Master Class Fiber Flatbed USER MANUAL

Full Spectrum
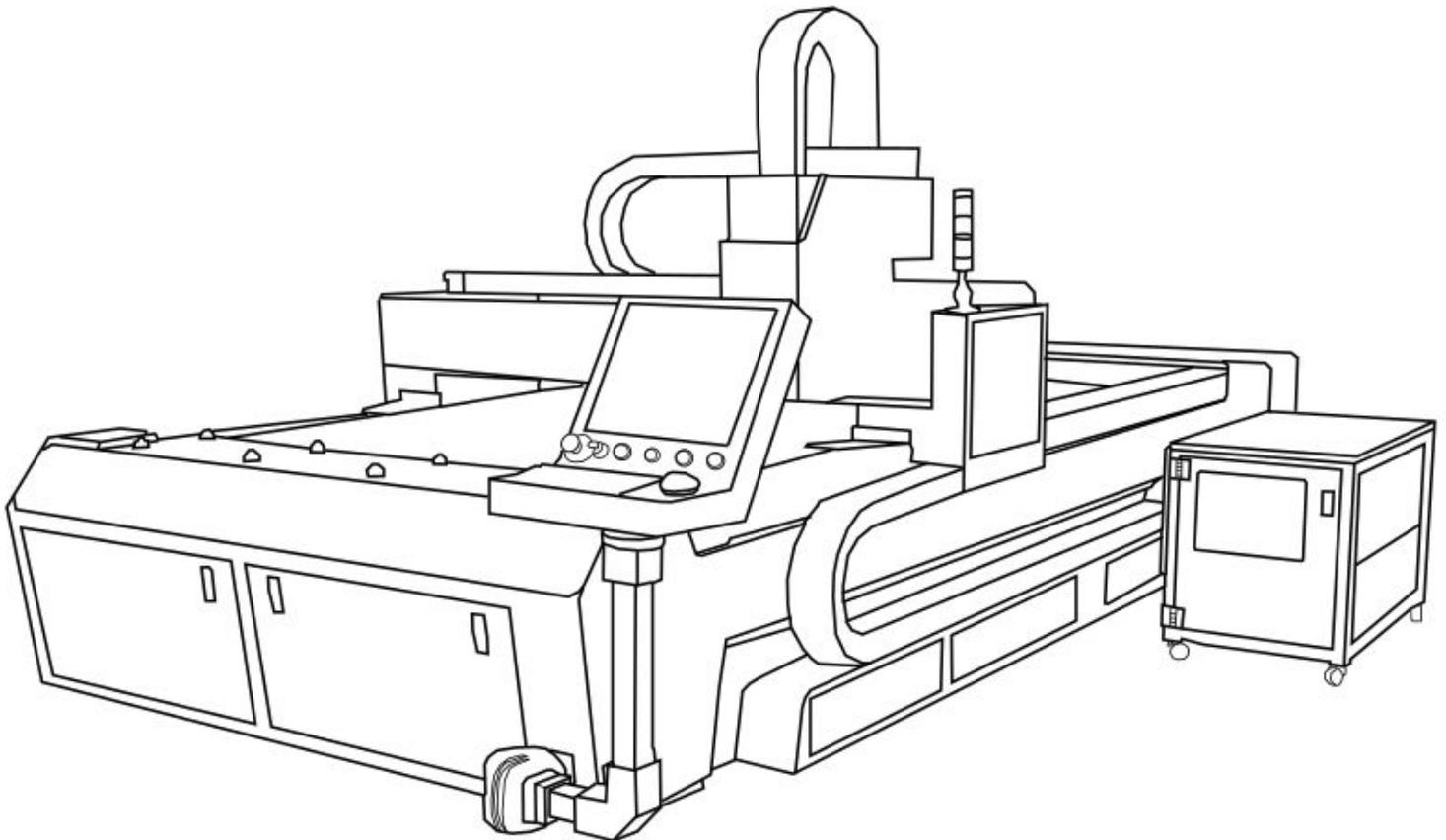**L A S E R**

Table of Contents

The Master Class Fiber Flatbed By Full Spectrum Laser

Thank you for purchasing your new Master Class Fiber Flatbed. Our high quality products will provide years of service simply by following proper usage and upkeep. This user manual will guide you through the safety guidelines and operation of your machine. We recommend that you familiarize yourself with this manual before using your laser engraver. Remember to be safe and have fun!

For more information and product selection, please visit www.fslaser.com

Compliance Statement: The Full Spectrum Laser Master Class Series is a Class 4 laser product, as defined in International Standard IEC 608251. The Full Spectrum Muse Titan complies with 21 CFR 1040.10 and 1040.11, the Federal Performance Standards for Light Emitting Products, except for deviations pursuant to Laser Notice No. 50, dated July 16, 2001. The Center for Devices and Radiological Health of the US FDA issued Laser Notice No. 50 to permit manufacturers to classify and manufacture their products in accordance with the International Standard. 21 CFR 1040 and IEC 608251 require that certification, identification, and warning labels be placed on laser products.
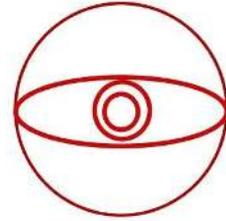
Symbols and Definitions

Red icons indicate dangerous situations that could result in serious injury or death.
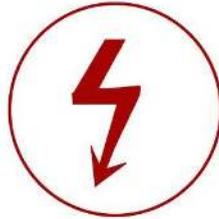
This symbol indicates a
hazardous situation.

This symbol indicates the
risk of fire.

This symbol indicates the
risk of potential eye injury.

This symbol indicates a
respitory hazard.

This symbol indicates an
electrical hazard.

This symbol indicates the risk of
getting cut by a sharp object.

This symbol warns of
fragile parts.

This symbol calls attention
to important details.
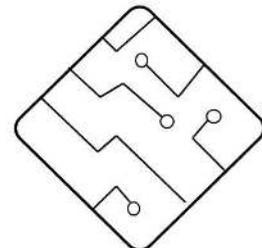
This symbol warns of
network or software isses.

DANGER

WARNING

CAUTION

Danger: Indicate[s] a hazardous situation which, if not avoided, will result in death or serious injury.

Warning: Indicate[s] a hazardous situation which, if not avoided, could result in death or serious injury.

Caution: Indicate[s] a hazardous situation which, if not avoided, could result in minor or moderate injury.

Setup Precautions

Follow all safety protocols and procedures before operating any machinery. It is the responsibility of the operator to ensure all safety precautions are correctly followed, and the machine is properly assembled and in working order.

⚠️

WARNING!

