

Swift Vacuum Owner's Manual



LAGUNA

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Swift Vacuum Owner's Manual

Scope of This Manual

This manual provides basic operating and maintenance procedures for the Swift Vacuum.

For detailed instructions and videos, please go to www.lagunatools.com

Customer Service

For technical support, please contact Laguna Tools Customer Service by phone at 1-800-332-4094.

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.

Serial No.	
Model No.	
Install Date:	

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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.

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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.

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.

 **WARNING**

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

 **CAUTION**

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

NOTE

A helpful tip from Laguna Tools technical staff.

1.3 Proposition 65 Warning of Harmful Exposure

Some dust created by sanding, sawing, grinding, drilling, machining, 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.



Fire Warning

Use extreme caution when working with flammable materials such as wood or acrylic, as they are more volatile than other materials.

Keep the machine clean and follow the maintenance schedule.

Always have a fire extinguisher ready to extinguish a fire.

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.

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/>.

1.4 Intended Use

The machine is designed to cut wood, acrylics, wood-fiber composites, certain plastics, and non-ferrous metals. Do not use this machine for anything other than its intended use.

1.5 Safety Information

The machine is an electrical appliance and precision machine. Please read and understand the entire owner's manual before attempting assembly or operation. Read and understand the warnings posted on the machine and in this manual. Failure to comply with all warnings may cause serious personal injury or damage to the machine.

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The machine is designed and intended for use by properly trained and experienced personnel only. Personnel who are not familiar with the correct and safe operation of the machine should not operate the machine until properly trained.

1. Never operate machinery under the influence of drugs or alcohol, when tired, or when distracted.
2. Stay alert at all times while operating the machine.
3. Always wear safety glasses and hearing protection.
4. 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.
5. Never stand on the machine. Serious injury may occur if the machine is tipped or if the cutting tool is unintentionally contacted.
6. Know where the emergency stop switch is located.
7. 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.
8. Use the machine only in clean areas free from excessive moisture or flammable objects.
9. Keep the working area clean and ensure adequate lighting is available.
10. Cables and cords should be inspected regularly.
11. Do not attempt to exceed the limits of the machine.
12. Keep the machine, electrical cabinet, and cables away from excessive heat, flammable substances, and sharp objects.
13. Keep the machine, electrical cabinet, and surrounding area clear of obstructions and free from excessive moisture.
14. Safety Signs should be attached to places that are easy to spot.
15. 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.
16. Exercise care with machine controls and around keypad to avoid unintentional start-up.
17. The machine must be level. Level the machine if the ground is uneven.

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18. Ensure the keys and adjusting wrenches have been removed and all the nuts and bolts are secured.
19. Keep cutting tools clean and sharp.
20. Do not use dull, gummy, or cracked cutting tools.
21. Lubricate and change accessories when necessary.
22. Keep controls clean and dry.
23. Consult the Owner's Manual or contact Laguna Tools for recommended accessories. Using improper accessories will increase the risk of serious injury or damage.
24. Keep a copy of this manual for future reference.
25. All motion parameters have been set up by Laguna Tools. If any modifications are required, please have a qualified operator perform the changes.

1.6 Shop Environment

1. Verify the floor can bear the weight of the machine and workpieces.
2. Ensure the floor around the machine is clean and free of scrap material, oil, and grease.
3. Do not lean material against the gantry, guide rails, or table.
4. Support the weight of the dust hose attached to the dust shoe (optional) accessory to prevent the weight of the hose from dislodging the dust shoe. Ensure that there is sufficient slack in the dust collection hose to allow the spindle to cover the entire work area.
5. Position the machine away from overhead pipes and plumbing fixtures to prevent condensation from dripping on to the spoil boards and control system components.
6. Locate the machine away from sinks, faucets, or other water supplies or storage to prevent splash-out that can damage the spoil boards and control system components.
7. Provide adequate room between this machine and other machines in the shop to reduce the chance of accidental jarring when transporting lumber or other heavy materials through the shop and while materials are being worked on other machines.
8. Verify there is adequate space between machines to allow for the possibility the workpiece will extend over the end of the machine.
9. 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.

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10. Store cutting tools in a dry location and prevent contact to preserve the cutting edge.

1.7 Health and Safety

1. Always wear approved personal health and safety equipment as indicated for the materials and type of operations that will be performed. These should include face, eye, respiratory, hearing, and body safety protection devices. Wear safety glasses/face shield and ear protectors (plugs or muffs) even during short periods of operation.
2. Before operating this machine: remove all hand, wrist, or neck jewelry and push sleeves up over the elbows. Do not wear loose clothing which may become caught in the machine and confine long hair. Non-slip footwear or anti-skid floor strips are recommended.
3. Use a dust mask or other safeguards to avoid inhaling dust generated from wood products. Install dust collection equipment consistent with shop ventilation practices and budget. Remove dust and debris from the floor frequently to prevent slipping. Drilling, sawing, sanding, or machining wood products generates wood dust and other substances known to the State of California to cause cancer. Wood products also emit chemicals known to the State of California to cause birth defects or other reproductive harm (California Health and Safety Code Section 56).
4. In addition to other health hazards, dust from wood and other materials is flammable. Do not operate welding, wood burning, smelting, soldering, or other high-heat tools on the machine or vicinity.
5. Do not operate this machine while tired or under the influence of drugs, alcohol, or any medications.

1.8 Electrical Safety

1. Verify the switch is in the OFF position before connecting the machine to the power supply.
2. Verify the machine is properly grounded and the circuit is protected with a fuse or circuit breaker in accordance with local codes. Install a separate circuit if necessary to limit power loss when multiple machines in the shop are operating simultaneously. If necessary, place a cover on the outlet to prevent accidental disconnection.
3. Verify all machine adjustments or maintenance with the machine unplugged from the power source.
4. Follow effective lockout procedures to reduce the risk from high voltage wires and components and prevent accidental operation.
5. Do not operate in a damp or wet location or exposed to rain, fog, or snow.

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6. Keep the electrical cord away from sharp edges, heat or moving parts, and do not store materials on top of it. Position the cord so it will not become a tripping hazard.
7. While the use of an extension cord is discouraged, if it is necessary, verify the cord is in good condition, meets the current requirements, and is located so as not to present a tripping hazard.

1.9 Additional Safeguards

1. Remove and store adjusting keys and wrenches before turning on the power. If necessary for visibility, apply safety markings to adjusting wrenches and keys.
2. Install safety guards consistent with general shop safety practices. Always keep safety guards in place when the machine is in use. If removed for maintenance purposes, use extreme caution, and replace the guards immediately after completion of maintenance.
3. Check damaged parts immediately. Before further use of the machine, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function.
4. Keep visitors a safe distance from the work area. Keep children away.
5. Control liquids in the shop to limit the possibility of spillage that can damage the machine and potentially cause damage or personal injury from electric shock or fire. Never use the table to apply or dry finishes.

1.10 Maintenance

1. Disconnect the machine from power when performing any maintenance.
2. Establish a weekly and monthly maintenance checklist and follow it diligently.
3. Routine maintenance should include periodic checks for alignment of moving parts, looseness, or binding of moving parts, worn or bare wires, breakage of parts, skewed mounting, and any other conditions that may affect its operation or cause injury. Analyze breakage or damage to determine the cause and take appropriate remedial action.
4. Do not operate the machine if a component of the control system is damaged. It should be properly repaired or replaced before use.
5. Follow instructions for lubricating and changing accessories.
6. Store maintenance tools and supplies nearby, consistent with the shop maintenance practices and resources.

1.11 Operational Practice

1. Never leave the machine running unattended. Always be in close reach of the emergency stop button.
2. Turn off the power and do not leave the machine until it comes to a complete stop.
3. Avoid pinch points and entanglement hazards. Keep hands and clothing away from any moving objects, rotating/moving cutting tools, ball screws, bearings, gantries, guide rails, and any other hazards while in operation.
4. Use the right tool at the correct speed and feed rate. Do not force a tool or attachment to do a job for which it was designed. The right tool will do the job better and more safely.
5. Do not touch a cutting tool immediately after use. It will be hot and may cause skin burns. Exercise caution when handling any cutting tool and accessories. If the cutting tool is hot, keep a heat-resistant glove or oven mitt on hand for this purpose.
6. Do not lay a hot cutting tool on its side.
7. Use recommended accessories; improper accessories may be hazardous.
8. Do not use dull, gummy, or damaged cutting tools such as blades, bits, etc. Keep cutting tools clean and sharp for the best and safest performance.
9. Turn off the machine before cleaning. Use a vacuum, brush, or compressed air to remove chips or debris. Do not use bare hands.
10. Do not climb or stand on the machine. Serious personal injury and costly damage could occur if the machine tips over or any component is dislodged.
11. Remove loose items and unnecessary workpieces from the table before starting the machine.
12. Plan tool paths to make multiple passes rather than to take off a large amount of material at one time. This will reduce mechanical stress and heat on cutting tools.
13. Always secure a workpiece to the spoil bard using clamps, vacuum, or double-sided tape. If the workpiece is mounted in a jig, ensure that the fixture is securely held to the table. Never hold a workpiece down by hand while operating.
14. Inspect the material of the workpiece to detect any defects that may result in ejection of large pieces of scrap.
15. Verify the workpiece is free from nails, hardware, or other foreign objects.
16. After installing a cutting tool, verify the collet is securely tightened. An unsecured cutting tool may fly loose from the collet and cause injury. Verify that the adjusting wrenches have been removed and are secured before turning on the power.

2.0 Receiving Your Machine

Following delivery and before the driver has 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 within 24 hours 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 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.

3.0 Machine Overview

3.1 Introduction to CNC Machines

The CNC is designed to provide years of safe service. Read this owner's manual in its entirety before use. The advantage of the CNC machine is that it can, in most cases, fully machine the complete job without it being removed from the table so that you have finished parts of high accuracy that are totally repeatable. It can also produce intricate carvings with the purchase of the relevant software. Nesting is also a valuable feature of CNC machine that saves on waste and costs. It is possible to reduce the number of different machines in the shop as the CNC will perform multiple functions and is a must for cabinet makers and serious wood workers.

3.2 Swift Vacuum

The Laguna Swift Vacuum CNC Router features a work envelope of 4' x 4', 4' x 8', 5' x 10'. It also includes an industrial-grade liquid cooled electro-spindle. The Swift Vacuum features a 4-zone (4' x 4' table) or 6-zone (4' x 8'/5' x 10') vacuum phenolic table to hold down your parts.

3.3 Machine Briefing

The Laguna Swift Vacuum offers a rugged platform with the durability and accuracy to process materials including wood, plastics, foams, aluminum, and composites. The optional vacuum table and 4th axis turner expands the possibilities of the machine even further. Built to the same standards as the Smartshop line and featuring many of the same components, the Swift Vacuum is a durable machine and dependable machine for businesses.

