



# **AURORA Series**

## **Unified User's Manual**

### **For AURORA 8 & 8 PRO**

Thunder Laser

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# Introduction

This manual has been designated as the thunder laser systems, fiber laser machine installation and user guide; The manual is divided into eight chapters, including general information instructions, safety instructions, the key components of every laser systems and the installation steps, operation instructions and maintenance instructions from THUNDERLASER Company.

First, it should be emphasized that the installation of each system must meet the requirements, and make it consistent with the installation requirements of THUNDERLASER. If not, the machine will not working properly, poor performance, life shortened, maintenance costs increased and even machine damage.

The note is for getting a specific requirement of system installation, and we hope every customer try to understand these notes before installation and usage, thus you can correctly install and use. If you meet any installation problems, you can contact our technical staff and customer service staff.

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## Chapter1. General

### 1.1 General Information

Please read this documentation carefully before installation and operation.

**Injury, death, loss of property, fire, electric shock, malfunction, reduced performance & machine life, and critical failures can result from not reading, understanding, and following the Operation Manual!**

Operation of the system is permitted only with equipment and spare parts supplied or listed in the spare parts and consumables lists. The use of 3<sup>rd</sup> Party components may void the warranty.

Auxiliary equipment must be adjusted to the base machine (contact us for further info).

The following symbols are used throughout the Operation Manual:



**Caution:** Warnings to keep in mind when operating the laser.



**High Voltage:** Care must be taken to prevent injury and/or death.



**Laser Radiation:** Pay attention to the dangers of the laser beam.



**Fire Hazard:** High potential for fire. NEVER RUN UNATTENDED!



**Tips:** Helpful notes or info that simplify the use or understanding.

## 1.2 Designated

The THUNDER LASER AURORA SERIES is intended exclusively for laser marking using the supplied marking software.

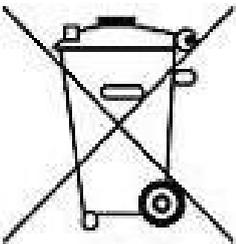
Materials such as metal, anodized aluminum, and several plastics can be PROCessed on the laser.

The following points should also be observed as part of the intended use:



- 1.The engraving process must only be performed with a perfectly adjusted machine.
2. Only mark approved materials using suitable parameters.
3. Use of the system in other areas is against the designated use. The manufacturer does not admit liability for damage to personal and/or equipment resulting from such use.
4. The system must only be operated, maintained and repaired, by personnel that are familiar with the designated field of use and the dangers of the machine!
5. Non-observance of the instructions for operation, maintenance and repair described in this Operation Manual excludes any liability of the manufacturer if a defect occurs.
6. Caution when processing conductive materials (carbon fibers), Conductive dust or particles in the ambient air might damage electrical components and lead to short circuits. Bear in mind that those defects are not warranted.

## 1.3 Disposal remarks



### **Do not dispose the machine with domestic waste!**

Electronic devices have to be disposed according to the regional directives on electronic and electric waste disposal. In case of further questions, please ask your supplier. He might take care of proper disposal.

## 1.4 Technical Data/Device Specification

### Mechanics

	AURORA 8		AURORA 8 PRO	
Max marking area	200*200mm/7.9"			
Max working area	200*200mm/7.9"			
Lens	Marking area	Max work Height	Focus Diameter	Focus length
F-160	4.3"×4.3"/110×110mm	7.9"/200mm	25.95μm	7.1"/180mm
F-210	5.9"×5.9"/150×150mm	5.7"/145mm	40.9μm	9.5"/233mm
F-290	7.9"×7.9"/200×200mm	1.2"/30mm	47μm	13.8"/350mm
Max marking speed	2m/sec, 200cps		8m/sec, 800cps	
Z-axis	Motorized Z-axis, 15.4"/390mm			
Table	Alumina table, 14.2"×10.5"/360×265mm			
Net weight	71kgs/157bs		72kgs/159lbs	
Housing dimensions(W*D*H)	27.7"×17"×32"/703mm×430mm×812mm			
PS	AURORA 8 comes standard with F-160, and 8 PRO comes with F-210 as standard			

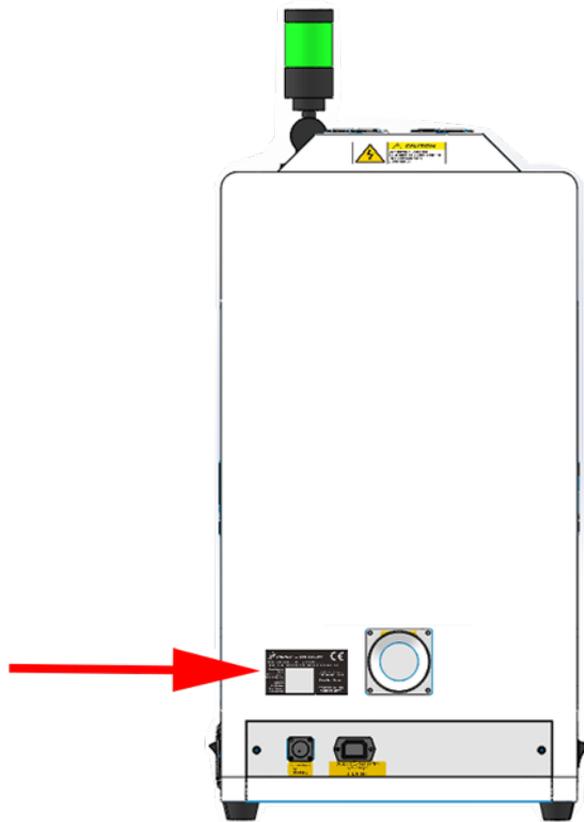
### Laser Equipment

	AURORA 8		AURORA 8 PRO	
Laser power fiber	20,50watts			
Laser power MOPA	20watts			
Wavelength	1064nm			
Frequency	20W	50W	20W(MOPA)	
	20-60kHz	50-100kHz	1-4000kHz	
Pulse width	110ns		2-350ns	
Cooling	Air cooled			
Red dot pointer	Laser Power<1mW, 630-680nm			
PS	AURORA 8 comes standard with Fiber 20W, and 8 PRO comes with MOPA 20W as standard			



## 1.5 Manufacturer's Label

The Manufacturer's Label is located on the backside of the machine (see picture below)



It is recommended to record all of the data so that you always have this handy. You will need to supply your Serial Number to our Support Team on occasion.

 <b>THUNDER LASER SYSTEM</b>	
<b>DONGGUAN THUNDER LASER EQUIPMENT CO.,LTD</b> Shatian Town, Shatian Dadao, Mintian, Dongguan City, Guangdong Province, China	
<b>Rated voltage:</b> <b>Phase:</b> <b>Rated frequency:</b> <b>Full load current:</b> <b>Weight:</b> <b>Lasertype:</b> <b>Model/Type:</b> <b>Serial Number:</b> <b>Manufactured:</b>	<b>Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007</b>  <b>This Product Complies With EN 60825-1:2014.</b>  <b>Class 2 Laser Product</b> <b>www.thunderlaser.com</b> <b>MADE IN CHINA</b>

## Chapter2 Safety

### 2.1 General Safety Information

All personnel involved in installation, set-up, operation maintenance and repair of the machine, must have read and understood the Operation Manual and in particular the "Safety" section. The user is recommended to generate company-internal instructions considering the professional qualifications of the personnel employed in each case, and the receipt of the instruction/Operation Manual or the participation at introduction/training should be acknowledged in writing in each case.

#### **Safety-conscious of Working**

The machine must only be operated by trained and authorized personnel.

The scopes of competence for the different activities in the scope of operating the machine must be clearly defined and observed, so that under the aspect of safety no unclear questions of competence occur. This applies in particular to activities on the electric equipment, which must only be performed by special experts.

For all activities concerning installation, set-up, start-up, operation, modifications of conditions and methods of operation, maintenance, inspection and repair, the switch-off procedures that may be provided in the Operation Manual must be observed.

#### **Safety Information for the User and/or Operating Personnel**



1. No working methods are permitted that affect the safety of the machine.
2. The operator must also ensure that no unauthorized persons work with the machine (e.g. by activating equipment without authorization).
3. It is the duty of the operator, to check the machine before start of work for externally visible damage and defects, and to immediately report changes that appear (including behavior during operation) that affect the safety.
4. The user must provide that the machine is only operated in perfect condition.
5. The user must guarantee the cleanness and accessibility at and around the machine by corresponding instructions and controls.
6. No safety components may be removed or disabled (again we emphasize the imminent

dangers, for example severe burns, loss of eyesight, etc.). If the removal of safety components is required during repair and service, the replacement of the safety components must be performed immediately after completion of the service and repair activities.

7. Preparation, retooling, change of work piece, maintenance and repair activities **must only performed with equipment switched off** and by trained personnel.

8. **Any attempt to perform unauthorized modifications and changes to the machine can VOID THE WARRANTY.** This does not apply to preventative & general maintenance, adjustment and alignment, etc that follow Thunder Laser's best practices.

## 2.2 Laser Safety Information



1. To assess the potential dangers laser systems pose, they are classified into 2 safety classes, Thunder Laser AURORA series is a device of class 2. This is guaranteed by the protective housing and the safety installations.

Please note that improper and warranty operation of the device can override the status of Safety class 2 and can cause the emission of harmful radiation.

2. Without safety precautions, the following risks exist with exposure to laser radiation:

Eyes: Burns to the cornea

Skin: Burns

Clothing: Danger of fire

3. Never try to modify or disassemble the laser and do not try to start up a system that had been modified or disassembled!

4. Dangerous radiation exposure can result from the use of operation or adjustment equipment other than that described here, and if different operational methods are performed.

### 2.3 Safety Precautions when Operating the Device

Your Thunder Laser AURORA SERIES has an integrated safety system which immediately stops the job when the protection cover (Lid) is opened. An incomplete job will occur if the cover is opened during operation.

**Please remember the following safety precautions when working with this device:**



1. CO2 Fire extinguishers should be placed near laser. Always keep a properly maintained and inspected fire extinguisher on hand.
2. Do not store any flammable materials in the inside of the device. Particularly leftovers of produced materials have to be removed to prevent fire hazard.
3. Please maintain free airflow around this system at all times. Do not cover the machine while in operation.
4. Stay with the laser. Do not leave the laser unattended when it is working.



1. These lasers emit invisible radiation; safety glasses should be worn when maintaining these machines for your protection.
2. Adjustment of the beam path must be performed only by specially trained personnel. An improper setting can lead to uncontrolled emission of the laser radiation.

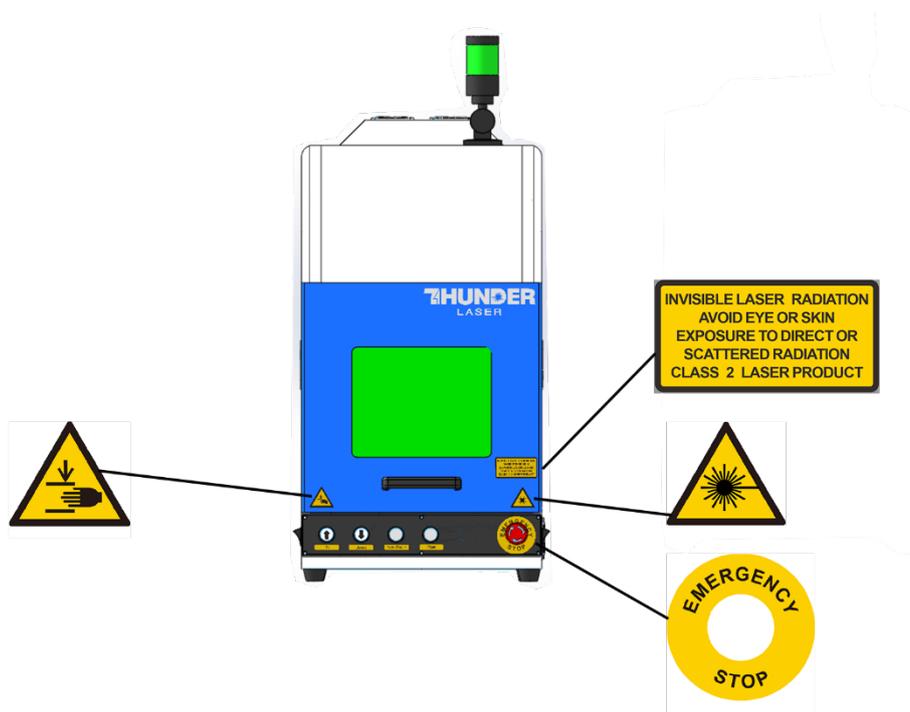


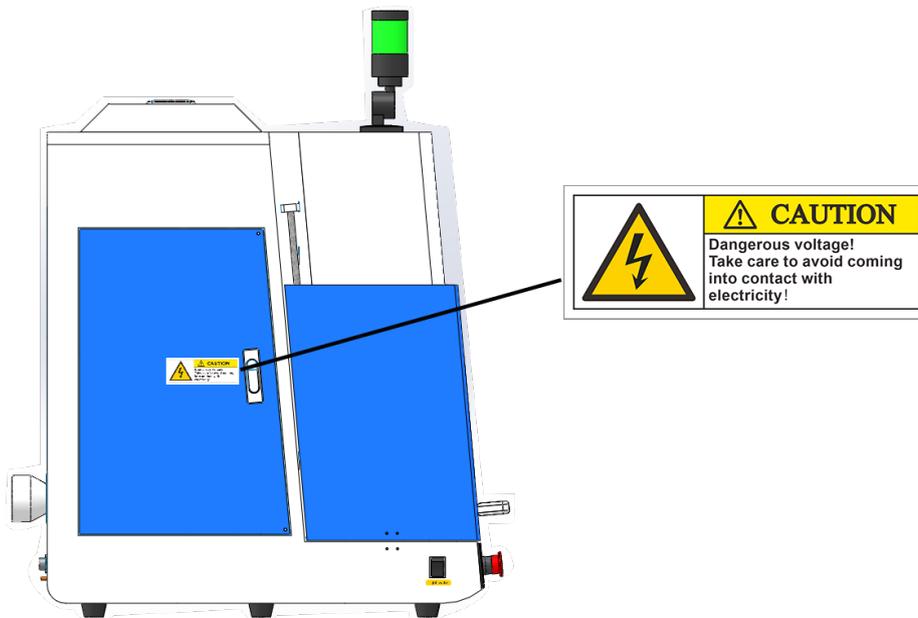
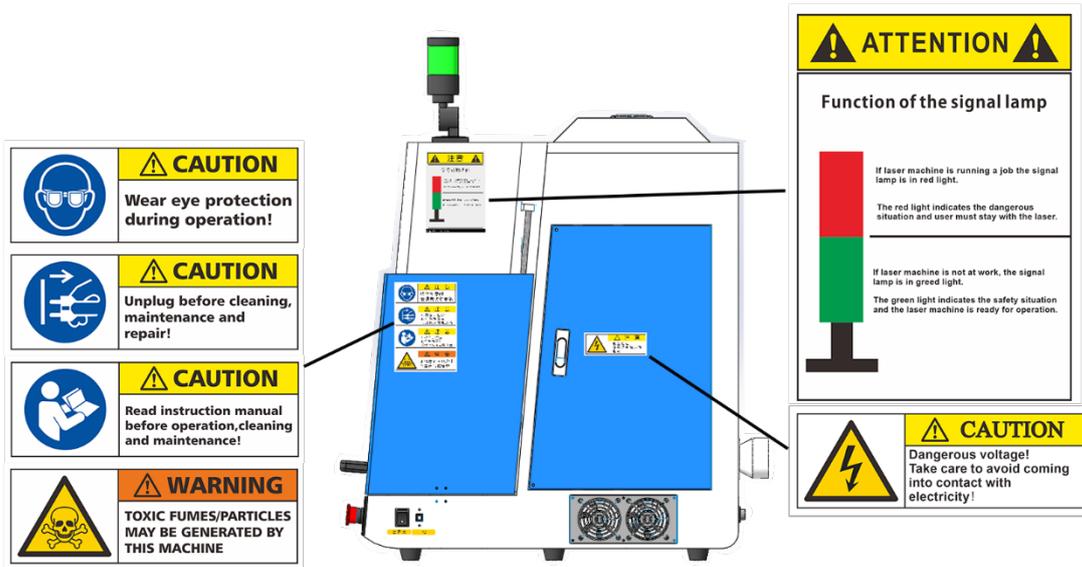
1. Do not disable limit switches or safety features as this can invalidate warranties and cause damage to you and the machine.
2. Before processing materials the user must verify whether harmful materials can be generated and whether the filter equipment of the exhaust system is suitable for the harmful materials. We emphasize that it is the responsibility of the user, to consider the national and regional threshold values for dust, fogs and gases when selecting the filters and the exhaust system. (The values for the maximum workplace concentration must not be exceeded.)
3. PVC (polyvinyl chloride) must under no circumstances be processed with the laser.

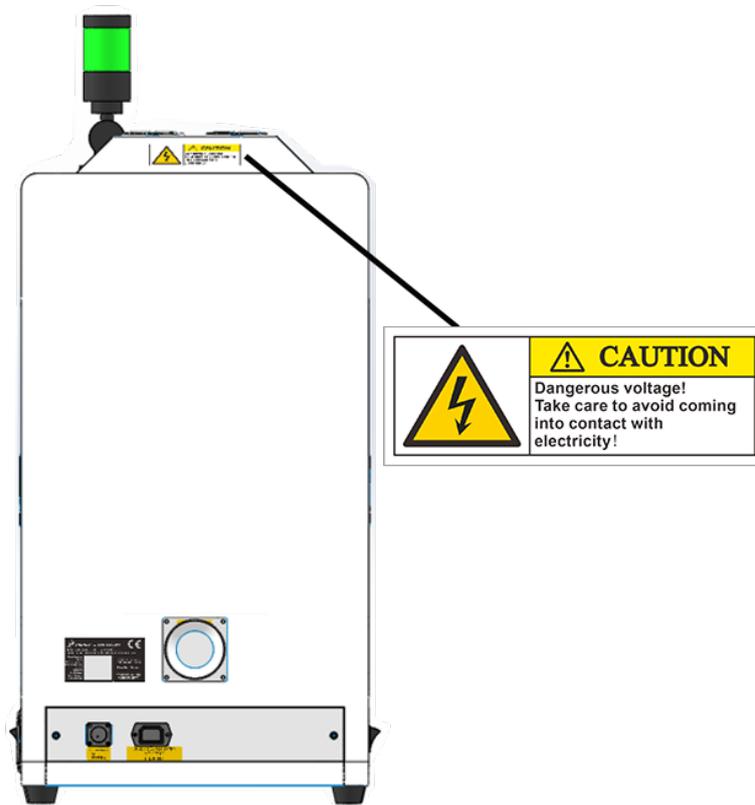
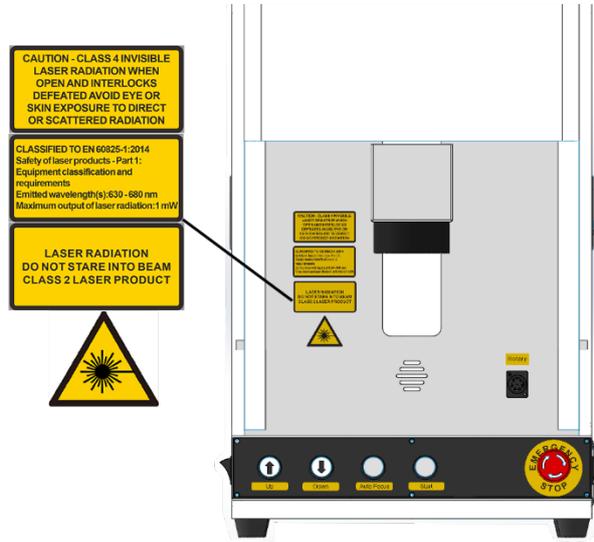
## 2.4 Warning and Information Labels



The warning and information labels in various locations of the machine should always be read carefully and understood. If labels are lost or damaged, they must be replaced immediately.







## Chapter3. PROcess of Installing

### 3.1 Unpacking

You receive your THUNDER LASER AURORA SERIES packed in a wooden box which contains the laser machine and additional accessories. The following steps give you an overview of the unpacking and assembly of the laser. Please follow these steps carefully.



Keep the packing box. You will require it in case of a return.

Dispose all waste according to the applicable waste disposal law.

1. Put the wooden box on a flat and spacious room for unpacking.
2. Remove the machine box; carefully remove the protective foam, wraps, films, etc.
3. Please keep the warranty certificate as well as the model and serial number of the machine. If you need tech support we may ask you for this information.
4. Then start to install the machine, carefully following the instructions in this manual.

### 3.2 Location

Before you install the fiber laser system, you should select an appropriate location. Follow the guidelines shown below:



1. Avoid locations where the system is exposed to high temperatures, dust and high humidity. (The humidity must not exceed 70% and the temperature must not be close to the dew point.)
2. Avoid locations, where the system is exposed to mechanical shocks.



1. Circuit Breaker protection: Do not connect other devices on the same circuit as the laser system. It requires a dedicated circuit.
2. DO NOT open any of the machine's access panels while the unit is plugged in. Opening a panel may expose the operator to severe electric shock, invisible laser radiation, mechanical pinch points, burns, blindness, and other hazards. ALWAYS POWER OFF AND UNPLUG!
3. DO NOT make or break any electrical connections to the system while the unit is turned on



1. Avoid locations with poor air circulation; select a location close to ventilation (if available). Select a location, whose room temperature is between 15 °C and 25°C (59° – 77° F).
2. This is fundamental to maintain consistent and reliable operation of a fiber laser and the machine itself. Avoid higher ambient temperatures and strong exposure of the engraver to the sun. Use blinds, if required.
3. Mechanical shock and vibration of the laser will have detrimental effects on the performance and life expectancy of the machine. It will manifest (over a period of time) with a noticeable decrease in performance and increased maintenance required, possibly even damage. Setting your Thunder Fiber Laser up in a suitable temperature controlled, dust free, moisture free, level, stable surface (a level concrete floor) with the recommended extraction is critical to the ongoing performance of the machine. It is also a warranty condition.

### 3.3 Connections



Perform the connections exactly in the order described; otherwise electrostatic charging can damage your computer and/or the electronics of the laser system.

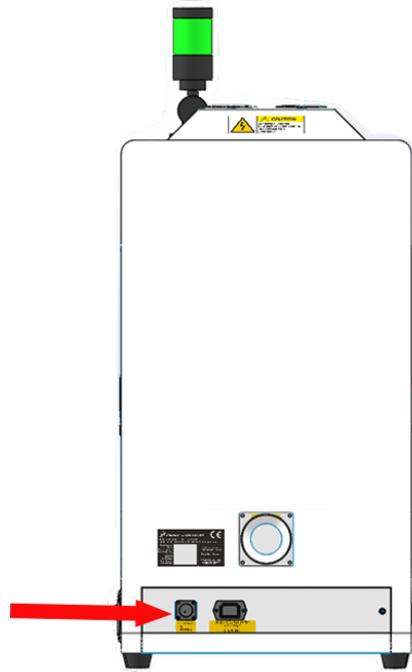
#### 3.3.1 Connecting the Mains

Connect one end of the mains cable with the connection socket at the rear side of the laser device (see Figure below) and the other end with a protected power outlet.

Mains voltage and operating voltage must correspond (AC 230V 50/60 Hz or AC 115V 50/60 Hz) – see information label beside the connection socket.



Under no circumstances should you switch on the device if the voltages do not correspond.



