



of South Florida, Inc.

High Performance | Tight Tolerances | Clean Cuts

CLN S-20 Manual



CLN S-20 Manual



Manufacturers of CNC Equipment

www.CLNofSouthFlorida.com



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Important

Make sure you read and fully understand this manual before operating your automated machine. Failure to do so will put yourself and others in harm and will void the warranty of this equipment.

Intended Use of Machine



- Machines are designed to automatically cut nonferrous materials:
 - Aluminum
 - Plastic
 - Brass
 - Led
 - Wood
 - Foam



- Machines are not intended for:
 - Steel
 - Stone

Introduction

Everyone at CLN of South Florida, Inc. would like to thank you for purchasing the CLN Brand CNC Router machine. We understand that you had a choice and you picked ours. Before you get started, there are a few things that we need to go over.

Purpose of this publication

- To help guide you through the learning curve of setting up and operating a new piece of automated equipment.
- As a training aid.

Contents

This manual will take on average about an hour to read and doing so will help you to better understand the machine functions and operations.

Disclaimer

CLN of South Florida, Inc. makes every effort to provide their valued customers with current and accurate information about their equipment. However due to constant research and development and an unsurpassed passion to provide our customers with the latest in cutting edge technologies, we cannot guarantee that the contents of this manual are current and complete.

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Machine Maintenance

Machine Operation

Machine Software (ATC)

Machine Software (MTC)

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Trouble Shooting

Safety

Your Responsibilities:

- As an operator of the CLN machine, you are responsible to follow all safety procedures. Any person who operates or does any maintenance on this machine must be aware of all safety procedures.

Safety Precautions:

- Do not wear any loose-fitting clothing such as scarves or hanging jewelry.
- Do not put hands in or on any moving parts at any time.
- Do not operate machinery while under the influence of alcohol, drugs or any other substance that may impair or alter your judgment.
- Always wear gloves when handling sharp materials.
- Always wear eye and hearing protection when operating equipment.
- Do not operate the machine without all the covers in place.
- Keep hands, head and body out of the way of moving parts.
- When performing maintenance work on the machine always unplug the incoming electric power and disconnect the compressed air supply. Make sure the air is completely drained out of the system.
- Be sure to stay clear of moving parts when turning on the air supply, the tools may unexpectedly move during the initial connection.
- Never leave the machine unattended.
- Completely power down when not in use.



Servicing the Machine:

- When servicing the machine, you must first disconnect the electricity, disconnect the compressed air line and completely drain the air out of the system. **If you do not disconnect the electric power and the compressed air line and drain the system, you will put yourself at serious risk of causing permanent damage to yourself or death.**

Guidelines:

- Always follow the safety rules. Under no circumstance should equipment be used for anything other than what it is designed for. Any person who operates or does maintenance on this equipment should be aware of all safety and operating procedures. It is extremely important that this equipment is handled with care! Distractions such as horseplay, carelessness, loud noises and sudden movements can result in unsafe conditions, therefore, should be always avoided when operating equipment.

Environmental Considerations:

- **Climate Control**
 - The machine should be in a climate-controlled area and NOT exposed to extreme temperatures and or weather.
 - There are components on the machine that are susceptible to corrosion and should NOT be exposed to any water based lubricant fluid or humidity.
- **Clean Working Conditions**
 - Your machine should be located in a clean environment.
 - Keep your machine and work area free of dirt and debris.
- **Lighting**
 - Your machine should be operated in a well lighted area.

Caution Labels:



Danger Stay clear sticker: Means that the machine moves automatically and will move without warning and cause serious damage to anyone that puts any of there body parts in the area.



Warning sticker: Means that the area around the sticker moves automatically and will move without warning and cause serious damage to anyone that puts any of there body parts in the area.



Danger Hazardous Voltage sticker: Means that the area around the sticker can cause an electrical shock to anyone that puts any of there body parts in the area.



Emergency Stop:

This machine is equipped with 3 emergency stops, two are located on the gantry and the other located next to the monitor. Pressing it will halt all motion on the machine as well as bleeding all the compressed air from the machine's pneumatic cylinders. The machines computer and monitor are the only two components that will remain on with the emergency stop pressed.

Machine Overview and Assembly

Components
Overview

Electronic
Components
Overview

All Machines
Footprint

Table Footprint

Assembly

Electrical
Connection

Compressed Air
Connection

Internet
Connection



Components Overview:

The S-20 CNC Router can be configured a few different ways.

Bed type:

Phenolic or T-Slot.

T-Slot Vacuum or T-Slot Clamps

Tool Changer

Manual (MTC) or Automatic Tool Change (ATC).

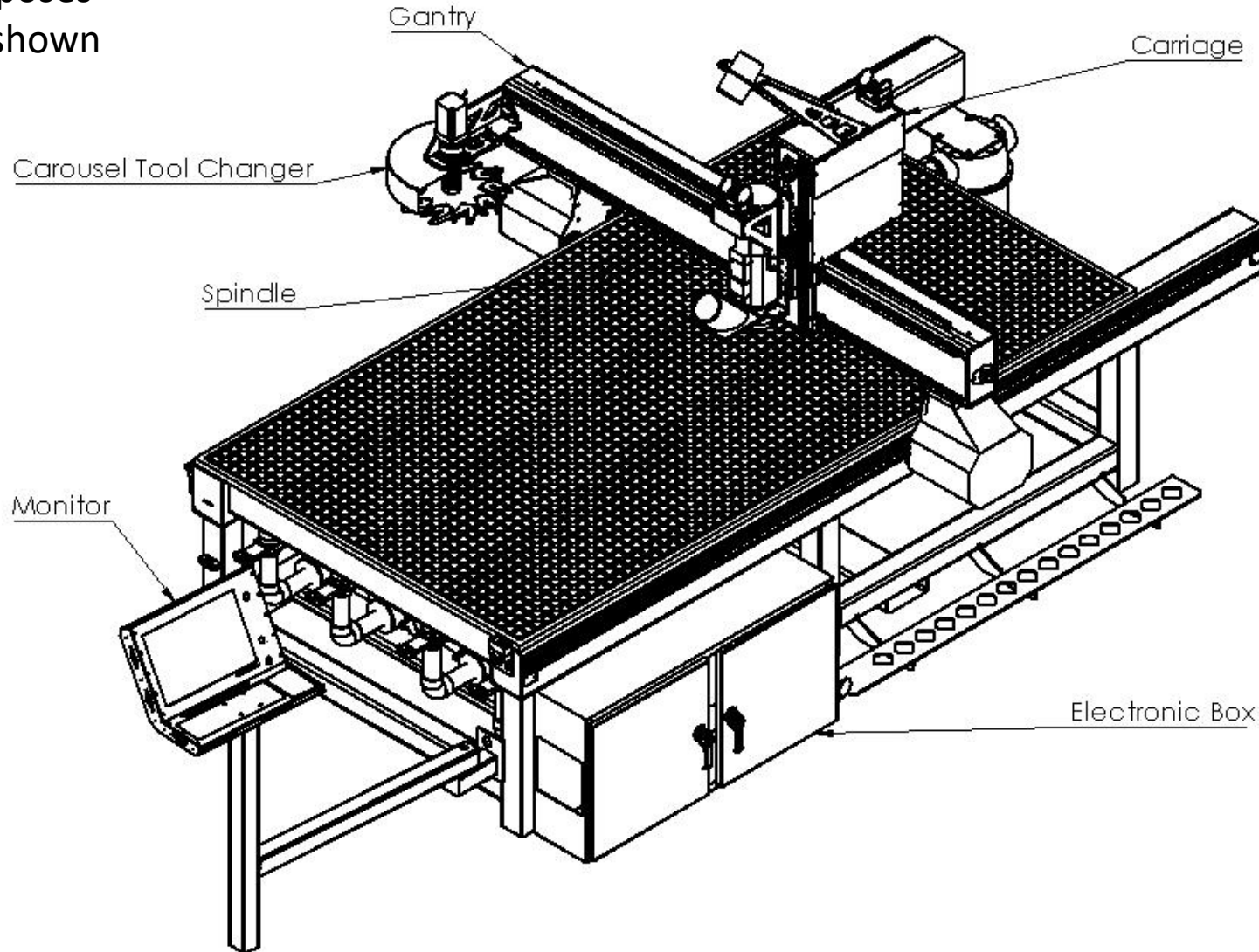
Automatic Tool Change

Carousel or Rack tool forks.

This manual covers all the possible configurations.

Components Overview:

For drawing purposes
The machine is shown
without covers.



**Table Size
4 X 8 and 5 X 10**

Components Overview Continued:

For drawing purposes
The machine is shown
without covers.

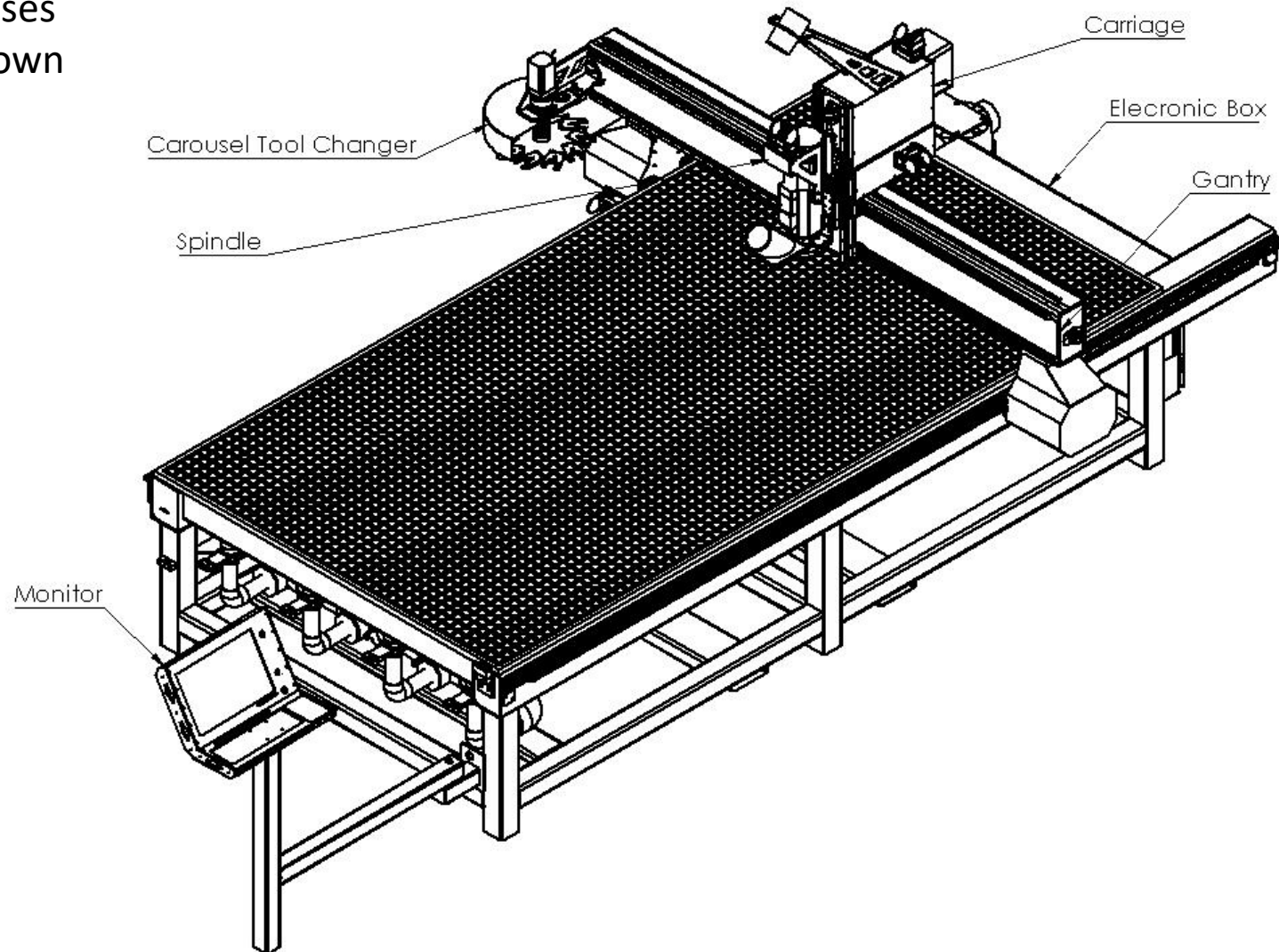


Table Size
6 X 12

Components Overview Continued:

Machine Bed:

- CLN offers two basic types of machine beds. A Phenolic Bed and a T-Slot Bed.

Phenolic Bed

- The Phenolic Bed is a resin-based product that is machined into 1.25-inch squares. The squares allow the vacuum pump to pull air around the squares evenly. A MDF board is placed on top of the phenolic then the material that you want to cut is placed on top of the MDF. The pump will pull air through the MDF which will hold the material that you want to cut, firmly to the MDF.



Components Overview Continued:

Machine Bed Continued:

T-Slot Bed

- A T-Slot Bed is constructed of structural aluminum. A PVC sheet is laminated to the aluminum. The Slots are on 6.125" centers and run all the way down the length of the table.
- There are two ways to hold the material down on a T-Slot table.

Clamping

- Tee Slot Nuts and bolts along with clamp bars are used to clamp the material to the machine bed.

Vacuum

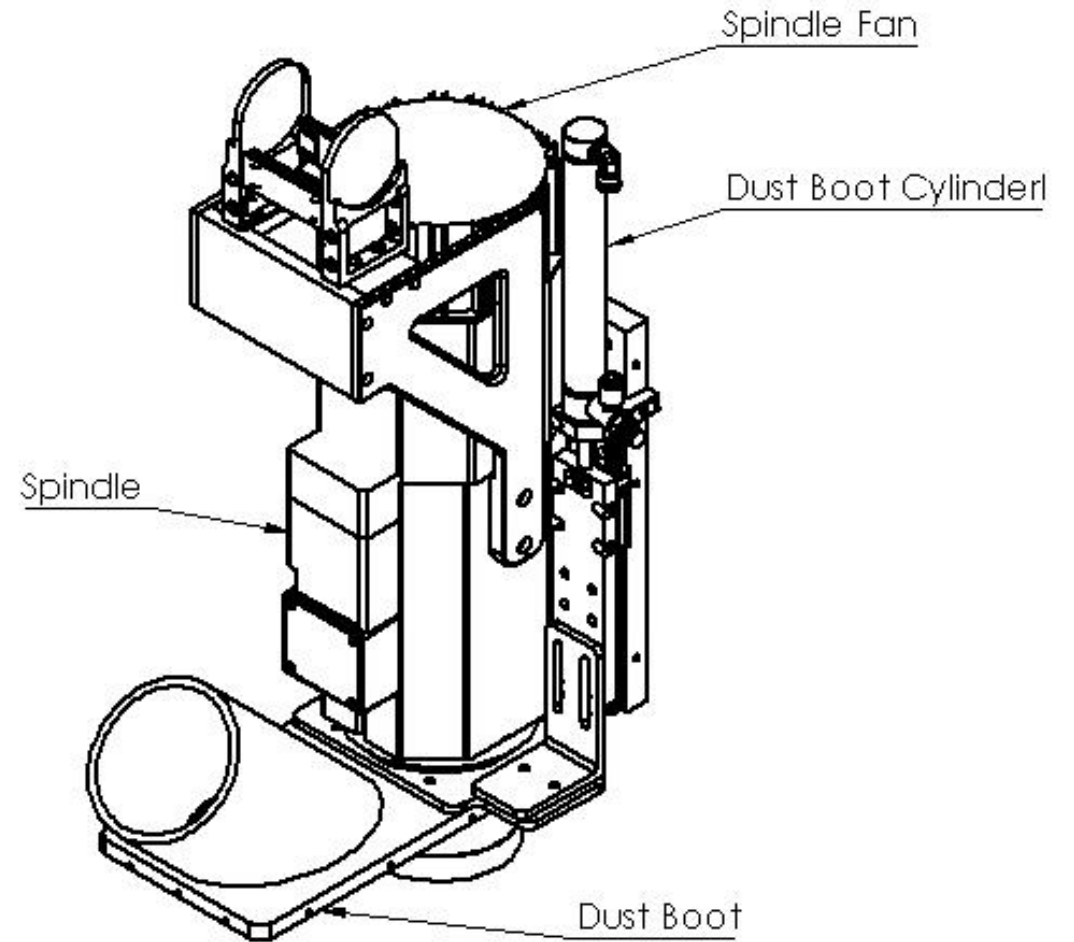
- Machines that have T-Slot Beds can also have a vacuum system added to them. Each section is hollow, and a series of holes are drilled into the bed of the machine. A Sheet of MDF can be placed on top of the T-Slot and the vacuum pump will pull a vacuum through the MDF and hold the material down firmly



Components Overview Continued:

Spindle

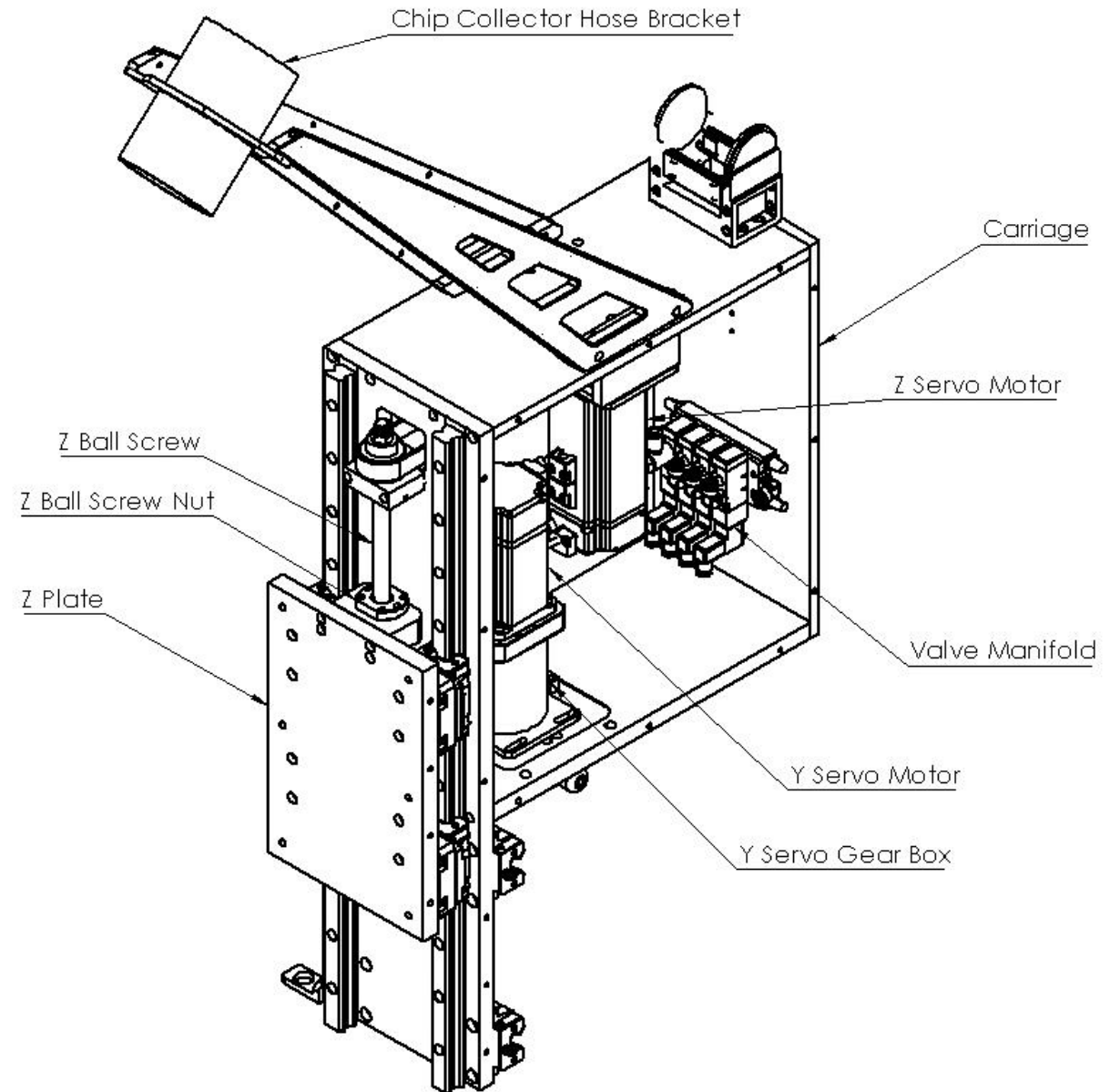
- The (ATC) Automatic Tool Changing Spindle, spins the router bits at a high RPM. The ATC Spindle is equipped with an electric cooling fan. CLN can also add a dust boot that automatically drops down when the spindle is turned on as shown here.



Components Overview Continued:

Carriage Assembly

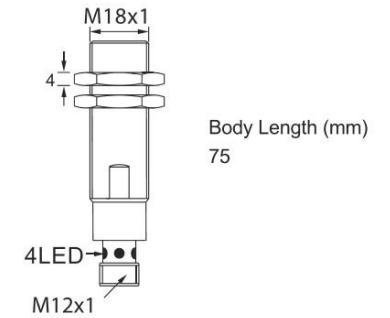
- The Carriage is designed to move the spindle in the Y and Z direction on the machine. This is where the motors for Y and Z are located. The air valves are also located inside. The Spindle mounts to the Z plate that is mounted to the front of the carriage.



Components Overview Continued:

Homing Cell

- This is a Proximity Sensor located in several places on the machine. It senses the steel or aluminum as it moves past the sensor. When the material is in front of the sensor a red LED light will illuminate.



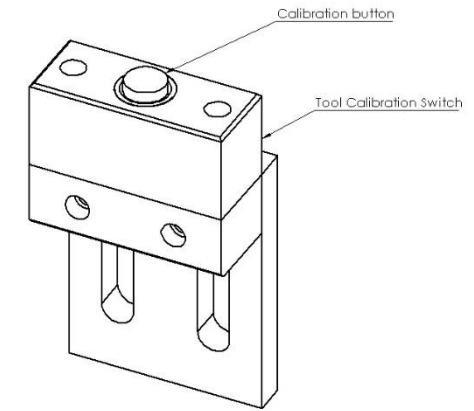
Tool Changing In-Line Rack

- The tool changing rack has a min. of 7 and a max. of 11 tool forks that will be mounted on the end of the table. The number of tools depends on the size of the table. When the machine performs a tool change, the gantry moves to the end of the table and selects a new tool. An added feature of the tool changer is that a tool presents sensor. This prevents the operator from putting a tool in the wrong spot causing a crash or loading a tool on top of an existing tool.

Components Overview Continued:

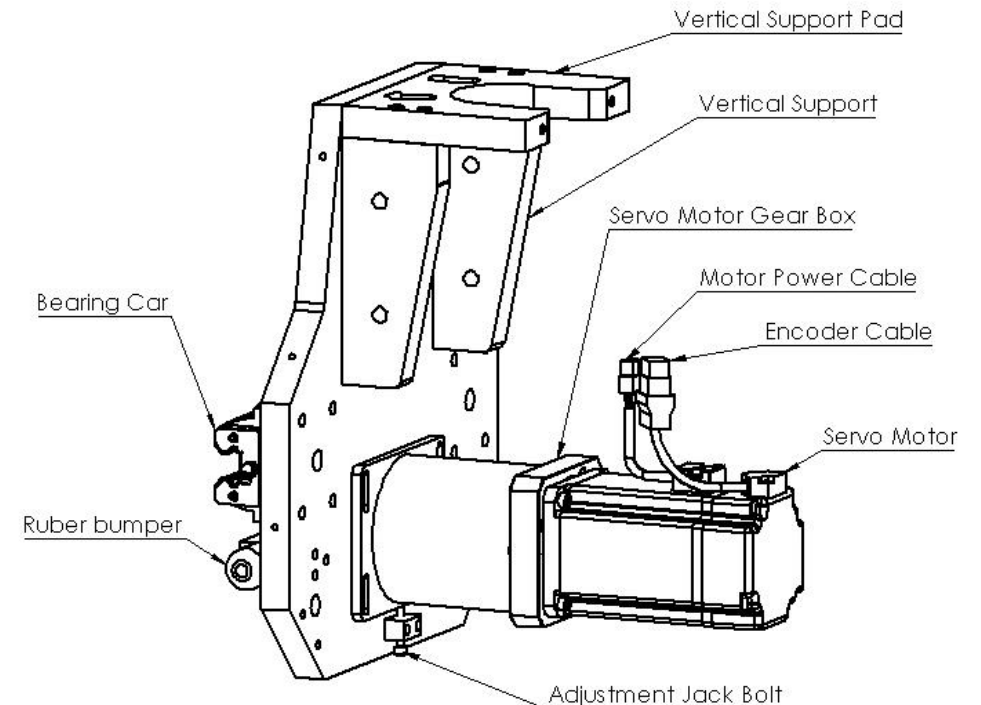
Tool Calibration Switch

- This unit is usually mounted on the front right side of the machine. The tool calibration switch is used to calibrate your tools that are either stored in the tool changer for a (ATC) machine or for a (MTC) machine the current tool that is in the spindle. When installing a new tool in the machine you will have to calibrate the tool only once. The machine will bring the tool over to the button then slowly lower the tool down until it touches the top of the button.



Vertical Support

- The vertical support bolts to the gantry. This is what moves the spindle in the X direction. There will be 2 on the machine. The one on the right side is called X1, the one on the left side is called X2. A servo motor is attached to a planetary gear box that has a pinion gear attached to the gear box shaft. The adjustment jack bolt is used to adjust the pinion gear into the rack that is mounted on the machine.



