ACMER Carvnova SM

Manual V1.0

Shenzhen Titan International Development Technology Co., Ltd.

Thank you for choosing our product and placing your trust in our brand. We are committed to offering top-tier quality products and unparalleled customer service. Your support is invaluable to us.

To ensure you get the most out of your product, we offer a range of support solutions:

Tutorials:

Your ACMER machine arrives with an in-depth manual, but we also understand the value of visual learning. Scan the QR code below to access video and document tutorials tailored to your specific machine model. Stay connected with ACMER for expert guidance:

For ongoing updates and insights, don't hesitate to engage with us directly or follow our social media channels. Stay informed about the latest news, expert advice, and engaging events.

Email Support:

For personalized assistance, our after-sales service team is just an email away. Reach out to us at support@acmerlaser.com for any queries or concerns you may have.

We're here to help you make the most of your ACMER experience. Thank you again for your trust and support.

ACMER Fiber Laser Marking Machine User Manual

Read Carefully Before Use Keep for Future Reference
BEAMING WITH POSSIBILITIES!

Thank you for choosing our ACMER laser equipment!
This fiber laser marking machine is intended for personal and professional use. Read this manual carefully before operation. It covers the details of correct installation, adjustment, maintenance, and—most importantly—safe operation of your new laser. It is intended to be used in conjunction with the manual for its engraving software, as the program not only provides image design but also serves as the main interface for the laser settings and machine controls. You and any other users of this device should thoroughly understand BOTH manuals before attempting to operate the laser.

Both manuals should be included if this device is given or sold to a third party.

If you have any questions, after reading these manuals, please contact us and our support department will address your concerns as soon as possible.

Welcome to the ACMER Community!

For helpful hints and instructional videos, visit our Help Center or join our official laser group! If you encounter any issues with your engraver, please feel free to contact us. Our support team will respond ASAP to resolve your concerns.

- Help Center：help.acmerlaser.com/hc/en-us
- Explore on your smart device：@acmerlaser
- Official Website：acmerlaser.com
- Technical Support：support@acmerlaser.com

Address：501, Building 1, No. 6 Zhongyuguan Road, Yousong Community, Longhua Street, Longhua District, Shenzhen,Guangdong, China

Content

1 Safety Information

1.1 Disclaimer

Read this disclaimer completely and carefully before proceeding with the rest of the manual content.

- As-Is: This ACMER product is sold 'as is' and without any express or implied warranties, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.
- Product Modifications: Any modifications or alterations to ACMER products void any warranties and may result in damage or injury. ACMER shall not be liable for any damages resulting from such modifications or alterations.
- Compliance with Laws: Customers shall be liable for ensuring that the use of ACMER products complies with all applicable laws and regulations in their respective jurisdictions. ACMER assumes no responsibility for any violations of laws or regulations resulting from the use of ACMER products.

- Correct Use:
- Always use ACMER products only as directed in the accompanying manuals. Failure to follow instructions may result in injury or damage.
- Always ensure the assembly, installation, operation, maintenance, or repair of ACMER products is carried out by a competent person.
- Always make maintenance regularly throughout ACMER products' lifecycles; you have the liability to keep the products operating as intended.
- Always wear appropriate protective gear.

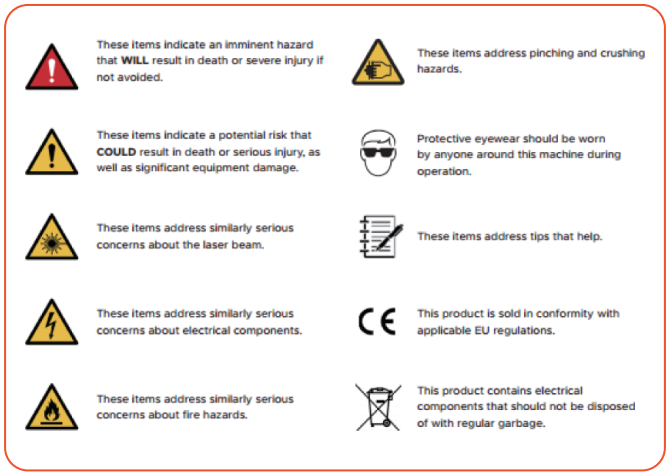
- Third-Party Products: ACMER shall not be liable for any damages or losses resulting from the use of third-party products in conjunction with ACMER products. Customers shall refer to the third-party's guidelines or/and warranties (if any) for any third-party products used.

- Limitation of Liability: ACMER shall not be liable for any direct, indirect, punitive, incidental, special, or consequential damages to property or life, whatsoever arising out of or connected with the use or misuse of ACMER products. In no event shall ACMER's liability exceed the value of the products sold.

This disclaimer states the entire obligation of ACMER with respect to ACMER products. If any part of this disclaimer is determined to be void, invalid, unenforceable, or illegal, including but not limited to the warranty disclaimers, liability disclaimers, and liability limitations set forth above, the invalid or unenforceable provision will be deemed superseded by a valid and enforceable provision that most closely matches the intent of the original provision and the remainder of the agreement shall remain in full force and effect.

1.2 Symbol Guide

The following symbols are used on this machine's labeling or in this manual:



1.3 General Safety Instructions

• DO NOT leave this machine unattended during operation. Observe the machine throughout the operation and, if anything seems to be operating strangely, immediately cut off ALL power to the machine and contact either our customer service or your dedicated repair service. Similarly, ensure the machine is FULLY turned off (including using the emergency stop switch) after each use.

• DO NOT allow minors, untrained personnel, or personnel suffering from physical or mental impairment that would affect their ability to follow this manual and the software manual to install, operate, maintain, or repair this machine.

• ALWAYS keep a fire extinguisher or other flame-retardant system nearby in case of accidents. Ensure that the local fire department's phone number is displayed nearby. In the case of a fire, cut electrical power BEFORE dousing the flame. Familiarize yourself with the correct range for your extinguisher BEFORE use. Take care not to use the extinguisher too close to the flame, as its high pressure can produce blowback.

• Use this laser marking machine ONLY in accordance with ALL applicable local and national laws and regulations.

• Use this machine ONLY in accordance with this instruction manual and the manual for the software included with it. ONLY allow this machine to be installed, operated, maintained, repaired, etc. by others who have also read and understood both manuals. Ensure that this manual and the software manual are both included with this machine if it is ever given or sold to a third party.

• ANY untrained personnel who might be near the machine while it is in operation MUST be informed that it is dangerous and FULLY instructed on how to avoid injury during its use.

1.4 Laser Safety Instructions

This machine complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2019.

When used in accordance with these instructions, it is a CLASS 4 laser product. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. Used without care, it can also cause serious property damage and personal injury including but not limited to the following:

- The laser will easily burn nearby combustible materials
- Some working materials may produce radiation or harmful gasse during processing
- Direct exposure to the laser will cause bodily harm including serious burns and irreparable eye damage

- NEVER interfere with the laser beam. DO NOT place any part of your body under the laser lens during operation. Take measures to protect yourself from potentially reflected laser beams including the use of screens or personal protective equipment.
- NEVER attempt to view the laser directly without protective eyewear. Always wear safety goggles or glasses designed to filter the specific wavelength of your engraver's laser with an optical density (OD) of 5+. As even seemingly matte materials can produce harmful reflected beams, care should be taken to keep anyone without protective eyewear from observing the machine during operation. EVEN WITH protective eyewear, DO NOT stare or allow others to stare continuously at the laser beam during operation.
- DO NOT leave potentially combustible, flammable, explosive, or corrosive materials nearby where they could be exposed to the direct or reflected laser beam.
- NEVER use this marking machine with the fiber source's housing opened, as the closed laser light path is necessary to prevent laser radiation leakage.
- DO NOT modify or disable this machine's provided safety features. DO NOT modify or disassemble the laser and DO NOT use the laser if it has been modified or disassembled by anyone except trained and skilled professionals. Dangerous radiation exposure and other injury may result from the use of adjusted, modified, or otherwise incompatible equipment.
- DO NOT use or leave sensitive EMI equipment nearby. Ensure the area around the laser is free of strong electromagnetic interference during ANY use.
- ONLY use this machine for the materials described in this manual. The laser settings and cutting process must be properly adjusted for specific materials.
- Ensure the area is kept free of other airborne pollutants, as these might pose a similar risk of reflection, combustion, etc.

1.5 Electrical Safety Instructions

• ONLY use this machine with a compatible and stable power supply with less than 5% fluctuation in its voltage.

• DO NOT connect other devices to the same fuse, as the laser system WILL require its FULL amperage. DO NOT use with standard extension cords or power strips. Use ONLY surge protectors rated over 2000 J.

• ONLY turn on the power to this device when it is well grounded, either via a firm connection to a 3-prong outlet or via a dedicated ground cable firmly connected to the proper slot on the back of the main tower. DO NOT use with an ungrounded 3-to-2 prong adapter. The device's grounding should be checked regularly for ANY damage to the line or loose connections.

• Turn the machine on and off using its power buttons in the correct order. The laser has a separate power supply that is separately grounded. Pushing all the buttons at once, too quickly, or in the wrong order may send electrical current to an ungrounded component, causing short circuits and other electrical hazards.

• ONLY use this machine with one hand at a time. The laser is powered by an EXTREMELY high voltage connection and placing two hands on the machine at one time during operation has the potential to create a closed circuit with the human body, resulting in electrical shock.

• The area around this laser marking device should be kept dry, well ventilated, and environmentally controlled to keep the ambient temperature between 40 °F–95 °F (5 ℃–35 ℃). The ambient humidity should not exceed 70%.

• Adjustment, maintenance, and repair of the electrical components of this machine must be done ONLY by trained and skilled professionals to avoid fires and other malfunctions, including potential radiation exposure from damage to the laser components. Because specialized techniques are required for testing the electrical components of this marking system, it is recommended such testing ONLY be done by the manufacturer, seller, or repair service.

• Unless otherwise specified, ONLY undertake adjustment, maintenance, and repair of the device when it is turned off and disconnected from its power supply.

1.6 Material Safety Instructions

Users of this fiber marking machine are responsible for confirming that materials to be processed can withstand the heat of the laser and will not produce any emissions or byproducts either harmful to people nearby or in violation of any local or national laws or regulations. In particular, DO NOT use this device to process polyvinyl chloride (PVC), Teflon, or other halogen-containing materials under any circumstances.

Users of this fiber laser are responsible for ensuring that every person present during operation has sufficient PPE to avoid any injury from emissions or byproducts of the materials being processed. In addition to the protective laser eyewear discussed above, this may require goggles, masks or respirators, gloves, and other protective outer clothing.

Users MUST exercise special caution when working with conductive materials as buildup of their dust and ambient particles may damage electrical components, cause short circuits, or produce other effects including reflected laser radiation.

CAN be used

- Aluminum
- Brass
- Carbide
- Gold
- Silver
- Steel
- Stone, including Granite, Marble, etc.
- Titanium
- Tungsten

This machine can be used with some other metals, hard plastics, and other materials with some care. For the recommended parameters for the most commonly engraved materials, see §5.4 Instructions for Specific Materials (Page 46) for reference.

CAN NOT be used

- Artificial Leather containing Hexavalent Chromium (Cr[VI]), due to its toxic fumes
- Astatine, due to its toxic fumes
- Beryllium Oxide, due to its toxic fumes
- Bromine, due to its toxic fumes
- Chlorine, including Polyvinyl Butyral (PVB) and Polyvinyl Chloride (PVC, Vinyl, Sintra, etc.), due to its toxic fumes
- Fluorine, including Polytetrafluoroethylenes (Teflon, PTFE, etc.), due to its toxic fumes
- Iodine, due to its toxic fumes
- Paper and Paperboard, due to their high flammability when exposed to the concentrated laser
- Phenolic Resins, including various forms of Epoxy, due to their toxic fumes
- Wood, including MDF, Plywood, Balsa, Birch, Cherry, Oak, Poplar, etc., due to its high flammability

For other materials, if you are unsure about its safety or laserability with this device, seek out its material safety data sheet (MDS). Pay especial attention to information about safety, toxicity, corrosiveness, reflectivity, and reaction(s) to high heat. Alternatively, contact our support department for further guidance.

1.7 Disposal Safety Instructions

Electrical products should not be disposed of with household products. In the EU and UK, according to the European Directive 2012/19/EU for the disposal of electrical and electronic equipment and its implementation in national laws, used electrical products must be collected separately and disposed of at the collection points provided for this purpose. Locations in Australia, Canada, and the United States may have similar regulations.

2 Introduction

2.1 General Information

This manual is the designated user guide for the installation, setup, safe operation, and maintenance of your ACMER fiber laser marking machine. It is divided into several chapters covering general information, safety instructions, installation steps, operation instructions, maintenance instructions, and contact information.
ALL personnel involved in the installation, setup, operation, maintenance, and repair of this machine SHOULD read and understand this manual, particularly its safety instructions. Substandard performance and longevity, property damage, and personal injury may result from not knowing and following these instructions.

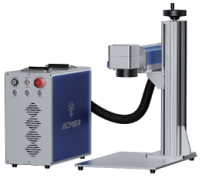
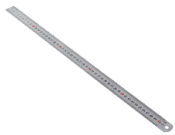
Your ACMER fiber laser marker works by emitting a powerful laser beam from its fiber laser source, sending that beam through a fiber optic cable, focusing its power through the galvanometer lens, and using this focused light to etch designs into certain substrates.
This fiber laser marking machine uses a nanoscale fiber laser source. Its single-mode output, good heat dissipation, high efficiency, and compact structure make it ideal for high-precision laser marking. With typical use, this device has an average lifespan of around 100,000 working hours. However, constantly running your laser above 80% of its maximum rated power can significantly shorten its service life. It is recommended to use settings from 10% to 75% of the maximum rated power to enjoy optimal performance and longevity.
Note that this is a high-voltage device and, as a safety precaution, it is recommended to only touch its components with one hand at a time during use.
Note also that this device has a protective housing, but without it the active laser is invisible to the human eye and anyone in or near the working area MUST use special protective eyewear when the laser is in use to avoid potentially permanent injury.
Never operate this device if the casing's exhaust system is not operating properly. The exhaust system must also fully comply with all applicable laws and regulations for workplace and environmental air quality.