Power input  
AC 230V  
50/60Hz

Power input  
AC 115V  
50/60Hz

### 3.3.2 Connecting the Computer

Connecting the computer and the machine by using the USB cable. Like below:





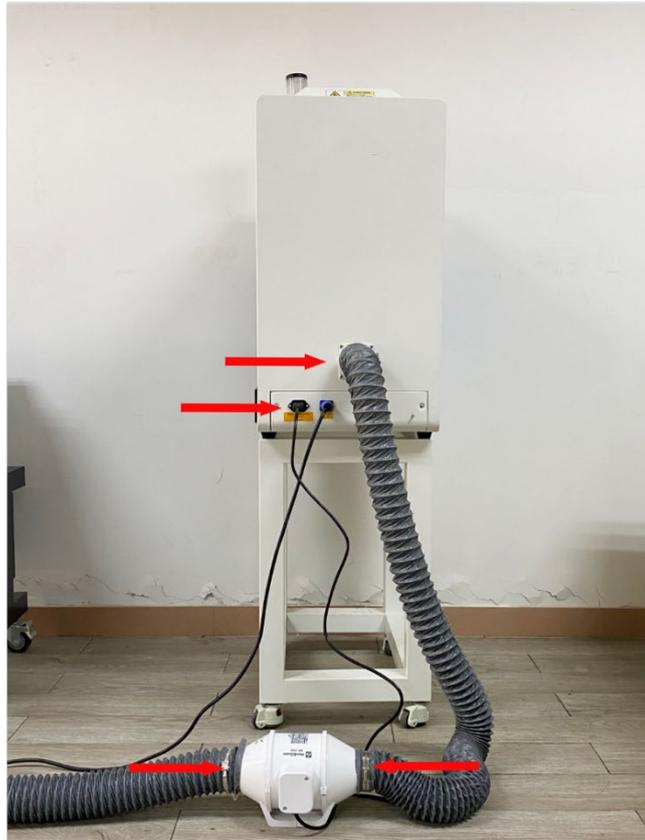
The USB cable is placed inside the toolbox.

### 3.3.3 Connecting the exhaust system

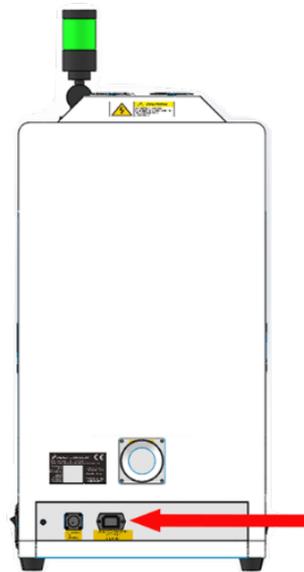
How to set up the exhaust system?

Insert one side of the gray exhaust pipe into the fan inlet and the other side into the fuselage behind the exhaust tank. Insert one side of the gray exhaust pipe into the fan outlet and put the other side of the pipe outside where you work (If the machine is far from the outside of the room that the gas manufactured by the machine cannot be discharged; then you might need a dust/fume filter, it can keep the air quality of your working environment well).

Please refer to the following pictures about how to install the exhaust pipe:



The input voltage must correspond (AC 230V 50/60 Hz or AC 115V 50/60 Hz) – see information label beside the connection socket.



Output: Exhaust fan  
AC 115V  
50/60Hz

Output: Exhaust fan  
AC 230V  
50/60Hz

## Chapter4. Machine view

### 1. Left side door

On fiber laser, there are installed Z motor and Driver, Z limit switches.

Please open this door for checking these parts, but must pay attention to the electric current.

### 2. Exhaust hole

This is for exhaust the fume.

### 3. Flap protection sensor

This is where open flap protection exist.

Laser will stop working once the cover is opened during working.

### 4. Light switch

Turn on the LED lamp inside the fiber laser.

### 5. Up button

You can raise the field lens up.

### 6. Down button

You can lower the field lens.

### 7. Auto focus button

The fiber laser will adjust the focus length automatically.

### 8. Start button

Start to marking job.

### 9. Emergency stop button

Once there's an accident happen during working, please turn off this switch immediately. It will be cut off the laser power and motion power immediately.

### 10. Rotary connector

To connect rotary device.

### 11. Field lens

You can replace the Field lens by rotate it.

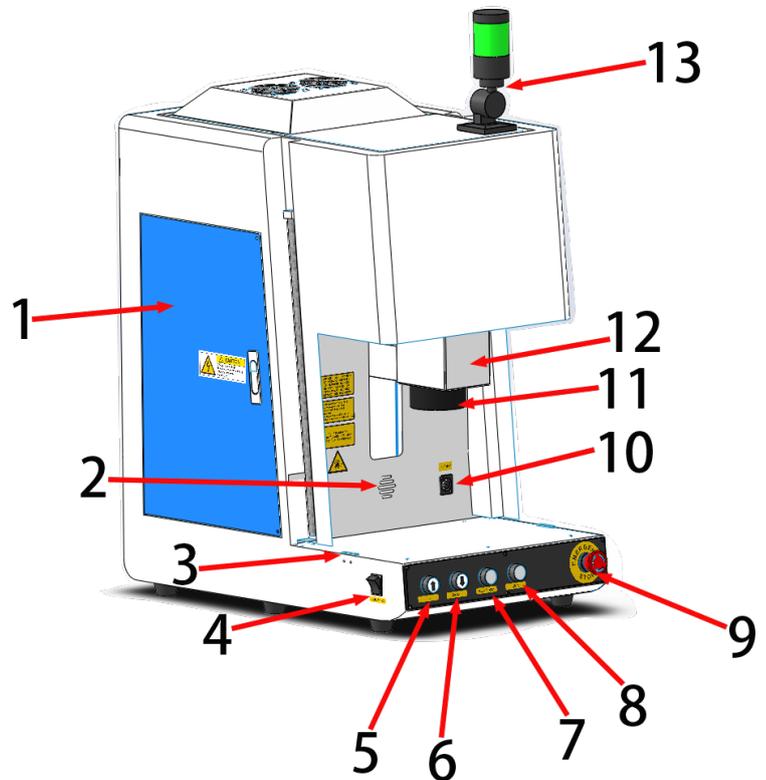
### 12. Galvanometer

Composed of two parts: optical scanning device and servo control.

### 13. Indicates light

If fiber laser machine is running a job, the signal lamp is in red light.

If laser machine is not at work, the signal lamp is in green light.



**14. Front door**

Open the door to put the material.

**15. Main switch**

The laser machine will be start while you turn it on.

**16. PC connection port (USB)**

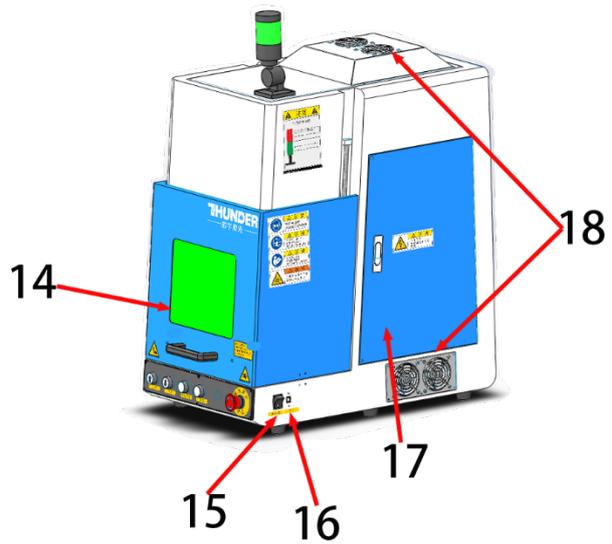
This USB is for connecting computer.

**17. Right side door**

On fiber laser machine, the laser inside the right door.

**18. Cooling fan**

To cooling the fiber laser machine and laser.



**19. Manufacture's label**

Show the laser information like serial number or manufacturing date etc.

**20. Main power socket**

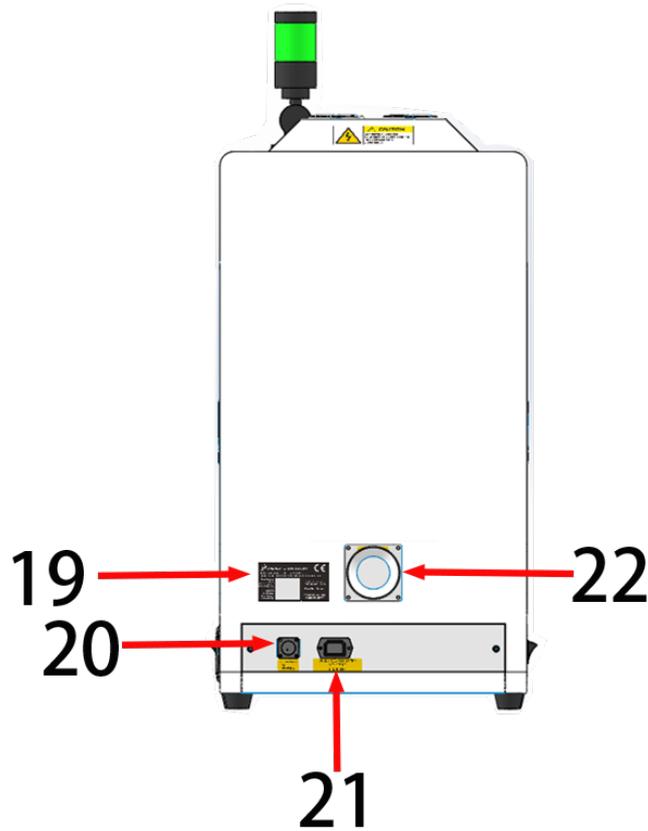
To connect the main power.

**21. Exhaust fan socket**

To connect the main power of exhaust fan.

**22. Exhaust hose**

This is for installing the exhaust device.



## Chapter5. Softwares Brief Introduction

For AURORA 8 and AURORA 8 PRO, the software is different. Please note which one is you need.

	AURORA 8	AURORA 8 PRO
Software	EzCad2	EzCad3

### 5.1 EzCad2

The EzCad2 software run on a PC with 900 MHz CPU and 256 MB RAM at least. In general, we recommend the fastest PC available. EzCad2 was developed in Microsoft Windows XP and will run in Windows XP, WIN7, WIN10and VISTA.

The installation of EzCad2 is very easy. Users simply need to copy EzCad2 folder that is in the Install FOLDER to hard disk, and then double click the Ezcad2.exe under the EzCad2's directory to run the software.

If user run the software without connect the fiber laser, a caution will appear and the software will work at demo state. In demo state, we can evaluate the software but we cannot save files and cannot control laser device.



The Software, Drive and Correction file are in the U-disk that came with the fiber machine.

#### 5.1.1 Driver Installation

Turn on the fiber laser

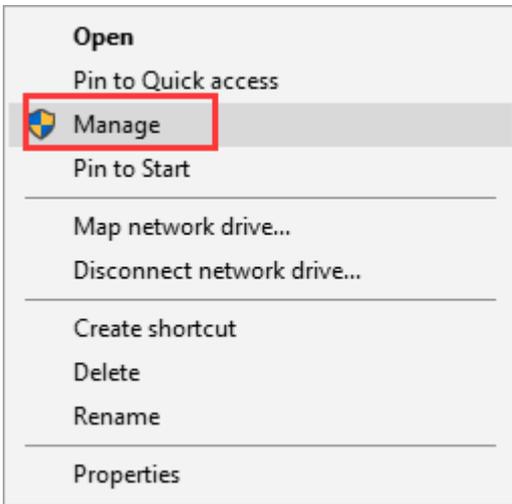
Connect your fiber laser and PC via USB cable.



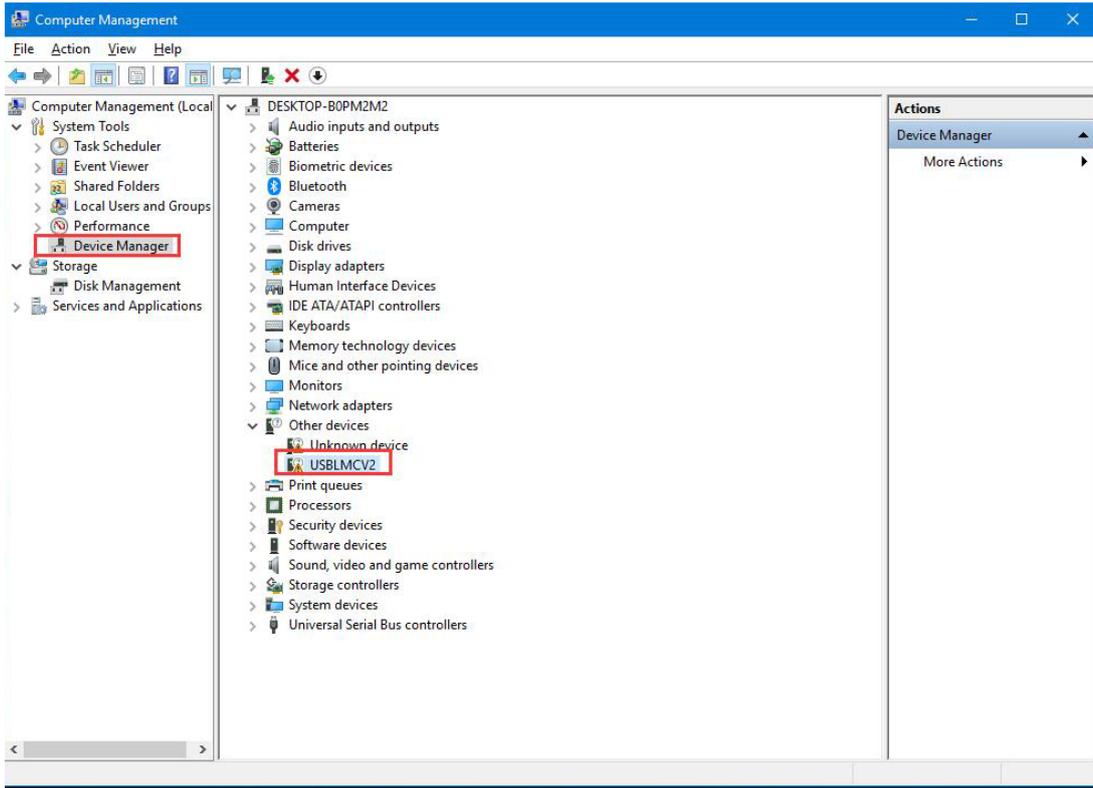
Before go to next step, please save the Driver file in the U- disk to your computer, and remember where it is.



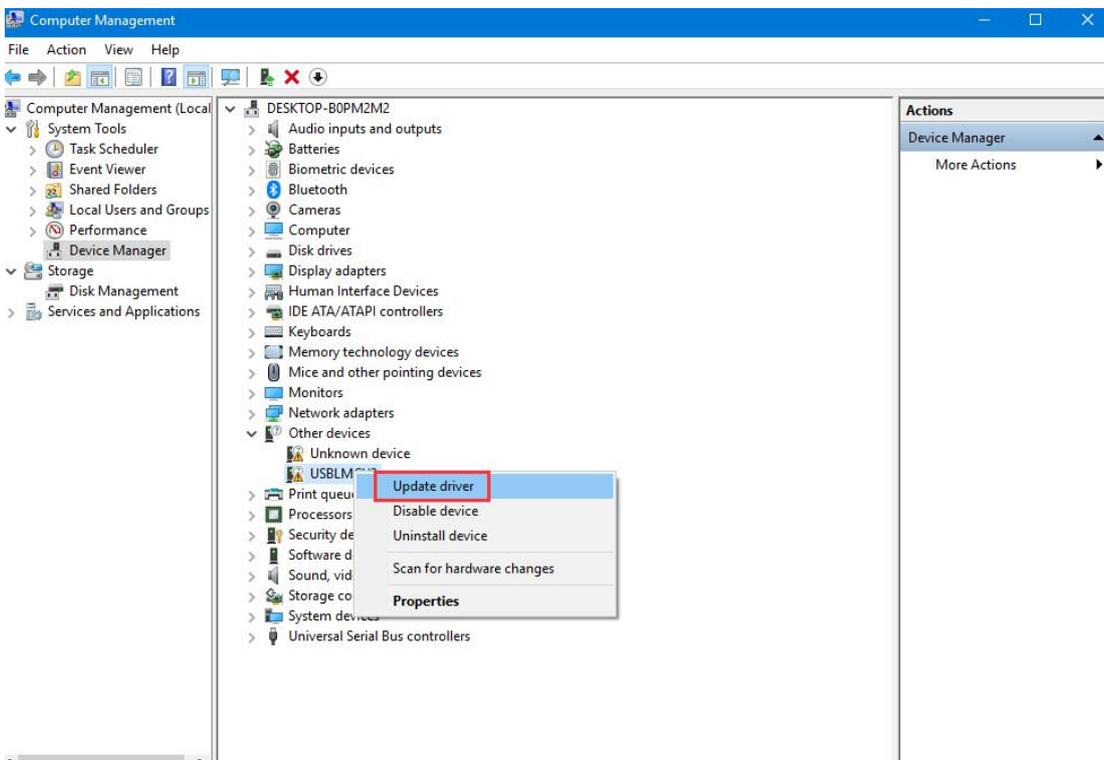
1. Go Manage>>Device manager>>Other devices>>USBLMCV2>>right click, Update driver>>Browse my computer for driver software>>Browse, and find the CV4 folder you saved from the U-disk that came with the fiber laser>>Select the CV4 driver>>Next>>Install, then the driver is installed successfully. See below pictures.



