THUNDER LASER SYSTEMS

TITAN & TITAN PRO Series Unified User's Manual

For TITAN 27, 35, 51, 63 and

TITAN Pro 27, 35, 51, 63

Thunder Laser

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June 2025

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Dongguan City, Guangdong Province, China

Introduction

This manual serves as the official installation and user guide for Thunder Laser cutting systems. It is divided into five chapters: general information, safety guidelines, key system components, installation procedures, operation instructions, and maintenance requirements.

It should be emphasized that all systems must be installed in strict accordance with Thunder Laser's specified requirements. Failure to do so may result in malfunction, poor performance, shortened service life, increased maintenance costs, or even permanent machine damage.

These notes outline critical requirements for proper system installation. We recommend that all users fully understand these instructions before installation and operation to ensure correct setup and use. If you encounter any issues during installation, please contact our technical support or customer service team.

Contents

Chapter 1. General

1.1 General Information

Please read this documentation carefully before installation and operation.

Failure to read, understand, and follow this manual may result in injury, death, property damage, fire, electric shock, machine malfunction, reduced performance, shortened service life, or critical failure.

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 3rd 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 TITAN & TITAN PRO SERIES are used for engraving and cutting of signs, stamps and suchlike.

A wide variety of materials such as rubber, acrylic, coated metal, tin, special steel, anodized aluminum, cork, cardboard, glass, leather, marble, several plastics and wood can be processed on the laser.

1. The engraving process must only be performed with a perfectly adjusted machine.
2. 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.
3. 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!
4. 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.
5. 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

TITAN SERIES

	TITAN 27	TITAN 35	TITAN 51	TITAN 63
Working Area	27.6″ x 19.7″ (700 x 500 mm)	35.4″x 23.6″ (900 x 600 mm)	51.2″x 35.4″ (1300 x 900 mm)	63.0″x 39.4″ (1600 x 1000 mm)
Table Size	31.1″x 23.2″ (790 x 590mm)	39″x 27.2″ (991 x 691mm)	54.7″x 39.1″ (1391 x 995mm)	66.5″x 43.1″ (1691 x 1095mm)
Z Axis Height	9″/230mm			
Max Work Height	7.2″/184mm			
Max. Speed	3000 mm/sec			
Motor	AC Servo Motor			
Drive	AC Servo Drive			
Work piece table	Solid metal blades & Honey comb table & Supports adsorption platform			
Max. table load	100kg/220lbs	100kg/220lbs	110kg/242lbs	/
Net Weight	306kg/375lbs(E50)	356kg/785lbs (I80)	485kg/1069lbs	624kg/1376lbs
Standard Head	2.5″ (63.5mm)			
Lens Diameter	20mm			
Mirror Diameter	25mm			
Beam Comb. Dia.	25mm			
Electricity Requirement	100-240V AC,50 or 60Hz, Single phase Machine requires either 115v or 230V voltage(customized from factory); Support both 50Hz and 60Hz, single phase			
Power consumption	1500W(E50,230V) 2000W(I120,230V)	1400W(I60,230V) 1700W(I80,230V) 2000W(I100,230V)	2000W(I80,230V) 2000W(I100,230V) 2100W(I120,230V)	
Recommended circuit breaker	7A(E50,230V) 9A(I120,230V)	7A(I60,230V) 8A(I80,230V) 9A(I100,230V)	9A(I80,230V) 9A(I100,230V) 10A(I120,230V)	

Dimensions

	TITAN 27	TITAN 35	TITAN 51	TITAN 63
W x D x H	62.6″×44.9″×43.3″ (1590×1140×1100mm)	61.0″×46.1″×43.7″ (1550x1170x1110mm)	76.8″×57.9″×43.7″ (1950x1470x1110mm)	88.6″×61.8″×43.7″ (2250x1570x1100mm)

Max Part Size (W x L x H)

	TITAN 27	TITAN 35	TITAN 51	TITAN 63
Door Closed	30.7″×23.6″×9.1″ 780×600×230mm	38.98″ × 29.13″ × 9.06″ 1000×740×230mm	54.53″ × 40.55″ × 9.06″ 1400×1030×230mm	66.5″×43.3″×9.1″ 1690×1100mm×230mm
Pass Thru	30.7″ × ∞″ × 2.56″ (780 × ∞ × 65mm)	39.37″ × ∞″ × 2.56″ (1000 × ∞ × 65mm)	55.12″ × ∞″ × 2.56″ (1400 × ∞ × 65mm)	66.5″ × ∞″ × 2.56″ (1690 × ∞ × 65mm)

TITAN PRO SERIES

	TITAN PRO 27	TITAN PRO 35	TITAN PRO 51	TITAN PRO 63
Working Area	27.6″ x 19.7 (700 x 500 mm)	35.4″x 23.6″ (900 x 600 mm)	51.2″x 35.4″ (1300 x 900 mm)	63.0″x 39.4″ (1600 x 1000 mm)
Table Size	31.1″x 23.2″ (790 x 590mm)	39″x 27.2″ (991 x 691mm)	54.7″x 39.1″ (1391 x 995mm)	66.5″x 43.1″ (1691 x 1095mm)
Z Axis Height	9″/230mm			
Max Work Height	7.2″/184mm			
Max. Speed	3000 mm/sec			
Motor	AC Servo Motor			
Drive	AC Servo Drive			
Work piece table	Solid metal blades & Honey comb table & Supports adsorption platform			
Max. table load	100kg/220lbs	100kg/220lbs	110kg/242lbs	/
Net Weight	317kg/699lbs (E50+Mopa E2-60)	376kg/830lbs (E50+Mopa E2-60)	498.5kg/1099lbs	/
Standard Head	3.0″ (76.2mm)			
Lens Diameter	20mm			
Mirror Diameter	25mm			
Beam Comb. Dia.	25mm			
Electricity Requirement	100-240V AC,50 or 60Hz, Single phase Machine requires either 115v or 230V voltage(customized from factory); Support both 50Hz and 60Hz, single phase			
Power consumption	1500W(E50,Mopa60&100W) 2000W(I120,Mopa60&100W) 230V	1400W(I60,Mopa60&100W) 1700W(I80,Mopa60&100W) 20000W(I100,Mopa60&100W) 230V	2000W(I80,Mopa60&100W) 2000W(I100,Mopa60&100W) 2100W(I120,Mopa60&100W) 230V	
Recommended circuit breaker	7A(E50,Mopa60&100W) 9A(I120,Mopa60&100W)	7A(I60,Mopa60&100W) 8A(I80,Mopa60&100W) 9A(I100,Mopa60&100W)	9A(I80,Mopa60&100W) 9A(I100,Mopa60&100W) 10A(I120,Mopa60&100W)	

Dimensions

	TITAN PRO 27	TITAN PRO 35	TITAN PRO 51	TITAN PRO 63
W x D x H	51.2″×41.1″×43.3″ (1300x1045x1100mm)	61.0″×46.0″×43.3″ (1550x1168x1100mm)	6.8″×57.9″×43.3″ (1950x1470x1100mm)	86.6″×60.8″×43.3″ (2200x1545x1100mm)

Max Part Size (W x L x H)

	TITAN PRO 27	TITAN PRO 35	TITANPRO 51	TITAN PRO 63
Door Closed	30.7″×23.6″×9.1″ 780×600×230mm	38.98″ × 29.13″ × 9.06″ 1000×740×230mm	54.53″ × 40.55″ × 9.06″ 1400×1030×230mm	66.5″×43.3″×9.1″ 1690×1100mm×230mm
PassThru	30.7″ × ∞″ × 2.56″ (780 × ∞ × 65mm)	39.37″ × ∞″ × 2.56″ (1000 × ∞ × 65mm)	55.12″ × ∞″ × 2.56″ (1400 × ∞ × 65mm)	66.5″ × ∞″ × 2.56″ (1690 × ∞ × 65mm)

Features

Standard:

Open flap protection, Fire alarm protection, Dual air-assist control,Communication via WI-FI.
Red Dot Pointer, Auto Focus, Smart board, Motorized Table, Honey Comb Table, Aluminum blade cutting table, Pass-Through Door, 2.5”(63.5mm) / 3.0”(76.2mm) Focus Lens, Warning light, Emergency Stop, Touch panel, Easily Adjustable Home Position, 3D Engraving, Maintenance mode, Air pump, Exhaust Fan, Vacuum Adsorption Platform.

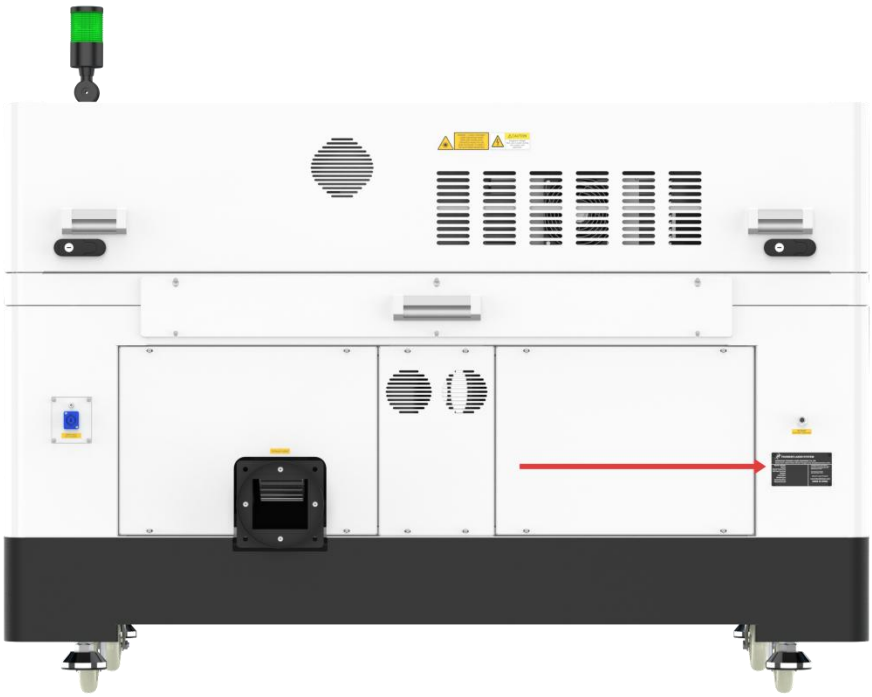
Optional:

Rotary Attachment, High air compressor set (Includes water filter).

Control System	
Laser power	Adjustable from 1 - 100% (typically 5-100%)
Interface Hardware	USB: connect to PC and U-disk Ethernet: connect to PC WIFI
Interface Software	LaserMaker - RDWorksV8
Operating Modes	Optimized raster, vector, and combined mode
Buffer Memory	1G standard
Laser Equipment	
Laser Type:	Sealed Radio Frequency Laser Tube/MOPA Pulsed Fiber Laser
Pulse width(CO2 Laser):	0.1~140KHz
Pulse width(MOPA Fiber):	1~4000KHz
Wavelength:	10.6μm/1064nm
Red dot pointer:	Laser Power< 1mW
Wavelength of Red dot pointer:	630nm – 680nm
Cooling System	
Machine Cooling System:	Air-Cooled
Tube Cooling System:	Air-Cooled
Ambient Conditions	
Ambient temperature	+15°C to +35°C / 59°F to 95°F
Humidity	40% to max. 70%, not condensing
Laser Safety	
Laser class	CDRH Laser Laser Class 1
Safety	CE compliant FDA approved

1.5 Manufacturer's Label

The manufacturer's label is located on the back of the device (see Figure 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.

Chapter 2. Safety

2.1 General Safety Information

All personnel responsible for the installation, setup, operation, maintenance, and repair of this machine must read and fully understand this Operation Manual, especially the "Safety" section.
We recommend that users develop internal company operating procedures based on the professional qualifications of the personnel involved.The receipt of this Operation Manual and participation in relevant on-site training or introduction sessions must 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 3 safety classes. Thunder Laser TITAN & TITAN PRO SERIES are device of class 1.The integrated protective housing, interlock systems, and safety installations ensure compliance with Class 1 standards.
Please note that improper and warranty operation of the device can override the status of Safety class 1 and can cause the emission of harmful radiation.
2. The system is equipped with a visible red laser diode of Class 2 (≤1 mW, 630 -680 nm) for positioning and alignment assistance. Do not stare directly into the red beam.
3. This laser engraving system contains a carbon dioxide (CO2) laser and a fiber laser(If your machine is TITAN PRO series) of class 4 that emits intensive and invisible laser radiation. Without safety precautions the direct radiation or even diffuse reflected radiation is dangerous!
4. Without safety precautions, the following risks exist with exposure to laser radiation:
Eyes: Burns to the cornea
Skin: Burns
Clothing: Danger of fire
5. Never try to modify or disassemble the laser and do not try to start up a system that had been modified or disassembled!
5. 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 TITAN & TITAN PRO SERIES have 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. Press the "PAUSE" button first if you want to interrupt an engraving process.

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

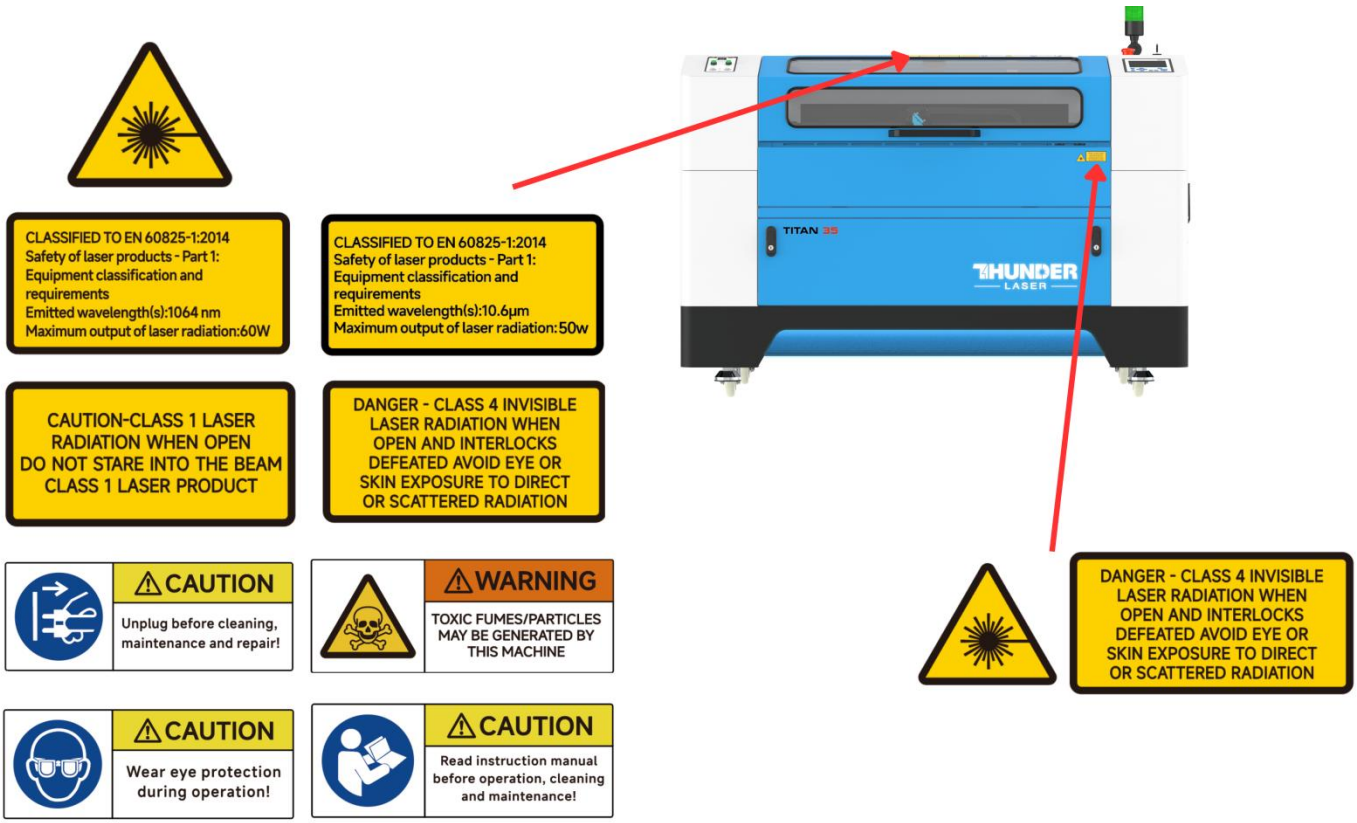
1. CO2 Fire extinguishers should be placed near laser. Always keep properly maintained and inspected fire extinguisher on hand.
2. Do not store any flammable materials in the inside of the device. Particularly leftovers of produced materials have to be removed to prevent fire hazard.
3. Please maintain 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, small scraps can ignite and without supervision can destroy the machine if not checked.
5. Use Air Assist. Always use the system's Air Assist feature when vector cutting.

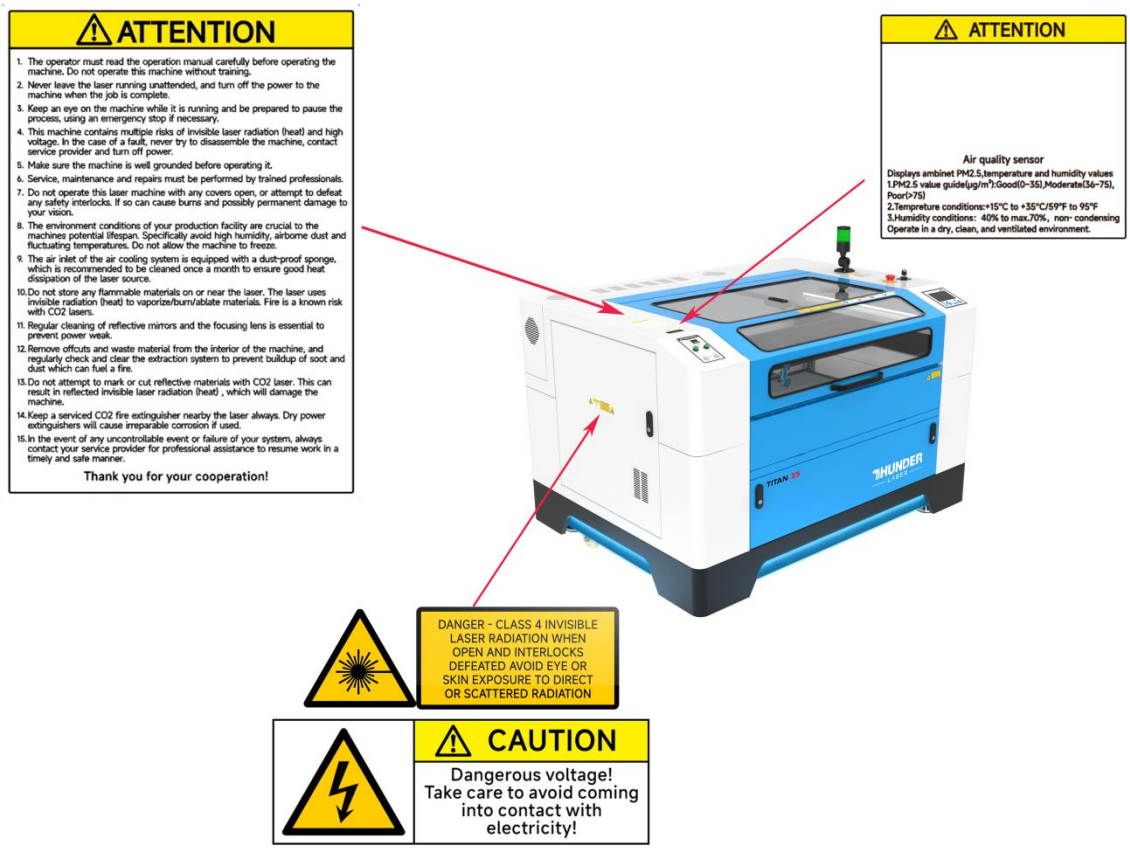
1. These lasers emit invisible radiation; safety glasses should be worn when maintaining these machines for your protection.
2. Adjustment of the beam path must be performed only by specially trained personnel. An improper setting can lead to uncontrolled emission of the laser radiation.

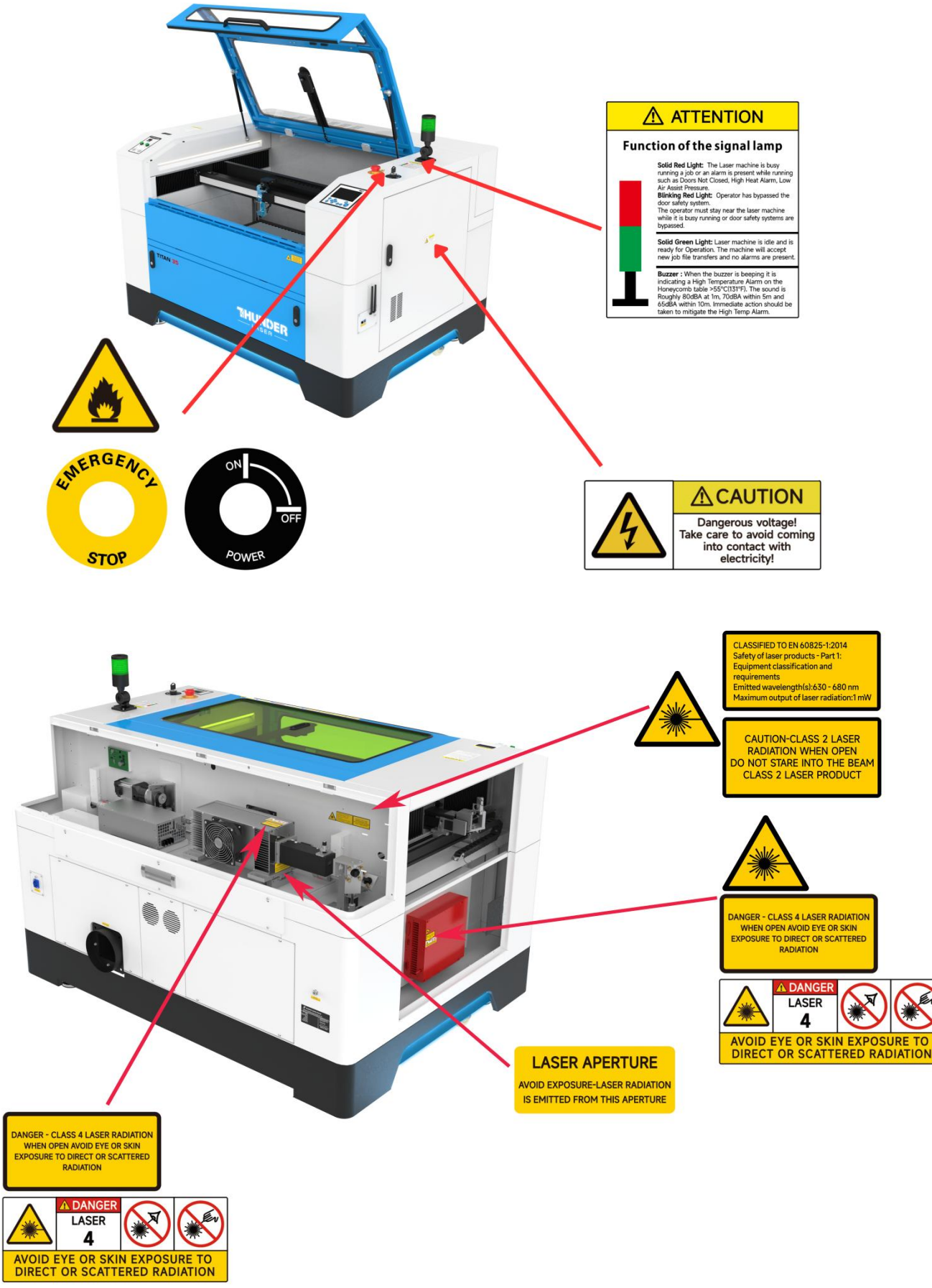
1. Do not disable limit switches or safety features as this can invalidate warranties and cause damage to you and the machine.
2. Before processing materials the user must verify whether harmful materials can be generated and whether the filter equipment of the exhaust system is suitable for the harmful 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.

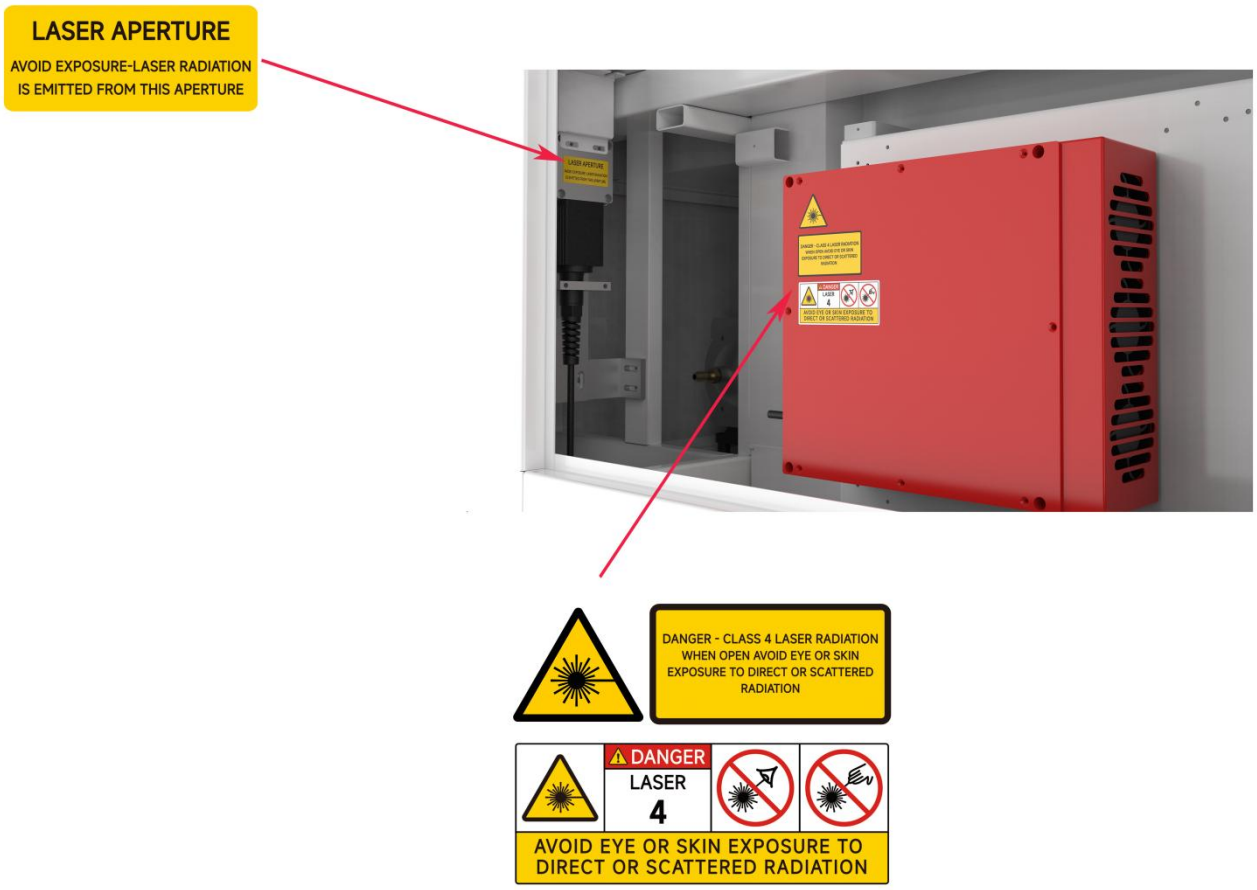
2.4 Warning and Information Labels

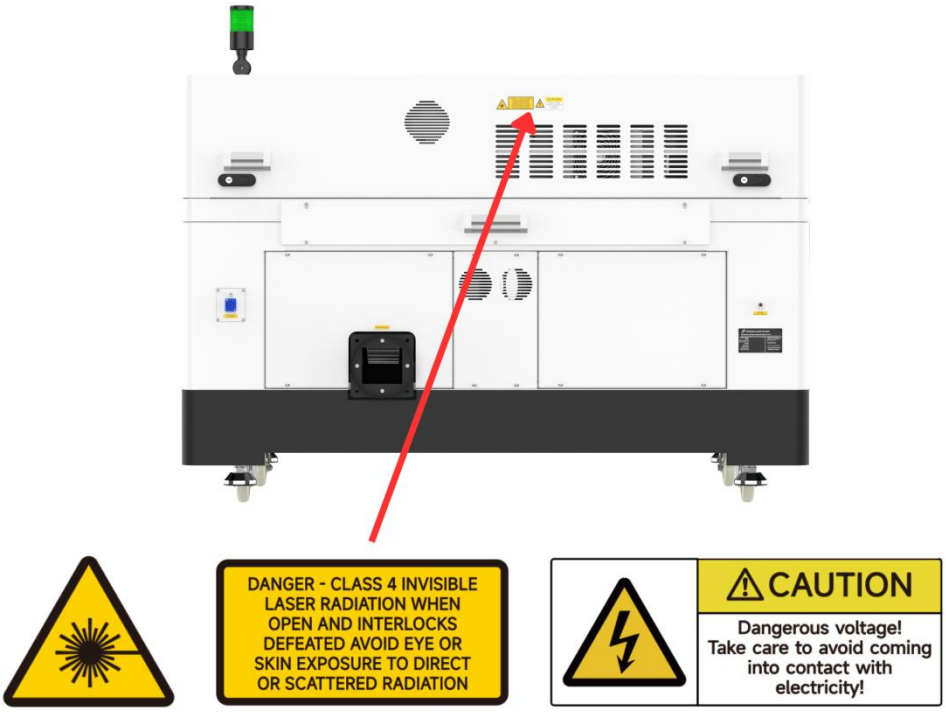
The warning and information labels in various locations if the machine should always be read carefully and understood. If labels are lost or damaged, they must be replaced immediately.


CLASSIFIED TO EN 60825-1:2014
Safety of laser products - Part 1:
Equipment classification and requirements
Emitted wavelength(s):1064 nm
Maximum output of laser radiation:60W
CLASSIFIED TO EN 60825-1:2014
Safety of laser products - Part 1:
Equipment classification and requirements
Emitted wavelength(s):10.6μm
Maximum output of laser radiation:50w
CAUTION-CLASS 1 LASER RADIATION WHEN OPEN DO NOT STARE INTO THE BEAM CLASS 1 LASER PRODUCT
DANGER - CLASS 4 INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
CAUTION
Unplug before cleaning, maintenance and repair!
WARNING
TOXIC FUMES/PARTICLES MAY BE GENERATED BY THIS MACHINE
CAUTION
Wear eye protection during operation!
CAUTION
Read instruction manual before operation, cleaning and maintenance!
TITAN 35
DANGER - CLASS 4 INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION


ATTENTION
1. The operator must read the operation manual carefully before operating the machine. Do not operate this machine without training.
2. Never leave the laser running unattended, and turn off the power to the machine when the job is complete.
3. Keep an eye on the machine while it is running and be prepared to pause the process, using an emergency stop if necessary.
4. This machine contains multiple risks of invisible laser radiation (heat) and high voltage. In the case of a fault, never try to disassemble the machine, contact service provider and turn off power.
5. Make sure the machine is well grounded before operating it.
6. Service, maintenance and repairs must be performed by trained professionals.
7. Do not operate this laser machine with any covers open, or attempt to defeat any safety interlocks. If so can cause burns and possibly permanent damage to your vision.
8. The environment conditions of your production facility are crucial to the machines potential lifespan. Specifically avoid high humidity, airborne dust and fluctuating temperatures. Do not allow the machine to freeze.
9. The air inlet of the air cooling system is equipped with a dust-proof sponge, which is recommended to be cleaned once a month to ensure good heat dissipation of the laser source.
10. Do not store any flammable materials on or near the laser. The laser uses invisible radiation (heat) to vaporize/burn/ablate materials. Fire is a known risk with CO2 lasers.
11. Regular cleaning of reflective mirrors and the focusing lens is essential to prevent power weak.
12. Remove offcuts and waste material from the interior of the machine, and regularly check and clear the extraction system to prevent buildup of soot and dust which can fuel a fire.
13. Do not attempt to mark or cut reflective materials with CO2 laser. This can result in reflected invisible laser radiation (heat) , which will damage the machine.
14. Keep a serviced CO2 fire extinguisher nearby the laser always. Dry power extinguishers will cause irreparable corrosion if used.
15. In the event of any uncontrollable event or failure of your system, always contact your service provider for professional assistance to resume work in a timely and safe manner.
Thank you for your cooperation!
ATTENTION
Air quality sensor
Displays ambinet PM2.5,temperature and humidity values
1.PM2.5 value guide(μg/m³):Good(0-35),Moderate(36-75), Poor(>75)
2.Tempreture conditions:+15°C to +35°C/59°F to 95°F
3.Humidity conditions: 40% to max.70%, non- condensing
Operate in a dry, clean, and ventilated environment.
DANGER - CLASS 4 INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
CAUTION
Dangerous voltage! Take care to avoid coming into contact with electricity!
TITAN 35


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, High Heat Alarm, Low Air Assist Pressure.
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 job file transfers and no alarms are present.
Buzzer : When the buzzer is beeping it is indicating a High Temperature Alarm on the Honeycomb table >55°C(131°F). The sound is Roughly 80dBA at 1m, 70dBA within 5m and 65dBA within 10m. Immediate action should be taken to mitigate the High Temp Alarm.
EMERGENCY
STOP
ON
OFF
POWER
CAUTION
Dangerous voltage! Take care to avoid coming into contact with electricity!
CLASSIFIED TO EN 60825-1:2014
Safety of laser products - Part 1: Equipment classification and requirements
Emitted wavelength(s):630 - 680 nm
Maximum output of laser radiation:1 mW
CAUTION-CLASS 2 LASER RADIATION WHEN OPEN DO NOT STARE INTO THE BEAM CLASS 2 LASER PRODUCT
DANGER - CLASS 4 LASER RADIATION WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
DANGER
LASER
4
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
LASER APERTURE
AVOID EXPOSURE-LASER RADIATION IS EMITTED FROM THIS APERTURE
DANGER - CLASS 4 LASER RADIATION WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
DANGER
LASER
4
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION


LASER APERTURE
AVOID EXPOSURE-LASER RADIATION IS EMITTED FROM THIS APERTURE
DANGER - CLASS 4 LASER RADIATION WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
DANGER
LASER
4
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION


DANGER - CLASS 4 INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
CAUTION
Dangerous voltage! Take care to avoid coming into contact with electricity!

