

# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



**LAGUNA**

Laguna Tools  
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Grand Prairie, TX 75050  
lagunatools.com

# MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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## Scope of This Manual

This manual outlines the basic procedures for unpacking, assembling, and operating the MX, EX, and EX-C CO2 Laser. Read this manual in its entirety prior to assembly or operation.

For detailed instructions and video, please go to [www.lagunatools.com](http://www.lagunatools.com).

## Customer Service

For technical support, please contact Laguna Tools Customer Service by phone at 1-800-332-4094, or email Customer Service at [customer\\_service@lagunatools.com](mailto:customer_service@lagunatools.com). Please note the machine type in the subject line.

In the space provided, record the serial number, model number, and install date of the machine.

<b>Serial No.</b>	
<b>Model No.</b>	
<b>Install Date:</b>	

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DISCLAIMER

Laguna Tools is not responsible for errors or omissions. Specifications subject to change. Machines may be shown with optional accessories.

**Revision 02 (01/20/2026)**

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## 1.0 General Information and Safety

### 1.1 Overview

#### SAVE THIS MANUAL

Keep this manual for the safety warnings, precautions, assembly, operating, inspection, and maintenance procedures. Read this Owner's Manual in its entirety prior to assembly or operation. Refer to [www.lagunatools.com](http://www.lagunatools.com) for the latest manual revision.

Read and understand all warnings and operation instructions before using any tool or equipment. Always follow basic safety precautions to reduce the risk of personal injury. Improper operation, maintenance, or modification of tools or equipment could result in serious injury or property damage. Laguna Tools equipment is designed for specific and limited applications. This product should not be modified nor used for any application other than its intended use.

**PERSONAL SAFETY IS THE RESPONSIBILITY OF THE OPERATOR.**

### 1.2 Safety Signs and Callouts

#### DANGER

*An imminently hazardous situation which, if not avoided, will result in death or serious injury.*

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#### WARNING

*A potentially hazardous situation which, if not avoided, may result in death or serious injury.*

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#### CAUTION

*A potentially hazardous situation which, if not avoided, could result in minor or moderate injury.*

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#### NOTE

*A helpful tip from Laguna Tools staff.*

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## 1.3 Safety Warnings

1. Failure to comply with safety instructions may lead to personal injury and/or damage to the equipment. Do not operate the machine unless familiar with all safety instructions, warnings, and signs.
2. Do not operate the machine with the electrical cabinet door open—High Voltage Supply Inside.
3. The machine must be properly electrically grounded. The power supply must be connected with a permanently fixed electrical wire.
4. Keep children and non-operators away from the machine.
5. Operators must be familiar with the installation, operation, and service of the machine. Only proper operation can ensure the safe and smooth running of the machine.

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 **WARNING**

*Automated machinery involves moving parts which pose a potential hazard to personnel. Be aware of machine movement at all times.*

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 **WARNING**

*Only allow qualified service personnel to do electrical installation or repair work and always disconnect power before accessing or exposing electrical equipment to reduce risks.*

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## 1.4 Additional Safety Information

1. Only qualified personnel are authorized to operate the machine.
2. All motion parameters have been set up by Laguna Tools. If any modifications are required, please have a professional operator perform the changes.
3. Safety Signs should be attached to places that are easy to spot.
4. Use the machine only in clean areas free from excessive moisture or flammable objects.

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5. The machine must be level. Level the machine if the ground is uneven.
6. Keep the machine, electrical cabinet, and surrounding area clear of obstructions and free from excessive moisture.
7. Keep the machine, electrical cabinet, and cables away from excessive heat, flammable substances, and sharp objects.
8. Do not attempt to exceed the limits of the machine.
9. Disconnect power to all system components when not in use, when changing accessories, and before servicing. Remove the switch keys or lock-out the machine to prevent unauthorized use and child-proof the workshop.
10. Exercise care with machine controls and around keypad to avoid unintentional start-up.
11. Keep cutting tools clean and sharp.
12. Lubricate and change accessories when necessary.
13. Cables and cords should be inspected regularly.
14. Keep controls clean and dry.
15. Keep a copy of this manual for future reference.
16. Perform daily inspection of the machine for damaged, loose, or improperly adjusted parts or any condition that could affect safe operation. For your own safety, do not operate the machine with damaged parts.
17. Stay alert at all times while operating the machine.
18. Always wear safety glasses and hearing protection.
19. Know where the emergency stop switch is located.
20. Never operate machinery under the influence of drugs or alcohol, when tired, or when distracted.
21. Do not wear clothing, apparel, or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to reduce the risk of slipping and losing control or accidentally contacting cutting tool or moving parts.
22. Never stand on the machine. Serious injury may occur if the machine is tipped or if the cutting tool is unintentionally contacted.
23. Consult the Owner's Manual or Laguna Tools for recommended accessories. Using improper accessories will increase the risk of serious injury or damage.

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## 1.5 Laser Safety & Policies

BE CAREFUL when operating this machine. Lasers are high-power tools, and precautions should be taken as with any other machinery. Laser machines use highly focused heat and can be hazardous.

Never leave your machine unattended while in operation, and do not allow untrained or unfamiliar individuals to use it.

Always keep access covers on and keep the top lid closed while operating. Avoid direct exposure to the laser beam and review all warning labels on your machine.

**The following safety measures are critical and should be followed at all times:**

1. NEVER operate without proper training.
2. ALWAYS use protective eyewear or keep the lid closed.
3. ALWAYS keep the exhaust fan running during use.
4. NEVER set anything on top of or inside the machine while not in use.
5. NEVER leave the laser unattended while running to monitor for hazards.
6. MAINTAIN a pollution-free environment around the machine, avoiding strong magnetic or electrical interference.
7. DO NOT use unapproved materials, such as polyvinyl chloride (PVC) or chlorine-based materials, as they emit harmful gases.
8. DO NOT operate near flammable or explosive substances, as the laser beam poses a fire risk.
9. NEVER lift the lid while the machine is running.
10. AVOID reflective materials that could cause laser deflection.
11. DO NOT manually adjust the laser head while in operation.
12. DO NOT dismantle the machine, as this disrupts sensitive parts and may lead to injury.
13. KEEP the collection tray(s) clean to avoid hazards.

**In Case of a Fire:**

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1. Press the EMERGENCY STOP button located above the LED Panel.
2. Lift the lid.
3. Extinguish any flames, using a CO2 fire extinguisher if needed.

## 1.6 Additional Laser Safety Information

### 1.6.1 Laser Radiation Risks

Laser's main hazards on the human body are to eye and skin, laser irradiation to any part of the human body can cause burns. Avoid any part of body placed in the optical path of laser device, in order to avoid damaged caused by misuse.

User is required to pay attention to the following while operating the laser equipment: It is strictly prohibited to directly expose any parts of human body, explosive object and flammable objects to direct laser.

- Modification of fasteners on the optical parts is strictly prohibited.
- Unauthorized change of light route is strictly prohibited.
- Abide by all instructions prescribed in the operation manual.

### 1.6.2 Grounding Methods



**DANGER**

*This machine must be grounded while in use to protect the operator from electric shock.*

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**DANGER**

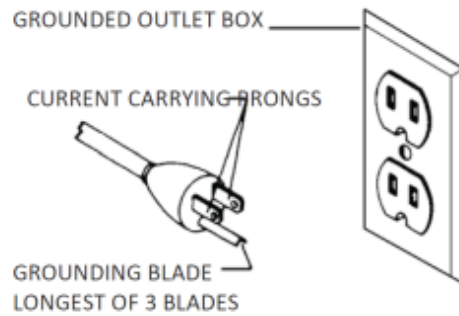
*In all cases, verify the receptacle in question is properly grounded.*

*If you are not sure, have a qualified electrician check the receptacle.*

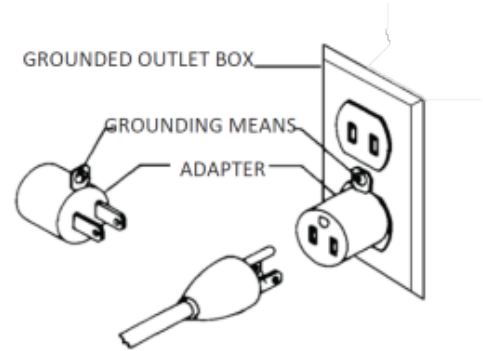
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Grounding Methods Provided by CSA Group. (Canadian Standards Association)



**Figure 1-1:**  
*Receptacle with nominal rating less than 150 volts*



**Figure 1-2:**  
*150 volt receptacle without grounding pin fitted with adapter*

## 1.6.3 All grounded, cord-connected machines:

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This machine is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Do not modify the plug provided. If it will not fit the outlet, have the proper outlet installed by a qualified electrician. Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.

Check with a qualified electrician or service technician if the grounding instructions are not completely understood, or if in doubt as to whether the machine is properly grounded.

Use only 3-wire extension cords that have 3-prong grounding type plugs and matching 3-conductor receptacles that accept the machine's plug, as shown in Fig. 1-1. Repair or replace damaged or worn cord immediately.

## 1.6.4 Grounded, cord-connected machines intended for use on a supply circuit having a nominal rating less than 150 volts:

If the machine is intended for use on a circuit that has an outlet that looks like the one illustrated in Figure 1-1, the machine will have a grounding plug that looks like the plug illustrated in Figure 1-1. A temporary adapter, which looks like the adapter illustrated in Figure 1-2, may be used to connect this plug to a matching 2-conductor receptacle as shown in Figure 1-2 if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician. The green-colored rigid ear, lug, and the like, extending from the adapter is used, it must be held in a place with a metal screw.

### NOTE

*In Canada, the use of a temporary adapter is NOT permitted by the Canadian Electric Code.*

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## 1.6.5 Extension Cords

### DANGER

*Use proper extension cords. Verify the extension cord is in good condition and is a 3-wire extension cord which has a 3-prong grounding type plug and matching receptacle which will accept the machine's plug.*

*When using an extension cord, be sure to use one heavy enough to carry the current of the machine. An undersized cord will cause a drop in line voltage, resulting in loss of power and overheating. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.*

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The tables below show the correct gauge to use depending on the cord length. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.

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*Table 1-3: Extension Cord Gauges 120V*

<b>Minimum Gauge Extension Cord 120V</b>			
<i>Recommended Sizes for Use with Stationary Electric Machines</i>			
<b>Ampere Rating</b>	<b>Volts</b>	<b>Total Length of Cord in Feet</b>	<b>Gauge of Extension Cord</b>
0-6	120	Up to 25	18 AWG
0-6	120	25-50	16 AWG
0-6	120	50-100	16 AWG
0-6	120	100-150	14 AWG
6-10	120	Up to 25	18 AWG
6-10	120	25-50	16 AWG
6-10	120	50-100	14 AWG
6-10	120	100-150	12 AWG
10-12	120	Up to 25	16 AWG
10-12	120	25-50	16 AWG
10-12	120	50-100	14 AWG
10-12	120	100-150	12 AWG
12-16	120	Up to 25	14 AWG
12-16	120	25-50	12 AWG
12-16	120	<i>Greater than 50 feet not recommended</i>	

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*Table 1-5: Extension Cord Gauge 240V*

<b>Minimum Gauge Extension Cord 240V</b>			
<i>Recommended Sizes for use with Stationary Electric Machines</i>			
<b>Ampere Rating</b>	<b>Volts</b>	<b>Total Length of Cord in Feet</b>	<b>Gauge of Extension Cord</b>
0-6	240	Up to 50	18 AWG
0-6	240	50-100	16 AWG
0-6	240	100-200	16 AWG
0-6	240	200-300	14 AWG
6-10	240	Up to 50	18 AWG
6-10	240	50-100	16 AWG
6-10	240	100-200	16 AWG
6-10	240	200-300	12 AWG
10-12	240	Up to 50	16 AWG
10-12	240	50-100	16 AWG
10-12	240	100-200	14 AWG
10-12	240	200-300	12 AWG
12-16	240	Up to 50	14 AWG
12-16	240	50-100	12 AWG
12-16	240	<i>Not recommended than 100 feet not recommended</i>	

## 1.7 Fire & Hazardous Materials



### WARNING

*This machine uses high heat to engrave, etch, and cut material. It should never be left unsupervised while in operation, as unattended use can result in fire and significant damage to both the machine and the building it is in.*

*Any fire-related damage not caused by defects in workmanship or the machine itself will NOT be covered by the Laguna Tools Limited Warranty.*

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### WARNING

*Materials hazardous to the machine's health or to the individuals operating or near it are NOT recommended for etching, cutting, or engraving. Some materials emit toxic fumes or may cause the machine to malfunction, requiring replacement parts.*

---

## 1.8 Proposition 65 Warning of Harmful Exposure

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm. Some examples of these chemicals are:

- Lead from lead-based paint.
- Crystalline silica from bricks, cement, and other masonry products.
- Arsenic and chromium from chemically treated lumber.



### DANGER

#### *Fire Warning*

*Use extreme caution when cutting flammable materials such as wood or acrylic. Keep the machine clean by following the*

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*supplied maintenance schedule and always have a fire extinguisher ready to extinguish a fire. Take extreme caution when cutting acrylic materials as they are more volatile than other materials.*

*Never leave the machine running unattended.*

*The tools sold by Laguna Tools are safe when used properly, as described by the American National Safety Institute, the UL Standards of safe tool use, and the IEC standards of safe tool use. Laguna Tools is in no way responsible for injury or death that occurs while using this product.*

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The risk of exposure varies depending on frequency of use. To reduce exposure to these chemicals, work in a well-ventilated area and work with approved safety equipment, such as face or dust masks that are specifically designed to filter out microscopic particles.

For more information go to <https://www.p65warnings.ca.gov/>.

## **1.9 Intended Use**

This machine is designed to cut and engrave non-metallic materials like wood, acrylic, leather, glass, etc. Do not use this machine for anything other than its intended use.

## 2.0 Definitions

1. **CO<sub>2</sub> Laser**-A type of gas laser that uses carbon dioxide as the active medium. It emits infrared light (typically at 10.6 μm) and is widely used for cutting, engraving, and marking non-metallic materials.
2. **Laser Tube**-The sealed glass or metal tube containing the CO<sub>2</sub> gas mixture. It generates the laser beam when electrically excited.
3. **Beam Combiner**-An optical device that combines the red dot pointer (visible light) with the invisible CO<sub>2</sub> laser beam for alignment purposes.
4. **Focal Length**-The distance from the lens to the point where the laser beam converges to its smallest diameter. It affects cutting precision and depth.
5. **Focus Lens**-A lens that concentrates the laser beam to a fine point for cutting or engraving. Different lenses are used for different materials and thicknesses.
6. **Mirrors**-Reflective components used to direct the laser beam from the tube to the lens. Typically, three mirrors are used in CO<sub>2</sub> laser systems.
7. **Engraving**-The process of removing material from the surface to create a design or text. It's usually shallower than cutting.
8. **Cutting**-Using the laser to completely penetrate and separate material. Requires higher power and slower speed than engraving.
9. **Raster Mode**-A scanning method where the laser moves back and forth like a printer to engrave images or text.
10. **Vector Mode**-A method where the laser follows paths or lines to cut or engrave shapes. Ideal for outlines and precise cuts.
11. **Air Assist**-A stream of compressed air directed at the cutting area to remove debris, cool the material, and improve cut quality.
12. **Honeycomb Table**-A perforated work surface that supports materials during cutting and allows smoke and debris to pass through.
13. **Exhaust System**-A ventilation system that removes smoke, fumes, and particles from the laser workspace to maintain safety and clarity.
14. **DPI (Dots Per Inch)**-A measure of resolution for engraving. Higher DPI results in finer detail but may take longer to process.
15. **Speed**-The rate at which the laser head moves. Faster speeds are used for engraving; slower speeds for deeper cuts.
16. **Power**-The intensity of the laser beam. Higher power is needed for cutting thicker or harder materials.
17. **Pulse Rate / Frequency**-The number of laser pulses per second. Affects how the laser interacts with different materials.
18. **Material Compatibility**-Refers to whether a material can be safely and effectively processed with a CO<sub>2</sub> laser (e.g., wood, acrylic, leather, glass).
19. **Kerf**-The width of the cut made by the laser. Important for precision work and fitting parts together.
20. **Test Fire**-A brief activation of the laser to check alignment or functionality without performing a full operation.

## 3.0 Receiving the Machine

Following delivery and before the driver and riggers have left, inspect the packing, invoice, and shipping documents. Next, ensure there is no visible damage to the packaging or the machine. All damage must be noted on the delivery documents and signed by the receiver and the delivery driver. Contact Laguna Tools Customer Service as soon as possible in case of damage. It is advisable to photograph and document any shipping damage. The original packaging is required to return damaged equipment to Laguna Tools.

### NOTE

*Sawdust may be found in the machine upon arrival. This is because the machine has been tested prior to shipment from the factory and/or Laguna Tools. Laguna Tools tests all machines prior to shipping, but some adjustments may have to be undertaken by the customer. These adjustments are covered in the various sections of this manual.*

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Most large machinery will be delivered on a tractor trailer 48 to 53 feet long. Please notify a Sales Representative with any Delivery Restrictions. The customer is required to have a forklift (6000 lbs. or larger is recommended) with 72-inch forks or fork extensions.



### 4.0 Electrical Requirements

The CO2 laser requires permanent, direct power installed by a qualified electrician familiar with industrial best practices. Ensure that all power cords are protected from traffic, moisture, chemicals, or other hazards. For safety, always have a qualified electrician assess grounding and any further electrical needs.

All the laser machines covered in this manual require a 110 Volt electrical connection.

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### 5.0 Specifications & Dimensions

<b>CO2 Laser Specifications</b>			
<b>Models</b>	Laser-MX	Laser-EX	Laser EX-C
<b>Shipping Weight</b>	950 lbs	1725 lbs	1730 lbs
<b>Shipping Dimensions (L x W x H)</b>	2 x 1.44 x 1.27	1.78 x 1.14 x 1.26	2 x 1.44 x 1.27
<b>Overall Size (L x W x H)</b>	53.5" x 39.8" x 42.1"	71.7" x 51.6" x 42.1"	71.7" x 51.6" x 42.1"
<b>Power Requirements</b>	110 Volt, 1 Phase,		
<b>Laser Type</b>	Sealed water-cooled CO2 Laser Tube		
<b>Laser Power</b>	100W	150W	
<b>Work Envelope (fit a work piece in)</b>	16" x 23"	24" x 36"	36" x 51"
<b>X-axis limit</b>	36"	51"	51"
<b>Y-axis limit</b>	24	36"	36"
<b>Z-axis limit</b>	10.5"	10.5"	10.5"
<b>Process Speed</b>	0-2215 in/min (0-54,000mm/min)	0-2350 in/min (0-60,000mm/min)	
<b>Resetting Position Accuracy</b>	$\pm 0.02"$ (.05mm)		
<b>Controlling Software</b>	Ruida		
<b>Design Software Integration (Included)</b>	RDWorks		
<b>Design Software Integration (not included)</b>	Lightburn, CorelDraw, AutoCAD, Adobe, and more...		

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<b>Graphic Format supported</b>	BMP, PLT, DST, DXF, AI, and more...		
<b>Color Separation</b>	Yes		
<b>Working Environment temperature</b>	33°-112° Fahrenheit (1°-45° Celsius)		
<b>Dust Port Outer Diameter</b>	3.95" (100mm)	2 x 5.95 (150mm)	5.95 (150mm)
<b>CFM Requirement (Cubic Feet per Minute)</b>	400CFM	400 CFM Fume 600 CFM Debris (lower)	600 CFM

## 5.1 Chiller Specifications

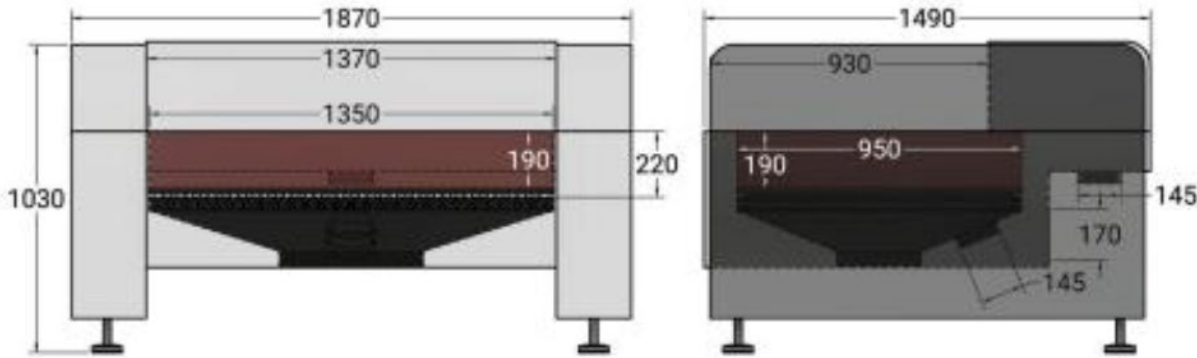
The shaded part is the model of the chiller used with the MX, EX, and EX-C laser.

The chiller model that is used is the CW-5200DH, outlined below.

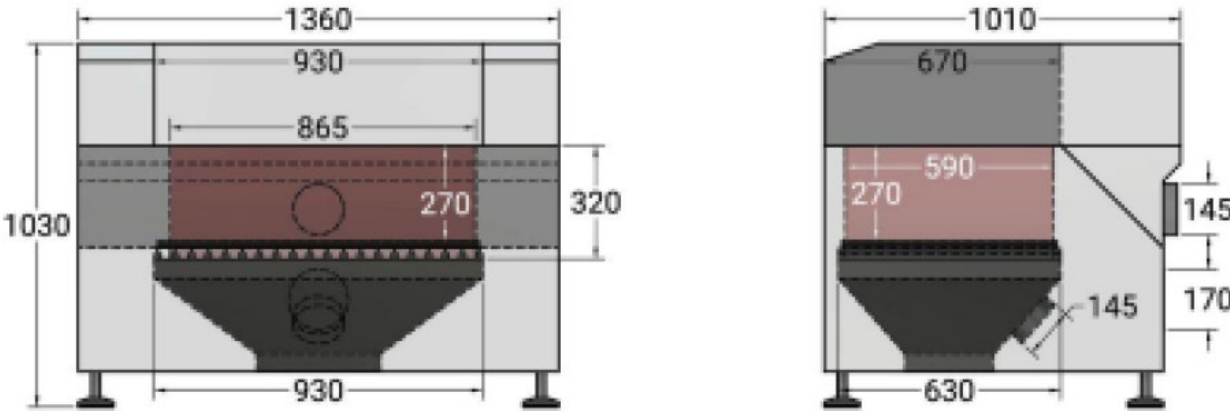
CW-5200				
MODEL	CW-5200TH	CW-5200DH	CW-5200TI	CW-5200DI
Voltage	AC 1P 220V	AC 1P 110V	AC 1P 220V	AC 1P 110V
Frequency	50/60Hz	60Hz	50/60Hz	60Hz
Current	0.5~4.48A	0.5~7A	0.8~3.87A	0.8~7.3A
Machine power	0.74/0.82kW	0.77kW	0.77/0.86kW	0.82 kW
Compressor power	0.6/0.62kW	0.66kW	0.82/0.95kW	0.66kW
	0.82/0.84HP	0.9HP	0.5/0.53HP	0.9HP
Nominal cooling capacity	6040/7303Btu/h	5699Btu/h	6040/7098Btu/h	5699Btu/h
	1.77/2.14kW	1.67kW	1.77/2.08kW	1.67kW
	1521/1839Kcal/h	1435Kcal/h	1521/1788Kcal/h	1435Kcal/h
Refrigerant charge	370g	330g	420g	330g
Pump power		0.05kW		0.1kW
Max.lift		12M		25M
Max.flow		13L/min		16L/min
N.W.			26Kgs	
G.W.			29Kgs	
Refrigerant	R-407c	R-410a	R-407c	R-410a
Precision			± 0.3°C	
Reducer			Capillary	
Tank capacity			7L	
Inlet and outlet		OD 10mm barbed connector		10mm fast connector
Dimension			58 X 29 X 47 cm (L X W X H)	
Package dimension			70 X 43 X 58 cm (L X W X H)	

Note: the working current can be different under different working conditions; The above information is for reference only. Please subject to the actual delivered product.

# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



SmartShop EX and EX-C Dimensions



Smartshop MX Dimensions

## 6.0 Machine Placement

When unpacking the laser, separate all enclosed items from the packing materials and inspect each for damage. Save the packaging materials until all issues concerning missing or damaged items have been resolved.

### 6.1 Placement

Select the area where the laser will be operated. The physical environment where the laser is located is important to safe assembly and operation. Before removing the laser from its packaging consider the weight load, electrical installation requirements, lighting, dust collection, and space allocation available for the machine and accompanying materials.

Guidelines for properly placing the machine follow:

1. There should be sufficient area around the machine to facilitate easy access to the workpiece, perform maintenance, and provide safe egress in the event of an emergency.
2. Select a solid level floor rated to hold the weight of the machine and workpieces under both static and dynamic loads. Laguna Tools recommends concrete flooring. Consult a licensed and experienced professional if in doubt.
3. Locate the machine close to a power source and dust collection.
4. Allow an area for the storage of workpiece materials, finished products, and tools.
5. Leave ample space around the machine for the operator to handle both the equipment and the materials being cut.
6. Leave enough space around the machine to open or remove doors/covers as required by the maintenance described in the Owner's Manual.
7. **Do not** place or operate the machine in a highly magnetic area.

### 6.2 Fume Extraction

Allow enough space for proper fume extraction from the machine. For optimal operation, ensure that the machine is in a dry environment, free from excessive moisture, extreme weather conditions, hazardous chemicals, or airborne abrasives

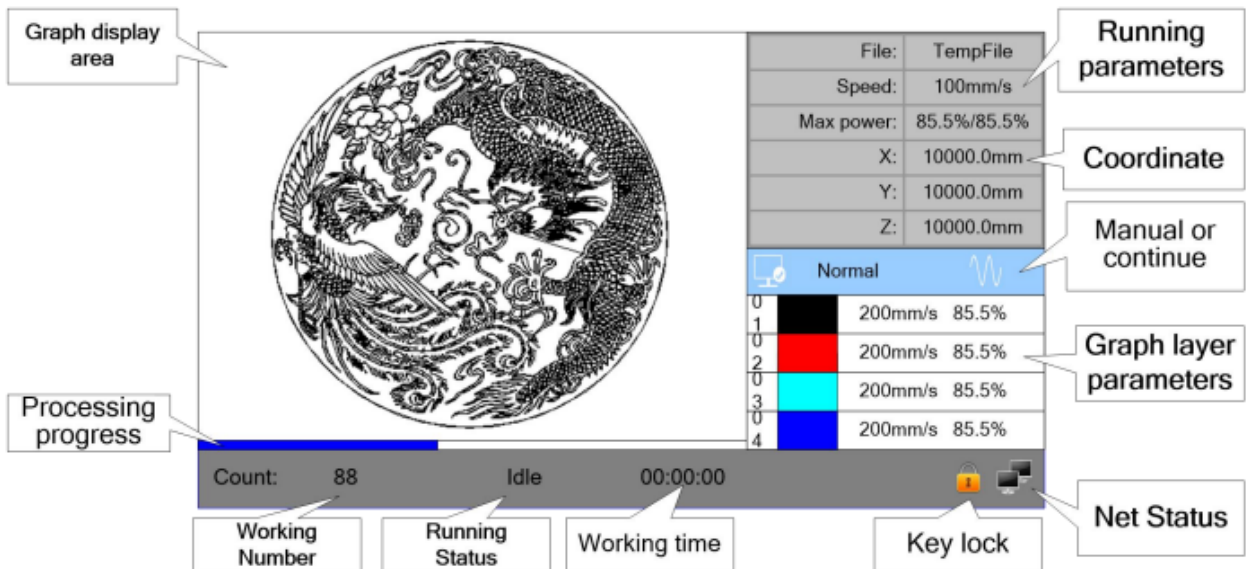
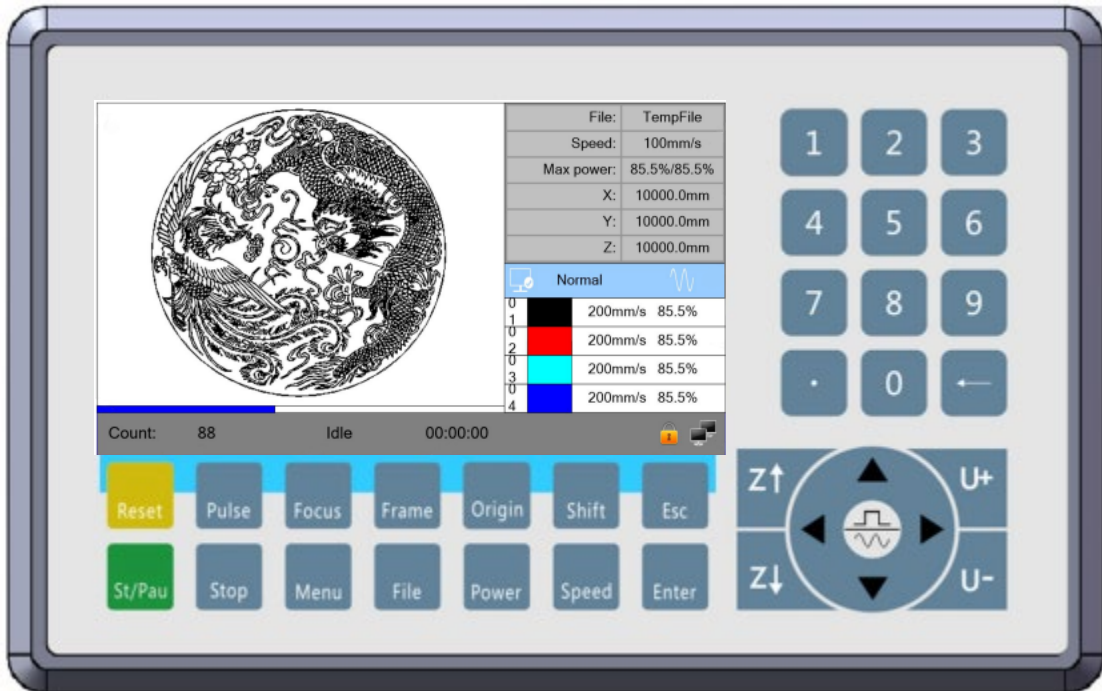
### **6.3 Electrical**

The machine requires permanent, direct power installed by a qualified electrician familiar with industrial best practices. Ensure that all power cords are protected from traffic, moisture, chemicals, or other hazards. For safety, always have a qualified electrician assess grounding and any further electrical needs.

### **6.4 Lighting**

Ensure that the lighting your machine is placed under is sufficient to safely perform regular operation and maintenance. Any glares, shadows, or strobe lighting which may distract or prevent the operator from safely operating the machinery should be removed from the working area.








## 7.0 Controller Panel and Operation



## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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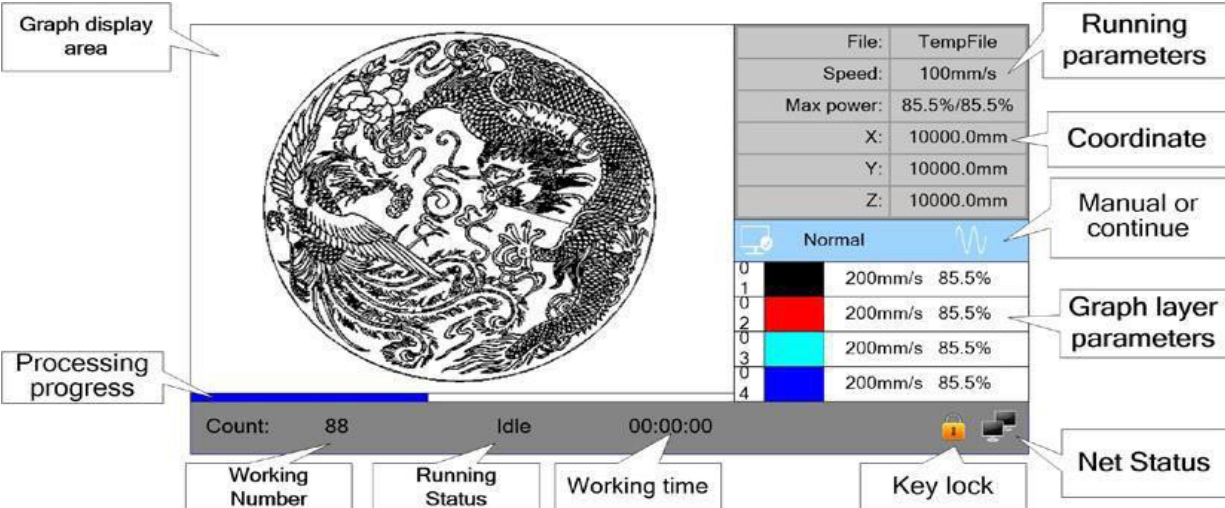
Reset	Reset the whole system.
St/Pau	To start or pause the work.
Pulse	Let the Laser to splash.
Stop	Stop working or motor axis motion.
Focus	Automatic searching for focus.
Menu	User parameters, factory parameters, language settings, etc.
Frame	To track by the current file's frame.
File	The management of the memory and U disc files.
Origin	Set the relative origin.
Power	Set the laser power of the current running layer, or set the power of
"Laser" Key.	
Shift	Special function switching.
Speed	Set the speed of the current running layer, or set the direction keys'
move speed.	
Esc	To stop work, or to exit to some menu.

-  Validate the change.
-  To move the X axes and Y axes or Up, down, left and right functions
-  Moving Z axis.
-  Moving U axis.
-  Point movement and continuous motion switching.
-  Decimal point.
-  Backspace.

Digital key 0~9: Used to set parameters.

## 7.1 The Main Interface

When the system is powered on, the screen will show as below:



The screenshot shows the main interface with the following components labeled:

- Graph display area:** A circular graphic showing a detailed engraving of a dragon or mythical creature.
- Processing progress:** A progress bar at the bottom left of the graph area, currently showing approximately 88% completion.
- Running parameters:** A table on the right side of the screen showing current settings:
 

File:	TempFile
Speed:	100mm/s
Max power:	85.5%/85.5%
X:	10000.0mm
Y:	10000.0mm
Z:	10000.0mm
- Coordinate:** The X, Y, and Z coordinate values listed in the running parameters table.
- Manual or continue:** A button labeled 'Normal' with a waveform icon, used to switch between manual and continuous motion.
- Graph layer parameters:** A table below the manual/continue button showing parameters for different layers:
 

0	Black	200mm/s	85.5%
1	Black	200mm/s	85.5%
2	Red	200mm/s	85.5%
3	Cyan	200mm/s	85.5%
4	Blue	200mm/s	85.5%
- Net Status:** A status bar at the bottom right showing 'Count: 88', 'Idle', and '00:00:00'.
- Working Number:** A button labeled 'Working Number'.
- Running Status:** A button labeled 'Running Status'.
- Working time:** A button labeled 'Working time'.
- Key lock:** A button with a lock icon labeled 'Key lock'.

# MX/EX/EX-C CO2 LASER OWNER'S MANUAL

**Graph Display Area:** To display the whole file's track and display the running track. **Running parameters:** To display the running file's file number, speed, max power etc. **Coordinate:** To display the current coordinate of X, Y and Z axis.

**Graph layer parameters:** To display the layers' information of the current file, such as max or min power, speed etc. When system is idle, double click the layer, then users can change the layer's parameters and the change would be saved.

**Running Status:** To display the current status of the machine, such as Idle, Run, Pause, Finish, etc.

**Running Progress Bar:** To display the progress bar of the current running file.

**Working Number:** To accumulate the work number of the current file.

**File Dimension:** To display the dimension of the current file.

**Net status:** To display the connecting status of the Ethernet. When the network



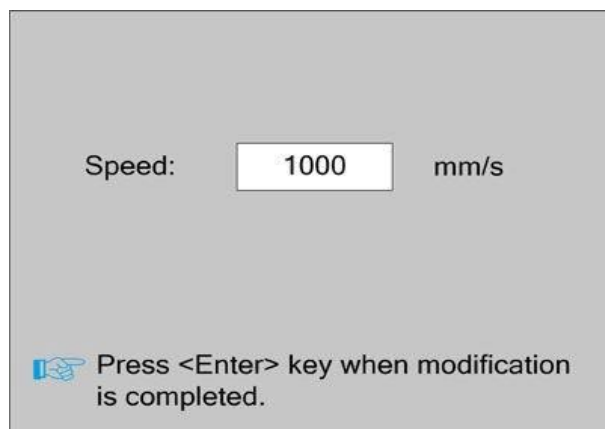
connection is successful, the icon  is displayed, otherwise the icon  is displayed.

**Key lock status** When the keyboard lock function is enabled, the icon is displayed, any key press does not respond and prompt for the unlock password, enter the correct unlock password before unlocking.

When work is Idle or finished, all keys can be pushed, users can select a file to run, set some parameters, preview to a select file etc. But, when work is running or paused, some keys don't respond when they are pushed.

## 7.2 Speed Setting

Push the < **Speed** > key when the screen is on the main interface, it will show as below:

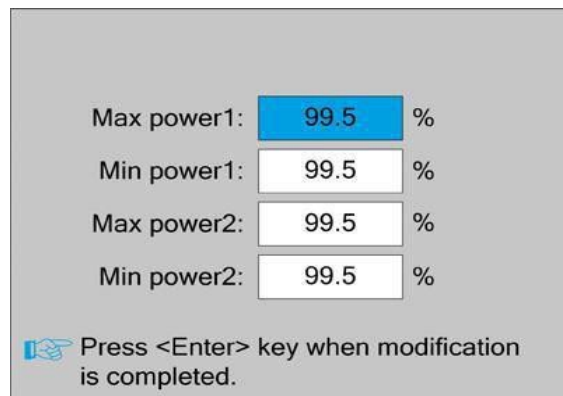


# MX/EX/EX-C CO2 LASER OWNER'S MANUAL

Press the number key and backspace key to set and modify the parameters. After modifying, press the **<Enter>** key to save the parameters. Press the **<Esc>** key to cancel the modification parameters. The interface disappears and returns to the main interface.

## 7.3 Max/Min Power Setting

Push the **< Power>** key when the screen is on the main interface, it will show as below:



At this point, the "blue selection block" stays on the first parameter to indicate that the parameter is selected, press the number key and the backspace key to set and modify the parameter.

Press the arrow button to move the "select block" to select other parameters for modification. When the parameters are modified, press the **<Enter>** key to save the parameters, press the **<Esc>** key to cancel the parameters, the interface disappears and returns to the main interface.

## 7.4 Set The Layer Parameters

After selecting a file to preview on the main interface, if there is layer information in the layer parameter area, show as below:

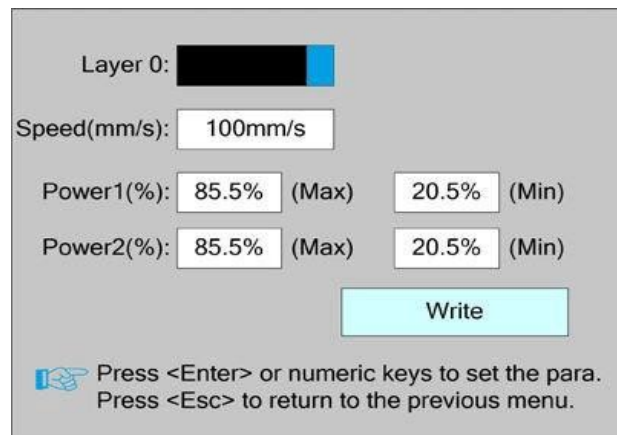
01		100mm/s	85.5%
02		100mm/s	85.5%
03		100mm/s	85.5%
04		100mm/s	85.5%

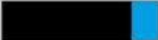
User can push **<Enter>** key to let the cursor move to the first layer show as below:

# MX/EX/EX-C CO2 LASER OWNER'S MANUAL

01		100mm/s 85.5%
02		100mm/s 85.5%
03		100mm/s 85.5%
04		100mm/s 85.5%

And then "Up and down" Keys can be pushed to select the intent layer, on that time, user can push <Enter> key to check the selected layer's parameters, show as below:





Layer 0: 

Speed(mm/s):

Power1(%):  (Max)  (Min)

Power2(%):  (Max)  (Min)

 Press <Enter> or numeric keys to set the para.  
Press <Esc> to return to the previous menu.

At this point, the "blue selection block" stays on the layer number entry, and then press the <Enter> key to enter the selection layer mode, while the "blue selection block" becomes , press the "up/down" key to select other layers, and then press the <Enter> key to exit the layer selection mode.

Then press the "up/down" key to move the "selection block" to the layer parameter entry to be modified.

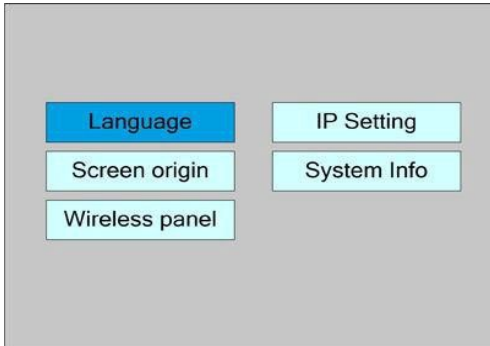
Press the number key and the backspace key to set and modify the parameters. After setting the parameters, move the "selection block" to the "write parameters" entry.

Press the <Enter> key to save the current layer parameters, otherwise the parameters will not be saved.

Press the <Esc> key interface to disappear and return to the main interface.

## 7.5 Controller Setting

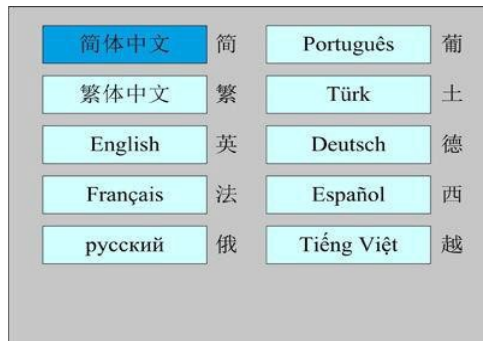
Select the "Controller Settings" entry under the menu interface, press the <Enter> button, and then pop up the controller settings interface as follows:



Press the <Esc> key to return to the previous menu.

## 7.6 Language

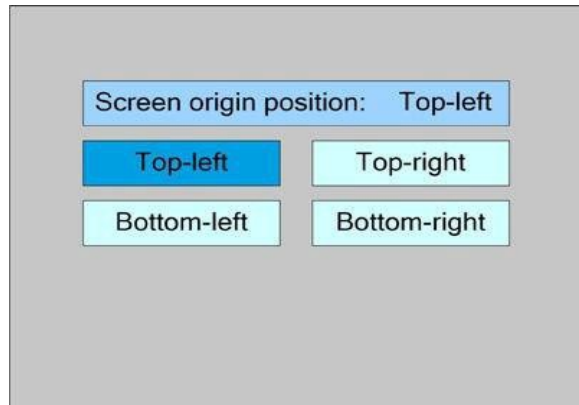
Select the "Language" entry under the controller setting interface, press the <Enter> button, and then pop up the language settings interface as follows:



Press the direction key to select a language and press the <Enter> key to set up the function and automatically return to the menu interface.

## 7.7 Screen Origin

Select the "Screen origin" entry under the controller setting interface, press the <Enter> button, and then pop up the interface as follows:



The display screen's origin position is set here, and different screen origin positions are selected to adjust the display graphics position in different X or Y directions.

Press the direction key to select an item and press the <Enter> key to set up the position and press the <Esc> key return to the main interface.

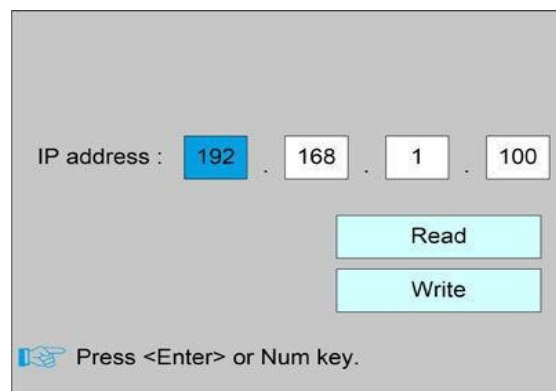
### WARNING

*This item is only used to preview the file on the screen, and it has no meaning to the machine's movement.*

---

## 7.8 IP Setting

Select the "IP setting" entry under the controller setting interface, press the <Enter> button, and then pop up the interface as follows:



Press the direction key to select a parameter, and then press the number key to modify the parameter.

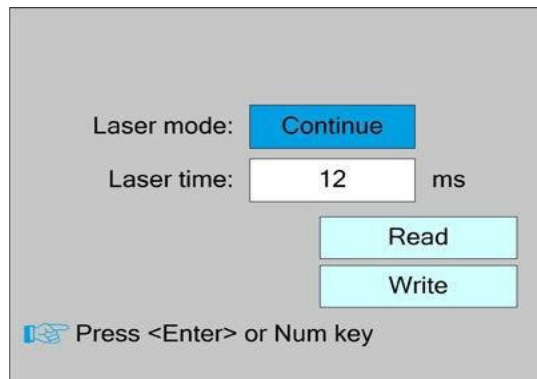
# MX/EX/EX-C CO2 LASER OWNER'S MANUAL

After the modification, move the "selection block" to the "Write" entry and press the <Enter> key.

The parameter setting takes effect. Press the <Esc> key to return to the menu at the previous menu.

## 7.9 Laser Setting

Select the "Laser setting" entry under the functions interface, press the <Enter> button, and then pop up the interface as follows:

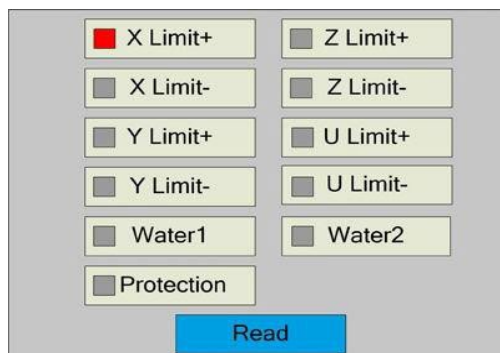


The operation method is the same as manual setting.

When "Continue" item is selected, then the "Laser time" item is not valid, on that time, push the Laser key to splash the enabled lasers, and when Laser key is loosed, then the lasers will finish splashing. When the Laser mode item is "Manual", then pushing the Laser key one time, the enabled lasers will splash a fixed time.

## 7.10 Diagnose

Select the "Diagnose" entry under the functions interface, press the <Enter> button, and then pop up the interface as follows:



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The interface displays the hardware IO information of the system and reads the hardware information of the system by pressing the <Enter> key.

When the hardware signal is triggered, the small box on the left side of the corresponding entry will show red. Otherwise, it will show gray.

Press the <Esc> key to return to the previous menu.

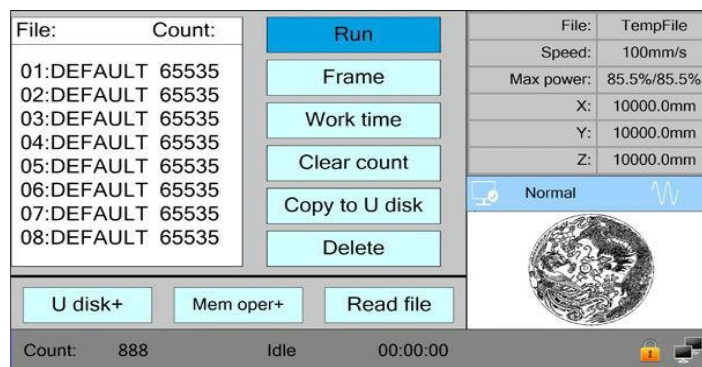
## 7.11 How to Upload and Run a File

1. Insert a USB with your design file into the machine.
2. Press the file button.
3. Press the right arrow button.
4. Press the arrow down button. The Udisk+ option should be highlighted in blue.
5. Press Enter
6. The "Read disk file" should be highlighted in blue. Press Enter
  - a. Files on the USB drive will be visible in the file menu.
7. Use the up/down arrow keys to highlight the desired file.
8. Press Enter to choose the file.
9. Use the arrow keys to highlight "Copy to mem" option.
10. Press Enter.
11. Press Enter again to copy the file to the machine memory.
12. Press ESC to return to the home screen and view your file in the file menu.