3.4 Features on the Machine

- 3HP Water Cooled Electro-Spindle (ER-20 Collet)
- 6,000 – 24,000 RPM Spindle
- Vacuum Table
- Handheld Controller
- Gantry Height: 7-1/2"
- Ball Screw "On" Z-Axis
- Double Helical Rack Drive on X & Y Axis

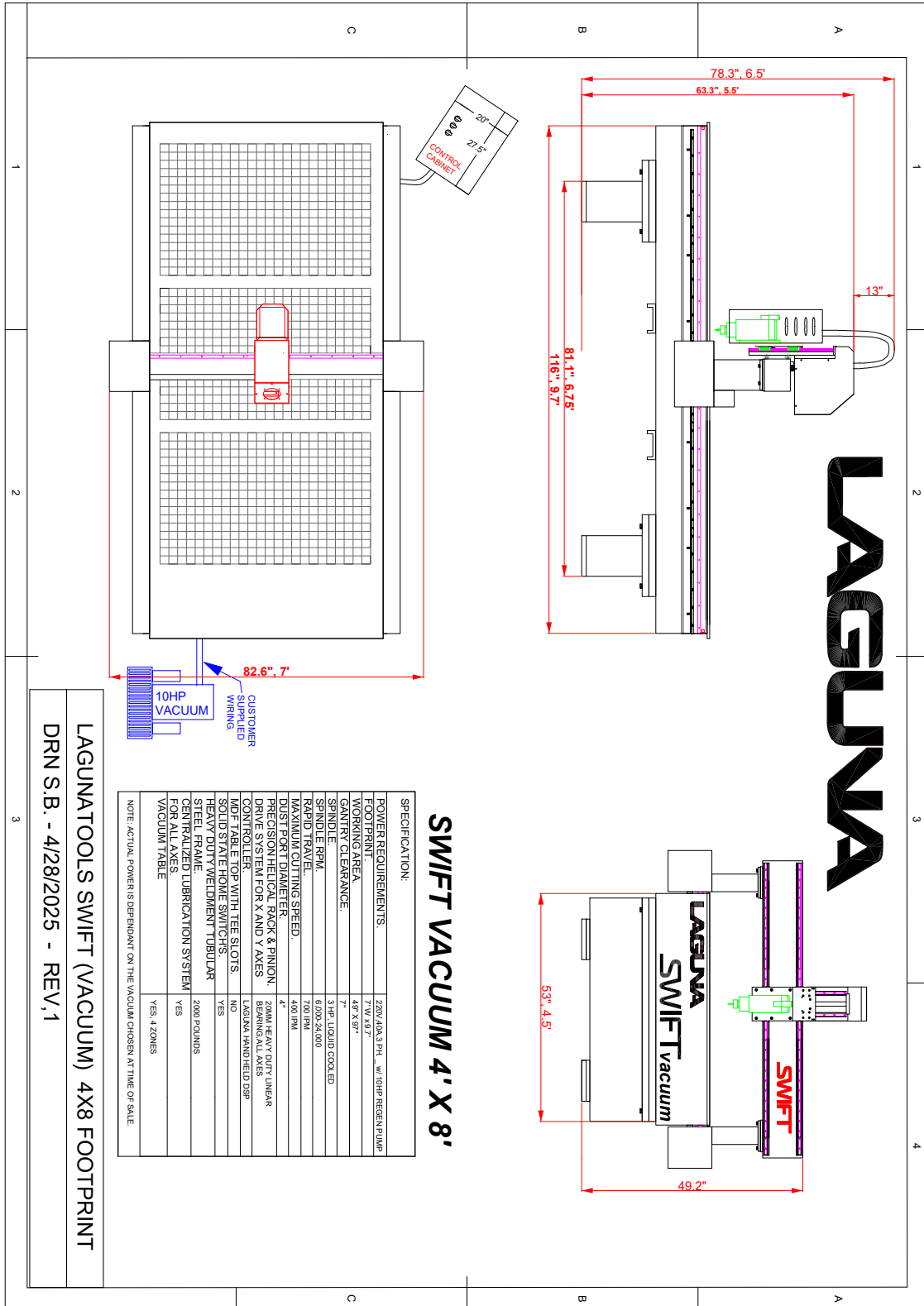
Vacuum Pump Sold Separately

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3.5 Specifications

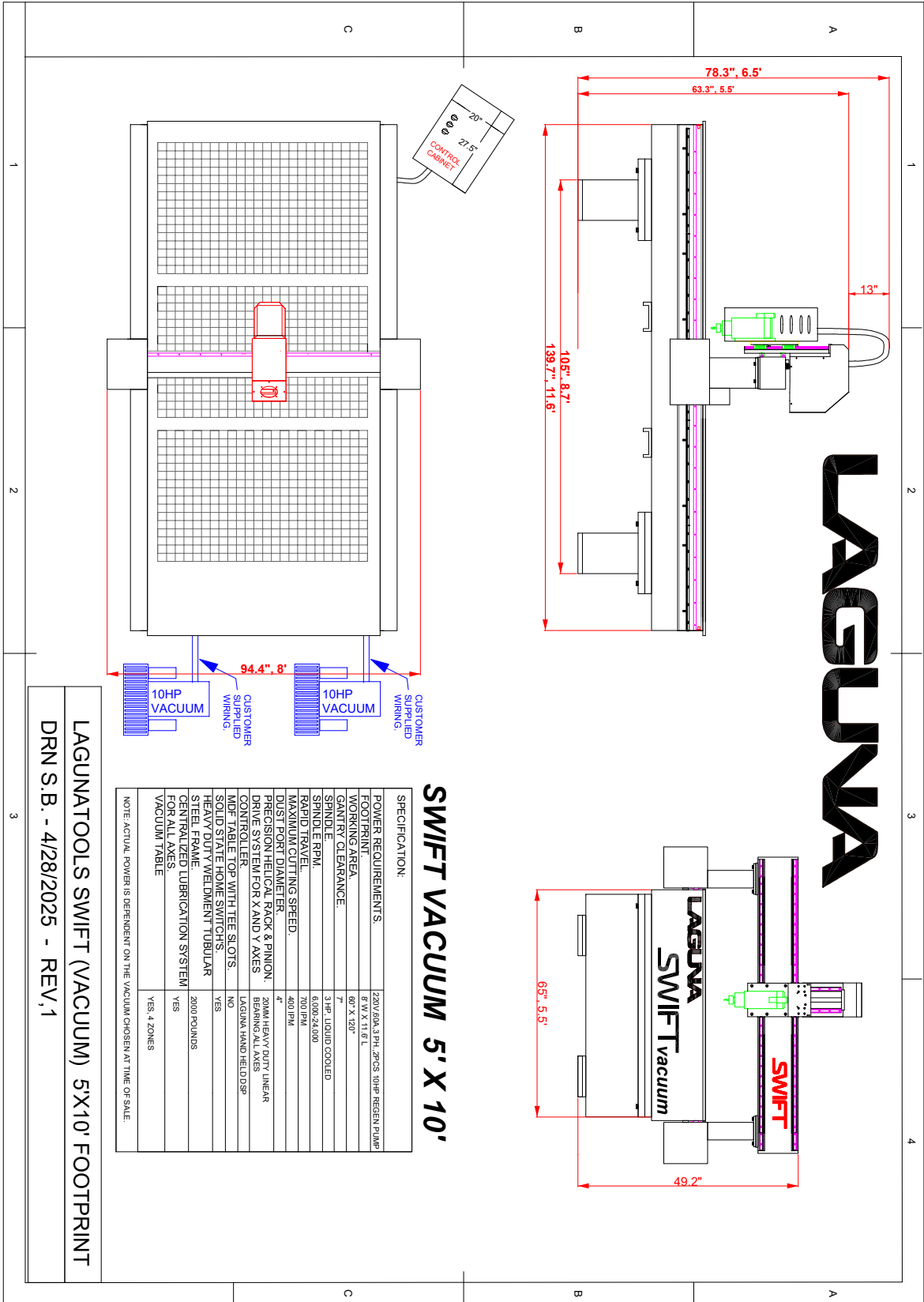
Item	Swift 48" x 48" or 4' x 4'	Swift 48" x 96" or 4' x 8'	Swift 60" x 120" or 5' x 10'
Spindle	3 Phase Industrial Induction Spindle, Liquid Cooled	3 Phase Industrial Induction Spindle, Liquid Cooled	3 Phase Industrial Induction Spindle, Liquid Cooled
Spindle RPM	6,000 – 24,000	6,000 – 24,000	6,000 – 24,000
Dust Chute Diameter	4 inches	4 inches	4 inches
Power	208-230V, 1- or 3-Phase	208-230V, 1- or 3-Phase	208-230V, 1- or 3-Phase
Gantry Clearance	8 inches	8 inches	8 inches
Machine Worktable	T-Slot/Vacuum	T-Slot/Vacuum	T-Slot/Vacuum
Z-Axis	Precision Ball Screw	Precision Ball Screw	Precision Ball Screw
X & Y-Axis	Rack & Pinion	Rack & Pinion	Rack & Pinion
Machine Footprint	73" w x 80" l x 55" h	67" w x 120" l x 80" h	90" w x 144" l x 58" h
Work Envelope	48" x 48" or 4' x 4'	48" x 96" or 4' x 8'	60" x 120" or 5' x 10'

3.6 Layout and Footprint



Swift 4' x 8' Table

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SWIFT VACUUM 5' X 10'

NOTE: ACTUAL POWER IS DEPENDENT ON THE VACUUM CHOSEN AT TIME OF SALE

SPECIFICATION:	
POWER REQUIREMENTS:	120V/60Hz, 3 PH, 2PCS 10HP REGEN PUMP
FOOTPRINT:	8' W X 11.6' L
WORKING AREA:	60" X 120"
GANTRY CLEARANCE:	7"
SPINDLE:	3 HP LIQUID COOLED
SPINDLE RPM:	6,000-24,000
RAPID TRAVEL:	700 IPM
MAXIMUM CUTTING SPEED:	400 IPM
DUST PORT DIAMETER:	4"
PRECISION HELICAL RACK & PINION DRIVE SYSTEM FOR X AND Y AXES:	20MM HEAVY DUTY LINEAR BEARING ALL AXES
CONTROLER:	LAGUNA HAND HELD DSP
WIP TABLE TOP WITH TEE SLOTS:	NO
SOLID STATE HOME SWITCHES:	YES
SPIN FAN WELDMENT TUBULAR SERVO PUMP:	2000 POUNDS
CENTRALIZED LUBRICATION SYSTEM FOR ALL AXES:	YES
VACUUM TABLE:	YES 4 ZONES

LAGUNATOOLS SWIFT (VACUUM) 5X10' FOOTPRINT
 DRN S.B. - 4/28/2025 - REV.1

Swift 5' x 10' Table

3.7 Components



Figure 3-1: Swift Vacuum Components

- | | |
|--------------------------------|-----------------|
| 1. Electrical Cabinet | 4. Vacuum Table |
| 2. Router Spindle w/ Dust Hood | 5. Frame |
| 3. Gantry | |

1. **Electrical Cabinet** – The electrical cabinet is a dust free enclosure and will be located on the side of the machine.

NOTE

See Section 3.8 Electrical Cabinet for a more detailed breakdown of the electrical cabinet.

2. **Router Spindle** – The router spindle is moved along the gantry by a precision ball screw system that is controlled by the machine controller.
3. **Gantry** – The gantry straddles the bed and carries the router spindle motion system. It is moved along the length of the bed by a precision ball screw system that is controlled by the machine controller.

