

LYF-175S

Split Fiber Marking Machine

User Manual



Read Carefully Before Use
Keep for Future Reference

PREFACE

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.

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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 fiber 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 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 10–75% 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 does not have a protective housing. It is thus recommended to use a special room or to raise protective screens around the work area. 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.

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, aluminum, 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 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 fiber 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

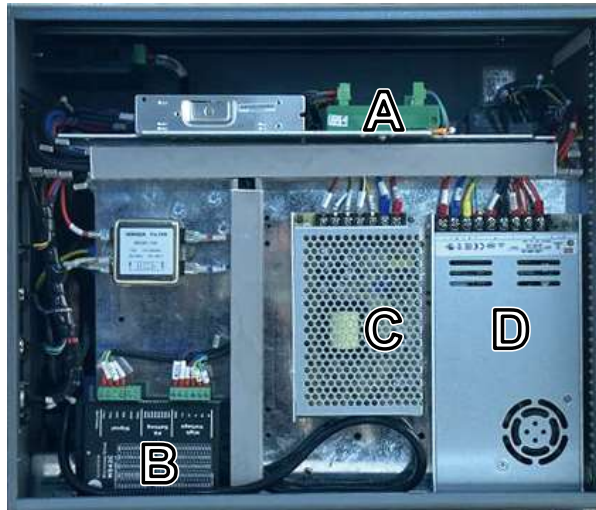
Model		LYS-175S	
Req. Voltage		110–120 V~ 60 Hz	
Max. Input Power		800 W	
Rated Power Range		10–50 W	
Expected Service Life (MTTF)		100,000 hr.	
Laser Wavelength		1064 nm (1.064 μ m)	
Laser Frequency		1–600 kHz	
Processing Area		6.9×6.9 in.	175×175 mm
Max. Marking Speed		275.6 ips	7000 mm/s
Max. Marking Depth (Single Pass)		0.004 in.	0.1 mm
Min. Marking Depth		0.0002 in.	0.005 mm
Min. Line Width		0.006 in.	0.15 mm
Autofocus Height Range		3.2–19.6 in.	80–500 mm
Precision	Laser	±0.000004 in.	±0.1 μ m
	Autofocus	±0.004 in.	±0.1 mm
Req. Operating Environment	Max. Humidity	70%	
	Temp. Range	55–83°F	13–28°C
Req. Operating Software		EZCad or LightBurn	
Mounting Bracket	VESA Sizes	50×50, 75×75, 100×100	
	Capacity	17.6 lb.	8 kg

1.5 Components



Main Components

- A. Handles**—These handles can be used to more easily move and reposition the tower when power is disconnected. Never move or adjust the tower during operation.
- B. Main Tower**—This houses the fiber laser source, the machine’s motors and power supplies, and various connections.
- C. Galvo Lens Head**—The high-speed galvanometer scanning head focuses the laser beam to a fine point, directing it to the proper locations on the target material during engraving using internal motorized mirrors. It also houses the laser’s mainboard and mainboard power supply. The built-in camera lets you position everything neatly in your software. The two buttons control the manual focus laser (left) and the built-in light (right).
- D. Laser Cable**—This transmits the laser beam from its source inside the main tower to the collimator in the laser arm.
- E. Workbed**—This platform holds the target material, with optional positioning bars to ensure precise alignment.
- F. Height Adjustment Knob**—This wheel should be unnecessary because of the automated focusing and movement controls on the tower but can also be used to move the laser arm up and down to focus the laser at the correct distance for different kinds and thicknesses of material.
- G. Laser Arm**—This holds the galvo head in place on the support column, elevating it up or down to attain the proper focus. The arm also houses the laser’s collimator, organizing the laser after its transit through the laser cable.
- H. Support Column**—The support column holds and moves the laser arm and includes a precise graduated rule for reference or when manually adjusting the height of the galvo head to work with different kinds and thicknesses of material.
- I. Mounting Bracket (Optional)**—This bracket can be attached to the support column to hold a small computer screen or touch screen beside the laser.