Components Overview Continued:

Rack Tool Changer

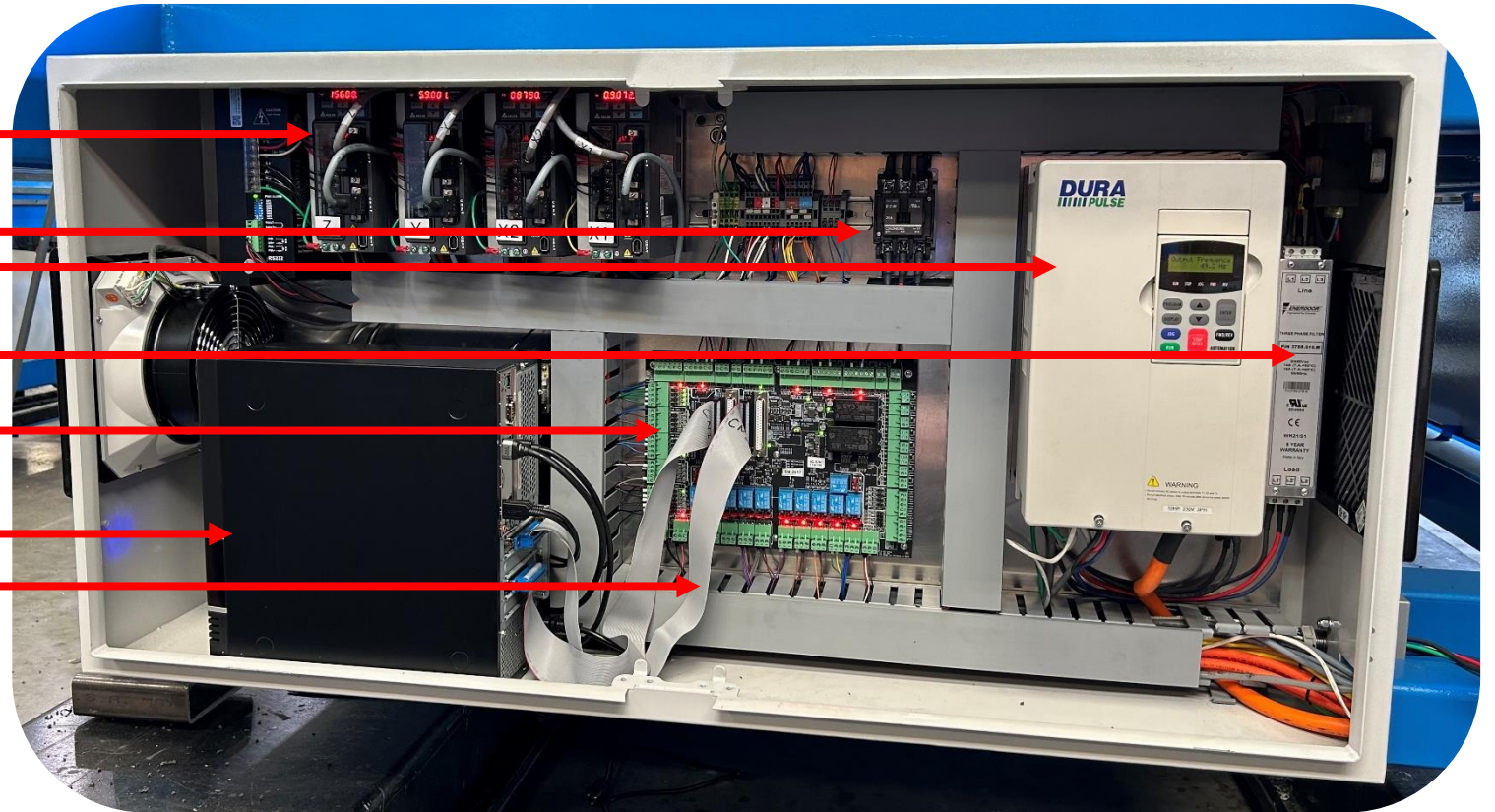
- A Rack Tool Changer holds a series of tools along the rear of the machine. The spindle moves the tool holders in and out of the tool forks that are mounted along the rail.



Electronic Components Overview:

Electrical Panel

- Servo Drives
- Contactor
- VFD
- Line Filter
- Main I/O Breakout Board
- Computer
- CN1 and CN2 Cables



Electronic Components Overview:

Electrical Panel

- Main Power Switch
- AC and DC Distribution
- Fan
- 12 Volt DC Supply



Shown with the computer
laying down on its side.

Electronic Components Overview Continued:

Servo Drives

- The servo drives power the servo motors. Its normal for them to have random numbers on them. The numbers are only positions of the motors. However, they also can tell us if something went wrong with the motor or the drive. If you receive a servo fault message from the Router program the drive will most likely display an error code. For example, AL.011 is an encoder issue. See [Delta Servo Fault codes](#) go to page 288 for a complete list.

Servo Drive identification :

From left to right

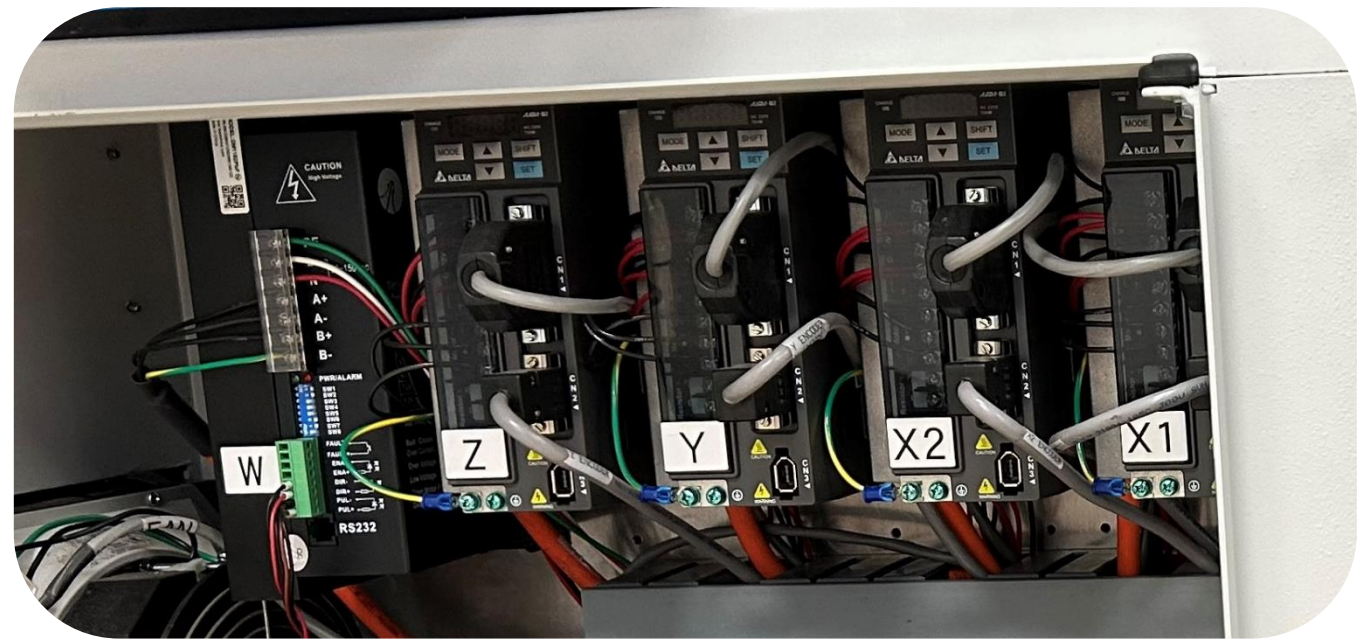
W Tool Changing Carousel Motor

Z Motor

Y Motor

X2 Left side motor

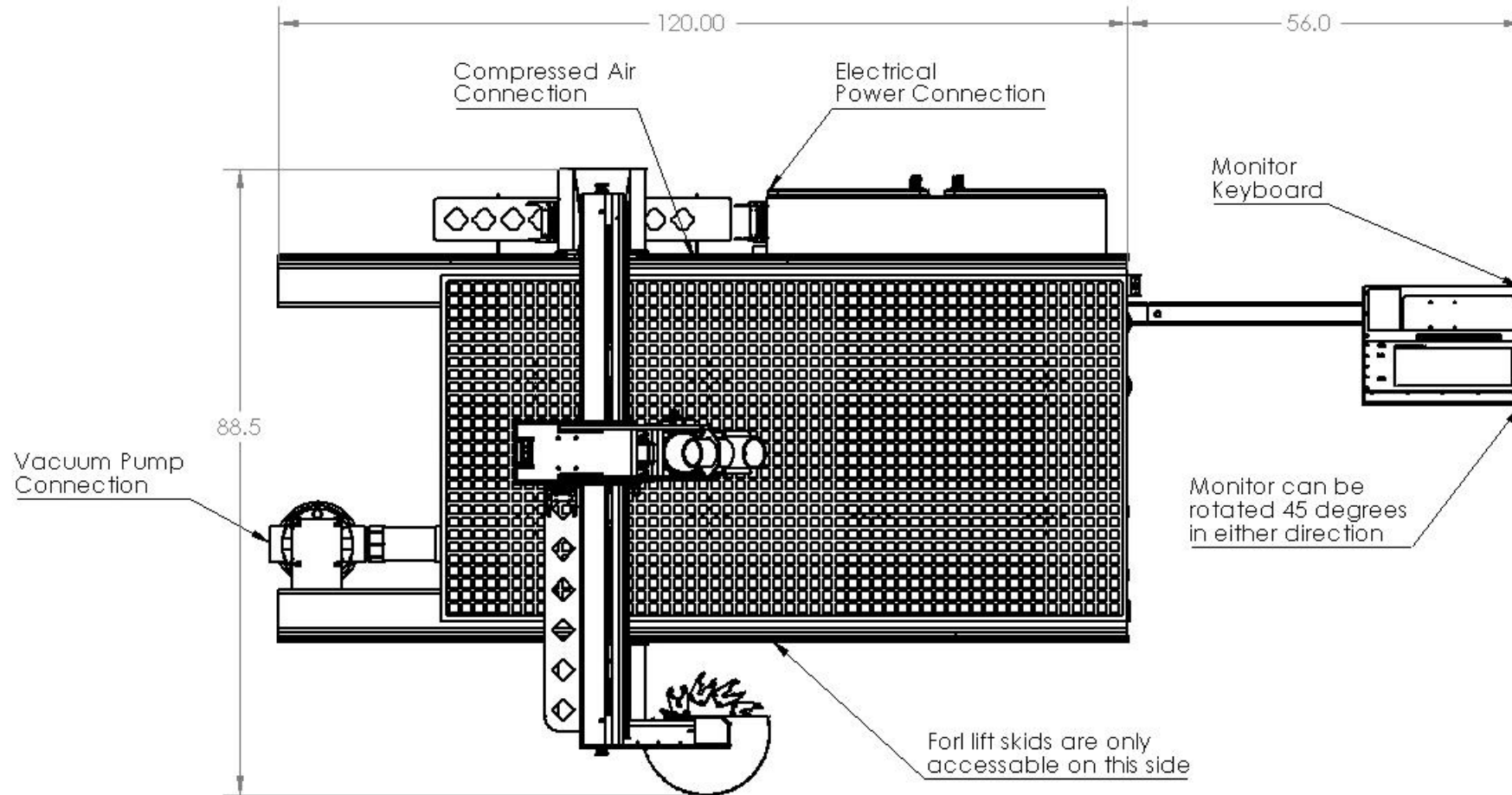
X1 Right side motor



Footprint 4 X 8:

Machine Footprint:

- Make sure you have at least 48" of clear workspace around the perimeter of the entire machine to ensure a safe working area for the machine operator.



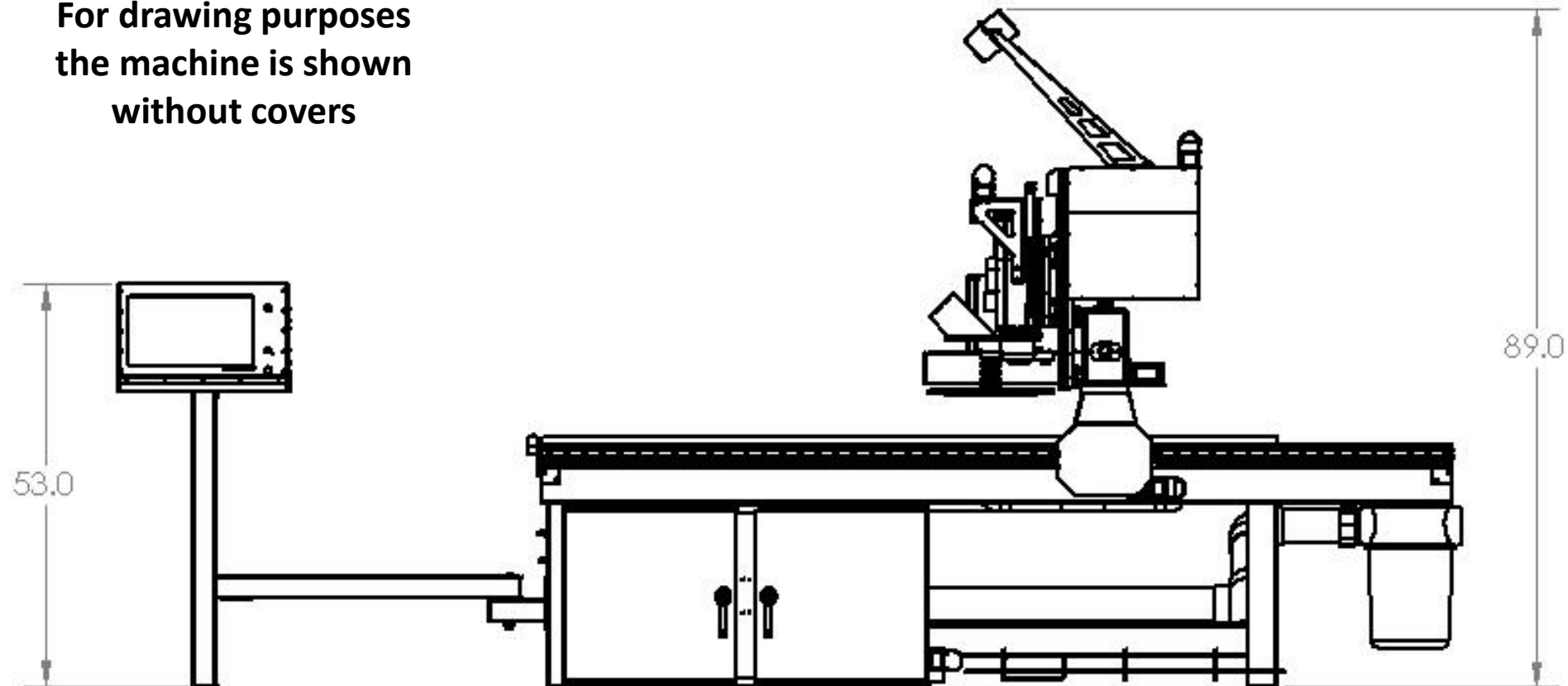
**For drawing purposes
the machine is shown
without covers**

Footprint 4 X 8:

Machine Footprint:

- Make sure you have at least 48" of clear workspace around the perimeter of the entire machine to ensure a safe working area for the machine operator.

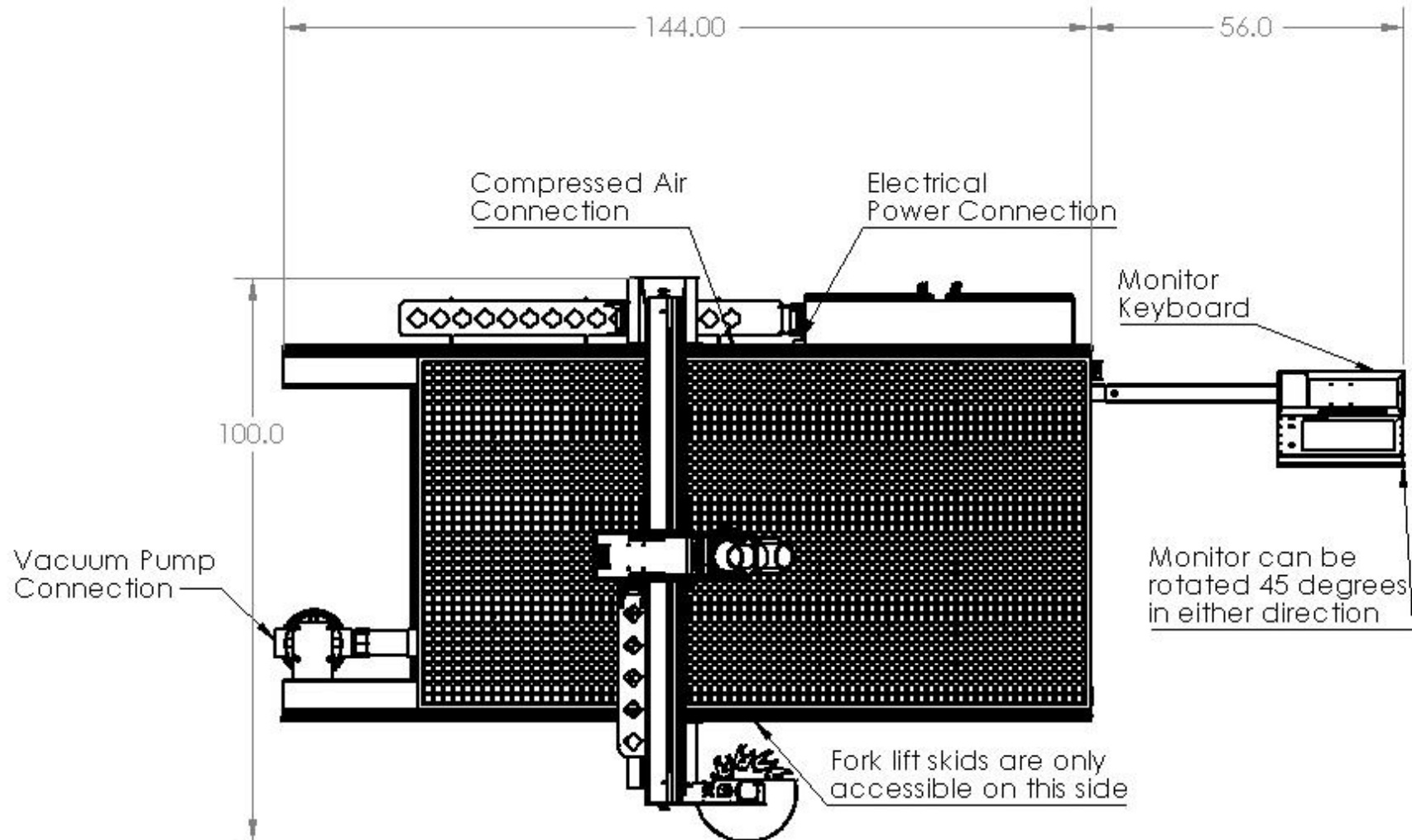
For drawing purposes
the machine is shown
without covers



Footprint 5 X 10:

Machine Footprint:

- Make sure you have at least 48" of clear workspace around the perimeter of the entire machine to ensure a safe working area for the machine operator.



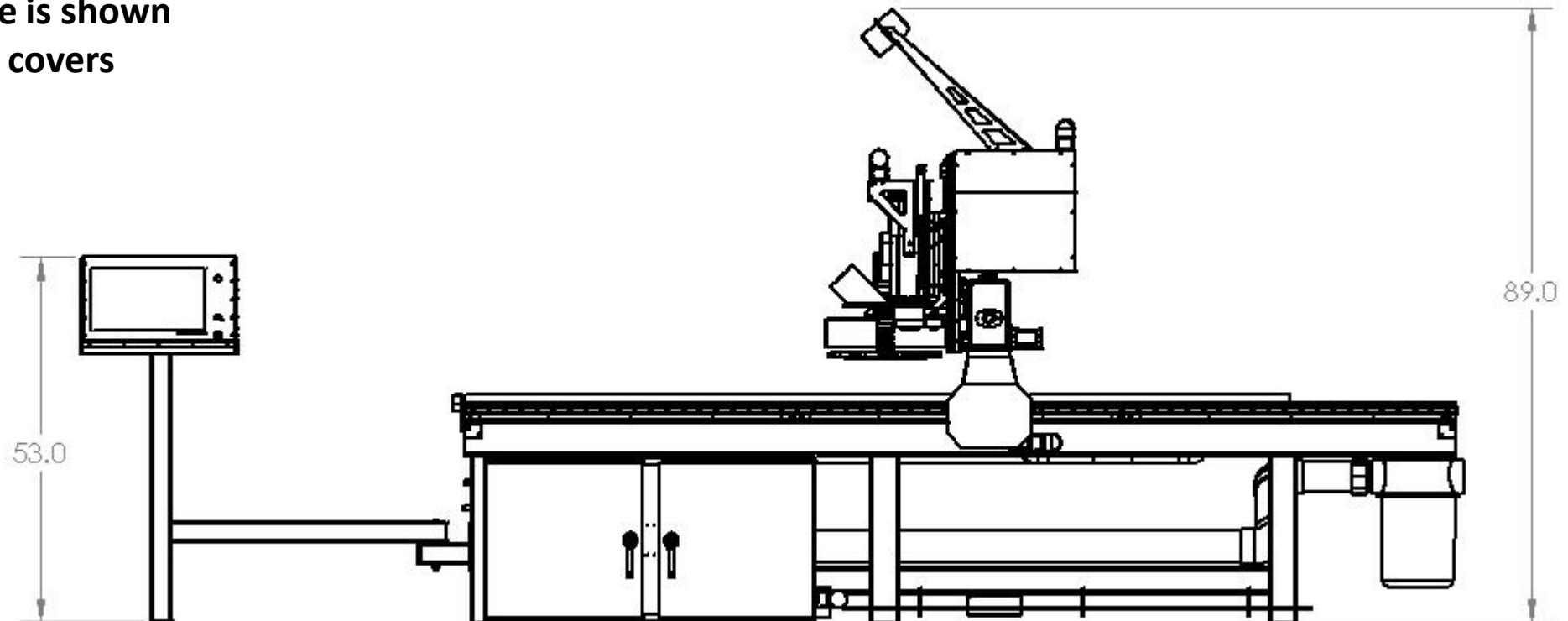
**For drawing purposes
the machine is shown
without covers**

Footprint 5 X 10:

Machine Footprint:

- Make sure you have at least 48" of clear workspace around the perimeter of the entire machine to ensure a safe working area for the machine operator.

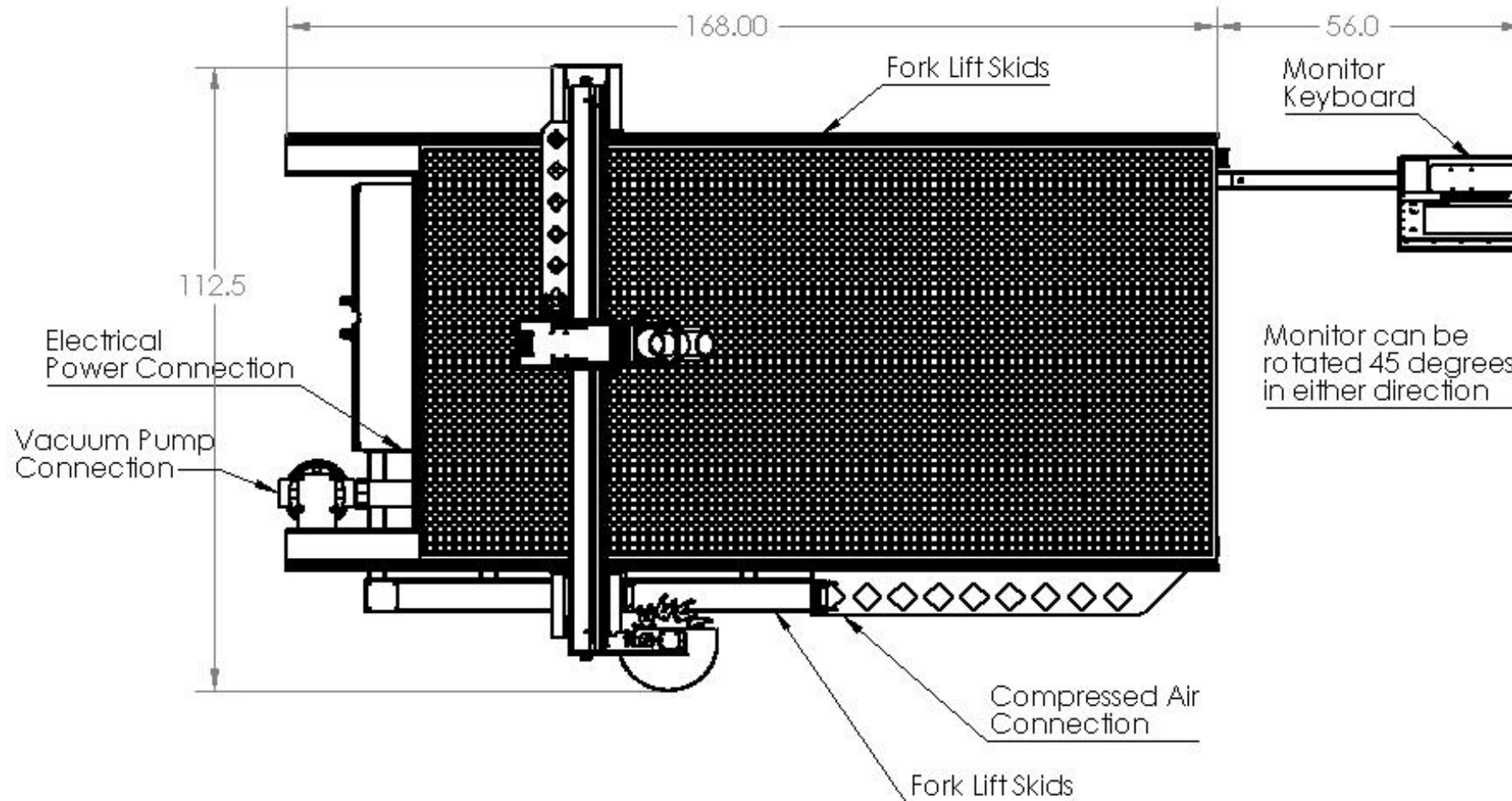
For drawing purposes
the machine is shown
without covers



Footprint 6 X 12:

Machine Footprint:

- Make sure you have at least 48" of clear workspace around the perimeter of the entire machine to ensure a safe working area for the machine operator.



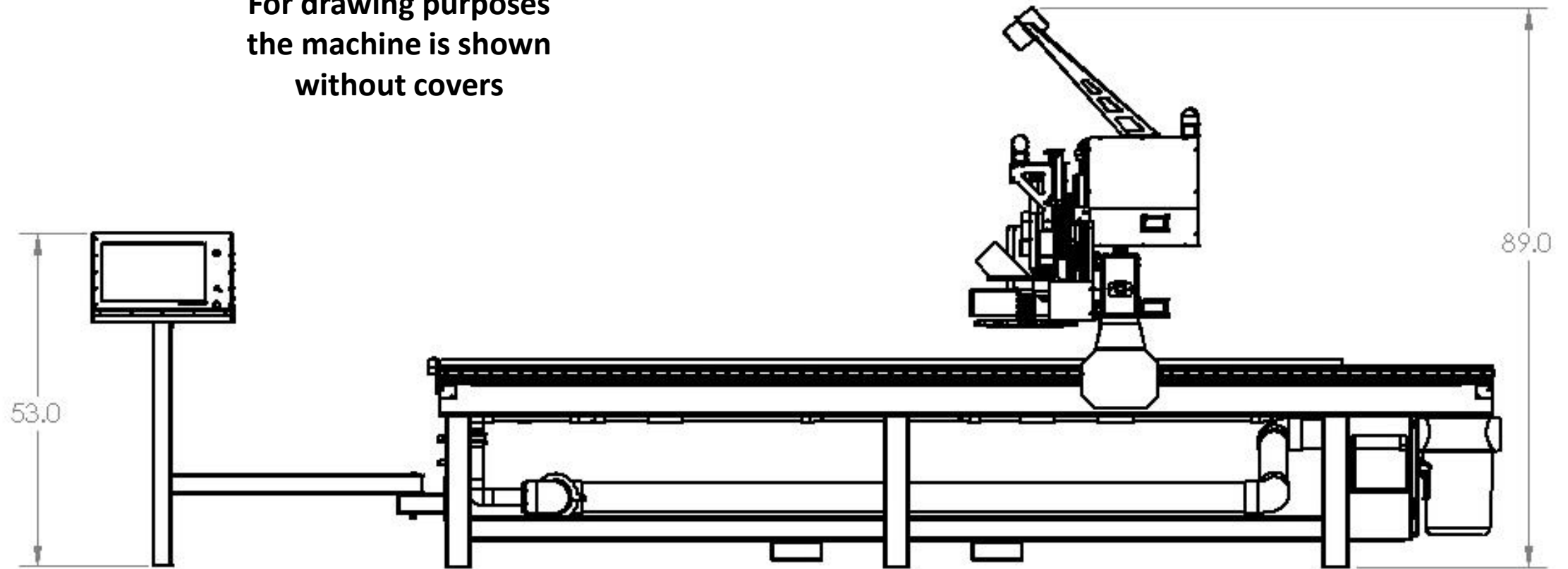
**drawing purposes
machine is shown
without covers**

Footprint 6 X 12:

Machine Footprint:

- Make sure you have at least 48" of clear workspace around the perimeter of the entire machine to ensure a safe working area for the machine operator.

