

LYF-60W

MOPA Laser Marking Machine

User Manual



Read Carefully Before Use
Keep for Future Reference

PREFACE

Thank you for choosing our laser equipment.

This fibre 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.

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1. Introduction

1.1 General Information

This manual is the designated user guide for the installation, setup, safe operation, and maintenance of your fibre laser marking machine. It is divided into six 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 fibre laser marker works by emitting a powerful laser beam from its fibre laser source, sending that beam through a fibre optic cable, focusing its power through the galvanometer lens, and using this focused light to etch designs into certain substrates.

This fibre laser marking machine uses a nanoscale fibre 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 10–75% 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.

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 with regard to the laser beam.



These items address similarly serious concerns with regard to electrical components.



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.

1.3 Designated Use

This machine is intended for use engraving signs and other consumer products on applicable substrates. This laser can process a wide variety of metals including steel, aluminium, titanium, brass, copper, tungsten, carbide, and chrome. It can also be used with stone and some hard plastics such as acrylic. (See §§2.5 & 4.3 for further details.) Use of this system for non-designated purposes or materials is not permitted.

The system must be operated, maintained, and repaired by personnel familiar with the field of use and the dangers of the machine and the material being engraved including its reflectivity, conductivity, potential for creating harmful or combustible fumes, etc.

Laser beams are dangerous. The manufacturer and/or seller bear(s) no responsibility and assume(s) no liability for any improper use of this device or for any damage or injury arising from such use. The operator is obliged to use this fibre laser marker only in accordance with its designated use, the other instructions on the device and in its manuals, and all applicable local and national laws and regulations.

1.4 Technical Specifications

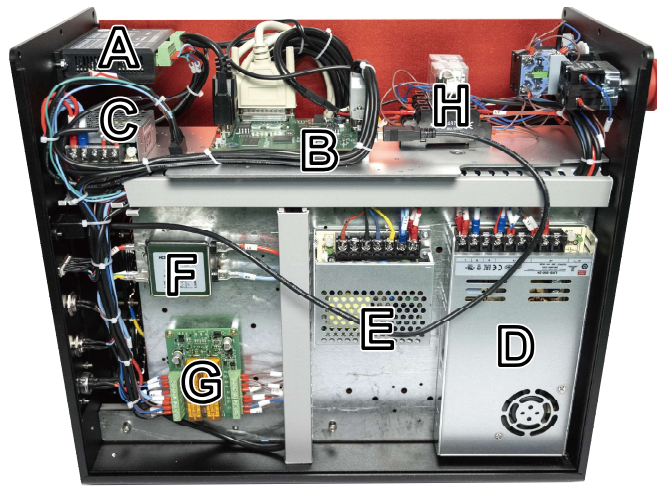
Model		LYF-60W	
Input Power		220–240 V~ 50 Hz	
Rated Power		60W	
Expected Service Life		100,000 hr.	
Laser Wavelength		1064 nm	
Laser Frequency		1–4000 kHz	
Processing Area		6.9×6.9 in.	17.5×17.5 cm
Max. Marking Speed		275.6 ips	700 cm/s
Min. Marking Depth		0.0002 in.	0.005 mm
Max. Marking Depth on a Single Pass		0.003 in.	0.07 mm
Min. Line Width		0.006 in.	0.15 mm
Precision		±0.1 µm	
Required Operating Environment	Max. Humidity	<70%	
	Temp. Range	40–95°F	5–35°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

1.5 Components



Main Parts

- A. Support Column**—The support column holds the laser arm and includes a precise graduated rule for quickly adjusting height to work with different materials and thicknesses.
- B. Height Adjustment Knob**—This wheel moves the laser arm up and down for the correct alignment across different materials and thicknesses.
- C. 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.
- D. Protective Covering**—This 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.
- E. Laser Cable**—This transmits the laser beam from its source to the galvonometric lens.
- F. Worktable**—This platform holds the target material, with optional positioning bars to ensure precise alignment.
- G. Main Tower**—This houses the fibre laser source, its mainboard, and various connections.