Chapter 3. Process of Installing

3.1 Unpacking

Your THUNDER LASER TITAN & TITAN PRO SERIES machine is delivered in a wooden crate, which includes t he laser machine and all accompanying accessories.The steps below provide a general guide to unpacking and assembling your laser system.Please follow these instructions carefully.

Please retain the original packing box, as it will be needed if you wish to return the machine.

Dispose all waste according to the applicable waste disposal law.

1. Place the wooden crate on a flat, spacious surface for unpacking.

2. Open the outer packaging, then slowly remove the machine from the pallet.

3. Take out the key,open the door of the laser, remove the accessories box which contains all accessory parts required for the installation of the laser machine and check the contents carefully.

4. Please keep the keys and record your machine model and serial number. If you need tech support we may ask you for this information.

5. Remove the sponges and nylon cable ties from inside the machine, and then start to install the machine, carefully following the instructions in this manual.

3.2 Location

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

1. Do not place the system in areas with high temperatures, excessive dust, or 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.

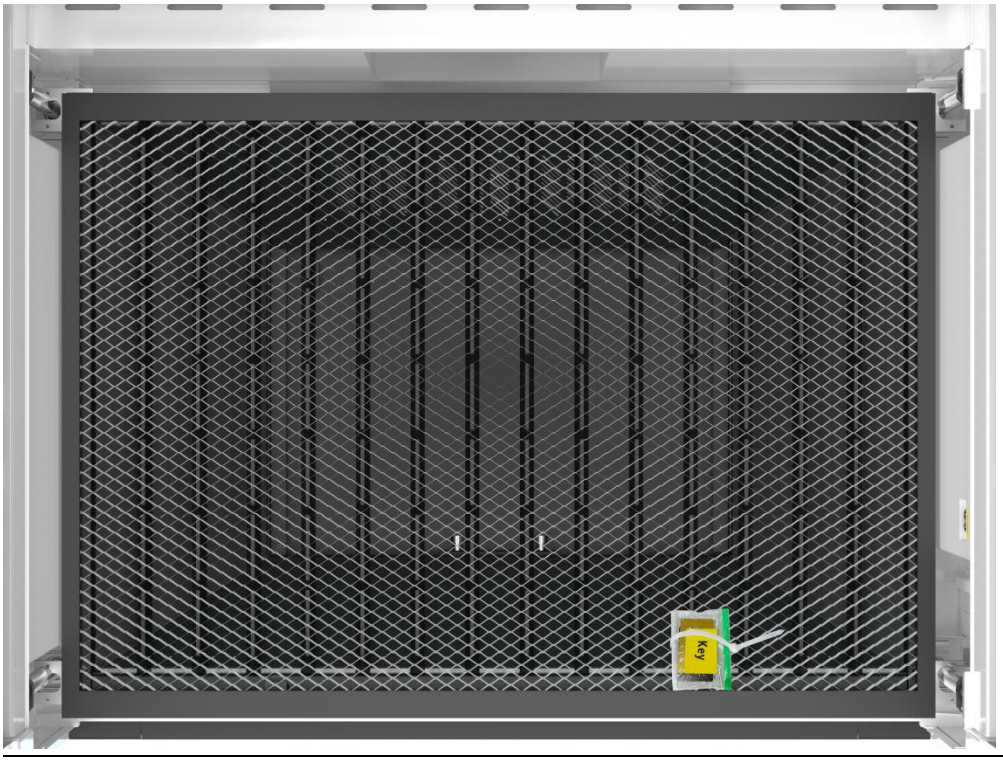
2. DO NOT open any of the machine's access panels while the unit is plugged in. Opening a panel may expose the operator to severe electric shock, invisible CO2 laser radiation, mechanical pinch points, burns, blindness, and other hazards. ALWAYS POWER OFF AND UNPLUG!
3. DO NOT make or break any electrical 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, where the recommended room temperature is between 15 °C and 25 °C (59° – 77° F).
2. This is fundamental to maintain consistent and reliable operation of a CO2 laser, Metal RF or Glass tube 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 Laser up in s 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 Before Installation

1. Remove the nylon cable ties around the honeycomb bed.

Remove the transparent bag from the front of honeycomb bed as shown below:

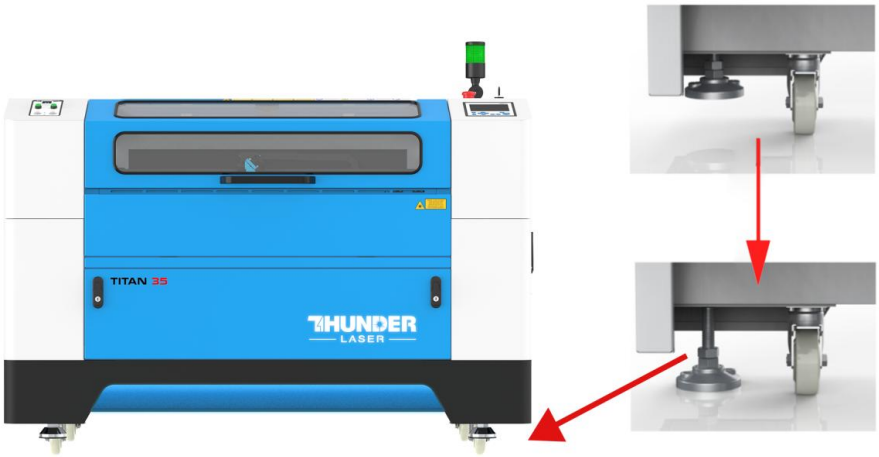


The transparent bag contains a set of machine door keys, a USB flash drive, and an engraving test sample(scanning offset card).
The USB flash drive stores essential software, manuals, material libraries, and other necessary files.

It also includes the **Reverse Offset / Scan Offset** compensation values specific to this machine.
The offset values must be entered into your RDWorks and/or LaserMaker software to ensure the highest possible engraving quality.
For detailed instructions, please refer to the Ruida or LaserMaker user manuals.

2.Rotate the E-Stop switch in the direction of the arrows to reset. Familiarize yourself with the emergency stop button's operation and location.

3. When you have the machine in its final position, please be sure to re-fix the feet in all four corners.
Please see below:



The main power cable is in the tool box that came with the machine.

3.4 Exhaust System – Requirements

Proper fume extraction is imperative to evacuate the combustible and noxious fumes that are created during the lasing process. This machine must be equipped with an adequate exhaust system. This includes a blower of rated flow, volume, and duty cycle as well as properly installed ducting and peripherals. You can further reduce smells from fine particulate matter with an inline filtering system.

Connection - see section 3.7.4 connecting the Exhaust System.

Do not start the machine without an adequate exhaust system.

3.5 Air System – Requirements

The included air pump supplies the dual stage air assist control and is a critical component. This helps keep the focusing lens clean and cool during the engraving process. Air assist is also critical when cutting to reduce flame-ups and clear the debris field.

The air pump model may vary based on regional specifications, and can be identified in the rear view of the machine.

You can find it by opening the left cover door the machine.

Always use the air assist system during all processing operations to protect the lens and minimize the risk of material catching fire.

3.6 Computer – Requirements

The recommendations below represent the minimum system requirements.
A more powerful computer will generate and display graphics faster, while also reducing processing time and data transfer speed to the laser machine.
To run the latest software version, additional system requirements may apply.

- Windows 11 (32 bit or 64 bit)
- Windows 10 (32 bit or 64 bit)
- Windows 8 (32 bit or 64 bit)
- Windows 7 (32 bit or 64 bit)
  Windows Vista (with Service Pack 1 or later)
  Windows XP (with Service Pack 2 or later)
- 1024 MB of RAM, 400 MB of hard disk space
- Pentium® 3 or 4 processor or AMD Athlon™ XP
- 1024 x 768 or better monitor resolution
- 1 free USB interface
- 1 free Ethernet interface
- Mouse

These requirements are for LaserMaker and RDWorks.

3.7 Connections

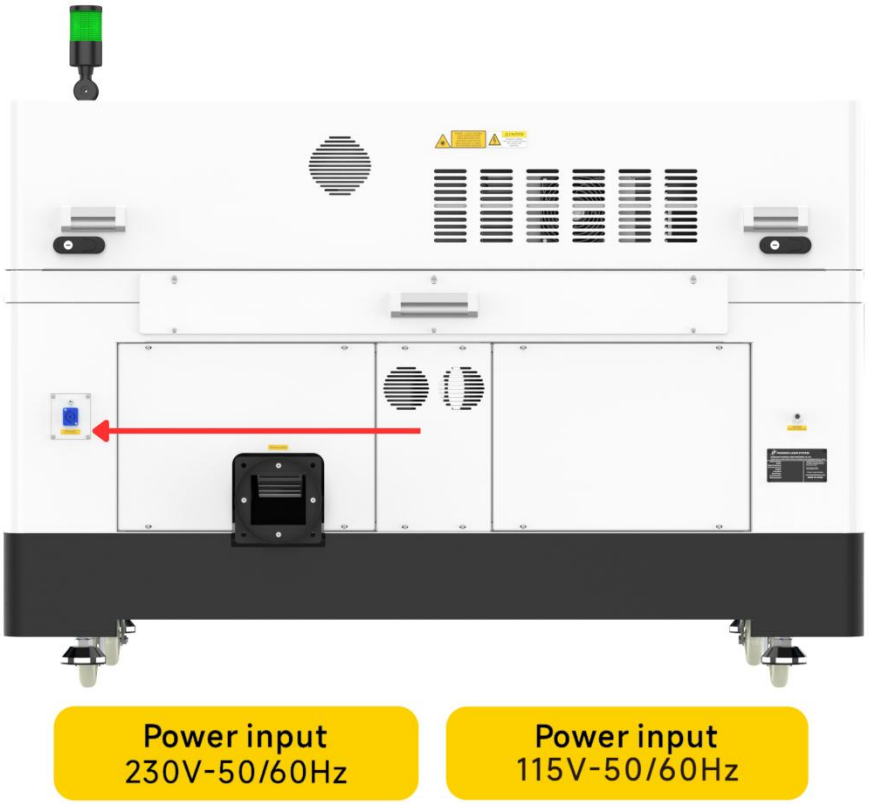
Please make all connections strictly in the specified sequence. Failure to do so may cause electrostatic damage to your computer and/or the electronic components of the laser system.

3.7.1 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.



The mains cable is placed the front of the honeycomb table.

3.7.2 Connecting the Computer

For proper communication, the computer and the device should be connected to the same local network, with their IP addresses sharing the same first three octets (network segment). This requirement applies to both Ethernet and WiFi connections.

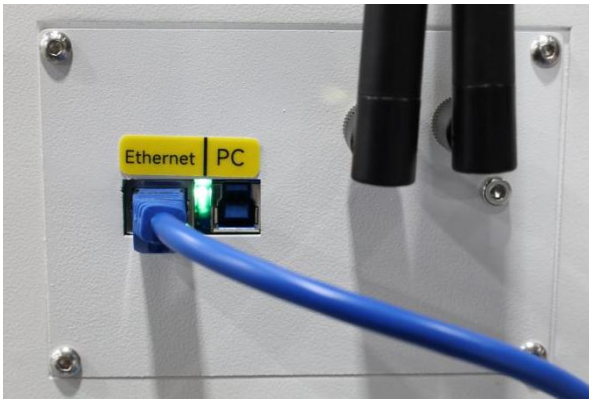
USB and Ethernet Connection

1.First, connect the laser machine and PC with the Ethernet cable that provided with the machine.

①USB:

Please pay attention to the USB connection method and the operating sequence: the USB cable must be inserted first, and then the machine power must be turned on. If the order is reversed (turn on the power first, then insert the USB cable), the machine will not be able to recognize the device, resulting in connection failure.

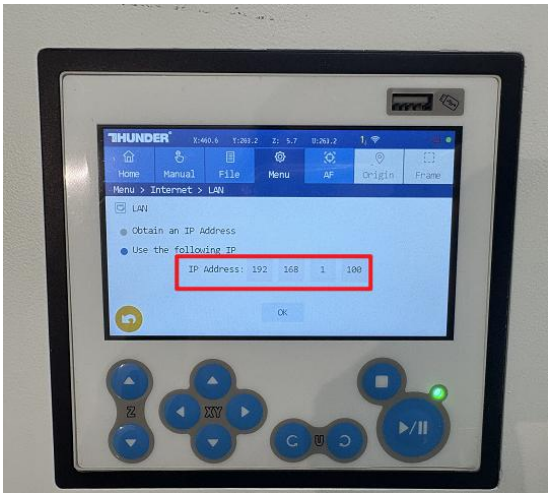
②Ethernet:



2. Find the IP address of your machine on the touch panel.

①USB:

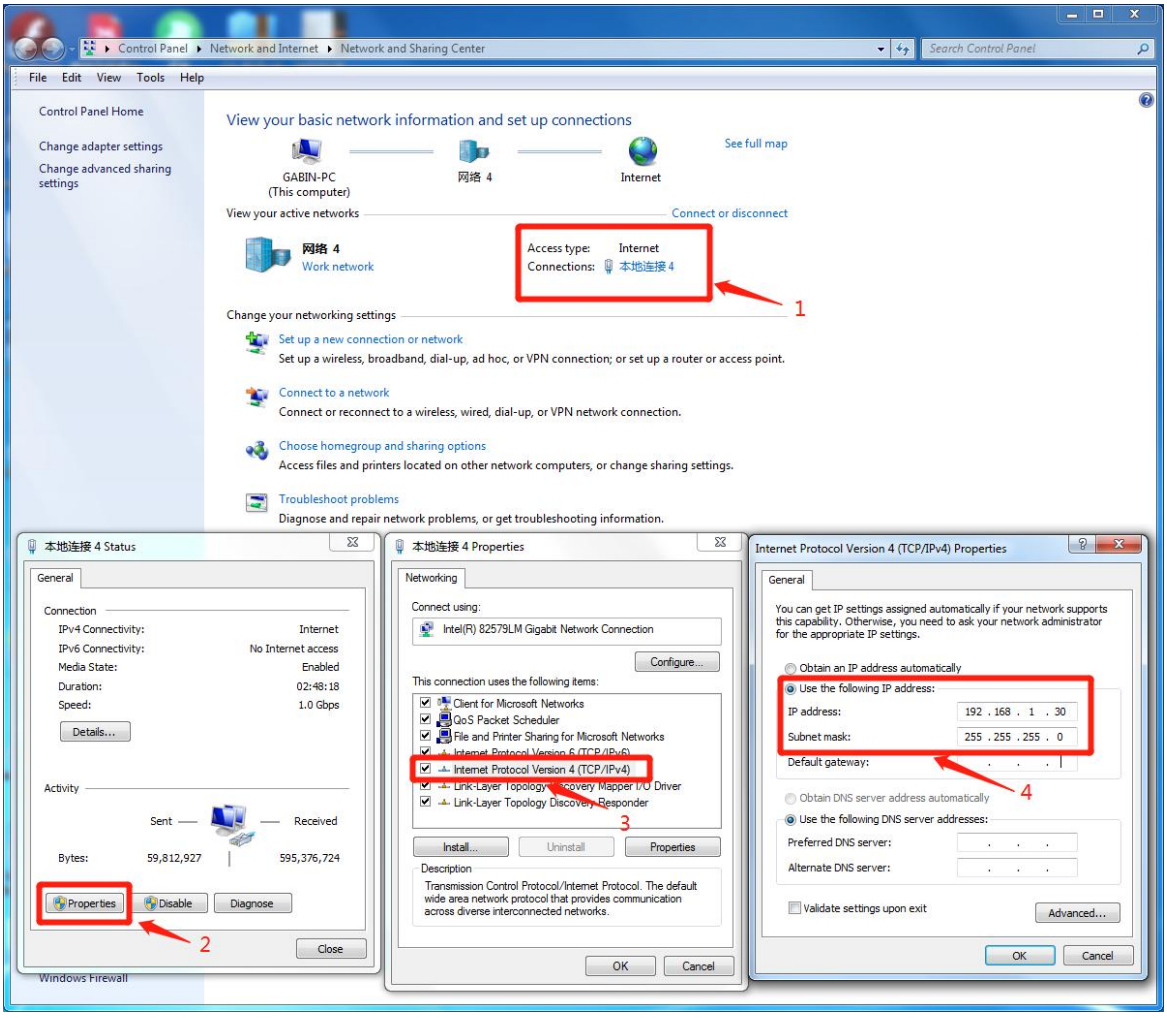
②Ethernet:



NOTE： The subsequent steps apply to both USB cable and Ethernet cable connection methods for Titan Series.

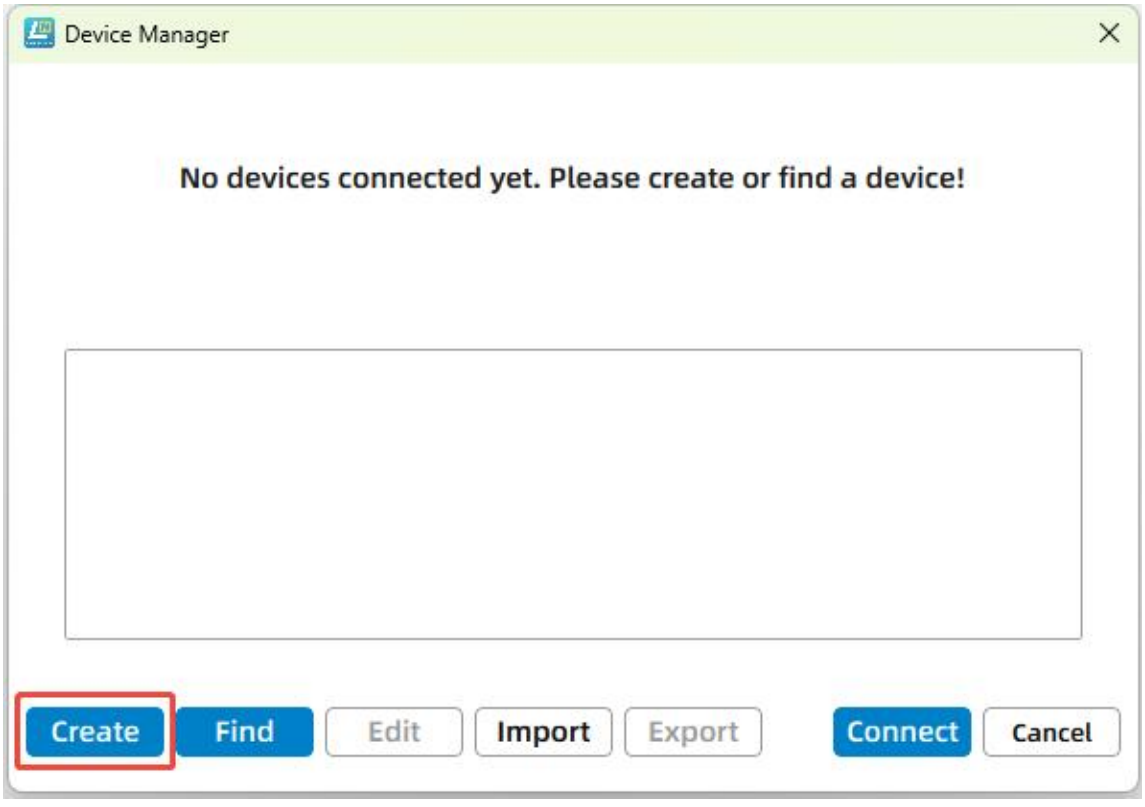
3. Configure computer.

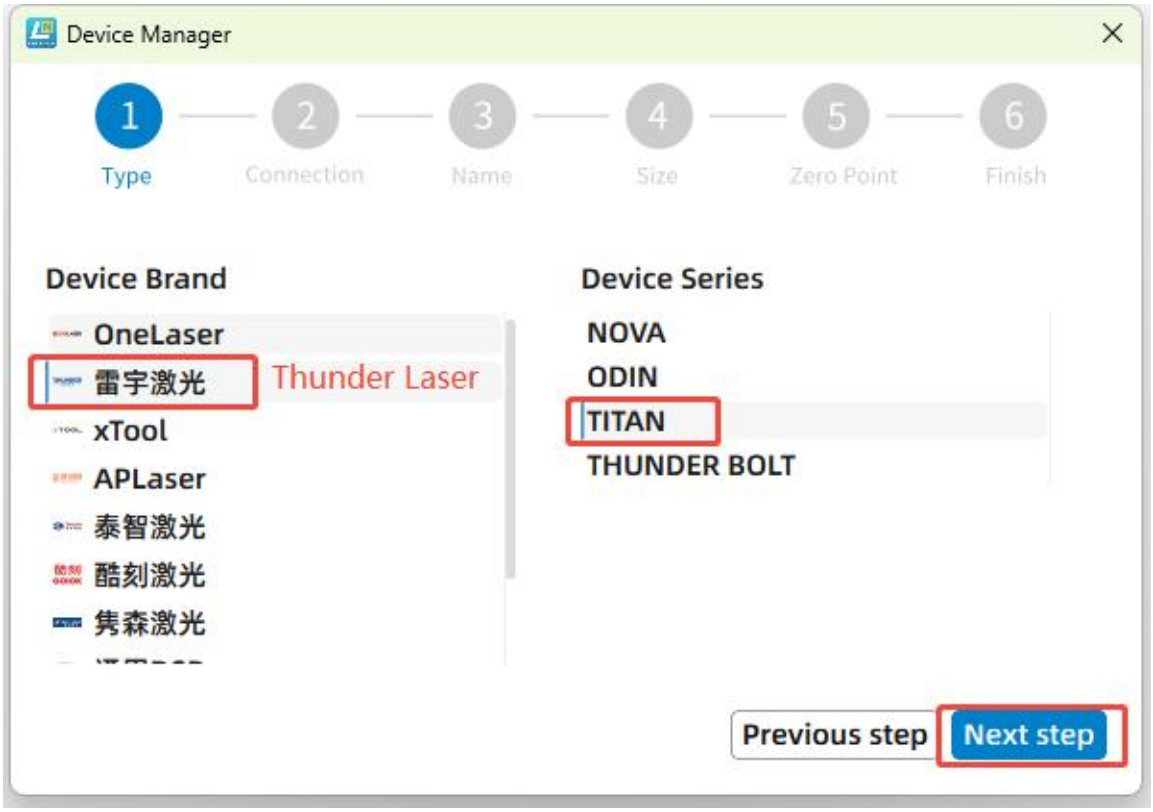
Go to Start >> Control Panel >> Network and Sharing Center, configure the connection for local connection, like below.

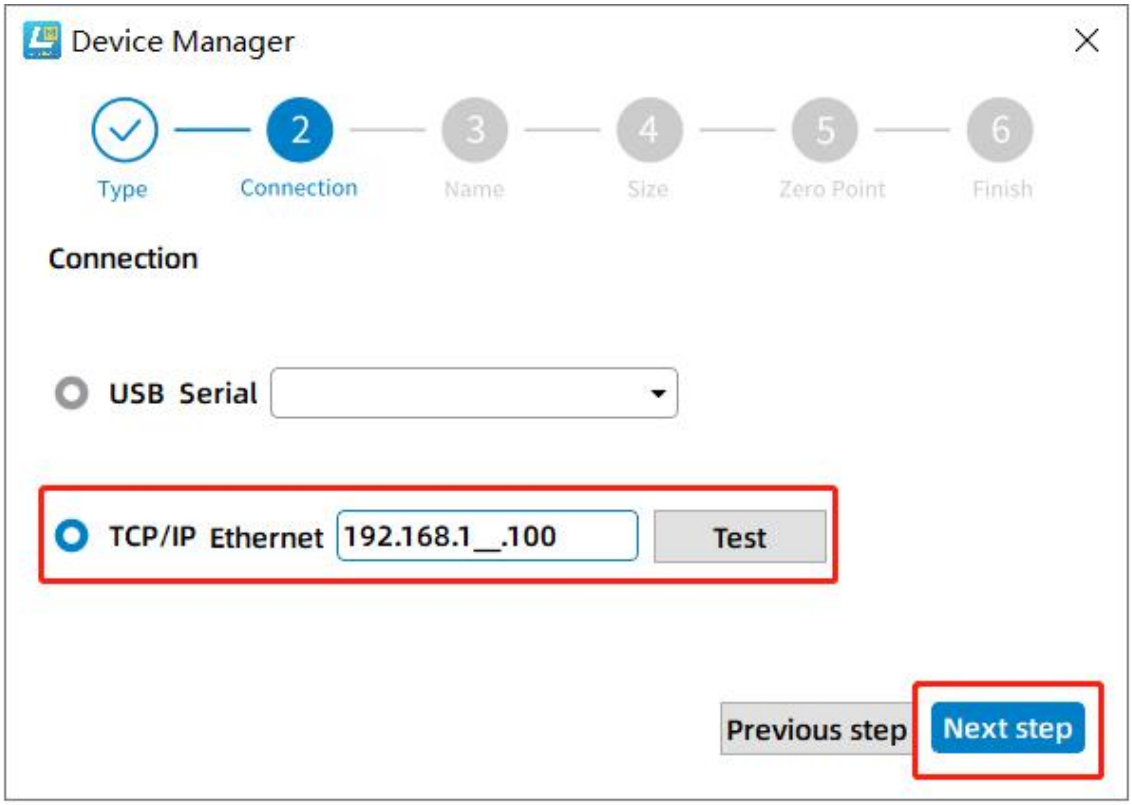


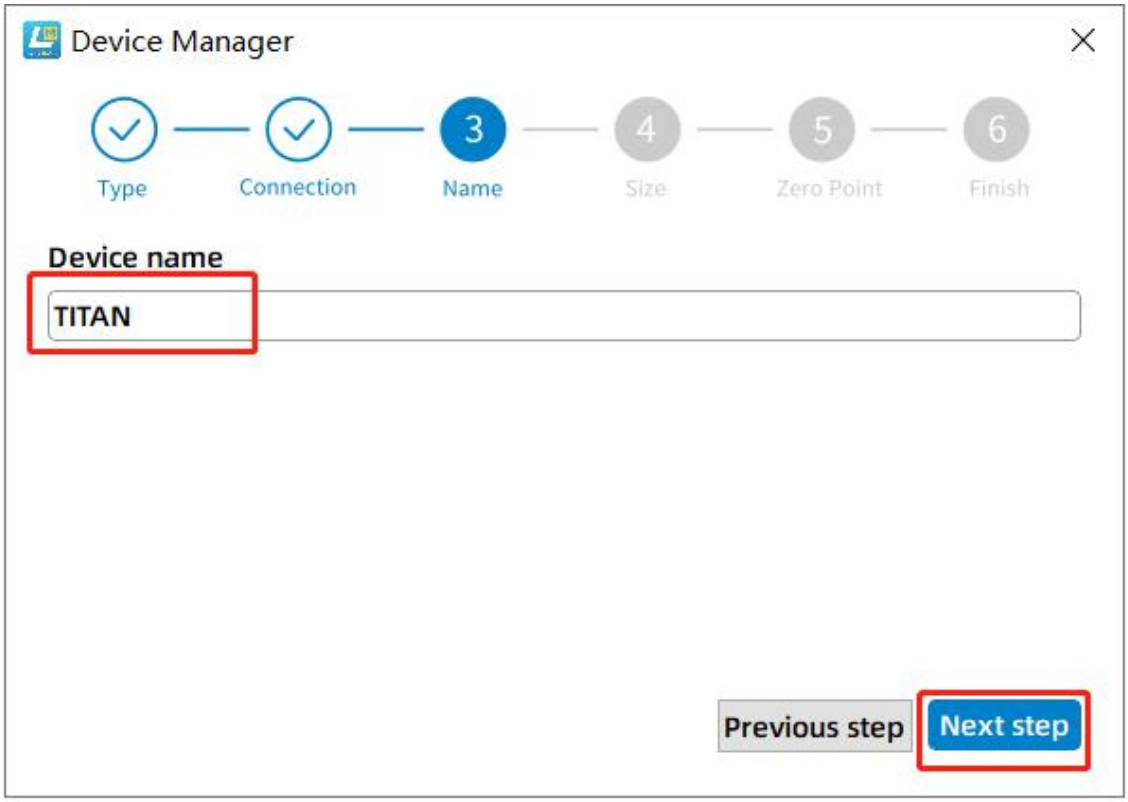
4.Configure the software.

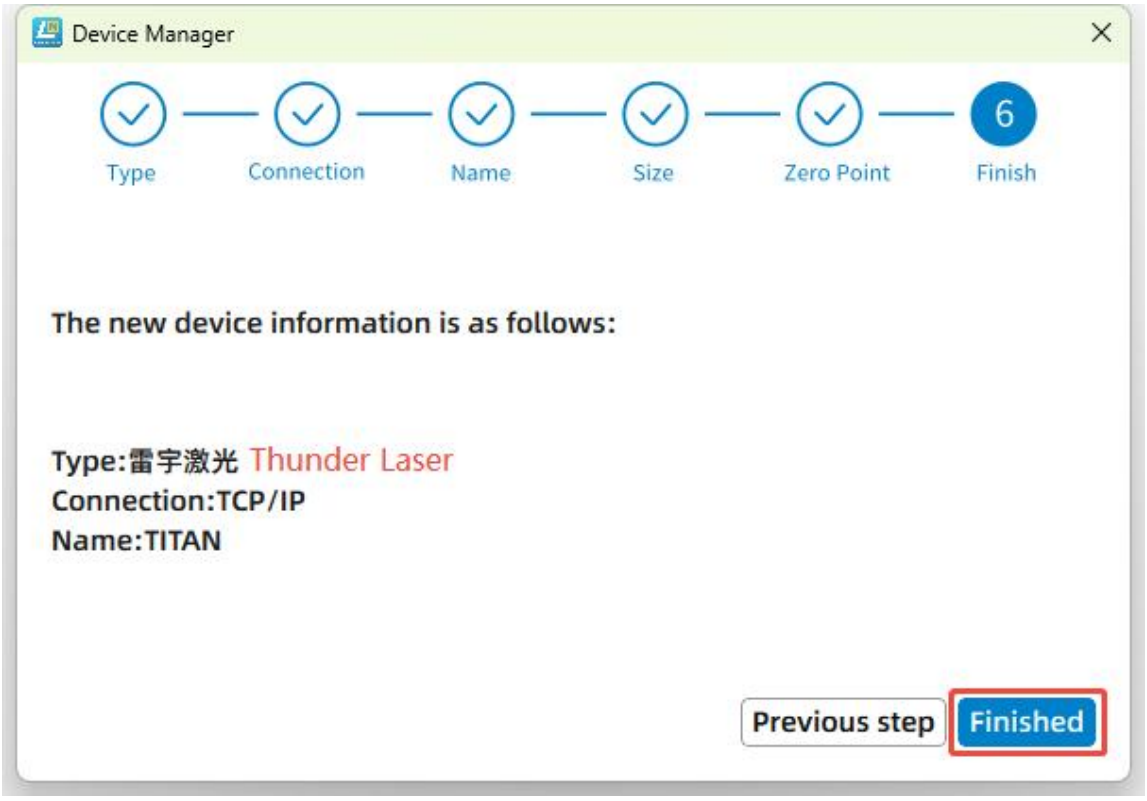
In LaserMaker:



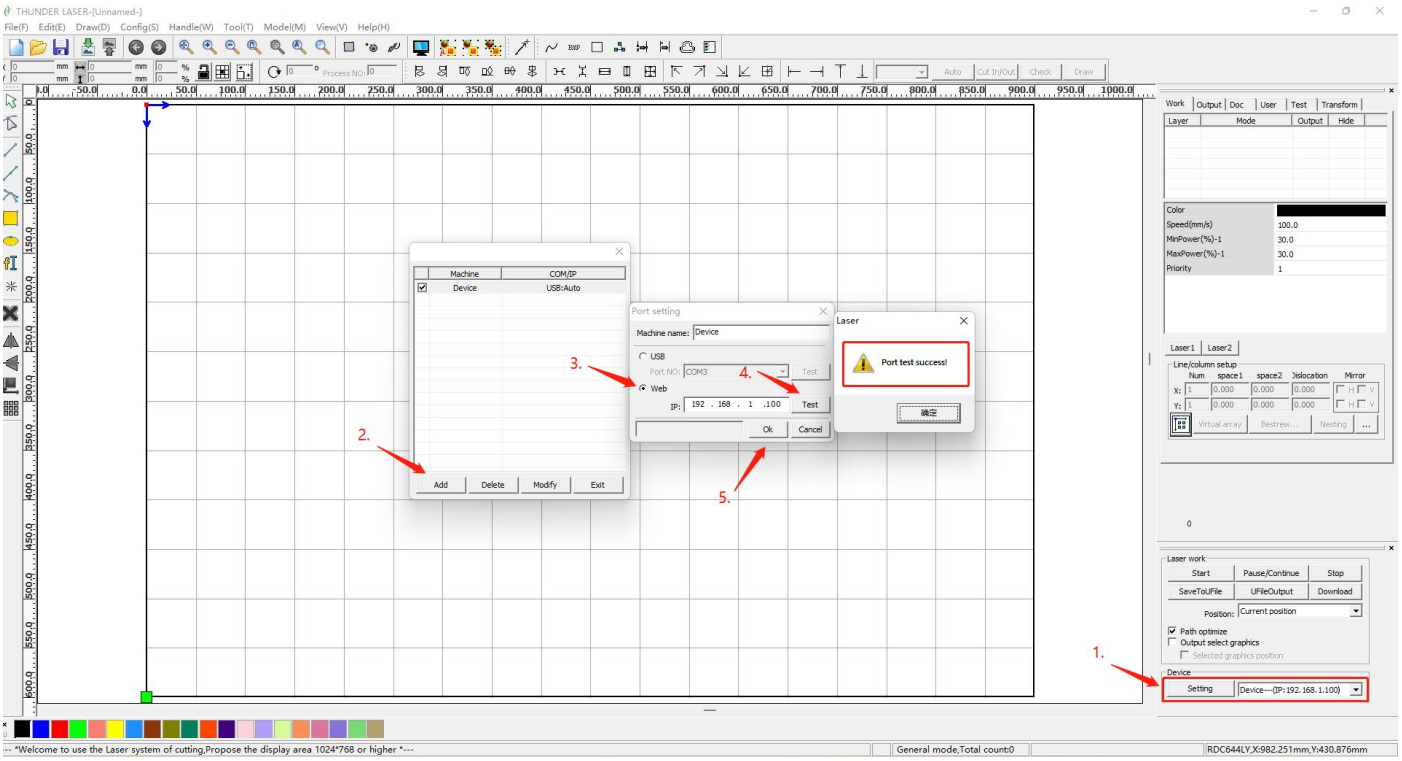

Device Manager
1 Type
2 Connection
3 Name
4 Size
5 Zero Point
6 Finish
Device Brand
OneLaser
雷宇激光
Thunder Laser
xTool
APLaser
泰智激光
酷刻激光
隽森激光
Device Series
NOVA
ODIN
TITAN
THUNDER BOLT
Previous step
Next step