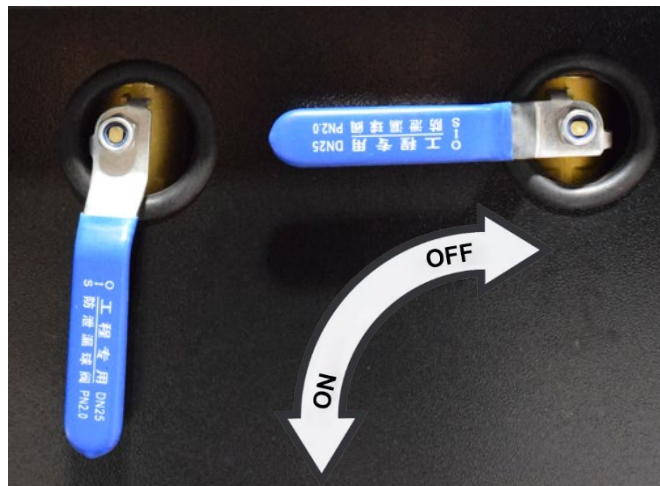
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4. **Bed** – The bed of the machine consists of a heavy steel frame with a plastic top that is slotted for the vacuum function. It has T-Slots to clamp the job or fixtures to the bed.
5. **Frame** – The frame is a heavy welded construction that supports all the other parts of the machine.
6. **Caterpillar Track (not shown)** – The caterpillar track runs along the side of the machine in a trough and carries all the electrical cables and the spindle colling tubes.
7. **Water Pump (not shown)** – The water pump provides coolant for the router spindle motor. The water pump provides coolant for the router spindle without the cooling pump running can lead to spindle bearing failure.

NOTE

See Section 5.3 Water Pump Installation for more detailed instructions on installing the water pump.

8. **Vacuum Levers**-These levers turn the vacuum zones on/off (4-6 zones)



3.8 Electrical Cabinet

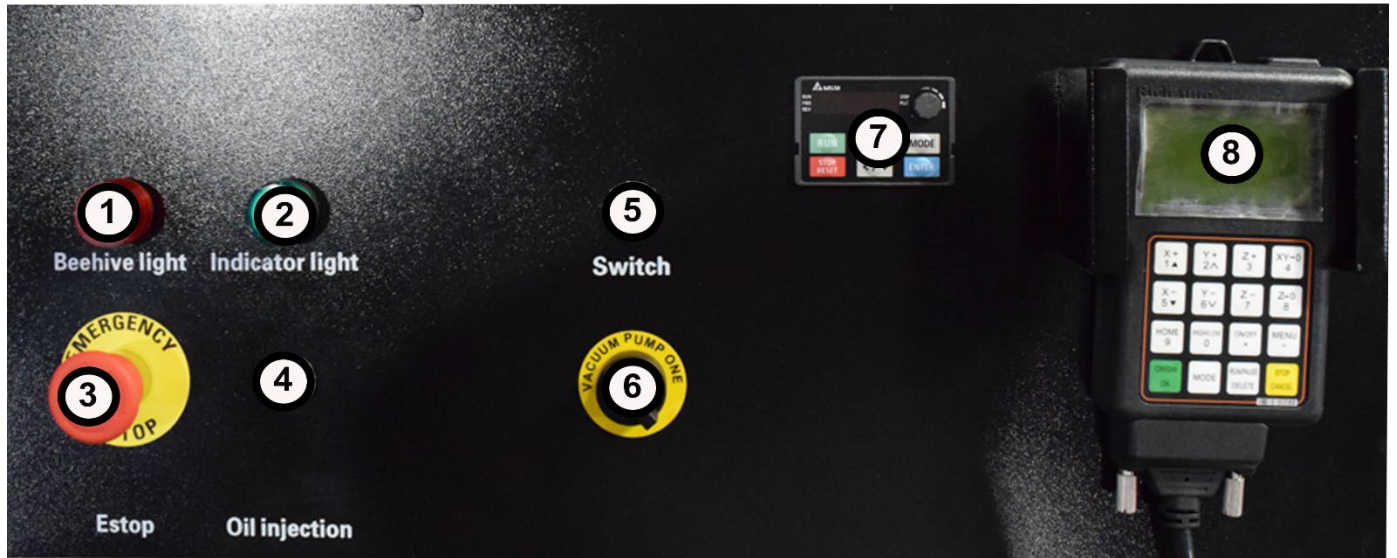


Figure 3-2: Control Panel

- | | |
|--------------------------|-------------------------|
| 1. Stop Light | 5. Power ON/OFF button |
| 2. Power On Light | 6. Vacuum Pump 1 Button |
| 3. Emergency Stop Button | 7. Inverter Controller |
| 4. Oiler Button | 8. Handheld Controller |

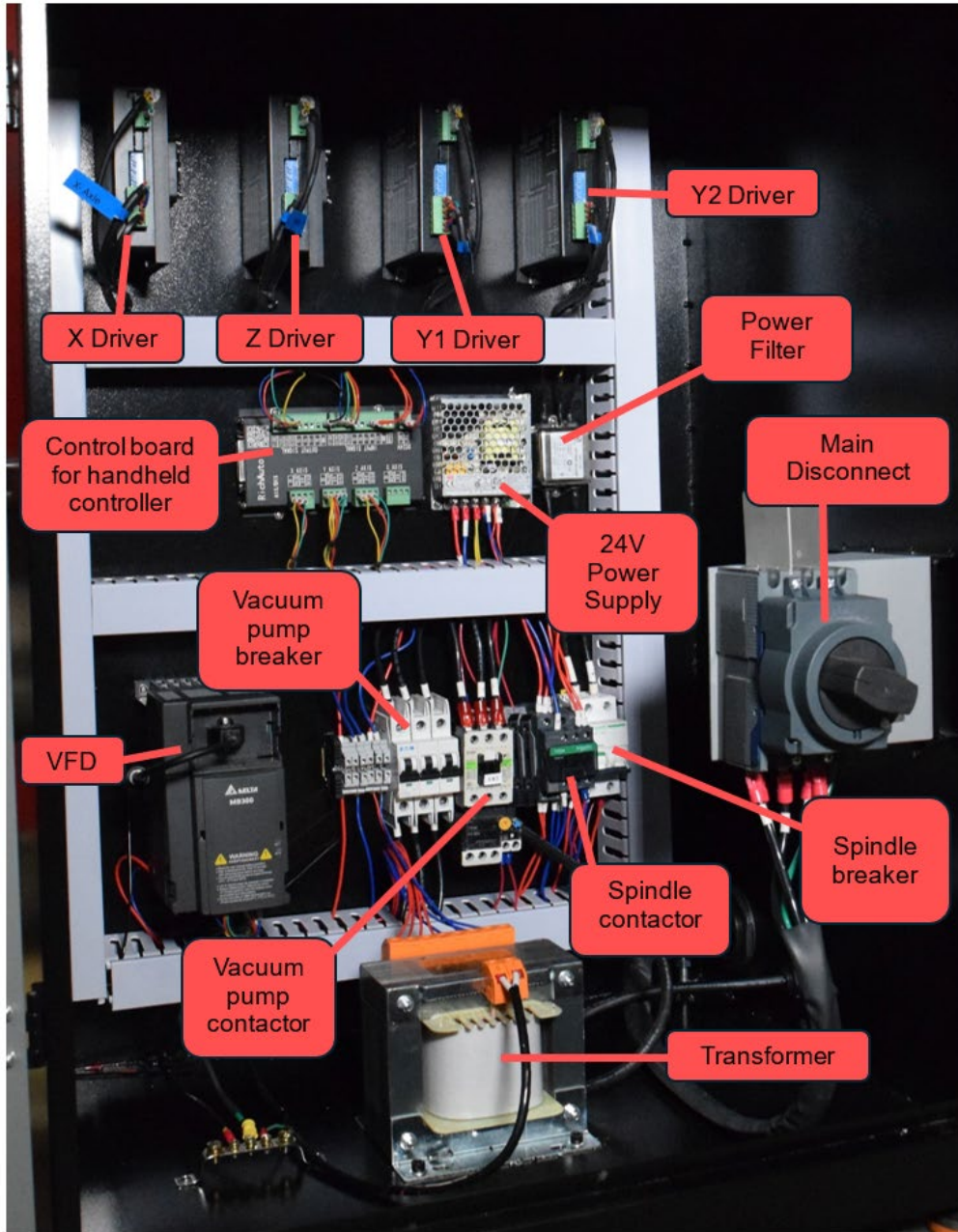


Figure 3-3: Interior of Electrical Cabinet

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3.9 Accessories

Toolbox



Laguna Container



Wrenches



Table Clamps



Collets



Dust Shroud/Hood



Tool Touch Off Puck



Flash Drive



Router Bits



USB Cable



Handheld Controller



Water Pump



4.0 Machine Placement

When unpacking your machine, separate all enclosed items from the packing materials and inspect them for damage. Ensure that there is no visible damage to either the packaging or the machine BEFORE the driver leaves. Save all packaging materials until you are satisfied with the machine and/or have resolved any issues concerning any missing or damaged items.

NOTE

It is probable that you will find sawdust within your machine. This is because the machine has been tested prior to shipment from the factory and or Laguna Tools. We test machines prior to shipping to customers, but movement can take place during transportation. Some adjustments may have to be undertaken by the customer. These adjustments are covered in the various sections of this manual.

4.1 Placement

Select the area where you will use our machine. Guidelines for properly placing your machine follow:

1. There should be sufficient area at the front of the machine to allow you to work comfortably.
2. There should be sufficient area at the back of the machine to allow access for adjustments and maintenance to be conducted.
3. Adequate lighting – The better the lighting the more accurately and safely you will be able to work.
4. Solid floor – You should select a solid flat floor, preferably one made of concrete or something similar.
5. Locate it close to a power source and dust collection.
6. Allow an area for the storage of blanks, finished products, and tools.

4.2 Locating Your Machine

The physical environment where you locate your machine is important for safe assembly and operation of your machine. Before removing your machine from the packaging, consider the weight load, electrical installation requirements, lighting, dust collection, and space allocation available for the machine and accompanying materials.

4.3 Space Allocation/Dust Collection

Consider the largest size and length of wood or other materials which will be processed through your machine. Leave ample space around the machine for the operator to handle both the equipment and the materials being cut. Leave enough space around the machine to open or remove doors/covers as required by the maintenance described in the owner's manual. Allow enough space for proper dust collection from your machine. For optimal operation, ensure that your machine is located in a dry environment free from excessive moisture, extreme weather conditions, hazardous chemicals, or airborne abrasives.

4.4 Electrical Requirements

Place your machine near an existing power source with the appropriate voltage required to operate your machine. Ensure that all power cords are protected from traffic, moisture, chemicals, or other hazards. For your safety, have a qualified electrician to assess your electrical needs and grounding. If you have any doubts about your own ability to do so. We DO NOT recommend that you use an extension cord to supply power to your machine.

4.5 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.

4.6 Machine Weight/Load

Ensure that the surface where your machine is located can bear the full weight of your machine as well as any additional equipment which may be placed on the machine. Also consider the

weight of the operator and any materials which may be stored around the machine when selecting a location for your machine.

4.7 Unpacking Your Machine

To unpack your machine, you will need tin snips, a knife, and a wrench.

1. Using the tin snips, cut the banding that is securing the machine to the pallet (if fitted).
2. Remove the box from the CNC machine if fitted and any other packaging material. The parts ordered with the machine will be packed on or inside the machine.

NOTE

The machine is heavy. If you have any doubt about the described procedure, seek professional assistance. Do not attempt any procedure that you feel is unsafe or that you do not have the physical capability to achieve.

3. Use a forklift with sufficient lifting capacity and forks that are long enough to extend the complete width of the machine.

NOTE

Obtain a 6000 lbs. forklift with six (6) foot fork extensions.

