PL1220 Precision Laser Owner's Manual

LAGUNA

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Scope of This Manual

This manual outlines the basic procedures for the PL1220 Precision Laser Machine.

For detailed instructions and video(s), please go to www.lagunatools.com.

Customer Service

For technical support, please contact Laguna Tools:

By phone at 1-800-332-4094 or email Customer Service at customer_service@lagunatools.com. Please note the machine type in the subject line.

Revision 03 (10/10/2023)

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NOTES:

1.0 General Information and Safety

1.1 Overview

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 neither be modified nor used for any application other than those for which it was designed.

1.2 Safety Signs and Call-Outs

DANGER

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

WARNING

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

CAUTION

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

NOTE

A helpful tip from Laguna Tools staff.

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.

⚠ WARNING

Automated machinery involves moving parts which pose a potential hazard to personnel.

Be aware of machine movement at all times.

⚠ 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.

⚠ CAUTION

Machine bits are sharp and pose a cutting hazard. Do not handle without gloves or while the machine is in operation.

1.4 Additional Safety Information

1. All motion parameters have been set up by Laguna Tools. If any modifications are required, please have a professional operator perform the changes.
2. Safety Signs should be attached to places that are easy to spot.
3. Use the machine only in clean areas free from excessive moisture or flammable objects.
4. The machine must be level. Level the machine if the ground is uneven.
5. Keep the machine, electrical cabinet, and surrounding area clear of obstructions and free from excessive moisture.
6. Keep the machine, electrical cabinet, and cables away from excessive heat, flammable substances, and sharp objects.
7. Do not attempt to exceed the limits of the machine.
8. 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.
9. Exercise care with machine controls and around keypad to avoid unintentional start-up.
10. Keep cutting tools clean and sharp.
11. Lubricate and change accessories when necessary.
12. Cables and cords should be inspected regularly.
13. Keep controls clean and dry.
14. Keep a copy of this manual for future reference.
15. 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.
16. Stay alert at all times while operating the machine.
17. Always wear safety glasses and hearing protection.
18. Know where the emergency stop switch is located.
19. Never operate machinery under the influence of drugs or alcohol, when tired, or when distracted.

20. 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.
21. Never stand on the machine. Serious injury may occur if the machine is tipped or if the cutting tool is unintentionally contacted.
22. Consult the Owner's Manual or Laguna Tools for recommended accessories. Using improper accessories will increase the risk of serious injury or damage.

1.5 Prohibited Materials

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.

Table 1-1 Prohibited Materials

Material	Danger
PVC (Polyvinyl Chloride) Vinyl Artificial Leather	Toxic gas is harmful to the operator and bystanders. Acidic byproduct is harmful to the lens and machine components.
Polycarbonate (Lexan) Epoxy Fiberglass Resin	Toxic gas is harmful to the operator and bystanders. Acidic byproduct is harmful to the lens and machine components. Material Properties resist laser cutting/engraving.
ABS	Toxic gas is harmful to the operator and bystanders. Acidic byproduct is harmful to the lens and machine components. Material properties resist laser cutting/engraving.
HDPE	Highly flammable. Acidic byproduct is harmful to the lens and machine components.
Polystyrene (Styrofoam) EPS Polyurethane Foam Polypropylene Foam	Extremely Flammable. Acidic byproduct is harmful to the lens and machine components. This material has been reported to cause several fires by processing with a laser machine.

1.6 Proposition 65 Warning of Harmful Exposure

Some dust created by power sanding, cutting, sawing, grinding, drilling, lasering, 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.

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.

⚠ DANGER

Fire Warning

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

Personal safety is the responsibility of the operator.

1.7 Electrical Safety

1.7.1 Power Connections

A separate electrical circuit should be used for each machine. The circuit should not be less than the wiring listed in the table below and should be protected with an appropriate circuit breaker based on the total running and start-up amperages (listed below). If an extension cord is required, use only 3-wire extension cords which have 3-prong grounding type plugs and matching receptacle which will accept the machine plug.

DANGER

Before connecting the machine to the power source, verify the switch is in the "OFF" position.

Table 1-2 Power Connections

MLC122040-2	
Voltage	110V
Phase	1PH
Hertz	60Hz
Full load amperage	9.6A/14.4A (all components)

WARNING

The table below lists RECOMMENDATIONS to be used for this machine based on the information in the above table. Variables outside of our control are

- A***ctual voltage supplied to the machine***
- ***Electrical code that must be met in your local province.***

An electrician will verify that all the demands are met to properly wire the machine. If you have absolutely any doubt when wiring this machine, please consult with a qualified electrician.

Plug/receptacle	5-15
Wiring (gauge)	14 Ga. (minimum)
Circuit breaker	15 AMP

⚠ WARNING

If this information is different than what is stated on the Motor Specification Plate–omit this information.

It is possible that the documentation is outdated to a machine change–such as a different motor.

Always check the motor plate prior to any wiring. If there are any doubts, please consult a certified electrician.

⚠ CAUTION

Running on a different voltage than stated above will damage the machine. NEVER run the machine in wet or damp conditions.

NOTE

Reference the wiring diagram in section 15.0 for a detailed look at the wiring diagram.

1.7.2 Grounding Methods

⚠ DANGER

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

⚠ DANGER

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

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

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

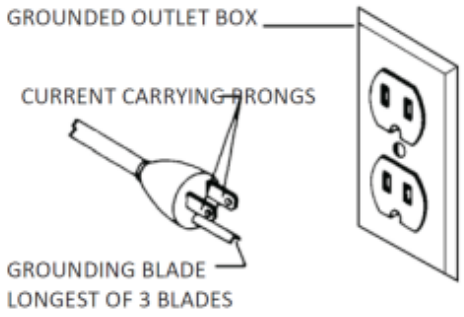

Figure 1-1:
Receptacle with nominal rating less than 150 volts

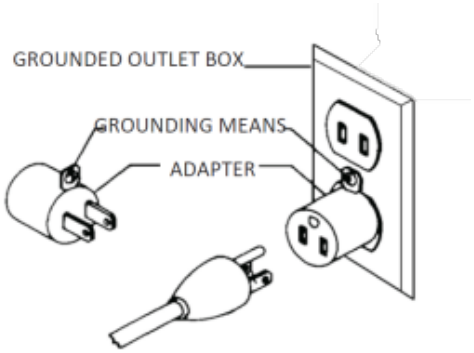

Figure 1-2:
150 volt receptacle without grounding pin fitted with adapter

1.7.2.1 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.

1.7.2.2 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.

1.7.3 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.

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.

Table 1-3: Extension Cord Gauges 120V

Minimum Gauge Extension Cord 120V *Recommended Sizes for Use with Stationary Electric Machines*			
Ampere Rating	**Volts**	**Total Length of Cord in Feet**	**Gauge of Extension Cord**
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	*Greater than 50 feet not recommended*	

Table 1-5: Extension Cord Gauge 240V

Minimum Gauge Extension Cord 240V *Recommended Sizes for use with Stationary Electric Machines*			
Ampere Rating	**Volts**	**Total Length of Cord in Feet**	**Gauge of Extension Cord**
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	*Greater than 100 feet not recommended*	

NOTES:

2.0 Connection Diagram

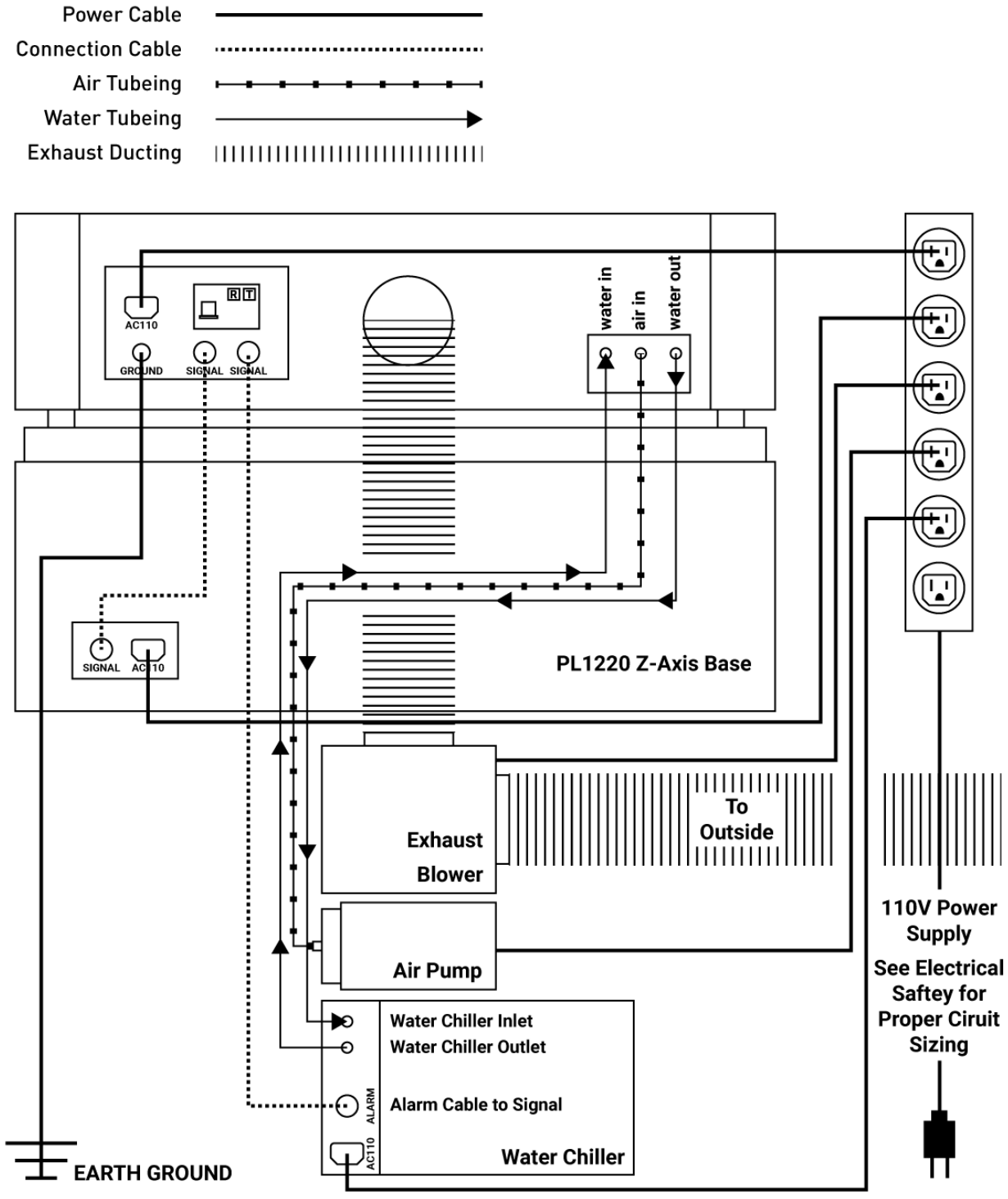

Figure 2-1: Connection Diagram

2.1 Connections

With the power still unplugged, make all connections according to the connection diagram. Verify water and air connections are not leaking.

Exhaust blower – Use a flathead screwdriver to install the Exhaust Ventilation to the machine.

Water Chiller – Press fit the rubber water hoses from the cooling system (water chiller) to the laser machine.

Air Pump – Press fit the air hose from the air pump to the machine.

Remote Interlock Connector - If the machine is provided with a remote interlock connector, connect the remote's cord to the machine interlock outlet.

2.2 Safety Check

Open the rear panel and check that all systems are working by powering them on individually. Do not give power to the laser machine during this check.

Exhaust blower – Verify the ducting is installed and will not come loose. Verify the fan will not tip over.

Water Chiller – With the rear panel open, water in the chiller and all connections made, give power to the chiller and verify there are no leaks or faulty connections. Confirm the water is flowing towards the first mirror. Verify the alarm works by performing the "pinch test" (pinch the water tube for twenty (20) seconds or until alarm sounds).

Air Pump – Verify that air is flowing to the laser head assembly.

NOTES:

3.0 Receiving the Machine

Following delivery and BEFORE the driver and riggers have left, inspect the packing, invoice, and shipping documents. Next, verify 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.

Most large machinery will be delivered on a tractor trailer 48 to 53 feet long. Please notify a sales representative regarding any specific delivery restrictions. The customer is required to have a forklift (6000 lbs. or larger is recommended) with 72-inch forks or fork extensions.

NOTES:

4.0 PL1220 Overview

The redesigned PL1220 laser from Laguna offers a complete ecosystem with optional rotary, fume collector, stand & software. The 40-watt laser makes quick work of complicated inlay techniques, cuts intricate designs out of wood, acrylic, and several other materials, along with perfect engraving lithography in most non-metallic materials. The PL1220 has a full 12″ by 20″ workspace with a full 12″ Z-axis to fit large materials and a rotary device. The bottomless design allows the user to engrave large projects like tabletops and murals. The PL1220 keeps raising the bar!

4.1 Features

- PL12|20 Laser Machine: 12″ x 20″ work surface
- 40-Watt CO2 Laser
- Z-Axis Base: 12″ Capacity
- Industrial Water Chiller
- Air Pump
- Exhaust Fan
- Multiple Work Surfaces: Steel, Honeycomb, Bottomless

4.2 Components

The following depicts items shipped with the machine. Machine parts should arrive sealed in plastic bags or packaging. Before assembling, verify that all the following parts are present:

- One (1) exhaust fan
- One (1) chilling unit
- One (1) air compressor
- One (1) steel bottom
- One (1) honeycomb bottom
- One (1) spare limit switch
- Three (3) power cables (Air Chiller, PL1220, Lift-bed)
- One (1) USB cable
- One (1) Ethernet Cable
- One (1) air hose with quick connect
- Two (2) connection cables

- Two (2) expandable ducting tubes
- One (1) exhaust reducer
- One (1) USB thumb drive with RDWORKS software
- One (1) 40W laser tube
- One (1) PL1220 laser machine

Figure 4-1: PL1220 Components

1. Exhaust Fan
2. Air Pump
3. Chilling Unit
4. PL1220 Machine
5. Lift-bed
6. Stand
7. Interface
8. Honeycomb Bottom
9. Rotary

Figure 4-1: PL1220 Components Cont'd

10.	Spare limit switch	13.	Power cable	16.	Expandable ducting tubes
11.	USB cable	14.	Air pump hose	17.	Exhaust reducer
12.	Ethernet cable	15.	Alarm cable	18.	Duct tube straps

NOTE

There are several other parts included in the toolbox not pictured above. Throughout the manual, those parts will be listed when needed.

NOTES:

5.0 Interface

The RDworks works interface is described below. The Buttons will be used within the text to help with tutorials.

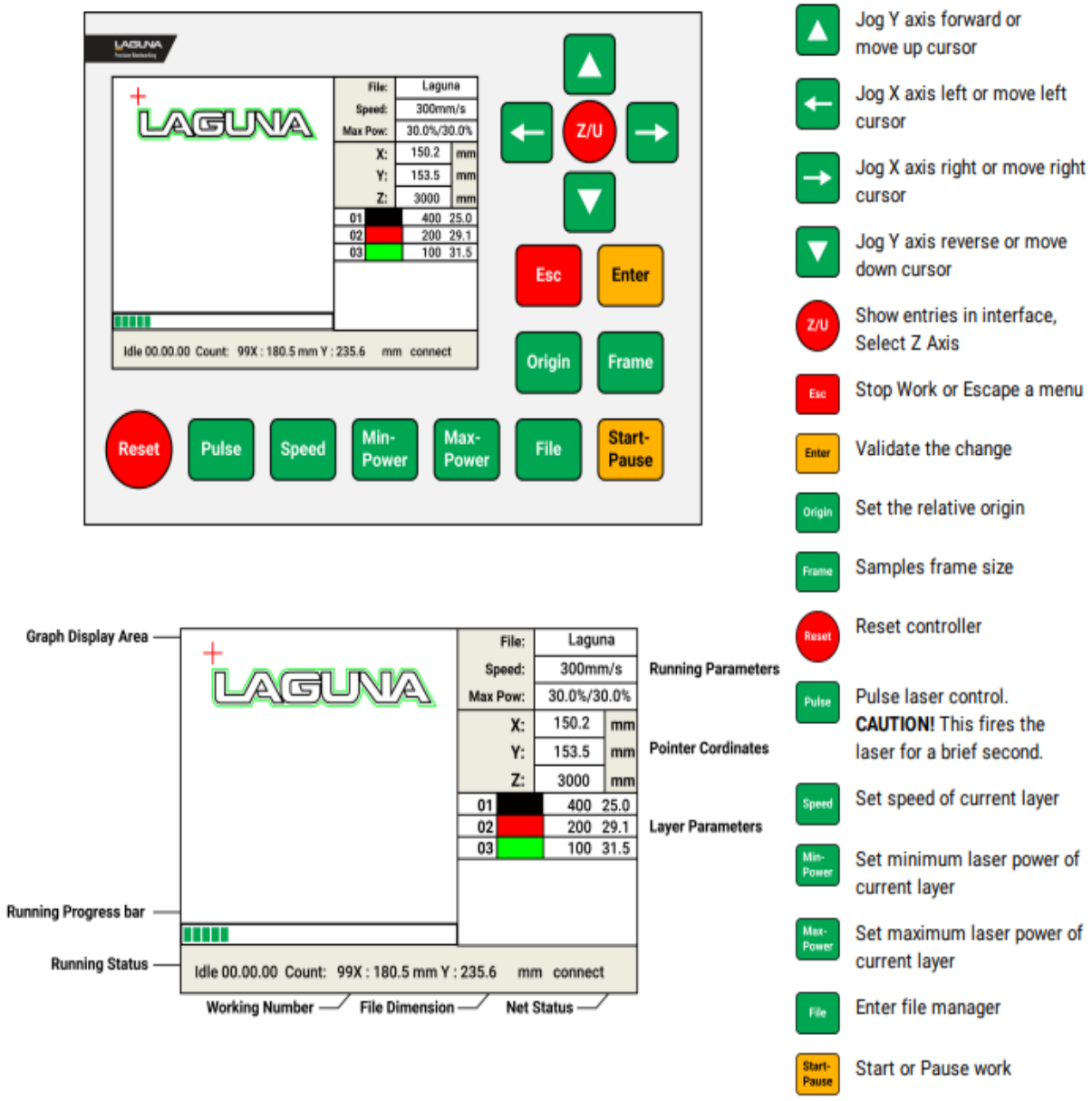

Figure 5-1: RDWorks Interface

Graph Display Area – Displays the whole file's track and display the running track.

Running Parameters – Displays the running file's file number, speed, max power, etc.

Coordinates – Displays the current coordinate of X, Y, and Z-Axes.

Graph Layer Parameters – Displays the layers' information of the current file, such as max or min power, speed, etc. When the system is idle, double click the layer. Then users can change the layer's parameters and the changes will be saved.

Running Progress Bar – Displays the progress bar of the current running file.

Running Status – Displays the status of the machine, such as Idle, Run, Pause, Finish, etc.

Working Number – Accumulates the work number of the current file.

File Destination – Displays the dimensions of the current file.