Device Manager
Type
2 Connection
3 Name
4 Size
5 Zero Point
6 Finish
Connection
USB Serial
TCP/IP Ethernet
192.168.1__.100
Test
Previous step
Next step


Device Manager
Type
Connection
3
Name
4
Size
5
Zero Point
6
Finish
Device name
TITAN
Previous step
Next step


Device Manager
Type
Connection
Name
Size
Zero Point
6
Finish
The new device information is as follows:
Type:雷宇激光 Thunder Laser
Connection:TCP/IP
Name:TITAN
Previous step
Finished

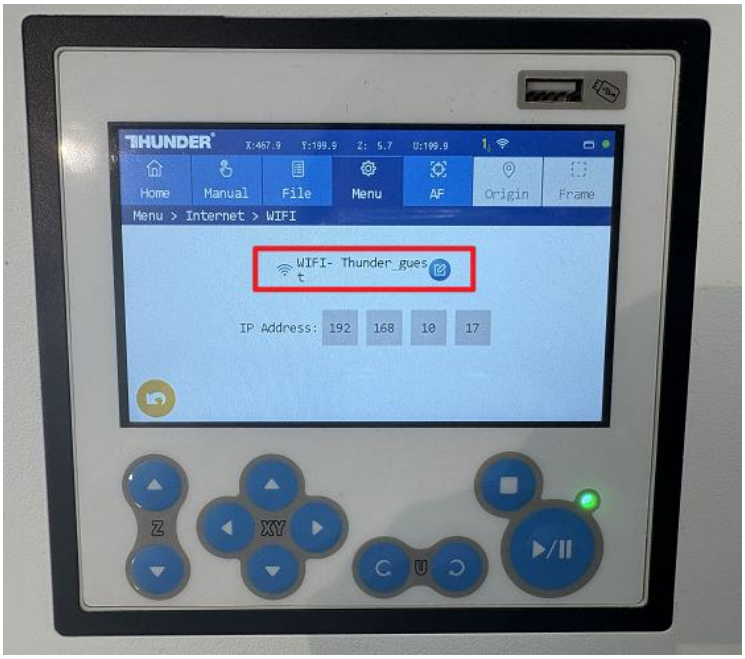
In RDWorks:

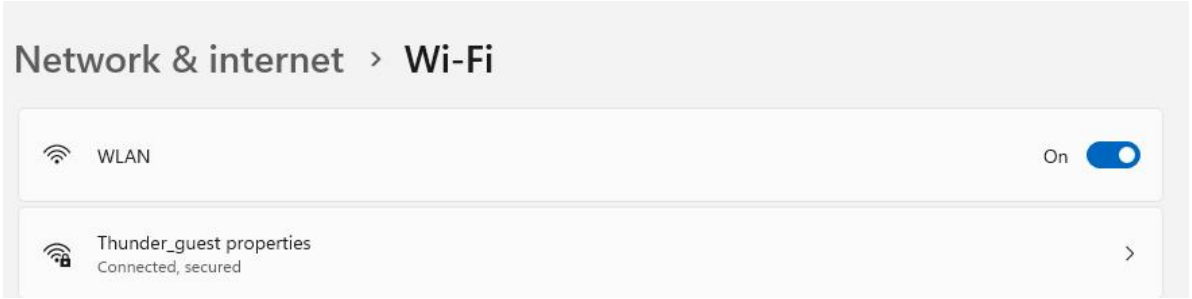


WIFI Connection

The machine also supports WiFi connection. To connect via WiFi:

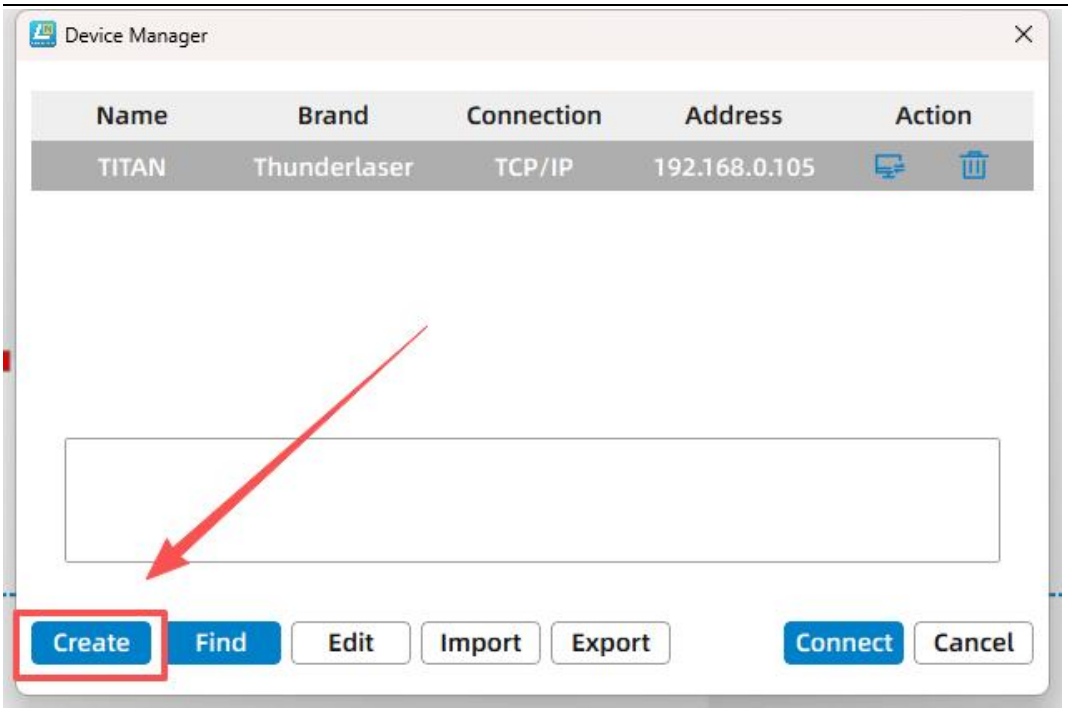
1. Ensure that both the machine and your computer are connected to the same WiFi network.
2. On the touch panel, navigate to the network settings and confirm that the WiFi connection is established.

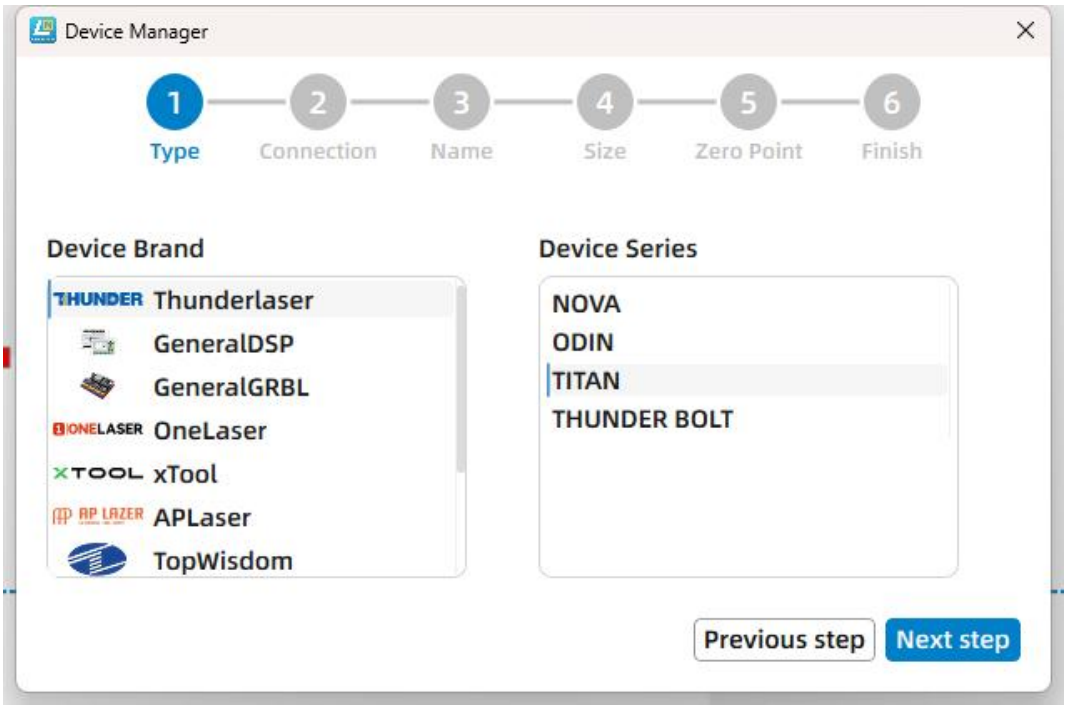


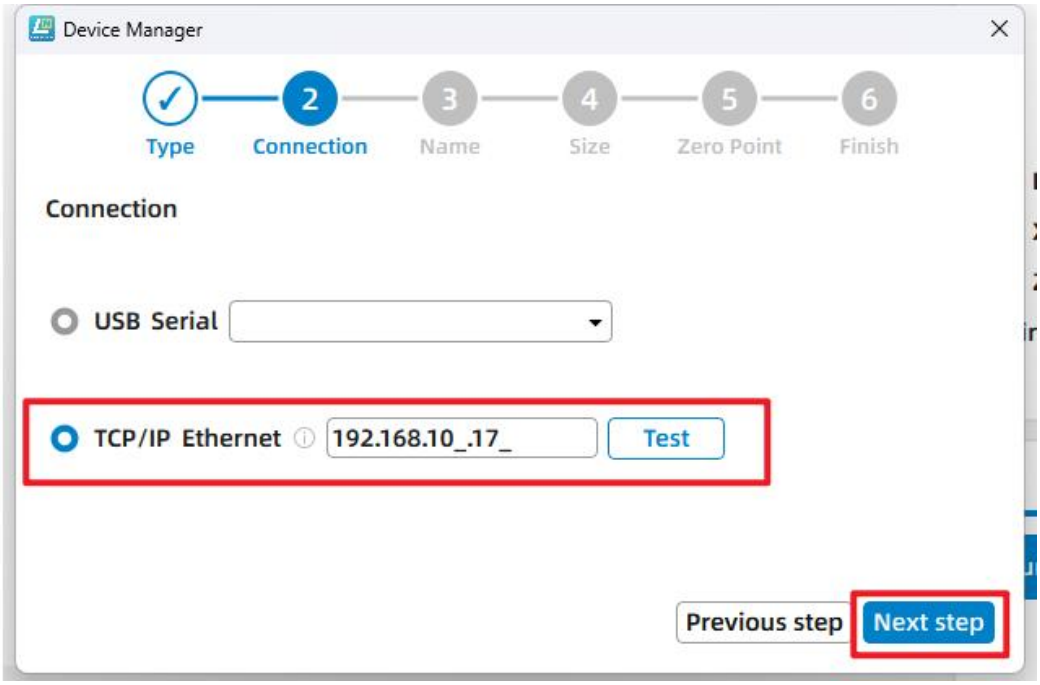


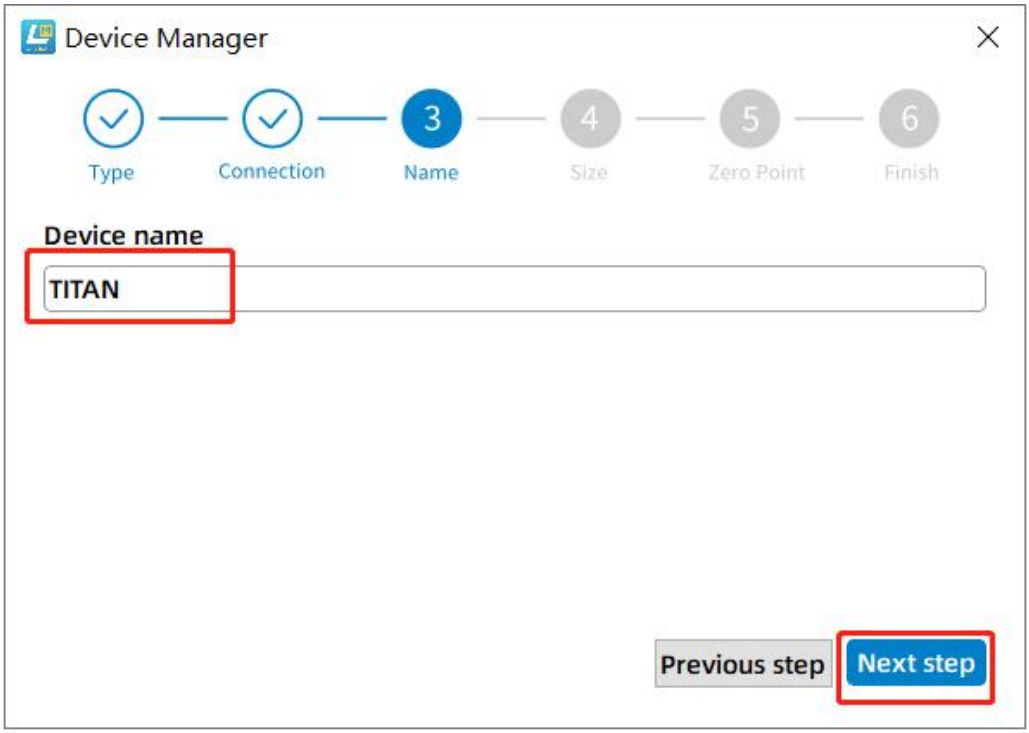
3. Configure the software.

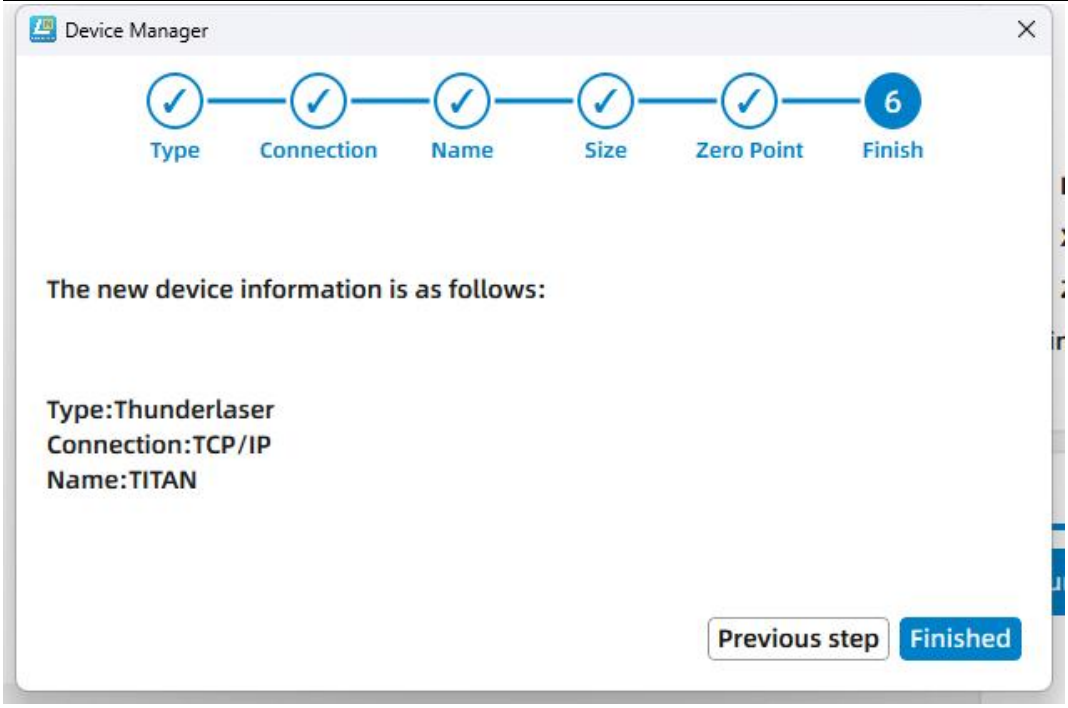
In LaserMaker:


Device Manager
Name
Brand
Connection
Address
Action
TITAN
Thunderlaser
TCP/IP
192.168.0.105
Create
Find
Edit
Import
Export
Connect
Cancel

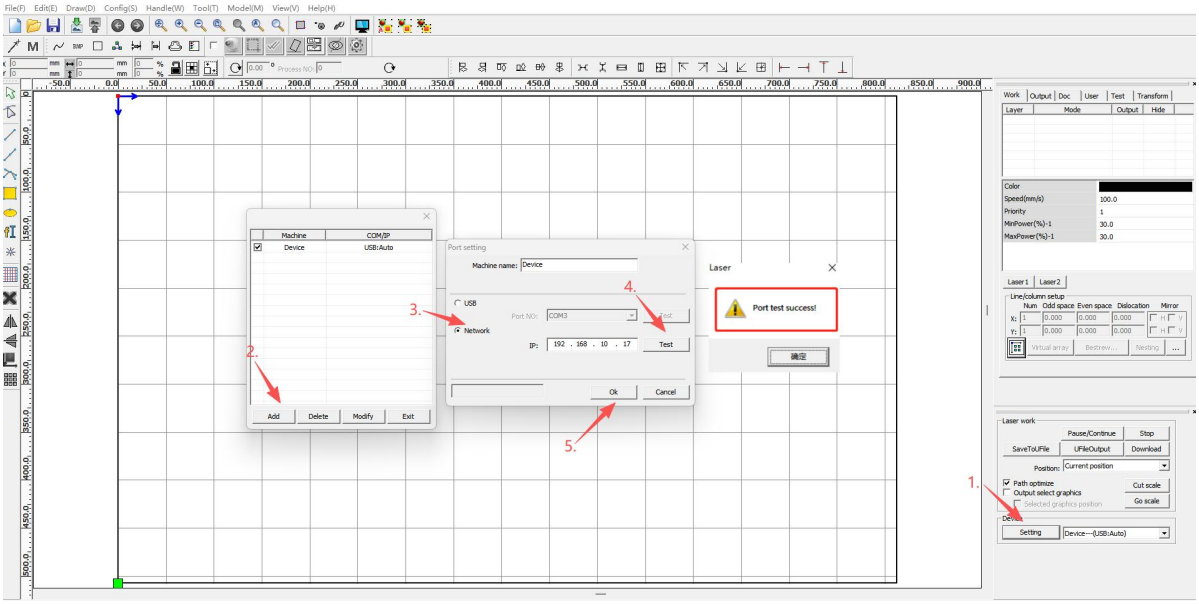

Device Manager
1
Type
2
Connection
3
Name
4
Size
5
Zero Point
6
Finish
Device Brand
Thunderlaser
GeneralDSP
GeneralGRBL
OneLaser
xTool
APLaser
TopWisdom
Device Series
NOVA
ODIN
TITAN
THUNDER BOLT
Previous step
Next step


Device Manager
Type
2
Connection
3
Name
4
Size
5
Zero Point
6
Finish
Connection
USB Serial
TCP/IP Ethernet
192.168.10_.17_
Test
Previous step
Next step


Device Manager
Type
Connection
3
Name
4
Size
5
Zero Point
6
Finish
Device name
TITAN
Previous step
Next step



In RDWorks:



Since WIFI network speed may affect the stability of device connections,we recommend that customers configure a dedicated standalone router to establish a dedicated network environment in order to ensure optimal network performance.

For specific usage tutorials, you can refer to this article.

3.7.3 Air System – Built - in Features and Considerations

To ensure precision and results in engraving and cutting, the TITAN & TITAN PRO SERIES have an air pump built into the machine for seamless operation.

When the machine is connected to the power supply and starts to work, the intelligent control system will immediately send commands to start the built-in air pump to provide stable air assistance for laser processing and guarantee the processing effect.

You can find the built-in air pump by unscrewing these four screws.

3.7.4 Exhaust System – Built - in Features and Considerations

Please note that the standard exhaust fan is built into the machine. It is strictly forbidden to operate the laser system without a functioning exhaust device. The exhaust system is responsible for removing dust, debris and odors from the engraving chamber and directing them out of the building or into a filtration unit.

For your safety, please note the following:

① Never operate the machine without the exhaust hose/pipe properly connected.

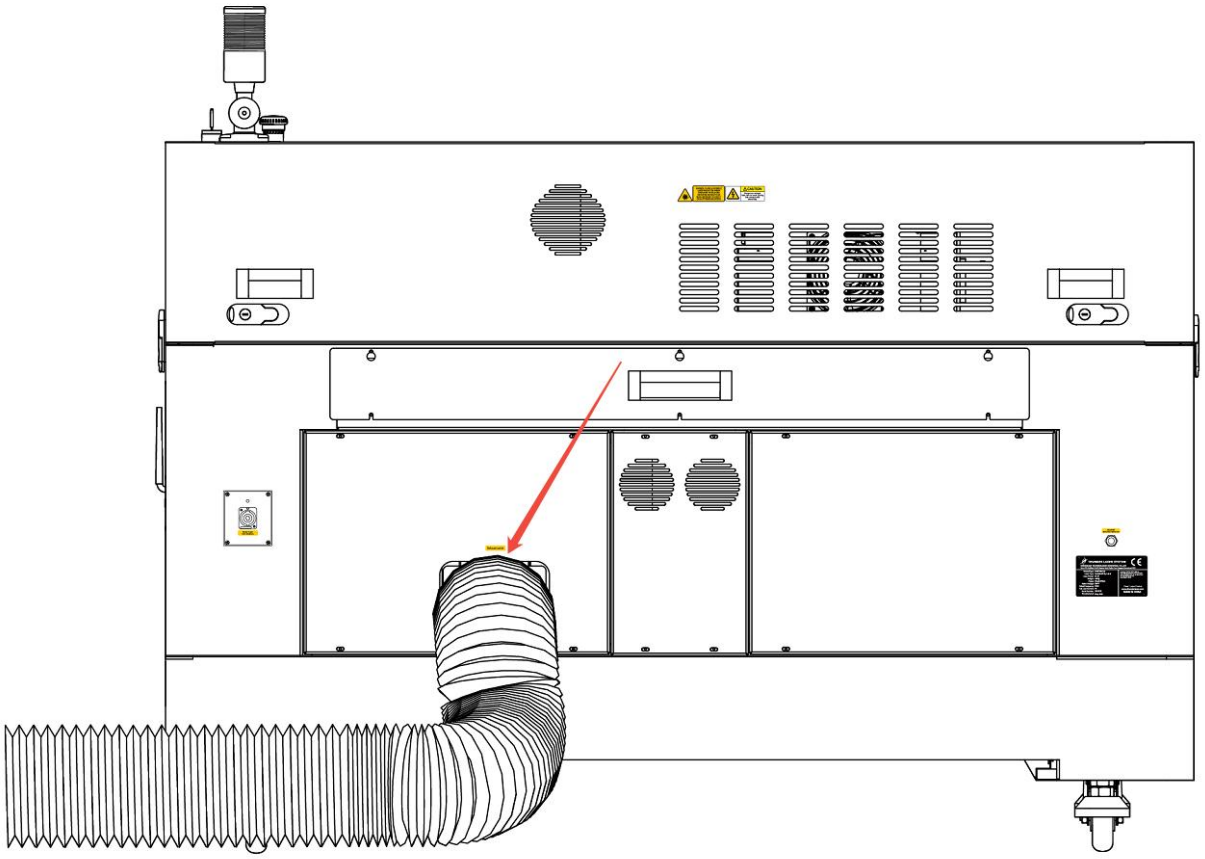
② To prevent accident contact with the running blades inside the fan, always cut off the main power before cleaning, inspecting, or servicing the exhaust fan or any electrical and mechanical components.

These precautions are essential to ensure safe and reliable operation of your machine.

How to set up the exhaust system

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 and dust/fume filter, it can keep the air quality of your working environment well).

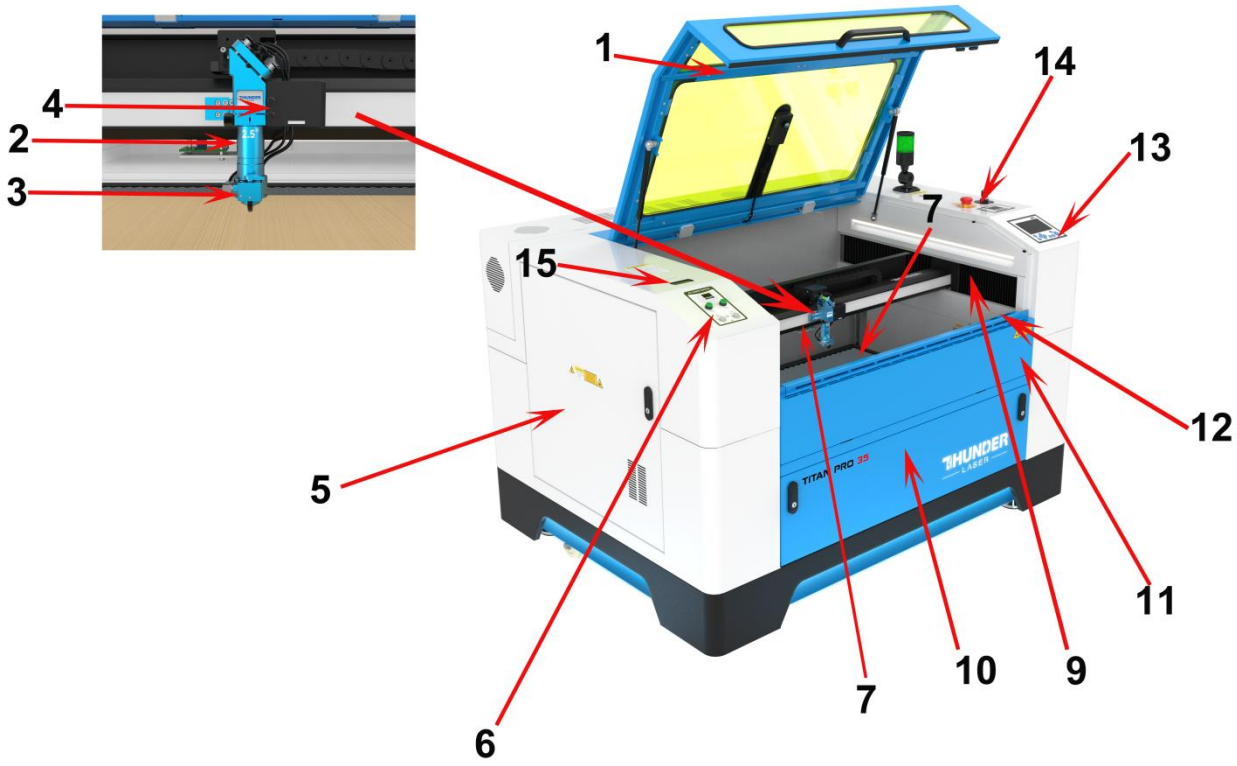
Please refer to the following pictures about how to install the exhaust pipe:



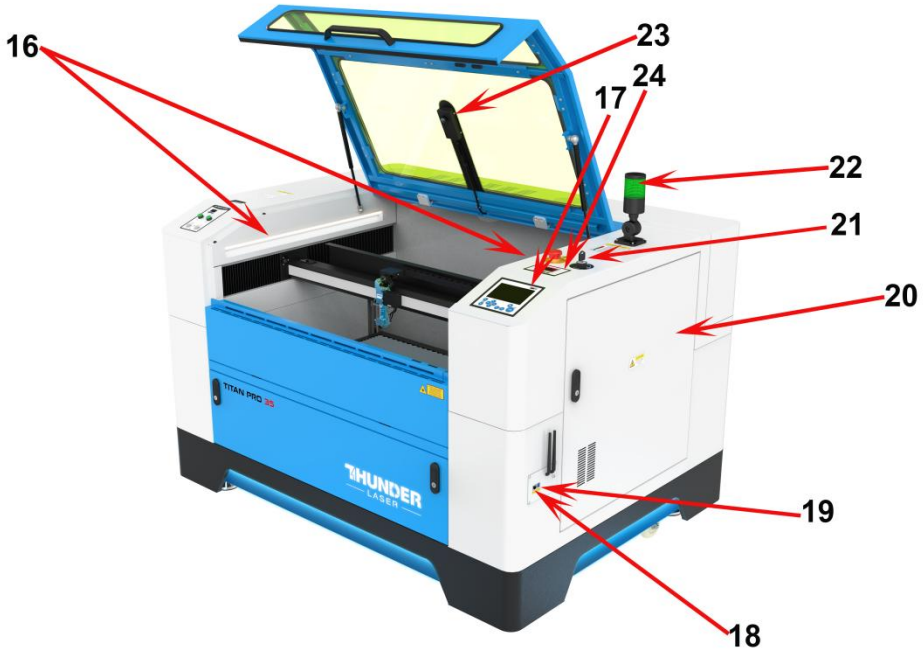
You can find the built-in exhaust fan by unscrewing these four screws.

Chapter 4. Operation

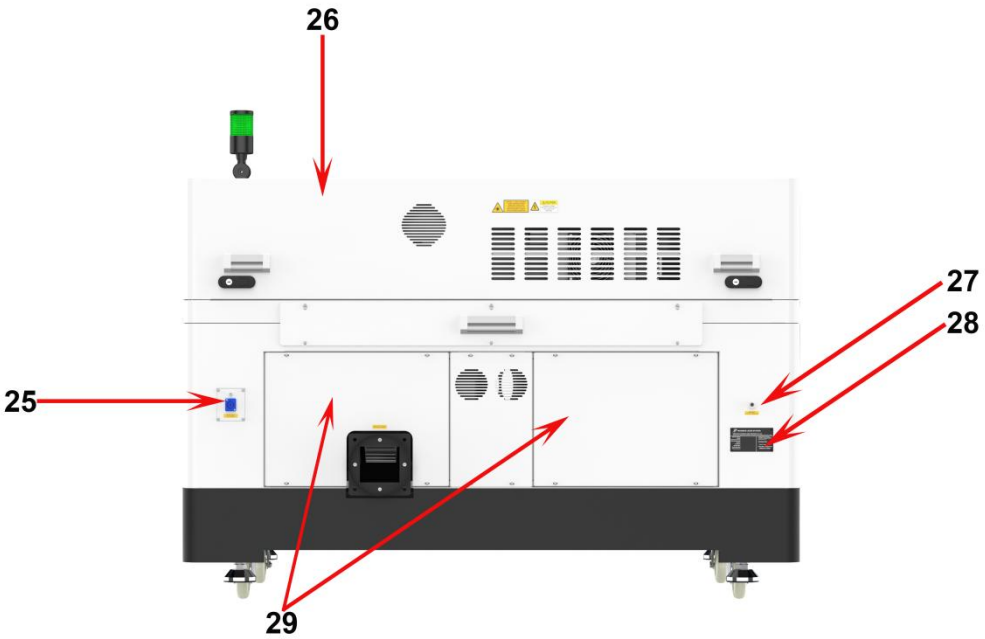
4.1 Machine View



1. Top flap
2. Laser head
3. Auto focus sensor
4. Head mounted camera (Movable camera)
5. Left side door
6. Dual air-assist control panel
7. X-axis
8. Honey comb table
9. Y-axis
10. Front door
11. Front up door
12. Flap protection sensor
13. Touch panel
14. Emergency stop switch



15. PM2.5 Display Instrument
16. LED lamp
17. U-disk connection port
18. Ethernet port
19. PC connection port (USB)
20. Right side door
21. Key switch
22. Alarm lamp
23. Over head camera
24. Fiber control board



25. Power supply socket
26. Laser tube cover
27. Air assist port
28. Manufacturer's label
29. Rear door

1. Top flap

If the top flap is opened during operation, all processing will pause immediately. The motion system and laser will shut down automatically for safety.

2. Laser head

Laser beam and red dot pointer are all come out from the laser head.

3. Auto-focus sensor

Used for the automatic focusing of the work table.

4. Head mounted camera (Movable camera)

This camera is widely used in the laser processing industry, playing a critical role in enhancing machining accuracy, enabling automated control, and ensuring quality monitoring.

5. Left side door

- The **TITAN series** is equipped with the Z-axis motor, solenoid valve, and related components.
- The **TITAN PRO series** is equipped with the fiber laser source, solenoid valve, and related components.

6. Dual air-assist control panel

You can adjust air volume for cutting or engraving if require. (Please view this chapter 4.8 for detail).

7. X-axis

The motion system is that performs the mechanical movements in X direction. The X-axis is visible in the working area.

8. Honey comb table

The honey comb plate sits on top of the blade bed and has indexing pins for alignment.

9. Y-axis

The motion system is that performs the mechanical movements in Y direction. The Y-axis is visible in the working area.

10. Front door

To clean the waste after working or remove the honey comb table. This door is installed with the flap protection sensor.

11. Front up door

Open this door to use pass-through door.

12. Flap protection sensor

This is where Open flat protection exist. Laser will stop working once the cover is opened during working.

13. Touch panel

You can control the X-axis, Y-axis and Z-axis manually by the display panel, it also shows the working time, power, speed and the whole working time and affords many function options (Please view this chapter 4.3 for detail).

14. Emergency stop switch

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

15. PM2.5 Display Instrument

Real-time monitoring of PM2.5 concentration, temperature and humidity in the working environment, with data displayed on the operation panel to help users assess air quality and environmental parameters.

16. LED lamp

It's used for lighting the working table once turn the Main switch on.

17. U-disk connection port(USB)

You can save the file as a U-disk File by press "SaveToUFile" on the software, then save it to the u-disk and insert the u-disk to the port of laser machine, then use the control panel to select and control it to work.

18. Ethernet port

This Ethernet port is for connecting computer.