For drawing purposes
the machine is shown
without covers



Assembly:

Inspect the Package:

- Prior to opening the package, check for any damages that may have occurred during shipping.

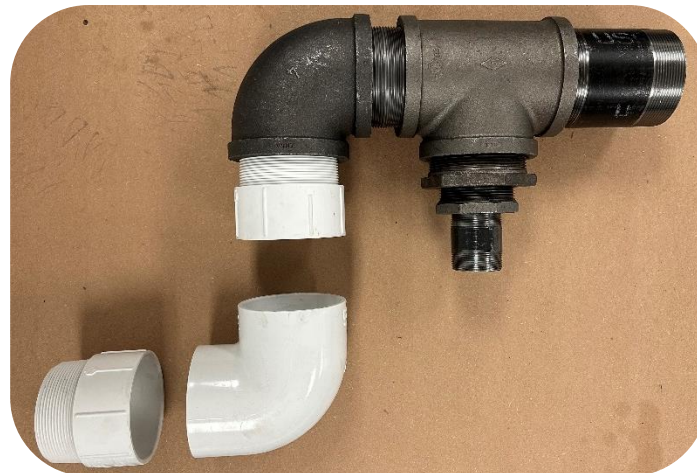
Unwrap the Machine

- Remove the shrink wrap.
- Unload all boxes from the bed of the machine.
- Remove the shipping plates.
- Install the leveling feet.
- Set the machine in place.
- Level the machine by adjusting the corners of the machine. Then bring the center leveling feet down to make solid contact with the floor.



Assembly Continued:

- **Machine Set Up:**
- Don't misplace the small parts. Don't throw anything away until your sure that you know that you have everything.



Electrical Connection:

Electric Power Connection:

- This machine can be wired a few different ways. Look at the tag that's riveted to the machine for the electrical specs.
- Have your electrician connect the power to the terminal box located on the electrical enclosure.
- Most shops that have 3 phase and some have a high leg. If you have a high leg, it must be connected to L2.
- Three phase tables require 3 hot lines, (Black Red & Blue) 1 neutral (White) and 1 ground (Green). The amperage draw is 30 amps and requires 10 - gauge wire.
- Single phase tables require 2 hot lines, (Black & Red) 1 neutral (White) and 1 ground (Green) The amperage draw is 30 amps and requires 10 - gauge wire.



Compressed Air Connection:

Connecting the Compressed Air Line:

- An air compressor with a minimum capacity of 5 CFM at 80 PSI is required for the machine to function.
- Connect your air supply to the side of the regulator marked in. The picture shows fittings that CLN uses. You can use any suitable hose connection.
- When the air line is connected to the machine, the gauge on the air regulator should read 80 psi. While the machine is running the gage should not drop more than 10 PSI.



Internet Connection:

Internet Installation:

- It is the user's responsibility to connect the PC to the Internet.
- There is a Network Adapter on the rear of the computer that you can connect an Ethernet cable to.
- You can also install a Wireless Network Adapter to the computer if you wish to connect wirelessly.
- To receive the most efficient technical support for one of our highly skilled technicians it is imperative to have internet connectivity for them to assist you.
- Our customer support team can log onto your machine through a software call Team Viewer if you need assistance. For this software to work properly you must be connected to the Internet.



*Cable not included



Vacuum Pump:

Vacuum Pumps: CLN offers several different vacuum pumps to accommodate a wide variety of user applications.

- **2 stage pump:**

- Brand: Black Box
- Part Number: Hurricane Pump
- Commonly used for Single Phase applications.

- **20 HP Regenerative Blower:**

- Brand: FPZ
- Part Number: K09-MS-20-3
- Commonly used on the 4 X 8 or the 5 X 10 Table.

- **25 HP Regenerative Blower:**

- Brand: FPZ
- Part Number: K10-TD-25-3
- Commonly used on the 5 X 10 or the 6 X 12 Table.



Vacuum Pump Continued:

Connecting the Pump to the Table:

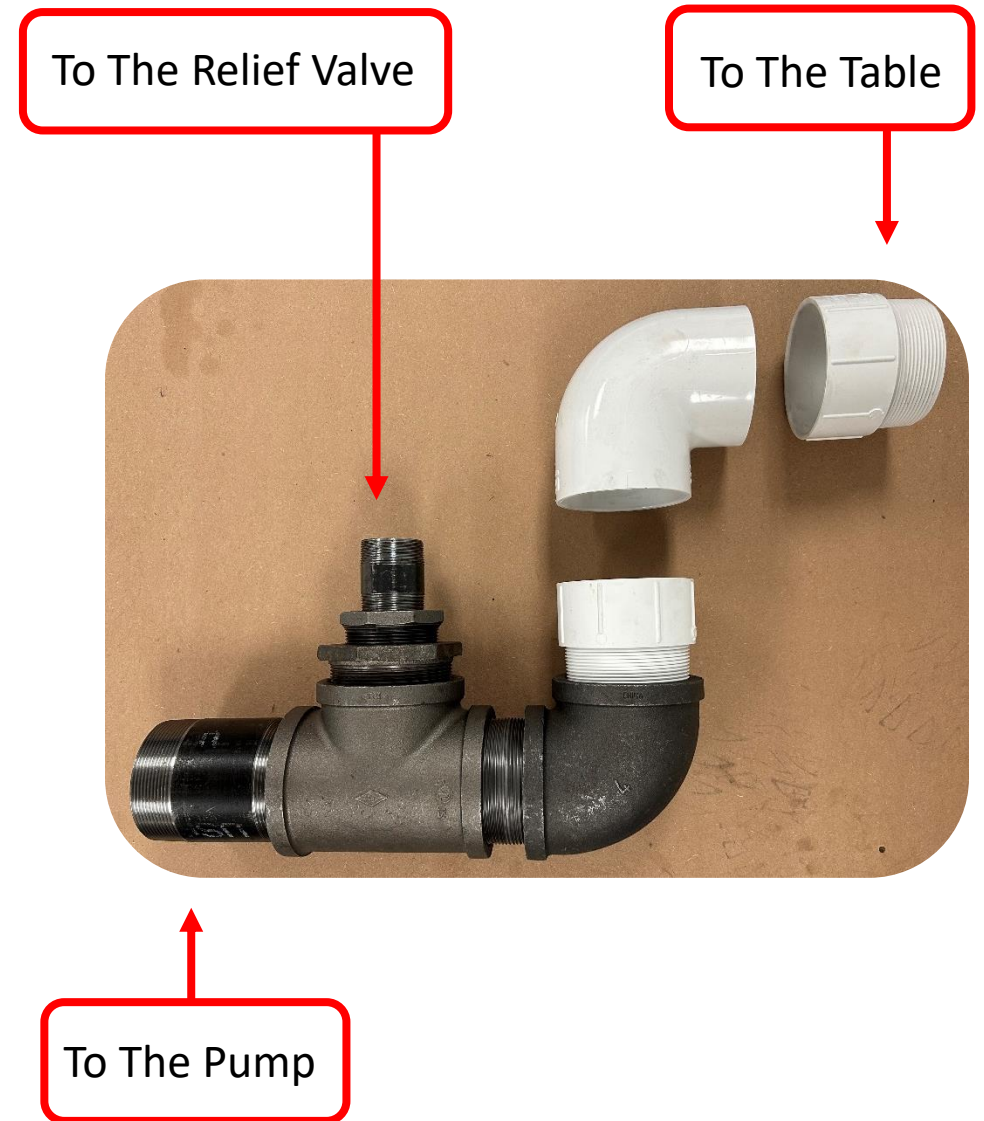
Vacuum Pump Connection Kit: For FPZ pump K10-MS-20-3 and K10-TD-25-3 require a connection kit to connect the Vacuum pump to the CLN Router Table. The kit allow you to install the pump in any favorable location. However, it is recommended that you keep the pump within 20 feet of the table, the closer the pump is to the table the better the vacuum will work. You can run PVC pipe from the pump to the table. **Never use PVC pipe for the exhaust of the pump, the exhaust is to hot for the PVC and it will catch on fire.** You must use steel for the exhaust.

Hurricane Black Box:

- The Huracan pump does not require a connection kit. Just run PVC pipe from the intake of the pump to the Router Table. Install the inline filter so that the filter cover is on top.

FPZ K10-MS-20-3 and K10-TD-25-3

- The Blower pumps require the (vacuum connection kit.) The parts are shown in the picture. Use Teflon tape when threading the pipe connectors together. The PVC pipe is not included.

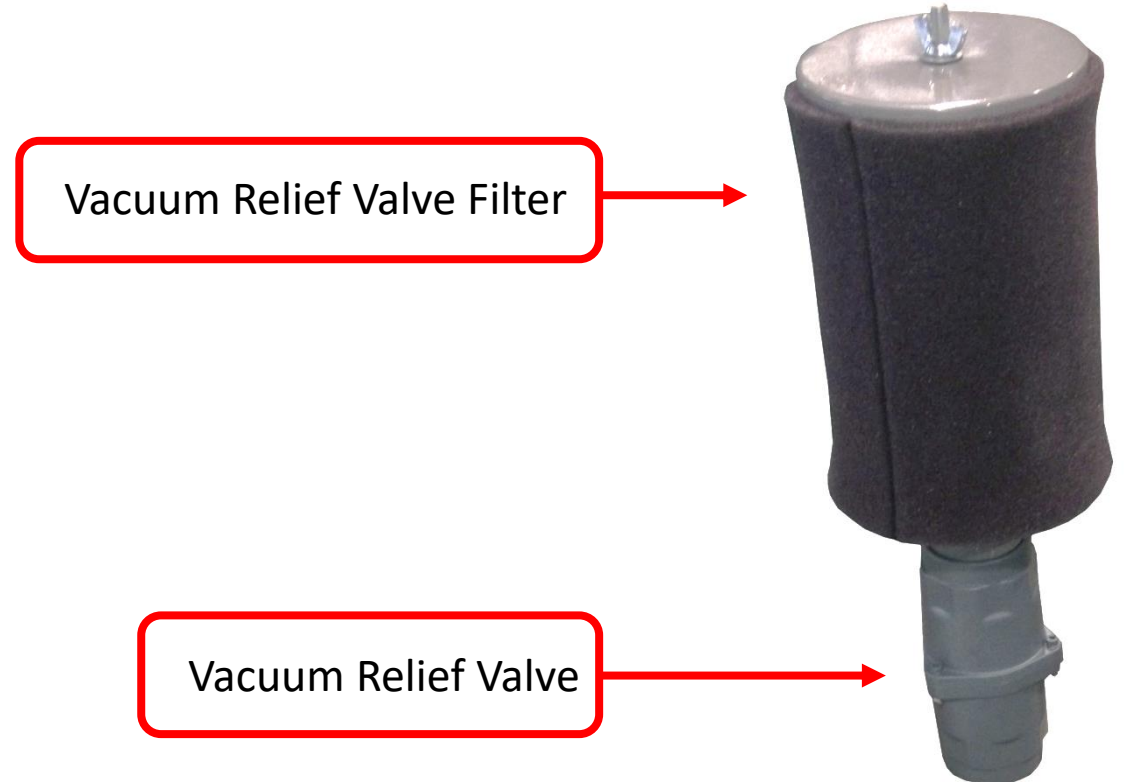


Vacuum Pump Continued:

Connecting the Pump to the Table Continued:

Vacuum Relief Valve:

- This valve opens up when all of the manual zone valves are shut off. This valve prevents the pump from starving for air, which will damage the pump. This valve must be adjusted at the time of installation of the vacuum system.
- The and K10-TD-25-3 pump relief valve needs to be set to **170 H2O**
- The and K10-MS-20-3 pump relief valve needs to be set to **140 H2O**



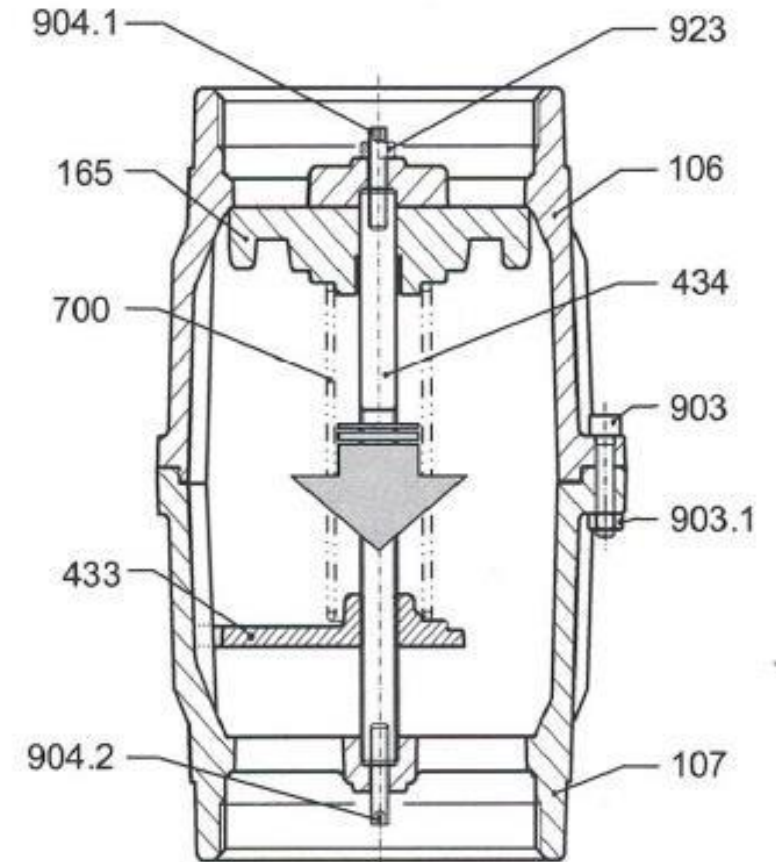
Vacuum Pump Continued:

Vacuum Relief Valve Continued:

Spring Selection: The valve is supplied with 2 different springs; each spring is to be used within a specific pressure-vacuum operating range. The valve is supplied with a silver spring. You will most likely need to use the green spring.

SPRING REPLACEMENT

- **Wear eye and ear protection.**
- Refer to figure 1.
- Remove the two plastic caps on valve.
- Ensure stop-nut 923 is locked on the upper housing 106.
- Unscrew screw 903 from nut 903.1.
- Remove cover 107 from housing 106.
- Unscrew spring guide disc 433 taking it out from shutter guide 434.
- Remove spring 700 (only in case of replacement).
- Install the appropriate spring into shutter 165.
- Compress spring and screw spring guide disc 433 on shutter guide 434 for at least 20 full thread turns.
- Check that both ends of the spring are properly positioned within their seats.
- Install the cover 107 on the housing 106 inserting the sliding guide on the slot in spring guide disc 433.
- Tighten screw 903 on nut 903.1.

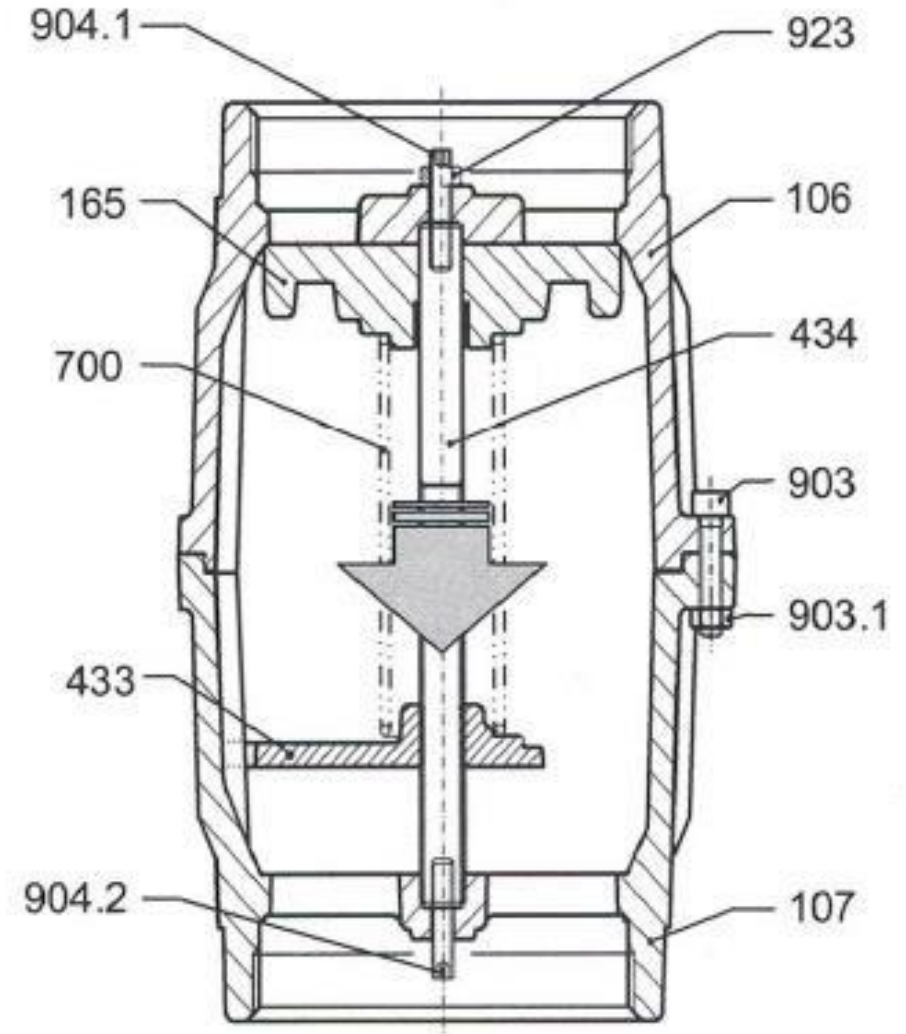


Vacuum Pump Continued:

Vacuum Relief Valve Continued:

Vacuum Relief Valve Adjustment:

- The pump needs to be wire for this step. Failure to complete this step will damage the pump.
- Go to [Vacuum Pump Pleasure](#) to find the safe operating setting.
- Loosen jam nut 923.
- Relieve spring tension by backing off upper grub screw 904.1 with the Allen wrench. **Make sure that you don't drop the wrench. If the wrench goes into the pump, it will destroy the pump. Use a wrench that is big enough so that it can't fit through the relief valve hole.**
- **Put on eye and ear protection.**
- Open all ball valves on the table.
- Turn on the vacuum pump.
- Close all ball valves.
- Adjust upper grub screw 904.1 until the safe operating setting is reached.
- Tighten nut 923 keeping blocked upper grub screw 904.1.
- Open all of the ball valves wait a minute then close all of the ball valves. Check the vacuum gauge again to make sure that you are at the safe operating setting

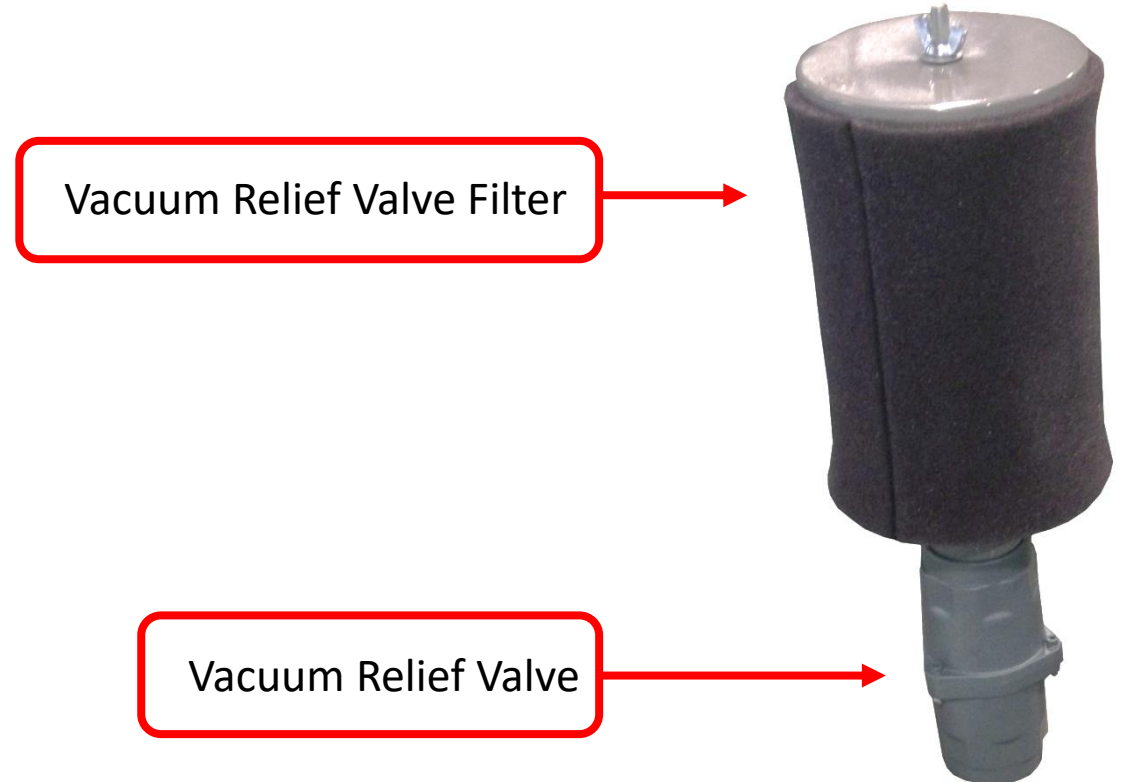


Vacuum Pump Continued:

Vacuum Relief Valve Continued:

Vacuum Relief Valve Filter:

- Install the filter to the relief valve. Use Teflon tape on the threads.



Vacuum Pump Continued:

Connecting the Pump to the Table Continued:

Here are some examples of pumps, connected to a CLN Router Table.

Hurricane Black Box:



K10-TD-25-3



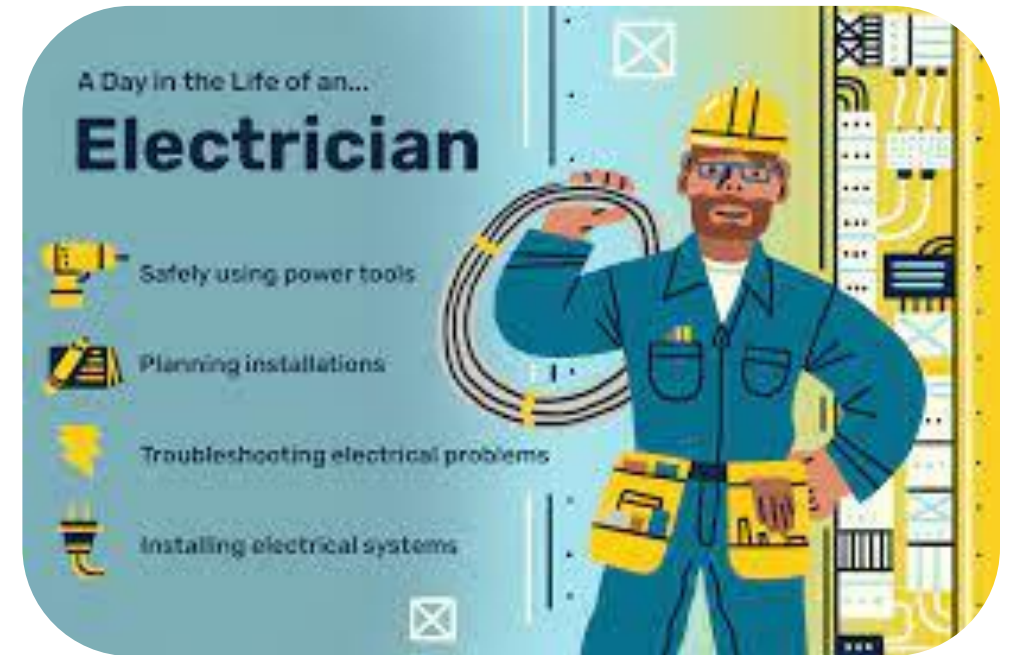
FPZ K09-MS-20-3



Vacuum Pump Continued:

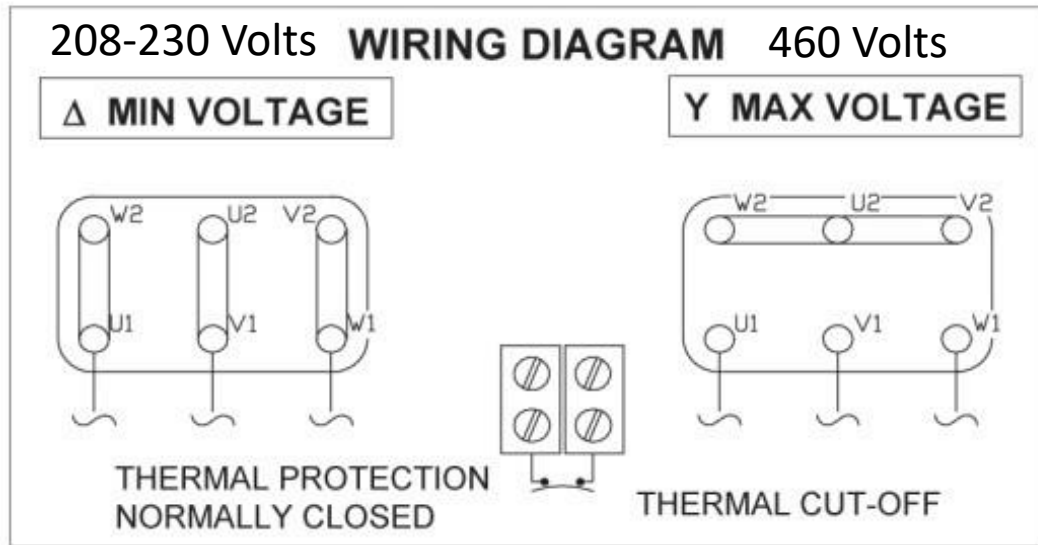
Electrical connection for FPZ K10-MS-20-3 and K10-TD-25-3:

- **Please read this !**
- Connecting electricity to the Vacuum pump must be done by a licensed certified electrical contractor. The electrician must have knowledge in your local electrical codes and has experience with high HP motors.
- An incorrectly wired pump cost \$5,000.00 to be repaired.
- 9 out of 10 pumps are damaged by inexperienced electricians.
- Size and length of wire need to be carefully calculated.
- Fuses and disconnects need to properly sized.
- The motors will draw an excessive amount of electricity on start up and you could lose power in other areas of the building.
- The jumpers on the motor need to be set to correctly.
- If you damage a new pump, CLN will not be responsible for the work of your electrician.
- You can avoid all of this by hiring a licensed certified electrical contractor. Ask your electrician for his credentials and a reference list.
- [Vacuum Pump Wiring Diagram](#)