4. Remove the securing bolts that attach the machine to the pallet (if fitted).
5. Approaching the machine from the side, lift the machine on the frame taking care that there are no cable or pipes around the forks.
6. Move the machine to the required position and lower gently to the floor.

5.0 Assembly and Setup

5.1 Leveling the Machine

1. Place a level on the machine to see if it is level.
 - a. If the machine is level, installing the leveling feet is optional.
 - b. If the machine is not level, the leveling feet will need to be installed.
2. Use a forklift, pallet jack, or 2-ton floor jack to slightly lift the machine off the ground.
3. Place the metal feet on the floor aligned with the feet hole(s).
4. Place the bolt/nut combo into the hole(s). Verify that the nut is on top of the metal.
5. Slowly lower the machine onto the metal feet.
6. Tighten the nut clockwise with a crescent wrench. Do not overtighten.
7. Place a level on top of the machine and verify it is level.
8. Use a crescent wrench to turn the nut clockwise/counterclockwise to make any leveling adjustments.
9. Verify that the machine is level and adjust as needed.

5.2 Electrical Connection for the Machine

A cable is not supplied; the proper cable will depend on local wiring codes and the electrical supply. When installing, ensure the power supplied to the machine is 220v (220 Volts) single phase or three-phase (depending on machine configuration). Amperage should be determined based on the vacuum pumps and the machine configuration.

When wiring the machine to the electrical system, keep the cable as short as possible and the cable should not be allowed to run along the floor as this will cause a trip hazard.

1. Access the front panel of the electrical cabinet.
2. Locate the two (2) cable ports on the right side of the electrical cabinet.
3. Insert the power cord through the port (Figure 5-1) nearest to the front of the cabinet.
4. Connect the power cables to the main disconnect.

5. Connect the green ground cable to the ground lug.



Figure 5-1: Cable Ports



Figure 5-2: Main Disconnect and Ground Lug (3-Phase)

NOTE

A qualified electrician must carry out the electrical installation.

5.3 Vacuum Pump Installation

The vacuum pump provides the suction necessary to hold projects to the vacuum table. The vacuum pump should be installed prior to operation.

1. Locate the two (2) cable ports on the right side of the electrical cabinet.
2. Insert the vacuum power cord through the port to the right of the electrical power cord.
3. Connect the green ground wire to the ground terminal.
4. Strip the power cables and attach spade terminals.
5. Connect the spade terminals to the contactor.
6. Verify all connections are correct and close the electrical cabinet.
7. Remove the lid from the power box on top of the vacuum pump.
8. Strip all cords and attach ring connectors.
9. Attach a spade terminal to the green ground cord.
10. Connect the power cords to the designated terminals.
11. Attach the green ground cable to the ground terminal.



Figure 5-3: Vacuum Pump Contactor(s) with electrical wires and ground attached

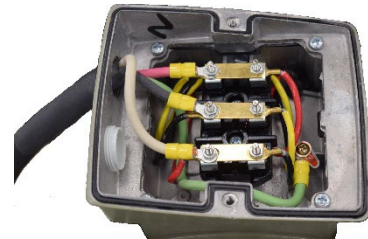


Figure 5-4: Vacuum Pump Power Box with electrical wires and ground attached

5.4 Water Pump Installation

The water pump ensures the spindle does not overheat. The water pump must be connected prior to operation.

1. Connect one pipe to the water pump and the other pipe will be placed in the water container for the return water. It is not important which pipe is used as the return.
2. Fit the 90-degree connector to the pump. Connect one of the pipes to the water pump by pushing it into the 90-degree connector. Lightly pull on the pipe to ensure that it is connected correctly.
3. Fill a container about $\frac{3}{4}$ full of clean distilled or de-ionized water.

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4. Lower the water pump into the container ensuring that it is the correct way up (water inlet lowest) and place the water return pipe into the container.

NOTE

For CNC Machines operating in the Northern or Cold Regions, the operator can use a 50/50 mix of Distilled Water/De-Ionized Water with Glycol Anti-Freeze.

The logical position for the water container is just behind the control box close to the caterpillar track. Ensure that it is close to the machine as you do not want to kick the container and spill the water. Once the assembly is complete and the water pump electrical connection has been made (plug the pump into the machine water pump socket), lift the water return pipe up and check that the water is flowing. Place the lid onto the container to keep dust and dirt out of the container. Check the container periodically as the water will evaporate or become dirty.

NOTE

Operating the spindle without cooling could cause damage and failure.

NOTE

If your shop is subject to freezing temperatures, antifreeze must be added to the cooling water.

NOTE

A qualified electrician must carry out the electrical installation. Lower the water pump into the container

ensuring that it is the correct way up (water inlet lowest) and place the water return pipe into the container. The logical position for the water container is just behind the control box close to the caterpillar track. Ensure that it is close to the machine as you do not want to kick the container and spill the water. Once the assembly is complete and the water pump electrical connection has been made, plug the pump into the machine water pump socket, lift the water return pipe up and check that the water is flowing. Place the lid onto the container to keep dust and dirt out of the container. Check the container periodically as the water will evaporate.

NOTE

If water is not flowing or is slow, reverse the hoses on the pump and flow should regain, sometimes the system will create an air bubble during shipping causing vapor lock.

5.5 Fitting the Dust Hose

1. Fit the dust hose to the dust shroud and secure with a clamp. Ensure that it is tight so that it does not detach during production.
2. Fit the shroud to the router head. Adjust the shroud so that the brushes are even with the tip of the router bits that you will be using.

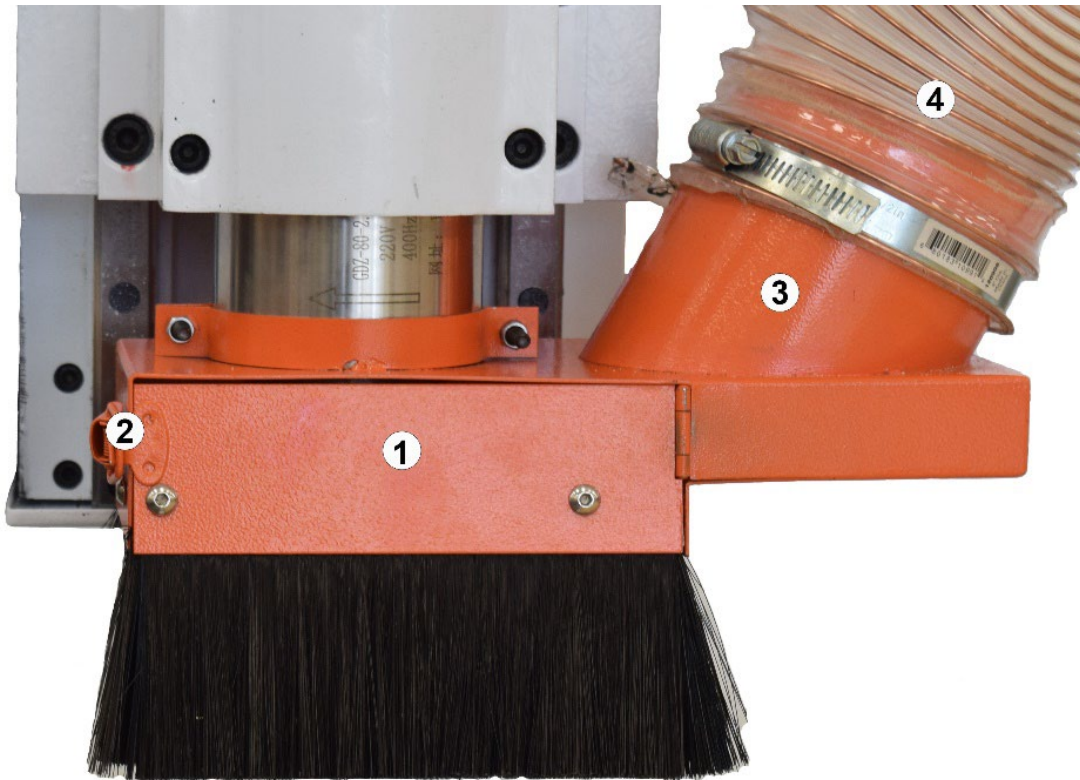


Figure 5-5: Dust Collection Components

- | | |
|----------------|-----------------------------|
| 1. Dust Shroud | 3. Dust Shroud Bracket |
| 2. Latch | 4. Dust Hose (not included) |

NOTE

If it is too low the brushes may drag on the job and could be cut by the router bit. If it is too high and is not in contact with the job suction may not be optimal. Once adjusted, tighten the clamp with the Allen screw.

-
3. The router head will move all the way across the table and the dust hose will follow the router head.

NOTE

If there is insufficient slack, the hose may break or damage the dust shroud. It is suggested that the hose be suspended from the ceiling of the facility with sufficient slack so that it will not restrict movement. It will also be out of the way and not cause a trip hazard.

5.6 Assembling the Controller

Fit the cable to the controller and ensure the screws are finger tight.



Figure 5-6: Handheld Controller

- | | | | |
|----|---------------------|----|------------------|
| 1. | 50-Pin Serial Cable | 3. | Keypad |
| 2. | USB Cable Port | 4. | Operating Screen |
| 5. | USB Port | | |

NOTE

A USB Drive fits into a slot on the top of the handheld controller.

5.7 Fitting the Router Bit into the Router Head

NOTE

Before changing or fitting the router bit always verify the Emergency Stop button is engaged and the router bit has come to a full stop.

NOTE

Collets and spindle collet holes must be cleaned regularly. Ensure that the slots in the collets are free of sawdust as sawdust builds up and will stop the collet compressing. If the collet or spindle holes are not clean, the router bit may not run true, and this will affect the performance of your machine.

1. Select a router bit and the relevant collet.
2. Fit the collet into the spindle nut. Press the collet into the spindle nut until it snaps into place.

NOTE

The router bit must not be fitted into the collet until the collet has been fitted into the spindle nut. With the router bit fitted into the collet the collet cannot compress and snap into the spindle nut. The face of the collet and the face of the spindle nut will be close to flush.



Figure 5-7: Collet



Figure 5-8: Spindle Nut

NOTE

To remove the collet, hold the spindle nut and press the collet on the side. The collet will compress and pop out. Do not try to remove the collet while a cutter is fitted as the collet will not compress and pop out.

3. Fit the spindle nut and collet assembly onto the spindle thread by hand.
4. Press the bit into the collet but note that the flute of the router bit must not be inside the collet and should be a minimum of 1/16 inch outside the collet. Hold the router spindle with the supplied wrench and tighten the collet with a second wrench. Do not overtighten.

NOTE

Use this process for all other router bits that you need to fit but you will have to change the collet if the shank of the router bit is a different size.

5.8 Controller Button Functions

NOTE

There is a comprehensive manual for the handheld controller. Below is a list of the main key functions. The controller may vary from the handheld controller shown below.