2.2 Designated Use

This machine is intended for engraving signs and logos on consumer products or applicable substrates. This laser can process a wide variety of metals including steel, aluminum, titanium, brass, copper, tungsten, carbide, and chrome. It can also be used with stone and some hard plastics such as acrylic (See §1.6 Material Safety Instructions on Page 6 and §5.4 Instructions for Specific Materials on Page 46 for further details.).
The use of this system for non-designated purposes or materials is not permitted.

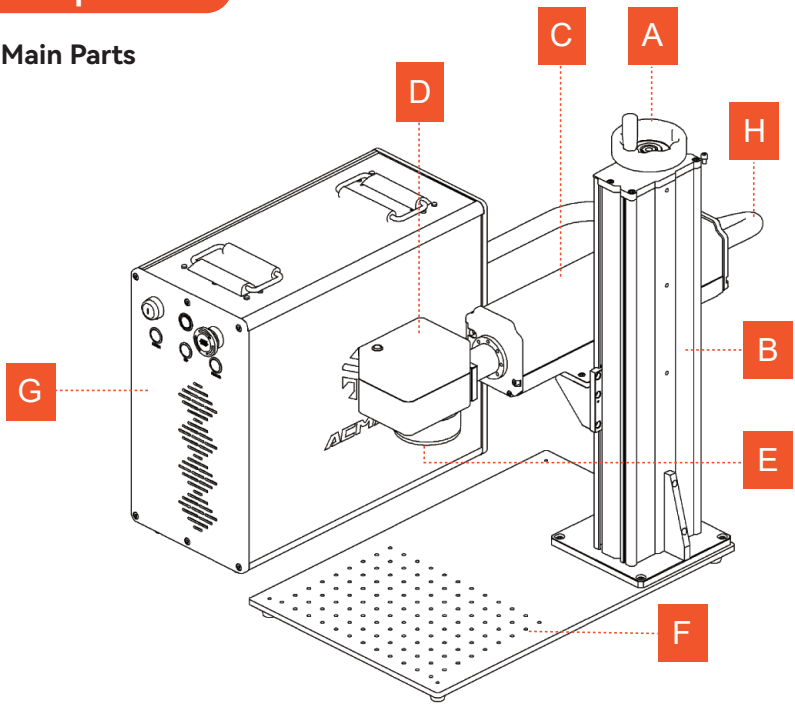
2.3 Specifications

Product Model	30W	50W	60W	100W
Voltage	110V,60Hz 220V,50Hz	110V,60Hz 220V,50Hz	110V,60Hz 220V,50Hz	110V,60Hz 220V,50Hz
Overall Rated Power	400W	400W	400W	400W
Processing Area	150*150mm	200*200mm	175*175mm	175*175mm
Max. Marking Speed	10000mm/s	10000mm/s	10000mm/s	10000mm/s
Marking Accuracy	0.01mm	0.01mm	0.01mm	0.01mm
Max.Marking Depth	0.08 mm (0.003in)	0.1 mm (0.004 in)	0.1 mm (0.004 in)	0.15mm (0.006in)
Min.Line Width	0.01 mm (0.004 in)	0.01 mm (0.004 in)	0.01 mm (0.004 in)	0.01 mm (0.004 in)
Beam Combiner Lens Size	ø20×2 mm	ø20×2 mm	ø20×2 mm	ø20×2 mm
Laser Output Power	30W	50W	60W	100W
Laser Type	Q-switched Fiber Laser	Q-switched Fiber Laser	MOPA Fiber Laser	MOPA Fiber Laser
Laser-Adjustable Power Range	0%-100%	0%-100%	0%-100%	0%-100%
Laser-Expected Service Life	100,000 hr	100,000 hr	100,000 hr	100,000 hr
Laser - Wavelength	1064nm	1064nm	1064nm	1064nm
Laser-Modulation Frequency	30-60 kHz	20-80 kHz	1-3000kHz	1-3000kHz
Laser-Pulse Width	100-120ns	80-110ns	200ns	200ns
Operating Temperature Range	40–95 (℉) | 5–35 (℃)	40–95 (℉) | 5–35 (℃)	40–95 (℉) | 5–35 (℃)	40–95 (℉) | 5–35 (℃)

 Laser Engraver x1	 Power Cord (1.5 meters) x1	 USB Cable (2 meters) x1
 USB Cable (2 meters) x1	 Laser Key x2	 Goggles (OD7+) x1
 Wrench Set x1	 Ruler (50cm) x1	 Foot Pedal x1
 Positioning Bars x2	 Usb to TypeC Adapter x1	 Height Fixator x1
 Test Aluminum Sheets x10	 Metal Pendant x4	 Screws M8*12 (For Support Column) x4
 Screws M5*12 (For Laser Arm) x4	 Screws M6*12 (For Positioning Bars) x4	 Lifting Motor Cable x1

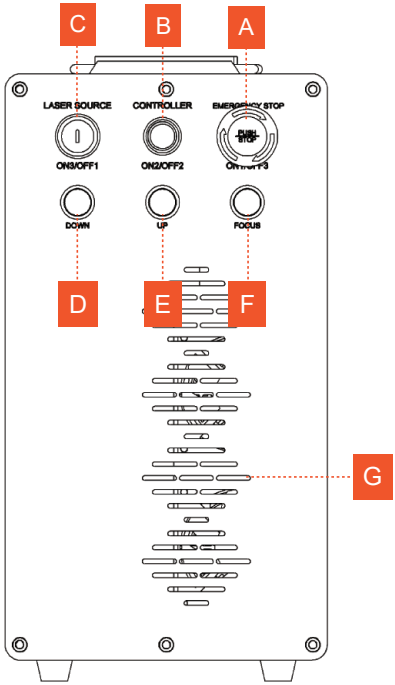
3 Components

3.1 Main Parts



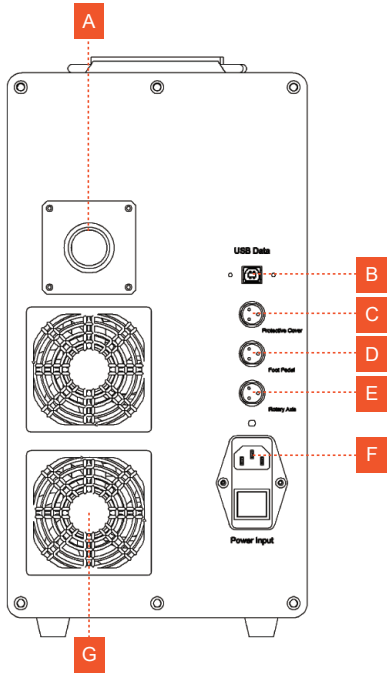
Label	Name	Function
A	Height Adjustment Wheel	Moves the laser arm up and down for the correct alignment across different materials and thicknesses.
B	Support Column	Holds the laser arm and includes a precise graduated ruler for quickly adjusting the height to work with different materials and thicknesses.
C	Laser Arm	Secures the galvo lens and moves it along the support column.
D	Galvo Lens Head	Focuses the laser beam to a fine point, directing it to proper locations on the target material during engraving.
E	Field Lens	Creates vivid markings on flat surfaces by maintaining a consistent, focused laser spot size across its working area.
F	Worktable	Holds the target material. Optionally, use it with positioning bars for more precise alignment.
G	Control Box	Houses the control system and various electronics that are responsible for controlling and managing the operation of the machine.
H	Laser Cable	Transmits laser beam emitted from the laser source, electrical power, and control signals between the main tower and the laser arm.

3.2 Control Panel



Label	Name	Function
A	Emergency Stop	In an emergency, press this button to cut off all power to the machine. Turn the knob clockwise to unlock it. When starting up, unlock this button first; when shutting down, turn it off last.
B	Controller &Galvo	Controls power to the controller board and galvo system. Turn it on as the second step during startup, and turn it off as the second step during shutdown.
C	Laser Switch	Turn clockwise to turn on the fiber laser power supply. Turn counterclockwise to turn off the fiber laser power supply. When starting up, turn it on last; when shutting down, turn it off first.
D	Down	Lowers the laser arm for focusing adjustments.
E	Up	Raises the laser arm for focusing adjustments.
F	Focus	Activates the autofocus function. Only press this after the material is correctly positioned under the laser.
G	Air Inlet	Connects to rear cooling fans. Contains a filter to prevent dust intake.

3.3 Connection Inputs



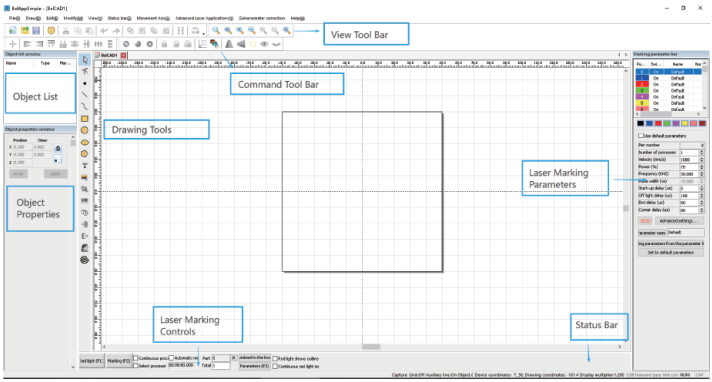
Label	Name	Function
A	Laser Cable	Transmits the laser beam from the laser source to the collimator in the laser arm.
B	USB Data	The USB-B port for connecting the engraver to your control computer for data transfer and machine control.
C	Protective Cover	Interlock input interface for compatible safety guards(sold separately). If the guard door is opened, this signal will immediately cut off the laser power supply,preventing injury from reflected beams.
D	Foot Pedal	For connecting the included foot switch. This foot switch serves as a remote trigger for manual laser emission.
E	Rotary Axis	Interface for compatible rotary axis accessories (sold separately). After connecting the rotary axis, position the workpiece beneath the galvo lens head to enable control via design software.
F	Power Input	The main 3-pin AC power inlet. Connect the provided standard power cord here.
G	Fans	Two high-speed exhaust fans for system cooling. They operate automatically when the machine is powered on to dissipate heat generated during operation.

3.4 Software Main Interface

This laser marking machine is controlled by the BslCAD software, which MUST be installed on an applicable computer to direct the laser. Some important features include the following parameters and controls:

Parameter/Control	Description
Loop Count	Specifies how many times the laser beam will repeat its path, with more loops creating greater contrast in the marked image.
Speed	Specifies the speed of the beam in millimeters per second, with greater speed creating less contrast in the marked image.
Power	Specifies the % of the machine's rated power that will be used, with greater power creating greater contrast. • It is recommended to use 10% – 75% of the rated power to enjoy optimal performance and longevity for most applications. • Constantly running your laser above 80% of its rated power can significantly SHORTEN the service life of this product.
Frequency	Specifies the laser's frequency in kilohertz (kHz), with higher frequency producing a denser and darker engraving.
Red (F1)	Tells the laser guidance to illuminate the current laser path.
Mark (F2)	Fires the laser beam for testing and focus improvement.

For more instructions on the BslCAD software, see the separate BslCAD software manual included in the USB flash drive.



4 Installation

4.1 Installation Overview

A complete working system consists of the fiber laser source, the laser arm with the galvanometer lens, a computer (not included) with engraving software (included), all applicable connection cables, a support column and a worktable. Users can also configure other additional accessories (such as a rotary axis) to suit their needs.

Use only the hardware, wiring, and power sources that came with or are compatible with this device.
Installing equipment that your device is not designed to work with can lead to poor performance, shortened service time, increased maintenance costs, property damage, and personal injury.

Please note the specific requirements of your system's installation. EVERY customer MUST understand these notes BEFORE installation to execute a proper setup and achieve safe laser performance. If you have any installation questions or problems, contact our technicians and customer support team.
ANY auxiliary equipment MUST be adjusted to the base machine. Queries may be directed to the dealer or manufacturer of such equipment.