## 7.12 File Management

### 7.12.1 Memory File

Push the <Menu> key when the screen is on the main interface, it will show as below:



## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

---

When showing this menu, the system would read the memory file first, the file name and the work times would be listed in the area, and the selected file is previewed in the bottom right area.

<Up

>/<Down> keys could be used to move the cursor on the file name list.

When the cursor is on a target file name, presses the <Enter> key, the selected file will be previewed on the main interface, and then if <Esc> key is pushed, the preview will disappear.

<Left>/<Right> keys could be used to move the cursor left and right. Press the <Esc> key to return to the previous menu.

The items on the right and bottom are as follows:

*Run:* To run the selected file.

*Track:* To track the selected file, and the track mode is optional.

*Work time:* To forecast the running time of the selected file, and the time is accurate to 1ms; *Clear count:* To clear the running times of the selected file.

*Copy to U disk:* To copy the selected file to U disk; *Delete:* To delete the selected file in the memory; *U disk:* read the U disk file list.

*Memory operation:* the other operation of the memory files; *Read mem file:* read the memory file list.

## 7.12.2 Memory Operation

Select the "Memory Operation" entry in the above interface and press the <Enter> button, then the pop-up menu appears as follows:



*Clear All Count:* To clear the running times of every file in the memory.

*Delete All File:* To delete all memory files.

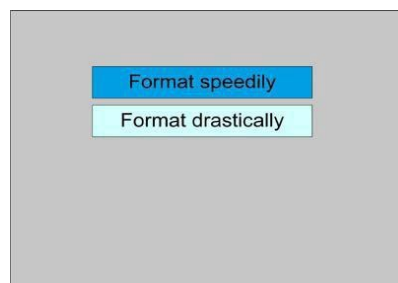
*Format Memory:* To format memory speedily, and then all the files in memory will be deleted.

*Total:* the total running times of all the files.

Methods of operation are the same as above. Press the <ESC> key to return to the previous menu.

### Format Memory

Select the "Format Memory" entry in the above interface and press the <Enter> button, then the pop-up menu appears as follows:

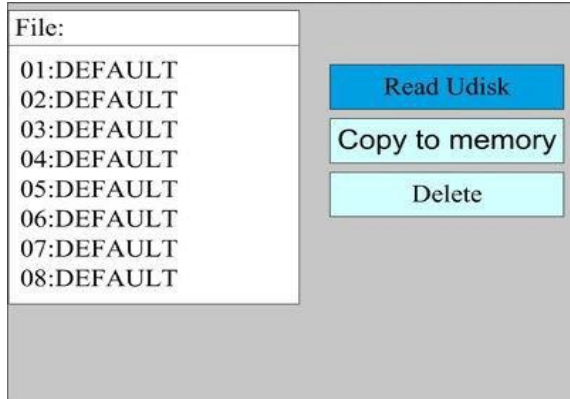


*Format Speedily:* To format memory speedily, and then all the files in memory will be deleted.

*Format Drastically:* To format memory drastically, and then all the files in memory will be deleted.

Methods of operation are the same as above. Press the <Esc> key to return to the previous menu. U Disk File

If the "U disk" entry in is pressed, the system will show as figure 8.8-4, and the operation method is all the same as.



*Read Udisk:* read the file list in the Udisk.

*Copy To Memory:* copy the target Udisk file to the memory; *Delete:* delete the selected Udisk file.

## 7.13 Camera for the EX-C Model

The EX-C model can utilize a camera that uses registration dots to help make precise cuts. The EX-C uses the visual cutting software RD vision to use with the camera.

To configure the RD vision software, refer to the software owners' manual.

# MX/EX/EX-C CO2 LASER OWNER'S MANUAL

## 8.0 Overview

The Laguna X Series CO2 Lasers (MX, EX, EX-C) are powerful CO2 laser cutters and engravers that comes packed with user-friendly features to make operation a breeze. These lasers are equipped with a laser tube offering high output power with incredible resolution. With automatic focusing, precision linear guide rails, and many more features, these lasers are user-friendly CO2 laser cutter capable of incredible power and fine detail.

## 8.1 Components & Hardware

1x-Laser machine  
(MX, EX, or EX-C)



1x-Spare  
Limit Switch

1x-USB Cable

1x-Ethernet  
Cable

1x-Power  
Cable

1x-Alarm  
Cable



1x- Laser Tube  
100W laser tube  
(MX) or 150W  
laser tube (EX &  
EX-C)



(Fragile! Do not drop)

1x-Exhaust  
Reducer

2x-Exhaust  
Tubes

3x-Exhaust  
Tube clamps



1x-Chiller



1x-Toolbox



# MX/EX/EX-C CO2 LASER OWNER'S MANUAL

1x- Exhaust Fan



1x- USB Drive



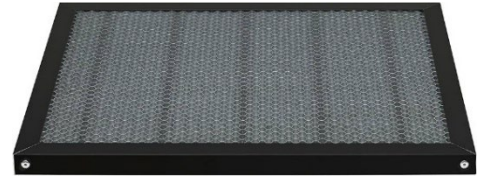
1x- Air Valve



1x- Air Pump w/air pump hose.



1x- Honeycomb Table (pre-installed)



1x-Lens Cleaner



2x-Keys  
1x-Alignment Crosshair



1x-Fuse



2x-Plates



1x-Flathead Screwdriver



4x-Allen Keys

1x-Diode



1x-Test Piece



## 9.0 Unloading & Unpacking the Machine

### NOTE

*All shipping-related claims for loss or damaged goods must be made to Laguna Tools within 24 hours of delivery.*

*Contact Laguna Tools customer service department to make claims for any damaged items/parts.*

*The original packaging is required to return damaged goods within the warranty period.*

---

The machine should be delivered on a trailer by one or a combination of these methods:

- |    |            |    |                        |
|----|------------|----|------------------------|
| 1. | In a crate | 3. | Heat shrunk in plastic |
| 2. | In a box   | 4. | Sitting on a pallet    |

BEFORE unpacking your new machine, inspect the packaging, invoice, and the shipping documents supplied by the driver. When unpacking the machine, verify there are no signs of damage to the parts or machine you have received.

See the components section to cross reference the parts you should receive.

### WARNING

*The customer is required to have a forklift (6000 lbs. or larger is recommended) with 72-inch forks or fork extensions.*

---

### WARNING

*Unload the machine with care. DO NOT pinch, crush, or damage any components that are on/around the machine.*

---

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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### WARNING

*This machine is heavy. Seek assistance from an experienced professional if you have any doubt about the following unboxing or set up procedures.*

*DO NOT attempt any procedure that you feel is unsafe or you believe you do not have the physical capability of achieving.*

---

### CAUTION

*When determining location, verify there is sufficient room around the machine. If you cannot fully open all the doors around the machine, it cannot be installed or serviced in the future if necessary.*

---

Tools needed:

- Crowbar or prybar
- Forklift or pallet jack
- Drill with Phillips head bit
- Tin snips

BEFORE moving the machine to the desired location, verify that there is sufficient room around the dust collector to facilitate easy access to the workpiece, perform maintenance, and provide a safe exit in the event of an emergency.

1. Use a forklift (6000 lbs. or larger is recommended) with 72-inch forks or fork extensions to unload the machine from the trailer.
2. Move the machine to a desired location.
3. Use tin snips to cut and remove any straps.
4. Use a drill with Phillips head bit to remove any screws that are securing the machine to the pallet/crate.
5. If necessary, use the prybar to remove any surrounding wood.
6. Use the forklift to lift the machine and remove the pallet/crate.
7. Lower the machine gently on the floor.
8. Ensure that all parts/components are present and in good condition.

## 10.0 Setup and Assembly



### WARNING

*To avoid and prevent injury, setup problems, and potential damage to the machine, read through the entire setup section prior to proceeding.*

---



### DANGER

*DO NOT plug in the machine until setup and assembly is complete.*

---

#### *Tools Needed*

- 3mm Allen key
  - 2.5mm Allen key
  - Wire cutters or scissors
  - Phillips screwdriver
1. Remove all parts and components from the machine.
  2. Use the wire cutters to remove all zip ties from the belts and other areas with a cutting tool.



### CAUTION

*DO NOT cut or nick the belts when removing the zip ties.*

---

## 10.1 Leveling the Machine

The laser machine comes installed with casters and leveling feet.

### NOTE

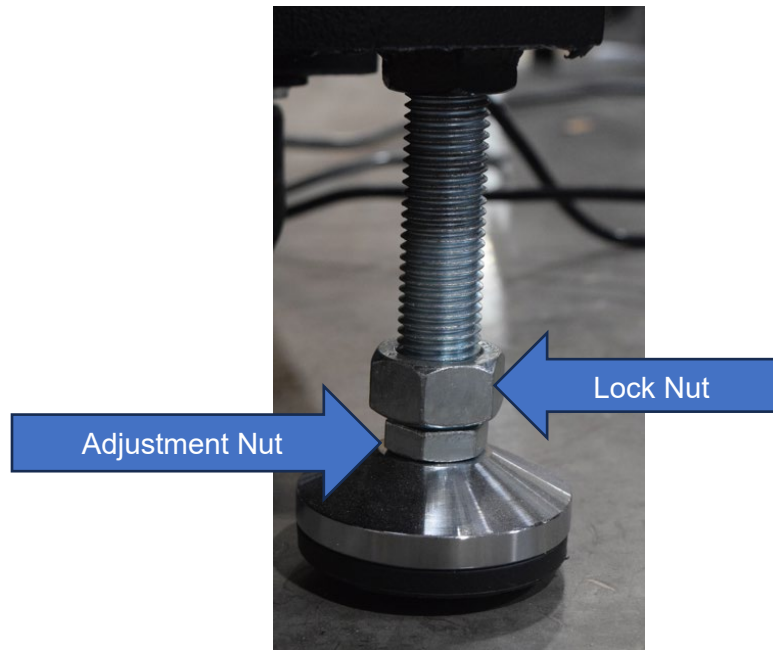
*We recommend adjusting the leveling feet to the floor.*

*The casters may be locked in place without adjusting the leveling feet, but the machine will be more prone to unwanted movement.*

---

Tools & items needed:

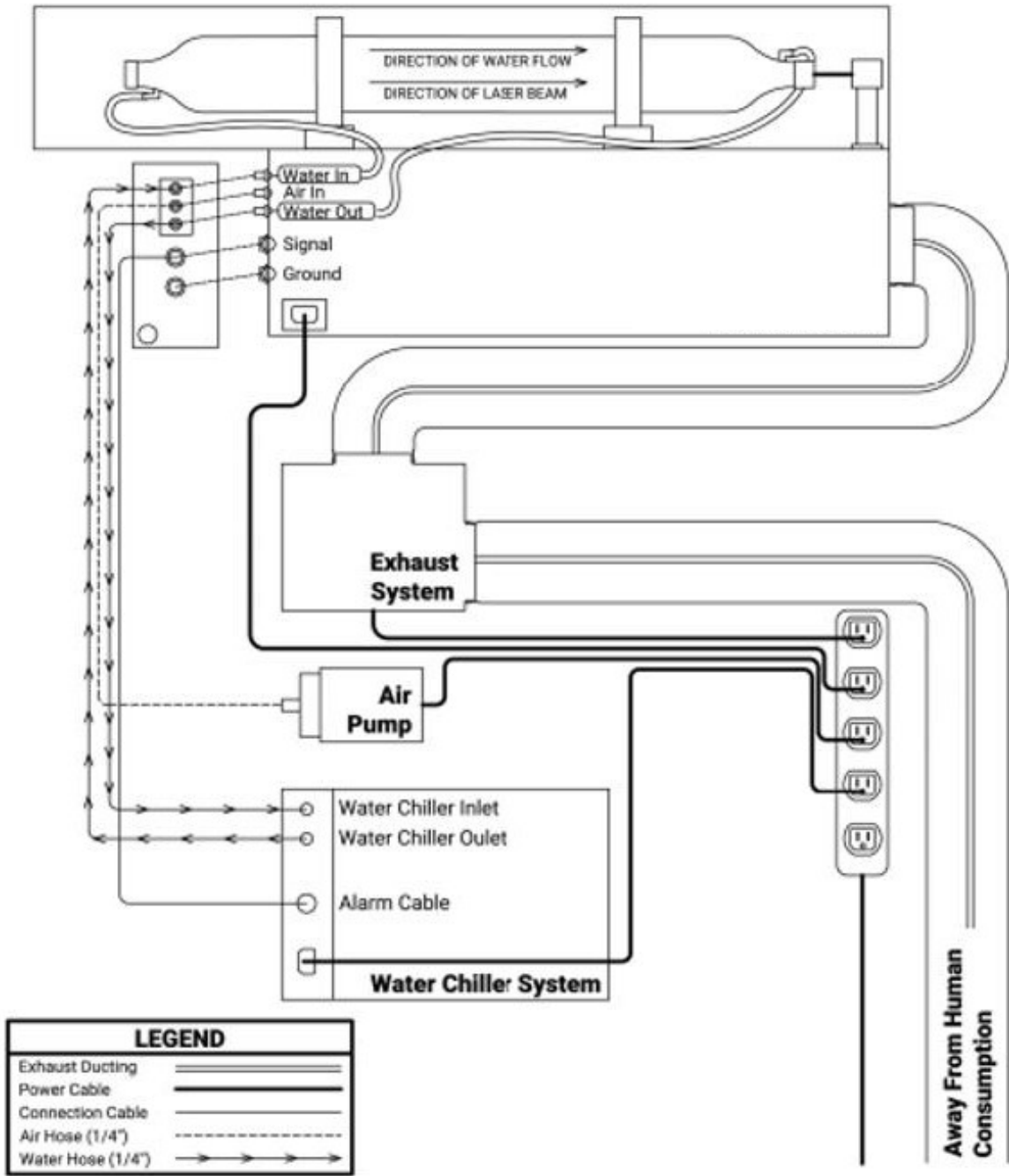
- Crescent wrench
  - Level
1. Place a level on the machine to see if it is level.
    - a. If the machine is level, no adjustment is needed.
    - b. If the machine is not level, the leveling feet will need to be adjusted.
  2. Use the crescent wrench to turn the adjustment nut clockwise/counterclockwise to make any adjustments.
  3. Ensure the lock nut is tight.



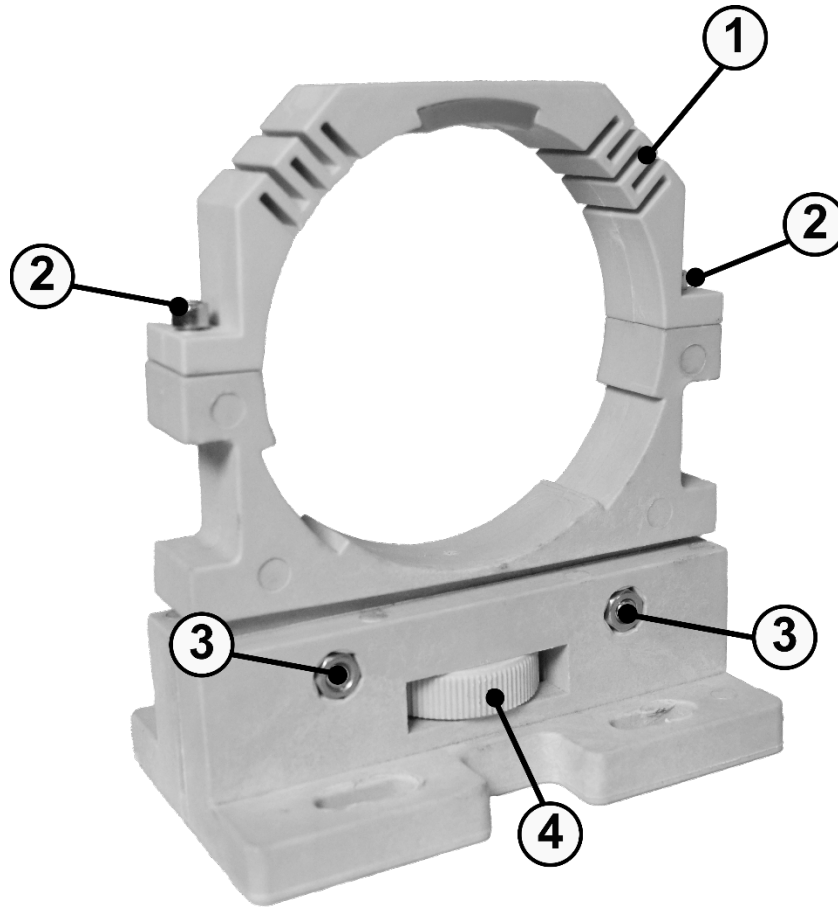
4. Place a level on the machine to check for levelness and adjust as needed.
5. Tighten the lock nut when final adjustments are made.

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## 10.2 Connection Diagram



### 10.3 Laser Tube Installation



*Figure 6-2: Laser Tube Mount*

- |                            |                                |
|----------------------------|--------------------------------|
| 1. Top mount               | 2. Tube top lock screws        |
| 3. Tube height lock screws | 4. Tube height adjustment dial |

1. Open the rear panel of the laser machine.
2. Use a 3mm Allen key to remove the tube top lock screws from all the mounts.
  - a. Remove the top of the mounts.
3. Use a 2.5mm Allen key to remove the side door. This will provide more clearance.
4. Unbox the laser tube. **THE LASER TUBE IS FRAGILE; DO NOT DROP IT!**
  - a. Remove the red endcap. **DO NOT TWIST IT OFF; PULL IT STRAIGHT OUT.**

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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5. **Carefully** place the laser tube into the mounts.
  - a. Seat the tube snugly into the mounts.



### CAUTION

*The laser tube is very fragile. DO NOT BREAK IT.*

---

6. On the side door side, use a Phillips screwdriver to remove the positive lead terminal screw.
  - a. Place your hand under the screw so that it does not fall down.



7. Attach the positive lead to the laser tube and tighten it down with the terminal screw.



8. Position the lead parallel to the laser tube.

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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7. Push the red endcap onto the laser tube. DO NOT TWIST IT.



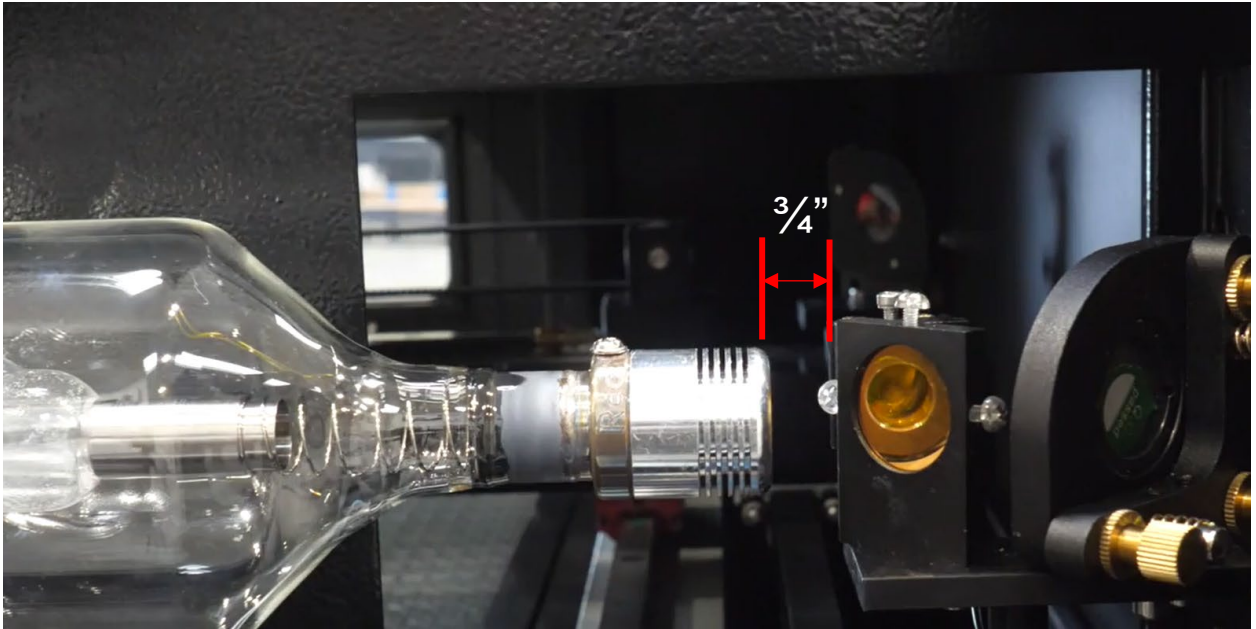
9. Locate the water outlet and inlet hoses.
10. Attach the hose onto the water **inlet** stem on the laser tube.
  - a. Spray denatured alcohol into the hose to help slip it onto the stem.



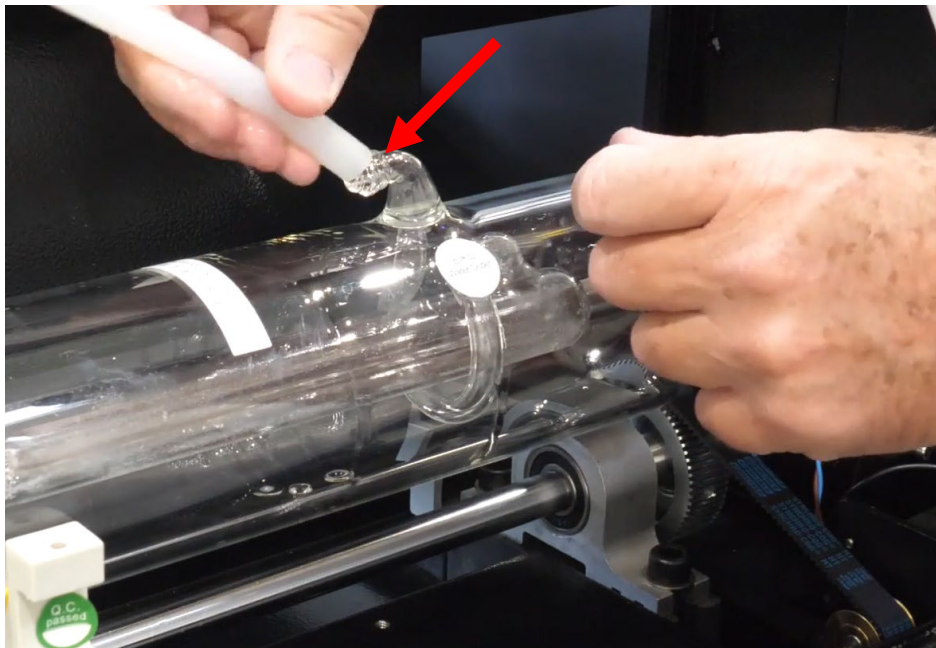
11. Tuck the hose back into the machine.

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

12. Position the tube to leave a  $\frac{3}{4}$ " gap between the mirror and the laser tube end.

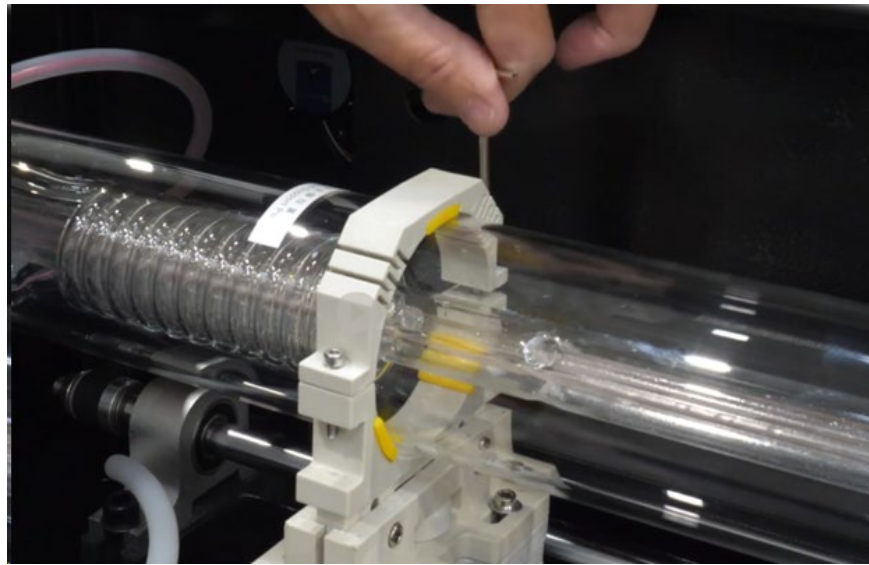


13. Replace the side door.
14. Attach the other hose to the water **outlet** stem of the laser tube.
  - a. Spray denatured alcohol into the hose to help slip it on the stem.





