Smart Shop Series:

SmartShop SS2 (B Axis/Syntec)

Basic SS2 Operation with B Axis & Syntec Controller.

Owner's Manual

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Updated August 2021

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Contents

General Information

SAVE THESE INSTRUCTIONS

Refer to them often and use them to instruct others.

Please 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 and property damage. There are certain applications for which tools and equipment are designed. This product should ***NOT*** be modified and/or used for any application other than for which it was designed.

NOTICE! It is important for you to read and understand this manual. The information it contains is provided for your safety while assembling and operating this machine.

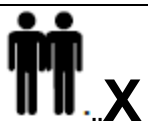
Safety Signs and Call-Outs:

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

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

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

NOTICE A helpful tip from our technical staff. Sometimes displayed as ***NOTICE!*** instead.

	Disconnect from power before proceeding.		Wear ear protection.
	Be aware of possible laceration danger.		Wear Eye Protection.
	Be aware of possible crushing danger.		Wear a full face shield.
	Electrical Hazard.		Wear lung protection.
			Requires X People

Safety Rules

PLEASE READ AND UNDERSTAND ALL SAFETY WARNINGS AND OPERATING INSTRUCTIONS BEFORE USING THIS MACHINE

FAILURE to follow all instructions listed below, may result in electric shock, fire, and/or serious personal injury or property damage.Woodworking can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, improper operation or assembly of this machine could result in personal injury to the operator. Safety equipment such as guards, push sticks, hold downs,feather boards, goggles, dust masks and hearing protection can reduce your potential for injury. But even the best guard won't make up for poor judgment, carelessness or inattention.

ALWAYS use common sense and exercise caution in the workshop. If a procedure feels dangerous, don't try it.Consult a professional to find an an alternative procedure which is safer and more efficient.

NOTICE! **Your personal safety is YOUR responsibility.**

⚠ WARNING! This machine was designed for certain applications only. We strongly recommend that this machine not be modified and/or used for any application other than that for which it was designed. If you have any questions relative to a particular application, **DO NOT** use the machine until you have first contacted the manufacturer to determine if it can or should be performed on the product.

⚠ WARNING! If you have any questions relative to its application **DO NOT** use the product until you have contacted the manufacturer and we have advised you. When using an electrical machine, basic precautions should always be followed, including the following:

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 and property damage. There are certain applications for which tools and equipment are designed. This product should NOT be modified and/or used for any application other than for which it was designed.
It is important for you to read and understand this manual. The information it contains relates to protecting your safety and preventing problems.

Machine & Workshop Safety Instructions

READ AND UNDERSTAND ALL WARNINGS AND OPERATING INSTRUCTIONS BEFORE USING THIS EQUIPMENT. FAILURE TO
FOLLOW ALL INSTRUCTIONS LISTED BELOW, MAY RESULT IN ELECTRIC SHOCK, FIRE, AND/OR SERIOUS PERSONAL INJURY
OR PROPERTY DAMAGE.

MACHINERY CAN BE DANGEROUS IF SAFE AND PROPER OPERATING PROCEDURES ARE NOT FOLLOWED. AS WITH ALL
MACHINERY, THERE ARE CERTAIN HAZARDS INVOLVED WITH THE OPERATION OF THE PRODUCT. USING

THE MACHINE WITH
RESPECT AND CAUTION WILL CONSIDERABLY LESSEN THE POSSIBILITY OF PERSONAL INJURY. HOWEVER, IF NORMAL
SAFETY PRECAUTIONS ARE OVERLOOKED OR IGNORED, PERSONAL INJURY TO THE OPERATOR MAY RESULT. SAFETY
EQUIPMENT SUCH AS GUARDS, PUSH STICKS, HOLD-DOWNS, FEATHER BOARDS, GOGGLES, DUST MASKS AND HEARING
PROTECTION CAN REDUCE YOUR POTENTIAL FOR INJURY. BUT EVEN THE BEST GUARD WON'T MAKE UP FOR POOR
JUDGMENT, CARELESSNESS OR INATTENTION. ALWAYS USE COMMON SENSE AND EXERCISE CAUTION IN THE WORKSHOP.
IF A PROCEDURE FEELS DANGEROUS, DON'T TRY IT. FIGURE OUT AN ALTERNATIVE PROCEDURE THAT FEELS SAFER.
REMEMBER: YOUR PERSONAL SAFETY IS YOUR RESPONSIBILITY.

OWNER'S MANUAL. READ AND UNDERSTAND THIS OWNER'S MANUAL BEFORE USING MACHINE.

TRAINED OPERATORS ONLY. UNTRAINED OPERATORS HAVE A HIGHER RISK OF BEING HURT OR KILLED. ONLY ALLOW

TRAINED/SUPERVISED PEOPLE TO USE THIS MACHINE. WHEN MACHINE IS NOT BEING USED, DIS-CONNECT POWER,
REMOVE SWITCH KEYS, OR LOCK-OUT MACHINE TO PREVENT UNAUTHORIZED USE—ESPECIALLY AROUND CHILDREN. MAKE
YOUR WORKSHOP KID PROOF!

DANGEROUS ENVIRONMENTS. DO NOT USE MACHINERY IN AREAS THAT ARE WET, CLUTTERED, OR HAVE POOR LIGHTING.
OPERATING MACHINERY IN THESE AREAS GREATLY INCREASES THE RISK OF ACCIDENTS AND INJURY.

MENTAL ALERTNESS REQUIRED. FULL MENTAL ALERTNESS IS REQUIRED FOR SAFE OPERATION OF MACHINERY. NEVER
OPERATE UNDER THE INFLUENCE OF DRUGS OR ALCOHOL, WHEN TIRED, OR WHEN DISTRACTED.

ELECTRICAL EQUIPMENT INJURY RISKS. YOU CAN BE SHOCKED, BURNED, OR KILLED BY TOUCHING LIVE ELECTRICAL
COMPONENTS OR IMPROPERLY GROUNDED MACHINERY. TO REDUCE THIS RISK, ONLY ALLOW QUALIFIED SERVICE
PERSONNEL TO DO ELECTRICAL INSTALLATION OR REPAIR WORK, AND ALWAYS DISCONNECT POWER BEFORE ACCESSING
OR EXPOSING ELECTRICAL EQUIPMENT.

DISCONNECT POWER FIRST. ALWAYS DISCONNECT MACHINE FROM POWER SUPPLY BEFORE MAKING ADJUSTMENTS,
CHANGING TOOLING, OR SERVICING MACHINE. THIS PREVENTS AN INJURY RISK FROM UNINTENDED START-UP OR
CONTACT WITH LIVE ELECTRICAL COMPONENTS.

EYE PROTECTION. ALWAYS WEAR ANSI-APPROVED SAFETY GLASSES OR A FACE SHIELD WHEN OPERATING OR OBSERVING

MACHINERY TO REDUCE THE RISK OF EYE INJURY OR BLINDNESS FROM FLYING PARTICLES. EVERYDAY EYEGLASSES ARE
NOT APPROVED SAFETY GLASSES.

WEARING PROPER APPAREL. 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 RISK OF SLIPPING AND LOSING
CONTROL OR ACCIDENTALLY CONTACTING CUTTING TOOL OR MOVING PARTS.

HAZARDOUS DUST. DUST CREATED BY MACHINERY OPERATIONS MAY CAUSE CANCER, BIRTH DEFECTS, OR LONG-TERM
RESPIRATORY DAMAGE. BE AWARE OF DUST HAZARDS ASSOCIATED WITH EACH WORKPIECE MATE-RIAL. ALWAYS WEAR A
NIOSH-APPROVED RESPIRATOR TO REDUCE YOUR RISK.

HEARING PROTECTION. ALWAYS WEAR HEARING PROTECTION WHEN OPERATING OR OBSERVING LOUD MACHINERY.
EXTENDED EXPOSURE TO THIS NOISE WITHOUT HEARING PROTECTION CAN CAUSE PERMANENT HEARING LOSS.

REMOVE ADJUSTING TOOLS. TOOLS LEFT ON MACHINERY CAN BECOME DANGEROUS PROJECTILES UPON STARTUP. NEVER
LEAVE CHUCK KEYS, WRENCHES, OR ANY OTHER TOOLS ON MACHINE. ALWAYS VERIFY REMOVAL BEFORE STARTING!

USE CORRECT TOOL FOR THE JOB. ONLY USE THIS TOOL FOR ITS INTENDED PURPOSE—DO NOT FORCE IT OR AN
ATTACHMENT TO DO A JOB FOR WHICH IT WAS NOT DESIGNED. NEVER MAKE UNAPPROVED MODIFICATIONS, MODIFYING
TOOL OR USING IT DIFFERENTLY THAN INTENDED MAY RESULT IN MALFUNCTION OR MECHANICAL FAILURE THAT CAN
LEAD TO PERSONAL INJURY OR DEATH!

AWKWARD POSITIONS. KEEP PROPER FOOTING AND BALANCE AT ALL TIMES WHEN OPERATING MACHINE. DO NOT
OVERREACH! AVOID AWKWARD HAND POSITIONS THAT MAKE WORKPIECE CONTROL DIFFICULT OR INCREASE THE RISK OF
ACCIDENTAL INJURY.

CHILDREN & BYSTANDERS. KEEP CHILDREN AND BYSTANDERS AT A SAFE DISTANCE FROM THE WORK AREA.STOP USING
MACHINE IF THEY BECOME A DISTRACTION.

GUARDS & COVERS. GUARDS AND COVERS REDUCE ACCIDENTAL CONTACT WITH MOVING PARTS OR FLYING DEBRIS. MAKE
SURE THEY ARE PROPERLY INSTALLED, UNDAMAGED, AND WORKING CORRECTLY BEFORE OPERATING MACHINE.
FORCING MACHINERY. DO NOT FORCE MACHINE. IT WILL DO THE JOB SAFER AND BETTER AT THE RATE FOR WHICH IT WAS

DESIGNED.

NEVER STAND ON THE MACHINE. SERIOUS INJURY MAY OCCUR IF MACHINE IS TIPPED OR IF THE CUTTING TOOL IS
UNINTENTIONALLY CONTACTED.

STABLE MACHINE. UNEXPECTED MOVEMENT DURING OPERATION GREATLY INCREASES RISK OF INJURY OR LOSS OF
CONTROL. BEFORE STARTING, VERIFY MACHINE IS STABLE AND MOBILE BASE (IF USED) IS LOCKED.

USE RECOMMENDED ACCESSORIES. CONSULT THIS OWNER'S MANUAL OR THE MANUFACTURER FOR RECOMMENDED
ACCESSORIES. USING IMPROPER ACCESSORIES WILL INCREASE THE RISK OF SERIOUS INJURY.

UNATTENDED OPERATION. TO REDUCE THE RISK OF ACCIDENTAL INJURY, TURN MACHINE OFF AND ENSURE ALL MOVING
PARTS COMPLETELY STOP BEFORE WALKING AWAY. NEVER LEAVE MACHINE RUNNING WHILE UNATTENDED.

MAINTAIN WITH CARE. FOLLOW ALL MAINTENANCE INSTRUCTIONS AND LUBRICATION SCHEDULES TO KEEP MACHINE IN
GOOD WORKING CONDITION. A MACHINE THAT IS IMPROPERLY MAINTAINED COULD MALFUNCTION, LEADING TO SERIOUS
PERSONAL INJURY OR DEATH.

DAMAGED PARTS. REGULARLY INSPECT MACHINE FOR DAMAGED, LOOSE, OR WRONGLY ADJUSTED PARTS—OR ANY
CONDITION THAT COULD AFFECT SAFE OPERATION. IMMEDIATELY REPAIR/REPLACE BEFORE OPERATING MACHINE. FOR
YOUR OWN SAFETY, DO NOT OPERATE MACHINE WITH DAMAGED PARTS!

MAINTAIN POWER CORDS. WHEN DISCONNECTING CORD-CONNECTED MACHINES FROM POWER, GRAB AND PULL THE
PLUG—NOT THE CORD. PULLING THE CORD MAY DAMAGE THE WIRES INSIDE. DO NOT HANDLE CORD/PLUG WITH WET
HANDS. AVOID CORD DAMAGE BY KEEPING IT AWAY FROM HEATED SURFACES, HIGH TRAFFIC AREAS, HARSH CHEMICALS,
AND WET/DAMP LOCATIONS.

Additional Safety Rules

For safe operation of your machine, please read these instructions thoroughly BEFORE operating machine.

1.) The machine is supplied ready to go—all motion parameters have been set up by the supplier. If any modifications are required, please have a professional operator to perform such changes.
2.) Never operate the machine with the electrical cabinet door open as there is high voltage supply inside.
3.) Carefully read through all the safety instructions, warnings as well as signs attached to the machine before operating.
4.) Use machine only in clean areas free from excessive moisture or flammable objects.
5.) Machine must be properly grounded. Level the machine is the ground is uneven.
6.) Keep the machine and cabinet clear of unnecessary objects and keep all parts clean.
7.) Keep the machine, cabinet and cables away from excessive heat, flammable substance and sharp objects. Do not attempt to exceed limits of the machine.
8.) **Safety**-Check to ensure that objects and persons are clear of the machine during operation.
9.) Disconnect power to all system components when not in use, when changing accessories and before servicing.
10.) Do not loosen, remove or adjust machine parts or cables while power is on.
11.) Exercise care with machine controls and around keypad to avoid unintentional starting.
12.) Maintain equipment with care: Keep cutting tools clean and sharp. Lubricate and change accessories when necessary. Cables and cords should be inspected regularly. Keep controls clean and dry.

Safety Signs

•Pay attention to the safety signs before operating the machine to avoid injury or damage to the operator or the equipment.


Danger: Improper or unsafe operation will result in personal injury and/or damage to the equipment.


Prohibited: prohibited under any circumstances.


Must-dos


High voltage power supply: Caution

⚠ CAUTION

Read thoroughly before operating. Do not operate machine if the operator is unfamiliar with the safety instructions and safety signs.

NOTICE! Users are required to keep a copy of this user manual for future reference. Failure to comply with the safety instructions may lead to personal injury and/or damage to the equipment.

Operator Safety

NOTICE

Before operating the machine, the operator must:
Be familiar with the equipment and its installation, adjusting and operation, and be able to react in emergencies. Be properly trained, familiar with the operation, repair and maintenance of the machine:

The operator must also:
1.) Perform daily inspection of the **Safety Device(s)**.
2.) **Stay Alert**at all times when operating the machine.
3.) Keep the table clear of debris or other unnecessary objects.
4.) Operate only after making sure the machine is clear of unnecessary objects.
5.) **Wear Safety Glasses at all Times**, **but gloves are prohibited**.
6. Keep the machine and cabinet free from unnecessary objects and keep all parts clean.
7. Not attempt to use the machine before proper inspection and preparation.
8. Know where the emergency stop switch is located.
9. Keep the machine from excessive moisture or use a filter to ensure this.

Electrical Safety

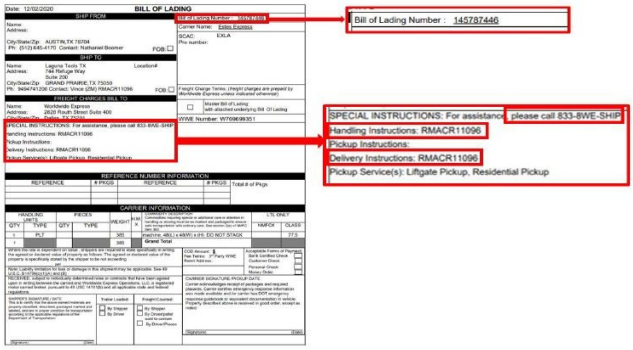
1.) Do not operate the machine with Electrical Cabinet Door Open—High Voltage Supply Inside.
2.) The machine must have proper electrical grounding.
The power supply must be connected to permanently fixed electrical wire.
3.) The machine is supplied ready-to-go.
Adjustments and modifications are to be performed only by qualified personnel.
4.) Keep children and non-operators away from the machine.
5.) Carefully read through all the safety instructions and warnings. The **Safety Signs should be Attached** on places that are easy to spot.
6.) Operators must be familiar with the installation, operation and service of the machine.
Only proper operation can guarantee the safe and smooth running of the machine.

Delivery Protocols

Most large machinery will be delivering on a tractor trailer 48'-53' long. Please notify Sales Representative with any Delivery Restrictions.

Customer is required to have a forklift (6000lb. or larger is recommended) with 72" forks or fork extensions and operator.

Note any visible damage, torn packaging, scuffs or any abnormal marks on the delivery receipt or **Bill of Lading (BOL)**.



Machine Specifications

Machine Specifications

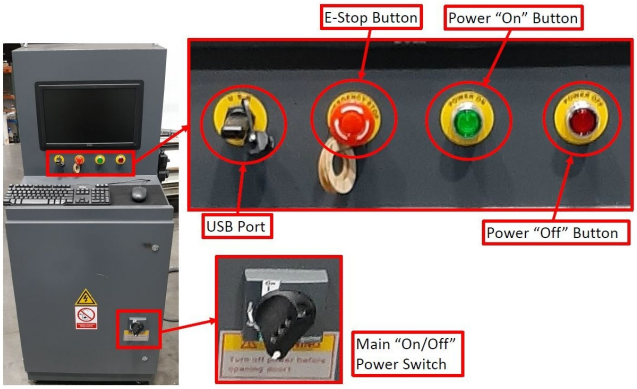
Smartshop SS2 Machine (B-Axis/Syntec Controller) Specifications-	
Traveling Size	98.5 In. x 49.60 In. x 7.87 In./11.81 In.
Working Size	97.63 In. x 48.42 In. x 7.09 In./11.02 In.
Table Size	98.42 In. x 48.42 In.
Optional Working Length	**"N/A"**
Transmission	X/Y Rack and Pinion, "Z" Ball Screw Drive
Table Structure	T-Slot Vacuum
Spindle Power	9.6kW
Spindle Speed	24000 rpm
Traveling Speed	750 in/min.
Working Speed	550 in/min.
Driving System	Stepper System or Servo System
Controller	Syntec

Machine Description

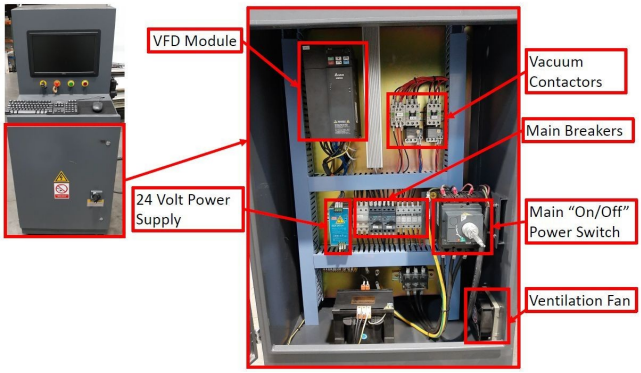
Machine Description:
This model is an extremely cost-effective work center with 8-Slot tool changer. With Italian high power ATC spindle, and gear reducers, French Schneider electronic components and other imported parts, this machine has stable and reliable performance.

It is highly suitable for various processing procedures with versatile functions: routing, drilling, cutting, side milling, chamfering, etc. The T-slot vacuum table can either hold the materials of different sizes with strong suction power, or clamp materials of irregular shapes Laguna Tools SS2 with B-Axis & Syntec Control with fixtures.

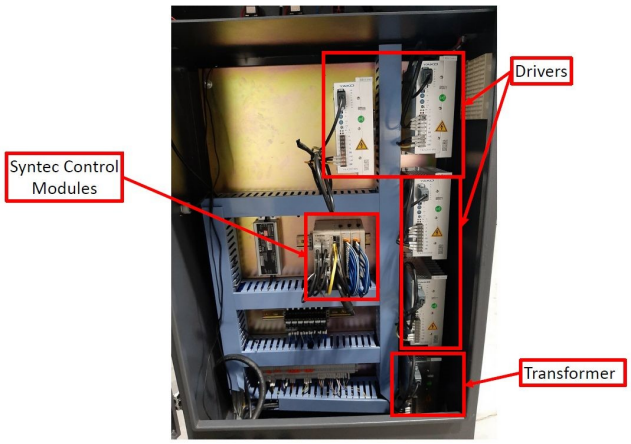
Electrical Cabinet Layout & Operation



Electrical Cabinets Lower Interior Layout and Operation



Electrical Cabinets Back Door Interior Layout and Operation

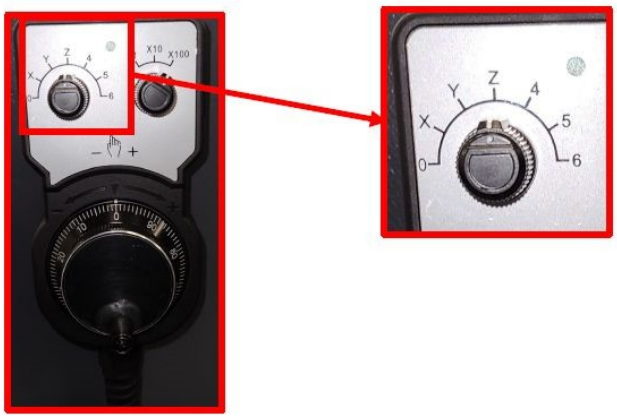


Electrical Cabinets MPG (Manual Pulse Generator) Location and Operation

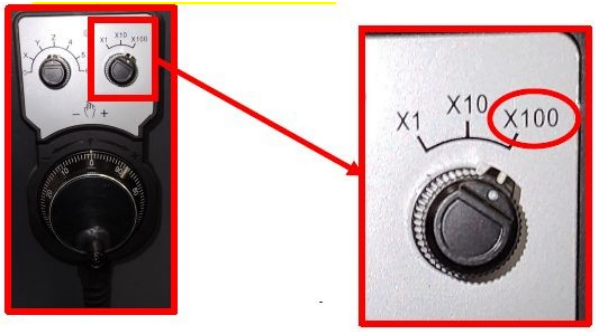
Operating the MPG

1.) From the Main Screen, press the "**MPG Button**".

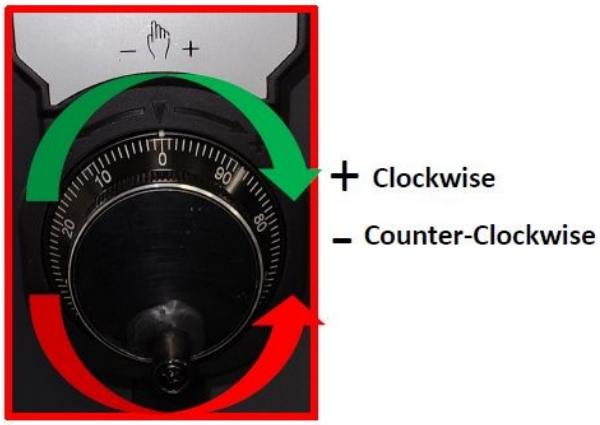
2.) Use the "**Top Left Knob on the MPG**" to select the axis to move.



3.) Use the "**Top Right Knob on the MPG**" to select speed, with 100X being the fastest.



4.) Rotate the "**Bottom Knob, Clockwise**" to move the Axis in the Positive (+) direction and **"Counter-Clockwise"**for Negative (-) direction.



Main Part Descriptions

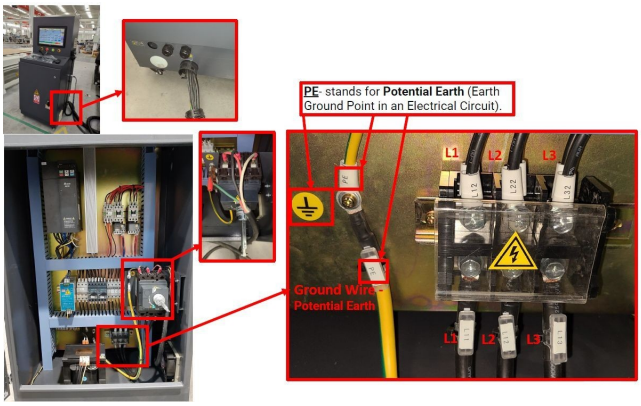
Main Part Machine Functions:

Part	Description
Electro-Spindle Assembly	For cutting, engraving and other operations. Its compact structure, light in weight, low vibration and noise, high rotation speed and high power have gained it wide popularity with the CNC Router users
Square Linear Guide Rail	Features high linear accuracy, rigidity and big dynamic load. The self-lubrication design achieves long service life and consistent accuracy. The machine features "**solid welded steel structure**". The material has been vibrated and heat-treated to release the inner stress.
Helical Rack:	This drives the machine. Each tooth is accurately geared, which enables smooth linear motion and minimum run noise. The load on each tooth is reduced and the movement is more steady.
Electric Cabinet	This houses the controller and other critical electronic components. The user-friendly design gives easy access to the operator. The electric fan located at the side of the cabinet guarantees effective air flow and keeps the inside cool.
Gantry	A rigid structure to carry the spindle's horizontal movement.
T-Slot Vacuum Table	Is able hold down the work pieces with either vacuum suction power or fixtures, which is easy to use.
Caterpillar Track	The caterpillar track runs along the side of the machine in a special trough and carries all the electrical cables and air lines.
Vacuum Control Valves	The machine has six (6) vacuum control valves that can be used to direct the vacuum to the vacuum table zones.
Tool Rack ATC	Tool changer includes eight (8) tool stations to accommodate a large range of tools. Each of the stations includes a ISO-30 gripper assembly, and station positions are controlled the Laguna Touch CNC controller.

Part	Description
Frame	The frame is a heavy steel all-welded construction that provides a rigid platform for the other components and ensures accuracy as well as edge finish.

Electrical Installation

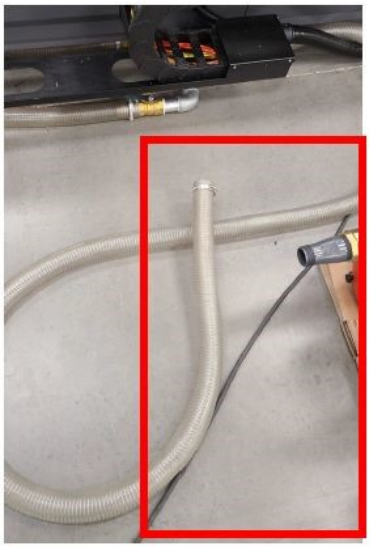
Electrify the following lines (as shown in the figure). Please test to guarantee 220V stabilized voltage before electrification.



Connecting the Vacuum Pump

Connecting the Vacuum Pump SV-400 Series:

The machine is provided with a 2-inch hose for connection to the vacuum pump. The vacuum hose is connected to the manifold located under the table toward the front of the machine. Connect the free end to the vacuum hose to the vacuum pump inlet. Ensure that it is clamped securely.