4.2 Selecting a Location

Prior to assembling your ACMER fiber laser marker, select a location that meets all of the following requirements:

- Be sure that it meets all of the requirements discussed in §1 Safety Information on Page 1.
- The location should be stable, level, dry, and climate controlled to ensure an ambient temperature 32 °F–104 °F (0 ℃–40 ℃) and an ambient humidity under 70%. In particular, the temperature and humidity together should not be close to the dew point. It is recommended to use a windowless room or to use blinds and/or curtains to avoid exposure to the potential additional heat of direct sunlight.
- The location should be free of dust and other airborne pollutants and well ventilated enough to process ANY fumes produced by the engraving process in accordance with ALL applicable laws and regulations. Depending on the materials to be processed, this may require construction of a dedicated ventilation system.
- It should be away from children; combustible, flammable, explosive, or corrosive materials; and sensitive EMI devices.
- The power cord should be plugged into a compatible and stable power source via a grounded 3-prong outlet. No other item should be drawing current from the same fuse.
- There should be fire-fighting equipment nearby and the local fire station's phone number should be clearly displayed.
- It is highly recommended to have an extra work table nearby in order to avoid placing objects on or directly adjacent to the machine, which could become a fire or laser hazard.
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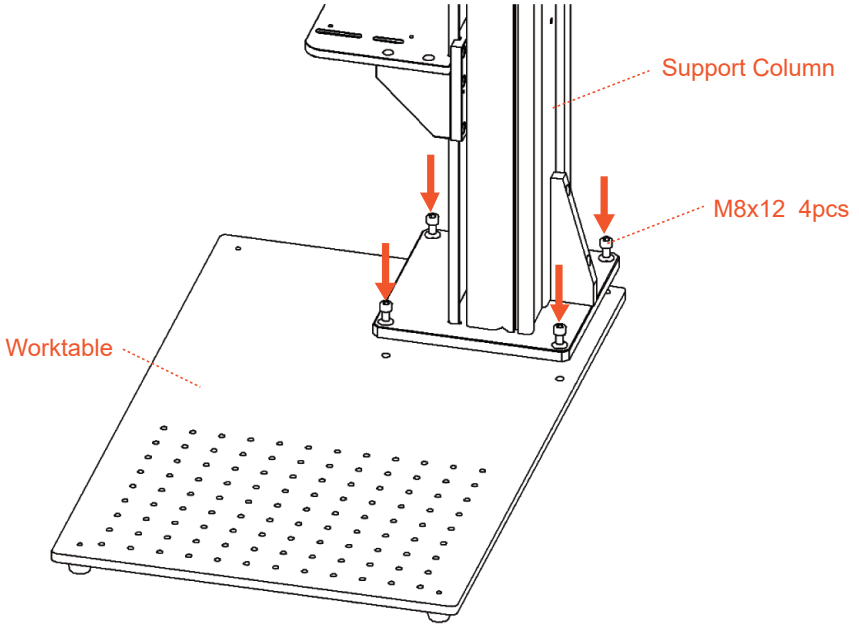
- It is highly recommended to have an extra work table nearby in order to avoid placing objects on or directly adjacent to the machine, which could become a fire or laser hazard

4.3 Electrical Grounding

- DO NOT use with an ungrounded 3-to-2 prong adapter. The machine's grounding should be checked regularly for any damage to the line or loose connections.
- Poor grounding WILL cause equipment failure and create a serious electrical shock hazard. The manufacturer and/or seller bear(s) no responsibility and assume(s) no liability for any damage, accidents, or injuries caused by bad grounding connections
- This machine employs a CLASS 4 laser which is extremely high voltage and potentially dangerous. Therefore, users MUST securely ground it to avoid the buildup of static electricity.
- Connect the main power cable to a standard 3-prong outlet firmly.

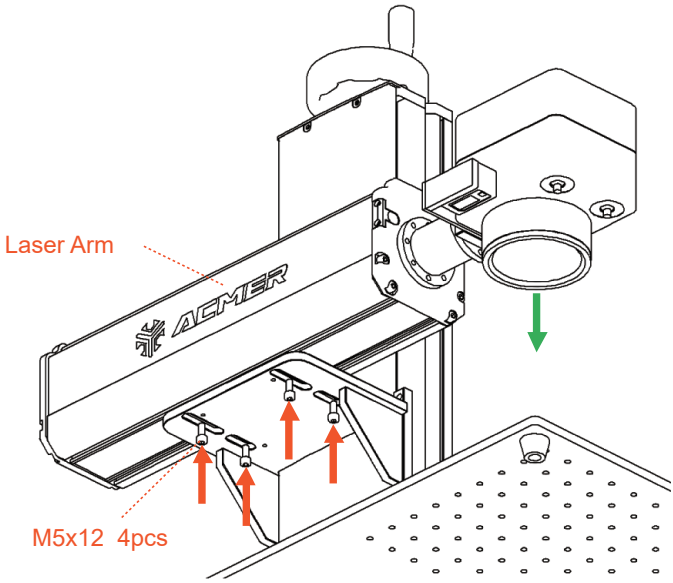
4.4 Assembly

1. Secure the column to the worktable with four screws.

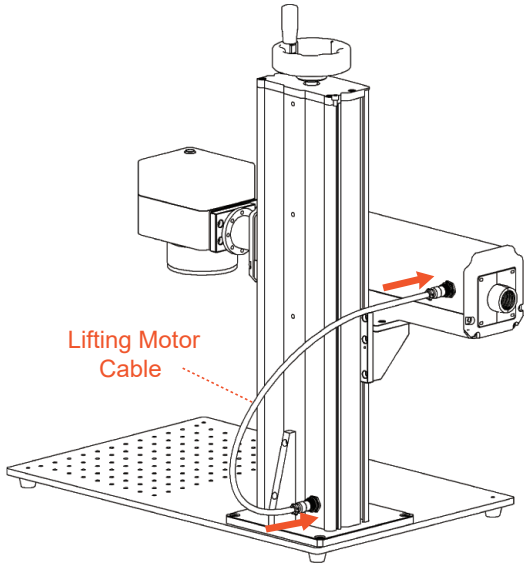


2. Using the four screws shown in the diagram on the right, secure the laser arm onto the support column.

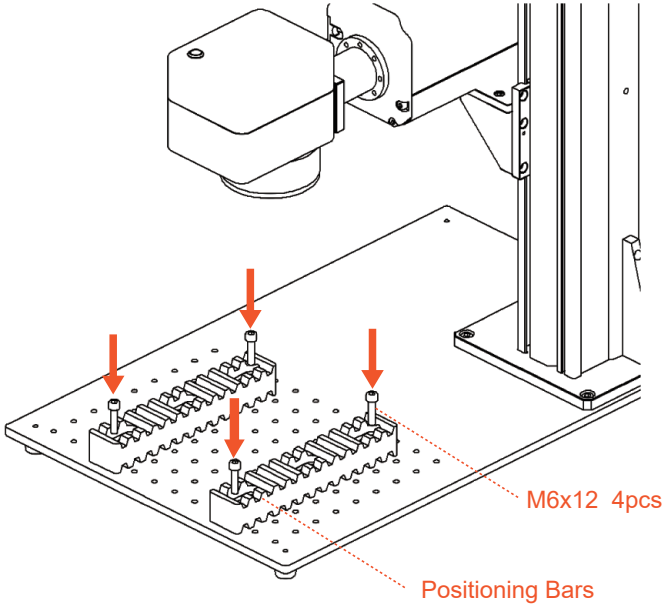
Attention! The field lens must be pointed toward the worktable.



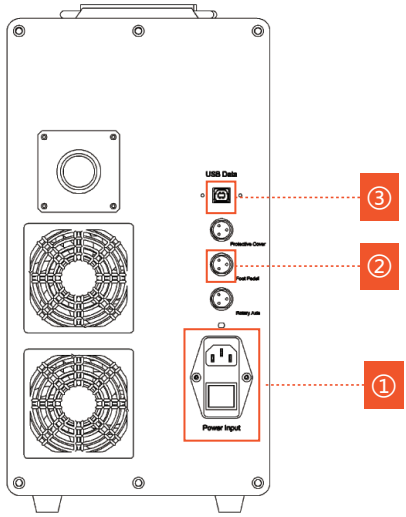
3. Insert both ends of the Lifting Motor Cable into the corresponding ports on the support column and laser arm.



4. (Optional) Install the positioning bars onto the worktable.They can be left in place for all your projects or can be moved around to suit different projects.



5. Make all necessary connections between the various components.
   ① Connect the main power cable from the main power port to the power supply.
   ② Connect the USB cable from the USB port to the control computer.
   ③ (Optional) Connect the foot pedal cable to the main tower.



4.5 Installing the Software

4.5.1 Preparing a Control Computer

• Prepare a control computer. See the software BslCAD manual in the USB for details on the requirements for the control computer. The control computer should not be placed more than 15 feet (4.5 m) away from the laser marking machine to avoid possible interference with the signal in its line.

• Prepare the applicable engraving software and its driver to operate the machine. For your convenience, we provide a copy of the BslCAD software, a BslCAD manual, an BslCAD driver, and a parameter reference document for colors in the provided USB drive. To avoid the risk of data loss, COPY AND PASTE the whole USB disk folder onto your computer BEFORE using it.

• LightBurn is also applicable with this machine; if you want to use it, see its manual to install the software and its driver.

4.5.2 Installing the BslCAD Driver

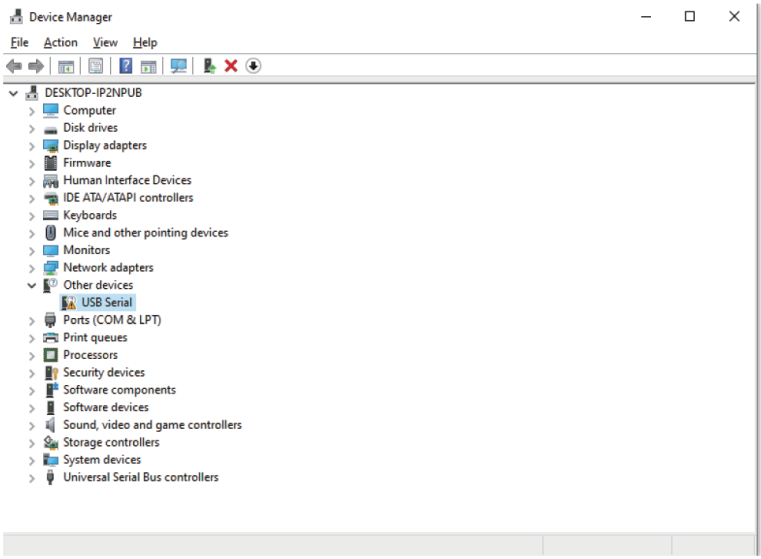
The BslCAD driver is included in the provided USB drive. Follow these steps to install:

• Turn on the laser marking machine and your computer.

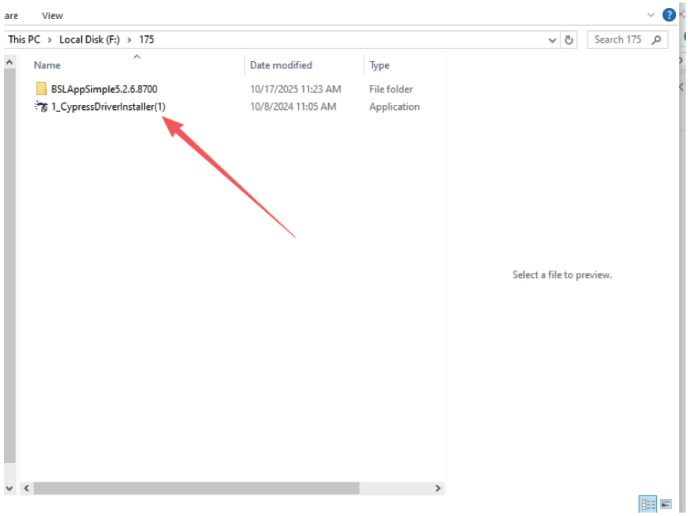
• Ensure that the USB cable is connected to the computer and laser marking machine, and insert the provided USB drive into your computer.

• Right-click and then select Device Manager.

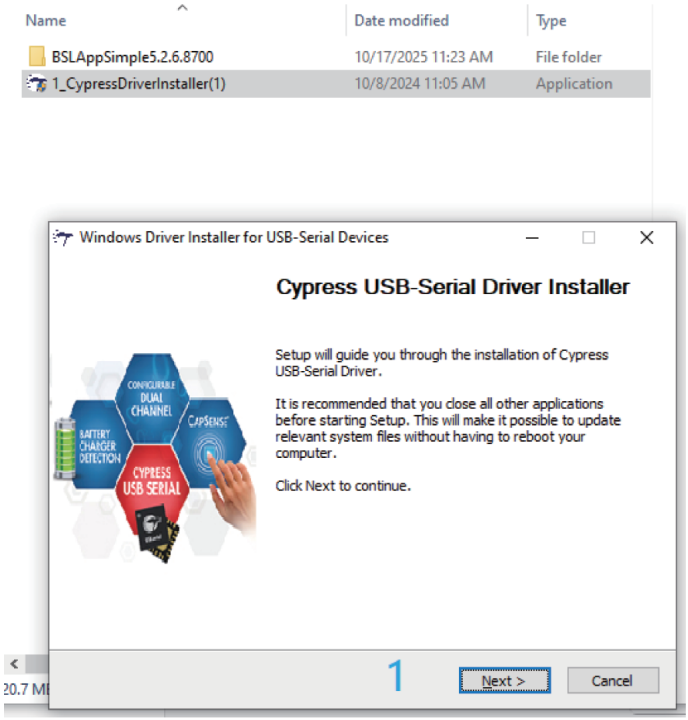
• Click Device Manager → Other devices and then double click Unknown device.



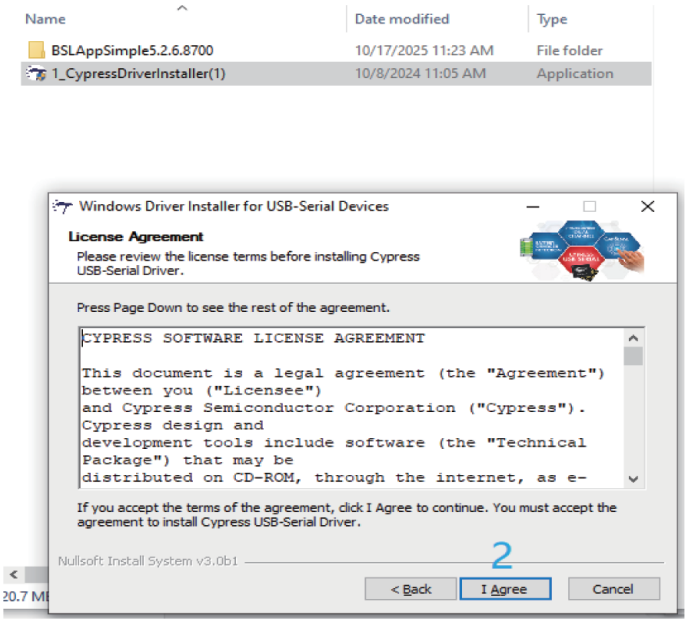
• Click Update Driver.



