AEON
LASER

REDLINE SERIES

MIRAS User Manual

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Preface

Thank you for choosing AEON Lasers . This user manual is designed to guide you step–by–step through the proper and efficient use of our laser engraving and cutting machine. It also offers essential maintenance tips to maximize your machine's performance. The manual is organized into six comprehensive chapters, covering general machine information, safety precautions, installation instructions, operational guidelines, maintenance principles, & vital troubleshooting methods. To enhance your understanding, we have included many real–world photographs throughout the manual.

Designated

The AEON laser system is designed for engraving and cutting signs, engraving stamps, and similar applications. It can process a wide variety of materials, including rubber, acrylic, coated metal, tin, special steel, anodized aluminum, cork, cardboard, glass, leather, marble, several plastics, and wood.

- The engraving process must only be performed with a perfectly adjusted machine.
- For cutting applications, using the blade cutting table is absolutely necessary.
- Use of the system in other areas other than cutting or engraving is against its designated purpose. The manufacturer does not assume liability for damage to persons and/or equipment resulting from such use.
- The system must only be operated, maintained, and repaired by personnel who are familiar with its designated use and the associated dangers.
- 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.
- Caution is required 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 such defects are not covered by warranty.

Caution:

Before installing and operating the machine, please read and follow this manual carefully. Failure to adhere to the instructions may result in damage to persons and/or property. The system must be operated only with equipment and spare parts supplied or listed in the spare parts and consumables lists. Any auxiliary equipment must be properly adjusted to the base machine. For any queries, please contact your dealer or the manufacturer.

It is crucial that the installation of each system meets the specified requirements and aligns with the installation guidelines of AEON Laser. Failure to follow these instructions may result in improper machine operation, poor performance, reduced lifespan, increased maintenance costs, and potential machine damage. This note is intended to emphasize the importance of following the specific installation requirements. We urge every customer to understand these guidelines before installation and use. If you encounter any installation issues, please contact our technical staff or customer service team.

Disposal of the machine

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.

You can also subscribe to our YouTube channel here: AEON Laser Official (youtube) for video tutorials and instructions. Join our Facebook community: AEON Laser Global (Facebook) to connect with other owners and get inspirational ideas on how to maximize your machine's use.

AEON Laser warmly welcomes your valuable comments and suggestions, and we will greatly appreciative!

Content

Chapter I Safety

1.1 General Safety Information

Working Principle of a CO2 Laser

LASER stands for Light Amplification by Stimulated Emission of Radiation. A CO2 laser operates by electrically stimulating the molecules within a carbon dioxide gas mixture. When focused through a lens, this highly intense and invisible beam can vaporize many materials. Depending on the speed and intensity of the projected beam, a CO2 laser can be used to engrave or cut through a wide variety of materials.

Safety Lock System

The laser system is equipped with a safety interlock system that utilizes magnetic sensors located on the bottom right corner of the laser working window. These magnetic sensors will deactivate the laser when the acrylic lid of the machine is open. Once the lid is closed, the laser will reconnect.

⚠ WARNING

- DO NOT operate the laser system if any component of the safety system is malfunctioning.
- DO NOT attempt to remove or modify any component of the safety interlock system.

1.2 Safety Notes

- This laser engraving system features a class 4 carbon dioxide (CO2) laser that emits intense and invisible laser radiation. Without proper safety precautions, direct or even diffuse reflected radiation can be hazardous.
- Exposure to laser radiation without safety measures presents the following risks:
  Eyes: Burns to the cornea
  Skin: Burns
  Clothing: Danger of fire
- The machine contains high voltage and other potential hazards. Keep it away from individuals who lack knowledge of the equipment.
- All personnel involved in the installation, setup, operation, maintenance, and repair of the machine must have read and understood the Operation Manual, especially the "Safety" section.
- The machine must only be operated by trained and authorized personnel. Competence for different tasks must be clearly defined and adhered to, particularly for electrical work, which should be performed by qualified personnel. Always follow the switch-off procedures outlined in the Operation Manual for installation, setup, startup, operation, modifications, maintenance, inspection, and repair.

- Operators must inspect the machine for visible damage and defects before starting work and report any changes or issues affecting safety immediately.
- Preparation, retooling, workpiece changes, maintenance, and repairs must be performed with the equipment turned off and by trained personnel.
- Unauthorized modifications or changes to the machine are prohibited for safety reasons. Such alterations can compromise safety and are not allowed.
- Place CO2 fire extinguishers near the laser and avoid storing flammable materials inside the device. Remove any leftover material to prevent fire hazards.
- Since the laser emits invisible radiation, safety glasses must be worn during operation.
- Do not disable limit switches or safety features, as this can invalidate warranties and pose risks to both the user and the machine.
- Never leave the laser unattended while it is in operation. Small scraps can ignite, potentially causing damage if not monitored.
- Before processing materials, verify whether harmful substances could be generated and ensure that the exhaust system's filter equipment is suitable. It is the user's responsibility to adhere to national and regional limits for dust, fogs, and gases when selecting filters and exhaust systems. Ensure that maximum workplace concentration values are not exceeded.
- Keep the machine in a dry environment, free from pollution, shocks, strong electrical currents, and strong magnetic fields. The ideal temperature range is 5–40°C, and humidity should be 5–95% (without condensation).
- Position the machine away from sensitive EMI equipment, as it can cause electromagnetic interference.
- Do not operate the machine when the power supply voltage is unstable or mismatched.

1.3 Safety Materials

Laser machines use high heat to cut or etch materials. Some materials respond well to this method, while others do not. It's crucial to understand the material you are working with, as some, like PVC, can be easily cut but release harmful chlorine gas that can be dangerous to both humans and the machine. Below is a guide to common materials. New materials are developed frequently, so if you are unsure about a material's compatibility with laser processing, please contact us for assistance in identifying its properties and determining if it is safe and feasible to process with a laser machine.

Plastics:

- ABS (Acrylonitrile Butadiene Styrene)----good for engraving and cutting
- Acrylic (also known as Plexiglas, Lucite, PMMA)----good for engraving and cutting
- Delrin(POM, Acetal)---- good for engraving and cutting
- High-Density Polyethylene (HDPE) ---- Melts poorly, not very good for cutting or engraving.
- Kapton Tape (Polyimide)---good to use
- Mylar (Polyester)---good to use
- Nylon — Melts poorly, not recommend
- PETG (Polyethylene Terephthalate Glycol)----good to use
- Polyethylene (PE) — Melts poorly, not recommend
- Polypropylene (PP)— Melts somewhat, not recommend

Styrene

Two-tone acrylic-top color different than core material, usually for custom instrumentation panels, signs and plaques.good for laser processing

Foam

Depron foam-often used for RC planes, good for laser processing

EPM

Gator foam- foam core gets burned and eaten away compared to the top and bottom hard shell

Other:

- Cloths(leather, suede, felt, hemp, cotton)
- Papers
- Rubbers(only if they do not contain chlorine Teflon(PTFE, Polytetrafluoroethylene))
- Woods(MDF, balsa, birch, poplar, red oak, cherry, holly, etc)

Materials that can't or should not be cut

- Metals
- Polycarbonate(PC, Lexan)due to the fumes
- Any materials containing chlorine
  a. PVC(Cintra)-contains chlorine
  b. Vinyl- contains chlorine

High pressure materials include all the above guidelines and as listed:

- Stainless steel: up to 18 gauge
- Mild steel: up to 18 gauge
- Thicker and Denser woods

Below is a chart of some frequently processed materials by CO2 laser machines:

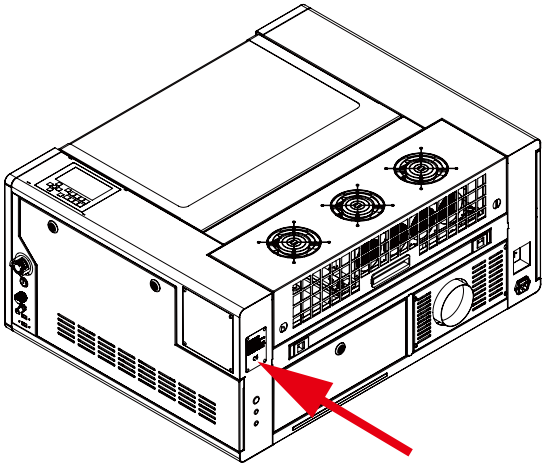
Material		Engraving	Cutting	Marking
Composite Material	Label Film		●	●
	Brick Tile	●		●
	Carbon Fiber/Glass Fiber		●	●
	Ceramics	●		●
	Pearl Foam Board	●	●	
Natural Inorganic Materials	Gemstones			●
	Shell		●	
	Stone	●		●
	Glass	●		●
Natural Organic Materials	Leather		●	●
	Wood	●	●	●
	Elastomer Rubber/Silicone	●	●	●
Foam	EVA/Silicone	●	●	
	Ceramic/Metal Foam	●		●
Paper Base		●	●	●
Plastic	PMMA	●	●	●
	ABS	●	●	●
	PDMS	●	●	●
	PEEK	●	●	●
	PLA	●	●	
	PET		●	●
	POM		●	●
	PC/PA/PE/PP		●	●
Fabric/Textile Fabric	Cotton	●	●	●
	Felt	●	●	●
	Denim	●	●	●
	Cashmere		●	
	Nylon Fabric		●	
	Polyester		●	
	Aramid Fiber		●	
Metal	Brass			●
	Stainless Steel			●
	Titanium			●
	Coated Metal			●
	Anodized Aluminum			●

* CO2 lasers can engrave or mark coated metal. For bare metal, it is not recommended, as the laser light might reflect back into the laser path, causing permanent damage to the optical parts. However, there are CO2 laser marking solvents available on the market. After applying these solvents, it is safe to use a CO2 laser for marking

1.4 Labels

Manufacturer's Label

This label is located at the left-back side of machine. All the product information such as Serial Number, Model Numbers, Laser Power and Electric power can be found here. Before requiring any further tech support, always provide the service person with the information on this label.



Model No.	MIRA5S
Laser Power	45W
Input Voltage	220~240V 50HZ
Rated Current	10A
Rated Power	1300W
Serial Number	YZ22057W37Q037Q03
Manufactuer Date	2023/02/22

Made In China

AEON LASER www.aeonlaser.net www.aeonlaser.com

Safety Warning Labels

AEON Laser prioritize the safe operation of our machines and are committed to creating the highest level of safety. Our machines are very safe under normal operating conditions. However, to ensure safety in case of any accident, warning labels are affixed both inside and outside the machine. Before using the machine, users should understand that wherever a warning label is affixed, extra caution is required. Our labeling system includes symbols and text. The following symbols are used to attract users' attention and help them understand the meaning of the texts:

Warning:

This symbol indicates the laser path.Pay attention to the possible laser beam, and take extra caution in this area when conducting maintenance

Warning:

This symbol indicates a potential risk of electrical shock in this area. Be cautious of electrical hazards when repairing or maintaining the machine in this area.

Warning:

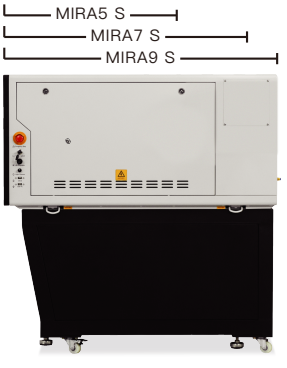
This symbol indicates potential laser radiation in this area. Take extra care when engraving and avoid direct exposure to the visible or invisible beam. Do not stare into the laser beam while the machine is operating.

Warning:

This label indicates the presence of fire hazards. Do not leave the machine unattended while it is operating.

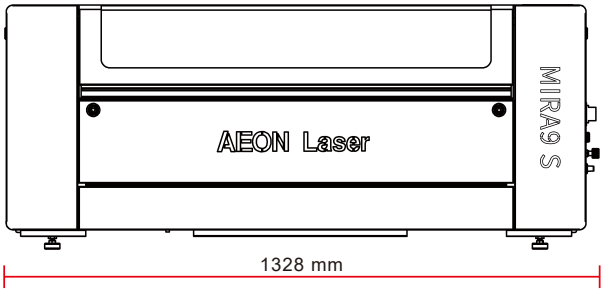
Chapter II General Information

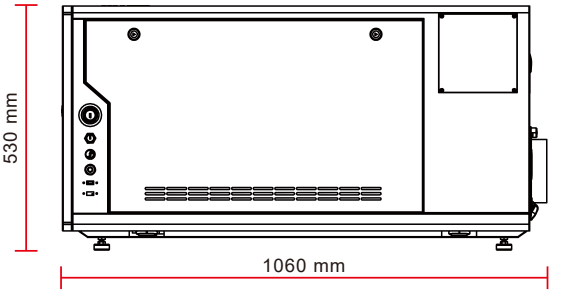
2.1 Overview of the machine

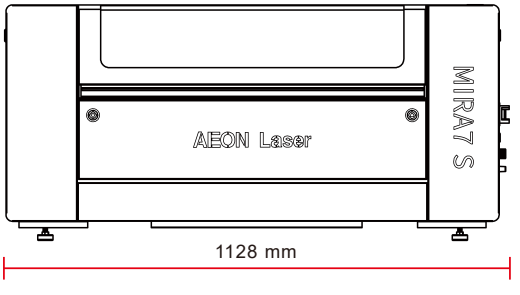


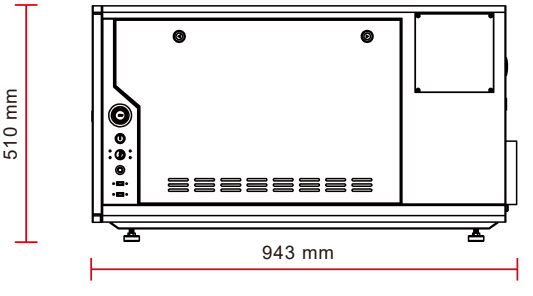
2.2Technical Parameters of the Machine

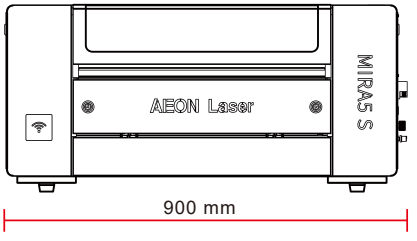
Model	MIRA5 S	MIRA7 S	MIRA9 S
X&Y Axis Working area	500*300mm	700*500mm	900x600mm
Z Axis Lifting Space	140mm	140mm	150mm
Laser Source Options	45W/60W RF30W/60W	45W/60W/80W/90W RF30W/60W	45W/60W/80W/90W/100W RF30W/60W
Machine Dimension(mm)	900x670x410	1128*943*510	1328*1060*530
Net Weight (N.W)	100KG	180KG	230KG
Package Size	1000*800*610mm	1250*1080*710mm	1440*1180*740mm
Packed Weight (G.W)	132KG	214.5KG	271KG
Voltage	110V/220V	110V/220V	110V/220V
Rated Power	630W (Laser tube excluded)	950W Laser tube excluded)	1440W (Laser tube excluded)
Max. Engraving Speed	Glass tube 1200mm/s, RF 3500mm/s		
Max Acceleration Speed	Glass Tube 5G / RF Tube 8G		
Minimum Font Size	1.0x1.0mm		
Positioning Accuracy	<=0.01mm		
Max. lifting capacity	25kg		
Water Chiller(RF Tube: Air cooling)	Built-in 3000chiller	Built-in S&A 3000chiller	Built-in S&A 5000chiller
Fume Exhaust Fan	built-in inline 75w		
Air Assist	Built-in 85w		
Focus Lenses	2.0"(Standard)/1.5", 4.0" Lens(Optional)		
AutoFocus	✓		
Wifi Data Transfer	✓		
Red Dot Positioning	✓		
Camera	✓		
Worktable	Knife table+Honeycomb table		
Engraving Software	RDWorks/LightBurn(Optional)		
Compatible operating systems	Windows & Mac(lightburn)		
Compatible Software	CorelDraw/Illustrator/AutoCAD		
Graphic Format Supported	AI/PDF/DXF/PLT/SVG/DXF//BMP/JPEG/PNG/GIF/TIFF		
Support Table	Optional		
Rotary	Optional		
Air Filter	Optional		

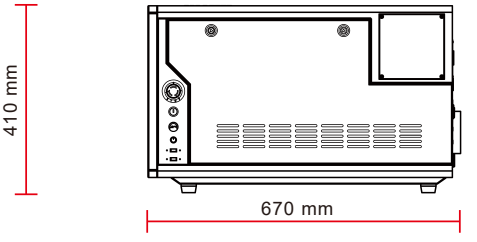

AEON Laser
MIRA9 S
1328 mm


530 mm
1060 mm


AEON Laser
MIRA7 S
1128 mm

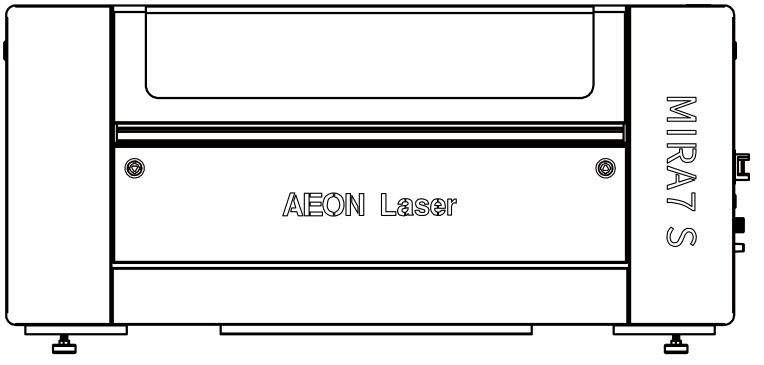

510 mm
943 mm

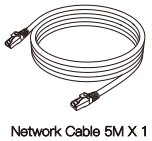

AEON Laser
MIRA5 S
900 mm

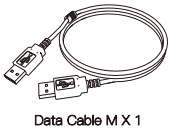

410 mm
670 mm

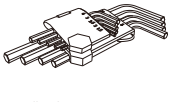
Chapter III Installation Guide

3.1 Accessories



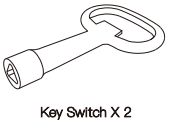

Network Cable 5M X 1

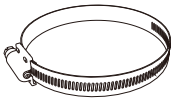

Data Cable M X 1

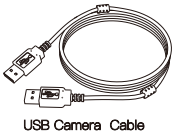

Allen key X 1

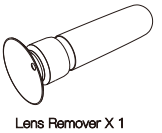

Cotton Swab X 1

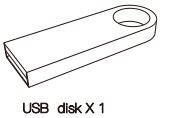

Exhaust Pipe 5M X 1

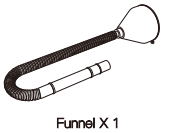

Key Switch X 2


Pipe Clamp X 2


USB Camera Cable

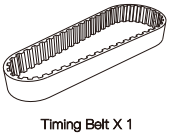

Lens Remover X 1


USB disk X 1


Funnel X 1


Rail Lubricant X 1

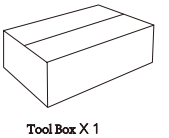

Acrylic Shooting Target X 1


Timing Belt X 1

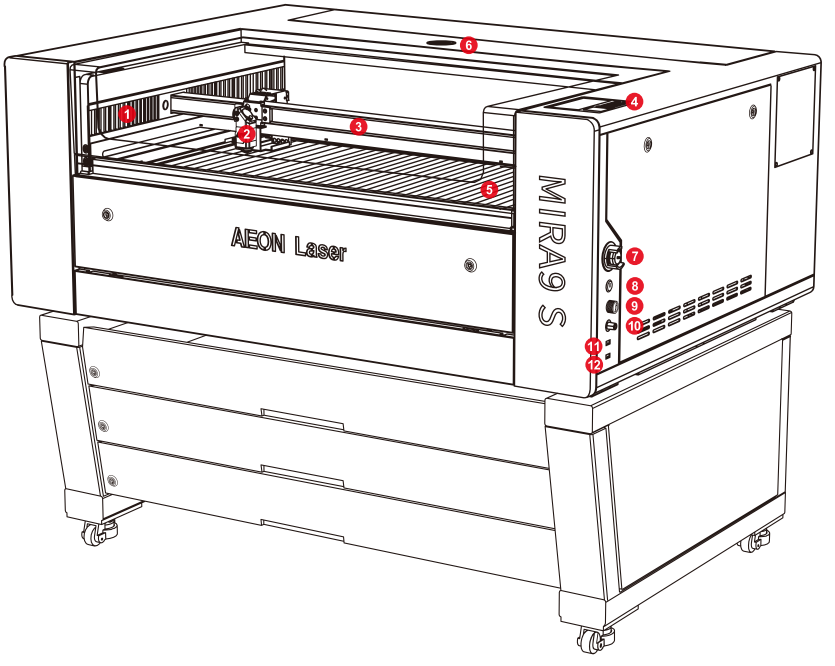
Phillips Screw X 6


Honeycomb Table X 1

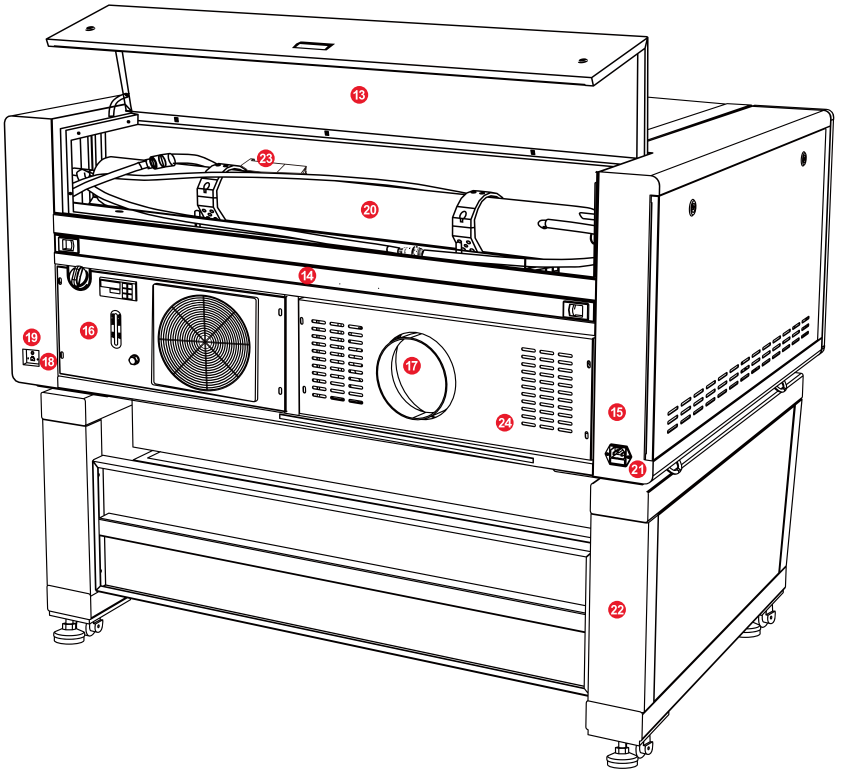

Sealing Plug X 5


Tool Box X 1

3.2 Laser Parts Overview



❶ Organ Guide rail cover Laser head
❷ Laser head
❸ Gantry
❹ Control Panel
❺ Worktable
❻ Level Gauge
❼ Emergency Stop button
❽ Key Switch
❾ Air regulator
❿ Light dimmer
⓫ Udisk interface
⓬ USB interface



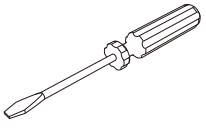
13 Laser tube service lid	14 Material Pass-through door	15 WIFI router
16 Chiller	17 Exhaust fan	18 LAN Interface
19 External air input	20 Laser tube	21 Power Input
22 Stand(Optional)	23 Synchronous Drive Shaft	24 Air pump

The laser machine consists of several key components, including the laser tube service lid, material pass-through door, and Wi-Fi router, which are essential for connectivity and access. The machine also includes a chiller, exhaust fan, and an external air input to manage temperature and airflow during operations. The laser tube and docking station, supported by a laser tube bracket, are crucial for precision cutting. Other integral parts include the air pump, level gauge, and power input, ensuring smooth operation.

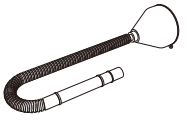
3.3 Setup and Installation Guide

This laser machine features a compact design that integrates a water cooling system, exhaust fan, and air assist system, simplifying the setup process. Installation is straightforward and does not require a separate water bucket or air pump. You can get started with just five easy steps.

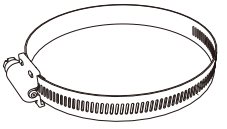
Perpetration



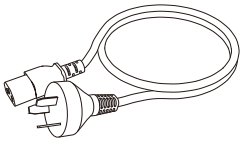
flat head screwdriver



Funnel

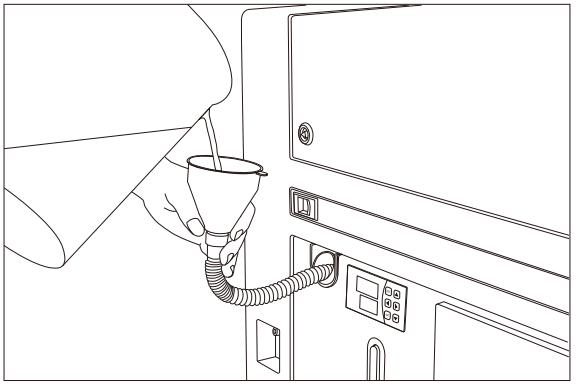


Pipe Clamp



Power cord

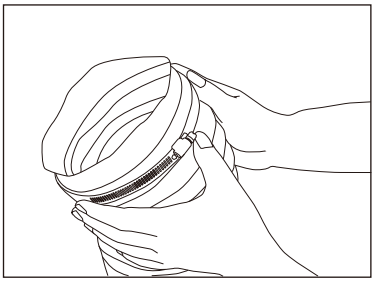
1. Add Water to the Chiller

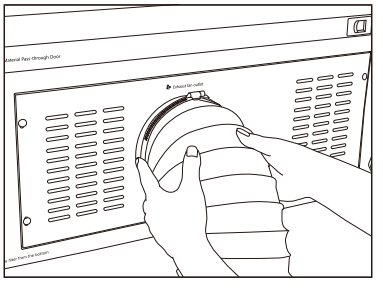


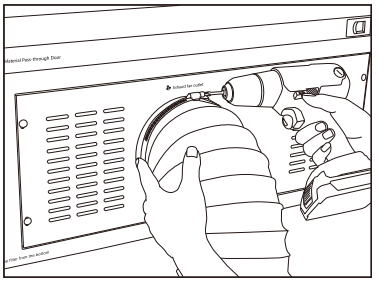
Regular Monitoring:Check the water level in the chiller regularly to ensure it remains in the appropriate range.
Normal Level Requirement: The water level must be at or above the green “NORMAL” zone. If the water level falls below the green “NORMAL” zone and reaches the red “ALARM” zone, refill the water immediately.
Refilling: When refilling, ensure that the water level reaches the yellow “FULL” zone but does not exceed it.
Warning:Operating the machine with water in the “ALARM” zone can cause overheating and potential damage to the laser and chiller components. Always maintain the water level within the green ”NORMAL” range for optimal performance.

2. Install the Exhaust Pipe

Screw in the exhaust pipe fixture, fasten the rings after you put on the pipe on the fixture.
Use a screwdriver to loosen the screw of the exhaust pipe clamp, put the exhaust pipe clamp onto the exhaust pipe, then put the exhaust pipe onto the outlet of the exhaust fan, and tighten the screw of the exhaust pipe clamp. Finally, lead the other end of the pipe outside your windows or connect with your house ventilation
Note: The suggested length of the exhaust pipe is 4Meters, if your distance is longer than 4 meters, you will need to add another exhaust fan, or the exhaust of the machine will not be good enough.



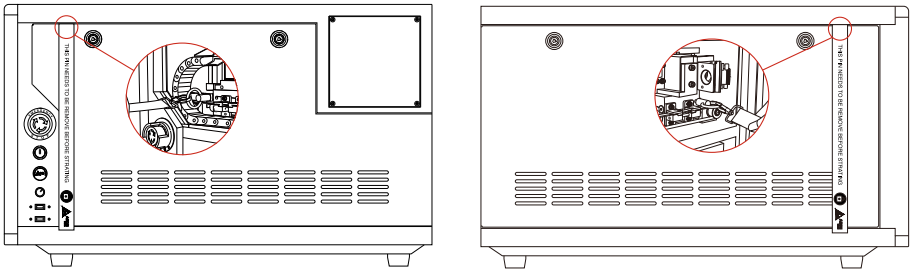




3. Remove the Fixing Latches

There are two fixing latches fixing the X and Y axis of the machine. It is a protective latch to ensure the axis will not move during transportation. Also, it is a positing latch as well. If the engineer needed to remove the axis for repairing, they could find the original postilion of the axis very easy by insert these latches. And this will make the axis squared quite fast.

Open the right and left side panel of the machine, the right latch is located nearby the motor. And the left latch is located nearby the mirror holder.

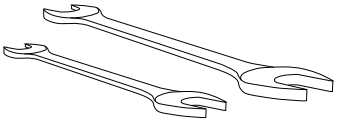


4. Level the machine

Proper leveling is essential; without it, the axles may suffer increased friction and distortion, significantly shortening the lifespan of the rails. Each Redline series machine is equipped with a bullseye leveling gauge, which makes leveling the machine much easier.

Leveling the Redline MIRA S on homemade stand.

Preparations:

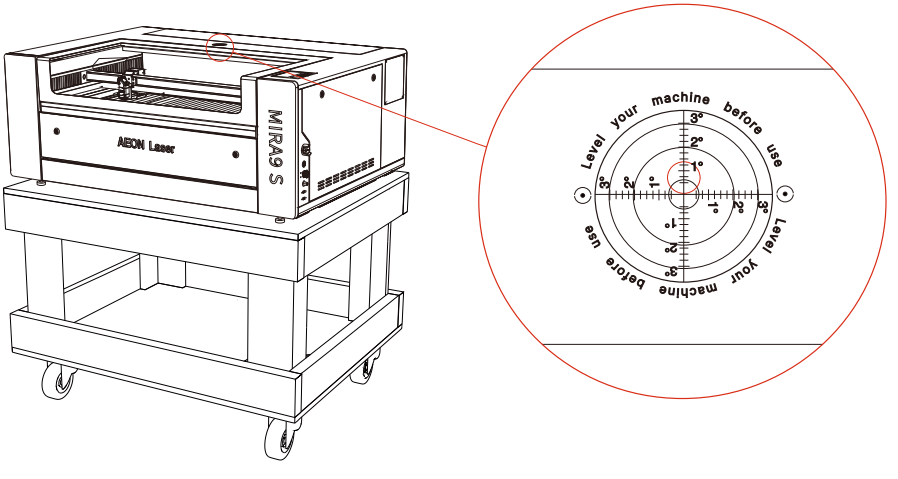


Open-ended Spanner 12-14 ; Open-ended Spanner 17-19

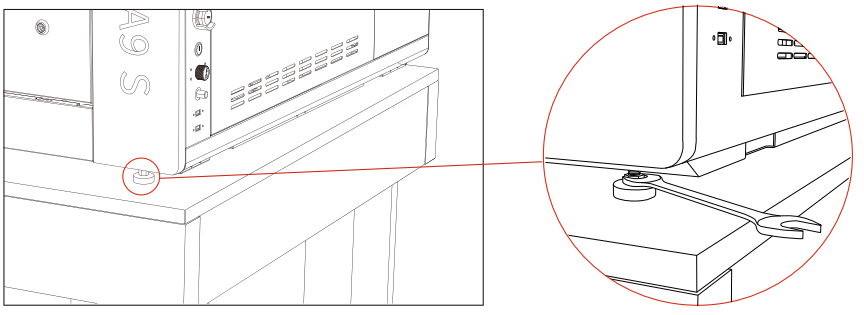
Leveling Your Machine on Your Own Stand

Put the machine on the homemade stand.

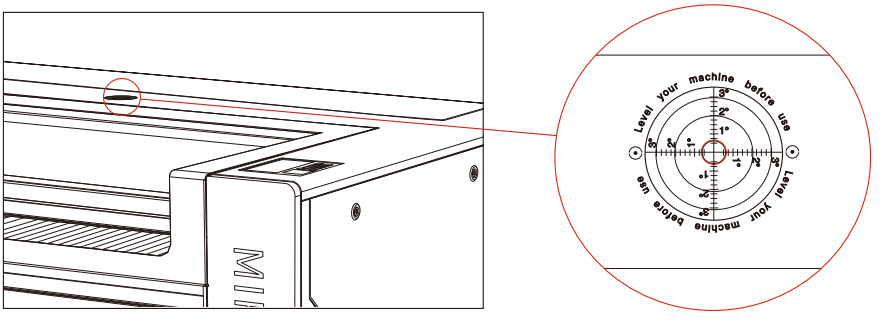
Check the leveling gauge to ensure the machine is properly leveled. If the bubble is positioned towards the upper side, use an open-ended spanner to slightly raise the back feet of the machine for adjustment.



After making the adjustment, check the leveling gauge again to see if the bubble moves to the center. If it's centered, the machine is properly leveled.

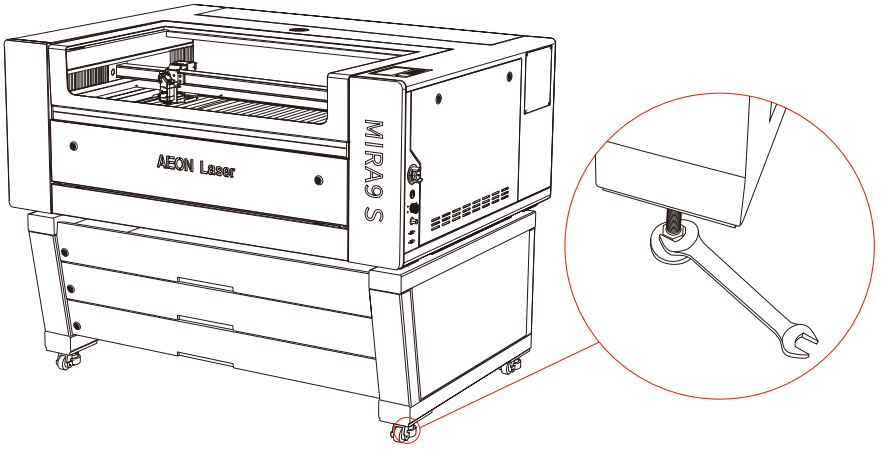


The bubble position indicates the lower side of the machine. If the bubble moves to the left, adjust the left feet of the machine to make them slightly higher. If the bubble moves to the right, adjust the right feet of the machine to make them higher.

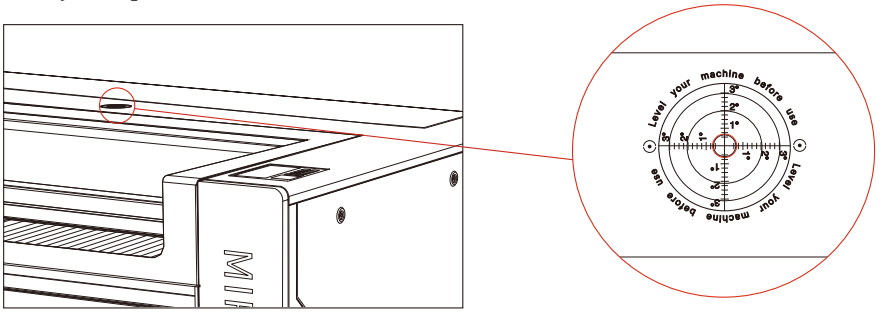


Leveling Your Machine on AEON Laser Stand.

When using the stand from AEON Laser, place the machine on the stand so that the feet fit into the holes on the stand. Once the machine is on the stand, the feet of the machine will no longer be accessible. If the leveling gauge indicates that the machine is not level, you will need to adjust the feet of the stand instead.



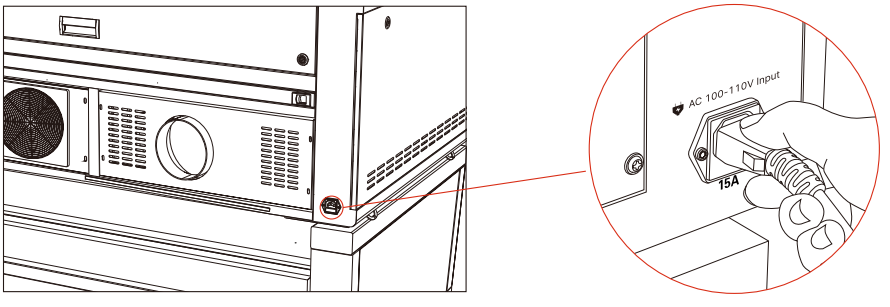
Use the same method to check the bubble in the leveling gauge. If the bubble shifts to the left, raise the left feet slightly using an open-ended spanner; if it shifts to the right, adjust the right feet. Continue adjusting until the bubble remains centered.



Connect the power

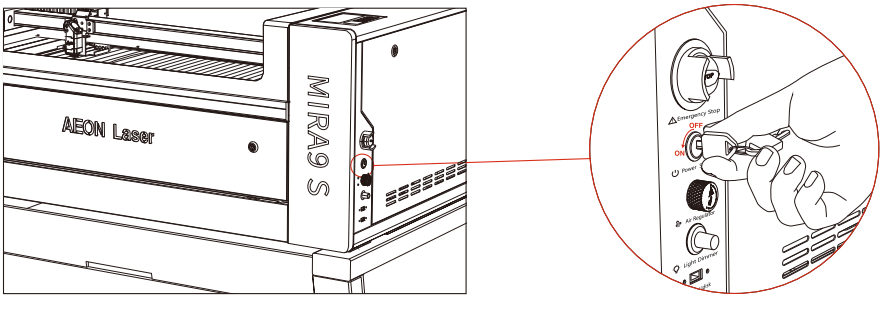
Find the power cord in the tool box, one side plug into the power inlet of the machine, the other plug into the socket of the power source.

Note: Please make sure the Ampere of your power socket is above 10A.



Turn on the machine

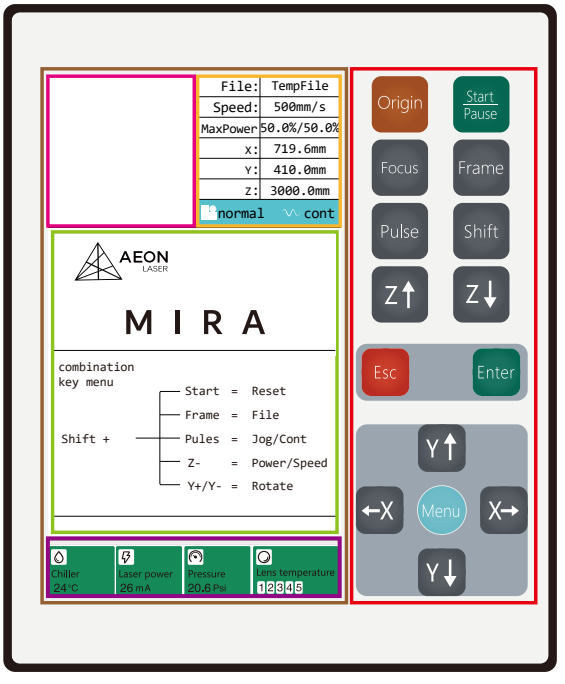
Turn the key switch anti-clockwise to power on the machine. theLaser head will move back to its default origin point. During the reset, do not perform any operations. A beep will sound once the reset is complete.



Note: For first time installation, after the machine was turned on, please do not operate the machine immediately. Wait one or two minutes to let the water cooling system fill laser tube fully. You could open the back lid to check if the laser tube is full of water. Then you could start firing the laser.

4.1 Overview of the keys on the control panel

After turn on the machine, the control panel will be on. You could see the main interface as below:



- Keypad operating area
- TFT LCD display area
  - Layer display area
  - Processing status display area
  - Parameter setting menu area \preview display area
  - Machine status display area

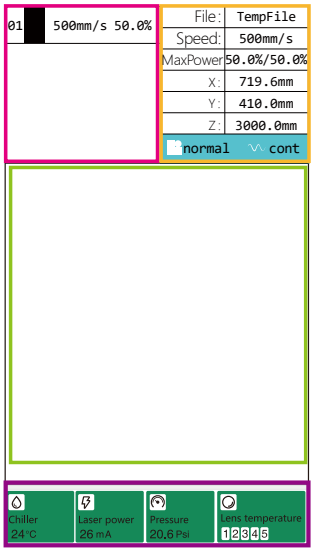
Display Function Description

Layer display area: Display the layer parameters of the current file or preview file, the parameters from left to right are: layer number, color, speed, maximum power; In the file management state, the graphic preview of the selected file is displayed. During the operation of the panel, the operation prompts and command execution status of the machine are displayed.

Processing status display area: display the file name, speed and maximum laser power output percentage; the coordinate value of the current position of the laser head; the intermittent or continuous motion status.

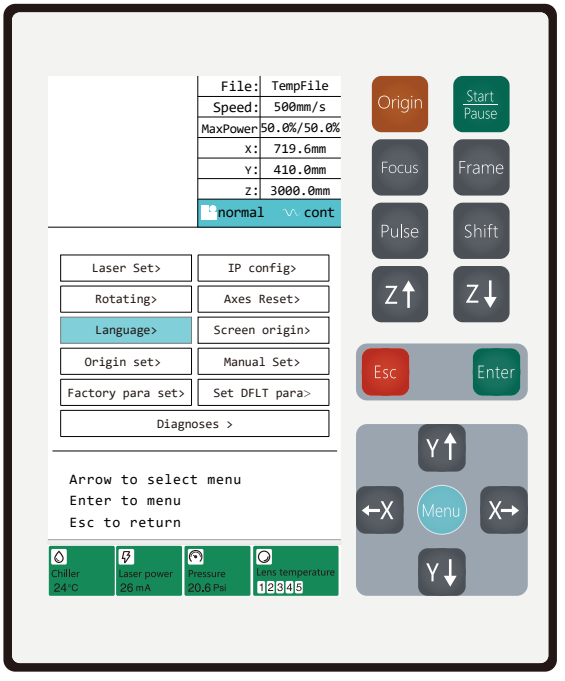
Parameter setting menu area\preview display area: Display the settings and prompts of all parameter control menus, portray the processing file image during processing.

Machine status display area: display the real-time status of equipment: progress bar, water temperature, power voltage, and communication connection status.



Overview of the Keys on the Control Panel

Menu : Main menu key. Press this key, it will return to the main menu interface. This menu key also makes the cursor move down to select the menu.



Esc :Esc Key. Press this key to return to the previous interface and cancel the current operation..

Enter : Confirm key. Used to confirm a setting. Usually used with other keys.

←X X→ : Movement and selection key. Press ←X under the main interface, the laser head will move to left, press X→ , the laser head will move to right. Under the menu selection interface, this key will make the cursor move to left or right. Press Enter to confirm a selection. Under the parameter setting interface, press these two keys to move the cursor left or right when changing the parameter.

Y↑ Y↓ : Movement and selection key. Press Y↑ under the main interface, the laser head will move forward along Y axis direction. Press Y↓ , the laser head will move backward along Y axis.

Under the menu selection interface, this key will make the cursor move to up or down. Press Enter to confirm a selection . Under the parameter setting interface, these two keys will add or deduct value of a number when changing the parameter.

Z↑ Z↓ : Z axis movement key. Press Z↑ key once to lift the worktable slightly, or hold it to lift continuously; the Z↓ performs the same operation in the opposite direction.

Pulse : Pulse key. Press this key under main interface(when the lid of the machine is closed), it will fire the laser once. Holding the key will fire the laser continuously.

Shift : Switch key. Usually used with other keys together to call out some shortcut functions or switch directly to other functions.

Focus : Autofocus key. Press this key, The worktable will lift to touch the laser head and stay at the focus point.

Frame : Frame key. Before starting a job, press this key, the laser head will move to outline the general size of the engraving or cutting area. Preview the job to make sure it is within the size of material to be processed.

Origin : Origin Key.Press this key to set the relative origin of the job. Laser head will start from this point.

Start Pause : Start and Pause key. Press this key to start or Pause a job.

Combo keys

Shift + Start Pause = Rest : Press these two keys together, it will reset the system. This worked like reboot the operation system.

Shift + Frame = File : Call out the file selection interface, select the job files saved in the controller to start the job or change the processing parameters(See more on page..... for details)

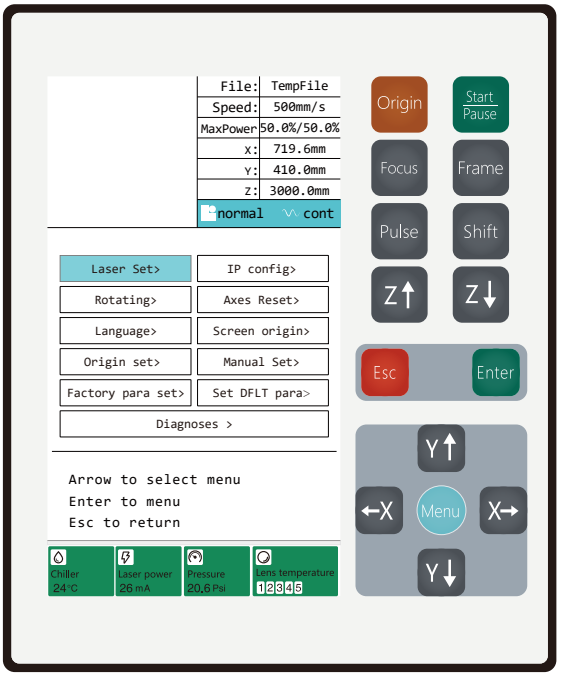
Shift + Pulse = Jog/Cont : Press these two keys together, will switch the mode of the laser head movement. Jog mode will move the laser head certain distance each time(usually press one time will move the laser head 1mm for accurate positioning). Continuous mode will move the laser head a long distance each time until you release the button (See more on page .....)

Shift + Z↓ = Power/Speed : Press these two keys together, will enter into power and speed setting. Speed refers to the speed to move the laser head manually by pressing the Arrow key. Max and Min power is to set the pulse power of the laser tube.

Shift + Y↑ / Y↓ = Rotate : Rotate your rotary in Y↑ / Y↓ direction.

4.2. Overview of the Main Menu Interface

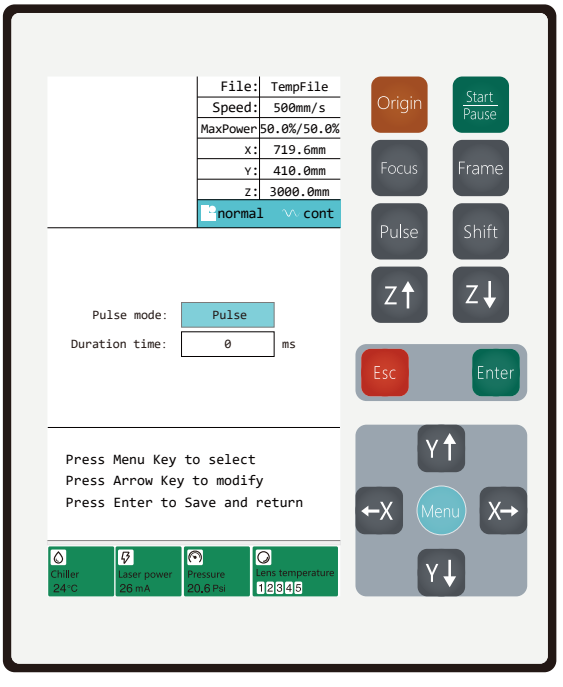
When press the Menu key , the screen will show as illustrated below:



This main menu contains most of the functions of the control panel. Press ←X X→ or Y↑ Y↓ to move the cursor to select the menu. Or you could press menu keys to move the down the cursor to select also. Once select one function, you could press Enter to open the detail setting interface of this function. Each function will be explained here in detail.

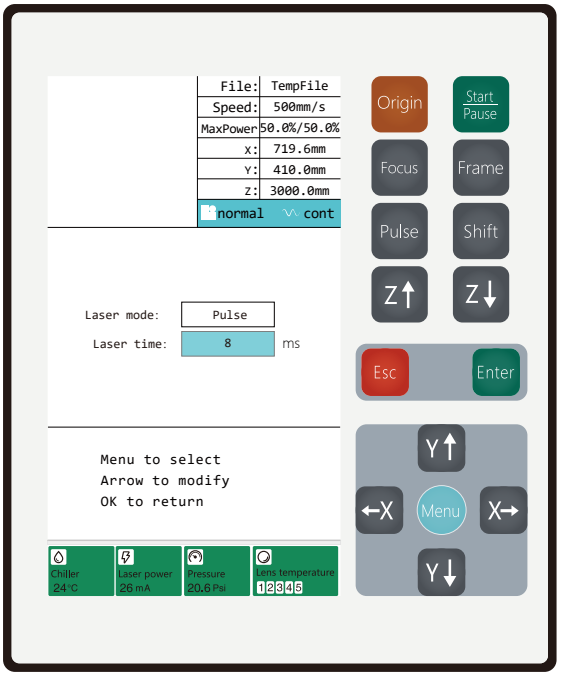
Pulse Mode and Duration Setting

Press the Menu key to enter the main menu, then select “Pulse Setting” to Enter the pulse setting interface.



The cursor stayed on the laser mode selection in default. Press Y↑ or Y↓ to set the laser pulse mode. Under pulse mode, press the Pulse will fire the laser one time. Under Continuous mode, Press Pulse without releasing the key will continuously fire the laser. Once selected to the Pulse mode, Press Menu , the cursor will move down to Laser Pulse time setting.

It is the duration time of the pulse by one press. Press Y↑ Y↓ to increase or decrease the value. Press ←X X→ to add or reduce a digital. For example. If there is only one digital “8”, you could press X→ the value will be “80”, If you press ←X , the value will be “18”.



Note: If the pulse time is too short, the laser will not burn the material.

In Continuous Pulse mode, the pulse duration can be controlled by holding or releasing the key, without the need to set the pulse time.

Once the settings are complete, press Enter to save and return to the main Menu interface.

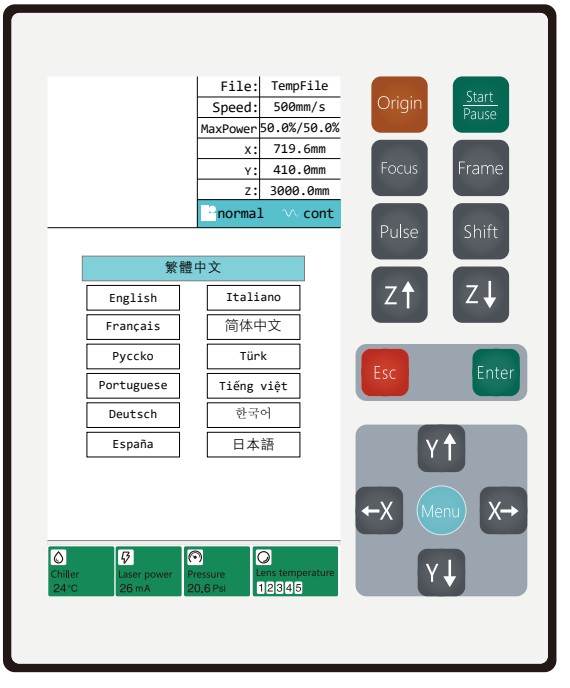
Rotary Setting

Refer to How to set up and use Rotary for more details

Set the display language of the system

Under Main menu interface. Press Y↓ ,move the cursor to Language Setting> . Then press Enter to enter into the Language settings.

