
# AURORA LITE
# Unified User's Manual

Thunder Laser

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Dongguan City, Guangdong Province, China

# Introduction

This manual has been designated as a user's guide for thunder laser systems and fiber laser machine installation; The manual is divided into eight chapters, including General Information Instructions, Safety Instructions, Key Components of every Laser Systems and the Installation Steps, Operation Instructions and Maintenance Instructions from THUNDERLASER Company.

It should be emphasized that the installation of each system must meet the requirements, and be consistent with the installation requirements of THUNDERLASER. If not, the machine won't work properly, manifested as poor performance, shortened life-span, increasing maintenance costs and even damage to the machine.

The note is about some specific requirements during system installation, and we hope every customer could try to understand these notes before installation and usage, so that you can correctly install and use it. If you meet any problems during installation, you can contact our technical personnel or Customer Service.

# Content

# Chapter 1. General

## 1.1 General Information

**Please read this documentation carefully before installation and operation.**

**Injury, death, property loss, fire, electric shock, malfunction, reduced performance & machine life-span, and serious failures might happen unless you read, understand, and follow the Operation Manual!**

Operation of the system is permitted only with equipment and spare parts supplied or listed in the *List of Spare Parts and Consumables*. The use of components from the 3rd Party may invalidate 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:** When operating the laser, keep alarmed all the time.

**High Voltage:** Be careful to prevent injury and/or death.

**Laser Radiation:** Keep away from the dangers of the laser beam.

**Fire Hazard:** High potential for fire. NEVER LEAVE IT UNATTENDED WHEN RUNNING!

**Tips:** Helpful notes or info can make it easier to use or understand.

## 1.2 Designated

The THUNDER LASER AURORA LITE is intended exclusively for laser marking through the supplied marking software.

Materials such as metal, anodized aluminum, and several plastics can be processed by the laser.

As part of the intended use, the following points should also be observed:

1. The engraving process must only be performed with a perfectly adjusted machine.

2. Only mark approved materials with suitable parameters.

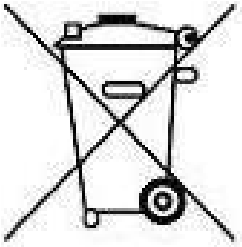
3. Use of the system in other areas is against the designated use. The manufacturer does not admit liability for damage to personal and/or equipment resulting from such use.

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 house refuse!**

Electronic devices have to be disposed along with electric waste disposal according to the regional directives on electronic. For further questions, please ask your supplier. He might handle it properly.

## 1.4 Technical Parameter/Device Specification

### Mechanics

| | AURORA LITE | | | |
|---|---|---|---|---|
| Max marking area | 200*200mm/7.9″ | | | |
| Max working area | 200*200mm/7.9″ | | | |
| Lens(Fiber and Mopa) | Marking area | Max work height | Focus diameter | Focus length |
| F-160 | 4.3″×4.3″/110×110mm | 8.3″/213mm | 26μm | 6.9″/176mm |
| F-210 | 5.7″×5.7″/145×145mm | 5.0″/127mm | 24μm | 9.1″/232.5mm |
| F-290 | 7.9″×7.9″/200×200mm | 2.5″/66mm | 35μm | 12.7″/324mm |
| Max marking speed | 7000mm/sec, 700cps | | | |
| Z-axis | Motorized Z-axis, 16.9″/430mm | | | |
| Table | Alumina table, 14.7″×11.3″/375×288mm | | | |
| Net weight | 72.5kg/159.8lbs | | | |
| Housing dimensions(W*D*H) | 16.9″×29.7″×31.4″/430*755*799mm | | | |
| PS | AURORA Lite is fitted with F-210 as standard. | | | |

### Laser Equipment

| | AURORA LITE |
|---|---|
| Laser power | Fiber 50w |
| Wavelength | 1064nm |
| Frequency | 50-100kHz |
| Pulse width | / |
| Q-pulse width | / |
| Cooling | Air cooled |
| Red dot pointer | Laser Power<1mW, 630-680nm |

### Control System

| | AURORA LITE |
|---|---|
| Computer | Microsoft Windows XP, Win7, Win8, Win10,Win11 |
| Interfaces | USB |
| Marking software | EzCad2/Lightburn |
| Correction software | CorFile2 |
| Laser power | Fiber 50W adjustable from 10% - 100% |

## Electricity, Power, Breaker

| | 50WATT |
|---|---|
| Electricity requirement | 115~240 Volt AC, 50 or 60Hz, Single phase |
| Power consumption | 300W |
| Current | 2.55A,115V<br>1.5A,230V |
| Recommended circuit breaker | 10A |

## Ambient Conditions

Ambient temperature — Operating temperature 0℃-40℃

Humidity — Maximum humidity 80%

## Laser Safety

Laser class — Class Ⅱ

CE-Compliant approved by FDA

## 1.5 Manufacturer's Label

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

It is recommended to record all of the data for access anywhere anytime. You will need to supply your Serial Number to our Support Team on occasion.

# Chapter 2. Safety

## 2.1 General Safety Information

Any personnel involved in installation, set-up, operation, maintenance and repair of the machine, should have read and understood the Operation Manual, particularly for the "Safety" section. The user is recommended to assign specific company-internal personnel to implement each operation according to the qualifications the employees. And the receipt of the instruction/Operation Manual or the participation at introduction/training should be acknowledged in writing in each case.

### Safety -conscious working

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

The scopes of different applicable operations of the machine must be clarified and observed in case of some problems related to safety. Especially for operations on the electric equipment, which must be performed by special experts only.

For all manipulations concerning modifications, maintenance, inspection and repair of installation, set-up, start-up, operation, conditions and operation methods, 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. Any operating methods that will imperil the safety of the working machine are forbidden.
2. The operator must also ensure that no unauthorized person work with the machine (e.g. activating equipment without authorization).
3. It is the duty of the operator to check the machine before starting for externally-visible damage or flaws, and to report changes (including behavior during operation) that imperils the safety.
4. The user must ensure that the machine is only operated in sound condition.
5. The user must guarantee the cleanness and accessibility at and around the machine by corresponding instructions and controls.
6. No removing or interrupting safety components (we emphasize again 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 repairing.

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

8. **Any attempt to perform unauthorized modifications and changes to the machine can INVALIDATE THE WARRANTY.** This does not conform to Thunder Laser's routine preventive & general maintenance, adjustment and alignment, etc.

## 2.2 Laser Safety Information

1. According to the assessment of the potential danger of the laser systems, the machine is classified into SECURITY CLASS 2. Thunder Laser AURORA series is a device of SECURITY CLASS 2, which is guaranteed by the protective housing and the safety installations.

Attention: Improper operation and maintenance of the device can change the security level and cause the emission of harmful radiation.

2. Without safety precautions, exposure to laser radiation will cause the following risks:

Eyes: Corneal burn

Skin: Burns

Clothing: Danger of fire

3. Never try to modify or disassemble the laser or start up a modified or disassembled system!

4. Other inappropriate operation or adjustment will cause dangerous radiation exposure other than those described here.

## 2.3 Safety Precautions when Operating the Device

Your Thunder Laser AURORA SERIES has an integrated safety system which immediately stops running when the protection cover (Lid) is opened. Opening the cover during the operation will interrupt the engraving.

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

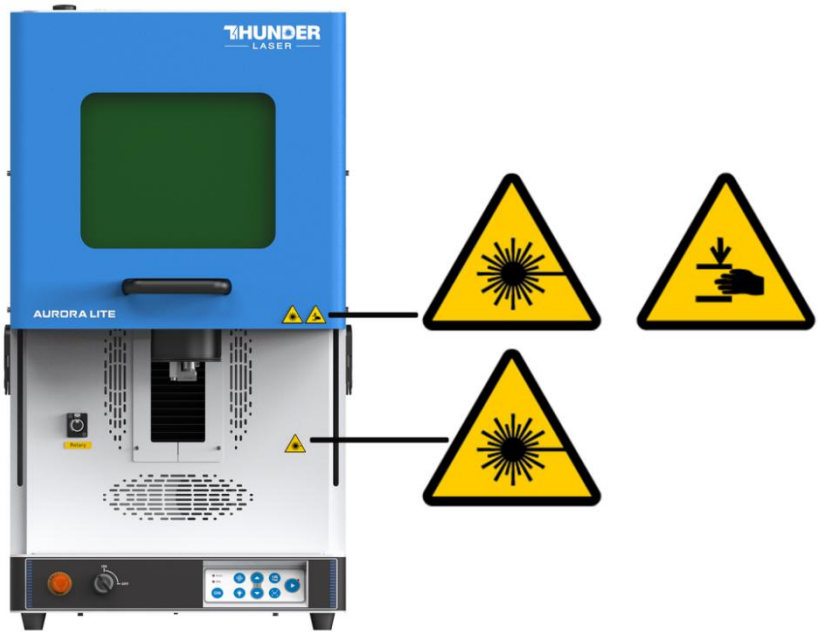
1. CO2 Fire extinguishers should be placed near laser. Always keep a properly maintained and inspected fire extinguisher on hand.
2. Do not store any inflammables inside of the device. Particularly, leftovers of processed materials have to be removed to prevent fire hazard.
3. Please maintain free airflow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

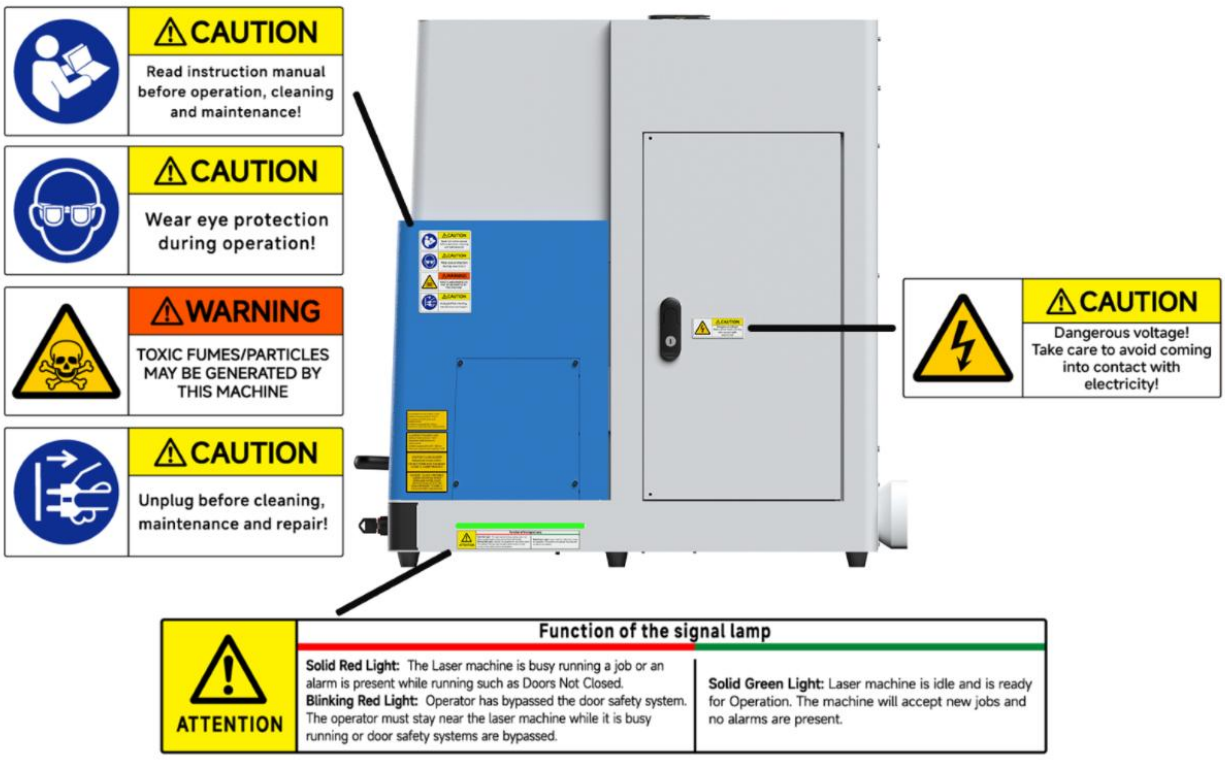
1. These lasers emit invisible radiation, so safety glasses should be worn when maintaining these machines for protection.
2. Adjustment of the beam path must be performed only by professionally trained personnel. Any non-standard setting can lead to uncontrollable emission of the laser radiation.