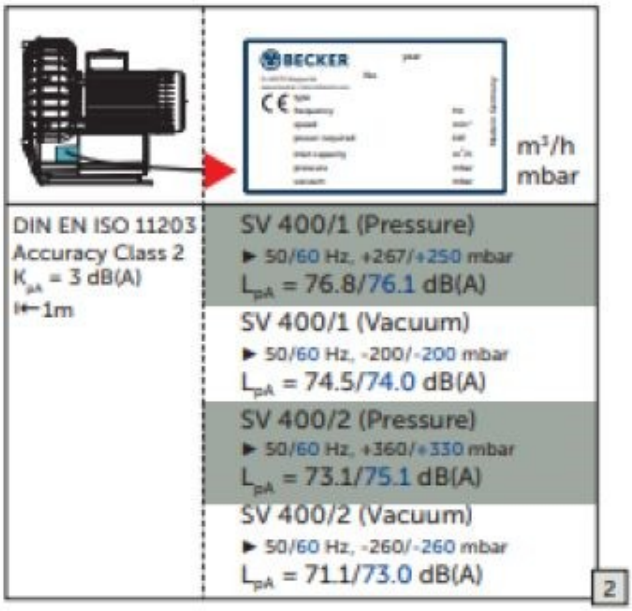


SV-400 Series BECKER

Connection Instructions:

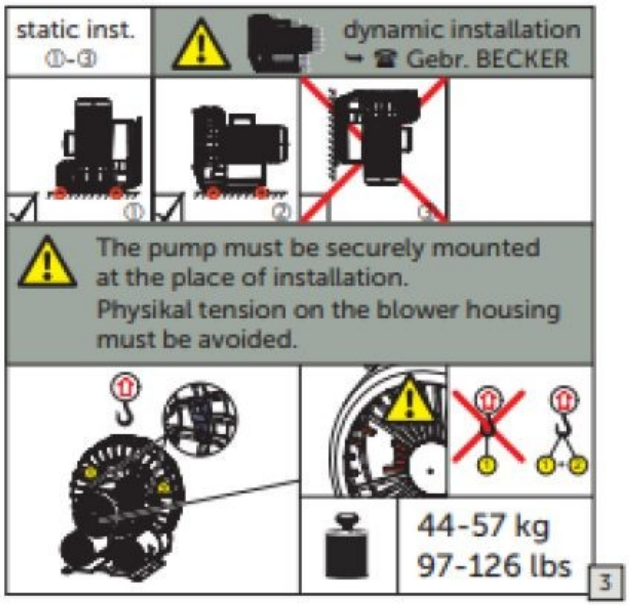
Step One:

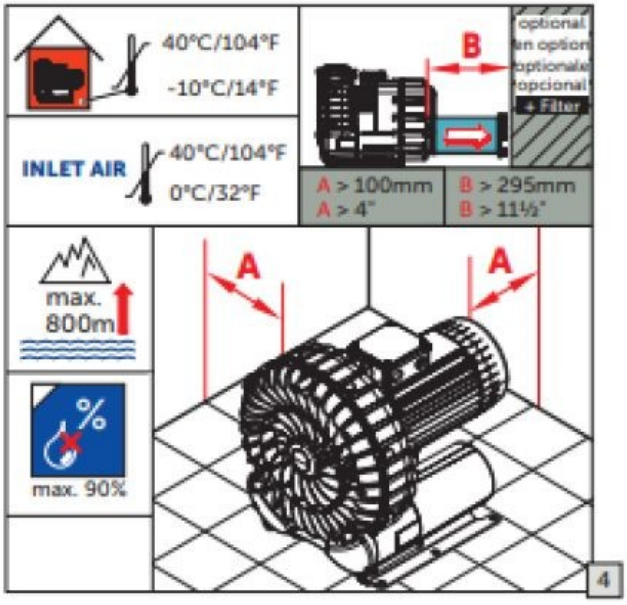
Step Two:



Step Three:

Step Four:





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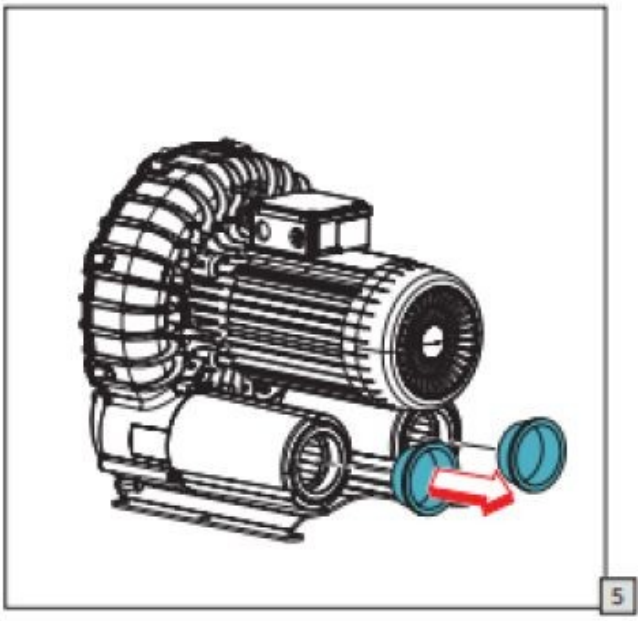

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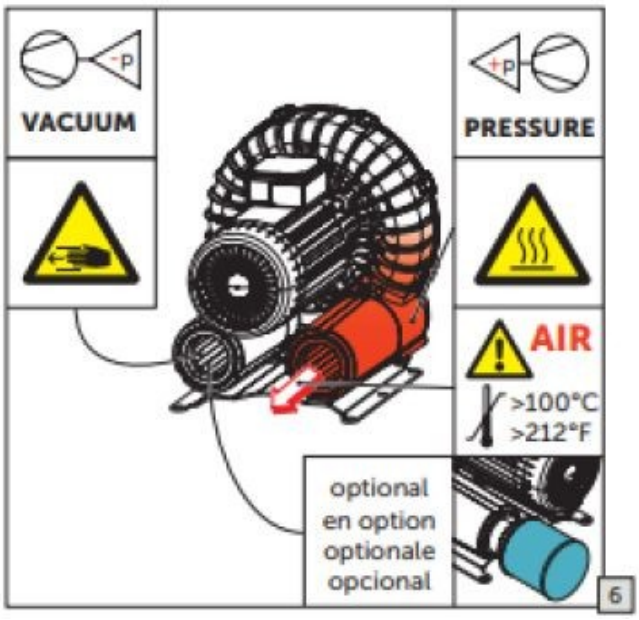
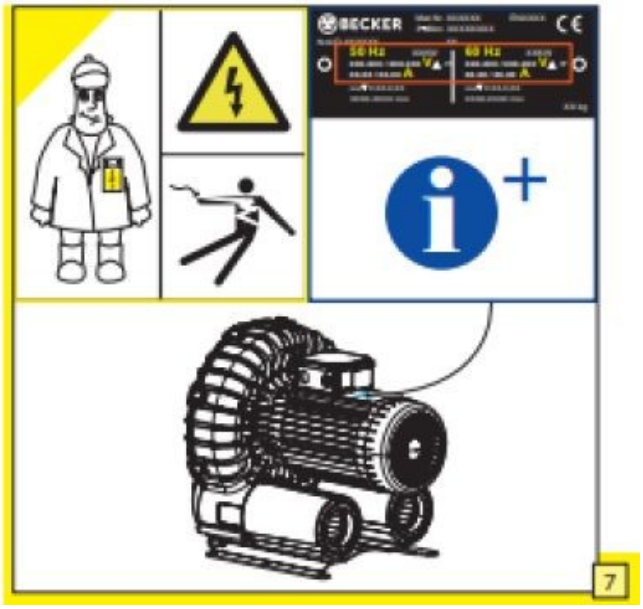
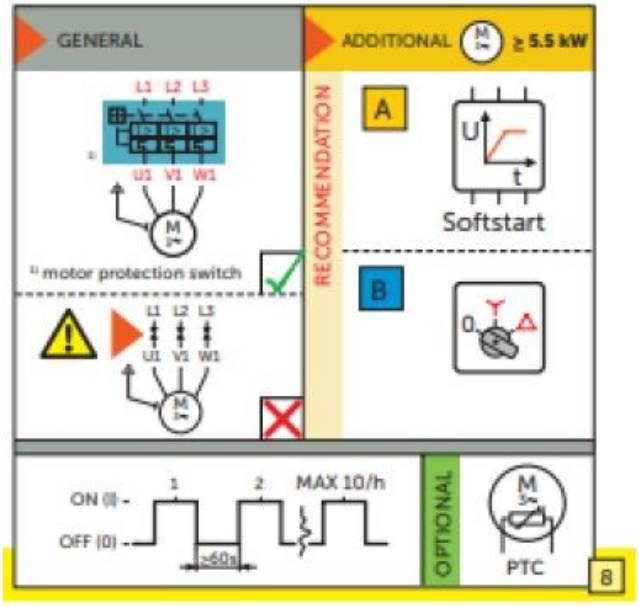


Step Seven:

Step Eight:





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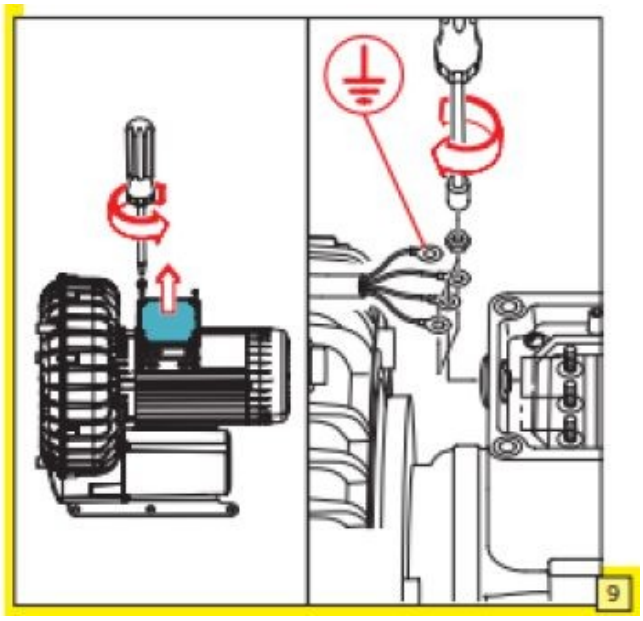
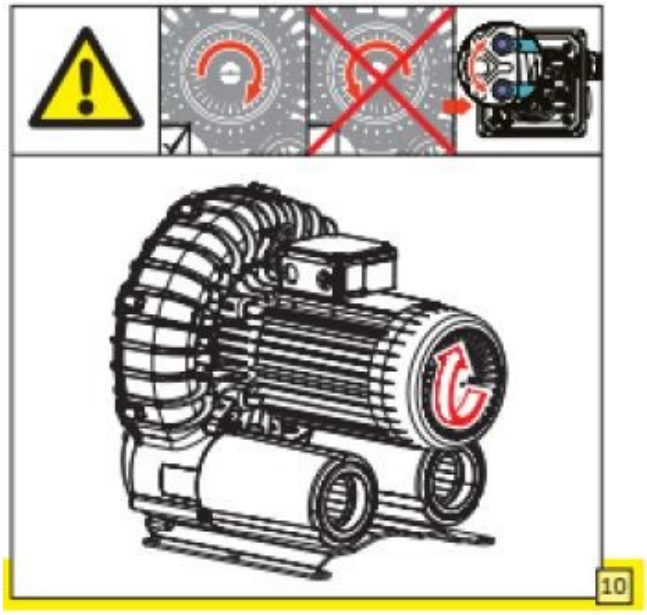
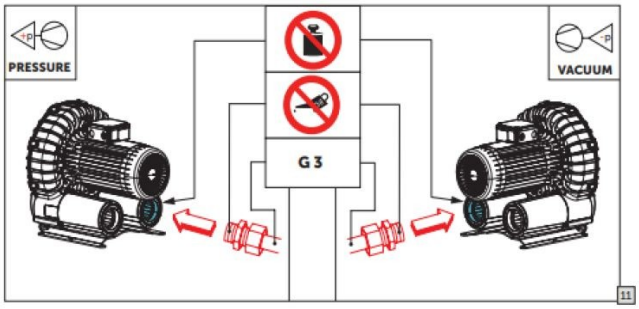


Step Ten:



Step Eleven:



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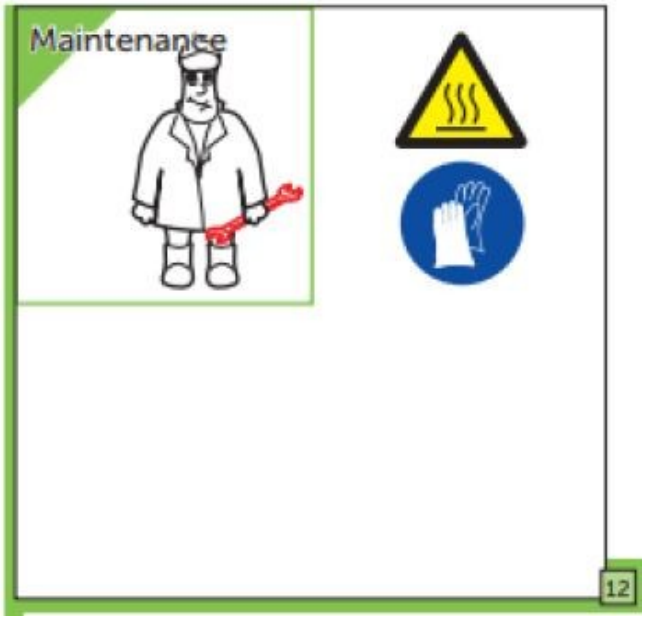
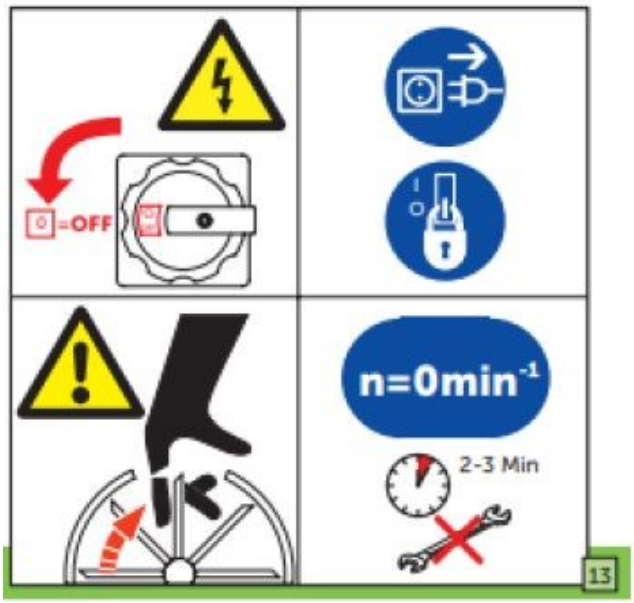
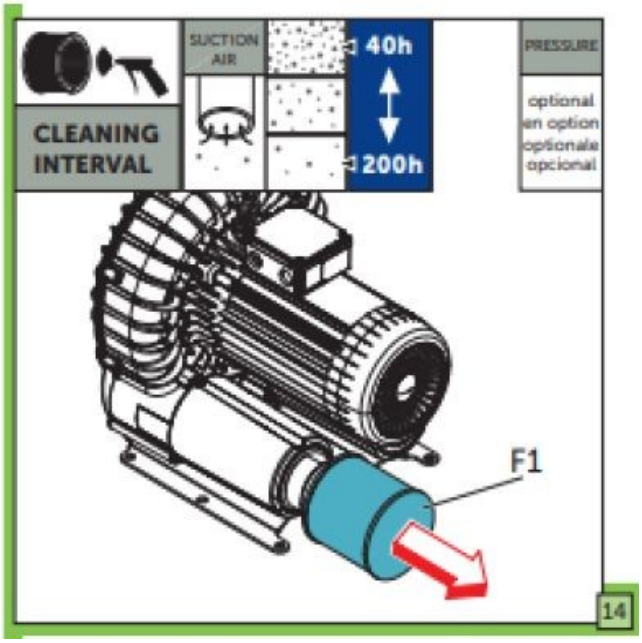


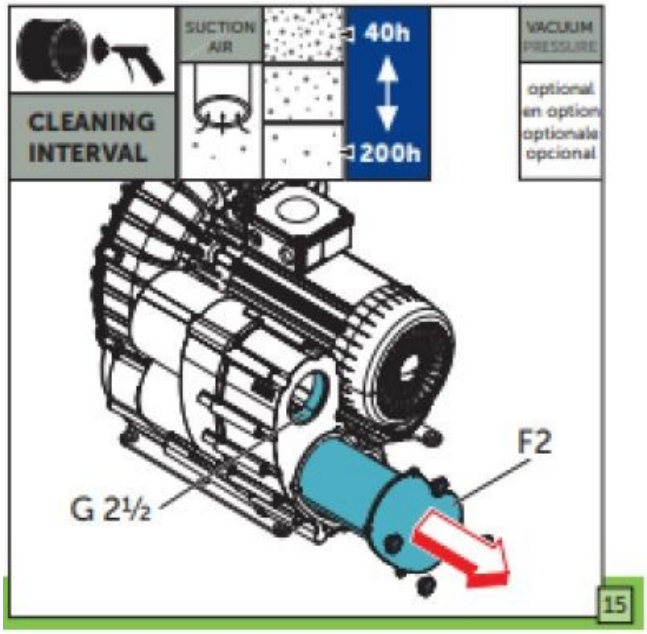
Step Thirteen:



Step Twelve:

Step Thirteen:





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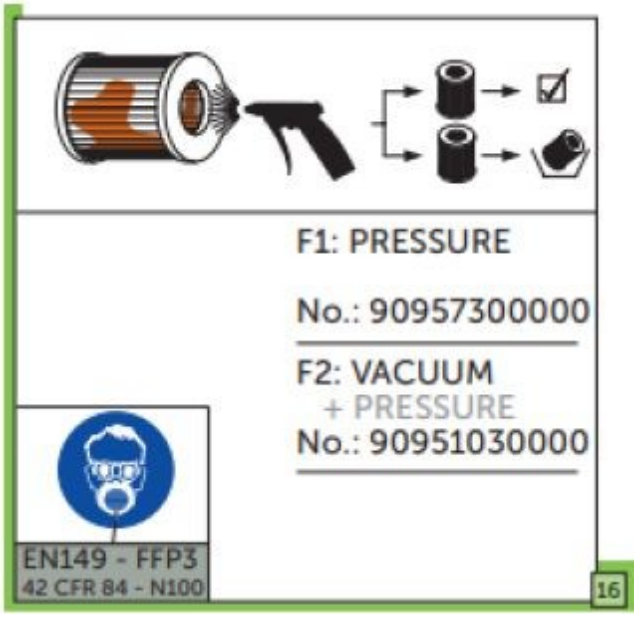
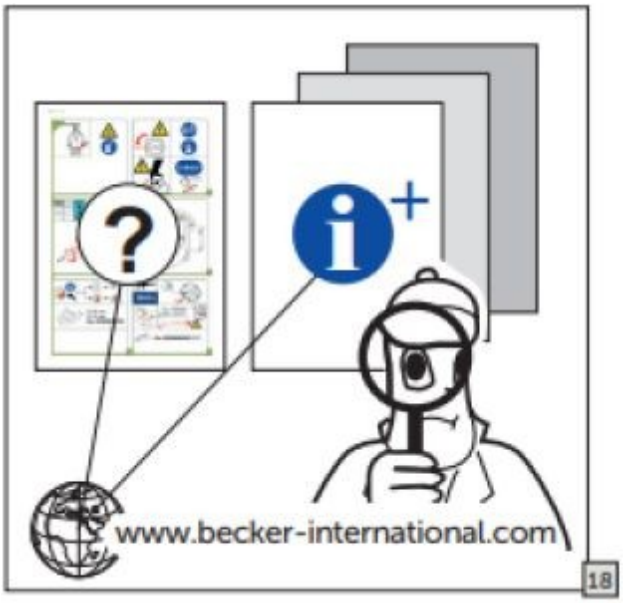


Step Seventeen:

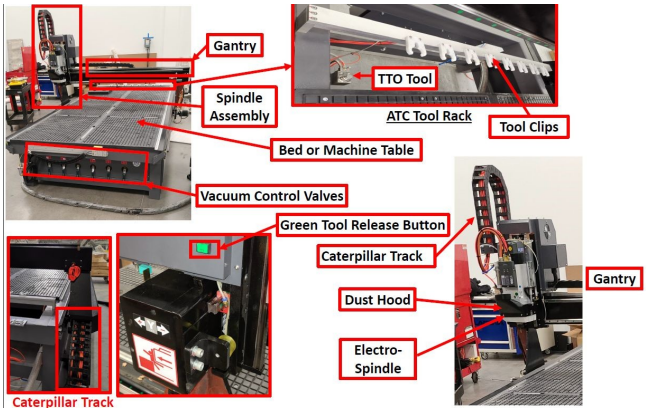
Step Eighteen:



More Information:

Introduction to CNC Machines

SmartShop SS2 Machine (B-Axis/Syntec Controller)



Smartshop SS2 Machine (B-Axis/Syntec Controller) Tool Kit

Name	Part No.	Part Name	Model	Qty.
Tool Kit	30505123	Toolbox (Domestic)	Rongyu	1
Collet	30505060	1/2" Inch Collet	ER32-12.7	1
Collet	30505065	7/8" Inch Collet	ER32-8	1
Collet	30505064	6 MM Collet	ER32-6	1
Collet	30505062	3.175 MM or 1/8" Inch Collet	ER32-3.175	1
Collet	30505063	1/4' or .250 Inch Collet	ER32-4	1
Collet/Spanner Wrench	30505028	Collet/Spanner Wrench	ER32-T2	1
Collet/Spanner Wrench	30505025	Collet/Spanner Wrench	30-32	1
Press Plate Screw	20202494	Press Plate Screw (Long Plate)	Long Board	8
Nut	40102475	Nut	M8	8
Nut (Butterfly)	40102537	Nut (Butterfly)	M8	8
Screw (Hexagon)	40102536	Screw (Hexagon Socket)	M8-40	8
Wrench (Hexagon)	30505042	Wrench (Hexagon)	Hekko Machine Dedicated	1
Straight Screwdriver	4010303009	Screwdriver	Large	1
Phillips Screwdriver	4010303007	#10-Screwdriver	#10-Large	1
Automatic Drainer	30511147	Automatic Drainer	QAD400-04	1
DSP Hand-Held System	30505355	Handle DSP Row Type Tool Change System.	B57	1
USB Cable	30505356	Data Cable (with B57 Row Tool Change System).	HDMI	1
USB Flash Drive	30505219	USB Disk	4G	2
Grease Gun	30505310	Any Type of Grease Gun.		1
Dust Collector Hose	30511072	Vacuum Cleaner Tube	Φ102	12
Clip	30315039	Clip	90-110	4
Filter Cotton	30511039	Filter Sponge	115*115*16	12
Screwed Pipe	30405040	Threaded Pipe	ϕ54.5	4
Screwed Pipe Joint	30405048	Threaded Pipe Fittings	ϕ54.5	2
Rubber Seal	30315033	Glue-(6.5*8)	E2-1325-71	30
Plug	30315017	Plug	30-40	20
One Set Labels on Cabinet		A set of all the Labels affixed on the Chassis.		1

Machine Location

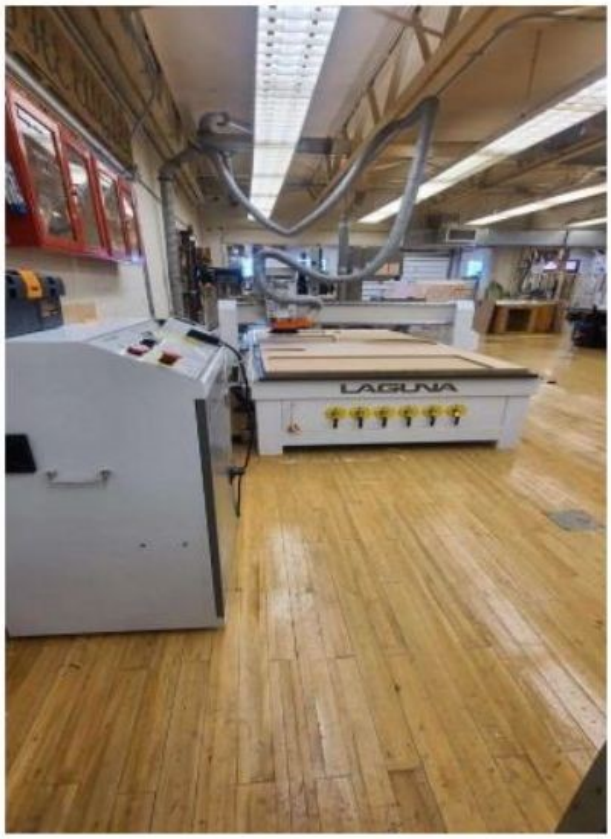
⚠WARNING Before unpacking the machine, select the area where the machine will be installed.

1)There should be an area around the machine suitable for the length of material that will be machined as well as any loading and unloading requirements.
2)There should be adequate lighting in the work area. The better the lighting, the better the productivity.
3)The floor area under the machine should be flat and solid so that the machine frame does not shift as the gantry and tool plate traverse. Concrete is preferable.
4)Consider the electrical and air supplies, vacuum pump location and dust collection when identifying an area to place the machine.

Installation Readiness & Set-up

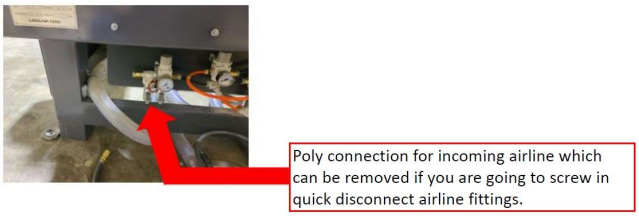
Installing your New CNC Machine

1.) Determine location, machine should have at least 3 feet around all sides. If you can't bend down between the wall and the machine neither can a technician if you need any repairs completed. Pictured is a typical machine layout. Not pictured is the vacuum pumps what are typically positioned behind the machine. Down in a later step you will see how most pumps are placed.



2.) When you receive your machine it will come with leveling pads, bolts and nuts. Before setting the machine down on the floor screw the bolts and nuts, bolt head facing upwards towards the tabletop. The pad goes underneath the frame and, on the floor, center the pads with each bolt as pictured. Then level the machine.

3.) Once the machine is leveled and you place the electrical cabinet on the floor you will be ready for electric, air and placement of the vacuum pump or pumps. Tool changing machines will require air between 95 and 100 psi 5-7 CFM at the machine. Manual tool change spindle will not require air unless you have an option like a misting unit. Laguna supplies a poly tube connection this can be removed if you want to put in a quick disconnect airline yourself. You are required to supply main power cable to the electrical cabinet, power cables from the cabinet to each vacuum pump, airline and connection to the back of the machine. Attached are a few pictures where to land power cables and air lines.



Once everything is wired do not turn on power. When the Technician arrives, she/he will make sure everything is correct.

Contactors to Vacuum Pumps Single Phase will have VFD Drives to connect Power Cables.

Main disconnect where incoming power connects . Use insulated connectors to connect power cables to the disconnect bolts.

Use this bolt to land vacuum grounds and main power ground.

Once everything is wired do not turn on power. When the Technician arrives, she/he will make sure everything is correct.

Closer look at the vacuum contactor connection. Laguna doesn't provide the cables to the vacuum; your electrician will need to properly size the wires to the pump and main disconnect according to your local codes.

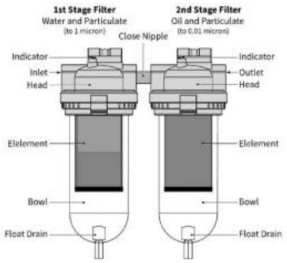
Typical Pump Wiring 208 to 240 Vac. Jumpers should look like these wires will land on **u1, v1 and w1 ground** will connect where you see the ground symbol.

Standard location for vacuum pumps.

⚠WARNING

Do not place vacuum under your machine, vacuums can get over heated. This will cause exhaust to be trapped at temperatures up to 212° F. Inlet air temperature should be less than 104°F. Also worth noting is that you will have to service the filters, and this is much easier to do with better access.

You will notice on your spindle one of these caution stickers these are talking about the bowls on the air inlets these are only back up protection if you get water here you are probably getting water, oil or contaminates into your pneumatic system and spindle. This can void your warranty, so it is important so have clean dry air to the machine.



Best way to prevent water Refrigerant Air Dryer and a 2-Stage Filter.

4.) Dust collection hook up. It is best to use duct as close to the center of the machine as possible. Some places will have height clearance issues the first picture in this document shows one with high height clearance and it's not the best solution. You may have clogging issue from time to time which will require you to pull the hose down and clean it out from time to time. Below is a better picture that shows a snorkel that we offer which works nice. Or you can supply your own system.