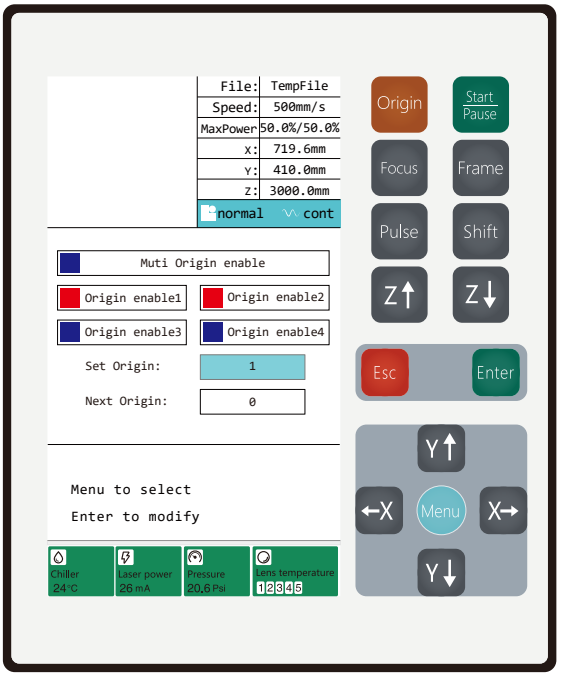
Press Y↑ Y↓ to move the cursor to the the language you want to set, press Enter to confirm the selection. Press the ESC key to return.



Origin Set——Multi-Origin Function

You can set up to four origins manually on your machine, allowing it to cycle through these origins for each new job you start. The multi-origin function is particularly useful for repetitive tasks or jobs that require different actions at various points. For example, you might want to cut a circle at Origin 1, engrave at Origin 2, and perform other tasks at Origins 3 and 4. You can have different files for each task: start File 1 at Origin 1, then select the second file to start at Origin 2, and so on. Additionally, you can disable an origin; for instance, if you disable Origin 3, the sequence will become 1, 2, and 4, repeating 1, 2, and 4 until you re-enable Origin 3.

For example, if you want to cut a square from the four corners of a workpiece, set the origins at 1, 2, 3, and 4. The machine will first cut at Origin 1, then at Origin 2, followed by Origin 3 and Origin 4, repeating the sequence. If you stop a job at Origin 3 and wish to restart at Origin 1, you must manually instruct the controller to start at Origin 1; otherwise, it will continue to the next origin in the sequence, which would be Origin 4. The number of origins you set will depend on your specific requirements. You can set up to four origins, but enabling all of them is not necessary.



If you want to set multi-origins, you have to first enable it.Under the Main Menu interface, select Origin set>, and press Enter Key, you'll enter into the multi-origin setting interface. Press Menu key to select.

Set as DFLT Para
——Set parameters as default parameters

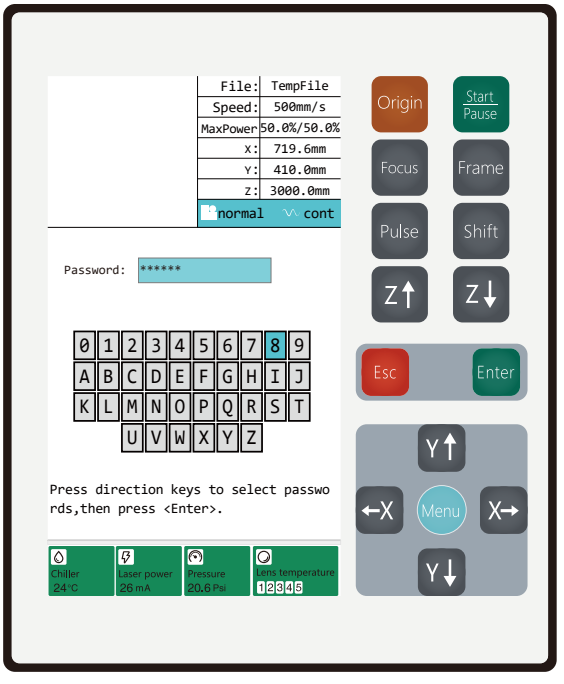
This feature is exclusive to the manufacturer and is restricted for user access. It was used for backup the factory parameter, and was locked by password once the backup finished.

Set to DFLT Para

——Restore to Default (factory)Parameter

Factory parameters enable quick recovery and troubleshooting. If you encounter unusual issues, consider resetting the machine to its factory state.

Under boot interface, press Menu key to enter into the main menu, press Y↓ to move the cursor to Set to DFLT Para>, Press Enter to confirm selection.



Use the arrow keys to navigate to the password option and press Enter to select it. Input the password 'HF8888' and confirm by pressing Enter. After a few seconds, the machine will beep, and the controller will display the message 'Parameter restoration successful'.

IP Config—Choose a Unique IP address for your laser

The machine controller operates over IPv4 (Internet Protocol Version 4), which uses unique external and local addresses within a network. It requires a static IP address, which is unchanging. The default IP address needs to be changed when connecting the machine via Ethernet or Wi-Fi.

Choosing a static IP address that doesn't interfere with other devices on your network can be challenging if you're not familiar with computer networking. For home networks, you can often pick an address that is unlikely to be already in use. In more complex network environments, such as schools or workplaces, we recommend working with your IT or networking team to select an appropriate IP address and connect your laser. This helps ensure you don't cause problems for your network infrastructure.

To begin, you'll need to find your computer's local IP address, which will look something like 192.168.1.19

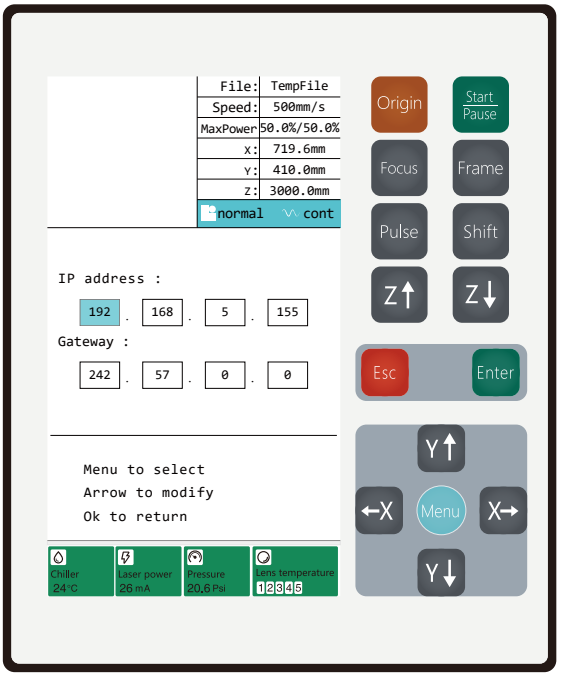
Open the command prompt (type "cmd" in the start menu or in the Win+R search box). At the command prompt, type ipconfig, and press Enter. Your results will look similar to this:

```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::12bc:f8c7:5cb3:354%3
   IPv4 Address. . . . . . . . . . . : 192.168.5.141
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.5.1
```

The line labeled IPv4 Address is what you're looking for. The first three segments must remain the same, while the last segment should be a value between 1 and 255 that isn't already in use on your network. To change the IP address, follow these steps:

In the Main Menu interface, press the X→ key to move the cursor to IP Config and then press the Enter key to enter the IP Config interface.

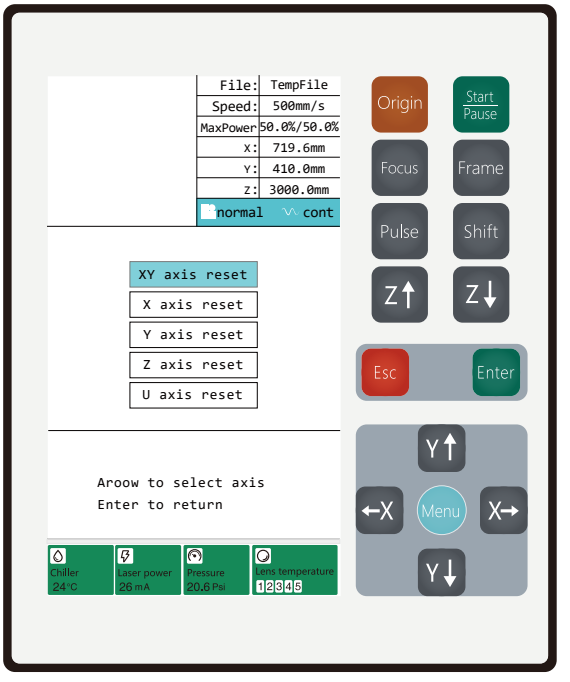


Press Menu to move the cursor to select the parameter you would like to modify, press Arrow keys to modify the parameter, ←X to add one digital, Y↑ Y↓ to increase of reduce value. and press Enter to save and return. For example, if you would like to Modify the last digital to 50, You could move the cursor on to it by pressing Menu , Then Press ←X and move the cursor to the digital "1", in this situation, you want to delete this digital, but it won't happen, you have to press Y↓ to revise the 1 to 0, and then move the cursor to right on to the last digit "5 "by pressing X→ , Then press Y↓ to revise it to 0. Then press <Enter> to save and exit.

Axes Reset—Reset the X,Y ,Z or U Axis to eliminate some errors

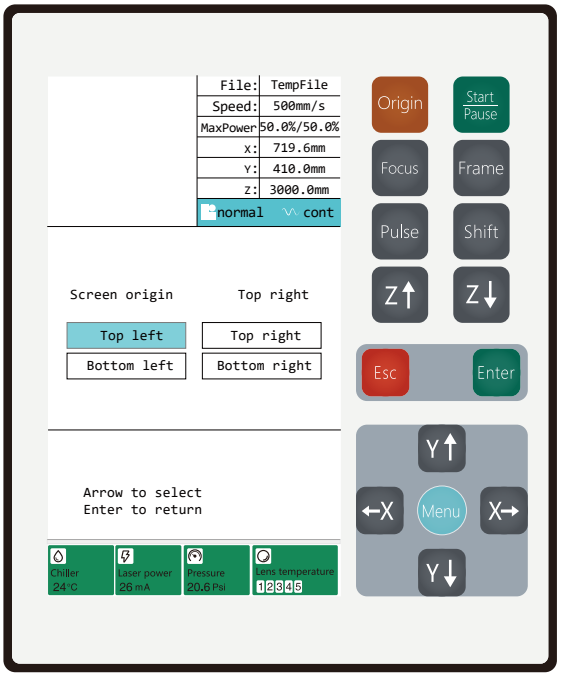
When you replace a proximity sensor of the axis, or some bizarre errors, you may need reset the axis to eliminate the errors.

Under the Main Menu interface. Press Arrow keys to select Axes Reset>, and press Enter t o enter into the Axes Reset interface. Press Y↓ to move the cursor to select the axis you want to reset, Then press , Enter the axis will start resetting. Once finished, the machine will beep.



Screen Origin—Set screen origin

You could set different screen origin to display your artworks

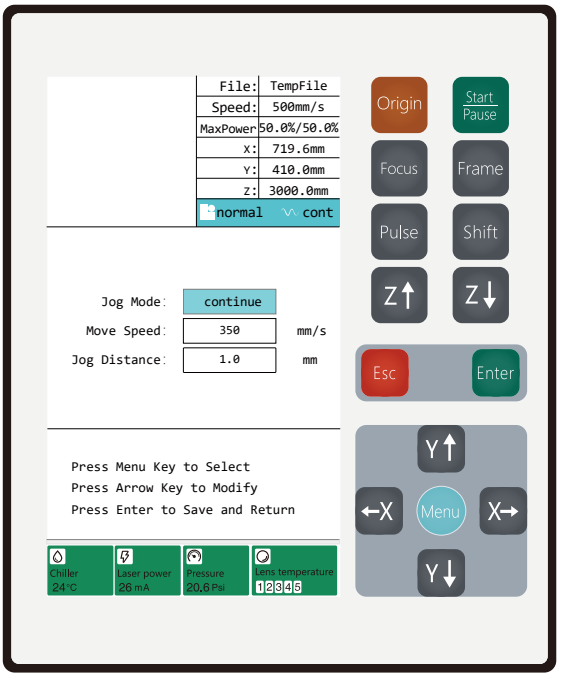


Under Main Menu interface, press Arrow keys to select Screen Origin> , and press Enter to enter into the Screen Origin Settings. You could press Arrow keys to select the screen origin you want to set and press Enter to save and return.

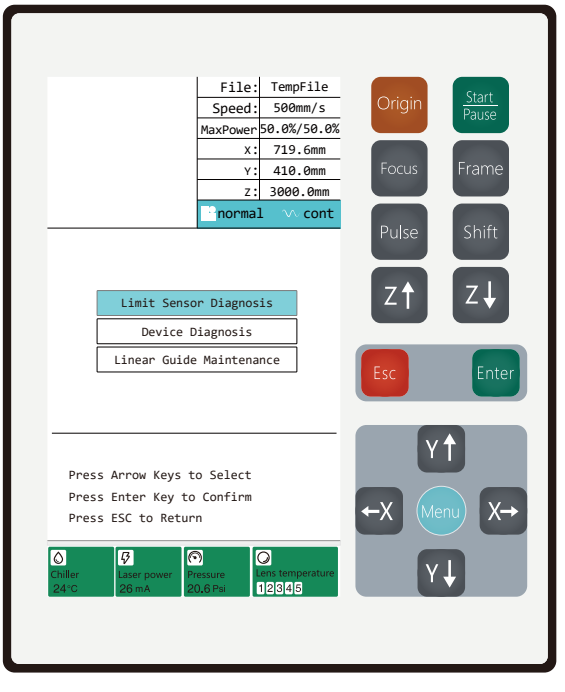
Note:
sometimes, if your artworks displayed in a reversed manner, you could set the screen origin to sort it out.

Jog Setting– Positioning accurately and efficiently

Jog settings is to move the X, Y axis for positioning a job. There are two modes to move the laser head. One is Continuous mode, the other is jog mode. Under continuous mode, if you press the arrow key, lets say, you press the X→ and hold it, the laser head will move continuously to the right along X direction until you release the key. Under Job mode, if you set the jog distance at 1mm, the axis will move 1mm each time you press the Arrow key. When you want to position a job more accurately, you could first move the laser head fast close to where you want to start, and press Shift + Pulse combo key to switch to jog mode, the laser head will move 1mm each time, and you could refer to the red beam to move the laser head stay to a desired starting point as close as possible.



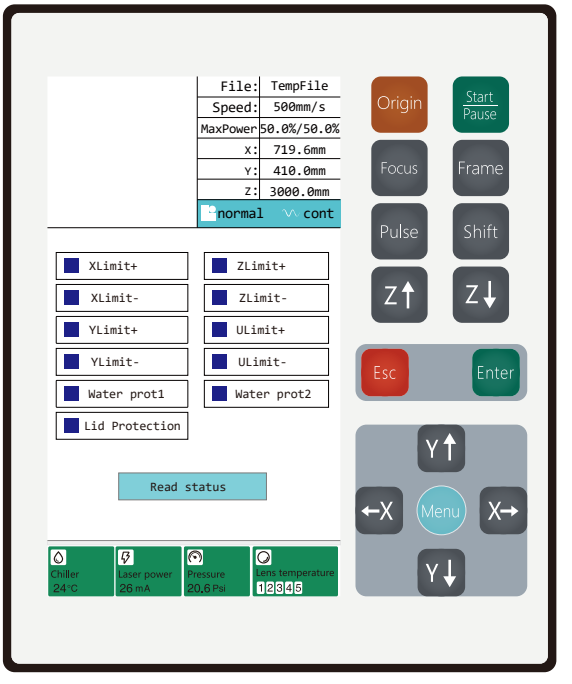
Diagnostics



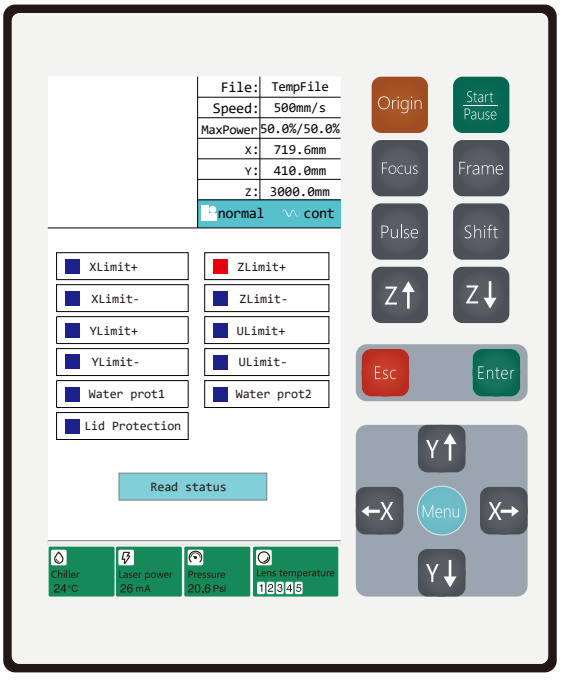
Diagnostics Menu has secondary menu.

1.Limit Sensor Diagnosis

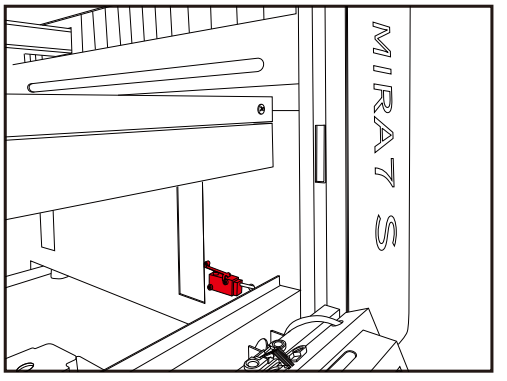
The cursor is on the Limit sensor diagnosis in default, just press Enter key , you will enter into the diagnosis interface.



The interface will display the status of all the sensors connected to the machine. If everything is normal, the indicator light will be blue. Once a limit sensor is touched and triggered, the indicator light will turn red, as shown below:



For example, this is a photo of the limit sensor for the Z axis, which is actually a micro switch. Pressing the metal lever activates the switch.To check if the sensor is functioning properly, press the metal handle and observe whether the indicator light on the control panel turns red. If the light does not turn red, the sensor may be faulty.



Here are the corresponding sensors we used on the machine.

XLimit+ ------> X axis sensor YLimit+ ------> Y axis sensor

ZLimit+ ------> Z axis bottom sensor ZLimit- ------> Autofocus sensor

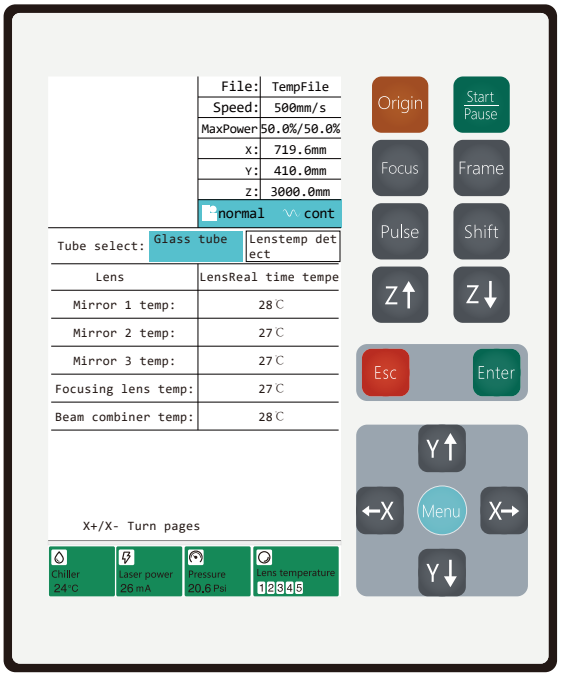
Water port1-----> Water protection sensor. (If there is water sensor error, you could check here to see if the sensor failed.)

Lid Protection----> Open lid protection sensor

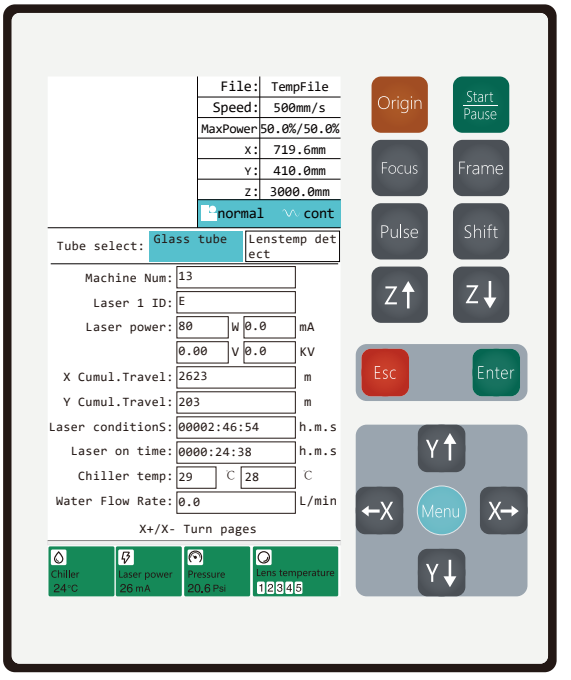
2. Device Diagnosis

Under the Main Menu, press the Arrow key to move the cursor on the Diagnoses> and press Enter key, Press  to select Device diagnosis and press Enter to enter into the device diagnosis interface.

The first page will show the Reflective Mirrors, focus lens temperature, as below:



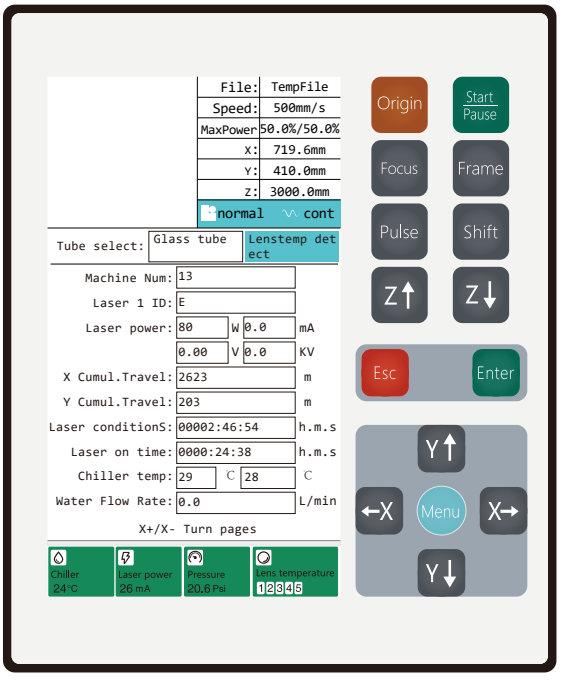
Press ←X or X→ , it will turn to anothe page like below:



This page displays laser tube details, including the distances traveled by the X and Y axes, the duration of laser firing, and the chiller's water temperature

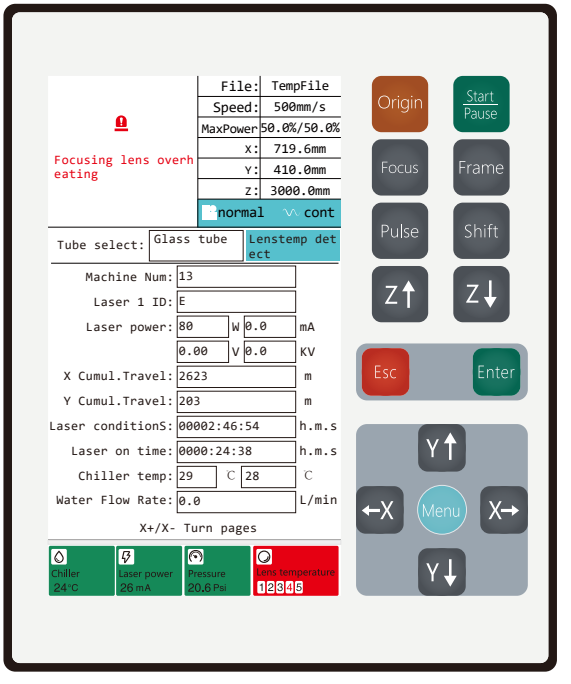
Optics checking test

If you have not operated the machine for a long time, it is good to check if the mirrors, lenses are functioning well.Under the Main Menu, press the Arrow key to move the cursor on the Diagnoses> and



press Enter key, Press Y↓ to select Device diagnosis and press Enter, then press Menu to select Lens Temp Detect and press enter

The worktable of the machine will automatically drop down to the bottom, and the laser tube will fire at its maximum power. After 3 minutes, the worktable will lift up automatically, indicating that the testing is finished. If there are any errors, they will be displayed on the screen as shown below:



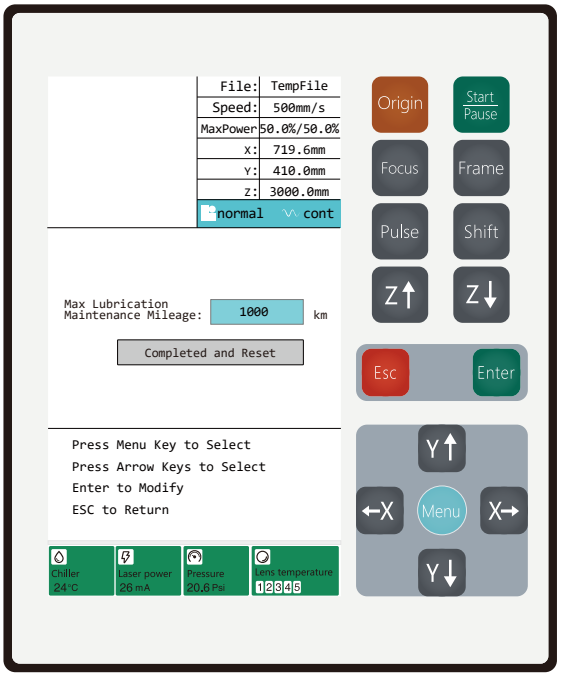
This message indicates that the focus lens temperature is too high. Check if the lens is dirty, cracked, or damaged. Refer to the maintenance instructions to clean the lens or replace it with a new one if needed. Press the ESC key to eliminate the error and go back to the Main Menu.

The numbers1 2 3 4 5 displayed on the panel correspond to the following lenses:

1--#1 reflect mirror
2-- #2 reflect mirror
3-- #3reflect mirror
4--Focusing lens
5---Red beam combiner

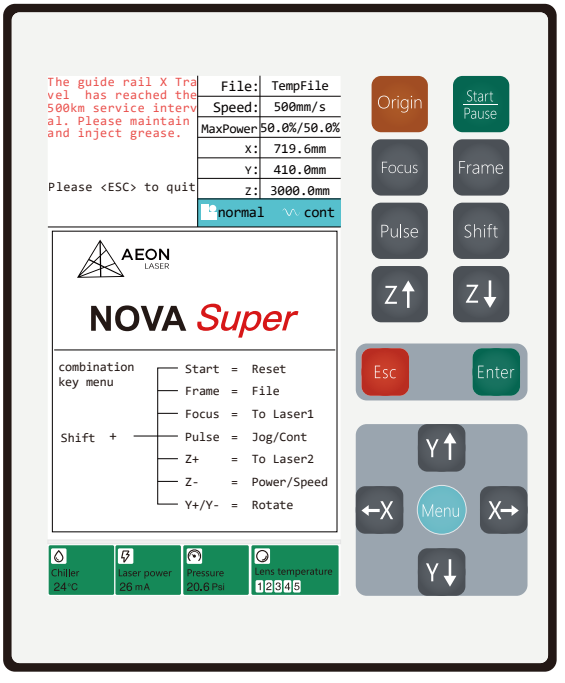
3.Linear Guide Maintenance

The default maximum maintenance mileage is set to 1,000 km, and this value can be adjusted as needed.



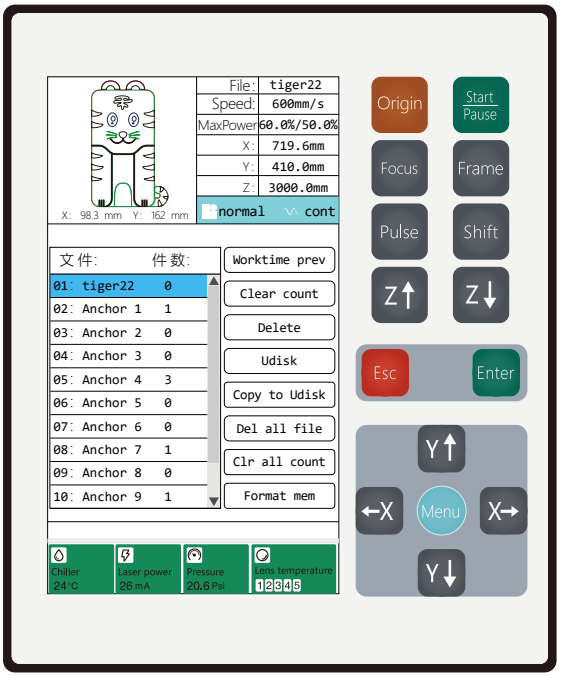
The cursor is at the Linear Guide Maintenance section by default, and press the Enter key to enter the setting interface.

When the maintenance mileage is reached, a reminder screen will appear upon startup.



After completing the maintenance, you must enter the panel to reset it. Once the reset is complete, the maintenance reminder will no longer appear.

Job File management in control panel



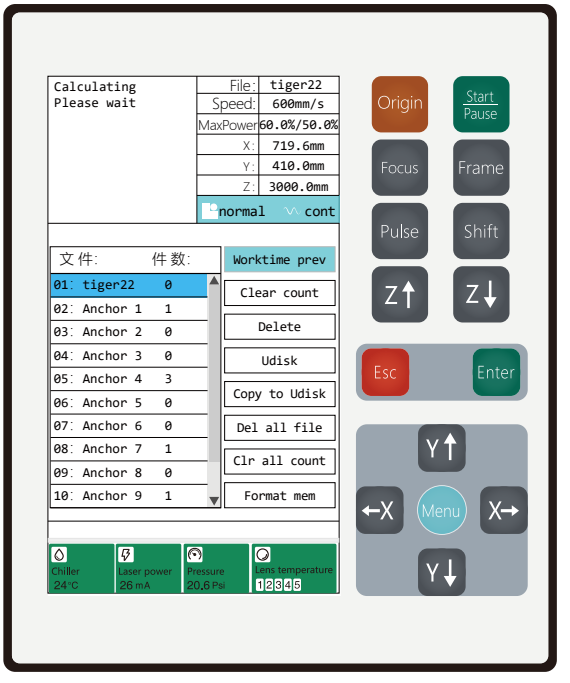
Under boot interface, press combo key Shift + Frame, then it will enter into the job files management interface directly like this:

Press Y↓ to move the cursor down to select a job. Press X→ to move the cursor to the menu on the right. Press Enter to confirm a selection.

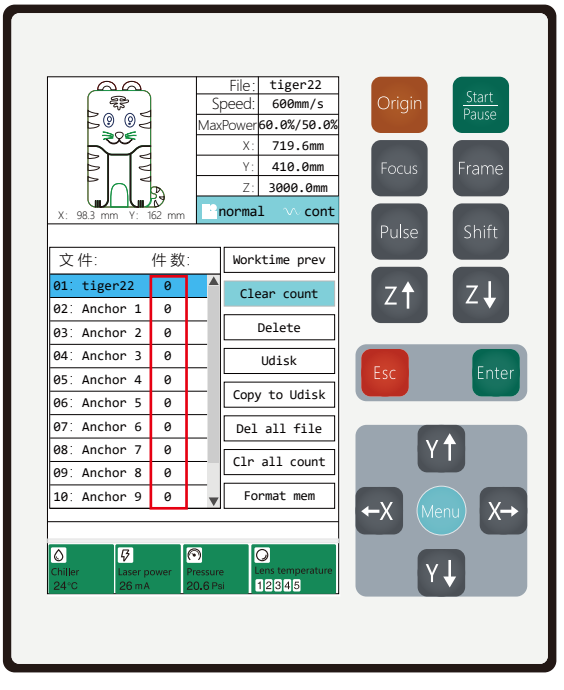
Preview the work time of the job

Users could select a job file to preview the total work time it might take.

Under Boot interface, press combo key Shift + Frame, enter into the file list interface. Press Y↓ to select a file. And press X→ to move the cursor to the menu on the right column, then select Worktime preview menu, press Enter, And then, the controller will calculate the overral time the job may take. Sometimes, if the file it large, it will take time to finish the calculation.



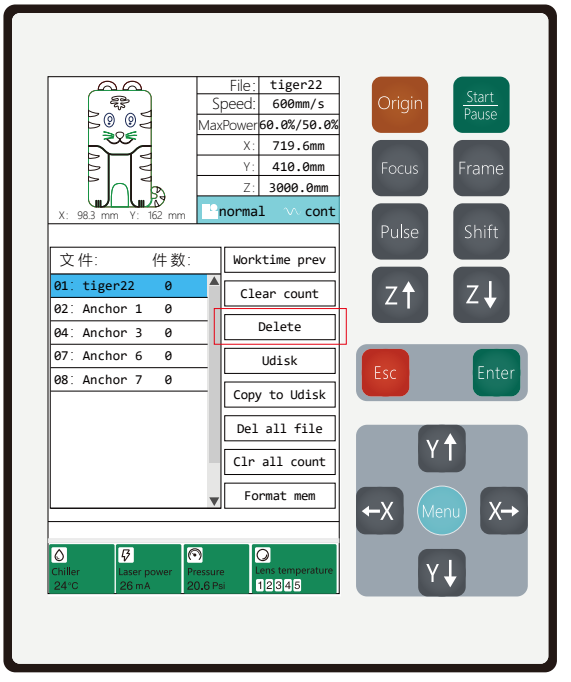
Clear the count of one or more job files



For repeating jobs, the user can see how many times the job has been running by checking the right column of the file list. If the user want to clear the processed times for certain job, he can first select the file and then press the Y↓ key,then press X→ to select the Clear Count menu, and press Enter to clear the count numbers.

Delete one or more job files

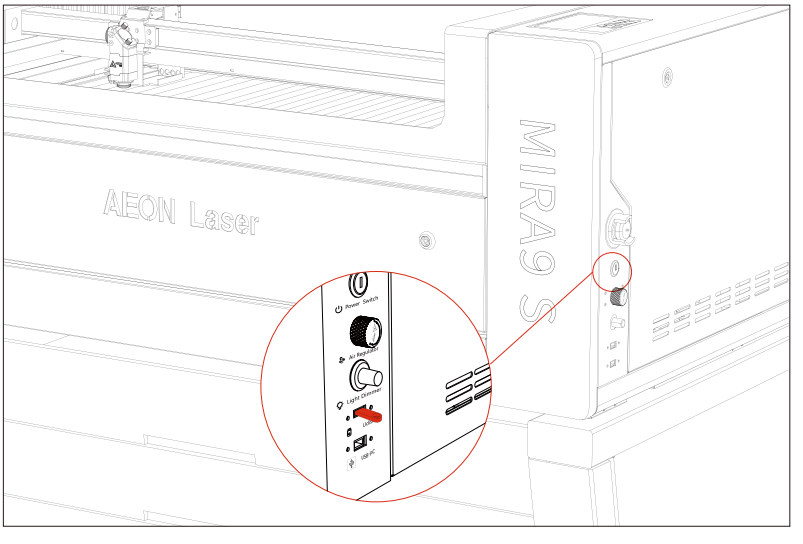
The controller memory is 1GB. If the user send too many files into the controller, he can delete some of them, or delete all of them to release more memory storage. Under the file management interface, select a job by pressing Y↓ , and then press X→ to go to the menu on the right column, and select Delete menu, press Enter, then it will delete the selected file. If the user want to delete all files, he can select the Del all Files menu and press Enter to delete all the job files in the controller.



Use the files in Udisk and Copy job files to Udisk

If you don't have access to a computer, if the computer can't connect to the machine, or if you need to restrict file transfers to the machine, you can use a USB drive (U-disk) to manage job files. This method is also useful for handling repetitive jobs with the same parameters. Simply save the job files onto a USB drive and process them directly from the drive.

Plug the USB drive with the job files into the USB port on the machine.

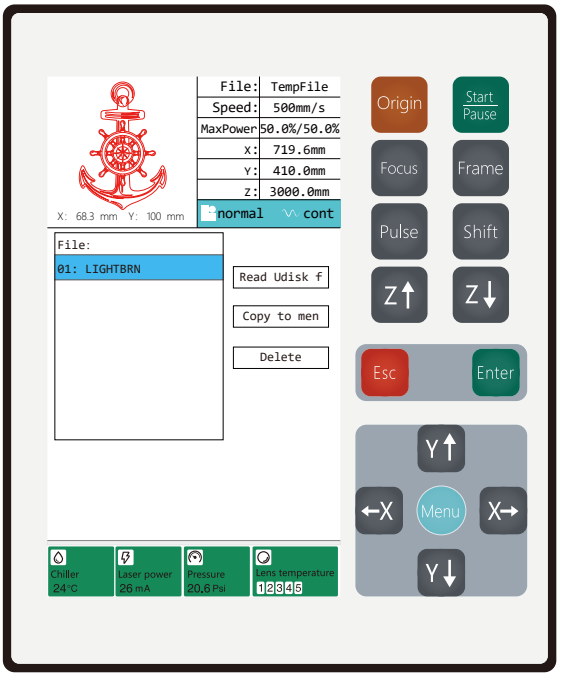


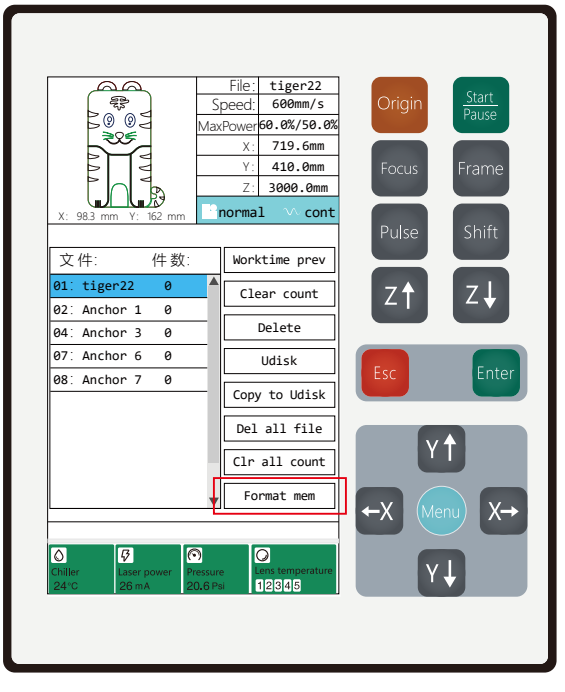
Got to the control panel, press combo Key Shift + Frame

Under the file management interface, select a job by pressing Y↓, and then press X→ to go to the menu on the right column, and select U–disk> menu, press Enter, then it will show the job files in the U–disk (The job file is a . rdl or lbrn format file created by Rdworks software or lightburn software. Ai, dxf, plt files can't be recognized by the controller directly).

Select the files in the U–disk by pressing Y↓ .If you want to process the job, just press Enter, and it will go to the preview interface, after that, press Start key, the machine will start processing the job.

Press X→ to move the cursor to select the menu on the right column. Select Read Udisk files and press Enter, it will read the files available in the Udisk. Select Copy to mem and press Enter, it will copy the selected file to the controller memory. Select Delete and press Enter, it will delete the job file selected.





Format the controller memory

Formatting the memory of the controller should be done cautiously. It can resolve some controller errors and improve processing speed. Before formatting, ensure you have saved all necessary files, as all files in the controller will be deleted after the format.

In the file management interface, select a job by pressing Y↓ ,then press X→ to navigate to the menu in the right column. Select the Format Mem menu, press Enter, and it will ask you if you are sure you want to format the controller. Press Enter to confirm, and wait for a moment while the controller memory is formatted.

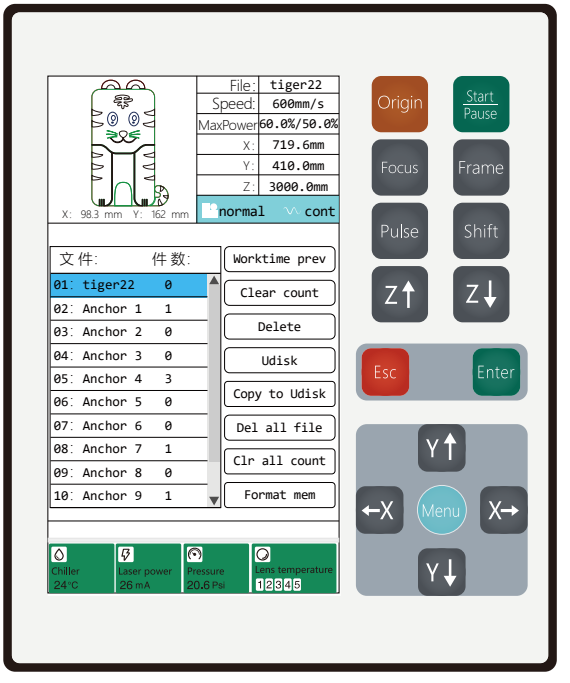
Change file processing parameters from the control panel.

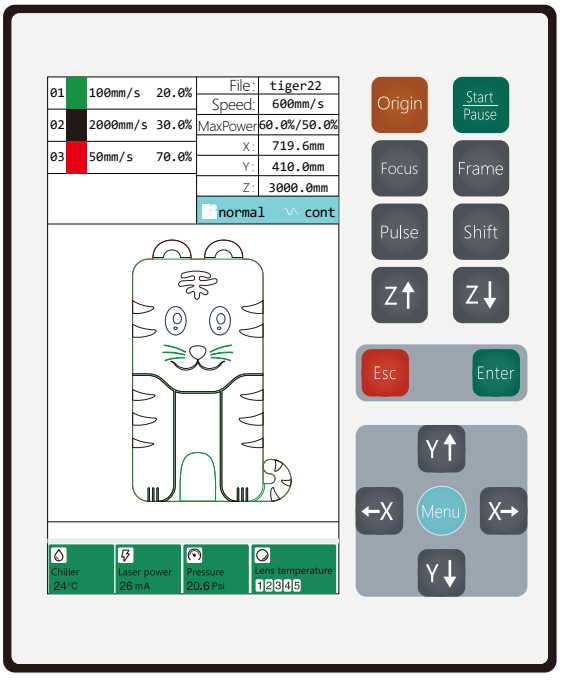
File Processing Parameters: These refer to the Power and Speed settings for a job file.

➢Power: Determines the laser power used to burn the material. Higher power results in deeper burns.
➢Speed: Refers to the working speed of the laser machine. Faster speeds complete the job more quickly but result in lighter burns due to reduced time on the material surface. For deeper cuts or engravings, you need to either slow down the speed or increase the power.

The easiest way to adjust these parameters is through RDworks or LightBurn software. However, if no computer is connected or if it's inconvenient to access the computer, you can change the processing parameters directly through the control panel.

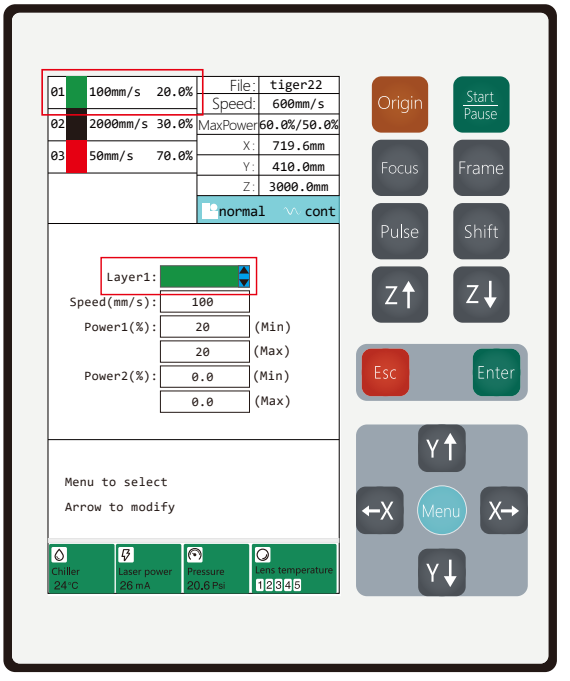
Got to the control panel, press combo Key Shift + Frame ,it will call out the file manage interface. Press Y↓ to select the job file you want to change the parameters and press Enter, it will preview the job.



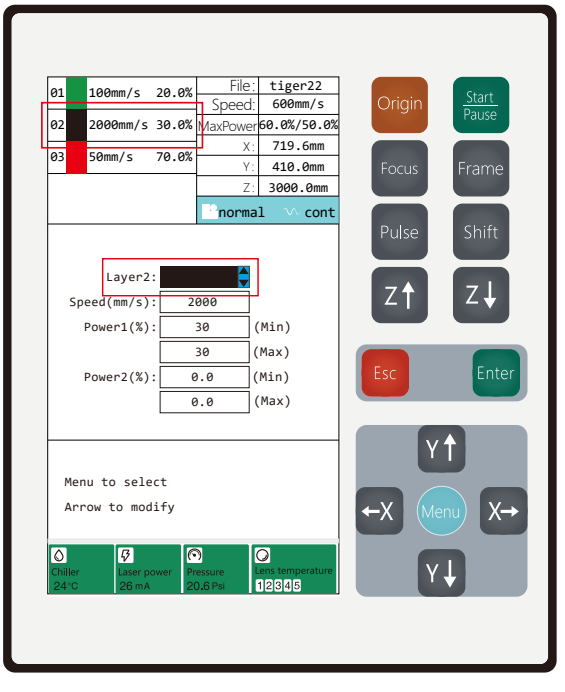


Press Enter to select the first layer of the job file. A layer represents a specific processing method. For example, if you have a name card where you want to engrave letters and cut out a logo, you need to define different layers for each process.

Layers:
Separate different tasks in your job file. For instance, one layer can include all the letters to be engraved, while another layer includes the logo to be cut. Each layer is typically represented by a different color, with the same color indicating the same layer. After selecting the layer, press Enter again to enter the parameter interface, where you can adjust the settings for that layer.



The cursor is on the layer menu in default. You could select the layer you want to change the parameter by pressing Y↓ .



Press Menu key to select the parameters you want to revise. Press the Arrow keys to modify, and press Enter to save and exit.
For example, if you want to change the speed of the second layer of the file, you could select the layer menu first, and then press Y↓ , the menu will change color and show it is Layer 2, then press Menu , the cursor will move to the Speed setting, Press ←X or X→ to move the cursor to the number, and press Y↓ to reduce number, press Y↑ to increase numbers.

Adjusting Power Settings

Changing the power settings follows the same process as adjusting other parameters.

Power Settings: Each layer has two power settings:

Power 1: Minimum power used.

Power 2: Maximum power used.

Setting both powers allows the controller to automatically adjust the power based on the job's requirements. For example:

Grayscale Engraving: The controller uses lower power for lighter areas and higher power for darker areas.

Cutting Jobs: The power will be automatically reduced in corners to prevent over–burning.

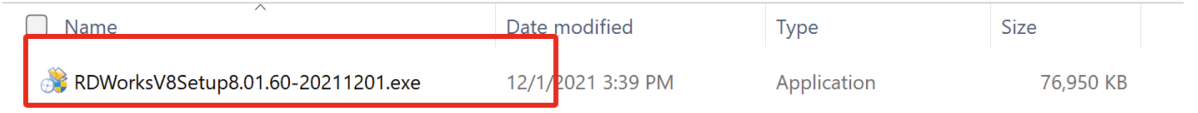
This approach ensures optimal results by adjusting power dynamically during the job.

Connect your machine to the computer

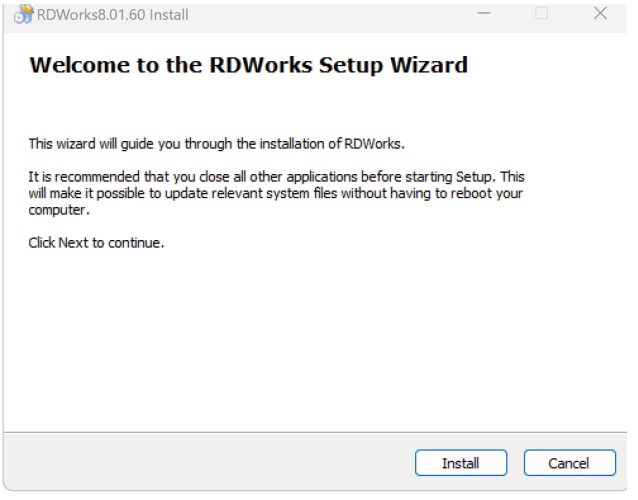
Install RDworks

RDworks engraving and cutting software is the standard free software coming with the machine. The software is compatible with Windows Operation System only. You need a Windows computer with XP OS or above. CPU 586 above, recommended that P III or P IV above.

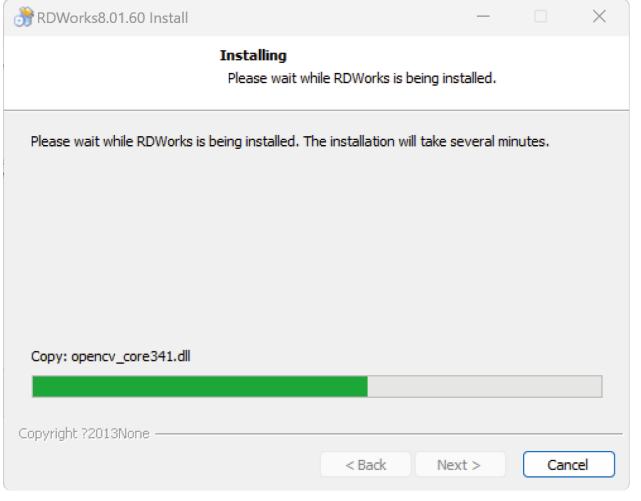
The installation file is saved in the Udisk. Find the Udisk in the tool box, and plug it into the computer USB port.



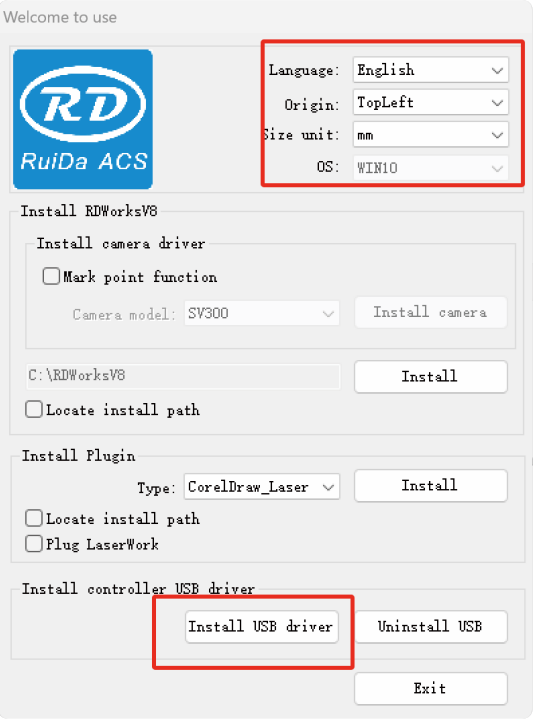
Double click the exe file, and then it will start the setup Wizard.



Click install to go to next.



Select the Language on the right top corner,set the machine origin to Top-right choose the size unit from Inch and mm.
Don't forget to install USB driver.

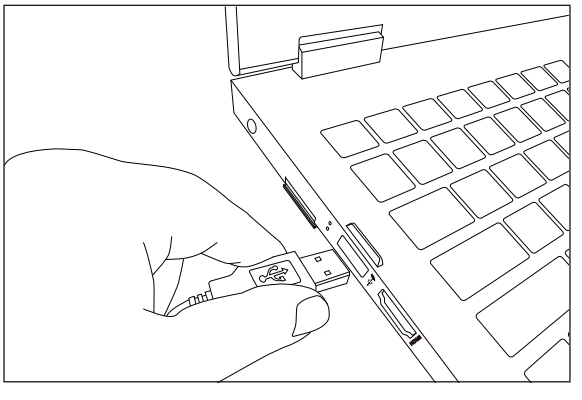


After that, you could click Exit. Then the software will be installed in your computer.

