



LYF-60W | MOPA | Fiber Laser Marking Machine User Manual



Read Carefully Before Use
Keep for Future Reference

A fiber laser marking machine with a red front panel and black top is positioned on a wooden workbench. To its right is a vertical laser head assembly. In the background, a blue Omtech laser engraver is visible on a desk, along with a whiteboard, shelves, and a window with blinds. A stainless steel tumbler and two coasters are on the workbench next to the machine.

BEAMING WITH POSSIBILITIES!

Thank you for choosing our 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 OMTech 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 within 24 hours to resolve your concerns.

Help Center

help.omtechlaser.com/hc/en-us | 🔍

[First Time Setup](#) | [Safety](#) | [Maintenance](#) | [Troubleshooting](#) | [FAQ](#) | [Hot Tips](#)



Explore on your smart device

@omtechlaser



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1 Safety Information

1.1 Disclaimer

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

1. **As-Is**

This Brand Name 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.

2. **Product Modifications**

Any modifications or alterations to Brand Name products void any warranties and may result in damage or injury. Brand Name shall not be liable for any damages resulting from such modifications or alterations.

3. **Compliance with Laws**

Customers shall be liable for ensuring that the use of Brand name products complies with all applicable laws and regulations in their respective jurisdictions. Brand Name assumes no responsibility for any violations of laws or regulations resulting from the use of Brand Name products.

4. **Correct Use**

Always use Brand Name 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 Brand Name products is carried out by a competent person.

Always make maintenance regularly throughout Brand Name products' lifecycles; you have the liability to keep the products operating as intended.

Always wear appropriate protective gear.

5. **Third-Party Products**

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

6. **Limitation of Liability**

Brand Name 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 Brand Name products. In no event shall Brand Name's liability exceed the value of the products sold.

This disclaimer states the entire obligation of Brand Name with respect to Brand Name 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:



These items present a risk of serious property damage or personal injury.



These items address similarly serious concerns about the laser beam.



These items address similarly serious concerns about electrical components.



These items address similarly serious concerns about fire hazards.



These items address pinching and crushing hazards.



Protective eyewear should be worn by anyone around this machine during operation.



This product is sold in conformity with applicable EU regulations.

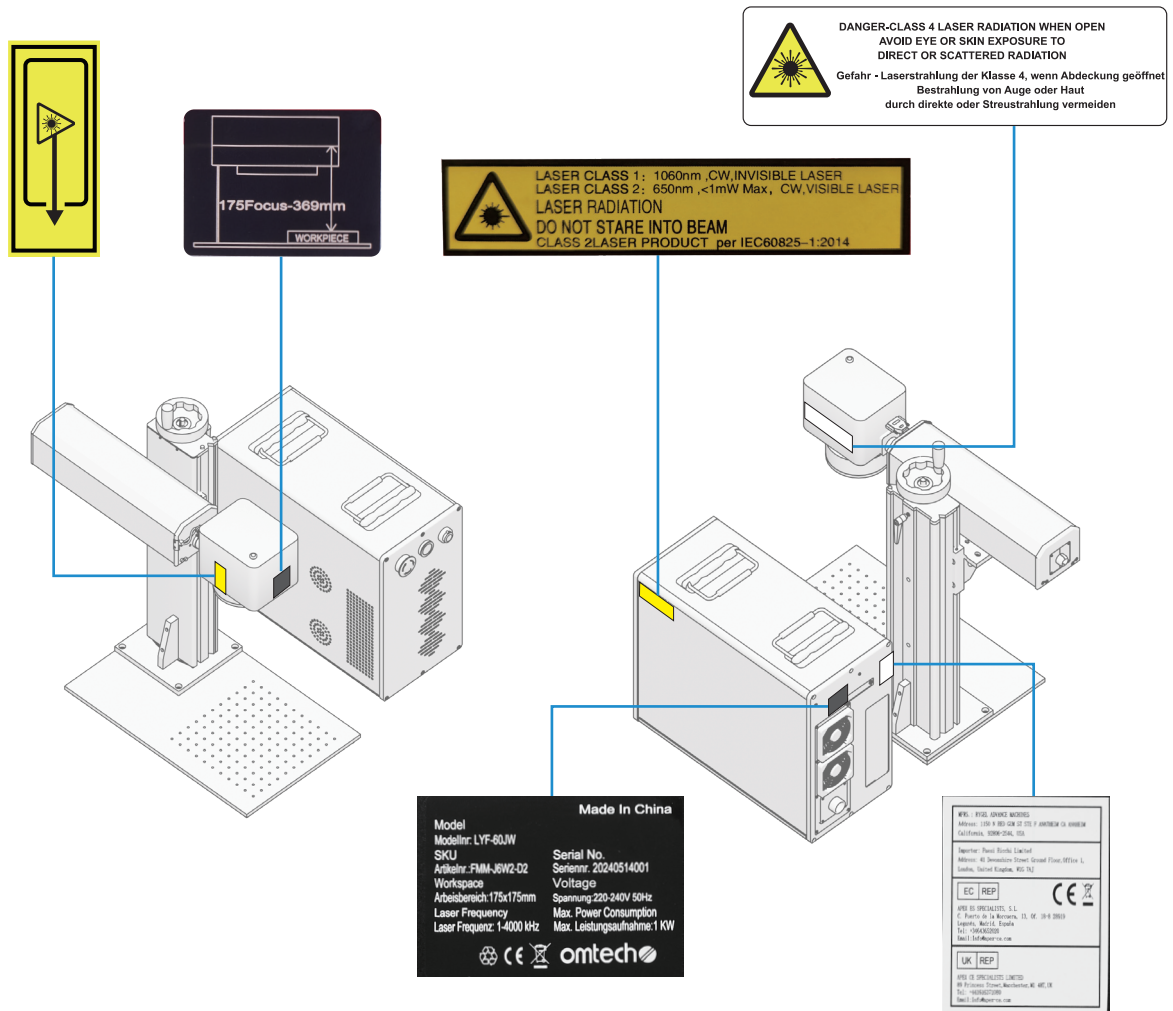


This product contains electrical components that should not be disposed of with regular garbage.

1 Safety Information

1.3 General Safety Instructions

- Your engraver should come with instruction labels in the following locations.



If any of these labels is missing, illegible, or damaged, it must be replaced.

- Use this laser marking device only in accordance with all applicable local and national laws and regulations.
- Use this device only in accordance with this instruction manual and the manual for the engraving software included with it. Only allow this device 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 device if it is ever given or sold to a third party.
- DO NOT** leave this device unattended during operation. Observe the device throughout 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 device is **FULLY** turned off in the correct order 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 device.
- Any untrained personnel who might be near the device while it is in operation **MUST** be informed that it is dangerous and fully instructed on how to avoid injury during its use.
- Always keep a fire extinguisher, water hose, or other flame-retardant system nearby in case of accidents. Ensure that the local fire department's phone number is clearly 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 your extinguisher too close to the flame, as its high pressure can produce blowback.

1.4 Laser Safety Instructions

This machine uses an invisible **CLASS 4 LASER**, the strongest and most dangerous class of laser available for public use. Used without care, it can 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 gasses during processing
- Direct exposure to the laser will cause bodily harm including serious burns and irreparable eye damage




As such,

- **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.
- **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 as described in the **Material Safety** section of this manual. The laser settings and engraving process must be properly adjusted for specific materials.

1 Safety Information

- Ensure the area is kept free of airborne pollutants, as these might pose a similar risk of reflection, combustion, etc.
- **NEVER** use this marking machine with the fiber source's housing open, as the closed laser light path is necessary to prevent laser radiation leakage.
- **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.

1.5 Electrical Safety Instructions

- **ONLY** use this device 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 2000J.
- **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 device on and off using its key and power buttons in the correct order. The mainboard, galvanometer, and laser have separate power supplies that are grounded in order. Activating everything 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 device 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°C–35°C). The ambient humidity should not exceed 70%.
- Adjustment, maintenance, and repair of the electrical components of this device 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 a class 4 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.

This machine can be safely used with the following materials:

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

See [§5.4 Instructions for Specific Materials](#) (Page 52) for the recommended parameters for the most commonly engraved materials.

1 Safety Information

This machine **CANNOT** be used with the following materials or with any materials which include them:

- 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

This machine can be used with some other metals, hard plastics, and other materials with some care. 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. This engraver's R-410A refrigerant also requires special handling for reuse or legal disposal. Contact your local authorities or dealer for advice.

2 Introduction

2.1 General Information

This manual is the designated user guide for the installation, setup, safe operation, and maintenance of your 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 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 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

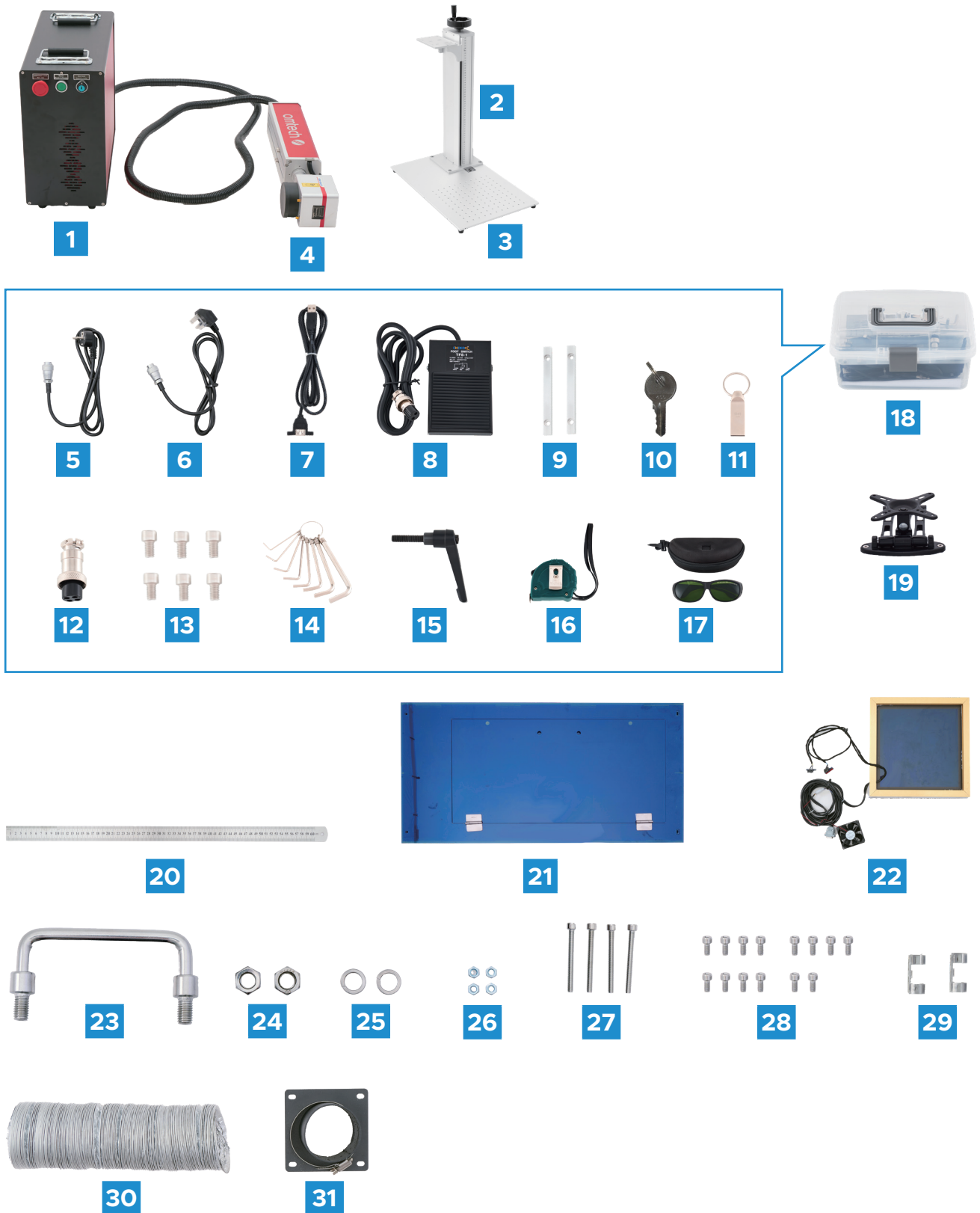
This machine is intended for engraving signs and logos on consumer products or applicable substrates. This laser can process a wide variety of metals including steel, aluminum, titanium, brass, copper, tungsten, carbide, and chrome. It can also be used with stone and some hard plastics such as acrylic (See [§1.6 Material Safety Instructions](#) on Page 6 and [§5.4 Instructions for Specific Materials](#) on Page 52 for further details.). The use of this system for non-designated purposes or materials is not permitted.