Net Status – Displays the connecting status of the Ethernet.

NOTES:

6.0 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.

6.1 Setup Overview

When setting up your PL1220, read this overview prior to starting.

1. Carefully un-box the laser machine.
2. Verify to setup on a level floor.
3. If using the base, level the base to the floor and then place the PL1220 Laser machine on top.
4. Install the laser tube.
    a. Follow the connections diagram for all connection to the PL1220.
5. Set up the chiller unit; this requires seven (7) liters (1.85Gal) distilled water, water tubes, and connection cables.
6. Verify that water is running through the laser tube.
7. Set up the air pump.
8. Set up the exhaust fan.
9. Install the software and sync with the PL1220 Laser machine.
10. Now that the setup is complete, plug in and power on the machine and all components.

⚠ 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.

11. With all components plugged in, run the confirmation of proper set-up test.

After Setup, there may be a few adjustments to be made. All of these adjustments are made prior to shipping the saw, but if one is found to need adjustments, please follow the adjustment guides.

6.2 Unboxing

⚠ 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

DO NOT cut deep into the wooden crate with a blade as it may scratch the paint.

Only use a dull edge or cut deep enough to only puncture the tape.

Figure 6-1: PL1220 Delivery Crate

The machine should arrive in a wooden crate on a pallet.

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

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

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.

6.3 Laser Machine Assembly and Leveling

⚠ DANGER

DO NOT plug in the PL1220 machine until setup and assembly is complete.

1. **Carefully** unbox the PL1220 laser machine.
2. With two (2) people, lift and place the PL1220 laser machine on a level floor or desired surface.

⚠ CAUTION

The machine is heavy and requires at least two (2) people to lift it into position.

a. If using the Z-Axis base (optional), place the base on a floor or desired surface and level the base by adjusting the pads on the bottom.

b. Verify the base is level.

c. With two (2) people, lift and place the PL1220 laser machine on top of the base and level the PL1220 to the base if needed.

⚠ WARNING

Use caution when placing the PL1220 on the base, it is NOT bolted down and the laser tube can break if it drops from the foot pad.

NOTE

The PL1220 does not need to be sitting on the Z-Axis base to operate. It has been designed where if the Z-Axis base is not connected, everything will still work other than the auto-focus control.

If the Z-Axis base is not connected, the focal length will need to be set manually by twisting the cap and setting the proper focal spacing.

The PL1220 is also designed to be used with an "open bottom". An example of this is when the operator would want to engrave onto the surface of a table. The operator will move the PL1220 to the tabletop, set the focal spacing manually and then proceed to operate the laser.

3. After the machine has been moved and leveled, remove all zip ties from the belts and laser head assembly with a cutting tool. There is one (1) on each belt to prevent movement in transit, and one (1) on the laser head assembly.

⚠ CAUTION

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

The next step is to install the laser tube, which is in the following section.

6.4 Laser Tube

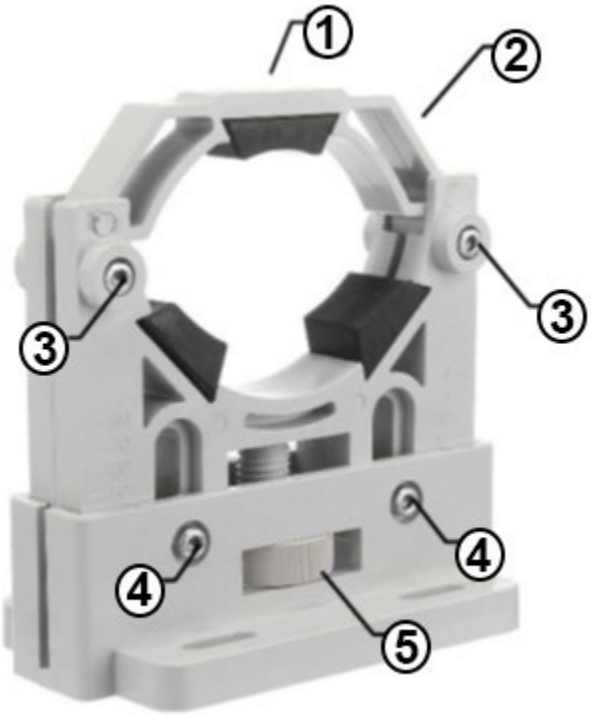

Figure 6-2: Laser Tube Mount

1. Tube top lock screw
2. Top mount
3. Tube lock screws
4. Tube height lock screws
5. Tube height adjustment dial

NOTE

Reference the connection diagram in section 2.0 when installing.

1. Open the rear panel of the laser machine. (Older models require unscrewing the screws using an Allen key).
2. Remove the top mounts removing the tube lock screws using an Allen key.
3. Loosen the tube height lock screws using an Allen key.

4. **Carefully** place the new, unconnected laser tube inside the mounts.

⚠ CAUTION

The laser tube is very fragile.

5. Carefully connect the water tube between the inlet on the rear of the connection panel and the water inlet on the laser tube (left side, cathode side).

6. Carefully connect the water tube between the outlet on the rear of the connection panel and the water outlet on the laser tube (right side, anode side).

7. Connect the high voltage (+) terminal (left side, cathode side) to the power supply according to the wiring diagram in this manual.

    a. Use the wire insulated with the rubber sleeve. The set screw is in this sleeve. Loosen and tighten the small set screw on the end of the cathode terminal. DO NOT break it off.

    b. Slide the set screw end onto the terminal, and tighten the set screw.

NOTE

The connection should be from (+) to (-) the same direction that the laser is firing (i.e., towards the first mirror).

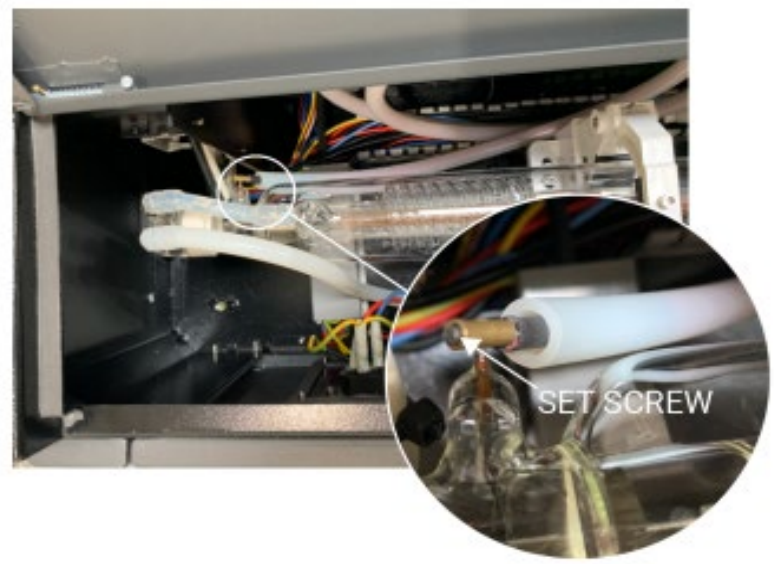

Figure 6-3: Set screw on cathode terminal

⚠ CAUTION

Loosen and tighten the small set screw on the end of the cathode terminal. DO NOT break it off.

8. Connect the low voltage (-) terminal (right side, anode side) to the power supply according to the wiring diagram in this manual.
    a. Use the wire with the alligator clip.
9. Re-install the top mounts and fasten the laser tube in place.
10. Slightly tighten the tube top lock screw to give **slight** pressure to the laser tube.
    a. The top mounts need to be snug against the tube.
11. Measure and adjust the tube height adjustment dials until the laser tube is firing perfectly straight.

⚠ CAUTION

Verify the tube height lock screws are loose.

NOTE

If using a level, verify that the laser machine is on a level surface. It is crucial that the laser tube is parallel to the chassis of the machine.

The first step of mirror alignment is to make certain that the tube is parallel to the chassis of the machine such that the mirrors can then be aligned to that plane.

12. Tighten the tube height lock screws using an Allen key.

NOTE

Do not worry about testing the laser for alignment at this point as all other components need to be installed prior to testing.

6.4.1 Properly Installed Laser Tube

Figure 7-3 depicts the water tubes connected to the inlet water port. The cathode wire connects to the pin with a set screw.

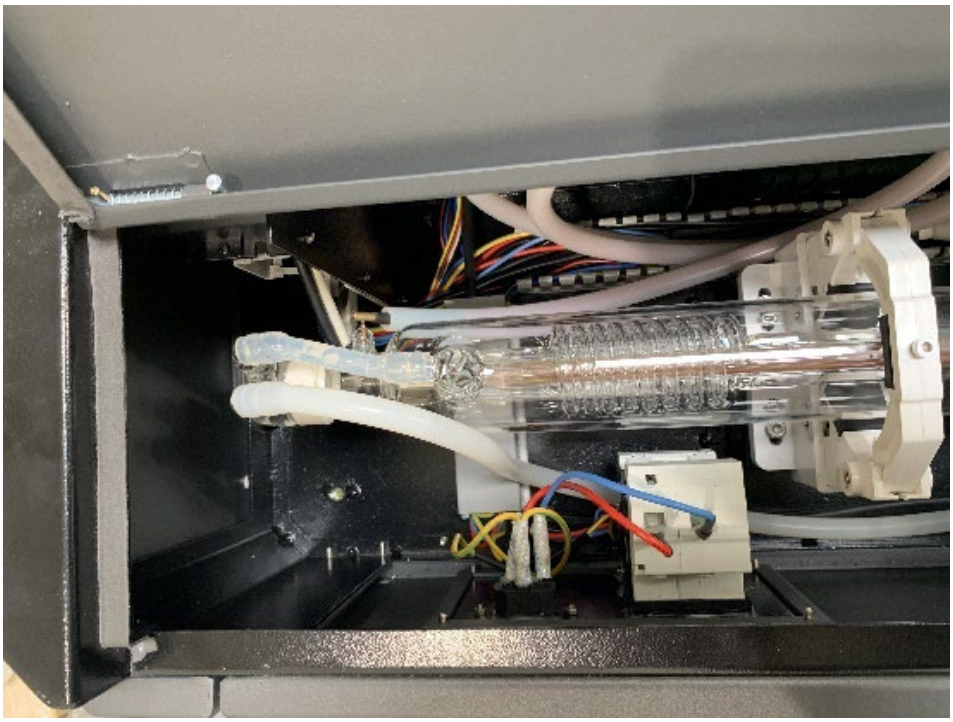

Figure 7-3: Cathode Side (Left)

Figure 7-4 depicts the water tubes connected to the outlet water port. The anode wire connects to the pin with the alligator clamp.