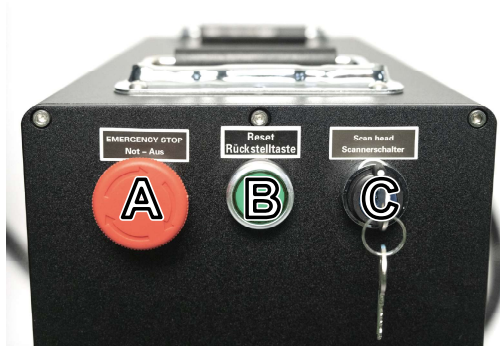
Main Tower

- A. Rotary Axis Driver**—This device controls the stepper motor of the rotary axis.
- B. Mainboard**—This circuit board works with your software to control the laser.
- C. Mainboard Power Supply**—This device draws 0.5A to convert standard electricity to 5V 3A power for the mainboard.
- D. Laser Power Supply**—This device draws 6.8A to convert standard electricity to 24V 14.6A power for the fibre laser source.
- E. Galvanometer Scanner Power Supply**—This device draws 2.5A to convert standard electricity to 15V 2A power for the scanning lens.
- F. EMI Filter**—This device helps protect the sensitive electronics in the mainboard from interference from the power supply.
- G. Alternating Current Contactor**—This device 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**—This device 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.

Connection Inputs

- A. Laser Cable**—This transmits the laser beam from its source to the galvanometric lens.
- B. USB Cord Input**—This port connects the device to your control computer.
- C. Interlock & Fan Cable**—This cable input enables the optional to connect the interlock and exhaust fan for a protective covering.
- D. Foot Pedal Cord Input**—This port enables optional pedal control of laser activation to free your hands for manual adjustment of the target material.
- E. Rotary Axis Cord Input**—This port enables use of a rotary axis engraver with a 4-pin connection cable. (Compatible rotary axis devices are sold separately.)
- F. Power Cord Input**—This 3-pin port connects to the device's standard 3-prong power cord.
- G. Ground**—This wire grounds this machine. For specific grounding procedures, see **3.3 Electrical Grounding**.





Power Buttons

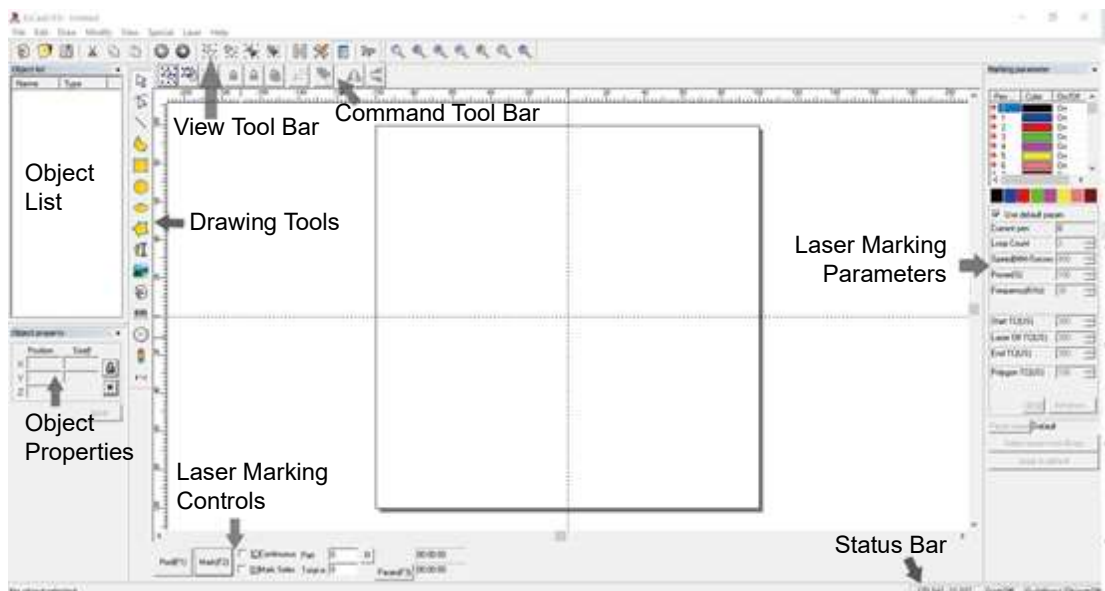
A. Emergency Stop—Because of the risk of fire and other hazards during engraving, this engraver includes a large and easy-to-reach emergency stop button near the control panel. Release it first during startup. Press it down to stop the laser instantly.