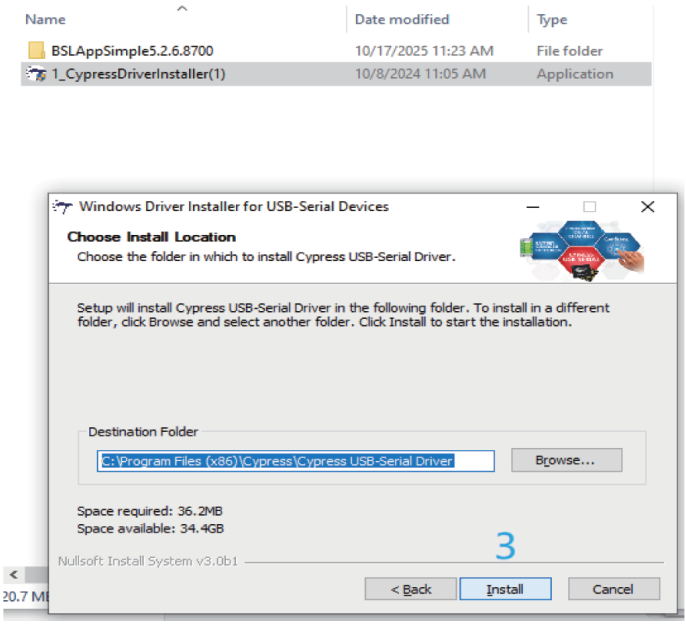
• Click the second option “Browse my computer for driver software”.



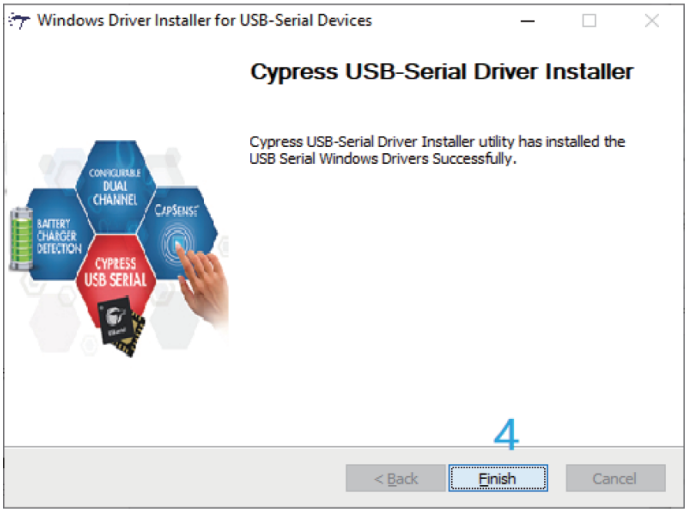
• Click Browse to select a location (the driver should be installed in the same location as the software) and then click Ok → Next. (Note: The folders “CypressDriverInstaller”)



• Check the box and click Install. (The driver installation should start.)



• After installation, click Close.



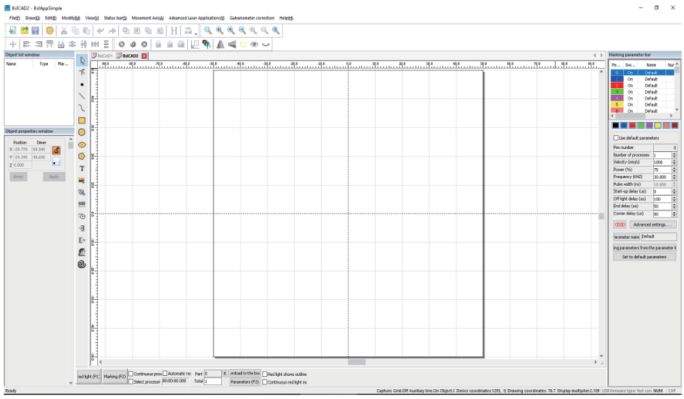
• Make sure that the driver has been installed successfully.

4.5.3 Running the BslCAD Software

The BslCAD software is included on the provided USB drive. You can use it without installation. Familiarize yourself with your software's image design features and laser control settings before beginning the operation of the laser marking machine. For instructions, see the BslCAD manual on the provided USB drive.

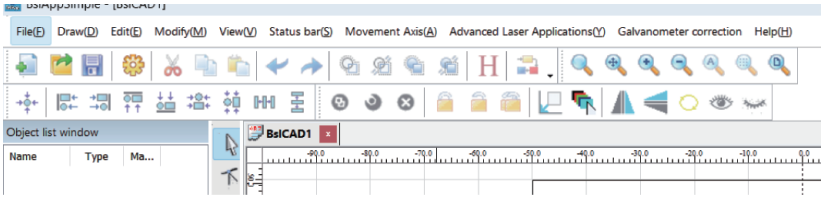
• Double click BslCAD2 to start the software.

• Click "I agree".
• Wait for a moment and make sure the software runs successfully.

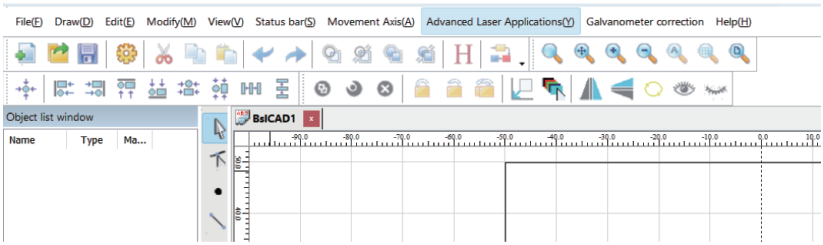


4.5.4 Configuring Parameters

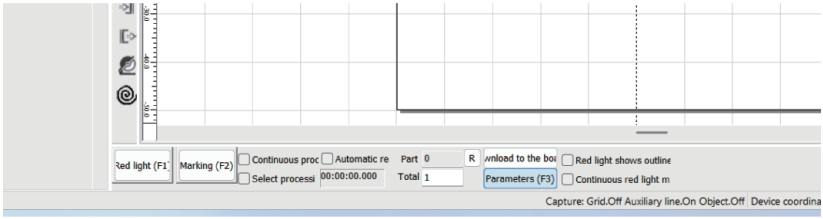
• Click File → System parameter to check and make sure the Workspace settings are the same as that on the picture “File_system Parameter_workspace.jpg” on the USB drive.



• If the rotary axis is used, click Laser → Rotate TextMark to check and make sure the rotary settings are the same as that on the picture “Laser-Rotate TextMark-param.jpg” on the USB drive.



• Click Param (F3) to check and make sure the settings on each subpage are the same as that on the picture “Parameter-Field.jpg”, “Parameter-Laser Control.jpg”, “Parameter-Other-Red light pointer.jpg”, and “Parameter-Port.jpg” on the USB drive.



4.6 Installing and Configuring Lightburn:

• Download and install LightBurn software from the website. (www.lightburnsoftware.com)

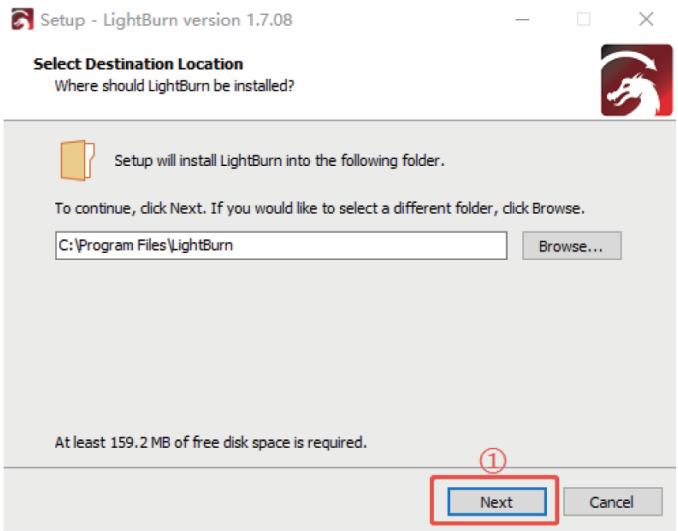
• Note: It is not compatible with our machine if your LightBurn version is lower than V1.7.00.

Please download the latest version and reinstall. LightBurn is a paid software with a 1-month free trial; you need to purchase the license key for the Pro version.

Please follow the steps below to install and configure the software.

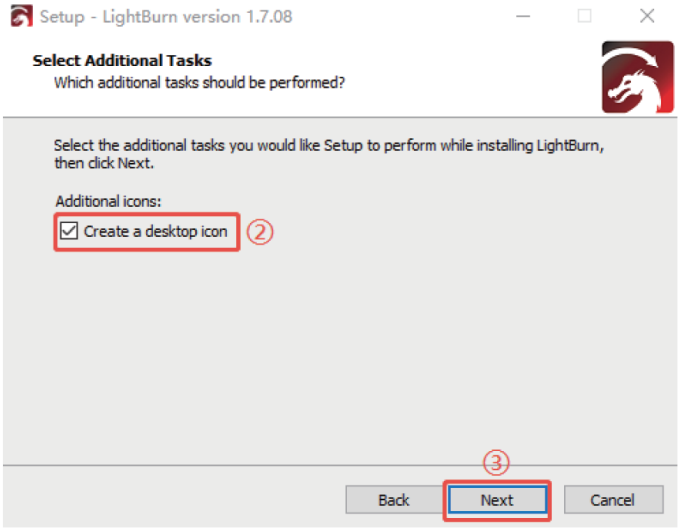
4.6.1 Installing Lightburn:

① Select the installation location, then click “Next”.

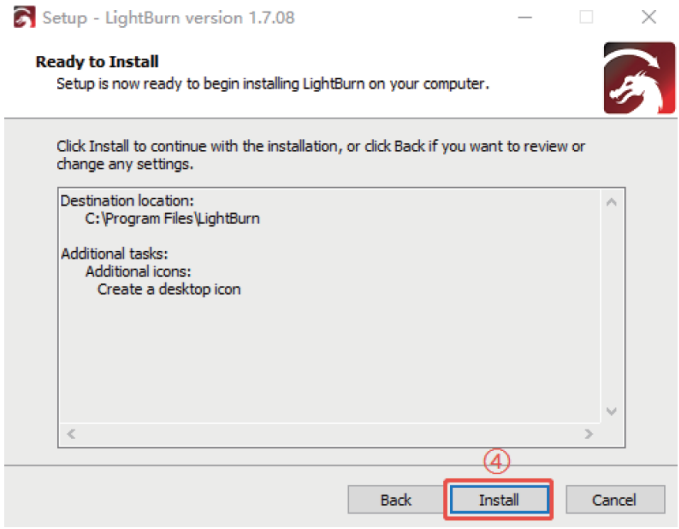


② Select “Create a desktop icon” ;

③ then click “Next”.



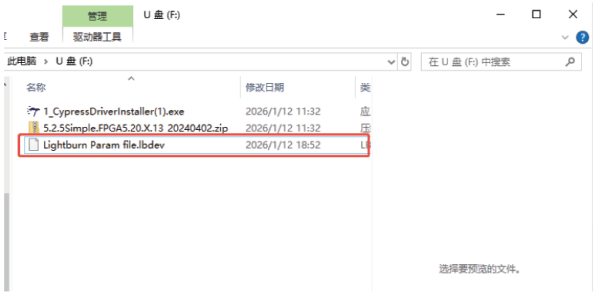
④ Click “Install”.



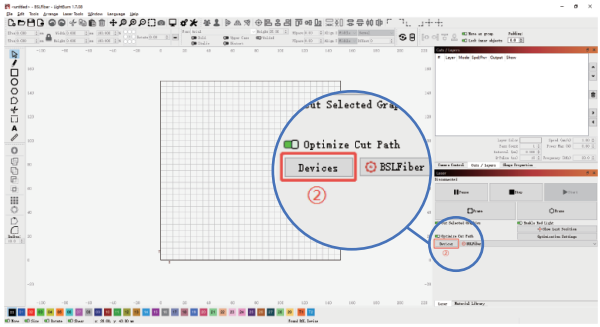
⑤ Select “Install EzCad2 driver (used by galvos)”,
be sure to choose ;
⑥ then click “Finish”,complete the software installation.

4.6.2 Configuring Lightburn(V1.0):

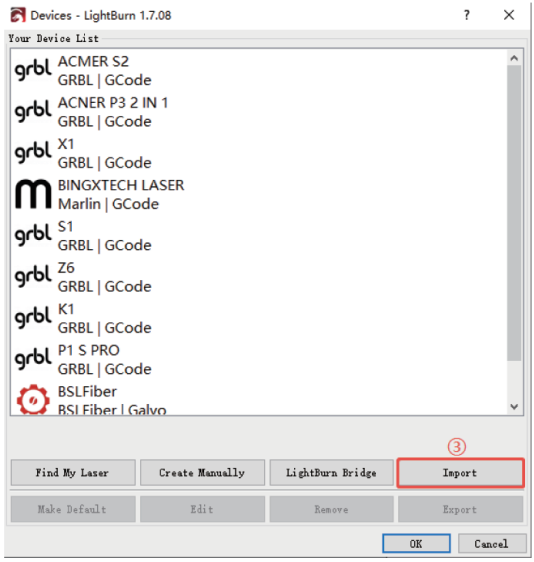
① Open the USB drive and check if there is a file named “Lightburn Param File”. If you cannot find this file, please proceed to **4.6.3** another version of the tutorial.