19. PC connection port(USB)

This USB is for connecting computer.

20. Right side door

There are laser controller, driver(Stepper Drive),TL-timer, flap sensor checking board, power supplier(both 24v DC and 36vDC)and the main connecting cables etc.

Please open this door for checking these parts, but must pay attention to the electric current. If you need to repair, please contact with professional maintenance staff.

21. Key switch

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

22. Alarm lamp

If laser machine is running a job or user starts it without closing door or water protection, the signal lamp is in red light. The red light indicates a hazardous condition, and the machine must not be left unattended.

If laser machine is not at work, the signal lamp is in green light. The green light indicates the safety situation and the laser machine is ready for operation.

If temperature is higher than 55°C/131°F on working table, the signal lamp will make buzzing sound.

(roughly 80dBA within 1m,75dBA within 5m and 65dBA within 10m,the sound gets weaker as it travels).

23. Over head camera

The camera's function is to provide real-time observation of the work platform and to enable accurate identification, positioning, and cutting recognition.Once the computer is connected to the machine, the machine's work table can be viewed in real time via the software's camera control function.

Please note that the TITAN 27, 35 and TITAN PRO 27, 35 come standard with one camera; the TITAN 51, 63 and TITAN PRO 51, 63 come standard with two cameras.

24. Fiber control board

This feature is only available on the TITAN PRO Series. It provides 8-bit digital control over the fiber laser's

repetition frequency, power, and pulse width modulation. With the softwares being able to set full fiber layer parameters, the fiber control board will be installed inside the right side door, next to the controller board in the future.

25. Power supply socket

To connect the main power and the extend power according the label information.

26. Laser tube cover

There are installed the laser tube, red dot pointer device, beam combiner and the first reflective mirror mount. This door is installed with the flap protection sensor.

27. Air assist port

This port is for connecting hoses of the external air compressor if needed.

28. Manufacture's Label

It's show you the laser information like serial number and manufacturing date etc.

29. **Rear door**

There are fan control board, driver(Servo Drive), RF tube etc.

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

4.2 ON/OFF Switch

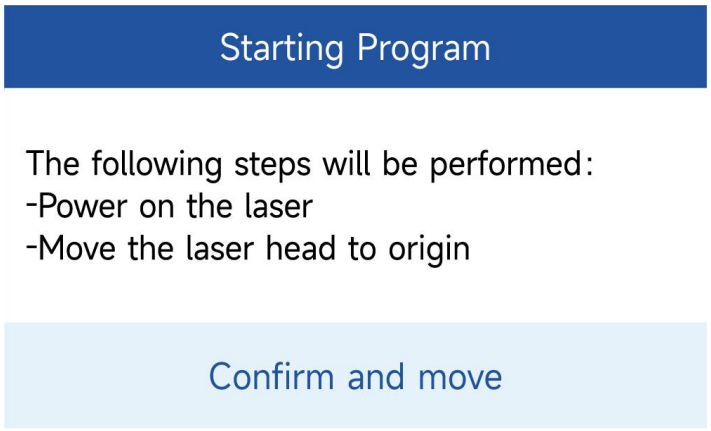
The mains power ON/OFF switch

The following conditions must be fulfilled for correct start up:

- The mechanical system can move freely (no obstructions)
- No materials under the engraving table
- All protective covers closed

Then turn the key switch to the ON position.

Then this page will pop up.



After clicking **"Confirm and move"** , the machine will initiate the homing procedure. A single beep will sound once the homing operation is successfully completed, indicating that the machine is ready for operation. When the laser homing process is finished, the control panel will display the homing interface.

Before switching on the device, the user must make sure that no objects of any kind are located inside the operating space, which could limit or obstruct the mechanics of the device.

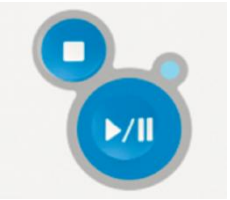
4.3 How to use the display

4.3.1 Function of the Buttons

Arrow buttons: control the movement of the Z-axis (height of the work bed).

Arrow buttons: control the X&Y movement of the laser head.

U movement button: Use this to control the rotary.

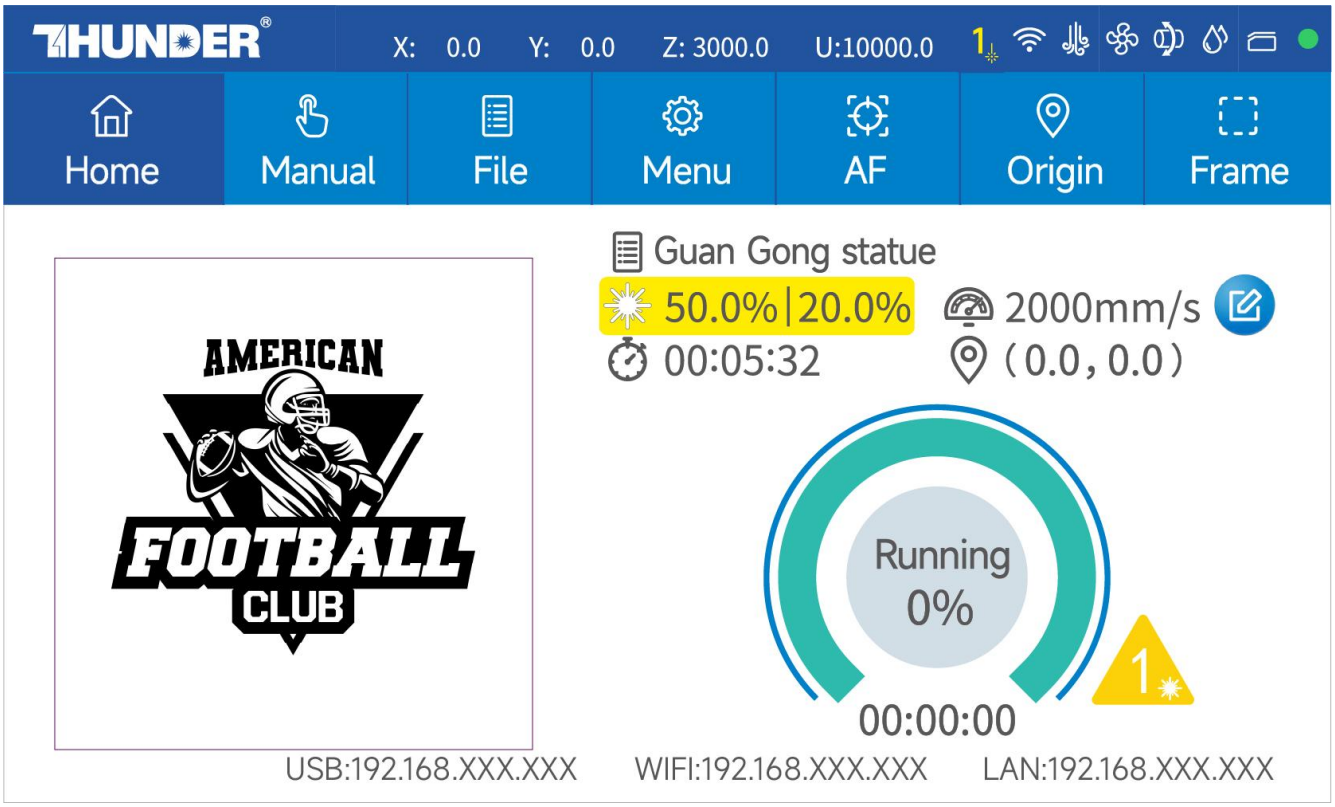


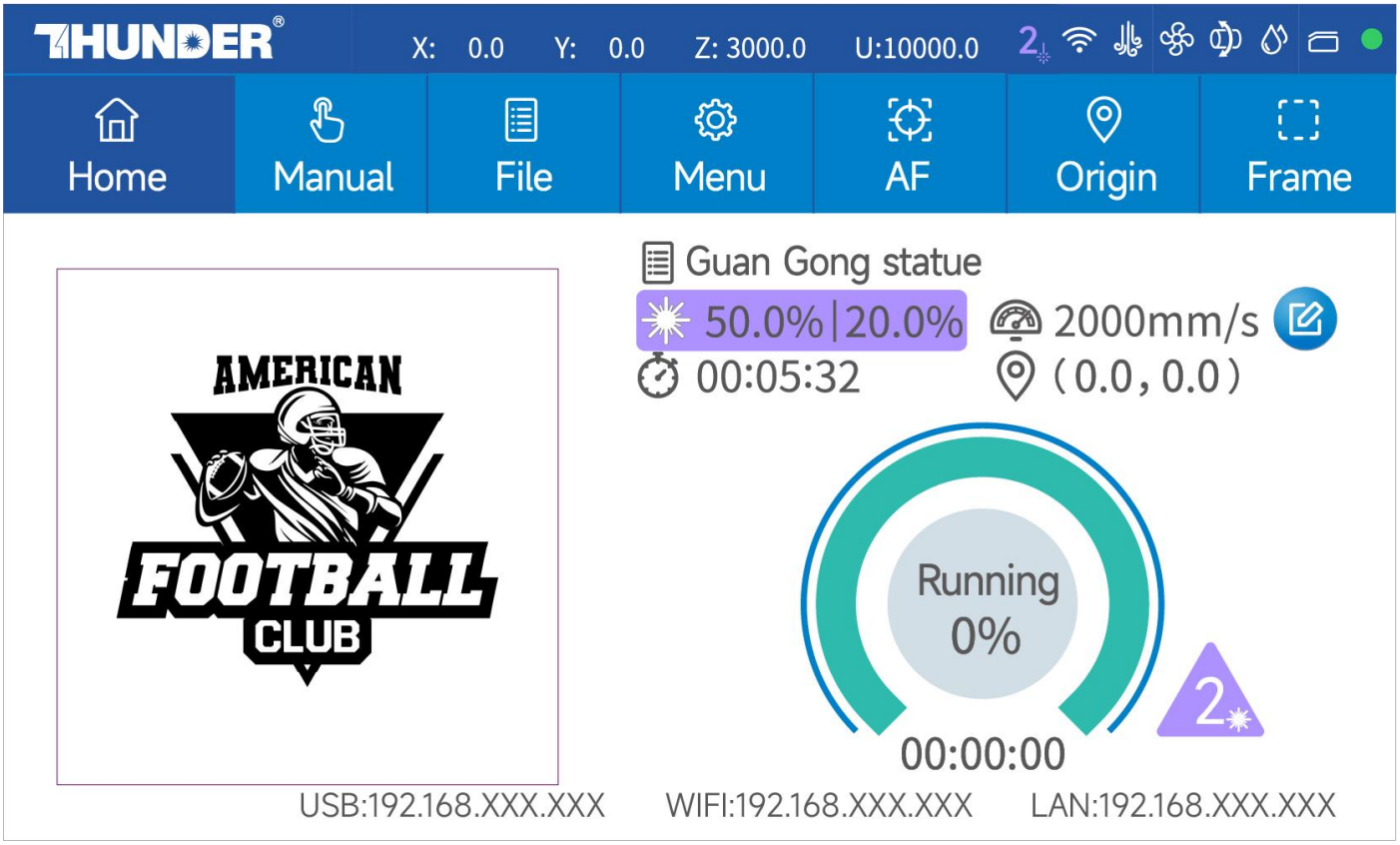
Start-Pause/Stop button: Use these buttons to start or pause and end a file job.

USB disk connector: To connect a U-disk

4.3.2 The main interface

- Home page





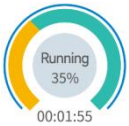
Name: The name of the file.

Power setting: Max power and min power.

Speed setting: Running speed of your job.

Working time: The running time of this job.

Coordinates: The coordinate of origin you set.



Processing progress: Check the processing status of the job.

IP address: Show the IP address of machine. (Please select the specific IP address corresponding to the connection method- USB, WIFI or LAN)

Air assist: The icon will be displayed when the air assist is running. Intelligent mode is set as the default.

Exhaust: The icon will be displayed when the exhaust fan is running.

Laser source : It will be displayed when the Laser 1/2 is applied in processing.

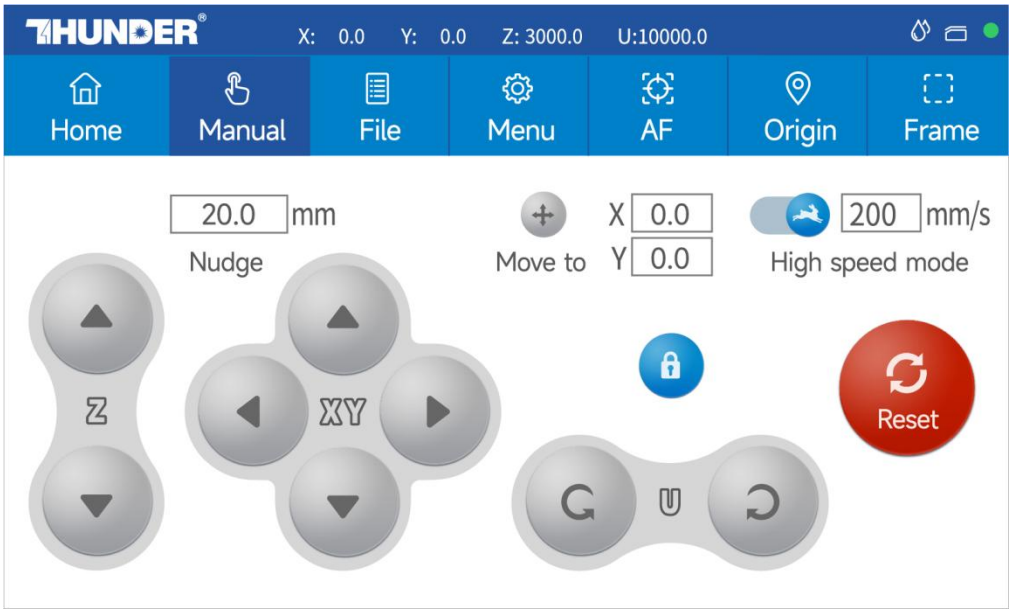
 Rotary: It will be displayed when the rotary is connected.

 Water protection: Only for water-cooled laser source.

 Door protection status: All doors are closed when it's gray. It's red when a door is opened.

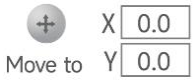
 Status: It's green when the machine is idle. Red when running a file.

- Manual page



 Lock button: Lock or unlock the manual buttons.

Nudge: Set the travel distance of clicking each arrow button one time.

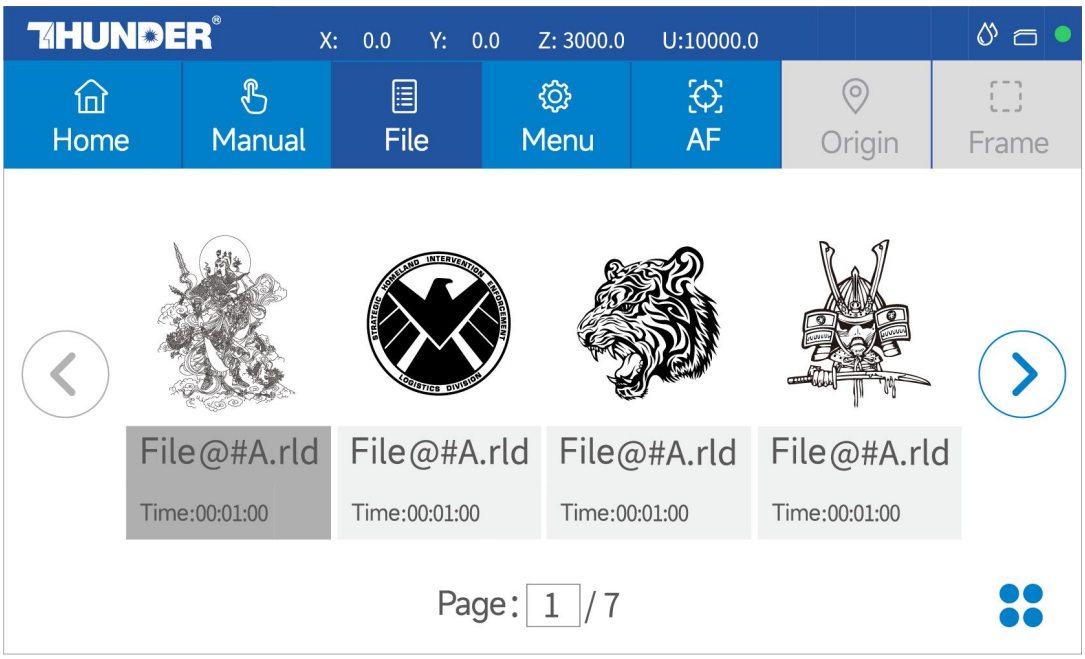


Target position: Set a coordinate, then the laser head will move to here when clicking "Move to".

Mobile mode: Toggle the speed modes and set laser head's moving speeds of clicking XY arrows..

Reset button: To reset X/Y axes.

- File page

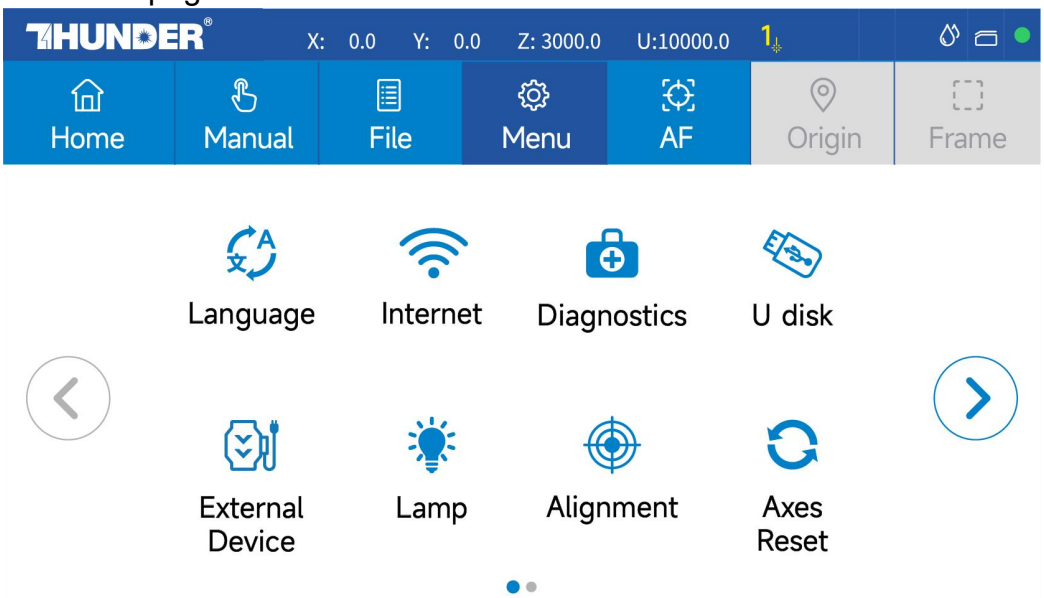


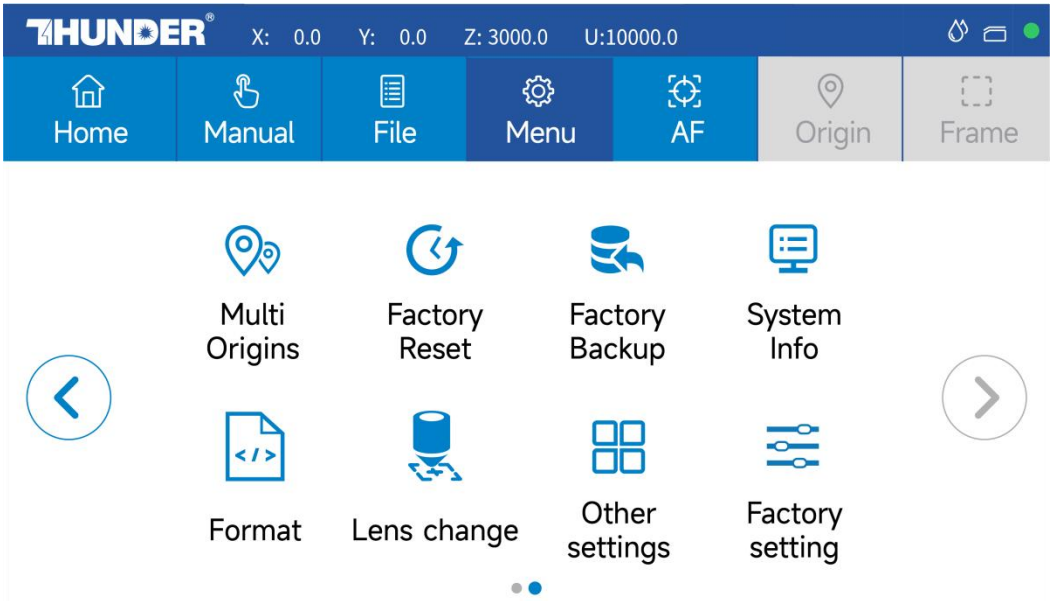
Check all files in this page. Press and hold to select a file to process.

Settings: check more settings of the file (e.g. power and speed setting of each layer).

Select and hold a file for 2 seconds to select it to run.

- Menu page





Language: Change the language of panel.
Internet: You can connect and set up network connections, including WiFi, LAN, and USB connections, through this menu.
Diagnostics: the “Diagnostics” interface shows some system input information, such as limiter status, and the status of the door protection etc.
U disk: Upload files via U-disk.
External Device: Switch the intelligent and standard mode. And set delay time for exhaust and air assist time.
Lamp: Adjust the brightness of led lamp.
Alignment: Check and adjust the laser beam, manually switching between laser one and laser two.
Axes Reset: Reset all axes.
Multi Origins: Set multi origins.
Factory Reset: Reset the vendor settings.
Factory Backup: Set the current setting as vendor settings.
System Info: Check all info of your machine.
Format: Permanently delete all files and data, and check the hard drive for bad sectors.
Lens change: This interface allows users to configure the autofocus parameters corresponding to the selected lens.
For more detailed information about the functions of "Lens change", please refer to this article.
Other Setting: This interface for configuring manual page button lock state and physical/touchscreen button sound feedback.
Factory Setting: This interface is used to configure core hardware functions.
For more detailed information about the functions of "Factory setting", please refer to this article.

- Others

Auto focus button: Click this button to auto focus after placing the materials on working bed.

Origin button: Click this button to set current XY coordinates as origin for the job.

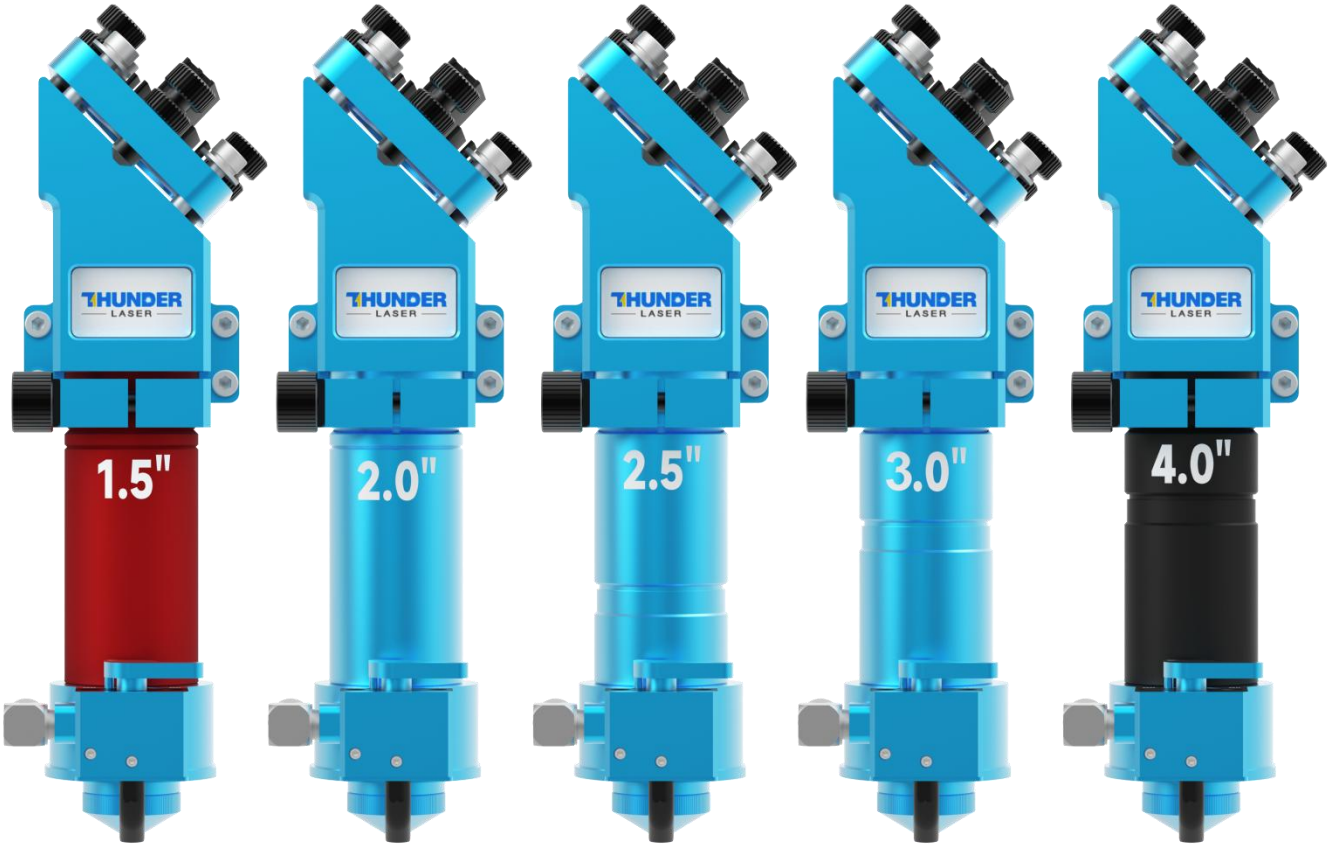
Frame button: Click to run a job preview outline after setting the origin, to verify the working area is correct..

4.4 Optional Lenses

4.4.1 How to use different Lens

The TITAN SERIES supports the installation of four types of lenses and lens tubes: 1.5 inches, 2 inches, 2.5 inches, and 4 inches. The 2.5-inch lens is included as standard, while the other three are optional and need to be purchased separately.
Note: These four lenses are for CO2 laser only.

The TITAN PRO SERIES supports the installation of five types of lenses: 1.5 inches, 2 inches, 2.5 inches, 3 inches, and 4 inches. The 3-inch lens is included as standard (support dual wavelengths), while the other four are optional and need to be purchased separately (and they works for single CO2 laser only).



Four lens types are available for engraving and cutting, and you may select the appropriate lens based on your actual application.

The **1.5-inch** lens is suitable for fine engraving and cutting of thin materials.

The 2-inch lens is suitable for general engraving and cutting.

The 2.5-inch lens is suitable for general engraving and cutting.

The 3-inch lens is exclusive to TITAN PRO SERIES and is suitable for medium-depth engraving and cutting of moderately thick materials. In addition, the series' dual laser source feature is only compatible with 3-inch lenses.

The 4-inch lens is suitable for general engraving and cutting materials with a thickness of 10mm and above.

For more information about the laser heads, you can refer to the following article.

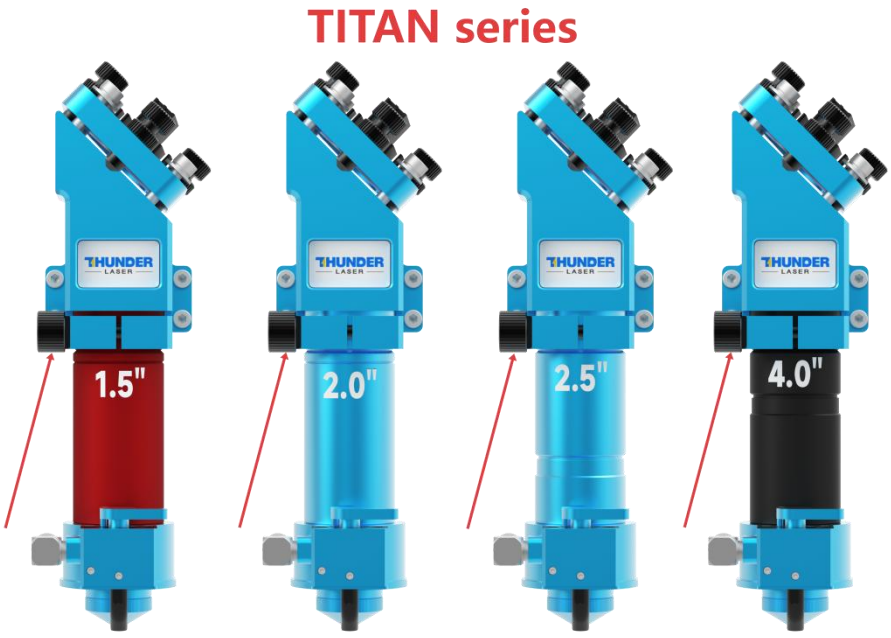
Titan and Titan Pro Laser Heads (Standard/Optional Configurations and Replacement Overview)

4.4.2 How to replace different lens

Please follow these steps:

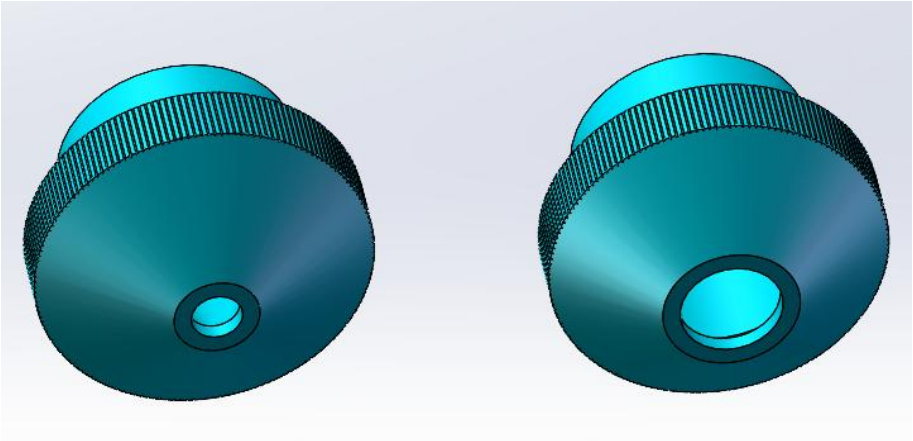
1. Hold the lens tube by hand, loosen the black screw, and remove the entire lens tube.
2. Remove the blue cone head part.
3. Reinstall the new lens tube in its original position.

(Note:Ensure the black rubber ring is correctly positioned to keep the lens tube at the same height as the original one.)



4.4.3 How to use different nozzle

The TITAN & TITAN PRO SERIES are compatible with two types of nozzles: a 3 mm nozzle (standard) and a 6 mm nozzle (spare in the toolbox).



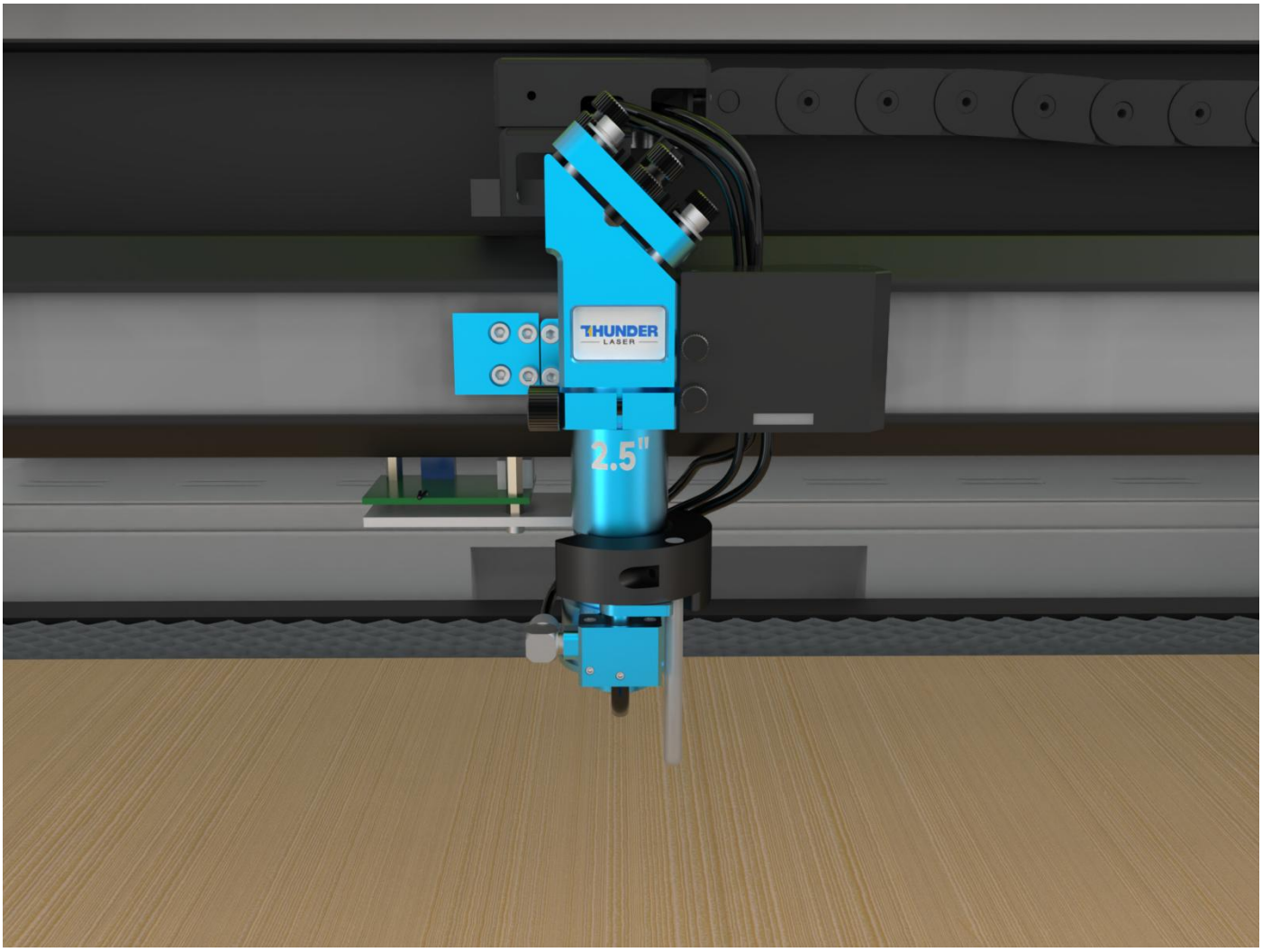
The 3 mm nozzle has a narrow outlet that delivers high-velocity airflow directly into the kerf. It is ideal for cutting wood, as it prevents soot buildup inside the cutting path.