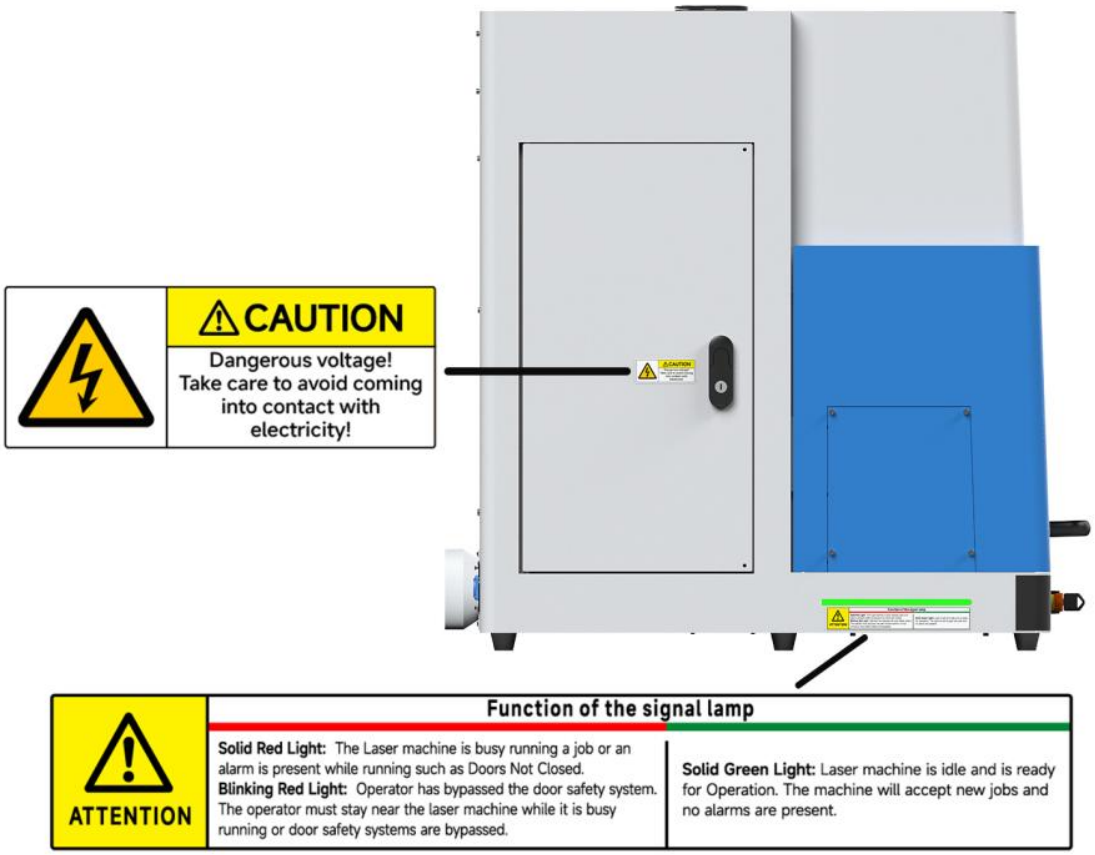
1. Do not disable limit switches or safety devices as this can invalidate warranties and cause damage to you and the machine.
2. Before processing, please verify whether harmful materials can be generated and whether the equipment for exhaust and filtration is useful in dealing with the harmful materials. We need to emphasize that it is the responsibility of the user to consider the national and regional boundary value (the maximum permitted emission concentration) for dust, fogs and gases when selecting the system for exhaust and filtration.
3. Under no circumstances can PVC (polyvinyl chloride) be processed with the laser.

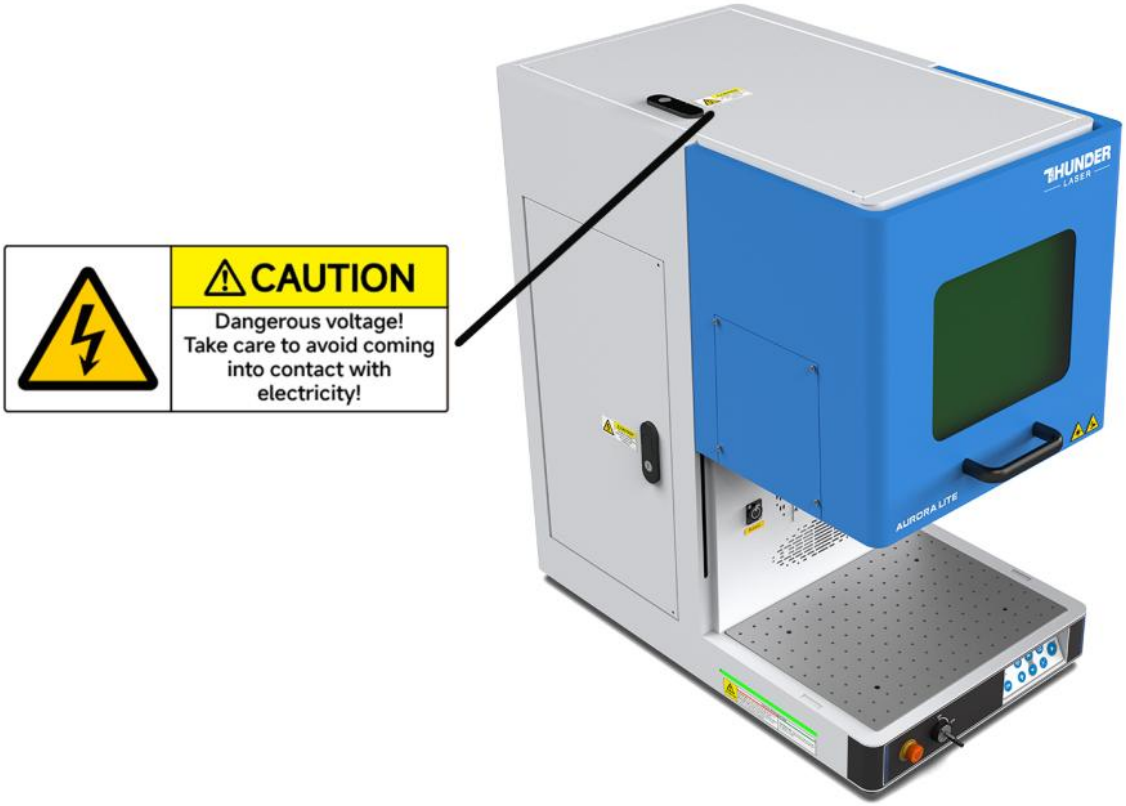
## 2.4 Warning and Information Labels

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




CAUTION
Dangerous voltage!
Take care to avoid coming into contact with electricity!
ATTENTION
Function of the signal lamp
Solid Red Light: The Laser machine is busy running a job or an alarm is present while running such as Doors Not Closed.
Blinking Red Light: Operator has bypassed the door safety system. The operator must stay near the laser machine while it is busy running or door safety systems are bypassed.
Solid Green Light: Laser machine is idle and is ready for Operation. The machine will accept new jobs and no alarms are present.


CAUTION
Dangerous voltage!
Take care to avoid coming into contact with electricity!
THUNDER LASER
AURORA LITE

# Chapter 3. Process of Installing

## 3.1 Unpacking

When you receive your THUNDER LASER AURORA SERIES, it's packed in a wooden box which contains the laser machine and additional accessories. The steps for unpacking and assembling of the laser are as follows. Please follow them carefully.

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

Dispose all waste according to the applicable waste disposal rules

1. Put the wooden box in 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, please tell us these.

4. Then start to install the machine, carefully following the instructions in this manual.

## 3.2 Location

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

1. Avoid locations of high temperature, much dust and high humidity. (The humidity should be kept within 70% and the recommended operating environment temperature range of the laser is 0-40℃.)

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 that of 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 any panel may expose the operator to severe electric shock, invisible laser radiation, mechanical pinch points, burns, blindness, and other hazards. POWER OFF AND UNPLUG after using!

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°F – 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 strong sunlight. Use blinds, if needed.

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 need for maintenance, even breakdown, possibly. Setting your Thunder Fiber Laser up in s suitable controlled temperature, dust free, moisture free, level, stable surface (a level concrete floor) with the recommended maintenance method is critical to the ongoing performance of the machine. It is also a premise for warranty.

## 3.3 Connections

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

### 3.3.1 Connecting the Mains

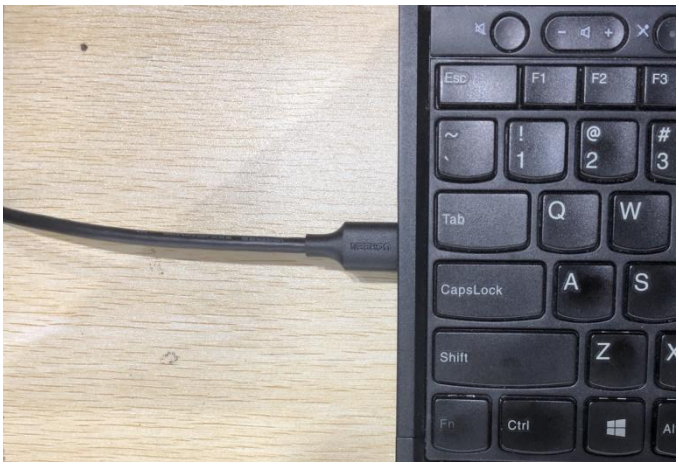
Connect one end of the mains cable with the connection socket at the rear side of the laser device (see figures below) and the other end with a protected power outlet.

Mains voltage must correspond with the operating voltage (AC 110V~240V 50/60 Hz) – see information on label beside the connection socket.

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

## 3.3.2 Connecting the Computer

Connecting the computer and the machine by using the USB cable, as shown in the picture below:

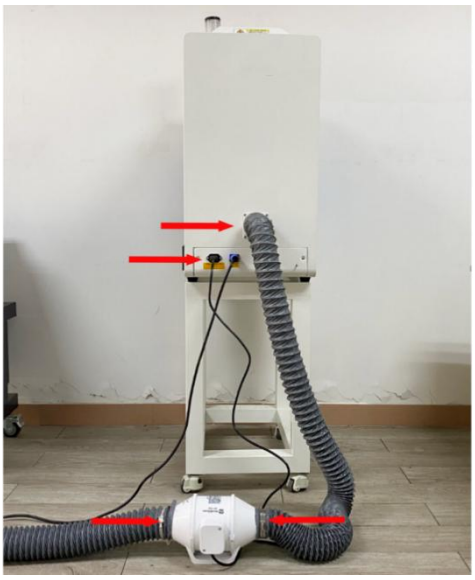

**About how to start to use software EzCad2, refer to chapter 5.1 EzCad2.**

The USB cable is placed inside the toolbox.

