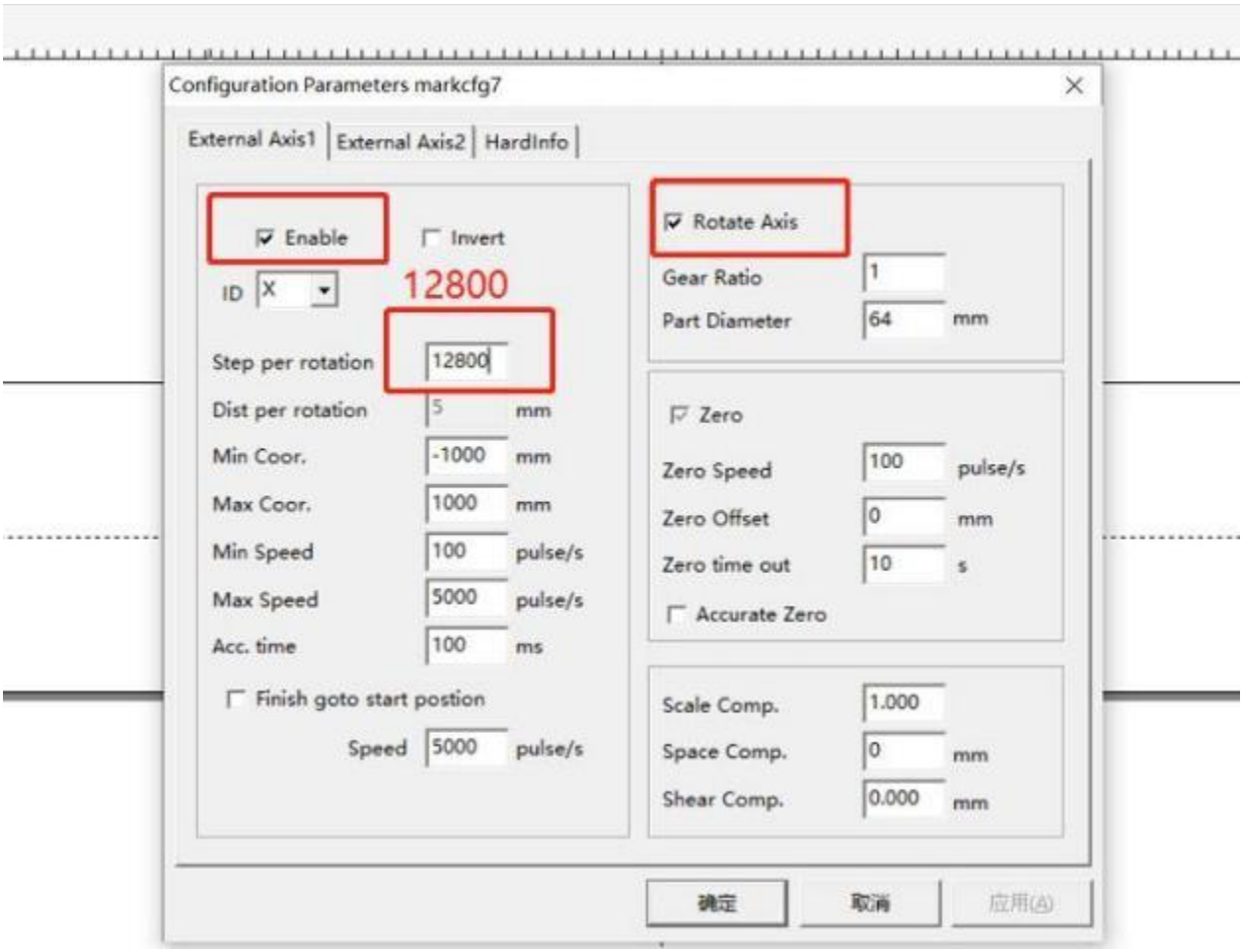
13. Doing marking on rotary axis

13.1 Marking TEXT

Step1: Click “ Laser” , choose “rotate TextMark”--Click “ Param (F3)”