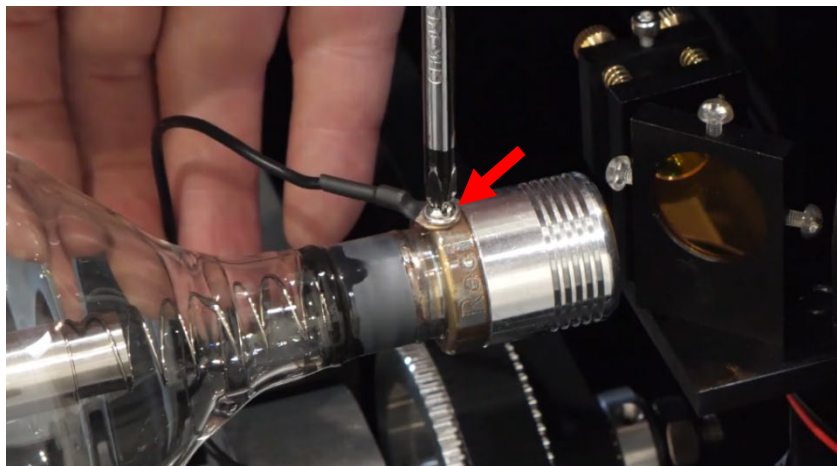
15. Replace the upper mounts and tighten them down. **DO NOT OVERTIGHTEN THE SCREWS.**



16. On the mirror side, use a Phillips screwdriver to remove the negative lead terminal screw.

a. Place your hand below the screw so that it does not fall down.

17. Attach the negative lead to the laser tube and tighten it down with the terminal screw.



18. Close the panel.

19. The laser tube is now installed.

## 10.4 Chiller Setup



### DANGER

*DO NOT plug in the machine until setup and assembly is complete.*

---



### WARNING

*DO NOT connect to a power supply until the setup is complete. DO NOT perform any of the following steps, installations, or adjustments with the machine connected to a power source unless directed to do so.*

---



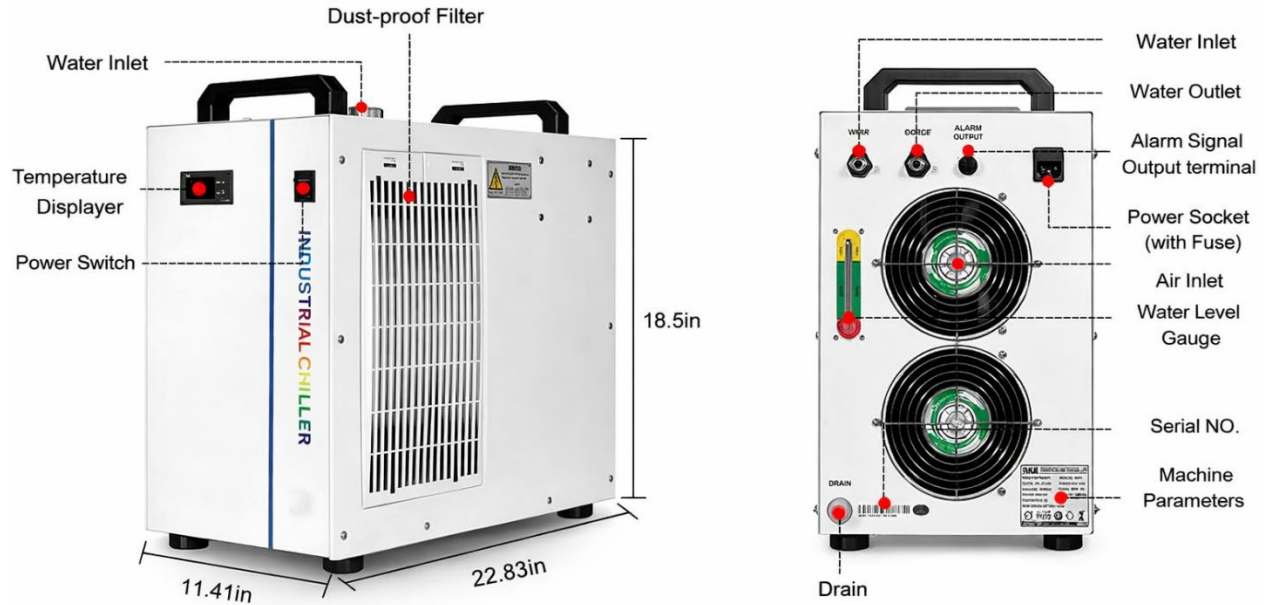
### CAUTION

*ONLY use deionized or distilled water (tap water or bottled water contains minerals which will affect the performance and life of the laser tube).*

*DO NOT use any type of chemical coolant.*

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## NOTE

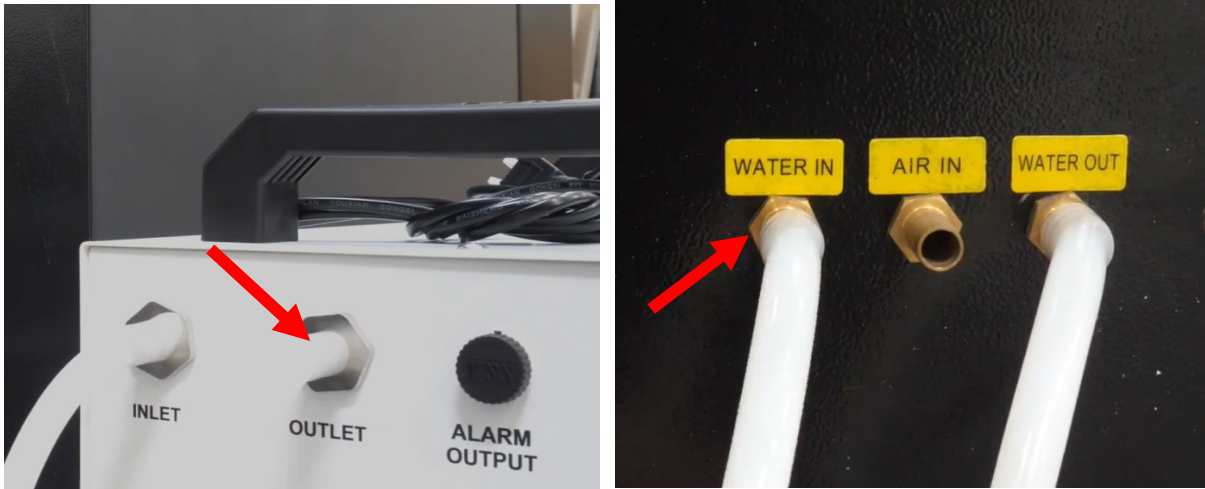
**Seven (7) liters (1.85 Gal) of distilled or deionized water are required to fill the chiller.**

1. Measure out seven (7) liters (1.85 Gal) of **distilled** or **deionized water** and place to the side.
2. Place the chiller in its location.
3. Select a water tubing and press fit one end of the water tubing to the chiller **INLET** and the other end to the machine **WATER OUT**.



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4. Select the other water tubing and press fit one end of the water tubing to the chiller **OUTLET** and the other end to the machine **WATER IN**.



5. Connect the alarm cable three prong end to the chiller alarm output.



6. Connect the alarm cable four prong end to the machine signal input.



## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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7. Unscrew the cap and fill the unit with 1.85 gallons (7 liters) of water.
8. Insert the power cord into the chiller.



9. Plug in the chiller to power.
10. Turn the chiller on.
  - a. The chiller will beep when powered on.
11. The laser tube will fill up with water.
  - a. Before using the laser, let the chiller run for a few minutes to clear any air bubbles.

### NOTE

*The water should be flowing in the tube in the same direction that the laser is firing (i.e., towards the first mirror).*

---

12. **DO NOT** connect the laser to power until setup is complete.

## 10.5 Fume Extractor Setup

### DANGER

*DO NOT plug in the machine until setup and assembly is complete.*

---

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

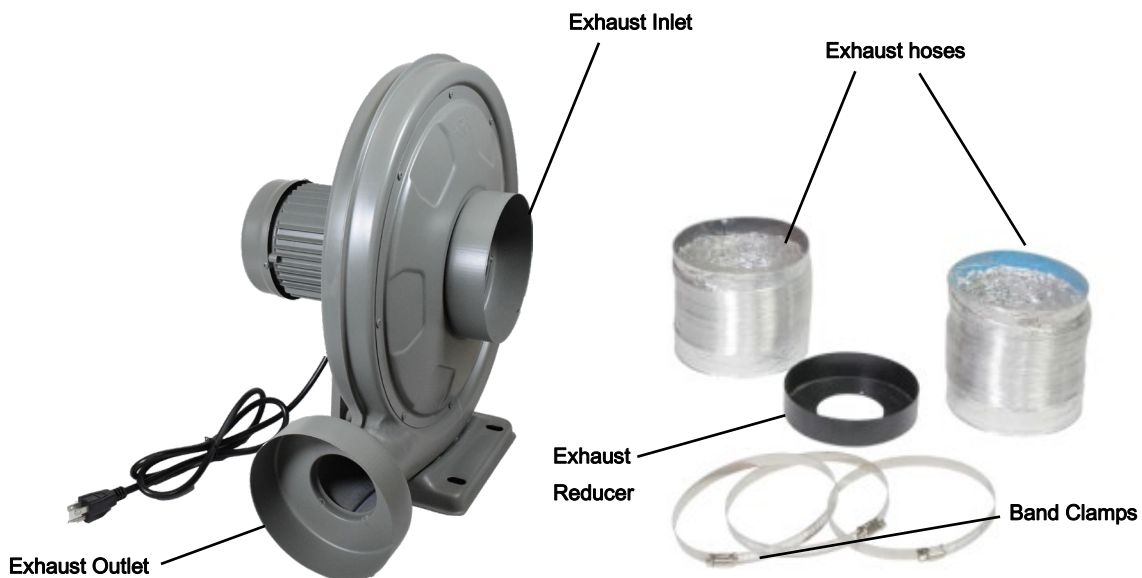
### WARNING

***DO NOT connect to a power supply until the setup is complete. DO NOT perform any of the following steps, installations, or adjustments with the machine connected to a power source unless directed to do so.***

### WARNING

***DO NOT let the exhaust fan tip over. The fan can tip over if not fastened to a base.***

The machine must ventilate the fumes during operation. Three (3) band clamps, two (2) ducting tubes, the blower unit, and a flathead screwdriver to fasten the clamps are required.



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1. Attach the exhaust hose to the rear of the machine and secure it with a band clamp.



2. Attach the other end to the blower and secure it with a band clamp.



3. Attach the other hose it to the exhaust outlet port.
4. Secure it with a band clamp.
  - a. The open end of this hose must be placed outside to ensure safe ventilation.

### **WARNING**

***The exhaust must safely and legally draw the fumes away from the laser machine to prevent inhalation by personnel or bystanders.***

---

## NOTE

*It is recommended to use an indoor fume extractor to isolate and control the fumes that are emitted from laser cutting and engraving.*

---

## 10.6 Air Pump Setup

### DANGER

*DO NOT plug in the laser machine until setup and assembly is complete.*

---

### WARNING

*DO NOT connect to a power supply until setup is complete.  
DO NOT perform any of the following steps, installations, or adjustments with the machine connected to a power source unless directed to do so.*

---



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The air pump needs to supply air to the nozzle to direct fumes away from the focal lens.

Installation requires the air pump, quick set adapter, and a 1/4" inch air hose.

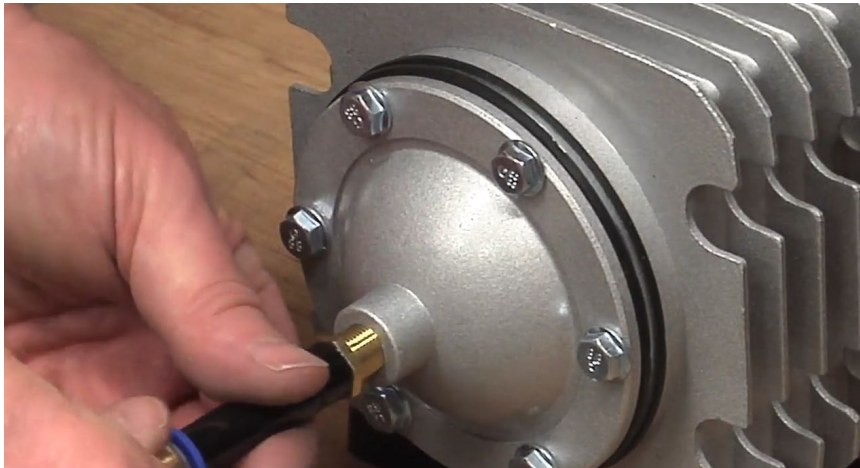
The air pump outputs 5-6 PSI.

### NOTE

*We recommend wrapping the threaded end of the air hose with Teflon tape*

---

1. Screw the air hose into the air pump adapter insert until it is hand tight.
  - a. Tighten the nut with a 14mm wrench. **DO NOT** overtighten the nut.



### NOTE

*Verify the air hose fits all the way into the adapter.*

*The connection should leak very slightly; this is normal.*

---

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2. Press fit the  $\frac{1}{4}$  inch air hose into the connection on the back of the laser machine.



3. **DO NOT** connect to power until safety check is performed.

### 10.7 Laser and Component Safety Check



#### **DANGER**

***DO NOT plug in the laser machine until setup and assembly is complete.***

---

1. With the power still unplugged, verify that all connections are correct.
2. Verify the water and air connections are not leaking. Tighten them if they are leaking.



#### **WARNING**

***Verify wiring is correct according to local electric code. All needed electrical information can be found in the Electrical Safety Section***

---

### NOTE

*It is recommended to use a power strip with an on/off switch to give power to the machine and all components at the same time and to turn them on and off easily.*

---

6. Plug in the chiller to power.
7. Open the rear panel of the laser machine.
8. Turn the chiller to the "ON" position.
  - a. The chiller alarm will beep several times before it is ready to perform. This is normal.
9. Water will flow through the laser tube.
  - a. Verify that water flows through the laser tube from left to right (towards the first mirror)
10. Verify the chiller alarm works by performing the "pinch test" (pinch any water tube for twenty (20) seconds or until alarm sounds).
  - a. If the alarm sounds, the chiller alarm works correctly.
  - b. If the alarm does not sound, verify that all connections are tight and secure.
12. Close the rear panel.
11. Plug in the fume extractor to power. (power strip recommend) It will turn on when plugged in. Make sure that the exhaust fumes are directed outside.
12. Plug in the air compressor to power. (power strip recommend) It will turn on when plugged in.
13. Check that all components are working. **Do not** give power to the laser machine during this check.
  - a. **Fume Extractor:** Verify the ducting tube is installed and will not come loose. Verify the fan will not tip over.
  - b. **Air Compressor:** Ensure that air flows to the laser head assembly.
  - c. **Laser Tube:** Verify the positive and negative lead screws are connected and tightened to the laser tube. DO NOT overtighten it.

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- d. **Chiller:** With the rear panel open, water in the chiller, and all connections made, give power to the chiller verify there are no leaks or faulty connections. Confirm that the water is flowing from right to left (towards the first mirror). Verify the alarm works by performing the “pinch test” (pinch any water tube for twenty (20) seconds or until alarm sounds).

### 10.8 Alignment Check and Test Run

1. With the chiller still on, plug in the laser machine to power (110V needed)
2. Flip the breaker up to the ON position



3. Verify the emergency stop is disengaged and turn on the controller by turning the key clockwise.
4. Open the laser lid. There should be a red dot under the nozzle of the laser. This red dot is combined in the beam combiner to be in the exact same path as the laser tube.




#### CAUTION

***If you do not see a red dot, then the laser is not aligned to the mirrors correctly.***

***If no red dot is visible, view the mirror alignment procedure.***

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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- a. If the red dot is present, open the lid and place a scrap piece of wood under the laser head, aligning the red dot with the expected firing point of the laser (on the scrap wood)
2. Rise the lift bed until the focal length sensor engages and stops the lift bed.
3. Close all doors.
4. Put on all safety equipment (ex. Safety glasses)
5. Press the PULSE button 
6. If the laser has pulsed properly and a small burn mark is present in the sample, setup and safety testing is complete.



### 11.0 Engraving and Cutting a Workpiece

1. Verify the laser is powered on.
2. Confirm the chiller is on and filled with clean, distilled water.
3. Check that the air pump is on and all connections are secure.
4. Ensure the exhaust fan is running and hoses are secure.
5. Confirm the laser beam is aligned.
6. Select the workpiece and change the engraving/cutting settings to correlate with the material being used. These settings can include power, speed, interval gap, and thickness. Reference section 14.0 for guidance on different materials.
7. Insert the USB with your design into the laser machine.
8. Upload your file from the USB to the laser machine. (section 6.11)
9. Place the workpiece on to the laser bed; make sure it is flat.
10. Focus the laser.
11. Move the laser head to the desired start point.
12. Close the lid and put on laser safe PPE (personal protective equipment (ex. Laser safety glasses))



13. Press  .
14. Let fumes clear before opening lid.

### 12.0 Software

A computer is required to download any software.

RDWorks is a design software for this machine that is included on the USB drive. You can download RDWorks by plugging in the USB.

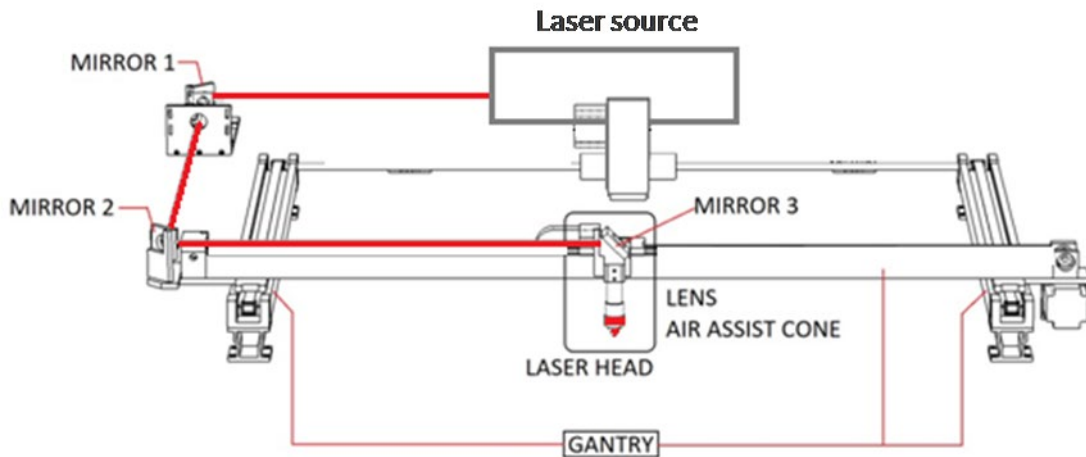
Lightburn is also a design software for lasers that is sold separately. Laguna Tools recommends using the Lightburn software to create designs. It is a user-friendly software that works well with the laser.

To configure the software, refer to the software owners' manual.

## 13.0 Adjustments

### 13.1 Adjusting the Mirrors

Adjusting the mirrors will affect where the laser beam will be directed. Below is an illustration of how the laser beam process works.



There are three adjusting bolts (brass) at different corners of the mirror support. When you adjust the angle of the mirror, you affect where the laser beam will hit the next mirror in the chain.

Place a piece of paper tape to front of the mirror you are aligning. This will show the test dot in a new position after adjustment.

Adjustments should be made to the mirror when the target is as far away as possible, small changes in the mirror are magnified over the distance and the alignment will be more accurate.

There are 3 mirrors in the laser cutter; alignment should be done on each mirror in order. Any adjustments made will affect all the mirrors that are further down the laser path, so changes made to mirror 1 will affect mirrors 2 and 3.

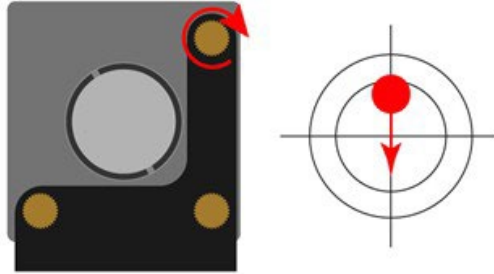
#### NOTE

*The machine figures shown in manual are for reference only.  
Please note that actual machine may differ from shown  
figures.*

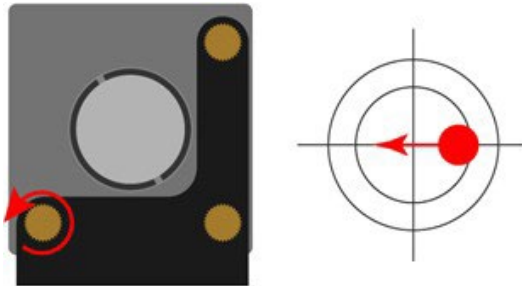
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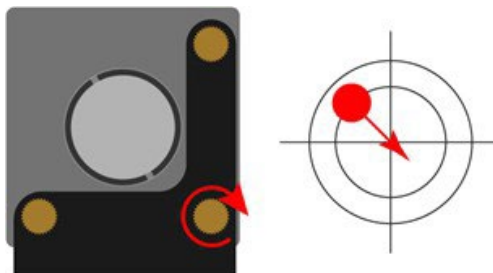
For **UP and DOWN adjustment**: If you turn the top knob half a turn to the right, clockwise, you will see the new test dot position is a few mm lower than it was before. Turn the knob half a turn back to the left (anticlockwise) and the test dot will go back to its original position.



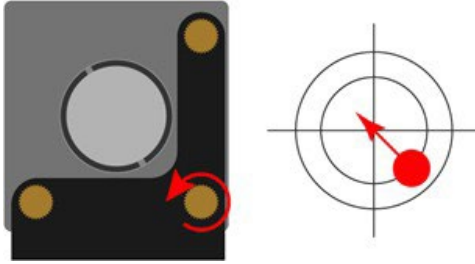
For **LEFT and RIGHT adjustment**: The left-hand adjustment knob will do the same, but it moves the laser left and right. Don't forget to loosen the retaining nut before adjustment and tighten it again once you have finished.



For **diagonally movement DOWN LEFT**: If you turn the right-hand adjustment knob half a turn to the right, clockwise, you will see the test dot move is a few mm lower than it was before. Turn the knob half a turn to the left (anticlockwise) and the test dot will go back same position.



For **diagonally movement UP RIGHT**: If you turn the right-hand adjustment knob half a turn to the left, anti-clockwise, you will see the test dot move is a few mm up right. Turn the knob half a turn to the left (clockwise) and the dot will go back same position.



## 13.1.1 Tube to Mirror 1

1. Place a piece of paper tape on mirror one.
2. Press the PULSE button.
3. Take note of where the dot is.

If the dot does not hit near the middle of the tape, you may need to **adjust the laser tube**.



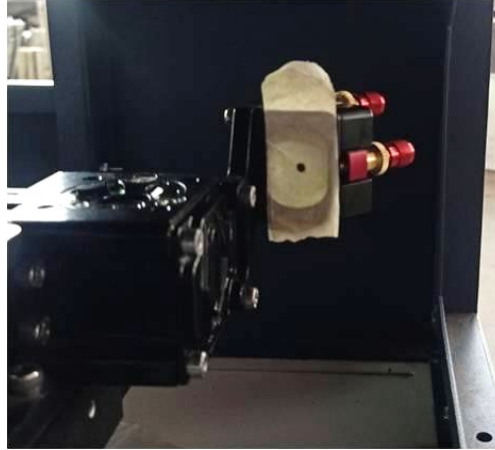
## 13.1.2 Mirror 1 to Mirror 2

Mirror 2 is fixed on the left-hand side of the machine, and it only moves forward and backward.

1. Place a piece of paper tape on the front of mirror 2.
2. Move the laser head all the way to the back of the machine.
3. Press the PULSE button.
4. Take note of where the dot is.
5. Move the laser head to the front of the machine.
6. Press the PULSE button.