## 3.3.3 Connecting the exhaust system

Insert one side of the gray exhaust pipe into the fan inlet and the other side into the machine behind the exhaust tank. Insert one side of the other gray exhaust pipe into the fan outlet and put the other side of the pipe outside the operation room (If the machine is too far from the door of the room to discharge the gas manufactured; then you might need a dust/fume filter, it can keep good air quality of your working environment).

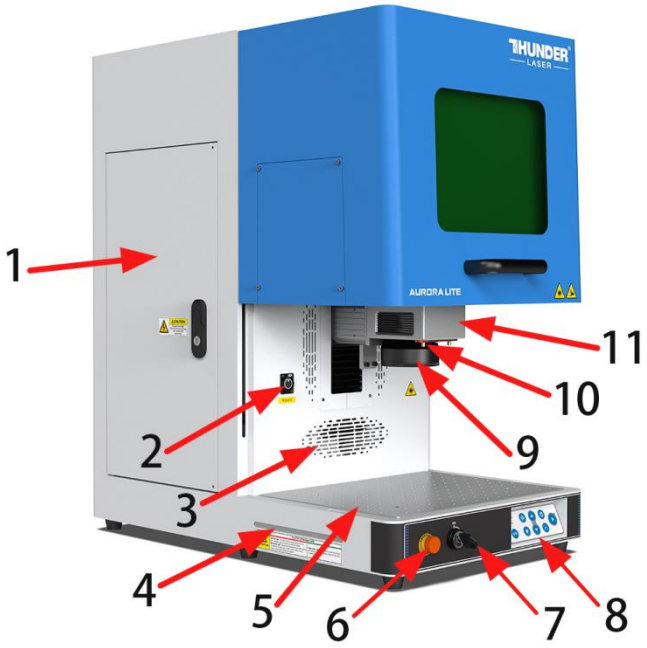
Please refer to the following pictures about how to install the exhaust pipe:



The input voltage must correspond to the required range (AC 110V~240V 50/60 Hz) – see information label beside the connection socket.

# Chapter 4. Operation

## 4.1 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 you must pay attention to the electric current.

**2. Rotary connector**

Use to connect the rotary.

**3. Exhaust hole**

This is for exhausting the fume.

**4. Indicator light**

If fiber laser machine is running, the signal lamp is in red light.
If the laser machine is on standby, the signal lamp is in green light.

**5. Flap protection sensor**

This is where the switch for flap protection exist. Laser will stop working once the cover is opened during working.

**6. Emergency stop button**

Once there's an accident during operation, please press this button immediately. And then the laser power and motion power will be cut off immediately.

**7. Key switch**

To turning the machine on.

**8. Operate panel**

Control Z-axis, galvo movement, etc.

**9. F- lens**

You can replace the field lens by rotating it.

**10. Dual red dot pointer**

For confirming the focal length.

**11. Galvanometer**

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

**12. Front door**

Close it to run a file.

**13. Protection glass**

Protect eyes from laser reflection.

**14. Pass-through door**

User can remove it to marking some longer objects

**15. Cooling fan**

Cooling the electricity parts.

**16. Exhaust hose**

Install the exhaust pipe.

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

This USB is for connecting computer.

**18. Main power socket**

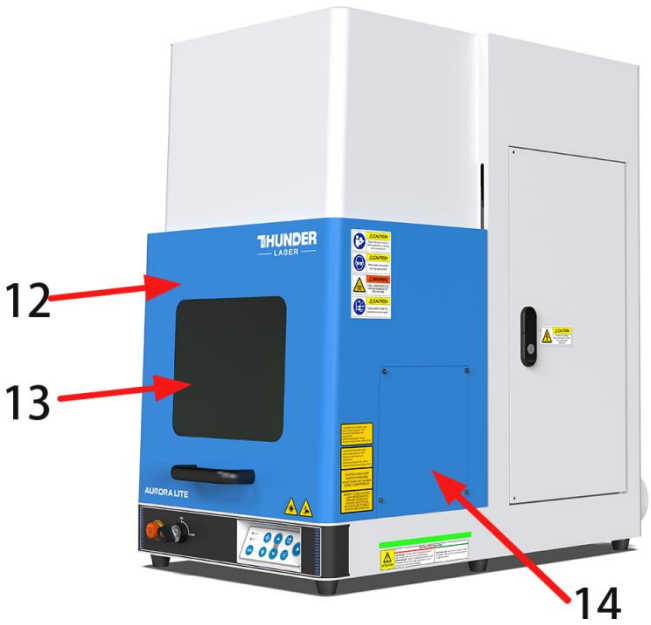
To connect the main power.

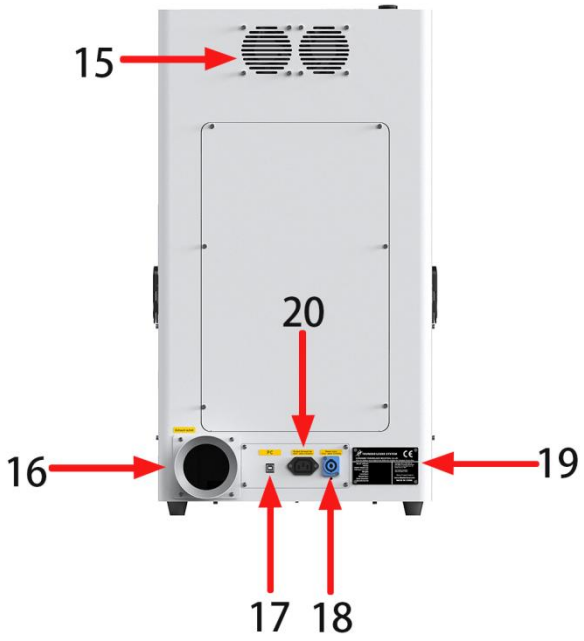
**19. Manufacture's label**

The device information is listed, such as serial number, manufacturing date and etc.

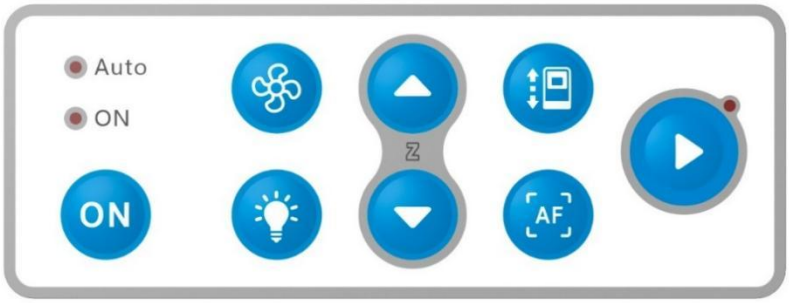
**20. Exhaust fan socket**

To connect the main power of exhaust fan.



## 4.2 How to use the display





Auto and ON: Auto is red means that an automatic door is installed on the laser, otherwise not.
On is red means the laser is ready, flashing means the laser needs to initialize.
Auto and On are all off means the emergency is pressed.


On button: Initialize button, user needs press this button after rebooting the machine.

Fan mode switching: In standard mode, the exhaust fan will always on. In auto mode, the fan will be on after marking.

Light button: Control the lighting of the work table, the light is divided into four brightness (the brightest by default for the power on).


Z button: Control the galvo to move.

Door button: Control the front cover to open and close. For Aurora Lite, this button is not working.


Auto focus button: Press it, the galvo will adjust the focal length automatically. For Aurora Lite, this button is not working.

Start button: Press it to run the job.

# Chapter 5. Brief Introduction to Software

## 5.1 EzCad2

The EzCad2 software runs 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, WIN10 and VISTA.

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

If users run the software without connecting 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 the 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.

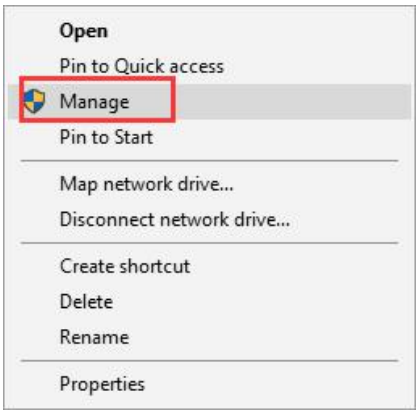
Connect your fiber laser with PC via USB cable.

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

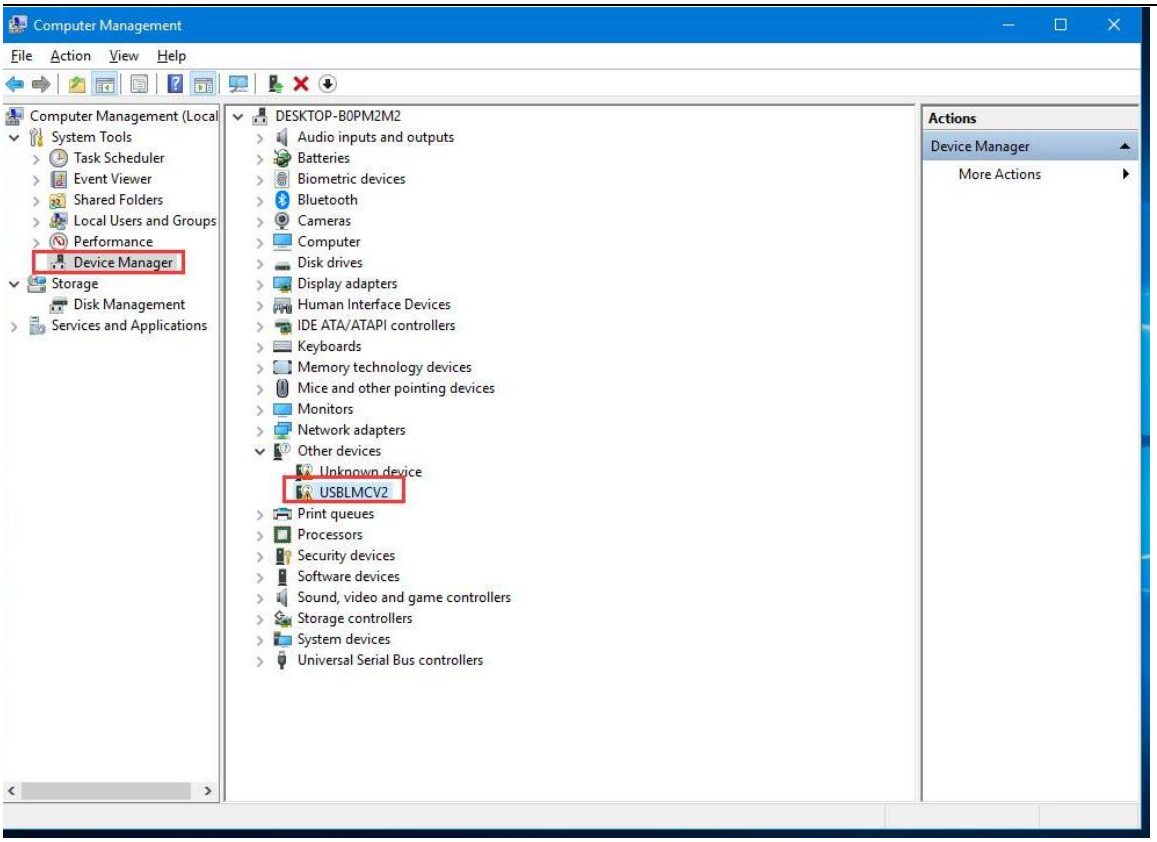
- **How to choose correct driver for fiber laser.**