B. Reset—Activates the 24V relay inside the main tower that connects or cuts 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.

Warning

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 press down the emergency stop button and turn the fiber laser key to **OFF** before pressing the reset button.

C. Scan Head—Activates the laser source. Insert your key and turn this after releasing the emergency stop during normal startup. As to normal shutdown, press down the emergency stop first and then turn the key.



Control Computer

This fibre laser marker is controlled by the included EZCad software, which must be installed on a compatible computer to direct the laser. See its separate manual for full details on its components and use. Some features which are particularly important to note include the following parameters and controls:

- **Loop Count**—Specifies how many times the laser beam will repeat its path, creating greater contrast in the marked image.
- **Speed**—Specifies the speed of the beam in millimetres 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. Note again that running the machine at greater than 80% power will shorten its service life and 10–75% is recommended for most applications.
- **Frequency**—Specifies the laser's frequency in kilohertz (kHz), with higher frequency producing a denser laser mark 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.

2. Safety Information

2.1 Disclaimer

Your engraver may differ somewhat from those shown in this manual due to options, updates, etc. Please contact us if your marking machine came with an outdated manual or if you have any other questions.

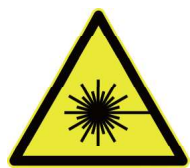
2.2 General Safety Instructions

- 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** operate this device continuously for more than 5 hours. Stop every 5 hours for at least ½ hour.
- **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 brigade's phone number is clearly displayed nearby. In the case of a fire, cut electrical power before dousing the flame. Familiarise 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.



2.3 Laser Safety Instructions

When used as instructed, this machine comprises a Class 1 laser system safe for users and bystanders. However the invisible engraving laser, the laser tube, and its electrical connections remain **extremely** dangerous. Used or modified without care, they 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

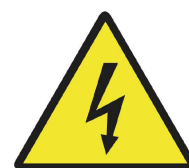
As such,

- **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 fully close the protective casing. It is advisable to further 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.
- 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 fibre source's housing opened, 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.

2.4 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 grounding 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 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 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 5–35°C (40–95°F). 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 specialised 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.



2.5 Material Safety Instructions

- Users of this fibre 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 fibre 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.
- **DO NOT** ever under any circumstances use this laser engraver if the exhaust system is not working properly. Always ensure that the exhaust fan can remove the dust and gas produced by the engraving process in accordance with all applicable local and national laws and regulations. Immediately stop use if the exhaust fan or vent pipe malfunctions.
- 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:

- Aluminium
- 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 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.

See §4.3 for the recommended parameters for the most commonly engraved materials.

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, Cintra, 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

3. Installation

3.1 Installation Overview

A complete working system consists of the fibre laser source, the laser arm with the galvanometer lens, a computer (not included) with engraving software (included), and all applicable connection cables. A support column, workbed, and protective case come included to assist your work. 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.

3.2 Location Selection

Prior to assembling your fibre laser marker, select an appropriate location for its use.