The two dots should be in the same position when the machine is aligned. The mirror can be adjusted from the front of the machine but if you are uncertain, it is easier to be standing behind the machine looking forward.

7. Repeat alignment steps until the dot is in the middle of the tape.



Adjust mirror 1 back side knob, until the dot is in the same location both front and back. It does not matter if this dot is not exactly in the middle of mirror.

2. Don't forget to add layers of tape if the target starts to burn.

### 13.1.3 Mirror 2 to Mirror 3

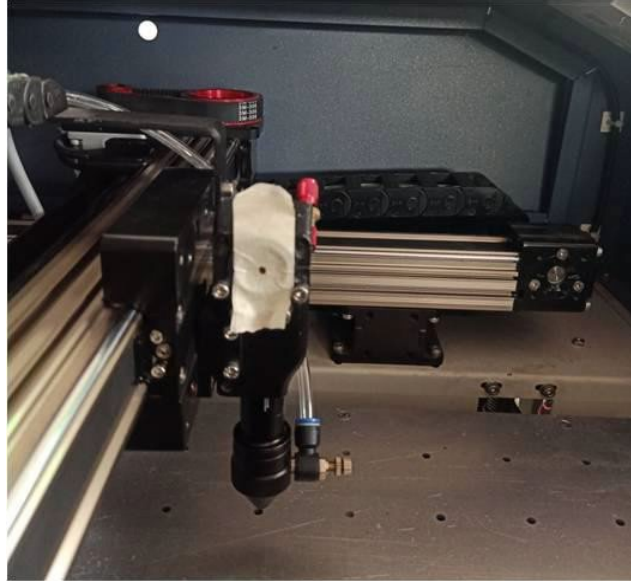
Mirror 2 to 3 is almost exactly the same as Mirror 1 to 2, just a bit easier to access.

8. Place a piece of paper tape on the front of mirror 3.
9. With the gantry in the middle of the laser (front to back), move the laser head all the way to the left of the machine.
10. Press the PULSE button.
11. Take note of where the dot is.
12. Move the laser head to the all the way to the right of the machine.
13. Press the PULSE button.

The two dots should be in the same position when the machine is aligned. The mirror can be adjusted from the front of the machine but if you are uncertain, it is easier to be standing behind the machine looking forward.

Adjust mirror 2 back side knob until the dot is in the same position at both the left and right-hand side of the machine. Again, it is more important that this dot is in the same position rather than in the middle of the hole.

14. Repeat alignment steps until the dot is in the middle of the tape.



## 13.1.4 Mirror 3 to Lens

1. Place a piece of paper tape on bottom of the laser head.
2. Press the PULSE button.
3. Take note of where the dot is.
4. Adjust mirror 3 if the dot does not hit near the middle.

If the dot does not hit near the middle of the tape, you may need to adjust. Fix the tape as shown in figure for adjustment. After adjustment, the mark can be like shown in right side figure below.

Laser beam Alignment of nozzle hole can be adjusted by Mirror 3, and it set to be in middle.

5. Repeat alignment steps until the dot is in the middle of the tape.

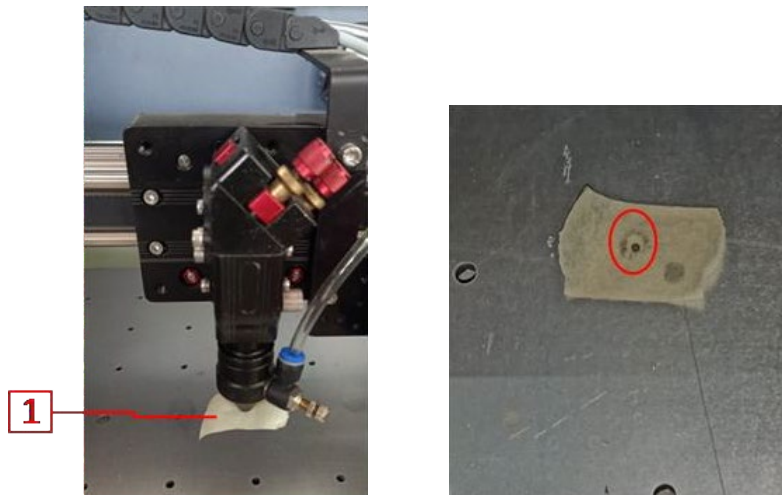


Figure 28

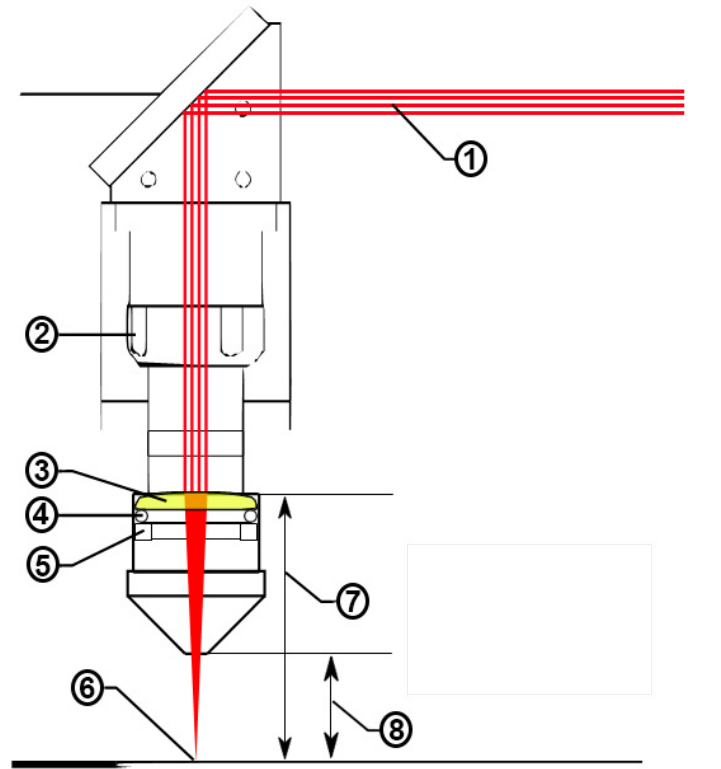
## 13.2 Focal Lens Adjustments

The laser will enter the head assembly and concentrate via the focal lens. Make sure that the laser has correct focal spacing, as this is extremely important to cut/etch quality. This is done automatically via the Automatic Focusing Focus Focal Sensor.

The pre-installed lens is 20mm in diameter, made of ZnSe through the particle vapor deposition process (PVD), and has a focal length of 50.8mm. The lens should be checked often for cleanliness and can be changed for lenses of different purposes.

To make cuts and engravings on different materials, the operator will need to adjust the focal length according to the material's properties. This is either done using the lift bed and the focal length sensor, or by adjusting manually.

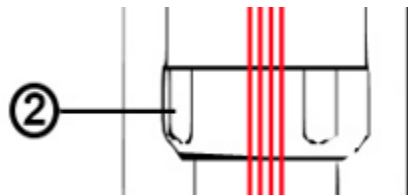
Diameter / Material / Focal Length	Purpose
20mm / PVD ZnSe / 25.4mm	Optimized for Engraving
20mm / PVD ZnSe / 50.8mm	General Use (Standard Lens)
20mm / PVD ZnSe / 101mm	Optimized for cutting or on round surfaces without rotary attachment



- |                                      |                            |  |                  |
|--------------------------------------|----------------------------|--|------------------|
| 1. Incoming, unfocused IR laser beam | 2. Height adjustment clamp | 3. Focal Lens (Standard is 63.5 mm in length, 20mm diameter) | 4. Rubber seal   |
| 5. Lock ring                         | 6. Focused IR laser beam   | 7. Focal Length  | 8. Focal spacing |

## 13.2.1 Adjustment Procedures

1. Unscrew the height adjustment clamp (2)

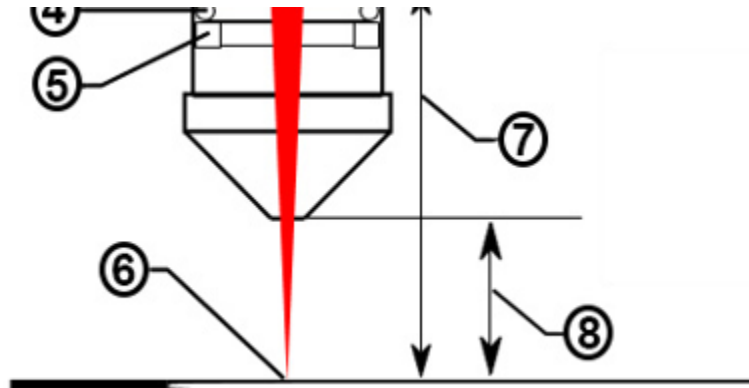


2. Adjust the height of the laser tube such that the focused beam (6) is in contact with the work surface.

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- a. This can be achieved by setting the focal spacing (8) to a distance between 7mm and 9 mm.



3. The focal spacing (8) will depend on the process and the material, but it is generally between 7mm and 9 mm.



### WARNING

***NEVER use the laser machine without the focal lens in place.***

---

### NOTE

***The maximum cut depth depends on the material. Always test the operation prior to running a work file.***

---

## **14.0 Feeds, Speeds, and Safe/Unsafe Materials to Use**

### **14.1 Unsafe Materials for Cutting, Etching, or Engraving**

The following materials are not permitted to be used with any CO2 laser processing machine. This list is not a complete list and there may be other materials that can harm the operator and the machine.

**NOTE**

***Most materials have a “Material Safety Data Sheet” (MSDS) that indicates whether they are safe to expose to high heat. Materials containing chlorine are unsafe for the laser and for anyone exposed to the fumes.***

***Contact Laguna Tools if you need help identifying whether a material is safe to laser.***

*Table 1-1: Prohibited Materials*

<b>Material</b>	<b>Danger</b>
Metals (some exceptions for engraving with specific agents)	Fumes can irritate the eyes, skin, and respiratory tract. Reflective metal can reduce laser power and damage lens and machine components
PVC (Polyvinyl Chloride) PVC Compounds Vinyl Vinyl with Chlorine Artificial Leather	Fumes from polyvinyl chloride can irritate eyes, skin, and respiratory tract. Do not expose to high temperatures. Toxic gas is harmful to the operator and bystanders. Chlorine-based fumes can irritate eyes, skin, and respiratory tract. Do not expose to high temperatures. Acidic byproducts are harmful to the lens and machine components.
Polycarbonate (Lexan) Polycarbonate Epoxy Fiberglass Resin	Fumes can irritate eyes, skin, and respiratory tract Toxic gas is harmful to the operator and bystanders. Acidic byproducts are harmful to the lens and machine components. Material Properties resist laser cutting/engraving.

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ABS	<p>Fumes can irritate the eyes, skin, and respiratory tract. Do not expose to high temperatures.</p> <p>Toxic gas is harmful to the operator and bystanders.</p> <p>Acidic byproducts are harmful to the lens and machine components.</p> <p>Material properties resist laser cutting/engraving.</p>
HDPE	<p>Fumes can irritate the eyes, skin, and respiratory tract. Do not expose to high temperatures.</p> <p>Highly flammable.</p> <p>Acidic byproducts are harmful to the lens and machine components.</p>
Polystyrene (Styrofoam) EPS Polyurethane Foam Polypropylene Foam	<p>Fumes can irritate the eyes, skin, and respiratory tract. Do not expose to high temperatures.</p> <p>Extremely Flammable.</p> <p>Acidic byproducts are harmful to the lens and machine components.</p> <p>These materials have been reported to cause several fires by processing with a laser machine.</p>

### 14.2 Safe Materials for Cutting, Etching, or Engraving

Lasers use heat to cut and etch materials, and different materials respond uniquely to this method. Below is a guide for safe materials but always double-check the properties of new materials to ensure they're suitable for laser processing.

The following materials are permitted to be used with any CO2 laser processing machine. This list is not a complete list and there may be other materials that are safe to use.

#### NOTE

***Most materials have a "Material Safety Data Sheet" (MSDS) that indicates whether they are safe to expose to high heat. Materials containing chlorine are unsafe for the laser and for anyone exposed to the fumes.***

***Contact Laguna Tools if you need help identifying whether a material is safe to laser.***

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Table 1-2: Safe Materials

Class of Material	Material
Plastics	Acrylic, Delrin, Polyethylene Terephthalate Glycol (PETG)
Foam	Ethylene Vinyl Acetate (EVA)
Textiles & Other Materials	Cloth, leather, felt, paper, wood

## 14.3 Feeds and Speeds

Feeds and speeds change depending on the type of material being engraved or cut. Below are tables of feeds and speeds for common materials. These tables are not a complete list. Always do research and confirm the right settings. Contact Laguna Tools for further assistance on feeds and speeds.

Acrylic					
Operation	Laser Power (Watts)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65W	25	350	0.065	ANY
	100W	20	350	0.065	ANY
	150W	15	350	0.065	ANY
Cutting	65W	80	10	N/A	1/4"
	100W	75	15	N/A	1/4"
	150W	65	20	N/A	1/4"

### NOTE

*There are commonly two (2) types of acrylics.*

*Cast acrylic produces a frosted-look engraving.*

*Extruded Acrylic (the cheaper of the two (2)) is best for cutting and produces a clear engraving.*

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Anodized Aluminum					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	35	325	0.065	ANY
	100	20	325	0.065	ANY
	150	15	325	0.065	ANY

### NOTE

*There are several products that use sintering (manufacturing process that forms solid objects from powdered materials) to make a ceramic marking into a metal surface. These parameters should only serve as a baseline to achieve a final engraving. Test a sample piece prior to running a work file.*

Balsa Wood					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	25	350	0.065	ANY
	100	20	350	0.065	ANY
	150	15	350	0.065	ANY
Cutting	65	60	25	N/A	1/8"
	100	55	25	N/A	1/8"
	150	40	25	N/A	1/8"



### CAUTION

***DO NOT process wood with flammable surface finishes like lacquer or varnish.***

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## NOTE

*Cut with the grain when possible. Take into consideration that the density and water content of the wood will play a role in the above parameters.*

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Basswood					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	35	350	0.065	ANY
	100	25	350	0.065	ANY
	150	20	350	0.065	ANY
Cutting	65	60	25	N/A	1/8"
	100	55	25	N/A	1/8"
	150	40	25	N/A	1/8"

Birch Wood					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	35	350	0.065	ANY
	100	25	350	0.065	ANY
	150	20	350	0.065	ANY
Cutting	65	80	10	N/A	1/4"
	100	70	15	N/A	1/4"
	150	65	20	N/A	1/4"

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<b>Birch Plywood</b>					
<b>Operation</b>	<b>Laser Power (W)</b>	<b>Power %</b>	<b>Speed (mm/s)</b>	<b>Interval / Scan Gap (mm)</b>	<b>Thickness</b>
Engraving	65	30	350	0.065	ANY
	100	25	350	0.065	ANY
	150	20	350	0.065	ANY
Cutting	65	85	10	N/A	1/4"
	100	75	15	N/A	1/4"
	150	70	20	N/A	1/4"

<b>Cardboard</b>					
<b>Operation</b>	<b>Laser Power (W)</b>	<b>Power %</b>	<b>Speed (mm/s)</b>	<b>Interval / Scan Gap (mm)</b>	<b>Thickness</b>
Engraving	65	25	350	0.065	ANY
	100	20	350	0.065	ANY
	150	15	350	0.065	ANY
Cutting	65	70	15	N/A	1/4"
	100	60	15	N/A	1/4"
	150	50	15	N/A	1/4"

<b>Ceramic</b>					
<b>Operation</b>	<b>Laser Power (W)</b>	<b>Power %</b>	<b>Speed (mm/s)</b>	<b>Interval / Scan Gap (mm)</b>	<b>Thickness</b>
Engraving	65	65	350	0.065	ANY
	100	40	350	0.065	ANY
	150	27	350	0.065	ANY

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

<b>Glass</b>					
<b>Operation</b>	<b>Laser Power (W)</b>	<b>Power %</b>	<b>Speed (mm/s)</b>	<b>Interval / Scan Gap (mm)</b>	<b>Thickness</b>
Engraving	65	27	325	0.065	ANY
	100	25	325	0.065	ANY
	150	20	325	0.065	ANY

<b>Granite</b>					
<b>Operation</b>	<b>Laser Power (W)</b>	<b>Power %</b>	<b>Speed (mm/s)</b>	<b>Interval / Scan Gap (mm)</b>	<b>Thickness</b>
Engraving	65	40	275	0.065	ANY
	100	25	275	0.065	ANY
	150	18	275	0.065	ANY

<b>Leather</b>					
<b>Operation</b>	<b>Laser Power (W)</b>	<b>Power %</b>	<b>Speed (mm/s)</b>	<b>Interval / Scan Gap (mm)</b>	<b>Thickness</b>
Engraving	65	25	350	0.065	ANY
	100	18	350	0.065	ANY
	150	15	350	0.065	ANY
Cutting	65	85	10	N/A	1/8"
	100	75	12	N/A	1/8"
	150	70	15	N/A	1/8"

### NOTE

*Leathers are complicated to process because of the range in oil density and/or finishes of the leather. It is best to use raw dried leather to cut or engrave.*

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

Powder-Coated Metal					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	35	325	0.065	ANY
	100	20	325	0.065	ANY
	150	15	325	0.065	ANY

Mirror (Back Side)					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	30	325	0.065	ANY
	100	20	325	0.065	ANY
	150	15	325	0.065	ANY

Romark					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	25	350	0.065	ANY
	100	20	350	0.065	ANY
	150	15	350	0.065	ANY

Paper					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Cutting	65	15	20	N/A	1/100"
	100	15	25	N/A	1/100"
	150	15	30	N/A	1/100"

 **CAUTION**

*When cutting paper, be very cautious of the fire danger.*

*Achieve laser settings such that the laser cuts the material as quickly as possible without leaving burn marks.*

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

Rubber					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	30	350	0.065	ANY
	100	20	350	0.065	ANY
	150	15	350	0.065	ANY
Cutting	65	85	10	N/A	1/8"
	100	75	12	N/A	1/8"
	150	70	15	N/A	1/8"

### NOTE

*Natural rubber is typically used to cut or engrave rubber stamps to be used with an inkpad.*

Foam					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Engraving	65	60	25	N/A	1/4"
	100	55	25	N/A	1/4"
	150	40	25	N/A	1/4"

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

Fabric (polyester, twill, cotton)					
Operation	Laser Power (W)	Power %	Speed (mm/s)	Interval / Scan Gap (mm)	Thickness
Cutting	65	30	25	N/A	1/4"
	100	30	25	N/A	1/4"
	150	20	25	N/A	1/4"

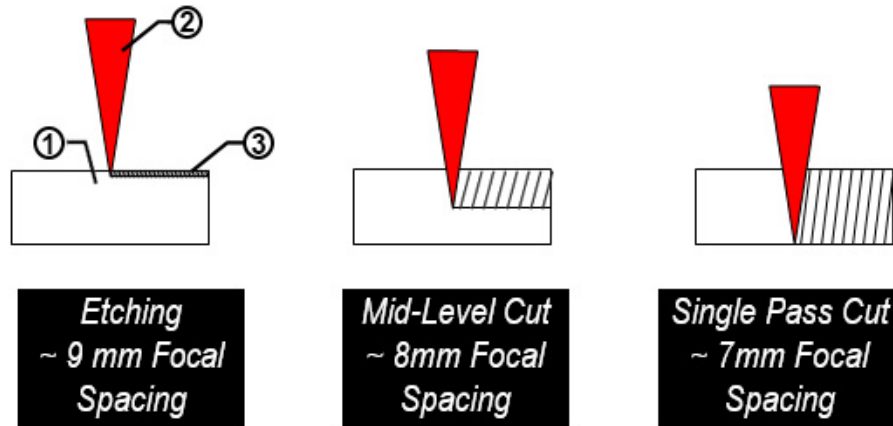
### CAUTION

*When cutting fabric, be very cautious of the fire danger. Achieve laser settings such that the laser cuts the material as quickly as possible without leaving burn marks.*

### NOTE

*Use a spray-on adhesive to hold the fabric to the work surface. Allow the adhesive to fully dry before using on the laser. This will prevent fires.*

## 15.0 Cutting Strategies



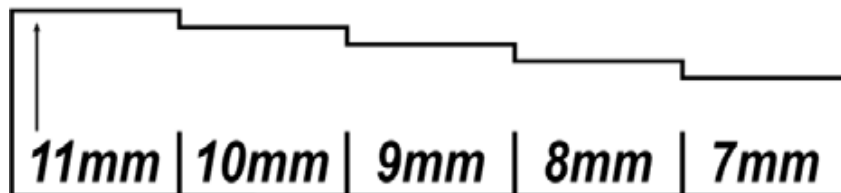
1. Work Piece    2. Focused Laser Beam    3. Cut/Etch Path

The focal spacing heavily depends on the workpiece and the single pass limit or maximum cut depth of that workpiece. It is recommended that you experiment with focal spacing prior to running a work file.

When using the lift bed, raise the bed until the workpiece encounters the focal length sensor. The focal spacing can be adjusted for repeated accuracy.

### NOTE

*When using the laser machine off the lift-bed – for engraving a tabletop or materials that does not fit in the laser – a spacing block can be made to quickly adjust the focal spacing. Use 1/4 inch acrylic or wood to cut out a piece similar to spacing Block Example shown below. Be sure to engrave the focal spacing on the surface for future reference.*



Spacing Block Example

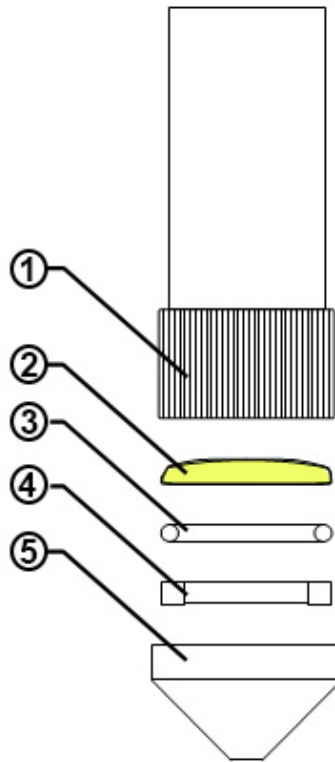
### NOTE

*The focal length is different than focal spacing and depends on the focal lens used. The stock lens used. The stock lens installed in the LASER MACHINE is 20mm in diameter and 63.5 mm in focal length.*

*Focal spacing will vary. Experiment with sample materials and make small adjustments.*

---

## 16.0 Changing & Cleaning the Focal Lens



*Focal Lens Assembly*

- |                         |               |                |
|-------------------------|---------------|----------------|
| 1. Adjustable head tube | 2. Focal lens | 3. Rubber seal |
| 4. Lock ring            | 5. Nozzle     |                |

1. Unscrew the assembly and remove it from the machine.

**NOTE**

*The front of the machine must be tilted up to remove the assembly.*

---

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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2. Unscrew the nozzle to expose the lock ring.
3. Carefully remove the lock ring with a small rod (a screwdriver will work).
4. Change or clean the focal lens as needed.
  - a. **To clean**-Use a microfiber cloth and alcohol or appropriate glass lens cleaner, gently wipe the surface.
  - b. Use the same method to clean the mirrors.
5. Reassemble as shown.



### CAUTION

*DO NOT scratch the focal lens.*

---

### NOTE

*The LASER MACHINE is designed to be used with a 20 mm diameter 63.5 mm focal length lens.*

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## 17.0 Accessories

All accessories are sold separately. Contact Laguna Tools or your sales representative for more information about accessories.

**Fume Extractors:** Fume Extraction units are used to control the toxic gases emitted by some materials. It is important to know the process you will use and materials you are processing prior to selecting a fume extractor. The laser machine also matters, for example, the Laser | MX allows dust and debris extraction in addition to fume extraction. You will find two ports on the rear of the machine. Please go to [lagunatools.com](http://lagunatools.com) or give us a call at +1 (800) 234-1976.

Laguna Tools recommends using a fume extractor for any laser machine. A fume extractor is the safest and most effective way to dissipate fumes from laser cutting and etching.

Some models that we offer are the L|Flux 800i Fume Extractor (left) and the E|Flux 7 Fume Extractor (right).