**Driver of fiber**

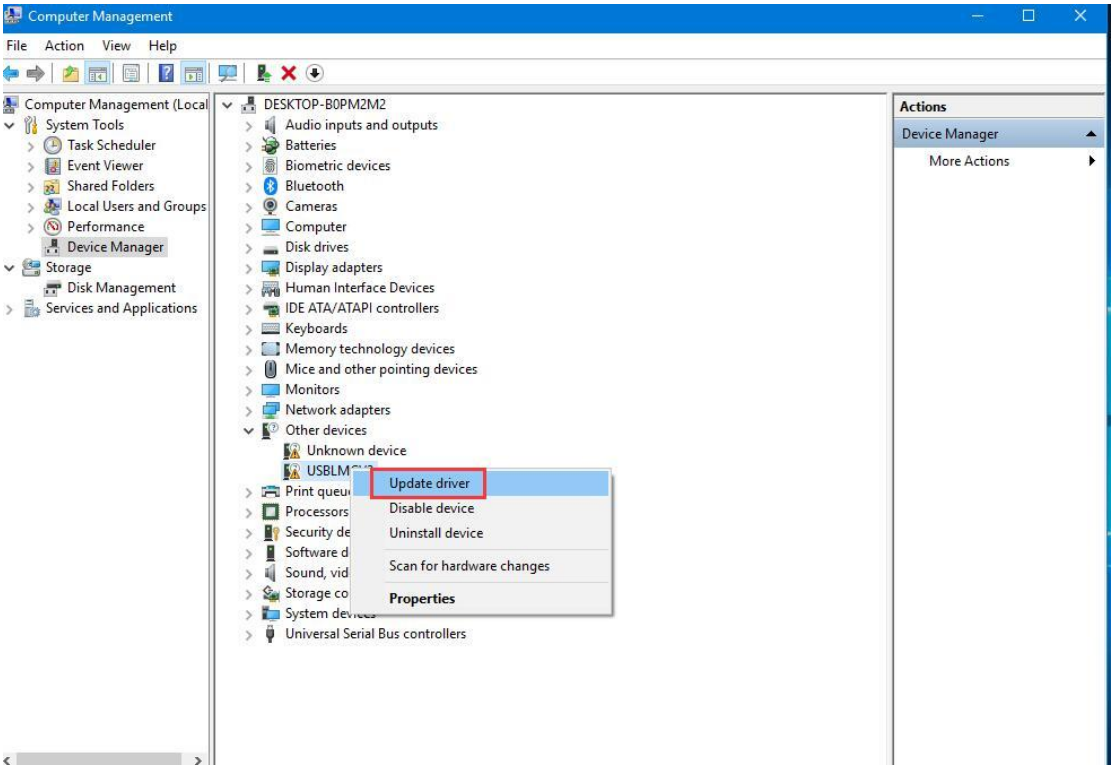

1. Go Manage>>Device manager>>Other devices>>USBLMCV2>>right click, Update driver>>Browse my computer for driver software>>Browse, and find the CV4 folder you saved from the U-disk that came with the fiber laser>>Select the CV4 driver>>Next>>Install, then the driver is installed successfully. See pictures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



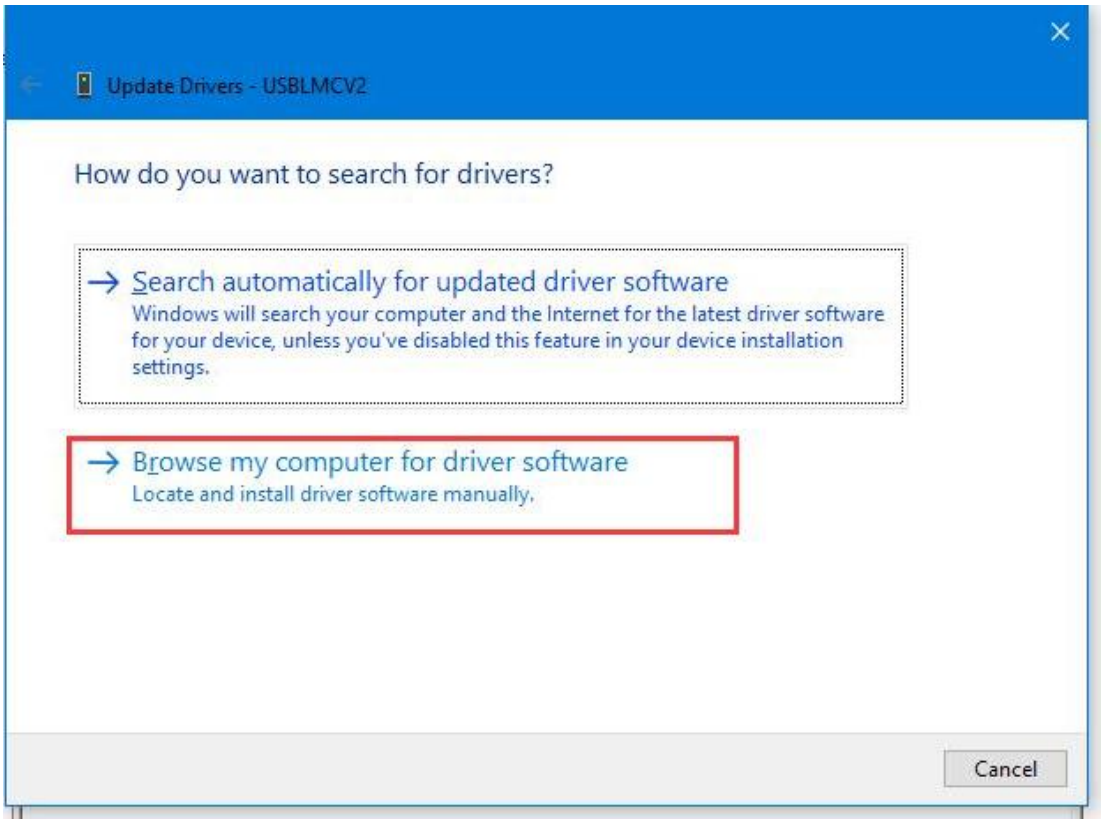

Pic1


Computer Management
File Action View Help
Computer Management (Local
System Tools
Task Scheduler
Event Viewer
Shared Folders
Local Users and Groups
Performance
Device Manager
Storage
Disk Management
Services and Applications
DESKTOP-B0PM2M2
Audio inputs and outputs
Batteries
Biometric devices
Bluetooth
Cameras
Computer
Disk drives
Display adapters
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Memory technology devices
Mice and other pointing devices
Monitors
Network adapters
Other devices
Unknown device
USBLMCV2
Print queues
Processors
Security devices
Software devices
Sound, video and game controllers
Storage controllers
System devices
Universal Serial Bus controllers
Actions
Device Manager
More Actions

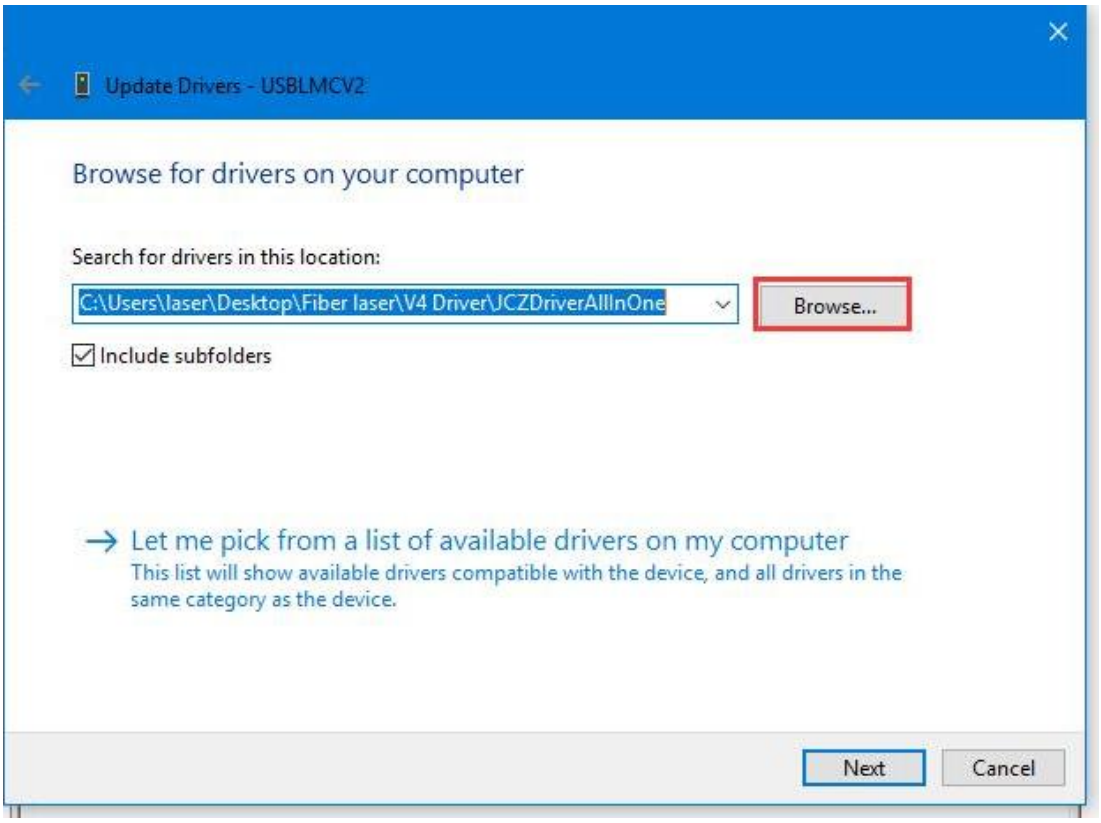
Pic2


Computer Management
File Action View Help
Computer Management (Local
System Tools
Task Scheduler
Event Viewer
Shared Folders
Local Users and Groups
Performance
Device Manager
Storage
Disk Management
Services and Applications
DESKTOP-B0PM2M2
Audio inputs and outputs
Batteries
Biometric devices
Bluetooth
Cameras
Computer
Disk drives
Display adapters
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Memory technology devices
Mice and other pointing devices
Monitors
Network adapters
Other devices
Unknown device
Update driver
Disable device
Uninstall device
Scan for hardware changes
Properties
Universal Serial Bus controllers
Actions
Device Manager
More Actions