The 6 mm nozzle features a wider outlet that provides gentle, diffused airflow rather than directing it straight into the kerf. This nozzle performs best when cutting acrylic, as it avoids white marks on the cut edge. It also produces clean, smoke-free engravings on wood by gently dispersing and extracting debris and fumes from the work area.

4.5 How to focus

- Manual focus

The laser machine comes equipped with a manual focusing tool that is attached to the cone module. Then raise the honeycomb table up with Touch panel, and the bottom of the tool touches the material surface, it means completing the focusing process.



- Auto focus

For the TITAN & TITAN PRO Series, place your material on the worktable and move the laser head above the material. Then press the AF button on the control panel.

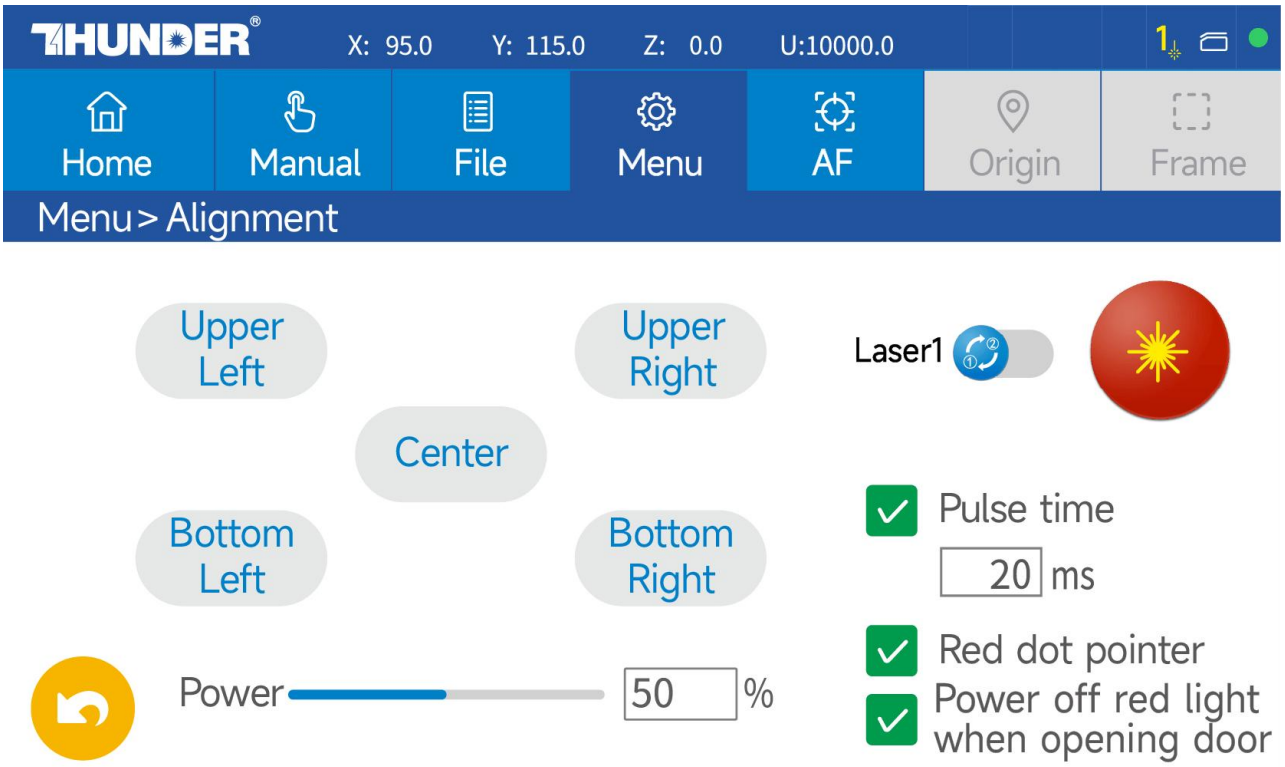
The table will automatically rise, trigger the sensor, then lower to the optimal focal height. This indicates that auto-focusing is complete.

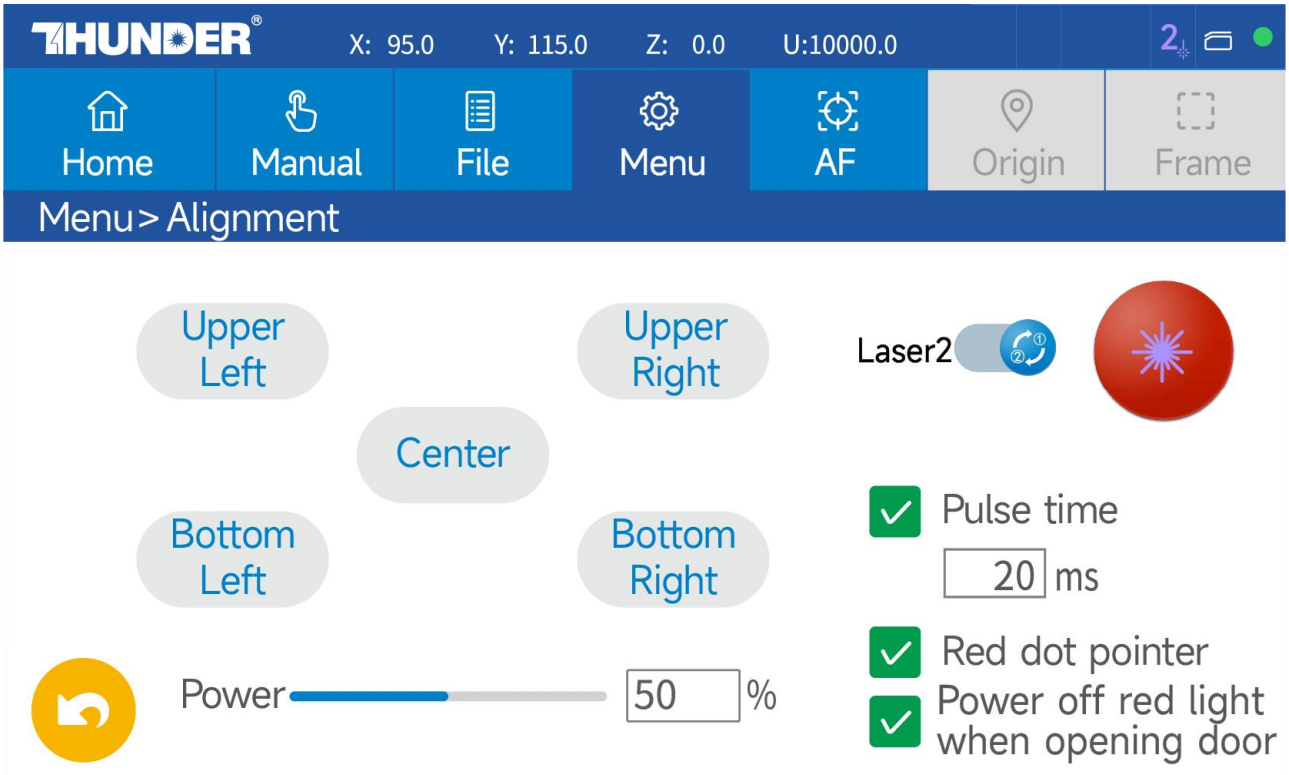
4.6 How to switch the Laser Sources Manually (for Titan Pro)

To verify proper laser operation and beam alignment in maintenance mode, you must manually switch the Dual Laser Source function.

TITAN PRO SERIES supports the installation of both CO2 and Fiber laser sources, how to switch as follows:

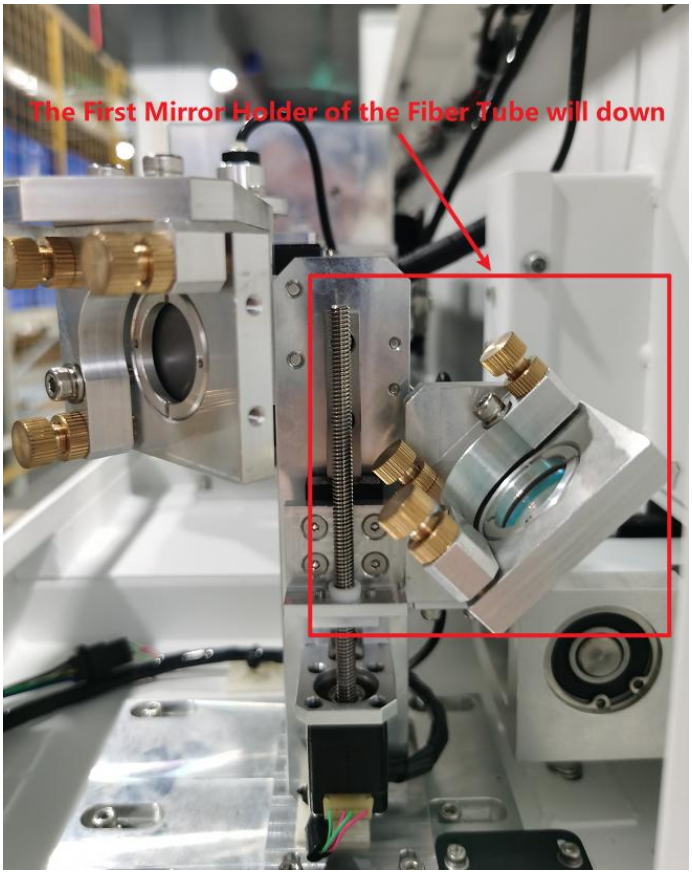
1. Click the Menu button on panel >> Click the Alignment >> By clicking on the Laser 1 button, the machine switches to Laser 2 and displays the corresponding laser source in the icon in the upper right corner .

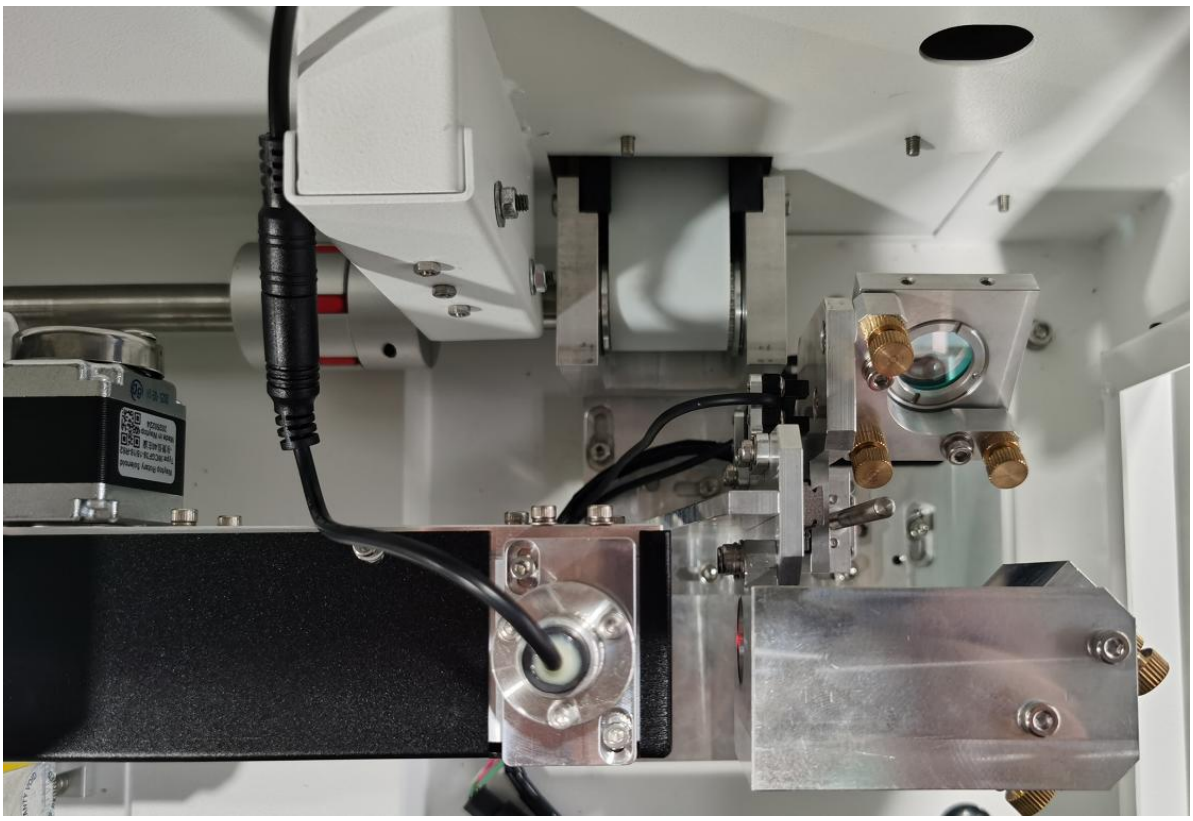




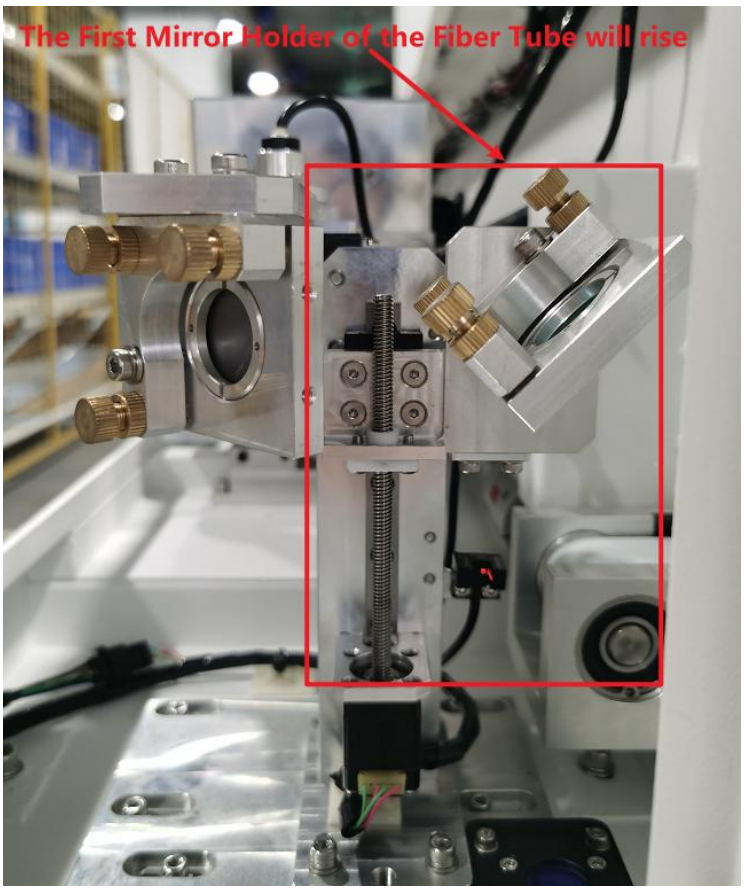
2. When switching, the lead screw motor of the fiber holder module drives the first mirror of the fiber to move.

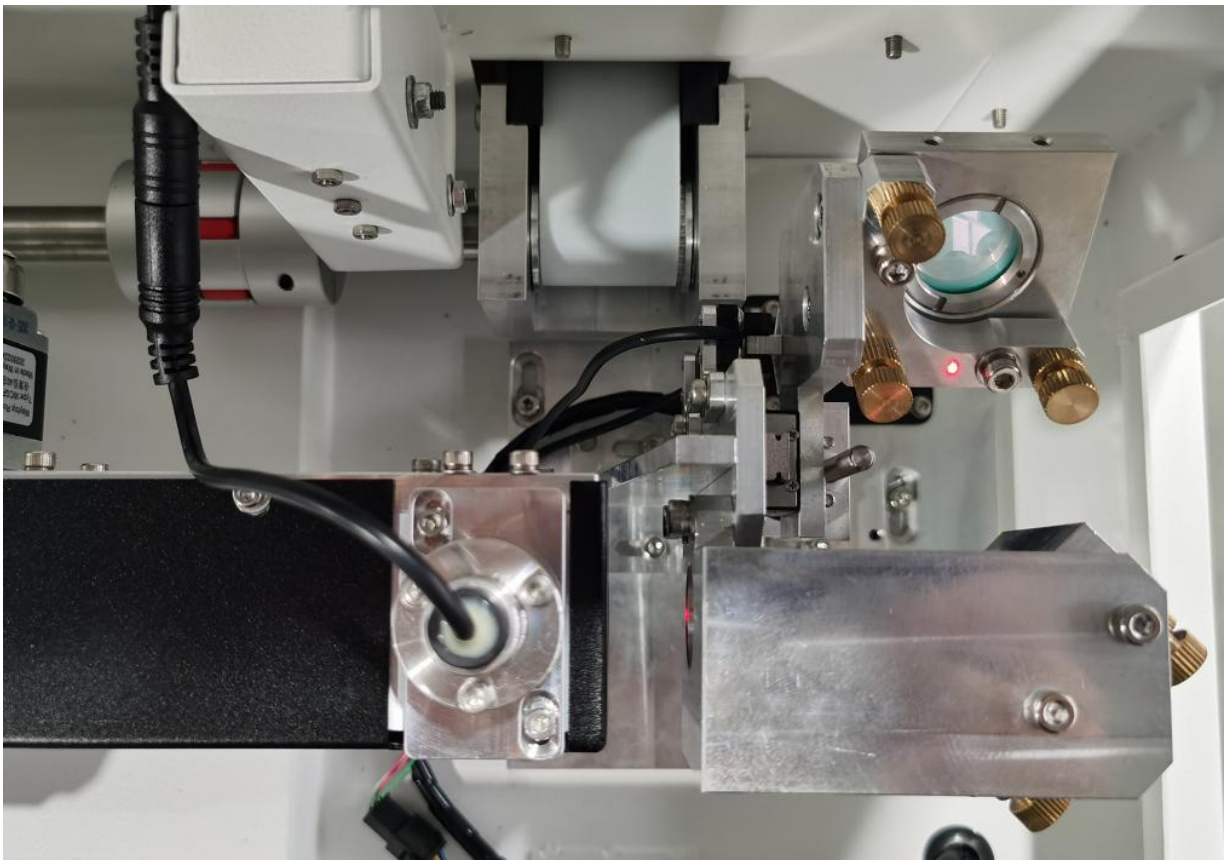
① When using the RF laser tube (Laser 1), the fiber laser's first mirror holder moves down to give way for the CO_2 laser beam through the path. This allows the RF laser beam to reach the second mirror on the guide rail and finally arrive at the laser head. In this mode, the RF tube can emit a beam while the fiber laser cannot.





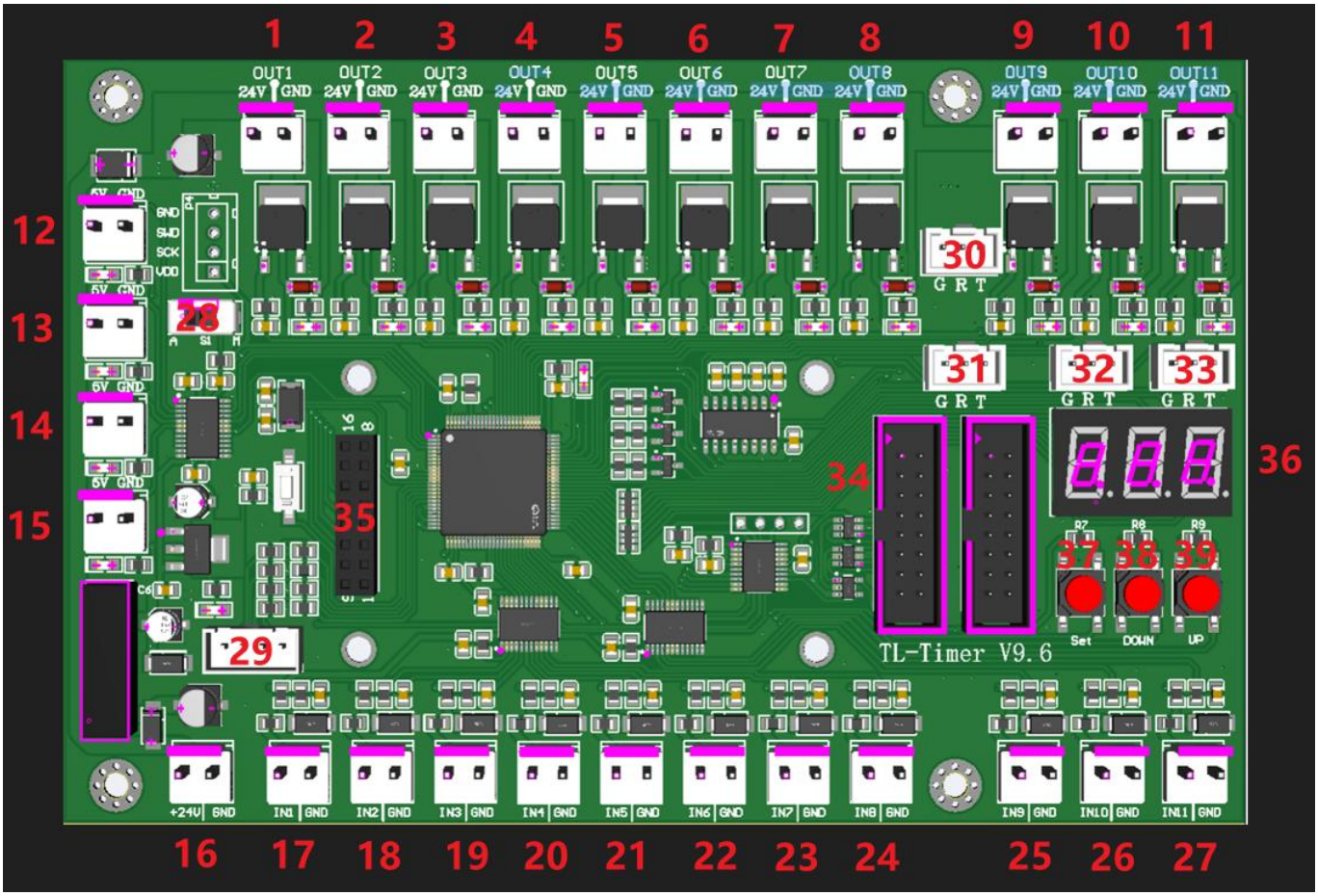
② When switching to the fiber laser (Laser 2), the first mirror holder of the fiber laser moves up to the designated beam output position (aligned with the optical path of the RF tube). This allows the fiber laser beam to reach the second mirror on the guide rail and then travel to the laser head. In this state, the fiber laser can emit a beam while the RF tube cannot.





4.7 How to use the TL-Timer

The TL-Timer is an optional auxiliary module for laser machines.It automatically controls peripheral devices including the air pump, exhaust fan, alarm lights, heat detector, and electrical locks.This greatly improves the ease of use of your laser machine.



About TL-Timer controller interface and buttons description：

1. OUT1: Control the green light of warning light; When the machine is not at work, the warning light is in green color;
2. OUT2: Control the red light of warning light; When the machine is working or getting around alarm message on LCD panel, the warning light turns red;
3. OUT3: Control the exhaust fan; Delay shutdown is set to 30 second（Factory default settings, change it if required）;
4. OUT4: Control air assist with “Low volume”; Delay shutdown is set to 20 second (Factory default settings, change it if required) ;
5. OUT5: Control air assist with “High volume”; Delay shutdown is set to 20 second（Factory default settings, change it if required）;
6. OUT6: Control the fire alarm system; When A high temp is detecting on working area, the alarm system will be active, the warning light alarms and the machine stops working immediately;
7. OUT7: Control the power for rotary device;
8. OUT8: Control the contactor of the relay, thereby controlling the connection status of the laser power supply;
9. OUT9: For contactor control of driver power supply;
10. OUT10: For the lamp, adjustable brightness;

11. OUT11: Controls the rotation of the Shutter motor;
12. 5V DC Voltage Power Output 1, control the power for red dot pointer;
13. 5V DC Voltage Power Output 2, spare interface;
14. 5V DC Voltage Power Output 3, Control of Fan Control Board and Fiber Optic Adapter Board switch input;
15. 5V DC Voltage Power Output 4, Control the RF tube enable signal of the Fan Control Board;
16. 24V DC Voltage Power Input;
17. In1: Spare interface;
18. In2: Temperature detection;
19. In3: Optical Shutter Limit of Fiber detection;
20. In4: Control air assist with “Low volume”;
21. In5: Control air assist with “High volume”;
22. In6: Temperature detection;
23. In7: Optical Shutter Limit of RF tube detection;
24. In8: Contactor switch input;
25. In9: Emergency stop switch input;
26. In10: Emergency stop switch input;
27. In11: Fan Control Board switch input;
28. Auto and manual mode switch;
29. Expansion Interface 1: Connect Fan Control Board to detect RF laser tube status;
30. 232 Serial Port 1: Communication with controller;
31. TTL Serial Port 1: Spare interface;
32. TTL Serial Port 2: Communication with autofocus board ;
33. 232 Serial Port 2: Spare interface;
34. Expansion Interface 2: Connect Door Sensor Checking Board;
35. Expansion Interface 3: Connect IO Expansion Board;
36. LED lights display, set the delay time for viewing each interface and enter;
37. ”Set” button, select each ”OUT” interface and confirm the setting;
38. ”DOWN” button, reduce time of delay shutdown;
39. ”UP” button, increase time of delay shutdown;

The TL-Timer is installed inside the lower right hand door panel, see below.

Operation:

Normal use:

The TL-Timer is factory-set to Auto mode by default.

In Auto mode, the air assist and exhaust fan remain inactive when the laser is idle. Once or seconds before (can be set from the touch panel) the laser starts operation, both the air assist and exhaust fan will activate automatically. After the job is completed, the air assist will shut off after a 20-second delay, and the exhaust fan will stop after 30 seconds (delay time can also be set from the touch panel).

In Manual mode, the air assist and exhaust fan run continuously while the laser is powered on.

Each “OUT” port supports an adjustable delay time ranging from 0 to 99 seconds.

Set up delay end time:

Generally, only the delay end times for the air assist and exhaust fan need to be set, allowing them to shut off with a delay as required.

The default delay end time is 20 seconds for air assist and 30 seconds for the exhaust fan.

Press the Set button to select interfaces from OUT1 to OUT8. The LED display will show the delay end time in seconds for each interface.

On each interface, use the Up or Down buttons to adjust the value, then press Set to confirm and proceed to the next interface.

When on the OUT8 interface, press the Set button again to turn off the display and exit delay setup mode.

4.8 How to use air-assist control

4.8.1 Internal Blow Assist Function

The air-assist system is an essential auxiliary feature for laser processing. Generally, optimal operation requires:

- **Cutting:** High-volume airflow for efficient material removal.
- **Engraving:** Low-volume airflow for precision surface treatment.

An integrated pressure sensor provides real-time monitoring, enabling precise airflow adjustment to match specific processing requirements.

How to adjust air volume if require?

For High volume mode,

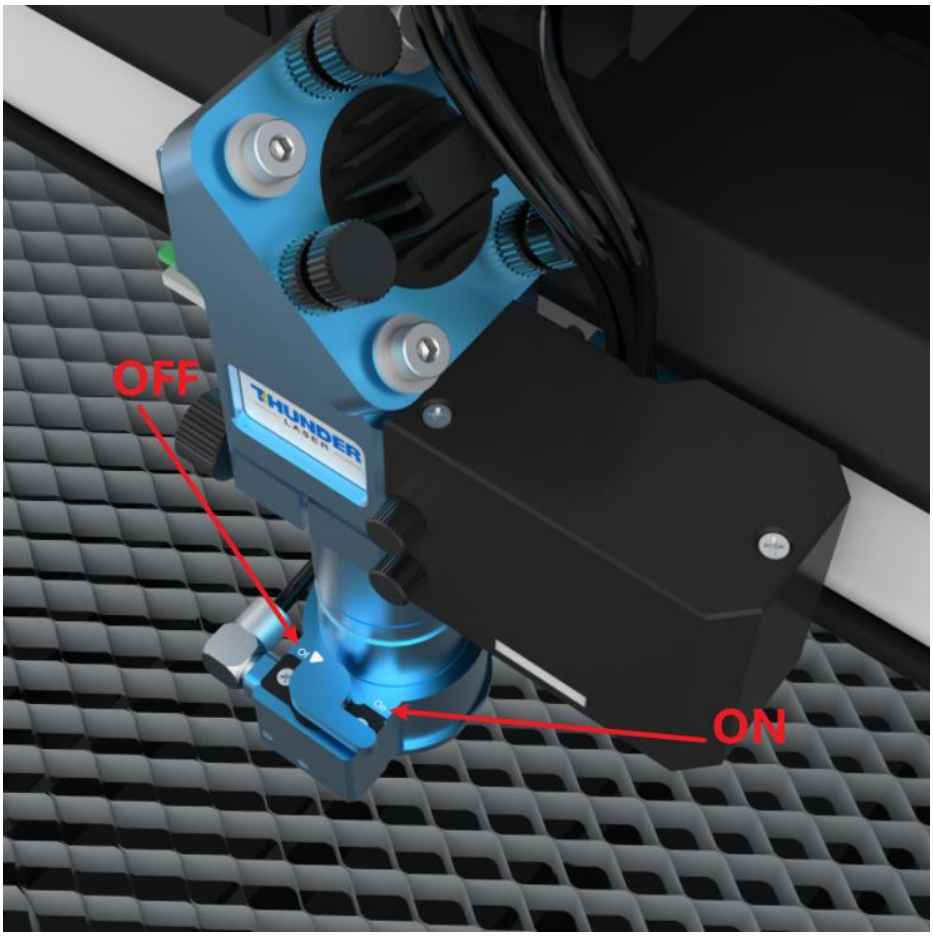
1. Make sure machine is not at work and laser switch is off
2. Click the left green button to start the air-assist with high volume
3. Check the air volume under the laser head
4. On left flow control valve, loosen the locked nut then rotate the adjusting screw to control the air volume to meet your requirements.
5. Fix the locked nut after finished.

And for Low volume mode, you do it the same.

4.8.2 External Blow Assist Function

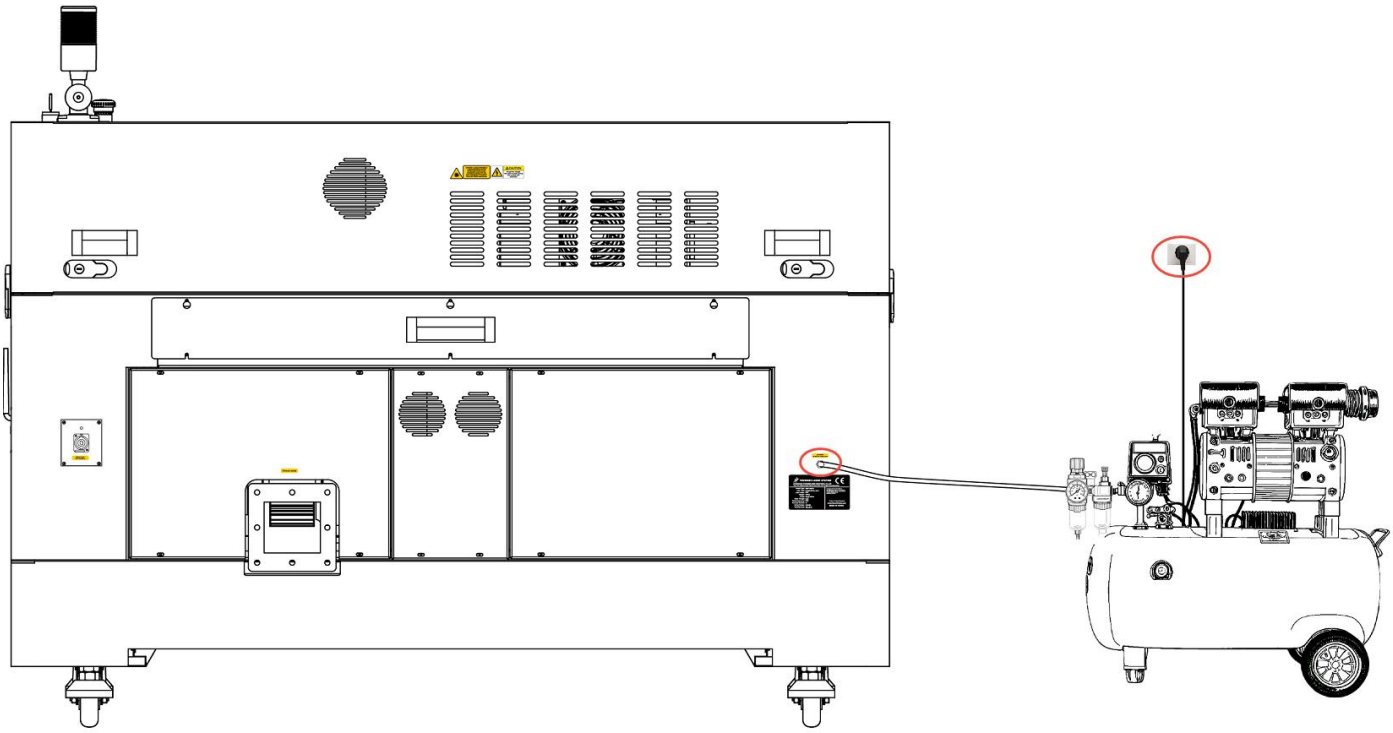
The TITAN & TITAN PRO SERIES are equipped with an external air blow function (also known as side air blow), which is controlled by a separate valve and works in conjunction with the Internal Blow Assist Function. The external air blow is mainly from the side air blow, with a small amount of air blowing out of the nozzle, which effectively prevents dust from getting into the nozzle and blocking the autofocus sensor.

When the arrow of the blow-off valve is pointing “off” the external blow-off is off and only the Internal Blow Assist Function is used; when the arrow is pointing “on” the external blow-off is on and the Internal Blow Assist Function can be used at the same time.