- **Always inspect the laser cutter for damage or breakage before each use. Do not operate machinery that is damaged or defective in any way.**

- **Always have a clean, level, and open work space to unbox and place your laser cutter.**

- **Never modify, disassemble, or in any way alter the construction of the laser and never start up a system that has been modified or disassembled.**

- **Never leave the laser system unattended during operation.**

- **Keep your laser system clean.** A buildup of cutting and engraving residue and debris is dangerous and can create a fire hazard. Keep your laser system clean and free of debris. Regularly remove the cutting grid to clean any small pieces that have gotten stuck or fallen through.

- **Do not disassemble the machine or remove any of its protective covers.**

- **Always have on hand a first-aid kit designed for the initial treatment of burns and smoke inhalation.** Be sure to store this kit in an area that is outside risk areas.

- **Never operate the machine with any of the panels removed.** Be aware that removal of any portion of the cabinet will expose the laser system and greatly increase the risk of injury and/or fire.

✋

WARNING!

- **Never place hands or fingers into moving parts such as belts or cooling fans.**

- **The laser lens and protective covers are made of glass and are therefore extremely fragile and can cause severe lacerations if broken.**

Safety During Operation

The output of the fiber engraving laser is fully contained in a Class 3 enclosure during normal operation. However, the output beam is accessible to the operator during normal operation, giving the total system an overall rating of Class 3B. Class 3 lasers have minimal safety concerns when used properly and handled with care. The laser system is designated as Class 3B due to the fact that safety glasses must be used when observing the laser engraving process.

Follow these Safety Guidelines at all times:

WARNING!

- **Never engrave or cut any unknown material.** The vaporization/melting of many materials, including but not limited to PVC and polycarbonates, can give off hazardous fumes. Please refer to the MSDS sheet from the material manufacturer to determine the response of any work material to extreme heat (burning/fire hazard).

- **Never operate the machine without a properly operating ventilation.** Most materials produce an irritating smoke when engraved. Some materials, including but not limited to: paint, varnish, composition board, and plastics,toxic compounds.

CAUTION!

- **Always use the provided safety glasses when looking at the laser.**

- **Never aim any laser towards an aircraft or vehicle that is in motion.**

Fire Safety
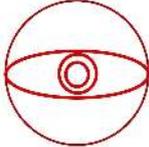
Laser cutting and engraving systems can present a significant fire hazard due to the extremely high temperatures generated by the laser beam. While the objective of most cutting and engraving operations is to vaporize material without burning, most materials capable of being cut or engraved are inherently combustible and can ignite. Usually this is a small flame of burning material issuing from the cut zone which self-extinguishes due to the air assist or depowering of the beam. However, it is possible for the flame to propagate and set fire to the machine and its surroundings.

WARNING!

Always keep a properly maintained and inspected 5lbs. or larger fire extinguisher on hand. Full Spectrum Laser recommends a Halogen or multipurpose dry chemical fire extinguisher. Halogen extinguisher are expensive but easy clean, while the dry chemical extinguisher discharges a sticky, corrosive powder that is very difficult to clean up.

Never operate your machine unattended. There is a significant risk of fire if set improperly, or if a mechanical or electrical failure occurs while operating.

Always use the air assist, especially while vector cutting. The process is relatively slow and applies a large amount of heat to the workplace. **Vector cutting with the laser has the most potential to create an open flame**.

Electrical Safety

The power supply is capable of releasing a current up to 20mA. This power is sent to the discharge terminals on the laser tube itself. In order to prevent access to bare wiring your laser shipped with silicone terminal covers. Please notify Full Spectrum Laser support and immediately cease operations if the covers ever slip and expose bare wire.

CAUTION!
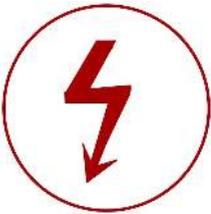
- **Do not open any of the machine's access panels while the unit is plugged in.** Opening a panel may expose the operator to the unit's power box, which is potentially lethal.

- **Never make or break any electrical connections to the system while the unit is turned on.**

- **Never access any electrical areas with hands or tools unless the unit is disconnected from the power for at least one hour.**

- **Never replace the installed 20 amp fuse with one of a higher rating.** This will void your warranty and the electronics will not be adequately protected from surges or short circuits.

- **POWER ON/OFF is controlled by the switch at the back of the machine.** The machine is on when the (-) side is pressed and off when the "o" side is.

- **In case of a blown fuse always contact Technical Support before replacing anything.**

The standard for laser safety is the American Standard for the Safe Use of Lasers, Z136.12000. Developed by the American National Standards Institute (ANSI) it is the basis for many federal regulations and Occupational Safety and Health Administration (OSHA) guidelines for laser and laser system manufacturers. It contains detailed information concerning the proper installation and use of laser systems. While the ANSI standard is not a law, its recommendations, including warning signage, training, and the designation of a laser safety officer, may be mandatory under local regulations. It is the operator's responsibility to ensure that the installation and operation of the Full Spectrum Desktop Laser System are performed following applicable laws. Copies of ANSI Standard Z136.12000 are available from:
LASER INSTITUTE OF AMERICA 12424 RESEARCH PARKWAY, SUITE 125 ORLANDO, FL 32826 (407) 3801553.

Materials

| Fiber (1000W)	Max Thickness
Carbon Steel	12mm (1/2")
Stainless Steel	6mm (1/4")
Galvanized Plates	3mm (1/8")
Aluminum Plates	3mm (1/8")
Copper Plates	2mm (5/64")

Section II. **Crate Removal**

WARNING!! The MC Fiber Flatbed models are over 6000lbs. A forklift is need to move this machine. DO NOT ATTEMPT TO LIFT!!

Removing the Fiber Flatbed from Crate

**Follow these instructions for best results:**

1. **Prepare Work Space:** You will need an open, level work space to place your laser cutter. A well-ventilated open room with at least 173" x 90" x 55" free is recommended. Be sure there is always a fire extinguisher nearby in case of emergencies.

2. **Open Crate.** Use ⅜" socket or flat blade screwdriver to remove multiple 3" screws. A cordless impact gun is recommended to decrease breakdown time. Remove the top panel, the top support bars, the left and right sides, and lastly the front and back sides. Note this will require help for best results.

3. **Remove Plastic Wrap and Foam.** Remove the plastic wrapping and the foam from the machine.

4. **Remove Machine from Crate.** Remove machine from the crate bottom. With the laser unit now sitting on the base of the crate, gently lift the machine off of the crate with a forklift.

5. **Remove Protective Film.** The machine will be covered in a protective Film. Remove it before proceeding to anything else.