Be sure that it meets all of the requirements discussed in the Safety Information above. The location should be stable, level, dry, and climate controlled to ensure an ambient temperature 5–35°C and an ambient humidity under 70%. In particular, the temperature and humidity together should not be close to the dew point. It is also advisable 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.

3.3 Electrical Grounding

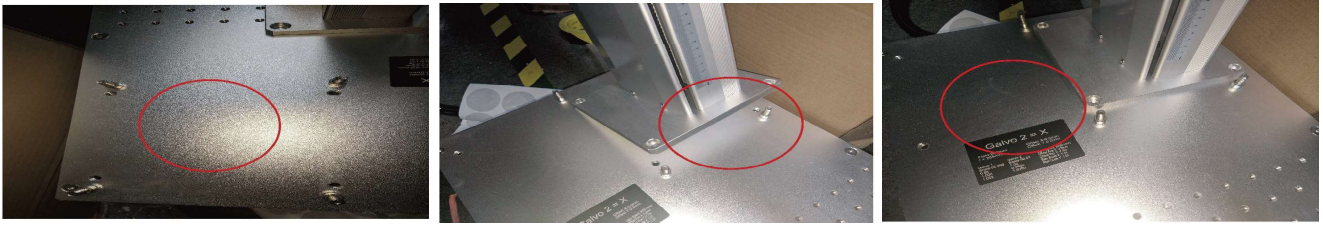
This device employs a powerful laser. As discussed in the Safety Information above, it is extremely high voltage and potentially dangerous, so users must securely ground it to avoid the buildup of static electricity. Using a standard 3-prong outlet will provide sufficient grounding. If you do not have access to a 3-prong outlet, you **MUST** use the grounding cable and ensure its proper connection. The far end of the cable should be securely connected to a metal rod driven at least 3 metres (8 ft.) deep into soil located at least 1.5 metres (5 ft.) from the machine. The resistance along the line should be no greater than 5Ω.



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.

3.4 Assembly Instructions

Step 1. Install the support column onto the worktable using the four mounting holes and the provided bolts.



Step 2. Install the laser arm onto the support column using the provided bolts.



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

Align the four holes on the housing with the holes in its mounting bracket.

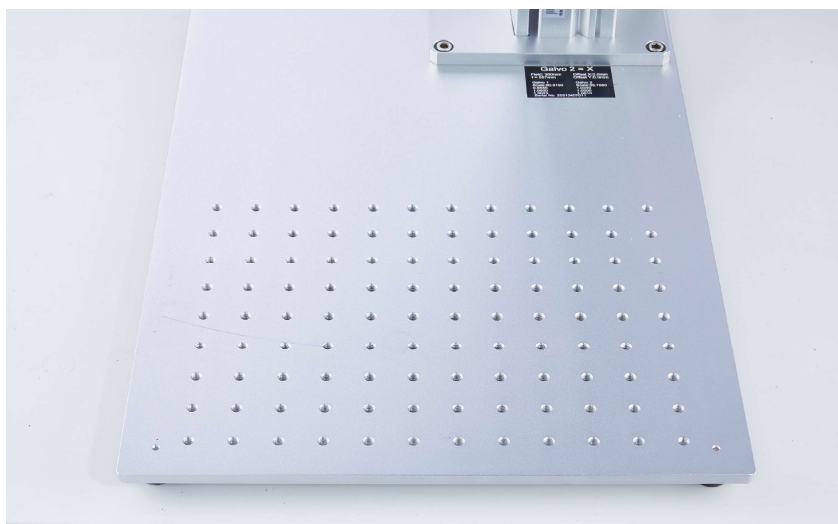
Tighten it into place with the included bolts.

Turn the knob on top of the support column to adjust the height of the laser arm to about 24 cm, as marked on the column's ruler. This will position the lens to be nearly in focus with most common materials.