You could find the detailed RDworks user manual in the U-disk or you could download from here: https://www.aeonlaser.net/support/oftware-download/

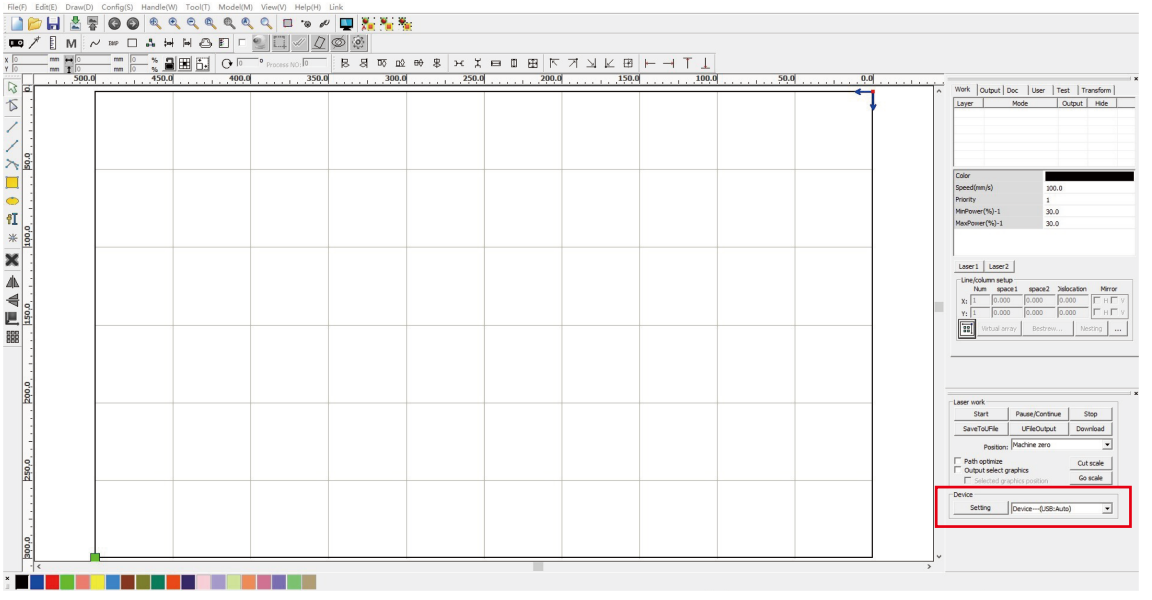
Connect your machine to RDworks with USB data cable

Insert the data cable into the USB port, and connect the other end to the computer;

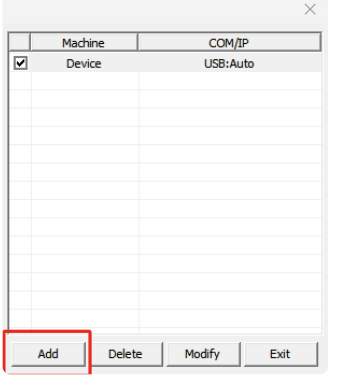


Run RDWorks by double click the shortcut 

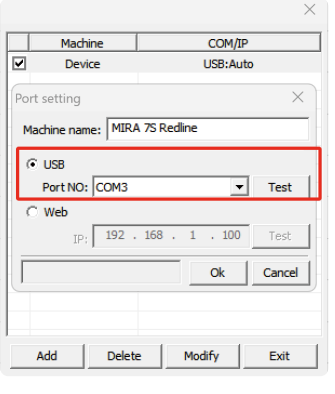
,set:Device–USB:Auto, and the software will automatically connected with the machine.

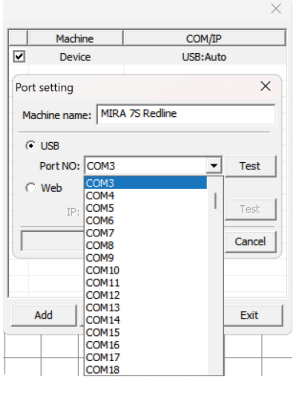


When there are multiple laser devices connected to the computer, click <Set> and click <Add> on the popup window to add a new machine.

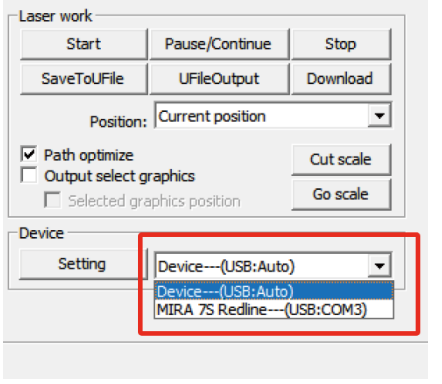


Give a new name for the device and choose USB connection. If your computer got extra USB port, you may connect more than one machine at the same time. Just choose the port number of the USB.





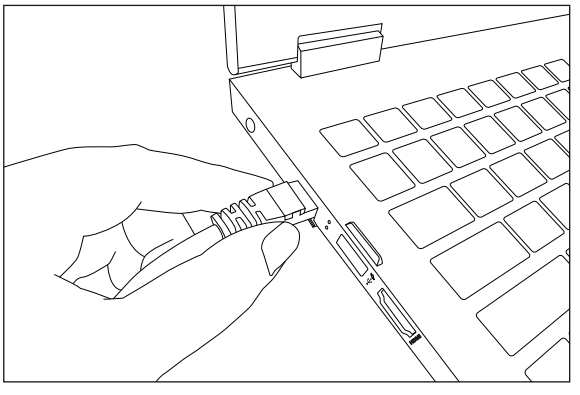
After adding or modifying, you can click [Test] to check whether the connection with the device is successful.
When you need to use one of those machines, click the check box to choose it.



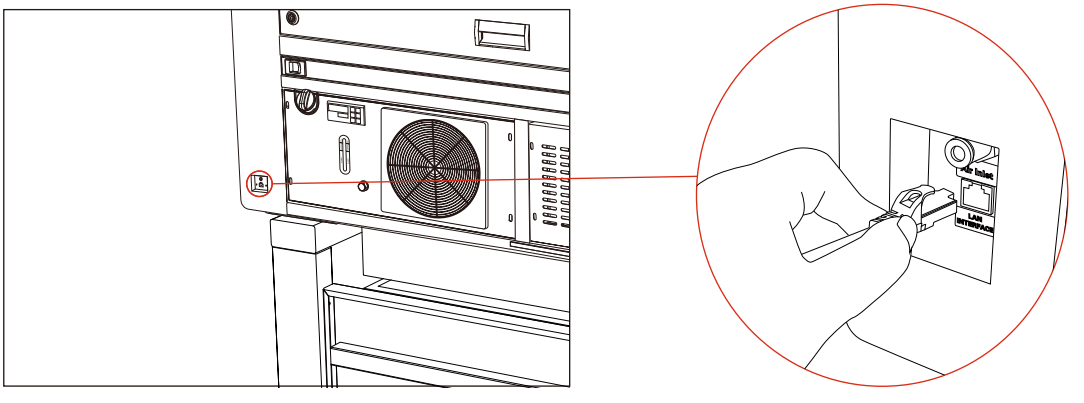
Connect your machine to RDworks with LAN cable

If you are using a desktop computer or a laptop with a LAN interface, you can connect it to the machine using the LAN cable provided. Although LAN cables might seem outdated, they offer a reliable connection.

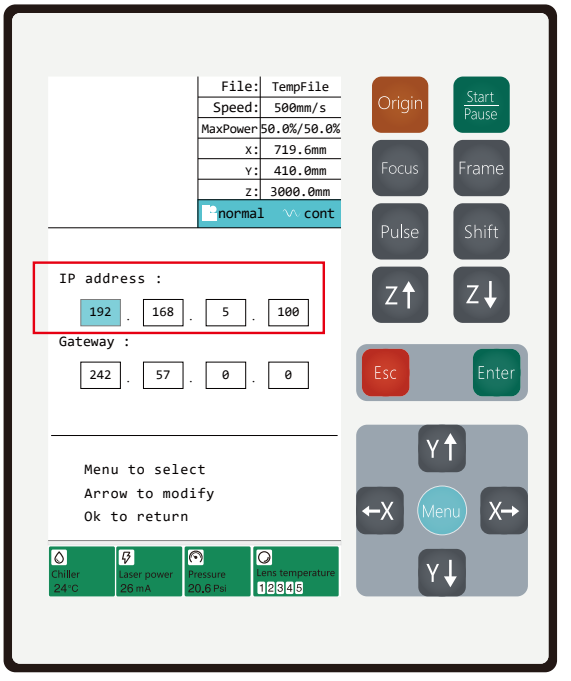
Locate the LAN Cable: Find the LAN cable in the machine's toolbox.
Connect to the Computer: Plug one end of the LAN cable into the LAN interface on your computer or laptop.
Connect to the Machine:



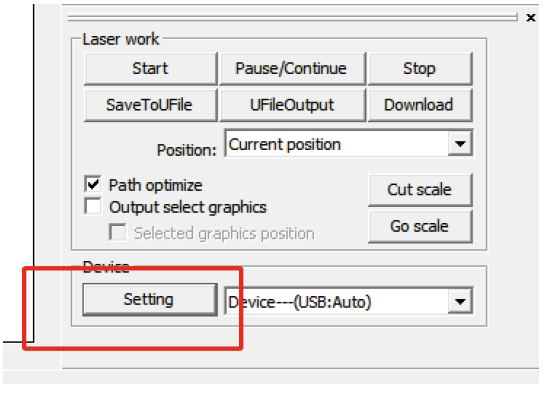
Plug the other end of the LAN cable into the LAN interface on the back of the machine.

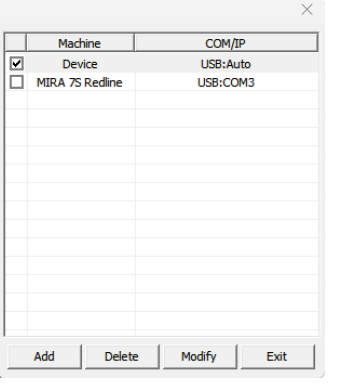


Go to the control panel, press **Menu** , select **IP Config** >> , and check the machine's IP address.

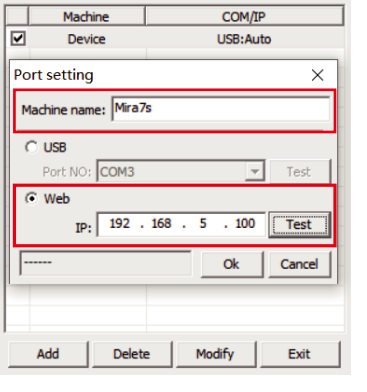


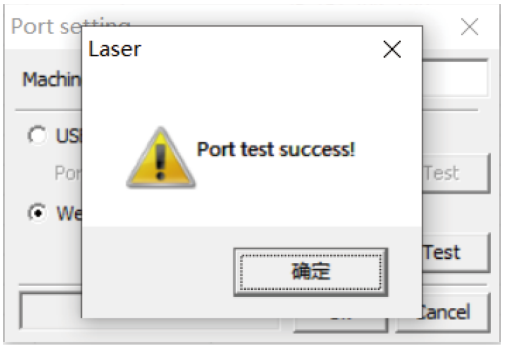
Go to computer, open RDworks software, then click Settings:





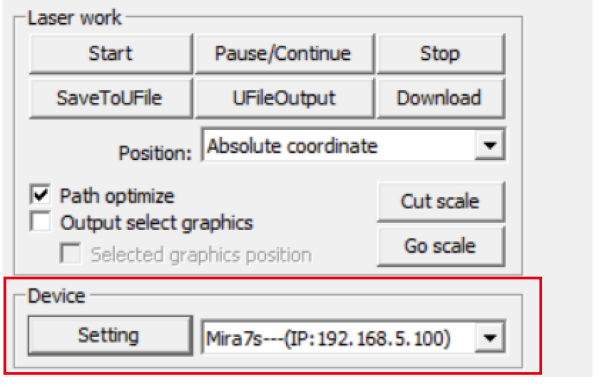
Click Add>, choose Web, and input the IP address you got from the control panel, you could re-name the machine by clicking the Machine Name





Click Test, if the machine is connected successfully, it will show “Port test success!”

Check the Setting> button of the software, you’ll find the device link



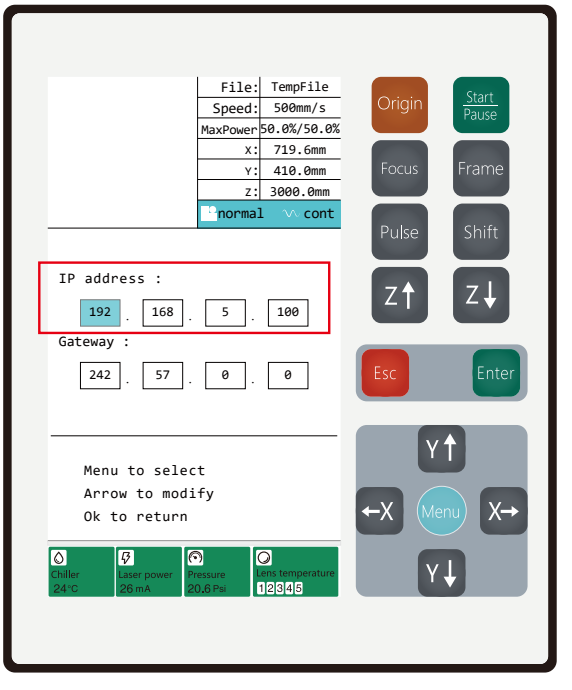
Connect your machine to RDWorks via WiFi

The Redline WiFi has two modes: **Access Point (AP)** and **Client** mode.

AP Mode: The machine’s built–in router acts as an access point, allowing direct connection between the machine and your computer. Note that this restricts internet access on your computer while connected to the machine.

Client Mode: The router connects the machine to your local wireless network, enabling both control of the machine and internet access on your computer.

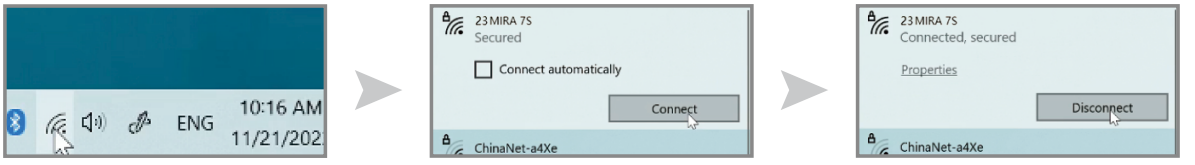
For ease of setup, start with AP mode and switch to Client mode for added convenience.



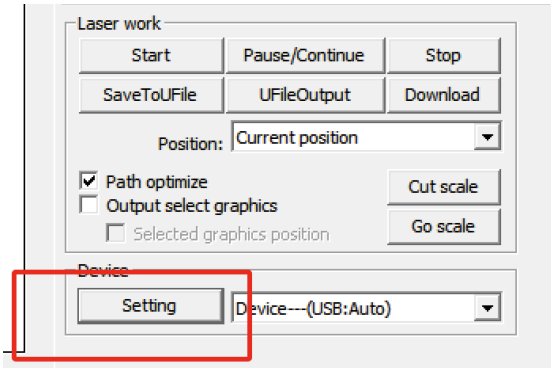
AP mode connection.

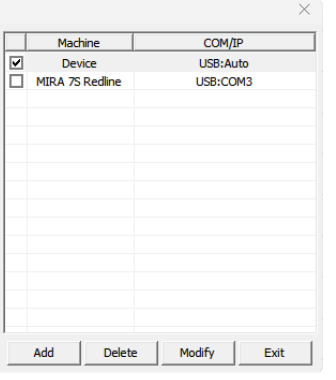
Powered on the machine, wait a few second till the machine beeped. Go to the control panel, press **Menu** key and select **IP** address with **Arrow Key** to check the **IP address** of the machine:

Click the WiFi icon on the bottom–right of your computer screen.From the list of available networks, select the wireless network. The default SSID is **TP–LINK_XXXXXX**.Click "Connect." Once the "Disconnect" button appears, your computer has successfully connected to the machine's wireless access point.

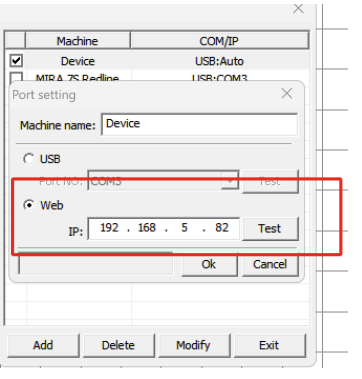


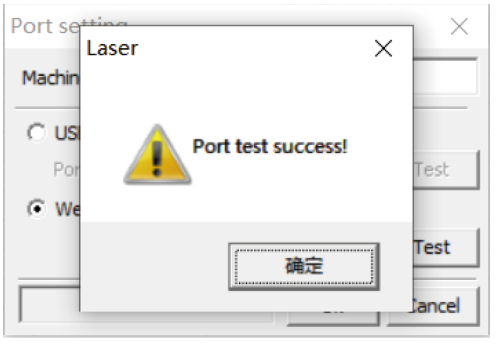
Open RDworks software, then Click Settings>





Click Add>, choose Web>, and input the IP address you got from the control panel. You could also name the link a different name to identify the machine easier. (the ip is already in the software)





Click Test, if the machine is connected successfully, it will show "Port test success!"

Now you'll be able to control the machine wireless through the RDworks software.but in this mode, you can't access to the internet anymore.

Switching to Client Mode

After connecting the machine in AP mode, follow these steps to switch to Client mode and enable internet access while controlling the machine:

Check Computer IP and DNS Settings:

- Ensure your computer's IP and DNS settings are set to "Obtain automatically." This is usually the default setting.
- If you encounter linking problems later, revisit these settings.

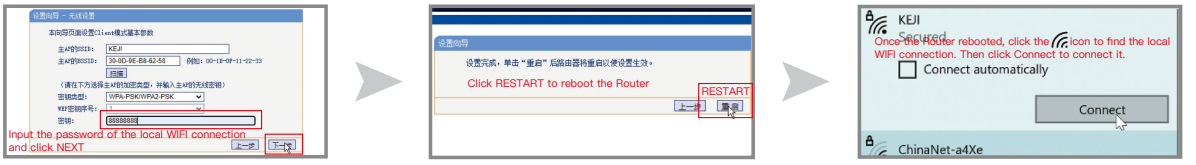
Setting Up IP and DNS:

This process varies by operating system. For Windows 7:

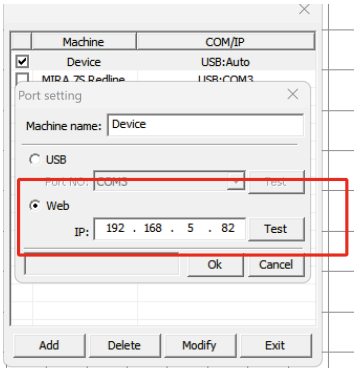
1. Go to **Network and Internet Settings**.
2. Select **WLAN** and then **Change adapter options**.
3. Right-click the adapter and choose **Properties**.
4. Select **Internet Protocol Version 4 (TCP/IPv4)**.
5. Set it to **Obtain an IP address automatically** and **Obtain DNS server address automatically**.
6. Click **OK** to save the changes.

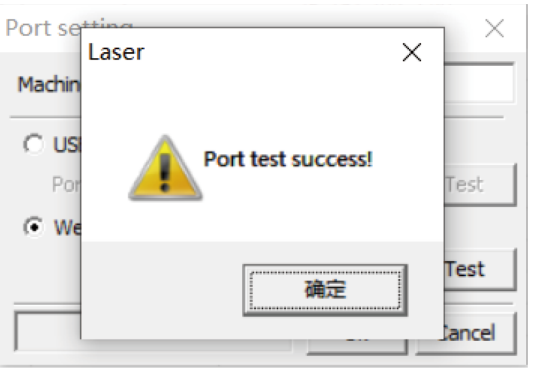
Open your browser and enter 192.168.1.253 into the address bar, then press Enter.On the router login page, set up a login password for the first-time setup. Ensure you save this password securely for future use. After logging in, the browser will display a setup wizard page. If it does not appear automatically, click the "Setup Wizard" menu on the left panel.

Click "Next" to begin configuration: Select "Client Mode," then click "Next."Click the "Scan" button. The router will search for local wireless networks and list them.Choose the WiFi network with the strongest signal (SSID). If it is not visible, click "Refresh" to search again.Enter the WiFi password in the "Key" field. Click "Next" to proceed.Click "Reboot" to apply settings. The router will restart and operate in client mode.



After completing the settings, open a browser and visit www.aeonlaser.net to verify internet access. Then, launch the RDworks software, go to '**Settings**', select the machine connected in AP mode (refer to instructions if not connected), and click **Test**. If you see **'Port test success!'**, you can now control the machine wirelessly while accessing the internet.





Install Lightburn software.

Download LightBurn
Visit the Download Page: https://lightburnsoftware.com/pages/license-page

1. Minimum Computer System Requirements

i.Windows: Windows 7.0 or later

ii.macOS: 10.11 or later

iii.Linux: Certain 64-bit versions (refer to Linux Installation for details)

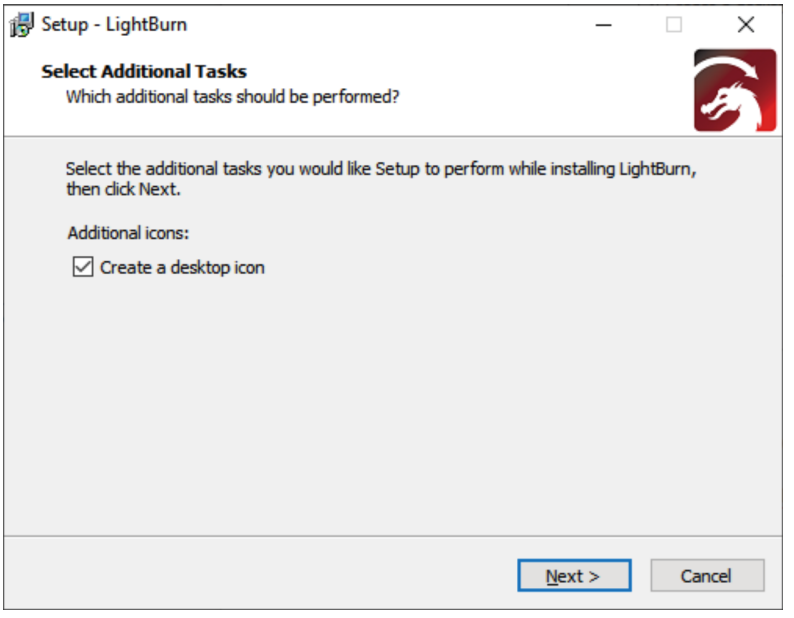
iv.Recommended: Screen resolution of at least 1920x1080 (FHD resolution)

> **Windows 32-bit**
>
> Starting with the release of LightBurn 1.6, the Windows version of LightBurn is 64-bit only. Users in need of a 32-bit version should download LightBurn 1.5.06, which is the final version available for 32-bit versions of Windows.

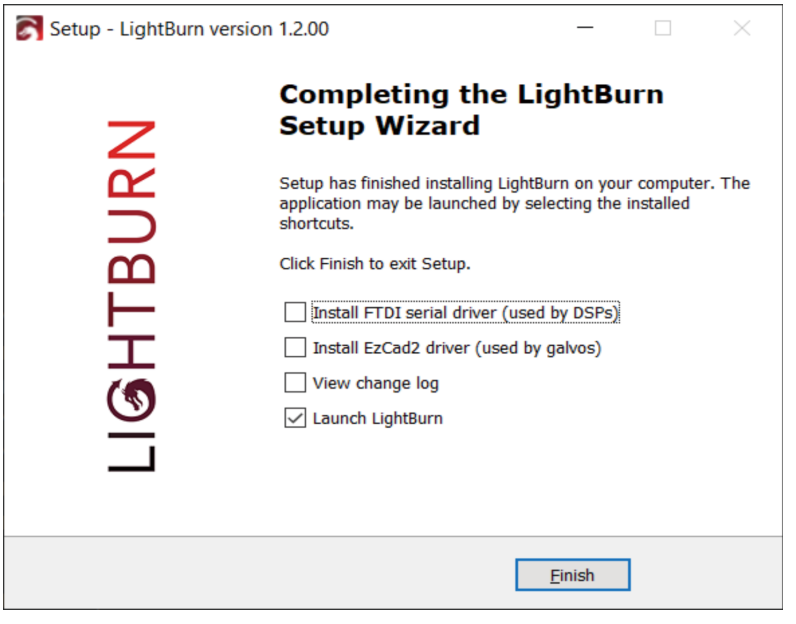
2. Complete the Download:

The downloaded file will appear in your "Downloads" folder or the folder you selected.

LightBurn doesn't require a powerful computer for most tasks, but more memory helps with designs containing many images; a faster computer improves performance with large images or complex vector graphics. To install, double-click the installer file and, if prompted by Windows, confirm that you trust the source to proceed.



Click Next, then click Install. The installation will proceed. When it completes, you'll see this:



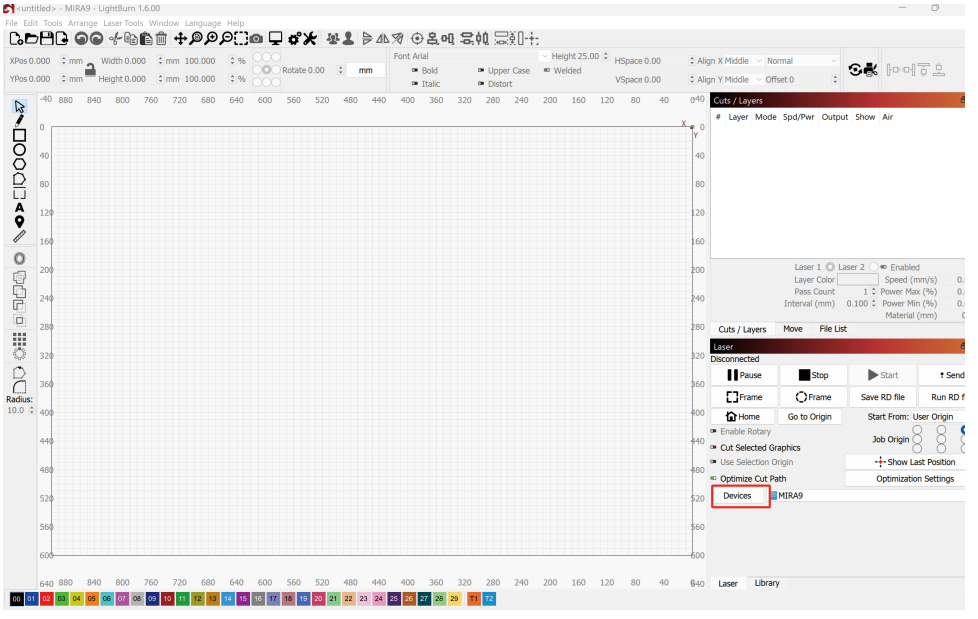
If you have never installed LightBurn on this computer before, you might need to install drivers. This is not necessary when updating an existing installation.
Choose Install FTDI Serial Driver, and wait the install Wizard to complete the installation.
That's it! Locate the LightBurn icon on the desktop to launch the program.

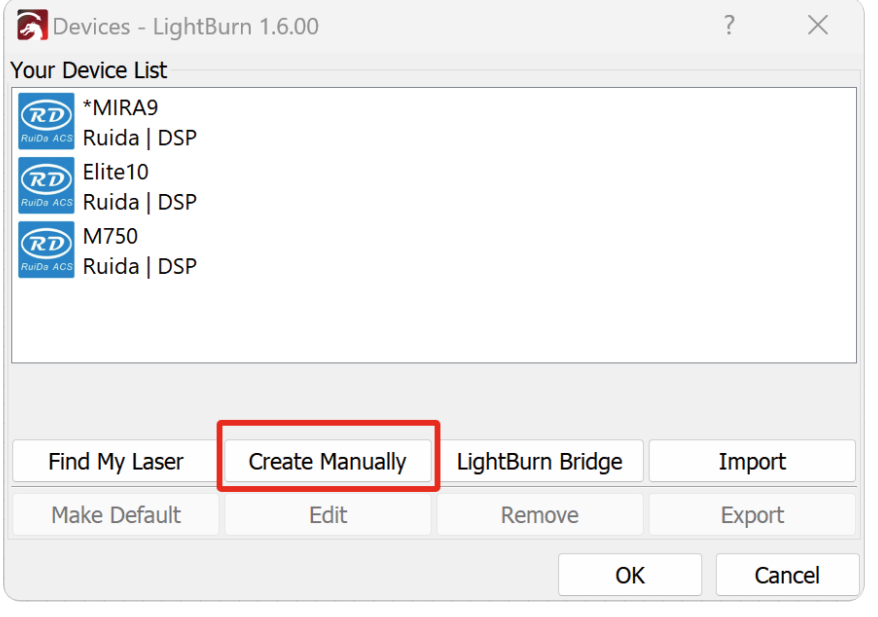
Connect your machine to Lightburn with USB data cable

Insert the data cable into the USB port, and connect the other end to the computer;

Double click the lightburn shortcut icon 

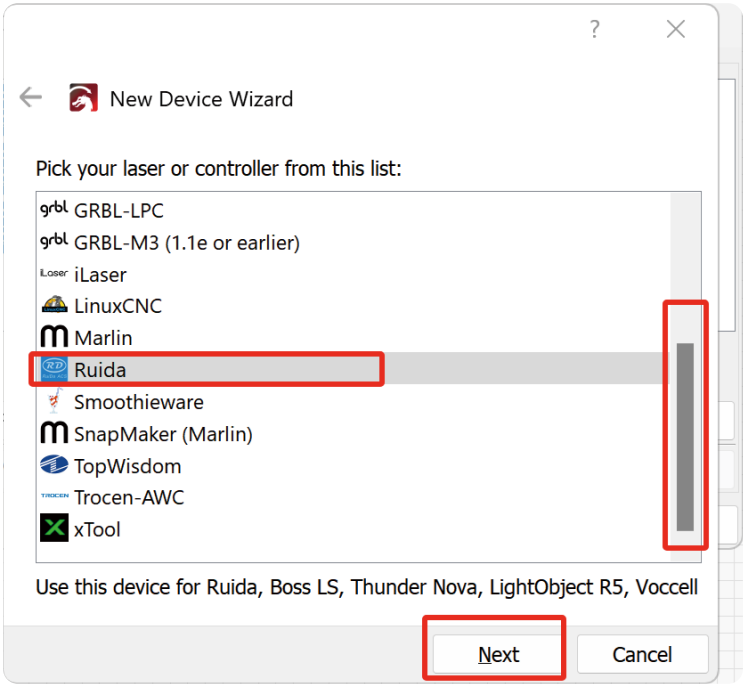
on desktop to run the software. Click Devices at the bottom right of the software window.



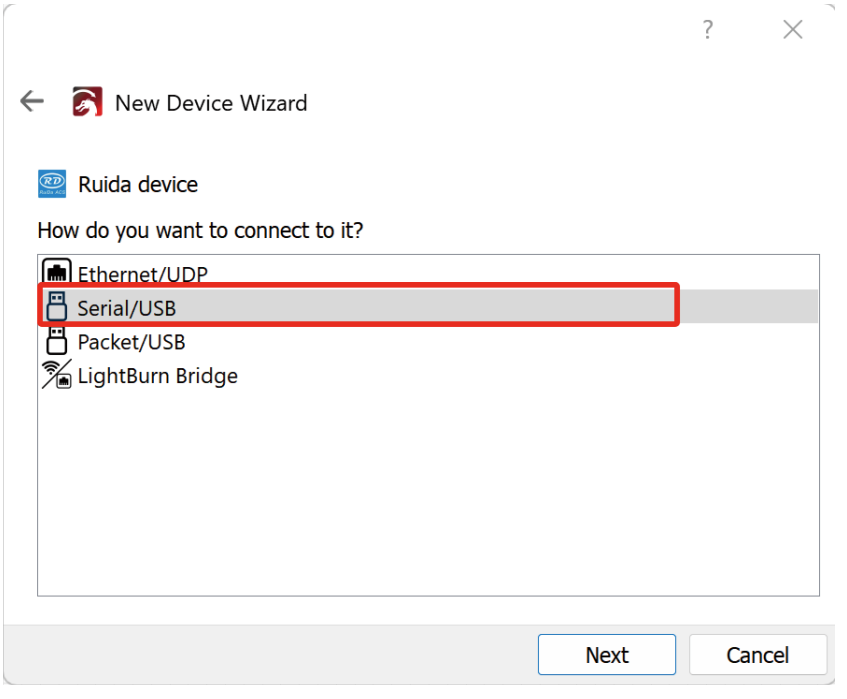


Click <create manually>

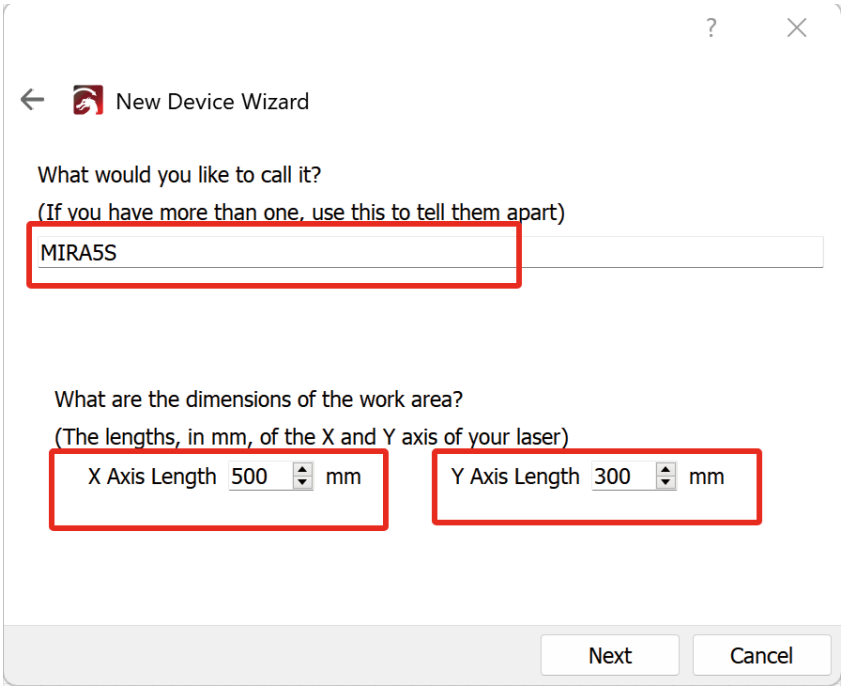
Scroll down and find the Ruida controller, select it and click Next.



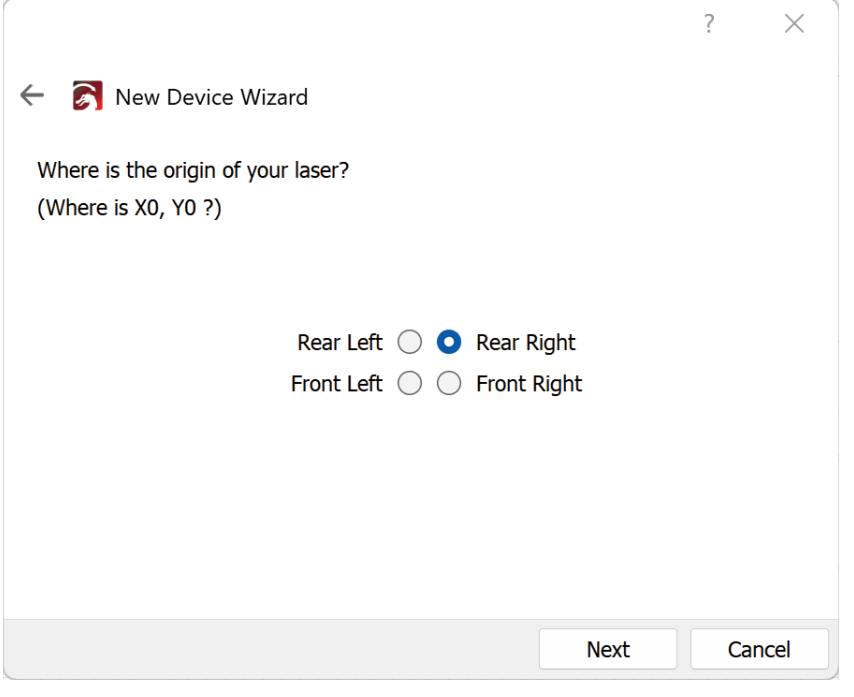
Select Serial/USB and click Next.



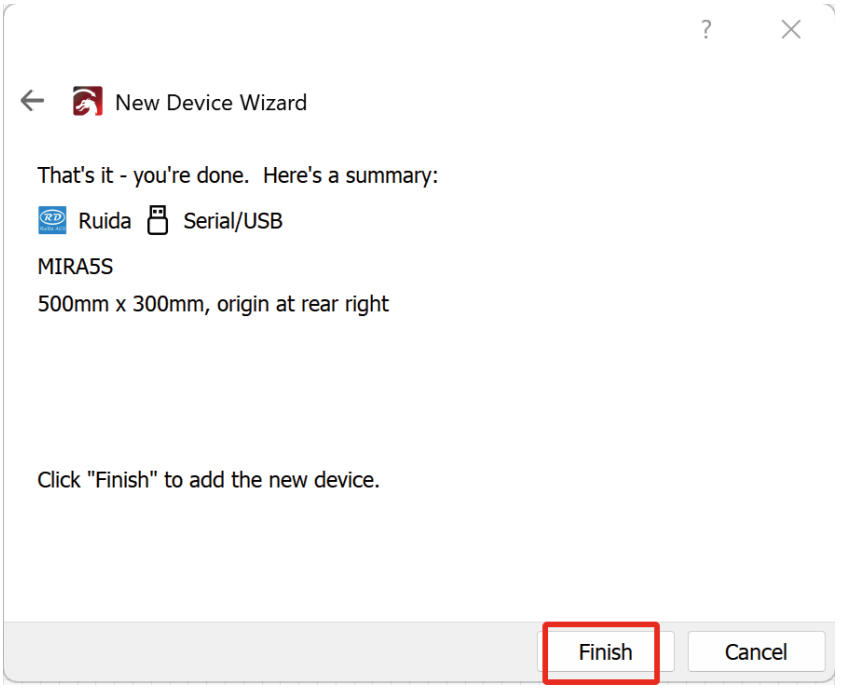
Name the machine and enter the X and Y dimensions. For example, for a MIRA 5S, set X to 500mm and Y to 300mm; for a MIRA 7S, set X to 700mm and Y to 500mm. These dimensions represent the working area of your machine. After entering the details, click Next.



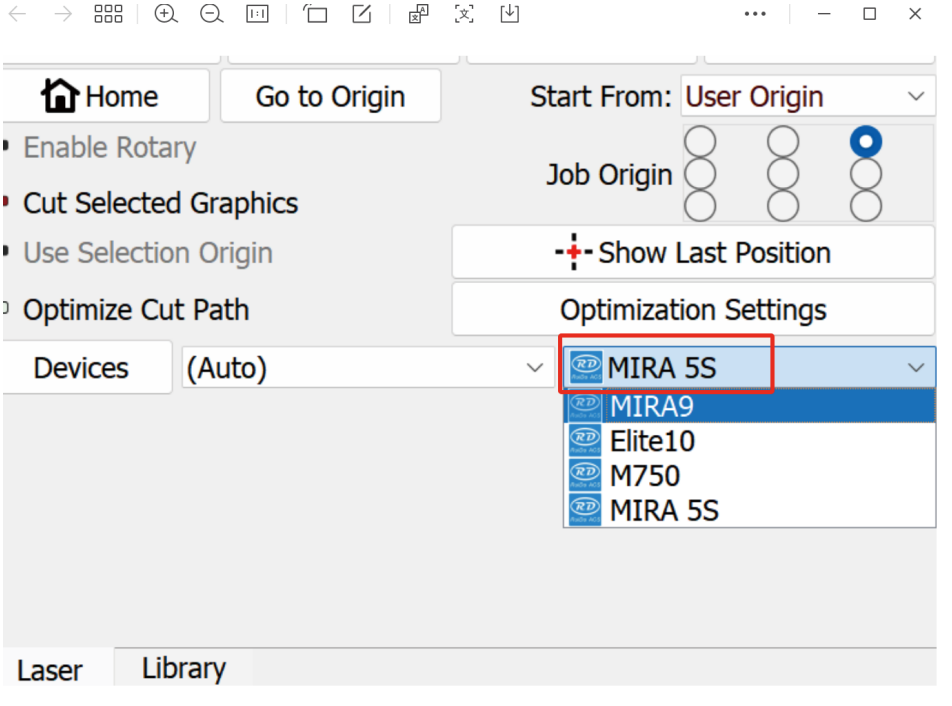
Here you will need to set the origin of the laser head. We could choose Rear Top Right



Review the connection summary and click **Finish** to complete the setup.



Go to the bottom right of the window, and select the link you just created:

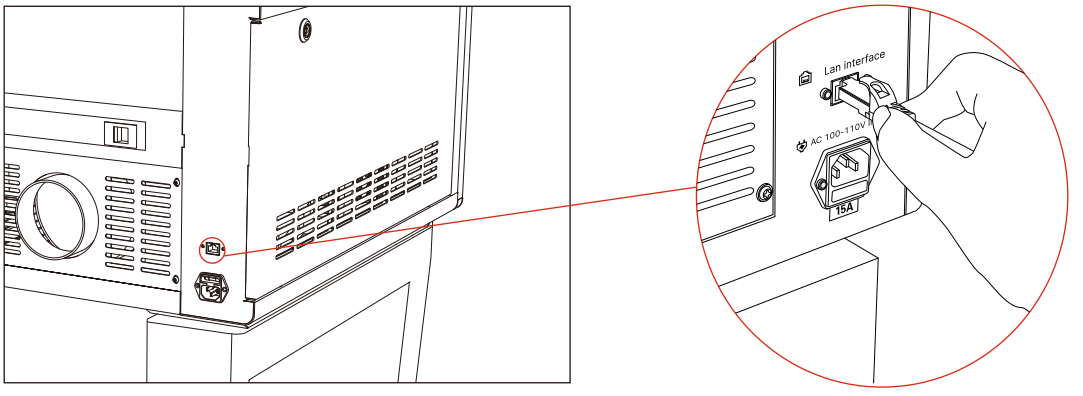


You are ready to go!

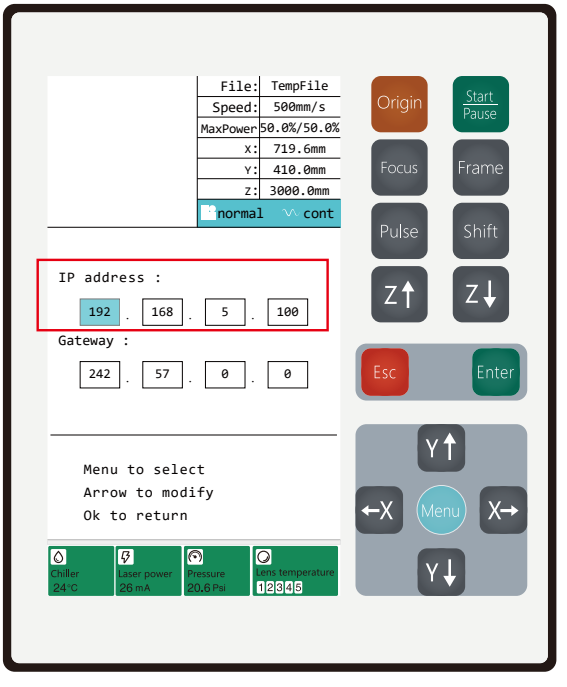
Connect your machine to lightburn with LAN cable

Connect Lightburn through Ethernet is similar with connecting through USB cable . When you created the link in lightubrn, you can choose Ethernet and input the machine's IP address. Let's go through it step by step.

Find the Lan cable in the tool box of the machine.
Plug it into the Lan interface of the computer.
Plug the other end of the cable into the LAN interface on the back of the machine

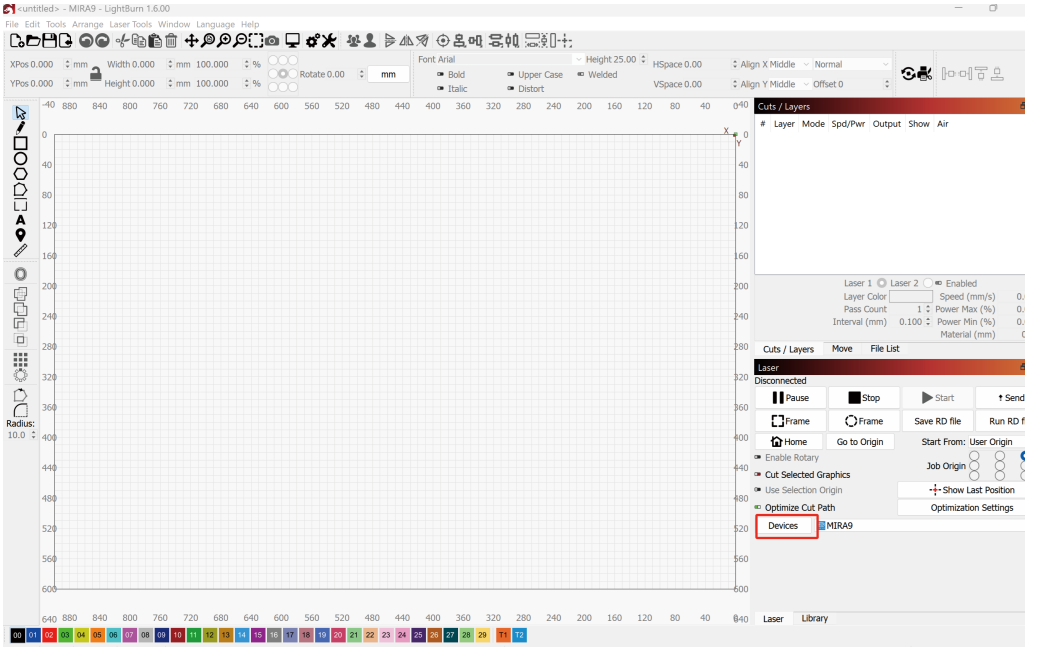


Go to the control panel, press Menu, select IP Config>, and check the machine's IP address.

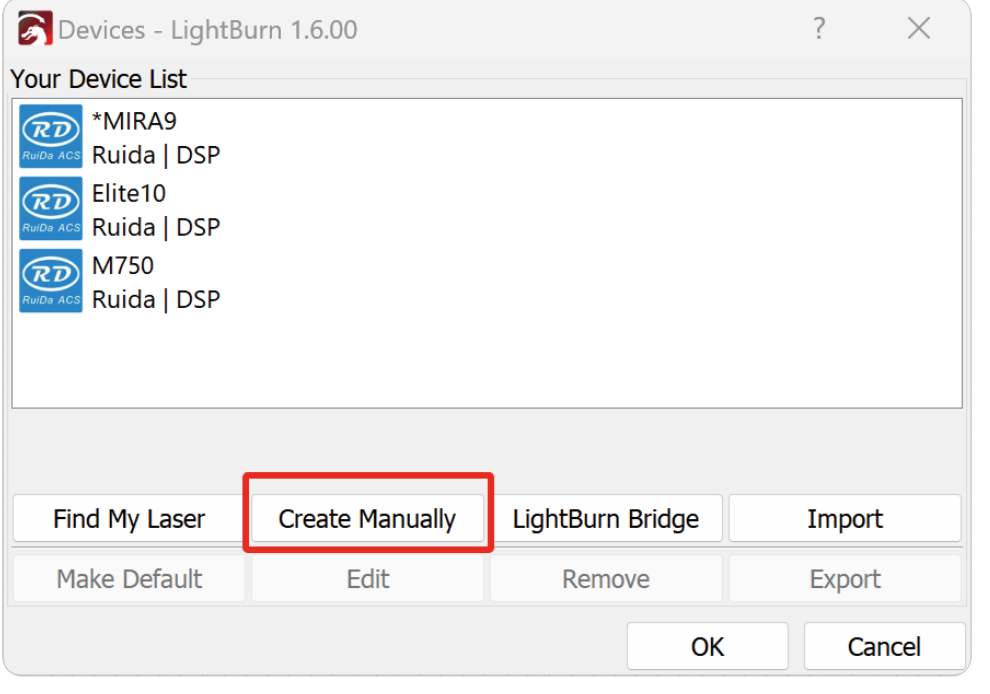


Double click the lightburn shortcut icon 

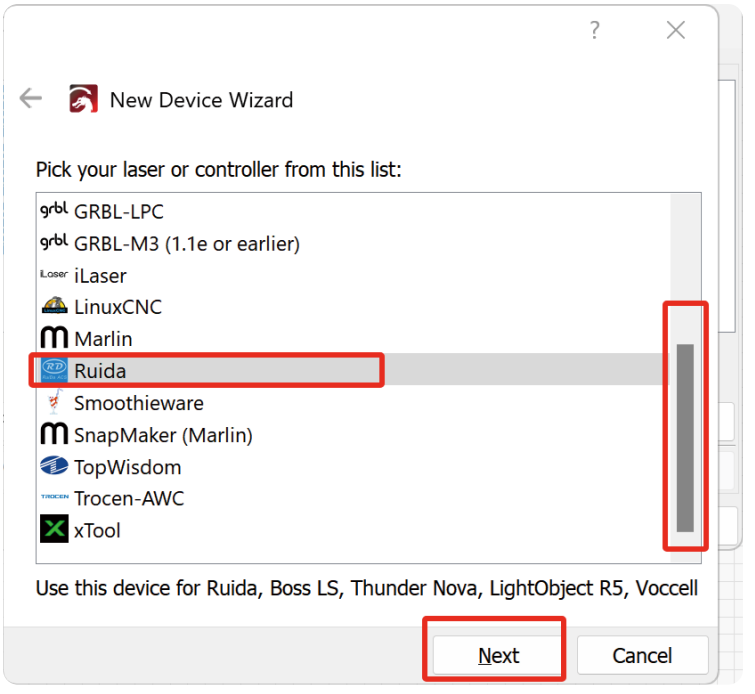
on desktop to run the software. Click Devices at the bottom right of the software window.



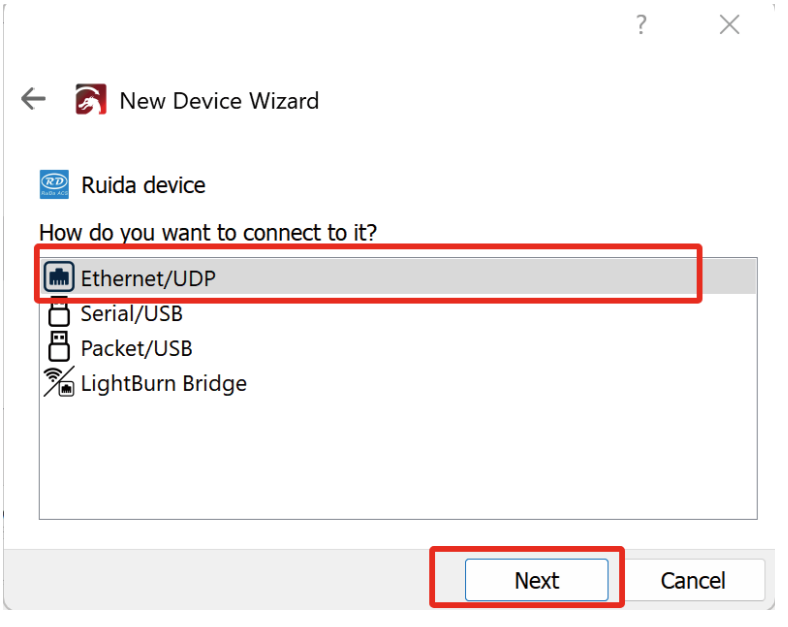
Click <create manually>



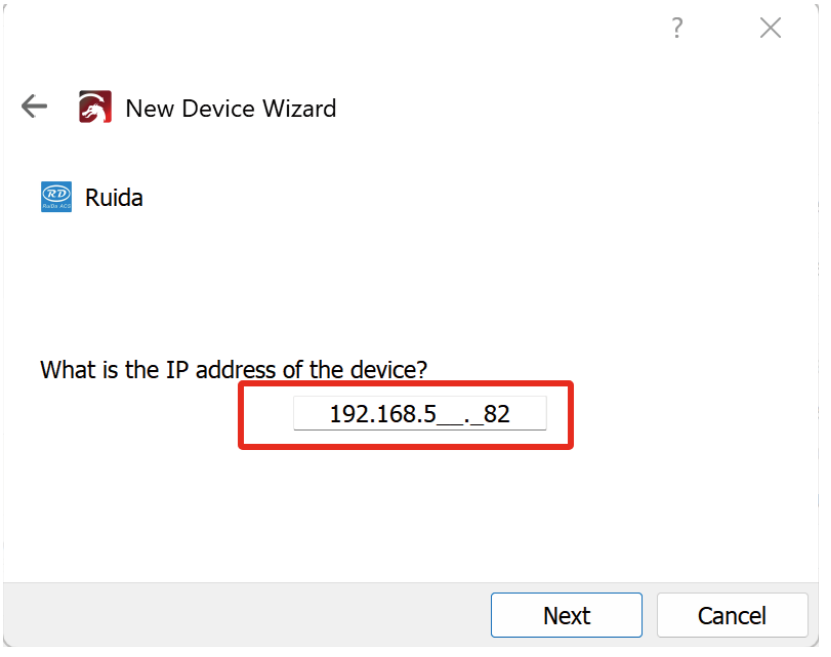
Scroll down and find the Ruida controller, select it and click Next.