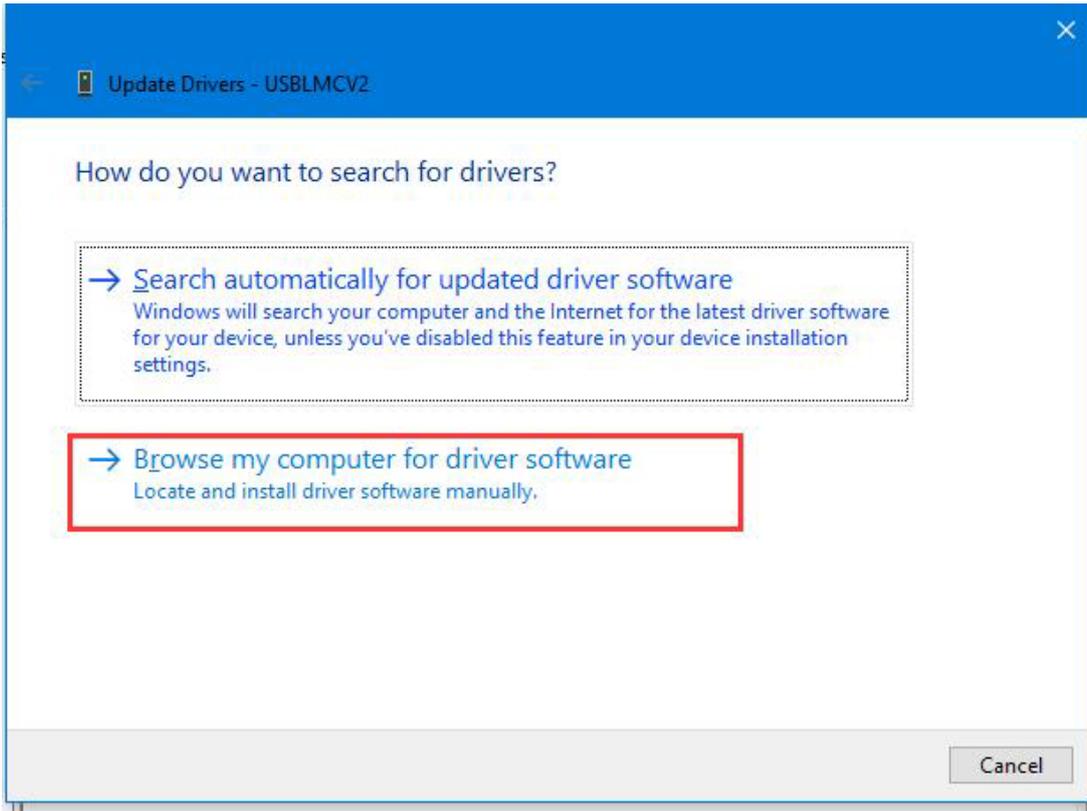
Pic1



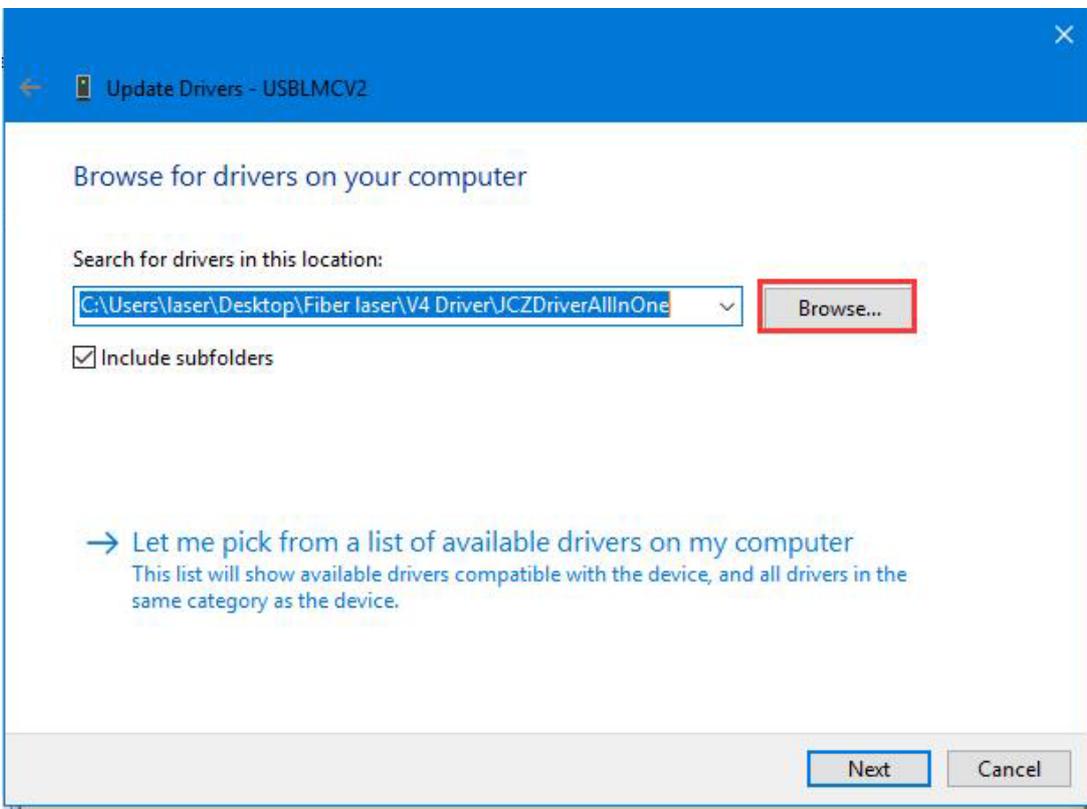
Pic2



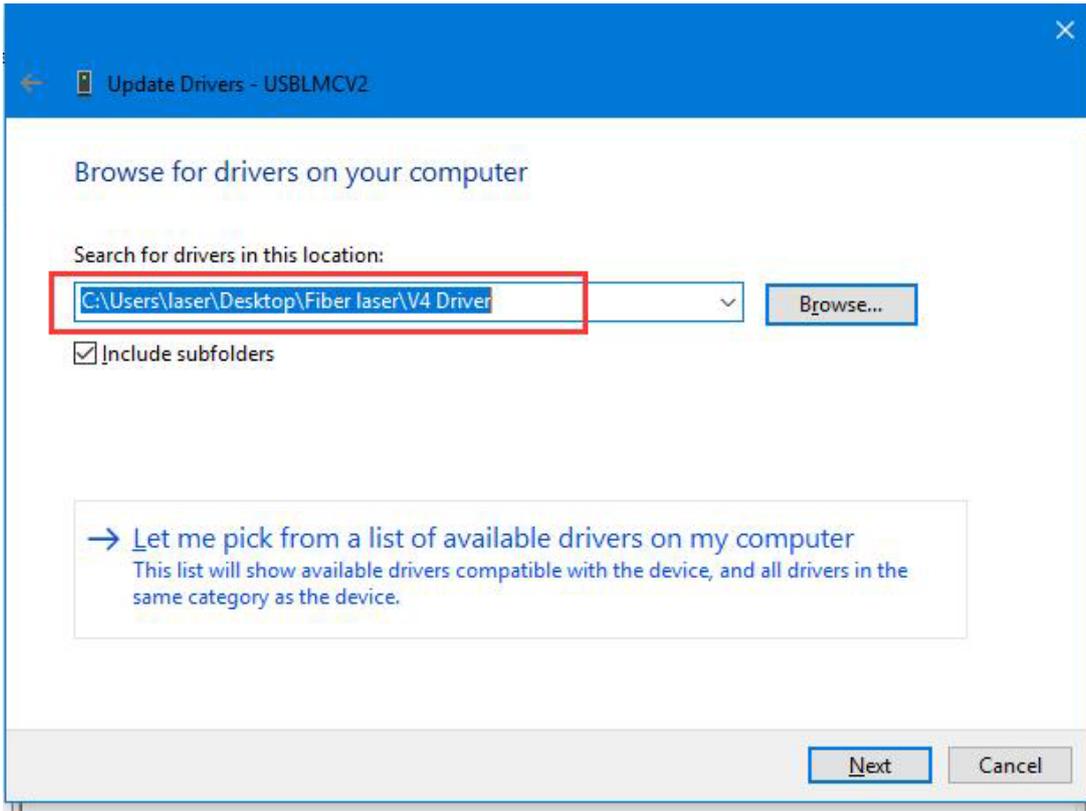
Pic3



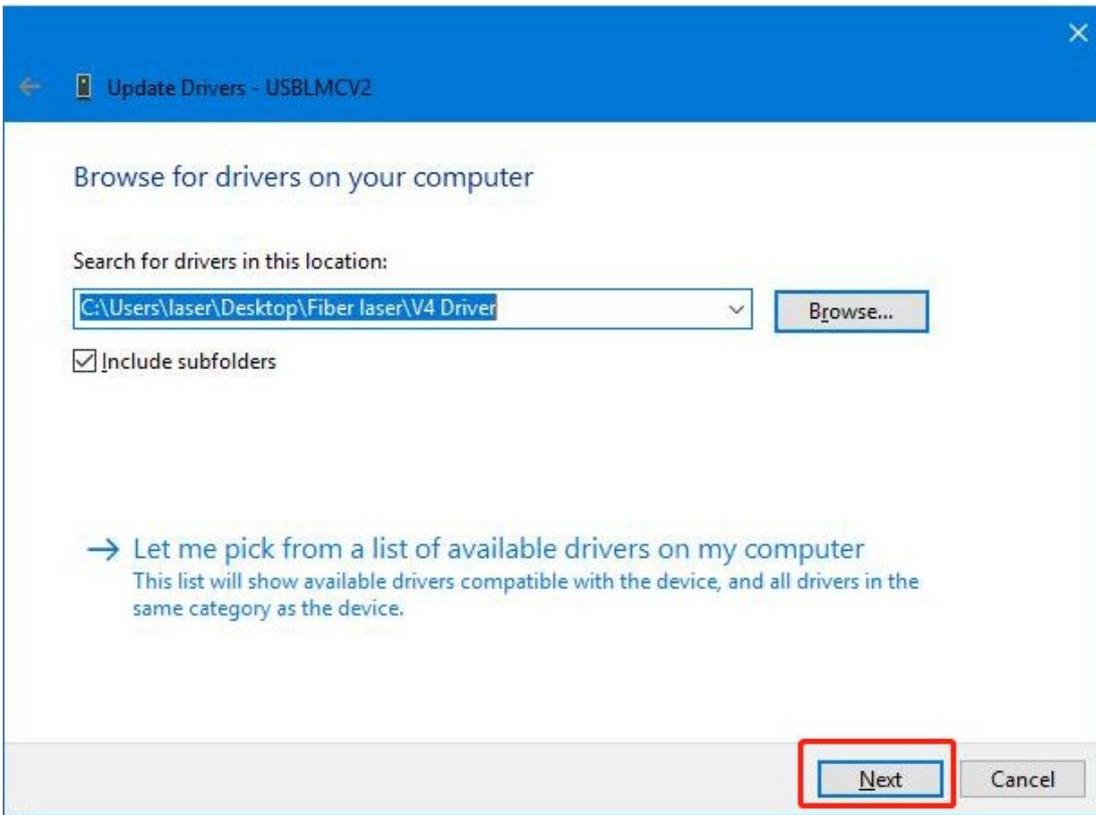
Pic4



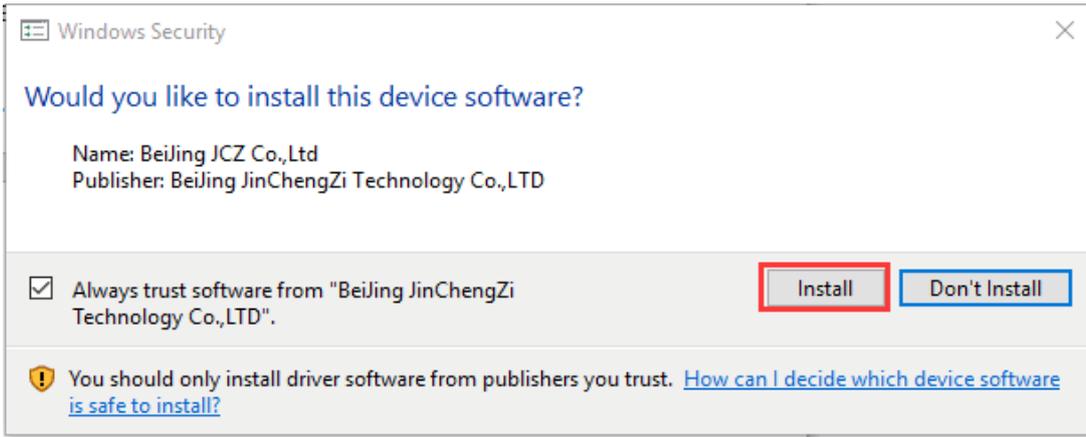
Pic5



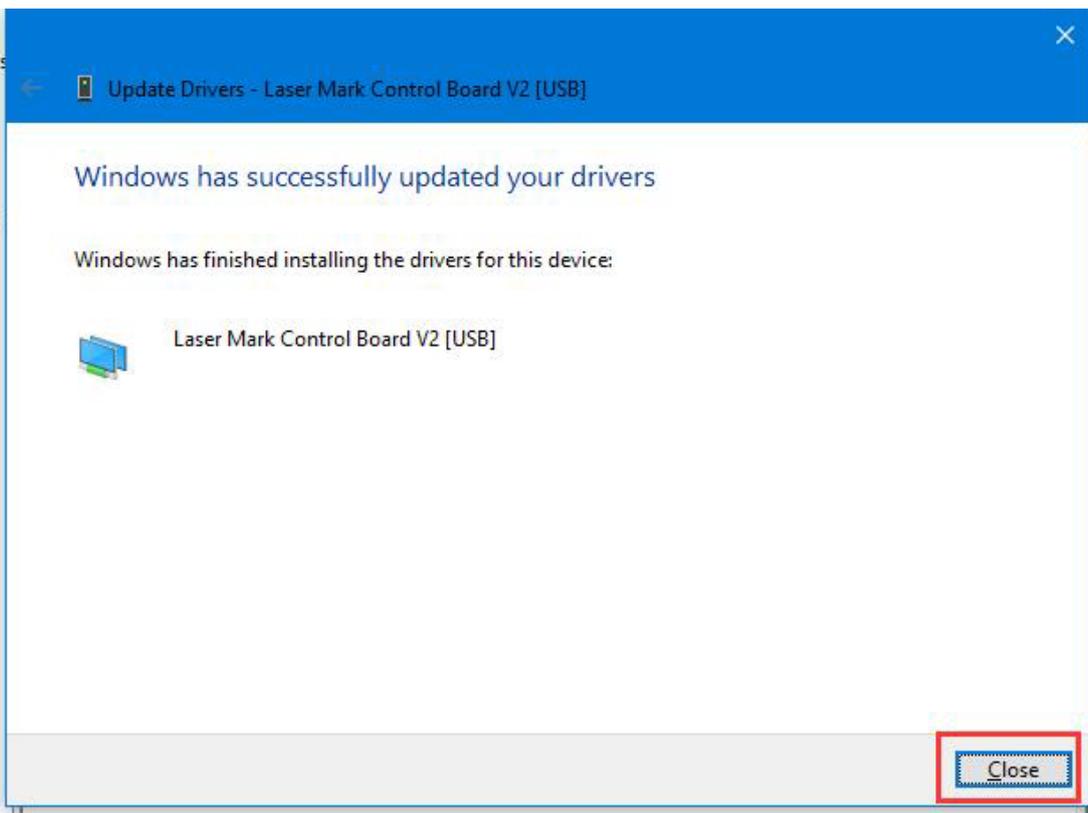
Pic6



Pic7



Pic8



Pic9

### 5.1.2 Software setting

#### 1. General setting

Open the software, then press “F3” and select items according to below picture (take AURORA 20W as an example) .

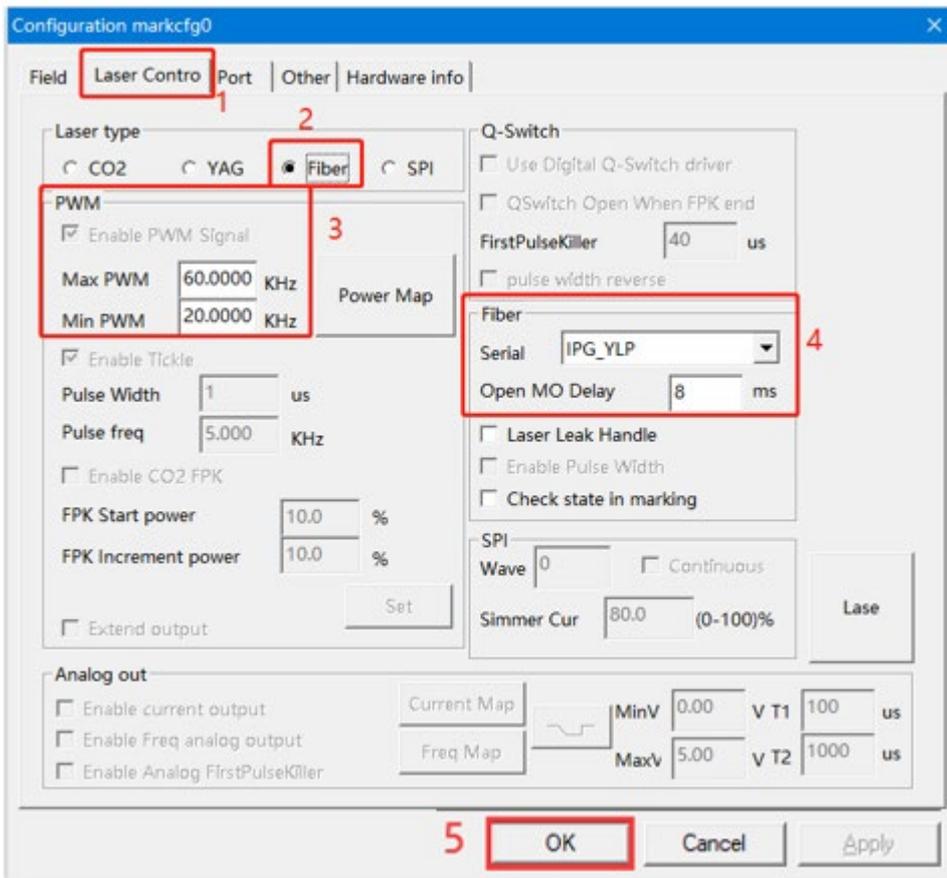
Laser type: Fiber

PWM:

Max PWM: 60KHz, Min PWM: 20 KHz.

Fiber serial: IPG\_YLP

Open Mo Delay: 8ms.



The frequency ranges for different laser source.

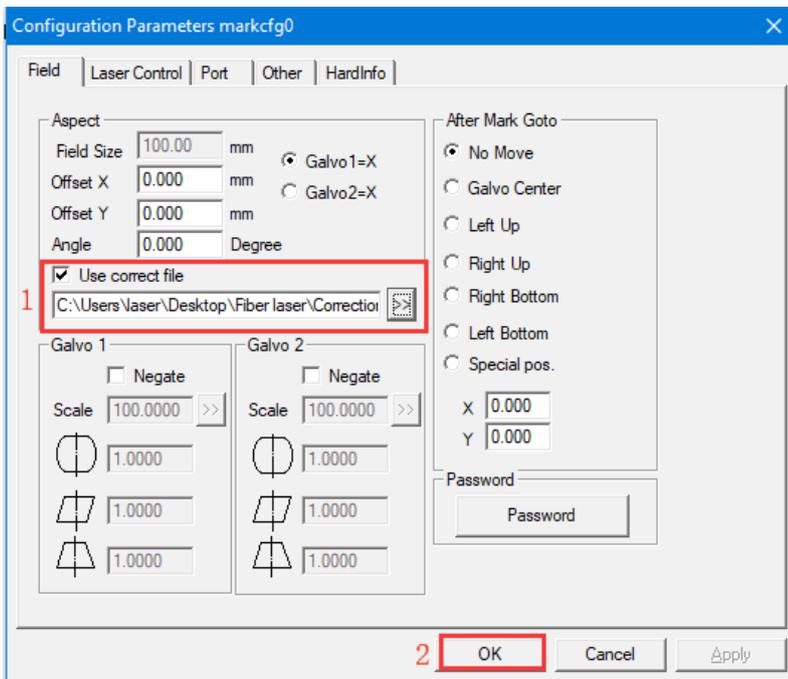
Laser fiber	20W	50W	
Laser MOPA			20W
Frequency	20-60kHz	50-100kHz	1-4000kHz

**2. How to import the correction file.**



1. Before leaving the factory, we have done a correction test for each machine and import the correction file to fiber software, so the customer does not need to do correction again.
2. Different field lenses have different correction files and cannot be used universally.
3. If the field lens selected by the random device is purchased from us, we will prepare the calibration file and put it in the U disk.

Open the software>>Press “F3” button>>Field>>find the correction file(let's say the name is 3×3.cor) in the USB disk that came with the machine.

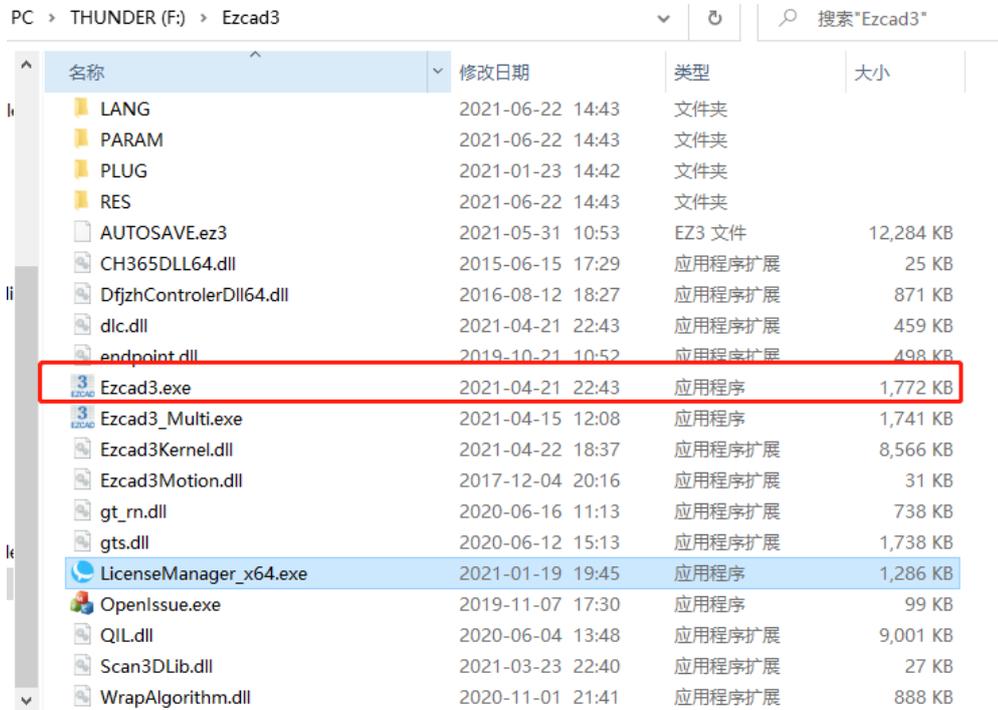


**5.2 EzCad3**

EzCad3 software standard computer hardware required for operation: dual-core CPU, memory 2G, hard disk 10G, dual native USB interface. The computer system software is Microsoft Windows operating system WIN7 64-bit, WIN8 64-bit and WIN10 64-bit. This manual fully states that the default operating system is Microsoft Windows.

**Note: It is recommended that the operating system choose PROfessional or Enterprise Edition.**

EzCad3 software installation is very convenient, users only need to copy the EzCad3.0 directory file on the installation CD directly to the hard disk. Then double-click the EzCad3.exe running software in the EzCad3.0 directory that has been installed. The computer must be authorized before the software runs, otherwise the software will not run normally.



The Software, Drive and Correction file are in the U-disk that came with the fiber machine.

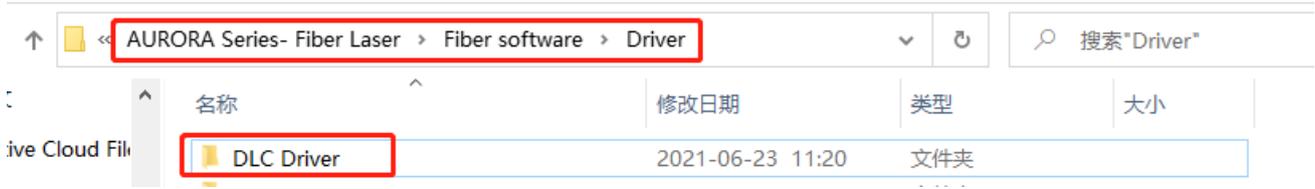
### 5.2.1 Driver Installation

Turn on the fiber laser

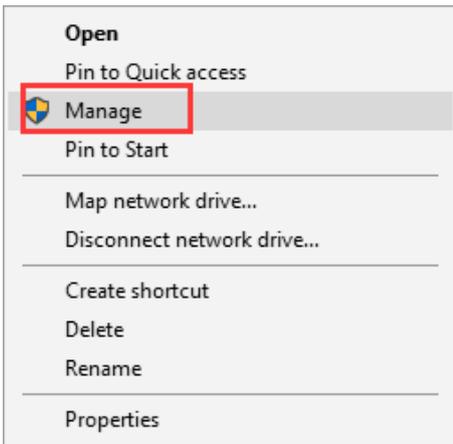
Connect your fiber laser and PC via USB cable.



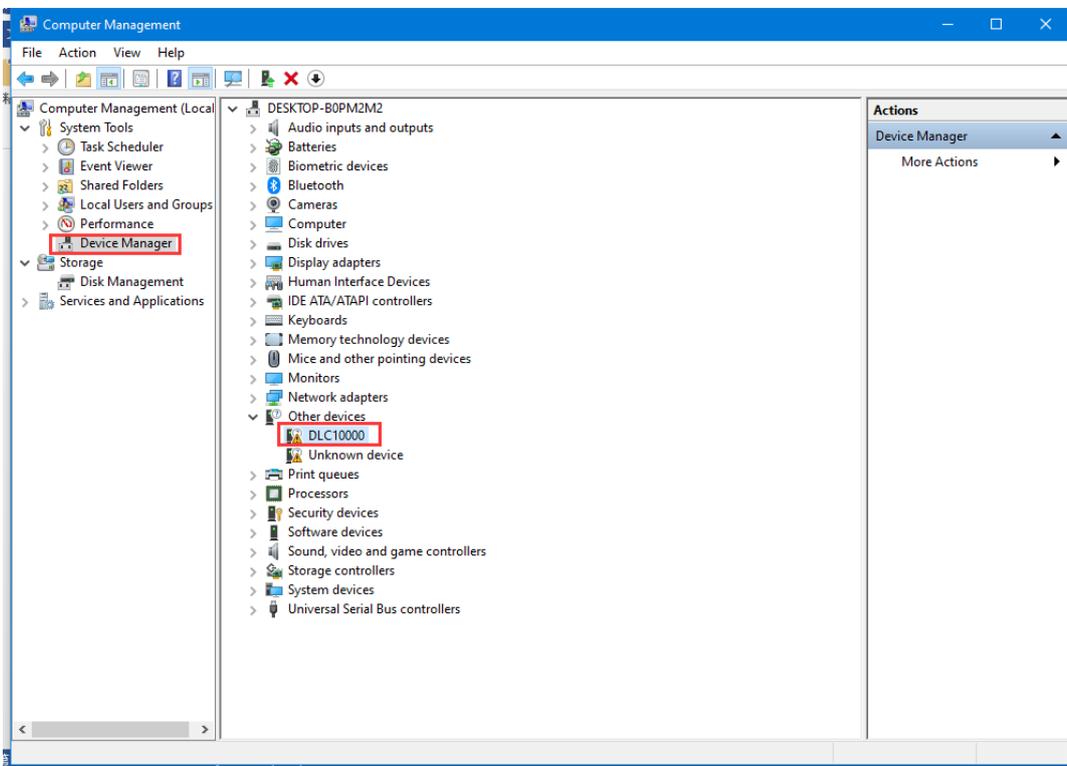
Before go to next step, please save the Driver file in the U- disk to your computer, and remember where it is.