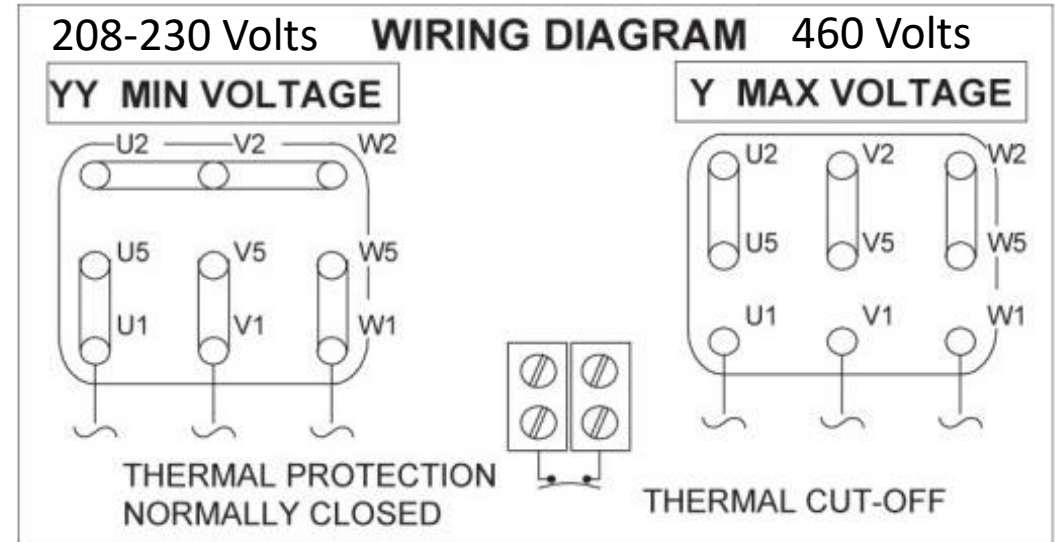


Vacuum Pump Continued:

Electrical connection for FPZ K10-MS-20-3 and K10-TD-25-3:



6 LEADS MOTORS.
208-230/460 V - 60 Hz
230/400 V - 50 Hz



**** 9 LEADS MOTOR. APPLICABLE TO 20Hp SIZE 132**
208-230/460 V - 60 Hz
200/400 V - 50 Hz

POWER		SIZE	60 HZ			50 HZ			STARTING CURRENT RATIO*	CABLE ENTRY 1***	CABLE ENTRY 2
HP	KW		VOLTAGE	FLA 208 / 460	POWER FACTOR cos φ	VOLTAGE	FLA 230 / 400 (200 V)	POWER FACTOR cos φ			
20**	15.0	132**	208-230/460	54.0 / 26.0	0.86	200/400	(61.0) / 30.5	0.82	7.0	M32	M32
		160	208-230/460	54.0 / 29.8	0.85	230/400	51.6 / 29.8	0.85	8.1	M40	M40
25	18.5	160	208-230/460	63.0 / 34.8	0.87	230/400	60.0 / 34.8	0.87	8.5	M40	M40
30	22.0	160	208-230/460	72.0 / 41.5	0.87	230/400	72.0 / 41.5	0.87	8.4	M40	M40

* FLA x starting current ratio = starting current

** 9 leads motor applicable to 20 hp motors with 132 frame (MS / MD series)

*** Cable entry 1 includes cable gland

THREE PHASE MOTOR

GENERAL SPECIFICATIONS:

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Type: 3-phase AC Motor IEC 60034 2. Marks: cURus, CE 3. Poles: 2 4. Insulation class: F 5. Frequency: 60 hz / 50 hz 6. Enclosure: TEFC | <ol style="list-style-type: none"> 7. Protection 8. Thermal protector: Klixon 150° C 9. Service factor: 1.15 10. Max. Ambient 40° C 11. Duty: Continuous 12. Construction: aluminum frame |
|--|---|

Vacuum Pump Continued:

Electrical connection for FPZ K10-MS-20-3 and K10-TD-25-3:

- Motor starters are necessary for the K10-MS-20-3 and K10-TD-25-3 vacuum pumps. The motor starters are specifically sized to the size of the vacuum pump and your buildings electricity.
- Instructions for the motor starter will come with the unit.



Machine Maintenance

Grease
Locations

Water
Separator

Filters

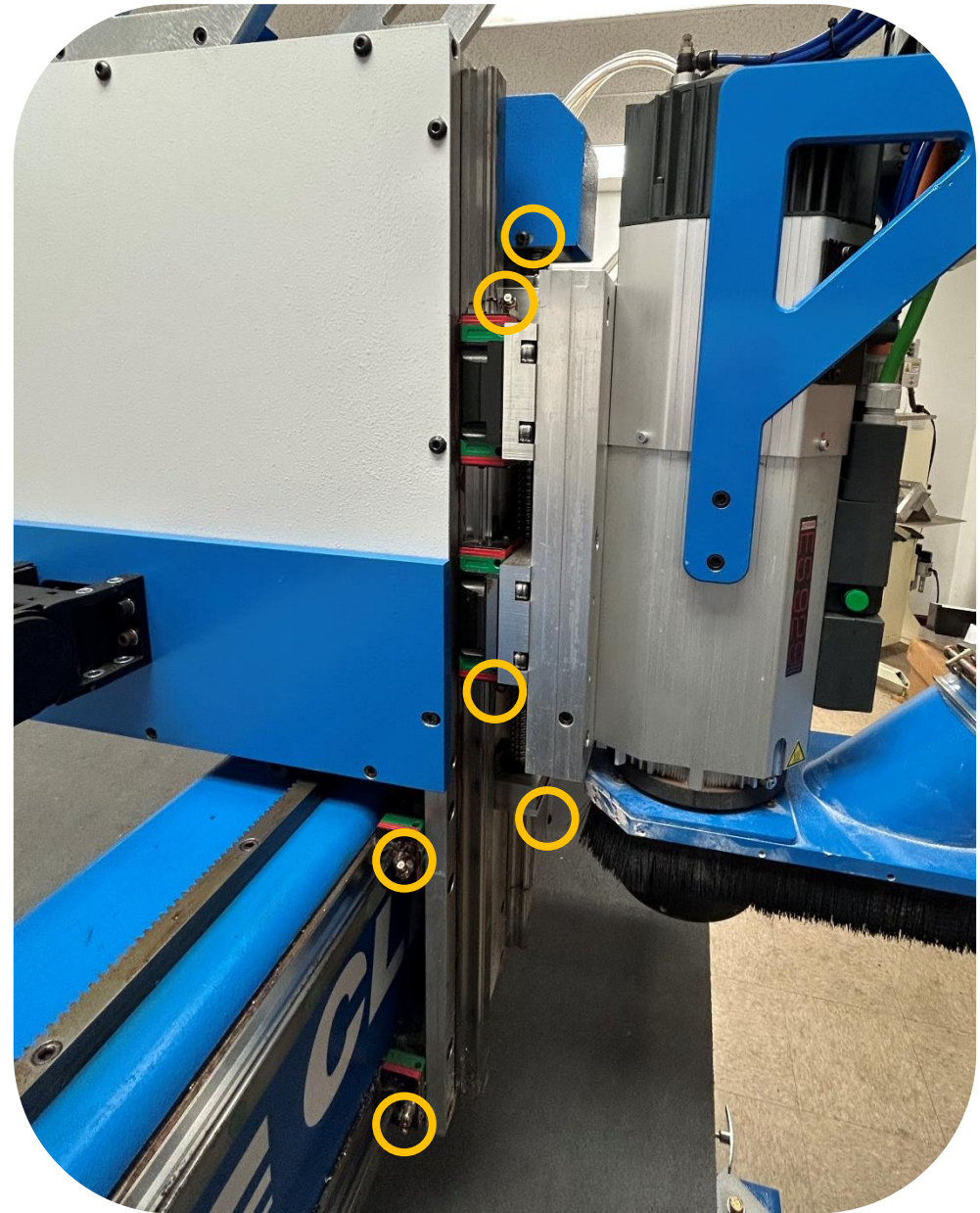
General
Inspection



Grease Locations:

Left Side of the spindle: Use a general-purpose grease to grease the machine. There are 6 locations shown with a yellow circle. 4 are bearing cars and the other 2 are the ball screw nut and lower bearing.

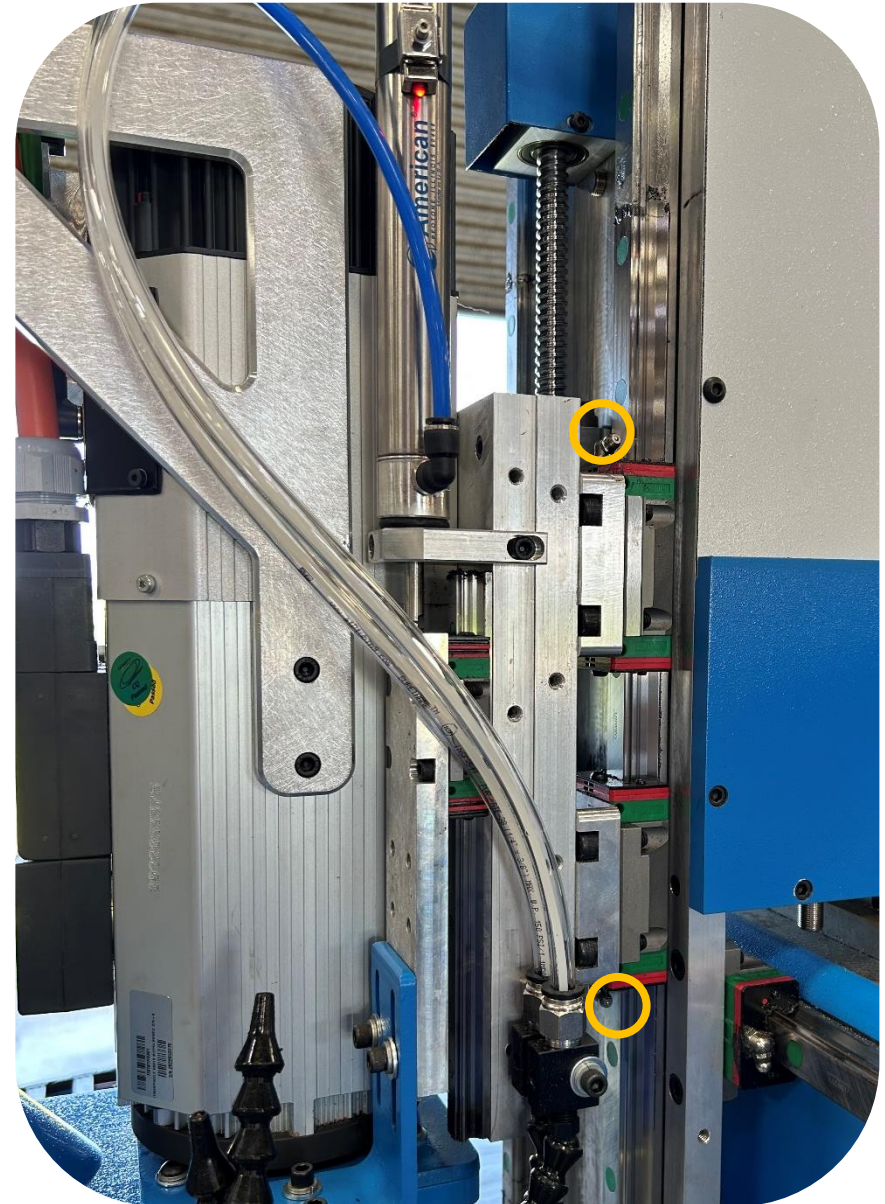
Grease Monthly



Grease Locations Continued:

Right side of spindle: There are 2 locations shown with a yellow circle. They are bearing cars.

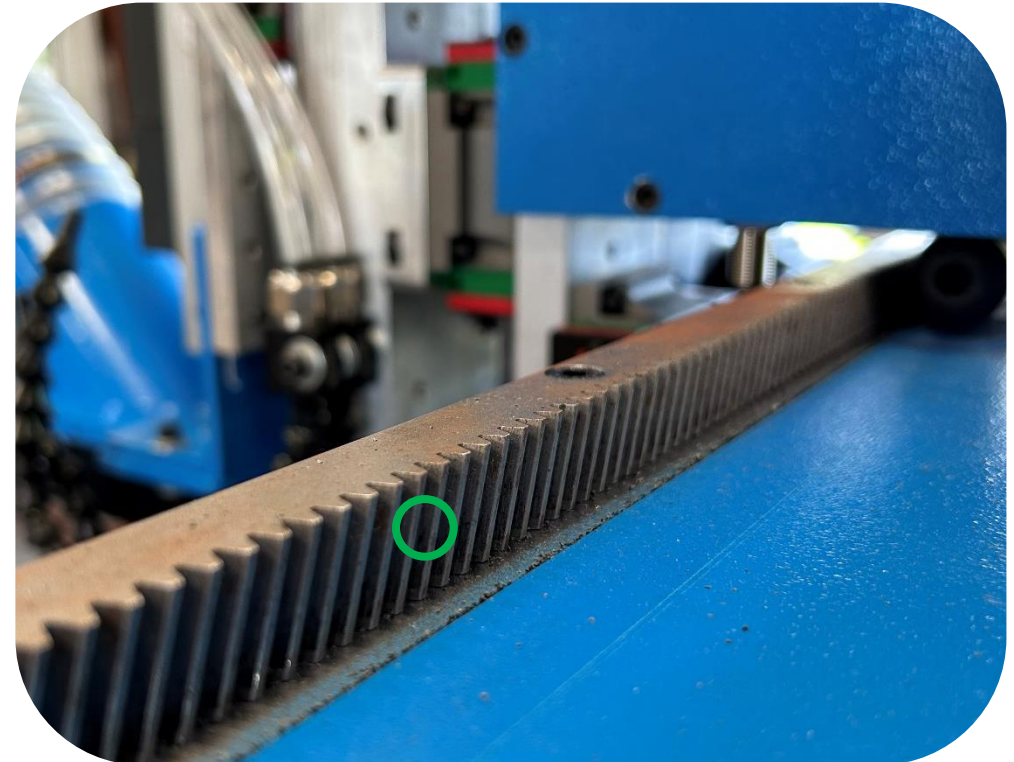
Grease Monthly



Grease Locations Continued:

Gear Rack: Use a brush and very lightly brush a thin coat of general-purpose grease on all the gear rack on the machine. The gear rack is shown with a green circle.

Grease Monthly



Grease Locations Continued:

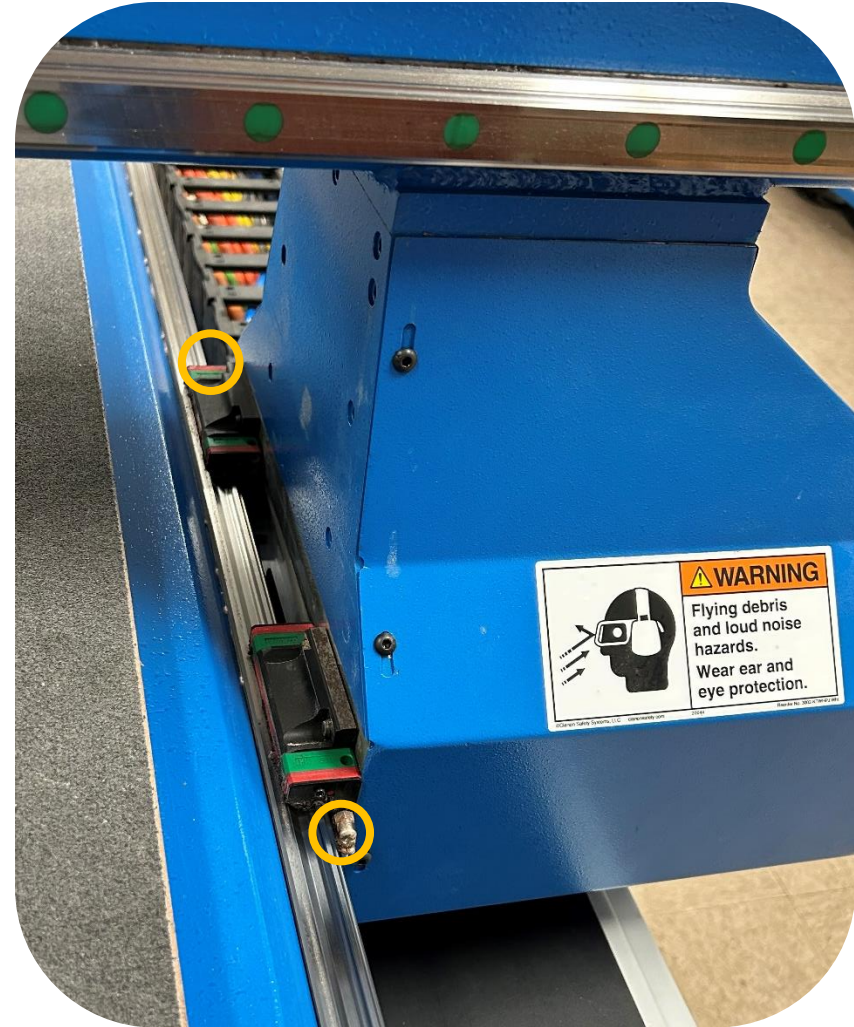
Grease Monthly

Vertical supports: There are 4 locations shown with a yellow circle. All 4 are bearing cars.

Left Side



Right Side



Water Separator:

Draining the Water Separator:

- Check the Air Filter Regulator for moisture every four hours and drain by pressing up on the bottom fitting as needed.

Drain Daily



Filters:

Cleaning the Electrical Cabinet Filters:

- There are 2 filters on the machine that need to be cleaned. Remove the filter by lifting the filter cover, up and away from the cabinet. Use a compressed air hose and blow out the filters, then reinstall them. If the filters look like you can't get them clean, then replace them with new ones.



Clean Monthly

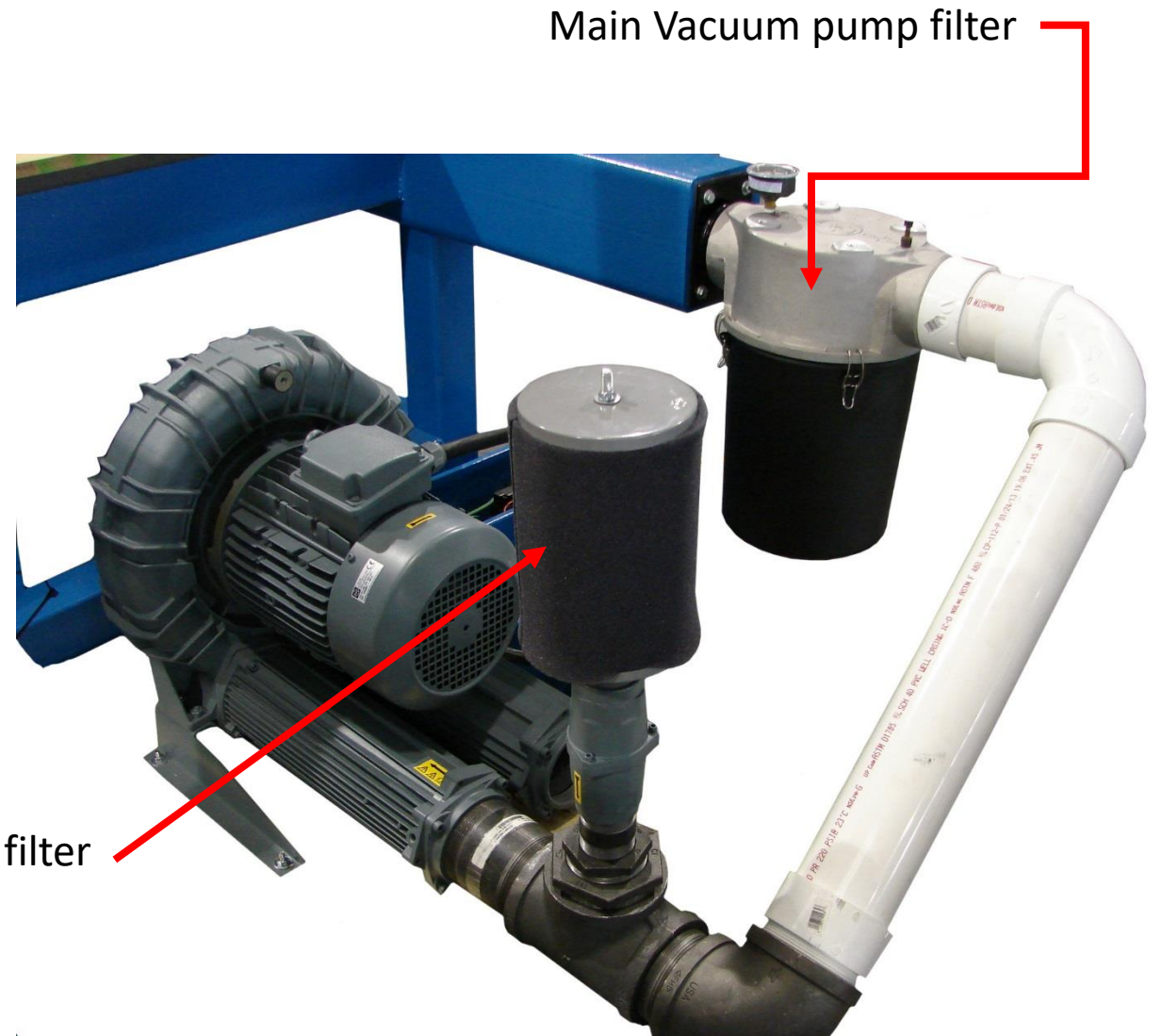


Filters Continued:

Cleaning the Vacuum Pump Filters:

- There are 2 filters on the machine that need to be cleaned. The main pump filter and the relief valve filter. Remove the filters and use a compressed air hose and blow out the filters, then reinstall them. If the filters look like you can't get them clean, then replace them with new ones.

Clean Monthly

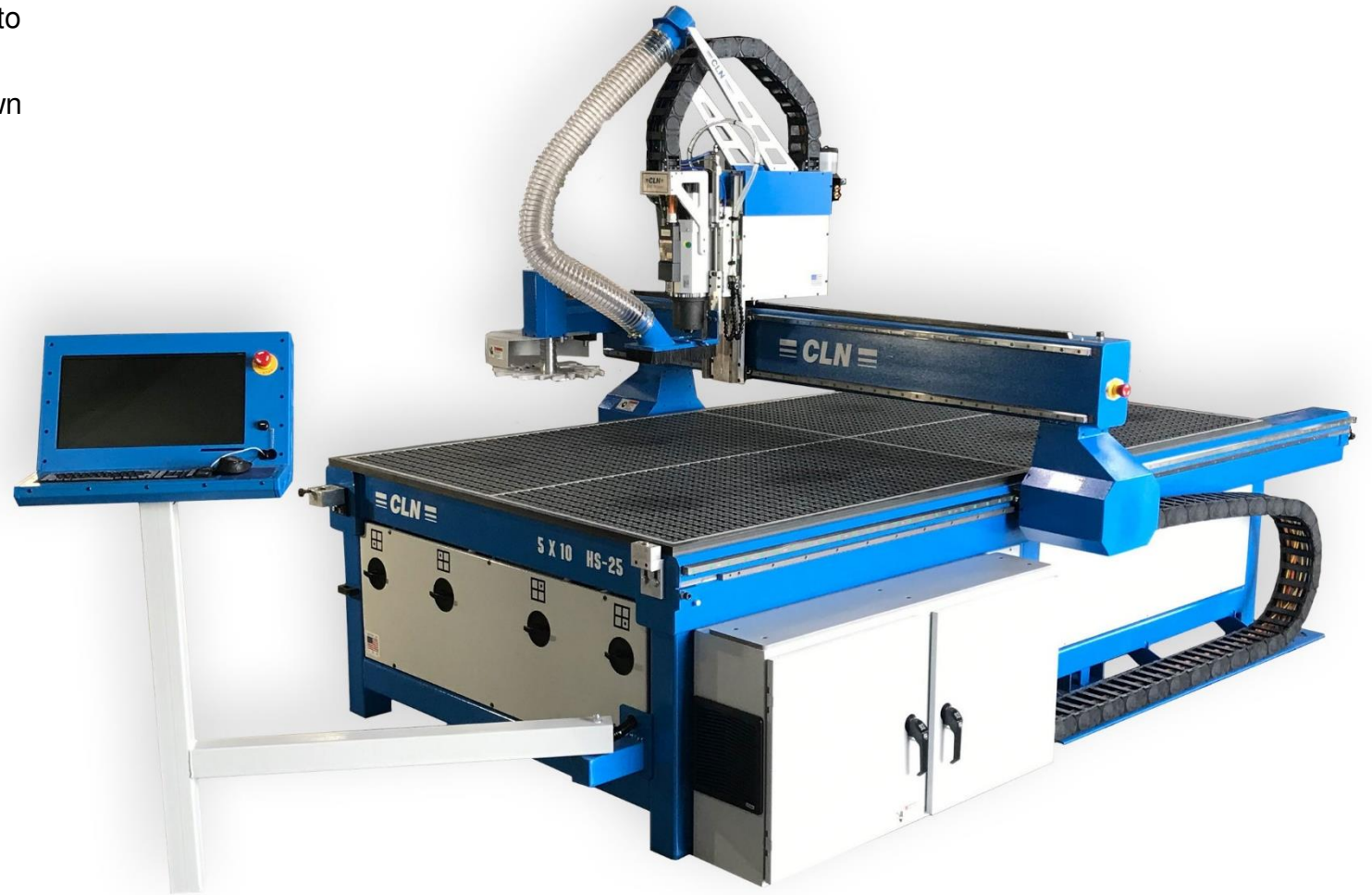


General Inspection:

Inspect the Machine:

- Preventing a real issue before it happens. Pay attention to what's going on with the machine. Listen for any strange noises, like air leaking or the camera moving up and down too fast. A simple adjustment can prevent a big problem.
- Look for any potential mechanical issue like tools not going in and out of the tool changer correctly. Again, a small adjustment to the software can prevent a big problem in the future.
- Clean the machine after every use.

Inspect Daily



Machine Operation

Turning the
Machine on
and off

Compressed
Air

Loading
Material

Mist
Coolant

Loading
Tools

Mechanical
Adjustments



Turning the Machine On and Off:

Power Up Sequence:

- Turn the main power on using the power switch located on the electrical box of the machine.
- The computer should come on when the main power switch is turned on. Its set to do this via the BIOS settings. If the computer doesn't start, then turn the computer power on by pressing the power button on the front of the computer. You will have to open one of the door closest to the operator in order to gain access to the power switch.
- Wait for the computer to completely boot up.

Power Down sequence:

- Shut the computer down through windows operating system. Wait 30 seconds for the computer to completely power down or until you hear a knock sound coming from the electrical box. That sound is the contactor switching to the off position.
- Turn off the main power switch located on the rear of the machine.



Compressed Air:

Check the Air pressure:

- Before you proceed any further, make sure your air compressor is turned on and connected to the machine. The gauge on the machine should read 80 psi.
- For the machine to function properly your air compressor should have a minimum capacity of 5 cfm at 80 psi.
- While the machine is running the gauge shouldn't drop more than 10 PSI.