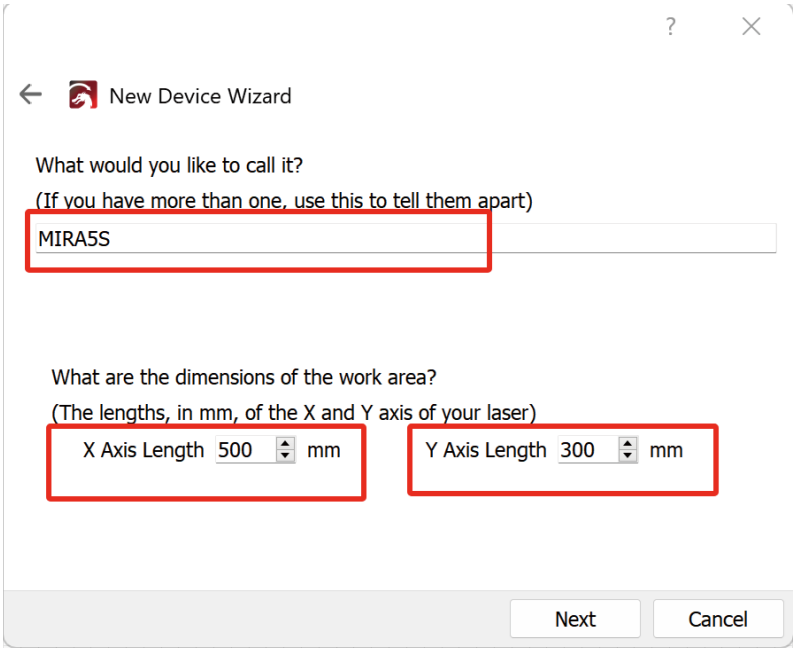
Select Ethernet/UDP and click Next



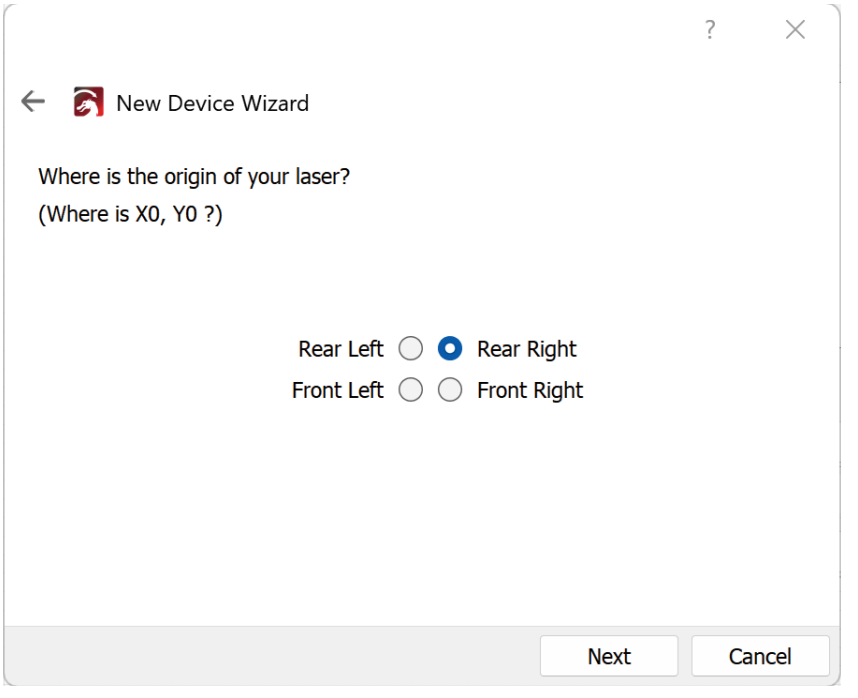
Enter the machine's IP address obtained from the control panel and click **Next**



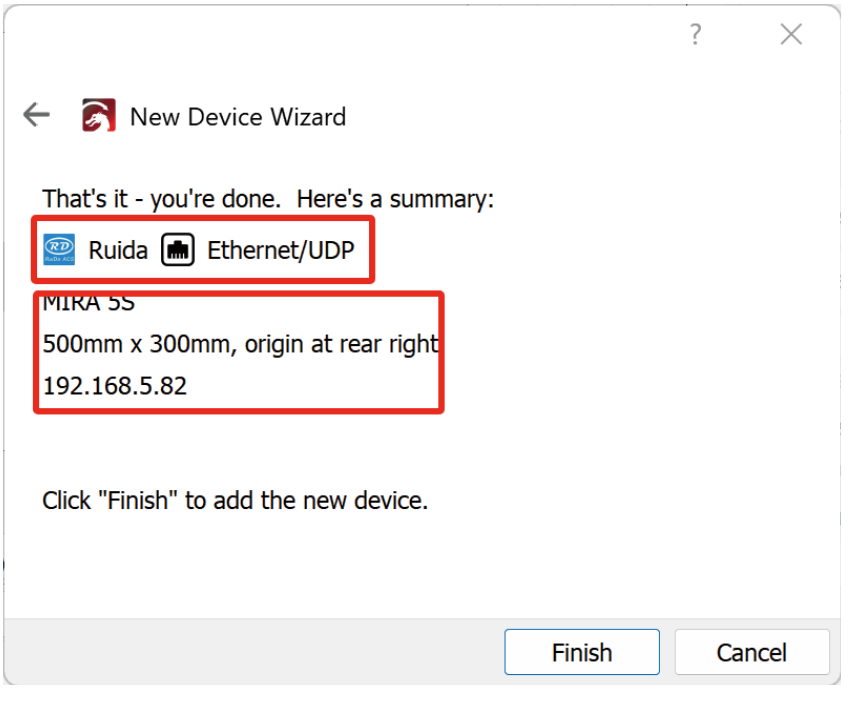
Name the machine and enter the X and Y dimensions. For example, for a MIRA 5S, set X to 500mm and Y to 300mm; for a MIRA 7S, set X to 700mm and Y to 500mm. These dimensions represent the working area of your machine. Once completed, click **Next**



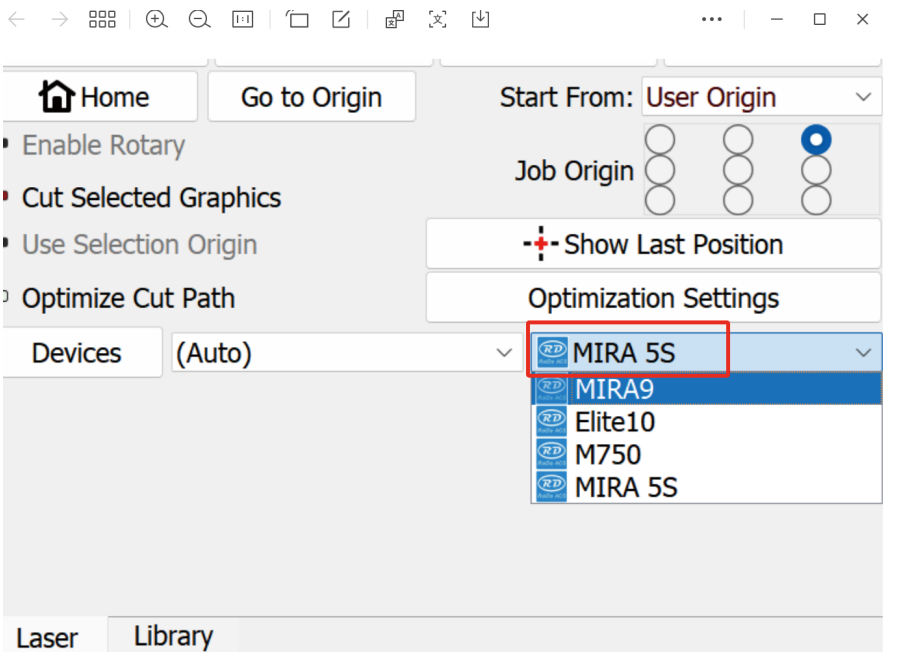
Here you will need to set the origin of the laser head. We could choose Rear Right.



Here you will see a summary of this connection, click Finish to finish the setup.



Go to the bottom right of the window, and select the link you just created:



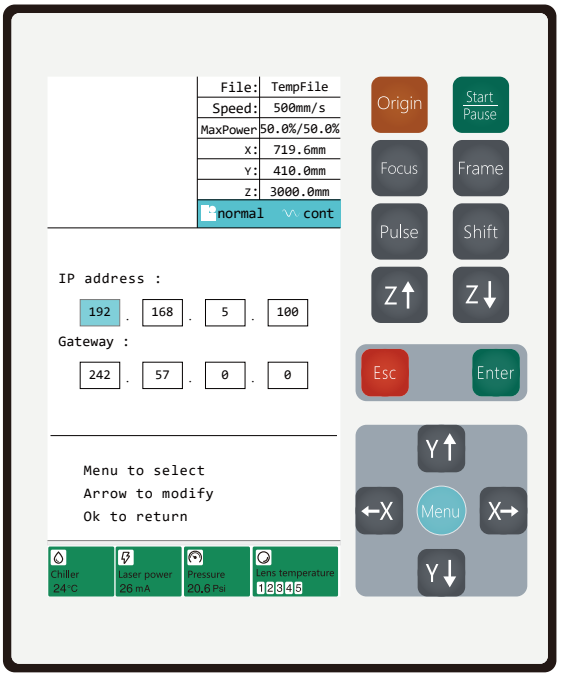
You are ready to go!

Connect your machine to Lightburn via WiFi

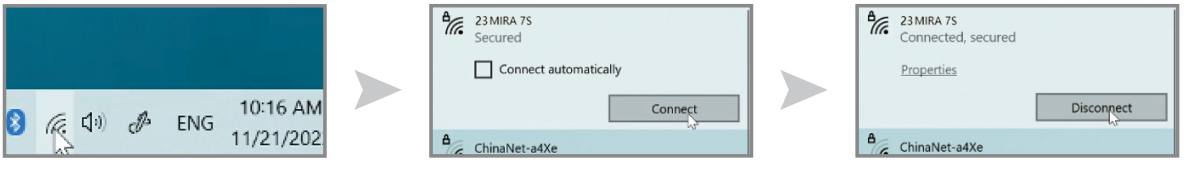
Redline WiFi Modes:
AP Mode: The machine's built-in router acts as an access point, allowing direct connection between the machine and your computer. Note that this restricts internet access on your computer while connected to the machine.

Client Mode: The router connects the machine to your local wireless network, enabling both control of the machine and internet access on your computer. Start with AP mode, then switch to Client mode for greater convenience.

AP Mode Connection:
Power on the machine and wait a few seconds until it beeps.
Go to the control panel, press the Menu key, and use the arrow keys to select IP address to check the machine's IP address.

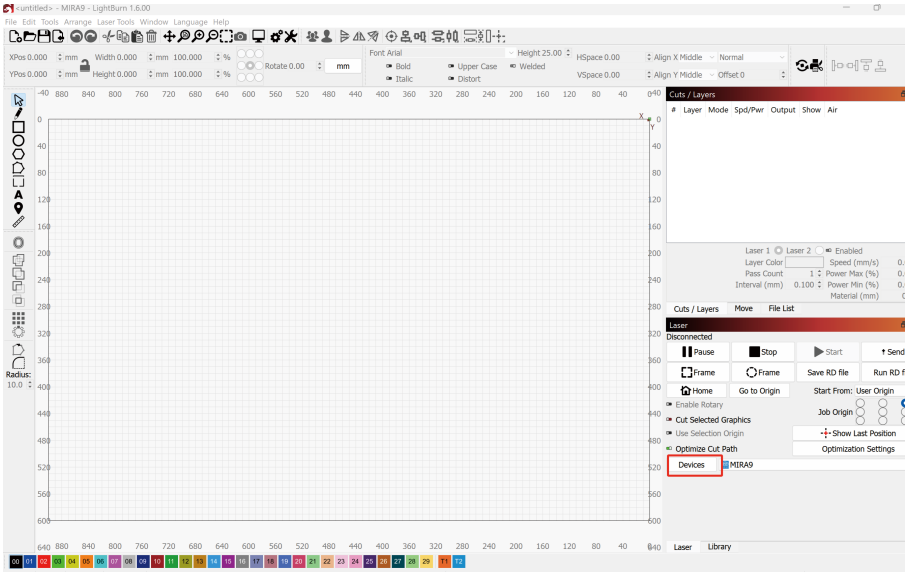


Click the WiFi icon on the bottom-right of your computer screen.From the list of available networks, select the wireless network. The default SSID is **TP-LINK_XXXXXX**.Click "Connect." Once the "Disconnect" button appears, your computer has successfully connected to the machine's wireless access point.

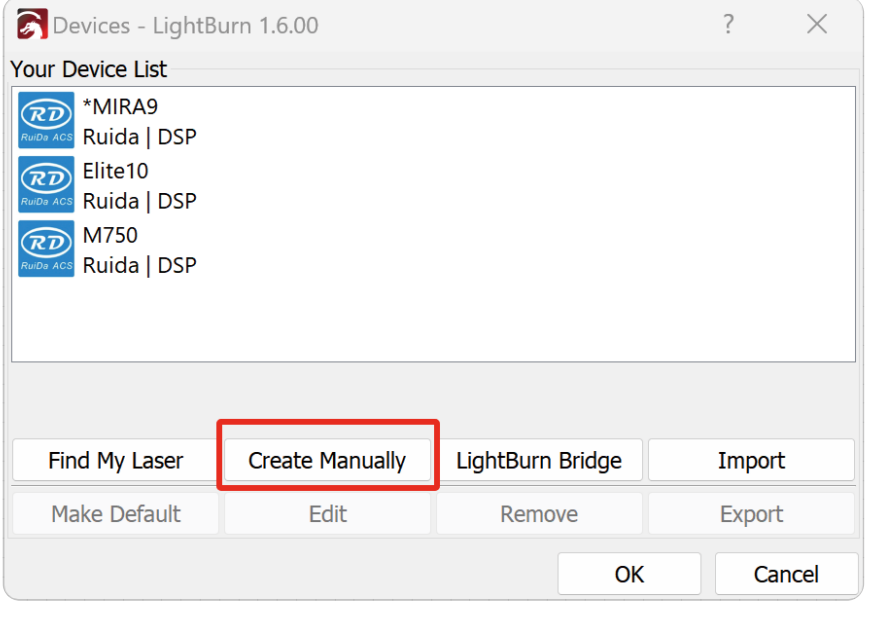


Double click the lightburn shortcut icon 

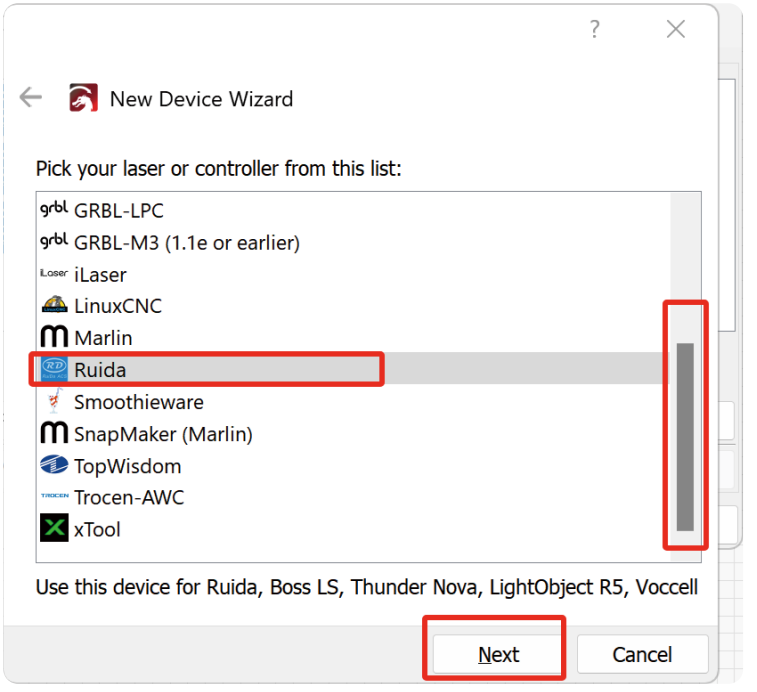
on desktop to run the software. Click Devices at the bottom right of the software window.



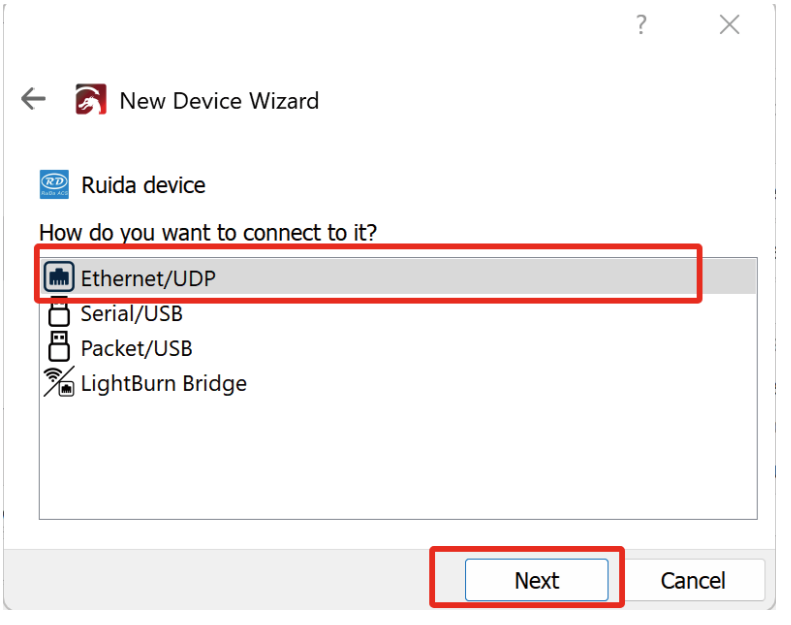
Click <create manually>



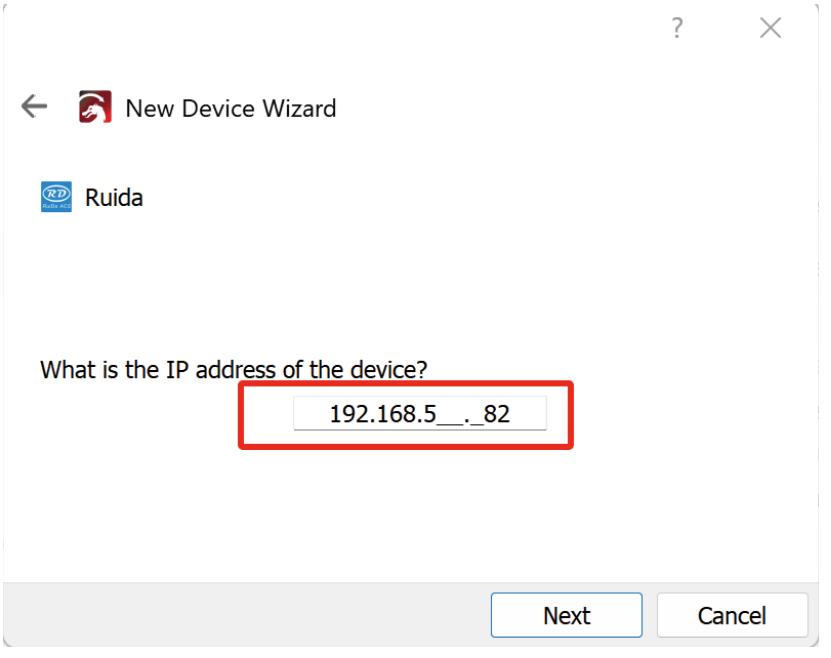
Scroll down and find the Ruida controller, select it and click Next.



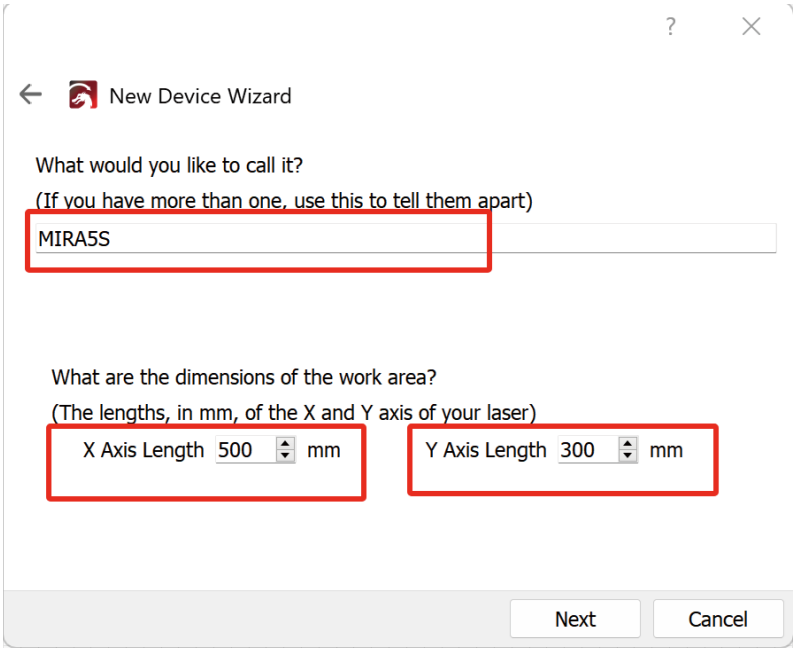
Select Ethernet/UDP and click Next



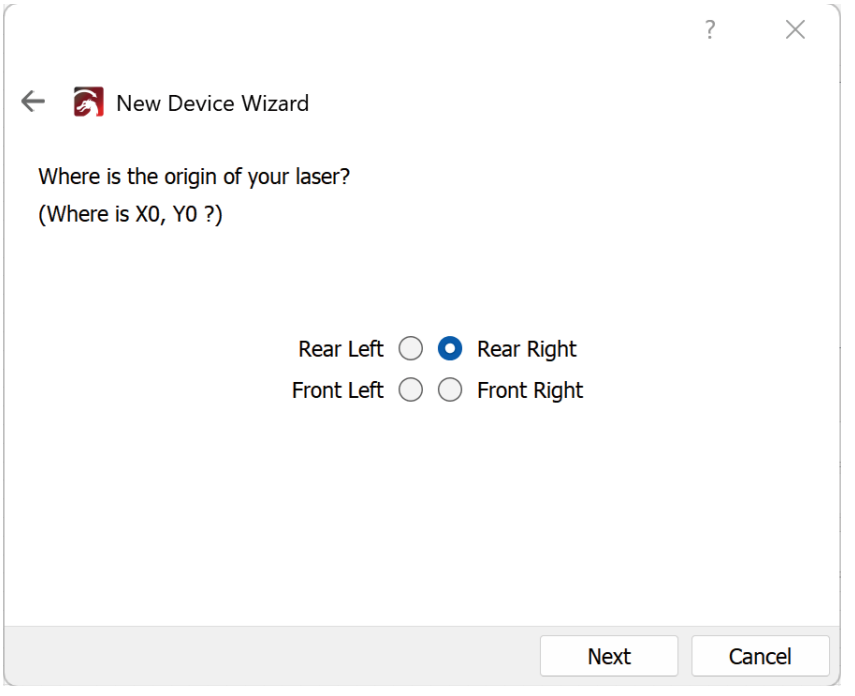
Input the machine's IP address you got from the control panel of the machine and click Next:



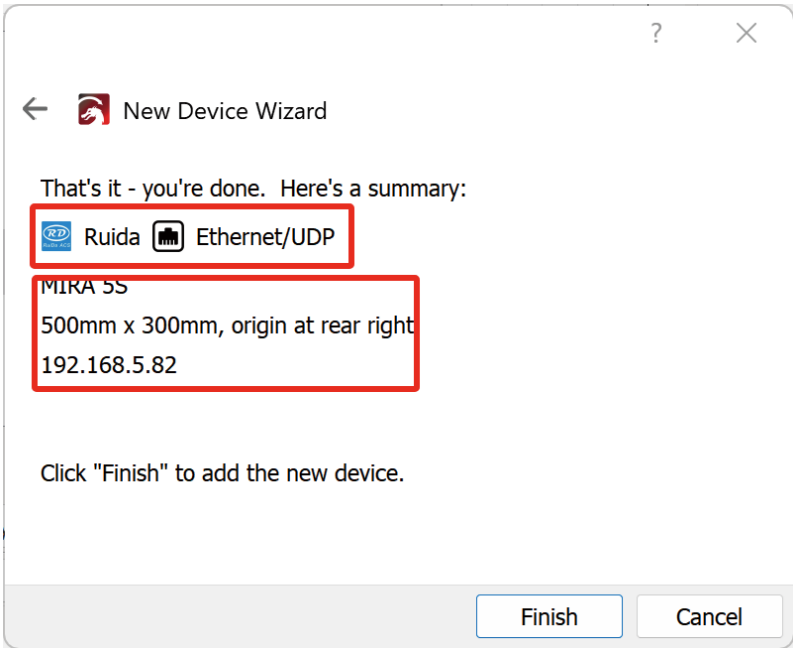
Name the machine and enter the X and Y dimensions. For example, for a MIRA 5S, set X to 500mm and Y to 300mm; for a MIRA 7S, set X to 700mm and Y to 500mm. These dimensions represent the working area of your machine. Once completed, click Next



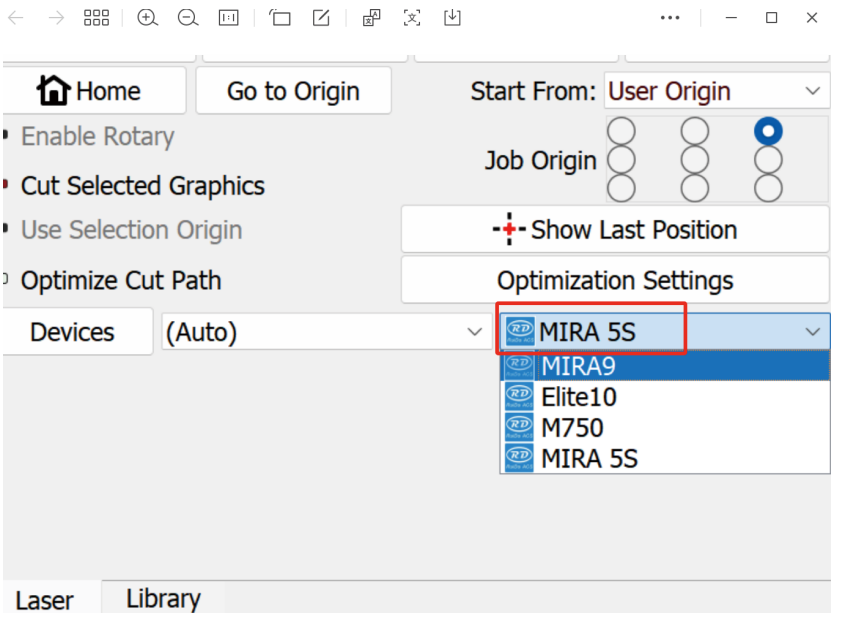
Here you will need to set the origin of the laser head. We could choose Rear Right.



Here you will see a summary of this connection, click Finish to finish the setup.



Go to the bottom right of the window, and select the link you just created:



The machine has been successfully connected to LightBurn in AP mode, allowing control of the machine but without internet access. To enable internet access while controlling the machine, switch to Client mode

Switching to Client Mode

Same method as “**page 45**”

After it is successfully connected, you are ready to go.

Try the first job

After you have connected the computer with the machine. You could start the first job. Here is a simple example to demonstrate the general operation process.

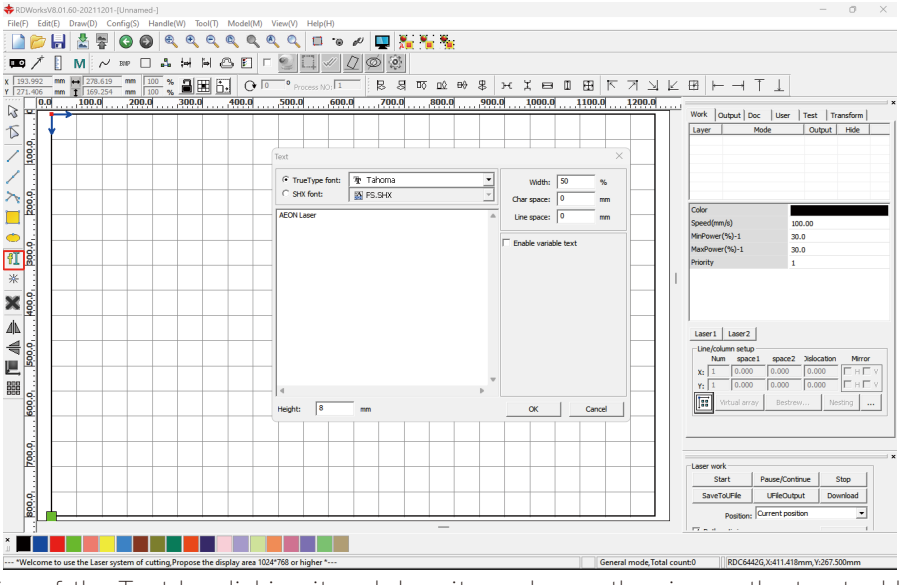
1. Prepare the engraving material.

Find a small piece of material that is suitable for engraving. Plywood, MDF,Acrylic, etc. Place it on the honeycomb table. Here we use a piece of 3mm plywood.

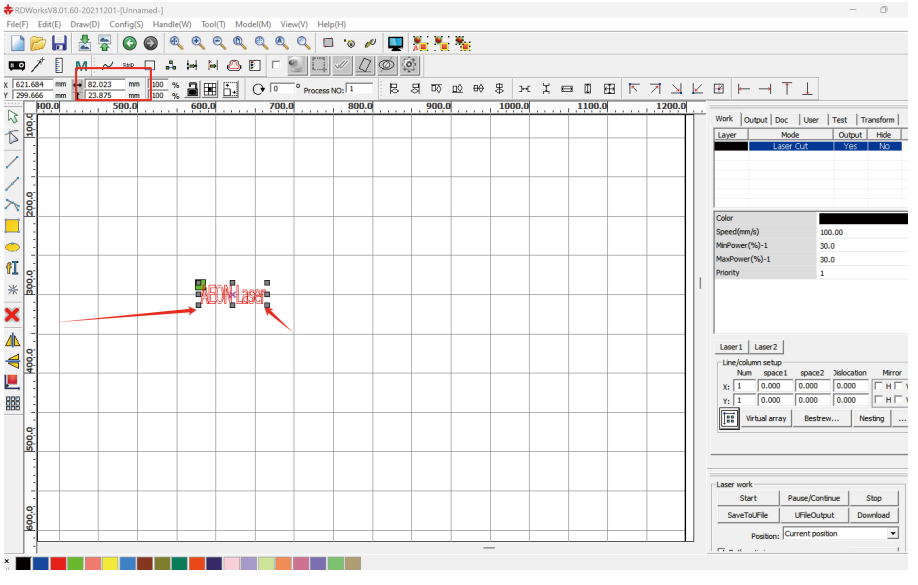
2. Create a job file.

Open RDworks software. Here we assume you have already installed the software and connected with the machine.

Click the Text icon on the left toolbar of the software. It will pop up a Text input Window, Input "AEON Laser" and click OK.

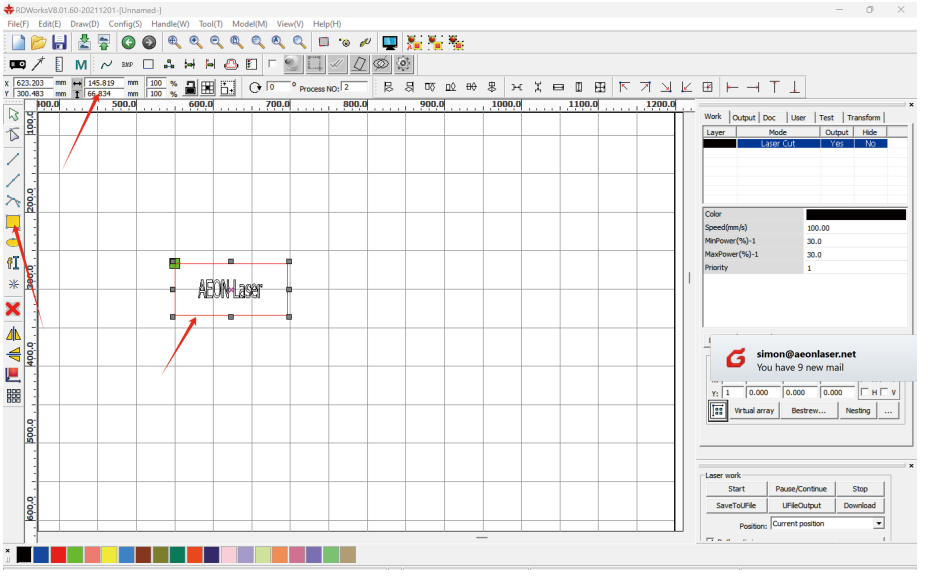


Adjust the size of the Text by clicking it and drag it, or change the size on the top tool bar.

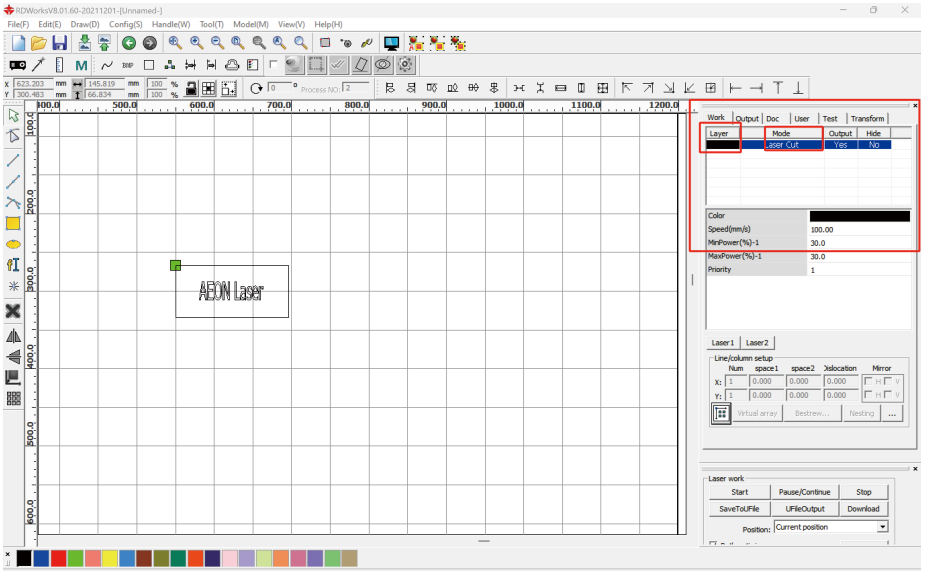


Click the Rectangle on the right tool bar, drag the mouse to draw a rectangle over the Text. Click the rectangle, move the mouse on to the spot of it, 

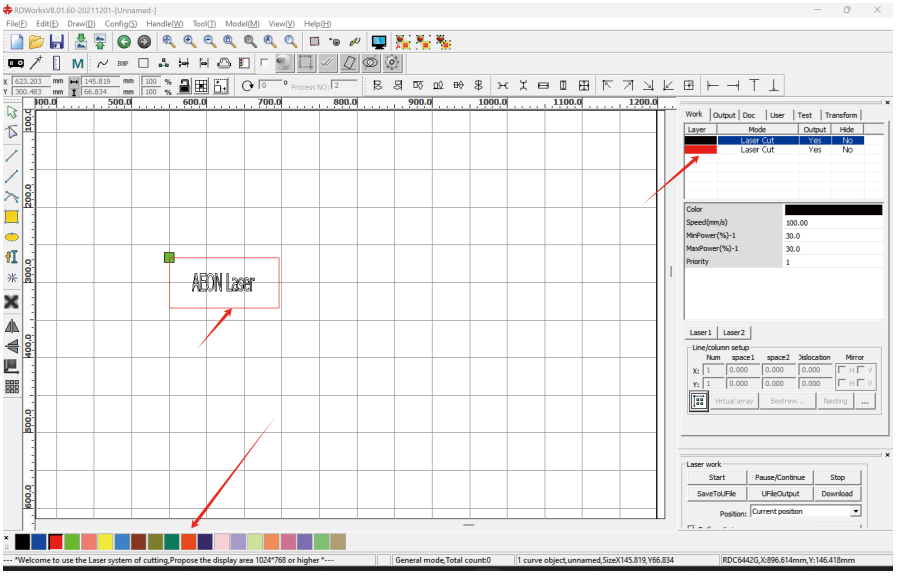
, drag it to change the size. Or go to the top toolbar to revise the size.



Check the top right of the software window, you will see a layer has been created. Layer color is in black, layer mode is “Laser cut”.



Click the rectangle to select it, then click the bottom color palette to choose a color to show it. Once the color is selected (e.g., red), a new layer will be created with the default mode set to "laser cut."



Change the first black layer, where the text is located, to scan mode by double-clicking the layer. A parameter setting window will pop up. Set the speed for engraving (e.g., 600), change the Processing Mode to **Scan** (engraving mode), and adjust the min and max power. Set the Interval to 0.08mm (approximately 317 DPI or lines per inch). Click OK to save the settings.

Laser engraving involves three key parameters: speed, power, and interval settings. The laser, a highly concentrated beam of light, generates extreme heat to burn the material.

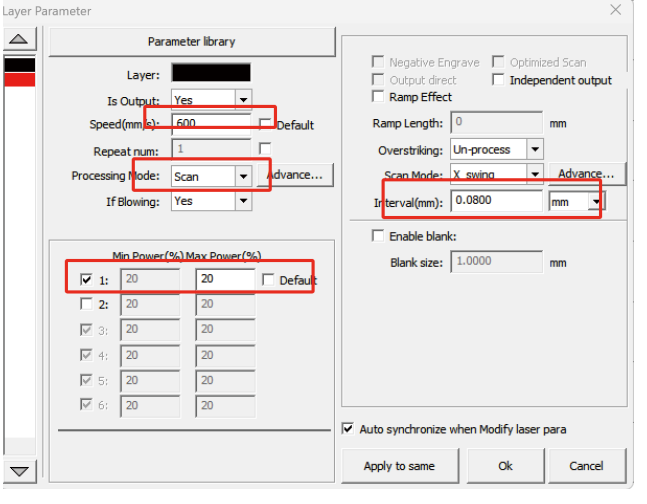
To achieve deeper engravings:

➢**Reduce Speed:** Slowing down the laser allows it more time to burn deeper.

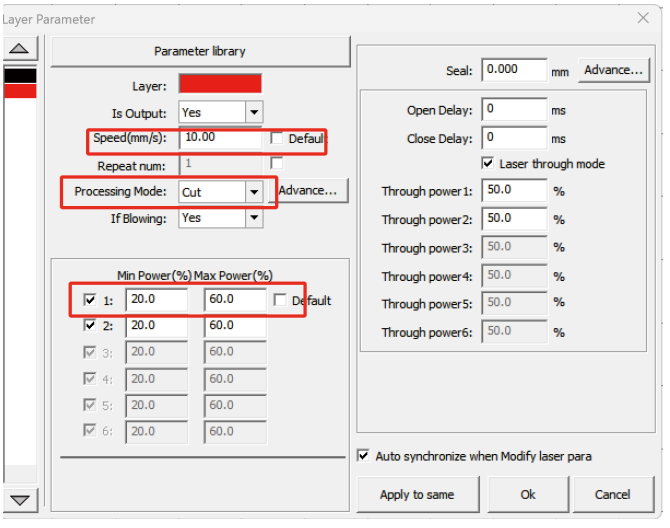
➢**Increase Power:** Higher power results in a stronger burn.

➢**Adjust Interval:** The smaller the interval value, the higher the resolution. This increases the overlap of the laser spot's thermal effect, resulting in more repeated passes over the same area during operation, which enables deeper engraving.

For shallow engravings, reverse these adjust ments. By balancing these settings, you can achieve precise engravings with varying depths and effects.



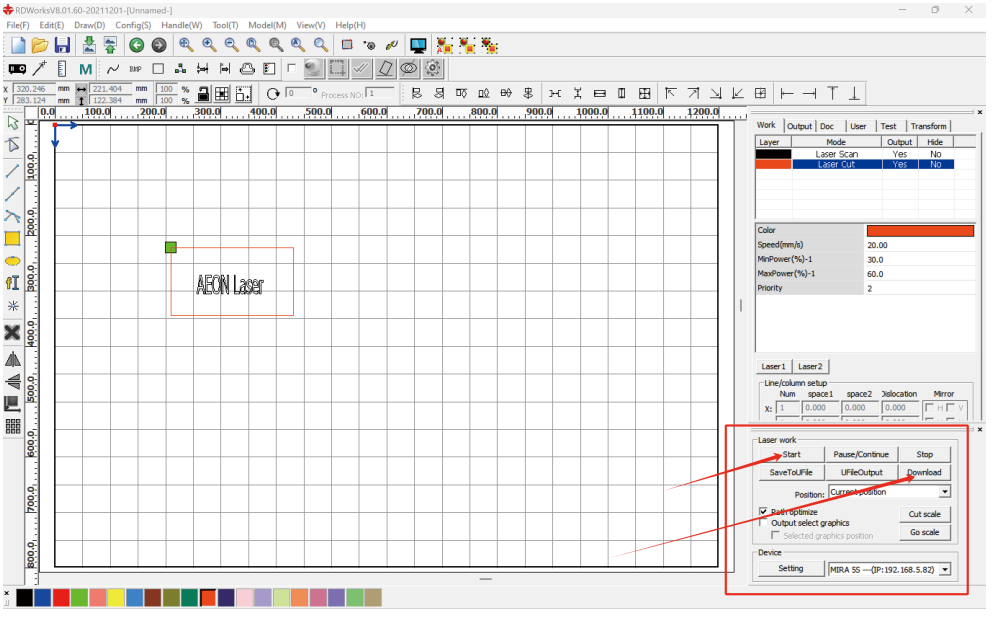
Next, click the red layer, where the rectangle is located. Set the speed to 10 and keep the processing mode as Cut. Set the min power to 20 and the max power to 60 (the laser will use min power for corners to prevent over-burning and max power for other areas). These settings depend on your laser tube's power and the material's thickness. Generally, for cutting through material, use a slower speed and higher power. Click OK to finish the settings.



It's done! You have now completed a job file for the laser.

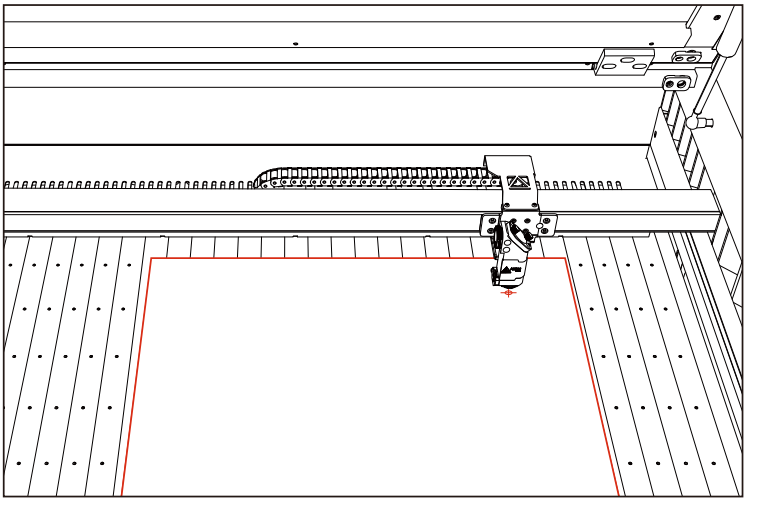
3. Send file to machine

After creating the job file, click the Download button at the bottom right of the software to transfer it to the machine's controller, as direct transfer may cause issues with large files



4. Do autofocus or manual focus

Once you have successfully sent the job file to the machine, you can go to the machine. Press the ←X X→ Y↑ Y↓ key to move the laser head onto the left top corner of the material. There is red dot to indicate exactly where the laser come from Press the Focus key, and then press Enter to confirm. The worktable will automatically lift up till the laser head touch the material, and then it will stop automatically at the focus point of the laser beam.

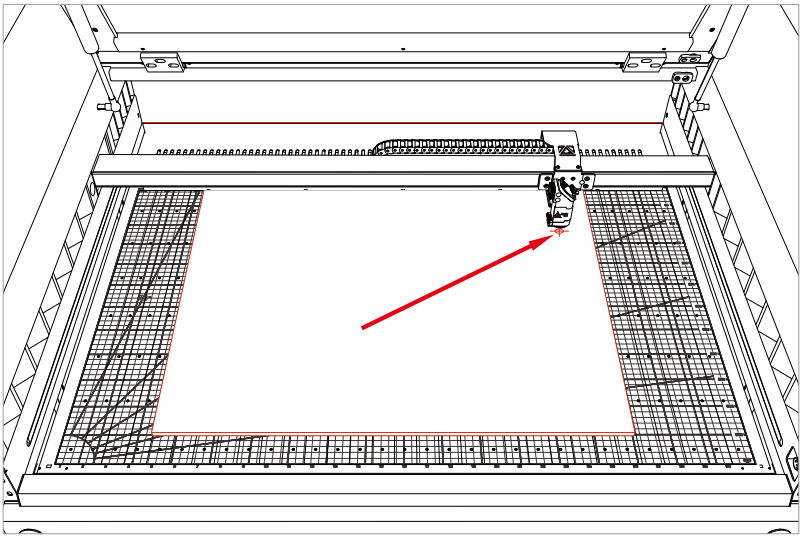


It's essential to process materials at the focus point of the laser beam to achieve the strongest power and thinnest beam. However, for some applications, like engraving on glass, you may need to defocus the laser slightly to widen the beam, which can speed up the process. For instance, autofocus, then adjust the worktable up or down by 1mm for better results.

Note: Autofocus may be inaccurate on soft materials like fabric or foam. Avoid using autofocus directly on the blade or honeycomb table without material underneath, as it may damage the laser head or the table. If you have a software material, you can manually focus the laser.

5. Set Origin and frame the job.

Once you get the machine focused. Press the ←X X→ Y↑ Y↓ to move the laser head to where you want to start your job. As a user, you don't want to waste your materials. Remember the laser Origin we sent when we installed the software? It is on the real right. So, we move the laser head to the top right corner of the material. Press Origin key to set the user origin. This means, the laser will start the job from the point that the red dot indicated.



After the orgin was set, you could can press Frame to frame the job. The laser head will travel anticlockwise to draw a virtual rectangle to indicate the size of the job. This will make sure your job is within the boundary of the material. If your job size is larger than the material, you either need to adjust the size of your design file or find a bigger material. If it is small than your material but is not within the material area, you could move your laser and set the Origin and do frame again till it fall into the material area.

6. Press Start

Ensure that the material is within the specified boundaries. Once confirmed, press the Start Pause . After the job is complete, the laser head will automatically return to its home position and emit a beep to indicate that the process has finished.

How to Use the Overhead Camera

All Redline series come with a built-in overhead camera, which works best with LightBurn software. The camera is used for:

·Positioning designs on material
·Tracing artwork directly from the bed of the laser
·Monitoring your laser

To Use the Camera:

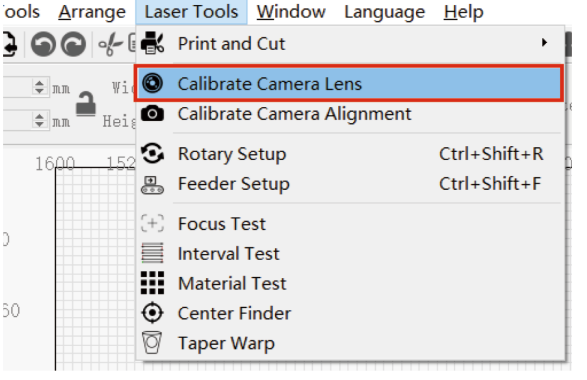
·Connect the camera to the machine using with the USB cable in accessory package.
·For the MIRA 5S, you do not need to open the lid while connecting the camera.
·For the MIRA 7S/9S, open the lid before connecting

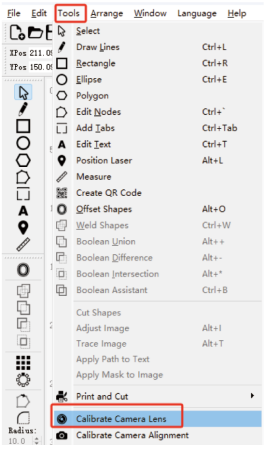
Camera Calibration:

Camera lenses can distort images (if the alignment is not done), especially fisheye lenses on larger lasers. Calibration ensures accurate use. The Redline camera comes with preset values that work well with LightBurn software. To calibrate:

·Start LightBurn software.
·If using the latest version, click Laser Tools on the top menu and select calibration Camera Lens.
·Follow the calibration wizard step by step.

If you are using an older lightburn version, you could find the lens calibration wizard by clicking the **<Tools>** and select it from the drop down menu.

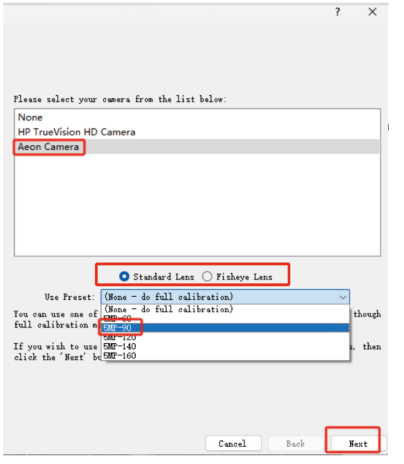


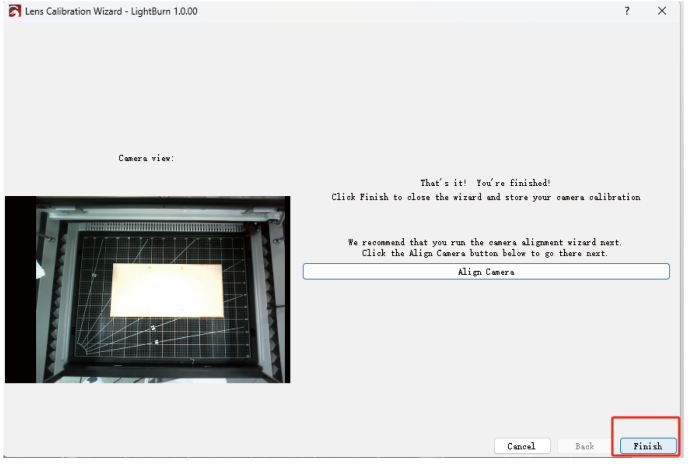


Then choose **"Aeon Camera"** from the camera list. If your machine is the MIRA 5S, select **Fisheye Lens**; if your machine is the MIRA 7S/9S, choose Standard Lens.