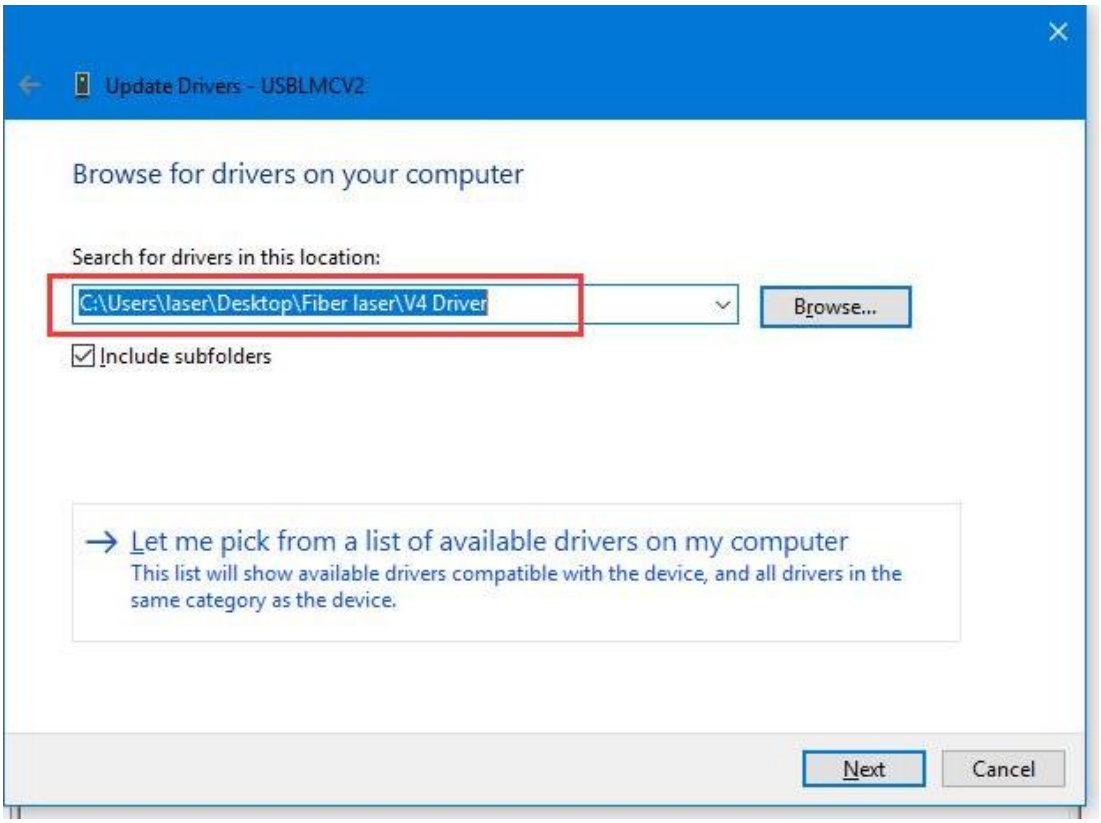
Pic3


Update Drivers - USBLMCV2
How do you want to search for drivers?
Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.
Browse my computer for driver software
Locate and install driver software manually.
Cancel

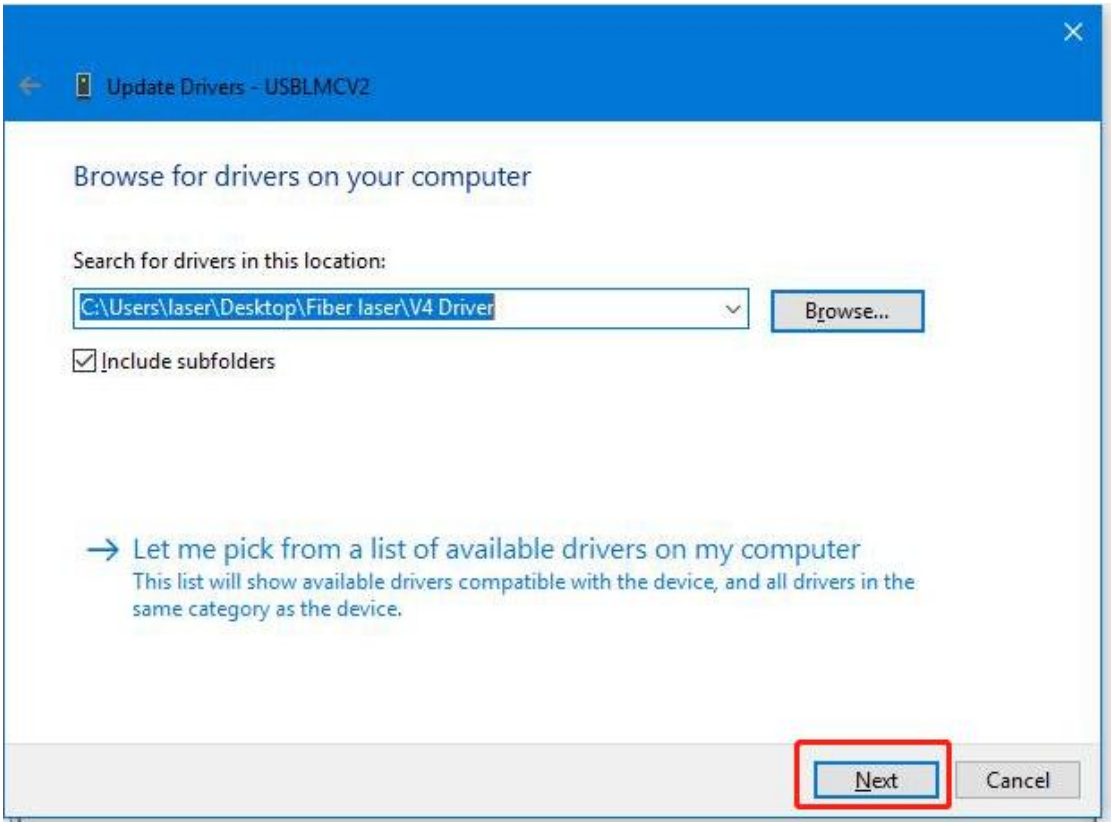
Pic4


Update Drivers - USBLMCV2
Browse for drivers on your computer
Search for drivers in this location:
C:\Users\laser\Desktop\Fiber laser\V4 Driver\JCZDriverAllInOne
Browse...
Include subfolders
Let me pick from a list of available drivers on my computer
This list will show available drivers compatible with the device, and all drivers in the same category as the device.
Next
Cancel

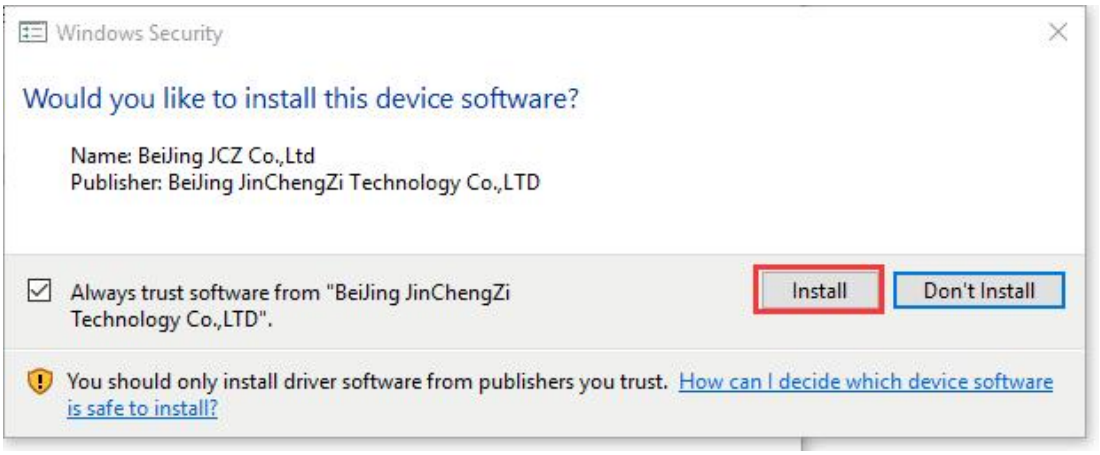
Pic5


Update Drivers - USBLMCV2
Browse for drivers on your computer
Search for drivers in this location:
C:\Users\laser\Desktop\Fiber laser\V4 Driver
Browse...
Include subfolders
Let me pick from a list of available drivers on my computer
This list will show available drivers compatible with the device, and all drivers in the same category as the device.
Next
Cancel

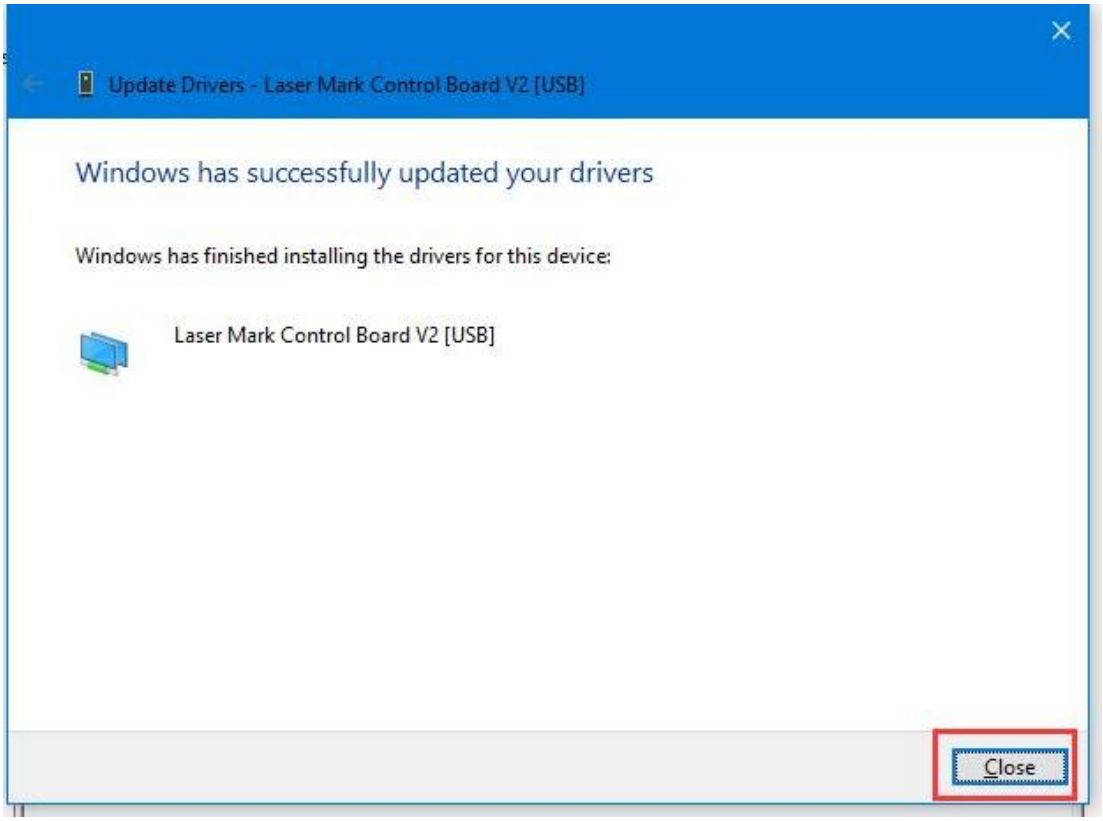
Pic6


Update Drivers - USBLMCV2
Browse for drivers on your computer
Search for drivers in this location:
C:\Users\laser\Desktop\Fiber laser\V4 Driver
Browse...
Include subfolders
Let me pick from a list of available drivers on my computer
This list will show available drivers compatible with the device, and all drivers in the same category as the device.
Next
Cancel

Pic7




Pic8




Pic9

Then, you can open the software now.

## 5.1.2 Software setting

**1. General setting**

- **Fiber**

Open the software, then press "F3" and select items according to the picture below.