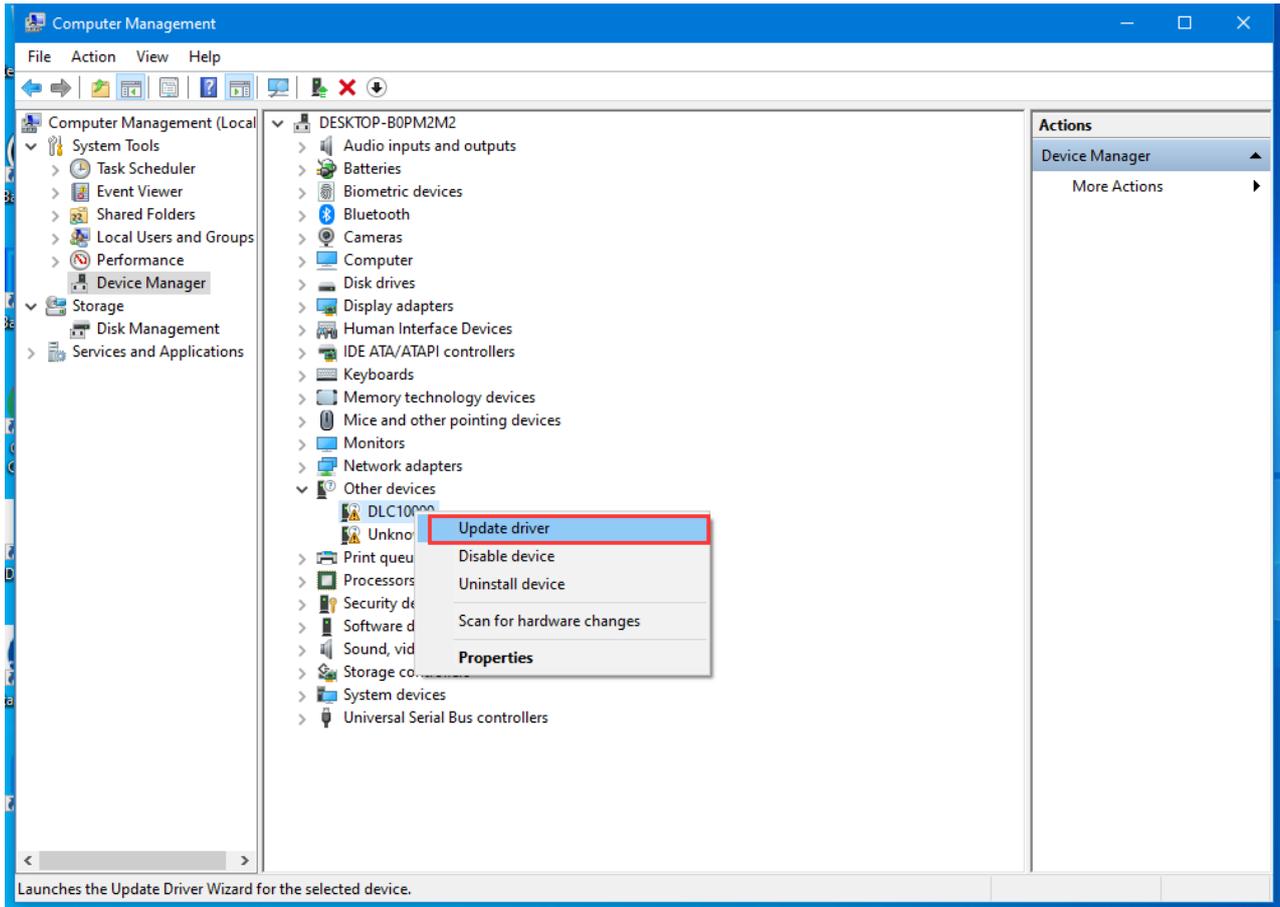
2. Go Manage>>Device manager>>Other devices>>DLC1000>>right click, Update driver>>Browse my computer for driver software>>Browse, and find the DLC1000 folder you saved from the U-disk that came with the fiber laser>>Select the DLC1000 driver>>Next>>Install, then the driver is installed successfully. See below pictures.



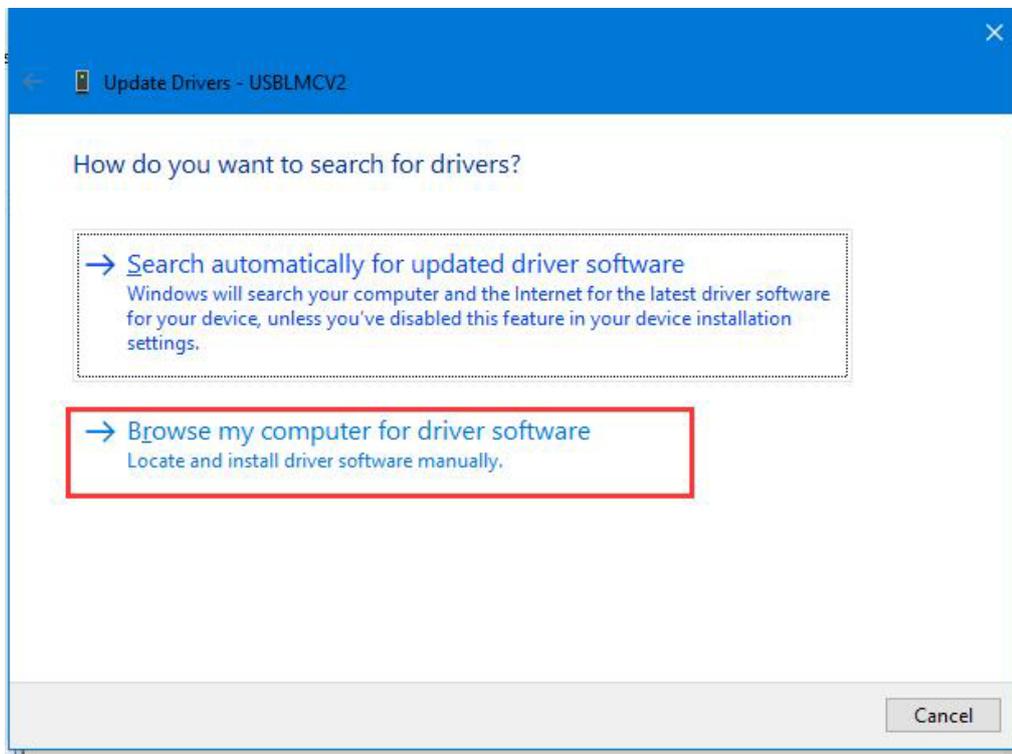
Pic1



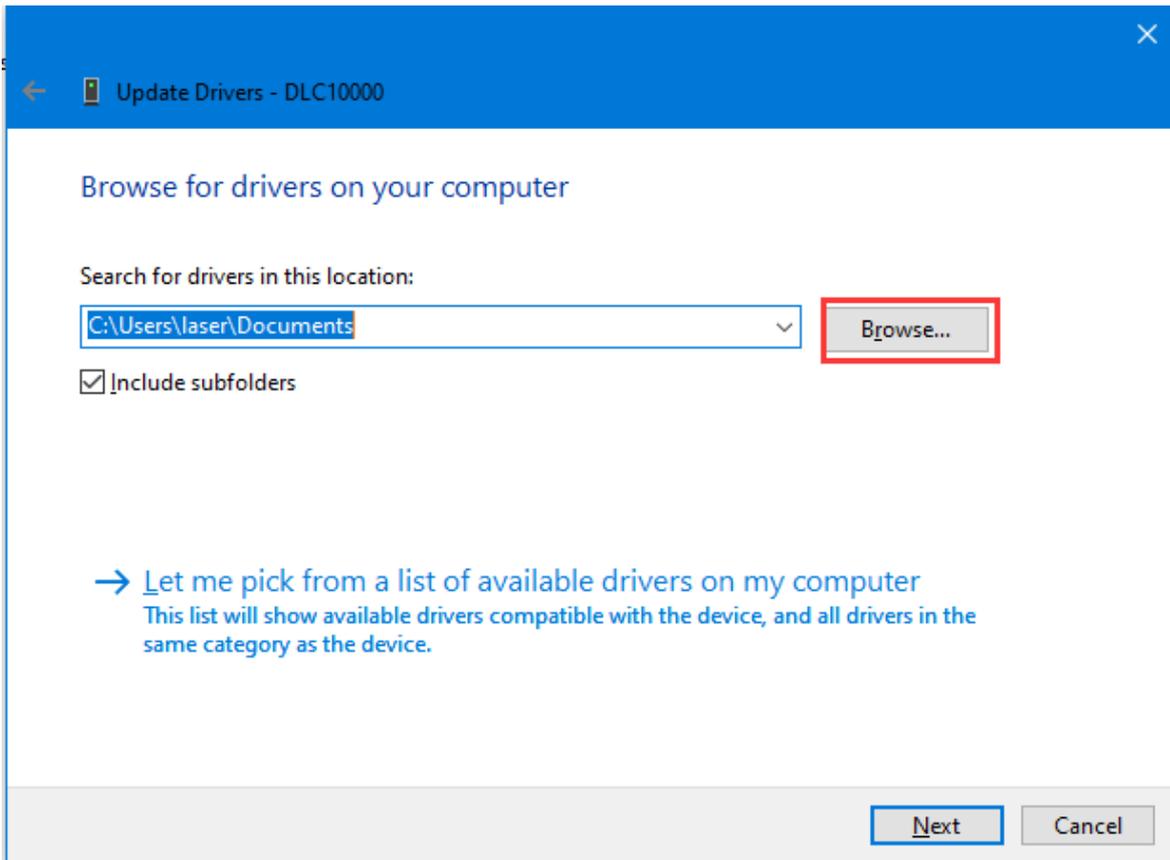
Pic2



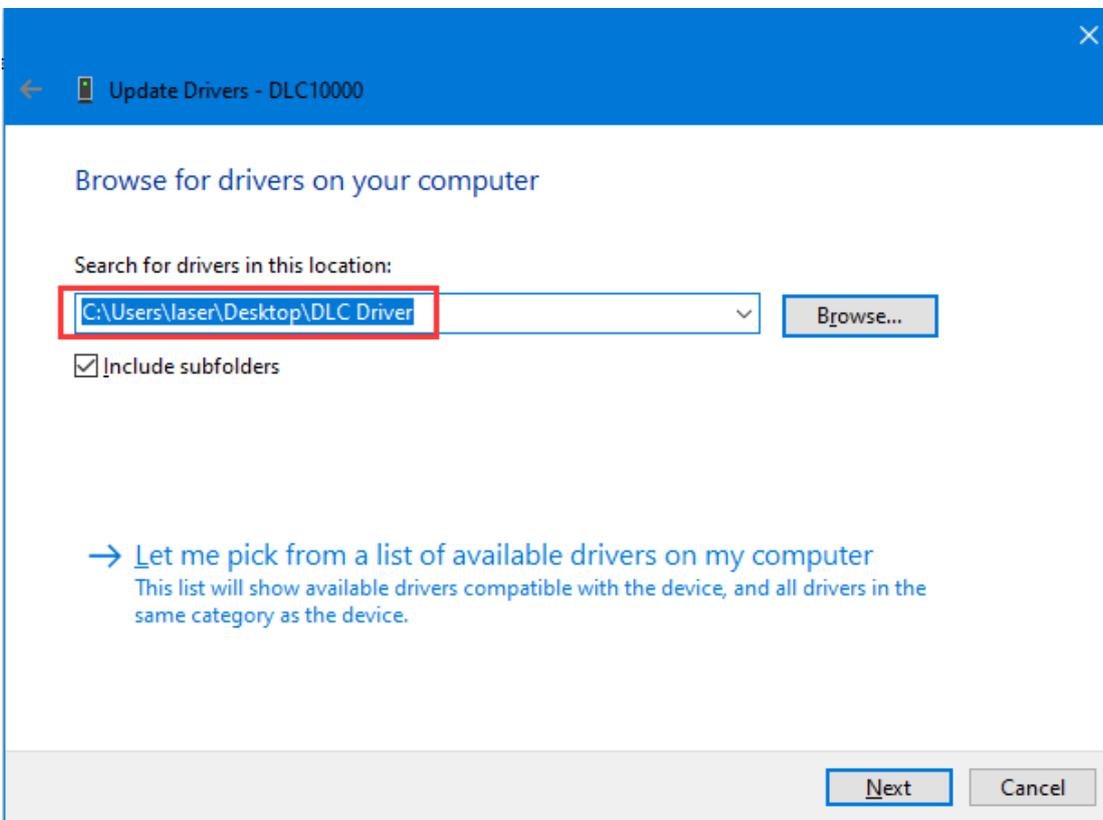
Pic3



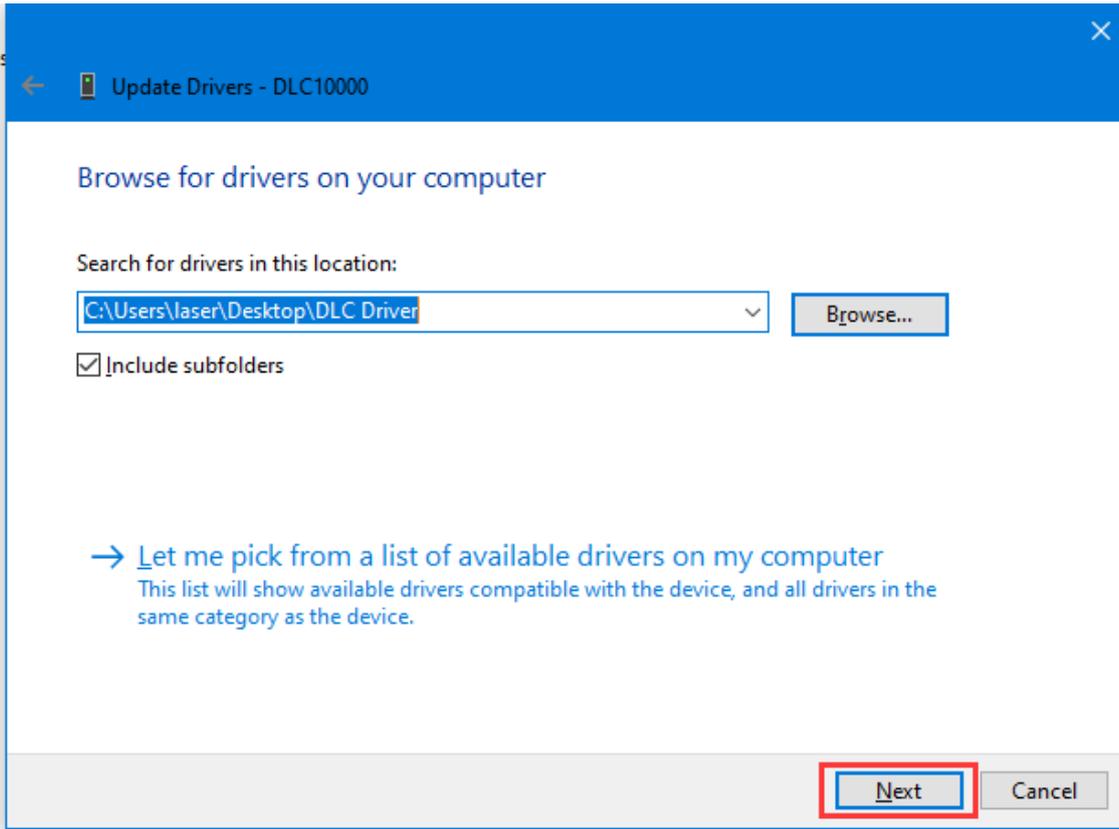
Pic4



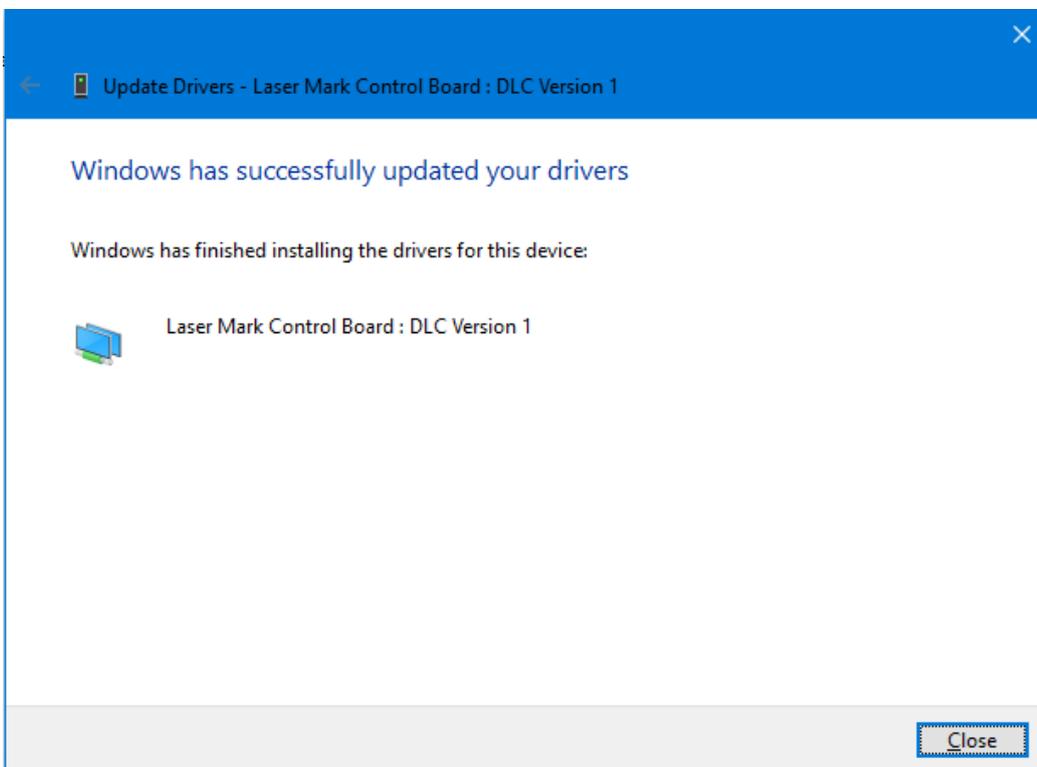
Pic5



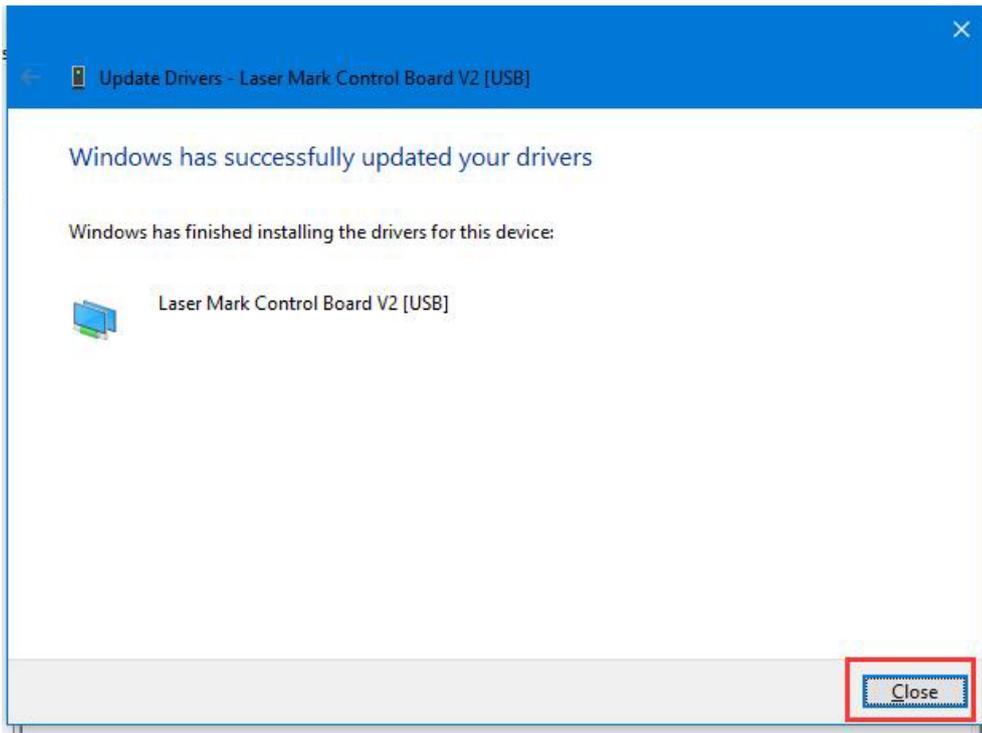
Pic6



Pic7



Pic8



Pic9

### 5.2.2 Activate the software

EzCad 3 needs to activate when first time install.

Here is a Dongle that came with the machine, on the side a string of activation codes on the back side:

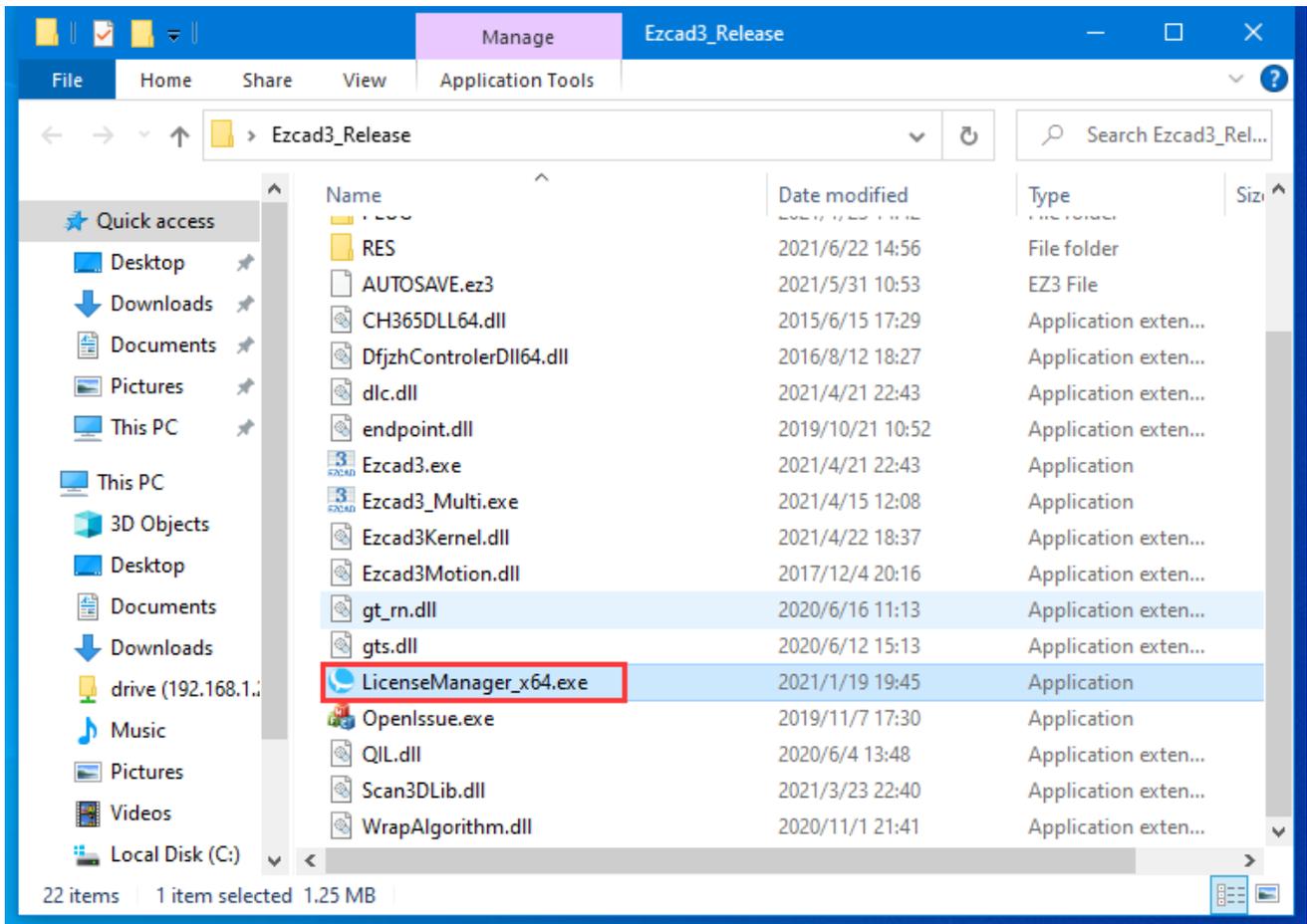


Please record this activation code to a paper, because you'll need it in activation process.

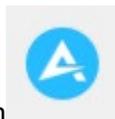
And insert the dongle into the PC during the use of EzCad3 and activation.