5.) Last thing software if you haven't received your software email your salesman to get your software. If you paid for a technician to come out, you will want to be ready. You should have your software training completed before the technician comes out. Mozaik is usually booked out about 3 weeks in advance so you will want to contact them right away to schedule your training. Mozaik will want your machine configuration. Example blew is a Smart Shop 2 with Syntec controller. Below that are all machine configurations.

Machine Configurations:
Swift & M2 (Rich Auto) SS2 (B&R or Syntec) SUV (B&R) Auto loader (Syntec) SS3 (Fanuc) (is the type of Controller).

•All machines Long Axis will be the Y-Axis.
•SS2 with B&R, SUV B&R and SS3 with Fanuc will be in inches.
•Swift, M2, SS2 with Syntec, Auto loader with Syntec will all be in millimeters.
•All machines you will want to choose top of the Spoil board.
•Auto Tool changer yes for all, except Swift.

NOTICE! Multi-Drill is only offered on the SS3 and Auto loader so if you have that option check yes. All other software programs please check our Laguna Tools Website at the link below:
https://lagunatools.com/resources/cnc-software/

Learning your Camming Software prior to the technician's arrival is your responsibility. Please have a working knowledge of the camming software so the technician can focus on the machine training. Technicians do have a working knowledge of Vectric Products and can assist, but they are not there for rudimentary software training.

All these steps must be completed before scheduling a technician to come out. If they are not completed a technician might not be able to complete all training and may have to schedule a second trip at the current daily rates plus travel expenses.

Like all machines, there is danger associated with the machine. Injury can be caused by lack of knowledge or familiarity. Use this machine with respect. If normal safety precautions are overlooked or ignored, serious personal injury may occur. As the CNC is under the control of the onboard machine controller, it is important that you are clear of the cutter when operating the machine.

List of Additional Accessories:
Clamps
Cutters & Collets
Memory Stick
Dust Hose Clamps
Tool Holders Wrenches

Unpacking Your Machine

Unpacking the Machine:
Unpacking the machine will require tin snips (to cut banding), a knife and an adjustable wrench. Follow the steps below:

1) Using the tin snips, cut the banding that is securing the machine to the pallet (if fitted).
2) **WARNING: EXTREME CAUTION MUST BE USED BECAUSE THE BANDING CAN SPRING AND COULD CAUSE INJURY**.
3) 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. (Please note, the machine is heavy, and it is recommended that professional assistance [rigging] be used for unloading and placing the machine.).
4) Use a forklift with sufficient lifting capacity and forks that are long enough to reach the complete width of the machine before attempting to lift the machine.
5) Remove the securing bolts that attach the machine to the pallet (if fitted).
6) Approaching the machine from the side, lift the machine on the frame, taking care that there are no cables or pipes in the area of the forks.
7) Move the machine to the required position and install the leveling feet.
8) Then lower the machine gently to the floor.
9) Level the machine so that all the supporting feet are taking the weight of the machine and no rocking is taking place.

Test Run Instructions

Preparation

1.) Check if the appearance of the machine is intact and if all the moving parts are at the Home position.
2.) Check to make sure none of the electric components in the cabinet are loose or damaged, and none of the wire terminals get loose.
3.) Check if all the safety devices are complete and all the buttons and electric parts are in the right positions.
4.) Check if the tool clamps and fixtures are installed tightly and check if they are displaced or damaged.
5.) Check if any electric components are damaged or the wire terminals are loose.
6.) Check if the cables are connected tightly. The zero line should be N or P line. Connection must be made according to the right line numbers or else short circuit might occur.
7.) Disconnect the circuit breaker and see if there is any abnormality. If so, clear the error before one operates the machine. Have a thorough inspection of all the parts and electronics before turning on the power supply.
8.) Check the pressure of each pressure indicator (Spec. 85 psi-95 psi).
9.) Turn on the power supply and switch on the machine.

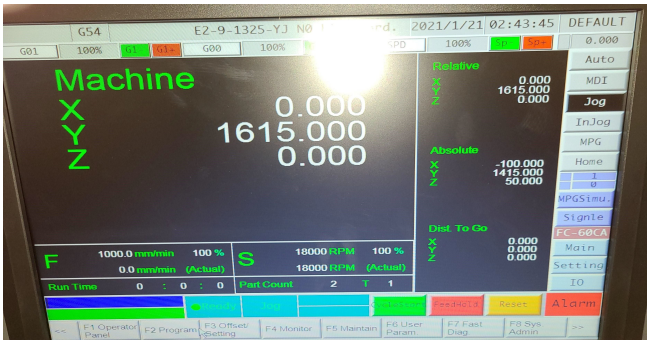
Main "On/Off" Power Switch

10.) Press the "**GreenPower On" Button**to turn on the power to the Controller Area, Press **"Red Power Off"Button**to cut off power to the Controller Area.

Wait for the system to boot, then release the **"Emergency Stop Switch"**. To release **"Emergency Stop Switch"** turn the red knob a ¼ of turn "Clockwise" to release.

NOTICE! Press this "**E-Stop Button**" when one is in personnel danger or a problem occurs during the table operation, then all the electric controlling of the table will be cut off.
At this time, except the power of the controller, the power of the servo motor, spindle and metalworking fluids will be cut off to ensure personnel and machine safety.

11.) The Control Software Interface will automatically materialize on the computer screen when the machine is powered up and turned on.
To begin, select origin mode, **"Home"** then **"Cycle Start"**.**The Machine "B" Parameter Setting, will not be present, unless one selects the setting in a prior operation.**



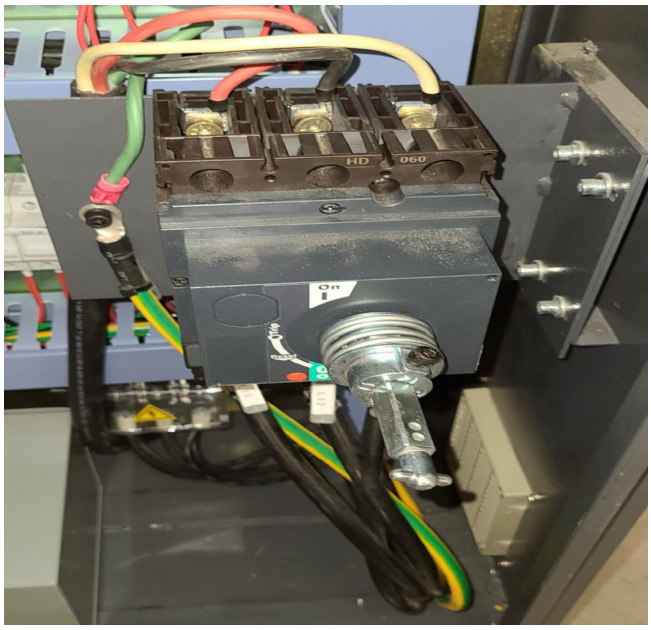
Machine Set-Up

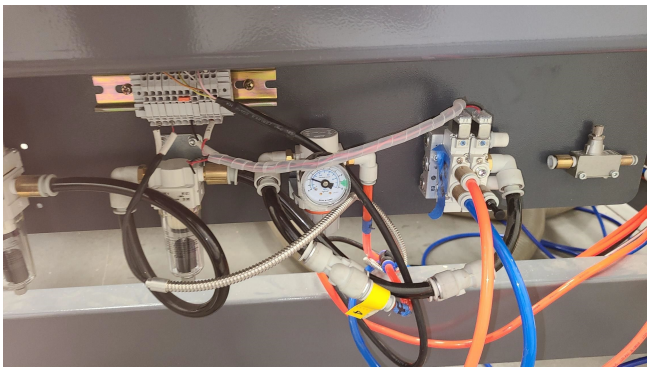
1.) Using Leveling Feet, Support and Level SS2 CNC Machine.

2.) SAFETY-Verify your shop/building has proper electrical supply. For confirmation on this, call customer service (1-800-234-1976) for diagrams verifying proper voltage & amperage requirements.

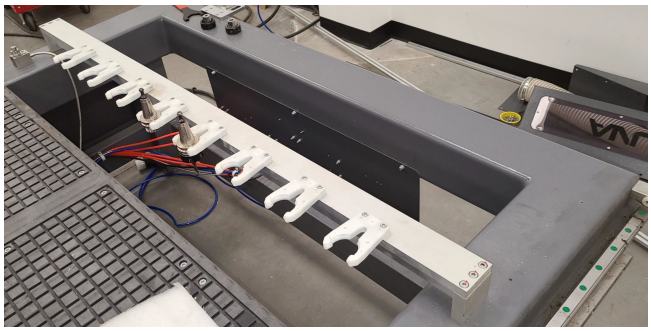
3.) Have a Certified Electrician wire from building breaker into control box (Does not need to hook up L1, L2, and L3, but they must run the wire into the box.)

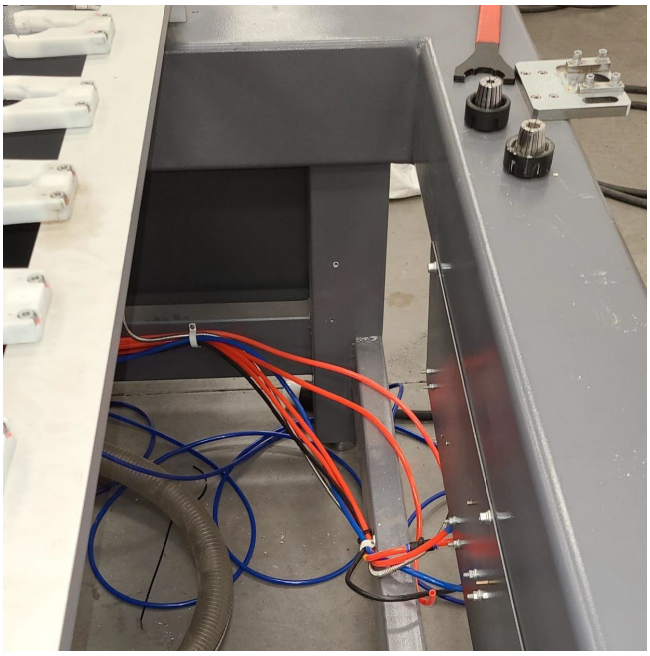
4.) Have a Certified Electrician wire from contactor to vacuum. (Run wires to vacuum and into box, we can wire once the wires are inside to the contactor. Vacuum has a Legend-Plate, electrician must decide wire size).





5.) Hook up clean, dry air to compressor on rear of machine underneath tool rack. (We do not supply inlet connector) Needs to be 85 PSI-95 PSI.





6.) Verify all items that were purchased and are on the sales order were sent and included. Verify there is a dust hood on the spindle. (If any items are missing, call customer service (1-800-234-1976 for verification on missing items so they may be sent out)

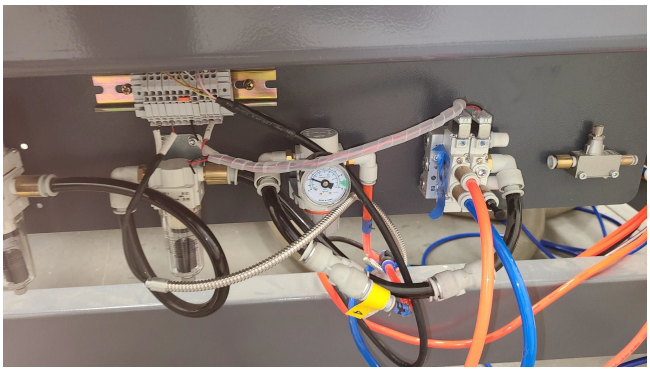
7.) If providing own tooling, verify all proper tooling is available and readily available.

8.) Acquire adequate supply of materials to be cut during install including MDF Board for a Spoil Board to be placed on tabletop (Spec. .75" –1" Think).

9.) Install all software ahead of time. Review tutorials and gather basic understanding of software before technician arrives.

10.) "**Read & Review Manuals"** and try to familiarize with machine and basic components.

11.) Get **30W Oil** for lubrication purposes **(DO NOT USE WD-40 as a lubricant!).**



The machine is supplied with an air regulator. The input air regulator regulates the air pressure that is supplied to the machine. You will require an air supply that can deliver a constant minimum pressure of 85 psi. The input air regulator will need to be adjusted to 85 psi-95 psi once you have connected your air supply to the machine.

Note: No air pipe is supplied, as the length will depend on your installation. To adjust the air pressure, pull the cap out (up) and rotate until the gauge reads the correct pressure. Once the pressure is adjusted, push the cap in.
Note: It is strongly recommended that 90 psi is supplied to the SmartShop II and that the regulator then be set to 85 psi. This will ensure that the machine always has the minimum required air pressure. The input regulator has a moisture trap that must be emptied each day.
Note: It is important that the air that is supplied to the machine is clean and dry. The machine will not perform consistently if the air is wet or dirty, as any dirt and moisture will block the valves. Wet, damp or dirty air will damage your machine and cause inconsistent performance.
Note: The pneumatic system does not need any type of lubricant. Some types of lubricant can damage the machine and compromise the machine's functions.
Note: During maintenance, always disconnect the air supply.

Set-Up Instructions Cont'd:
1.) Per Unpacking Instructions make sure remove all protective coating and packaging.
2.) Make sure check if machine has all the tooling (kits, etc.) components that were placed in your order.
3.) Make sure that the building/shop have appropriate electrical voltage and amperage for machine(s) purchased.
*Electricians and service staff are welcome to contact our Customer Service if they have any questions (Toll Free: 1-800-234-1976).
4.) Make sure one has access to the main power source and available and can be pulled to the Electrical Cabinet and all Vacuum Pump(s) for use.
5.) All machine(s) must be leveled with the leveling feet installed.

⚠WARNING
Clean Dry Air is vital for the machine(s) performance. Make sure the clean dry air is available & compressed and can be attached to the machine(s).
Prepare adequate supply of materials for practice cutting as well as several 3/4" Medium-Density Fiberboard(MDF) sheets for use as spoil boards (material to be cut and tested on).

Make sure the technician who is to be trained to operate purchased machines, learns the software prior to set-up/training.

Should a technician representing Laguna Tools not be able to come to the site and work on the machines due to the lack of preparedness or inoperable equipment per the above and/or beyond Laguna Tools control any expenses incurred will be passed on to the customer.

Smart Shop SS2 Syntec Set-Up

Syntec Setup and Running the Machine:
First home machine click Home, cycle start
To jog go to Main, click jog then click on x, y or z positive or negative depending what direction you want to jog.

TTO Set-Up:
(F8) system admin, F3 Param, F5 goto param, type in 3411, enter 0 it will ask for password enter 520.
This will set 3411 to 0.
Touch Off Tool, load end mill in the tool 1 position (Laguna Tools Technicians prefer to use the 3/8 compression, but any flat bottom end mill will work for this step.
Main, auto tool, MDI, monitor, mdi input, type in tool number T1, F1 confirm, cycle start.
This will pick up the tool and touch it off to the TTO (Tool Touch-Off) Switch. Once touched off jog the tool to the phenolic and subtract the machine coordinate by the tool length. To get the tool length go to Main, (F3) Offset/Settings, (F2) Tool Set, Length Geometry for 1 is the Tool Length. The difference from tool length and machine zero is the value for 3411.
TTO switches that are raised above the phenolic will always be a positive number and below the will be a negative.
After 3411 setting is entered, you will need to touch off the tool again.
At this time, you can touch off all new tools.

Tool Position Setup:
SET TOOL LOCATIONS-
SETTING > 520 (passcode) > F5 > 520 (passcode) > OK
MPG Handheld > Jog to Tool Position > Select "Set T#" > Repeat on Tools #2-#8.

Spoil Board Setup:
1. Place a the 1.5” Inch Fly Cut Tool Bit in ATC Tool #8.
2. Make sure the external shift is set to Z0.
3. (F3) offset/settings, external shift set z to 0 (click on the z value so its highlighted then on the blue bar below type in 0 and enter this will set external shift to 0 if it’s not already at 0. If it’s set to 0 already skip this step.
4. Now pick up tool 8 make sure auto tool is off on the main screen.
5. Main, MDI, F4 monitor, F3 mdi input, type in tool number T8, F1 confirm, cycle start to pick up the tool.
6. Now set your X Y 0 origin.
7. Jog the tool so it is centered with the front left corner of the MDF and set the P1 G54 position.
8. Go to (F3) offset/ settings and set the current machine x, y valve to the P1 G54 x and y.
9. If you always use this same origin and it’s already set, you can skip this step.
10. Touch the fly cutter to the table, jog machine so the bit is near center of the table and lower Z about ½ inch above the spoil board. Turn on vacuum by clicking pump 1 and 2 if you don’t have a second pump only turn on pump 1. You will want to bring the dust hood up to see the tool. To do this click the brusher button (When you want to bring the hood back down click it again).
11. Now click “MPG” and use the hand-held mpg to bring the z down until it’s just touching the MDF Board. Once touching you will enter in the machine z value as the tool length.
12. To enter the tool length, you will go to Main, (F3) offset/settings, (F2) tool set,
13. Enter in machine Z value to the length h geometry for Tool #8. Once this is set you are ready to run the fly cut program.
14. Load fly cut program go to Main, click auto which is at top right corner of the screen, F2 Program, F8 file manager, click on fly cut program, F5 execute, now it’s ready to run click cycle start. If the program isn’t already loaded to the controller use your USB drive.
15. F2 Program, F8 File Manager, F4 File Transfer, F1 File Import
16. Click on the fly cut program, F1 copy, << 2 times, click on the file to run “flycut”, F5 Execute

17. Cycle start to run program.
18. Once finished you need to set the external shift Z (external Shift Z is for your spoil board thickness)
19. Go to Main, click auto tool, MDI, F4 monitor, F3 mdi input, type in tool number T1, F1 confirm, cycle start this will touch off tool 1.
20. Jog Tool 1 and bring the bit down to the spoil board with the vacuum on. Subtract Tool 1 length by the machine Z value. This will be the thickness of your spoil board. This eliminates the need to use a caliper to measure your spoil board thickness and is a really accurate way to set your spoil board thickness.
21. Go to (F3) offset/ settings in external shift set Z to this value.

Running A Program And Copying The File To Run:

1. Click “Auto”.
2. Main, turn on vacuum pumps, start
3. (F2) Program, (F8) File Manager, (F4) File Transfer, (F1) File Import.
4. Click on the file you want, (F1) copy, << twice, click on the file to run, (F5) Execute.
5. Cycle start to run program.

Delete A File:

1. (F2) program, (F8) file manager, (F3) delete file, click the file again, (F4) delete file.

MDI Command to Move Machine to Zero:

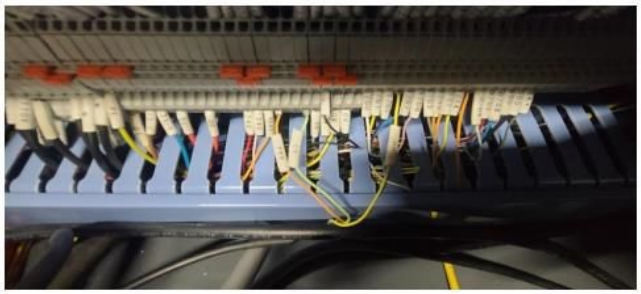
Main, MDI, F4 monitor, F3 mdi input.

G54G0X0Y0

4th-Axis Setup:

Wire the harness power wires to the 4th-Axis Drive wire may already be connected remove them and wire the harness here.

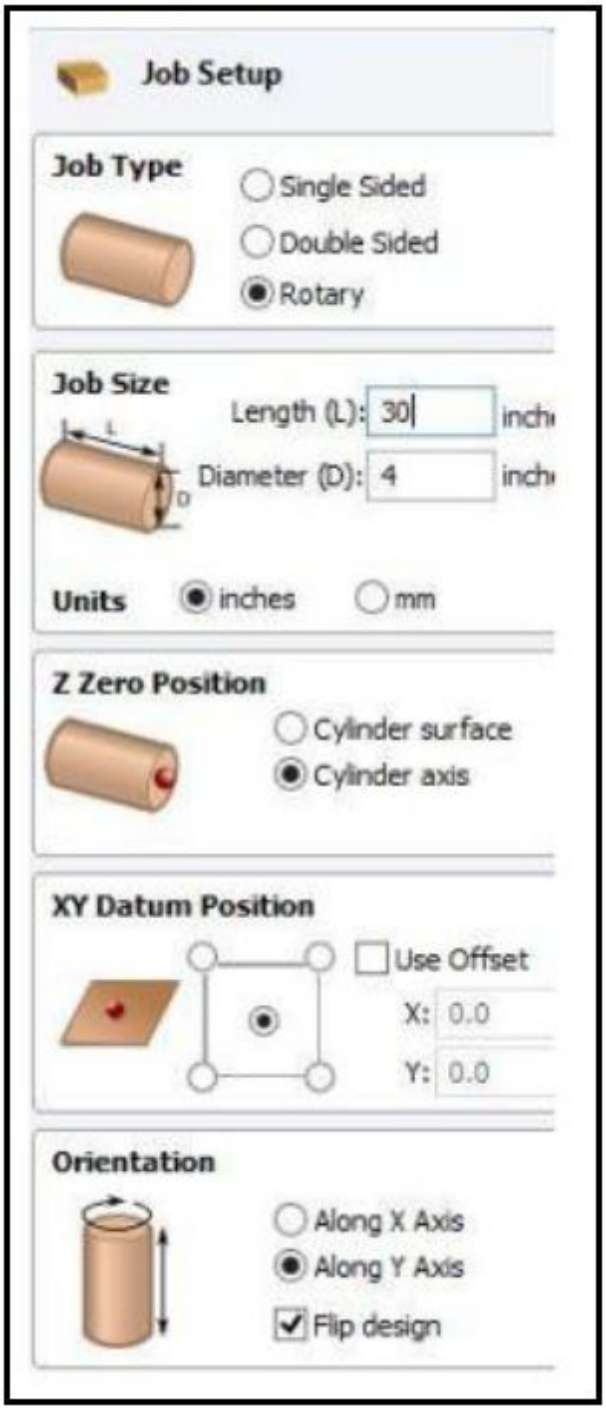
Then wire the sensor to the terminal strip 3 wires 0vdc, 24vdc, and H0. H0 wire will go to I/03.



Once completed power up machine and change parameter 24 from 0 to 4 reboot machine and home machine and the 4th axis should be operational.
Write down the external shift Z setting so you can go back after running the 4th axis then set it to 0. V bit will work best make sure it has been touch off then bring the tool to the center of the 4th axis tail stock dead center point. Subtract Tool length by the machine Z value this is what you will enter into the external Z setting.

In aspire or v carve pro setup is really simple the attached picture is for a 4” inch diameter, 30” inch long piece of material. Before moving the head away from the tail stock end note the position of the X jog the head up so you can load your material and mark the center of the 30” inch length this will be your Y position. Jog the Z Up-Load the material and then jog the tool the center mark you just made. The machine X and Y will be your new P1 G54 X and Y value so write down what P1 G54 is so you can change back to this after running the 4th-Axis.

Syntec Set-Up Parameters



Parameters
F8 system admin, F3 Param, F5 goto param
Password (520)

TTO
2841 –X
2842 –Y

Max Cutting Feeds
621 –X
622 –Y
623 –Z

Rapid Speeds
461 –X (800 IPM) (20320 MM)
462 –Y (800 IPM) (20320 MM)
463 –Z (150 IPM) (3810 MM)

Y-Safe
3410

Max RPM
3460 (240000 RPM)

Change to Inches
[MAINTAIN]
[SYSTEM SETTINGS]
Change to ‘1’

Rotary
24 (0 off) (4 on)
Must be Hooked Up to Enable ‘Home’ Sensor
Must reboot.

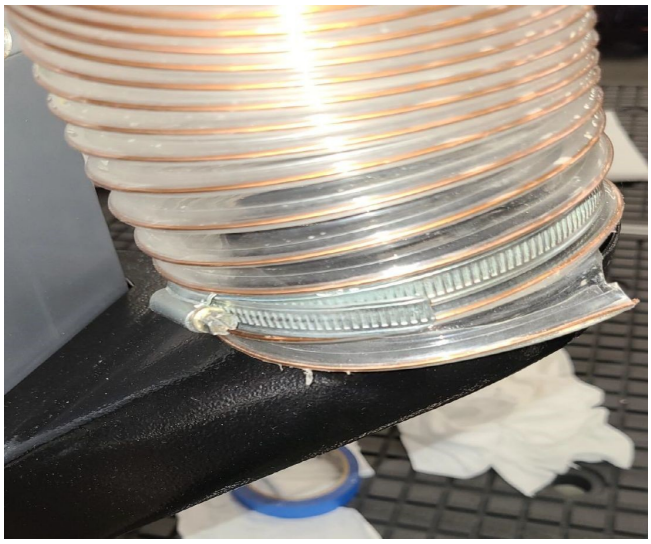
VFD Parameters

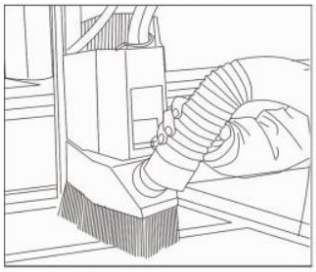
(3) VFD MS300 Parameters Delta MS300-		
Number		Comment
00-02	9	
00-03	1	
00-20	1	
00-21	1	
00-23	1	
00-32	0	
01-00	800	
01-01	800	
01-02	220	
01-12	10	
01-13	10	
02-16	34	
02-17	3	
05-00	2	
05-01	25	
05-02	8	
05-03	17999	
05-04	4	
05-05	10	
06-06	4	
06-07	74	
06-08	6	
07-01	20	
07-02	0	
07-03	1	
09-00	1	
09-01	19.2kbps	
09-04	12	

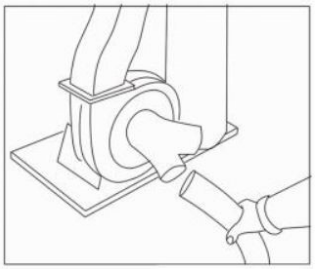
Installing the Dust Hose

1.) Take out the dust collector and install it according to the instruction. Balance it on the floor. Fit the dust shroud to thetwo air cylinder rods and clamp in position with the clamping nuts.

2.) Fit a 4-inch (not supplied) dust hose to the dust shroud and secure with the clamp. Ensure that it is tight; it is very inconvenient to have it fall off during production.







3.) The head of the machine will move across the complete table, and the dust hose will follow the head. 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 shop with sufficient slack so that it will not restrict movement. It will also be out of the way and not causing a trip hazard.

4.) Connect one end of the hose to the dust collector and the other to the machine, as indicated below.

5.) Connect cable to the dust collector.

6.) Connect the cable to the power supply.

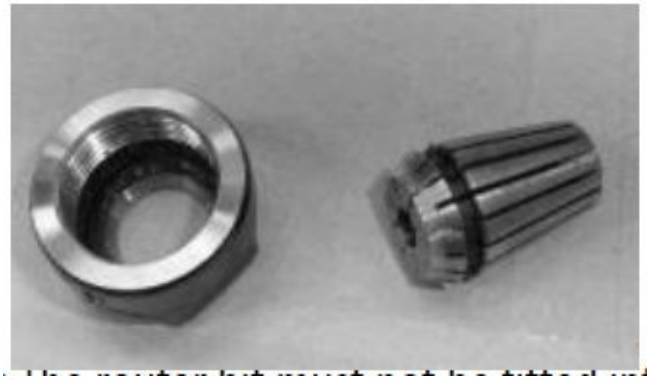
7.) Power on the machine to see if the motor rotates CW. If not, swap any two of the live wires.