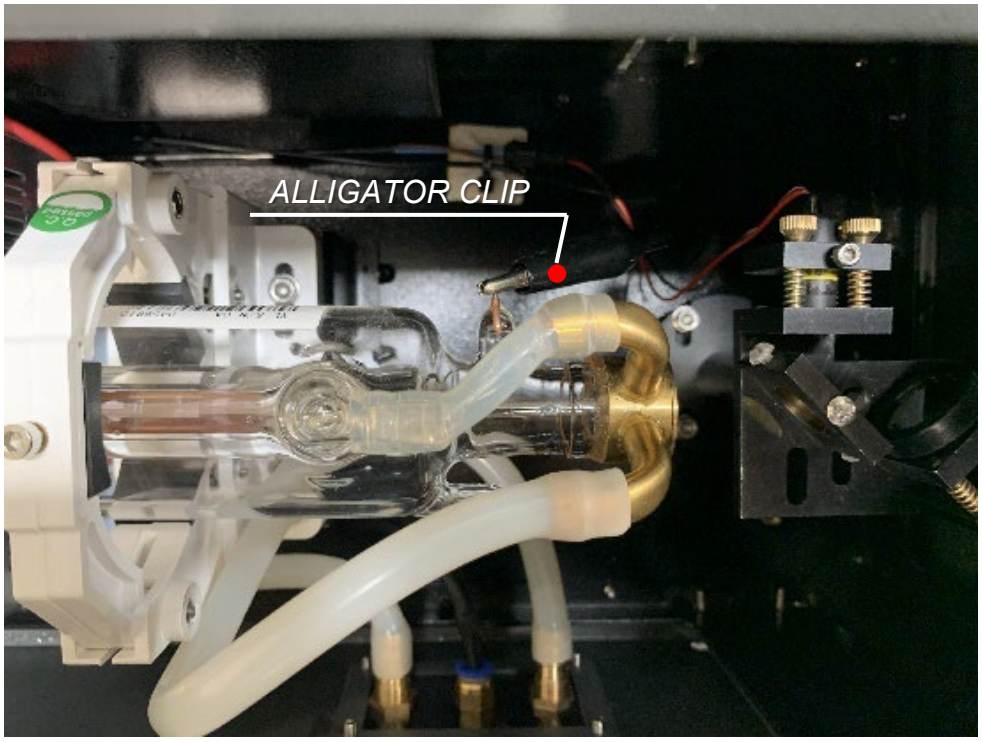

Figure 7-4: Anode Side (Right)

NOTE

The chiller, air pump, exhaust blower, and software need to be properly installed prior to running and testing the function of the laser tube.

⚠ CAUTION

DO NOT test the laser tube or pulse the laser machine until the setup indicates this action.

NOTE

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

The next step is to connect the chiller, air pump, and exhaust fan, which are in the following section(s).

6.5 Chiller

⚠ DANGER

DO NOT plug in the PL1220 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.

NOTE

Reference the connection diagram in section 2.0 for connections to the PL1220.

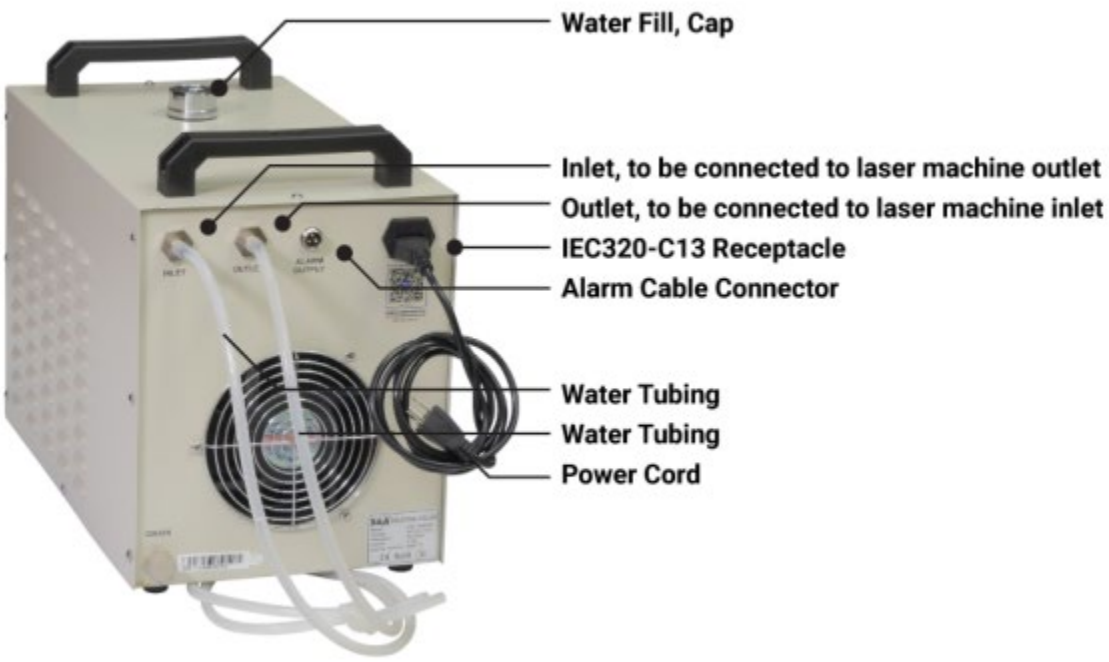

Figure 6-6: Water Chiller

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. Unscrew the cap and fill the unit with the seven (7) liters of water.
4. Press fit one end of the water tubing to the chiller outlet and the other end to the machine water inlet.
5. Press fit one end of the water tubing to the chiller inlet and the other end to the machine outlet.
6. Connect the alarm cable to the laser machine.

7. Connect the power cord to the chiller machine **only.**
8. **DO NOT** connect to power until setup is complete.

6.6 Air Pump

⚠ DANGER

DO NOT plug in the PL1220 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.

NOTE

Reference the connection diagram in section 2.0 for connections to the PL1220.

Figure 6-7: Air Pump

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 ¼ inch air hose.

1. Screw the air hose threaded fitting into the air pump adapter insert until it is hand tight.
    a. Tighten the nut with a 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.

2. Press fit the ¼ inch air hose into the connection on the back of the PL1220 machine.
3. **DO NOT** connect to power until setup is complete.

6.7 Exhaust Fan

DANGER

DO NOT plug in the PL1220 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.

WARNING

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

NOTE

Reference the connection diagram in section 2.0 for all connections to the PL1220.

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

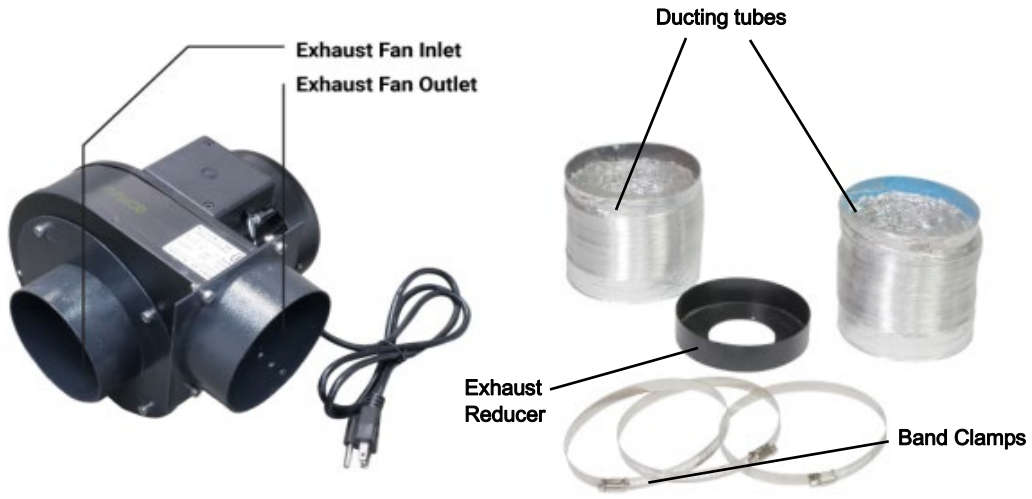

Figure 6-8: Exhaust Fan and components

1. Use a flathead screwdriver to install the exhaust reducer to the back of the PL1220 machine.
2. Connect and fasten (with band clamps) the end of 1 (of 2) ducting tubes to the exhaust fan inlet.
    a. Connect and fasten the other end to the exhaust reducer. (If the rear panel was removed by taking off screws, **Do not** connect the other end at this time.)
3. Verify the ducting tubes are fastened with the included band clamps.
4. Connect and fasten the end of the 2nd (of 2) ducting tubes to the exhaust fan outlet. **Do not** connect the other end; this end is for ventilation.
5. **DO NOT** connect to power until setup is complete.