*L | Flux 800i Fume  
Extractor*



*E | Flux 7 Fume  
Extractor*

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**Laser Rotary Attachment (left):** The Laser Rotary Attachment is an accessory for laser engravers that rotates cylindrical or rounded objects (like cups, bottles, pens, rings) while the laser head stays stationary, allowing for seamless, 360-degree engraving or cutting around curved surfaces that a standard flat laser bed can't handle. It ensures consistent focus and precise design placement by synchronizing the object's spin with the laser's movement, preventing distortion on curved items.

Our model that we offer is the PiBurn V4.0 Laser Rotary Attachment with Mag Feet for EX & MX

**Quill Resin Printer (right):** The Quill ADA resin printer accessory is the easiest, quickest, and most affordable way to provide perfect ADA-compliant braille.



*PiBurn V4.0 Laser  
Rotary Attachment*



*Quill 3D Braille Resin  
Printer*

## 18.0 Troubleshooting

Review the troubleshooting procedures in this section if a problem develops with your machine. If you need replacement parts or additional help with a procedure, call Laguna Tools customer service.

<b>Symptom</b>	<b>Possible Causes</b>	<b>Possible Solutions</b>
Laser machine will not turn on.	<ol style="list-style-type: none"> <li>1. Breaker is in the defeated position.</li> <li>2. Improper input power.</li> </ol>	<ol style="list-style-type: none"> <li>1. Flip breaker switch</li> <li>2. Confirm power supply meets machine specifications.</li> </ol>
All systems are powered but Laser will not fire.	<ol style="list-style-type: none"> <li>1. Interlock Switch (door sensor) defeated.</li> <li>2. Chiller Alarm defeated.</li> <li>3. Water is flowing in the wrong direction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Close the door, inspect switch.</li> <li>2. Troubleshoot chiller unit.</li> <li>3. Confirm direction of water flow (should be with direction of laser beam, towards first mirror).</li> </ol>
Laser fires but does not process work surface or quality of process is poor.	<ol style="list-style-type: none"> <li>1. Mirror is not aligned.</li> <li>2. Focal distance is not set correctly.</li> <li>3. Incorrect focal lens.</li> <li>4. Focal lens is dirty.</li> <li>5. Non-compatible material.</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform mirror alignment procedure.</li> <li>2. Adjust focal spacing to 7mm from work surface.</li> <li>3. Use lens with 50.8mm focal length.</li> <li>4. Clean focal lens and ensure that the air assist system is working.</li> <li>5. No solution</li> </ol>

## 19.0 Maintenance

Performing regular maintenance will ensure optimal performance of the machine. Please follow these maintenance procedures.

Failure to follow maintenance procedures will void the warranty.

 **WARNING**

***Always disconnect power to the machine before performing maintenance. Failure to do this may result in serious personal injury or damage to the machine.***

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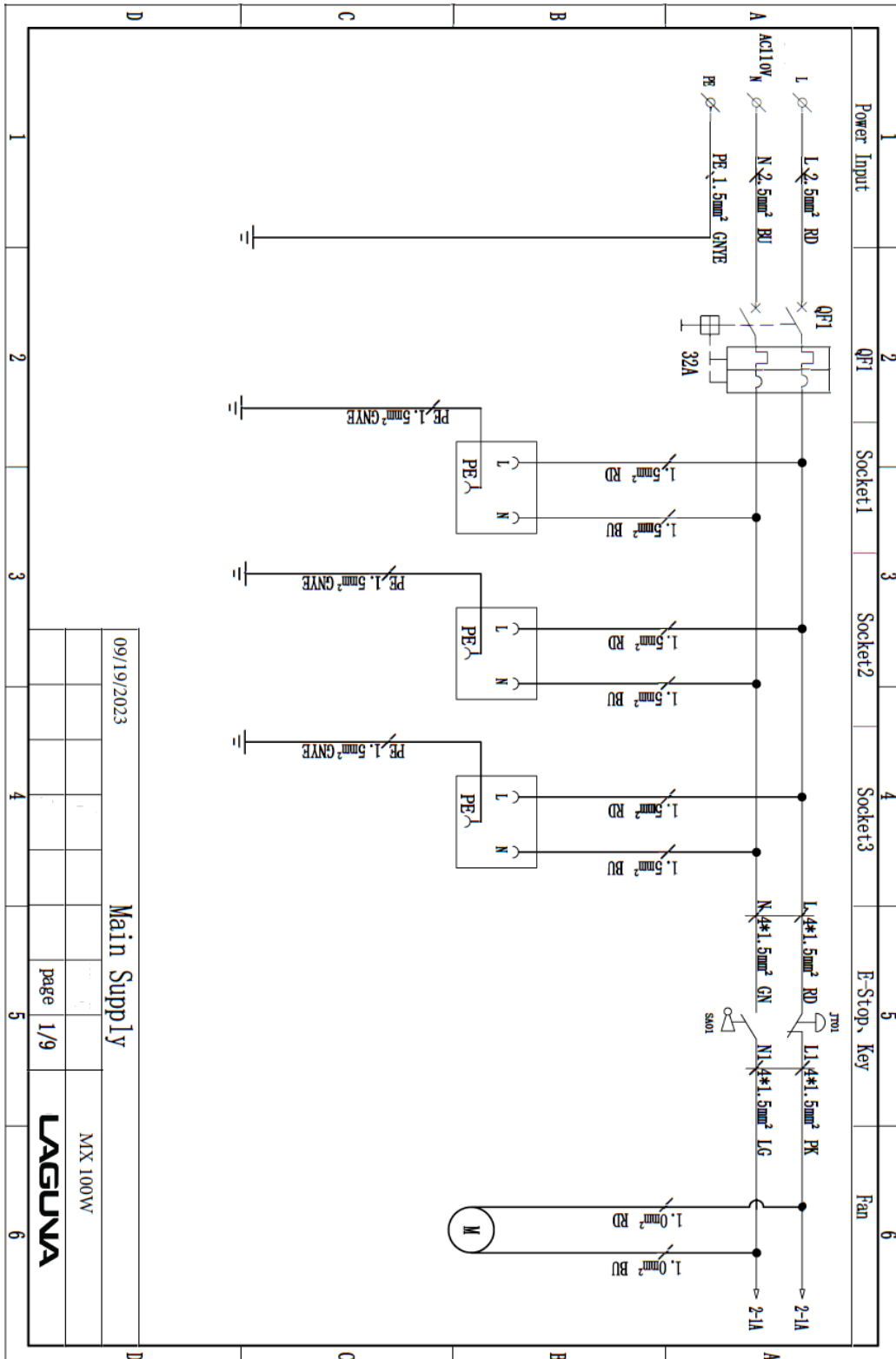
This table is based off 30 hours of use a week			
	Daily	Weekly	Monthly
Clean the machine before and after use.	X		
Clean the focus lens & mirrors with acetone and approved lens cleaning wipe and allow to fully dry before operating.  DO NOT clean using a back-and-forth motion.	X		
Remove and clean lens tube. Blow away dust and gently wipe with acetone. Allow to dry completely.	X		
Clean the honeycomb table	X		
Clean exhaust/fume extractor	X		
Check/replace exhaust/fume pathway	X		
Check mirror alignment	X		

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

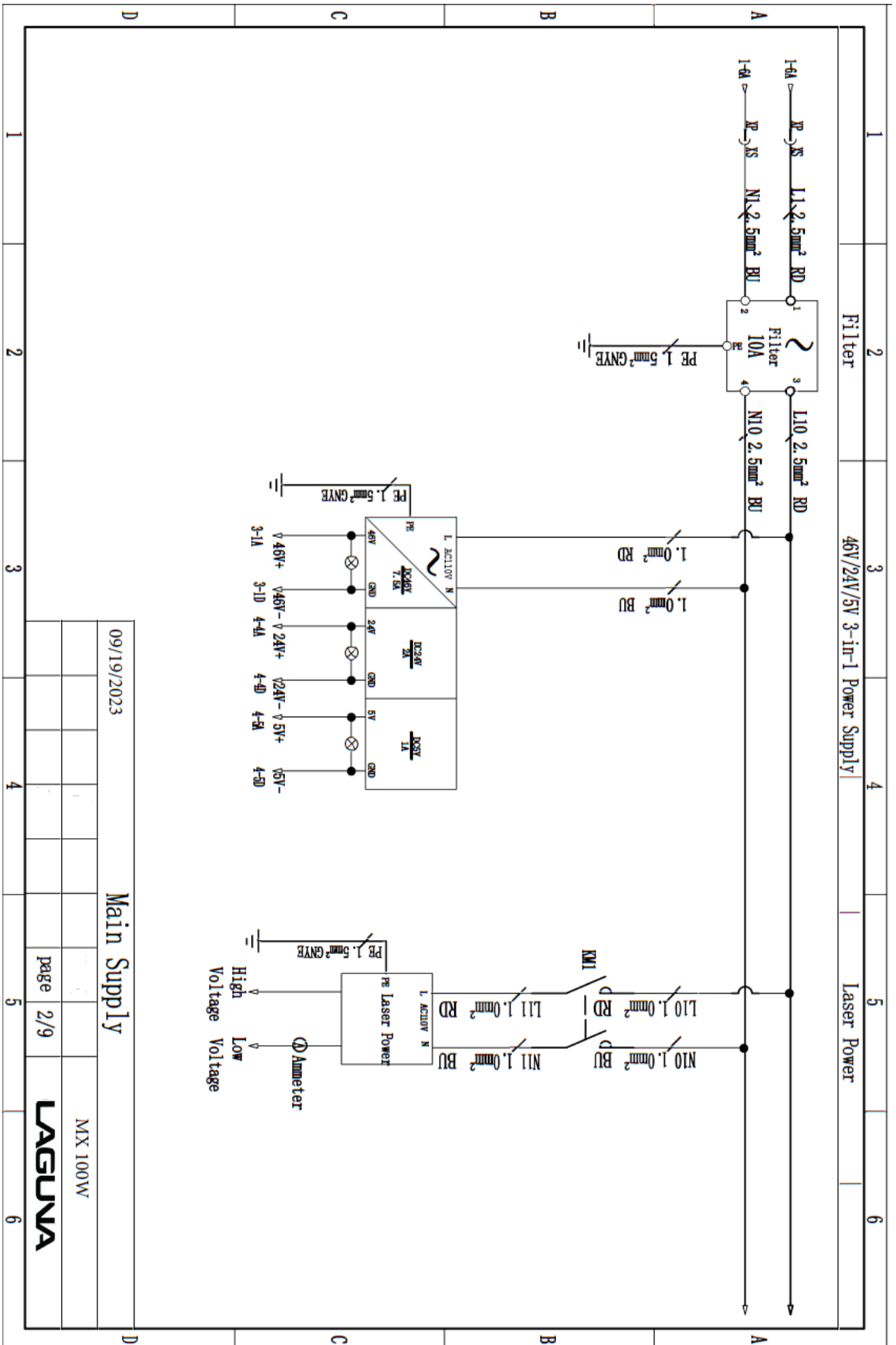
<p>Inspect to see if chiller water is clean and the water level is correct. Empty/refill the chiller water if dirty or level is low. There is a removable drain plug on the rear of the chiller on the bottom left.</p> <p>*Only use <i>distilled</i> or <i>deionized</i> water</p>	X		
<p>Check air supply</p>	X		
<p>Clean guide rails</p>		X	
<p>Lubricate guide rails with 30wt conventional motor oil</p>			X
<p>Empty chiller water and refill with <i>distilled</i> or <i>deionized</i> water.</p> <p>There is a removable drain plug on the rear of the chiller on the bottom left.</p>			X

## 20.0 Wiring Diagrams

### 20.1 MX (100W) Wiring Diagram



# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



09/19/2023

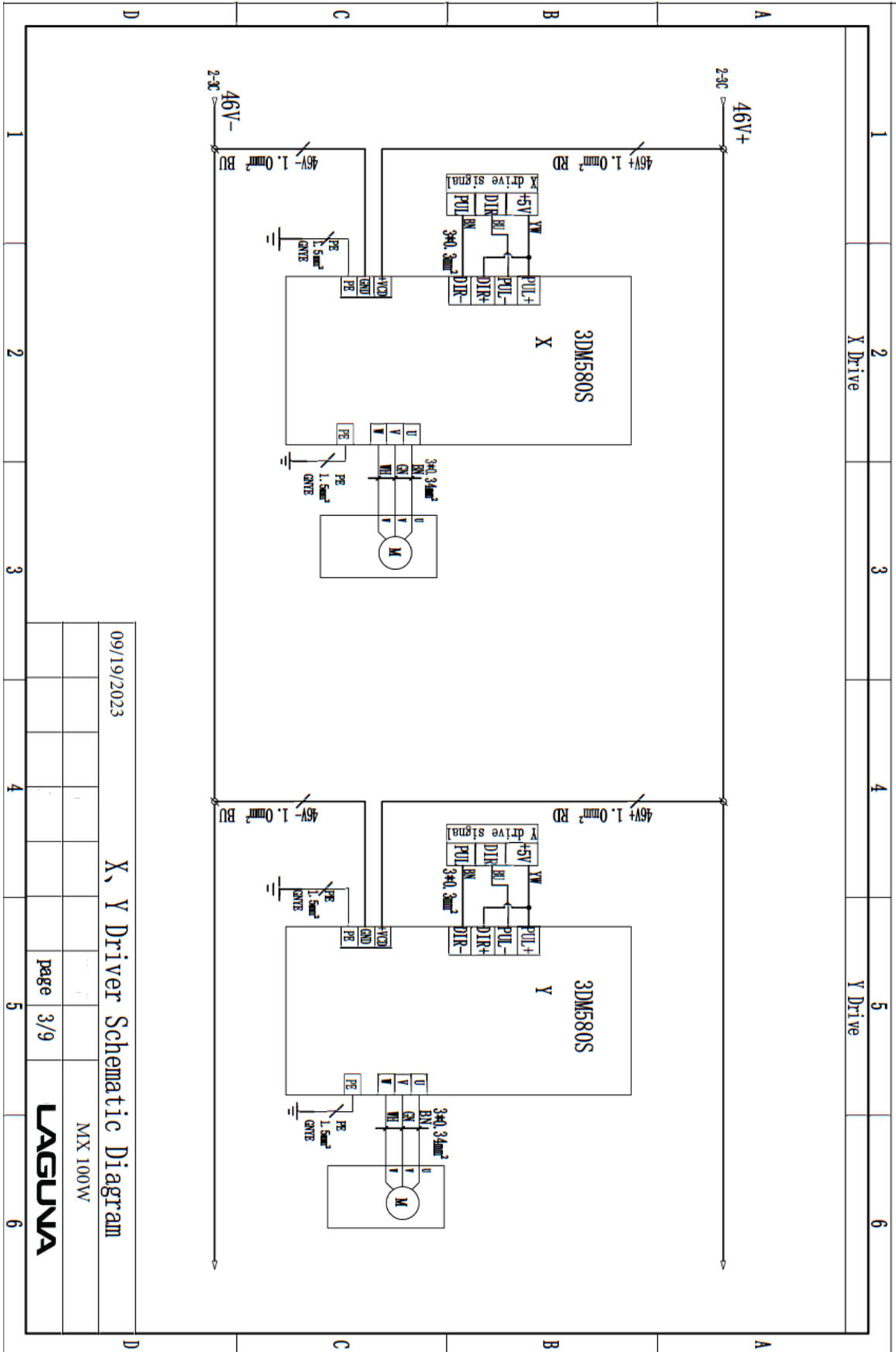
Main Supply

MX 100W

page 2/9

**LAGUNA**

# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



09/19/2023

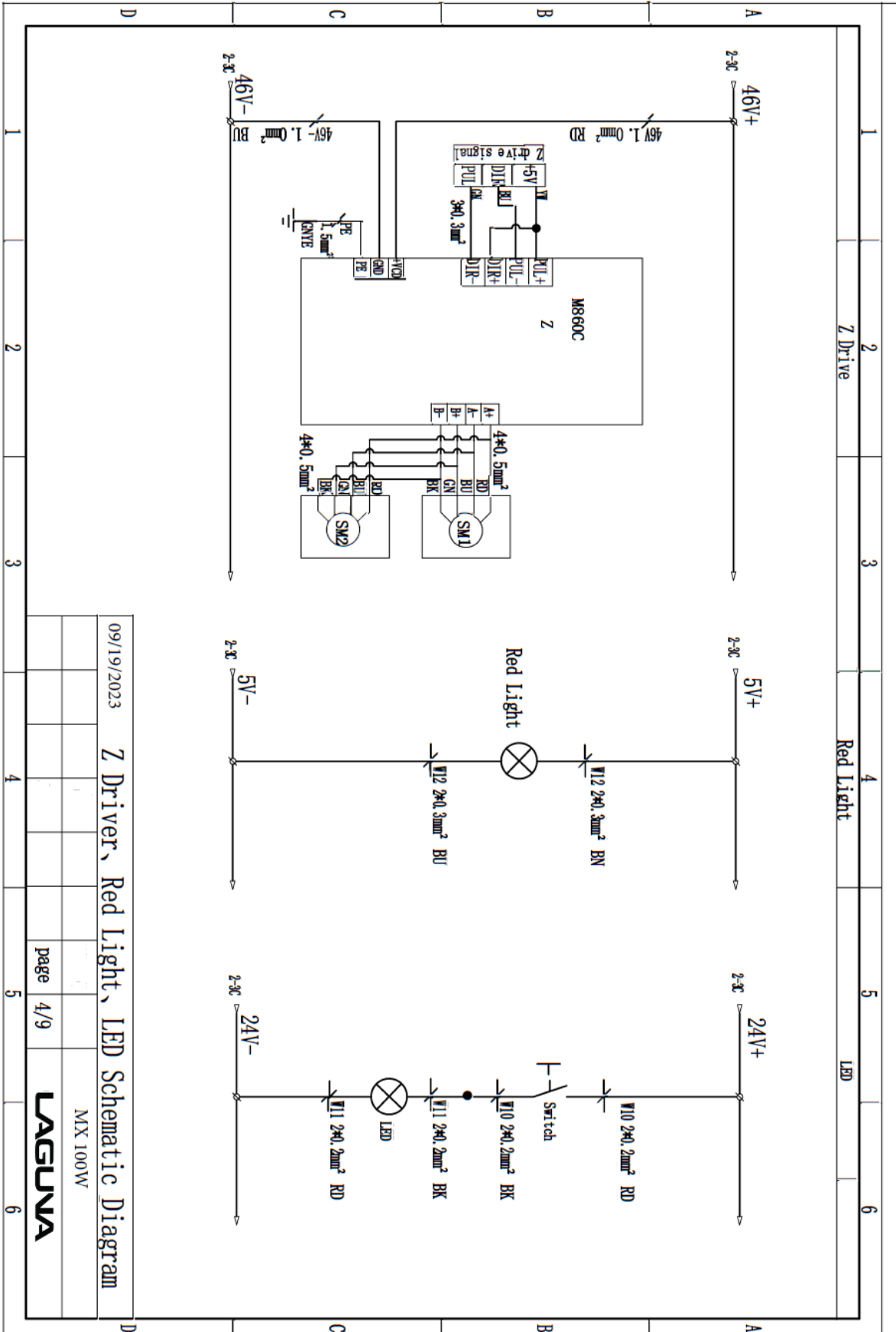
X, Y Driver Schematic Diagram

MX 100W

page 3/9

**LAGUNA**

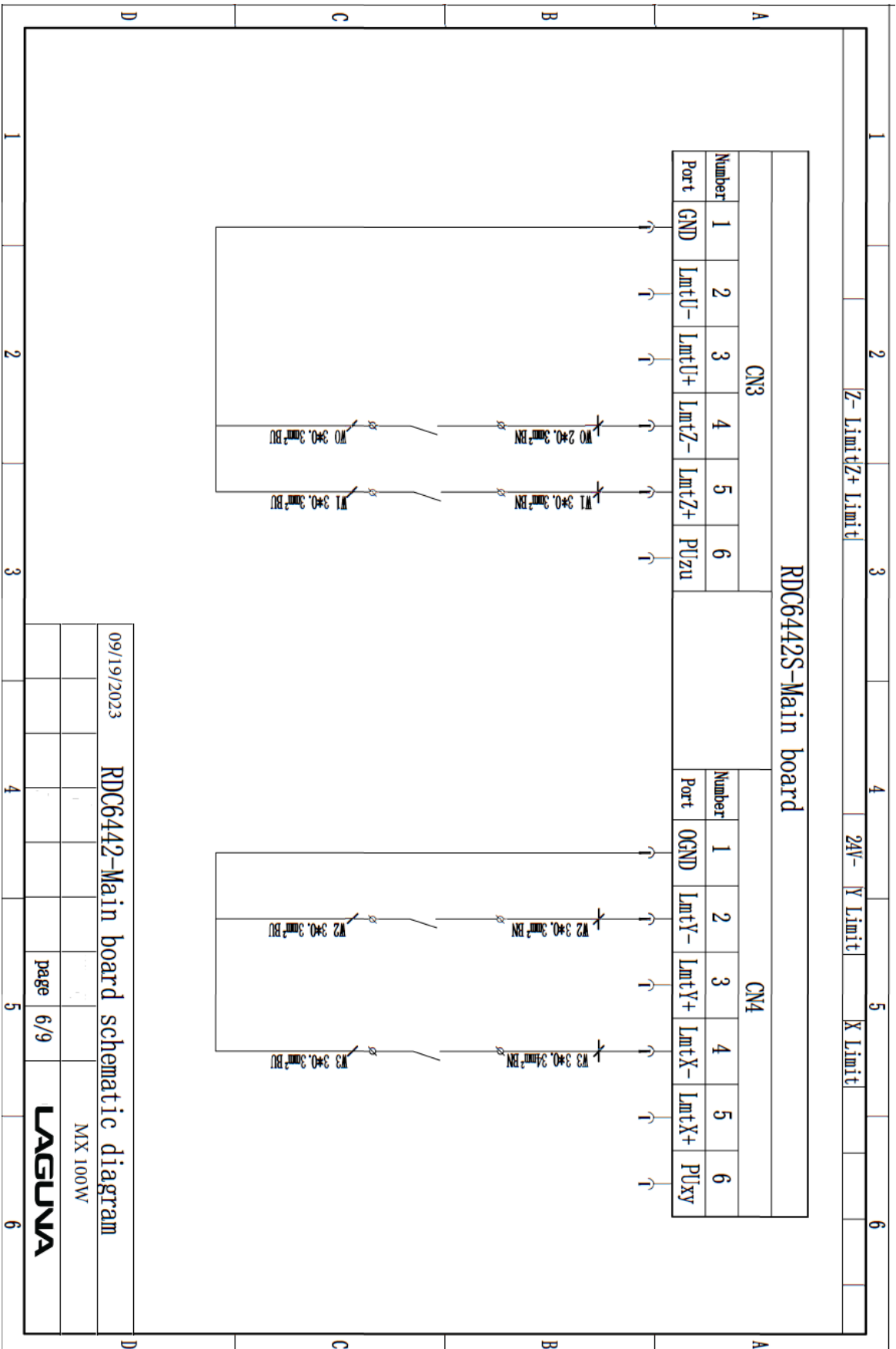
# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



09/19/2023	Z Driver, Red Light, LED Schematic Diagram	MX 100W
	page 4/9	<b>LAGUNA</b>