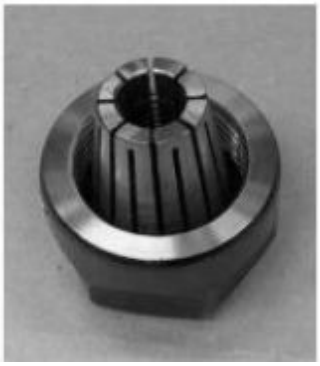
Installing the Router Bit

Installing the Router Bit in the Tool Holder **Caution:**Before changing or fitting the router bit, always **disconnect the power to the machine.**

1) Select a router bit and its 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 can not compress and “snap” into the spindle nut. The face of the collet and the face of the spindlenut will be close to flush.

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 tryto 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 tool holder spindle thread by hand.
Press the bit into the collet. Note that the flute of the router bit must not be inside the collet and should be a minimum of1/16" outside the collet. Hold the toolholder with the supplied wrench and tighten the collet with a second wrench. Do not over tighten.

Note: Use this process to install each of the router bits into the tool holders, being careful to use the correct collet size for each router bit. Note: Keep the collets clean and blow all dust out of the slots. Fine dust accumulates and may affect the clamping action.

Operation (Tutorials)

Read carefully before operating the machine:

1)Keep the working area clean and be sure adequate lighting is available.

2)Do not wear loose clothing, gloves, bracelets, necklaces or ornaments. Wear face, eye, respiratory and body protection devices as indicated for the operation or environment.

3)Be sure that the power is disconnected from the machine before tools are serviced or an attachment is to be fitted or removed.

4) Never leave the machine with the power on.

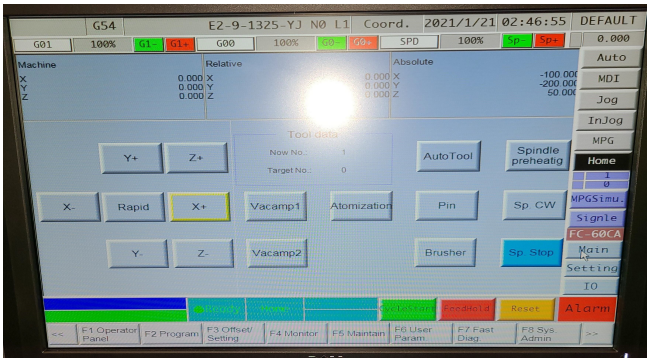
5) Do not use dull, gummy or cracked cutting tools.

6) Be sure that the keys and adjusting wrenches have been removed and all the nuts and bolts are secured.

Software Operation:

1.) **About Syntec Folder:** Please do not delete Disk “C” and Network in the : ”D” Disk of the computer. Disk “C” Folder: System Interface File, Connect Controller, Modify Parameter Setting.
Network Folder: The process is stored here.

Main Interface

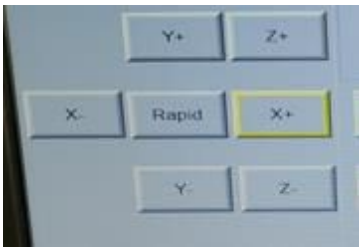


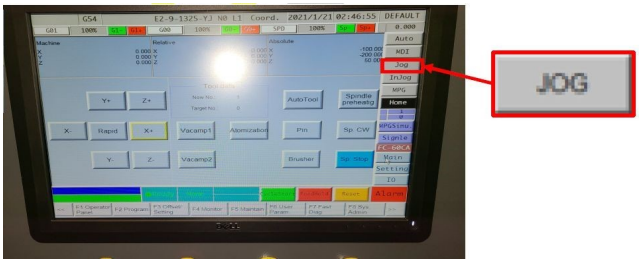
Processing Speed Adjustment:
Press G1-or G1+to reduce and increase the processing speed.

Idle Speed Adjustment:
Press G0-or G0+to decrease and increase the Speed Spindle speed adjustment.

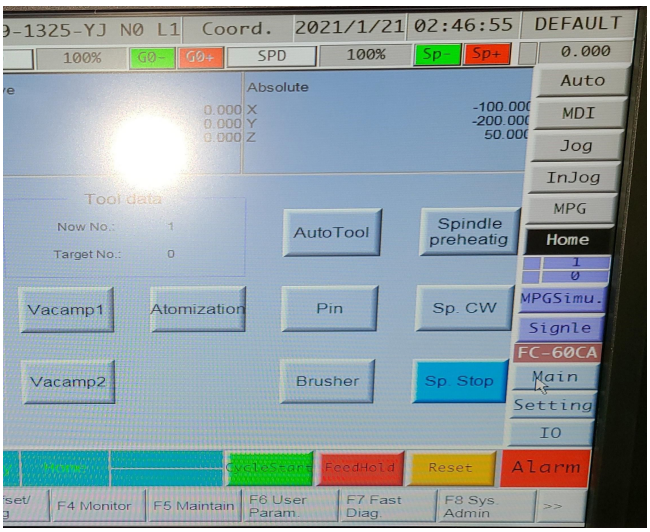
Press SP-or SP+to decrease and increase the rotation speed of the spindle.

RAPID: Fast moving machine X+Y+Z+B+ X-Y-Z-B-: In **"JOG"** mode, move the machine manually.





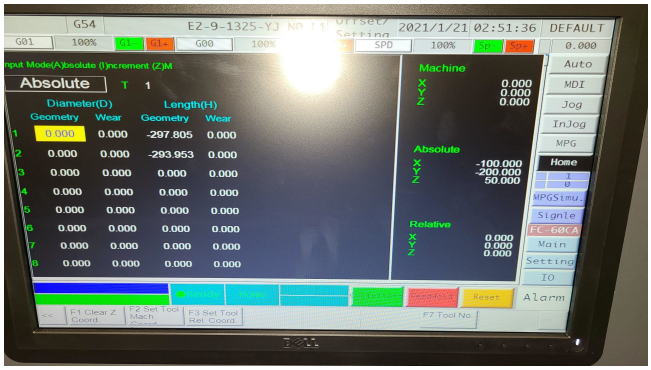
Button Overview:



Button	Function
OVER TRAVEL	Cancel hardware overdrive alarm.
AUTO TOOL	Tool length is measured using an Auto Tool Sensor.
SPINDLE PREHEAT:	Preheat the spindle, if you do not use the machine for a long time, you need to use this function.
VACUUM1 OFF	Vacuum Pump1 On.
VACUUM2 OFF	Vacuum Pump2 On.
SUCT	Table vacuum on.

Button	Function
	.
SP. CW	Spindle Clockwise.
SP. STOP:	Spindle Stop.
BRUSHER	Spindle Brush Up and Down
“O” PIN DOWN	Under positioning cylinder down.

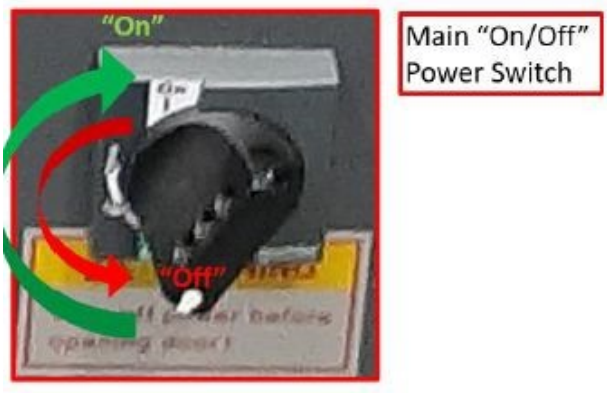
Tool Management Interface



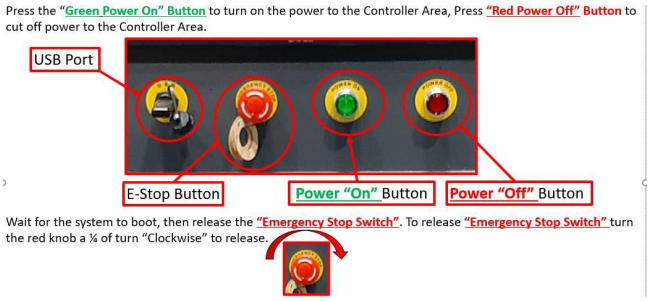
Auto Tool Set

Machine Operation Instructions

How to Power On:



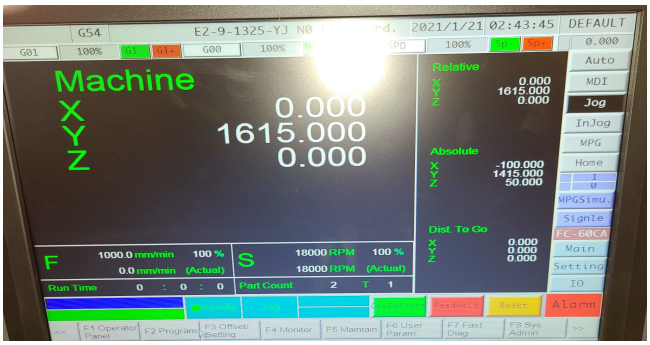
Release the emergency stop button and switch on the PC, and the system enters the main interface after the auto check.



How to Power Off:

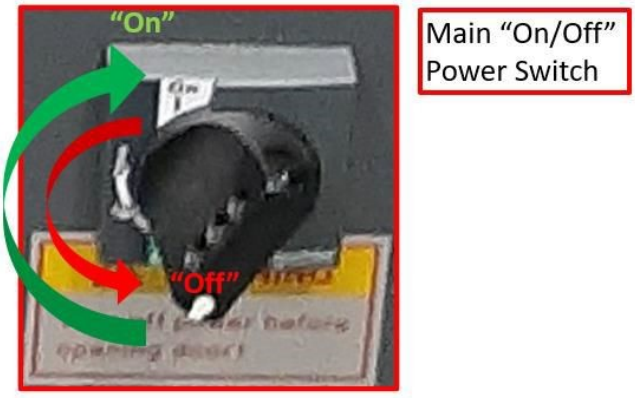
1.) Before machine stops, first press the "Emergency Stop Button.

2.) Exit the System Operation Interface.



3.) Shut Down the Personal Computer (PC) “Off”.

4.) Turn the knob on electric cabinet door Counter-Clockwise.



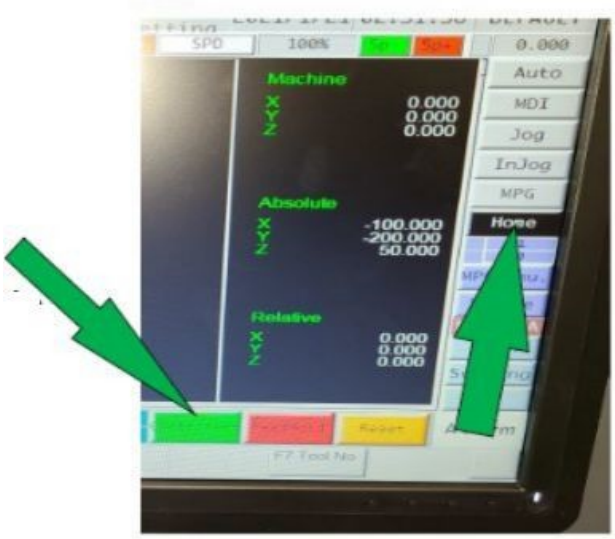
Emergency Stop:

In case of safety emergency, press the “Emergency Stop Button/Switch” and all the machine parts except for the controller are disconnected from the power supply to ensure personal and machine safety.

“Emergency Stop Button/Switch”

Auto Go Home:
After the system self check is complete, it will direct you to the main screen. Release the “Emergency Stop Switch” (1/4 Turn Clockwise to the Right) .
The system will prompt you to go home.
All Axis **MUST**be homed before you start to operate the machine.

Methods:
Click on the “Auto Go Home Button” and “**Cycle Start Button**”,
the Z Axis will go home. After Z Axis is homed, X and Y axes will begin.

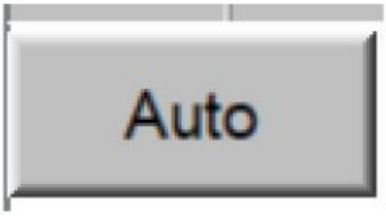


Operator can jog the machine in the desired direction. Methods: Click on the “Manual Jog Button” to enter. Control the movement with axes directional keys--『X+,X-,Y+,Y-,Z+,Z-』. Caution: Click on the “G0-” key to reduce the speed before entering this mode. If it is safe, you can use the “G0+” button to increase the speed.

Idle Speed Adjustment:
Press G0-or G0+to decrease and increase the Speed Spindle speed adjustment.

MPG Handwheel

Operator can move the axes by spinning the "**MPG Handwheel**".
Methods: Select the "**MPG MODE**" Define the axis, direction and speed.
i.) Spin the handwheel in the Clockwise (CW) direction, the machine will move in the positive direction.
ii.) Spin in the Counter-Clockwise (CCW) direction, the machine will move in the negative direction.
The speed is determined by the selected speed value.

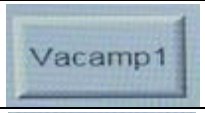
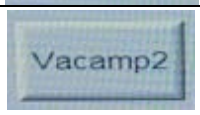
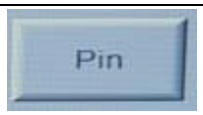


Auto Mode

Operator can process a job under this mode. The machine will automatically run the NC program.

Methods: Select the program file you wish to process. Set the job origin and tool length offset value, then press "**Auto ModeButton**". This mode is only available after all axes have been homed.
Press the "**Auto Mode Button**" and the system will begin process the selected file.

Buttons:

Button	Function
	This mode allows the operator to write one block and execute that block..
	When you press this button, the vacuum will be turned on.
	Press once, the vacuum pump will be turned on. Press again, the pump will be turned off.
	Press once, the pop-up pins will rise. Press again, the pins will go down.

Button	Function
	Press to access the Tool Screen.
	Press to go to the main screen.
	Press to Reset.
	Under Auto and MDI Modes, press once to start processing the program
	Press to “**Freehold Button**” to pause the process.
	If you wish to restart, press “**Cycle Start Button "for“Program Start**” to restart.
	Under manual continuous mode, manual jog mode and hand wheel mode, **pressing this button can stop the spindle.**
	Press to make the spindle spin in the Clockwise (CW) direction under manual continuous, manual jog and hand wheel modes.

⚠ CAUTION **All axis must be homed after power is “On”.**

As tool setting and job coordinate setting must be done based on the mechanical reference point, after CNC is switched on, reference point must be confirmed with all axes going back “Home”

.

The Syntec Controller can’t be started by auto NC program.

1.) Release the emergency switch. The system will display “READY”.

2. Press the “**HOME**” softkey. Press the “**Cycle start**” softkey.

Note: “**HOME**” Z axis before other X, Y Axis to avoid interference.

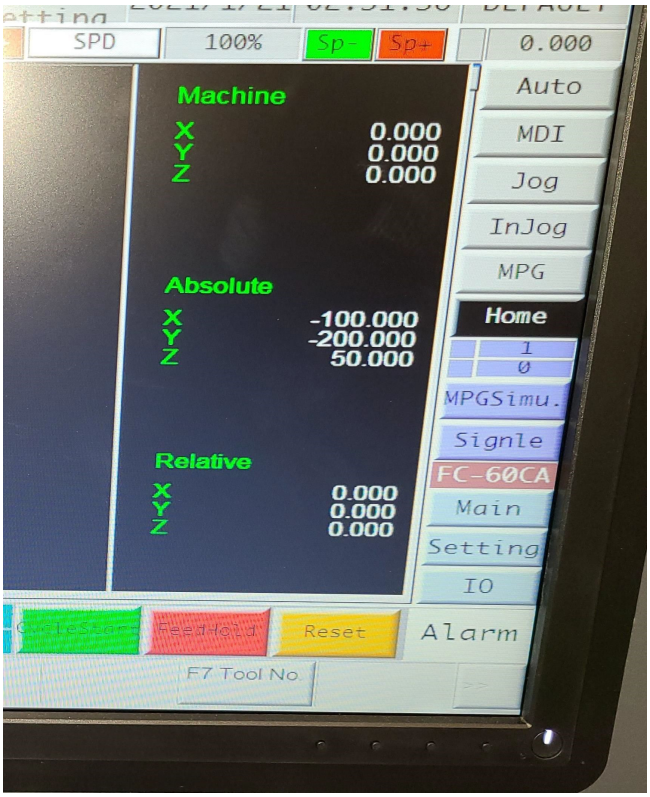
3.) Note: The homing direction can be set in the CNC parameters.

4.) Note: The homing function homes all three axes together.

5.) Note: After homing, the mechanical coordinates are all “0”.

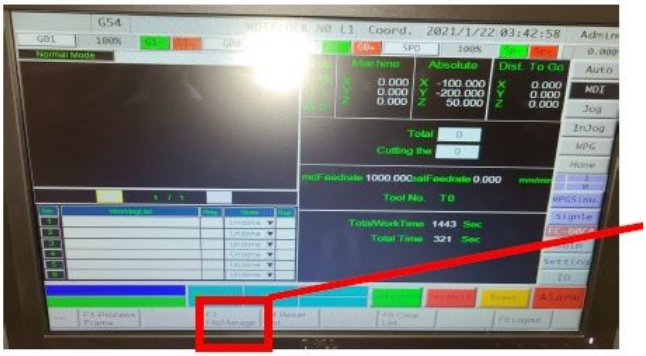
6.) Note: The software limit switches of the machine are not enabled until all axis are reset.

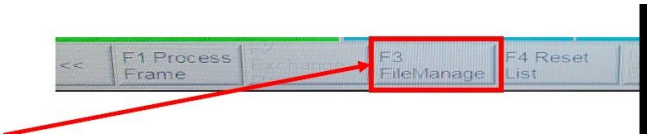
⚠WARNING **Do not engage the machine in movement too fast until the axis are reset.**


SPD
100%
Sp
Sp+
0.000
Machine
X 0.000
Y 0.000
Z 0.000
Absolute
X -100.000
Y -200.000
Z 50.000
Relative
X 0.000
Y 0.000
Z 0.000
Auto
MDI
Jog
InJog
MPG
Home
1
0
MPGSimu.
Signle
FC-60CA
Main
Setting
IO
Reset
Alarm
F7 Tool No.

Part Program Selection

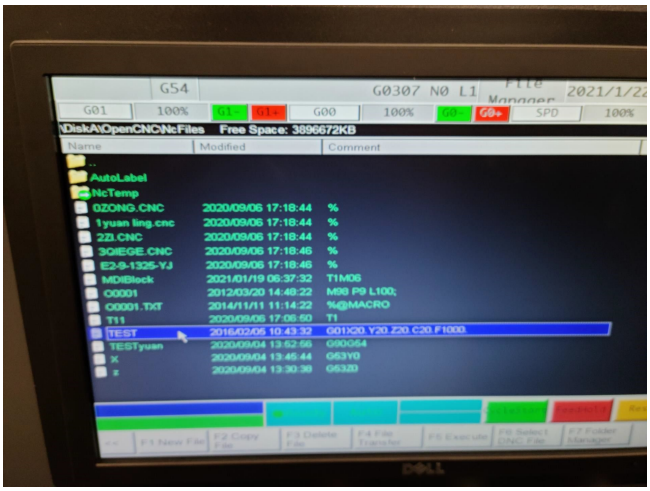
Select “**F2 PROGRAM**”



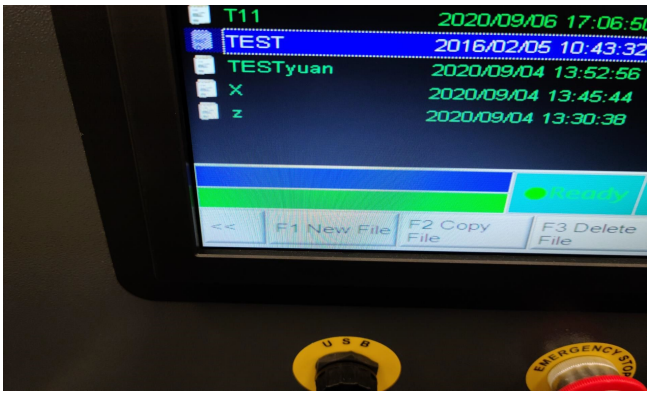


Navagating the
1.) Select “F1” Operator Panel.
2.) Select Program , Select “F2” Program
3.) Then Select “F3” File Manager.

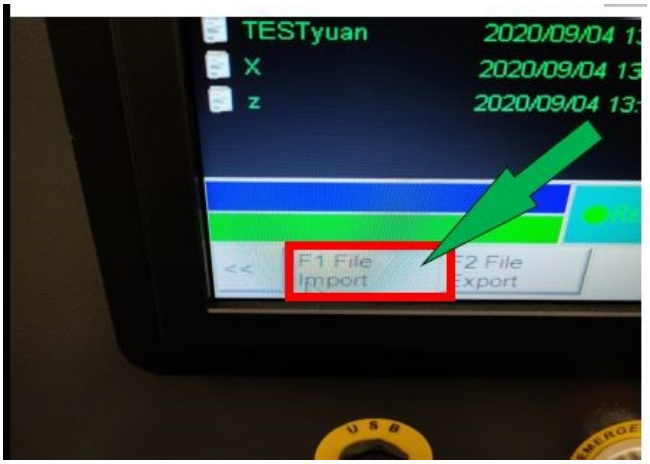
Select the processing file, to “**F1 Execute**”.
4.) Select File for Execution.



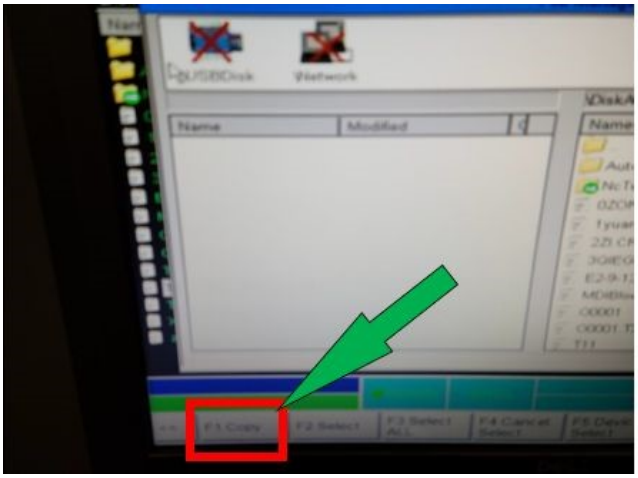
5.) Select F2-Copy File for Execution.



6.) Select "**F1**"-File Import for Execution.



7.) Select “**F1**”-Copy File for Execution.



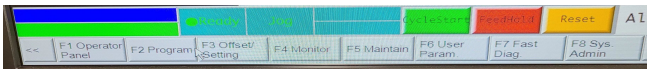
8.) Select “**F1-Execute**”-To Execute File.


Ready
<<
F1 Execute
F2 Delete Line
F3 CanCycle
U S B
EMERGENCY STOP

Job Origin Preset

Job Origin Preset

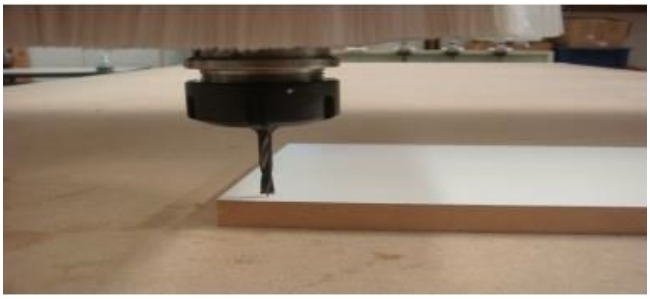
Click on the "**F3 OFFSET/SETTING**" softkey on the bottom menu of the main interface.
And we use G54 as the "0" Point of Processing.



And we use G54 as the "0" Point of Processing:

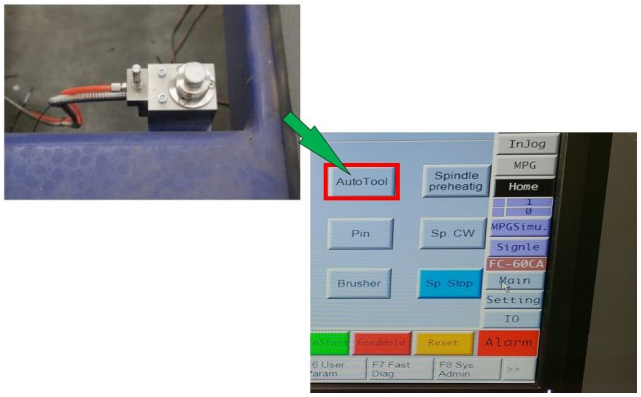
Press the "**Hand Wheel Mode**" to control and move the X/Y/Z axis to material processing surface,
(For irregular materials, users need to set a center, and the workpiece origin should be benchmarked on the zero surface on which the tool is aligned with the workpiece).

ENTER, When the yellow cursor has been moved to X, press FI on the panel (Latch Machine cord), and the following note will be shown:
Choose "**Yes**" , and press "**Enter**" on the panel.

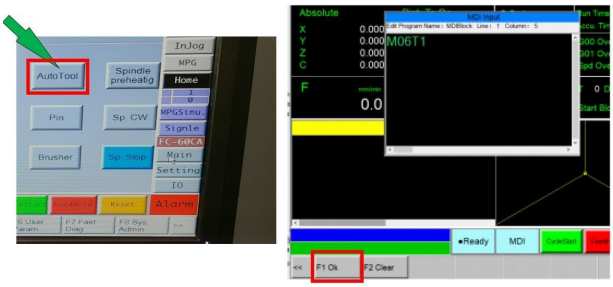


(Set Workpiece) Choose F5 (Set Workpiece).

Spindle tool length measurement using auto tool sensor



Press the "**AUTO TOOL Button**" to enter the TOOL number to be measured in MDI mode.



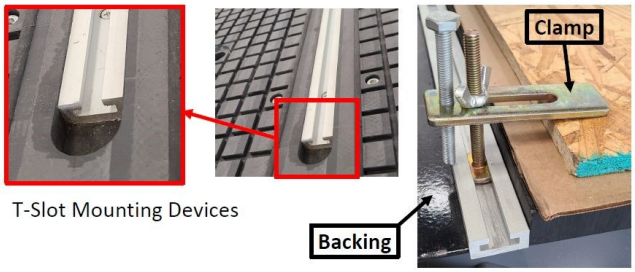
Click F1"OK" and the machine will automatically measure the tool length.
After the measurement is completed, the machine will automatically enter the tool length into the system.

	Diameter(D)		Length(H)	
	Geometry	Wear	Geometry	Wear
1	0.000	0.000	-201.000	0.000
2	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000

F3 OFFSET/SETTING F2 TOOL SET

Vacuum Table T-Slots & Automatic Tool Changer (ATC)

The vacuum table has T-slot mounting devices incorporated into the tables to enable fixtures and material blanks to be clamped directly to the table.
Clamps are provided, but the table must be protected with a backer when using jacking bolts. If the jacking bolts come in contact with the composite or aluminum of the table, the materials could be damaged. The backer should be as large as possible to spread the load on the machine table.