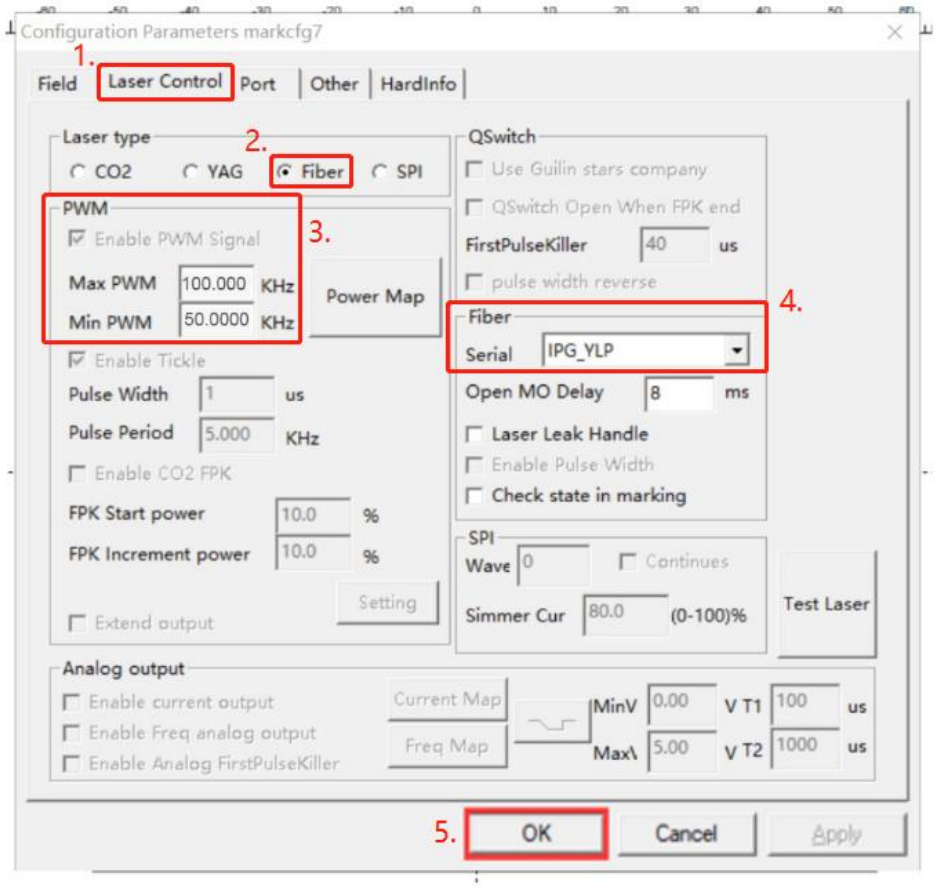
Laser type: Fiber

PWM:

Max PWM: 100 kHz, Min PWM: 50 kHz.

Fiber serial: IPG_YLP

Open Mo Delay: 8ms.




The frequency range for Aurora Lite laser source.

| Fiber laser | 50W |
|---|---|
| Frequency | 50-100kHz |

And we set all setting above before leaving the factory, so just check if these are correct. If not, change them according.

## 2. How to import the calibration file

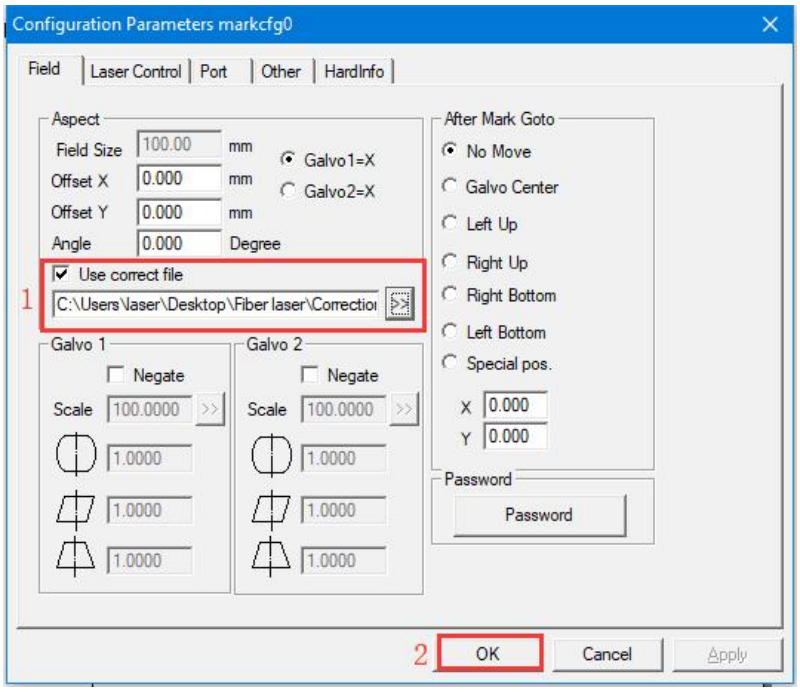
1. Before leaving the factory, we have done a correction test for each machine and imported the calibration file to fiber software, so the customer does not need to calibrate again.

2. Different field lenses have different calibrate files and cannot be used randomly.

3. If you've purchased other field lens with the fiber machine, we will prepare the calibration file and put it in the U-disk too.

4. If you've purchased other field lens after the machine left the factory, contact us to get the calibration file.

Open the software>>Press "F3" button>>Field>>find the calibration file (say the name is150×150.cor) in the USB disk that came with the machine.

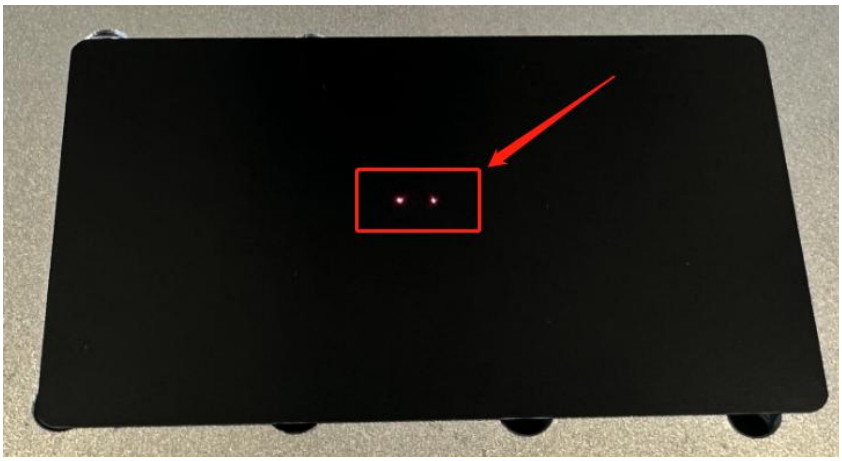



Customer can save the calibration file to computer from U-disk, and select it from computer.

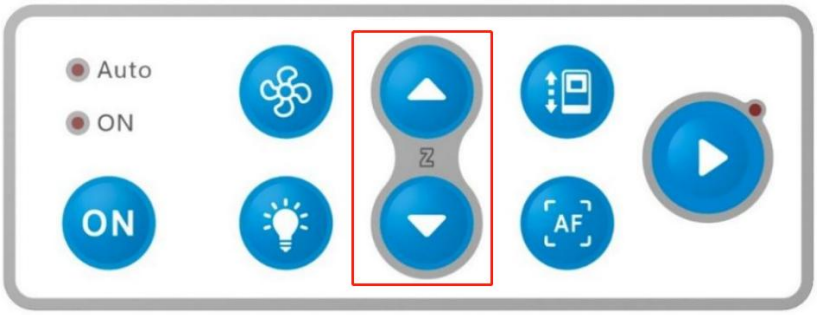
# Chapter 6. How to focus

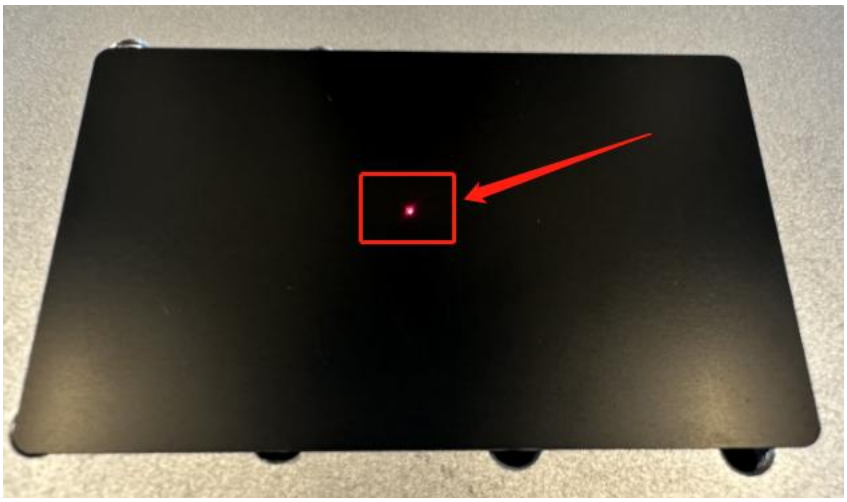
- **How to use the dual red dot focus function**

1.Place the material under the dual red dot.



2.Using the Z-axis up and down buttons to focus two beams of focused red dot to the same point.

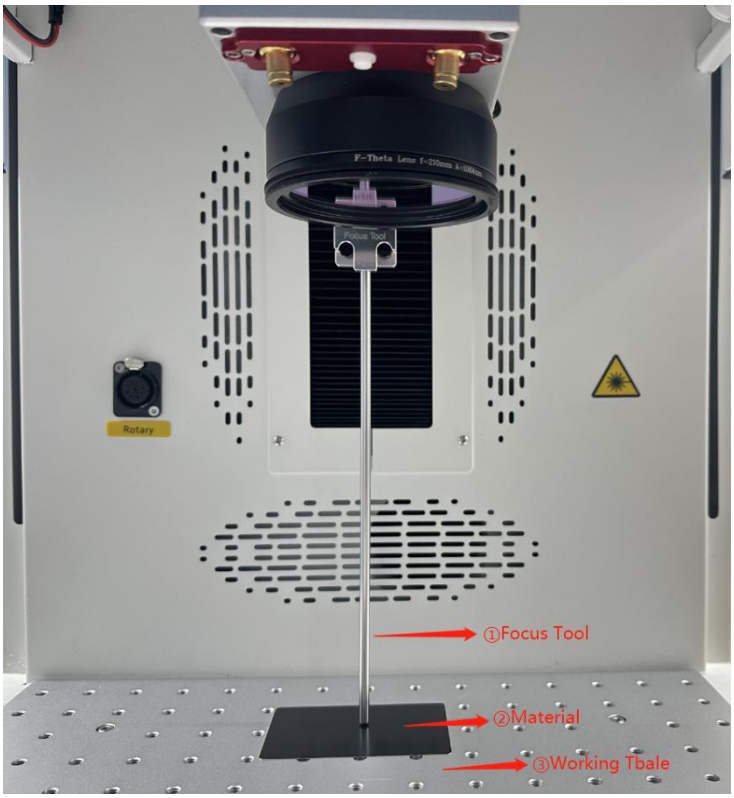


- **How to use manual focus tool**

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

Find the Focus Tool for help to adjust the focus directly like below:




① **Focus Tool**
② **Material**
③ **Working**

# Chapter 7 The First Time to Run the Fiber Laser

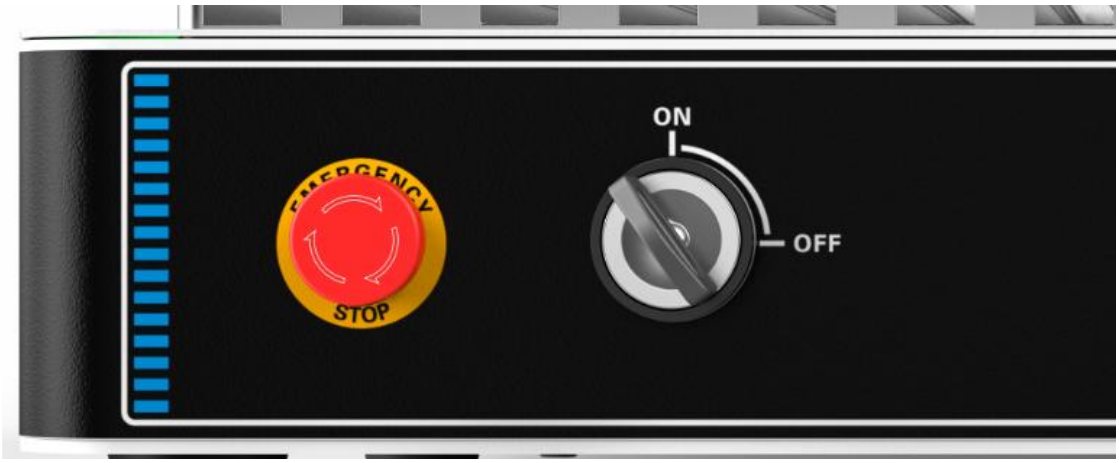
For your safety, never ever run the laser system unattended.