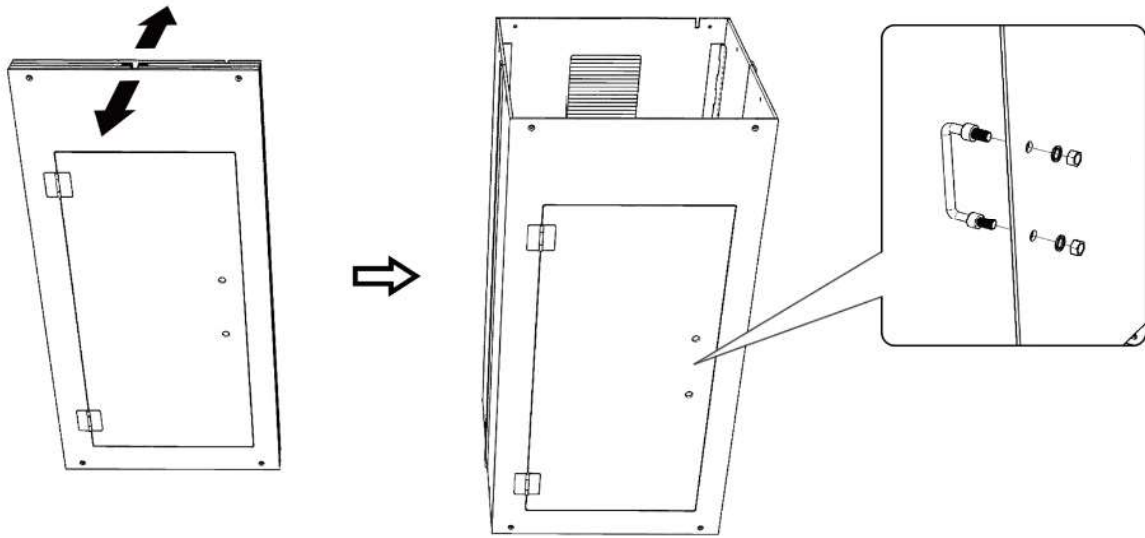
Step 3. Make all necessary connections between the various components.



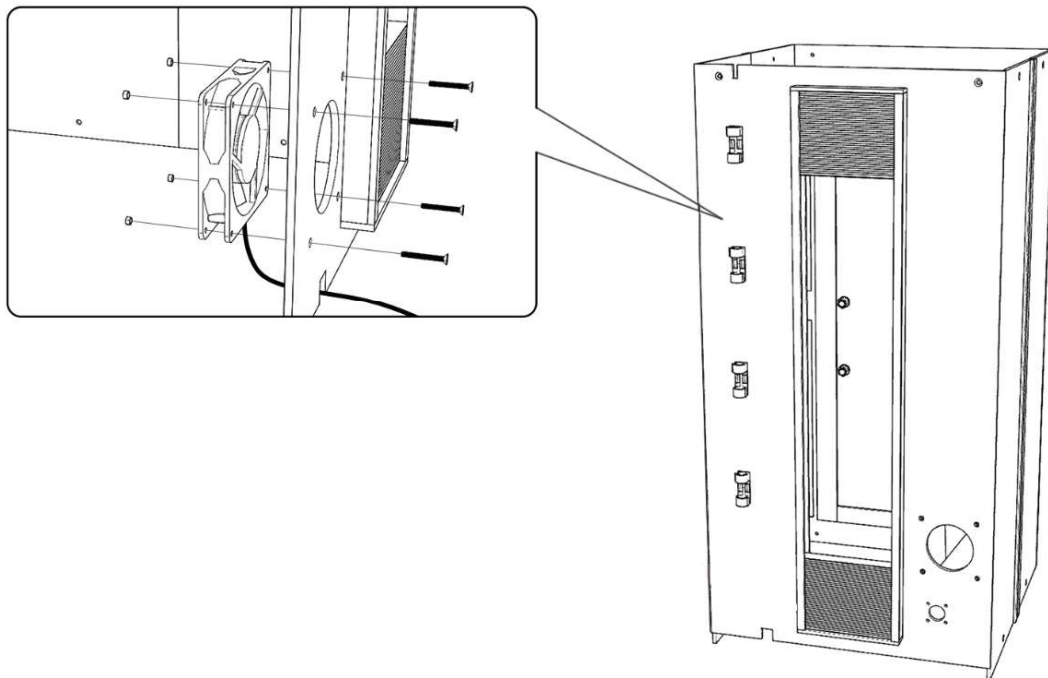
Step 4. The positioning bars can be installed onto the worktable and left in place for all your projects or can be moved around to suit different projects. Simply place the bars over the holes that will form the outer edge of the target material and fasten them into place with the provided bolts.