2.3 Specifications

Model	LYF-60W	
Input Power	AC 220–240 (V), 60 Hz	
Rated Power	60 W	
Expected Service Life	100,000 hr.	
Laser Wavelength	1064 nm	
Pulse Width	2–500 (ns)	
Laser Frequency	1–4000 (kHz)	
Processing Area	6.9×6.9 (in.)	175×175 (mm)
Max. Marking Speed	275.6 ips	7000 mm/s
Min. Marking Depth	0.0002 in.	0.005 mm
Max. Marking Depth on a Single Pass	0.003 in.	0.07 mm
Min. Line Width	0.006 in.	0.15 mm
Max. Material Height	9.84 in.	250 mm
Precision	±0.1 μm	
Required Operating Environment	Max. Humidity	<70%
	Temp. Range	40°F–95°F 5°C–35°C
Required Operating Software	EZCad	
Dimensions	13.8×23.2×27.2 (in.)	35×59×69.2 (cm)
Net Weight	66.1 lb.	30 kg

2 Introduction

2.4 Package List

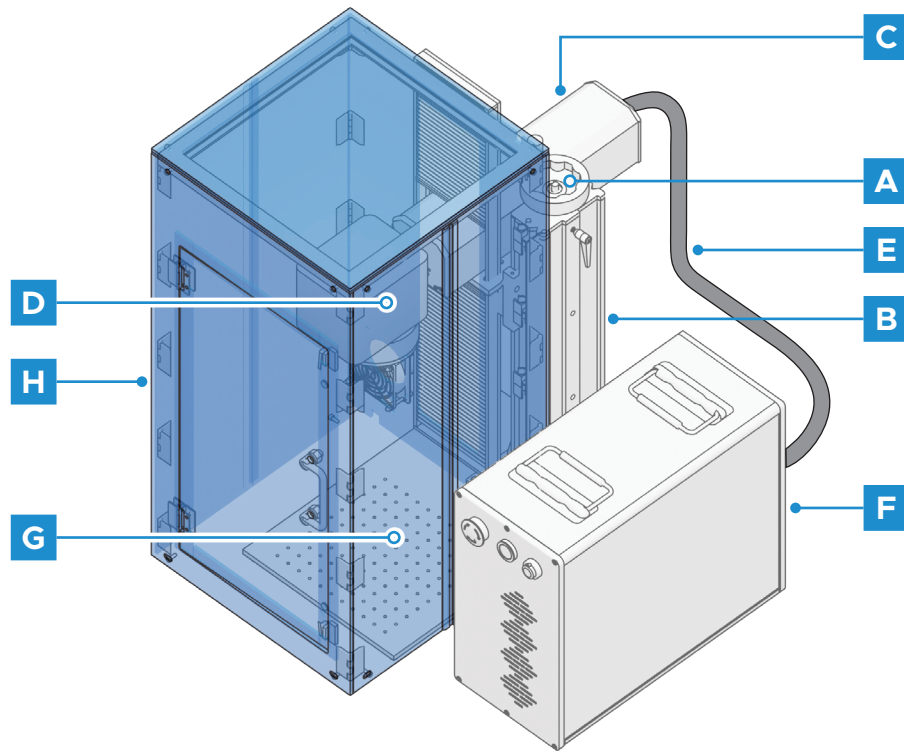


No.	Part	Qty.
1	Main Tower	1
2	Support Column	1
3	Worktable	1
4	Galvo Lens Head	1
5	Power Cable (EU)	1
6	Power Cable (UK)	1
7	USB Cable	1
8	Foot Switch	1
9	Positioning Bar	1
10	Laser Keys	2
11	USB Flash Drive	1
12	Four-Pin Aviation Connector	1
13	Bolts	6
14	Hex Wrench	1 Set
15	Height Lock	1

No.	Part	Qty.
16	Tape Measure	1
17	Laser Protective Eyeglass	1 Pair
18	Tool Box	1
19	Monitor Mount	1
20	Steel Ruler	1
21	Protective Cover Plates	4
22	Top Cover (with cables and fan)	1
23	Door Handle	1
24	M10 Nuts	2
25	M10 Washers	2
26	M4 Nuts	4
27	M4×18 Bolts	4
28	M4×10 Bolts	14
29	Cable Fixing Clips	2
30	Exhaust Pipe	1
31	Pipe Connector	1

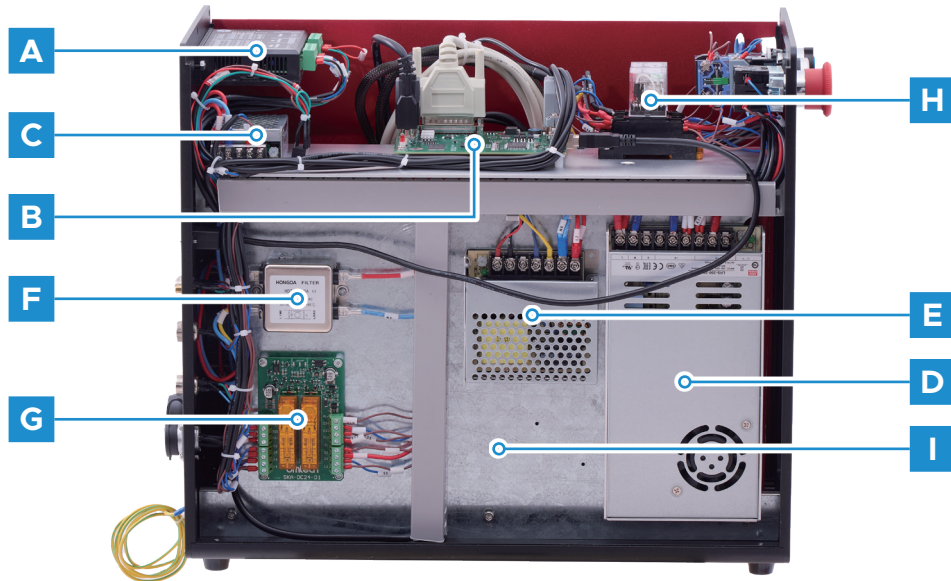
3 Components

3.1 Main Parts



A	Height Adjustment Knob	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	The high-speed galvanometer scanning head focuses the laser beam to a fine point, directing it to proper locations on the target material during engraving.
E	Laser Cable	Transmits laser beam emitted from the laser source, electrical power, and control signals between the main tower and the laser arm.
F	Main Tower	Houses the fiber laser source, the mainboard, and various connections, controlling the operation of the laser marking system. It is equipped with a laser cable and a ground wire on the back.
G	Worktable	Holds the target material. Optionally, use it with positioning bars for more precise alignment.
H	Protective Cover	Protects onlookers from the potentially harmful effects of the invisible laser and its reflections. Its exhaust fan will put out gasses and airborne dust from your worktable, sending it through your vent to a window or air purifier.

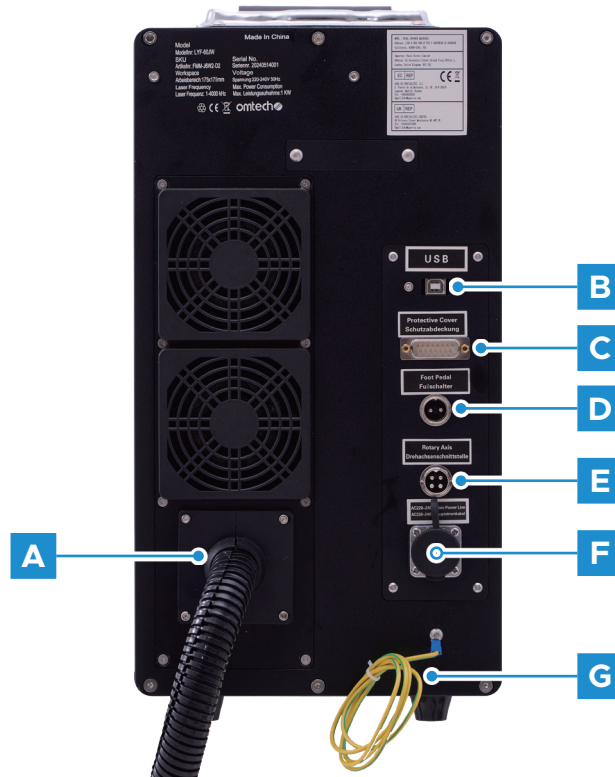
3.2 Main Tower




A	Rotary Stepper Motor	Helps control the stepper motor of the attached rotary axis.
B	Mainboard	Works with your software to control the laser.
C	Mainboard Power Supply	Draws 0.5A to convert standard electricity to 5V, 3A power for the mainboard.
D	Laser Power Supply	Draws 6.8 A to convert standard electricity to 24 V, 14.6 A power for the fiber laser source.
E	Galvanometer Power Supply	Draws 2.5 A to convert standard electricity to 15 V, 2 A power for the scanning galvo lens.
F	EMI Filter	Protects the sensitive electronics in the mainboard from interference from the power supply.
G	Alternating Current Contactor	Forms a safety dual circuit with the safety relay by making and breaking electrical connections between the laser and the laser power supply.
H	Safety Relay	Disables the scan head instantly following a blackout, when the door of the protective cover is opened, which triggers the interlocks, and when the emergency stop is pressed. To resume normal operation, close the door of the protective cover, resume power or release the emergency stop, press the reset button, and resume operation following the normal operational sequence.
I	Fiber Laser Source (Inside Casing)	Creates the laser beam and transfers it to the fiber optic pathway to the scanning lens.

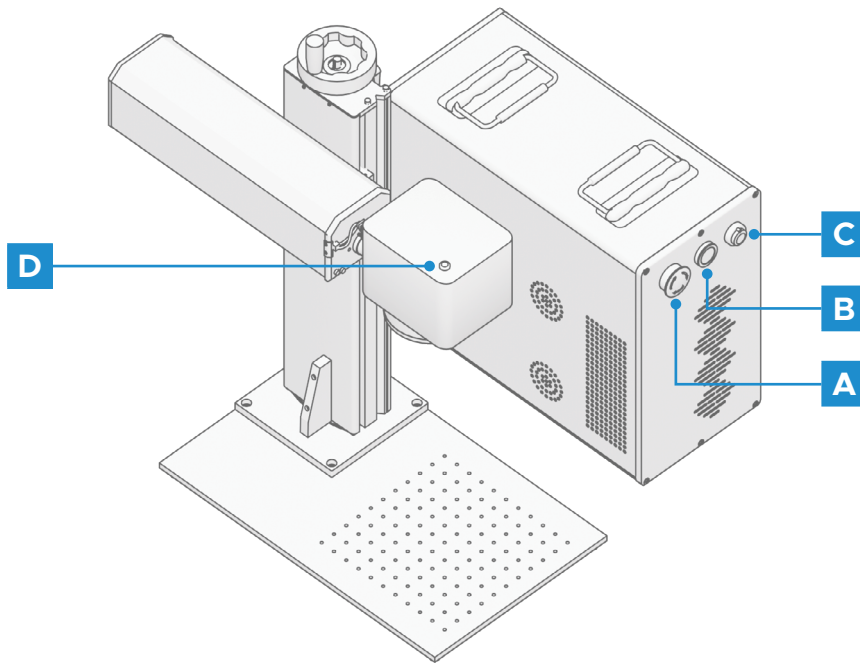
3 Components


3.3 Connection Inputs



A	Laser Cable	Transmits the laser beam from its source to the galvo lens.
B	USB Port	Connects the machine to your control computer.
C	Protective Cover Port	Connects to the protective cover and powers the cover's interlock(s) and exhaust fan. <div style="border: 1px solid blue; border-radius: 15px; padding: 10px; margin-top: 10px;"><p>The engraver cannot turn on if the protective cover is not connected.</p></div>
D	Foot Pedal Cord Input	Enables optional pedal control of laser activation to free your hands for manual adjustment of the target material.
E	Rotary Axis Cord Input	Enables an optional rotary axis with a 4-pin connection cable.
F	Power Cord Input	Connects to the machine's standard 3-prong main power cable.
G	Ground Wire	Connects to a dedicated ground cable for safety if applicable.

3.4 Power Buttons

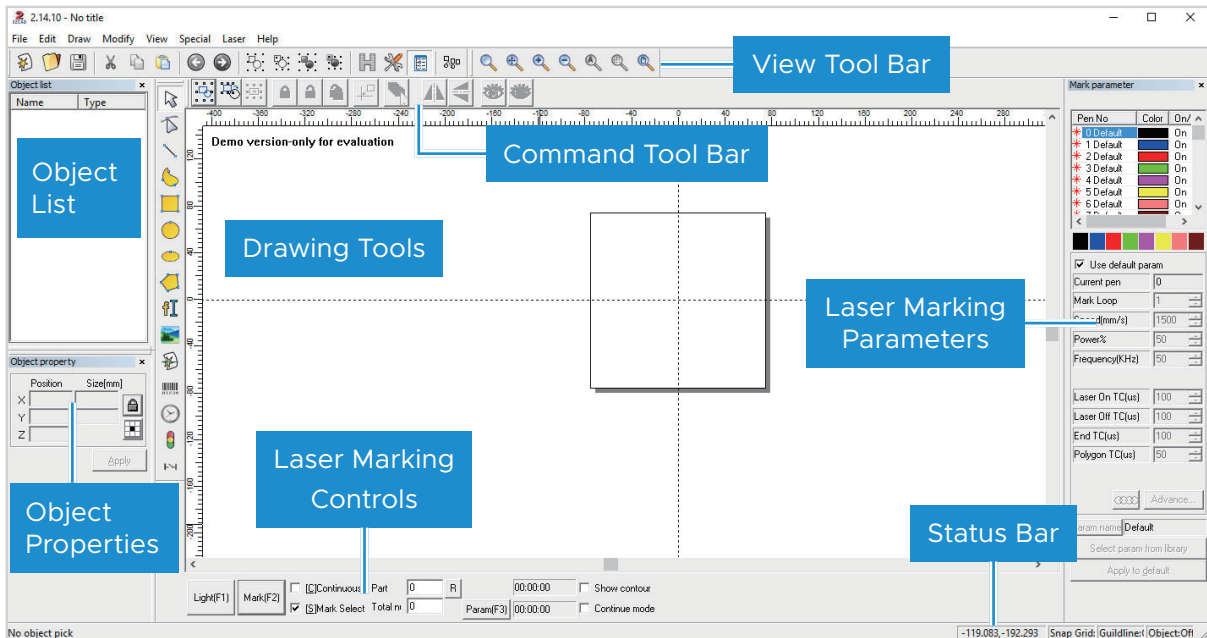


A	Emergency Stop	Stops the machine instantly by pressing the button during operation; turning it clockwise releases the button. Due to risks of fire and other hazards during engraving, this engraver includes a large and easy-to-reach emergency stop button on the control panel.
B	Reset	<p>Activates the 24V relay inside the main tower that connects the high-voltage power to the fiber laser source. Press it after the emergency stop button during normal startup. Press it to restore the power after a blackout.</p> <div style="border: 1px solid blue; border-radius: 15px; padding: 10px; margin: 10px 0;">  <p>Mind that the laser WILL fire the instant the reset button is pressed, if the emergency stop and fiber laser key have not been reinstated to their OFF positions. Always release the emergency stop button and close the protective door before pressing the reset button.</p> </div>
C	Scan Head	Activates the mainboard and the scanning galvo lens. Insert your key and turn it clockwise after releasing the emergency stop during normal startup. As to normal shutdown, press down the emergency stop first and then turn the key counterclockwise.
D	Focus Switch	Activates the red light guider to assist the focusing and engraving process.

3 Components

3.5 Software Main Interface

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



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 EZCad software, see the separate EZCad software manual included in the USB flash.

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 fiber laser marker, select a location meeting 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 40°F–95°F (5°C–35°C) 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.

4 Installation

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.

Execute one of the following depending on your situation:



If applicable, execute both grounding methods.

- Connect the main power cable to a standard 3-prong outlet firmly.
- Connect the ground wire on the back of the main tower to a dedicated ground cable.

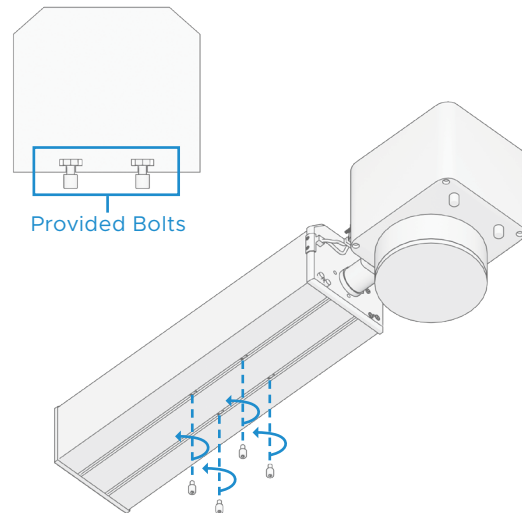
The far end of the dedicated ground wire should be securely connected to a metal rod driven at least 8 feet (3 m) deep into soil located at least 5 feet (1.5 m) from the machine. The resistance along the line should be no greater than 5 Ω .