**Your first marking test ( AURORA Lite, Lens F-210)**

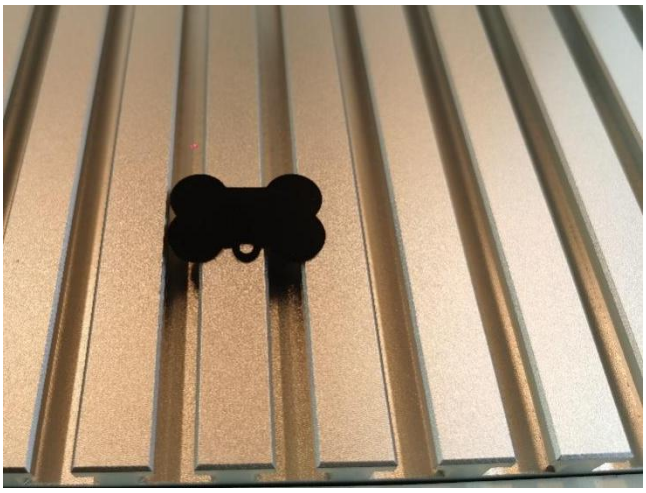
The following steps describe how to successfully engrave a pattern for the first time. Please follow the steps:

1. First ensure that the exhaust fan, computer and all mains are connected.

2. Turn on the key switch and emergency button.




3. Place the material on the working platform.

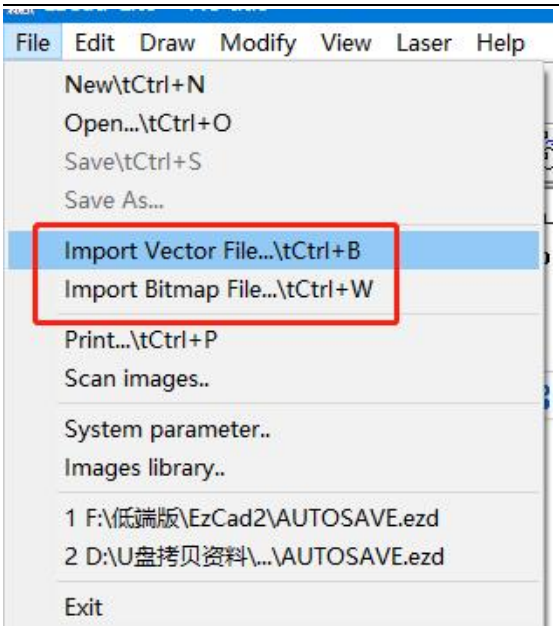


4. Open the software EzCad2, then install driver and import the calibration file according to **Chapter 5.2**

**Please must follow the steps to turn on the machine：**

**Turn on the machine>> turn on the software, otherwise the software cannot connect with the machine.**

5. Import your file to EzCad2




This software supports these file types.

Vector Files

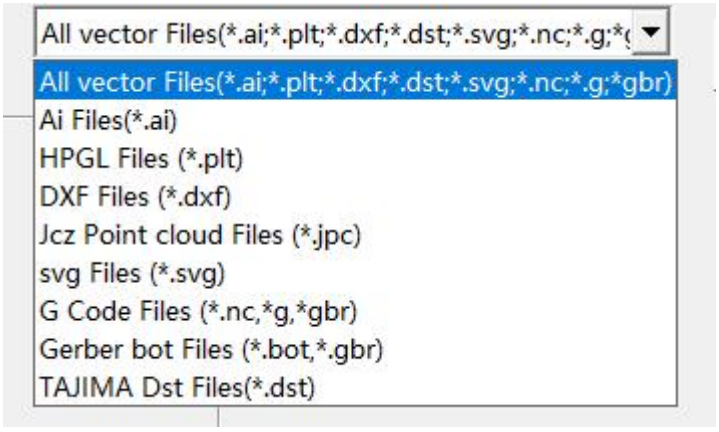
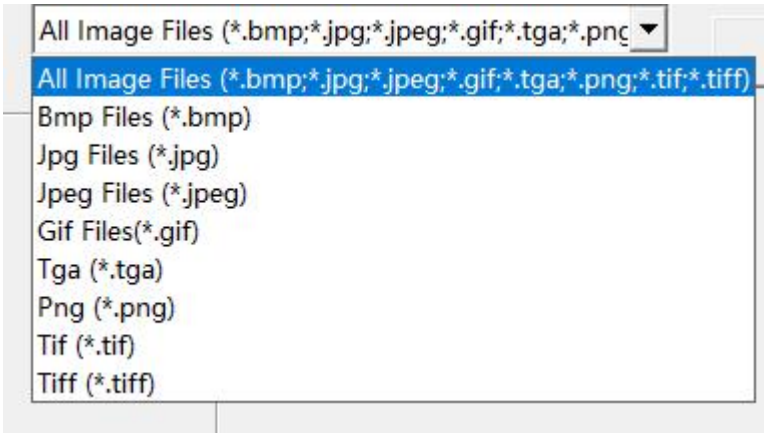
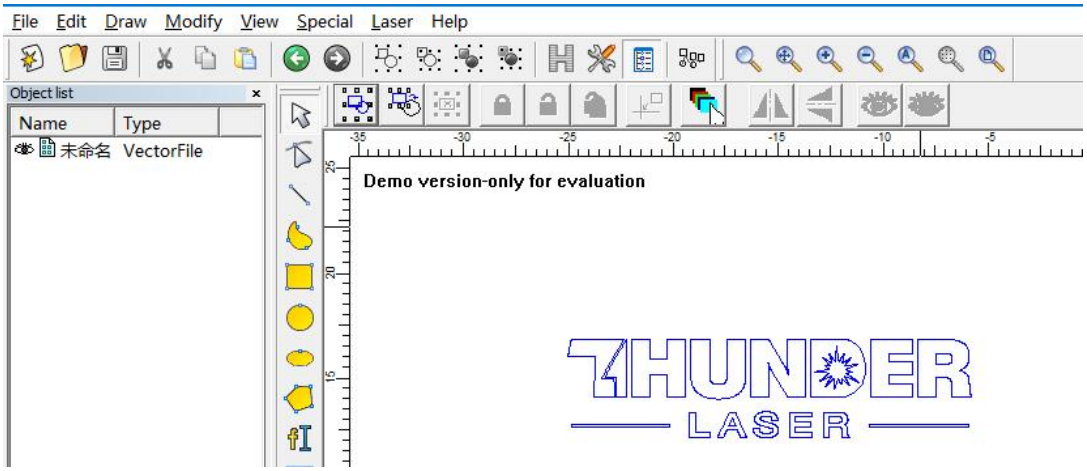
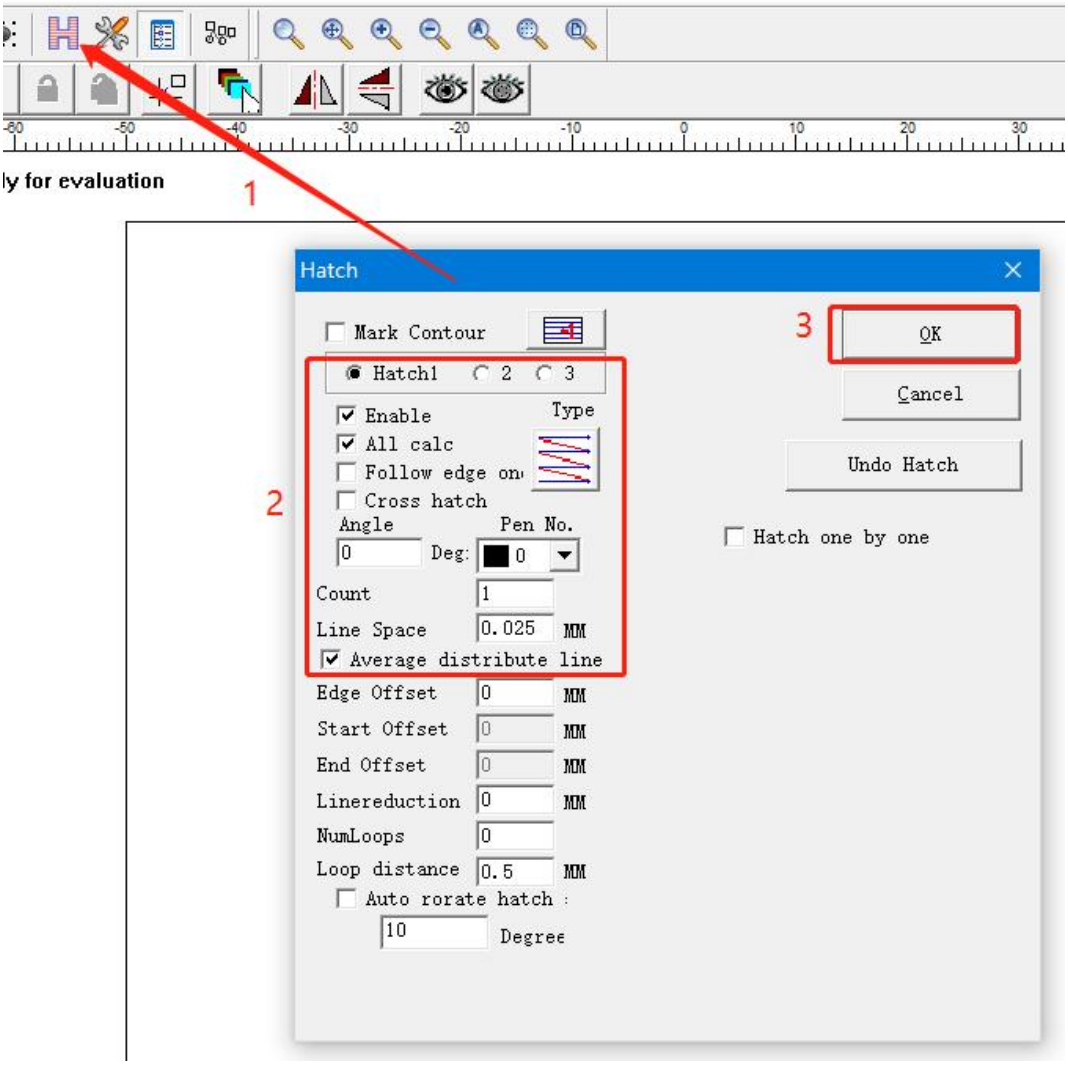