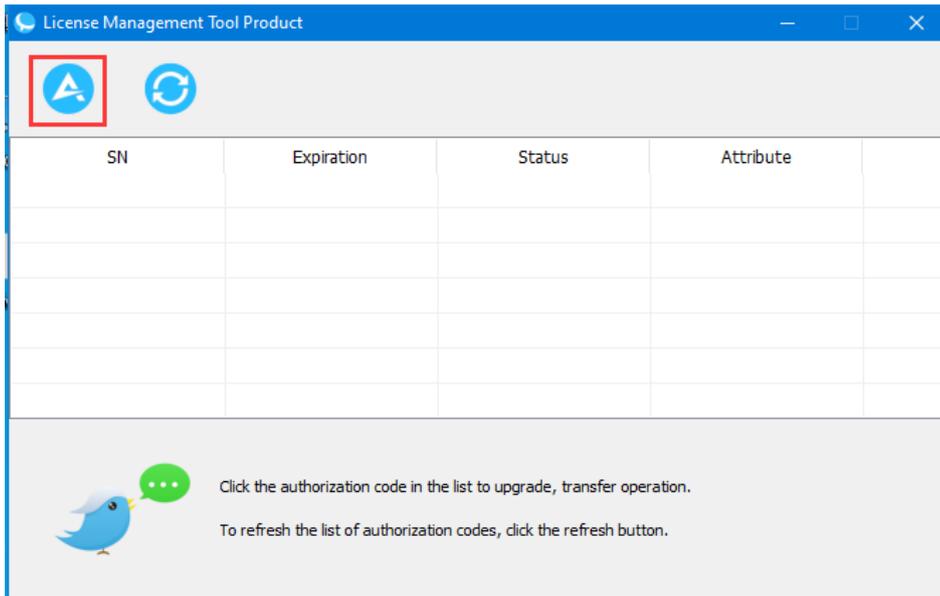
● **Activate PROcess**

1. Open the activate software LicenseManager X64 in fiber software folder

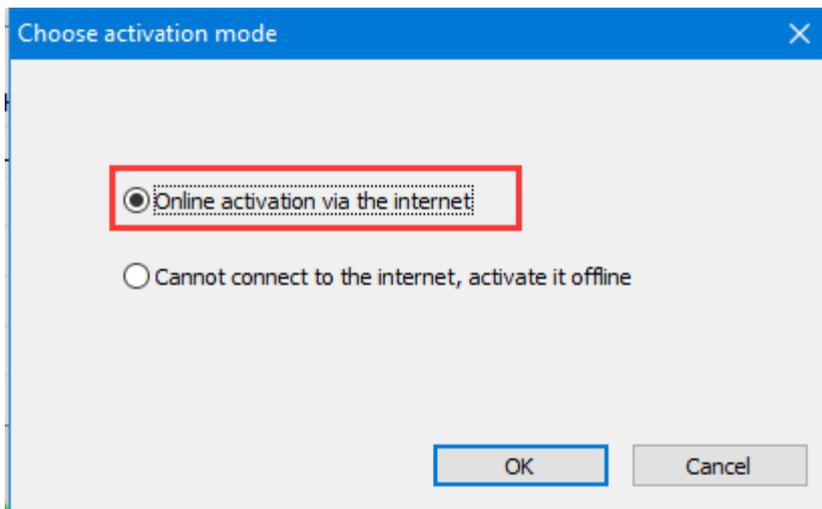


2. Click License activation icon

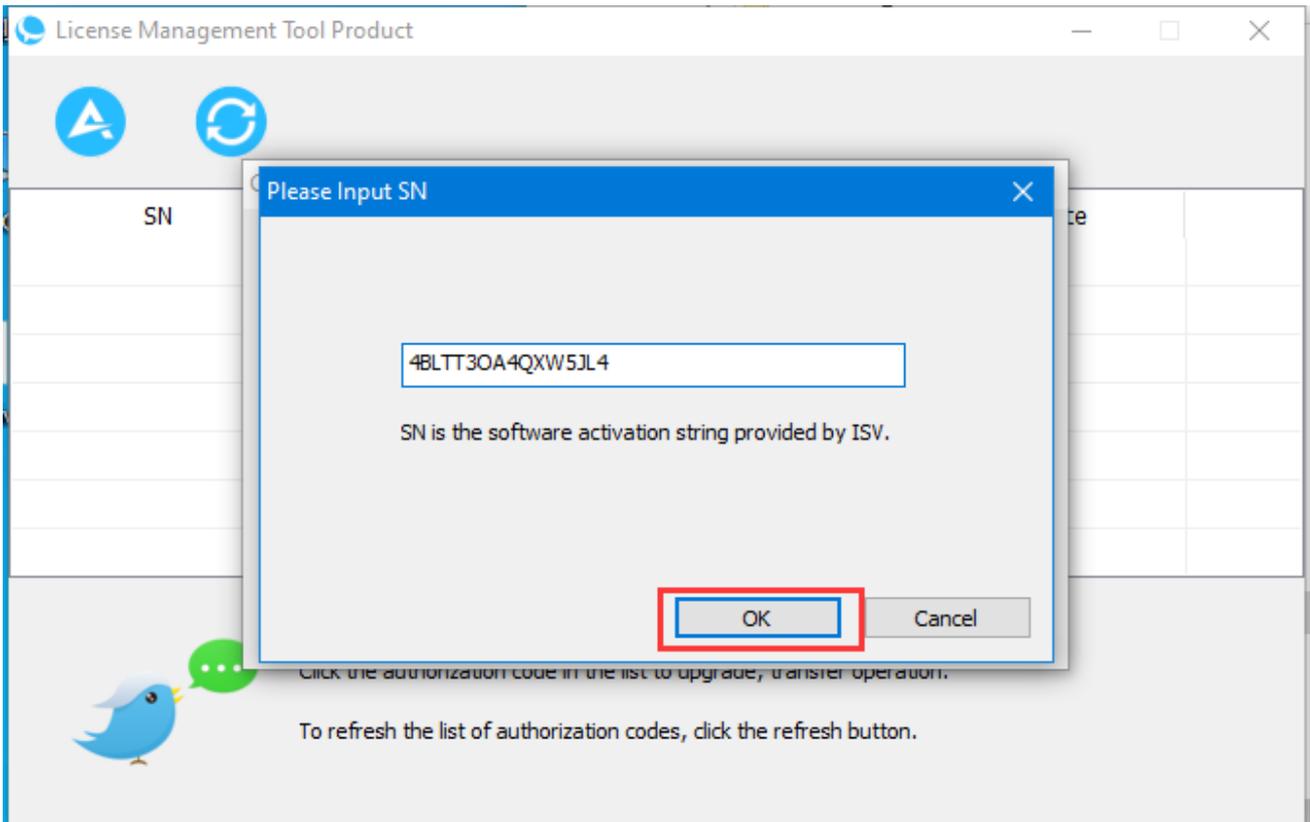
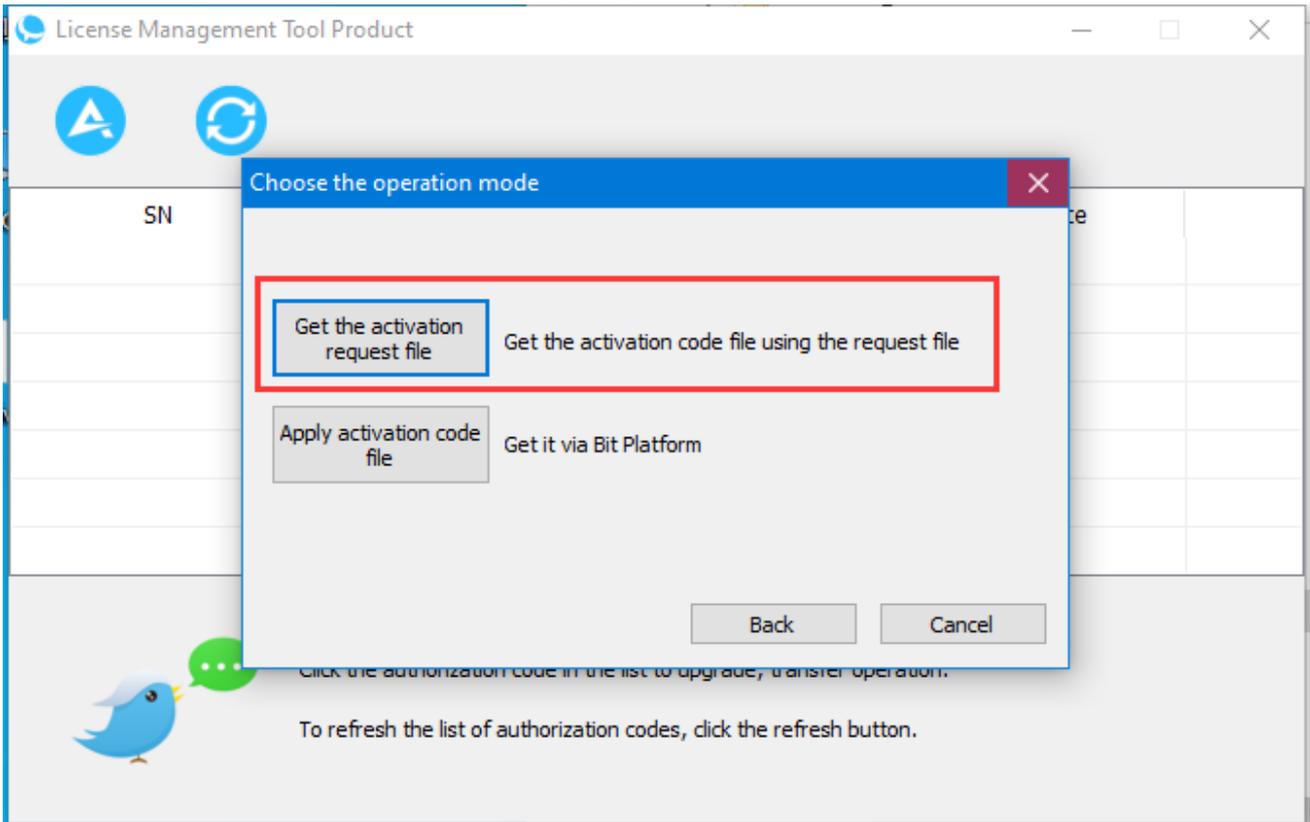




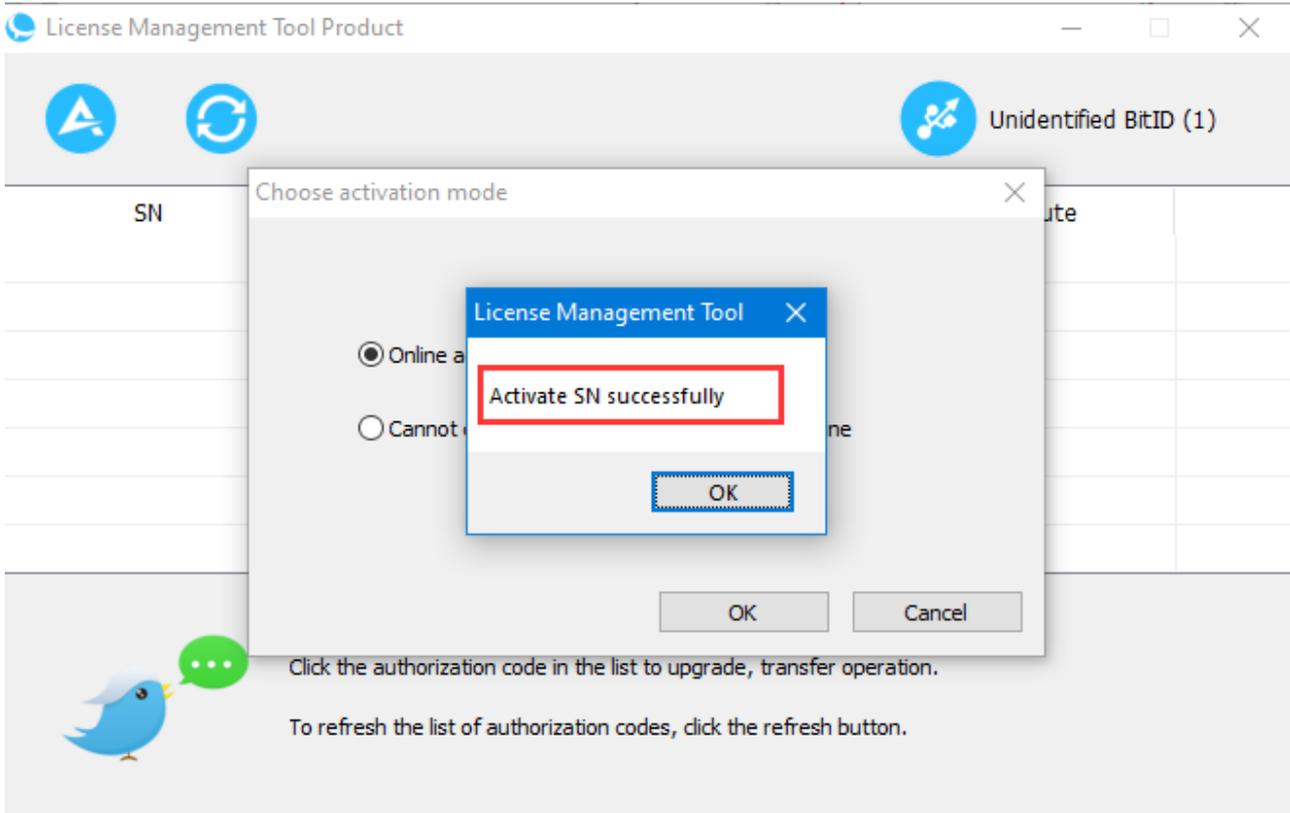
3. Click "Cannot connect to the internet, activate it offline" and click



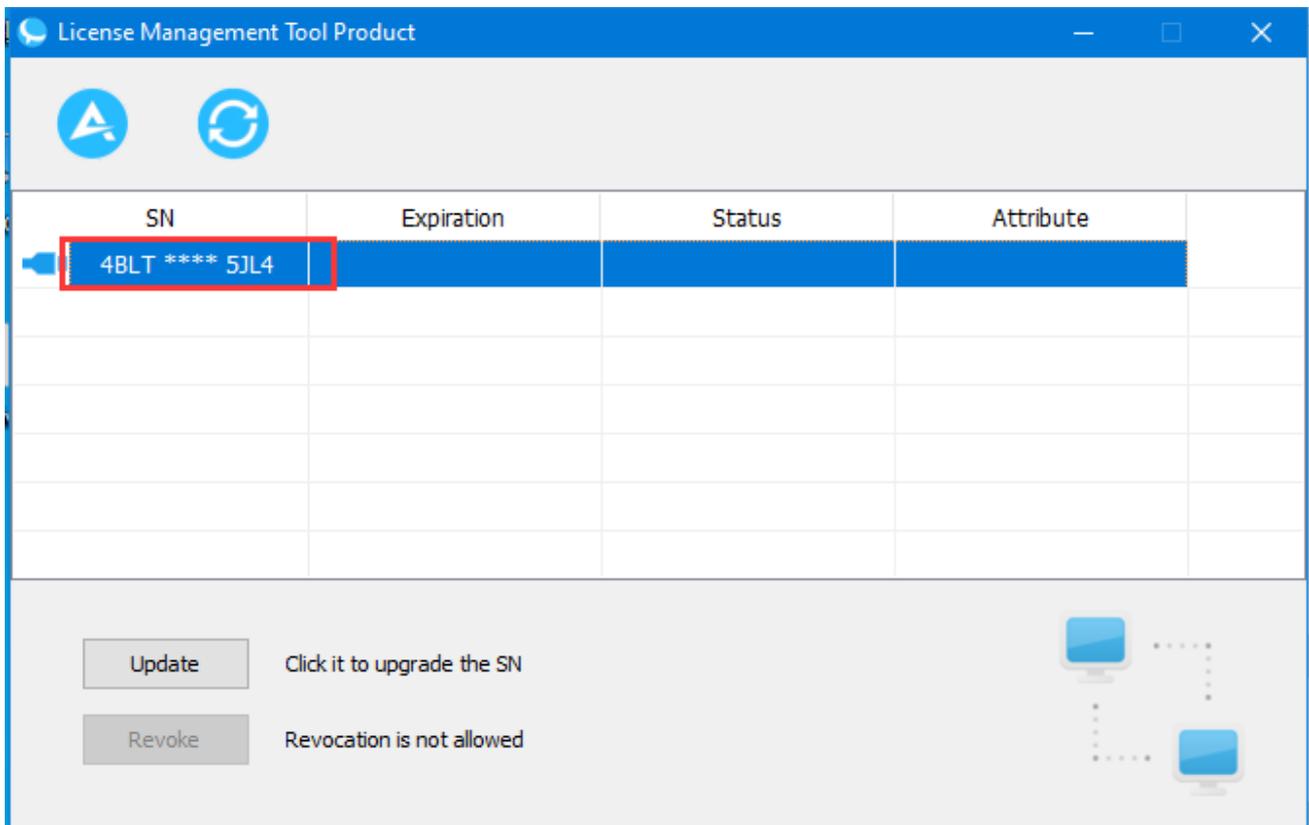
4. Click "Get the activation request file" and enter the activation code that you record. Then click "OK".



5. Then it will show "Activate SN successfully".



6. Now, the SN is activated successfully.



7. Then you can open the EzCad3 software.



1. The dongle must be plug into the PC when you using fiber machine.
2. The activation code can only activate 5 computers.

### 5.2.3 Software setting

#### 1. General setting

We have made the correct settings in the software before the machine leaves the factory.

Please open the software to check if they are correct.

Open the software, then press “F3” and select items according to below picture (take MOPA 20W as an example) .

**Laser type:** FIBER

**Frequency(kHz):**

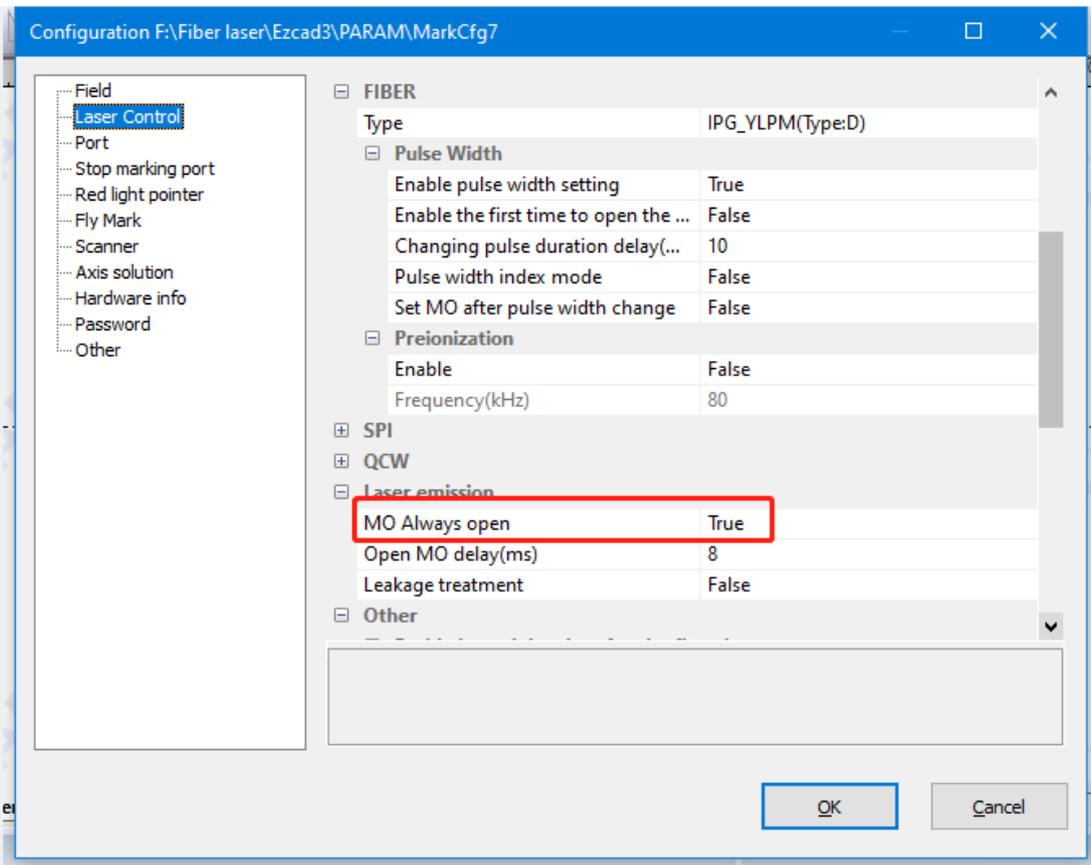
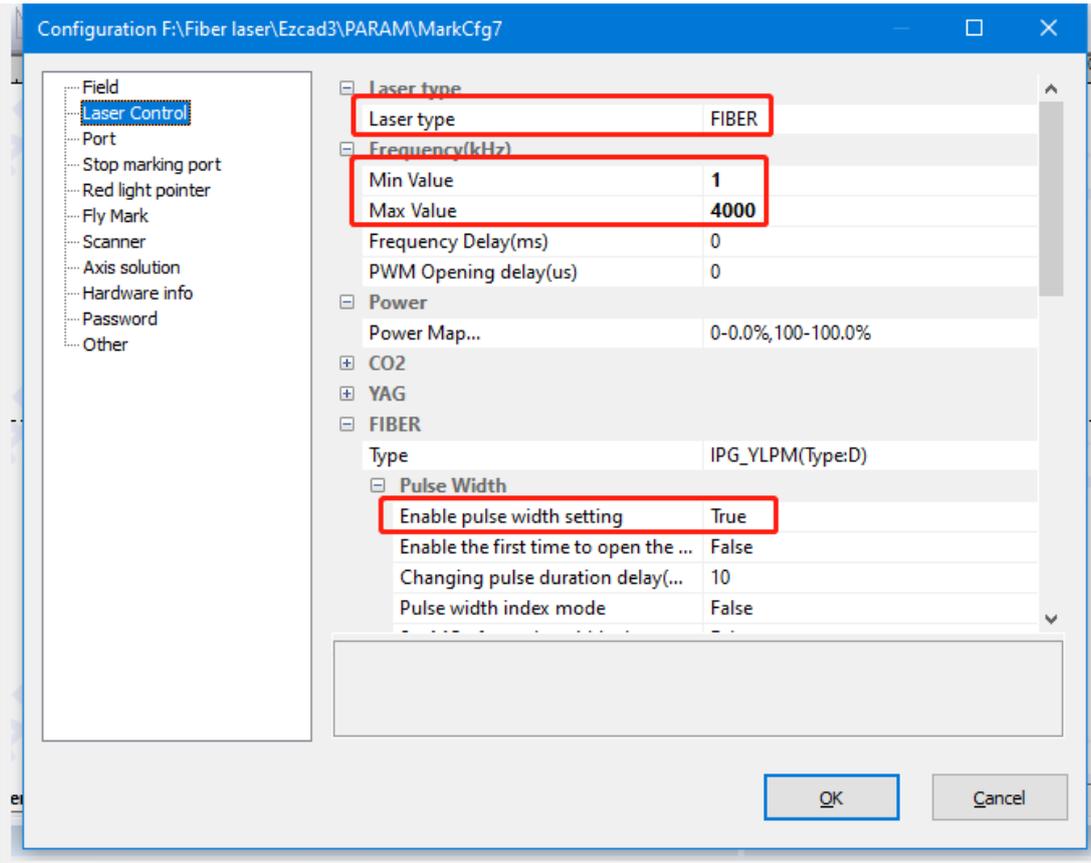
Min Value:1, Max Value:4000.

**Pusle Width:**

Enable pulse width setting: Ture

**Laser emission:**

MO always open: Ture





The frequency ranges for different laser source.