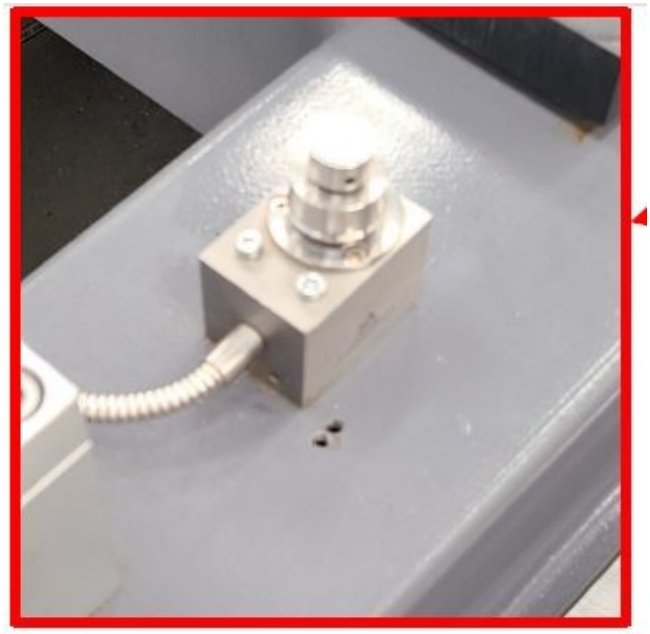


T-Slot Mounting Devices

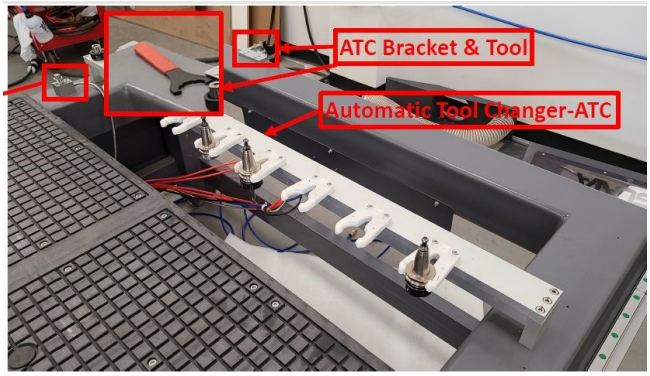
T-Slot Clamps

Automatic Tool Changer (ATC)

The Automatic Tool Changer consists of a group of tool holder grippers mounted to a rigid bar. The machine control knows the location of each of the grippers and will load and unload tools automatically as required by the program.



Tool Touch Off Switch-TTO



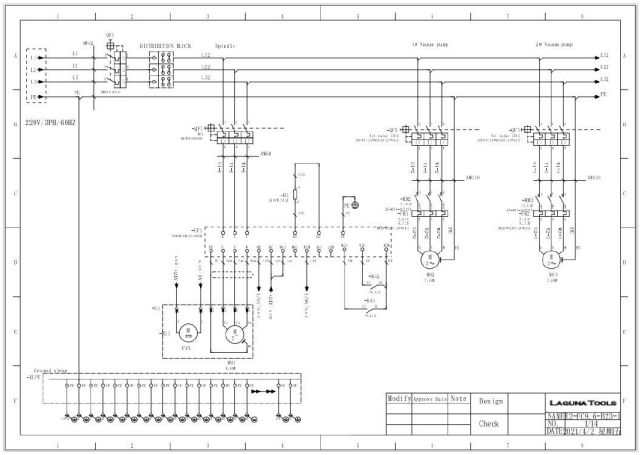
Subject: Automatic tool changing CNC maintenance overview.

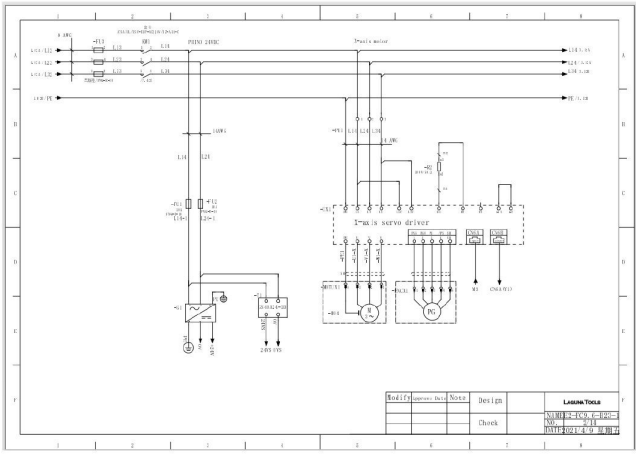
1.) Frame Rails and Oiling System.
2.) Axis Drive Points.
3.) Tool Holders and Spindle Points.
4.) Electrical Points.
5.) Vacuum System Points.
6.) Pneumatic System Points.

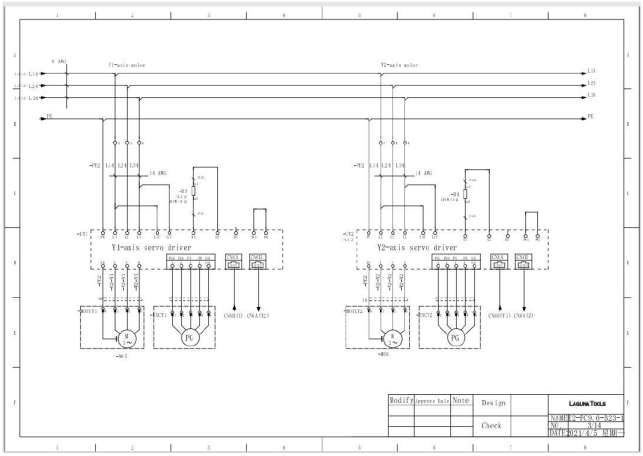
NOTE: Intervals are based on optimal shop conditions. If operating conditions are extreme, then the intervals should be decreased.

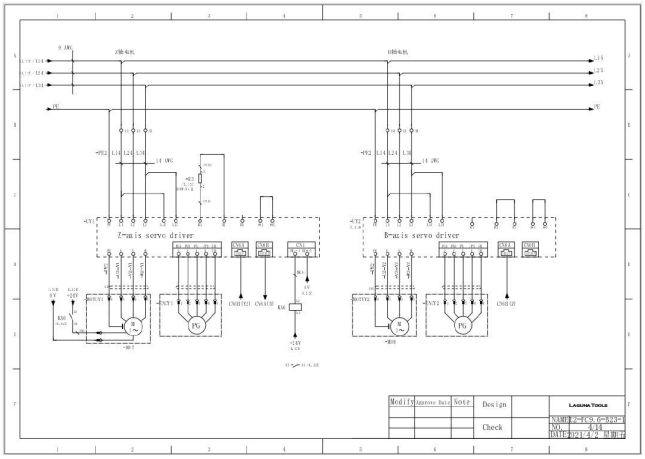
ONLYtrained and qualified personnel should attempt the quarterly, and yearly procedures. Contact Laguna if you would like a P.M. preformed by our technicians.

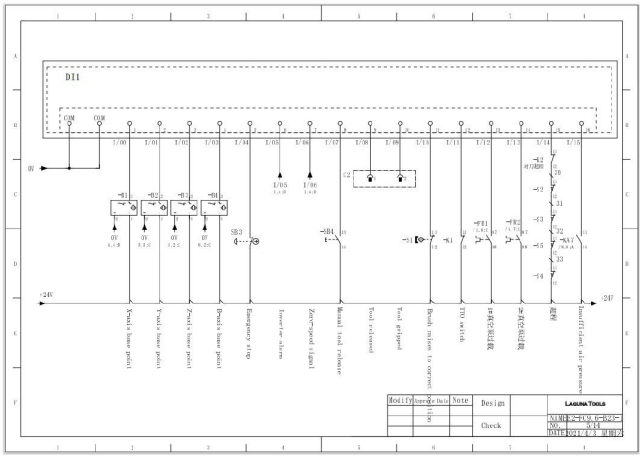
Electrical Diagrams

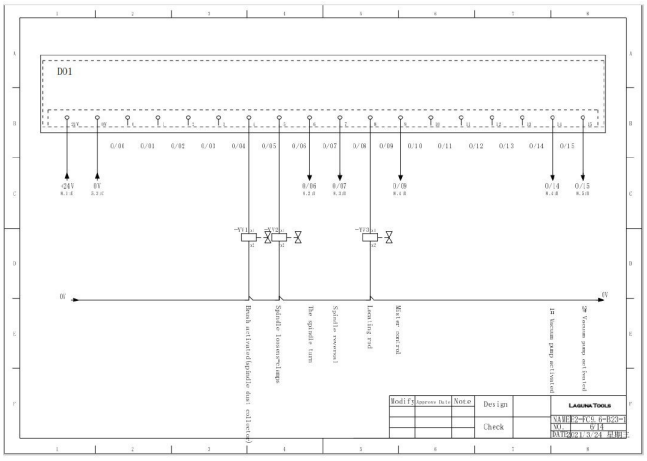


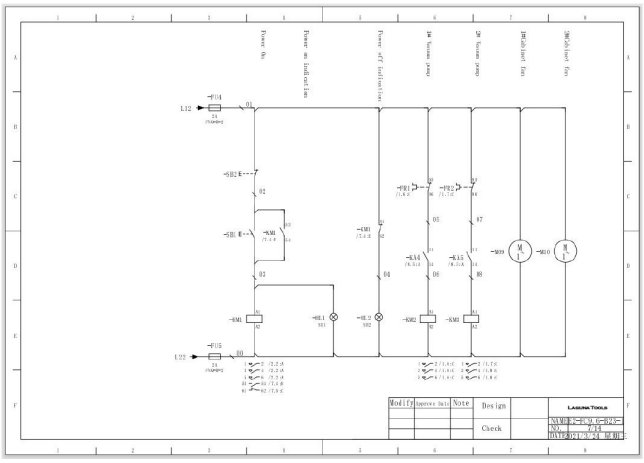


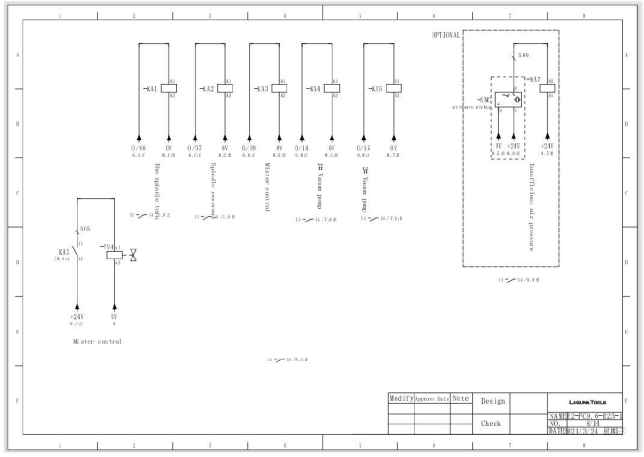


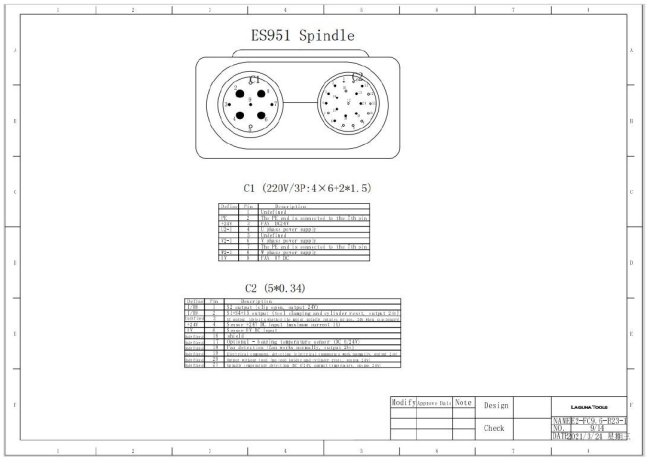

X-axis servo driver
Z-axis servo driver
Design
Check

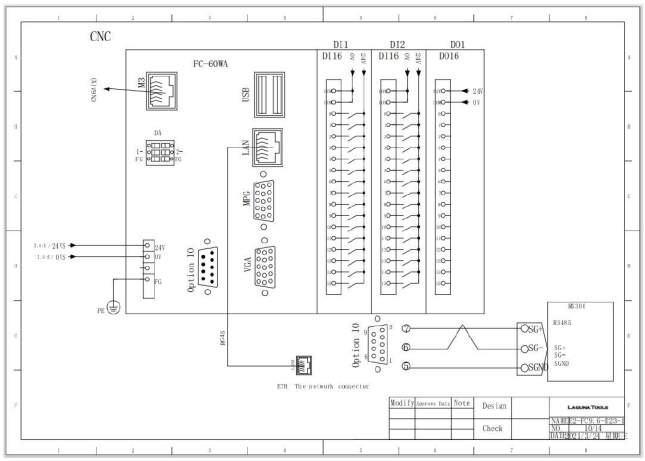

DI1
Design
Check

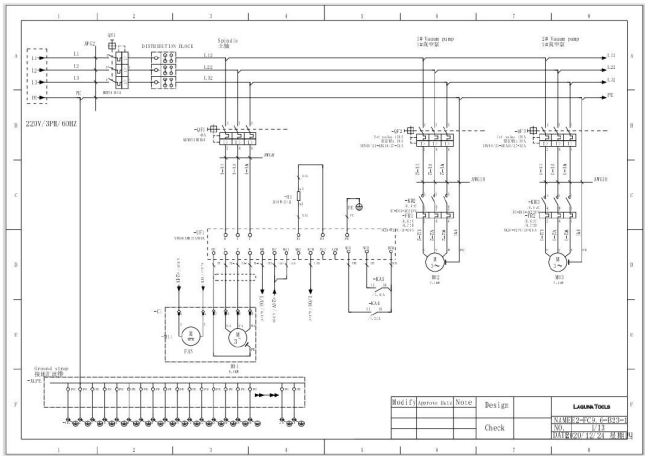

DO1
Design
Check

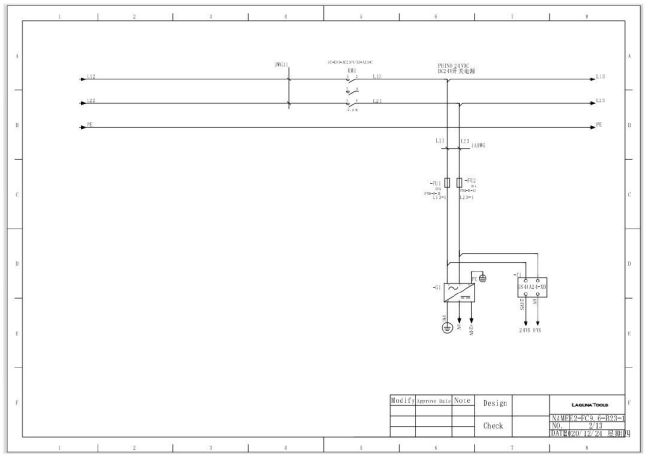


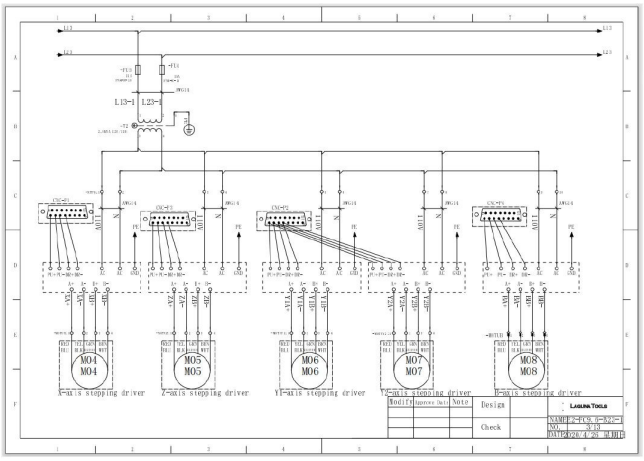


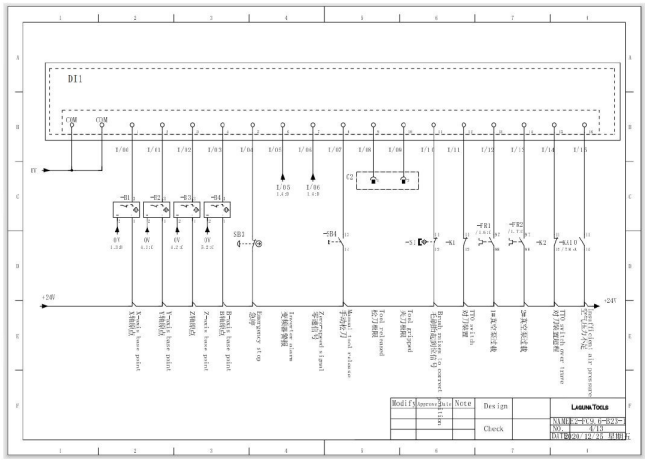

ES951 Spindle
C1 (220V/3P:4×6+2*1.5)
C2 (5*0.34)

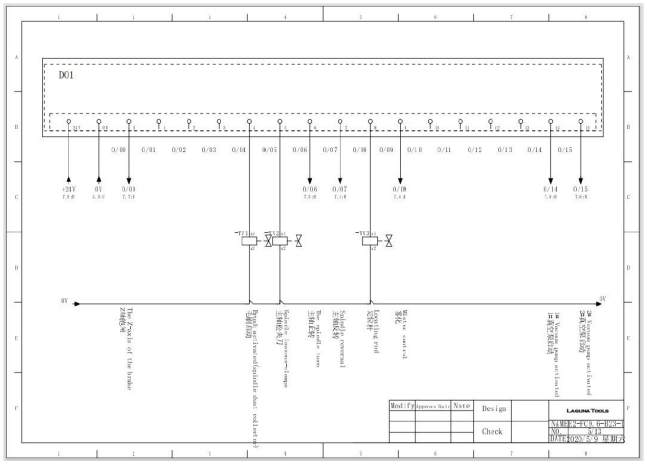

CNC
FC-60WA
DI1
DI2
DO1
USB
LAN
MDI
VGA
Option IO
RS485
ETH The network connector

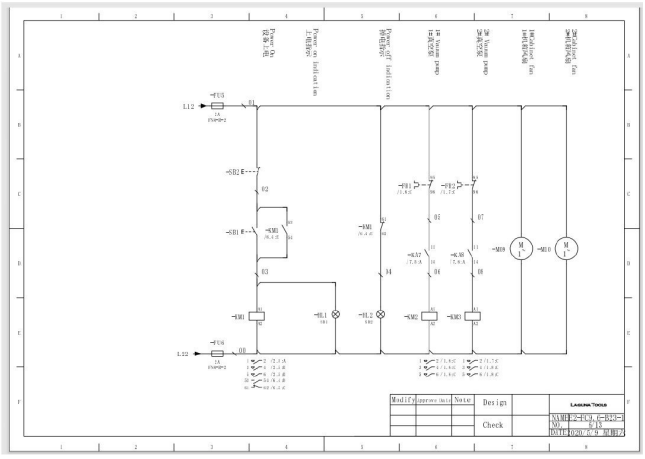

220V/3PH/60HZ
DISTRIBUTION BLOCK
Design
Check

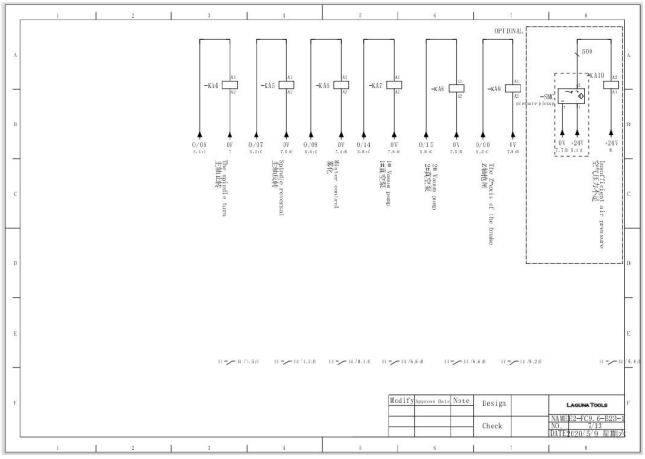

Design
Check

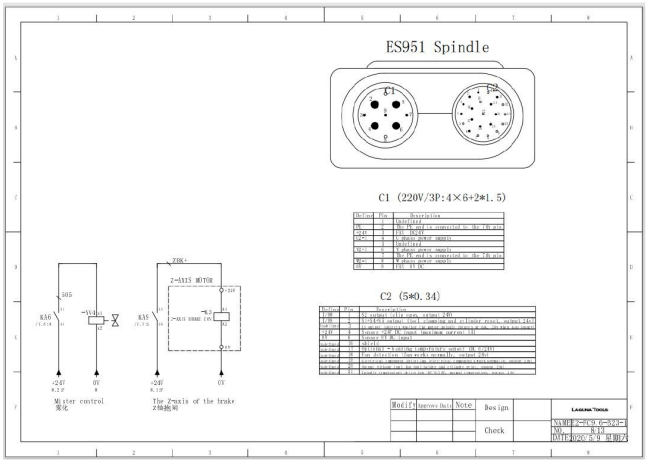

L13
L23
L13-1
L23-1
M04
M04
M05
M05
M06
M06
M07
M07
M08
M08
X-axis stepping driver
Z-axis stepping driver
Y1-axis stepping driver
Y2-axis stepping driver
B-axis stepping driver
Design
Check
LAGUNA TOOLS

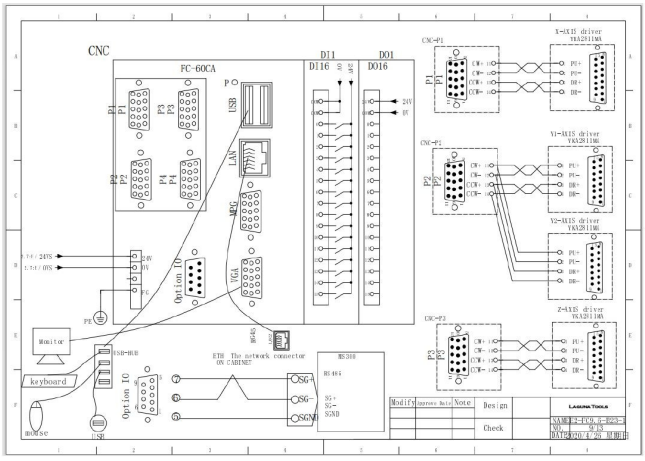

DI1
COM
COM
+24V
0V
Design
Check
LAGUNA TOOLS

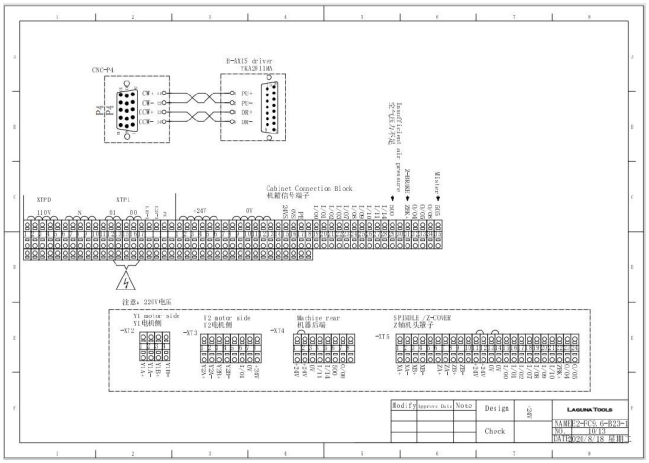

DO1
+24V
0V
Design
Check
LAGUNA TOOLS

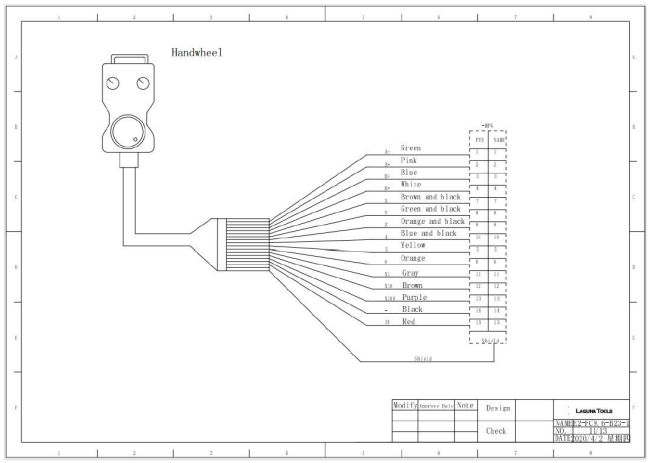


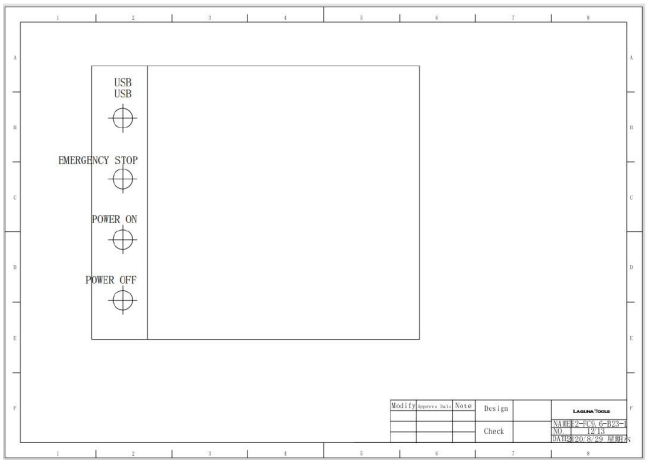


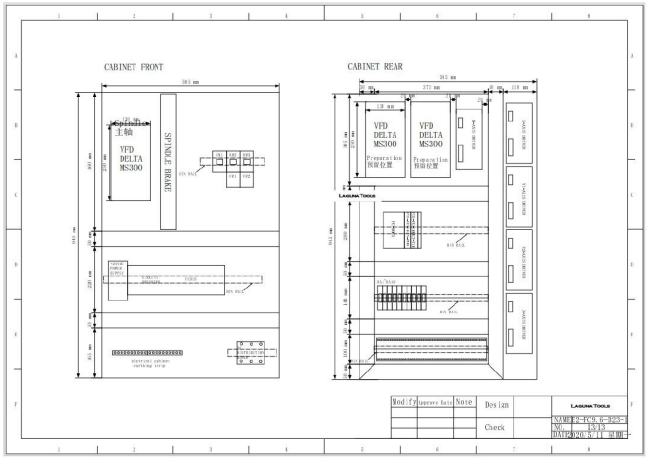

ES951 Spindle
C1 (220V/3P:4×6+2*1.5)
C2 (5*0.34)


CNC
FC-60CA
DI1
DI16
DO1
DO16
CNC-P1
X-AXIS driver
YKA2810MA
CNC-P2
Y1-AXIS driver
YKA2810M
Y2-AXIS driver
YKA2810M
CNC-P3
Z-AXIS driver
YKA2810M
Monitor
keyboard
mouse
USB
Option IO
VGA
LAN
RS485
RS232
USB-HUB
ETH The network connector ON CABINET
MS300
RS485
SG+
SG-
SGND
Design
Check


CNC-P4
B-AXIS driver
YKA2810MA
Cabinet Connection Block
XTP0
XTP1
Design
Check


Handwheel
Green
Pink
Blue
White
Brown and black
Green and black
Orange and black
Blue and black
Yellow
Orange
Gray
Brown
Purple
Black
Red
Shield
Design
Check


USB
USB
EMERGENCY STOP
POWER ON
POWER OFF


CABINET FRONT
CABINET REAR
VFD
DELTA
MS300
SPINDLE BRAKE

Vacuum Tables & Spoil Boards

The more effective the vacuum table setup, the more secure the parts will be held in place. Follow the instructions below to obtain optimum results. The vacuum table has six (6) zones that can be used to configure the vacuum supply depending on the type of application.

The table has vacuum ports for each zone that extract the air and generate the vacuum. The table also has grooves to ensure that the air is extracted evenly across the zones. Each zone is controlled by a valve located at the front of the machine.

These Valves Controls the six “6” Zones.

Spoil Boards:

Spoil Board Material and Precautions For machining parts from panel materials (cabinets, fixtures, case goods, etc.) a technology referred to as “Flow-Through” fixturing is employed.
A sheet of porous material (usually MDF [Medium-Density Fiberboard]) is placed on top of the vacuum table.