If you need more air volume, it's much better to use a large air compressor instead of an air pump for air assist.

For how to connect the air compressor you can refer to the following connections.

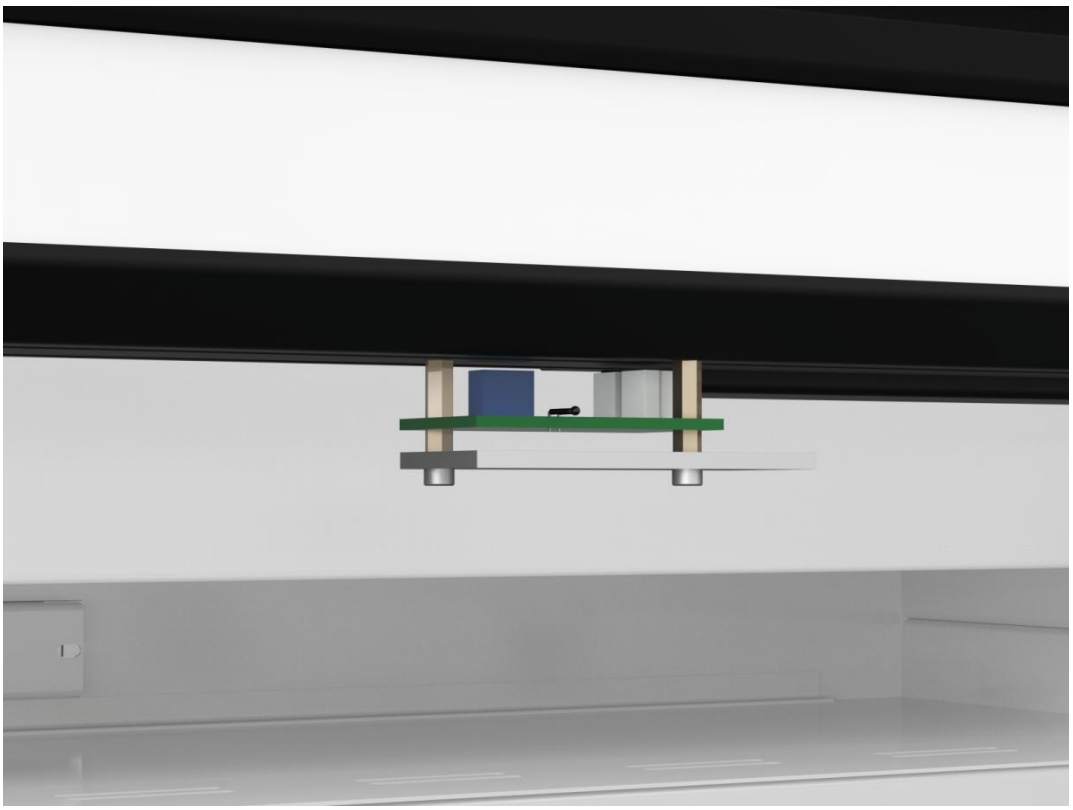


Please note that the air compressor should be powered through the external power charging connector and should never be connected directly to the machine to ensure equipment safety and proper operation. Since the TITAN series is equipped with a built-in air pump, you need to disconnect the air tube between the built-in air pump and the solenoid valve. It is also recommended to unplug the power supply of the built-in air pump for energy saving and noise reduction. Then connect the external air assist air tube to the solenoid valve before using an external air compressor. You may refer to the tutorial video for detailed operation: https://www.youtube.com/watch?v=F52Z5lt3T7g.

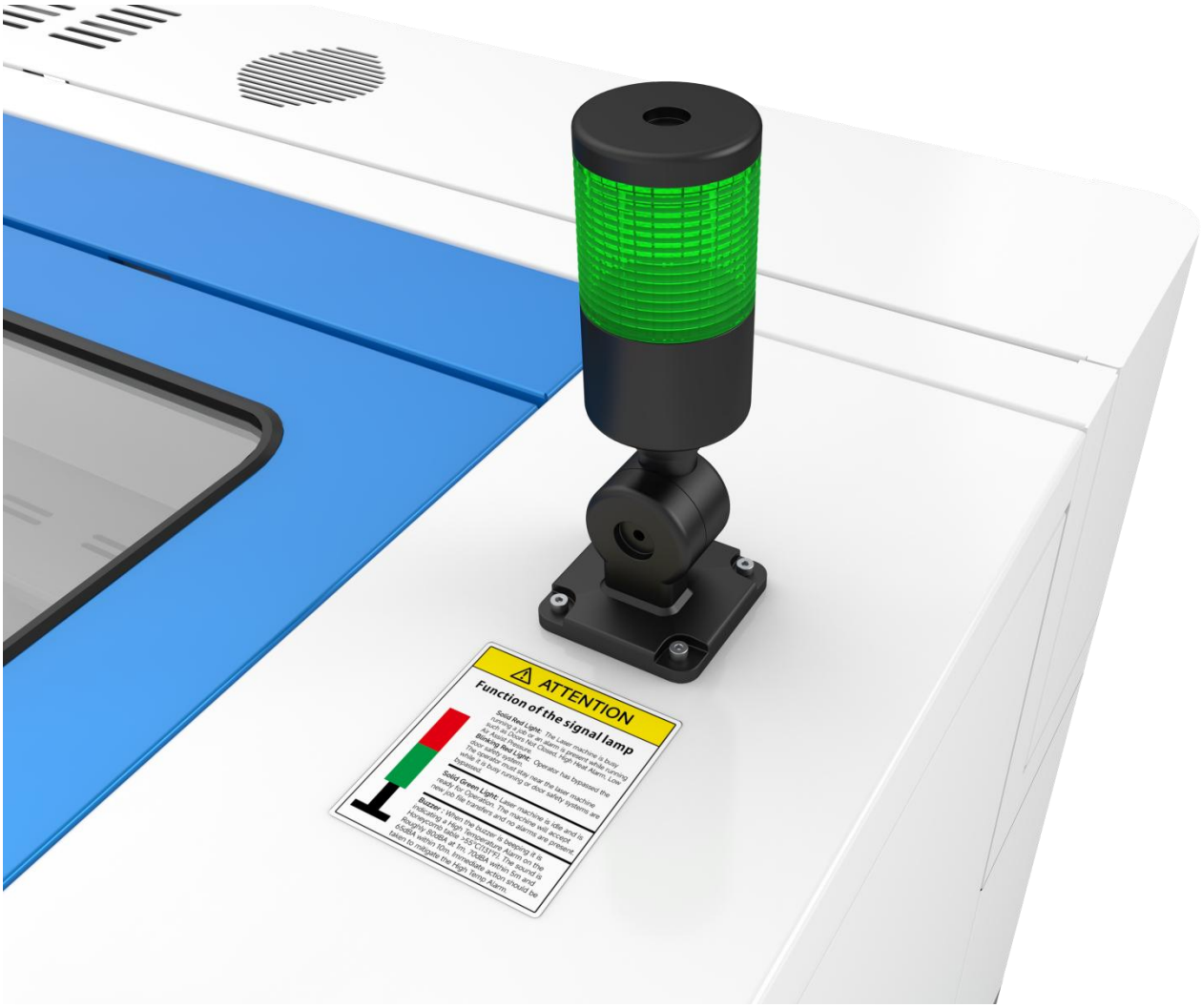
The air pressure can be set between 5 – 55 psi. We recommend keeping the pressure below 50 psi to accommodate regulator variability.

4.9 How the heat alarm system works

The heat alarm system is an additional accessory for laser cutting machines.
Certain materials, such as acrylic and wood, pose a high fire risk, especially during cutting operations.
The system is equipped with an intelligent control board and a temperature sensor, which responds to abnormal temperatures on the worktable (above 55°C / 131°F).
When the threshold temperature is reached, the unit sends a signal to the TL-Timer module to stop laser processing immediately and activate an audible alarm, allowing the operator to take timely fire-safety measures and reduce potential losses and risks.



The alarm sound comes from signal lamp (roughly 80dBA within 1m, 75dBA within 5m and 65dBA within 10m, the sound gets weaker as it travels).



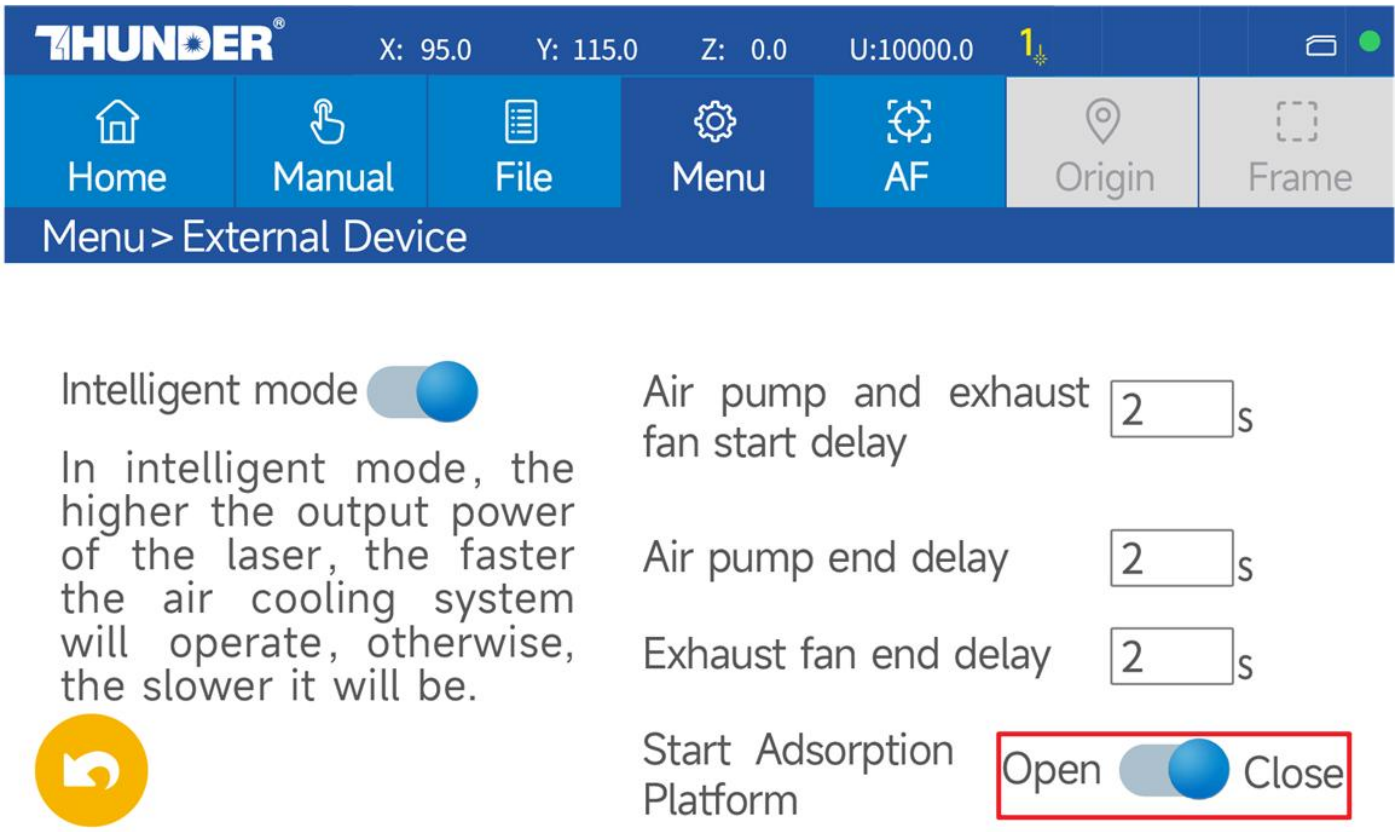
When the heat alarm system is triggered, the alarm will sound continuously until the machine is restarted by the user.

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

4.10 How to use the Vacuum Adsorption Platform function

This function is to form a negative pressure by pumping out the air to firmly fit the processing material to the working table surface, to ensure that the material remains stable during laser processing, to effectively avoid processing errors caused by material displacement, and to improve processing accuracy and efficiency.

It can be switched on via the operation panel, the path is: Menu >> External Device >> Start Adsorption Platform.



For specific usage tutorials, you can refer to this article.

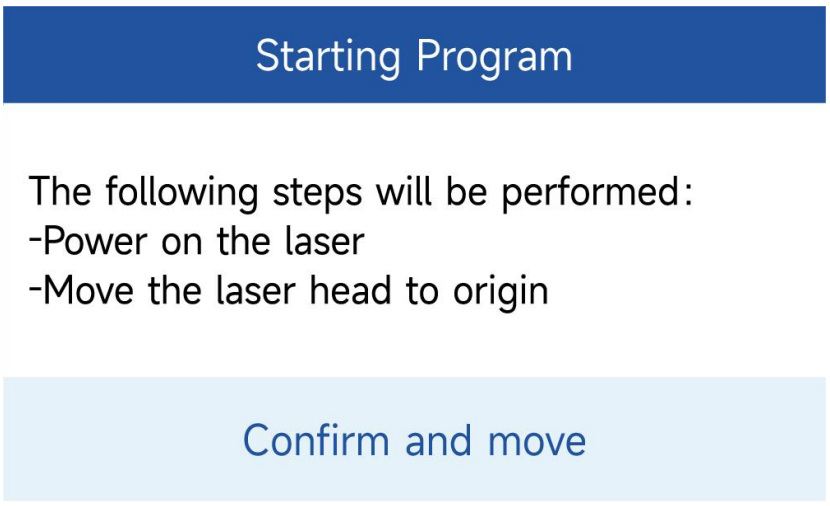
4.11 The First Time Running the Laser

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

Yours first engraving tests

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

1. Switch on the laser and click "**Confirm and move**" , then wait for a beep to note the machine is initialized, and the laser head will do the reset and find the home from top left corner.



2. After machine finish resetting, adjust the height of working table, place the material usually on the top left corner of the working table.

① Move down the working table;

② Place the material;

③ Move up the working table;

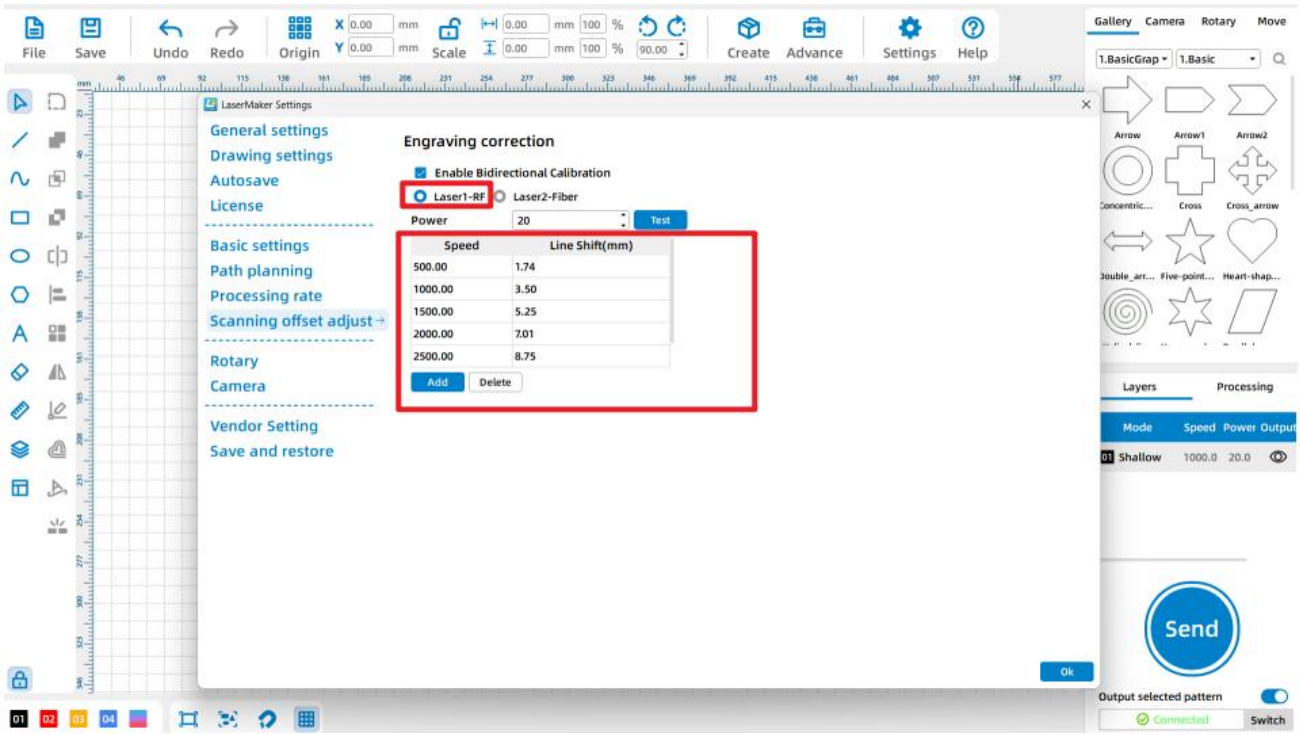
3. With the help of the focus tool, adjust the focus distance. Or click the AF on the control panel to autofocus.

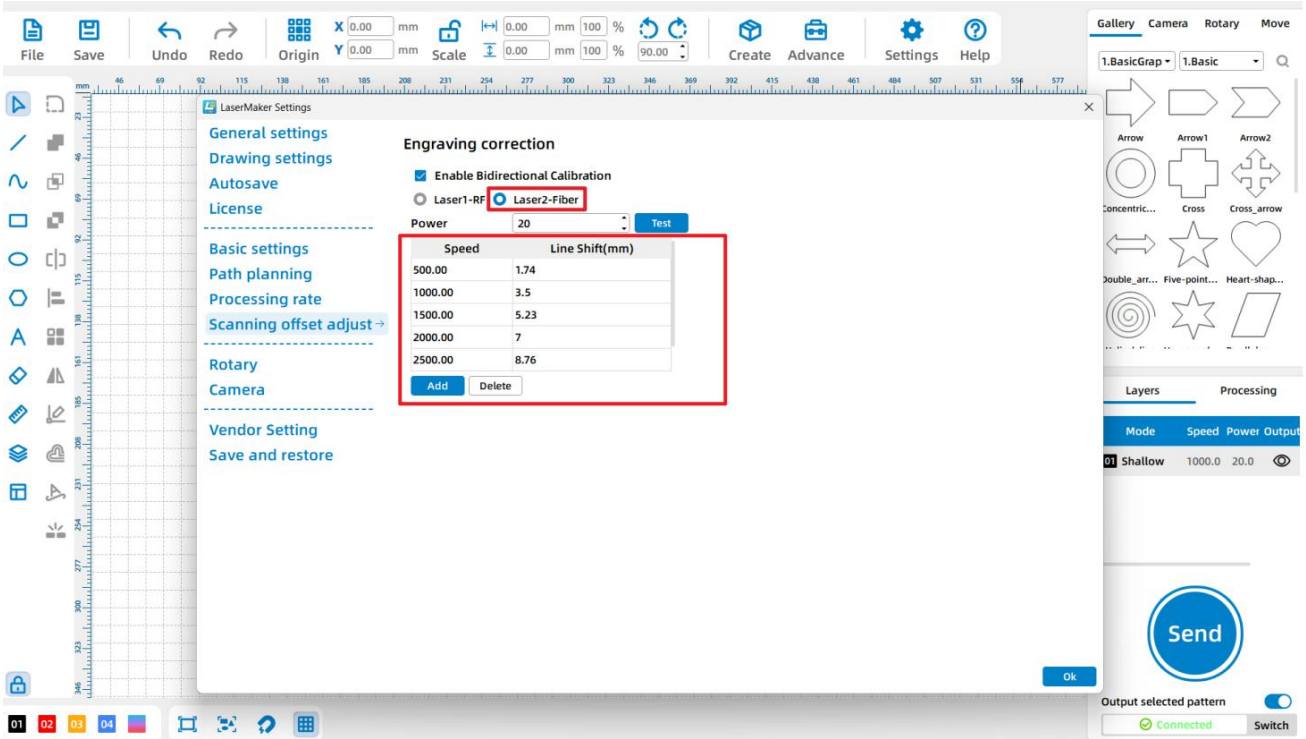
4. Connect the machine with an USB cable or Ethernet cable or WIFI method.

5. Open the software to set up/read the values on the “Scanning(Reverse compensation)” check box.

In LaserMaker

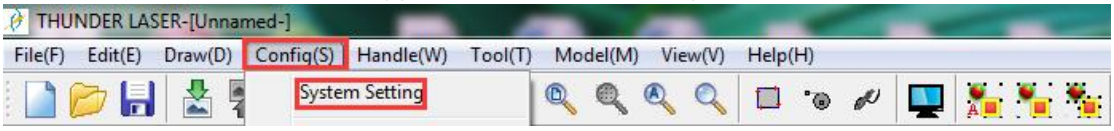
Click Settings>>Scanning offset adjust

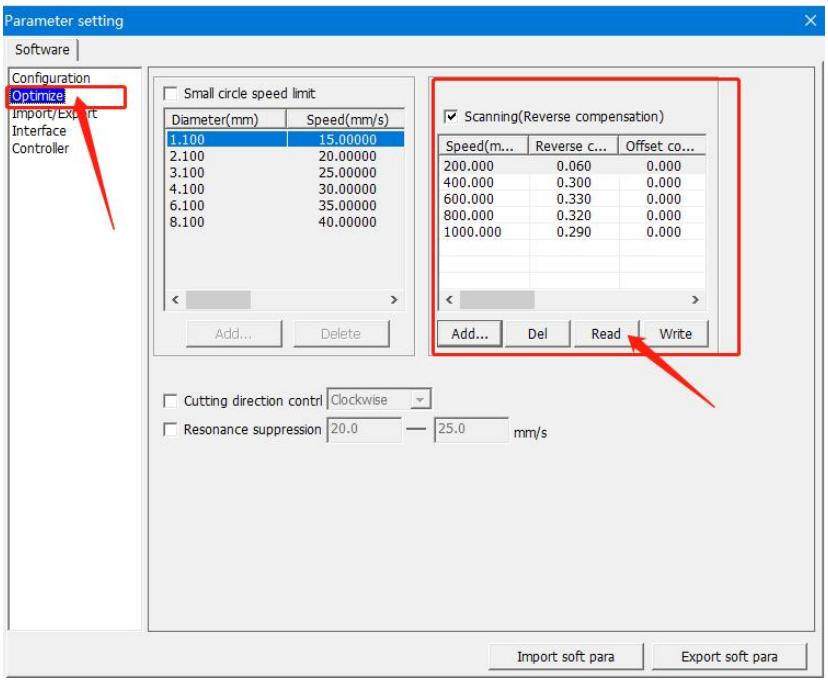




In RDworks

Open Config(s)>>system setting>>Optimize>>Scanning(Reverse compensation),and there are some default values on the “Scanning(Reverse compensation)” check box.





NOTE：

①Please make sure the unit is in mm instead of inch.

②If the machine is TITAN PRO SERIES, there will be two corresponding sets of scanning compensation values.

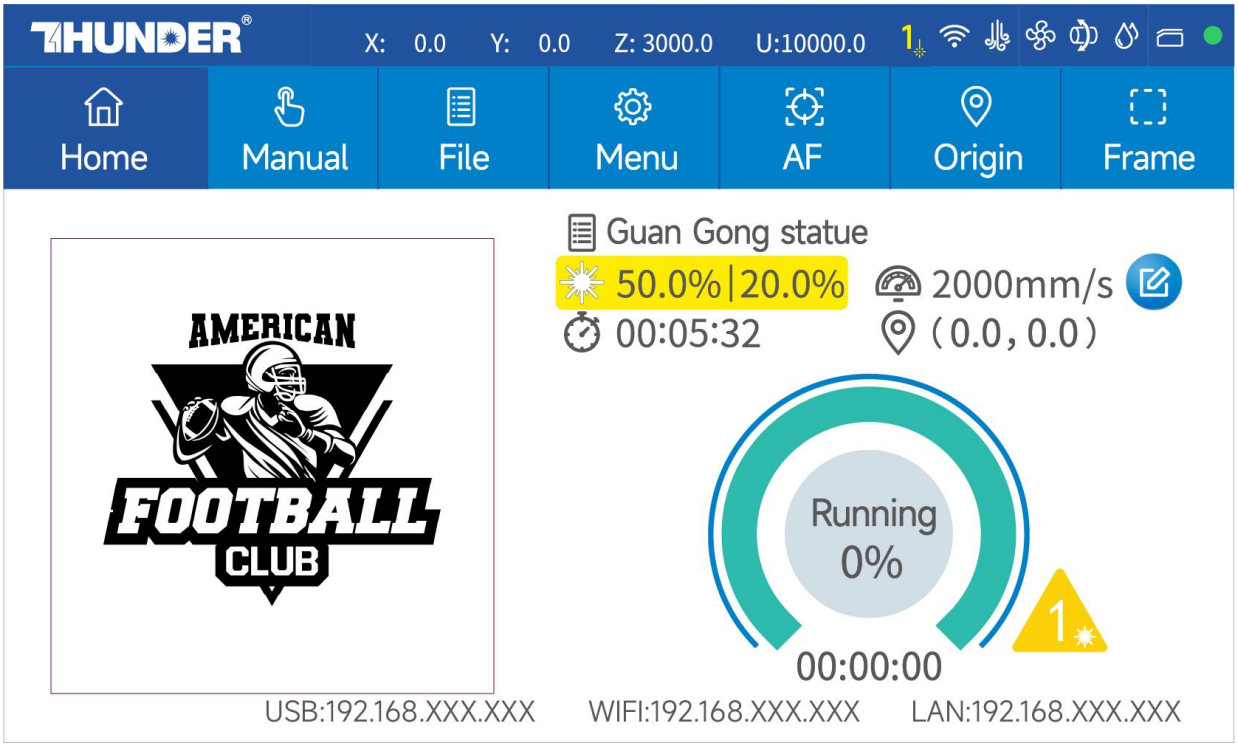
The particular values are showing with a picture in folder of laser software on the USB flash drive and on the Anodized aluminum piece that came with your machine.

6. Create sample text for engraving directly on RDWorks, then set up the parameter and download the file to your machine.

More details for how to use software please watch the instruction video below.

https://www.thunderlaser.com/videos/

7. Click “Original” and “Frame” on the display, please make sure that the material is in the right location and there is enough space for working.



① Control arrow button to move the laser head;
② Click “Origin” button to select the start point;
③ Click “Frame” button to be sure the working area;

8. Finally press the “Start-Pause” button in the display, to start the engraving process.
9. While the laser is engraving, you can generate the next graphic.
10. When the engraving is complete, the laser machine will give out the notification sound and the laser head will go back to the original point, and the warning light will return to the green light, then you can repeat engraving.

4.12 How to use the Dual Laser Sources

TTITAN PRO SERIES supports a dual light source configuration. Follow the steps below to operate this feature correctly:

In a dual laser setup job, the machine automatically switches between laser sources based on layer settings. Focus is set default based on Laser 1, but according to the laser source applied in each process layer, the system will automatically adjust the work bed to fit different focal depths and adjust Fiber Mirror 2 holder heights to switch to correct beam path when needed after pressing **Start**.

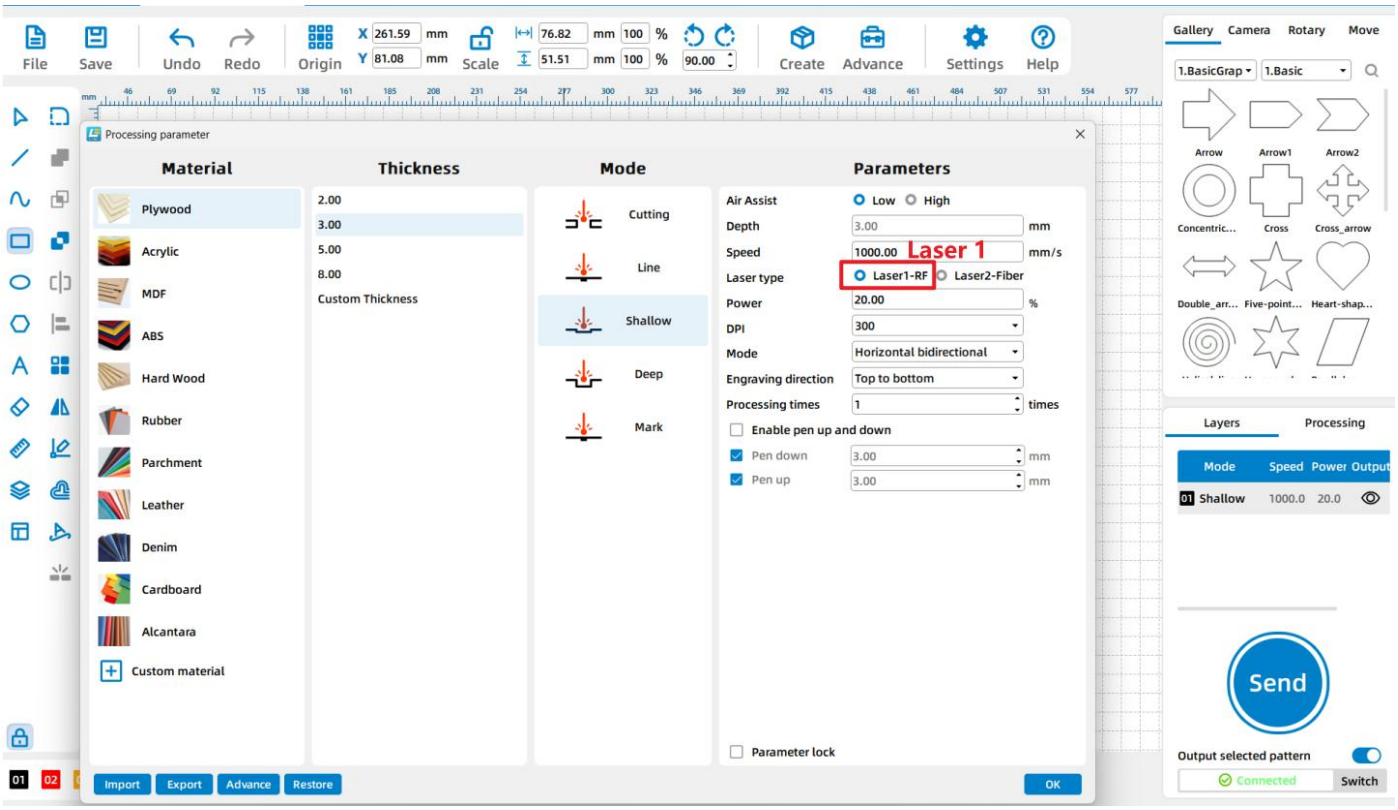
Before enabling Dual Source:

- Verify scanning compensation for both laser sources.
- Confirm machine compatibility.
- Ensure the correct focus lens is installed for the active laser source. Do not enable a laser source that does not match the installed optical path. Incorrect configuration may result in lens damage.
- Never bypass safety interlocks unless in controlled maintenance mode with proper protective equipment.

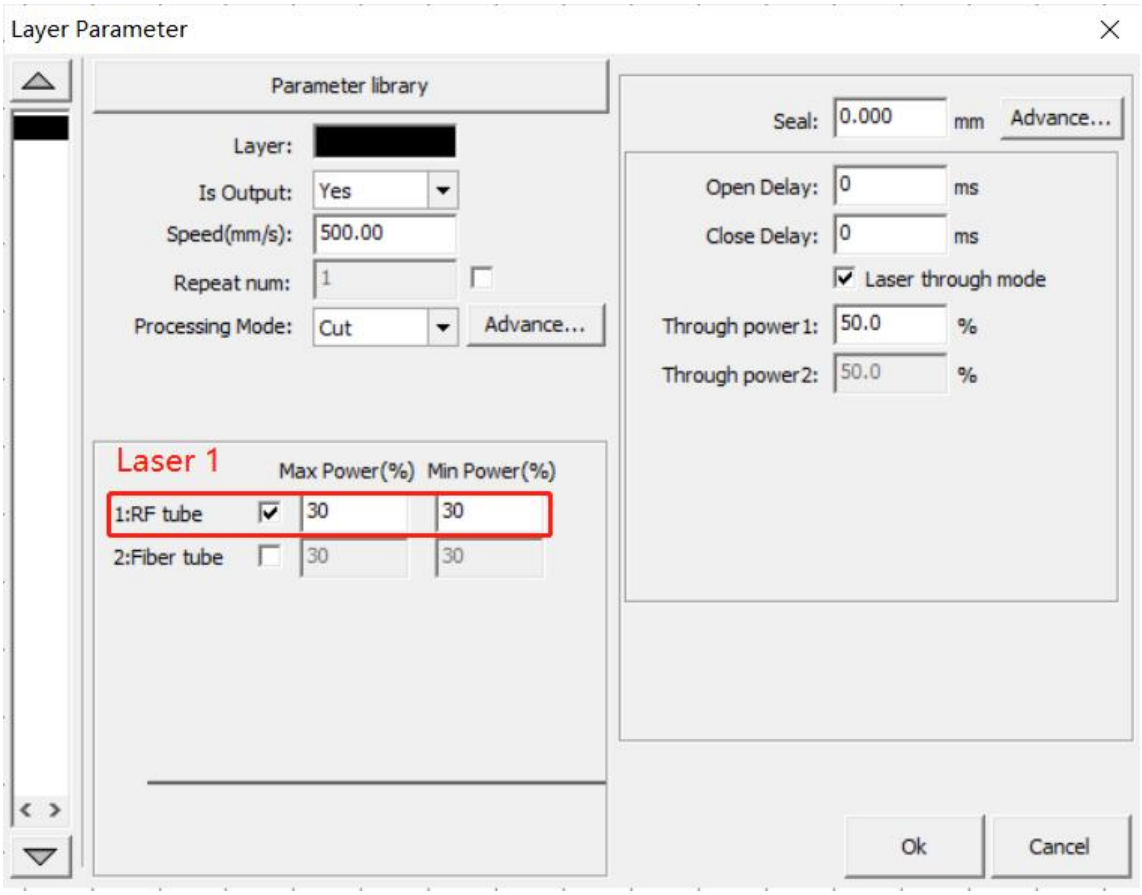
1. **Using CO2 Laser only**

①Open the Layer Parameters, select Laser 1, and configure the processing settings such as power and speed.