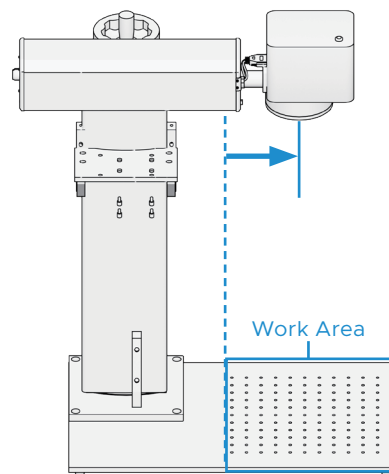
4.4 Assembly

4.4.1 Assembling the Main Body

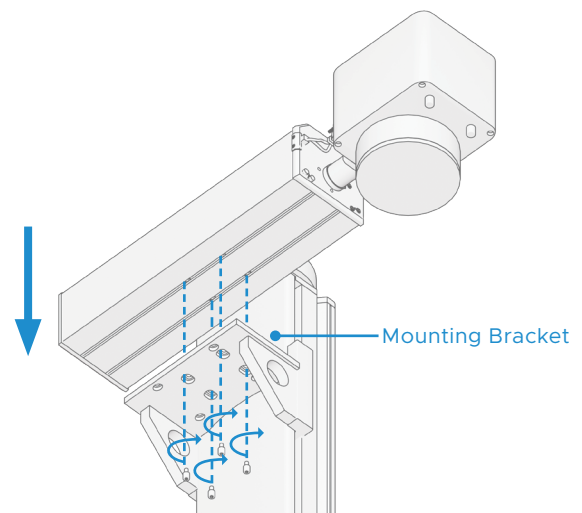
1. Install the laser arm onto the support column.
 - a. Remove the preinstalled bolts from the laser arm.



- b. Mount the laser arm so that its lens box is positioned over the work area.



- c. Align the four holes on the housing with the holes in its mounting bracket.
 - d. Tighten it into place with the removed bolts.

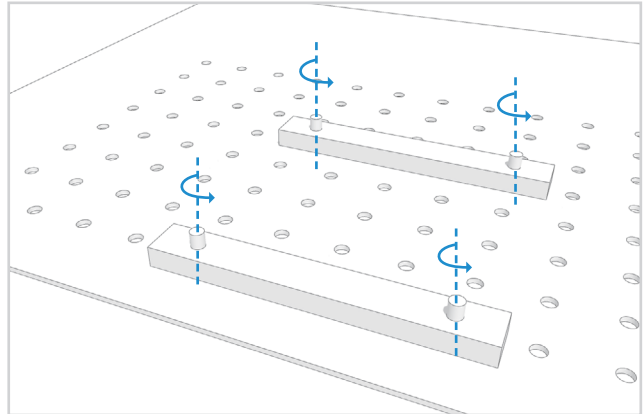


4 Installation

2. **(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.

- a. Simply place the bars over the holes that will form the outer edge of the target material.
- b. Fasten the positioning bars into place with the provided bolts.



3. Make all necessary connections between the various components.

- a. Connect the main power cable from the main power port to the power supply.
- b. Connect the USB cable from the USB port to the control computer.
- c. (Optionally) Connect the foot pedal cable to the main tower.

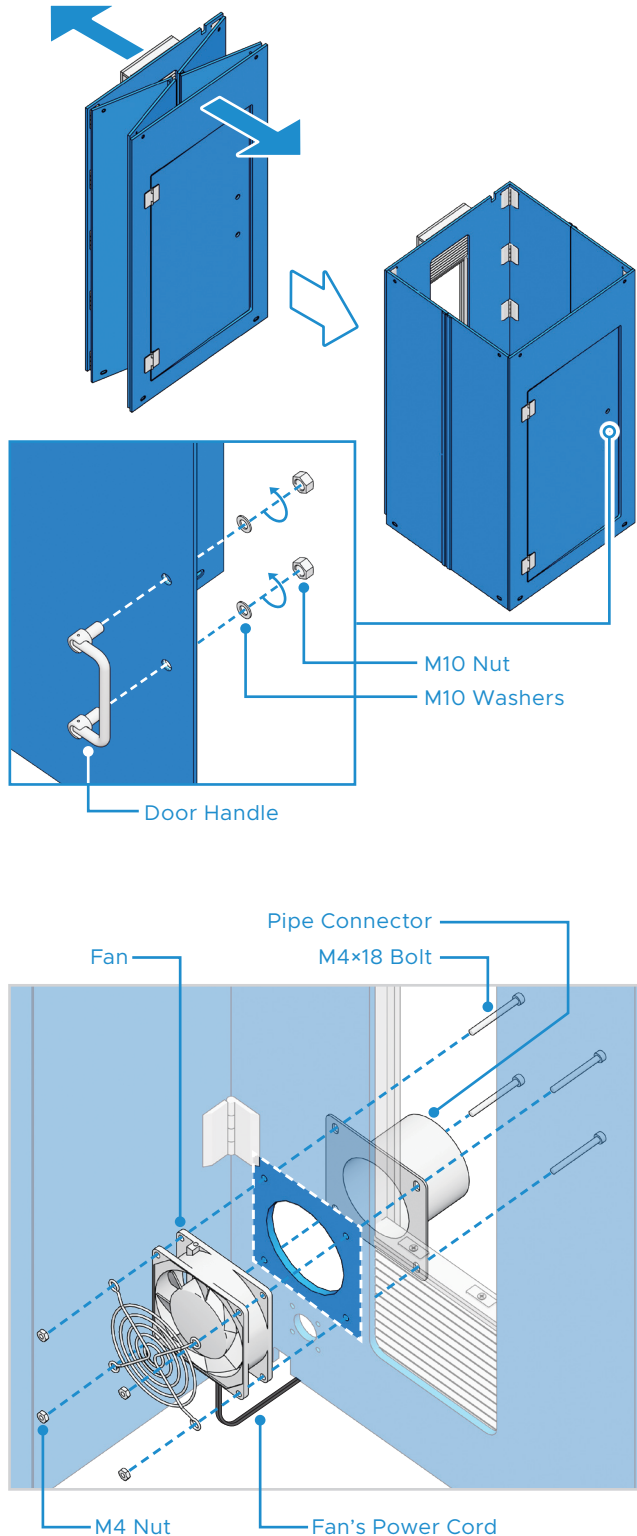


4.4.2 Assembling the Protective Cover



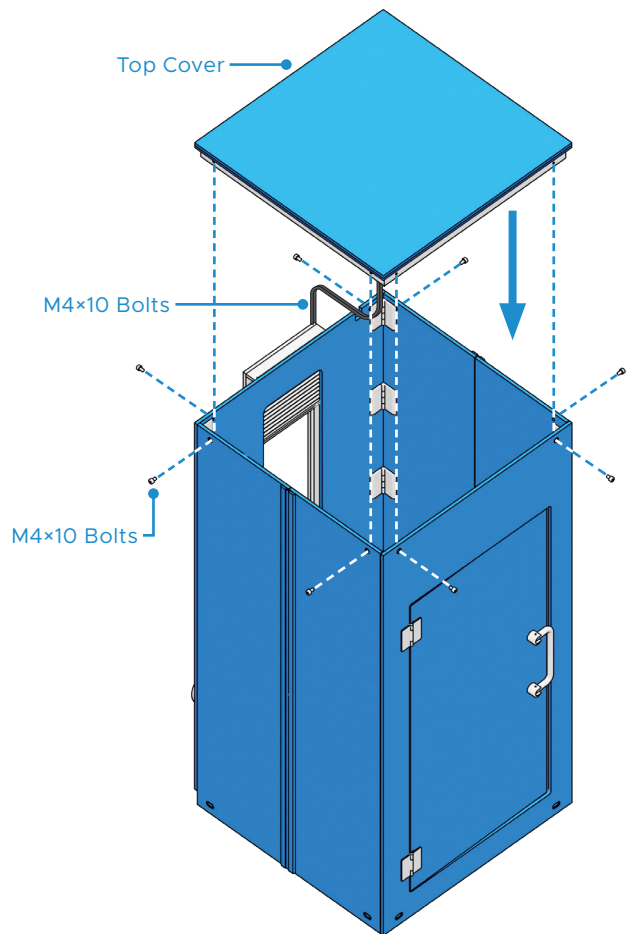
The engraver cannot turn on if the protective cover is not connected.

1. Unfold the protective cover plate.
2. Affix the door handle to the protective cover with the provided M10 nuts and washers.
3. Affix the fan and pipe connector to the protective cover with the provided M4×18 bolts and the M4 nuts.
4. Feed the fan's power cord through the attachment points at the back of the protective cover.

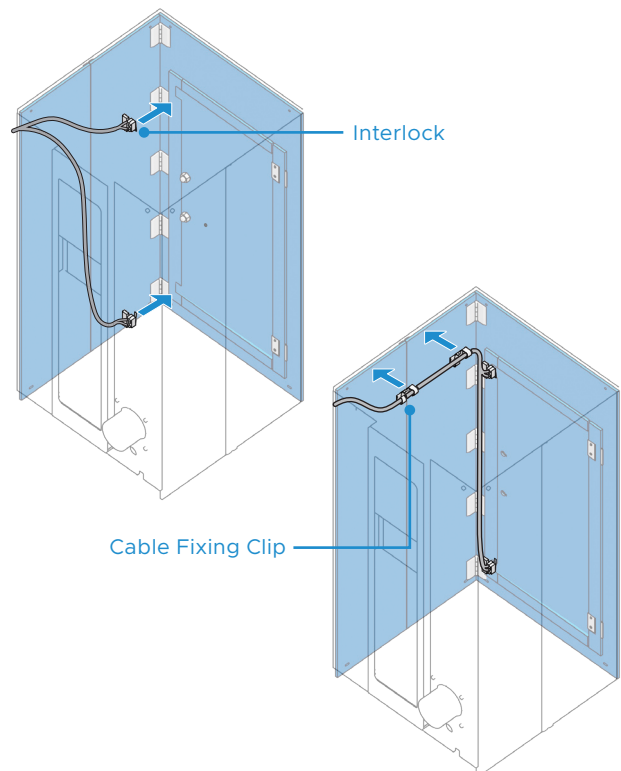


4 Installation

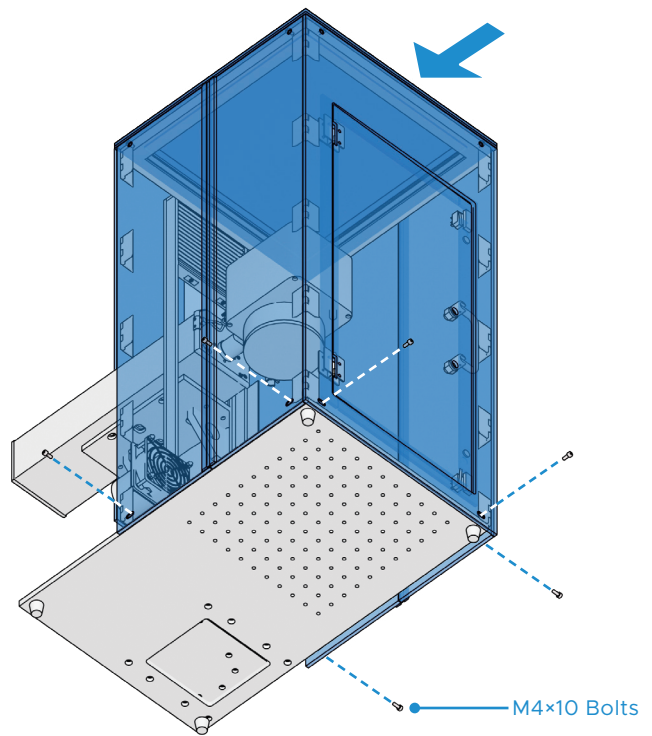
5. Place the top cover onto the protective housing and secure them together using the provided M4×10 bolts.



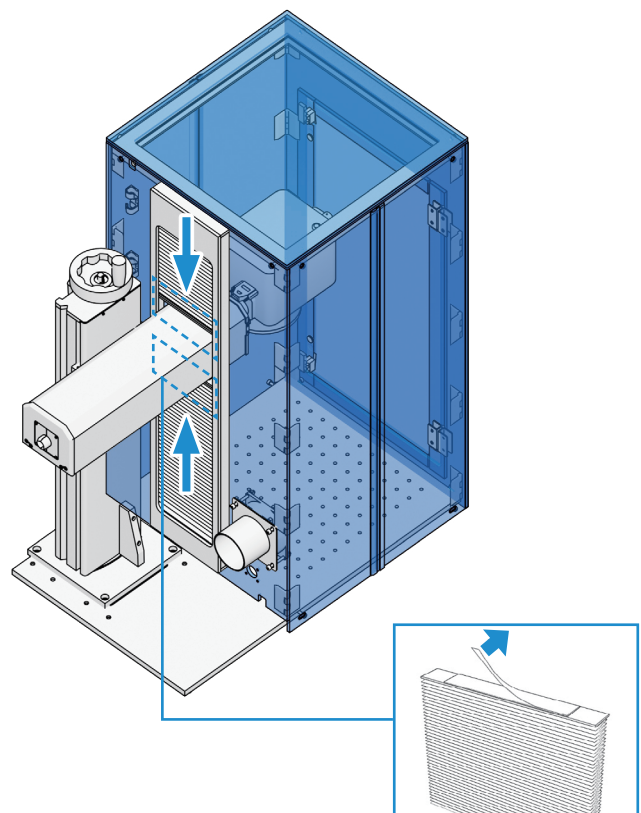
6. Attach the interlocks to the part of the cover as shown.
 - a. Peel off the backing of one interlock.
 - b. Press the adhesive side firmly against the indented part of the cover from inside, being sure the trigger of the interlock protrudes completely from the cover.
 - c. Repeat the process for the other interlock.
 - d. Arrange the cables using the provided cable fixing clips.