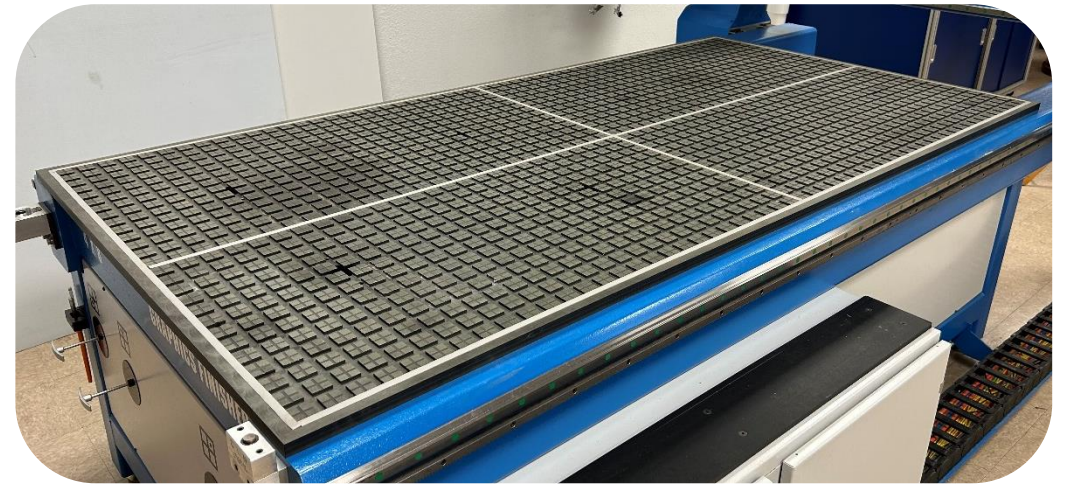
Loading Material:

Vacuum Table:

- Park the spindle by pressing park on the monitor. This will move the spindle out of the way.

Establishing the zones on the table:

- The most common way to configure the zones is to divided their table into 4 zones. However, you can use any configuration that fits your needs the best. Use ¼ X ½ inch weather striping around the entire table then divide the table up into zones.
- Don't use a weather strip that is too dense, it wont flatted out when the vacuum is turned on. We recommend Foam Window Seal. This brand can be purchase at any popular hardware store.

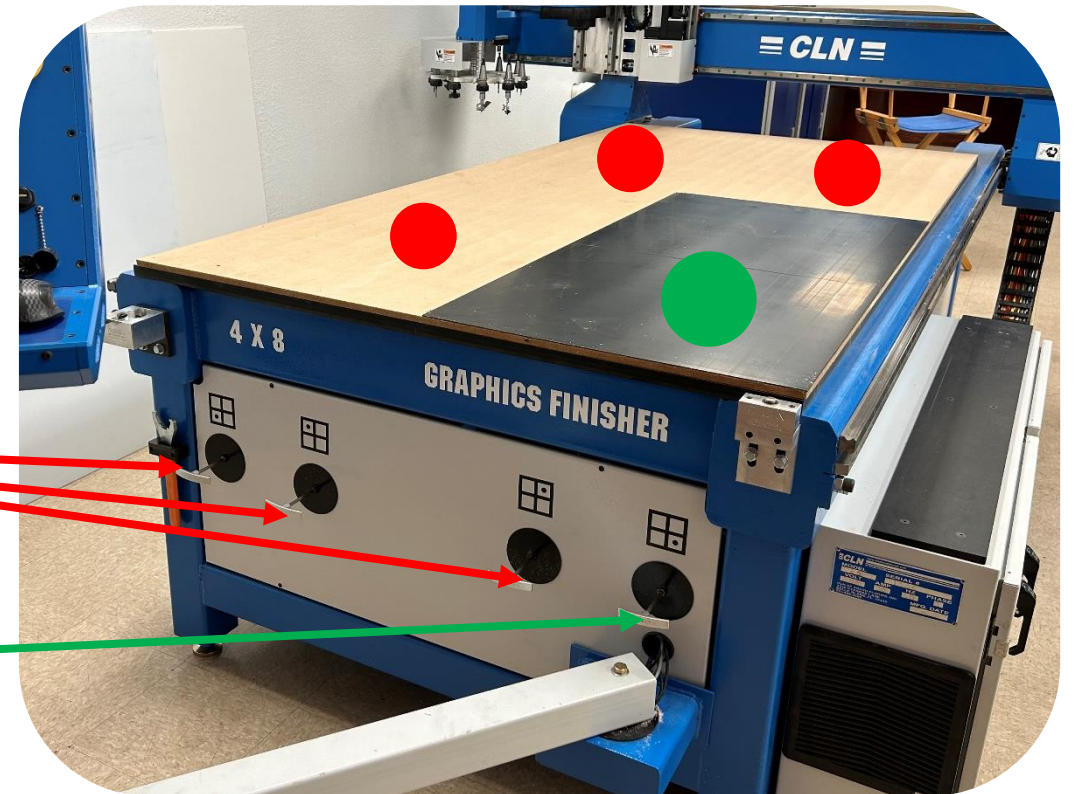


Loading Material Continued:

Vacuum Table:

Cutting with the spindle:

- Make sure that all of the vacuum zones are off. Set the material directly on top of the MDF spoil board. Place the material as straight as you can. Only turn on the vacuum zones that are under the material. If needed use a drop to cover any area on the table that has air sucking through the MDF. This will ensure that you are using maximum suction to hold your material down to the table.
- For example, in this picture we only need one zone to be turned on. The other 3 need to be shut off.



Off

On

Mist Coolant:

Cutting Aluminum:

- When cutting aluminum, you must use the misting unit. However, for ACM material that have a thin alum sheet laminated to a plastic core you do not need the misting unit.
- The misting unit is mounted on the back of the carriage. You must use Cool Lube brand coolant in the unit, or you will void your warranty.
- Fill the coolant reservoir to the fill line with Unist Cool Lube brand coolant.
- To maximize the efficiency, of the coolant. The misting unit will turn on every time the machine lowers the router bit into the material and turn off when it raises the bit out of the cut.
- To manually turn on the misting unit. Make sure that the manual air shut off valve is open. Push it into the misting unit to open the valve. Go to the monitor and Click the (Turn Misting On) button in the CLN Router program.
- To adjust the air flow. Turn the small thumb screw. There are 2, one for each nozzle.
- The amount of lubricant is adjusted by how many times the red pumpers cycle per second. Use a flat screwdriver and turn the frequency screw until it cycles 1 time every 4 seconds.
- The nozzles should be about 1-1/2" away from the router bit and pointed at where the bit is doing the cutting.



Loading Tools:

Tool Identification:

These are MTC tool components. These will be installed directly in the spindle on a MTC machine.

Collet Nut



Collet



Router Bit



Loading Tools Continued:

Tool Identification:

These are ISO 30 tool components. This is for an ATC machine

Tool Holder



Collet Nut



Collet



Router Bit



Loading Tools Continued:

Inserting the collet in the collet nut:

The collet must snap into the collet nut. Sometimes you will need to use a rubber hammer to set the collet into the nut. Collets wear out in time and need to be replaced.



Right

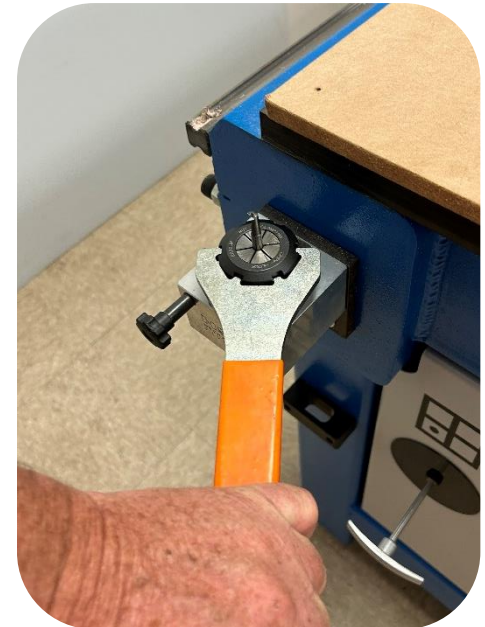


Wrong

Loading Tools Continued:

Inserting the router bit in the collet:

- Place the tool holder into the tool changing post. Push the button on the post to allow the tool holder to drop down and lock into place.
- Insert the bit so that most of the shank of the bit is in the collet.
- Use the collet nut wrench and tighten the collet nut firmly.
- In time the wrench and nut may wear out or the wrench isn't seated in the nut correctly. Any rate be prepared for the wrench to slip so brace yourself, so you don't fall and hurt yourself. Where you put your feet makes a big difference if the wrench were to slip.



Loading Tools Continued:

Loading the In-link Rack Tool Changer:

- Press the emergency stop button. Carefully load the tools in the tool forks of the changer.
- Place the spoil board cutter or the fly cutter bit in the highest tool holder number.
- You do not need to use all tool forks.
- It's up to the operator to assign a position for the rest of the tools. Whatever position that you decided to use must be transferred over to the CAD program that you're going to output the files from.
- Do not calibrate the tools until you Surface the MDF spoil board and set the machine bed.



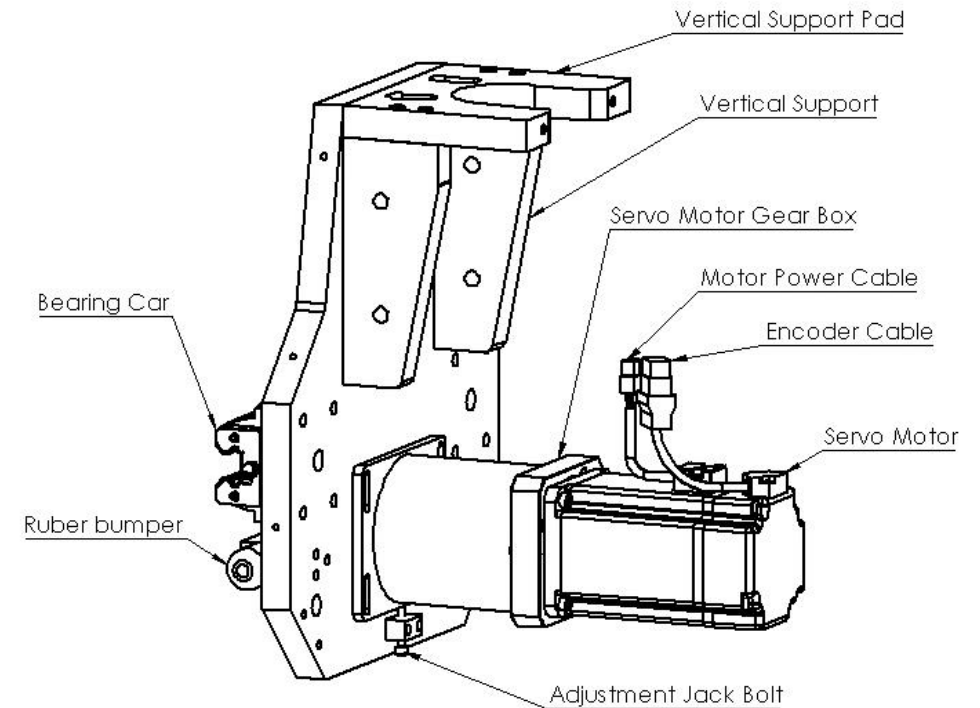
Mechanical Adjustments:

Pinion Gear to rack adjustment:

- After 6 months of using your machine, you may have to adjust the pinion gears for X and Y axis on the machine. The reason for this, is that the pinion is harden steel and the rack is not. Like any mechanical system there is a break in period. Once you perform this operation you probably won't need to do it again.
- To see if you need to adjust the pinion gear, just grab the gantry and shake it back and forth. If you detect and back lash or slop in the gears, then you have to adjust the pinion gear.
- For the X axis, remove the vertical support cover. For the Y axis, remove one of the carriage covers.
- Loosen the 4 motor flange bolts.
- Shake the vertical support while turning the jack bolt until the slop in the gears go away.
- Tighten the 4 motor flange bolts.

We highly recommend that you click on the link below and watch the video on this step.

[Adjust the Pinion Gear](#)



Machine Software (ATC)

CLN Software
Overview
(ATC)

Using the
CLN Software
(ATC)

The screenshot displays the CLN of South Florida machine software interface. The main window shows a grid with the text "CLN ROUTER" overlaid. The interface includes several control panels:

- SPINDLE CONTROLS:** Includes buttons for "TURN SPINDLE ON", "TURN MISTER ON", "LOWER DUST BOOT", "RAISE DUST BOOT", and "SPINDLE WARMUP". A "Spindle: 0 rpm" indicator is present.
- COORDINATE TABLE:** Shows current coordinates for X, Y, Z, W, and C axes.
- TOOL COMMANDS:** A vertical list of buttons for "TOOL 1" through "TOOL 10", "UNLOAD TOOL", "CALIBRATE TOOL", "RANDOM TOOL CALIBRATION", and "MANUALLY SET TOOL".
- MONITORING:** A section with status indicators for "X1 Servo Enable", "X2 Servo Enable", "Y Servo Enable", "Z Servo Enable", "Z 2 Servo Enable", "VFD", "Tool Calibration Button", "Tool Clamped", "Spindle Mode", and "Knife Mode".
- RAPID COMMANDS:** Includes "MATERIAL HOME", "PARK", "MACHINE HOME", and "CHANGE BLADE".
- MATERIAL SETUP:** Includes "SET CORNER", "SET CAMERA", "SET KNIFE", and "CALIBRATE ATC".
- UTILITIES:** Includes "KNIFE MODE", "SPINDLE MODE", "OPTISCOUT", "LOWER CAMERA", "RAISE CAMERA", "SURFACE TABLE", and "SET MACHINE BED".
- MACHINE ZERO:** Includes "ZERO X", "ZERO Y", "ZERO Z", and "CLEAR Z".
- POWER UP/RESTART:** Includes "SEEK LIMITS" and "RESET SERVOS".

The interface also features a menu bar (File, Configuration, Settings, View, Options, Units, Transit, Jog, Help) and a taskbar at the bottom showing the Windows operating system environment.

CLN Software Overview (ATC):

- **Software**

The purpose of the CLN software is to give the operator a way to view the parts that was sent via a .TAP or G-Code file and convert it so that the machine can process the information correctly. The CLN software has no ability to create code for the machine. Creating code for the machine come from a CAD program. A CAD program can be installed on your machine and most CADS programs will work together seamlessly.

Machine control

Overrides

- At any time that you are running the machine you can override the Feed Rate and the Spindle RPM

Home Positions

- The CLN Software can set multiple home positions anywhere on the table. It can also set a Z position at the bottom of the table or at the top of your work piece.

Proximity restart

- In the event that you break a bit. Or you are running a large 3D file and you want to shut the machine down for the night. You can restart where you left of with the restart feature.

Pausing the Matching

- The space bar will pause the machine. Hitting enter will resume operation.

CLN Software Overview (ATC) Continued:

Shortcut Icons

XYZWC Position Window

Spindle Controls

Jog and Transit Controls

Rapid Commands

Material Setup

Utilities

Machine Zero

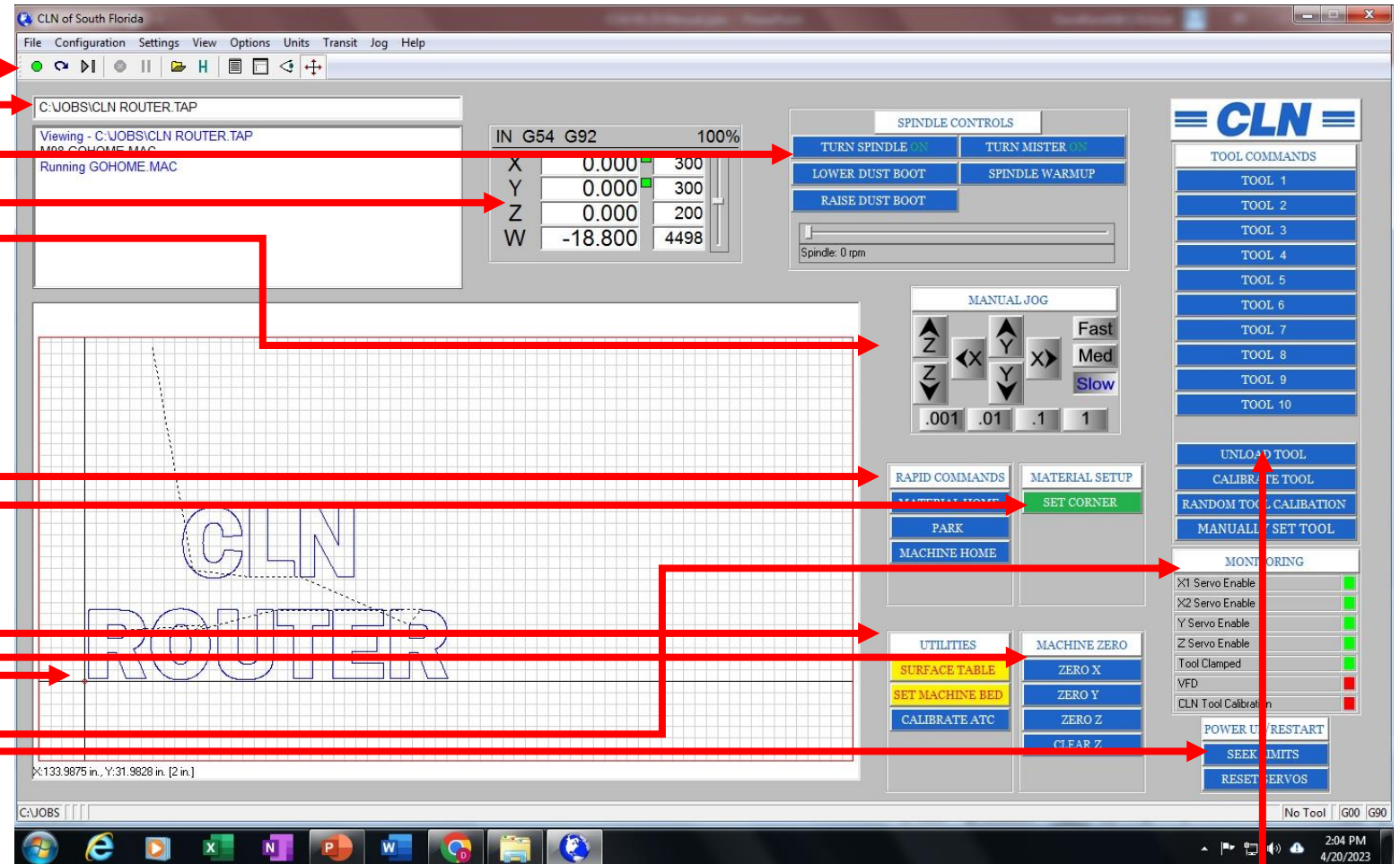
Power Up / Restart

Tool Commands

Command Line Terminal








Display Viewer

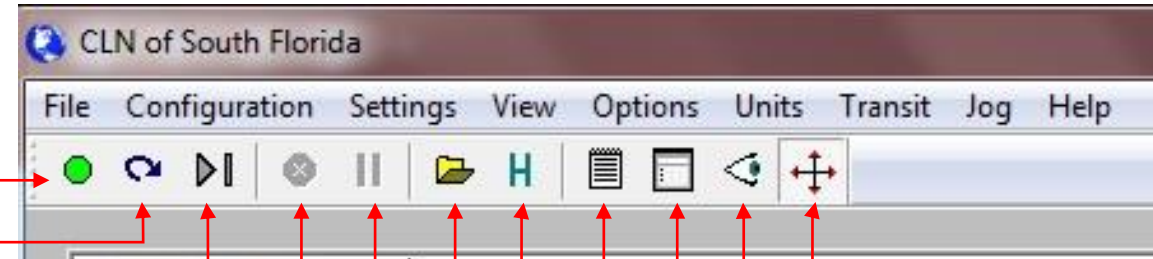
Monitoring



CLN Software Overview (ATC) Continued:

Shortcut Icon Definitions:

- Begin cutting 
- Restart from a line number 
- Step Mode 
- Abort 
- Pause 
- File Open 
- History 
- Job Editor 
- Simulate 
- Previewer 
- Soft limits on and off 



CLN Software Overview (ATC) Continued:

CLN Keyboard Short Cut Keys

- **Jog Speed**

- Fast – (F4)
- Medium – (F3)
- Slow – (F2)

- **Machine Jog Keys**

- **Left – (Left Arrow)**
- **Right – (Right Arrow)**
- **Forward – (Up Arrow)**
- **Backward – (Down Arrow)**
- **Spindle Up – (Page Up)**
- **Spindle Down – (Page Down)**

- **Spindle RPM's**

- **Increase – (+)**
- **Decrease – (-)**

- **Feed Rate**

- **Increase – (Insert)**
- **Decrease- (Delete)**
- **Jump to 100% - (Ctrl & Delete)**

- **Machine Operation**

- Start File – (Enter)
- Restart – (Ctrl & R)
- Single Step – (Ctrl & P)
- **Abort – (Esc)**
- **Pause – (Space Bar)**
- Open File – (Ctrl & O)
- File History – (Tab)
- Edit File – (Ctrl & E)
- Simulate – (Ctrl & S)
- View File – (Ctrl & V)
- Soft Limits On/Off – (Ctrl & L)
- **Resume – (Enter)**

- **File Editing Shortcut Keys**

- **Copy – (Ctrl & C)**
- **Paste – (Ctrl & V)**
- **Cut – (Ctrl & X)**
- **Find – (Ctrl & F)**
- **Find & Replace – (Ctrl & H)**
- **Undo – (Ctrl & Z)**
- **Redo – (Ctrl & Y)**
- **Display what line your cursor is on – (Ctrl & G)**

The Commands highlighted in red, are the most common short cut keys that you will use.

CLN Software Overview (ATC) Continued:

XYZW Position Window:

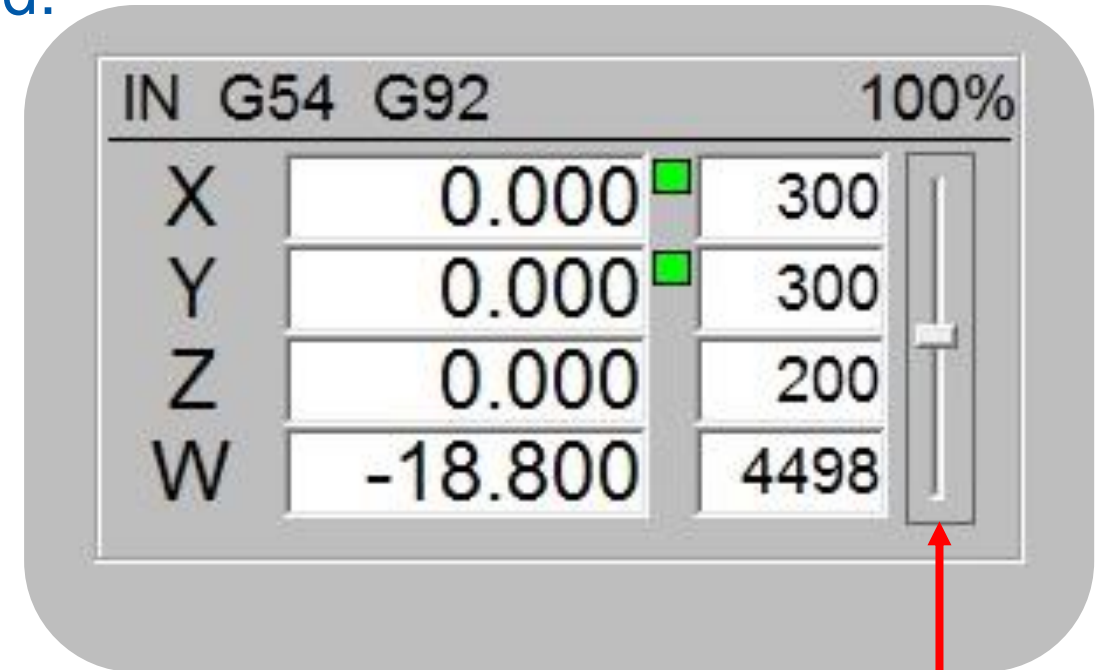
- This window tells you the position of the tool. For X and Y, the distance is from the center of the tool. For Z, the distance is from the tip of the bit.

X and Y

- When you see the green box next to the position, this means that the displayed position is the distance from where you set a zero for your material. Otherwise know as a local hone position.
- No box or, If you click on the green box, it will turn red. This is the displayed position from the machine home to the tool. For normal operation leave the box green because machine home is rarely used.

Z

- The blue box is the position from the machine bed or the (MDF Spoil Board). This position is defined when you set the machine bed. Typically, after you surfaced the spoil board you must set the machine bed. Setting the machine bed means that you are setting the distance from the tip of the bit to the spoil board to zero. Moving the spindle up will result in a positive number.
- No box or, If you click on the green box, it will turn red. This is the displayed position from the machine bed to the tip of the tool.



W

W is the position of the carousel tool changer. The position are in degrees.

Feed Rate

Next to the Positions is the feed rate. You can adjust the feed rate by moving the slide bar up or down with your mouse. You can also press delete or insert on the keyboard to adjust the feed rate.

CLN Software Overview (ATC) Continued:

Spindle Controls:

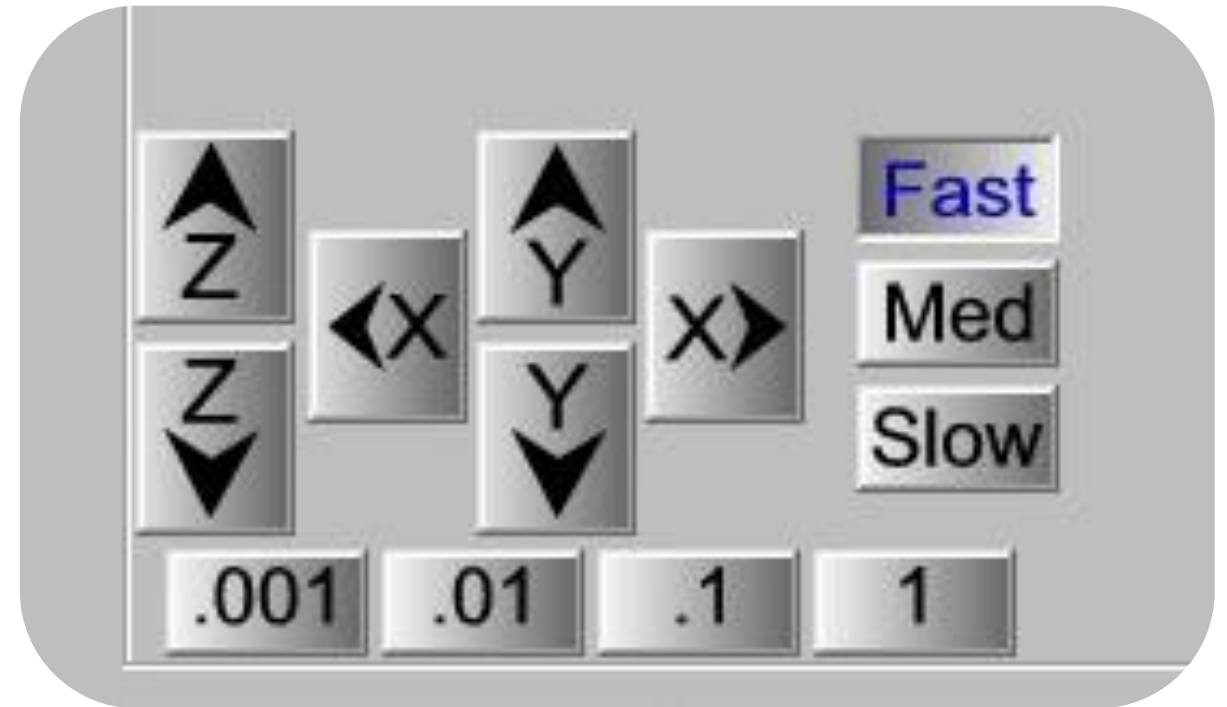
- **Turn Spindle On:** This button turns the spindle on and off. The slide bar at the bottom will adjust the spindle RPM.
- **Lower Dust Boot:** This button lowers the dust boot.
- **Raise Dust Boot:** This button raises the dust boot.
- **Turn Mister On:** This button turns the misting unit on and off.
- **Spindle Warmup:** This button turns the spindle on so that it will run for a few minutes to warm up the bearings in the spindle.
- **Spindle RPM:** You can adjust the spindle RPM by moving the slide bar left and right with your mouse. Plus and Minus on the keyboard will also adjust the RPM.