Main Tower

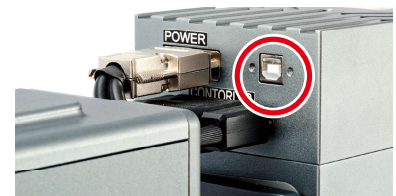
- A. **Lift Motor**—This stepper motor controls the automated movement of the laser arm up and down the support column.
- B. **Rotary Motor**—These stepper motor helps control attached rotary axes.
- C. **Galvanometer Power Supply**—This device converts standard electricity to the DC voltage needed for the motorized mirrors inside the galvo head.
- D. **Laser Power Supply**—This device converts standard electricity to the DC voltage needed for the fiber laser source.
- E. **Fiber Laser Source (Inside Casing)**—This component creates the laser beam and transmits it to the fiber optic pathway to the collimator in the laser arm.

Connection Inputs

- A. **Laser Cable**—This transmits the laser beam from its source to the collimator in the laser arm.
- B. **Grounding Cable Input**—This bracket can be used to enable an optional secondary grounding cable or the necessary primary grounding cable when well-grounded 3-prong outlets are unavailable.
- C. **DB15 Input**—This male 15-pin connection should be used to receive interlock signals from compatible protective enclosures (sold separately). When the enclosure is opened, the signal will then immediately cut power to the laser to prevent damage or injury from reflected beams.
- D. **Foot Pad Input**—This 2-pin connection should be used to receive firing commands from the provided foot pad trigger.
- E. **Rotary Axis Cord Input**—This 4-pin connection can be used to control compatible rotary axes (sold separately). Place the rotary axes on the workbed beneath the galvo head, connect its cable here, and then enable rotary control through your software.
- F. **Power Cord Input**—This 3-pin connection connects to the device’s standard 3-prong power cord.



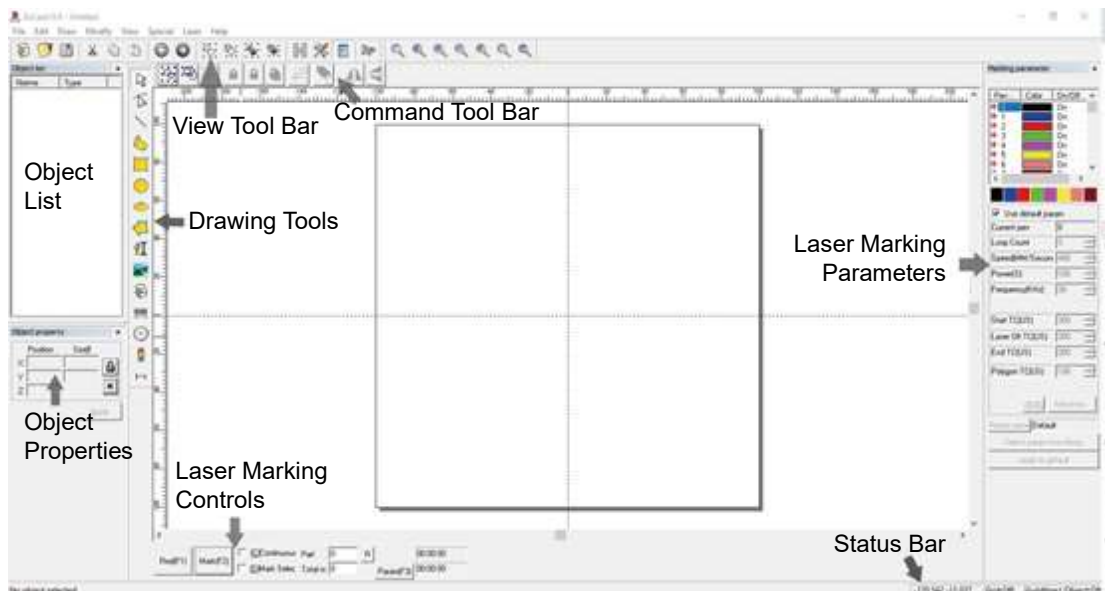
The control computer’s USB cable connects to a port on the back of the galvo head, which holds the engraver’s mainboard.