Next, select the preset from the drop-down list: choose **5MP-160** for the MIRA 5S and **5MP-90** for the MIRA 7S/9S.

After that, click **Next**.





Click **"Finish"**, and the camera lens calibration is finished. A big piece of check the LB to see

Camera Alignment

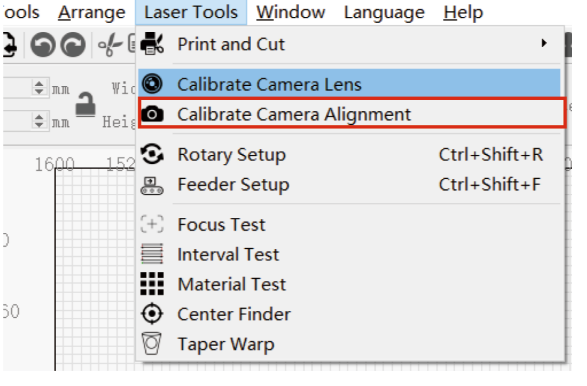
Now that the camera is calibrated, proceed to camera alignment. This step informs LightBurn of your camera's position relative to the machine's work area.

Preparation:

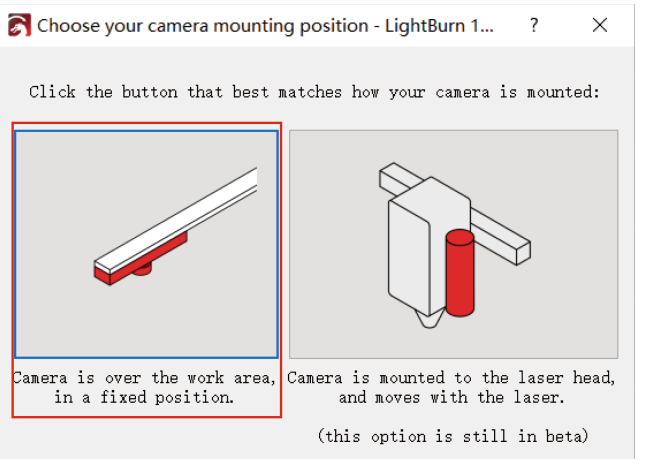
·Ensure you have a piece of material (at least 200 mm x 200 mm or about 8" square) to burn the calibration pattern onto. Larger materials may be needed for bigger lasers.

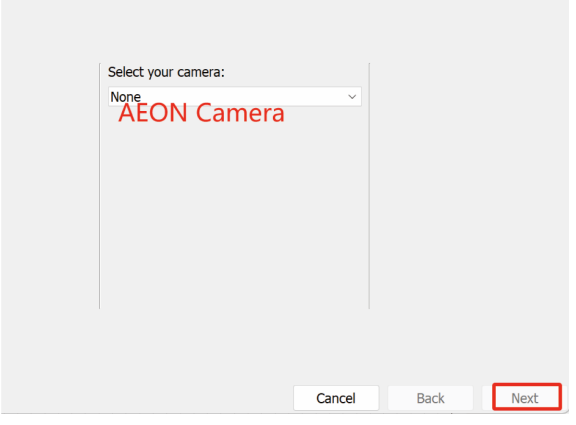
·Focus your laser based on the material you're using.

For the latest version of LightBurn, click Laser Tools on the top menu bar and select Calibrate Camera Alignment to start the wizard. For older versions, find the Calibrate Camera Alignment wizard in the Tools drop-down list.



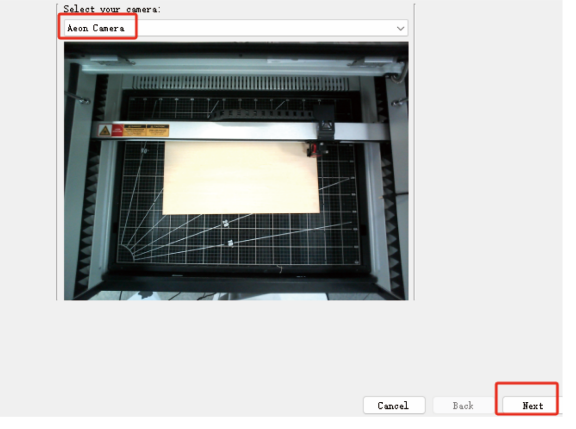
Select the first installation method.



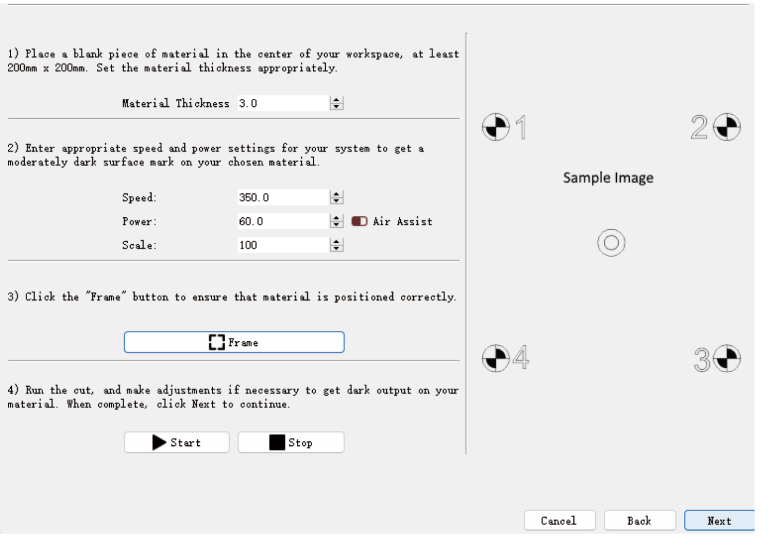


Select AEON Camera and click**”Next”**

After verifying that you see an image from the camera, click **”Next”**

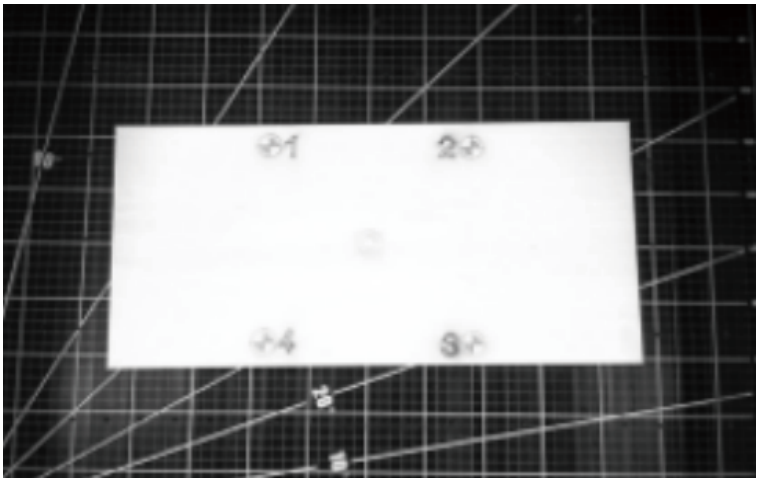


You'll get to this screen:

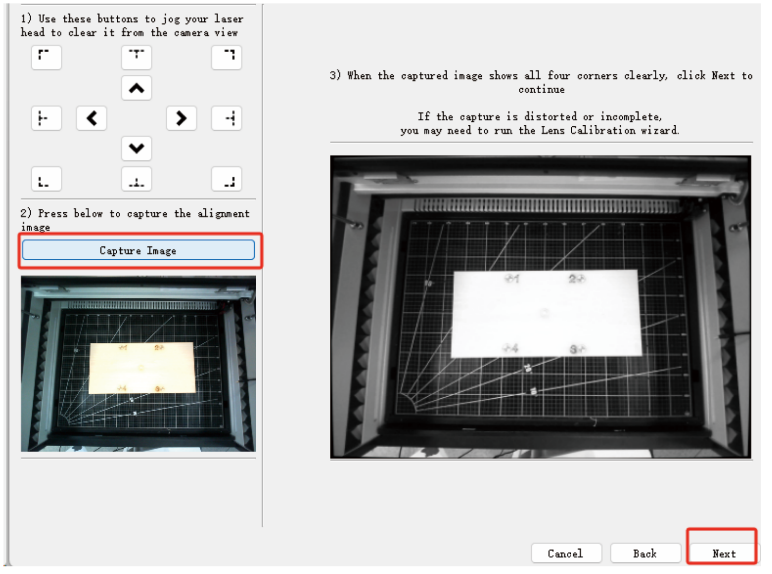


This tool uses your laser to cut a target pattern onto a piece of material, such as card stock, paper, cardboard, or thin wood. The pattern to be cut is shown on the right side of the display.

Enter appropriate speed and power settings to achieve a moderately dark mark without burning through.Adjust these settings based on your laser and material. Set "Support Height" and "Material Thickness" to zero if these values are not used in your cutting process.
For large lasers, you may need to scale the pattern up to increase accuracy. For example, on the MIRA 9S, scaling to a little over 200% can be useful. Ensure you use sufficiently large material.
Frame the pattern to verify its position on the material. After setting these parameters, run the cut. If the mark is not dark enough, adjust the settings and run it again. When the pattern is clearly visible and easy to see, click Next.



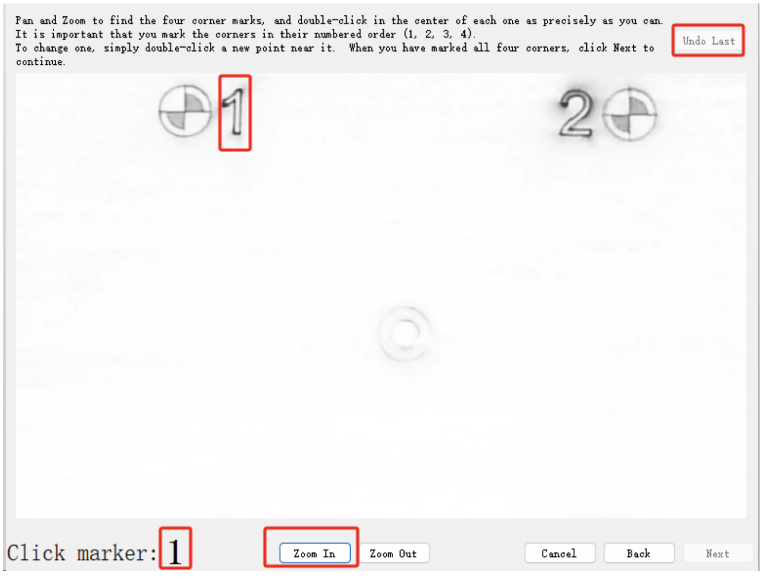
From this screen, you'll capture the alignment image. Use the jog or "send to corner" buttons to move the laser out of the view of the camera. When the camera has a clear view of all four targets, click the Capture button. You should see an undistorted version of the camera view appear in the right side of the window, with all four corner targets visible, as shown below:



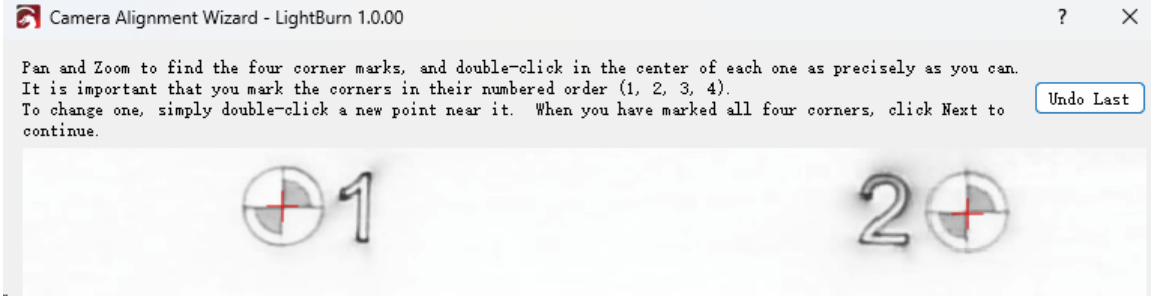
The image should be clean and undistorted. If it is not, use the **lens calibration wizard** to recalibrate the camera. Click **Next** when finished.

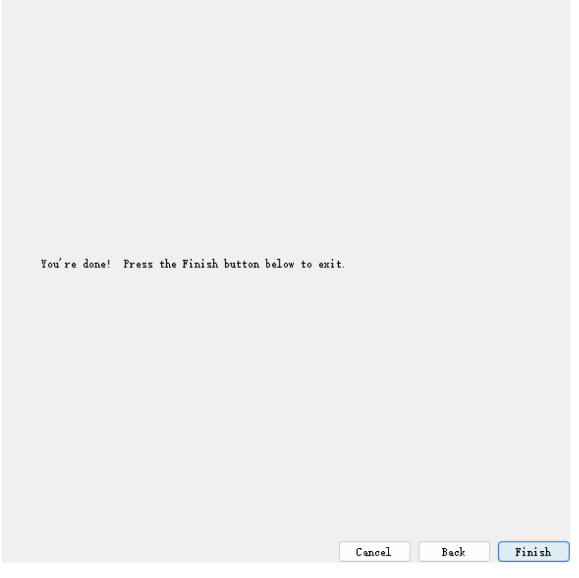
From this screen, tag each of the targets by double-clicking the center of each one in order. You can pan and zoom using the same controls as in the LightBurn edit and preview windows. Double-clicking will place a red '+' mark. Tag each of the four targets in their numbered order (1, 2, 3, 4). If a marker is placed incorrectly, double-click nearby to adjust it or click Undo Last to remove it and try again.

Once all four markers are placed, zoom out and ensure all are visible and clearly centered on the targets.



Place each marker as accurately as you can. You can see the ideal placement here:





Click **Next** to finish the marker placement screen and click Finish to complete the process and store the results. You're done!

Click **Next** to finish the marker placement screen, then click Finish to complete the process and store the results. You're done!

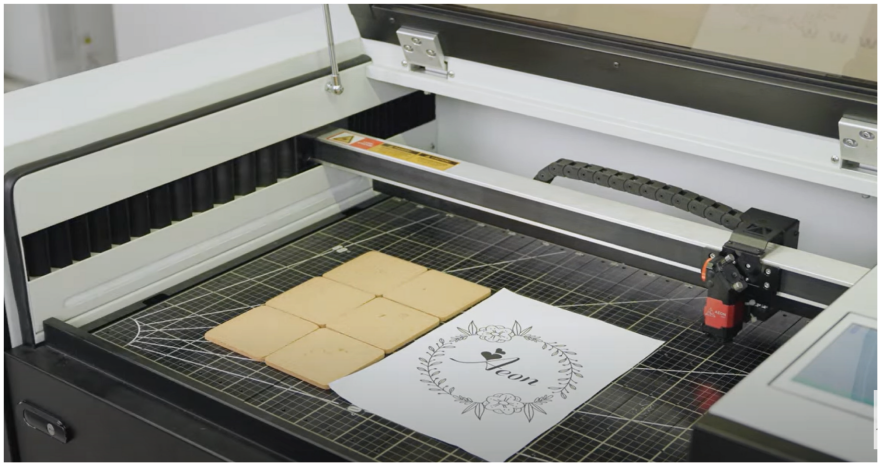
Use the camera to trace an artwork and positing.

Now that everything is aligned, we can use the camera. Let's walk through an example of how to trace printed artwork and engrave it onto a coaster

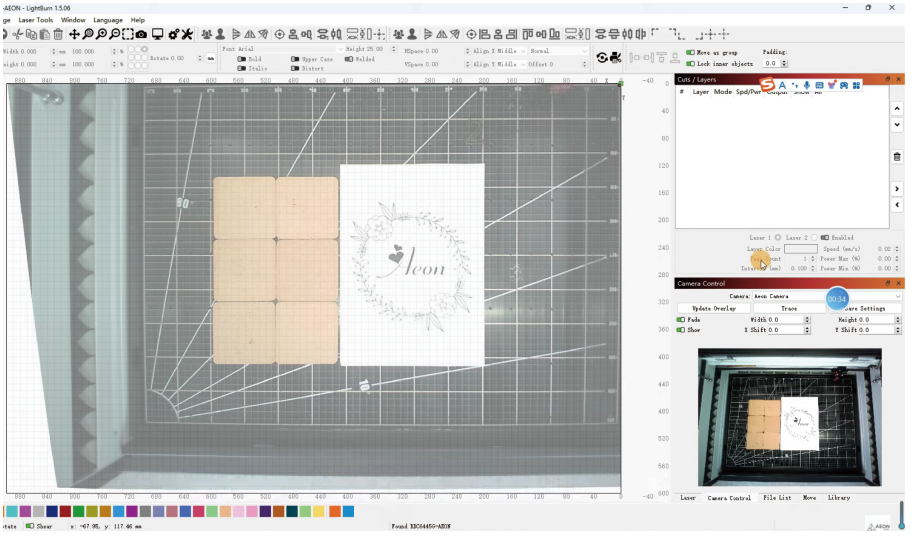
Place a piece of paper that already printed with desired artworks(our some hand drawings, etc) and some coasters along size that you want to engrave the artwork on.

Now that everything is aligned, you can use the camera. Here's how to trace printed artwork and engrave it onto a coaster:

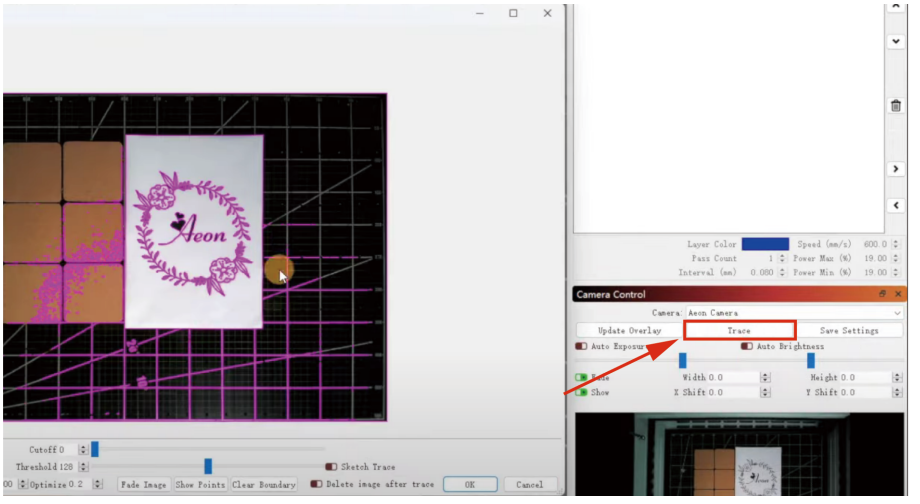
·Place a piece of paper with your printed artwork (or hand drawings) on the laser bed.
·Arrange the coasters where you want to engrave the artwork.



Keep the lid open. Open the **Camera Control** window in LightBurn, and click **Update Overlay** to capture and project whatever is in the camera view onto your workspace.



Then Click “Trace”

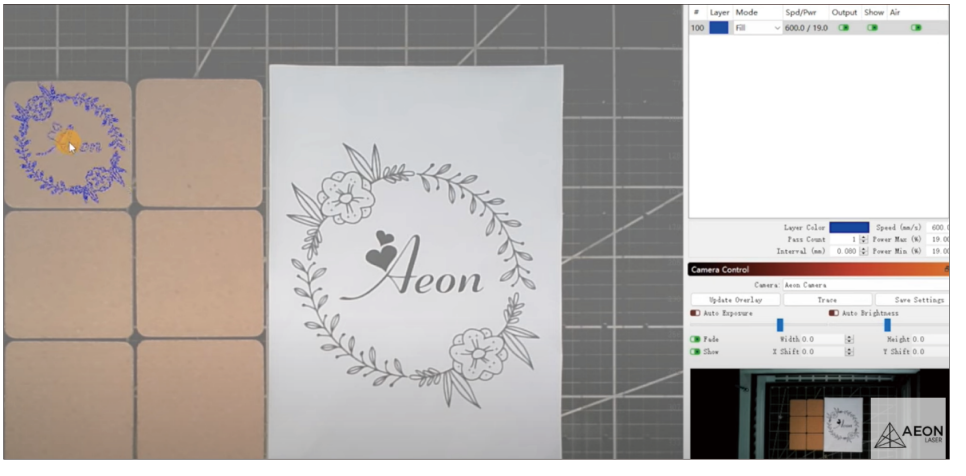


The Cutoff slider controls the lower end of the brightness range that LightBurn will outline with vectors, while the Threshold slider sets the upper end. The default range is 0 to 128, tracing values from 0 to 128 brightness and excluding lighter values from 129 to 255. Adjust these sliders until the selection area (red lines) fits the edges of the full artwork

Select the artwork by dragging the mouse and click OK, then you’ll get a vectorized new artwork in blue color.

Select the artwork and adjust its size to fit the coaster by dragging the handles or inputting the size directly from the toolbar.

Drag the artwork on the coasters.



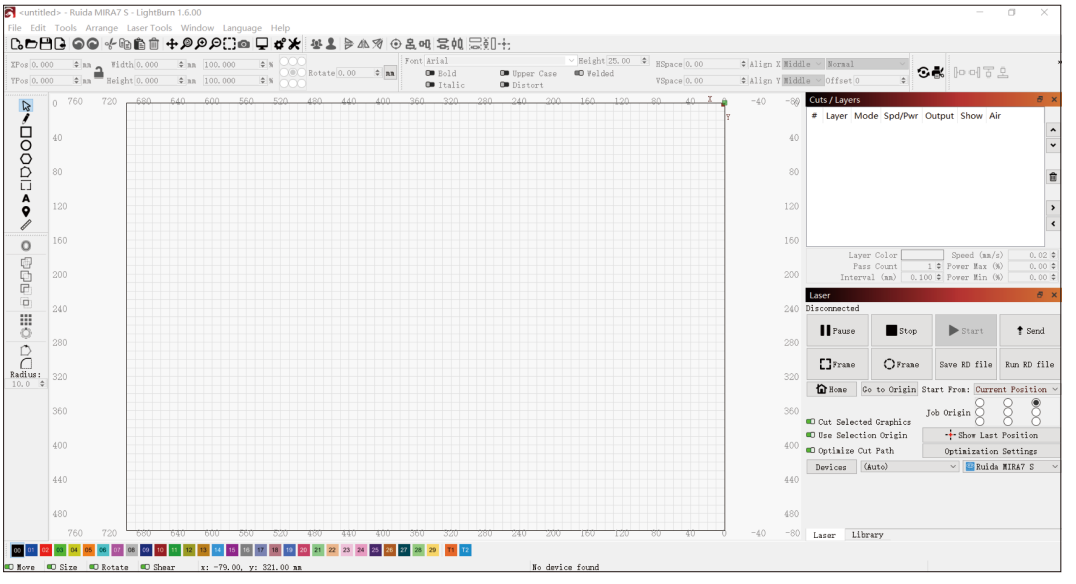
Make copies and place then on the other coasters.

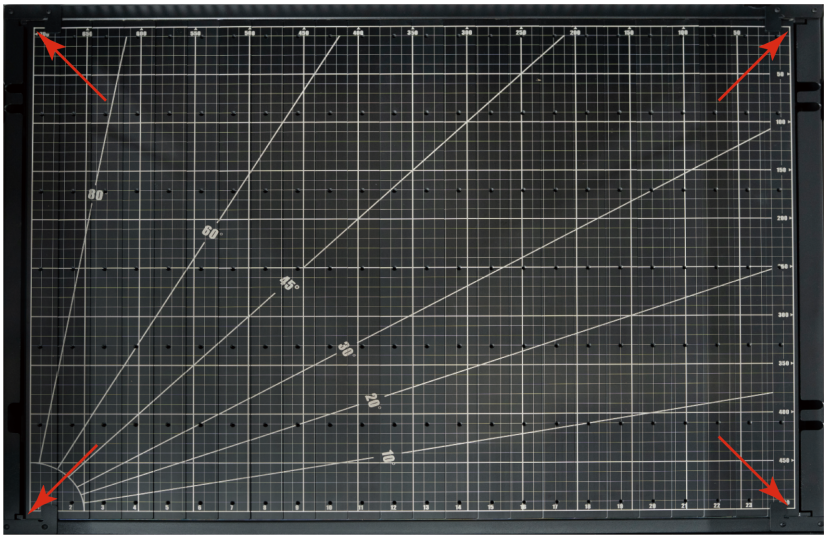
How to Use the Multifunctional Worktable

The Redline MIRA S machines come with a multifunctional worktable. When the blades are positioned downward, it functions as a flat table for precise design positioning and adding jigs for bulk engrav–ing. When the blades are upright, the machine is ready for cutting tasks.

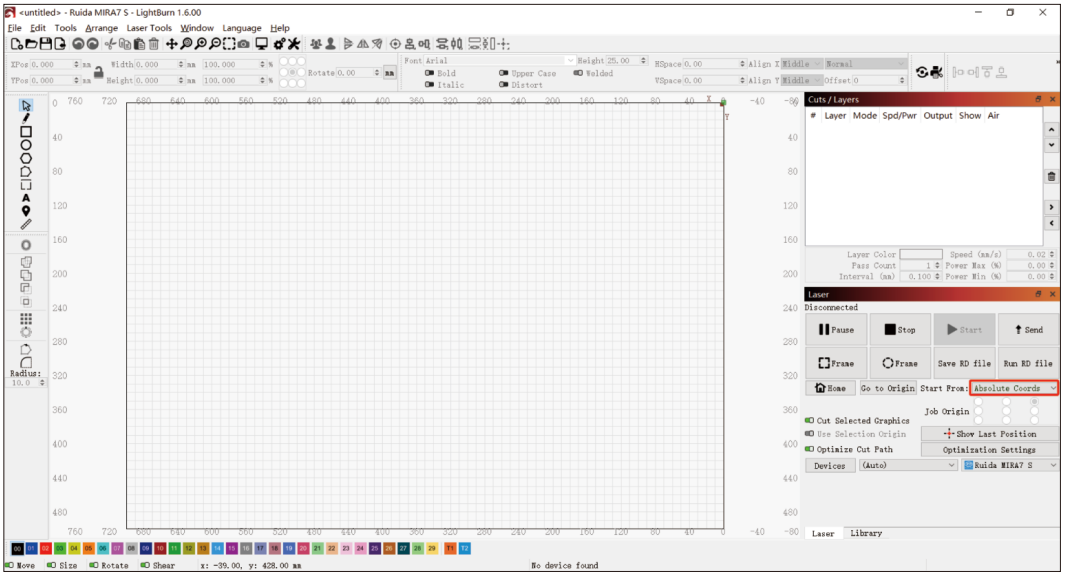
Use the Table Ruler to Position Your Artwork

The flat table is engraved with a ruler that corresponds to the coordinates in the software, allowing for accurate positioning of your artwork.

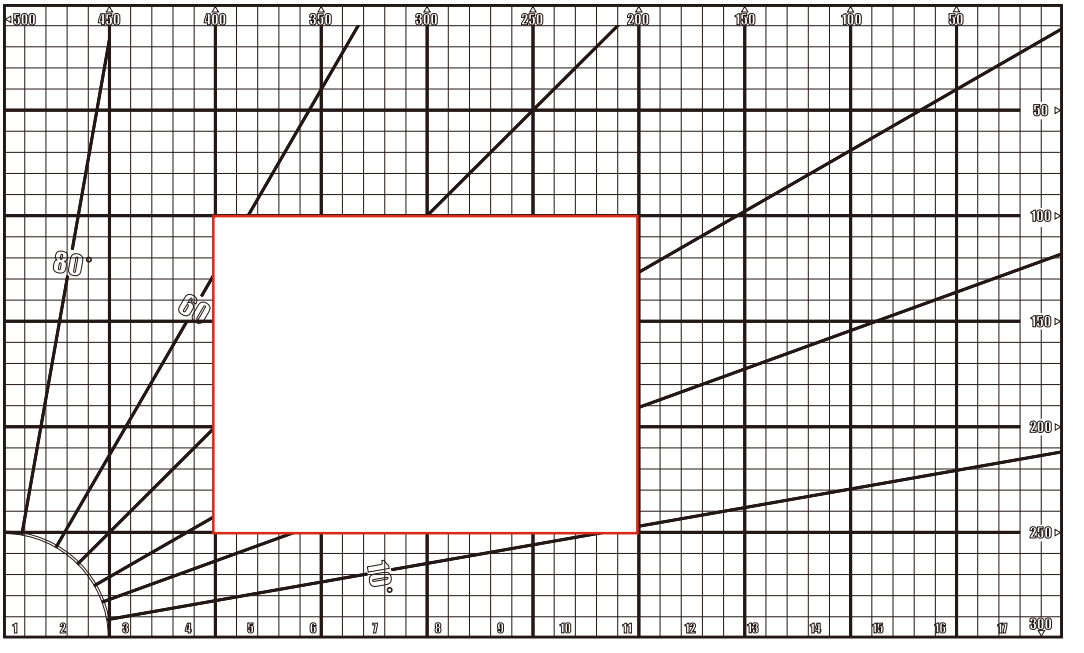




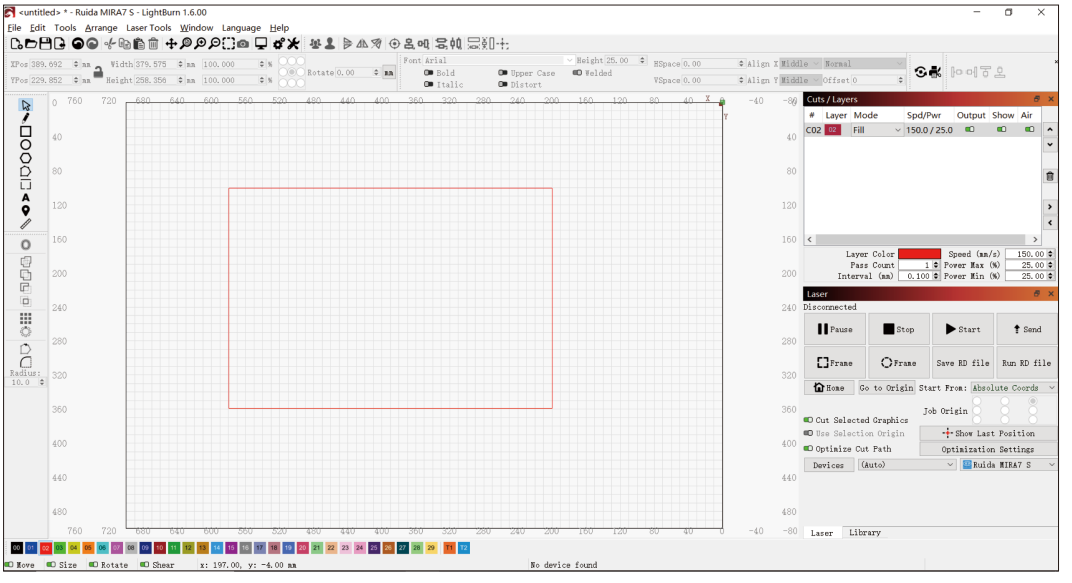
Go to Lightburn Find the**< Start From>** drop down list and select Absolute Coordinates.



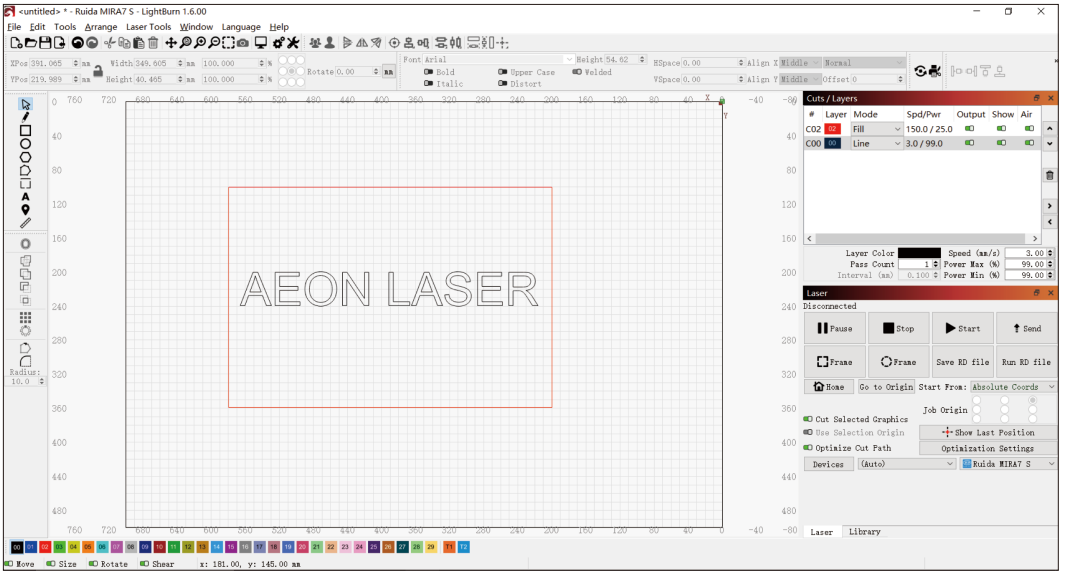
Place a piece of material according to the table ruler coordinates. We can put it on X coordinate 100, Y coordinate 200 like below: (needs sharp picture



Then we can know the four corner's coordinates on the table, and we could map this on the software exactly.

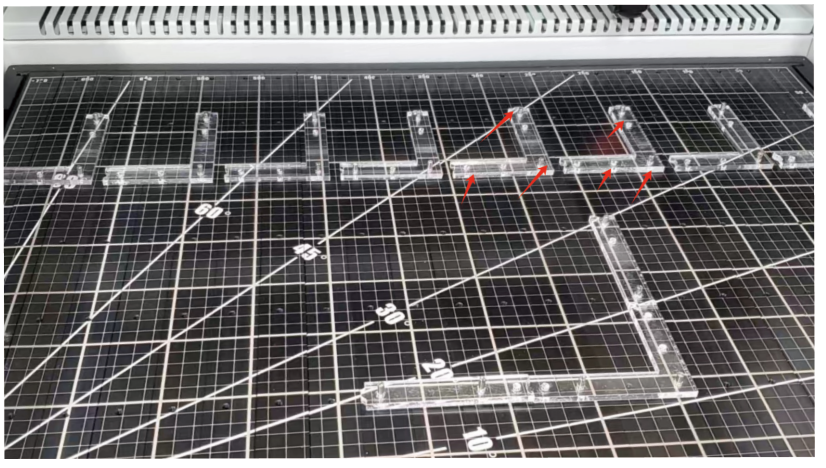


If you you want to engrave on some texts on the material, just locate it on the software, and send to the laser to process



Add Jigs on Fat Worktable.

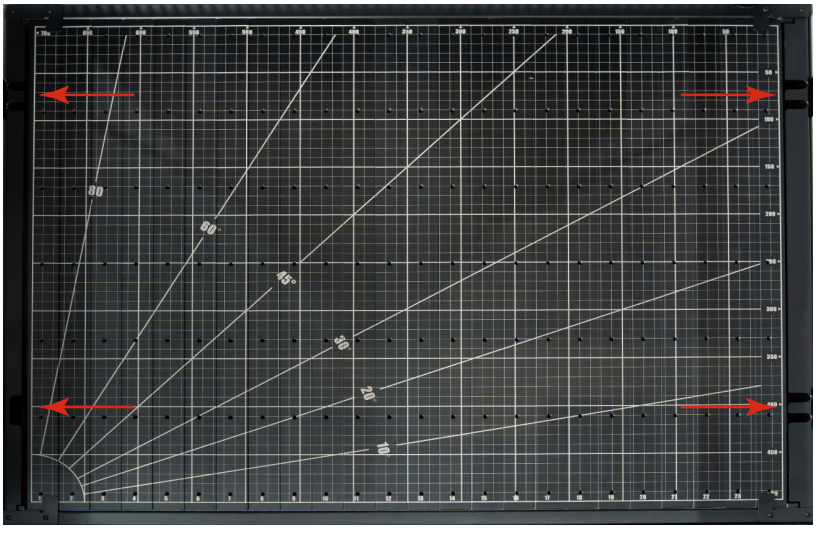
·Prepare the Blades: Ensure the blades are positioned downward to access the worktable's surface.
·Locate Thread Holes: Look closely at the worktable to find the thread holes designed for adding jigs.
·Add Jigs: Create or use pre-made jigs and secure them onto the worktable by aligning with the thread holes.
·Position Artwork: Use the jigs to position multiple pieces of material for bulk engraving.



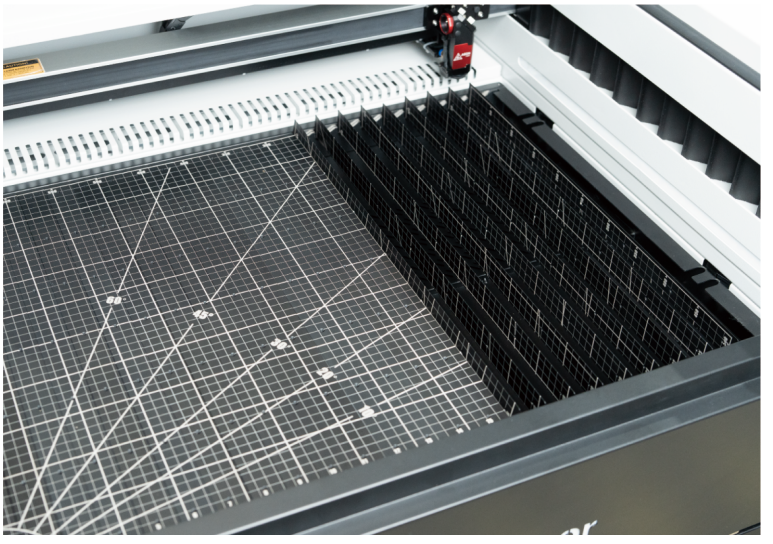
Switch to Blade Cutting Table

·**Adjust Blade Position:** Place the blades upward to convert the table into a blade cutting configuration.
·**Access the Blades:** On the right side of the table, locate the two finger holes.
·**Flip the Blades:** Insert your fingers into the holes and flip each blade upward, one by one.
·**Create Cutting Table:** Continue until all blades are in the upward position, forming a blade cutting table.

This setup helps minimize overburn by reducing the material's contact area with the table, which is useful when cutting through materials with high power settings.

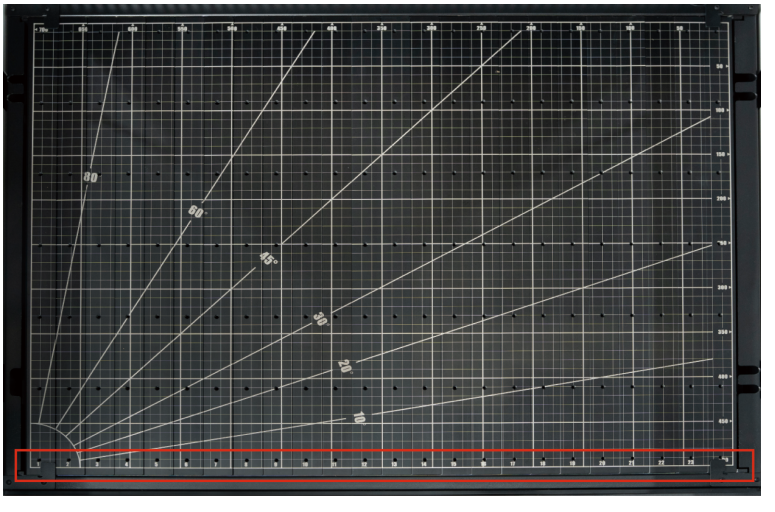


Like below:



Reconfigure Blades

·**Remove Blades:** Take out each blade and place them downward one by one, using the same method as flipping them up.
·**Restore Order:** If you accidentally mix up the blades, don't worry. Simply refer to the numbers on the blades to reinstall them in the correct order.



Important Notes:

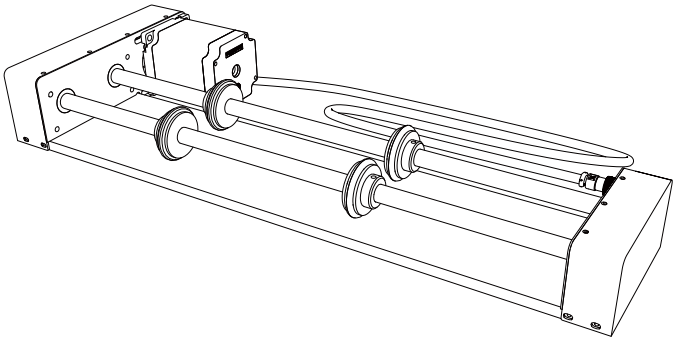
·**Avoid Cutting on Flat Table:** Doing so will damage the table coating and disrupt the ruler.
·**Use Honeycomb Table:** Place the honeycomb table on top of the blade table for cutting jobs.
·**Don't Cut on Honeycomb Table on Flat Table:** Similarly, cutting on a honeycomb table placed directly on the flat table will also damage coatings and disrupt the ruler.

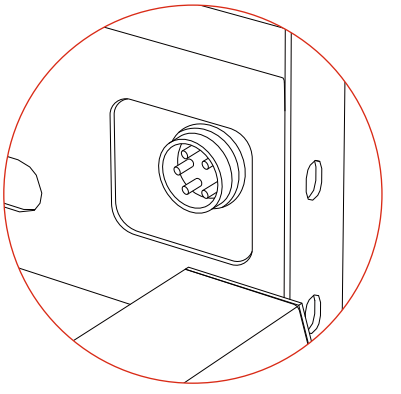
How to Use the Roller Rotary

1.Remove Honeycomb: Open the machine lid, remove all contents from the honeycomb, then carefully remove the honeycomb and set it aside.
2.Power On and Reset: Turn on the machine and let it fully reset.

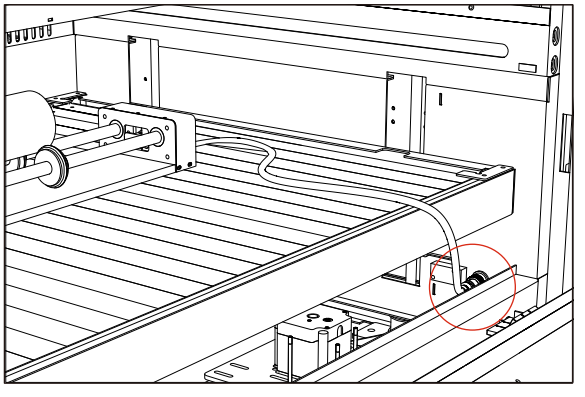
3.Lower Worktable: Press  to lower the worktable until the rotary port is fully exposed.

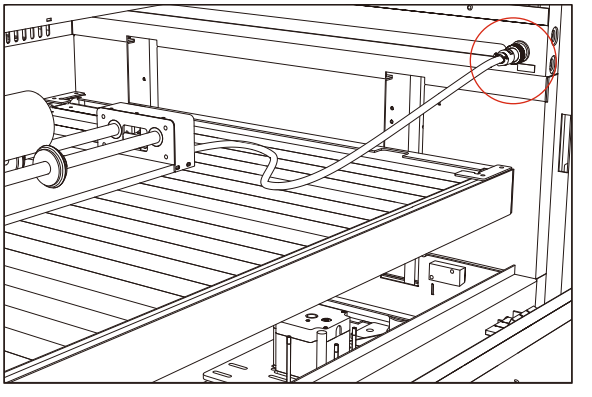
4.Position the roller rotary so that the motor is on the top left side when facing the front of the machine. If positioned incorrectly, the engraved design will appear mirrored and inverted. If placed upside down, the engraved design will be mirrored and inverted.
Lid Protection----> Open lid protection sensor





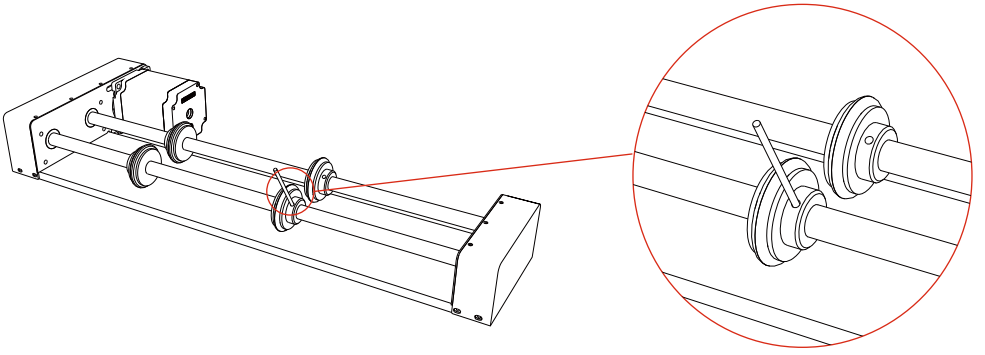
Plug the rotary into the rotary port.MIRA 5S is on the top left corner of the working area.





How to Adjust the Spacing Between the Rollers

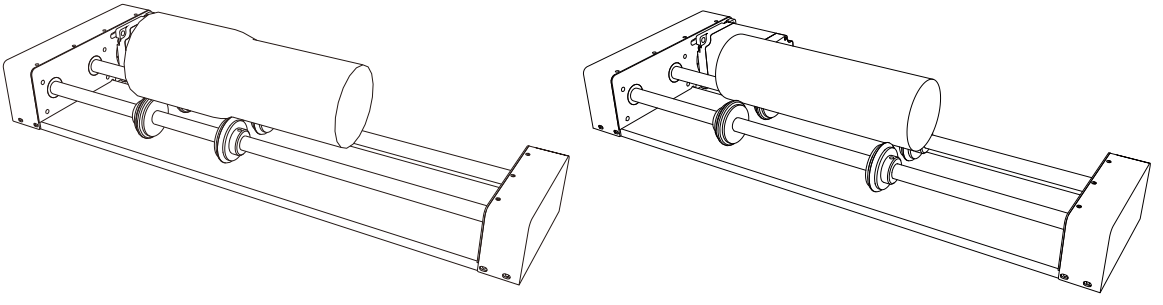
If the distance between the two rollers is too long or too short, causing the rollers unable to support the workpiece or keep it balanced, please adjust the spacing as follows when the rotary is not pluged:
Manually rotate the rollers to locate the set screws of the rollers, Use a 2.5 mm Allen wrench to loosen the set screws on all four wheels.



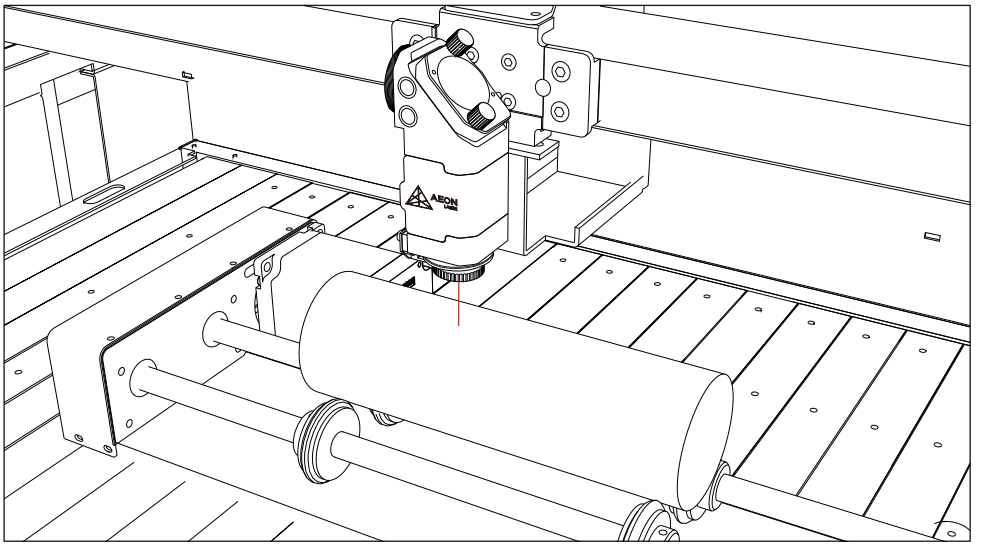
Note: Loosen the set screws by 2–3 turns, just enough so the wheels can slide freely along the rollers. Do not remove them completely. Adjust the wheels based on the size and shape of the work–piece, ensuring that any bumps or raised logos are not in the direct path of the wheels.

Setup for Different Shapes:

- **Cylindrical Objects:** Align the wheels to securely hold the cylindrical shape, ensuring even contact with the surface.
- **Rounded Objects:** Adjust the wheels to match the curvature, providing stable and flat support.
- **Irregular Shapes:** Ensure all contact points are stable and the object is held flat without wobbling.
- **Illustrations:** Use the provided images as a guide for setting up the rotary to fit different product shapes and sizes.



Move the laser head over the product using the Arrow keys on the control panel. Perform either manual focus or Autofocus. A small tip: being a couple of millimeters out of focus (e.g., 1 mm or 2 mm) can achieve better results with materials with high reflectivity and low absorption rate for CO2 lasers like glass or metal cups with thick coatings, this can also reduce the damage to the lens and laser tube caused by the reflection of the laser beam on metal materials.



Set the Rotary Parameters

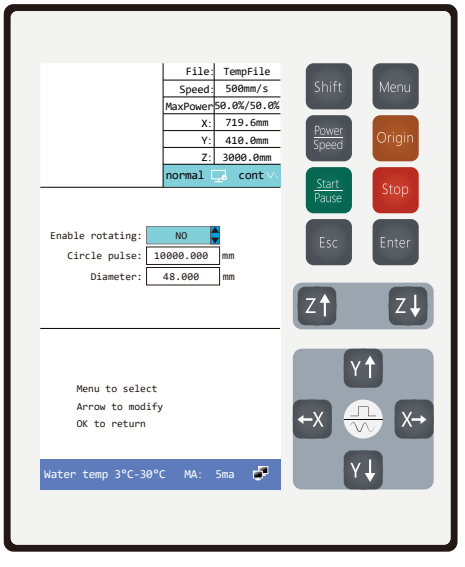
To set up the Smart Rotary, configure the following parameters either through the software or the control panel:

• Steps Per Rotation (in LightBurn) or Circle Pulse (in RDWorks): Set this to 12800. This value represents the number of motor steps required for one complete rotation of the rotary. Ensure this value is accurate to avoid warped or disconnected output.

• Roller Diameter: Set this to 38 mm, which refers to the diameter of the wheels on the Smart Rotary.

These parameters must be correctly set in either the control panel, LightBurn, or RDWorks to ensure proper functionality.

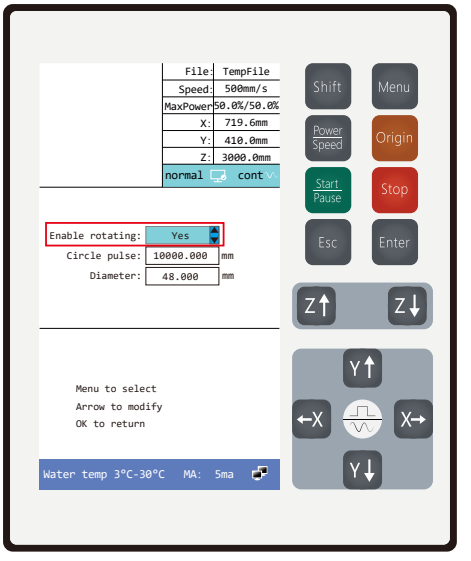
Set Parameter on Control Panel.



Press Menu key under boot menu, and move the cursor to the Rotating> by pressing Y↓.

Press Enter key to enter into the Rotary setting interface:

The cursor is on Enable Rotating option, default value is “No”. Press Y↓, it will change to “Yes”. This means the Rotary is enabled.