The panel material that is to be machined is actually placed on top of the MDF, and the vacuum passes through the MDF (Medium-Density Fiberboard) and holds the panel material down as it is machined.
***Great care should be taken when machining parts free to limit the extension of the tool into the spoil board materials.

The purpose is to limit vacuum infiltration through grooves in the spoil board. This also allows the processing of various nests without any setup time on the machine.

This technology is the basis for Nested-Based Manufacturing (NBM)-Nested-based manufacturing refers to a system used to efficiently produce groups of rectangular and non-symmetrical parts from flat material, such as composite and solid wood panels or plastic sheets.The components are “Nested” together on the material (see the photo below), which means they are positioned in a pattern that achieves the best possible material utilization.

Functions of the Spoil Board:

1) To protect the vacuum table from damage. The cutter extends only a few thousandths of an inch past the material thickness. Without the spoil board, the cutters could damage the surface of the vacuum table.

2) To transfer the vacuum from the table to the job. This means that the spoil board has to be porous to allow air flow to the panel material. Low cost MDF (Medium-Density Fiberboard) has proven to be a very good material for this purpose.

3) To provide a “Zero Setup” environment for processing panel products.

Spoil Board Preparation:
When MDF is sourced for the spoil board, it should be (>) greater than ¾" of an inch.

Contrary to what might seem logical, the thicker the MDF the better the suction that is created. "Flow-Through" fixturing maintains a careful balance between air flow through the MDF and the infiltration that occurs as the kerfs (GroovesorNotchesmadebyacuttingtool) are machined.

It is not recommended that the spoil board material be is thicker than 1 inch.

The MDF manufacturing process causes the top and bottom surfaces of the material to be compressed. It is necessary, therefore, to remove the compacted top and bottom surfaces.
This process is termed "fly-cutting" and requires the removal of approximately 0.060" from each surface. This process also ensures that the machining plane and spoil board surface are parallel.

The spoil board (MDF) edges are also very porous, and sealing them can improve the part holding ability.
__Hard Candle Wax__-is an excellent product for sealing the spoil board edges because it contains no water and is very easy to apply.

Never use a water-based product to seal the edges of the board, as this will make the board expand and become unsuitable for use as a spoil board.
Even some glue products 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 flat on the table. Never try to use a bowed MDF panel as a spoil board.

Use the following Procedure for preparing the Spoil Board:

1)Cut the spoil board to the size of the table of the machine, if necessary.
2) Apply gasketing (The action of fitting or sealing with a gasket)to the outermost vacuum grooves on the table surface.
3) Make sure that the table is clean and free from sawdust and dirt.
4) Place the spoil board on the vacuum table, being careful not to displace the vacuum gasketing.
5) **"Turn On"** the vacuum pump and check for leaks.
6) Fly cut the surface of the spoil board, removing approximately 0.060 Inch" to ensure that the compressed surface of the material is removed.
7) Once the material surface is machined, **"Turn Off"** the vacuum pump, turn the spoil board over and repeat the process for the other side. (***Remember to ensure that the table and spoil board are clean.***)

Spoil Board Use Each time a new job is machined, there may be shallow cuts into the spoil board in the areas that the cutter passes through the material.
Prior to placing a sheet of material on the spoil board, clean with a hand-held blower or vacuum cleaner.
Dirt under the material will reduce the vacuum, and in extreme cases, parts may move during the machining process. In general, keeping everything clean is the key to achieving good, repeatable results.

Precautions Regarding Spoil Boards:
The spoil board is porous and will absorb moisture. As moisture is absorbed, the dimensions of the board will change. In general, this will not be a problem, as the changes from day to day are not that excessive and will typically be over the complete board.

There are, however, exceptions:

1) It is a good practice to keep material on the top surface of the spoil board overnight to prevent warpage due to uneven moisture absorption by the material.

2) Once a spoil board has been used and has kerf cuts that resulted from machining parts, it is a good idea to fly cut the surface again. This time it should only be necessary to remove 0.015" of material since the only purpose is to produce a smooth, flat surface, and that amount should remove the machining marks.

3) The spoil board must cover the complete table and sit on the flats around the table. If the spoil board does not cover all the vacuum slots, the vacuum may be lost or not exist and the panel material will not be pulled down onto the spoil board effectively.

Manual Tool Release

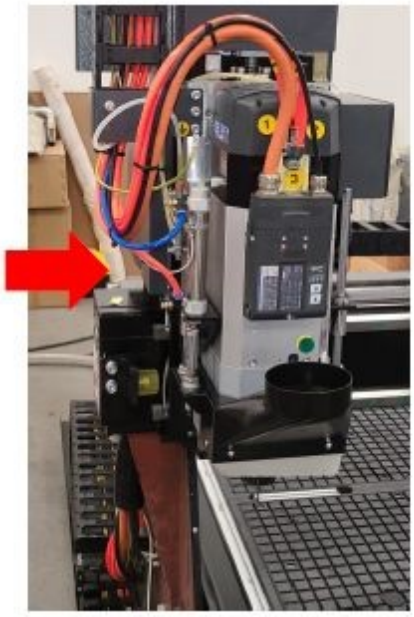
The tool holder can be released from the spindle manually by pressing the **"Green Manual Release Button"** near the Electro-Spindle.

Note. When the **"Green Manual Release Button"** is pressed, the clamping is released and the tool will fall out.

Place your hand so that the tool holder (not the cutter) is supported.
To manually insert a **Tool Holder**, hold the tool holder in the spindle taper while holding the green manual release button.

Once the green manual release button is released, the tool holder will be pulled up into the spindle hole and clamped in position. ***Please note that a small amount of air escapes from the spindle nose. This is used to blow any dust out of the spindle taper and is normal.**

Note: Keep the tool holders clean, lubricated with Teflon.
Note: The spindle taper is susceptible to rust and must be kept clean and lubricated with a Teflon lubricant.



Tool Holder & Tool Holder Bracket

"Green Manual Release Button"

Straight Router Bits: These are the standard router bits that are commonly used with handheld routers and are readily available at home centers. They will work but will generally not produce the edge finishes that are available with the spiral designed router bits.

Straight Router Bits

Up Shear Router Bits: These bits have flutes that are spiraled upward (a standard twist drill is an example of this type of bit). This bit design removes the chips from the kerf but has a tendency to chip the top surface, especially on veneers or melamine surfaces.

Ball Nose Router Bits: are a variation of the up shear bit design but have radiuses on the ends. These bits are typically used for 3D surfacing applications.

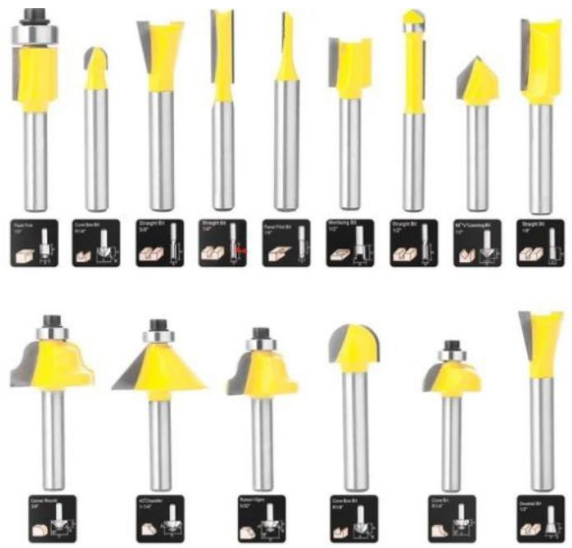
Ball Nose End Mills

Down Shear Router Bits: These bits are similar to the up shear but with an opposite spiral that actually tends to pack the chips into the kerf. These bits prevent chipping the material surface, especially with veneers or melamine surfaces, and are an excellent choice for machining dadoes and other joinery that do not extend completely through the material.

Combination (Compression) Router Bits: These bits combine the advantages of both up shear and down shear designs. The top section of the tool is down shear to prevent chipping the top surface of the material, and the lower part of the bit is up shear to prevent chipping the bottom surface of the material.

Compression Router Bits:are the preferred configuration for machining veneered plywood as well as melamine-surfaced product. A variation of the bit is called the “Mortising Compression” router bit. With this bit, the Up Shear portion of the bit is less than ¼" in length so that the bit can be used on ¼" veneered plywood and for dados.

Form Router Bits: Form Router Bits typically are available in standard profiles such as round over, ogee, cove, etc. Router bits that have a shape associated with them would be classified with this group.



Service, Maintenance, & Troubleshooting

Troubleshooting Syntec SS2:

Alarm ID	OP-001	Alarm Title	Invalid axis board setting, IO will not work
Description	When the controller does not detect the hardware interrupt signal, it will send an alarm (old axis card: one interpolation time interval sends one signal. new axis card: 0.5ms sends one signal)		
Possible Cause	1. Controller parameters are set wrong 2. CPU BIOS sets wrong 3. Axis card error or jump setting error 4. Axis card and ISA SLOT have poor contact or axis card represses ISA SLOT		
Solution	1. Check whether setting parameter Pr1 of the controller is suitable for the corresponding hardware specifications (see application handbook-parameter explanation) 2. Check whether IRQ11 setting of BIOS is Legacy ISA 3. Check jump of axis card 4. Check whether discontinuity signal ISR of the first card is disconnection (other axis cards must open). 5. Replacement the Axis card to avoid the poor contact between axis card and ISA slot		

Alarm ID	OP-002	Alarm Title	Parameter storage access failure, system halt
Description	The file name of system parameter is PARAM.DAT, saved in the first CF card with file path C:\CNC\APP. The backup file of system parameter is PARAM.LKN, saved in the first CF card with file path C:\CNC\LKN. As booting, if controller cannot find out two above files or two above files are damaged, system will rebuild those files. However, if system cannot rebuild those two files, it will send alarm to user		
Possible Cause	The first CF card error		
Solution	1. Take the first CF card out, insert into CF card reader, connect to the PC and repair CF card on PC, after that recopy backup parameters to C:\CNC\APP(file name of backup parameter is PARAM.LKN) 2. Replace the first CF card. (Please note that the first CF card needs DOS boot system and CNC kernel software)		

Alarm ID	OP-003	Alarm Title	Parameter storage access failure, system halt
Description	The file name of machining data is REGISTRY.DAT, saved with file path C:\CNC\USER. The first backup file of machining data is REGISTRY.LKN, saved with file path C:\CNC\LKN. The second backup file of machining data is REGISTRY.MIR, saved with file path C:\CNC\MIR. As booting, if controller cannot find out three above files or three above files are damaged, system will rebuild those three files. However, if system cannot rebuild those three files, it will send alarm to user		
Possible Cause	The second CF card error		
Solution	Once this case happens, back up the machining data of user to a new CF card, and then replace the second CF card		

Alarm ID	OP-004	Alarm Title	Machining data loss, re-calibrate before machining
Description	Once booted, controller will re-load the system registry file of the last shutdown into memory. After loading, if controller discovers the last shutdown state is busy or if the register file and the first backup file are damaged, one alarm will be sent to the user. The name of registry file is REGISTRY.DAT, saved with file path D:\CNC\USER. The first backup registry file is REGISTRY. MIR, saved with file path D:\CNC\ MIR. The second backup file of registry is REGISTRY. LKN, saved with file path D:\CNC\ LKN		
Possible Cause	1. Shut down controller or power when controller state is busy 2. The second CF card error 3. File REGISTRY.DAT is damaged		
Solution	Once this case happens, back up the machining data of user to new CF card, and then replace the second CF card		

Alarm ID	OP-005	Alarm Title	I/O transmission error
Description	When PIO5 of Watch Dog fails, the system will display warning		
Possible Cause	1. Motherboard is too hot 2. PIO5 error		
	3. Motherboard error 4. Ground wire of controller is interfered		
Solution	1. Check whether the fan turns correctly 2. Change the PIO5 3. Change the motherboard 4. Check whether the machine touches the ground properly.		

Alarm ID	OP-006	Alarm Title	Permanent storage data CRC check failure, re-calibrate before machining
Description	When the hardware of PIO5 has errors, alarm will appear		
Possible cause	1. PIO5 error 2. Fram CRC error 3. Fram doesn't initialize		
solution	1. For the first and the second reason, change PIO5 2. For the third reason, using software version which is from 10.112.95 or 10.114.29 on		

Alarm ID	OP-007	Alarm title	Low memory, memory space is less than 1M
Description	If capacity of system memory is less than 1M, alarm will appear		
Possible cause	Users design too many texts and pictures when they design CE human-machine interface, and make the capacity of system memory less than 1M.		
Solution	Human-machine interface of controller should simplify components, only design effective variables and scripts to avoid the low memory phenomenon.		

Alarm ID	OP-008	Alarm title	Fatal low memory, memory space is less than 100K
Description	System memory is less than 100k.		
Possible cause	Users design too many texts and pictures when they design CE human-machine interface, and make the capacity of system memory less than 100k.		
Solution	Human-machine interface of controller should simplify components, only design effective variables and scripts to avoid the low memory phenomenon.		

Alarm ID	OP-009	Alarm title	The number of interpolation loss times is bigger than 100
Description	Diagnose variable No.54 (Interpolation delay times) more than 100. Interpolation delay: Axis card doesn't send the command calculated by last interpolation time, the system will ignore the interpolation value to avoid the unsent command amount which causes outflow command		
Possible cause	1. Axis card is damaged. 2. System resource is exhausted. 3. The setting of interpolation time interval (Pr3203) is too small.		
Solution	1. Replace the hardware of axis card. 2. Replace a better motherboard. 3. Set longer interpolation time interval.		

Alarm ID	OP-010	Alarm title	Axis Group setting error
Description	When parameters of axis group in CNC are not set correctly, controller will send alarm.		
Possible cause	Parameter setting error Ex: Assume that the machine exists XYZ axes, each associated axis group is set as follows: Pr701 = Pr702 = Pr703 = 5(XYZ axes belong to the 1st group + 3rd group) Suppose that Pr731 = 3(axis groups in CNC are the 1st spindle group, the 2nd spindle group, and the 3rd spindle group). It means that the 2nd axis group is not covered by any axes, and one alarm will appear.		
Solution	Please check the matching between Pr701 ~ Pr716 and Pr731.		

Alarm ID	OP-012	Alarm title	CF card set by Pr3219 is error, check CF card or system setting value
Description	When CNC uses Dos, if we set Pr3219 equal to 3 and do not insert the second CF card (user data), controller will send alarm to avoid error of CF card and data in registry.dat.		
Possible cause	1. The system doesn't have the 2nd CF card or cannot read the 2nd CF card. 2. The system has two CF cards, but only one CF card is partition disk.		
Solution	1. Check whether the 2nd CF card exists or there is CF card reading error. 2. Set the first card to the default state, have two partition states. 3.Set parameter 3219 equal to 0 to use C: all		

Alarm ID	OP-013	Alarm title	Software version and model can't driver hardware, call your vender!
Description	The controller (ex: EZ, 10A…) does not support the software version (ex: 10.115.x… etc.). When axis card cannot send command to the controller to implement machining, this alarm will appear.		
Possible cause	1. The hardware doesn't support software version set on the controller, ex: EZ milling setups 10.114 software version. 2. In the controller, the motherboard, or IO card and CF card are replaced, and software version doesn't support new hardware.		
Solution	1. Install the software version that supports the machine model, ex: EZ type uses 9.242 software version. Or open the option, ex: option1 "EZ2/3/4 upgrade 10A software function". 2. Ask SYNTEC for the password to solve the incompatible hardware problem. 3. Super controller doesn't have this error.		

Alarm ID	OP-014	Alarm title	WinCE option not enabled, call your vender!
Description	Setting CE software version of controller, WinCE options are not opened. Axis card cannot send command from controller to machine		
Possible cause	The Option 2 of controller "Controller upgrades WinCE system" is not opened.		
Solution	1. Install Dos version. 2. Ask SYNTEC for the password, and open Option 2 "Controller upgrades WinCE system". 3. Super controller doesn't have this error.		

Alarm ID	OP-020	Alarm title	NC file name is different with backup name, re-calibrate before machining
Description	Machining file name of controller is saved in registry.dat, one backup file name also is available at Fram. After booting, if these two data are inconsistent, this alarm will appear and machining file name will be removed.		
Possible cause	1. System shows that writing registry.dat and registry.mir are written unsuccessfully leads to two file names inconsistent. 2. Install or replace registry.dat file. 3. Rename file name when downloading file		
Solution	1. Scan CF card disk. 2. Reselect machining file name. 3. Check whether machining data setting is correct. 4. Reboot.		

Alarm ID	OP-021	Alarm title	Use last known data, re-calibrate before machining
Description	Machining data of controller is stored in registry.dat, and has two backup files: registry.mir and registry.lkn. If both registry.dat and registry.mir have errors. When system uses registry.lkn, an alarm will appear and remove machining file name.		
Possible cause	CF card is damaged, so registry.dat and registry.mir files are also damaged.		
Solution	1. Scan CF card disk. 2. Try setting again or check whether machining data setting is correct. 3. Reboot.		

Alarm ID	OP-022	Alarm title	Machine data rebuild, re-calibrate before machining
Description	When controller doesn't have registry.dat, backup files registry.mir and registry.lkn, and need to rebuild file, an alarm will appear.		
Possible cause	1. Replace CF card. 2. Format CF card.		
Solution	1. Reset machining data. 2. Reboot		

Alarm ID	OP-023	Alarm title	Power break in machining, re-calibrate before machining
Description	As start machining, controller will set up machining flag in registry.dat and it will be removed when machining comebacks to ready status. When rebooting, if machining flag is not removed, this alarm will appear.		
Possible cause	Discontinue power in machining process.		
Solution	1. Scan CF card disk. 2. Check whether machining data setting is correct. 3. Reboot.		

Alarm ID	OP-024	Alarm title	Machine data file write fail, re-calibrate before machining
Description	Before shutting down controller, if the last writing registry.dat or registry.mir file is unsuccessful, this alarm will appear.		
Possible cause	1. CF card is damaged. 2. Registry.dat or registry.mir files are set read-only. 3. System file cannot handle system resource, lead to writing file unsuccessfully.		
Solution	1. Scan CF card. 2. Check whether machining setting is correct. 3. Reboot.		

Alarm ID	OP-025	Alarm title	Machine data file write fail many times, re-calibrate before machining
Description	Before shutting down controller, if the total times of writing registry.dat or registry.mir file unsuccessfully exceed 100 times, this alarm will appear.		
Possible cause	1. CF card may be damaged seriously, and CF card should be processed soon. 2. Registry.dat or registry.mir file is set to read-only. 3. System file cannot handle system resource well, lead to writing file unsuccessfully.		
Solution	1. Scan CF card. 2. Check whether machining setting is correct. 3. Reboot.		

Alarm ID	OP-026	Alarm title	Machine data file fault error, re-calibrate before machining and do scandisk
Description	Before shutting down controller, if the total times of writing registry.dat or registry.mir file unsuccessfully exceed 100 times, this alarm will appear.		
Possible cause	1. CF card may be damaged seriously, and CF card should be processed soon. 2. Registry.dat or registry.mir file is set to read-only. 3. System file cannot handle system resource well, lead to writing file unsuccessfully.		
Solution	1. Scan CF card. 2. Check whether machining setting is correct. 3. Reboot.		

Alarm ID	MOT–027	Alarm Title	program error in PLC axis
Description	Grammar of PLC axis program error		
Possible cause	Grammar of PLC axis program error		
Solution	Check grammar of PLC axis program		

Alarm ID	MOT-028	Alarm Title	System memory too low
Description	When CNC axis and PLC axis switch, free memory of system is too low, the controller will issue an alert warning		
Possible Cause	The machining program switches to PLC axis		
Solution	Contact machinery manufacturers		

Alarm ID	MOT-029	Alarm Title	Miss index in homing
Description	When searching home, if motor does not find out motor index signal after leaving home DOG more than 5 pitches, controller will send this alarm.		
Possible Cause	1. Can't read the index signal. 2. The setting of homing 2nd travel feedrate is too fast. 3. The setting of motor reduction ratio is too big 4. The distance between index signal and HomeDog is more than 5 pitches		
Solution	1. Check motor index wire connecting; observe diagnostic screen 48(X), 49(Y), 50(Z) to check whether index signal is read. If no, please check whether connecting wire is correct. 2. Reduce setting value of the homing 2nd travel federate (Parameter 841~843)		
More description	When searching home, machine will use the velocity setting value of the first stage to move to home DOG, and stop. After that machine moves backward with velocity of the second stage. After leaving home DOG to move backward, it start to search the nearest motor index signal. In the second stage, controller will calculate according to resolution of encoder. If controller leaves home DOG more than 5 pitches and can not find out the index signal. Controller will send alarm.		

Alarm ID	MOT-030	Alarm Title	Zero speed timeout in homing
Description	When motor touches HomeDog, if motor cannot stop, controller will send this alarm.		
Possible Cause	1. Setting drive gain is not good, so it makes motor vibrating 2. Motor running causes resonance phenomenon.		
Solution	1. Check the position loop gain and velocity loop gain setting of driver 2. Start the resonance frequency inhibition ability of driver 3. Contact machinery manufacturers for help.		
More description	When searching home, machine will use the velocity setting value of the first stage to move to home DOG, and stop once it meets home DOG. After that machine moves backward with velocity of the second stage. After leaving home DOG to move backward, it start to search the nearest motor index signal. At the first stage to find the home DOG, motor will decrease velocity to stop. After 0.1 second command stops, if system data 8(X), 9(Y), 10(Z)-error register receives values bigger than zero speed check window(Pr901~Pr920), controller will send alarm.		

Alarm ID	MOT-031	Alarm Title	Static dual feedback error exceed
Description	After the controller stops sending the motion command, during the time set by parameter Pr3805, the system will check whether dual feedback error exceeds allowed limit set by parameter Pr1421~1440. If yes, controller will send alarm.		
Possible Cause	1. Motor encoder is interfered 2. 2nd encoder loop is interfered 3. Servo controller is disconnected. 4. Mechanism has problem 5. Servo is damaged 6. The 2nd resolution loop is set wrong		
Solution	1. Check whether the connection between the motor and encoder is firm 2. Remove high-power electromagnetic devices 3. Check whether the machine table can move smoothly 4. Replace the servo driver		
	5. Contact machinery manufacturers for help		

Alarm ID	MOT-032	Alarm Title	(Z axis) Following spindle error exceed
Description	For tapping, when wiring diagram of spindle feedback is inverted, it will cause spindle reversal when tapping is started. This phenomenon will raise Z axis command. If Z axis command is raised more than 1 pitch, controller will send this alarm.		
Possible Cause	Wiring diagram of spindle feedback is inverted		
Solution	1. Exchange the position feedback value A+ and A- which frequency transformer sends to the controller 2. Change parameters related to frequency transformer		

Alarm ID	MOT-033	Alarm Title	Absolute encoder read error
Description	When using absolute encoder, if the communication between the controller and the driver fails, the controller will send this alarm immediately.		
Possible Cause	1. The driver doesn't power on 2. The communication line between the controller and driver come is turned off 3. The absolute transfer board is damaged		
Solution	1. Check the power supply of driver 2. Check the connecting wire 3. Exchange the absolute transfer board		

Alarm ID	MOT-034	Alarm Title	not set home position, Absolute encoder will not work
Description	When using absoluter encoder, if the initial value of encoder set in controller is NULL, the controller will send this alarm immediately.		
Possible Cause	Do not use C25–to set the home of machine		
Solution	Use C25–to set home machine		
More description	Absolute encoder to search home Step 1: Move axes to the desired origin. Step 2: Trigger C25 ~ (fill R38 value with X-axis mechanical coordinate), controller automatically records the initial value A of encoder from driver. Step 3: Next time when controller is rebooted and communicates successfully with encoder, regardless of positions of axes, controller will compare present encoder motor position with record value A to find the difference value. Therefore, the correct motor position can be reached.		

Alarm ID	MOT-035	Alarm Title	absolute position battery failure
Description	When using absolute encoder, if the communication between the controller and driver is successful, but the motor encoder position value is 0, then the controller send this alarm message.		
Possible Cause	The battery of absolute encoder has no power		
Solution	Change the battery		

Alarm ID	MOT-036	Alarm Title	Can't leave home dog
Description	When searching home, if motor can't leave HomeDog after moving over 5 pitches, the controller will send this alarm message.		
Possible Cause	HomeDog is damaged		
Solution	Use the electrical multimeter to check whether the sensor of HomeDog is damaged or wiring connection is missing.		
More description	When searching home, machine will use the velocity setting value of the first stage to move to home DOG, and stop. After that machine moves backward with velocity of the second stage. After leaving home DOG to move backward, it start to search the nearest motor index signal. In the second stage, controller will calculate according to resolution of encoder. If controller leaves home DOG more than 5 pitches and cannot find out the index signal, controller will send alarm.		

larm ID	MOT–037	Alarm Title	Second Positive software limit exceed
Description	Position value of end point of servo motor exceeds setting value in controller- Second Positive software limit		
Possible Cause	The motion of machine table exceeds setting value		
Solution	Remove alarm. Move axis in negative direction out of stroke protection software.		

Alarm ID	MOT–038	Alarm Title	Second Negative software limit exceed
Description	Position value of end point of servo motor exceeds setting value in controller- Second negative software limit		
Possible Cause	The motion of machine table exceeds setting value		
Solution	Remove alarm. Move axis in positive direction out of stroke protection software.		

Alarm ID	MOT–051	Alarm Title	Inhibit cycle start in moving
Description	Before all manual commands are sent, prohibit starting machining to prevent operation error.		
Possible Cause	Manual command (JOG, INJOG, and MPGJOG) cannot be sent successfully.		
Solution	Remove alarm. Wait until machine stops, then start machining		

Service and Mainteance

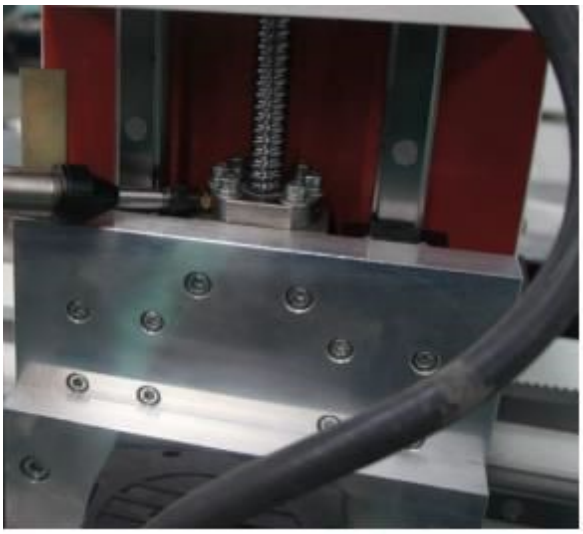
⚠ CAUTION

1.) Maintenance must be performed by qualified personnel.
2.) Switch off the main power supply before servicing.
If power supply is needed, have a qualified Electrician install main power Outlet.
3.) The changed or replaced parts and components must be of same type, specification & quality.

Drive System:
Wipe clean the linear guides after use. Make sure the guides stay clean and lubricated.

Lubricate the rack and pinion and the ball screw drive once every week. This ensures longer service life.

When lubricating the spindle screw, please use the manual oil gun provided by the manufacturer.