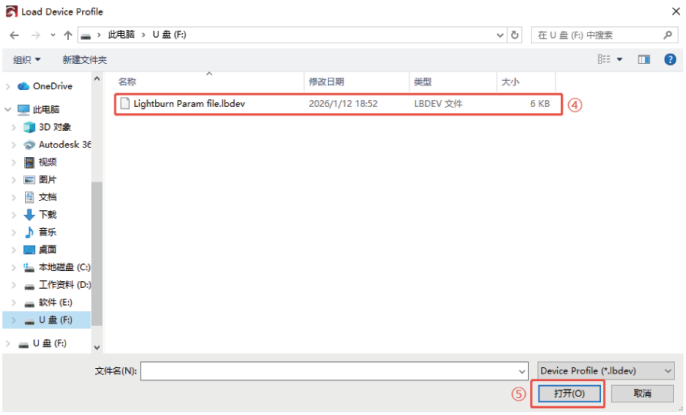
② Click “Devices”.



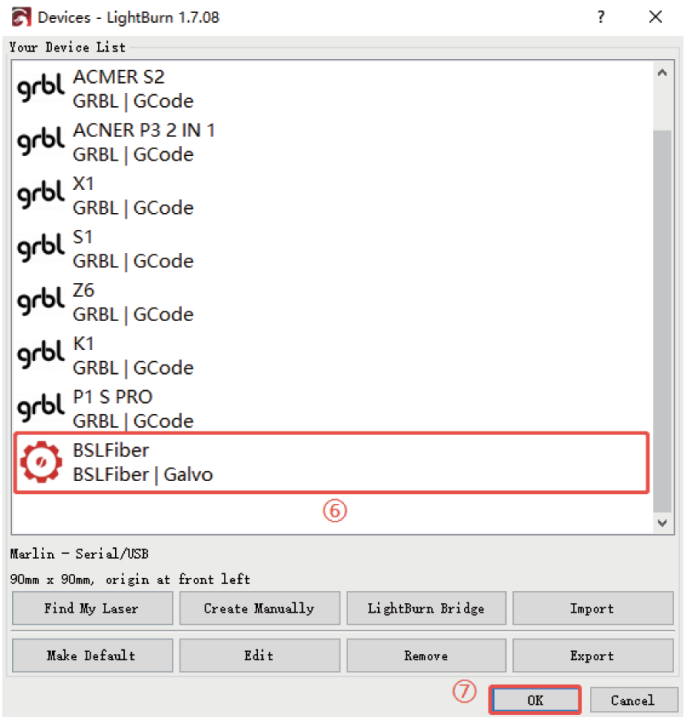
③ Click “Import”.



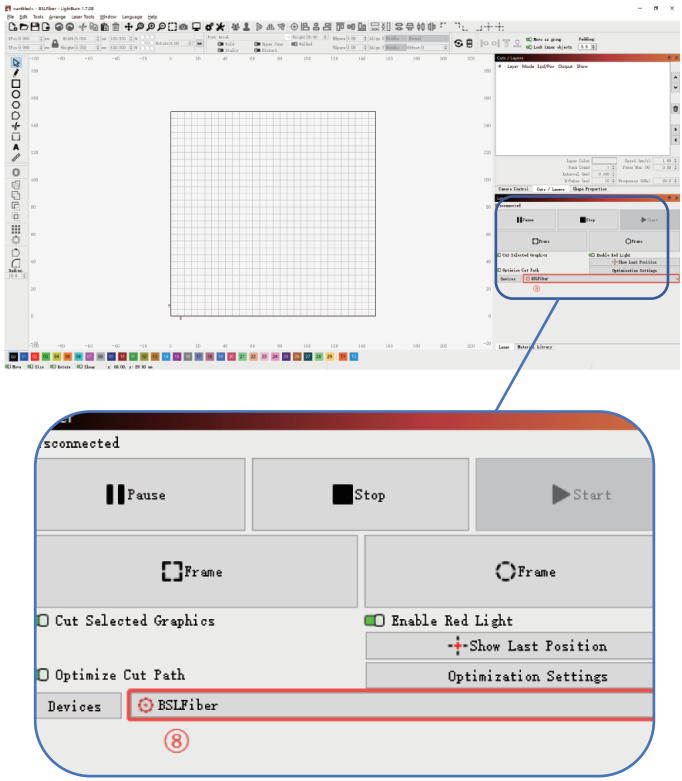
④ Open the file named “Lightburn Param File” on the USB drive.;
⑤ Click “Open”.



⑥ Select the most recently imported device (named BSLFiber);
⑦ Click “OK”.



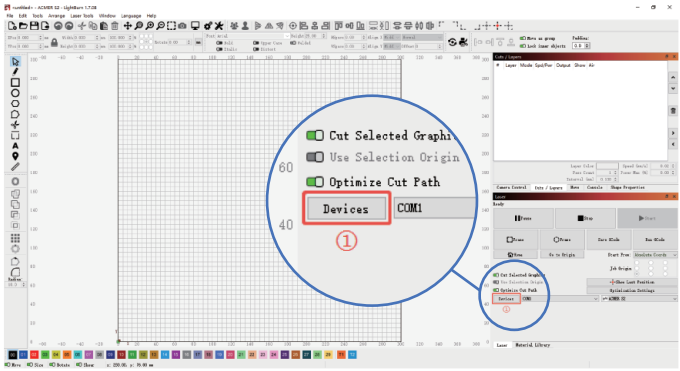
⑧ Verify that the correct device configuration is selected.



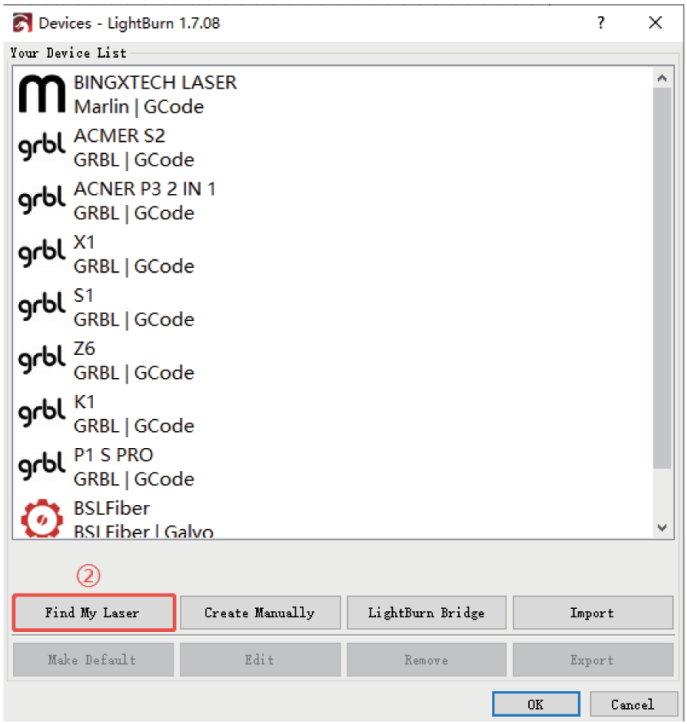
4.6.3 Configuring Lightburn(V2.0):

Note: If you cannot locate the file named “Lightburn Param File” on your USB drive, please follow the instructions below to complete the configuration.

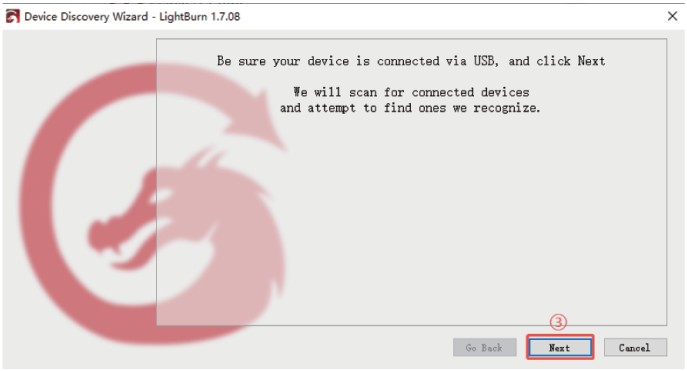
① Click “Devices”.



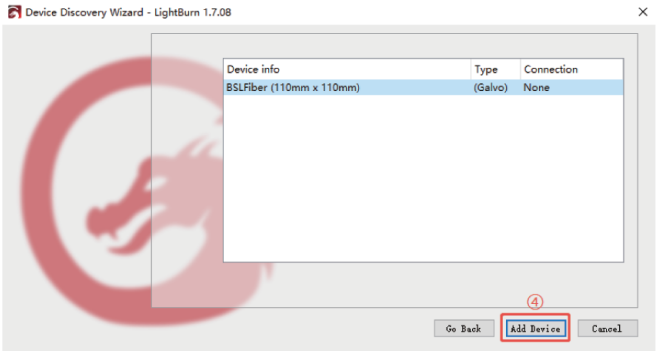
② Click “Find My Laser”.



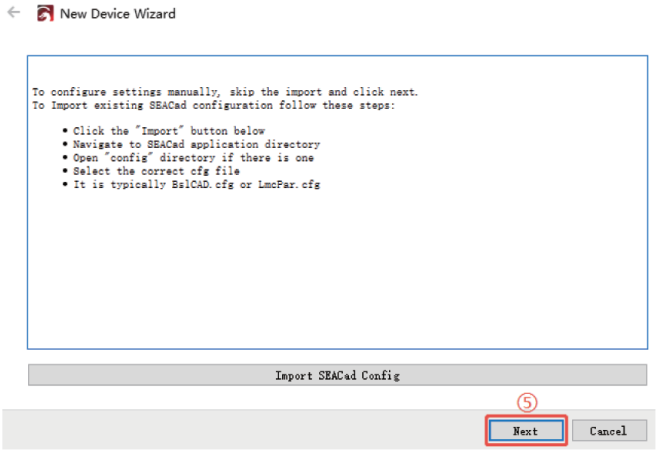
③ Click “Next”.



④ Click “Add Device”.

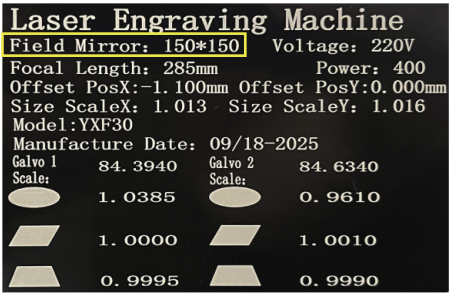


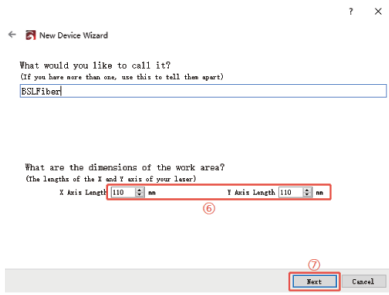
⑤ Click “Next”.



⑥ Enter the value listed under the “Field Mirror” section on the machine nameplate of the actual machine you received. (Left in the picture)

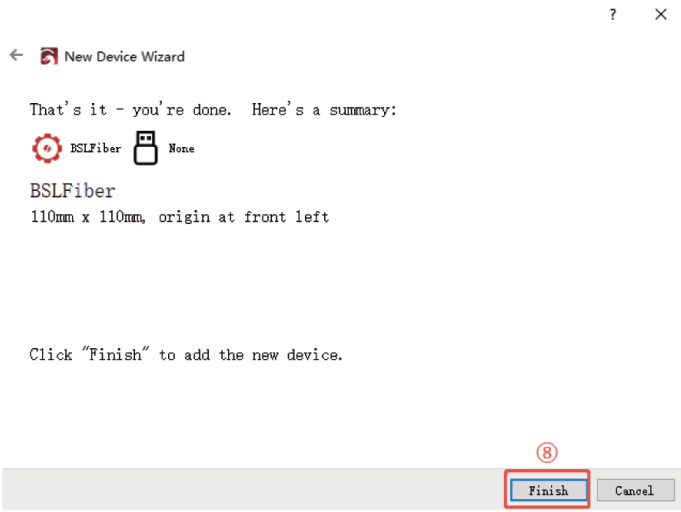
⑦ Click “Next”.



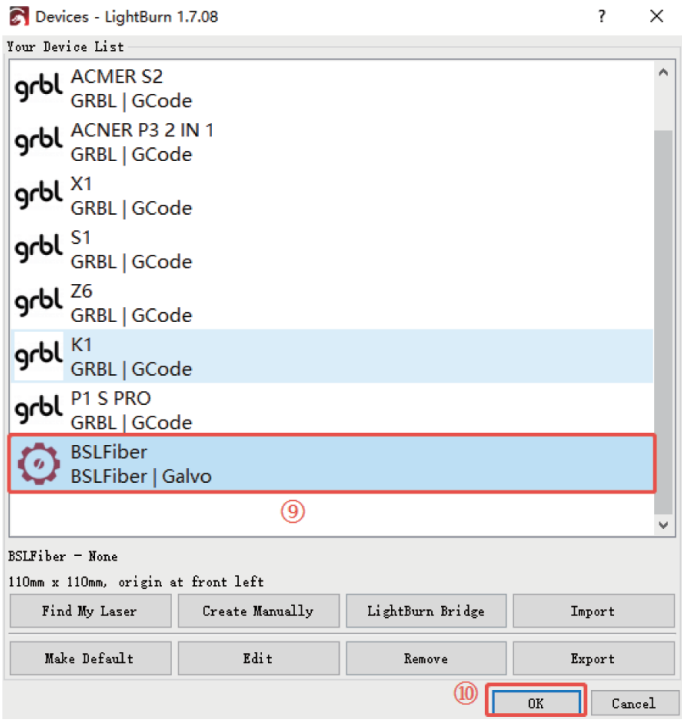


This image is for reference only. Do not enter any values shown in the image!!