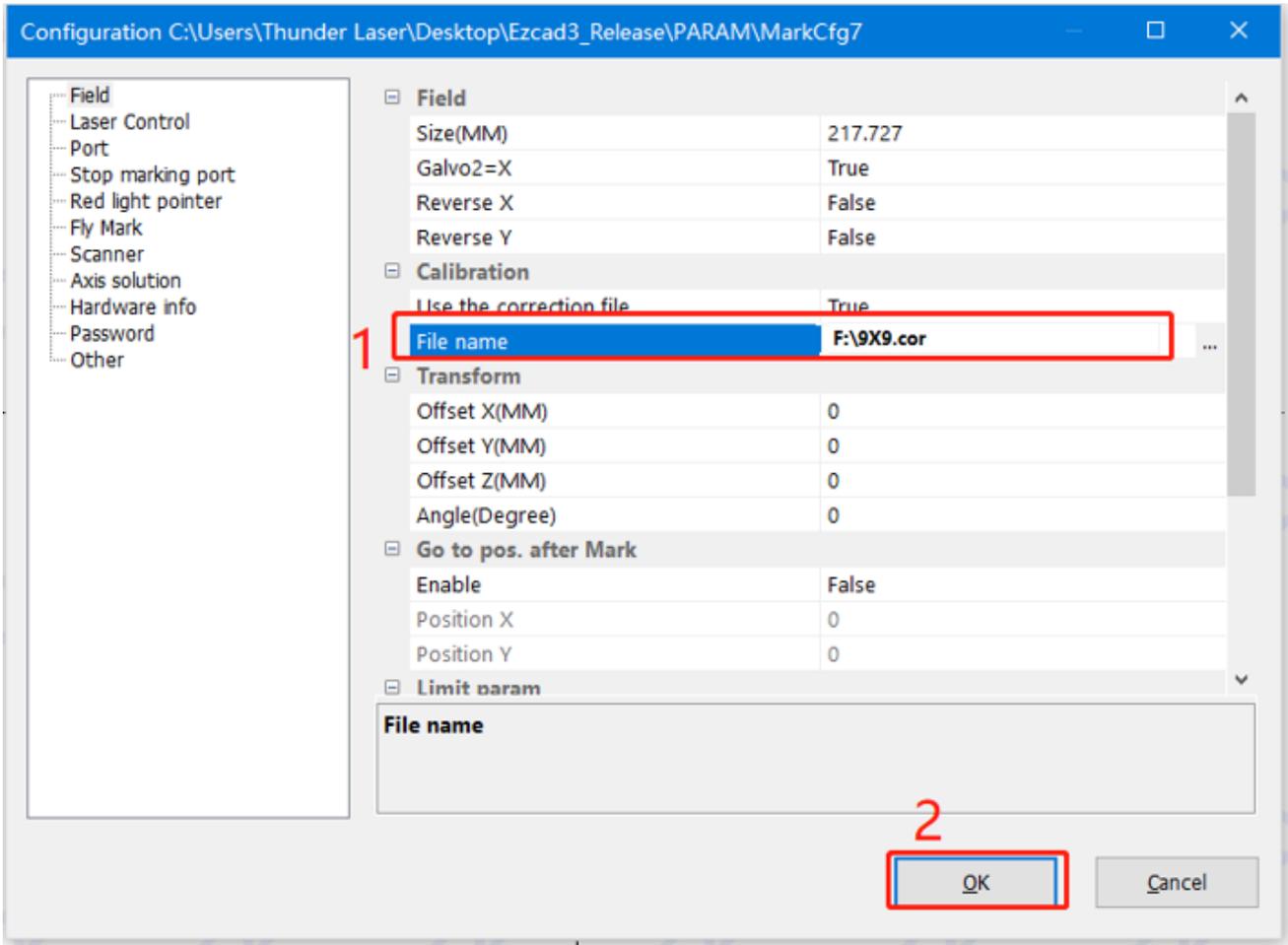
Laser fiber	20W	50W	
Laser MOPA			20W
Frequency	20-60kHz	50-100kHz	1-4000kHz

**2. How to import the correction file.**



1. Before leaving the factory, we have done a correction test for each machine and import the correction file to fiber software, so the customer does not need to do correction again.
2. Different field lenses have different correction files and cannot be used universally.
3. If the field lens selected by the random device is purchased from us, we will prepare the calibration file and put it in the U disk.

Open the software>>Press “F3” button>>Field>>find the correction file(let’s say the name is 9×9.cor) in the USB disk that came with the machine.



## 6. How to set&adjust the focus length of Auto-focus

AURORA series marking machines can be equipped with 3 field lenses ( F-160, F-210, F-290), and the focal lengths of different field lens es are different. After changing the field lens, the user needs to adjust the focus of autofocus again.

	AURORA 8	AURORA 8 PRO
Auto-focus software	Jhc Seriestools	TI-tool

### 6.1 Jhc Serials tool

#### How to set the focus length of Auto-focus:

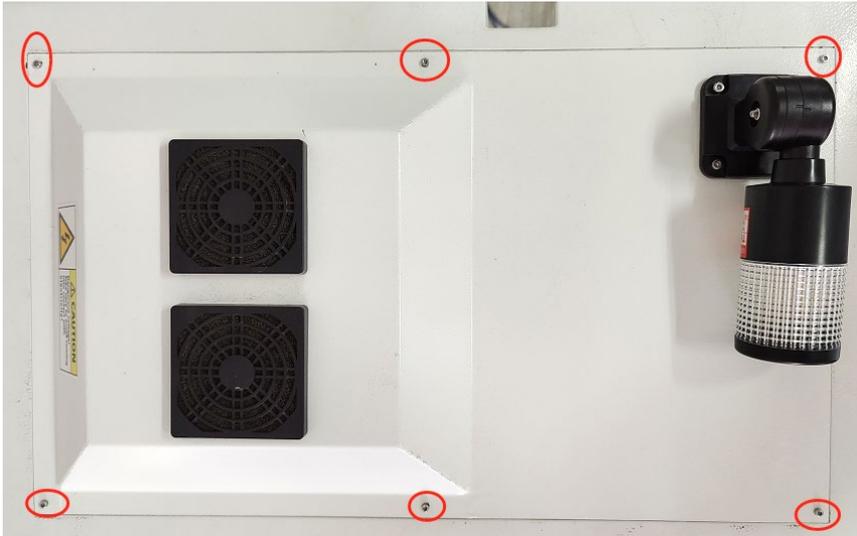
(1) First time use the auto-focusing system, connect the wire of the control board, then connect to the computer.

How to connect the USB cable of Auto-focus board:

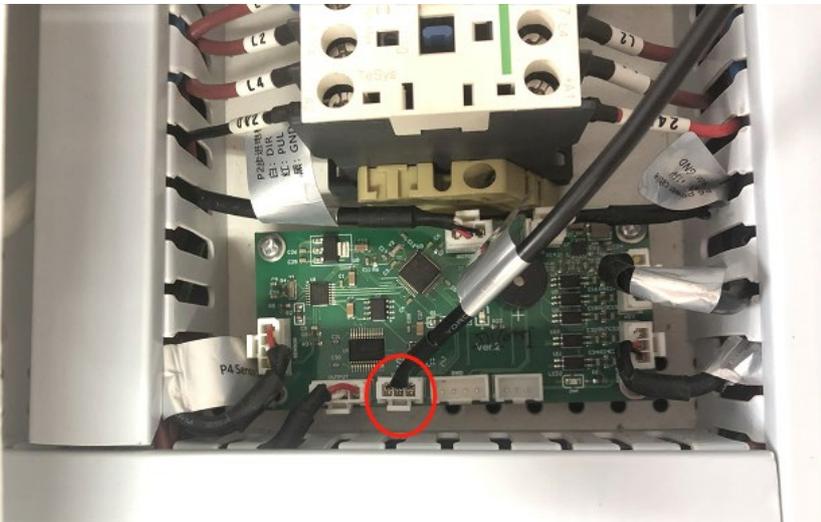
Find the USB cable of Auto-focus board that came with the Fiber machine.



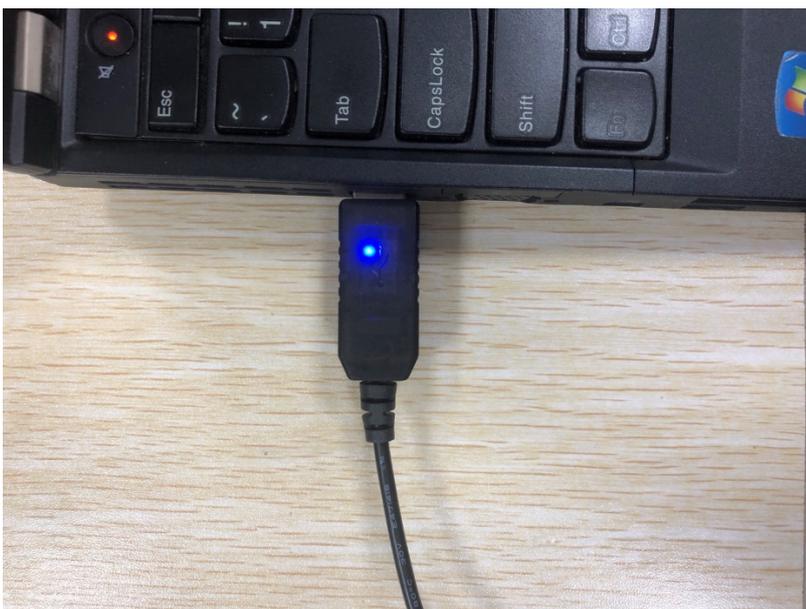
Loosen the 6 fixing screws of the top cover of the fixed marking machine (please keep the screws), move the top cover to the right, move it to see the auto focus plate, and connect the USB cable to the auto focus plate “UStart” interface, the other end is connected to the computer end.



Pic1



Pic2



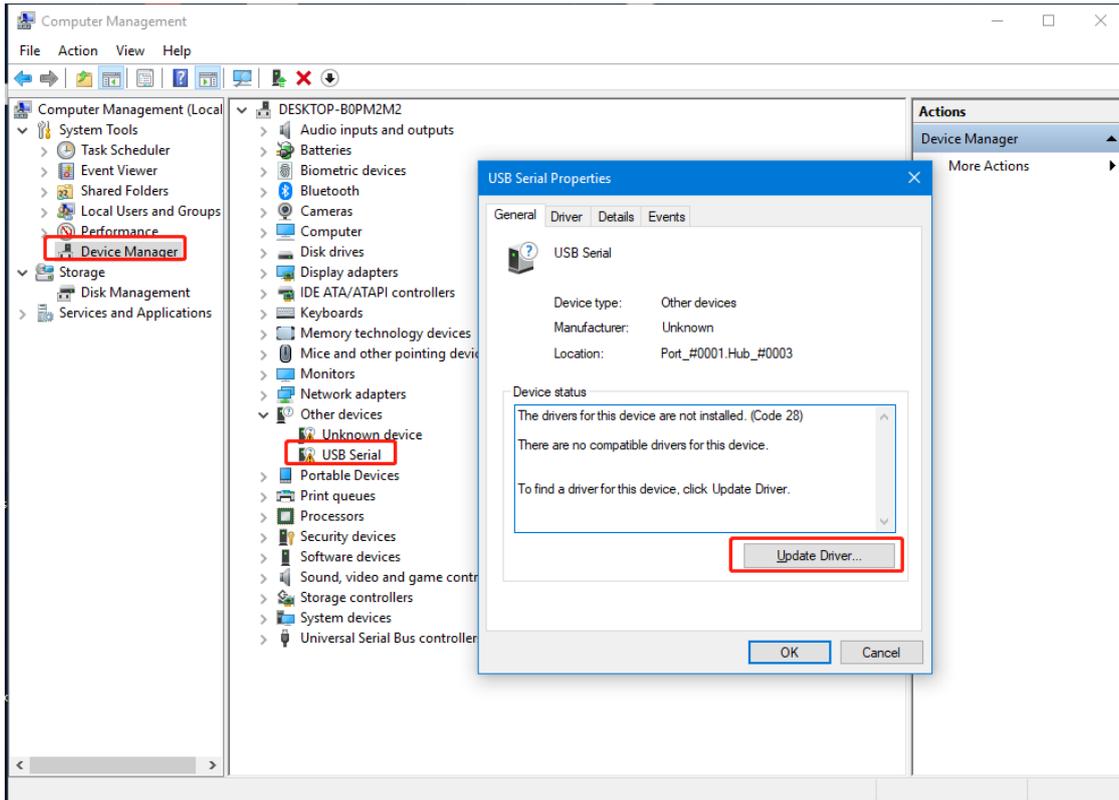
Pic3

(2) Install USB driver: Right click “computer>>Management>>device manager>>Other devices>>USB Serial>>Update Driver>>Browse my computer to driver software>>Find the Driver folder that came with the machine CD340G-USB-Drive>>Next>>Install successfully.

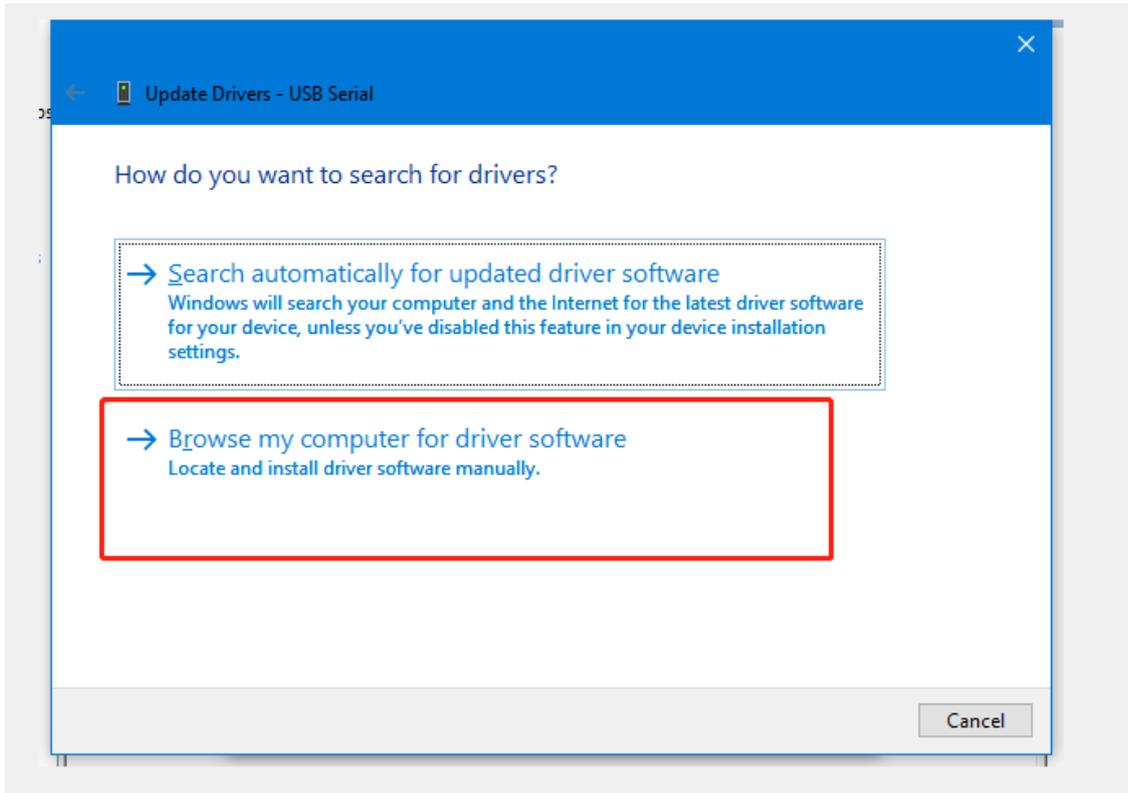
Find the corresponding COM of the USB, and remember it.



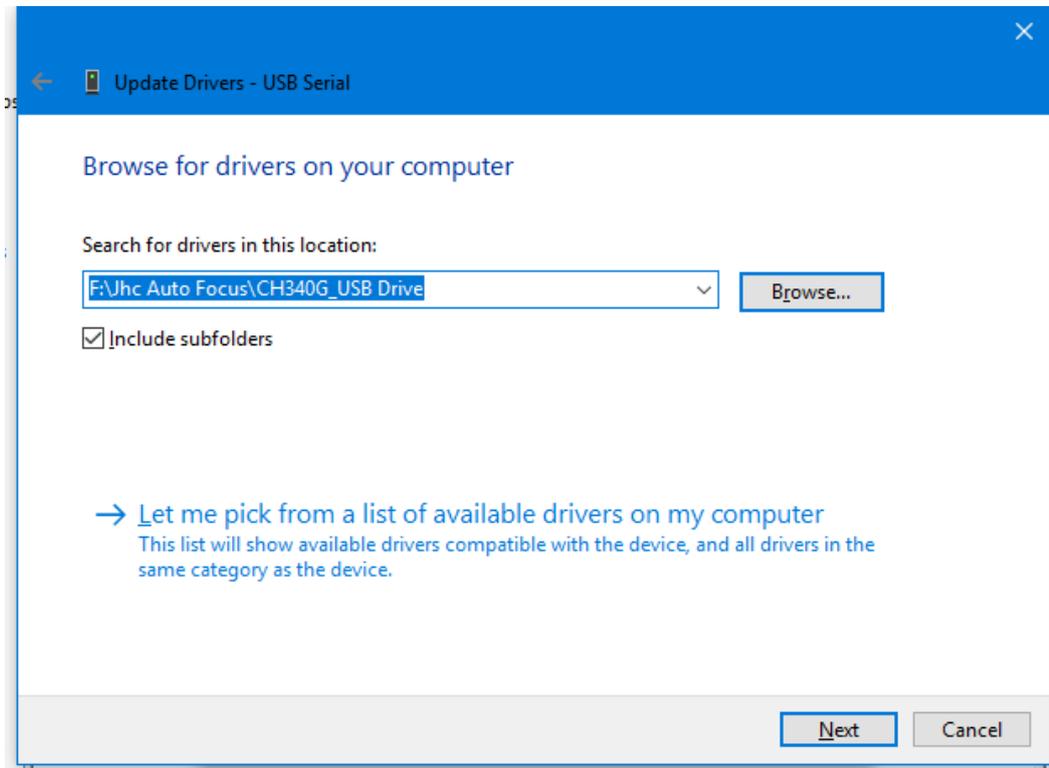
The auto-focus software driver folder in the U-disk that came with the Fiber machine.



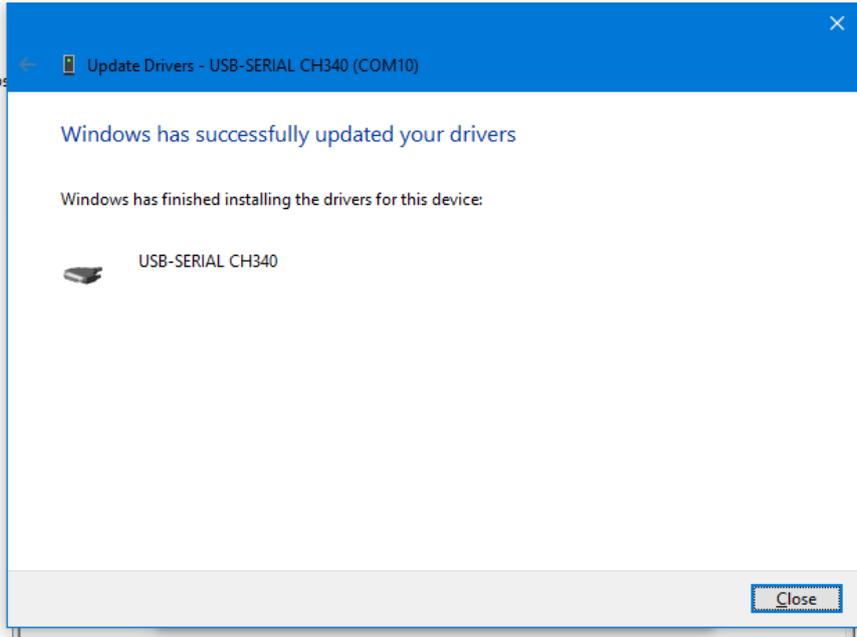
Pic1



Pic2



Pic3

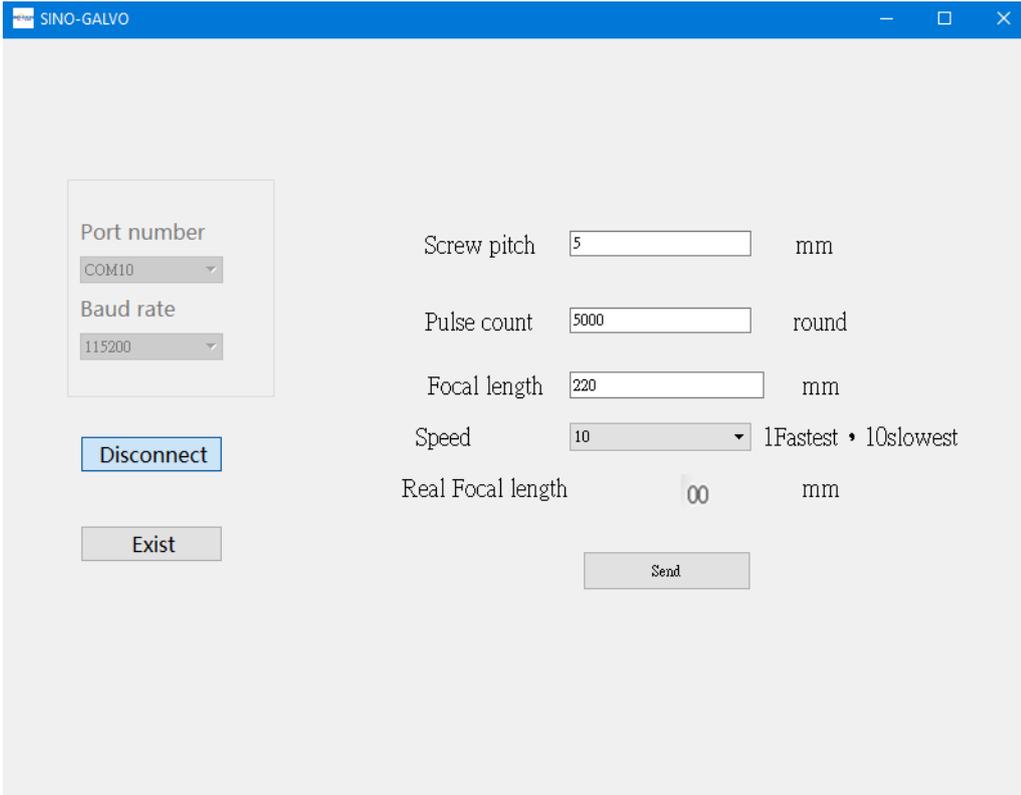


Pic4

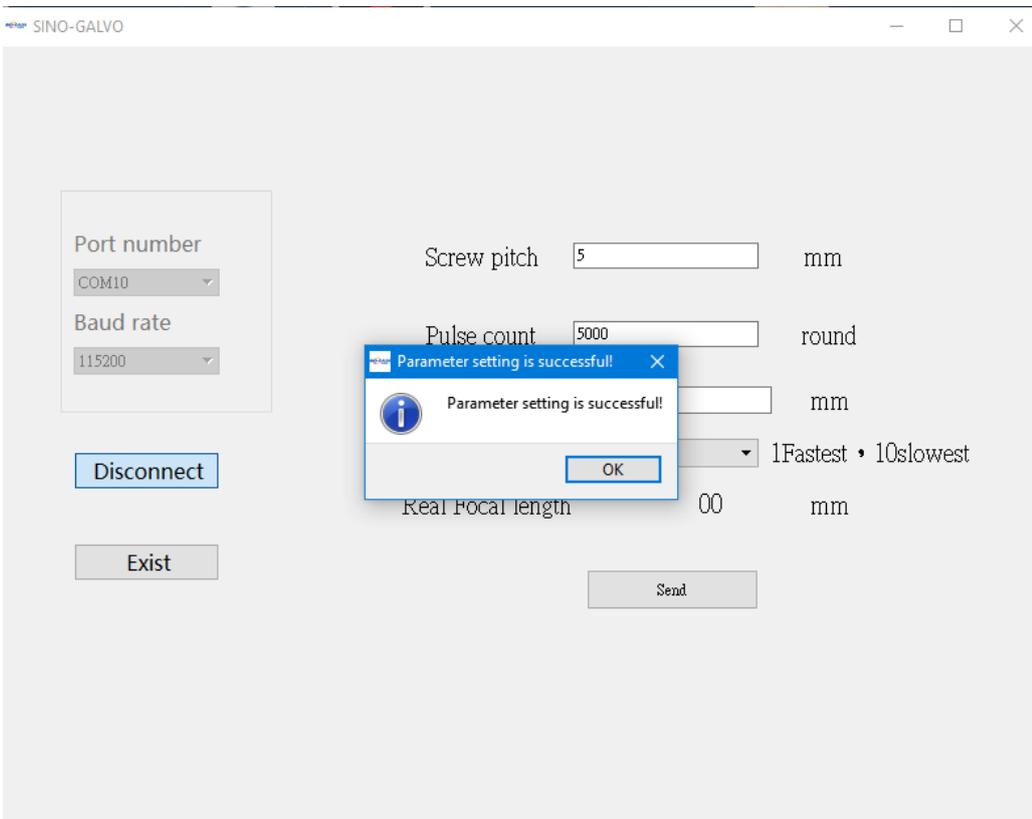
(3) Choose correct COM port and click connect, then set the screw pitch as 5, Pulse count as 5000. Speed as 1(divided into 10 gears, 1 fastest, 10 slowest, 1-10 decreasing speed), then click Send, successfully set window will be showed. And enter the focal length according to the recommended form.