7. Affix the protective housing to the base of the worktable using the provided M4×10 bolts.



8. Remove the accordion strip's adhesive covering and secure it to the main arm of the engraver.



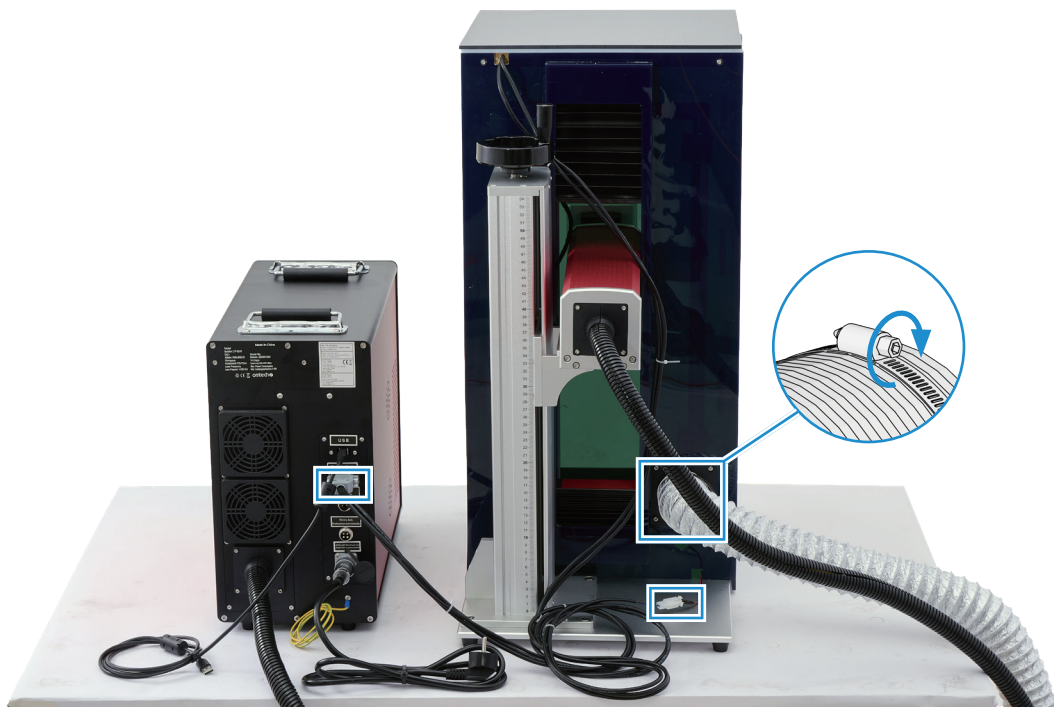
4 Installation

9. Install the provided exhaust pipe directly to the pipe connector.

The pipe can be expanded to a full length of about 1.5 meters (5 ft.). The other end should be connected to a dedicated purifier or (if the fumes are not hazardous and meet local and national air safety standards) placed out a window.

10. Connect the interlocks and the fan.

- a. Connect the female and male JST connectors, which encompass the wire for the interlocks and fan.
- b. Connect the DB15 male connector to the port at the back of the main tower, marked "Protective Cover", screwing the bolts in place.



NEVER operate the laser if the vent is not purifying or removing the fumes produced by the target material. Research materials before use and never operate the laser on any (such as PVC, teflon, and other halogen-containing substances) that can produce corrosive, hazardous, or even deadly fumes.

4.5 Installing the Software

4.5.1 Preparing a Control Computer

1. Prepare a control computer. See the software EZCad 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.

2. Prepare the applicable engraving software and its driver to operate the machine.

For your convenience, we provide a copy of the EZCad software, an EZCad manual, an EZCad 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.




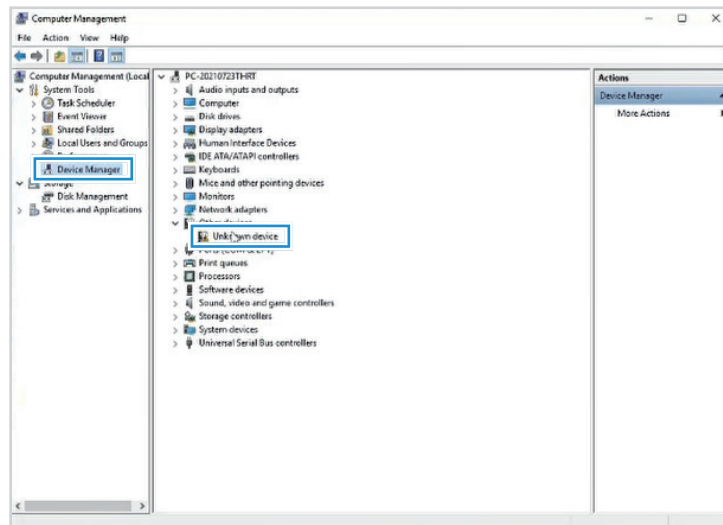
LightBurn is also applicable with this machine; if you want to use it, see its manual to install the software and its driver.

4 Installation

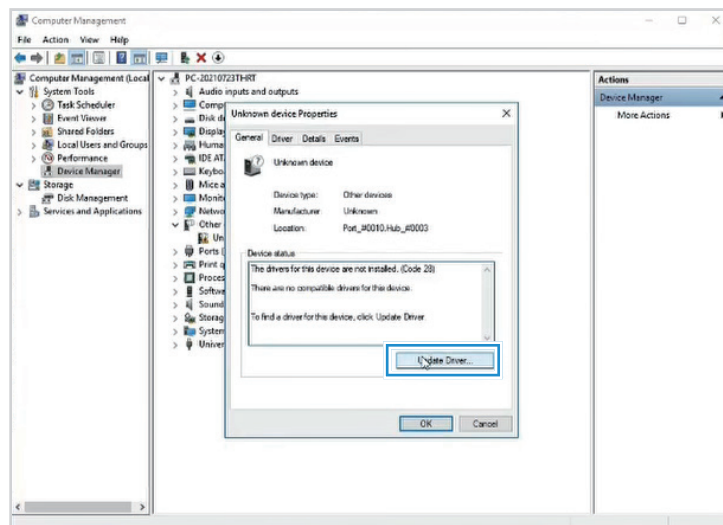
4.5.2 Installing the EZCad Driver

The EZCad driver is included in the provided USB drive.

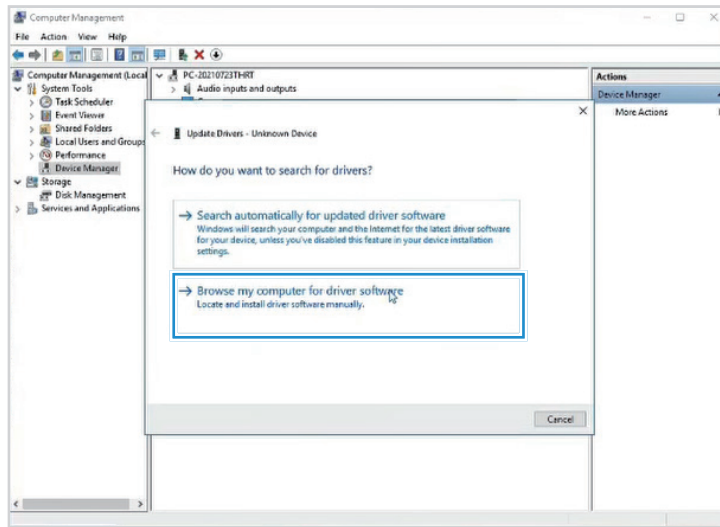
1. Turn on the laser marking machine and your computer.
2. Ensure that the USB cable is connected to the computer and laser marking machine, and insert the provided USB drive into your computer.
3. Right click  and then select **Device Manager**.
4. Click **Device Manager** → **Other devices** and then double click **Unknown device**.



5. Click **Update Driver**.



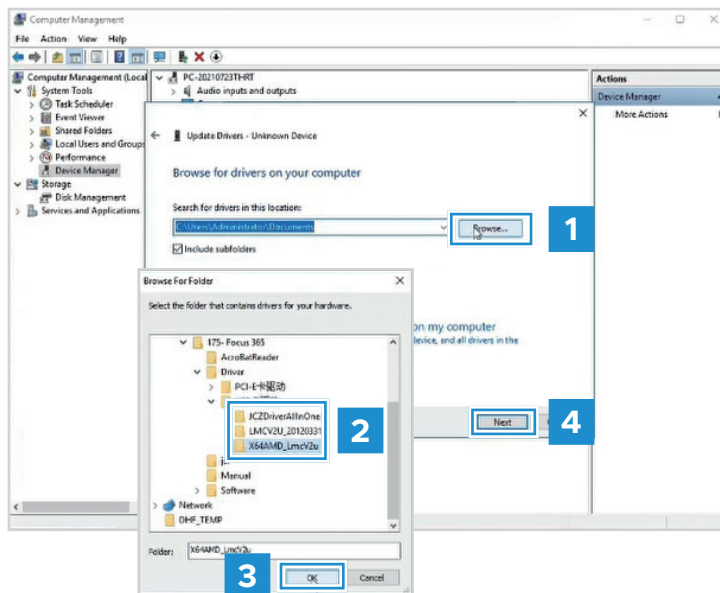
6. Click the second option **Browse my computer for driver software**.



7. Click **Browse** to select a location and then click **Ok** → **Next**.

The driver should be installed in the same location as the software.

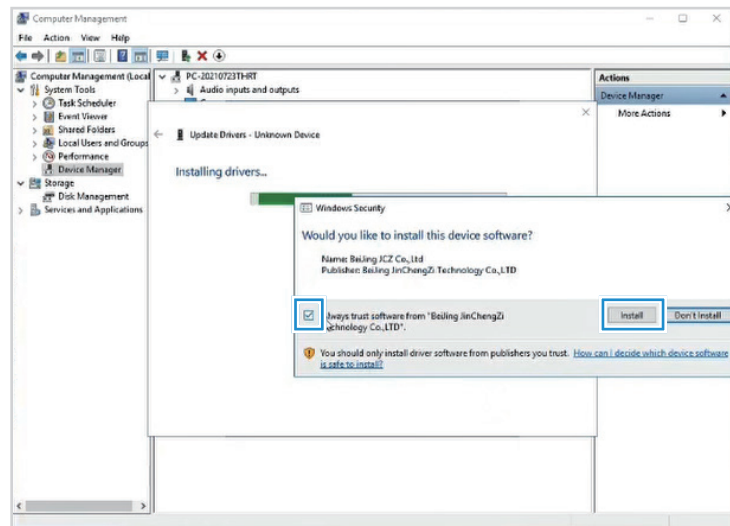
The folders “JCZDriverAllInOne” and “LMCV2U_20120331” are for 32-bit installation and the folder “X64AMD_LmcV2u” is for 64-bit installation.



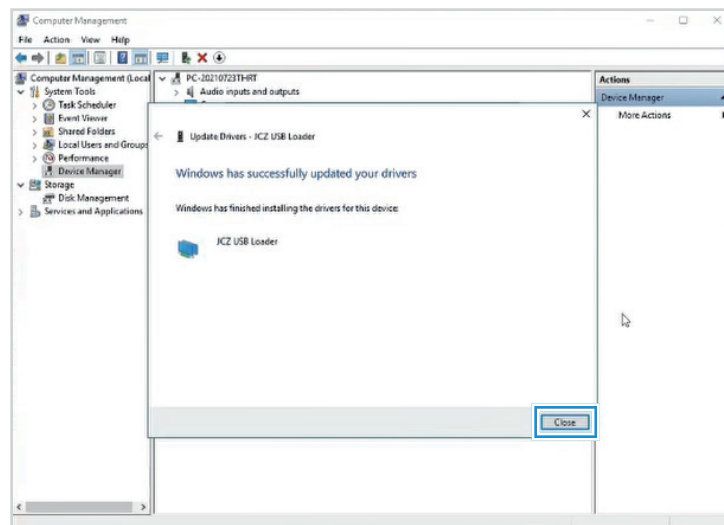
4 Installation

8. Check the box and click **Install**.

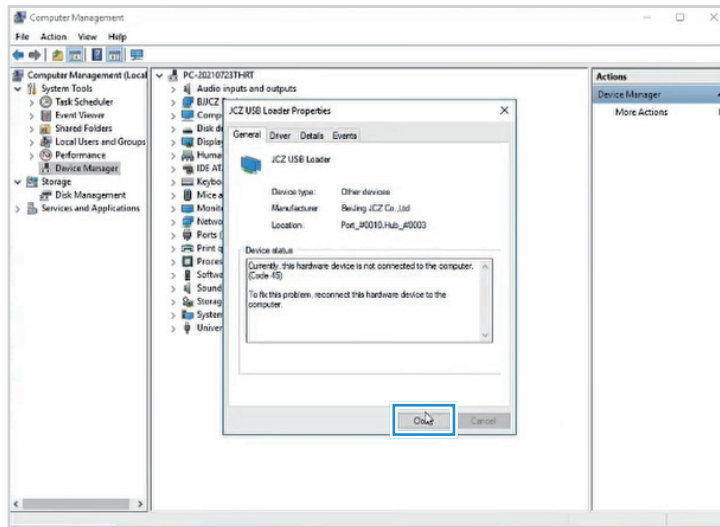
The driver installation should start.



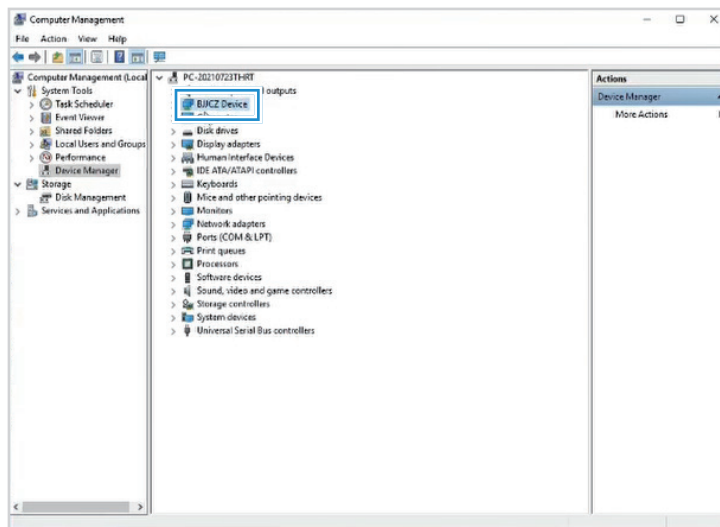
9. After installation, click **Close**.



10. Click **Close**.



11. Make sure that the driver has been installed successfully.



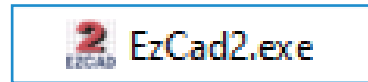
4 Installation

4.5.3 Running the EZCad Software

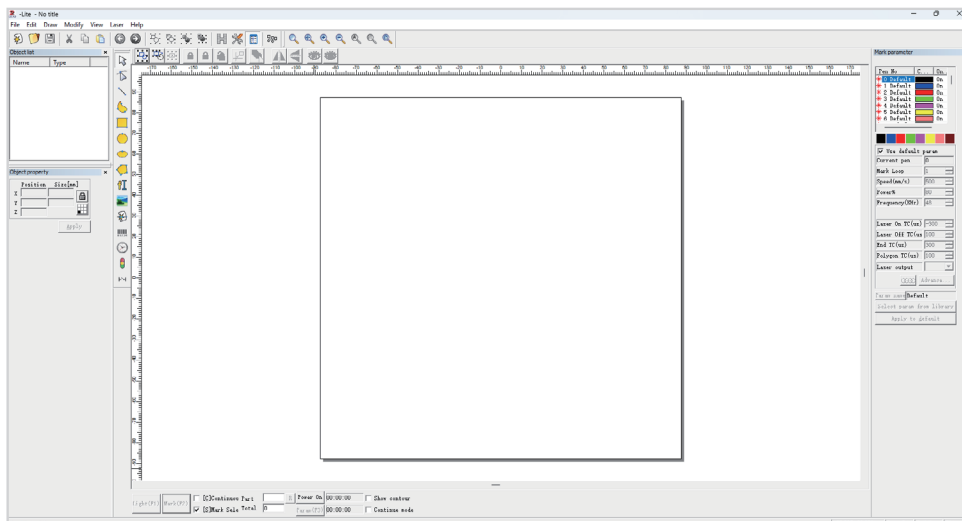
The EZCad software is included in the provided USB drive. You can use it without installation.