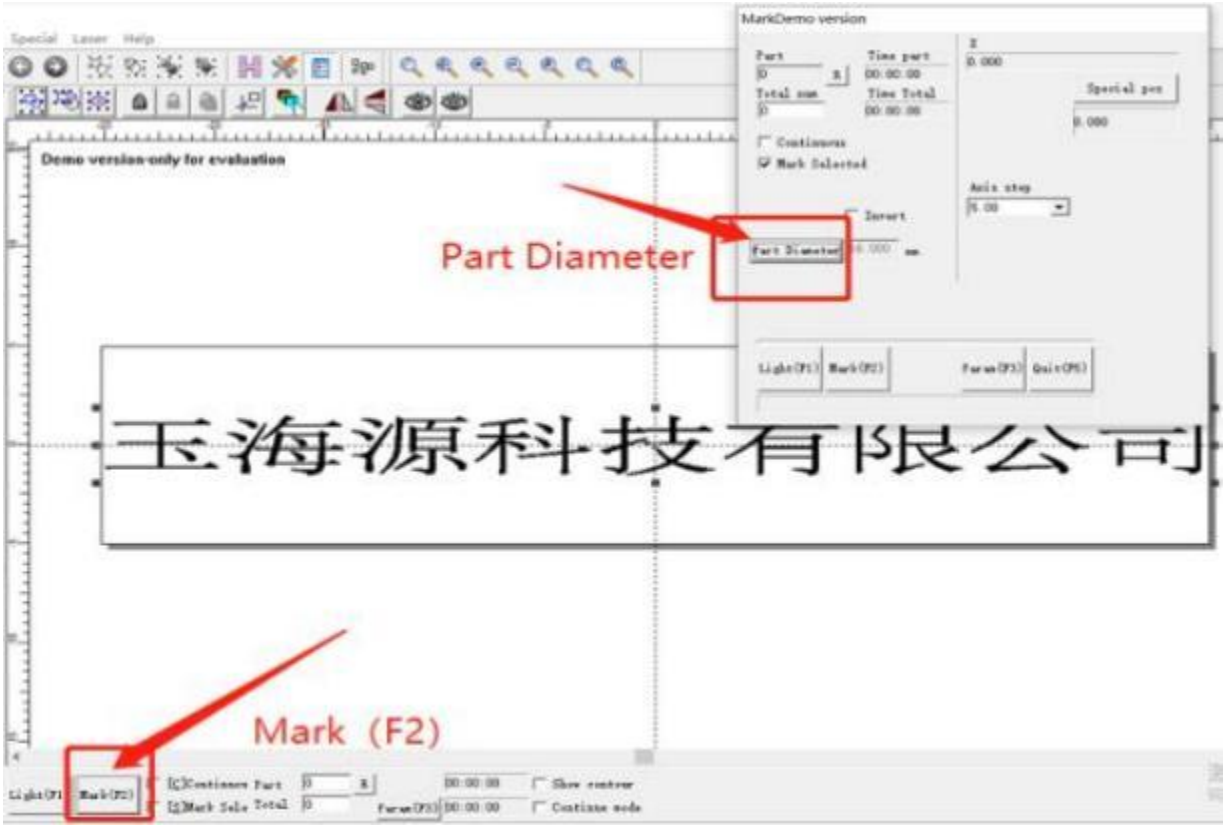


Step 2:Check “☑enable” “☑Rotary Axis”, set up “Step per rotation to12800”, Click OK.