In LaserMaker:



In RDWorks:

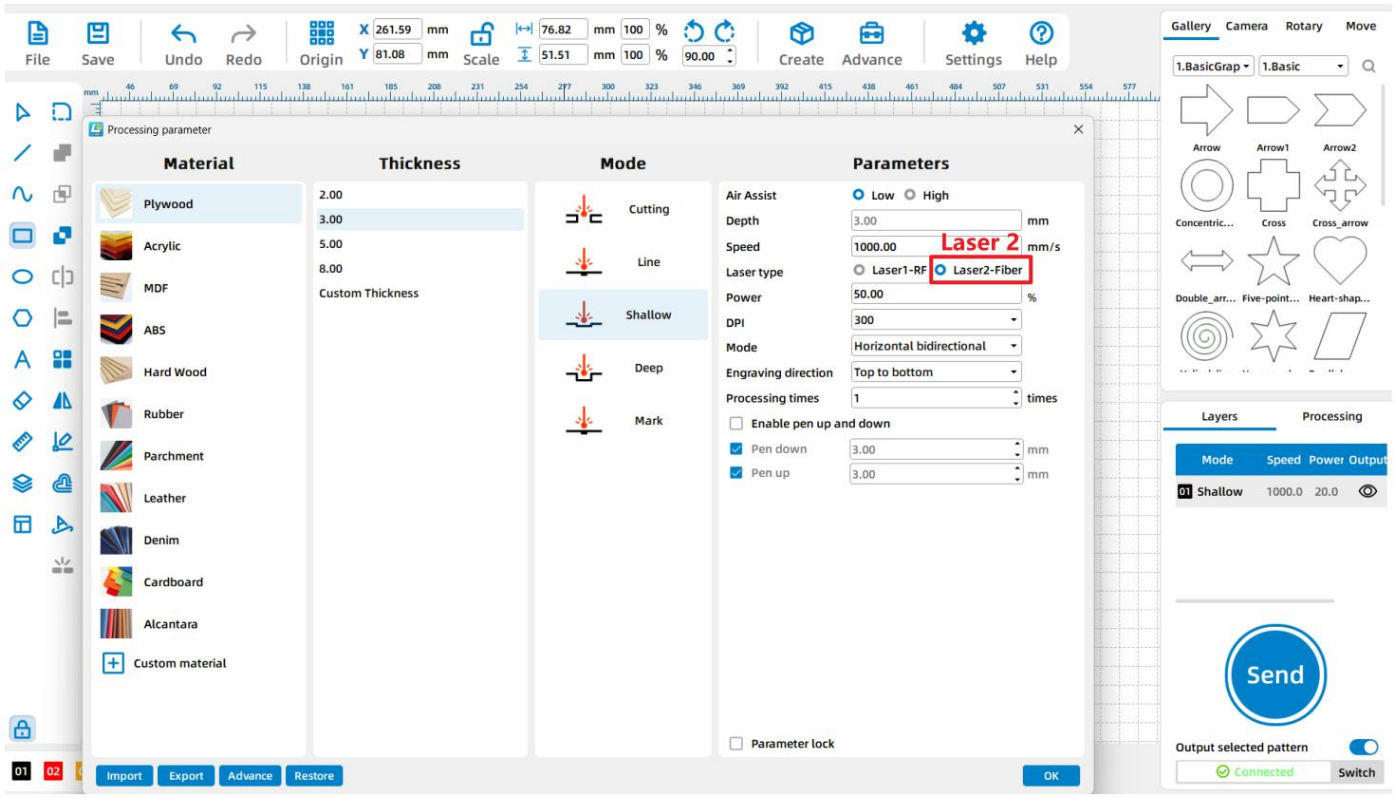


②Send the file to the machine and start working.

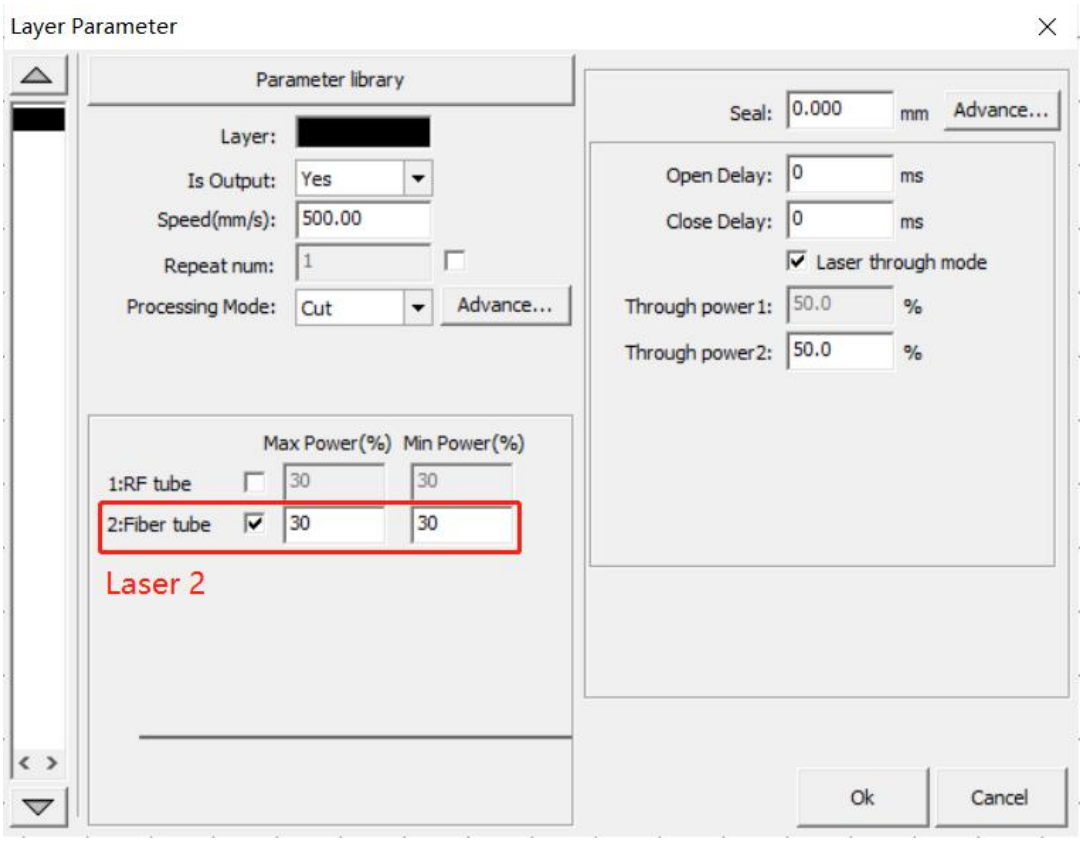
2. **Using Fiber Laser only**

①Open the Layer Parameters, select Laser 2, and configure the processing settings such as power and speed.

In LaserMaker:



In RDWorks:



②Set the Frequency and Pulse Width using the Fiber Adapter Module (disregard this step after upgrading the program and controller firmware that supports fiber settings from the laser software).

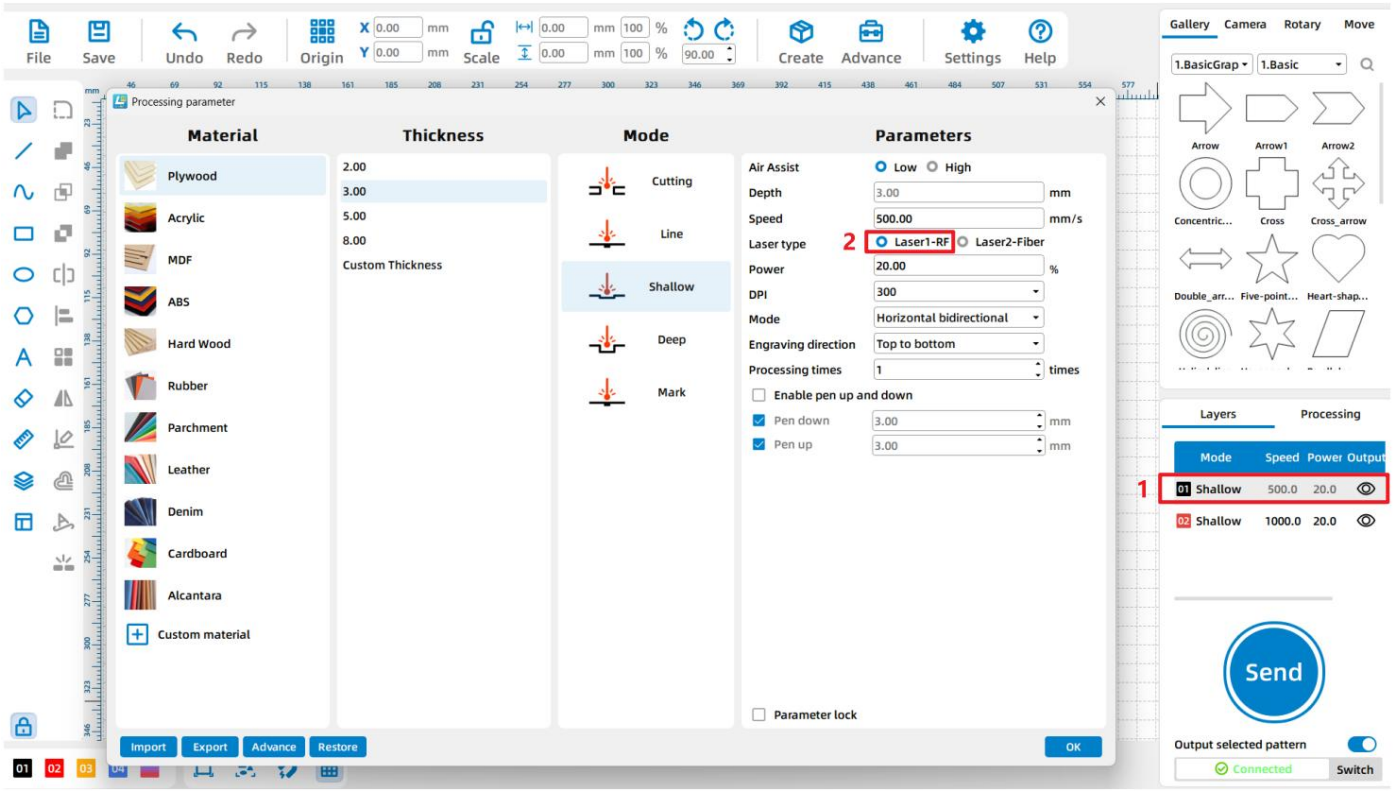
Esc Button: Exit and return to previous menu.
+/- Button: Controls the movement of checkboxes up and down and increases and decreases the value.
Enter Button: Go to the next menu or save the modifications.

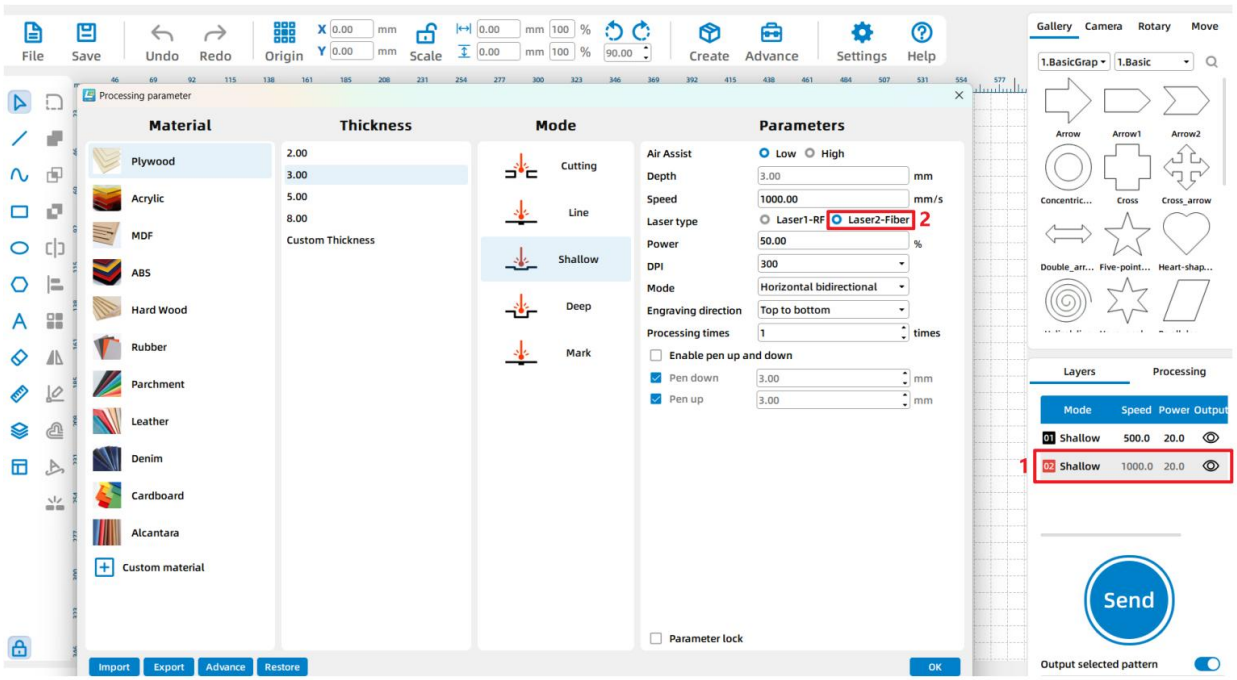
③Send the file to the machine and start working.

Using both CO2 and Fiber Lasers

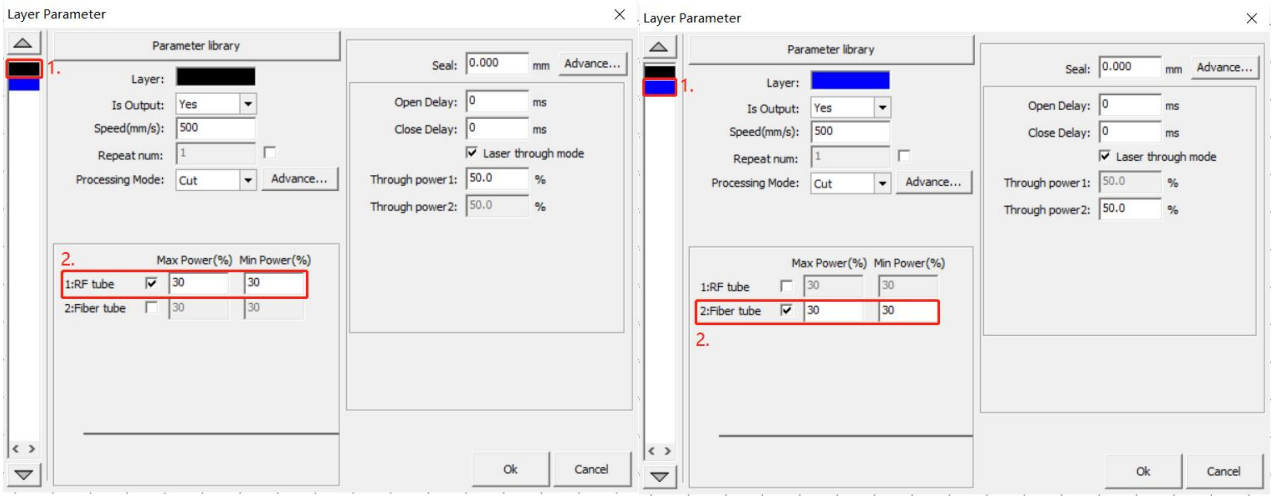
①Open the Layer Parameters, create multiple layers, and set the corresponding laser to each layer.

In LaserMaker:





In RDWorks:



②Set the Frequency and Pulse Width using the Adjust Switch. (disregard this step after upgrading the program and controller firmware that supports fiber settings from the laser software).

Esc Button: Exit and return to previous menu.

+/- Button: Controls the movement of checkboxes up and down and increases and decreases the value.

Enter Button: Go to the next menu or save the modifications.

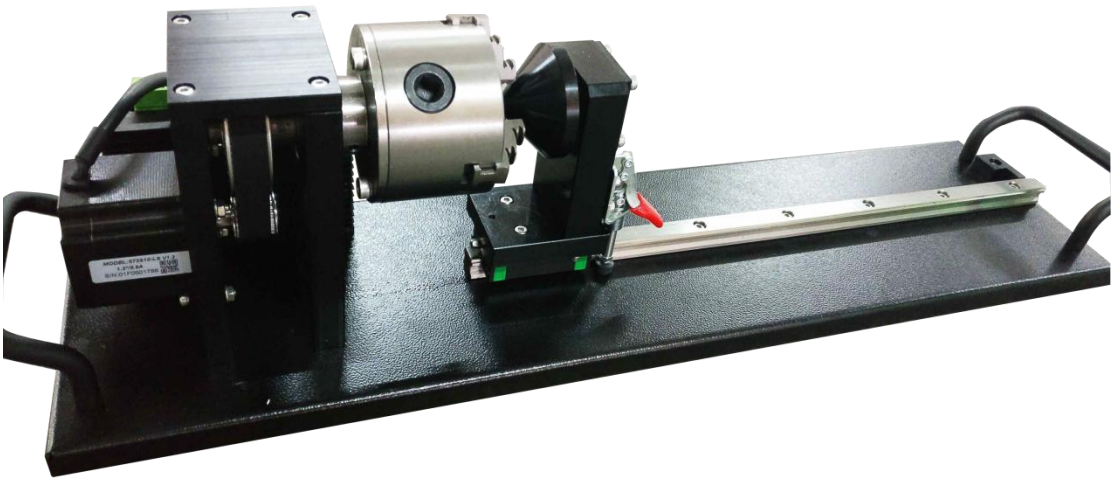
③Send the file to the machine and start working.

4.13 Workstation Area Indication

Side view

Plain view

4.14 How to use the Chuck Rotary axis Attachment



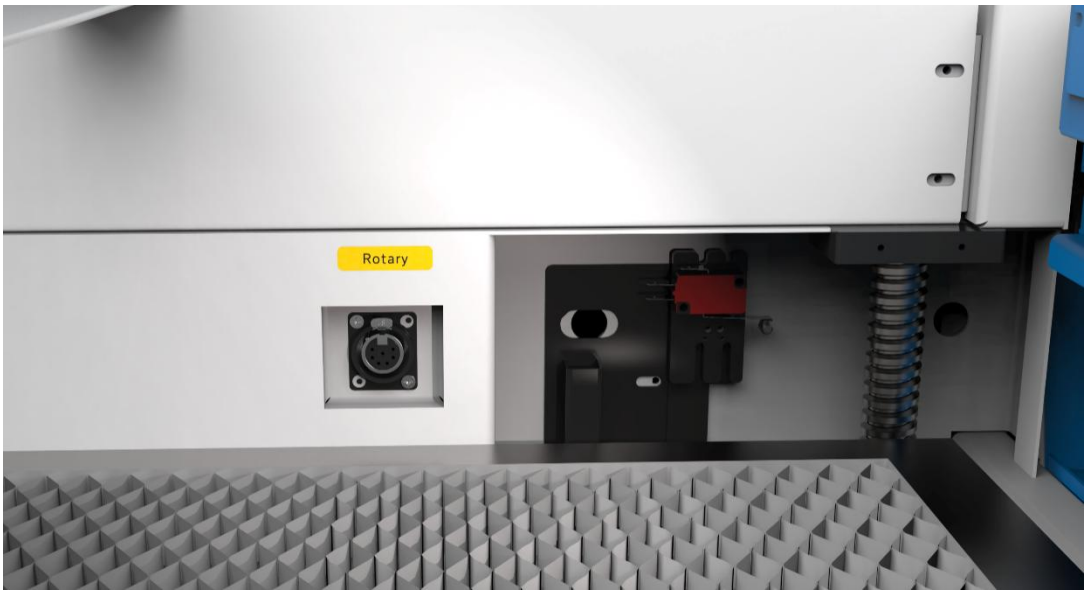
The chuck rotary axis attachment is the optional item.

Specification:

W×D×H	23.62"×5.91"×6.69"/600mm×150mm×170mm
Max working length	11.42"/290mm
Max working diameter	3.94"/100mm

To install and set-up the rotary axis attachment proceed as described as follows:

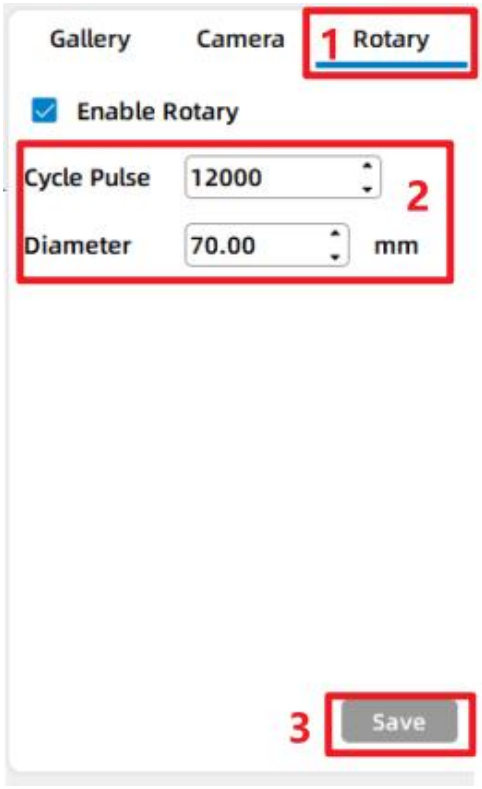
1. Move the working table to the lower position, then switch off the laser and open the top lid.
2. Put the rotary axis attachment onto the working table and align the rotary attachment with the x-axis are parallel, with the jaw chuck closest to where the rotary attachment plugs in.
3. Connect the rotary. The connector is located inside the right front of the laser. Like below:



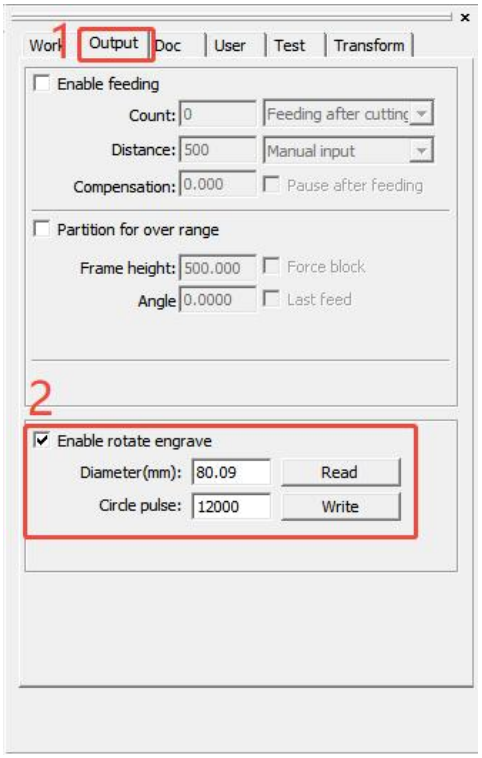
4. Measure the outer diameter of your cup. Please note that for irregular work pieces, measure the outside diameter of the position to be processed.

5. Adjust and fit the work piece into the rotary.
6. Set your focus; please use manual focus. It is not recommended to use the auto focus with a rotary.
7. Set your origin.
8. Select “Output” and then input the diameter of the object and the circle pulse.

In LaserMaker:



In RDWorks:



9. Select "Download", click “Frame” on the touch panel, please make sure that the material is in the right location and there is enough space for working.
10. Finally, press the “Start-Pause” button on the panel to start the engraving or cutting process.

4.15 For Laser Engraving

Engraving depth can be adjusted by changing the laser power or processing speed. To achieve deeper engraving, reduce the speed or increase the power. This increases the amount of energy delivered per unit area.

However, excessive engraving depth may reduce detail quality. For coated materials, the required power depends on the type and thickness of the coating. If the power is set too high, engraved lines may become too wide, resulting in a loss of sharpness and image clarity.

The recommended image resolution is typically **500 DPI**, although the optimal DPI setting depends on the material. Lower DPI values result in lower image resolution, but they also:

- Reduce the risk of flaming
- Increase the energy per pulse

In some cases (such as certain plastics), a lower DPI setting can improve overall engraving results.

1. Plastics

Plastics used for engraving are available in a wide range of colors, thicknesses, coatings, and surface finishes. Most plastic materials can be effectively engraved and cut using a laser.

Plastics with a micro-porous surface typically produce the best results, as less material needs to be removed during engraving.

Since most plastics have relatively low melting points, it is recommended to use a low pip setting. This helps reduce heat buildup and minimizes the risk of melting, resulting in cleaner engraving quality.

Safety Warning:

Do **not** process PVC or other chlorine-containing materials with a laser. These materials release toxic and corrosive chlorine gas when heated, which can severely damage machine components and pose serious health risks to operators.

2. Acrylic

There are two different types of acrylic – cast and extruded. The cast acrylic becomes white or mat after engraving, the extruded acrylic remains clear. Use extruded acrylic for engravings that are filled with paint and cast acrylic for normal engravings. Cast acrylic can be best engraved without protection foil. It is better to engrave the entire surface with a low energy setting.

3. Engrave the rubber stamp

The various mixtures and densities of rubber plates cause a slightly varying engraving depth. The settings in the overview table give a good indication. Since engraving a standard rubber material requires a relatively high laser power, the laser power is principally set to 40% or more high and only the speed is varied. Due to their lower density, so-called micro porous rubber materials allow a significantly higher engraving speed. Test the rubber first, to find out the correct speed setting.

The LaserMaker software using the engraving function, you can choose “Ramp Effect” or common engraving, once you choose “Ramp Effect” and you will need to set a minimum power lower than Max Power, generally we set it to about 15%, and input a value with the Ramp Length what you want, but if you want to make it better, you may need to test different kinds of power and speed by yourself, then you can get the best result.

Engraving rubber produces a considerable amount of dust and terrible gas. Therefore a well-dimensioned exhaust system and its regular maintenance are very important.

Chapter 5. Maintenance

5.1 Cleaning the Laser Machine

Any operation, adjustment, or procedure performed on controls not specified in this document may result in exposure to hazardous laser radiation.

Always power off the equipment and unplug the main power cord before conducting any cleaning or maintenance.

Keep the system clean at all times, as flammable debris in the work area or exhaust duct will significantly increase fire hazards.

You should inspect the engraving system for dust buildup at least once daily and clean the machine promptly if contamination is found.

The cleaning frequency depends heavily on the type of material being processed and the machine's operating duration.

Please note that only a well-maintained, clean machine ensures optimal performance and helps lower maintenance costs.

General Cleaning Notes:

1. Make sure, that the device is switched off and unplugged. Open the protective cover.
2. Move the working table into a position in which it is easiest for you to clean the surface with a window cleaning agent and paper towels.
3. Thoroughly remove all loose dirt particles and deposits in the interior of the machine.
4. Clean the cover of the laser tube.
5. You can clean the viewing window with a cotton cloth. Do not use paper towels as they could scratch the acrylic.

Cleaning the Optical Parts

The lens has a durable multi-coating and won't be damaged by correct and careful cleaning. You should inspect the focus lens and the mirrors and the beam combiner according the maintenance plan. If you discover a veil of haze or dirt, you must clean them.



It is suggested to clean the mirrors/lens before work every day in order to run the machine at max efficiency. **Please turn off the power of laser machine before cleaning the optical parts.**

Lens cleaning fluid and swabs are as follows:

1. Lens cleaning fluid and cotton swabs are in the tool box that came with the machine.
2. The lens must be cleaned carefully with a clean cotton swab to avoid scratching the surface of the lens.
3. Do not touch the lens with your hands after wiping.
4. Never use a cleaning swab twice.

Follow the instructions below for the cleaning of optical parts:

5.1.1 Cleaning the Focus Lens

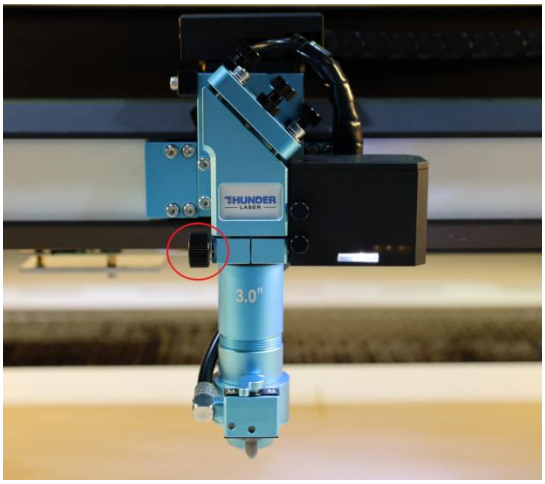
Follow the complete procedure below to clean and reinstall the focus lens correctly:

1. Preparation & Disassembly

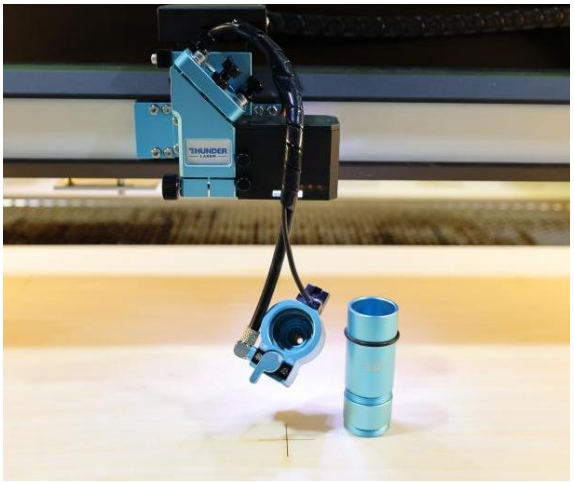
- Move the working table to approx. 10 cm under the lens holder.
- Move the working head to the center of the working surface.
- Unscrew the lens holder and remove the nozzle by carefully turning the lens holder.
- Take out the focus lens from the holder.

  Refer to below steps 1 – 3 for laser head disassembly guidance:

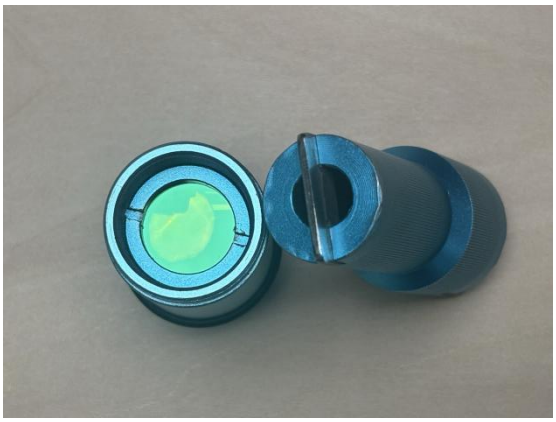
  ①Remove the laser head.

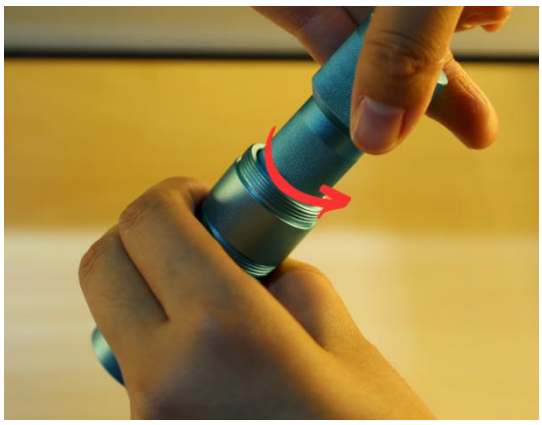


  ②Divide the laser head.



  ③Take out the lens.





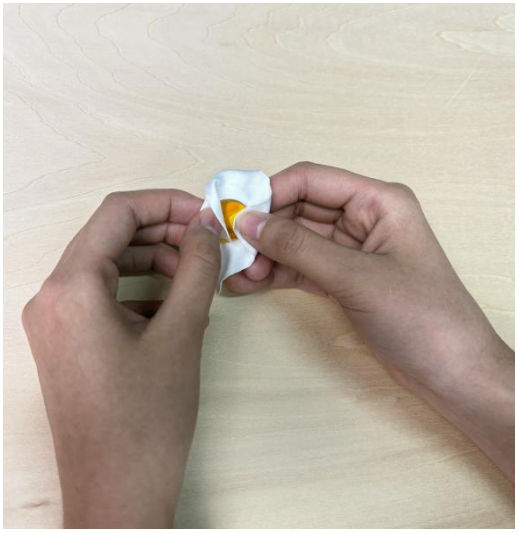
2. Lens Cleaning Procedure

- Remove loose dust: Blow air gently onto the lens surface to remove coarse dust.
- Wet cleaning:

①Place the lens on a dust-free cleaning cloth.

②Spray lens cleaning solution onto one side of the lens. Let it take effect for about 1 minute.

③Wrap the lens with the cloth and wipe it gently and carefully.



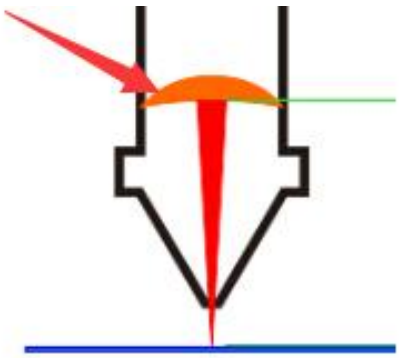
④Dry the cleaned side with a new dry swab, then repeat the process on the other side.

- Inspection: Examine the lens. If still soiled, repeat the cleaning process until it is clean.

3. Reinstallation

Carefully insert the lens back into the holder and fix it securely.

NOTE: Please refer to the diagram below for the installation direction of the focusing lens to ensure correct assembly.