6. **Remove Protective Covering.** The protective covering on the back ends of the Flatbed must be removed to access the Limit Stopper. Once removed the rubber can be slid out of the way.
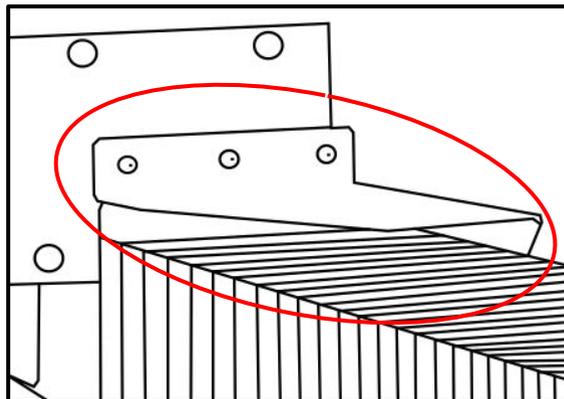

7. **Remove the Limit Stopper.**
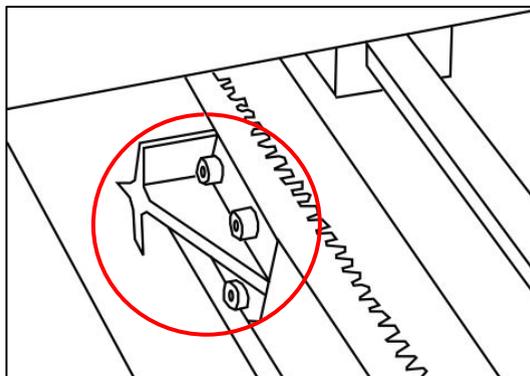
8. **Remove the Limit Stopper on the Other Side.**

9. **Ensure Machine is Level.** Before completely lowering the machine, ensure that once the machine is lowered it is level. If out of level, adjust height of threaded posts as needed until machine is level. Lower machine onto feet.

10. **Open the Laser head Compartment**. Locate the key to open the laser head compartment. This area need to be open for cable installation.
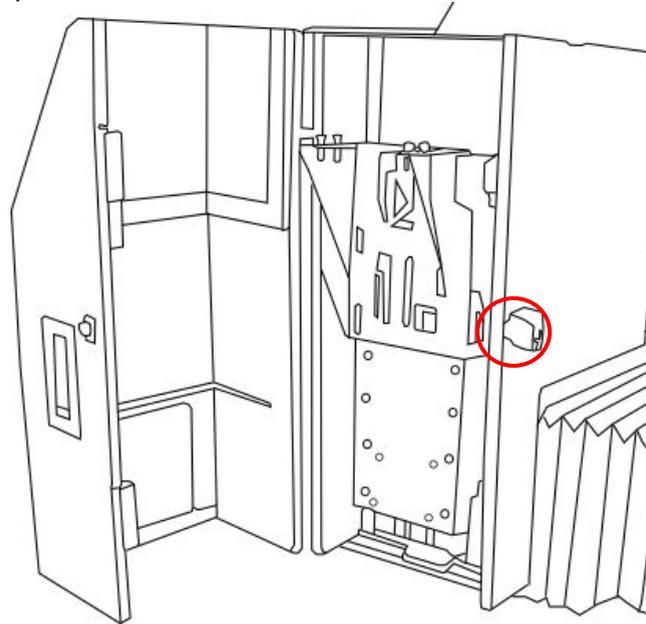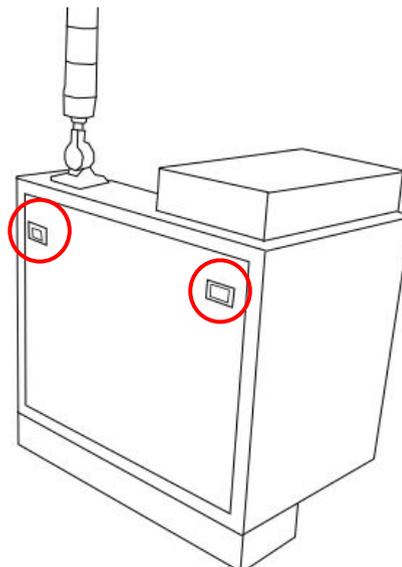

11. **Opening Cable Connection.** Open the cable covers to access the needed cables using a Flathead Screwdriver (See below).
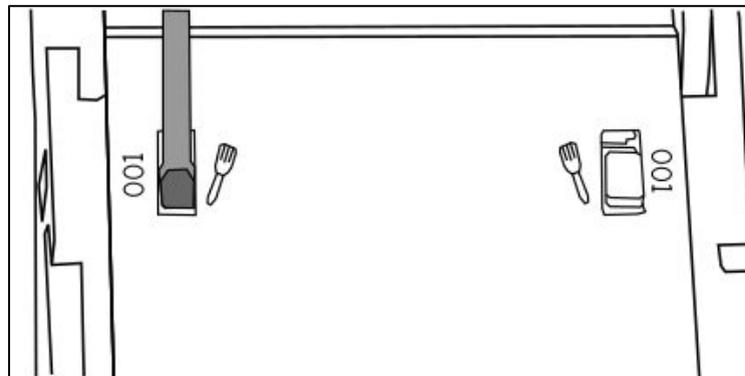
Note: For easy cable installation, make sure to remove the entire cable covering.
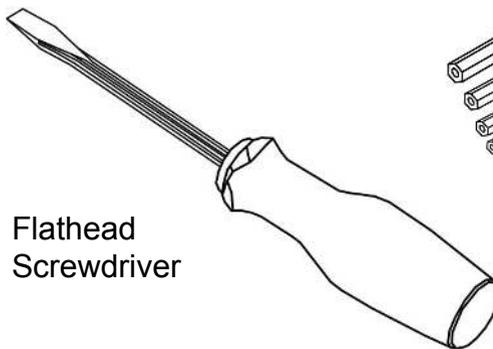
12. **Open Side Panel.**

Section III. Installation & Assembly

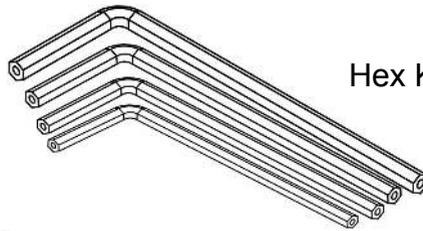This assembly is a simple process that should take less than half an hour to complete.

Assembly Stages

1. **Laser Box Installation**

2. **Laser Head Installation**

3. **Machine Connections**

4. **Operations Table Assembly**

Tools Needed:

Flathead
Screwdriver

Hex Keys

NOTICE

- **Please be aware that the accessories will increase circuit load**
  The most significant power draw usually comes from the blower/exhaust system. Consult the manufacturer's information and manual for the operating parameters of your exhaust system.