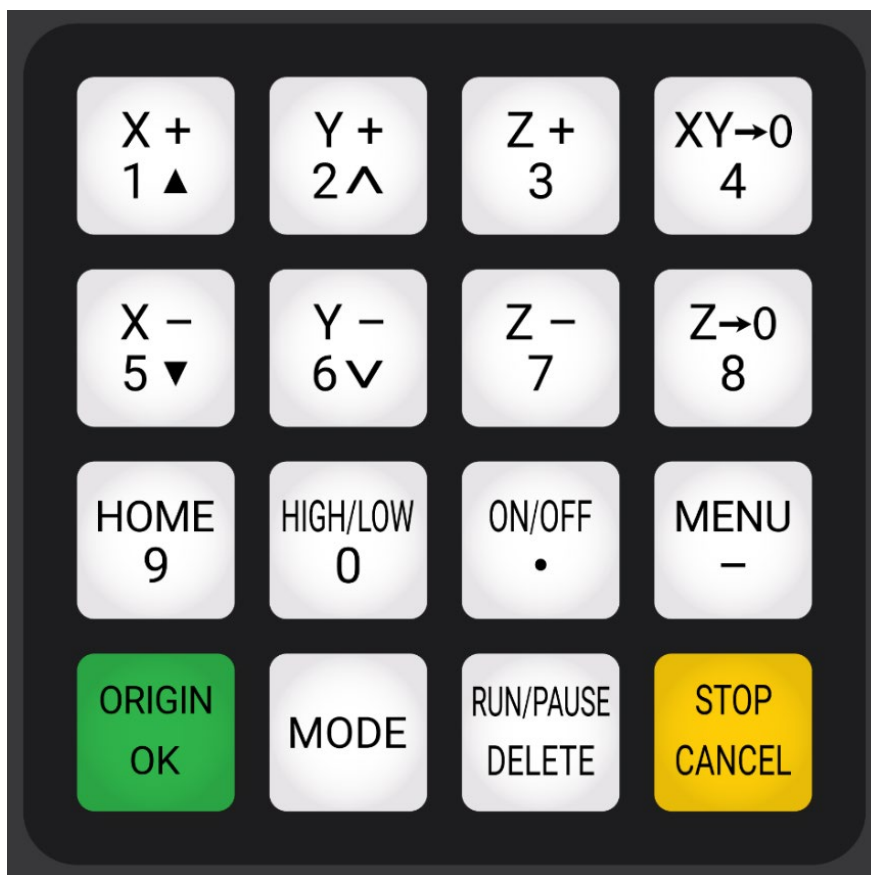


Figure 5-9: A11E Handheld Controller Keypad

X+/1 - Moves the gantry in the X direction away from the home end of the bed.

Y+/2 - Moves the gantry in the Y direction away from the home end of the bed.

Z+/3 - Moves the router head in the Z (UP) away from the table surface.

X Y - 0/4 - Sets the machine origin.

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X-/5 - Moves the gantry in the X direction towards the home end of the bed.

Y-/6 - Moves the router head in the Y direction towards the home end of the bed.

Z-/7 - Moves the router head in the Z (DOWN) towards the table surface.

Z-0/8 - Sets the tool to the Zero surface (Tool Touch Off).

HOME/9 - Causes the machine to move to the Home position, first in the Z-Axis, followed by X and then Y (Home is a mechanically determined position using mechanical switches/sensors).

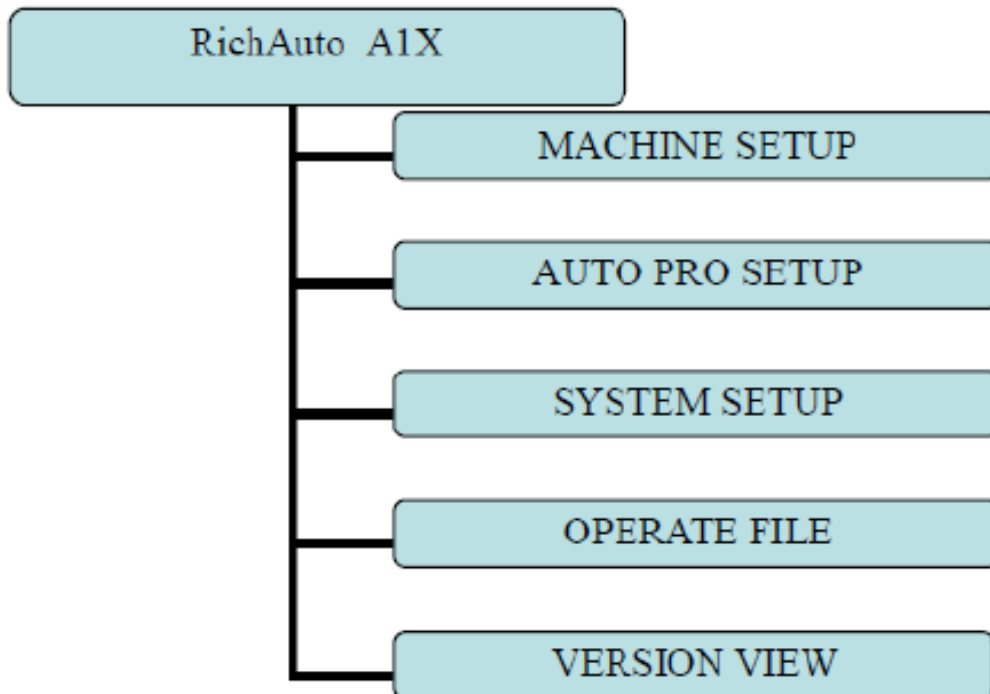
ORIGIN/OK - Use to accept commands (ON); Origin causes machine to go to the machine origin.

MODE - Toggles between the three (3) jogging modes: Continuous, Step, or Distance.

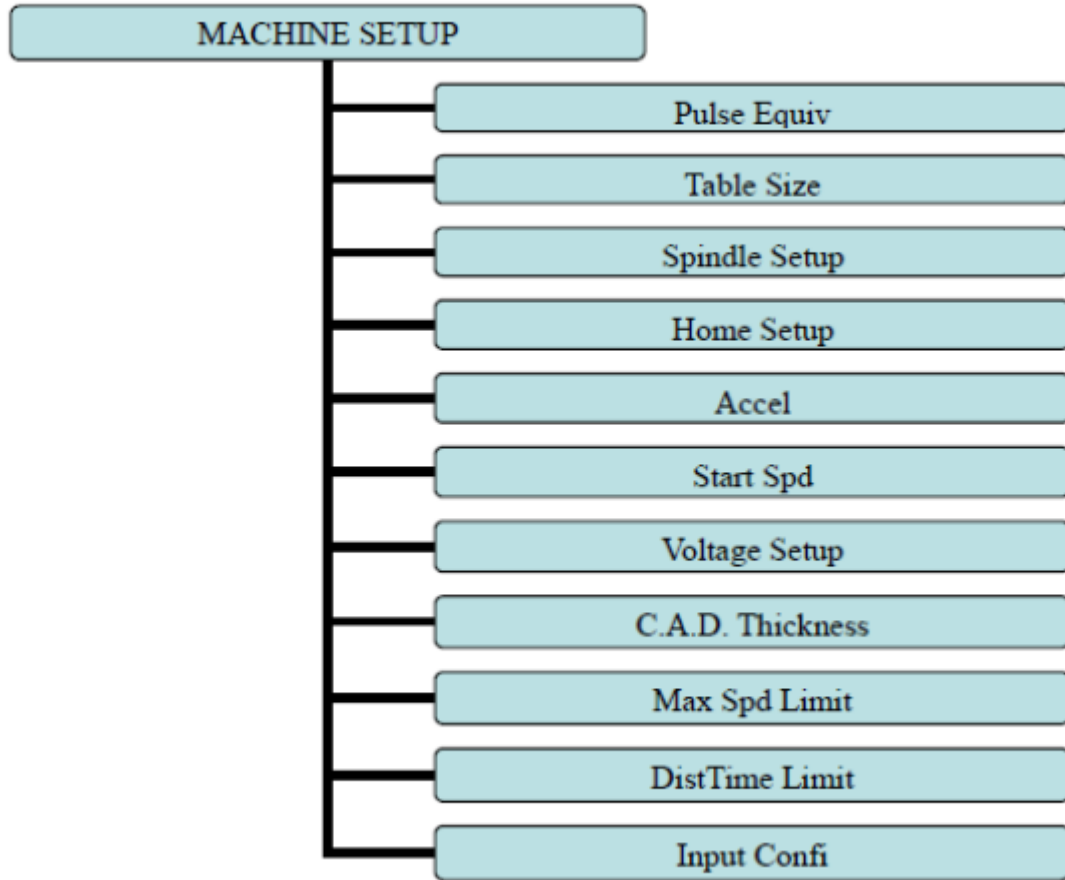
RUN/PAUSE DELETE - Used to load a program from either the USB drive or internal memory, to pause a program during operation, or delete a program file.

STOP/CANCEL - Stops a running program or cancels commands.

5.9 Menu Path



5.10 Machine Setup Path



6.0 Operation

6.1 Turning On the Machine

Before the machine is turned on, remove all tools and other objects from the worktable.

1. Release the Emergency Stop by twisting clockwise until it pops out.
2. Turn the Main Power Isolation Switch clockwise to the ON position.

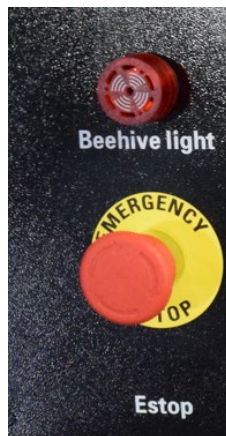


Figure 6-1: Emergency Stop



Figure 6-2: Main Power Switch

3. Turn the Main Power Key Lock clockwise from 0 (the off position) to the 1 (the on position).

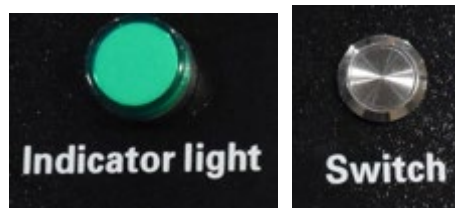


Figure 6-3: Power On Light and Machine ON/OFF Button

4. Press the Start button that will turn power on the machine, Power On Light will appear.
5. To turn the vacuum on, turn the switch to the right.

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Pressing the green button will also power the controller and the display will light up. The screen will display *Go to Home?*. Verify the table surface is clear of obstructions and press the green **ORIGIN/OK** button.

6. The router head will move to the Home position on the table.

NOTE

Home is a mechanical position that is a constant and is determined by switches on each of the three (3) axes.

X+ - Across (from left-to-right when standing in front of the machine).

Y+ - Length (from front-to-back when standing in front of the machine).

Z+ - Vertical (Up) By pressing HIGH LOW/0 and MENU/- the display will change to AX+0, AY+0, and AZ=0.

When the X, Y, and Z have an A in front, this denotes that the dimensions displayed are about the machine's home position. When the X, Y, and Z values are displayed with a number (1-9) this indicated the dimensional relationship of the machine from the machine Origin.

6.2 Moving the Router Head

There are three (3) different methods to move the router head:

1. **Continuous Mode** – Press the **MODE** button until *Continuous* is displayed. The display will show (on bottom row of the screen) the changing location of the router head as it moves location. By holding **X+** button down, the machine will move constantly until the button is released. This is the same for X-, Y+, Z+, and Z-. The **HIGH LOW** button determines the speed of the jogging moves.
2. **Step Mode** – Press the mode button until *Step* is displayed. With *Step* selected, each time **X** or **Y** button is pressed it will move the router head by 0.5 mm in high setting and 0.1 mm in the low setting.