Control Panel

- A. Emergency Stop**—This button immediately cuts all power to the laser in the event of an emergency. Rotate it up first during startup and push it down last during shutdown.
- B. Galvo**—This lock controls power to the motorized mirrors inside the galvo head on the laser arm. Unlock it second during startup and relock it second during shutdown.
- C. Laser**—This button activates the fiber laser source. Press this last during startup and first during shutdown.
- D. Autofocus**—This button activates automatic focusing of the laser. Only use it once your material has been placed under the laser.
- E. Up**—This button moves the laser arm up.
- F. Down**—This button moves the laser arm down.



Control Computer

This fiber 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 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. 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 create a red light preview of the current design.
- **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.

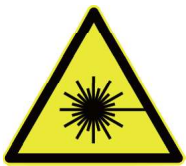
2.2 General Safety Instructions

- 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 24 hours. Stop every 24 hours for at least 30 minutes.
- **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.



2.3 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

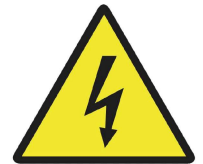
As such,

- **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.
- The red light guidance is itself a Class 2 laser. Do not stare directly into the beam, aim it at others, or allow anyone to view it through focusing optics.

- **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 fiber 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 controls in the correct order. The mainboard, galvanometer, and laser have separate power supplies that are grounded in order. Activating them all 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 55–82°F (13–28°C). The ambient humidity should not exceed 75%.
- 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.



2.5 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

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 special 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 fiber 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 and workbed come included to assist your work. Users can also configure other additional accessories (such as a rotary axis or nearby monitor) 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 fiber 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 55–82°F and an ambient humidity under 75%. 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 department'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 Setup Instructions

- Step 1.** Carefully remove the packaging material from around your engraver. You may keep them to ease future transport, but keep them inaccessible to any small children or pets.
- Step 2.** Confirm that you have received the laser tower, galvo head, laser arm, support column, workbed, power and connection cables, a footpad, a monitor mounting bracket, a spare ground wire, a USB flash drive with EZCad, two positioning bars with their bolts, a pair of OD6 laser glasses and their case, a ruler and tape measure, 2 access keys for the galvo power lock, a set of hex wrenches, and a storage box for these accessories.
- Step 3.** This device employs a Class 4 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 provided grounding cable and ensure its proper connection. The near end should be attached to the bolt left of the main power socket on the back of the main tower. The far end should be securely connected to a metal rod driven at least 8 feet (3 m) deep in soil located at least 5 feet (1.5 m) 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.

Step 4. Everything should arrive preassembled. Check that all connections are firm, tightening if necessary. Use the handles to move the main tower to the location you have selected. Using two or more people to minimize the risk of dropping the machine is highly recommended.

Make all the necessary connections between the various components and plug in the main power cord. The control computer's USB cord attaches to a port on the galvo head. Position the cords out of the way to minimize any tripping hazard, using covers and cable managers as needed.

Step 5. The positioning bars can be installed onto the workbed 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 6. Use the height adjustment knob to confirm that the laser arm moves smoothly and easily through its whole range of motion. At the same time, test that there is enough slack in the USB connection cable to safely move through the laser arm's entire range of motion, adjusting as needed.



Step 7. Remove the protective lens cap from the galvo head. Rotate the emergency stop clockwise to release it. Wait about 3 seconds for the main power to activate before inserting and turning your access key to power the galvo head. Wait about 3 seconds for the galvo power system to activate.

Confirm that the left button on the galvo head activates the two laser focus dots and the right button activates the built-in light. Confirm the **UP** and **DOWN** buttons on the tower move the laser head up and down the support column.