CLN Software Overview (ATC) Continued:

Jog and Transit Controls:

- **Fast Med Slow:** These buttons set the transit speed
- **XYZ:** These buttons Move the tool around the table.
- **.0001 .001 .1 1:** These buttons set the jog distance



CLN Software Overview (ATC) Continued:

Rapid Commands:

- Rapid commands mean that the machine will move as fast as it can to particular location. **Make sure that everyone is clear of the machine before you click on any of these buttons.**
- **Material Home:** This button moves the spindle to where you set the XY corner of the material otherwise known as the local home position for XY.
- **Park:** This button moves the spindle to where you establish the park position.
- **Machine Home:** This button moves the spindle to where the machine was after it seeks limits otherwise known as machine zero.



CLN Software Overview (ATC) Continued:

Material Setup:

- The material setup is where you can set the tools to the material or to the table.
- **Set Corner:** This button sets the bit to the corner of the material. Otherwise known as local home position for XY.



CLN Software Overview (ATC) Continued:

Utilities:

- The Utilities buttons are where extra features are located.
- **Surface Table:** This button is used to run a routine that requires you to have your spoil board bit loaded in the spindle. Lower the spoil board cutter to the top of the MDF then click Surface Table. Follow the direction on the screen. When it is finished surfacing the table it will ask you to set the machine bed, then calibrate all of the tools in the tool holder. When the machine bed is set, you do not have to set it again unless you resurface the table.
- **Set Machine Bed:** This button is used set the machine bed if you haven't done so with the Surface Table routine. Lower any Router bit to the top of the MDF then click Surface Table. Follow the direction on the screen. After the machine bed is set, calibrate all of the tools. When the machine bed is set, you do not have to set it again unless you resurface the table.
- **Calibrate ATC:** This button is used to calibrate the positions of the tools that are in the tool holders. This operation requires special a spindle probe tool that goes in the spindle. The spindle probe is only lent out to customers if needed and requires a \$2,000.00 refundable deposit before it leave CLN of South Florida.

We highly recommend that you click on the link below and watch the video on this step.
[How To Calibrate The ATC](#)

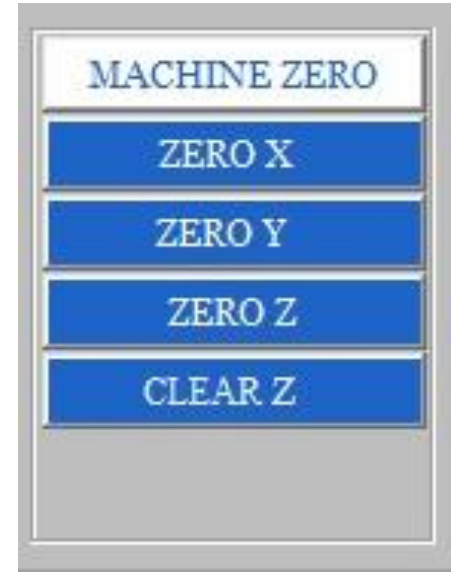


CLN Software Overview (ATC) Continued:

Machine Zero:

- The Machine Zero buttons allow you to set local coordinates one at a time on the table.
- **Zero X:** This button sets a zero for only the X axes.
- **Zero Y:** This button sets a zero for only the Y axes.
- **Zero Z:** This button sets a zero for only the Z axes.
- **Clear Z:** This button is used to clear the saved Z position.

We highly recommend that you click on the link below and watch the video on this step.
[How to Adjust The Z Height](#)



Power Up / Restart:

The Power Up / Reset are initialization buttons

- **Seek Limits:** This button is used at program startup it makes the machine find machine zero.
- **Reset Servos:** This button is only needed if a servo faults out. Pressing it will reset most servo faults. Otherwise, you have to power down the machine completely to reset other servo faults. It is always a good idea to read the servo fault code on the servo drive before pressing this button. Unless you crash the machine, faults are not normal and should be addressed. See [Delta Servo Fault codes](#) go to page 288 for a complete list.

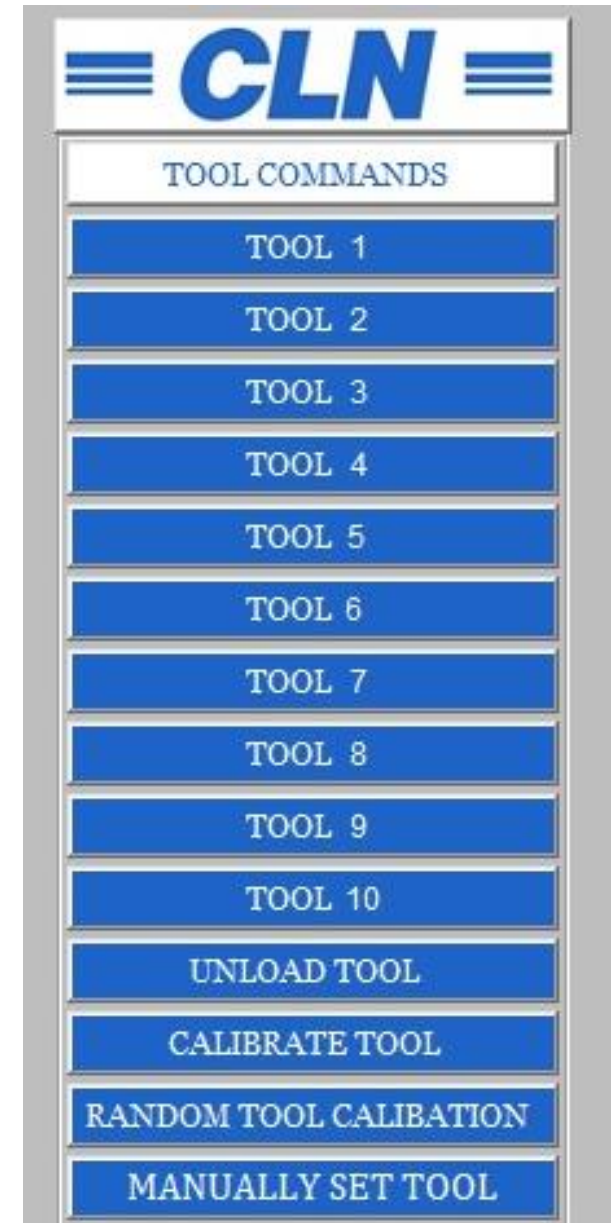


CLN Software Overview (ATC) Continued:

Tool Commands:

- The tool commands buttons are where you can manually tell the machine to change tools and calibrate them
- **CLN:** Clicking on the banner will take you to our website where you can find lots of training videos on this machine.
- **Tool numbers:** By clicking on any of the tool number, the machine will automatically pick up the selected tool.
- **Unload Tool:** This button will put the current tool that is in the spindle back in the tool holder.
- **Calibrate Tool:** This button is used to calibrate the current tool that is in the spindle.
- **Random Tool Calibration:** This button is used to calibrate any tool that you decide to calibrate.
- **Manually Set Tool:** This button is used to manually set the tool height of a tool to the machine bed. Its useful for odd shape tools like fly cutters. However, the highest tool number in your tool changer can accept spoil board or fly cutters.

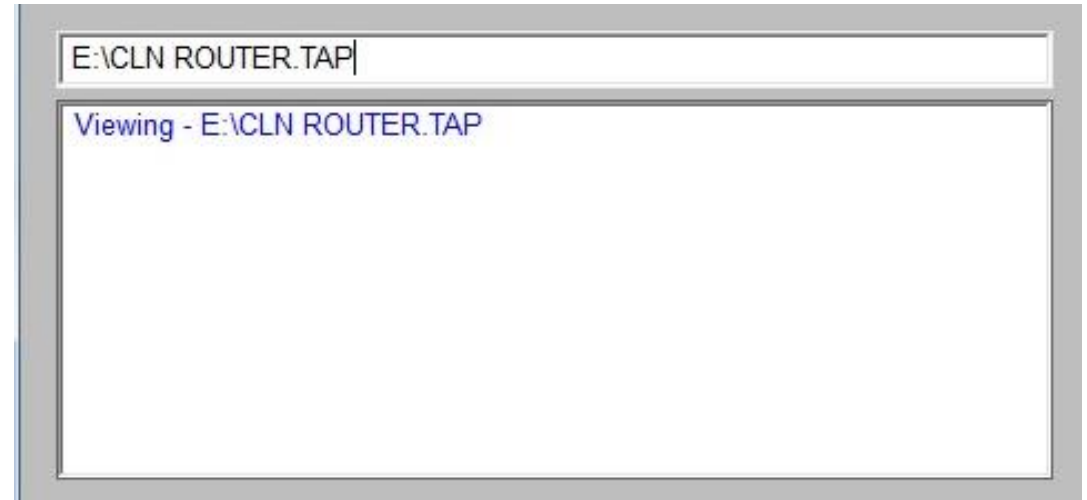
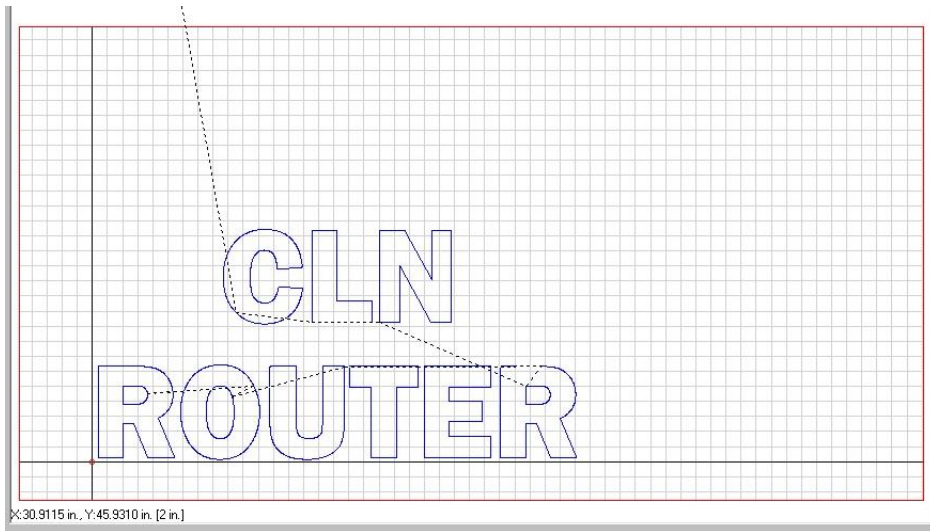
We highly recommend that you click on the link below and watch the video on this step.
[How to Calibrate The Router Bits](#)



CLN Software Overview (ATC) Continued:

Command Line Terminal:

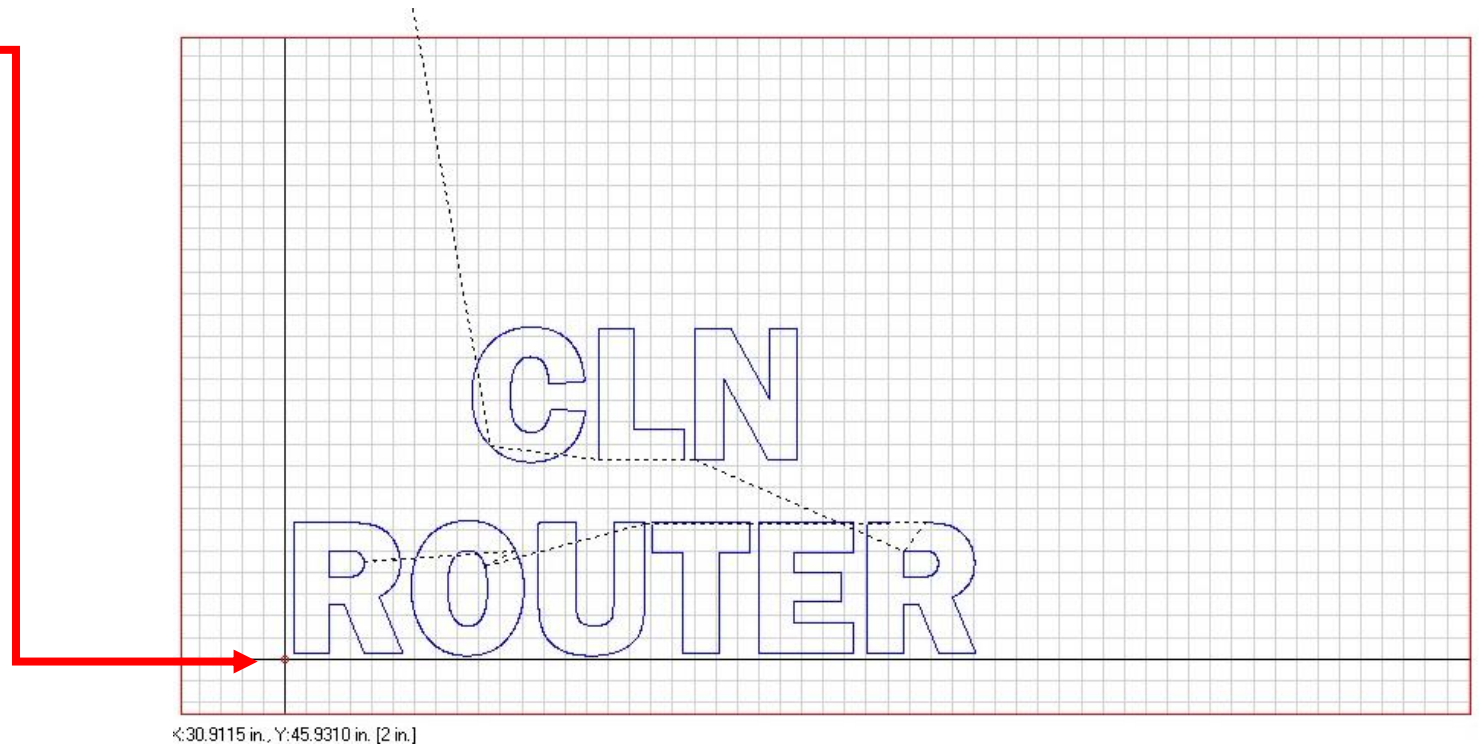
- The command line is where you can type in any valid command. The terminal is where the machine displays information from the machine.



CLN Software Overview (ATC) Continued:

Display Viewer:

- The display viewer displays the job and tracks the machines path. The Red crosshairs represent the router bit and as you jog the machine around on the table you can see the tool move around the viewer. The long black line represent the material home position.
- This picture shows the future path of the tool coming from the tool changer and cutting the letters



CLN Software Overview (ATC) Continued:

Monitoring:

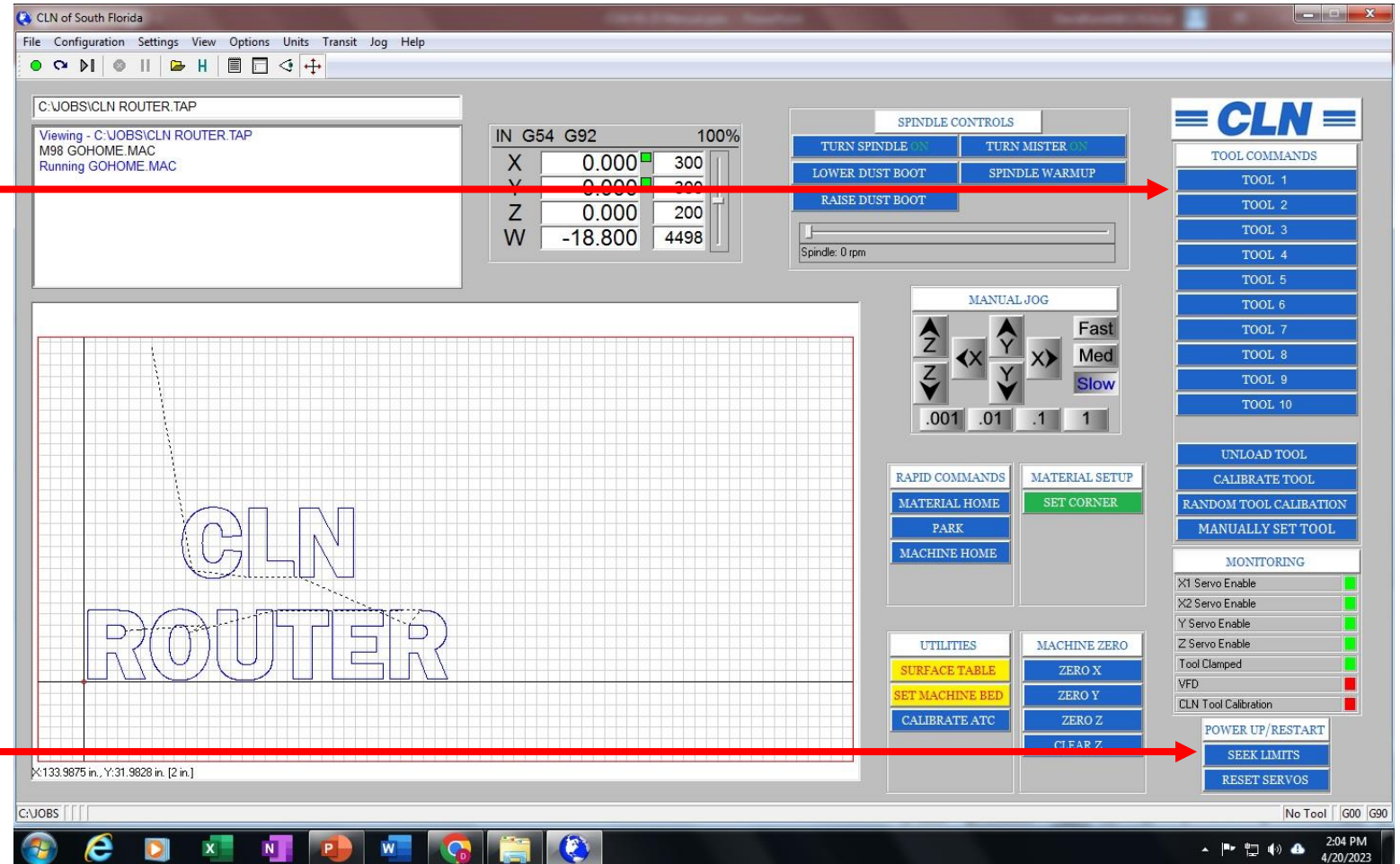
- The Monitoring display will tell you the status of various features of the machine. If a fault is detected, then you have to open the electrical box and read the fault code on the drive. See [Electronic Components Overview](#): for a description of the electrical components.
- **Servo Drive:** When the square indicator is green, it means all systems are good. If it turns to red, then you have a fault on the servo drive and you need to retrieve the fault code from the drive. See [Delta Servo Fault codes](#) go to page 288 for a complete list.
- **VFD:** When the square indicator is green, it means all systems are good. If it turns to red, then you have a fault on the VFD and you need to retrieve the fault code from the VFD. See go to page 288 for a complete list.
- **Tool Calibration Button:** When the tool calibration buttons square indicator turns red, it means that the tool calibration button is pressed.
- **Current tool number:** The current tool number that the machine thinks, is in the spindle, is displayed here. It is shown here as No Tool. This doesn't mean that there is no tool in the spindle. You can manually put a tool the spindle and it won't change. Remember its what the machine thinks is in the spindle.



Using The CLN Software (ATC):

Start the program:

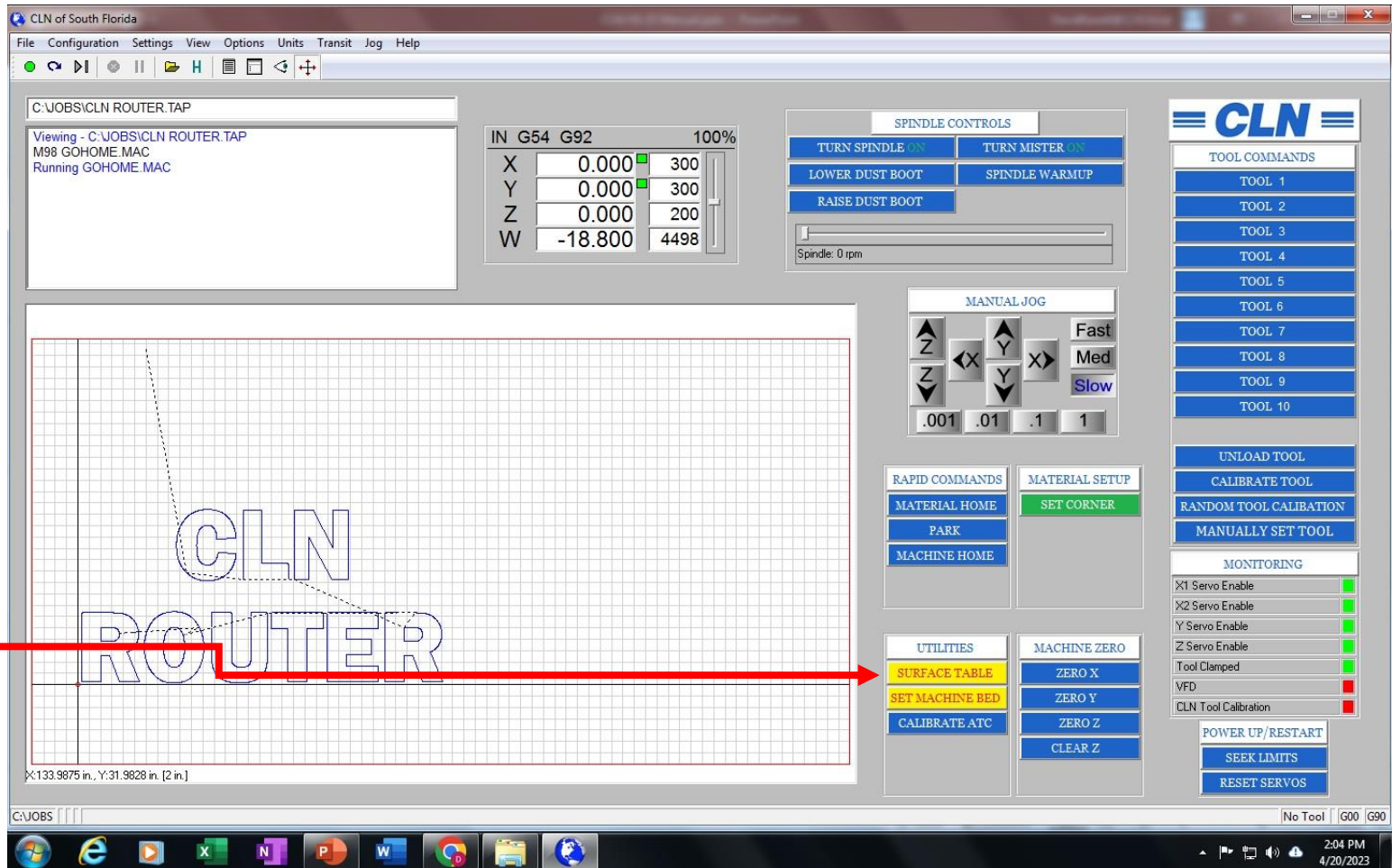
- To open the operating software on the machine simply double click on the desktop icon “CLN Router”.
- Make sure that it is safe to move the machine then click (Seek Limits). This sets a machine zero.
- You are now able to move the machine around with the jog buttons.
- Clicking on any one of the tools on the right side of the screen will cause the machine to tool change to your selected tool.



Using The CLN Software (ATC) Continued:

Surfacing the MDF Spoil Board:

- The MDF spoil board must be surfaced on both sides. The reason for this is to remove the glue that's on the surface to let the air flow through it more efficiently.
- If the machine is new, CLN most likely surfaced one side all ready. However, when you replace the MDF spoil board remember to surface both sides.
- For (ATC): The highest tool number in your tool changer is allocated for the spoil board cutter. Click on it to retrieve the spoil board cutter.
- Turn on vacuum pump so the spoil board sucks down to the tabletop.
- Lower the spoil board cutter to the top of the MDF.
- Click on the "Surface Table" button on the screen and follow the directions that follow.
- When the machine is finished surfacing the MDF, it will ask you to set the machine bed. This will set the bed height to zero.
- After you surface the MDF, remember to calibrate all of the tools in your tool changer. If you don't do it now, there's a good chance that you will forget, then you run the risk of crashing your machine.