⚠ 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.

6.8 Laser and Component Safety Check

⚠ DANGER

DO NOT plug in the PL1220 machine until setup and assembly is complete.

1. With the power still unplugged, verify the connections are according to the connection diagram.

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

Reference the connection diagram in section 2.0 for all connections to the PL1220.

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. **DO NOT** turn it on at this time.
7. Open the rear panel of the laser machine. (Older models require unscrewing the screws using an Allen key). **DO NOT** break any connections.
8. On the laser tube, verify the cathode wire is connected and the set screw is tightened (less than 1 Nm (Newton meter) or .738 lbs·ft.
    a. Verify the anode wire is connected via the alligator clip.
9. Turn the chiller to the "ON" position.
    a. The chiller alarm will beep several times before it is ready to perform. This is normal.
10. Water will flow through the laser tube.
    a. Verify that water is flowing through the laser tube from left to right (towards the first mirror)
11. Verify the 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 is working correctly.
12. Close the rear panel. (Older models require screwing in screws with an Allen key).
13. Connect the unused end of the exhaust inlet ducting tube to the exhaust adapter on the back of the machine.
    a. Fasten with the included band clamps.
12. Give power to all the other components. (power strip recommended.)
13. Check that all other components are working by turning them on individually. **Do not** give power to the laser machine during this check.
    a. **Exhaust Fan:** Verify the ducting tube is installed and will not come loose. Verify the fan will not tip over.

b. **Air Support System:** Ensure that air is flowing to the laser head assembly.

c. **Laser Tube:** Verify the cathode wire is connected and the cat screw is tightened (less than 1 NM or torque). Verify the anode wire is connected via the alligator clip.

d. **Cooling System:** 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).

6.9 Alignment Check and Test Run

1. With the chiller still on, give power to the machine and turn it on.

2. Open the laser lid. There should be a red dot laser sight 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 not is visible, view the mirror alignment procedure.

a. If the red dot is present, open the lid and place a scrap piece of wood under the laser head with the red dot where you expect to fire 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. Press the 

PULSE button.

5. If the laser has pulsed properly and a small burn mark is present in the sample, setup is complete.

If the RDWorksV8 software is already installed on your computer, you are now ready to use the laser machine.

If you **do not** have the RDWorksV8 software program installed on your computer, you will need to install it prior to using the laser machine.

RDWorksV8 is a software program for laser cutting engraving operations. The program has support for drawing points, lines (horizontal/vertical), polyline, ellipse/circle, rectangular/square, Bezier curve, text, and for CAD models such as DXF, AI and PLT.

7.0 RDWorksV8 Software

NOTE

For techniques on how to use the RDWorks software suite or manipulate work files, please refer to the Ruidia RDWorksV8 software manual available at https://lagunatools.com/resources/product-manuals/

The standalone setup is recommended for new users and is the easiest way to get started with the Laser Machine.

NOTE

The laser machine must be connected to a computer to read the factory preset parameters on the Ruida controller.

NOTE

Design programs may not be compatible with the newest versions of RDWorks and vice versa.

RDWorksV8 is a software program for laser cutting engraving operations. The program has support for drawing points, lines (horizontal/vertical), polyline, ellipse/circle, rectangular/square, Bezier curve, text, and for CAD models such as DXF, AI and PLT.

Table 7-1: RDWorks Password

RDWorks Password(s)
RD8888

RDWorks is adaptable and can be installed as a stand-alone program or as an add-in to a design program like AutoCAD or Adobe Illustrator. The following guide will go through the procedure of installing each individually.

No matter which configuration of RDWorks is chosen to operate the laser machine, it is recommended to first connect the laser machine with the computer that will be manipulating files, just as with an inkjet printer.

The operator could, however, choose to put work files on a USB thumb drive and transfer them to the laser machine, but the laser machine parameters (things like work area and mirror configurations) must be synced with the software to preserve ratios and other parameters set by the onboard controller.

The easiest way to sync this information is by connecting the PC to the laser machine via the included USB connector.

Confirm these software settings if not connecting to a PC (intending to only transfer files via USB thumb drive):

Table 8-2: Software Settings

Setting	Selection	Notes
Units	mm	Laser machine preset to mm.
Page width	500mm	Config>page_settings>
Page height	300mm	

There are three (3) major steps to complete the software setup:

1. Install RDWorksV8.
2. Sync machine settings.
3. Connect the PC to the laser machine.

7.1 Install RDWorksV8 as a Standalone Program (Recommended)

This setup is recommended for beginner operators and is the easiest way to get started in laser machining. Installing this version of RDWorks will allow the operator to utilize the RDWorks software package to create or edit work files and send them to the laser machine to be executed.

NOTE

Refer to the RDWorksV8 software manual for software-related guidance aside from this initial setup.

1. Download RDWorksV8 from the internet or connect the USB thumb drive.
    a. If using the USB thumb drive, insert the USB thumb drive into your USB port on your computer.

Figure 7-2 RDWorks Software Files

1. RDWorks application launcher icon
2. RDWorksSetup.exe file. Run to install
3. Folder containing the .exe file to install RDworks
4. .Zip file form online download

2. If the file was downloaded, unzip the .zip file ④.
3. Run the RDWorksSetup.exe file ② in the unzipped folder to a desired location.
4. Click "'Install"
    a. Wait for the program to install.

Figure 7-3 RDWorks Installation Interface

5. Once the program is installed, select "LaserWork" as the Type and then select the Origin and units that you wish to use.

NOTE

Other "types" are only compatible with certain software packages (E.g: CorelDraw_Laser will install a plugin into the CorelDraw software package.

6. Click install.

   The RDWorksV8 program should now be installed on your computer.

7.1.1 Troubleshooting

Table 8-3: RDWorks Troubleshooting

Problem(s)	Solution(s)
Cannot Unzip the downloaded file	Use a file extractor software program (like 7-sip, winzip, or WinRar) to perform this task.
Cannot locate RDWorksSetup.exe	Check the C: drive. On Windows, open: file explore>This_PC>Windows (C:)>RDWorksV8
Cannot run the RdworksSetup.exe file	Depending on the version of Windows installed, the operator may need to run the program as the administrator. To do this, right click rdworkssetup.exe and select "Run as Administrator".
The program will not install	Verify the "Type" is LaserWork. Verify that "Install" rather than "Install USB driver" is selected.

7.2 Connect PC to Laser Machine

To sync machine settings, you will need to connect the PC to the laser machine. The RDWorks software can also control the laser, start projects, and manage files directly from a PC connected to the Laser Machine.

7.2.1 Connecting Via USB (recommended for quick start)

1. Connect the one end of the USB-to-USB cable to PC and the other end to the PL1220 machine.

7.2.2 Connecting Via Ethernet (recommended for long term use)

1. Connect on end of the Ethernet cable to the Ethernet port on the back of the machine.
    a. Connect the other end to the router the computer is connected to. Follow the connection diagram to connect the laser machine to the internet router the PC is connected to. This includes connecting the Ethernet cable from the laser machine to the router.
2. Set the IP address of the Laser Machine by hitting the Z/U button on the Ruida controller and navigating to IP config+.
3. Set the IP address of the PL1220 by pressing the 

Z/U button on the Ruida controller.
    a. Navigate to IP config+

4. Set the IP address to any known value. Use 10.10.100.10 if confused.

NOTE

Every device (computer, router, laser machine) has a unique IP address. Completing step 4 establishes an address so that other devices can connect to the machine.

5. Set the **Gateway** to the IP address of the internet router being used.
6. Connect the PC to the now available Laser Machine network with the known IP address of the laser machine (10.10.100.10).

   The PC will not send any notification that the laser is connected. If the connection is not true, the following message will be displayed when trying to run a command:

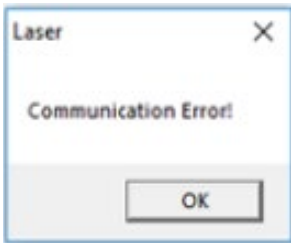

Figure 7-6: Laser Error Code

NOTE

If you plan to use the laser machine with a USB stick only, it is still recommended that the RDWorks software (on PC) is initially synced to the factory preset machine settings.

7.2.3 Troubleshooting

Table 8-6: PC Connection Troubleshooting

Potential Issue(s)	Resolution(s)
Cannot connect	Verify the laser machine is powered on, functional, and that RDWorks V8 is installed and running on the connecting computer.
Cannot connect via Ethernet	Verify that the laser machine is connected to an available Ethernet port on the router. With Ethernet connected, turn the router off, wait 20 seconds, and then turn the router back on.