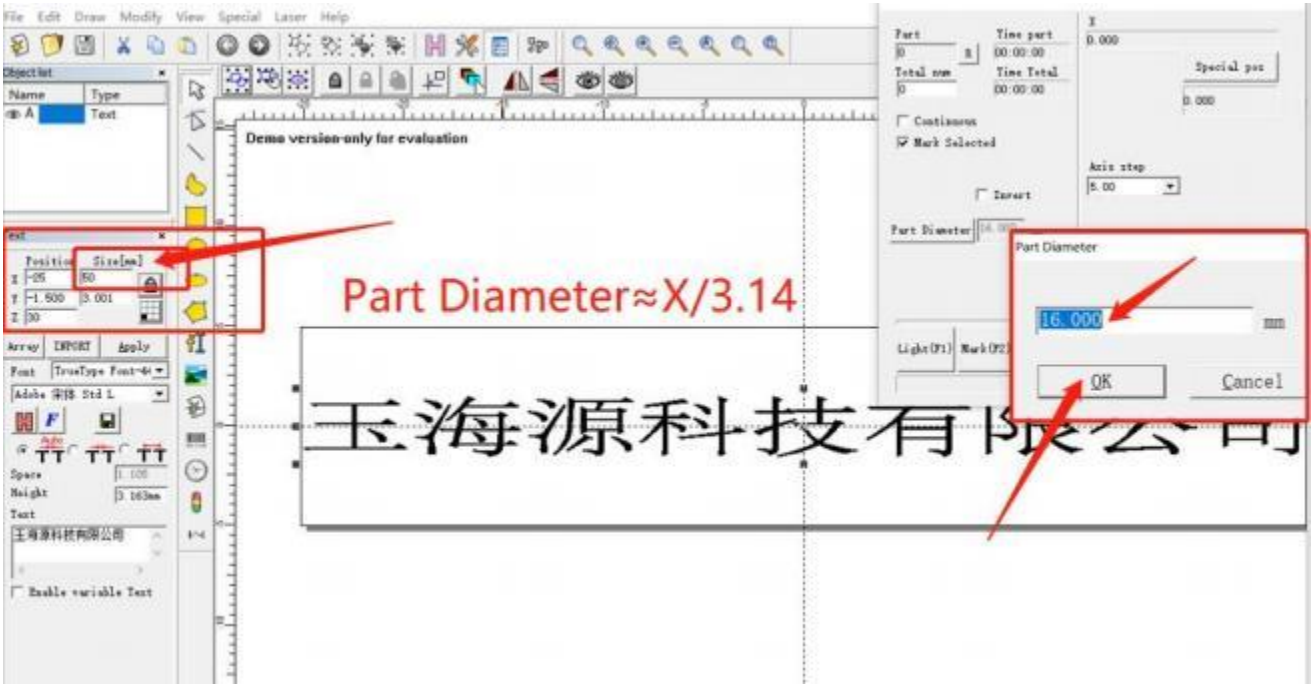


Step 3:Find out the “Mark” button in the bottom left corner, Click “Part Diameter”. (Part Diameter

=X/3.14).

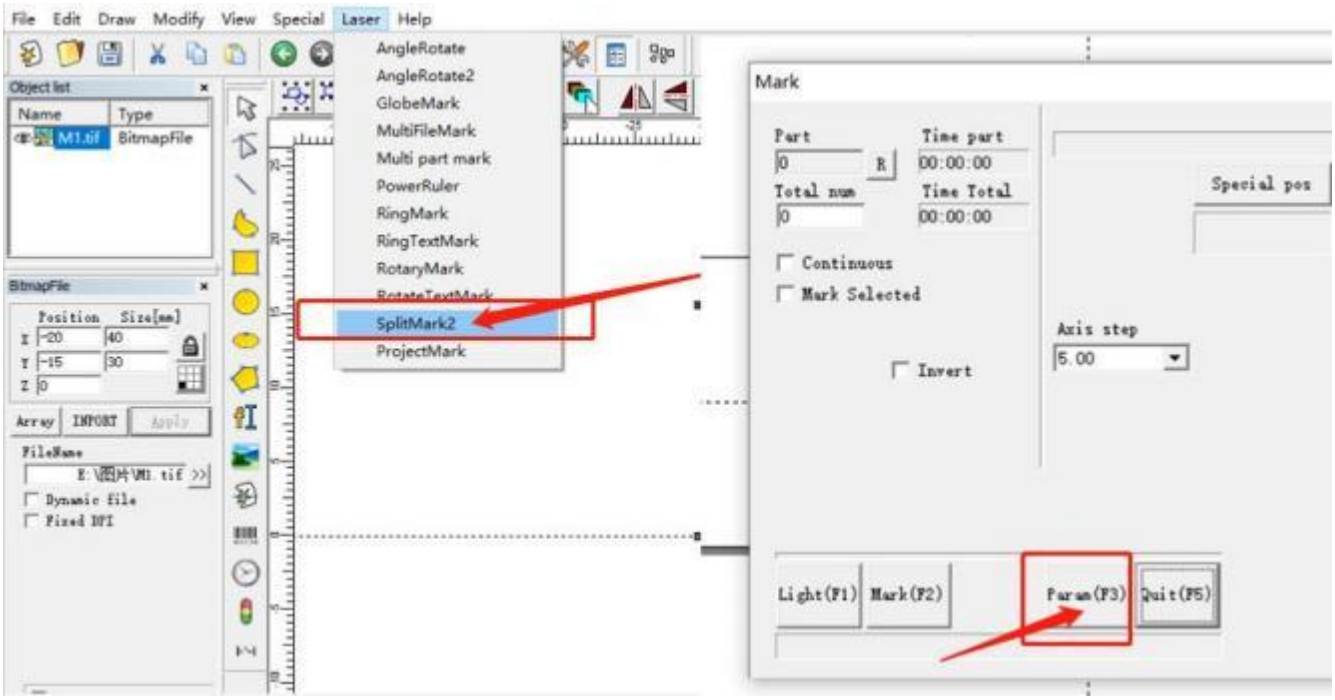


Step 4:Click OK, finish rotary axis parameter setting. Start Mark.