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 EZCad manual in the provided USB drive.

1. Double click **EzCad2** to start the software.



2. Click **I agree**.
3. Wait for a moment and make sure the software runs successfully.



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 EZCad 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 EZCad 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

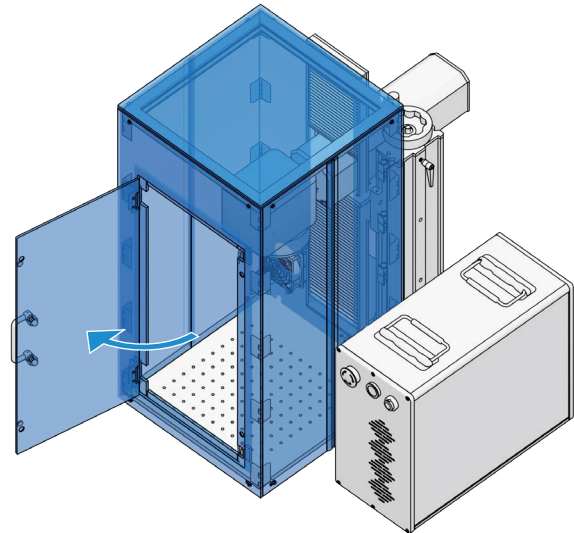


- Turning the laser key and pressing the buttons out of order **MAY** cause electrical hazards as the separate power supplies are grounded in order. Do not activate everything quickly. Give each power supply time to come on line, activating its fans. Three seconds is sufficient.
- **ONLY** touch the components of this product with **ONE HAND** at a time during use to reduce the risk of electric shock.

1. Check the following:

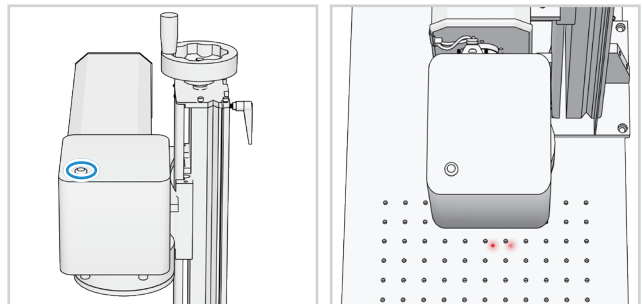
- The power cable is connected to the power supply.
- The protective cover is connected to the protective cover port.

2. Open the door and remove the lens head cover.

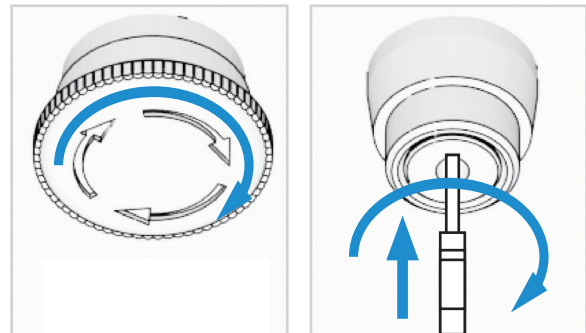


3. Press the **Focus switch** button on the scanning head to turn on the red light guider.

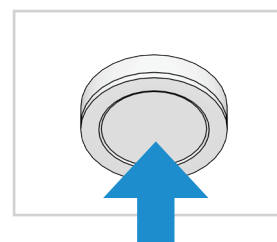
The two red dots should be displayed on the working platform when the red light guider is on.



4. Close the door.
5. Release the **EMERGENCY STOP** button by turning it clockwise if it is locked.
6. Insert the laser key into the **Scan head** and turn clockwise by 90°.



7. Press the **Reset** button.



5 Operation

5.2.2 Focusing

1. Place the test material on the processing area and ensure the red dots are displayed on the test material.



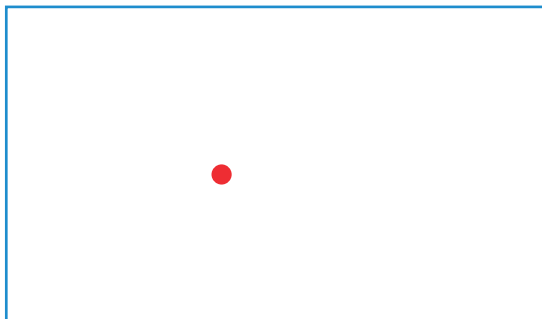
- Make sure the material can be engraved by this machine. See [§1.6 Material Safety Instructions](#) (Page 6) for details.
- The test material should be the same as the actual material.

2. Focus the laser using one of the following two methods.

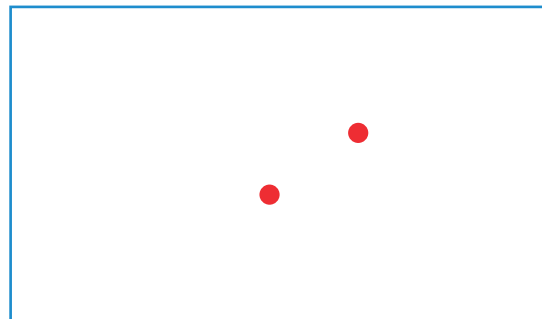
Should the red light guider malfunction, choose the method 2. Employing a ruler for focusing assistance yields greater accuracy than relying on the red dot guider.

Method 1: Using the Red Light Guider

- a. Rotate the focus adjustment knob clockwise to lower the scanning head or rotate it counterclockwise to raise the scanning head until the two red dots merge into one.
- b. Make a note of the correct height on the support column's ruler for future reference.



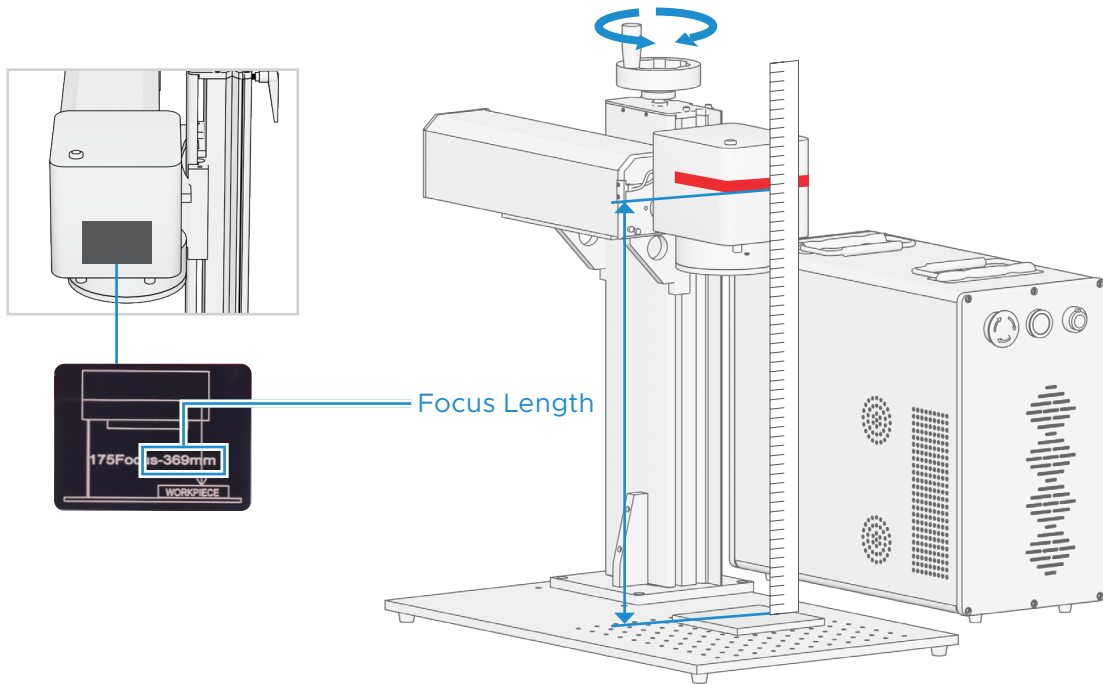
In Focus



Out of Focus

Method 2: Using the Ruler

- a. Use the provided ruler to measure the distance from the center line of the scanning head to the surface of the test material.
- b. Rotate the focus adjustment knob clockwise to lower the scanning head or rotate it counterclockwise to raise the scanning head until the height on the ruler is the same as the value marked on the lens head, which varies among different models.



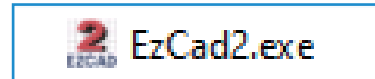
5.2.3 Preparing Your Design

1. 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 EZCad is already running, restart it now to establish a connection between the computer and the laser's control board.

2. Double click **EzCad2.exe** in the "Software" folder in the USB drive to start the software.




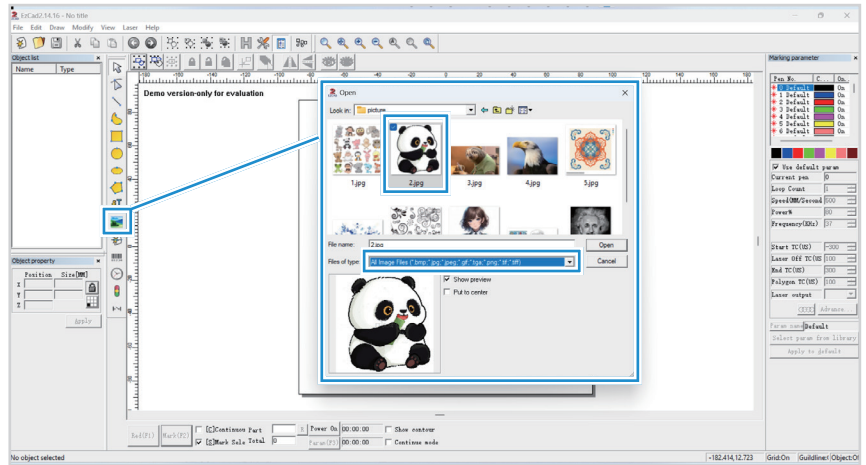
3. Load or create a design in EZCad as follows.

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 EZCad software manual in the USB drive.

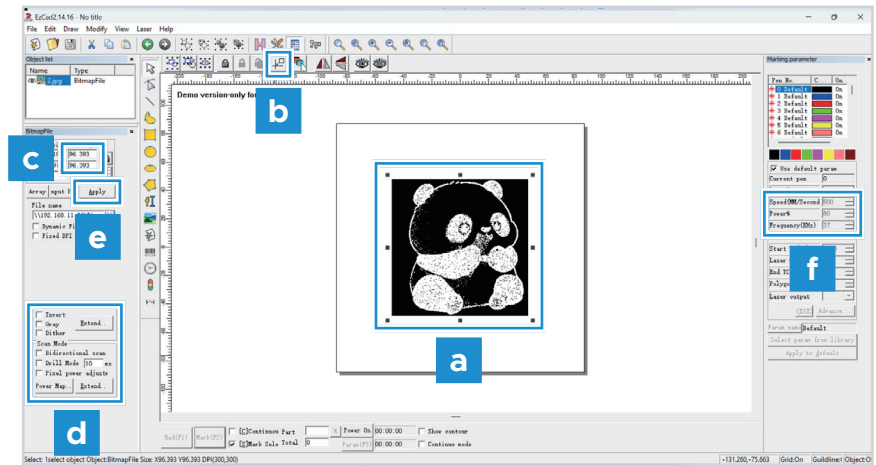
5 Operation

Loading Bitmap Graphics

1. Click  to draw a bitmap file.
2. Choose the file folder.
3. Select the file type.
4. Select the picture you want to mark.
5. Open the picture and import the canvas.



6. Set picture parameters.




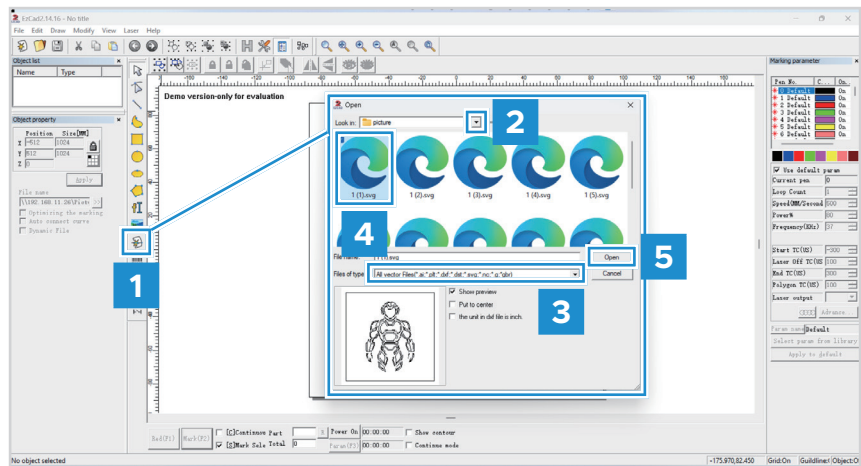
- a. Select the picture.
- b. Center the picture on the canvas.
- c. Set the picture size.
- d. Set the picture parameters.
- e. After setting parameters, click **Apply**.

- f. Set processing parameters: speed, power, frequency.

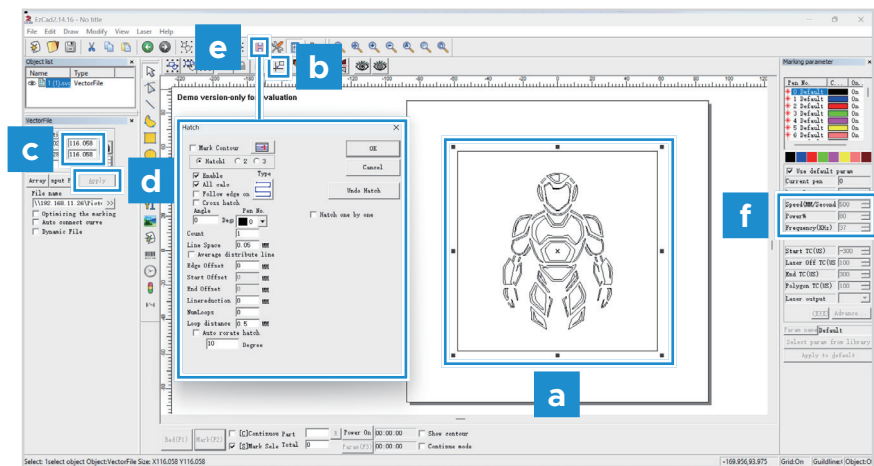
See [§Setting Engraving Parameters](#) on Page 39 for details.