- **The power inlet is equipped with a fuse to protect the machine from surges or short circuits in case of emergencies. If this fuse ever needs replacement, please contact Full Spectrum Laser technical support.**
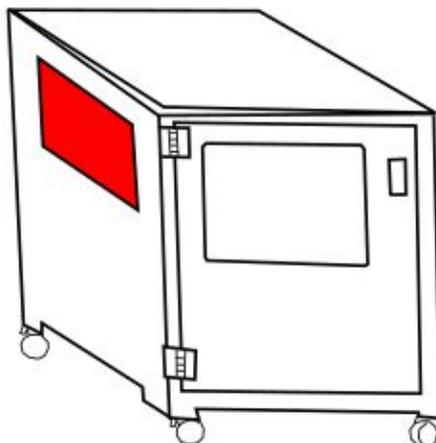
Laser Box Installation

1. **Install The Z-Axis Cover.** Once installed remove the top layer of the covering for cable access.
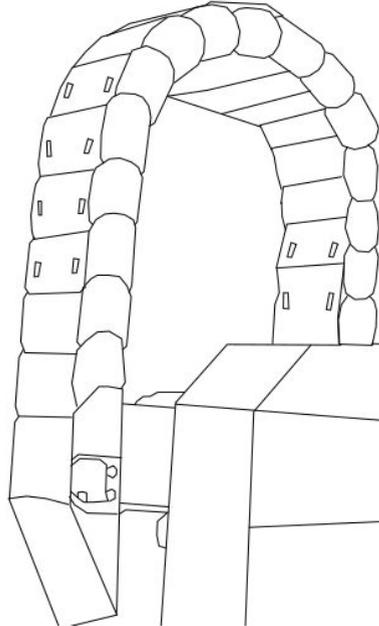
2. **Prepare Laser Box.** Remove the side screws to open the side cover. Then remove the screws from the top and remove the top cover.
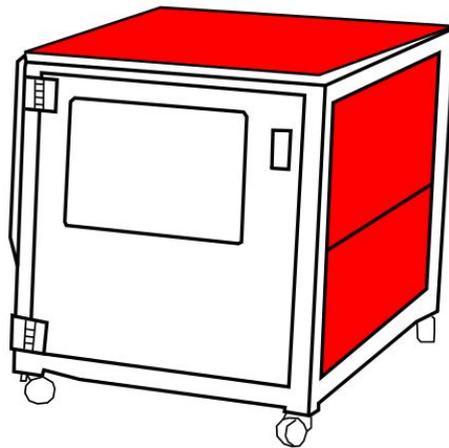
3. **Prepare Air Conditioner.** Take out the Air Conditioning Unit and install onto the opening in the box.

Laser Head Installation

Take out and set the laser generator onto the top shelf of the laser box. The laser generator should come with a yellow fiber cable.

Note: The fiber cable if extremely delicate. It should not be bend or placed in areas that will case high pressure. Do not tread on the fiber cable.

1. Install the fiber cable onto the laser starting from the cable access and proceeding along with the cables until the side panel is reached (see below).

2. Pass the cable through the panel onto the X-gantry and then the Z-gantry.
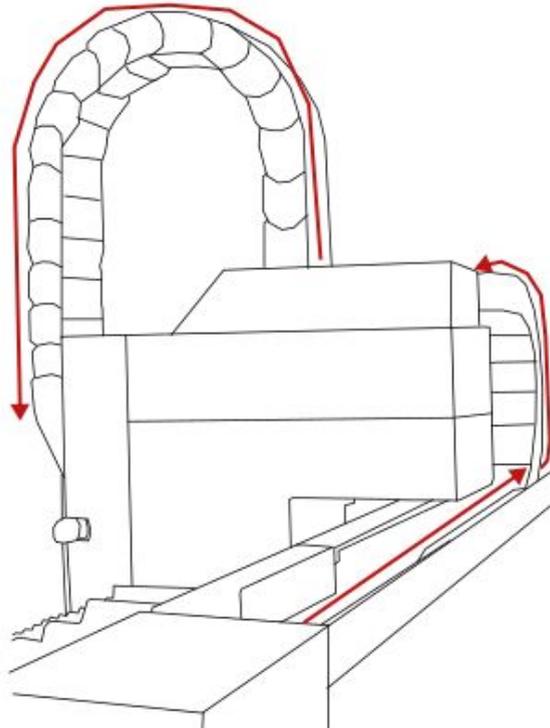
3. The cable will be laser in the Laser head compartment. Make sure to remove the rubber and aluminum cover from the fiber cable head.

4. Pull out the laser head.
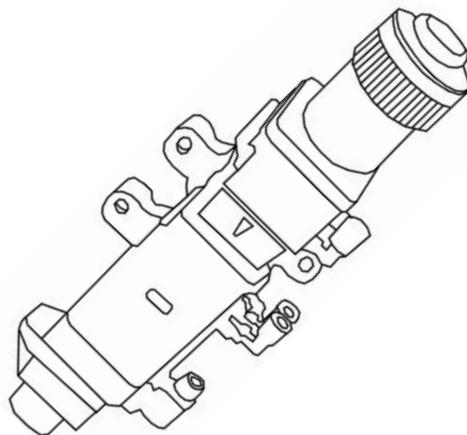
4. The Fiber Cable and the laser head both have red dots on one side. Make sure to line up the dot before inserting the cable head onto the laser head.

5. Once inserted turn the knob counterclockwise to tighten.
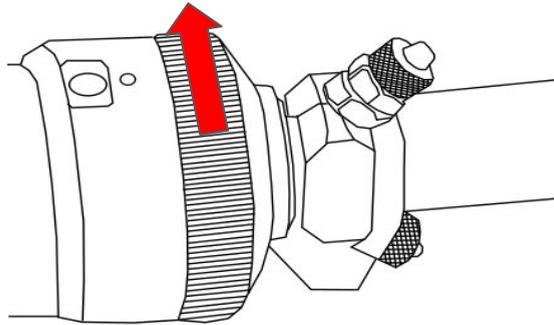
6. Install the Laser head onto the Laser Head Compartment using the screws located on the fitting.