Here we are going to change the default Circle Pulse from 10000 to 12800, and adjust the diameter from 48 to 38

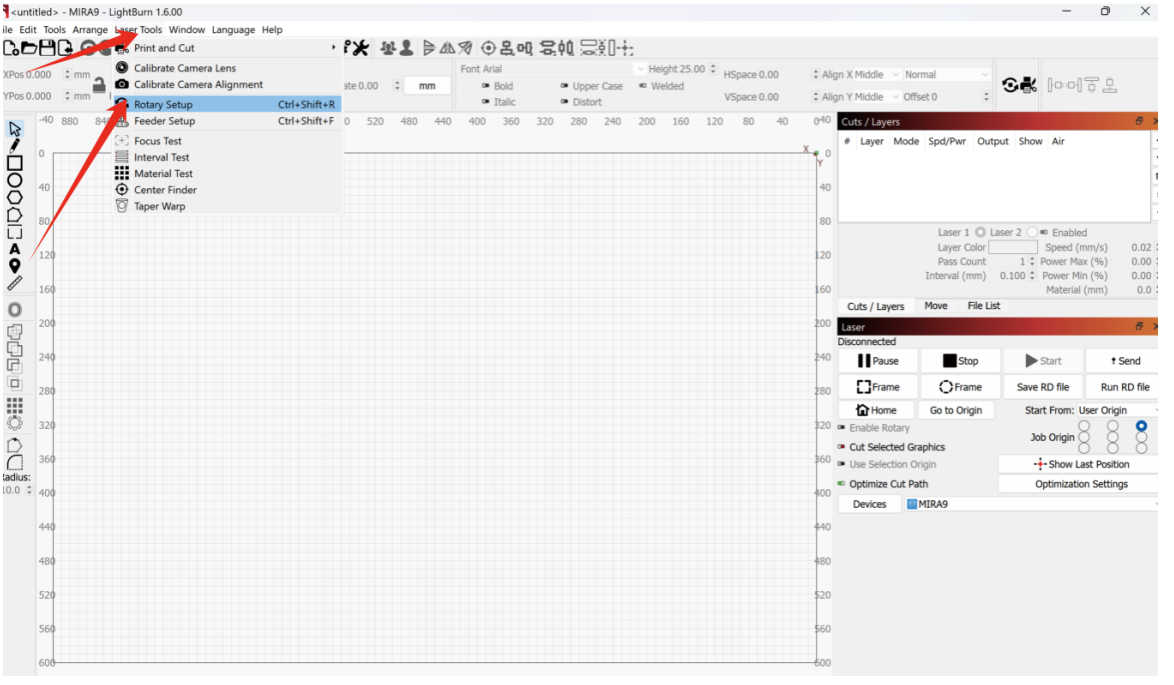
Press Menu key to move to next parameter. And then Press ←X the cursor will move inside the input box. Move the cursor under the second digit, and press Y↑ twice, the number will be revised to 2. Then, press X→ to move the cursor to the third digit, pres Y↑ to modify the number to 8. Then, press Menu to move the cursor to the Diameter parameter. Press X→ , to move the cursor inside the box, and press ←X to move the cursor under the first Digital, then press Y↓ to modify the number to 3.

All OK, just press Enter to save and then press Esc to return back the boot interface.

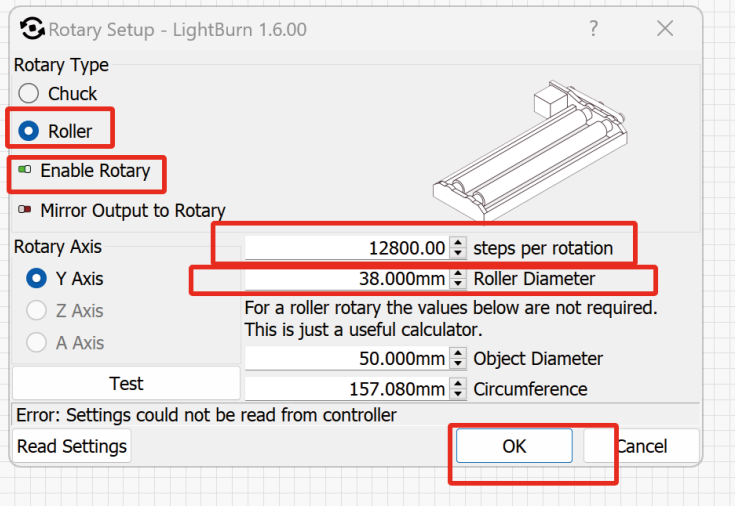
Note: Many users forget to exit Rotary mode after use, causing the laser to move only in the X–axis when switching back to flat engraving. After using the Rotary, remember to disable it: Navigate to the Rotary settings on the control panel, set **’Enable Rotating’** to ’No,’ and confirm with it by press–ing **“Enter”**

Set Parameter in Lightburn.

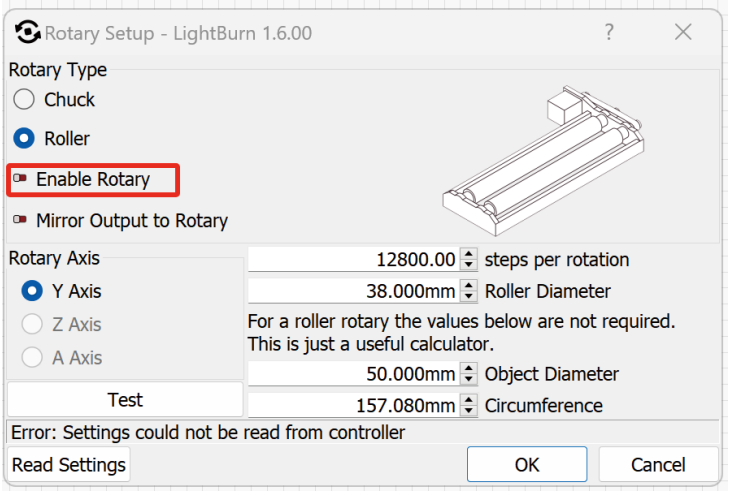
Open the lightburn software. Click the Laser Tools> on the top menu bar. Select the Rotary Setup in the dropdown list.



Choose the Rotary type as “Roller,” then click the Enable **Rotary button** (it will turn green when enabled). Input 12800 for the Steps per Rotate value and 38 for the Roller Diameter value. After completing these settings, click **OK**.

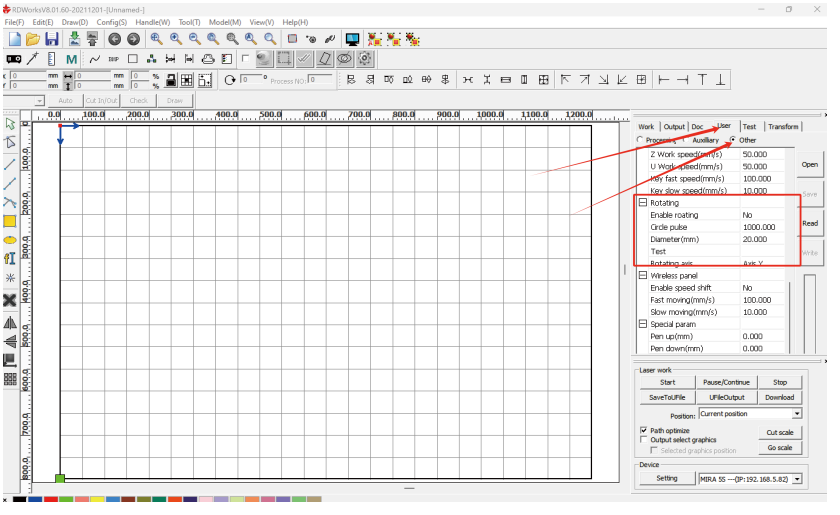


The rotary will be enabled and the parameters set. To return to flat engraving mode, go back to the Rotary setup page and click the Enable Rotary button (it will turn gray when disabled).

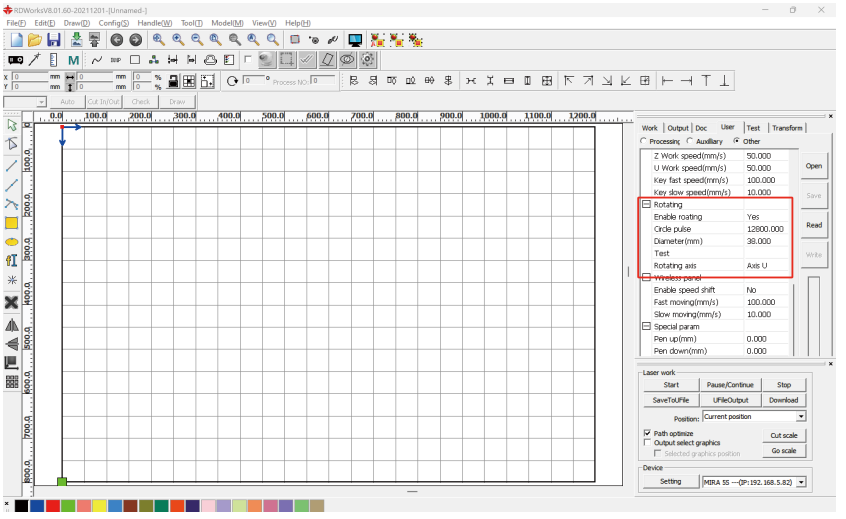


Set Parameter in RDworks.

Open RDworks. Click the User tab on the right column, then select Other, scroll down to find the Rotating setting.



Then, click to change the Enable Rotating to “Yes” , then input 12800 to the Circle pulse value, then input 38 into Diameter value. Then, Choose the Rotating axis as “Axis U”.

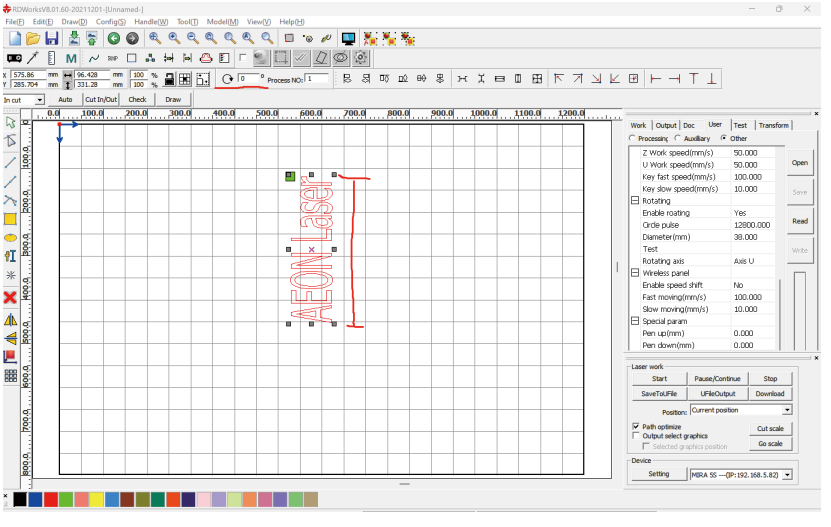


If you want to go back to the flat engraving mode. Go to the software and set the Enable Rotating to “No”. And go to the control panel,

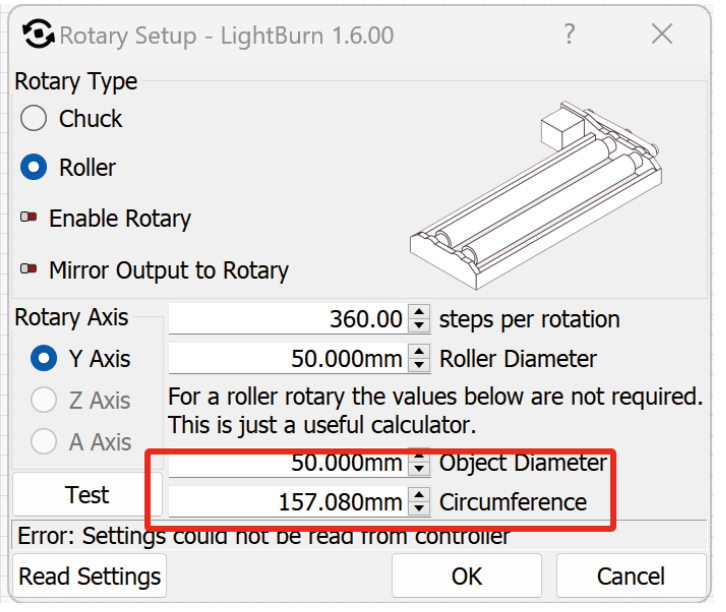
Preparing a File for Engraving.

Now that you’ve set up the rotary attachment and adjusted the parameters, you can create an engraving file for your job. In rotary mode, the overall length of your file corresponds to the circumference of the product. If you are doing a wrap-around engraving, this length should match the product’s circumference.

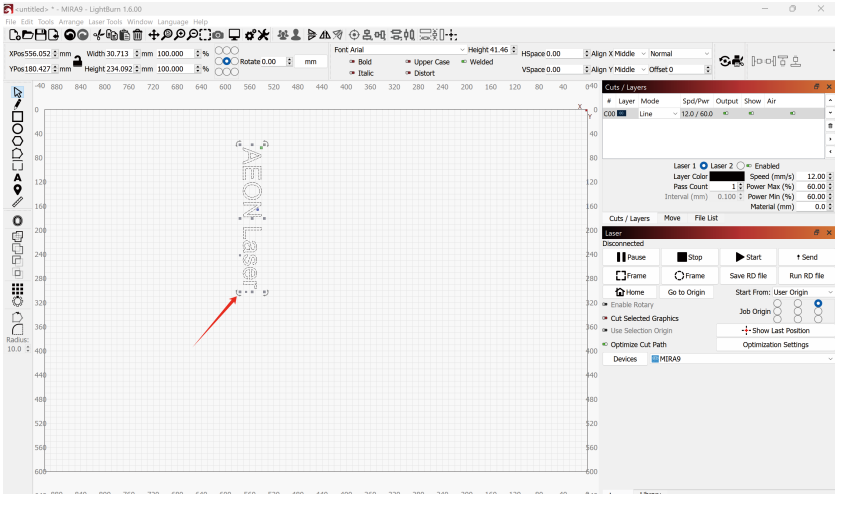
In RDWorks, you can rotate the design 90 degrees by entering the value in the top toolbar.



In lightburn, you could measure the diameter of the product and input it into the setup page, it can calculate the circumference automatically.



And you could rotate the design by rotate the handle of the design.

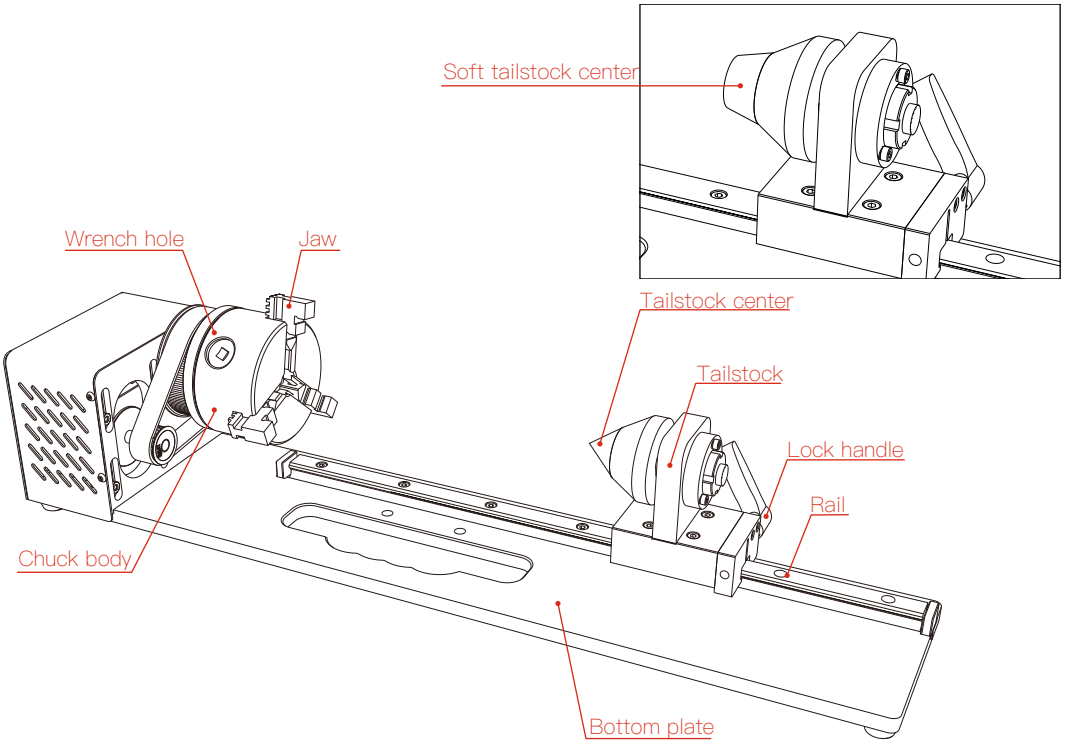


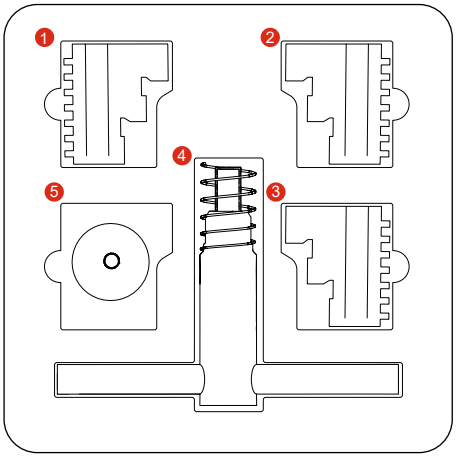
Set the engraving speed, interval, and power. Then, go to the machine's control panel and make sure the laser is properly focused. Press the button Origin to set your starting point. Press Frame to preview the job, and finally, press Start Pause to begin engraving.

How to Use the Chuck Rotary.

The Chuck Rotary is designed for larger objects, both cylindrical and irregular in shape. In addition to standard cylindrical items such as cups, glasses, wine bottles, tumblers, and cola cans, it can also accommodate more complex objects like wine glasses, cone-shaped cups, and tumblers with handles.

Overview of the Chuck Rotary.

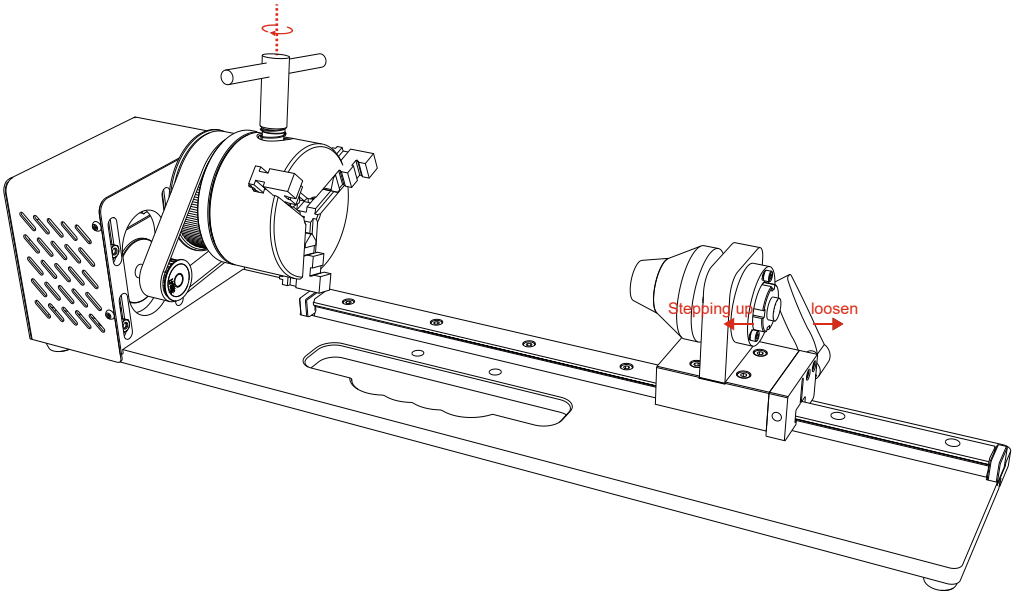


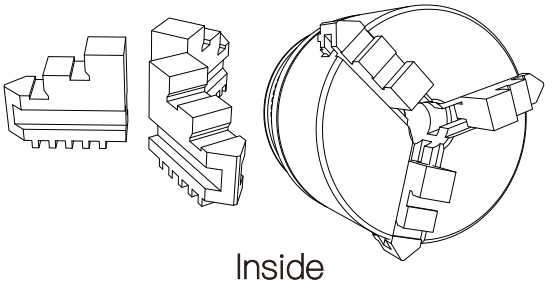


1 2 3 Outside jaw
4 Tailstock center
5 Wrench handle

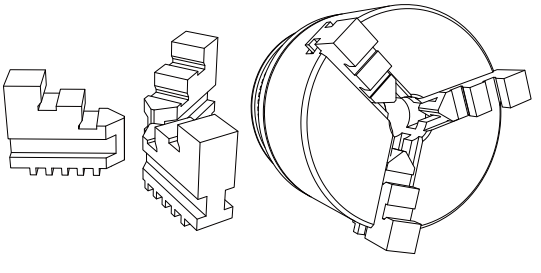
Adjust the Clamp.

To adjust the clamp, insert the handle wrench into the designated hole. Rotate the wrench clockwise to secure the jaw and counterclockwise to loosen it. To relocate the tailstock, rotate the lock handle to the right to move it, then lock it in place by turning the handle to the left.





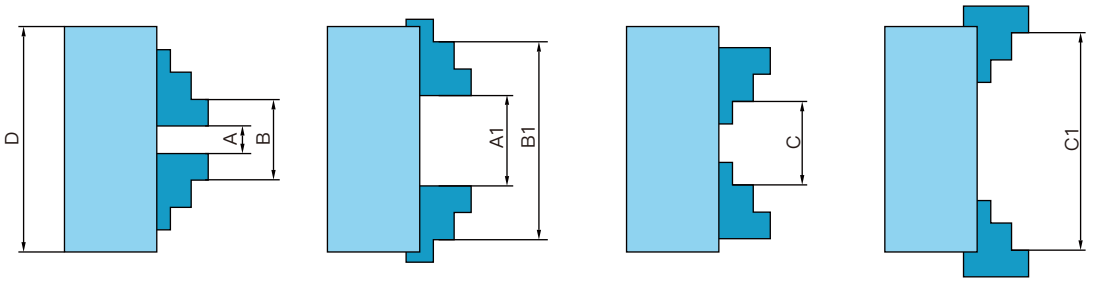
Inside



Outside

Change Different Jaws for the Chuck

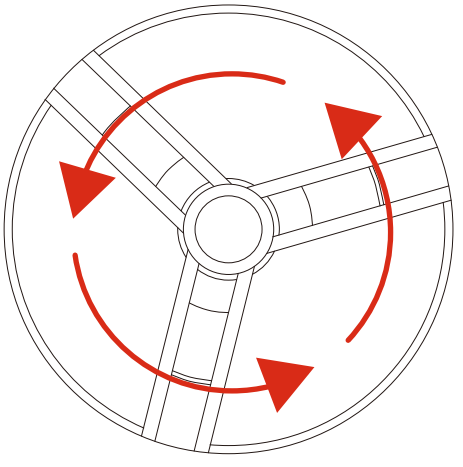
The rotary includes two types of jaws: the preinstalled Hard Solid Inside Jaw, which supports objects with an inside diameter up to 70mm or clamps items up to 22mm in diameter, and the Outside Jaw, designed for clamping the outside diameter of objects up to 70mm in diameter, which comes as a spare set with the rotary.

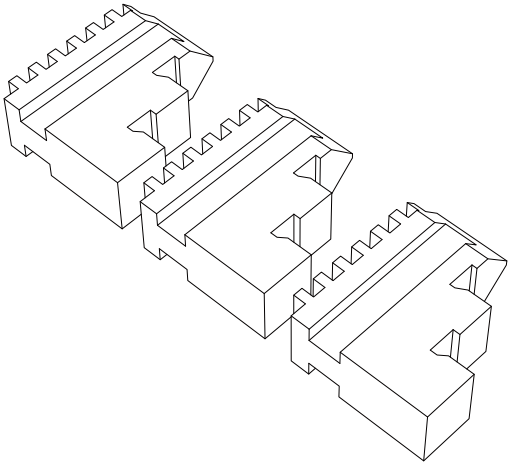


CLAMP RANGE

Chuck body diameter (mm)	Inside jaw		Outside jaw
	Clamp diameter	Support diameter	Clamp diameter
	A – A1	B – B1	C – C1
80	2 ~ 22	25 ~ 70	22 ~ 63

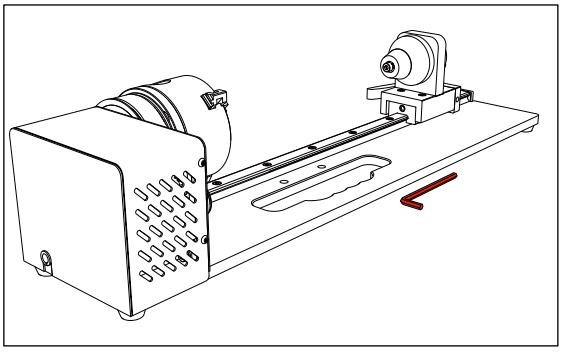
For jaw replacement, first loosen the jaws completely using the handle wrench. Remove the existing jaws and install the new ones in their place, aligning them with the numbered slots on both the chuck body and the jaws for proper placement.

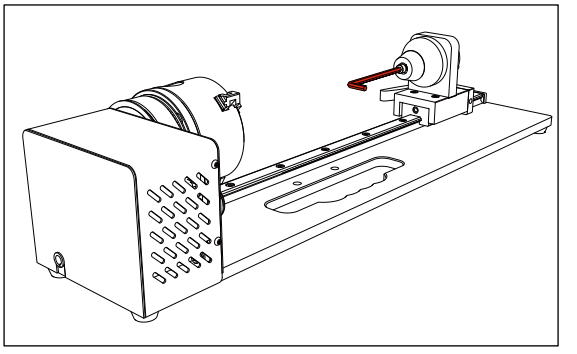


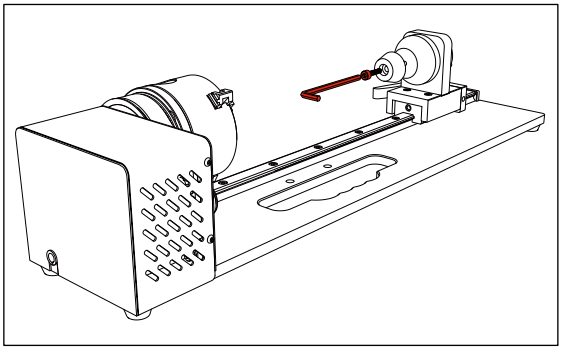


Change Different Tailstock Center.

To change the tailstock center, remove the standard hard center by rotating it counterclockwise. Replace it with the softer center for delicate work, such as engraving on wine glasses, and secure it using a 4mm Allen key to tighten the screw.







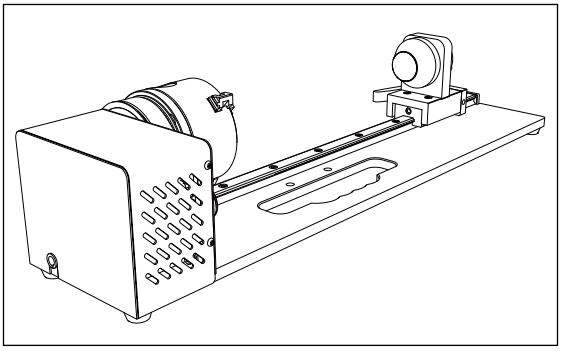
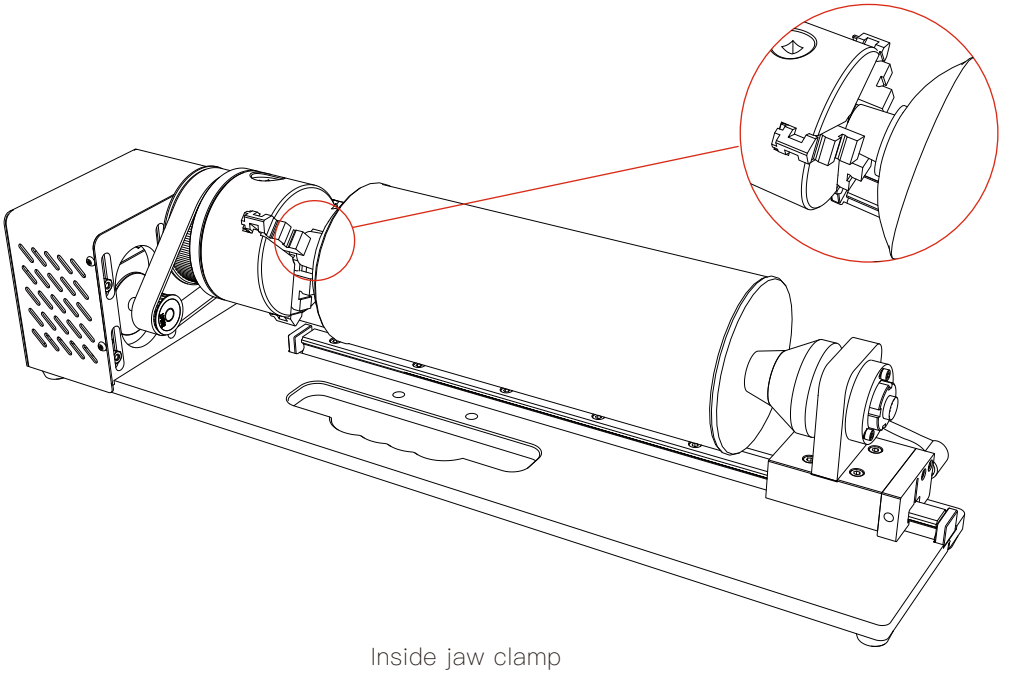
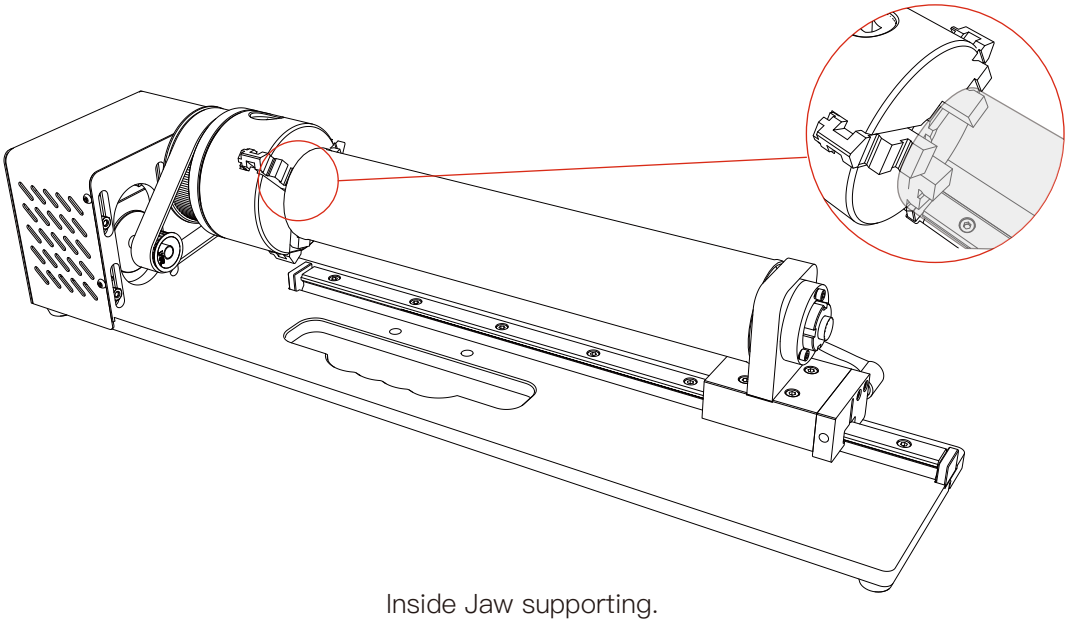


Illustration of Different Ways to Clamp the Products.

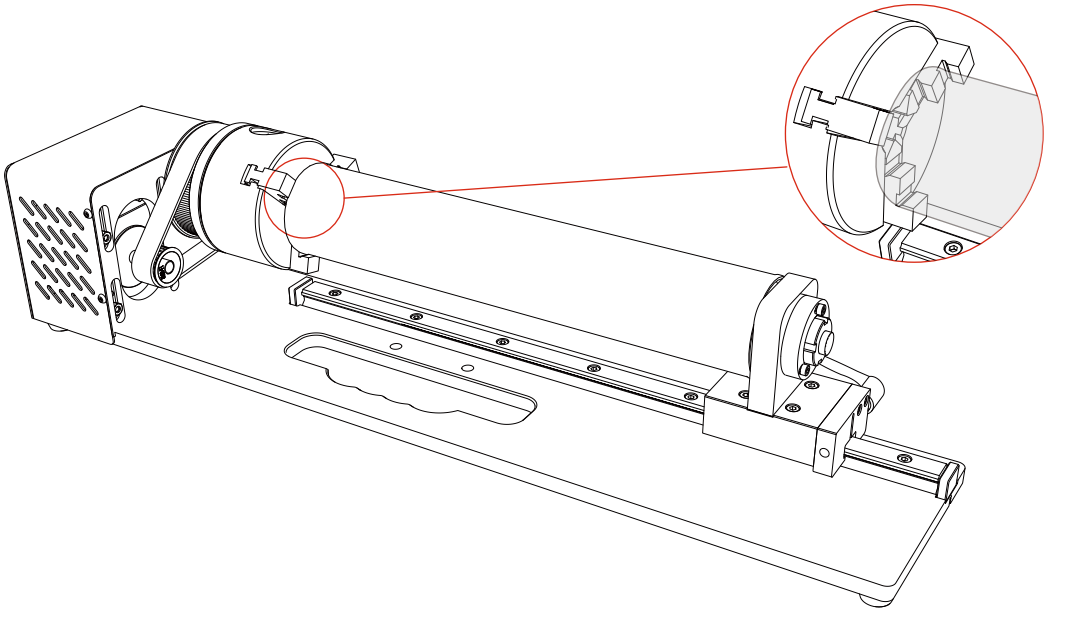
Here are some illustrations on different ways to clamp the products.



Inside jaw clamp



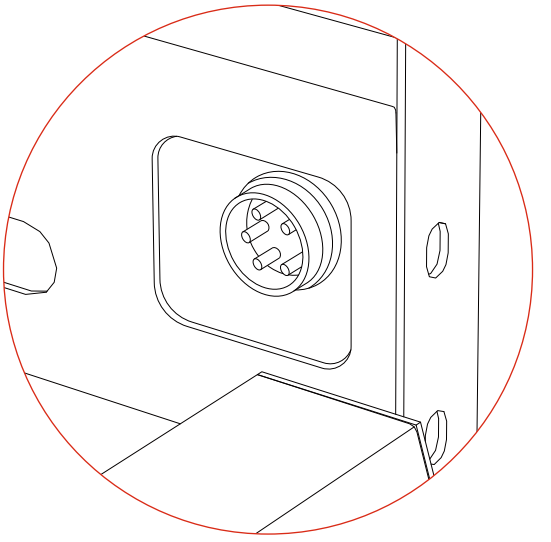
Inside Jaw supporting.

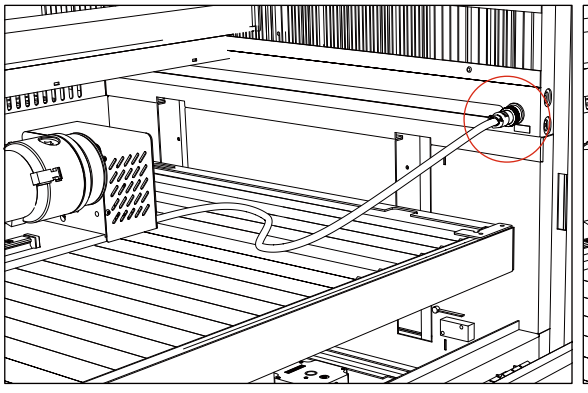


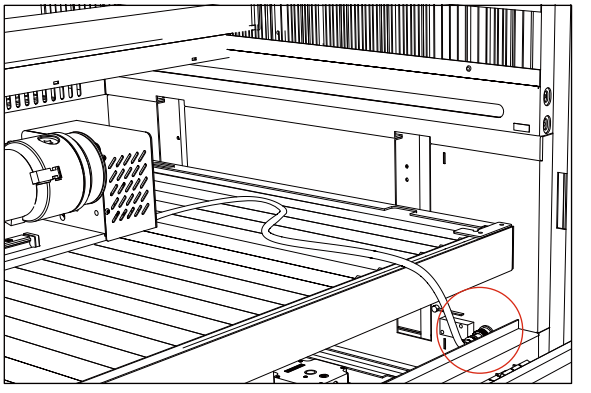
Outside Jaw clamp.

Set Up the Rotary

1. Open the machine lid and remove all contents from the honeycomb. Carefully take out the honeycomb and set it aside in a safe place.
2. Power on the machine and allow it to fully reset.
3. Press the button to lower the worktable to its bottom position.
4. Place the rotary onto the center of the machine bed, ensuring that the motor faces to the left (relative to the front of the machine). Insert the rotary plug into the rotary port and secure it by tightening the ring.

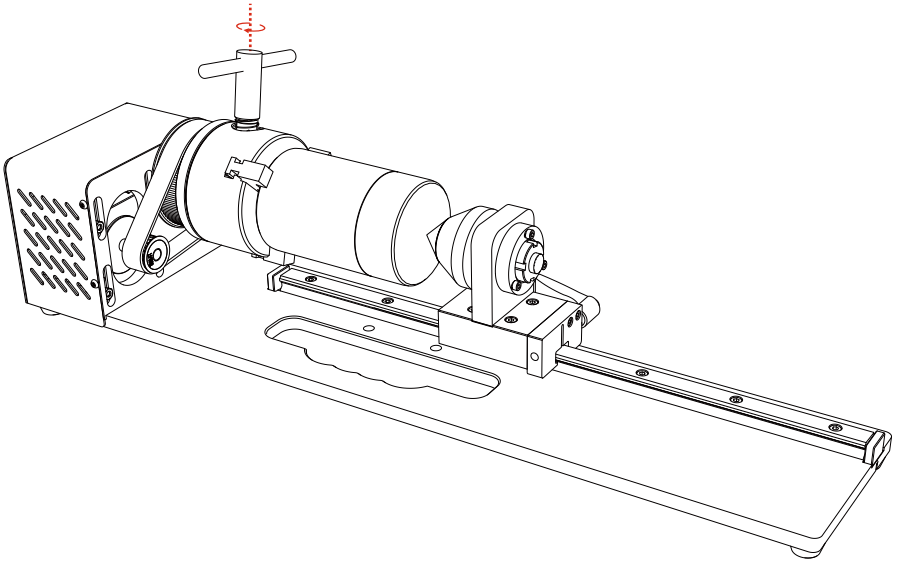






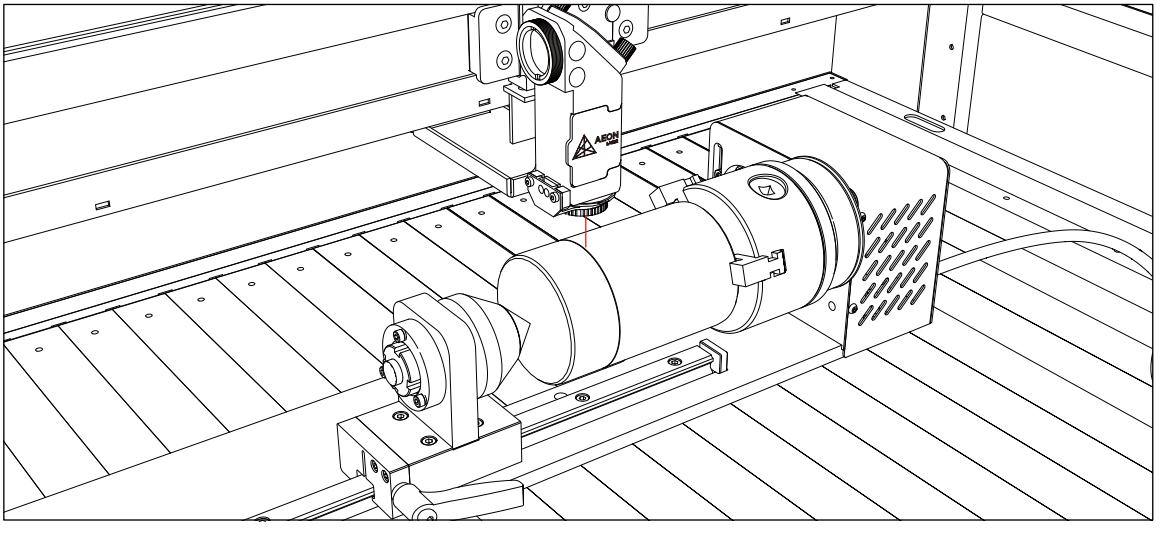
Here we illustrate you to clamp a cylindrical product by outside jaw.

Loosen the jaw with the handle wrench to a diameter slightly larger than the product. Insert the product into the jaw, holding it with your other hand, and carefully tighten the jaw. Stop tightening once you feel resistance to avoid damaging the product.



Next, unlock the tailstock and adjust it until the tailstock center makes contact with the product, then lock it in place. Gently rotate the chuck body by hand to ensure the product rotates smoothly with it. Once everything is aligned, the setup is complete.

Move the laser head to the product using the Arrow keys on the control panel. Perform a manual focus or Autofocus. For heat-sensitive items like glass or metal cups with thick coatings, slightly defocusing (e.g., 1–2 mm) can improve results by preventing flashback and potential tube damage during engraving.



Set the Parameter of the Rotary by Software or Control Panel.

The Chuck Rotary Attachment has two critical parameters:

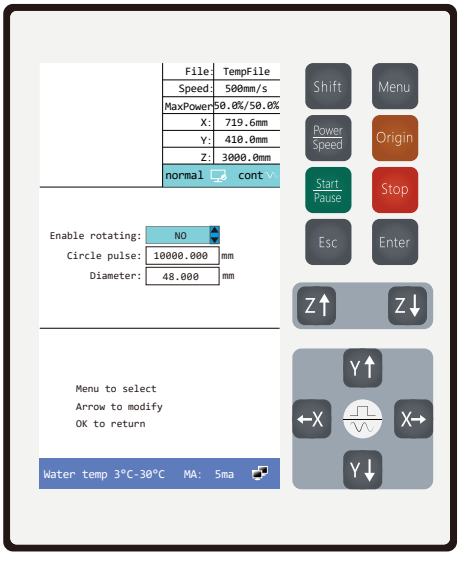
Steps per Rotation (in LightBurn) or **Circle Pulse** (in RDWorks): This parameter indicates the number of motor steps required for one complete rotation of the rotary. For Redline MIRA S machines, this fixed value is 38400. Incorrect settings may result in distorted or disconnected outputs.

Product Diameter: This refers to the actual diameter of the product you are engraving, as measured by the user.

Set Parameters on the Control Panel:

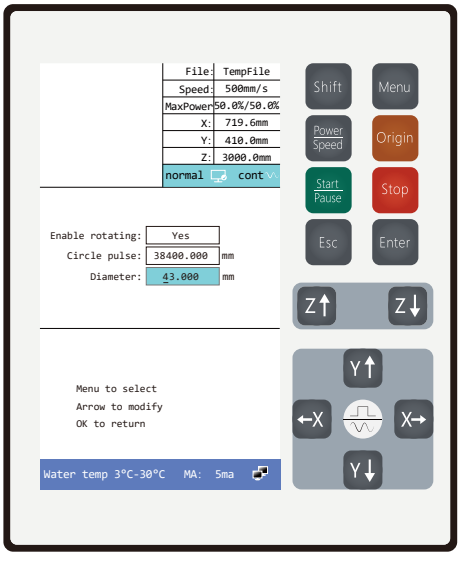
· Measure the diameter of the product you plan to engrave using a ruler or caliper. For example, if the diameter is 43mm:

· Press the Menu key under the boot menu, then navigate to Rotating by pressing the Arrow keys. Y↓ Press the Enter key to enter the Rotary settings interface.



The cursor is on Enable Rotating option, default value is "No" . Press Y↓ , it will change to "Yes". This means the Rotary is enabled.

The cursor is on the **Enable Rotating** option, which defaults to **No**. Press Y↓ the Enter key to change it to **Yes**, enabling the rotary.



Here we are going to modify the circle pulse value to 38400, and the Diameter to 43.

Press Menu key to move to next parameter. And then Press , ←X the cursor will be moved inside the input box. Move the cursor under the fourth digit, and press Y↑ to increase value, Y↓ to decrease value, the number will be revised to 4. Then, press X→ to move the cursor to the third digit, press Y↑ or Y↓ to modify the number to 8. Then, move the cursor to the first digit modify it to 3.

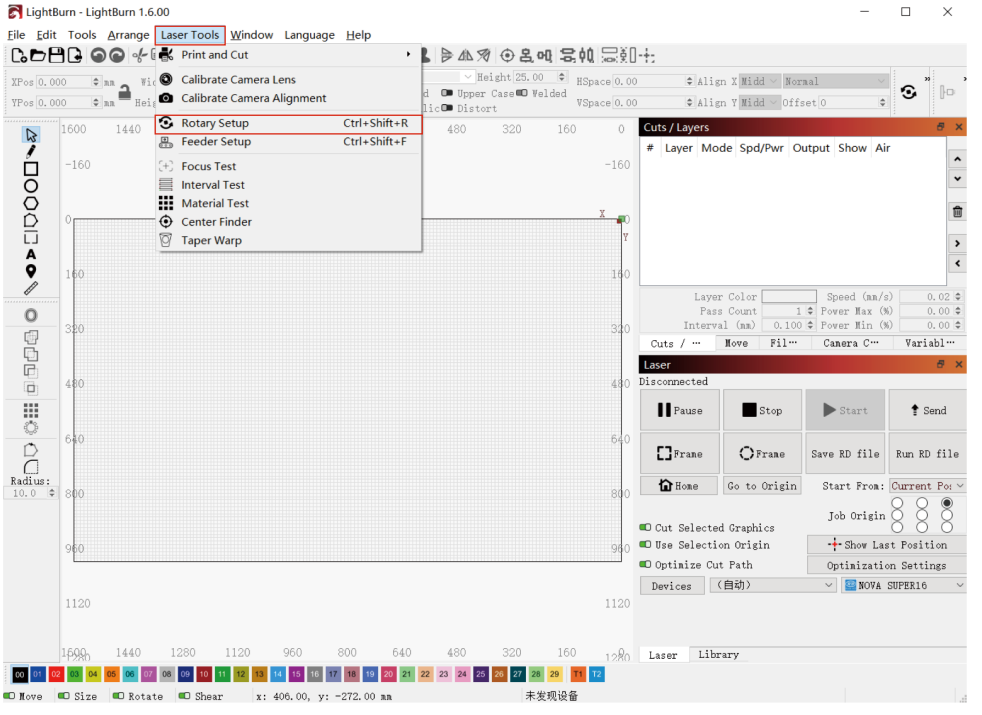
Then, press Menu to move the cursor to the Diameter parameter. Press X→ , to move the cursor inside the box, and press ←X to move the cursor under the first Digital, then press Y↑ or Y↓ to modify the number to 4. Same operation to modify the second digit to 3.

All OK, just press Enter to save and return back, press Esc to go back to the boot menu.

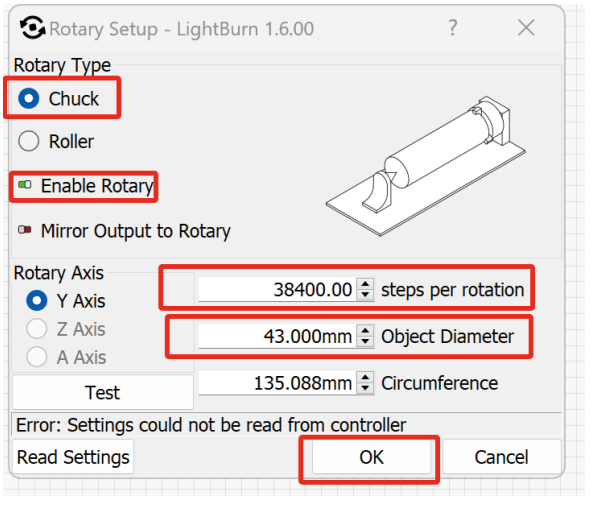
Note: Many users forget to exit Rotary mode after use, causing the laser to move only in the X-axis when switching back to flat engraving. After using the Rotary, remember to disable it: Navigate to the Rotary settings on the control panel, set 'Enable Rotating' to 'No,' and confirm with it by pressing "Enter"

Set Parameters in LightBurn:

1.Open the LightBurn software.
2.Click **Laser Tools** on the top menu bar.
3.Select **Rotary Setup** from the dropdown list.

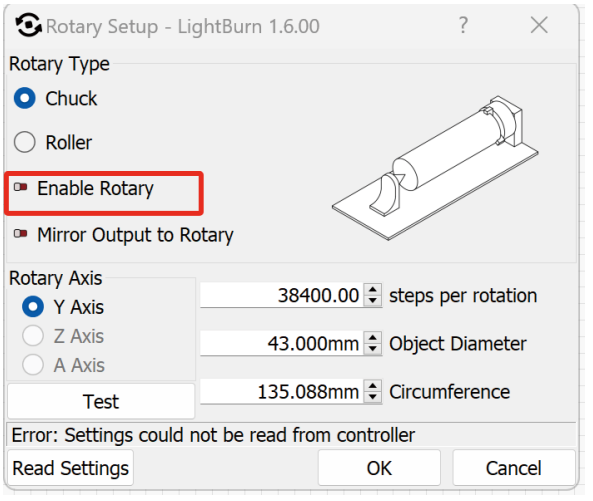


Choose the Rotary type as “Chuck”, then click the Enable Rotary button to enable it (the button will turn green if it is enabled), then input 38400 to the Steps per Rotate value, then input 43 to Object Diameter value, after this, click OK.



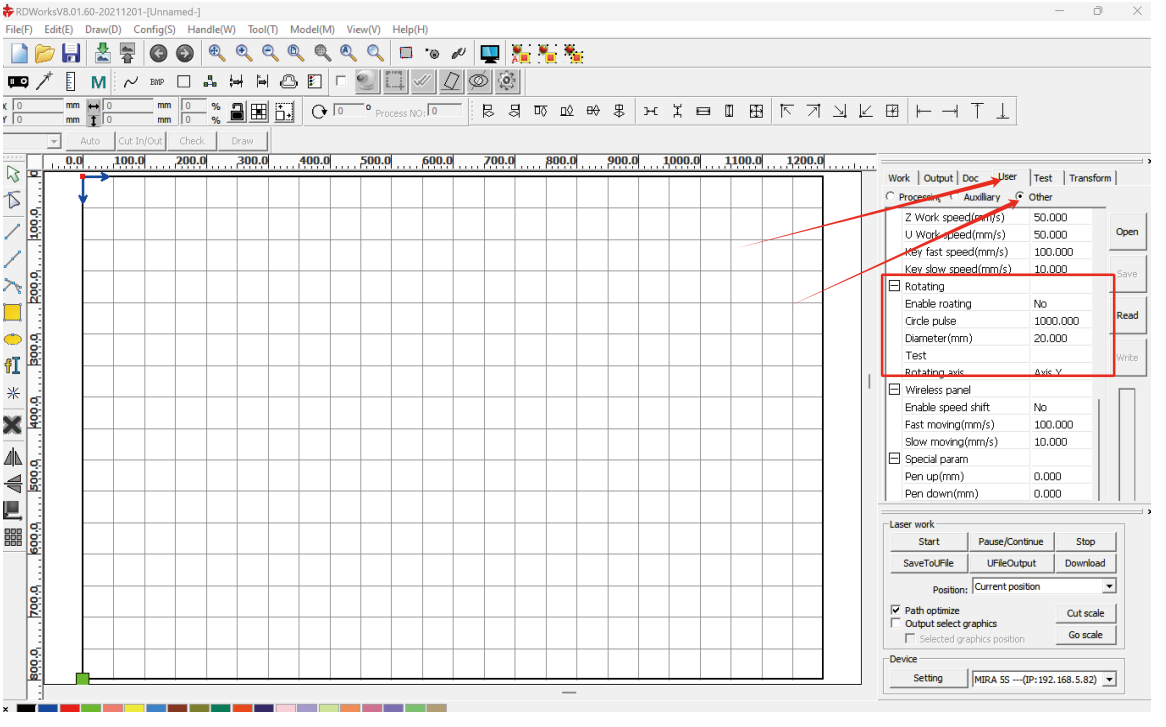
After setting the parameters, the rotary will be enabled and ready for use.