Step 5. Affix the door handle to the protective cover with the provided M10 nuts and washers.



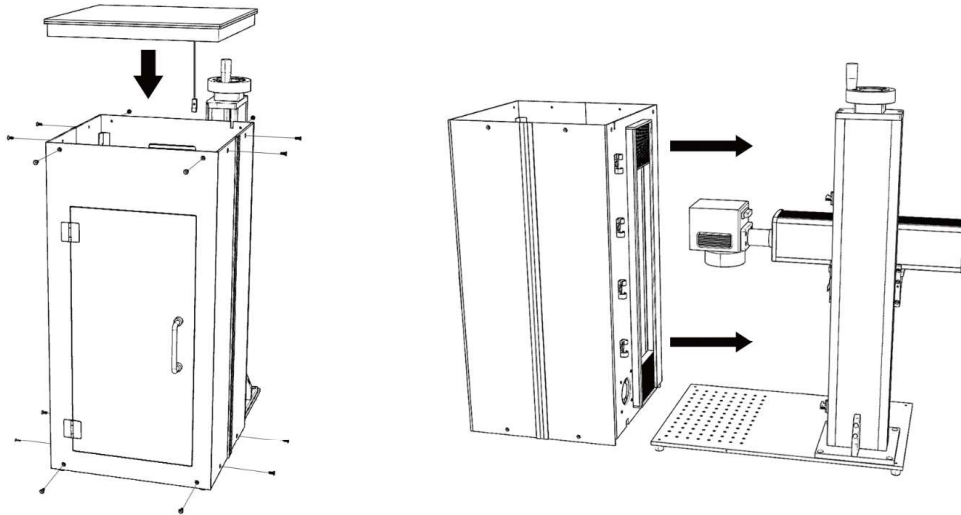
Step 6. Affix the fan to the protective cover with the provided M4×18 bolts and the M4 nuts.



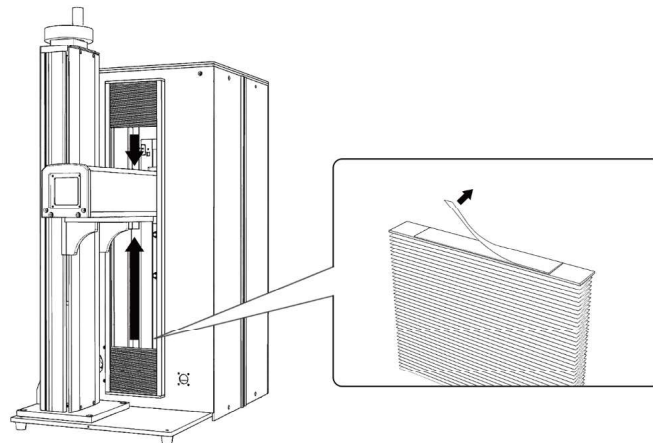
Step 7. Feed the fan's power cord through the attachment points at the back of the protective cover.

Step 8. Place the top cover onto the protective housing and secure them together using the provided M4×10 bolts.

Step 9. Affix the protective housing to the base of the workbed using the provided M4×10 bolts.



Step 10. Remove the accordion strip's adhesive covering and secure it to the main arm of the engraver.