3. **Distance Mode** – Press the **MODE** button a third time and *Distance* is displayed. This allows you to input a position into the controller that you want the router spindle to move to. As an example, if you want to move the router spindle 100 mm from the home position in the X and / or Y-Axis.
 - a. Press the **MODE** button until *Distance* is displayed.
 - b. Type in *100* and press **OK**.
4. **Pressing the X+** - button will now move the router 100 mm in the X+ axis. The router head also moves the set distance in the X+, X-, Y+, and Y- depending on the button that is pressed. To move the router head in the Z-Axis, press the Z+/=3 (UP) or the Z-/7 button (DOWN). By pressing any of the other X, Y, or Z+ or – buttons the router head will move 100 mm in the selected direction.

6.3 Jogging Speed

Select between a low or high speed. Pressing the **HIGH LOW / 0** button toggles between the two (2) speeds. The high-speed jog setting is approximately four (4) times the speed of the low-speed jog setting.

6.4 Setting the Work Envelope

The Work Envelope is a volume that defines the movement limits of the router spindle. The X0, Y0 corner of the work envelope is determined by the machine's Home Position. The X+ and Y+ limits of the work envelope are determined by the Table Size: Settings (MENU/MACHINE SETUP/TABLE SIZE) and provide the soft limits for the machine. The Table Size settings prevent the possibility of the spindle assembly/gantry from being jogged into the machine's frame.

Ensure that the controller display is indicating the Machine Coordinates. Those numbers correspond to the machine Home position that is determined by physical limit switches. Machine Coordinates are indicated on the screen by the designating AX, AY, or AZ. If the Machine Coordinates are not being displayed, depressing the **HIGH/LOW** and **MENU** buttons together will toggle between the machine coordinates and origin coordinates (e.g., 1-9).

1. Select Low Speed by pressing the **HIGH LOW / 0** button. Select *Continuous* by pressing the **MODE** button until *Continuous* is displayed. The position of the router head as it changes will

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be shown at the bottom of the display. Move the router spindle to the home position by pressing the **HOME** button.

2. Move the router head to the max position by pressing the **X+** button until the router spindle stops. Note the displayed AX= value.
3. Press the **Y+** button and hold until the router gantry stops moving, note the displayed AY value.
4. Typically, on the Laguna Swift 4 x 4 CNC machine the work envelope will be 1300 mm (51.181 in) x 1300 mm (51.181 in). Work envelopes vary by machine model.
5. Machining can only be performed if the tool path center lines fall within the work envelope. If an error message is displayed while trying to execute a program indicating an over travel error in one of the axes, executing the program would require that a tool path fill outside of the machine's Work Envelope.

Please note that the selection of the origin also effects placement of the program within the work envelope.

6.5 Using the Vacuum Table

The vacuum table has four to six (4–6) zones and the configuration can be set to suit the type of work that you will be producing. Each zone is controlled by a switch that is located at the front of the machine. The table has two (2) holes in each zone that extract the air and generate the vacuum. The table has grooves that ensure the air is extracted evenly across the zone. To seal the zone from leakage, a foam rubber gasket is pressed into the outer grooves. The gasket is compressed by the spoil board (sometimes called sacrificial board) as the vacuum is applied. T-Slots are also provided to allow you to clamp jobs/spoil boards to the table should it be required.

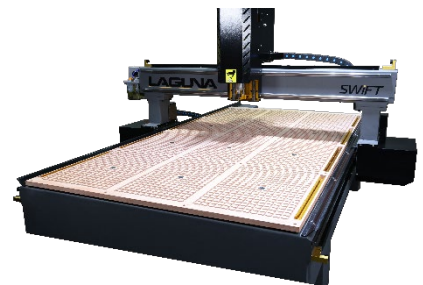


Figure 6-4: Vacuum Table

NOTE

The better the vacuum created, the more securely the parts will be held in place. Follow the below instructions to obtain optimum results.

6.6 Fitting the Foam Rubber Gasket

It is important that the foam rubber gasket is pressed evenly into the groove(s) in the vacuum table around the zone that you are constructing. To ensure a good seal, it is strongly recommended that the gasket is turned in at the beginning. The gasket tends to stretch while fitting and over time it may relax and shorten. The extra length of gasket allows you to reset it and make the seal again. If the initial turn is not put in place, there is no margin for error, and you may have to discard a complete length just for being one inch short. It is recommended that you initially create three (3) zones, each one completely across the table. You can change the configuration at a later stage.

NOTE

Do not stretch the foam rubber gasket while you are fitting it into the groove(s) in the vacuum table.

6.7 Spoil Boards

The Spoil Board has two (2) functions:

1. **To protect the vacuum table from the cutters** - Set the depth of the cutter a few thousandths of an inch deeper than the job thickness. Without a spoil board, the machine would cut into the vacuum table.
2. **To transfer the vacuum from the table to the job** - The spoil board must be porous to allow air to be sucked from the underside of the job. Inexpensive Medium-Density Fiberboard (MDF) is the best material for this function.

6.8 Spoil Board Preparation

When you purchase your MDF spoil board it should be no thinner than $\frac{3}{4}$ inch. The thicker the MDF the better the suction that is created. However, it is not recommended that your spoil board be thicker than one (1) inch.

The MDF that you purchase will not be flat and the machine will be cutting to accuracy in the order of a few thousandths of an inch so you will have to machine the spoil board flat. After your spoil board has been skimmed many times is $\frac{1}{2}$ inch thick discard it and start a new spoil board. The spoil board edges are very porous and must be sealed. Hard candle wax is recommended as it contains no water. Never use a water-based product to seal the edges of the board as this will make the board grow and it will be unsuitable as a spoil board.

NOTE

Some glues contain water and can affect the edges of the spoil board.

NOTE

Do not confuse flatness with bow. If the board is bowed the vacuum may not pull the board down and you will lose the vacuum. Never use a bowed board as a spoil board.

1. Cut your spoil board to the size of the bed of the machine.
2. Place the spoil board on the vacuum table. Prior to placing the spoil board onto the vacuum table, the table is perfectly clean, free from sawdust and dirt. If there is sawdust etc. on the table, it will change the height of the spoil board and it will not be flat. It is strongly recommended that you do not wipe or brush the table clean but use a handheld blower. Do not use a vacuum cleaner as it may draw the foam seal out of the groove and damage it.

NOTE

At least two (2) people are required to load a spoil board. Never put the edge of the board on the vacuum table and push it across. The foam rubber gasket will be damaged and no longer provide a vacuum seal. Lift the board into place and lower it onto the vacuum table in the correct position.

3. Turn on the vacuum.
4. Fly cut the total surface of the spoil board.

NOTE

Only remove the minimum to achieve a flat surface over the complete surface. You will have to skim the surface several times during the life of the spoil board to clean it up and you should get into the habit of only skimming the minimum off the surface.

5. Once the face is flat, remove the vacuum, turn the spoil board over and repeat the process for the other spoil board.

6.9 Precautions Regarding Spoil Boards

Spoil boards are porous and will absorb moisture. Over time, the absorption of moisture will change the dimensions of the board. Day-to-day changes are normally insignificant and will occur across the entire board evenly. However, if liquids are spilled on the board, it will be absorbed and cause the board to grow in the spillage area. Do not allow the board to become wet. If an accident should happen, remove the board from the machine and allow it to dry. Drying may take several days. Meanwhile, make use of a new board. Once the wet board has completely dried it may be possible to recut and reuse. If the board cannot be cut flat, it should be scrapped.

6.10 Vacuum Table T-Slots

The vacuum table has nine (9) T-Slots to enable fixtures and jobs to be clamped directly to the table. Clamps are provided, but the table must be protected with a packer when using jacking bolts. If the jacking bolts meet the plastic of the table, the plastic will be damaged. The packer must be as large as possible to spread the load on the plastic of the table.

T-Slots are also provided at the end and sides of the table and can be used for clamping jobs and fixtures.

6.11 Fitting the Touch Off Puck

The touch off puck plugs on top of the machine on the side. Unplug and remove the touch off puck when it is not in use.

6.12 Automatic Z Origin Point (Tool Touch Off Point)

The machine is provided with an automatic tool height adjustment. Place the touch off puck on the clean spoil board directly under the cutter. To activate the automatic tool height adjustment, press **MENU** and **ON/OFF** key at the same time on the control pad. This will cause the cutter to move slowly down. Once the cutter touches the touch off puck, electrical contact is made and the cutter will move up and away from the touch off puck. The machine now knows the height of the cutter.

6.13 Manual Z Origin Point (Tool Touch Off Point)

1. Fit a flat bottom router bit to the spindle.
2. Jog (Z) the tip of the tool down so that it is just above the top of the spoil board using the *Continuous* mode.
3. Step down in slow mode (0.1 mm or 0.004 inches each time the button is pressed) while turning the router collet by hand in the reverse direction. When you feel pressure, stop jogging down.



DO NOT turn the router bit by hand as it is sharp and could cause injury.

4. Select the distance mode and enter 0.0254 mm (0.0001 inches). Press **Z+** (UP) and rotate the cutter in the reverse direction until the cutter is free to move and there is no drag. The cutter is now within 0.001 inches above the spoil board.
5. Once the router bit is at zero press the **Z-0/8** button to set the zero point.
6. Jog the router bit up or press the origin button to move the router bit up and to the origin point.

6.14 Setting the Spoil Board on the Vacuum Table

To move the router head to the spoil board corner position:

1. With the router head in the home position, drop the router bit to just above the spoil board top face as described earlier (Z-Axis).
2. Use the distance command as described earlier (press mode, toggle through to distance) to set the X and Y position to 40.39 mm.
3. Press **X+**.
4. Once the router head has stopped moving press **Y+**.
5. The point of the router bit is now located over the point where the corner of the spoil should be.
6. You may need to move the router bit lower so that it is closer to the top surface of the spoil board by pressing the **Z-** button.
7. Press the top right-hand button **XY-0/4** this will set the origin and the machine now has a new datum point which will be the X=0/Y=0 in your design program.
8. Adjust the board until it is parallel with the edges of the vacuum table and the corner is directly under the router bit. Vacuum can now be applied to the spoil board.

6.15 Fitting a Job to the Spoil Board

One can use double-sized tape to attach the job to the spoil board. If you are using double-sized tape, ensure that the spoil board and the job are clean and do not have saw dust or chips as this will affect the ability of the tape to hold the job securely. Only use the smallest amount of double-sided tape as it will make it easier to remove the job once machined.

6.15.1 Removing the Job from the Spoil Board

If necessary, carefully pry the job off the spoil board with a wide blade putty knife or similar tool.

6.15.2 Fitting the Job to the Table using the T-Slots

It may be convenient to clamp the job to the spoil board with table clamps. Note that this attachment method can only be used if the outside edges are not being machined. When using the clamps, place a piece of packing under the jacking bolt to protect the bed of the machine.

7.0 Resetting the Origin Point

1. Bring the router head to the origin point by pressing the **ORIGIN OK** button.
2. Lower the router bit by pressing **Z-** so that it is just above the spoil board.

NOTE

Note the position of the tip of the router bit point and you will probably find the origin point will have to be adjusted.

3. Jog the point over so that it lines up with the edge of the spoil board in the X-axis.
4. Jog the point over so that it lines up with the edge of the spoil board in the Y-axis.
5. Reset the origin point by pressing the top right-hand button **XY-0/4**. This will set the origin and the machine now has a new datum point.

7.1 Spindle Speed Control

Only three (3) buttons are operator accessible:

ARROW UP, ARROW DOWN, and STOP KEY.

ARROW UP Key is used to raise the spindle speed.

ARROW DOWN Key is used to lower the spindle speed.