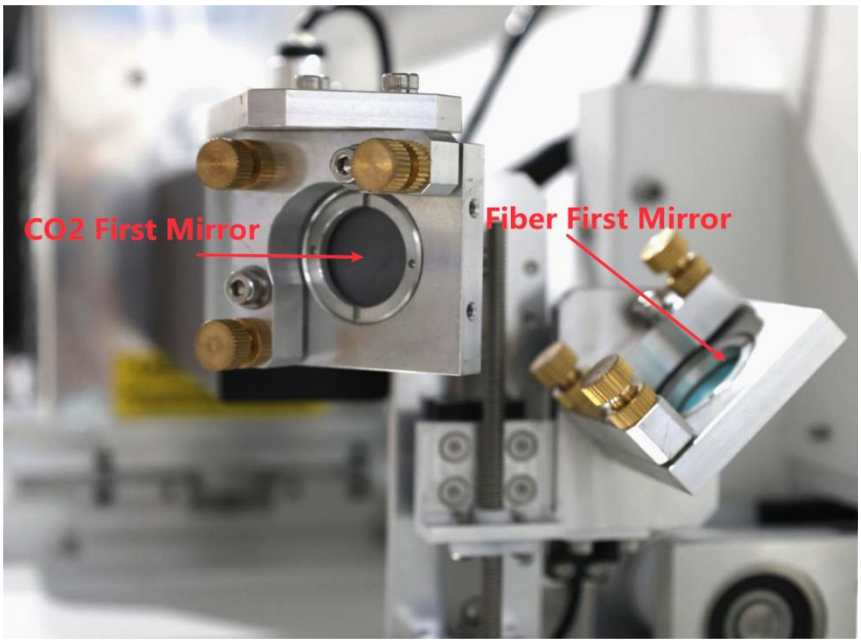


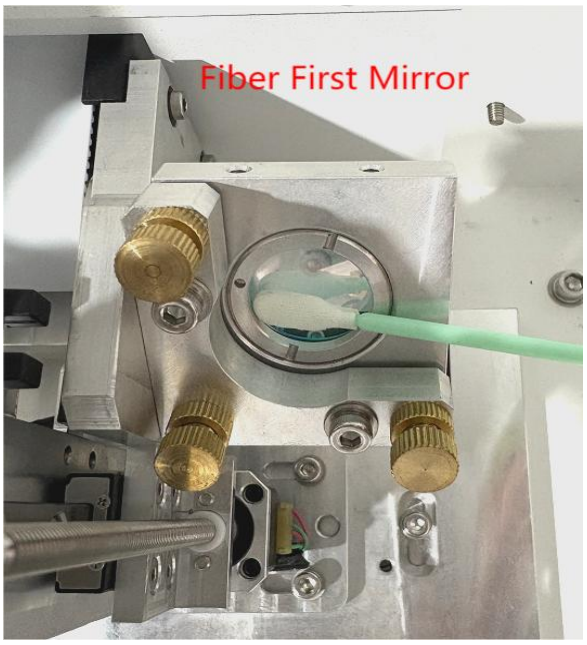
5.1.2 Cleaning the Mirrors

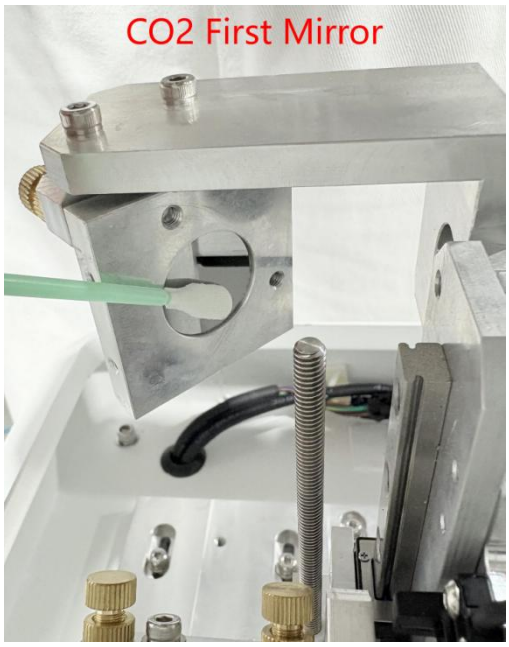
There are three mirrors in the operating area of the laser, which may have to be cleaned if they are soiled. To clean the mirror, follow the instructions below.

1. Remove the coarse dust as good as possible by blowing air onto the mirror surface.
2. Check the surface and if necessary clean the mirror with the lens cleaning liquid and swabs.
3. Put some lens cleaning liquid on the mirror. Leave the liquid to take effect for approximately one minute and then gently wipe it away with cleaning swabs soaked with lens cleaning liquid.
4. Finally, dry this side of the mirror with dry cleaning swabs and repeat the cleaning process on the other side of the mirror (if needed). Never use a cleaning swabs twice. Dust accumulated in the cleaning swabs could scratch the mirror surface.
5. Examine the mirror. If it is still soiled, repeat the cleaning process until the lens is clean.

The Mirror#1

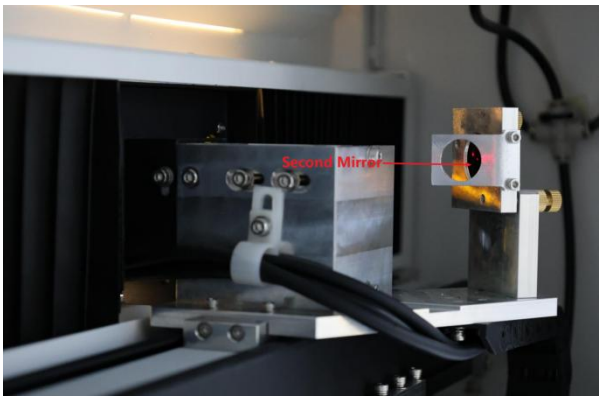


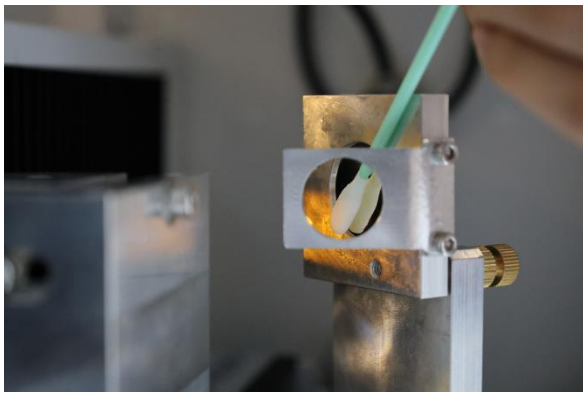




The 1st mirror is installed in the rear box of the laser tube, open it then view the right side.

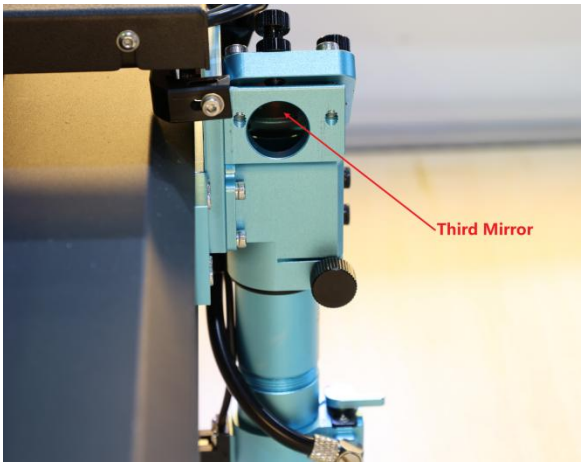
The Mirror#2

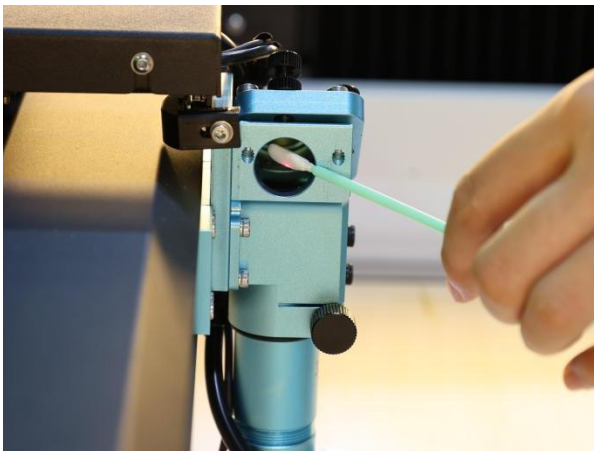




The 2nd mirror is installed on the left side of X rail.

The Mirror#3

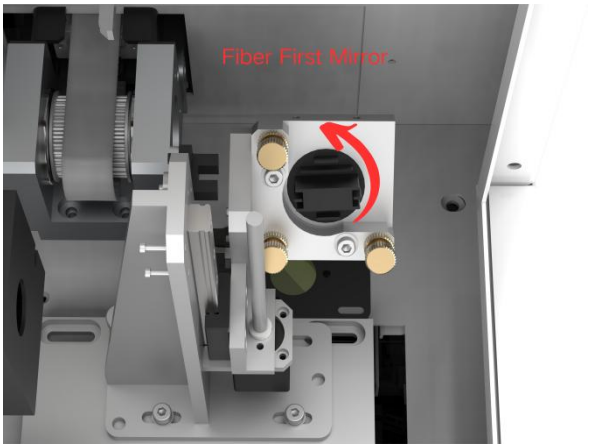




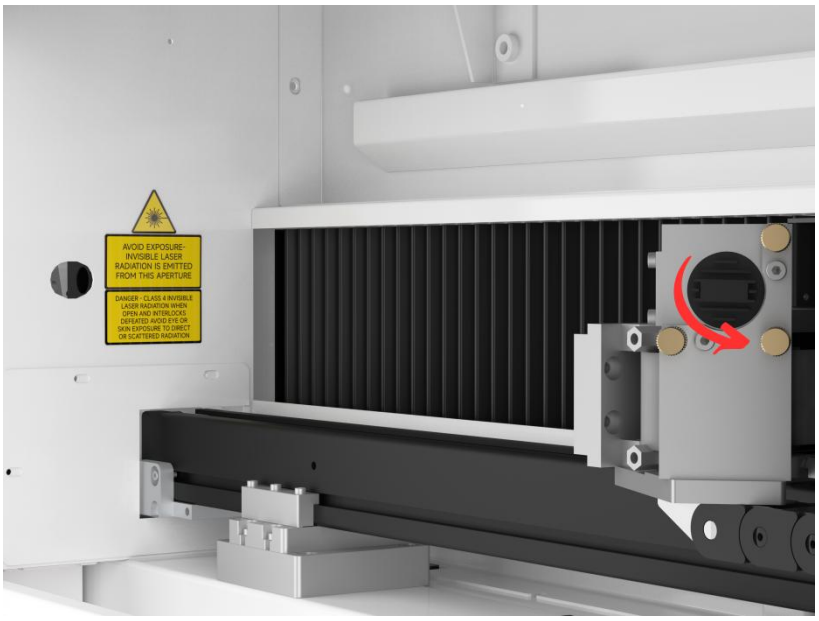
The 3rd mirror is installed on the top of the laser head.

How to take out the mirror#1 #2 and#3, and please just as following the picture indicated:

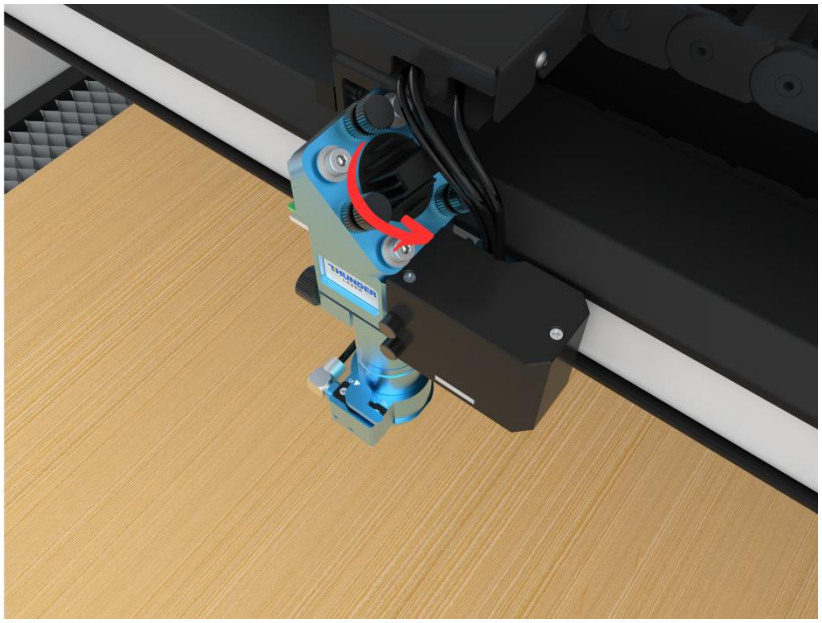
1. The mirror#1



2. The mirror#2

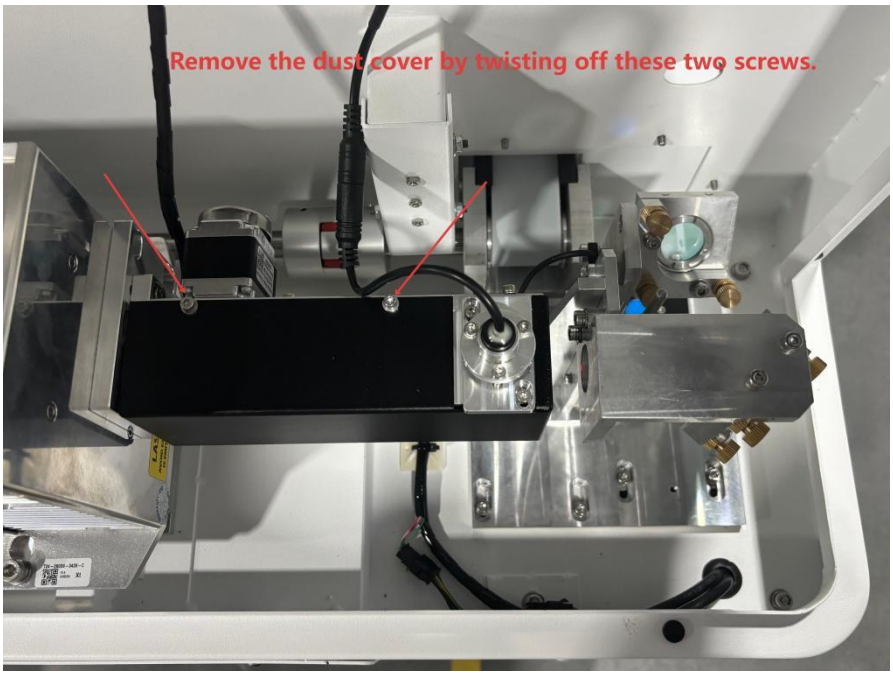


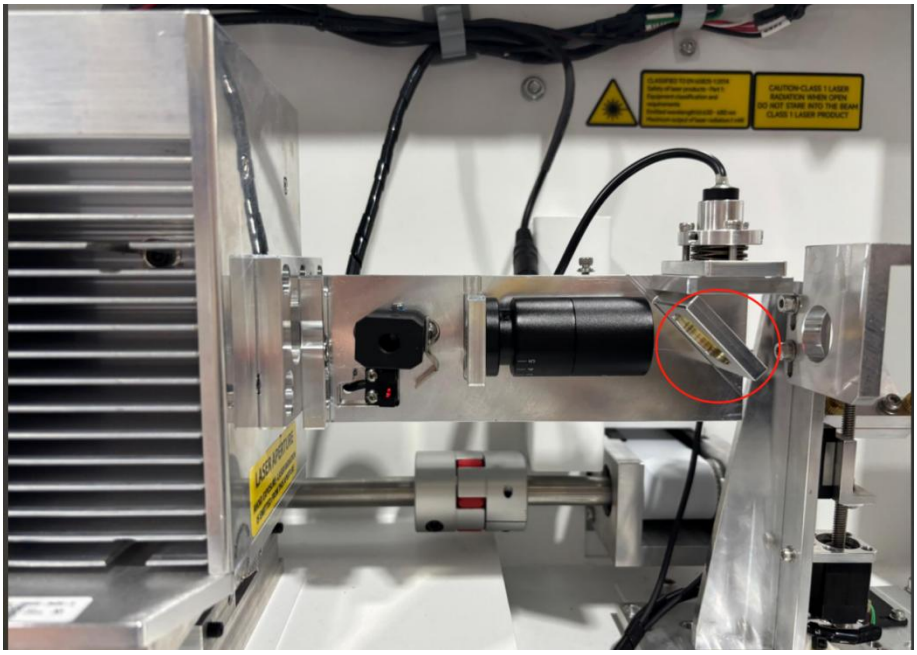
3. The mirror#3



5.1.3 Cleaning Laser Combiner

1. The laser combiner is mounted inside the dust cover, so you will need to remove the dust cover before you can find it.



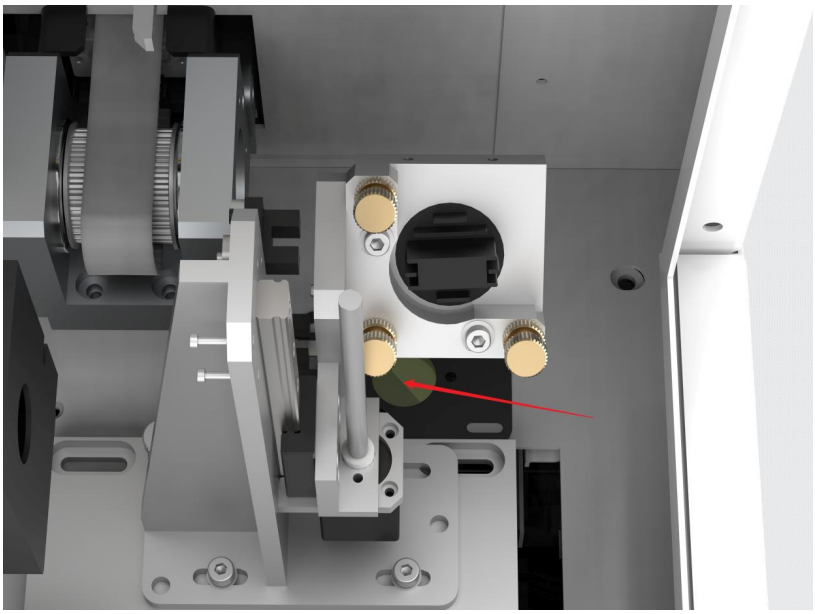


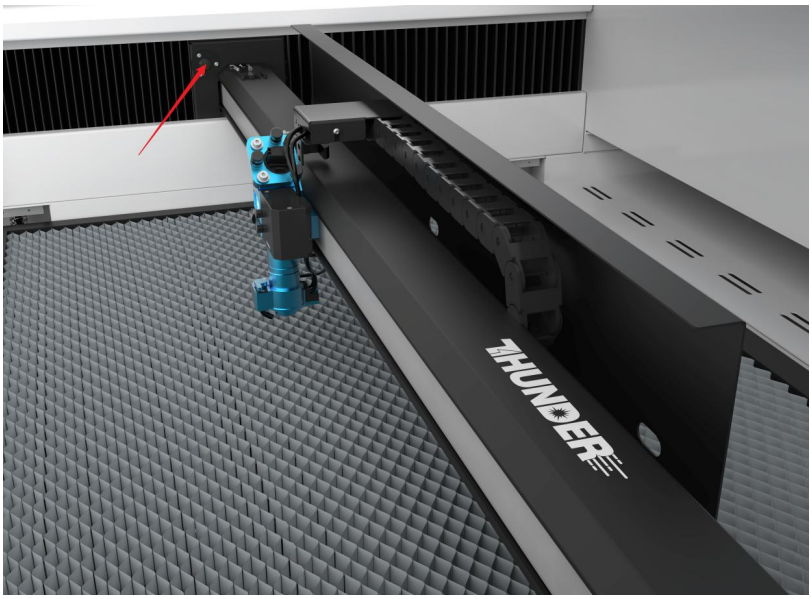
2. Remove as much coarse dust as possible by blowing air onto the lens surface.
3. Inspect the surface and clean the laser combiner with lens cleaning solution and a cotton swab if necessary.
4. Apply some lens cleaning fluid to one side of the swab. Let the liquid work for about a minute, and then gently wipe with a cleaning swab dipped in the lens cleaning fluid.
5. Finally, dry this side of the laser combiner with a dry cleaning swab and repeat the cleaning process on the other side of the lens. Do not reuse the cleaning swab. Dust accumulated on the cleaning swab may scratch the surface of the lens.
6. Check the laser combiner. If dirt is still present, repeat the cleaning process until the lens is clean.
7. Reinstall the dust cover back on after completing the cleaning.

5.1.4 Cleaning Window Lens

The window lens is a key protective component in the laser optical path. Contamination such as dirt, oil, or dust on its surface will directly reduce the laser energy transmission efficiency, affecting cutting/engraving quality. In severe cases, it may even cause lens damage due to local overheating. Therefore, regular cleaning of the window lens is critical.

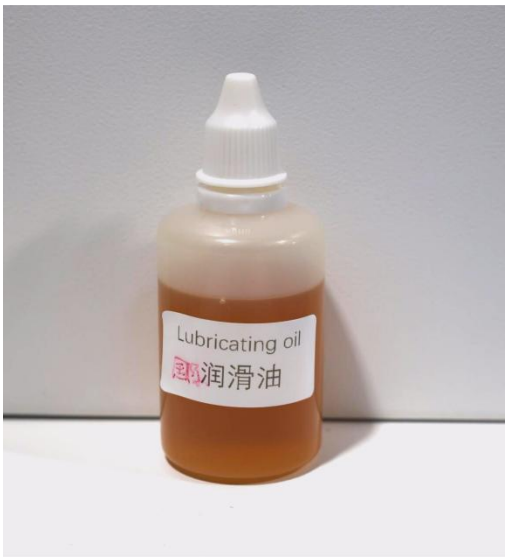
Before cleaning, always turn off the machine power. Use a lint-free cloth or cotton swab to gently wipe the lens surface. For stubborn stains, use a cotton swab dipped in alcohol to spot-clean the affected area.





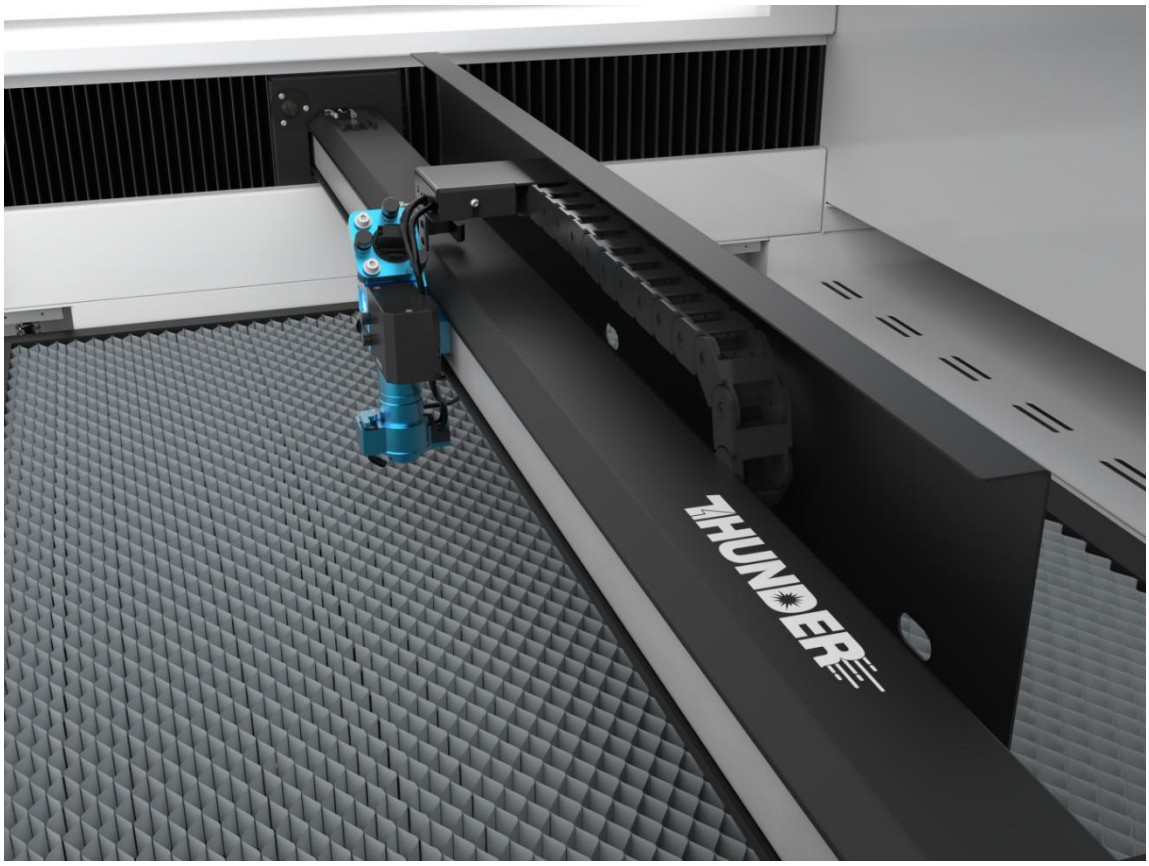
5.2 Maintain the Screw of the Dual laser Source Switching Motor

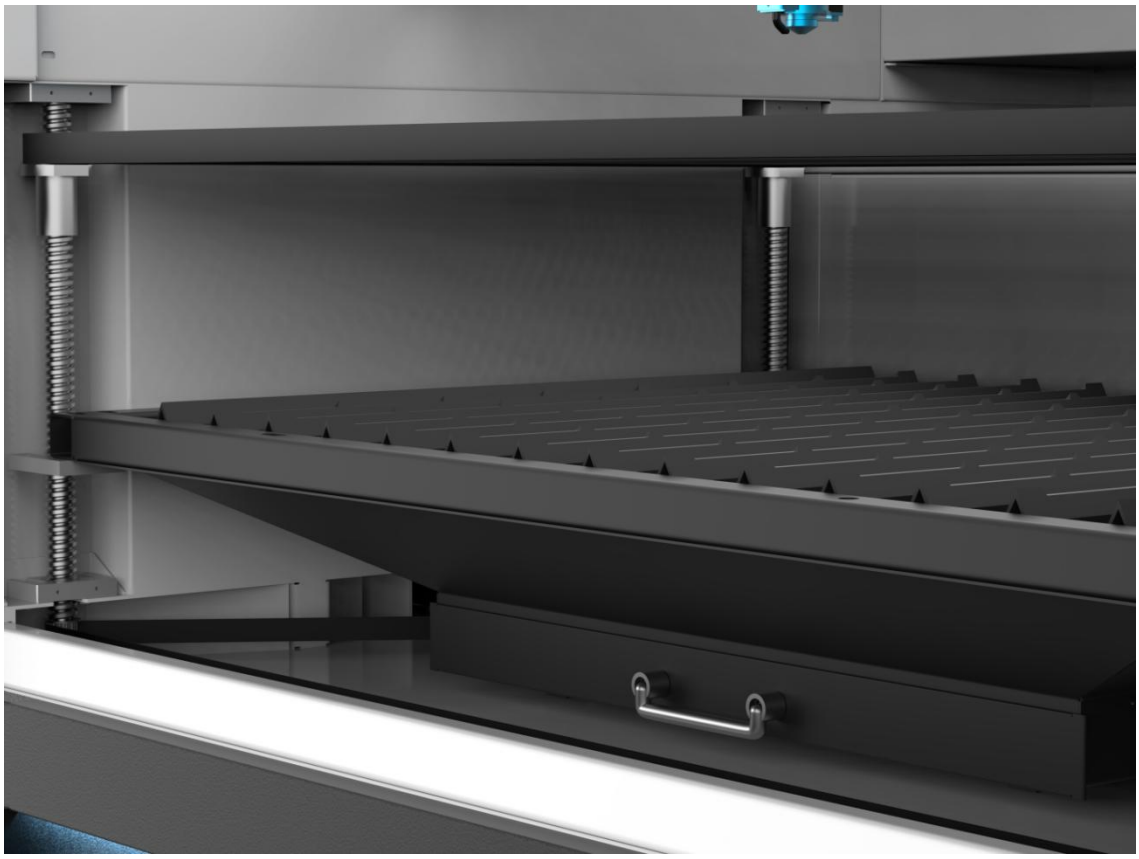
It is suggested to add lubricant oil (or Rust Preventative Grease) to the screws of the Dual laser Source Switching Module (Fiber Mirror 1 Mount) at least every two weeks.



Please note that insufficient lubrication may cause the screw.Stuck during operation and not successfully switch the dual laser source function.

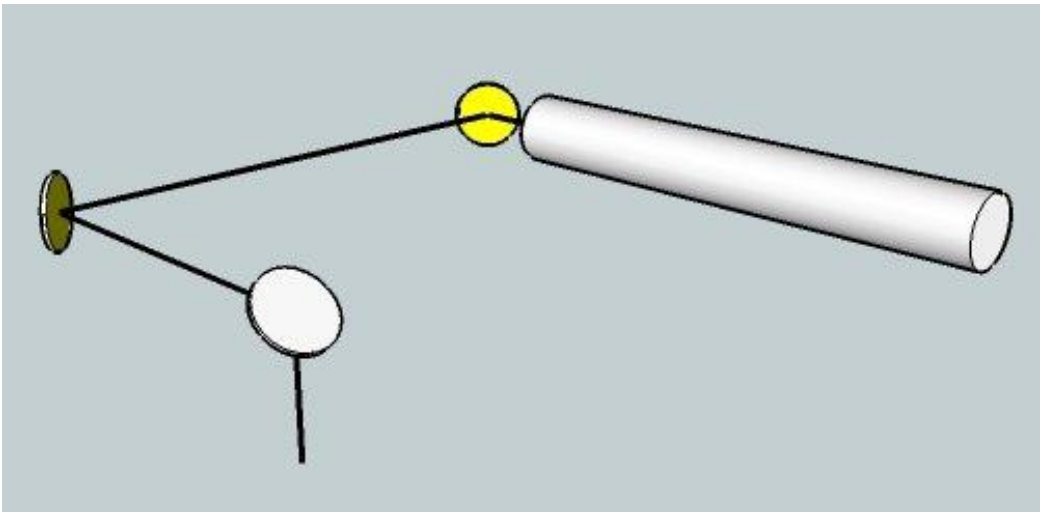
5.3 Maintain the X/Y/Z Rails





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

5.4 Check the Beam Path



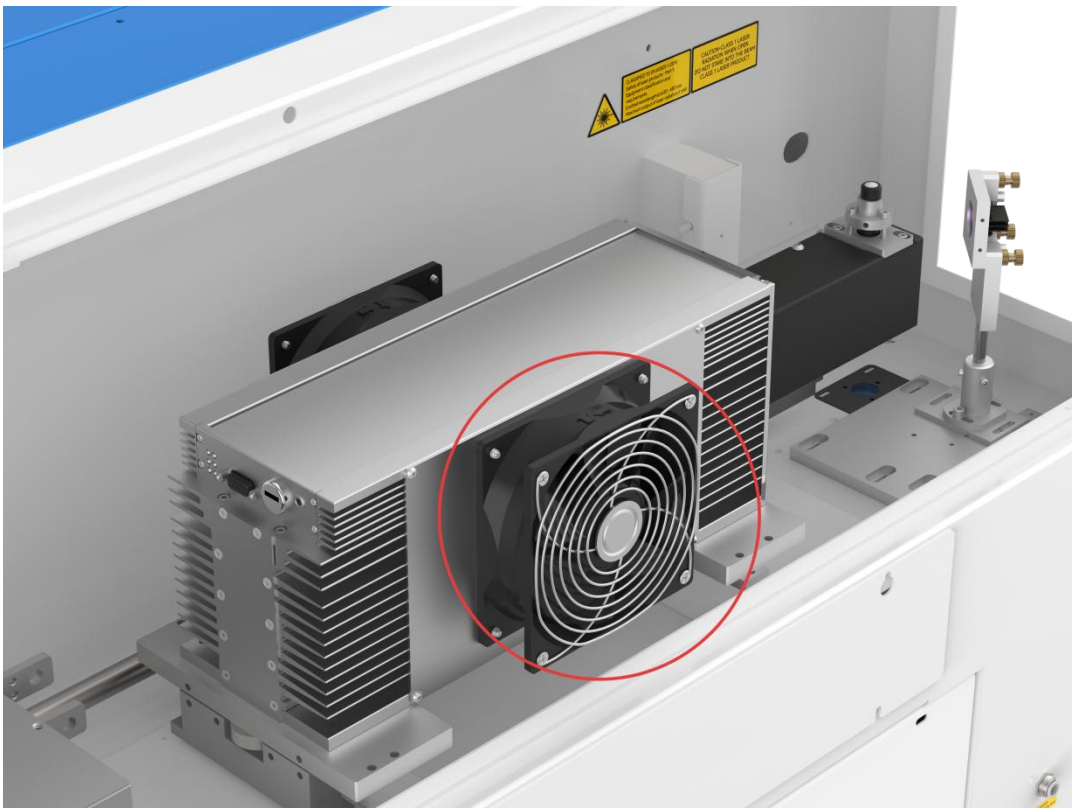
After being used for a long time, the beam path might be deflective. This will reduce the efficient of the laser beam or even cause no laser beam. At this moment, you will need to re-adjust the beam path again.
Here is a video about Titan(Pro) beam alignment for your reference:
How to adjust the laser beam path

5.5 Cleaning the cooling system

For the RF and Fiber laser source, providing a good heat dissipation environment for it determines the stability of its beam output, so it is necessary to regularly clean the dust on the cooling fan of the tube and the machine.
It is suggested to use an air blow gun to blow the dust away, as shown in the pictures:
1. Use the air blow gun to blow away the dust on the fan inside and dust from the sponge and mesh.

2. Use the air blow gun to blow the dust on the Laser tube.

Clean the RF tube.



If you have a TITAN PRO SERIES, it is equipped with an dual laser source, so you will also need to clean the Fiber laser source.

5.6 Maintenance Plan

To help you get the most out of your Thunder Laser machine, we have outlined a simple yet effective maintenance plan below. By dedicating just a few minutes each week or each month to these tasks, you can keep your system running smoothly and efficiently for years to come.

Maintenance Topic	Minimum Frequency
Focus Lens Cleaning	Daily (or as needed)
Mirrors Cleaning	Weekly (or as needed)
Beam Combiner	Weekly
Machine (Honeycomb, panels etc.)	Weekly
Lubrication for Rails and Screw Rods	Monthly
Laser Beam Path	Monthly
Exhaust Fan and Exhaust Air Path	Monthly
Laser Tube Cooling Air Filters	Monthly

THE END