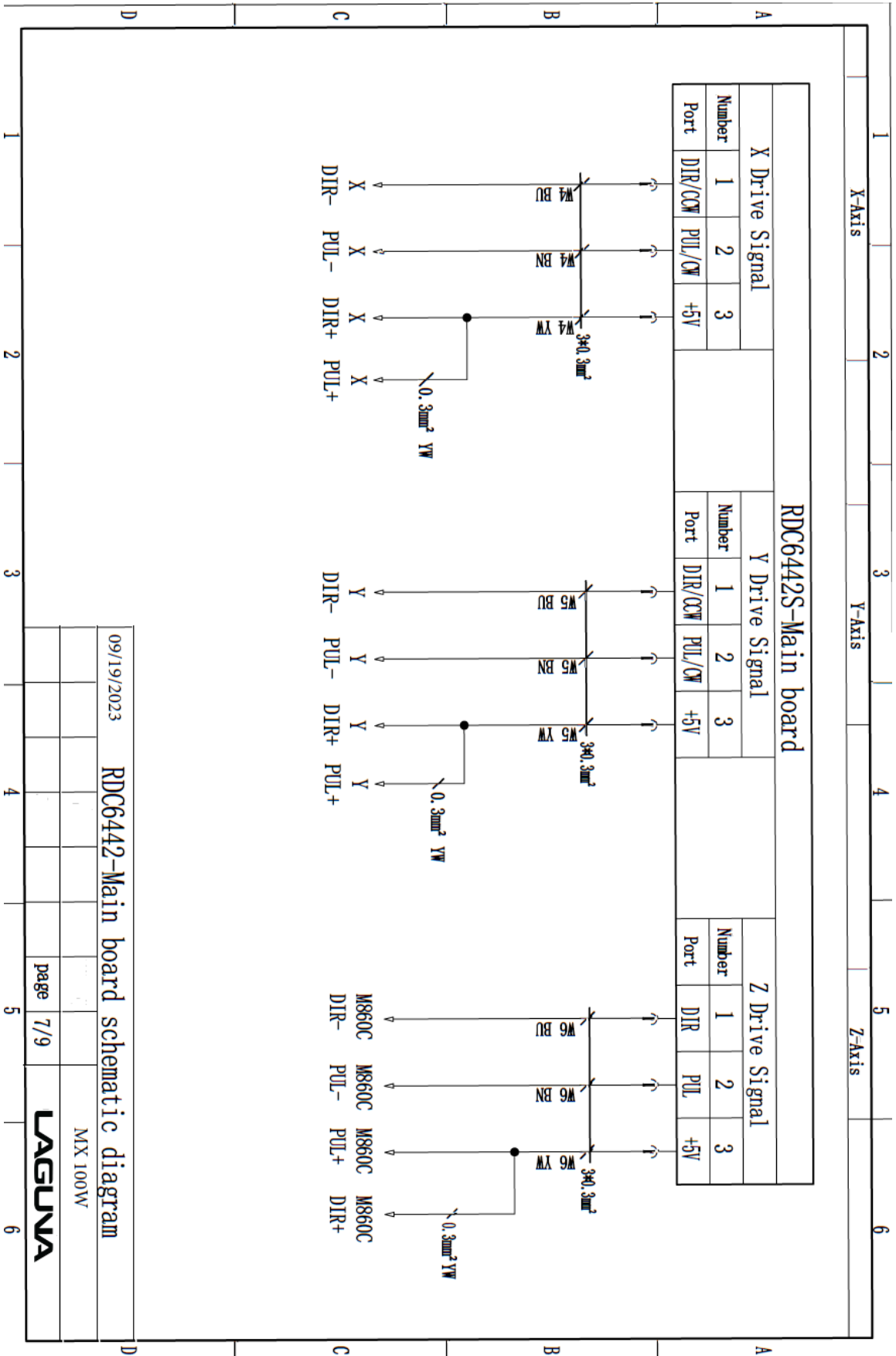


# MX/EX/EX-C CO2 LASER OWNER'S MANUAL

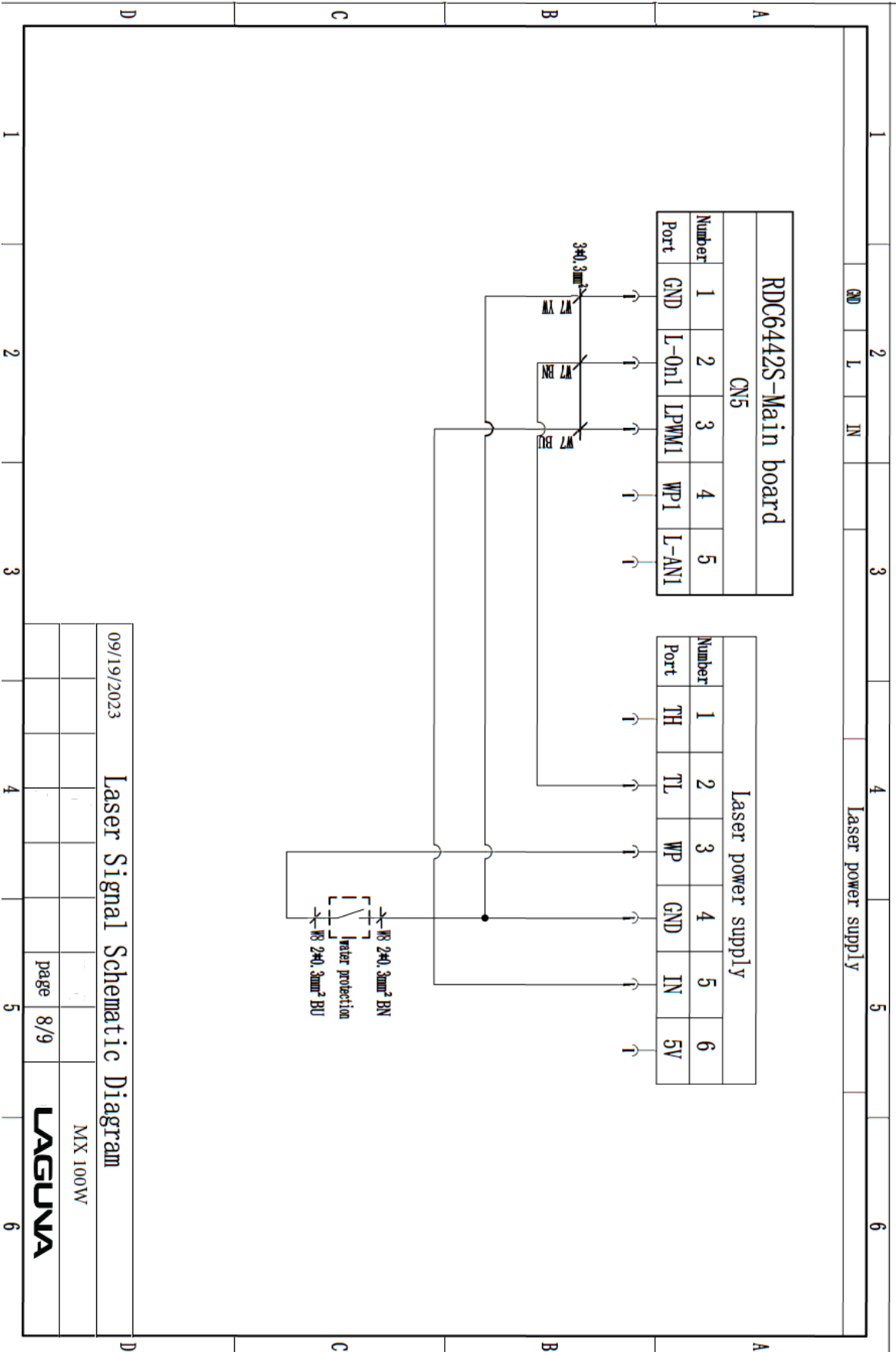


09/19/2023      RDC6442-Main board schematic diagram      MX 100W

page 6/9      **LAGUNA**

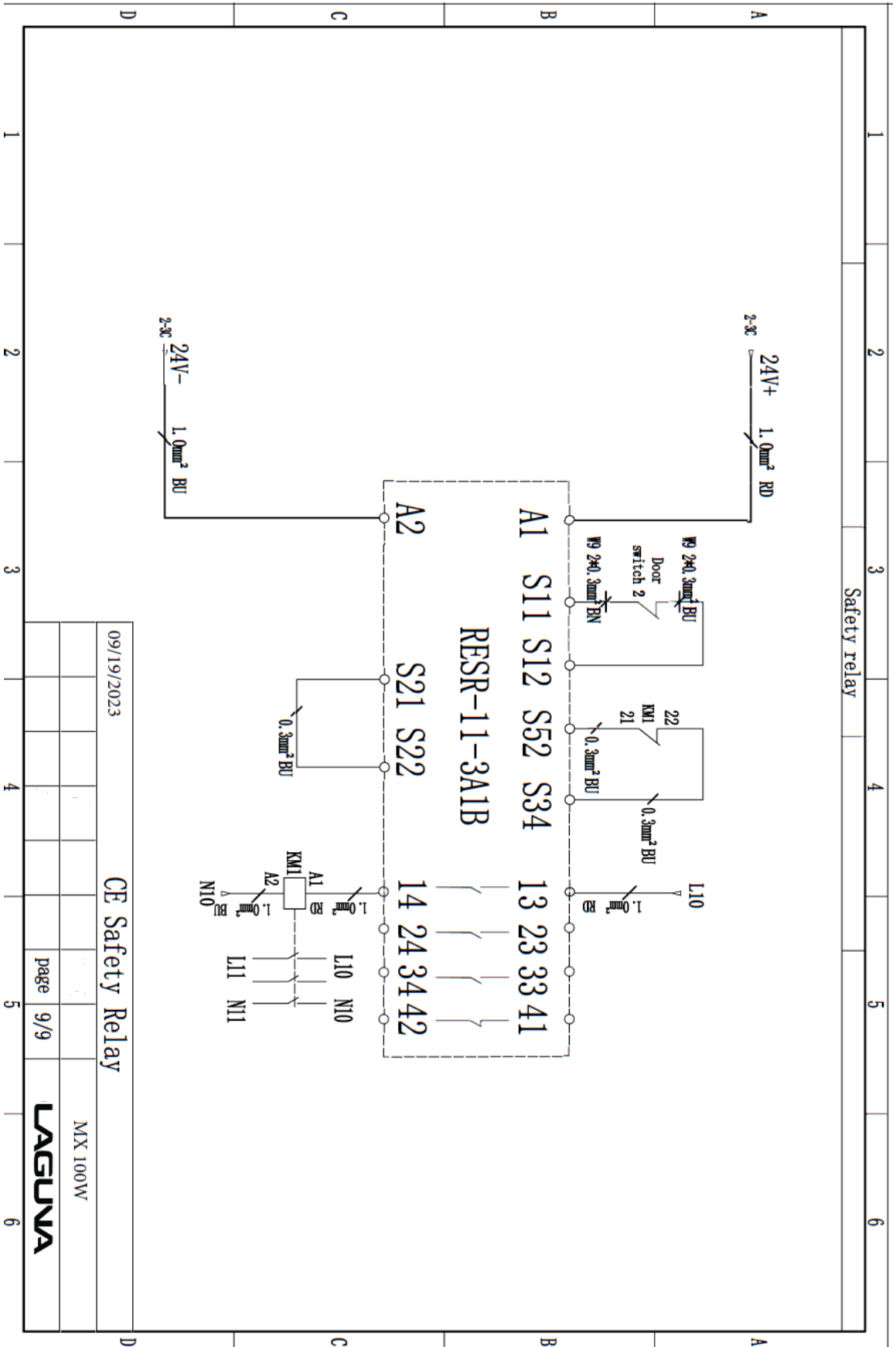


09/19/2023 **RDC6442-Main board schematic diagram**  
 MX 100W  
 page 7/9 **LAGUNA**



09/19/2023		Laser Signal Schematic Diagram		MX 100W	
		page 8/9		<b>LAGUNA</b>	

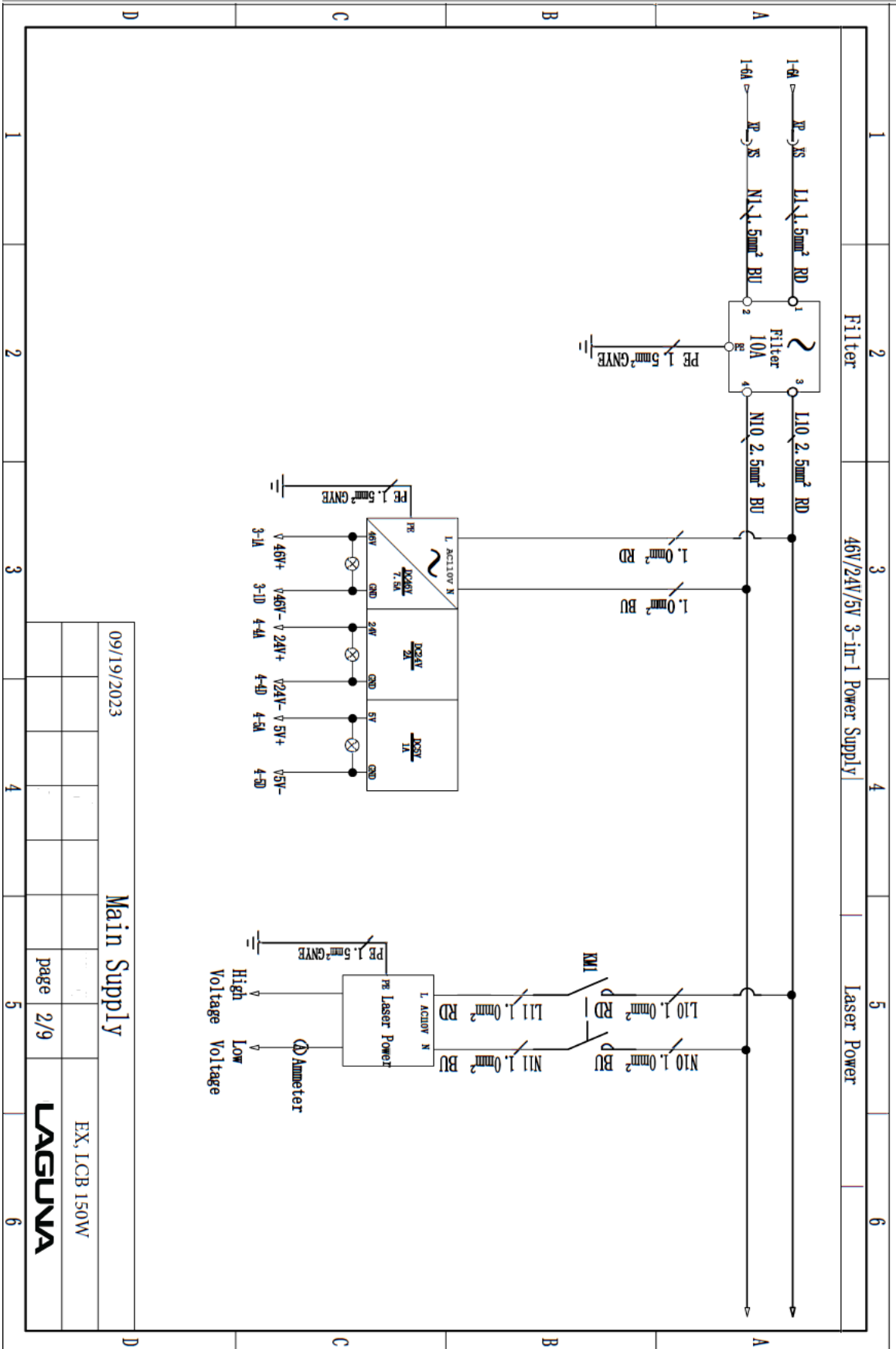
# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



09/19/2023	<b>CE Safety Relay</b>			MX 100W
page	9/9	<b>LAGUNA</b>		

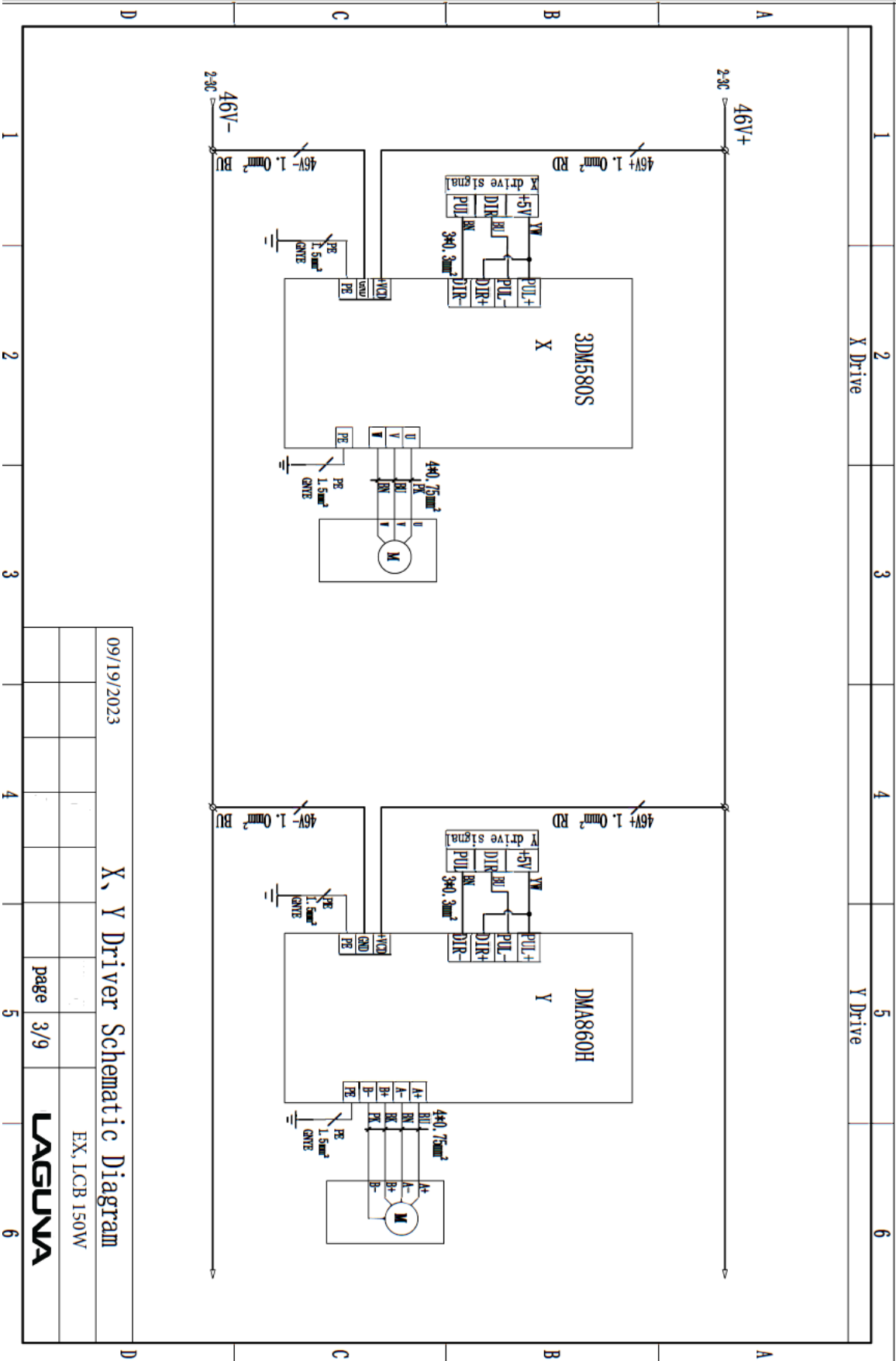


# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



09/19/2023		Main Supply			
page	2/9	<b>LAGUNA</b>			

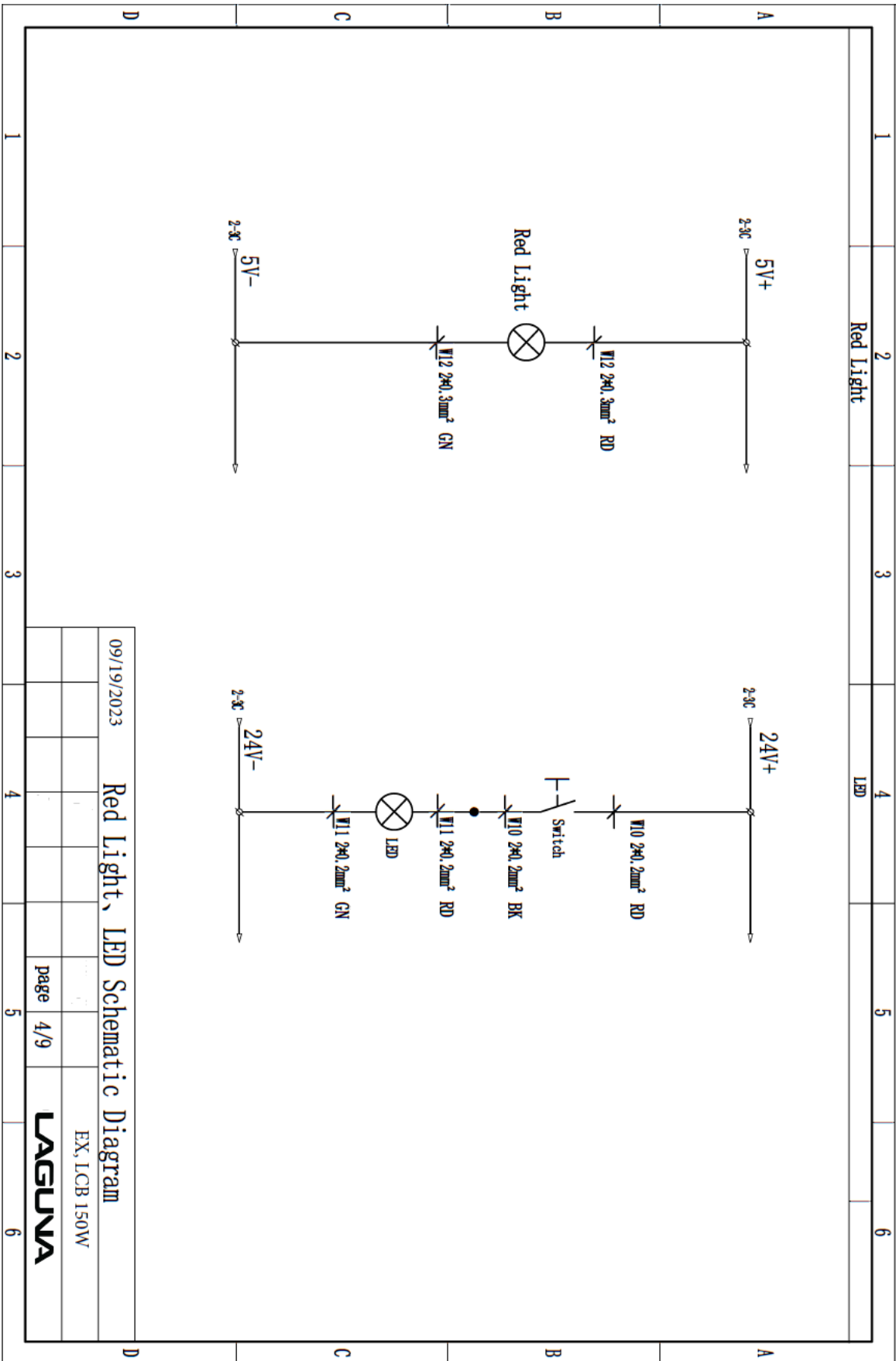
# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