To return to flat engraving mode, go back to the Rotary setup page and click the Enable Rotary button (the button will turn gray when disabled).

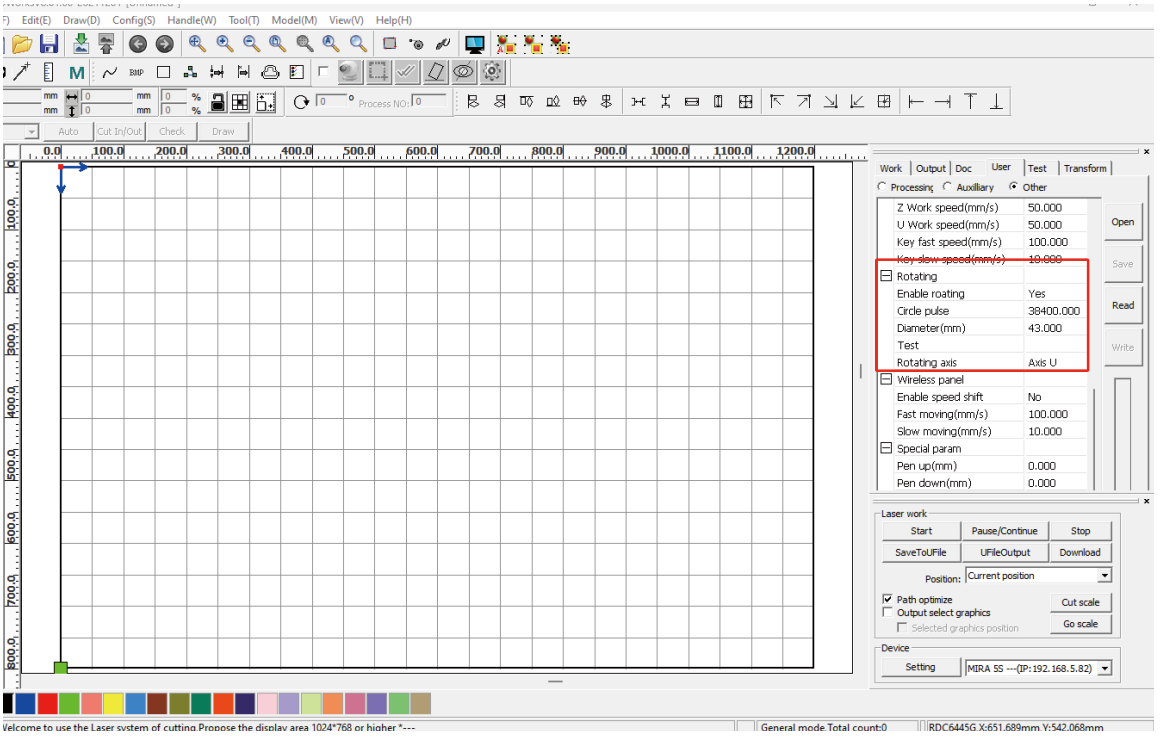


Set Parameter in RDworks.

Open RDworks. Click the User tab on the right column, then select Other, scroll down to find the Rotating setting.



Then, click to change the Enable Rotating to “Yes” , then input 38400 to the Circle pulse value, then input 43 into Diameter value. Then, Choose the Rotating axis as “Axis U”.

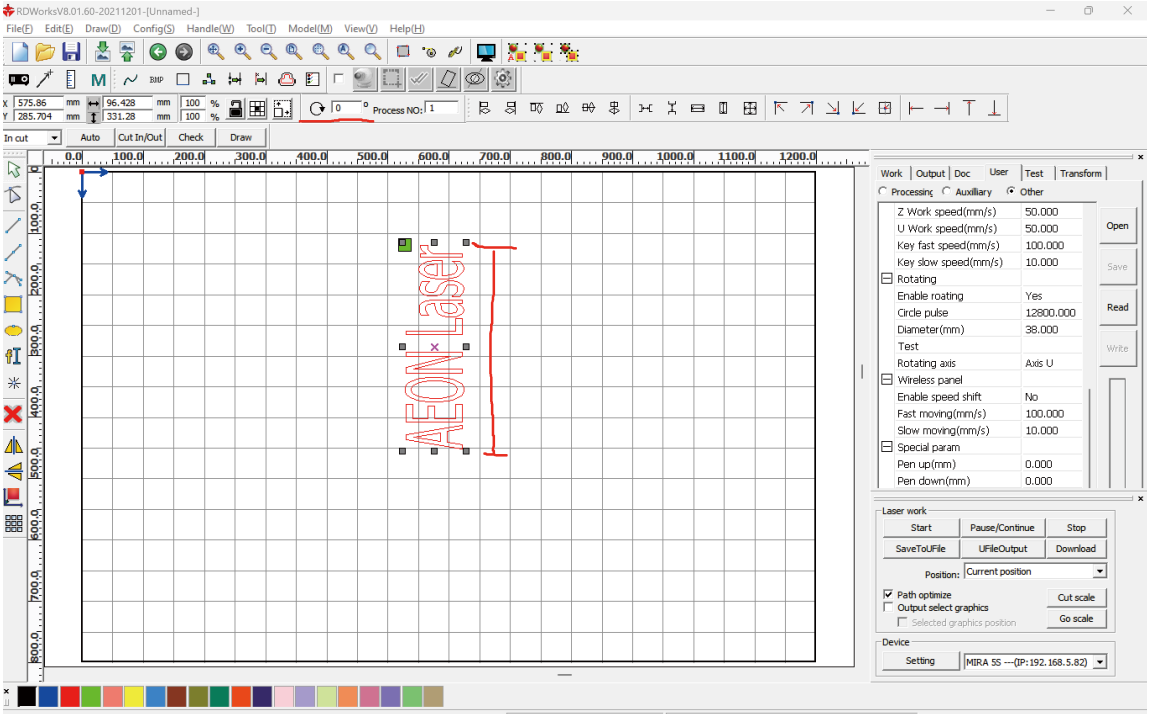


If you want to go back to the flat engraving mode. Go to the software and set the Enable Rotating to “No”. And go to the control panel.

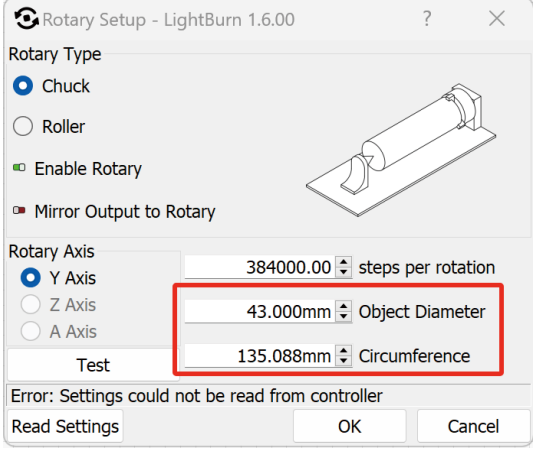
Preparing a file for your engraving.

Preparing a file for engraving involves adjusting your design to match the rotary setup. In rotary mode, the total length of your design file should equal the product's circumference. If you are doing a wrap-around engraving, this ensures that the design wraps seamlessly around the entire surface.

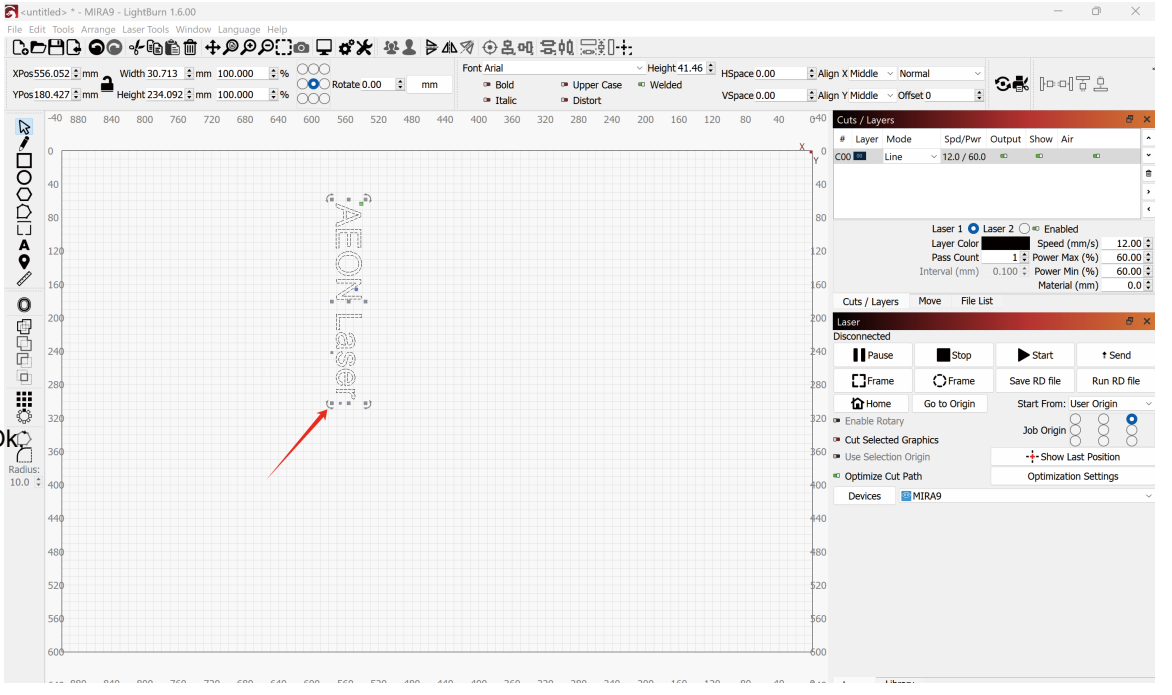
In RDWorks, you can rotate the design by 90 degrees by entering the value on the top toolbar.



In lightburn, if the diameter of the product is input, it can calculate the circumference automatically.



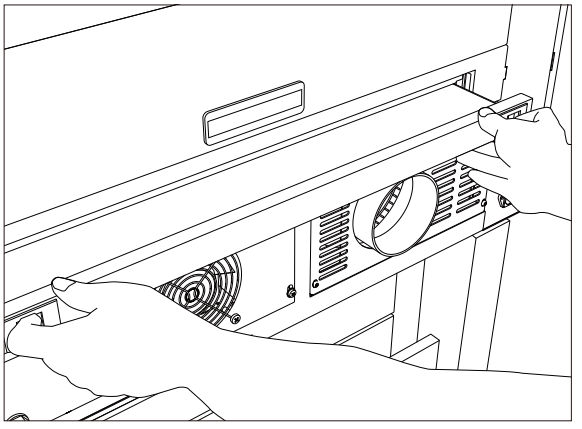
And you could rotate the design by rotate the handle of the design.



Ok, the rest would be easy. Set the engraving speed, power and interval, go to the control panel of the machine, make sure the laser is focused, press Origin to set where you want to start. Press Frame to preview the job, and then, press Start Pause

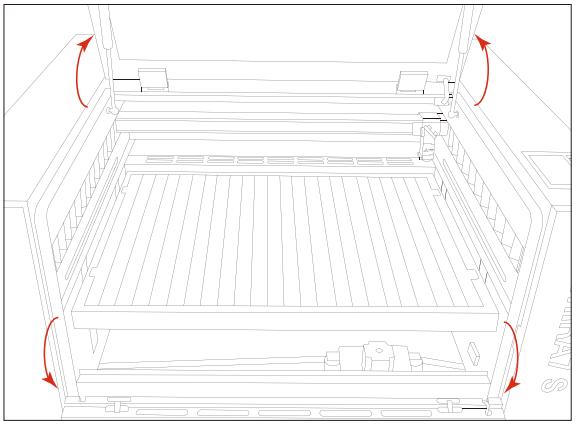
How to Use the Pass-Through Door

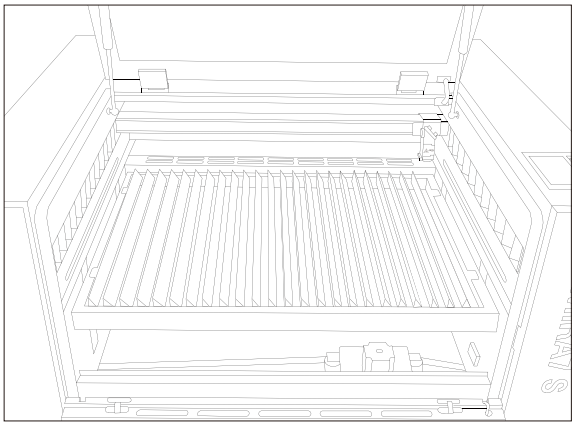
The Redline MIRA S Series is equipped with a pass-through door, which can be opened as needed to process longer materials.



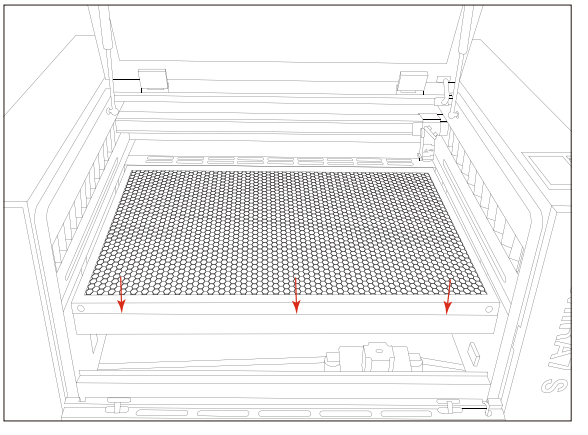
1.Simultaneously press the safety latches on both sides of the pass-through door, then gently pull the door outward.

2.Open the lid and front panel.

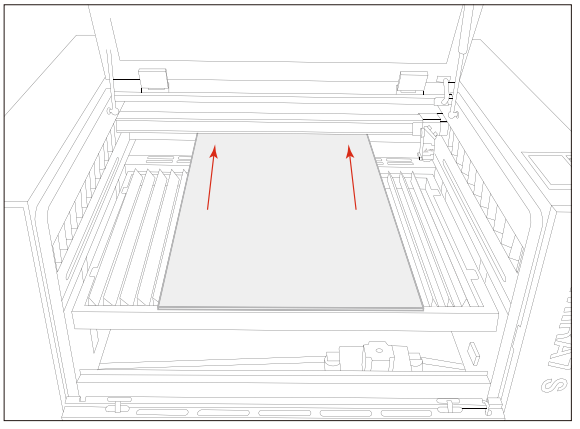




3.Lift the platform blades upright.



For thinner or flexible materials, the honeycomb table can be placed on top of the blades.

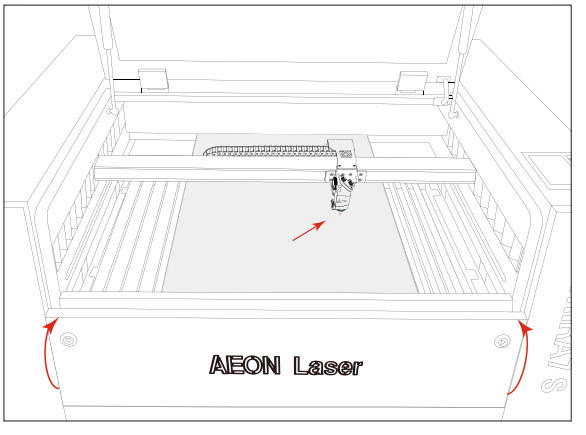


4.Move the laser head to the coordinate origin (X: 0, Y: 0, generally referring to the top-right corner for convenient material placement).

5.Adjust the platform height to align with the pass-through pathway metal sheet. (This ensures smooth material placement without collisions with the metal sheet or laser head.)

6.When placing the material, ensure that the bottom edge of the material is within the bottom edge of the platform (ensure the lid and front panel can close properly). It is advised that the material length not exceed twice the Y-axis length.

7.Move the laser head over the material and autofocus (recommended near the center of the Y-axis length).Then Close the front panel.



8.Lid of the machine. You can now begin processing the extended material!

How to Change the Focus Lens

The focus lens narrows or “focuses” the laser beam to a very small, precise spot, enabling high–accuracy engraving and cutting for graphic images. Lens performance and application vary based on their focal lengths. Commonly available focus lenses on the market include 1.5”, 2”, 2.5”, and 4” Below are the key features of each:

1.5–inch Lens

·Optional lens for high–resolution engraving.
·Recommended for raster engraving above 300 DPI.
·Ideal for small fonts or fine detail engraving.
·Produces a spot size of 0.003 to 0.0065 inches in diameter.
·Effective for cutting thin materials (less than 1/16 inch).

2–inch Lens

·Standard lens on most laser systems.
·Versatile for both engraving and cutting applications.
·Recommended for raster engraving from 300 DPI to 600 DPI.
·Produces a spot size of 0.004 to 0.007 inches in diameter.

2.5–inch Lens

·Most commonly used lens for laser systems.
·Suitable for both engraving and cutting applications.
·Produces graphics with medium detail and resolution.
·Approximately 63.5mm thick, ideal for a majority of works.

4–inch Lens

·Designed to focus the beam over a longer vertical distance.
·Specialty lens typically used for engraving within recessed areas (e.g., bowls or plates).
·Effective for cutting thick materials.

The Redline MIRA S comes standard with a 2” focus lens but can also accommodate 1.5” and 4” lenses. Our tool–less optics feature allows for easy lens changes.

Changing to a 1.5” Lens on the Redline MIRA S

1.Preparation:

·Ensure the machine is powered off and cooled down.
·Prepare a clean, lint-free cloth to catch the lens and other small parts.

2.Accessing the Lens:

·Locate the lens holder on the laser head (red section in its center).
·Gently grasp the lens carriage between your thumb and forefinger.

3.Removing the Existing Lens:

·Rotate the lens carriage clockwise to disengage the parts.
·Note the strong magnetic force within, so apply gradual pressure as you rotate.
·Carefully remove the existing lens, allowing it to fall onto the prepared cloth.

4.Installing the 1.5” Lens:

·Take the 1.5” lens and insert it into the lens carriage.
·Ensure the convex side of the lens (if applicable) is oriented correctly.
·Rotate the lens carriage counterclockwise to secure the new lens in place. Ensure it is snug but not overly tight to avoid damage.

5.Cleaning the Lens:

·Before use, clean the new lens with a lens cleaning solution and a lint-free cloth to remove any dust or fingerprints.

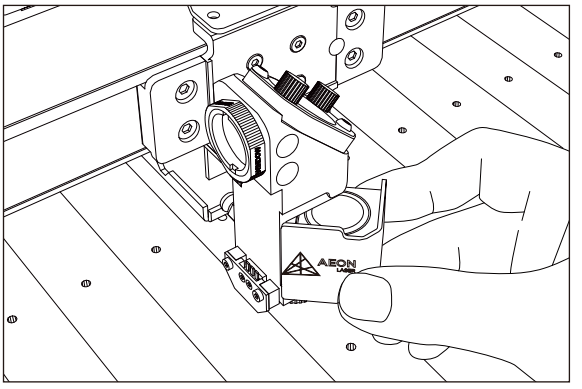
6.Adjusting the Focus:

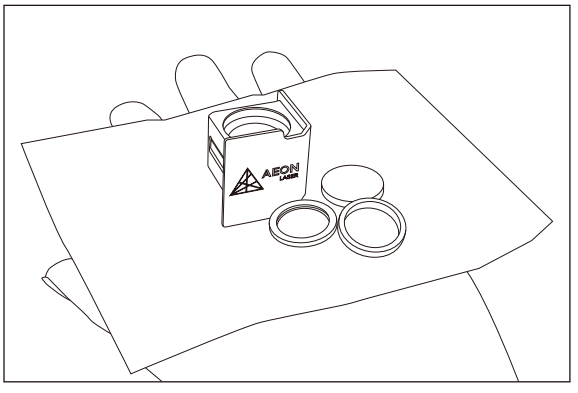
·Power on the machine and allow it to reset.
·Adjust the focus of the laser head according to the focal length of the newly installed 1.5” lens.
·Use the manual focus or autofocus function to achieve the correct focal distance.

7.Testing the Lens:

Perform a test engraving or cutting job on a scrap piece of material to ensure the new lens is properly installed and the laser is correctly focused.

By following these steps, you can effectively change to a 1.5" focus lens on your Redline MIRA S machine, allowing for high-resolution engraving and precise cutting on thin materials.

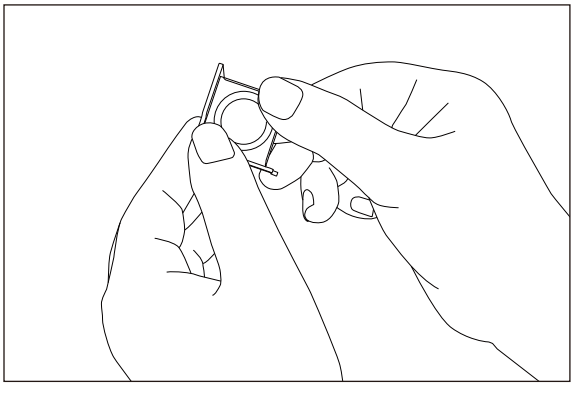


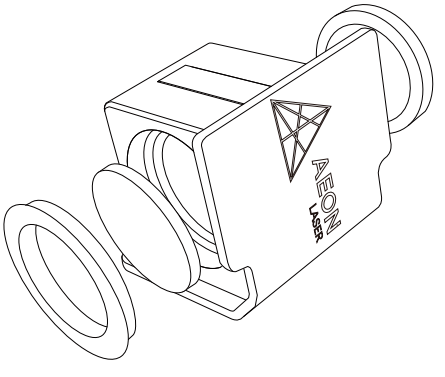


Carefully remove the ring atop the focus lens using your fingernail, then tilt the lens carriage to release the lens onto the prepared cloth.

Reverse the carriage and remove the inner white ring, you will see another lens installation position.

Insert a 1.5" lens, ensuring the convex surface faces the laser beam. Press the top ring back into place and secure it with your finger, then press the bottom ring back into the top 2.5" lens position.





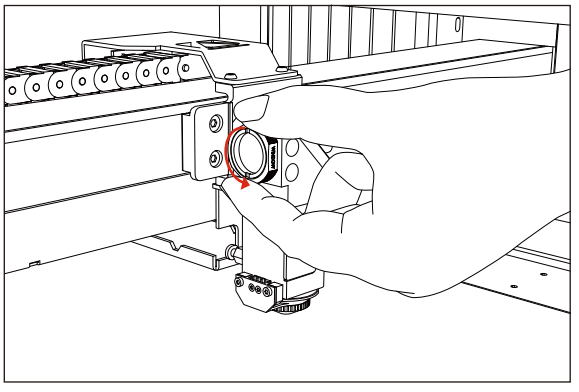
Then, press the lens carriage into the laser head, and it's ready to use.

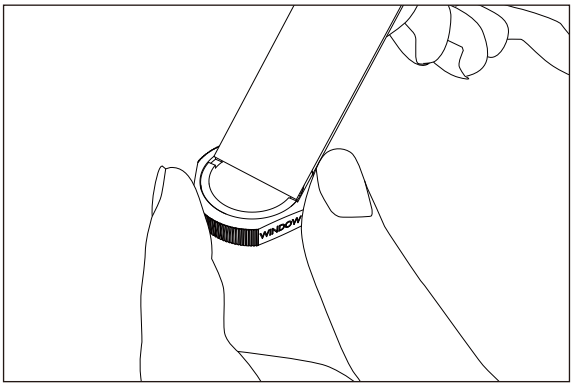
Changing to 4" lens.

The 4" lens installation position is located before the Mirror #3. In fact, it shared the same position with the protective lens.
To install a 4" lens, you have to remove the protective lens and the 2" lens first.

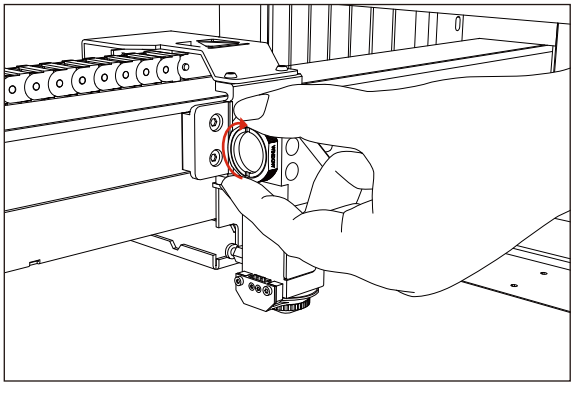
Prepare a piece of clean cloth large enough to catch the lens and small components. Find the lens removal tool in the tool box.

The protective lens is situated on the left side of the laser head. Grip it with two fingers of your left hand and rotate the red ring counterclockwise to fully disengage it





Once the black inner ring is removed, take out the protective lens and insert the 4" lens with the convex side facing the laser beam. Reinstall it on to the laser head.



Then, locate the 2" lens carriage, pull it out, remove the 2" lens and put it in a safe place, install the lens carriage back Without lens.

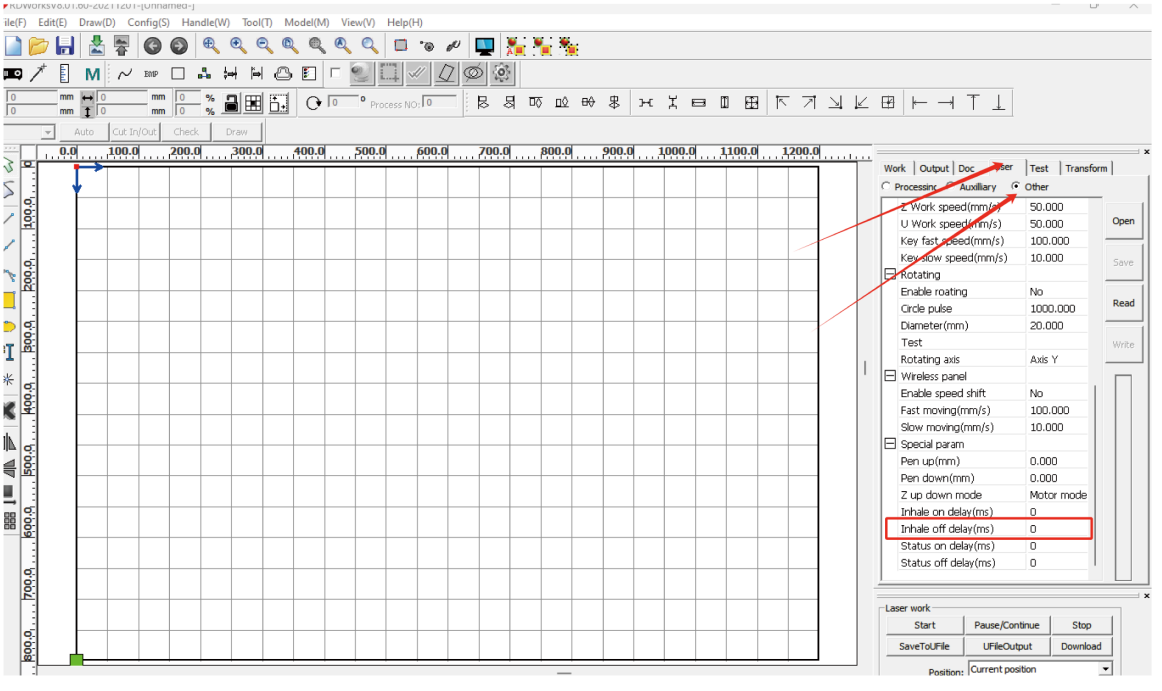
Then, it's ready to go.

If you want to switch much more faster among different focus lenses, you could buy more lens carriage with different lenses pre-installed.

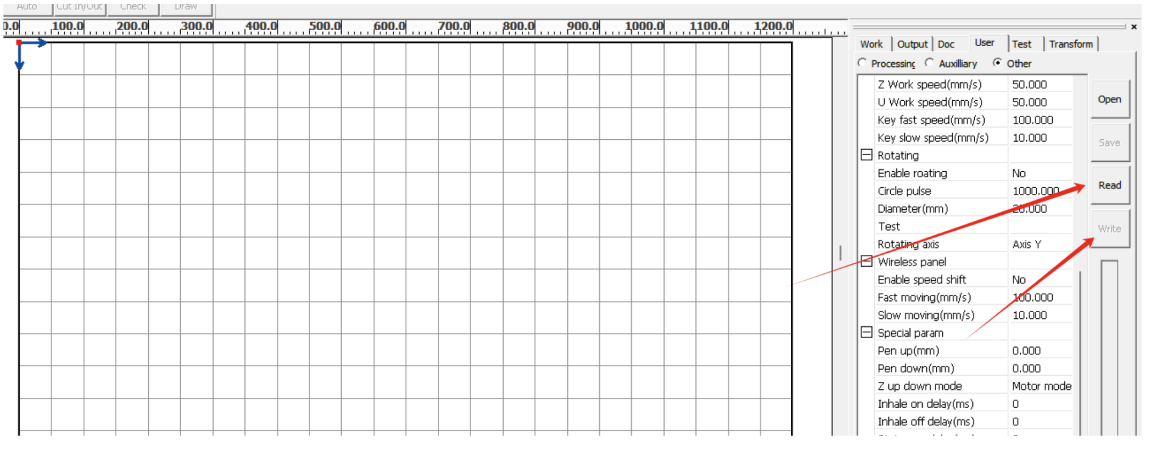
How to Set Extraction Delay Time.

The Redline extraction blower operates automatically with the machine, stopping when not in use and including a post-job delay to fully extract any odors. If the odors are persistent, you can set a longer delay time.

To set or change the delay time, open RDWorks and ensure it is connected to the machine. Click the "User" tab on the top right of the software, then choose "Other," and scroll down to find the "Inhale off delay" option.

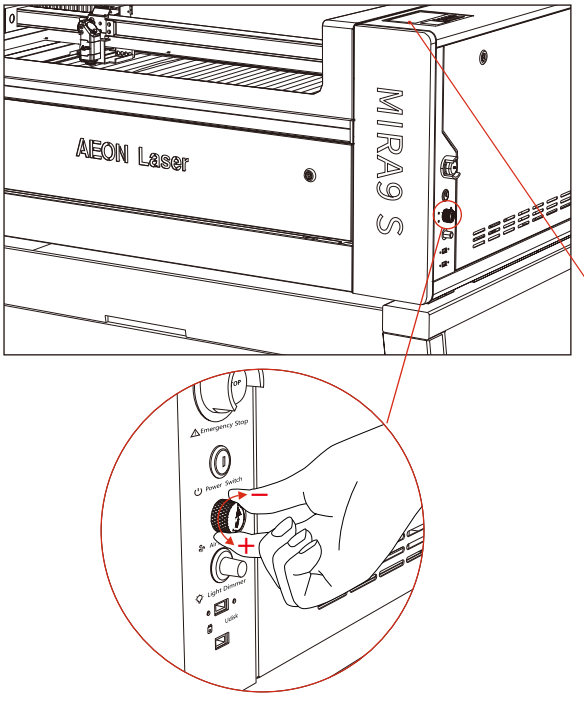


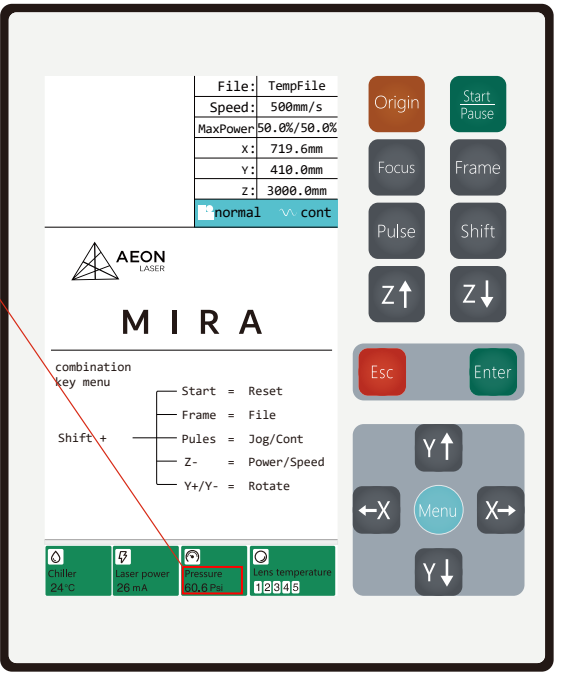
Click Read, then change the delay time, and click Write to save it to the controller, and it's done. (Note, the unit is millisecond , 1seond equals 1000 millisecond. If you want to set 5 minutes delay time, then you need to fill 300000ms.)



How to adjust the air pressure

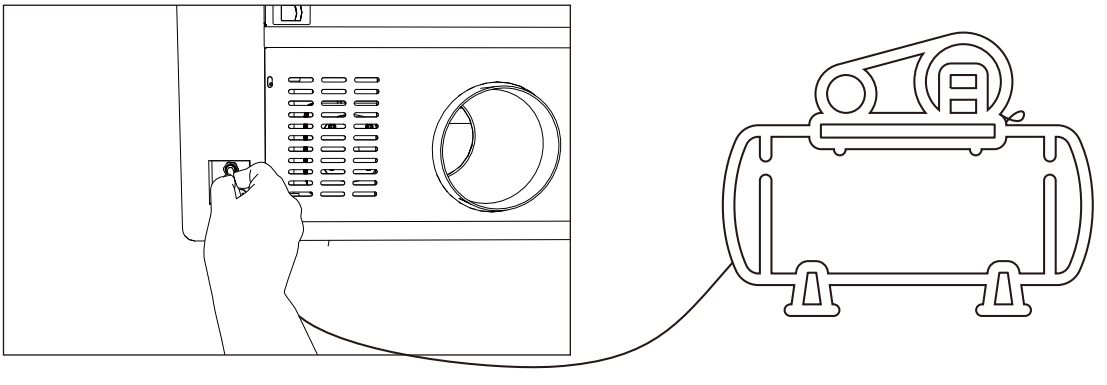
Turn the airflow knob counterclockwise to increase air flow and pressure, and clockwise to decrease them.The real-time air pressure can be viewed at the bottom of the panel.



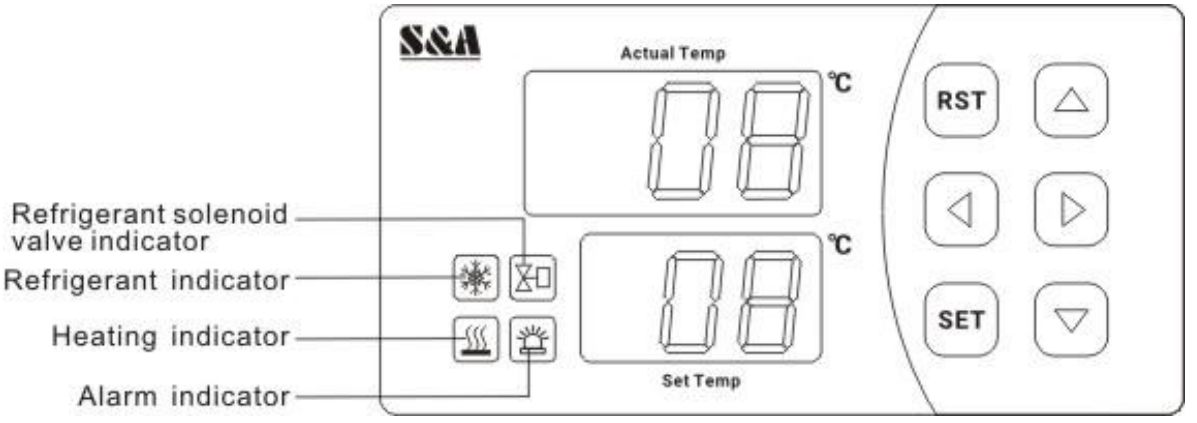


How to attach an external air compressor for MIRA S

Connect the air hose from the external air compressor to the machine's air compressor quick connector, which can be found at the back of the machine.



How to set water temperature(MIRA9 S)



1.Quick setting

Press “SET” key to set the temperature. The upper window indicates F0 (F1 is indicatedin intelligent control mode) while the lower window flashes with current value. Then press △ or ▽ key to change the value which will be memorized by the temperature controller. Press “RST” key to save the data and exit.

2.Press ▷ key once to enter status display menu and it indicates t1 which suggests temperature of room temperature sensor.

Press ▷ key twice to indicate t2 which suggests flow rate.

Press ▷ key three times to return to normal operation.

3.When first powered on, press ▽ key to cancel delay time and connect the compressor.

4.User parameter setting (F0~F11 is available)

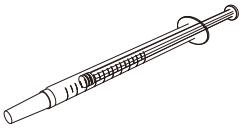
△ and ▽ keys are for changing and saving data. ◁ and ▷ keys are for switching items. Press and hold the △ key while press “SET” key for 6 seconds to enter parameter setting until the lower window indicates PAS and the upper window indicates 00. Press △ or ▽ key to revise password (F7 is for revising password, factory default password is 08) and then press “SET” key. If the password is correct, the lower window indicates F0 and the parameter is available for revision. If the password is wrong, it will return to temperature display. If there is no action within 20 seconds, the temperature controller will also automatically exit parameter setting status. Press “RST” key to save the data and exit.

5.Restore to factory settings

After the power is on for 30 seconds, press △ and ▽ hold and keys for 3 seconds until it displays “rE”. The supplier parameter and user parameter will restore to factory value. 3 seconds later, it will return to temperature display.

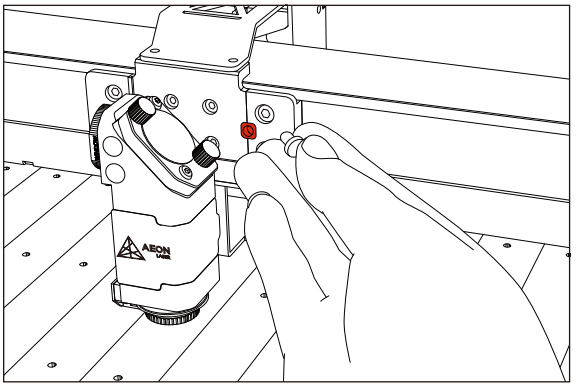
How to Grease the Guiderail

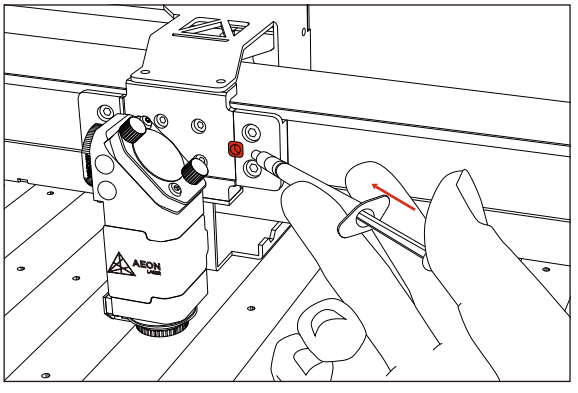
The high-speed operation of Redline MIRA S RF models may cause the lubricant within the system to vaporize over time. To ensure optimal performance, an alarm has been configured to notify users when the X-axis has traveled 5,000 hours. Upon receiving this alert, it is imperative to apply lubricant to the guide rail promptly.
Move the laser head to the center of the working area and power off the machine. Find the Guiderail Service toolkit in the toolbox of the machine.



Rail Lubricant X 1

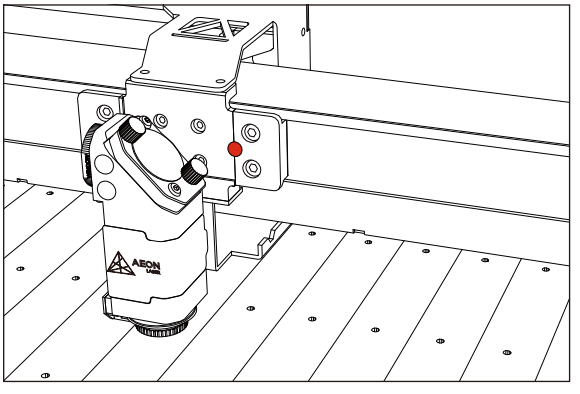
Locate the greasing hole of the X-axis beside the laser head. Open the small silicon cap of the greasing hole and put it in a safe place.





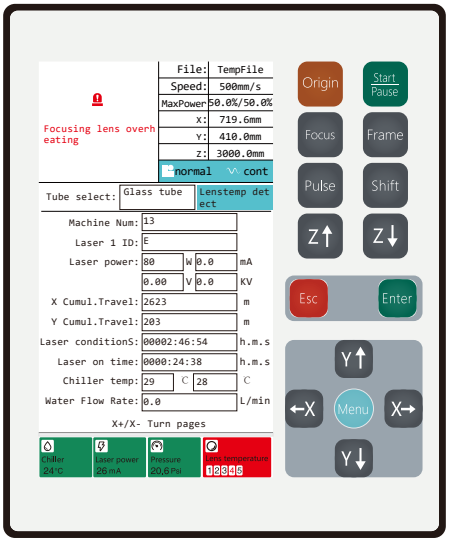
Inject 0.2-0.3ml into the greasing hole with the syringe.

Press the the silicon cap into the greasing hole and secure it. Turn on the machine, clear the alert by pressing ESC.



How to Clean the Lens and Mirrors

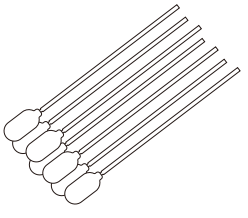
Maintaining the optical components on Redline machines is straightforward and does not require specialized tools for removal. After cleaning, there is no need to realign the optical path. The MIRA 7S and 9S models are equipped with a thermal sensor that alerts you when lenses or mirrors become excessively hot, prompting inspection or cleaning.



When you see a warning on the control panel like this on the right, it means your focus lens or mirrors may be dirty (Most times, it warns you exactly which mirror you need to clean, but it is better do routine cleaning once a week.), and you need to clean it.

Preparation:

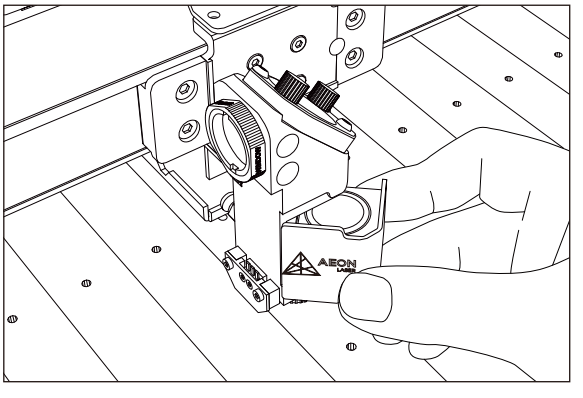
- **Cotton Swabs:** (There is one pack in the tool box of the machine)
- **Suction Cup:** (There is one inside the tool box of the machine)
- **Cabinet Key:** (In the tool box)
- **90% Isopropyl Alcohol:** (Prepared by users)



Cotton Swab X 1

Alcohol X 1

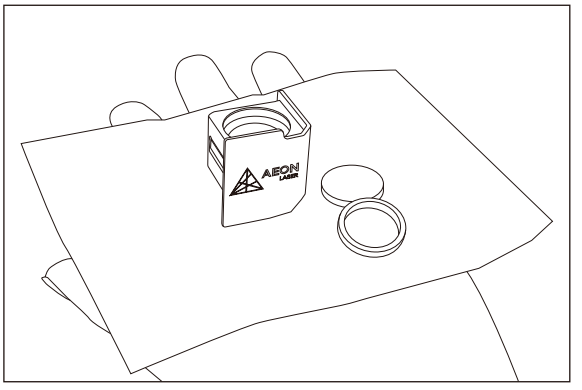
Or you can use Microfiber Lens Cloth as well.

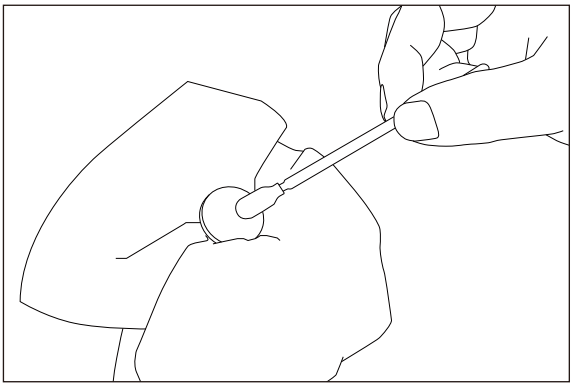


Clean the Lens:

1.Go to the laser head and locate the red section in its center.
2.Grasp it gently between your thumb and forefinger.
3.Rotate clockwise to disengage the parts. Note that there is a strong magnetic force, so apply gradual pressure as you rotate.

Place the removed lens holder, sealing ring, and focusing lens sequentially on a clean, dust-free cloth

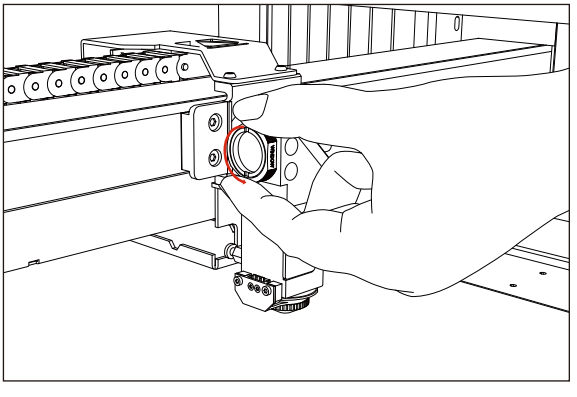




Take out a cotton swab, dip it in alcohol, and gently wipe the lens. After cleaning, carefully reposition the lens, place the ring on top of it, and secure it with a gentle press of your finger. Finally, firmly insert the entire lens holder back into the laser machine.

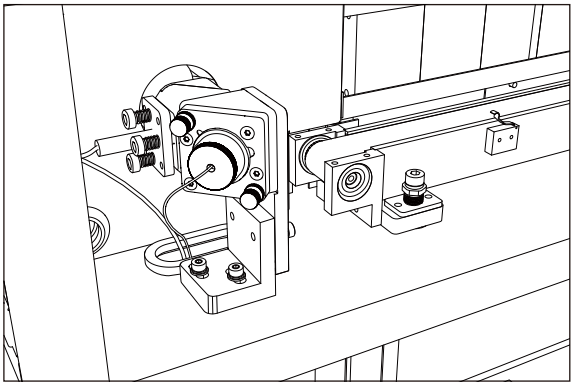
Cleaning the Protective Lens

The protective lens is located on the left side of the laser head. Grip it with two fingers of your left hand and rotate the red ring counterclockwise to fully disengage it. After it has been cleaned, you can install it back by rotating it clockwise.

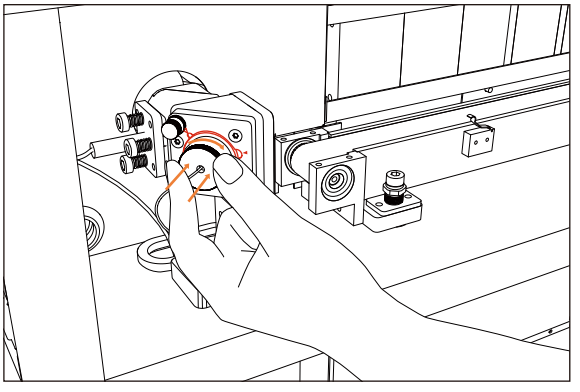


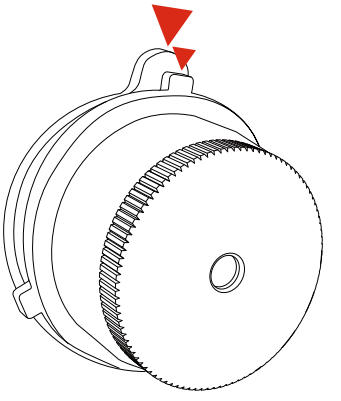
Clean the Mirror #1 and Mirror #2

Unlock and open the left side panel using the cabinet key, making sure it is securely placed out of the way. Next, locate the first mirror holder in the upper left corner.

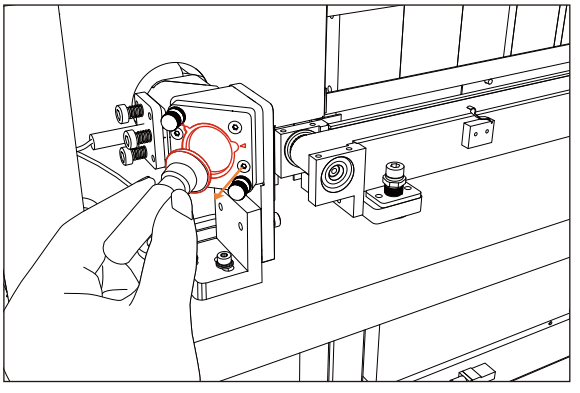


Press and rotate the button until the small handle aligns with the corresponding opening, then release to disengage it. Put it aside temporarily, being careful of the sensor wires attached to it.

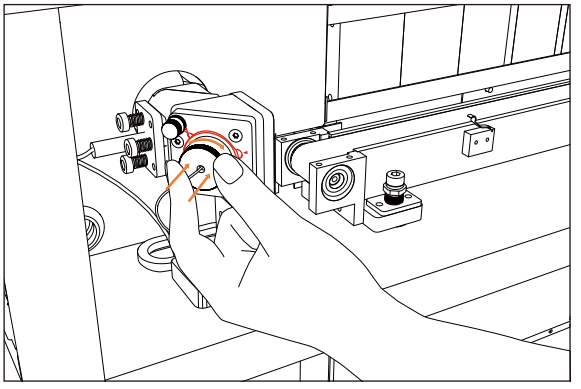


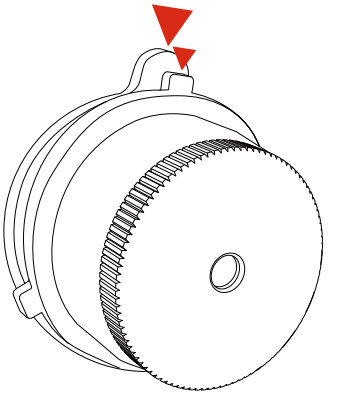


Secure the rear of the mirror with a suction cup and carefully extract the mirror from within



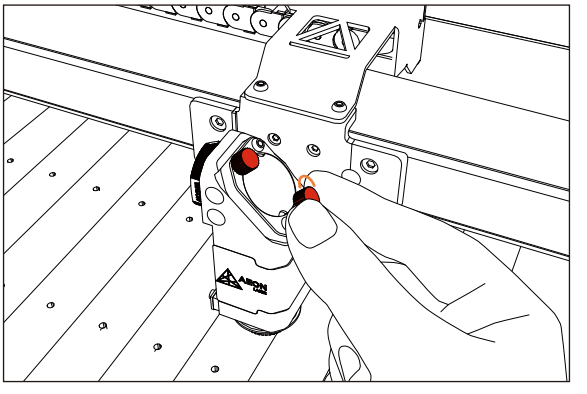
Clean it, and install it back carefully, then, press and screw in the push button.
Do the same with the mirror #2, it is on the gantry of the machine.