**Focal Length for different lens(for reference only)**

	F-160	F-210	F-290
20WATT			
Focus length range			
50WATT	P:30%, S:100mm/s, PW:100ns		P:30%, S:100mm/s, PW:100ns
Focus length range	215—217mm		393-395mm
20 WATT(MOPA)	P:30%, S:100mm/s, PW:100ns		P:30%, S:100mm/s, PW:100ns
Focus length range	215—217mm		393.5—395.5mm



Pic1



Pic2

**How to adjust the focus length:**

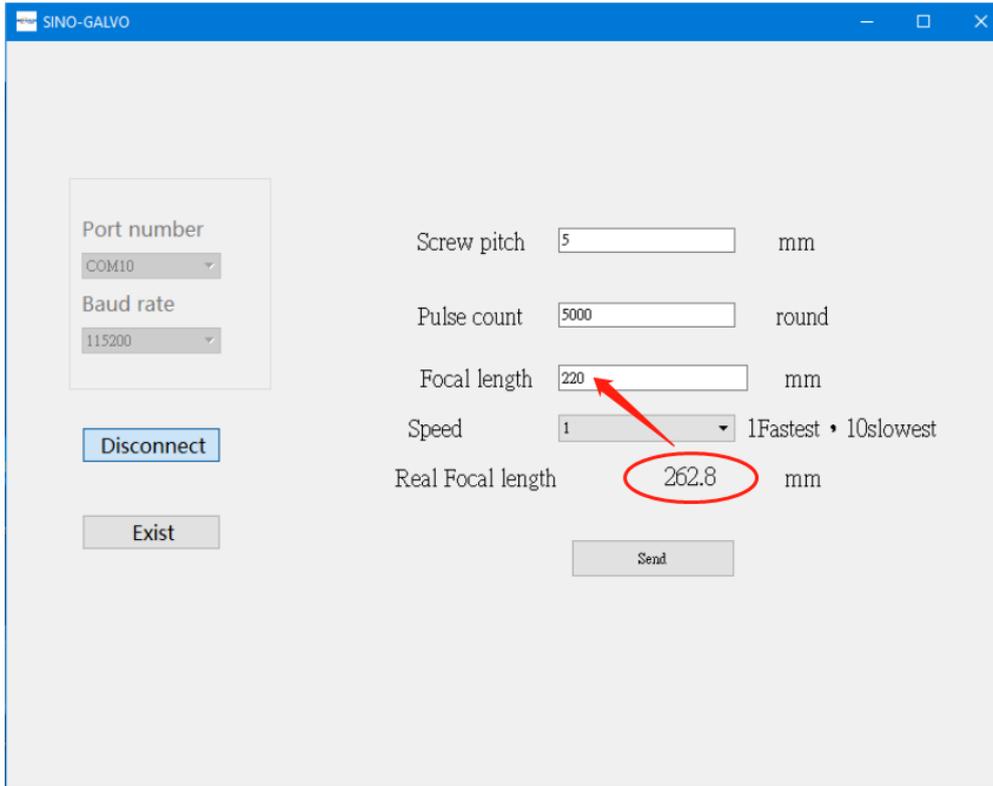
(1) Install the USB driver first, and set the Screw pitch, Pulse count and Speed according to the steps in **How to set the focus length.**

(2) Open the marking software, place a piece of metal material on the work platform, draw a 10\*10mm square in the software, set the marking parameters, it is recommended to set the speed at 100mm/s and the power at 30%. Low-speed marking makes it easier to observe changes in focal length. Click on the red light, align the material, and click on the mark. During the marking process, press the up or down button of the marking machine to observe the beam. When the beam is brightest, it is the best focus. At the same time, it can be observed that the actual focal length column in the auto-focus adjustment software is constantly changing, and the actual focal length when the beam is at its brightest is recorded. How to use the Fiber laser, you can refer to **Chapter 6.**

And below form is for reference. You can enter them in auto-focus software or adjust based on them.

	F-160	F-210	F-290
20WATT			
Focus length range			
50WATT	P:30%, S:100mm/s, PW:100ns		P:30%, S:100mm/s, PW:100ns
Focus length range	215—217mm		393-395mm
20 WATT(MOPA)	P:30%, S:100mm/s, PW:100ns		P:30%, S:100mm/s, PW:100ns
Focus length range	215—217mm		393.5—395.5mm

(5) Enter the recorded real focal length value into the set focal length input box, click "send" again, the software will return to the successful setting, the parameters will be stored by the software, and the system will automatically move to this position by clicking the auto focus button again.



## 6.2 TL-tool

### How to set the focus length of Auto-focus:

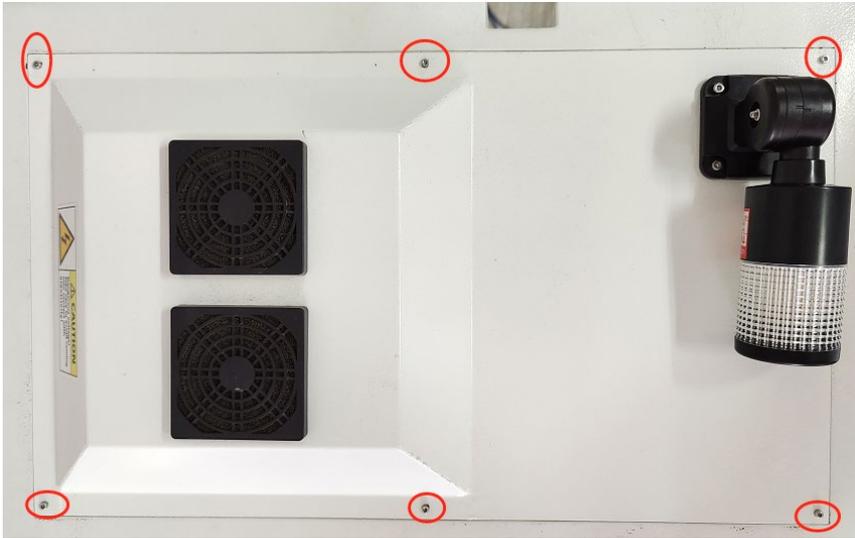
(1) First time use the auto-focusing system, connect the wire of the control board, then connect to the computer.

How to connect the USB cable of Auto-focus board:

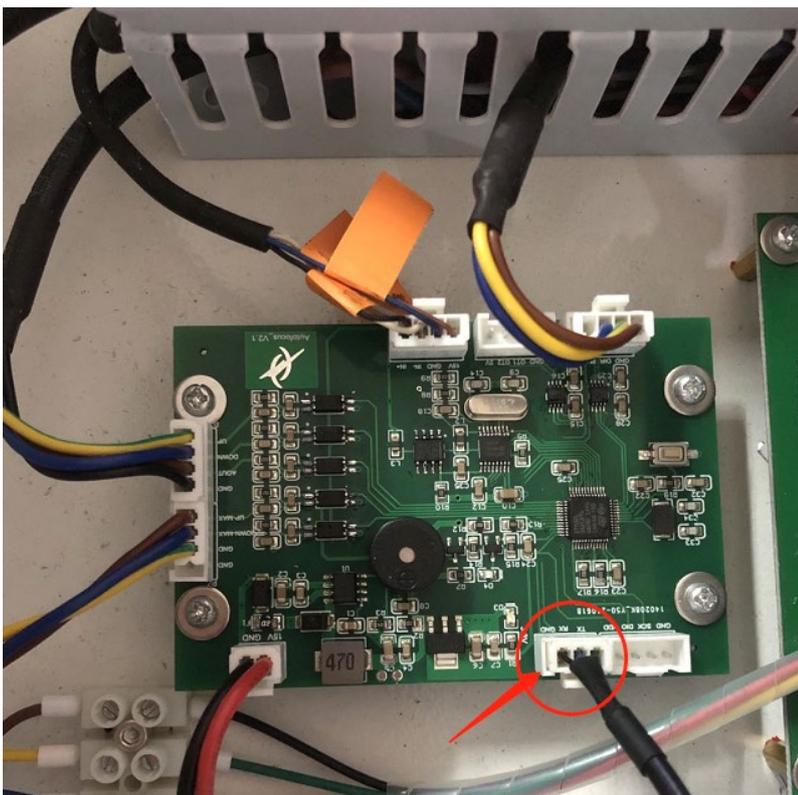
Find the USB cable of Auto-focus board that came with the Fiber machine.



Loosen the 6 fixing screws of the top cover of the fixed marking machine (please keep the screws), move the top cover to the right, move it to see the auto focus plate, and connect the USB cable to the auto focus plate interface, the other end is connected to the computer end.



Pic1



Pic2



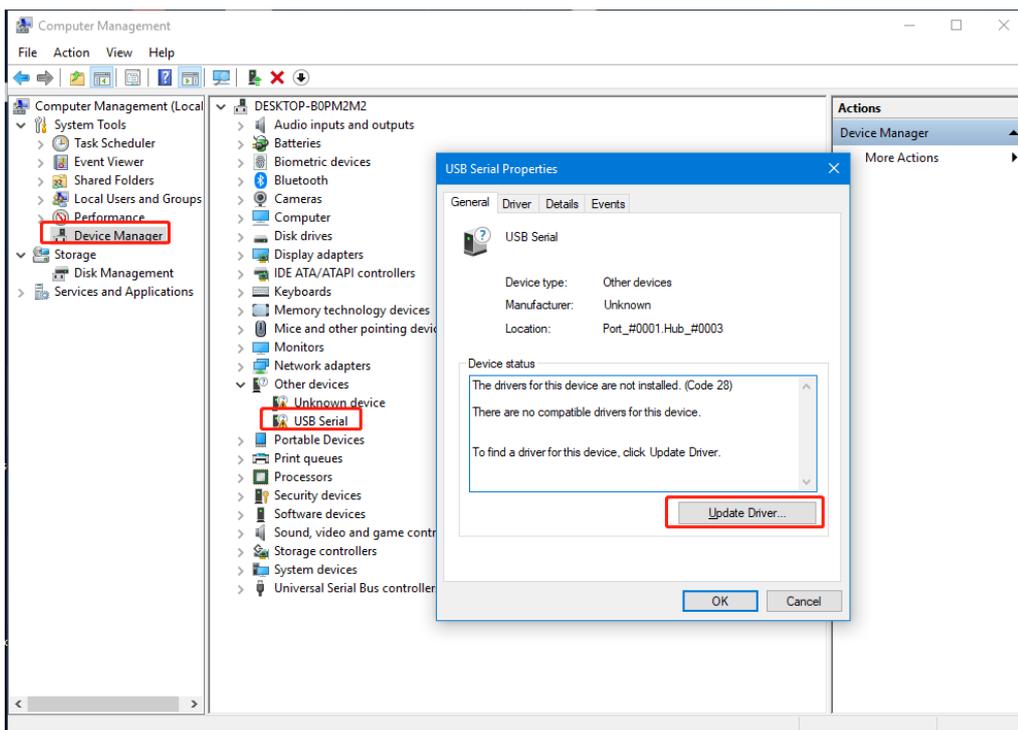
Pic3

(2) Install USB driver: Right click “computer>>Management>>device manager>>Other devices>>USB Serial>>Update Driver>>Browse my computer to driver software>>Find the Driver folder that came with the machine CD340G-USB-Drive>>Next>>Install successfully.

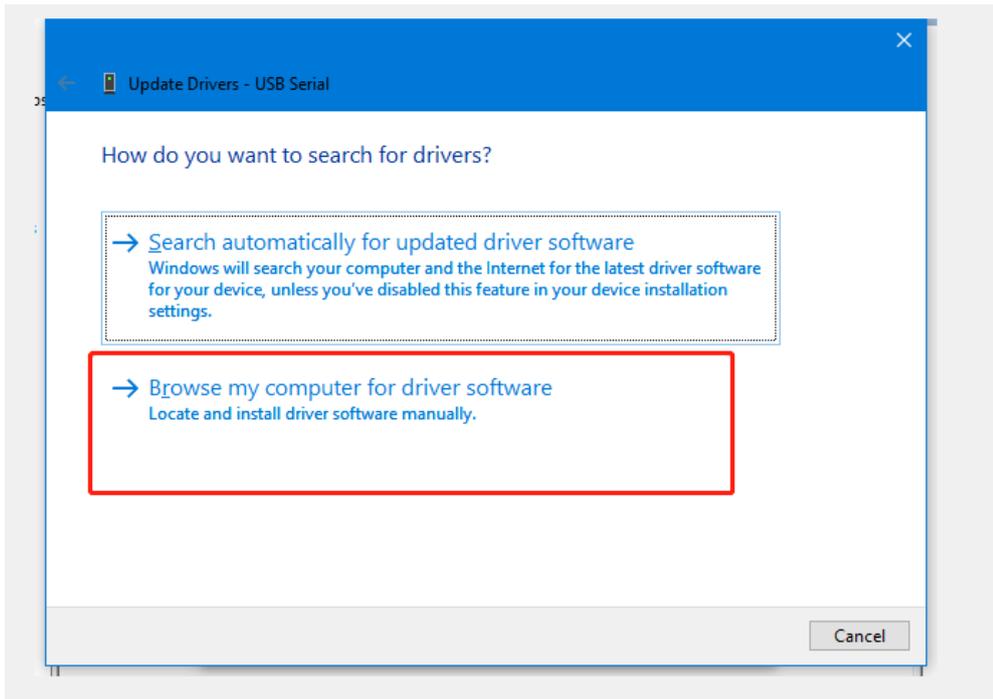
Find the corresponding COM of the USB, and remember it.



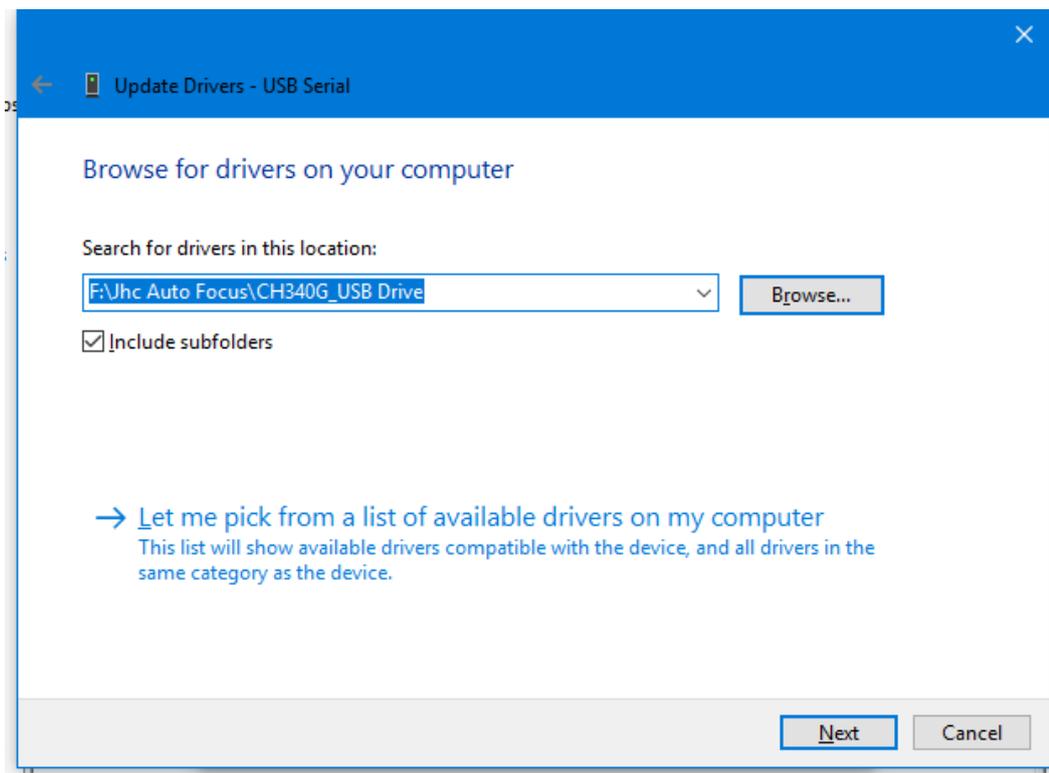
The auto-focus software driver folder in the U-disk that came with the Fiber machine.



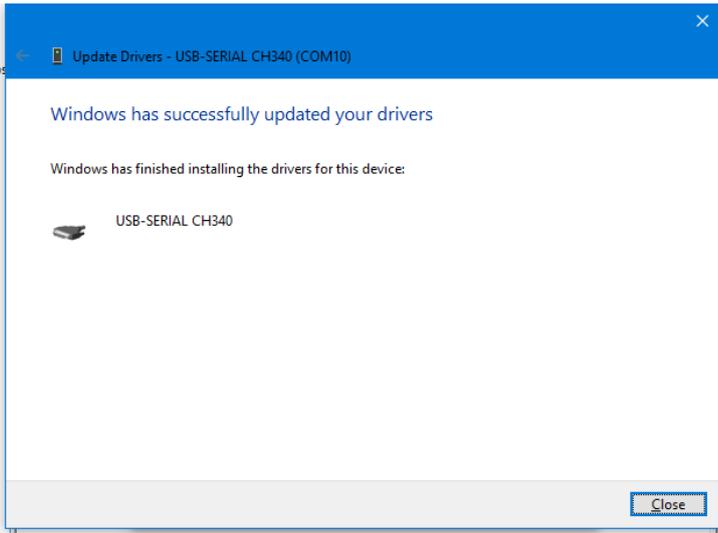
Pic1



Pic2



Pic3

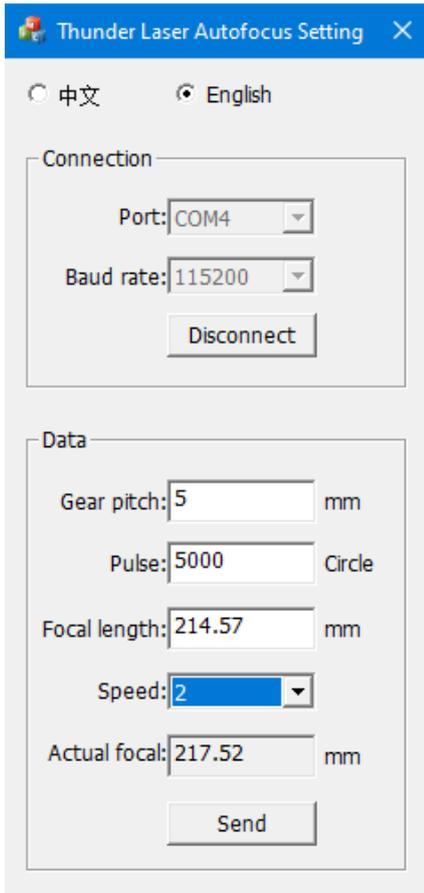


Pic4

(3) Choose correct COM port and click connect, then set the screw pitch as 5, Pulse count as 5000. Speed as 2(divided into 9 gears, 1 fastest, 9 slowest, 1-9 decreasing speed), then click Send, successfully set window will be showed. And enter the focal length according to the recommended form.

**Focal Length for different lens(for reference only)**

	F-160	F-210	F-290
20WATT			
Focus length range			
50WATT	P:30%, S:100mm/s, PW:100ns		P:30%, S:100mm/s, PW:100ns
Focus length range	215—217mm		393-395mm
20 WATT(MOPA)	P:30%, S:100mm/s, PW:100ns		P:30%, S:100mm/s, PW:100ns
Focus length range	215—217mm		393.5—395.5mm



**How to adjust the focus length:**

(3) Install the USB driver first, and set the Screw pitch, Pulse count and Speed according to the steps in

**How to set the focus length.**

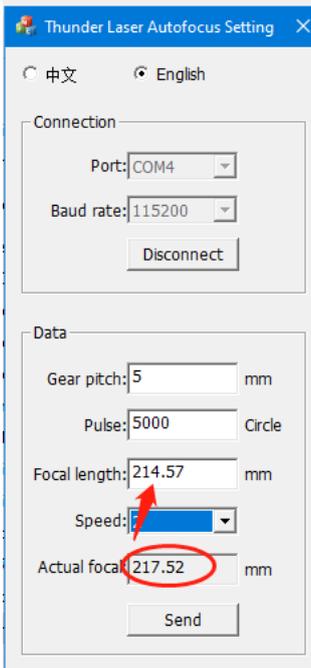
(4) Open the marking software, place a piece of metal material on the work platform, draw a 10\*10mm square in the software, set the marking parameters, it is recommended to set the speed at 100mm/s and the power at 30%. Low-speed marking makes it easier to observe changes in focal length. Click on the red light, align the material, and click on the mark. During the marking process, press the up or down button of the marking machine to observe the beam. When the beam is brightest, it is the best focus. At the same time, it can be observed that the actual focal length column in the auto-focus adjustment software is constantly changing, and the actual focal length when the beam is at its brightest is recorded.

How to use the Fiber laser, you can refer to **Chapter 6**.

And below form is for reference. You can enter them in auto-focus software or adjust based on them.

	F-160	F-210	F-290
20WATT			
Focus length range			
50WATT	P:30%, S:100mm/s, PW:100ns		P:30%, S:100mm/s, PW:100ns
Focus length range	215—217mm		393-395mm
20 WATT(MOPA)	P:30%, S:100mm/s, PW:100ns		P:30%, S:100mm/s, PW:100ns
Focus length range	215—217mm		393.5—395.5mm

(5) Enter the recorded real focal length value into the set focal length input box, click "send" again, the software will return to the successful setting, the parameters will be stored by the software, and the system will automatically move to this position by clicking the auto focus button again.



## Chapter 7 The First Time Running the Fiber Laser



To be safe, never ever run the laser system unattended.