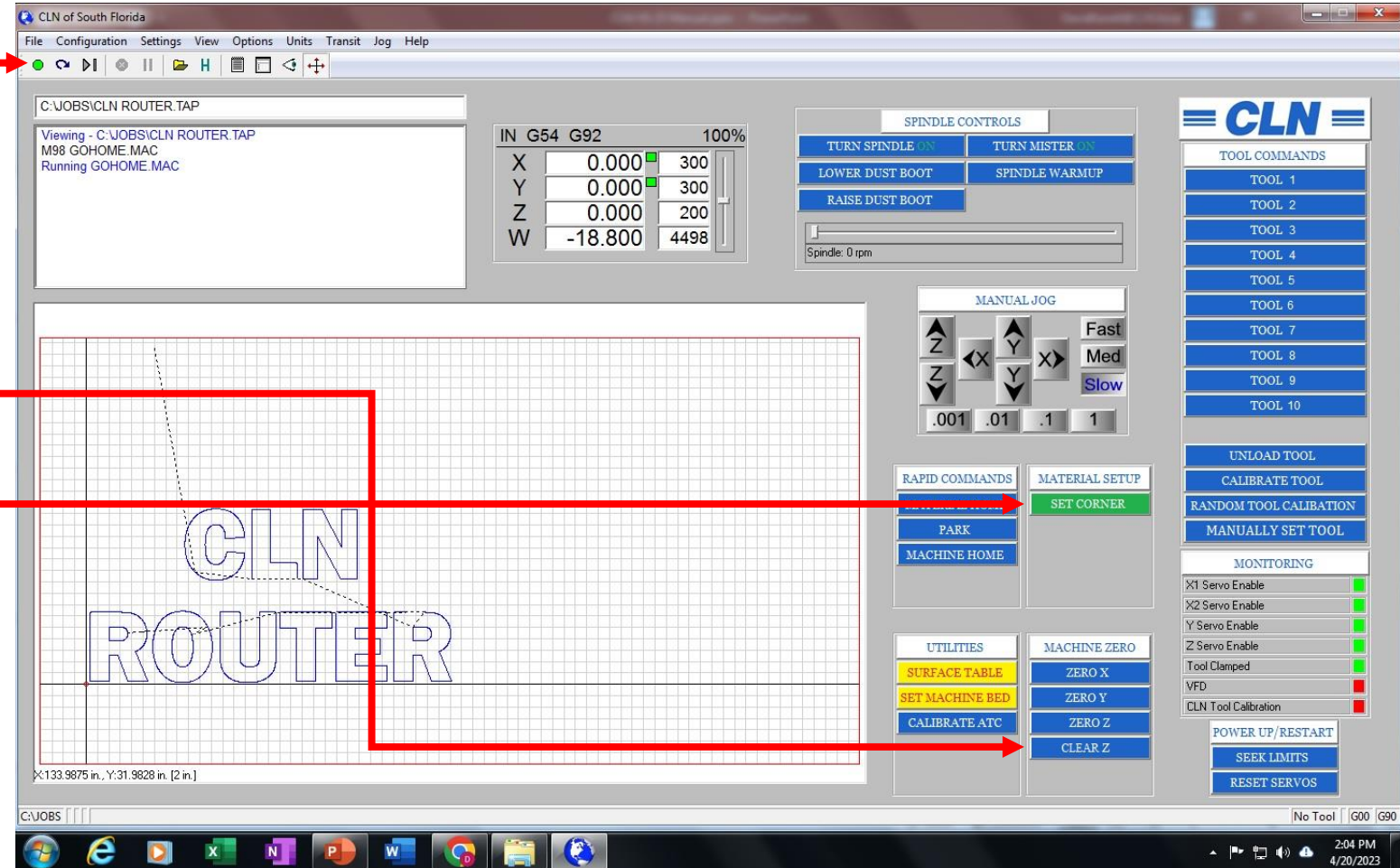


Using The CLN Software (ATC) Continued:

The space bar will pause the machine. Hitting enter will resume operation.

Running the machine:

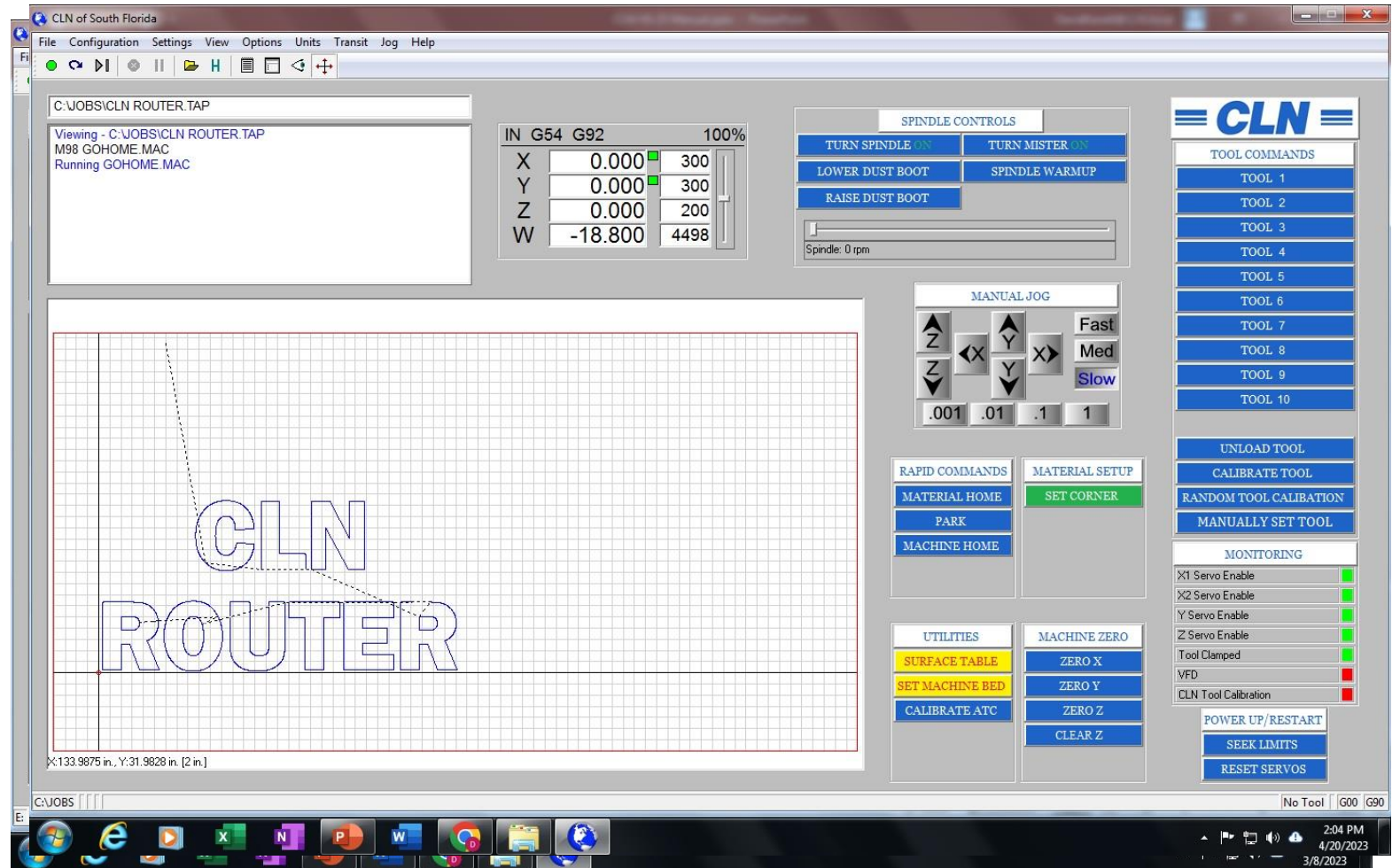
- On the CAD program. Before you output the .TAP file from your cad program, you want to set the zero for Z at the bottom of your material.
- On the machine, click the Clear Z button to make sure that you don't have a saved zero set for Z. Jog the tip of the router bit down to the MDF. Zero for Z should be at the top of the MDF spoil board. You should only be able to jog the bit down -.01 below the top of the MDF spoil board at this time.
- Load a sheet of material on the table. Jog the router bit to the lower left corner of the material then click the green button called set corner.
- Click on File / Open. Then open the .TAP file. Click on the view job icon to view the job.
- To begin cutting click on the green button in the top left corner of the screen.



Machine Software (MTC)

CLN Software
Overview
(MTC)

Using the
CLN Software
(MTC)



CLN Software Overview (MTC):

- **Software**

The purpose of the CLN software is to give the operator a way to view the parts that was sent via a .TAP or G-Code file and convert it so that the machine can process the information correctly. The CLN software has no ability to create code for the machine. Creating code for the machine come from a CAD program. A CAD program can be installed on your machine and most CAD programs will work together seamlessly.

Machine control

Overrides

- At any time that you are running the machine you can override the Feed Rate and the Spindle RPM

Home Positions

- The CLN Software can set multiple home positions anywhere on the table. It can also set a Z position at the bottom of the table or at the top of your work piece.

Proximity restart

- In the event that you break a bit. Or you are running a large 3D file and you want to shut the machine down for the night. You can restart where you left off with the restart feature.

Pausing the Machine

- The space bar will pause the machine. Hitting enter will resume operation.

CLN Software Overview (MTC) Continued:

Shortcut Icons

XYZWC Position Window

Spindle Controls

Jog and Transit Controls

Rapid Commands

Material Setup

Utilities

Machine Zero

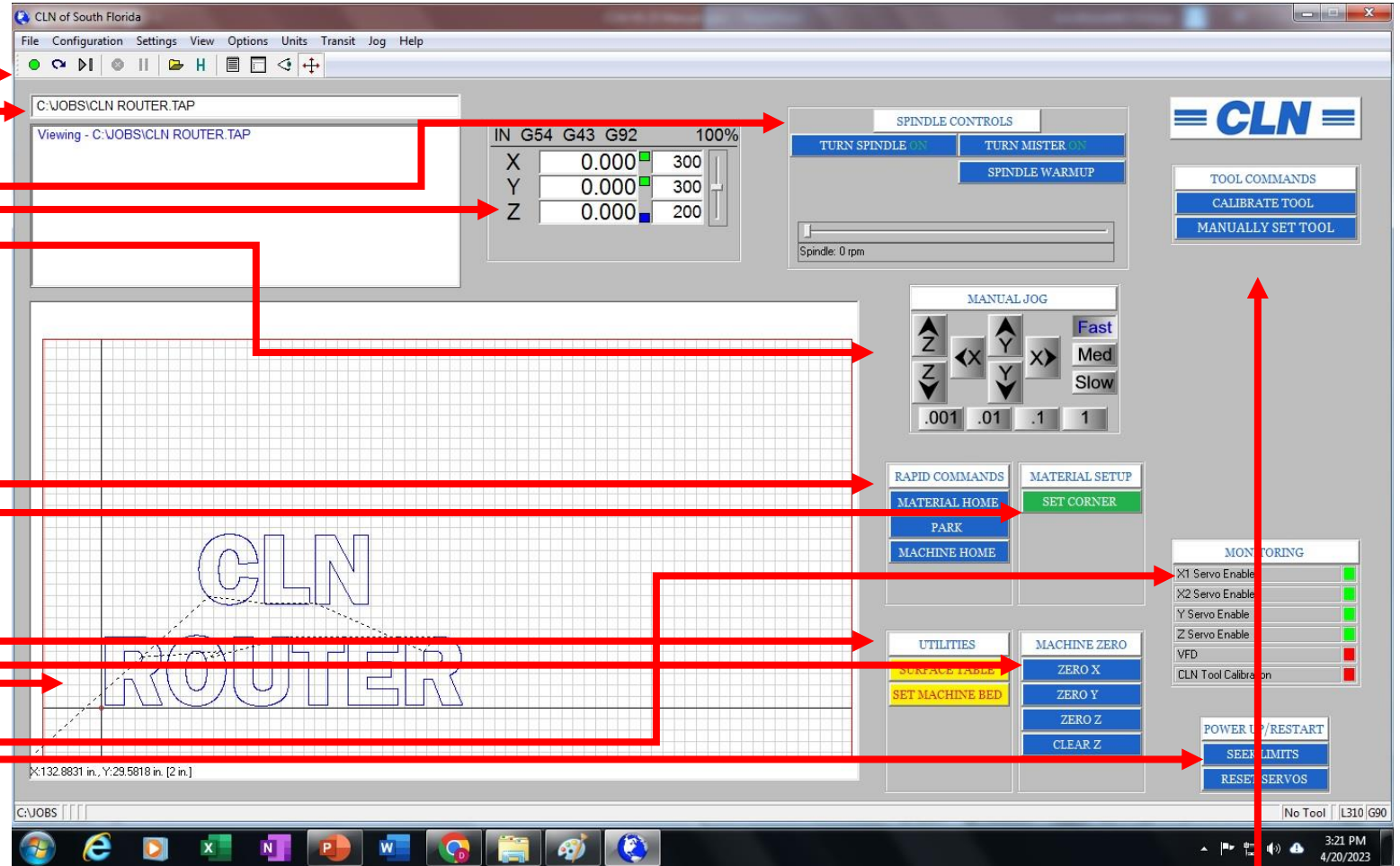
Power Up / Restart

Tool Commands

Command Line Terminal









Display Viewer

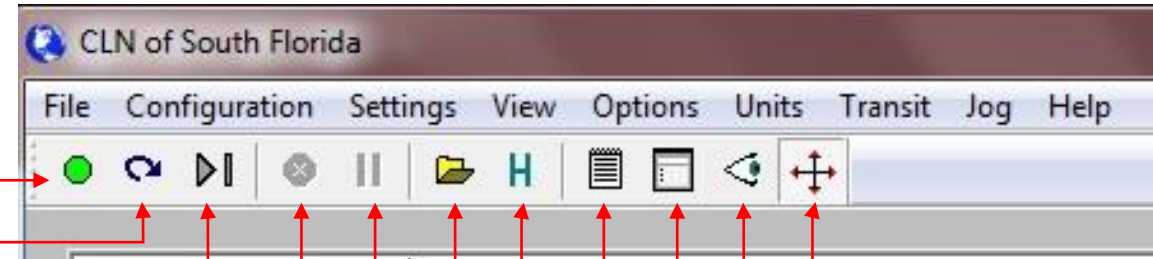
Monitoring



CLN Software Overview (MTC) Continued:

Shortcut Icon Definitions:

- Begin cutting 
- Restart from a line number 
- Step Mode 
- Abort 
- Pause 
- File Open 
- History 
- Job Editor 
- Simulate 
- Previewer 
- Soft limits on and off 



CLN Software Overview (MTC) Continued:

CLN Keyboard Short Cut Keys

- **Jog Speed**

- Fast – (F4)
- Medium – (F3)
- Slow – (F2)

- **Machine Jog Keys**

- **Left – (Left Arrow)**
- **Right – (Right Arrow)**
- **Forward – (Up Arrow)**
- **Backward – (Down Arrow)**
- **Spindle Up – (Page Up)**
- **Spindle Down – (Page Down)**

- **Spindle RPM's**

- **Increase – (+)**
- **Decrease – (-)**

- **Feed Rate**

- **Increase – (Insert)**
- **Decrease- (Delete)**
- **Jump to 100% - (Ctrl & Delete)**

- **Machine Operation**

- Start File – (Enter)
- Restart – (Ctrl & R)
- Single Step – (Ctrl & P)
- **Abort – (Esc)**
- **Pause – (Space Bar)**
- Open File – (Ctrl & O)
- File History – (Tab)
- Edit File – (Ctrl & E)
- Simulate – (Ctrl & S)
- View File – (Ctrl & V)
- Soft Limits On/Off – (Ctrl & L)
- **Resume – (Enter)**

- **File Editing Shortcut Keys**

- **Copy – (Ctrl & C)**
- **Paste – (Ctrl & V)**
- **Cut – (Ctrl & X)**
- **Find – (Ctrl & F)**
- **Find & Replace – (Ctrl & H)**
- **Undo – (Ctrl & Z)**
- **Redo – (Ctrl & Y)**
- **Display what line your cursor is on – (Ctrl & G)**

The Commands highlighted in red, are the most common short cut keys that you will use.

CLN Software Overview (MTC) Continued:

XYZW Position Window:

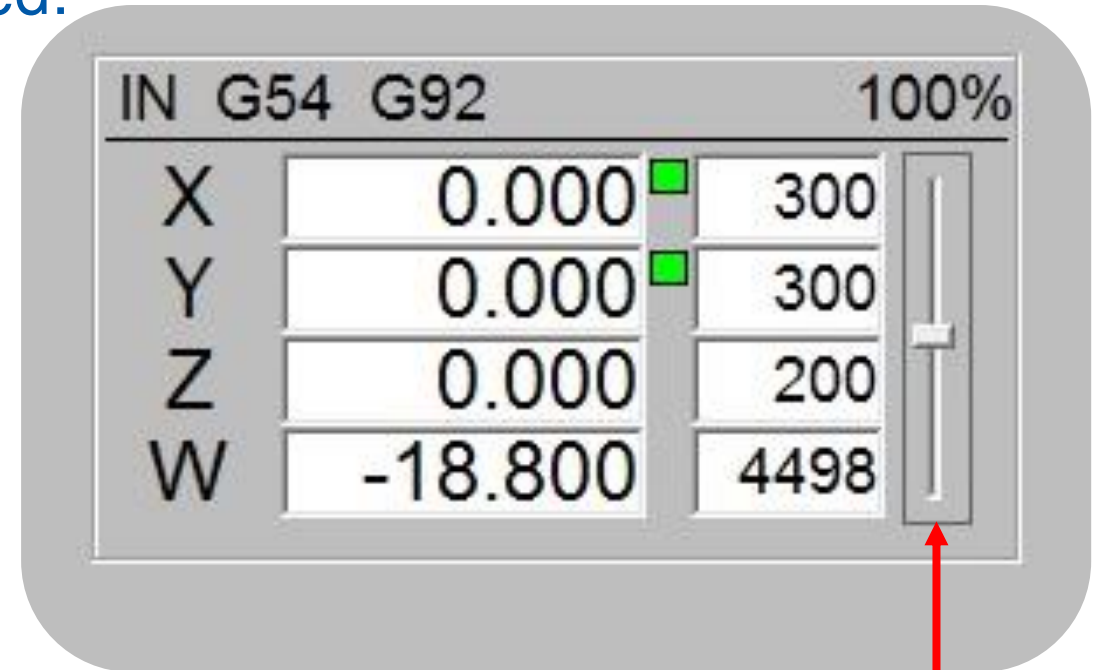
- This window tells you the position of the tool. For X and Y, the distance is from the center of the tool. For Z, the distance is from the tip of the bit.

X and Y

- When you see the green box next to the position, this means that the displayed position is the distance from where you set a zero for your material. Otherwise know as a local hone position.
- No box or, If you click on the green box, it will turn red. This is the displayed position from the machine home to the tool. For normal operation leave the box green because machine home is rarely used.

Z

- The blue box is the position from the machine bed or the (MDF Spoil Board). This position is defined when you set the machine bed. Typically, after you surfaced the spoil board you must set the machine bed. Setting the machine bed means that you are setting the distance from the tip of the bit to the spoil board to zero. Moving the spindle up will result in a positive number.
- No box or, If you click on the green box, it will turn red. This is the displayed position from the machine bed to the tip of the tool.



W

W is the position of the carousel tool changer. The position are in degrees.

Feed Rate

Next to the Positions is the feed rate. You can adjust the feed rate by moving the slide bar up or down with your mouse. You can also press delete or insert on the keyboard to adjust the feed rate.

CLN Software Overview (MTC) Continued:

Spindle Controls:

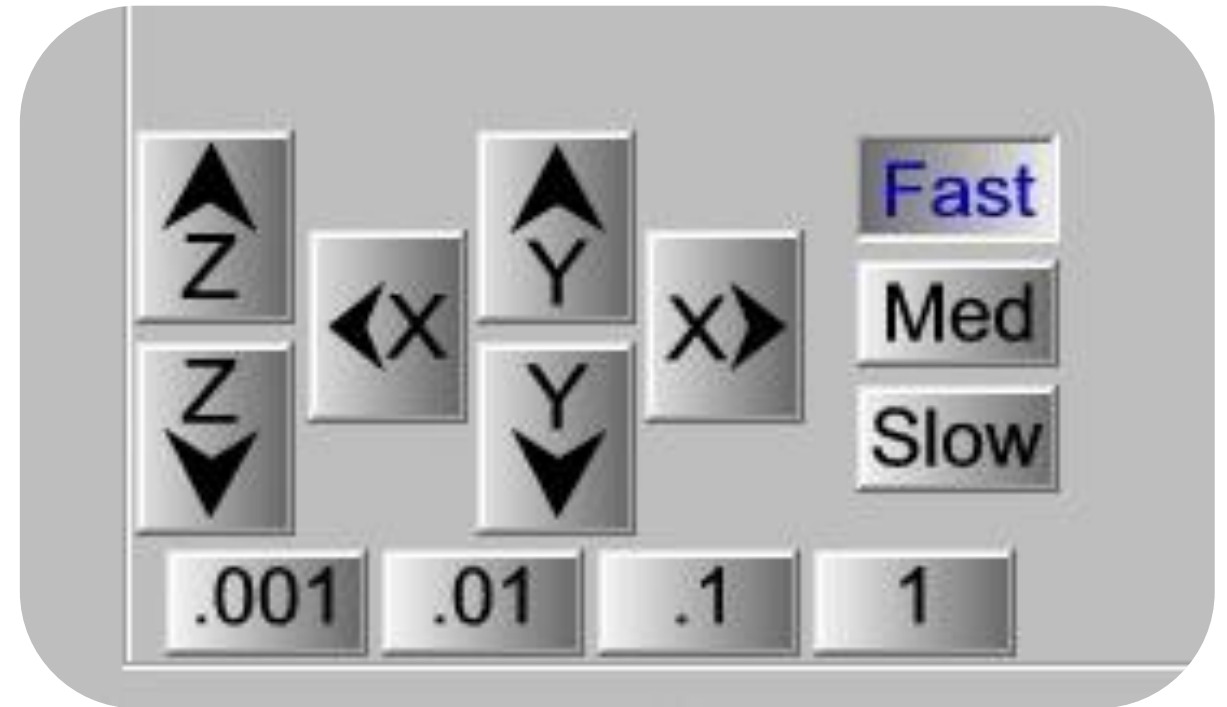
- **Turn Spindle On:** This button turns the spindle on and off. The slide bar at the bottom will adjust the spindle RPM.
- **Turn Mister On:** This button turns the misting unit on and off.
- **Spindle Warmup:** This button turns the spindle on to allow the spindle to run for a few minutes to warm up the bearings in the spindle.
- **Spindle RPM:** You can adjust the spindle RPM by moving the slide bar left and right with your mouse. Plus and Minus on the keyboard will also adjust the RPM.



CLN Software Overview (MTC) Continued:

Jog and Transit Controls:

- **Fast Med Slow:** These buttons set the transit speed
- **XYZ:** These buttons Move the tool around the table.
- **.0001 .001 .1 1:** These buttons set the jog distance



CLN Software Overview (MTC) Continued:

Rapid Commands:

- Rapid commands mean that the machine will move as fast as it can to particular location. **Make sure that everyone is clear of the machine before you click on any of these buttons.**
- **Material Home:** This button moves the spindle to where you set the XY corner of the material otherwise known as the local home position for XY.
- **Park:** This button moves the spindle to where you establish the park position.
- **Machine Home:** This button moves the spindle to where the machine was after it seeks limits otherwise known as machine zero.



CLN Software Overview (MTC) Continued:

Material Setup:

- The material setup is where you can set the tools to the material or to the table.
- **Set Corner:** This button sets the bit to the corner of the material. Otherwise known as local home position for XY.



CLN Software Overview (MTC) Continued:

Utilities:

- The Utilities buttons are where extra features are located.
- **Surface Table:** This button is used to run a routine that requires you to have your spoil board bit loaded in the spindle.
- **Set Machine Bed:** This button is used set the machine bed if you haven't done so with the surfacing routine.



CLN Software Overview (MTC) Continued:

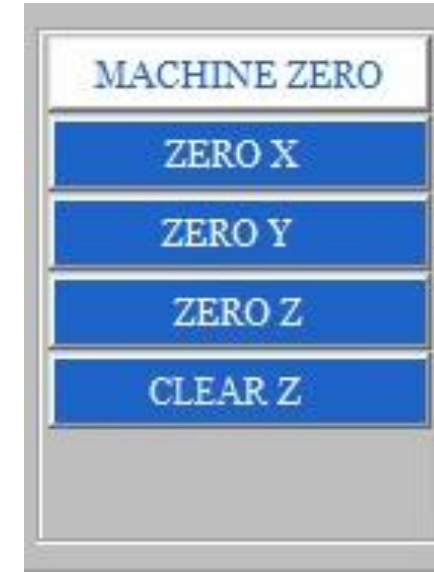
Machine Zero:

- The Machine Zero buttons allow you to set local coordinates one at a time on the table.
- **Zero X:** This button sets a zero for only the X axes.
- **Zero Y:** This button sets a zero for only the Y axes.
- **Zero Z:** This button sets a zero for only the Z axes.
- **Clear Z:** This button is used to clear the saved Z position.

Power Up / Restart:

The Power Up / Reset are initialization buttons

- **Seek Limits:** This button is used at program startup it makes the machine find machine zero.
- **Reset Servos:** This button is only needed if a servo faults out. Pressing it will reset most servo faults. Otherwise, you have to power down the machine completely to reset other servo faults. It is always a good idea to read the servo fault code on the servo drive before pressing this button. Unless you crash the machine, faults are not normal and should be addressed. See [Delta Servo Fault codes](#) go to page 288 for a complete list.



CLN Software Overview (MTC) Continued:

Tool Commands:

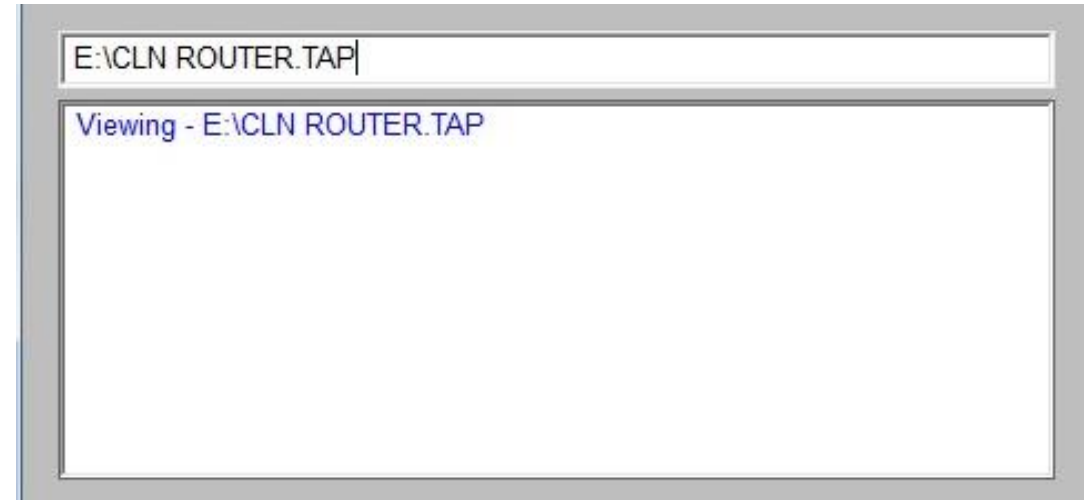
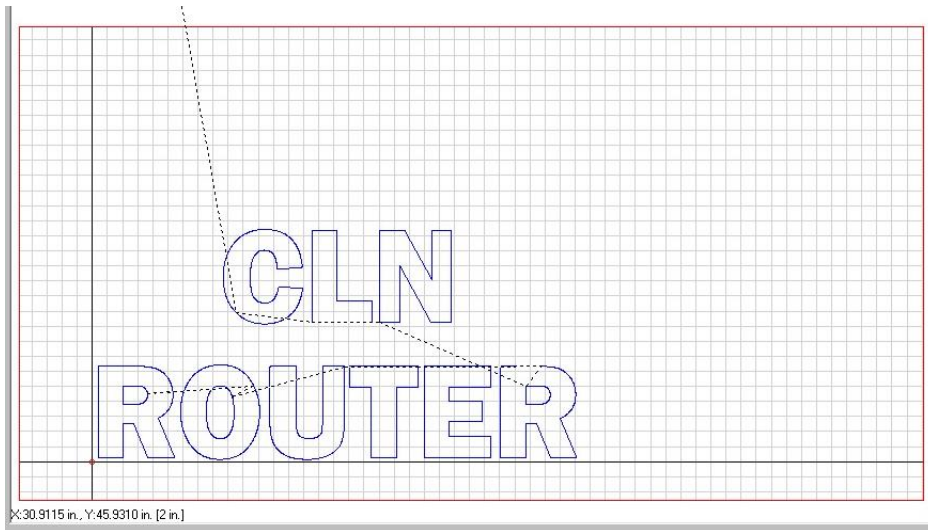
- The tool commands buttons are where you can calibrate the tool height with the tool setting switch or manually set the tool height off the machine bed.
- **CLN:** Clicking on the banner will take you to our website where you can find lots of training videos on this machine.
- **Calibrate Tool:** This button is used to calibrate the current tool that is in the spindle.
- **Manually Set Tool:** This button is used to manually set the tool height of a tool to the machine bed. Its useful for odd shape tools like fly cutters.