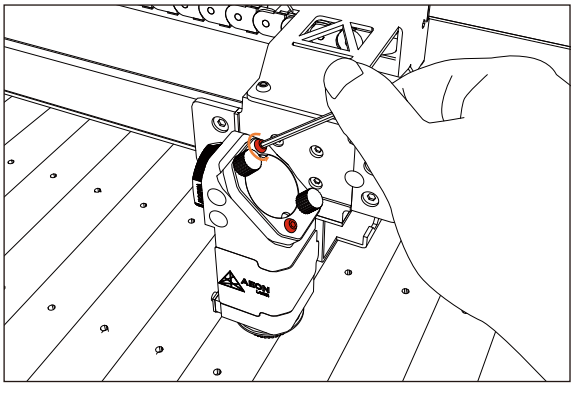


Clean the Mirror #3

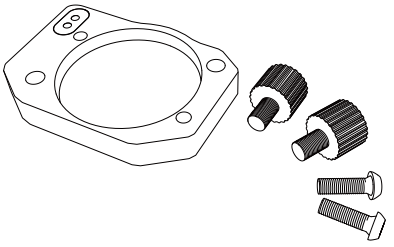
The Mirror #3 is located on the laser head, pressed by two knob screws. Use your fingers to unscrew them and put it in a safe place.



Follow that, use a suction cup to lift the round metal plate, exposing the mirror below. Extract the mirror with the suction cup, clean it, and then reinstall it.
For some early versions of the Redline Mira S, you may need to remove two set screws to access the mirror. If you can remove the back round metal plate after removing the two knob screws, you won't need to proceed with this step.



After removed the two set screws and the two knob screws, you could remove the whole piece like this:



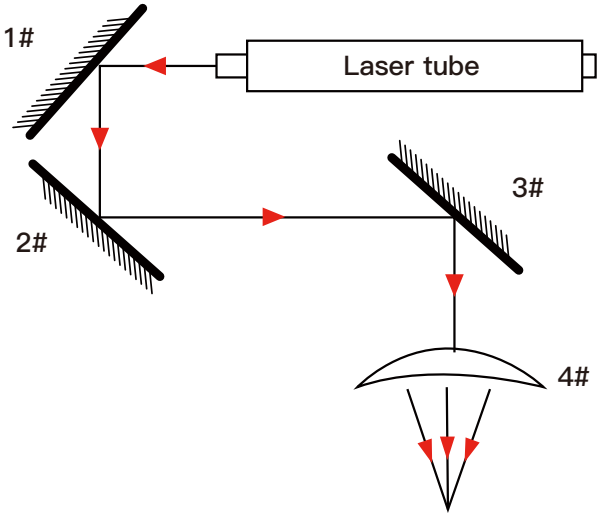
Then you could reach the mirror, clean them and install it back.

How to Calibrate the Laser Path

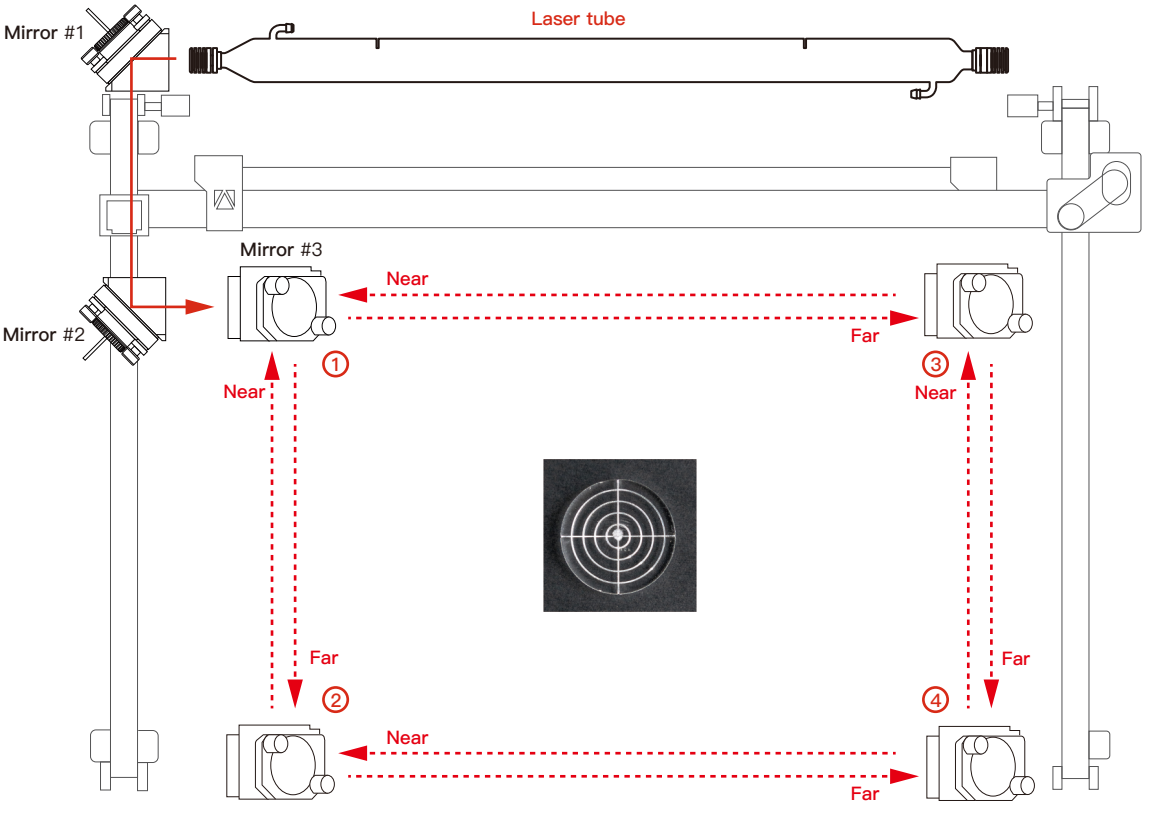
The MIRA S is equipped with a precision-engineered optical path designed to maintain consistent alignment, even after replacing mirrors, lenses, or laser tubes. However, minor errors may occasionally arise across batches, There are steps to verify correct optical path and how to correct the wrong light path.

To verify the optical path after replacing mirrors, lenses, or the laser tube, you can perform an optics checking test (refer to the instructions in Chapter 2, Operation of the Control Panel, Diagnosis). Additionally, you can manually confirm the precision of the optical path, as the diagnostic function may not always detect slight misalignments in optical components. While some tolerance for error is permissible, perfect alignment of the optical paths is essential for high-quality engraving and cutting tasks.

Let's first understand the general theory:
The principle is simple: Light propagates in a straight line. Our goal is to ensure that the laser beam passes through the center of the laser head nozzle precisely and is absolutely perpendicular to the worktable.



To test that, place a piece of acrylic or masking tape in front of the Mirror #3, and use the laser's pulse function to burn marks onto the acrylic or tape in different positions (typically at the four corners and the center of the working area of the machine) to check if they overlap. To simplify the calibration process, we have designed a cutting file that allows users to cut small acrylic blocks with an engraved shooting target.You can download the file here:
https://tvbskvgxsk.jiandaoyun.com/sharedoc/7onNefzSt0fpc72eQXHwi5

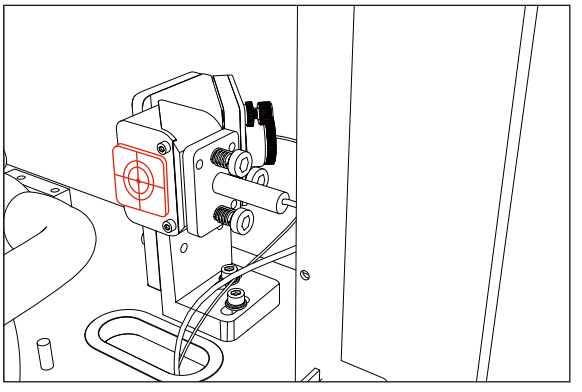


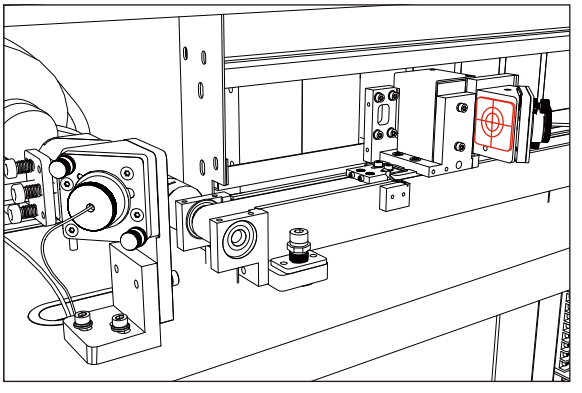
If you find the pulse dots at 5 positions don't overlap, here goes the calibration steps.
Tools needed:
Cabinet key.
Double-sided adhensive
Shooting target (Usually small piece of acrylic block, or masking tape)
Allen key.
Hex nut driver.

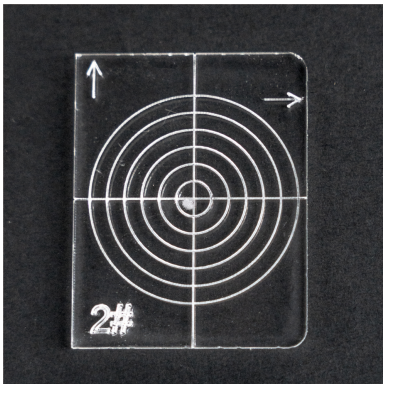
Before starting, ensure the lid of the machine is closed. Go to the control panel, press the **Menu** key, and select Laser Setting. Set the mode to Pulse, press **Enter** to save the changes. Set the laser time on 30ms and press enter. Then press **ESC** to return to the main interface. Press the combo key **Shift + Z–** to set the maximum pulse power to 35% and save it. This configuration ensures that when you initiate the pulse, it will create a sufficiently large circular mark on the acrylic for easy verification.

Next, start with the first mirror. Open the back lid of the laser cabinet. Apply a piece of double-sided adhensive to the back of the acrylic shooting target and attach it to Mirror #2. Move the gantry to the up near side of working space.

Press the Pulse key to make a pulse. The laser will burn a small mark on the acrylic. Check if the mark is centered on the target.

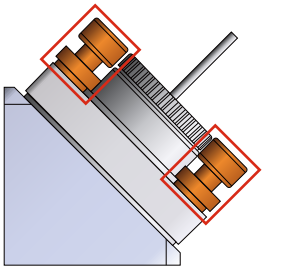




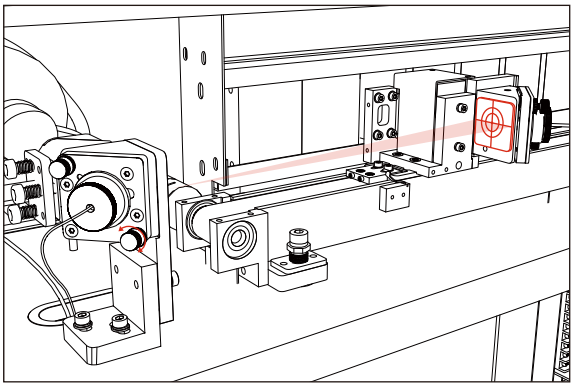


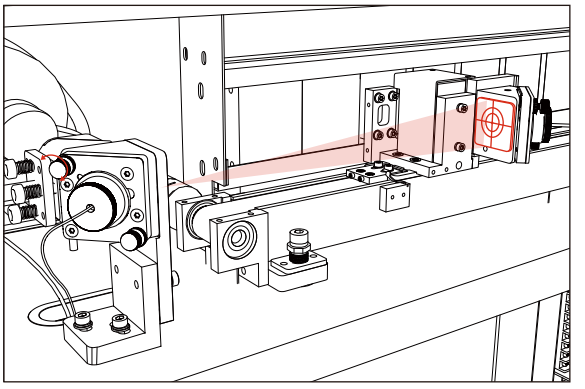
If it isn't, proceed as follows:

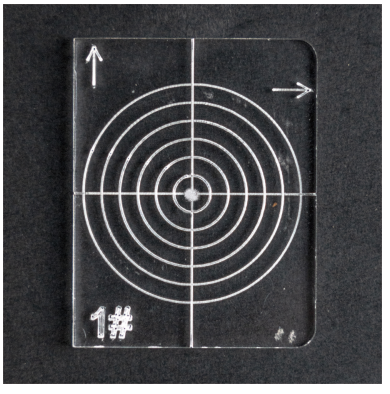
Loosen the knob screws of Mirror #1 by turning the small ring undeneath. Adjust the beam's position by rotating the knob screws :

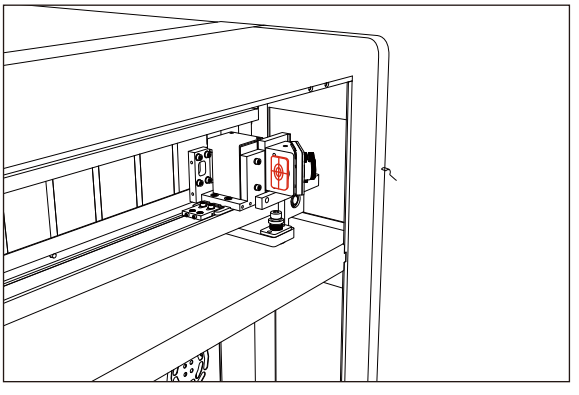


1.Clockwise rotation of the right knob moves the beam right; anticlockwise moves it left.
2.Clockwise rotation of the left knob moves the beam up; anticlockwise moves it down.









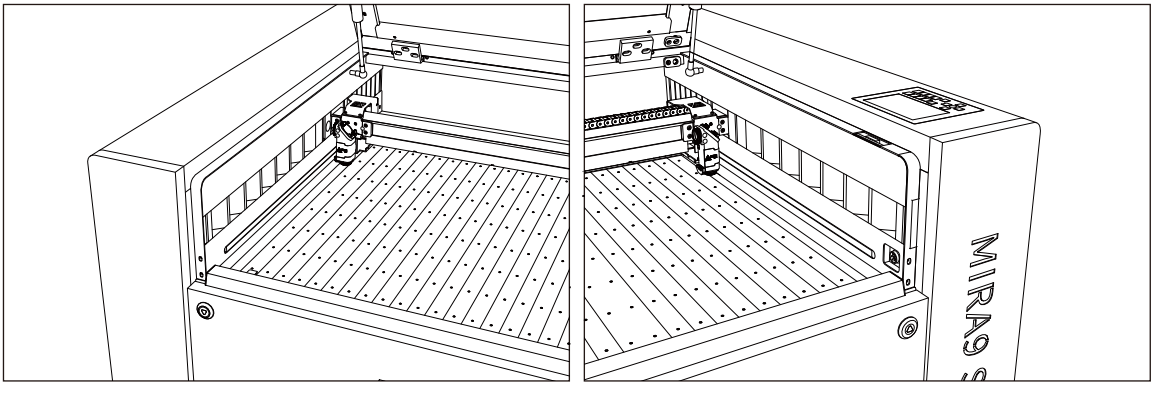
Once the burn mark is centered on the near up side, replace the acrylic block with a new one. Make a pulse, then move the gantry to the bottom near side of the working area by pressing the Arrow key. Make another pulse.

Compare the two pulse made by the laser to see if the two burn marks are overlapped.

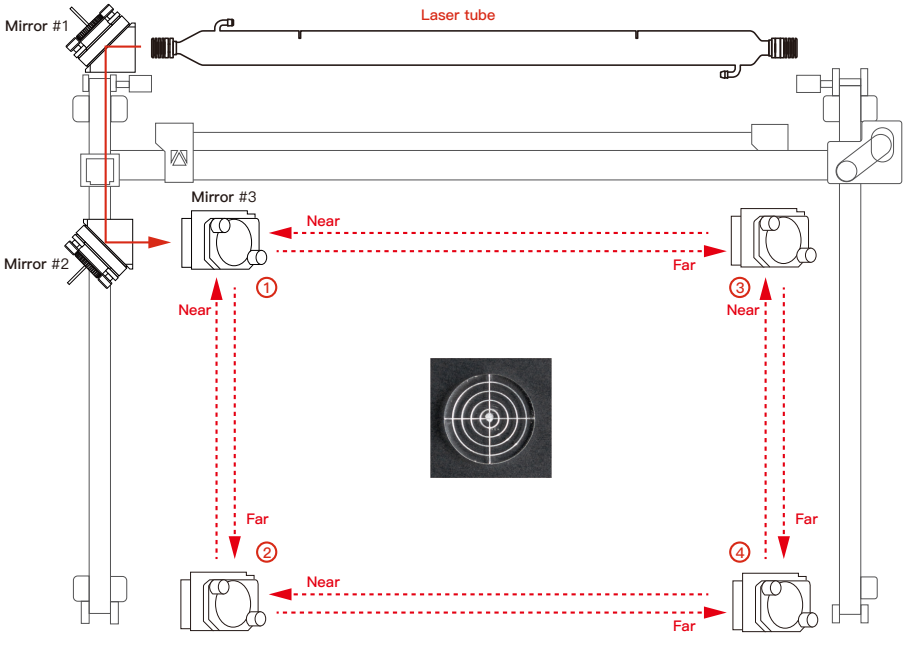
If the second burn mark shifts to the left, rotate the right knob screw clockwise. If it shifts to the right, rotate counterclockwise. Make a pulse and compare the marks again. Repeat the process until the burn marks overlap with the first mark, then tighten the ring beneath the knob screw to fix the mirror.

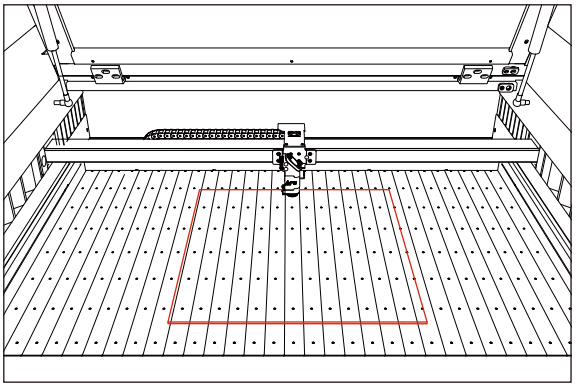
If you are unsure of the knob direction, refer to the red beam direction during adjustment. We will cover how to adjust the red beam later.

After adjusting Mirror #1, remove the protective lens on the left of the laser head attach the acrylic target to Mirror #2. Position the laser head to the middle near side of the workspace. Make a pulse on the far side, check if it is in the middle, if not adjust with the knobs on second mirror), then move the laser head to the far side and press Pulse. Compare the two burn marks and, if they are not aligned, adjust the knobs on Mirror #2 until the marks overlap in the middle.



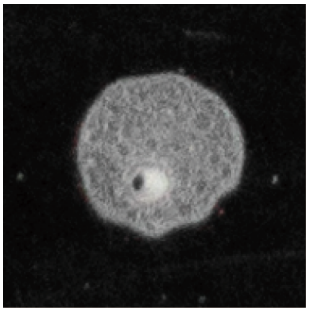
Change a piece of clean acrylic shooting target, take pulse in the four corners of the working area to see if they are overlapped (within 2mm error will be acceptable). If they are not overlapped or not centered, adjust the knobs on the mirror #2 until they are good.





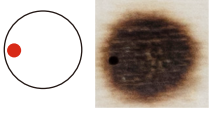
Then, jog the laser head to the middle of the working area. Put a piece of acrylic under the laser head.

Press the Focus key to focus the laser, then press the Pulse key to burn a mark. Next, press the Z– key to lower the worktable by 100mm, and press the Pulse key again to make another burn mark.

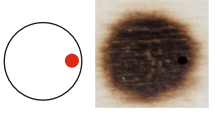


Compare the first and second mark, see if the first mark is in the center of the second mark, if not you can adjust the laser tube to center it.

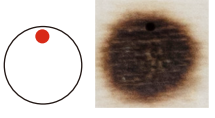
For results indicating misalignment



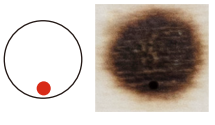
Lower the left side of the laser tube or rise the right side of the laser tube.



Rise the left side of the laser tube or lower down the right side of the laser tube.



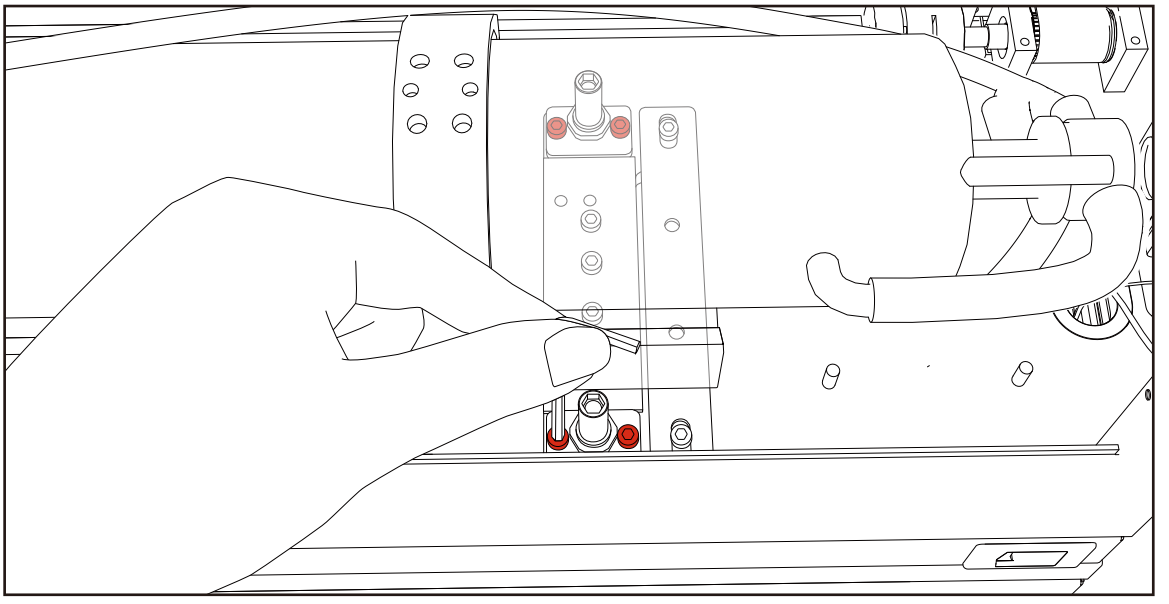
Move the left side of laser tube horizontally down a little or move the right side horizontally up a little.



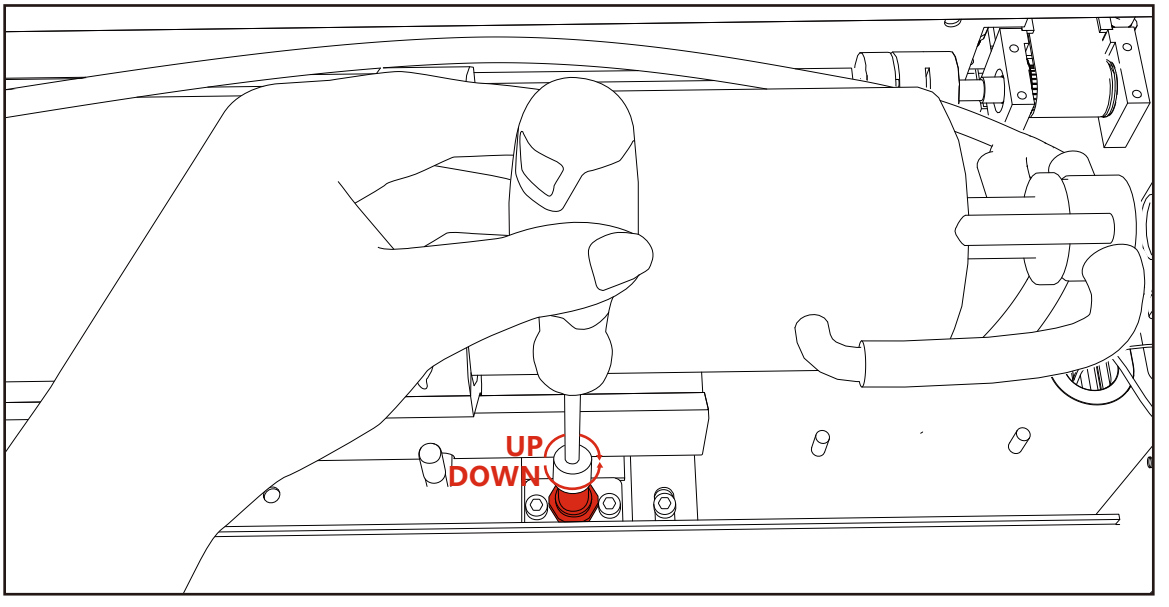
Move the left side of the tube horizontally up a little or move the right side horizontally down a little.

Here is How to Adjust the Laser Tube:

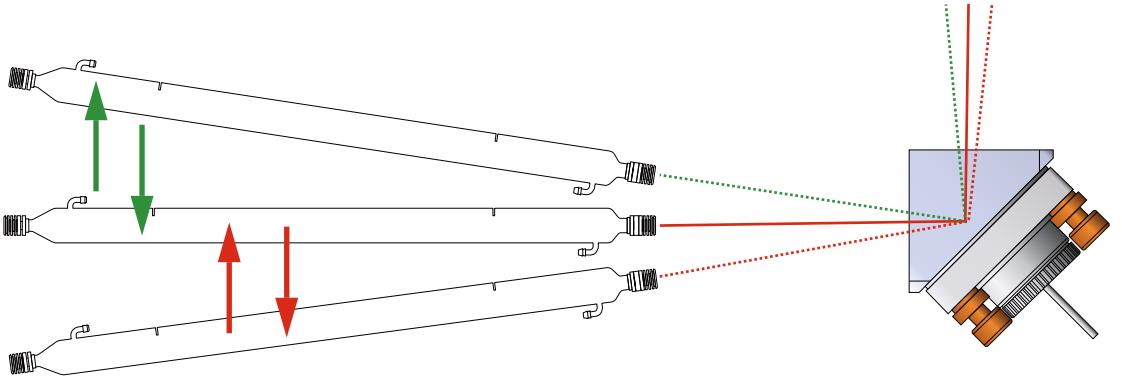
Open the lid of the laser tube cabinet. Locate the four screws on the laser tube docking station, positioned near the laser bracket.Take out the 2.5mm Allen key and first loosen the set screws beside it.



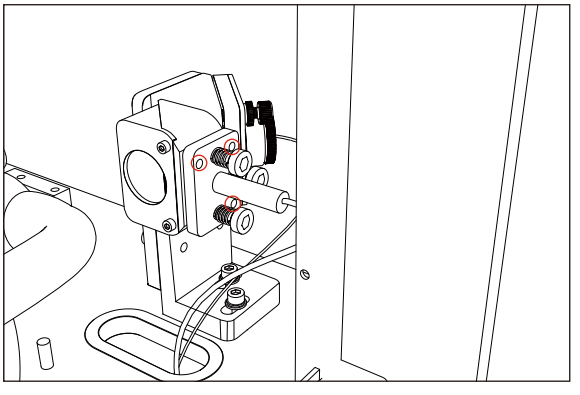
Next, use a hex nut driver to adjust the screws. Rotate clockwise to raise the laser tube or counter-clockwise to lower it. Ensure to make equal adjustments on the other side to maintain level alignment.



If you loosen the set screws, you can move the laser docking station horizontally up or down a little from the left end and right end illustrated below:



Repeat the procedure to until the first mark is centered in the second mark , tighten the set screws to secure it.

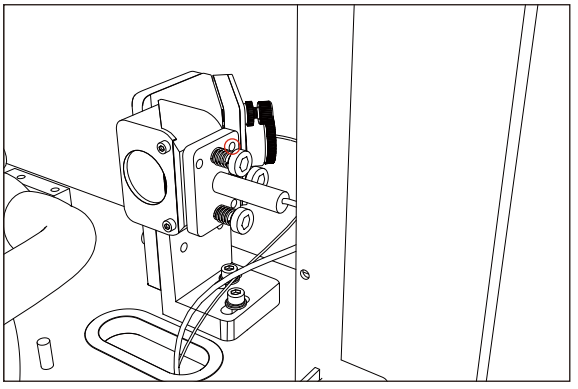


Use a 2mm Allen key for adjustments:

·**#1 hole:** Turning counterclockwise shifts the red beam to the left; turning clockwise shifts it to the right.

·**#2 hole:** Turning clockwise moves the red beam down and to the left; turning counterclockwise moves it up and to the right.

·**#3 hole:** Turning clockwise raises the red beam; turning counterclockwise lowers it.



The red beam is visible, making it easier to adjust while watching it. Once the laser path and red beam are properly aligned, ensure that the knob screws and the set screw on the laser docking station are securely tightened to prevent any subsequent shifts.

Add Anti-Freeze for the Chiller:

When winter approaches, you should monitor the room temperature on the control panel. If temperatures in your area fall below 10-15°F (-12 to -9°C), it is advisable to fill the chiller with anti-freeze to prevent damage to the laser tube or chiller. Note that anti-freeze can decrease laser power, so when the weather gets warmer, you don't have to use it.

1.Turn off and unplug the machine.

2.Since it uses a water chiller, drain the water from the system to prevent freezing and potential damage to the glass laser tube and chiller components. This is an essential step.

3.For the MIRA series laser machines, here are the general antifreeze guidelines to prevent freezing and potential tube damage:

-MIRA 5S (2.5L water tank): Use a mix of 1L distilled water and 1L antifreeze.
-MIRA 7S (3L water tank): Fill with 3L of antifreeze.
-MIRA 9S (3.5L water tank): Fill with 3.5L of antifreeze.

Ensure the antifreeze is compatible with the chiller system to protect against freezing and damage in cold environments

4.After draining the water and adding the anti-freeze blend, plug in and turn on the machine. Let it idle to fully flush the anti-freeze through the system, then power off once complete.

Maintenance Plan:

·Grease the guide rail every 5000 km travel of the X axis.
·Change the water every 3 months.
·Clean the optical path whenever it alerts or check and clean it daily.

Add Anti-Freeze for the Chiller:

To ensures your laser machine operates normally during colder months, prevent water in the cooling system from freezing and potentially damaging the laser tube or chiller, it is recommended to add antifreeze when the ambient temperature drops below 5℃ (41℉).
When purchasing and using antifreeze, please pay attention to the following points:

I. Choose Suitable Antifreeze
Select the antifreeze that offers chemical stability, excellent freeze protection, low-temperature adaptability, good corrosion resistance to ensure long-term stable operation. AEON LASER uses the Antifrogen N series antifreeze from CLARIANT (USA), the same series of antifreeze is recommended.

2. Avoid Excessive Concentration:
While high concentrations of antifreeze offer better freeze protection, they may increase corrosive effects. Please refer to the local historical lowest temperature as a guide and adjust the ratio based on actual conditions before use.
The recommended water-to-antifreeze mixing ratios are as follows:

Water Tank Capacities of MIRA Models:
MIRA 5S: 2.5L
MIRA 7S: 4L
MIRA 9S: 3.5L

Temperature Range℃(C)	Antifreeze (%)	Purified Water (%)	Ratio	MIRA5 S		MIRA7 S		MIRA9 S	
				Antifreeze (L)	Purified Water (L)	Antifreeze (L)	Purified Water (L)	Antifreeze (L)	Purified Water (L)
-6℃ to - 15℃	**30%**	**70%**	**3:7** Recommend	**0.75**	**1.75**	**1.2**	**2.8**	**1.05**	**2.45**
-16℃ to -23℃	40%	60%	4:6	1	1.5	1.6	2.4	1.4	2.1
-24℃ to -35℃	50%	50%	5:5	1.25	1.25	2	2	1.75	1.75
-36℃ to -45℃	60%	40%	6:4	1.5	1	1.6	2.4	2.1	1.4

Note: While meeting antifreeze performance requirements, use the lowest effective concentration. A minimum antifreeze proportion of 30% is recommended.

3. Antifreeze Replacement:
The antifreeze in cooling systems should be replaced periodically due to the degradation of its properties over time. it is recommended to replace the antifreeze every 2–3 months. As temperatures rise above freezing, replace the antifreeze with distilled or purified water.

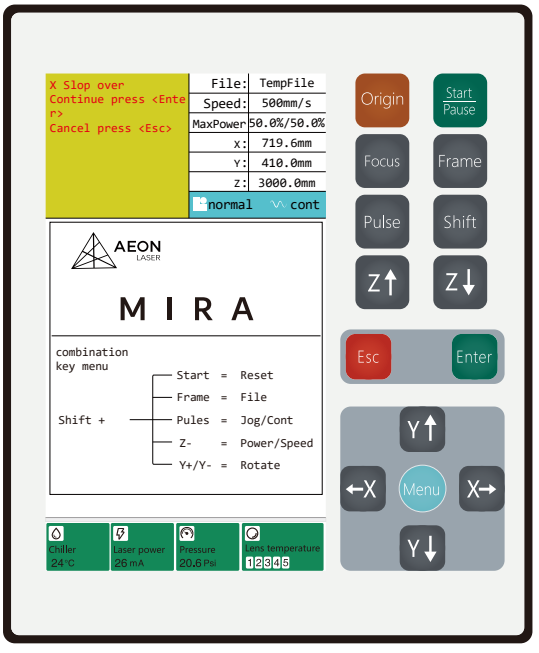
Choosing other brand Antifreeze
If CLARIANT Antifrogen N series antifreeze is not available in your area, you may use RV Antifreeze, commonly available in 100% concentrated, ready–to–use RV/Marine Antifreeze, It can be used directly without dilution(pink or green).

Please note that windshield wiper antifreeze is not suitable for use in laser machine cooling system. Please consult us or your local distributor before purchasing or using different type of antifreeze.

Maintenance Plan:
- Grease the guide rail every 1000 km travel of the X axis.
- Change the water every 3 months.
- Clean the optical path whenever it alerts or check and clean it daily.

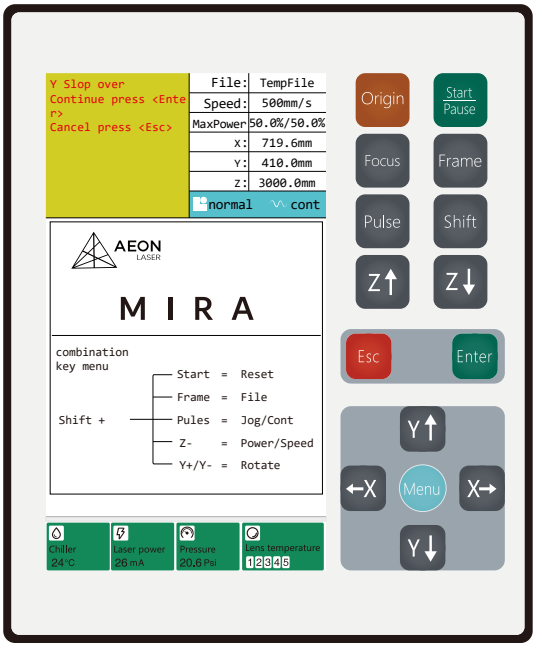
Slop Error

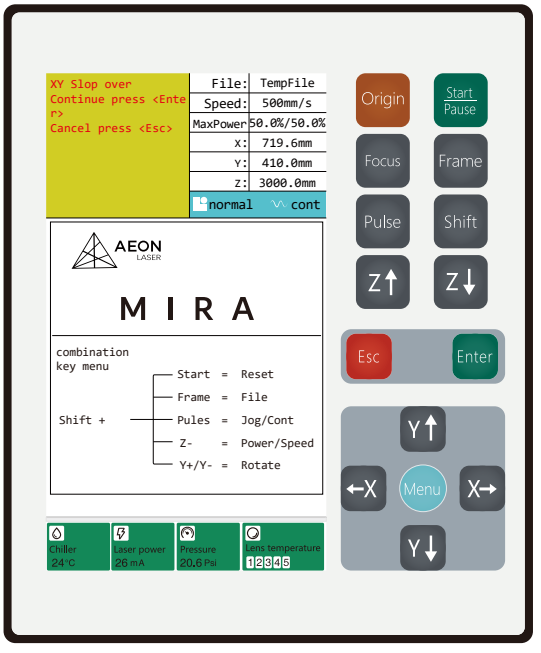
Slop errors occur when the machine detects a potential collision due to the file dimensions exceeding the workspace or the origin placement not allowing sufficient space. For example, attempting to process a file 800 mm wide on a MIRA7 (with a 700 mm X travel) triggers an X Slop Error, indicating a risk of collision with the side wall unless the file or origin is adjusted. Users may encounter three types of slop errors: X Slop Error, Y Slop Error, and XY Slop Error.



·**X Slop Error:** Occurs when the machine lacks sufficient X-axis space to process the file without collision risk.

·**Y Slop Error:** Occurs when the machine lacks sufficient Y-axis space to process the file without collision risk.





·**XY Slop Error:** Occurs when the machine does not have sufficient space to frame or run along both the X and Y axes without risking a collision.

Slop errors often result from incorrect origin settings. For instance, processing a 200 mm box on a MIRA7 with the software origin set to the top right while the user origin is at the top left will trigger an error, as the machine lacks space to execute the file from the set origin.

To resolve these errors:

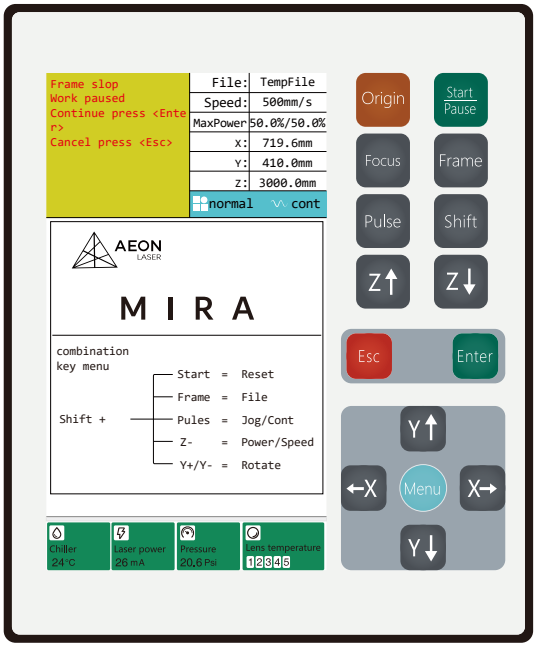
1.Ensure the file dimensions fit within the bed's limits.
2.Set the origin correctly.
3.Press the ESC key on the control panel to clear the error.

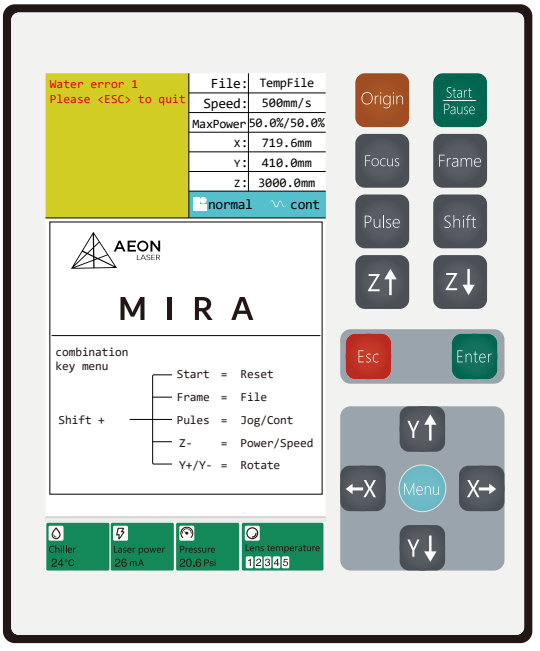
Not Enough Extend Space Error

The 'Not Enough Extend Space' error arises when, although the job is positioned with adequate clearance to avoid a slop error, the machine lacks sufficient space on both sides of the work area for the laser head to safely accelerate and decel–erate. This issue may only become apparent after initiating standard operations such as sending the file, framing, setting the origin, and attempting to start the job. The machine's motors need time to reach full speed and come to a complete stop before reversing direction during scanning.

To resolve the 'Not Enough Extend Space' error:

1.Move the origin to a central position on the bed to ensure adequate space for full motion on all sides.
2.Reduce the speed settings in the file. Lowering the speed reduces the required deceleration and acceleration distance, alleviating the need for extra space.





Water Error 1

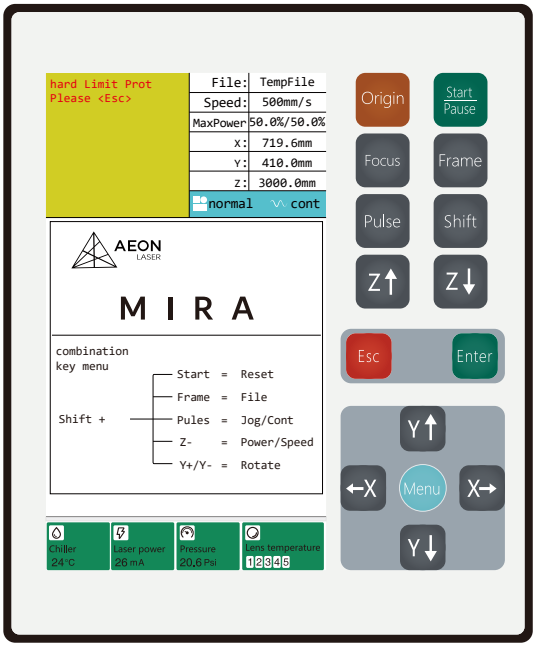
The 'Water Error 1,' or Water Protection, is triggered when the machine controller detects a lack of water flow through the chiller flow sensor. This indicates that no water is flowing through the tubing to the laser tube, which can prevent the laser tube from being properly cooled and may cause permanent damage.

Potential Causes and Corresponding Solutions:

·**Insufficient water in the chiller tank:** Ensure the chiller reservoir is adequately filled.
·**Blocked or reduced water flow due to a faulty pump or algae buildup:** Inspect and repair or replace the water pump if faulty.
·**Malfunctioning chiller flow sensor:** Check the chiller flow sensor and replace it if needed.
·**Poor connection in the signal cable between the controller and sensor:** Inspect and secure the signal cable connections at the controller terminal 'CN5'.

Resolution Steps:

1.Ensure the chiller reservoir is filled with water.
2.Inspect the water pump and clean or replace it if necessary.
3.Check the chiller flow sensor and replace it if malfunctioning.
4.Verify and secure all signal cable connections to the controller.



Hard Limit Error

The 'Hard Limit Protect' error is triggered when a machine component, such as the gantry, laser head, or bed, activates a limit sensor. This safety feature prevents collisions with the side walls or bed and ensures user safety. The error message indicates an unexpected activation but does not specify the sensor involved.

Common Causes:

·Machine interruption during the reset process.
·Issues with the X/Y axis in the back right (far side) corner or the Z axis at its highest and lowest positions.

Resolution Steps:

1.Reset the machine using the keypad.
2.Pressing the "ESC" key will clear the error but may override the sensor, potentially leading to collisions. Exercise caution when using this method.

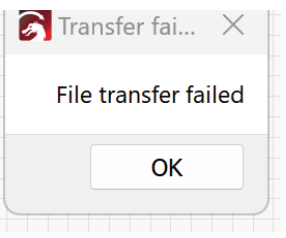
Potential Causes for "File Transfer Failure":

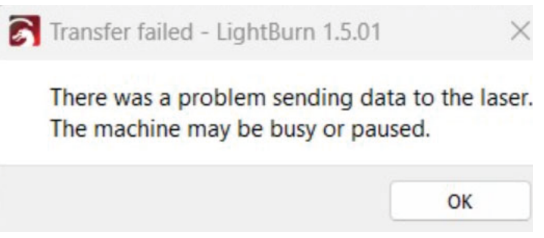
·The machine is turned off.
·Improper connection to the machine or an incorrect device profile is selected.
·The machine is still processing a job.

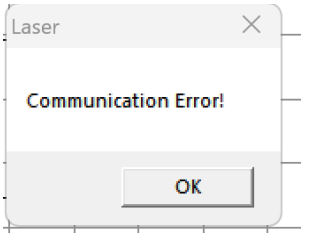
To Address These Issues:

1.Ensure that the machine is powered on.
2.Check the connection to ensure it is securely established. If using Wi-Fi or USB, confirm that the device profile is selected in LightBurn and correctly configured based on the chosen connection method.
3.If the machine is actively running a job or believes it is still processing one, allow the current job to complete or cancel it. Press the "ESC" key on the keypad repeatedly until you hear a couple of beeps and observe the laser head returning to the set origin. Then attempt to resend the file.

Note: Sometimes, although the machine may appear to be idle, the controller might still think it has a job queued for processing. Pressing "ESC" on the keypad clears this state, enabling the controller to send and receive information as intended.
In RDWorks, a similar issue will result in an error message: "Communication error."

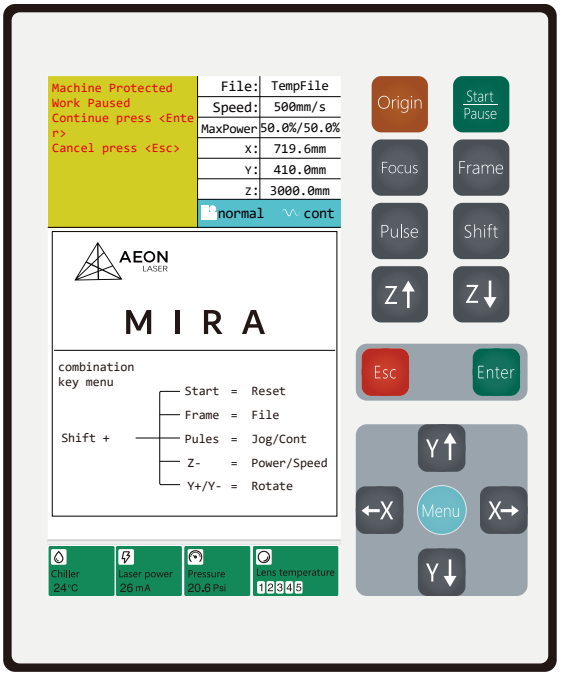






Machine protected error

The 'Machine Protected Error' is triggered by the lid sensor when the lid is open, preventing the machine from firing as a safety precaution.



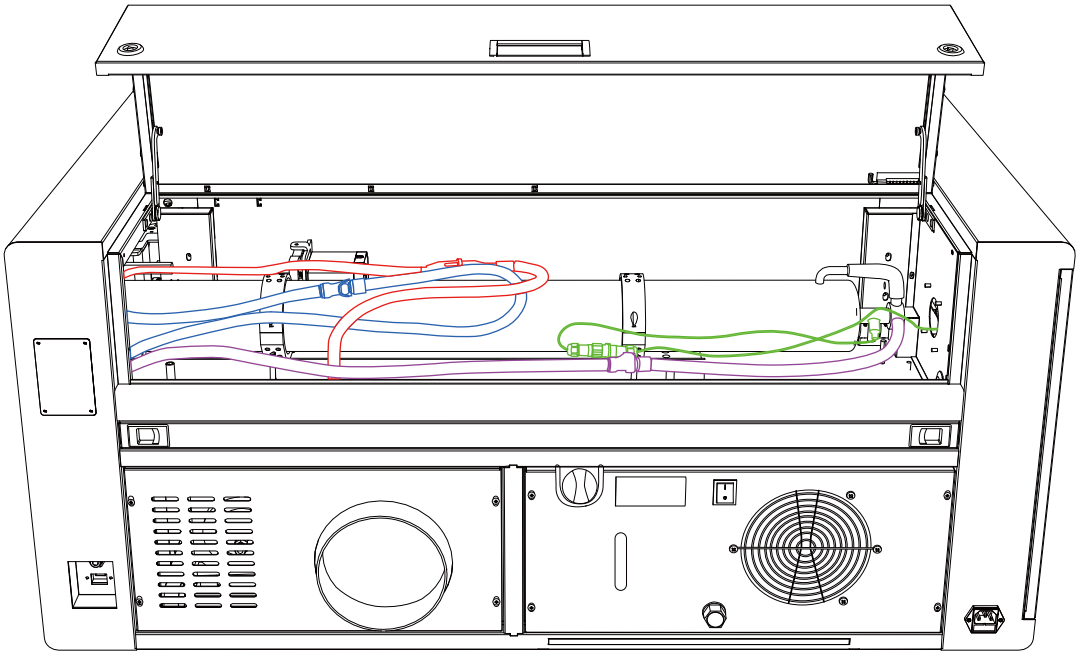
To resolve this error, press the ESC key and confirm that the lid is securely closed. This will reset the sensor and enable safe machine operation.

Mirror or Lens too hot.

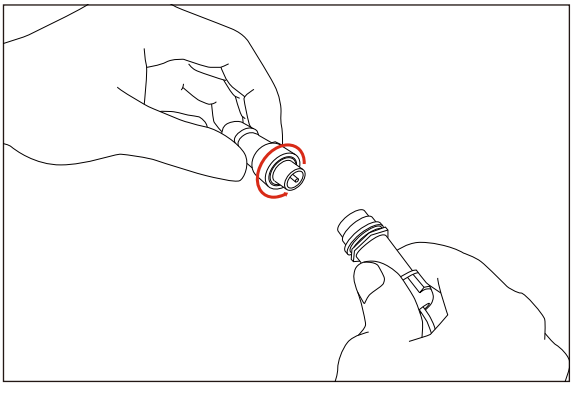
How to Replace the Laser Tube

Replacing the laser tube on Redline MIRA S machines is straightforward and requires no special tools.

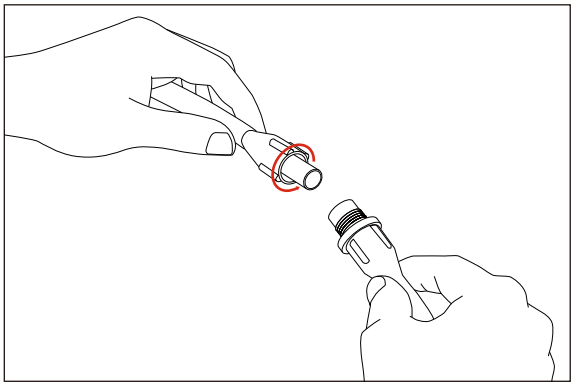
First, prepare a spare laser tube from AEON Laser or a local distributor. Power off the machine and open the back lid of the laser cabinet. You will see the laser tube as shown below:



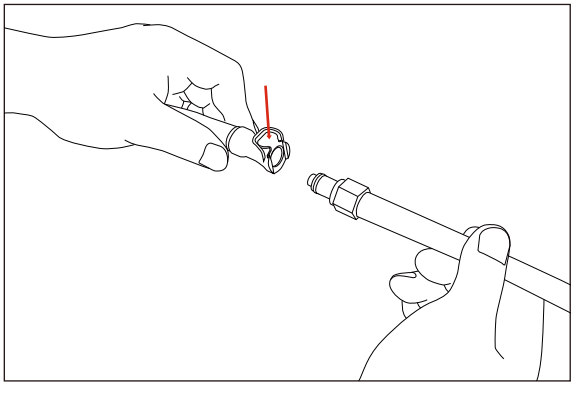
Locate the negative wire quick connector. Rotate the ring in the middle to disconnect it



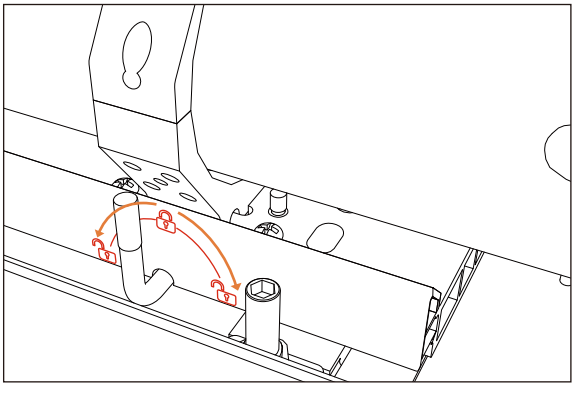
Then, locate the positive quick connector and rotate it to disconnect.



Locate the quick connectors for the water inlet and outlet hoses.
To disconnect, press the metal ring to release the connectors.



There are two red handles on both sides of the laser docking station. Locate them and rotate them sideways (either direction will work) to unlock the laser tube.



Carefully! remove the old laser tube by hand. Install the new one, secure it with the red handle, and reconnect the wires and water hose.

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