Step 11. Attach the interlocks to the part of the cover as shown. Peel off the backing of one interlock and 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. Repeat the process for the other interlock.



To connect the interlocks and the fan,

- a. Connect 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.

Step 12. Install the provided exhaust pipe directly to the fan. The pipe can be expanded to a full length of about 1.5 metres (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.

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, noxious, or even deadly fumes.

3.5 Control Computer Installation

See the separate engraving software manual for details on the requirements for the control computer. The control computer should not be placed more than 4.5 metres (15 ft.) away from the fibre laser marker in order to avoid possible interference to the signal in its line. Familiarise yourself with your software's image design features and laser control settings before beginning operation of the laser itself.

4. Operation

4.1 Operation Overview

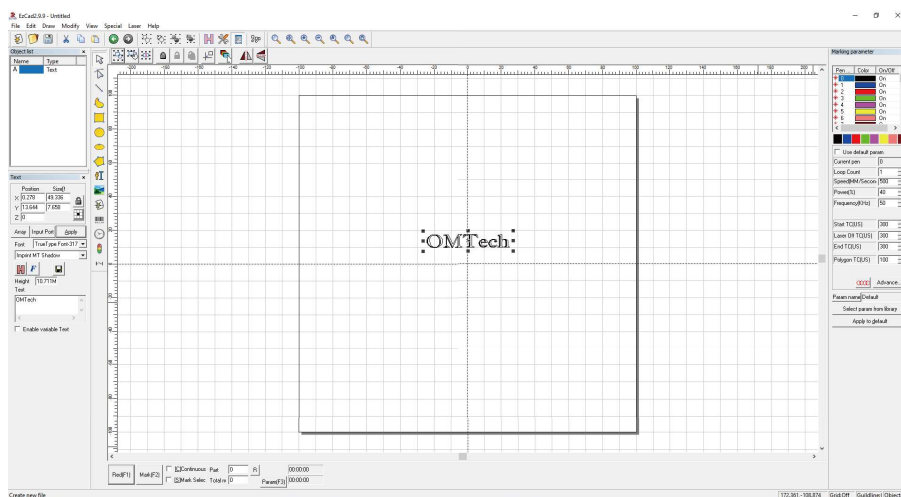


Operate this laser marking machine only in accordance with all the instructions provided in this manual. Failure to follow the proper guidelines detailed here can result in property damage and personal injury.

This section will address only some of the options and features provided by the operation software. Before beginning to use the machine, make sure that you have read this entire manual (particularly the Safety Information above), the separate software manual, and any and all warnings provided on the machine itself.

4.2 General Operation Instructions

Step 1. Load or create a design in EZCad.



Step 2. Put on your protective eyewear. Ensure that anyone else who might be exposed to direct or reflected laser beams is also wearing protective eyewear as described in §2.4.



Step 3. Release the emergency stop if it has been pressed. Insert your passkey and turn clockwise by 90°, and then press the reset button.

Activating them out of order may cause electrical hazards as the separate power supplies are grounded in order. Do not press the buttons too quickly. Give each power supply time to come on line, activating its fans. 3 seconds is sufficient.



To reduce the risk of electric shock, once the engraver is on, try to touch its components with only one hand at a time.



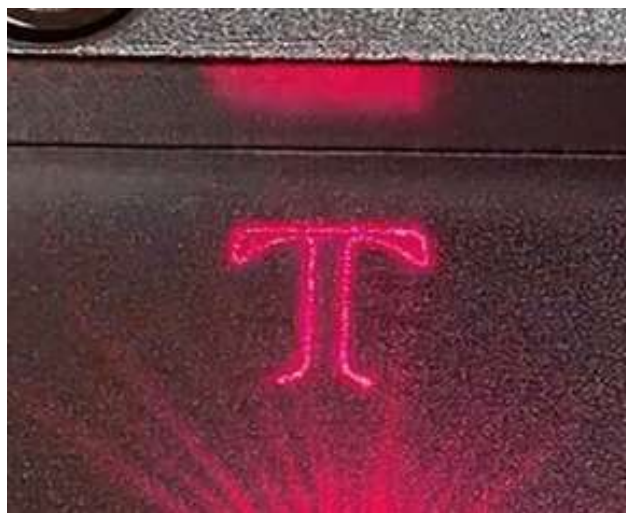
Step 4. If you previously disconnected the control computer, reconnect it via the USB cable now. If your computer is already connected and EZCad is already running, restart it now to establish a connection between the computer and the laser's control board.