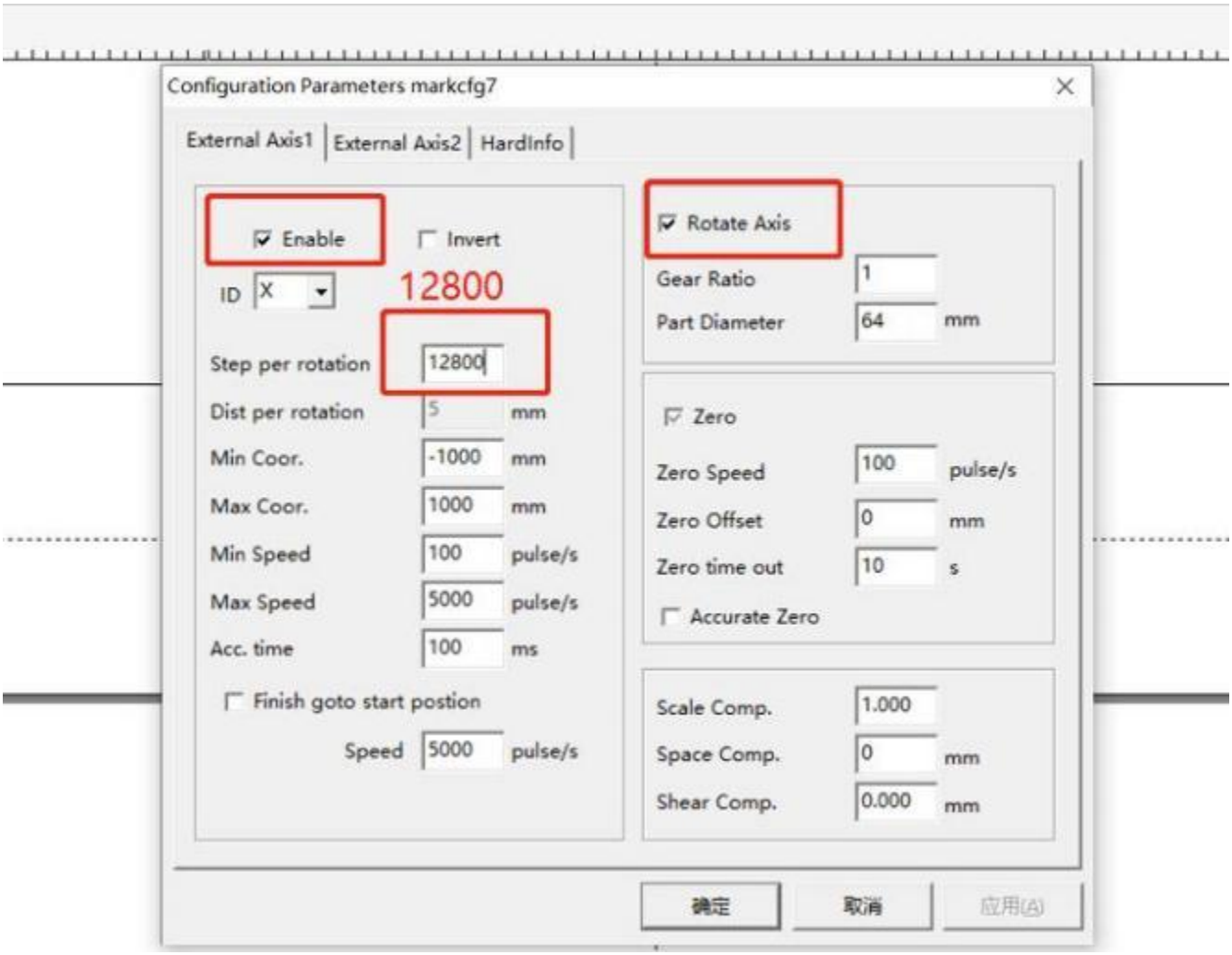


13.2 Marking pictures