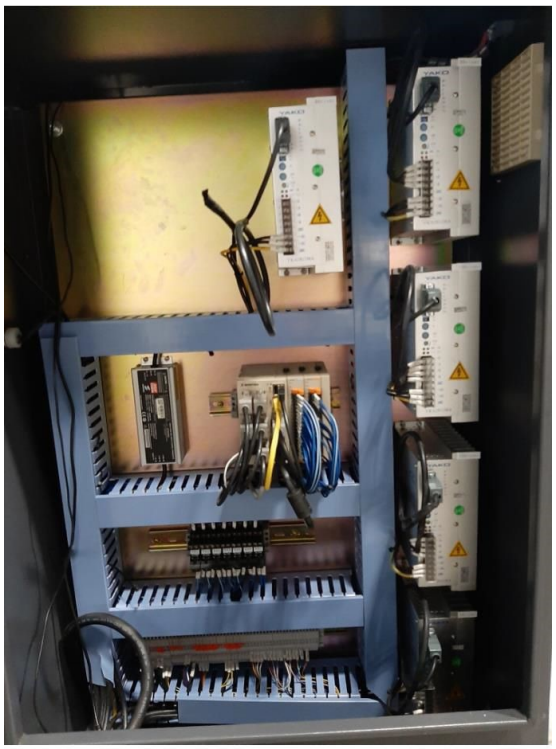


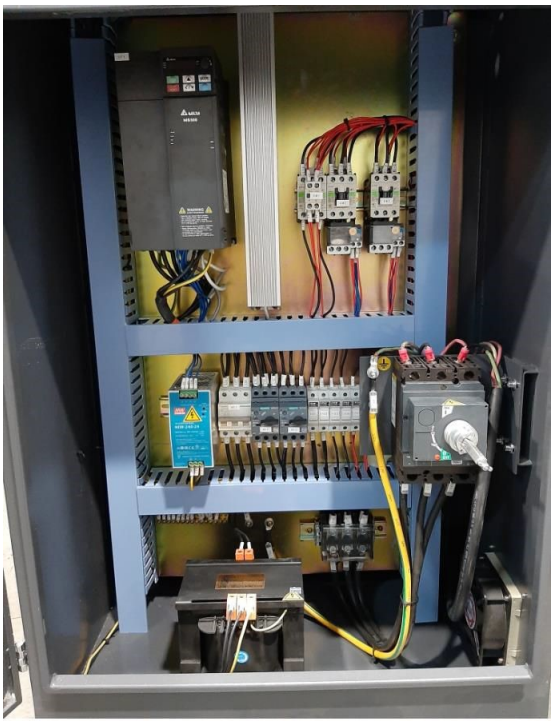
Electric Cabinet

Attention! **Switch off the main power supply before servicing. If power supply needed, have a qualified Electrician install an Electrical Outlet.**

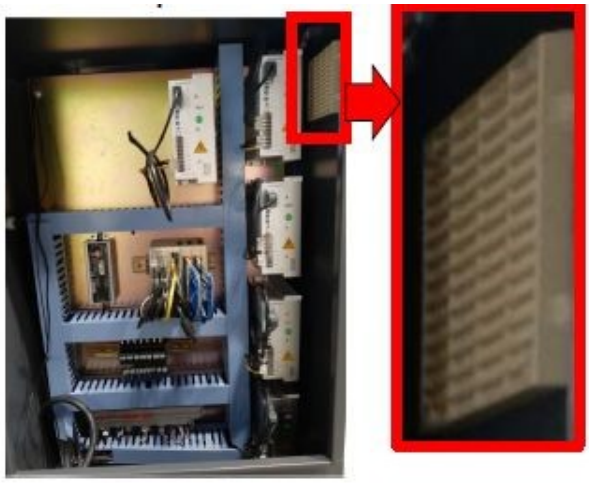
Main "On/Off" Power Switch

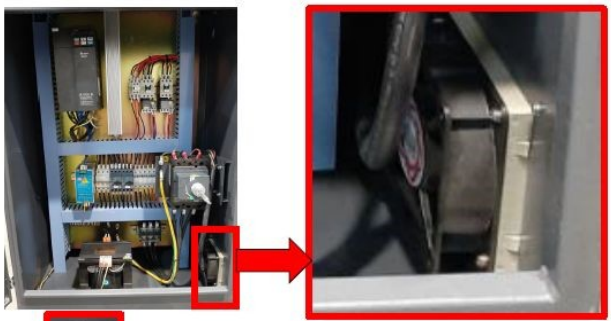
1.) Clean the cabinet with once every week. Keep the electronics clean.





2.) Inspect the fans every month. Keep them clean.





3.) Regularly inspect if the emergency stop button is functional. If machine belongs to Company/Facility that is ISO/QS 9000 Quality System Certified, make sure to place
& document the stated Service & Maintenance Protocols into the facilities General Preventive Maintenance Section of the Quality System.

Servicing Vacuum Pumps

Maintenance for Vacuum Pumps:

1.) The entry filter net on the vacuum pump needs to be cleaned daily to keep dust from entering the pump.
2.) The exit filter net needs to be cleaned weekly.
3.) Inspect the pump grease every 2 months. Change, if the grease becomes dark and thick.
4.) Lubricate every three months. Only use the appointed grease.

Motion Troubleshooting

Motion, MOT	
001	A,B feedback signal error
002	Error counter overflow
003	Encoder modulo error
004	No index signal
005	DDA command overflow
006	Can't clear index latch state
008	Loss Pulse
009	Servo Driver Alarm
010	Servo position command comm. error
011	Drive communication error
012	Driver failed to Homing
017	First Positive software limit exceed
018	First Negative software limit exceed
019	Following error exceed
020	Cannot back control mode when move
021	Must re-homing
022	Home position inaccurate
023	Fatal following error exceed
024	Dual feedback position error exceed
025	Positive hardware limit exceed
026	Negative hardware limit exceed
027	Program error in PLC axis
028	System memory too low
029	Miss index in homing
030	Zero speed timeout in homing
031	Static dual feedback error exceed
032	Following spindle error exceed
033	Absolute encoder read error
034	It is not set home position, Absolute encoder will not work
035	absolute position battery failure
036	Can't leave home dog
037	Second Positive software limit exceed
038	Second Negative software limit exceed
051	Inhibit cycle start in moving

Alarm ID	MOT-001	Alarm Title	A,B feedback signal error
Description	Only occurs when the Pr9 – servo type is set 0 (EMP2), axis card detects A/B encoder feedback error		
Possible Cause	When servo type is set EMP2, internal axis card will automatically detect the A, B encoder signals, if signal error or have A-phase signal, but no B-phase signal, this alarm will appear.		
Solution	Check the servo cable or replace the axis card		

Alarm ID	MOT-002	Alarm Title	Error counter overflow
Description	Only occurs when the Pr9-servo type is set to 0 (EMP2), 4(PMC4), 6(SERVO6), axis card detects overflow encoder feedback		
Possible Cause	When servo type is set 0(EMP2), 4(PMC4), 6(SERVO6), internal axis card will automatically detect the A, B encoder signals, if signal error or too much input signal, counter overflow will appear.		
Solution	Check the servo cable or replace the axis card		

Alarm ID	MOT-005	Alarm Title	DDA command overflow
Description	Controller sends too many commands. In the one interpolation time interval, if software calculates that the number of commands to be sent is out of 2047 pulses, this alarm will appear		
Possible Cause	1. DDA software time setting value (interpolation time interval, parameter Pr3203) is too long 2. Motion velocity is too fast 3. Servo resolution is set too high 4. Backlash compensation or pitch compensation is too large 5. Compensation is enabled before booting		
Solutions	1. Recommend that low interpolation time interval setting (parameter 3203) is not less than 2000 2. Reduce the velocity to do the test if max rapid travel federate is to high (Pr461-Pr480) 3. Reduce the servo resolution setting to do test (encoder and CNC Pr61-Pr80) 4. If mechanical compensation time constant is set (parameter 1401~1420), cancel the mechanical compensation setting to do test and find the best setting. 5. If system had set feed forward (parameter 581~600), cancel feed forward setting to do test and find the best setting. 6. Please contact staff of machinery manufacturer to solve problem		
More description	In order to achieve the multi-axis coordinated control, SYNTEC's controller uses DDA (Digital Differential Analyzer). Cycle Time of DDA is set by parameter Pr 3203. In one Cycle time of DDA, every axial is allowed to send maximum 2047 pulses. Once exceeding this value, controller will send alarm		

Alarm ID	MOT-008	Alarm Title	Loss Pulse
Description	One second after sending command, controller will check whether the error of feedback command and sending command is in predetermined error range. If no, controller will send alarm.		
Possible Cause	1. Kinematic occurs obstruction phenomenon 2. Servo drive occurs unexpected Servo ON / OFF 3. CPU board send the data to axis card unsuccessfully (CPU board or axis card has problem, the contact between CPU and axis card is not good) 4. The cable that sends command from controller to servo driver has poor quality or is disconnected. 5. Controller doesn't set servo drive alarm check, controller continues to send motion command although the drive is abnormal 6. Local interference		

Alarm ID	MOT-008	Alarm Title	Loss Pulse
Solution	1. Do not shut down the controller when alarm occurs. Please check whether the value of No 8, 9, 10 in diagnose function is zero 2. Check whether the mechanical lubrication system is good. 3. Open the cover of axial to check whether foreign matter blocks the motion of axial. 4. Rotate screw to check whether machine is stuck (loading of driver) 5. Check the drive servo-on and the servo-off of power or cable signal 6. If the setting value of No 8, 9, 10 in diagnostic function do not change, please take home search action (don't need to reboot), after that check whether parameters 24, 25, 26, 40, 41, 42 are equal to zero, if the parameters 24, 25, 26 are not equal to zero, the feedback loop has problems 7. If the parameters 40, 41, 42 are not equal to zero, command transmission from controller to the motor has been lost pulse. 8. If all parameters 24, 25, 40, 41, 42 are not zero, then the interference signal is relatively large, specifically in the machining process, the setting value of parameters 8, 9, 10 gradually become large. The reason is the contact point between CPU board and axis card is not good. Try to replace CPU board and axis card		
More description	Set parameters 561~580 to check the range of loss pulse 8[X axis following error value] 9[Y axis following error value] 10[Z axis following error value] 24[X axis absolute position feedback value] 25[Y axis absolute position feedback value] 26[Z axis absolute position feedback value] 40[X axis absolute position command value] 41[Y axis absolute position command value] 42[Z axis absolute position command value]		

Alarm ID	MOT-009	Alarm Title	Servo Driver Alarm
Description	Drive sends out warning signal		
Possible Cause	Drive alarm mostly is because of external causes. Ex: High temperature, connecting wire error, internal parameters is set wrong, servo motor is unsuitable, driver is error, etc.		
Solution	Follow the steps in driver's application manual to solve alarm		

Alarm ID	MOT-010	Alarm Title	Servo position command comm. error
Description	Once the communication between Kernel and axis card has errors, software will check whether the queue value in internal IC of axis control is not zero		
Possible Cause	1. There is only one axis card, but parameter sets two axis cards, and servo axis points to the second axis card 2. One axis card has errors in case controller has two more axis cards 3. Two or more axis cards, IRQ11 Jump is plugged. In diagnosis function, number 23 is not equal to100 4. Servo board clock source parameter(Pr11) is set incorrectly		
Solution	1. Check whether the parameter setting Pr11, Pr13 are consistent with the hardware feature 2. Check jump axis card setting 3. Change axis card to do test		
More description	Each interpolation time interval, Kernel (core) software will check whether the QUEUE value FLAG is correct. After one FILTER, if it reads the error value, alarm will appear and diagnose function number 68 will be added 1.		

Alarm ID	MOT–011	Alarm title	Drive communication error
Description	Abnormal driver communication		
Possible Reason	External reason like wire problem or noise interference		
Solution	Checking wire connection of drive and checking whether controller is connected with ground correctly or noise interference.		

Alarm ID	MOT–012	Alarm title	Driver homing error
Description	If Driver searches home unsuccessfully, this alarm will appear		
Reason	Home search method is set incorrectly (Pr961) or driver doesn't support home search function		
solution	Check whether home search method is correct or driver supports home search function		

Alarm ID	MOT-017	Alarm Title	First Positive software limit exceed
Description	The end point in movement of servo motor exceeds positive software limit		
Possible Cause	Stroke movement of machine table exceeds the setting value		
Solution	Remove alarm, and let axis moves to negative movement out of the stroke protection software		

Alarm ID	MOT-018	Alarm Title	First Negative software limit exceed
Description	The end point in movement of servo motor exceeds negative software limit		
Possible Cause	Stroke movement of machine table exceeds the setting value		
Solution	Remove alarm, and let axis move to positive movement out of the stroke protection software		

Alarm ID	MOT-019	Alarm Title	Following error exceed
Description	Because of the characteristics of servo, servo motor location, there is no way to respond the command of controller immediately, so a slow phenomenon appears, when this latency is not in allowed range, controller will send out the alarm.		
Possible Cause	1. Movement mechanism is not smooth 2. Contact wire has poor quality 3. Setting values of acceleration and deceleration time are too small 4. Servo on off Relay is interfered		
	5. Inner loop gain of driver is set too small 6. Encoder solution and electric gear ratio is set wrong 7. Drive or motor is damaged 8. Encoder or line between encoder and controller is abnormal 9. On diagnosis screen, number 23 is not equal to100		
Solution	1. Add lubricating oil to machine 2. Use electric meter to check whether wire connecting is correct. When 3. controller runs dry run mode, open case to check whether servo on off of relay pulses abnormally. 4. Increase acceleration and deceleration time (parameter 401) 5. Inner loop gain of driver is set too small. For Mitsubishi driver, check Pr37 6. Contact to machinery manufacturers for helping		

Alarm ID	MOT-019	Alarm Title	Following error exceed
More description	Maximum velocity setting value of G00 and home search is equal to setting parameter divided by Kp. This value multiplied by 2 is setting range of controller. Reasonable following error: Ferr= speech in command/ setting value of loop gain Alarm allowed values= {max[(velocity of first stage in home search process), velocity G00 of each axis]/Kp}*2 For example: Speed 1000mm/min, loop gain 30, precision, 1um, Ferr = 1000*1000÷60÷30=555 32[X axis reasonable following error] 33[Y axis reasonable following error] 34[Z axis reasonable following error]		

Alarm ID	MOT-020	Alarm Title	Cannot back control mode when move
Description	When emergency stop or monitor mode (C31 ~) is canceled, in one Interpolation time interval (No 3203) if the motor movement exceeds zero speed check window (901), controller will send alarm.		
Possible Cause	1. Cancel instantly movement of machine by hand 2. Drive gain is set badly. Therefore, when cancelling instantly, motor will be trembled		
Solution	1. Avoid man-made movement 2. Check the drive's position loop gain and speed loop gain setting		

Alarm ID	MOT-021	Alarm Title	Must re-homing
Description	When MOT-0020 and MOT-0022 appear, the controller will send alarm		
Possible Cause	MOT -0020[Cannot back control mode when move] or MOT -0022[Home position inaccurate] is triggered		
Solution	See MOT -0020 or MOT -0022-alarm		

Alarm ID	MOT-022	Alarm Title	Home position inaccurate
Description	After booting, at the N(N>1) times of searching home, home grid will be compared to the result of the first time searching home, if the error is over 0.1 turn of motor, the controller will send alarm.		
Possible Cause	6. Homing signal of motor is abnormal 7. Stopper, coupling or bearings is not locked tightly		
Solution	1. Move motor in the same direction and observe to check whether position counter index changes normally. 2. Check whether the mechanism components are fixed properly		

Alarm ID	MOT-023	Alarm Title	Fatal following error exceed
Description	Because of the characteristics of servo, servo motor location, controller cannot respond immediately command, a delay phenomenon will appear, when this delay phenomenon is not in allowed limit, the controller will send alarm.		
Possible Cause	1. Servo motor doesn't receive control due to external force 2. Parameter of drive - inner loop gain is too small 3. Parameters of acceleration and deceleration time is set too short 4. Encoder is abnormal or connecting encoder to controller is abnormal		
Solution	1. Check the external motion of machine table 2. Check the setting parameter of drive 3. Check the acceleration and deceleration setting of each axis, parameters 401, 541-560 4. Maintain the connection between encoder and servo drives.		
More description	Maximum velocity value of G00 and home search is equal to setting parameter divided by Kp. This value multiplied by 4 is setting range of controller. Reasonable following error: Ferr= speech in command/ loop gain Alarm allowed values= {max[(velocity of first stage in home search process), velocity G00 of each axis]/Kp}*4 32[X axis reasonable following error] 33[Y axis reasonable following error] 34[Z axis reasonable following error]		

Compiler Troubleshooting

Compiler, COM	
001	EOF in comment
002	No end of string character
003	Syntax error
004	Illegal variable
005	expression too complex
006	EXIT statement outside loop statement
007	Repeat loop too deep
008	absent end of statement character ';'
009	wrong assignment character ':='
010	absent right ')'
011	absent right ']'
012	absent 'FOR' keyword in FOR statement
013	absent 'DO' keyword in FOR statement
014	absent 'END_FOR' keyword in FOR statement
015	absent 'UNTIL' keyword in REPEAT statement
016	absent 'END_REPEAT' keyword in REPEAT statement
017	absent 'DO' keyword in WHILE statement
018	absent 'END_WHILE' keyword in WHILE statement
019	absent 'THEN' keyword in IF statement
020	absent 'END_IF' or 'ELSE' keyword in IF statement
021	absent 'END_IF' keyword in IF statement
022	absent 'OF' keyword in CASE statement
023	absent 'END_CASE' or 'ELSE' keyword in CASE statement
024	absent 'END_CASE' keyword in CASE statement
025	absent ':' or ',' delimiter in CASE statement

Alarm ID	COM–001	Alarm Title	EOF in comment
Description	The symbol "(*" and "*)" must be used in pairs, if the program uses "(*" as the beginning of the comment, but doesn't use "*)" at the end of the comment. System will send alarm		
Possible Cause	Programming error		
Solution	Using symbol "(*" before command and symbol "*)" after command		

Alarm ID	COM–002	Alarm Title	No end of string character
Description	Character string in brackets of PRINT command in MACRO has no "symbols		
Possible Cause	Programming error		
Solution	Check PRINT command of program		

Alarm ID	COM–003	Alarm Title	Syntax error
Description	MACRO program has syntax error when controller interprets it		
Possible Cause	Programming error		
Solution	Check program syntax according to symbol appears on the screen		

Alarm ID	COM–004	Alarm Title	Illegal variable
Description	System cannot access variable, this alarm will appear.		
Possible Cause	Change error variable		
Solution	Check program variable and confirm whether system uses that variable		

Alarm ID	COM–005	Alarm Title	expression too complex
Description	MACRO is too complicated,		
Possible Cause	Programming error		
Solution	Check whether logic is clear and correct		

Alarm ID	COM–006	Alarm Title	EXIT statement outside loop statement
Description	The purpose of EXIT command is to jump out loop. If EXIT command		
	cannot go to next loop, system will send alarm		
Possible Cause	Programming error		
Solution	Check whether EXIT command in program is used correctly		

Alarm ID	COM–007	Alarm Title	Repeat loop too deep
Description	IF Loop command in MACRO such as REPEAT loop, REPEAT loop, WHILE loop, FOR loop repeats more than 10 times, system will send this alarm.		
Possible Cause	Programming error		
Solution	Change MACRO program to avoid too many loop commands.		

Alarm ID	COM–008	Alarm Title	absent end of statement character ';'
Description	Program doesn't have terminal symbol when MACRO command finishes.		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether it has the terminal symbol		

Alarm ID	COM–009	Alarm Title	wrong assignment character ':='
Description	In program, if Assigning value to symbolic variable doesn't use the correct notation" : =", system will send alarm		
Possible Cause	Programming error		
Solution	Check MACRO program to see whether assigning value to symbolic variable is correct		

Alarm ID	COM–010	Alarm Title	absent right ')'
Description	In program, notation "(" and ")" must be used in pairs, if "(" lacks ")", system will send alarm		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether using "(" and ")" is correct		

Alarm ID	COM-011	Alarm Title	absent right ']'
Description	In program, notation "[" and "]" must be used in pairs, if "[" lacks "]", system will send alarm		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether using "[" and "]" is correct		

Alarm ID	COM-012	Alarm Title	absent 'FOR' keyword in FOR statement
Description	If FOR loop in MACRO uses TO to define loop condition incorrectly, this alarm will appear.		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether FOR loop uses TO correctly		

Alarm ID	COM-013	Alarm Title	absent 'DO' keyword in FOR statement
Description	If FOR loop in MACRO uses DO to define Implement task in loop incorrectly, this alarm will appear.		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether FOR loop uses DO correctly		

Alarm ID	COM-014	Alarm Title	absent 'END_FOR' keyword in FOR statement
Description	If FOR loop in MACRO doesn't use END_FOR to finish loop, this alarm will appear.		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether FOR loop uses END_FOR		

Alarm ID	COM-015	Alarm Title	absent 'UNTIL' keyword in REPEAT statement
Description	If REPEAT loop in MACRO uses UNTIL to define loop condition incorrectly, this alarm will appear.		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether using UNTIL in REPEAT loop is correct		

Alarm ID	COM-016	Alarm Title	absent 'END_REPEAT' keyword in REPEAT statement
Description	If REPEAT loop doesn't have END_REPEAT to finish loop, this alarm will be sent		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether REPEAT loop has END_REPEAT		

Alarm ID	COM–017	Alarm Title	absent 'DO' keyword in WHILE statement
Description	If WHILE loop uses DO to define implement task incorrectly, this alarm will appear		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether WHILE loop uses DO correctly		

Alarm ID	COM–018	Alarm Title	absent 'END_WHILE' keyword in WHILE statement
Description	If WHILE loop doesn't have END_WHILE to finish loop		
Possible Cause	Programming error		
Solution	check MACRO program to confirm whether WHILE loop has END_WHILE to end		

Alarm ID	COM–019	Alarm Title	absent 'THEN' keyword in IF statement
Description	If IF uses THEN to define implement task incorrectly, system will send this alarm		
Possible Cause	Programming error		
Solution	Check MACRO program to confirm whether IF loop use END correctly		

Alarm ID	COM–020	Alarm Title	absent 'END_IF' or 'ELSE' keyword in IF statement
Description	If IF loop doesn't have ELSE or END_IF, this alarm will appear		
Possible Cause	Programming error		
Solution	check whether IF loop uses ELSE or END_IF		

Alarm ID	COM–021	Alarm Title	absent 'END_IF' keyword in IF statement
Description	If IF loop uses END_IF to finish loop incorrectly, this alarm will appear		
Possible Cause	Programming error		
Solution	Check whether IF loop uses END_IF correctly		

Alarm ID	COM–022	Alarm Title	absent 'OF' keyword in CASE statement
Description	If CASE command uses OF incorrectly, this alarm will appear		
Possible Cause	Programming error		
Solution	Check whether CASE command uses OF correctly		

Alarm ID	COM–023	Alarm Title	absent 'END_CASE' or 'ELSE' keyword in CASE statement
Description	If CASE command doesn't use ELSE or END_CASE		
Possible Cause	Programming error		
Solution	Check whether CASE loop uses ELSE or END_CASE correctly		

Alarm ID	COM–024	Alarm Title	absent 'END_CASE' keyword in CASE statement
Description	If CASE command doesn't have END_CASE keyword		
Possible Cause	Programming error		
Solution	Ensure that END_CASE keyword is used before finishing CASE command		

Alarm ID	COM–025	Alarm Title	absent ':' or ',' delimiter in CASE statement
Description	If CASE command in MACRO uses ‘ ; ’or ‘, ’, this alarm will appear.		
Possible Cause	Programming error		
Solution	Check MACRO program. In CASE statement, ‘ ; ’or ‘, ’ is correct. However, you should use‘ ; ’when finishing CASE command.		

Program Error Troubleshooting

Alarm ID	COR-001	Alarm title	Array Index must be Integer
Description	When indirect variable is not an integer, the system will send this alarm Ex: if #1 in @[#1+1] command is not positive integral, this alarm will appear		
Reason	Programming error.		
Solution	Please check the machining program, the index in MACRO command has to be rounded Ex : @[ROUND(#1)+1]		

Alarm ID	COR-002	Alarm title	File not found
Description	If the file that the system wants to read does not exist EX: Use M98 (or G65.G66…etc) to call a no existence file.		
Reason	Programming error.		
Solution	Check the machining program to make sure the existence of the file.		

Alarm ID	COR-003	Alarm title	Devide by zero
Description	If denominator in division of MACRO is equal to 0 Ex : If #3 in #1 :=(#2 / #3) command is equal to 0.		
Reason	Programming error		
Solution	Check the machining program to ensure that the denominator is not equal to 0.		

Alarm ID	COR-004	Alarm title	Operand domain error
Description			
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–005	Alarm title	Program loading failure
Description	MACRO syntax error.		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–006	Alarm title	Arc not on work plane
Description	In G02 and G03 syntax, if vector from center to starting point is not on the arc of working plane, this alarm will appear. Ex : G17 G02 I50. K10.; if it implements the left program, this alarm will appear.		
Reason	Programming error		
Solution	Check the machining program to ensure that G02 and G03 are used correctly.		

Alarm ID	COR–007	Alarm title	Arc radius too short
Description	In G02 and G03 syntax, if Arc radius is smaller than 10 to the power of minus 10 (10^-10), system will send this alarm		
Reason	Programming error		
Solution	Check the machining program to ensure that the Arc radius of G02 and G03 are used correctly		

Alarm ID	COR–008	Alarm title	Arc destination not on arc
Description	In G02 and G03 syntax, if the Arc end point coordinate is not on the circle, system will send this alarm. From V8.31 version, parameter 3807- destination not on arc check window is added. It allows error set in parameter 3807. When error of Arc end point coordinate is smaller than setting value in Pr3807, system will automatically correct center coordinate, so the end point can be on arc correctly. If error of Arc end point coordinate is bigger than setting value in Pr3807, system will send alarm.		
Reason	Programming error		
Solution	Check the machining program to ensure that the Arc radius of G02 and G03 are used correctly		

Alarm ID	COR–009	Alarm title	Macro call too deep
Description	Use G65 to call MACRO subprogram that has more than 12 layers		
Reason	Programming error		
Solution	Check machining program to ensure that G65 calls MACRO subprogram that has less than 12 layers		

Alarm ID	COR–010	Alarm title	Modal macro call too deep
Description	Use G66 to call MACRO subprogram that has more than 4 layers		
Reason	Programming error		
Solution	Check machining program to ensure that G66 calls MACRO subprogram that has less than 4 layers		

Alarm ID	COR–011	Alarm title	Subprogram call too deep
Description	Use M98 to call subprogram that has more than 16 layers		
Reason	Programming error		
Solution	Check machining program to ensure that M98 calls subprogram that has less than 16 layers		

Alarm ID	COR–012	Alarm title	Too many modal macro canel,G67
Description	G66 and G67 need to be used in pairs. When number of G67 is larger than G66 in one machining program, this alarm will appear.		
Reason	Programming error		
Solution	Check program to ensure that G66 and G67 are used in pairs		

Alarm ID	COR–013	Alarm title	G65,G66 must be the last one in G code list
Description	G65 and G66 are MACRO, so in single block the right hand side of G65 and G66 will have processing arguments. So in single block, please put other G code in the left hand side of G65 and G66. If the right hand side of G65 and G66 has G code or M code, system will send this alarm		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–014	Alarm title	Absent program number
Description	The right hand side of G65 and G66 doesn't have parameter P to specify program number, system will send this alarm.		
Reason	Programming error		
Solution	Please check the machining program to ensure the use of G65 and G66.		