Step 5. Customise 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. Again, 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.

Step 6. Activate the laser guidance system by pressing **Red** or hitting **F1** in EZCad. The design should be displayed in red light on the worktable, showing where the laser will fire.



Step 7. Place an expendable piece of the material to be engraved in the location shown by the laser guidance. Do not use a different target as the galvanometer lens automatically focuses at different heights for different materials. Being careful that the protective casing is fully sealed and no part of your body is near the worktable or laser path, press **Mark** or hit **F2** in EZCad to fire the test laser. Alternatively, you can activate the laser by using the foot pad.

Step 8. The laser is invisible but will create a buzzing noise and sparks and begin engraving when it is correctly focused on your test material. If no sparks are emitted, the laser is out of focus. Continue to fire it while adjusting the laser arm up or down using the height adjustment wheel on the support column. Adjust the case's accordion strips accordingly. Small, consistent sparks will be emitted at the marking point when the beam is correctly in focus. Make a note of the correct height on the support column's ruler for future reference.



In Focus



Out of Focus

- Step 9.** Replace the test material with the actual material. Use the foot pad or press **Mark** or hit **F2** in EZCad to engrave your pattern. Again, do not stare at the laser in operation even with protective eyewear. Watch for possible issues like sparks or fires, however, and be prepared to quickly extinguish a fire if necessary.
- Step 10.** Examine the quality of your first run and adjust the laser parameters in EZCad as necessary to create your desired effect. 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.
- Step 11.** When you have finished engraving your design, close EZCad and then turn off the laser marking machine by deactivating the systems in order, first the emergency stop and then the passkey.
- Step 12.** Cover the galvanometer lens and fully clean the workbed and interior of the protective casing. For best results, disconnect your fibre marking machine from its power supply between uses. Unplug it or turn off its intermediary surge protector.

4.3 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:

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.

Aluminium: Bare aluminium 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 anodisation or producing a deep engraving that can be darkened by using black epoxy or other filler. Anodised aluminium 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 semidurable 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 aluminium.

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.

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.

5. Maintenance

5.1 Maintenance Overview



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.

5.2 Regular Maintenance Procedures

- 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 protective covering with a soft cloth when dust or debris become visible.
- 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 other parts yourself.

5.3 Troubleshooting Guidance

Potential Problems	Possible Solutions
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 fibre laser source or its power supply have worn out, 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 fibre laser source and the mainboard. Correct any problems or replace the part.

5.4 Disposal 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 Canada and the US may have similar regulations. Contact your local authorities or dealer for disposal and recycling advice.

Contact Us

Thank you for choosing our laser equipment for your home or shop! For a .pdf copy of the latest version of this manual, use the appropriate app on your smartphone or other device to scan the QR code to the right.

Come join the OMTech community at our official laser group on Facebook or visit the company forums at **omtechlaser.com**! Check our YouTube channel for helpful hints and instructional videos. If you encounter any problem regarding your engraver, do not hesitate to contact customer service with your order number at **help@cs-supportpro.com** or **techsupport@omtechlaser.com**. Our teams will respond within 24 hours to make things right. You can also reach us Monday to Friday at (949) 539-0458 between 8 am and 4:30 pm PST.

Thank you and we hope you will choose us again for all your laser needs!



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