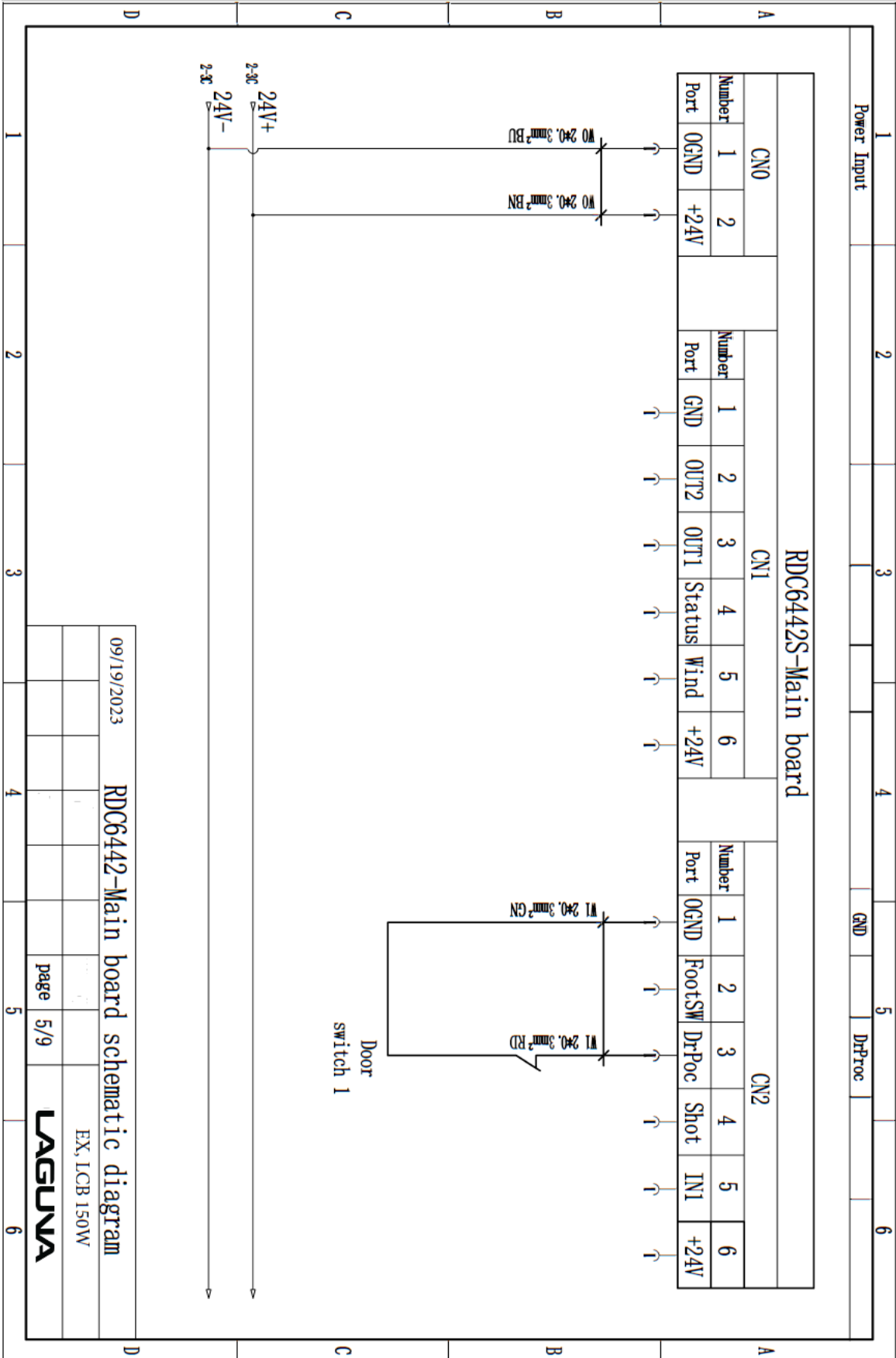
X, Y Driver Schematic Diagram

09/19/2023					
page 3/9			<b>LAGUNA</b>		

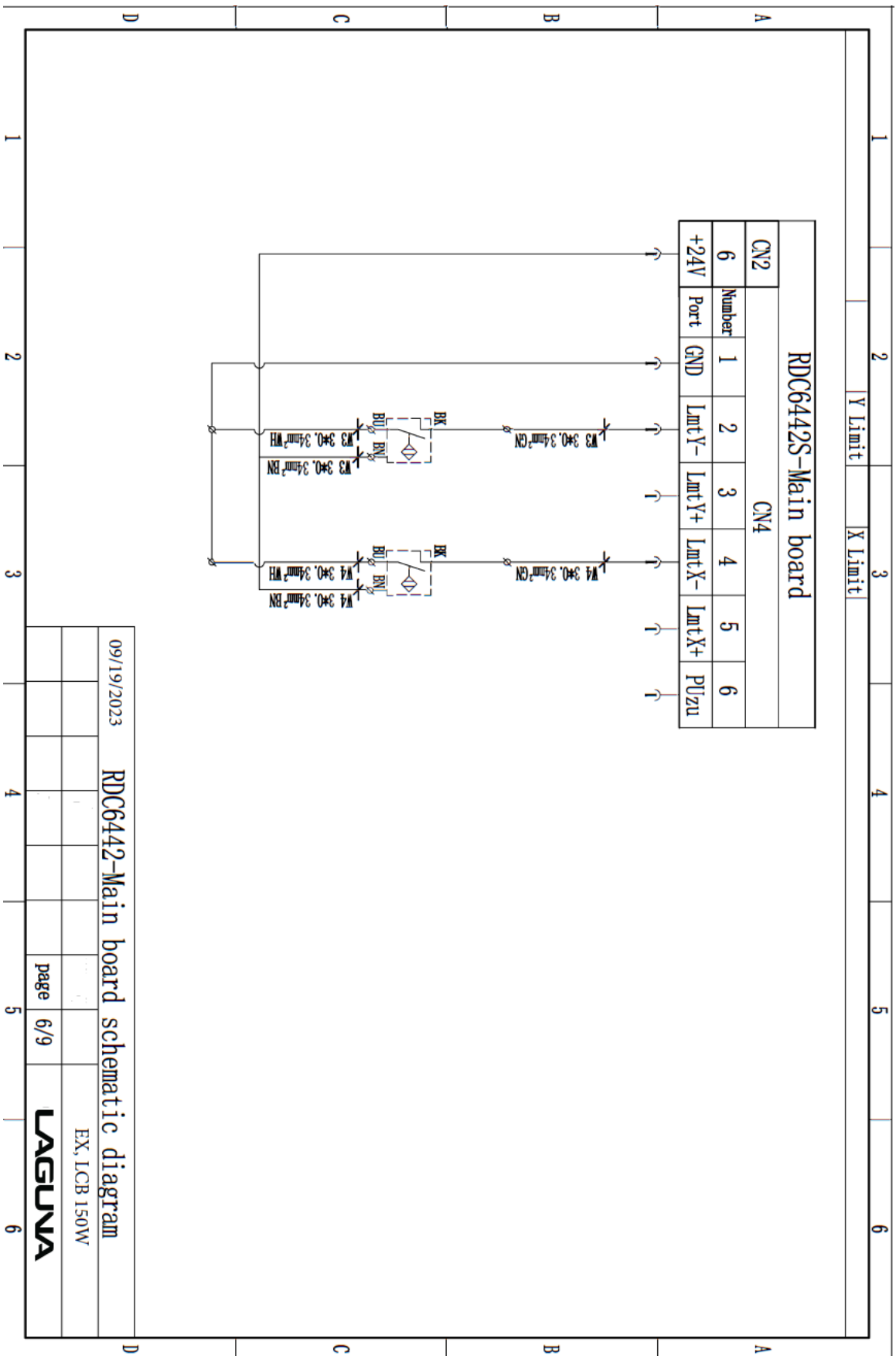
# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



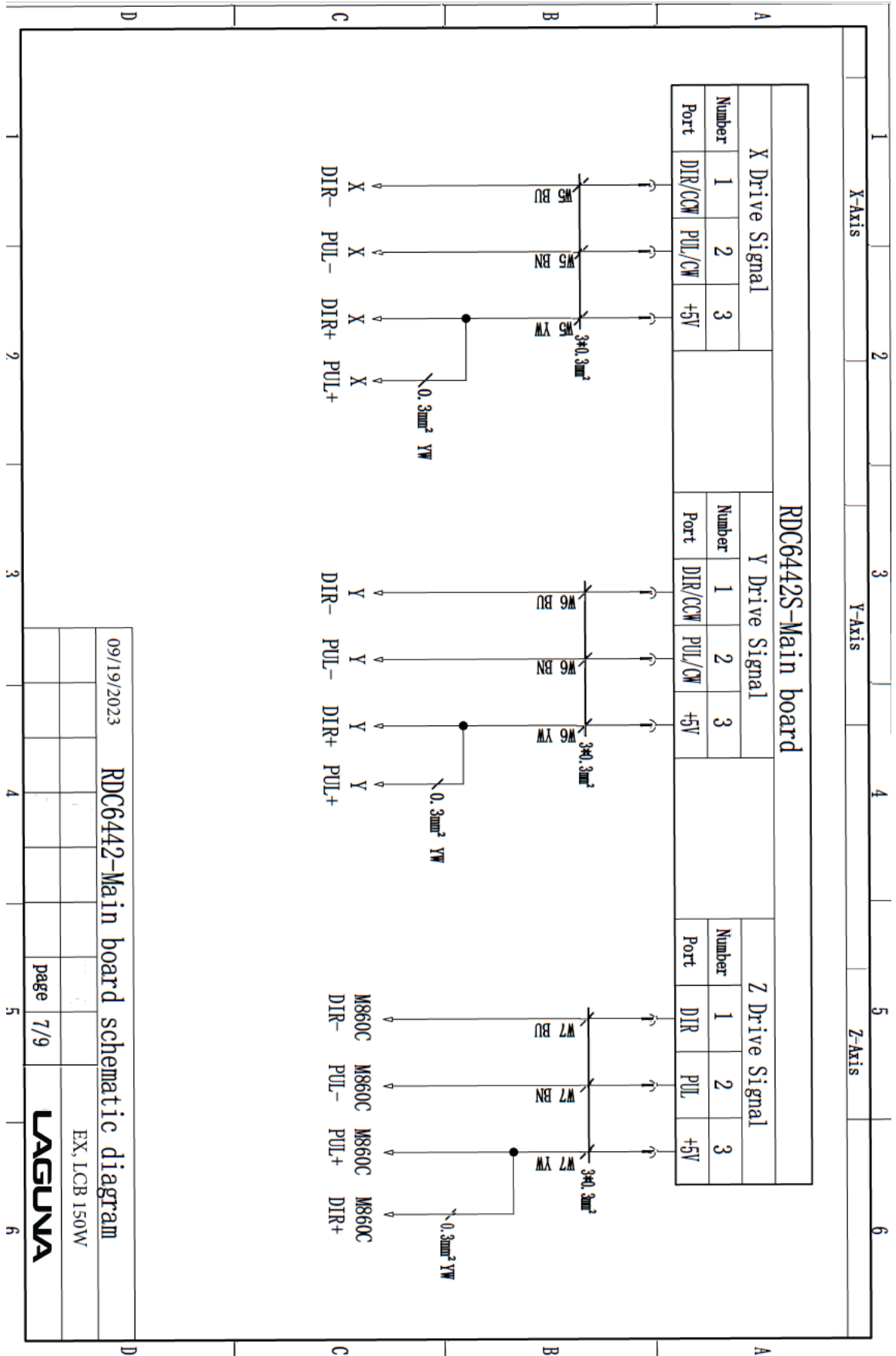
09/19/2023	Red Light、LED Schematic Diagram			
page	4/9	<b>LAGUNA</b>		
EX, LCB 150W				



09/19/2023	RDC6442-Main board schematic diagram	EX, LCB 150W
	page	5/9
	<b>LAGUNA</b>	



09/19/2023 RDC6442-Main board schematic diagram  
 EX, LCB 150W  
 page 6/9  
**LAGUNA**



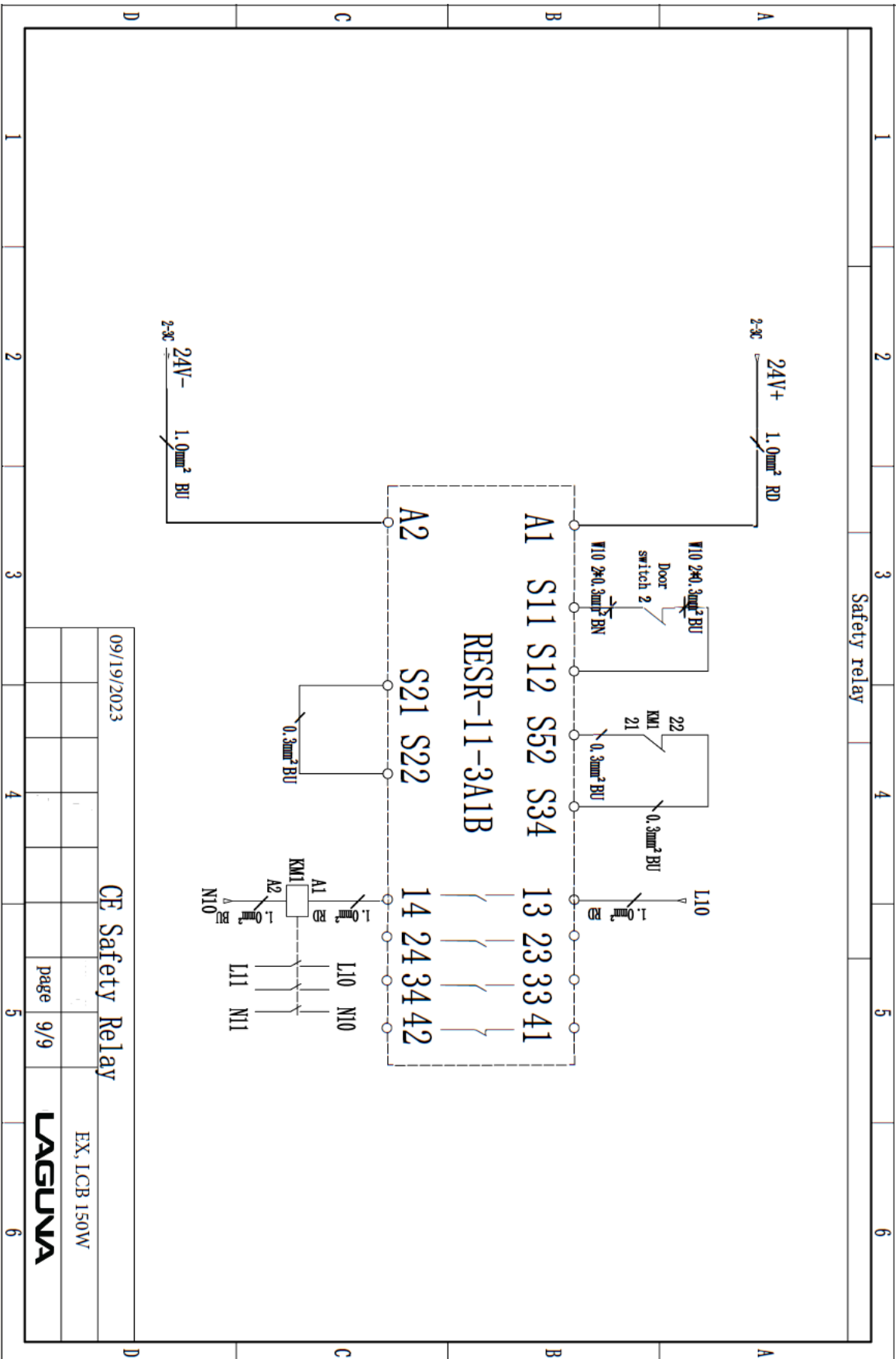
09/19/2023 RDC6442-Main board schematic diagram

EX, ICB 150W

**LAGUNA**



# MX/EX/EX-C CO2 LASER OWNER'S MANUAL



09/19/2023	CF Safety Relay			EX, LCB 150W
page	9/9	<b>LAGUNA</b>		

### 21.0 FAQs (Frequently Asked Questions)

Q: How does a fume extractor differ from a dust collector?

**A: A fume extractor consists of up to 4 layers of filtration: as the waste goes into the machine it crosses a material catch, a Prefilter (10 micron) layer, a HEPA (0.2 micron) layer, and an activated charcoal (adsorption) layer. This ensures that the fumes are isolated and stay inside the machine. A dust collector focuses on separation of the dust (large particles) and air. This is usually done with a large 1-micron (or HEPA 0.2 micron) filter.**

Q: How do I use the in-line model for the fume extractor?

**A: Each laser machine that Laguna Tools sells comes with an auxiliary blower. If the machine does not have a fume extractor, the blower is used to move the fumes to a location away from the machine and operators. With a filter stack (in line model) the blower is still used but the filter stack is then attached in-between the CO2 machine and the axillary blower.**

## 22.0 Warranties

### Dealer Machinery Warranty

New woodworking machines sold by Laguna Tools carry a two-year warranty effective from the date of dealer invoice to customer/end-user. Machines sold through dealers must be registered with Laguna Tools within thirty (30) days of purchase to be covered by this warranty. Laguna Tools guarantees all new machines sold to be free of manufacturers' defective workmanship, parts, and materials. We will repair or replace, without charge, any parts determined by Laguna Tools, Inc. to be a manufacturer's defect. We require that the defective item/part be returned to Laguna Tools with the complaint. The end-user must request a Return Material Authorization (RMA) number from Customer Service. Include the RMA number with any and all returned parts/components requesting warranty coverage\*. Any machines returned to Laguna Tools must be returned with packaging in the same manner in which it was received. A part or blade is being returned must have adequate packaging to ensure it is not damaged during shipping. In the event the item/part is determined to be damaged due to lack of maintenance, cleaning, or misuse/abuse, the customer will be responsible for the cost to replace the item/part, plus all related shipping charges. This limited warranty does not apply to natural disasters, acts of terrorism, normal wear and tear, product failure due to lack of maintenance or cleaning, damage caused by accident, neglect, lack of or inadequate dust collection, misuse/abuse or damage caused where repair or alterations have been made or attempted by others.

\* The issue of an RMA number is for reference only; it DOES NOT indicate acceptance of the warranty claim.

### CNC Limited Warranty

New CNC machines sold by Laguna Tools carry a one-year warranty effective from the date of shipping. Laguna Tools guarantees all new machines sold to be free of manufacturers' defective workmanship, parts, and materials. We will repair or replace, without charge, any parts determined by Laguna Tools, Inc. to be a manufacturer's defect. If the defective item/part is determined to be damaged due to lack of maintenance, cleaning or misuse/abuse, the customer will be responsible for the cost to replace the item/part, plus all related shipping charges. This limited warranty does not apply to natural disasters, acts of terrorism, normal wear and tear, product failure due to lack of maintenance or cleaning, damage caused by accident, neglect, lack of or inadequate dust collection, misuse/abuse or damage caused where repair or alterations have been made or attempted by others.

Laguna Tools, Inc. is not responsible for additional tools or modifications sold or performed (other than from/by Laguna Tools, Inc.) on any Laguna Tools, Inc. woodworking machine. Warranty may be voided upon the addition of such described tools and/or modifications, determined on a case-by-case basis. Software purchased through Laguna Tools, Inc., is not covered under this warranty and all technical

## MX/EX/EX-C CO2 LASER OWNER'S MANUAL

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support must be managed through the software provider. Normal user alignment, adjustment, tuning, and machine settings are not covered by this warranty. It is the responsibility of the user to understand basic woodworking machinery settings and procedures and to properly maintain the equipment in accordance with the standards provided by the manufacturer.

Parts under warranty are shipped at Laguna Tools, Inc.'s cost either by common carrier, FEDEX ground service, or a similar method. Technical support to install replacement parts is primarily provided by phone, fax, e-mail or Laguna Tools Customer Support Website. The labor required to install replacement parts is the responsibility of the user. Laguna Tools is not responsible for damage or loss caused by a freight company or other circumstances not in our control. All claims for loss or damaged goods must be notified to Laguna Tools within twenty-four (24) hours of delivery.

Please contact our Customer Service Department for more information. Only NEW machines sold to the original owner are covered by this warranty.

For warranty repair information, call 1-800-332-4094.

Warning: No portion of these materials may be reproduced without written approval from Laguna Tools, Inc.

Copyright 2025 Laguna Tools, Inc.

### **No Modifications Allowed or Sold**

Laguna Tools, Inc. is not responsible for additional tools or modifications sold or performed (other than from/by Laguna Tools, Inc.) on any Laguna Tools, Inc. woodworking machine. Warranty may be voided upon the addition of such described tools and/or modifications, determined on a case-by-case basis.

Normal user alignment, adjustment, tuning, and machine settings are not covered by this warranty. It is the responsibility of the user to understand basic woodworking machinery settings and procedures and to properly maintain the equipment in accordance with the standards provided by the manufacturer. Parts, under warranty, are shipped at Laguna Tools, Inc.'s cost either by common carrier, FEDEX ground service or a similar method. Technical support to install replacement parts is primarily provided by phone, fax, e-mail, or Laguna Tools Customer Support Website. The labor required to install replacement parts is the responsibility of the user. Laguna Tools is not responsible for damage or loss caused by a freight company or other circumstances not in our control. All claims for loss or damaged goods must be notified to Laguna Tools within twenty-four (24) hours of delivery. Please contact our Customer Service Department for more information. Only new machines sold to the original owner are covered by this warranty.

For warranty repair information call 1-800-332-4094.

## Laguna Tools Warranty

# WARRANTY & REGISTRATION

### Thank You!

Welcome to the Laguna Tools® group of discriminating woodworkers. We understand that you have a choice of where to purchase your machines and appreciate the confidence you have in the Laguna Tools® brand.

Through hands-on experience, Laguna Tools® is constantly working hard to make innovative, precision products. Products that inspire you to create works of art are a joy to operate and encourage your best work.

Laguna Tools®  
Imagination, Innovation, and Invention at Work

### Warranty & Registration

Every product sold is warranted to be free of manufacturer's defective workmanship, parts, and materials. For any questions about this produce, the intended use or what it was designed for, customer service, or replacement parts, please contact our customer service department:

Laguna Tools® Customer Service  
744 Refuge Way, Grand Prairie, Texas 75050, USA  
1-800-234-1976  
[www.lagunatools.com/why/customer-service/](http://www.lagunatools.com/why/customer-service/)  
8AM. To 5PM PSF. Monday through Friday

For warranty claims or to report damage upon receiving-please reach out to our warranty department:

Laguna Tools® Warranty Service  
744 Refuge Way, Grand Prairie, Texas 75050, USA  
1-800-234-1976  
[www.lagunatools.com/policies/warranty](http://www.lagunatools.com/policies/warranty)  
8AM to 5PM PST, Monday through Friday

### Registration

To prevent voiding this warranty, all products sold must be registered within thirty (30) days of receiving the product. Registering the product will enable the original purchaser to receive notifications about important product changes, receive customer service, and be able to file a warranty claim against defective workmanship, parts, or materials.



### Who is Covered

The applicable warranty covers only the initial purchaser of the product from the date of receiving the product. To file such claims, the original purchaser must present the original receipt as proof of purchase.

### What is Covered

The warranty covers any defects in the workmanship of all parts and materials that make up the machine unless otherwise specified. Any part determined by Laguna Tools® to have a defect will be repaired or replaced (and shipped), without charge. The defective item/part must be returned to Laguna Tools® with the complaint and proof of purchase in the original packaging that it was received in. In the event the item/part is determined to be not covered by this warranty, the customer will be responsible for the cost to replace the item/part and all related shipping charges.

### Warranty Limitations

This limited warranty does not apply to natural disasters, acts of terrorism, normal wear and tear, product failure due to lack of maintenance or cleaning, damage caused by accident, neglect, or lack-of inadequate dust collection. The warranty may be voided against proof of misuse/abuse, damage caused where repair or alterations have been made or attempted by others, using the product for purposes other than those described as intended use (unless with consent by Laguna Tools®), modification to the product, or use with an accessory that was not designed for the product. It is the responsibility of the user to understand basic woodworking machinery settings and procedures and to properly maintain the equipment in accordance with the standards provided in this manual.

### Length of Warranty

All new machines and optional accessories sold through an authorized dealer carry a two-year warranty effective from the date of receiving the product. Machines sold for either commercial or industrial use have a one-year warranty. Wearable parts like throat plates, bandsaw guides, etc., have a ninety-day warranty.

**Table A-1 Warranty Lengths**

*2 Year – New Machines Sold Through an Authorized Dealer*

*2 Year – Accessories Sold as Machine Options (excluding blades)*

*1 Year – Machines Sold for Commercial or Industrial Use*

*1 Year – Blades and Accessories outside or Machine Options*

*90 Days – Wearable Parts*

Aside from being free of defects upon receiving, consumable parts, like cutters and abrasives, are not covered by this warranty unless otherwise stated by Laguna Tools®. These parts are designed to be used at the expense of the operator and are available for replacement or inventory purchase. The determination of a consumable part will be made on a case-by-case basis by Laguna Tools®.

### Shipping Damage

Laguna Tools® is not responsible for damage or loss caused by a freight company or other circumstances not in the direct control of Laguna Tools®. All shipping-related claims for loss or damage to goods must be made to Laguna Tools® within twenty-four hours of delivery.

### How to Receive Support

To file a warranty claim, please contact the warranty department at 1-800-234-1976. To receive customer service or technical support, please contact the customer service department at 1-800-332-4094. Parts, under warranty, are shipped at the expense of Laguna Tools® either by common carrier, FedEx ground services, or similar method. Technical support to install replacement parts is primarily provided by phone, fax, email, or the Laguna Tools® Customer Service Support Website.



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**LAGUNA**

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