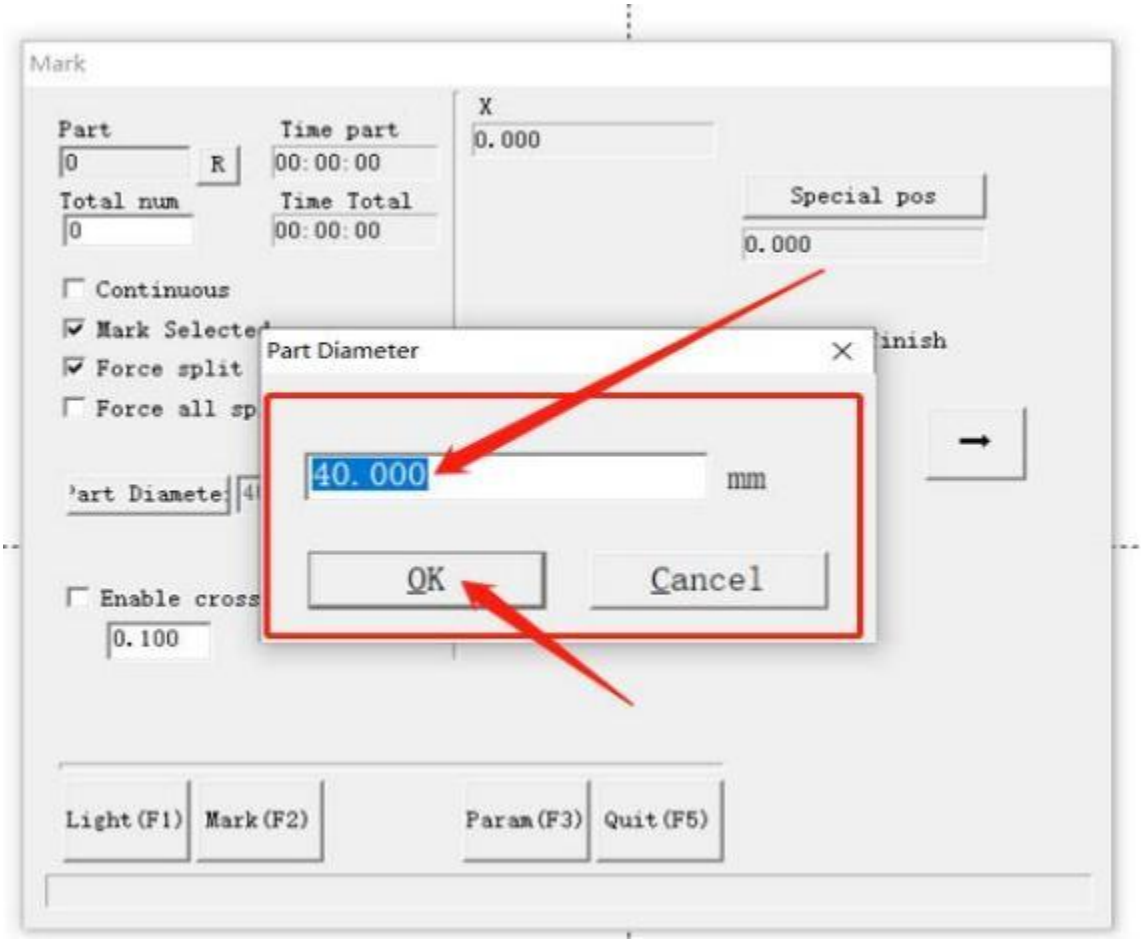
Step 1: Click Laser, choose “SpilitMark2”--Click “Param (F3)”