Alarm ID	COR–015	Alarm title	Too many M code
Description	There are more than 3 M codes in a single block.		
Reason	Programming error		
Solution	Please check the machining program to ensure that there are equal or less than 3 M codes in a single block		

Alarm ID	COR–016	Alarm title	Illegal variable access
Description	Accessing variables do not exist.		
Reason	Programming error		
Solution			

Alarm ID	COR–017	Alarm title	Label not found
Description	Cannot find out corresponding line number N in GOTO command		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–018	Alarm title	Line number not found
Description	Input of line number is incorrect when implementing MDI		
Reason	Programming error		
Solution	Enter the correct MDI line number		

Alarm ID	COR–019	Alarm title	sub program no M99
Description	Subprogram has no M99 to return main program		
Reason	Programming error		
Solution	Write M99 at the end of subprogram		

Alarm ID	COR–020	Alarm title	Too many G code
Description	There are more than 10 G codes in a single block.		
Reason	Programming error		
Solution	Dividing that single block into others single block that has less than 10G codes		

Alarm ID	COR–021	Alarm title	Too many (I,J,K) triples
Description	Repeat to much IJK command in the same single block.		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–022	Alarm title	Use undefined workpiece coordinate
Description	Do not input G17, G18, G19		
Reason	Programming error		
Solution	Decide the working plane, and input G17, G18, or G19		

Alarm ID	COR–024	Alarm title	Invalid arc radius value
Description	When implementing G02, G03, appointing Arc end point and given radius is contradicted, given radius cannot meet appointing Arc end point. Ex: G03X1500Y4000R2000		
Reason	Programming error		
Solution	Check the program and recalculate.		

Alarm ID	COR–025	Alarm title	macro stack is full or access fail
Description	1. STACK can store maximum value up to 4095(PUSH). If this value is exceeded, controller will send alarm. 2. in STKTOP[n], n is started from 0, if the value of n is bigger than (value storing in stack-1), controller will send alarm		
Reason	1. Storing value in STACK (PUSH) is to much. 2. Arguments in STKTOP[]exceeds the value storing in STACK		
Solution	1.Stack is full, no using push command 2. Input reasonable argument in STKTOP[].		

Alarm ID	COR–026	Alarm title	macro stack is empty
Description	Empty stack still has value pop()		
Reason	The numbers of Push commands and Pop commands are not the same.		
Solution	Check the program to ensure that the number of Push commands is the same with that of Pop commands.		

Alarm ID	COR–027	Alarm title	Invalid macro arguments
Description	Macro Alarm.		
Reason	Once Macro finds out the unreasonable situation, machining program will be stopped and alarm will appear		
Solution	According to display content of alarm to find out where error is		

Alarm ID	COR–028	Alarm title	macro program error
Description	Cannot quit Quiet Mode although Quiet Mode already finish.		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–029	Alarm title	Tool length offset change at arc
Description	G43, G44, G49 only receive linear interpolation command in the next single block		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–031	Alarm title	Radius compensation cancel at arc
Description	G40 only receives linear interpolation command in the next single block		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–032	Alarm title	Radius compensation startup at arc
Description	G41,G42 only receive linear interpolation command in the next single block		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–033	Alarm title	Wrong direct draw command usage
Description	Using A, R, or C command is not suitable for specification		
Reason	Programming error		
Solution	Check machining program to confirm that whether before and after single block is suitable for specifications		

Alarm ID	COR–035	Alarm title	Zero movement at corner in direct draw
Description	Before and after single block, inserted value of rounding or chamfer is too small and cause system calculates wrong		
Reason	Programming error		
Solution	1. Check machining program to confirm that whether inserted value of rounding or chamfer is suitable for specifications 2. Check to confirm whether working plane and round plane are the same.		

Alarm ID	COR–036	Alarm title	Invalid angle amount , A, in direct draw
Description	A is valid only in linear interpolation of single block.		
Reason	Programming error		
Solution	Check machining program to confirm that whether angle amount A is suitable for specifications		

Alarm ID	COR–037	Alarm title	Dot chamfer amount bigger than displacement
Description	Before and after single block, inserted value of rounding or chamfer is too small and cause system calculates wrong		
Reason	Programming errors.		
Solution	1. Check machining program to confirm that whether inserted value of rounding or chamfer is suitable for specifications. 2. Check to confirm whether working plane and round plane are the same.		

Alarm ID	COR–040	Alarm title	Block end point exceed software limit
Description	The coordinate in the program exceeds machine limit.		
Reason	Program error		
Solution	Check the machining program, and correct coordinate position		

Alarm ID	COR–041	Alarm title	GOTO label must be integer
Description	The input GOTO label is not an integer. Ex: GOTO 1 Correct GOTO 1. Wrong N1; Correct N1.; Wrong		
Reason	Program error		
Solution	Check the machining program, and input integer in GOTO label.		

Alarm ID	COR–043	Alarm title	ASIN()/ACOS() operand must between -1.0 and 1.0
Description	ASIN()/ACOS() Operand is not between -1.0 and 1.0.		
Reason	Programming error		
Solution	Check the machining program.		

Alarm ID	COR–044	Alarm title	SQRT() operand should not be negative
Description	The square root of a negative value will be imaginary, but the controller does not provide this function.		
Reason	Programming error		
Solution	Check the program; enter a positive value in SQRT operand.		

Alarm ID	COR–045	Alarm title	L address should be integer
Description	The L address is not an integer.		
Reason	Programming error		
Solution	Check the program, and use L address in integer.		

Alarm ID	COR–046	Alarm title	O address should be integer
Description	The O address is not an integer.		
Reason	Programming error		
Solution	Check the program, and use O address in integer.		

Alarm ID	COR–047	Alarm title	M address should be integer
Description	M address is not an integer.		
Reason	Programming error		
Solution	Check the program, and use M address in integer.		

Alarm ID	COR-048	Alarm title	Spindle speed, S, should be integer
Description	The speed S of spindle is not an integer.		
Reason	Programming error		
Solution	Check the program, and use the speed S of spindle in integer.		

Alarm ID	COR-049	Alarm title	Tool length number, H, should be integer
Description	If tool length number, H, is not an integer, controller will send this alarm.		
Reason	Programming error		
Solution	Please check the program, and use tool length number H in integer.		

Alarm ID	COR-050	Alarm title	Tool radius number, D, should be integer
Description	If tool radius number, D, is not an integer, controller will send this alarm.		
Reason	Programming error		
Solution	Please check the program, and use the tool radius number D in integer.		

Alarm ID	COR-051	Alarm title	Tool selection number, T, should be integer
Description	If the tool number, T is not an integer, this alarm will appear.		
Reason	Programming error		
Solution	Please check the program, and use the tool number T in integer.		

Alarm ID	COR-052	Alarm title	Sub-program number, P, should be integer
Description	If the sub-program number P is not an integer, controller will send this alarm.		
Reason	Programming error		
Solution	Please check the program, and use the sub-program number P in integer.		

Alarm ID	COR-053	Alarm title	Repeat count, L, should be integer
Description	If the repeat times L is not an integer, this alarm will appear.		
Reason	Programming error		
Solution	Please check the program, and use the repetitive times L in integer.		

Alarm ID	COR-054	Alarm title	Imcompatible data type
Description	When the data format doesn't meet the requirements set by controller, controller will send this alarm.		
Reason	Machining program is not compatible with the SYNTEC controller.		
Solution	Make sure that the data format is suitable for controller.		

Alarm ID	COR–055	Alarm title	Tool length number, H, over range
Description	The tool length number H exceeds the range of tool number.		
Reason	Programming error		
Solution	Make sure that the tool length number, H, is in the range of tool number.		

Alarm ID	COR–056	Alarm title	G10 table index, P, over range
Description	The format of G10 is G10 L_ P_ R_; different L value has different corresponding P value, Ex: L10 has the corresponding tool No. P. If you input P1000, and the tool No. P1000 doesn't exist, controller will send this alarm.		
Reason	Program error		
Solution	Use reasonable value P in G01 table index		

Alarm ID	COR–057	Alarm title	Tool radius number, D, over range
Description	The tool radius number D exceeds the range of tool number.		
Reason	Program error		
Solution	Make sure that the tool radius number D is in the range of tool number.		

Alarm ID	COR–058	Alarm title	Tool nose number over range
Description	If the tool nose number exceeds the range of tool number, the controller will send this alarm.		
Reason	Program error		
Solution	Make sure that the tool radius number D is in the range of tool number.		
Alarm ID	COR–059	Alarm title	Subprogram call sequence num., H, must integer
Description	Number H called in subprogram is not an integer		
Reason	Program error		
Solution	Change the number H of subprogram into an integer.		

Alarm ID	COR–060	Alarm title	M99 return sequence number, P, must integer
Description	The return sequence number P of M99 is not an integer.		
Reason	Program error		
Solution	Change the return sequence number P of M99 into an integer.		

Alarm ID	COR–061	Alarm title	Workpiece number over range
Description	The number of work pieces exceeds the allowable range of the controller.		
Reason	Program error.		
Solution	Make sure the number of work pieces in the allowed range of the controller.		

Alarm ID	COR–062	Alarm title	Dwell skip source, Q, must be integer
Description	If dwell skip source Q is not an integer, controller will send this alarm.		
Reason	Program error		
Solution	Change the dwell skip source Q into an integer.		

Alarm ID	COR–063	Alarm title	Dwell skip source Q, over range
Description	Dwell skip source Q exceeds the allowed range		
Reason	Program error.		
Solution	Make sure the dwell skip source Q in the allowed range.		

Alarm ID	COR–064	Alarm title	P address must be integer
Description	If P address is not an integer, this alarm will be sent.		
Reason	Programming error		
Solution	Change P address into an integer.		

Alarm ID	COR–065	Alarm title	Dot angle and axis command conflict
Description	The end point of single block is in the specified angular direction.		
Reason	Programming error		
Solution	Check the machining program.		

Alarm ID	COR–066	Alarm title	Inc. axis command and abs. axis command conflict
Description	Both G91 and G90 are in the same line.		
Reason	Programming error		
Solution	Decide to use incremental or absolute command, and enter the correct command.		

Alarm ID	COR–067	Alarm title	Arc center vector and radius conflict
Description	The arc end point is not on the arc created by the arc starting point and the specify center.		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–068	Alarm title	Metric/Inch cmd. not available under quiet mode
Description	The Quiet mode operation of single block command cannot switch to Metric/ Inch unit		
Reason	Programming error		
Solution	Please check the machining program.		

Alarm ID	COR–069	Alarm title	Corner round and chamfer cmd. conflict
Description	Chamfer command and fillet command are on the same line.		
Reason	Program error		
Solution	Do not let chamfer command and fillet command exist in the same line.		

Alarm ID	COR–070	Alarm title	Invalid G Code
Description	Enter incorrect G code to controller.		
Reason	Program error		
Solution	Enter the valid G-code.		

Alarm ID	COR–071	Alarm title	No main program assignment
Description	The name of main program is not specified.		
Reason	The program is not loaded.		
Solution	Specify the name of main program.		

Alarm ID	COR–074	Alarm title	Overcut by tool radius too big
Description	1. During machining notch, if notch width is smaller than twice radius of tool, this alarm will appear. 2. During machining trapezoidal, if the height of trapezoidal is less than twice radius of tool, this alarm will be sent.		
Reason	Tool compensation causes overcut		
Solution	Please check the machining program to decide whether this part of the machining cancels radius compensation.		

Alarm ID	COR–075	Alarm title	Exact stop wait timeout
Description	After 1 second sending Exact stop (G09/G61) command, If the difference between feedback and command exceeds allowable value, this alarm will be sent.		
Reason	Servo vibration		
Solution	1. Servo tuning 2. Change parameters		

Alarm ID	COR–076	Alarm title	G04 dwell time cannot be negative
Description	When input value of dwell time G04 is negative, this alarm will appear.		
Reason	Program error		
Solution	Check the machining program, and enter a positive value to G04		

Alarm ID	COR–201	Alarm title	Part program file not exist
Description	When specified program does not exist, this alarm will appear.		
Reason			
Solution	Ensure that program file exists		

Alarm ID	COR–202	Alarm title	Communication link failure
Description	When communication link is dropped, controller will send this alarm.		
Reason			
Solution	Reconnect a good communication link		

Alarm ID	COR–203	Alarm title	Loading page size too small
Description	System assigns loading page to small, and can't meet the demands of new program.		
Reason			
Solution	Please contact with the machinery manufacturer.		

Alarm ID	COR–204	Alarm title	File size too large
Description	When program file is too large, controller will send this alarm		
Reason	Program error		
Solution	Reduce the program size, or split program into two subprograms.		

Alarm ID	COR–205	Alarm title	File content is empty
Description	After controller loads the program, it finds out that the file content is null.		
Reason	Loading program error or CF card damaged		
Solution	Reload program or replace CF card		

Alarm ID	COR–206	Alarm title	Loading page lock failure
Description	New machining program requires the system to distribute loading page unsuccessfully.		
Reason			
Solution	Please contact machinery manufacturers		

Alarm ID	COR–207	Alarm title	Sequence number not found
Description	When sequence number is not found, controller will send this alarm.		
Reason	Program error		
Solution	Use sequence number in the program range.		

Alarm ID	COR–208	Alarm title	Cannot use jump statement in sequential file
Description	Using jump command to execute sequential file.		
Reason			
Solution	Do not use jump command to execute sequential file.		

Spindle Safety Instructions

1.) Use ISO 30 Tool Holder (HSD 9KW Spindle).

2.) It is suggested that you use original tool holders.

3.) The tool holder must be in the upright position when changing tools.

4.) Empty the filter every day (preferably every 8 hours) to prevent from rusting.

5.) Air Pressure needs to be 6kg-7kg during tool change.

6.) Clear the dust in the spindle regularly. Do not blow to clean. Shut the red cover plate when the spindle is not in use to prevent dust from falling in.

7.) Keep the tools sharp and clean. The workpiece needs to be fixed tightly on the table or the spindle will vibrate during a job.

8.) Change the filter in the oil-water separator on a monthly basis. Empty the water every 8 hours. Blow air into the middle hole and make sure there is no oil, or else the bearing might be damaged.

9.) The air needs to be filtered to be free of moist, oil mist and dust before entering the spindle.

Other Maintenance Protocols

NOTICE ***The coolant filter net needs to be cleaned daily.***
NOTICE ***Clean the tool magazine regularly.***

To have a longer service life, perform regular maintenance on the following parts and components:

1.) Keep the machine lubricated. Regularly inspect and clean the lubrication system. Keep the ball screw, linear guide and rack and pinion lubricated at all times.

2.)Regularly inspect the vacuum system. The filter nets need to be cleaned and changed regularly. Remember to empty the filter in time. When the system gives out low pressure alarm, check if the pressure is enough.

3.) Inspect the over travel limit switches (both software limit switch and mechanical stopper regularly. Do not let rust accumulate on the limit switches as it seriously affects their sensitiveness and may fail to give alarm when the machine over travels, which could lead to mechanical crash and damage to the machine. The way to inspect is to press the switch with hand to see if it gives off alarm. You can also check if the I/O port input signal changes.

4.) Regularly inspect the electronics. Make sure all plug-in devices, cables and cords are well-connected. Keep the cabinet door closed when possible.

NOTICE ***Opening the cabinet door will not help it cool down. Regularly inspect and clean the fans and filter nets to ensure better cooling effect.***

5.) You are encouraged to utilize the machine and do not let it stay idle for long, especially in the first year. The more you use the machine, the more likely the machine will be in good condition in the future. If the machine stays idle for too long, the electronics are exposed to moist, heat, etc., thus reducing the service life of the machine. Make sure to power up the machine from time to time (at least once in a month) even you do not use it. Perform regular check and maintenance. Run the machine for one hour each time and the heat generated will help reduce the humidity.
This will also help you to discover problems with the machine in advance.

More Maintenance Tasks:
1.) Sweep and clean the table every day. Keep the machine clean and free of other objects.
2.) Check and clean all the limit switches every day.
3.) Check the lubricator every day and make timely refill.
4.) Check every day to ensure there is enough water in the water tank used for spindle cooling and whether that water tank is functioning.
5.) Check each of the tools is in correct position.
6.) Make sure the air compressor has the right air pressure.
7.) Make sure the filter cup of the water separator and dryer is dry.
8.) Wipe clean the linear guides and check if they have any scratches or damages.
9.) Make sure the protective covers on the machines are all intact.
10.) Make sure the fan in the electrical cabinet is working and there is no clogging in the air filter net. Clean the filter regularly.
11.) Make sure all the signal lights are functioning, all axes are in zero position and that tool holders and other accessories are in working order.
12.) Regularly check the oil bowl and water tank to see if they need refilling. Replace the liquid when necessary. Clean the oil bowl and water tank regularly.
13.) Sweep clean the electrical cabinet when necessary.

14.) Clean the filter net regularly, replace with new one when necessary.
15.) Make sure the wirings and connections are alright.
16.) Make sure all the valves and switches are functioning.
17.) Check all the cables, cords and terminals are in correct working order.
18.) Perform monthly check of the controller.
19.) Check if the electrical parts are making strange noises. If they do, replace them.
20.) Measure the backlash on all axes every half year. If you find any deviation, make sure to adjust or make compensation.
21.) Inspect all the electronics and relays to make sure they are working.
22.) Make sure the whole machine is still properly balanced after 6 months of service. If not, adjust the iron pads and tighten the screws.

Automatic Tool Change (ATC) Maintenance

	ATC CNC Preventative & Maintenance Protocols		
	Protocol	**Interval**	**Completed By:**
1.)	Fully clean and inspect bearing rails for wear on all 3-Axis.	Quarterly	
	Fill Oil Reservoir with 30W Oil.	Weekly	
	Pump the Oil System once for every 8 hours of run time.	Every 8 Hours.	
	Inspect all Oil Lines and verify every device is receiving oil. Bleed lines with large air bubbles.	Monthly	
2.)	Drop drive pinions, and verify motion is smooth the length of travel in Y and X-Axis.	Yearly	
	Re-install pinion box's or Planetary gear box drive mechanisms. Set proper mesh and verify with holding current present.	Yearly	
	For belt drive pinion box or Z-Axis drive belt, check drive belt condition. Replace if worn or degraded. Verify pulley alignment.	Quarterly	
	For belt drive pinion box, or Z-Axis drive belt check belt tension. Verify with holding current present, and with it released that there is no slack in the belts.	Quarterly	
	For Z-Axis with planetary gear box, verify coupler condition. Make sure alignment is correct and all fasteners are properly tightened.	Quarterly	

3.)	Inspect all tool holders for wear. Tighten all pull studs. Replace any components with visual wear.	Weekly, or when tooling is changed out.	
	Wipe down all toolholders with oil saturated cloth. Wipe off the excess oil completely.	Weekly, or when tooling is changed out.	
	Inspect all tool holder clips. Replace any that are deformed or are loosely holding the tool holder.	Quarterly	
	For liquid cooled spindles, inspect all water lines and	Weekly	
	For liquid cooled spindles, Verify reservoir is always full of clean water and return water is a constant flow.	Daily	
	Verify all tool locations. Adjust any that have excessive motion during a tool change. Back up machine settings after tool location adjustments.	Yearly	
	Check the spindles internal taper for imperfections, or rust. Clean completely and lightly lubricate with oil saturated rag. Never use compressed air on any spindle.	Weekly	
	For HSK style spindles. Lubricate monthly with MetaFlux Moly Spray. Never use compressed air for cleaning. Compressed air will destroy any spindle by pushing debris into the precise mechanics internally.	Monthly	

4.)	With power locked out, clean electrical cabinet, and tighten all connections on both sides of the panel.	Yearly	
	With power locked out, tighten the electrical connections on the vacuum pump, and it's contactor/overload or the VFD that powers	Quarterly	
	With power restored, carefully inspect that the cooling fans are fully functional.	Monthly	
	Inspect and clean if needed, the filters on the electrical cabinets cooling system. Keep all foam inserts cleaned or cooling will be effected.	Monthly	
	Test all Emergency stop's to insure they are fully functional. Verify recovery after E-stop is easily achieved.	Monthly	
5.)	Clean Vacuum Pump Filters.	Inspect Weekly. Fully Clean Monthly.	
	Check all vacuum pump connections. Do this over the entire plumbing to the table and it's manifold.	Yearly	
	Verify that relief valve operates properly. With the table covered inspect the relief is open.	Monthly	
	Check the vacuum pump motors heat after 15min of run time. It should not exceed the 10 second rule on the motor. Do not touch impeller or pump housing, It gets extremely Hot.	Monthly	

6.)	Inspect all pneumatic lines for wear, and or pinched/creased conditions.	Quarterly	
	Check for air leaks at all fittings, Valves and regulators.	Quarterly	
	Drain all water separators or service filters.	Weekly	
	Inspect all air controlled pistons are moving at full travel and at the proper speed.	Quarterly	

Parts List

Name	Part No.	Qty.
Cable	30402032	6
Cable	30402046	12
Inverter	3010302043	1
Brake resistor	3010601023	1
USB Cable	30317550	1
Transformer	30107041	1
Power supply	30114008	1
Driver	3010200007	4
Key switch	30109067	1
E-stop switch	30109035	1
Self-recover switch	30109009	1
Self-recover switch	30109006	1
Self-locking switch	30109025	2
Breaker	30108137	1
Fuse core	30113042	2
Fuse core	30113037	2
Fuse core	30113030	1
Fuse core base	30113058	5
Breaker	30108095	2
AC contactor	30110022	1
AC contactor	30110020	2

Name	Part No.	Qty.
Thermal relay	30112026	2
Breaker	30108047	1
Relay	30111007	3
Line adapter board	3010105002	1
Fan on the electric box	30115210	2
Dust screen	30115081	4
Ground strip	30115102	1
Ground strip	30115101	1
Electric box	20220226	1
Handheld hook	3010104018	1
Rotation handheld bracket	20120147	1
Hand wheel cover plate	20202001	2
Aviation plugs	30405027	1
Self-recover button	30109024	1
	30402046	13.7
	30402037	42.8
Ground Cable: From control box to machine, 54.5mm Dia. x 4M L（3010404026)	30402033	11.2
	30402032	2.5
	30402030	17.8
Proximity sensor	30404092	3
Limit switch supporter	30404059	3

Name	Part No.	Qty.
Drag chain	30403043	1
Drag chain	30403210	1
Pneumatic schematic diagram	3040101519	1
Terminal junction box	20221059	1
Terminal cover plate	20221058	1
Tool sensor	30406014	1
Speed control valve	30406036	1
Hose joint	30401096	1
Hose joint	30401090	1
Hose joint	30401127	1
Tool sensor supporter	20103117	1
Drag chain slot	20202411	1
X axis Drag chain slot	20202748	1
Drag chain slot bracket	20201045	1
Drag chain bracket	20204307	2
Button bracket	20206004	1

Name	Part No.	Qty.
Transition plate of limited block	20220100	4
Limited block	20120143	6
Drag chain	30403049	1
Upper bracket on Z-axis drag chain	20106008	1
Lower bracket on Z-axis drag chain	20101058	1
Limited sheet	20201068	1
Limited sheet	20201065	2
Limited sheet	20201067	1
Proximity switch supporter	20211046	1
Limit switch supporter	20102563	1
Pneumatic cover	20103233	1
Pneumatic protection cover	20102481	1
Protection window	30305088	1

Warranties & Policies

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 30 days of purchase to be covered by this warranty. Laguna Tools guarantees all new machine 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 an RMA (return material authorization) number from Customer Service and 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. If a part or blade is being returned it must have adequate packaging to ensure no damage is received 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.

NOTE: Issuing an RMA number is for referencing materials and issues, it does NOT indicate warranty acceptance/conformity.

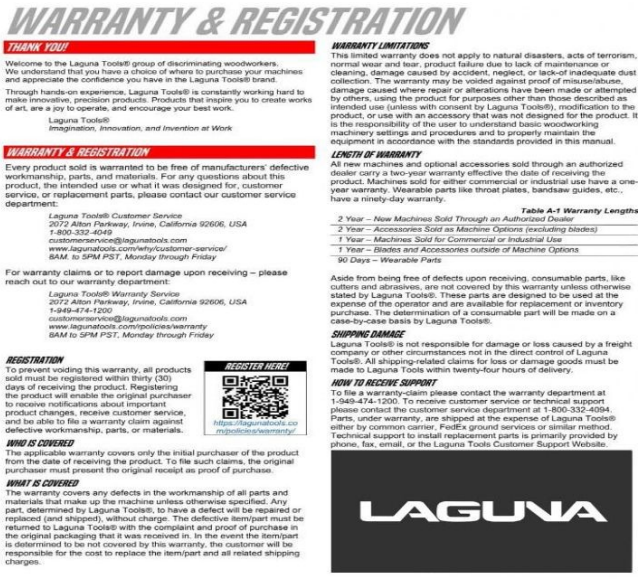
Laguna Tools is not responsible for errors or omissions. Specifications subject to change. Machines may be shown with optional accessories.

CNC Limited Warranty

CNC Limited Warranty

New CNC machines sold by Laguna Tools carry a one-year warranty effective from the date of shipping. Laguna Tools guarantees allnew machine 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 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 andtear, 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 maybe 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 support must be managed through the software provider. Normal user alignment, adjustment, tuning and machine settings are notcovered by this warranty. It is the responsibility of the user to understand basic woodworking machinery settings and proceduresand 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 Toolswithin twenty-four 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. Copyright 2013 Laguna Tools, Inc.



WARRANTY & REGISTRATION

THANK YOU!

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

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

Laguna Tools®
Imagination, Innovation, and Invention at Work

WARRANTY & REGISTRATION

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

Laguna Tools® Customer Service
2072 Alton Parkway, Irvine, California 92606, USA
1-800-332-4049
customerservice@lagunatools.com
www.lagunatools.com/why/customer-service/
8AM. to 5PM PST, Monday through Friday

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

Laguna Tools® Warranty Service
2072 Alton Parkway, Irvine, California 92606, USA
1-949-474-1200
customerservice@lagunatools.com
www.lagunatools.com/tpolicies/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.

REGISTER HERE!

https://lagunatools.co m/policies/warranty/

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 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 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 1-949-474-1200. 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 Support Website.

LAGUNA

Modifications Policy

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 maybe 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 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. No Modifications Allowed or Sold.

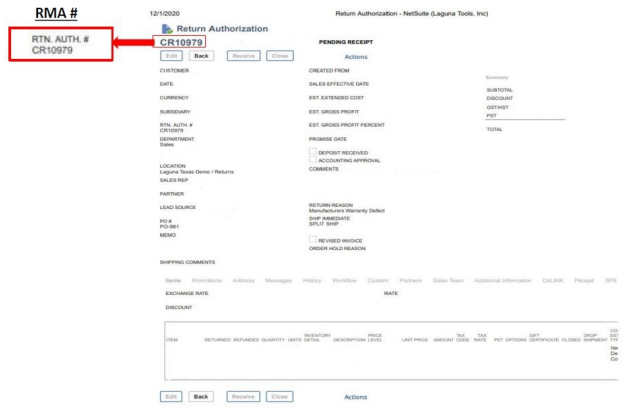
Return Materials Authorization (RMA) Procedure

Laguna Tools Packaging/RMA Example Procedure

****Any machines returned to Laguna Tools must be returned with packaging in the same way it was received. If a part or blade is being returned it must have adequate packaging to ensure no damage is received 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.**

We require that the defective item/part be returned to Laguna Tools with the complaint. The end-user must request an **RMA (Return Material Authorization) Number** from Customer Service and include the (RMA) number with all returned parts/components requesting warranty coverage.

(Return Material Authorization)



LAGUNA SuperMax

LAGUNA AMERICAN HEADQUARTERS

Texas: 744 Refuge Way Suite 200, Grand Prairie, Texas 75050, U.S.A. Phone: +1-800-332-4094
Huntington Beach: 7291 Heil Ave Huntington Beach, CA 92647, U.S.A. Phone: +1-949-474-1200
South Carolina: 825 Bistline Dr. Ste 101, West Columbia, SC 29172, U.S.A. Phone: +1-800-234-1976
Minnesota: 5250 West 74th St, Edina, MN 55439, U.S.A Phone: +1-949-474-1200

LAGUNA EUROPE

Walker Rd, Bardon Hill, Coalville LE67 1TU, United Kingdom. Phone: +44-1530-516921