7.3 Sync Machine Settings with RDWorksV8

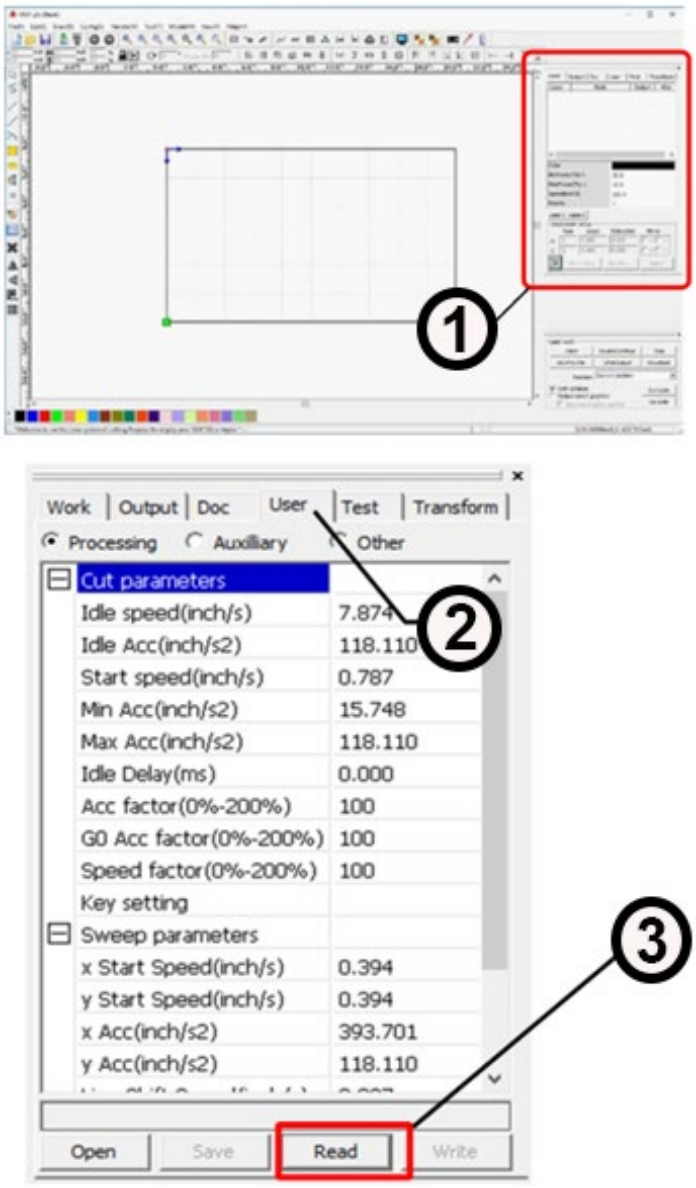

Figure 7-4: RDworksV8 Machine Settings

1. System work plat
2. User tab
3. Read button

NOTE

RDWorks must be installed on the PC and the laser machine must be fully set up and operational.

1. Connect the PC to the laser machine via the USB cable or Ethernet cable.
2. On RDWorks, go to "File" and select vendor settings.
3. Enter the vendor password: RD8888.
4. Select the "User" tab on the right-side control panel (system work plat).
5. Click "Read".

7.3.1 Verify Settings

Page settings > page size > Page width: 19.685 inch (500mm), Page height: 11.811 inch (300mm)

NOTE

Reference the RDWorksV8 software manual for software-related guidance aside from this initial setup.

7.3.2 Troubleshooting

Table 8-4: RDWorks Troubleshooting

Problem(s)	Solution(s)
Cannot connect or communication error	Verify the laser machine is powered on and functional. Use a hardwired USB to USB connection if the Ethernet method is problematic.

7.4 Sync Machine Settings with RDWorksV8 (Alternate Method)

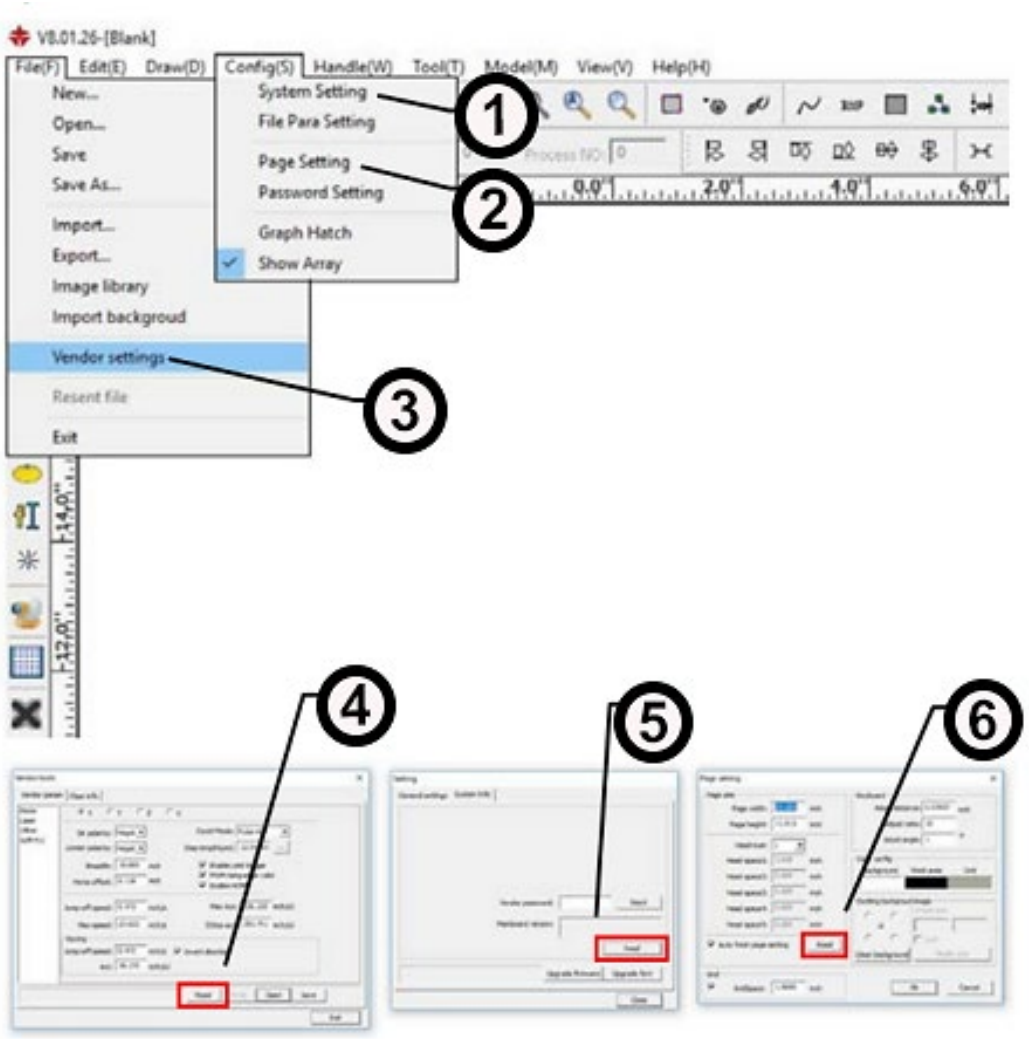

Figure 7-5: RDWorksV8 Machine Settings

1. System settings
2. Page settings
3. Enter password RD8888 here and read machine settings
4. Read machine settings
5. Read system settings
6. Read page settings

NOTE

RDWorks must be installed on the PC and the laser machine must be fully setup and operational.

1. Connect the PC to the laser machine via USB cable.
2. On RDWorks, click "File" and click "vendor settings".
3. Enter the vendor password: RD8888
4. Click the "Read" button to read machine settings.
5. Click the "Save" button to save machine settings
6. On RDWorks, click "Config" and click "system settings".
7. Select the "System Info" tab.
8. Click the "Read" button to read system settings.
9. On RDWorks, click "Config" and select "Page Settings".
10. Click the "Read" button to read page settings.

7.4.1 Troubleshooting

Table 8-5: RDWorksV8 Troubleshooting

Problem(s)	Solution(s)
Cannot connect or communication error	Verify the laser machine is powered on and functional. Use a hardwired USB to USB connection if the Ethernet method is problematic.

8.0 Adjustments

8.1 Focal Lens Adjustments

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.

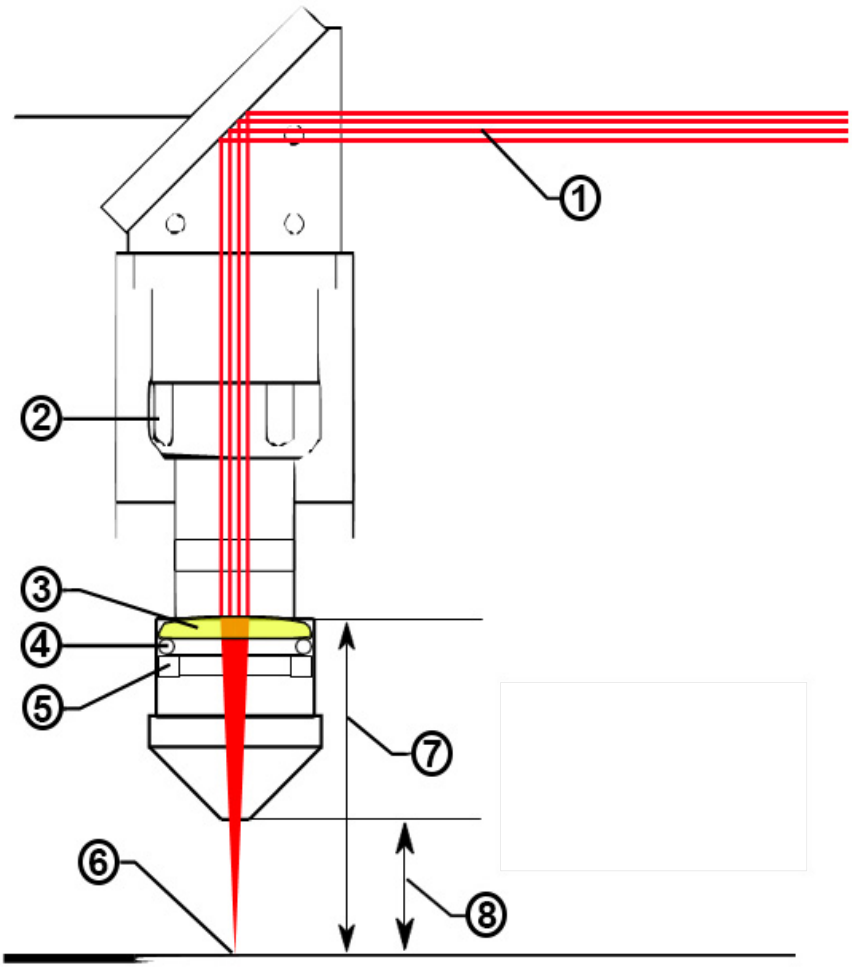

Figure 7-8: Focal Lens

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

8.1.1 Adjustment Procedures

1. Unscrew the height adjustment clamp.
2. Adjust the height of the laser tube such that the focused beam is in contact with the work surface.
    a. This can be achieved by setting the focal spacing to a distance between 7mm and 9 mm.
3. The focal spacing 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.