7. Locate the signal, water and gas cables and run them through the Z-gantry into the Laser Head Compartment.

8. Connect the signal cable to the back port and the power cable to the front port.

Signal Cable

Power Cable
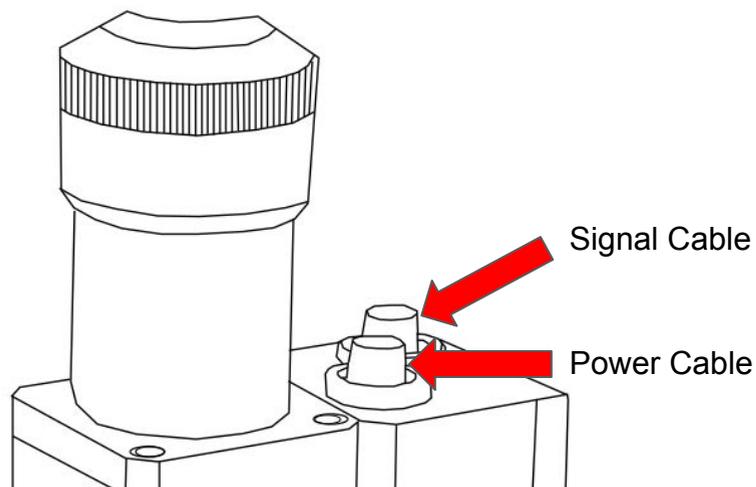
9. Locate the water cables. Secure one end of a water tube to the blue cable and then onto the port below by unthreading the screw and inserting them onto the cable.
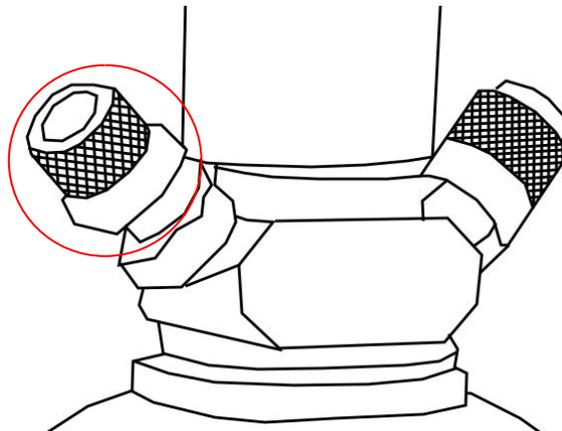
10. Place the cable onto the port and thread the screw in place.

11. Insert the second blue tube onto the adjacent port.
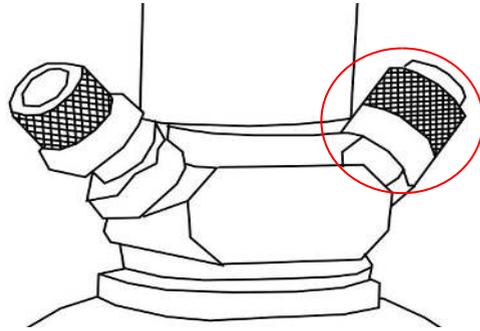
12. Insert the other end into the following port. (see below)
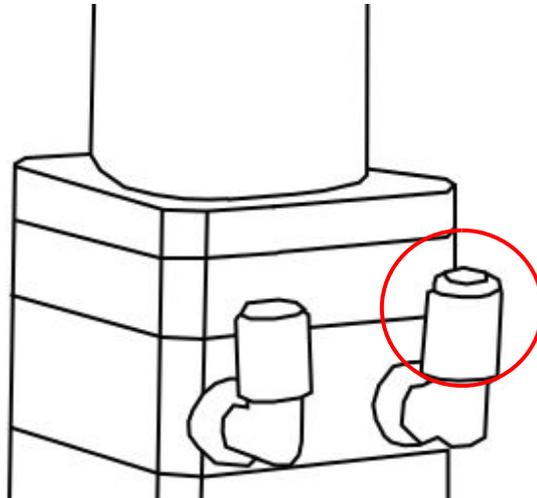
13. The third water tube will be placed onto the port on the left. Connect the other end to the port on the right below.
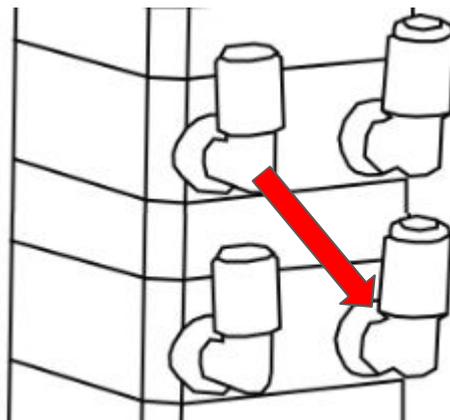
14. The final water tube will be connect to the final port and the black cable above.

15. A red gas tube will connect to the red cable and to the port at the very bottom of the laser head (see below).
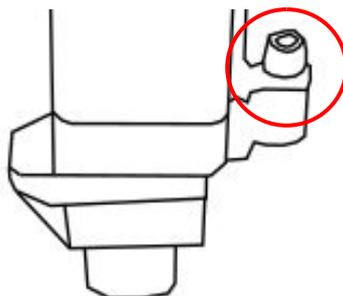
15.Locate the following items for the next step.

High Temperature
Cable

Signal Amplifier
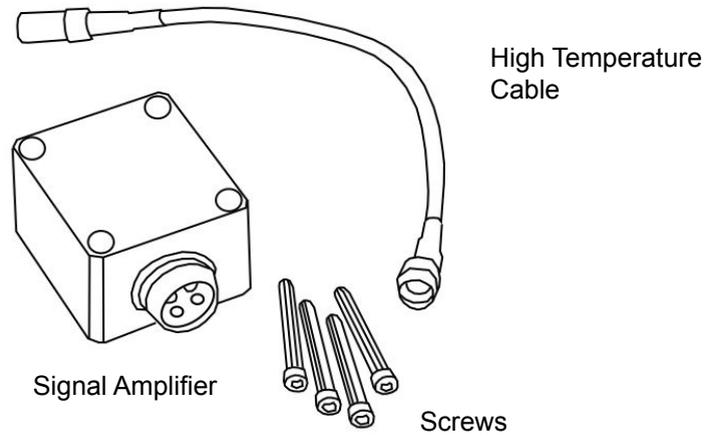
Screws

16. Attach the signal amplifier onto the side of the laser head using the provided screws.(see below)
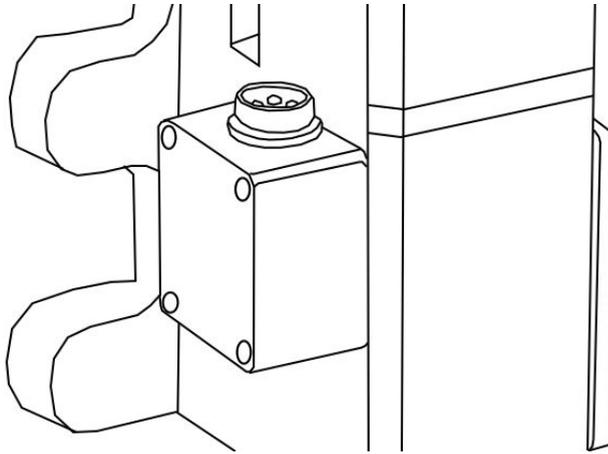
17. Insert the signal cable into the signal amplifier top port. Connect the high temperature cable to the amplifier's bottom port.