- Step 8.** Move the laser arm to its lowest position using the adjustment knob or the **DOWN** button. Place a piece of safely laserable material on the workbed. Press the **AUTOFOCUS** button on the tower. Confirm that the laser arm rises to the proper focus height by activating the laser focus dots using the left button on the galvo head. They should converge to a single point on the surface of the material. Turn off the engraver by turning your access key, waiting 3 seconds for the galvo power system to shut down, and then pressing the emergency stop. Cover the lens with its protective cap.
- Step 9.** See the separate engraving software manual 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 fiber laser machine in order to avoid possible interference to the signal on its line. Familiarize yourself with your software’s image design features and laser control settings before beginning operation of the laser itself.
- Step 10.** Turn the engraver back on by turning the emergency stop, waiting for the mainboard to fully activate, turning your access key, and waiting for the galvo head to fully activate. Remove the lens cap. Confirm that the software recognizes your engraver’s camera. Check the effect with and without the built-in light using the right button on the galvo head.
- Step 11.** Because of the risk of fire and other hazards during engraving, this machine includes a large and easy-to-reach emergency stop button on its control panel. Press it down to stop the laser instantly.

You should test that it works properly before conducting **ANY** other work with your machine. Put on your laser glasses and turn on the laser source inside the main tower by pressing the **LASER** button on the tower. In EZCad, press **Mark** or hit **F2** to fire the laser. Alternatively, use the foot pad. While the laser is still active, hit the emergency stop button and observe whether the laser stops instantly. If the laser continues to fire, the emergency stop is not working and must be replaced before the machine can be used. Turn off the machine, replace the lens cap, and contact customer service.



- Step 12.** Attach and test any other equipment—particularly safety equipment such as 15-pin protective enclosure—in similar fashion before beginning work.

If you will use the bracket to hold a computer display on the support column, be sure to use two people for heavier monitors. One should tighten everything carefully while the other fully supports the weight of the monitor. When you are finished, only slowly release the support as you safely confirm both that the monitor’s weight will be supported and that it will not affect the balance of the support column.

Confirm again that all cords and cables will present no tripping hazard and do what you can to limit unauthorized access to the laser, including installing locks on its room and password protecting the control computer.