The Stop Key is available to stop the spindle during a program activation.

Display reads in hertz, 200hz = 12,000, 300hz = 18,000, 400hz = 24,000.

7.2 Loading a Program into the Machine

NOTE

The USB slot is on top of the controller.

1. Load your program into your USB drive.
2. Fit the USB into the USB slot in the controller.

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3. Press the button **RUN/PAUSE DELETE**. The display will show *U disc*.
4. Press the **OK** button. The contents of the USB drive will be shown on the screen.
5. Use the arrow keys to select the file to load into the controller.
6. Press **OK** button.
7. Once the code/program has been downloaded the machine will start to operate.

NOTE

Ensure all personnel are clear of the machine as the spindle will start to turn and could cause injury.

8. The router will just cut the surface of the spoil board the distance that you set in the design software. Laguna suggests 1.6 mm (1/16 inches) and cut the outline of the job. This will give the location of the part on the spoil board.

7.3 Steps to follow before running a program

1. Secure materials to tables
 - a. Safely secure materials down to top of table by use of clamps, double sided tape, vacuum, etc...
2. Load tool into spindle
 - a. The first step to loading a tool is to identify the parts involved and assemble them correctly. The following is a picture of the main parts:



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Step one in assembling the tools together is to snap the collet into the collet nut. Firmly press the collet into the spindle nut until a “snap” sound is heard. The collet will have a little wiggle room but will not come out unless some force is applied.



The next step is to start the collet and nut threading onto the spindle as shown (Start threading before loading tool to help prevent a possible cross thread)

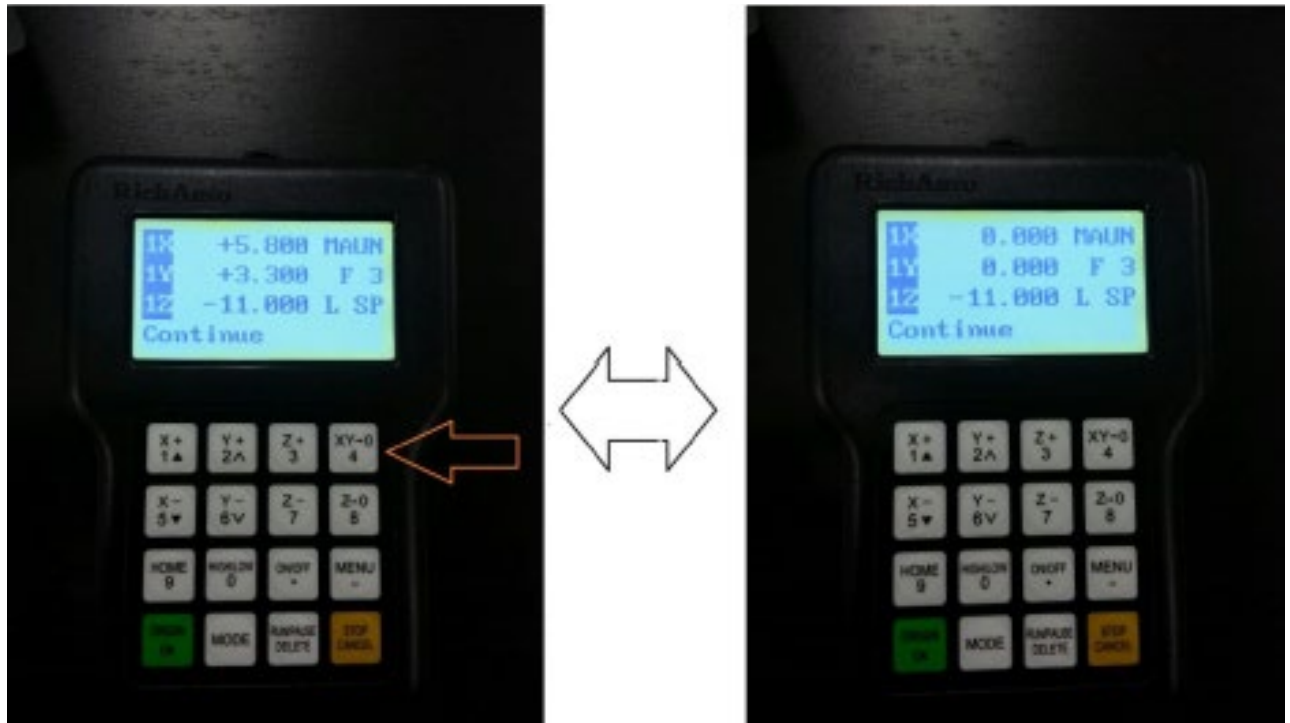


Now you can start to load the tool into the collet and keep tightening the collet nut by hand. You can now use the wrenches to tighten up the tool, using the small wrench on the flats above the threading and the big wrench on the collet nut, tighten the tool in place.

3. Teach origin (XY→0)
 - a. The next step in the process is to verify that you have the proper origin (X+Y axes only). The origin is a changeable number which is the programs Zero (Not to be confused with home, which is a mechanical zero that cannot be changed)

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- i. The first step to setting the X,Y origin is to jog the machine to the lower left corner (Or wherever your program origin is located) and center the tool bit over where you want it to be
- ii. Once you are located where you want to be to set the origin, you have to press the number 4 key (XY→0)



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-WARNING-

If you receive the following error:



Then you are in the absolute coordinates page, (AX, AY, AZ) To get out of this page, press the green origin/ok button to get back to the coordinates page, and then hold Menu and the 1 key and release both together to go back to the origin 1 page (1X,1Y,1Z) and you will be able to set an origin (1-9 are 9 different origins, the 0 key brings you to absolute coordinates)

3. Tool Lengths

- a. Teaching tool lengths will allow the machine to know how far down until the tool is touching the top of spoil board (or top of material if that's how the program is set up for)
 - i. To do this we have to use the controller and jog the Z axis down to the material. Jog it down until it is just above the material and then slow it down or step jog until you are just touching the material/spoil board (Can use a piece of paper to go between the top and the bit and lower until paper can longer move free)
 - ii. Once you have the bit directly on top of the spoil board or part, you will press the 8 key to teach the machine the Z-0.

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- iii. Now the machine will know how far down to go for the cutting. Make sure you touch off to the appropriate area, based off what you program.
 4. Copy program to controller
 - a. When running your programs, it is highly recommended to not run them directly off the USB as the file may corrupt or skip while reading, it is best to copy them directly to avoid any errors.
 - i. Put the USB into the HHC.
 - ii. Press Menu and by using the X-/5 key, go down until you are highlighted on Operate File. Then press the green origin/ok button.
 - iii. You should immediately find yourself highlighted on Copy File, and press the origin/ok button.
 - iv. Push the origin/ok button again to select U-disk file (USB device)
 - v. Using the 1 and 5 keys, move through the files, and press ok on the file you want to copy over.
 - vi. You can now press cancel until you get to the 1X,1Y,1Z page
 5. Turn on dust collector
 6. Run the program
 - a. To run the program, press the Run/Pause delete button
 - b. Using the 5 key, scroll down to Internal file and press the origin/ok button
 - c. Using the 5 key, look for your file and press the origin/ok button. Press ok again, and the program should start. (The controller will run a code check and let you know if it will error out by traveling too far on a certain axis, adjust location of part and origin, and try to run again)

8.0 Maintenance and Troubleshooting

As with any machine, conducting regular maintenance will ensure optimal performance.

Failure to follow maintenance procedures will void the warranty.

NOTE

If you are operating within a Quality System Certified Facility (ISO/QS 9000, TS-16949, etc.), be advised to incorporate the daily and weekly maintenance checks into the preventative maintenance protocol of the facilities Quality System.

8.1 Controller Settings

The controller settings are calibrated and set to the correct values in production. These processes are documented in this manual in the event it becomes necessary to recalibrate and reset the values.

8.2 Daily Checks

1. Clean the machine and lubricate unpainted surfaces with Teflon lubricant. Wipe off any excess and buff with a dry polishing cloth. This will reduce the likelihood of rust forming.
2. Check cutter teeth for chips and dullness.
3. Collets and spindle collet holes must be cleaned regularly. Ensure that the slots in the collets are free of sawdust, as sawdust builds up and will stop the collet from compressing. If the collet or spindle holes are not clean, the router bit may not run true, and this will affect the performance of your machine.
4. Do not leave any tooling in the spindle overnight. This includes tool cones, collets, router bits, etc.
 - a. Leaving any tooling in the spindle overnight can cause the tooling to get dirty, stuck, rust, and cause damage to the spindle.
5. Check the dust collection hose and hood for blockage or possible breakage.
6. Inspect the overall machine for damage and loose or worn parts.

8.3 Weekly Checks

1. Clean the cutters.
2. Check cutter teeth for chips and dullness.
3. Inspect the overall machine for damage and loose or worn parts.
4. Check the dust extraction for blockages and any large bits that could cause blockages.

8.4 Oiling the Machine

The machine is provided with a central oiler. Do not over lubricate the machine as excess oil attracts dirt and sawdust. One pump of the oiler is recommended at least once a month to keep your machine lubricated; more lubrication may be required depending on frequency of machine use. When the oil tank is low, fill with a good quality SAE 30 weight oil.