18. Insert the other end of the high temperature cable into the slot below.

Machine Connections

Laser Box to Machine Connection

1.   Insert the power cable into the laser generator and the machine.

2.   Connect the signal cables to the laser generator (see below). Make sure that the cables are in the correct position before plugging it into the machine.
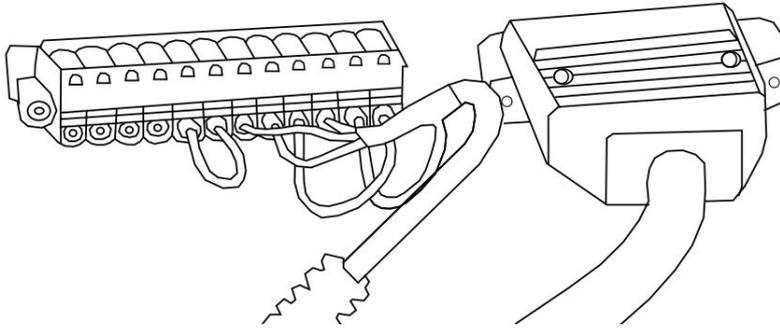
3.   Connect the ethernet cable next.

Water Chiller to Machine Connection

1.   Locate the red, blue, and black cables on the machine.

2.   Connect the black cable to the inlet and the blue cable to the outlet.

3.   Connect the power cable into the water chiller and the machine.

4.   Get out the white water tube and connect it to the low temperature outlet on the Water Chiller. Connect the other end of the tube to the inlet of the Laser Generator.

5.   Connect the second water tube to the low temperature inlet on the Water Chiller with the outlet on the Laser Generator.

6.   Locate a red tube. Connect one end of the red tube to the oxygen slot in the machine and the other to the Oxygen Valve.

7.   Connect the red cable from earlier onto the Nitrogen Valve.

8.   Connect the machine to the power box. A yellow ground cable is also included. Connect the yellow cable to the ground slot.
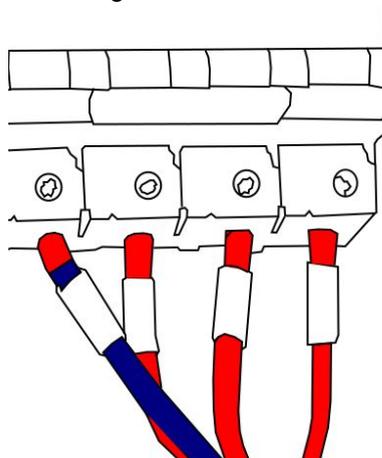
Operations Table Assembly

1. Take out the Operations Table and the connecting rods.

2. Remove the front right cover plate.
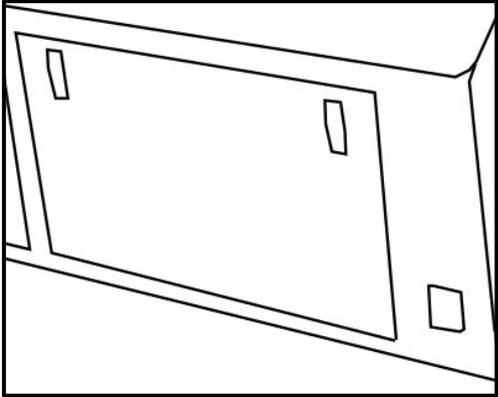
3. Pull out the Signal Cable and run it through the first connecting rod.
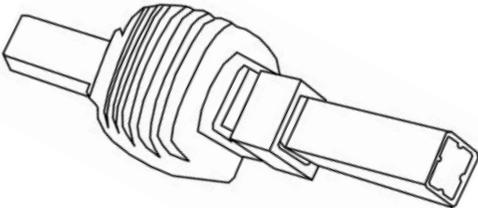
4. Install the rod onto the mount (see below).
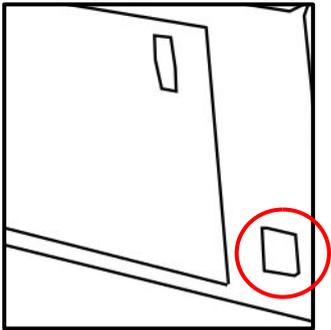
5. Run the cable through the second rod and connect it to the first.
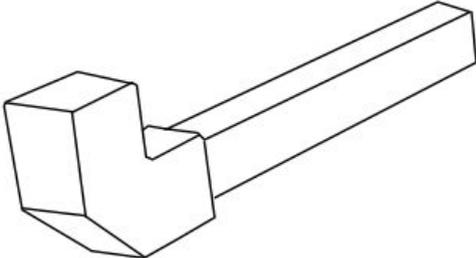
6. Open the back cover of the Operation Table and run the cables through the back cover.

7. Now connect the Power and VGA cables to the monitor.

8. Connect the Signal cable to the similar cable on the table.

9. Connect the USB cable to the USB port and plug in the wireless controller.

10. Place the wireless controller on the top of the back panel.

11. Lastly install the wireless receiver for the mouse into the USB Port.

PC Installation:

1. Open the Right Side Panel.

2. Place the computer inside.

3. Connect by ascending order (bottom to top): the power cable, the 62 pin signal cable, the 37 pin signal cable, the usb cable, the ethernet cable, and the VGA cable.

Congratulations. Your Flatbed is now ready to use.

Section IV. **Cypcut Software**

Installation Instructions:

The MC Series Fiber Flatbed uses the software called CypCut. The software can be downloaded at www.fscut.com. Before installing, make sure your system meets the following requirements to operate the software.

CypCut System Minimum Requirement:

OS:WIndows 7
Processor: Intel i3
Memory: 4 GB Ram
Graphics: 15-pin VGA
Storage:73.2 MB

Follow the Setup Wizards instruction to install CypCut.