Loading Vector Graphics

1. Click  to draw a vector file.
2. Choose the file folder.
3. Select the file type.
4. Select the image to be marked.
5. Open the image and import the canvas.



6. 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.

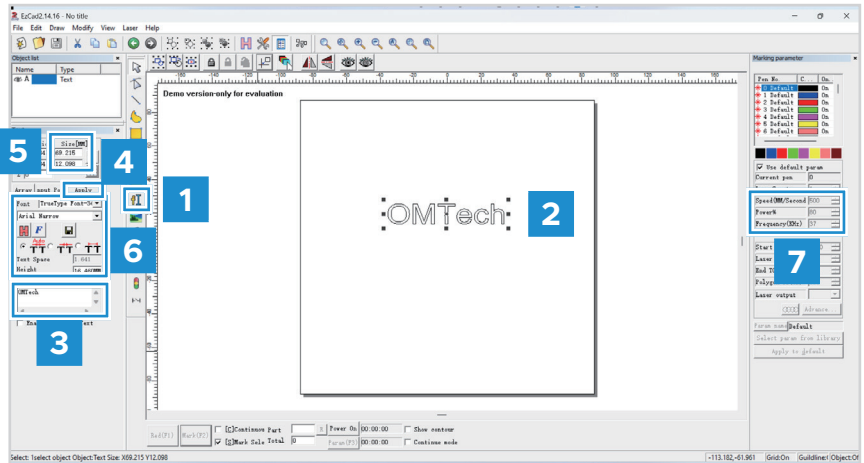
See [§Setting Engraving Parameters](#) on Page 39 for details.

5 Operation

Creating Text

1. Click the text tool  to create text.
2. Click the left mouse button on the canvas and “TEXT” appears.
3. Modify the text.
4. Click **Apply**.

The text content entered is displayed in the canvas.



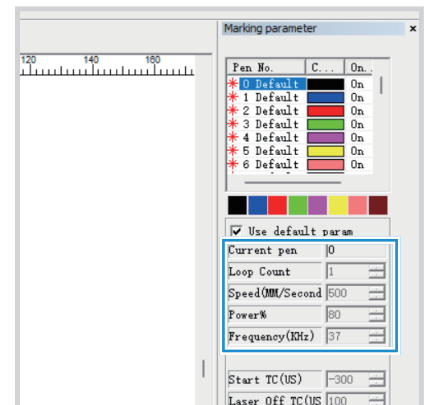
5. Set the text size.
6. Configure other settings (fill, text style, font, etc.).
7. Set processing parameters: speed, power, frequency.

See [§Setting Engraving Parameters](#) on Page 39 for details.

Setting Engraving Parameters

Customize your contrast and engraving depth by adjusting the engraving parameters in EZCad.

- 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.

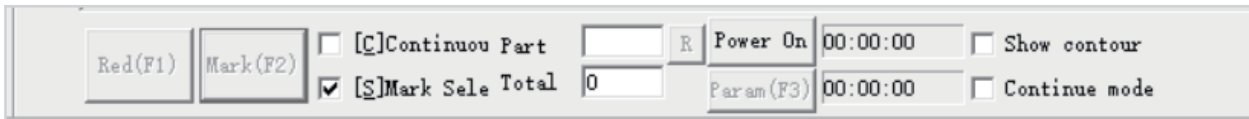


Engraving too deep, however, reduces image quality, especially for coated materials.

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 to activates this function.

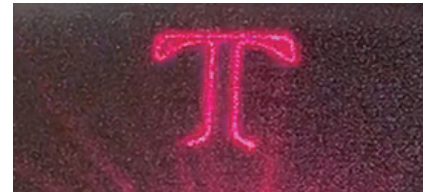
- **Mark(F2):** Starts processing. Press F2 on the keyboard to run this command.

For other marking settings, see the EZCad software manual.

5.2.4 Testing the Engraving Effect

1. Activate the laser guidance system by clicking **Red** in EZCad or hitting **F1** on the keyboard.

The design should be displayed in red light on the worktable, showing where the laser will fire.



2. 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.

3. Click **Mark** in EZCad or press **F2** on the keyboard to engrave your design. Alternatively, you can activate the laser by using the foot pad.

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, however, and be prepared to quickly extinguish a fire if necessary.

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

5 Operation

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:
 1. Release the emergency stop.
 2. Press the reset button.
 3. Resume operation following the normal operational sequence.
- If the door of the protective cover is opened, the machine stops working immediately. To resume normal operation:
 1. Close the door of the protective cover.
 2. Press the reset button.
 3. Resume operation following the normal operational sequence.

5.2.6 Engraving

1. Replace the test material with the actual material.
2. Use the foot pad or press **Mark** in EZCad 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 pad.

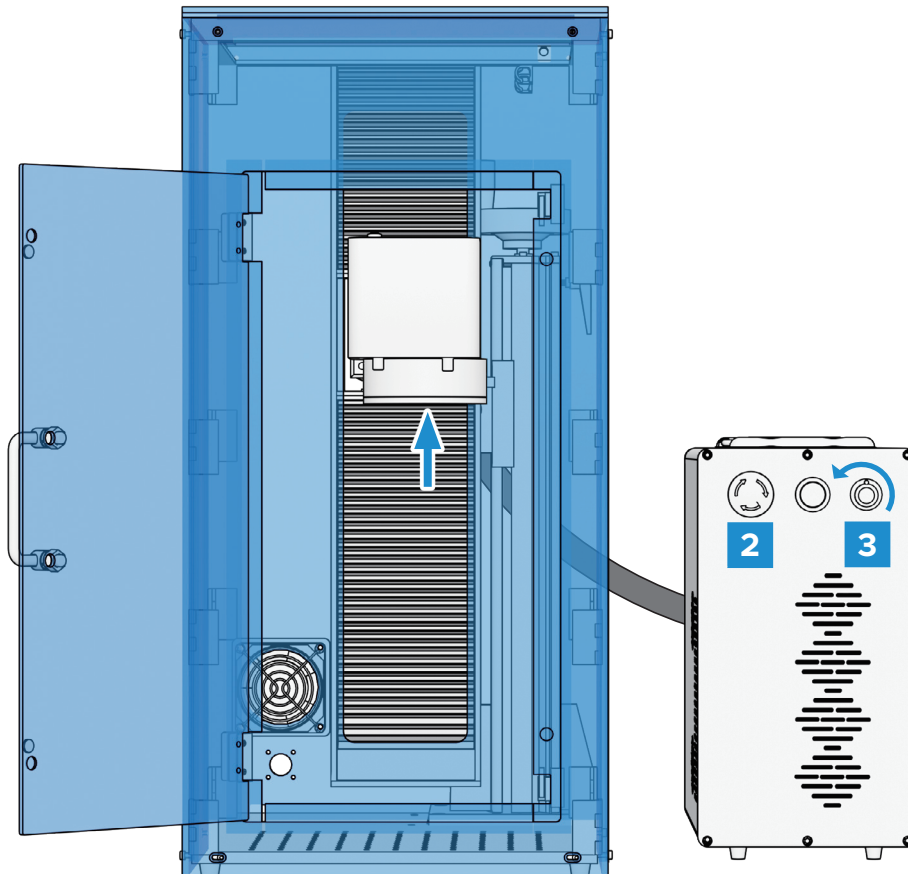


- **DO NOT** stare at the laser in operation even with protective eyewear.
- When an unexpected situation occurs, press the emergency stop button immediately to halt the machine's operation.
- Watch for possible issues like sparks or fires, however, and be prepared to quickly extinguish a fire if necessary.

5.2.7 Finishing-up

When you have finished engraving your design, deactivate the systems as follows:

1. Close the EZCad software and disconnect your computer.
2. Press the emergency stop button.
3. Turn the key counterclockwise to turn off the laser.
4. Cover the galvanometer lens.
5. 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 interior of the protective cover.



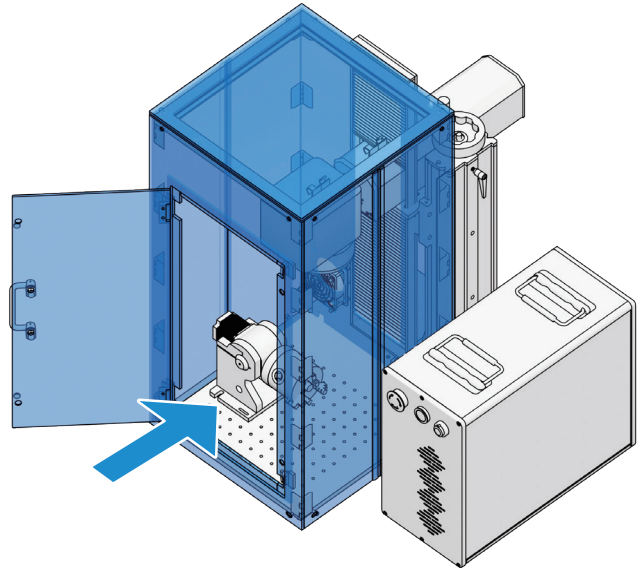
5 Operation

5.3 Rotary Axis Processing

5.3.1 Installing the Rotary Axis

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

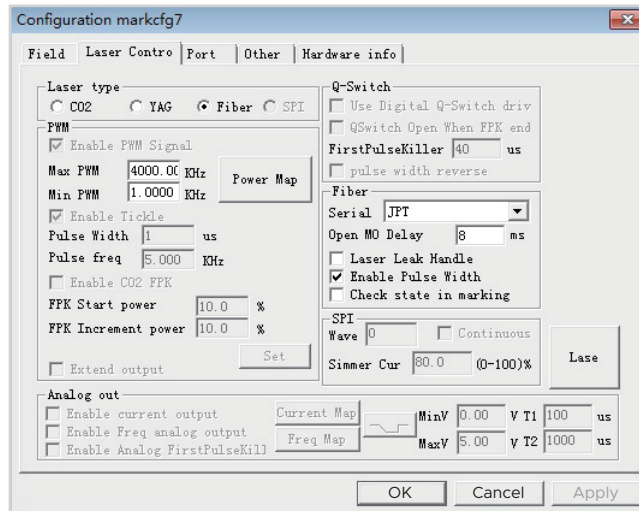
To facilitate the installation of the rotary axis, you can also remove the protective cover. Remember to replace the protective cover after installation.



2. Connect the 4-receptacle rotary cable to the rotary axis port through the bottom attachment point at the back of the protective cover.
3. Connect the 4-receptacle rotary cable to the rotary axis port.
4. Turn on the machine and then the red light guider. (See [§5.2.1 Turning on the Machine](#) on Page 33)
5. Focus the laser. (See [§5.2.2 Focusing](#) on Page 35)



5.3.2 Instructions for EZCad



1. Click **Laser** → **Rotate TextMark** in EZCad to check and make sure the rotary settings are the same as that on the picture “Laser-Rotate TextMark-param.jpg” in the USB drive.

2. Set other rotary parameters.

For detailed instructions, see the EZCad software manual.

3. Prepare your design, test and engrave.

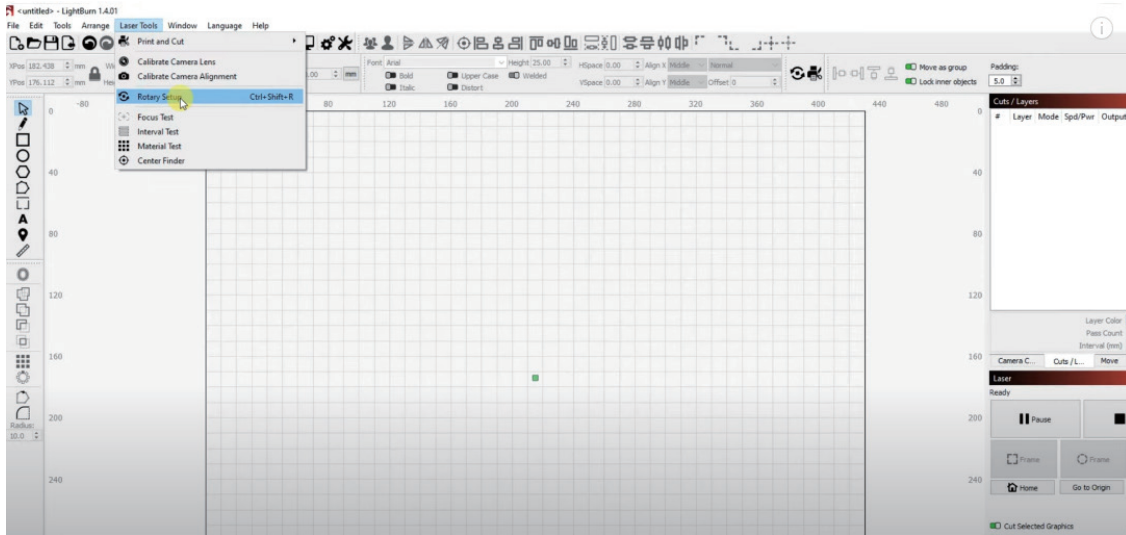
For detailed instructions, see [§5.2.3 Preparing Your Design](#) (Page 36), [§5.2.4 Testing the Engraving Effect](#) (Page 40), [§5.2.6 Engraving](#) (Page 41).

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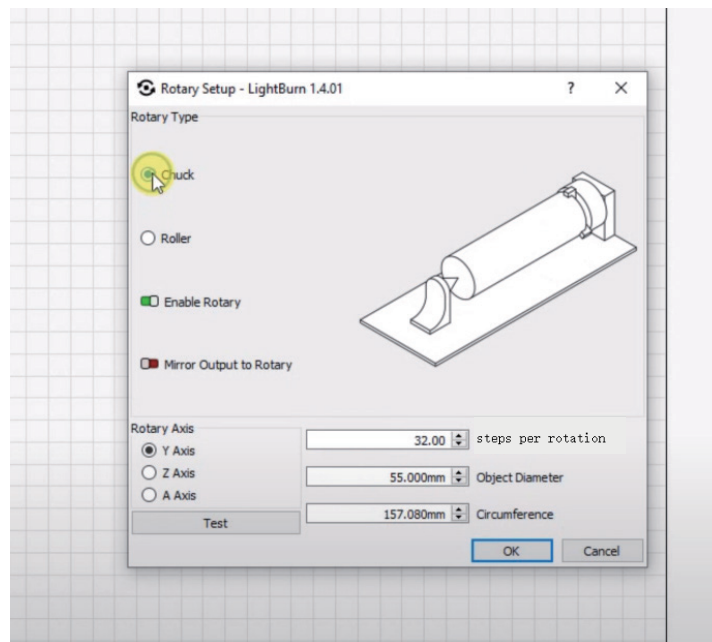
5.3.3 Instructions for Lightburn

Enabling the Rotary Axis

1. Enable the rotary axis function on your engraving software.
2. Run your engraver and control computer.
3. Choose **Rotary Setup** or press **Ctrl+Shift+R** on your engraving software.