CLN Software Overview (MTC) Continued:

Command Line Terminal:

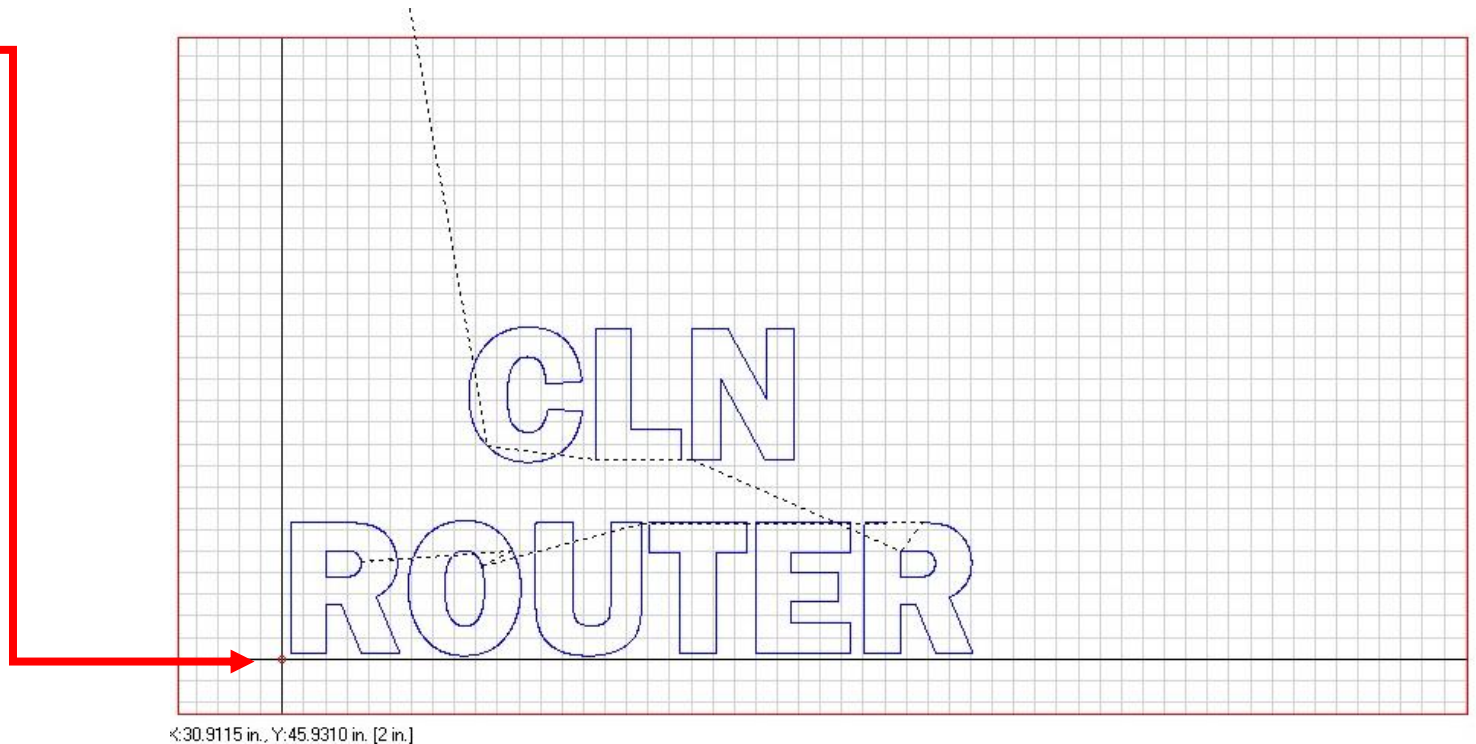
- The command line is where you can type in any valid command. The terminal is where the machine displays information from the machine.



CLN Software Overview (MTC) Continued:

Display Viewer:

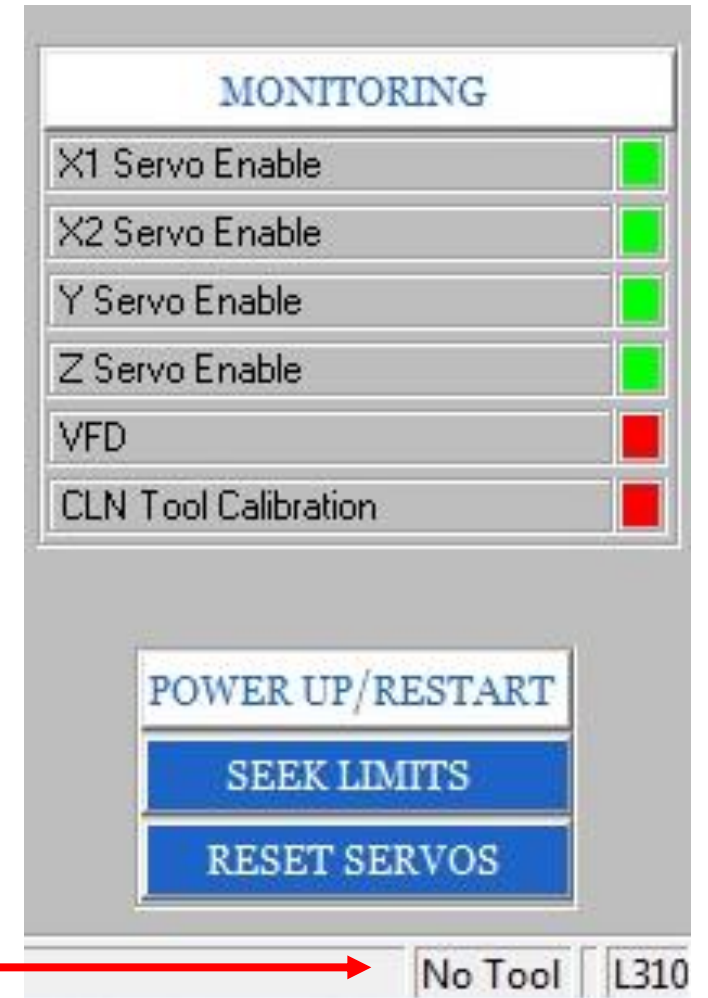
- The display viewer displays the job and tracks the machines path. The Red crosshairs represent the router bit and as you jog the machine around on the table you can see the tool move around the viewer. The long black line represent the material home position.
- This picture shows the future path of the tool coming from the tool changer and cutting the letters



CLN Software Overview (MTC) Continued:

Monitoring:

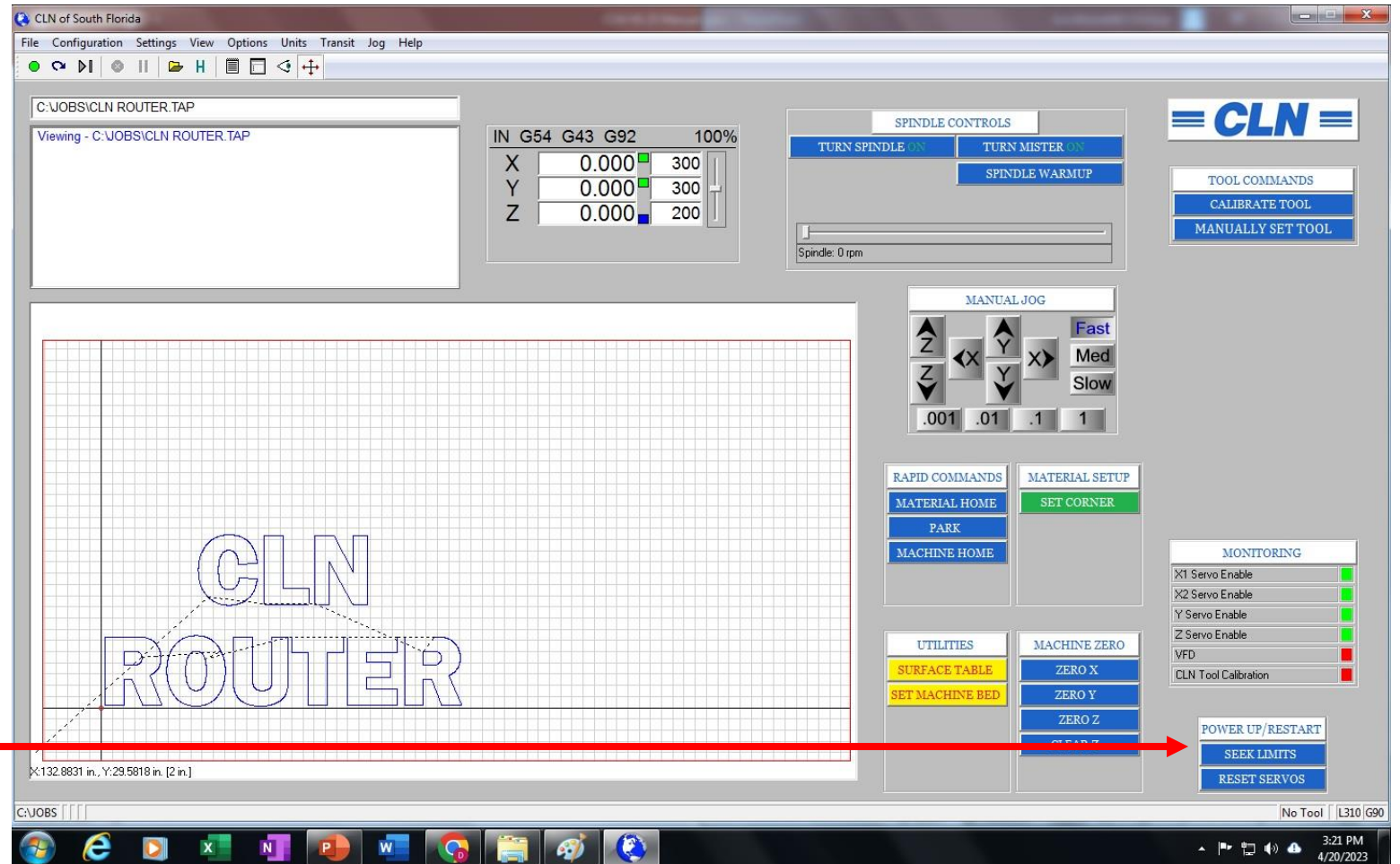
- The Monitoring display will tell you the status of various features of the machine. If a fault is detected, then you have to open the electrical box and read the fault code on the drive. See [Electronic Components Overview](#): for a description of the electrical components.
- **Servo Drive:** When the square indicator is green, it means all systems are good. If it turns to red, then you have a fault on the servo drive and you need to retrieve the fault code from the drive. See [Delta Servo Fault codes](#) go to page 288 for a complete list.
- **VFD:** When the square indicator is green, it means all systems are good. If it turns to red, then you have a fault on the VFD and you need to retrieve the fault code from the VFD. See go to page 288 for a complete list.
- **Tool Calibration Button:** When the tool calibration buttons square indicator turns red, it means that the tool calibration button is pressed.
- **Current tool number:** The current tool number that the machine thinks, is in the spindle, is displayed here. It is shown here as No Tool. This doesn't mean that there is no tool in the spindle. You can manually put a tool the spindle and it won't change. Remember its what the machine thinks is in the spindle.



Using The CLN Software (MTC):

Start the program:

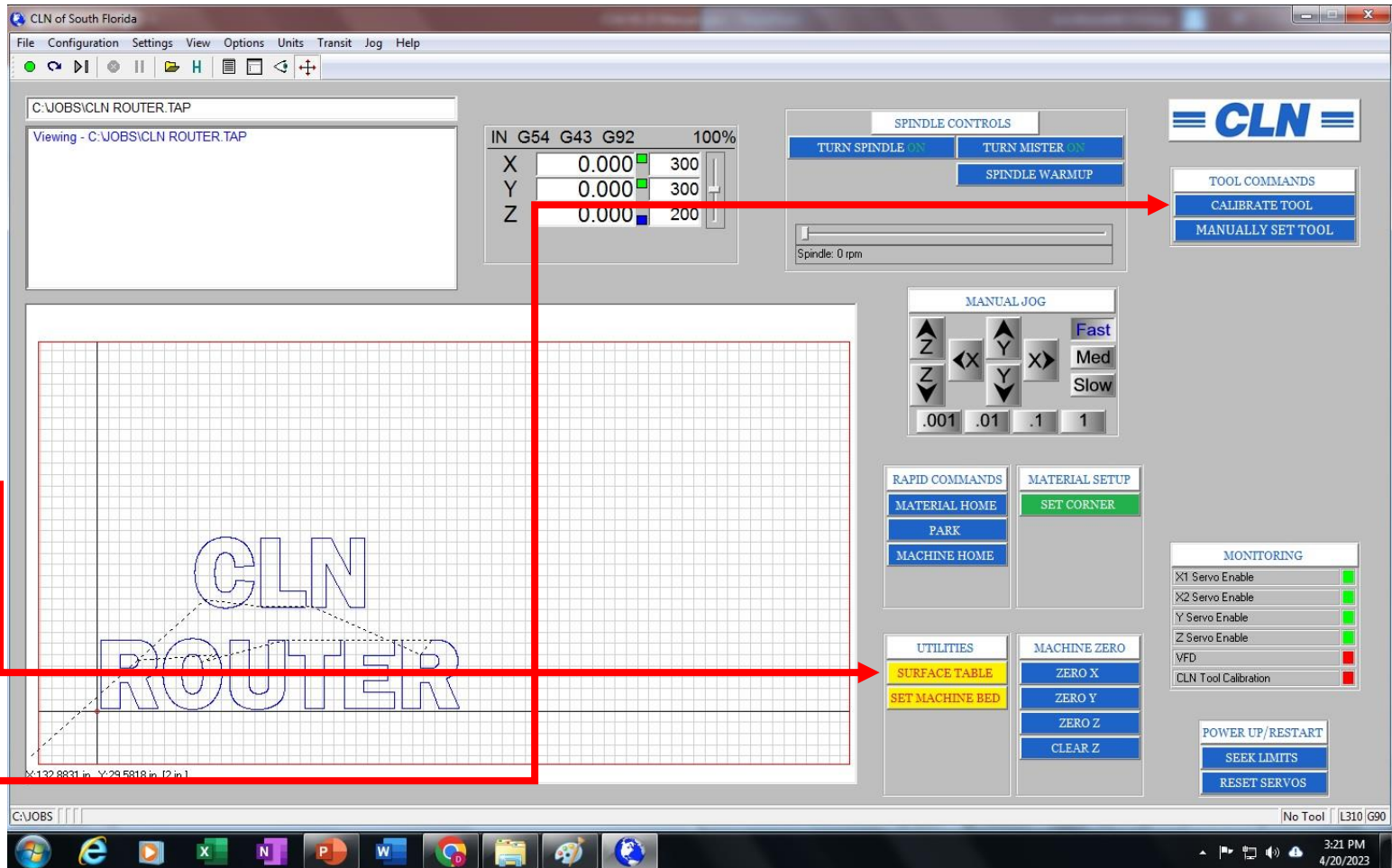
- To open the operating software on the machine simply double click on the desktop icon “CLN Router”.
- Make sure that it is safe to move the machine then click (Seek Limits). This sets a machine zero.
- You are now able to move the machine around with the jog buttons.



Using The CLN Software (MTC) Continued:

Surfacing the MDF Spoil Board:

- The MDF spoil board must be surfaced on both sides. The reason for this is to remove the glue that's on the surface to let the air flow through it more efficiently.
- If the machine is new, CLN most likely surfaced one side already. However, when you replace the MDF spoil board remember to surface both sides.
- Insert the spoil board cutter in the spindle.
- Lower the spoil board cutter to the top of the MDF.
- Click on the "Surface Table" button on the screen and follow the directions that follow.
- When the machine is finished surfacing the MDF, it will ask you to set the machine bed. This will set the bed height to zero.
- Insert a tool that you want to cut with in the spindle.
- Click on Calibrate Tool. The spindle will move to the tool calibration switch and move down to touch the switch.

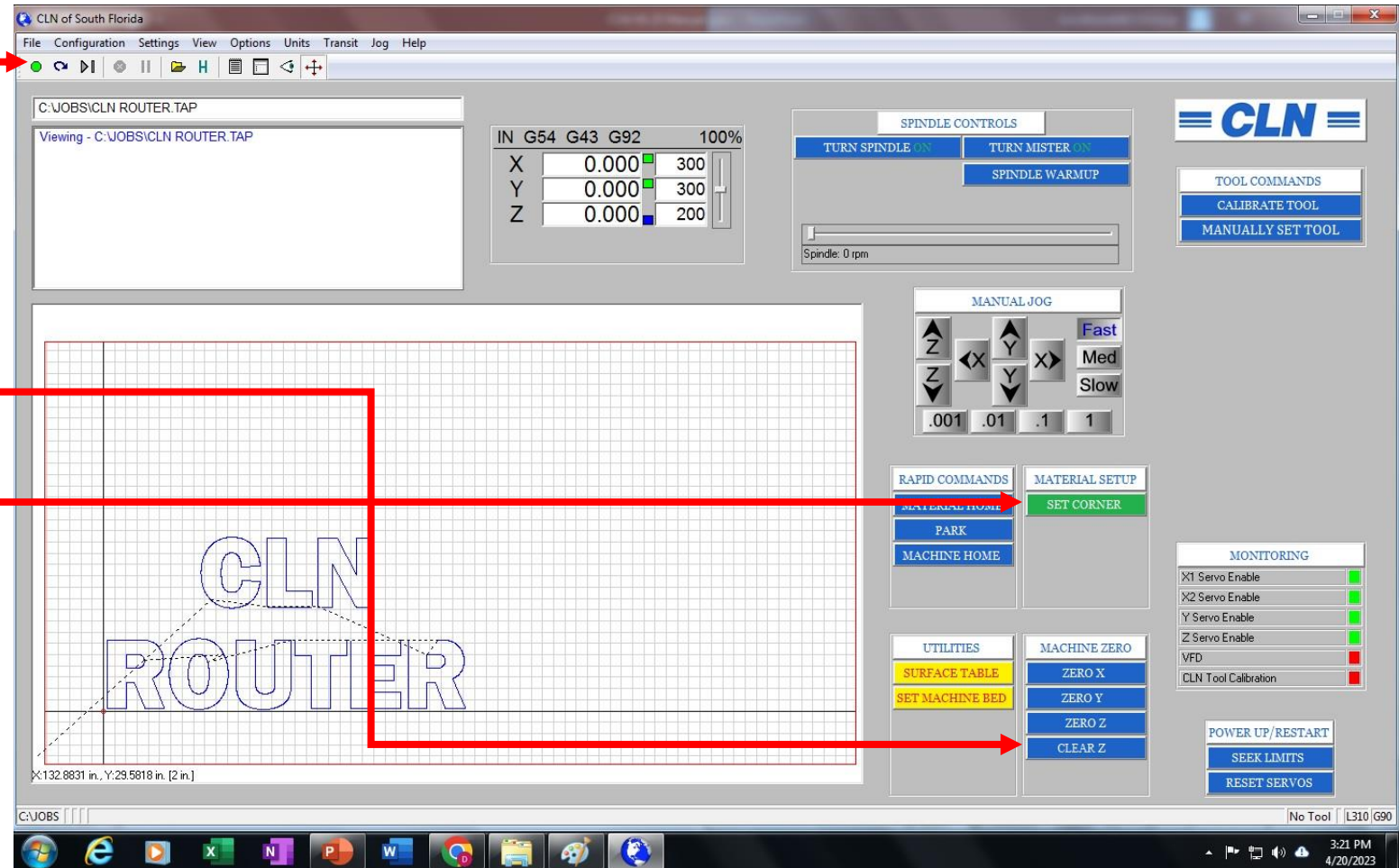


Using The CLN Software (MTC) Continued:

The space bar will pause the machine. Hitting enter will resume operation.

Running the machine:

- On the CAD program. Before you output the .TAP file from your cad program, you want to set the zero for Z at the bottom of your material.
- On the machine, click the Clear Z button to make sure that you don't have a saved zero set for Z. Jog the tip of the router bit down to the MDF. Zero for Z should be at the top of the MDF spoil board. You should only be able to jog the bit down -.01 below the top of the MDF spoil board at this time.
- Load a sheet of material on the table. Jog the router bit to the lower left corner of the material then click the green button called set corner.
- Click on File / Open. Then open the .TAP file. Click on the view job icon to view the job.
- To begin cutting, click on the green button in the top left corner of the screen.



Router Bit Height:

- It is very important to control the Router bit height while it's cutting. You must first [set the machine bed](#) then [calibrate the tools](#).
- The object is to have the bit cut into the MDF by as little as possible, no more than .01".
- For a vacuum table that is pulling a vacuum through a sheet of MDF. The MDF, after awhile will compress a bit. For a clamp down table, that has MDF on it, the MDF will swell if you are located in a high humidity area. So, you will have to adjust the Z height to compensate for it.
- To adjust the bit, stop the machine from cutting. Move X and Y so that the bit is clear of the material. In the [Command Line Terminal](#) type Z0, press enter. The bit will move to the current set zero position. Set the [transit buttons](#) to .001 and adjust the bit height.
- Click [Zero Z](#), Notice a [green box](#) appeared next to the Z position. This is a local home position. You just overridden the machine bed height. The machine will let you cut deeper by .001 before you must reset the machine bed. [Clear Z](#) will set Zero back to where the machine bed was set.
- Continue cutting and inspect the cut depth. Repeat if necessary.



Trouble Shooting

Spindle

Cutting



Spindle:

Problem- Spindle is making a strange noise, losing speed and lose of power.

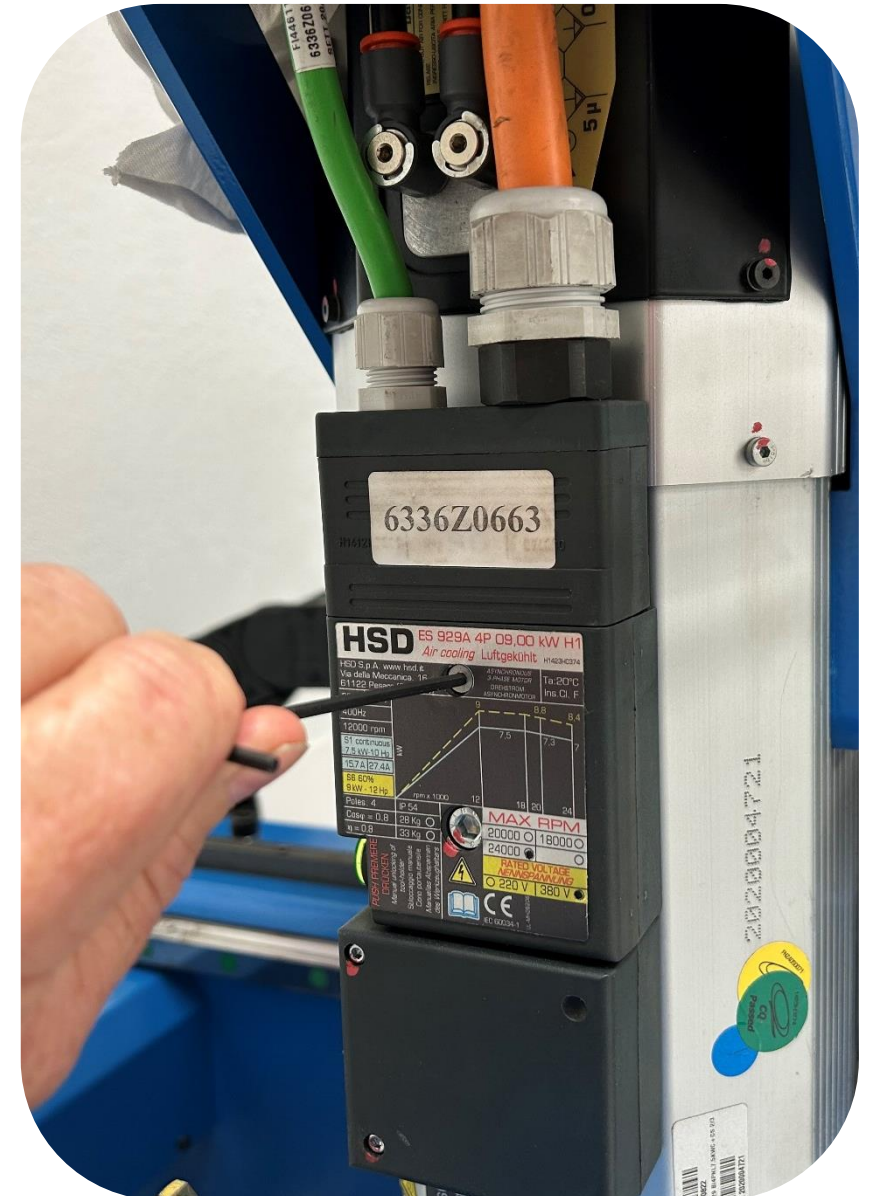
Solution- This could be two things a bad Spindle cable or a Bad Spindle.

Check for a broken cable.

- Turn off the main power to the machine.
- Locate the large black or orange cable. It will have 4, 10 Gage wires in it labeled, UVW and ground.
- Use a Allen wrench and remove the cable connector screw. Pull the connector upwards to remove the Spindle cable connector.
- Remove the VFD cover
- Check continuity on all 3 phases (UVW) of the cable from the spindle to the VFD.
- With a continuity tester, check for continuity on all 3 wires label UVW.

Check the windings on the spindle.

- Use a Ohm meter. You should have 1.7 OHMs between all 3 phases on the spindle.
- [Spindle connector Pin Out](#)

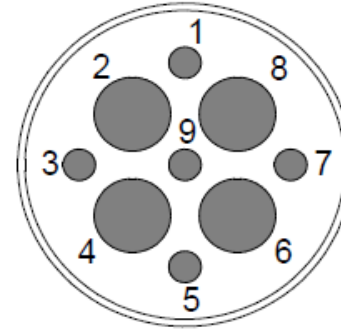


Spindle nose and lose of speed Continued:

Spindle connector Pin Out.

The position of the electrical connectors is shown in section 2.

4.6.1.1 Layout of POWER connector (fixed part)



PIN	DESCRIPTION
1	Thermal alarm 230V AC MAX; 48V DC MAX; 1.6A MAX
2	Common PE with PIN 7
3	230V AC 50/60Hz electric fan (if present)
4	U Motor phase
5	Thermal alarm 230V AC MAX; 48V DC MAX; 1.6A MAX
6	Motor V phase
7	Common PE with PIN 2
8	Motor W phase
9	230V AC 50/60Hz electric fan (if present)



Use cables of not less than 6mm² (or AWG10) for the even PINs, and 1mm² (or AWG18) for the odd ones



The electrical power supply to the electrospindle MUST be provided via inverter.

Cutting:

Router bit not cutting at the correct height:

- Machine bed not set correctly. See [Set Machine Bed](#)
- Router bit not calibrated. See [Calibrate Tool](#)
- The bit is cutting at the desired height then after awhile it needs to be adjusted. See [Router Bit Height](#).