Once starting the Application it should look similar to the window below.
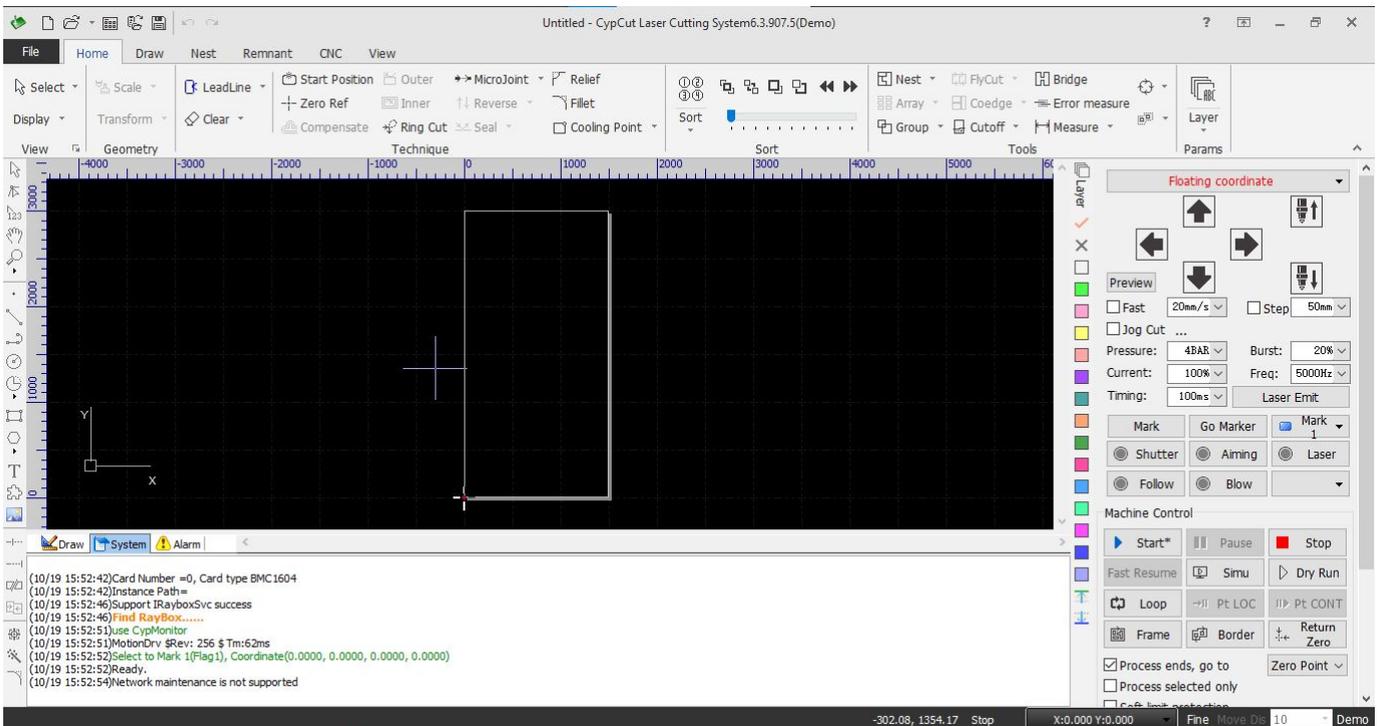
Control Panel:
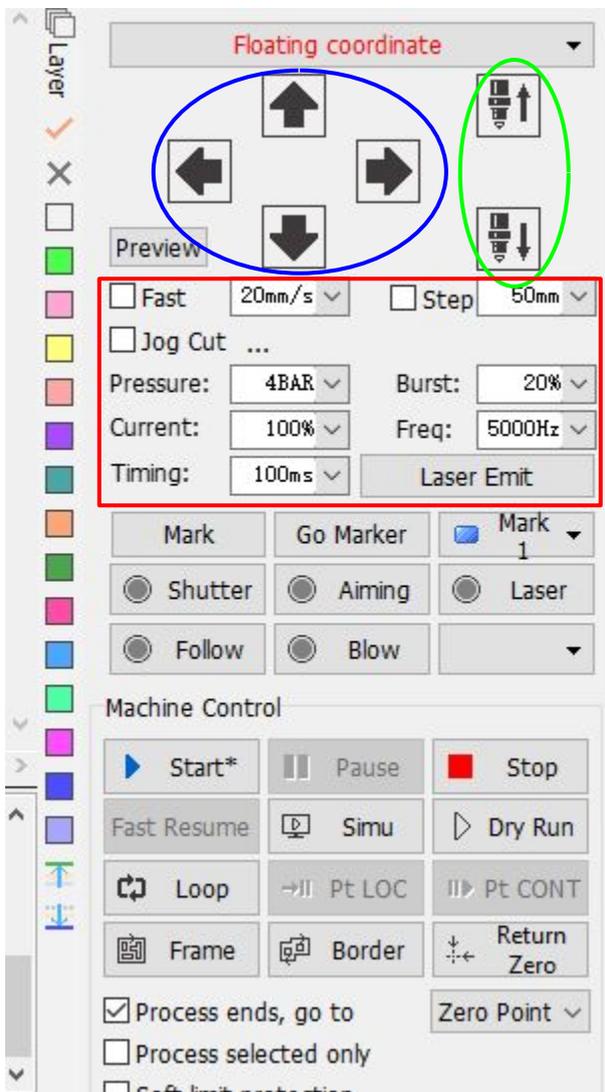
Jogging Controls -Moves the Laser Head Assembly along the work area.

Laser Head Controls -Moves the Laser Head Up and Down

Cutting Parameters - Parameters than can be adjusted before Running a project to obtain different results

Simu   - Also known as the Simulation Button.
This button will show a simulation in the work area of how it will cut out your material

Dry Run-
Runs the project without turning on the laser head. Ideal for making final adjustment.

Start
Starts the project.

Pause
Pause the project. Selecting Start will resume where it left off.

Stop
Ends the project. Selecting start will resume project from the beginning

Loop
Repeats the project the amount of times programmed.

Top Bar:
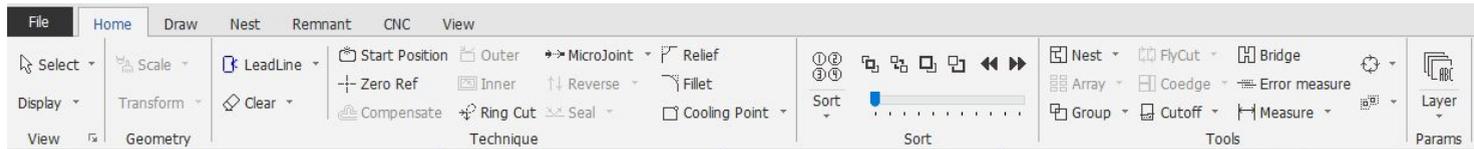
Tabs:

File	-	Import, Export, Save, Load,and Create Files here.
Home	-	Contains many scaling and design altering tools.
Draws	-	Create a design using the different tools and shapes available.
Nest	-	Save cutting designs here. You can also group and ungroup object.
Remnant	-	Guides on how to use project remnants to get the most out of your material
CNC	-	CNC settings
View	-	Look and Arrange the Layers.

Quick Bar:

1

Section 1
Select
NodeEdit
Sort
PanView
Scale   - Window Zoom
            - Zoom All
            - Machine Range
            - Selected Zoom
            - Dynamic Zoom

2

Section 2
Point
Line
Polyline
Circle
Curve   - Circle
            - 3-point Arc
            - Scan Arc
            - Ellipse
Rectangle
Polygon - Rectangle
            - Round Rectangle
            - Polygon
            - Star
Text
Standard Parts
Insert Image

3

Section 3
Cut and Clip
Extend
Segment
Knit

4

Section 4
Center Align
Explode
Rounded

Status Log:

Shows a log of previous and ongoing actions.

```
Draw   System   Alarm        <

Command: New Circle
Please specify center:
*Cancel*
Command: New Rectangle
please specify start point: (520.8333, 1802.0833)
Please specify cross point: (947.9167, 1156.2500)
Completed
Command: Explode
```

Draw: Log of object indeed and removed from the workspace.