4. Turn on **Enable Rotary** by clicking, and then choose **Chuck**.



5. Click **OK**.

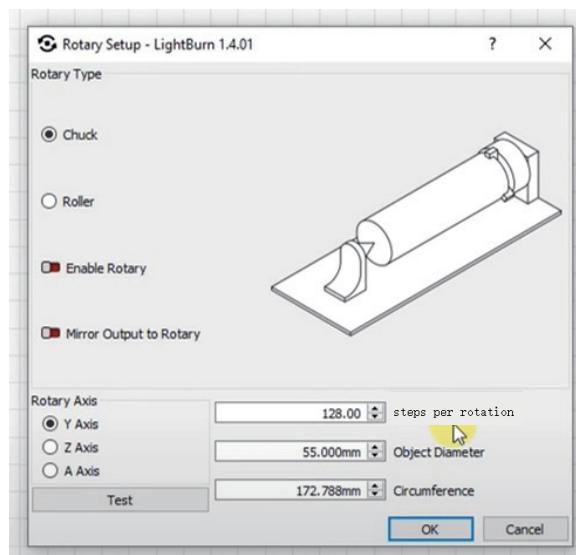
Rotation Calibration

1. Check the **steps per rotation** value in the **Rotary Setup** window of Lightburn on your control computer with the engraver on.

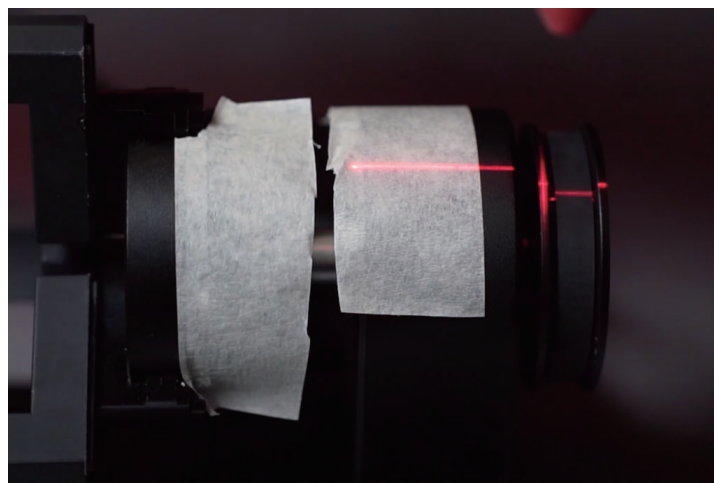
For certain engravers, this parameter could be **mm per rotation**, this manual uses **steps per rotation** for example.



For this OMTech Fiber laser engraver, use 12800 directly.

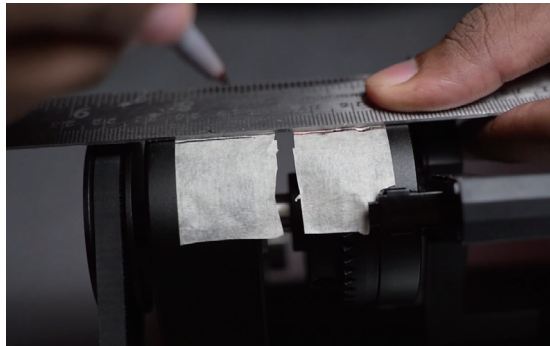


2. Stick some masking tape, one piece on the chuck as close to the mounting as possible, and the other piece on the mounting. Make sure the chuck is free to rotate.



5 Operation

3. Mark the tape. These marks indicate how much the chuck has rotated.



4. Click **Test** and observe how much the chuck has rotated.

5. Adjust the **steps per rotation** value.

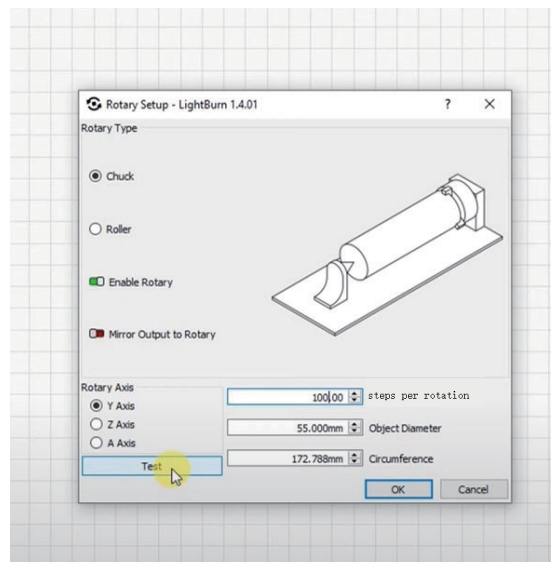
- If it has rotated beyond one rotation, decrease the **steps per rotation** value.
- If it has not completed one rotation, increase the **steps per rotation** value.

Click **Test** and observe again. Do this until you figure out the exact value for one complete rotation.

Usually, the **steps per rotation** value is a multiple of 4.



- Record the correct steps per rotation value for this product for future reference.
- Engraving without a rotary chuck uses a different value for the steps per rotation parameter. In case you engrave from without a rotary chuck to with a rotary chuck, you can directly use the recorded correct value.



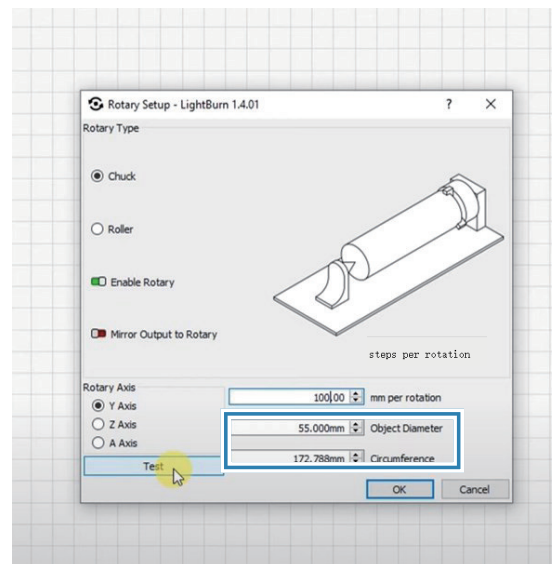
Rotary Engraving

1. Measure and fill in the **Object Diameter** parameter or the **Circumference** parameter of the object. As you fill in one parameter, the other parameter will automatically update.
 - To measure **Object Diameter**, you can use either a ruler or a caliper, but a caliper provides an accurate reading.
 - To measure **Circumference**, you can use a tape measure.

For a curved-surface object, take the average value of the diameter/circumference of the actual engraving range of the measured object (the average value of the left, middle and right of the engraving range position).



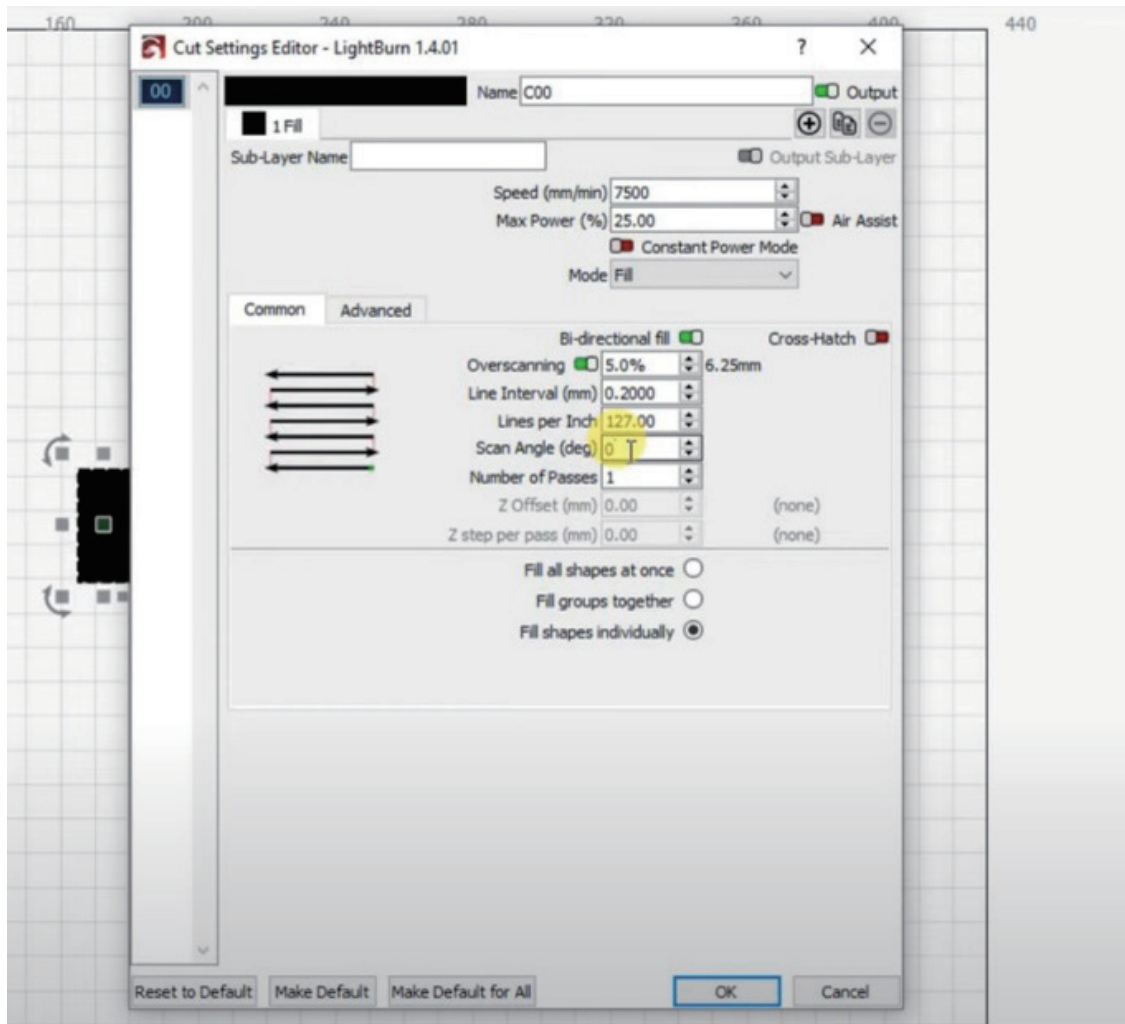
Do not forget to update the parameters of the object every time you change the object.



5 Operation

2. Ensure that you are using the horizontal scan option in layer settings by setting **Scan Angle** to **0**.

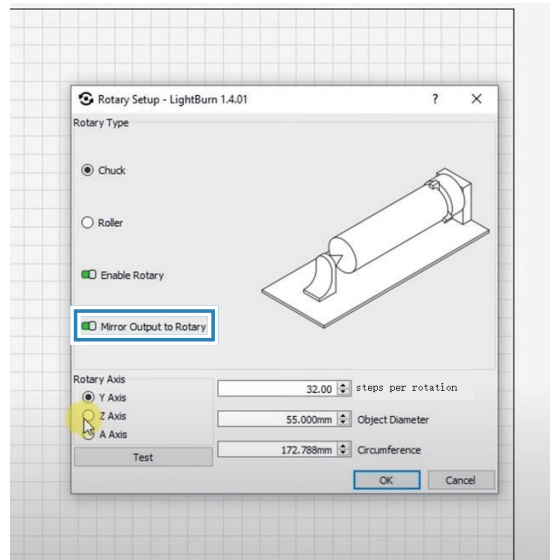
Using vertical scanning changes the chuck's directions frequently, which can cause jerking and your object might jump out of position.



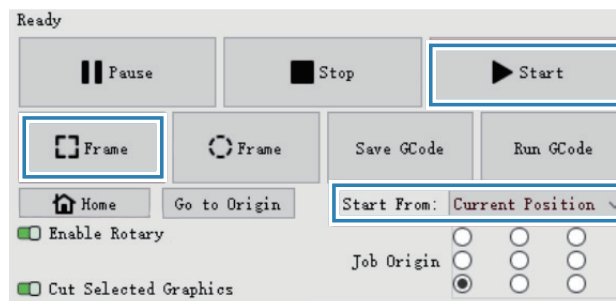
4. Create/upload your design via the software, adjusting any necessary parameters for the best result, for example, the size of the pattern, and the speed and power of the engraving.



If you notice that the engraved pattern appears mirrored, stop the engraving, turn on the **Mirror Output to Rotary** option on the **Rotary Setup** window, and try again.



5. Click **Frame** to preview the position of the engraving pattern, and then move the laser head to the desired position. It is recommended to use **Current Position** for the start position and click **Start** to engrave when you have finished setting.



6. Examine the quality of your first run and adjust the laser parameters as necessary to create your desired effect.
7. Replace the test material with the actual material.
8. Click **Start** to engrave.

5 Operation

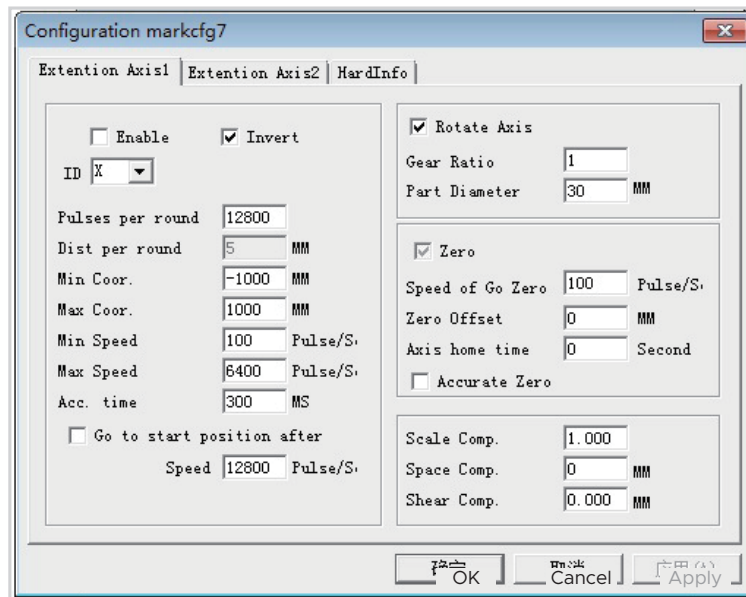
5.3.4 Finishing-up

See §5.2.7 Finishing-up on Page 42 for detailed instructions.

5.3.5 Uninstalling the Rotary Axis

When you need to engrave without the rotary chuck, do as follows to detach the rotary chuck:

1. Unplug the engraver.
2. Remove the protective cover.
3. Unplug and remove the rotary chuck away.
4. Change parameters in your software.
 - If you are using EZCad, untick the **Enable** box.



- If you are using Lightburn, do as follows:
 - a. Turn off **Enable Rotary** in the **Rotary Setup** window on your control computer.
 - b. Change the value of the steps per rotation parameter according to your engraver.