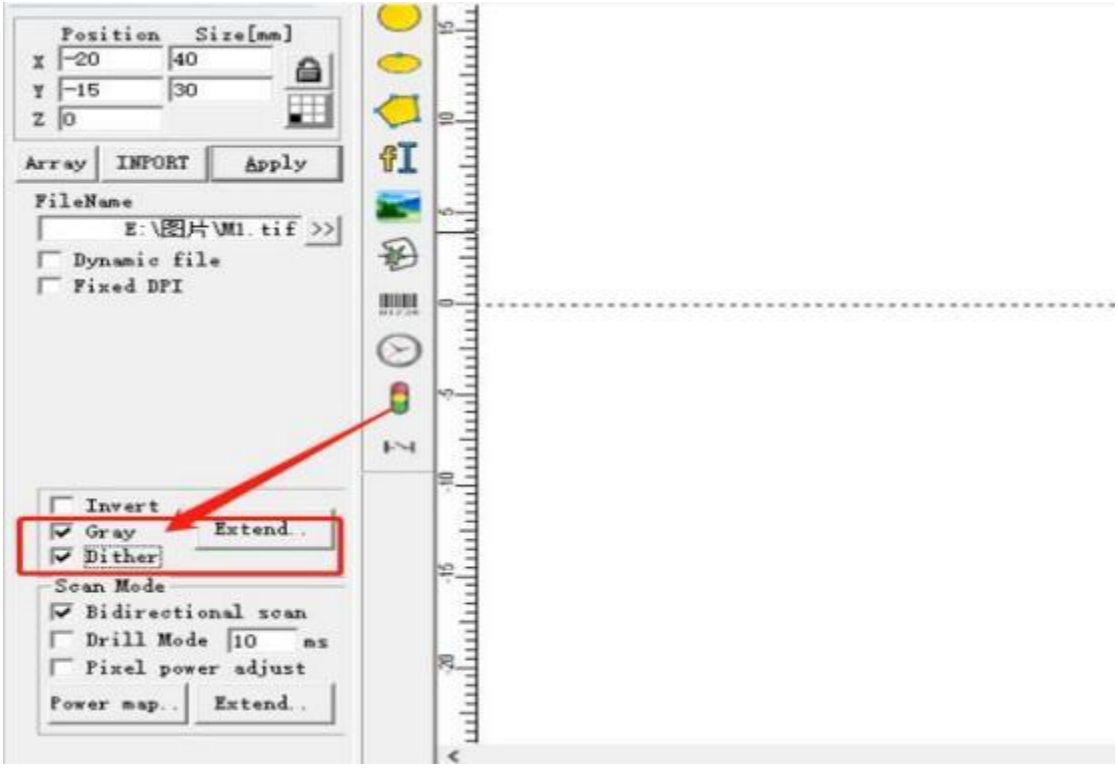
Step 2:Check “☑enable” “☑Rotary Axis”, set up “Step per rotation to12800”, Click OK.



Step 3:Find out the “Mark” button in the bottom left corner , Click “Part Diameter”, set up Part Diameter. (Diameter is the actual size of the material.)



Step 5:Choose “Gray” and “Dither”

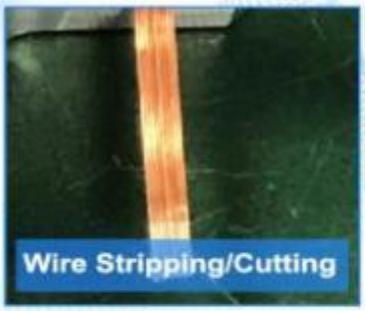


Choose “Gray” and “Dither” sample

Choose “Gray” sample

14. Reference parameter

Note: These are just some sample data references. For specific products and effects, you need to adjust the parameters yourself



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER Paint Stripping	F=160mm	10X	0.01mm/s	1μs	150KHz	1000mm/s
Cutting			0.01mm/s	1μs	140KHz	120mm/s

Process analysis: Fiber laser stripping will cause oxidation, and will lead to plastic melting affect the subsequent soldering process, UV light source stripping plastic heat-affected zone, cutting copper wire burr small

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=254mm	10X	0.04MM	8μs	45-60 KHz	2000mm/s

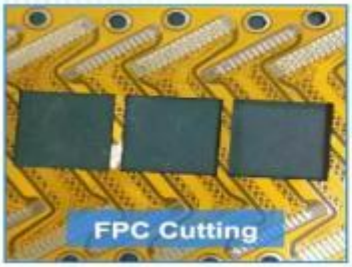
Process analysis: The individual pulses of energy are more moderate so that they damage the substrate as little as possible, and the material removes more cleanly with UV stripping.

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV Laser	F=170mm	10X	0.02mm	1μs	80-100KHz	20mm/s

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
10W UV LASER	F=100mm	10X	/	1μs	120-150 KHz	/

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
15W UV LASER	F=100mm	10X	40mm/s	5μs	50-70KHz	/

Process analysis: Higher energy is required to cut the mulch film, and the fewer cuts you make the less carbonization will occur.