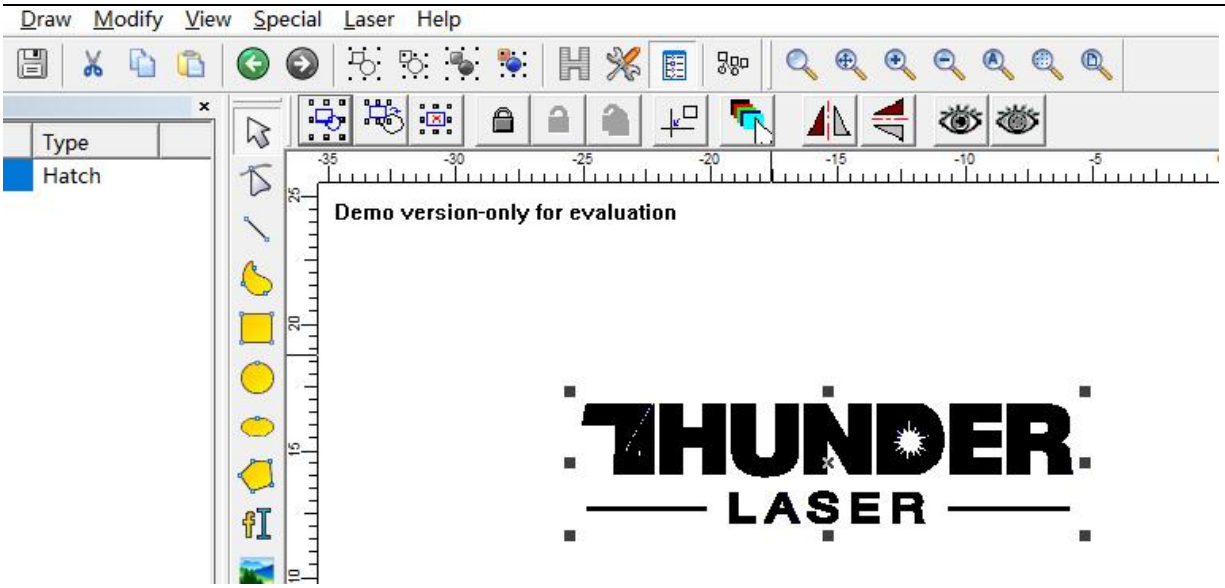

Image Files






6. Press "Hatch", choose Hatch1(or you can choose the others as you need), set the Line space as 0.025mm (we recommend the range of 0.01-0.1mm), then press "OK".



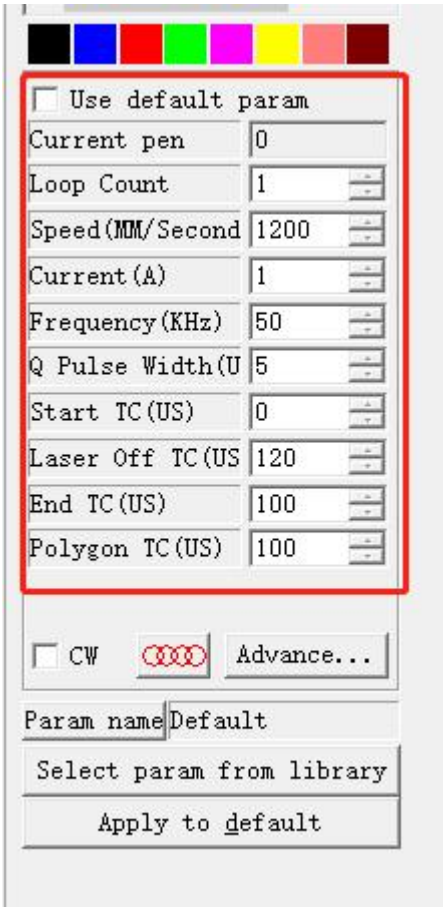



7. Set the marking parameters for your file. Adjust parameters as needed (you need to unselect "use the default para" for changing the parameters).

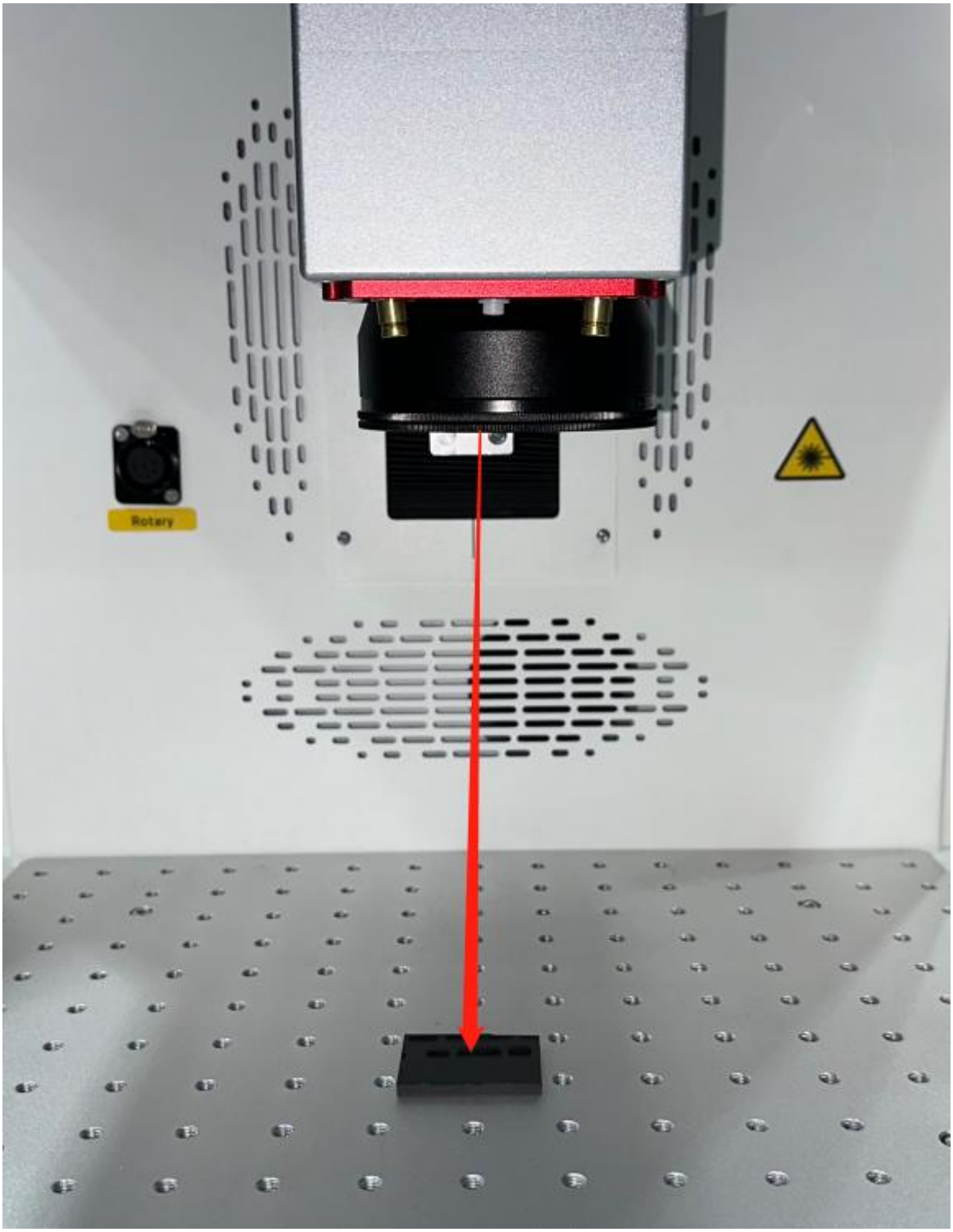
Set the Loop Count to 1, Speed to 1200mm/s, Frequency to 50KHz, Q-Pulse width to 5μs.

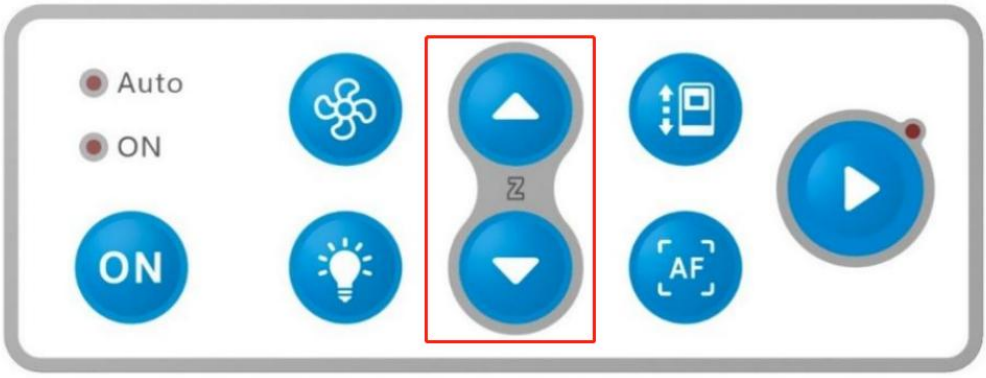
Start TC(US) to 0, Laser Off TC(US) to120, End TC(US) to 100, Polygon TC(US) to 100.

Other settings needn't to change.



8. You can see a red dot on the work area, which comes from the galvanometer. So please put your material under the red dot, then Focus manually. Using the Z-axis up and down buttons to focus two beams of focused red dot to the same point.Finally the focus distance adjustment is complete.






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


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 just press "Start" button of the fiber machine.

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

11. The laser will mark your image.

# Chapter 8 Maintenance

## 8.1 General Maintenance

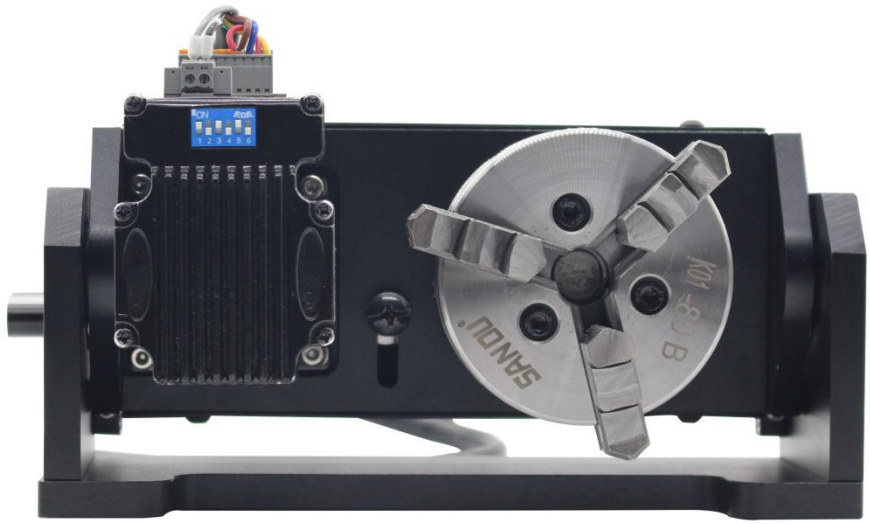
Caution-**Before any maintenance efforts takes place, ensure that the power supply has been cut off and the system is powered off.**

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

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

- Lubricating the rotary

It is suggested to add lubricant oil (or Rust Preventative Grease) to the chuck at least every two weeks.



## 8.2 Clean the Field lens

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

1. Never touch the optical components with your fingers! Oily or dirty hands may damage the surfaces of lens.
2. Do not use any tools or hard objects to clean the surfaces. Scratches cannot be repaired.
3. Blow away large pieces of dirt by blowing up a balloon.

4. Spray the cleaning solution onto the Q-tip, and remove the remaining stains with it.

5. Distribute the cleaning fluid carefully by small circular motions. Start with the center of the lens and move outwards to the edge. Keep moving the Q-tip until the entire surface is clean.

6. Clean it again with a new clean and dry cotton swab.

7. Make sure that no water or stains remain on the surface of the lens after cleaning.

8. Do not wipe the lens with a dry cloth.

9. Do not exert any pressure on the lens.

10. Clean once half a year (depended on the usage).

**The End.**