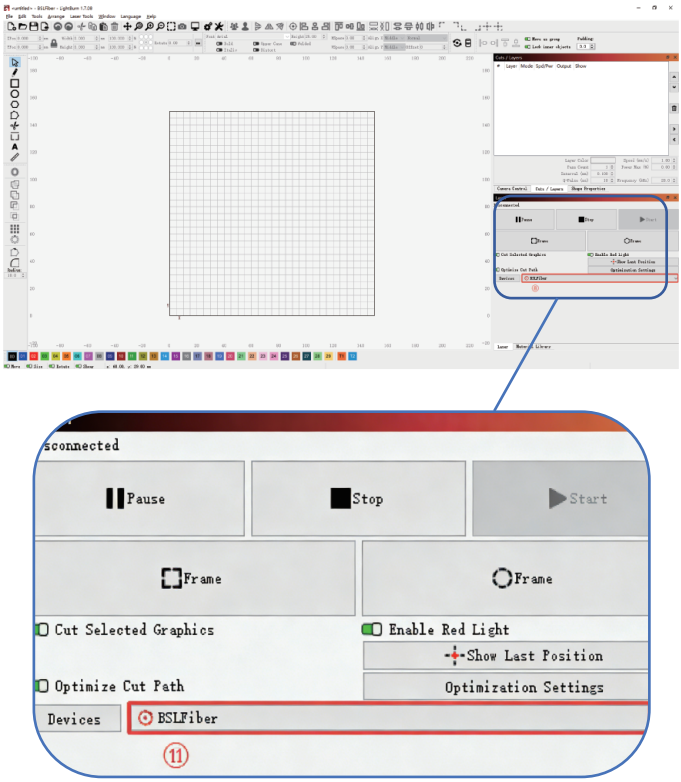
⑧ Click “Finish”.



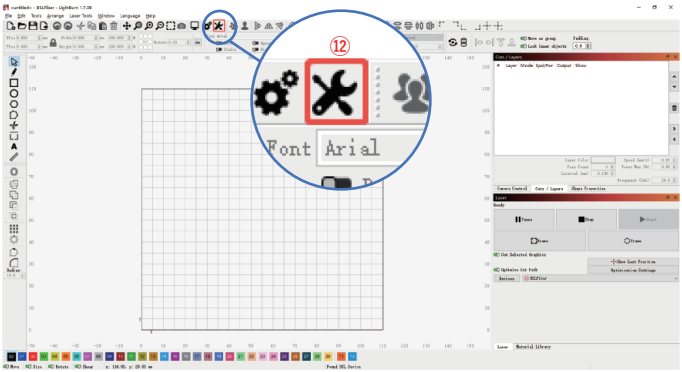
⑨ Select the most recently imported device (named BSLFiber);
⑩ Click “OK”.



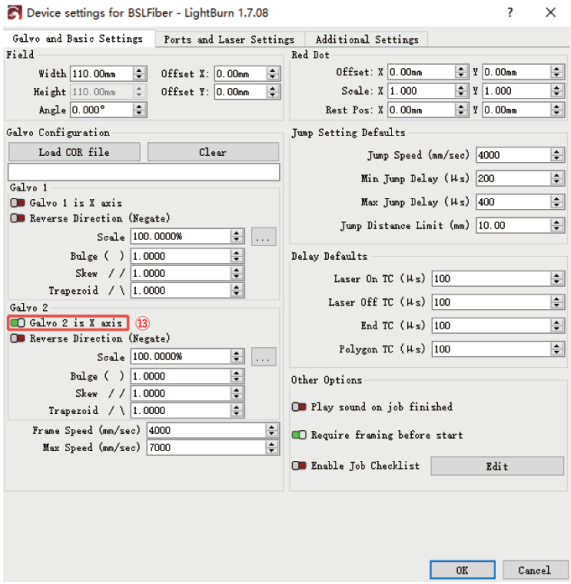
⑪ Verify that the correct device configuration is selected.



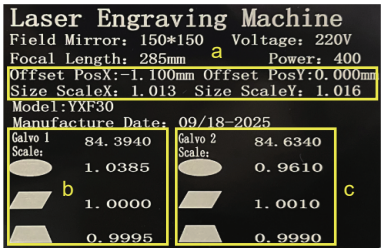
⑫ Locate “Device Settings” in the toolbar at the top of the software.



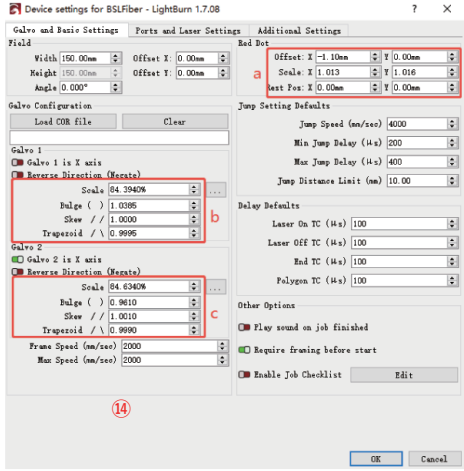
⑬ Click“Galvo 2 is X axis”.



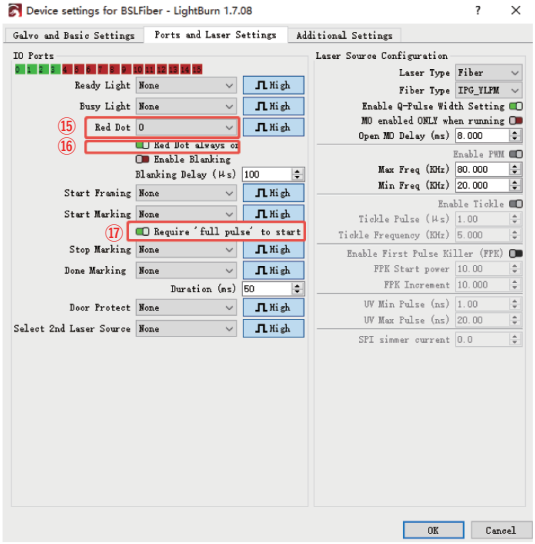
⑭ Modify the device parameters according to the device nameplate (left in the picture).



This image is for reference only. Do not enter any values shown in the image!!

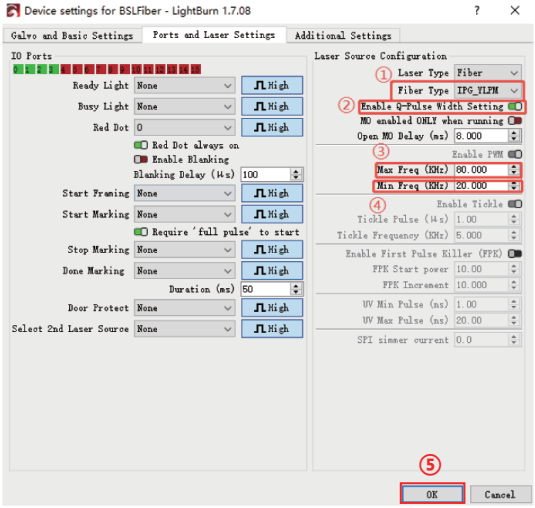


⑮ “Red Dot” modified to “0”;
⑯ Open “Red Dot always on”;
⑰ Open “Require full pulse to start”;
⑱ Click “OK”.



If you purchase mopa series products, you will also add the following settings:

① “Fiber Type” modified to “IPG-YLPM”;
② Open“Enable Q-Pluse Width Setting”;
③ “Max Freq(KHz)” changed to “3000”;
④ “Min Freq(KHz) ”changed to “1”;
⑤ Click “OK”.



5 Operation

5.1 Operation Overview

ALWAYS operate this machine following ALL the instructions provided herein. Performance of procedures other than those specified herein may result in property damage and personal injury.

• DO NOT use this machine for purposes not specified herein.

This section will address only some of the options and features provided by the operation software BslCAD for your reference. Before operating this machine, ensure that you have read and understand this entire manual (particularly §1 Safety Information on Page 1), the separate BslCAD software manual, and any warnings provided on the machine.

5.2 General Instructions

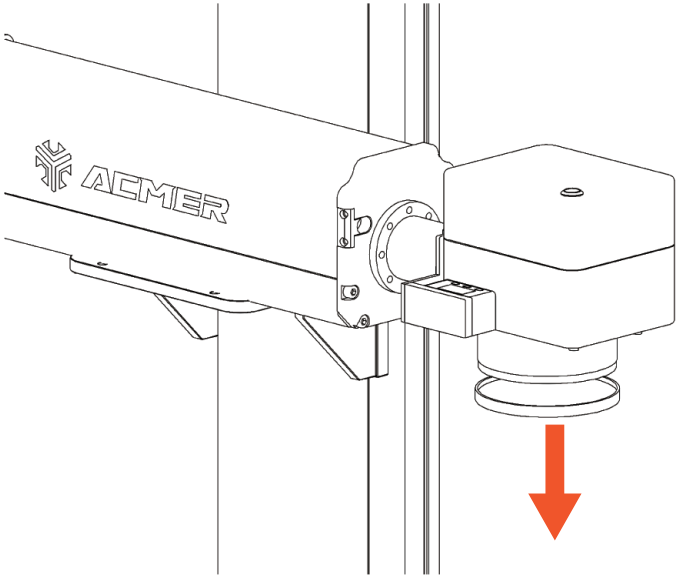
Anyone else who might be exposed to direct or reflected laser beams MUST also wear protective eyewear. Put on any other PPE necessary for your material.

5.2.1 Turning On the Machine

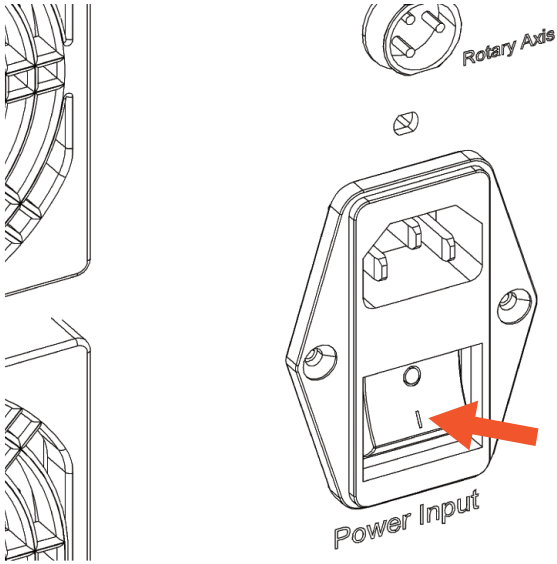
• Please strictly follow the sequence below when starting the machine to avoid electrical interference and damage to the equipment.

• ONLY touch the components of this product with ONE HAND at a time during use to reduce the risk of electric shock.

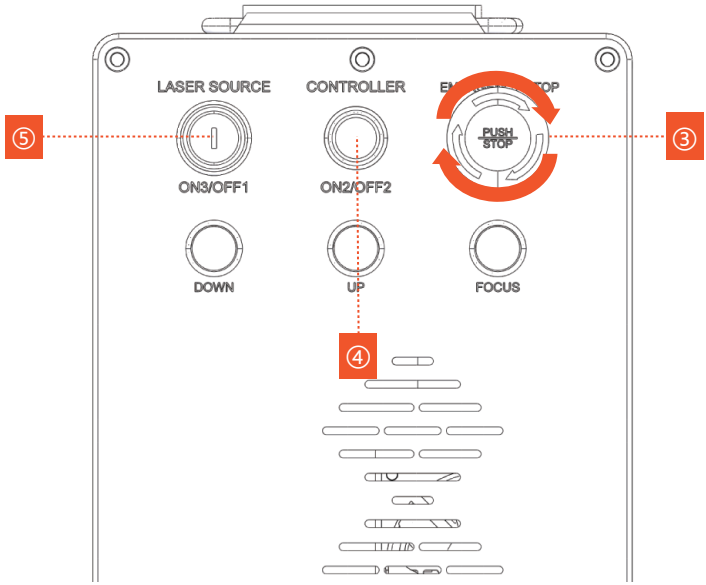
①Remove the lens head cover.



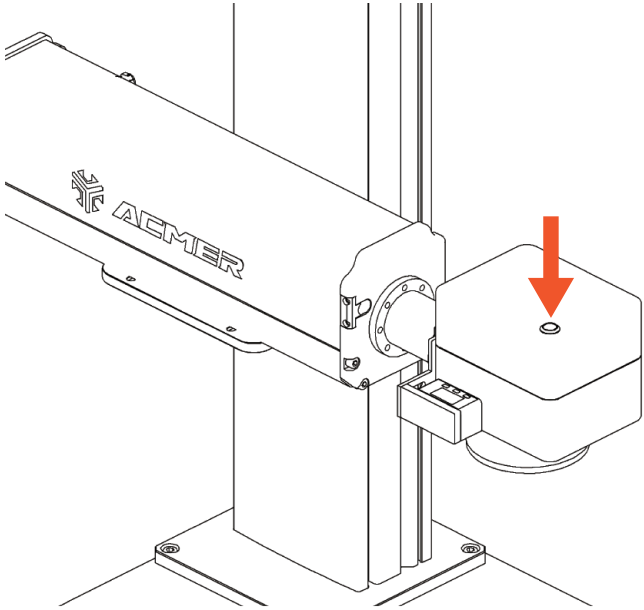
②Toggle the power switch to I. The red light should come on when the machine is on.



③ Release the EMERGENCY STOP button by turning it clockwise if it is locked.
④ Press the CONTROLLER button.
⑤ Insert the laser key and turn clockwise by 90°.