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
15W UV LASER	F=100mm	10X	/	1μs	60-70 KHz	1000mm/s

Process analysis: FPC flex circuit board cutting requires higher energy, the fewer cuts the less carbonization will occur.

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=254mm	10X	0.04mm	4μs	80-100KHz	2000mm/s

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=170mm	10X	/	1μs	30-40KHz	10mm/s

Process analysis: The ceramic surface is a highly reflective material that requires a high energy density for marking, otherwise it is prone to instability or light color.

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV Laser	F=254mm	10X	/	8-12μs	45-60KHz	2000mm/s

Process analysis: Narrow pulse width version of the laser, the peak power is higher in the marking can be done without feeling the effect.

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=254mm	10X	0.08mm	1-2μs	30-40KHz	2500mm/s

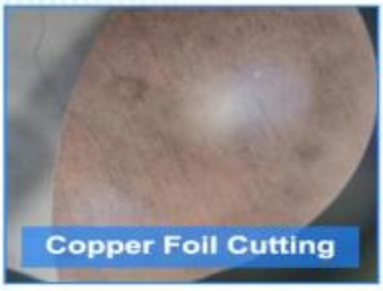
Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=163mm	10X	0.03mm	1-3μs	30-40KHz	1000mm/s

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
5W UV LASER	F=254mm	10X	0.03mm 0°+90KHz	6μs	80-90KHz	1000~1200 mm/s

Process analysis: As the surface layer of plastic is not broken, but is presented as a plastic heated blistering effect. Therefore, in the use of high-frequency relatively more heat for debugging.

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
10W UV LASER	F=100mm	10X	/	1μs	70KHz	1000mm/s

Process analysis: Higher energy is required to cut the mulch film, and the fewer cuts you make the less carbonization will occur.



Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
10W UV LASER	F=100mm	10X	/	1μs	120-150 KHz	150-200 mm/s

Process analysis: <0.1mm copper foil cutting with UV can get a better edge effect, while the blackening brought about by the thermal effect is more slight.

Laser source type	Filed lens	Beam expansion	Fill Density	Pulse width	Frequency	Speed
10W UV LASER	F=100mm	10X	/	1μs	120-150 KHz	/

15. Care and maintenance

15.1 Regular cleaning

Keep the surface of the equipment clean to prevent dust accumulation

15.2 Cooling system inspection

- Regularly check the coolant level and the operation of the cooling system
- Cooling system water temperature setting:
- Water cooler 25 ± 1 ℃ (no need to change in summer)
- Coolant requirements:
- Purified water is used as cooling water, and it is recommended to use purified drinking water and replaced every month.
- To prevent mold growth in the water in the chiller from causing pipe blockage, it is recommended to add ethanol with a volume ratio of 10% when adding purified water.
- When the ambient temperature of the equipment is between - 10 ℃ and 0 ℃, the ethanol solution with a volume ratio of 30% must be used and replaced every two months.
- When the ambient temperature of the equipment is lower than - 10 ℃, the dual-system (with heating function at the same time) water chiller must be used, and the uninterrupted operation of the cooling system must be guaranteed.
- Other requirements for the cooling system:
- When starting the cooling system for the first time, check the entire water system and connections for water leaks. The external water pipes must be installed and connected according to the water inlet (IN) and water outlet (OUT) marked by the laser.Otherwise, the laser may not work properly.
- If the laser is not used for a long time, the cooling water inside the cooling system and the laser should be drained, otherwise the laser will be irrecoverable damaged.

16. Q&A

Q: What should I do if the U-Disk is not found in the package?

A: This is because the customs took out the U disk during customs clearance.

Please contact customer service in time and leave your email. We will send you the U-Disk Files.

Q: If the computer prompts that file has a virus when I install the JCZ software, what should I d

A: You must close all anti-virus software on your computer before installing the software.

Q: When I install the Ezcad software, it shows “Ezcad-Lite work only with UsbLmc- Lite, use Ezcad!” What should I do?

A: This is because your computer version cannot match the software.
Please contact us if you encounter this problem.

Q: What should I do if the effect of my marking is too shallow?

A: You can choose continuous marking. If you’re using 300x300mm field lens, please change to 110x110mm field lens.

Q: I bought a UV 5W laser machine, can i change a 300x300mm field lens,

A: No, we suggest 5W machine working lens no more than 200x200mm.