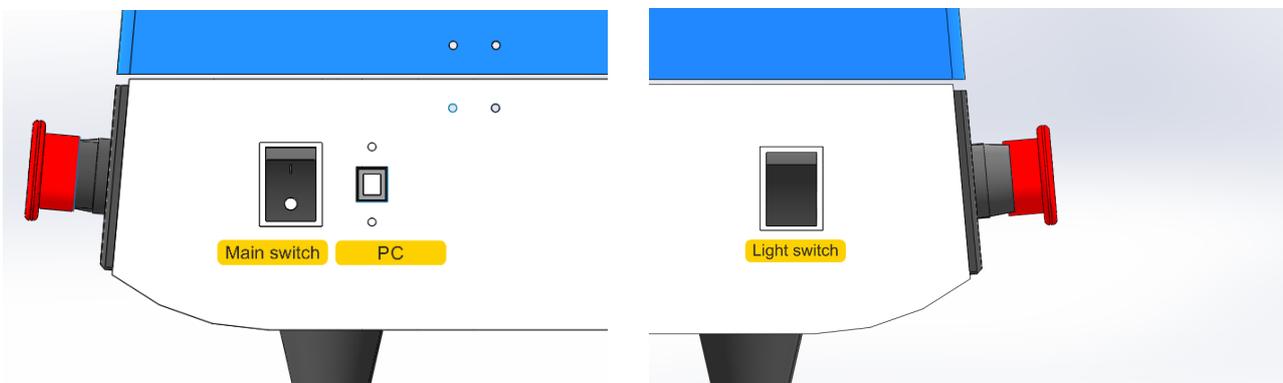


According to international standard, “O” means close; “I” means open for the rocker switch below.

**Yours first marking test (take AURORA 8 PRO, MOPA 20W, Lens F-290 as example)**

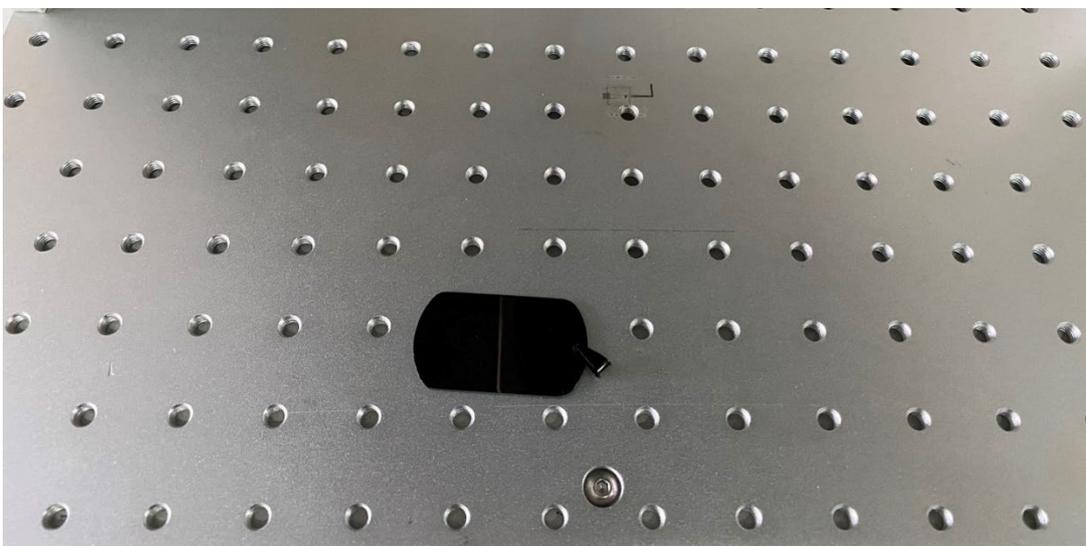
The following steps describe how to successfully engrave a first pattern. Please follow the individual steps:

1. First confirm the exhaust fan, computer and all mains are connected.
2. Turn on the “Main” switch and “Light” switch.



Main switch on the right side of the Fiber laser, Light switch one the left side of the fiber laser.

3. Place the material on the work table.



4. Open the software EzCad3, then install driver and import the Correction file according to **Chapter**

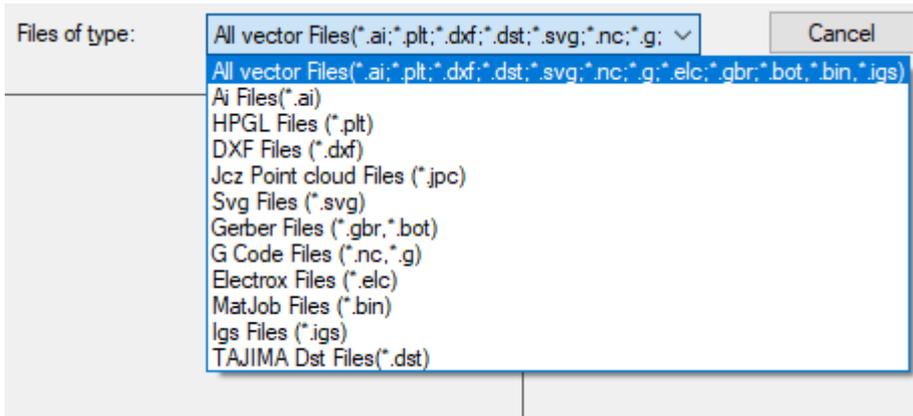
**5.2.1.**

5. Import your file to EzCad3

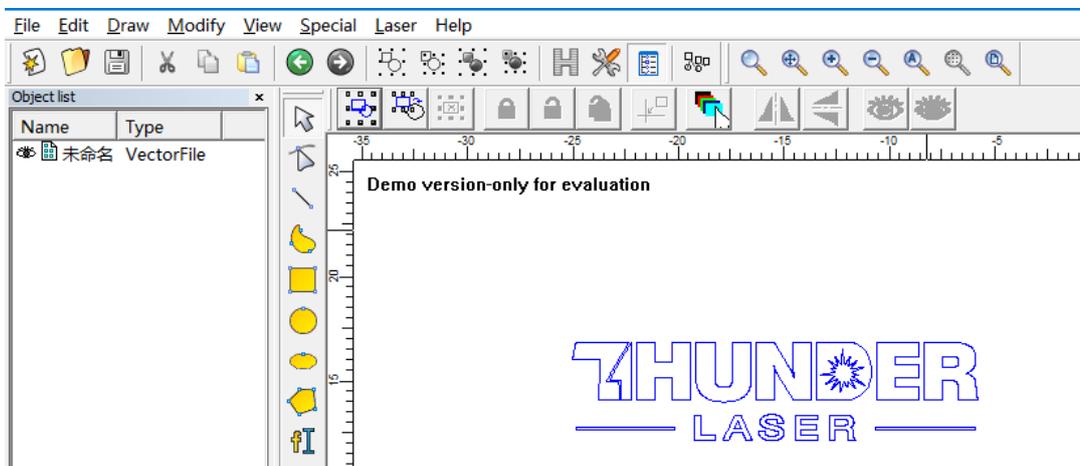
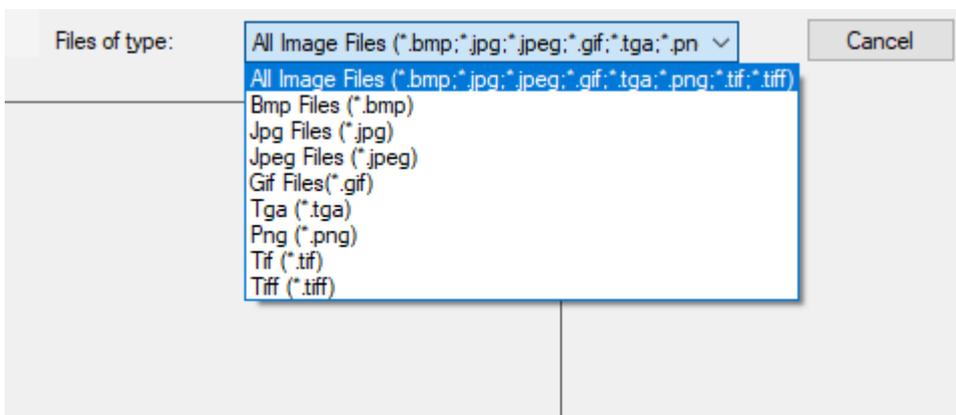


This software supports these file types.

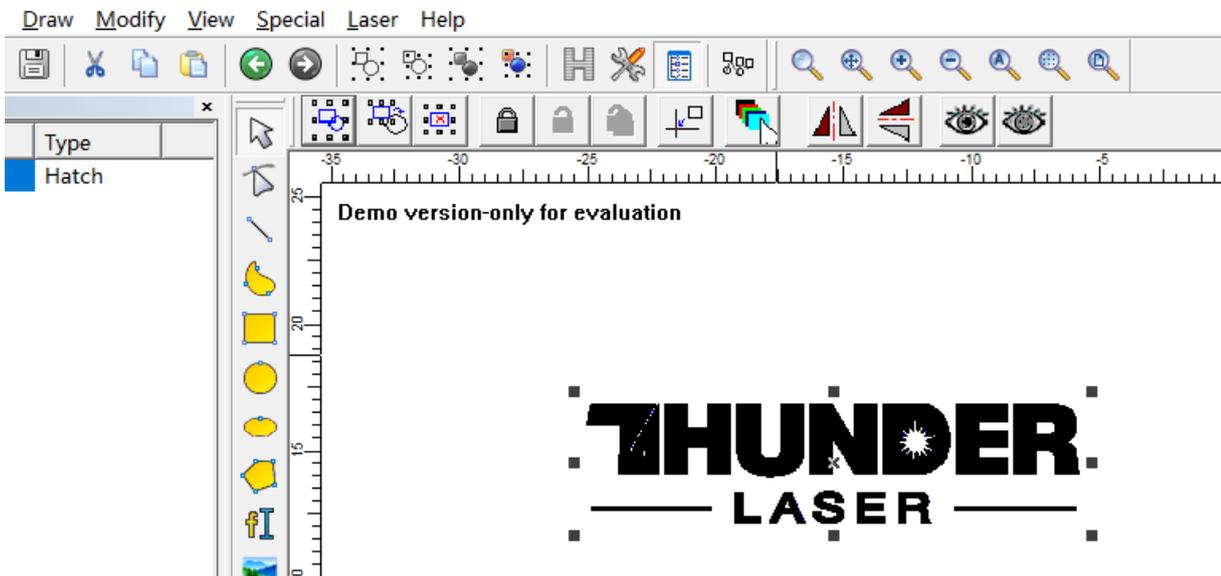
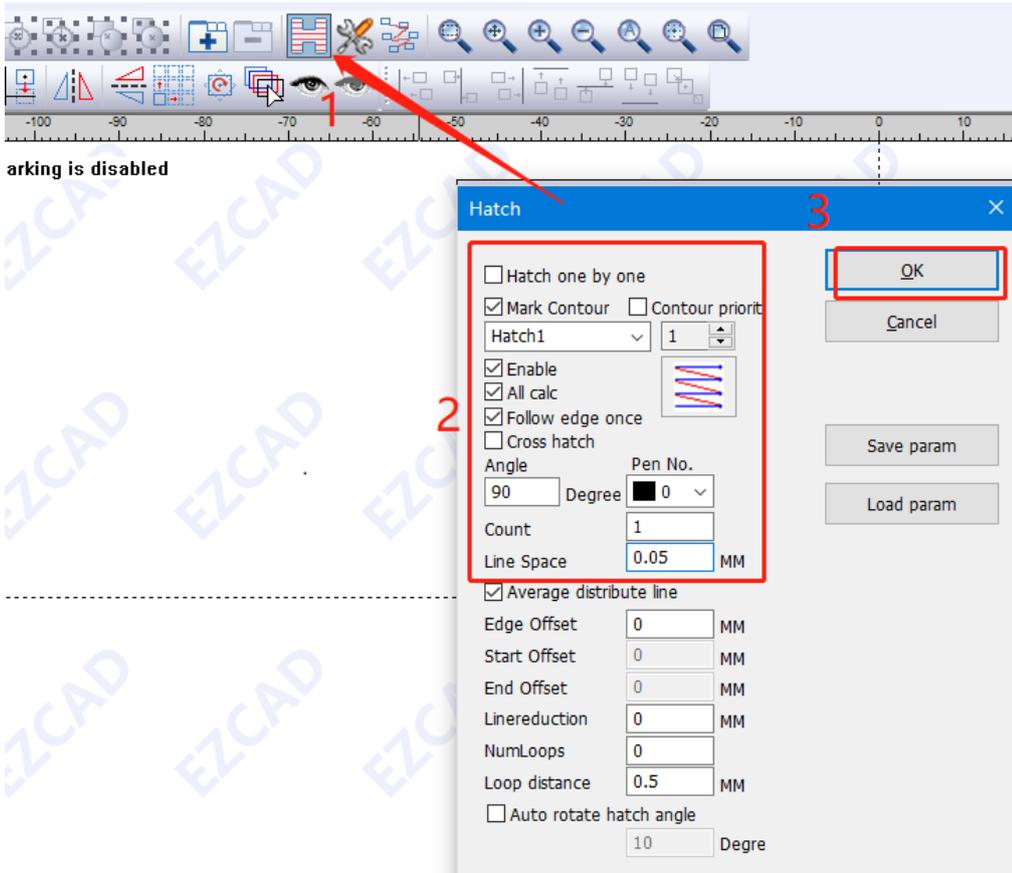
Vector Files



**Image Files**



6. Press Hatch function, choose Hatch1(or you can choose the other according to your need), Set the Line space as 0.05mm(we recommend using the range of 0.01-0.1mm), then press “OK”.



7. Set the marking parameters for your file. Adjust parameters as needed (you need to unselect “use the default para” for change the parameters).

Set the Loop Count to 1, Speed to 1800mm/s, Power to 50%, and Frequency to 300KHz, Pulse width to

200ns.

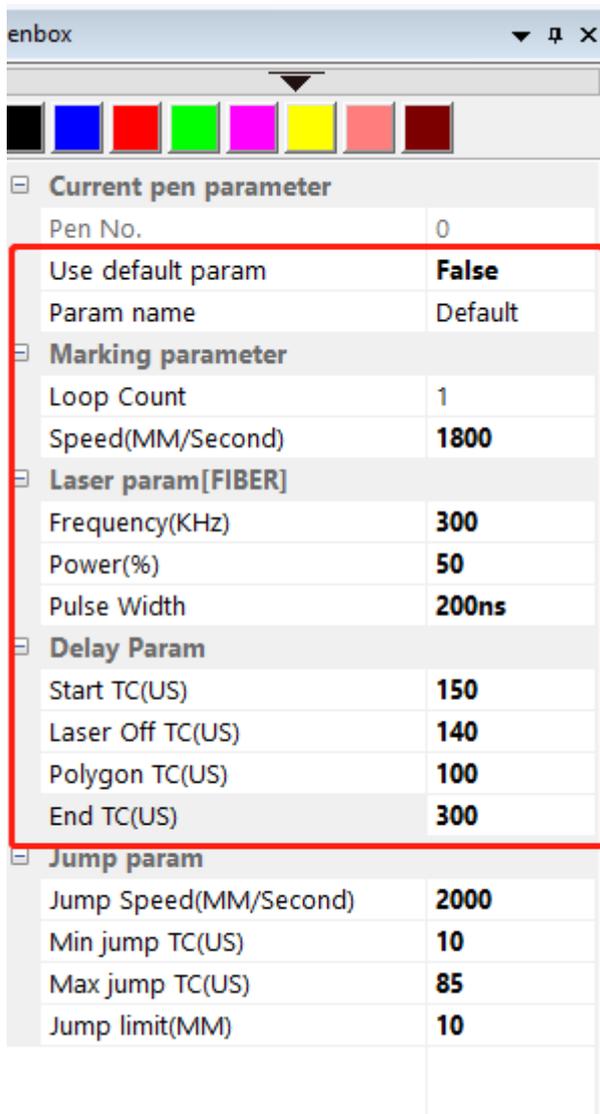
Start TC(US) to 150, Laser Off TC(US) to 140, End TC(US) to 300, Polygon TC(US) to 100.

Other settings no need to change.



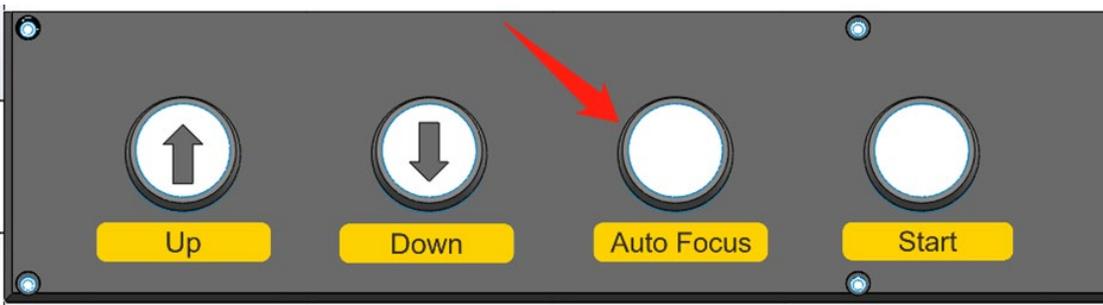
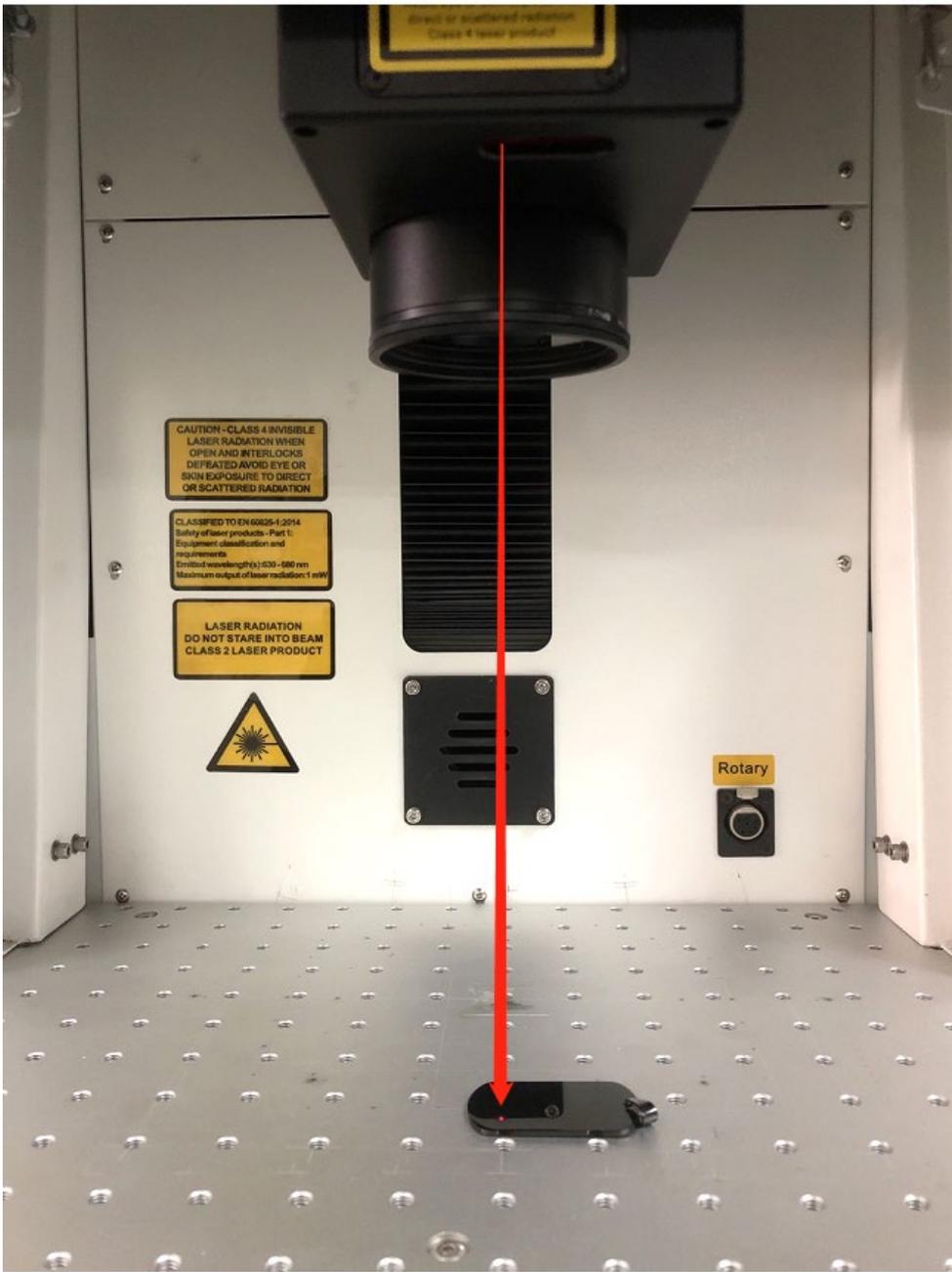
For different watts, the frequency range is different, please refer to the table below

Laser Fiber	20W	50W	
Laser MOPA			20W
Frequency	20-60kHz	50-100kHz	1-4000kHz



8. You can see a red dot on the work area, it comes from the galvanometer. So please put your material under the red dot, then press "Auto focus" button. The galvanometer will adjust the focus distance

automatically. And wait 2-3 seconds, after hearing a beep(from the indicates light), that means the focus distance adjustment is complete.





If the beep continues after you pressing the auto focus button, please view below info.

Here is a ranging sensor inside the field lens, the range we set is 200mm-600mm(the distance between the ranging sensor and object), if the distance is lower than 200mm or higher than 600mm, the buzzer inside the sensor will beeps. You need to UP/DOWN the field lens manually, after you adjust to correct range, stop to press UP/DOWN button, then the beep will stop. Then you can use the auto focus again.

Below picture is the ranging sensor.



9. Press Key F1 or Red(F1) in software, then fiber will virtual marking out the size of your file. Adjust the position of your material according to the red area. See below pictures.





10. Close the door and press Key F2 or Mark(F2) in software. Or press start button to mark.



1. The controller can record the last file, if you want to run a file twice or more, you can press "Start" button of the fiber machine directly.

2. You can start to marking with "Start" button also.

11. The fiber laser will mark your image.



## Chapter8 Maintenance

### 8.1 General Maintenance



**Caution-Before any maintenance work takes place, ensure that the power supply has been switched off and the system is powered off.**

All maintenance work must be carried out according to the safety regulations.

In order to ensure the maximum availability and lifetime of the system, we recommend you regularly check the ventilation and keep the surrounding area clean.

### 8.2 Cleaning the Field lens

This system is fitted with high quality optical components, which under normal operating conditions are maintenance free for their lifetime. However, it may be necessary to clean output lenses, e.g. the scanner flat field lens (f-theta objective) if it becomes covered in dust or fumes.

1. Never touch the optical components with your fingers! Oily or dirty hands may damage the lens surfaces.
2. Do not use any tools or hard objects to clean the surfaces. Scratches cannot be repaired.
3. To remove larger pieces of dirt, only use a lens cleaning cloth with high proof (min. 98 %) alcohol.
4. Do not dip the cleaning cloth in the cleaning solution. This contaminates the solution and makes it unusable. Place drops of the solution on the cloth!
5. Distribute the cleaning fluid carefully using small circular motions. Start at the center of the lens and move outwards to the edge. Keep moving the cloth until the entire surface is clean.
6. Do not wipe the lens with a dry cloth. Do not touch the reverse side of the cloth.
7. Do not exert any pressure on the lens.
8. Clean once half a year (depending on usage).

**The End.**