Figure 8-1: Oil Reservoir

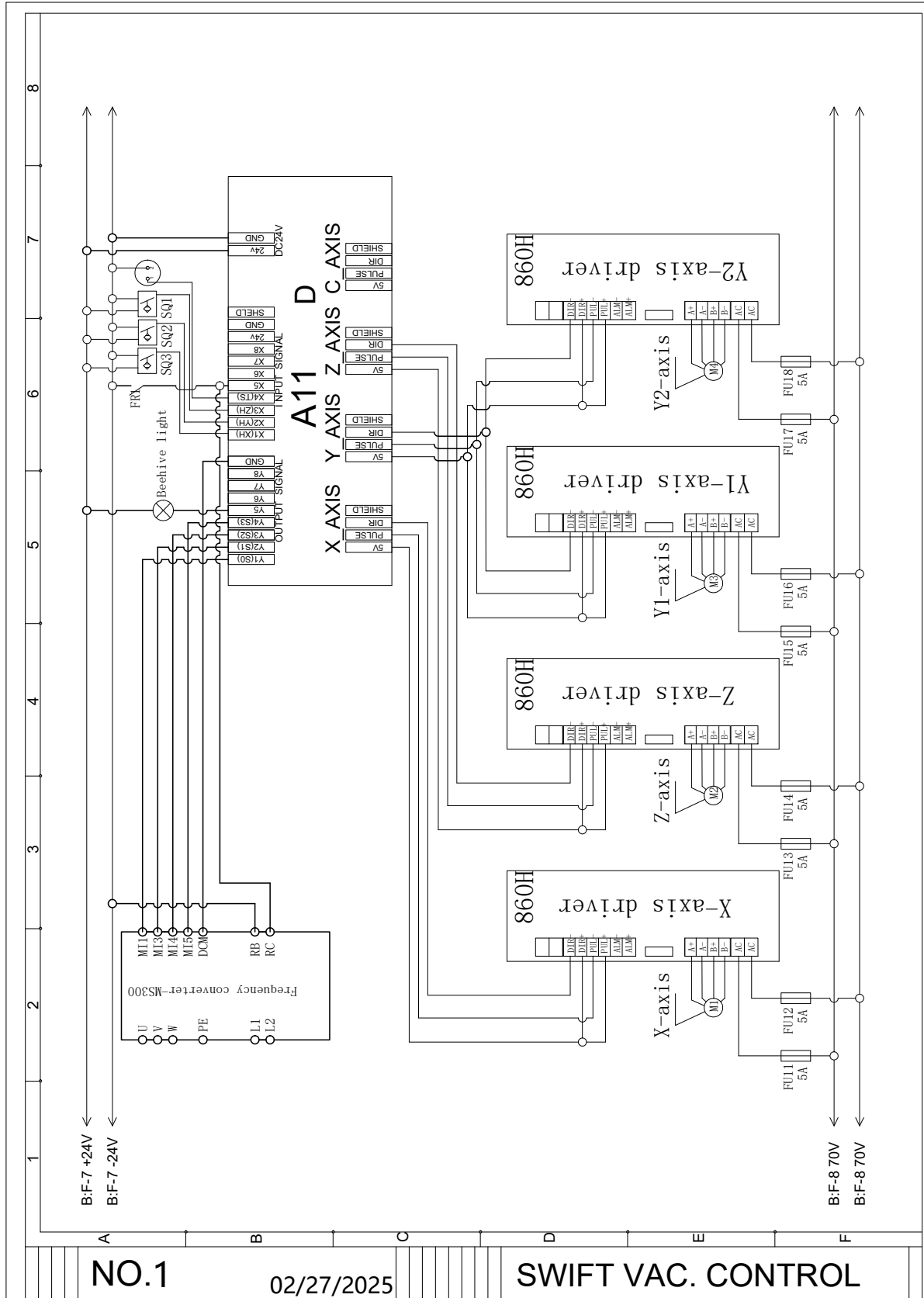
9.0 Troubleshooting

Problem	Possible Solution
Machine will not start	<ol style="list-style-type: none"> 1. Verify the start switch is being pressed full in. 2. Verify the red stop switch is fully out. 3. Verify the electrical power cord is plugged into the power outlet. 4. Verify the electrical supply is on (reset the breaker). 5. With the power disconnected from the machine, check the wiring to the plug is correct. 6. Verify the rubber insulation is stripped enough and is not causing a bad connection. Verify all the screws are tight.
Machine will not stop	<p>This is a very rare occurrence as the machine is designed to be fail-safe. If it should occur and you cannot fix the fault, seek professional assistance.</p> <p>The machine must be disconnected from the power and never run until the fault has been rectified.</p> <p>Internal breaker faulty; replace the breaker.</p>
Motor tries to start but will not start	<ol style="list-style-type: none"> 1. With the power disconnected from the machine, try to turn the spindle by hand. If the spindle will not turn, check the reason for the jamming. 2. Motor faulty; replace the motor.

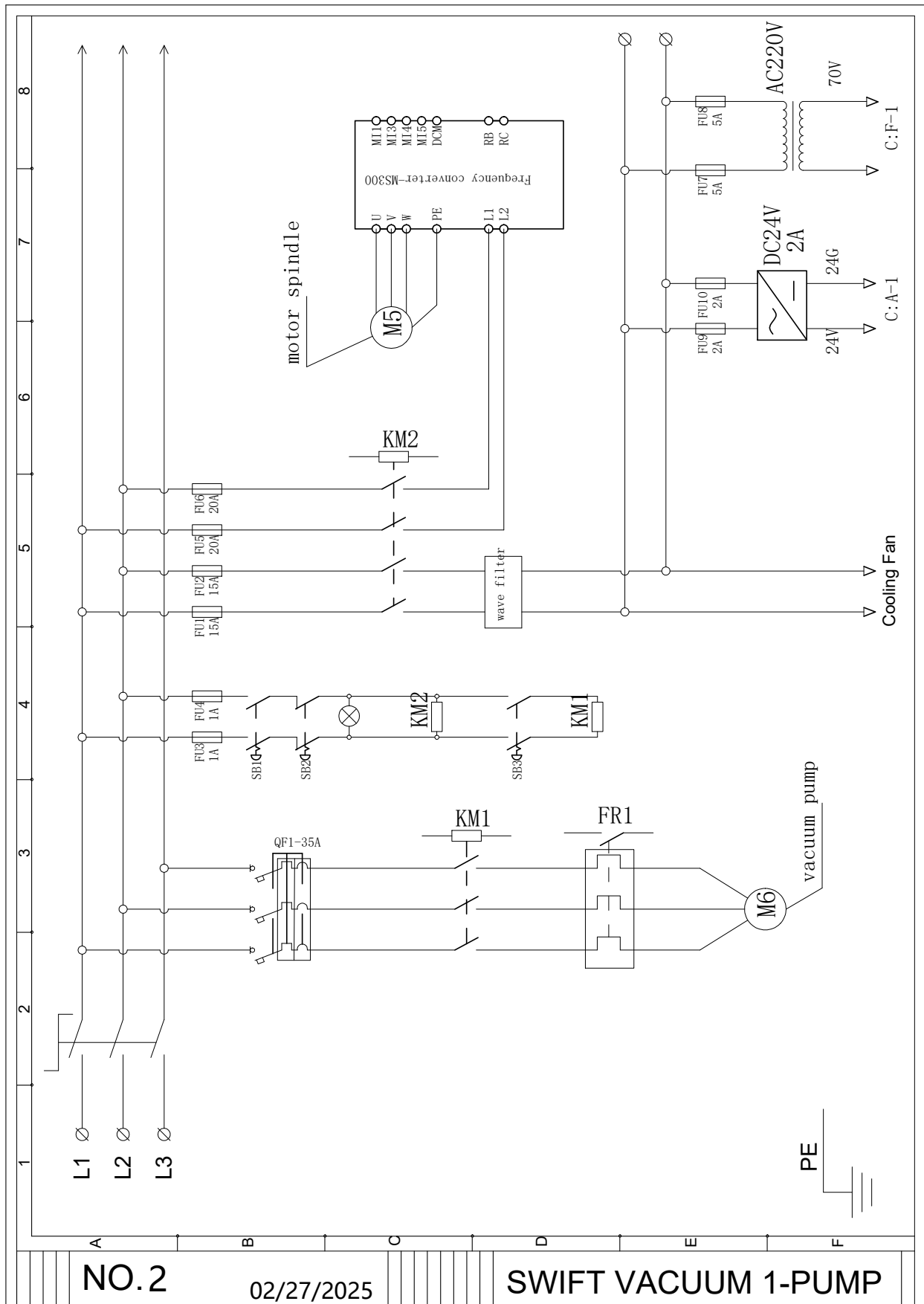
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Problem	Possible Solution
Motor Overheats	The motor is designed to run hot, but should it overheat it has an internal thermal overload protector that will shut it down until the motor has cooled and then it will reset automatically. If the motor overheats wait until it has cooled and restarted. If the motor shuts down consistently check for the reason. Typical reasons are dull cutting tools, no water in the coolant tank, blockage in the coolant pipe and excessive ambient temperature.
Squeaking Noise	Check the bearings.
Spindle Slows Down During a Cut	<ol style="list-style-type: none"> 1. Dull cutting tools. Replace the tool or have it re-sharpened. 2. Feeding the wood too fast. Slow down the feed rate.
Machine Vibrates	Machine not level on the floor. Re-level the machine ensuring that it has no movement.
Unable to change feedrate	<ol style="list-style-type: none"> 1. Click Menu 2. Select autopro setup 3. Select G-codes setup 4. Select "Read F Code" 5. Press the run/pause button 6. Navigate to "Read F" 7. Press OK

10.0 Wiring Schematics



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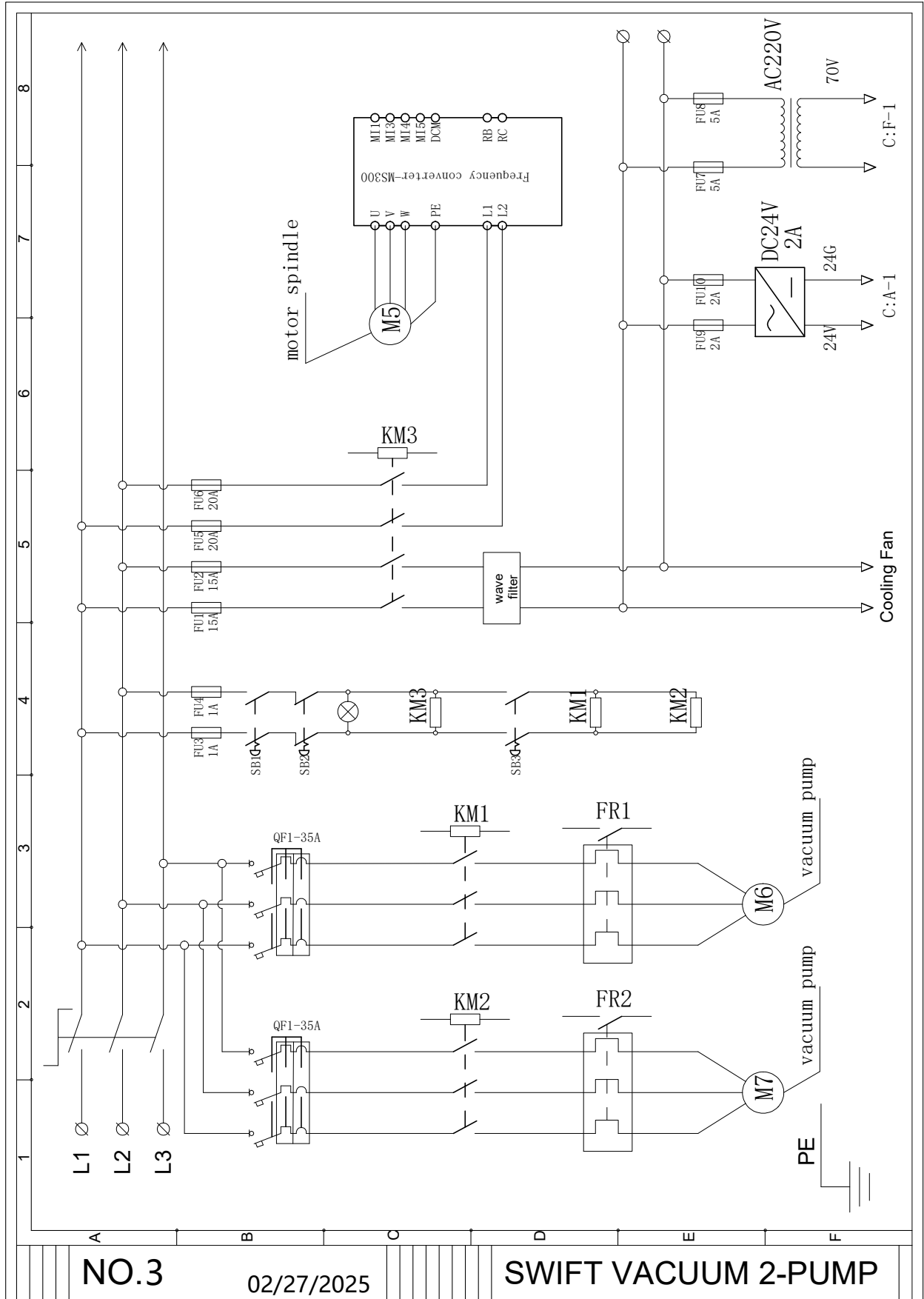


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11.0 Warranties

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

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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.

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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.

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Laguna Tools 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
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
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 of 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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1-800-234-1976

www.lagunatools.com

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