4. Operation

4.1 Operation Overview

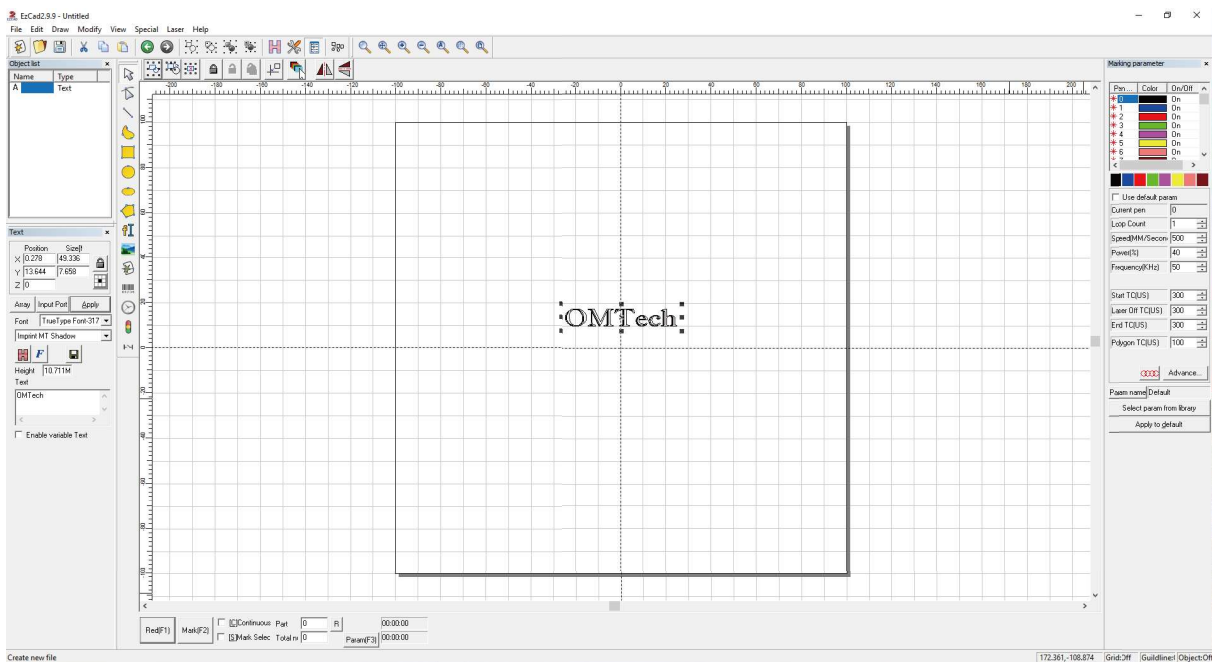


Operate this laser marking machine only in accordance with all the instructions provided in this manual. Failure to follow the proper guidelines detailed here can result in property damage and personal injury.

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. Turn on the laser marker by activating its power from top to bottom in order:

1. Turn the emergency stop to release it and power the mainboard.
2. Turn the **GALVO** access key to power the galvo head.
3. Press the **LASER** button to power the fiber laser source.

Activating these out of order may cause electrical hazards as the separate power supplies are grounded in order. Do not activate them 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 laser power supply is on, try to touch the machine's 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.

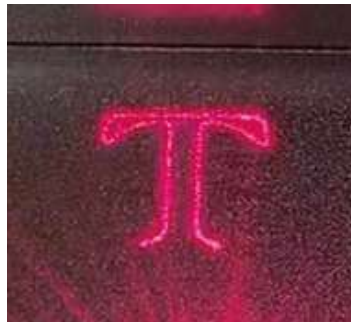
Step 5. Customize your contrast and engraving depth by adjusting the engraving parameters in EZCad.

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. 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. Remove the protective cap from the galvo lens and place your material on the workbed.

You can hold each piece of material in the same place with the positioning brackets. You can also preview exactly where your design will appear in either of two ways. Within EZCad, you can press **Red** or **F1** to activate a red laser preview of your design at its current position and size.



You can also activate your camera through the software to place an image of the workbed in your preview screen. Use the right button on the galvo head to turn on the built-in light if the image is too dark at first. If you need to make any changes to the design or material's position or size, do so now.

Step 7. Focus the galvo head on your material.

For most common materials, this will be as easy as pressing the **AUTOFOCUS** button on the tower and letting the system automatically move the laser arm to exactly the right height for you. In some cases, it may help the autofocus system to activate the laser head's light.

If you need to manually focus the laser, activate the red laser dots using the left button on the galvo head. Use the direction buttons on the tower or the adjustment knob on the support column to move the laser arm up or down until the two separate dots converge into a single brighter spot on the surface of your material. If you consistently need to manually focus the laser for certain materials, you can speed repetitive work by using the provided ruler and the support column's own built-in rule to note the correct heights for various thicknesses of material.

Step 8. Being careful that no part of your body is near the workbed or laser path, press **Mark** or hit **F2** in EZCad to engrave your design. Alternatively, you can use the foot pad.



In Focus



Out of Focus

The active laser is invisible but will create a buzzing noise and sparks and begin engraving when it is correctly focused on your material. 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 9.** Examine the quality of the 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 10.** When you have finished engraving your design, close EZCad and then turn off the laser marking machine from bottom to top in order:
1. Press the **LASER** button.
 2. Turn the **GALVO** access key.
 3. Push down the emergency stop.

Again, wait about 3 seconds between each step to allow each system to safely disengage.

- Step 11.** Fully clean the workbed. Check the lenses for any accumulation of dust and safely clean them as well if needed.
- Step 12.** Cover the galvanometer lens. For best results, fully disconnect your fiber marking machine from its power supply between uses. Unplug it or turn off its intermediate 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.

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 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 aluminum.

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.
- When necessary, clean the galvo head's lenses. Blow or use pressurized air to remove any large coarse dust or debris and then use a lens-cleaning tissue or cloth thoroughly soaked in cleaning fluid or pure rubbing alcohol to clear smaller pieces of dust using soft circular motions. Be careful not to touch any lens surface with your fingers.
- 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 fiber 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	Check your control computer for any viruses or malware that might be interfering with its connection to the machine.
	Have a technician check the fiber 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 Australia, Canada, and the United States 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!