⑥ Press the button on the scanning head to turn on the red dot pointer.The two red dots should be displayed on the working platform when the red dot pointer is on.



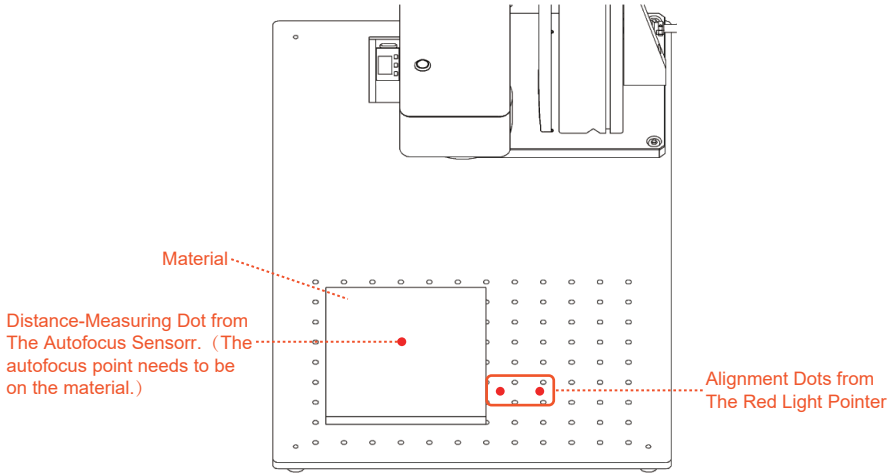
5.2.2 Focus

• Place the test material on the processing area and ensure the red dots are displayed on the test material. (Make sure the material can be engraved by this machine. See §1.6 Material Safety Instructions (Page 6) for details. The test material should be the same as the actual material.)

① Autofocus

1. Place the test material in the processing area and ensure three red dots are displayed on the test material (see illustration below). If your material is too small, place it under the distance-measuring red dot for focusing, then align it under the two alignment red dots for engraving.

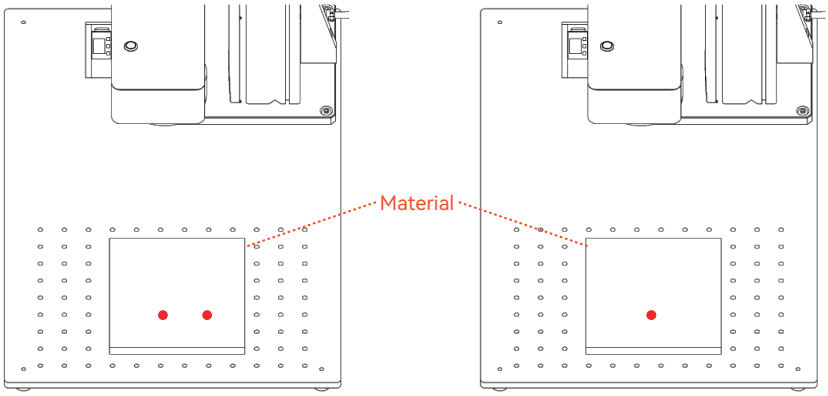
- Make sure the material can be engraved by this machine.See §1.6 Material Safety Instructions (Page 6) for details.
- The test material should be the same as the actual material.



2. Press the Autofocus button on the front of the control box. The scanning galvanometer head will automatically adjust to the correct height for precise focusing.
Note: Objects taller than 150 mm on the workbench may cause the auto focus function to fail. The allowable height range for automatic focusing on the workbench is 80-500 mm.

② Manual Focus

I. Using the Red Dot Pointer
Press the Up/Down buttons or rotate the Wheel to move the scanning vibrating lens upward or downward until the two alignment red dots merge into one.
Attention! The red dot must be on the material.



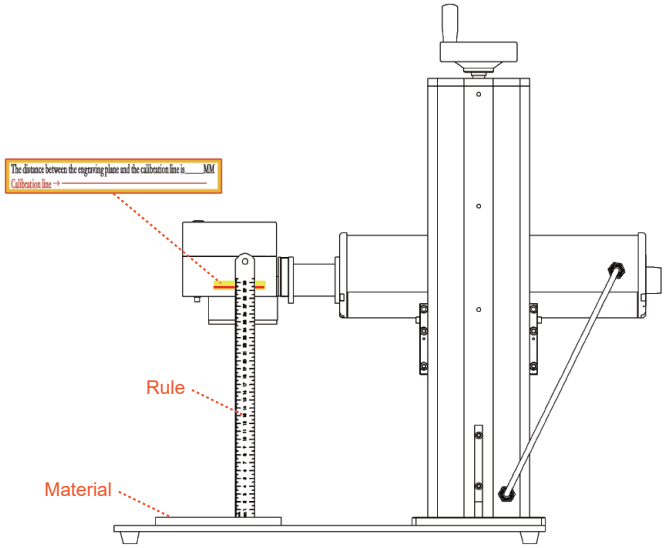
② Manual Focus

II. Using the Ruler

• Use the provided ruler to measure the distance from the calibration line on the scanning galvo head to the surface of the test material.

• Press the Up/Down buttons or rotate the Wheel to move the scanning vibrating lens upward or downward until the measured height matches the value marked on the scanning galvo head.

• Note:That this value may vary depending on the model.



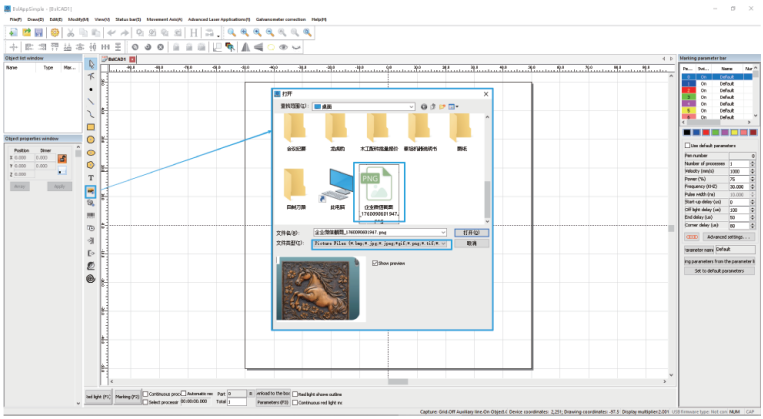
5.2.3 Preparing Your Design

• Make sure the control computer is connected to the machine via the USB cable. (If you previously disconnected the control computer, reconnect it via the USB cable now. If your computer is already connected and BslCAD is already running, restart it now to establish a connection between the computer and the laser's control board.)

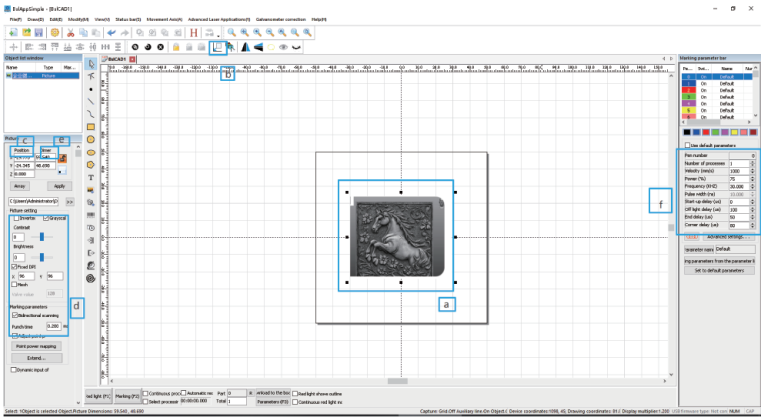
• Double click BslCAD.exe in the "Software" folder on the USB drive to start the software.

• Load or create a design in BslCAD as follows. (Here we only provide a BRIEF introduction on drawing bitmap pictures and vector graphics and creating text. For detailed parameter descriptions and settings, see the BslCAD software manual on the USB drive.)

Loading Bitmap Graphics



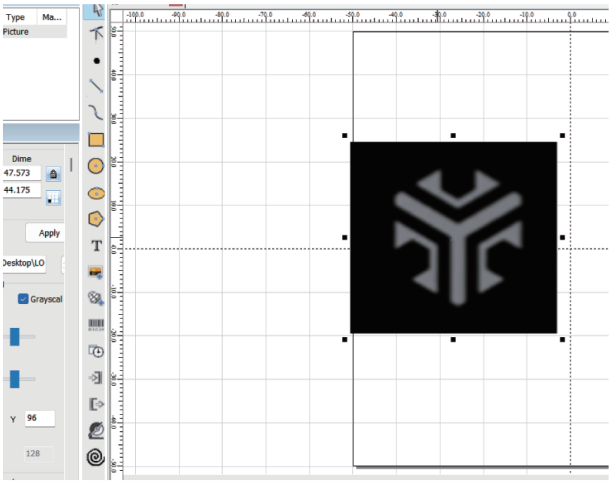
- Click to draw a bitmap file.
- Choose the file folder.
- Select the file type.
- Select the picture you want to mark.
- Open the picture and import the canvas.
- Set picture parameters:

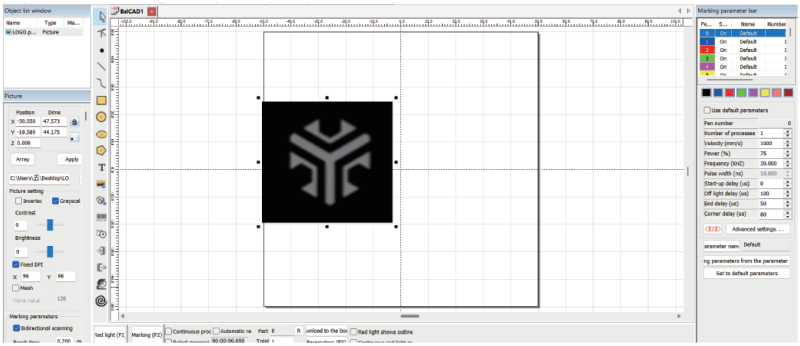


a. Select the picture.
b. Center the picture on the canvas. (If the image is outside the canvas, select the picture and click in the center of the canvas to find the picture.)
c. Set the picture size.
d. Set the picture parameters.
e. After setting parameters, click Apply.
f. Set processing parameters: speed, power, frequency. (See §Setting Engraving Parameters below for details.)

Loading Vector Graphics

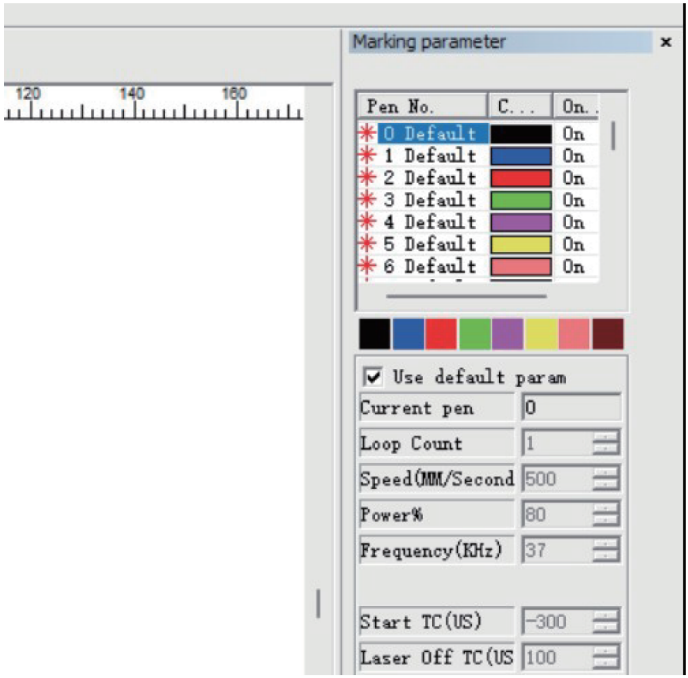
- Click to draw a vector file.
- Choose the file folder.
- Select the file type.
- Select the image to be marked.
- Open the image and import the canvas.
- Set vector graph parameters:





a. Select the picture.
b. Center the vector graphics on the canvas. (If the image is outside the canvas, select the image and click in the center of the canvas to find the image.)
c. Set the vector file parameters.
d. After setting the graphic size, click Apply.
e. Click to fill in the settings and click OK after completing the settings.
f. Set processing parameters: speed, power, frequency. (See §Setting Engraving Parameters below for details.)

Setting Engraving Parameters



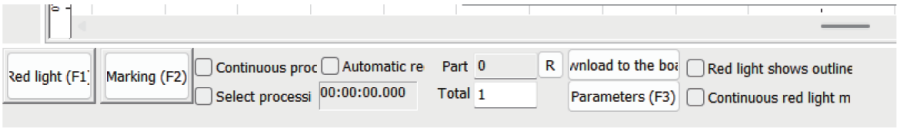
Customize your contrast and engraving depth by adjusting the engraving parameters in BslCAD:

• To darken an image, use a higher frequency setting. To lighten it, use a lower one.

• To increase engraving depth, increase the amount of energy per unit area by reducing the speed parameter or increasing the laser's power or the number of loops. (Engraving too deep, however, reduces image quality, especially for coated materials.)

• Constantly using settings over 80% will shorten the expected service life of your laser.

• Resolution should usually be set to 500 dots per inch. Reducing your image resolution can be helpful in some cases, reducing flaming and increasing the energy of the pulse in a way that improves the quality of the resultant image in some materials such as some plastics.



Marking Settings

• Red(F1): Marks the frame of the object to be marked, with no laser emitted during the process. It is used to indicate the processing area and facilitate locating the workpiece. (This function is available on models with a red light guider. Pressing F1 on the keyboard activates this function.)

• Mark(F2): Starts processing. Press F2 on the keyboard to run this command.