9.0 Cutting Strategies

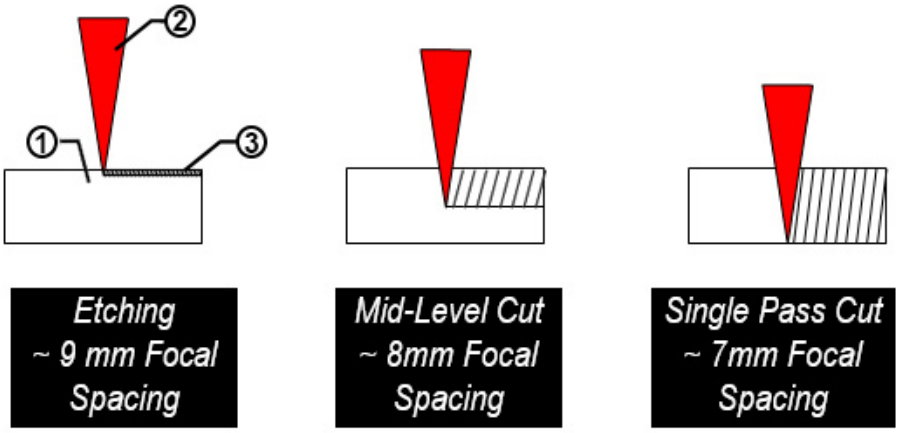

Figure 9-1: Focal Spacing

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 PL1220 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 ¼ inch acrylic or wood to cut out a piece similar to Figure 11-2. Be sure to engrave the focal spacing on the surface for future reference.

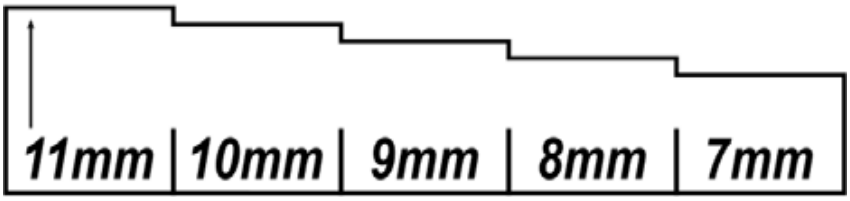

Figure 9-2: Spacing Block Example

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 PL1220 is 20mm in diameter and 63.5 mm in focal length.

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

10.0 Changing or Cleaning the Focal Lens

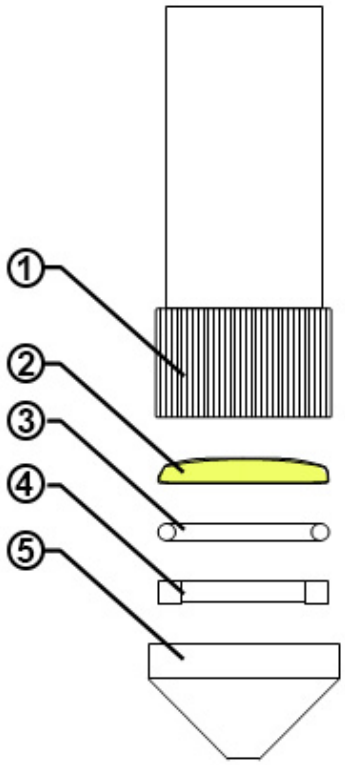

Figure 10-1: Focal Lens Assembly

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

1. Unscrew the assembly and remove from the PL1220 machine.

NOTE

The front of the PL1220 must be tilted up to remove the assembly.

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 to scratch the focal lens.

NOTE

The PL1220 is designed to be used with a 20 mm diameter 63.5 mm focal length lens.

11.0 Feeds and Speeds

Table 12-1: Polymer Material

Acrylic/Lucite/Plexiglass/PMMA			
	40 WATT	*80 WATT*	*120 WATT*
Engrave	450 – 50%	450 – 35%	450 – 25%
Cut 1/8 inch (3.2mm)	25 – 100 %	50 – 100%	60 – 100%
Cut ¼ inch (6.4mm)	10 – 100%	20 – 100%	35 – 100%
Cut 3/8 inch (9.5mm)		5 – 100%	15 – 100%
Cut ½ inch (12.7mm)			5 – 100%

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.

Table 12-2: Polymer Material Cont'd

Natural Rubber			
	40 WATT	*80 WATT*	*120 WATT*
Engrave	100 – 80%	325 – 80%	400 – 80%
Cut 1/8 inch (3.2mm)	50 – 100%	120 – 100%	150 – 100%

NOTE

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

Table 12-3: Wood Material

Hardwoods/Plywoods/MDF/ Particle Boards			
	40 WATT	*80 WATT*	*120 WATT*
Engrave	150 – 100%	300 – 100%	450 – 100%
Deep Engrave	75 -100%	175 – 100%	300 – 100%
Cut Veneer	150 -80%	250 – 80%	250 – 100%
Cut 1/8 inch (3.2mm)	25 – 100%	100 -100%	200 - 100%
Cut ¼ inch (6.4mm)	5 – 100%	25 – 100%	50 – 100%
Cut 3/8 inch (9.5mm)		5 – 100%	40 – 100%
Cut ½ inch (12.7mm)			5 – 100%

⚠ CAUTION

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

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.

Table 12-4: Thin Materials

Paper			
	40 WATT	*80 WATT*	*120 WATT*
Cut	500 – 15%	500 – 10%	500 – 5%

⚠ CAUTION

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

NOTE

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.

Table 12-5: Thin Material Cont'd

Fabric (polyester, twill, cotton)			
	40 WATT	*80 WATT*	*120 WATT*
Cut	250 – 35%	450 – 80%	450 – 60%

NOTE

Use a spray on adhesive to hole the fabric to the work surface.

Table 12-6: Thin Material Cont'd

Leathers			
	40 WATT	*80 WATT*	*120 WATT*
Engrave	150 – 100%	300 – 100%	450 – 100%
Cut 1/8 inch (3.2mm)	75 – 100%	175 – 100%	300 – 100%

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.

Table 12-7: Marked Metals

Cermark®, Alumark®, Thermak®, Painted, Anodized			
	40 WATT	*80 WATT*	*120 WATT*
Engrave - Cermark®	125 – 100%	250 -100%	300 -100%
Engrave – Anodized	450 – 50%	450 -30%	450 – 25%
Engrave – Painted	450 – 40%	450 – 25%	450 – 15%

NOTE

There are several products that use sintering 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.

NOTES:

12.0 Maintenance

⚠ DANGER

Unplug the machine prior to any maintenance work.

Always unplug the machine when changing the blade, guards, or any maintenance.

12.1 General

Keep the machine clean. At the end of each day, clean the machine. Wood contains moisture and if sawdust or wood chips are not removed, it will cause rust. We recommend only using Teflon-based lubricant on the saw. Regular oil attracts dust and dirt. Teflon lubricant tends to dry and has less of a tendency to accumulate dirt and saw dust.

Periodically check that all nuts and bolts are tight.

12.2 Drive Belt & Bearings

Drive Belt: The drive belt should last for many years (depending on the usage). Regularly inspect the belt for cracks, cuts, and general wear. Replace the belt if damage is found.

Bearings: All bearings are sealed for life and do not require any maintenance. Replace a bearing if it becomes faulty.

12.3 As Needed

- Clean Engraving Table (work surface)
- Clean Mirror Surfaces (only if dirty)
- Clean Focal Lens (only if dirty)
- Check mirror alignment
- Replace laser tube

12.4 Before Every Use

- Clean engraving table (work surface)
- Check mirror surfaces (clean only if dirty)
- Check focal lens (clean only if dirty)
- Check the air assist system

12.5 Weekly (10 hours of use)

- Clean venting pathway
- Clean air assist nozzle
- Check belts for debris and lubrication. Lubricate if needed.
- Check linear bearings and guides for debris and lubrication. Lubricate if needed.

12.6 Monthly (100 hours of use)

- Lubricate linear bearings and guides.
- Replace the chiller water.
- Inspect all systems for loose screws and hazards.
- Remove panels and confirm electrical connections.
- Check belts for cracks or frays. Replace if found.

12.7 Yearly (Independent of use)

- Replace water tubing.
- Replace air tubing.

12.8 Cleaning and Lubrication Suggestions

General Cleaning – Soapy water. Do not use chemical cleaners or degreasers.

Glass Cleaning – Microfiber non-scratch cloth and alcohol-based glass cleaner.

⚠ CAUTION

Excessive cleaning can be problematic. Clean mirrors and lenses only when needed.

Motion System Lubrication – White Lithium (PTFE) grease.

13.0 Troubleshooting

Table 14-1: Troubleshooting

Behavior	Possible Causes	Solutions
Laser machine will not turn on.	1. Breaker is in the defeated position. 2. Improper input power.	1. Flip breaker switch 2. Confirm power supply meets machine specifications.
All systems are powered but Laser will not fire.	1. Interlock Switch (door sensor) defeated. 2. Chiller Alarm defeated. 3. Water is flowing in the wrong direction.	1. Close the door, inspect switch. 2. Troubleshoot chiller unit. 3. Confirm direction of water flow (should be with direction of laser beam, towards first mirror).
Laser fires but does not process work surface or quality of process is poor.	1. Mirror is not aligned. 2. Focal distance is not set correctly. 3. Incorrect focal lens. 4. Focal lens is dirty. 5. Non-compatible material.	1. Perform mirror alignment procedure. 2. Adjust focal spacing to 7mm from work surface. 3. Use lens with 50.8mm focal length. 4. Clean focal lens and ensure that the air assist system is working. 5. No solution

13.1 Frequently Asked Questions

Q: What materials can the 40-Watt CO2 laser machine cut/engrave?