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 the process, here are some general guidelines for commonly engraved materials. Again, 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, a 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

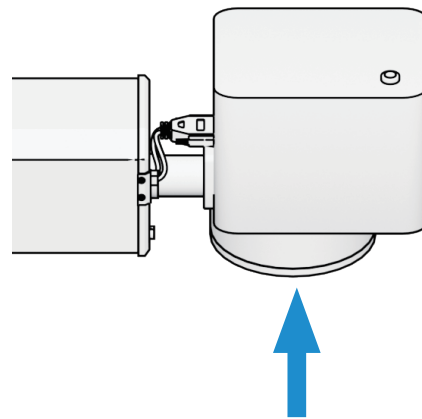
When engraving various kinds of stone, generally use moderate power and speed at low frequency. As with ceramics and metals, be mindful of the dust created (especially for repetitive industrial applications) and take similar measures to ensure the safety of users and others in the work area.

6 Maintenance



Unless otherwise specified, **ONLY** perform adjustment and maintenance of this device when the power is turned off and the power supply has been disconnected. **ONLY** allow trained and skilled professionals to modify or disassemble this device.

- 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

7.1 Common Problems

Problems	Solutions
The driver installation failure	Make sure you are using an authentic window system; if not, use another computer loaded with the right software.
	Use a different data cable.
	The computer port or its board has a problem; try with another computer.
No Laser Output	Correct the focus by adjusting the height of the laser arm.
	Correct the software parameters if they are invalid or mistaken.
	Have a technician fix or establish the connection between the laser and the mainboard.
	Have a technician fix or establish the connection between the laser and its power supply.
	If either the fiber laser source or its power supply malfunctions, have a technician replace them.
No Engraving despite Laser Output	Confirm that the material can be safely engraved with this device.
	Correct the focus by adjusting the height of the laser arm.
	Adjust the software parameters to create greater intensity.
	Have a technician check the control panel, scanning lens, and its power supply. Correct any problems or replace the part.
Other Laser Errors	Have a technician check the fiber laser source and the mainboard. Correct any problems or replace the part.
No/Too light red dots from the red-light guider	Adjust the focal length.
	If it still doesn't work, contact our customer service.
Deformed preview or engraved patterns	Check and fix the parameters. See §4.5.4 Configuring Parameters on Page 32.
	If it still doesn't work, contact our customer service.

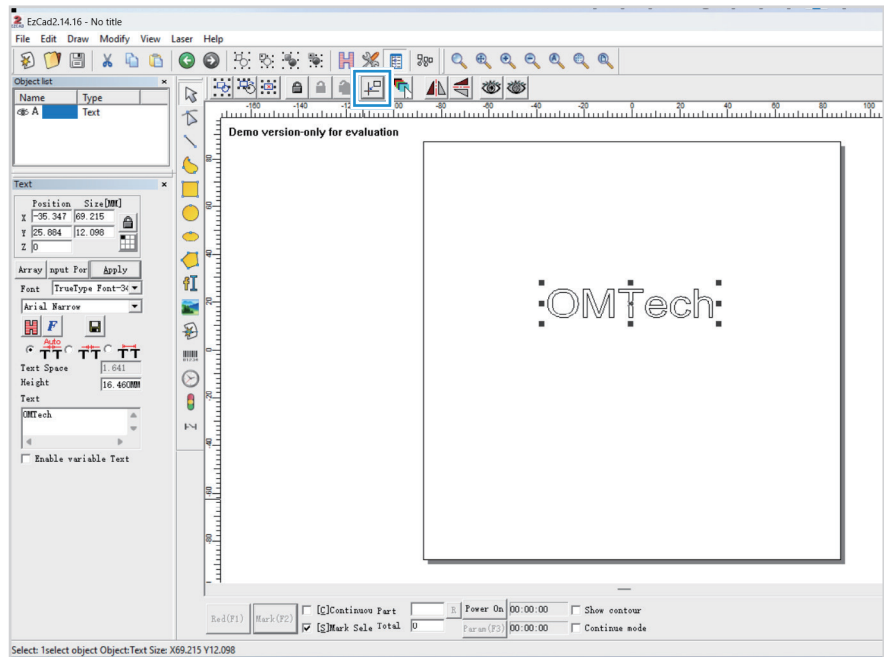
7 Troubleshooting

Problems

Solutions

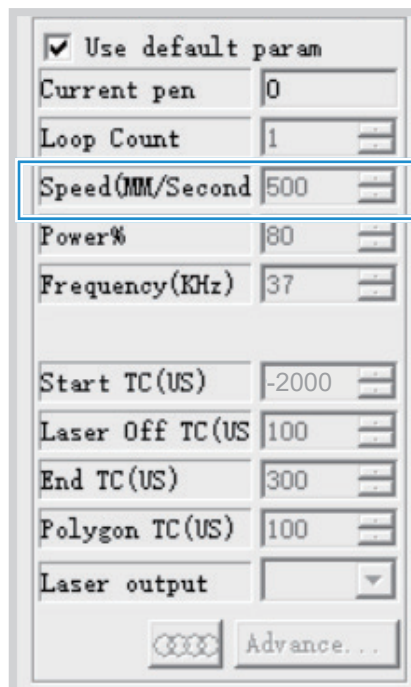
Nothing displayed on canvas board when importing text or picture

Click the practical center button. The picture or text should be in the center of the canvas.



Broken marking lines

Reduce **Speed** to less than 1000, and adjust **Start TC(US)** to **-2000** or less.



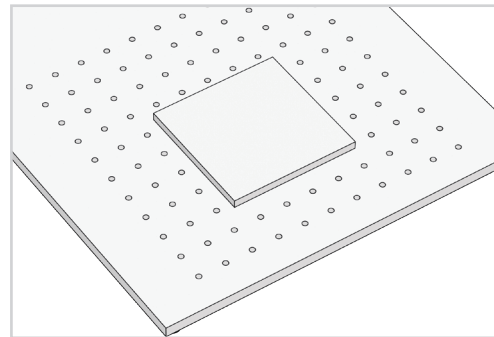
7.2 Wrong Focal Length Despite the Merged Red Dots

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.

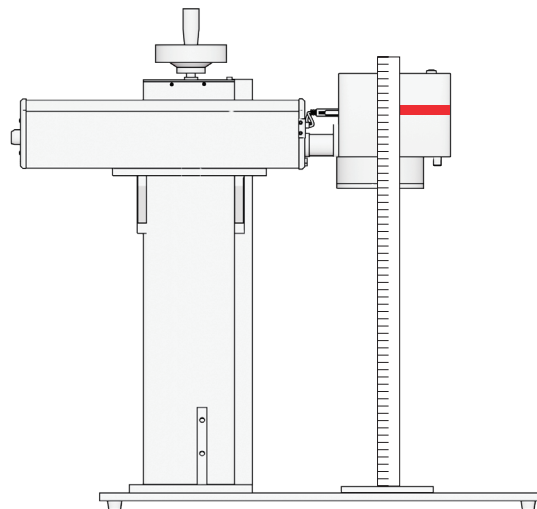
The focal length of this machine is _____ mm. This length is the distance measured from the center line of the galvanometer to the surface of the engraving material.

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

1. Place a sample material on the worktable.

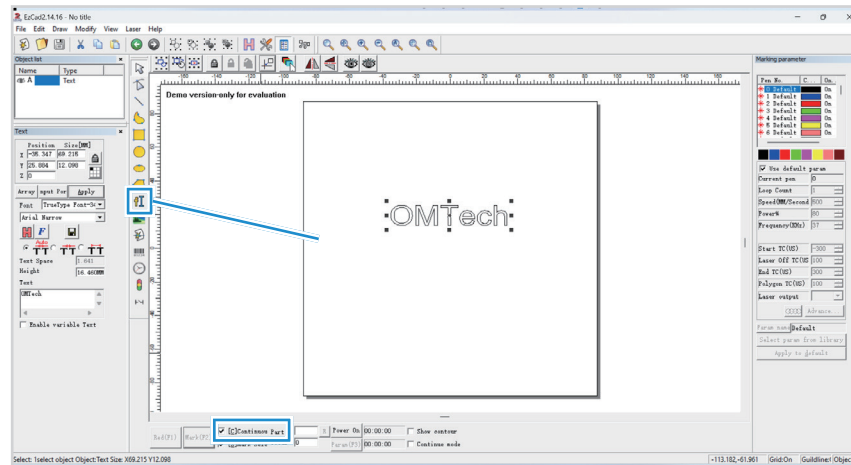


2. Turn the focus adjustment knob to move the lens head close to the best focus point.
3. Turn on the machine and the red-light guider. (See [§5.2.1 Turning on the Machine](#) on Page 33)
4. Make sure the computer is connected to the machine and start the EZCad.



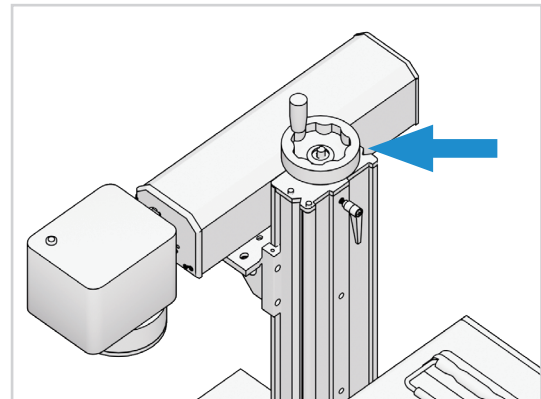
7 Troubleshooting

- Click **F1** to import the TEXT for testing, use the default parameters, and tick **Continuous Part**.

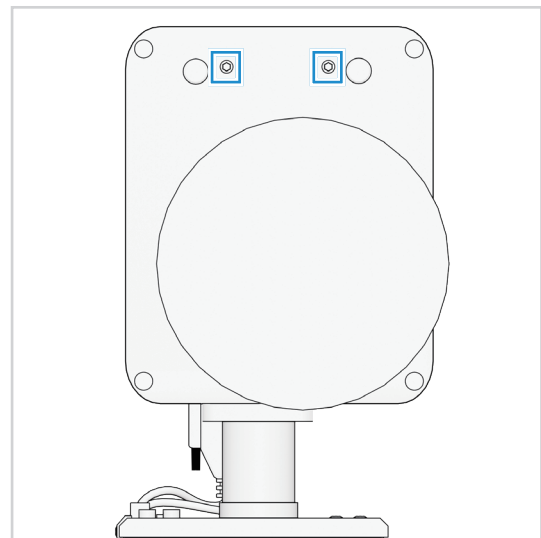


- Press **Red** in EZCad or hitting **F1** on the keyboard to ensure it'll mark on the test material.
- Click **Mark** in EZCad or press **F2** on the keyboard.
The laser should be in continuous marking state.

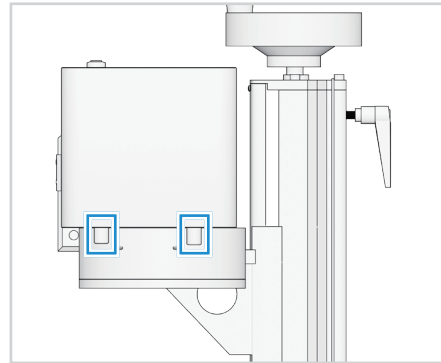
- At the same time, manually lift the laser head by turning the height adjustment knob and observe the obvious change of intensity of the laser beam. Stop when the laser beam becomes the strongest.



- Loosen the screws of the red light guiders.



10. Manually adjust the relative position of the red light guiders to make their dots merge. Tighten the screws.

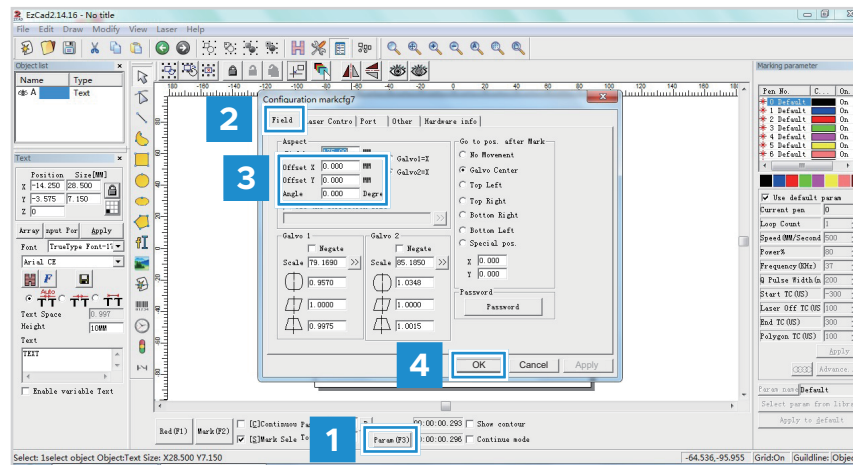


7 Troubleshooting

7.3 Inconsistency Problems

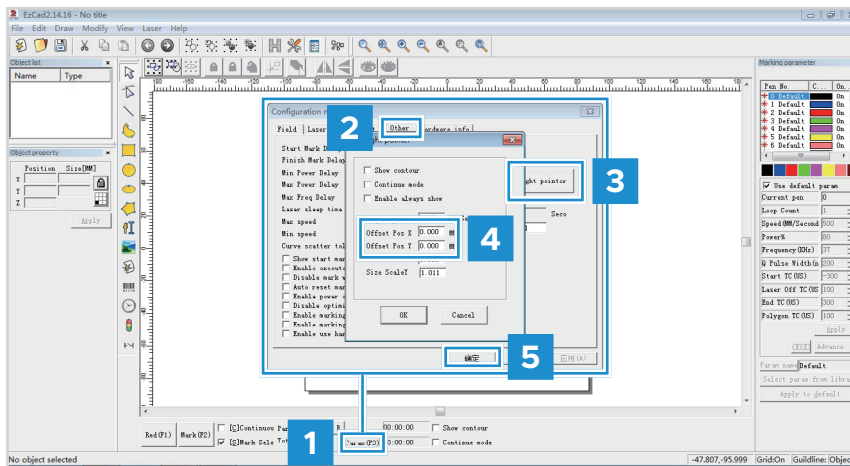
The size of the preview and the mark is inconsistent with the software display, or the preview and the mark are not horizontal or vertical but slanted.

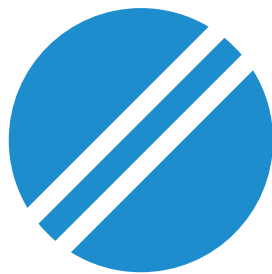
- Check and fix the parameters. See [§4.5.4 Configuring Parameters](#) on Page 32.
- If the problem remains, fix the parameters.
 - a. Select **Parameter (F3)** → **Field**.
 - b. Input numbers in **Offset X**, **Offset Y** or **Angle** according to the actual deviation number based on the measurement with a ruler.
 - c. Exit after confirming.
- If the problem remains, contact our customer service.



The red-light preview is inconsistent with the actual engraving position.

- Check and fix the parameters. See §4.5.4 [Configuring Parameters](#) on Page 32.
- 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.





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