For other marking settings, see the BslCAD software manual.

5.2.4 Testing the Engraving Effect

• Activate the laser guidance system by clicking Red in BslCAD or hitting F1 on the keyboard. (The design should be displayed in red light on the worktable, showing where the laser will fire.)

• Place an expendable piece of the material to be engraved in the location shown by the laser guidance. (The test material should be of the same material as the actual one you are going to mark.)

• Click Mark in BslCAD or press F2 on the keyboard to engrave your design. Alternatively, you can activate the laser by using the foot pedal. (The laser is invisible but will create a buzzing noise and sparks and begin engraving when it is correctly focused on your test material. DO NOT stare at the laser in operation even with protective eyewear. When an unexpected situation occurs, press the emergency stop button IMMEDIATELY to halt the machine's operation. Watch for possible issues like sparks or fires, and be prepared to quickly extinguish a fire if necessary.)

• Examine the quality of your first run and adjust the laser parameters in BslCAD as necessary to create your desired effect.

5.2.5 Stop and Resume

During the engraving process, if an unexpected situation occurs, press the emergency stop button IMMEDIATELY to halt the machine's operation. To resume normal operation:

• Release the emergency stop.

• Press the Fiber Laser button.

• Resume operation following the normal operational sequence.

5.2.6 Engraving

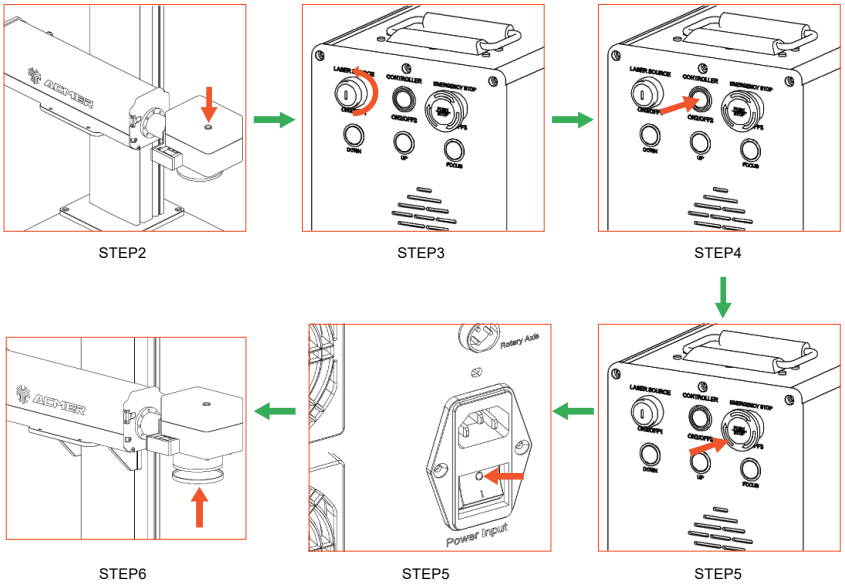
• Replace the test material with the actual material.

• Use the foot pedal or press Mark in BslCAD or hit F2 on the keyboard to engrave your pattern. (The foot pedal is particularly useful for continuous or repeated operation of the laser once you've settled on your design and its ideal parameter settings. You can also achieve more control of the marking process by reducing the laser's speed and using the foot pedal. DO NOT stare at the laser in operation even with protective eyewear. When an unexpected situation occurs, press the emergency stop button IMMEDIATELY to halt the machine's operation. Watch for possible issues like sparks or fires, and be prepared to quickly extinguish a fire if necessary.)

5.2.7 Finishing-up

After completing your engraving job, deactivate the systems as follows:

1. Close the BslAPPSimples software and disconnect the USB cable from your computer.
2. Press the button on the scanning head to turn off the red dot pointer.
3. Turn the key counter clockwise.
4. Press the CONTROLLER button.
5. Press the EMERGENCY STOP button to turn off the machine. For best results, disconnect your marking machine from its power supply between uses. Unplug it or turn off its intermediary surge protector.
6. Fully clean the worktable and the galvanometer lens. Cover the galvanometer lens afterward.



5.4 Instructions for Specific Materials

When engraving a new material, it can be helpful to engrave a test matrix of small boxes produced with various speed, power, and frequency settings to home in on the exact effect that you are looking for. To speed up the process, here are some general guidelines for commonly engraved materials. However, these are only guidelines for your convenience and it is the responsibility of the user to consult material safety data sheets and other sources to ensure the safety of working with various materials and setups. Some of the materials listed will require additional workspace and personal protective equipment in addition to this engraver.

5.4.1 Metals

When engraving metals, generally use high power, low frequency, and low to medium speed settings. To avoid using your marker at greater than 80% power for extended periods, you can also get similar effects by reducing the power somewhat while also increasing the number of passes or decreasing the engraving speed.

Be mindful that some metals will produce conducting, reflective, and/or toxic dust. Softer metals naturally produce more dust during engraving, while harder metals can require higher power settings that also produce more dust. In addition to the risk to the user's skin and eyes, there may be enough dust produced (especially for repetitive industrial applications) that a full ventilation system is required to address the problem. Similarly, operators and others in the work area may need to use breathing PPE such as masks and respirators.

• Aluminum: Bare aluminum requires a somewhat higher frequency than other metals and will never produce a strong black mark similar to those created by engraving steel. When darker marking is required, consider employing anodization or producing a deep engraving that can be darkened by using black epoxy or other filler. Anodized aluminum requires a little more speed but a very low frequency.

• Powder Coated Metals: Metals with a powder coating usually require a very high frequency and, for best results, at least 3 passes to remove the coating and polish the bare lower layer.

• Precious Metals: Gold and similarly soft metals should be engraved with less power but a moderate speed. Silver and other semi durable metals are best engraved at a slightly higher power and slightly slower speed, but still not at the same power and speed as steel or aluminum.

5.4.2 Plastics

When engraving plastics, generally use low-power and high-speed settings. Marking and engraving with too much power or at too low a speed can concentrate too much energy at the point of contact, causing the plastic to melt. Among other problems, this may produce poor engraving quality, noxious fumes, and even fires.

5.4.3 Stone

When engraving various kinds of stone, generally use moderate power and speed at low frequency. As with ceramics and metals, be mindful of the dust created (especially for repetitive industrial applications) and take similar measures to ensure the safety of users and others in the work area.

6 Maintenance

Adjustment, maintenance, and repair of the electrical components of this machine must be done ONLY by trained and skilled professionals to avoid fires and other malfunctions, including potential radiation exposure from damage to the laser components. Because specialized techniques are required for testing the electrical components of this marking system, it is recommended such testing ONLY be done BY the manufacturer, seller, or repair service.

• Unless otherwise specified, ONLY undertake adjustment, maintenance, and repair of the machine WHEN it is turned off, disconnected from its power supply, and fully cooled. For maximum safety, wait about 3 minutes after turning the machine off before adjusting the integrated chiller or other electronic parts. This will allow time for the ground connection to clear any residual charge.

To ensure normal use of the ACMER fiber laser machine, regular maintenance is essential. Handle with care during maintenance as it contains high-precision components, and follow each part's procedures closely to prevent damage.

For maintenance not listed in this manual, visit the Maintenance section on our website acmerlaser.com where real-time updates are available to assist you.

Regular Maintenance Items

• Keep the workroom clean and dust-free at all times.

• Ensure the device is fully powered off when not in use.

• Cover the galvanometric lens when it is not in use.

• Clean the worktable after use with a cloth wetted with greater than 75% rubbing alcohol. NEVER clean this device with abrasive or caustic cleansers, with aerosol sprays, or with enough water to enter any electrical component. ALWAYS allow surfaces to FULLY dry BEFORE further use.

• Clean the lens with cotton swab and alcohol wipe. The device can only be used after the alcohol has evaporated.

• If removing dust from the device's vents using a vacuum, ONLY use the lowest power setting to avoid damage to internal components.

No other servicing should be done by the operator. DO NOT attempt to service or replace ANY parts yourself.

7 Troubleshooting

Adjustment, maintenance, and repair of the electrical components of this cutter must be done ONLY by trained and skilled professionals to avoid fires and other malfunctions, including potential radiation exposure from damage to the laser components. Because specialized techniques are required for testing the electrical components of this marking system, it is recommended such testing only be done by the manufacturer, seller, or repair service.

Unless otherwise specified, ONLY undertake adjustment, maintenance, and repair of the cutter when it is turned off, disconnected from its power supply, and fully cooled. For maximum safety, wait about 3 minutes after turning the machine off before adjusting the integrated chiller or other electronic parts. This will allow time for the ground connection to clear any residual charge.

This chapter covers common issues and solutions. For problems not listed in this manual, visit the Troubleshooting section on our website acmerlaser.com where real-time updates are available to assist you.

7.1 Common Problems

• Install the rotary axis on the worktable and place a piece of sample material on the rotary axis.

Problems	Solutions
Driver installation failure	Use a different data cable. Try connecting to another computer port. If the problem persists, check the connection between the computer and the mainboard (have a technician fix or replace faulty parts if needed).
No Laser Output	1. Correct the focus by adjusting the height of the laser arm. 2. Correct the software parameters if they are invalid or mistaken. 3. Have a technician fix or establish the connection between the laser and its power supply. 4. If either the fiber laser source or its power supply malfunctions, have a technician replace them.
No Engraving despite normal laser operation	1. Confirm that the material can be safely engraved with this device. 2. Correct the focus by adjusting the height of the laser arm. 3. Adjust the software parameters to create greater intensity. 4. Have a technician check the control panel, scanning lens, and its power supply (correct problems or replace parts if needed). 5. Have a technician check the fiber laser source and the mainboard (correct problems or replace parts if needed). 6. If it still doesn't work, contact our customer service.
No/Too light red dots from the red-light guider	Adjust the focal length.
Deformed preview or engraved patterns	1. Check and fix the parameters. See §4.5.4 Configuring Parameters on Page 25. 2. If it still doesn't work, contact our customer service.

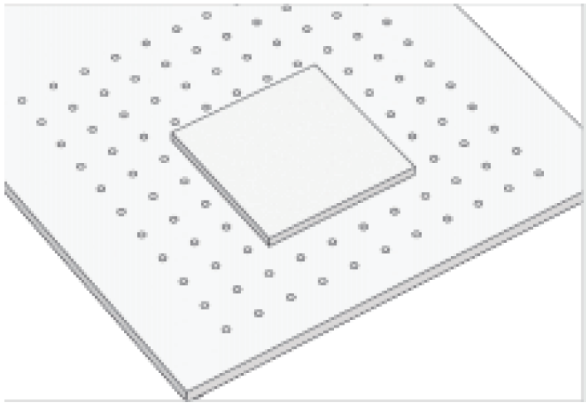
7.2 Wrong Focal Length Despite the Merged Red Dots

Generally, the right focal length is reached when the two red dots emitted by the red light guider merges into one. However, this indicator of focal length is subject to the changes in laser sources and field lenses.

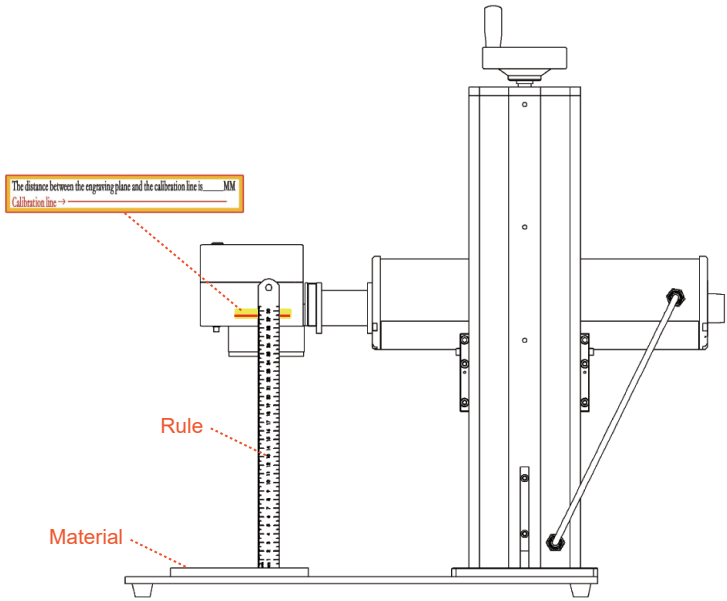
The distance marked on the machine. This length is the distance measured from the center line of the galvanometer to the surface of the engraving material.

To make sure the red light guiders indicate the right focal length:

• Place a sample material on the worktable.



• Turn the focus adjustment knob to move the lens head close to the best focus point.



• Turn on the machine and the red-light guider.
• Make sure the computer is connected to the machine and start the BslCAD.
• Click to import the TEXT for testing, use the default parameters, and tick Continuous Part.
• Press Red in BslCAD or hitting F1 on the keyboard to ensure it'll mark on the test material.
• Click Mark in BslCAD or press F2 on the keyboard. (The laser should be in continuous marking state.)

7.3 Inconsistency Problems

Problem 1: Preview/mark size inconsistent with software display; preview/mark slanted (not horizontal/vertical)

• If the problem remains, contact our customer service.

Problem 2: Red-light preview inconsistent with actual engraving position

• Check and fix the parameters. See §4.5.4 Configuring Parameters on Page 25.
• If the problem remains, fix the parameters:
a. Select Parameter (F3) → Other → Red light pointer.
b. Input numbers in Offset X, Offset Y, or Angle according to the actual deviation number based on the measurement with a ruler. The number can be positive or negative, the red light will change in different directions at the positive and negative values.
c. Exit after confirming.
• If the problem remains, contact our customer service.
For other laser errors, have a technician check the fiber laser source and the main-board. Correct any problems or replace the part(s).

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