A: The processing capabilities of laser machines are distinguished by the wavelength of the laser beam and the power output of the laser tube. CO2 Lasers can cut and engrave most materials other than metals. By contrast, fiber lasers are engineered to produce a laser beam that can process metals. The 40-watt CO2 laser can cut and engrave most polymers and polymer composites: plastics, woods, leathers, fabrics, papers, etc.

It can also engrave several surfaces that it cannot cut, including anodized or coated metals, glass, and stone. Reference section 12 for a sample of what this machine can process. The operator must consider hazardous and problematic by-products of some of these polymers. For example, polycarbonate should not be cut because it produces a toxic gas that can be harmful to the operator and will damage components of the laser machine.

See the safety section for other hazardous materials and always check the Material Safety Data Sheet (MSDS) prior to cutting any questionable materials.

Q: Do I have to use RDWorks V8 software with a Ruida-controlled laser machine?

A: No. RDWorks can be installed as a printer device (see the software setup section 8.0). Independent software programs such as Lightburn® may be used. Follow this link to learn more about the LightBurn Software for Laser Cutters: https://lightburnssoftware.com/.

Q: How often do I need to change the laser tube?

A: The laser lube is classified as a consumable part and has a rated lifespan of 5000 hours of use. However, several variables affect the lifespan of the laser tube, like the power setting used and the quality of water coolant used.

⚠ CAUTION

ONLY use deionized or distilled water with the chiller/laser tube cooling system (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.

Q: How often do I need to change the water in the chiller unit and can I leave the water in the laser tube when not in use?

A: The water should be changed on a monthly (30 days) basis. The water can be left in the tube so long as there is no danger the water will freeze.

⚠ CAUTION

If you operate this laser in freezing temperatures (32°F, 0°C) there is a high probability the expanded frozen water will break the laser tube.

Q: Can I use a different Focal Length than the included 50.8 mm focal length?

A: All focal lenses must be 20 mm in diameter to fit the laser tube assembly. The shortest focal length that can be used is the 50.8 mm, constraint by the laser assembly mounting tube.

A longer focal length can be used by removing the removable bottom of the PL1220 and resting the machine on riser blocks to accommodate the larger focal spacing needed.

Q: What type of lubricant should I use for the linear bearings?

A: We recommend white lithium (PTFE) grease

Q: Do I need to use a Fume Extractor with a CO2 laser cutting machine?

A: You must vent the machine to a safe location that will not harm yourself as the operator or any bystanders. This is most easily done with the use of a fume extractor machine. The use of a fume extractor is beneficial to the safety of the operator and bystanders as it filters the harmful by-product away.

This does not make it acceptable to use harmful materials as the fumes must still travel through the venting and parts of the machine that could be irreversible damaged.

NOTES:

14.0 Specifications

Table 15-1: PL1220 Laser Specifications

PL1220 Laser	
Voltage	115V
Hertz	60Hz
Phase	1Ph
Running Amperage	9.6A (14.4A with all components)
Recommended Breaker	Dedicated 15A on power strip for all components

Table 15-2: CO2 Laser Specifications

CO2 Laser	
Laser Tube	RECI Water Cooled 40W 15,000H working file
Optics	U.S. II-VI Focusing lens & beam combiner
Drive System	Leadshine motors & 3PH drivers
Linear Guides	Hiwin HG resin capped
Work Envelope	12" x 20"
Table Lift	12"
Control Software	RUIDA RDWorks, Lightburn option
Engraving Speed	0-500mm/s
Cutting Speed	0-500mm/s
Laser Output Control	0-100% Software controlled
Exhaust	300CFM

Working Environment	32º-104ºF, Humidity 5-95%

Table 15-3: PL1220 Dimensions

Dimensions	
Net Weight	300 lbs (all components)
Ship Weight	325 lbs
Assembled Height	10" (top unit) 27" (with base) 40" (with base and stand)
Assembled Width	40"
Assembled Depth	30"

Table 15-4: Chiller Specifications

Chiller CW-3000DG	
Voltage	115V
Hertz	60Hz
Phase	1Ph
Running Amperage	0.9A
Net Weight	21 Lbs
Ship Weight	26 Lbs
Tank Capacity	9L (2.3 Gal)
Flow	10L/min (2.64 Gal/min)

Table 15-5: Air Pump Specifications

Air Pump	
Voltage	115V
Hertz	60Hz
Phase	1Ph
Running Amperage	1.3A
Air Flow	5 CFM
Net Weight	9.9 Lbs
Ship Weight	10 Lbs

Table 15-6: Exhaust Fan Specifications

Exhaust Fan	
Voltage	115V
Hertz	60Hz
Phase	1Ph
Running Amperage	2.6A
Horsepower	1/3HP
Air Flow	300CFM

NOTES:

15.0 Wiring Diagram

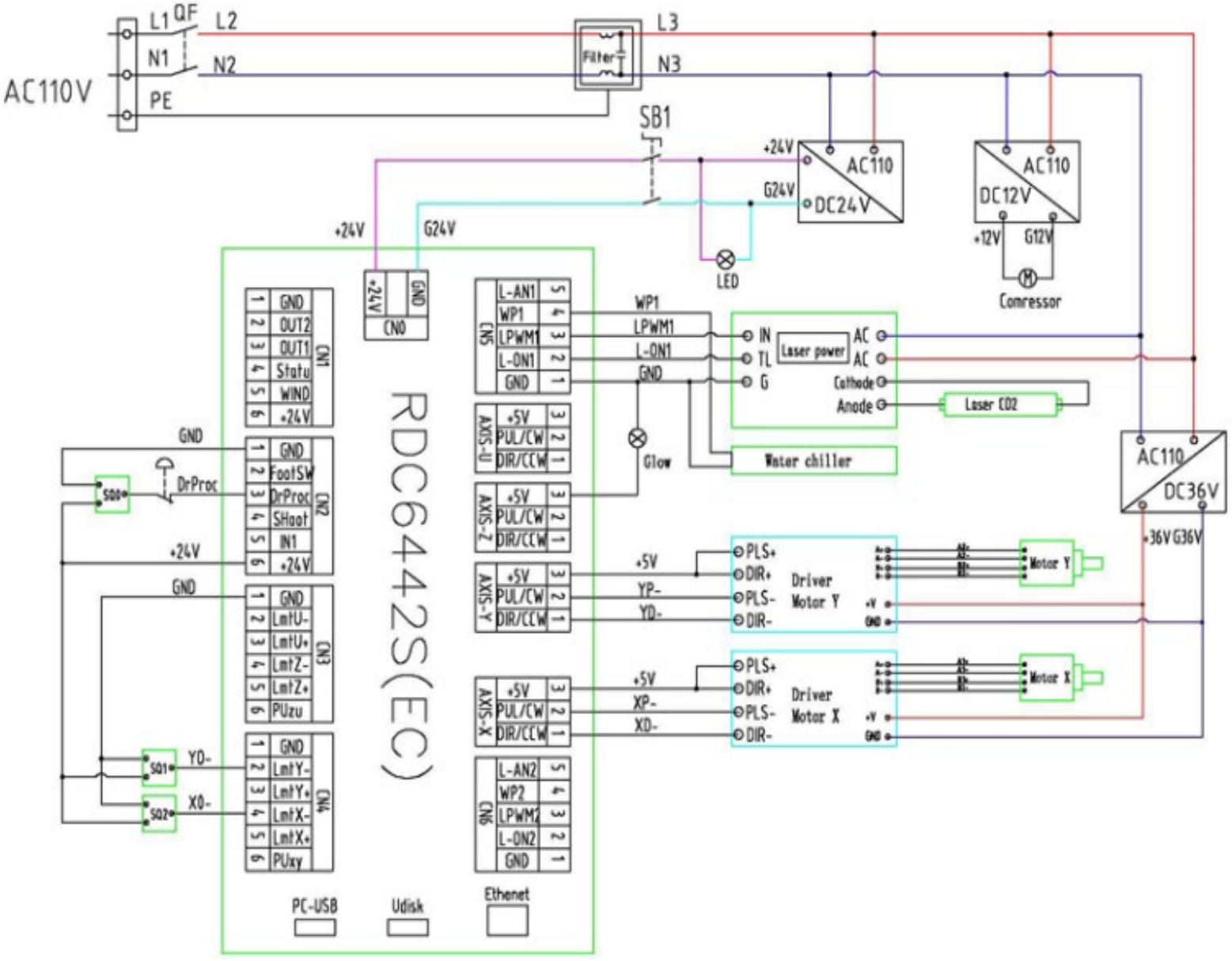

Figure 15-1: Wiring Diagram

NOTES:

16.0 Warranty

WARRANTY & REGISTRATION

Thank You!

Welcome to the Laguna Tools® group of discriminating industrial machinery owners. 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
customerservice@lagunatools.com
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
customerservice@lagunatools.com
www.lagunatools.come/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 machinery settings and procedures and to properly maintain the equipment in accordance with the standards provided in this manual.

Length of Warranty

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

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 or technical support please contact the customer service department at 1-800-332-4049. 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.

Laguna Tools, Inc.
744 Refuge Way
Grand Prairie, TX 75050
800-234-1976
www.lagunatools.com