System: Log of system actions

Alarm: Log of system errors

Layer Tab:
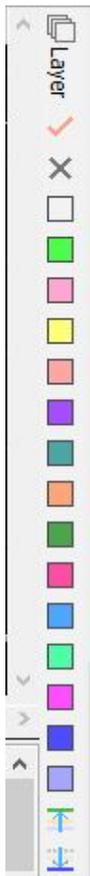
The Layer Tab also you to move objects to different layers for better grouping. It's important to note that objects in the same layers will be cut out together.

For more detailed information on how to use CypCut, such as videos and tutorials please visit https://www.fscut.com/en/soft/cypcut/?video=true .

Section V. Maintenance & Adjustments

Before starting a job:

Check your gantry rails for any debris. If any particles are present, wipe it clean with a rag. If you find that a piece of debris fell into your gantry rails, then we suggest removing the belt to remove the debris as it can interfere with your lasers output. Double check that no material is near your belts, laser head, or any moving components as the laser will move to the front right side of your laser upon boot up.

Daily:

- Keep you machine and workspace clutter-free.

- Read all material warnings and make sure you are working in a well-ventilated workspace.

- Keep your fire extinguisher up to regulation and easily accessible.

- Always follow all safety protocols.

Weekly:

- Wipe down the walls of the machine with a clean rag.

- Use optical-grade lens wipes to clean both sides of the beam combiner, the focus lens, and protective mirror. Optic surfaces may need to be cleaned more often if cutting materials produce excessive residue (possibly daily).

- Clean fallen debris from the debris tray and from of the machine to reduce fire risk, and provide better exhaust power.

- Keep rails, motors and moving parts free from excess material as it can obscure movement and cause damage.

Monthly:

- Change water in the cooling system. This will keep your tube safe from unwanted debris, mold or evaporation. If you live in an area that gets cold it is recommended to add laser antifreeze to your system to keep your tube from breaking.

- Check for wear on belts. Belts should last, however, eventually they may wear and crack. If you find that the belts have become loose over time you can add tension by loosening the motor, adding tension, and re-tightening the bolts.

Machine Adjustments:

Setting Machine and Laser Head Origin:

The machine should be powered on and work space clear.
1. Open CypCut.

2. Find the "Go Origin" button in the top bar and Select it.

3. The machine should move to the front left corner, the Z axis will be homed, and the fine focus lens will be re-zeroed.

Machine Calibration:

1. Press F1 to enter calibration page

2. Place material to be cut underneath laser head

3. Start the Servo calibration and follow the instructions on the screen

4. Jog laser head to about 10-15 milimeters above the material and start capacitance calibration.

5. The result for stability and smoothness should be perfect. If not,we went to make sure the material is flat and does not bend/bounce.

6. Preform needed adjustments by follow the instructions on the screen.

7. Save your changes before exiting.

Cutting Parameter Adjustment/Refinement:

1. Use a suitable cut setting to start adjustment.

2. Cut a relatively small simple graphic, such as a square with a small circle inside to determine cut quality.

3. Once cut, verify what the edge quality looks like and determine what needs to be adjusted based on the following graphics.
   a. **Start with an acceptable speed.**
   b. **Adjust focus position to get an acceptable kerf width. One that allows the molten metal to be removed during cutting.**
   c. **Adjust the gas pressure up or down to prevent blowback of molten metal**

   Note: Adjusting the nozzle style and size affects the kerf width as well.

General Reference Cutting Parameters:

Carbon steel: use O2, dual nozzles, low pressure for thick materials

Stainless Steel and Aluminum: use N2, single nozzles, high pressure for all thicknesses

Protective Window Replacement:

If cut quality degrades, verify the cleanliness of the cut window. If the cut window has spots or is burned,then it should be replaced with a new window.

WARNING! GLASS WINDOW IS FRAGILE. WEAR GLOVES WHEN HANDLING FRAGILE MATERIALS!

1. To replace, open the window cover and remove the window holder.

2. Close the window cover door while the the protective window is out to avoid damage to the focus lens.

   Do not under any circumstances cut or blow air if the window is removed!

3. Remove the set screw that holds the retaining ring in place.

4. Remove the window and throw away it away.

5. Insert new window into the window holder mount.

6. Replace the retaining ring and set screw.

7. Once everything is tight, replace the window mount to the laser head.

8. Each laser head has 2 protective windows, one above the focus lens by the laser end, and one below the focus lens by the nozzle.

   a. The lower window is replaced most often.

   b. The upper window is not often/ever replaced except under extreme circumstances.

Warranty

Full Spectrum Laser will replace or repair any defective parts free of charge within the first 30 days. Ground shipping is free with overnight shipping available at extra charge.

Full Spectrum Laser will replace or repair any defective part within the warranty period free of charge but shipping charges are the responsibility of the customer. Warranty includes parts and labor only. Shipping of defective and replacement components is excluded.

The customer may arrange their own shipping. Parts can be dropped off at our warehouse free of charge.

All defective parts must be returned to Full Spectrum Laser for evaluation before replacements are issued, unless otherwise authorized. The warranty is valid for normal use only and excludes uses not stated in manual. Parts damaged by fires are considered user error if the machine is left unattended. Always stand next to the machine with a fire extinguisher and be ready to turn it off in case of an emergency. Never operate the machine unattended.

Our lasers have a 60-day full warranty and include a 1-year extended warranty. The 1-year extended warranty excludes shipping and consumable items. All electronic items (control cards, power supplies, motors) and most mechanical items are covered under the extended warranty unless damaged by abuse/fires. Consumables not covered include, but are not limited to, rubber parts (such as tubing, belts, plastic wheels, lenses, mirrors, other optics, and laser tubes).

The original purchaser may transfer the balance of the warranty to anyone free of charge provided we are notified in writing within 30 days.After 30 days, we will only provide warranty and tech support services to the original purchaser unless a warranty transfer fee.

Warranty will remain valid if product is sold. However, the buyer must request RMAs and repairs from the original purchaser unless a warranty transfer fee is paid.

NOTE: Full Spectrum Laser DOES NOT offer warranties or customer support for 3rd Party parts, including replacement laser tubes, as it may not be compatible with Full Spectrum Laser machines and can cause damage to your laser system.

Visit https://laser101.fslaser.com/support for most current warranty postings.

Customer Support

If you have any questions about your machine don't hesitate to contact us. We have a large number of resources available to make your first laser experience user-friendly.

Technical Support

M-F 8AM-5PM PST
support@fslaser.com
702-802-3103

Sales

M-F 8AM-5PM PST
sales@fslaser.com
702-802-3101

Manuals

fslaser.com/resources/

User manuals, Quick-Start Guides and other resources for your laser.

Financing

fslaser.com/financing/

Work with us or our providers to find the perfect option for any budget.

More Options

Submit a ticket online
fsl3d.zendesk.com/hc/en-us

Videos
youtube.com/user/FullSpectrumLasers

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